



# 2021 Sewage Collection & Water Reclamation Plant Report

The City of Greensboro's wastewater system includes two major components: the collection system and T.Z. Osborne Water Reclamation Facility (TZO). The City's highly-trained, state-certified staff does an excellent job with both. Wastewater collection/treatment is a 24-hour-a-day, 7-day-a-week responsibility. Ultimately, the goal is to protect both the environment and the quality of life not only for Greensboro's residents, but for neighboring communities as well. Downstream neighbors along the Cape

Fear River Basin are affected by the quality of water discharged from TZO.

The Clean Water Act of 1999 (House Bill 1160) requires all entities that own or operate wastewater collection and treatment systems to make an annual report available to their customers. The purpose of the report is to show how a system operates, how well it performed during the year, what violations occurred, and other important information.

This report is produced in compliance with these requirements and covers the calendar year January - December 2021. It is submitted to the North Carolina Department of Environmental Quality. This report is available to all customers at the Water Resources Customer Service Center at 2602 S. Elm Eugene St. and online at [www.greensboro-nc.gov/WastewaterReport](http://www.greensboro-nc.gov/WastewaterReport) or in Spanish [here](#).

**T.Z. Osborne**  
**Water Reclamation Facility**

**336-373-7740**

**[www.greensboro-nc.gov/water](http://www.greensboro-nc.gov/water)**

**To report sewer overflows, please contact 336-373-2033**





## System Overview

The long history of water reclamation in Greensboro began with the construction of the original four million gallon per day (MGD) South Buffalo Creek Treatment Plant in 1928. Over the next 10 years, the North Buffalo Water Reclamation Plant opened to provide secondary treatment for the northern half of Greensboro. By 1984, South Buffalo Creek Treatment Plant closed only to be replaced by TZO.

Currently, the City of Greensboro Water Resources Department operates one water reclamation plant and a sewage collection system that collects and transports sewage to that plant. The North Buffalo Facility was decommissioned in October 2017. It is now a transfer pump station and all wastewater is currently treated at TZO.

The sewage collection and water reclamation system of the City begins with approximately 105,060 connections that serve homes, commercial establishments, and industries. Every day an average of 33.4 million gallons of sewage is generated in homes and industries that must be collected, transported, and treated to very stringent standards before it is released back into the environment at South Buffalo Creek. This service is provided by the City's Water Resources Department and is funded almost entirely from the user charges that are paid monthly by customers.

The sewage collection system is comprised of 1,452 miles of gravity lines, 34,182 sewer manholes, 50 pump stations, and 75.02 miles of pressurized sewage force mains. The system is subject to many federal and state rules and regulations designed to enforce the provisions of the Clean Water Act. All spills and overflows, of any volume, that reach surface waters must be reported to the state. The City notifies the media any time a spill results in 1,000 gallons or more reaching surface waters.

## T.Z. Osborne Water Reclamation Facility

- Constructed in 1984 with several major upgrades and expansions since
- Design capacity of 56 million gallons per day (MGD)
- Treated 12.2 billion gallons of wastewater in 2021

## Wastewater Treatment Plant Performance

The City's wastewater treatment plant operates under a National Pollutant Discharge Elimination System (NPDES) Municipal Wastewater Permit. This highly complex permit includes monitoring requirements and discharge limits. The permit can be viewed at the treatment plant upon request. Compliance with these permits requires laboratory staff to conduct more than 50,000 tests per year. Wastewater treatment plants have no control over some parameters, other than through regulating what industries and households can discharge to the sewers through the Industrial Waste and Pretreatment Program.

During 2021, the Water Resources Department treated more than 12.2 billion gallons of wastewater and returned it to local streams. The City is proud of the performance of these facilities, which is made possible by the dedicated efforts of the professionals who operate, maintain and conduct tests for the plant. All NPDES permit violations are reported to the state to ensure compliance with reporting regulations. A list of violations that occurred during the 2021 calendar year is at the end of this report (Table 1).

The City's water reclamation facility is a tertiary treatment plant that utilizes activated sludge processes. Biosolids generated in these processes are disposed of by two fluidized bed incinerators.



## COVID-19 Wastewater Testing Program

### System Improvements

Water Resources is proud that given the capacity of its treatment plant and the age of its collection system, permit violations have been minimal. Recognizing the changing climate of environmental concern, total compliance is the City's commitment to its customers.

In an effort to continue to meet new regulations and requirements, various capital improvement projects have been initiated. The TZO expansion and upgrade was completed August 1, 2021. The four-phase construction project took more than 6.5 years to complete at a cost of almost \$140 million. The plant design capacity was increased from 40 MGD to 56 MGD and Biological Nutrient Removal (BNR) treatment processes were added in order to comply with the Total Nitrogen limits in the Jordan Lake Rules. The annual mass-based Total Nitrogen limit was effective January 1, 2021 and TZO met the new limit for 2021, discharging less than 66% of the allowable limit.

