# Village of Poplar

November 8, 2017

Notice of Inspection for Sources of I & I

Dear Municipal Sewer Customer:

The Village of Poplar municipal sewage system has been receiving very costly and excessive I & I (Inflow and Infiltration, see attached) during rain events for an extended period of time. This also occurs during the annual spring thaw and during any fall, winter, or spring short periods of snow and ice thawing.

The Village of Poplar has inspected the condition of many of the manholes, pumping stations, and lift stations by contracted services and by village employees. Some of the most seriously leaking or damaged components have been repaired or replaced. Additional repairs and maintenance is scheduled for the upcoming year.

As a part of the process to reduce I & I, the Village of Poplar will be conducting inspections of all customer premise to examine the way building drains and sewer connections operate. The inspection will include basement ground water sump pits and sanitary sump pits and the associated pump and piping installations for each. It will also include roof drainage systems and the associated connections, and drains from window wells. The inspection is in accord with the Village of Poplar sewer ordinance sections 7.4.02 F. and 7.5.07 C.1.

Please call Gina, the Village Clerk/Treasurer during Village hours, Monday through Friday 10:00 a.m. to 3:00 p.m., to schedule a time for inspection of your ground water, storm water and associated piping systems. Inspection times will be Wed. and Thur. afternoons from 4-6 p.m., November 15, 16, 29, 30 and Dec. 6, 7, 13, 14, 20, and 21. Inspections will also be scheduled on Sat. November 18, December 2, and 16 from 8a.m. to 6 p.m. If these times do not work for you, please call 715-364-2707 between 7 and 9 p.m. and ask for Pete to schedule a mutually agreeable time for inspection. Please allow approximately 30 minutes for the inspection.

Cordially,

Randy Jones

Randy Jones, Village President

Enclosure: *"What are Inflow and Infiltration"*
*Proposed Rate Increase*

**Proposed Sewer Billing Starting**
**January 2018**

- Residential Customers: Increase from $51.00 a month to $60.00 a month. Discounts for pre-paying for annually or semi-annually will be eliminated.

- Quarterly billing preferred: $180.00/ quarter

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|---|---|
| January, February, March | due January 31 |
| April, May, June | due April 30 |
| July, August, September | due July 31 |
| October, November, December | due October 31 |

- **Late fees $15.00/ quarter if not paid by next billing.**

- **Sewer bills for rental properties will be sent to the landlord – Tenants will pay the landlord and the landlords will be responsible to pay the sewer bills.**

- Commercial customers bills will be raised approximately 20%

- The school district rates will be raised the by the same percentage as the increase in operation costs.

**FYI - YOU MAY WANT TO CHECK YOUR HOMEOWNERS POLICY TO SEE IF SEWER BACK UPS ARE COVERED.**

# Village of Poplar Wastewater

## *Proposed Rate Increase*

Due to the rising costs of treating wastewater the monthly sewer bill will increase for all customers being served by the Village of Poplar Wastewater Treatment and Collection facility.

**Needed Repairs**

In preparation to meet the new stringent phosphorus limits in our discharge some much needed repairs will need to be performed on the manholes and lift stations to have them functioning as efficiently as possible and to reduce unwanted storm water from entering the system.

**Treatment Plant Upgrades**

The treatment ponds will need upgrades to add chemicals to the wastewater to help reduce the phosphorus levels. This in turn will require additional sludge removal.

**Staffing Needs**

Additional part time operator's assistant is very probable. Job will be posted.

**Permit Renewal**

We will be applying to renew our Operating Permit from the DNR in the coming year and we will know what the requirements will be for our next four-year permit term and the cost requirements by the time our permit expires on June 30, 2019

**What are Inflow and Infiltration?**

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

Inflow is stormwater that enters into sanitary sewer systems at points of direct connection to the systems. Various sources contribute to the inflow, including footing/foundation drains, roof drains or leaders, downspouts, drains from window wells, outdoor basement stairwells, drains from driveways, groundwater/basement sump pumps, and even streams. These sources are typically improperly or illegally connected to sanitary sewer systems, via either direct connections or discharge into sinks or tubs that are directly connected to the sewer system. An improper connection lets water from sources other than sanitary fixtures and drains to enter the sanitary sewer system. That water should be entering the stormwater sewer system or allowed to soak into the ground without entering the sanitary sewer system.

