BNQ

Bureau de normalisation
du Québec

CAN/BNQ 3682-320/2023

Mitigation of the Risks of Inflow and Infiltration in New Sanitary Sewer Systems

SCC CCN

STANDARD

CAN/BNQ 3682-320/2023

Mitigation of the Risks of Inflow and Infiltration in New Sanitary Sewer Systems

Atténuation des risques de captage et d'infiltration dans les nouveaux réseaux d'égout sanitaire

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. Its publication was approved by a Standards Development Committee, whose members were:

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BHARGAVA, Abhishek	Epcor Utilities
BRENT, Burton	Metro Vancouver
KELLERSHOHN, David	City of Vaughan
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1 At the time of the publication of this standard, the aforementioned person no longer worked for this organization.

WELLS, Sarah	City of Vancouver

General Interest

ABBAS, Celia	Centre d'expertise et de recherche en infrastructures urbaines (CERIU)
DUGRÉ, Pierre	Aqua Data
KOWALCZYK, Twyla (Chair)	Associated Engineering
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MITIGATION OF THE RISKS OF INFLOW AND INFILTRATION IN NEW SANITARY SEWER SYSTEMS

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 risks to public health and safety.

I/I creates a lack of capacity in pumping stations and trunk sewer systems, hence limiting the potential for urban densification and additional developments in urban communities

I/I also increases life cycle costs of sanitary sewer systems and can reduce by many years the lifespan of infrastructure. Sanitary sewage treatment plants may experience negative impacts associated with wet weather peaking, and overflow by-passes at pumping stations. As well, secondary by-passes at sanitary sewage treatment plants present significant risk to surface water systems associated with sanitary sewer system overflows. Negative impacts of I/I are exacerbated by increasing urban populations, increasing urban density/infill development, and aging infrastructure. I/I is also expected to be affected by climate change.

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 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.

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.

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].

Existing NSCs related to this standard include:

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

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

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

d) CSA W211 *Management Standard for Stormwater Systems*;

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

This standard has been developed to complement these existing resources by providing comprehensive guidance to limit risk of I/I in new sanitary sewer system construction. Development of this standard was sponsored by the Standards Council of Canada (SCC). For further information concerning occurrence of I/I in new sewer system construction in Canada, refer to the foundational document prepared to support the development of this standard: *Reducing the Risk of Inflow and Infiltration (I/I) in New Sewer Construction*.

1 PURPOSE

This standard specifies the requirements for inflow and infiltration (I/I) risk mitigation in new sanitary sewer systems.

NOTE — A sanitary sewer system constructed to replace an existing one is considered a new sanitary sewer system.

This standard sets requirements for:

a) the design of new sanitary sewer systems;

b) the construction of new sanitary sewer systems;

c) the inspection and testing of construction work on new sanitary sewer systems;

d) the maintenance and operation of new sanitary sewer systems.

This standard has been drafted with the objective of being cited and/or incorporated, in whole or in part, into the regulations of authorities having jurisdiction (AHJ) over sanitary sewer systems such as municipalities, regional county municipalities, government departments and other authorities responsible for developing construction codes, standards, guides and related documents.

2 SCOPE

This standard applies to both public and private sanitary sewer systems.

NOTES —

1 Private sanitary sewer laterals are installed on private properties in order to collect sewage from the sanitary sewer pipe of residential (single-family dwellings, multi-unit dwellings), commercial, institutional and industrial buildings, and any other types of property where the sanitary sewer system is not public.

2 The installation of a private sanitary sewer system is generally subject to construction requirements specified in construction codes or municipal by-laws.

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

This standard does not apply to combined sewer systems.

NOTES —

1 A combined sewer system includes pipes that collect and transport both sanitary sewage and other sewage from residential, commercial, institutional and industrial buildings, and facilities and stormwater through a single-pipe system.

2 A combined sewer system should not be used from an I/I reduction perspective.

This standard only covers aspects related to I/I mitigation risks in new sanitary sewer systems.

This standard does not cover all aspects related to the design, construction, maintenance and operation of new sanitary sewer systems or to the inspection and testing as part of its construction.

NOTE — Regulatory requirements in place in some provinces and territories may be similar, complementary or different from the requirements described in this standard.

Users of this standard requiring information on other aspects related to the maintenance and operation of new sanitary sewer systems or to the inspection and testing as part of the construction of new sanitary sewer systems not identified in Chapter 1 shall refer to other documents.

This standard is intended for regulatory authorities and owners of public and private sanitary sewer systems. It is also intended for real estate developers, residential building owners, property insurers, material manufacturers and suppliers, and sanitary sewer construction contractors.