

strum

CONSULTING



LEVEL 1 GROUNDWATER ASSESSMENT
809 Horne Settlement Road
Enfield, NS

May 26, 2026

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Andrew Gilby and Juliette Gilby

**Re: Level 1 Groundwater Assessment
809 Horne Settlement Road, Enfield, NS**

Attached is the Level 1 Groundwater Assessment report prepared for 809 Horne Settlement Road in Enfield, NS.

The report documents our observations, findings, and recommendations.

We trust this to be satisfactory at this time. Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,



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EXECUTIVE SUMMARY

Andrew and Juliette Gilby commissioned Strum Consulting to conduct a Level 1 Groundwater Assessment for eight to nine single-family dwellings (lots) in Enfield, within the Municipality of East Hants of Nova Scotia.

Based on the findings of this Level 1 Groundwater Assessment completed for the Development, the following conclusions are provided:

- No potential environmental concerns related to the Development were noted during the site visit, historical records review, or previous assessments.
- Both dug and drilled wells are found within the Study Area, per the NS Well Logs Database.
- Based on pumping test data from nearby sites, the underlying bedrock aquifer appears capable of yielding approximately 56.0 Lpm. This groundwater yield is anticipated to be sufficient to meet the 1,350 Lpd requirement in the NSECC (2011) guidelines.
- Through the lot water balance and well interference calculations, the Level 1 completed an evaluation of potential effects. The Development appears to satisfy the NSECC (2011) assessment criteria by providing a sufficient water yield (1,350 Lpd) while maintaining sufficient ecological support and minimal interference to on-site or off-site wells.
- Based on a province-wide aquifer characterization, the underlying bedrock aquifer appears capable of supplying sufficient water quality for the Development, with some homes possibly requiring conventional treatment systems to meet the Guidelines for Canadian Drinking Water Quality (GCDWQ) (Health Canada, 2025). Such parameters, which may exceed the maximum allowable concentration or the aesthetic objective of the GCDWQ, include hardness, sodium, and manganese. All of these contaminants can be treated by conventional treatment systems, typically at the point of entry (POE) into the home. Specific treatment feasibility and system costs will need to be determined based on on-site water testing.
- Given the Development is for eight to nine lots and meets the water balance and interference criteria, a Level 2 assessment is not required.

Based on the findings of the Level 1, the following recommendations are forwarded:

- Based on the water quality and quantity data reviewed in this Level 1, private drilled wells should be used to supply the Development. Surficial wells require greater clearance from septic systems and are generally more susceptible to contamination from surface or near-surface sources, and are more susceptible to drought.
- Maintaining the current average lot size provides an estimated 2,560 Lpd per lot. Should the number of lots increase from that stated in the Level 1, the findings should be reviewed to ensure the Development can be sustainably serviced by groundwater.
- Construct drilled wells to a minimum depth of 42.6 m (140 ft) or up to a depth of 91 m (300 feet) unless the desired air lift yield is attained at a shallower depth, and per the Well Construction Regulations (N.S. Reg. 382/2007), including two casing lengths or to

bedrock (whichever is greater) and grouted in place. Additional depth may be added if the driller's airlift yield is less than 2 Lpm. Wells should be spaced at least 30 m apart, or more, to avoid interference.

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1.0 INTRODUCTION

Strum Consulting was commissioned by Andrew and Juliette Gilby (the "Client") to conduct a Level 1 Groundwater Assessment (the "Level 1"). The Client is looking to rezone and develop a property into eight to nine single-family dwellings (lots), with individual on-site wells and a private road (the "Development"), in Enfield, within the Municipality of East Hants, Nova Scotia (NS) (Drawing 1, Appendix A). The Development is located at 809 Horne Settlement Road, on property identification (PID) 45080801; herein referred to as the "site."

1.1 Regulatory Context and Requirements

The Level 1 is completed in accordance with the Nova Scotia Environment and Climate Change (NSECC) Guide to Groundwater Assessments for Subdivisions Served by Private Wells (2011).

The NSECC (2011) guidelines require a Level 1 Groundwater Assessment for developments proposing to construct 10 or more lots, or that are otherwise required by the Municipality due to concerns related to groundwater quality and/or quantity. Through the Development Agreement with the Municipality of East Hants, a Level 1 is required.

2.0 ASSESSMENT PURPOSE AND SCOPE

The Level 1 completed by Strum follows the NSECC (2011) guidelines and is based on the Client's preliminary Development plans. The Level 1 is a high-level screening tool to determine the potential for groundwater quality and/or quantity issues. The Level 1 consists of (but is not limited to) the following:

- **Records review:** Review existing records to characterize local hydrology, hydrogeology, and land use on and near the site. The Level 1 reviewed information pertaining to the following:
 - Google Earth Satellite Imagery
 - NS Environmental Registry Request
 - NS Well Logs Database
 - NS Pumping Test Database
 - Well Water Quality Data
 - Groundwater Reports
 - Geological Maps and Reports
 - Watershed Information
 - Previous Groundwater Assessments
- **Site visit:** Strum completed a site visit (May 8, 2026) to verify and supplement the information collected from the records review.
- **Reporting:** The conclusions and recommendations are presented in this Level 1.

This Level 1 is not intended to guarantee that groundwater can adequately supply potable water to the Development; however, based on the work to date, the Level 1 will identify potential concerns related to groundwater quality and quantity at the site.

3.0 SITE DESCRIPTION

3.1 Site Location

The site is located east of Shubenacadie Grand Lake in Enfield, NS and includes PID 45080801, a land parcel on Horne Settlement Road. The site comprises approximately 9.4 hectares (ha), and the Study Area includes neighbouring land parcels located within 500 m of the site.

The Development consists of eight new residential lots, one existing residential dwelling, and an access road (Drawing 1, Appendix A).

- Lot 1 (existing dwelling) = approximately 0.4 ha.
- Lots 2 = approximately 0.6 ha.
- Lots 3 to 8 = approximately 0.8 ha each.
- Lot 9 = approximately 2.7 ha.

The lots are configured to follow the existing property boundaries, with access provided via a single internal roadway extending from Horne Settlement Road. The overall layout has been designed to maximize developable area. The Development is intended to be serviced by individual private wells and on-site septic systems located within each lot.

3.2 Surrounding Land-use

The lands surrounding the site include Shubenacadie Grand Lake to the west and residential homes to the north, east, and south. Homes are located along Edward Drive, which forms the site's northern boundary. Additional homes are situated along Horne Settlement Road to the east, which also provides access to the site. Sheridan Brook Road and the adjacent property define the southern boundary (Drawing 1, Appendix A).

