2020
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.

Steven L. Ellis, David Scott

sellis@rrsd.org dscott@rrsd.org

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, which serves an approximate population of 17,600. The sewer lines within Roanoke Rapids, Gaston and all sub-divisions, 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 sub-divisions 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, pH control, 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 accumulative 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 two 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 2020 was particularly good. There were no permit violations or monitoring and reporting violations. The District's Fat, Oil, and Grease (FOG) Program performed 29 inspections of area restaurants and food preparation facilities (FSE). Full facility inspections were limited due to the ongoing COVID-19 pandemic. There were no notices of violation. All FSE 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 twenty-seven total SSOs during the period attributed to FOG in 2020.

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 2020, the Roanoke River Wastewater Plant operated very efficiently. There were no permit violations or monitoring and reporting violations. The plant flows ranged from a daily maximum of 12.4 MGD to a minimum of 2.0 MGD. The average daily flow was 3.6 MGD. The plant treated 1,507,500,000 gallons of wastewater throughout the year, which was discharged to the Roanoke River.

During 2020, there were two plant bypasses of treatment units in which 1,536,877 gallons of Wastewater with some biological treatment were bypassed to the Roanoke River. There were five times during the year when flows into the plant were increased due to heavy rains. During these times, flow was equalized to the equalization basins to lower peak flows through the plant. Throughout 2020, 7,360,300 gallons of wastewater was equalized 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 2020. This work has led to lower peak flows for shorter durations and reduced the number of bypasses from the plant as illustrated in the following table:

Year	2016	2017	2018	2019	2020
Max Day (MGD)	17.3	8.2	9.0	11.4	12.4
Avg. Daily Flow - MGD	3.62	2.96	3.34	3.24	3.58
Estimated I & I - MGD	1.76	1.06	1.54	1.48	1.86
Annual Rainfall - in.	49.99	41.33	60.5	46	66.3

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%	95.6%	7.7mg/L	35.6mg/L	3.0mg/L
TSS	30mg/L	45mg/L	85%	92.0%	15.4mg/L	109.3mg/L	4.4mg/L
Fecal Coliform	200 Colonies	400 Colonies	N/A	N/A	35 Colonies	>240 Colonies	1 Colony
NH_3-N	N/A	N/A	N/A	N/A	<1.9mg/L	8.2mg/L	<0.5mg/L
Total-N	N/A	N/A	N/A	N/A	<15.3mg/L	32.3mg/L	4.8mg/L
Total-P	N/A	N/A	N/A	N/A	0.99mg /L	1.80mg/L	0.47mg/L

The Wastewater Treatment Plant relies on anaerobic digesters for primary sludge stabilization. In 2019 digester number 1 original sludge heater installed in 1965 for was replaced. The new heater is safer and more efficient. In 2020, the parts to update the heater for digester number 3 were installed to make both heaters alike. Furthermore, a new waste gas burner was installed that will automatically control the methane gas system pressure for the digester heaters. This will prevent the wasting and release of unburned methane gas into the atmosphere.

The wastewater treatment plant also relies heavily on electricity to operate all its treatment units. The Sanitary District entered a contract with Greggory Poole Caterpillar for the purchase and installation of a new full load generator. The new generator will be installed in early 2021 and will be complimentary to the existing full load generator to provide redundant emergency back-up power.

During 2020, the Land Application Permit was renewed to facilitate land application of stabilized biosolids. A total of 1,535.15 applicable acres is permitted; a decrease of 450.31 acres from the prior permit. There were 2,275,042 gallons, or 430.27 dry tons of biosolids applied to 327.17 acres. There were no permit violations for the land application program in 2020.

