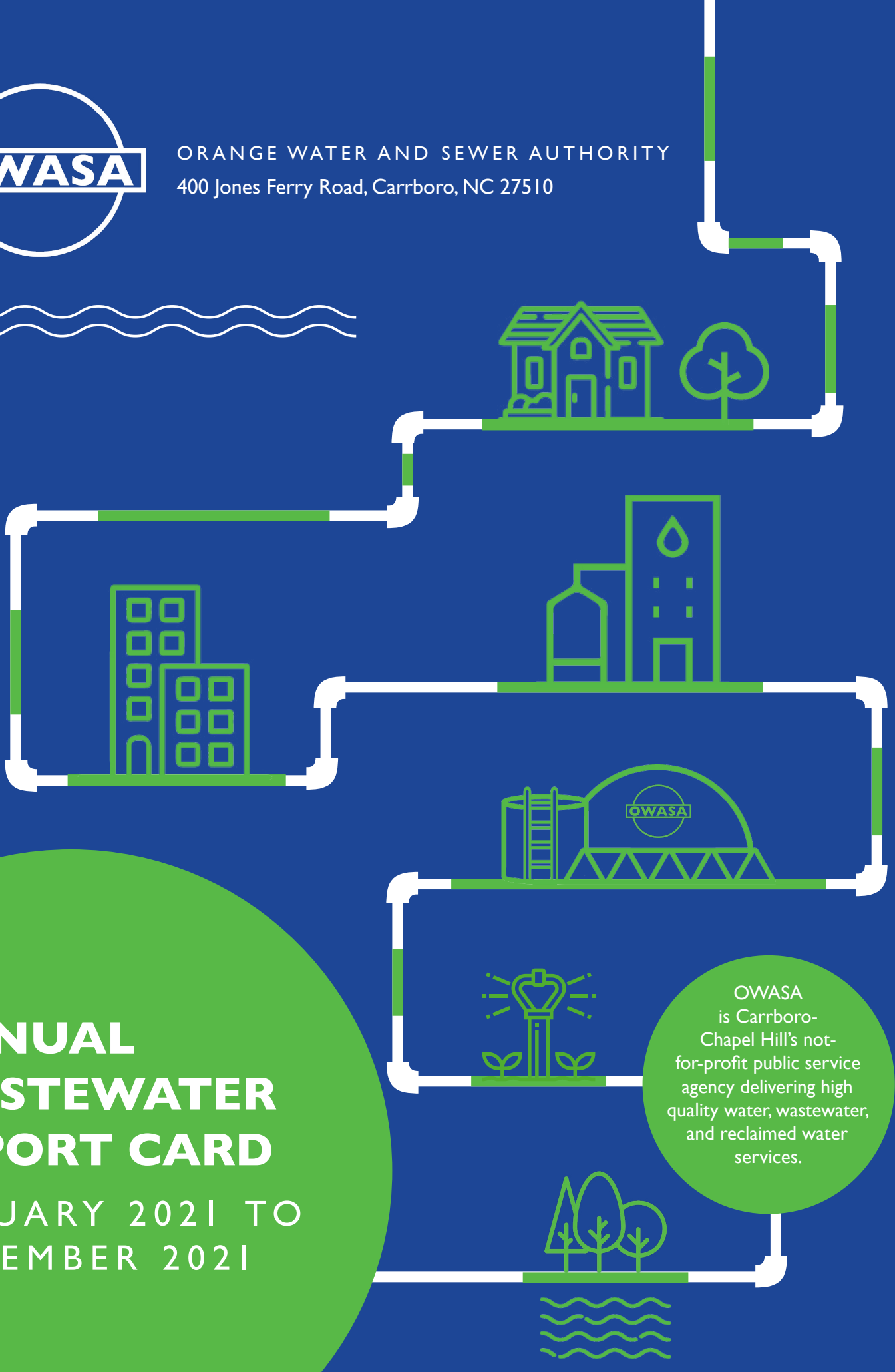
ORANGE WATER AND SEWER AUTHORITY
400 Jones Ferry Road, Carrboro, NC 27510



ANNUAL WASTEWATER REPORT CARD

JANUARY 2021 TO DECEMBER 2021

OWASA is Carrboro-Chapel Hill's not-for-profit public service agency delivering high quality water, wastewater, and reclaimed water services.

