Raleigh Water

Annual Wastewater Collection And Resource Recovery Report

2023-2024

Protecting You And The Environment Everyday

Wastewater systems have evolved considerably from early systems in the 1800's to the modern and complex systems we have today. Although the purpose has always been to collect human waste and transport it away from urban areas to protect human health, early systems merely transported the wastewater to a nearby stream, where it was discharged. Today, wastewater systems are not only expected to protect public health, but to also protect the environment as well. In 1972, the U.S. Congress passed landmark legislation entitled the "Clean Water Act" which ensured environmental protection as a performance benchmark for all wastewater systems. Long before the passage of this act, and every day since, the protection of public health and the environment have been the operating standard of the Raleigh Water's wastewater system.

This report provides information about the performance of the three (3) wastewater treatment plants: Neuse River Resource Recovery Facility (NRRRF), Smith Creek Resource Recovery Facility (SCRRF) and Little Creek Resource Recovery Facility (LCRRF) in addition to the performance of the wastewater collection system for the period of July 1, 2023 through June 30, 2024. To learn more about the wastewater collection system or the treatment facilities, please contact Raleigh Water at 919-996-3245 or visit our web site at: www.raleighnc.gov/water

Wastewater Collection System

Raleigh Water provides wastewater collection and treatment services for areas within the City's corporate limits and many areas in the City's Extraterritorial Jurisdictional area (ETJ). Raleigh Water also provides wastewater collection and treatment services for Garner, Rolesville, Wake Forest, Knightdale, Wendell and Zebulon. Temporary contracts are also in place to treat specific amounts of wastewater from the Towns of Clayton, Middlesex and Johnston County.

The wastewater collection system functions primarily by gravity flow and it consists of approximately 2,644 miles of pipeline ranging in diameter from six inches to eight feet. For this reporting period an average of 51 million gallons per day (MGD) of wastewater traveled through the sanitary sewer collection system to our three Resource Recovery Facilities.

The sewer pipes of the collection system are connected by a series of sewer manholes needed for maintenance and access. Manholes in the street are level with the pavement, while manholes near streams are built higher to minimize impacts during flood events. Some pipes, known as sewer aerials, are exposed above the ground often crossing streams or other low lying areas. Ventilation is necessary at most manholes and is provided through vent holes in the lids or separate vent stacks. Although the collection system functions primarily by gravity, 130 pump stations are necessary to keep the wastewater flowing to the Resource Recovery Facilities. Raleigh Water also uses odor control systems on many large volume lift stations and manhole vents near public greenways to improve air quality in these areas.

In order to continually improve our sewer services, the Sewer Maintenance Division fully implemented an ISO 14001:2015 Environmental Management System (EMS). The Sewer Maintenance Division's EMS is a commitment to prevent pollution through continual improvements in environmental performance and compliance with all regulatory requirements, by identifying aspects of activities having significant environmental impacts, setting performance objectives and targets and establishing standards and training for staff, including metrics for measuring performance. These processes allow the Sewer Maintenance Division to operate the collection system in a sustainable manner while contributing to the economic, social and environmental vitality of the communities it serves. Some of the highlights of the EMS in the 2023-2024 reporting period include:

Sanitary Sewer Spills per 100 Miles

(Southeastern US Average = 7.0)

1.30

Miles of Easements Inspected

1094

Miles of Sewers Cleaned & Inspected (36% of System)

442

Sanitary Sewer Overflows (SSOs)

Sanitary sewer overflows (SSOs) occur when blockages in the collection system cause sewage to come out of the sewer collection system, which is usually at manhole locations. During the period from July 1, 2023 through June 30, 2024, the collection system experienced 34 SSOs that were 1,000 gallons or greater or that reached surface waters. Of the 34 SSO's, 16 were avoidable, which means they were the result of preventable issues. Raleigh Water continues to pursue its goal of reducing the number of SSO's by investing millions of dollars to replace sewer lines in poor condition, employing a fleet of 17 sewer flusher trucks to clear blockages and proactively maintaining pumping equipment to reduce the chance of failure. Blockages can be caused by items as rags, paper towels, "flushable" wipes, feminine hygiene products, etc., all of which are illegal to discharge into the sanitary sewer system. Cooking grease is also not appropriate to pour down the drain as it quickly congeals underground and creates blockages. Raleigh Water has an ongoing education program to educate residents and business owners regarding the need to keep grease and other inappropriate materials out of the sewer system. The following represents the SSO data from the reporting period:

