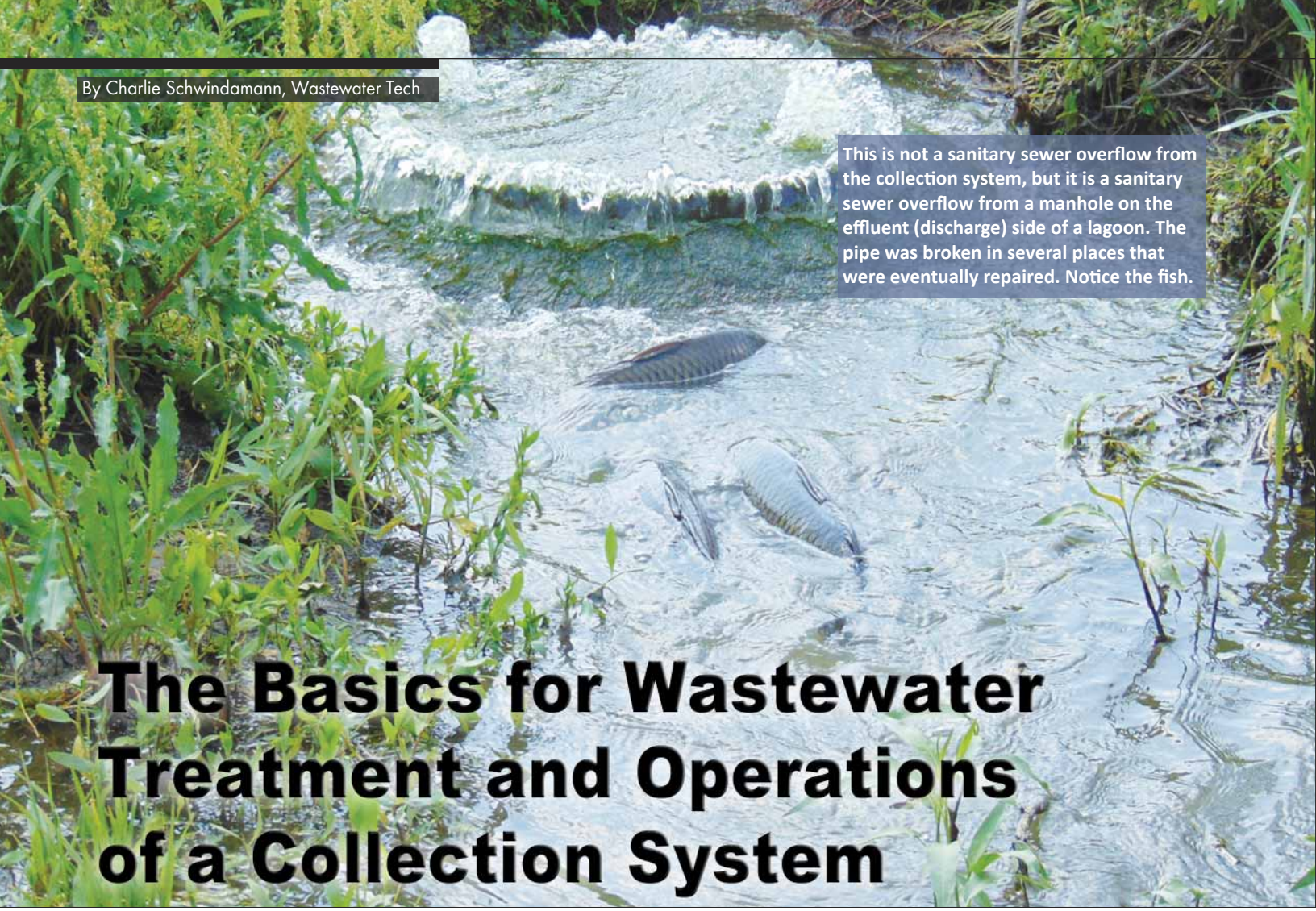
By Charlie Schwindamann, Wastewater Tech



This is not a sanitary sewer overflow from the collection system, but it is a sanitary sewer overflow from a manhole on the effluent (discharge) side of a lagoon. The pipe was broken in several places that were eventually repaired. Notice the fish.

