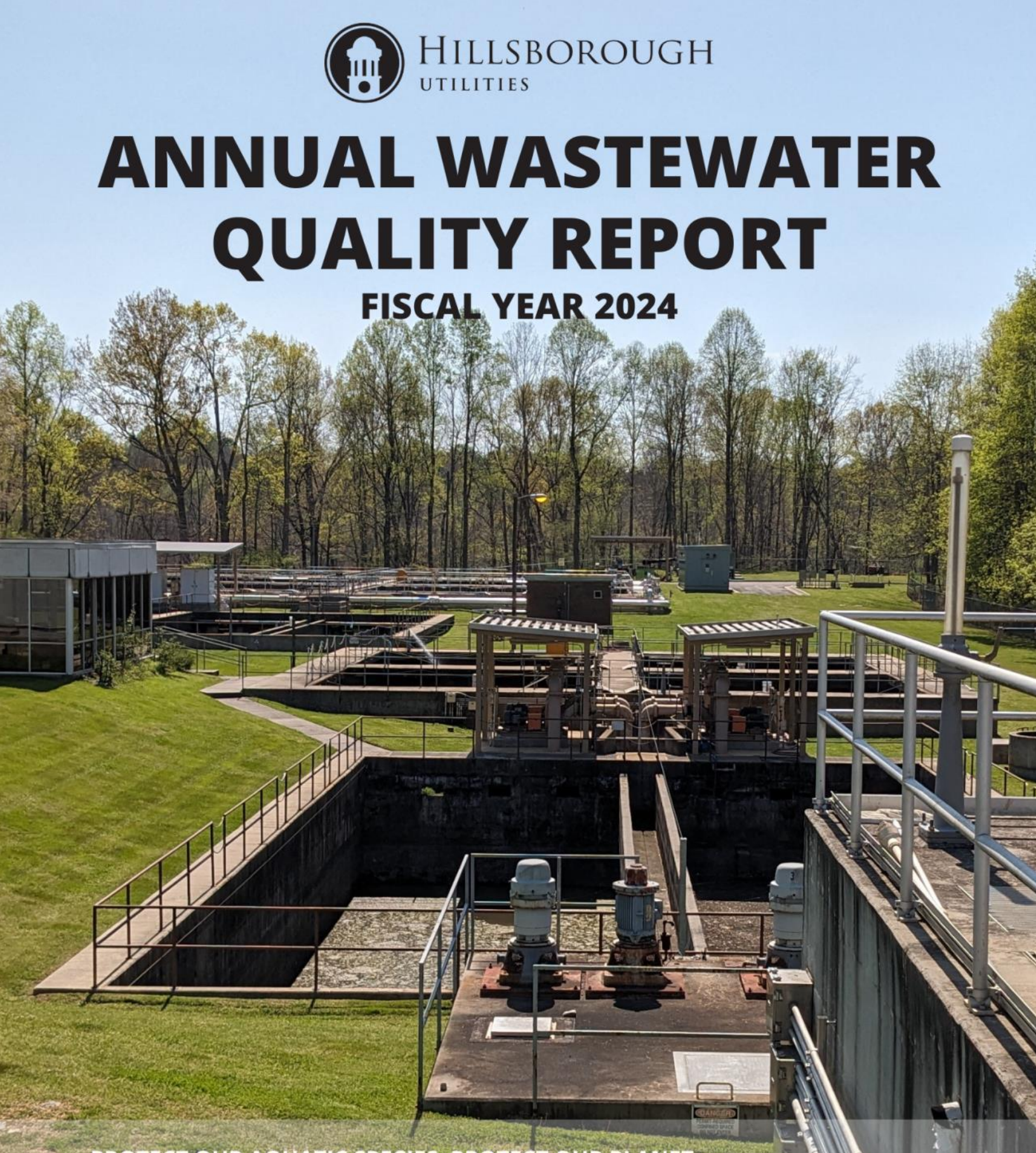
HILLSBOROUGH
UTILITIES

ANNUAL WASTEWATER QUALITY REPORT

FISCAL YEAR 2024



PROTECT OUR AQUATIC SPECIES, PROTECT OUR PLANET

Wastewater Treatment Plant
NPDES Permit Number: NC0026433
355 Elizabeth Brady Road, PO Box 429
Hillsborough, NC 27278
919-296-9670

Wastewater Collection Division
Permit Number: WQCS00077
715 Dimmoks Mill Road, PO Box 429
Hillsborough, NC 27278
919-296-9670

About This Year's Annual Wastewater Quality Report

The following pages report wastewater quality results for Fiscal Year 2024 among other pertinent information. Included are details about the performance of the town's wastewater collection and treatment systems.

