ORE
Oakridge Environmental Limited
Environmental and Hydrogeological Services

October 11, 2024

Van Ziffle Architects
33 Alberta Ave,
Toronto, Ontario
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Attention: Eric Van Ziffle, Principal Architect

Re: Stage 1 Update, Hydrogeological Study for Residential Development
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County
ORE File No. 24-3484

1.0 Introduction

Oakridge Environmental Ltd. (ORE) is pleased to provide this Stage 1 update letter outlining the work completed to date and our findings, for the above referenced property as per our proposal of September 6, 2024. Included are a summary of the data collected as part of the Stage 1 assessment, a preliminary nitrate impact assessment and our recommendations for the completion of the remaining Stages of the hydrogeological study.

As water and sanitary sewer services are not available at or near the site, it is necessary that the proposed development utilize groundwater for potable water supply and private sewage systems for wastewater treatment/disposal. Stage 1 of our assessment has evaluated the shallow soil and groundwater conditions on the site to determine the site's capability to treat the effluent that will be produced by the proposed sewage systems. Stage 1 has also included a review of groundwater supply conditions in the area, based on examination of recorded local wells. Although Stage 1 has been limited to only the tasks outlined in our proposal, for those tasks, we have endeavoured to follow the general requirements of guidelines provided by the province as outlined in the Ministry of the Environment, conservation and Parks (MECP) Procedures D-5-4 and D-5-5. Subsequent stages of the study will need to include the remaining requirements of the guidelines in order to have a complete study. As such, some parts of this letter are expected to be incorporated into a final report once the remaining stages have been completed.

2.0 Scope of Work

The following tasks were completed as part of Stage 1 of the Hydrogeological Study.

2.1 We have compiled and reviewed background data including available technical reports, MECP well records, published geological mapping, water resources reports, water quality data and any other relevant background information.

We have reviewed the Municipality of Trent Hills and Northumberland County typical requirements for the completion of a hydrogeological study to support plan of subdivision developments. Consultation with the Municipality may be required depending on the scope of any subsequent Stage of the hydrogeological study.

2.2 A geo-referenced site plan will be prepared for plotting of data collected in the field.

2.3 An initial site inspection was completed by ORE staff.

Manual (hand) auger probes were advanced about the site to examine the shallow soil conditions, on a preliminary basis. The probes were limited to a depth penetration of 1 m (or less), as allowed by the prevailing soil conditions. No excavation equipment was mobilized to the site for test pitting or borehole drilling, to limit costs.

The soil types encountered were logged in the field and any evidence of saturated conditions (i.e., that would represent a shallow water table) were recorded. No soil samples were subjected to laboratory or classification analyses (e.g., for grain size distribution tests, etc.) as part of Stage 1, to limit costs.

Site location data were obtained by differential GPS. The preliminary soils data were utilized to assess the general conditions. (Note: more detailed soil investigations may be required as part of subsequent stages of the study, depending on which servicing model is chosen.)

2.4 A detailed assessment of the site geology has been conducted from published mapping and the results of the preliminary on-site investigations.

2.5 A review of local MECP well records has been completed, including examination of local aquifer distribution and potential yield. From these data, a preliminary assessment of the potential for servicing the development by private wells and/or by a communal well system has been completed. (Note: This assessment would need to be updated with the

results of any future well construction and testing conducted during the remaining stages of the study.)

2.6 A preliminary nitrate impact assessment has been completed, utilizing the available data. The purpose of the assessment is to determine the viability of utilizing conventional septic systems to service the development, based on the property's area and soil conditions, as per Procedure D-5-4. Alternative approaches have also been considered.

Recommendations have been provided with regard to approach viability.

2.7 This preliminary (Stage 1) hydrogeological study letter-report has been prepared, outlining the work completed and our findings. The report is intended for internal Project Team use only and must not be submitted to any agency.

A more detailed (final) hydrogeological study report will need to be prepared at the completion of any subsequent stages. That report will be provided in format for submission to, and review by, the various agencies.

3.0 Development Concept

Although only conceptual at this time, it is understood that the intent is to develop seven (7) lots for residential use, with an 8th lot being developed for a community-type use (i.e., Amenity Building). Each of the seven residential lots will contain three (3) residential units, for a total of twenty one (21) residences. The eight lots appear to be part of an older Registrar's Plan or similar, although the Planning status of those lots is not clear and would need to be verified.

It is also understood that the development will be communally owned by the residents, which suggests that the development will need to proceed as a type of vacant land condominium corporation, rather than as a conventional subdivision. Each of the lots has an area of approximately 0.81 m (2 acres), for a total property size of approximately 6.48 ha (16 acres). In the site's rural (un-serviced) setting, the proposed development density is considered ambitious.

4.0 Physical Setting

4.1 Site Location and Access

The subject site is located approximately 1.5 km east of the community of Trent River, near

the northern boundary of the former Seymore Township now part of the Municipality of Trent Hills, roughly 5 km southeast of Havelock, Ontario (Figure 1). The subject site can be accessed from Highway 7 at Havelock by following County Road 30 southward to Browns Line Road, then eastward on Church Street to Trent River Road, which leads to Timberland Drive. The subject site is at the intersection, to the southwest.

The subject site has been previously cleared and consists mostly of an open (green) field habitat. The site consists of a dug out area that appears to have been constructed for the purpose of forming a foundation for a structure. The area has since naturalized as a shallow pond. Available imagery suggests the site formerly contained a racing oval, presumably representing a practice track for horses. Several residential properties abut the subject site along Trent River Road and appear to be privately serviced with individual wells and sewage systems.

4.2 Topography and Drainage

As illustrated by Figure 2, the subject site is relatively flat, with a total topographic relief of about 7 m. The site slopes gently from northeast to southwest, ultimately toward the Trent River which occurs at a distance of roughly 500 m. While there are no channelized watercourses or wetlands mapped on the site, the local area contains numerous pockets of unevaluated wetland. Along the Trent River, the wetlands are considered to be Provincially Significant, part of the Nappan Island Complex.

As illustrated by the mapping, some local streams exhibit linear sections, typical of farm drainage works, suggesting that drainage can be problematic in the area. The presence of the drainage works, wetlands and low relief suggest that the water table is likely shallow in the site area.

4.3 Geology

Published geological mapping (Figure 3) indicates that the site is situated in an area of extensive glaciolacustrine deposits. These are typically layered sequences of coarse to fine sand, with occasional gravel and/or silt/clay seams. The glaciolacustrine deposits represent the remnants of a period of ancient (post-glacial) inundation and are generally expected to be comparatively permeable.

Immediately east of the site (and possibly within the site's southeastern corner), the mapping indicates the presence of stony, carbonate-rich silt and sand till. This till is part of the Dummer Complex. Dummer Complex sediments have a sandy matrix supporting a coarse stony component. The coarse component is typically composed of large and angular (broken) blocks of Paleozoic bedrock limestone. The stone composition primarily reflects the underlying bedrock lithology, although can contain some granitic materials. The Dummer

Complex exhibits scattered, pitted hummocks of blocky, angular debris extending as a broad belt from Lake Simcoe to northeast of Kingston. In some locations, drumlin-like ridges occur within the till. The till may occur below the glaciolacustrine deposits, although this would need to be confirmed by in-situ testing.

As illustrated by Figure 3, scattered deposits of organic soil also occur, corresponding to the local wetlands.

Immediately south of the Trent River, the mapping indicates that Paleozoic limestone outcrop occurs at the surface. As illustrated by Figure 4, the bedrock consists of limestone and minor shale of the Bobcaygeon Formation. Deeper aquifers within the limestone formations will often contain elevated concentrations of hydrogen sulphide gas and salt, which renders the groundwater difficult (if not impossible) to treat.

The location of the site being close to the area of limestone outcropping suggests that the overburden in the site area may be fairly thin. As the overburden thickness is an important consideration with respect to future effluent transport and potential supply aquifer occurrence, this is further examined in a following section.

5.0 MECP Well Record Data

We have compiled and reviewed MECP well record data for recorded wells surrounding the subject site (within approximately 1 km). In total, 138 local well records have been incorporated into our Groundwater Information System (GWIS), representing conditions in the site area. The locations of these wells surrounding the site are illustrated by Figure 5 and a summary of the well record data is provided in Appendix A.

Of the 138 local wells, only 4 well records appear to represent large diameter bored or dug wells. The overwhelming majority are drilled wells. As dug wells are often under-reported, it is conceivable that more dug wells are actually present in the area. The dataset also suggests that only one drilled well was originally constructed as a dug well. The paucity of recorded dug wells suggests that any aquifers in the shallow overburden are of limited use. Dug wells are typically not viewed favourably for new developments, given their susceptibility to surficial contaminants and limit recharge area, which makes them susceptible to seasonal changes (i.e., prolonged periods of drought).

The majority of the recorded wells are described as being drilled for domestic use, with a few supplying agricultural uses (primarily livestock watering). Only two (2) of the recorded wells are described as being “not used”, one possibly due to insufficient yield and the other due to water quality issues (i.e., salt). Two (2) other recorded wells were abandoned, with one (1) abandoned due to insufficient yield and one (1) abandoned for unspecified reasons. No commercial or institutional uses are indicated by the well records.

As illustrated by the histogram of Figure 6, the average (mean) reported test rate of the entire data set is approximately 10.21 gallons per minute (gpm). However, that average has been somewhat skewed by a few anomalously high values (i.e., 25 gpm). The majority of the recorded wells had a driller's test rate of between 2.5 gpm and 5 gpm, which is generally sufficient for a single residential use. Since there are a few higher-yield wells present in the area, it is conceivable that a communal well system could be feasible, although considerable testing would be required to make that determination.

Figure 5 graphically illustrates local well yields by the symbol size. While most wells fall into the lower yield category, the plot indicates that a handful of wells surrounding the site exhibit higher than typical yields. For example, well #4508780 (situated northwest of the site) was reportedly tested at a rate of 50 gpm over a 1 hour duration. The driller's log for that well indicates that the aquifer was encountered at two depths within "granite" bedrock. As there is no granite mapped within the site area, it is not clear whether the driller's observations are accurate.

Other higher-yield wells occur within the 1 km search radius of the well records. However, as illustrated by Figure 5, there is no clear pattern to their distribution. In other words, the occurrence of higher-yield wells appears to be rather randomly distributed in the area, as opposed to be clustered in one area or along a particular trend. As such, there is no obvious target area to explore for a higher-yield aquifer on the site.

The other histogram of Figure 6 illustrates the elevations of aquifers (i.e., "drillers found elevation") as reported by the drillers. There is a fairly tight range of aquifer elevations, occurring from approximately 174 masl to 187 masl, with the mean value being 177.9 masl. Based on the subject site's surface elevation of about 201 masl an aquifer should be expected at a depth of approximately 23 m (range 14 m to 27 m). This statistic may be useful for future test well construction planning.

From perusal of the well record data (Appendix A), we note that the majority of drilled wells encounter groundwater within the limestone. These are typically water-bearing fracture systems. However, there are a few instances of wells being drilled sufficiently deep to penetrate through the limestone and into the underlying granite. Well #4508780 is one of several examples in the dataset, which also includes likely penetration of the Shadow Lake Formation, which occurs at the bottom of the Paleozoic sequence, just above the Precambrian granite. As such, while the majority of wells tap into comparatively shallow groundwater sources in the limestone, there is a potential for aquifers to occur in the deep granite, including at least one well with an apparent higher-yield than the average.

Based on the above, future groundwater exploration should not be limited to only the limestone.

6.0 Site Data

6.1 Shallow Soil Exploration

A total of ten (10) manual auger boreholes were advanced about the subject site to explore the shallow soil and shallow groundwater conditions (Figure 7). All of the boreholes encountered a similar soil sequence, consistent with the presence of glaciolacustrine deposits, as suggested by the published geological mapping of Figure 3. The field borehole logs are presented in Appendix B. The shallow soil stratigraphy is briefly described below:

Topsoil

All of the manual boreholes encountered a sandy to silty organic topsoil, with rare gravel (or concrete fragments) and an abundance of rootlets.

Silty Sand (SM type)

Eight of the ten boreholes encountered a well sorted to poorly sorted silty sand with occasional gravel directly below the topsoil. In some instances, the sand was mixed slightly with the topsoil, likely a result of past agricultural activities. In some instances, the upper portion of the silty sand exhibited evidence of oxidation (i.e., red-brown colour). These soils have been field-classified as an SM type soil in accordance with the Unified Soil Classification System (USCS). According to the *Code and Guide for Sewage Systems* (2005), the percolation rate of the soil would be between 8 min/cm and 20 min/cm. In accordance with Appendix C of the *Low Impact and Development Stormwater Management Planning and Design Guide* (2010) suggests the corresponding range of infiltration rates would be between 30 mm/hr and 75 mm/hr.

Samples were not submitted for grain size distribution analysis to aid in narrowing down the ranges stated above. This may be needed for a future Stage of the study.

Sand (SP type)

Six of the ten boreholes encountered a well sorted medium to coarse sand with occasional gravel, usually directly below the topsoil or below the overlying silty sand layer. In some instances, the sand was mixed slightly with the topsoil, likely a result of past agricultural activities. In some instances, the sand exhibited evidence of oxidation (i.e., red-brown colour). These soils have been field-classified as an SP type soil in accordance with the Unified Soil Classification System (USCS). According to the *Code and Guide for Sewage Systems* (2005), the percolation rate of the soil would be between

8 min/cm and 20 min/cm. In accordance with Appendix C of the *Low Impact and Development Stormwater Management Planning and Design Guide* (2010) suggests the corresponding range of infiltration rates would be between 75 mm/hr and 300 mm/hr.

Samples were not submitted for grain size distribution analysis to aid in narrowing down the ranges stated above. This may be needed for a future Stage of the study.

Sand (SW type)

Two of the ten boreholes encountered a poorly sorted coarse sand with occasional gravel, occurring directly below the overlying silty sand layer. These soils have been field-classified as an SW type soil in accordance with the Unified Soil Classification System (USCS). According to the *Code and Guide for Sewage Systems* (2005), the percolation rate of the soil would be between 2 min/cm and 12 min/cm. In accordance with Appendix C of the *Low Impact and Development Stormwater Management Planning and Design Guide* (2010) suggests the corresponding range of infiltration rates would be between 50 mm/hr and 300 mm/hr.

Samples were not submitted for grain size distribution analysis to aid in narrowing down the ranges stated above. This may be needed for a future Stage of the study.

Fill and Cultural Materials

As illustrated by Figure 7, piles of fill, concrete fragments, rock and wood debris were identified in the northeastern part of the site, close to the intersection of Trent River Road and Timberland Drive. In addition, the remnants of a abandoned concrete foundation (water-filled) are also present in the same area, suggesting some relationship between the fill materials and the former use. It is not known whether the water observed in the foundation is groundwater or merely collected runoff.

The manual auger boreholes also encountered some concrete fragments within the topsoil at HA-3, situated about 80 m to the south of the above mentioned piles. As such, it appears possible that some of the fill has been incorporated into the topsoil, perhaps by tilling of the field.

Shallow Groundwater

The manual boreholes did not encounter any groundwater. This is likely due to their shallow depths of penetration (i.e., limited to about 1 m). As such, the groundwater flow direction cannot be determined from the available data. However, for purposes of our Stage 1 (preliminary) assessment, we would expect the flow path to be a subdued

reflection of the local surface topography. Of note during the site work was the absence of water in the roadside ditch along Timberland Drive, suggesting the water table is below that elevation.

