PATERSON GROUP

memorandum

re: **Underground Storage Tank – Buoyancy Review**
Proposed Mixed-Use Development – Wellings of Stittsville Phase 2
20 Cedarow Court - Ottawa

to: Nautical Lands Group – **Ms. Angela Mariani** – angela@nlgc.com

cc: Stantec – **Mr. Mike Sharp** – Mike.Sharp@stantec.com

date: June 22, 2022

file: PG4772-MEMO.07

Following your request and authorization, Paterson Group (Paterson) prepared the current memorandum to review the potential effects of buoyancy on the proposed underground storage tanks, from a geotechnical perspective, for Phase 2 of the mixed-use development at the aforementioned site. The following memorandum should be read in conjunction with Paterson Group Report PG4772-1 Revision 2, dated February 17, 2022.

Paterson reviewed the following site servicing plan prepared by Stantec regarding the aforementioned development:

- Site Servicing Plan - Wellings of Stittsville Phase 2 - Project No. 160401511 - Drawing No. SSP-1 - Sheet No. 3 of 7 - Revision 4 - dated March 29, 2022.

Geotechnical Review

Based on our review of the above noted site servicing plan, the subsurface profile and soil conditions within the area of the proposed underground storage tanks, the tanks will be founded on a bearing medium consisting of a combination of an impermeable silty clay and glacial till rich in silty clay and surrounded in all directions by a silty clay deposit.

In addition, the long-term groundwater table is expected to be well below the proposed invert level of the proposed storage tanks. Reference should be made to the above noted geotechnical report for details on the estimated long-term groundwater table under Subsection 4.3.

Due to cohesive properties, low hydraulic conductivity of the surrounding soils and the estimated depth of the long-term groundwater table, groundwater and surface water movements throughout the soil matrix will be limited to negligible and thereby any fluctuation of the groundwater table due to seasonal highs or storm events is expected to be significantly reduced. Furthermore, clay seals have been proposed within the service trenches for the entire development as indicated by the geotechnical report under Subsection 6.4 which will prevent any groundwater infiltration within the backfill material.

As a precautionary measure, subdrains have been proposed by Paterson along the perimeter of the underground storage tanks to immediately drain surface water infiltration around the storage tank system and induce seasonal high groundwater lowering during precipitation events and snow melt seasons.

Long-term Groundwater Table Vs Invert Levels

It should be noted that as per the American Concrete Pipe Association (ACPA 2008), the buoyancy force exerted on the underground structures is equal to the weight of the fluid displaced by the objects. Given the properties of the subsurface soil conditions and the depth of the long-term groundwater table with respect to the invert level of the storage system, the underground storage tanks will not displace groundwater due to the invert level being higher than the long-term groundwater table. Therefore, the buoyancy force exerted on the underground storage tanks will be negligible.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Owen Canton, EIT

Faisal I. Abou-Seido, P. Eng.