If you have any questions about this report or concerning wastewater treatment, please contact Deputy Utilities Director — Water Treatment Jeff Mahagan at 919-296-9671 or jeff.mahagan@hillsboroughnc.gov. We hope you find the report informative and helpful to understand the wastewater treatment operation.

Este informe contiene información muy importante sobre el tratamiento de aguas residuales. Si desea una traducción, comuníquese con nuestra oficina o hable con alguien que la entienda bien.

In good health,
K. Marie Strandwitz, PE
Utilities Director

Definitions of Acronyms, Words and Phrases

Ammonia as N — Ammonia is a nutrient that contains nitrogen and hydrogen. "Ammonia as N" values are based only on the nitrogen component.

Average Daily Flow — The average of the daily flow of treated wastewater discharged into the Eno River.

Biochemical Oxygen Demand (BOD) — The amount of dissolved oxygen needed by aerobic biological organisms to break down organic material present in treated wastewater. The Hillsborough Wastewater Treatment Plant is allowed a maximum of 5 milligrams per liter.

Biosolids — Solid particles removed from wastewater.

Interceptor — Conduits that run through a series of manholes from residential and commercial sewer line connections to the Wastewater Treatment Plant.

Maximum Monthly Flow — An average of the daily flow per month of treated wastewater discharged into the Eno River. The Wastewater Treatment Plant is permitted to treat up to a maximum monthly flow of 3 million gallons of wastewater per day. This equates to an annual average daily flow of about 2.2 million gallons.

mg/L — One part per million or one milligram per liter

mgd — Million gallons per day

lb/yr — Pounds per year

Not Applicable (N/A) — Information not applicable

Sanitary Sewer Overflow — The discharge of untreated sewage from a sanitary sewer into the environment prior to reaching sewage treatment facilities.

Sludge — Muddy sediment produced by water and wastewater treatment processes.

Total Nitrogen — The sum of all nitrogen forms. Nitrogen is a nutrient that is harmful to aquatic life in large supplies. It promotes the growth of algae, which uses up oxygen in water when decomposing.

Total Phosphorus — The sum of all phosphorus forms. Phosphorus is a nutrient that is harmful to aquatic life in large supplies. It promotes the growth of algae, which uses up oxygen in water when decomposing.

Wastewater Treatment Summary and Highlights

- The Wastewater Treatment Plant operates under state-issued permits. State regulators enforce these permits through review of required reports and inspections of facilities. Noncompliance with any part may result in a notice of violation, which may include fines of up to $25,000 per day per violation.
- The Wastewater Treatment Plant treated 424.5 million gallons in Fiscal Year 2024. The treated water discharged to the Eno River remains of excellent quality. All parameters regulated by North Carolina and the Environmental Protection Agency were compliant with permitted water quality limits.
- In February 2024, the wastewater plant received a notice of violation for an unauthorized bypass. During a significant rain event, an operator attempted to reduce flow to the plant's filtration process by redirecting flow to an empty tank. Unfortunately, the operator closed a valve that should not have been closed and a small amount of sludge discharged onto an access road through a vent pipe. The spill was quickly identified and stopped. No sludge left the treatment plant's property. The sludge was estimated to be under 2,000 gallons and was confined to a grassy area where it was removed and disposed of. Staff training was completed to prevent another occurrence.
- Staff discovered that a large amount of ceiling in the wastewater plant's main office building contained asbestos. The remediation resulted in weeks of disruptions to the plant's laboratories and offices. The remediation was a success, and normal operations now resume.
- Since a risk assessment analysis was completed in Fiscal Year 2019, the town works each year to make improvements at the Wastewater Treatment Plant to reduce risk. This past year, we installed a new sound enclosure on a very loud air blower to protect employee hearing and reduce sound pollution.

