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BluePlan ENGINEERING

Hydrogeological Report and Site Servicing Study

263512 Southgate Road 26, Southgate
Proposed Wilder Lake Subdivision
H.Bye Construction Ltd.

GMBP File: 218173

Revised: January, 2020

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TABLE OF CONTENTS

1. INTRODUCTION 1
1.1 Purpose and Scope of Work 2
2. REGIONAL SETTING AND HYDROGEOLOGY 3
2.1 Topography 3
2.2 Existing Conditions 3
2.3 Hydrogeological Setting 3
2.4 Nearby Water Wells and Users 4
3. REVIEW OF EXISTING SYSTEMS AND EXISTING CONDITIONS 4
3.1 Review of MECP Well Records 4
4. SITE SERVICING OPTIONS REVIEW 5
4.1 Municipal Servicing 5
4.2 Communal Services 5
4.3 Individual Private Services 6
5. OVERBURDEN FIELD STUDY (SEWAGE DISPOSAL) 6
5.1 Methodology 6
5.1.1 Site Reconnaissance 6
5.1.2 Overburden Test holes and Well Installation 6
5.1.3 Overburden Groundwater Quality Sampling 7
5.2 Overburden Observations and Measurements 7
5.2.1 Overburden Test Holes 7
5.2.2 Overburden – Groundwater Flow Direction 7
5.2.3 Overburden – Groundwater Quality 7
5.3 Overburden – Hydrogeologic Setting 8
6. DOMESTIC WATER SUPPLY FIELD STUDY 9
6.1 Methodology 9
6.1.1 Pumping Tests 9
6.1.2 Groundwater Quality Sampling 9
6.2 Observations and Measurements 9
6.2.1 Geologic Setting 9
6.2.2 Groundwater Flow Direction 10
6.2.3 Groundwater Quality 10
6.2.4 Aquifer Performance Testing 11
6.3 Water Supply – Interference with Other Wells 12
7. SEWAGE SYSTEM ASSESSMENT 13
7.1 Sewage System – Lot Carrying Capacity 13
7.2 On-Site Sewage System Feasibility 14
8. DOMESTIC WATER SUPPLY ASSESSMENT 15

8.1 Groundwater Quantity 15
8.2 Groundwater Quality 15
8.3 Water Supply Recommendations 16
9. GROUNDWATER IMPACT ASSESSMENT 16
9.1 Groundwater Quality – Sewage Systems 16
9.2 Surface Water Quality – Sewage Systems 17
9.3 Water Quantity and Quality – Stormwater Management 18
10. CONCLUSIONS AND RECOMMENDATIONS 18
11. REFERENCES 20

FIGURES

Figure 1: Site Location
Figure 2: Site Location and General Layout
Figure 3: Site Physiography
Figure 4: Site Geology
Figure 5: MECP Well Record Search and Well Location Map
Figure 6: Testhole, Piezometer and Monitoring Well Location Map
Figure A: Groundwater Contour Plan
Figure B-1: Groundwater Cross-section A-A
Figure B-2: Groundwater Cross-section B-B

TABLES

Table 1: Summary of MOECC Well Records
Table 2: Theoretical Well Yields for Nearby Wells
Table 3: Water Level Observations
Table 4: Summary of Overburden Groundwater Quality
Table 5: Summary of Bedrock Groundwater Quality
Table 6: Summary of Observations from Aquifer Performance Test
Table 7: Summary of Aquifer Supply Characteristics
Table 8: Estimates of Sustainable Well Yield
Table 9: Estimates of Radius of Influence
Table 10: Attenuation of Nitrogen from Sewage Output of Proposed Development

APPENDICES

APPENDIX A: DRAFT PLAN OF SUBDIVISION
APPENDIX B: MECP WATER WELL RECORDS
APPENDIX C: LABORATORY CERTIFICATE OF ANALYSIS
APPENDIX D: AQUIFER ANALYSIS REPORTS
APPENDIX E: MONITORING WELL BOREHOLE LOGS
APPENDIX F: BOREHOLE SOIL GRAIN-SIZE ANALYSES

263512 SOUTHGATE ROAD 26, SOUTHGATE
PROPOSED WILDER LAKE SUBDIVISION

HYDROGEOLOGICAL REPORT AND SITE SERVICING STUDY

REVISED: JANUARY, 2020

GMBP FILE: 218173

1. INTRODUCTION

GM BluePlan Engineering Limited (GM BluePlan) was retained by H. Bye Construction Ltd. to complete a site servicing study with respect to the use of individual on-site water supply and sewage disposal for a proposed residential development in Southgate Township, County of Grey, Ontario. We understand that standard services such as gas, cable and telephone, and electricity will be provided through extension of existing infrastructure in the area.

The residential development proposed by H. Bye Construction is situated on 263512 Southgate Road 26, Egremont Concession 21, Part Lots 2-4 (Site), which is generally located south of Southgate Road 26 and west of Wilder Lake. The proposed development is on the eastern half of the current Homestead Resort Golf and Cottages Resort. The location of the Site is shown in Figure 1. The Site is approximately 20.8 hectares (51.3 acres) in size and an approximate layout of the Site is provided in Appendix A. As shown in Appendix A, the proposed Draft Plan of the subdivision comprises 29 single family residential lots, 3 blocks for the construction of stormwater management (SWM) facilities, and a new roadway. The lots are proposed to be serviced by private groundwater supply wells for drinking water and on-site systems for sewage disposal.

The following report has been completed in conjunction with the Stormwater Management Report (GM BluePlan, November 2019) for the proposed development and presents the findings of the study, including reviews of background information, results of the hydrogeological field study, and conclusions of the assessments for groundwater supply, on-site sewage disposal, and groundwater impact assessment.

The impact assessment is completed with reference to:

Natural Heritage Environmental Impact Study (EIS) entitled *Environmental Impact Assessment, 263512 Southgate Road 26, Egremeont Concession 21, Part Lots 2-4, Southgate Township, County of Grey RP 16R 6386 Parts 1 and 2, Pt. Part 3*, prepared by SAAR Environmental Limited (October 2019).

Geotechnical Investigation, Wilder Lake Development, 263530 Southgate Road 26, Township of Southgate, Ontario, prepared by CMT Engineering Inc. (December 12, 2018), hereafter referred to as the "Geotechnical Investigation".

1.1 Purpose and Scope of Work

The objectives of this study are:

1. To provide an assessment of groundwater supply quantity and quality;
2. To determine the feasibility of on-site sewage systems;
3. To assess the potential for impacts to groundwater related to the operation of the proposed on-site sewage systems; and
4. Provide an impact assessment with respect to the local water resources (including recommendations from the EIS) due to the development.

The scope of work was developed based on Ministry of Environment, Conservation and Parks (MECP) Procedures D-5-4 *Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment* (1996) and D-5-5 *Technical Guideline for Private Wells: Water Supply Assessment* (1996).

To gather the necessary information for the required analyses, both desktop (e.g. review of records on file) and field study work was performed. In general, the scope of work include1d:

- Background study regarding the geological and physiographic setting of the Site;
- Search of MECP records for wells within 500 m of the Site boundaries;
- Completion of overburden boreholes, complete with monitoring wells, for characterization of overburden materials and groundwater in conjunction with the Geotechnical Investigation (CMT Engineering Inc., December 2018);
- Site reconnaissance and review (including water level measurement) during multiple site visits over differing seasons;
- Water quality testing of overburden groundwater;
- Estimation of the nitrate attenuation capacity of the proposed development (as per Procedure D-5-4);
- Completion of a series of pumping tests and well response tests on three (3) supply wells to characterize aquifer yield and drawdown potential; and
- Water quality testing of drinking water supply wells as part of the pumping tests.

For the purposes of this report, the information has been divided into Overburden Geology, which deals primarily with sewage disposal (i.e., Procedure D-5-4), and Bedrock Geology, which deals primarily with the domestic water supply assessment (i.e., Procedure D-5-5). While discussed separately, the sewage system assessment, water supply assessment, and impact assessment have been completed with respect to the holistic groundwater system, including consideration to interactions with surface water systems.

2. REGIONAL SETTING AND HYDROGEOLOGY

2.1 Topography

The Site is situated in a region of irregular moderately sloping to irregular very steeply sloping topography, with slopes generally trending toward Wilder Lake, which is located along the eastern portion of the site, and its outlet stream which runs through the north portion of the property. Elevations on the Site range from about 435 m above sea level (masl) in the elevated areas to about 422 masl in the low-lying areas.

2.2 Existing Conditions

The Site is situated on the west side of Wilder Lake. The current property is an 18 hole golf course and winter resort. The current golf course and winter resort includes a restaurant and clubhouse, along with several rental cottages along the shore of Wilder Lake.

The land uses in the vicinity of the Site are predominantly rural residential and agricultural. There is a residential area to the north and east along Southgate Road 26, including residences and cottages along Wilder Lake. Wilder Lake, and its outlet stream, Camp Creek Tributary, are within Environmental Protection zoned areas. The area to the south and west is predominately agricultural. Directly to the south of the site is a forested area which is zoned Deferred Development. In the broader area the predominant land use is agricultural.

The current golf course and winter resort includes a restaurant and several cottages along the shore of Wilder Lake. Groundwater supply well 2593529 is used to supply drinking water for the restaurant and clubhouse. The cottages water supply is provided by groundwater supply well A227593. The restaurant and cottages are also serviced by on-site systems for sewage disposal. Water for golf course watering is pumped from Wilder Lake under a Permit to Take Water with Permit Number 5514-83DLBD.

Based on the historic property use at, and surrounding, the subject property, there is no evidence of historic operations/development that would cause concern for specific environmental impact to the proposed development.

2.3 Hydrogeological Setting

The Site is located within the physiographic region known as the Horseshoe Moraines, which is characterized as having drumlinized till plains, kame moraines, and spillways (Chapman and Putnam 2007, see Figure 3 and 3). The spillways are often characterized by lacustrine clay and till plains. The Site is entirely within an area identified as a spillway.

The Ontario Geological Survey (2010) indicates that the soils are ice-contact stratified deposits, which is described as sand and gravel, minor silt, clay and till. The Ontario Soil Survey Report No. 17 identifies the surface soil on site as Pike Lake Loam.

Based on the MECP well records within the vicinity of the site, and onsite testhole and drilling investigations, the overburden soils are mainly described as being gravel, sand, and occasionally clay with stones approximately 34 to 41 m thick. The bedrock is reported to be brown to grey dolostone.

Beneath the overburden, the Site and its vicinity are underlain by the Guelph formation, a sedimentary formation composed of sandstone, shale, dolostone, and siltstone with an approximate elevation of 200 masl. This formation is well-known in the area to have high yield for groundwater supply.

Hydrologically, the Site is in the watershed of the Saugeen River, in which a tributary flowing from Wilder Lake to Camp Creek runs east to west across a northern portion of the site. Wilder Lake generally forms the head water to Camp Creek, with the overall topography and surface water flows to the west. Wilder Lake has complex history including historic lake bottom mining of clay/mud. A former rail spur/road appears to have been built along the southerly shore and across the outlet to the Camp Creek, which controls the outflow elevation through a culvert. The water elevations in Wilder Lake are reported to be relatively consistent throughout the year and base conditions are inferred to be controlled primarily by the more regional groundwater system.

Camp Creek is reported to be a cold water fishery with evidence of groundwater discharge to surface water along the system. The creek flows throughout the year, with maintenance of flows inferred to be associated with the groundwater system. The discharge of groundwater to the Creek is consistent with topography and the occurrence of relatively coarse-grained soils observed in the creek and reported to exist in the area.

As recorded by Environment Canada (2015) at the MECP monitoring station in Durham (approximately 8 kilometres northwest of the Site), annual average precipitation in the area between 1981 and 2010 is reported to be 1119 mm/year.

2.4 Nearby Water Wells and Users

The map interface of the Ontario Water Well Information Service was used to list all of the registered water wells within 500 m of the site. The records for eight (8) wells were found, in addition to the two (2) wells located on site. The locations of the wells are presented on Figure 5 and the well records are provided in Appendix B. A summary of the well records, including stratigraphic and usage information, is provided in Table 1. The wells are all recorded as being used for private rural residential supply. Five (5) of the wells are drilled within the overburden to a depth of between 19.8 meters and 41.1 meters below ground surface (mbgs). Three (3) of the wells are drilled within the bedrock to a depth between 39.3 meters and 40.5 meters.

Two drinking water wells are currently located on the Site. The main well, well record 2593529, supplies the restaurant and golf course clubhouse. The cottages are supplied by a separate well, with well tag A227593. No problems with water quantity or quality from either well were reported. Both wells are drilled within the overburden.

3. REVIEW OF EXISTING SYSTEMS AND EXISTING CONDITIONS

The review of existing systems in the area is considered to provide additional valuable information. In particular, properties that have similar characteristics and/or development and that have completed a level of study can be used to provide certainty regarding the current proposal. The area surrounding the proposed subdivision has been developed with several residential properties nearby. The nearby residential properties are serviced by on-site wells and sewage systems.

3.1 Review of MECP Well Records

Figure 5 displays the results of a MECP Well Record search for a 500 m radius around the subject property. The search returned 10 water well records including the two wells on site. Three (3) wells were completed in the bedrock and the remaining seven (7) were completed in the deep overburden. The well records are provided in Appendix B. A summary of the well records is attached as Tables 1 & 2.

To provide a general assessment of the potential well yields, pumping information from the well records was used to estimate well yield. This calculation uses only the available information provided by drillers on the well records and is considered to be a general approximation of the theoretical potential yield. As summarized on Table 2, of the 10 private water supply well records, an average well yield was calculated to be 45.2 L/min (10.4 igpm). The average well yield for the wells in the overburden was 38.3 L/min, and was 58.9 L/min for the bedrock wells. The range in well yield for both the overburden and bedrock wells is considered to be similar. One bedrock well with a potential yield of over 3,000 L/min was not used in the average calculation since it is considered anomalous. Three of the overburden wells were also reported to show no drawdown for the duration of the test, which indicates very high yield. However, for the purposes of calculating a yield, no estimation could be made. Therefore, the estimate provided is considered conservative (i.e., negates four high yiled locations). The average aquifer transmissivity from water well records was estimated to be in the range of 45 L/min (n = 6).

Based on the MECP Hydrogeological Technical Information Requirements for Land Development Applications (1995), the recommended minimum supply rate for individual residential homes is 13.7 L/min. The estimated well yields for all of the wells in the vicinity are well above the minimum recommended supply rate.

In summary, based on area well records, hydrogeologic setting, and existing water supply systems in the area, it is reasonable to expect that well yield for wells drilled on the subject properties will be sufficient for a single family dwelling. To provide more certainty and support this study, a site-specific investigation with pumping tests has been completed, with the results provided in Section 5 and 6.

4. SITE SERVICING OPTIONS REVIEW

A review of water and sewage servicing for the Draft Plan of Subdivision with reference to the Ministry of Environment Conservation and Parks (MECP) Guideline D-5-3. Standard services such as gas, cable and telephone, and electricity will also be provided through extension of existing infrastructure on Southgate Road 26.

4.1 Municipal Servicing

Based on standard development/planning principals, municipal servicing is the preferred approach. Currently, the closest municipal servicing is the Durham system, owned and/or operated by the Municipality of West Grey. This system is located approximately 10 km away. Without analyses, it is clear that the economics and logistics of extending municipal services over 10 km to service 29 lots is not feasible.

In broader terms, the area is dominated by rural and agricultural uses. Development is generally limited through the Official Plan to development areas such as Hamlets and other approved designations. It is reasonable to expect that future potential future development in the area would not be at a level that would warrant consideration for the extension, or creation of municipal services.

4.2 Communal Services

In the absence of municipal servicing, communal services are the "preferred" servicing option. The use of communal services requires the development of Municipal Responsibility Agreement, which would require the municipality to assume the end responsibility of the system. It is our understanding that the Township of Southgate is not amenable to the assumption of a communal system.

From an economical perspective, the use of communal services requires specific approvals under the MECP, which typically include monitoring programs. The communal water system would be designated under Ontario Regulation and have specific operational requirements, including appropriate designated operator.

Notwithstanding the need for a Responsibility Agreement, the costs associated with the design, approval, development, and operation of a communal to service only 29 lots is not considered feasible, particularly relative to private on-site servicing. Based on the development of 29 lots, the relative development cost (compared to private servicing) is expected to be approximately a factor of two (2) and the relative operational cost approximately a factor of five (5).

4.3 Individual Private Services

For rural lots in the Township, the standard water and sewage services are provided via an on-site well and sewage system under Part 8 of the Ontario Building Code. The on-site wells are to be completed by Drilling Contractors licensed under Ontario Regulation 903 with well locations developed in conjunction with standard site layout planning.

Based on the site location, number of lots, and size of proposed development, the use of private individual servicing is considered the most economic and practically feasible servicing option for the proposed subdivision.

5. OVERBURDEN FIELD STUDY (SEWAGE DISPOSAL)

5.1 Methodology

5.1.1 Site Reconnaissance

As part of the field program, the subject property was walked in order to assess areas of interest, such as evidence for changes in geology or bedrock exposure, surface patterns that would indicate mass loss, groundwater discharge areas (such as saturated ground conditions), and the nature of surface water features. In particular, the bases of slopes and surface water features were viewed for evidence of upwelling, vegetative patterns, and occurrence of surface water during "dry" periods.

This information was cross-referenced with the Natural Heritage and Environmental Impact Study (SAAR Environmental, 2019). Information from this process was combined with the other components of the field work program to provide an assessment regarding the site's hydrogeologic setting.

5.1.2 Overburden Test holes and Well Installation

Six (6) boreholes were advanced across the site as part of the Geotechnical Investigation. As shown in Figure 6, six (6) monitoring wells were completed. Each monitoring well was installed to a depth of approximately 5.2 to 7.0 meters below ground surface (mbgs).

Stratigraphy was logged for each of the test holes to characterize the surficial materials at the Site. For each test hole, a sample of soil was taken from just below the topsoil (approximately 30-50 cm below surface) to analyze for grain size distribution and estimate the "percolation time" to support the on-site sewage system assessment.

Each of the six monitoring wells was completed with a nominal 2-inch (5.08 cm-diameter PVC pipe with capped with a locking protective cap. The wells were completed with a 1.5 m long screen. Logs for each of these wells containing details about soil observations and well details, are provided in Appendix E.

5.1.3 Overburden Groundwater Quality Sampling

Water quality samples were collected from the overburden monitoring wells in August 2018 and May 2019. The sampling interval was selected in consideration of the hydrogeologic and site use setting, which indicates that it is reasonable to expect that the shallow groundwater quality would be relatively consistent overtime. In such a scenario, a single groundwater sampling event is considered sufficient.

Overburden wells were purged (i.e. withdrawal of three times their well volume) before sampling. These samples were submitted to a laboratory, accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL), to be analyzed for the following: routine comprehensive analysis (including major anions, cations, nutrients, hardness, and other parameters), colour, turbidity, and field-filtered metals. The Laboratory Certificates of Analysis are included in Appendix C.

5.2 Overburden Observations and Measurements

5.2.1 Overburden Test Holes

The soils observed in the overburden test holes were consistent with the geologic mapping and conceptual model of the Site geology. Immediately below the topsoil layer, which was observed to be less than 0.3 m thick, the soil was loose and predominantly silty sand and gravel with varying amounts of clay. The occurrence of the silty sand and gravel was found to be consistent across the site. The testhole logs are provided in Appendix E.

Six samples were taken of the soil immediately below the organic layer and were analyzed for grain size distribution and percolation time. The soils of the near surface overburden were reported to be primarily sand (17% - 84% by mass), with some silt (8% - 28% by mass) and some gravel (2% to 71% by mass). The shallow samples were classified as SM (silty sand), GM (silty gravel), GW-GM (well-graded silty gravel), or GP-GM (poorly graded silty gravel) under the Unified Soil Classifications System (Terzaghi *et al* 1996). The average percolation time was found to be T = 10 min/cm.

5.2.2 Overburden – Groundwater Flow Direction

Table 4 contains the water level readings and groundwater elevations for the overburden wells. These readings were processed to construct a map of the potentiometric surface of the shallow overburden groundwater across the site: this map is provided in Figure A. In general, the shallow groundwater flow is inferred to flow to the west or toward Camp Creek Tributary.

- Camp Creek Tributary flows west from Wilder Lake through the northern portion of the site. The wetland area includes the stream and a system of shallow ponds which are inferred to be fed by groundwater. A full discussion of the ecological function of the wetland system can be found in the Environmental Impact Study (EIS). Stream and ponds occur where the water table (HGL) intersects the ground surface, on the basis of:
    - Soil type
    - Water temperature
    - Uniform levels across seasons
    - Species as noted in the EIS which require consistent water level and temperature
    - Ground profile
    - Potentiometric mapping

5.2.3 Overburden – Groundwater Quality

A summary of the analytical results of the groundwater samples taken from the overburden are summarized in Table 5. The groundwater in the overburden can be characterized as slightly mineralized, with minor to negligible influence from anthropogenic sources. Though the groundwater in the shallow overburden is not the intended as a source potable water supply for the subdivision, the analytical results in Table 5 are compared against the Ontario Drinking Water Standards (2002) Maximum Allowable Concentration MAC limits and Aesthetic Objective (A/O) limits for the purposes of general characterization.

It should be noted that the Ontario Drinking Water Standards are established for *treated* drinking water. It is expected that the shallow groundwater would be influenced by surface water sources.

The results are considered to be reflective of shallow groundwater in a carbonate-based system. Hardness is reported to be between 320 and 360 mg /L (as $CaCO_3$). With respect to anthropogenic influence, the concentration of nitrite and nitrate is slightly variable, ranging from 0.14 mg/L to 1.10 mg/L, well below the A/O (10 mg/L). The average nitrite plus nitrate concentration of 0.53 mg/L, indicates relatively low background nitrogen concentrations.

The reported concentrations of manganese, although above the aesthetic objective of the Standard for treated drinking water, are considered typical of shallow groundwater systems (i.e., naturally occurring).

5.3 Overburden – Hydrogeologic Setting

Shallow groundwater flow often correlates to topographical features and typically flows towards nearby lakes, streams, and wetland areas, except where modified by service trenches. Based on the area geology and topography, the shallow groundwater flow is inferred to be primarily to the west congruent with the Camp Creek drainage system. Although Wilder Lake is a major surface water feature in the area, it has been created by anthropogenic disruption (damming along the west), and is inferred to create a groundwater mounding scenario, whereby groundwater flows are from Wilder Lake to the west. Groundwater flow on the south, east, and northeast of Wilder Lake, are inferred to be towards Wilder Lake.

These expected groundwater flows are consistent with the water levels measured during the monitoring program. The inferred direction of shallow groundwater flow is shown on Figures A, and B1 and B2 (representing fall 2019 conditions) and the measured groundwater elevations are summarized in Table 4. The mounding effect associated with Wilder Lake is consistent with a reservoir type setting with gradients away from the discharge area (i.e. Camp Creek).

Based on groundwater elevation monitoring events to date, the shallow groundwater elevations at the six monitoring wells were found to occur between approximately 420.72 masl to approximately 425.39 masl and the shallow groundwater was generally found to flow to the west. Based on the groundwater elevation measurements collected at selected monitoring locations between August 2018 and November 2019 (Table 4), the water table is observed to fluctuate with seasonal and precipitation events (as expected).

The majority of the Site is generally considered to be a "recharge" area with downward gradients. Local upwards gradients are inferred to exist along Camp Creek and were observed through both the site reconnaissance and EIS. The general occurrence of coarse-grained soils mapped at the subject property and site observations support a high potential for infiltration.

The majority of the overburden soils identified at depth through the testhole program are considered to be highly permeable (sand and gravel) which is expected to facilitate groundwater movement and infiltration.

6. DOMESTIC WATER SUPPLY FIELD STUDY

6.1 Methodology

6.1.1 Pumping Tests

Pumping tests were completed on both the on-site wells and the domestic well at the residence directly to the north of the site in January 2019. The pumping tests were completed by the licensed well contractor with monitoring and water quality sampling completed by GMBP personnel. During the pumping the tests, the discharge line was placed approximately 9 m (30 feet) or greater from the well in a downslope position and the discharge monitored to ensure it was flowing away from the well (i.e., so that the discharge could not potentially influence the well).

An aquifer performance testing program was conducted within each of the three domestic wells. This involved performing a pumping test with a constant-discharge of approximately 65 L/min in well 2513529, 55 L/min in well A227593, and 40 L/min in 7197381.

For each pumping test, drawdown observations were logged at each of the other domestic bedrock wells and four (4) overburden monitoring wells on site with Solinst Levelogger instruments (pressure transducers). Following each pumping test, the recovery of the water level was logged until a static or near-static (i.e. 95%) water level was reached.

6.1.2 Groundwater Quality Sampling

Groundwater quality was measured at each of the pumped domestic wells. Two samples were collected from each well; one near the middle, and one near the end of each test.

Samples were collected using industry accepted methodology. Groundwater samples were collected for analysis of a comprehensive parameter set to determine the groundwater quality in each well. The samples were collected by pumping water into pre-preserved laboratory supplied containers.

Samples were submitted to Maxxam Analytics Inc. (Maxxam) within the specified hold times in coolers and under standard chain of custody protocols. Maxxam is accredited by the Canadian Association for Laboratory Accreditation (CALA) and by the Standards Council of Canada for the analyses requested. The laboratory Certificates of Analysis are provided in Appendix C and the results are summarized in Table 6.

6.2 Observations and Measurements

6.2.1 Geologic Setting

The thickness of the unconsolidated glacial materials overlying the bedrock varies between 34 m and 41 m. Based on the findings of the observations made by within the MECP Well Records for nearby wells, dolostone bedrock of the Guelph formation underlies the site.

Of the ten (10) domestic supply wells within 500 m of the site, including the two on site, three (3) are completed in the dolostone bedrock, and the remaining seven (7) are completed in the deep overburden. The well depths for those completed in the dolostone bedrock range from 39.3 m to 40.5 m. The well depths for those completed in the overburden range from 19.8 m to 41.1 m with an average depth of 33.5 m.

It is expected that the aquifers in the deep overburden and in the bedrock are highly connected. Typically, the upper layer of the bedrock is weathered and the depth to the overburden-bedrock interface varies spatially. These two factors influence the groundwater flow rates and directions between the deep overburden and the bedrock. If the two aquifers are highly connected, the groundwater quality and availability, as studied in the pumping and quality sampling procedures, should be similar. As discussed in section 3.1, based on the well records, the overburden wells and bedrock wells showed no significant difference in well yield with the range in yield being similar.

6.2.2 Groundwater Flow Direction

The two domestic wells on site were completed in the deep overburden and the well on the neighbouring property was completed in the dolostone aquifer underlying the Site. Table 4 contains water level readings and well construction summaries for the domestic wells used in this study. The locations of the wells are shown in Figure 6. From this information, a plot was drawn to show the potentiometric surface of the groundwater in the aquifer (Figures A). Based on the measurements, it is inferred that the groundwater flows to the west.

Based on the hydrogeologic setting, on-site information, experience in the area, and information from the site owner, the bedrock water levels are considered to be relatively stable throughout the year with typical seasonal variation on the scale of 1 to 3 metres, or less. These seasonal fluctuations are not considered to affect the potential water supply for the development. In particular, the water column associated with most supply wells is on the scale of 15 to 30 m, or more.

Based on the Grey Bruce Groundwater Study, the regional groundwater flow direction in the area is to the west-northwest.

6.2.3 Groundwater Quality

For the purposes of this report, the analytical results are compared against the Ontario Drinking Water Standards (ODWS) MAC and A/O for *treated* drinking water, and are presented in Table 6. Results of note are as follows:

- As expected from a carbonate aquifer system, the groundwater is relatively hard, with hardness between 250 and 300 mg $CaCO_3$/L, exceeding the A/O (100 mg/L) in all domestic wells.
- The reported nitrate concentrations in the groundwater from the wells varied between were 0.38 and 1.50 mg/L, respectively.
- The water quality results were found to be consistent during pumping. The minor variability obtained is considered to be within that expected with natural variability when groundwater sampling. The no evidence of dramatic changes in water quality that may indicate change in water source during pumping (such as a boundary condition or increased influence from near surface sources).
- No significant quality difference between the overburden wells and the bedrock well was found.
- The raw groundwater at each of the tested locations meets the health related criteria of the ODWS
- The raw groundwater at each of the tested locations meets the aesthetic objectives with the exception of hardness at all locations and manganese at well 2513529.

The groundwater quality is considered to be typical of that from a carbonate-based bedrock system, with elevated hardness and in some cases manganese and increased mineralization with depth.

The groundwater from the aquifer generally meets the Ontario Drinking Water Objective. The security of groundwater systems in rural environments cannot be guaranteed. As such, it is recommended that water supply systems be fitted with a disinfection treatment component, such as ultra-violet (UV) or chlorination.

The water is considered to be moderately mineralized, typical for groundwater supplied from a carbonate-derived overburden or carbonate bedrock system. Specifically, the aesthetic water quality issues can be treated by several different treatment technologies, depending on the requirements/preferences of the specific property owner, but typically include filter and water softener. Additional water treatment can be and/or reverse osmosis treatment or other technologies, if required.

6.2.4 Aquifer Performance Testing

As discussed, to characterize the aquifer, each of the wells was subject to a constant-rate pumping test with drawdown observations being made in all three of the wells. The data gathered during these pumping tests is provided in plotted and tabular format in Tables 8, 9, 10 and Appendix D. Following the completion of each pumping test, the pumping well was monitored to record the progress of recovery. Table 8 provides summary observations made during the pumping tests, including discharge rate, maximum drawdown, and time to recovery.

AquiferTest software was utilized to calculate the aquifer properties. The wells were modelled using the Theis and Cooper and Jacob methods for confined aquifers. Well 2513529 pumping test response was also modelled using the psudo-steady-state double porosity flow model developed by Warren and Root (1963) and the unconfined aquifer analysis developed by Neuman (1972). The analysis method was selected based on the hydrogeologic conditions observed at the site and the shape of the response curves. The estimation of aquifer properties utilizing the unconfined aquifer analysis systems is considered sufficient for the purposes of this study.

Well A227596 is located approximately 35 m from the edge of Wilder Lake. It is expected that Wilder Lake can be conceptualized as a constant supply boundary condition in influencing this well. The response curve in this well demonstrated an initial drawdown of 0.74 m in 2 minutes, and a total drawdown of 0.78 m.

Well 2513529 pumping test response curve was modelled using the double porosity flow model and the unconfined aquifer (Neuman) model, both of which were able to fit the measurements better than the confined aquifer models. It is reasonable to expect that the aquifer in the deep overburden is acting as an unconfined aquifer at this location. As the well is approximately 41 meters deep, it is also possible that the bedrock, with a different porosity, is close to the bottom of the well and may be influencing the response curve.

The transmissivity for the aquifer is estimated to be between 7.29×10^{-6} and 4.49×10^{-3} m^2/s. The transmissivity is estimated to be slightly lower in the bedrock well than the overburden wells. The transmissivity for the overburden wells is estimated to be between 8.41×10^{-5} m^2/s and 4.49×10^{-3} m^2/s, whereas the transmissivity for the bedrock well is estimated to be between 7.29×10^{-6} m^2/s and 2.34×10^{-5} m^2/s. The storativity was estimated to be between 1.96×10^{-3} and 6.16×10^{-1} (dimensionless) and was similar for well 2513529 in the overburden and well 7197381 in the bedrock. Storativity estimates for well A227593 are considered to not be representative of the aquifer due to the influence of Wilder Lake. The domestic wells had between 0.7 and 2.8 m of available drawdown, which is defined as the height of the water column in the well above the top of the aquifer. The values for transmissivity, storativity, and available drawdown as determined by each analysis are provided in Table 9. Based on the absence of response in the wells being monitored, the analyses consisted of intra-well methods.

For the purposes of average daily water use, the daily demand for each proposed residential lot is expected to be in the range of 1,000 L/day (from the 2012 Ontario Building Code [OBC]). The number of lots proposed by H. Bye. Construction Limited is 29. Therefore, it is expected that the overall area of development will require approximately 29,000 L (29 m^3) of water per day.

Using the results of analysis from each pumping test separately, the modified Moell method (Maathuis and van der Kamp 2006) was used to determine the range of expected sustainable yield (Q_{20}) for the aquifer. It was assumed that all of the wells that would be installed in the subdivision could be represented by a single well: this is a conservative assumption made to simplify the analysis, the results of which are presented in Table 9. The Q_{20} was estimated to be between 43.7 m^3/day in well 2513529 and 125.3 m^3/day in well A227593. These estimated sustainable well yields are higher than the expected water demand for the entire subdivision (29 m^3/day).

Based on this analysis, wells installed in the overburden or the deeper dolostone bedrock system (approximately 40 to 50 m bgs) are both likely to provide sufficient long-term yield to support a single home. The well yields determined as part of this investigation are considered to be representative of the long-term yields which can be expected by the future residents of the development.

6.3 Water Supply – Interference with Other Wells

The radius of influence describes the maximum distance from a pumped well that a lowering to the water table can be measured. Within the radius of influence, a lowering of the water level, and thus water column can occur. Interference occurs when the water level is lowered sufficiently in the neighbouring wells to cause a reduction in the yield beyond those required. The radius of influence is typically described as the area around a well where water level reductions are experienced. It is important to note that it doesn't differentiate the magnitude of the water level change. Further, it is important to note that the radius of influence typically decreases exponentially with distance from the pumping well, with the majority of influence in the direct vicinity of the well.

The Maathuis and van der Kamp (2006) paper describes how to estimate the drawdown within the radius of influence of a well after pumping for 20 years.

It was assumed that all of the wells that would be installed in the subdivision could be represented by a single well: this is a conservative assumption made to simplify the analysis. The properties of the aquifer from each of the three pumping tests were included in the analysis. Using the design flow of the entire development of approximately 29,000 L (29 m^3) of water per day, the drawdown within the radius of influence was calculated, the results of which are presented in Table 9. The results show that at 300 m from the well representing the entire subdivision, the drawdown was estimated to be between 0.43 and 0.01 m.

The individual lot well drawdown was also estimated. Based on the lot sizes, the average distance from the well to the lot boundaries is approximately 25 m, and the average distance between the wells is approximately 50 m. At a daily pumping rate of 1000 L/day, the drawdown after 20 years ranged from 0.30 to 0.01 m at 25 m from the well and 0.22 m and 0.01 m at 50 m from the well. Based on the aquifer thickness and typical water column height, this drawdown is considered insignificant.

