



2022

Annual Performance Report

Roanoke River Waste Treatment Plant NC0024201 &
Collection System WQCS00027

Abstract

The Annual Performance Report provides key performance information that demonstrates the POTW's accountability to ensure Roanoke Rapids Sanitary District's stewardship and prosperity by addressing its environmental, operations, and maintenance challenges through transformative process and technology solutions.

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I. General Information:

A. Regulated entity: Roanoke Rapids Sanitary District, Collection Systems (C.S.) and Wastewater Treatment Plant (WWTP), together Publicly Owned Treatment Works (POTW)

B. Responsible entity: Roanoke Rapids Sanitary District, Dan Brown, CEO
PO Box 308
Roanoke Rapids, NC 27870
Phone: 252-537-9137

C. Person in charge/contact

1. C.S.: David Warren Scott, Operator in Responsible Charge (ORC)
Eric Wes Deaton, Back-up ORC
Roanoke Rapids Sanitary District, Distribution & Collection
425 East 11th St.
Roanoke Rapids, NC 27870
Phone: 252-537-9747

2. WWTP: Steven L Ellis, Operator in Responsible Charge (ORC)
Timothy Skipper, Back-up ORC
Roanoke River Wastewater Treatment Plant
135 Aqueduct Road
Weldon, NC 27890
Phone: 252-536-4884

D. Applicable Permit(s)

1. C.S.: North Carolina Environmental Management Commission System-wide Wastewater Collection System Permit No. WQCS00027
2. WWTP: - National Pollution Discharge Elimination System (NPDES): NC0024201
- Land Application (L.A.): WQ0001989
- Stormwater (General): NCG110000

E. Description of C.S.:

The collection system consists of approximately 146 miles of sewer lines and six lift stations that serve Roanoke Rapids, Gaston, and portions of Halifax and Northampton Counties. All with an approximate population of 17,600. The sewer lines within Roanoke Rapids, Gaston, and all subdivisions, which connect to two main Interceptors, range in size from 8" to 12". There are two main 30" diameter Interceptors transporting wastewater to the WWTP.

The Roanoke River Interceptor collects wastewater from basins located on the north side of the Sanitary District. The Gaston basin and Northampton County are also served by this interceptor. The Interceptor begins just west of 100 Gaston Road (NC HWY 48) in Roanoke Rapids. There are 3 primary basin pump stations and 2 secondary pump stations served by the interceptor whose pipe sizes range from 18" to 30".

The Chockoyotte Creek Interceptor serves the south side of the Sanitary District and three subdivisions located outside the Roanoke Rapids city limits: Lake View Park, Greenbriar, and Lincoln Heights. The Interceptor begins adjacent to 1100 Zoo Road. There is one primary basin pump station along the route. The interceptor pipe sizes range from 12" to 30".

The system has six sewer lift stations. Three stations are in the Gaston basin. HWY 46 Pump Station serves a Northampton County School. The Old Emporia Road Pump Station serves the Chowan Housing Projects, and the Hwy 48 Pump Station pumps all flows from Gaston and Northampton County via an 8" force main suspended from the NC HWY 48 Bridge spanning the Roanoke River to the Roanoke River Interceptor. The remaining three pump stations are located within Roanoke Rapids basins and serve residential and some light commercial customers. Two of the stations, Belmont and Poplar Springs, discharge to the Roanoke River Interceptor while the Greenbriar Pump Station discharges to the Chockoyotte Creek Interceptor.

F. Description of WWTP:

The wastewater treatment plant is rated at 8.34 million gallons per day (MGD). Peak flow is rated at 12.5 MGD.

Treatment processes at the wastewater plant include grit and rag removal. This is followed by primary clarification, trickling filter BOD buffering, biological secondary treatment, activated solids treatment, secondary clarification, final effluent chlorination/de-chlorination processes, and final pH adjustment.