Wastewater Treatment Plant Performance

Subject	Detail
Permit Compliance	One violation for a small sludge spill
Inspections	
N.C. Facility	Passed
N.C. Laboratory	Passed
N.C. Stormwater	Passed

Subject	Permit limit	FY2024 actual	FY2023 actual	FY2022 actual
Average daily flow	N/A	1.163 mgd	1.104 mgd	1.053 mgd
Maximum monthly flow	3.0 mgd	1.643 mgd	1.831 mgd	1.358 mgd
Biochemical oxygen demand (BOD)	5.0 mg/L	<2.0 mg/L	<2.0 mg/L	<2.0 mg/L
Ammonia (as N)	1.0 mg/L	<0.1 mg/L	<0.1 mg/L	<0.1 mg/L
Total Nitrogen	10,422 lb/yr	6,815 lb/yr	6,000 lb/yr	4,444 lb/yr
Total Phosphorus	1,352 lb/yr	1,094 lb/yr	766 lb/yr	606 lb/yr

The current Wastewater Treatment Plant was completed in 1977. It was upgraded in 2001, 2007 and 2014.

The original plant was built in the 1960s.

Wastewater Treatment Plant Permit Information

The Wastewater Treatment Plant operates under state-issued permits. State regulators enforce these permits through review of required reports and inspections of facilities. Noncompliance with any part may result in a notice of violation, which may include fines of up to $25,000 per day per violation.

Permit Type	Permit Number	Operator in Responsible Charge	Contact
Wastewater Discharge	NC0026433	Deputy Utilities Director — Water Treatment Jeff Mahagan	919-296-9671
Stormwater Discharge	NCG110000	Deputy Utilities Director — Water Treatment Jeff Mahagan	919-296-9671
Laboratory Certification	121	Deputy Utilities Director — Water Treatment Jeff Mahagan	919-296-9671

Treatment Processes

Process	Explanation
Preliminary Treatment	Removal, cleaning and compacting of trash from wastewater.
Secondary Treatment	Removal of organics and nutrients from wastewater in a five-stage process.
Tertiary Treatment	Filtration to remove suspended solids that remain.
Disinfection	Addition of chlorine to disinfect.
Dechlorination	Removal of chlorine from treated water prior to release into Eno River.
Post-aeration	Raising of oxygen level in treated water prior to release into Eno River.
Solids Processing	Treatment, thickening and pressing of solids for delivery to composting facility.

Deputy Utilities Director — Water Treatment Jeff Mahagan leads a virtual tour of the plant. See the video on how wastewater is treated and returned to the Eno River in Hillsborough (on the town's website and YouTube channel).

Chief Wastewater Plant Operator Shawn Maines performs maintenance on probes to monitor the treatment process. Staff continually monitor suspended solids, dissolved oxygen, and nitrate nitrogen. The information gathered by these probes is used to automatically adjust treatment process equipment, including pumps, blowers and valves.

Wastewater Plant Tours

Schedule a walking tour of Hillsborough's wastewater treatment plant, which can process 3 million gallons of water a day. The tour takes about two hours and is open to ages 10 years and older. Groups are limited to 10 people. Tours for specialty groups can be arranged as well.

Use the link below or email jeff.mahagan@hillsboroughnc.gov.

TOUR REQUEST FORM

Wastewater Collections Summary and Highlights

The town's underground water utilities is a maze of pipes, valves, and pumps. The distribution system distributes drinking water to customers. The collection system collects wastewater from customers and transports it to the wastewater plant for treatment and for return into the Eno River.

- Every calendar year, staff is required by state mandate to hydraulically clean a minimum of 10% of the gravity sewer lines in the system. In 2023, 8.34 miles of gravity sewer were cleaned and 0.66 miles inspected using a closed-circuit television camera that produces a film on DVD.
- The town had one sanitary sewer overflow in Fiscal Year 2024. The overflow was caused by a fiber optic boring contractor hitting a pump station force main.
- A severe increase in repair work in Fiscal Year 2024 was due to fiber contractors boring across Hillsborough. Many pipes were hit by the boring.
- All sanitary sewer force main air release valves were inspected, and repairs or replacements were completed if needed. The town owns and operates 14 of these air release valves. Replacement for the valves ranges from $5,000 to $10,000 per valve. A failed valve can result in sanitary sewer overflows.
- A study of the Lawndale Sewer Basin is now complete, and the town has completed relining about 20 manholes in the Lawndale Sewer Basin circuit.
- The town installed a new pump at the Elizabeth Brady sewage pumping station. It had the other two pumps rebuilt and the variable frequency drive that controls the pumps programmed.

