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CHALLENGES IN THE CONSTRUCTION OF THE CITY OF EDMONTON'S W12 INVERTED SYPHON PROJECT

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ABSTRACT: The Rat Creek outfall is the final discharge point for the wet weather flows from West Edmonton Sanitary Trunk. Over 60-80 percent of the combined sewer overflow (CSO) volume from the City of Edmonton overflows into the North Saskatchewan River via the Rat Creek Outfall. The W12 project located immediately upstream of the Rat Creek outfall on the north side of the river, will reduce the volume and frequency of CSO discharges and regulate peak flows using a Real Time Control (RTC) structure. During wet weather flows, an inverted siphon diverts portions of the flow via a 2500 mm diameter tunnel under the North Saskatchewan River to the Goldbar Waste Water Treatment Plant (GBWWTP) located to the south of the river.

The W12 project involves the construction of a 34m deep RTC shaft, a 65m deep siphon inlet shaft, a 34m deep diversion shaft in the north side of the river, a 1118m long tunnel that crosses the river about 12m below the bed and a 65m deep exit shaft on the south side of the river.

This paper examines the risks associated with selection of the liner to withstand internal pressures that exceed external confining pressures and tunneling method and alignment under the deep river valley with coal seams and associated methane gas. The paper also discusses the extensive risk assessment and failure mode analysis of the control structures, hydraulic optimization and selection of methods of break-into existing live sewer trunk that were used to optimize the location and size of permanent and temporary shafts.