Prepared By:

Moco Farms Ltd.

Hydrogeological Study: Moco Farms Development
Part of Lot 31, Concession 1, East Luther – Grand Valley

GMBP File: 215309

December 2015

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HYDROGEOLOGICAL STUDY: MOCO FARMS DEVELOPMENT

PART OF LOT 31, CONCESSION 1, EAST LUTHER –GRAND VALLEY

MOCO FARMS LTD.

DECEMBER 2015

GMBP FILE: 215309

1. INTRODUCTION

Moco Farms Ltd. (the Client) retained GM BluePlan Engineering Ltd. (GMBP) to perform a hydrogeological study to support the development of a residential subdivision in the geographic Town of Grand Valley, ON. The property on which the subdivision will be built (the Site) is 16.36 ha (40.4 acres) in size and is described as Part of Lot 31, Concession 1, Township of East Luther – Grand Valley, County of Dufferin. It is our understanding that the proposed subdivision domestic water supply and sanitary sewage will be serviced by the municipal services (water and sewer) for Grand Valley.

The following report presents the findings of the hydrogeological study, which gathers data from review of background information and field investigation, to assess the potential impact that the proposed subdivision may have on the local groundwater and nearby surface water features. The findings of this study are also coordinated with water budget analyses and stormwater modeling performed by Valdor Water Resources.

1.1 Purpose and Scope

The purpose of this report is to gather information about the Site from existing sources and from field investigation in order to assess the potential impact that the proposed subdivision may have on local groundwater and nearby bodies of surface water. Based on preliminary information, the primary focus of the study will be the shallow groundwater and the surface water resources.

The study follows the guidelines for the scope of work identified in Table 1 of *Hydrogeological Assessment Submissions: Conservation Authority Guidelines to Support Development Applications* with some modifications, as accepted by the Grand River Conservation Authority (GRCA) via pre-consultation: a copy of the pre-consultation letter is provided in Appendix A.

Background information was gathered from existing records such as geologic mapping, site- and area-specific hydrogeological and geotechnical reports, and well records available through the Ontario Ministry of the Environment and Climate Change (MOECC).

The field investigation involved the installation of monitoring wells and piezometers, sampling and analysis of groundwater, and inspection of topographic and surface water features. A more detailed description of the field investigation is given in Section 3.1 (Methodology).

A Functional Servicing Report (FSR) completed by Valdor Water Resources was reviewed to assess the potential impact of the proposed development on the nearby Boyne Creek and Grand River.

2. BACKGROUND

2.1 Site Location and Setting

The Site is situated just south of the presently developed area of Grand Valley (refer to Figure 1). It occupies an area of 34.42 ha (85.1 acres) and is located between about 300 and 700 m south of the Grand River between Water Street (County Road 25) to the west and Boyne Creek to the east. The property is described as Part of the north half of Lot 31, Concession 1, Township of East Luther – Grand Valley, County of Dufferin.

2.2 Proposed Development

Moco Farms Ltd. proposes to develop the Site with 111 residential lots, three blocks (two of them 1.92 ha in size, the other 2.33 ha) of mixed use land, and a block of parkland 0.49 ha in size. The development will also include associated roadways, walkways, and at the northeast portion of the developed land, a stormwater management facility. A buffer area of approximately 55 m is to be maintained along the easterly slope and away from the Boyne Creek.

Moco Farms Ltd. also owns a piece of land (6.89 ha) on the east side of Boyne Creek, but those lands are not proposed for development and as such, will not be discussed in this hydrogeological study. A draft plan of subdivision is provided in Appendix B.

2.3 Surficial Geology and Physiography

The Site is located near the boundary between two physiographic regions known as the Dundalk Till Plain and the Stratford Till Plain (Chapman and Putnam 2007). The Dundalk Till Plain is “characterized by swamps or bogs and by poorly drained depressions” (Chapman and Putnam 1985). Much of the Dundalk Till Plain has a layer of silt (perhaps windblown loess) typically less than 0.6 m in depth (Chapman and Putnam 1985). The northern part of the Stratford Till Plain is a rather level region of clay plains which were deposited as ground moraine (Chapman and Putnam 1985).

In terms of physiographic landforms, the southern portion of the Site lies in a till plain and the northern portion of the Site lies in a glacial spillway closely associated with the Grand River valley (Chapman and Putnam 1985, see Figure 2). As such, the southern part of the Site may contain more homogeneous surficial materials, having been laid down by ice, whereas the northern portion of the site may exhibit greater heterogeneity due to the depositional and sorting effects of flowing water.

The distribution of surficial materials at the Site and its surroundings are shown in Figure 3. The surficial materials are primarily composed of clay till or silt till with some modern alluvial (heterogeneous deposition of clay, silt, sand, and gravel) deposits associated with the ravine of Boyne Creek to the east (Ontario Geological Survey 2010). Bedrock underlying the Site is expected to be of the sedimentary Guelph Formation, which is composed of sandstone, shale, dolostone and siltstone (Ontario Geological Survey 2011). Based on the maps from the Ontario Geological Survey (2011), the thickness of unconsolidated materials (i.e. glacially-deposited material) above the bedrock in this area is moderate, on the order of 25 m.

2.4 Local Use of Groundwater

Grand Valley obtains its municipal water supply from a network of groundwater wells, all located to the north of the proposed development. The nearest municipal well to the Site is approximately 300 m to the northwest (MOECC Well ID 1703757): it is completed in the bedrock with open hole from 28.5 m to 116.5 m (93.5 ft to 382 ft) below ground surface (bgs). According to maps available through the GRCA, the proposed development is not identified to be within a capture zone of any of these municipal wells.

A records search was performed to collect information about wells within 500 m of the Site. Information sources included the MOECC water well database, and project file data previously collected by GMBP for a nearby residential subdivision project (GMBP 2012). A summary of information about area water wells collected from the MOECC water

well database is provided in Table 1. The locations of these wells are graphically presented in Figure 4. Copies of the available MOECC well records are provided in Appendix D. Based on the available information, local properties not serviced by the municipal system are reported to be supplied by domestic supply wells which draw from the bedrock aquifer.

No wells are reported to be located on the Site. No wells are reported to be located between the Site boundary and the Grand River to the north, or between the Site boundary and Boyne Creek to the east (i.e. areas considered downgradient of the proposed subdivision).

The closest well identified is at a house at about 173154 County Road 25, which is across County Road 25 from the Site. The well at this property (MOECC Well ID 1702261) is identified to have a well completed to a depth of 31.7 m bgs, reaching the limestone bedrock aquifer. Between the ground surface and the top of bedrock at this well is a 29 m-thick layer of stony clay, which is inferred to be low permeability clay till based on the surficial geology of the area.

2.5 Local Topography

According to topographic maps available through Atlas Canada (Natural Resources Canada 2013), the ground surface of the Site is fairly flat, primarily following a grade of approximately 3%, sloping from west to east toward Boyne Creek. The area of the property proposed to be developed is considered to be the upper, flat portion of the property, with relief in the range of 469 m asl (above sea level) to 470 m asl. Along the easterly limit of the proposed development, the property slopes at approximately 8% towards the Boyne Creek, with a relief in the range of approximately 455 m asl to 469 m asl.

2.6 Relevant Local and Site-Specific Reports

2.6.1 Geotechnical Investigation – 2014

A geotechnical investigation was conducted at the Site in 2014 by V.A. Wood (Guelph) Incorporated Consulting Geotechnical Engineers. The investigation consisted of the drilling of eleven boreholes, typically advanced to 5 m depth, by the use of an auger-type drill. The Site was found to be underlain by 100 mm to 250 mm of topsoil on top of clay and silt materials. In a couple of instances, sand and gravel layers were found: in one case in the south portion of the Site, the sand/gravel was found to be nearly 5 m thick; in the other case, in the west central portion of the Site, the sand/gravel was approximately 1 m thick.

2.6.2 Functional Servicing Report – 2015

A Functional Servicing Report (FSR) for the subject development was completed by Valdor Water Resources in July 2015. This report considered the anticipated sanitary and stormwater drainage of the subject development and provided recommendations for stormwater management and conveyance design, sanitary drainage routing, and erosion control measures.

In terms of the potential for impacts to the local surface water features, the stormwater drainage is considered a critical factor. The FSR presented the estimates of existing and proposed stormwater drainage flow rates for storms of varying frequency from 2-year to 100-year: the estimates indicate that the proposed design for the stormwater management facility (pond) will allow for the decrease of peak stormwater discharge rates to Boyne Creek, relative to pre-development (i.e. current) levels, by between 20% to 40% for all storm frequencies from 2-year to 100-year. The stormwater management facility is designed to be a wet pond that will provide “Normal (Level 2) treatment” (i.e. at least 70% removal of suspended solids) to the stormwater before its discharge to Boyne Creek.

With respect to infiltration, the pre-development annual infiltration volume was estimated to be 16,461 m^3. The post-development infiltration is estimated to be 39.8% of the pre-development infiltration volume when no enhanced best management practices are utilized. With the implementation of enhanced best management practices, the post-

development recharge is estimated to be approximately equivalent (i.e. 101.9%) to the pre-development recharge. A copy of the water budget analysis is provided in Appendix C.

The FSR also gives recommendations concerning erosion control measures, from construction through to operation, including construction sequencing, temporary sediment control basins, silt fences, permanent erosion protection, and others. Thermal mitigation measures are also proposed to be incorporated into the stormwater management facility design.

2.7 Ecologically-Sensitive and Protected Areas

In terms of receivers of potential impacts, the most prominent are those of the riparian areas and surface waters of Boyne Creek and the Grand River. The Site is not reported to coincide with, nor is it adjacent to, any particular ecologically-sensitive or protected areas beyond these features.

3. FIELD INVESTIGATION

In order to collect site-specific information about the hydrogeological conditions on-Site, a field investigation was conducted. This information was combined with the existing geotechnical information to establish the site conceptual model.

3.1 Methodology

On November 10 and 11, 2015, four boreholes (MW101, MW102, MW103, and MW104) were advanced by V.A. Wood on the Site to depths between 8.1 and 12.7 m bgs to collect information about the soil materials and stratigraphy underlying the Site. Figure 5 shows the locations of these boreholes across the Site. The borehole logs are provided in Appendix D. In each of the boreholes, a monitoring well was installed. These monitoring wells were constructed with 50 mm (2 in) diameter PVC piping with slotted screens and furnished with protective steel stickup casing.

On November 18, 2015, members of GMBP visited the Site to make observations and perform additional investigative work. Two shallow, drive-point piezometers (PZ-01 and PZ-02) were installed near the left (west) bank of the Boyne Creek (see Figure 5) by hand excavation and manual percussion (i.e. “driving”). Piezometer installation logs are included in Appendix D. The ground and top-of-casing elevations at each of the four monitoring wells, as well as the top-of-casing and creek water surface elevations at each of the piezometers, were surveyed using GPS. The groundwater levels in each of the piezometers and monitoring wells was measured using an electric water level tape.

Each of the monitoring wells was installed with a Waterra tube inertial pump and purged, either until dry or until three well-volumes of water were removed. After purging a groundwater sample was collected from each of the monitoring wells. These samples were submitted to a laboratory accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL) and subjected to “RCAP” analysis, which is a suite of analyses for various parameters including metals, inorganics, and nutrients. The results of the analyses were compared to the Ontario Drinking Water Objectives (2006).

The Boyne Creek channel was also inspected for evidence of springs, creek bottom upwelling, erosional features, flow changes through the reach, and other signals of significant groundwater interaction with the creek.

Water levels in the monitoring wells and piezometers were measured by GMBP staff a second time on November 25, 2015.

3.2 Subsurface Investigation

Based on the observations made during drilling the four boreholes, V.A. Wood prepared borehole logs summarizing stratigraphic information and well construction details: these logs are provided in the Appendix D. The boreholes are all

very similar in stratigraphy, each with between 200 mm and 300 mm of topsoil, underlain by a soft clay and silt layer (likely reworked till) which was about 1.5 m to 2 m thick in the north half of the Site and slightly thicker, around 3 m thick, in the south half of the Site. This layer was underlain by a deposit of stiff-to-hard silty clay till, which was noted to contain sand seams in MW-NE and MW-SW. This silty clay till layer extended at least to the bottom of all of the boreholes except MW-SE, in which a 2 m-thick deposit of sand and gravel was encountered at 10.8 m bgs.

Stratigraphic well logs for the piezometers installed were also prepared and are provided in the Appendix D. The materials encountered during the piezometer installation were primarily silt till, though the texture was fining-downward indicating that erosional action of the creek: this was most pronounced at PZ-01, at which the soil surface was submerged in the creek, and the top 0.3 m of it was predominantly cobble and gravel.

Cross-sections showing the stratigraphy of the Site are shown in Figures 6 and 7.

3.3 Groundwater Quality

The groundwater quality results are provided in Table 2 and the laboratory Certificates of Analysis for the groundwater quality analyses are included in Appendix E.

Generally, the reported results are considered to reflect groundwater quality typical of overburden wells in the region, with moderately elevated hardness, calcium, magnesium, and manganese due to their naturally-occurring levels in the carbonate based system. Evidence of influence due to anthropogenic activities include elevated sodium and chloride, attributed to road salting activities.

3.4 Observations of Boyne Creek

The section of Boyne Creek adjacent to the Site was observed during the field visit on November 18, 2015. Photos of the creek are provided in Appendix F. The Boyne Creek is a pool-riffle stream that flows northward to the Grand River. The site is located at the lower reaches of the Creek, directly upstream of its discharge location to the Grand River. The Creek extends several km west of the site, west of Grand Valley.

At the time of the visit, the water in the creek was a distinctly rusty reddish-brown colour. The bottom of the stream was predominantly covered in cobbles and gravel and its margins were composed of silt till soil; on the left (west) bank, grassy vegetation predominated, while the east bank was largely covered with cedar trees. In some places along its length, evidence of erosion from meandering and past high water events were found along the creek, including a floodplain (up to 5 m wide in places on the left bank) butting up against a scoured terrace slope rising steeply up to about 1 m above the floodplain.

No evidence of significant seeps or groundwater seepage areas was observed. No areas of significant upwelling were observed within the Creek itself, where the bottom was observed. Along the Creek through the property, no evidence of changes to flow volume (gaining or losing) was observed. Some areas of minor groundwater seepage were observed above the creek level. In these limited areas, it was generally a low-flow seep emerging below the crest of the scoured terrace slope. In one instance evidence of a seep was noted to be above the crest of the terrace in a stand of cedar trees: a path of exposed cobbles gave evidence of erosion, and green vegetation gave indication of available water. The topography there suggested that this might also be a preferential pathway for spring runoff to drain towards Boyne Creek.

Consistent with the soil types identified, seepage rates are expected to be limited. Based on the low permeability soils that dominate the catchment area, the Creek is expected to have highly variable flows, controlled predominantly by surface water inputs. The relatively minor contributions from base flow are considered to maintain the flow throughout the year, and during periods of low precipitation.

3.5 Water Level Monitoring and Groundwater Flow

Groundwater levels in the monitoring wells, as measured on November 25, 2015 are provided in Table 3. The piezometric head of the groundwater in the upland decreases at a horizontal gradient of approximately 4% as one approaches Boyne Creek. This indicates that the direction of shallow groundwater flow on the Site is toward the Creek. The piezometric contours are plotted in Figure 8.

The water surface in the creek was compared to the water levels measured in the adjacent piezometers: recorded values from the November 25th monitoring event are provided in Table 4. From this data, the vertical hydraulic gradient at the creek was computed for each piezometer. The hydraulic gradient in the vicinity of PZ-01 was 0.47 and in the vicinity of PZ-02 it was 0.53, both indicating downward flow, in the vicinity of the creek. Overall, this suggests that the property and Boyne Creek is an overall area of groundwater recharge. Local groundwater discharge is considered to exist directly adjacent to the Creek, particularly during wet periods of the year.

4. IMPACT ASSESSMENT

4.1 Potential Impact to Groundwater

Based on the information provided in the FSR by Valdor Water Resources, the proposed development will maintain the infiltration rate as compared to the pre-development levels. Consequently, no impacts to the overall water budget are expected through the use of the enhanced Best Management Practices proposed in the FSR.

No impacts to the local groundwater resources are expected due to the proposed development. Domestic supply wells in the area are reported to obtain water supply from bedrock. The Site is underlain by a thick layer of glacial till which will provide significant resistance to hydraulic interaction between surface activities and the groundwater source aquifer, therefore limiting potential for impacts to bedrock groundwater quality. The potential for impacts to local groundwater use is further limited by the fact that the wells near the Site are also all located upgradient from the Site. With respect to the potential impacts to future land owners of the Site, the development proposed for the Site will be connected to municipal services.

4.2 Potential Impact to Surface Water

The primary concerns related to the potential for impact to surface water can be divided into water quantity and water quality. With respect to water quantity, the degree of recharge to the site will influence the groundwater discharge and potential baseflow conditions in Boyne Creek. Considering that the FSR proposes the implementation of Enhanced Best Management Practices, which will essentially maintain the pre-development proportions of infiltration and runoff, there is anticipated to be no impact to surface water features with respect to water budget. With respect to peak flows, the FSR proposes a stormwater management facility design that will result in reduced peak runoff discharge rates. This moderation of stormwater runoff will serve to reduce the severity of high-water events and erosion associated with them.

With respect to water quality, the wet pond design for the stormwater management facility will also allow for removal of at least 70% of total suspended solids from the stormwater discharge, which will help to preserve the quality of water in the receiving watercourse. The FSR indicates that the stormwater management facility will also incorporate thermal mitigation measures and extended detention to mitigate erosion and flooding which will also improve the quality of stormwater discharged to Boyne Creek.

In terms of interactions between groundwater and surface water, the observed interaction between groundwater and surface water indicates that groundwater discharge above the creek is distributed, with slow seepage incrementally adding to the creek along the length of the Site, as opposed to point-source locations of considerable flow. With the implementation of Enhanced Best Management Practices recommended in the FSR, which will preserve the pre-development degree of infiltration, no impacts to water quantity or quality in the Boyne Creek are expected.

5. SUMMARY

A hydrogeological study of the proposed Moco Farms development has been completed in support of the terms of reference accepted by the GRCA during pre-study consultation. The study comprised several aspects, including desktop study of available geological and hydrogeological information, field activities such subsurface investigation and monitoring well sampling and water level survey, and integration of the Functional Services Report (FSR, prepared by Valdor Water Resources) for the stormwater management plan of the proposed development.