Additional duties of the wastewater collections staff include:

- Mowing and inspecting sewer easements twice per year.
- Maintaining and operating pumping stations.
- Responding to emergencies. Most emergency responses are for pumping station problems. Some are for blocked pipes due to improper disposal of grease, rags and trash.

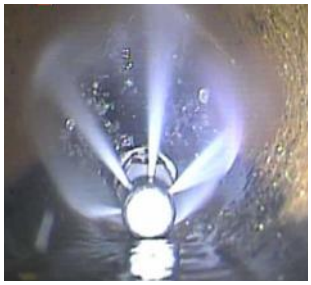
Getting the Work Done

Crews inspect manholes in the town's service areas. Smoke is used to find leaks in the system.

A vacuum truck (above) is used to clean out a clogged pump station. Clogs from wipes and grease can be costly to clean up and can damage equipment.

Crews inspect manholes in the town's service areas. Manholes are raised in floodplains, like along Riverwalk.

Wastewater Collection System Performance



MAINTAINING SEWER LINES: Tree roots penetrated this sewer pipe (far left). Such issues can be found in the town's annual inspection of part of the system's gravity lines. A jet hose (left) is used to clean and clear sewer pipes. This trailer (right) helps haul equipment and deliver educational messages.

Collection System

Resource	Quantity	Explanation
Pipes	105.84 miles	
Gravity Sewer	87.21 miles*	Downward sloping pipe that transports wastewater by gravity
Force Main Sewer	18.63 miles	Pressurized pipe that transports wastewater where gravity flow is not possible
Public Pumping Stations	26	Intermediate collection chamber that uses pumps to lift wastewater to a higher elevation.
Manholes	2,245	Sewer system access point
Employees	5**	Responsible for day-to-day operations

** Includes all pipes in town GIS system, which could report sewer laterals and privately owned mains.*
*** Additional employees provide related work, including sewer taps, point repairs and inspections.*

Permit Information

Permit Number	Operator in Responsible Charge	Contact
WQCS00077	Utility Mechanic Supervisor Ethan Oles	919-296-9652

Maintenance

Maintenance subject	Amount completed	Explanation
Pipes	0.66 miles	Inspected with closed-circuit television camera
	8.34 miles	Cleaned with high pressure jet wash
Public Sewer	0.0 feet	Smoke tested
	0.0 miles	Relined
Manholes	488	Inspected
	14	Relined

Sanitary Sewer Overflows

Date	Location	Spill volume (Gallons)	Volume reaching surface water (Gallons)	Cause
3/5/24	Intersection of N.C. 86 North and Holman Drive	600	None	Contractor boring through pipe

Good to Know

The Town's wastewater services operate 24 hours a day each day. Employees are highly certified and continually operate and maintain the plant and collection system to ensure compliance with state and federal regulations.

DID YOU KNOW?

Your water and sewer rates pay for the water and sewer operation.

Your taxes do not.

How You Can Help

Report Illegal Dumping

If you see anyone dumping contents into an open manhole who is not in a town truck, please call 911 to report it.

If it's safe to do so discreetly, also take a photo and note some information to help the town prosecute the case. Details are helpful, including the time, date, location, name on the truck, truck number and license plate. Please do not directly confront anyone.

You can submit photos and information to Deputy Utilities Director for Water Treatment Jeff Mahagan by email at jeff.mahagan@hillsboroughnc.gov or to the Hillsborough Police Department or Orange County Sheriff's Office.

Help Wipe Out Sewer Problems

Flushing wipes, tampons and plastics leads to costly repairs

Hillsborough, we have a problem. It's the wipes and tampons you're flushing.

"If you put toilet paper under a stream of water, it breaks down immediately," Utilities Infrastructure Protection Supervisor Troy Miller said. "Wipes and other products don't break down. They clog pumps and motors at pump stations."

