

Lavigne Flood Retention Basin, Montreal



Drilling and installation of multi-point extensometers



Inclinometer data logger



Extensometer data logger, hidden in a service box



Aerial view of Lavigne flood retention basin excavation

In order to reduce the number of wastewater spills into Rivière des Prairies, the city of Montreal launched construction of a new retention basin in the heart of the Ahuntsic-Cartierville and Saint-Laurent boroughs.

Currently, as the collector reaches its capacity, water accumulates to the river's water level, and eventually results in wastewater spilling into Rivière des Prairies. This wastewater overflow affects the river's use for recreational activities and increases its level of pollution.

Building the new Lavigne wastewater retention basin will decrease the volume of wastewater discharged into Rivière des Prairies. It will also help to improve the Gouin collector's capacity to prevent sewer backups. Located in Parc Lefebvre, the Lavigne retention basin is a circular underground structure, 42 m in diameter and 25 m deep. It is connected to the existing systems through three new pipes that are 1.8 m in diameter, requiring the excavation of approximately 2 km of tunnel and the construction of three shafts leading to these three tunnels.

GKM Consultants was mandated by GHD and EBC to supply and install automated geotechnical instruments for the entire project. Multi-point extensometers more than 15 m in length were installed above the route of the future pipes to monitor ground movement during tunnel excavation. Vibrating wire inclinometer chains, 20 m in length, surrounded the retention basin and monitored potential

displacement.

The systems installed took continuous measurements and transferred that data via cellular modems to GKM's secure servers. This system allowed project stakeholders to monitor data remotely and receive alarms by email in real-time if thresholds were exceeded.

Located in a dense urban area, the challenge was to install the instruments and data acquisition system in the sidewalks or roadway, without having to pull extensive lengths of cable. GKM Consultants developed a wireless, weatherproof monitoring solution, powered by long-life batteries, that could be installed in service boxes placed on top of the instruments. Each data acquisition system communicated with a single portal located at the Lavigne retention basin, more than 500 m from the furthest instrument. This solution eliminated the risk of cable deterioration and the inconvenience of having to install instrumentation beneath the roadway; it also ensured the entire tunnel-monitoring system remained invisible to surrounding residents.

GKM Consultants is proud to have participated in this project, as well as other instrumentation projects for major tunnels under construction in the greater metropolitan area of Montreal.