Incident Date	Address	SSO VOLUME (GAL):	SSO ROOT CAUSE:
2023-07-03 10:50 AM	3800 GREYWOOD DR, RALEIGH, NC, 27604	57	Wipes/Paper Towels
2023-07-31 08:05 PM	7900 TWIN OAK CT, RALEIGH, NC, 27615	940	Grease
2023-08-17 12:45 AM	1115 TEMPLE ST, RALEIGH, NC, 27609	3600	Roots
2023-08-22 09:33 PM	2609 SPRING FOREST RD, RALEIGH, 27616	1750	Roots
2023-08-25 10:19 AM	701 VAN BUREN RD, RALEIGH, NC, 27604	1500	Asset Failure
2023-08-29 08:07 AM	5044 TRYON RD, RALEIGH, NC, 27606	1900	Asset Failure
2023-10-06 12:24 PM	737 HUNTING RIDGE RD, RALEIGH, NC, 27615	690	Asset Failure
2023-10-12 01:14 PM	1900 MAIN CAMPUS DR. RALEIGH	1380	Asset Failure
2023-10-24 07:06 AM	1903 ALEXANDER RD, RALEIGH, NC, 27608	1500	Asset Failure
2023-11-06 08:41 AM	2245 GARNER RD, RALEIGH, NC, 27610	560	Grease
2023-11-23 01:57 PM	1117 CHATHAM LN RALEIGH NC	990	Grease
2023-12-03 10:20 AM	3731 CHARLESTON PARK DR, RALEIGH, NC, 27604	4680	Grease
2023-12-08 10:32 AM	908 CHERRY POND CT.WAKE FOREST, NC, 27587	2530	Grease
2023-12-13 12:00 PM	8417 SAWYER DR, RALEIGH, NC, 27613	1335	Roots
2023-12-14 12:00 PM	700 GREEN RIDGE DR, RALEIGH, NC, 27609	190	Roots
2023-12-18 01:37 PM	5832 WHITEBUD DR, RALEIGH, NC, 27609	2040	Wipes/Paper Towels
2023-12-18 02:01 PM	1901 CLARK AVE, RALEIGH, NC, 27605	650	Grease
2023-12-30 10:23 PM	1500 BANBURY RD, RALEIGH, NC, 27607	1100	Roots
2024-01-02 12:00 PM	6209 RIVER JASMINE LN, RALEIGH	143	Asset Failure
2024-01-10 02:18 PM	4905 NORTH HILLS DR, RALEIGH, NC, 27609	1450	Roots
2024-01-14 12:25 AM	4801 BLUE BIRD CT, RALEIGH, NC, 27606	252	Roots
2024-01-19 10:57 AM	7301 GRIST MILL RD, RALEIGH, NC, 27615	1500	Wipes/Paper Towels
2024-02-03 06:00 PM	5536 NEUSE VIEW DR	1500	Vandalism
2024-02-19 06:33 AM	1527 TRYON RD UNIT 101	475	Roots
2024-03-01 08:17 AM	900 LORIMER RD, RALEIGH, NC, 27606	750	Contractor Damage
2024-03-08 08:16 AM	1401 WENDELL BLVD, WENDELL, NC, 27591	1440	Grease
2024-03-08 08:18 AM	7049 JEFFREYS CREEK LN, RALEIGH, NC, 27616	6059	Wipes/Paper Towels
2024-04-17 12:03 PM	CHAPEL HILL RD, RALEIGH, NC, 27607	24800	Roots
2024-05-03 03:30 PM	10320 GLOBE RD, MORRISVILLE, NC, 27560	5498	Grease
2024-05-09 07:02 AM	1025 WILTS DAIRY PT, WAKE FOREST, NC, 27587	930	Contractor Damage
2024-05-17 08:00 AM	7100 GREAT LAUREL DR.	5000	Asset Failure
2024-05-20 09:32 AM	7401 SANDY CREEK DR, RALEIGH, NC, 27615	2600	Roots
2024-05-22 10:11 PM	8421 HOBHOUSE CIR, RALEIGH, NC, 27615	4700	Grease
2024-05-29 05:13 PM	6509 RAINBOW CT, RALEIGH, NC, 27612	90	Roots

Resource Recovery

Historically referred to a “wastewater treatment plants”, we now call our plants “Resource Recover Facilities” to recognize the beneficial reuse products that are produced from the treatment process.

The Neuse River Resource Recovery Facility (NRRRF), Smith Creek Resource Recovery Facility (SCRRF), and the Little Creek Resource Recovery Facility (LCRRF) process and treat wastewater for approximately **630,000** residents every day.

