Bureau de normalisation du Québec

CAN/BNQ 3682-420/2025

Existing Sanitary Sewer Systems — Inflow and Infiltration Reduction Program — Guidelines

STANDARD

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Existing Sanitary Sewer Systems — Inflow and Infiltration Reduction Program — Guidelines

Réseaux d'égout sanitaire existants — Programme de réduction du captage et de l'infiltration — Lignes directrices

Bureau de normalisation du Québec

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FOREWORD

This standard was developed in compliance with the Standards Council of Canada (SCC)'s Requirements and Guidance for standards development organizations and approved as a National Standard of Canada by the SCC. Its publication was approved by a Standards Development Committee, whose members were:

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INTRODUCTION

Inflow/Infiltration (I/I) in sanitary sewer systems is a chronic issue throughout Canada. Negative consequences of I/I include increased risk of flooding associated with sewer backup, multiple risks to the environment and to the public health and safety.

I/I reduces capacity in sanitary sewers and pumping stations, hence limiting the potential for urban densification and additional developments in urban communities. Excessive I/I flow can greatly affect the ability of existing sanitary sewer systems to adequately serve growing populations by generating, among other things, sewer backups, flooding in basements, and environmental discharges of untreated wastewater. If the infiltration rate is too high, major work may be required, such as rebuilding a pumping station or increasing the capacity of a sewage treatment plant. From an asset management point of view, I/I occupies pipe capacity that was originally designed to service future developments. With this in mind, reducing I/I instead of financing such work could be economically efficient. On another note, sanitary sewer dilution reduces the concentration of pollutants in the sewage or lowers its temperature, making treatment more complex and expensive.

In Canada, sewer backup is a primary driver of insured loss associated with extreme rainfall events. From 2013 to 2021, the insurance industry reported $2 billion in insured losses directly attributed to sewer backup in residential buildings during urban flood catastrophe events.[1] Sewer backup typically causes more than half of the total insured losses during major urban flood events. In general, rainfall-derived I/I (RDII) is expected to increase with higher rainfall intensity/accumulation, and short duration high-intensity (SDHI) rainfall events are expected to increase in frequency and severity under changing climate conditions in many regions of Canada. These events increase operation and maintenance costs for sewage treatment plants and pumping stations, and are likely to reduce the useful life of these infrastructure, in addition to causing sewage overflows into public roads and watercourses.

Recent climate change resilience programs in Canada have fostered the development of multiple practical resources oriented toward practitioner guidance in the management of urban floods and related climatic hazards in Canada. These resources have come in the form of National Standards of Canada (NSCs), aimed at infrastructure practitioners and decision makers involved in local and regional infrastructure management, home building, and climate resilience program development and implementation.

Existing NSCs related to this standard include:

a) CAN/BNQ 3682-320 *Mitigation of the Risks of Inflow and Infiltration in New Sanitary Sewer Systems*;

1 Catastrophe Indices and Quantification (CatIQ) mentions on its website that this amount includes losses experienced in insured catastrophe events where total losses are $25 million or more [https://public.catiq.com].

b) CSA S900.1 *Climate Change Adaptation for Wastewater Treatment Plants*;

c) CSA W204 *Flood Resilient Design of New Residential Communities*;

d) CSA W210 *Prioritization of Flood Risk in Existing Communities*;

e) CSA W211 *Management Standard for Stormwater System;*

f) CSA Z800 *Guideline on Basement Flood Protection and Risk Reduction*.

This standard has been developed to enhance asset management already in place in municipalities by providing them with efficient and cost-effective tools to help them fully understand the impact of I/I on their sanitary sewer systems. This standard aims at helping municipalities assess risk correctly before spending large sums on studies and rehabilitation work. The guidelines proposed in this standard will help municipalities to prioritize initiatives and to find appropriate, cost-effective ways to reduce I/I issues.

1 PURPOSE

This standard establishes guidelines to implement a proactive program to reduce inflow and infiltration (I/I) in existing sanitary sewer systems of the municipalities in Canada.

This standard sets out guidance and recommendations related to:

a) data collection and data analysis relevant to I/I (see Chapter 4);

b) development of an I/I reduction program (see Chapter 5);

c) development of I/I reduction strategies on the public side (see Chapter 6);

d) development of I/I reduction strategies on the private side (see Chapter 7);

e) ongoing maintenance of the I/I reduction strategies (see Chapter 8).

2 SCOPE

This standard applies to existing sanitary sewer systems.

This standard does not apply to new sanitary sewer systems.

NOTE — A sanitary sewer system built to replace an existing system is not considered as an existing sanitary sewer system, but as a new sanitary sewer system.

This standard does not apply to sanitary sewer systems installed in special conditions such as permafrost or shallow bedrock (Canadian Shield).