Wireless, Real-Time, Remote Monitoring: eleven-x Improves Stormwater Management for the City of Kitchener

Smart Water Monitoring Solution

Kitchener, Ontario

Customer Challenge

For the City of Kitchener, the stormwater management system is a vital process in municipal infrastructure. Proper stormwater management helps reduce the amount of runoff and the resulting runoff pollution as well as the risk of flood, which can disturb the local environment. The City of Kitchener is trying to avoid these disturbances by draining stormwater locally under the roadways through perforated pipe systems – also known as Low Impact Development (LID), rather than funnelling it and dumping it in the local rivers.

The City of Kitchener currently has a comprehensive city-wide stormwater monitoring program in place that is using Solinst dataloggers to monitor the water levels in these roadway LID systems. These dataloggers, located under the road in observation ports, require data to be manually downloaded every month or so which is labour intensive, time consuming and does not provide real-time data or alerting capabilities. With the goal of improving efficiencies and streamlining operations, the City of Kitchener was looking for a wireless option that could enable remote monitoring and real-time data capabilities.

Solution

After assessing several potential solutions, The City of Kitchener selected eleven-x's WIU-X Smart Water Monitoring Interface. The WIU-X interface was integrated with existing dataloggers managed by the City's current consultant on the City-wide monitoring program, GHD - a leading global solution provider, to enable a complete wireless, real-time stormwater monitoring solution. As part of the initial deployment and to thoroughly test the solution, the city chose seven locations to deploy the interface units, including at two rain gauges, to monitor water levels and rainfall.

The real-time data is securely communicated through a low power LoRaWAN® network to a customized dashboard managed completely by the City of Kitchener.

Benefits

- **Eliminates the need for manual collection**: Collecting data manually requires blocking a portion of the roadway to open observation ports. The WIU-X interface can be installed and updated remotely, making remote wireless data collection easy and cost effective.
- **Integrates with existing infrastructure**: The WIU-X interface can easily be connected to currently non-networked water management devices to facilitate remote water level monitoring capabilities. There is no need to replace existing dataloggers which saves costs.
- **Real-time level tracking and data capture:** Access to real-time data and pre-configured alerting capabilities allow for agile and pro-active decision-making.

The City of Kitchener is a city located in southern Ontario. It is one of three cities that make up the Regional Municipality of Waterloo, located approximately 100km West of Toronto. With a population of over 260,000, the City of Kitchener is the largest of the Tri-Cities.

Challenge Details

The City of Kitchener's storm sewer system monitoring program utilized Solinst dataloggers for tracking water levels within LID sites. However, when data needed to be collected staff would be required to drive to the site, block a lane of traffic to work on a busy roadway to physically open manhole covers, download the data and then return the dataloggers. This method was labour intensive, time-consuming and disruptive to the community, so the data was only being collected every month or two.

Faced with these challenges, the City of Kitchener was looking to pilot a wireless option that would be installed at LID sites to help the assess the performance of the newly installed LID infrastructure. The City of Kitchener needed to know how the perforated pipe systems were draining after installation, and how fast they would overflow to the storm sewer network after a rainfall.

The City of Kitchener wanted to have access to more convenient, accurate, real-time information on newly installed stormwater infrastructure. Having this would give them insights to make their program more efficient and streamline operations, and make more agile, proactive decisions.

Solution Details

The City of Kitchener worked with GHD to select eleven-x's Smart Water Monitoring solution for a pilot to help manage their stormwater. The eleven-x solution allows for cost-effective monitoring of a wide range of sewer and environmental systems. eleven-x collaborated with GHD to provide a wireless, real-time stormwater monitoring solution designed to monitor water levels and temperature in storm sewer systems in real-time while reducing program costs.

eleven-x worked with GHD to design and install interface units that integrated with Kitchener's existing Solinst dataloggers to transmit water level and temperature data. The City installed conduit running under the road for the sensors during the road reconstruction to help make the process easier. The transmitters were installed on hydro poles and connected to the Solinst loggers within the observation ports. The battery-powered sensors wirelessly collect and transmit water level and temperature data through eleven-x's IoT LoRaWAN platform for an in-depth and real-time analysis of the city's storm water levels and temperatures in the system over time. Data collected can be used to evaluate infrastructure performance and capacity, as well as develop data-drive maintenance schedules and capital investment cost forecasting.

Ready for a smart water monitoring solution? Find out more about how eleven-x can help you, let's connect.

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Results and Next Steps

Once the sensors were installed, the City of Kitchener was able to start collecting data. Measurements were taken at a high frequency with one-minute readings. The low power technology enables, data to be transmitted every 30 minutes and accessed and managed by the city through a dashboard. Additionally, overall, the data transmission worked extremely well in terms of accuracy and timely data analysis. In fact, the data transmitted by eleven-x was less noisy than the data from the dataloggers, making for more streamlined data sets.

The City of Kitchener was able to identify several areas of concern right away. In one case, they saw a significant and consistent rise in the water level on the dashboard, a sign that they needed to look into what was going on. Upon investigation, they discovered that the LID was embedded in a clay soil and was unable to drain properly. In another case, the logger in the well was not picking up any water level readings at. After a field visit it was discovered that the observation port was covered in some sort of grease and the City of Kitchener was able to promptly clean it out to regain functionality within the LID system. The sensors allowed the City of Kitchener to identify and solve the issues right away rather than having to wait a month or two to see the data. This helped the City to rectify any issues as fast as possible to allow the system to function in its intended capacity.

The City of Kitchener can now collect data in real-time and in all weather conditions, without having to send a crew to the site. They have also been able to see cost-savings even though they have only deployed a few sensors.

The next step for the City of Kitchener would be to implement a wireless solution across the city-wide program as well as investigation into other potential areas of deployment. With more sensors deployed, the cost-savings will be much higher.