

## **Extending the life of a Large Diameter Horseshoe- Shaped Combined sewer in Hamilton using a GRP Liner**

ABSTRACT: The City of Hamilton (City) owns, operates and maintains a large network of aging, large diameter sewers. Maintaining this network is an ongoing task for the City. A large diameter sewer inspection program has been in place for several years and has been effective at identifying sewers that are at risk of future failure.

One of the identified sewers, a 1200 mm by 1350 mm horseshoe shaped combined overflow sewer located 7.5 m below Barton Street, was found to be in critical condition. This 94-year concrete sewer was constructed by tunneling through a mixture of soil and shale. During a CCTV inspection and a secondary man-entry inspection it was confirmed that this sewer had significant longitudinal cracking at the 3 o'clock and 9 o'clock locations, extending extensively along the sewer. Additionally, a 7 m long portion had already partially collapsed along the crown of the pipe leaving a void to the ground above. The City identified the Barton Street sewer for a full rehabilitation.

The rehabilitation of the sewer involved the construction of a new access shaft to facilitate a grouted-in-place GRP (Glass Reinforced Plastic) liner. The construction shaft was converted to a permanent manhole structure to provide provisions for future maintenance and inspection. This paper will provide an overview of the inspection, design and rehabilitation for this combine sewer.