

Appendix C

**Hydrogeological
Assessment and Effects
Assessment Report and
Groundwater Supply
Feasibility and Effects
Desktop Assessment**

North Kent Wind 1 Project

Hydrogeological Assessment and Effects Assessment

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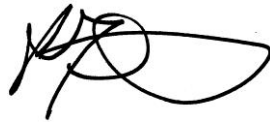
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Acronyms and Abbreviations

GSC	Geological Survey of Canada
HVA.....	Highly vulnerable aquifer
L/day	Litres per day
m	Metres
m/s	Metres per second
mASL	Metres above sea level
mBGS.....	Metres below ground surface
MOECC.....	Ontario Ministry of the Environment and Climate Change
MW.....	Megawatts
North Kent Wind 1.....	North Kent Wind 1 LP, by its general partner, North Kent Wind 1 GP Inc.
OGS	Ontario Geological Survey
OGSR.....	Oil, Gas and Salt Resource
O&M	Operations and Maintenance
Pattern Development	Pattern Renewable Holdings Canada ULC
PTTW	Permit to Take Water
Project	North Kent Wind 1 Project
PSA.....	Project Study Area
R _o	Radius of influence
REA.....	Renewable Energy Approval
Samsung Renewable Energy	Samsung Renewable Energy Inc.
SGRA	Significant Groundwater Recharge Areas
ZOI	Zone of influence

1. Introduction

North Kent Wind 1 LP (North Kent Wind 1), a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada ULC (Pattern Development) and Samsung Renewable Energy Inc. (Samsung Renewable Energy), is proposing to construct a Class 4 wind facility called the North Kent Wind Project (the “Project”) in the Municipality of Chatham-Kent, north of the City of Chatham, Ontario. The Project will be located on both public and private lands and is generally bounded by Oldfield Line to the north, Bear Line road to the west, Pioneer Line and Pine Line/Darrell Line to the south and Centre Side road and Caledonia Road to the east (**Figure 1**).

The Project will use wind to generate energy through the use of commercial wind turbine technology, expected to be a Siemens SWT-3.2-133 or similar turbine capable of producing up to 100 Megawatts (MW). Approximately 46 turbine locations are currently being assessed for the Project. The total number of turbines will depend on the nominal rating of each turbine. To facilitate the construction of the proposed Project, a number of permanent and temporary construction components are required, which include:

- Wind Turbine Generators;
- Pad-mounted Transformers;
- Wind Turbine Access Roads;
- Collector Lines;
- Collector Substation;
- Microwave Tower;
- Meteorological Towers;
- Interconnection Station;
- Operation and Maintenance Building; and
- Temporary Crane Pads and Construction Staging Areas.

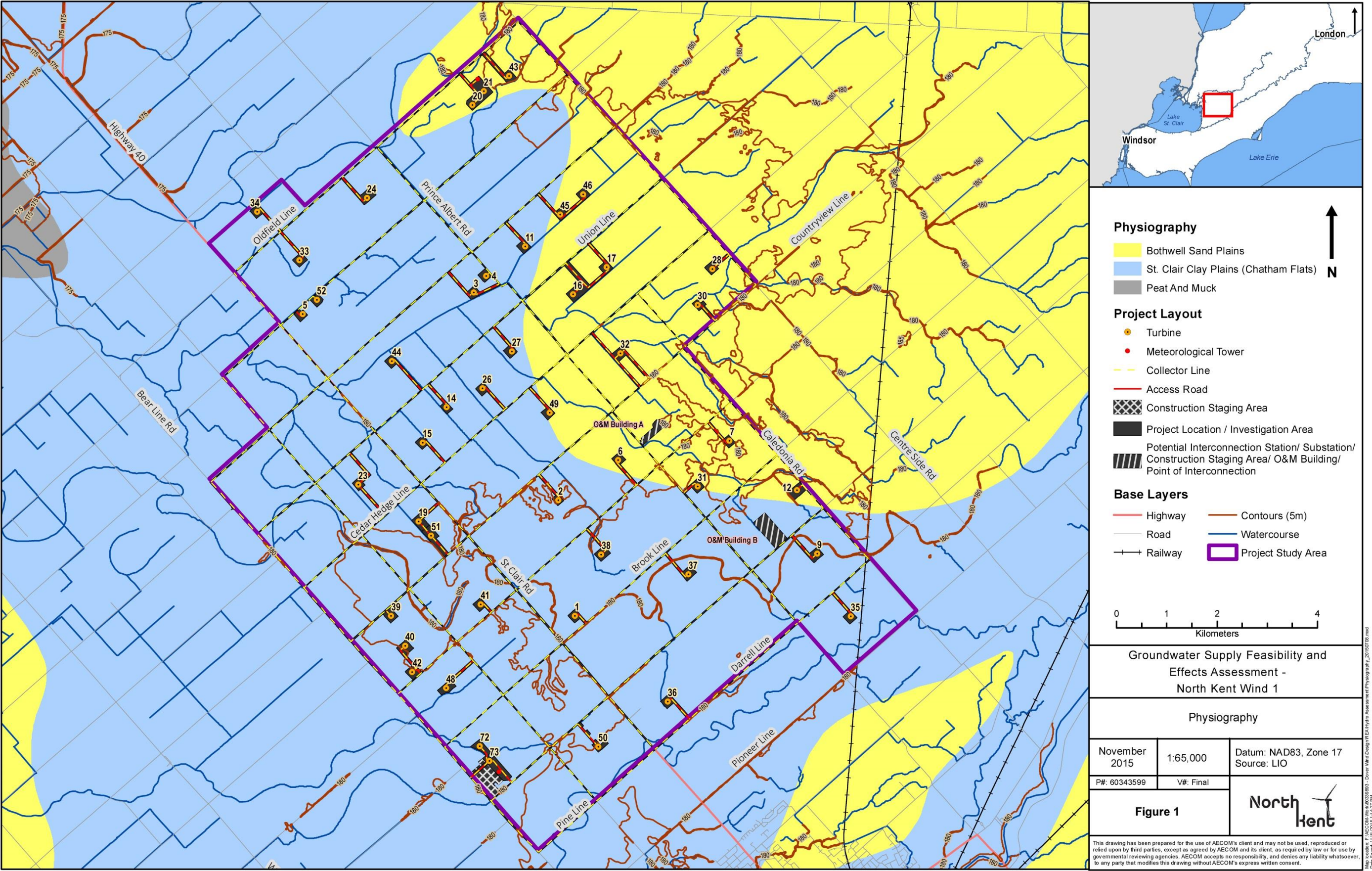
A detailed description of key Project information is presented in the *Project Description Report* prepared by AECOM Canada Ltd. (AECOM, 2015).

The scope of this Hydrogeological Assessment was developed in accordance with requirements of the Renewable Energy Approval (REA) process outlined in Ontario Regulation 359/09 (*O.Reg. 359/09*), in addition to the *Technical Guide to Renewable Energy Approvals* (Ontario Ministry of the Environment and Climate Change (MOECC), 2013).

For this assessment, a desktop study was conducted to provide a high-level characterization of existing local geological and hydrogeologic conditions and to identify potential effects to groundwater through construction and installation of the Project. Subsurface stratigraphy, hydrogeological conditions and general groundwater usage within the Project Study Area (PSA) was interpreted from available secondary source data including:

- Quaternary geological mapping from the Ontario Geological Survey (OGS);
- Bedrock geological mapping from OGS;
- MOECC Water Well Records;
- Drift thickness mapping from OGS; and
- Geotechnical borehole data from the Oil, Gas and Salt Resource Library.

Figure 1: Physiography



2. Existing Conditions

2.1 Topography and Physiography

The PSA is located within 2 distinct physiographic regions. The western, northwestern and southeastern portions of the PSA lie within the Chatham Flats, a sub-region of the St. Clair Clay Plains physiographic region, whereas the northeastern portion of the PSA is located within the Bothwell Sand Plains physiographic region (Chapman and Putnam, 1984) (**Figure 1**).

The Chatham Flats is described as a low relief extensive clay plain that slopes gently to the west toward Lake St. Clair. In the Municipality of Chatham-Kent, encompassing the eastern portion of the PSA, a shallow sand layer is found to overlie the predominantly clay soils (Chapman and Putnam, 1984). According to MOECC water wells records, the sand layer can be up to 5 metres (m) thick in some places.

The Bothwell Sand Plain consists of glaciolacustrine fine sands and silts associated with a delta of the Thames River in glacial Lake Warren. These sands form a thin veneer (less than 2 m thick) overlying a predominantly clay soil.

Fine-grained soils residing beneath the surficial granular veneer in both physiographic regions typically inhibits deep infiltration of surface water and precipitation, resulting in the common occurrence of high water table conditions in much of the region (Chapman and Putnam, 1984). Topographic depressions commonly exhibit swampy or wet conditions.

Land use across the PSA is dominated by mixture of crop cultivation and livestock agriculture, which has been made possible by the installation of dredged ditches and tile under-drains to provide satisfactory moisture conditions within the imperfectly drained soils. Chapman and Putnam (1984) classify the soils of the Bothwell Sand Plains as low-grade, with the majority of the farmland cultivated with corn and soybeans. In contrast, the soils of the Chatham flats are considered highly fertile, producing cash crops in addition to corn and soybeans.

Ground surface topography within the PSA is characterized as having low relief, with minor undulations associated with local surface water features. Generally, the ground surface elevation within the PSA decreases towards the northwest from a high of approximately 182 metres above sea level (mASL) to a low of about 178 mASL (**Figure 1**).

2.2 Geological Setting

2.2.1 *Bedrock Geology*

Across the PSA, thick successions of Upper Devonian aged Paleozoic sedimentary rocks subcrop beneath the overburden soils. The PSA is underlain by bedrock of the Kettle Point Formation, which can be described generally as a brown to black, laminated, organic-rich shale and siltstone (Armstrong, D.K., and Dodge, J.E.P., 2007).

Depth to bedrock across the PSA was assessed through a review of Drift Thickness mapping published by the OGS, as well as MOECC water well record information. Based on this review, overburden thickness within the PSA has been shown to range between approximately 10 m and 32 m, with an average thickness of about 18 m.

2.2.2 *Overburden Geology*

Thick overburden deposits consisting of both fine and coarse textured glacial sediments and fluvial deposits occur across the PSA. The PSA is situated within an abandoned lacustrine plain that consists of numerous alluvial

features which were deposited in high level post-glacial and non-glacial lakes which historically occupied the Lake St. Clair basin (Kelly, 1991). Where the Thames River entered the glacial lakes, deltaic sediments of sand and gravel were deposited.

Surficial geology across the PSA is illustrated in **Figure 2**. The following surficial sediments are found within the PSA, as indicated in the figure:

Alluvial Deposits

Modern alluvial deposits of clay, silt, sand and gravel were laid down in river floodplains during the post-glacial period. Locally, these deposits occur primarily within the floodplain of 3 major river systems that transect the PSA; being the Rankin Creek Drain, Little Bear Creek Drain and Maxwell Creek Drain.

Older alluvial deposits of clay, silt, sand and gravel are found in abandoned high-level floodplains within existing floodplains and along rivers and streams that once flowed into the Erie and St. Clair basins. These rivers and streams have produced large areas of gently rolling and variably textured terrain within the PSA.

Lacustrine Deposits

Small isolated sandy ridges and nearshore deposits are found within the southwestern portion of the PSA (**Figure 2**). These deposits consist of sand and gravel and were likely deposited during post-Nipissing falling water stages in the St. Clair basin (Kelly, 1991).

Glaciolacustrine Deposits

Course textured glaciolacustrine deposits of sand and gravel occupy the central portion of the PSA (**Figure 1**). These sediments represent a thin, deltaic deposit that developed where the Thames River entered the glacial lake which occupied the St. Clair basin. According to MOECC water well records, these deposits are up to 5 m thick and overlie fine-textured glaciolacustrine deposits of silt and clay.

During periods of deep water deposition, fine-textured glaciolacustrine sediments accumulated in glacial lakes that occupied the St. Clair basin. These deposits directly underlie the deltaic deposits described earlier and are exposed at surface in the north and south portions of the PSA.

2.2.3 Economic Geology

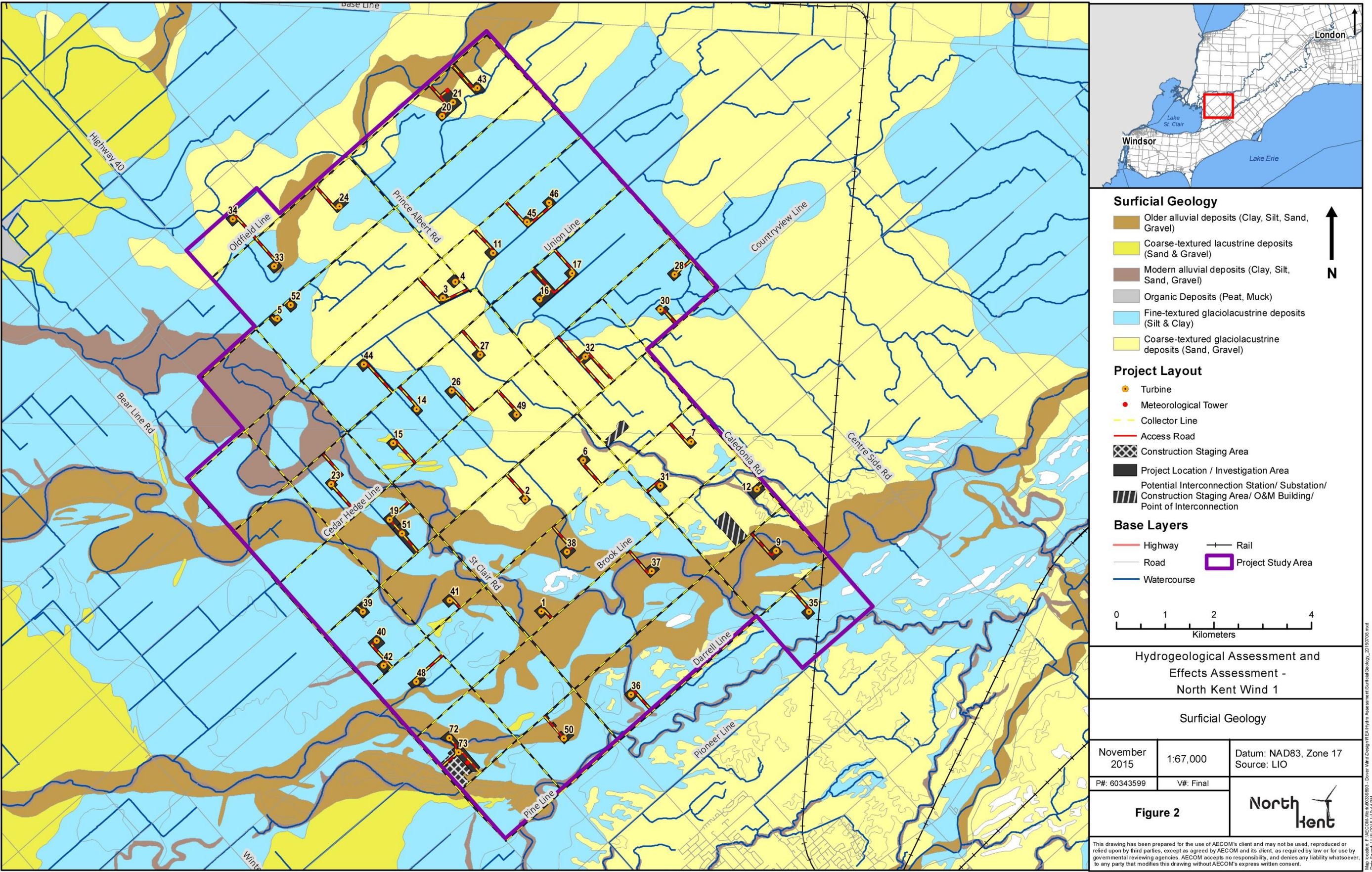
Oil and gas exploration is the most important geological resource within the PSA. Actively producing oil and gas wells are found within the northern portion of the PSA (OGSR, 2014). Several major gas pipelines transverse the PSA (OGSR, 1999).

