

Operating and Maintaining Water and Wastewater Utilities Becoming More Unaffordable in Small Communities

Public water and wastewater systems are confronted with many challenges. Whether it is dealing with changing regulations, or needing to address critical repairs and upgrades, it is the smaller systems across Kansas and the U.S. where the impact of costs associated with operating the utilities is most profound on ratepayers. While many water and wastewater utilities have implemented dramatic rate adjustments, many of these utilities are increasingly worried that their services have or will become unaffordable to low-income customers. Those concerns are compounded because of a reducing number of customers to support the debt. Add to that the effect higher rates have on water usage. Yes, it decreases.

In this article, I would like to discuss a problem that the small town of Toronto, Kansas recently confronted.

Case Study: Toronto, Kansas

Toronto is located in Woodson County between the towns of Eureka and Yates Center. The population is less than 300. Like most small communities across the state, there is evidence of what once was a thriving small town. The town sits on high ground overlooking the USACE Toronto Reservoir. The city is active and full of pride but there are also all the signs of economic struggle due to a decreasing population. In that regard, Toronto is not unlike many small towns in Kansas.

My current residence is 40 miles from Toronto. I became familiar with Toronto while previously working at the Kansas Department of Health and Environment (KDHE) as a water and wastewater inspector. The town has a minor mechanical wastewater treatment facility that was constructed in the 1960s. The facility has had minimal upgrades to the treatment equipment other than an improved UV system and a refurbished clarifier. The wastewater facility generally puts out permit-compliant effluent. The effluent TSS and BOD sample results are often in the teens. I was in Toronto previously as a state regulator with KDHE to observe a water leak repair. During that visit, I pulled up to the leak location and looked down into a recently dug trench to see the two city workers covered in mud and standing in water. The leak was on a main line and with the city backhoe, the workers had exposed twenty-plus feet of the line to locate the leak. Within this stretch of exposed line there were numerous repair clamps. Such a scenario is not limited to Toronto; repair clamps are used extensively in many aging water systems in small towns in Kansas. The “Operator in Training” (OIT) and his assistant climbed out of the ditch and explained that this leak wasn’t too difficult to repair because they knew the shut off valves worked in this area. They knew this because they had repaired a leak on the same line just up the street the week prior. So, I marked the box on my regulator sheet that Toronto has a valve exercise program and added a comment that would certainly fulfill the KDHE shut off valve exercise

requirements: “X - VALVES ARE EXERCISED WEEKLY DUE TO LEAKS”.

After joining the KRWA staff in August 2018, I learned that the OIT was no longer employed by the city of Toronto. I stopped by the city to see if I could assist in any way. Assistant operator Troy McCoy and I went to the facility and he showed me around. I encouraged him to call me if he had questions or issues with the wastewater treatment plant. During the visit I also met with the city clerk to discuss submitting electronic Discharge Monitoring Reports (eDMRs) which are the effluent reports required by KDHE/EPA. The absent OIT held the credentials to submit eDMRs for the city. I scheduled a return trip to assist the city in converting the credentials for eDMR submission to the city clerk, a process I will explain in a future article. I left my card with Troy and asked him to give me a call any time if he had any questions or needed assistance with the water or wastewater utilities.

12-Inch clay tile broken sewer main

Less than two weeks later in early November I received a call from Troy. He reported that the city has a major sewer problem and he reminded me that I had suggested he call me

