Mequon to help homeowners pay for repair of leaking laterals

(June 2001) The City of Mequon has approved an ambitious and effective program to reduce inflow and infiltration into local sewers by helping homeowners with the cost of repairs to sewer laterals on their private property.

Mequon is the first municipality in the Milwaukee area in recent history to agree to help fund private lateral repairs.

After smoke tests of 2,000 homes, which is about half of the city, located 100 defective and leaky sewer laterals, the Mequon Common Council approved helping to fund the lateral repairs, allowing the city to hire a single contractor to do the repairs at the city's expense.

Mequon officials said using one contractor cuts down the administrative costs and financially helps property owners in making needed lateral repairs. Ultimately the lateral repair program helps the homeowner, other property owners who may have experienced basement flooding, and the city.

The homeowner's lateral repairs are covered by the city up to $1,000. Any additional costs including landscape restoration will be charged to the property owner.

Jon Garms, Mequon public works director, said the arrangement will improve the project's efficiency and keep down the cost.

"Using one contractor cuts down on administrative costs," he said. "If homeowners get their own contractors, city staff has to chase around and watch everything – it's a burden and using one contractor is much easier."

William Hoppe, Mequon city engineer, said repairing leaks in laterals is a relatively cheap way to control inflow and infiltration into the sanitary sewer.

"Leaks add 500 gallons per minute to the system," he said. "To handle this problem within the system costs $250,000 — there's a big payback to the city in repairing the laterals instead."

The cost of the repairs is small compared to the $2 million to $3 million the city is paying to stop the inflow and infiltration of stormwater into the sanitary sewer system, said Mequon Alderwoman Pamela Adams.

Since rainwater enters the sanitary sewer system in many ways, including leaky manhole covers or deteriorated manholes, downspouts, yard drains, and sump pumps improperly connected to the sewer system, Hoppe said Mequon has established a constant repair program.

Hoppe said the city is looking to finish smoke testing the rest of the city's laterals during the course of this year.

The City of Mequon's inflow and infiltration program is also involved in manhole inspections and repairs in addition to its lateral repair program. City staff has mapped the city to locate the 100-year flood stage and have replaced every manhole cover that was deteriorated or defective in that region.

Mequon's ambitious cost-sharing program will help set a precedent for communities served by the District which are working to reduce rainwater entering their sewers, said Kevin Shafer, MMSD's director of technical services.

"Mequon's approach is unique to the Milwaukee area and if it is successful, we would

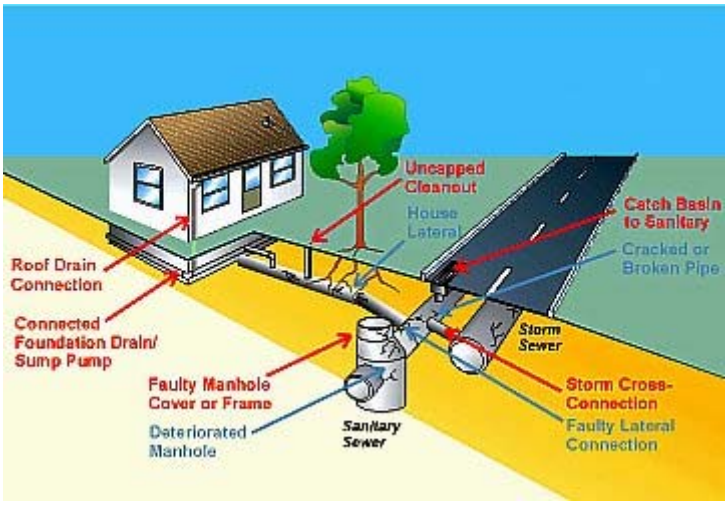
hope other municipalities would try a similar approach to reducing rainwater," Shafer said.

MMSD is funding eight demonstration projects in its communities aimed at identifying the most effective methods of reducing inflow and infiltration. The results will be shared with all the communities to help implement effective infiltration and inflow reduction programs.

The projects are being done in Brown Deer, Elm Grove, Bayside, Wauwatosa, Oak Creek, Whitefish Bay, Milwaukee and the Caddy Vista Sanitary District. Preliminary inspection work in Brown Deer found that 60 percent of the first 128 homes inspected by the village had leaking laterals.