Based on the information collected as part of this investigation, no influences on groundwater levels, interference between wells (on or off-site) or hydrogeological resources is expected from the proposed development.

7. SEWAGE SYSTEM ASSESSMENT

The following sewage system assessment has been completed using the stepwise process under the MECP D-5-4 Guideline. Under this process, a series of steps, or "tests", are completed, to determine if development is suitable.

The first step of the D-5-4 Guideline is to assess whether lots are greater than one hectare, since it is evident sufficient attenuation will occur for large lots. In this case the lots are less than one hectare so further study is required.

The second step relates to *System Isolation Considerations*. Where it can be shown that the water supply aquifers are isolated from the potential for impacts from sewage disposal, development may be supported. Although a degree of attenuation, or separation may exist between the shallow overburden and deeper bedrock, this approach has not been relied upon to support development.

This assessment uses the *Contaminant Attenuation Considerations* approach under the third step to evaluate the potential for impacts. This generic approach estimates the amount of attenuation that will occur in the groundwater system under the proposed development. More specifically, the *Predictive Assessments – Residential Developments* has been used.

Although information regarding a neighbouring existing development is provided within this report, the D-5-4 Guideline for *Monitoring Based Assessments – Existing Developments* is not relied upon. Likewise, the *Monitoring Based Assessments – Phased Developments* is not considered applicable or relied upon. Additional evaluation or explanation is not considered to be applicable for the approaches not relied upon.

7.1 Sewage System – Lot Carrying Capacity

With respect to on-site sewage systems, the species of primary concern for environmental impacts is nitrogen. Nitrogen, typically in the form of nitrate (and to a lesser extent nitrite) in groundwater systems, is a nutrient which can cause adverse impacts to potable groundwater supply and receiving surface waters. As such, it is necessary to ensure that the nitrogen (as nitrate) output of the proposed development will be attenuated to concentrations of 10 mg/L, or lower (i.e. the health-based Ontario Drinking Water Standard). Under Procedure D-5-4, the method of estimating attenuation is by dilution with only local infiltration (i.e. net precipitation going to groundwater recharge). This procedure is considered to be conservative as it does not account for natural attenuation mechanisms that occur within tile bed and groundwater system, or dilution with groundwater.

The equation used to estimate dilution using the Procedure D-5-4 methodology is:

$$\frac{\text{Daily Sewage Loading (mg/day) (A)} + \text{Daily Loading from Infiltration (mg/day) (B)}}{\text{Total available dilution (L/day) (C)}} = \text{Total Nitrate Loading (mg/L)}$$

Under the D-5-4 Guideline, the calculations are to be considered holistically for the development (as opposed to the individual lots). Based on the proposed development plan of 25 lots to be serviced by on-site sewage systems, the anticipated nitrogen loading (as nitrate) is approximately 365 kg/year. The assumptions and calculation inputs are as follows:

- The effective hydrologic water input, accounting for evapotranspiration and runoff, is estimated to be approximately 90,100 m^3/yr.
- The infiltration rate was obtained by taking the difference between precipitation (1118.5 mm/yr, Environment Canada 2015) and evapotranspiration (304 mm/yr, MODIS Global Evapotranspiration Dataset, 2016) and discounting the result by 40% due to runoff (Ontario Ministry of Transportation 1997). Subsurface soils of sand and gravel promotes infiltration. The run-off coefficient considers large rural lots with sloping topography and is considered to be relatively conservative for the purposes of the impact assessment (under estimates recharge and increases resultant nitrate concentration estimates), with a resultant infiltration rate of 489 mm/year.
- The property area of 20.8 hectares was used in the calculation.
- A nitrate loading rate of 40 g/day was utilized for each of the proposed lots.

Table 10 shows the results of calculations to estimate the resultant groundwater nitrate concentration as a function of number of lots. For the 29-lot proposed development, the resultant groundwater nitrate concentration is calculated to be 3.77 mg/L, below the allowable concentration of 10 mg/L

7.2 On-Site Sewage System Feasibility

The proposed subdivision is anticipated to utilize private on-site sewage systems. To assess the feasibility of this proposal, a preliminary sizing of the on-site sewage system will be compared against the typical lot size. Typical houses in this development are expected to have between 4 and 7 bedrooms. Table 8.2.1.3.A. of the Ontario Building Code (OBC) was used to estimate the design daily sanitary sewage flow based on the number of bedrooms.

From the analysis of five soil samples taken from the near-surface (see Appendix F), the T-time (percolation time) was determined to range from 8 minutes to 15 minutes/cm. Assuming a conservative estimate of T-time for the site of 15 minutes, the dispersal beds are expected to have an overall size of between 200 and 350 m^2 (12 m by 16 m to 15 m by 25 m). This was calculated using Table 8.7.4.1.A. of the OBC, which states that where a T-time of less than 20 min/cm exists, the overall contact area is determined by a loading rate of 10 L/m^2/day. It is assumed that offsets of 5 m (from structures) and 3 m (from property line) are added as per OBC Table 8.2.1.6.B.

Based on water levels collected to date, the groundwater table is approximately 0.27 m bgs near the edge of Wilder Lake but ranges from 3.8 to 6.1 m bgs elsewhere across the site. As a 30 m setback from surface water features and associated wetlands is required, development will not occur near the edge of Wilder Lake. Therefore water levels in the range of 3.8 to 6.1 m bgs are expected in the developable area.

Table 8.2.1.6.A and 8.2.1.6.B in the Ontario Code and Guide for Sewage Systems 2012 indicates that the distribution bed must be at least 3 metres from the property line, 5 metres from any structures on the property, and 15 metres from any domestic drilled wells cased to at least 6m, or 30m from any other well (refer to the OBC for specific requirements). A standard house footprint with garage is expected to be in the range of 200 to 300 m^2, for a combined footprint of 600 to 700 m^2.

The lot sizes proposed for the development are proposed to be above 4,000 m^2 (1.0 acre). With respect the logistics of lot layout a lot of size 0.4 ha to represent the smallest lot is considered. Using the information provided above, it is reasonable to expect that a Standard Class IV system could be constructed while meeting the setback at the smallest lot, and accordingly, the other larger lots proposed. While the review is based on the larger Standard Class IV system, the individual lots could also be serviced filter beds as per the OBC where less disturbance of land is desirable. Ultimately, the design and construction of the sewage system would be regulated under the requirements of the OBC with the application of associated setbacks, from buildings, wells, and the water table.

8. DOMESTIC WATER SUPPLY ASSESSMENT

8.1 Groundwater Quantity

Based on information from the MECP well record search, there is a reasonable expectation of obtaining sufficient supply of groundwater at each of the proposed lots and that the supply would provide a long-term reliable source of water.

Based on the analyses, the expected sustainable yield (Q_{20}) for the wells in the deeper bedrock system is expected to be in the range of 44 to 122 m^3/day. With respect to peak flow requirements, the pumping tests completed on the new wells at target depths were completed continuously at rates of between 36 and 66 L/min, well above the 13 L/min identified Procedure D-5-5. Although not expected, in the event that an installed well could not provide sufficient yield to meet peak water supply, supplemental storage, or an additional, or deeper, well could be used to ensure peak demands are met.

The use of domestic water on the subject property is not expected to cause influence or impact to neighboring properties based on observations made during the pumping tests and corresponding analyses. This analysis is consistent with anecdotal information which indicates similar lot size and density in the broader area.

8.2 Groundwater Quality

Groundwater quality is considered to be consistent with groundwater from a carbonate-rich bedrock system with elevated hardness. Raw water quality generally meets the aesthetic objectives with the exception of hardness. Elevated hardness can cause staining and/or mineral deposits on fixtures. Depending on the personal preferences of the home-owner standard treatment for hard water includes water softening or reverse-osmosis systems.

The shallow bedrock groundwater quality is considered to have the potential for microbiological contamination. Additionally, the security of groundwater systems in rural environments cannot be guaranteed. Consequently, it is recommended that water supply systems be fitted with a disinfection treatment component, such as ultra-violet (UV) deactivation or chlorination.

Interference with existing neighbouring property use is not expected. As provided within the impact assessment for on-site sewage systems, sufficient attenuation of sewage within the shallow groundwater system is anticipated.

8.3 Water Supply Recommendations

In order to ensure sufficient water quantity and quality supply for the subject property, it is recommended that the water supply wells be installed by licensed drilling contractor with considerations to setbacks from sewage systems required by the Ontario Building Code. It is recommended that the wells target the overburden or dolostone bedrock aquifer system (approximately 15 to 45 m below ground surface) and be constructed as per requirements of Ontario Regulation 903.

It is recommended that the aesthetic water treatment requirements be established by the property owner via direct samples from the well on their specific lot. Regardless of water quality results, it is recommended that water supply systems be fitted with a disinfection treatment component, such as ultra-violet (UV) or chlorination.

9. GROUNDWATER IMPACT ASSESSMENT

9.1 Groundwater Quality – Sewage Systems

The background nitrate concentrations in the shallow overburden groundwater system were measured to be between 0.14 and 1.1 mg/L, with an average of all samples of 0.53 mg/L, below 10 mg/L, which is the level at which the D-5-4 Guideline indicates that development would not normally be supported. In the bedrock system, the nitrate concentrations were measured to be between 0.38 and 1.50 mg/L, with an average nitrate concentration of 0.81 mg/L for on-site and off-site locations. In all cases, the reported nitrate concentrations were below the ODWS value of 10 mg/L.

The relatively low background levels of nitrogen and other constituents are considered to show only minor influence from anthropogenic sources (i.e., human activity).

Water quality degradation due to the use of on-site sewage was estimated using the D-5-4 method, which accounts only for dilution of sewage with rainfall. This approach is considered conservative since it doesn't account for additional attenuation of sewage due to dilution with groundwater or natural attenuation via biological or geochemical process, which are known to occur. Using the dilution with rainfall approach, for the 29-lot proposed development, the resultant groundwater nitrate concentration is estimated to be 3.78 mg/L, which is below the allowable level of 10 mg/L. Consequently, once the additional potential attenuation is considered, it is reasonable to expect that the resultant groundwater quality will not be impacted by nitrogen due to the use of the on-site sewage systems and no impacts are expected due to the proposed development.

Further, from an anecdotal perspective, it is reasonable to expect that the use of the property for rural residential lots will be similar, or have less potential for impact to the groundwater quality. Based on the fact background water quality shows little evidence of anthropogenic influence, it follows that the proposed development will not impact groundwater.

With respect to surface water quality, there are two primary receptors of concern:

1. Wilder Lake, and
2. Camp Creek.

The groundwater flow from the development is considered to be primarily away from Wilder Lake towards the west. Consequently, the potential for groundwater influenced by sewage disposal is not likely to impact Wilder Lake. Even where localized flow may be towards Wilder Lake, for example the westerly shoreline, setbacks from Wilder Lake are provided through maintenance of the treed and low-lying buffer area for the shoreline lots.

Beyond the inferred flows to the northwest, the dilution factors associated with the relatively large rural lot with sewage systems set back from the shoreline (greater than 50 m), with systems that are located in relatively coarse-grained soils greater than 3 m above the water negate the potential for impacts to surface water.

The potential for impacts to Camp Creek are important based on the fact it is groundwater fed and acts as a coldwater fishery. As an overall development, the water quality is not expected to be influenced, as described through previous sections.

9.2 Surface Water Quality – Sewage Systems

With respect to surface water quality, there are two primary receptors of concern:

1. Wilder Lake, and
2. Camp Creek.

The groundwater flow from the development is considered to be primarily away from Wilder Lake towards the west. Consequently, the potential for groundwater influenced by sewage disposal is not likely to impact Wilder Lake. Even where localized flow may be towards Wilder Lake, for example the westerly shoreline, setbacks from Wilder Lake are provided through maintenance of the treed and low-lying buffer area for the shoreline lots. The potential for impacts are negated since:

- The large dilution factors associated with the relatively large rural lot with sewage systems set back from the shoreline (greater than 50 m),
- The sewage systems that are located in relatively coarse-grained soils greater than 3 m above the water, reducing the potential for phosphorous loading and migration.

The potential for impacts to Camp Creek are important based on the fact it is groundwater fed and acts as a coldwater fishery. As an overall development, the water quality is not expected to be influenced, as described through previous sections. With respect to Camp Creek specifically, there are 4 lots directly adjacent to this creek. No impacts are anticipated for the same reasons noted above:

- The large dilution factors associated with the relatively large rural lot with sewage systems set back from the shoreline (greater than 30 m),
- The sewage systems that are located in relatively coarse-grained soils generally greater than 3 m above the water, reducing the potential for phosphorous loading and migration.
- The groundwater discharging in to the creek is inferred to be influenced on a more regional basis and groundwater quality subject to mixing with all components.

9.3 Water Quantity and Quality – Stormwater Management

A stormwater management report and associated designs for the proposed development has been completed under separate cover. The site development as whole is considered to be low intensity with approximately 30% impervious area and large areas of undeveloped lands available for infiltration.

Of note is the occurrence of relatively coarse-grained soils at the site and deep water table in the elevated areas where the proposed development will occur. These conditions are favourable for the use of the naturally high infiltration capacity of soils. The proposed stormwater management utilized many infiltration-promoting methods (i.e., low-impact development methods) including infiltration ponds, wet ponds, swales, and enhanced grass swales. It is expected that the majority of rainfall events will be effectively infiltrated in through the stormwater management system, with only major storm events having the potential for discharge to Wilder Lake or Camp Creek.

Based on the site conditions and the promotion of infiltration throughout the stormwater management system no impacts to water quantity or quality are expected to the groundwater or surface water. Since the majority of stormwater will be treated through infiltration, water temperature and water quality will be mitigated while maintaining recharge and groundwater conditions.

10. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this site servicing study, the following conclusions can be made:

- The aquifer beneath the site is capable of supplying groundwater at a rate greater than the expected demand of the proposed development.
- It is reasonable to expect that individual supply wells installed into the aquifer system will have sufficient yield for both long-term supply and to meet peak demands.
- It is reasonable to expect that the water quality from wells installed into the bedrock aquifer system will be adequate for supply with the use of disinfection and aesthetic treatment for hardness.
- The proposed development of 29 lots with private individual sewage systems are not expected to cause impacts to the groundwater resources. Estimates of the potential for groundwater impact by nitrate (using the D-5-4 Guidelines) indicate a resultant estimated nitrate groundwater concentration of 3.77 mg/L, below the allowable concentration of 10 mg/L. With use of the additive method for background water quality, the resultant groundwater concentration would be 4.20 mg/L, below the allowable concentration of 10 mg/L.
- The size of the lots is sufficient to logistically support standard Class IV sewage systems and meet set back requirements under the OBC. As per standard process, site layouts are to be confirmed at the time of lot development and should consider neighbouring development plans, including well and sewage system placement.
- The recommendations of the EIS have been considered as part of this Hydrogeological Study. No impacts to ecological features due to changes in hydrogeological conditions or the water balance are expected. The development layout and associated grading will maintain shallow groundwater flows towards the low-lying wet areas and the water balance will generally be maintained.

The following recommendations are made in support of the Conclusions provided above and to support the development:

- Wells are to be completed in the overburden or bedrock aquifer system to a depth of approximately 15 to 45 mbgs and properly cased as per the requirements of Ontario Regulation 903.
- The type of treatment system be based on the results of a water quality analysis of the groundwater at each well and the homeowner requirements/preferences for general/aesthetic groundwater parameters. Regardless of water quality results, the treatment system should include a disinfection component, such as UV or chlorination.

All of which is respectfully submitted.

GM BLUEPLAN ENGINEERING LIMITED

Per:

J. Swiger, B.E.Sc., E.I.T.

Per:

M. Nelson, P.Eng., P.Geo.

JS/mr

11. REFERENCES

Chapman, L.J. and Putnam, D.F. 2007. *Physiography of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release, Data 228.

Environment Canada. 2015. Canadian Climate Normals 1981-2010 Station Data Durham. Accessed Online at http://climate.weather.gc.ca/

Grey County GIS Mapping. Accessed Online at:
https://geo.grey.ca/Html5Viewer/Index.html?configBase=https://geo.grey.ca/Geocortex/Essentials/REST/sites/Public__Planning__Development/viewers/H5/virtualdirectory/Resources/Config/Default

Maathuis, H. and van der Kamp, G. 2006. *The Q_{20} Concept: Sustainable Well Yield and Sustainable Aquifer Yield.* Saskatchewan Research Council (Publication No. 10417-4E06)

Ontario Geological Survey. 2012. *1:250 000 Scale Bedrock Geology of Ontario.* Ontario Geological Survey, Miscellaneous Release, Data 126 - Rev. 1

Ontario Geological Survey. 2012. *Surficial Geology of Southern Ontario; Ontario Geological Survey.* Miscellaneous Release, Data 128 – Rev. 1

Ontario Ministry of the Environment and Energy. 1996. *Procedure D-5-4 - Technical Guideline for Private Wells: Water Supply Assessment.* Government of Ontario

Ontario Ministry of the Environment and Energy. 1996. *Procedure D-5-5 – Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment.* Government of Ontario

Ontario Ministry of Municipal Affairs and Housing. 2012. *Ontario Building Code Part 8: Sewage Systems.* Government of Ontario.

Ontario Ministry of Natural Resources. 1984. Water Quantity Resources of Ontario.

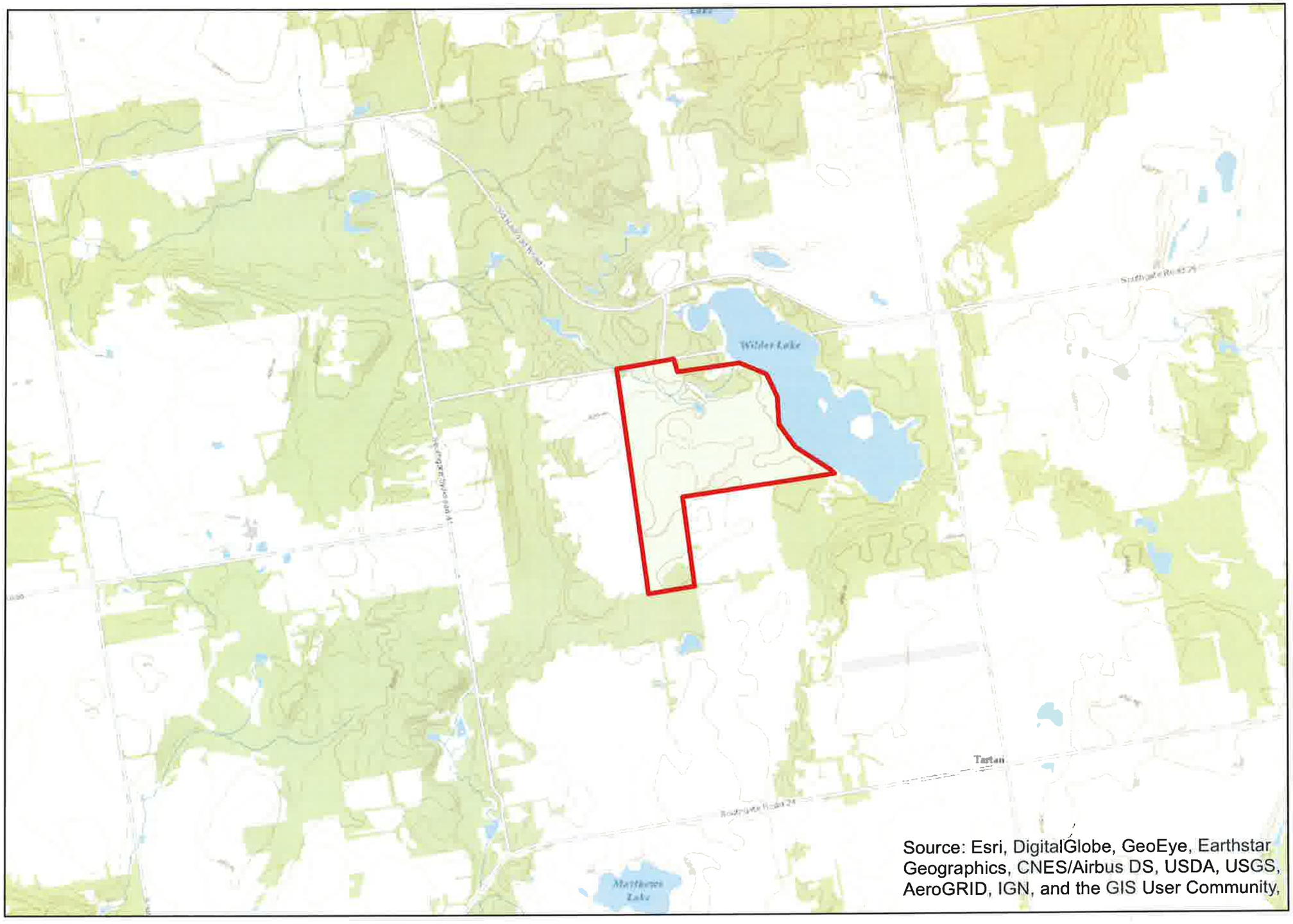
Ontario Ministry of Transportation. 1997. Drainage Management Manual Part 4: Design Charts.

Terzaghi, K., Peck, R.B., and Mesri, G. 1996. *Soil Mechanics in Engineering Practice – Third Edition*. Wiley Interscience. p. 27-29.

Waterloo Hydrogeologic Inc. July, 2003. *Grey and Bruce Counties Groundwater Study, Final Report.*

FIGURES:

218173
Site Servicing Study
Wilder Lake Subdivision



N

LEGEND

Approximate Site Boundary

Scale
1:24,000

May 2019

SITE LOCATION MAP

263512 Southgate Road 26,
Egremont ON

Figure No. 1

BluePlan ENGINEERING

218173
Servicing Study
Wilder Lake Subdivision

N

LEGEND

Approximate Site Boundary

Scale
1:10,000

May 2019

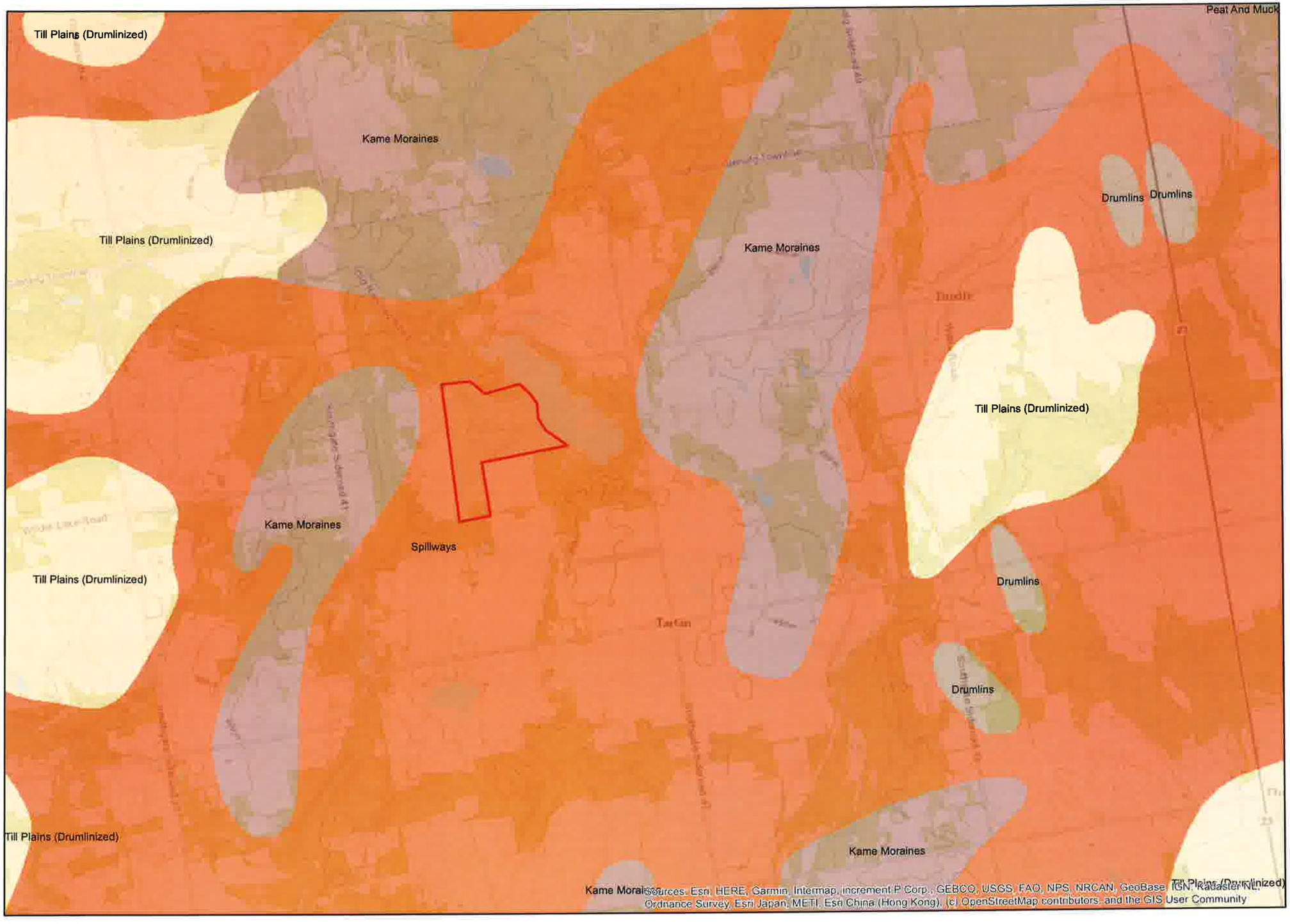
SITE LOCATION AND GENERAL LAYOUT

263512 Southgate Road 26,
Egremont

Figure No. 2

BluePlan ENGINEERING

218173
Site Servicing Study
Wilder Lake Subdivision



N

LEGEND

- Approximate Site Boundary
- 17: Peat And Muck
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 4: Kame Moraines
- 3: Spillways

Scale
1:40,000

May 2019

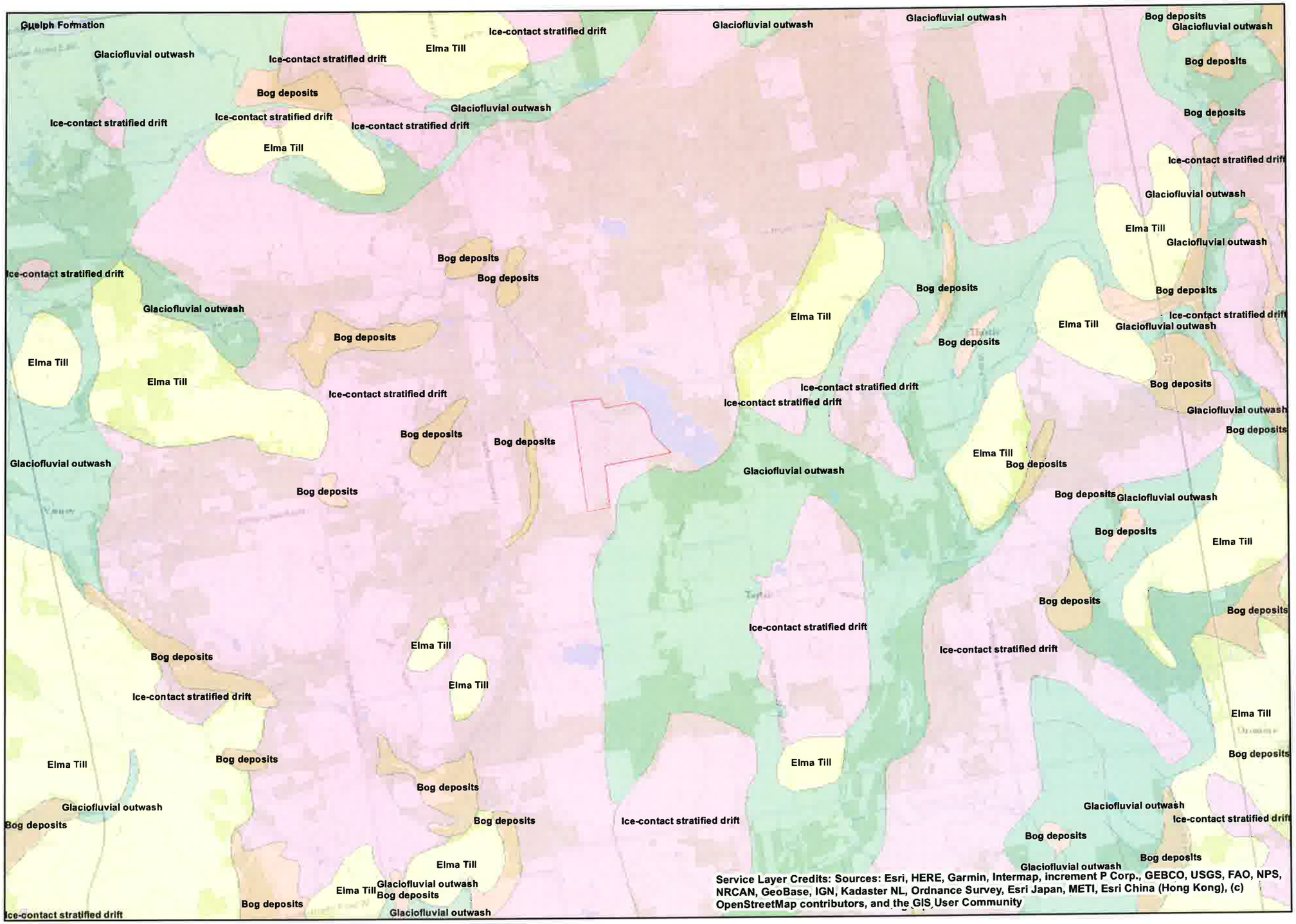
PHYSIOGRAPHY MAP

263512 Southgate Road 26,
Egremont ON

Figure No. 3

BluePlan ENGINEERING

218173
Site Servicing Study
Wilder Lake Subdivision



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N

LEGEND

- Approximate Site Boundary
- Bog deposits
- Elma Till
- Glaciofluvial outwash
- Glaciolacustrine sediments
- Guelph Formation
- Ice-contact stratified drift

Scale
1:50,000

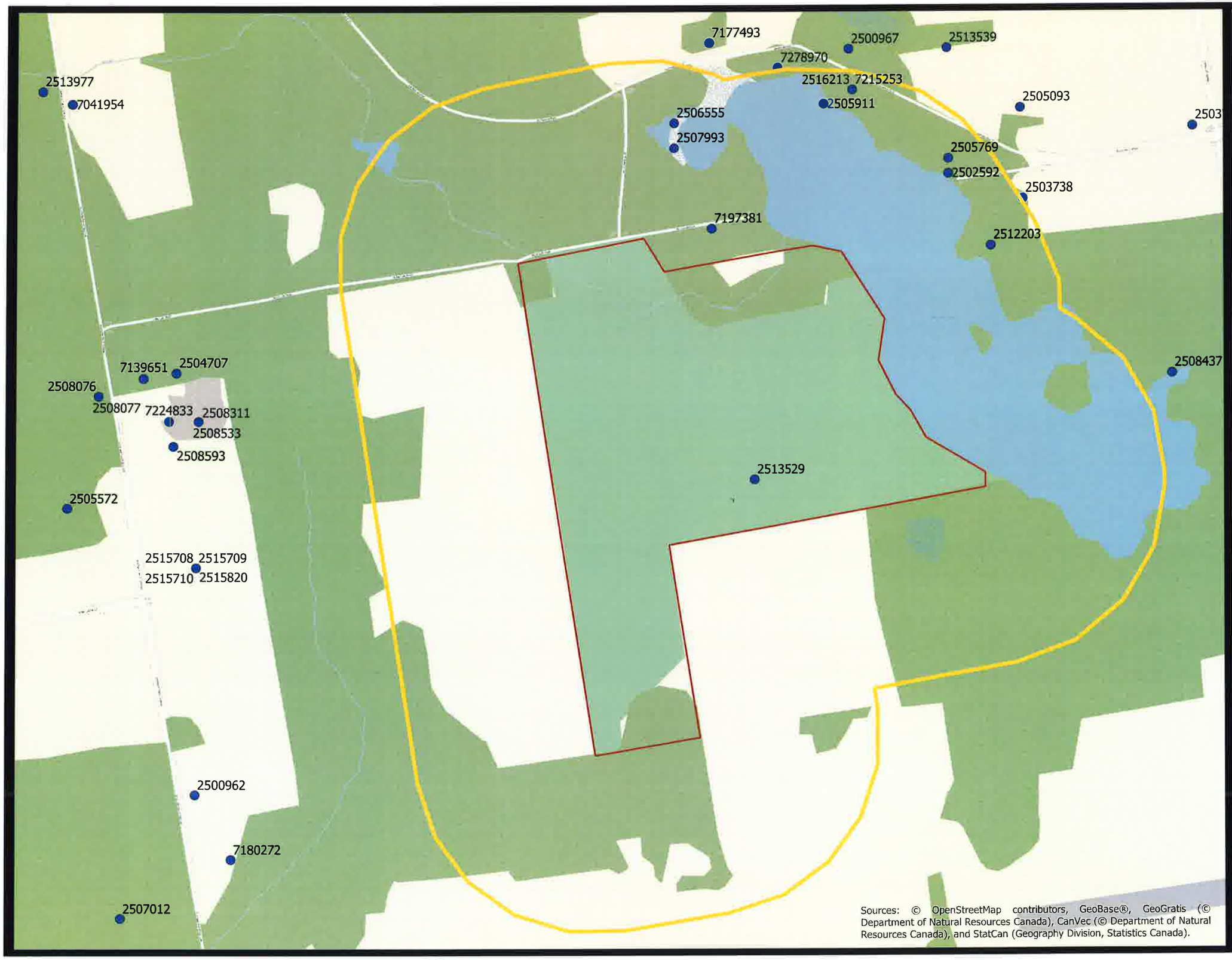
May 2019

SURFICIAL GEOLOGY MAP

263512 Southgate Road 26,
Egremont ON

Figure No. 4

BluePlan ENGINEERING



218173
SITE SERVICING REPORT

N

LEGEND

- MECP Domestic Well
- Approximate Site Boundary
- 500 m Well Search

SCALE= NTS
September 2019

MECP WELL SEARCH AND WELL LOCATION MAP

PROPOSED WILDER LAKE SUBDIVISION
263512 SOUTHGATE ROAD 26
SOUTHGATE, ONTARIO

Figure No. 5

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218173
Site Servicing Study
Wilder Lake Development