The Basics for Wastewater Treatment and Operations of a Collection System

Wastewater treatment, also known as sewage treatment, is the removal of impurities from wastewater or sewage before the water is released into Nature. Nature has ways of breaking down pollutants and removing them from the water. But Nature's way of breaking down can't compete with the volume of pollutants entering the environment because of all the human and commercial activities. Wastewater lagoons and treatment plants apply the same natural processes on a large scale to ensure our water systems stay clean. Wastewater treatment is necessary to accelerate the same functions. Wastewater treatment is one of the widest-practiced forms of pollution control.

Wastewater treatment is one of the widest-practiced forms of pollution control.

So, what's the problem?

As KRWA staff member Jason Solomon often refers to some new operators as "key tossers". What is a key tosser? That's when a new operator is hired – and the city council or management tosses the keys to the new operator with the comment, "Well – have at it!" In many cases, no one else, or few at best in the organization, understand much about wastewater treatment. As I have previously mentioned, KRWA has a brief outline for operators of lagoon treatment systems, "Lagoon Basic Operations Guide". A similar guide is available for water systems. Either of these would be good resource.

For example, all water and wastewater systems should have written operation guides, and any upgrades should be documented in the guides. The guide should be reviewed and updated annually and whenever changes are made to the system. That information will be beneficial when the next operator comes along.

In this article, I hope to review the wastewater collection system and the basics of operation so that the wastewater system maintains compliance with regulations and reduces the chances of sewer backup into homes and businesses.

Essential data for operators

There are three essential pieces of data an operator needs to be aware of and have access to them. They are:

1. The Permit: The permit will detail what type of treatment system – from a lagoon or activated sludge treatment facility. The permit includes the design capacity and sampling requirements for discharging systems. It will state what is required to report

and records to maintain and for how long. This information is in the "standard conditions" section. Most records must be kept for a minimum of three years, e.g., incident report forms, lift station records and discharge monitoring reports, including laboratory results for discharging systems. EPA 503 sludge reports must be on file for five years.

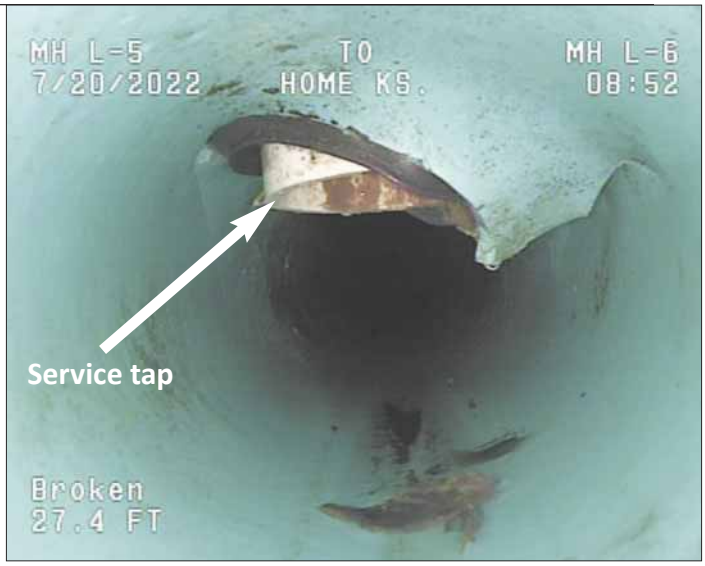
2. System Plans: System plans detail the design of the collection and treatment system. This includes the location of manholes and depth and tap locations for the collection system. The treatment system will detail the depth of the cells (ponds) and the locations of control valves.

3. KDHE Inspection Reports and **Letters Outlining Technical Assistance:** Inspection reports should be read thoroughly after each inspection, especially by new operators, to provide direction to correct past deficiencies. They may be as minor as signs that need to be painted around the treatment facility to hire an engineer to repair the system's treatment facility. The technical assistance letters written by KRWA staff are posted on the KRWA website www.krwa.net. Then, click on TECHNICAL ASSISTANCE. A drop-down menu will appear. Cursor to the bottom to LETTERS and click on it. Then another menu appears; type your system's name into the search box and click GO. Any letters by KRWA should display. As a side note, there are more than 8,000 letters posted.