According to the OGS (2010), no pit and/or quarry activities are located within the PSA.

2.2.4 Seismicity

Seismic hazard is quantified by determining the probability of expected ground motion within an area. The Geological Survey of Canada (GSC) is responsible for evaluating regional seismic hazards and preparing seismic hazard maps based on statistical analysis of past earthquakes and from knowledge of Canada's tectonic and geological structure. The National Building Code uses seismic hazard maps and earthquake load guidelines to design and construct buildings to be as resilient to earthquake damage as possible. According to the 2010 Seismic Hazard Map, prepared by the GSC (2015), the PSA is situated within a low relative hazard area.

Figure 2: Surficial Geology



2.3 Hydrogeological Setting

Surficial geology and physiography of the Municipality of Chatham-Kent provides a foundation to characterize the general hydrostratigraphy of the PSA. Hydrostratigraphy is the classification of various major stratigraphic units into aquifers and aquitards, with some simplification or combination of units with similar properties. A review of available secondary source information was used in this investigation.

2.3.1 Hydrostratigraphy

An aquifer is classically defined as a geological unit that is sufficiently permeable to permit the extraction of a useable supply of water. Aquifer units within the PSA are typically comprised of coarse-textured unconsolidated (overburden) sediments and shale and siltstone bedrock. Coarse-textured surficial sediments within the PSA are limited to local lacustrine, glaciolacustrine, and alluvial deposits. The coarse-textured alluvial sediments possess limited depth and areal extent, and thus are considered poor groundwater aquifers. A large portion of the PSA is underlain by coarse-textured glaciolacustrine deposits consisting of sand and gravel. According to Chapman and Putnam (1984), these sands are approximately 2 m to 5 m thick and overly clay soil within the PSA. These surficial sands are capable of infiltrating and transmitting significant quantities of groundwater due to the inability of water to infiltrate further through the underlying clay soil toward deeper aquifers systems. The coarse-textured glaciolacustrine deposits are considered an unconfined aquifer due to their presence at surface, but are not considered a useable supply of potable water for residents in the area due to the susceptibility of surficial contamination and shallow depth.

Surficial sediments within the PSA consisting of fine-textured glaciolacustrine deposits typically possess low hydraulic conductivity and a limited ability to transmit groundwater, however, heterogeneities, secondary porosity, permeability features and fractures may locally permit a low yield, and/or provide groundwater recharge-discharge pathways. MOECC Water Well Records located within areas of the PSA mapped as fine-textured glaciolacustrine deposits indicate the presences of a layer of sand ranging in thickness from less than 1 m up to about to 4 m.

Underlying the surficial fine-textured glaciolacustrine sediments, a confined sand and gravel aquifer exists at a depth of approximately 17 metres below ground surface (mBGS) and typically directly overlies shale bedrock. This deeper aquifer unit is a source of water for domestic and livestock wells within the PSA.

The shale bedrock is the most highly utilized aquifer unit within the PSA. As discussed previously in Section 2.2.1, the average depth to bedrock in the area is approximately 18 m. MOECC Water Well Records indicate that the average completion depth for wells drilled in bedrock is approximately 20 m, ranging between about 11 m and 38 m, indicating that the upper / weathered portion of the bedrock unit commonly possesses a superior aquifer potential.

The following defines the local surficial sediments into hydrostratigraphic units:

- Modern Alluvial Deposits (Clay, Silt, Sand, Gravel) – **Unconfined Aquifer or Aquitard**
- Older Alluvial Deposits (Clay, Silt, Sand, Gravel) – **Unconfined Aquifer or Aquitard**
- Coarse-Textured Lacustrine Deposits (Sand ,Gravel) – **Unconfined Aquifer**
- Coarse-Textured Glaciolacustrine Deposits (Sand and Gravel) – **Unconfined Aquifer**
- Fine-Textured Glaciolacustrine Deposits (Silty and Clay) – **Aquitard**

2.3.2 Groundwater Resources

Within the Municipality of Chatham-Kent, water for municipal supply is provided from 4 surface water facilities and two groundwater facilities (Chatham-Kent, 2015). There are no municipal surface water intakes and/or

groundwater supply wells within the PSA. Approximately 97% of the population within the Municipality of Chatham-Kent is served by municipal water. However, the remaining 3% depend on groundwater as the primary water supply for properties outside the municipally serviced areas (Chatham-Kent, 2015).

Groundwater Use

Figure 3 depicts the locations of MOECC water well records within and adjacent to the PSA, primary use of the wells, and highlights shallow wells that are screened at a depth of less than 10 m below ground surface. A complete listing of MOECC water well records is provided in **Appendix A**.

Review of the MOECC database has identified approximately 681 well records within the PSA. As shown in **Table 1**, available well records indicate that 33% of groundwater use in the PSA is for domestic purposes. Agricultural supply use (i.e., irrigation and livestock) accounts for 17% of the MOECC water well records, followed by commercial and/or industrial (2%), monitoring and/or test hole (1%), and public/municipal sources (1%). Approximately 37% of MOECC water well records did not specify the well use and therefore are classified as 'Unknown'. Approximately, 9% of the MOECC water well records indicate the well is not used, accounting for decommissioning records and dry wells.

Table 1: Summary of MOECC Water Well Record Information

Primary Water Use	Number of Well Records	Well Depth (m)	Primary Well Type
Commercial/Industrial	11	11.9 to 28.7	2 Overburden, 8 Bedrock, 1 unknown
Domestic	225	4.6 to 34.7	58 overburden, 154 bedrock, 13 unknown
Irrigation/Livestock	116	10.4 to 38.1	37 overburden, 79 bedrock
Monitoring/Test Hole	6	2.4 to 18.2	6 unknown
Public/Municipal	6	22.0 to 114.0	2 overburden, 3 bedrock, 1 unknown
Not Used	64	3.4 to 37.2	15 overburden, 36 bedrock, 13 unknown
Unknown	253	7.6 to 38.1	25 overburden, 193 bedrock, 35 unknown

The location and depth of MOECC water well records gives some indication of the presence of viable groundwater resources within the PSA. Approximately 77% of the wells within the PSA obtain their source water from the bedrock aquifer. In contrast, only 23% of the MOECC water well records within the PSA were completed in overburden sediments. This differential provides further evidence that the overburden is a marginal groundwater resource locally.

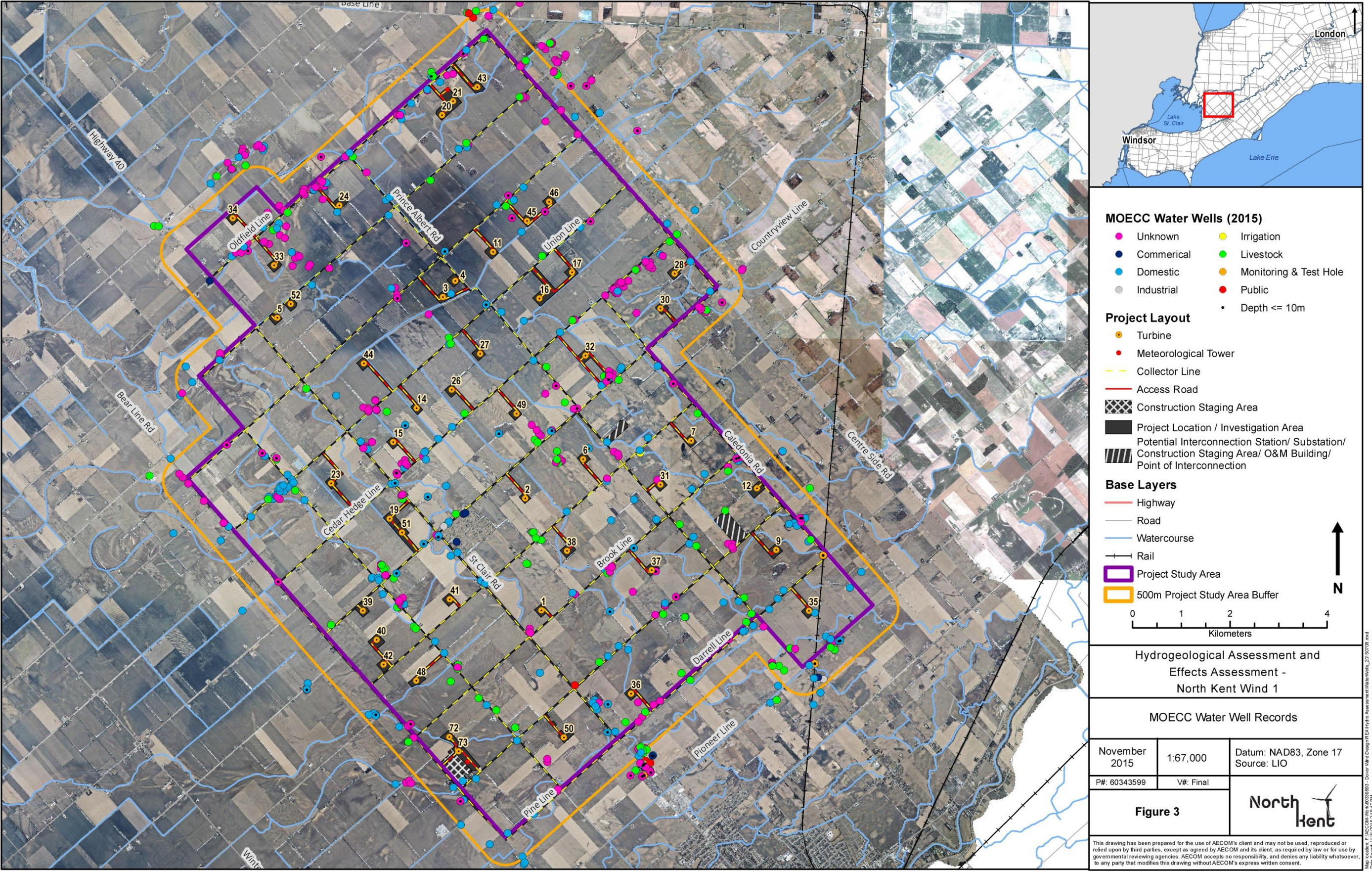
Depth to Water Table

Given the relatively low number of wells within and adjacent to the PSA that target the shallow overburden, some difficulty was presented in characterizing the depth to the water table. Only fifteen (15) MOECC well records were identified which report a well depth of less than 10 m, sourcing their water from an unconfined overburden aquifer. Static water levels within these wells are reported on the MOECC records to range between about 0.9 m and 4.5 m below ground surface (mBGS). Static water levels may fluctuate considerably in response changes in precipitation patterns and seasonal fluctuations. Therefore, for the purposes of this assessment, it has been conservatively assumed that the water table within the PSA is positioned at a depth of approximately 0.5 mBGS.

2.3.3 Highly Vulnerable Aquifers

A highly vulnerable aquifer (HVA) is one that is susceptible to contamination due to its location near ground surface or the type of material found in the ground around the aquifer. Aquifers that are near the ground surface and have less of a barrier between the ground surface and water below the ground are considered to be HVA.

Figure 3: MOECC Water Well Records



Within the PSA, HVA consists of those areas where coarse textured glaciolacustrine deposits and alluvial deposits are mapped at surface in **Figure 2** (Thames-Sydenham and Region Source Water Protection, 2015).

2.3.4 Significant Groundwater Recharge Areas

Surface water received from precipitation will percolate or infiltrate into the ground until it reaches the water table. This occurs in surficial sediments that are sufficiently permeable to permit the movement of water through its pore spaces. Areas such as these are known as groundwater recharge areas.

Significant Groundwater Recharge Areas (SGRA) are characterized by high permeable soils at surface, such as sand and/or gravel, which allows water to readily pass from the ground surface to an aquifer. These areas are considered significant when they aid in maintaining the water level in an aquifer that provides water for potable means or supplies groundwater to a cold water ecosystem.

According to the Thames-Sydenham and Region Source Water Protection Committee, SGRA are identified as an area that has a hydrological connection to a surface water body or aquifer that is a source for a drinking water system. SGRA have been mapped within the southwestern portion of the PSA, where alluvial deposits and coarse-textured glaciolacustrine deposits are mapped at or near surface. The remaining surficial soils within the PSA are considered fine textured and do not possess the soil characteristics necessary to allow for significant quantities of groundwater recharge or are coarse-textured deposits that are not hydraulically connected to a sourced aquifer.

2.3.5 Well Head Protection and Intake Protection Zones

According to the Thames-Sydenham and Region Source Water Protection Committee, there are no surface water or groundwater takings for municipal purposes within the PSA. There are no Well Head Protection Areas and/or Intake Protection Zones that extend within the PSA.

3. Water Taking Assessment

3.1 Temporary Water Takings and Construction Considerations

As described in the *Technical Guide to Renewable Energy Approvals* (MOE, 2013), an important environmental effect to consider is the potential for the Project to interfere with existing uses of a water resource. Groundwater takings for the purposes of providing dry working conditions during turbine foundation construction, collection line installation, road construction, dust suppression and general maintenance activities may be required during construction of the Project. Any water taking conducted during the construction phase of the Project is subject to the REA application and as such does not require a separate Permit to Take Water (PTTW). However, a similar assessment to that which typically would be required to obtain a PTTW for water takings exceeding 50,000 Litres per day (L/day) is to be submitted as part of the REA application.

During the construction phase of the Project, water may be required to support turbine construction (i.e., dust suppression and directional drilling fluids). Water demands during construction of the Project for these purposes are expected to have peak water demands up to 40,000 L/day. Actual daily demands will vary based on day-to-day operations and will typically be lower in volume than the estimated peak volume. As described in the Water Supply Feasibility and Effects Assessment for the Project, found in **Appendix B**, the proposed source of water for general construction use is a groundwater supply well located at the Operations and Maintenance (O&M) building.