3.2.1 Satellite Imagery

Google Earth Pro (2026) aerial imagery covering the period from May 2003 to September 2025 was reviewed to determine land use within the site and the Study Area. The following observations were noted during the aerial photograph review:

- From 2003 to 2025, the site and the surrounding area experienced little change.
 - Approximately eight additional homes were built to the north on Edward Drive.
 - At least one additional home appears to have been built on Horne Settlement Road between Renfrew Drive and Sheridan Brook Road.
 - At least one additional home was built on the southern side of Sheridan Brook Road.

No environmental concerns which may adversely impact groundwater in the area were noted during the aerial photographs review. Nearly all neighbouring land use appeared to be residential, with one nearby property at 294 Renfrew Road (PID 45209483) having apparent dual use (commercial and residential). This property was visually inspected during the site visit (Section 3.4); however, no obvious land use concerns were noted.

3.2.2 Environmental Registry Request

Strum submitted an NSECC environmental registry request for the site and searchable neighbouring properties (Table 3.1).

Table 3.1: PIDs Submitted for NSECC Environmental Registry Request

PIDs	
45080801 ⁽¹⁾	45409000
45080777	45443132
45213881	45081213
45210051	45081205
45211315	45080793
45408994	45209483
45419058	45204377

⁽¹⁾ Development PID

The environmental registry request results identified several files related to on-site sewage disposal systems, notification receipts, and a request for comment on subdivision plans. These forms are standard for constructing new homes with septic systems, and, as such, no environmental concerns were noted. The environmental registry request results identified a registered public water supply located at 791 Horne Settlement Road (PID 45204377). Of note, this system is under a current boil water advisory (issued April 17, 2026) (NSECC, 2026). However, this system is an apparent surface-water system (PNI Atlantic, 2021) and therefore does not necessarily indicate any concern regarding microbiological contamination of the underlying aquifer.

3.3 **Site Visit Observations**

On May 8, 2026, a qualified environmental geoscientist (MIT) conducted a site visit without a Client representative present. The site visit aimed to examine topographic patterns on the site and accessible parts of neighbouring properties, observe domestic well sites on those neighbouring properties, and evaluate potential environmental issues in the area that might adversely affect groundwater quality and/or quantity.

The site visit consisted of a walk-through of the site from the eastern to the western portion. This included the forested areas and the existing residence located at 809 Horne Settlement Road. Refer to the photo log in Appendix B for photos taken during the site visit.

The eastern portion of the site contains an existing residence along 809 Horne Settlement Road. This residence contained a domestic oil tank, an apparent on-site septic, and an apparent dug well. Three sheds were located on the site, and several piles of debris (e.g., an old domestic oil tank). Moving westward toward Shubenacadie Grand Lake, the site becomes forested, with the only observed access trail along its northern boundary, likely established as a survey line. A watercourse enters the property from the north and crosses southwest until it exits the property to the south. In general, the site slopes from east to west and is bound by Shubenacadie Grand Lake (Appendix B).

3.3.1 Off-Site Well Locations & Local Land Use

Off-site well locations and local land use were determined through a visual inspection along the neighbouring roads. The site visit corroborated the NS Well Logs Database (NSECC & NSNR, 2022), which indicated that private domestic groundwater wells provide at least some of the neighbouring community's potable water supply. Local land use consists primarily of residential properties and undeveloped forested lands, except for one nearby property at 294 Renfrew Road (PID 45209483), which appears to have mixed commercial and residential use. This property was visually inspected during the site visit and appeared to be used for storing heavy equipment (e.g., a snowplow and a tractor). Permission to access the site was not obtained; however, no obvious land use concerns were noted.

3.3.2 Surface Water Features

Of note were a watercourse (Appendix B) and Shubenacadie Grand Lake, which bounds the western portion of the site (Drawing 1, Appendix A).

3.3.3 Obvious Potential Contamination Sources

The only notable signs of on-site contamination are the domestic oil tank, the septic tank, and piles of rubbish (e.g., an old domestic water tank). These items should be removed or decommissioned (as required) by qualified contractors prior to developing the site. Water quality sampling of any constructed groundwater well should be completed prior to commissioning.

3.4 **Known Local Water Quantity/Quality Concerns**

No existing reports of water quality and/or quality concerns were identified by Strum or provided by the Client for the site or its surrounding area. The only noted concern was the boil water advisory at 791 Horne Settlement Road, due to surface-water quality issues from Shubenacadie Grand Lake.

4.0 **Surface Water and Watershed Setting**

4.1 **Topography, Drainage and Watersheds**

The primary watershed is the Shubenacadie/Stewiacke watershed, and the secondary watershed is the Shubenacadie River watershed (Drawing 2, Appendix A). A single unnamed watercourse was identified through desktop mapping and confirmed during the site visit (Appendix B) and flows southwest. Drainage throughout the site will be controlled by local topography, the unnamed watercourse, and drainage ditches along roads. Broadly, local topography is higher in the east and lower in the west and southwest. Ultimately, surface water will drain into Shubenacadie Grand Lake.

4.2 **Local Surface Water Features**

The nearest local surface water feature is the on-site unnamed watercourse, which flows northeast to southwest, and Shubenacadie Grand Lake, which borders the site to the west. The Shubenacadie River is approximately 2.5 km south of the site.

4.3 Flood Risk

The site is located inland, over 5 km from the nearest coastline; therefore, coastal flooding is not considered a risk to the Development.

However, the site is situated next to Shubenacadie Grand Lake, which may experience periodic flooding. There is currently no publicly available flood mapping for the East Hants portion of Shubenacadie Grand Lake. However, flood risk within the Shubenacadie Grand Lake area is influenced by proximity to the shoreline, local topography, hydraulic connectivity within the Shubenacadie watershed, seasonal snowmelt, and extreme precipitation events. Low-lying areas adjacent to the lake and connected watercourses may be susceptible to temporary inundation during periods of elevated water levels and significant rainfall.

Recent floodplain studies indicate that portions of the Shubenacadie Lakes system (Fletchers Lake, Thomas Lake, Lake William, and Lake Charles) may face increasing flood risk due to projected climate change, including more frequent and intense precipitation events (CBCL, 2020).

Flood risk at a given property is dependent on local elevation, drainage characteristics, shoreline setback, and proximity to mapped floodplain boundaries. Flooding may affect well integrity, promote surface water intrusion into the groundwater system, and degrade water quality through potential contamination. A flood risk assessment exceeds the Level 1 scope.

5.0 Local Geology and Hydrogeology

5.1 Existing Water Users

Based on the surrounding area, the existing water users neighbouring the site are likely derived from single-family dwellings along Edward Drive and within Horne Settlement Road. However, some of these users may also be receiving water from Shubenacadie Grand Lake.

The NS Well Logs Database (NSECC & NSNR, 2022) was reviewed to identify the distribution and characteristics of drilled water wells within 500 m of the site. There are notable limitations related to the spatial accuracy of the well logs database. For this Level 1, any groundwater wells with a spatial uncertainty exceeding 1,000 m were excluded from the analysis.