N

LEGEND

MW-1 Approximate Monitoring Well Location & ID

DW-1 Approximate Domestic Well Location & ID

Scale
1:5,000
1 centimeter = 50 meters

November 2018

WELL LOCATION MAP

263512 Southgate Road 26
Township of Southgate

BluePlan ENGINEERING

TABLES:

Table 1: Summary of Water Well Records

MOECC Well ID	Lot	Conc.	Easting	Northing	Township	County/ Municipality	Well Use	Bedrock/ Overburden	Depth to Bedrock (m)	Total Depth of Well (m)	Static Water Level (m)	Year Drilled	Notes
Wells on Neighbouring Properties													
2502592	4	22	520950	4888000	Egremont	Grey	Domestic	Overburden	-	40.2	8.20	1968	
2505769	4	22	520964	4888254	Egremont	Grey	Domestic	Bedrock	39.6	46.9	5.49	1976	
2505911	4	22	520714	4888364	Egremont	Grey	Domestic	Overburden	-	19.8	4.27	1976	
2506555	3	22	520400	4888100	Egremont	Grey	Domestic	Overburden	-	32.6	10.67	1977	
2507993	3	22	520414	4888273	Egremont	Grey	Domestic	Overburden	-	32.0	10.67	1983	
2512203	4	21	521050	4888079	Egremont	Grey	Domestic	Bedrock	39.3	52.7	4.27	1993	
7197381	3	21	520490	4888113	Egremont	Grey	Domestic	Bedrock	40.5	50.3	14.94	2012	
A019451	4	22	520771	4888392	Egremont	Grey	Domestic	Overburden	-	41.1	15.24	2013	Two well records - deepend. 7197381 and 2516213
Wells on Site													
2513529	3	21	520577	4887609	Egremont	Grey	Domestic	Overburden	-	35.4	8.53	1998	Clubhouse Well
A227593	4	21			Egremont	Grey	Domestic						Cottages Well

Table 2: Theoretical Well Yields for Nearby Wells

MOE Well No.	Easting	Northing	Township/Village	Well Completion	Depth to Bottom of Well (m)	Static WL (m)	Saturated Thickness (m)	Pumping Rate (m3/s)	Test Duration (hours)	End of Test Water Level (m)	Drawdowns (m)	Transmissivity =0.6Q/s	Available Drawdown =0.9 sat thickness H (m)	Well Yield =0.54TH (m3/s)	Well Yield (L/min)	Well Yield (igpm)	K (m/sec)	R_o (m)
2502592	520950	4888000	Egremont	Overburden	40.2	8.23	31.96	0.0009	2.0	-	-	-	-	-	-	-	-	-
2505769	520964	4888254	Egremont	Bedrock	46.9	5.49	41.41	0.0015	2.3	5.79	0.30	3.03E-03	37.27	0.0610	3659.58	841.70	7.32E-05	7.70
2505911	520714	4888364	Egremont	Overburden	19.8	4.27	15.53	0.0015	6.0	9.14	4.87	1.87E-04	13.98	0.0014	84.55	19.45	1.20E-05	50.66
2506555	520400	4888100	Egremont	Overburden	32.6	10.67	21.94	0.0005	2.2	18.29	7.62	4.18E-05	19.75	0.0004	26.73	6.15	1.90E-06	31.53
2507993	520414	4888273	Egremont	Overburden	32.0	10.67	21.33	0.0005	4.0	22.86	12.19	2.24E-05	19.20	0.0002	13.92	3.20	1.05E-06	37.45
2512203	521050	4888079	Egremont	Bedrock	52.7	4.27	48.46	0.0009	1.5	13.72	9.45	5.78E-05	43.61	0.0014	81.61	18.77	1.19E-06	30.94
2513529	520577	4887609	Egremont	Overburden	35.4	8.53	26.83	0.0011	1.0	-	-	-	-	-	-	-	-	-
7197381	520490	4888113	Egremont	Bedrock	50.3	14.94	35.35	0.0009	3.8	30.48	15.54	3.51E-05	31.82	0.0006	36.19	8.32	9.93E-07	46.46
A019451	520771	4888392	Egremont	Overburden	41.1	15.24	25.86	0.0004	6.0	21.34	6.10	3.73E-05	23.27	0.0005	28.12	6.47	1.44E-06	21.96
A227593			Egremont		-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3: Summary of Wells Installed and Water Levels Observed On-Site

Well ID	Ground Elev. (m ASL)	Stickup	TOP Elev. (m ASL)	Well Depth (mb TOP)	Screen Interval[1]		2018-08-02		2019-01-07		2019-01-08		2019-01-09		2019-04-17		2019-05-02		2019-11-15	
					Top Elev. (m ASL)	Length (m)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)	Depth to GW (m bTOP)	Elev. Of GW (m ASL)
Overburden Wells																				
MW-1	425.66	1.10	426.76	6.92	421.3	1.5	5.590	421.165	-	-	5.518	421.237	-	-	5.120	421.635	4.870	421.885	5.790	420.965
MW-2	430.67	1.08	431.74	7.05	426.2	1.5	DRY	<423.59	-	-	6.355	425.389	-	-	DRY	<423.59	6.550	425.194	DRY	<423.59
MW-3	425.90	1.07	426.97	6.89	421.6	1.5	5.030	420.869	5.130	421.839	5.150	421.819	5.140	421.829	4.690	422.279	4.420	422.549	5.370	421.599
MW-4	429.60	1.18	430.78	7.81	424.5	1.5	DRY	<421.73	DRY	<421.73	DRY	<421.73	DRY	<421.73	DRY	<421.73	DRY	<421.73	DRY	<421.73
MW-5	425.22	1.19	426.41	6.18	421.7	1.5	4.400	420.816	4.495	421.913	4.385	422.023	4.365	422.043	4.000	422.408	3.780	422.628	4.720	421.688
MW-6	427.31	1.07	428.38	6.84	423.0	1.5	6.590	420.719	6.580	421.796	6.545	421.831	6.545	421.831	6.170	422.206	5.930	422.446	DRY	<421.39
Bedrock Wells																				
2513529	429.93	0.52	430.45	35.36	424.3	29.2			8.400	422.050	8.400	422.050	8.400	422.050	-	-	-	-	-	-
A227593	423.62	0.65	424.27	17.16	418.3	11.2			2.340	421.933	2.350	421.923	2.340	421.933	-	-	-	-	-	-
7197381	434.18	0.50	434.68	50.29	427.7	43.3			15.050	419.630	15.050	419.630	15.045	419.635	-	-	-	-	-	-

Notes:

1. Bedrock wells are not screened: the well interval is open hole.
2. 7197381 is located on 110 Homestead Road, situated approximately 50 metres north of the north property boundary.
3. m bTOC - Metres below top of casing of well.
4. m ASL - Metres Above Sea Level
5. GW - Groundwater
6. SW - Surface Water
7. Elev. - Elevation

Table 4: Summary of Overburden Groundwater Chemistry

Parameter	ODWS MAC	ODWS A/O	Units	MW-1 (02-Aug-2018)	MW-2 (02-Aug-2018)	MW-3 (02-Aug-2018)	MW-4 (02-Aug-2018)	MW-5 (02-Aug-2018)	MW-6 (02-May-2019])
General Chemistry									
Calculated TDS	-	500	mg/L	320	DRY	320	DRY	380	270
Hardness (CaCO3)	-	80-100	mg/L	**320**	DRY	**330**	DRY	**360**	**270**
Conductivity	-	-	umho/cm	580	DRY	580	DRY	660	470
pH	-	6.5-8.5	pH	8.03	DRY	7.85	DRY	7.83	8.17
Dissolved Sulphate (SO4)	-	500	mg/L	8.4	DRY	8.6	DRY	15	12
Dissolved Chloride (Cl)	-	250	mg/L	16	DRY	3.4	DRY	13	8.2
Nitrite (N)	1	-	mg/L	<0.010	DRY	<0.010	DRY	<0.010	<0.010
Nitrate (N)	10	-	mg/L	0.65	DRY	0.21	DRY	0.14	1.10
Nitrite + Nitrate	10	-	mg/L	0.65	DRY	0.21	DRY	0.14	1.10
Dissolved Iron (Fe)	-	0.3	mg/L	<0.10	DRY	<0.10	DRY	<0.10	<0.10
Dissolved Manganese (Mn)	-	0.05	mg/L	<0.002	DRY	0.0026	DRY	**0.21**	0.0039
Dissolved Sodium (Na)	20	200	mg/L	4.9	DRY	1.3	DRY	6.1	6.5
Dissolved Organic Carbon	-	5	mg/L	0.95	DRY	1.4	DRY	2.6	1.2

Notes:
1. ODWS = Ontario Drinking Water Standards
2. MAC = Maximum Acceptable Criteria; health based criteria
3. A/O = Aesthetic Objective; aesthetic criteria
4. Values in **bold** exceed the A/O
5. Values in **bold** and shaded exceed the MAC
6. The aesthetic objective for sodium in drinking water is 200 mg/L. However, the local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted
7. "-" indicates that there is no associated value or that the parameter was not measured.

Table 5: Summary of Deep Overburden and Bedrock Groundwater Chemistry

Parameter	ODWS MAC	ODWS A/O	ODWS OG	Units	2513529		A227593		7197381	
					Pumping Test 07-Jan-2019		Pumping Test 08-Jan-2019		Pumping Test 09-Jan-2019	
					Early Time	Late Time	Early Time	Late Time	Early Time	Late Time
General Chemistry										
Calculated TDS	-	500	-	mg/L	290	280	310	300	260	260
Hardness (CaCO3)	-	80-100	-	mg/L	**280**	**280**	**300**	**290**	**250**	**250**
Total Ammonia-N	-	-	-	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Conductivity	-	-	-	umho/cm	520	520	560	560	480	470
Dissolved Organic Carbon	-	5	-	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Orthophosphate (P)	-	-	-	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	-	6.5-8.5	-	pH	8.04	8.02	7.97	7.93	8	8.15
Dissolved Sulphate (SO4)	-	500	-	mg/L	14	14	9.9	10	12	12
Alkalinity (Total as CaCO3)	-	30-500	-	mg/L	260	260	280	280	240	240
Dissolved Chloride (Cl)	-	250	-	mg/L	5	5.2	7.6	6.9	3.8	4
Nitrite (N)	1	-	-	mg/L	0.053	0.043	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	10	-	-	mg/L	0.6	0.57	1.5	1.41	0.42	0.38
Nitrite + Nitrate (N)	10	-	-	mg/L	0.65	0.61	1.5	1.41	0.42	0.38
Dissolved Metals										
Dissolved Aluminum (Al)	-	-	100	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Antimony (Sb)	6	-	-	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	25	-	-	ug/L	<1.0	<1.0	<1.0	<1.0	1.6	1.4
Dissolved Barium (Ba)	1000	-	-	ug/L	23	24	13	13	17	17
Dissolved Beryllium (Be)	-	-	-	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Boron (B)	5000	-	-	ug/L	<10	<10	<10	<10	10	10
Dissolved Cadmium (Cd)	5	-	-	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	-	-	-	ug/L	62000	62000	70000	68000	56000	57000
Dissolved Chromium (Cr)	50	-	-	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	-	-	-	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Copper (Cu)	-	1000	-	ug/L	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
Dissolved Iron (Fe)	-	300	-	ug/L	<100	<100	<100	<100	<100	<100
Dissolved Lead (Pb)	10	-	-	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	-	-	-	ug/L	30000	30000	31000	30000	26000	26000
Dissolved Manganese (Mn)	-	50	-	ug/L	**53**	**59**	<2.0	<2.0	4.6	4
Dissolved Molybdenum (Mo)	-	-	-	ug/L	0.59	0.61	<0.50	<0.50	1.4	1.4
Dissolved Nickel (Ni)	-	-	-	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Phosphorus (P)	-	-	-	ug/L	<100	<100	<100	<100	<100	<100
Dissolved Potassium (K)	-	-	-	ug/L	710	690	810	780	520	540
Dissolved Selenium (Se)	-	-	-	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	-	-	-	ug/L	5300	5300	4600	4700	4900	4900
Dissolved Silver (Ag)	-	-	-	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	20000	200000	-	ug/L	2700	2700	3200	3200	3200	3300
Dissolved Strontium (Sr)	-	-	-	ug/L	710	710	440	440	700	700
Dissolved Thallium (Tl)	-	-	-	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Titanium (Ti)	-	-	-	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	20	-	-	ug/L	1.2	1.2	0.73	0.71	1.3	1.4
Dissolved Vanadium (V)	-	-	-	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	-	5000	-	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Notes:

1. ODWS = Ontario Drinking Water Standards
2. MAC = Maximum Acceptable Criteria; health based criteria
3. A/O = Aesthetic Objective; aesthetic criteria
4. Values in **bold** exceed the A/O
5. Values in **bold** and shaded exceed the MAC
6. The aesthetic objective for sodium in drinking water is 200 mg/L. However, the local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.
7. "-" indicates that there is no associated value or the parameter was not measured.

Table 6: Summary of Observations from Aquifer Performance Tests

Well ID	Ground Elev. (m ASL)	TOC Elev. (m ASL)	Static WL (m ASL)	Top of Aquifer (m ASL)	Q_t (L/min)	Duration of Pumping (min)	Maximum Δs (m)	Recovery Time (min)
2513529	429.93	430.45	422.05	421.5	65	385	4.99	435
A227593	423.62	424.27	421.92	421.2	55	455	0.78	8
7197381	434.18	434.68	419.63	416.2	42 L/min for 230 min, 36 L/min for 143 min	373	17.95	63

Notes:
Static WL: Elevation of water surface in well immediately before pumping that well for aquifer performance test.
Maximum Δs: Maximum drawdown, the drawdown at the end of pumping.
Recovery Time: Time for well to recover 95% of its maximum drawdown.
Q_t: Well discharge (or pumping) rate during the test.

Table 7: Summary of Aquifer Supply Characteristics

Pumping Well	Well Completion	Pumping Test Date	Analytical Method	Q_t (L/min)	T (m^2/s)	S (--)	K (m/s)	H_A (m)
2513529	Overburden	1/7/2019	Theis	65	1.24E-04	2.18E-01	3.10E-06	8.4
			Theis with Jacob Correction - Early Fit		1.12E-04	3.95E-01	2.80E-06	
			Theis with Jacob Correction - End Fit		1.85E-04	1.36E-02	2.10E-06	
			Cooper & Jacob (Time - Drawdown)		1.18E-04	3.14E-01	2.95E-06	
			Unconfined (Neuman)		1.30E-04	1.96E-03	3.25E-06	
			Double Porosity (Warren & Root)		8.41E-05	6.16E-01	2.10E-06	
				AVERAGE	**1.26E-04**	**2.60E-01**	**2.72E-06**	
A227593	Overburden	1/8/2019	Theis	55	2.98E-03	1.98E-11	6.21E-05	2.4
			Cooper & Jacob (Time - Drawdown)		4.49E-03	1.02E-17	9.36E-05	
				AVERAGE	**3.74E-03**	**9.88E-12**	**7.78E-05**	
7197381	Bedrock	1/9/2019	Theis	40	7.29E-06	3.07E-01	2.08E-07	18.0
			Cooper & Jacob (Time - Drawdown)		1.66E-05	2.20E-01	4.74E-07	
			Theis Recovery - 1		2.34E-05	-	6.67E-07	
			Theis Recovery - 2		1.27E-05	-	3.64E-07	
				AVERAGE	**1.50E-05**	**2.36E-01**	**4.28E-07**	

Notes:

1. Q_t= Discharge flow rate during pumping test
2. T= Transmissivity of the Aquifer
3. S= Storativity of the Aquifer
4. H_A= Available Drawdown, height of water column above the top of the aquifer. Assumed to be the greater of the maximum drawdown during the pumping test or the distance from static water level to the top of the open hole.
5. K= Calculated Hydraulic Conductivity of the Aquifer

Table 8: Estimates of Sustainable Well Yield and Radius of Influence

$$Q_{20} = \frac{S_f Q_t H_A}{s_{100} + 5\Delta s_p} \qquad \Delta s_p = \frac{2.3 Q_t}{4\pi T} \qquad s_{20} = \frac{2.3Q}{4\pi T} log \frac{16436.25T}{r^2 S}$$

Safety Factor (S_f) =	0.7				
Unit Flow =	1000 L/day				
# of Lots =	29			Radius r (m)	
Design Flow (Q) =	29 m^3/day			10	300
Observation Well	s_{100}	Q_{20}	Q_{20}	s_{20}	s_{20}
(--)	(m)	(m^3/day)	(L/day)	(m)	(m)
2513529	4.60	43.7	9.53E+05	1.88	0.43
A227593	0.78	125.3	8.73E+05	0.26	0.21
7197381	12.00	60.3	6.25E+06	12.10	0.01

Notes:

1. s_{100}= Drawdown measured after 100 minutes
2. Q_{20}= Sustainable Well Yield as calculated by the Modified Moell Method (Maathuis and van der Kamp 2006)
3. Q_t= Pumping Rate during the pump tests
4. s_{20}= Drawdown at radius r after 20 years of pumping at Design Flow (Maathuis and van der Kamp 2006)

Table 9: Estimates of Radius of Influence

				# of Lots = 29		
	Flow Rate (Q)	Unit Flow 1000 L/day		Design Flow 29 m^3/day		
		s_{20} (m)				
	Radius r (m)	10	25	50	10	25	300
Observation Well	2513529	0.06	0.05	0.04	1.88	1.49	0.43
	A227593	0.01	0.01	0.01	0.26	0.25	0.21
	7197381	0.42	0.30	0.22	12.10	8.84	0.01

$$s_{20} = \frac{2.3Q}{4\pi T} log \frac{16436.25T}{r^2 S}$$

Notes:

1. s_{20}= Drawdown at radius r after 20 years of pumping at a specified flow rate (Maathuis and van der Kamp 2006)

Table 10: Attenuation of Nitrogen from Sewage Output of Proposed Development

Parameters	Value	Source
Total Precipitation (mm/yr) =	1118.5	Obtained from Environment Canada. Meteorological Service of Canada. Canadian Climate Normals. 1981-2010 Climate Normals & Averages. Durham Ontario.
Evapotranspiration (mm/yr) =	304	Obtained from the MODIS Global Evapotranspiration Dataset
Nitrogen Loading (as Nitrate, g/lot/day) =	40	Specified by Procedure D-5-4
Sewage Effluent (L/lot/day) =	1000	Allowable under Procedure D-5-4
Total Property Area (ha) =	20.8	Concept Lot Layout Proposal
Runoff Coefficient =	0.4	Ministry of Transportation of Ontario. Design Chart 1.07: Runoff Coefficients. Typical Suburban Reside

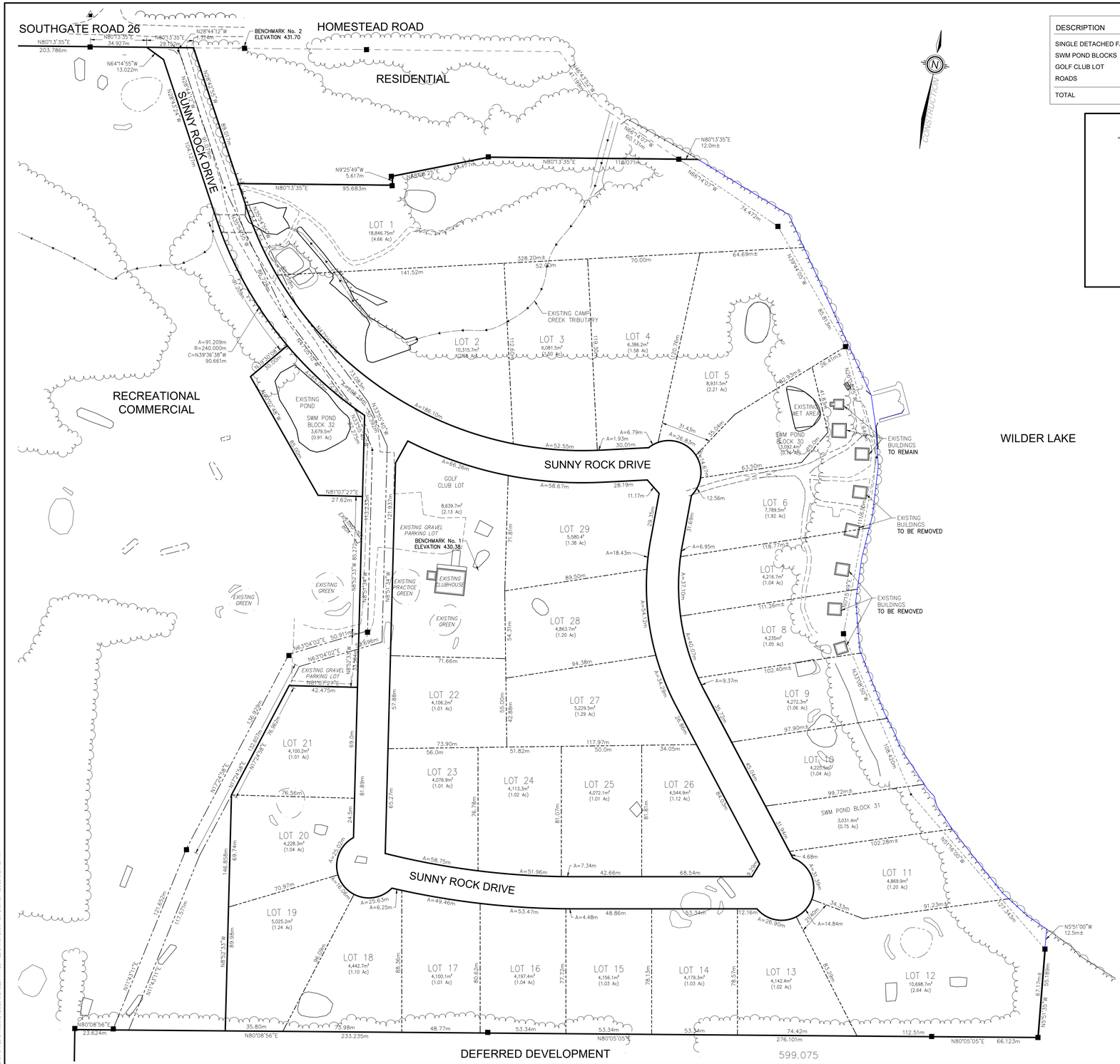
$$C_N = \frac{N_{load}}{V_{sewage} + V_{hydrologic}}$$

		Volumes Available for Dilution		Estimated Nitrogen Concentration (as Nitrate with no Additional Treatment)
Number of Lots	Nitrogen Load (as Nitrate) (kg/yr)	User Input Sewage Effluent (m^3/yr)	Hydrologic Input Infiltration by Water Balance (m^3/yr)	(mg/L)
15	219.0	5475	101650	**2.04**
20	292.0	7300	101650	**2.68**
25	365.0	9125	101650	**3.29**
26	379.6	9490	101650	**3.42**
27	394.2	9855	101650	**3.54**
28	408.8	10220	101650	**3.65**
29	423.4	10585	101650	**3.77**
30	438.0	10950	101650	**3.89**
35	511.0	12775	101650	**4.47**
40	584.0	14600	101650	**5.02**
50	730.0	18250	101650	**6.09**
60	876.0	21900	101650	**7.09**
70	1022.0	25550	101650	**8.03**
80	1168.0	29200	101650	**8.93**
29	423.4	10585	101650	**3.77**

Notes:

1. Nitrogen concentrations in **bold** represent Acceptable Nitrogen Loading
2. Estimated nitrogen concentrations not bolded are considered unacceptable nitrogen loading.
3. 29 lots are proposed for the site (shaded in Grey)

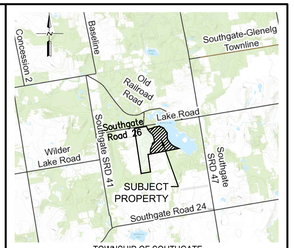
APPENDIX A:
DRAFT PLAN OF SUBDIVISION



DESCRIPTION	LOTS/BLOCKS	UNITS	AREA (ha)
SINGLE DETACHED FAMILY RESIDENTIAL	1 - 29	29	16.60 ha
SWM POND BLOCKS	30, 31, 32	3	0.98 ha
GOLF CLUB LOT		1	0.83 ha
ROADS			2.66 ha
TOTAL		34	21.10 ha

PLANNING ACT SEC.51 (17)

a) See plan
b) See plan
c) See plan
d) Single Family
e) See plan
f) See plan
g) See plan
h) Individual drilled wells
i) Silty sand and gravel
j) See plan
k) Hydro, telephone, fire and police protection, ambulance
l) None



TOWNSHIP OF SOUTHGATE
KEY PLAN
NOT TO SCALE

DRAFT PLAN OF PROPOSED DEVELOPMENT

PART OF LOTS 2, 3 & 4
CONCESSION 21
TOWN OF SOUTHGATE
(GEOGRAPHIC TOWNSHIP OF EGREMONT)
COUNTY OF GREY

OWNER'S CERTIFICATE

I, THE REGISTERED OWNER OF THESE LANDS, HEREBY AUTHORIZE GM BLUEPLAN ENGINEERING LIMITED TO SUBMIT THIS DRAFT PLAN FOR APPROVAL.

SIGNED BY: H. BYE CONSTRUCTION LIMITED — DATE:

SURVEYOR'S CERTIFICATE

I, HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED BY: WILSON - FORD, SURVEYING & ENGINEERING — DATE:

BENCHMARKS :

BENCHMARK No. 1 - ELEVATION 430.38m

TOP OF CASING ON EXISTING WELL LOCATED NEAR THE NORTH EAST CORNER OF THE EXISTING CLUBHOUSE BUILDING.

BENCHMARK No. 2 - ELEVATION 431.70m

TOP OF IB LOCATED APPROXIMATELY 40m EAST OF THE CENTRE OF THE EXISTING ACCESS ROAD TO THE SUBJECT PROPERTY.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM.

NO.	DATE	REVISION DESCRIPTION	CHKD
2	12/02/19	ISSUED FOR DRAFT PLAN APPROVAL	I.E.E.
1	10/28/19	ISSUED FOR REVIEW	I.E.E.

BluePlan ENGINEERING
GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | LONDON | HAMILTON | GTA
1260 - 2ND AVENUE EAST, UNIT 1, OWEN SOUND, ON N4K 2J3
TEL. 519-376-1805
www.gmblueplan.ca

WILDER LAKE SUBDIVISION

H. BYE CONSTRUCTION LIMITED

263512 SOUTHGATE ROAD 26, TOWNSHIP OF SOUTHGATE

DRAFT PLAN OF SUBDIVISION

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
K.B.	I.E.E.	218173	DP
DESIGNED BY :	DATE :	SCALE :	
I.E.E.	MARCH 2019	1:1250	

APPENDIX B:
MECP WATER WELL RECORDS

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

41 A/2E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

2505911 | MUNICIP 25005 | CON CON | 22

COUNTY OR DISTRICT: GREY | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: EGREMONT | CON, BLOCK, TRACT, SURVEY, ETC.: Con 22 | LOT: 004

[redacted]

DATE COMPLETED: DAY 25 MO 11 YR 76

88140 5 | ELEVATION 1400 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Black	Top Soil			0	1
Brown	Gravel	Sand	Boulders	1	43
Grey	Gravel			43	65

31 0001802 | 32 COH3611128113 | 0065211

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0055 ~~70~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0065	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

5 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~62~~ 0062
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE: 0020 GPM | DURATION OF PUMPING: 06 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
014 FEET	030 FEET		030 FEET	030 FEET	030 FEET	030 FEET

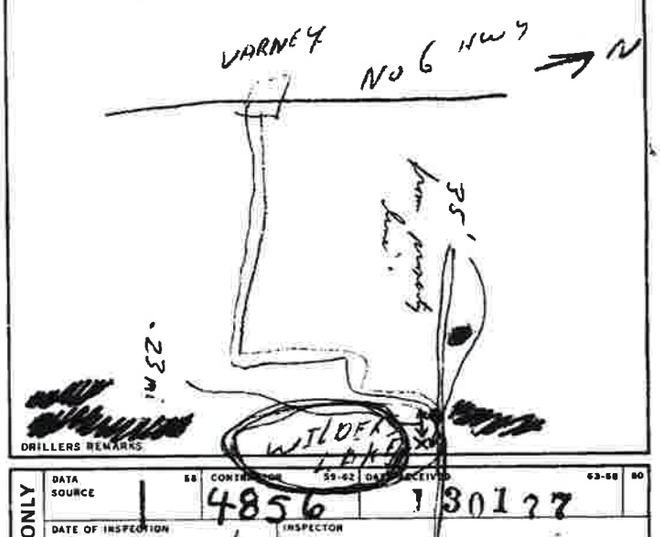
IF FLOWING GIVE RATE: GPM | PUMP INTAKE SET AT: 30 FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 030 FEET | RECOMMENDED PUMPING RATE: 0006 GPM

GPM / FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01 — 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 2 — 1 ☐ CABLE TOOL 2 ☒ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Ray Spencer & Son Well Drlg Inc | LICENCE NUMBER: 4856

ADDRESS: RR#5 Mt Forest

NAME OF DRILLER OR BORER: Ray Spencer | LICENCE NUMBER: 4856

SIGNATURE OF CONTRACTOR: Ray Spencer | SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62: 4856 | DATE RECEIVED 63-68: 130177 | 80

DATE OF INSPECTION: June 23/77 | INSPECTOR

REMARKS: CSS 58 | P B.A. | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

17 520956 XXII
5 4888000 Lot 4 CODED
SP. 1400
22

41A2g

2502592
3 9

WATER RESOURCES DIVISION
AUG 2 1968
ONTARIO WATER RESOURCES COMMISSION

7

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District GREY
Township, Village, Town or City EGREMONT
Con. XXII Lot 4
Date completed 7 (day) JUNE (month) 68 (year)
[redacted] DURHAM ONT

Casing and Screen Record

Inside diameter of casing 4"
Total length of casing 132
Type of screen —
Length of screen —
Depth to top of screen —
Diameter of finished hole 4"

Pumping Test

Static level 27
Test-pumping rate 12 G.P.M.
Pumping level 60
Duration of test pumping 2 HRS
Water clear or cloudy at end of test CLEAR
Recommended pumping rate 10 G.P.M.
with pump setting of 90 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
TOP SOIL	0	2	130	FRESH
BOULDERS	2	50	TD	
QUICK SAND	50	100	132	
SAND + GRAVEL	100	130		
FINE GRAVEL	130	132		

For what purpose(s) is the water to be used? HOUSE HOLD USE
Is well on upland, in valley, or on hillside? UPLAND
Drilling or Boring Firm DURHAM DRILLING & ENTERPRISES LTD
Address DURHAM ONT

Licence Number 2802
Name of Driller or Borer ED HOTCHKISS
Address DURHAM ONT
Date JUNE 7 — 68

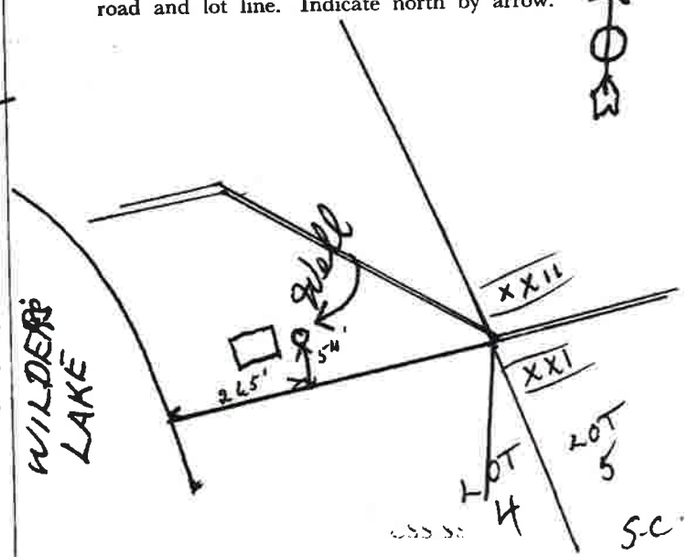
T.E. Johnston
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M-60-4138

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

41 A/2E

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2505769 | MUNICIP. 25005 | COD. CON | 22

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT	DATE COMPLETED
GREY	EGREMONT (FORMERLY MILLER PARK)	22	25-27 204	DAY 05 MO. 07 YR. 76

[redacted] | UTM | 8803a | HC 5 | ELEVATION 1400 | RC 5 | BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BLACK	TOPSOIL			0	2
BROWN	DRY	GRAVEL		2	48
BROWN	MARL	+ SAND		48	130
BROWN	ROCK		HARD	130	154

31 | 0002802 | 0048611168 | 0130633328 | 0154626731

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0145	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
~~70~~	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
~~154~~	1 ☐ FRESH 2 ☒ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	1/4	0	0130
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		130	0154 ~~154~~
	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP ~~2 BAILER~~	0020 GPM	02 HOURS 20 MINS

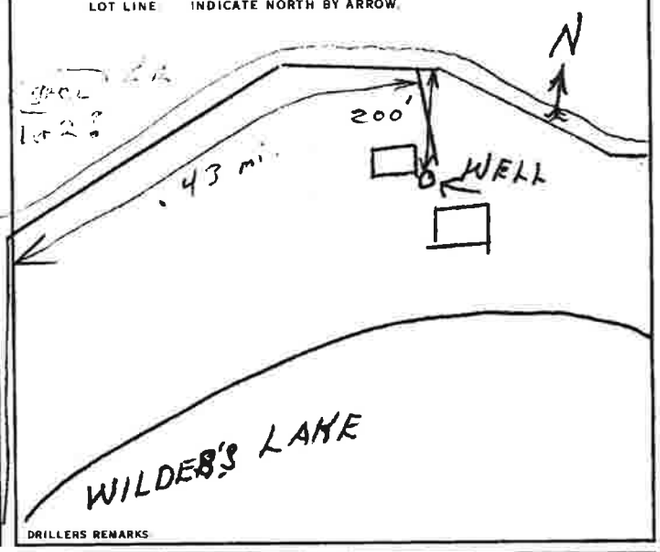
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ TIMES 2 ☒ RECOVERY	30 MINUTES	45 MINUTES	60 MINUTES
018 FEET	~~72~~ 019 FEET	~~18~~ 018 FEET	~~018~~ FEET	018 FEET	~~98~~ FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST	RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
GPM	FEET	1 ☒ CLEAR 2 ☒ CLOUDY	☐ SHALLOW ☒ DEEP	060 FEET	0010 ~~12~~ GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL 94: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 12: 1 ☒ DOMESTIC; 2 ☒ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; ☐ OTHER; 9 ☐ NOT USED

METHOD OF DRILLING 1: 1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: DURHAM DRILLING ENT. LTD. — LICENCE NUMBER: 1804
ADDRESS: RR3 DURHAM
NAME OF DRILLER OR BORER: STEVE KURANYI — LICENCE NUMBER: 1804
SIGNATURE OF CONTRACTOR: P Johnston — SUBMISSION DATE: DAY 9 MO. 7 YR. 76

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1804 | DATE RECEIVED 2 20 9 76
DATE OF INSPECTION June 22/77 | INSPECTOR
REMARKS
P B.H.
W/B

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

41 A/2E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 2506555 MUNICIP. 25005 CON. CON 22

COUNTY OR DISTRICT: Grey
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Egremont
CON. BLOCK, TRACT, SURVEY, ETC.: 22
LOT: 003
ADDRESS OF WELL LOCATION: [redacted]
OWNER: Wilder Lake Resorts Ltd.
DATE COMPLETED: DAY 14 MO 12 YR 77

(21) UTM ZONE 17 EASTING 520400 NORTHING 4888100 RC 5 ELEV 1400 5 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand	Boulders		0	22
Brown	Gravel	Sand, Boulders		22	63
Brown	Clay	Stones		63	85
White	Gravel			85	107

(31) 0922628113 00636 NR813 0085605121 0107111.1

(32)

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0104	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	205	0090	
05"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		90	0107
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

(61) PLUGGING & SEALING RECORD

DEPTH SET AT FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

(71) PUMPING TEST

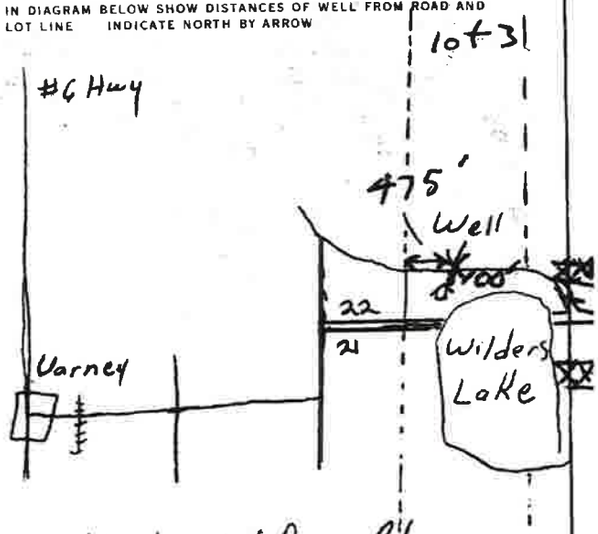
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 0007 GPM
DURATION OF PUMPING: 02 HOURS 10 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
035 FEET	060 FEET		060 FEET	060 FEET	060 FEET	060 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 60 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 060 FEET
RECOMMENDED PUMPING RATE: 0005 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW



DRILLERS REMARKS: Well is 110' from Rd.