Review of existing secondary source information provided by OGS and local MOECC water well records indicates that groundwater takings for the purpose of turbine foundation construction may exceed 400,000 L/day, but is dependent on the surficial material being excavated, the depth to groundwater, and other hydrogeological characteristics that may be determined during geotechnical analysis. For the purposes of this investigation, anticipated dewatering rates and potential zone of influence (ZOI) have been calculated for a typical turbine foundation excavation in coarse-textured glaciolacustrine surficial sediments. **Table 2** summaries the site conditions and design parameters assumed in calculating the anticipated dewatering rates and potential ZOI.

Table 2: Site Conditions and Design Parameters

Component	Value	Comments
Water Table Depth (h)	0.5 mBGS	Interpreted from MOECC Water Well Records
Hydraulic Conductivity (K)	1×10^{-4} m/sec	Adapted from Freeze and Cherry (1979)
Excavation Dimension	25.0 m L x 25.0 m W	Based on typical excavation dimensions
Excavation Depth	2.5 m	Based on typical excavation dimensions
Assumed Dewatering Depth (H)	3.5 m	Assumed water table will be lowered 1.0 m below base of excavation.
Water Table Drawdown (H - h)	3.0 m	

Using information presented in **Table 2**, the dewatering radius of influence (R_o) was calculated assuming radial flow to a well, using the following empirical relationship developed by Sichart and Kryieleis (Powers *et al.*, 2007):

$$R_o = 3000(H - h)\sqrt{K_s} \quad (1)$$

Where H is the pre-construction saturated aquifer thickness and h is the dewatered aquifer saturated thickness. A conservative value for hydraulic conductivity was estimated based on soil descriptions presented in the MOECC water well records, and was considered for all calculations. Using the noted parameters, an R_o value of approximately 90 m was calculated.

Equation 2 provides the equivalent radius, r_s for a square excavation area of length a and width b . This is a required input parameter into the groundwater inflow equation (3).

$$r_s = \sqrt{\frac{ab}{\pi}} \quad (2)$$

Using the noted parameters, an r_s value of approximately 14 m was determined.

Using the R_o and r_s values determined above, along with previously defined H , h and K values, the dewatering rate (Q), or the steady-state groundwater inflow for the saturated portion of the excavation was estimated using the following numerical solution for unconfined aquifers (Powers *et al.*, 2007).

$$Q = \frac{\pi K (H^2 - h^2)}{\ln\left(\frac{R_o}{r_s}\right)}$$

Where:

Q	=	groundwater inflow (m^3/sec)
K	=	hydraulic conductivity ($1.0 \times 10^{-4} m/s$)
H	=	pre-construction saturated aquifer thickness (3.6 m)
h	=	post construction saturated aquifer thickness (0.1 m)
R_o	=	radius of influence (105 m)
r_s	=	equivalent radius (13 m)

A typical daily dewatering rate of approximately 141,000 L is calculated for each turbine excavation. It is recommended that a 3 times Factor of Safety (F_s) be applied to this value for a maximum daily volume of 422,000 L for each turbine excavation. This recommendation is based on a number of factors that could cause the daily dewatering rate required to maintain dry working conditions to be above the typical daily rate. It should be expected that surface runoff or shallow infiltration, caused by spring freshet and/or precipitation events, will add water to the excavation area, thus requiring dewatering.

We understand that at least one geotechnical borehole will be drilled at each turbine foundation location and that site specific soil and groundwater information will become available at that time. Should groundwater taking from a turbine foundation excavation be expected to exceed 50,000 L/day, mitigation and monitoring efforts as detailed in **Table 3**, will be performed.

Water removal from turbine foundation excavations due to overland flow of surface water into the excavation, the interception of tile drains and farm drains, and direct precipitation inputs are not considered a groundwater taking. If it is confirmed that groundwater is not present in the excavation area (i.e., observation of dry conditions prior to precipitation event) the contractor will be responsible to record daily water taking quantities and the source of water (surface runoff, tile drains, etc.).

3.2 Long Term Water Takings and Operation Considerations

During operation of the Project, it is expected that approximately up to 15 full time employees will regularly use the O&M building. Non-potable water taking during operation will be limited to regular personnel requirements, which are expected to be approximately 4,500 Litres per day and are not expected to exceed 50,000 Litres per day. Facilities that will provide this non-potable water will require the construction of one or more new well(s). A Water Supply Feasibility and Effects Assessment for the Project has been completed to evaluate the feasibility of meeting projected water demand using groundwater supply wells and assess the potential effects of this water taking on existing local users and environmental features (**Appendix B**).

4. Assessment of Impacts and Monitoring Recommendations

Potential environmental impacts, mitigation measures, residual effects, and a monitoring plan associated with potential effects to groundwater are described in **Table 3**.

Table 3: Mitigation Measures, Net Effects and Monitoring Plan: Geology and Groundwater

Potential Effect	Performance Objective	Mitigation Strategy	Net Effects	Monitoring Plan and Contingency Measures
Temporary reduction in groundwater flow to natural features (waterbodies, watercourses and wetlands) during groundwater dewatering activities associated with turbine foundation construction.	Minimize reduction of groundwater contribution to near-by natural features.	- Direct dewatering discharge to the downgradient watercourse (following sediment and erosion control practices) to negate the potential that groundwater drawdown will decrease baseflow into streams and groundwater discharge into wetlands. - Limit duration of dewatering to as short a time frame as possible. - Implement groundwater cut-offs, where practical, to limit groundwater taking quantities.	- Reduction in groundwater quantity and quality minimized through application of mitigation measures. - Low likelihood and negligible magnitude of long term effects based on the amount of dewatering required and the duration of expected dewatering activities.	- Should groundwater dewatering activities be expected to exceed 50,000 L/day, the following measures will be implemented: - Inlet pump head shall be surrounded with clear stone and filter fabric. - The discharge shall be regulated at such a rate that there is no flooding in the receiving water body and that no soil erosion is caused that impacts the receiving water body.
Temporary reduction in groundwater quantity and quality to existing groundwater users (private water wells) during groundwater dewatering activities associated with turbine foundation construction.	Minimize reduction of groundwater quantity and quality to existing groundwater users.	- Limit duration of dewatering to as short a time frame as possible. - Implement groundwater cut-offs, where practical, to limit groundwater taking quantities. - Maintain a setback of 120 m from known active residential groundwater supply wells (private water wells), where possible. - A survey of private water wells will be conducted within the Project Study Area prior to construction. The survey will be used to confirm the results of the hydrogeological assessment and potential impacts to water wells associated with construction dewatering.	- Reduction in groundwater quantity and quality minimized through application of mitigation measures. - Low likelihood and negligible magnitude of long term effects based on the amount of dewatering required and the duration of expected dewatering activities.	Should groundwater dewatering activities exceed 50,000 L/day and a private water well becomes dry as a result of such activities, a temporary potable water supply will be provided to the property owner.
Contamination of groundwater resources due to accidental spills or releases of contaminants (i.e., fuel, lubricating oils and other fluids) during the refuelling, operation or maintenance of Project equipment.	Prevent contaminant discharge to the environment.	- Develop a spill response plan and train staff on procedures and protocols. - Refuel Project equipment and vehicles on spill collection pads and/or in designated areas. - Dispose of any waste material from construction activities by authorized and approved off-site vendors.	- Groundwater contamination minimized through application of mitigation measures. - Low likelihood and limited magnitude of effects on groundwater.	- Routine inspections performed by the contractor of construction equipment for leaks and spills. - In the event of a contaminant spill all work will stop until the spill is cleaned up. - Notify MOECC's Spill Action Centre, where appropriate, of any leaks or spills.
Reduction in groundwater quantity from an increase in impervious area created by turbine foundations and access roads resulting in reduced infiltration to unconfined aquifers (coarse-textured lacustrine deposit)	Minimize the increase in impervious areas.	- Direct runoff from the constructed impervious surfaces to ground surface to prevent any decrease in infiltration and recharge. - Minimize vehicle and construction equipment traffic on exposed soils to avoid compaction and a reduction of water infiltration.	- Reduced infiltration near groundwater recharge areas minimized through application of mitigation measures. - Low likelihood and limited magnitude of effects based on surface area of turbine foundations and the primary land use of surrounding area.	No monitoring or contingency measures required.

5. Conclusions and Recommendations

This desktop hydrogeological assessment was completed for the purpose of providing a high level review of existing hydrogeological conditions within the PSA, describe potential groundwater taking needs of the Project during construction and operation, outline potential effects of the Project on local groundwater resources, and provide a mitigation strategy and contingency measures that negate these adverse effects.

Results of this desktop investigation indicate that surficial soils within the PSA typically are composed of sand and/or sand and gravel glaciolacustrine and alluvial deposits overlying predominantly clay soils. The granular surface materials have the potential to readily transmit groundwater and turbine foundations excavated within these materials may require significant dewatering during construction. A site-specific geotechnical investigation has not yet been completed to confirm soil and groundwater conditions at each turbine foundation location. Should turbines be excavated in coarser-grained materials (e.g., sand and/or gravel), below the water table, dewatering requirements may exceed 50,000 L/day.

In conclusion, there is potential for groundwater takings to exceed 50,000 L/day at certain turbine foundation locations. This potential will be dependent on the surficial material being excavated, the depth to groundwater (relative to the excavation extent), and other hydrogeological characteristics that will be determined during a future geotechnical investigation. Should groundwater dewatering rates be expected to exceed 50,000 L/day from a turbine foundation excavation, implementation of mitigation measures to minimize the potential impact to groundwater resources are recommended, as detailed in **Table 3**.

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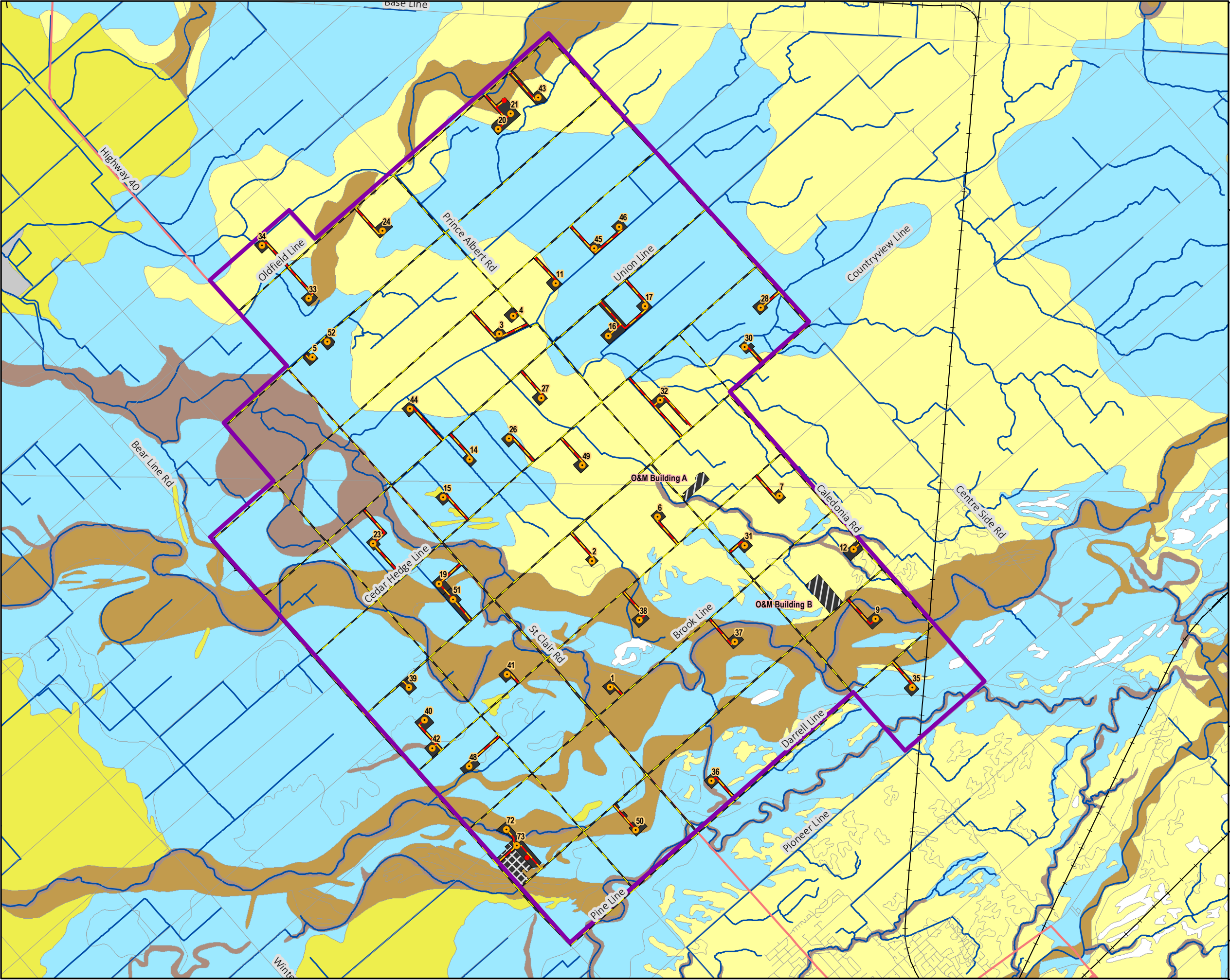
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Figures



Surficial Geology

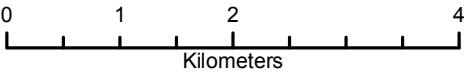
- Older alluvial deposits (Clay, Silt, Sand, Gravel)
- Coarse-textured lacustrine deposits (Sand & Gravel)
- Modern alluvial deposits (Clay, Silt, Sand, Gravel)
- Organic Deposits (Peat, Muck)
- Fine-textured glaciolacustrine deposits (Silt & Clay)
- Coarse-textured glaciolacustrine deposits (Sand, Gravel)

Project Layout

- Turbine
- Meteorological Tower
- Collector Line
- Access Road
- Construction Staging Area
- Project Location / Investigation Area
- Potential Interconnection Station/ Substation/ Construction Staging Area/ O&M Building/ Point of Interconnection

