

How to get your Water Reuse Project Approved



Alberta Water Reuse
Symposium June,
2014, Calgary, AB



Re-Fresh

The Confluence of Ideas and
Opportunities on Water Reuse

Alberta Water Council Symposium

Water Reuse in Alberta

FOR
DUMMIES

But Officer, I thought
I could reuse this
wastewater. After
all, Its just water!



BY Ryan Devlin B.Sc. Chem.

Agenda

- Who am I?
- Definitions
- Legislation
- Approval Processes
- Examples
- Q&A

Ryan Devlin

- Over 19 years of experience in Water Resources
 - Chemistry and Molecular Biology
 - Published several articles on water reuse
 - Managed and worked on some very unique water resource Projects for Stantec, Nalco and ZL
-
- NAIT on site wastewater treatment and reuse for Toilet & Urinal Flushing
 - University of Alberta Integrated Water Management Plan (IWMP)
 - Edmonton International Airport IWMP
 - Several Golf Course IWMP
 - City of Edmonton, Stormwater reuse Project
 - City of Calgary Dual Pipe Preliminary Design Study
 - Parkland and Strathcona County

Challenges to Approvals ?

- Public Perception “Yuk Factor”
- Technology challenges?
- Design Challenges?
- Construction Challenges?
- Approval Challenges?

**Mitigation
of Risk**



What you will Learn Today

- Even though Alberta's regulations do not clearly outline the regulatory approval process for all types of water reuse, there IS a way to get them approved.
- NO Guarantees of Approval

Alberta Reclaim Water Working Group

- * In Alberta, there currently exists a reclaimed water working group who's mandate is to explore the Government of Alberta's criteria and a path forward to mitigate the risks associated with reuse of reclaimed water.



History of WW Reuse

- * The ancient city of Jerusalem (1500 BC) had very strict plumbing laws that required wastewater to be disposed of away from buildings and camps.
- * These laws further evolved to include the separation of toilet water from sink water. The sink water was diverted to a lagoon and stored and used for irrigating crops.



Definitions

- * **Wastewater:** Any water that is discharged from a household residence or commercial site that contains a wide range of contaminants and concentrations resulting from the mixing of wastewaters from different sources. In Alberta there is no distinction between black water and grey water.
- * **Reclaimed water:** Reclaimed water is wastewater that has been treated either passively or mechanically to remove or minimize contaminants and disease causing pathogens. This can also be referred to as “treated wastewater”.

Definitions

- * **Blackwater** – This type of wastewater contains high concentrations of organic contaminants such as BOD, COD, and suspended solids, as well as pathogens such as bacteria and viruses.
- * **Clear Water**: This type of wastewater comes from sinks, showers, and toilets. It contains lower levels of organic contaminants, however it still contains some levels of bacteria and pathogens.
- * **Grey Water** – showers/bathrooms, laundry, and kitchen wastewater.
- * **Dark Water** – This type of wastewater comes from industrial processes and can contain higher levels of organic contaminants, oils, grease, and microbiology.

Definitions

- * **Non-potable water:** Any water source that does not meet drinking quality standards or is of unknown water quality.
- * **Policy** - A policy is a statement of intent arising from a set of principles, rules and terms that guides the decision making process. Policies are not laws. (AKA - guidelines)
- * **Act** - An act is a law legislated and enforced by our provincial and federal governments to comply with a set of rules. The Act is supported by regulations and codes of practices. These codes of practice, standards (if referred to in the legislations) and regulations are also laws and support each specific act.

Types of Reuse

- * Water reuses can be categorized under 4 general categories:

1. Irrigation of Public and Residential Areas

- * Parks including grass, trees and shrubs
- * Sports fields and ice rinks (winter)
- * Water gardens, Food crops

2. Commercial Uses

- * Car washes
- * Nurseries



Types of Reuse

Water uses can be categorized under general 4 categories continued:

3. Industrial Uses

- * Cooling
- * Process Water
- * Wash water

4. Residential Reuse

- * Toilets and Urinals



What Do the Regulations Say?

- * **Alberta's Water Act (WA)**
- * **Alberta Environmental Protection and Enhancement Act (EPEA)**
 - * **Activities Designation**
 - * **Wastewater and storm Drainage Regulation**
- * **Plumbing Code Regulation (Safety codes Act)**
 - * **2005 National Plumbing Code**
- * **2006 National Building Code Code**
- * **Many Alberta and National Guidelines exist**
 - * **Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems (Alberta Environment, 2006)**
 - * **Canadian Guidelines for Domestic Reclaimed Water for use in Toilet and Urinal Flushing**
 - * **Classification of Land for Irrigation**
 - * **Guidelines for Municipal Wastewater Irrigation**
 - * **Water Quality Based Effluent Limits Procedures Manual**

What Do the Regulations Say?