FINAL STATUS OF WELL (54): 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE (55-56) 01: 1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING (57) 2: 1 ☐ CABLE TOOL; 2 ☒ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Ray Spencer + Son Well Dr. Inc. — LICENCE NUMBER: 4856
ADDRESS: RR #5 Mount Forest.
NAME OF DRILLER OR BORER: Mike Kelly — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE (58): 1
CONTRACTOR (59-62): 4856
DATE RECEIVED (63-68): 120978
DATE OF INSPECTION: 29, 5, 79
INSPECTOR:
REMARKS:
CSS 58
PLL
WR LL

FORM NO. 0506—4—77

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 2512203 — MUNICIP 25005 — CON. KON 12,1

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON	BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	EGREMONT		#21	4

[redacted] RR#4 DURHAM

DATE COMPLETED: DAY 06 MO 05 YR 93

LINE — RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		TOPSOIL		0	2
		CLAY & STONES		2	129
	GREY	ROCK		129	173

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
168	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
TO 173	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	130
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		130	173
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE/SLOT OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
20		

71 PUMPING TEST

PUMPING TEST METHOD (1 ☐ PUMP 2 ☐ BAILER)	PUMPING RATE GPM	DURATION OF PUMPING HOURS	MINS
AIR	12	1	30

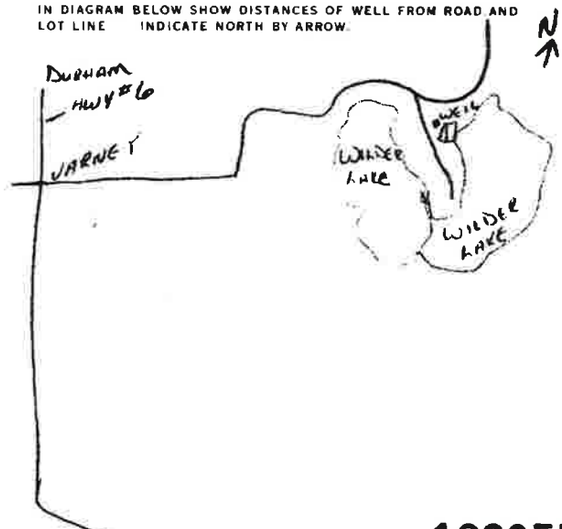
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
14 FEET	45 FEET		45 FEET	45 FEET	45 FEET	45 FEET

IF FLOWING GIVE RATE GPM	PUMP INTAKE SET AT	WATER AT END OF TEST (1 ☒ CLEAR 2 ☐ CLOUDY)
	AIR 173 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	120 FEET	7 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: MOUNT FOREST

109355

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
6 ☐ ABANDONED INSUFFICIENT SUPPLY
6 ☐ ABANDONED POOR QUALITY
7 ☐ UNFINISHED
☐ DEWATERING

WATER USE

1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL
2 ☒ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING
☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: KAUFMAN INVESTMENTS LTD. — WELL CONTRACTOR'S LICENCE NUMBER: 6634

ADDRESS: RR#3 ELMWOOD N0G-1S0

NAME OF WELL TECHNICIAN: KAUFMAN OR JACKSON — WELL TECHNICIAN'S LICENCE NUMBER: T-1920

SIGNATURE OF TECHNICIAN/CONTRACTOR: [signature] — SUBMISSION DATE: DAY 25 MO 05 YR 93

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR 6634 — DATE RECEIVED MAY 27 1993

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

41A/2E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 2507993 MUNICIP 25005 CON ON 22

COUNTY OR DISTRICT: [redacted] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: EGREMONT CON BLOCK TRACT, SURVEY, ETC: 22. LOT: 003

DATE COMPLETED: DAY 30 MO JUNE YR 83

[redacted] JACKSON CRESENT LISTOWEL

3050 8050 ELEVATION 1390 MAIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	SAND	GRAVEL		0	22.
GREY	HARD PAN	GRAVEL		22	59.
BROWN	SAND	CLAY QUICK SAND		59.	80
GREY	GRAVEL			80	105

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
90 TO 105	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.244	0	105
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☑ PUMP 2 ☐ BAILER	6 GPM	4 HOURS ___ MINS

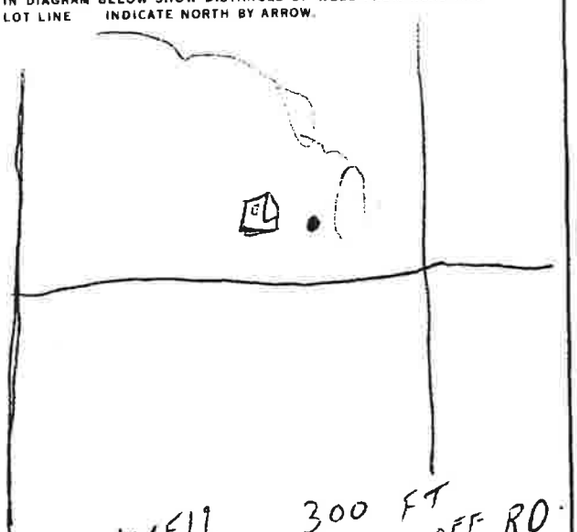
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
35. FEET	75 FEET	1 ☑ PUMPING 2 ☐ RECOVERY	75 FEET	75 FEET	75 FEET	75 FEET

IF FLOWING GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	75 FEET	1 ☑ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	75. FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: WELL 300 FT OFF RD

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☑ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: RAY SPENCE, SON WELL DR. INC. LICENCE NUMBER: 4P56

ADDRESS: RR #5 MT FOREST

NAME OF DRILLER OR BORER: RAY SPENCER LICENCE NUMBER: 4P56

SIGNATURE OF CONTRACTOR: Ray Spence SUBMISSION DATE: DAY ___ MO ___ YR ___

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED 05 10 83

DATE OF INSPECTION 29/11/86 | INSPECTOR

REMARKS: WDE

CSS S#

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of Environment and Energy
Ontario

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 2513529 Municipality 25005 Con CON 21

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
GREY COUNTY	EGREMONT TWP	CON 21	3

[redacted]

Address: R.R#4, DURHAM, ONT

Date completed: 19 day 06 month 98

21 T M Northing RC Elevation RC Basin Code ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth – feet From	Depth – feet To
	TOP SOIL			0	1
BROWN	SAND	STONES		1	65
GREY	SILTY CLAY	STONES		65	77
BROWN	SILTY CLAY	GRAVEL		77	105
BROWN	SAND	GRAVEL	WET	105	113
BROWN	CLAY	GRAVEL		113	116

31

32

41 WATER RECORD

Water found at – feet	Kind of water
10-13: 110-113	1 ☐ Fresh 3 ☐ Sulphur 14; 2 ☑ Salty 4 ☐ Minerals; 5 ☐ Gas (UNTESTED)
15-18	1 ☐ Fresh 3 ☐ Sulphur 19; 2 ☐ Salty 4 ☐ Minerals; 5 ☐ Gas
20-23	1 ☐ Fresh 3 ☐ Sulphur 24; 2 ☐ Salty 4 ☐ Minerals; 5 ☐ Gas
25-28	1 ☐ Fresh 3 ☐ Sulphur 29; 2 ☐ Salty 4 ☐ Minerals; 5 ☐ Gas
30-33	1 ☐ Fresh 3 ☐ Sulphur 34; 2 ☐ Salty 4 ☐ Minerals; 5 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam Inches	Material	Wall thickness Inches	Depth – feet From	Depth – feet To
10-11: 6"	1 ☐ Steel 12; 2 ☑ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic	.188	+1	109 13-16
17-18	1 ☐ Steel 19; 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic			20-23
24-25	1 ☐ Steel 26; 2 ☐ Galvanized; 3 ☐ Concrete; 4 ☐ Open hole; 5 ☐ Plastic			27-30

SCREEN

Sizes of opening (Slot No.) 31-33	Diameter 34-38	Length 39-40
20	6" Inches	3 feet

Material and type	Depth at top of screen 41-44
S/S	110 feet

61 PLUGGING & SEALING RECORD

☑ Annular space ☐ Abandonment

Depth set at – feet From	Depth set at – feet To	Material and type (Cement grout, bentonite, etc.)
10-13: 0	14-17: 41	BENSEAL
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

Pumping test method	Pumping rate 11-14	Duration of pumping 15-16 Hours 17-18 Mins
1 ☐ Pumping 2 ☑ Bailer	15 GPM	1 Hours Mins

Static level 19-21	Water level end of pumping 22-24	Water levels during 25: 1 ☐ Pumping 2 ☑ Recovery			
		15 minutes 26-28	30 minutes 29-31	45 minutes 32-34	60 minutes 35-37
28 feet	feet	28 feet	– feet	– feet	– feet

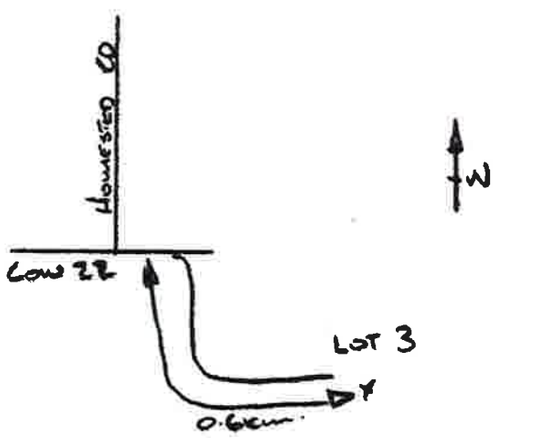
If flowing give rate 38-41	Pump intake set at	Water at end of test 42
– GPM	65 feet	☑ Clear ☐ Cloudy

Recommended pump type	Recommended pump setting 43-45	Recommended pump rate 46-49
☐ Shallow ☑ Deep	85 feet	15 GPM

50-53

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



185774

FINAL STATUS OF WELL 54

1 ☑ Water supply; 2 ☐ Observation well; 3 ☐ Test hole; 4 ☐ Recharge well; 5 ☐ Abandoned, Insufficient supply; 6 ☐ Abandoned, poor quality; 7 ☐ Abandoned (Other); 8 ☐ Dewatering; 9 ☐ Unfinished; 10 ☐ Replacement well

WATER USE 55-56

1 ☑ Domestic; 2 ☐ Stock; 3 ☐ Irrigation; 4 ☐ Industrial; 5 ☐ Commercial; 6 ☐ Municipal; 7 ☐ Public supply; 8 ☐ Cooling & air conditioning; 9 ☐ Not used; 10 ☐ Other

METHOD OF CONSTRUCTION 57

1 ☐ Cable tool; 2 ☐ Rotary (conventional); 3 ☐ Rotary (reverse); 4 ☑ Rotary (air); 5 ☐ Air percussion; 6 ☐ Boring; 7 ☐ Diamond; 8 ☐ Jetting; 9 ☐ Driving; 10 ☐ Digging; 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
HIGHLAND WATER WELL	2576

Address: BOX 141, DURHAM, ONT, N0G 1R0

Name of Well Technician	Well Technician's Licence No.
NIGEL POPPLETON	T-2130

Signature of Technician/Contractor	Submission date
[signature]	day 19 mo 06 98

MINISTRY USE ONLY

Data source 58	Contractor 59-62: 2576	Date received 63-68: JUN 25 1998
Date of inspection	Inspector	
Remarks		CSS. S9

0506 (07/94) Front Form 9

2 - MINISTER OF ENVIRONMENT & ENERGY COPY

Ontario — Ministry of the Environment

Well Tag No. (Sticker supplied by MOE) A 019451

A 019451

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

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 Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN 2 5 0 3 5 CON C 6 N 2 2 LOT 4

[redacted]

Address of Well Location (County/District/Municipality): SOUTH GATE

Township: FOREMONT

Lot: 4

Concession: 22

RR#/Street Number/Name

City/Town/Village

Site/Compartment/Block/Tract etc.

GPS Reading: NAD 8 3 | Zone 1 7 | Easting 5 2 0 7 7 1 | Northing 4 9 8 8 3 9 2

Unit Make/Model: MAGELLAN

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

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
		Topsoil		0	1
		Gravel & Stones		1	25
		Clay & Stones		25	40
		Marl		40	55
		Clay		55	74
		Gravel		74	82

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	20FT	10 inch
20	82FT	9 inch

Water Record

Water found at Metres	Kind of Water		
82FT	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:

After test of well yield, water was ☑ Clear and sediment free ☐ Other, specify

Chlorinated ☑ Yes ☐ No

Construction Record

Inside diam (centimetres)	Material	Wall thickness (centimetres)	Depth From	Depth To (Metres)
Casing				
6	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.188	0	82FT
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		

No Casing or Screen

☐ Open hole

Test of Well Yield

Pumping test method: AIR & PUMP

	Draw Down Time (min)	Draw Down Water Level (Metres)	Recovery Time (min)	Recovery Water Level (Metres)
Static Level		30FT.		50
1	1	38	1	48
2	2	46	2	40
3	3	50FT.	3	32
4	4		4	30FT
5	5		5	
10	10		10	
15	15		15	
20	20		20	
25	25		25	
30	30		30	
40	40		40	
50	50		50	
60	60		60	

Pump intake set at - (metres) 60FT

Pumping rate - (litres/min) 8GAL

Duration of pumping 120 hrs + ___ min

Final water level end of pumping 30FT metres

Recommended pump type: ☐ Shallow ☑ Deep

Recommended pump depth. 60FT metres

Recommended pump rate. 8GAL (litres/min)

If flowing give rate - (litres/min)

If pumping discontinued, give reason.

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
		150LBS 3/8 Holeplug	
0	20FT	50GALS Grout Slurry	

Method of Construction

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

Water Use

☑ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☑ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: KAUFMAN INVESTMENTS LTD. — Well Contractor's Licence No.: 6634

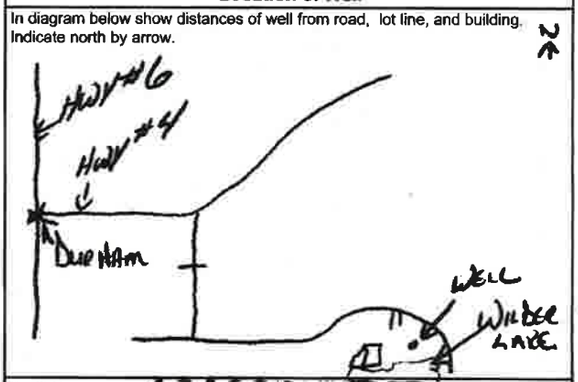
Business Address (street name, number, city etc.): RR#3 Elmwood, Ontario

Name of Well Technician (last name, first name): KAUFMAN & SWEENEY — Well Technician's Licence No.: T-1982

Signature of Technician/Contractor: X [signature] — Date Submitted: YYYY 2004 MM 11 DD 17

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 13433

Date Well Completed: YYYY 2004 MM 09 DD 24

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

Date Delivered: YYYY 2004 MM 10 DD 16

Ministry Use Only

Data Source

Contractor: 6634

Date Received: YYYY NOV 25 2004 MM DD

Date of Inspection: YYYY MM DD

Remarks

Well Record Number: 2516213

0506E (09/03)

Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐

Cette formule est disponible en français

Ontario — Ministry of the Environment

Well Tag A120515 (A-120515)

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☑ Imperial

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	EGREMONT	3	21

County/District/Municipality	City/Town/Village	Province	Postal Code
WESTGREY		Ontario	N0G1R0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	520490	4888113		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	TOPSOIL			0	2FT
	CLAY & STONES			2	133FT
GREY	LIMESTONE		HARD	133	165FT

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20FT	50GAL GROUT SLURRY 150 LBS 3/8 GR. HOLEPLUG	

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☑ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6INCH	STEEL	.188	0	100FT
5INCH	STEEL	.188	90	135FT

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water	Other, specify
165 (m/ft)	☐ Fresh ☐ Untested ☐ Gas	
(m/ft)	☐ Fresh ☐ Untested ☐ Gas	
(m/ft)	☐ Fresh ☐ Untested ☐ Gas	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20FT	10INCH
20	100FT	9INCH
100FT 135	135FT 165	6INCH 5INCH

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☑ Other, specify CLOUDY

If pumping discontinued, give reason:

Pump intake set at (m/ft): AIR-PUMP

Pumping rate (l/min / GPM):

Duration of pumping: 3 hrs + 50 min

Final water level end of pumping (m/ft): 100FT

If flowing give rate (l/min / GPM):

Recommended pump depth (m/ft): 125FT

Recommended pump rate (l/min / GPM): 5 GPM

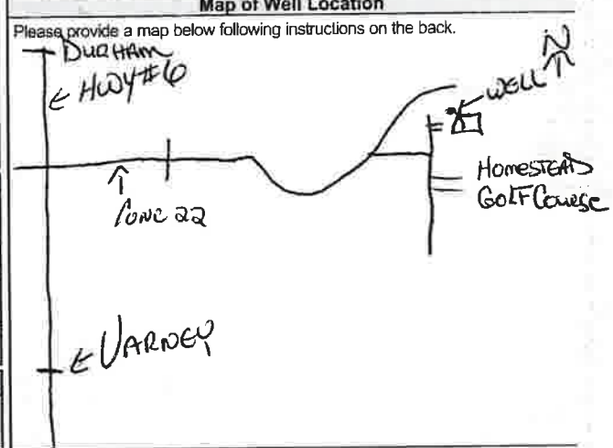
Well production (l/min / GPM): 5 GPM

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		49FT		100FT
1		54	1	95
2		59	2	90
3		64	3	85
4		69	4	80
5		74	5	75
10		99	10	50
15		100FT	15	49FT
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
KAUFMAN INVESTMENTS LTD	6634

Business Address (Street Number/Name)	Municipality
314023 HWY #6 RR#1 DURHAM	WESTGREY

Province	Postal Code	Business E-mail Address
ONTARIO	N0G1R0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
5193693344	KAUFMAN PAUL

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1922	Paul Kaufman	2012/06/05

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No	2012/06/01	2012/05/28

Ministry Use Only

Audit No. Z151531

Received 15 2013

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Ministry's Copy

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* TAG# A019451

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
BOX 1476 WILDER LAKE Rd	EGREMONT	4	22

County/District/Municipality	City/Town/Village	Province	Postal Code
SOUTHGATE		Ontario	N0G1R0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	520771	4888392		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	DEEPENED 6 INCH WELL FROM				
	82 TO 135 FT				
	SAND & GRAVEL			82	130
	CLAY		HARD	130	132FT
	PEA GRAVEL			132	135FT

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5INCH	STEEL	.188	75	135FT

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
135 (m/ft)	☐	☑ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	75FT	6INCH
75	135FT	5INCH

Results of Well Yield Testing

After test of well yield, water was:
☑ Clear and sand free
☐ Other, specify _____

If pumping discontinued, give reason:

Pump intake set at (m/ft): 135 AIR-PUMP

Pumping rate (l/min / GPM): 5 GPM

Duration of pumping: 6 hrs + _____ min

Final water level end of pumping (m/ft): 70 FT

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft): 110 FT

Recommended pump rate (l/min / GPM): 5 GPM

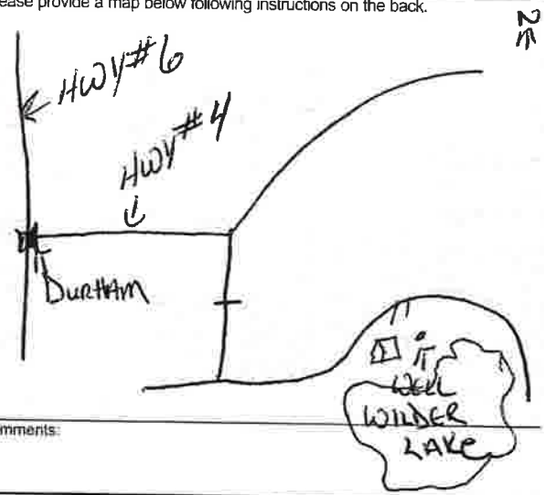
Well production (l/min / GPM): 5 GPM

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		50FT		70
1		55	1	65
2		60	2	60
3		65	3	55
4		70FT	4	50FT
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
KAUFMAN INVESTMENTS LTD	6634

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
314023 HWY #6 RR#1 DURHAM	WESTGREY	ONTARIO	N0G1R0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
5193693344	KAUFMAN PAUL	1922	Paul Kaufman	2013/12/31

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No	20130917	20130904

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APPENDIX C:
LABORATORY CERTIFICATE OF ANALYSIS

Maxxam
A Bureau Veritas Group Company

Your Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Your C.O.C. #: n/a

Attention: Kim Donnelly

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2018/08/10
Report #: R5351388
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B8J8086
Received: 2018/08/03, 09:15

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	3	N/A	2018/08/07	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2018/08/08	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	3	N/A	2018/08/07	CAM SOP-00463	EPA 325.2 m
Conductivity	3	N/A	2018/08/07	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2018/08/07	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	3	N/A	2018/08/09	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	3	2018/08/04	2018/08/09	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	3	N/A	2018/08/09		
Anion and Cation Sum	3	N/A	2018/08/09		
Total Ammonia-N	2	N/A	2018/08/08	CAM SOP-00441	EPA GS I-2522-90 m
Total Ammonia-N	1	N/A	2018/08/10	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2018/08/07	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	3	N/A	2018/08/07	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	3	N/A	2018/08/07	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	3	N/A	2018/08/09		
Sat. pH and Langelier Index (@ 4C)	3	N/A	2018/08/09		
Sulphate by Automated Colourimetry	3	N/A	2018/08/07	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	3	N/A	2018/08/09		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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Your Project #: 219173
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or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: AGibson@maxxam.ca
Phone# (905) 817-5700

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8J8086
Report Date: 2018/08/10

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		HJY620		HJY621	HJY622		
Sampling Date		2018/08/02		2018/08/02	2018/08/02		
COC Number		n/a		n/a	n/a		
	UNITS	BH-1/MW-1	QC Batch	BH-3/MW-3	BH-5/MW-5	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	6.57	5664051	6.66	7.68	N/A	5664051
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	290	5663639	320	350	1.0	5663639
Calculated TDS	mg/L	320	5663133	320	380	1.0	5663133
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.0	5663639	2.1	2.2	1.0	5663639
Cation Sum	me/L	6.72	5664051	6.61	7.54	N/A	5664051
Hardness (CaCO3)	mg/L	320	5663132	330	360	1.0	5663132
Ion Balance (% Difference)	%	1.09	5664049	0.360	0.870	N/A	5664049
Langelier Index (@ 20C)	N/A	0.919	5663640	0.809	0.889		5663640
Langelier Index (@ 4C)	N/A	0.670	5663641	0.560	0.641		5663641
Saturation pH (@ 20C)	N/A	7.11	5663640	7.04	6.95		5663640
Saturation pH (@ 4C)	N/A	7.36	5663641	7.29	7.19		5663641
Inorganics							
Total Ammonia-N	mg/L	0.17	5667142	0.24	0.58	0.050	5666945
Conductivity	umho/cm	580	5665320	580	660	1.0	5665320
Dissolved Organic Carbon	mg/L	0.95	5664567	1.4	2.6	0.50	5664567
Orthophosphate (P)	mg/L	<0.010	5665201	<0.010	<0.010	0.010	5665201
pH	pH	8.03	5665317	7.85	7.83		5665317
Dissolved Sulphate (SO4)	mg/L	8.4	5665200	8.6	15	1.0	5665200
Alkalinity (Total as CaCO3)	mg/L	300	5665315	320	350	1.0	5665315
Dissolved Chloride (Cl-)	mg/L	16	5665198	3.4	13	1.0	5665198
Nitrite (N)	mg/L	<0.010	5665209	<0.010	<0.010	0.010	5665209
Nitrate (N)	mg/L	0.65	5665209	0.21	0.14	0.10	5665209
Nitrate + Nitrite (N)	mg/L	0.65	5665209	0.21	0.14	0.10	5665209
Metals							
Dissolved Aluminum (Al)	ug/L	<5.0	5665152	<5.0	5.2	5.0	5665152
Dissolved Antimony (Sb)	ug/L	<0.50	5665152	<0.50	<0.50	0.50	5665152
Dissolved Arsenic (As)	ug/L	<1.0	5665152	<1.0	<1.0	1.0	5665152
Dissolved Barium (Ba)	ug/L	6.1	5665152	7.0	18	2.0	5665152
Dissolved Beryllium (Be)	ug/L	<0.50	5665152	<0.50	<0.50	0.50	5665152
Dissolved Boron (B)	ug/L	12	5665152	<10	11	10	5665152
Dissolved Cadmium (Cd)	ug/L	<0.10	5665152	<0.10	<0.10	0.10	5665152
Dissolved Calcium (Ca)	ug/L	69000	5665152	76000	89000	200	5665152
Dissolved Chromium (Cr)	ug/L	<5.0	5665152	<5.0	<5.0	5.0	5665152

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8J8086
Report Date: 2018/08/10

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		HJY620		HJY621	HJY622		
Sampling Date		2018/08/02		2018/08/02	2018/08/02		
COC Number		n/a		n/a	n/a		
	UNITS	BH-1/MW-1	QC Batch	BH-3/MW-3	BH-5/MW-5	RDL	QC Batch
Dissolved Cobalt (Co)	ug/L	<0.50	5665152	<0.50	<0.50	0.50	5665152
Dissolved Copper (Cu)	ug/L	<1.0	5665152	1.2	<1.0	1.0	5665152
Dissolved Iron (Fe)	ug/L	<100	5665152	<100	<100	100	5665152
Dissolved Lead (Pb)	ug/L	<0.50	5665152	<0.50	<0.50	0.50	5665152
Dissolved Magnesium (Mg)	ug/L	36000	5665152	33000	34000	50	5665152
Dissolved Manganese (Mn)	ug/L	<2.0	5665152	2.6	210	2.0	5665152
Dissolved Molybdenum (Mo)	ug/L	1.4	5665152	2.8	3.0	0.50	5665152
Dissolved Nickel (Ni)	ug/L	<1.0	5665152	1.1	1.3	1.0	5665152
Dissolved Phosphorus (P)	ug/L	<100	5665152	<100	<100	100	5665152
Dissolved Potassium (K)	ug/L	1200	5665152	750	790	200	5665152
Dissolved Selenium (Se)	ug/L	<2.0	5665152	<2.0	<2.0	2.0	5665152
Dissolved Silicon (Si)	ug/L	3700	5665152	3500	3600	50	5665152
Dissolved Silver (Ag)	ug/L	<0.10	5665152	<0.10	<0.10	0.10	5665152
Dissolved Sodium (Na)	ug/L	4900	5665152	1300	6100	100	5665152
Dissolved Strontium (Sr)	ug/L	290	5665152	74	160	1.0	5665152
Dissolved Thallium (Tl)	ug/L	<0.050	5665152	<0.050	<0.050	0.050	5665152
Dissolved Titanium (Ti)	ug/L	<5.0	5665152	<5.0	<5.0	5.0	5665152
Dissolved Uranium (U)	ug/L	0.52	5665152	0.24	1.3	0.10	5665152
Dissolved Vanadium (V)	ug/L	<0.50	5665152	<0.50	0.85	0.50	5665152
Dissolved Zinc (Zn)	ug/L	<5.0	5665152	<5.0	<5.0	5.0	5665152

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B8J8086
Report Date: 2018/08/10

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

TEST SUMMARY

Maxxam ID: HJY620
Sample ID: BH-1/MW-1
Matrix: Water

Collected: 2018/08/02
Shipped:
Received: 2018/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5665315	N/A	2018/08/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5663639	N/A	2018/08/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	5665198	N/A	2018/08/07	Deonarine Ramnarine
Conductivity	AT	5665320	N/A	2018/08/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5664567	N/A	2018/08/07	Shivani Shivani
Hardness (calculated as CaCO3)		5663132	N/A	2018/08/09	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5665152	2018/08/04	2018/08/09	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5664049	N/A	2018/08/09	Automated Statchk
Anion and Cation Sum	CALC	5664051	N/A	2018/08/09	Automated Statchk
Total Ammonia-N	LACH/NH4	5667142	N/A	2018/08/10	Parminder Sangha
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5665209	N/A	2018/08/07	Chandra Nandlal
pH	AT	5665317	N/A	2018/08/07	Surinder Rai
Orthophosphate	KONE	5665201	N/A	2018/08/07	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5663640	N/A	2018/08/09	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5663641	N/A	2018/08/09	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5665200	N/A	2018/08/07	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5663133	N/A	2018/08/09	Automated Statchk

Maxxam ID: HJY621
Sample ID: BH-3/MW-3
Matrix: Water

Collected: 2018/08/02
Shipped:
Received: 2018/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5665315	N/A	2018/08/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5663639	N/A	2018/08/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	5665198	N/A	2018/08/07	Deonarine Ramnarine
Conductivity	AT	5665320	N/A	2018/08/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5664567	N/A	2018/08/07	Shivani Shivani
Hardness (calculated as CaCO3)		5663132	N/A	2018/08/09	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5665152	2018/08/04	2018/08/09	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5664049	N/A	2018/08/09	Automated Statchk
Anion and Cation Sum	CALC	5664051	N/A	2018/08/09	Automated Statchk
Total Ammonia-N	LACH/NH4	5666945	N/A	2018/08/08	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5665209	N/A	2018/08/07	Chandra Nandlal
pH	AT	5665317	N/A	2018/08/07	Surinder Rai
Orthophosphate	KONE	5665201	N/A	2018/08/07	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5663640	N/A	2018/08/09	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5663641	N/A	2018/08/09	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5665200	N/A	2018/08/07	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5663133	N/A	2018/08/09	Automated Statchk

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A Bureau Veritas Group Company

Maxxam Job #: B8J8086
Report Date: 2018/08/10

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

TEST SUMMARY

Maxxam ID: HJY622
Sample ID: BH-5/MW-5
Matrix: Water

Collected: 2018/08/02
Shipped:
Received: 2018/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5665315	N/A	2018/08/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5663639	N/A	2018/08/08	Automated Statchk
Chloride by Automated Colourimetry	KONE	5665198	N/A	2018/08/07	Deonarine Ramnarine
Conductivity	AT	5665320	N/A	2018/08/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5664567	N/A	2018/08/07	Shivani Shivani
Hardness (calculated as CaCO3)		5663132	N/A	2018/08/09	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5665152	2018/08/04	2018/08/09	Matthew Ritenburg
Ion Balance (% Difference)	CALC	5664049	N/A	2018/08/09	Automated Statchk
Anion and Cation Sum	CALC	5664051	N/A	2018/08/09	Automated Statchk
Total Ammonia-N	LACH/NH4	5666945	N/A	2018/08/08	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5665209	N/A	2018/08/07	Chandra Nandlal
pH	AT	5665317	N/A	2018/08/07	Surinder Rai
Orthophosphate	KONE	5665201	N/A	2018/08/07	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5663640	N/A	2018/08/09	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5663641	N/A	2018/08/09	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5665200	N/A	2018/08/07	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	5663133	N/A	2018/08/09	Automated Statchk

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GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