Discussion of Soils and Shallow Groundwater

From the preliminary borehole data, we can confirm that the site appears to be underlain by comparatively permeable and layered glaciolacustrine sands, silty sand and gravelly sand, consistent with the geological mapping. In general, the sand content of the soils increases from north to south.

No evidence of the Dummer Complex till was identified directly by the boreholes. However, as illustrated by Figure 7 (and the site photos in Appendix C), areas of large limestone boulders occur on the site. While the origin of the boulders is not known, it is possible that these are "float" from an underlying layer of Dummer Complex till. This is also suggested by the occurrence of cobbles that prevented the auger from probing to its maximum extent. However, deeper investigations would be needed to fully assess this, as part of a future Stage of the study. If present, the till could represent a possible "limiting layer" with respect to the vertical movement of groundwater, potentially affecting recharge rates and/or being a concern with respect to a perched water table.

The extent or quality of the fill materials observed on the subject site have not been investigated or tested with regard to compliance with O. Reg. 153/04. This should be examined further as part of a future Stage of the study.

Deeper soils and groundwater investigations will be needed as part of a future Stage of the study. We expect that backhoe test pitting will be needed. At that time, soil samples will need to be tested for grain size distribution, for classification purposes. Soil/fill quality testing may also be needed.

Any requirements from the Municipality for karst hazard analysis (if needed) can also be incorporated into a future Stage of the study.

6.2 Infiltration Testing

In the absence of grain size distribution analysis, infiltration rate testing utilizing a Pask Permeameter was completed within select hand auger boreholes on the site. The results of the permeameter testing are presented with the borehole logs in Appendix B. As provided, three (3) permeameter tests were completed, yielding an average infiltration rate of approximately 65 mm/hr, which is equivalent to a field saturated hydraulic conductivity (K_{fs}) of approximately 6.5 x 10^{-4} cm/s. These values are consistent with a silty sand (SW to SM type), corresponding to an approximate percolation rate of about 10 min/cm. Due to the

limited testing on the site, these value should be considered preliminary but may help inform an additional Stage of the hydrogeological investigations.

6.3 Well Survey

A door-to-door well survey was not completed as part of the Stage 1 (preliminary) investigation. As this is a requirement of Procedure D-5-4, a door-to-door well survey will need to be completed as part of a future Stage of the study.

6.4 Background Nitrate Analysis

No shallow groundwater samples were to be collected as part of the Stage 1 scope, as a cost-saving measure. Regardless, the preliminary manual auger boreholes could not penetrate deep enough to intersect the water table, therefore, sampling was not possible.

As determination of the prevailing background nitrate concentration in the shallow groundwater system is needed to complete the nitrate impact assessment and is a requirement of Procedure D-5-4, deeper explorations to reach the water table (with groundwater sampling) will need to be conducted as part of a future Stage of the study.

7.0 Groundwater Supply

7.1 Target Aquifer

As outlined above, the well statistics suggest that most drilled wells in the site area will be capable of supplying sufficient groundwater to support a single residence. There may also be an opportunity to construct a higher-yield well system that could operate as a communal water supply system.

From the geological setting, it is apparent that an overburden aquifer is not likely present in the immediate site area. While the overburden may be about 10 m thick (above the limestone), it is likely dominated by low-permeability till with a thin surficial zone of glaciolacustrine soils. As such, the principal aquifer(s) in the site area are water-bearing fractures in the limestone, and perhaps fractures in the deeply buried granite, below the limestone. This interpretation would need to be confirmed as part of a subsequent Stage of a hydrogeological evaluation.

7.2 Water Servicing Model

For a privately-serviced development (i.e., individual wells on each lot), Procedure D-5-5 requires construction of three (3) test wells, followed by testing (pumping and water quality analyses) to demonstrate that a sufficient quantity of acceptable quality water will be available to support the development. Assuming the test wells are successful, they can be utilized to supply some of the lots, once approved. Typically, a yield of at least 2,500 L/day is needed for a domestic supply. Compliance with Procedure D-5-5 requires test well yields of about 5,000 L/day, to demonstrate that the aquifer can meet the demand with a generous contingency.

For a communal water supply system, a test well and at least one observation well should be constructed, followed by long-term testing and water quality analyses. The test well would need to have sufficient yield to support the entire development. As the development concept includes 21 residential unit (plus an amenity building), the required yield could be on the order of 21 units x 4 persons/unit x 450 L/day = 37,800 L/day + 1,500 L/day for the amenity building + contingency ≈ 40,000 L/day.

Both approaches also require an assessment of interference, to ensure that the planned water takings do no impact existing neighbouring wells. For a communal water supply system with more than five (5) connections, a "municipal servicing responsibility agreement" may be required to ensure the water system functions in perpetuity without disruption. Similarly, a communal system with more than five (5) connections will be required to register as a "non-municipal year-round residential drinking water system" under Ontario Regulation 170/03.

7.3 Future Stage Testing

As the water servicing model has not been determined yet, the best approach for completing the future Stage water supply assessment is likely to proceed with test well construction, assuming the lots are to be privately-serviced. If the wells are found to exhibit yields that are sufficient only for private supply use, that will likely dictate the servicing model. However, if one of the test wells is found to have a higher-yield potential, the testing program could be modified to accommodate that model instead.

An updated proposal for the test well evaluations can be prepared, based on the above assumptions, incorporating Project Team input. To obtain the most representative data, the test wells should be distributed across the site.

8.0 Wastewater Servicing Models

8.1 Preliminary Nitrate Impact Analysis

8.1.2 General Considerations

It is assumed that the expected wastewater system(s) will need to release treated effluent into the subsurface, since there is no municipal collection system in the site area, nor is a surface water feature available that could accept the treated flows. As such, the future wastewater treatment system(s) will need to include either *individual* septic systems or a *communal* sewage works. In any case, the principal impact of the proposed development on groundwater resources will be related to the introduction of effluent into the shallow flow zone. To assess the potential impact on groundwater, a nitrate impact assessment must be completed. It is important to recognize that this assessment is usually the deciding factor that ultimately determines the development density.

Within the effluent, nitrate is considered the critical contaminant as elevated nitrate concentrations are linked to infant methaemoglobinaemia (nitrate poisoning). To protect groundwater resources, the Ministry of Environment's Procedure D-5-4 sets the maximum allowable nitrate concentration at the site boundary to be 10 mg/L (also the Ontario Drinking Water Standard) for private (individual) systems. The nitrate impact assessment is therefore conducted to verify that this limit is not exceeded. Similarly, there is a more strict limit of 2.5 mg/L for communal systems, under the Ministry's Reasonable Use Policy (also referred to as Policy B-7).

Naturally occurring bacteria and soil interaction mechanisms can, and usually do, result in nitrate being renovated. However, Procedure D-5-4 acknowledges ***dilution*** as the principal attenuation mechanism[1] to be used to predict future nitrate concentrations for developments that utilize individual septic systems. Although this is a very restrictive application of D-5-4, there have been some recent changes in how the Procedure is applied, wherein *tertiary treatment* systems have been recommended to reduce nitrate in the effluent, thereby achieving an increase in development density. However, those approaches are still considered experimental and need to be examined on a case-by-case basis. Ultimately, the Municipality will decide whether such an approach is approvable.

For communal systems (referred to as "sewage works"), Procedure D-5-4 does not apply. Instead, an engineered treatment system must be designed and approved by the MECP (and the Municipality), to achieve the more strict effluent criteria. Separate technical guidelines are applicable to such systems.

[1] Procedure D-5-4 also acknowledges monitoring-based assessments and other specialized assessment forms, primarily for use in areas where there is scientific precedent.

As the area has already been subjected to some previous development, it is also necessary to consider the cumulative impact of the proposed development and the existing neighbouring residences. As a result, nitrate sampling of the shallow groundwater system will need to be completed to establish the background value, which is factored into the assessment calculations. This is a requirement of Procedure D-5-4. In the absence of nitrate concentration data, a value of 0.1 mg/L has been assumed, for our preliminary assessment (see below).

The following subsections provide an overview of the parameters to be considered for the nitrate impact assessment

8.1.3 Development Area Available Natural Dilution

In order to estimate the availability of sustained dilution from direct recharge, the following calculation has been considered:

$$D_w = A \times W_s \times I_f$$

where,

D_w= Available dilution water — A = Net dilution area
W_s= Water surplus — I_f = Infiltration factor[2]

For this assessment, the average regional water surplus has been determined from the 1981 to 2010 climate normals at the nearest meteorological station in Trenton with available data. The average precipitation rate for Trenton is 911.4 mm/year. From the climate normal data, the Thornwaite adjusted potential evapotranspiration rate is 594 mm/yr, yielding a theoretical Water Surplus (W_s) of 317.4 mm/yr.

The proposed development area consists of approximately 6.48 ha, with relatively flat (albeit slightly sloping) terrain and limited tree cover. The soils are predominantly sandy materials, expected to have a relatively rapid percolation rate (to be confirmed). As a result, the preliminary infiltration factor for the site is expected to be as follows:

Soil factor	=	0.30 (fine sand)
Slope factor	=	0.25 (gently sloping terrain)
Cover factor	=	0.10 (mostly grass covering)
Total	=	0.65

[2] Infiltration factor calculation method: From MOEE Hydrogeological Technical Information Requirements for Land Development Applications, April 1995.

Substituting the various factors into the above expression and accounting for assumed future impermeable surfaces (i.e., 5% of lot area - to be confirmed) yields the following total dilution availabilities for the site area:

$$6.48 \text{ ha X } 317.4 \text{ mm/yr X } 0.65 = 13{,}369 \text{ m}^3\text{/yr } (36.6 \text{ m}^3\text{/day})$$

Therefore, the preliminary volume of available (natural) dilution for the subject site is 36.6 m^3/day.

8.1.4 Enhanced Dilution

It may be possible to enhance the natural dilution availability by implementing Low Impact Design (LID) facilities for stormwater management. LID facilities include soak-away pits, infiltration swales and similar features designed to increase infiltration, thereby reducing runoff. In some municipalities, implementing LID facilities is required for most developments.

For the subject site, the preliminary data suggests that the shallow soils could be amenable to implementing LID facilities. However, as the water table depth can be a limiting factor to the proper operation of LID facilities, we cannot assess their applicability at this time, due to the limitations of the preliminary Stage 1 soil testing. Nevertheless, we expect that future testing will demonstrate some opportunities to achieve increased dilution using this approach. Should that occur, the various wastewater servicing models would need to be updated, likely resulting in some density increases.

8.2 Wastewater Servicing Models

8.2.2 Simple Privately Serviced Approach

Despite the preceding, Procedure D-5-4 states the following:

> *"Developments consisting of lots which average 1 hectare (with no lot being smaller than 0.8 ha), may not require a detailed hydrogeological assessment..."*

The currently proposed development concept illustrates that the lots have an area of approximately 0.81 ha on a total site area of 6.48 ha (to be confirmed). While we understand that a much higher development density is being sought, there may be an opportunity to avoid the nitrate impact assessment, provided the development is limited to a single residence on each of six (6) lots, with a limited use for the amenity building (i.e., restricted to low sewage flow rate). The remaining lot could be dedicated for green space or some other, non-residential use.

This could potentially be the *path of least resistance* for the development application, for

consideration by the Project Team.

8.2.3 Conventional Private Septic Systems, 21 Residential Units + Amenity Building

Lot density is determined through a simple mass-balance calculation which considers the following factors:

- available dilution (total 36.6 m^3/day, see above)
- total volume of septic effluent (1,000 L/day)
- baseline nitrate levels in the supply aquifer (assumed to be 0.0 g/day)
- nitrate input from septic systems (40 g/day)
- background nitrate in shallow groundwater (assumed to be 0.1 mg/L)[3]

Where:

$$[Nitrate] = \frac{(septic\ input + supply\ aquifer\ input) \bullet No.\ of\ Septic\ Systems}{available\ dilution + volume\ of\ septic\ effluent}$$

$$[Nitrate] = \frac{(40\ g/day + 0.1\ g/day)\ X\ 21)}{36.6\ m^3/day + (1\ m^3/day\ X\ 21\ systems)}$$

$$= \boldsymbol{15.1\ mg/L}$$

The preceding does not include the effluent loading resulting from the amenity building. Regardless, based on the above preliminary analysis, the assessment would not support development of 21 residences (each with a septic system) while remaining in compliance with the 10.0 mg/L nitrate limit of MECP Procedure D-5-4.

Re-running the calculations, the property can support a maximum of only ten (10) residences (result = 9.0 mg/L) while leaving a small capacity (1 mg/L) for the amenity building. If enhanced dilution (from implementing LID facilities) can be demonstrated, it is possible that perhaps one or two additional residences could be supported. Regardless, this is clearly a substantial reduction in density when compared to the originally proposed 21 units.

8.2.4 Tertiary Treatment Private Septic Systems, 21 Residential Units + Amenity Building

[3] As indicated above, the preliminary calculations assume that the baseline nitrate concentration in the shallow groundwater is 0.1 mg/L, as this is typically the method detection limit of the laboratory analysis. However, this assumed value may need to be revised should future testing reveal a different value or if nitrate is found in the supply aquifer. This is a potentially significant "unknown" that could affect the calculations. If the concentration is elevated, the number of supportable lots could be further reduced as a consequence.

Deploying tertiary treatment, when approved by the Municipality, is expected to reduce nitrate loading of the septic systems from 40 g/day to approximately 20 g/day. Utilizing the same calculation method as above, while substituting the reduced loading value, we find that the resulting nitrate concentration would be reduced to only 7.59 mg/L, easily complying with the 10.0 mg/L limit of Procedure D-5-4 and leaving some capacity for the amenity building.

While the calculations support this approach, it is not known whether the Municipality would be supportive. Our experience is that some municipalities are supportive and others are sceptical of the technology. In this regard, there has been a fairly recent Local Planning Appeal Tribunal (LPAT) hearing (now the purview of the Ontario Land Tribunal - OLT) that found in favour of utilizing tertiary treatment to increase development density, potentially representing an important precedent. Despite the LPAT decision, deploying tertiary treatment in this manner must still be viewed as experimental, with no guarantee of success.

Our firm has had some success in obtaining approvals for developments that utilize tertiary treatment to meet the nitrate impact limits and can prepare the necessary documentation as part of a subsequent Stage of the hydrogeological study.

8.2.5 Communal Sewage Works, 21 Residential Units + Amenity Building

In theory, a communal sewage works can be engineered to treat almost any sewage flow rate, provided there is sufficient area available for the treatment system and the accompanying effluent disposal bed. For the conceptual 21 unit (+ amenity building) development, the expected total sewage flow rate would likely be on the order of 40,000 L/day - similar to the water demand estimated in a previous section. Based on the very approximate formula

$$A = Q/50$$

where,

A = area (m^2)
Q = sewage flow rate (40,000 L/day)
(assuming the soil percolation rate is 15 min/cm)

the area bed(s) will likely occupy about 800 m^2, for a fully in-ground configuration. Depending on the soil and shallow groundwater conditions, the design may need to incorporate sand fill and/or a raised bed (or partially raised bed) plus a 15 wide sand mantle. In that event, the effluent bed could be considerably larger.