A. Permit limit violation

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

B. Monitoring and Reporting Violations

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

C. 2020 Sanitary Sewer Overflows

1. C.S.: There were 27 reportable SSO's in 2020.
    1. Manhole K-419 near Chockoyotte Creek & Smith Church Rd. 1/4/2020 200 Gal.
    2. Manhole B-46 3rd & Starke Dr. on 1/14/2020 675 Gal.
    3. Manhole B-46 3rd & Starke Dr. on 2/7/2020 5,100 Gal.
    4. Manhole B-52 3rd & Rapids St. on 2/7/2020 900 Gal.
    5. Manhole C-41 1st & Franklin St. on 2/7/2020 300 Gal.
    6. Manhole A-54 on Land St. on 2/7/2020 13,500 Gal.
    7. Manhole B-46 on 3rd & Starke Dr. 6/17/2020 8,400 Gal.
    8. Manhole MGB-10 on Gail Dr. 6/18/2020 600 Gal.
    9. Manhole A-54 on Land St. 8/4/2020 1,050 Gal.
    10. Manhole A-54 on Land St. 9/17/2020 16,200 Gal.
    11. Manhole B-46 on 3rd & Starke Dr. 9/18/2020 4,050 Gal.
    12. Manhole B-1 on Harris St. on 9/29/2020 3,300 Gal.
    13. Manhole B-46 on #rd & Starke St. 9/29/2020 3,300 Gal.
    14. Manhole B-46 on 3rd & Starke Dr. on 11/12/2020 15,750 Gal.
    15. Manhole B-52 3rd & Rapids St. on 11/12/2020 10,500 Gal.
    16. Manhole A-54 on Land St. on 11/12/2020 27,000 Gal.
    17. Manhole C-12 on 2nd & Franklin St. 9,900 Gal.
    18. Manhole C-11A on 2nd & Franklin St. 9,900 Gal.
    19. Manhole C-13B on 1st & Franklin St. 15,600 Gal.
    20. Manhole G-46 on River Rd. on 11/12/2020 46,500 Gal.
    21. Manhole C-188 in WestRock Paper on 11/12/2020 600 Gal.
    22. Manhole D-228 in WestRock Paper on 11/12/2020 9,000 Gal.
    23. Manhole C-183 in WestRock Paper on 11/12/2020 16,200 Gal.
    24. Manhole C-186 in WestRock Paper on 11/12/2020 15,750 Gal.
    25. Manhole C-184 in WestRock Paper on 11/12/2020 52,500 Gal.
    26. Manhole C-185 in WestRock Paper on 11/12/2020 63,000 Gal.
    27. Manhole J-46 on Ivey St. on 11/17/2020 5,400 Gal.

There was an estimated total of 360,575 gallons spilled in SSO's in 2020. These spills are the result of capacity exceedance due to wet weather conditions. This correlates to 18.49 spills per 100 miles of pipe.

2. WWTP: N/A

D. Bypass of Treatment Facility

1. C.S.: N/A
2. WWTP: There were two bypasses at the Wastewater Treatment Plant in 2020.

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, RRSD 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 three Sanitary Sewer Point Repairs in 2020. The locations 1008 W 2nd St, 105 Beechwood St, and 2500 W 10th St.

   District employees completed 17 total new replacement taps in 2020. All 17 were 4" service lateral replacement taps throughout the district service area.

   District employees cleaned 22.81 miles of sewer lines and CCTV'd all suspect problem areas.

   District employees utilized the District's excavator mounted flail mower in conjunction with NC Wildlife Solutions LLC to cut and clear 19.01 miles of interceptor right-of-way's and cross-country lines in 2020.

   The District contracted with Tri-State Utilities to clean and CCTV the Chockoyotte Creek Interceptor from Zoo Rd. to Roanoke Ave. Tri-State cleaned and TV'd 7,700 feet of 12" sewer main in Basin J.

   RRSD entered into *Task Authorization 3* associated with its Master Agreement with Freese and Nichols to perform Wastewater Sub-Basin 'K' Sanitary Sewer Evaluation Survey (SSES) 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 Outfall) that serves the basin. The sub-basin contains approximately 435 manholes, and approximately 100,000 feet of gravity pipe. Work includes flow monitoring; manhole inspections and gravity pipe zoom camera inspection.

   The District contracted with Freese and Nichols, Inc. to perform Sub-Basin 'A' sanitary sewer evaluation using flow meters and modeling with a total cost of $116,895.00. Additionally, 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 study is expected to be completed during 2021.

The District entered into a design services agreement with Freese and Nichols, Inc. to replace a segment of 8" main during 2021 which crosses Chockoyotte Creek in the vicinity of Smith Church Road and is known to be a significant source of inflow due to the deteriorated condition of the pipe.

2. WWTP: All repairs to minimize the Inflow & Infiltration due to heavy rains are being made to correct known system deficiencies.

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 of law, 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. Danieley Brown, PE
Chief Executive Officer

1/27/21
Date