
To: Liquid Waste Committee

From: Brent Burton, Division Manager, Policy, Planning and Analysis, Liquid Waste Services

Date: January 11, 2021 Meeting Date: January 21, 2021

Subject: **Inflow and Infiltration Action Strategy**

RECOMMENDATION

That the Liquid Waste Committee receive for information the report dated January 11, 2021, titled "Inflow and Infiltration Action Strategy".

EXECUTIVE SUMMARY

Inflow and Infiltration (I&I), defined as contributions of extraneous rainwater and groundwater, is conveyed along with separated sanitary sewage through sanitary sewers to treatment facilities. Excessive amounts of I&I during wet weather can cause Sanitary Sewer Overflows (SSOs) whereby diluted sanitary sewage overflows from the sewerage system, resulting in risk to public and environmental health. A range of municipal and regional actions for improved I&I management have been implemented as identified in the 2011 *Integrated Liquid Waste and Resource Management Plan* (ILWRMP); however, SSOs continue to occur around the region during wet weather.

Accelerated actions are required to better manage the sources of I&I ("demand side") and also ensure that sufficient sewerage capacity ("supply side") is available to manage, at minimum, the agreed allowance for I&I without SSOs. These actions will be integrated into an Inflow and Infiltration Action Strategy that supports and aligns with the review and update of the ILWRMP.

PURPOSE

To update the Liquid Waste Committee on ongoing and planned priority actions to support improved management of inflow and infiltration.

BACKGROUND

Municipal and regional sanitary sewers are designed to convey separated sanitary sewage, plus an allowance for extraneous contributions of rainwater and groundwater known as inflow and infiltration (I&I), to regional wastewater treatment facilities. This sanitary sewage originates from homes, businesses and institutions around the region and is discharged to municipal sanitary sewers via private laterals. Municipal storm sewers are designed to convey separated stormwater to receiving bodies of water.

Sources of I&I, much of which originates from private property, include illegal direct connections (e.g., "inflow" of rainwater) and leaky sewer joints (e.g., "infiltration" from groundwater). While all sanitary sewers do convey some levels of I&I, excessive amounts of I&I during wet weather can overload sanitary sewers and treatment facilities, resulting in:

- Reductions in available sewer or treatment capacity to accommodate community growth

- Additional operating and capital costs to convey and treat extraneous flows
- Sanitary Sewer Overflows (SSOs) whereby diluted sanitary sewage leaves the sewer system, potentially posing risk to local waterbodies and public health.

SSOs are prioritized for mitigation in the interim, and elimination in the longer-term, under the criteria outlined in the provincially-approved 2011 *Integrated Liquid Waste and Resource Management Plan* (ILWRMP). However, SSO management has been a continuing challenge for both Metro Vancouver and its members, and SSOs continue to occur around the region during significant wet weather. Without priority actions on SSO management, the sewer system and treatment facilities will become increasingly challenged due to factors such as increasing rainfall intensities due to climate change, ongoing community growth and aging infrastructure.

REGULATORY FRAMEWORK

The *Municipal Wastewater Regulations* require elimination of wet weather SSOs for less than a 5-year return period storm event, unless permitted as a transitional measure towards SSO elimination via a provincially-approved liquid waste management plan. The ILWRMP outlines a number of priority targets for improved I&I management to move towards eventual elimination of SSOs. Metro Vancouver targets, at minimum, provision of “Basic Service” capacity for all of its regional sanitary sewers – this is defined as Peak Dry Weather Flow plus an allowance of 11,200 L/ha/day for I&I.

CURRENT STATE

Wet weather SSOs continue to occur during wet weather, often at levels less than the 5-year return period event; for example, a number of SSOs occurred through mid-December 2020 to early January 2021 at less than a 2-year return period event. In 2020, there were a total of 53 wet weather SSOs from the regional sewer system. These SSOs are caused by a range of drivers, including capacity constraints in the sewerage system and levels of I&I which exceed the allowance of 11,200 L/ha/d.