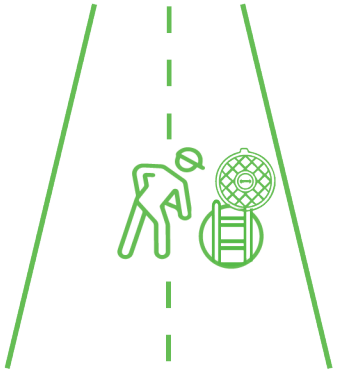
WHEN YOU FLUSH THE TOILET OR SEND WATER DOWN THE DRAIN, WHERE DOES IT ALL GO?

OWASA's wastewater system treats on average 7.5 million gallons per day; that's about 3 billion gallons per year. We work 24/7 to collect, treat and clean the community's wastewater, and recycle (or reclaim) it where we can. What we can't reclaim, we return to Morgan Creek. The water that we return to the Creek, which eventually flows into Jordan Lake, has gone through a comprehensive treatment process so it is safe for the environment and for communities to access downstream.

350 MILES OF WASTEWATER PIPES UNDER CARRBORO-CHAPEL HILL:
INVISIBLE YET ESSENTIAL

Back in the old days, when people collected their water with pails and tossed their waste out the door, life was messy! With the advent of modern plumbing, chores and sanitation became more convenient and public health improved significantly.

Today, OWASA maintains about 350 miles of underground wastewater pipes, connecting to every home, school and business across Carrboro and Chapel Hill. If you look down when you walk along the street, what do you see? Not a wastewater pipe, but probably a manhole. For maintenance or emergency, OWASA can access this critical piping network anywhere in the community through its nearly 11,000 manholes.



The wastewater system is also designed to harness the power of gravity. Most pipes originate at elevated locations and descend as they make their way to OWASA's Wastewater Treatment Plant in Chapel Hill.

When you send water down the sink at home, or flush the toilet at work, the waste travels through these pipes powered by the natural force of gravity. At locations where gravity has run its course, 21 pump stations help keep the wastewater flowing as it makes its way to the treatment plant.

BIOLOGY PLUS TECHNOLOGY:
THE WASTEWATER TREATMENT PROCESS

Wastewater treatment is the biological process of removing pollutants from the water so it can be returned safely to the environment. OWASA's treatment system mimics nature's processes and uses technology to accelerate it. The system starts with the collection of wastewater through pipes, pumps to help move it, settling tanks to take out solids, and treatment tanks where naturally occurring bacteria and other microorganisms consume pollutants.

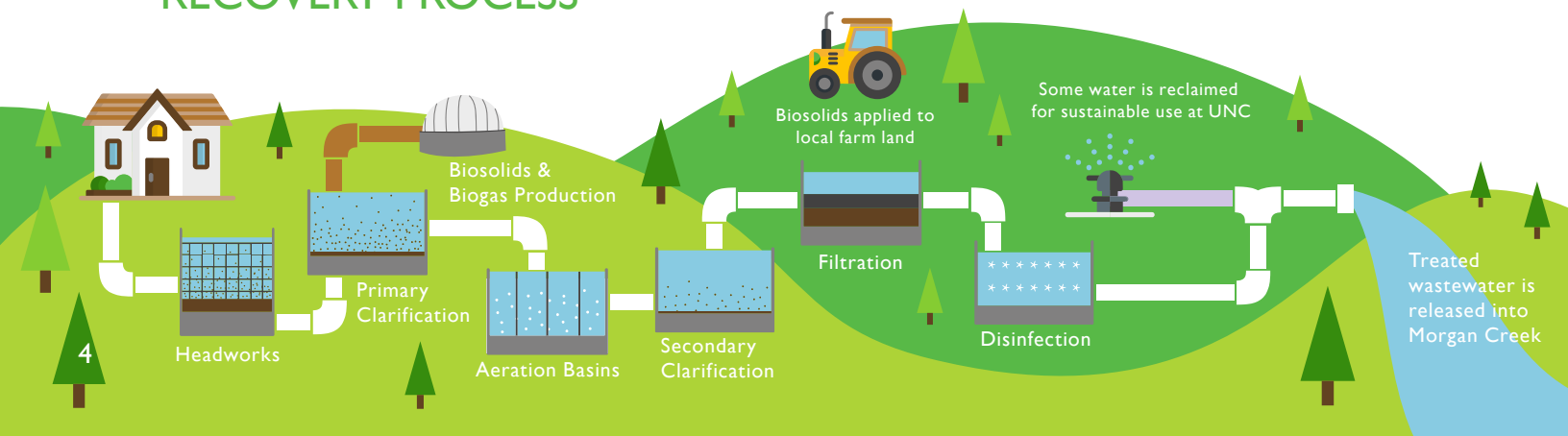
Our Mason Farm Wastewater Treatment Plant is located in the southern part of Chapel Hill. We do our best to be a good neighbor and maintain a comprehensive odor elimination program throughout our treatment process. This includes ensuring our storage basins are covered tight at all times, and treating air being exhausted from our tanks with carbon filters.

