



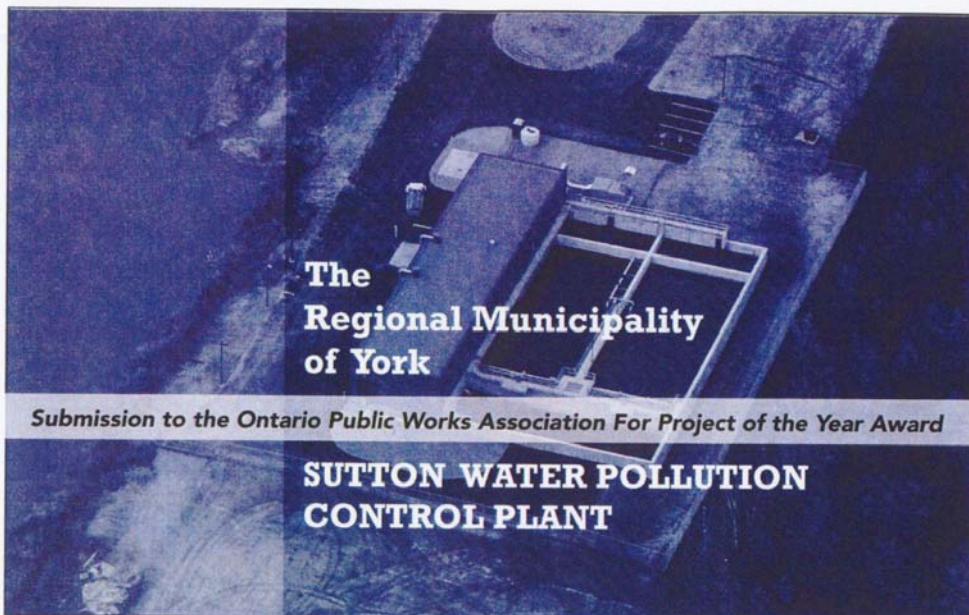
**The
Regional Municipality
of York**

Submission to the Ontario Public Works Association For Project of the Year Award

2004



**SUTTON WATER POLLUTION
CONTROL PLANT**



OVERVIEW

The new Sutton Water Pollution Control Plant (WPCP), a fully automated tertiary treatment plant with a rated plant capacity of 3,412 m³/day, is located in the community of Sutton, the Town of Georgina in The Regional Municipality of York (York Region). The plant services both Sutton and Jackson's Point.

The old Sutton WPCP consisted of an aerated basin, a final clarifier and an effluent polishing lagoon providing capacity for approximately 4,500 people. The final effluent is discharged to the Black River and eventually to Lake Simcoe.

The construction of the new wastewater treatment plant had been contemplated by York Region since early 1990s. In 1997, a Secondary Plan for the Community of Sutton was approved by York Region for an ultimate design population of 16,500 by the year 2016, representing an increase of 12,000 people. The Environmental Assessment process, completed in 2001, included a phased expansion approach. The preferred option would involve a Phase 1 expansion for a serviced population of 7,500 people (average daily flow of 3,412 m³/day), and Phase 2 – for 16,500 people (average daily flow of 7,510 m³/day).

DESIGN

The new effluent criteria were developed through the Ministry of Environment and summarized in the table below:

Total Phosphorus	0.18 mg/L (224 kg/year)
Ammonia, as N	3.0 mg/L (winter) • 1.0 mg/L (summer)
Total Suspended Solids	15 mg/L
Total BOD	15 mg/L
Fecal (E.Coli) Coliforms	<100 per 100 mL





In order to shorten the project time line, York Region, in association with local private developers, decided to proceed with the project on a design-build basis.

Accordingly, York Region retained R. V. Anderson Associates Limited (RVA) to prepare a Request for Proposal (RFP), to assist the Region with the selection of a design-build contractor.

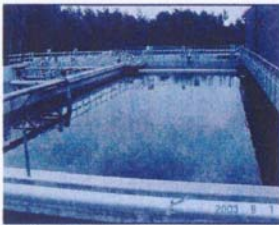
A "Defined-Concept" design-build approach was selected for this project. The RFP contained information about capacities and performance requirements, equipment specifications, redundancy provisions and process narrative, which allowed York Region to establish minimum design requirements, but left the selection of the specific equipment and conceptualization of the design to the proponents. The RFP also included for a one-year operation period.

