

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



OWASA's wastewater system treats on average 8.2 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

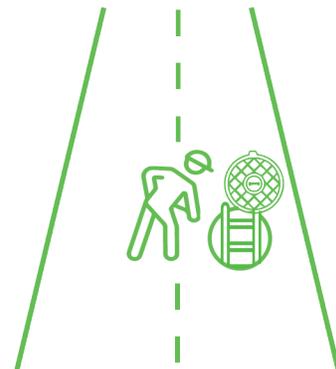


Back in the old days, when people collected their water with pails and tossed their waste out the door, life was messy! With the advent of modern plumbing, chores and sanitation became more convenient and public health improved significantly.

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.

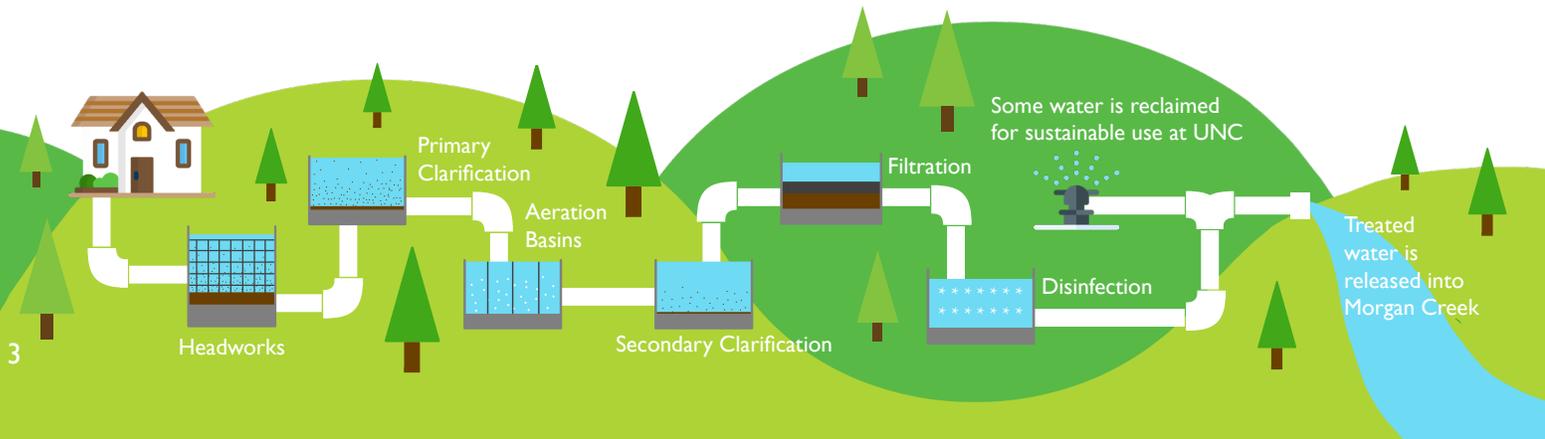
Our Mason Farm Wastewater Treatment Plant is located in the southern part of Chapel Hill. We do our best to be a good neighbor and maintain a comprehensive odor elimination program throughout our treatment process. This includes ensuring our storage basins are covered tight at all times, and treating 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'S WASTEWATER TREATMENT PROCESS



REDUCE, REUSE, RECYCLE!



RECLAIMING WATER FOR ALMOST 10 YEARS

In 2009, OWASA and the University of North Carolina (UNC) at Chapel Hill partnered to develop a reclaimed water system. The system provides UNC with recycled, reclaimed water (instead of treated drinking water) to meet university demands for water that is not for human consumption in a more sustainable way. For example, the University uses reclaimed water to irrigate athletic fields on campus, to flush some toilets, and in chiller plants to cool buildings.

Last year, UNC used an average of 0.80 million gallons of reclaimed water a day. That's nearly one million gallons less raw water each day that OWASA needs to source from University Lake and Cane Creek Reservoir. In fact, since 2009, the 2.1 billion gallons of wastewater that OWASA has reclaimed for use at UNC equates to the size of University Lake about five-times over!

UNC pays OWASA the full cost to operate and maintain the reclaimed water system. This enables OWASA to cost-effectively meet UNC's non-drinking water requirements, while freeing up the community's drinking water supply and treatment capacity to meet other essential needs. Overall, the use of reclaimed water decreases the energy used in the community's water treatment process and lowers both OWASA's and UNC's greenhouse gas emissions.

BIOGAS: A WASTEWATER BY-PRODUCT FOR SUSTAINABLE ENERGY USE

Biogas is a type of biofuel naturally produced from the decomposition of organic waste. When organic matter, such as food scraps or human waste, break down in an anaerobic environment (an environment absent of oxygen) they release a blend of gases, primarily methane.

During OWASA's treatment process, organic solids in the wastewater are separated into large anaerobic digesters. Over 30 days, heat is applied and in the absence of oxygen, microorganisms break down the organic solids. Methane biogas is a major output of this process, which we capture and use as an important energy source to reduce our natural gas consumption.

Last year, we restored our biogas recovery system and used biogas to offset our use of natural gas, in fact, 60% less than the year before. This reduced our greenhouse gas emissions by about 350 metric tons; that's equivalent to taking 80 passenger vehicles off the road for one year!



RECYCLING NUTRIENTS WITH BIOSOLIDS



Another 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, and nutrients in our biosolids every 60 days. Protecting water quality is our top priority so we monitor groundwater quality three times per year at OWASA-owned locations.