The findings of the study are as follows:

- The soils on-Site consist of up to 300 mm of topsoil, which is underlain by a soft layer of silty clay between 1.5 m and 3 m thick (thickness is greater on south half of Site), which is underlain by a layer of stiff silty clay till in which some sand lenses were observed. The borehole in the southeastern portion of the Site also indicated a sand and gravel layer (thickness unknown) at approximately 10.8 m below ground surface.
- Groundwater sampling indicates chemistry typical of the region and carbonate-derived overburden soils, including naturally-occurring elevated levels of hardness, calcium, magnesium, and manganese.
- Water level measurements at the monitoring wells on-Site indicated that the groundwater flow direction is toward the east and Boyne Creek. The inferred direction of shallow groundwater flow is consistent with the site topography and occurrence of surface water features.
- Piezometer water levels were compared to the water levels in Boyne Creek and indicated that vertical flow was downward. Based on this information, the site is considered to be in an overall area of groundwater recharge. Some localized groundwater discharge is considered to exist in the vicinity of the Creek, particularly during wet periods of the year.
- Observations indicate that groundwater flow/seepage to the creek was relatively limited and distributed along the Creek rather than point-sources such as springs. Minor groundwater discharge to surface water was primarily observed in the scoured terrace slope and floodplain above Boyne Creek.
- The FSR indicates that post development recharge will be similar to the pre-development volumes through the use of Enhanced Best Management Practices to encourage infiltration.
- In its discussion of the design of the stormwater management facility (SWMF), the FSR indicates that the post-development peak surface water discharge rates will be between 20% and 40% less than pre-development peak rates. The SWMF proposed by the FSR will provide a Normal level of treatment (70% removal of suspended solids).

6. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis of information collected as part of this investigation, the proposed Moco Farm Subdivision is not expected to have a negative impact on the local groundwater resources. In particular, no impacts to area wells or bedrock groundwater quantity/quality are expected.

Based on the implementation of the Enhanced Best Management Practices identified in the FSR, no impacts to the Boyne Creek are expected.

7. STATEMENT OF LIMITATIONS

The information in this report is intended for the sole use of Moco Farms Ltd. and its successors or assigns. GM BluePlan Engineering Limited accepts no liability for use of this information by third parties. Any decisions made by third parties on the basis of information provided in this report are made at the sole risk of the third parties.

GM BluePlan Engineering Limited cannot guarantee the accuracy or reliability of information provided by others. GM BluePlan Engineering Limited does not accept liability for unknown, unidentified, undisclosed, or unforeseen surface or sub-surface conditions that may be later identified.

The conclusions pertaining to the condition of soils and/or groundwater identified at the site are based on the visual observations at the locations of the investigative boreholes/monitoring wells and on the reported analytical data for the selected soil and groundwater samples. GM BluePlan Engineering Limited cannot guarantee the condition of soil and/or groundwater that may be encountered at the site in locations that were not specifically investigated as part of this investigation.

8. REFERENCES

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All of which is respectfully submitted.

GM BLUEPLAN ENGINEERING LIMITED

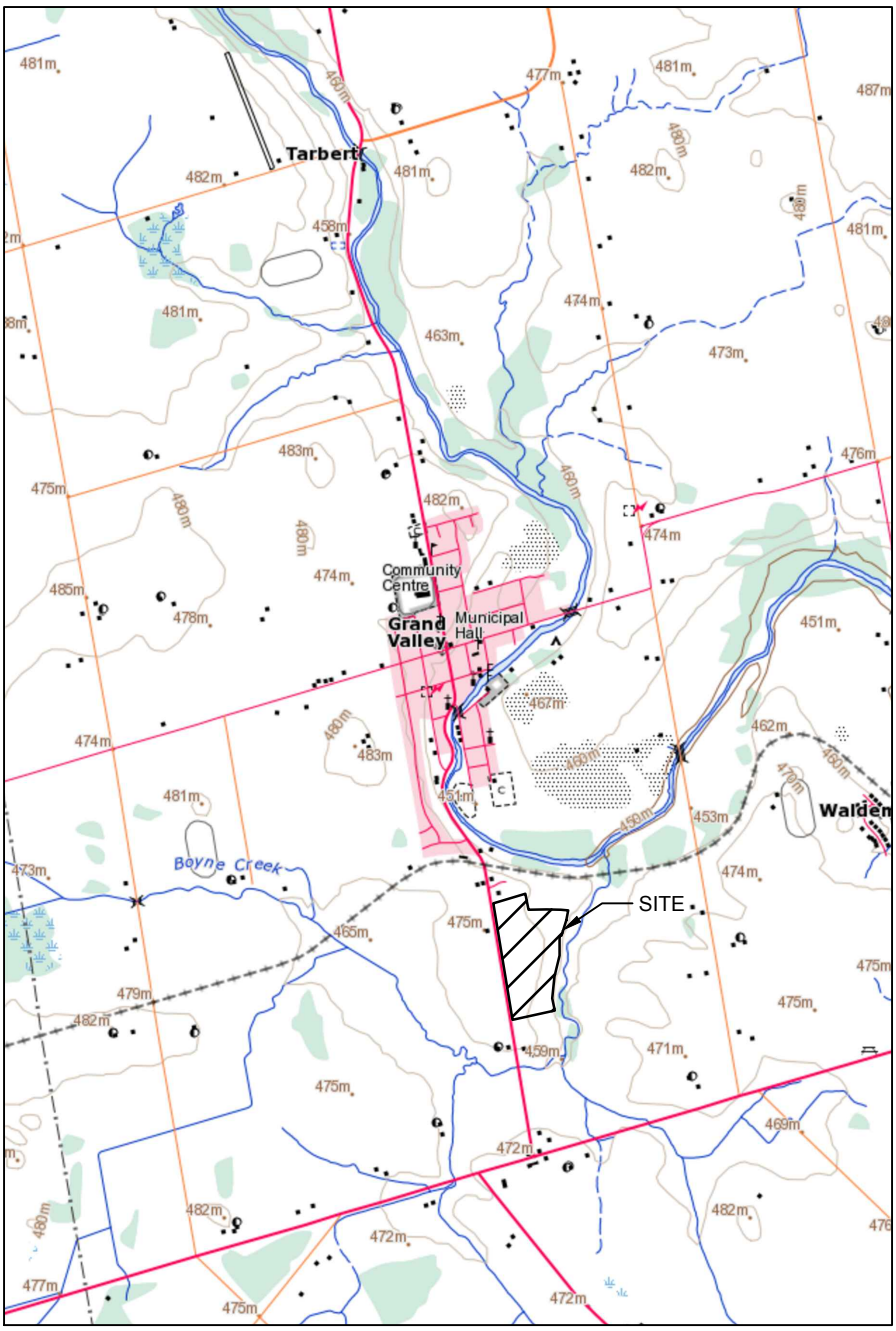
Per:

Matt Long, M.Eng., P.Eng.

Matthew Nelson, P.Eng., P.Geo.

FIGURES

215309
Moco Farms Development
Grand Valley, ON

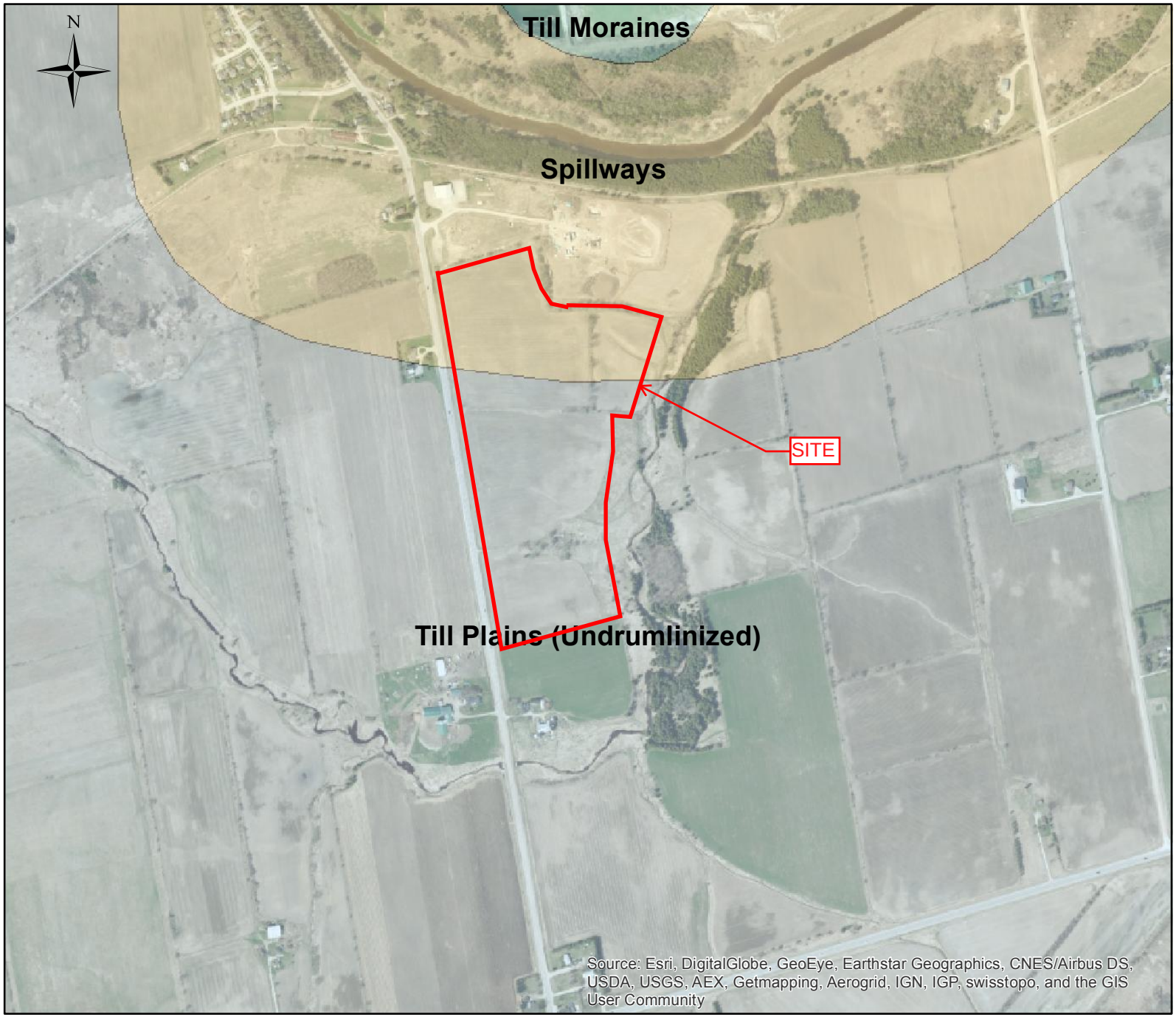


SCALE = 1:50,000
DEC 2015

SITE LOCATION DRAWING

Figure No. 1

BluePlan ENGINEERING



Project: 215309
Hydrogeological Study
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Development
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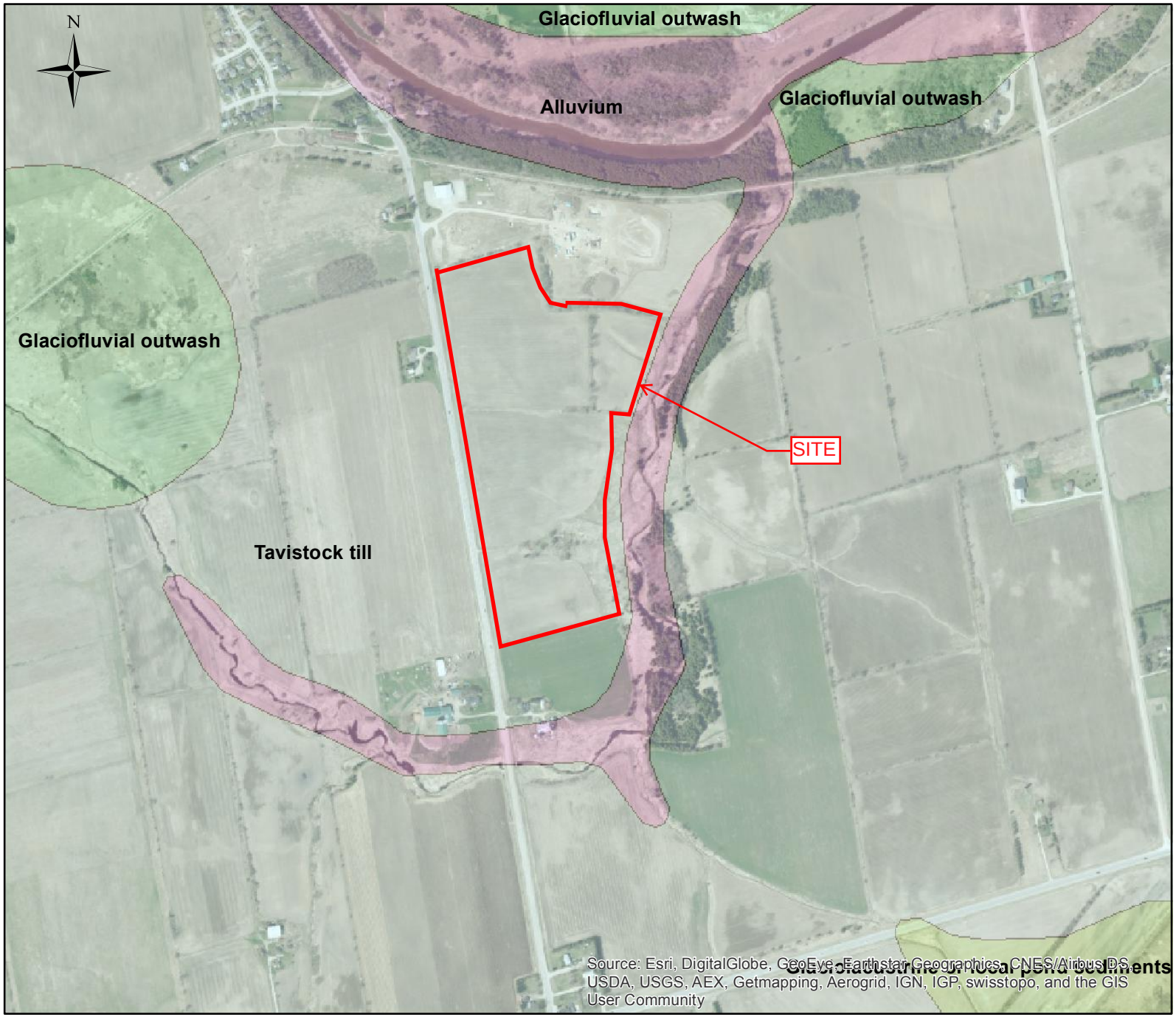
Legend

Physiography of Southern Ontario

- Spillways
- Till Moraines
- Till Plains (Undrumliniz...

Scale: 1: 10,000
December, 2015
Site Physiography
Figure 2

BluePlan ENGINEERING



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Legend

Surficial Geology of Ontario

- Alluvium
- Glaciofluvial outwash
- Glaciolacustri... or local pond sediments
- Tavistock till

Scale: 1: 10,000
December, 2015
Site Surficial Geology
Figure 3

BluePlan ENGINEERING

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Legend

- Water_Wells
- Monitoring Wells
- Property Location
- Well Search Buffer

Scale: 1: 10,000
December, 2015
Water Well
Buffer Search
Figure 4

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LEGEND

MW-SW	MONITORING WELL OR PIEZOMETER LOCATION
BH1	BOREHOLE LOCATION (VA WOOD 2014)

Scale: 1: 5,000
December, 2015
Site Plan
Figure 5

BluePlan ENGINEERING

A

A'

MW104

BH7

MW101

PZ-01

475

470

465

460

455

450

445

EXISTING GROUND PROFILE
(APPROXIMATE)

TOPSOIL

RISER PIPE
AND CASING

SILTY CLAY TILL WITH
OCCASIONAL SAND SEAMS

BOYNE CREEK ELEV.
454.41m ASL

SCREENED
INTERVAL

APPROXIMATE SURFACE OF BEDROCK

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LEGEND

▽ GROUNDWATER OR SURFACE WATER ELEVATION

NOT FOR CONSTRUCTION

VERTICAL 1:150
HORIZONTAL 1:1500
DECEMBER 2015

CROSS-SECTION
A-A'

Figure No. 6

BluePlan ENGINEERING

B

B'

MW103

MW102

PZ-02

475

470

465

460

455

450

445

EXISTING GROUND PROFILE (APPROXIMATE)

RISER PIPE AND CASING

TOPSOIL

SILTY SAND FILL

BOYNE CREEK ELEV. 456.90m ASL

SILTY CLAY TILL WITH OCCASIONAL SAND SEAMS

SCREENED INTERVAL

SAND AND GRAVEL

APPROXIMATE SURFACE OF BEDROCK

?

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LEGEND

GROUNDWATER OR SURFACE WATER ELEVATION

NOT FOR CONSTRUCTION

VERTICAL 1:150
HORIZONTAL 1:1500
DECEMBER 2015

CROSS-SECTION B-B'

Figure No. 7

BluePlan ENGINEERING

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LEGEND

MW-SW MONITORING WELL OR PIEZOMETER LOCATION

Scale: 1: 5,000
December, 2015
Groundwater Contours and Flow Direction
Figure 8

BluePlan ENGINEERING

TABLES

215309 - Hydrogeological Study: Moco Farms Development
Table 1: Summary of Wells within 500 m of Site

MOECC Well ID	Address	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														
1701078	RR#4 Grand Valley	31	1	555414	4858773	East Luther	Dufferin	Domestic	Bedrock	48.8	71.6	4.0	1969	
1700250	~	30	2	555140	4859670	East Luther	Dufferin	Domestic	Bedrock	29.6	62.2	15.2	1952	
1700280	~	~	~	555070	4859816	East Luther	Dufferin	Domestic	Bedrock	23.2	44.2	7.3	1964	
1701170	~	31	2	555164	4860003	East Luther	Dufferin	Domestic	Bedrock	28.3	32.0	Flowing	1970	
1701208	~	30	2	554810	4859600	East Luther	Dufferin	Domestic	Bedrock	29.0	54.9	4.0	1971	
1702261	RR#4 Grand Valley	30	1	555164	4859473	East Luther	Dufferin	Domestic	Bedrock	29.3	31.7	9.1	1976	
1702413	~	31	2	555264	4859623	East Luther	Dufferin	Commercial	Bedrock	29.0	33.5	11.9	1978	
1703756	~	30	2	554972	4859828	East Luther	Dufferin	Dom./Public	Bedrock	28.7	56.4	11.9	1988	
1703757	~	30	2	555066	4859799	East Luther	Dufferin	Municipal	Bedrock	26.5	116.4	9.8	1988	No tag number.
1703817	~	31	2	555205	4859812	East Luther	Dufferin	Domestic	Bedrock	11.3	20.4	5.8	1988	
7139106	173146 County Rd 25	30	2	555156	4859636	East Luther	Dufferin	Abandoned	~	~	~	~	2009	
7149325	~	31	2	555617	4860077	East Luther	Dufferin	Observation	Overburden	~	6.1	~	2010	
7161608	~	30	2	555108	4859783	East Luther	Dufferin	~	~	~	~	~	~	Alteration Record. A076888
7172735	~	30	1	555220	4859386	East Luther	Dufferin	~	~	~	32.3	~	~	Alteration Record. A112895

Notes:
A tilde (~) indicates this data was not recorded in the well record.

