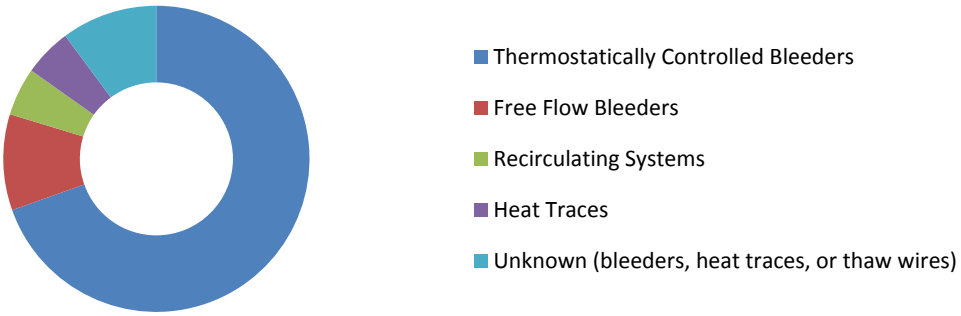
Hillcrest Local Improvement (LI) Project:

Water & Energy FAQ

Engineering Services, November 2016

1. What types of frost protection systems are in place in the Hillcrest LI Project area?

The majority of properties in the Hillcrest LI Project area rely on thermostatically controlled bleeders (TCBs) for the frost protection of water services. TCBs have a sensor that measures water temperature and periodically release water to prevent freezing. A smaller number of properties have free flow bleeders (FFBs), which are less efficient than TCBs by continuously bleeding water during winter months, regardless of temperature. The area's most recent developments have recirculating services that function using an electric pump and do not bleed any water. Other systems in place include heat traces, which are wrapped around water services and consume a steady flow of electricity to keep lines warm. Some properties may have thaw wires, which are charged only after services have frozen to thaw them out. The City's records are not complete enough to know the exact ratio of the area's estimated 140 frost protection systems, but a close guess can be made:



2. How much water does the project area use annually for frost protection?

The City estimates that the project area uses approximately 10.5 - 18.5 million litres (L) of water each year for frost protection (the volume equivalent of 12 - 21 Canada Games Centre swimming pools). The City annually spends approximately $20,000 - 36,000 of tax payer dollars to provide this bleed water at a service cost of $1.94/1,000 L. This unit amount reflects the energy, labour, and facility inputs required to treat water to a potable standard, heat, circulate, and treat it again at the sanitary lagoon. This cost does not reflect the additional expenses of expanding or developing new wells, lift stations, treatment facilities, and lagoons to meet water demand.

3. How much water does each bleeder use for frost protection?

The volume of water used by bleeders varies depending on the kind of bleeder that is in place and the size of the service. At average winter temperatures, a residential sized TCB will typically discharge between 330 - 600 L/day and up to 1,000 L/day during very cold weather. If operated 6 - 7 months

annually, this results in a consumption of 60,000 - 126,000 L/year. The estimated cost of this water to the City and tax payers is $115 - 245 for each system, annually.

FFBs are less water efficient than TCBs and will discharge 1.1 L/minute, passing 1,600 L/day of potable water into the sewer system. If operated 6 - 7 months annually, an FFB will consume 288,000 - 336,000 L/year. The estimated cost to the City and tax payers is $560 - 650 for each system, annually.

The City stopped allowing for water services that bleed to be installed in new developments in the early 1960s. In the late 1990s, the City installed thermostatic controls in many FFBs (turning them into TCBs) to reduce the water consumption of these systems by approximately 2/3rds. This was intended as a stopgap measure that would ultimately be eliminated, since TCBs are also water intensive.

4. How much water and energy does a heat trace system use?

Heat trace systems do not release any water for frost protection. A transformer provides low voltage electrical flow to a heavily insulated wire that heats up due to high amperage. Typical continuous energy use for a residential system is 200 - 500 watts, at 4.8 - 12.0 kwh per day (depending on the transformer and length of the service from the building to the main). If operated for 6 - 7 months per year, the cost to the property owner is approximately $110 - 330 annually (at $0.13/kwh).

5. How much water and energy does a recirculating pump use?

Recirculating systems do not release any water for frost protection. Instead, a pump is used to recirculate water through the service until drawn for use within the building. The energy consumption of a residential pump is approximately 85 watts, at 2.0 kwh per day. If operated 6 - 7 months per year, the cost to the property owner is approximately $45 - 55 annually (at $0.13/kwh).

6. What is the cost for installing a recirculating water system?

Replacing a residential water bleeder with a recirculating service has an installation cost to the property owner for the purchase of a recirculating pump, estimated at $500, and any indoor plumbing work needed to connect to the pump, estimated at $1,500 - 2,500. As indicated above, the annual cost to run the pump is estimated at $45 - 55. These expenses do not factor in sewer service replacement (optional) or LI Charges for surface works, which are additional costs. For the Hillcrest LI Project, and other infrastructure renewal projects, the City will pay for the new recirculating lines on private property installed up to the front of each building (an estimated value of $15,000+).

7. Will each property receive a recirculating water system?

In some cases, where the installation of new services would result in major disturbance or cost to the property owner (e.g. Steelox properties where there are no crawl spaces), the full recirculating water system will not be installed. Instead, recirculating lines will be installed to end somewhere within the property. The building's existing water service will be connected to one side of the dual lines and the

return portion will be capped for potential future use. The owner will be able to connect the lines and purchase a pump to complete the system during redevelopment of the property at a later date.

8. How much water does the City expect to save?

Once the project is complete, the City expects to save approximately 7.5 - 13 million L of water each year from being used for frost protection in the Hillcrest LI Project area (the volume equivalent of 8 - 15 Canada Games Centre swimming pools). Additional water savings are expected as more properties are redeveloped in the Steelox area and more of the recirculating systems are completed. Water conservation will be just one of the important outcomes of the proposed local improvements, which also include enhancements to roadway, pedestrian, cycling, and drainage infrastructure.