GENERAL COMMENTS

All of the 500mL General plastic bottles contained visible sediment.
All of the 250mL plastic bottles for NH4 analysis contained visible sediment.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5664567	Dissolved Organic Carbon	2018/08/07	95	80 - 120	96	80 - 120	<0.50	mg/L	0.46	20
5665152	Dissolved Aluminum (Al)	2018/08/09	100	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
5665152	Dissolved Antimony (Sb)	2018/08/09	103	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
5665152	Dissolved Arsenic (As)	2018/08/09	100	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
5665152	Dissolved Barium (Ba)	2018/08/09	99	80 - 120	98	80 - 120	<2.0	ug/L	1.5	20
5665152	Dissolved Beryllium (Be)	2018/08/09	98	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
5665152	Dissolved Boron (B)	2018/08/09	100	80 - 120	97	80 - 120	<10	ug/L	NC	20
5665152	Dissolved Cadmium (Cd)	2018/08/09	100	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
5665152	Dissolved Calcium (Ca)	2018/08/09	NC	80 - 120	97	80 - 120	<200	ug/L	0.69	20
5665152	Dissolved Chromium (Cr)	2018/08/09	96	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
5665152	Dissolved Cobalt (Co)	2018/08/09	101	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
5665152	Dissolved Copper (Cu)	2018/08/09	100	80 - 120	98	80 - 120	<1.0	ug/L	0.88	20
5665152	Dissolved Iron (Fe)	2018/08/09	103	80 - 120	101	80 - 120	<100	ug/L	NC	20
5665152	Dissolved Lead (Pb)	2018/08/09	97	80 - 120	99	80 - 120	<0.50	ug/L	7.9	20
5665152	Dissolved Magnesium (Mg)	2018/08/09	NC	80 - 120	102	80 - 120	<50	ug/L	1.2	20
5665152	Dissolved Manganese (Mn)	2018/08/09	101	80 - 120	99	80 - 120	<2.0	ug/L	NC	20
5665152	Dissolved Molybdenum (Mo)	2018/08/09	104	80 - 120	103	80 - 120	<0.50	ug/L	NC	20
5665152	Dissolved Nickel (Ni)	2018/08/09	98	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
5665152	Dissolved Phosphorus (P)	2018/08/09	106	80 - 120	114	80 - 120	<100	ug/L	NC	20
5665152	Dissolved Potassium (K)	2018/08/09	105	80 - 120	103	80 - 120	<200	ug/L	0.065	20
5665152	Dissolved Selenium (Se)	2018/08/09	99	80 - 120	97	80 - 120	<2.0	ug/L	NC	20
5665152	Dissolved Silicon (Si)	2018/08/09	98	80 - 120	96	80 - 120	<50	ug/L	2.9	20
5665152	Dissolved Silver (Ag)	2018/08/09	97	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
5665152	Dissolved Sodium (Na)	2018/08/09	98	80 - 120	100	80 - 120	<100	ug/L	0.45	20
5665152	Dissolved Strontium (Sr)	2018/08/09	100	80 - 120	98	80 - 120	<1.0	ug/L	0.35	20
5665152	Dissolved Thallium (Tl)	2018/08/09	101	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
5665152	Dissolved Titanium (Ti)	2018/08/09	101	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
5665152	Dissolved Uranium (U)	2018/08/09	97	80 - 120	95	80 - 120	<0.10	ug/L	5.0	20
5665152	Dissolved Vanadium (V)	2018/08/09	99	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
5665152	Dissolved Zinc (Zn)	2018/08/09	99	80 - 120	98	80 - 120	<5.0	ug/L	2.2	20
5665198	Dissolved Chloride (Cl-)	2018/08/07	NC	80 - 120	100	80 - 120	<1.0	mg/L	0.084	20

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B8J8086
Report Date: 2018/08/10

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5665200	Dissolved Sulphate (SO4)	2018/08/07	NC	75 - 125	99	80 - 120	<1.0	mg/L	0.82	20
5665201	Orthophosphate (P)	2018/08/07	92	75 - 125	100	80 - 120	<0.010	mg/L	NC	25
5665209	Nitrate (N)	2018/08/07	100	80 - 120	104	80 - 120	<0.10	mg/L	NC	20
5665209	Nitrite (N)	2018/08/07	90	80 - 120	97	80 - 120	<0.010	mg/L	NC	20
5665315	Alkalinity (Total as CaCO3)	2018/08/07			96	85 - 115	<1.0	mg/L		
5665317	pH	2018/08/07			101	98 - 103			0.14	N/A
5665320	Conductivity	2018/08/07			102	85 - 115	<1.0	umho/cm	0.72	25
5666945	Total Ammonia-N	2018/08/08	97	75 - 125	100	80 - 120	<0.050	mg/L	18	20
5667142	Total Ammonia-N	2018/08/10	99	75 - 125	102	80 - 120	<0.050	mg/L	4.0	20

N/A = Not Applicable

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

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

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

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

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

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

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Maxxam
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Maxxam Job #: B8J8086
Report Date: 2018/08/10

GM BluePlan Engineering Limited
Client Project #: 219173
Site Location: WILDER LAKE SUBDIVISION/WILDER LAKE
Sampler Initials: CS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

Cristina Carriere, Scientific Service Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

Site Location: WILDER LAKE
Your C.O.C. #: N/A

Attention: Kim Donnelly

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2019/01/21
Report #: R5565467
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B908653
Received: 2019/01/11, 09:15

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	4	N/A	2019/01/14	CAM SOP-00448	SM 23 2320 B m
Alkalinity	2	N/A	2019/01/16	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2019/01/15	CAM SOP-00102	APHA 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	2	N/A	2019/01/17	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2019/01/14	CAM SOP-00463	EPA 325.2 m
Chloride by Automated Colourimetry	2	N/A	2019/01/16	CAM SOP-00463	EPA 325.2 m
Conductivity	4	N/A	2019/01/14	CAM SOP-00414	SM 23 2510 m
Conductivity	2	N/A	2019/01/16	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2019/01/12	CAM SOP-00446	SM 23 5310 B m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2019/01/14	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	6	N/A	2019/01/17	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	6	2019/01/16	2019/01/17	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	6	N/A	2019/01/17		
Anion and Cation Sum	6	N/A	2019/01/17		
Total Ammonia-N	6	N/A	2019/01/15	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	4	N/A	2019/01/15	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2019/01/16	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	4	N/A	2019/01/14	CAM SOP-00413	SM 4500H+ B m
pH	2	N/A	2019/01/16	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	4	N/A	2019/01/14	CAM SOP-00461	EPA 365.1 m
Orthophosphate	2	N/A	2019/01/16	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	6	N/A	2019/01/17		
Sat. pH and Langelier Index (@ 4C)	6	N/A	2019/01/17		
Sulphate by Automated Colourimetry	4	N/A	2019/01/14	CAM SOP-00464	EPA 375.4 m
Sulphate by Automated Colourimetry	2	N/A	2019/01/16	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	6	N/A	2019/01/17		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

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Site Location: WILDER LAKE
Your C.O.C. #: N/A

Attention: Kim Donnelly

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2019/01/21
Report #: R5565467
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B908653
Received: 2019/01/11, 09:15

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

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

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

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: AGibson@maxxam.ca
Phone# (905) 817-5700

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS608		ISS609		ISS610		
Sampling Date		2019/01/07 12:13		2019/01/08 16:10		2019/01/07 10:45		
COC Number		N/A		N/A		N/A		
	UNITS	DW-1-SAMPLE 1	QC Batch	DW-1-SAMPLE 2	QC Batch	DW-2-SAMPLE 1	RDL	QC Batch
Calculated Parameters								
Anion Sum	me/L	5.73	5924819	5.66	5924819	6.12	N/A	5924819
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	260	5924262	260	5924262	280	1.0	5924262
Calculated TDS	mg/L	290	5924822	280	5924822	310	1.0	5924822
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.7	5924262	2.5	5924262	2.5	1.0	5924262
Cation Sum	me/L	5.67	5924819	5.69	5924819	6.18	N/A	5924819
Hardness (CaCO3)	mg/L	280	5924264	280	5924264	300	1.0	5924264
Ion Balance (% Difference)	%	0.510	5924818	0.270	5924818	0.540	N/A	5924818
Langelier Index (@ 20C)	N/A	0.836	5924820	0.811	5924820	0.845		5924820
Langelier Index (@ 4C)	N/A	0.587	5924821	0.561	5924821	0.596		5924821
Saturation pH (@ 20C)	N/A	7.20	5924820	7.21	5924820	7.13		5924820
Saturation pH (@ 4C)	N/A	7.45	5924821	7.46	5924821	7.38		5924821
Inorganics								
Total Ammonia-N	mg/L	<0.050	5927341	<0.050	5927341	<0.050	0.050	5927341
Conductivity	umho/cm	520	5924992	520	5929145	560	1.0	5924992
Dissolved Organic Carbon	mg/L	<0.50	5923041	<0.50	5925023	<0.50	0.50	5923041
Orthophosphate (P)	mg/L	<0.010	5925941	<0.010	5930349	<0.010	0.010	5925941
pH	pH	8.04	5924991	8.02	5929150	7.97		5924991
Dissolved Sulphate (SO4)	mg/L	14	5925940	14	5930348	9.9	1.0	5925940
Alkalinity (Total as CaCO3)	mg/L	260	5924985	260	5929141	280	1.0	5924985
Dissolved Chloride (Cl-)	mg/L	5.0	5925939	5.2	5930347	7.6	1.0	5925939
Nitrite (N)	mg/L	0.053	5925937	0.043	5929866	<0.010	0.010	5925937
Nitrate (N)	mg/L	0.60	5925937	0.57	5929866	1.50	0.10	5925937
Nitrate + Nitrite (N)	mg/L	0.65	5925937	0.61	5929866	1.50	0.10	5925937
Metals								
Dissolved Aluminum (Al)	ug/L	<5.0	5931459	<5.0	5931459	<5.0	5.0	5931459
Dissolved Antimony (Sb)	ug/L	<0.50	5931459	<0.50	5931459	<0.50	0.50	5931459
Dissolved Arsenic (As)	ug/L	<1.0	5931459	<1.0	5931459	<1.0	1.0	5931459
Dissolved Barium (Ba)	ug/L	23	5931459	24	5931459	13	2.0	5931459
Dissolved Beryllium (Be)	ug/L	<0.50	5931459	<0.50	5931459	<0.50	0.50	5931459
Dissolved Boron (B)	ug/L	<10	5931459	<10	5931459	<10	10	5931459
Dissolved Cadmium (Cd)	ug/L	<0.10	5931459	<0.10	5931459	<0.10	0.10	5931459
Dissolved Calcium (Ca)	ug/L	62000	5931459	62000	5931459	70000	200	5931459

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS608		ISS609		ISS610		
Sampling Date		2019/01/07 12:13		2019/01/08 16:10		2019/01/07 10:45		
COC Number		N/A		N/A		N/A		
	UNITS	DW-1-SAMPLE 1	QC Batch	DW-1-SAMPLE 2	QC Batch	DW-2-SAMPLE 1	RDL	QC Batch
Dissolved Chromium (Cr)	ug/L	<5.0	5931459	<5.0	5931459	<5.0	5.0	5931459
Dissolved Cobalt (Co)	ug/L	<0.50	5931459	<0.50	5931459	<0.50	0.50	5931459
Dissolved Copper (Cu)	ug/L	<1.0	5931459	<1.0	5931459	1.1	1.0	5931459
Dissolved Iron (Fe)	ug/L	<100	5931459	<100	5931459	<100	100	5931459
Dissolved Lead (Pb)	ug/L	<0.50	5931459	<0.50	5931459	<0.50	0.50	5931459
Dissolved Magnesium (Mg)	ug/L	30000	5931459	30000	5931459	31000	50	5931459
Dissolved Manganese (Mn)	ug/L	53	5931459	59	5931459	<2.0	2.0	5931459
Dissolved Molybdenum (Mo)	ug/L	0.59	5931459	0.61	5931459	<0.50	0.50	5931459
Dissolved Nickel (Ni)	ug/L	<1.0	5931459	<1.0	5931459	<1.0	1.0	5931459
Dissolved Phosphorus (P)	ug/L	<100	5931459	<100	5931459	<100	100	5931459
Dissolved Potassium (K)	ug/L	710	5931459	690	5931459	810	200	5931459
Dissolved Selenium (Se)	ug/L	<2.0	5931459	<2.0	5931459	<2.0	2.0	5931459
Dissolved Silicon (Si)	ug/L	5300	5931459	5300	5931459	4600	50	5931459
Dissolved Silver (Ag)	ug/L	<0.10	5931459	<0.10	5931459	<0.10	0.10	5931459
Dissolved Sodium (Na)	ug/L	2700	5931459	2700	5931459	3200	100	5931459
Dissolved Strontium (Sr)	ug/L	710	5931459	710	5931459	440	1.0	5931459
Dissolved Thallium (Tl)	ug/L	<0.050	5931459	<0.050	5931459	<0.050	0.050	5931459
Dissolved Titanium (Ti)	ug/L	<5.0	5931459	<5.0	5931459	<5.0	5.0	5931459
Dissolved Uranium (U)	ug/L	1.2	5931459	1.2	5931459	0.73	0.10	5931459
Dissolved Vanadium (V)	ug/L	<0.50	5931459	<0.50	5931459	<0.50	0.50	5931459
Dissolved Zinc (Zn)	ug/L	<5.0	5931459	<5.0	5931459	<5.0	5.0	5931459

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS611			ISS611			ISS612		
Sampling Date		2019/01/08 16:35			2019/01/08 16:35			2019/01/07 10:45		
COC Number		N/A			N/A			N/A		
	UNITS	DW-2-SAMPLE 2	RDL	QC Batch	DW-2-SAMPLE 2 Lab-Dup	RDL	QC Batch	DW-3-SAMPLE 1	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	6.05	N/A	5924819				5.22	N/A	5924819
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	270	1.0	5924262				240	1.0	5924262
Calculated TDS	mg/L	300	1.0	5924822				260	1.0	5924822
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.2	1.0	5924262				2.3	1.0	5924262
Cation Sum	me/L	6.00	N/A	5924819				5.09	N/A	5924819
Hardness (CaCO3)	mg/L	290	1.0	5924264				250	1.0	5924264
Ion Balance (% Difference)	%	0.450	N/A	5924818				1.26	N/A	5924818
Langelier Index (@ 20C)	N/A	0.785		5924820				0.732		5924820
Langelier Index (@ 4C)	N/A	0.536		5924821				0.483		5924821
Saturation pH (@ 20C)	N/A	7.14		5924820				7.27		5924820
Saturation pH (@ 4C)	N/A	7.39		5924821				7.52		5924821
Inorganics										
Total Ammonia-N	mg/L	<0.050	0.050	5927341	<0.050	0.050	5927341	<0.050	0.050	5927341
Conductivity	umho/cm	560	1.0	5925972				480	1.0	5924992
Dissolved Organic Carbon	mg/L	<0.50	0.50	5925023				<0.50	0.50	5923041
Orthophosphate (P)	mg/L	<0.010	0.010	5925941				<0.010	0.010	5925941
pH	pH	7.93		5925974				8.00		5924991
Dissolved Sulphate (SO4)	mg/L	10	1.0	5925940				12	1.0	5925940
Alkalinity (Total as CaCO3)	mg/L	280	1.0	5925971				240	1.0	5924985
Dissolved Chloride (Cl-)	mg/L	6.9	1.0	5925939				3.8	1.0	5925939
Nitrite (N)	mg/L	<0.010	0.010	5925937				<0.010	0.010	5925937
Nitrate (N)	mg/L	1.41	0.10	5925937				0.42	0.10	5925937
Nitrate + Nitrite (N)	mg/L	1.41	0.10	5925937				0.42	0.10	5925937
Metals										
Dissolved Aluminum (Al)	ug/L	<5.0	5.0	5931459				<5.0	5.0	5931459
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	5931459				<0.50	0.50	5931459
Dissolved Arsenic (As)	ug/L	<1.0	1.0	5931459				1.6	1.0	5931459
Dissolved Barium (Ba)	ug/L	13	2.0	5931459				17	2.0	5931459
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	5931459				<0.50	0.50	5931459
Dissolved Boron (B)	ug/L	<10	10	5931459				10	10	5931459
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	5931459				<0.10	0.10	5931459
Dissolved Calcium (Ca)	ug/L	68000	200	5931459				56000	200	5931459

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS611			ISS611			ISS612		
Sampling Date		2019/01/08 16:35			2019/01/08 16:35			2019/01/07 10:45		
COC Number		N/A			N/A			N/A		
	UNITS	DW-2-SAMPLE 2	RDL	QC Batch	DW-2-SAMPLE 2 Lab-Dup	RDL	QC Batch	DW-3-SAMPLE 1	RDL	QC Batch
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	5931459				<5.0	5.0	5931459
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	5931459				<0.50	0.50	5931459
Dissolved Copper (Cu)	ug/L	<1.0	1.0	5931459				<1.0	1.0	5931459
Dissolved Iron (Fe)	ug/L	<100	100	5931459				<100	100	5931459
Dissolved Lead (Pb)	ug/L	<0.50	0.50	5931459				<0.50	0.50	5931459
Dissolved Magnesium (Mg)	ug/L	30000	50	5931459				26000	50	5931459
Dissolved Manganese (Mn)	ug/L	<2.0	2.0	5931459				4.6	2.0	5931459
Dissolved Molybdenum (Mo)	ug/L	<0.50	0.50	5931459				1.4	0.50	5931459
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	5931459				<1.0	1.0	5931459
Dissolved Phosphorus (P)	ug/L	<100	100	5931459				<100	100	5931459
Dissolved Potassium (K)	ug/L	780	200	5931459				520	200	5931459
Dissolved Selenium (Se)	ug/L	<2.0	2.0	5931459				<2.0	2.0	5931459
Dissolved Silicon (Si)	ug/L	4700	50	5931459				4900	50	5931459
Dissolved Silver (Ag)	ug/L	<0.10	0.10	5931459				<0.10	0.10	5931459
Dissolved Sodium (Na)	ug/L	3200	100	5931459				3200	100	5931459
Dissolved Strontium (Sr)	ug/L	440	1.0	5931459				700	1.0	5931459
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	5931459				<0.050	0.050	5931459
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	5931459				<5.0	5.0	5931459
Dissolved Uranium (U)	ug/L	0.71	0.10	5931459				1.3	0.10	5931459
Dissolved Vanadium (V)	ug/L	<0.50	0.50	5931459				<0.50	0.50	5931459
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	5931459				<5.0	5.0	5931459

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS613			ISS613		
Sampling Date		2019/01/08 14:45			2019/01/08 14:45		
COC Number		N/A			N/A		
	UNITS	DW-3-SAMPLE 2	RDL	QC Batch	DW-3-SAMPLE 2 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	5.19	N/A	5924819			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	240	1.0	5924262			
Calculated TDS	mg/L	260	1.0	5924822			
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.1	1.0	5924262			
Cation Sum	me/L	5.17	N/A	5924819			
Hardness (CaCO3)	mg/L	250	1.0	5924264			
Ion Balance (% Difference)	%	0.140	N/A	5924818			
Langelier Index (@ 20C)	N/A	0.878		5924820			
Langelier Index (@ 4C)	N/A	0.628		5924821			
Saturation pH (@ 20C)	N/A	7.27		5924820			
Saturation pH (@ 4C)	N/A	7.52		5924821			
Inorganics							
Total Ammonia-N	mg/L	<0.050	0.050	5927341			
Conductivity	umho/cm	470	1.0	5929145			
Dissolved Organic Carbon	mg/L	<0.50	0.50	5925023			
Orthophosphate (P)	mg/L	<0.010	0.010	5930349	<0.010	0.010	5930349
pH	pH	8.15		5929150			
Dissolved Sulphate (SO4)	mg/L	12	1.0	5930348	12	1.0	5930348
Alkalinity (Total as CaCO3)	mg/L	240	1.0	5929141			
Dissolved Chloride (Cl-)	mg/L	4.0	1.0	5930347	3.7	1.0	5930347
Nitrite (N)	mg/L	<0.010	0.010	5929866	<0.010	0.010	5929866
Nitrate (N)	mg/L	0.38	0.10	5929866	0.38	0.10	5929866
Nitrate + Nitrite (N)	mg/L	0.38	0.10	5929866	0.38	0.10	5929866
Metals							
Dissolved Aluminum (Al)	ug/L	<5.0	5.0	5931459			
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	5931459			
Dissolved Arsenic (As)	ug/L	1.4	1.0	5931459			
Dissolved Barium (Ba)	ug/L	17	2.0	5931459			
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	5931459			
Dissolved Boron (B)	ug/L	10	10	5931459			
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	5931459			
Dissolved Calcium (Ca)	ug/L	57000	200	5931459			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

RCAP - COMPREHENSIVE (LAB FILTERED)

Maxxam ID		ISS613			ISS613		
Sampling Date		2019/01/08 14:45			2019/01/08 14:45		
COC Number		N/A			N/A		
	UNITS	DW-3-SAMPLE 2	RDL	QC Batch	DW-3-SAMPLE 2 Lab-Dup	RDL	QC Batch
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	5931459			
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	5931459			
Dissolved Copper (Cu)	ug/L	<1.0	1.0	5933685	<1.0	1.0	5933685
Dissolved Iron (Fe)	ug/L	<100	100	5931459			
Dissolved Lead (Pb)	ug/L	<0.50	0.50	5931459			
Dissolved Magnesium (Mg)	ug/L	26000	50	5931459			
Dissolved Manganese (Mn)	ug/L	4.0	2.0	5931459			
Dissolved Molybdenum (Mo)	ug/L	1.4	0.50	5931459			
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	5931459			
Dissolved Phosphorus (P)	ug/L	<100	100	5931459			
Dissolved Potassium (K)	ug/L	540	200	5931459			
Dissolved Selenium (Se)	ug/L	<2.0	2.0	5931459			
Dissolved Silicon (Si)	ug/L	4900	50	5931459			
Dissolved Silver (Ag)	ug/L	<0.10	0.10	5931459			
Dissolved Sodium (Na)	ug/L	3300	100	5931459			
Dissolved Strontium (Sr)	ug/L	700	1.0	5931459			
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	5931459			
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	5931459			
Dissolved Uranium (U)	ug/L	1.4	0.10	5931459			
Dissolved Vanadium (V)	ug/L	<0.50	0.50	5931459			
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	5931459			

RDL = Reportable Detection Limit
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Maxxam
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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

TEST SUMMARY

Maxxam ID: ISS608
Sample ID: DW-1-SAMPLE 1
Matrix: Water

Collected: 2019/01/07
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5924985	N/A	2019/01/14	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	5925939	N/A	2019/01/14	Deonarine Ramnarine
Conductivity	AT	5924992	N/A	2019/01/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5923041	N/A	2019/01/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5925937	N/A	2019/01/15	Amanpreet Sappal
pH	AT	5924991	N/A	2019/01/14	Surinder Rai
Orthophosphate	KONE	5925941	N/A	2019/01/14	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5925940	N/A	2019/01/14	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

Maxxam ID: ISS609
Sample ID: DW-1-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5929141	N/A	2019/01/16	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/17	Automated Statchk
Chloride by Automated Colourimetry	KONE	5930347	N/A	2019/01/16	Alina Dobreanu
Conductivity	AT	5929145	N/A	2019/01/16	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5925023	N/A	2019/01/14	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5929866	N/A	2019/01/16	Amanpreet Sappal
pH	AT	5929150	N/A	2019/01/16	Surinder Rai
Orthophosphate	KONE	5930349	N/A	2019/01/16	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5930348	N/A	2019/01/16	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

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Maxxam
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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

TEST SUMMARY

Maxxam ID: ISS610
Sample ID: DW-2-SAMPLE 1
Matrix: Water

Collected: 2019/01/07
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5924985	N/A	2019/01/14	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	5925939	N/A	2019/01/14	Deonarine Ramnarine
Conductivity	AT	5924992	N/A	2019/01/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5923041	N/A	2019/01/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5925937	N/A	2019/01/15	Amanpreet Sappal
pH	AT	5924991	N/A	2019/01/14	Surinder Rai
Orthophosphate	KONE	5925941	N/A	2019/01/14	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5925940	N/A	2019/01/14	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

Maxxam ID: ISS611
Sample ID: DW-2-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5925971	N/A	2019/01/14	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	5925939	N/A	2019/01/14	Deonarine Ramnarine
Conductivity	AT	5925972	N/A	2019/01/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5925023	N/A	2019/01/14	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5925937	N/A	2019/01/15	Amanpreet Sappal
pH	AT	5925974	N/A	2019/01/14	Surinder Rai
Orthophosphate	KONE	5925941	N/A	2019/01/14	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5925940	N/A	2019/01/14	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

TEST SUMMARY

Maxxam ID: ISS611 Dup
Sample ID: DW-2-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware

Maxxam ID: ISS612
Sample ID: DW-3-SAMPLE 1
Matrix: Water

Collected: 2019/01/07
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5924985	N/A	2019/01/14	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/15	Automated Statchk
Chloride by Automated Colourimetry	KONE	5925939	N/A	2019/01/14	Deonarine Ramnarine
Conductivity	AT	5924992	N/A	2019/01/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5923041	N/A	2019/01/12	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5925937	N/A	2019/01/15	Amanpreet Sappal
pH	AT	5924991	N/A	2019/01/14	Surinder Rai
Orthophosphate	KONE	5925941	N/A	2019/01/14	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5925940	N/A	2019/01/14	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

Maxxam ID: ISS613
Sample ID: DW-3-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	5929141	N/A	2019/01/16	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	5924262	N/A	2019/01/17	Automated Statchk
Chloride by Automated Colourimetry	KONE	5930347	N/A	2019/01/16	Alina Dobreanu
Conductivity	AT	5929145	N/A	2019/01/16	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	5925023	N/A	2019/01/14	Mandeep Kaur
Hardness (calculated as CaCO3)		5924264	N/A	2019/01/17	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	5931459	2019/01/16	2019/01/17	Thao Nguyen
Ion Balance (% Difference)	CALC	5924818	N/A	2019/01/17	Automated Statchk
Anion and Cation Sum	CALC	5924819	N/A	2019/01/17	Automated Statchk
Total Ammonia-N	LACH/NH4	5927341	N/A	2019/01/15	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5929866	N/A	2019/01/16	Amanpreet Sappal
pH	AT	5929150	N/A	2019/01/16	Surinder Rai
Orthophosphate	KONE	5930349	N/A	2019/01/16	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	5924820	N/A	2019/01/17	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	5924821	N/A	2019/01/17	Automated Statchk
Sulphate by Automated Colourimetry	KONE	5930348	N/A	2019/01/16	Deonarine Ramnarine

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Maxxam
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Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

TEST SUMMARY

Maxxam ID: ISS613
Sample ID: DW-3-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Dissolved Solids (TDS calc)	CALC	5924822	N/A	2019/01/17	Automated Statchk

Maxxam ID: ISS613 Dup
Sample ID: DW-3-SAMPLE 2
Matrix: Water

Collected: 2019/01/08
Shipped:
Received: 2019/01/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	5930347	N/A	2019/01/16	Alina Dobreanu
Lab Filtered Metals by ICPMS	ICP/MS	5933685	2019/01/17	2019/01/18	Thao Nguyen
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	5929866	N/A	2019/01/16	Amanpreet Sappal
Orthophosphate	KONE	5930349	N/A	2019/01/16	Alina Dobreanu
Sulphate by Automated Colourimetry	KONE	5930348	N/A	2019/01/16	Deonarine Ramnarine

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Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
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GENERAL COMMENTS

Results relate only to the items tested.

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Report Date: 2019/01/21

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5923041	Dissolved Organic Carbon	2019/01/11	95	80 - 120	98	80 - 120	<0.50	mg/L	1.3	20
5924985	Alkalinity (Total as CaCO3)	2019/01/14			95	85 - 115	<1.0	mg/L	1.7	20
5924991	pH	2019/01/14			102	98 - 103			0.63	N/A
5924992	Conductivity	2019/01/14			100	85 - 115	<1.0	umho/cm	0.28	25
5925023	Dissolved Organic Carbon	2019/01/14	97	80 - 120	98	80 - 120	<0.50	mg/L	0.017	20
5925937	Nitrate (N)	2019/01/15	102	80 - 120	103	80 - 120	<0.10	mg/L	NC	20
5925937	Nitrite (N)	2019/01/15	101	80 - 120	101	80 - 120	<0.010	mg/L	NC	20
5925939	Dissolved Chloride (Cl-)	2019/01/14	92	80 - 120	103	80 - 120	<1.0	mg/L	0.32	20
5925940	Dissolved Sulphate (SO4)	2019/01/14	NC	75 - 125	108	80 - 120	<1.0	mg/L	0.49	20
5925941	Orthophosphate (P)	2019/01/14	103	75 - 125	99	80 - 120	<0.010	mg/L	NC	25
5925971	Alkalinity (Total as CaCO3)	2019/01/14			94	85 - 115	<1.0	mg/L	1.2	20
5925972	Conductivity	2019/01/14			100	85 - 115	<1.0	umho/cm	0.15	25
5925974	pH	2019/01/14			102	98 - 103			0.39	N/A
5927341	Total Ammonia-N	2019/01/15	98	75 - 125	99	80 - 120	<0.050	mg/L	NC	20
5929141	Alkalinity (Total as CaCO3)	2019/01/16			96	85 - 115	<1.0	mg/L	0.036	20
5929145	Conductivity	2019/01/16			100	85 - 115	<1.0	umho/cm	0.38	25
5929150	pH	2019/01/16			102	98 - 103			0.29	N/A
5929866	Nitrate (N)	2019/01/16	98	80 - 120	101	80 - 120	<0.10	mg/L	1.4	20
5929866	Nitrite (N)	2019/01/16	103	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
5930347	Dissolved Chloride (Cl-)	2019/01/16	109	80 - 120	104	80 - 120	<1.0	mg/L	6.7	20
5930348	Dissolved Sulphate (SO4)	2019/01/16	107	75 - 125	105	80 - 120	<1.0	mg/L	0.35	20
5930349	Orthophosphate (P)	2019/01/16	102	75 - 125	100	80 - 120	<0.010	mg/L	NC	25
5931459	Dissolved Aluminum (Al)	2019/01/17	97	80 - 120	104	80 - 120	<5.0	ug/L		
5931459	Dissolved Antimony (Sb)	2019/01/17	99	80 - 120	102	80 - 120	<0.50	ug/L	6.2	20
5931459	Dissolved Arsenic (As)	2019/01/17	94	80 - 120	101	80 - 120	<1.0	ug/L	5.6	20
5931459	Dissolved Barium (Ba)	2019/01/17	93	80 - 120	100	80 - 120	<2.0	ug/L	1.1	20
5931459	Dissolved Beryllium (Be)	2019/01/17	93	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
5931459	Dissolved Boron (B)	2019/01/17	94	80 - 120	100	80 - 120	<10	ug/L	1.7	20
5931459	Dissolved Cadmium (Cd)	2019/01/17	94	80 - 120	101	80 - 120	<0.10	ug/L	NC	20
5931459	Dissolved Calcium (Ca)	2019/01/17	NC	80 - 120	101	80 - 120	<200	ug/L		
5931459	Dissolved Chromium (Cr)	2019/01/17	93	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
5931459	Dissolved Cobalt (Co)	2019/01/17	93	80 - 120	101	80 - 120	<0.50	ug/L	9.8	20
5931459	Dissolved Copper (Cu)	2019/01/17	93	80 - 120	100	80 - 120	<1.0	ug/L	NC	20

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
5931459	Dissolved Iron (Fe)	2019/01/17	94	80 - 120	101	80 - 120	<100	ug/L		
5931459	Dissolved Lead (Pb)	2019/01/17	90	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
5931459	Dissolved Magnesium (Mg)	2019/01/17	96	80 - 120	100	80 - 120	<50	ug/L		
5931459	Dissolved Manganese (Mn)	2019/01/17	93	80 - 120	101	80 - 120	<2.0	ug/L		
5931459	Dissolved Molybdenum (Mo)	2019/01/17	99	80 - 120	102	80 - 120	<0.50	ug/L	0.58	20
5931459	Dissolved Nickel (Ni)	2019/01/17	92	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
5931459	Dissolved Phosphorus (P)	2019/01/17	96	80 - 120	118	80 - 120	<100	ug/L		
5931459	Dissolved Potassium (K)	2019/01/17	95	80 - 120	100	80 - 120	<200	ug/L		
5931459	Dissolved Selenium (Se)	2019/01/17	98	80 - 120	105	80 - 120	<2.0	ug/L	NC	20
5931459	Dissolved Silicon (Si)	2019/01/17	96	80 - 120	103	80 - 120	<50	ug/L		
5931459	Dissolved Silver (Ag)	2019/01/17	95	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
5931459	Dissolved Sodium (Na)	2019/01/17	NC	80 - 120	100	80 - 120	<100	ug/L	1.7	20
5931459	Dissolved Strontium (Sr)	2019/01/17	95	80 - 120	100	80 - 120	<1.0	ug/L		
5931459	Dissolved Thallium (Tl)	2019/01/17	91	80 - 120	97	80 - 120	<0.050	ug/L	NC	20
5931459	Dissolved Titanium (Ti)	2019/01/17	95	80 - 120	102	80 - 120	<5.0	ug/L		
5931459	Dissolved Uranium (U)	2019/01/17	90	80 - 120	98	80 - 120	<0.10	ug/L	2.5	20
5931459	Dissolved Vanadium (V)	2019/01/17	93	80 - 120	100	80 - 120	<0.50	ug/L	13	20
5931459	Dissolved Zinc (Zn)	2019/01/17	93	80 - 120	102	80 - 120	<5.0	ug/L	NC	20
5933685	Dissolved Copper (Cu)	2019/01/18	98	80 - 120	100	80 - 120	<1.0	ug/L	NC	20

N/A = Not Applicable

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

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

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

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

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

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

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B908653
Report Date: 2019/01/21

GM BluePlan Engineering Limited
Site Location: WILDER LAKE
Sampler Initials: JW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Maxxam
A Bureau Veritas Group Company

Your Project #: 218173
Site#: 263512 SOUTHGATE RD
Site Location: WILDER LAKE DEVELOPMENT
Your C.O.C. #: na, 709966-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2019/05/08
Report #: R5702847
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B8363
Received: 2019/05/03, 09:05

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	1	N/A	2019/05/07	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2019/05/07	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2019/05/06	CAM SOP-00463	SM 4500-Cl E m
Conductivity	1	N/A	2019/05/07	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2019/05/06	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2019/05/08	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	1	N/A	2019/05/08	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2019/05/08		
Anion and Cation Sum	1	N/A	2019/05/08		
Total Ammonia-N	1	N/A	2019/05/06	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2019/05/07	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2019/05/04	2019/05/07	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	1	N/A	2019/05/06	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2019/05/08		
Sat. pH and Langelier Index (@ 4C)	1	N/A	2019/05/08		
Sulphate by Automated Colourimetry	1	N/A	2019/05/06	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	1	N/A	2019/05/08		

Remarks:

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

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

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

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Maxxam
A Bureau Veritas Group Company

Your Project #: 218173
Site#: 263512 SOUTHGATE RD
Site Location: WILDER LAKE DEVELOPMENT
Your C.O.C. #: na, 709966-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
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Report Date: 2019/05/08
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B8363
Received: 2019/05/03, 09:05
agent.