Given the above, it is clear that a communal sewage works would consume a substantial part of the development site, especially when including the area required for the disposal bed and the treatment plant. As such, the works might only be feasible if constructed on the same site as the amenity building, which might need to have its footprint modified to accommodate the

works.

The treatment system would need to include a high level of treatment, in order to achieve the Reasonable Use limit of 2.5 mg/L (nitrate) at the property boundary. It has been our experience that the MECP can be sceptical with regard to being able to achieve that limit with a small works.

A further complication of the communal wastewater servicing model is the *system ownership*. While the system can be owned privately (e.g., by a condominium corporation), it is standard practice for the MECP to require a "municipal servicing agreement" with the developer to ensure that the works will continue operating in perpetuity, as part of the approval. The agreement usually requires a substantial financial bond naming the Municipality as beneficiary, in the event that the works fails (requiring replacement) or requires maintenance that the owner does not undertake to the Municipality's satisfaction. Such agreements can be difficult to enact and are typically very expensive.

Although a communal sewage works could be feasible for the proposed development and could be explored further, it is our expectation that such a system would not be economically viable for a development of only 21 residences. The details of such a proposal would need to be carefully considered.

8.2.6 Other Considerations

While there are several potentially viable wastewater servicing models, there are other technical and Planning matters that may need to be considered. For example, the conceptual plan envisions three residential units on a single lot. This will mean that the total sewage flow rate for each residential lot will be three (3) times the normal residential rate, which should be acceptable, provided that total rate remains <10,000 L/day. If the total rate per lot exceeds 10,000 L/day, each lot would require an environmental compliance approval (ECA) from the MECP. Although this is unlikely, it is not clear whether three residences and their water and wastewater services (i.e., well and septic systems) will fit within a single lot. As there are substantial setbacks that must be accommodated under the Ontario Building Code and local Zoning By-Laws, a detailed analysis of the layouts for each lot will need to be undertaken as part of a future Stage of the study, to verify that all elements will fit.

9.0 Stage 1 Conclusions and Recommendations

9.1 Our Stage 1 (preliminary) investigation of the shallow soil conditions has confirmed the presence of glaciolacustrine deposits consisting primarily of silt and sand mixtures that are comparatively permeable. These soils should be acceptable for the operation of tile bed wastewater effluent disposal systems and should provide a moderate to high

infiltration rate.

However, the preliminary testing could not penetrate sufficiently deep to intersect the water table. As such, it is not possible to determine whether there are any limiting layers above the water table nor the depth to the shallow groundwater. The direction of shallow groundwater flow also cannot be confirmed. Similarly, sampling of the shallow groundwater could not be conducted to determine the prevailing background nitrate concentration.

As all of these things are required to comply with Procedure D-5-4 (and to support LID facilities), deeper investigations will be needed as part of a future Stage of the study. Recommendations are provided below.

9.2 From our assessment of local well records, the target aquifer is expected to be a water-bearing fracture in the limestone bedrock. There is also a potential for an aquifer to occur within the deeply buried Precambrian granite. From the statistics, it is apparent that most drilled wells are capable of meeting the typical domestic water demand of a single residence. However, there are several higher-yield wells in the area, suggesting that it may be possible to support a communal water supply system for the development. Dug wells will not be appropriate or acceptable for the development.

As the water servicing model cannot be determined from the available information, it is recommended that a future Stage of the study focus initially on constructing and testing of three (3) test wells, as per the requirements of Procedure D-5-5. In the event that any of the test wells exhibits a comparatively high yield, the assessment should examine the viability of a communal water system. Otherwise, the development will default to a privately serviced model for water supply. The wells should be constructed across the site to ensure they are representative of the conditions.

Each test well will need to be subjected to a pumping test, water quality sampling and an assessment of potential interference.

9.3 Our preliminary nitrate impact assessment has demonstrated that the site can likely support a maximum of six (6) privately serviced residences, if a conventional septic system model for wastewater disposal is implemented. This is likely the "path of least resistance" for the development application, however, falls short of the desired development density.

To achieve the desired development density (i.e., 21 residential units plus amenity building), it will likely be necessary to implement tertiary treatment as part of the septic system for each residence. It is not clear whether this will be acceptable to the approving authorities. Some municipalities have a favourable view of such systems and

others do not. As there has been a recent LPAT decision in favour of utilizing such systems to increase density, the decision could represent a precedent. However, proposing tertiary treatment must still be viewed as experimental, and success is not guaranteed.

Our firm has experience with tertiary treatment systems and has had success in implementing this technology to achieve increased development density. Should this wastewater servicing model be pursued, the hydrogeological report will need to provide technical justification, as part of a detailed nitrate impact assessment. It should be noted that implementing tertiary treatment can also result in smaller septic system footprints, which could potentially be favourable if the lot layouts are restrictive.

9.4 A preliminary examination of a communal wastewater servicing model has also been completed. Since the sewage flow rate of the development would likely exceed 40,000 L/day, a large effluent disposal bed would be required, likely having a footprint of at least 800 m^2, plus the area required for the treatment plant and appurtenances. As such, deploying a communal wastewater system could displace other parts of the development, likely some of the amenity building.

In addition to the size considerations, a communal sewage works would need to have its engineering design approved by the MECP, to obtain an ECA. Although the works could be owned by a condominium corporation (for example), such systems are usually subject to some form of municipal control. Typically, a "municipal servicing responsibility agreement" and financial bond is required. Obtaining an agreement of this type can be an onerous process. Moreover, the economics of a sewage works may not be favourable for a 21-residence development. Considerable assessment of this servicing model would be needed before viability could be determined.

9.5 Based on the preceding, we recommend that the Project Team consider the various water supply and wastewater disposal servicing options, and provide direction as to how the remainder of the hydrogeological study should proceed. As a general guide, we would recommend the following, to meet the Procedural requirements:

- Stage 2 - complete the soil an shallow groundwater evaluation, including determination of the baseline nitrate concentration;
- Stage 3 - construct three (3) drilled test wells about the site, followed by pumping tests and water quality analyses, and completion of a door-to-door survey to catalogue neighbouring wells;
- Stage 4 - conduct a detailed nitrate impact assessment to confirm the development density and prepare a servicing layout for the development,

and

- Stage 5 - prepare the required technical illustrations and hydrogeological report.

Should the above align with the Project Team's direction, we would be pleased to provide a proposal for Stages 2 to 5.

— End of Stage 1 Update —

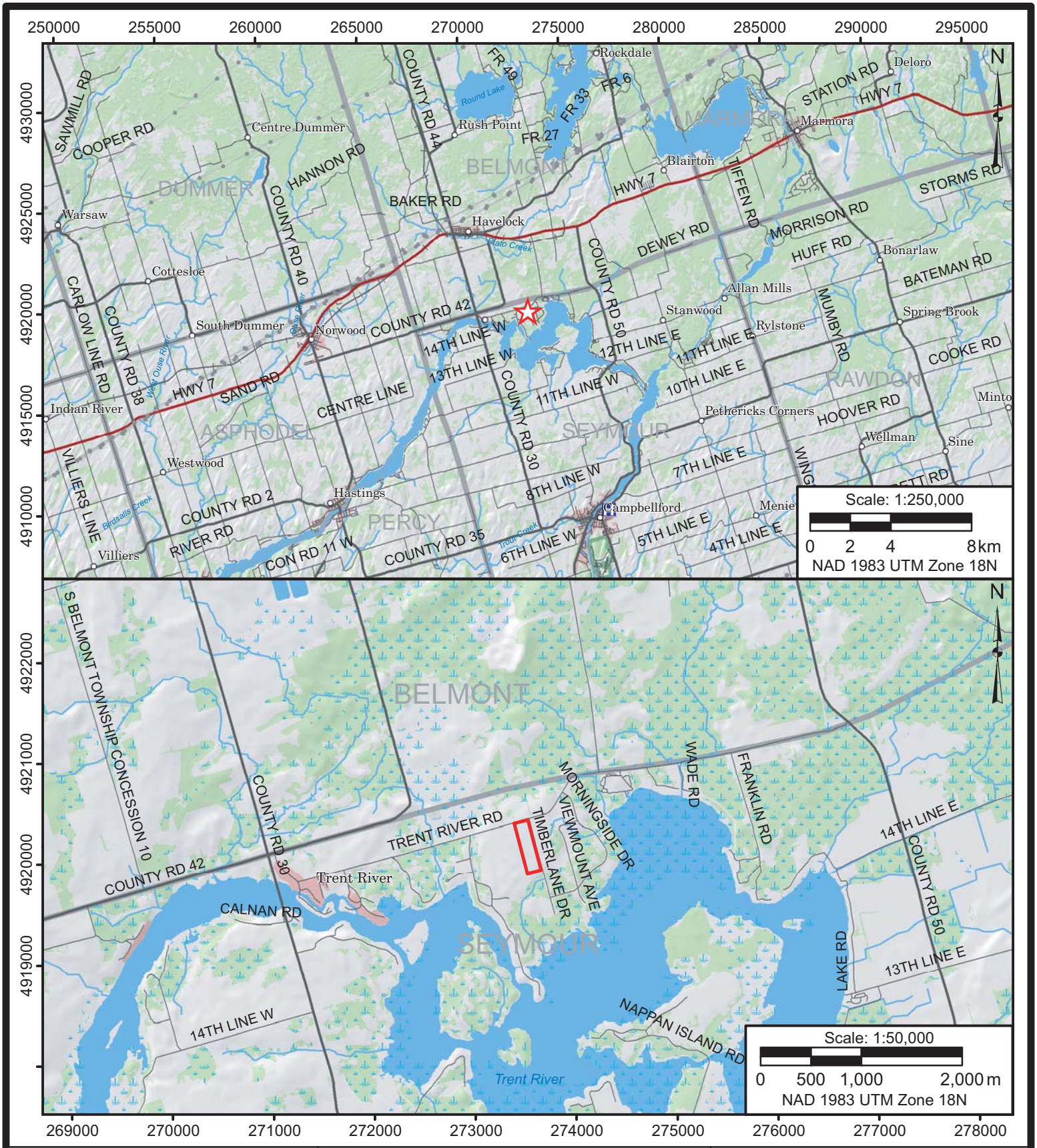
Yours truly,
Oakridge Environmental Ltd.

Dan MacIntyre, B.Sc.
Project Manager
Senior Hydrogeological Technician

Brian R. King, P.Geo.
Principal

Attachments:
Figure 1 - General Location
Figure 2 - Topography and Drainage
Figure 3 - Surficial Geology
Figure 4 - Paleozoic Geology
Figure 5 - MECP Well Records
Figure 6 - Well Statistics
Figure 7 - Physical Features
Appendix A - Water Well Information System
Appendix B - Borehole Logs and Permeameter Testing
Appendix C - Site Photos

Figures



Approximate Site Location

Approximate Property Location

Notes:
Base mapping provided by the Ontario Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) database, copyright the King's Printer

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Stage 1 Update
Hydrogeological Study for Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

North American Datum (NAD) 1983

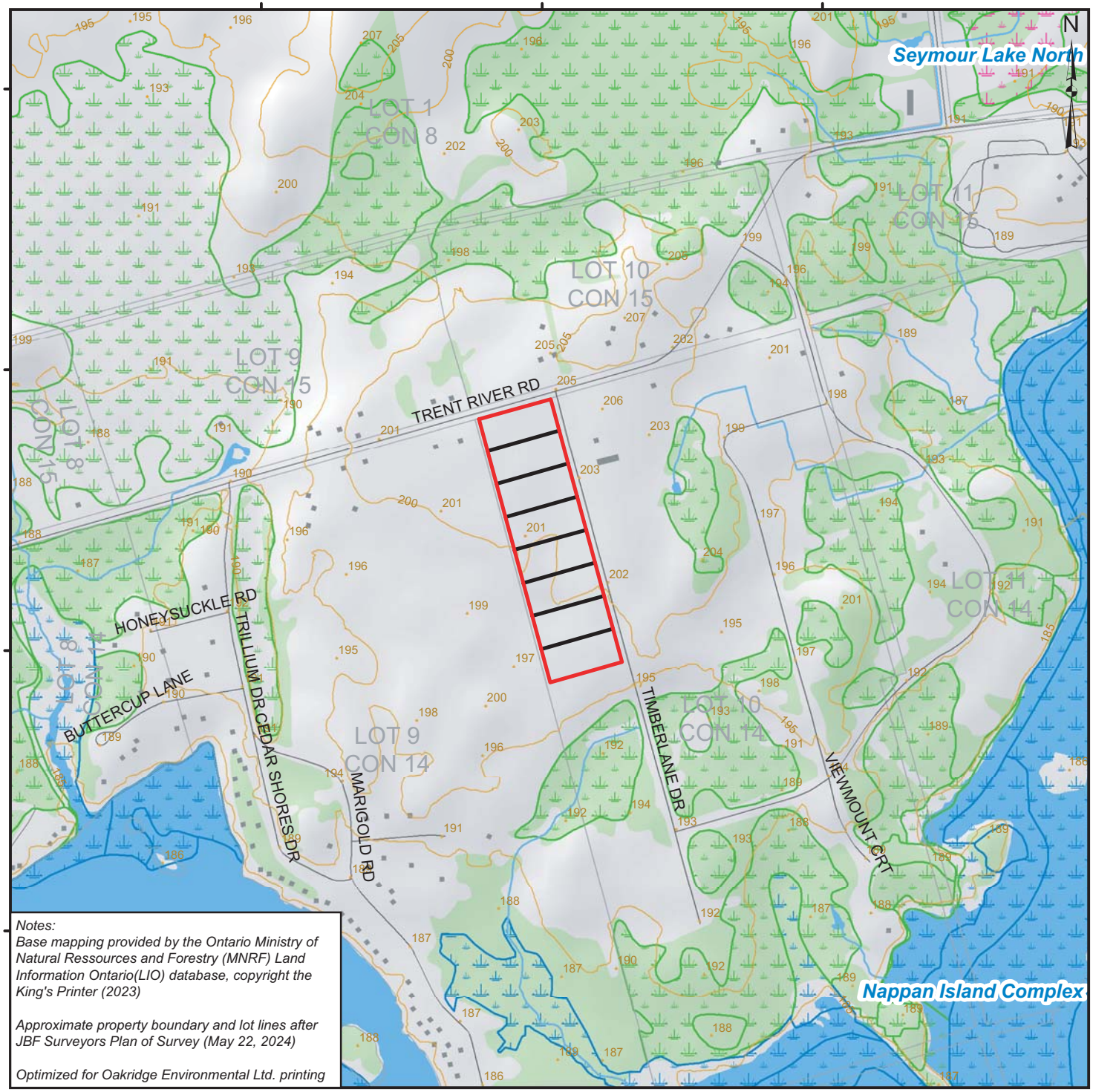
TITLE
General Location

PROJECT # 24-3484

DATE October 2024

FIGURE NO. **1**

Stage 1 Update
Hydrogeological Study for
Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County



Approximate Property Boundary
Approximate Lot Lines
Wetland (Unevaluated)
Wetland (Evaluated Non PSW)
Wetland (Provincially Significant)
Waterbody
Wooded Area
Building (to scale)
Geographic Lot Fabric
Watercourse
Road
Contour (5m Intervals)
Building (symbol)
Spot Height (m asl)

Scale: 1:10,000

0 100 200 400 m

Notes:
Base mapping provided by the Ontario Ministry of Natural Ressources and Forestry (MNRF) Land Information Ontario(LIO) database, copyright the King's Printer (2023)

