Knowledge Series Actions for Climate Resiliency:

Part 2 - Navigating Standards for Water and Wastewater Resilience

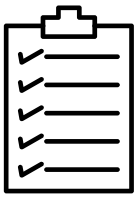
CWWA, as the National Voice on municipal water and wastewater issues, aims to support water utility professionals by providing information and support on key topics.

Part two of this knowledge series focuses on standards and how they can inform your climate risk assessment. Demonstrating the need for climate-resilient water and wastewater infrastructure is often the first step in generating buy-in for undertaking a Climate Risk Assessment (CRA).

A wide range of local, provincial, national, and international standards and guidance documents are available to municipalities and practitioners to support the integration of climate risk, mitigation, and adaptation considerations into infrastructure planning and management. Sometimes, the volume of information can feel overwhelming. This guide is intended to help you navigate climate risk assessment planning and ensure that this important phase of work aligns with best practice standards.

If additional support is needed, the Climate Toolkit for Housing and Infrastructure at Housing, Infrastructure and Communities Canada (HICC) offers a range of support services to help municipalities better understand their options and plan the next steps in their climate-resilient infrastructure journey.

What do Standards mean for your organization?



1. Provide external validation of your locally derived standards.
2. Provide external validation of your climate resiliency plans and strategies.
3. Seek to go beyond minimum local requirements to ensure future assets are designed with enhanced resilience and adaptability.
4. Maintain or increase public trust when there is opposition to municipal climate action plans.
5. Support a business case to justify investment in adaptation actions
6. Provide staff with clear direction on where to begin when updating municipal standards.
7. Maintain consistency across the sector in how risk assessments are executed.

The Need for Climate-Resilient Water and Wastewater Infrastructure

Water and wastewater (W/WW) infrastructure is a critical component supporting public health, environmental stewardship, and economic stability worldwide. Climate change further exacerbates the frequency and duration of extreme weather events, introducing unprecedented weather patterns that pose significant challenges to municipalities:

- **Flooding and Storm Surges:** Increased intensity and frequency threaten infrastructure integrity and resilience.
- **Droughts and Water Scarcity**: Reduced precipitation impacts water access and availability.
- **Sea Level Rise**: Coastal facilities face inundation and saltwater intrusion.
- **Wildfire and Extreme Heat:** Temperature variations, smoke and increased frequency of wildland fires affect water quality, microbial activity, treatment efficiency, and infrastructure durability.
- **Changing Water Quality**: Changes in nutrient loading and turbidity from higher intensity rainfall, wildfire, and flooding, harmful algal blooms as a result of warmer temperatures, and increased salinity as a result of sea level rise.

To maintain service levels and reliability during extreme weather events, municipalities must embrace resilience through robust design, innovative management, and forward-looking governance. Standards and codes provide the necessary benchmarks, integrating best practices and technological innovations to meet these challenges while taking measures against future financial constraints posed by climate disasters.

Wherever you are in your CRA journey, the International Organization for Standardization (ISO) has published an application guide designed to meet municipalities where they are, helping them align their risk assessments to international benchmarks – in this case, ISO 14092.

Understanding the Differences Between Codes and Standards

What is a Code? Codes are commonly mandated through regulations to govern how a piece of infrastructure is developed so that it is safe. Examples: National Building Code, Canadian Electrical Code, and Canadian Highway Bridge Design Code.
What is a Standard? Standards are documents that outline best practice instructions. Examples: CSA S900.1:18 (R2023), Climate change adaptation for wastewater treatment plants, ISO 14080:2018 Framework and principles for methodologies on climate actions.

For more information on the distinction between climate-resilient codes and standards, visit HICC's Build Climate Smart.

What Standards are Available?

There are many Canadian and International standards that support the identification of climate risks to water and wastewater infrastructure.

For example, the ISO standard on Risk Management - ISO 31000:2018 – promotes a structured approach to identifying vulnerabilities, evaluating risks, and implementing mitigation measures in water systems. A second document in the 31000 family useful for the selection and application of methodologies for assessing risk in a wide range of situations is Risk management - Risk assessment techniques – IEC/ISO 31010:2019. Since 2016, HICC has partnered with the National Research Council (NRC) and the Standards Council of Canada (SCC) to advance a suite of climate-informed codes, standards and guidance for housing and infrastructure assets. Resilience-related standards, tools and resources are listed in a filterable database on the HICC website: Housing, Infrastructure and Communities Canada - Codes, standards and guidance for climate resilience.

Additionally, HICC's Climate Toolkits for Housing and Infrastructure initiative supports infrastructure owners through their online, open-access platform, providing tools, resources and guidance to support infrastructure owners and decision-makers in developing projects that build resilience and reduce emissions.

Resources can be accessed directly through the SCC at https://scc-ccn.ca/areas-work/climate-and-sustainability/published-projects.

Please note that standards and guidelines are always changing. When referencing information, it is important to verify the latest version of the standard is being used.

Final thoughts

Climate resilience in water and wastewater systems is crucial for public health, environmental protection, and economic stability. Standards like ISO 14090, ISO 22371, and CSA standards and guidelines help shape resilient infrastructure through risk assessment, adaptive design, and proactive management. Continual updates, harmonization, and new technologies will be vital to address evolving climate risks and ensure water security for the future.

Previous Knowledge Series can be found here:

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CWWA Climate Change Committee
The CWWA Climate Change Committee monitors and coordinates CWWA's involvement in federal programs and initiatives to both mitigate and adapt to changing climate. Members of the Committee are experienced users of PIEVC including some with IRP Credentials. Committee members also participate in several national initiatives, including the Advisory Council on Flooding, the National Working Group on Financial Risk of Flooding, the National Working Group on Flood Mapping, and the Strategic Vision for Urban Water Management in Canada for the next 50 years, representing the Association. The Committee plays a key role in organizing sessions at the National Water and Wastewater Conference. If you have any questions on climate-related issues, please contact us.

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