Base Layers

- Highway
- Road
- Watercourse
- Railway
- Project Study Area



Groundwater Supply Feasibility and Effects Assessment - North Kent Wind 1

Surficial Geology

November 2015 1:67,000 Datum: NAD83, Zone 17 Source: LIO

P#: 60343599

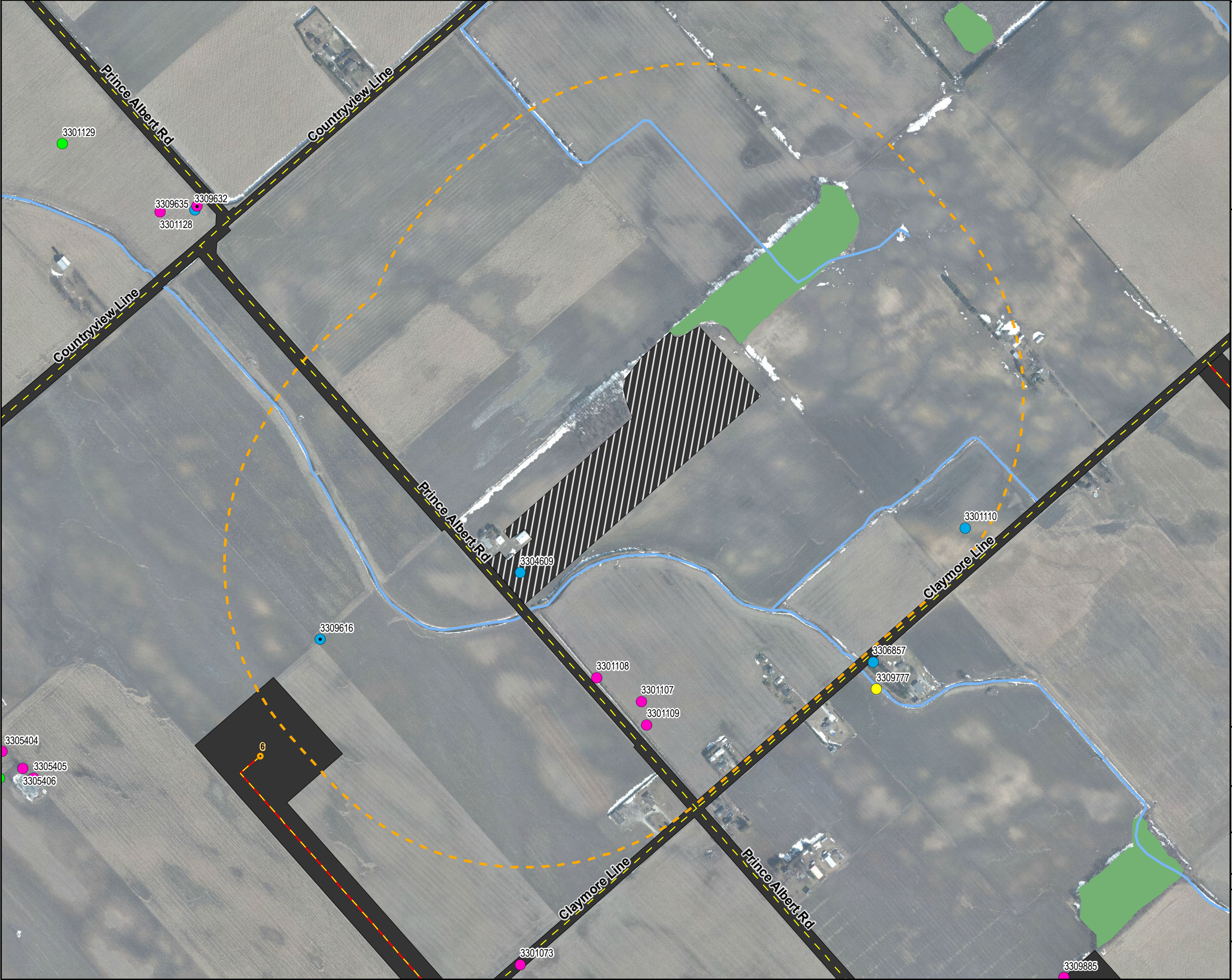
V#: Final

Figure 1



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Map Location: F:\AECOM\Work\60343599 - Dover Wind Design\EA\Feasibility\SurficialGeology_20160708.mxd Date Saved: 11/17/2015 10:23:22 AM



MOECC Water Wells (2015)

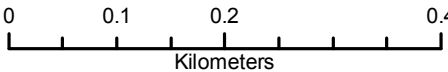
- Unknown
- Commerical
- Domestic
- Industrial
- Irrigation
- Livestock
- Monitoring & Test Hole
- Public
- Depth <= 10m

Project Layout

- Turbine
- Meteorological Tower
- Collector Line
- Access Road
- Construction Staging Area
- Project Location / Investigation Area
- Potential Interconnection Station/ Substation/ Construction Staging Area/ O&M Building/ Point of Interconnection
- Operation & Maintenance Buffer (500m)

Base Layers

- Highway
- Road
- Railway
- Watercourse
- Wooded Area



Groundwater Supply Feasibility and
Effects Assessment -
North Kent Wind 1

Operation and Maintenance Building Location A

November 2015	1:7,000	Datum: NAD83, Zone 17 Source: LIO
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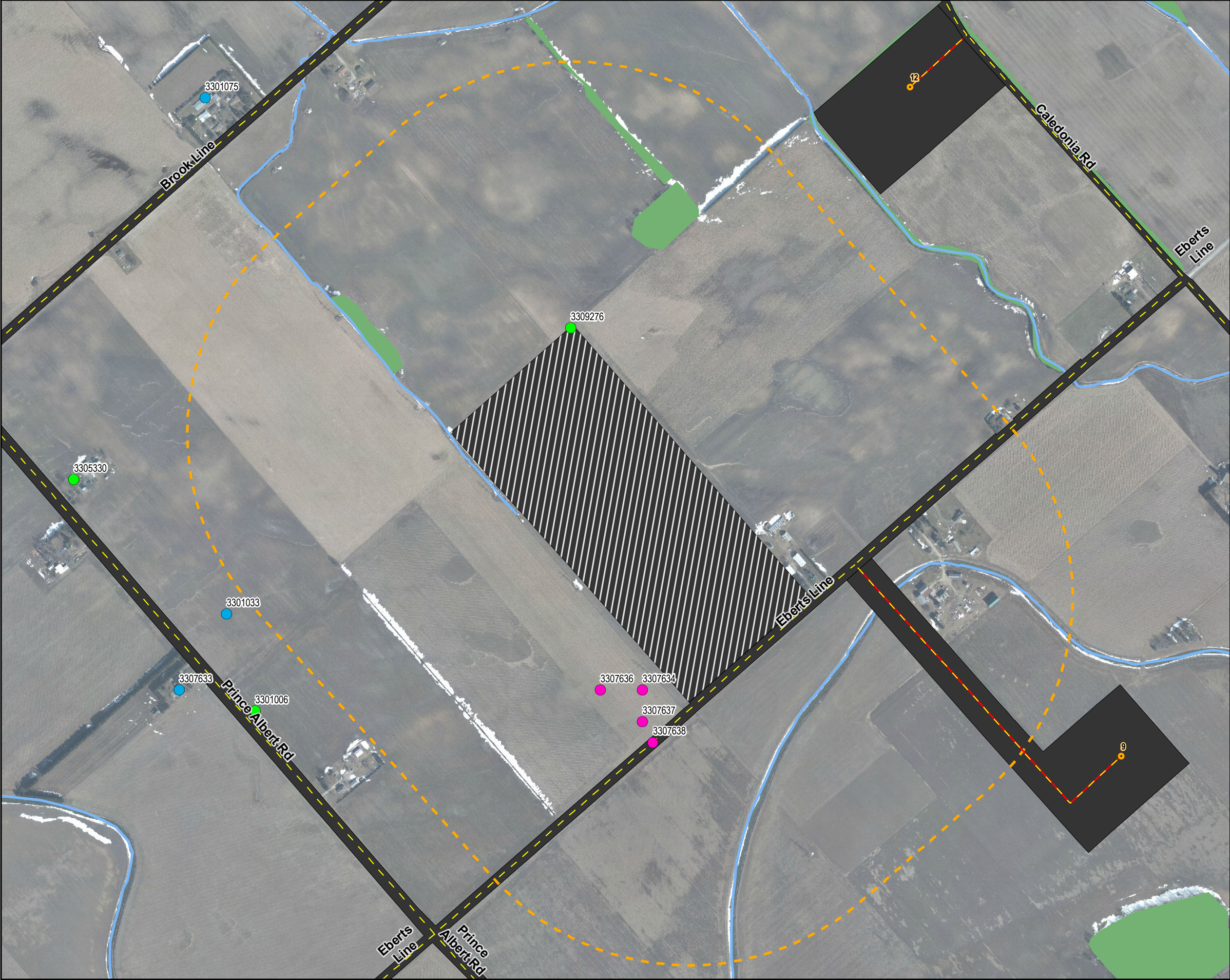
P#: 60343599	V#: Final
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Figure 2



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Map Location: F:\AECOM-Work\60339893 - Dover Wind Design\EA\Feasibility\O_M_Facility_20160709.mxd
Date Saved: 11/17/2015 10:13:17 AM



MOECC Water Wells (2015)

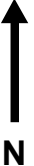
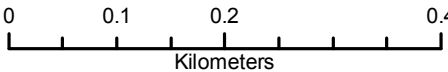
- Unknown
- Commerical
- Domestic
- Industrial
- Irrigation
- Livestock
- Monitoring & Test Hole
- Public
- Depth <= 10m

Project Layout

- Turbine
- Meteorological Tower
- Collector Line
- Access Road
- Construction Staging Area
- Project Location / Investigation Area
- Potential Interconnection Station/ Substation/ Construction Staging Area/ O&M Building/ Point of Interconnection
- Operation & Maintenance Buffer (500m)

Base Layers

- Highway
- Road
- Railway
- Watercourse
- Wooded Area



Groundwater Supply Feasibility and
Effects Assessment -
North Kent Wind 1

Operation and Maintenance Building Location B

November
2015

1:7,000

Datum: NAD83, Zone 17
Source: LIO

P#: 60343599

V#: Final

Figure 3



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Table 1

Summary of MOECC Water Well
Record Information

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3300435	17	393293	4705667	177.43	Bedrock	Domestic	FRESH	13.41	5.49	9	13,093	
3300928	17	401583.1	4700467	179.83	Bedrock	Domestic	FRESH	21.03	4.57	9	13,093	
3300930	17	402613.1	4700672	181.25	Bedrock	Domestic	FRESH	23.16	3.66	14	19,639	
3300931	17	402473.1	4700967	180.44	Bedrock	Domestic	FRESH	20.73	2.74	18	26,185	
3300932	17	402383.1	4701232	179.99	Bedrock	Domestic	FRESH	22.25	4.27	9	13,093	
3300934	17	402903.1	4701552	180.68	Overburden	Livestock	FRESH	21.34	3.05	9	13,093	
3300938	17	402983.1	4701732	180.54	Overburden	Domestic	FRESH	6.10	1.83	5	6,546	
3300957	17	399113	4699067	180.67	Bedrock			25.91				
3300958	17	399098	4699067	180.61	Overburden	Not Used	FRESH	21.03	3.66	14	19,639	
3300959	17	399113	4699222	180.78	Bedrock	Public	FRESH	23.47	3.66	14	19,639	
3300960	17	399038	4699497	180.51	Bedrock	Livestock	FRESH	22.56	4.27	18	26,185	
3300961	17	398988	4699537	179.78	Bedrock			22.56				
3300962	17	398963	4699472	179.72	Bedrock	Livestock	FRESH	22.56	4.27	9	13,093	
3300963	17	398973	4699432	179.92	Bedrock	Livestock	FRESH	22.86	4.27	9	13,093	
3300964	17	399013	4699272	180.43	Overburden	Public	FRESH	21.34	6.71	9	13,093	
3300966	17	398863	4699522	178.89	Bedrock			25.60				
3300967	17	398923	4699447	179.15	Overburden	Livestock	FRESH	18.29	2.74	23	32,732	
3300968	17	398903	4699472	178.92	Overburden	Livestock	FRESH	18.29	3.05	23	32,732	
3300969	17	398918	4699567	178.93	Overburden	Livestock	FRESH	18.29	3.66	14	19,639	
3300970	17	398908	4699547	178.89	Overburden	Livestock	FRESH	18.29	3.66	14	19,639	
3300973	17	399938	4700922	179.83	Bedrock	Domestic	FRESH	21.03	1.52	36	52,371	
3300977	17	401763.1	4701222	181.20	Bedrock	Livestock	FRESH	21.34	5.49	9	13,093	
3300978	17	401563.1	4702382	182.00	Bedrock	Domestic	FRESH	23.47	2.44	14	19,639	
3300979	17	401983.1	4701577	179.81	Overburden	Livestock	FRESH	20.42	4.27	14	19,639	
3300980	17	402088.1	4701572	179.93	Bedrock			23.16				
3300995	17	399938	4700922	179.83	Overburden	Livestock	FRESH	38.10	3.66			
3300996	17	397988	4700392	180.53	Overburden	Domestic	FRESH	21.95	2.13			
3300997	17	398938	4700167	181.27	Bedrock			24.99				
3300998	17	398863	4700072	182.06	Bedrock			23.16				
3300999	17	398603	4700067	181.70	Overburden	Livestock	FRESH	23.77	3.66	5	6,546	
3301000	17	398013	4700322	180.63	Overburden	Domestic	FRESH	15.24	5.18	136	196,391	
3301001	17	398858	4700472	180.72	Bedrock			24.69				
3301002	17	399313	4700497	180.00	Bedrock			24.38				
3301003	17	399173	4700422	180.00	Bedrock			25.30				
3301004	17	399758	4701072	180.23	Overburden	Livestock	FRESH	21.64	3.66	27	39,278	
3301005	17	399003	4700277	180.31	Overburden	Livestock	FRESH	21.03	3.05	32	45,825	
3301006	17	400058	4703682	181.08	Bedrock	Livestock	FRESH	19.81	3.35	23	32,732	
3301007	17	400923.1	4702542	182.36	Overburden	Domestic	FRESH	20.42	2.13	18	26,185	
3301008	17	401088.1	4702122	182.22	Bedrock	Livestock	FRESH	21.03	3.66	14	19,639	
3301009	17	399818	4702222	180.03	Bedrock	Livestock	FRESH	21.03	3.66	18	26,185	
3301010	17	401853.1	4702772	182.26	Bedrock	Domestic	FRESH	16.76	3.05	36	52,371	
3301011	17	401963.1	4704132	181.74	Bedrock	Domestic	FRESH	20.42	3.05	14	19,639	
3301012	17	402123.1	4704097	181.44	Bedrock	Domestic	FRESH	20.73	2.74	5	6,546	
3301013	17	402368.1	4703772	180.67	Bedrock	Domestic	FRESH	19.51	2.74	5	6,546	
3301014	17	402413.1	4703812	180.60	Overburden	Livestock	FRESH	19.81	4.27	14	19,639	
3301015	17	402063.1	4704147	181.57	Overburden	Domestic	FRESH	21.03	4.57	18	26,185	
3301016	17	402213.1	4704172	180.88	Bedrock	Not Used	FRESH	20.73				
3301017	17	402238.1	4704172	180.55	Bedrock	Livestock	FRESH	20.12	3.66	14	19,639	
3301018	17	402388.1	4704872	180.00	Bedrock	Livestock	FRESH	27.43	2.74	5	6,546	
3301031	17	397563	4700822	180.39	Overburden	Public	FRESH	22.86	4.57	14	19,639	
3301032	17	398058	4701297	180.24	Overburden	Livestock	FRESH	23.16	2.74	18	26,185	
3301033	17	400003	4703867	180.73	Overburden	Domestic	FRESH	18.90	2.13	36	52,371	
3301034	17	401038	4705542	180.64	Overburden	Livestock	FRESH	19.20	3.66	14	19,639	
3301070	17	397563	4702697	180.54	Bedrock			23.16				
3301071	17	397513	4702722	180.45	Bedrock	Domestic	FRESH	23.47	3.35			
3301072	17	396873	4703802	180.84	Bedrock	Livestock	FRESH	17.98	2.44	14	19,639	
3301073	17	398223	4705067	179.51	Bedrock			19.51				
3301074	17	398213	4705012	179.71	Bedrock	Domestic	FRESH	17.98	4.27	18	26,185	
3301075	17	399963	4704847	179.74	Bedrock	Domestic	FRESH	19.81	3.66	14	19,639	
3301076	17	400088	4706397	180.48	Bedrock	Livestock	FRESH	10.97	5.49			
3301105	17	395633	4702972	179.91	Bedrock	Domestic	FRESH	22.86	3.66	14	19,639	
3301106	17	395153	4703541	180.04	Bedrock	Domestic	FRESH	20.42	2.13	14	19,639	
3301107	17	398453	4705567	179.60	Bedrock	Not Used	FRESH	21.64				O&M Building Location A
3301108	17	398368	4705612	179.24	Bedrock			20.42				O&M Building Location A
3301109	17	398463	4705522	179.80	Bedrock			19.20				O&M Building Location A
3301110	17	399068	4705897	179.82	Bedrock	Domestic	FRESH	20.42	4.88			O&M Building Location A
3301111	17	398463	4707092	178.33	Bedrock	Livestock	FRESH	16.76	2.44			
3301125	17	394913	4704912	180.24	Overburden	Domestic	FRESH	15.24	4.27	9	13,093	
3301126	17	394438	4705522	178.10	Overburden			17.07				
3301127	17	394498	4705452	178.21	Bedrock	Domestic	FRESH	18.90	3.05	14	19,639	
3301128	17	397538	4706497	177.57	Bedrock			14.33				
3301129	17	397353	4706627	177.17	Overburden	Livestock	FRESH	13.72	9.45	14	19,639	
3301130	17	396713	4707492	177.17	Bedrock	Domestic	FRESH	15.85	3.05	23	32,732	
3301131	17	396958	4707342	177.28	Bedrock			15.54				
3301132	17	396973	4707352	177.30	Bedrock	Livestock	FRESH	15.54	3.66	23	32,732	
3301133	17	398113	4706977	179.72	Overburden	Domestic	FRESH	14.33	9.14	14	19,639	
3301134	17	398413	4708872	179.61	Bedrock			14.33				

