



August 14, 2020

The Village of Sundridge
Sundridge, ON

**Re: NTB-00005257-00 Peer Review of Site Hydrology Assessment
Proposed Property Development
Northern Ontario Affordable Housing
Sundridge, ON**

EXP Services Inc. (EXP) was retained by the Village of Sundridge to complete a peer review of a hydrogeological report for a proposed development at a property north of Highway 124 in Sundridge, Ontario. The subject report ("the Report") was titled *Site Hydrogeology Assessment* and was prepared by Urso & Miller Surveying Inc. on May 22, 2020.

The Report (Section 1.2) stated that the assessment was completed in general accordance with the following guidance documents:

- Procedure D-5-5. Technical Guideline for Private Wells: Water Supply Assessment (August 1996) ("Procedure D-5-5").
- Design Guidelines for Drinking-Water Systems, 2008 ("DW Guideline").

One of the on-site wells was used to assess the capability of the site to sustain and on-site water supply.

The Report (Section 3.0) estimated a design daily water flow demand of 15,675 litres (275 litres per person per day x 57 people) and design peak water flow demand of 7,912 litres over one hour (from the DW Guideline).

The Report (Section 4.0) summarized information on existing 67 water wells in the vicinity from the Well Records obtained from the Ontario Ministry of Environment, Conservation and Parks (MECP) database. However, it did not describe how far the wells were from the subject site. Most of the wells (41) were completed in bedrock, but 23 of the wells (including the two on-site wells) were completed in overburden. The Report noted that 8 of the 23 overburden wells were reported as artesian, but it did not provide the location of these wells relative to the subject site. Mean depth to water table in the overburden wells was listed as 1.45 m.

The Report stated that the on-site well selected for water supply is screened beneath a clay layer and appears to be in a confined aquifer. This appears to be the case in other overburden wells in the vicinity.

The Report (Section 5.0) described findings of two extended pumping tests, including a stepped pump test and an 8-hour pump test at a pumping rate of 37.85 litres/minute (selected to exceed the design daily water demand). For both pumping tests, water levels were also monitored in two observation wells – one on-site and one off-site.



Relevant findings were:

- The overburden aquifer beneath the subject site appears to be able to sustain the water supply requirements for the site. Extended pumping at the site generated an acceptable groundwater drawdown and the well recovered quickly after pumping stopped.
- There appeared to be minimal interference with other nearby water wells during pumping of the on-site well.

The Report (Section 6.2) stated that a water sample was taken at the end of the stepped pump test and submitted for analysis of potability. The water quality test indicated presence of total coliforms and general bacteria. It also exceeded the drinking water aesthetic objective for iron. Otherwise, the water was found to be of acceptable potable quality.

In general, the study showed that the subject site appears to have an on-site groundwater supply with acceptable water quantity and quality for its intended use.

However, there are some concerns with the assessment.

Application of Procedure D-5-5

As the report stated, Procedure D-5-5 was used for the hydrogeological assessment although this procedure is meant to be applied to lots with single-family residences, not lots with 50+ residents and large peak-demand water usage demand. Procedure D-5-5 states, "The guideline applies to all development proposals for residential development involving individual well water supplies." It states that it may also be applied to a plan of condominium and to industrial, commercial or institutional developments, but that consultation with MECP is recommended to discuss applicability of the guidelines.

The subject site is more of a communal supply scenario which will require, if implemented, a small drinking water system. Generally, these systems will require a more rigorous assessment than Procedure D-5-5.

Water Quality Testing

Only a single water quality test was completed. This is generally insufficient to assess the potability of raw water source.

The water quality test result showed the presence of total coliforms and bacteria. This is a major concern and, as the report stated, further assessment is required to assess the source.

Wellhead Protection

This is a communal water supply pumping significant volume of water in an area of mixed residential/commercial. The Report (Section 1.2) stated that the DW Guideline was referenced in the hydrogeological assessment. This guideline is principally meant for designers of municipal systems. However, it specifically stipulates that small municipal and non-municipal systems may also be considered.



Project Name: Peer Review of Hydrogeological Assessment
Proposed Property Development, Sundridge, ON
Project Number: NTB-00005257-00
Date: August 14, 2020

The DW Guideline states that a wellhead protection plan should be developed for a water system with a groundwater source. It states, "The designer should prepare a wellhead protection plan for continued protection of the water supply from potential sources of contamination, such as mechanical protection or run-off diversion, in accordance with the requirements of the ministry document *Protocol for Delineation of Wellhead Protection Areas for Municipal Groundwater Supply Wells under Direct Influence of Surface Water*".

This would identify potential contaminant sources within the "capture zone" of the well and plans to protect the well from these contaminant sources.