Four dug wells were identified; all dug wells were reported to be used for domestic water consumption, except for one, which was not designated a usage type (Drawing 3, Appendix A). The surrounding dug wells ranged in depth from 5.3 m to 21.3 m, with a median depth of 6.1 m. The reported estimated yield from these wells was only recorded for two of the four wells and was 45.4 litres per minute (Lpm) and 717.3 Lpm (Table 1, Appendix C). It should be noted that the dug well, with an estimated yield of 717.3 Lpm, was reported to have poor water quality in the well log (NSECC & NSNR, 2022).

A total of 15 drilled wells were identified; all drilled wells were reported to be used for domestic water consumption (Drawing 4, Appendix A). The surrounding wells were constructed to depths ranging from 25.0 m to 124.8 m, with a median depth of 42.6 m. These wells

encountered bedrock between 5.8 m and 60.9 m below grade with a median bedrock depth of 22.2 m. The reported estimated yield from these wells ranged from 0.05 litres per minute (Lpm) to 454.0 Lpm with a median of 36.3 Lpm (Table 1, Appendix C).

Estimated yields (dug and drilled) are estimates based on short-duration tests (e.g., airlift tests) conducted at the end of well construction. It is important to note that long-term well production rates are typically 20% to 50% of these estimates.

Longer-term or more continuous safe yields must be evaluated by aquifer testing (Section 5.4.3).

5.2 Surficial Geology

The site is underlain by Quaternary silty till plain deposits associated with ground moraine and streamlined drift (Drawing 3, Appendix A). These materials consist of compact, silty sediments derived from both local and distant sources and were deposited beneath melting ice sheets. The terrain is generally flat to gently rolling, with few surface boulders, and the till thickness (approximately 3 to 30 m) is sufficient to obscure underlying bedrock topography. These deposits are significant for their moderate drainage and stoniness, good buffering capacity due to calcareous content, and suitability for agriculture, making them among the most productive soils in the province (Stea et al., 1992).

5.3 Surficial Hydrogeology

Based on the NS Well Logs Database (NSECC & NSNR, 2022), four dug wells were found within the Study Area (Table 1, Appendix C). No surficial aquifers are mapped within the site or the Study Area.

With limited available resources on surficial groundwater quality at the site and in the surrounding area, it is difficult to determine the expected water quality and/or quantity from dug wells. In general, hardness, iron, manganese, colour, turbidity, and low pH are the most common chemical parameters which may pose aesthetic issues to the user and may require point-of-entry (POE) treatment. Conventional treatment is available if necessary. Colour may be challenging to treat if it is due to humic substances. Although less common, arsenic and uranium may contribute to additional quality issues in surficial materials.

The site is considered a medium-risk area for manganese contamination and low-risk for corrosive groundwater in surficial water wells (Kennedy, 2019, 2021). The site is also considered a medium risk for the potential impact of drought on private wells (Kennedy & Drage, 2017a).

5.4 Bedrock Geology

The site is underlain by the Early Carboniferous Green Oaks Formation and Macdonald Road Formation of the Windsor Group. The Green Oaks Formation comprises reddish-brown siltstone and fine-grained sandstone, with intercalated marine limestone and dolostone, and associated anhydrite or gypsum. Whereas the Macdonald Road Formation comprises gypsum, anhydrite, and some halite and is interbedded with siltstone (Horne et al., 2009). These rocks

were formed in a shallow-marine depositional environment, with periods of drought that produced minor evaporites (Drawing 4, Appendix A).

Detailed geological mapping indicates that a lineament runs northwest-southeast along the western portion of the site (Horne et al., 2009).

Note that the underlying bedrock is considered high risk for encountering karst topography (Drage, 2019).

5.5 Bedrock Hydrogeology

5.5.1 Bedrock Groundwater Region

The Windsor Group rocks underlying the site form part of the Carbonate/Evaporite groundwater region of NS. Wells within the Carbonate/Evaporite groundwater region typically produce higher yields due to the more highly fractured nature of the bedrock. However, groundwater quality is often characterized by elevated total dissolved solids and increased hardness. In addition, sulphate and salinity levels are commonly higher in this setting (Kennedy, 2009).

5.5.2 Water Quality

The NS Groundwater Chemistry map series (NSNR, 2021) was reviewed; however, no chemistry data were available within a 500 m radius of the site. The nearest groundwater chemistry data were more than 4 km from the site and were collected from wells within the Goldenville Formation, which is not anticipated to be representative of on-site conditions.

A review of province-wide pumping data across the Carbonate/Evaporite groundwater region indicates that groundwater quality tends to be higher for many general inorganic parameters than in other bedrock groundwater regions (i.e., sedimentary, metamorphic, volcanic, or plutonic), including alkalinity, hardness, total dissolved solids, calcium, magnesium, potassium, sodium, and sulphate. Typically, alkalinity, hardness, and total dissolved solids relate more to operational concerns of a treatment system or to aesthetic issues in water quality. Additionally, median sodium values exceed the aesthetic parameters of the Guidelines for Canadian Drinking Water Quality (GCDWQ, 2025) (Kennedy, 2009).

This site is considered medium-risk for manganese groundwater in bedrock wells, and low-risk for arsenic and uranium in bedrock wells (Kennedy & Drage, 2017b; Kennedy & Drage, 2020; Kennedy, 2021).

Sources of water hardness are typically natural and related to the underlying bedrock material. Water hardness can be caused by a variety of parameters, most commonly calcium and magnesium. Typical treatment systems can be installed and often include water softeners (i.e., ion exchange treatment). The most common sources of manganese in drinking water are naturally occurring and result from the weathering of manganese-bearing rocks and soils. Effective treatment methods for reducing manganese levels in drinking water include ion exchange, distillation, reverse osmosis, and catalyzed oxidation/filtration. Specific treatment

feasibility and system costing will need to be determined based on on-site water testing (NSECC, 2025a).

5.5.3 Water Quantity

The NS Pumping Test Database (NSNR, 2022) was reviewed, although no pumping test data were available within a 500 m radius of the site. The nearest pumping test was located over 4 km from the site and situated in the Goldenville Formation, which is not anticipated to be representative of on-site conditions.

A review of province-wide pumping data across the Carbonate/Evaporite groundwater region indicates that groundwater quantity tends to be higher than in most other bedrock groundwater regions (i.e., metamorphic, volcanic, or plutonic) (Table 5.1) (Kennedy, 2009).

Table 5.1: Carbonate/Evaporite Groundwater Region Median Aquifer Properties

Median Well Yield (Lpm)	Median Specific Capacity (m ³ /d/m)	Median Transmissivity (m ² /d)	Storativity
56.0	7.4	5.2	6.60E-04

Source (Kennedy, 2009 & NSECC & NSNR, 2011)

The pumping test statistics indicate a median long-term safe yield (Q₂₀) of approximately 56.0 Lpm, a median specific capacity of 7.4 cubic metres per day per metre (m³/d/m), and a median transmissivity of 5.2 square metres per day (m²/d) (Kennedy, 2009). Additionally, the median storativity value across the Carbonate/Evaporite groundwater region is 6.60E-04 (unitless) (NSECC & NSNR, 2011).

