Water Efficiency

Small and Medium Sized Communities

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Progressive communities across Manitoba and North America have been considering ways to reduce costs and environmental impacts for years. Water efficiency is one topic that has received a lot of attention, especially by those communities facing the need for new or expanded water or wastewater infrastructure.

Potential Benefits of Implementing Water Efficiency Practices

- Reduced distribution system leakage results in lower treatment and pumping costs.
- Fewer emergency leak repairs result in lower overtime and other related costs.
- When the utility repairs or replaces meters regularly, revenues increase.
- Better estimates of unmetered use result in better consumption data for municipal planning.
- Reduced water use means lower wastewater pumping and treatment costs.
- Reduced consumption delays the need for a municipality to expand treatment facilities.

Water Costs Municipalities Money

A growing demand for municipal water means increasing expenses. Costs include the construction and maintenance of infrastructure, pumping costs, treatment, and monitoring for both water and wastewater. All of these expenses are paid for by the municipality or its water and wastewater utility.

A water utility loses money in four areas:

1. Low meter readings that result in customers paying for less water than they use.
2. Water distribution system leakage, resulting in operation and treatment costs for water unused water.
3. System bleeders (intentional water leaks intended to prevent frozen water pipes).
4. Lower water/sewer rates for heavy commercial/industrial users.

Environmental Impact of Water Use

The amount of water available for municipal use in Manitoba is decreasing, and available water sources have sometimes become effected or contaminated as a result of natural or human activities. More efficient use of water will protect existing supplies for future years.

Withdrawal of water from sensitive water sources may effect:

- Dilution for effluent discharges from municipal and industrial wastewater sources;
- Channel maintenance and sediment flushing flows;
- Flow that is needed for marshes, wetlands, biota, wildlife and aquifer recharge;
- Saltwater intrusion of groundwater due to excessive withdrawals;
- Water-based recreation such as swimming, rafting, kayaking, boating;
- Aesthetics (appreciation of the beauty of the water); and
- Water delivery to downstream users.

Treated wastewater may effect the water body receiving treated wastewater, depending on the amount and quality of the wastewater, and the nature of the treatment. If a sewage treatment plant or lagoon is overloaded, it will not adequately treat the wastewater.

Water Audit

A water audit will determine where the water in your municipal water system goes, how much is unaccounted for, and how much inaccuracies and leaks cost. Gathering this information is the first step toward making your system more cost efficient. Authorize water plant operators to do the water audit. Based on what is found during the water audit, work with water staff to prioritize what needs to be done.

Assisting Others

Distribute copies of other pamphlets in this AMM Water Efficiency Series to others in your community. The pamphlets outline the water audit process for facilities such as hotels, schools, and health facilities. Contact AMM for copies, or check on the Internet at http://www.amm.mb.ca/

This series of water efficiency publications was supported by: Sustainable Development Innovations Fund, Manitoba Conservation

Water Efficiency Success Stories

Gillam, Manitoba (approximate population 1,500)

After analyzing its water distribution system, Gillam replaced the distribution lines in its mobile home park. The Trailer Park project included the installation of 4,300 m of shallow bury insulated ductile iron watermains and 200 individually recirculating watermain services.

Within days of completing the work, system water demand decreased. The average demand in 1998 is approximately 1,100 m3/day. It is estimated that demand has been reduced by approximately 55%. Current average demand is 2,500 m3/day. The decrease in demand is due to the upgrades in the trailer park. The largest saving was due to the large amount of water that was previously being used to prevent frozen water pipes (bleeders).

Gimli, Manitoba (approximate population 1,600)

Gimli installed water meters and water conservation devices in Gimli homes in 1996 at a cost of $250,000. Water efficiency bill inserts were mailed out with water bills. The Town increased water utility rates effective January 1,1997 to encourage water conservation.