While wastewater management is a public service that is somewhat invisible, OWASA's team members that make it happen are so essential! Our wastewater team ranges from operators who manage the treatment processes to our maintenance crews who work every day across the community, maintaining the pumping systems and pipes 24/7. They keep the 350 miles of wastewater pipes coursing underground clear of blockages and test for cracks in pipes to mitigate potential sewer overflows.

Meanwhile, scientists in OWASA's wastewater lab test our effluent – the treated wastewater that we recycle into clean water for return to Morgan Creek. One of the purposes of these tests is to ensure that the leftover nutrients from the wastewater, such as phosphorus and nitrogen levels that re-enter the creek, are below regulatory limits. This is important because nutrient levels that are too high can cause an increase in algal blooms, which have the potential to affect water quality.

"The water that people use for personal hygiene, cleaning, in commercial buildings and restaurants, it all originates from local water sources and is returned to OWASA as wastewater," said Monica Dodson, OWASA's Wastewater Treatment and Biosolids Recycling Manager. "At our plant, the wastewater undergoes thorough clarification, filtration and disinfection processes. Along the way, we reclaim some of it for sustainable use for non-drinking purposes. This reduces our use of water, energy and material resources, a triple win for the planet."

OWASA RESOURCE RECOVERY PROCESS



IT TAKES A TEAM TO SUCCESSFULLY OPERATE THE WASTEWATER TREATMENT PLANT

PARTNERSHIP AWARD

The Partnership for Clean Water (PCW), which is part of the American Water Works Association, recently awarded OWASA's Mason Farm Wastewater Treatment Plant (WWTP) the Partnership for Clean Water's Directors Award. This honor places the treatment plant among a top group of wastewater utilities in committing to protecting public health, the environment, and ratepayer funds by optimizing wastewater system operations.

The PCW is a voluntary program that recognizes treatment plants for working toward operational excellence and doing so in an energy-efficient manner.

"The Directors Award marks a significant milestone in our pursuit of operational excellence at the Mason Farm Wastewater Treatment Plant," OWASA Wastewater Treatment Plant and Biosolids Recycling Manager Monica Dodson said of the recognition. "It is awarded for the successful completion (as judged by a panel of our peers) of a comprehensive and rigorous self-assessment of our entire plant operations and performance."

To achieve this honor, OWASA submitted a thorough self-assessment of the entire WWTP operations and performance that was reviewed by utility peers through the Partnership. The assessment identified nearly 100 action items to improve overall operational performance. Eight of these items have already been completed with more than 40 others underway prior to being notified of the Directors Award. The self-assessment process took more than a year to complete and involved Team members from across the OWASA organization. OWASA will be recognized for this achievement at the national American Water Works Association conference in 2022.

OWASA OPERATORS KEY TO WASTEWATER TREATMENT

Treating the community's wastewater is a job that requires time and attention 24 hours a day, 7 days a week, 365 days a year, and OWASA's team of Wastewater Treatment Plant (WWTP) operators is responsible for making sure the plant is running effectively.