Quality of the final product is one of the principal concerns with any project delivery method. However, with a design-build concept, obtaining quality needs more attention through the various stages of the project, must begin early in the selection process and should start with the identification of bidders who are best qualified to do the work. The "Sutton WPCP" selection process took the following steps: Pre-Qualification; Request for Proposal, Evaluation, Interviews (as part of evaluation), Negotiation and Award.

Evaluation of the submissions was carried out by four separate individuals (two from the Region and two from the consulting team. Technical proposals were independently scored and subsequently the price proposal were opened, scored and the combined scores calculated. Azurix North America (now AWS Engineers and Planners Corp.) was the successful proponent.

CONSTRUCTION SCHEDULE AND MANAGEMENT

Construction of the \$7.0 million project commenced in the spring of 2002. Throughout that year, the focus was on structures and site works, including construction of the reinforced concrete substructure for the Plant building and yard piping. Shop fabrication of long-delivery equipment items was coordinated at an early date in 2002 to ensure timely delivery of equipment in 2003. Superstructures were constructed through the winter of 2003.



In August 2003, the Plant was ready to be commissioned. Substantial levels of performance were achieved on September 30, 2003 after a 30-day evaluation period was realized. During this period, high-quality treated effluent was produced and tested to ensure strict compliance with all regulatory environmental standards.

The project was managed as a design-build project, with AWS Engineers & Planners acting as the general contractor and project designer. For continuity York Region retained R. V. Anderson to provide the process consultant services, throughout all phases of the project including design and construction management services. During the design phase, a number of progress review meetings were







conducted among AWS, R.V. Anderson and York Region, including special sessions to review potential safety issues.

Contract administration and construction inspection were provided by R.V. Anderson to ensure the work was being carried out in accordance with all plans and specifications, as well as to certify all payments to the Contractor. Weekly meetings were conducted by the contractor with all site staff and York Region, to ensure continuous co-ordination of all construction activities.

The design-build contractor was required to obtain all the required permits regulating the design and construction of the Sutton Water Pollution Control Plant. This included certificates from the Ontario Ministry of Environment, project filing with the Ontario Ministry of Labour, certification from the Electrical Safety Authority, and the Lake Simcoe Regional Conservation Authority.

A safety workplan was prepared by AWS, and in accordance with the company's safety manual, regularly scheduled safety meetings were carried out. There were no lost-time injuries during construction.

The plant effluent outfall, which is the pipe discharging highly treated effluent to the environment, was constructed within the flood plain of the Black River. To comply with the permit requirements of the Lake Simcoe Regional Conservation Authority, sediment control measures, including siltation barriers, and rock check dams were constructed to minimize environmental impacts. There were adjacent neighbours to the plant effluent outfall, who were notified of construction activities through the handout of leaflets.