Approximate property boundary and lot lines after JBF Surveyors Plan of Survey (May 22, 2024)

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NAD 1983 UTM Zone 18N

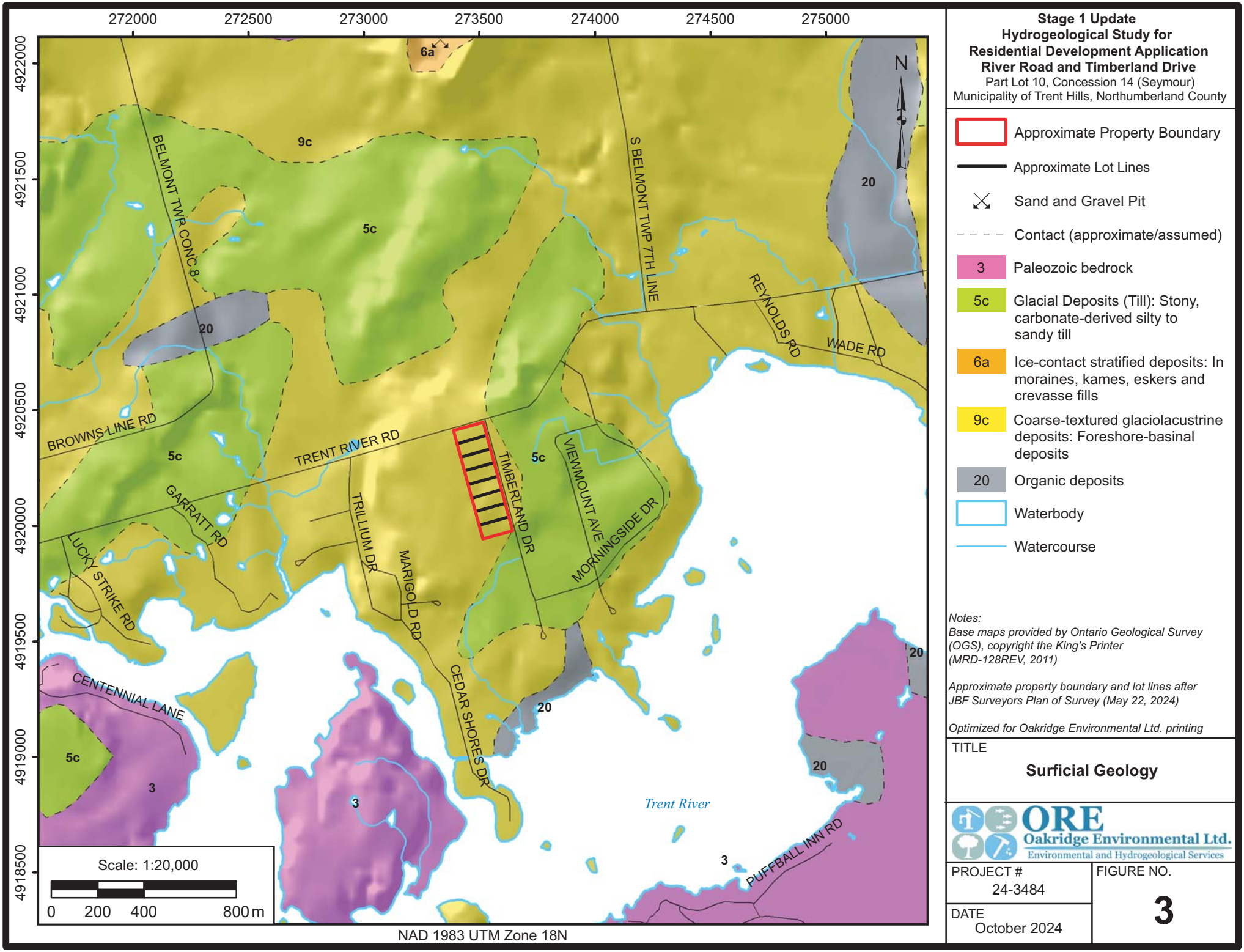
TITLE
Topography and Drainage

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT # 24-3484

FIGURE NO. **2**

DATE October 2024



Stage 1 Update
Hydrogeological Study for
Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

- Approximate Property Boundary
- Approximate Lot Lines
- Sand and Gravel Pit
- Contact (approximate/assumed)
- 3 — Paleozoic bedrock
- 5c — Glacial Deposits (Till): Stony, carbonate-derived silty to sandy till
- 6a — Ice-contact stratified deposits: In moraines, kames, eskers and crevasse fills
- 9c — Coarse-textured glaciolacustrine deposits: Foreshore-basinal deposits
- 20 — Organic deposits
- Waterbody
- Watercourse

Notes:
Base maps provided by Ontario Geological Survey (OGS), copyright the King's Printer (MRD-128REV, 2011)

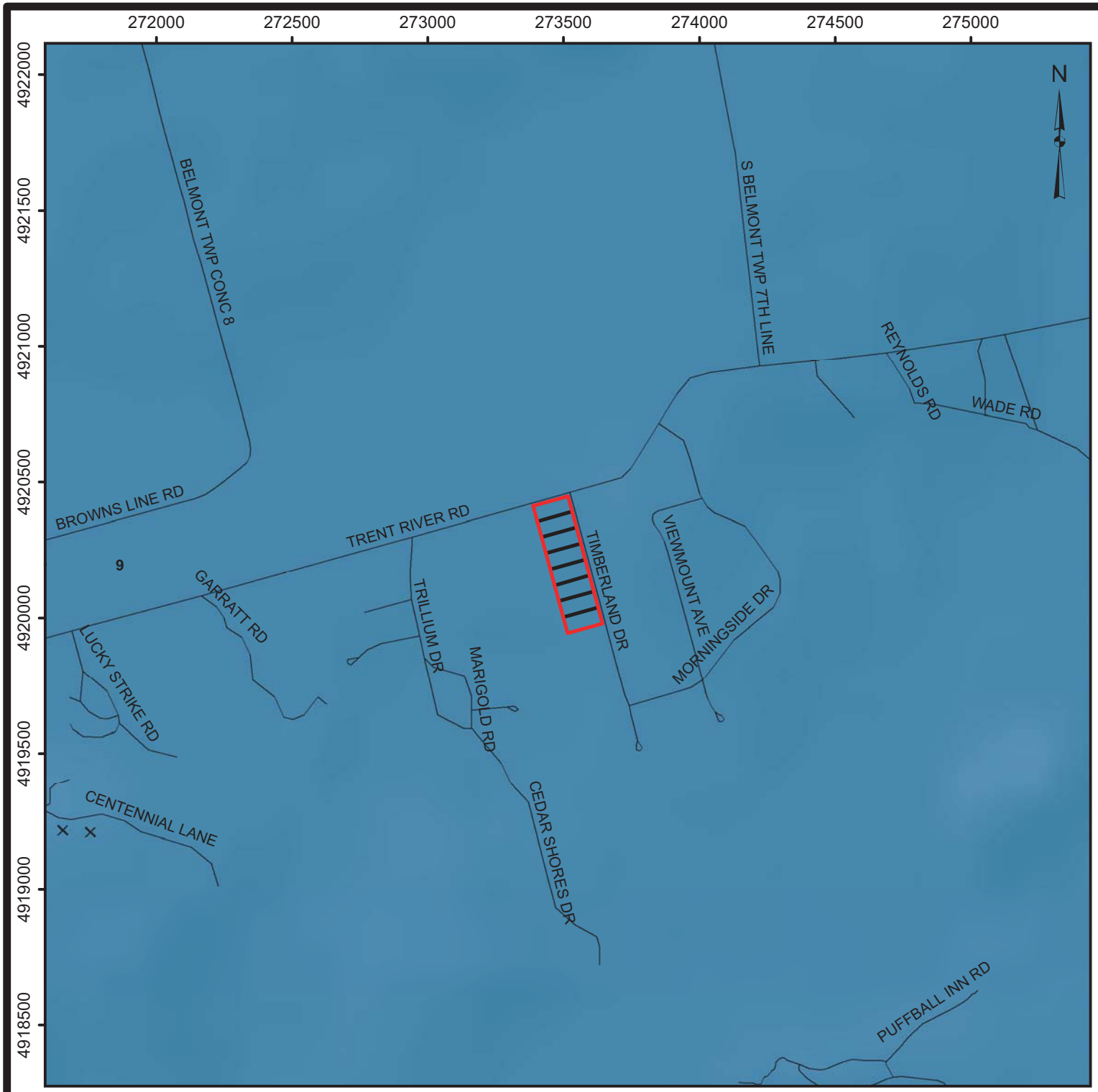
Approximate property boundary and lot lines after JBF Surveyors Plan of Survey (May 22, 2024)

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TITLE
Surficial Geology

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT #	FIGURE NO.
24-3484	3
DATE: October 2024	



Stage 1 Update
Hydrogeological Study for
Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

- Approximate Property Boundary
- Approximate Lot Lines
- × Outcrop
- Bobcaygeon Formation

Scale: 1:20,000

0 200 400 800 m

Notes:
Base maps provided by Ontario Geological Survey (OGS), copyright the King's Printer (MRD-219, 2007)

Approximate property boundary and lot lines after JBF Surveyors Plan of Survey (May 22, 2024)

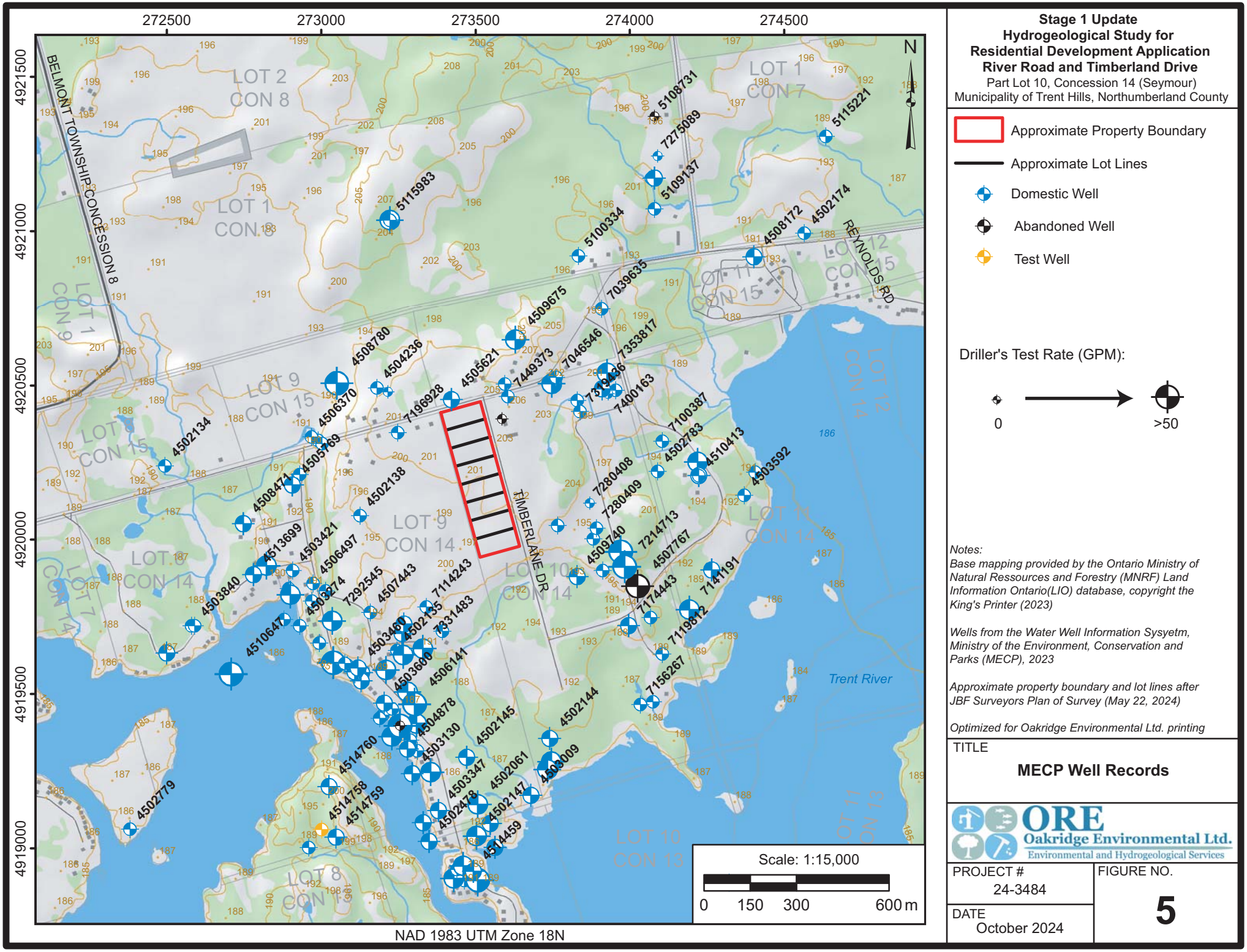
Optimized for Oakridge Environmental Ltd. printing

TITLE

Paleozoic Geology

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT #	FIGURE NO.
24-3484	**4**
DATE	
October 2024	



Stage 1 Update
Hydrogeological Study for
Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

- Approximate Property Boundary
- Approximate Lot Lines
- Domestic Well
- Abandoned Well
- Test Well

Driller's Test Rate (GPM):

0 — >50

Notes:
Base mapping provided by the Ontario Ministry of Natural Ressources and Forestry (MNRF) Land Information Ontario(LIO) database, copyright the King's Printer (2023)

Wells from the Water Well Information Sysyetm, Ministry of the Environment, Conservation and Parks (MECP), 2023

Approximate property boundary and lot lines after JBF Surveyors Plan of Survey (May 22, 2024)

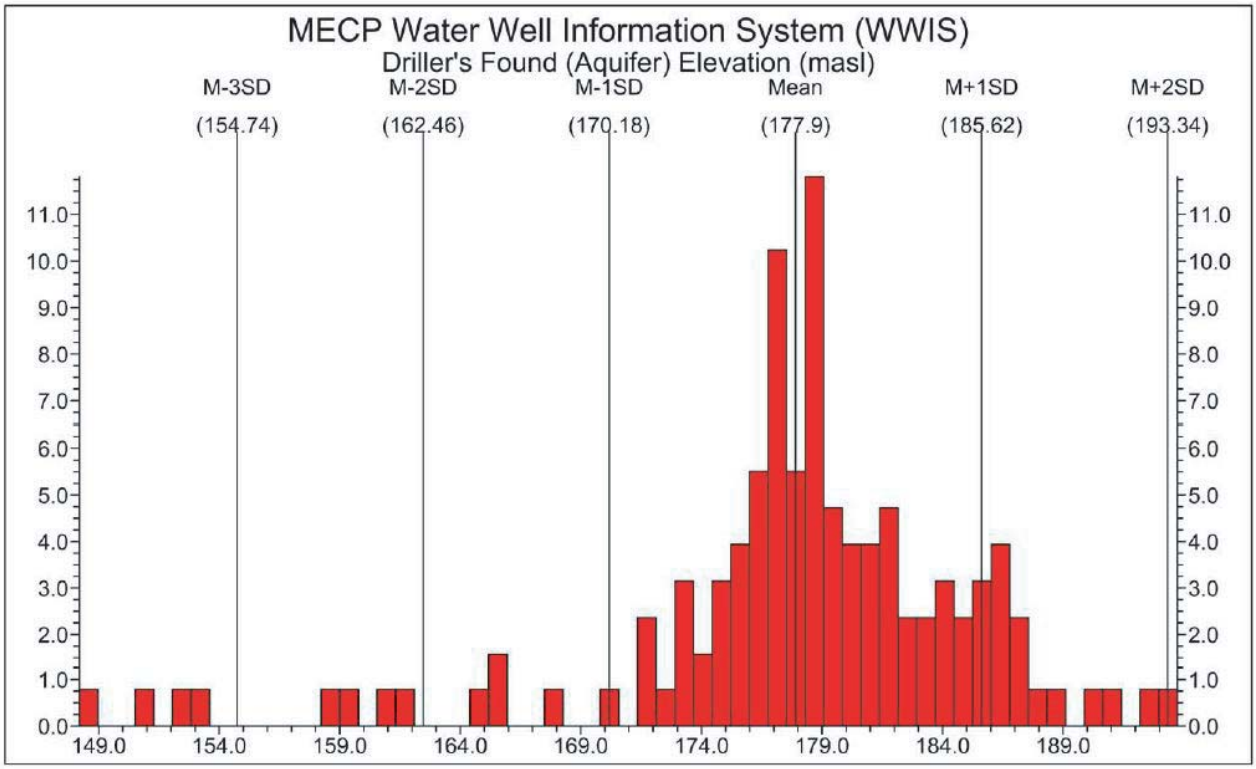
Optimized for Oakridge Environmental Ltd. printing

