ORE
Oakridge Environmental Limited
Environmental and Hydrogeological Services

January 27, 2026

Van Ziffle Architects
33 Alberta Ave,
Toronto, Ontario
M6H 2R5

Attention: Eric Van Ziffle, Principal Architect

Re: Summary of Stage 1 Report, 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 Summary of our findings from the Stage 1 Hydrogeological Study, issued on October 11, 2024. As the Stage 1 report includes a significant amount of technical data necessary for a future development application, this summary is intended to distill that information into a more easily readable document, with a focus on the Next Steps required to advance the hydrogeological study to support the application.

As water and sanitary sewer services are not available at or near the site, the hydrogeological study is required to demonstrate that the site is capable of supporting the development, with regard to having sustainable sources of potable water and capacity to manage wastewater flows. The hydrogeological study must generally follow the 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.

The following sections provide a point-form overview of the hydrogeological setting of the development site, our preliminary findings and recommendations for the Next Steps for completing the study.

2.0 Site Conditions

- The subject site is relatively flat, with a total topographic relief of about 7 m, sloping gently from northeast to southwest, ultimately toward the Trent River.

- While there are no 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.

- Published geological mapping indicates that the site is situated in an area of extensive sandy glaciolacustrine deposits, which are expected to be comparatively permeable. From shallow manual auger boreholes advanced about the site, we confirmed that the

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sandy glaciolacustrine deposits occur throughout.

- 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, which exhibits a much lower permeability. The till likely occurs below the sand deposits, although this would need to be confirmed by in-situ testing.

- Immediately south of the Trent River, the mapping indicates that limestone bedrock outcrop occurs at the surface. The nearby presence of bedrock outcrop can indicate that the soil cover is thin.

- Groundwater was not encountered by the boreholes, 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, ultimately flowing towards the Trent River.

- 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.

- 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.

3.0 Local Well Data

- To assess groundwater supply options for the development, we obtained well records for 138 local wells situated within approximately 1 km of the site. The overwhelming majority are drilled wells.

- The average reported test rate of the entire data set is approximately 10.2 gallons per minute (gpm), although this is skewed by a few anomalously high values (i.e., 25 gpm). The majority of the recorded wells had test rates between 2.5 gpm and 5 gpm, which is generally sufficient for a single residential use.

- As 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. For example, a nearby well (situated northwest of the site) was reportedly tested at a rate of 50 gpm over a 1 hour duration.

- The well data also indicate that aquifers are typically encountered within a narrow range of depths within the limestone. These are typically water-bearing fracture systems. Based on the subject site's surface elevation, an aquifer should be expected at a

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depth of approximately 23 m (range 14 m to 27 m).

- For well records that had sufficient information, a geometric mean of the calculated specific capacity was found to be approximately 0.1 litres per second per metre of drawdown. This is generally considered to be sufficient for small communities (Krasny, 1993) but would need to be confirmed on-site through well construction and testing.

- 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.

- From the geological setting, it is apparent that an overburden supply 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.

4.0 Servicing Model

- Two servicing models are potentially available for the development:

  - *communal servicing* (i.e., single, shared water supply and sewage disposal for entire development) or,

  - *private servicing* (i.e., individual wells and septic systems on each lot).

- Unless directed otherwise, it will be assumed that private servicing is the preferred option, based on the most recent Concept Plan provided by Van Ziffle Architects (January 7, 2026). The services would be comprised of seven (7) residential septic systems and seven (7) drilled wells (each shared by three residences) plus a separate well and septic system to service the proposed Amenity Building.

- Under this model, each lot will need to have a separate ownership (ideally, a single entity for approval purposes), such that the total sewage flow rate for the lot does not exceed 10,000 L/day and that no sewage flows cross a property boundary such that local approvals can be obtained.

- If either of the preceding conditions are not met, the septic systems (as a whole) would be considered a “sewage works” and would be subject to approval by the Ministry of the Environment, Conservation and Parks (MECP). Such approvals are referred to as an Environmental Compliance Approval (“ECA”) and can be somewhat onerous to obtain. This approach would add considerably to the cost and time required for development approval.

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- As the lots are comparatively small for rural development, sharing of wells and septic systems may offer some benefits with regard to placement of these elements on the lots, especially considering the applicable setbacks that must be achieved.

- Sharing of wells means that each well must be capable of supplying three times the normal yield of a single residence, and that the resulting water takings do not interfere with other wells in the development or existing wells in the neighbourhood. Water quality will also need to be acceptable. As such, detailed testing will be needed to confirm their adequacy. While local well records suggest this may be achievable, conditions can vary based on a number of factors.

- The sharing of septic systems will mean that each system will need to be designed and constructed to be larger than a typical domestic system, as the sewage flow rate will be triple. To accommodate the additional flows, the tile bed area will need to be increased considerably, resulting in a larger bed footprint on the lot relative to what is typically required for a single residence.

- A critical part of the hydrogeological study includes the assessment of potential impacts related to the use of the proposed septic systems. This is generally referred to as a "nitrate impact assessment". A preliminary assessment was included in our Stage 1 report, revealing that the results would not be acceptable, based on a conventional septic tank and tile bed arrangement for each lot. To achieve compliance with the nitrate impact assessment with the currently proposed density, tertiary treatment systems (that incorporates denitrification) would need to be utilized at each lot. While adding to the cost of the septic systems, such systems can offer a smaller footprint, which may be advantageous given the small lot sizes proposed.

- In addition to the treatment systems outlined above, Low Impact Development (LID) stormwater management features that promote recharge could be utilized to further mitigate potential impacts from the sewage systems. The feasibility of these systems would need to be examined as part of a future Stage of the study.

- Although there has been some resistance to approving developments that rely on tertiary treatment systems, our recent experience has been that attitudes are changing and approvals are now much more probable.

5.0 Next Steps

Assuming that any outstanding Planning matters have been resolved, to complete the required hydrogeological study, the following tasks will need to be undertaken to support the development application:

- Confirmation of servicing model (i.e., communal versus private) and ownership (e.g., plan of condominium or freehold lots). Private servicing is assumed.

- Construction and testing of a minimum of three (3) drilled test wells at the

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recommended locations, to comply with Provincial guidelines.

- Completion of pumping tests to verify well yield, water quality and interference assessment.
- Updating shallow soils data by test pitting and/or borehole drilling.
- Completion of the nitrate impact assessment.
- Finalizing the hydrogeological study report.

A detailed proposal and cost estimate for completing the above can be provided upon request. The remaining components of the hydrogeological study should be completed in a series of stages.

— End of Stage 1 Summary —

Yours truly,
Oakridge Environmental Ltd.

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