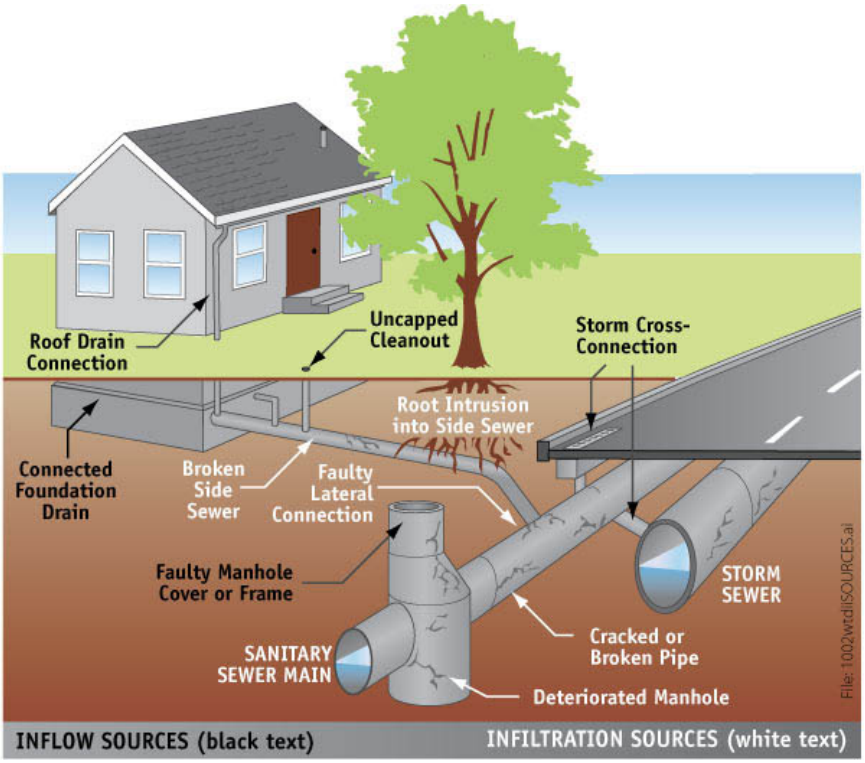
INFLOW AND INFILTRATION
CAN BE COSTLY FOR COMMUNITIES

Inflow and infiltration are terms used by wastewater professionals to describe the ways groundwater and stormwater enter dedicated wastewater or sanitary sewer systems. Dedicated wastewater or sanitary sewers are pipes located in the street or on easements that are designed strictly to transport wastewater from sanitary fixtures inside a house or place of business. Sanitary fixtures include toilets, sinks, bathtubs, showers, and lavatories.

What is Infiltration?

The term infiltration is used by wastewater professionals to describe the excess water that sometimes seeps, trickles, or flows into old or damaged sanitary sewer systems from the surrounding soil. For example, high groundwater or water remaining in the soil after rain or snow often can infiltrate mainline pipes, joints, service laterals, connections, and other parts of a collection system that have deteriorated, cracked, sagged, or collapsed.



Some causes of infiltration may include:

- Poor soil conditions in which sewer lines are laid
- Poor materials or shoddy construction and workmanship
- Excessive groundwater levels
- Precipitation and percolation of surface waters
- Water retained in the surrounding soils
- Poor condition of pipes, joints, and connecting sewer structures

What is Inflow?

Additional unwanted water also can enter sanitary sewer systems from above-ground sources. During storms or snow thaws, for example, large volumes of water may flow into systems through leaky manhole covers or combined stormwater/wastewater connections. In addition, private residences may have roof, cellar, yard, area, or foundation drains inappropriately connected to sanitary sewers. Any extra water flowing into wastewater collection systems from above ground sources, either intentionally or unintentionally is referred to as inflow.

Causes of Inflow:

- Deliberate or poorly planned connections of storm water or other drainage water into the sanitary sewer systems
- Draining of swamps, wetlands, or low-lying or flooded areas into sanitary sewer collection systems through connections or leaky manhole covers.

What are the costs of Inflow and Infiltration?

Inflow and Infiltration (I/I) problems place an additional burden on sanitary sewer systems and wastewater treatment facilities. Sanitary sewer systems can be damaged when they are forced to transport larger volumes of flow than they have been designed to handle. In extreme cases, pipes can collapse or burst, causing pavement to buckle. Damage to pipes from I/I also can allow wastewater to contaminate vital groundwater and drinking water sources. I/I also increase operation and treatment costs for the facilities that receive the additional wastewater flow. After rain and snow events, in particular, excess flows from I/I can overburden treatment plants to the extent that untreated wastewater must be discharged to the environment.

Sanitary and combined sewer overflows (SSOs and CSOs) can occur when wastewater flow volumes exceed the design capacity of a sanitary sewer system or wastewater treatment plant. If the treatment plant cannot store the extra flow for later treatment, the excess wastewater bypasses the facility and is dumped untreated into receiving waters. SSOs and CSOs must meet National Pollutant Discharge Elimination System (NPDES) permit requirements and eventually be corrected. Monitoring and correcting SSOs and CSOs is costly for communities.