When fully staffed, OWASA employs eight full-time WWTP operators, according to Operations Supervisor Wil Lawson, who is also able to step in as an operator if needed. Currently, OWASA's operator team includes seasoned members with over 35 years of experience to folks entering the field who are new to the role and eagerly learning from their experienced teammates and bringing in fresh new perspectives. There are four levels of certifications that the WWTP operators strive to achieve through training.

The wastewater treatment and biosolids recycling process is a complicated process that involves a lot of biological and physically engineered systems. The main role of the operator is to monitor these processes on an individual and collective basis and troubleshoot problems when they arise.

The operators are always on-site during any emergency situations brought on by weather or other circumstances. "Our Team of dedicated operators is ready and prepared to respond to any situation to maintain successful plant operations," Lawson said of the group.

This team of operators serves a crucial role in making sure that OWASA is properly treating the community's wastewater to ensure we are protecting our downstream environment and producing high-quality biosolids for beneficial use.

RESOURCE RECOVERY PROCESS

A by-product of the anaerobic digestion process is an organic material containing nutrients called biosolids. During the anaerobic process, the extreme heat applied in the digester to aid the breakdown of the organics also destroys bacteria and eliminates odors. The nutrients in these biosolids are recycled and reused as fertilizer or amendments to improve soil conditions.

We land apply biosolids to lands that we own or through partnerships with farmers in Orange, Chatham and Alamance Counties, in accordance with State permits and regulations. The maximum amount of biosolids that can be applied to a field is determined by the biosolids' nitrogen content, and is limited to the nitrogen requirements of each particular crop. Our biosolids are designated as Class A – Exceptional Quality by the Environmental Protection Agency (EPA).

OWASA closely monitors its biosolids application rates which are well below regulatory levels. In accordance with Federal regulations, we test our biosolids quality throughout the year. We also measure the trace metals, solids, bacteria, and nutrients in our biosolids.

Last year, we recycled more than 75% of our biosolids through land application, meeting a lofty organizational goal set by the OWASA Board of Directors. As reported in the table below, the level of substances in our biosolids met or surpassed all State and Federal regulations. What we don't land apply we compost into a soil additive in partnership with a regional composter.

Biosolids Quality Annual Data Summary (Permit #s WQ0021828/WQ0001169)		
Substance	EPA Limit for Exceptional Quality Biosolids	OWASA Calendar Year Results
Fecal Coliform Bacteria	1,000 cfu	112 cfu (maximum)
Mercury	17 ppm	0.13 ppm
Cadmium	39 ppm	0.66 ppm
Arsenic	41 ppm	0.39 ppm
Lead	300 ppm	8.88 ppm
Copper	1,500 ppm	205 ppm
Zinc	2,800 ppm	602 ppm
Nickel	420 ppm	9.49 ppm
Molybdenum	n/a	2.28 ppm
Selenium	36 ppm	0.67 ppm

ppm = part per million. One part per million is equal to one penny in $10,000.
CFU = colony forming units

BACK TO MORGAN CREEK
AND BEYOND

Water that is not reclaimed throughout this comprehensive treatment process is returned to Morgan Creek, safe for the environment and communities, including wildlife along the waterway's path and water treatment plants and the people they serve downstream. The water eventually makes its way to the Atlantic Ocean, traversing Jordan Lake and Cape Fear River along the journey. It's all part of the world's water system, interconnected, interdependent and shared by everyone, making it all the more important for us to transform our community's wastewater into clean water, before we return it back to the environment.

Last year, as in previous years, OWASA met or surpassed all Federal and State standards for the quality of our treated wastewater. We ensure that leftover nutrients from wastewater, such as nitrogen levels, are below regulatory limits to protect water quality downstream of OWASA and our local environment. In our effluent (the treated water we return to Morgan Creek) phosphorus and nitrogen levels test consistently below the regulatory limit.

Wastewater Effluent Quality Annual Data Summary (Permit # NC0025241)			
Water Quality Measure	Regulatory Limit	OWASA Calendar Year Results	Notes
Phosphorus	Maximum of 10,188 lbs for the year	982 lbs	Full compliance; 90% below the limit
Nitrogen	Maximum of 134,375 lbs for the year	101,500 lbs	Full compliance; 24% below the limit

OWASA's permit limit for Nitrogen was lowered in 2021. We've been preparing for this change, which furthers our environmental stewardship.