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

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: AGibson@maxxam.ca
Phone# (905) 817-5700

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9B8363
Report Date: 2019/05/08

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

RCAP - COMPREHENSIVE (WATER)

Maxxam ID		JPQ777		
Sampling Date		2019/05/02		
COC Number		709966-01-01		
	UNITS	MW-06	RDL	QC Batch
Calculated Parameters				
Anion Sum	me/L	5.37	N/A	6103891
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	240	1.0	6103892
Calculated TDS	mg/L	270	1.0	6103888
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.3	1.0	6103892
Cation Sum	me/L	5.68	N/A	6103891
Hardness (CaCO3)	mg/L	270	1.0	6103889
Ion Balance (% Difference)	%	2.80	N/A	6103890
Langelier Index (@ 20C)	N/A	0.937		6103886
Langelier Index (@ 4C)	N/A	0.687		6103887
Saturation pH (@ 20C)	N/A	7.24		6103886
Saturation pH (@ 4C)	N/A	7.49		6103887
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	6105421
Conductivity	umho/cm	470	1.0	6104173
Dissolved Organic Carbon	mg/L	1.2	0.50	6104098
Orthophosphate (P)	mg/L	<0.010	0.010	6104195
pH	pH	8.17		6104175
Dissolved Sulphate (SO4)	mg/L	12	1.0	6104197
Alkalinity (Total as CaCO3)	mg/L	240	1.0	6104171
Dissolved Chloride (Cl-)	mg/L	8.2	1.0	6104196
Nitrite (N)	mg/L	<0.010	0.010	6104187
Nitrate (N)	mg/L	1.10	0.10	6104187
Nitrate + Nitrite (N)	mg/L	1.10	0.10	6104187
Metals				
Dissolved Aluminum (Al)	ug/L	9.2	5.0	6105543
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	6105543
Dissolved Arsenic (As)	ug/L	<1.0	1.0	6105543
Dissolved Barium (Ba)	ug/L	11	2.0	6105543
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	6105543
Dissolved Boron (B)	ug/L	<10	10	6105543
Dissolved Cadmium (Cd)	ug/L	<0.10	0.10	6105543
Dissolved Calcium (Ca)	ug/L	62000	200	6105543
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	6105543
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	6105543

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Maxxam
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Maxxam Job #: B9B8363
Report Date: 2019/05/08

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

RCAP - COMPREHENSIVE (WATER)

Maxxam ID		JPQ777		
Sampling Date		2019/05/02		
COC Number		709966-01-01		
	UNITS	MW-06	RDL	QC Batch
Dissolved Copper (Cu)	ug/L	<1.0	1.0	6105543
Dissolved Iron (Fe)	ug/L	<100	100	6105543
Dissolved Lead (Pb)	ug/L	<0.50	0.50	6105543
Dissolved Magnesium (Mg)	ug/L	28000	50	6105543
Dissolved Manganese (Mn)	ug/L	3.9	2.0	6105543
Dissolved Molybdenum (Mo)	ug/L	0.91	0.50	6105543
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	6105543
Dissolved Phosphorus (P)	ug/L	130	100	6105543
Dissolved Potassium (K)	ug/L	760	200	6105543
Dissolved Selenium (Se)	ug/L	<2.0	2.0	6105543
Dissolved Silicon (Si)	ug/L	2200	50	6105543
Dissolved Silver (Ag)	ug/L	<0.10	0.10	6105543
Dissolved Sodium (Na)	ug/L	6500	100	6105543
Dissolved Strontium (Sr)	ug/L	84	1.0	6105543
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	6105543
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	6105543
Dissolved Uranium (U)	ug/L	0.17	0.10	6105543
Dissolved Vanadium (V)	ug/L	<0.50	0.50	6105543
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	6105543

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B8363
Report Date: 2019/05/08

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

TEST SUMMARY

Maxxam ID: JPQ777
Sample ID: MW-06
Matrix: Water

Collected: 2019/05/02
Shipped:
Received: 2019/05/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	6104171	N/A	2019/05/07	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	6103892	N/A	2019/05/07	Automated Statchk
Chloride by Automated Colourimetry	KONE	6104196	N/A	2019/05/06	Deonarine Ramnarine
Conductivity	AT	6104173	N/A	2019/05/07	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	6104098	N/A	2019/05/06	Mandeep Kaur
Hardness (calculated as CaCO3)		6103889	N/A	2019/05/08	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	6105543	N/A	2019/05/08	Matthew Ritenburg
Ion Balance (% Difference)	CALC	6103890	N/A	2019/05/08	Automated Statchk
Anion and Cation Sum	CALC	6103891	N/A	2019/05/08	Automated Statchk
Total Ammonia-N	LACH/NH4	6105421	N/A	2019/05/06	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	6104187	N/A	2019/05/07	Chandra Nandlal
pH	AT	6104175	2019/05/04	2019/05/07	Surinder Rai
Orthophosphate	KONE	6104195	N/A	2019/05/06	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	6103886	N/A	2019/05/08	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	6103887	N/A	2019/05/08	Automated Statchk
Sulphate by Automated Colourimetry	KONE	6104197	N/A	2019/05/06	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	6103888	N/A	2019/05/08	Automated Statchk

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Maxxam Job #: B9B8363
Report Date: 2019/05/08

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam
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Maxxam Job #: B9B8363
Report Date: 2019/05/08

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6104098	Dissolved Organic Carbon	2019/05/06	94	80 - 120	99	80 - 120	<0.50	mg/L	3.2	20
6104171	Alkalinity (Total as CaCO3)	2019/05/06			96	85 - 115	<1.0	mg/L	0.61	20
6104173	Conductivity	2019/05/06			102	85 - 115	<1.0	umho/cm	0.10	25
6104175	pH	2019/05/06			102	98 - 103			0.18	N/A
6104187	Nitrate (N)	2019/05/07	93	80 - 120	90	80 - 120	<0.10	mg/L	NC	20
6104187	Nitrite (N)	2019/05/07	104	80 - 120	102	80 - 120	<0.010	mg/L	1.1	20
6104195	Orthophosphate (P)	2019/05/06	101	75 - 125	99	80 - 120	<0.010	mg/L	NC	25
6104196	Dissolved Chloride (Cl-)	2019/05/06	NC	80 - 120	101	80 - 120	<1.0	mg/L	0.65	20
6104197	Dissolved Sulphate (SO4)	2019/05/06	101	75 - 125	93	80 - 120	<1.0	mg/L	1.4	20
6105421	Total Ammonia-N	2019/05/06	98	75 - 125	100	80 - 120	<0.050	mg/L	1.0	20
6105543	Dissolved Aluminum (Al)	2019/05/08	105	80 - 120	101	80 - 120	<5.0	ug/L		
6105543	Dissolved Antimony (Sb)	2019/05/08	106	80 - 120	100	80 - 120	<0.50	ug/L		
6105543	Dissolved Arsenic (As)	2019/05/08	103	80 - 120	98	80 - 120	<1.0	ug/L	2.8	20
6105543	Dissolved Barium (Ba)	2019/05/08	103	80 - 120	99	80 - 120	<2.0	ug/L		
6105543	Dissolved Beryllium (Be)	2019/05/08	104	80 - 120	98	80 - 120	<0.50	ug/L		
6105543	Dissolved Boron (B)	2019/05/08	104	80 - 120	100	80 - 120	<10	ug/L		
6105543	Dissolved Cadmium (Cd)	2019/05/08	106	80 - 120	99	80 - 120	<0.10	ug/L		
6105543	Dissolved Calcium (Ca)	2019/05/08	NC	80 - 120	104	80 - 120	<200	ug/L		
6105543	Dissolved Chromium (Cr)	2019/05/08	102	80 - 120	98	80 - 120	<5.0	ug/L		
6105543	Dissolved Cobalt (Co)	2019/05/08	100	80 - 120	97	80 - 120	<0.50	ug/L		
6105543	Dissolved Copper (Cu)	2019/05/08	104	80 - 120	99	80 - 120	<1.0	ug/L		
6105543	Dissolved Iron (Fe)	2019/05/08	104	80 - 120	100	80 - 120	<100	ug/L		
6105543	Dissolved Lead (Pb)	2019/05/08	103	80 - 120	97	80 - 120	<0.50	ug/L		
6105543	Dissolved Magnesium (Mg)	2019/05/08	103	80 - 120	99	80 - 120	<50	ug/L		
6105543	Dissolved Manganese (Mn)	2019/05/08	NC	80 - 120	97	80 - 120	<2.0	ug/L		
6105543	Dissolved Molybdenum (Mo)	2019/05/08	109	80 - 120	101	80 - 120	<0.50	ug/L		
6105543	Dissolved Nickel (Ni)	2019/05/08	99	80 - 120	96	80 - 120	<1.0	ug/L		
6105543	Dissolved Phosphorus (P)	2019/05/08	107	80 - 120	124 (1)	80 - 120	<100	ug/L		
6105543	Dissolved Potassium (K)	2019/05/08	103	80 - 120	99	80 - 120	<200	ug/L		
6105543	Dissolved Selenium (Se)	2019/05/08	105	80 - 120	102	80 - 120	<2.0	ug/L		
6105543	Dissolved Silicon (Si)	2019/05/08	102	80 - 120	100	80 - 120	<50	ug/L		
6105543	Dissolved Silver (Ag)	2019/05/08	104	80 - 120	97	80 - 120	<0.10	ug/L		

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

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A Bureau Veritas Group Company

Maxxam Job #: B9B8363
Report Date: 2019/05/08

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6105543	Dissolved Sodium (Na)	2019/05/08	99	80 - 120	95	80 - 120	<100	ug/L		
6105543	Dissolved Strontium (Sr)	2019/05/08	101	80 - 120	98	80 - 120	<1.0	ug/L		
6105543	Dissolved Thallium (Tl)	2019/05/08	103	80 - 120	98	80 - 120	<0.050	ug/L		
6105543	Dissolved Titanium (Ti)	2019/05/08	104	80 - 120	99	80 - 120	<5.0	ug/L		
6105543	Dissolved Uranium (U)	2019/05/08	96	80 - 120	91	80 - 120	<0.10	ug/L		
6105543	Dissolved Vanadium (V)	2019/05/08	104	80 - 120	99	80 - 120	<0.50	ug/L		
6105543	Dissolved Zinc (Zn)	2019/05/08	102	80 - 120	99	80 - 120	<5.0	ug/L		

N/A = Not Applicable

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

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

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

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

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

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

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

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9B8363
Report Date: 2019/05/08

GM BluePlan Engineering Limited
Client Project #: 218173
Site Location: WILDER LAKE DEVELOPMENT
Sampler Initials: CS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

APPENDIX D:
AQUIFER ANALYSIS REPORTS

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

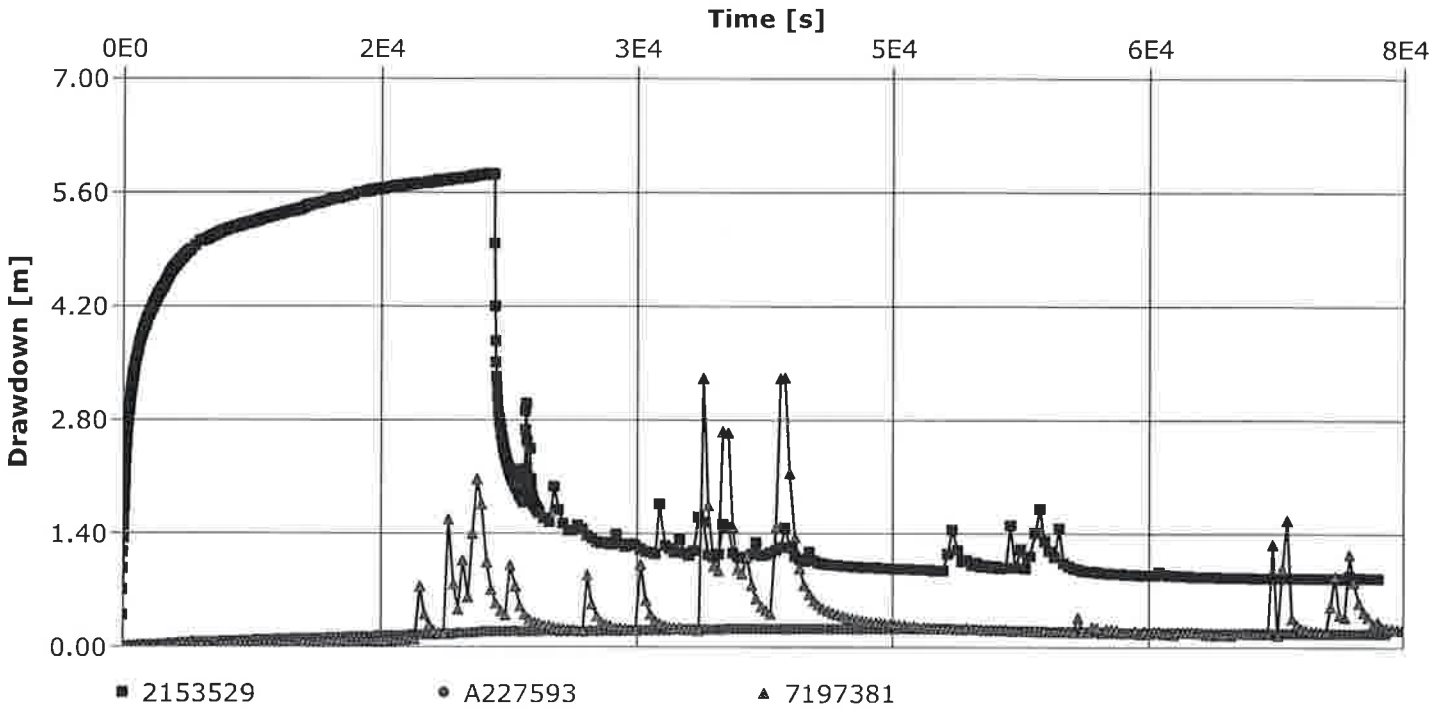
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Time-Drawdown	Analysis Date: 5/7/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

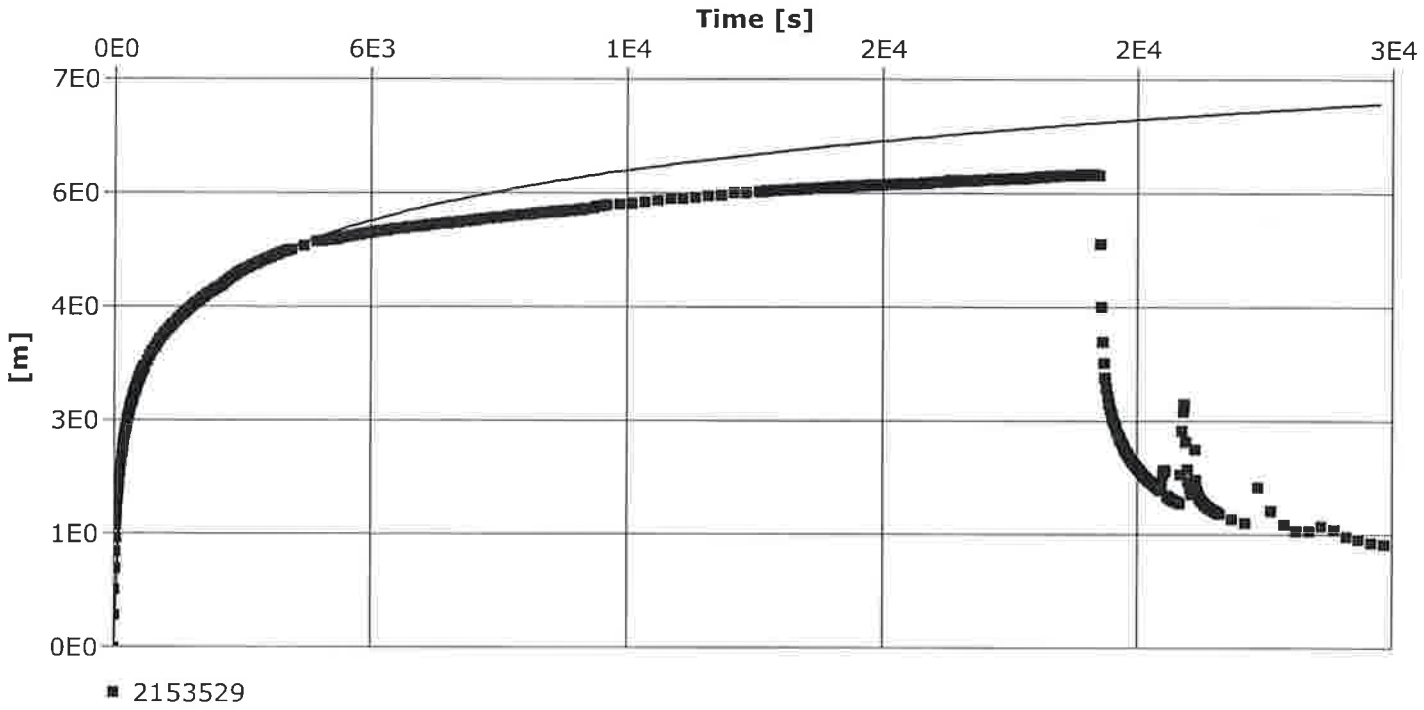
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Theis-Jacob Corr. - Early Fit	Analysis Date: 1/15/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



Calculation using Theis with Jacob Correction

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
2153529	1.12×10^{-4}	2.80×10^{-6}	3.95×10^{-1}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

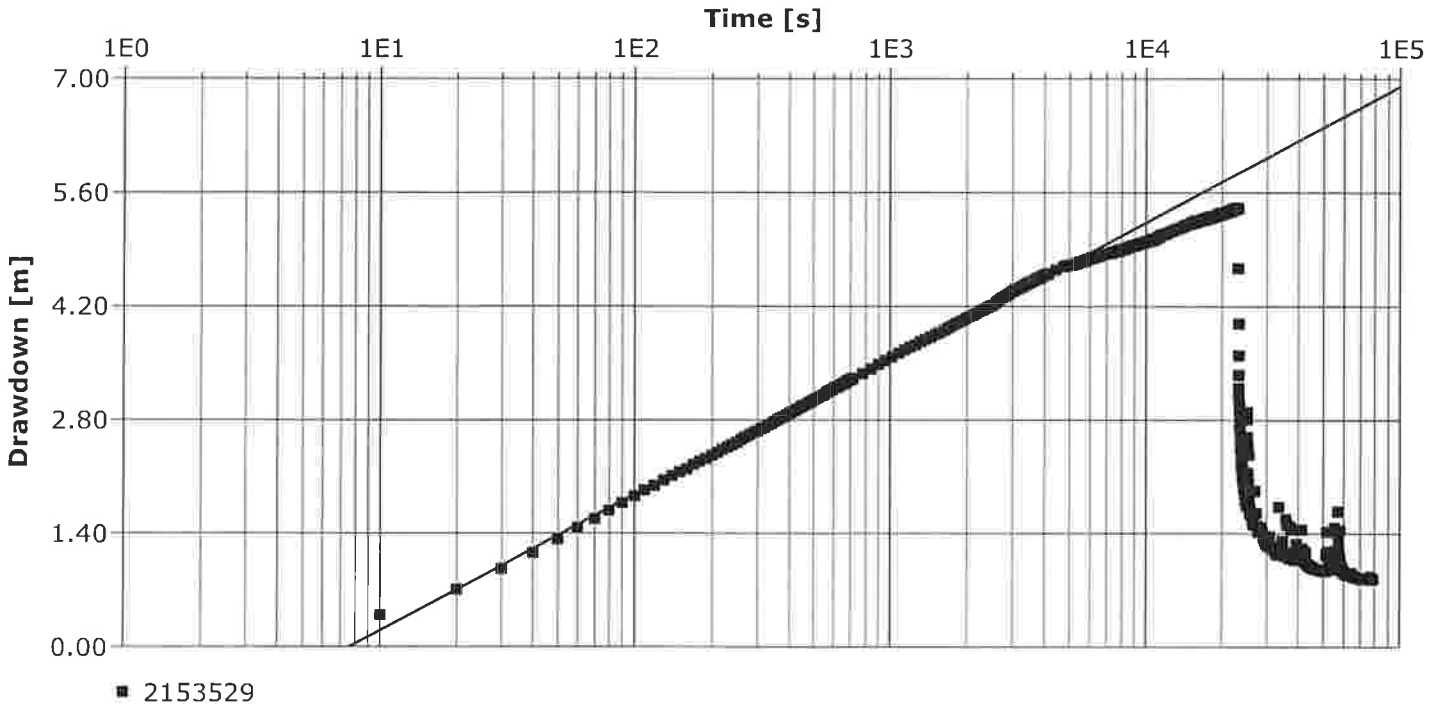
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Cooper and Jacob (T-DD)	Analysis Date: 1/15/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



Calculation using COOPER & JACOB

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
2153529	1.18×10^{-4}	2.95×10^{-6}	3.14×10^{-1}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

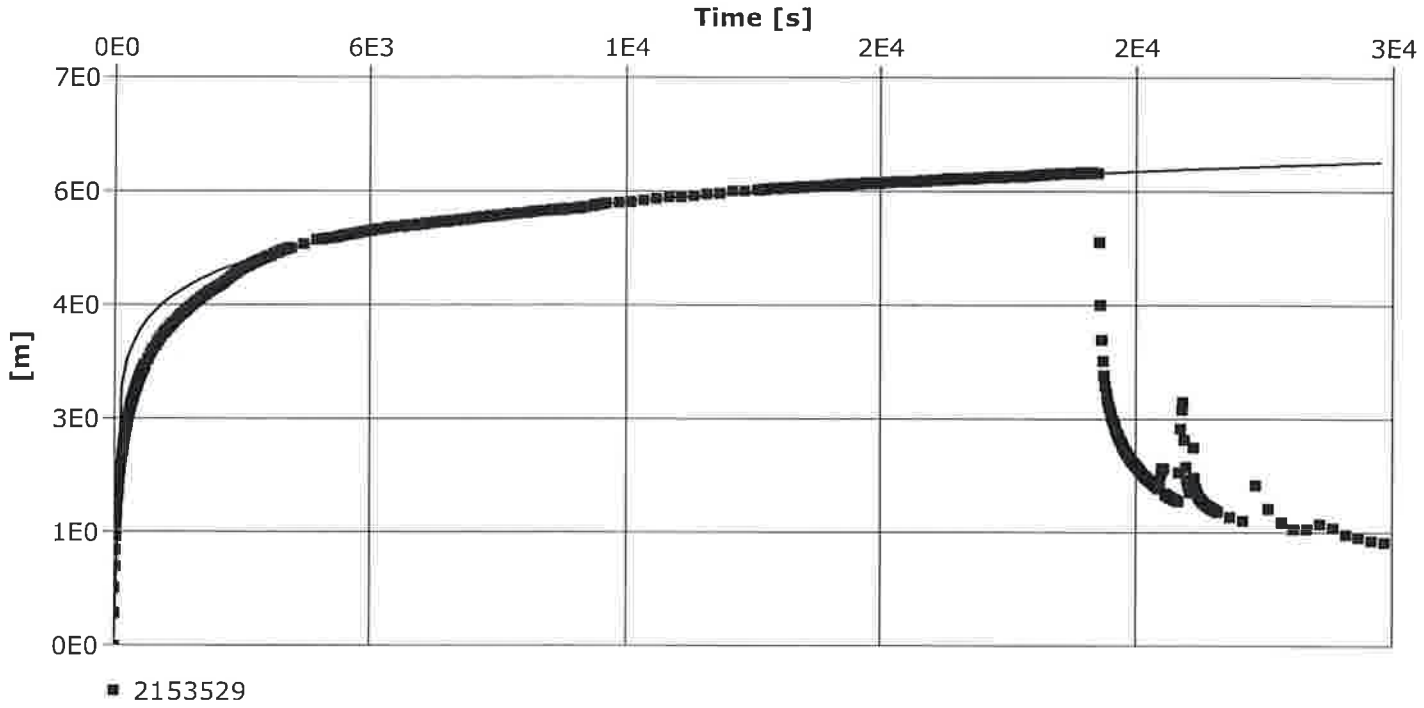
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Theis-Jacob Corr. - End Fit	Analysis Date: 1/15/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



Calculation using Theis with Jacob Correction

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
2153529	1.85×10^{-4}	4.62×10^{-6}	1.36×10^{-2}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

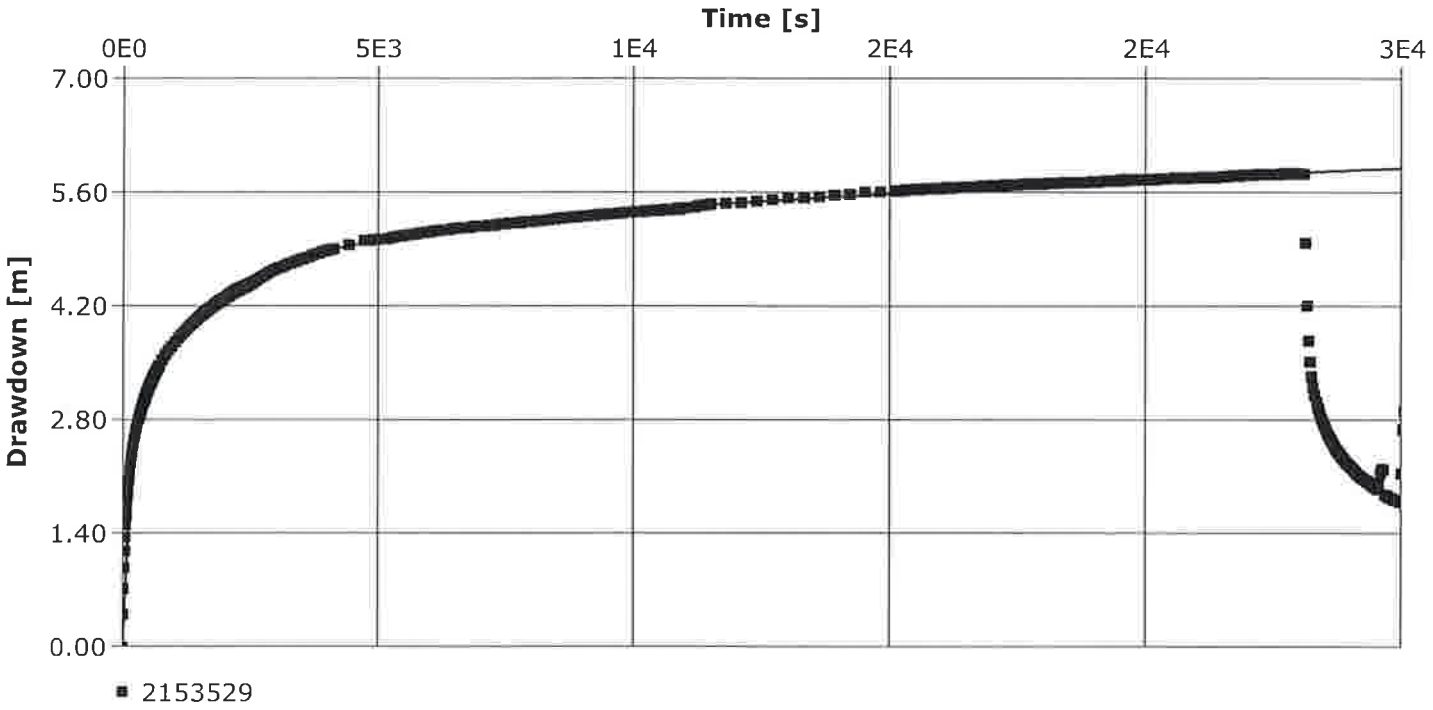
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Double Porosity	Analysis Date: 5/7/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



Calculation using Double Porosity

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Sigma	Lambda	Radial Distance to PW [m]
2153529	8.41×10^{-5}	2.10×10^{-6}	6.16×10^{-1}	3.49×10^{0}	7.47×10^{-3}	0.08

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

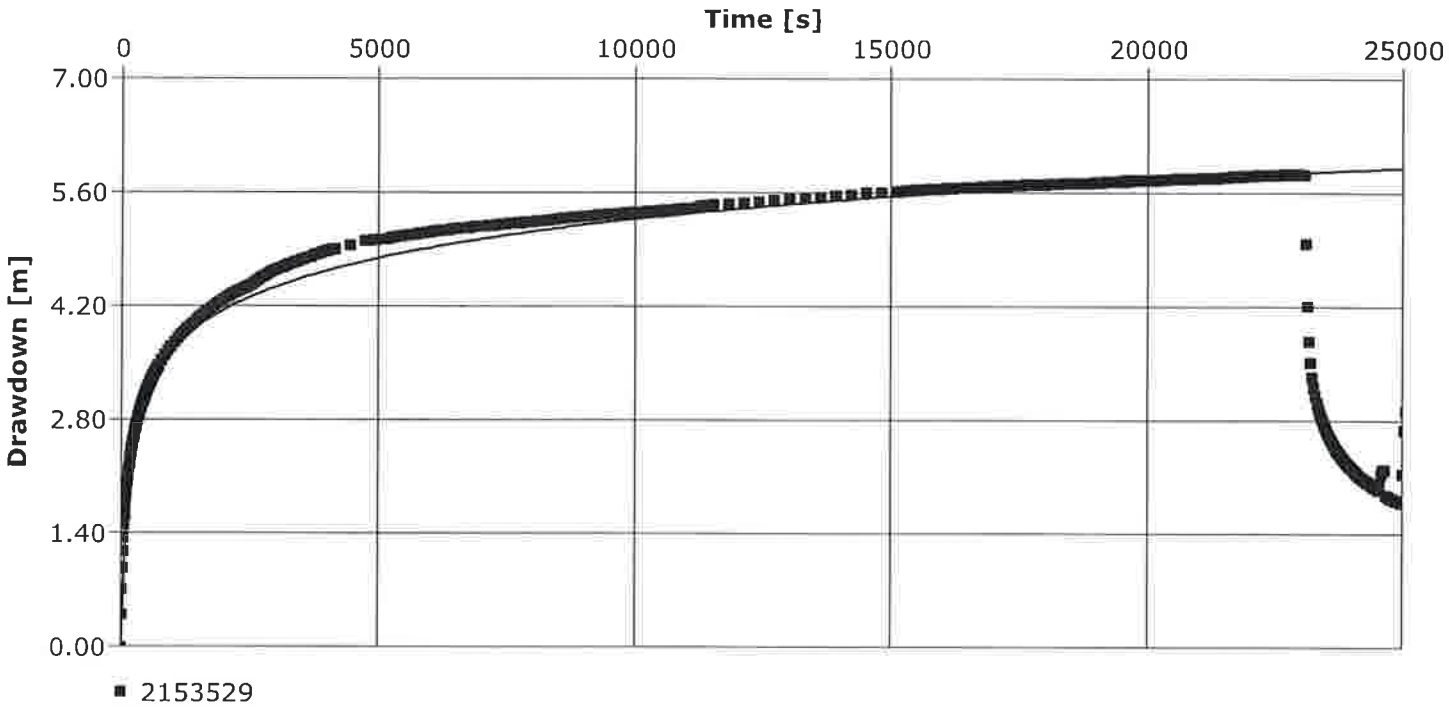
Pumping Test Analysis Report

Project: Wilder Lake Servicing Study

Number: 218173

Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by: J Swiger	Theis	Analysis Date: 5/8/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	

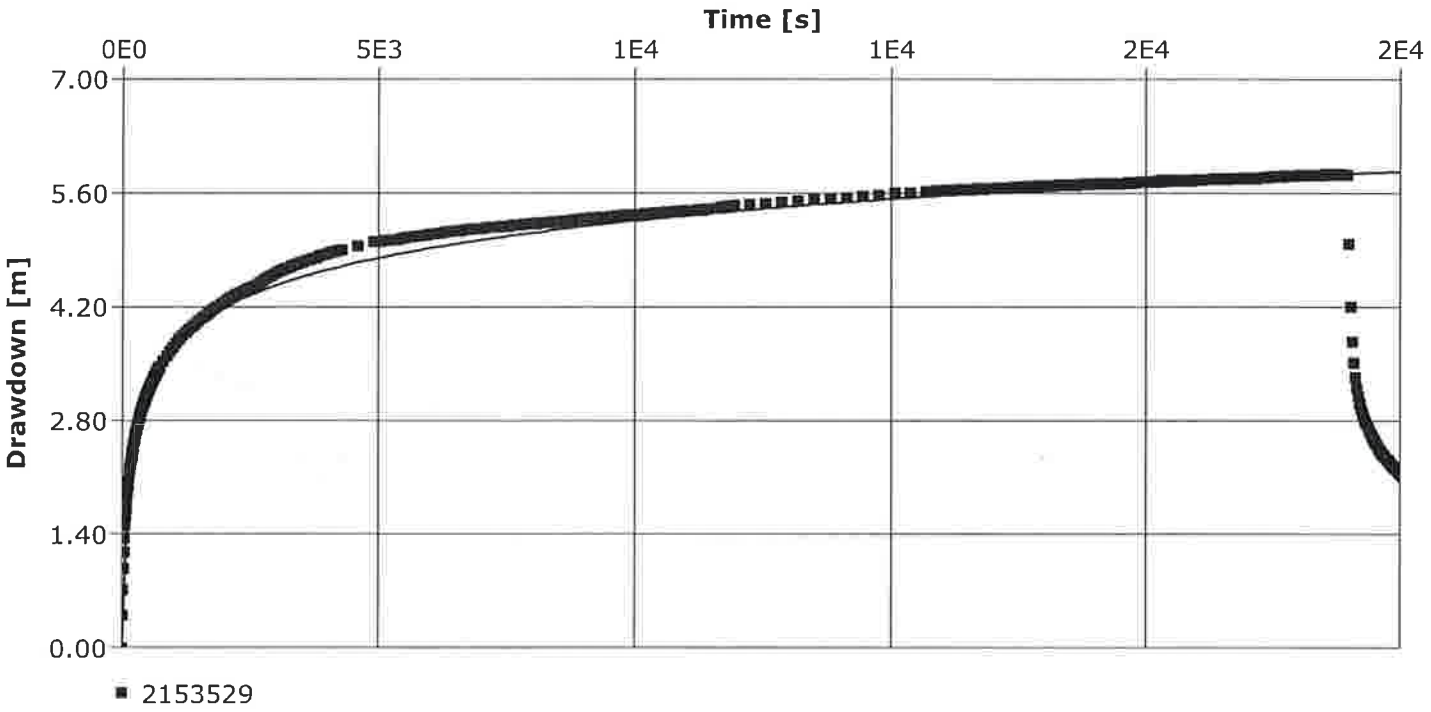


Calculation using Theis

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
2153529	1.24×10^{-4}	3.10×10^{-6}	2.18×10^{-1}	0.08	