These groundwater yields and aquifer characteristics are likely sufficient for the Development, provided similar yields are found on the site. However, it should be noted that the pumping tests completed in the NS Pumping Test Database (NSNR, 2022) and characterized by Kennedy (2009) provide apparent transmissivity values, which can be used to inform aquifer properties; however, these are generally influenced by well effects (e.g., wellbore skin) and are not necessarily indicative of the properties of the broader aquifer.

5.5.4 Observation Wells

The nearest provincial groundwater observation well is more than 15 km from the site and is located in the metamorphic bedrock groundwater region; therefore, it is not expected to be representative of on-site conditions. There are no provincial observation wells within the Carbonate/Evaporite groundwater region within 50 km of the site (NSECC, 2025b).

5.5.5 Saltwater Intrusion

The site is located inland; therefore, saltwater intrusion is not considered a risk to the Development.

5.5.6 Drought Risk

The NS Potential Impact of Drought to Private Wells risk map was reviewed for this Level 1. The site is considered a medium risk for potential drought in private wells. However, it should

be noted that this risk map is based on a snapshot of drought risk as of September 15, 2022, and does not necessarily reflect future risk rankings. Additionally, drought risk is highly variable and determined by precipitation trends, well construction, and population density; therefore, the Level 1 cannot accurately quantify drought risk.

To mitigate drought risk for privately owned wells, deeper wells tend to be less susceptible to drought than shallower wells (Kennedy & Drage, 2017a).

6.0 Evaluation of Potential Effects

6.1 Lot Water Balance

Each well serving a single-family residential household should be capable of supplying at least 1,350 litres per day (Lpd) continuously. The requirement to provide 1,350 Lpd for single-residential households is an estimate based on the average home and does not differentiate by home size (NSECC, 2011). Therefore, more water may be needed for any individual home; however, for this Level 1, the 1,350 Lpd guidance was used to represent the average home and inform the Lot Water Balance.

A simplified water balance calculation was used to estimate whether the available groundwater on each lot in the Development area would meet the target water demand of 1,350 Lpd. The calculations and definitions are based on those outlined in the NS Guide to Groundwater Assessments for Subdivisions Serviced by Private Wells (NSECC, 2011). According to NSECC (2011):

"The calculation assumes that the available groundwater is equal to the groundwater recharge that occurs on the lot, minus the amount of groundwater reserved for ecological use. Ecological use refers to groundwater that helps maintain ecological habitats by discharging as baseflow to surface waterbodies. Ecological use is assumed to be 50% of the groundwater recharge."

$$Q_{lot} = \frac{IA_{lot}E_{use}}{365 \text{ days}} \quad (\text{Eq. 1})$$

Where: Q_{lot} = Available groundwater from each lot (Lpd)
 I = Groundwater recharge rate (mm/year)
 A_{lot} = Lot area contributing to recharge, excludes impermeable areas (m²)
 E_{use} = Percentage for recharge reserved for baseflow/ecological support (%)

$$A_{lot} = A_{avg} - (A_{avg} \times ISP) \quad (\text{Eq. 2})$$

Where: ISP = Percentage of impervious surface area in subdivision development (%)
 A_{avg} = Average area of development lot (m²)

The Client provided a site overview of the Development, which, together with available provincial datasets, was used to calculate the Lot Water Balance. The Client intends to construct 8 to 9 single-family dwellings (lots) with individual on-site wells on a site totalling 94,160 m². These lots will vary in size; however, the mean lot size (A_{avg}) will be 10,462 m². The groundwater (bedrock) recharge rate was obtained through the NS Groundwater Toolkit (NSECC & NSNR, 2011) and was determined to be 188 mm/year. The Client did not provide a detailed design of the Development; therefore, the ISP was determined through a desktop geomatics assessment of the surrounding neighbourhood along Horne Settlement Road. Based on satellite imagery and assuming the Development will provide a site design similar to that of its surrounding community, the ISP was determined to be 2.3%. This value was rounded to 5% to account for any variances.

The Lot Water Balance inputs and results are provided in Table 6.1.

Table 6.1: Parameters and Results for Water Balance Calculation

No. of Lots	I (mm/year) ⁽¹⁾	A_{avg} (m ²)	E_{use} (%)	ISP (%)	A_{lot} (m ²)	Q_{lot} (Lpd)
9	188	10,462	50	5	9,938	2,560

⁽¹⁾ Based on recharge from the Shubenacadie/Stewiacke Watershed (Drawing 2, Appendix A) (Kennedy et al., 2010).

From Table 6.1, the groundwater recharge available to the average individual lot (Q_{lot}) is greater than the average daily demand of 1,350 Lpd. Therefore, the Development satisfies the Lot Water Balance, and sufficient water is anticipated to be available for the Development.

6.1.1 Potential Effects on Surface Water Features

Based on the Lot Water Balance (Section 6.1), there are no anticipated effects on surface water features.

6.2 Well Interference

The NS Groundwater Toolkit (NSECC & NSNR, 2011) was used to estimate well interference for wells within the Development and those from neighbouring properties. The province-wide aquifer characteristics (Table 5.1) were used to inform the Well Interference calculations (Table 6.2). Note that the aquifer characteristics may not exactly reflect current on-site conditions.

Furthermore, the interference calculator used by the NS Groundwater Toolkit (NSECC & NSNR, 2011) relies on the Theis (1935) method, which makes several assumptions, including:

- The aquifer has infinite areal extent.
- The aquifer is homogeneous, isotropic, porous, and of uniform thickness.
- The water from storage is released instantaneously with a decline in hydraulic head.

While the Theis (1935) method is widely used and accepted for informing aquifer characteristics and performance, uncertainty is expected when these assumptions differ from the reality of the underlying aquifer. For instance, where the underlying aquifer lies within the Carbonate/Evaporate groundwater region, groundwater flow will be governed by a connected fracture network within the bedrock.

This assessment considered both on-site and off-site groundwater wells within 500 m of the site. Since it is unknown where on-site wells will be located, it was assumed that a single well would be located at the center of the Development, and all remaining lots (8) would be within 100 m of this center well.

The results of the Well Interference assessment are provided in Table 6.2.