Decrease The Risk Of Basement Backups And Damages To Your Home

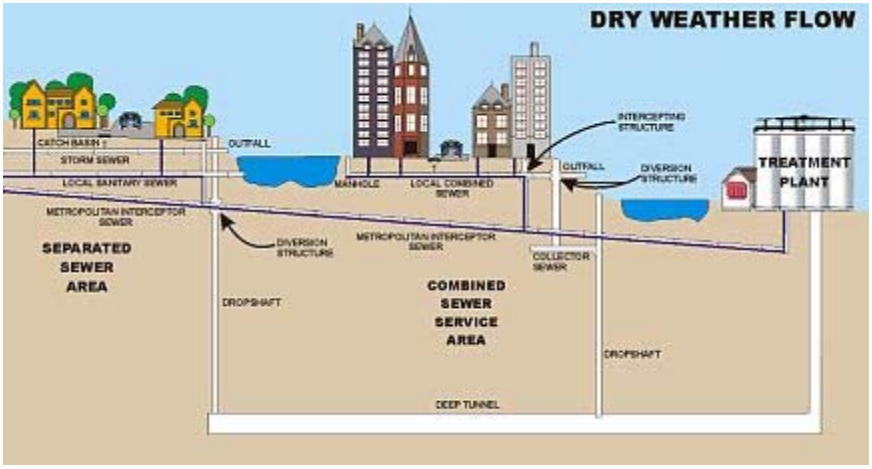
- Install glass block windows in basement walls
- Adjust grade around foundation to slope away from house.
- Install downspout extensions.
- Install sump pump discharge line extensions.
- Increase sump pump capacity.
- Provide standby power, battery/generator, for sump pump.
- Disconnect foundation drain from sanitary sewer.
- Install lining in sanitary sewer lateral if leaks are found.
- Isolate downspouts from foundation drains.
- Be aware of drainage patterns.
- Store basement items 1 foot off floor.
- Clean/repair gutters and downspouts.
- Disconnect yard drains from sanitary sewer.
- Install high water level alarms in sump crock or below ground spaces.
- Install backflow prevention devices, contact your local plumber.



How rainwater enters the sanitary sewer system

- Leaky manhole covers or deteriorated manholes
- Illegally connected downspouts, yard drains and sump pumps connected to the sanitary sewer system
- Collapsed, broken or leaky sewer pipes

Sewer Operations Under Different Weather Conditions



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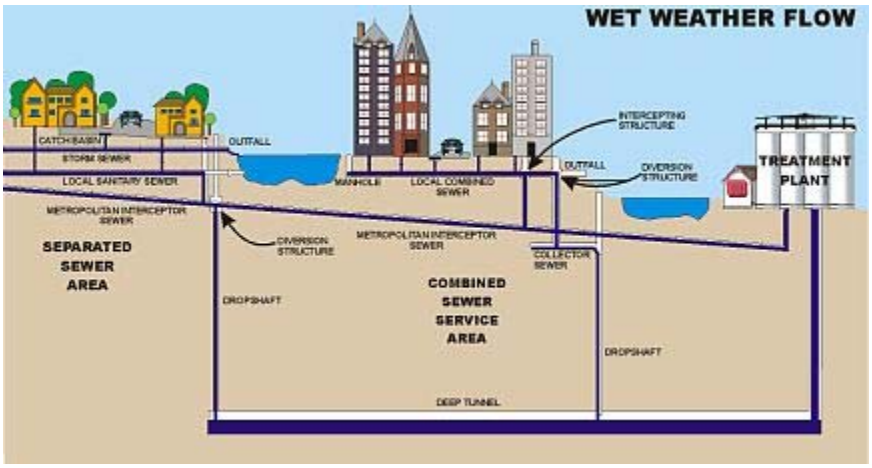
Separated Sewer Area: Sanitary sewage travels from property owners' lateral sewers into local sanitary sewers, owned by the municipality. Local sanitary sewers then empty into the metropolitan interceptor sewers (MIS), owned by MMSD. The MIS conveys flow to Jones Island or South Shore for treatment. Clean water is discharged to Lake Michigan, while solids removed during treatment are turned into useable products such as Milorganite, Agri-Life and lightweight aggregate. There is no flow in storm sewers.

Combined Sewer Area: During dry weather, the combined sewer area operates the same as the separated sewer area.



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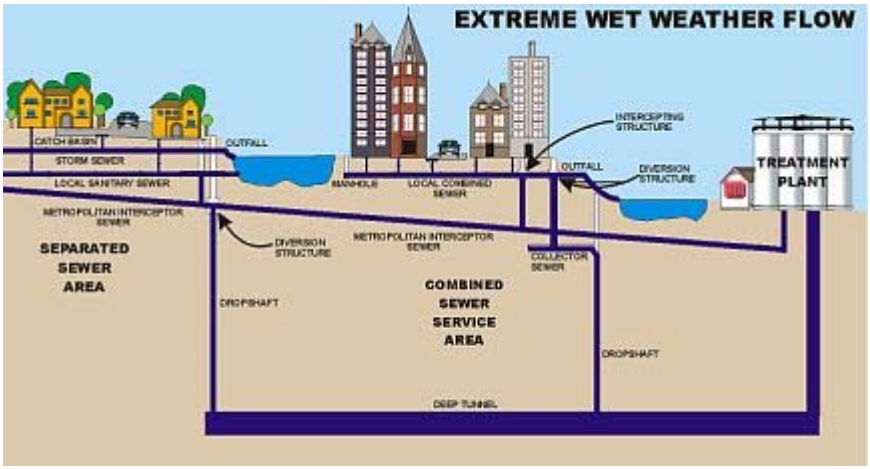
Separated Sewer Area: Storm sewer flow is discharged to waterways through local storm sewers. Sanitary sewage travels from property owners' lateral sewers into local sanitary sewers, owned by the municipality. Local sanitary sewers then empty into the MIS. The MIS conveys flow to Jones Island or South Shore for treatment. Clean water is discharged to Lake Michigan. If the plants cannot handle all of the flow in the MIS, it is diverted to the deep tunnels through the collector sewer and dropshaft, where it is stored until the plants have the capacity to treat it.