Improper connections can be made in either residential homes or businesses and can contribute a significant amount of water to sanitary sewer systems. Eight inch sanitary sewer pipes can adequately move the domestic wastewater flow from up to 200 homes, but only eight sump pumps operating at full capacity or six homes with downspouts connected to the sanitary sewer pipe will overload the capacity of the same eight inch sewer pipes. A single sump pump can contribute over 7,000 gallons of water to sanitary sewer systems in a 24 hour period, the equivalent of the average daily flow from 26 homes.

Infiltration is groundwater that enters sanitary sewer systems through cracks and/or leaks in the sanitary sewer pipes. Cracks or leaks in sanitary sewer pipes or manholes may be caused by age related deterioration, loose joints, poor design, installation or maintenance errors, damage or root infiltration. Groundwater can enter these cracks or leaks wherever sanitary sewer systems lie beneath water tables or the soil above the sewer systems becomes saturated. Often sewer pipes are installed beneath creeks or streams because they are the lowest point in the area and it is more expensive to install the pipe systems beneath a roadway. These sewer pipes are especially susceptible to infiltration when they crack or break and have been known to drain entire streams into sanitary sewer systems. Average sewer pipes are designed to last about 20-50 years, depending on what type of material is used. Often sanitary sewer system pipes along with the lateral pipes attached to households and businesses have gone much longer without inspection or repair and are likely to be cracked or damaged.

Inflow and Infiltration water is called "clear water" (although it may be dirty) to distinguish it from normal sanitary sewage water in the sewer system.

**Why is inflow and infiltration a problem?**

Sanitary sewer systems are designed to carry wastewater from toilets, dishwashers, sinks, or showers in homes or businesses. Inflow and infiltration add clear water to sewer systems increasing the load on the systems. Clear water belongs in stormwater sewers or on the surface of the ground, and not in the sanitary sewers. A stormwater sewer is a pipe system designed to carry rainwater away. Stormwater sewers are normally much larger than sanitary sewer systems because they are designed to carry much larger amounts of water. Drainage ditches also act the same way in many neighborhoods. When clear water enters sanitary sewer systems, it must be transported and treated like sanitary waste water. During dry weather the impact of inflow and infiltration can vary from minimal impact to a significant portion of the sewer pipe flow. Wet weather magnifies existing inflow and infiltration sources. As a rain or snow melt event begins the inflow and infiltration sources start filling the sanitary sewer systems with clear water, eventually filling the sewer systems to capacity. Once the sanitary sewer systems have reached capacity or becomes overloaded, wastewater flows at much higher water level than normal and if sanitary fixtures or drains are below this overload level, water will flow backward through the sanitary sewer pipe, flooding basements or households and causing manholes to pop open releasing wastewater onto the street.

Overflow occurrences put public health at risk and violate state and federal environmental regulations. Sanitary sewer overflows release wastewater and potential pathogens onto streets, into waterways, and basements increasing potential health risks. As wastewater overflows into creeks, rivers, lakes, and streams it contaminates all bodies of water fed by the waterways and all

creatures/plants coming in contact with the polluted water. Sewer overflows also contribute to beach advisories and closures due to contamination.

Many communities are likely to experience at least a few overflows in their sanitary sewer systems, but older communities located downstream from these overloaded sewer systems will experience the most overflows and basement backups because of their low location in the watershed. The sanitary sewer systems in these older communities not only carry their own wastewater and inflow and infiltration, they also receive the wastewater flow from the upstream neighboring community's sewer systems. The network of integrated sewer collection system pipes throughout a regional service area makes it essential for all municipalities to collaborate on and share responsibility for developing and implementing long-term solutions to the inflow and infiltration problem.

