2018
System Performance Annual 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; which encompasses 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 served by the interceptor whose 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, 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 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. 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 then removed to a holding tank to await 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 and accumulative requirements.

There are two pumping stations in the wastewater plant distributing wastewater into and through the plant. They are the Influent Pump Station and the Trickling Filter Effluent Pump Station. The Influent Pump Station has the capacity to pump 20 MGD and the Trickling Filter Effluent Pump Station 27 MGD. In conjunction with these two pump stations there 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 for process control.

II. Performance:

1. C.S: The performance of the system in 2018 was very good. There were no permit violations or monitoring and reporting violations. The District's Fat, Oil, and Grease (FOG) Program performed 46 inspections of area restaurants and food preparation facilities. There were no notices of violation, although seven notices to correct were sent to food preparation facilities in 2018. All notices to correct were addressed in a timely manner. Public education aspects of the program continued as well. There was one Sanitary Sewer Overflow (SSO) out of five total SSOs during the period attributed to FOG during 2018.

   The District contracted with USDA wildlife services for beaver removal from Chockoyotte Creek located adjacent to its interceptor. Over the course of 2018, there were 7 beavers removed along with 3 manual dams. Further during the reporting period RRSD, working with a local contractor, performed stream restoration of Chockyotte Creek; removing storm debris to restore flow to the natural run of the creek. This ongoing work improved access to the interceptor and helped minimize flooding of manholes along the easement.

2. WWTP: Over the course of 2018, 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 9.0 Million Gallons per Day(MGD) to a minimum of 1.9 MGD. The average daily flow was 3.3 MGD. The plant treated 1,220,420,000 gallons of wastewater throughout the year; which was discharged to the Roanoke River.

   During 2018, there were no plant bypasses of treatment units. There were six times during the year when flows were increased due to heavy rains. During these

times, flow was equalized to the equalization basins to lower peak flows through the plant. Throughout 2018, 1,973,352 gallons of wastewater was equalized and later returned to the plant for treatment. There has been a substantial amount of work performed to the collection system in 2018 and prior years to lower the amount of Inflow and infiltration. This work has led to lower peak flows and reduced the number of bypasses from the plant as illustrated in the following table:

Year	2014	2015	2016	2017	2018
Max Day (MGD)	15.2	11.4	17.3	8.2	9.0
Avg. Daily Flow - MGD	4.01	3.80	3.62	2.96	3.34
Estimated I & I - MGD	2.24	2.05	1.76	1.06	1.54
Annual Rainfall - in.	60.05	47.93	49.99	41.33	60.5

The following table illustrates the treatment performance of the wastewater plant and its ability to meet and exceed 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%	96.5%	6.9mg/L	22.2mg/L	2.9mg/L
TSS	30mg/L	45mg/L	85%	90.4%	14.6mg/L	78.7mg/L	5.6mg/L
Fecal Coliform	200 Colonies	400 Colonies	N/A	N/A	29 Colonies	>328 Colonies	1 Colony
NH_3-N	N/A	N/A	N/A	N/A	<2.3mg/L	8.8mg/L	<0.1mg/L
Total-N	N/A	N/A	N/A	N/A	<11.8mg/L	14.6mg/L	7.3mg/L
Total-P	N/A	N/A	N/A	N/A	0.97mg/L	2.14mg/L	0.40mg/L

There are 1985.46 acres of applicable land currently permitted through the District's Land Application Permit. During 2018 there were 3,158,474 gallons, or 630.37 dry tons of biosolids applied to 356.26 acres. There were no permit violations for the land application program in 2018.

For better solids handling in the solids storage tank, new mixers were installed in a more efficient configuration to keep the solids in suspension. This makes for more efficient removal of the solids and less cleaning and maintenance required for the storage tank. A new manway was also installed that makes personnel entry into the tank much safer and makes servicing the mixers much easier.

A. Permit limit violation
   1. C.S.: None
   2. WWTP: None

B. Monitoring and Reporting Violations
   1. C.S.: None
   2. WWTP: None

C. 2018 Sanitary Sewers Overflows (SSO)

1. C.S.: There were 5 reportable SSO's in 2018.
   1. Manhole 54 at Land St., 1200gals.
   2. Manhole 437 at Smith Church Rd., 600gals.
   3. Manhole 54 at Land St., 2700gals.
   4. Third St. and Starke Dr., 1500gals.
   5. Manhole 27 on Highway 48, 2400gals. (FOG)

   There was an estimated total of 8400 gallons spilled in SSO's in 2018. These spills are the result of capacity exceedance due to wet weather conditions and one blockage attributed to FOG. This correlates to 3.42 spills per 100 miles of pipe down from a 5-year high in 2014 of 15.07 spills 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 2018.

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, Creek Restoration measures, 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 replaced its CCTV van with a new Raush Mobile Pro C135 camera system in 2018.

   District employees cleaned 21.65 miles of sewer lines and CCTV'd all suspect problem areas.

   District employees utilized the District's excavator mounted flail mower to cut and clear 8.56 miles of interceptor rights-of-way and cross-country lines. NC Wildlife Solutions, LLC also cut and cleared 5 additional miles of rights-of-way.

RRSD contracted Layne Inliner for pipeline rehabilitation work to the lower Roanoke Outfall and Basin 'A' including lining and point repair with old services being replaced. 6,573 feet of 30-inch interceptor and 1,547 feet of 8-inch sewer line have been lined and two point repairs have been made at the intersection of Bowling Rd. and Cleveland St. and at 1020 Faye St. Layne Inliner's subcontractor, A & K, also replaced fifty 4-inch sewer services in sewer Basin 'A' as a requirement of the Layne Inliner Contract.

Atlantic Coast Contractors rehabbed via pipe burst 430 feet of 10-inch sewer from near the intersection of Virginia Ave and Julian R. Allsbrook Hwy. to Elm St.; MH-K109a to MH-K153, a segment of the Marshal Street outfall, thereby eliminating deteriorated pipe conditions and gushing infiltration from an adjacent stream.

RRSD has also installed a permanent natural gas fueled generator at the Rochelle Court lift station for emergency backup power. Prior to this, the District had to use its mobile generator to power the station.

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 entering the collection system. Sub-Basin 'K' contains mostly 8" and 10" gravity collection lines with a 30" main interceptor (Chockoyotte Outfall) that runs through the basin. The sub-basin contains approximately 435 manholes, and approximately 100,000 feet of gravity 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 available to customers via the RRSD's Webpage at www.rrsd.org and its URL noted on the customer bill for viewing: www.rrsd.org/annualwastewaterreport.pdf.

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

R. Danieley Brown, PE
Chief Executive Officer

2/4/19
Date