

# City of London: Pump Station Assessment



**Location:** City of London, Canada

**Population:** 405,000

**Purpose:** Transient Mitigation

The operation of pumping stations can significantly impact the asset life of distribution systems and the amount of leakage in a system. Distribution systems are best maintained at consistent water pressures with minimal pressure spikes. Large and rapid swings in pressures are known to damage water systems and over time cause failure of watermains. Even before a watermain fails from these large swings in pressure, leakage at joints begins to increase as the transient events start to loosen the joints.

One of the most common causes of pressure swings is the operation of pumps either on startup or shutdown or during a power failure. If the pumps are not programmed to slowly start up and slowly shut down, or if there are not appropriate transient control devices in place, sudden changes in pump status will cause transient events in the distribution system. Transient events in a distribution system without a relief to the atmosphere such as an elevated tank can attenuate longer and may have larger pressure swings as the pressure spike cannot escape the water system.

## The Experience

Four hydrant.AI Devices were installed in the City of London water distribution system to monitor pressures and listen for leaks as part of a model calibration and system performance review. Fire flow field testing was conducted to stress the system to better understand the system hydraulics. During the fire flow testing additional pumps were turned on to supply the higher system demands. During field testing the hydrant.AI Devices noted large swings in pressures as the pumps struggled to find the appropriate setpoint to provide the higher flows as shown below.

## The Results

Based on the system pressures noted by the hydrant.AI Devices, and SCADA data including pump speeds and discharge pressure, the study has recommended modifying the pump control operation to slow the pump startup speeds, adjust setpoints of the pumps so multiple pumps could operate without exceeding the high pressure threshold and install a transient relief valve that would react quickly to relieve transient pressures and protect the distribution system.