### Protecting the System

Each year, the City evaluates the wastewater collection system and prioritizes needs and resources. The system is monitored and maintained daily with the implementation of both preventative and corrective maintenance measures. In addition, the City continually improves the system using an aggressive program to rehabilitate old infrastructure that exhibits signs of deterioration. Planning and making improvements to our wastewater collection system extends the life and operating efficiency of the City's sewer system.

At the request of the North Carolina Department of Public Health, TZO has been participating in COVID-19 wastewater testing since June 2021. Twice per week, influent (raw untreated) wastewater samples are collected by the TZO laboratory staff and prepared for shipment. COVID virus genetic material is excreted in the feces of infected persons and the same types of tests that laboratories use to detect the virus from nasal swabs can be used to detect COVID concentrations in wastewater. The wastewater testing is very sensitive and since it does not depend on people to realize they are sick, or even to have symptoms at all, it is often the earliest warning a community has a wave of COVID-19 infections on the way. Although COVID can be detected/measured in wastewater, it is not transmitted through wastewater. TZO is proud to be part of this national testing program to help better understand the pandemic and protect the public health of the community.

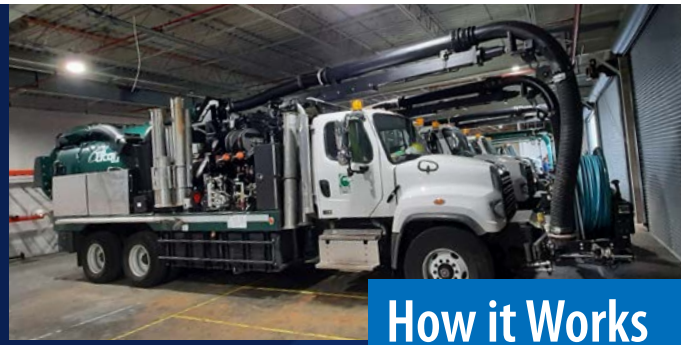




# Summary of Collection

In 2021, there were 43 Sanitary Sewer Overflows (SSOs) in the community, which is a slight decrease from the 44 spills reported in 2020. SSOs occur when problems in the system cause sewage to emerge from manhole covers, service cleanouts or plumbing fixtures. The major contributors to sewer overflows include grease, wipes, trash or debris, tree and shrub roots, pump station equipment failure, and pipe failures or breaks. A list of SSOs that exceeded 1,000 gallons during the 2021 calendar year are at the end of this report (Table 2).


While an important part of avoiding SSOs is reducing the introduction of inappropriate materials into the sewer collection system, Water Resources also operates a fleet of four flusher trucks which help keep the sewer lines clear of blockages.



## How it Works

- Two main elements to the truck: a water jet hose on the front of the vehicle and the vacuum located on the back, attached to a swinging boom.
- The operator deploys the water jet hose through a manhole, washing buildup off the sides of the sewer pipe with over 1,000 psi of water pressure.
- The vacuum equipment collects the loose debris in the downstream manhole and pumps it into a large tank on the truck.
- Cutter heads can be fitted to the water jet hose to remove harder buildups and root intrusion.

## Tips to Prevent Sanitary Sewer Overflows

- Remember no wipes in pipes! Only flush the four Ps: Pee, Poop, Puke & (toilet) Paper. 
- Place cooled oil and grease into trash bins or covered collection containers. Never pour grease down the drain!
- Scrape food scraps from dishes into trash bins.
- Wipe off all fats, oils, grease and food residue from dishes and cookware into trash bins.
- Use a strainer in the sink to collect excess food particles.
- Clean up grease spills with absorbent material and place into trash bins.

## Fats, Oils and Grease Program

Grease from cooking oils, gravy, lard or shortening, and butter or margarine may not look harmful as a liquid, but when they cool they get thick and stick to pipes.

SSOs result from cooking oil, fats, and grease that enter the sanitary system from household drains and poorly maintained grease traps in restaurants, food and meat processing factories, and other food establishments. These SSOs can cause health hazards, damage home interiors and threaten the environment.



The City implements a Fats, Oils, and Grease (FOG) policy

designed to educate about and enforce proper disposal of FOG within the community. The FOG policy educational and enforcement programs are intended for all customers (food service establishments, nursing/group homes, schools/cafeterias, industries, and residents) that discharge wastewater into the City's Sanitary Sewer System with the aim of mitigating or eliminating SSOs that are grease related. The City FOG policy requires all commercial and food service establishments to install and regularly maintain an appropriately sized grease trap or interceptor.

