# Executive Summary

EXP Services Inc. (EXP) was retained by **Drewlo Holdings Inc.** to conduct a hydrogeological assessment and water balance for the proposed residential development property located on Kilally Road in the City of London, Ontario (hereinafter referred to as the 'Site'). The Site is irregular in shape and occupies a total area of approximately 22 hectares (ha). The development plan includes the lands north of Kilally Road between Webster Street and Sandford Street (**Drawing 1** in **Appendix B**). The Site was previously a sand and gravel aggregate extraction pit, which has altered the current topography of the Site.

This report provides an assessment of hydrogeological characteristics of the Site, including soil conditions, groundwater flow and quality, as well as an assessment of potential impacts to the groundwater as a result of the proposed development. The objective of the assessment is to examine and summarize the hydrogeological characteristics of the Site by reviewing available information on the geological and hydrogeological characteristics of the area, reviewing the Ontario Ministry of the Environment, Conservation and Parks (MECP) Water Well Record (WWR) database, and assessing soil and groundwater conditions on the Site by completing a subsurface drilling and monitoring well installation program. The assessment provides comments pertaining to potential impacts on hydrogeological conditions at the Site and provides design/construction measures, where applicable, to mitigate this potential for impact. This report has been prepared for submission to the City of London and to the Upper Thames River Conservation Authority (UTRCA) in support of the proposed development.

Based on the results of the hydrogeological assessment of the Site, the following findings are presented:

- The proposed development Site is located 200m south of the Thames River in The Forks sub-watershed;
- Topography across the Site is variable but generally slopes to the north. Shallow groundwater flow is to the north-northwest across the Site;
- The Site is generally covered with surficial layers of fill, sand, and/or sand and gravel overlying a thick sequence of clayey silt till. An underlying confined sand and gravel unit is found at depth underlying the thick till unit;
- An upper aquifer within the overlying sand/sand and gravel unit is found primarily within the eastern area of the Site. This upper aquifer is found discharging along the slope located along the northern edge of the development Site;
- Groundwater levels were found to be above ground surface in a number of the piezometers on the Site, and closest to ground surface at BH8/MW where they ranged from 1.92 to 3.02 mbgs;
- MTE identified a number of vegetation communities across the Site, including areas of Mineral Thicket Swamp (SWT2-2) and Gray Dogwood Thicket Swamp/Phragmites/Cattail Marsh (SWT2-9/MAM2). Shallow piezometers were installed in these areas;

- Single Well Response Tests (SWRT) were completed on three (3) monitoring wells and resulted in estimated hydraulic conductivities ranging from $3.5 \times 10^{-3}$ to $5.4 \times 10^{-4}$ m/s for the sand and sand and gravel, and from $1.2 \times 10^{-8}$ to $8.9 \times 10^{-9}$ m/s for the clayey silt till;

- Areas of thick sand and gravel deposits are found closest to Kilally Road, in the southern portion of the Site. These areas have been identified as the best locations for implementing secondary infiltration facilities during development;

- In -situ infiltration testing was completed across the Site in January 2021. One test pit (TP3) had a valid result and resulted in a hydraulic conductivity of $5.4 \times 10^{-4}$ m/s. The remaining test pits either had materials which were too coarse to test or thick sequences of till which could not be tested. Grain size analyses were completed on selected locations which could not be effectively tested in the field;

- Design infiltration rates for areas within sand and gravel are roughly 150 mm/hr and areas within sand are roughly 54 mm/hr;

- Groundwater quality testing showed exceedances of nitrate at BH4/MW and of dissolved lead at P3S and P3D. Surface water analysis showed exceedances of total phosphorus at SW1 and SW2, and of total aluminum and total iron during select sampling events;

- The entire Site is considered a Significant Groundwater Recharge Area (SGRA) and a Highly Vulnerable Aquifer (HVA);

- Water balance calculations were carried out for the post-development environment and show that a 17% reduction in runoff in Area A and a 35% reduction in runoff in Area B will be necessary to meet the target of 80% of pre-development infiltration volumes.