

WINKLER NEW POTABLE WATER TREATMENT PLANT

Rapid growth in the City of Winkler has led to the critical need to establish long term water sourcing and treatment to sustain the existing and future developments.

To satisfy the demand the past years, the City withdraws more water from the Winkler Aquifer than the licensed volume although the City could buy more water from a regional water co-op but at a much more expensive rate.

The original allocation was for the withdrawal of fresh water from the Aquifer which is now supplemented by an additional allocation from the brackish water compartment of the Aquifer.

Due to the existing Water Treatment Plant (WTP) nearing its life expectancy and its incapability to treat brackish water, the City was considering a replacement of the old with a new WTP.

Reverse osmosis (RO) membrane technology was the preferred option with greensand filtration for the removal of iron and manganese upstream of the membranes.

The new WTP was also to be located to optimize on an expanded water distribution system.

Why did the City look for an innovative approach?

The City currently has a contract to buy water annually from a regional water co-op for not less than a fixed volume of water. This contract only expires in 8 years. The unit rate is however double what the City can produce water for, which results in a resistance to buy more water from the co-op.

The existing WTP is reaching its life expectancy and wouldn't be able to treat brackish water to the required standard.

Due to the availability of stimulus funding and the availability of brackish water from the Aquifer, the City used it as an opportunity to make some fundamental changes.

The building of the new WTP could proceed only if it would result in a far lower treatment cost than to buy water from the water co-op and that the City can handle the additional financial burden.

Why did the City choose the approach it did?

To further reduce costs and to make sure that the City satisfies its needs in an optimal way it was decided to do the maximum amount of the engineering in-house as well as the project management.

The structural, mechanical and electrical engineering were sole sourced from an engineering company and the process equipment was procured through a Request For Proposal (RFP) for the design and built of the process equipment. The RFP was compiled and adjudicated by the City's Engineering Department.

Due to the high iron and manganese content, it was decided that the most practical and cost effective solution would be greensand filtration, a well-known and established technology. It also protects the membranes against fouling by these two constituents.


Due to the high conductivity of the brackish water, it was decided to use reverse osmosis membranes with calcite conditioning downstream.

Disinfection is accomplished with sodium hypochlorite before the water is discharged to a circular storage tank above ground. The storage tank above ground was chosen instead of a rectangular

concrete tank below ground due to costs and time constraints but also due to improved mixing in the circular tank by a mechanical mixer.

A new distribution pump station delivers water into the distribution system at the north side of the City while an existing pump station at the City's main reservoir delivers water into the distribution system at the south side of the City.

The new pump station is controlled both by flow and pressure depending on the operating conditions in the system at any time. The pump station will mainly be controlled by flow, matching the treated capacity of the plant. If it is more than the demand it will push the water into the City's main reservoir for storage. The control will switch to pressure control should the demand increase for example during fire flow.

 How did you plan, build support for, and finely implement the innovation?

A Business Plan was prepared by the City's Engineering Department, which has been submitted for acquiring of stimulus funding as well as an Environment Act Proposal for an Environment Act License, which was a requirement for funding.


While waiting for the funding decision, the Engineering Department issued a Request for Information (RFI) to a few companies specializing in water treatment processes to qualify for the RFP (Design-Built tender process).

The raw water characteristics of the ground water to be treated to meet the provincial standards were included in both the RFI and RFP. H2O Innovation was selected the preferred supplier with which a contract would be conducted after a successful pilot plant study to demonstrate the performance to their proposed system.

The pilot plant study was completed after a couple of weeks of treating well water and required some changes to the proposed process resulting in the omitting of blending water and introducing calcite contact tanks.

The well pumps are controlled by the level in the raw water tank via a SCADA system.

Part of the innovation was the establishment of two new wells near the treatment plant to share in the emergency power supply provided for the plant. None of the existing nine wells have standby power facilities. With this arrangement, the treatment plant can function fully and independently during power outages.

 Why did the City select the process they did?

The volume of fresh water which can be withdrawn from the Winkler Aquifer is a contentious issue and Manitoba Water Stewardship is reluctant to agree to greater allocations than the perceived annual natural recharge of the Aquifer. It was however agreed to license an additional withdrawal from the brackish zone of the Aquifer. The City decided on the RO technology as it is currently the best practice for desalination, which can't be accomplished with the technology in the old WTP.

 What benefits such as cost savings, new economic development, or improved service were realized?

The choice was to buy more water from the water co-op or treat groundwater for half the price, saving the consumers valuable income. The lesser price for water will also be to the advantage of future development as the price of water is a deciding factor for many businesses to relocate or to settle in a certain area.

The water service is improved in a few different aspects; the City can be provided with water during potential longer power outages, the distribution is being fed from two opposite sides with two independent systems and a better quality of water will enter the system.

✚ What makes the City most proud about the innovation?