During these processes, solids are removed from two locations. Primary clarification removes settleable solids from incoming wastewater to an anaerobic digestion unit. Here, the solids in the absence of oxygen, receive pH adjustment, mixing, and heating to produce a stabilized material suitable for land application. Once the solids are stable, excess water is decanted and returned to the plant for further treatment. The stabilized, thickened solids are treated with lime for odor control and then removed to a holding tank prior to transportation for land application.

Secondary clarification removes solids from the activated solids process. Here, solids in the presence of oxygen and mixing accumulate in excess. They are removed, chemically stabilized, and added to a holding facility. All stabilized solids are analyzed, and land applied according to their nutrient value, ceiling limit (mg/kg) and cumulative requirements.

There are two pumping stations distributing wastewater into and through the plant. They are the Influent Pump Station, which includes an equalization pump, and the Trickling Filter Effluent Pump Station. The Influent Pump Station has the capacity to pump 20 MGD, the equalization pump, 6 MGD, and the Trickling Filter Effluent Pump Station, 27 MGD. Standing by in conjunction with these pump stations is the Emergency Flood Pump Station with a capacity of 21 MGD to remove treated effluent from the plant during high river stages which prevent normal gravity flow discharge. Also, a storm water pump station has been installed. This station intercepts site runoff, an unnecessary treatment load and potential site flooding condition, and removes it before entry to the plant. It has the capacity to pump 11.5 MGD. Numerous other pumps and mixers are located throughout the plant to facilitate process control.

II. Performance:

1. C.S:

The performance of the system in 2022 was particularly good. There were no permit violations or monitoring and reporting violations. The District's Fat, Oil, and Grease (FOG) Program performed 23 inspections of area restaurants and food preparation facilities (FPE). Full facility inspections are now handled by the Northampton and Halifax County Health Departments. The District continues outside visual inspections for exterior traps, and interior inspections for potential problem areas as well as interior separators. There were no notices of violation. All FPFs were advised to continue following "Best Management Practices" and maintain maintenance records. The District FOG program is continuing our public education program. There were no Sanitary Sewer Overflows (SSO) out of the five total SSOs during the period attributed to FOG in 2022.

The District contracted with USDA wildlife services for outfall cutting, stream debris removal and beaver management from Chockoyotte Creek located adjacent to its interceptor. This ongoing work improved access to the interceptor and helped minimize flooding of manholes along the easement.

2. WWTP:

Over the course of 2022, the Roanoke River Wastewater Treatment Plant operated very efficiently. There was one monitoring or reporting violation. The plant flows ranged from a daily maximum of 9.30 MGD to a minimum of 1.70 MGD. The average daily flow was 2.78 MGD. The plant treated 1,015,400,000 gallons of wastewater throughout the year, which was discharged to the Roanoke River.

Throughout 2022, there was 172,937 gallons of wastewater that was equalized due to maintenance and later returned to the plant for treatment.

The efforts to repair the collection system and reduce Inflow and Infiltration from prior years continued in 2022. This work has led to lower peak flows for shorter peak durations and reduced the number of bypasses from the plant as illustrated in the following table:

Year	2018	2019	2020	2021	2022
Max Day (MGD)	9.0	11.4	12.4	12.68	9.30
Avg. Daily Flow - MGD	3.34	3.24	3.58	3.39	2.78
Estimated I & I - MGD	1.54	1.48	1.86	1.6	1.12
Annual Rainfall - in.	60.5	46	66.3	44.10	47.4

The following table illustrates the treatment performance of the wastewater plant and its ability to meet and comply with the NPDES permit requirements:

PARAMETER	MONTHLY LIMIT	WEEKLY LIMIT	REQUIRED REMOVAL	ANNUAL REMOVAL	ANNUAL AVERAGE	DAILY MAX	DAILY MIN
CBOD	25mg/L	37.5mg/L	85%	96.4%	8.5mg/L	22.0mg/L	3.9mg/L
TSS	30mg/L	45mg/L	85%	90.9	18.7mg/L	44.4mg/L	7.7mg/L
Fecal Coliform	200 Colonies	400 Colonies	N/A	N/A	43.7 Colonies	>436 Colonies	1 Colony
NH ₃ -N	N/A	N/A	N/A	N/A	<1.8mg/L	10.2mg/L	<0.5mg/L
Total-N	N/A	N/A	N/A	N/A	21.1mg/L	24.8mg/L	17.4mg/L
Total-P	N/A	N/A	N/A	N/A	1.0mg/L	2.2mg/L	0.4mg/L

During 2022, the District continued its contract with Granville Farms, Inc. for the management of biosolids. A total of 1,535.15 applicable acres is permitted in the Land Application Program. There were 2,974,513 gallons, or 662.68 dry tons of biosolids applied to 334.19 Acres. There were no permit violations for the land application program in 2022.

One of the main treatment units at the wastewater plant is the activated sludge basins. This is where much of the biological treatment occurs. It is also one of the largest energy consumers at the plant due to the large centrifugal blowers needed to supply air to the process. In 2021, the District contracted with RK&K Engineering to do design work on a new blower system to provide the air needed to the basins in a more efficient manner. The design phase has continued in 2022 and plans should be ready for bidding in fiscal year 2023-24.

Another crucial element to the Wastewater Treatment Plant is the preliminary station and its screening and grit removal equipment. During 2022, the Rotamat screen was rebuilt to provide more reliable service. The grit classifier was also rebuilt to ensure it will continue to operate for years to come.

A. Permit limit violation

1. C.S.: None
2. WWTP: None

B. Monitoring and Reporting Violations

1. C.S.: None
2. WWTP: There was one Notice of Violation in August of 2022 for a monitoring and reporting violation of effluent ammonia nitrogen. The permit requires twice per week monitoring of ammonia. During the first week of August, there were several staff members out with Covid-19 and on vacation, leaving the laboratory short staffed. Only one sample was collected and analyzed that week. No other violations have occurred since. There were no penalties assessed due to this violation.

C. 2022 Sanitary Sewer Overflows

1. C.S.: There were 5 reportable SSO's in 2022.
 1. Manhole PC-186 at 420 Tabb Dr in Gaston NC on 1/3/2022 900 Gal.
 2. Manhole K-221 at Charles Cir in Roanoke Rapids on 1/26/2022 300 Gal.
 3. Manhole A-54 on 3/24/2022 12,600 Gal.
 4. Manhole PI-6 in Gaston at end of Baird St on 8/10/2022 7500 Gal.
 5. Manhole K-419 at Smith Church Rd on 12/6/2022 750 Gal.

There was an estimated total of 22,050 gallons spilled in SSO's in 2022. Four spills are the result of blockage due to debris in the line and one spill was from capacity exceedance due to wet weather conditions. This correlates to 3.42 SSOs per 100 miles of pipe.

2. WWTP: N/A

D. Bypass of Treatment Facility

1. C.S.: N/A
2. WWTP: There were no bypasses at the Wastewater Treatment Plant in 2022.

E. Description of any known environmental impact or violations.

1. C.S.: None
2. WWTP: None

F. Description of corrective measures taken to address violations or deficiencies.

1. C.S. : Along with the wildlife control, FOG program and outfall clearing discussed above, RRSB continues to perform preventative sewer backup maintenance by cleaning with Jetter and Root Cutter; which is attached to the Jetter hose, followed by Closed Circuit TV (CCTV) camera to inspect the lines after cleaning. The District also uses its Vac-con Truck, which cleans the

line more effectively and proves to be more reliable than the old unit. The District also continues to use the Rausch CCTV van purchased in 2018 extensively.

District employees completed two Sanitary Sewer Point Repairs in 2022. The locations were Melody Ln at MH I-257 and 713 Raleigh Dr.

District employees completed 31 total new replacement taps in 2022. All 25 were 4" service lateral replacement taps throughout the district service area.