Inflow and infiltration reduce the ability of sanitary sewer systems and treatment facilities to transport and treat domestic and industrial wastewater. As a result of the inflow and infiltration, wastewater treatment processes are disrupted and poorly treated wastewater is discharged to the environment.

There are various costs associated with inflow and infiltration including sanitary sewer system overflow, with wastewater treatment and transportation facilities, and funding opportunities. Overflow costs are associated with road and waterway cleanup and the potential for fines if the overflow problem is not corrected. Additionally, sewer system backups into basements or households can result in litigation and potential liabilities for the responsible city or agency. Eventually, new homes or businesses may not be allowed to connect to the sanitary sewer system if the inflow and infiltration issues are not corrected, increasing costs to residents as a new sanitary sewer systems are installed or potentially lowering housing values due to the inability to develop land for future growth.

Inflow and infiltration costs water treatment facilities and consumers large amounts of money in water treatment operating expenses. All water entering a water treatment facility must be treated as wastewater causing an increase in operating costs proportional to the amount of clean water entering the sanitary sewer system due to inflow and infiltration. For example, the Metro Plant in St. Paul, Minnesota typically receives 200 million gallons a day (mgd) of wastewater from its sanitary sewer systems. During a rainstorm the load on the sewer systems can triple to 700 mgd or more. Costs associated with processing the added clean water from inflow and infiltration are eventually passed back to the consumer in the form of rate increases. By reducing inflow and infiltration capital and operating costs can be lowered. Minimizing inflow and infiltration can also increase the lifetime-capacity of a treatment facility and wastewater transportation system. The pumps that are involved with wastewater treatment and transport operate 24 hours a day seven days a week; however they must work harder as the sewer system's water level load increases. This puts an unneeded strain on the pumps and shortens the life expectancy of these expensive pumps.

Other costs include the city or agency failing to meet federal or state guidelines and causing the community to become ineligible for low interest loans from grant or revolving fund opportunities. Often state water boards will provide funding opportunities to a city or agency; however they will be tied to some related criteria. In this case the funding opportunities would be tied to the number of sanitary sewer system overflow incidences in the city or agency's area.

**History and scope of the inflow and infiltration problem.**

Inflow and infiltration problems are difficult to resolve because of the enormity of the infrastructure in place. It is estimated that there are approximately 4.0 billion feet of sanitary sewer pipe in the United States and more being installed daily. This estimate does not include "combined sewer systems" that serve as both storm and sanitary sewer system. If these sewer systems were laid end-to-end, they would represent about 290 parallel pipelines that would stretch from New York to California. Most sewer pipe inventory for older cities pre-dates World War II, were installed with materials that are well beyond their expected service life and using methods of construction that are not state of the art. Many old neighborhoods have "combined sewer systems", which were designed before wastewater treatment plants existed. These combined sewer systems are typically routed to the wastewater treatment plants for processing. Due to their nature many of these sewer systems experience overflows during storm events. In response to this many cities and agencies are retrofitting or redesigning their systems to better meet the EPA requirements and the load their

community places on the sewer systems.

The EPA requires any regulated agency with a NPDES permit to eliminate all wastewater overflows that reach the waters of the United States. The ability to achieve such a goal is virtually impossible for a large majority of cities and agencies, since inflow and infiltration cannot be completely stopped. Initial efforts, in the 1970's, to reduce inflow and infiltration in sanitary sewer systems were, typically, unsuccessful, in spite of substantial funding from the EPA's Construction Grants Program. Most inflow and infiltration control programs were reduced to emergency programs, in the late 1980's, that tried to resolve isolated issues in the sanitary sewer systems. During this time period several major sanitary sewer systems were evaluated in cities such as Nashville, Atlanta, and Houston. These evaluations raised public interest in the repair and replacement of sanitary sewer system infrastructure. Additionally new and better sewer system technologies allowed for reduction or elimination of inflow and infiltration sources.