Table 6.2: Distance-Drawdown from Pumping Well after 365 Days of Continuous Pumping

Radial Distance to Centre of Subdivision (m)	Predicted Drawdown Caused by a Single Well (m)	Number of Wells Located at Specified Radial Distance	Drawdown Caused by All Wells at Specified Radial Distance (m)
0.08	0.43	1	0.43
100	0.13	9	1.20
200	0.11	10	1.05
300	0.09	26	2.30
400	0.08	58	4.45
500	0.07	91	6.15
Total			15.59

Aquifer Characteristics provided by Kennedy, 2009, & NSECC & NSNR, 2011.
 Aquifer Characteristics are based on median values province-wide.
 Pumping Rate = 1,350 Lpd

Note that the NSECC topographic database building layer was used to determine the number of residences within the Study Area. This database often includes structures such as garages; therefore, it may overestimate the number of wells near the site (GeoNova, 2026).

The total cumulative drawdown is estimated at approximately 15.59 m (Table 6.2). The median depth of drilled wells within 500 m of the site is 42.6 m. Subtracting an assumed static water level of 5 m and a pump clearance of 5 m yields approximately 32.6 m of available water in a typical well. The predicted cumulative drawdown is less than half of the available water, indicating that the Development meets the well interference criteria and is not anticipated to cause excess drawdown within the subdivision or onto existing homes beyond the Development.

Note that the aquifer characteristics input into the Groundwater toolkit are based on a desktop review; therefore, they may not reflect current on-site conditions.

Additionally, the assumed aquifer properties for this assessment are of the bedrock aquifer.

6.3 Well Contamination

On-site septic systems are a common source of potential contamination. Surficial wells require greater clearance from septic systems and are generally more susceptible to contamination from surface or near-surface sources (30.5 m). Drilled wells can be spaced closer to septic systems at 15.2 m (Well Construction Regulations, N.S. Reg. 382/2007). Furthermore, drilled wells are typically more resilient to drought. It is recommended that drilled wells be used for this site, as these are likely to provide sufficient water quality and quantity if constructed

correctly and with adequate treatment (as required). Based on the size and placement of the individual lots, providing sufficient separation distances from on-site septic systems is not anticipated to be an issue.

7.0 CONCLUSIONS

Based on the findings of this Level 1 Groundwater Assessment completed for the Development, the following conclusions are provided:

- No potential environmental concerns related to the Development were noted during the site visit, historical records review, or previous assessments.
- Both dug and drilled wells are found within the Study Area, per the NS Well Logs Database.
- Based on pumping test data from nearby sites, the underlying bedrock aquifer appears capable of yielding approximately 56.0 Lpm. This groundwater yield is anticipated to be sufficient to meet the 1,350 Lpd requirement in the NSECC (2011) guidelines.
- Through the lot water balance and well interference calculations, the Level 1 completed an evaluation of potential effects. The Development appears to satisfy the NSECC (2011) assessment criteria by providing a sufficient water yield (1,350 Lpd) while maintaining sufficient ecological support and minimal interference to on-site or off-site wells.
- Based on a province-wide aquifer characterization, the underlying bedrock aquifer appears capable of supplying sufficient water quality for the Development, with some homes possibly requiring conventional treatment systems to meet the GCDWQ (Health Canada, 2025). Such parameters, which may exceed the maximum allowable concentration or the aesthetic objective of the GCDWQ, include hardness, sodium, and manganese. All of these contaminants can be treated by conventional treatment systems, typically at the point of entry (POE) into the home. Specific treatment feasibility and system costs will need to be determined based on on-site water testing.
- Given the Development is for eight to nine lots and meets the water balance and interference criteria, a Level 2 assessment is not required.

8.0 RECOMMENDATIONS

Based on the findings of the Level 1, the following recommendations are forwarded:

- Based on the water quality and quantity data reviewed in this Level 1, private drilled wells should be used to supply the Development. Surficial wells require greater clearance from septic systems and are generally more susceptible to contamination from surface or near-surface sources, and are more susceptible to drought.
- Maintaining the current average lot size provides an estimated 2,560 Lpd per lot. Should the number of lots increase from that stated in the Level 1, the findings should be reviewed to ensure the Development can be sustainably serviced by groundwater.

- Construct drilled wells to a minimum depth of 42.6 m (140 ft) or up to a depth of 91 m (300 feet) unless the desired air lift yield is attained at a shallower depth, and per the Well Construction Regulations (N.S. Reg. 382/2007), including two casing lengths or to bedrock (whichever is greater) and grouted in place. Additional depth may be added if the driller's airlift yield is less than 2 Lpm. Wells should be spaced at least 30 m apart, or more, to avoid interference.

9.0 STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report (the "Report") has been prepared by Strum Consulting (the "Consultant") for the benefit of Andrew and Juliette Gilby (the "Client") in accordance with the agreement between the Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to the Consultant, which has not been independently verified
- has not been updated since the date of issuance of the Report, and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole, and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client
- as required by law
- for use by governmental reviewing agencies

Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations forms part of the Report, and any use of the Report is subject to the terms hereof.

Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can reassess the conclusions presented in this report. This report was prepared by Alex Scott, MIT, EPT, Environmental Scientist and reviewed by François Gascon, P.Eng., Environmental Engineer.

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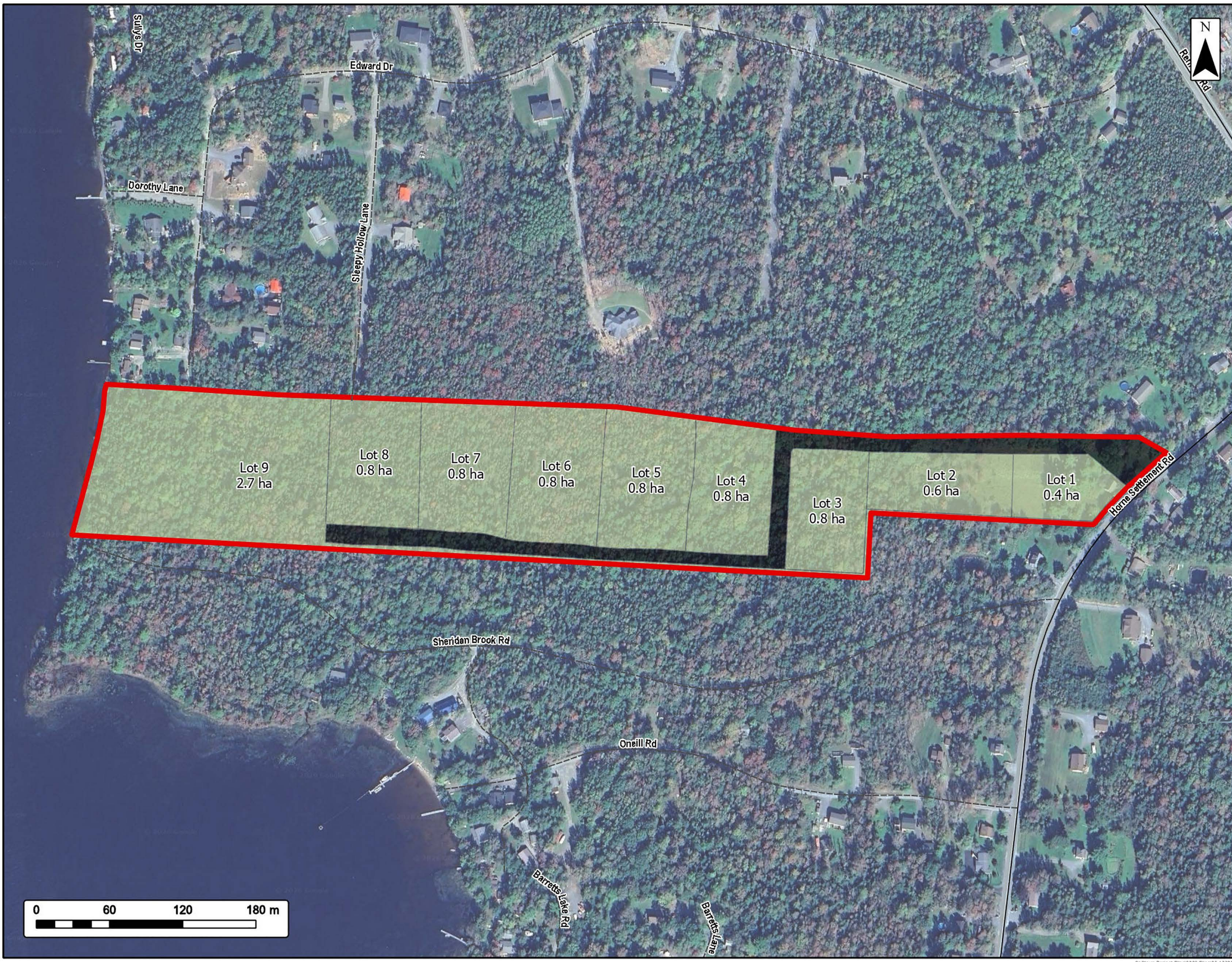
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APPENDIX A
SITE DRAWINGS