Flushing items that don't break down risks clogging pipes and creating overflows. Items to trash include:

- All parts of feminine hygiene products.
- Dental floss.
- Adhesive bandages.
- Sanitary and baby wipes — even if labeled "flushable."

Flushing plastic wraps and inserts from tampons sets up your sewer system for a fatberg that could clog pipes and lead to sewage spilling into the environment. Plastic items float and collect fats and oil, which also shouldn't be flushed. Most blockages in the town's sewer system are caused by flushable wipes, tampons and grease.

Wipes, tampons and plastics entangled in this sewer pump made it inoperable in May 2023. Each pump costs about $34,000 and helps in transporting sewage to the treatment plant. Two pumps had to be replaced.

Protect Your Home and Environment

Overflows of a sanitary sewer can lead to violation notices and fines from the state, in addition to cleanup and environmental costs. Call 919-732-3621 to report spills immediately.

Fats, Oils and Grease

Food scraps and grease often are washed into the plumbing system through kitchen sinks. The grease sticks to the insides of sewer pipes in your home and in the streets.

Commercial additives, including detergents, that claim to dissolve grease may only pass grease down the line and cause problems in other areas.

Over time, grease can block an entire pipe, which can lead to:

- Raw sewage overflowing in your or your neighbor's homes, resulting in expensive and unpleasant cleanups.
- Raw sewage overflowing into parks, yards and streets.
- Human contact with disease-causing organisms.
- Higher sewer bills.

Sewer Blockage Formation

A blocked pipe starts when grease and solids collect on the top and sides of the pipe interior.

The buildup increases over time when grease and other debris are washed down the drain.

Excessive accumulation restricts wastewater flow and can cause a sanitary sewer overflow.

How Can You Help?

Discard used fats, oil and grease with other garbage or recycle.

- Orange County residents and businesses with 15 gallons or fewer of used cooking or fryer oil can bring it to the household hazardous waste collection centers at 1514 Eubanks Road (northwest of Chapel Hill) or 3605 Walnut Grove Church Road (north of Hillsborough). Only liquid oil is accepted. No water, bacon grease or lard is accepted.
- Use an old coffee can or jar as a grease container. The town has fat trappers available for free. Call 919-296-9653.
- Freeze or cool animal fats before discarding in the trash.
- Mix liquid vegetable fats with cat litter or coffee grounds in a sealable container before throwing in the trash.

Minimize use of garbage disposals.

- Scrape plates into trash cans.

Keep grease out of water for washing dishes.

- Use paper towels to wipe leftover oils and fats from pots and pans before washing. Discard paper towels in the trash.

See and share our video on fats, oils and grease.

Do not pour grease down drains.

Instead place grease in a can to discard in the trash. Contact the town for a free fat trapper.

Infrastructure Protection

More information is available on the About Wastewater page of the town's website.
Or contact Utilities Infrastructure Protection Supervisor Troy Miller at 919-296-9653 or troy.miller@hillsboroughnc.gov.

Go Easy on Easements

Easements look like cleared paths to nowhere, but they grant the Utilities Department the right to access a town asset for maintenance and repairs.

Utility easements are normally at least:

- 20 feet wide for one utility pipeline.
- 30 feet wide for pipes deeper than 16 feet.
- 10 feet wide on both sides of a pipe for multiple pipes.

Easements reserve property for a specific purpose. Older water and sewer mains without a documented easement have a "prescriptive easement" — they can be accessed by right if in the ground so long without complaint.

Easements (or rights of way) provide the town with access to water and sewer assets for maintenance and repairs.

Make sure you know your responsibilities for utility easements.

Additional information on technical specifications for utilities and for sanitary sewer use can be found in the Hillsborough Code of Ordinances, chapters 14 and 15.

For more information, contact the Water Distribution and Wastewater Collection Division at 919-296-9650.

Your responsibilities for easements

Easements do not remove property from an owner, but they must be kept clear of any plantings or structures since these can limit accessibility. Plant roots also can damage water and sewer pipes. See your responsibilities:

Be aware of land containing easements before building or planting.

Without authorization (given only under certain conditions), the town will not allow or replace plants, fences, sheds, fountains, patios, decks or other structures that impede clear access to the easement and maintenance of town infrastructure.