WASTEWATER MONITORING

OWASA's Team at the Wastewater Treatment Plant continuously monitors the wastewater that is being treated at the plant and discharged into Morgan Creek. This is a vital part of the treatment process to know as much as we can about the water that we are discharging back into the environment that will travel to Jordan Lake that serves as the drinking water supply for many North Carolinians.

COVID-19 has added a layer to that wastewater monitoring as well. People infected with the virus can shed detectable virus particles in their feces, even if they don't have symptoms. To help monitor the prevalence of COVID-19 in our community, OWASA worked with UNC – Chapel Hill and the North Carolina Department of Health and Human Services throughout 2021 on regular wastewater sampling for COVID-19. This testing has helped inform decisions at the local and state level as we have progressed throughout the pandemic.

Additionally, in 2021, OWASA launched a new tool on our website to better display the results of OWASA's ongoing, proactive monitoring of our community's wastewater for the compounds known as Per- and Polyfluoroalkyl Substances (PFAS). These compounds are in many household items and are under review by state and federal officials for their impact on the health of the population. Although not required to do so, OWASA monitors our wastewater as it reaches the Wastewater Treatment Plant and as it is discharged into Morgan Creek to better understand the occurrence of these compounds in the community's wastewater and throughout our treatment process.

OWASA is proud to partner with research efforts to help better understand many aspects of our environment.

visit OWASA.org to explore the PFAS Monitoring Dashboard

A broken sewer clean out cap is one of the most common issues identified through smoke testing

WASTEWATER (SEWER) OVERFLOWS

What flows through a community's wastewater system is what gets flushed or sent down the drain by residents and visitors. Sometimes, what isn't supposed to be flushed can create overflows. For example, grease gets sent down sink drains and can build up in the system. Nature can also play a role; for example, when a tree root causes a crack in an underground pipe, or when a flash flood inundates the system with too much water.

OWASA's Distribution and Collection System Team plays a key role in maintaining our sewer system preventing sewer overflows through their preventative maintenance efforts. Issues like broken sewer caps and cracked sewer laterals can be identified through smoke testing, where non-toxic smoke is pushed through the sewer system. Where these issues exist, smoke can be seen exiting through the cracks. Some of these identified issues are on private property, and that is where YOU can help! Maintaining your private sewer lateral when these issues are identified helps protect your property and the community's sewer system.

We continuously monitor the community's wastewater system to mitigate for potential overflows. This is important because untreated wastewater can have a negative impact on the environment so, we work to prevent overflows or address them quickly when they occur. Electronic alarms at pump stations throughout our system notify us of a potential issue, which we investigate quickly to keep the wastewater moving. We count on the community to alert us too. If you see an overflow at a manhole, please stay clear of the area (people and pets) and notify OWASA immediately at 919-968-4421.

Last year, the total volume of recorded overflows in OWASA's wastewater system was 2,963 gallons. As noted in the table below, overflow events occurred due to grease and roots in the sewer pipe, two pipe failures, a leaking manhole, and vandalism.

Sewer Overflows Annual Data (Permit #WQCS00031)			
Date	Location	Quantity (Gallons)	Cause
1/11/21	114 Highway 54	375 gallons	Grease
4/14/21	1748 Service Road	250 gallons	Roots
4/29/21	505 W Rosemary Street	113 gallons	Pipe Failure
8/16/21	Manhole #7743 at Morgan Creek	325 gallons	Manhole Leaking
8/17/21	1415 Grey Bluff Trail	660 gallons	Pipe Failure
9/18/21	1 Europa Drive	900 gallons	Roots
11/8/21	705 N Greensboro Street	340 gallons	Vandalism

Rags pulled from equipment at the Mason Farm Wastewater Treatment Plant

ONLY FLUSH THE THREE Ps!

Flushing the wrong stuff (like the rags in the picture to the left) can harm the wastewater system by causing costly and messy clogs and even impact water quality in our streams and lakes. This is a friendly reminder that the three Ps are the only things that should be flushed down the toilet: pee, poo, and toilet paper!