215309 - Hydrogeological Study: Moco Farms Development
Table 2a: Groundwater Quality Analyses

	Sample ID	MW101	MW102	MW103	MW104
	Sample Description	Groundwater	Groundwater	Groundwater	Groundwater
	Screened Interval (m asl)	452.6-455.6	454.1-457.1	462.6-465.6	462.1-465.1
	Sampling Date	2015-11-18	2015-11-18	2015-11-18	2015-11-18
Metals in Groundwater	**Criteria (µg/L)**	**Concentration (µg/L)**			
Dissolved Aluminum (Al)	100	<5.0	5.7	<5.0	6.9
Dissolved Antimony (Sb)	*6*	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	*25*	4.7	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	**1000**	65	70	150	81
Dissolved Beryllium (Be)	NV	<0.50	<0.50	<0.50	<0.50
Dissolved Boron (B)	*5000*	92	55	55	110
Dissolved Cadmium (Cd)	**5**	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	NV	30000	51000	120000	40000
Dissolved Chromium (Cr)	**50**	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	NV	<0.50	<0.50	0.77	0.54
Dissolved Copper (Cu)	1000	1.4	1.5	1.3	2
Dissolved Iron (Fe)	300	<100	<100	<100	<100
Dissolved Lead (Pb)	**10**	<0.50	<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	NV	24000	34000	55000	61000
Dissolved Manganese (Mn)	50	59	44	170	200
Dissolved Molybdenum (Mo)	NV	4	7.2	5.3	37
Dissolved Nickel (Ni)	NV	<1.0	<1.0	1.4	1.1
Dissolved Phosphorus (P)	NV	<100	<100	<100	<100
Dissolved Potassium (K)	NV	2900	3700	8800	13000
Dissolved Selenium (Se)	**10**	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	NV	5200	5700	5600	4900
Dissolved Silver (Ag)	NV	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	**20000** (200000)	**26000**	20000	**390000**	**33000**
Dissolved Strontium (Sr)	NV	430	510	460	430
Dissolved Thallium (Tl)	NV	<0.050	<0.050	<0.050	0.058
Dissolved Titanium (Ti)	NV	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	**20**	0.8	0.92	1.4	0.89
Dissolved Vanadium (V)	NV	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	5000	6.3	9.8	<5.0	17

Notes:

1. Criteria are from the Ontario Drinking Water Objectives (2002). Criteria are indicated by:
Underlined for Aesthetic Objective, **Bold** for Maximum Acceptable Concentration, *Italics* for Interim Maximum Acceptable Concentration

2. Concentrations in µg/L (ppm).
3. Concentrations with bold, italic, or underlined text in shaded cells exceed the corresponding criteria.
4. Screened well intervals presented are approximate.
5. ---- represents sample parameters that were not analyzed; NV = No value specified.
6. Maxxam Laboratory job number: B5N401

215309 - Hydrogeological Study: Moco Farms Development
Table 2b: Groundwater Quality Analyses

	Sample ID	MW101	MW102	MW103	MW104
	Sample Description	Groundwater	Groundwater	Groundwater	Groundwater
	Screened Interval (m asl)	452.6-455.6	454.1-457.1	462.6-465.6	462.1-465.1
	Sampling Date	2015-11-18	2015-11-18	2015-11-18	2015-11-18
Various Parameters in Groundwater	**Criteria**	**Concentration**			
Anion Sum (me/L)	NV	4.51	6.05	24.5	8.29
Bicarb. Alkalinity (calc. as CaCO3) (mg/L)	NV	190	200	400	220
Calculated TDS (mg/L)	500	240	320	1400	440
Hardness (CaCO3) (mg/L)	80:100	170	270	520	350
Conductivity (umho/cm)	NV	440	610	2700	860
Orthophosphate (P) (mg/L)	NV	<0.010	<0.010	<0.010	<0.010
pH (pH)	6.5:8.5	8	8.05	7.85	8.01
Dissolved Sulphate (SO4) (mg/L)	500	19	39	37	36
Alkalinity (Total as CaCO3) (mg/L)	30:500	190	200	400	220
Dissolved Chloride (Cl) (mg/L)	250	13	44	550	110
Nitrite (N) (mg/L)	**1**	<0.010	0.016	<0.010	<0.010
Nitrate (N) (mg/L)	**10**	<0.10	<0.10	1.76	<0.10
Nitrate + Nitrite (N) (mg/L)	**10**	<0.10	<0.10	1.76	<0.10
Total Ammonia-N (mg/L)	NV	0.15	<0.050	0.21	0.37
Dissolved Organic Carbon (mg/L)	5	2.3	1.8	2.9	1.9

Notes:

1. Criteria are from the Ontario Drinking Water Objectives (2002). Criteria are indicated by:
Underlined for Aesthetic Objective, **Bold** for Maximum Acceptable Concentration, *Italics* for Interim Maximum Acceptable Concentration
2. Concentrations are as listed for each given parameter.
3. Concentrations with bold, italic, or underlined text in shaded cells exceed the corresponding criteria.
4. Screened well intervals presented are approximate.
5. ---- represents sample parameters that were not analyzed; NV = No value specified.
6. Maxxam Laboratory job number: B5N401

215309 - Hydrogeological Study: Moco Farms Development
Table 3: Monitoring Well Water Levels

Date:	2015-11-25		Screen		Water Level	
Well ID	Ground Elev.	TOC Elev.	Top Elev.	Length	Depth	Elev.
(--)	(m ASL)	(m ASL)	(m ASL)	(m)	(m bTOC)	(m ASL)
MW-NE	460.207	460.916	455.6	3.0	2.685	458.231
MW-SE	465.151	465.961	457.1	3.0	3.720	462.241
MW-SW	471.672	472.482	465.6	3.0	1.950	470.532
MW-NW	471.985	472.844	465.1	3.0	2.780	470.064

m bTOC - metres below top of casing of well.
m ASL - metres above Sea Level
Elev. - Elevation

GM BluePlan Engineering Ltd.
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
650 Woodlawn Rd. W. Block C, Unit 2, Guelph, ON N1K 1B8
www.GMBluePlan.ca

215309 - Hydrogeological Study: Moco Farms Development
Table 4: Piezometer Water Levels

Date:	2015-11-25	Screen		Piezometer Water Level		Surface Water Level	
Piezo. ID	TOC Elev.	Top Elev.	Length	Depth	Elev.	Depth	Elev.
(--)	(m ASL)	(m ASL)	(m)	(m bTOC)	(m ASL)	(m bTOC)	(m ASL)
PZ-01	455.070	453.39	0.23	1.220	453.850	0.71	454.360
PZ-02	457.785	456.09	0.23	1.285	456.500	0.686*	457.099*

m bTOC - metres below top of casing of well.
m ASL - metres above Sea Level
Elev. - Elevation
N/M - no measurement
** - Measurements taken November 18, 2015*

GM BluePlan Engineering Ltd.
Guelph, Owen Sound, Listowel, Kitchener, Exeter, Hamilton, GTA
650 Woodlawn Rd. W. Block C, Unit 2, Guelph, ON N1K 1B8
www.GMBluePlan.ca

APPENDIX A:
PRE-CONSULTATION LETTER

October 27, 2015
Our File: 215309

Grand River Conservation Authority
400 Clyde Road
PO Box 729
Cambridge ON N1R 5W6

Attention: Andrew Herreman, Resource Planner

Re: Hydrogeological Study Scope Consultation
Moco Farms Development
Part of Lot 30, Concession 2
East Luther – Grand Valley

Dear Andrew,

GM BluePlan Engineering Limited (GMBP) has been retained by Moco Farms Limited to conduct a Hydrogeological Investigation to support the proposed Moco Farms development located on Part of Lot 30, Concession 2, Township of East Luther – Grand Valley (Town). The purpose of this letter is to consult with the GRCA regarding the anticipated scope of work as it relates to the site-specific details of the subject property and obtain input regarding specific concerns or issues you feel should be addressed within the Hydrogeological Investigation.

Based on our discussions, it is our understanding that the Hydrogeological Study is required to support GRCA comment regarding the development. As such, our general scope of work is based on the guidelines within the document entitled *Hydrogeological Assessment Submissions, Conservation Authority Guidelines to Support Development Applications* (June, 2013), hereafter referred to as the Guideline.

With respect to the general site information, it is noted that:

- The site is to be serviced through municipal water supply and sanitary sewer,
- The site is located adjacent to the Boyne Creek and GRCA regulated area (along the easterly limits of the development),
- The site is located approximately 200 to 600 m south of the Grand River,
- The site is not located within a well-head protection area (WHPA),
- Through previous hydrogeological studies in the direct vicinity of the site, the potential for impacts to the deeper aquifer system (supporting area domestic wells) is considered to be low due to the presence of approximately 25 to 30 m of low permeability overburden (till deposits) located above the bedrock,
- Through door-to-door surveys completed in the area for other developments, MOECC well record reviews, and locations of existing developed lots, there are limited domestic supply wells in the direct vicinity of the subject property. The known wells that do exist in the direct vicinity of the site are completed in the bedrock.

Based on this preliminary information, it appears that the primary focus of a Hydrogeological Study would pertain to the adjacent creek and shallow groundwater/ surface water resources. As such we are proposing the following general scope of work to address GRCA comment:

Desk-top Study

- Background data review including geologic mapping, resource mapping, agency regional and area-specific hydrogeological reports,
- Review of area-specific hydrogeological and geotechnical reports,
- Review of MOECC Well Records.

Field Investigation

- Installation of four (4) monitoring wells
- Installation of two (2) shallow piezometers adjacent to creek,
- Groundwater level monitoring and sampling,
- Groundwater quality sampling at four (4) locations,
- Inspection of the site to assess topography and surface water features,
- Elevation survey of monitoring wells.

Impact Assessment

- Integration of pre- versus post stormwater modelling and water budget analysis,
- Review and integration of stormwater management works and mitigation measures,
- Impact assessment of subdivision on area water resources, both groundwater and surface water.
- Hydrogeological Assessment Reporting.

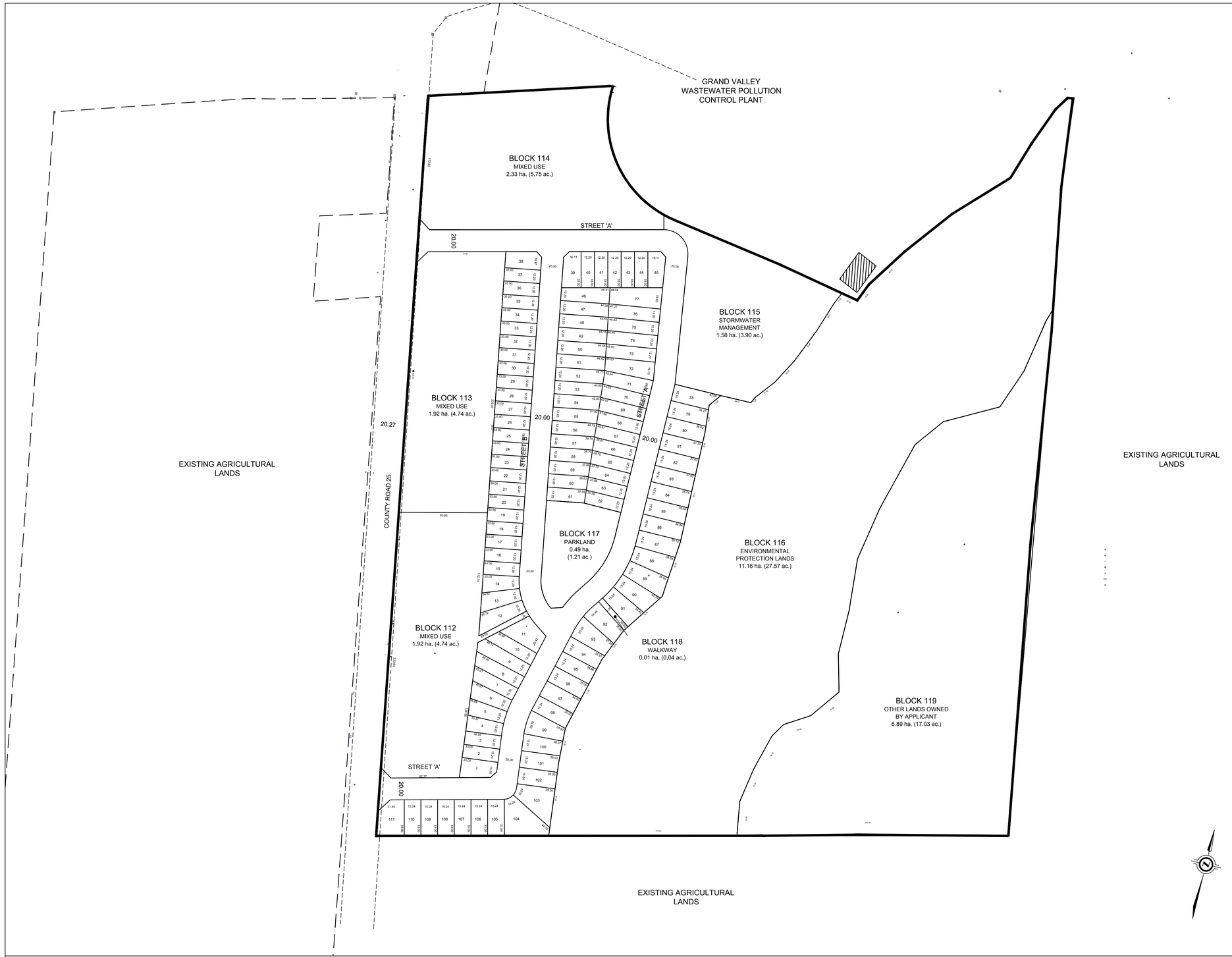
We look forward to your comments with respect to proposed scope and more importantly, key concerns/issues your staff may have with respect to the proposed development. Should you require any additional information regarding the proposal in order to support your evaluation, please feel free to contact us.

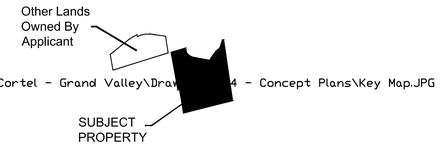
Yours truly,

GM BLUEPLAN ENGINEERING LIMITED
Per:

Matthew Nelson, P.Geo., P.Eng.
MN/kd
cc: File 215309

APPENDIX B:
DRAFT PLAN OF PROPOSED DEVELOPMENT





KEY MAP

DRAFT PLAN OF SUBDIVISION

PART OF NORTH HALF OF LOT 31, CONCESSION 1

FORMERLY IN THE TOWNSHIP OF EAST LUTHER
NOW IN THE
TOWNSHIP OF EAST LUTHER - GRAND VALLEY
COUNTY OF DUFFERIN
2015

0 m 150 m

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE INNOVATIVE PLANNING SOLUTIONS TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE _____ TOWERHILL DEVELOPMENTS _____

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE _____ PIER DE ROSA, O.L.S _____

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON PLAN
b) SHOWN ON PLAN
c) SEE KEY PLAN
d) RESIDENTIAL, MIXED USE, PARKLAND, ENVIRONMENTAL PROTECTION, STORMWATER MANAGEMENT
e) SHOWN ON PLAN
f) SHOWN ON PLAN
g) SHOWN ON PLAN
h) MUNICIPAL WATER
i) GUELPH LOAM
j) SHOWN ON PLAN
k) ALL MUNICIPAL SERVICES
l) NONE

LAND USE STATISTICS

Land Use	Lot / Block No.	Area (ha.)	Units
RESIDENTIAL UNITS (40')	1-77	3.70	77
RESIDENTIAL UNITS (50')	78-111	2.02	34
MIXED USE	112-114	6.17	
PARKLAND	117	0.49	
STORMWATER MANAGEMENT	115	1.58	
ENVIRONMENTAL PROTECTION LANDS	116	11.16	
OTHER LANDS OWNED BY APPLICANT	119	6.89	
WALKWAY	118	0.01	
0.3 m RESERVE			
20.0 m R.O.W		2.4	
TOTAL		34.42	111

MOCO FARMS- DRAFT PLAN OF SUBDIVISION
TOWN OF GRAND VALLEY

Y:\IPS\Logo & Business Cards\logo\Titleblock Logo.jpg

FILE NAME: 10-301 MOCO - 010615.dwg	DATE: JUNE 3, 2015
PROJECT: 10-301 CORTEL GRAND VALLEY	

APPENDIX C:
WATER WELL RECORDS

UTM Z E
19 R N
Elev. 9 R 1545
Basin 23

ONTARIO

RECEIVED
NOV 24 1952
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

17 No. 250

The Well Drillers Act

Department of Mines, Province of Ontario

Water Well Record

[redacted], ~~Village, Town or City~~ East Luther

~~Town or City~~)

Grand Valley

Date Completed 10 Sept 1952 (day) (month) (year) Cost of Well (excluding pump)

Pipe and Casing Record

Casing diameter(s) 4" O.D.
Length(s) of casing(s) 97'
Type of screen
Length of screen
Distance from top of screen to ground level
Is well a gravel-wall type?

Pumping Test

Date
Static level 50'
Pumping level 80'
Pumping rate 10 gal per min
Duration of test
Distance from cylinder or bowls to ground level

Water Record

Kind (fresh or mineral) Sweet
Quality (hard, soft, contains iron, sulphur, etc.) Soft
Appearance (clear, cloudy, coloured) Clear
For what purpose(s) is the water to be used? Farm

How far is well from possible source of contamination?
What is the source of contamination?
Enclose a copy of any mineral analysis that has been made of water

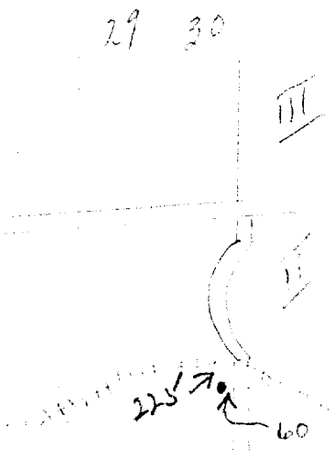
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
170	Fresh	120
204	"	154

Well Log

Overburden and Bedrock Record	From 0 ft.	To ....ft.
Tops Soil	0	4
Boulders & Clay	4	70
(Hard pan) Stones & Clay	70	97
Limestone	97	204

Location of Well

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



Situation: Is well on upland, in valley, or on hillside?
Drilling Firm Harry Kerr
Address New Hamburg
Name of Driller H. Kerr Address New Hamburg
Date Nov 13 52 Licence Number 135

Harry A Kerr
Signature of Licensee

FORM 5

CSS.S8

UTM Z E

5 R N

Elev 5 R 1525

17 No. 280

The Ontario Water Resources Commission Act

WATER WELL RECORD

Basin 23 Dufferin

County or District

Township, Village, ~~Town or City~~ GRAND VALLEY

Con. ~~11~~ Lot ~~12~~ 30

Date completed 27 (day) 5 month 1964 year)

[redacted]

dress Grand Valley

Casing and Screen Record

Inside diameter of casing 4 1/4

Total length of casing 81 feet

Type of screen –

Length of screen –

Depth to top of screen –

Diameter of finished hole 4 1/4

Pumping Test

Static level 24 feet

Test-pumping rate 7 G.P.M.

