

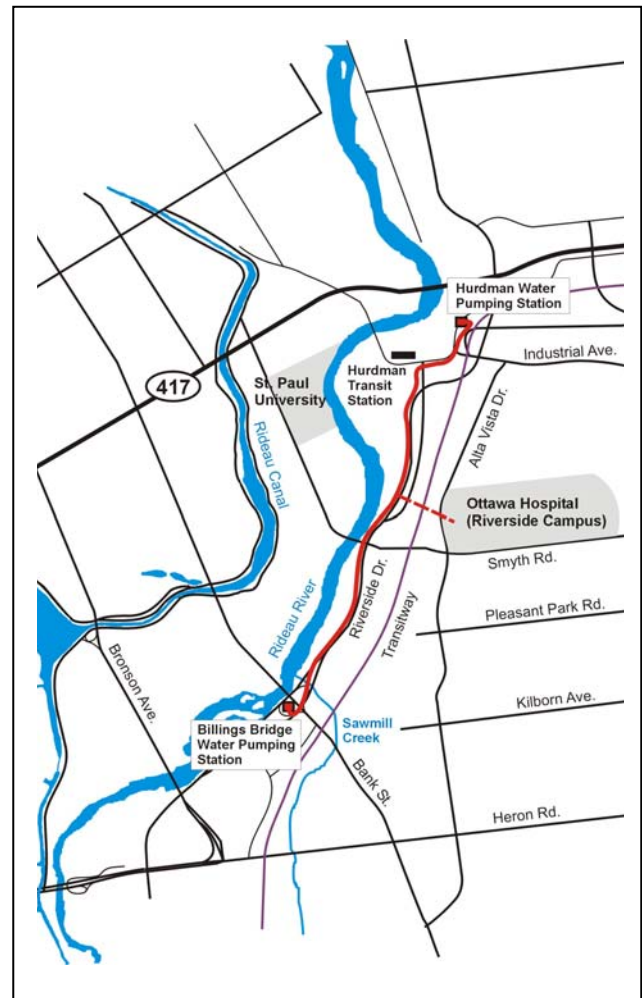
## Billings/Hurdman Interconnection Water Main

In the spring of 2004, the City of Ottawa retained the Ainley Group to provide resident and non-resident construction services for the \$7M Billings-Hurdman Interconnection Water Main project. As shown on the map below, the assignment involves the installation of approximately 3.9 kms of new 900-mm diameter prestressed concrete-cylinder pipe. The new water main, running adjacent to the Rideau River and Riverside Drive, will link the Billings Bridge Water Pumping Station to the Hurdman Water Pumping Station in the City of Ottawa.

The water main is intended to improve the reliability of the water supply by providing a secondary source for two large developed areas. This will be accomplished through an interconnection of two existing water Pressure Zones (2C and 1E). A secondary supply link to the Ottawa Hospital's Riverside Campus, considered a critical-needs supply point, will be made through a small interconnect feeder linked to the existing supply system.

A number of alignments for the connection between Billings and Hurdman were developed and analyzed. Due to environmental concerns (contaminated soils); the original preferred alignment avoided the area beside Riverside Road. In order to avoid this area, the preferred route would have passed in front of the Ottawa Hospital's Riverside Campus and crossed the Transitway corridor and a number of residential streets. The potential of utility conflicts along this route would have resulted in major disruptions to area residents and business and a significant increase in construction costs.

Seeing the potential for savings, the Ainley Group's Ottawa office suggested a more direct route; an alignment adjacent to Riverside Drive. Since most of this proposed alternate route lay within the limits of an old industrial landfill site and near a former underground fuel storage tank, a series of test pits/ boreholes were needed to determine the exact nature and extent of any contamination.



*The proposed route of the new trunk water main, taking a more direct route along Riverside Drive, avoids a number of streets where utility conflicts would be a major concern.*

The subsequent geotechnical investigation revealed only traces of Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Volatile Organic Compounds (VOC) and Polynuclear Aromatic Hydrocarbons (PAH) in the soil. As a result of the trace readings, it was decided to adopt the more direct route through the contaminated area at a substantial cost saving.

The new trunk water main will be routed adjacent to the Riverside Drive right-of-way and located off the traveled portions of the four-lane divided roadway.

Methane vapour, probably the result of previous landfill activities and the presence of natural organic (peat) deposits, was detected in some of the monitoring wells. To avoid the potential for explosive gas levels in confined spaces, such as the proposed trench excavation, specific methane monitoring and appropriate ventilation measures will be provided during construction. In addition, a passive ventilation system for valve-chamber structures has been designed to minimize the risk of gas build-up and potential explosion. Clay seals in the trench excavation will be installed to prevent long-term lowering of the groundwater level and potential migration of contaminants within the site.

Since the alignment was different to the one presented in the original Provincial EA, it was necessary to prepare an addendum. In addition, since a portion of the preferred alignment was also on National Capital Commission (NCC) lands, it was necessary to undertake a Federal Screening Report and obtain both permanent and temporary construction easements.

The selection of a large diameter water main material with the capability to resist the rigours of this site was also a major component of the design. The Ainley Group prepared an extensive report comparing alternative water main materials including;

- Prestressed Concrete Cylinder
- Ductile Iron
- Polyvinyl Chloride (PVC) with ductile iron fittings
- Stainless Steel
- High Density Polyethylene (HDPE)
- Ductile Iron- Concrete Coated



*By installing the new trunk water main off the traveled portions of the four-lane divided roadway (Riverside Drive), traffic disruption was kept to a minimum.*



*The majority of the 3.9 kms of water main is being installed using traditional trenching methods.*

- Steel Pipe, Concrete Lined with a Polyurethane Tape Exterior Coating
- Steel Pipe, Concrete Lined, with a Concrete Exterior Coating.

Factors considered in the pipe product evaluation analysis included:

- Operating and surge pressures
- Electrochemical action
- Corrosive site conditions
- Presence of soluble sulphates and chlorides
- Presence of BETX, VOC's and PAH's
- Groundwater levels
- Permeation and leaching of pipe materials and coatings
- Pipe coatings and bonding of the coatings
- Maintenance and repairs
- Risk Management.

After detailed evaluation of water main materials and the construction environment, the following types of pipe were listed in the tender documents:

- Prestressed Concrete Cylinder Pipe
- Steel Pipe with Concrete Lining and Concrete Exterior Coating
- Steel Pipe with Concrete Lining and Polyurethane Exterior Coating

Prestressed Concrete Cylinder Pipe, the type of pipe specified by the successful bidder, was selected for the water main installation. This material was chosen because of its resistance to hydrocarbon permeation, overall strength, durability, expected life and associated manufacturing cost.



*A section of the prestressed concrete cylinder pipe being lowered into the trench.*

Of the total 3.9-km length of water main, approximately 0.5 km will be installed by trenchless methods (tunnelling or boring and jacking). In particular, the crossing of Bank Street and the Riverside Drive South Bound Lanes intersection will be accomplished by trenchless methods to avoid disruption of traffic patterns and any impact on major buried utilities such as natural gas, hydro and cable TV. It will also be necessary to tunnel under nearby Sawmill Creek, as the creek contains significant fish habitat and is bordered by trees and vegetation that must be preserved. The Federal Screening Document prepared by the Ainley Group recommended a trenchless crossing of Sawmill Creek.

Surplus and excess materials from the trench excavation will be placed on nearby City property north of Riverside Drive. The material will be shaped and graded to blend into the existing hill and the entire disturbed area will be covered with topsoil and seeded.

The expected construction period is from mid July to December 2004, with site cleanup and landscaping in Spring/Summer 2005.