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3301135	17	398513	4709097	177.56	Bedrock			13.41				
3301136	17	398188	4708822	179.67	Bedrock			16.15				
3301137	17	398443	4708867	179.99	Bedrock			13.41				
3301138	17	398373	4708982	179.95	Bedrock			13.41				
3301139	17	398338	4708947	179.90	Bedrock			14.02				
3301140	17	398413	4708997	178.83	Bedrock			13.41				
3301141	17	398388	4708972	179.84	Bedrock			13.72				
3301142	17	398393	4708967	179.82	Bedrock			13.72				
3301143	17	398458	4708977	178.24	Bedrock			13.72				
3301144	17	398393	4708877	179.00	Bedrock			14.02				
3301145	17	398363	4708947	179.96	Bedrock			19.20				
3301146	17	398413	4708872	179.61	Bedrock			13.41				
3301147	17	398838	4709367	177.64	Overburden			12.80				
3301148	17	398848	4709367	177.64	Overburden			12.80				
3301149	17	398813	4709347	177.60	Bedrock	Livestock	MINERIAL	14.94	2.13	18	26,185	
3301150	17	399513	4709922	177.96	Bedrock	Livestock	FRESH	17.68	3.05			
3301151	17	400338	4708902	179.14	Overburden	Domestic	FRESH	14.63	9.14	14	19,639	
3301152	17	399663	4710082	178.29	Bedrock	Livestock	FRESH	15.54	3.05			
3301208	17	393258	4705722	177.30	Bedrock			15.85				
3301209	17	393213	4705682	177.33	Bedrock			21.34				
3301210	17	393273	4705687	177.38	Bedrock			17.37				
3301211	17	393388	4705812	177.43	Bedrock			16.76				
3301212	17	393153	4705822	177.08	Bedrock	Domestic	FRESH	13.41	2.13	18	26,185	
3301213	17	394493	4705622	177.96	Bedrock	Domestic	FRESH	15.24	3.05	18	26,185	
3301214	17	394473	4705602	177.99	Bedrock	Domestic	FRESH	13.72	3.05	18	26,185	
3301215	17	393473	4706482	177.35	Bedrock			19.20				
3301216	17	393463	4706482	177.17	Bedrock			19.51				
3301217	17	393488	4706462	177.80	Bedrock			19.20				
3301218	17	393478	4706472	177.57	Bedrock			19.81				
3301219	17	393693	4706442	177.18	Bedrock	Livestock	FRESH	16.76	7.32	5	6,546	
3301220	17	395293	4706402	177.62	Overburden	Livestock	FRESH	16.76	3.05	5	6,546	
3301221	17	394973	4707822	176.31	Bedrock	Domestic	FRESH	16.76	4.57			
3301222	17	395013	4707832	176.80	Bedrock	Livestock	FRESH	13.72	3.35	23	32,732	
3301223	17	396053	4708482	176.09	Bedrock	Domestic	FRESH	14.94	3.66			
3301277	17	396263	4710762	177.66	Bedrock	Livestock	FRESH	14.94	2.13	9	13,093	
3301278	17	396143	4710657	177.51	Bedrock	Livestock	FRESH	16.15	2.13	23	32,732	
3301279	17	396893	4709637	177.11	Overburden	Livestock	FRESH	15.24	4.57	5	6,546	
3301307	17	392513	4709357	175.85	Overburden	Livestock	FRESH	14.02	1.83	36	52,371	
3301308	17	393793	4708972	175.97	Bedrock	Domestic	FRESH	16.15	3.05	18	26,185	
3301309	17	393868	4708982	175.88	Bedrock			16.15				
3301310	17	393898	4708842	176.04	Bedrock			15.85				
3301311	17	393733	4710462	176.47	Bedrock	Domestic	FRESH	15.24	2.13	9	13,093	
3301312	17	394593	4711182	177.27	Bedrock	Livestock	FRESH	19.51	3.66	9	13,093	
3301313	17	396473	4712867	179.38	Bedrock			16.15				
3301314	17	396493	4712897	179.67	Bedrock	Livestock	FRESH	16.15	4.27	18	26,185	
3301315	17	396503	4712882	180.04	Bedrock			16.15				
3301316	17	396493	4712902	179.57	Bedrock			16.76				
3301317	17	396553	4712882	180.38	Bedrock			15.85				
3301318	17	397133	4713432	180.17	Bedrock			38.10				
3301319	17	397123	4713402	180.00	Bedrock			24.38				
3301320	17	397198	4713352	179.31	Bedrock	Livestock	FRESH	25.60	6.40	9	13,093	
3301321	17	397193	4713357	179.33	Bedrock	Livestock	FRESH	25.91	6.10	9	13,093	
3301322	17	397273	4712622	179.87	Bedrock			17.07				
3301323	17	398068	4712572	180.29	Bedrock	Domestic	FRESH	16.76	4.27	18	26,185	
3301326	17	397073	4714002	181.29	Bedrock			21.34				
3301334	17	390703	4709697	176.35	Bedrock			21.34				
3301335	17	390703	4709697	176.35	Bedrock	Livestock	FRESH	21.64	2.13	23	32,732	
3301336	17	391358	4710162	175.62	Overburden	Livestock	FRESH	21.95	3.05			
3301337	17	391498	4710057	175.65	Bedrock			18.90				
3301338	17	391593	4710002	175.66	Bedrock			18.90				
3301339	17	391858	4709642	175.86	Bedrock			18.59				
3301340	17	392113	4709452	175.95	Bedrock			18.59				
3301341	17	392083	4709407	176.00	Bedrock	Not Used	FRESH	18.90	8.53	18	26,185	
3301342	17	391623	4710242	175.50	Bedrock			18.90				
3301343	17	391173	4709927	175.86	Bedrock	Not Used	FRESH	18.59	0.61	23	32,732	
3301344	17	391193	4709902	175.87	Bedrock	Not Used	FRESH	18.59	3.66	9	13,093	
3301345	17	391813	4709582	175.92	Bedrock	Not Used	FRESH	18.90	7.92	18	26,185	
3301346	17	391273	4709882	175.86	Bedrock	Not Used	FRESH	19.81	8.53	18	26,185	
3301347	17	391753	4709427	176.07	Bedrock	Not Used	FRESH	18.90	8.53	18	26,185	
3301348	17	391898	4709622	175.86	Bedrock			18.59				
3301349	17	391158	4709917	175.88	Bedrock	Domestic	FRESH	18.59	3.66	27	39,278	
3301350	17	393673	4710777	176.77	Overburden	Domestic	FRESH	18.59	2.44	9	13,093	
3301351	17	392993	4711662	175.27	Bedrock	Livestock	FRESH	24.38	4.57	5	6,546	
3301352	17	393283	4711342	175.58	Bedrock			23.77				
3301353	17	394193	4712767	179.25	Overburden	Domestic	FRESH	16.46	6.10	14	19,639	
3301354	17	395333	4711952	177.66	Bedrock	Livestock	FRESH	20.12	2.74	36	52,371	
3301355	17	394793	4713202	178.97	Overburden	Domestic	FRESH	19.51	6.10			

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3301356	17	394793	4713202	178.97	Bedrock			22.86				
3301357	17	394933	4713337	179.03	Bedrock			21.95				
3301358	17	395053	4713372	179.85	Bedrock			21.34				
3301359	17	396431	4712897	179.80	Overburden	Livestock	FRESH	17.68	3.05	14	19,639	
3301360	17	395688	4714082	180.86	Overburden	Livestock	FRESH	17.37	5.49	18	26,185	
3301361	17	396468	4713552	180.33	Bedrock			17.07				
3301362	17	396433	4713522	180.44	Bedrock	Not Used	FRESH	16.46	4.88	18	26,185	
3301367	17	390593	4709702	176.24	Bedrock	Not Used	FRESH	21.34	4.27	36	52,371	
3301368	17	390632	4709722	176.34	Overburden	Livestock	FRESH	19.20	4.57	27	39,278	
3301370	17	391018	4711887	176.88	Bedrock			22.86				
3301371	17	391053	4711907	176.81	Bedrock			22.86				
3301372	17	391478	4710662	175.47	Bedrock			28.65				
3301373	17	391583	4710572	175.60	Bedrock			29.26				
3301374	17	392853	4711672	175.40	Bedrock			18.59				
3301375	17	392838	4711662	175.85	Bedrock			22.25				
3301376	17	392933	4711752	177.11	Bedrock	Domestic	FRESH	20.42	2.44	14	19,639	
3301380	17	395333	4713862	179.91	Bedrock	Domestic	FRESH	18.59	3.66			
3301381	17	395473	4714522	180.91	Bedrock	Public	SALTY	24.99	5.49			
3301389	17	390193	4711267	175.49	Overburden	Livestock	FRESH	21.64	5.18	18	26,185	
3301390	17	390773	4711702	176.80	Bedrock			25.91				
3301391	17	390738	4711837	175.93	Overburden			24.99				
3301392	17	390653	4711657	176.78	Bedrock	Domestic	FRESH	24.38	3.66	14	19,639	
3301541	17	395531	4714662	180.07	Bedrock	Livestock	FRESH	18.90	6.10			
3301542	17	395378	4714612	180.15	Bedrock	Public	FRESH	21.34	3.66	18	26,185	
3301544	17	395753	4715152	180.40	Bedrock	Domestic	FRESH	21.95	4.27	59	85,103	
3301565	17	396423	4714822	181.16	Bedrock			21.34				
3301888	17	394873	4701482	178.96	Bedrock	Domestic	FRESH	24.99	2.74	45	65,464	
3301889	17	395158	4701242	179.35	Overburden	Livestock	FRESH	12.19	2.44	14	19,639	
3301890	17	394683	4701722	179.07	Bedrock	Domestic	FRESH	20.12	3.66	14	19,639	
3301891	17	393833	4703012	181.04	Bedrock	Livestock	FRESH	18.29	8.53	9	13,093	
3301892	17	393573	4703222	180.24	Bedrock			16.76				
3301893	17	393593	4703282	180.36	Bedrock	Not Used	FRESH	17.98	5.18			
3301894	17	393593	4703292	180.37	Bedrock			17.37				
3301895	17	393568	4703302	180.26	Bedrock			17.37				
3301896	17	393593	4703292	180.37	Bedrock	Livestock	FRESH	17.37	4.88	23	32,732	
3301897	17	393663	4703082	180.50	Bedrock	Not Used	FRESH	16.76	5.49	18	26,185	
3301909	17	397203	4698647	182.10	Bedrock			23.47				
3301910	17	397213	4698682	181.91	Bedrock	Not Used	FRESH	24.38	2.13	5	6,546	
3301911	17	395588	4700562	179.06	Bedrock	Livestock	FRESH	19.20	3.05	14	19,639	
3301912	17	395743	4700412	178.91	Overburden	Domestic	FRESH	22.25	3.66	18	26,185	
3301913	17	395013	4700902	178.86	Bedrock	Livestock	FRESH	19.20	4.57	14	19,639	
3301914	17	393913	4702422	180.24	Bedrock	Livestock	FRESH	20.73	5.49	73	104,742	
3301915	17	391593	4704832	179.08	Overburden	Domestic	FRESH	18.59	4.27	14	19,639	
3301916	17	391658	4704892	178.98	Bedrock	Domestic	FRESH	18.29	4.27	14	19,639	
3301917	17	391433	4704732	179.05	Bedrock	Domestic	FRESH	19.20	3.96	18	26,185	
3301918	17	391553	4704852	179.04	Overburden	Domestic	FRESH	16.76	3.66	23	32,732	
3301919	17	391503	4704802	179.08	Overburden	Domestic	FRESH	17.07	3.66	14	19,639	
3301920	17	391253	4704642	179.36	Bedrock	Livestock	FRESH	17.37	3.66	14	19,639	
3301921	17	389697.9	4707042	177.64	Bedrock	Domestic	FRESH	18.90	4.57	32	45,825	
3302145	17	395988	4696762	180.04	Bedrock			22.86				
3302190	17	398923	4699197	179.95	Bedrock			23.16				
3302191	17	398813	4699072	179.92	Bedrock	Livestock	FRESH	23.47	3.66	14	19,639	
3302192	17	398903	4699222	179.81	Bedrock			25.60				
3302244	17	394093	4698822	178.84	Bedrock			22.25				
3302245	17	394153	4698862	180.00	Bedrock			25.60				
3302246	17	394193	4698812	179.35	Bedrock			23.77				
3302248	17	395273	4698472	178.87	Bedrock	Domestic	FRESH	21.64	3.96	23	32,732	
3302249	17	396178	4697792	181.94	Bedrock	Domestic	FRESH	21.95	5.49	32	45,825	
3302250	17	395273	4698472	178.87	Bedrock	Domestic	FRESH	19.81	2.74	18	26,185	
3302304	17	394243	4699742	179.09	Bedrock			21.95				
3302305	17	394143	4699662	179.22	Overburden	Livestock	FRESH	18.90	3.66	9	13,093	
3302378	17	394293	4701982	180.01	Bedrock	Livestock	FRESH	19.81	4.57	18	26,185	
3302379	17	394253	4702027	180.06	Bedrock	Livestock	FRESH	20.12	4.57	18	26,185	
3302400	17	394013	4704732	179.76	Bedrock			15.54				
3302401	17	393998	4704722	179.77	Bedrock			16.76				
3302402	17	394013	4704642	179.81	Overburden	Livestock	FRESH	19.51	3.66	18	26,185	
3302405	17	390343	4704152	179.22	Bedrock			23.16				
3302406	17	390903	4704282	179.05	Bedrock	Domestic	FRESH	18.29	4.57	27	39,278	
3302407	17	391998	4704622	179.22	Overburden	Domestic	FRESH	19.51	5.49	23	32,732	
3302408	17	391353	4704642	179.45	Bedrock	Domestic	FRESH	19.20	5.49	18	26,185	
3302440	17	392043	4706912	177.31	Overburden	Livestock	FRESH	18.29	3.66	14	19,639	
3302479	17	389252.9	4705472	177.44	Bedrock	Domestic	FRESH	21.95	2.44	9	13,093	
3302491	17	390053	4709122	176.38	Bedrock	Commercial	FRESH	28.65	4.27	36	52,371	
3302506	17	388913	4710252	173.69	Overburden	Livestock	FRESH	22.86	8.23	18	26,185	
3302507	17	389003	4710242	174.00	Overburden	Livestock	FRESH	21.34	9.75	9	13,093	
3304600	17	402813.1	4701602	180.65	Bedrock	Livestock	FRESH	21.64	3.05	14	19,639	
3304609	17	398223	4705812	178.51	Bedrock	Domestic	FRESH	16.46	3.05	9	13,093	O&M Building Location A