Pumping level 70 feet

Duration of test pumping 3 1/2 Hours

Water clear or cloudy at end of test Clear

Recommended pumping rate 7 G.P.M.

with pump setting of 70 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)
Dug well	0	25		
Stoney Clay	25	76	145	fresh
grey lime Stone	76	145		

For what purpose(s) is the water to be used?

Domestic

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm John Cudney

Address Salem ont

Licence Number 1280

Name of Driller or Borer

Address

Date

John Cudney

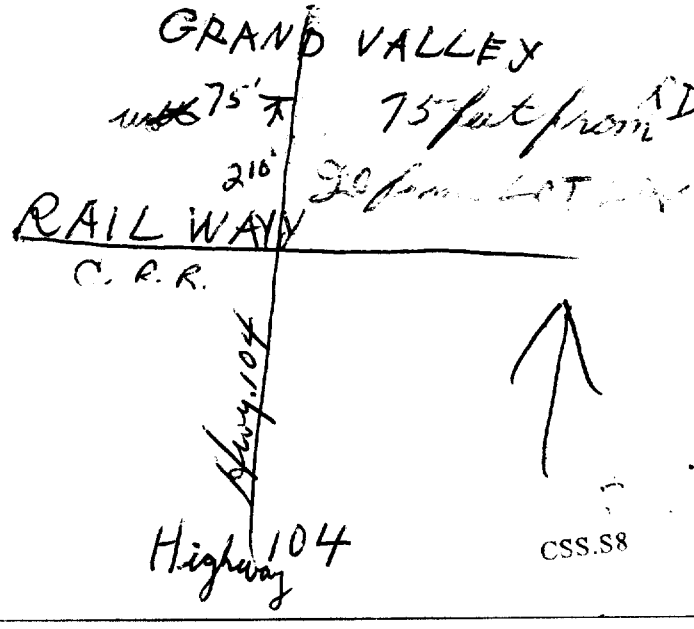
(Signature of Licensed Drilling or Boring Contractor)

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.



CSS.S8

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario

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

11 | 1701078 | MUNICIP. 17003 | CON. GN | 21

COUNTY OR DISTRICT: DUFFERIN

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: EAST LUTHER

CON., BLOCK, TRACT, SURVEY, ETC.: 1

LOT: 031

[redacted] RR # 4 GRAND VALLEY

DATE COMPLETED: DAY 15 MO. 12 YR. 69

ELEVATION: 1525 RC. 6

BASIN CODE: 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
BROWN	CLAY	CLAY & ROCKS		0	15
GREY	CLAY	CLAY & GRAVEL LAYERS		15	85
GREY	LIMESTONE			85	160
BROWN	LIMESTONE			160	235

31: 0015 0085 0160 0235

32:

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0198	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0234	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
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	205	0	~~93~~ 0093
04	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		93	~~235~~ 0235
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.): NONE | 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.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0006 GPM | DURATION OF PUMPING: 02 HOURS 30 MINS.

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
013 FEET	022 FEET	022 FEET	022 FEET	022 FEET	022 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP

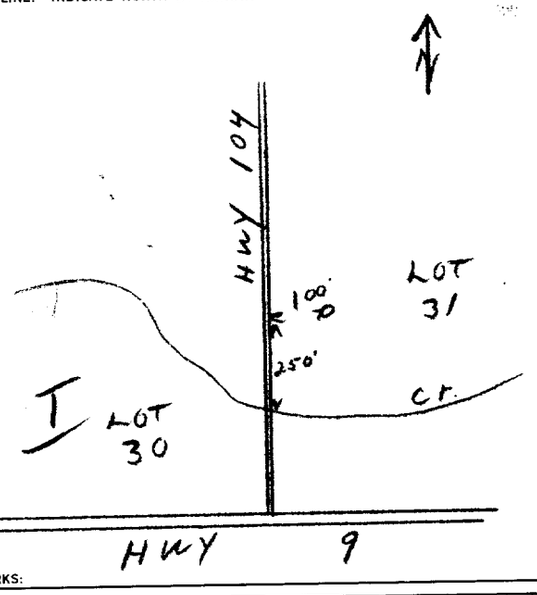
RECOMMENDED PUMP SETTING: 035 FEET

RECOMMENDED PUMPING RATE: 0005 GPM

50-53 000.7 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

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 ☐ 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: LADCO DRILLING | LICENCE NUMBER: 3423

ADDRESS: HILLSBURGH RR #1

NAME OF DRILLER OR BORER: ROY LANG | LICENCE NUMBER: 3424

SIGNATURE OF CONTRACTOR: Roy Lang | SUBMISSION DATE: DAY 15 MO. 12 YR. 69

OWRC COPY

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3316 | DATE RECEIVED: 160370

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.S8 1/M.

The Ontario Water Resources Commission Act

WATER WELL RECORD

40 P/16 W

Water management in Ontario

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

11 | 1701170 | MUNICIP. 17003 | CON. C&N | 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
DUFFERIN	EAST LUTHER	II	031

[redacted] GRAND VALLEY

DATE COMPLETED DAY 22 MO SEPT YR 70

UTM [illegible] 59780 | RC 4 | ELEVATION 1480 | RC 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH FROM	DEPTH TO
	GRAVEL	& BOULDERS		0	32
	CLAY	& ROCKS		32	38
GREY	ROCK			~~38~~	~~93~~
BROWN	LIMESTONE			93	105
WHITE	LIMESTONE			105	135

31 0032 111 13 | 0038 05 12 | 0093 26 | 0105 6 15 | 0135 1 15

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0130 ~~140~~	1 ☐ FRESH 3 ☐ SULPHUR / 2 ☐ SALTY 4 ☐ MINERAL
~~135~~	
	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

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH FROM	DEPTH TO
~~4~~ 04	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.205	0	~~42~~ 0042
~~4~~ 04	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		42	0135 ~~135~~
	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	0005 GPM	02 HOURS ~~00~~ MINS.

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

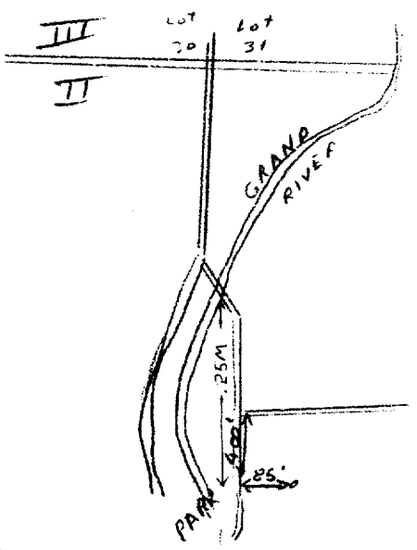
IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
~~X~~ 0001 GPM.	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	060 FEET	0005 GPM.

50-53 0001 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

54

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

WATER USE 01

55-56

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

METHOD OF DRILLING

57

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

CONTRACTOR

NAME OF WELL CONTRACTOR: LADCO DRILLING — LICENCE NUMBER: 3316

ADDRESS: HILLSBURGH

NAME OF DRILLER OR BORER: ROY LANG — LICENCE NUMBER: 3317

SIGNATURE OF CONTRACTOR: Roy Lang — SUBMISSION DATE: DAY 22 MO SEPT YR 70

OWRC COPY

OFFICE USE ONLY

DATA SOURCE 58	CONTRACTOR 59-62	DATE RECEIVED 63-68
1	3316	301270

DATE OF INSPECTION: 29/3/71 — INSPECTOR: DE

REMARKS: CSS.S8 — P Z — WI

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario

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

11 | 1701208 | MUNICIP. 17003 | CON. CON 02

COUNTY OR DISTRICT: DUFFERIN

TOWNSHIP, ~~BOROUGH, CITY, TOWN, VILLAGE~~: ~~GRAND VALLEY~~ EAST LUTHER

CON., BLOCK, TRACT, SURVEY, ETC.: ~~C.P. RAIL ROAD STATION~~ 11

LOT: 030

OWNER (SURNAME FIRST): ~~Royal Canadian Legion~~ 443 ROYAL CAN LEGION

ADDRESS: Grand Valley

DATE COMPLETED: DAY 09 MO 06 YR 71

21 | UTM ZONE 17 | EASTING 554810 | NORTHING 4859600 | RC 4 | ELEVATION 1540 | 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
Sandy Clay				0	2
	GRAVEL			2	25
HARD	PAN			5-0	95-
BLUE	LIMESTONE			95-	180

31: 0925 | 0509 | 0050 | 11 | 0095 | 14 | 0180 | 15

32:

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0180	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
~~6~~ 8 04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~100~~ 0100
04	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		100	~~180~~ 0180
	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	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0010 GPM. | DURATION OF PUMPING: 02 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
013 FEET	018 FEET	017 FEET	FEET	FEET	017 FEET

IF FLOWING, GIVE RATE: GPM.

PUMP INTAKE SET AT: 94 FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

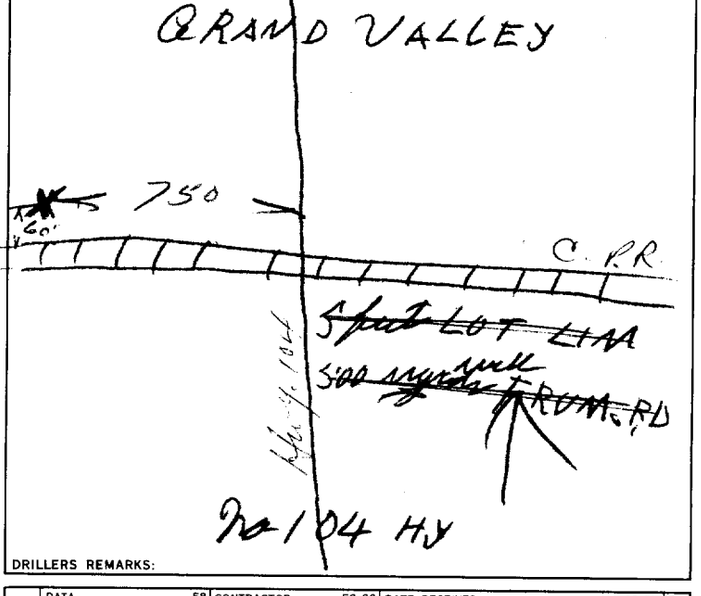
RECOMMENDED PUMP SETTING: 095 FEET

RECOMMENDED PUMPING RATE: 0010 GPM.

002.0 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

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

WATER USE 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

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: JOHN CUDNEY | LICENCE NUMBER: 1659

ADDRESS: SALEM ONT

NAME OF DRILLER OR BORER: JOHN CUDNEY | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: John Cudney | SUBMISSION DATE: DAY 9 MO 6 YR 71

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1659 | DATE RECEIVED: 290671

DATE OF INSPECTION: | INSPECTOR:

REMARKS: CSS.S8

OWRC COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

Ontario M

WATER WELL RECORD

40P/16 W

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

11 | 1702261 | MUNICIP 17003 | CON. CON 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	EAST LUTHER	1	030

RR#4 GRAND VALLEY — DATE COMPLETED: DAY 06 MO. 07 YR. 76

21 [redacted] 59250 | 5 | ELEVATION 1555 | 5 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
BROWN	CLAY	STONES - GRAVEL LAYERS		0	15
GREY	CLAY	STONES - SAND		15	96
GREY	LIMESTONE			96	104

31 00156051211 00962051228 01042115

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0103	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	TO
04"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0102
04"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		102	0104
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN
	FEET

61 PLUGGING & SEALING RECORD

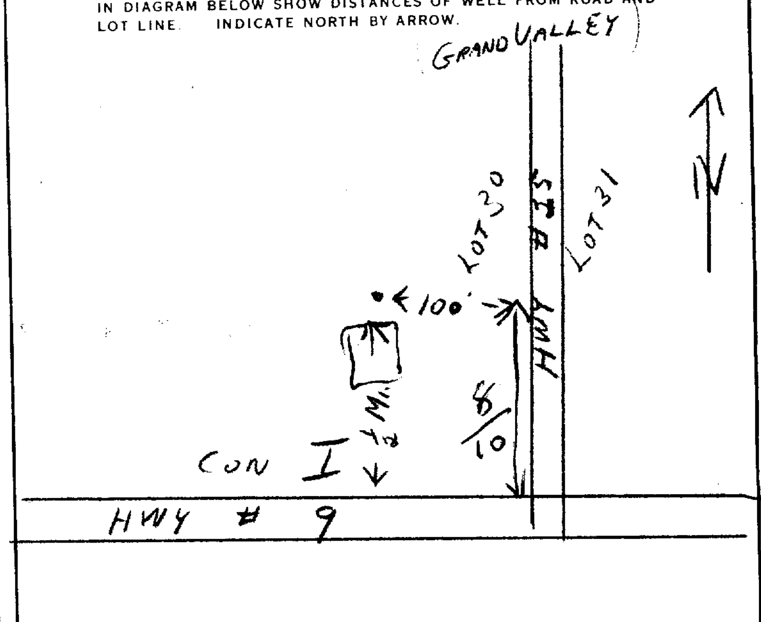
DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE	0011 GPM
DURATION OF PUMPING	02 HOURS 00 MINS
STATIC LEVEL	030 FEET
WATER LEVEL END OF PUMPING	033 FEET
WATER LEVELS DURING	1 ☒ PUMPING 2 ☐ RECOVERY
15 MINUTES / 30 MINUTES / 45 MINUTES / 60 MINUTES	FEET / FEET / FEET / FEET
IF FLOWING, GIVE RATE	GPM
PUMP INTAKE SET AT	50 FEET
WATER AT END OF TEST	1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE	☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING	060 FEET
RECOMMENDED PUMPING RATE	0010 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: 1	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE: 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: 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	LANG WELL DRILLING
LICENCE NUMBER	3317
ADDRESS	RR#HILLSBURGH
NAME OF DRILLER OR BORER	ROY LANG
LICENCE NUMBER	3317
SIGNATURE OF CONTRACTOR	Roy Lang
SUBMISSION DATE	DAY 6 MO. 7 YR. 76

OFFICE USE ONLY

DATA SOURCE	1
CONTRACTOR	3317
DATE RECEIVED	020577
DATE OF INSPECTION	Aug 15/77
INSPECTOR	[illegible]
REMARKS:	

P
WI
CSS.S8

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FORM 7 MOE 07-091

Ministry of the Environment

Ontario

The Ontario Water Resources Act 40P/16W

WATER WELL RECORD

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

11 1702413 MUNICIP 17003 CON. CON 02

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Dufferin	East Luther	Con. 2	031

[redacted]

Grand Valley, Ont.

DATE COMPLETED 48-53: DAY 28 MO 06 YR 78

UTM 359400 RC 5 ELEVATION 1545 RC 5 BASIN CODE 23

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	1
brown	clay			1	15
grey	clay	stones		15	95
grey	limestone			95	110

31 0001802 00156O5 0095205/2 0110215

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0110	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
04	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	~~97~~ 0097
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		97	0110
	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	0012 GPM	01 HOURS 30 MINS

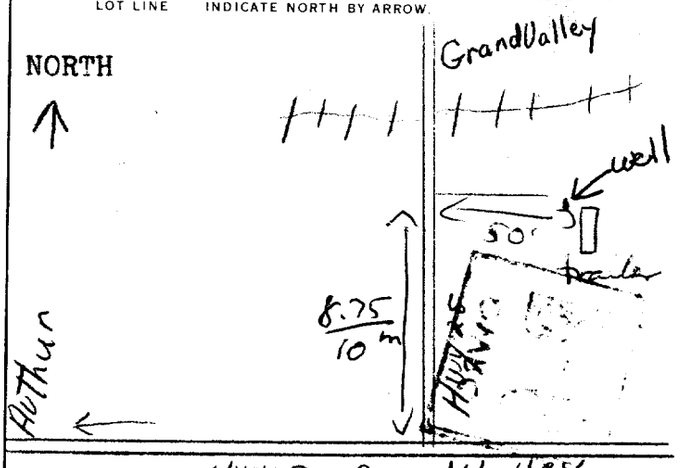
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
039 FEET	065 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	FEET	FEET	FEET	065 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	80 FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	080 FEET	0010 GPM

LOCATION OF WELL

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



Hwy 9 Grand Valley Corner

DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

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: 05

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 57: 4

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: Hugh Morrison Well Drilling Ltd. — LICENCE NUMBER: 3740

ADDRESS: R.R. 5 Mount Forest, Ontario

NAME OF DRILLER OR BORER: Hugh Morrison — LICENCE NUMBER: 3740

SIGNATURE OF CONTRACTOR: Hugh Morrison — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 3740 — DATE RECEIVED 63-68: 140778

DATE OF INSPECTION: Aug 11/78 — INSPECTOR: 29

REMARKS: CSS.S8

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77

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 — 1703756 — MUNICIP 17701 — CON.

