Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

April 14, 2022
File: 160900954 Task 208

Attention: Sarah Dilamarter, Junior Planner
Municipality of Trent Lakes
760 Peterborough County Road 36
Trent Lakes, ON K0M 1A0

Dear Sarah Dilamarter,

Reference: Peer Review of Hydrogeological Study
Sewage System Monitoring
Pigeon Lake Commercial Cabins
16 Fire Route 94A, Municipality of Trent Lakes, County of Peterborough, Ontario

Stantec has completed a peer review of the Hydrogeological Study Report prepared by D.M. Wills Associates Limited, Peterborough, for Pigeon Lake Commercial Cabins (owner: Stephen Lennox), dated October 2021. The Township requested that Stantec Consulting Ltd. (Stantec) peer review the report. The purpose of the Hydrogeological Study was to assess the capacity of the Site to support onsite sewage disposal at daily flow rates of 8,500 L/day.

The Site is a little peninsula approximately 0.64 ha in size and surrounded by Pigeon Lake to the east, south and west with a neighbouring property and Fire Route 94A to the north. The Site has approximately 300 m of irregular shoreline frontage. The Functional Servicing Report (FSR) indicated that the water supply will be from Pigeon Lake and that the domestic water demand is 12,600 L/day based on a maximum occupancy of 28 persons.

The hydrogeological investigation included excavation of six test pits, submission of two soils samples for Particle Size Distribution and submission of two soil samples for calcium content. Groundwater was not encountered in the thin veneer of soil overlaying bedrock and was not investigated further. The report ultimately concludes that the Study supports the application provided that the sewage system design considers the MECP and Lakeshore Capacity Assessment Handbook.

Stantec has several comments with respect to the Study, as follows:

- The Study indicates that the sewage flows will be 8,500 L/day, while the FSR states the water demand is 12,600 L/day based on a maximum occupancy of 28 persons. Please reconcile these numbers and confirm if sewage flows could exceed 10,000 L/day. If sewage flows exceed 10,000 L/day, then this would be considered a large subsurface disposal system and the application would be subject to MECP review and an Environmental Compliance Approval (ECA).

- Given the shallow depth to bedrock, a mounded disposal system is being proposed. A raised bed takes up considerable space and it is not clear from the drawings and sketches provided that the Site is large enough to build everything while maintaining minimum setback distances. Please provide a scaled drawing showing all proposed structures and minimum setback distances.

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- The Study focuses on Total Phosphorus (TP) as the primary contaminant of concern and quotes a 2018 Study showing TP concentrations in Pigeon Lake ranging from 14-19 ug/L. Since the TP range is below the Provincial Water Quality Objective (PWQO) of 20 ug/L, the Study proceeded under the assumption that Pigeon Lake was a Policy 1 waterbody. The issue is that that a recent surface water quality sample collected as part of the Environmental Impact Study (GHD, 2020) at the Site shows a TP concentration of 54 ug/L. There needs to be some discussion as to how this data impacts the suitability of the Site for subsurface sewage disposal.

- Stantec appreciates that the soil has low calcium content and is likely quite acidic. However, the phosphorus attenuation capacity of the Site may still be quite low, particularly if the effluent short circuits through shallow bedrock fractures, travels along the bedrock/overburden interface and/or migrates to areas where there is no soil cover whatsoever. Stantec would be more comfortable if the design assumed that the only reliable phosphorus attenuation occurs in the engineered soil brought onsite to construct the raised bed and mantle.

- Un-ionized ammonia is also a concern and needs to be discussed. The time it takes for the effluent to travel from the raised bed to Pigeon Lake will be small and the opportunity for chemical conversion to nitrate will be minimal. This means that the proposed Waterloo Biofilter system will need to be operating optimally all the time so that the unionized ammonia has a chance to convert to nitrate and be removed by the system. The manufacturer should be consulted to determine if this is feasible.

- In the conclusions of the report, it states that effluent nitrate concentrations should not exceed the Canadian Council of Ministers of the Environment water quality guidelines for Protection of Aquatic Life of 13 mg/L at the point of discharge. Given the short travel time and limited potential for any effluent dilution prior to the point of discharge into Pigeon Lake, the Waterloo Biofilter would need to provide treatment to this level. Has Waterloo Biofilter been consulted to determine if this level of treatment for nitrate is feasible? What would the installation and O&M costs be to operate such a system? Some case studies highlighting the performance of the Waterloo Biofilter system in similar settings would be helpful.

- Additional details are needed with respect to how the system would be monitored to ensure that the effluent quality consistently meets criteria at the point of discharge for TP, unionized ammonia, and nitrate.

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We trust these comments are sufficient for your purposes; however, if you have any questions or require clarification, please do not hesitate to contact the undersigned.

Sincerely,

Stantec Consulting Ltd.

Digitally signed by Roger Freymond
Date: 2022.04.14 10:01:57 -04'00'

Digitally signed by Grant Whitehead
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