Enfield Level 1 GW Assessment Site Overview

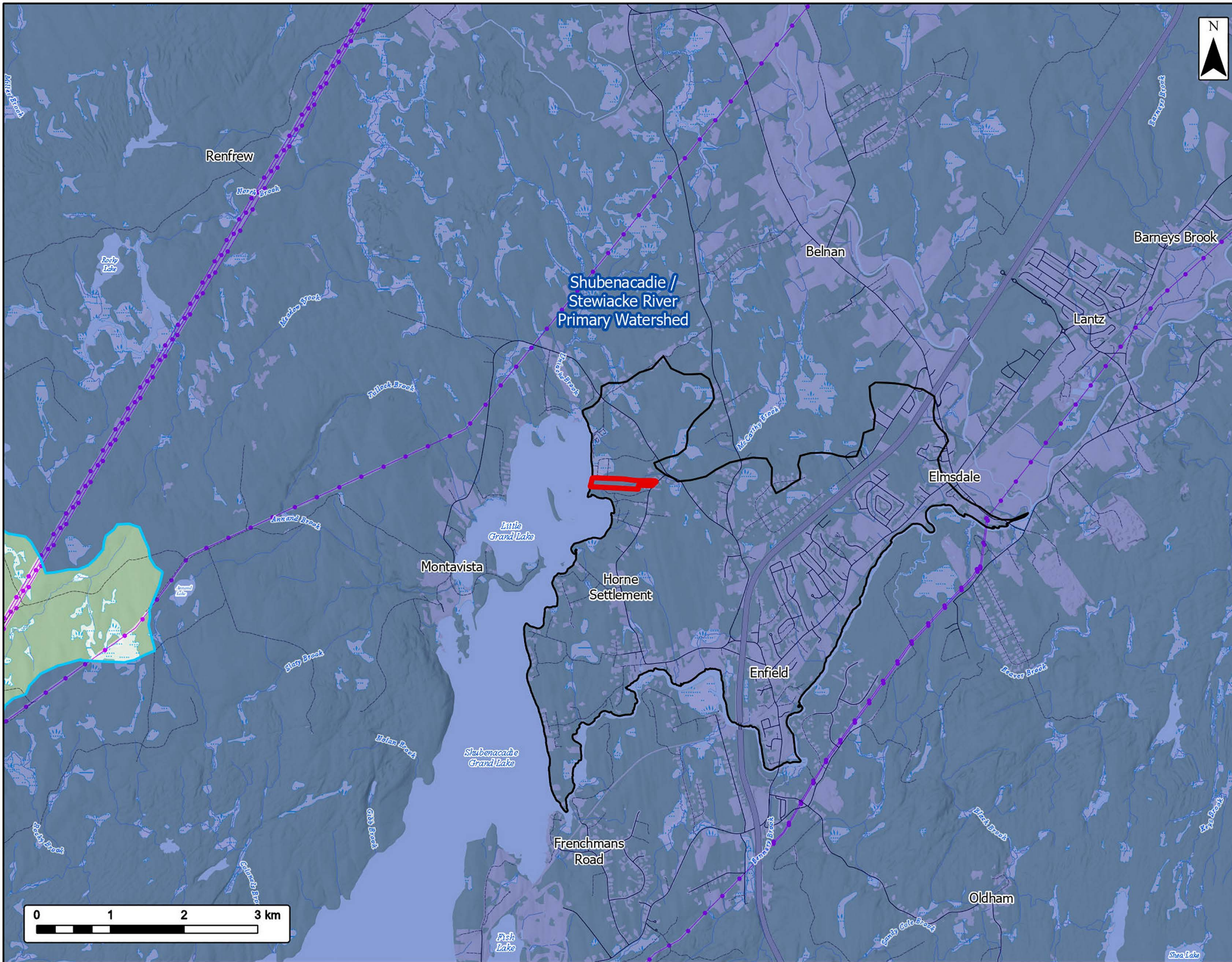
- Site (PID 45080801)
- Approximate Lot Boundaries
- Access Road
- Transportation**
- Road
- Unpaved Road



Coordinate System: NAD 1983 CSRS UTM Zone 20N
 Sources: © OpenStreetMap (and) contributors, CC-BY-SA, GeoNOVA, SNSIS, NSNRR, ACCDC, BA Canada, CNWL HERE, Garmin, USGS

Date: 2026-05-25	Project #: 26-13305
Scale: 1:3,000	1
Drawn By: K. Wallace	
Checked By: A. Scott	