COUNTY OR DISTRICT: Dufferin
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Village of Grand Valley (Formerly, Township of East Luther)
CON: 11
BLOCK, TRACT, SURVEY, ETC:
LOT: 30
OWNER (SURNAME FIRST): Timber Oak Bldg. Group Inc.
ADDRESS: 105 Queen St. W., Brampton, Ont. L6Y 1M6
DATE COMPLETED: DAY 14 MO 10 YR 88

21 — UTM ZONE — EASTING — NORTHING — 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
Br.	Clay	Stones		0	8
Br.	Clay		(Sticky)	8	23
	Clay	Stones		23	65
Gr.	Clay	Rocks	(hard)	65	85
Gr	Clay	Stones		85	94
Gr	Limestone			94	160
Br.	Limestone			160	185

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
173 TO 175	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
	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
6¼"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	102'6"
6¼	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		102'6"	185'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

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

71 PUMPING TEST

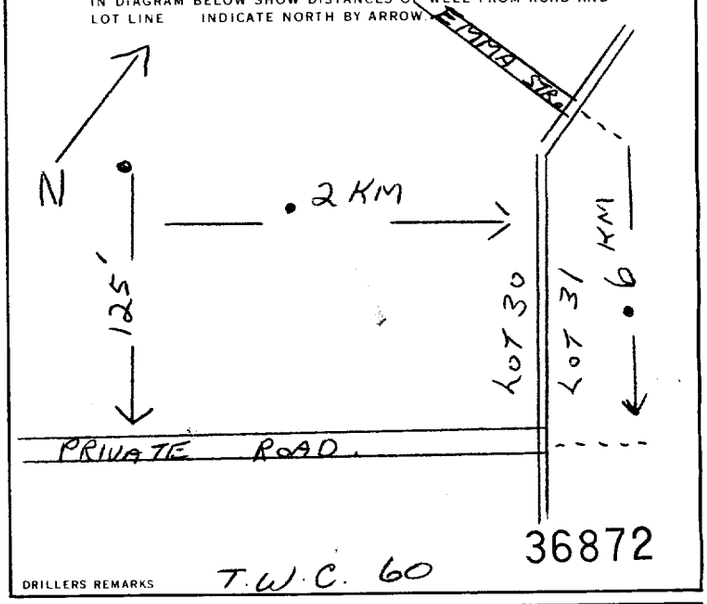
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — AIR
PUMPING RATE: 60 GPM
DURATION OF PUMPING: 2 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
39 FEET	150 FEET		150 FEET	150 FEET	150 FEET	150 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 160 FEET
RECOMMENDED PUMPING RATE: 50 GPM

LOCATION OF WELL

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



DRILLERS REMARKS: T.W.C. 60

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; 9 ☐ 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: Lang Well Drilling Limited
WELL CONTRACTOR'S LICENCE NUMBER: 3317
ADDRESS: R.R.1 Hillsburgh Ont.
NAME OF WELL TECHNICIAN: Roy Lang
WELL TECHNICIAN'S LICENCE NUMBER: T-0158
SIGNATURE OF TECHNICIAN/CONTRACTOR: R Lang
SUBMISSION DATE: DAY 10 MO 02 YR 89

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 3317
DATE RECEIVED: FEB 10 1989
DATE OF INSPECTION
INSPECTOR
REMARKS
WDE
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

1703757

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

11

MUNICIP 17701 CON.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT
DUFFERIN	VILLAGE OF GRANDVALLEY (FORMERLY THE TOWNSHIP OF EAST LUTHER)	11	PT 25-27 N.E. 1/4 S.E. 1/4 30

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
TIMBER OAK INC.	105 QUEEN ST., BRAMPTON, ONT.	DAY 10 MO 05 YR 88

21 — UTM ZONE — EASTING — NORTHING — 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	TO
Br.	Clay	Stones	(sticky)	0	11
Br	Clay	Stones	(soft)	11	16
Gr.	Clay	Stones		16	49
Gr.	Clay		(sticky)	49	57
Gr.	Clay	Stones		57	65
Gr.	Clay	Sand		65	87
Gr.	Limestone			87	156
Lt. Br.	Limestone			156	230
Br.	Rock			230	340
Gr.	Rock			340	354
Gr./Br.	Rock			354	368
Gr.	Rock			368	382

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
175	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
200	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
295	1 ☒ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
370 378 382	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	TO
6 1/4"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC		0	936'
6 1/8"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		936'	382
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

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.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☐ BAILER — AIR

PUMPING RATE: 250 GPM — DURATION OF PUMPING: 2 HOURS — MINS

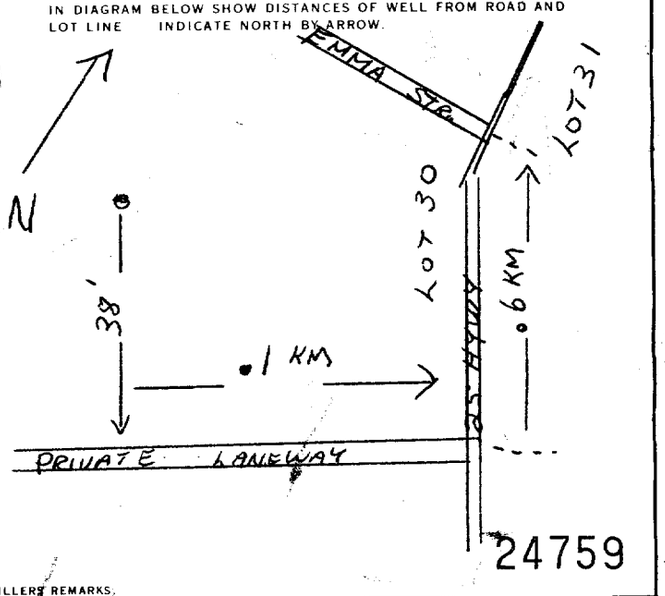
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
32 FEET	375 FEET		375 FEET	375 FEET	375 FEET	375 FEET

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

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	300 FEET	150 GPM

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

1 ☒ WATER SUPPLY — 2 ☐ OBSERVATION WELL — 3 ☐ TEST HOLE — 4 ☐ RECHARGE WELL — 5 ☐ ABANDONED, INSUFFICIENT SUPPLY — 6 ☐ ABANDONED, POOR QUALITY — 7 ☐ UNFINISHED — 9 ☐ DEWATERING

WATER USE

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 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: LANG WELL DRILLING LTD.
WELL CONTRACTOR'S LICENCE NUMBER: 3317
ADDRESS: R.R.1 HILLSBURGH ONT.
NAME OF WELL TECHNICIAN: ROY LANG
WELL TECHNICIAN'S LICENCE NUMBER: T-0158
SIGNATURE OF TECHNICIAN/CONTRACTOR: R Lang
SUBMISSION DATE: DAY 10 MO 02 89

OFFICE USE ONLY

DATA SOURCE — CONTRACTOR: 3317 — DATE RECEIVED: FEB 10 1989
DATE OF INSPECTION — INSPECTOR
REMARKS: WDE

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

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

11 — 1703817 — MUNICIP 17701 — CON.

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Grand Valley
CON., BLOCK, TRACT, SURVEY, ETC: #4 Grand Valley
LOT:
DATE COMPLETED: DAY 24 MO 06 YR 88
LOCATION METHOD CODE | 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	TO
Brown	Top Soil			0	2
Brown	Clay	Stones		2	21
Brown	Clay	Boulders		21	37
	Limestone			37	67

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
66	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS 6 ☐ Not Tested
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 5 ☐ GAS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
006	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	+ 1	39
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC		39	67
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

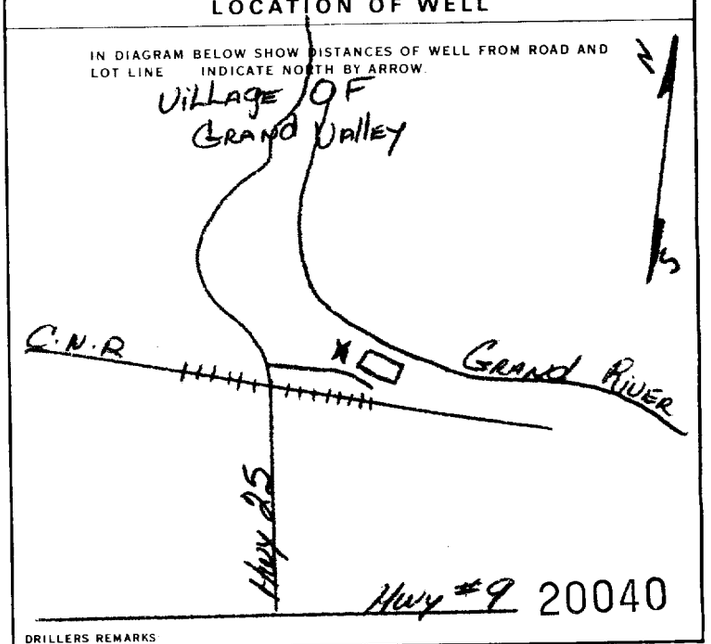
DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0	39	Holedug & Slurry

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 10 GPM
DURATION OF PUMPING: 2 HOURS ____ MINS
STATIC LEVEL: 19 FEET
WATER LEVEL END OF PUMPING: 37 FEET
WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY
15 MINUTES: 19 FEET | 30 MINUTES: — FEET | 45 MINUTES: — FEET | 60 MINUTES: — FEET
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 37 FEET
RECOMMENDED PUMPING RATE: 8 GPM

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

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ 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: Lunney Well Drilling
WELL CONTRACTOR'S LICENCE NUMBER: 3406
ADDRESS: Gen Delivery Laurel
NAME OF WELL TECHNICIAN:
WELL TECHNICIAN'S LICENCE NUMBER:
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY 25 MO 06 YR 88

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 3406 | DATE RECEIVED MAR 17 1989
DATE OF INSPECTION | INSPECTOR
REMARKS

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (v) **A 079699**

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
COUNTRY	TRADES LTD.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
156213 R.R 6	SHELBURNE	ONT	L0N1S9	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
173146 County RD #25	EAST LUTHER TWP	30	2

County/District/Municipality	City/Town/Village	Province	Postal Code
DUFFERIN COUNTY		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	555156	4859636		

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

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	1	A GRAVEL	
1	2	GROUT	
2	13	A GRAVEL	
13	14	GROUT /14 - 50ft	GROUT

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	To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	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* NOT USED
☐ Other, *specify*

Water Details

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	50	36"

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

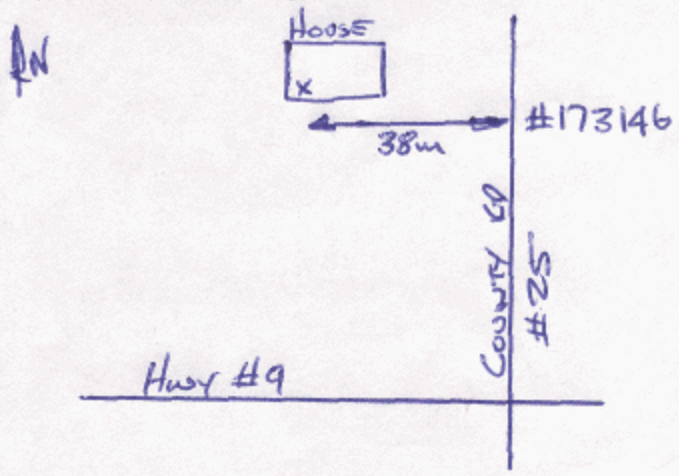
Well production (l/min / GPM)

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	10			
1			1	
2			2	
3			3	
4			4	
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.
HIGHLAND WATER WELLS	2576

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
Box 141, DURHAM		ONT	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
5193696363	POPPLETON, NIGEL	2130		2009 10 30

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2009 10 30

Ministry Use Only

Audit No. Z 107793

FEB 02 2010

0506E (12/2007) **Ministry's Copy**

Ontario — Ministry of the Environment

10-0117-00.

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A099616

Page 1 of 1

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Concession 2 (Amaranth East Luther Townline)	East Luther	31	2
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
Dufferin	Grand Valley	Ontario	
UTM Coordinates NAD 83 Zone 17 Easting 555617 Northing 4860077	**Municipal Plan and Sublot Number**	**Other**	

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
Brown	gravel	silt	Packed	0'	5'
Grey	silt	gravel, Cobbles	Cemented	5'	20'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0'	8'	Bentonite	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☒ Other, *specify* H.S.A.

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☒ Test Hole ☒ Monitoring ☐ Livestock ☐ 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
2"	Plastic	Sch 40	0'	10'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2"	Plastic	10	10'	20'

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
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	
	☐	☐ Fresh ☐ Untested	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20'	8"

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)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

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

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
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: See Map.

Well Contractor and Well Technician Information

Business Name of Well Contractor: Aardvark Drilling Inc.

Well Contractor's Licence No.: 7138

Business Address (Street Number/Name): 25 Lewis Road, Unit C

Municipality: Guelph

Province: ON

Postal Code: N1H1E9

Business E-mail Address:

Bus. Telephone No. (inc. area code): 1982693 40

Name of Well Technician (Last Name, First Name): Smith, Kyle

Well Technician's Licence No.: 3591

Signature of Technician and/or Contractor: Kyle Smith

Date Submitted: 2010 07 15

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2010 07 15

Ministry Use Only

Audit No. z114062

Received AUG 04 2010

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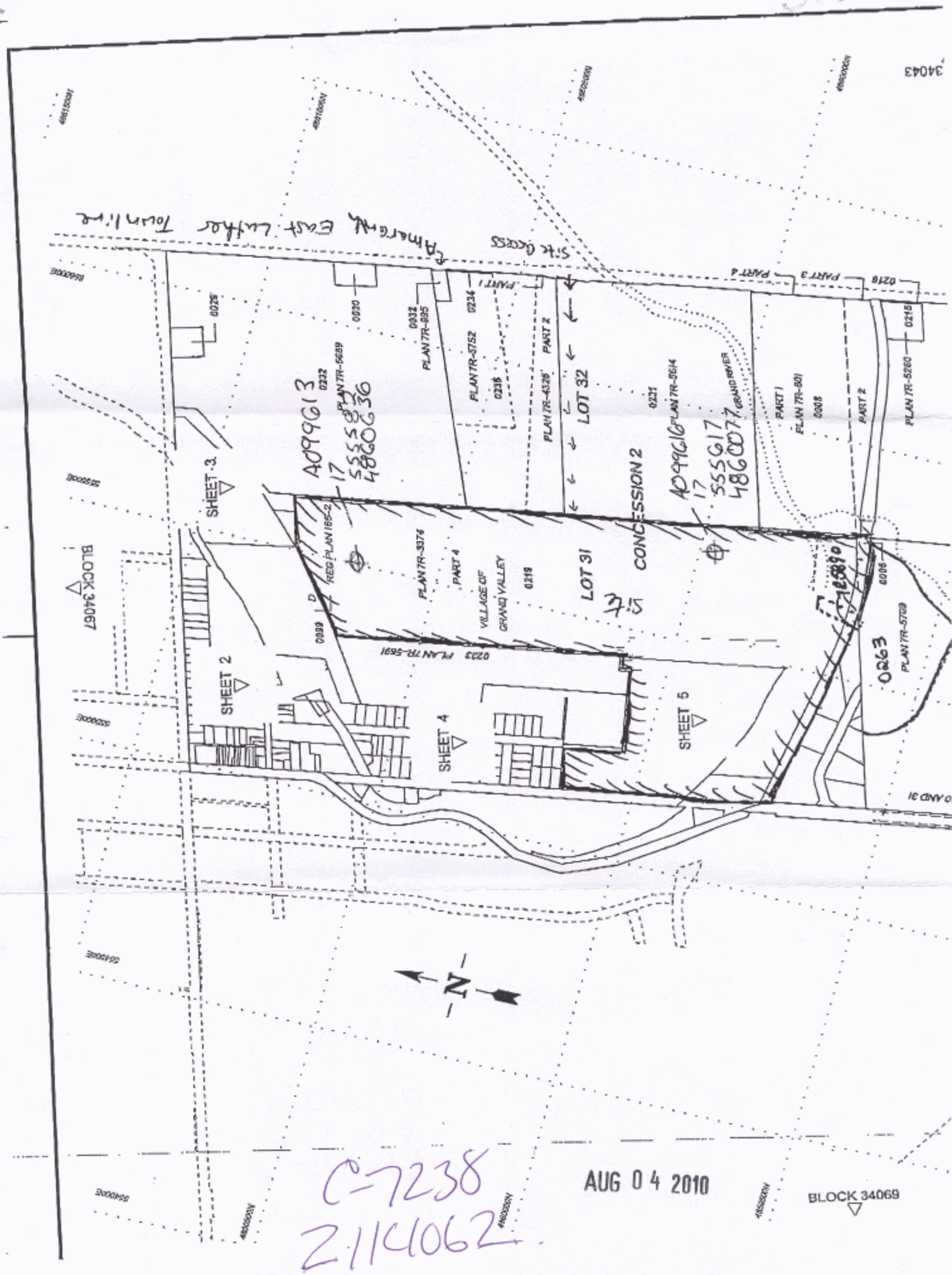


C-7238
21C4062

AUG 04 2010

Ontario Ministry of the Environment

A076888

(Print Below)

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☒ Metric ☐ Imperial

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	East Luther	2	30

County/District/Municipality	City/Town/Village	Province	Postal Code
Dufferin		Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	555108	4859783		

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
			4-inch diameter well in a pit extended using 6-inch casing.		
			Well pit to be filled by Owner		

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0			

Method of Construction

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

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
15.24	Steel	0.188	+0.50	1.98

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*

Construction Record - Screen

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

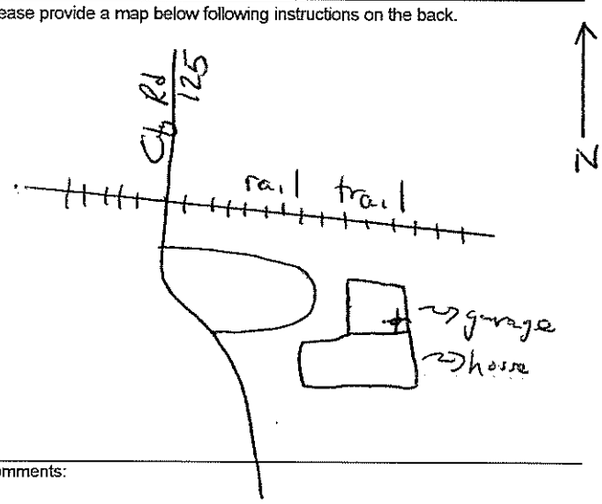
Well production (l/min / GPM)

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
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.
Gerrits Drilling & Engineering Ltd.	3406

Business Address (Street Number/Name)	Municipality
215154 10th Line, R.R. #1	

Province	Postal Code	Business E-mail Address
Grand Valley Ontario	L0N 1G0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
	Chris Gerrits

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2738	Gerrits Drilling Ltd	2010/10/26

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☒ Yes ☐ No	2010/10/26	Audit No. Z110376
	Date Work Completed 2010/10/26	APR 08 2011 Received

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Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. A112895

A 112895

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 3

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
	GRAND VALLY/E.LUTER	30	1
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
DUFFERIN.	GRAND VALLEY.	Ontario	
UTM Coordinates NAD 8 3 — Zone — Easting 17555220 — Northing 4859386	**Municipal Plan and Sublot Number**	**Other**	

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
			UPGRADED A 4" 99' DEEP DRILLED WELL THAT WAS IN A PIT. WELDED ON 7' OF CASING (6"), INSTALLED A PITLESS ADAPTOR, VERMIN PROOF WELL LID, A GRAVEL BENTONITE. REG.#903 TAG, GPS' LOCATE, WELL RECORD.		

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	To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	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	Gas	Other, specify
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

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)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

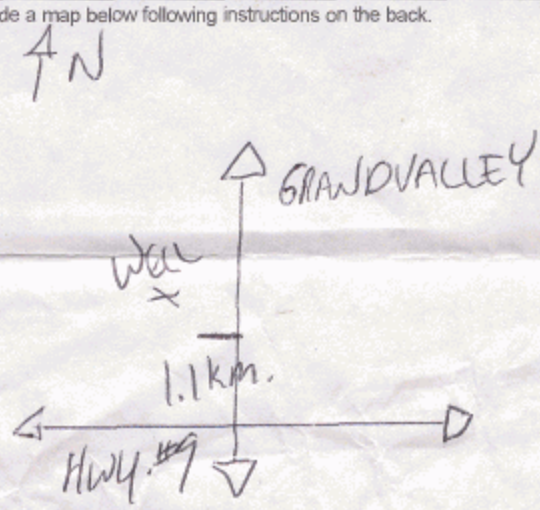
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
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: TOM'S WELL DRILLING INC. — Well Contractor's Licence No.: 7143

Business Address (Street Number/Name): 8 JOHN AVE. — Municipality: NEW TEC.

