

# A National Standard for Wastewater Treatment in Northern Communities Using Lagoon and Wetland Systems

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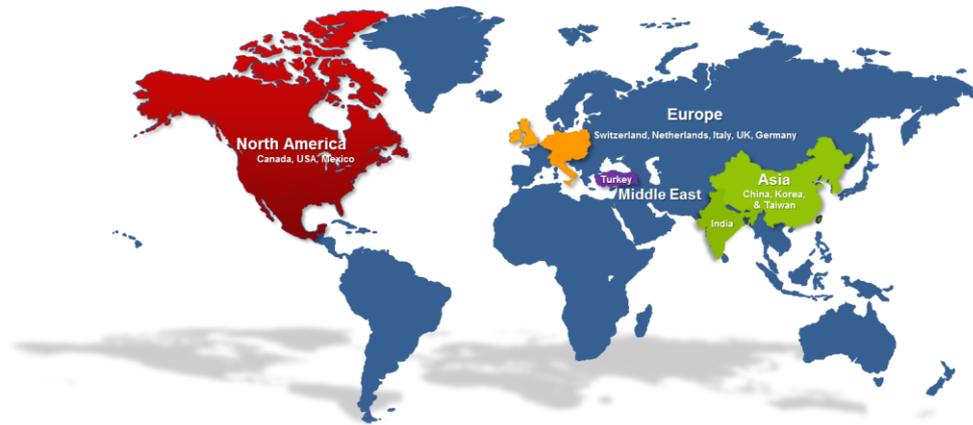
# Outline

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# Background

## Who is CSA Group?



Consumer  
Product  
Evaluation

Standards

Product  
Certification  
& Testing

# Background

## Who is CSA Group?

- Also known as the Canadian Standards Association
- 39 offices in 14 countries
- 9,000 engaged and committed Members
- 1,300 standards development Technical Committees
- 3,000+ standards in 54 program areas and services
- 40% referenced in legislation and regulation
- Authorized to develop standards in Canada and U.S. by SCC and ANSI



## What is a consensus standard?

A consensus standard is a document designed to be used as a rule, definition or set of minimum requirements. It is a consensus-built, repeatable way of doing something that can foster safety, consistency, and other social, economic, or environmental benefits.

## Standards must fit the need

- Prescriptive based
- Objectives based
- Performance based
- Principles based
- Hybrids

## What is a standard?

It's different from a typical guideline.

### Accredited Standard

- Specify expectations and provide a way to measure compliance to the content.
- Primarily includes requirements and recommendations.
- Written to be compatible with demonstrating due diligence such as with accepted practice or regulations.
- Concise, and structured to easily locate specific content.
- Developed through a third party accreditation process.

### Guideline

- Provide advice and help users better understand how to carry out a task or procedure.
- Primarily include information, background, and decision support.
- Written for practitioners and not usually usable to demonstrate due diligence.
- Less concise with more background and context.
- Usually developed by individuals or organizations with unspecified motives.

## Fully accredited development process

- Accredited by Standards Council of Canada and American National Standards Institute
- Standards developed by experts on a consensus basis
- Balanced Matrix: representatives from industry, government, NGOs, academics, consultants
- Automatic 5-year review

### Value Proposition:

- **Public acceptance** by way of inclusive input and transparency
- Stakeholder engagement and **compliance**
- Process, regulatory, and financial **efficiency**
- **Harmonization** across jurisdictions