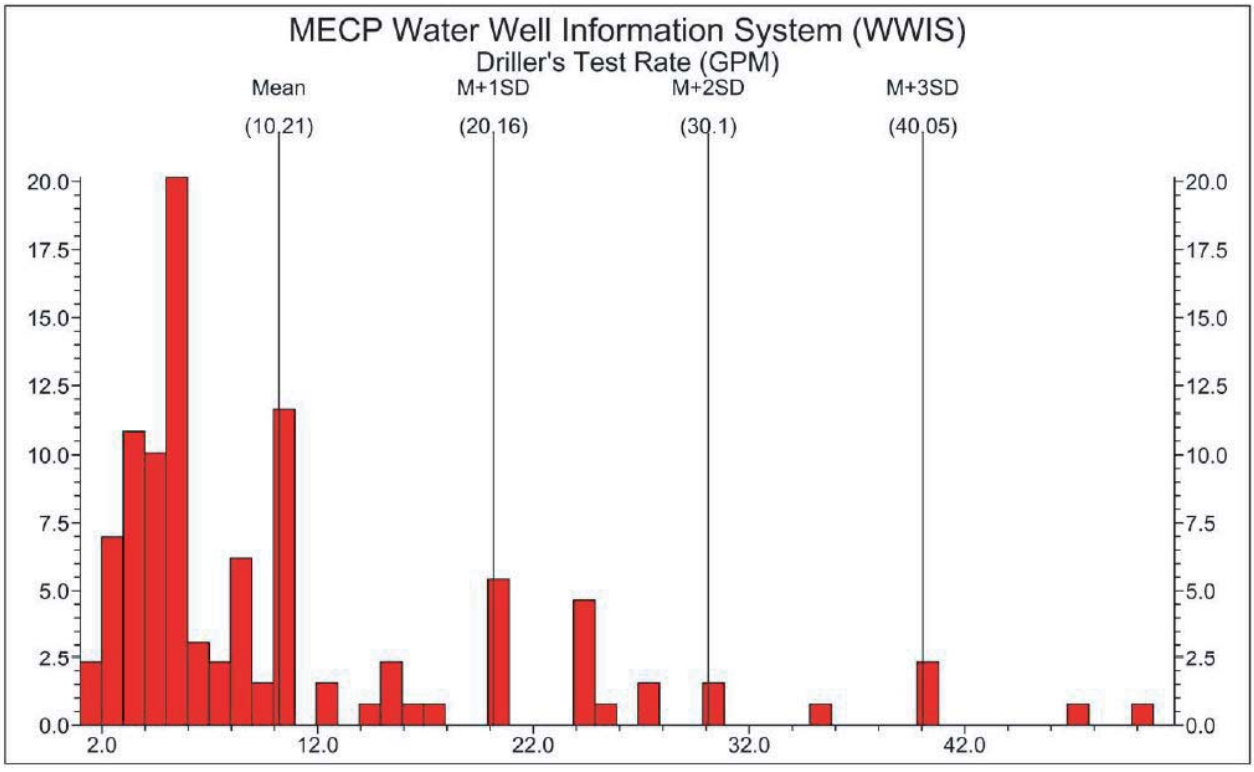
TITLE

MECP Well Records

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT #	FIGURE NO.
24-3484	**5**
DATE	
October 2024	





Stage 1 Update
Hydrogeological Study for Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

TITLE
Well Statistics

Notes: Well statistics interpretted from the Ministry of Environment, Conservation and Parks well record data, copyright the King's Printer, 2023.

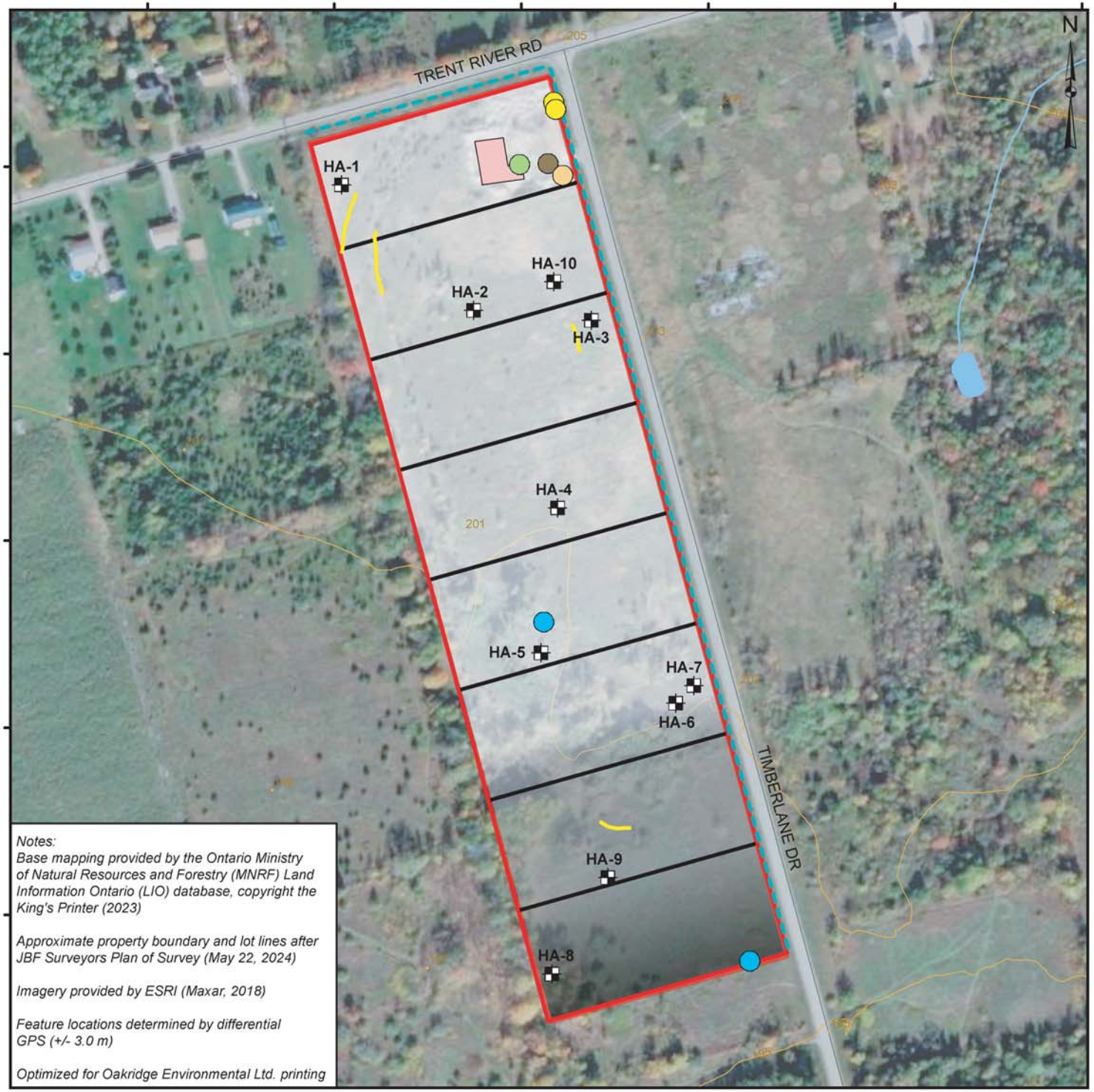
Original figure to be viewed in colour on letter size (8.5" x 11") paper.

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT # 24-3484

DATE October 2024

FIGURE NO. **6**



Stage 1 Update
Hydrogeological Study for
Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

- Approximate Property Boundary
- Abandoned Foundation (Filled with water at time of inspection)
- Approximate Lot Lines
- Valleys
- Drainage Ditch (Dry at time of inspection)
- Hand Auger Boreholes
- Boulders
- Concrete Pile
- Fill Pile
- Rock Pile
- Wood Pile

Increasing Sand Content

Scale: 1:3,000

0 25 50 100 m

Notes:
Base mapping provided by the Ontario Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) database, copyright the King's Printer (2023)

Approximate property boundary and lot lines after JBF Surveyors Plan of Survey (May 22, 2024)

Imagery provided by ESRI (Maxar, 2018)

Feature locations determined by differential GPS (+/- 3.0 m)

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NAD 1983 UTM Zone 18N

TITLE
Physical Features

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

PROJECT #	FIGURE NO.
24-3484	7
DATE	
October 2024	

Appendix A

Water Well Information System

Water Well Records

September 10, 2024

10:59:34 AM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BELMONT & METHUEN TO CON 07 001	18 274635 4921308 L	1991-04 6003	6	FR 0044	10//3/1:0	DO		5115221 (90651)	BRWN LOAM 0002 GREY LMSN ROCK FCRD 0004 GREY LMSN ROCK 0103
BELMONT & METHUEN TO CON 08 001	18 274080 4921172 W	1976-05 2402	6 6	FR 0065 FR 0089	10/68/8/1:0	DO		5108050 ()	SAND BLDR 0017 LMSN 0094
BELMONT & METHUEN TO CON 08 001	18 274070 4921172 W	1969-05 4811	6	FR 0018	13/14/5/0:30	DO		5104693 ()	BRWN MSND 0016 ROCK 0018
BELMONT & METHUEN TO CON 08 001	18 274080 4921372 W	1977-09 2402						5108731 () A	SAND BLDR 0015 BLUE LMSN 0106 RED SHLE 0111
BELMONT & METHUEN TO CON 08 001	18 274080 4921072 W	1978-08 2104	6	FR 0125	9/120/4/1:10	DO		5109137 ()	BRWN CLAY GRVL LOOS 0008 GREY LMSN HARD 0095 RED LMSN HARD 0120 RED GRNT HARD 0125
BELMONT & METHUEN TO CON 08 001	18 273223 4921036 L	1990-03 6003	6	FR 0167	100/130/20/2:0	DO		5114828 (64301)	BLCK LOAM 0001 GREY LMSN SHLE 0003 GREY LMSN ROCK 0137 BRWN LMSN ROCK 0139 GREY LMSN ROCK 0147 BRWN LMSN ROCK 0170
BELMONT & METHUEN TO CON 08 001	18 273223 4921036 L	1990-08 4008	6	FR 0067	20//5/1:0	DO		5114873 (78529)	BRWN SILT STNS OBDN 0035 GREY ROCK LMSN 0071
BELMONT & METHUEN TO CON 08 001	18 273223 4921036 L	1992-09 6398	6 6	FR 0130 FR 0140	30/150/4/2:0	DO		5115983 (116499)	BRWN SAND 0007 GREY LMSN 0100 BLUE SHLE 0150
BELMONT & METHUEN TO CON 08 001	18 274090 4921244 W	2016-08 1455	6.25	0022	23///:	DO		7275089 (Z222850) A195727	BRWN LOAM 0001 BRWN SAND BLDR 0016 GREY LMSN ROCK 0095
BELMONT & METHUEN TO CON 08 001	18 273833 4920920 W	1951-01 3121	5	FR 0027	9/24/2/4:0	ST		5100334 ()	GREY CLAY 0015 BRWN GRVL 0027 GREY LMSN 0036
SEYMOUR TOWNSHIP	18 273983 4919913 W	2013-12 6593	36		6//27/1:0	DO		7214713 (Z161451) A140672	BLCK LOAM STNS LOOS 0001 BRWN SAND SILT LOOS 0009 BRWN CLAY STNS DNSE 0025
SEYMOUR TOWNSHIP	18 273970 4919961 W	2013-12 6593	36	FR 0017	5/6/27/1:0	DO		7214712 (Z161453) A140674	BLCK LOAM STNS LOOS 0001 BRWN SAND SILT LOOS 0009 BRWN CLAY STNS DNSE 0021
SEYMOUR TOWNSHIP	18 273996 4919721 W	2011-08 6564	6.25 6.11	FR 0031	8/20/8/1:			7174443 (Z127480) A112500	GREY CLAY BLDR 0003 GREY SHLE STNS 0006 GREY CLAY STNS 0015 GREY LMSN FCRD LYRD LMSN SAND LYRD 0029 GREY LMSN 0035
SEYMOUR TOWNSHIP	18 273838 4920416 W	2018-08 6578	6.11 6.11	UT 0160	15/83/3/1:	DO		7319436 (Z291234) A250864	GREY CLAY STNS HARD 0015 GREY LMSN HARD 0140 RED GRNT HARD 0200
SEYMOUR TOWNSHIP	18 273340 4919782 W	2008-08 7115	5.98	FR 0069	30/59/3/2:0	DO		7114243 (Z59253) A053130	BRWN LOAM SOFT 0002 GREY CLAY STNS HARD 0018 GREY LMSN 0105