Province: ON — Postal Code: L9R 1J8 — Business E-mail Address:

Bus. Telephone No. (inc. area code): 7054358851 — Name of Well Technician (Last Name, First Name): EBDON, STEVE

Well Technician's Licence No.: 2178 — Signature of Technician and/or Contractor — Date Submitted: 2011/05/18

Well owner's information package delivered: ☐ Yes ☐ No

Date Package Delivered: 2011/05/18

Date Work Completed: 2011/05/18

Ministry Use Only

Audit No. Z128091

DEC 01 2011 Received

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APPENDIX D:
WATER BUDGET ANALYSIS FROM VALDOR

VALDOR ENGINEERING INC.
File: 14119
Date: July 2015

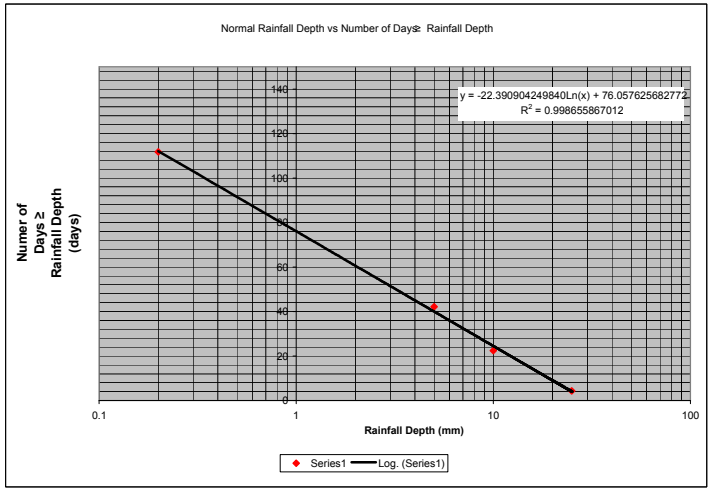
Table E.1: Site Water Balance Calculations (Annual)
Moco Subdivision, Town of Grand Valley

Condition	Site Area (ha)	Water Balance Components	Pervious Area Without Infiltration BMP's	Impervious Area Without Infiltration BMP's	Impervious Area With Basic Infiltration BMP's	TOTAL SITE VOLUMES Precipitation (m^3)	Evapotranspiration (m^3)	Surplus (m^3)	Runoff (m^3)	Infiltration (m^3)	Percent of Existing Infiltration (%)
Existing	**16.436**	Area (ha)	16.436	0.000	0.000	130,337	94,870	35,023	18,562	16,461	100.0
		HSG	BC	n/a	BC						
		Weighted WHC (mm)	175	n/a	175						
		Infiltration Factor	0.470	0.00	0.000						
		Precipitation (mm)	793.0	793.0	793.0						
		Evapotranspiration (mm)	577	0.0	577						
		Surplus (mm)	213	793.0	213						
		Infiltration (mm)	100.2	0.0	0.0						
		Runoff (mm)	112.9	793.0	213.1						
Proposed (No Infiltration BMP's)	**16.436**	Area (ha)	4.694	11.742	0.000	130,337	25,020	105,148	98,590	6,558	39.8
		HSG	BC	n/a	BC						
		Weighted WHC (mm)	100	n/a	100						
		Infiltration Factor	0.545	0.00	0.431						
		Precipitation (mm)	793.0	793.0	793.0						
		Evapotranspiration (mm)	533	0.0	533						
		Surplus (mm)	256	793.0	256						
		Infiltration (mm)	139.7	0.0	110.4						
		Runoff (mm)	116.6	793.0	146.0						
Proposed (With Basic Infiltration BMP's)	**16.436**	Area (ha)	4.694	10.242	1.500	130,337	33,018	97,096	88,882	8,214	49.9
		HSG	BC	n/a	BC						
		Weighted WHC (mm)	100	n/a	100						
		Infiltration Factor	0.545	0.00	0.431						
		Precipitation (mm)	793.0	793.0	793.0						
		Evapotranspiration (mm)	533	0.0	533						
		Surplus (mm)	256	793.0	256						
		Infiltration (mm)	139.7	0.0	110.4						
		Runoff (mm)	116.6	793.0	146.0						
Proposed (With Enhanced Infiltration BMP's)	**16.436**	**See Table E.6**							8214 + 8538	16,752	101.8

Notes:
1. Site water balance calculations based on methodology per *Stormwater Management Planning and Design Manual* (MOE, March 2003).
2. Basic Infiltration BMP's consist of roof leaders that discharge to pervious areas.
3. Enhanced Infiltration BMP's consist of the proposed infiltration trenches.

Table E.2: Rainfall Analysis

VALDOR ENGINEERING INC.
File: 14119
Date: July 2015



Normal Rainfall Depth (mm)	Normal Days ≥ Rainfall Depth (days)
0.2	111.8
5	42.1
10	22.4
25	4.3

Toronto Pearson Airport Climate Normals (1971 - 2000)

684.6	Normal Annual Rainfall Depth (mm)
111.8	Normal Annual Days with Rainfall (≥ 0.2 mm)
792.7	Normal Annual Precipitation Depth (mm)

Simulated Depth (mm)	Simulated Days ≥ Sim Depth (days)	Average Event Depth (mm)	Simulated Days Equal to Avg Depth (days)	Assumed IA (mm)	Runoff (Rain - IA) (mm)	INF Design Storm (mm)	Event Based Maximum Design INF Depth (mm)	Event Based Design INF Depth (mm)	Annual Incremental Design INF Depth (mm)	Annual Cumulative Design INF Depth (mm)	Annual Incremental Total Rain Depth (mm)	Annual Percent of Total Rain (%)	Annual Cumulative Total Rain Depth (mm)	Annual Cumulative Percent of Total Depth (%)
0.2	112.09													
0.5	91.58	0.2 - 0.5	20.52	5.00	0.00	15.00	10.00	0.00	0.00	0.00		0.000	0.0	0.000
1.5	66.98	1	24.60	5.00	0.00	15.00	10.00	0.00	0.00	0.00	24.60	0.036	24.6	0.036
2.5	55.54	2	11.44	5.00	0.00	15.00	10.00	0.00	0.00	0.00	22.88	0.033	47.5	0.069
3.5	48.01	3	7.53	5.00	0.00	15.00	10.00	0.00	0.00	0.00	22.60	0.033	70.1	0.102
4.5	42.38	4	5.63	5.00	0.00	15.00	10.00	0.00	0.00	0.00	22.51	0.033	92.6	0.135
5.5	37.89	5	4.49	5.00	0.00	15.00	10.00	0.00	0.00	0.00	22.47	0.033	115.1	0.168
6.5	34.15	6	3.74	5.00	1.00	15.00	10.00	1.00	3.74	3.74	22.44	0.033	137.5	0.201
7.5	30.94	7	3.20	5.00	2.00	15.00	10.00	2.00	6.41	10.15	22.43	0.033	159.9	0.234
8.5	28.14	8	2.80	5.00	3.00	15.00	10.00	3.00	8.41	18.56	22.42	0.033	182.3	0.266
9.5	25.65	9	2.49	5.00	4.00	15.00	10.00	4.00	9.96	28.52	22.41	0.033	204.8	0.299
10.5	23.41	10	2.24	5.00	5.00	15.00	10.00	5.00	11.20	39.72	22.41	0.033	227.2	0.332
11.5	21.37	11	2.04	5.00	6.00	15.00	10.00	6.00	12.22	51.94	22.41	0.033	249.6	0.365
12.5	19.50	12	1.87	5.00	7.00	15.00	10.00	7.00	13.07	65.01	22.40	0.033	272.0	0.397
13.5	17.78	13	1.72	5.00	8.00	15.00	10.00	8.00	13.79	78.80	22.40	0.033	294.4	0.430
14.5	16.18	14	1.60	5.00	9.00	15.00	10.00	9.00	14.40	93.20	22.40	0.033	316.8	0.463
15.5	14.69	15	1.49	5.00	10.00	15.00	10.00	10.00	14.93	108.13	22.40	0.033	339.2	0.495
16.5	13.29	16	1.40	5.00	11.00	15.00	10.00	10.00	14.00	122.13	22.40	0.033	361.6	0.528
17.5	11.97	17	1.32	5.00	12.00	15.00	10.00	10.00	13.17	135.31	22.40	0.033	384.0	0.561
18.5	10.73	18	1.24	5.00	13.00	15.00	10.00	10.00	12.44	147.75	22.40	0.033	406.4	0.594
19.5	9.55	19	1.18	5.00	14.00	15.00	10.00	10.00	11.79	159.54	22.40	0.033	428.8	0.626
20.5	8.43	20	1.12	5.00	15.00	15.00	10.00	10.00	11.20	170.73	22.40	0.033	451.2	0.659
21.5	7.36	21	1.07	5.00	16.00	15.00	10.00	10.00	10.66	181.40	22.40	0.033	473.6	0.692
22.5	6.34	22	1.02	5.00	17.00	15.00	10.00	10.00	10.18	191.58	22.39	0.033	496.0	0.724
23.5	5.37	23	0.97	5.00	18.00	15.00	10.00	10.00	9.74	201.31	22.39	0.033	518.3	0.757
24.5	4.44	24	0.93	5.00	19.00	15.00	10.00	10.00	9.33	210.65	22.39	0.033	540.7	0.790
25.5	3.54	25	0.90	5.00	20.00	15.00	10.00	10.00	8.96	219.60	22.39	0.033	563.1	0.823
26.5	2.68	26	0.86	5.00	21.00	15.00	10.00	10.00	8.61	228.22	22.39	0.033	585.5	0.855
27.5	1.85	27	0.83	5.00	22.00	15.00	10.00	10.00	8.29	236.51	22.39	0.033	607.9	0.888
28.5	1.05	28	0.80	5.00	23.00	15.00	10.00	10.00	8.00	244.51	22.39	0.033	630.3	0.921
29	0.66	≥ 29	0.66	5.00	24.00	15.00	10.00	10.00	6.61	251.12	54.28	0.079	684.6	1.000

VALDOR ENGINEERING INC.
File: 14119
Date: July 2015

Table E.3: Water Holding Capacity (WHC) Calculations

Per MOE Methodology (SWM Planning & Design Manual, MOE, March 2003)

Existing Conditions (Pervious Area)			Proposed Conditions (Pervious Area)		
BC	HSG		BC	HSG	
Moderately Rooted Crops			Lawn		
175	WHC (mm)		**100**	WHC (mm)	

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

**This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2

Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)		
Fine Sand	**A**	**50**
	AB	**63**
Fine Sandy Loam	**B**	**75**
	BC	**100**
Silt Loam, Muck	**C**	**125**
Clay Loam	**CD**	**100**
Clay	**D**	**75**
Moderately Rooted Crops (corn and cereal grains)		
Fine Sand	**A**	**75**
	AB	**113**
Fine Sandy Loam	**B**	**150**
	BC	**175**
Silt Loam,Muck	**C**	**200**
Clay Loam	**CD**	**200**
Clay	**D**	**150**
Pasture and Shrubs		
Fine Sand	**A**	**100**
	AB	**125**
Fine Sandy Loam	**B**	**150**
	BC	**200**
Silt Loam, Muck	**C**	**250**
Clay Loam	**CD**	**250**
Clay	**D**	**200**
Mature Forests		
Fine Sand	**A**	**250**
	AB	**275**
Fine Sandy Loam	**B**	**300**
	BC	**350**
Silt Loam, Muck	**C**	**400**
Clay Loam	**CD**	**400**
Clay	**D**	**350**

VALDOR ENGINEERING INC.
File: 14119
Date: July 2015

Table E.4: Infiltration Factor Calculation
Per MOE Methodology (SWM Planning & Design Manual, MOE, March 2003)

Topography	
0.3	Flat Land (avg slope < 0.06%)
0.225	0.06% to 0.27%
0.15	Rolling Land (avg slope between 0.28% and 0.38%)
0.125	0.39% to 2.7%
0.1	Hilly Land (avg slope between 2.8% and 4.7%)
Soils	
0.4	HSG A - open sandy loam
0.35	HSG AB
0.3	HSG B
0.27	HSG BC
0.23	HSG C
0.2	HSG CD - medium combinations of clay and loam
0.1	HSG D - tight impervious clay
Cover	
0.1	cultivated land (crops)
0.15	pasture, lawns
0.2	woodland (forest)

Infiltration Factor Calculations

Existing Conditions	
0.100	Topography
0.270	Soils
0.100	Cover
0.470	Total Infiltration Factor (Existing Conditions)

Proposed Conditions	
0.125	Topography
0.270	Soils
0.150	Cover
0.545	Total Infiltration Factor (Proposed Conditions)

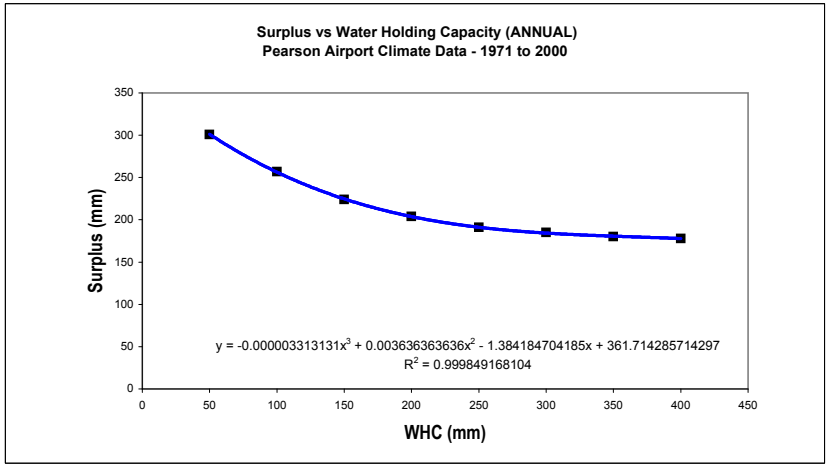
VALDOR ENGINEERING INC.
File: 14119
Date: July 2015

Table E.5: Surplus and Actual Evapotranspiration vs Water Holding Capacity (WHC) Regression Analysis

AES Water Balance Model Results for a Range of WHC
Pearson Airport Climate Data (1971 - 2000)

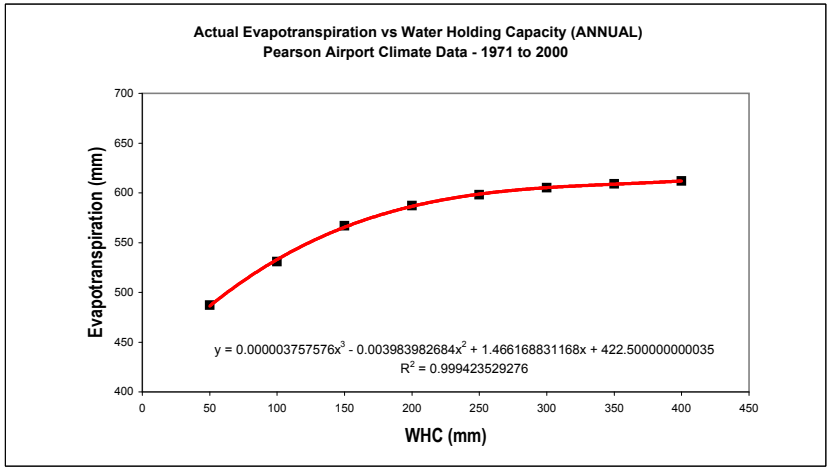
Existing Condition

Trendline			AES Model Results	
Surplus (mm)	AE (mm)	WHC (mm)	Surplus (mm)	AE (mm)
301	486	50	301	487
256	533	100	257	531
225	565	150	224	567
204	586	200	204	587
191	599	250	191	598
184	605	300	185	605
181	609	350	180	609
178	612	400	178	612
213.1	577.2	**175.00**	**TOTAL SITE**	



Proposed Condition

Trendline			AES Model Results	
Surplus (mm)	AE (mm)	WHC (mm)	Surplus (mm)	AE (mm)
301	486	50	301	487
256	533	100	257	531
225	565	150	224	567
204	586	200	204	587
191	599	250	191	598
184	605	300	185	605
181	609	350	180	609
178	612	400	178	612
256.3	533.0	**100.00**	**TOTAL SITE**	



Moco Subdivision, Town of Grand Valley

Table E.6: Infiltration Trench Calculation

VALDOR ENGINEERING INC.
741 Rowntree Dairy Road, Suite 2, Woodbridge, Ontario L4L 5T9
Tel: 905-264-0054 Fax: 905-264-0069
info@valdor-engineering.com www.valdor-engineering.com

Designed By: PA
Checked By: BC

File No.: 14119

Total Req'd Annual Infiltration Volume to Achieve Target (m^3)	*Total Actual Annual Infiltration Volume per Design (m^3)*	*Soil Percolation Rate (mm/h)*	*Drainage Area (ha)*	*Maximum Trench Length per Site Plan (m)*	*Initial Abstraction (Trench Drainage Area) (mm)*	*Retention Time (hr)*	*Total Annual Rainfall Depth (Per 1971-2000 Climate Normals for Pearson Airport) (mm)*	*Total Rainfall Depth Available for Infiltration Per Rainfall Analysis (mm)*	*Annual Rainfall Depth Needed to Achieve Target Infiltration (mm)*	*Req'd Design Storm Depth to Achieve Annual Infiltration Requirements (mm)*	*Req'd Event-Based Runoff Volume to be Infiltrated (Based on Req'd Design Storm Depth (m^3)*
8,247	8,538	**15.0**	**3.400**	**-**	**5.0**	**48**	**684.6**	**251.1**	242.6	**15.0**	442.0

Infiltration Type	**Infiltration Trench with Clear Stone**

Infiltration Facility Design

Minimum Required Bottom Area (m^2)	*Max Allowable Depth (m)*	*Design Depth (m)*	*Design Bottom Area (m^2)*	*Required Length (m)*	*Design Width (m)*	*Check*
1,535	0.72	**0.72**	1,534.72	1,534.7	**1.00**	**OK**

Notes:

Infiltration facilities are sized based on the following criteria (SWMPDM, MOE, 2003) and/or assumptions:

(1) Infiltration trench volume should be sized based on the runoff generated by a 4-hr 15-mm event or smaller.

(2) Drainage area should be sufficient to provide req'd runoff quantity.

(3) The maximum allowable depth of the infiltration facility is based on the soil percolation rate and the retention time.

(4) It is feasible to convey the runoff to the infiltration facility.

(5) The seasonal high water table should be at least 1 m below the infiltration trench.

APPENDIX E:
MONITORING WELL AND PIEZOMETER LOGS

MONITORING WELL ID: PZ-01

CLIENT Moco Farms Ltd
PROJECT NAME Moco Farms Hydrogeological Study
PROJECT NUMBER 215309
PROJECT LOCATION Lot 31, Conc. 1, Twp. of East Luther - Grand Valley
DATE COMPLETED 2015-11-18
CONTRACTOR
LOGGED BY MRL
METHOD Hand
WELL CONSTRUCTION Drive Point
NOTES Drive Point Piezometer installed in a side channel of Boyne Creek

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	-2.5					
	-2.0	455.0				
-0.5	-1.5					
	-1.0					Riser pipe above water.
	-0.5	454.5				
0.0	0.0				0.00 Ground Surface 454.36	
	0.5				[Alluvium] brown and grey cobbles, some gravel, poorly-graded, below water (creek).	Riser pipe through water (creek)
	1.0				0.30 454.06	Bentonite Seal
		454.0			[Till] medium brown, soft SILT, some clay, some sand, some cobbles, wet.	
0.5	1.5					
	2.0					
	2.5					Native Soil Embedment
		453.5				
	3.0					
1.0	3.5					Drive Point Screen (Stainless Steel Mesh)

Borehole Terminated at 1.20 m.