**CSA does not write standards**

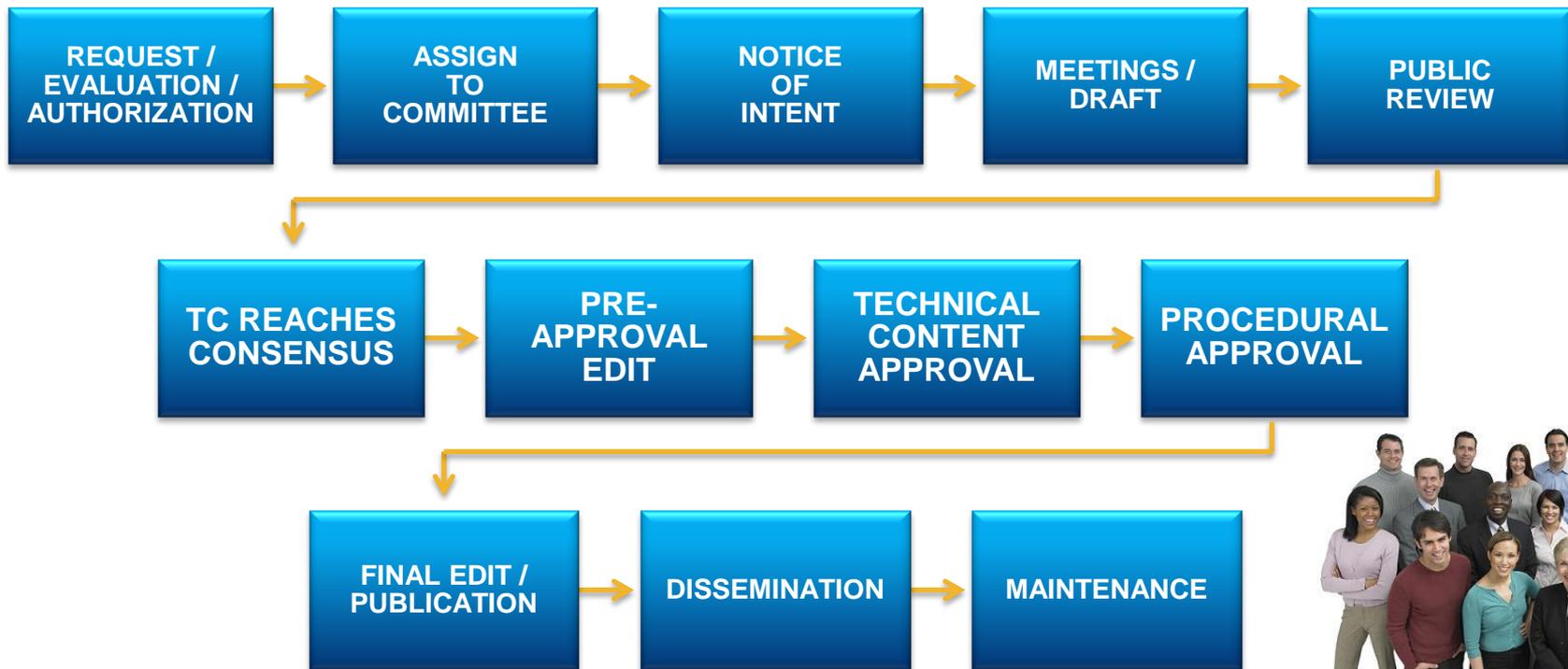
**Technical Committees write standards**

CSA does not influence the technical content



# Standards Development Process

A new standard will generally follow the same steps throughout its development. The steps include:



## The Potential Value of Accredited Standards

- Facilitate consistency in practices and equipment.
- Harmonize accepted practices across jurisdictions.
- Provide credibility to accepted practices through trust in CSA's brand and neutral process.
- Leverage resources for government and industry through collective experience and shared effort.
- Provide tools for compliance with policies and regulations.
- Allow for practitioners to demonstrate due diligence.

# Standard for Northern Lagoons and Wetlands

## Northern Infrastructure Standardization Initiative

*Answering  
the call from  
Northerners  
for  
assistance  
to adapt to a  
changing  
climate*

### **Phase 1 (2011-2016)**

\$3.5 million program funded under the Clean Air Agenda in partnership with INAC

### **Phase 2 (2016-2021)**

\$1.9 million funded under Budget 2016

### **The main objectives of NISI include:**

- Establish and maintain a Northern Advisory Committee (NAC) to guide the NISI program
- Focus on priority infrastructure issues affected by climate change
- Create new standards and a sustainable process to support the incorporation and implementation of these new standards
- Northern practitioners to be involved in the development and implementation of standards



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# Standard for Northern Lagoons and Wetlands