That the City could on its own brought this project from the ground with very little assistance from outside and making it therefore much more identifiable with the City.

That the brackish water from the Aquifer of which large volumes exist can be treated with a lower cost than to buy from outside and which will make the City far lesser dependent on other water sources to be tapped into with huge cost implications.

And last but not least, that the City has a complete system which can function independently during power outages.

The City is also very grateful for the financial assistance from both the Federal and Provincial Governments as this project wouldn't have been a reality without their funding.

7th Annual Municipal Excellence Award

PART 1:

Name of Municipality:	Rural Municipalities of Langford & Lansdowne
Date Implemented:	September 2010
Type of Municipal Project:	Langford Community Pasture Conservation Easement Agreement Initiative

PART 2:

Introduction:

The Rural Municipalities of Langford and Lansdowne signed the largest conservation easement agreement in Manitoba's history (and the 3rd largest in Canada) protecting in perpetuity 9,822 acres of municipally owned native grassland in the Langford Community Pasture. The future sustainability of these fragile high erosion risk soils was in question with the rapid expansion of the potato industry and the unknown future of PFRA with its change to the new national mandated Agri-Environmental Services Branch (AESB).

Uniqueness/Creativity:

- **First and Largest:** This is the first conservation easement agreement involving a Community Pasture in Canada (a model for others) and the largest conservation easement agreement in Manitoba.
- **Partnerships:** The RMs of Langford and Lansdowne were creative in utilizing the expertise of Manitoba Habitat Heritage Corporation (MHHC) to coordinate the conservation easement agreement. The RMs also enlisted the support of the Whitemud Watershed Conservation District to help MHHC with financial support.
- **Public Consultation:** The two municipal councils held public meetings with the community pasture patrons and other users (largely recreational) to ensure they supported the concept. Local public support was fundamental to proceeding with the concept of perpetual protection of this unique natural geographic area.
- **Coordination:** The 2 municipal councils coordinated the project with the provincial government (Crown Lands) and the federal government (AESB) as 65% of the community pasture is Crown owned land. Unique Memorandum of Understanding agreements connecting native grassland protection with sustainable pasture management practices helped to solidify the Crown agencies' support, the first of their kind in Canada for community pasture management. The property land titles needed to be changed to a modern format and the easement documents needed to coincide with the changed titles to be acceptable to the district registrar. This unique work could act as a model for future conservation easement agreements involving Community Pastures across western Canada.

Benefits to the Municipality:

- **Environmental Sustainability:** The conservation easement agreement provides perpetual environmental sustainability through the conservation and protection of a continuous large block of unique prairie ecosystem. An aquifer based water supply will significantly reduce chemical treatment of the drinking water and disposal of the byproducts of treatment, all affecting a positive impact on the environment.
- **Economic Sustainability:** The sustainable management of the native grasslands has supported and benefited local livestock producers for over 100 years. The conservation easement and grazing agreement with AESB (past PFRA) will ensure economic sustainability for local livestock producers. These are the highest at risk soils in Manitoba for soil erosion. Permanent protection from cultivation for potatoes or other crops will maintain the economic sustainability of these lands forever.
- **Species at Risk Protection:** Includes the endangered prairie skink.
- **Drinking Source Water Protection:** The Town of Neepawa and the surrounding municipalities of Langford and Rosedale obtain their drinking water from the Assiniboine Delta Aquifer within the Langford Community Pasture which will be maintained in perpetuity as healthy native grassland.
- **Recreation, Tourism & Heritage:** The RMs of Langford and Lansdowne are exploring opportunities with AESB (past PFRA) for summer trails through and around the Community Pasture to promote recreation and tourism and the spinoff economic benefits to local businesses. The local Prairie Snowdrifters groom snowmobile trails through the rolling sand hills in Langford Community Pasture supporting recreation and tourism. There are significant heritage opportunities in the pasture. Deer hunting is a significant attraction in this large block of undisturbed habitat, which benefits local guiding outfits and local hunters.
- **Economic Development:** Similar to Riding Mountain National Park, a natural oasis surrounded by agriculture, this large block of natural habitat will provide future economic development opportunities to local municipal entrepreneurs.
- **Land Ownership:** Ownership of land does not change with a conservation easement agreement, so the municipalities retain their ownership.

Cost Effectiveness:

- **Cost:** The Rural Municipalities initiated the largest conservation easement agreement in Manitoba with minimal cost. It was extremely cost effective as Manitoba Habitat Heritage Corporation covered the majority of staff time costs and financial costs to register the easements with land titles. Partnership agency support was crucial to the success of this project.
- **Water Treatment Cost Reductions:** The Town of Neepawa will experience significant reductions in water treatment costs as they shift from a surface water source (Whitemud River) to a protected groundwater source from the Langford Community Pasture. The reduced costs will benefit water users in Neepawa and those on rural water lines.

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