



City of Charlottetown

Wastewater Treatment Expansion & Upgrading

Background

As Canada's smallest provincial capital, the City of the Charlottetown has a population of approximately 34,000 residents and welcomes upwards of one million people a year. Long considered one of Atlantic Canada's most appealing urban centres, the "Birthplace of Confederation", can also take pride in a proactive history of innovative environmental stewardship that is integrally linked to, and defined by, the waters that encompass it.

For more than 100 years, the residents of the City of Charlottetown have benefited from a central sanitary sewer service. Early disposal practices, while advanced for their time, eventually were found to compromise the ecological integrity of the nearby Hillsborough River and the Charlottetown Harbour.

Forearmed with this knowledge, the Charlottetown Pollution Control Commission was established in the early 1970s to address the harbour clean-up and future wastewater treatment needs of the City and surrounding environs. The Commission represented a partnership between the Province of PEI, the City of Charlottetown, the Town of Parkdale and the Village of Sherwood.

By 1974, the Commission had spearheaded the development of a primary wastewater treatment plant, known as the Charlottetown Pollution Control Plant, together with the construction of several pumping stations along the City's waterfront, and outfall piping deep into the Hillsborough River.

The Charlottetown Pollution Control Plant has now been in operation for more than 30 years and has generally served the area well. However, the advanced age of the plant, together with continued residential and business expansion, outdated sanitary and storm systems within the City, and inappropriate on-site septic practices throughout the Island, has strained the capacity of the existing infrastructure.



As part of its mandate to protect and enhance the health and well-being of current and future generations, the City of Charlottetown approved a comprehensive pollution abatement strategy in 2001 that will:

- enhance the local environment immediately and over the next two to three decades; and
- form an integral component of a province-wide pollution abatement strategy designed to improve the ecological health of the communities across the province;
- promote and advance tri-level partnering opportunities through the Government of Canada's *Strategic Infrastructure Initiative* so as to safeguard the Island's environmental integrity, enhance public health, preserve aquatic habitats, and showcase best practices in the industry.

The Approach

As part of the City's pollution abatement initiative this project was designed to:

- upgrade both the capacity and the capability of the Charlottetown Wastewater Treatment Plant; and

With a value of approximately \$21 million, the initiative represents a considerable investment for the City of Charlottetown but one that is absolutely critical to the City's long-term economic well-being and its award-winning reputation as an urban centre that offers a superior quality-of-life lifestyle.

Charlottetown Wastewater Treatment Plant

As mentioned earlier, the existing Charlottetown Pollution Control Plant has been in operation for about 30 years. It has served the community well, but age, and more stringent environmental standards, dictates that more advanced treatment systems be installed. Given

that the existing plant was originally developed with the foresight to accommodate future needs, the City was well positioned to build upon the plant's previous accomplishments.

The project was spearheaded by the Charlottetown Water & Sewer Utility. Construction began in May, 2005, and was substantially complete in April of 2007. The project:

- advances the City of Charlottetown's Official Plan;
- responds to today's environmental standards; and
- provides for the needs of future generations.

Key Objectives

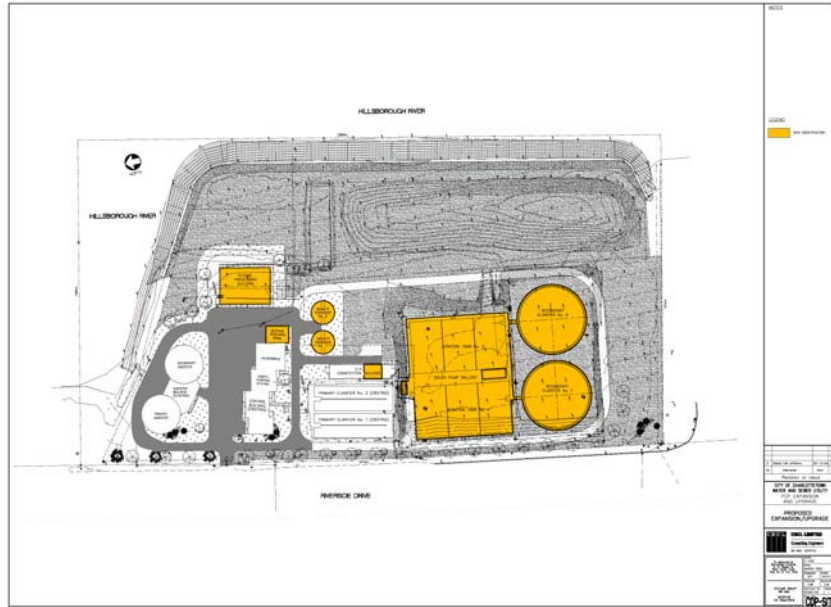
Now completed, the Plant will:

- **Advance the level of treatment from Primary to Secondary Clarification.**
- **Replace the existing chlorine disinfection systems with ultra-violet systems.**
- **Offer improved biosolids treatment.**

Key Technology Platforms

To achieve the key objectives, various technologies have been put in place. These include:

- **Solids Handling, Bio-pasteurization and Dewatering Systems.** Biosolids are the organic solids that settle from the flow through the plant. The upgraded facility will utilize solids handling, bio-pasteurization and dewatering processes that incorporate pre-pasteurization and drying methods to fully stabilize wastewater sludge. Systems to be installed as part of the project are the first of their kind in Atlantic Canada and, perhaps, in the whole of Canada.
- **Aeration.** Aeration will be provided within two bioreactors to better mix microorganisms, dissolve organic matter, and utilize oxygen to help clarify and reduce ammonia.
- **Ultraviolet systems.** Ultraviolet units have replaced chlorine gas as a means to disinfect secondary effluent.
- **Activated Sludge processes for Secondary Treatment.** Under ideal conditions, these traditional and proven processes will remove more than 90% of the contaminants from the raw sewage before discharging to the Hillsborough River.
- **SCADA, Full Automation.** The installation of developing technologies will build on existing technologies to take full advantage of opportunities to automate processes, communications, and security.



Key Outcomes

Based on the above features, the City of Charlottetown Wastewater Treatment Plant will:

- **Achieve and/or surpass Regulatory Standards.** These include:
 - standards prescribed in the *Proposed Risk Management Strategy Addressing Ammonia Dissolved in Water, Inorganic Chloramines and Chlorinated Wastewater Effluents* under the *Canadian Environmental Protection Act (CEPA) 1999*.

- biosolid treatment outcomes equivalent to “Class A” as defined by the EPA Part 503 Rule. Upon testing, the biosolids have been shown to meet the criteria needed for an “Exceptional Quality” biosolid which has no restrictions on end use.
- **Promote Island-wide Environmental Excellence.** An investment in the City of Charlottetown Wastewater Treatment Plant is an investment in the future health and well-being of Central and Eastern Prince Edward Island. This is because the Charlottetown facility has the capacity to accept septic waste from adjacent and outlying eastern communities, for processing. This partnership, together with a similar partnership between the City of Summerside (to Charlottetown’s west) and Western PEI, will facilitate the creation of an integrated, province-wide wastewater management strategy, which may well be the first of its kind in Canada.
- **Advance Biosolid Processing.** New technologies, combined with proven sludge stabilization practices, has resulted in a final product suitable for use as a soil conditioner that carries no restrictions on use, or application. Subject to testing and public acceptance, sale of the processed biosolids could potentially provide the City with a future additional revenue stream.
- **Reduce Green House Gas Emissions.** Methane gas produced during wastewater treatment is recovered, stored and used to produce required heat or energy needs within the treatment plant operations. This will provide an ongoing reduction of energy and fuel consumption within the plant, thus helping to lower operating costs.
- **Reduce Effluents.** Upgraded systems are designed to improve the effluent quality, as follows:
 - lower BOD to 25 mg/1, from 200 mg/1;
 - lower TSS to 25 mg/1 from 200 mg/1;
 - lower TKN to 16 mg/1 from 30 mg/1;
 - provide average fecal coliforms to 200 MPN/100 ml; and
 - limit peak fecal coliforms to 400 MPN/100 ml.
 - The use of ultraviolet disinfection will negate the need for chlorine gas and aeration will facilitate a reduction in ammonia. Together, these two factors will improve the quality of effluents in the Hillsborough River and the Charlottetown Harbour, thus fostering recreational and fish/shellfish industry confidence in the quality of the City’s water environs.
- **Address Current and Future Community Needs.** The current system, complemented with the addition of secondary components will improve flow capacity from 22,730 m³/day to 26,120 m³/day, an increase of 15%. This increase will improve the City’s capacity over the next 25 years to provide more residents and businesses with access to central wastewater treatment.

Conclusion

The City of Charlottetown's municipal leaders have long been committed to building a community that promotes and encourages responsible environmental practices.

The decision to invest in a world-class wastewater treatment plant, together with dedicated sewer and water systems, is a testament to the City's commitment to build a future that provides citizens, businesses and visitors with continued confidence in integrity of their environment.