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3304611	17	398163	4707162	179.49	Bedrock	Livestock	FRESH	14.94	4.57	23	32,732	
3304612	17	397543	4708332	178.74	Bedrock			14.33				
3304613	17	397563	4708322	179.81	Bedrock	Not Used	FRESH	14.33	3.05	18	26,185	
3304614	17	397513	4708312	178.35	Bedrock	Livestock	FRESH	14.63	3.05	18	26,185	
3304624	17	389482.9	4706812	178.08	Bedrock			18.90				
3304625	17	389452.9	4706772	178.11	Overburden	Domestic	SULPHUR	18.90	3.05	23	32,732	
3304626	17	392553	4702062	179.73	Bedrock	Livestock	FRESH	19.81	4.27	114	163,659	
3304642	17	398213	4707062	179.70	Overburden			13.72				
3304643	17	398153	4707002	178.58	Bedrock			14.63				
3304644	17	398343	4707142	179.83	Bedrock			14.33				
3304652	17	398333	4707222	179.67	Overburden			14.33				
3304653	17	398273	4707172	179.76	Bedrock	Not Used	FRESH	14.63	4.57	14	19,639	
3304654	17	398263	4707182	179.72	Overburden	Not Used	FRESH	14.02	4.57	14	19,639	
3304655	17	398273	4707262	179.45	Bedrock	Not Used	FRESH	14.33	4.57	14	19,639	
3304656	17	398263	4707272	179.40	Bedrock	Not Used	FRESH	14.63	4.57	14	19,639	
3304664	17	397193	4705622	177.34	Overburden	Livestock	FRESH	16.76	1.22	82	117,835	
3304736	17	391963	4710962	176.11	Bedrock			20.73				
3304737	17	391973	4710942	176.10	Overburden			21.34				
3304738	17	391993	4710922	176.09	Bedrock			21.95				
3304739	17	392003	4710892	176.08	Bedrock			22.86				
3304740	17	391993	4711002	176.16	Bedrock			21.34				
3304742	17	397963	4700522	180.34	Bedrock	Domestic	FRESH	22.25	1.52	182	261,855	
3304743	17	397933	4700462	180.30	Bedrock	Domestic	FRESH	22.25	2.44	91	130,927	
3304744	17	399843	4702222	180.21	Bedrock	Domestic	FRESH	22.25	2.13	5	6,546	
3304765	17	398263	4703222	182.57	Overburden			21.34				
3304766	17	398313	4703272	182.93	Bedrock			22.56				
3304767	17	398313	4703242	182.63	Bedrock			22.86				
3304768	17	398183	4703182	182.19	Overburden	Domestic	FRESH	20.42	3.05	23	32,732	
3304769	17	398283	4703172	181.71	Bedrock			22.56				
3304770	17	398253	4703212	182.45	Overburden	Not Used	FRESH	20.73	5.18	14	19,639	
3304778	17	397193	4705452	177.49	Bedrock	Livestock	FRESH	16.76	7.92	23	32,732	
3304835	17	391453	4704812	179.01	Bedrock	Domestic	FRESH	19.81	5.18	91	130,927	
3304864	17	393663	4703212	180.40	Bedrock	Livestock		17.07	5.18	23	32,732	
3304868	17	396583	4703312	181.92	Bedrock	Livestock	FRESH	17.07	4.27	91	130,927	
3304869	17	394973	4707952	177.33	Bedrock	Livestock	FRESH	14.63	2.44	91	130,927	
3304883	17	396373	4699692	180.00	Bedrock	Domestic	FRESH	23.16	5.49	36	52,371	
3304884	17	392413	4711052	176.42	Overburden	Not Used	FRESH	24.38	5.49	23	32,732	
3304885	17	392353	4711122	176.44	Bedrock			25.91				
3304891	17	396573	4703322	181.91	Bedrock	Livestock	FRESH	17.68	4.27	91	130,927	
3304948	17	398243	4701422	180.26	Overburden	Domestic	FRESH	21.34	2.13	36	52,371	
3304950	17	398463	4701622	181.68	Overburden	Domestic	FRESH	22.25	2.44	36	52,371	
3305002	17	400253	4708482	180.27	Bedrock			16.15				
3305003	17	400163	4708542	179.96	Bedrock			15.85				
3305004	17	400163	4708522	180.46	Bedrock			16.15				
3305005	17	400143	4708532	179.95	Bedrock			16.46				
3305006	17	400153	4708572	179.86	Bedrock			16.46				
3305007	17	400113	4708582	179.84	Bedrock			15.85				
3305008	17	400153	4708522	180.37	Bedrock	Not Used	FRESH	16.15	3.05			
3305009	17	400223	4708522	180.31	Overburden	Not Used	Not stated	15.54	3.05	9	13,093	
3305018	17	400263	4708522	180.20	Overburden	Livestock	FRESH	15.85	3.05	18	26,185	
3305019	17	395113	4704342	180.30	Bedrock	Livestock	FRESH	17.07	2.44	23	32,732	
3305032	17	399213	4702272	181.02	Overburden	Not Used	FRESH	19.81	4.88			
3305034	17	401043.1	4702622	183.12	Overburden	Livestock	FRESH	18.29	3.35	114	163,659	
3305052	17	401623.1	4701222	180.36	Bedrock	Livestock	FRESH	21.34	5.79	68	98,196	
3305053	17	401623.1	4701232	180.30	Bedrock			21.34				
3305055	17	401613.1	4701282	179.90	Bedrock			21.34				
3305073	17	392513	4709382	175.80	Overburden	Not Used	Not stated	16.46				
3305074	17	395293	4713802	179.94	Overburden			18.59				
3305087	17	392413	4711042	176.41	Overburden	Domestic	FRESH	19.81	3.35	14	19,639	
3305088	17	392413	4711062	176.42	Overburden	Not Used	FRESH	19.81	3.35	23	32,732	
3305127	17	401063.1	4701942	182.18	Bedrock	Domestic	FRESH	24.38	4.27	9	13,093	
3305179	17	393793	4704952	179.27	Bedrock	Domestic	FRESH	17.07	3.35	9	13,093	
3305221	17	398233	4703122	181.35	Bedrock	Livestock	FRESH	21.95	3.66	23	32,732	
3305222	17	398283	4703152	181.38	Overburden		FRESH	19.51	3.66	23	32,732	
3305225	17	391423	4705452	178.57	Bedrock	Livestock	SALTY	18.59	4.88	27	39,278	
3305226	17	394953	4704142	180.03	Bedrock	Domestic	FRESH	17.37	2.44	45	65,464	
3305228	17	395943	4700312	178.77	Bedrock	Livestock	FRESH	20.73	3.66	23	32,732	
3305259	17	392813	4711647	176.59	Bedrock	Domestic	SALTY	31.70	4.27	5	6,546	
3305269	17	399013	4699212	180.39	Bedrock	Domestic	FRESH	21.34	6.10	5	6,546	
3305275	17	394973	4704182	180.01	Bedrock	Domestic	FRESH	17.37	2.44	91	130,927	
3305279	17	395786.8	4714562	181.00	Bedrock			18.29				
3305300	17	400913	4705472	180.32	Overburden	Domestic	FRESH	19.20	5.18	9	13,093	
3305301	17	400953	4705472	180.32	Bedrock			21.34				
3305330	17	399713	4704122	180.30	Bedrock	Livestock	FRESH	19.51	4.57	23	32,732	
3305356	17	396333	4699952	180.11	Bedrock	Livestock	FRESH	24.38	7.62	36	52,371	
3305395	17	396793	4705802	176.74	Bedrock	Livestock	FRESH	15.85	1.83	18	26,185	
3305396	17	396741	4705862	176.77	Bedrock	Livestock	FRESH	15.85	1.83	18	26,185	

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3305397	17	396858	4705942	176.71	Bedrock			15.85				
3305398	17	396673	4706167	176.75	Overburden			14.33				
3305399	17	396773	4706057	176.66	Overburden			14.63				
3305400	17	396821	4705986	176.67	Overburden			15.54				
3305401	17	397218	4705392	177.59	Overburden	Livestock	FRESH	15.85	5.79	23	32,732	
3305402	17	397173	4705402	177.53	Overburden			15.85				
3305403	17	397233	4705422	177.57	Overburden	Livestock	FRESH	15.85	5.79	27	39,278	
3305404	17	397238	4705472	177.53	Bedrock			18.29				
3305405	17	397298	4705422	177.68	Overburden			16.76				
3305406	17	397278	4705440	177.63	Bedrock			18.29				
3305407	17	390508	4709627	175.33	Overburden	Domestic	FRESH	18.29	2.44	23	32,732	
3305426	17	392193	4710982	176.25	Bedrock	Domestic	FRESH	21.34	3.96	23	32,732	
3305427	17	392383	4710797	176.23	Bedrock			21.95				
3305428	17	392173	4710982	176.24	Bedrock			23.77				
3305429	17	392153	4711002	176.25	Bedrock			23.77				
3305430	17	392173	4711012	176.27	Bedrock			23.77				
3305431	17	392173	4710992	176.25	Bedrock			22.86				
3305432	17	392191	4711017	176.28	Overburden		FRESH	21.34	4.27			
3305433	17	392211	4711007	176.28	Bedrock		FRESH	21.95	3.96	14	19,639	
3305434	17	392217	4711032	176.31	Bedrock			21.64				
3305435	17	392231	4711042	176.32	Bedrock		FRESH	23.16				
3305482	17	396503	4711042	178.08	Bedrock	Domestic	FRESH	15.85	2.44	41	58,917	
3305493	17	396993	4699312	181.08	Bedrock			28.96				
3305494	17	396993	4699242	181.23	Bedrock	Not Used	FRESH	32.61	8.84	14	19,639	
3305498	17	390833	4709902	175.04	Bedrock			27.43				
3305512	17	391653	4710522	175.61	Overburden	Livestock	FRESH	10.36	1.83			
3305514	17	401193.1	4702292	181.21	Bedrock	Livestock	FRESH	21.34	3.66	68	98,196	
3305517	17	395153	4701192	179.30	Bedrock	Not Used	FRESH	21.34	5.18			
3305520	17	395153	4701162	179.24	Bedrock	Livestock	FRESH	20.12	4.57	9	13,093	
3305668	17	390423	4711542	176.62	Bedrock			27.43				
3305685	17	397183	4713382	179.47	Bedrock	Livestock	FRESH	22.25	7.92	14	19,639	
3305715	17	390719	4711785	176.01	Bedrock	Livestock	SALTY	30.48	3.96	5	6,546	
3305724	17	398057	4700467	180.72	Bedrock		FRESH	22.56	2.13	45	65,464	
3305767	17	393627	4703207	180.36	Bedrock	Livestock	FRESH	17.37	5.18	23	32,732	
3305856	17	397563	4712493	179.89	Bedrock	Domestic	FRESH	15.85	8.84	18	26,185	
3305877	17	394863	4704084	179.99	Bedrock	Industrial	FRESH	18.29	2.44	36	52,371	
3305878	17	395723	4702936	179.81	Bedrock			20.73				
3305879	17	395716	4702910	180.79	Overburden	Domestic	FRESH	20.42	4.88	27	39,278	
3305901	17	390761	4711747	176.44	Overburden	Livestock	FRESH	20.73	5.18	23	32,732	
3305902	17	390730	4711770	176.13	Bedrock			24.38				
3305903	17	390790	4711759	176.52	Bedrock			35.05				
3305919	17	394021	4702619	180.38	Bedrock			25.60				
3305920	17	393988	4702472	180.17	Bedrock			24.38				
3305921	17	394055	4702489	180.23	Bedrock	Domestic	FRESH	21.34	7.01	45	65,464	
3305922	17	393952	4702565	180.12	Bedrock			24.69				
3305923	17	393957	4702510	180.13	Bedrock			25.91				
3305924	17	393939	4702533	180.08	Bedrock			24.38				
3305925	17	394002	4702601	180.29	Bedrock			22.86				
3305940	17	390788	4711487	175.93	Bedrock	Livestock	FRESH	23.47	4.88	23	32,732	
3305971	17	390532	4711432	175.56	Bedrock			19.51				
3305972	17	390526	4711441	175.60	Bedrock	Livestock	FRESH	19.81	5.18	23	32,732	
3305974	17	389304.9	4703946	177.95	Bedrock	Domestic	FRESH	17.98	3.05	45	65,464	
3306005	17	399369	4709631	177.75	Bedrock			14.02				
3306006	17	399315	4709666	177.73	Bedrock	Domestic	MINERIAL	12.50	4.57	18	26,185	
3306021	17	398918	4699446	179.09	Overburden	Domestic	FRESH	18.29	2.44	23	32,732	
3306036	17	395883	4714677	180.98	Bedrock	Domestic	FRESH	20.42	6.10	27	39,278	
3306109	17	394087	4705429	178.25	Bedrock	Livestock	FRESH	16.46	2.74	9	13,093	
3306110	17	394067	4705441	178.23	Bedrock			13.72				
3306111	17	394082	4705376	178.36	Bedrock			14.63				
3306112	17	393999	4705372	178.35	Bedrock			14.33				
3306113	17	394108.9	4705351	178.41	Bedrock			13.41				
3306114	17	394111	4705342	178.43	Bedrock			14.33				
3306115	17	394087	4705426	178.26	Bedrock	Livestock	FRESH	16.46	2.74	9	13,093	
3306117	17	394528	4713044	179.15	Bedrock	Domestic	FRESH	20.73	5.49	18	26,185	
3306118	17	394527	4713026	179.15	Bedrock		SULPHUR	19.81	5.79	9	13,093	
3306143	17	402565.1	4700980	180.80	Bedrock	Commerical	FRESH	18.29	1.83	23	32,732	
3306211	17	400029	4710568	179.78	Bedrock	Domestic	FRESH	18.59	3.96	23	32,732	
3306215	17	396613	4701921	180.32	Bedrock			22.86				
3306216	17	396636	4701986	180.52	Bedrock			21.34				
3306217	17	396644	4701897	180.27	Bedrock			21.34				
3306218	17	395802	4703048	180.18	Bedrock	Domestic	FRESH	21.03	4.88	9	13,093	
3306220	17	399108	4709446	177.67	Bedrock			14.33				
3306223	17	399026	4709485	177.67	Overburden			12.50				
3306224	17	399103	4709510	177.67	Bedrock		SALTY	13.72	3.66			
3306225	17	399020	4709556	177.69	Bedrock	Domestic	SALTY	12.80	3.66	18	26,185	
3306235	17	398878	4699364	179.00	Bedrock	Domestic	FRESH	21.34	4.88	18	26,185	
3306263	17	401820	4705615	180.88	Bedrock			20.42				