## Published Northern Infrastructure Standards

- **CAN/CSA-S500 Thermosyphon foundations for buildings in permafrost regions**
- **CAN/CSA-S501 Moderating the effects of permafrost degradation on existing building foundations**
- **CAN/CSA-S502 Managing changing snow load risks for buildings in Canada's North**
- **CAN/CSA-S503 Community drainage system planning, design, and maintenance in northern communities**
- **CAN/BNQ 2501-500 Geotechnical Site Investigations for Building Foundations in Permafrost**

# Standard for Northern Lagoons and Wetlands

## Lagoon and Wetlands Systems

- Usually consists of:
  - Primary retention lagoon (often natural ponds);
  - Secondary retention lagoon;
  - Natural or constructed wetland.
- Operation
  - most treatment is the lagoon
  - Discharge from lagoons during summer season
- Typically an effective wastewater treatment system
- Additional challenges in Canada's North

# Standard for Northern Lagoons and Wetlands

## Northern Challenges

- Extreme climate restricts wastewater treatment options
- Remoteness
  - Logistics for availability of materials (construction and maintenance)
  - Construction and operational costs
  - Availability of trained personnel
- Climate change
  - Warming and melting permafrost
  - Changes in precipitation (Snow, rain, snowmelt)
- Regulations and Standards often based on Southern experiences

# Standard for Northern Lagoons and Wetlands

## Origins of the Standard

- Standards Council of Canada ‘scoping study’ on the needs for a standard for Northern Wastewater using lagoons and wetland.
- A number of key issues were identified:
  - There are no standards for this topic area specific to northern Canada.
  - Lagoons and wetlands in the north are particularly sensitive to known climate change-related impacts.
  - Many systems are already in poor operational states.
  - New systems are being planned, and many existing systems are due for upgrades and expansion.
  - Failure and underperformance of these systems leads to loss of critical services and high repair costs.

# Standard for Northern Lagoons and Wetlands

SCC consulted with members of their Northern Advisory Committee, subject matter experts from across the North including owners, operators, regulators, engineers, and permafrost scientists.

This chart is not exclusive.

Region	Organization
Nunavut	Department of Community & Government Services Nunavut Housing Corporation
NWT	Design and Technical Services, Public Works and Services Asset Management, Municipal and Community Affairs NWTAC
Yukon	Major Construction Highways and Public Works Community Development Infrastructure Development Branch
Nunavik	Kativik Municipal Housing Bureau Municipal Public Works, Kativik Regional Government
Northern Experts/ stakeholders	NWTAC RSI Private industry stakeholders (engineers/designers)
Federal Departments	NRC ECCC INAC ...and more
Academics	Dalhousie Carleton ...and more

# Standard for Northern Lagoons and Wetlands

## Informative Documents List

- CAWT's publication on "[Wastewater Treatment in Northern Communities using Lagoon and Wetland Systems](#)"
- CAWT -along with the United Nations Environmental Program (UNEP)- [also developed a software to design Treatment Wetland systems adapted to the North](#)
- CAWT published an important corpus of [studies/reports/presentations](#) related to Treatment Wetlands in the North.
- Terriplan Consultants. 2009 (April). Arctic water workshop: summary report. March 10-11th, 2009. Yellowknife, NWT, Canada. Sponsored by Environment Canada. 97 pg.
- [Guidelines for the Approval and Design of Natural and Constructed Treatment Wetlands for Water Quality Improvement March 2000. Alberta Environment](#)
- Canadian Council of Ministers of the Environment (CCME), 2009. [Canada-wide Strategy for the Management of Municipal Wastewater Effluent.](#)
- Canadian Council of Ministers of the Environment (CCME), 2014. [Canada-wide Strategy for the Management of Municipal Wastewater Effluent: 2014 Progress Report.](#)
- Community and Government Services (CGS), 2012. Municipal Infrastructure Standards and Criteria Manual. Government of Nunavut, April 2012, 73 pp.
- Duong, Diep, and Ron Kent, 1996. Guidelines for the Development of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories. GNWT Dept. of Community and Municipal Affairs, 11 pp.
- Ferguson Simek Clark (FSC), 2005. Abandonment and Restoration of Sewage Lagoons in Nunavut: Final Review Report. March, 2005, 68 pp.
- Government of the Northwest Territories (GNWT), 2005. Northwest Territories Small Water Treatment Systems Operator: Student Manual. Dept. of Municipal and Community Affairs, 120 pp.
- National Research Council (NRC), 2004. [Optimization of Lagoon Operation: A Best Practice by the National Guide to Sustainable Municipal Infrastructure.](#) 28 pp.
- Documents prepared by the Centre for Water Resources Studies, Dalhousie University

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# Standard for Northern Lagoons and Wetlands

## Scope

This Standard establishes requirements and recommendations for planning, design, operation, maintenance, closure, and reclamation of wastewater treatment in Northern communities using lagoon and wetland systems.