Public interest in sanitary sewer systems has also been aroused by the project growth estimates of many metropolitan areas. Growth projections are used to predict and plan for wastewater flows through the sanitary sewer systems and wastewater treatment plants. Typically the sewer systems and treatment plants are designed using national standards for average and peak flows of wastewater through the sewer systems.

If the inflow and infiltration levels were not reduced or eliminated, projecting their contribution to the sanitary sewer systems show that cities and agencies would be required to make significant investments in relief sewer systems and pumping stations. However it is not feasible to add capacity to transport and treat the clear water introduced by inflow and infiltration. Wastewater treatment infrastructure is an expensive investment for a community. Additionally most of the existing wastewater treatment plants would not be able to treat the additional flow of an ever increasing clear water problem because of space constraints at the wastewater treatment sites.

**How can the inflow and infiltration problem be solved?**

The reduction and control of inflow and infiltration in sanitary sewer systems should be considered with regard to a disciplined, long-term monitoring and maintenance program. The first step to resolving any inflow and infiltration problems is determining how significant the problem is. Typically a sanitary sewer system evaluation is performed to assess the system. An evaluation of the sewer system will determine the quantity of inflow and infiltration, determine their sources and provide guidance to determine a cost effective corrective action plan.

As with most situations you can't manage what you can't measure and the first step to managing the inflow and infiltration issue is to measure the extent of problem. To quantify the inflow and infiltration into a sanitary sewer system means a significant attempt to locate and record information that relating to a variety of issues including but not limited to observed overflows, measured or observed surcharges, reported bypasses, customer backup complaints, and chronic maintenance activities. The information should be obtained from different places including maintenance records, sewer maps, complaint records, assorted department files, work orders, past studies, engineering reports, and interviews with personnel who are responsible for maintenance and management of the sanitary sewer system. A large amount of information can be found using these sources as well as others. Once the data has been found it must be recorded and displayed in a way that will show possible relations between overflows, bypasses and other related factors such as capacity models, rainfall records, maintenance activities, and reported backups. If electronic maps of the sanitary sewer system are available, they should also be used to confirm the result of the data findings.

Once the data has been researched and correlations found the city or agency must establish sewer flow monitoring points at various locations within the system. Typically sanitary sewer systems can be broken down into associated watersheds. Then those watersheds can be separated into basins and if necessary sub-basins.

Flow monitoring instrumentation must be placed in sanitary sewer systems at locations appropriate to obtain the data desired. To measure wastewater flows through the sanitary sewer system it is important to select the appropriate flow meter. Many types of flow monitoring instrumentation are available and pricing varies accordingly. Simple instruments like a **flow probe** measure water velocity and depth but do not record data. This type of instrument is good for spot flow checks or random checks of permanently installed flow meters. Often long term flow measurements can be made using simple **water level recorders**. In this case only water level is

recorded then the data is exported into a spreadsheet and the data can be processed through an equation or lookup table that cross references water level to flow for that particular site. The advantage of **water level recorders** is that they are relatively inexpensive and multiple units can be purchased with a moderate investment to monitor the water level (flow) throughout the sanitary sewer system. Alternatively more sophisticated **flow meters** can output, display, and record flow information directly. Often these instruments also have output that can trigger **wastewater samplers** or other devices. These instruments are typically a larger investment, but have greater monitoring abilities.

The following "rules-of-thumb" may be used to determine a monitoring and evaluation strategy to adequately measure amount of inflow and infiltration in a sanitary sewer system. These parameters vary depending on the overall city or agency goals.

