

Incorporating Climate Resilience for Municipal Infrastructure into the Updates of Existing Atlantic Canada Water and Wastewater Design Guidelines

Wastewater Guidelines Update



Natural Resources Canada / Ressources naturelles Canada

Canada

Workshop No. 1

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- ▶ 1991(NS document only)
- ▶ Revised 2000 (Atlantic Canada)
Revised 2006
- ▶ In use in all four Atlantic
Canada provinces
- ▶ In addition: NL has own Design
Guidelines and Draft Treatment
Standards



Environment
Canada

Environnement
Canada

Atlantic Canada Wastewater Guidelines Manual

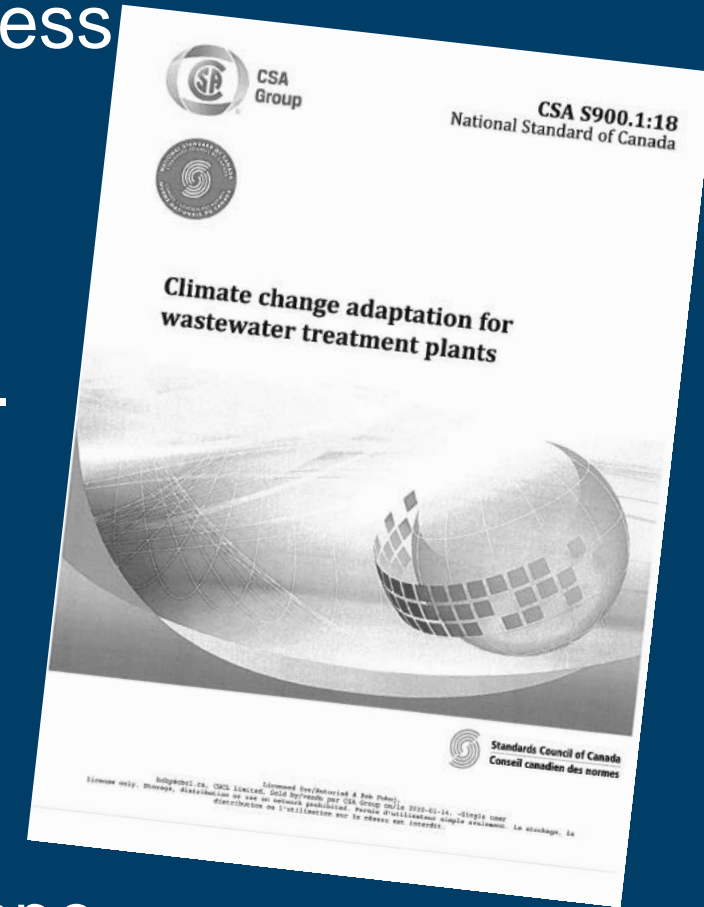
for Collection,
Treatment, and Disposal

2006



- ▶ Incorporate **Climate Resilience** into the **Guidelines (New Section)**.
- ▶ Update existing sections to include climate resilient requirements.
- ▶ Jurisdictional review for relevant materials
- ▶ Reference up-to-date provincial regulatory requirements
- ▶ Technical Update
 - ▶ Reflect advancements in water and wastewater treatment process and technology.

- ▶ The development of a standard approach to incorporating climate resiliency into the design process for wastewater infrastructure is a complex task.
- ▶ Fortunately a new **Standard**, CSA S9000.1.18 – *Climate Change Adaptation for Wastewater Treatment Plants* was published in December 2018.
- ▶ Therefore, the approach will be to modifying the existing guidelines to refer to the **Standard** in the appropriate areas and provide some direction in applying the standard.
 - ▶ Wastewater collection and pumping will require additional attention as they are not within the scope of the **Standard**.



- ▶ Standard Focuses on Adaptation
 - ▶ Adjusting designs to allow for actual or expected changes in climate.

- ▶ Adaptation approach includes eight steps:
 1. Define Physical Setting
 2. Define Climate Setting
 3. Define WWTP Context
 4. Define WWTP Project Considerations
 5. Document Climate-Plant Interactions
 6. Undertake Risk Assessment
 7. Adaptation
 8. Record of Assessment



1. Define Physical Setting

- ▶ Location, address, property info, etc.
- ▶ Environmental features
 - ▶ Wetlands, watercourses, groundwater, geotech
- ▶ Collection of Documentation and Background Info
 - ▶ Mapping, Aerial Photos
 - ▶ Technical reports, Environmental Assessments.

2. Define Climate Setting

- ▶ Standard provides instructions on how and where to find historical climate data.
- ▶ Methodology should result in consistent projections.