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP 13 009	18 273493 4918925 W	2005-09 7115	5.98	FR 0041	19/25/8/2:0	DO		4514459 (Z30481) A028448	GREY CLAY STNS 0030 GREY LMSN 0041
SEYMOUR TOWNSHIP 14 008	18 273048 4919036 W	2006-09 1413	6.25	FR 0031	9/38/6/1:0	DO		4514759 (Z53322) A038611	BRWN STNS BLDR SAND 0006 BRWN LMSN GRVL 0011 GREY CLAY TILL STNS 0023 GREY LMSN 0038
SEYMOUR TOWNSHIP 14 008	18 273001 4919061 W	2006-09 1413	6.25		10/53/2/1:0	DO		4514758 (Z53323) A038612	BRWN LOAM 0001 GREY SAND GRVL 0009 GREY CLAY TILL STNS 0022 GREY LMSN 0053
SEYMOUR TOWNSHIP 14 008	18 273025 4919200 W	2006-09 1413	6.25	FR 0041	21/51/5/1:0	DO		4514760 (Z53321) A038608	BRWN LOAM 0001 BRWN GRVL SAND CLAY 0010 GREY CLAY TILL LMSN 0018 GREY CLAY TILL GRVL 0034 GREY LMSN 0051
SEYMOUR TOWNSHIP 14 008	18 272959 4919003 W	2006-09 1413	6.25	FR 0038	9/39/2/1:0	DO		4514754 (Z53330) A038621	BRWN LOAM 0001 BRWN GRVL SAND STNS 0014 GREY CLAY TILL STNS 0025 GREY LMSN 0039
SEYMOUR TOWNSHIP 14 009	18 273265 4919626 W	2005-04 6564	6.40	FR 0024 FR 0032	10/11/12/1:	DO		4514215 (Z12788) A012730	GREY CLAY STNS 0004 GREY LMSN 0040
SEYMOUR TOWNSHIP 14 009	18 273392 4919704 W	2005-05 6564	6.40		23/46/3/1:0	DO		4514425 (Z27584) A026425	GREY CLAY STNS 0013 GREY HPAN 0085 GREY LMSN
SEYMOUR TOWNSHIP 14 010	18 274066 4919748 W	2007-06 7099	6	0030	23/36/2/1:	DO		7048981 (Z45283) A040652	BRWN CLAY GRVL STNS 0018 BRWN SAND CLAY GRVL 0023 GREY LMSN 0049
SEYMOUR TOWNSHIP 14 023	18 274265 4919902 W	2006-04 3367	6.25	FR 0029	10/10/10/1:0	DO		7045711 (Z33115) A039649	BRWN STNS SAND PCKD 0008 GREY SHLE LMSN LYRD 0016 GREY LMSN HARD 0034
SEYMOUR TOWNSHIP 15 010	18 273908 4920749 W	2006-11 1507	6.21	0065 0075	9/50/4/1:0	DO		7039635 (Z46269) A044954	BRWN SAND CLAY 0022 BRWN CLAY GRVL 0042 GREY CLAY GRVL 0064 GREY LMSN 0065 GREY LMSN 0078
SEYMOUR TOWNSHIP 15 010	18 273761 4920527 W	2007-04 6564	6.25	0042 0067	14/50/4/1:	DO		7046546 (Z66044) A055893	YLLW SAND GRVL 0038 GREY LMSN 0080
SEYMOUR TOWNSHIP 14 44	18 274105 4920319 W	2007-10 6564		0025 0060	19/56/3/1:0	DO		7100387 (Z66074) A055924	BRWN SAND STNS 0009 GREY CLAY STNS 0010 GREY LMSN 0065
SEYMOUR TOWNSHIP CON 13 009	18 273507 4919142 W	1966-05 4506	6 6	FR 0026	8/28/24/0:30	DO		4502061 ()	BLDR GRVL 0009 LMSN 0028
SEYMOUR TOWNSHIP CON 13 009	18 273440 4918932 W	1972-05 4811	6	FR 0034	6/21/5/:	DO		4503442 ()	LOAM 0004 BRWN SAND GRVL 0019 LMSN 0035
SEYMOUR TOWNSHIP CON 13 009	18 273680 4919172 W	1970-06 2203	6	FR 0030	20/20/10/2:0	DO		4503009 ()	BRWN CLAY BLDR 0028 GREY LMSN 0032

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 13 009	18 273380 4919122 W	1971-06 2118	6	FR 0020	8/15/7/2:0	DO		4503347 ()	BRWN CLAY GRVL STNS 0019 GRVL 0020
SEYMOUR TOWNSHIP CON 13 009	18 273459 4918943 W	1980-06 1805	6	FR 0026	8/30/20/1:30	DO		4505434 ()	BRWN LOAM 0003 GREY LMSN FCRD ROCK 0006 GREY LMSN GRVL 0019 GREY LMSN 0030
SEYMOUR TOWNSHIP CON 13 009	18 273563 4919003 W	1964-01 4811	6 6	FR 0022	9/13/10/1:0	DO		4502060 ()	LOAM 0003 MSND GRVL 0018 LMSN 0024
SEYMOUR TOWNSHIP CON 13 009	18 273430 4918902 W	1971-05 2118	7	FR 0032	17/24/15/2:0	DO		4503002 ()	BRWN CLAY GRVL STNS 0030 GRVL 0032
SEYMOUR TOWNSHIP CON 13 009	18 273464 4918896 W	1967-07 2203	6 6	FR 0030	12/28/4/1:0	DO		4502062 ()	CLAY BLDR 0018 LMSN 0031
SEYMOUR TOWNSHIP CON 13 009	18 273350 4919022 W	1969-04 2203	6 6	FR 0027	14/18/8/2:0	DO		4502478 ()	CLAY BLDR 0018 CLAY MSND 0026 LMSN 0028
SEYMOUR TOWNSHIP CON 13 009	18 273506 4918897 W	1985-06 2553	6	FR 0022	2/10/30/1:0	DO		4506236 ()	BRWN LOAM SNDY 0010 BRWN BLDR GRVL 0022
SEYMOUR TOWNSHIP CON 13 009	18 273330 4919082 W	1969-07 2203	6 6		12/30/8/1:0	DO		4502751 ()	CLAY BLDR 0022 LMSN 0032
SEYMOUR TOWNSHIP CON 14	18 273926 4920541 W	2020-02 6593	36	FR 0014	175/197/20/1:	DO		7353817 (Z283689) A245393	BLCK LOAM 0000 BRWN SAND SILT STNS 0006 GREY LMSN HARD 0022
SEYMOUR TOWNSHIP CON 14 006	18 272780 4919887 W	2004-01 7115		FR 0034	14//8/1:	DO		4513699 (Z00607) A000503	GREY CLAY STNS HARD 0024 GREY ROCK HARD 0035
SEYMOUR TOWNSHIP CON 14 007	18 272380 4919062 W	1970-05 1904	6	FR 0018	4/10/5/3:45	DO		4502779 ()	LOAM MSND CLAY 0002 BRWN CLAY BLDR 0012 GREY GRVL MSND 0016 GREY GRVL 0018
SEYMOUR TOWNSHIP CON 14 007	18 272973 4919858 W	1986-10 2104	6	UK 0035	5/36/3/3:0	DO		4506497 (NA)	BRWN CLAY STNS DNSE 0021 GREY LMSN HARD 0041
SEYMOUR TOWNSHIP CON 14 008	18 272708 4919565 L	1990-09 2553	6	FR 0024	3/7/35/1:30	DO		4509082 (62382)	BRWN LOAM CLAY 0013 GREY LMSN 0024
SEYMOUR TOWNSHIP CON 14 008	18 272822 4919916 W	1988-11 2553	6	FR 0030	15//15/2:0	DO		4507582 (44016)	BRWN CLAY GRVL PCKD 0015 GREY SHLE 0027 GREY LMSN 0040
SEYMOUR TOWNSHIP CON 14 008	18 272930 4919722 W	1972-07 1805	6 6	SU 0032	12/33/5/0:30	DO		4503274 ()	CLAY GRVL 0016 GREY LMSN 0033
SEYMOUR TOWNSHIP CON 14 008	18 272895 4919842 W	1971-05 2118	7	FR 0016	10/12/5/2:0	DO		4502999 ()	BRWN CLAY GRVL STNS 0015 GRVL 0016
SEYMOUR TOWNSHIP CON 14 008	18 272747 4920051 W	1989-11 6003	6	SU 0052	15/40/10/1:30	DO		4508471 (66681)	BLCK LOAM LOOS 0003 GREY GRVL BLDR PCKD 0024 GREY LMSN ROCK 0055
SEYMOUR TOWNSHIP CON 14 008	18 272494 4920239 W	1963-07 4811	6 6	FR 0018	6/10/5/1:0	DO		4502134 ()	LOAM 0002 BLDR 0010 GREY LMSN 0020
SEYMOUR TOWNSHIP CON 14 008	18 273747 4920505 W	1990-06 6398	6	FR 0024	4/25/20/2:0	DO		4508730 (85125)	BRWN GRVL LOAM 0011 GREY LMSN 0025

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 14 008	18 272500 4919632 W	1974-07 2553	6	FR 0022	10/22/8/3:0	DO		4503820 ()	BRWN CLAY GRVL 0020 BRWN SHLE 0022 GREY LMSN 0032
SEYMOUR TOWNSHIP CON 14 008	18 272580 4919722 W	1968-09 4811	6 6	FR 0020	1/10/5/0:30	DO		4502341 ()	LOAM 0003 LMSN 0022
SEYMOUR TOWNSHIP CON 14 008	18 272708 4919565 L	1995-06 6564	6	FR 0014	2/7/30/1:0	DO		4510647 (153509)	BRWN LOAM 0001 BRWN CLAY BLDR 0008 BRWN CLAY GRVL 0013 BRWN LMSN 0030
SEYMOUR TOWNSHIP CON 14 008	18 272900 4919822 W	1971-05 2118	7	FR 0022	9/10/16/2:0	DO		4503003 ()	BRWN CLAY GRVL STNS 0018 GREY LMSN 0022
SEYMOUR TOWNSHIP CON 14 008	18 272880 4919742 W	1971-05 2118	7	FR 0037	31/35/2/2:0	DO		4503004 ()	BRWN CLAY GRVL STNS 0011 LMSN 0032 GRNT 0037
SEYMOUR TOWNSHIP CON 14 008	18 272907 4919901 W	1973-03 2104	6 6	FR 0023	5/20/5/2:30	DO		4503421 ()	BRWN CLAY SAND 0015 GREY CLAY GRVL 0020 GREY LMSN 0028
SEYMOUR TOWNSHIP CON 14 008	18 272590 4919722 W	1974-08 5016	6	FR 0024	8/20/3/3:0	DO		4503840 ()	BRWN SAND STNS 0024 GREY SAND GRVL 0026
SEYMOUR TOWNSHIP CON 14 008	18 273248 4920347 W	2012-12 3367	6.25 6.25	FR 0036 FR 0041	21/33/3/2:			7196928 (Z160928) A131488	BLCK LOAM STNS SOFT 0002 GREY STNS CLAY PCKD 0009 GREY CLAY GRVL SAND 0036 GREY LMSN SHLE SAND 0041
SEYMOUR TOWNSHIP CON 14 009	18 273255 4919397 W	1971-05 2104	6	FR 0010	3/3/40/2:0	DO		4503227 ()	LOAM 0001 BRWN CLAY SAND STNS 0006 BRWN LMSN 0012
SEYMOUR TOWNSHIP CON 14 009	18 273003 4920312 W	1972-07 2118	6	FR 0039	8/34/3/1:0	ST		4503346 ()	GREY CLAY GRVL STNS 0031 GREY LMSN 0039
SEYMOUR TOWNSHIP CON 14 009	18 273014 4919835 W	1972-10 2104	6	FR 0024	7/27/3/2:10	DO		4503365 ()	LOAM 0001 GREY CLAY STNS 0017 GREY LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273190 4919422 W	1971-04 5016	6	FR 0018	0/8/4/3:0	DO		4502979 ()	BRWN CLAY GRVL 0010 GREY LMSN 0020
SEYMOUR TOWNSHIP CON 14 009	18 273077 4919599 W	1972-06 2104	6	FR 0034	12/34/2/2:20	DO		4503369 ()	LOAM 0001 BRWN CLAY STNS 0010 GREY GRVL CLAY 0016 GREY LMSN 0035
SEYMOUR TOWNSHIP CON 14 009	18 273295 4919242 W	1971-09 2118	7	FR 0020	6/17/8/1:0	DO		4503130 ()	GREY CLAY GRVL 0019 GRVL 0020
SEYMOUR TOWNSHIP CON 14 009	18 273110 4919572 W	1971-05 2118	7	FR 0028	18/20/10/2:0	DO		4503000 ()	BRWN CLAY GRVL STNS 0023 GREY LMSN 0028
SEYMOUR TOWNSHIP CON 14 009	18 273471 4919295 W	1965-05 4811	6 6	FR 0027	4/15/10/1:0	DO		4502145 ()	LOAM 0002 BRWN MSND GRVL 0012 LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273245 4919642 W	1961-05 4811	6 6	FR 0028	5/11/5/1:0	DO		4502135 ()	LOAM 0003 GREY LMSN 0031
SEYMOUR TOWNSHIP CON 14 009	18 273312 4919316 W	1961-05 4811	6 6	FR 0022	6/12/5/1:0	DO		4502136 ()	LOAM 0003 BLDR 0010 GREY LMSN 0024
SEYMOUR TOWNSHIP CON 14 009	18 273355 4919247 W	1961-06 4518	6 6	FR 0025	6/24/25/0:10	DO		4502137 ()	SHLE GRVL 0014 GREY LMSN 0027

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 14 009	18 273126 4920078 W	1961-10 4811	6 6	SU 0026	11/15/5/1:0	DO		4502138 ()	BLDR 0005 HPAN 0015 BLUE LMSN 0028
SEYMOUR TOWNSHIP CON 14 009	18 273309 4919404 W	1962-05 4518	6 6	FR 0009 FR 0028	4/26/20/0:20	DO		4502139 ()	LOAM CLAY GRVL 0003 SHLE 0011 LMSN 0017 SHLE 0022 LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273280 4919507 W	1962-06 4518	6 6	FR 0017 FR 0022	5/10/20/0:20	DO		4502140 ()	SHLE GRVL 0011 LMSN 0024
SEYMOUR TOWNSHIP CON 14 009	18 273084 4919594 W	1963-08 4811	6 6	FR 0027	8/25/2/0:30	DO		4502141 ()	LOAM 0002 BLDR 0010 GREY LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273547 4919080 W	1964-04 4518	6 6	FR 0011	6/6/10/0:15	DO		4502142 ()	LOAM CLAY BLDR 0006 SHLE 0008 LMSN 0012
SEYMOUR TOWNSHIP CON 14 009	18 273741 4919356 W	1964-05 4518	6 6	FR 0014	10/18/10/0:15	DO		4502144 ()	CLAY GRVL BLDR 0010 SHLE 0012 LMSN 0022
SEYMOUR TOWNSHIP CON 14 009	18 273131 4919569 W	1964-05 4518	6	FR 0015	10/12/10/0:10	DO		4502143 ()	LOAM CLAY BLDR 0005 SHLE 0013 LMSN 0017
SEYMOUR TOWNSHIP CON 14 009	18 272930 4920212 W	1970-06 4811	6 6	FR 0035	6/30/2/0:30	DO		4502728 ()	LOAM 0003 HPAN BLDR 0007 LMSN 0042
SEYMOUR TOWNSHIP CON 14 009	18 273735 4919249 W	1965-10 4506	6 6	FR 0028	4/29/2/0:30	DO		4502146 ()	BRWN CLAY BLDR 0010 SHLE GRVL 0012 SHLE LMSN 0015 LMSN 0029
SEYMOUR TOWNSHIP CON 14 009	18 273503 4919040 W	1966-06 4506	6 6	FR 0016	7/12/24/0:30	DO		4502147 ()	CLAY BLDR 0008 LMSN 0017
SEYMOUR TOWNSHIP CON 14 009	18 273229 4919362 W	1966-06 4506	6 6	FR 0023	11/18/24/0:30	DO		4502148 ()	BRWN CLAY BLDR 0011 LMSN 0024
SEYMOUR TOWNSHIP CON 14 009	18 273746 4919281 W	1966-06 4506	6 6	FR 0015 FR 0020	3/19/24/0:30	DO		4502149 ()	BRWN CLAY 0003 LMSN 0021
SEYMOUR TOWNSHIP CON 14 009	18 273733 4919255 W	1966-06 4506	6 6	FR 0018 FR 0027	4/22/24/0:30	DO		4502150 ()	BRWN CLAY BLDR 0009 SHLE 0011 LMSN 0028
SEYMOUR TOWNSHIP CON 14 009	18 272990 4920322 W	1968-09 4811	6 6	FR 0015	7/8/5/1:0	DO		4502340 ()	LOAM 0004 BLDR 0013 LMSN 0016
SEYMOUR TOWNSHIP CON 14 009	18 273200 4919432 W	1969-10 2104	6	FR 0014	6/12/5/1:0	DO		4502599 ()	LOAM 0001 GREY CLAY STNS 0007 LMSN 0017
SEYMOUR TOWNSHIP CON 14 009	18 273130 4919542 W	1969-10 2104	6	FR 0024	7/22/6/2:0	DO		4502600 ()	LOAM 0001 GREY CLAY STNS 0004 LMSN 0027
SEYMOUR TOWNSHIP CON 14 009	18 273040 4919602 W	1969-08 2104	6	FR 0012	5/7/47/2:0	DO		4502606 ()	LOAM 0002 BRWN MSND CLAY BLDR 0008 GREY LMSN 0020
SEYMOUR TOWNSHIP CON 14 009	18 272906 4920177 W	1982-05 2553	6	FR 0032	20/25/8/1:30	DO		4505769 ()	BRWN BLDR SNDY LOAM 0020 BRWN GRVL 0025 GREY LMSN
SEYMOUR TOWNSHIP CON 14 009	18 273329 4919646 W	2019-03 2558	6	UT 0094	14/40/20/1:	DO		7331483 (Z297385) A256792	CLAY GRVL 0005 BLCK LMSN 0100

