

FECAL BACTERIA BEST MANAGEMENT PRACTICES (BMPs)

► Public Sanitary Sewer Systems

OVERVIEW

Leaking Sanitary Sewer Systems And Illicit Connections

Fecal bacteria can enter waterways from public sanitary sewer systems. One human source of fecal bacteria in storm sewers can be leaks in sanitary sewer systems or illicit connections. Illicit connections refer to improper connections between wastewater and storm water sewer laterals.

Therefore, wastewater (which should be treated) goes into the storm sewer system and is released into waterways untreated. Additionally, leaks and illicit connections allow storm water and groundwater to enter sanitary sewers, which can create flow capacity issues at wastewater treatment facilities (WWTF).

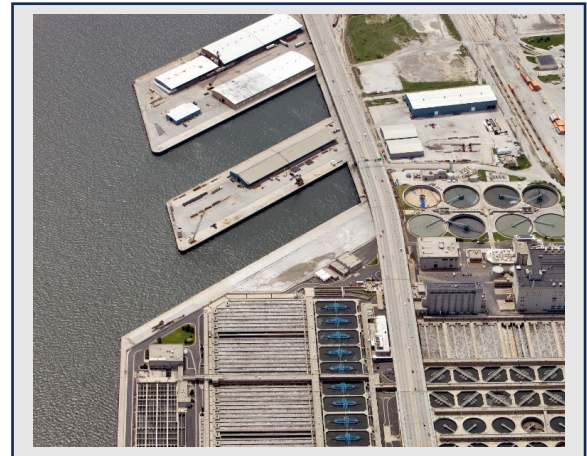


Photo Credit: Wisconsin DNR

Illicit connections do not always provide obvious visual indicators of sewage contamination, such as foul smells or toilet paper at storm water outfalls. Illegal connections can go undetected for years without properly testing for fecal bacteria. When testing, the presence of other water quality parameters (e.g., chlorine, ammonia, etc.) can indicate sewage contamination. However, since bacteria is a living organism, making correlations between biological versus chemical parameters should not be assumed. For example, the presence of ammonia has been assumed to be an indicator of fecal pollution. However, since ammonia is not specific to human sewage further investigation is likely necessary to identify the source.

Sanitary Sewer Overflows (SSOs) And Combined Sewer Overflows (CSOs)

Sanitary Sewer Overflows (SSO) and Combined Sewer Overflows (CSO) are known to be significant human sources of fecal bacteria in waterways. SSOs occur when a WWTF needs to bypass wastewater when it has reached maximum treatment capacity. Additionally, SSOs may occur through inflow and infiltration in which storm water or groundwater enters the sanitary sewers through cracked pipes or illicit connections. In the event of an SSO, the wastewater will likely not receive secondary or tertiary treatment before being discharged into the environment.

A CSO can occur in areas serviced by a system where the sanitary and storm sewers are combined, delivering wastewater and storm water to the WWTF. When the WWTF capacity is overwhelmed, the facility needs to divert combined sewers to discharge directly into the environment. CSOs are particularly prevalent when there is a high impervious surface area, leading to a rapid influx of storm water into sanitary sewers.

IMPLEMENTATION

Managing Leaking Sewer Systems And Illicit Connections

Adopt Local Ordinances To Prohibit Illicit Connections

Where an illicit connection is suspected, ordinances can require that landowners allow access to plumbing inspections and require modifications where needed.

- Can help resolve issues of lack of oversight over privately owned laterals.
- Requires investigation to identify illicit connections or non-compliance with the ordinance.

Inspect Municipal Sewer Systems And Encourage Property Owners To Perform Sanitary Sewer Lateral Inspections

This is typically done using cameras to identify leaks or inputting smoke into maintenance holes or dye into toilets, then looking for signs of smoke or dye at suspected outfalls. This can help identify leaks or illicit connections. Typically, these services are performed by plumbers (see additional resources for information about inspection services and procedures).



- If done regularly, inspections can prevent future expensive repairs.
- Maintaining functional sanitary sewer systems also helps reduce SSOs by preventing storm water or groundwater from overwhelming them.
- Brings awareness to the issues associated with leaking sanitary sewer laterals and illicit connections.
- Inspections can be expensive.
- Requires education to help landowners understand why inspections are necessary and the different funding opportunities available.