At our resource recovery facilities, wastewater is treated both physically and biologically. As the wastewater enters the plant it goes through the area called preliminary treatment which is a physical process to remove debris, sand, and other inorganics that can’t be biologically treated. The first stage of treatment is referred to as primary treatment and is a physical process to remove the settleable and floatable organics. The second stage of treatment is a biological process referred to as “activated sludge” in which microorganisms consume organic matter (suspended and dissolved) and convert ammonia nitrogen to nitrogen gas through the process of nitrification/denitrification. The microorganisms are separated from the treated water by secondary clarification and returned to the biological process. In the final stage, the clarified water is filtered by sand filters and disinfected by UV disinfection before it is metered and returned to the Neuse River. Ultimately, the goal for all of our resource recovery facilities it to produce outstanding treated water that protects downstream communities and the aquatic environment of the Neuse River.

The table below represents our permit limits and how our facilities performed during the review period:

Paramater	Permit Limit	NRRRF	LCRRF	SCRRF
Ammonia-Nitrogen (mg/L)	2.00/1.00/1.00	0.08	0.04	0.07
Fecal Coliform (col/100mls)	200	1.1	1.4	1.1
Biological Oxygen Demand (mg/l)	5.00	0.00	0.00	1.10
Total Suspended Solids (mg/l)	30.00	0.00	0.00	1.90
Total Phosphorous (mg/l)	2.00/1.00/2.00	1.62	0.30	0.30
Total Nitrogen(annual pounds)		Permit Limit 713,373 pounds	Permit Limit 26,660 pounds	Permit Limit 70,814 pounds
		Actual Pounds 308054.22	Actual Pounds 4938.17	Actual Pounds 40028
Average Daily Flow (MGD)	75.0/2.20/3.0	47.327	0.904	2.465

Neuse River Resource Recovery Facility (NRRRF)

The NRRRF was designed to serve the City of Raleigh and surrounding communities. The facility is located in Wake County, approximately 12 miles southeast of Raleigh, near the Johnston County line and currently can treat up to **75** million gallons per day (MGD).

The NRRRF did not experience any permit (NC0029033) performance violations during the reporting period, while treating approximately **47.3** million gallons of wastewater per day. Through improvements and continued excellent operation of the facility, the NRRRF has had **21 consecutive years** of 100% compliance, resulting in the facility's Platinum Award issued by the National Association of Clean Water Agencies. The treatment process is being converted from aerobic digestion to anaerobic digestion, a conversion that will provide a renewable fuel source for approximately **70** natural gas-powered vehicles in the City's bus fleet and reduce overall biosolids volume by approximately **50%**. The reduction in biosolids volume will significantly reduce the City's carbon footprint through a reduction of hauling and handling services.

Smith Creek Resource Recovery Facility (SCRRF)

The SCRRF was designed to serve the Town of Wake Forest and was transferred to the City of Raleigh on July 1, 2005. The plant is in Wake Forest, approximately 14 miles north of Raleigh and operates with a capacity of **3.0 MGD** with plans to increase capacity to **4.0 MGD**. The SCRRF did not experience any NPDES permit (NC0030759) performance violations during the past fiscal year, while treating an average of **2.5 MGD** of wastewater. As a result of the SCWWTP maintaining 100% compliance, it received the Platinum Award, which is issued by NACWA for **19** consecutive years of such compliance.

Little Creek Resource Recovery Facility (LCRRF)

The LCRRF was designed to serve the Town of Zebulon and was transferred to the City of Raleigh on October 1, 2006. The plant is in Zebulon, approximately 24 miles east of Raleigh and operates with a capacity of **2.20 MGD**. The LCRRF did not experience any NPDES permit (NC0079316) violations during the past fiscal year while treating an average of **0.90 MGD** of wastewater. The LCRRF has earned a NACWA Platinum Award with no discharge violations occurring during the past **9** years. The facility has been in 100% compliance 15 out of the past 16 years.

Reuse Water Program

Reuse or reclaimed water [used interchangeably] is defined in North Carolina as effluent from a wastewater treatment plant that is treated to an exceptionally high level. Traditionally, reuse or reclaimed water has been utilized primarily to replace potable water in applications where non-potable water is sufficient such as golf course irrigation and industrial cooling towers. Following the severe droughts of 2002, 2005 and 2007, the construction of a reuse water system was an important part of the City's overall strategy to reduce potable water demand and improve drought resilience. This benefit remains a critical element of the City's future drinking water supply plans, as there is also potential to use direct potable reuse water at the Dempsey E. Benton Water Treatment Plant to augment current drinking water resources.