Last year, we recycled about 50% of our biosolids through land application. 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 Fiscal Year Results
Fecal Coliform Bacteria	1,000 CFU	117 CFU (maximum)
Mercury	17 ppm	0.48 ppm
Cadmium	39 ppm	0.91 ppm
Arsenic	41 ppm	2.75 ppm
Lead	300 ppm	6.75 ppm
Copper	1,500 ppm	302 ppm
Zinc	2,800 ppm	799 ppm
Nickel	420 ppm	14.5 ppm
Molybdenum	n/a	5.8 ppm
Selenium	36 ppm	3.12 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. This includes wildlife along the waterway's path. Plus 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 so as not to impact water quality. 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 Fiscal Year Results	Notes
Phosphorus	Maximum of 10,188 lbs for the year	2,595 lbs	Full compliance; 75% below the limit
Nitrogen	Maximum of 409,448 lbs for the year	121,135 lbs	Full compliance; 70% below the limit



OWASA's Youth Water Academy visits the Wastewater Treatment Plant to learn about the wastewater process.



READY TO HELP NEIGHBORS IN HURRICANE FLORENCE

OWASA, along with communities across the Carolinas, braced for the worst as Hurricane Florence made landfall in September. Early on in the storm, the bridge to our Wastewater Treatment Plant flooded, blocking access into and out of the plant. Anticipating this outcome (because of the plant's location in a low-lying area of town), our wastewater team prepared with extra staff deployed on site to work in shifts, overnight sleeping and food supplies to support the team's well-being, and back-up generators at the ready to ride out the storm. OWASA provided reliable wastewater services throughout the event, and luckily, the Carrboro-Chapel Hill community escaped the eye of the storm.

Neighboring communities were not so fortunate. Within hours of the storm's landing, we received an alert that a town in a neighboring County might need assistance. Some of their wastewater pump stations were at risk of overflowing and they asked: Does anyone have a Vac-Truck and a few people they can send to help? Wastewater crew members Christian Arvizu-Garcia and Harrison Ray were the first among many OWASA employees to volunteer to provide support. They got OWASA's Vac-Truck ready and remained on standby.

WHAT IS A VAC-TRUCK?

Think of a giant vacuum cleaner, but bigger than any you've seen before. It's the size of a truck, and it can vacuum up to 3,000 gallons of liquid in one go. "With the Vac-Truck, we can vacuum up excess wastewater and take it to the plant where it can be treated safely. This is important because we don't want wastewater to overflow into a street or stream or lake. We want to protect our community's drinking water sources," said Christian.

In the end, the neighboring town scaled down the alert as their team was able to manage the overflow. Our thoughts remain with communities who continue to recover from the storm. OWASA remains ready to provide support to neighbors as needed.





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, when grease gets sent down sinks and builds-up in the system. Or when a large volume of dental floss clogs up a pump. 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.

We continuously monitor the community’s wastewater system to mitigate for potential overflows. This is important because wastewater can be contaminated, so we work to prevent overflows or isolate 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 768,740 gallons. As noted in the table below, 3 overflows occurred due to large amounts of rain entering our system during Hurricane Florence, a system blockage, and a major pipe failure. All overflows were reported in accordance with State regulations to the NC Division of Water Resources.

Sewer Overflows Annual Data (Permit# WQCS00031)			
Date	Location	Quantity (Gallons)	Cause
9/17/2018	Rainbow Soccer Field	8,300	High flows during Hurricane Florence
11/1/2018	105 Meadowbrook Dr.	300	Blockage
4/12/2018	Rogerson Dr.	760,140	Pipe Failure





YES TO THE THREE PS!



Flushing the wrong stuff 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:



“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!

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!

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.



Dental floss – this stringy substance loves to wrap itself around anything and everything that travels down the same path in the sewers.

Other products that should not be flushed – 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 of Medications Locations	Drop Box Day	Hours	Address	More Information
Chapel Hill Police Headquarters	Monday - Friday	9 am – 5 pm	828 Martin Luther King Jr. Blvd.	919-968-2760
Carrboro Police Department	Monday - Friday	8:30 am – 5 pm	100 N. Greensboro St. (Century Center)	919-918-7397

2018-2019
**QUICK
FACTS**

Our team mowed and cleared 111.2 miles of easements in the community to help keep tree and shrub roots from growing into the wastewater system.

We tested for cracks by putting non-toxic smoke into the wastewater pipes to see where the smoke came out. Cracks are caused mostly by intrusive tree roots, and also age. Where we found a crack, we fixed it: to keep rainwater and groundwater from seeping in, and wastewater from leaking out.

Last year, OWASA cleaned about 190 miles of wastewater pipes, 54% of the community's wastewater system. Fats, oil and grease, dental floss and wipes were the main culprits clogging up the system.

Throughout the year, we spent \$3.2 million replacing or renewing 2.9 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



SIGN UP FOR A TOUR OF THE WASTEWATER TREATMENT PLANT!

The science of wastewater treatment is fascinating incorporating biology, ecology, chemistry and more! Gather a group of friends, classmates or a community group and book an educational tour of OWASA's Wastewater Treatment Plant in Chapel Hill. Contact 919-537-4205 or email info@owasa.org. Tours are free and run throughout the year.

CHECK OUT OUR VIDEO

You can also view OWASA's educational video to learn more, for example, about the ultraviolet lightshow that helps disinfect bacteria. Peaked your interest? View our video now!
<https://bit.ly/2ZJjtUK>



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

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