Managing Sewer Overflows

Increase The Capacity Of Sewers Or Wastewater Treatment Facilities



Photo Credit: Wisconsin DNR

Municipalities can increase the amount of sewage they can handle before the treatment facility is at capacity and they are forced to discharge into surface waters. Milwaukee constructed a deep tunnel to increase storage capacity in the combined sewer area. Additionally, municipalities can increase the treatment capacity of wastewater treatment facilities. When expanding the capacity of wastewater treatment facilities, you must submit plans to the DNR to ensure that effluent rates comply. For more information about

increasing Wastewater Treatment capacity, please [visit the DNR's Municipal Wastewater Facility Planning webpage](#).

- The previous deep tunnel project in Milwaukee has demonstrated that deep tunnels significantly reduce the number of sewer overflows. See more information under “Additional Resources.”
- Constructing deep tunnels and increasing capacity is expensive.

Adopt Green Infrastructure Practices

Green infrastructure practices divert storm water onto pervious surfaces where it can infiltrate and filter pollutants. Also, they can reduce peak flow rate and storm water volume, which reduces the likelihood of sewer overflows.

Implement a system to alert residents of incoming storms or encourage residents to use the existing messaging program.

These systems notify residents of incoming rain events and encourage them to take measures, such as reducing household water usage, to prevent sanitary sewer overflows.

- Brings awareness to the issue of sewer overflows.
- Requires education and advertising to have widespread adoption and help residents understand specific actions they need to make to prevent sanitary overflows from occurring.

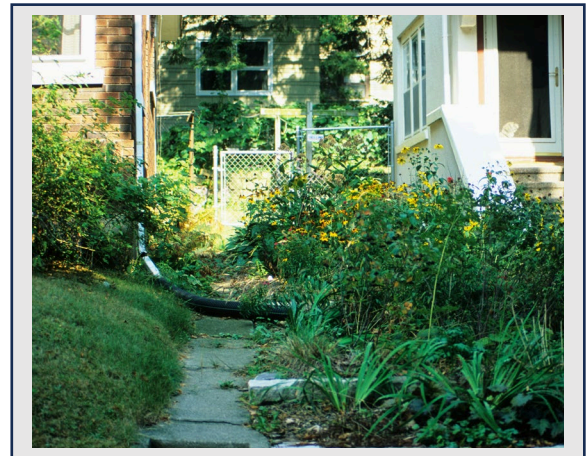


Photo Credit: Wisconsin DNR

Reduce Infiltration And Inflow Of Storm Water Or Groundwater Into Sanitary Sewers

Leaking pipes or illicit connections can cause storm water or groundwater to infiltrate and flow into sanitary sewers. Identifying leaks and illicit connections is important to understanding whether sewer systems need to be repaired or replaced.

For example, the [city of Redwood Falls, Minnesota](#), developed a plan to reduce infiltration and inflow, including smoke testing and sump pump inspections.

ADDITIONAL RESOURCES

Sewer Inspection Products, Services, And Procedures

- [🗨️ 1 – Pipe & Sewer Inspection Camera & Systems – USA Borescopes](#)
- [Collection System Maintenance Part 1 – Wisconsin DNR](#)
- [GPRS CCTV Video Pipe Inspection Services For Sewer & Laterals – GPRS](#)
- [NASSCO Specification Guideline Smoke Testing](#)
- [Dye Test Procedure – State Of Pennsylvania](#)
- [Closed Circuit Television Program – City Of Madison Engineering](#)
- [I & I Reduction Program – City Of Redwood Falls](#)

Managing Sewer Overflows

- [What Is A Deep Tunnel? | MMSD](#)
- [Sign Up For Water Drop Alerts | Mmsd](#)
- [Sewer Capacity Plan Summary – City Of Seattle](#)

SOURCES

CP 24. [26-Year Leak In Hamilton Sewage System Dumped More Than 300M Liters Of Waste Into The Harbor.](#)

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Berounsky, V. M., Travers, H., Reynolds, K. 2018. *Canine Detection Of Fecal Coliform Bacteria From Human Sources In The Pettaquamscutt Estuary, RI – Preliminary Results*. [OCEANS](#).

Milwaukee Metropolitan Sewerage District. [Milwaukee Deep Tunnels](#).

Gwinnett County. [Best Management Practice \(BMP\) Water Quality Protection Guideline](#).

[Bureau of Land Management](#).

[The City of Madison. Sanitary Sewer](#).

Disclaimer: This fact sheet is intended to be used for informational purposes only. These examples and references are not intended to be comprehensive and do not preclude the use of other technically sound practices.

Last Updated: October 2024