Includes:

- Site evaluation
- Permafrost considerations
- Pipe continuous or truck inflow
- Inspection and Monitoring
- Management of sludge
- Optimizing treatment in a natural system
- Sampling and testing
- Climate change
- Modeling

# Standard for Northern Lagoons and Wetlands

Sample of organizations participating in the development of the Standard

We are still looking for participants.

Region	Organization
Water Boards	Gwich'in Land and Water Board Inuvialuit Water Board Mackenzie Valley Land and Water Board
Government	Yukon Government, Community Services Government of Nunavut, Municipal Planning NWT Government, Environment and Natural Resources NWT Government, Municipal and Community Affairs Environment and Climate Change Canada
Communities	NWT Association of Communities Town of Inuvik
Consultants	Various
Researchers	Dalhousie University Fleming College
	...and more

## Preliminary Table of Contents

- Planning
- Design considerations in permafrost
- Lagoon design
- Biosolids considerations
- Wetland / Overland flow
- Facilities management
- End of design life
- Closure and restoration
- Annexes

# Expected Content

## Sample of Content

### 7.7 Biosolids Quality

Biosolids shall be fully dewatered or have gone through one freeze/thaw cycle before the direct disposal of biosolids on the land can occur. Biosolids may be dewatered in-situ in the lagoon as long as wastewater treatment capability is not compromised.

Biosolids to be applied to the land shall be stable as defined by having a Volatile Suspended Solid to Total Suspended Solid (VSS/TSS) ratio of 0.6, prior to incorporation.

Sewage biosolids shall meet the pathogenic organism criteria as follows:

# Expected Content

## Sample of Content

### 8.4.2.1 Site Checklist

The following items found to be important in maintaining biodiversity should be examined when investigating the possibility of using a natural wetland or other natural area for wastewater treatment.

- a) Flood storage capacity;
- b) Water quality improvement;
- c) Impact on habitat for rare plants or plant communities;
- d) Presence of significant habitat for breeding waterfowl;
- e) Importance as a significant habitat for migrating waterfowl or shorebirds;
- f) Importance as a habitat or breeding area for sensitive fauna;
- g) Importance as a corridor for floral or faunal distribution;
- h) Impact on fisheries habitat;
- i) Importance as a habitat for significant animal species.

# Work Plan and Key Project Milestones

Item	Description	Expected date
Content development	Discussion and review of the content by Technical Committee (draft circulated electronically)	To End of April 2018
Committee meeting (development of content)	Discussion on the content/resolution of comments to reach a first consensus	End of April - May 2018
Public enquiry	Dissemination of the draft for public review and comments	60 days – Aug and Sept
Technical content approval by the TC	Ballot sent for vote and comments at the TC level	21 days – Oct - Nov 2018
Committee meeting (Review and resolving comments)	Review of the previous TC ballot comments	Mid-Nov 2018
Publication and dissemination	Promotion of the standard and communication.	March 2019

# How You Can Participate

- There are currently no direct First Nations or Inuit members.
- Your perspective and input is extremely important
- Members should have a significant interest in or knowledge of WW treatment with lagoons and wetlands.
- Members do not necessarily need strong technical expertise.
- Members are not compensated for their time (some travel support is available for travel to meetings).
- Non members can participate through the Public Review phase of the standard.

# How You Can Participate

## CSA Research

- CSA has initiated a Research Project for the North
- Standards needs in water, wastewater, stormwater.
  - Processes and practices,
  - Health,
  - Safety,
  - Environment,
  - Technology,
  - Monitoring,
  - Climate change adaptation.
- Your input can lead to the development of important standards



# **CSA Group**

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