MONITORING WELL ID: PZ-02

CLIENT Moco Farms Ltd
PROJECT NAME Moco Farms Hydrogeological Study
PROJECT NUMBER 215309
PROJECT LOCATION Lot 31, Conc. 1, Twp. of East Luther - Grand Valley
DATE COMPLETED 2015-11-18
CONTRACTOR
LOGGED BY MRL
METHOD Hand
WELL CONSTRUCTION Drive Point
NOTES Drive Point Piezometer installed in floodplain above Boyne Creek

DEPTH (m)	DEPTH (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	-2.5					
	-2.0					
-0.5	-1.5	457.5				Riser Pipe
	-1.0					
	-0.5					
0.0	0.0				0.00 Ground Surface 457.10	
		457.0			[Till] medium brown, soft SILT, some clay, some sand, some cobbles, wet.	Bentonite Seal
	0.5					
	1.0					
0.5	1.5					
	2.0	456.5				Native Soil Embedment
	2.5					
	3.0					
1.0	3.5					Drive Point Screen (Stainless Steel Mesh)
		456.0				

Borehole Terminated at 1.20 m.

REFERENCE No: G3525-5-11

MONITORING WELL No: 101

CLIENT: Moco Farms Limited

PROJECT: Proposed Subdivision

ENCLOSURE No: 2

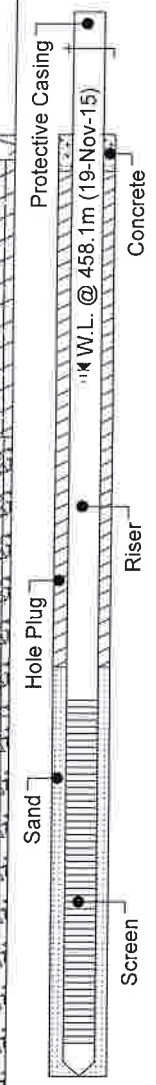
LOCATION: Grand Valley, Ontario

SUPERVISOR: B.R.F.

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	460.0								
0.2	200mm Topsoil	459.8			1	SS	8	•		
	brown,stiff to hard CLAY AND SILT trace sand, trace gravel, moist				1	SS	8	•	•	
					2	SS	10	•		
					3	SS	53	•	•	
2.4		457.6								
	brown, stiff to hard CLAY AND SILT TILL some sand, trace gravel, moist				4	SS	50	• 50mm		
					5	SS	50	• 75mm	•	
4.7		455.3								
	grey, very stiff to hard SILTY CLAY TILL some sand, trace gravel, some wet sand and gravel seams, moist to wet				6	SS	40	•		
					7	SS	26	•	•	
8.1		451.9			8	SS	42	•		
	End of Borehole									



DRILLED BY: London Soil Test Limited

HOLE DIAMETER: 210mm

DRILL METHOD: Hollow Stem Augers

DATUM: Geodetic

DRILL DATE: November 10, 2015

SHEET: 1 of 1

REFERENCE No: G3525-5-11

MONITORING WELL No: 102

CLIENT: Moco Farms Limited

PROJECT: Proposed Subdivision

ENCLOSURE No: 3

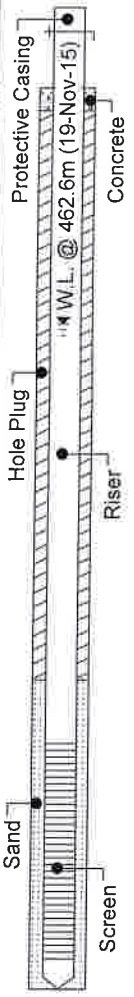
LOCATION: Grand Valley, Ontario

SUPERVISOR: B.R.F.

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	465.5								
0.3	300mm Topsoil	465.2			1	SS	8			
	brown, compact SILTY SAND (reworked/ possible fill) moist				1	SS	12			
					2	SS	8			
					3	SS	8			
					4	SS	8			
3.2		462.3								
	brown, hard CLAY AND SILT TILL some sand, trace gravel, moist				5	SS	40			
					6	SS	40			
					7	SS	31			
7.8		457.7								
	grey, hard SILTY CLAY TILL trace sand, trace gravel, moist to wet				8	SS	50	75mm		
					9	SS	30			
10.8		454.7								
	brown, compact SAND AND GRAVEL wet				10	SS	13			
12.7		452.9			11	SS	15			
	End of Borehole									



DRILLED BY: London Soil Test Limited

HOLE DIAMETER: 210mm

DRILL METHOD: Hollow Stem Augers

DATUM: Geodetic

DRILL DATE: November 10, 2015

SHEET: 1 of 1

REFERENCE No: G3525-5-11

MONITORING WELL No: 103

CLIENT: Moco Farms Limited

PROJECT: Proposed Subdivision

ENCLOSURE No: 2

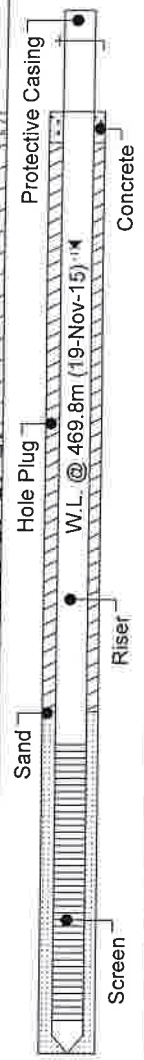
LOCATION: Grand Valley, Ontario

SUPERVISOR: B.R.F.

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	471.1								
	200mm Topsoil				1	SS	4			
	brown,stiff to hard CLAY AND SILT trace sand, trace gravel, moist				1	SS	10			
					2	SS	16			
					3	SS	9			
3.0		468.1			4	SS	21			
	brown, stiff to hard CLAY AND SILT TILL some sand, trace gravel, occasional wet sand seams, moist to saturated				5	SS	43			
					6	SS	43			
					7	SS	35			
7.8		463.3								
	grey, hard SILTY CLAY TILL some sand, trace gravel, moist				8	SS	50	75mm		
9.6		461.5			9	SS	50	100mm		
	End of Borehole									



DRILLED BY: London Soil Test Limited

HOLE DIAMETER: 210mm

DRILL METHOD: Hollow Stem Augers

DATUM: Geodetic

DRILL DATE: November 11, 2015

SHEET: 1 of 1

REFERENCE No: G3525-5-11

MONITORING WELL No: 104

CLIENT: Moco Farms Limited

PROJECT: Proposed Subdivision

ENCLOSURE No: 5

LOCATION: Grand Valley, Ontario

SUPERVISOR: B.R.F.

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	471.9								
0.3	250mm Topsoil	471.7			1	SS	6	•		
	brown, compact SILTY SAND (reworked/ possible fill) moist				1	SS	6	•	•	
0.9		471.0			2	SS	13	•		
	brown, stiff to hard CLAY AND SILT, trace silt, trace gravel, moist to wet				3	SS	15	•	•	
					4	SS	50	•		
					5	SS	43	•	•	
4.7	grey, very stiff to hard SILTY CLAY TILL some sand, trace gravel, moist	467.2			6	SS	50	•150mm		
					7	SS	50	•150mm	•	
					8	SS	50	•125mm		
9.6		462.3			9	SS	50	•75mm	•	
	End of Borehole									

Protective Casing
Concrete
Hole Plug
Riser
Sand
W.L. @ El. 464.9m (19-Nov-15)
Screen

DRILLED BY: London Soil Test Limited

DRILL METHOD: Hollow Stem Augers

DRILL DATE: November 11, 2015

HOLE DIAMETER: 210mm

DATUM: Geodetic

SHEET: 1 of 1

APPENDIX F:
CERTIFICATES OF LABORATORY ANALYSES

Maxxam
A Bureau Veritas Group Company

Your P.O. #: 215309
Your Project #: 215309
Site Location: MACO FARMS
Your C.O.C. #: 520725-31-01

Attention:Reporting Contacts

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

Report Date: 2015/11/27
Report #: R3784600
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5N8401
Received: 2015/11/19, 16:00

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	4	N/A	2015/11/25	CAM SOP-00448	SM 22 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2015/11/26	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2015/11/25	CAM SOP-00463	EPA 325.2 m
Conductivity	4	N/A	2015/11/25	CAM SOP-00414	SM 22 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2015/11/24	CAM SOP-00446	SM 22 5310 B m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2015/11/25	CAM SOP-00446	SM 22 5310 B m
Hardness (calculated as CaCO3)	4	N/A	2015/11/25	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	4	N/A	2015/11/25	CAM SOP-00447	EPA 6020A m
Ion Balance (% Difference)	4	N/A	2015/11/26		
Anion and Cation Sum	4	N/A	2015/11/26		
Total Ammonia-N	4	N/A	2015/11/25	CAM SOP-00441	EPA GS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2015/11/25	CAM SOP-00440	SM 22 4500-NO3I/NO2B
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2015/11/27	CAM SOP-00440	SM 22 4500-NO3I/NO2B
pH	4	N/A	2015/11/25	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	4	N/A	2015/11/25	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2015/11/26		
Sat. pH and Langelier Index (@ 4C)	4	N/A	2015/11/26		
Sulphate by Automated Colourimetry	4	N/A	2015/11/25	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	4	N/A	2015/11/26		

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

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

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

Your P.O. #: 215309
Your Project #: 215309
Site Location: MACO FARMS
Your C.O.C. #: 520725-31-01

Attention:Reporting Contacts

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

Report Date: 2015/11/27
Report #: R3784600
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B5N8401

Received: 2015/11/19, 16:00

* 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.
Rickey Samaroo, Customer Service
Email: rSamaroo@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 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

Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

RCAP - COMPREHENSIVE (WATER)

Maxxam ID					BJR476	BJR476		BJR477		
Sampling Date					2015/11/18 09:45	2015/11/18 09:45		2015/11/18 12:25		
COC Number					520725-31-01	520725-31-01		520725-31-01		
	UNITS	MAC	IMC	A/O	MW-NE-01	MW-NE-01 Lab-Dup	QC Batch	MW-NW-01	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	-	-	-	4.51		4280889	8.29	N/A	4280889
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	-	190		4280274	220	1.0	4280274
Calculated TDS	mg/L	-	-	500	240		4280645	440	1.0	4280645
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	-	1.7		4280274	2.1	1.0	4280274
Cation Sum	me/L	-	-	-	4.63		4280889	8.84	N/A	4280889
Hardness (CaCO3)	mg/L	-	-	80:100	170		4280600	350	1.0	4280600
Ion Balance (% Difference)	%	-	-	-	1.25		4280888	3.24	N/A	4280888
Langelier Index (@ 20C)	N/A	-	-	-	0.345		4280643	0.498		4280643
Langelier Index (@ 4C)	N/A	-	-	-	0.0950		4280644	0.250		4280644
Saturation pH (@ 20C)	N/A	-	-	-	7.65		4280643	7.51		4280643
Saturation pH (@ 4C)	N/A	-	-	-	7.90		4280644	7.76		4280644
Inorganics										
Total Ammonia-N	mg/L	-	-	-	0.15		4283073	0.37	0.050	4283073
Conductivity	umho/cm	-	-	-	440		4284917	860	1.0	4285116
Dissolved Organic Carbon	mg/L	-	-	5	2.3	2.4	4283388	1.9	0.20	4283388
Orthophosphate (P)	mg/L	-	-	-	<0.010		4284955	<0.010	0.010	4284955
pH	pH	-	-	6.5:8.5	8.00		4284916	8.01	N/A	4285119
Dissolved Sulphate (SO4)	mg/L	-	-	500	19		4284957	36	1.0	4284957
Alkalinity (Total as CaCO3)	mg/L	-	-	30:500	190		4284905	220	1.0	4285110
Dissolved Chloride (Cl)	mg/L	-	-	250	13		4284947	110	1.0	4284947
Nitrite (N)	mg/L	**1**	-	-	<0.010		4285074	<0.010	0.010	4284738
Nitrate (N)	mg/L	**10**	-	-	<0.10		4285074	<0.10	0.10	4284738
Nitrate + Nitrite (N)	mg/L	**10**	-	-	<0.10		4285074	<0.10	0.10	4284738
Metals										
Dissolved Aluminum (Al)	ug/L	**-**	-	100	<5.0		4285991	6.9	5.0	4285991
Dissolved Antimony (Sb)	ug/L	**-**	6	-	<0.50		4285991	<0.50	0.50	4285991
Dissolved Arsenic (As)	ug/L	**-**	25	-	4.7		4285991	<1.0	1.0	4285991
Dissolved Barium (Ba)	ug/L	**1000**	-	-	65		4285991	81	2.0	4285991
Dissolved Beryllium (Be)	ug/L	**-**	-	-	<0.50		4285991	<0.50	0.50	4285991

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Lab-Dup = Laboratory Initiated Duplicate

MAC,IMC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [Criteria A / MAC], Interim Maximum Acceptable Concentration [IMC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

N/A = Not Applicable

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

RCAP - COMPREHENSIVE (WATER)

Maxxam ID					BJR476	BJR476		BJR477		
Sampling Date					2015/11/18 09:45	2015/11/18 09:45		2015/11/18 12:25		
COC Number					520725-31-01	520725-31-01		520725-31-01		
	UNITS	MAC	IMC	A/O	MW-NE-01	MW-NE-01 Lab-Dup	QC Batch	MW-NW-01	RDL	QC Batch
Dissolved Boron (B)	ug/L	-	5000	-	92		4285991	110	10	4285991
Dissolved Cadmium (Cd)	ug/L	**5**	-	-	<0.10		4285991	<0.10	0.10	4285991
Dissolved Calcium (Ca)	ug/L	-	-	-	30000		4285991	40000	200	4285991
Dissolved Chromium (Cr)	ug/L	**50**	-	-	<5.0		4285991	<5.0	5.0	4285991
Dissolved Cobalt (Co)	ug/L	-	-	-	<0.50		4285991	0.54	0.50	4285991
Dissolved Copper (Cu)	ug/L	-	-	1000	1.4		4285991	2.0	1.0	4285991
Dissolved Iron (Fe)	ug/L	-	-	300	<100		4285991	<100	100	4285991
Dissolved Lead (Pb)	ug/L	**10**	-	-	<0.50		4285991	<0.50	0.50	4285991
Dissolved Magnesium (Mg)	ug/L	-	-	-	24000		4285991	61000	50	4285991
Dissolved Manganese (Mn)	ug/L	-	-	50	59		4285991	200	2.0	4285991
Dissolved Molybdenum (Mo)	ug/L	-	-	-	4.0		4285991	37	0.50	4285991
Dissolved Nickel (Ni)	ug/L	-	-	-	<1.0		4285991	1.1	1.0	4285991
Dissolved Phosphorus (P)	ug/L	-	-	-	<100		4285991	<100	100	4285991
Dissolved Potassium (K)	ug/L	-	-	-	2900		4285991	13000	200	4285991
Dissolved Selenium (Se)	ug/L	**10**	-	-	<2.0		4285991	<2.0	2.0	4285991
Dissolved Silicon (Si)	ug/L	-	-	-	5200		4285991	4900	50	4285991
Dissolved Silver (Ag)	ug/L	-	-	-	<0.10		4285991	<0.10	0.10	4285991
Dissolved Sodium (Na)	ug/L	**20000**	-	200000	**26000**		4285991	**33000**	100	4285991
Dissolved Strontium (Sr)	ug/L	-	-	-	430		4285991	430	1.0	4285991
Dissolved Thallium (Tl)	ug/L	-	-	-	<0.050		4285991	0.058	0.050	4285991
Dissolved Titanium (Ti)	ug/L	-	-	-	<5.0		4285991	<5.0	5.0	4285991
Dissolved Uranium (U)	ug/L	**20**	-	-	0.80		4285991	0.89	0.10	4285991
Dissolved Vanadium (V)	ug/L	-	-	-	<0.50		4285991	<0.50	0.50	4285991
Dissolved Zinc (Zn)	ug/L	-	-	5000	6.3		4285991	17	5.0	4285991

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,IMC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [Criteria A / MAC], Interim Maximum Acceptable Concentration [IMC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

RCAP - COMPREHENSIVE (WATER)

Maxxam ID					BJR478			BJR479		
Sampling Date					2015/11/18 11:45			2015/11/18 11:45		
COC Number					520725-31-01			520725-31-01		
	UNITS	MAC	IMC	A/O	MW-SW-01	RDL	QC Batch	MW-SE-01	RDL	QC Batch
Calculated Parameters										
Anion Sum	me/L	-	-	-	24.5	N/A	4280889	6.05	N/A	4280889
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	-	400	1.0	4280274	200	1.0	4280274
Calculated TDS	mg/L	-	-	500	1400	1.0	4280645	320	1.0	4280645
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	-	2.6	1.0	4280274	2.1	1.0	4280274
Cation Sum	me/L	-	-	-	27.5	N/A	4280889	6.27	N/A	4280889
Hardness (CaCO3)	mg/L	-	-	80:100	520	1.0	4280600	270	1.0	4280600
Ion Balance (% Difference)	%	-	-	-	5.63	N/A	4280888	1.79	N/A	4280888
Langelier Index (@ 20C)	N/A	-	-	-	0.928		4280643	0.633		4280643
Langelier Index (@ 4C)	N/A	-	-	-	0.683		4280644	0.384		4280644
Saturation pH (@ 20C)	N/A	-	-	-	6.92		4280643	7.42		4280643
Saturation pH (@ 4C)	N/A	-	-	-	7.16		4280644	7.67		4280644
Inorganics										
Total Ammonia-N	mg/L	-	-	-	0.21	0.050	4283073	<0.050	0.050	4283073
Conductivity	umho/cm	-	-	-	2700	1.0	4286125	610	1.0	4285116
Dissolved Organic Carbon	mg/L	-	-	5	2.9	0.20	4283132	1.8	0.20	4285150
Orthophosphate (P)	mg/L	-	-	-	<0.010	0.010	4285713	<0.010	0.010	4284955
pH	pH	-	-	6.5:8.5	7.85	N/A	4286129	8.05	N/A	4285119
Dissolved Sulphate (SO4)	mg/L	-	-	500	37	1.0	4285734	39	1.0	4284957
Alkalinity (Total as CaCO3)	mg/L	-	-	30:500	400	1.0	4286128	200	1.0	4285110
Dissolved Chloride (Cl)	mg/L	-	-	250	550	5.0	4285723	44	1.0	4284947
Nitrite (N)	mg/L	**1**	-	-	<0.010	0.010	4285787	0.016	0.010	4285074
Nitrate (N)	mg/L	**10**	-	-	1.76	0.10	4285787	<0.10	0.10	4285074
Nitrate + Nitrite (N)	mg/L	**10**	-	-	1.76	0.10	4285787	<0.10	0.10	4285074
Metals										
Dissolved Aluminum (Al)	ug/L	**-**	-	100	<5.0	5.0	4285991	5.7	5.0	4285991
Dissolved Antimony (Sb)	ug/L	**-**	6	-	<0.50	0.50	4285991	<0.50	0.50	4285991
Dissolved Arsenic (As)	ug/L	**-**	25	-	<1.0	1.0	4285991	<1.0	1.0	4285991
Dissolved Barium (Ba)	ug/L	**1000**	-	-	150	2.0	4285991	70	2.0	4285991
Dissolved Beryllium (Be)	ug/L	**-**	-	-	<0.50	0.50	4285991	<0.50	0.50	4285991