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 14 009	18 273261 4919696 W	1989-11 2553	6	FR 0038	25/32/10/1:5	DO		4508442 (62317)	BRWN BLDR GRVL CLAY 0018 GREY LMSN 0042
SEYMOUR TOWNSHIP CON 14 009	18 273268 4919726 L	1991-08 6003	6	SU 0041	4/42/5/1:0	DO		4509465 (90664)	GREY CLAY GRVL BLDR 0004 GREY LMSN ROCK 0046
SEYMOUR TOWNSHIP CON 14 009	18 273268 4919726 L	1991-06 6003	6	FR 0027	5/25/7/1:0	DO		4509467 (90658)	BLCK LOAM 0004 GREY CLAY GRVL BLDR 0024 GREY LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273268 4919726 L	1990-10 6003	6	FR 0053	8/70/5/1:0	DO		4509149 (64321)	BLCK LOAM BLDR LOOS 0004 GREY CLAY GRVL PCKD 0011 GREY LMSN ROCK 0075
SEYMOUR TOWNSHIP CON 14 009	18 273159 4919764 W	1988-09 2553	6	FR 0027	21/37/5/1:30	DO		4507443 (42233)	BRWN LOAM 0002 GREY SAND GRVL CLAY 0011 GREY LMSN HARD 0042
SEYMOUR TOWNSHIP CON 14 009	18 273035 4919737 W	2017-04 1507	6.25	UT 0014	9/34/12/1:	DO		7292545 (Z235973) A208050	BRWN CLAY STNS PCKD 0010 GREY LMSN HARD 0056
SEYMOUR TOWNSHIP CON 14 009	18 273302 4919468 W	1984-09 2553	6	FR 0024	18/20/40/1:0	DO		4506141 ()	BRWN LOAM SNDY BLDR 0012 GREY LMSN 0035
SEYMOUR TOWNSHIP CON 14 009	18 272994 4919666 W	1982-06 1805	6 6	FR 0028	10/33/3/1:0	DO		4505752 ()	BRWN LOAM 0002 BRWN CLAY 0006 GREY LMSN 0033
SEYMOUR TOWNSHIP CON 14 009	18 273210 4919578 W	1980-07 1805	6	FR 0023	4/25/17/1:0	DO		4505466 ()	GREY CLAY BLDR 0008 GREY GRVL BLDR 0019 GREY LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273205 4919470 W	1973-05 2118	7	FR 0039	11/32/6/2:0	DO		4503600 ()	GREY CLAY GRVL STNS 0037 GREY GRVL 0039
SEYMOUR TOWNSHIP CON 14 009	18 272970 4919802 W	1973-08 4811	6 6	SU 0028	15/25/4/0:30	DO		4503712 ()	LOAM 0004 HPAN 0016 LMSN 0030
SEYMOUR TOWNSHIP CON 14 009	18 273264 4919694 W	1973-05 2118	7 6	FR 0026	10/20/5/2:0	DO		4503601 ()	GREY CLAY GRVL STNS 0012 GREY LMSN 0019 BRWN LMSN 0026
SEYMOUR TOWNSHIP CON 14 009	18 273120 4919584 W	1973-05 2118	6	FR 0039	11/32/6/2:0	DO		4503460 ()	GREY CLAY GRVL STNS 0037 GREY GRVL CLAY 0039
SEYMOUR TOWNSHIP CON 14 009	18 273256 4919398 W	1973-06 2118						4503510 () A	GREY CLAY STNS GRVL 0054 GREY CLAY SHLE 0067
SEYMOUR TOWNSHIP CON 14 009	18 273280 4919322 W	1977-12 2553	6	FR 0023	3/15/8/1:10	DO		4504878 ()	GREY CLAY LOAM 0008 GREY LMSN 0025
SEYMOUR TOWNSHIP CON 14 009	18 273289 4919351 W	1973-06 2118	7	FR 0040	15/35/5/1:0	DO		4503511 ()	GREY CLAY GRVL BLDR 0039 GRVL 0040
SEYMOUR TOWNSHIP CON 14 010	18 273870 4920119 W	2013-07 2662	6.25 6			DO		7280408 (Z170761) A147533	BRWN SAND BLDR 0010 GREY LMSN 0033 BRWN LMSN 0080 BLUE LMSN 0083 GREY LMSN 0120
SEYMOUR TOWNSHIP CON 14 010	18 273765 4920047 W	2012-07 1413	6.25 6	FR 0085	18/131/5/1:	DO		7186153 (Z147562) A132705	STNS BLDR HARD 0004 BRWN CLAY TILL STNS 0025 GREY LMSN ROCK SOFT 0131

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 14 010	18 274033 4919466 W	2010-10 1413	6.25 6		8/116/3/1:0	DO		7156267 (Z122446) A095663	STNS BLDR GRVL 0020 GREY LMSN ROCK HARD 0116
SEYMOUR TOWNSHIP CON 14 010	18 273585 4920392 W	7115				DO		7118318 (Z59239) A053135 A	
SEYMOUR TOWNSHIP CON 14 010	18 273830 4919880 L	1992-05 6564	6	FR 0015 FR 0074	13/50/10/1:0			4509740 (116340)	GREY SAND BLDR 0011 GREY LMSN 0057 BRWN LMSN HARD 0069 GREY LMSN 0071 BRWN ROCK HARD 0074 GREY SHLE QTZ 0080
SEYMOUR TOWNSHIP CON 14 010	18 273954 4920485 W	1997-05 4008	6	UK 0038	9/115/1/1:0	DO		4511140 (110056)	BRWN CGVL BLDR OBDN 0010 GREY ROCK LMSN 0118 RED ROCK SHLE 0120
SEYMOUR TOWNSHIP CON 14 010	18 273929 4920473 W	1997-04 4008		UK 0040	15///:	DO NU		4511141 (110055)	BRWN CGVL BLDR OBDN 0013 GREY ROCK LMSN 0120 RED ROCK SHLE 0125
SEYMOUR TOWNSHIP CON 14 010	18 274025 4919850 W	1989-03 6003		SA 0142	30/30/40/:	NU		4507767 (44056) A	BRWN LOAM STNS LOOS 0006 GREY LMSN MGRD HARD 0117 BRWN LMSN SOFT 0123 GREY LMSN SOFT 0132 BRWN LMSN SOFT 0142
SEYMOUR TOWNSHIP CON 14 010	18 274105 4919630 W	2008-10 6564	6.25	0033 0065	13/32/1/1:			7119812 (Z77769) A070139	GREY CLAY SAND BLDR 0015 GREY LMSN FCRD 0032 GREY LMSN 0105
SEYMOUR TOWNSHIP CON 14 010	18 273881 4920003 W	2012-07 1413	6.25 6	FR 0060	20/116/5/1:	DO		7186152 (Z147561) A132704	BRWN SAND 0001 STNS BLDR GRVL 0014 GREY LMSN ROCK SOFT 0116
SEYMOUR TOWNSHIP CON 14 010	18 273830 4920452 W	1969-05 4811	6 6	FR 0045	9/35/5/0:30	DO		4502500 ()	LOAM 0004 LMSN 0047
SEYMOUR TOWNSHIP CON 14 010	18 273912 4919901 W	2012-07 1413	6.25 6	FR 0075	27/130/5/1:	DO		7186151 (Z147559) A132703	CGVL STNS BLDR 0031 GREY CLAY GRVL BLDR 0050 GREY LMSN ROCK SOFT 0101 GREY LMSN ROCK HARD 0131
SEYMOUR TOWNSHIP CON 14 010	18 273830 4919880 L	1989-07 6014	6 6	FR 0083	13/13//1:0	DO		4508060 (27278)	BLCK LOAM STNS LOOS 0001 GREY CLAY BLDR HARD 0019 GREY GRVL CLAY PORS 0030 BRWN SHLE CLAY LYRD 0033 GREY LMSN CLAY HARD 0082
SEYMOUR TOWNSHIP CON 14 010	18 273910 4920488 W	2018-11 1507	6.25	UT 0029 UT 0118	17/99/10/1:0	DO		7326497 (Z279302) A257918	BRWN SAND LOOS 0012 GREY LMSN HARD 0125
SEYMOUR TOWNSHIP CON 14 010	18 273891 4920037 W	2013-07 2662	6.25 6		16/101/4/1:30	DO		7280409 (Z170762) A147534	BRWN SAND BLDR 0014 GREY LMSN 0035 BLCK LMSN 0041 GREY LMSN 0069 BLUE LMSN 0075 GREY LMSN 0120
SEYMOUR TOWNSHIP CON 14 010	18 273946 4920396 W	2021-09 6578						7400163 (Z366123) A335454 P	
SEYMOUR TOWNSHIP CON 14 010	18 273604 4920464 W	2022-02 7560	6.25 5.25	UT 0048	8/42/4/2:0	DO	0035 13	7449373 (Z99583PS) A358006	BLCK LOAM SOFT 0001 GREY CLAY STNS PCKD 0028 GREY LMSN HARD 0048

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
SEYMOUR TOWNSHIP CON 14 011	18 274223 4920208 L	1992-11 6003	6	FR 0070	22/60/10/2:30	DO		4509951 (115179)	BRWN SAND BLDR PCKD 0015 GREY LMSN ROCK 0069 BLUE SHLE VERY SOFT 0073
SEYMOUR TOWNSHIP CON 14 011	18 274371 4920144 W	1973-05 4811	6 6	FR 0039	8/15/5/1:0	DO		4503592 ()	LOAM 0004 SAND GRVL 0012 LMSN 0040
SEYMOUR TOWNSHIP CON 14 011	18 274192 4919774 W	2009-07 6564	6.25	0013 0030	9/10/12/1:			7141191 (Z096174) A083598	GREY CLAY STNS BLDR 0008 GREY LMSN FCRD 0040
SEYMOUR TOWNSHIP CON 14 011	18 274220 4920252 W	1970-06 1904	6	FR 0026	0/15/15/3:0	DO		4502785 ()	MSND BLDR 0002 BRWN MSND BLDR 0023 GREY LMSN 0028
SEYMOUR TOWNSHIP CON 14 011	18 274223 4920208 L	1994-09 3367	6 6	UK 0012 UK 0054	10/44/4/1:30	DO		4510413 (150757)	BRWN LOAM SOFT 0001 BRWN SAND CLAY STNS 0009 BLCK SHLE LMSN LYRD 0012 GREY LMSN MGRD HARD 0054
SEYMOUR TOWNSHIP CON 14 011	18 273230 4919452 W	1969-06 2203	6 6	FR 0035	4/36/3/1:0	DO		4502753 ()	CLAY BLDR 0022 LMSN 0036
SEYMOUR TOWNSHIP CON 14 011	18 274406 4920219 W	1973-05 4811	6 6	FR 0036	8/15/5/1:0	DO		4503452 ()	LOAM 0004 SAND GRVL 0012 LMSN 0040
SEYMOUR TOWNSHIP CON 14 011	18 274090 4920222 W	1970-07 1904	6	FR 0065	14/58/4/4:30	DO		4502783 ()	BRWN MSND 0002 BRWN MSND CLAY BLDR 0014 GREY LMSN 0066
SEYMOUR TOWNSHIP CON 14 012	18 274402 4920916 W	1989-08 3651	6 6	FR 0088	5/102/10/1:0	DO		4508172 (59918)	RED LOAM 0001 BRWN SAND 0036 GREY GRNT 0087 RED GRNT 0093 RED GRNT 0102
SEYMOUR TOWNSHIP CON 14 017	18 274074 4919475 W	1989-06 1472	36	FR 0006 FR 0010 FR 0013	7/1/4/1:0	DO		4508518 (65251)	GREY CLAY LMSN HARD 0007 BLUE HPAN CLAY BLDR 0015
SEYMOUR TOWNSHIP CON 15 009	18 273216 4920479 W	1951-08 3121	5	FR 0034	14/34//3:0	DO		4502172 ()	CLAY MSND STNS 0034
SEYMOUR TOWNSHIP CON 15 009	18 273594 4920505 W	1983-08 2553	6	FR 0042 FR 0049	19/42/5/2:30	DO		4505984 ()	BRWN LOAM SNDY 0006 GREY BLDR HPAN 0035 BRWN HPAN 0041 GREY LMSN 0050
SEYMOUR TOWNSHIP CON 15 009	18 273180 4920492 W	1975-12 5016	6	FR 0030	25//2/3:0	DO		4504236 ()	BRWN SAND 0025 GREY LMSN 0050
SEYMOUR TOWNSHIP CON 15 009	18 273051 4920507 L	1990-06 3651	6 6	FR 0044 FR 0094	6/100/50/1:0	DO		4508780 (79779)	GREY HPAN BLDR 0030 RED GRNT 0100
SEYMOUR TOWNSHIP CON 15 010	18 273629 4920648 L	1992-04 6564	6	FR 0087	30/55/24/1:30	DO		4509675 (116332)	LOAM 0001 SAND BLDR LOOS 0010 CLAY STNS PCKD 0028 GRVL LOOS 0030 GREY LMSN 0087 YLLW GRNT 0090
SEYMOUR TOWNSHIP CON 15 010	18 273422 4920454 W	1981-08 4008	6	FR 0076	40/80/10/1:0	DO		4505621 ()	BRWN CLAY GRVL HPAN 0034 GREY ROCK LMSN 0084
SEYMOUR TOWNSHIP CON 15 010	18 272968 4920334 W	1986-05 2553	6	FR 0032	25/50/2/1:30	DO		4506370 ()	BRWN LOAM 0001 BRWN CLAY LOAM 0010 BRWN HPAN BLDR 0025 GREY ROCK FCRD 0030 GREY LMSN 0056
SEYMOUR TOWNSHIP CON 15 011	18 274565 4920994 W	1953-09 3121	5	FR 0038	14/20/1/1:30	ST DO		4502174 ()	PRDG 0018 RED MSND CLAY 0031 GREY LMSN 0040