3. Define WWTP Context

- ▶ Plant type, size, process
- ▶ Discharge type, regulatory requirements
- ▶ Project scope
 - ▶ Is standard applied to project or entire plant



4. Define WWTP Project Considerations

- ▶ Itemized list of all WWTP Components.
- ▶ Include O&M Considerations.
 - ▶ i.e. Storm surges could be addressed through on-site practices which would require increased maintenance budgets.

5. Document Climate-Plant Interactions

- ▶ Climate interactions with components identified in step 4 are documented
 - ▶ i.e. Outlet sewer capacity could be adversely affected by storm surge, rising sea level
 - ▶ Blower output could be impacted by future temperature/humidity conditions

6. Undertake Risk Assessment

- ▶ The probability, severity, and risk of climate plant interactions are evaluated using a standard methodology.
- ▶ Objective is to prioritize and determine where adaptation is required.

7. Adaptation

- ▶ The areas requiring adaptation are identified.
 - ▶ The adaptation measures are not identified here.
 - ▶ The designer will need to evaluate and include the adaptation measures.

8. Record of Assessment

- ▶ Documentation of the results of the previous 7 steps is compiled into a report.



- ▶ **The existing manual generally contains the following sections:**
- ▶ **Approval Requirements and Procedures**
 - ▶ **Pre-Design Evaluation and Reporting Requirements**
 - ▶ **Detailed Design Documentation Requirements**
- ▶ **Sewer Design**
- ▶ **Pump station Design**
- ▶ **Sewage Treatment Plant Design**
 - ▶ **Performance Requirements**
 - ▶ **Site Considerations**
 - ▶ **General Design Requirements**
- ▶ **Seven Individual Chapters on Unit Processes**

- ▶ **A new educational section/chapter on climate mitigation and adaptation will be added to the manual.**
- ▶ **The CSA standard will be referenced and the requirement for an adaptation assessment will be added to the preliminary design requirements.**
- ▶ **The detailed design documentation requirements will be amended to require identification of the climate adaptation measures included.**

▶ Chapter 1.0 Approval Requirements & Procedures

- ▶ Make consistent with WSER
- ▶ Revise Pre-design requirements to refer to:
 - ▶ ERA vs Receiving water Studies
 - ▶ Climate Change Evaluation (CSA S900.1:18)
- ▶ Update Detailed Design Documentation
 - ▶ Document Climate Parameters
 - ▶ Describe Adaptation Measures
 - ▶ Include Requirement to Reference other Codes/Standards
 - ▶ CEC
 - ▶ NFPA

▶ Chapter 2.0 Design of Sewers

- ▶ **Revise CSO sections:**
 - ▶ **Consistent with CCME/WSER**

▶ Chapter 3.0 Sewage Pumping Stations

- ▶ **Revise Pre-design requirements to refer to:**
 - ▶ **ERA vs Receiving water Studies**
 - ▶ **Climate Change Evaluation (CSA S900.1:18)**
 - ▶ **Enhance/Strengthen CEC/NFPA References**

General Updating of Other Sections



▶ Chapter 4.0 Sewage Treatment Facility

- ▶ **Revise Section on Receiving Water Study to be consistent with CCME/WSER (less detail, reference to CCME/WSER)**
- ▶ **Modify section on Hydraulic gradient to reference an allowance for sea level rise.**
- ▶ **Add Section under safety identifying the requirement to Classify areas based on NFPA and identify those areas within the design documentation (reports, drawings, specs).**
- ▶ **Provide guidance for post disaster requirements.**

- ▶ **Chapter 5.0 – 11.0 Chapters For Individual Unit Processes**
 - ▶ **Edit & Update**
 - ▶ **Add additional detail in some areas / clarify and reduce detail in others.**
 - ▶ **Some initial thoughts:**
 - ▶ **MBBR/BAF/MBR – currently in section that describes them as new.**
 - ▶ **These sections could be modified and included as mainstream processes.**
 - ▶ **Update UV Section**
 - ▶ **Improve wetland section, remove floating aquatic plants**

▶ Appendices

- ▶ A - Certification & Plant Classification
- ▶ B - Manpower Requirements
- ▶ C - Treatment Process Control
- ▶ D – Operations & Maintenance Manuals
- ▶ E – Effluent Discharge Guideline
- ▶ F – List of Legislation for MWWWE
- ▶ G – Sludge Utilization on Land
- ▶ H – Conversion Table
- ▶ I – Reference

▶ Current legislation should result in fewer appendices

Thank you!