Enfield Level 1 GW Assessment Watershed

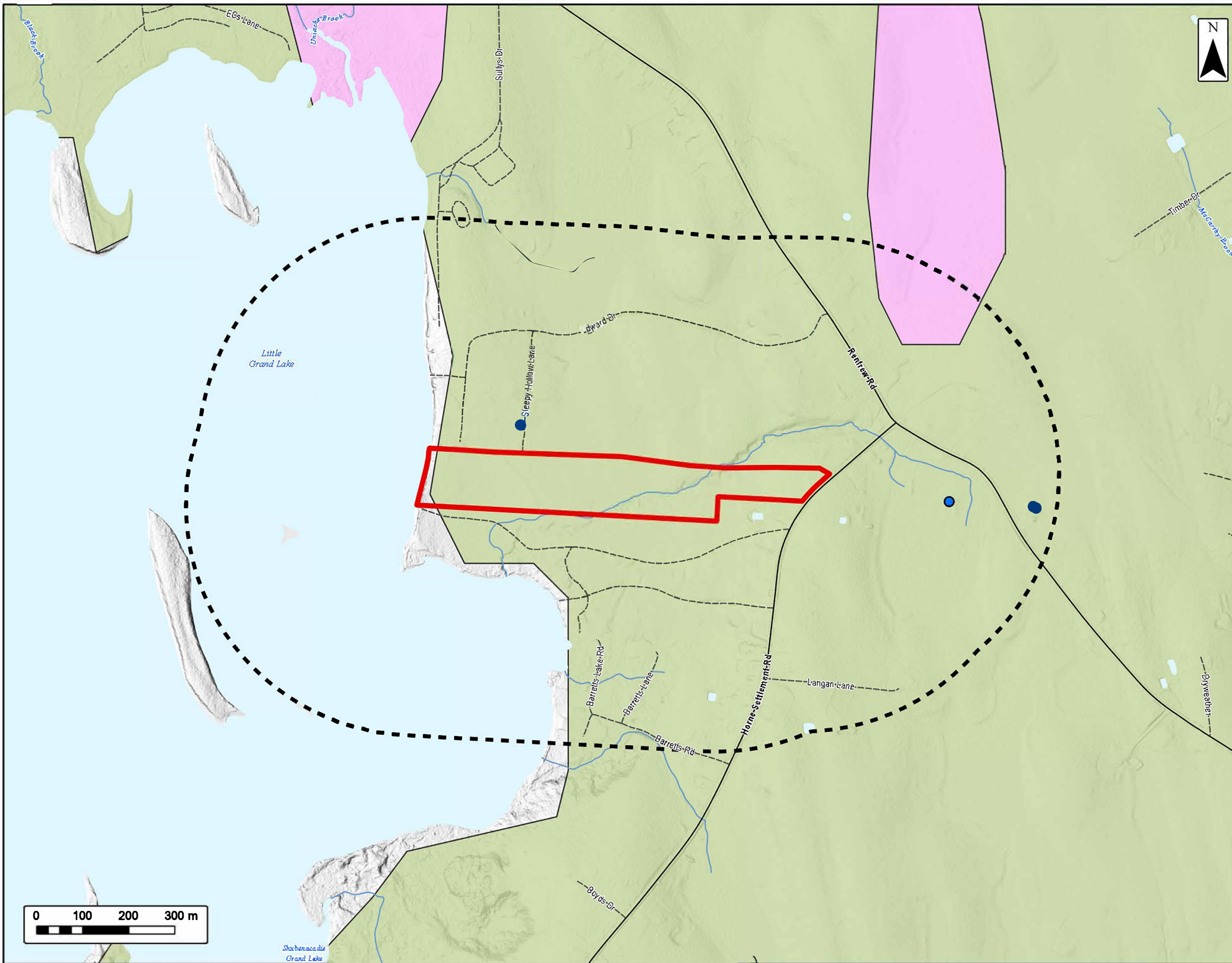
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- Primary Watershed Boundary
- Secondary Watershed (1DG-1)
- Tertiary Watershed (1DG-1P)
- Transportation**
- Highway
- Road
- Unpaved Road
- Water Features**
- Mapped Watercourses
- Mapped Lakes and Rivers
- Mapped Wetlands



Coordinate System: NAD 1983 CRS UTM Zone 20N
Sources: Esri, NASA, NGA, USGS, Service Nova Scotia, GeoNOVA, SNGS, NSNFR, ACCDC, ISA Canada, CNWL, HERE, Garmin, USGS

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Checked By: A. Scott	





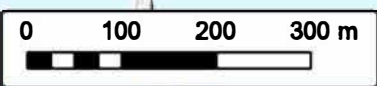
Enfield Level 1 GW Assessment Surficial Geology

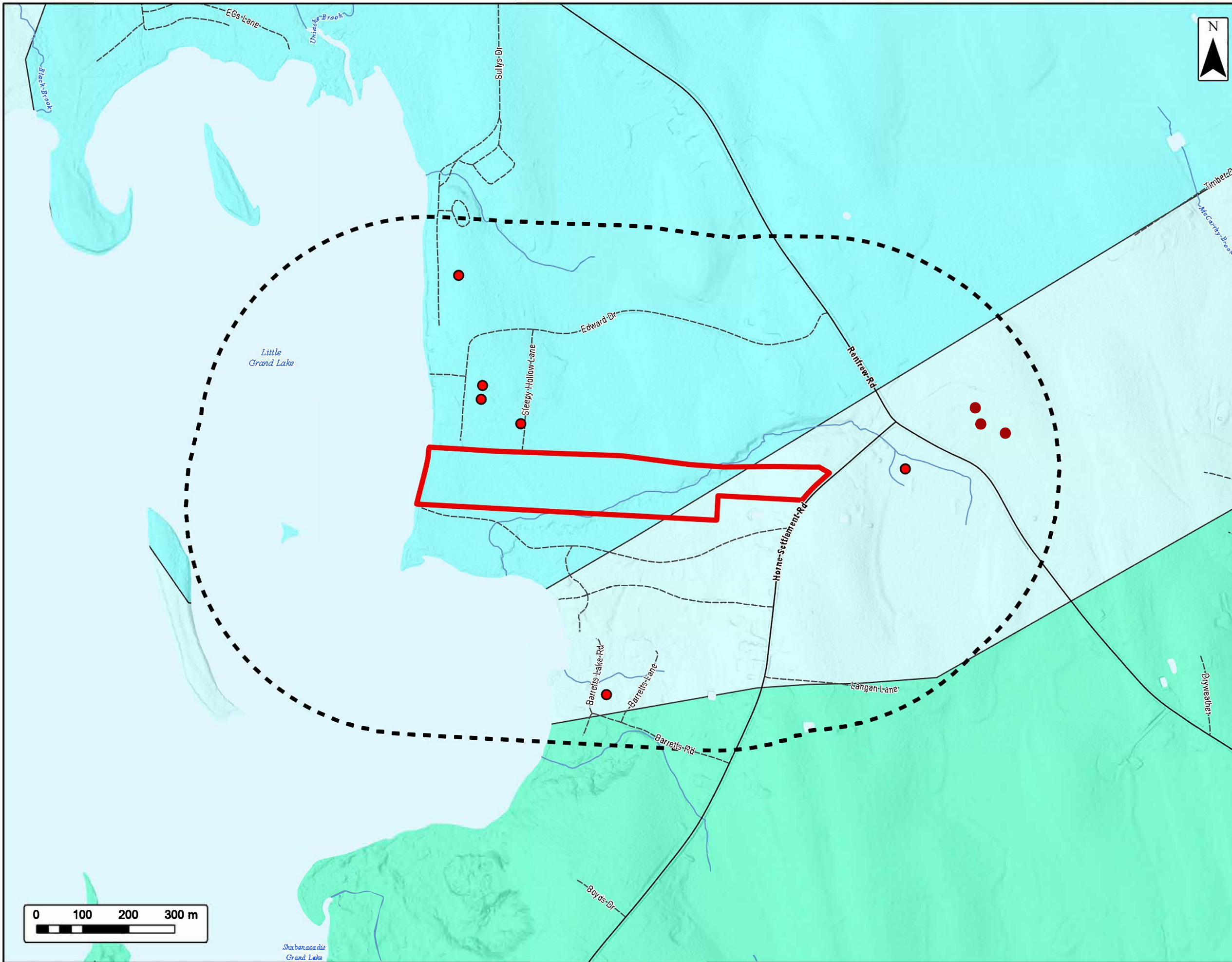
- Site (PID 45080801)
- Study Area (500 m)
- Groundwater Well (Dug)
- Surficial Geology By Unit**
- Organic Deposits
- Silty Till Plain
- Transportation**
- Road
- Unpaved Road
- Water Features**
- Mapped Watercourses
- Mapped Lakes and Rivers