Groundwater under the Direct Influence of Surface Water

The well on the subject site is within 500 m of Lake Bernard. There was no assessment of groundwater under the direct influence of surface water (GUDI). Overburden wells that are in a confined aquifer and this far from the lake are not generally deemed to be GUDI. However, the extent of the confining clay layer is not established. It is possible that the confining clay layer does not extent beneath Lake Bernard.

Also, the capture zone of the well is not established and (as previously mentioned) water quality test result showed the presence of total coliforms and bacteria. This is sometimes indicative of a GUDI well.

Limitations

The information presented in this letter is based on information provided by others and visual observations as identified herein. This type of limited investigation is designed to provide information to support an opinion on a hydrogeological assessment at the Site. Achieving the objectives stated in this letter has required me to arrive at conclusions based upon the best information presently known to me. No investigative method can completely eliminate the possibility of obtaining partially imprecise or incomplete information; it can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of the conclusions. Like all professional persons rendering advice, we do not act as absolute insurers of the conclusions we reach, but we commit ourselves to care and competence in reaching those conclusions.

Should you have any questions, please do not hesitate to contact this office.

Yours truly,

EXP Services Inc.

A handwritten signature in black ink, appearing to read "Perry Sarvas". The signature is fluid and cursive, written over a light blue horizontal line.

Perry Sarvas, P. Geo.
Senior Hydrogeologist, Earth & Environmental
Northeastern Ontario



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September 4, 2020

The Village of Sundridge
Sundridge, ON

RE: Response to Peer review by EXP of Site Hydrogeology Assessment for Northern Ontario Affordable Housing Development.

Background

This letter provides our response to a peer review conducted by EXP Services (EXP) for our report entitled "Site Hydrogeology Assessment" for the proposed Northern Ontario Affordable Housing Project. The peer review was summarized in a letter dated August 14, 2020.

In general the peer review did not find any issues with our methodology or findings and agreed with the conclusion in our report which indicate that the aquifer will be able to sustain the water supply requirements for the proposed development and that except for presence of total coliforms and general bacteria, the water is of acceptable potable quality.

Raised Concerns

The following summarizes the concerns were raised by EXP as part of their peer review as well as our response.

1. *Application of Procedure D-5-5* – EXP indicates that a more rigorous assessment than spelled out by Procedure D-5-5 should be utilized. Although we did refer to Procedure D-5-5 for general guidance, the assessment as completed was more rigorous than what would have completed for a single family dwelling (D5-5) as we conducted two pumping tests, both a stepped test and a longer term peak extraction test. EXP did not provide any specific comments regarding how our assessment should be improved, nor do they propose any other regulatory or applicable procedures, so we are unclear on what specifically should have been done to alleviate this concern.
2. *Water Quality Testing* – EXP has indicated that a single water quality test is generally insufficient to assess potability of a raw water source and that the presence of total coliforms and bacteria in the sample tested is of concern. As per our report, we have advised that additional well development, disinfection, and sampling should be done prior to commissioning the well. In addition, due to the size of the water supply system, it will be regulated under Ontario Regulation 179/03 which will require a professional engineering report be done for final design of any required water treatment system and ongoing water quality monitoring.
3. *Wellhead Protection* – EXP Has advised that a wellhead protection plan should be developed for the groundwater source as per the DW guidelines. Completion of a Wellhead Protection Plan for this study was not completed as it was not required for the intended purpose of the report. Should the project be approved and actually be completed, then we agree that a Wellhead Protection Plan should be completed in conjunction with the other water system operating procedures required under Ontario Regulation 179/03.



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4. *Groundwater under Direct Influence of Surface Water (GUDI)* – EXP has suggested that a GUDI assessment be considered for the well due to the site being near Lake Bernard. We did not consider completion of a GUDI assessment for our initial study due to the fact that there are numerous wells situated between the site and the Lake judged to be drawing from the same aquifer that would also have the same potential issue and we are not aware of any water quality issues with these wells. In addition, a review of the relative elevations indicates that flow from Lake Bernard is not possible. The test well collar elevation is at least 10 m above Lake Bernard and the maximum drawdown during the pump test was 1.8 m so the lowest water table at the test well was still at least 8 m higher than Lake Bernard. It is our judgement that the total coliforms and general bacteria present in the sample are due to insufficient well disinfection.

Closure

We trust that the information provided herein provides a satisfactory response to concerns raised in the EXP peer review. Should there be any further questions of clarification required, please feel free to contact us.

Yours Truly,

Miller and Urso Surveying Inc.

Matthew R. Parfitt, P. Eng.
Senior Engineer