- One **flow meter** for every 30,000 - 50,000 feet of sanitary sewer pipe
- The **flow meter** recording should be set at 15-minute intervals
- **Flow meter** capable of measuring surcharges
- One **rain gauge** for every 2-4 **flow meters**
- Minimum monitoring period - 45 days with 60 days being optimal
- Measurement of between 6-8 separate rainfall events
- The system should be monitored during a period of high seasonal groundwater

Once the flow monitoring data has been collected it should be carefully evaluated. Adjustments to account for periodic flow profiling at the monitoring site, errors associated with grease or deposits on the sensors, drift of the depth recordings, and downtimes related to **flow meter**malfunction. The corrected data should be tabulated and analyzed to make comparisons between the measured inflow and infiltration and the corresponding rainfall intensity. Data under surcharge conditions should be avoided for analysis purposes. The analysis will provide two essential parameters that are used to quantify the inflow and infiltration problem. The first parameter is a comparison between different basins so that basins can be prioritized for future studies and potential inflow and infiltration reduction. The second parameter is information that will be useful if subsequent relief or replacement sewer systems are necessary to reduce or eliminate overflow or bypass conditions.

Basins can be ranked in a range of ways. Rankings might include unit inflow or infiltration rates such as gallons/day/foot, mgd/1,000', gpd/inch-mile of pipe, mgd/acre, etc. By changing the raw flow data into a measured unit rate, comparisons may be made between basins as well as comparisons relating factors such as general age of the sanitary sewer system, frequency of reported overflows, etc.

In addition to flow monitoring there are other tests that a city or agency can use to identify sources of inflow and infiltration. These tests include dye and smoke testing and visual inspection. Smoke and dye testing work by introducing either dye or smoke into the sanitary sewer system and determining where it comes out. Visual inspection can be done with remote television monitoring devices and used to look for cracks or other damage in a sewer pipe.

Once a source of inflow and infiltration has been discovered the city or agency will take appropriate action to resolve the problem, including fixing or replacing damaged or leaky sewer pipes and notifying property owners of improper connections. Periodically the city or agency must monitor and measure their sanitary sewer system to maintain the integrity of the system and determine new sources of inflow and infiltration. Continuous monitoring is also beneficial to the cities and agencies so appropriate cost increases can be applied to communities/basins that are heavy contributors to inflow and infiltration into the sanitary sewer system.

## Why Are Infiltration And Inflow Big Problems?

Infiltration and inflow (I/I) are terms referring to groundwater and/or rainwater that enters the sanitary sewer system through cracked pipes, leaky manholes, roof and gutter downspouts, sump pumps, foundation drains, and improperly connected storm drains. Most infiltration comes from groundwater, and most inflow comes from rainwater and/or snowmelt. Extensive studies have shown that as much 40% of I/I enters the collection system from building sewers.

Additional I/I flow in the sanitary sewer collection system results in the need for larger sewers and treatment plants. Higher sewer user fees must be collected to treat the increased volume of wastewater from I/I.

## What Can I Do To Prevent And Reduce Infiltration And Inflow?

- Make sure the cap to any cleanout is secure and has not been damaged.
- Disconnect outdoor patio, deck, yard, or garage drains that may be connected to the building sewer.*
- Reroute sump pump discharges from basement or foundation drains entering building sewer connections* to outdoor lawn areas or storm drains.
- Redirect rain gutters and downspouts connected to the building sewers* to rain gardens, lawns, or storm drains.

*NOTE: These types of connections are illegal in many communities.

## Who Is Responsible For Maintaining and Repairing The Building Sewer?

Property owners are usually responsible for maintaining and repairing building sewers. However, there may be special circumstances when a municipality will pay for the repair and maintenance of all or a portion of the building sewer.

If your building sewer needs maintenance or repair, always call your wastewater utility to verify local requirements. Your wastewater utility may also want to perform an inspection, prior to a repair, to identify if there is a problem in the main sanitary sewer pipe. The installation and maintenance of the building sewer is regulated by the Department of Commerce, Safety and Buildings Division.