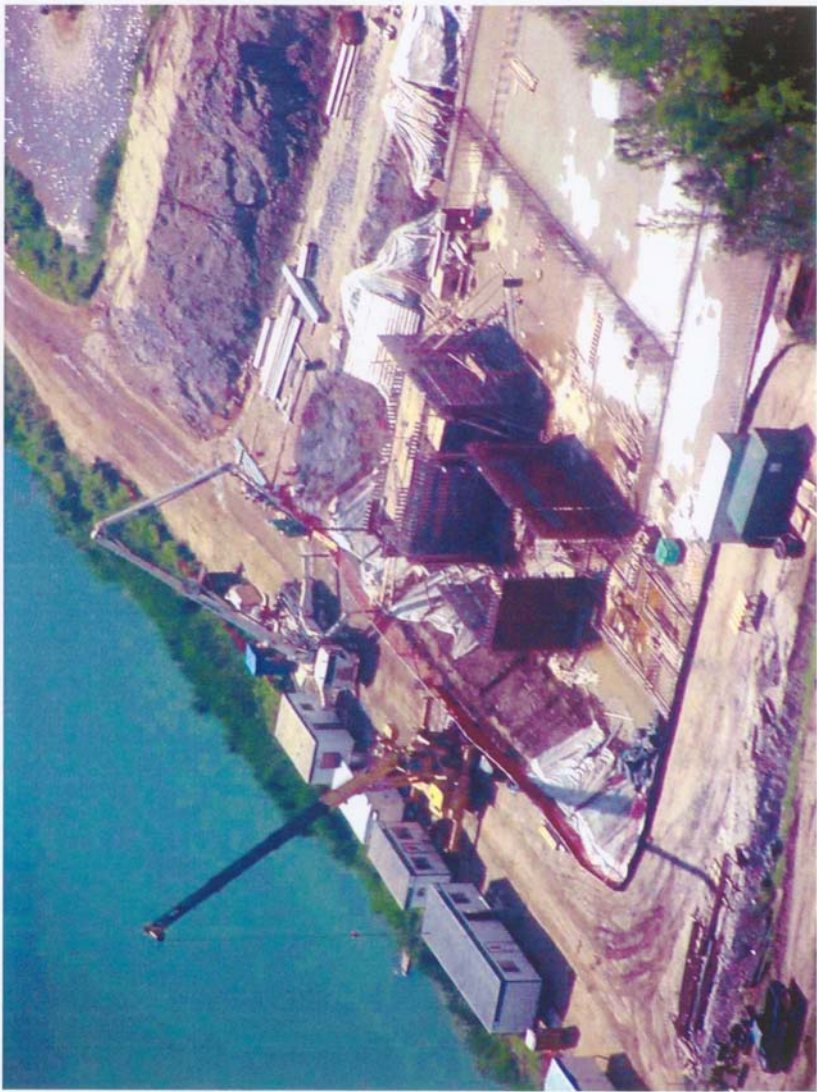
The innovative use of an old sewage lagoon at the plant site provided environmental benefits during and after construction. During construction, poor soils were encountered, which required a quick redesign and construction of substructures, including the provision of substructure caissons, and significant site dewatering without extending the construction schedule. The sewage lagoon provided a catchment area for groundwater from site dewatering activities, in order to avoid general discharge to the environment.

After the Water Pollution Control Plant was constructed, the lagoon was kept in service as a safety feature, so that it could be utilized to contain sewage spills should they occur. Also, a connection from the plant to the lagoon was provided, so treated plant effluent could be added to keep the lagoon filled with liquid. This has enhanced the lagoon as a habitat for wildlife, as many waterfowl have been regularly observed at the site.

ACCOMPLISHMENTS

During the last two months of construction, a video inspection of the existing plant effluent outfall revealed the condition of this pipe was so deteriorated, there was the potential for plant effluent to leak into the soils, sub-strata and environment. A replacement outfall pipe was required, and within two months, the pipe was designed, permitted by the Ontario Ministry of Environment, and constructed, so the project could be commissioned to meet its original schedule.

November 2004





The new Sutton WPCP is designed for a 'Phase 1' average daily flow of 3,412 m³/day and a peak capacity of 12,212 m³/day. The major process components of the Sutton WPCP include the following:

- Headworks with one automatic self-cleaning fine screen with a screenings washer/compactor, a manual screen and two vortex type grit removal tanks with a grit classifier.
- Septage receiving.
- Sequencing batch reactors, which utilizes so-called Intermittent Cycle Extended Aeration System (ICEAS) process that provides both nitrification and de-nitrification.
- Tertiary filtration, consisting of six continuously backwashed sand filter modules.
- UV disinfection.
- Sludge handling, chemical addition, odour control, existing storage lagoon and outfall to the Black River. All sludge generated at the Sutton WPCP is hauled off site for disposal at the Duffin Creek WPCP for further processing.

All processes at the Sutton WPCP are controlled by a computerized Supervisory Control and Data Acquisition System (SCADA).

CONCLUSION

It is important to note that the project delivery method employed for this project was unique, in that it was a design-build project with a one-year operating contract from September 2003 to September 2004. During the 12-month operation period, AWS Engineers & Planners Corp.'s staff were in full control of the treatment plant. The intent was to demonstrate continued compliance with all effluent criteria. Operational parameters of the various treatment processes were optimized, and training was provided to York Region's operations staff, including a period of shadowing for about four weeks.

The "Defined-Concept" Design-Build approach with a one-year operating contract has proven to be a cost-effective alternative project delivery method. The one-year operating period also permitted increased integration between the owner's operation staff and the contractor, allowing a smoother transition. It also provided an opportunity to implement project enhancements and 'fine tune' the plant before final handover.

Building in specific owner requirements and defining quality in the RFP are key to a successful Design-Build Project.

