



# DURHAM COUNTY

## Triangle Wastewater Treatment Plant PERFORMANCE ANNUAL REPORT

JULY 2018—JUNE 2019

Triangle Wastewater  
Treatment Plant  
5926 NC Hwy. 55 E.  
Durham, NC 27713  
(919) 560-9033

### Permits:

Wastewater

Treatment Plant:  
NC0026051

Collection System:  
WQCS00038

Stormwater :  
NCG110054

Reclaimed Water:  
WQ0032821

### Owned and Operated by:

Durham County  
Engineering  
&  
Environmental Services  
Utilities Division

### Contact:

Stephanie Brixy  
Deputy Director



Durham County TWWT BNR

**D**urham County owns and operates the Triangle Wastewater Treatment Plant (TWWT) servicing Research Triangle Park and the surrounding areas. The plant is designed to treat 12 million gallons per day (MGD) and currently treats an average of 5.11 MGD. Treatment of

the wastewater occurs biologically within three treatment trains capable of five-stage biological nutrient removal (BNR). Each train is designed for an average daily flow of 4.0 MGD. Currently, each oxidation ditch within the train includes brush aerators (rotors) for maintaining ideal conditions for bacteriological degradation of waste through aerobic treatment and mixing. Submersible mixers are utilized



Disc Diffusers



Blower Pipe

for maintaining the solids in suspension due to the depth of the ditch. To increase oxygen transfer, one of the BNR trains is under construction to replace the brush aerators with two membrane disc diffused aeration grids and two blowers. This upgrade will not only supply better aeration to ensure the ammonia permit limit is easily met but will be more energy efficient. Upgrades are scheduled to be completed in October 2019.

# Collection System

**D**urham County owns and maintains a wastewater collection system which includes 105 miles of gravity sewer, 10.3 miles of pressurized force mains, and 13 pump stations.

In the past 12 months Durham County had four reportable spills.

- On October 22, 2018, a spill estimated at 1,500 gallons of wastewater occurred due to equipment failure of an air release valve.
- On October 30, 2018, a spill estimated at 500 gallons of wastewater occurred due to pipe failure.
- On February 6, 2019, a spill estimated at 1,305 gallons of wastewater occurred due to equipment failure of an air release valve.
- On June 3, 2019, a spill estimated at 300 gallons of wastewater occurred as a result of grease and rocks in a service line.

The Durham County Utilities Division prides itself on providing a high level of customer service. All commercial and residential customers' questions and concerns are responded to in a timely manner. If you have a question or concern regarding the collection system, services or any item covered in this report, please call (919) 560-9033.



## Reuse Water

**T**he Triangle Wastewater Treatment Plant (TWWTP) operates a reuse water system. Some of the uses of this water include: landscape irrigation, industrial cooling, industrial process water and sewer cleaning. Approximately 107.6 million gallons of reuse water was distributed during the fiscal year.

## Projects & Rehabilitation

**T**hroughout the last year, the County has continued its efforts to rehabilitate aging collection system infrastructure and increase sanitary sewer capacity to facilitate economic growth in our service area. Some of these completed projects include:

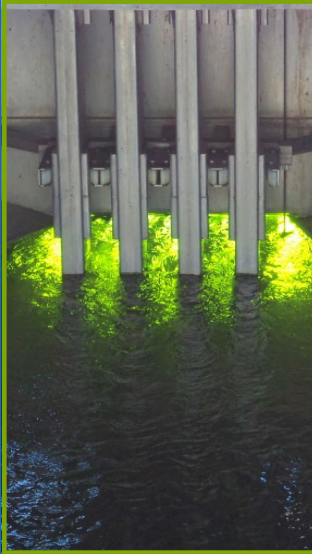
- ⇒ Slater Road Pump Station was upgraded to increase sewer capacity by replacing two existing pumps with larger ones;
- ⇒ A four-way valve was replaced at Page Park Pump Station allowing all three pumps to be operable;
- ⇒ Continuous inflow and infiltration investigations occur to eliminate hydraulic overload in the collection system and at TWWTP;
- ⇒ Vitrified clay pipe (VCP) cleaning and inspection project to repair and/or replace pipe prior to failure;
- ⇒ Stream bank stabilization around a high-priority gravity sewer main; and
- ⇒ Additional survey work to refine the Stirrup Iron Creek (SIC) Pump Station sewer basin's hydraulic model.

Over the next several months, the SIC Pump Station will be upgraded with new pumps and control panels to increase sewer capacity.

## Biosolids System

**T**he TWWTP generates biological residuals (approximately 7,400 wet tons per year), which are dewatered by centrifuges. The dewatered cake (approximately 1,300 wet tons per year) is transported to McGill Environmental Systems, where it undergoes further biological treatment to produce a Class A biosolid. These biosolids are beneficially used as soil amendments in commercial landscaping and agricultural activities.

# Treatment System & Process



Ultraviolet (UV) System

In the past year, while treating 1.80 billion gallons of wastewater, the TWWTP was compliant in all sampling events except for one BOD violation.

The **Influent Pump Station (IPS)** is used to pump raw wastewater (sewage) to the treatment process to be biologically treated. The IPS is sized for 12 million gallons per day average flow.

The **Fine Screens** are used to remove fine materials from the wastewater such as grit, sand, egg shells, etc. All of the organic materials are washed off and used in the biological treatment process.

The **Five Stage Biological Nutrient System** is where all biological treatment takes place, such as removing ammonia through nitrification and denitrification processes as well as the removal of phosphorus.

The **Chemical Polishing** process removes any phosphorus that is remaining after the biological treatment process. Methanol is used in this polishing process to add additional BOD to support the denitrification treatment process.