District employees cleaned 26.51 miles of sewer lines and CCTV'd all suspected problem areas.

District employees utilized the District's excavator mounted flail mower in conjunction with NC Wildlife Solutions LLC to cut and clear 20 miles of interceptor rights-of-way and cross-country lines in 2022.

The District contracted with Tri-State Utilities to clean and CCTV 11,982 feet of 30" PVC wastewater pipe. The 30" pipe is part of the Chockoyotte Outfall System.

2. Construction has not started on the replacement of a segment of 8" main which crosses Chockoyotte Creek in the vicinity of Smith Church Road between Manholes K419 and K417. The segment is known to be a significant source of inflow and SSOs due to the deteriorated condition of the pipe. The District has permitted plans for the purpose of making known corrective actions for the problematic segment of sanitary sewer line (MHK419 – MHK417 SS Rehab). Line deficiencies involve excess inflow in the portion crossing Chockoyotte Creek, and misalignment caused during Smith Church Road widening that contributed to hydraulic flow problems. Quotes are currently being taken for proposals to perform the WORK, but our RFP has not been satisfactorily responded to.

Priority projects continue to prevent RRSD from performing desired improvements and rehabilitation work in Collection System Sub-Basin 'K'. Sanitary Sewer Evaluation Survey (SSES) was completed in 2020 to assist RRSD in identifying areas within the sub-basin where inflow & infiltration (I/I) is occurring. Sub-Basin 'K' contains mostly 8" and 10" gravity collection lines with a 30" main interceptor (Chockoyotte Creek Outfall) that serves the basin. The sub-basin contains approximately 435 manholes, and approximately 100,000 feet of gravity pipe.

The District completed the Wastewater Sub-Basin 'A' and Roanoke River Outfall Study conducted by Freese and Nichols, Inc. in the first quarter of 2022. The study includes a desktop analysis of the existing system, development of existing sanitary sewer flows, review of previous study information, and hydraulic modeling to evaluate capacity in these areas.

The RRSD requested funding assistance from the NC Department of Environmental Quality, Division of Water Infrastructure in the Spring 2022 Application for Funding to address severe Inflow & Infiltration (I&I) issues in one of its primary drainage basins in its Wastewater collection system located in Roanoke Rapids. The purpose of this project is to eliminate a

chronic I&I condition by transferring wet weather flows utilizing the existing duplex Belmont Pump Station. The project will specify reconfiguring its 200 GPM wastewater pumps with 600 GPM flood transfer pumps. Additionally, the project will construct 4,700 LF of 8-in. ductile iron force main that will divert the combined stormwater and wastewater, influent to the Belmont Pump Station, from the sub-basin collection system to an existing parallel 12" and 18" interceptor within the sub-basin that is of sufficient capacity to transport the combined sewer directly to the Roanoke River Outfall for treatment at the Roanoke River Wastewater Treatment Plant. The Belmont Pump Station is located on Laurel Street in Roanoke Rapids and the 8-inch ductile iron force main will be constructed on Laurel Street, W. 4th Street and connect with an existing manhole and 12" gravity sewer that extends along Taylor Street to W. 2nd Street, at which point, the interceptor merges with parallel sewer interceptors. The requested funding assistance has not been awarded.

In April 2022 RRSd entered an agreement with Freese and Nichols, Inc. to assist RRSd by providing evaluation and develop a Preliminary Engineering Report (PER) for the rerouting of the existing force main and the associated Belmont Pump Station improvements. The PER is expected to be completed early in 2023.

3. WWTP: All repairs to minimize Inflow & Infiltration are being made to correct known system deficiencies. There has been continued staff training in regard to compliance monitoring and sampling requirements.

III. Notification:

This System Annual Performance Report will be noted on the monthly bill and available to customers via the Roanoke Rapids Sanitary District's Webpage at www.rrsd.org.

IV. Certification:

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



R. Daniele Brown, PE
Chief Executive Officer

February 1, 2023

Date