TETRA TECH

TECHNICAL MEMO

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To:	Michelle Klaben, YG Project Manager	**Date:**	November 29, 2022
c:	Hamlet of Mount Lorne	**Memo No.:**	001
From:	Stephan Klump, TT Project Manager	**File:**	704-ENW.GENV03329-01
Subject:	Hydrological Assessment and Preliminary Mitigation Options for Flooding Area, McConnell Lake, Yukon		

1.0 INTRODUCTION

Several residences in the Hamlet of Mount Lorne are severely affected by annually re-occurring flooding during freshet in the area of McConnell Lake. Tetra Tech is therefore completing a hydrological assessment to determine the root causes of the overland flooding in recent years and to develop potential high-level mitigation options and associated approximate cost estimates.

2.0 SCOPE OF SERVICES

2.1 LiDAR Survey

Tetra Tech completed an aerial LiDAR survey of the study area, including McConnell Lake, the areas of frequent flooding to the east, northeast and south of McConnell Lake and the Watson River immediately to the south and southeast of McConnell Lake.

The LiDAR survey yields an elevation accuracy of ±15 cm (absolute) and ±3 cm (relative) and can be used to construct a 3-D surface topography of the study area.

Completed to date:

- Aerial survey by helicopter: September 14, 2022
- Data reduction and preparation of Digital Elevation Model (DEM): November 9, 2022

Next steps:

- Use of DEM for assessment of reasons for flooding: January 31, 2023
- Use of DEM for evaluation of potential mitigation options: January 31, 2023

2.2 Installation of Monitoring Wells and Groundwater Elevation Survey

Tetra Tech installed three (3) groundwater monitoring wells in the area of frequent flooding to continuously monitor groundwater elevation using dataloggers which provides information for the assessment of the flooding causes. In addition, the borehole drilling provides pertinent information on the shallow subsurface conditions which is also required for the development of potential mitigation options.

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The monitoring wells were drilled using a small track-mounted auger drill and were completed as shallow 2-inch diameter monitoring wells with PVC standpipes. In all three locations, shallow saturated sand was encountered to about 3-5 m depth, overlying clay to more than 15 m depth. The continuous, thick clay unit prevents shallow water from infiltrating deeper into the ground and hence, contributes to the flooding issue.

