

Before Spending Millions on Collection System Repairs – Check the Sump Pump Connections!

As promised, here is another article about inflow and infiltration. In past articles, I have covered the effects of Inflow and Infiltration (I and I) on the wastewater treatment process and how it can negatively affect treatment facilities. I have written about how to identify infiltration. I have discussed and written about how to resolve and correct infiltration issues. There seems to be an elephant in the room regarding wastewater collection systems. Wastewater operators up to the Utility Directors, seem to avoid talking about the elephant until they must. One reason is that it is hard to identify the source directly without potentially upsetting individual customers. Another possible reason for the lack of acknowledgment is it may take a very supportive city council willing to ruffle some feathers to get the results desired. Not an overly common theme amongst most city councils.

The article that I authored for The Kansas Lifeline in the July 2023 issue outlined how one small southeast Kansas community has spent millions of dollars identifying and correcting stormwater infiltration into the wastewater collection system. While this money has been well spent and has tightened up the wastewater collection system, the city still receives a significant increase in flow to the wastewater treatment plant during precipitation or storm events. All arrows point to the elephant in the room I was referring to earlier. That elephant is “Inflow”.

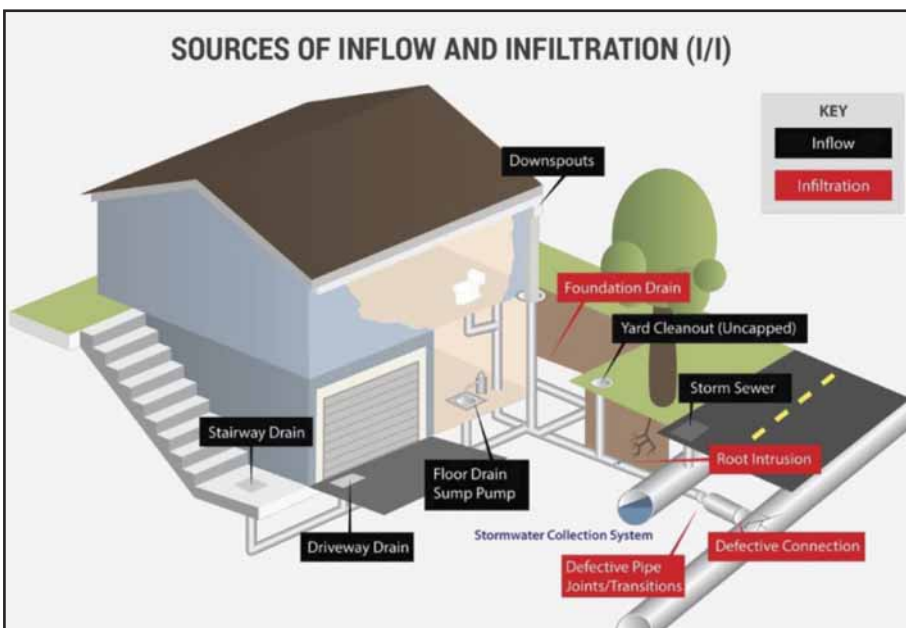
EPA’s definition of Inflow

The US Environmental Protection Agency (EPA) describes inflow as follows: “Water other than sanitary wastewater that enters a sewer system from sources such as roof leaders, cellar/foundation drains (sump pumps), yard drains, area drains, drains from

springs and swampy areas, maintenance hole covers, cross connections between storm sewers and sanitary sewers, and catch basins.” Inflow does not include infiltration.

Considering the EPA definition, most of these Inflow sources would be easy to identify and eliminate. However, the inflow source that, in my opinion, causes the most issues to wastewater collection systems is sump pumps. As I have written in prior articles, it is nearly beating a dead horse given the amount of water one sump pump can pump into a wastewater collection system.

I have written in detail about all these issues, and this final article, at least for a while about I and I is how cities or other wastewater systems can identify and eliminate these sources of inflow. To date, I have found no city or sewer district that accurately accounts for the number of sump pumps connected to the sewer system. I have had multiple engineering firms explain to me that they have done a survey and that there are only a few sump pumps in the system only to find out later that there were many that were unknown in the system and were the major contributor to the excessive flows during precipitation events.



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The problems caused by illegally connected sump pumps!