Reuse Water Tank on Sunnybrook Road

However, due to a Federally promulgated nutrient management strategy implemented in 2003 for the Neuse River basin, reuse water has increasingly become a highly valuable tool to help municipal wastewater treatment facilities comply with these rules. The Neuse River nutrient management strategy strictly limits nutrient (total nitrogen) discharges from wastewater point sources such as the Neuse River Resource Recovery Facility. The City of Raleigh was allotted a total nitrogen allocation, or total maximum discharge limit (TMDL), which translates to a total nitrogen poundage limit on an annual basis. In response, the Raleigh Water upgraded its treatment facilities to comply with the requirements and has been a national leader in nitrogen removal performance. The ongoing expansion of the reuse system is also a crucial part of this effort, as it diverts treated wastewater and the associated nitrogen poundage from being discharged to the Neuse River.

Reuse Distribution System

The NRRRF uses reuse water for irrigation of the agricultural land that serves the facility. From July 1, 2022 to June 30, 2023, approximately **26 million gallons** of reuse water was used to irrigate cropland. The reuse system has bulk reuse water loading stations at the Neuse River Resource Recovery Facility and Little Creek Resource Recovery Facility . “Bulk” distribution of reuse water allows certified landscape contractors or citizens to obtain reclaimed water at no cost provided they will transport and responsibly use the reclaimed water for approved purposes. The location of the bulk reuse facilities are as follows:

Neuse River RRF - 8500 Battle Bridge Road, Raleigh, NC

Little Creek RRF HWY 39 (behind the Mudcats Stadium), Zebulon, NC

The Raleigh Water service area system also includes a reuse pipeline distribution system and an elevated storage tank. Reuse water is provided to North Carolina State University for use at their main campus for non-potable demands. Raleigh Water also operates the Zebulon service area reclaimed water distribution system, which takes treated effluent from the Little Creek Resource Recovery Facility and provides the product to six permitted customers through **21,400 linear feet** of distribution pipe and a **250,000 gallon** elevated storage tank. The following chart shows the total amount of reuse water distributed by the various reuse systems for the reporting period of July 1, 2023 through June 30, 2024.

NRRRF Bulk Re-use Flow	LCRRF Reuse Distribution Flow (includes bulk)	NRRRF Reuse Irrigation Flow	NRRRF Reuse Distribution (off-site)
1,315,989 gal	57,617,075 gal	23,204,600 gal	217,991,250 gal

Biosolids Program

Sludge is a by-product of all wastewater treatment plants. Biosolids are defined as treated, stabilized sludge and are produced at two of the City's wastewater treatment plants. The City beneficially reuses these biosolids by processing them into products that can be utilized by local farmers, landscapers and homeowners on both public and privately owned land. Close monitoring of these biosolids product constituents, environmental conditions and the utilization of extensive pretreatment methodologies, allow Raleigh Water to ensure that these products are safe for their intended use.

Putting Biosolids to Work

The sludge from the Smith Creek Resource Recovery Facility is discharged into the city's sewer collection system and is recovered and processed into biosolids at the Neuse River Resource Recovery Facility. The Little Creek Resource Recovery Facility solids, and a portion of the solids produced at the Neuse River facility, are processed into a Class B biosolids product. Once the Bioenergy Project is complete, we will transition entirely to a Class A Biosolids product and this will be beneficially reused on the NRRRF's farm and by local farmers as a fertilizer on agricultural crops. The nutrients in the biosolids are taken up by the crops, which are then harvested and sold to agricultural markets. Further information concerning the bio-solids program can be obtained by calling 919-996-3700 or by email at Biosolids@raleighnc.gov.

Environmental Management Systems

An Environmental Management System integrates environmental considerations into day-to-day decision making and operations. It is also used for improving organizational performance over time. All of our Resource Recovery Facilities are 14001:2015 certified facilities. The Environmental Management System is re-verified by an independent third-party auditor. Reverification occurs every three years with surveillance audits of the program conducted annually. This re-verification certifies the Neuse River Resource Recovery Facility has an effective emergency management system that:

- Supports continual improvement of environmental performance
- Meets regulatory compliance obligations
- Uses good management practices
- Creates meaningful opportunities for public participation.