The **Clarifiers** are where the biomass is separated from the treated wastewater and then is returned to the BNR for further treatment.

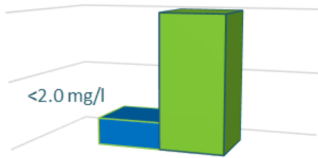
The **Tertiary Filters** are next in the clarification process which removes all remaining unsettled biomass in the treatment process.

The **Ultraviolet Disinfection** treatment process is used to remove all disease causing bacteria without creating harmful by-products.

The **Reaeration** stage of the treatment process adds dissolved oxygen to the treated wastewater to meet required permit limits before it is discharged to Northeast Creek.

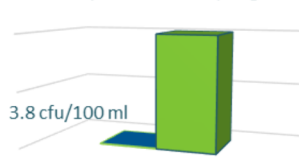
## Effluent Annual Average Data

5.0 mg/l Monthly Avg. Permit Limit



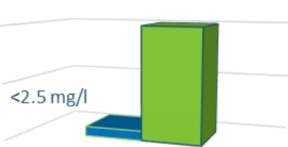
BIOCHEMICAL OXYGEN DEMAND

200 cfu/100ml Monthly Avg. Permit Limit



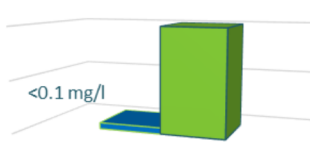
FECAL COLIFORM

30 mg/l Monthly Avg. Permit Limit



TOTAL SUSPENDED SOLIDS

1.0 mg/l Monthly Avg. Permit Limit



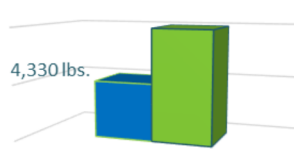
AMMONIA-NITROGEN

111,207 lbs. Annual Permit Load Limit



TOTAL NITROGEN

8,432 lbs. Annual Permit Load Limit



TOTAL PHOSPHORUS

Clarifier



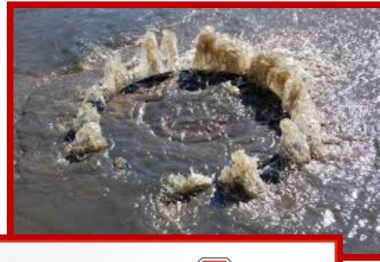


## Lab & Pretreatment Program

The Triangle Wastewater Treatment Plant's (TWWTP) laboratory staff collects and analyzes wastewater samples as required by the NPDES permit and the reclaim water permit. Currently, the laboratory is certified by the Division of Water Resources Laboratory Certification Branch to analyze ammonia, biochemical oxygen demand, total residual chlorine, conductivity, dissolved oxygen, fecal coliform, pH, temperature, and total suspended solids. Staff determines the age and health of the activated sludge and identifies microorganisms, such as amoebae, bacteria, ciliates, flagellates, nematodes, rotifers, and water bears.

The TWWTP implements an Industrial Pretreatment Program (IPP) to control pollutants which may cause pass through or interfere with the treatment plant's processes, which may contaminate sewage sludge, or potentially be hazardous to worker's health and safety. Currently, there are fifty-one permitted industries that are regularly inspected and monitored to ensure their discharges meet specific permit limits. Thirteen of these industries are Significant Industrial Users (SIUs). Biosafety Laboratories in our service area have also been identified and nineteen are currently permitted. Several of the Industrial Pretreatment Permit holders are required to certify that their facility has followed biosafety procedures consistent with the fifth edition of the Biosafety in Microbiological and Biomedical Laboratories, US DHHS -PHS, -CDC and -NIH for the deactivation of Biosafety Level 1, 2, 3 or 4 materials prior to discharge to the sewer system.

**S**anitary sewer overflows can cause health hazards, damage homes and businesses, threaten the environment, and local waterways and are costly to clean up for wastewater utilities.



### PLEASE DO NOT FLUSH

- Baby wipes
- Cleaning wipes
- Feminine hygiene products
- Paper towels
- Tissues
- Trash of any kind



Do your part to prevent overflows by following these simple guidelines:

- ⇒ **Collect fats, oils and grease (F.O.G.) in a container and dispose of it in the garbage.**
- ⇒ **Place food scraps in the garbage and use garbage disposals in your home as little as possible.**
- ⇒ **DO NOT flush wipes. Even if they say "flushable", disposable wipes will clog pipes. They are not biodegradable like toilet paper which breaks down at a much quicker rate, and can cause issues in the sanitary sewer.**
- ⇒ **Place ALL personal hygiene products and diapers in the garbage.**
- ⇒ **DO NOT pour hazardous materials down the drain.**
- ⇒ **Call 811 or visit [www.nc811.org](http://www.nc811.org) BEFORE you dig and protect your underground utilities from damage.**
- ⇒ **DO NOT plant trees and shrubs, or erect structures such as fences on or near manholes, sewer lines or easements.**

August 31, 2019

Notification:

This Performance Annual Report covering July 1, 2018 through June 30, 2019, was forwarded to the NC Department of Environmental Quality. Public Notice of the report was advertised in the Durham Herald Sun newspaper and is available for review at the following locations:

Clerk to the Board  
200 East Main St.

Main Library  
300 N. Roxboro St.

South Regional Library  
4505 S. Alston Ave.

Website  
[www.dconc.gov](http://www.dconc.gov)

Certification:

I certify under penalty of law that this report is complete and accurate to the best of my knowledge. I further certify that this report has been made available to the users or customers of the named system and that those users have been notified of its availability.

*Stephanie Brixey*

Stephanie Brixey  
Deputy Director

**EVERYONE, including YOU, can help prevent overflows!**