

NANTON WASTEWATER
TREATMENT PLANT PROJECT



FINAL REPORT
OCTOBER 2, 2017

1.0 Background

On October 16, 2014, the former wastewater treatment plant suffered a catastrophic failure of the wall between the Rotating Biological Contactor (RBC) tank and the Chlorine Contact tank.

The Town of Nanton, in partnership with ISL Engineering and Land Services Inc. (ISL), embarked on the fast-tracking of the construction of a new Wastewater Treatment Facility in Nanton.

Initial workshops were conducted in December, 2016 to evaluate potential technologies for use in the new Wastewater Treatment Facility. The Town initiated these workshops as a full collaborative process, inviting representatives from multiple technology providers, as well as officials from Alberta Environment and Alberta Transportation.

Through the workshops, the Town of Nanton selected “Membrane Bio-Reactor” (MBR) technology for handling the wastewater treatment process.

1.1 Technology Selection

Having selected MBR as the preferred technology solution, the Town undertook a fully competitive process to select their preferred technology vendor.

Through a competitive bidding process of pre-qualified MBR providers, GE Water Technologies’ “Z-Weed” Membranes was selected as the Town’s technology partner for the project.

1.2 General Contractor Selection

The Town of Nanton submitted the design documents to the contractor community in a pre-qualification process, intending to enter into a contract with a general contractor with experience in the construction of municipal infrastructure, and specifically in wastewater treatment. 6 companies were qualified to participate in the Request for Proposals.

In completing the RFP process, Chandos Construction Ltd. was chosen as the General Contractor for the project.

2.0 Project Goals and Objectives

The Town of Nanton had four primary goals for the project:

1. **Timeliness:** With the existing plant in near failure and the life of the fixes implemented during the 2014 crisis unknown, the Town could not afford delays to the timeline.
2. **Budgetary:** The Town was relying primarily on grant funding and reserves for the project, and there was no contingency attached to the project. The solution implemented must be affordable to the Town.

3. Operator Level: The Town desired the final plant to be classified as a “Level II” facility for the purposes of operator licensing requirements. Level III operators are highly sought-after professionals commanding a high salary that is not sustainable for the Town.
4. Operator Friendliness: The completed plant must be designed with the operators in mind. Ease of working in the facility and maintaining the equipment was of very high concern.

3.0 Approved Contracts

The approved contracts & budgets for each component are listed below:

ISL Engineering	\$808,877
General Electric	\$2,604,000
Chandos Construction Ltd.	\$8,188,652
TOTAL	\$11,601,529

3.1 Foreign Exchange

In the Winter/Spring of 2016, the Canadian Dollar fell heavily against the US Dollar prior to the official order of the GE Process Equipment, resulting in an increase of cost of the process equipment of \$167,000.

3.2 Items Outside of Scope

The following items were outside of the project’s contracted scope, however are and form a part of the final project costs:

- Building Permits
- Utility Company Work (Telus, Fortis, ATCO)
- Materials & Soils Engineering
- Haul-in of Plant Seeding Material

3.3 Value Engineering

Chandos Construction Ltd. was the low bidder for the General Contracting portion of the project, with a lump-sum bid of **\$8,890,423**. In an effort to reduce the costs to the Town of Nanton, representatives from ISL Engineering, Chandos Construction and the Town of Nanton. In the end, **\$701,771** of changes were made to the construction plan and design to reduce the contract to **\$8,188,672**.

4.0 Construction Costs

4.1 Engineering

Final engineering costs were near budget, at **\$814,877** – an increase of \$6,000.

Through the construction, there were a few change orders that had basis in design errors and omissions. ISL Contributed **\$24,254** towards change orders from Chandos Construction Ltd.

The total amount paid to ISL Engineering for the project was **\$790,623**.

4.2 General Electric

Outside of the Foreign Exchange costs noted above, no change orders were made to the contract with General Electric.

Total amount paid to date is **\$2,354,675**. \$137,636 remains on holdback as of the writing of this report. The holdback is due and payable upon 12 months of successful operation of the plant.

4.3 Chandos Construction

Through the course of construction, change orders were signed totaling **\$404,089**, for a Grand Total on Contract of **\$8,592,742**.

Of the change orders signed, **\$339,801** are directly related to project unknowns, such as excavation, rock, dewatering, some additional heating costs over winter, and schedule extensions due to force majeure.

There were a total of **\$266,093** in other change orders for the construction and outfitting of the wastewater treatment plant above those contemplated in the original design. ISL's contributions of \$24,254 were directly relating to any changes in costs due to the design or change of items in the plant, however the actual cost of the materials were borne by the Town of Nanton.

Finally, **\$201,805** of change orders were credits to, and not charges against the project. These savings were identified through the construction process as ways to assist in the control of costs to the Town, and specifically due to a highly collaborative effort on the part of all parties – ISL, Chandos and Administration.

4.4 Items Out of Scope

Items Out of Scope represented a total of **\$94,536**. \$63,253 were made up of Materials Testing and Geotechnical, with the remaining split between utilities and building permits.

4.5 Outstanding Amounts

As of this report, \$20,000 in holdback remains payable to Chandos Construction, \$137,636 to General Electric, and likely \$12,000 in miscellaneous odds and ends still to be finalized.

4.6 Total Construction Cost

Actual cost to construct is as follows:

ISL Engineering	\$790,623
General Electric	\$2,752,711
Chandos Construction Ltd.	\$8,592,742
Out of Scope	\$94,536
TOTAL	\$12,230,612
Less: AMWWP	\$6,090,396
Less: New Building Canada	\$3,500,000
Less: MSI – Capital	\$1,435,967
Less: Reserves Already Approved	\$1,090,000
TOTAL REMAINING TO BE FUNDED	\$114,249

Total construction costs represent a contingency of **3.92%** over the budgeted construction cost of \$11,866,363.

It is worth noting that the final construction cost is **\$221,399** less than had the Town of Nanton accepted the lowest bidder without conducting any value engineering, and before any change orders were applied.

5.0 Successes & Lessons Learned

The single greatest success of the project was the collaborative working relationship of all the parties involved. Regular meetings were held throughout the project, and generally whenever a problem was encountered, in order to find the best, most efficient and economical solution available.

Overall, the few times where the project had challenges were the few cases where lines of communication broke down.

The overall design was well done. A majority of design challenges were experienced when merging 2D designed plans with 3D Modelling – there were conflicts that went undiscovered until construction. Care should be taken to have all parties using the same technology in design.

Underground GeoTechnical unknowns was the prime driver for change orders and cost overruns. Part of this was due to the shift from surface to underground tankage during the design phase, however improved geotechnical investigations may have prevented, or at least identified, some of the challenges we faced.

The Town of Nanton did not handle communication with the Golf Club effectively. As delays impacted the schedule, Administrative officials could have done a better job of keeping the club informed, which likely would have resulted in less frustration experienced by the Club.

6.0 Conclusion

The Wastewater Treatment Plant Project was highly successful, resulting in a high quality treatment facility designed to take Nanton through the next 20 years.

Overall contingency of 3.92% is well within standard guidelines for a construction project of this scope, especially given the unknowns involved in the excavation.

The collaborative process embarked on by all parties proved its success through the project, and will be employed by the Town of Nanton on all future projects.

The lessons learned throughout this project, as well as detailed analysis of challenges experienced have been recorded, and will be once again brought forward and analyzed on any future projects to ensure that any errors, omissions, or issues are properly mitigated at the onset of the project.