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3306265	17	397676	4710218	176.76	Bedrock	Domestic	FRESH	13.72	3.05	23	32,732	
3306268	17	391192	4705517	178.68	Bedrock	Domestic	FRESH	18.29	5.49	14	19,639	
3306273	17	398508	4709076	177.56	Bedrock			28.65				
3306274	17	390280.9	4707597	176.82	Bedrock			19.81				
3306275	17	390258.9	4707639	176.93	Bedrock			24.38				
3306276	17	390246.9	4707531	177.10	Bedrock			20.42				
3306277	17	390248.9	4707493	176.80	Bedrock	Domestic	FRESH	18.59	3.05	23	32,732	
3306301	17	390438	4704077	179.32	Bedrock	Domestic	FRESH	10.67	1.83	14	19,639	
3306334	17	399377	4702281	181.22	Bedrock	Livestock	FRESH	21.03	3.05	23	32,732	
3306335	17	401835	4705628	180.77	Bedrock	Domestic	FRESH	20.73	4.57	9	13,093	
3306358	17	391739	4705051	178.67	Bedrock	Domestic	FRESH	17.98	5.18	27	39,278	
3306372	17	390753	4709822	176.03	Overburden	Domestic	FRESH	12.19	0.30	14	19,639	
3306421	17	402863.1	4701722	180.56	Bedrock			22.86				
3306422	17	402813.1	4701772	180.55	Bedrock	Domestic	FRESH	22.56		23	32,732	
3306423	17	396553	4713642	180.14	Bedrock	Livestock	FRESH	16.15	4.57	23	32,732	
3306425	17	399413	4702472	180.77	Overburden		FRESH	19.51	3.05	18	26,185	
3306426	17	399413	4702452	180.50	Overburden			17.68				
3306427	17	399413	4702502	181.38	Overburden	Domestic	FRESH	17.68	3.05	23	32,732	
3306437	17	401863.1	4701122	180.94	Bedrock	Livestock	FRESH	19.51	3.35	36	52,371	
3306488	17	389612.9	4704962	178.33	Bedrock			17.68				
3306489	17	389492.9	4705082	178.34	Bedrock			21.64				
3306490	17	389432.9	4705162	178.19	Bedrock			21.95				
3306491	17	403213.1	4702822	182.59	Bedrock	Domestic	FRESH	20.73	6.40	23	32,732	
3306501	17	399263	4707372	179.26	Bedrock	Domestic	FRESH	15.24	4.27	23	32,732	
3306519	17	395953	4710682	177.44	Bedrock	Domestic	FRESH	14.63	4.27	23	32,732	
3306545	17	400913	4705422	180.22	Overburden	Domestic	FRESH	17.68	2.13			
3306553	17	394453	4703722	180.01	Overburden	Domestic	FRESH	9.14	1.22			
3306555	17	391433	4710202	175.58	Overburden	Domestic	FRESH	18.29				
3306596	17	395033	4706122	176.84	Bedrock	Domestic	FRESH	15.24	1.22	27	39,278	
3306605	17	397053	4714002	181.12	Overburden	Livestock	FRESH	18.29	6.40	18	26,185	
3306606	17	397373	4713762	181.02	Overburden			16.76				
3306631	17	401013	4709372	179.94	Bedrock			19.51				
3306657	17	394053	4705282	178.55	Bedrock	Domestic	FRESH	13.41				
3306691	17	390793	4709842	175.73	Bedrock			21.34				
3306692	17	390713	4709962	175.27	Bedrock			22.86				
3306693	17	390813	4709882	175.03	Bedrock		SALTY	28.65				
3306731	17	389933	4704602	178.73	Bedrock			22.86				
3306771	17	390753	4710002	175.86	Overburden	Domestic	FRESH	9.14	2.44			
3306776	17	391433	4704702	179.16	Bedrock			19.81				
3306777	17	391453	4704682	179.30	Bedrock			19.81				
3306778	17	391493	4704642	179.50	Bedrock			19.81				
3306779	17	391413	4704722	179.06	Bedrock	Domestic	FRESH	19.81	6.10	5	6,546	
3306780	17	391813	4704822	178.80	Bedrock	Livestock	FRESH	19.51	5.49	36	52,371	
3306783	17	396953	4713882	180.07	Overburden			19.20				
3306784	17	396913	4713922	180.04	Overburden			17.68				
3306785	17	396873	4713942	180.02	Overburden			17.68				
3306795	17	396573	4696922	177.73	Bedrock	Domestic	FRESH	22.25	4.27	18	26,185	
3306830	17	398513	4707342	179.79	Bedrock	Domestic	FRESH	14.63	4.88			
3306831	17	396513	4697142	178.07	Overburden	Domestic	FRESH	18.90	2.44	18	26,185	
3306857	17	398893	4705642	178.48	Bedrock	Domestic	FRESH	16.76	3.05	45	65,464	
3306862	17	397153	4713662	179.98	Bedrock			18.29				
3306863	17	397173	4713642	179.95	Bedrock			18.29				
3306864	17	397193	4713602	179.88	Bedrock			19.81				
3306868	17	393533	4702982	179.95	Bedrock	Domestic	FRESH	17.37	6.40	23	32,732	
3306884	17	395213	4697962	179.96	Overburden	Domestic	FRESH	12.19	2.44			
3306894	17	398233	4699862	179.07	Overburden	Domestic	FRESH	4.88	2.44			
3306935	17	393893	4703122	180.91	Overburden	Domestic	FRESH	4.88	2.13			
3306954	17	400993	4709342	179.92	Bedrock			19.20				
3306955	17	400993	4709342	179.92	Bedrock			15.54				
3306956	17	400993	4709342	179.92	Bedrock		FRESH	15.24				
3307036	17	393993	4712562	178.65	Bedrock	Domestic	FRESH	18.90	3.96	27	39,278	
3307043	17	397393	4704382	179.42	Bedrock	Domestic	FRESH	18.29	1.83	114	163,659	
3307044	17	396713	4703962	180.64	Bedrock	Livestock	FRESH	17.07		9	13,093	
3307045	17	396693	4703962	180.64	Bedrock	Livestock		17.07				
3307046	17	396753	4703842	180.95	Bedrock	Livestock	FRESH	17.37	3.05	23	32,732	
3307048	17	391153	4710222	175.78	Bedrock	Domestic	FRESH	20.73	1.83			
3307050	17	403013.1	4701742	180.55	Bedrock	Domestic	FRESH	7.62	3.66			
3307141	17	395133	4703762	180.80	Overburden	Commerical	FRESH	11.89	2.44			
3307144	17	393913	4705142	178.90	Bedrock			14.33				
3307145	17	393913	4705162	178.84	Bedrock	Domestic	FRESH	13.72	3.66	23	32,732	
3307171	17	391473	4710302	175.53	Overburden	Domestic	FRESH	19.51	2.13			
3307179	17	400713	4705302	180.41	Bedrock			19.81				
3307180	17	400713	4705222	180.31	Bedrock	Livestock	FRESH	20.12	3.66	45	65,464	
3307209	17	399013	4709522	177.68	Bedrock			15.85				
3307210	17	399153	4709382	177.70	Bedrock			13.41				
3307211	17	399093	4709402	177.67	Bedrock			13.41				
3307213	17	394653	4713322	179.29	Bedrock	Livestock	Not stated	27.43				

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3307214	17	394613	4713402	179.49	Bedrock	Livestock	FRESH	26.82				
3307226	17	390073	4711122	176.60	Bedrock	Domestic	FRESH	21.03	4.88	23	32,732	
3307229	17	393293	4706502	178.03	Bedrock			20.73				
3307230	17	393313	4706502	178.09	Bedrock	Not Used		15.85				
3307231	17	393213	4706522	177.86	Bedrock	Not Used		16.76				
3307232	17	393313	4706442	177.46	Bedrock	Not Used		14.94				
3307233	17	393313	4706462	177.89	Bedrock	Not Used		16.46				
3307239	17	392073	4700862	177.31	Bedrock	Domestic	FRESH	17.68	2.74	32	45,825	
3307259	17	394613	4713322	179.34	Overburden	Domestic	FRESH	8.53	2.13			
3307305	17	395173	4711822	177.68	Bedrock	Domestic	FRESH	17.68	0.61	14	19,639	
3307351	17	388812.9	4705122	178.16	Bedrock	Livestock	FRESH	21.34	3.05	23	32,732	
3307353	17	395353	4714622	180.12	Overburden	Livestock	FRESH	19.51	4.88	45	65,464	
3307380	17	391153	4711802	176.35	Bedrock	Domestic	FRESH	21.95	4.88	23	32,732	
3307425	17	397213	4713622	179.92	Bedrock			21.95				
3307426	17	397093	4714022	181.46	Bedrock			17.68				
3307461	17	397353	4713722	181.02	Bedrock		Not stated	14.63				
3307462	17	397213	4713602	179.86	Bedrock			19.81				
3307463	17	397093	4713982	181.13	Bedrock			22.86				
3307472	17	399933	4709522	178.08	Bedrock	Domestic	FRESH	15.24	3.35	18	26,185	
3307473	17	399933	4709542	178.11	Bedrock		FRESH	15.85	3.35	9	13,093	
3307495	17	391133	4711842	176.43	Bedrock			21.95				
3307496	17	391173	4711882	176.47	Bedrock	Domestic	FRESH	21.34	4.88	23	32,732	
3307524	17	399233	4704222	181.37	Bedrock	Domestic	FRESH	19.51	2.44	45	65,464	
3307532	17	395313	4704362	180.51	Bedrock	Commercial	FRESH	18.59	2.13	18	26,185	
3307533	17	395273	4704342	180.56	Bedrock	Commercial	FRESH	18.29	2.13	18	26,185	
3307534	17	392153	4709042	175.75	Bedrock	Domestic	FRESH	18.90	2.44	32	45,825	
3307535	17	391653	4705142	178.36	Bedrock	Domestic	FRESH	18.59	6.10	14	19,639	
3307593	17	394133	4699982	178.01	Bedrock			21.95				
3307610	17	398773	4703642	180.37	Overburden	Domestic	FRESH	4.57	0.91	18	26,185	
3307611	17	393513	4703022	180.17	Overburden	Domestic	FRESH	19.51	4.27	23	32,732	
3307633	17	399913	4703722	181.30	Bedrock	Domestic	FRESH	20.12	3.35	68	98,196	
3307634	17	400793	4703722	181.63	Bedrock		FRESH	23.77	3.35	23	32,732	O&M Building Location B
3307636	17	400713	4703722	180.69	Bedrock			19.81				O&M Building Location B
3307637	17	400793	4703662	180.79	Bedrock			19.81				O&M Building Location B
3307638	17	400813	4703622	180.40	Bedrock			24.69				O&M Building Location B
3307639	17	401433.1	4702022	181.46	Bedrock			24.38				
3307640	17	401233.1	4702042	181.79	Bedrock	Domestic	FRESH	21.64	4.57	23	32,732	
3307676	17	399013	4699142	180.32	Bedrock			23.47				
3307677	17	398993	4699142	180.25	Overburden	Commercial	FRESH	22.56	8.23	5	6,546	
3307713	17	391773	4704982	178.79	Overburden	Domestic	FRESH	18.90	6.10	27	39,278	
3307721	17	401713.1	4700522	180.13	Bedrock	Livestock	FRESH	23.47	3.66	9	13,093	
3307731	17	393953	4712522	178.59	Bedrock			19.81				
3307733	17	393913	4712522	178.75	Bedrock			19.81				
3307734	17	393953	4712522	178.59	Bedrock		FRESH	18.29	4.88	14	19,639	
3307735	17	393953	4712502	178.46	Bedrock		FRESH	18.29	4.88	18	26,185	
3307736	17	393973	4712522	178.48	Bedrock		FRESH	17.98	4.88	18	26,185	
3307737	17	393993	4712442	177.57	Bedrock	Domestic	FRESH	18.29	4.88	23	32,732	
3307741	17	393913	4712522	178.75	Bedrock			18.90				
3307746	17	395013	4703482	180.04	Bedrock	Domestic	FRESH	21.95	3.66	45	65,464	
3307789	17	396533	4697182	179.46	Bedrock	Domestic	GAS	26.82	4.57	23	32,732	
3307807	17	395063	4698722	179.08	Overburden	Domestic	FRESH	19.81	3.66	27	39,278	
3307831	17	398832	4708458	178.12	Bedrock			22.25				
3307832	17	396957	4706810	176.30	Overburden		Not stated	15.85				
3307868	17	391733	4704952	178.85	Bedrock	Domestic	SULPHUR	18.59	4.88	27	39,278	
3307904	17	398755	4702746	181.83	Bedrock	Not Used	FRESH	20.12	6.10	5	6,546	
3308015	17	392343	4711102	176.42	Bedrock	Not Used	FRESH	24.38	5.79			
3308016	17	392373	4711152	176.47	Overburden	Not Used	SALTY	30.48				
3308017	17	392333	4711172	176.47	Overburden	Not Used	SALTY	29.26				
3308018	17	392353	4711072	176.40	Overburden	Not Used		21.34				
3308061	17	394713	4703902	180.98	Bedrock			19.81				
3308062	17	394713	4703902	180.98	Bedrock			19.81				
3308063	17	394753	4703862	181.03	Overburden	Domestic	FRESH	8.23	1.22			
3308136	17	401023.1	4701932	182.20	Bedrock	Domestic	GAS	23.16	3.96	14	19,639	
3308137	17	401738.1	4700812	180.05	Bedrock	Domestic	FRESH	21.64	2.44	9	13,093	
3308186	17	393463	4700202	178.59	Bedrock	Domestic		22.25				
3308187	17	393433	4700242	177.78	Bedrock	Domestic		21.34				
3308189	17	393328	4700222	177.68	Bedrock	Domestic		24.38				
3308205	17	393463	4700222	177.99	Overburden	Domestic	FRESH	7.92	3.05			
3308272	17	391984	4710914	176.08	Bedrock	Not Used	FRESH	29.87				
3308277	17	389562.9	4707362	176.35	Bedrock	Domestic	FRESH	20.12	3.35	9	13,093	
3308315	17	402293.1	4704252	180.09	Bedrock	Domestic	FRESH	20.42	4.57	14	19,639	
3308379	17	391487	4704876	178.88	Bedrock	Domestic	GAS	18.90	4.88	45	65,464	
3308380	17	391522	4704915	178.80	Bedrock	Domestic	GAS	18.59	4.57	45	65,464	
3308387	17	400908	4705515	180.42	Bedrock	Domestic	FRESH	19.20	3.96	18	26,185	
3308389	17	396482	4697310	177.92	Bedrock	Domestic	FRESH	24.69	4.27	14	19,639	
3308397	17	399459	4710298	178.42	Bedrock	Domestic	FRESH	13.72	3.66	14	19,639	
3308404	17	391571	4704923	178.87	Bedrock	Domestic	FRESH	18.59	4.88			