Coordinate System: NAD 1983 CGRS UTM Zone 20N
Sources: Service Nova Scotia, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: 2026-05-25	Project #: 26-13305
Scale: 1:8,000	3
Drawn By: K. Wallace	
Checked By: A. Scott	





Enfield Level 1 GW Assessment *Bedrock Geology*

- Site (PID 45080801)
- Study Area (500 m)
- Groundwater Well (Drilled)
- Windsor Group**
- Green Oaks Formation
- MacDonald Road Formation
- Carrolls Corner Formation
- Transportation**
- Road
- Unpaved Road
- Water Features**
- Mapped Watercourses
- Mapped Lakes and Rivers



Coordinate System: NAD 1983 CGRS UTM Zone 20N
Sources: Service Nova Scotia, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: 2026-05-25	Project #: 26-13305
Scale: 1:8,000	4
Drawn By: K. Wallace	
Checked By: A. Scott	



APPENDIX B
PHOTO LOG



Photo 1: Western portion of site. Existing residence.



Photo 2: Western Portion of site. Residential domestic oil tank.



Photo 3: Western portion of site. Old rusted domestic oil tank.



Photo 4: Western portion of site. Three existing sheds.



Photo 5: Western portion of the site. Sheds and an apparent septic manhole cover.



Photo 6: Western portion of the site. Apparent dug well.



Photo 7: Western portion of the site. Waste cans of wood water seal.



Photo 8: Western portion of the site. Field behind the existing residence.



Photo 9: North-Central portion of the site. On-site watercourse.



Photo 10: Central portion of the site. On-site watercourse.

APPENDIX C DATA TABLES

Table 1: Wells located within 500 m of the Site - 809 Horne Settelement Road, Enfield, NS

Project # 26-13305

WELL NUMBER	ADDRESS	COMMUNITY	COUNTY	DATE	DEPTH	CASING	BEDROCK	STATIC	YIELD (LPM)	ELEVATION	TYPE	WATER USE
910627	RENFREW ROAD	HORNE SETTLEMENT	HANTS	1991-09-05	38.37	8.22	5.79	---	454	37	DRILLED	Domestic
90870	19 SLEEPY HOLLOW LANE, ENFIELD, HRM	HORNE SETTLEMENT	HANTS	2009-03-05	38.06	22.23	22.23	9.14	90.8	21	DRILLED	Domestic
101698	224 RENFREW ROAD, ENFIELD	HORNE SETTLEMENT	HANTS	2010-03-11	109.62	52.07	51.76	---	---	40	DRILLED	Domestic
880308	BUDLAND ACRES, ENFIELD	HORNE SETTLEMENT	HANTS	1988-05-30	62.42	16.44	14.62	---	6.81	39	DRILLED	Domestic
2424	212 RENFREW ROAD, ENFIELD	HORNE SETTLEMENT	HANTS	2000-09-15	73.69	41.72	41.11	19.79	6.81	39	DRILLED	Domestic
30587	EDWARDS DRIVE	HORNE SETTLEMENT	HANTS	2003-06-12	30.45	21.62	16.75	---	45.4	21	DRILLED	Domestic
921621	397 RENFREW ROAD	HORNE SETTLEMENT	HANTS	1992-12-26	36.54	8.53	6.09	---	181.6	37	DRILLED	Domestic
890527	OLD ENFIELD ROAD	ENFIELD	HANTS	1989-08-02	82.22	24.36	21.32	---	2.27	39	DRILLED	Domestic
841571	BARRETT ROAD	KINSAC	HALIFAX	1984-10-04	85.26	66.99	60.9	---	4.54	17	DRILLED	Domestic
930168	ENFIELD	HORNE SETTLEMENT	HANTS	1993-05-28	35.02	30.45	24.36	---	68.1	21	DRILLED	Domestic
20811	229 RENFREW ROAD, ENFIELD	HORNE SETTLEMENT	HANTS	2002-10-05	91.35	39.58	38.67	---	0.05	37	DRILLED	Domestic
890139	OLD ENFIELD ROAD	ENFIELD	HANTS	1989-05-03	38.06	24.36	19.79	---	136.2	21	DRILLED	Domestic
130184	178 EDWARD DRIVE, ENFIELD	HORNE SETTLEMENT	HANTS	2013-05-31	42.63	30.45	23.75	---	27.24	23	DRILLED	Domestic
890271	749 FERN DRIVE	HORNE SETTLEMENT	HANTS	1989-05-19	24.97	9.14	7	---	181.6	21	DRILLED	Domestic
880290	BUDLAND ACRES, ENFIELD	HORNE SETTLEMENT	HANTS	1988-07-20	124.84	24.36	22.84	---	6.81	39	DRILLED	Domestic
982674	EDWARD ROAD	HORNE SETTLEMENT	HANTS	1998-12-07	6.09	6.09	---	3.96	45.4	21	DUG	Domestic
180006	174 RENFREW ROAD	ENFIELD	HANTS	2018-02-05	6.09	---	---	---	---	37	DUG	---
180239	174 RENFREW ROAD	ENFIELD	HANTS	2018-02-05	21.32	---	---	---	---	37	DUG	Domestic
50016	Renfrew Road	ENFIELD	HANTS	2005-03-29	5.33	5.33	---	1.52	717.32	37	DUG	Domestic