GM BluePlan Engineering Ltd. 1260 - 2nd Avenue East Owen Sound, On N4K 2J3	**Pumping Test Analysis Report**
	Project: Wilder Lake Servicing Study
	Number: 218173
	Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Analysis Performed by:	Unconfined - Neuman	Analysis Date: 9/26/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	



Calculation using Neuman

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Specific Yield	Ratio K(v)/K(h)	Ratio Sy/S	Radial Distance to PW [m]
2153529	1.30×10^{-4}	3.25×10^{-6}	1.96×10^{-3}	5.59×10^{0}	1.26×10^{-2}	0.08

GM BluePlan Engineering Ltd. 1260 - 2nd Avenue East Owen Sound, On N4K 2J3	**Pumping Test Analysis Report**
	Project: Wilder Lake Servicing Study
	Number: 218173
	Client: H.Bye Construction Ltd

Location: Southgate, ON	Pumping Test: Pumping Test 1	Pumping Well: 2153529
Test Conducted by: J Swiger		Test Date: 1/7/2019
Aquifer Thickness: 40.00 m	Discharge: variable, average rate 1.081 [l/s]	

	Analysis Name	Analysis Performed by	Analysis Date	Method name	Well	T [m²/s]	K [m/s]	S
1	Theis-Jacob Corr. - Early Fit	J Swiger	1/15/2019	Theis with Jacob Correction	2153529	1.12×10^{-4}	2.80×10^{-6}	3.95×10^{-1}
2	Cooper and Jacob (T-DD)	J Swiger	1/15/2019	Cooper & Jacob I	2153529	1.18×10^{-4}	2.95×10^{-6}	3.14×10^{-1}
3	Theis-Jacob Corr. - End Fit	J Swiger	1/15/2019	Theis with Jacob Correction	2153529	1.85×10^{-4}	4.62×10^{-6}	1.36×10^{-2}
4	Double Porosity	J Swiger	5/7/2019	Double Porosity	2153529	8.41×10^{-5}	2.10×10^{-6}	6.16×10^{-1}
5	Theis	J Swiger	5/8/2019	Theis	2153529	1.24×10^{-4}	3.10×10^{-6}	2.18×10^{-1}
6	Unconfined - Neuman		9/26/2019	Neuman	2153529	1.30×10^{-4}	3.25×10^{-6}	1.96×10^{-3}
					Average	1.26×10^{-4}	3.14×10^{-6}	2.60×10^{-1}

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

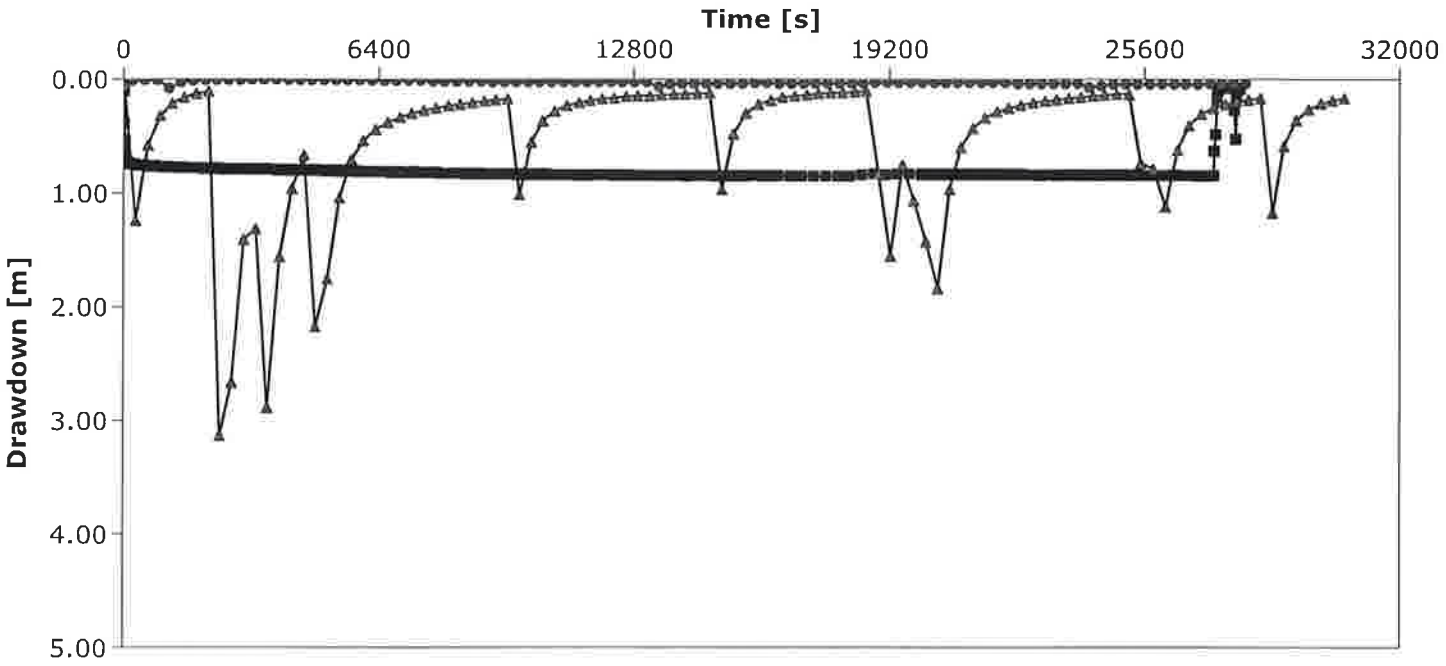
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 2	Pumping Well: A227593
Test Conducted by: J Swiger		Test Date: 1/8/2019
Analysis Performed by: J Swiger	Time - Drawdown	Analysis Date: 5/8/2019
Aquifer Thickness: 15.00 m	Discharge: variable, average rate 0.9167 [l/s]	



GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

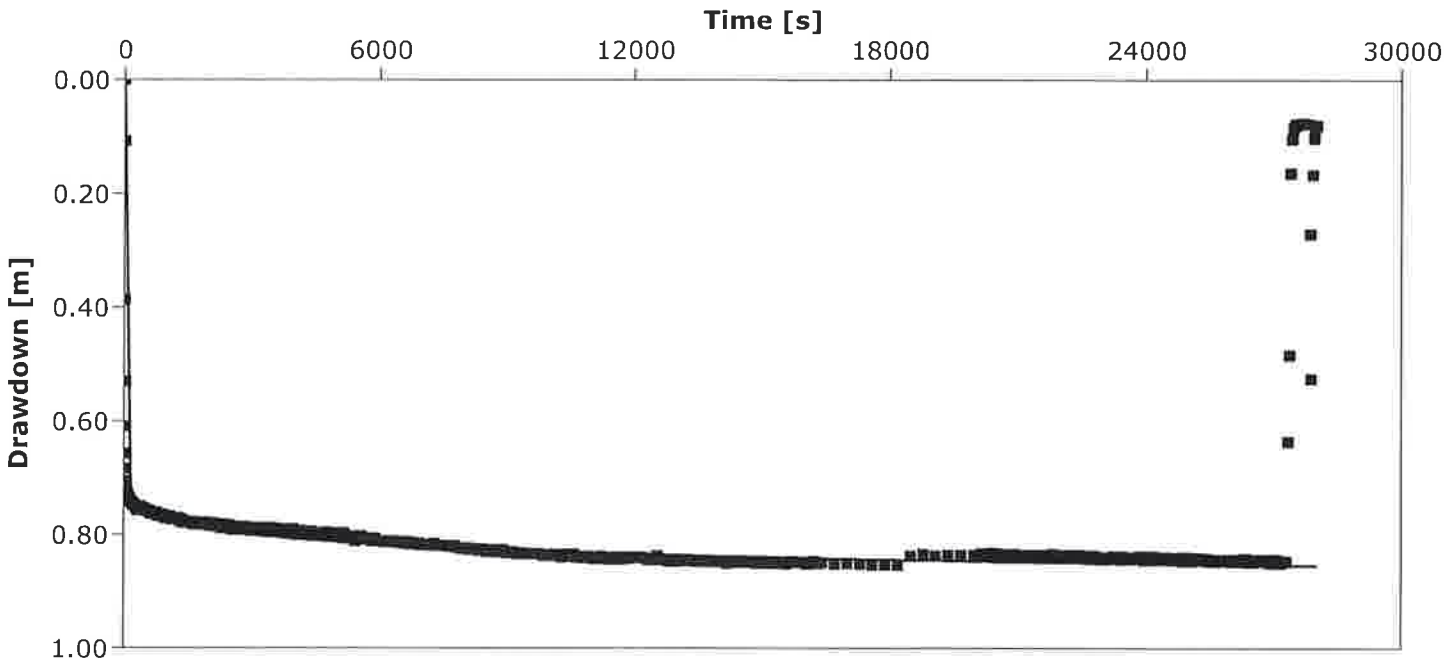
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 2	Pumping Well: A227593
Test Conducted by: J Swiger		Test Date: 1/8/2019
Analysis Performed by: J Swiger	Theis	Analysis Date: 5/8/2019
Aquifer Thickness: 15.00 m	Discharge: variable, average rate 0.9167 [l/s]	



Calculation using Theis

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
A227593	2.98×10^{-3}	1.99×10^{-4}	1.98×10^{-11}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

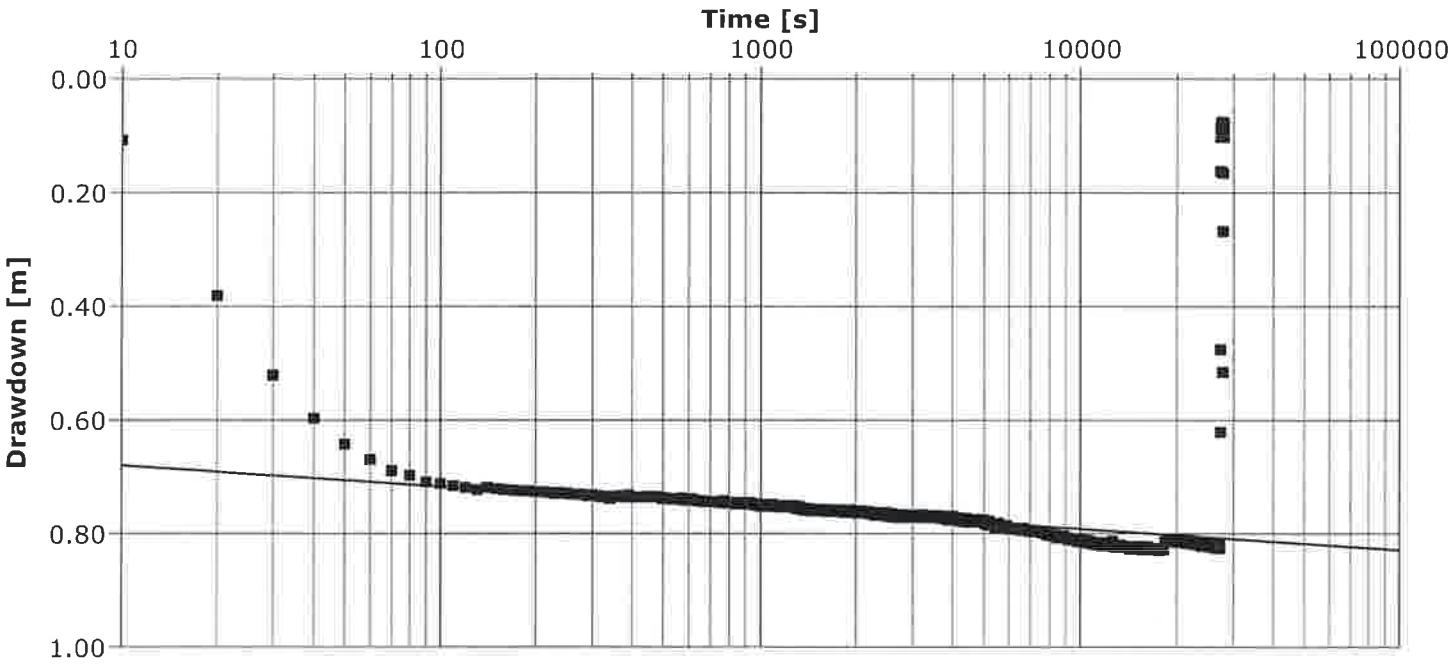
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 2	Pumping Well: A227593
Test Conducted by: J Swiger		Test Date: 1/8/2019
Analysis Performed by: J Swiger	Cooper and Jacob (T-DD)	Analysis Date: 5/8/2019
Aquifer Thickness: 15.00 m	Discharge: variable, average rate 0.9167 [l/s]	



Calculation using COOPER & JACOB

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
A227593	4.49×10^{-3}	2.99×10^{-4}	1.02×10^{-17}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 2	Pumping Well: A227593
Test Conducted by: J Swiger		Test Date: 1/8/2019
Aquifer Thickness: 15.00 m	Discharge: variable, average rate 0.9167 [l/s]	

	Analysis Name	Analysis Performed by	Analysis Date	Method name	Well	T [m²/s]	K [m/s]	S
1	Theis	J Swiger	5/8/2019	Theis	A227593	2.98×10^{-3}	1.99×10^{-4}	1.98×10^{-11}
2	Cooper and Jacob (T-DD)	J Swiger	5/8/2019	Cooper & Jacob I	A227593	4.49×10^{-3}	2.99×10^{-4}	1.02×10^{-17}
					Average	3.74×10^{-3}	2.49×10^{-4}	9.88×10^{-12}

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

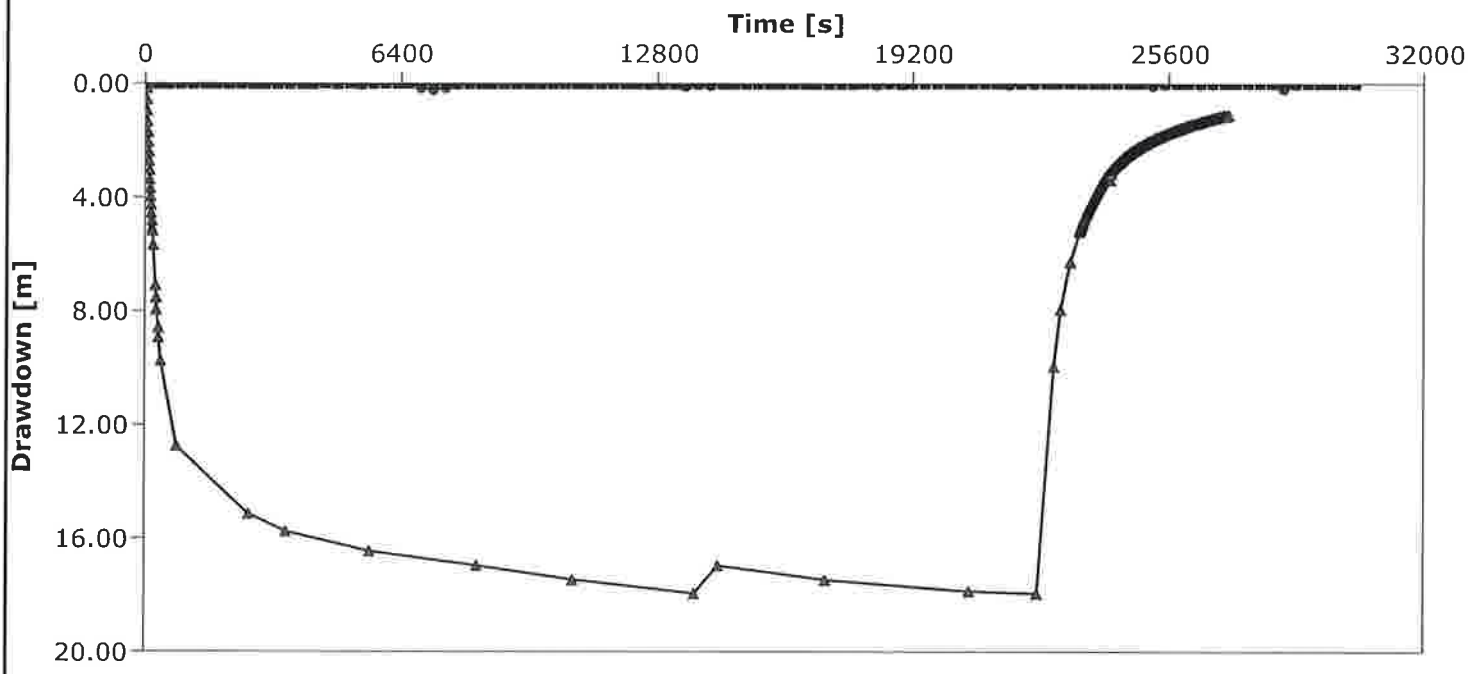
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Analysis Performed by: j Swiger	Time - Drawdown	Analysis Date: 5/8/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	



GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

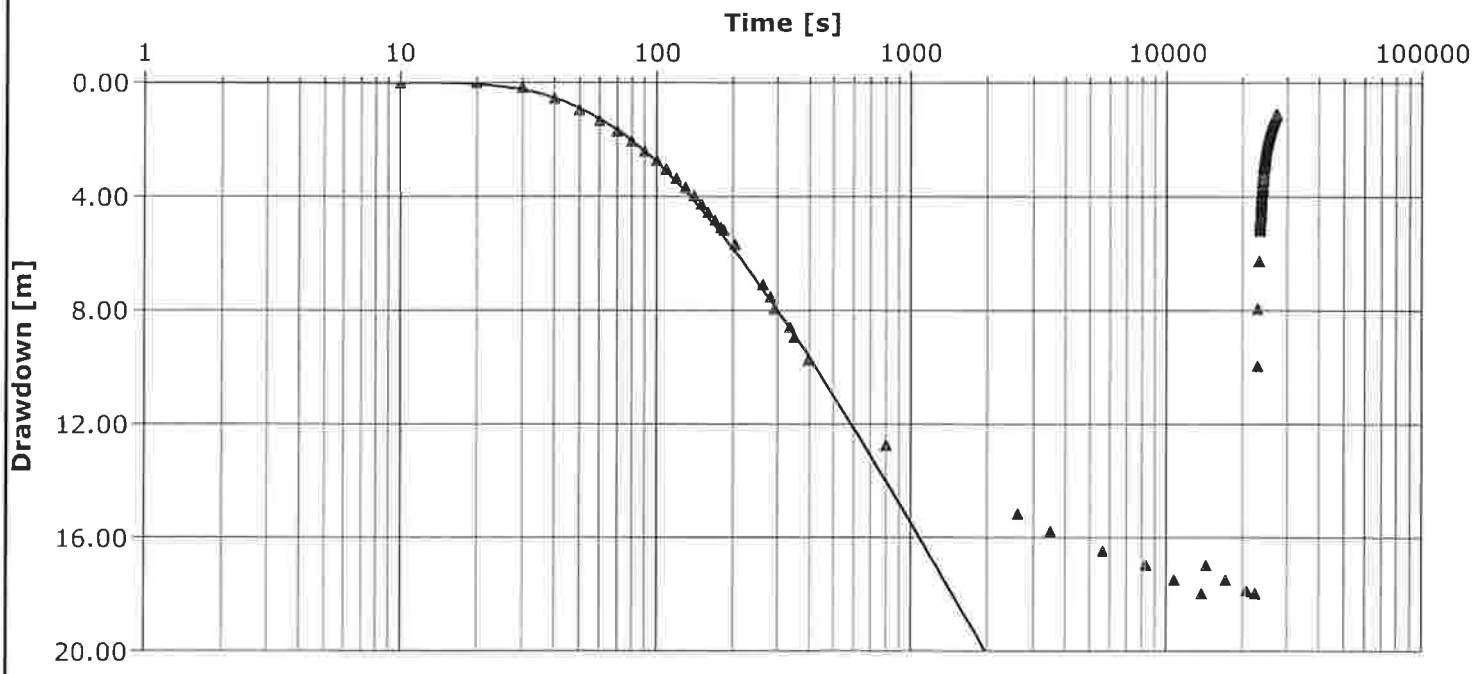
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Analysis Performed by: J Swiger	Theis	Analysis Date: 5/8/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	



Calculation using Theis

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
7197381	7.29×10^{-6}	2.08×10^{-7}	3.07×10^{-1}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

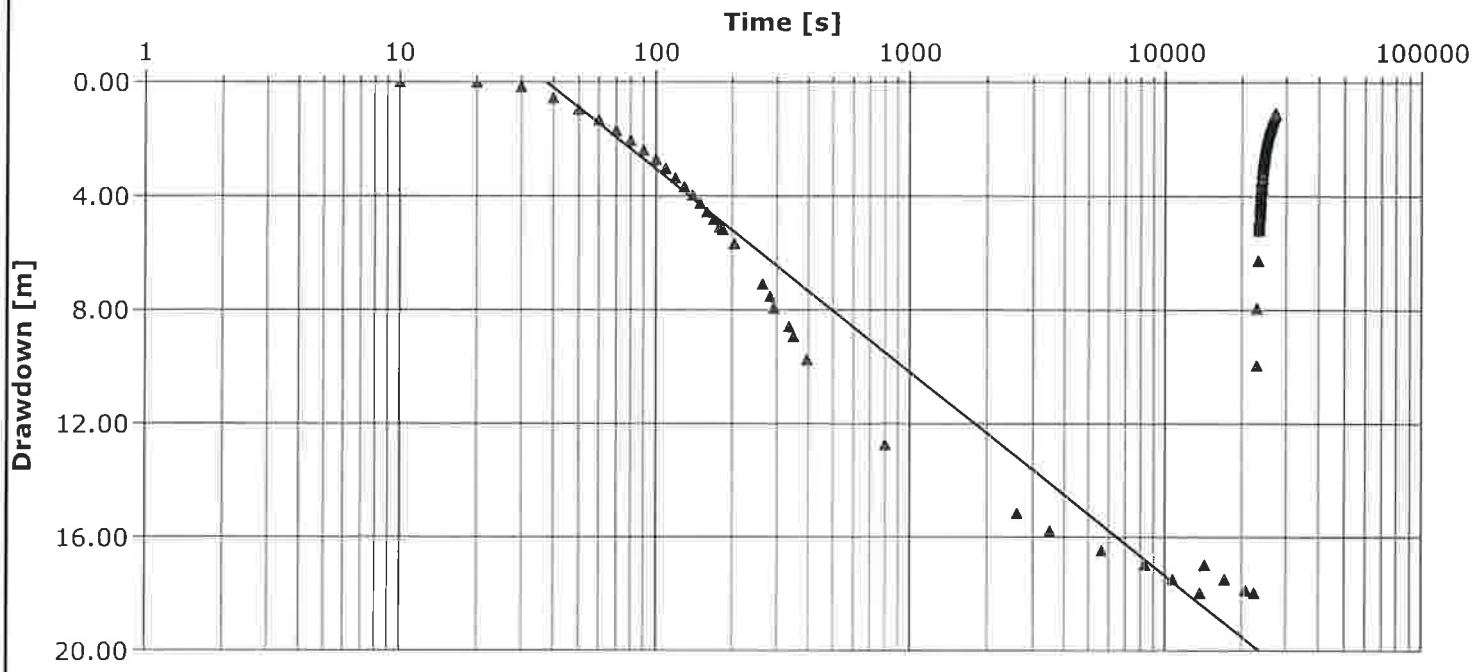
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Analysis Performed by: J Swiger	Cooper and Jacob (T-DD)	Analysis Date: 5/8/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	



Calculation using COOPER & JACOB

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Storage coefficient	Radial Distance to PW [m]	
7197381	1.66×10^{-5}	4.74×10^{-7}	2.20×10^{-1}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

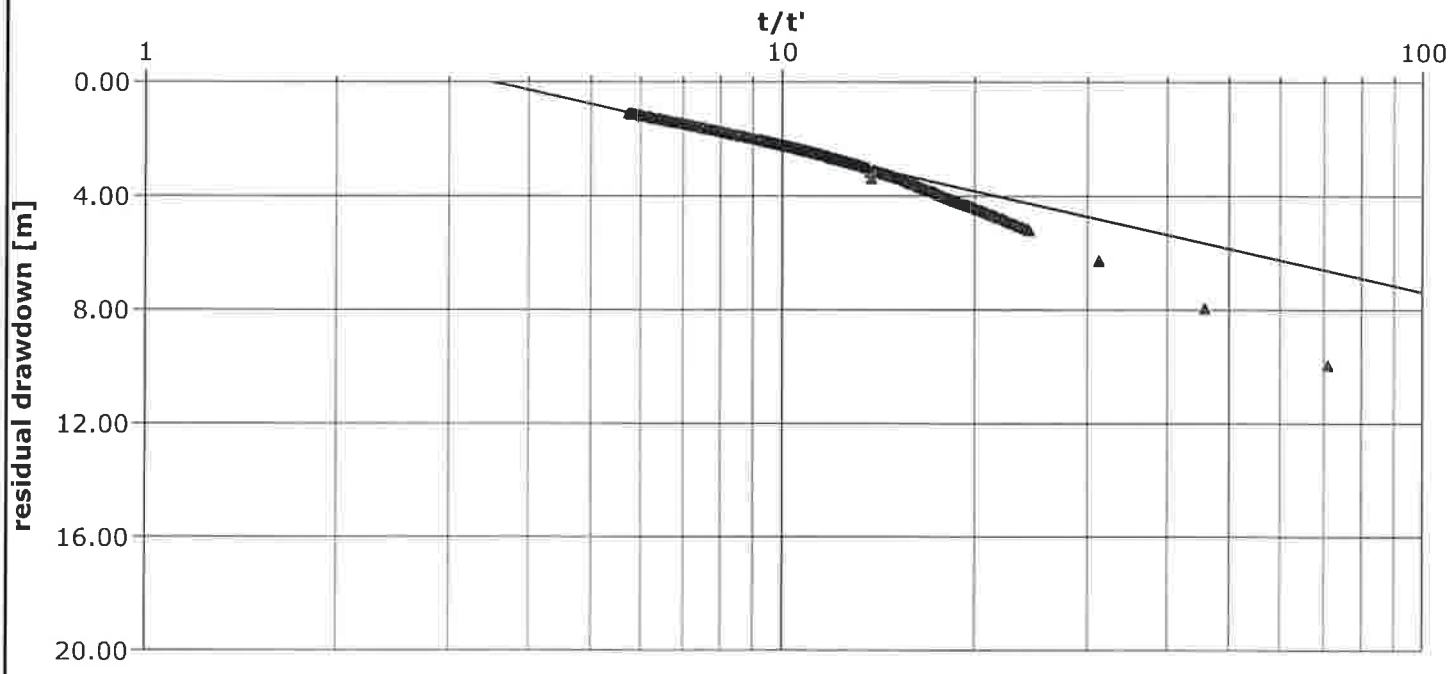
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Analysis Performed by: J Swiger	Theis Recovery - 1	Analysis Date: 5/8/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	



Calculation using THEIS & JACOB

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Radial Distance to PW [m]	
7197381	2.34×10^{-5}	6.67×10^{-7}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

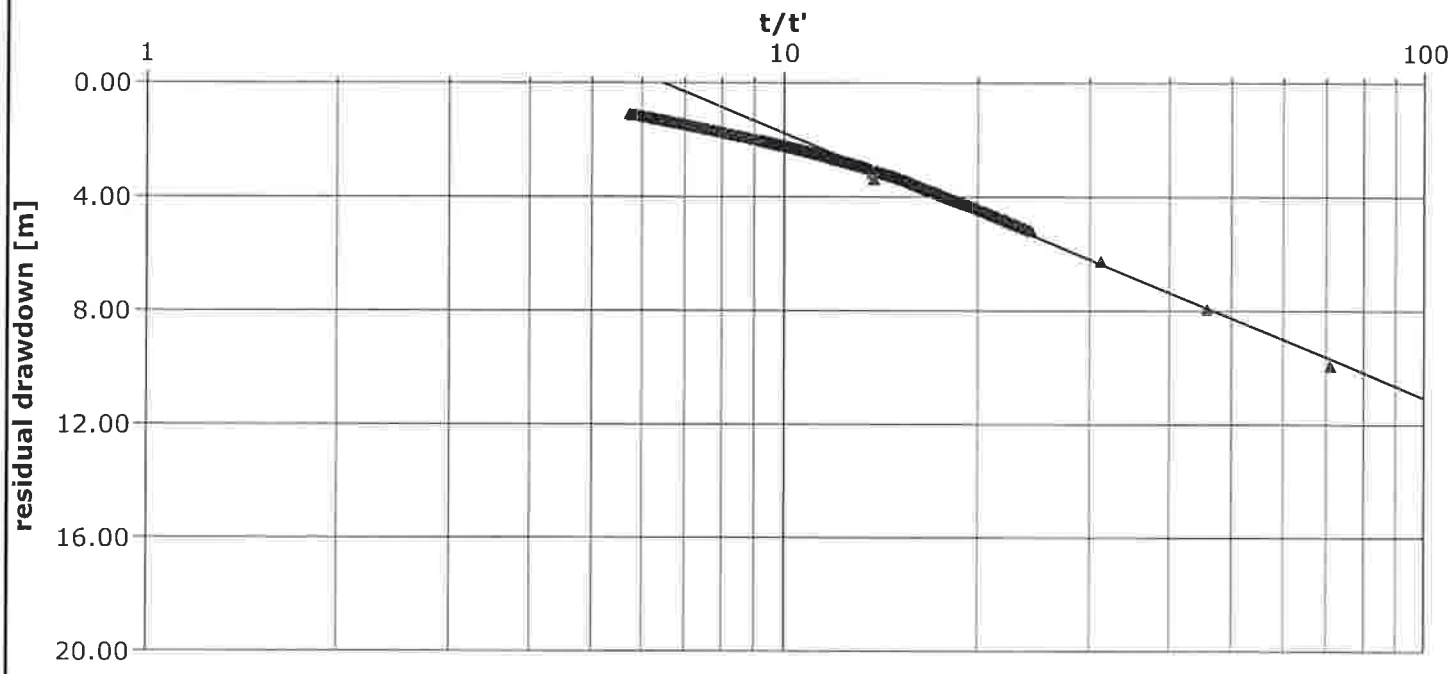
Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Analysis Performed by: J Swiger	Theis Recovery - 2	Analysis Date: 5/8/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	



Calculation using THEIS & JACOB

Observation Well	Transmissivity [m²/s]	Hydraulic Conductivity [m/s]	Radial Distance to PW [m]	
7197381	1.27×10^{-5}	3.64×10^{-7}	0.08	

GM BluePlan Engineering Ltd.
1260 - 2nd Avenue East
Owen Sound, On N4K 2J3

Pumping Test Analysis Report

Project: Wilder Lake

Number: 218173

Client: H. Bye Construction Ltd

Location:	Pumping Test: Pumping Test 3	Pumping Well: 7197381
Test Conducted by: J Swiger		Test Date: 1/9/2019
Aquifer Thickness: 35.00 m	Discharge: variable, average rate 0.64845 [l/s]	

	Analysis Name	Analysis Performed by	Analysis Date	Method name	Well	T [m²/s]	K [m/s]	S
1	Theis	J Swiger	5/8/2019	Theis	7197381	7.29×10^{-6}	2.08×10^{-7}	3.07×10^{-1}
2	Cooper and Jacob (T-DD)	J Swiger	5/8/2019	Cooper & Jacob I	7197381	1.66×10^{-5}	4.74×10^{-7}	2.20×10^{-1}
3	Theis Recovery - 1	J Swiger	5/8/2019	Theis Recovery	7197381	2.34×10^{-5}	6.67×10^{-7}	
4	Theis Recovery - 2	J Swiger	5/8/2019	Theis Recovery	7197381	1.27×10^{-5}	3.64×10^{-7}	
					Average	1.50×10^{-5}	4.28×10^{-7}	2.63×10^{-1}