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,IMC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [Criteria A / MAC], Interim Maximum Acceptable Concentration [IMC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively (Made under the Ontario Safe Drinking Water Act, 2002)

N/A = Not Applicable

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

RCAP - COMPREHENSIVE (WATER)

Maxxam ID					BJR478			BJR479		
Sampling Date					2015/11/18 11:45			2015/11/18 11:45		
COC Number					520725-31-01			520725-31-01		
	UNITS	MAC	IMC	A/O	MW-SW-01	RDL	QC Batch	MW-SE-01	RDL	QC Batch
Dissolved Boron (B)	ug/L	-	5000	-	55	10	4285991	55	10	4285991
Dissolved Cadmium (Cd)	ug/L	**5**	-	-	<0.10	0.10	4285991	<0.10	0.10	4285991
Dissolved Calcium (Ca)	ug/L	-	-	-	120000	200	4285991	51000	200	4285991
Dissolved Chromium (Cr)	ug/L	**50**	-	-	<5.0	5.0	4285991	<5.0	5.0	4285991
Dissolved Cobalt (Co)	ug/L	-	-	-	0.77	0.50	4285991	<0.50	0.50	4285991
Dissolved Copper (Cu)	ug/L	-	-	1000	1.3	1.0	4285991	1.5	1.0	4285991
Dissolved Iron (Fe)	ug/L	-	-	300	<100	100	4285991	<100	100	4285991
Dissolved Lead (Pb)	ug/L	**10**	-	-	<0.50	0.50	4285991	<0.50	0.50	4285991
Dissolved Magnesium (Mg)	ug/L	-	-	-	55000	50	4285991	34000	50	4285991
Dissolved Manganese (Mn)	ug/L	-	-	50	170	2.0	4285991	44	2.0	4285991
Dissolved Molybdenum (Mo)	ug/L	-	-	-	5.3	0.50	4285991	7.2	0.50	4285991
Dissolved Nickel (Ni)	ug/L	-	-	-	1.4	1.0	4285991	<1.0	1.0	4285991
Dissolved Phosphorus (P)	ug/L	-	-	-	<100	100	4285991	<100	100	4285991
Dissolved Potassium (K)	ug/L	-	-	-	8800	200	4285991	3700	200	4285991
Dissolved Selenium (Se)	ug/L	**10**	-	-	<2.0	2.0	4285991	<2.0	2.0	4285991
Dissolved Silicon (Si)	ug/L	-	-	-	5600	50	4285991	5700	50	4285991
Dissolved Silver (Ag)	ug/L	-	-	-	<0.10	0.10	4285991	<0.10	0.10	4285991
Dissolved Sodium (Na)	ug/L	**20000**	-	200000	390000	100	4285991	20000	100	4285991
Dissolved Strontium (Sr)	ug/L	-	-	-	460	1.0	4285991	510	1.0	4285991
Dissolved Thallium (Tl)	ug/L	-	-	-	<0.050	0.050	4285991	<0.050	0.050	4285991
Dissolved Titanium (Ti)	ug/L	-	-	-	<5.0	5.0	4285991	<5.0	5.0	4285991
Dissolved Uranium (U)	ug/L	**20**	-	-	1.4	0.10	4285991	0.92	0.10	4285991
Dissolved Vanadium (V)	ug/L	-	-	-	<0.50	0.50	4285991	<0.50	0.50	4285991
Dissolved Zinc (Zn)	ug/L	-	-	5000	<5.0	5.0	4285991	9.8	5.0	4285991

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

MAC,IMC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [Criteria A / MAC], Interim Maximum Acceptable Concentration [IMC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively (Made under the Ontario Safe Drinking Water Act, 2002)

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

TEST SUMMARY

Maxxam ID: BJR476
Sample ID: MW-NE-01
Matrix: Water

Collected: 2015/11/18
Shipped:
Received: 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4284905	N/A	2015/11/25	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	4280274	N/A	2015/11/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4284947	N/A	2015/11/25	Deonarine Ramnarine
Conductivity	AT	4284917	N/A	2015/11/25	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4283388	N/A	2015/11/24	Elsamma Alex
Hardness (calculated as CaCO3)		4280600	N/A	2015/11/25	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4285991	N/A	2015/11/25	Kevin Comerford
Ion Balance (% Difference)	CALC	4280888	N/A	2015/11/26	Automated Statchk
Anion and Cation Sum	CALC	4280889	N/A	2015/11/26	Automated Statchk
Total Ammonia-N	LACH/NH4	4283073	N/A	2015/11/25	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4285074	N/A	2015/11/27	Chandra Nandlal
pH	AT	4284916	N/A	2015/11/25	Yogesh Patel
Orthophosphate	KONE	4284955	N/A	2015/11/25	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	4280643	N/A	2015/11/26	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4280644	N/A	2015/11/26	Automated Statchk
Sulphate by Automated Colourimetry	KONE	4284957	N/A	2015/11/25	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	4280645	N/A	2015/11/26	Automated Statchk

Maxxam ID: BJR476 Dup
Sample ID: MW-NE-01
Matrix: Water

Collected: 2015/11/18
Shipped:
Received: 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4283388	N/A	2015/11/24	Elsamma Alex

Maxxam ID: BJR477
Sample ID: MW-NW-01
Matrix: Water

Collected: 2015/11/18
Shipped:
Received: 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4285110	N/A	2015/11/25	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	4280274	N/A	2015/11/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4284947	N/A	2015/11/25	Deonarine Ramnarine
Conductivity	AT	4285116	N/A	2015/11/25	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4283388	N/A	2015/11/24	Elsamma Alex
Hardness (calculated as CaCO3)		4280600	N/A	2015/11/25	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4285991	N/A	2015/11/25	Kevin Comerford
Ion Balance (% Difference)	CALC	4280888	N/A	2015/11/26	Automated Statchk
Anion and Cation Sum	CALC	4280889	N/A	2015/11/26	Automated Statchk
Total Ammonia-N	LACH/NH4	4283073	N/A	2015/11/25	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4284738	N/A	2015/11/27	Chandra Nandlal
pH	AT	4285119	N/A	2015/11/25	Yogesh Patel
Orthophosphate	KONE	4284955	N/A	2015/11/25	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	4280643	N/A	2015/11/26	Automated Statchk

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

TEST SUMMARY

Maxxam ID: BJR477 **Collected:** 2015/11/18
Sample ID: MW-NW-01 **Shipped:**
Matrix: Water **Received:** 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sat. pH and Langelier Index (@ 4C)	CALC	4280644	N/A	2015/11/26	Automated Statchk
Sulphate by Automated Colourimetry	KONE	4284957	N/A	2015/11/25	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	4280645	N/A	2015/11/26	Automated Statchk

Maxxam ID: BJR478 **Collected:** 2015/11/18
Sample ID: MW-SW-01 **Shipped:**
Matrix: Water **Received:** 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4286128	N/A	2015/11/25	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	4280274	N/A	2015/11/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4285723	N/A	2015/11/25	Deonarine Ramnarine
Conductivity	AT	4286125	N/A	2015/11/25	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4283132	N/A	2015/11/25	Elsamma Alex
Hardness (calculated as CaCO3)		4280600	N/A	2015/11/25	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4285991	N/A	2015/11/25	Kevin Comerford
Ion Balance (% Difference)	CALC	4280888	N/A	2015/11/26	Automated Statchk
Anion and Cation Sum	CALC	4280889	N/A	2015/11/26	Automated Statchk
Total Ammonia-N	LACH/NH4	4283073	N/A	2015/11/25	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4285787	N/A	2015/11/25	Chandra Nandlal
pH	AT	4286129	N/A	2015/11/25	Yogesh Patel
Orthophosphate	KONE	4285713	N/A	2015/11/25	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	4280643	N/A	2015/11/26	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4280644	N/A	2015/11/26	Automated Statchk
Sulphate by Automated Colourimetry	KONE	4285734	N/A	2015/11/25	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	4280645	N/A	2015/11/26	Automated Statchk

Maxxam ID: BJR479 **Collected:** 2015/11/18
Sample ID: MW-SE-01 **Shipped:**
Matrix: Water **Received:** 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	4285110	N/A	2015/11/25	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	4280274	N/A	2015/11/26	Automated Statchk
Chloride by Automated Colourimetry	KONE	4284947	N/A	2015/11/25	Deonarine Ramnarine
Conductivity	AT	4285116	N/A	2015/11/25	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	4285150	N/A	2015/11/25	Elsamma Alex
Hardness (calculated as CaCO3)		4280600	N/A	2015/11/25	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	4285991	N/A	2015/11/25	Kevin Comerford
Ion Balance (% Difference)	CALC	4280888	N/A	2015/11/26	Automated Statchk
Anion and Cation Sum	CALC	4280889	N/A	2015/11/26	Automated Statchk
Total Ammonia-N	LACH/NH4	4283073	N/A	2015/11/25	Charles Opoku-Ware
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	4285074	N/A	2015/11/27	Chandra Nandlal
pH	AT	4285119	N/A	2015/11/25	Yogesh Patel

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

TEST SUMMARY

Maxxam ID: BJR479
Sample ID: MW-SE-01
Matrix: Water

Collected: 2015/11/18
Shipped:
Received: 2015/11/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Orthophosphate	KONE	4284955	N/A	2015/11/25	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	4280643	N/A	2015/11/26	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	4280644	N/A	2015/11/26	Automated Statchk
Sulphate by Automated Colourimetry	KONE	4284957	N/A	2015/11/25	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	4280645	N/A	2015/11/26	Automated Statchk

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Maxxam Job #: B5N8401
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GM BluePlan Engineering Limited
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GENERAL COMMENTS

Results relate only to the items tested.

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4283073	Total Ammonia-N	2015/11/25	NC	80 - 120	102	85 - 115	<0.050	mg/L	0.11	20
4283132	Dissolved Organic Carbon	2015/11/25	103	80 - 120	104	80 - 120	0.25, RDL=0.20	mg/L	0.074	20
4283388	Dissolved Organic Carbon	2015/11/24	101	80 - 120	103	80 - 120	0.20, RDL=0.20	mg/L	3.9	20
4284738	Nitrate (N)	2015/11/27	NC	80 - 120	99	80 - 120	<0.10	mg/L	NC	25
4284738	Nitrite (N)	2015/11/27	NC	80 - 120	97	80 - 120	<0.010	mg/L		
4284905	Alkalinity (Total as CaCO3)	2015/11/25			96	85 - 115	<1.0	mg/L	0.94	25
4284916	pH	2015/11/25			102	98 - 103			0.11	N/A
4284917	Conductivity	2015/11/25			102	85 - 115	<1.0	umho/cm	0	25
4284947	Dissolved Chloride (Cl)	2015/11/25	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.47	20
4284955	Orthophosphate (P)	2015/11/25	103	75 - 125	100	80 - 120	<0.010	mg/L	NC	25
4284957	Dissolved Sulphate (SO4)	2015/11/25	NC	75 - 125	100	80 - 120	<1.0	mg/L	0.95	20
4285074	Nitrate (N)	2015/11/27	104	80 - 120	99	80 - 120	<0.10	mg/L	NC	25
4285074	Nitrite (N)	2015/11/27	109	80 - 120	99	80 - 120	<0.010	mg/L	NC	25
4285110	Alkalinity (Total as CaCO3)	2015/11/25			96	85 - 115	<1.0	mg/L	1.0	25
4285116	Conductivity	2015/11/25			102	85 - 115	<1.0	umho/cm	0.27	25
4285119	pH	2015/11/25			101	98 - 103			0.24	N/A
4285150	Dissolved Organic Carbon	2015/11/25	104	80 - 120	106	80 - 120	<0.20	mg/L	3.6	20
4285713	Orthophosphate (P)	2015/11/25	109	75 - 125	100	80 - 120	<0.010	mg/L	NC	25
4285723	Dissolved Chloride (Cl)	2015/11/25	NC	80 - 120	102	80 - 120	<1.0	mg/L	0.77	20
4285734	Dissolved Sulphate (SO4)	2015/11/25	NC	75 - 125	99	80 - 120	<1.0	mg/L	0.26	20
4285787	Nitrate (N)	2015/11/25	81	80 - 120	106	80 - 120	<0.10	mg/L	0.067	25
4285787	Nitrite (N)	2015/11/25	111	80 - 120	102	80 - 120	<0.010	mg/L	NC	25
4285991	Dissolved Aluminum (Al)	2015/11/25	109	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
4285991	Dissolved Antimony (Sb)	2015/11/25	111	80 - 120	100	80 - 120	<0.50	ug/L		
4285991	Dissolved Arsenic (As)	2015/11/25	106	80 - 120	100	80 - 120	<1.0	ug/L		
4285991	Dissolved Barium (Ba)	2015/11/25	103	80 - 120	100	80 - 120	<2.0	ug/L	1.2	20
4285991	Dissolved Beryllium (Be)	2015/11/25	106	80 - 120	103	80 - 120	<0.50	ug/L		
4285991	Dissolved Boron (B)	2015/11/25	NC	80 - 120	106	80 - 120	<10	ug/L	0.80	20
4285991	Dissolved Cadmium (Cd)	2015/11/25	109	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
4285991	Dissolved Calcium (Ca)	2015/11/25	NC	80 - 120	102	80 - 120	<200	ug/L	2.0	20
4285991	Dissolved Chromium (Cr)	2015/11/25	103	80 - 120	99	80 - 120	<5.0	ug/L	NC	20

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4285991	Dissolved Cobalt (Co)	2015/11/25	103	80 - 120	100	80 - 120	<0.50	ug/L		
4285991	Dissolved Copper (Cu)	2015/11/25	98	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
4285991	Dissolved Iron (Fe)	2015/11/25	106	80 - 120	101	80 - 120	<100	ug/L	NC	20
4285991	Dissolved Lead (Pb)	2015/11/25	102	80 - 120	100	80 - 120	<0.50	ug/L	NC	20
4285991	Dissolved Magnesium (Mg)	2015/11/25	NC	80 - 120	104	80 - 120	<50	ug/L	3.1	20
4285991	Dissolved Manganese (Mn)	2015/11/25	NC	80 - 120	101	80 - 120	<2.0	ug/L	1.6	20
4285991	Dissolved Molybdenum (Mo)	2015/11/25	111	80 - 120	99	80 - 120	<0.50	ug/L		
4285991	Dissolved Nickel (Ni)	2015/11/25	100	80 - 120	99	80 - 120	<1.0	ug/L		
4285991	Dissolved Phosphorus (P)	2015/11/25	112	80 - 120	107	80 - 120	<100	ug/L		
4285991	Dissolved Potassium (K)	2015/11/25	105	80 - 120	101	80 - 120	<200	ug/L	2.2	20
4285991	Dissolved Selenium (Se)	2015/11/25	110	80 - 120	104	80 - 120	<2.0	ug/L		
4285991	Dissolved Silicon (Si)	2015/11/25	106	80 - 120	100	80 - 120	<50	ug/L		
4285991	Dissolved Silver (Ag)	2015/11/25	87	80 - 120	95	80 - 120	<0.10	ug/L		
4285991	Dissolved Sodium (Na)	2015/11/25	NC	80 - 120	106	80 - 120	<100	ug/L	2.8	20
4285991	Dissolved Strontium (Sr)	2015/11/25	NC	80 - 120	103	80 - 120	<1.0	ug/L		
4285991	Dissolved Thallium (Tl)	2015/11/25	101	80 - 120	99	80 - 120	<0.050	ug/L		
4285991	Dissolved Titanium (Ti)	2015/11/25	102	80 - 120	97	80 - 120	<5.0	ug/L		
4285991	Dissolved Uranium (U)	2015/11/25	107	80 - 120	102	80 - 120	<0.10	ug/L		
4285991	Dissolved Vanadium (V)	2015/11/25	106	80 - 120	100	80 - 120	<0.50	ug/L		
4285991	Dissolved Zinc (Zn)	2015/11/25	103	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
4286125	Conductivity	2015/11/25			102	85 - 115	<1.0	umho/cm	0	25
4286128	Alkalinity (Total as CaCO3)	2015/11/25			95	85 - 115	<1.0	mg/L	1.8	25

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Maxxam Job #: B5N8401
Report Date: 2015/11/27

QUALITY ASSURANCE REPORT(CONT'D)

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
4286129	pH	2015/11/25			102	98 - 103			0.0026	N/A

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 spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of 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 (one or both samples < 5x RDL).

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

Maxxam Job #: B5N8401
Report Date: 2015/11/27

GM BluePlan Engineering Limited
Client Project #: 215309
Site Location: MACO FARMS
Your P.O. #: 215309

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 Services

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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CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#3057 GM BluePlan Engineering Limited	Company Name:		Quotation #:	B47865	Maxxam Job #:	Bottle Order #: 520725
Attention:	Accounts Payable	Attention:	Reporting Contacts	P.O. #:	215309		
Address:	1260 - 2nd Ave E Unit 1 Owen Sound ON N4K 2J3	Address:		Project:	215309	COC #: C#520725-31-01	Project Manager: Rickey Samaroo
Tel:	(519) 376-1805 Fax: (519) 376-8977	Tel:	Fax:	Project Name:	Maco Farms		
Email:	Al.Bringleson@gmblueplan.ca; matthew.nelson@gmblu	Email:	Al.Bringleson@gmblueplan.ca; Jessica.Walker@gmblu	Site #:			
				Sampled By:	ML/MN		

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

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ___ ☐ PWQO ☐ Other ODWQ	

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

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: X
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): (Metals / Hg / Cr VI)	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): RCAP Comprehensive	# of Bottles	Comments
1		MW-NE-01	18 NOV 2015	9:45	Water	y	✓	4	All samples are groundwater
2		MW-NW-01	"	12:25	Water	y	✓	4	
3		MW-SW-01	"	11:45	Water	y	✓	4	
4		MW-SE-01	"	11:45	Water	y	✓	4	
5									
6									
7									
8									
9									
10									

19-Nov-15 16:00
Rickey Samaroo
B5N8401
GK1 ENV-570

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal	Yes	No
Matt Long	15/11/19	12:30		2015/11/19	16:00			8 1 8	Present	✓	
									Intact		

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

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

White: Maxxam Yellow: Client

Maxxam Analytics International Corporation o/a Maxxam Analytics

APPENDIX G:
PHOTOS OF BOYNE CREEK

215309 - Hydrogeological Study: Moco Farms Development
Photos from Observations of Boyne Creek

Top: Boyne Creek looking downstream. Cedars line the east bank.

Bottom: Boyne Creek near PZ-01. Cobbles dominate creek bed.

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215309 - Hydrogeological Study: Moco Farms Development
Photos from Observations of Boyne Creek

Top: Evidence of groundwater discharge.

Bottom: Till soils above the creek.

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Top: Drainage channel leading through stand of cedars above creek banks.