

# **Dynamic Rail Monitoring, Ontario**



Smith Falls track section



Drilling with Geoprobe Rig



Finalizing connections



Fully commissioned datalogger

In late 2017 GKM was successful in their bid to install, monitor, and maintain a three year rail deformation monitoring project for the National Research Council (NRC). The project location, situated near Smith Falls, Ontario on an approximately 50 m section of Via Rail Line, was selected due to its expected large vertical deformation under load. The goals of this project were to provide long term static condition monitoring of the rail and ground conditions alongside the dynamic condition monitoring that was to be triggered during a train passing over the project site.

As of March 2018, this project is in progress and successfully logging data with the active data being retrieved at about 100 Hz during each triggered event.

The instrumentation as selected by NRC personnel and GKM included: multipoint borehole extensometers (MPBX), semi-conductor piezometers (SP), a thermistor string (TH), strain gauges (SG) and Shape Accel Arrays (SAA). In addition to the instrumentation above two geophones were integrated into the system to act as triggers for the dynamic monitoring. In this application the key parameters of interest included both the long term static conditions of the soil including pore pressure, consolidation, temperature

profile and deformation shape as well as the dynamic measurements during train passage of the changes in pore pressure, deformation shape, peak particle acceleration in the soil and strain induced within the railway tracks.

Unlike many dynamic instrumentation monitoring setups, the data logger used is powered exclusively by a solar setup in spite of the power requirements for both the periodic high frequency measurements and cellular modem used for the data transfer. To achieve this GKM had to accurately estimate the power requirements and data transfer times necessary.

All installation work was undertaken during the night in generally poor winter weather conditions. As such, the success of this installation is a testament to the capabilities of the drillers and GKM's field personnel. GKM will continue to provide data to NRC throughout the 3 year project lifespan and will be responsible for decommissioning the site at the end of this project.

GKM is proud to be a part of this as well as many other national and regional research projects.