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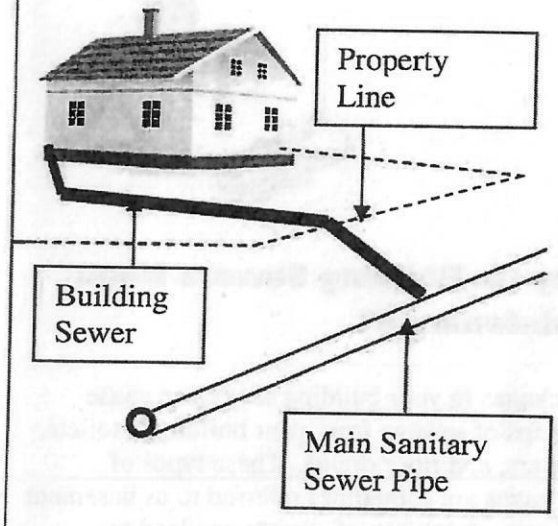
This brochure can be downloaded from:
http://www.dnr.state.wi.us/org/water/wm/ww/cmar/brochures.htm



**Wisconsin Department of Natural Resources**
**Bureau of Watershed Management**
**P.O. Box 7921**
**Madison, WI 53707-7921**

PUB-WT-848-2006

# BUILDING SEWER MAINTENANCE AND REPAIR




**Wisconsin Department of Natural Resources**
**Wisconsin Department of Commerce**

## What Is A Building Sewer?

A building sewer is the pipe that connects a building's plumbing system to the main sanitary sewer. Building sewers are also called "service laterals", "house laterals", or "sewer laterals."

The main sanitary sewer is usually located in the street and collects wastewater, called sewage, from building sewers and conveys it to the wastewater treatment plant.

## Why Do Building Sewers Need Maintenance?

Blockages in your building sewer can cause backups of sewage from your building's toilets, showers, and floor drains. These types of blockages are sometimes referred to as basement backups. A backup of sewage can lead to disease, destruction of valuables, damage to your property, and electrical malfunctions.

Rubbish and other objects often combine with hair, grease, and other debris to cause clogging of the sewer system. Even something as small as a cotton tip swab with other attached debris can clog sewer building sewers.

Cracked building sewers allow groundwater to enter the sewer system, which can also cause a basement backup.

## What Are Sewer Cleanouts?

Building sewers often have cleanouts which provide a point of access for cleaning or repair. One cleanout is located immediately inside the building or just outside the building wall. There may be additional cleanouts between the building wall to the main sewer. The cleanout is usually a small pipe about 4 inches in diameter within a frost sleeve. There should be a cap on the cleanout.

## What Problems Should I Look For?

- Wastewater backups inside the building.
- Slow draining sinks and toilets.
- Wet or soggy ground in your yard.
- Water leaking from cleanouts, outside drains, or main sewer manhole covers.
- Unusual odors or sewage smells in or around your home or business.

If you suspect you have a blockage or problem in your building sewer, call a professionally licensed plumber for an inspection. Even if you aren't experiencing drain or sewer problems, periodic inspections and cleaning by a professionally licensed plumber are a good idea.

Building sewers are usually neglected by homeowners until problems arise. Simple maintenance and timely repairs can avoid sewage backups and damage to your property and personal belongings.

## How Can I Prevent Problems?

Follow these DOs and DON'Ts to prevent problems with your building sewer:

### DOs:

- Place paper towels, feminine products, disposable diapers, dental floss, hypodermic needles, plastics, and other personal hygiene products in a wastebasket. Dispose as garbage.
- Use sink and shower drain strainers.
- Collect grease and fats in a heat-resistant container, cool, and dispose of it in your garbage with solid waste.
- Choose the most appropriate method of disposal for food scraps: composting; in the garbage for solid waste disposal; or down the sink by grinding with a garbage disposal unit.

### DON'Ts:

- Don't use the toilet as a wastebasket for garbage, medications, or chemicals!
- Don't plant trees or large shrubs near sewer lines where roots can penetrate and create a dense mat of "root balls."
- Don't pour grease, fats, or oils from cooking down the drain. Grease in drains collects and hardens into a plug.
- Don't connect French drains, roof gutters, sump pumps and other flood control systems to your sanitary sewer. These types of connections are illegal.