- * Alberta does not have Regulations or a Code of Practice for the use of Reclaim water
- * Guidelines and policy statements do exist

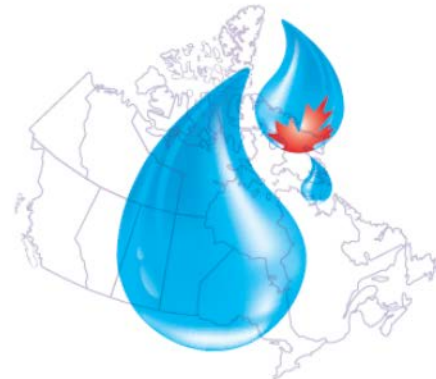


Health Canada

- * In 2010, Health Canada published a policy document entitled “*Canadian Guidelines for Household Reclaimed Water for Use in Toilet and Urinal Flushing*”. This technical document proposes guidelines for household reclaimed water quality as well as guidance on potential elements of a management framework.



Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal Flushing



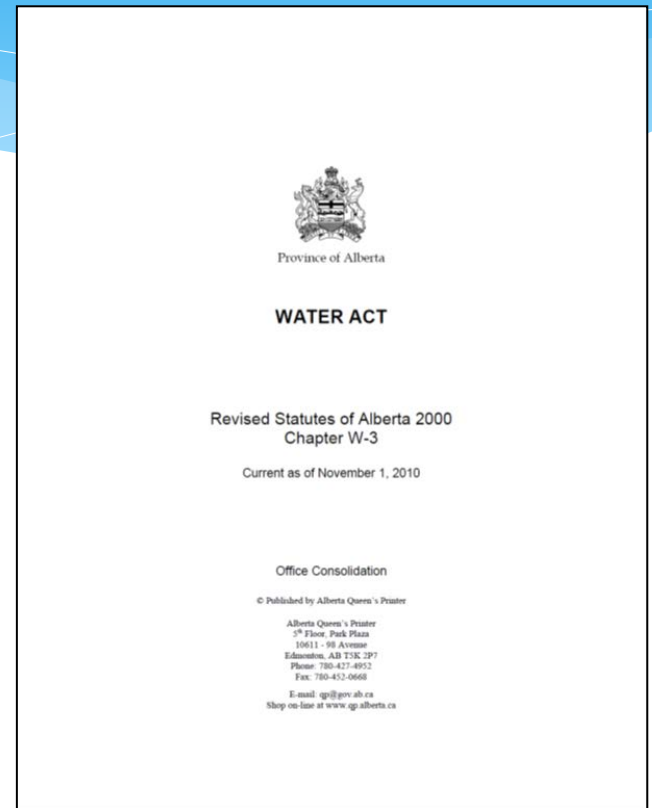
Canada

Alberta's Water Act (WA)

- * **Alberta's Water Act (WA)** is a legislative tool that supports and promotes the conservation and management of water in Alberta. The Water Act does not specifically mention the word storm water, however it does address the **diversion of water**.
- * The **diversion of water** means the impoundment, storage, consumption, taking or removal of water for any purpose, except the taking or removal for the sole purpose of removing an ice jam, drainage, flood control, erosion control or channel realignment, and any other thing defined as a diversion in the regulations.

Alberta's Water Act (WA)

- * If you are to use storm water, for any purpose such as irrigation or toilet and urinal flushing which are not listed in the act, a license to divert the water will be required. For these cases, the WA allows for the discretionary **“opinion” of the Director** to require licensing for water diversions.
- * The Director may require a study of the receiving environment and include hydrological, hydrogeological and cumulative effects study and monitoring.



Alberta's Water Act (WA)

The Water Act also contains several references to “conservation” planning. The requirement to do so or not to do so comes from an “**Opinion of the Director**”

Water Act

Section 1 - Interpretation

- j) “conservation” includes but is not limited to
 - (i) improved efficiency, recycling, reuse or reduction of wastage or losses,

Alberta Environmental Protection and Enhancement Act (EPEA)

- * **Activities Designation Regulation AR 276/2003**
- * Activities defined under this regulation require an approval or registration.
- * This becomes important when industrial water reuse is desired