**To learn more, please visit [www.greensboro-nc.gov/FOG](http://www.greensboro-nc.gov/FOG)**

# 2021 Wastewater Treatment & Sewer Collection Violations

TABLE 1

## T.Z. Osborne Water Reclamation Facility NPDES Permit #NC0047384

Month	Effluent Parameter Violation	Type of Violation
February	Flow	1 Monthly Average
	Carbonaceous Biochemical Oxygen Demand (CBOD)	2 Weekly Average
		1 Monthly Average
	Ammonia-Nitrogen	2 Weekly Average
		1 Monthly Average
	Total Suspended Solids	1 Weekly Average
1 Monthly Average		
March	Ammonia-Nitrogen	1 Monthly Average
April	Carbonaceous Biochemical Oxygen Demand (CBOD)	1 Weekly Average
	Ammonia-Nitrogen	1 Weekly Average
		1 Monthly Average
	Chronic Bioassay	Fail @ 90% Effluent
June	SOC* 1,4-Dioxane Compliance Value	Daily Maximum
November	SOC* 1,4-Dioxane Compliance Value	Daily Maximum

\*The City's Water Resources Department has been investigating sources of 1,4-dioxane within the City's sewer collection and wastewater treatment facilities since 2015. Considerable progress has been made and the department continues to work proactively with local industries through the Industrial Pretreatment Program. Greensboro has a long and strong working relationship with North Carolina Department of Environmental Quality and appreciates its guidance and assistance in its efforts.

Through these partnerships, the City fully commits to developing a management strategy to further reduce the release of 1,4-dioxane into waterways that may potentially impact downstream communities who rely on the Haw River and Cape Fear River for their source water.

With the approval of the Greensboro City Council, the Water Resources Department signed a Special Order by Consent

(SOC) to address 1,4-dioxane levels discharged from TZO. The SOC was effective May 1, 2021 and is a commitment outlining the continuation of Greensboro's previous voluntary source identification and reduction efforts.

Two entities legally objected to the original SOC and, after much negotiation, a settlement was reached and the amended SOC went into effect December 1, 2021. The City agreed to compliance values in year one of 35 ppb (parts per billion), year two of 31.5 ppb and year three of 23 ppb.

The 36-month SOC includes: comprehensive source study, a public awareness program, allocations for industrial users, continued collaboration/oversight of indirect sources of 1,4-dioxane, TZO's effluent compliance values, annual reports, and civil penalties for noncompliance with SOC requirements.

More information about the SOC can be found on the [City's 1,4-Dioxane Updates web page](#).

# 2021 Wastewater Treatment & Sewer Collection Violations

**TABLE 2**

## Sewage Collection System Permit #WQCS00006

*Sewage Spills from Collection System Exceeding 1,000 Gallons*

PERMITTEE: CITY OF GREENSBORO				
Incident Started	Volume Reaching Surface Water	Surface Water Name	Location	Probable Cause
1/25/2021	7,200 gallons	South Buffalo	4807 B Koger Blvd.	Debris in line
2/2/2021	1,500 gallons	South Buffalo	1121 S. Benbow Rd.	Grease
3/16/2021	3,000 gallons	South Buffalo	4207 Romaine St.	Debris in line
3/30/2021	4,500 gallons	East Fork	7908 Piedmont Pkwy.	Debris in line
4/16/2021	7,000 gallons	South Buffalo	3808 Fraizer Dr.	Debris in line
4/23/2021	3,000 gallons	North Buffalo	411 S. Booker St.	Debris in line
4/26/2021	2,000 gallons	Brush Creek	4057 Battleground Ave.	Debris in line
4/29/2021	3,000 gallons	North Buffalo	1715 Kay St.	Grease
5/1/2021	2,000 gallons	Brush Creek	3315 Mill Spring Ct.	Roots
6/26/2021	2,625 gallons	South Buffalo	2730 Dumont Dr.	Debris in line
6/28/2021	1,800 gallons	South Buffalo	3522 Mccuiston Rd.	Debris in line
7/6/2021	1,500 gallons	South Buffalo	1724 Bristol Rd.	Grease
7/10/2021	18,000 gallons	Little Alamance	4254 Harbor Ridge Dr.	Grease
7/19/2021	1,800 gallons	South Buffalo	Cypress Park Rd. & Lamroc Rd.	Debris in line
7/28/2021	7,500 gallons	South Buffalo	4124 Eastland Ave.	Grease
8/1/2021	24,000 gallons	Little Alamance	3626 Southeast School Rd.	Pipe failure
9/18/2021	3,600 gallons	East Fork Deep River	7625 Thorndike Rd.	Debris in line
11/25/2021	3,000 gallons	Buffalo Creek	3607 Warldron Dr.	Grease
12/26/2021	2,000 gallons	North Buffalo	2510 Walker Ave.	Grease
12/27/2021	5,500 gallons	South Buffalo	4223 Romaine St.	Debris in line

*The names below are professionals designated by the state as the "Operators in Responsible Charge" (ORC) of the respective systems:*

T.Z. Osborne Water Reclamation Facility  
Permit Number: NC0047384  
ORC: Bradley Flynt, 336-433-7262

Sewage Collection System  
Permit Number: WQCS00006  
ORC: Robert Martin, 336-373-2033