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

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

1. Core Material and Descriptive terms

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

2. Core Color

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

3. Well Use

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

4. Water Detail

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

Appendix B

Borehole Logs and Permeameter Test Results

ORE
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HAND AUGER I.D.: **HA-1**

TOTAL DEPTH: **0.4 m**

UTM Coordinates:	Elevation (masl):
273404, 4920390	202.0

PROJECT INFORMATION	CONTRACTOR INFORMATION
PROJECT NO: **24-3484**	CONTRACTOR: **Oakridge Environmental Ltd.**
SITE LOCATION: **Trent Hills, ON**	EQUIPMENT: **Manual (Hand) Auger**
LOGGED BY: **DC**	STANDPIPE/PIEZOMETERS: **Not Installed**
DATES ASSESSED: **September 20, 2024**	SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20							
0.25							
0.30				HA-1 (0 - 0.3 m)	0.3		SM: Mottled brown silty-sand, oxidized. Well sorted. No appreciable gravel content with minimal rootlets. Dry
0.35				HA-1 (0.3 - 0.37 m)	0.37		SP: Light brown coarse sand. Well sorted. No appreciable gravel content. Dry Refused on presumed boulder/cobble @ 0.4 m

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-2**

TOTAL DEPTH: **0.38 m**

UTM Coordinates:	Elevation (masl):
273474, 4920323	201.1

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Dark brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20							
0.25				HA-2 (0.15 - 0.25)			SM: Mottled brown silty-sand, oxidized. Well sorted. No appreciable gravel content with minimal rootlets. Dry
0.30							
0.35				HA-2 (0.25 - 0.35)	0.35		SW: Light brown coarse sand with slight oxidation. Poorly sorted. Occasional subangular gravel (average 3 cm in size). Dry
				HA-2 (0.35 - 0.38)			Refused on presumed boulder/cobble @ 0.38 m

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-3**

TOTAL DEPTH: **0.4 m**

UTM Coordinates:	Elevation (masl):
273537, 4920318	200.2

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Dark brown sandy topsoil with silt, rootlets throughout. Occasional pieces of concrete (average 5 cm in size). Dry
0.05							
0.10							
0.15							
0.20							
0.25							
0.30					0.32		SM: Mottled brown silty-sand, oxidized. Well sorted. No appreciable gravel content with minimal rootlets. Dry Refused on presumed boulder/cobble @ 0.4 m
0.35							

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-4**

TOTAL DEPTH: **0.5 m**

UTM Coordinates:	Elevation (masl):
273519, 4920218	199.2

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Dark brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20					0.2		TOPSOIL: Mottled brown sandy topsoil with silt. Roolets throughout. Occasional sub-angular gravel (average 1 cm in size). Dry
0.25					0.25		SM: Mottled light brown silty-sand, oxidized. Poorly sorted. Occasional subangular gravel (average 3 cm in size). Dry
0.30					0.3		SP: Light brown sand with slight oxidation. Well sorted. No appreciable gravel content. Dry Refused on presumed boulder/cobble @ 0.5 m
0.35							
0.40							
0.45							

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-5**

TOTAL DEPTH: **0.9 m**

UTM Coordinates:	Elevation (masl):
273510, 4920140	197.7

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00 – 0.55							TOPSOIL: Brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.55 – 0.85					0.55		SM: Mottled dark brown silty-sand. Well sorted. No appreciable gravel content. Dry Refused on presumed boulder/cobble @ 0.9 m

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-6**

TOTAL DEPTH: **0.47 m**

UTM Coordinates:	Elevation (masl):
273583, 4920113	199.3

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Light brown sandy topsoil with silt, rootlets throughout. Slightly oxidized with no appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20					0.2		SP: Light brown coarse sand with slight oxidation. Well sorted. Occasional sub-angular gravel (average 2 cm in size). Dry Refused on presumed boulder/cobble @ 0.47 m
0.25							
0.30							
0.35							
0.40							
0.45							

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-7**

TOTAL DEPTH: **0.4 m**

UTM Coordinates:	Elevation (masl):
273592, 4920123	199.6

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00					0.03		TOPSOIL: Light brown sandy topsoil with silt, rootlets throughout. Slightly oxidized with no appreciable gravel content. Dry
0.05							SP: Light brown coarse sand with slight oxidation. Well sorted. No appreciable gravel content. Dry
0.10							END @ 0.40 m
0.15							
0.20							
0.25							
0.30							
0.35							

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-8**

TOTAL DEPTH: **0.37 m**

UTM Coordinates:	Elevation (masl):
273516, 4919969	195.1

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20							
0.25							
0.30					0.3		SM: Mottled brown silty-sand. Poorly sorted. Occasional gravel (average 1.5 cm in size) with minimal rootlets. Dry Refused on presumed boulder/cobble @ 0.37 m
0.35							

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-9**

TOTAL DEPTH: **0.96 m**

UTM Coordinates:	Elevation (masl):
273546, 4920020	196.6

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00 – 0.35							TOPSOIL: Dark brown sandy topsoil with silt, rootlets throughout. Occasional gravel (average 2 cm in size). Dry
0.35 – 0.4							SM: Mottled brown silty-sand, oxidized. Well sorted. No appreciable gravel content with minimal rootlets. Dry
0.4 – 0.5							SW: Light brown sand. Poorly sorted. Occasional subangular gravel (average size of 1 cm). Dry
0.5 – 0.96							SP: Light brown sand. Well sorted. No appreciable gravel content. Dry Length of auger reached @ 0.96 m

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

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HAND AUGER I.D.: **HA-10**

TOTAL DEPTH: **0.4 m**

UTM Coordinates:	Elevation (masl):
273517, 4920339	200.8

PROJECT INFORMATION

PROJECT NO: **24-3484**
SITE LOCATION: **Trent Hills, ON**
LOGGED BY: **DC**
DATES ASSESSED: **September 20, 2024**

CONTRACTOR INFORMATION

CONTRACTOR: **Oakridge Environmental Ltd.**
EQUIPMENT: **Manual (Hand) Auger**
STANDPIPE/PIEZOMETERS: **Not Installed**
SAMPLING METHODS: **Composite Grab**

▽ Seepage ▼ Water Level △ Moist

FIELD AUGER LOG

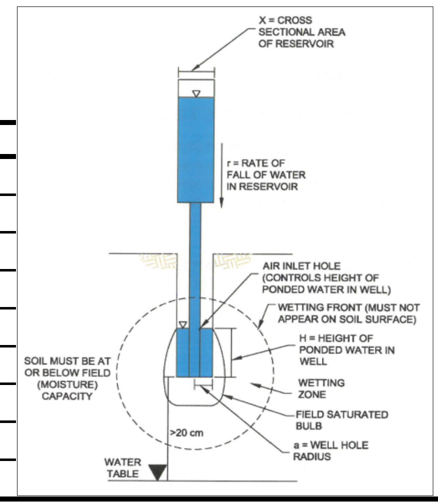
Depth (cm)	Water	Piezometer Installation	Special Notes	Sample #	Depth	Soil Symbol	Soil Description
0.00							TOPSOIL: Dark brown sandy topsoil with silt, rootlets throughout. No appreciable gravel content. Dry
0.05							
0.10							
0.15							
0.20					0.2		SM: Mottled brown silty-sand, oxidized. Well sorted. No appreciable gravel content with minimal rootlets. Dry
0.25							
0.30							
0.35					0.35		SP: Light brown sand. Well sorted. No appreciable gravel content. Dry END @ 0.4 m

NOTES: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation, NAD 83 UTM Zone 18

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

Test Pit #: HA-7
Date: September 20, 2024
Site: Timberland Dr
Job #: 24-3484
Initials: DC

Weather: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation
Type: Standard Permeameter
Field Permeability Test #: 1



Field Parameters	
D - reservoir diameter (cm):	8.30
d - well hole diameter (cm):	10.00
H - height of water in well (cm):	15.00
X - cross-sectional area (cm^2):	53.46
Depth below ground surface (cm):	40.00
Soil Texture:	Silty Sand
Soil Structure:	Loose
α* (cm^{-1}):	0.36
C-Factor:	1.38

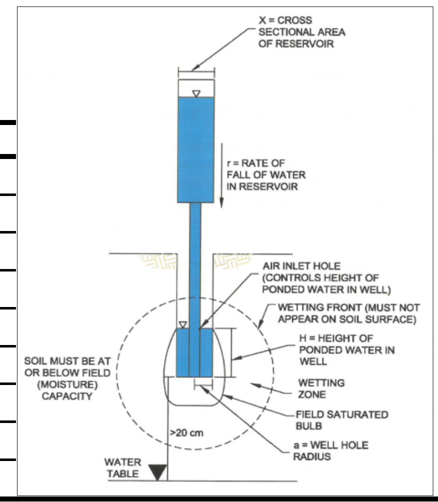
Field Data

Time	Elapsed Time (min)	Change (min)	Water Level (cm)	Change (cm)	Rate (cm/min)	Notes
12:50:00	0.0		13.0			High rate on initial upturning of permeater into borehole
12:50:30	0.5	0.5	9.8	3.3	6.50	Average rate calculated from here
12:51:00	1.0	0.5	8.3	1.5	3.00	
12:51:30	1.5	0.5	7.0	1.3	2.50	
12:52:00	2.0	0.5	5.8	1.3	2.50	
12:52:30	2.5	0.5	4.5	1.3	2.50	
12:53:00	3.0	0.5	3.5	1.1	2.10	
12:53:30	3.5	0.5	2.4	1.1	2.10	
12:54:00	4.0	0.5	1.3	1.2	2.30	
12:54:30	4.5	0.5	0.3	1.0	1.90	

Rate (cm/min):	**2.36**
Hydraulic Conductivity - K_{fs} (cm/s):	**1.63E-03**
Interpolated Infiltration Rate - I_r (mm/hr):	**80.2**
Interpolated Infiltration Rate - I_r (mm/hr):	**see above/below**
Calculated Infiltration Rate - I_r (mm/hr):	**97.6**

Test Pit #: HA-7
Date: September 20, 2024
Site: Timberland Dr
Job #: 24-3484
Initials: DC

Weather: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation
Type: Standard Permeameter
Field Permeability Test #: 2



Field Parameters	
D - reservoir diameter (cm):	8.30
d - well hole diameter (cm):	10.00
H - height of water in well (cm):	15.00
X - cross-sectional area (cm^2):	53.46
Depth below ground surface (cm):	40.00
Soil Texture:	Silty Sand
Soil Structure:	Loose
α* (cm^{-1}):	0.36
C-Factor:	1.38

Field Data

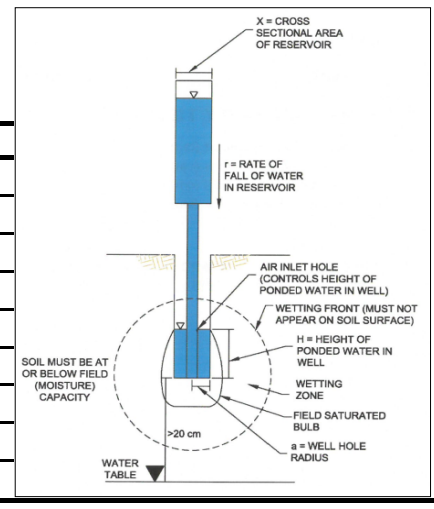
Time	Elapsed Time (min)	Change (min)	Water Level (cm)	Change (cm)	Rate (cm/min)	Notes
13:02:00	0.0		25.5			
	2.0	2.0	25.1	0.4	0.20	
	4.0	2.0	23.8	1.3	0.65	
	6.0	2.0	21.8	2.1	1.03	
	8.0	2.0	19.5	2.3	1.13	
	10.0	2.0	17.5	2.0	1.00	
	15.0	5.0	12.3	5.2	1.04	
	20.0	5.0	7.1	5.2	1.04	
	25.0	5.0	2.0	5.1	1.02	
	27.0	2.0	0.0			

Rate (cm/min):	**0.99**
Hydraulic Conductivity - K_{fs} (cm/s):	**6.79E-04**
Interpolated Infiltration Rate - I_r (mm/hr):	**66.1**
Interpolated Infiltration Rate - I_r (mm/hr):	**66.1**
Calculated Infiltration Rate - I_r (mm/hr):	**77.3**

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Environmental and Hydrogeological Services

Test Pit #: HA-10
Date: September 20, 2024
Site: Timberland Dr
Job #: 24-3484
Initials: DC

Weather: 27°C, Sunny, Low wind (2-10km/h), 0mm precipitation
Type: Standard Permeameter
Field Permeability Test #: 1



Field Parameters		
D - reservoir diameter (cm):	8.30	
d - well hole diameter (cm):	10.00	
H - height of water in well (cm):	15.00	
X - cross-sectional area (cm^2):	53.46	
Depth below ground surface (cm):	40.00	
Soil Texture:	Silty Sand	
Soil Structure:	Loose	
α* (cm^{-1}):	0.36	
C-Factor:	1.38	

Field Data

Time	Elapsed Time (min)	Change (min)	Water Level (cm)	Change (cm)	Rate (cm/min)	Notes
13:02:00	0.0		38.3			High rate on initial upturning of permeater into borehole
	1.0	1.0	38.1	0.1	0.15	Average rate calculated from here
	2.0	1.0	37.5	0.6	0.60	
	3.0	1.0	36.6	0.9	0.90	
	4.0	1.0	35.7	0.9	0.90	
	5.0	1.0	34.6	1.1	1.10	
	6.0	1.0	33.9	0.7	0.70	
	7.0	1.0	33.0	0.9	0.90	
	8.0	1.0	32.2	0.8	0.80	
	9.0	1.0	31.4	0.8	0.80	
	10.0	1.0	30.5	0.9	0.90	
	15.0	5.0	26.4	4.1	0.82	
	20.0	5.0	22.4	4.0	0.80	
	25.0	5	18.1	4.3	0.9	
	30.0	5	13.8	4.3	0.9	
	40.0	10	5.8	8.0	0.8	
	46.5	6.5	0.0			
					Rate (cm/min):	**0.84**
					Hydraulic Conductivity - K_{fs} (cm/s):	**5.78E-04**
					Interpolated Infiltration Rate - I_r (mm/hr):	**63.3**
					Interpolated Infiltration Rate - I_r (mm/hr):	**63.3**
					Calculated Infiltration Rate - I_r (mm/hr):	**74.0**

Appendix C

Site Photos



Photo A: Photo of wooded area in south-west corner of property. Photo taken facing west.



Photo B: Photo of boulders in middle of property (In Lot 5). photo taken facing south-west.



Photo D: Photo of concrete pile on north end of the subject site. Photo taken facing north-west.



Photo C: Photo of abandoned foundation on north end of subject site. Photo taken facing west.



Photo E: Overview of property taken from the north-east corner facing south-west.

Site photos were taken on September 20, 2024

Stage 1 Update
Hydrogeological Study for Residential Development Application
River Road and Timberland Drive
Part Lot 10, Concession 14 (Seymour)
Municipality of Trent Hills, Northumberland County

ORE Oakridge Environmental Ltd.
Environmental and Hydrogeological Services

TITLE
Site Photos

PROJECT # 24-3484

DATE October 2024

APPENDIX **C**