Province of Alberta

ENVIRONMENTAL PROTECTION AND
ENHANCEMENT ACT

**ACTIVITIES DESIGNATION
REGULATION**

Alberta Regulation 276/2003

With amendments up to and including Alberta Regulation 1/2009

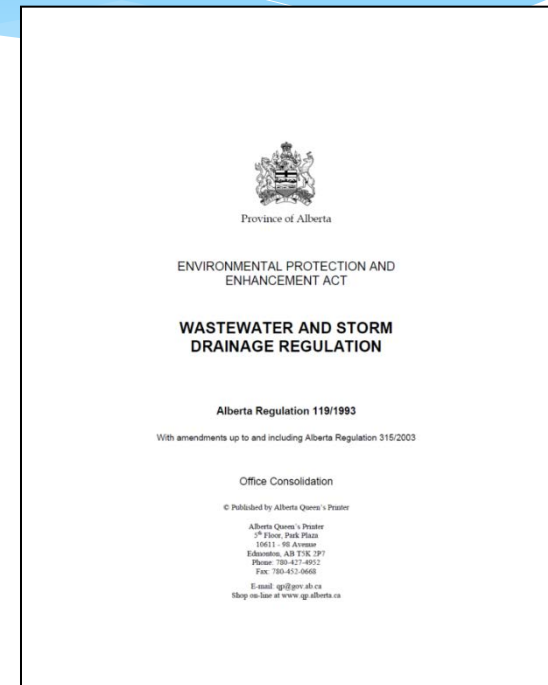
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Alberta Environmental Protection and Enhancement Act (EPEA)

- * **Wastewater and Stormwater Regulation AR 119/1993**
- * The Wastewater and Storm Drainage Regulation enables AESR to regulate the operation of storm drainage and wastewater systems .
- * AESR may issue approvals for systems that reuse treated municipal wastewater for irrigation on agricultural lands and other facilities such as golf courses



Alberta Environmental Protection and Enhancement Act (EPEA)

- * These regulations have references to standards and guidelines for specific design and operating criteria which include the following:

STANDARDS AND GUIDELINES FOR MUNICIPAL WATERWORKS, WASTEWATER AND STORM DRAINAGE SYSTEMS

GUIDELINES FOR MUNICIPAL WASTEWATER IRRIGATION



APRIL 2000

Municipal Program Development Branch
Environmental Sciences Division
Environmental Service

Standards
for the
Classification of Land
for Irrigation
in the
Province of Alberta

2004



Alberta
AGRICULTURE, FOOD AND
RURAL DEVELOPMENT

Alberta Safety Codes Act

- * Plumbing Code Regulation has adopted the 2005 National Plumbing Code
- * 2010 National Plumbing Code
 - * The Canadian Standards Association (CSA) Standards B128.1, B128.2 and B128.3 address water reuse in a building. The 2005 NPC does not reference these standards
- * 2006 Alberta Building Code
 - * The NBC requires that all building sewers shall discharge into a public sewage system where such a system is available

CSA Standards B128.1, B128.2 and B128.3

B128.1 - Design and installation of non-potable water systems/ Maintenance and field testing of non-potable water systems

B128.2 - Maintenance and field testing of non-potable water systems

B128.3 - Performance of non-potable water treatment systems

CSA Standards B128.1, B128,2 and B128.3

So.... if The 2005 NPC does not reference these standards and the NBC requires that all building sewers shall discharge into a public sewage system where such a system is available...

What do we do?

Application for an Alternate Solution

The Alberta Safety Codes Act Allows for local approving governments (municipalities) to entertain new and innovative solutions to water resources challenges through an application process.

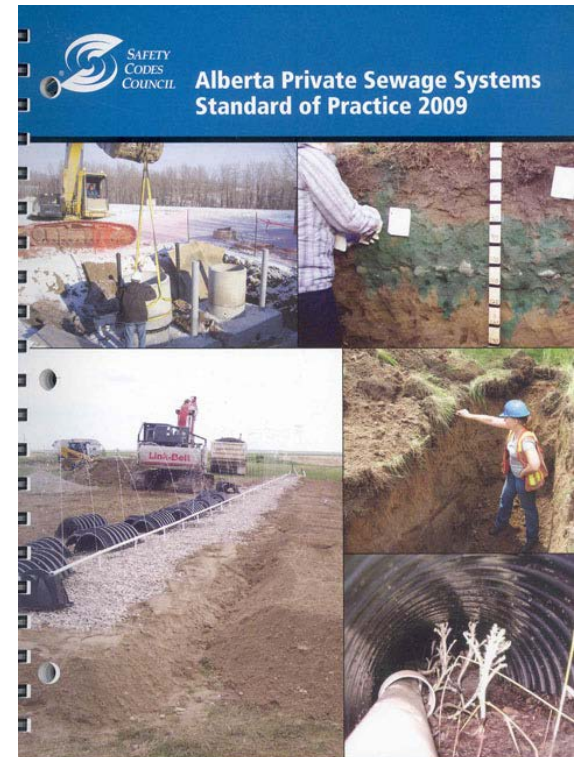
Why? - The Alberta Government does not want to impose restrictions on the advancement of technology.