PROTECT YOUR COMMUNITY'S WASTEWATER SYSTEM

Together, we can protect our community's water system, wastewater system and the environment. Please help keep these items out of our sewers:

FEMININE PRODUCTS

These products expand and absorb moisture, making it difficult for them to travel through pipes. Nor do they break down into smaller pieces.

DISPOSABLE DIAPERS

Like feminine products, diapers expand and absorb moisture, and are very bulky. Diapers are just not meant to be flushed!

DENTAL FLOSS

This stringy substance loves to wrap itself around anything and everything that travels down the same path in the sewers.

"FLUSHABLE" WIPES

These clog wastewater pipes and get caught in the equipment at the treatment plant. Please dispose of wipes in the trash, even if the package says they're flushable!

OILS AND GREASE

Inside a sewer or plumbing drain, fat, oil and grease harden into a plaster-like substance that can block flow. Please scrape or wipe fat, oil and grease off pots, pans, plates and bowls before washing them.

OTHER PRODUCTS

Other products that should not be flushed include sand, hair, kitty litter, condoms and cotton balls.

PRESCRIPTION MEDICATIONS!

Please don't flush prescription medications. Wastewater treatment plants were not designed to remove the chemicals in many pharmaceuticals. If they are flushed and enter the wastewater system, they may enter into a creek, river or lake that acts as a water supply for a community downstream, or harm aquatic life. The Police Departments of Chapel Hill and Carrboro have "no questions asked" drop boxes where you can discard of your leftover medicines.

Safe Disposal Locations	Drop Box Day	Hours	Address	More Information
Chapel Hill Police Headquarters	Monday - Friday	9:00 am – 5:00 pm	828 Martin Luther King Jr. Blvd.	919-968-2760
Carrboro Police Department	Monday - Friday	8:30 am – 5:00 pm	100 N. Greensboro St. (Century Center)	919-918-7397

2021 QUICK FACTS

Our team mowed and cleared 112.1 miles of easements in the community to help keep tree and shrub roots from growing into the wastewater system.

Last year, OWASA cleaned about 107 miles of wastewater pipes, 32% of the community's wastewater system. Fats, oil and grease, dental floss and wipes were the main culprits clogging up the system.

The first in a series of projects installing solar panels on OWASA-owned properties came online at OWASA's biosolids site in late 2020. This site generated more than 176,000 kWh of renewable energy in 2021, which is equivalent to the energy used by about 16 households over the course of an entire year.

Throughout the year, we spent $393,255 replacing or renewing 1.08 miles of wastewater pipes to prevent overflows and maintain system resiliency.

FOR MORE INFORMATION ABOUT WASTEWATER AND RECLAIMED WATER

If you have any questions about the wastewater treatment process, please contact our team! Connect with Monica Dodson, OWASA's Wastewater Treatment and Biosolids Recycling Manager, at 919-537-4205.

LEARN MORE

PLAN A FUTURE TOUR OF THE WASTEWATER TREATMENT PLANT!

The science of wastewater treatment is fascinating incorporating biology, ecology, chemistry, and more! Please stay tuned to **owasa.org** for more information on when tours will resume and other fun ways to engage.

CHECK OUT OUR VIDEOS

You can keep your kids (and kids at heart) engaged by watching a video on how wastewater is treated in our community. View our video now! **https://bit.ly/2ZJJtUK**

EMERGENCY PREPAREDNESS

Our Team at the Wastewater Treatment Plant takes emergency preparedness seriously. You can find out more about the steps they take to continue treating the community's wastewater, even during severe weather, and what you can do to help on **OWASA's YouTube page**.

CONTACT OWASA ANYTIME

OWASA is Carrboro-Chapel Hill's not-for-profit public service agency delivering high quality water, wastewater, and reclaimed water services. Under the streets, in the field, at the lab and in the office, our diverse team manages the community's wastewater system. Contact us anytime. We welcome your questions and feedback!

ORANGE WATER AND SEWER AUTHORITY

400 Jones Ferry Road, Carrboro, NC, 27510 | 919-968-4421 | info@owasa.org | owasa.org

@OWASA_NC Orange Water and Sewer Authority Orange Water & Sewer Authority