Table 1

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3308405	17	391573	4704807	179.09	Bedrock	Domestic	GAS	18.90	4.88	45	65,464	
3308423	17	392446	4711140	176.49	Overburden	Domestic	FRESH	18.59	3.66	205	294,587	
3308432	17	396717	4698183	180.12	Bedrock	Domestic	GAS	23.16	3.66	23	32,732	
3308447	17	394762	4703896	181.11	Bedrock	Domestic	GAS	20.73	4.27	5	6,546	
3308468	17	393455	4706671	177.38	Bedrock		FRESH	15.85	2.13			
3308469	17	393461	4706664	177.43	Bedrock	Not Used		21.95				
3308473	17	398397	4699864	178.66	Bedrock	Domestic	FRESH	22.25	3.66	27	39,278	
3308504	17	393870	4698790	179.61	Overburden	Domestic	FRESH	10.67	1.52			
3308516	17	393748	4710832	176.16	Bedrock	Domestic	FRESH	17.98	2.44			
3308577	17	402575.1	4700949	180.89	Bedrock	Industrial	FRESH	27.43	4.88	5	6,546	
3308578	17	402673.1	4700941	180.57	Bedrock	Industrial	FRESH	19.20	2.74	14	19,639	
3308579	17	402673.1	4700941	180.57	Bedrock	Industrial	FRESH	19.20	2.74	45	65,464	
3308648	17	393387	4703018	179.95	Bedrock	Domestic		18.90				
3308649	17	393393	4703033	179.92	Bedrock	Domestic	SULPHUR	17.37	4.57	18	26,185	
3308672	17	398943	4699200	180.05	Bedrock	Domestic	FRESH	29.26		45	65,464	
3308674	17	398950	4699202	180.09	Bedrock	Domestic	FRESH	22.25	8.53	5	6,546	
3308708	17	391264	4704689	179.12	Bedrock	Domestic	FRESH	18.90	4.88	36	52,371	
3308763	17	400224	4705162	180.23	Bedrock	Domestic	FRESH	20.73	4.27	14	19,639	
3308778	17	397256	4708063	176.81	Bedrock	Domestic	FRESH	15.24	2.13	27	39,278	
3308896	17	399165	4699384	181.06	Bedrock	Domestic	FRESH	21.64	6.40	14	19,639	
3308897	17	401727.1	4702604	182.25	Bedrock	Domestic	FRESH	21.03	3.05	27	39,278	
3308899	17	390721.5	4702357	177.73	Bedrock	Domestic		21.34				
3308900	17	390721.5	4702357	177.73	Bedrock	Domestic		21.34				
3308902	17	390721.5	4702357	177.73	Bedrock	Domestic	FRESH	18.29	2.44	9	13,093	
3308966	17	396957	4712397	179.02	Bedrock	Not Used		23.77				
3308967	17	396957	4712397	179.02	Bedrock	Not Used		18.29				
3308968	17	396957	4712397	179.02	Bedrock	Not Used		21.95				
3308969	17	396957	4712397	179.02	Bedrock	Not Used		19.81				
3308970	17	396957	4712397	179.02	Bedrock	Not Used		22.86				
3308971	17	396957	4712397	179.02	Bedrock	Not Used		18.90				
3308997	17	396845.5	4701077	179.52	Overburden	Domestic	FRESH	15.24	1.83			
3309012	17	396469	4710122	176.58	Overburden	Domestic		14.33				
3309026	17	396510	4708296	175.93	Overburden	Domestic	FRESH	16.76	9.14	23	32,732	
3309028	17	395340.9	4711860	177.82	Bedrock	Domestic	FRESH	20.73	4.88	9	13,093	
3309029	17	395367.9	4711911	177.63	Bedrock			21.34				
3309064	17	394075	4706160	177.37	Overburden	Domestic	FRESH	10.67	1.52			
3309084	17	394075	4706160	177.37	Bedrock	Domestic		18.29				
3309101	17	390279.5	4703794	178.58	Bedrock	Domestic	FRESH	20.42	4.27	68	98,196	
3309121	17	394749	4705879	177.42	Overburden	Domestic	FRESH	15.24	2.44	68	98,196	
3309201	17	394534	4704696	179.32	Bedrock	Domestic	FRESH	17.37	3.05	23	32,732	
3309202	17	400617	4702524	180.08	Bedrock	Domestic	FRESH	21.64	3.35	9	13,093	
3309223	17	392676	4710536	176.24	Overburden	Domestic	FRESH	20.73		5	6,546	
3309272	17	396000	4705985	177.55	Bedrock	Domestic	FRESH	21.03	3.05	9	13,093	
3309273	17	394550	4708431	175.97		Not Used		15.85				
3309274	17	394550	4708431	175.97	Bedrock	Domestic	FRESH	15.24	3.66	9	13,093	
3309276	17	400657	4704410	181.01	Bedrock	Livestock	GAS	18.90	3.05	273	392,782	O&M Building Location B
3309299	17	392656	4706771	178.09	Bedrock	Domestic	FRESH	17.68	3.66	23	32,732	
3309313	17	397906	4713232	180.95	Bedrock	Not Used		37.19				
3309319	17	403451.1	4703150	183.23	Bedrock	Domestic	FRESH	34.75	4.27	5	6,546	
3309321	17	398778	4704629	179.95	Bedrock	Domestic	FRESH	19.81	3.05	55	78,556	
3309362	17	391733	4709710	175.84	Overburden	Domestic	FRESH	13.72	2.13			
3309390	17	394091	4709901	176.35								
3309445	17	398281	4702333	179.78	Overburden	Domestic	FRESH	6.10	4.57			
3309448	17	396944.5	4710539	177.08								
3309562	17	398706.5	4698966	180.37								
3309563	17	398706.5	4698966	180.37								
3309572	17	402497.6	4702308	181.57	Bedrock	Domestic	FRESH	21.34	3.35	23	32,732	
3309605	17	395998.5	4705981	177.56								
3309606	17	395998.5	4705981	177.56	Bedrock	Livestock	FRESH	24.69	3.66	91	130,927	
3309616	17	397842.5	4705685	178.50	Domestic	Not stated		3.05		14	19,639	O&M Building Location A
3309632	17	397604	4706501	177.42	Overburden	Domestic	FRESH	15.54		5	6,546	
3309633	17	396304	4710781	177.70	Bedrock	Domestic	FRESH	14.63	3.96	18	26,185	
3309634	17	396188	4710869	177.73								
3309635	17	397608	4706508	177.40								
3309638	17	395813	4697558	179.91	Bedrock	Domestic		27.43				
3309639	17	396618	4696922	178.23	Bedrock	Domestic		29.87				
3309640	17	396600	4696893	177.87	Bedrock	Domestic	FRESH	25.30	6.71	14	19,639	
3309671	17	395255	4698853	179.82	Bedrock	Domestic	FRESH	21.03	3.35	55	78,556	
3309758	17	398843.9	4712201	179.16								
3309777	17	398899	4705591	178.28	Bedrock	Irrigation	FRESH	15.85		45	65,464	
3309782	17	393862.9	4704974	179.39		Domestic						
3309810	17	393896.9	4705183	178.78		Not Used						
3309840	17	399640	4702638	181.40								
3309848	17	392339	4711665	176.99								
3309858	17	391246	4710524	175.48								
3309859	17	393909	4708768	176.08								
3309860	17	391424	4705486	178.55								

Table 1

Summary of MOECC Water Well Record Information



Well ID	UTM Zone	Easting (NAD83)	Northing (NAD83)	Elevation (mASL)	Well Type	Primary Water Use	Water Kind	Well Depth (m)	Static Level	Pumping Rate (lpm)	Pumping Rate (L/day)	Comments
3309861	17	391130	4705584	178.58								
3309884	17	398304	4704206	181.12	Bedrock	Domestic	FRESH	21.34	3.66	18	26,185	
3309885	17	399256	4705042	180.04	Overburden	Not Used	FRESH	17.37	3.05	36	52,371	
3309887	17	399163	4699380	181.05		Commerical						
3309920	17	402465.1	4700422	181.46	Bedrock	Domestic	FRESH	32.00	2.44	14	19,639	
3309923	17	395020.9	4708862	176.12	Bedrock	Domestic	FRESH	15.85	3.05	45	65,464	
3309928	17	398239	4700431	181.02		Municipal	FRESH					
3309929	17	398239	4700431	181.02		Not Used	FRESH					
3309930	17	398239	4700431	181.02		Domestic	FRESH		4.27			
3309931	17	398239	4700431	181.02		Domestic	FRESH		2.74			
3309933	17	394532	4704693	179.32		Not Used						
3309979	17	394072.9	4706157	177.37		Not Used						
3309982	17	399225	4703156	182.13		Not Used						
3310120	17	397884	4710339	177.69								
3310121	17	393609	4702696	180.06	Bedrock	Domestic	FRESH	17.68	4.62	45	65,464	
3310178	17	397621	4712127	180.01	Bedrock	Not Used	FRESH	20.73		2	3,273	
3310204	17	398659	4701549	180.46	Bedrock	Domestic	FRESH	22.86	3.35	8	11,520	
3310251	17	395264	4713783	179.89								
3310259	17	395524	4698905	179.81	Overburden	Domestic	FRESH	21.48	3.04	45	65,376	
3310321	17	398494	4707312	179.79	Bedrock	Domestic	FRESH	16.80	5.10	6	8,208	
3310350	17	398247	4707099	179.88		Domestic						
7041263	17	396268	4710409	177.39	Overburden	Not Used		3.40				
7041344	17	397796	4713119	180.91	Overburden	Not Used		7.30				
7041345	17	397480	4713121	180.20	Overburden	Not Used		7.30				
7042831	17	398946	4698954	180.24	Overburden		FRESH	7.60				
7051657	17	394881	4709728	176.71		Domestic	GAS	15.24	2.13	45	65,464	
7051658	17	394881	4709728	176.71								
7053080	17	395209	4698441	178.96								
7102061	17	398982	4698972	180.27		Monitoring	FRESH	2.40				
7105314	17	402719	4701828	180.23		Domestic	FRESH	23.77	4.82	23	32,732	
7111629	17	397177	4706972	176.87								
7111630	17	397172	4706971	176.84					1.83			
7113690	17	399121	4699035	180.68		Not Used						
7113691	17	400939	4705490	180.36								
7116119	17	398972	4699193	180.19		Test Hole		4.50				
7119001	17	396593	4696869	177.76								
7119003	17	393946	4699967	178.09		Domestic		22.86	3.05			
7119006	17	400878	4705471	180.35			Untested		3.96			
7120921	17	390841	4709740	176.29								
7124690	17	402235	4704252	180.35								
7129479	17	398993	4699207	180.30		Monitoring		3.66				
7131955	17	390504	4711419	175.50		Not Used		30.48				
7131958	17	390501	4711415	175.48		Domestic	GAS	20.42	4.57	14	19,639	
7137280	17	400725	4701770	181.73								
7137281	17	400728	4701790	181.76								
7139497	17	402496	4701271	180.07		Test Hole	FRESH	3.00				
7139802	17	402664	4703487	180.65		Test Hole	FRESH	4.60				
7144778	17	398956	4699181	180.12		Monitoring						
7158526	17	398443	4708910			Domestic	GAS	14.63	2.13	9	13,093	
7158527	17	398656	4709120			Not Used		14.02				
7158528	17	398565	4709000			Not Used		14.33				
7158529	17	398526	4709072			Not Used		20.42				
7158530	17	398478	4709085			Not Used		14.63				
7160290	17	394183	4700024			Not Used	FRESH					
7163633	17	395733	4708628			Domestic	FRESH	16.46	2.74	45	65,464	
7163645	17	395733	4708628			Other	FRESH		2.74			
7163653	17	391466	4702945									
7172138	17	392047	4700733			Domestic	Untested	18.29	2.95	27	39,278	
7172139	17	392049	4700724									
7177280	17	400588	4708683									
7180172	17	402196	4704256									
7185511	17	390400	4705754									
7186693	17	397073	4706034			Domestic	FRESH	16.76	1.86	5	6,546	
7186694	17	397087	4706051						1.83			
7198559	17	399586	4707012									