A positive result to an Application for an Alternate solution is a **Variance Order**.

Private Sewage

- * 2009 Alberta Private Sewage Standard of Practice allows the reuse of treated wastewater under certain conditions

Approval process is clearly defined



Municipal Sewer Use Bylaws

- * Every Alberta municipality has storm sewer and wastewater sewer bylaws that regulate servicing connections and the release of matter (and water) to the sewerage system and watercourses.
- * The City of Edmonton Sewers Bylaw 9425 Part III - Public Use of Storm Water Management Facilities also states, “*No person shall remove water from a City owned storm water management facility without the City Manager’s permission.*”

Approval process is clearly defined

Rainwater Harvesting

* Rainwater harvesting is defined as the **collection, storage and use of precipitation prior to its contact of the ground surface.** In 2010, Alberta Municipal Affairs (AMA) published guidelines for residential rain water harvesting systems. The Alberta Building, Plumbing and Electrical Codes are applicable to rainwater harvesting.

Alberta Guidelines for Residential Rainwater Harvesting Systems

2010

HANDBOOK

In Alberta, the Alberta Building Code, National Plumbing Code, with select amendments, and the Canadian Electrical Code are the codes that are applicable to the design, construction and management of rainwater harvesting systems. This guidelines document and the accompanying handbook provide additional guidance for designing, constructing, and managing rainwater harvesting systems based on the minimum safety requirements established in these codes.

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Approval process is
clearly defined

Storm water

- * Once the precipitation has **contacted the ground**, such as pavement or grass, it becomes storm water and its collection, storage and ultimate use is governed by different legislation.
- * Storm water reuse becomes more complicated as AESR and AMA govern activities of water (precipitation) once it reaches the ground surface.



Rainwater Harvesting from a Green Roof?



Approval process is NOT clearly defined

Storm Water Consideration

Storm water approvals can include simple ponds and conveyance systems to larger, multi pond facilities with special rate control devices and water treatment.



Approval process is through a variation order and AESRD depending on the reuse activity

Storm Water Consideration

Keys to approval

- Demonstrate the water is available
- Show that the system is required
- Scientifically demonstrate the receiving environment can take the water
- Prove that the system will provide equal to or greater than level of safety to people and the environment
- Demonstrate back-up and contingency plans

Process and Industrial WW

- * Processes that use water and generate wastewater are governed by both the WA and the EPEA. What makes this approval environment **different for reuse** is that of the concept of “used” or a “drain” does not apply if it remains on site.



Industrial Wastewater

Industries like pulp and paper, chemical, Oil and Gas and manufacturing are governed by that industries standards and approval processes.

Remember, once it leaves the industrial site and enters into the environment, it falls under AERSD's jurisdiction.

Approval processes are clearly defined by each industry and AESRD

Spray parks

Is reuse of this water is prohibited.

WHY?

Under what conditions would it be allowed?



Swimming pools

The reuse of this water is prohibited.

WHY?

Under what conditions would it be allowed?



Recreational Pools and Spray Parks

Remember: A pool is fixture or appliance and has a drain

What will it be used for?

- Irrigation?
- Street cleaning?
- Cooling water?

Equal to or greater level of safety to people and the environment.

Approval process is through a variation order and AESRD depending on the reuse activity

Car washes

The reuse of this water is prohibited.

WHY?

Under what conditions would it be allowed?



Approval process is through a variation order and AESRD depending on the reuse activity

Municipal Wastewater

- * The reuse of this water is allowed.
- * WHY?
- * Under what conditions is it allowed?



Approval process is through AESRD depending on the reuse activity and possible AMA if used residentially

Other Considerations to Address

- * Social – Who does the water belong to?
- * Environmental – Can the environment handle large reuse projects with diversions?
- * Financial – is there an true economic force driving the project

Summary

- * Currently, water reuse in Alberta is in its infancy. Technology has far surpassed our regulations.
- * That is not to say, legislation prohibits us under any circumstances to reuse water, it just means we have to work within the system we have until there is enough demand that the rules can be changed to make is more clearly defined.

**The answer is YES to water reuse,
but only if you can get approval!**

Questions?

Thank you