Plans, maps, and record retention

Any operator needs to know more than the three points mentioned. Since this article focuses on the basic operations of collection systems for new operators, I will highlight the most critical parts of the collection system operations. The system's plans should be reviewed by the operator who should become familiar with them. There are many formats of plans.

The most common type is paper copies with many pages. There is usually an overview page o,f the entire system but it doesn't have much detail. It will show where the pipes, manholes, and lift stations are located. Then the overview map is usually divided into smaller sections with more detail such as tap locations, distances between manholes, and depths in each section or block of pipe. This usually shows several blocks of the collection system per page in a city. KRWA uses a GIS system to map wastewater systems. An hourly fee is charged. GPS mapping technology keeps changing. Maps of utility systems can be accessed through various devices such as a tablet, I-pad or phone. I have used maps on a phone serval times; I was amazed at how easy that was.



This service tap was installed less than ten years ago. It was recently discovered during a cleaning and CCTV of the sewer districts collections system.

The operator should become familiar with the overview page and be able to locate the manholes. If they cannot be found, they may be buried and should be raised to the proper height for access. Usually, I would raise to grade, but some systems have dirt or gravel roads. The manholes should be just below the surface to not be disturbed by road graders. If the streets are asphalt or concrete, the manholes should be at grade. This is due to the need for reasonable access in case of sewer backup and will reduce the

This photo shows a fiber optic line which has been drilled through a clay tile of a city's collection system.

system's liability for damages. I recently assisted a system with uncovering manholes for cleaning of the collection system. At least ten manholes were buried, and several by eight inches or deeper. It took an hour to dig the hard-packed gravel with a small jackhammer to access just one manhole. As part of the cleaning process, the cleaning contract costs $350 per hour for opening manholes. Having the manholes accessible saved the system at least $2,500 in contractual fees. Extensions were ordered for all of the manholes for $2,800. With the recommended cleaning of the collection systems every three years, that city is budgeting $7,500 in maintenance costs over the next ten years.

The entire collection system is recommended to be cleaned every three years. Some systems clean only once every three years; others will clean a section every year. Cleaning a section every year is usually easier to budget for. If trouble areas are found such as excessive grease from schools, restaurants, or healthcare facilities, then those sections of the collection system should be cleaned every year. This is also true where tree roots are found in the system. Repairs should be made to eliminate root intrusion. Contractors will usually include CCTV (closed circuit video) of ten percent of the lines cleaned. I recommend that each section that is cleaned be televised. If a third of the system is cleaned as one project, then televise the entire third so the entire collection system will have been cleaned and televised in three years. For systems that have never been cleaned, it is advisable to clean and televise the entire system, then have routine cleaning every three years with televising every third or fourth cleaning cycle. Even in newer systems, issues such as broken taps or pipes bored through for other underground utilities are frequently found. Any major issues televising the collection system should be repaired as soon as possible.

When sanitary sewer overflows, commonly called sewer backups, occur, the operator should attend to the issue as soon as possible. Doing so is required by the permit. The utility must also notify KDHE within 24 hours by calling the area KDHE district or central office. Then within five days, the utility must provide a written report o KDHE. These will soon be able to be sent to KDHE through the new KEIMS Electronic Discharge Monitoring Report (EDMR) program and written reports will be sent through this program.

KRWA is in the early planning stages for the 2023 conference sessions. Wastewater topics will be very available. I hope all readers of this magazine will mark March 28 – 30, 2023 for the conference and exhibition. It's one of the top-rated conferences in the U.S.

This manhole was located and excavated to allow for smoke testing of the collection system. This manhole was at least four inches below grade. If access is needed in an emergency due to a sewer backup, it could cost the system thousands of dollars for cleanup because of slow response and having to locate and excavate the manhole.

Charlie Schwindamann has been a Wastewater Tech at KRWA since September 1999. Charlie holds Class II Water and Class II Wastewater Operator certification. He has also served as a member of the Marysville, Kansas city council.