Combined Sewer Area: Sanitary sewage travels from property owners' lateral sewers into local combined sewers, owned by the municipality, where it mixes with stormwater. Local combined sewers then empty into the MIS, owned by MMSD. The process is then the same as in the separated sewer area.



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Separated Sewer Area: Storm sewer flow is discharged to local waterways through local storm sewers. Sanitary sewage travels from property owners' lateral sewers into local sanitary sewers. Local sanitary sewers then empty into the MIS. The MIS conveys flow to the treatment plants. If local sanitary sewers or the MIS cannot handle all of the flow caused by excessive infiltration and inflow of clear water into the sanitary sewer system, it is bypassed to nearby waterways. Flows are also diverted to the deep tunnel, where it is stored until the plants have the capacity to treat it.

Combined Sewer Area: Sanitary sewage travels from property owners' lateral sewers into local combined sewers, where it mixes with stormwater from runoff. Flow from local combined sewers empties into the MIS, and excess flow is bypassed to nearby waterways at combined sewer outfalls. The MIS conveys flows to the plants for treatment. The plants will not be able to handle all of the flows caused by excessive infiltration and inflow; therefore, the excess is diverted to the deep tunnel, where it is stored until the plants have capacity to treat it. If the deep tunnel is filled, it is discharged to local waterways. Deep tunnels are pumped to plants for treatment when capacity is available.

Frequently Asked Questions

What is the Rainwater Reduction Education Program and why is it important?

This public education program is designed to help reduce the amount of rainwater entering the region's sanitary sewer system, which is a major cause of basement backups and property damage. The program's theme is to have individuals, municipalities and the Milwaukee Metropolitan Sewerage District (MMSD) work cooperatively to encourage

both individual action and municipal public works projects to fix aging systems, correct code violations and implement routine maintenance programs.

I hear terms like inflow and infiltration. What do they mean?

Inflow and infiltration are terms used to describe the ways unwanted water enters the sanitary sewer system. Inflow refers to water entering the system through leaky manhole covers, improperly connected downspouts, yard drains or sump pumps that connect to the sanitary sewer system.

Infiltration is water entering the system through deteriorated manholes or collapsed, broken or leaky sewer pipes.

The unwanted water entering the system often is referred to as "clear water" to distinguish it from sanitary sewage, even though the water may be somewhat dirty.

Why is this "clear water" a problem?

Clear water does not belong in the sanitary sewer system. It needs to be conveyed through storm sewers or drainage ditches, or absorbed into the ground. If it enters the sanitary sewers, clear water mixes with the sewage and takes up much-needed capacity in the system. The mixture must be conveyed and treated just like sanitary waste. When local sanitary sewers fill to capacity, (like traffic backing up on the freeway), waste backs up into residents' basements or overflows into rivers and streams.

How can I, as one property owner, make a difference?

Improper connections allow water from sources other than sanitary pipes to enter the sanitary sewer system. By eliminating the improper connections you will significantly reduce the flow of clear water to the sanitary system.

Consider this: An eight-inch sanitary sewer can handle wastewater from up to 200 homes. However, it takes only eight sump pumps, or six homes with downspouts connected to the sewers, to overload this same eight-inch sanitary sewer.

My basement's never flooded because of a sewer backup, so why should I bother with my connections?

If the downspout connections or plumbing on your property convey clear water into the sanitary sewer, it may be causing flooding in your neighbor's basement. It may also add to sewer overflows, polluting Milwaukee's rivers and Lake Michigan.

How do I know if my home has improper connections or is the cause of any flooding problems?

The Milwaukee Metropolitan Sewerage District encourages you to work with your municipality's public works department or a licensed plumber to inspect your property and locate any sources of clear water improperly entering the sanitary system. If problems are detected, it is up to each property owner to have those problems corrected.

