

November 30, 2022

Our Reference: 33186

City of Pitt Meadows
Engineering Department
12007 Harris Road
Pitt Meadows, BC V3Y 2B5

Attention: Samantha Maki, P.Eng., Director of Engineering and Operations
Alina Torres, P.Eng., Manager of Engineering and Facilities

**Reference: Preloading Impact to Groundwater Risk Assessments
Recommended Information Requests from Developers**

ISL Engineering and Land Services Ltd. (ISL) was retained by the City of Pitt Meadows (the City) to complete a phased hydrogeological study of shallow groundwater conditions across the City. The purpose of the study was to evaluate the potential impacts to the groundwater by means of preloading conducted prior to development. The study and the accompanying groundwater numerical model, completed by Aqua Insight Inc. (Aqua Insight), resulted in a risk map that identified areas of the City that are at higher relative risk of groundwater rise impacts due to preloading. The risk map identified areas of low, moderate, significant, and high risk depending on the geological/hydrogeological conditions of the areas, as well as the predicted water table depths.

When the City receives an application for development that will require preloading, the location of the development should be compared to the risk map, presented in Aqua Insight's September 2022 report entitled Preload Effect on Groundwater Levels, Evaluation using the Pitt Meadows Groundwater Flow Model. Based on the relative risk of that location, the following are recommended to be requested from developers as part of the permitting process:

LOW RISK AREAS

- No additional requirements to assess impacts to groundwater.

MODERATE RISK AREAS

- Installation of at least one groundwater monitoring wells (also known as piezometers), with a screened interval across or below the water table, and with the borehole extending at least 5 m below ground surface or to the base of any peat unit encountered. At least one groundwater level shall be taken at the well(s) once water levels have stabilized after drilling. Submit the borehole logs and water levels to the City for review.
- City staff should confirm the groundwater levels are at least 2 m depth below ground surface and the presence or absence of peat on the borehole log. If water levels are higher than 2 m depth below ground or if peat is present in the boreholes, ISL should be consulted to reevaluate the risk level of the location. Additional requirements similar to those of Significant or High risk areas may be requested.

SIGNIFICANT RISK AREAS

- Installation of at least three groundwater monitoring wells extending to at least 10 m depth or to the base of any peat unit encountered (whichever is less), with a screened interval across or below the water table and their locations spread across the site as much as possible.
- Soil samples should be collected during drilling for all distinct soil types encountered within the borehole. Such soil samples should be laboratory tested for axial compressibility for a range that spans the expected preload.
- Groundwater levels shall be taken at the well(s) once water levels have stabilized after drilling and shall be taken at least at a weekly frequency for a duration of at least two to three months to capture seasonal and precipitation related trends. Submit the borehole logs and water levels to the City for review.
- Conduct a compressibility study of the site and complete the preloading design, including providing details on the height and density of preload materials, location, and duration of the preloading, at a minimum. Submit the compressibility study to the City for review.
- City staff and ISL will review the information provided and evaluate the risk of groundwater impacts due to preloading. If the compressibility study, preloading design, presence of peat, and water levels indicate a high risk of impacts, Aqua Insight will be retained to refine the groundwater numerical model in the area and complete model runs to estimate groundwater impacts. ISL and Aqua Insight's technical report will provide the City with information regarding the risk to surrounding properties such that an informed decision can be made with respect to the development application.

HIGH RISK AREAS

- Installation of at least three groundwater monitoring wells extending to at least 15 m depth or at least 5 m below the base of any peat unit encountered (whichever is less), with a screened interval across or below the water table and their locations spread across the site as much as possible.
- Soil samples should be collected during drilling for all distinct soil types encountered within the borehole. Such soil samples should be laboratory tested for axial compressibility for a range that spans the expected preload.
- Groundwater levels shall be taken at the well(s) once water levels have stabilized after drilling and shall be taken at least at a weekly frequency for a duration of at least two to three months to capture seasonal and precipitation related trends. Submit the borehole logs and water levels to the City for review.
- Complete hydraulic conductivity testing by means of single well response tests at each of the groundwater monitoring wells. Provide the test results to the City for review.
- Conduct a compressibility study of the site and complete the preloading design, including providing details on the height and density of preload materials, location, and duration of the preloading, at a minimum. Submit the compressibility study to the City for review.
- City staff and ISL will review the information provided and evaluate the risk of groundwater impacts due to preloading. Aqua Insight will be retained to refine the groundwater numerical model in the area and complete model runs to estimate groundwater impacts. ISL and Aqua Insight's technical report will provide the City with information regarding the risk to surrounding properties such that an informed decision can be made with respect to the development application.