Maintain enough clearance around water and sewer features in road rights of way to allow the town access, operation and maintenance of the features.

These clearance requirements are measured from the center point (radius) of the device:

- Fire hydrants — 3 feet
- Manholes and concrete vaults — 6 feet
- Water meters, valve boxes, sewer cleanouts, and other utilities apparatus not listed — 2 feet

Maintain your property where easements are located and within the road right of way.

This includes mowing and can be done on your maintenance schedule.

Did You Know?

The Riverwalk greenway was built along a sewer easement, allowing recreation in an area that otherwise would not be developed.

Pictured is former Hillsborough Mayor Tom Stevens by an above-ground manhole. The elevated manholes along the Eno River help prevent floodwaters and heavy rain from entering the sewer system. The manholes are connected to one of the town's main sewer interceptors, which move sewage from homes and businesses to the wastewater plant.

Preparing for the Future

The town's wastewater services must be vigilant to protect and maintain the systems we have while also preparing for growth. Below are the projects we have planned for capital improvement or to prepare for our expanding system.

Fiscal Year 2025

- Wastewater Plant Master Plan — The master plan will provide a roadmap for the plant's Phase II upgrade. In anticipation of growth, the master plan will identify alternative treatment technologies and other options to continue complying with the stringent nitrogen requirements in the state's rules for protecting Falls Lake. The town's watershed drains to that lake.
- River Pump Station Replacement — The River Pump Station is the town's largest pump station. The 40-year-old station is undersized and no longer meets safety regulations due to exposed wiring and a steel spiral staircase. The station also in the Eno River's floodway. Much of the cost for this project is federally funded. It is expected to be completed by Fiscal Year 2027.
- Adron Thompson Facility Renovation and Expansion — The Water/Sewer Facility, originally a water treatment plant, was built in 1936. The water distribution and wastewater collection divisions began using the building after a new water plant was built in 1972. A study of the facility notes components of the building contain asbestos and lead. The facility will be remodeled with a small addition to accommodate current and future employees while maintaining the building's historic nature.
- Wastewater Plant Power Monitoring — Monitoring trending power consumption will allow the Wastewater Treatment Plant to identify equipment that could be run less frequently or reconfigured to draw fewer amps. Process adjustments based on trending data would allow the town to potentially lower its utility bills and reduce its carbon footprint.
- Lawndale Basin Rehabilitation — This project will rehabilitate or replace 26 manholes, public side lateral pipes and all but 2 segments of gravity sewers in the Lawndale Sewer Basin with no expansion. The basin consists of about 6,600 linear feet of 8-inch truss pipe sewer main, 28 manholes, and 1 duplex submersible pumping station.
- Exchange Club Interceptors Rehabilitation — This gravity sewer was installed in the early 1970s. Recent hydraulic modeling of the collection system revealed a capacity deficiency for existing and proposed growth conditions. Configuration of some of the mains also may contribute to hydraulic flow restrictions.

Fiscal Year 2026

- Eno River Interceptors — Constructed in the mid-1970s, the concrete in this sewer system is subject to corrosion from hydrogen sulfide. The town has had no significant rehabilitation or replacement of the collection system in this area. Significant stormwater inflow and infiltration occurs along the interceptors. Rehabilitation will greatly reduce leaks and overflows.

Fiscal Year 2027

- Elizabeth Brady Pump Station and Force Main Upgrade — The station upgrades would enable new development in the Elizabeth Brady Basin, as well as denser redevelopment of existing sites.

For More Information

If you have questions about this report or the treatment of your wastewater, please contact the Wastewater Treatment Plant at 919-296-9670 or through the town website. Printed copies of the report are available at the Town Hall Annex, 105 E. Corbin St. For a copy by mail, call 919-296-9630.

Lead staff at the Wastewater Treatment Plant is Deputy Utilities Director — Water Treatment Jeff Mahagan. We would love to address your questions about our operation. We also would love to provide a tour if you wish!

Connect with us!

www.hillsboroughnc.gov
@HillsboroughGov

Certification: *I certify under penalty of law that this report is complete and accurate to the best of my knowledge. I further certify that this report has been made available to the users or customers of the named system and that those users have been notified of its availability.*

Deputy Utilities Director—Water Treatment Jeff Mahagan