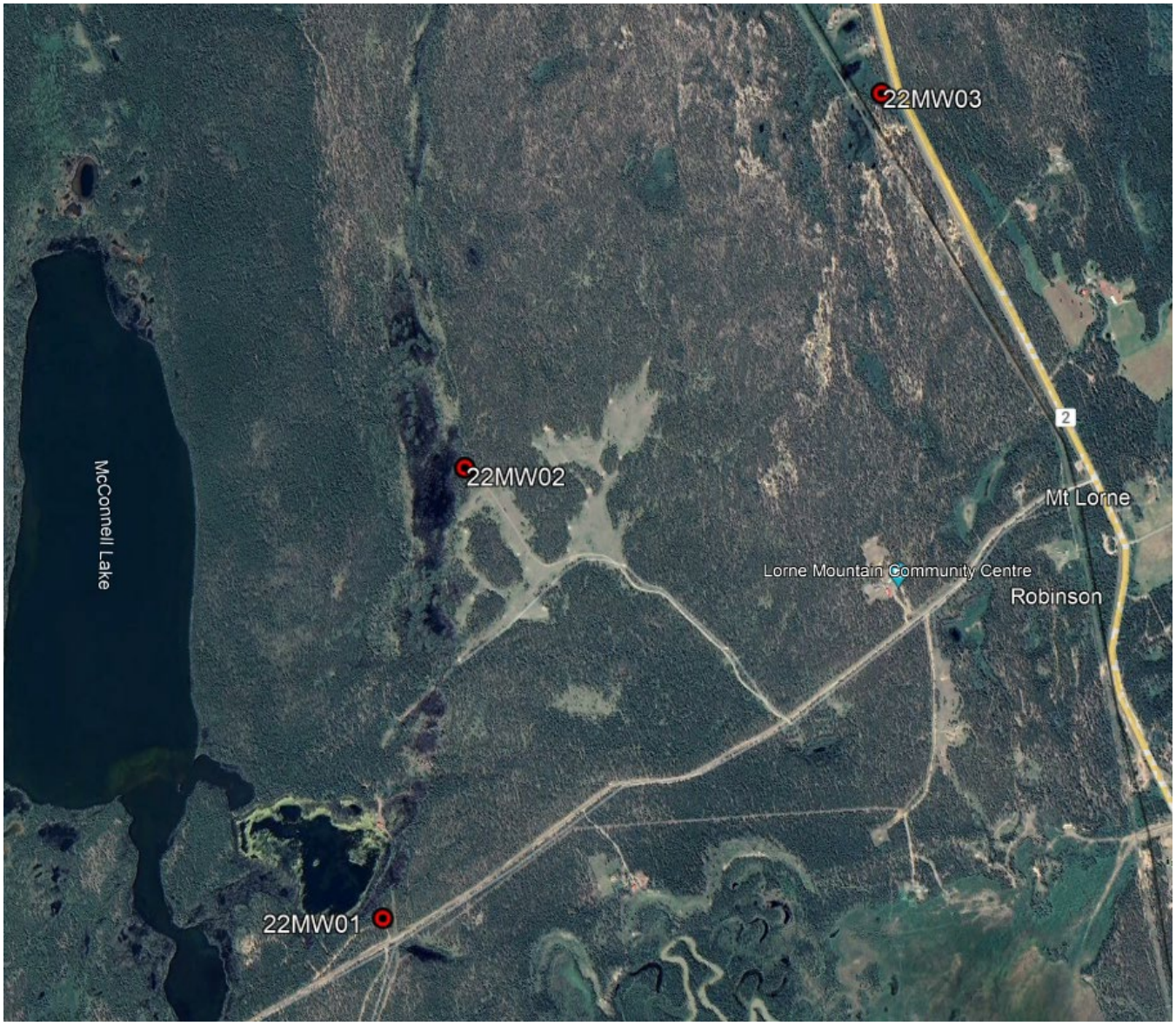

Figure 1: Monitoring Wells installed in the Flood-Prone Areas to the East of McConnell Lake.

Pressure transducer with dataloggers (Solinst Levelogger Series 5 LTC) will be installed in each monitoring well to continuously monitor groundwater elevations. The dataloggers have been ordered and will be available for installation in the week of December 5, 2022.

In addition, samples were collected from all three monitoring wells for analysis to be conducted by Water Resources Branch, Government of Yukon.

Completed to date:

- Monitoring well drilling and installation: October 25-28, 2022
- Monitoring well development: November 14, 2022
- Groundwater sampling: November 17, 2022

Next steps:

- Installation of dataloggers: week of December 5, 2022
- Elevation survey of monitoring wells: December 31, 2022

2.3 McConnell Lake Stage Monitoring

Tetra Tech will install equipment for continuous monitoring of the McConnell Lake level. The pressure transducer to monitor the lake level elevation will be housed in a perforated pipe installed at the shore of McConnell Lake.

Next steps:

- Installation of perforated pipe and pressure transducer: December 31, 2022

2.4 Elevation Survey of Monitoring Stations

The three monitoring wells and the McConnell Lake monitoring station will be surveyed by a professional surveyor for their absolute elevations to be able to compare the measured water elevations.

Next steps:

- Complete elevation surveys: December 31, 2022

2.5 Data Analysis, Potential Mitigation Options, and Reporting

Tetra Tech will analyze the data collected as part of this project and develop potential mitigation options for the flooding in the area of McConnell Lake. Approximate costs of the potential mitigation options will also be evaluated and presented in the report.

Next steps:

- Completion of all fieldwork: December 31, 2022
- Analysis of collected data: January 13, 2023
- Development of potential mitigation options and approx. cost estimates: January 31, 2023
- Project report delivered to EMO: February 17, 2023

3.0 LIMITATIONS OF REPORT

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