To reduce infiltration into the sewage system and defer the need to expand or move the lagoons, Gimli:

- Eliminated all unauthorised wastewater flows from private wells and heat exchangers;
- Undertook a well sealing program to grout 23 wells;
- Undertook a survey to ensure other abandoned wells were properly sealed;
- Repaired and sealed manholes;
- Repaired waste water collection piping;
- Audited water use of nine major commercial accounts to identify actions the customers could take to become more efficient;
- Installed flow meter on lift station; and
- Installed new meters where required.

At the time of release of wastewater from the lagoons in the fall of 1999, the lagoons were only 1.2 meters deep, compared to the 1.6 meter allowed depth. Before water conservation actions were taken, water depth in the lagoon at time of release was at maximum. Through these activities, The Town of Gimli has deferred a $1 million expansion/relocation of the lagoon for at least several years. In addition, the Town plans to implement a program to disconnect weeping tile from the wastewater collection system. This should result in further reductions in wastewater flows to the lagoon.

Pierson, Manitoba (approximate population 230)

Faced with high water consumption, water supply pipes vulnerable to winter freezing and summer water shortages due to shallow water supply wells, the U.V.D. of Pierson partnered with the R.M. of Edward and their residents to determine water efficiency priorities. Pierson installed water meters on all customers' supplies, installed new wells, and replaced water supply lines in 1992. The new supply lines were installed deeper than the original lines to reduce the chance of freezing. These improvements were paid by changes in water utility rates, a Water Services Board grant, and a debenture (paid using a water rate surcharge).

As of January 1997, the U.V.D. of Pierson has successfully implemented a user pay system, has a steady water supply and is continuing to build a reserve fund to ensure economically sustainable water services.

St. Boniface General Hospital, Winnipeg, MB Reverse Osmosis Water Reuse Project

In 1999, by reusing process wastewater from the reverse osmosis water filtration units for the morgue coolers and medical vacuum pumps, the St. Boniface General Hospital reduced water costs by approximately $47,000 per year. The Sustainable Development Innovations Fund contributed $25,000 towards the cost of the project. The total cost of the project including materials and labour was $66,412.93 with a simple payback for the project of 1.4 years. Reduction in water consumption is estimated at approximately 6.7 million gallons per year.

Municipal Planning Overview

Begin your water efficiency program with an audit to ensure your water efficiency plan targets the most appropriate components. Priority should be based on cost/benefit analysis, and how actions may support each other. For example, educating the public about a lawn watering by-law will increase awareness and raise compliance. Deferring a water or wastewater treatment expansion through water efficiency will result in a plan with priorities that will differ from communities that intend to reduce peak summer water use. Some examples of expected results are provided - your community's expected results might vary from these examples.

Initial action items	Priority	Expected results	Budget	Person responsible	Completion timeline	Actual results	Actual $'s	Date complete
Carry out a community-wide water audit using data from previous 2-3 years	**1**	Identify percent unaccounted-for-water, meter inaccuracies, & seasonal water use variations.						
Establish water efficiency plan	**2**	List of priority components for action.						
Suggested components for plan								
Leak detection & repair		Reduce system leakage by __%.						
Pressure reduction		Reduce water loss due to leaks by __%.						
Metering		Enable user pay pricing & accurate water audits.						
Full cost pricing		Pay for all costs of water production with water revenues.						
Optimize water treatment plant		Reduce water, chemical & energy use in the water treatment process by __%.						
Flow reducers at service connections		Reduce water used by customers by __%.						
Education		More aware & supportive public.						
Incentive programs		Encourage public to purchase water efficient fixture &/or appliance purchase.						
Lawn watering by-law		Reduce peak summer use by __%.						
Six litre toilet by-law		Require efficient use of water.						
Ensure local availability of water efficient fixtures & appliances		Decrease water used by fixtures and appliances by __%.						
Facilitate audits & development of water efficiency plans for metered ICI & household water users		Individual plans to reduce water waste by __%.						
Prevention of frozen water pipes		Reduce winter peak water use by __%.						
Other								