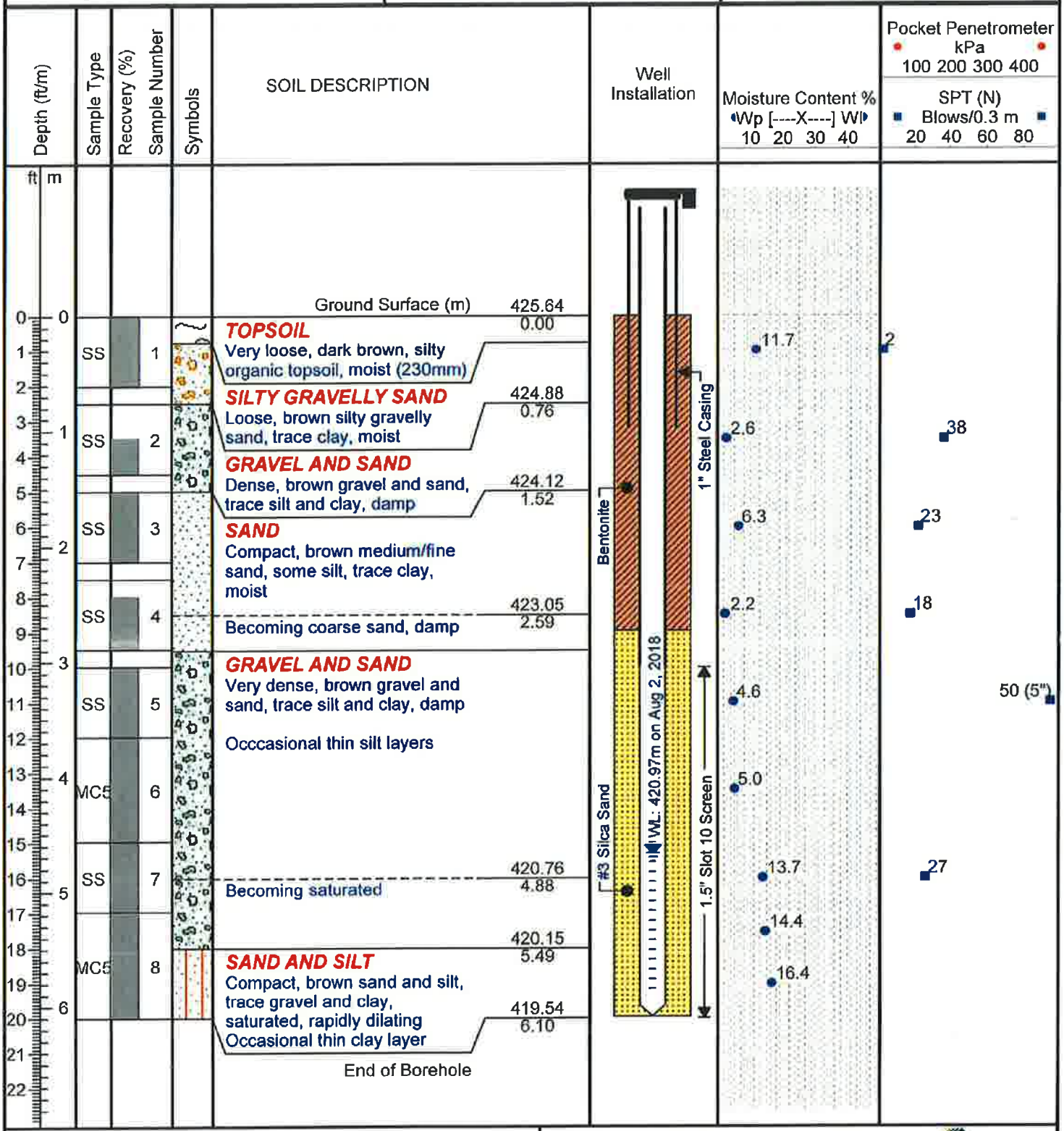
APPENDIX E:
MONITORING WELL BOREHOLE LOGS

BOREHOLE 1

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 425.64 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario



CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
phone 519-699-5775 fax 519-699-4664
www.cmtinc.net

BOREHOLE 2

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 430.64 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa	SPT (N) Blows/0.3 m
					Ground Surface (m)	430.64	0.00				
0	SS		1		**TOPSOIL** Loose, dark brown, silty organic topsoil, moist (250mm)				8.3		7
1	SS		2		**FILL** Loose, dark brown silt fill, some topsoil, moist	429.42	1.22		6.4		19
2	SS		3		**SANDY GRAVEL** Compact, brown sandy gravel, some silt, trace clay, occasional cobbles, moist				9.5		26
	SS		4		Becoming dense	428.35	2.29		8.0		33
3	SS		5						8.6		50 (2")
4	MC		6		**SAND AND SILT** Compact, brown, sand and silt, some gravel, trace clay, occasional cobbles, wet	426.68	3.96		10.4		
	SS		7						10.2		26
5	MC		8						10.9		
6	SS		9		Becoming dense	424.54	6.10				31
7	MC		10			423.32	7.32		2.8		
					GRAVEL AND SAND Dense, brown gravel and sand, trace silt and clay, damp	432.02	7.62				
8					End of Borehole						

Bentonite
#3 Silca Sand
1" Steel Casing
1.5" Slot 10 Screen
Well dry to bottom Aug 2, 2018

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BOREHOLE 3

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 425.90 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa	SPT (N) Blows/0.3 m
					Ground Surface (m)	425.90	0.00				
0	SS		1		**TOPSOIL** Loose, dark brown, silty organic topsoil, moist (150mm)	425.14	0.76		11.3	8	
1	SS		2		**SILTY SAND AND GRAVEL** Compact, brown silty sand and gravel, trace clay, moist				3.6		27
2	SS		3		**GRAVEL** Compact, brown gravel, some sand and silt, trace clay, occasional cobbles, moist				9.7		17
3	SS		4		Becoming very moist to wet, occasional sand layer	423.61	2.29		17.3		29
4	SS		5						7.7		21
5	MC		6						10.7		
	SS		7		Occasional clay layer, wet	421.33	4.57		10.6		29
6	MC		8		Becoming saturated	420.72	5.18		14.2		
					End of Borehole	419.80	6.10				

Well Installation: Bentonite; #3 Silica Sand; WL: 421.83m on Aug 2, 2018; 1" Steel Casing; 1.5" Slot 10 Screen

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BOREHOLE 4

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 425.54 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa	SPT (N) Blows/0.3 m
					Ground Surface (m)	425.54					
0	SS		1		**TOPSOIL** Loose, dark brown, silty organic topsoil, moist (200mm)		0.00		8.2		9
1											
2											
3	SS		2		**SILTY GRAVELLY SAND** Compact, brown silty gravelly sand, trace clay, moist Occasional sand layers	424.02	1.52		6.8		13
4											
5											
6	SS		3		**SANDY GRAVEL** Compact, brown sandy gravel, some silt, trace clay, occasional cobbles, moist				8.7		15
7											
8	SS		4						6.5		24
9											
10					Becoming dense	422.49	3.05				
11	SS		5						8.3		50 (2")
12											
13	MC5		6						4.0		
14						421.27	4.27				
15					**GRAVEL AND SAND** Dense, brown gravel and sand, trace silt and clay, damp						
16	SS		7						8.3		47
17											
18						420.05	5.49				
19	MC5		8		**SANDY GRAVEL** Dense, brown sandy gravel, some silt, trace clay, occasional cobbles, moist				12.4		
20						419.44	6.10				
21					Becoming very moist						
22											
23	MC5		9						10.4		
24											
25						417.92	7.62				
					End of Borehole						

Well Installation: Bentonite; #3 Silica Sand; 1" Steel Casing; 1.5" Slot 10 Screen

Well dry to bottom Aug 2, 2018

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BOREHOLE 5

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 425.26 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa	SPT (N) Blows/0.3 m
					Ground Surface (m)	425.26	0.00				
0-1 ft / 0 m	SS		1		**TOPSOIL** Loose, dark brown, silty organic topsoil, moist (150mm)				4.7		11
1-3 ft / 0-1 m	SS		2		**SANDY GRAVEL** Dense, brown sandy gravel, trace silt and clay, occasional cobbles, damp				3.2		41
3-6 ft / 1-2 m	SS		3						2.1		37
6-8 ft / 2 m	SS		4		Becoming compact	422.67	2.59		3.2		24
8-10 ft / 2-3 m					Becoming saturated	422.21	3.05				
10-11 ft / 3 m	SS		5								12
11-13 ft / 3-4 m	MC		6						18.8		
13-15 ft / 4 m					Becoming grey	420.69	4.57				
15-16 ft / 4-5 m	SS		7						12.9		10
16-18 ft / 5 m	MC		8						8.0		
18-20 ft / 5-6 m					End of Borehole	419.16	6.10				

Well Installation: Bentonite; #3 Silica Sand; WL: 421.88m on Aug 2, 2018; 1" Steel Casing; 1.5" Slot 10 Screen

Moisture Content % (Wp [----X----] Wl) 10 20 30 40

Pocket Penetrometer kPa 100 200 300 400

SPT (N) Blows/0.3 m 20 40 60 80

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BOREHOLE 6

Date Drilled: July 27, 2018
Rig: Geoprobe 7822DT
Contractor: CMT Drilling Inc.
Drilling Method: SPT

Elevation: 427.30 m
Logged by: TS

Project No.: 18-368
Project: Wilder Lake Subdivision
Location: 263530 Southgate Road 26, Southgate, Ontario

Depth (ft/m)	Sample Type	Recovery (%)	Sample Number	Symbols	SOIL DESCRIPTION	Elevation	Depth	Well Installation	Moisture Content % (Wp [----X----] Wl)	Pocket Penetrometer kPa	SPT (N) Blows/0.3 m
					Ground Surface (m)	427.30	0.00				
0-1	SS		1		**TOPSOIL** Loose, dark brown, silty organic topsoil, moist (250mm)				2.4		10
1-2	SS		2		**GRAVEL AND SAND** Compact, brown gravel and sand, trace silt and clay, occasional cobbles, moist				2.7		27
2-3	SS		3						3.3		24
						425.01	2.29				
	SS		4		Becoming very dense				2.8		50 (6")
3	SS		5						3.0		50 (2")
4	MC		6						3.8		
	SS		7			422.27	5.03				13
5					**SAND AND SILT** Compact, brown sand and silt, some gravel, wet				10.1		
	MC		8						10.3		
					Becoming gravelly	421.66	5.64				
6									8.2		
					End of Borehole	421.20	6.10				

Well Installation: Bentonite; #3 Silica Sand; 1" Steel Casing; 1.5" Slot 10 Screen; WL: 421.64m on Aug 2, 2018

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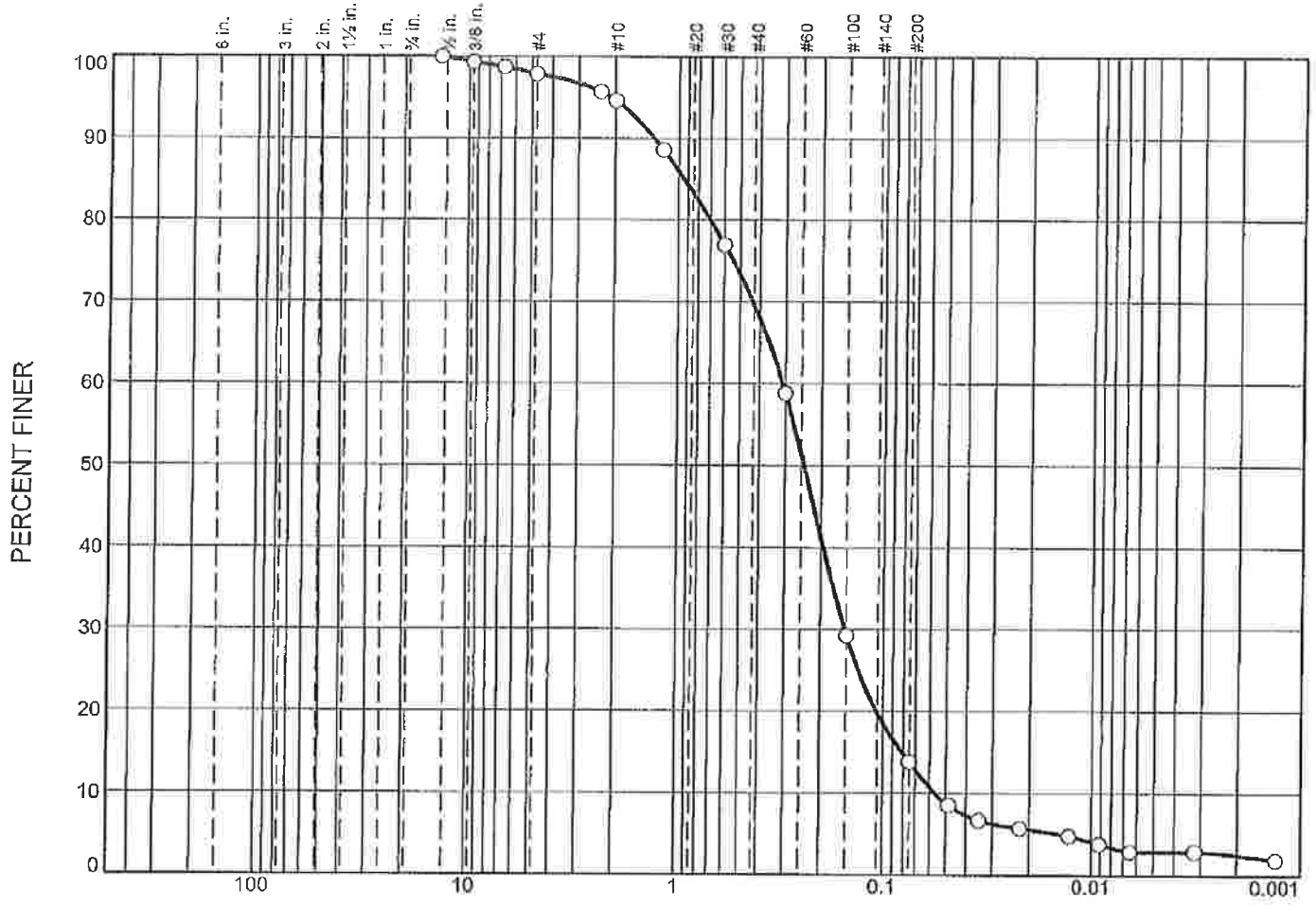
APPENDIX F:
BOREHOLE SOIL GRAIN-SIZE ANALYSES

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
O	0.0	0.0	2.1	3.3	25.1	55.7	11.3	2.5

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
O	BH1	3	1.52-2.13m	sand, some silt, trace clay and gravel	SM
				Estimated Percolation Rate; T = 10 min/cm	
				Estimated Coefficient of Permeability; k = 3.2 x 10^{-3} min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

CMT Engineering Inc.

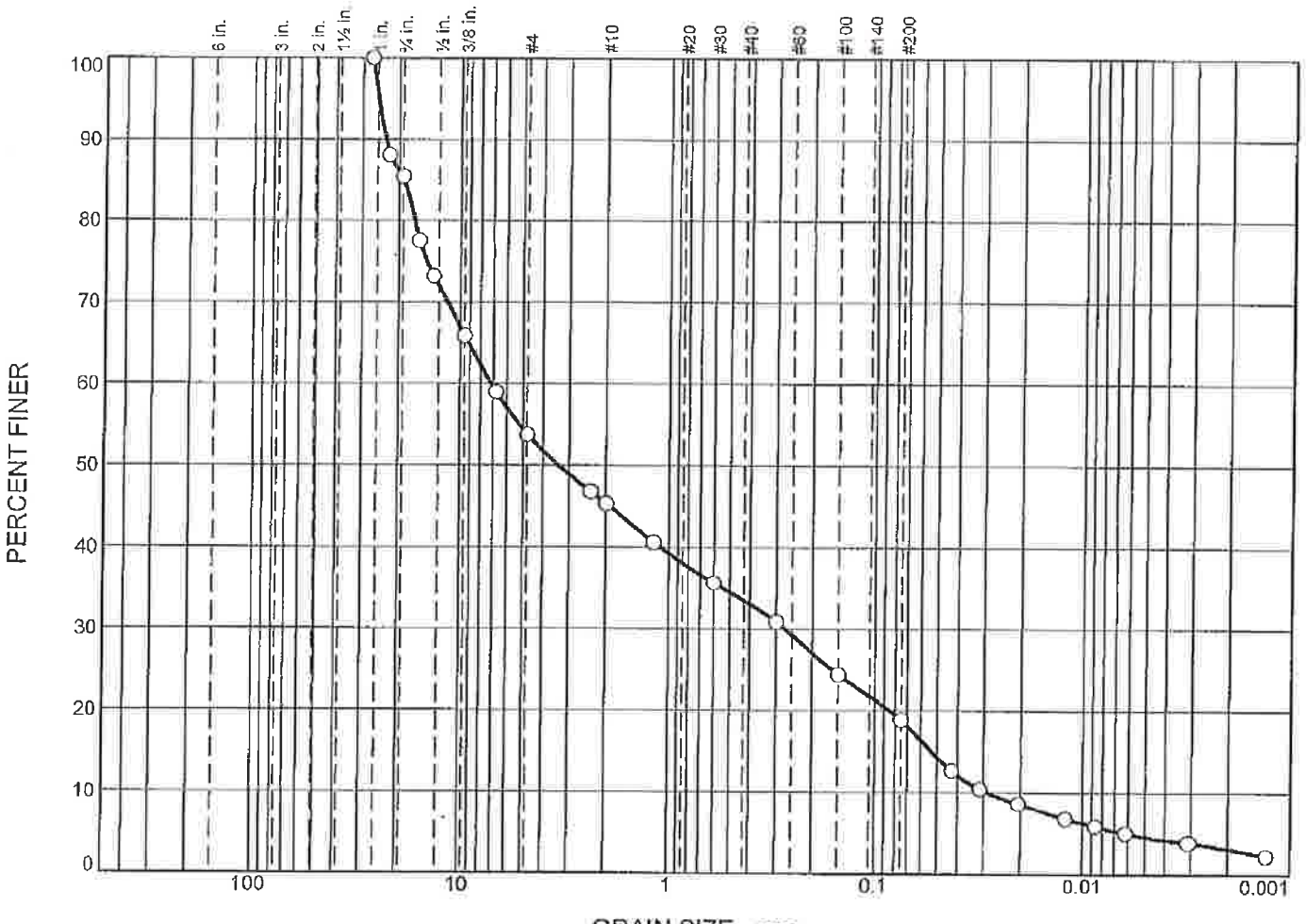
St. Clements, ON

Client: H. Bye Construction

Project: Wilder Lake Subdivision
263530 Southgate Road 26, Southgate Twp, Ontario

Project No.: 18-368 **Figure** 1

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
O	0.0	14.5	31.8	8.4	11.9	14.6	15.7	3.1

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
O	BH2	3	1.22-2.13m	sandy gravel, some silt, trace clay	GM
				Estimated Percolation Rate; T = 12 min/cm	
				Estimated Coefficient of Permeability; k = 8.4 x 10^{-4} min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

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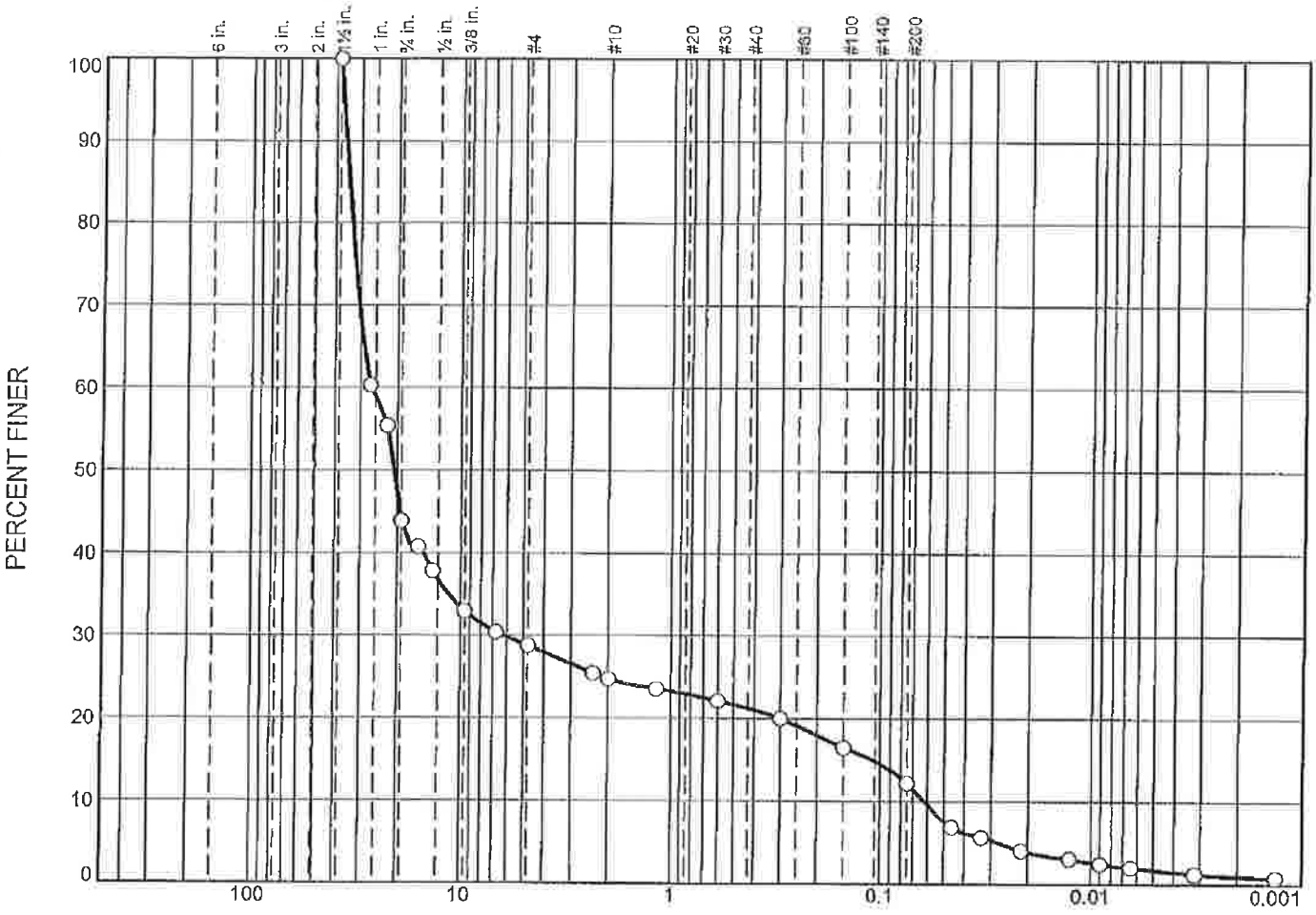
Project: Wilder Lake Subdivision
263530 Southgate Road 26, Southgate Twp, Ontario

Project No.: 18-368

Figure 2

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	56.1	15.1	4.1	3.5	9.0	11.3	0.9

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH3	2	0.76-1.37m	gravel, some sand and silt, trace clay	GM
				Estimated Percolation Rate; T = 8 min/cm	
				Estimated Coefficient of Permeability; $k = 3.9 \times 10^{-3}$ min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

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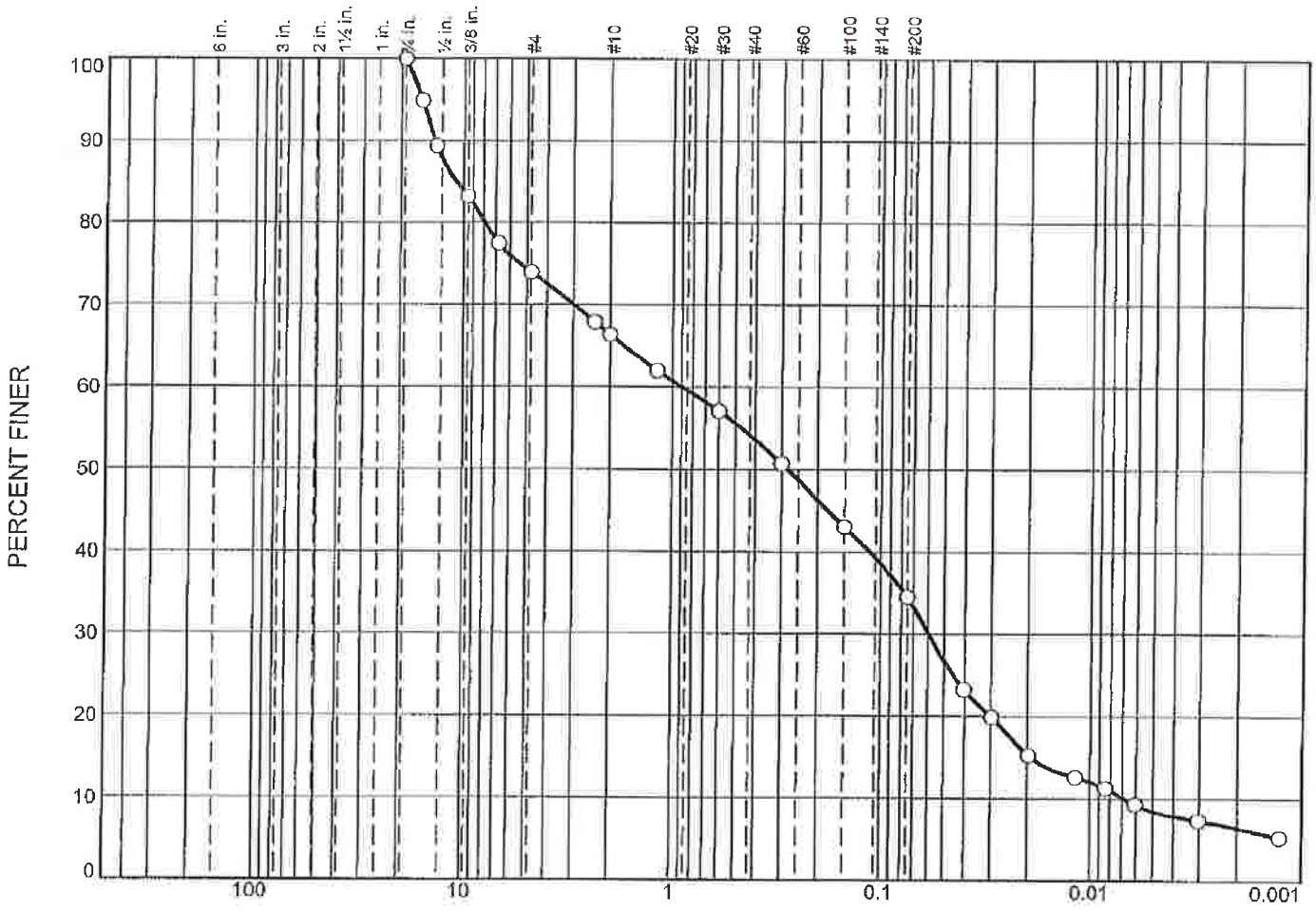
Project No.: 18-368 **Figure** 3

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	26.1	7.5	12.3	19.7	28.0	6.4

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH4	2	0.76-1.37m	silty, gravelly sand, trace clay	SM
				Estimated Percolation Rate; T = 15 min/cm	
				Estimated Coefficient of Permeability; k = 4.8×10^{-4} min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

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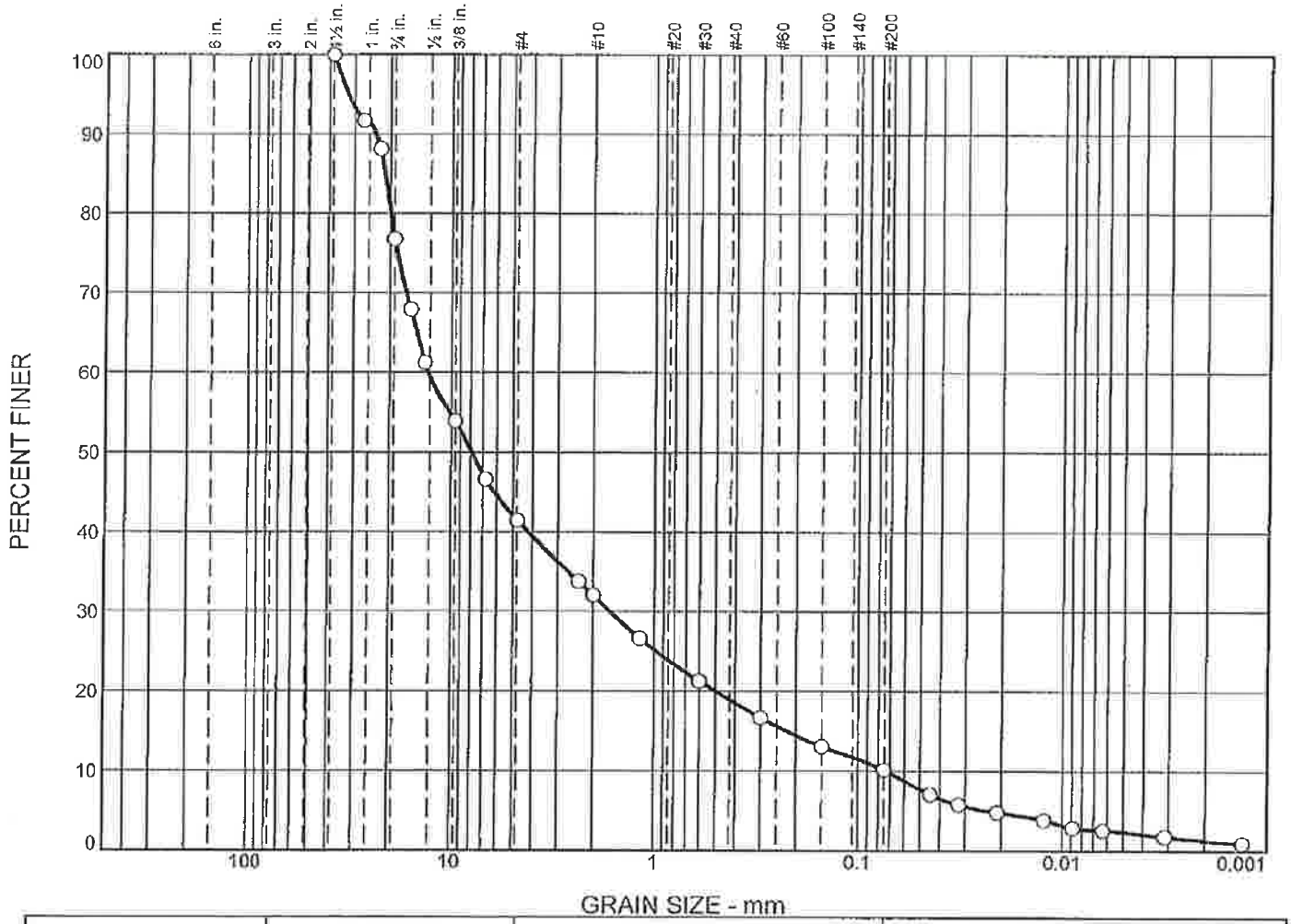
Project: Wilder Lake Subdivision
263530 Southgate Road 26, Southgate Twp, Ontario

Project No.: 18-368

Figure 4

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	23.2	35.4	9.4	13.1	8.7	8.9	1.3

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH5	2	0.76-1.37m	sandy gravel, trace silt and clay	GW-GM
				Estimated Percolation Rate; T = 8 min/cm	
				Estimated Coefficient of Permeability; k = 5.3 x 10^{-3} min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

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Client: H. Bye Construction

Project: Wilder Lake Subdivision
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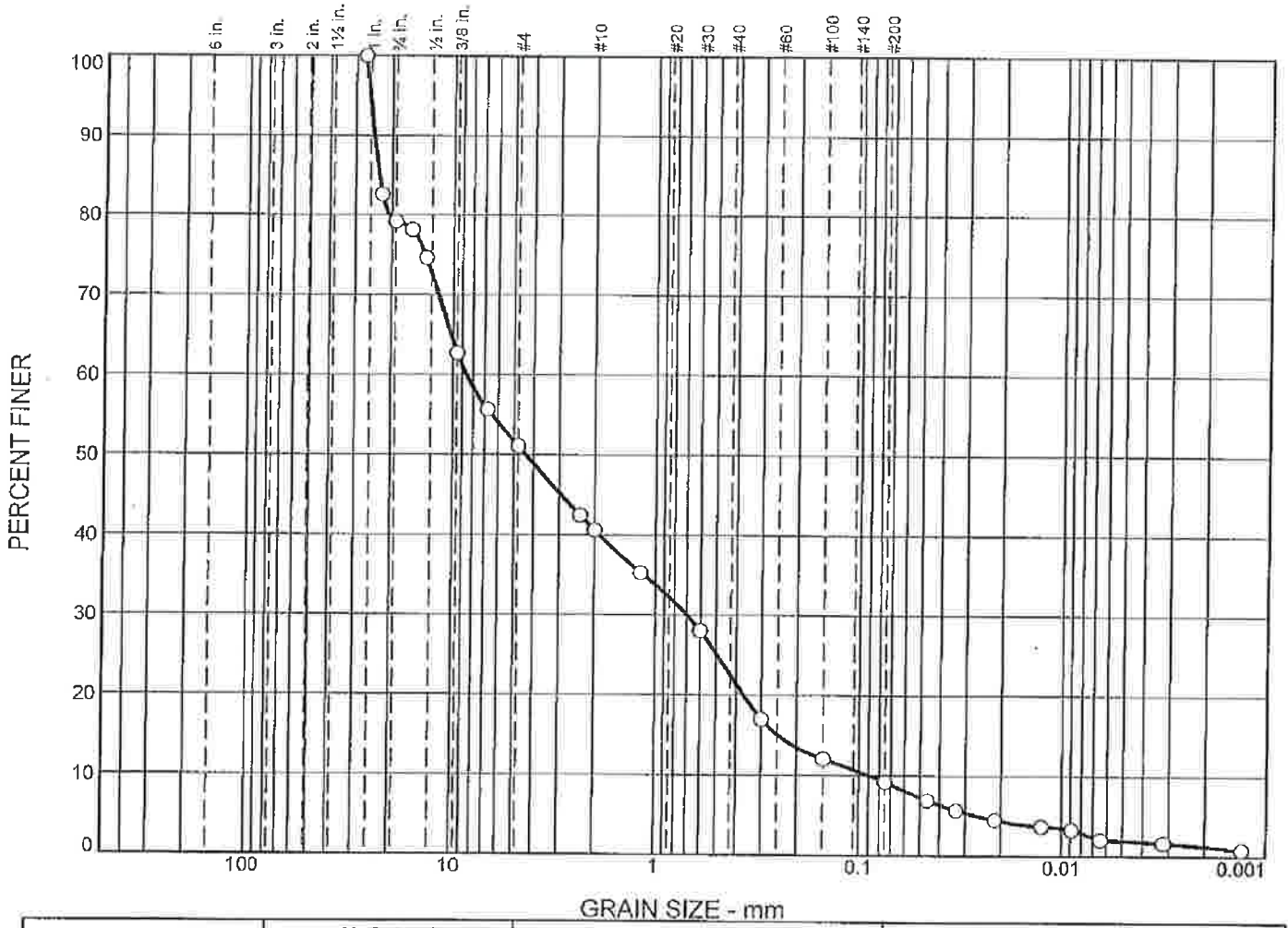
Project No.: 18-368

Figure 5

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
O	0.0	20.8	28.2	10.4	18.2	13.2	8.0	1.2

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
O	BH6	2	0.76-1.37m	gravel and sand, trace silt and clay	GP-GM
				Estimated Percolation Rate; T = 8 min/cm	
				Estimated Coefficient of Permeability; $k = 8.0 \times 10^{-3}$ min/cm	
				Tested by JM of CMT Engineering Inc., August 1, 2018	

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Project: Wilder Lake Subdivision
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Project No.: 18-368

Figure 6