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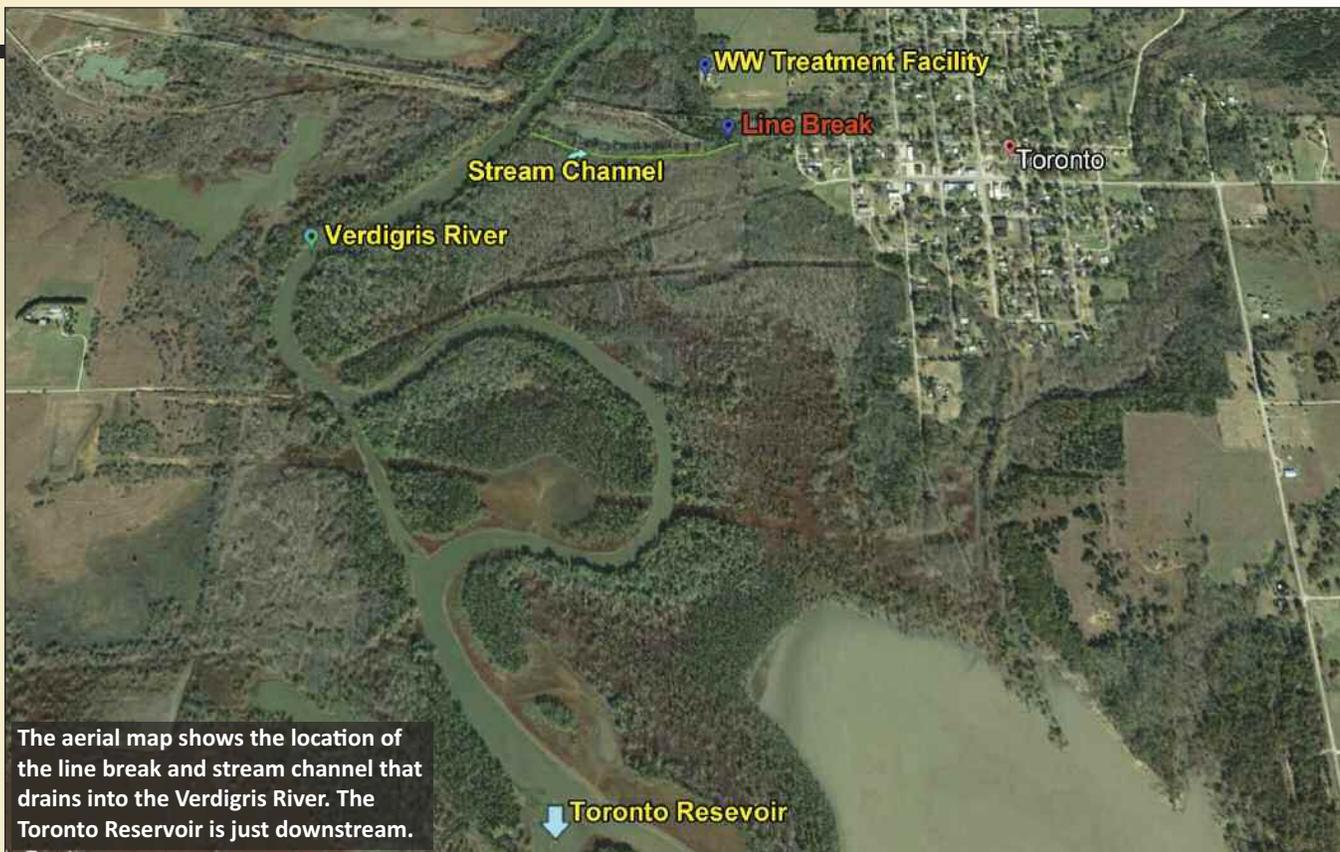
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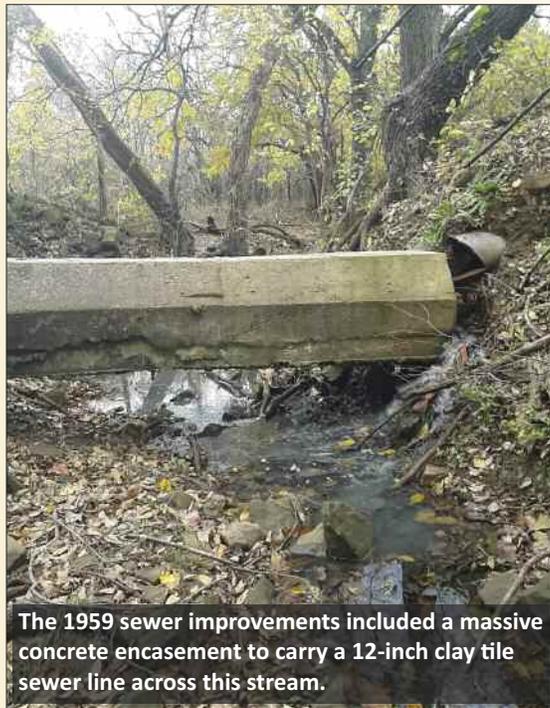
The aerial map shows the location of the line break and stream channel that drains into the Verdigris River. The Toronto Reservoir is just downstream.