Internal and Interim Audits

In February of 2014, the NRRRF received ISO 14001:2004 certification for its wastewater EMS; NRRRF was recertified in 2017 to the upgraded ISO 14001:2015 standard. Results of the third-party audits are available by contacting Emily Fentress, Utilities Coordinator at:

Emily.Fentress@raleighnc.gov or calling 919-996-3680. Additional information may also be found on our website at: https://www.raleighnc.gov/environment/content/PubUtilAdmin/Articles/Biosolids.html

Regulatory Compliance:

- 100% regulatory compliance by NRRRF, LCRRF, & SCRRF
- All of the City's biosolids contractors achieved 100% compliance with City contract requirements
- Contractor activities include hauling, spreading, and composting. Routine observations are performed by City staff to ensure contractor adherence to applicable regulations.
- All biosolids produced and distributed met all EPA 40 CFR 503 compliance requirements
- NRRRF, SCRRF, and LCRRF received Platinum awards from the National Associations of Clean Water Agencies (NACWA) for 100% regulatory NPDES compliance.
- Received continuation of ISO 14001 EMS

FY24 Objectives:

- Promote efficient and safe management of materials and equipment used in Utility operations
- Institute environmental and social justice practices that minimize the Utility's impact on the environment, energy consumption, and carbon footprint
- Protect and maintain existing assets and enhance operations necessary to ensure system reliability

ISO 14001 EMS

How You Can Help!

Raleigh Water is committed to protecting the quality of the Neuse River and the environment. The water returned to the Neuse River from our Resource Recovery Facilities is of higher quality water by most parameters than the water in the river itself.

While grease continues to be a significant cause of sanitary sewer overflows in the sewer collection system, you can help Raleigh Water reduce the number of overflows by following these simple steps:

- ***Collect grease, fats and oils from cooking in a container and dispose of it in the garbage instead of pouring it down the drain.***

- ***Place a wastebasket in each bathroom for the disposal of solid waste, disposable diapers, baby wipes, disinfecting wipes, condoms and personal hygiene products. These products DO NOT belong in the sewer system.***

Wastewater collection systems are designed to handle *only three things: used water, human body waste and toilet paper. It is very important to keep all foreign materials, such as grease and other household debris from entering the system, as these can cause blockages. Most sewer backups occur between the house and the City's sewer main.* ***The property owner is responsible for correcting this problem.***

Many disinfecting wipes and baby wipes are touted as disposable, and some are even labeled as flushable, but both contribute to sanitary sewer overflows (SSOs) throughout the sanitary sewer system. Their cloth-like material doesn't break down in the sanitary sewer system like toilet paper but rather blocks sewer lines and clogs pumps throughout the system, which increases maintenance and repair costs. Please help the city reduce costs and protect the environment by disposing of these items in the trash rather than in the sewer system.

Managing unused or expired medications is a safety and an environmental concern. Proper disposal will prevent medications from entering soil and groundwater. Where available, take unwanted or expired medications to a local collection site. The following link includes medication drop locations: Drop Box Locations

Report Sanitary Sewer Overflows (SSOs) Water Main Breaks

To report a sanitary sewer backup, overflow or a water main break please call Raleigh Water at **919-996-3245** (24/7). Thanks for your help!

$50 SSO Reward Program

Raleigh Water has a Sanitary Sewer Overflow (SSO) Reporting Reward Program. In this program, citizens who are the first to notify the Raleigh Water of an SSO that they observe are rewarded with a **$50** check. By promptly reporting the overflow, Raleigh Water staff are able to minimize the impact of the overflow to the environment.

Illegal Dumping Reward Program - $5,000 Reward

Raleigh Water's service area currently has approximately 2,000 Food Service Establishments (FSEs) that generate grease and that are required to install grease interceptors. There is concern that some of this wastewater from grease interceptors will be illegally dumped into the sanitary sewer system. Grease and other materials illegally dumped can lead to sanitary sewer overflows (SSOs), which are a public health, environmental and regulatory concern. Reporting a problem or an illegal dumping incident may be rewarded with a **$5,000** check if you are the first to notify Raleigh Water of an illegal dumping incident. To report anything suspicious or a suspected illegal dumping incident, contact the City of Raleigh Public Utilities Department at 919-996-3245 (24/7).

Property Manager Grease Management Kit

If you reside in an apartment or condo community, make sure your property manager is aware of our Grease Management Kit, which is available to any multi-family community in our service area. The kit is free of charge and includes grease pan scrapers, universal can lids (for grease storage), brochures and informational thumb drives that can be distributed to residents. Keeping grease out of the drain not only can help prevent SSO's in the sewer system, but can also help keep facility plumbing clear and avoid expensive plumbing bills. More information is available at our website (search "grease") or call 919-996-2334.