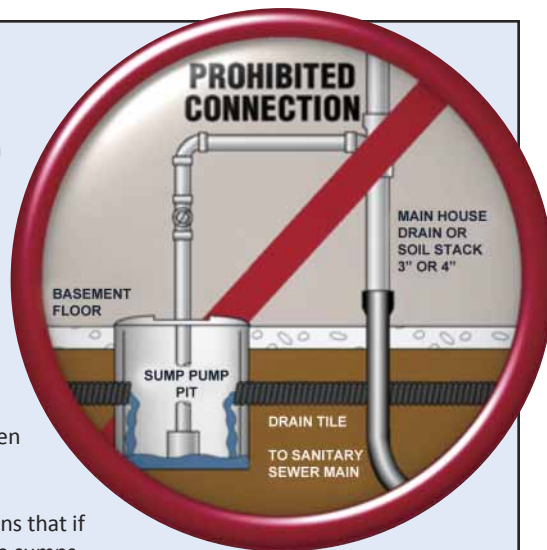
Aside from the fact that connecting sump pumps to the sanitary sewer is illegal, it can cause significant health and safety risks. Sump pumps are designed to pump groundwater and rainwater.

Generally, the sanitary sewer pipe in the street is only 8 inches in diameter, and the pipe slope is often not very steep. Many 8-inch sewer pipes are installed with a slope of 0.4%. This means that for every 100 feet of pipe, the pipe goes downhill less than 5 inches. This low slope condition is very common in many sewer collection systems, which means there is only so much sewage water that can flow through this pipe.

About 300 gallons of water can flow through this type of sewer pipe in a minute. If more sewage than this is directed towards the sewer pipe, the result is that sewage will begin filling the lateral pipes that are installed to the sewer main from houses. When even more sewage or extra water is sent to the sewer pipe, it will surcharge even further, eventually pushing back into someone's basement.

A one-half-horsepower sump pump will pump about 60 gallons per minute. That means that if five pumps are connected to the sewer, the sewer main will be filled with water from the sumps. Normal sewage flows often fill the sewer main more than halfway already. So, if two or three neighbors in a block illegally connect their sump pumps to their sewer lateral, the flow that is trying to get through the sewer main will be more than its capacity of 300 gallons per minute. The sewage in the pipe is going to start backing up!

Sump pumps connected to the house sewer lateral can be major contributors to Inflow and Infiltration (I&I). I&I affects the quantity of wastewater that needs to be treated, the capacity of the collection system pipes, the treatment processes and ultimately the rate increases that people and businesses in the community will pay to operate the wastewater system. Excess I&I also affects wastewater treatment.



As with the case of the small southeastern Kansas city I referred to earlier, this city has eliminated all major Infiltration sources, leaving Inflow as the culprit for high flows during precipitation events. Now, the “Millions-of-Dollars Question” is how to identify those households with sump pumps or other sources of Inflow tied into the collection system and eliminate them. And potentially, an even more significant issue is who will pay for correcting the illegal connections.

One key component is the city council's willingness to address the issue and enforce or beef up the ordinance. One mid-central Kansas town has taken a unique approach to identify and eliminate the inflow source generated by sump pumps.

The city of Hillsboro staff has taken this issue and, with the city council's support, developed a plan to address inflow from sump pumps in the city through a Sump Pump Amnesty program.

Hillsboro's Sump Pump Amnesty program

Hillsboro's certified wastewater operator Kaleb Spencer, and

wastewater Superintendent Morgan Marler, developed an ordinance and presented it to the city council. The ordinance was adopted as the Sump Pump Amnesty program.

The city sent surveys to the community, offering \$500 per illegal connection toward the sump pump disconnection identified through the survey response. The council capped the program for 2023 to 100 connections.

Currently, the city is receiving surveys from the community on the connections and will soon know how many sump pumps will be eliminated through this first round of amnesty. The program stipulates that a licensed plumber or contractor must complete the work to disconnect the sump pump. The city has hired a contractor to work with the homeowner to reroute sump pump connections away from the city's sewer mains.

The city of Osage City has taken a somewhat different approach with the similar goal of also eliminating the sump pumps from discharging into the city's wastewater collection system. Director of Utilities Dale Schwiieger says the city annually budgets to assist homeowners with service line issues.

This money can also be used to disconnect sump pumps with a cost share of up to \$250.

I commend the cities of Hillsboro and Osage City for implementing plans or programs to assist the city patrons with the disconnection of sump pumps. Many cities build multi-million-dollar facilities to handle the excess Infiltration or Inflow rather than fix the issue. To me, this seems a bit irresponsible, both financially and environmentally. I don't think many in city management or even their citizens understand that the multi-million-dollar treatment facility is still partially funded and paid for by its citizens. If I were in a city setting, I would rather be bothered or inconvenienced with a fix that is a one-time cost of several hundred dollars rather than pay for a multi-million dollar treatment facility for the rest of my time on this planet.

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