any time. I was thinking that the problem might be a plugged line, or a manhole overflowing, etc. Troy then told me that the city had a sewer line leak that was dumping into the creek. I looked on aerial imaging as Troy described the location on the phone call. I told him I would be there as soon as possible as I was within 40 miles. Meanwhile, I instructed Troy to use the city's backhoe to build an earthen dam across the stream channel downstream of the leak.

I arrived in Toronto around noon. The city and I contacted KDHE and the Toronto Corps of Engineers office and informed them of the line break.

The city had asked a former water operator to assist with the leak because he could operate the backhoe. A functional dam was constructed approximately 300 feet downstream of the sewer line break. The stream channel that the broken line was discharging into flows directly to the Verdigris River in less than one-half mile. The Verdigris River flows into the Toronto Reservoir less than two miles downstream. The stream channel had minimal natural flow on the day of the leak and the dam held the wastewater from flowing into the Verdigris River.

The line break was on the main influent line from town that leads to the wastewater treatment facility. About 600 feet from the line reaching the plant it crosses an unnamed stream channel. At this channel crossing the 12-inch clay tile line was an aerial crossing which means it was suspended above the stream channel bottom. To protect the clay tile line the line was encased in several feet of concrete. The length of the concrete casing was 24 feet in length and greater than three feet in circumference. The casing was built to last to say the least. I have not calculated the weight of the concrete casing and pipe; the concrete cased line was massive.



The 1959 sewer improvements included a massive concrete encasement to carry a 12-inch clay tile sewer line across this stream.

The construction plans from 1959 for a wastewater improvement project were located after the temporary repair was completed. The plans show that the only support for this structure was crushed rock on either end. The creek bank was part of the support system for the structure. Steam bank erosion removed this support over time and the weight of the concrete broke the line. Despite the lack of support the structure was functional for more than 50 years.

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Here is another view of the concrete encasement.

This would be an easy fix for a contractor with all the proper equipment, an experienced crew, and all the repair materials readily available. The day of this break, Toronto did not have any of those resources. I knew calling in a contractor for an “Emergency” repair would be extremely costly to the city which admittedly has just enough monthly income to cover the city’s monthly bills. I would like to re-emphasize that this scenario is not limited to Toronto, but is the same for many small towns in Kansas.

My goal was to help the city make a temporary repair to stop the sewage leak from flowing into the stream channel and to keep the cost to a minimum for the city.

We sized up the project and considered the resources available: city backhoe, one city worker and a former operator who could operate the backhoe. With no materials large enough to make a temporary repair, I said “Men, we’ve got this, I have a plan.”

I told Troy we needed a track-hoe or equipment large enough to remove the concrete-encased pipe. Troy went to contact a local contractor to ask if his equipment might be available to remove the concrete cased pipe.

I called Eric Boone with the city of Yates Center, and asked what the largest diameter pipe he might have on hand; it was 10-inch. I then called the city of

Chanute. I spoke with Water Superintendent Danny Finley. I explained what the issues were and he said he had some HDPE pipe that we could use and knew a way to adapt and connect the poly pipe to the 12-inch clay tile. I have to give Danny credit, from experience he knew how to adapt the clay tile pipe to the black HDPE pipe with random materials that were on hand. I measured the pipe several times and factored in cutting the existing line. Danny had a section of pipe with the measurement that was needed. The city of Chanute delivered the pipe to us because we did not have any way to haul a 28-foot piece of solid pipe. Danny and the city of Chanute's immediate response was critical to my plan coming together.