When an SSO occurs, Metro Vancouver staff immediately initiate spill response protocols, in coordination with the affected municipality, as necessary to minimize the risk to public and environmental health. Each SSO from the regional system is promptly reported to Emergency Management British Columbia as soon as practical after spill response is initiated. Emergency Management British Columbia forwards the notification to the Ministry of Environment and Climate Change Strategy (MoECCS) and Environment and Climate Change Canada. Metro Vancouver staff also notifies the Health Authorities and Ministry of Agriculture, as appropriate. All SSOs are also reported to MoECCS via biennial and interim annual reporting (Reference 1).

ONGOING AND PLANNED ACTIONS

Current approaches implemented since the provincial approval of the ILWRMP in 2011 have not led to the desired outcomes in SSO reduction. New approaches to I&I management are required to help ensure that mitigating actions are completed both in the short term and the longer term.

Priority actions already underway include:

- Establishing a defensible process for prioritizing regional / municipal action on SSOs (e.g., considering factors such as risk to public and environmental health, frequency, etc.)

- Prioritizing the planning, design and construction of key regional sewer facility expansion to continue to ensure that Basic Service criteria are being met
- Progressing key discussions with member jurisdictions leading to action on I&I (e.g., establishing a framework for an I&I action strategy via the Regional Engineers Advisory Committee and its Liquid Waste Sub-Committee; direct engagement with municipal Councils, etc.)
- Initiating engagement with elected officials and community groups to better understand drivers and solutions (e.g., public meetings)
- Initiating development of educational programs for improved management of private laterals (e.g., factsheets, etc.).

Other approaches currently being investigated include:

- Improved regional / municipal data sharing and commitments to flow monitoring, as well as guidelines to support improved consistency in I&I reporting and metrics
- Developing a Triple Bottom Line business case for I&I management approaches (“demand side”) as compared against infrastructure upgrading approaches (“supply side”)
- Scoping alternate approaches to provide financial incentives for municipal action on I&I management (e.g., wet weather surcharges), with broad discretion for members to allocate costs to problematic private property laterals as appropriate within their own community.

Longer-term approaches that may be developed further include:

- Confirmation of an appropriate allowance for I&I in planning regional infrastructure works
- Establish criteria for minimum municipal budgetary allocations to I&I abatement
- Regional guidelines for member jurisdictions in: (1) identifying, prioritizing and implementing action to address problematic private laterals; (2) certifying new private and municipal sewerage works and establishing source control bylaws; (3) the role of source controls, such as green infrastructure, in supporting action on I&I management
- Adopting financial incentives to reward municipalities that aggressively manage I&I within their jurisdiction under a user-pay philosophy.

These actions, combined with additional actions as established through engagement processes supported by technical assessment and business casing, will be integrated into an Inflow and Infiltration Action Strategy that supports and aligns with the review and update of the ILWRMP. In addition to the broader engagement activities as outlined in the report to Liquid Waste Committee dated September 4, 2020 and titled “Strategy for Review and Update of the *Integrated Liquid Waste and Resource Management Plan*” (Reference 2), targeted engagement activities specific to the development of the Inflow and Infiltration Action Strategy will be undertaken through 2021.

An update on progress in implementing accelerated action towards improved management of I&I will be provided to the Liquid Waste Committee in the second quarter of 2021.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Accelerated action on management of I&I will have significant financial implications for both Metro Vancouver and its member jurisdictions, especially in cases where levels of I&I are excessive. The scale of these implications will be informed by the development of an Inflow and Infiltration Action Strategy that supports and aligns with the review and update of the ILWRMP.

CONCLUSION

Accelerated actions are required to better manage I&I in the region and reduce the risk of SSOs. Staff, with support from member jurisdictions through advisory committees, are developing an Inflow and Infiltration Action Strategy that will align and support the development of the ILWRMP. An update on progress will be provided to the Liquid Waste Committee in the second quarter of 2021.

References

1. Biennial and Interim Reports: <http://www.metrovancouver.org/services/liquid-waste/plans-reports/reports/Pages/default.aspx>
2. Report to September 17, 2020 Liquid Waste Committee titled "[Strategy for Review and Update of the Integrated Liquid Waste and Resource Management Plan](#)" (Item 5.1, report dated September 4, 2020)

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