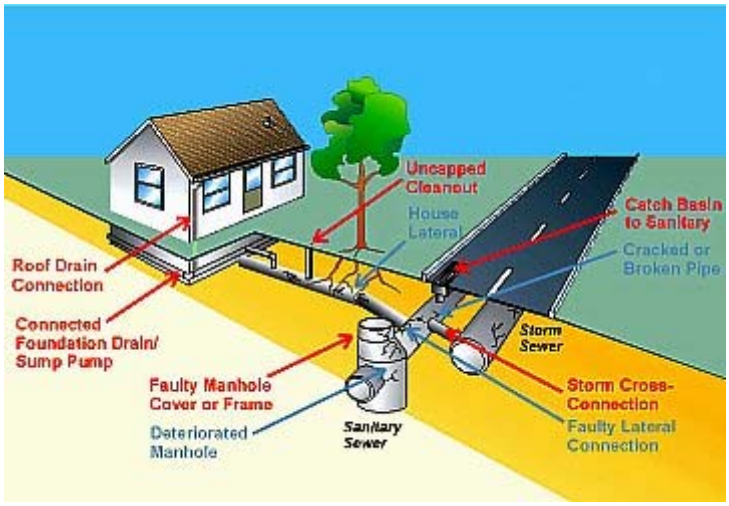
My neighborhood has "combined" sewers where sanitary sewage and stormwater are conveyed and treated together. Should I disconnect my downspouts?

When it comes to downspout disconnection, every little bit helps. In combined sewer areas, any excess water entering the system contributes to combined sewer overflows, where a mix of raw sewage and stormwater enter waterways untreated. Check with your local municipality or a licensed plumber for more information on disconnecting your downspouts.

Besides disconnecting downspouts, what other steps can I take to decrease the risk of basement backups and damage to my, or my neighbor's property?

- Install glass block windows in basement walls to keep the water out
- Adjust the grade around the foundation to slope away from your home
- Install downspout extensions six feet from the foundation
- Install sump pump discharge line extensions and increase sump pump capacity
- Install a lining in the sanitary sewer lateral connected to your home if leaks are found
- Disconnect yard drains from the sanitary sewer
- Install backflow prevention devices and contact your local plumber

How rainwater enters the sanitary sewer system



Roof Drain, Foundation Drain and Yard Drain Connections

These connections drain the impervious area of the roof, areas surrounding the structure, and yards that accumulate water during storms to the sewer lateral. The reason for the drains is mainly to prevent yard flooding and flooding into the structure, especially if the structure has a basement.

This illegal storm drain connection is an example of a private source of rainwater entering the sanitary sewer system.

Most illicit roof and foundation drain connections are discovered during field inspections (smoke testing) or during replacement of the sewer lateral. The drains, when discovered, should be disconnected from the sewer lateral.

Stormwater systems can be a stormwater pipeline system, an open channel ditch system along the sides of the streets, or the streets themselves where they configure to collect the water. In the case where one of the above listed stormwater systems is available, it is a good idea to extend the roof drain to discharge into it. Even though connecting into the stormwater system will remove the water from the area, it can be costly.

If a stormwater system does not exist, then the drain connection must be extended to a distance far enough away and at a reverse slope from the foundation so that the water is not allowed to migrate back into the foundation. The distance required is dependent on the rain fall, soil condition, and normal landscaping of the area. For example, Macomb County, Michigan has implemented an ordinance where the roof drain connection discharge must be at least five feet from the structure foundation.

Uncapped Cleanouts

All cleanouts that are uncapped, and especially those that are below the existing ground surface, can cause large quantities of stormwater to enter the sewer system. Uncapped cleanouts are usually discovered by field inspection (smoke testing) and are simple to remedy. The cleanouts should be capped with screw type caps that are water tight.

Manholes and Manhole Covers

Many manhole covers have holes in them to allow venting of gases from the sewer. These holes, especially for manholes that are located in low topographic areas, allow significant amounts of stormwater to enter the sewer system.

Manhole covers with vent and pick holes can be replaced, or manhole inserts can be installed. Manhole inserts are bowl shaped and are put in the manhole right below the cover. The bowl does not allow the stormwater to enter the sewer. The inserts do have a small vent hole that still allows sewer gases to be released to the atmosphere.

If manholes are located in areas where ponding is a problem, the manholes should have a water tight manhole installed. The manhole should be moved to a different location if possible.

Storm System Cross Connections

These are connections of the storm system to the sewer system. These connections are overflows from the storm system in high flow events or mistaken connections. When discovered during field inspections, the cross connections are eliminated.

Defects in laterals and sewer mains

These defects can be caused by bad installation practices or by deterioration of the system over time. These defects include:

- Cracks and pulled joints in laterals and sewer mains
- Shearing at the connection of the lateral to the sewer main or building plumbing
- Bad installation of connection of lateral to sewer main
- Deterioration or settlement of manholes.

Deteriorated laterals on private property, such as the one pictured to the left, are an example of a private source of rainwater entering the sanitary sewer system.