The major issue was removing or getting the concrete-encased pipe out of the way to install a temporary pipe. The city backhoe could not lift the concrete due to its weight. I was under the assumption a piece of equipment was on the way. Once Troy confirmed that no other equipment was on its way, we began to figure out how to move the concrete encased pipe out of the way. Trenches were dug on either side of the concrete casing and it was then pushed, pulled, rolled, and nudged into falling out of the way. We finally installed the temporary piping; the wastewater discharge was stopped.

At 4 a.m. and 16 hours after beginning work on the project, the temporary repair line was installed. We reinforced the earthen dam and headed home. I made it home and let my dogs out to run and then went to bed. I woke up to a phone call later the same morning still tired

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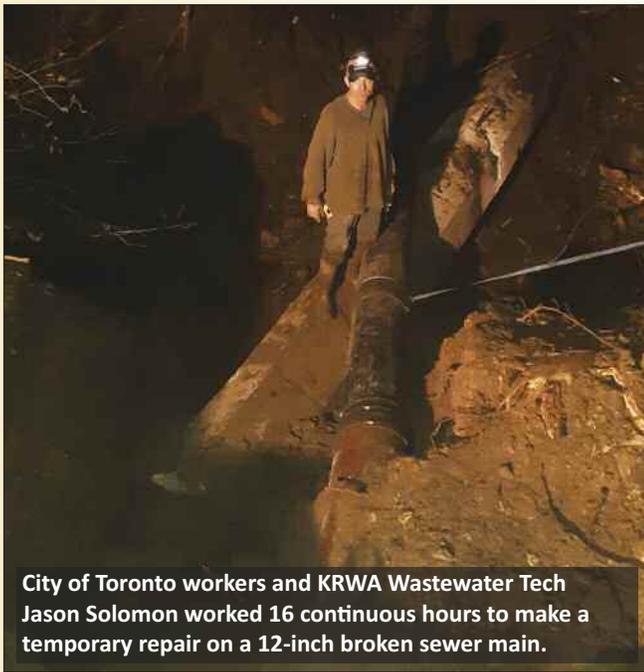
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City of Toronto workers and KRWA Wastewater Tech Jason Solomon worked 16 continuous hours to make a temporary repair on a 12-inch broken sewer main.

from the night before and it was Troy. He said, “Jason, the Corps of Engineers is here to talk to you.”

I told Troy I would be right there. That discussion will be for another article in *The Kansas Lifeline*.

During the repair project I learned that Matt, the former water operator for the city, is a fine backhoe operator. And Troy will stand in the trench into the night with you and help in any way possible.

The city of Toronto has a proposed engineering bid of more than \$2 million for drinking water distribution system improvements. The collection system and treatment facility could possibly use an equal amount for improvements. The city recently learned they did not make the cut for the \$600,000 CDBG grant for the distribution improvements. What is the city to do? Continue repairing lines that will eventually have to be replaced anyway? Raise rates and encumber a loan payment on 300 citizens? These are extremely difficult decisions too many small towns are having to make.

In my opinion, it all depends on what side of the table you are sitting on. It only makes sense to take the money while it is available at low rates. But when you live paycheck to



Moving the large concrete encasement was a challenge that was only accomplished by digging trenches on either end and then maneuvering it out of the way.

paycheck like the city and many of its citizens, the council's decision can be more difficult than described.

Thanks go to Eric Boone with the city of Yates Center for his advice and willingness to help. Also Danny Finley with the city of Chanute for the experience and knowledge he provided. The city of Toronto offered to compensate the city of Chanute for their services and materials. The last communication I had with Chanute was that they intended to nullify the debt and consider it a neighborly act. Hopefully the city of Toronto will be back into a position to provide assistance to another local system, paying it forward.

Annual conference coming up

During my work experience at KDHE, I was pleased to present at various KRWA training events and the annual conference. This year, I'm on KRWA's team of board and staff members who will be doing their best to help everyone have a beneficial and successful conference. This is everyone's conference! From funding agencies to companies showing the latest in technology, there is something for everyone all the time during the conference. Check the program and mark your calendar to be in Wichita March 26 – 28.

Jason Solomon works primarily as a wastewater tech at KRWA. He previously was District Administrator at the Kansas Department of Health and Environment southeast Kansas office in Chanute.



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