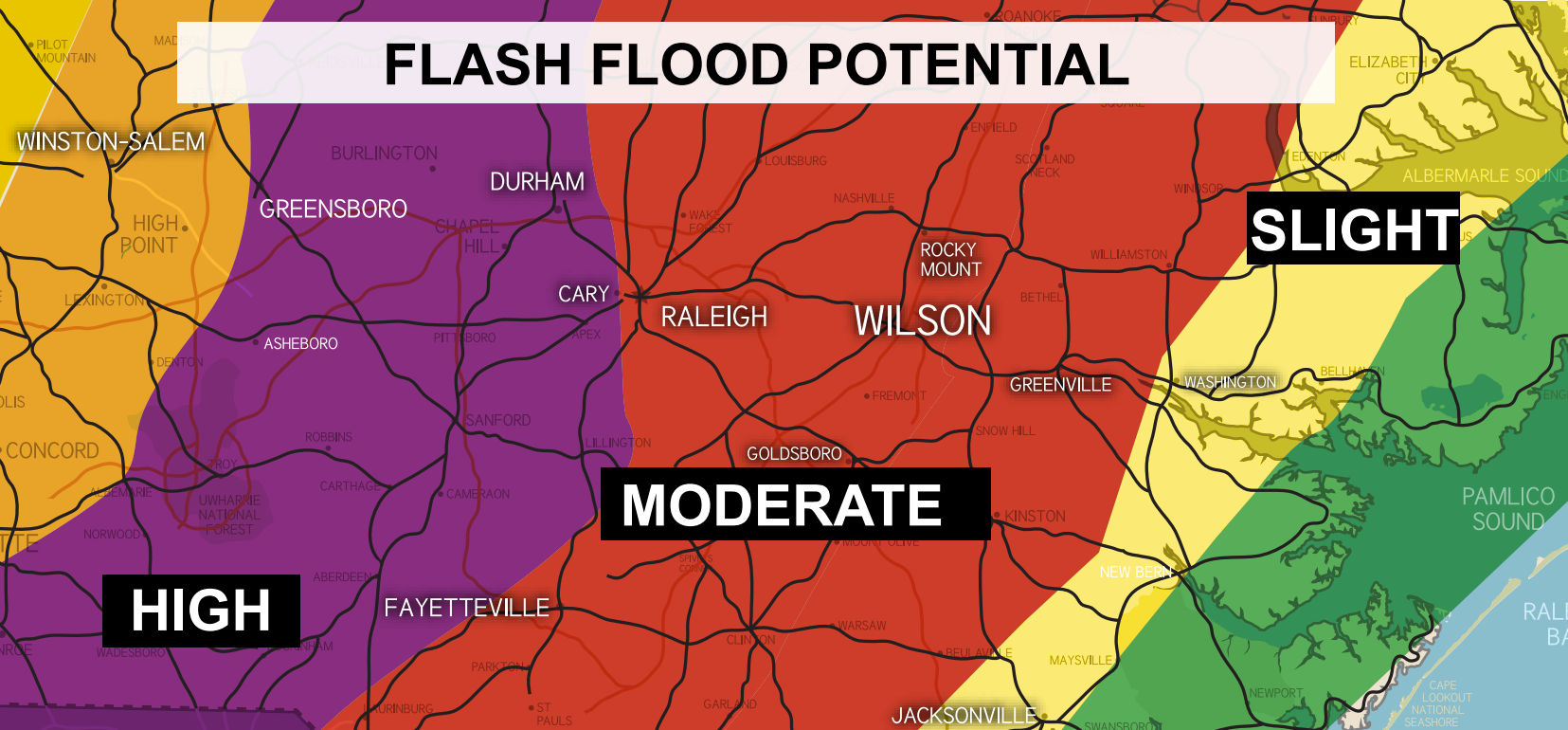


FLASH FLOOD POTENTIAL



The Challenges of Inflow and Infiltration



City of Wilson
Wastewater Collection and Treatment System Report
Fiscal Year 2022-23

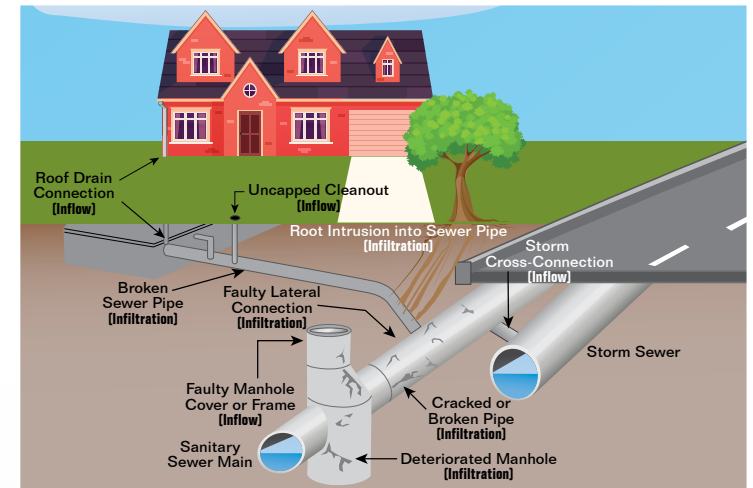
The Challenges of Inflow and Infiltration

Inflow and infiltration (I/I) are terms describing ways that stormwater runoff and groundwater make their way into wastewater collection pipes and eventually get treated, unnecessarily, at wastewater treatment plants.

Inflow is when clear water enters the wastewater system through rain leaders, sump pumps, or foundation drains that are illegally connected to sewer lines. Inflow is greatest during major storm events.

Infiltration is when groundwater seeps into cracked or broken wastewater pipes. Infiltration is a steady contributor to the problem, especially when the ground stays saturated due to steady rainfall. Infiltration quantities often exhibit seasonal variation in response to groundwater levels. Storm events can trigger a rise in groundwater levels and increase infiltration flows. The highest infiltration flows are observed following significant storm events or following prolonged periods of precipitation.

I/I can also be costly to communities. Once clear water gets mixed in with wastewater, it must be treated and that results in additional expenses that can increase rates for all users.



Increased inflow during heavy rains can cause problems.

Inflow is the biggest problem because during major rain events it quickly consumes pipe capacity needed for future growth. In more extreme rain events, inflow can cause sewage backups into homes and businesses. Inflow and infiltration reduce the ability of sanitary sewer systems and treatment facilities to transport and treat domestic and industrial wastewater. As a result, wastewater treatment processes can be disrupted and may allow poorly treated wastewater to be discharged to the environment.

What can homeowners do about I/I?

- **Familiarize** yourself with your house plumbing system. If you have roof downspouts that are piped underground, a sump pump that has no identifiable discharge point, or foundation drains that don't discharge to the road side ditch or other low point on the lot, you may be contributing to the problem.
- **Disconnect** unlawful connections to the sewer system. Contact Water Resources to help you find reasonable alternatives.

- **Locate** clean-outs on your property and verify that they are intact. Broken or loose clean-out caps contribute to inflow. Tighten or replace cap. Contact a plumbing professional if needed.
- **Do not open** clean-out plugs to drain your yard, or pull manhole covers to drain flooded streets or intersections. Let these areas drain naturally. Contact Water Resources if you observe abnormal flooding.

How does the City of Wilson minimize I/I?

A full time I/I Technician inspects the collection system daily for leaks and other problems. Inspection methods include closed circuit television (CCTV) inspection, smoke testing, and occasionally dye testing.

- CCTV cameras can be robotically sent down sanitary sewer lines and along each side sewer to record a video of sewer conditions. CCTV inspections can identify breaks, root intrusion, leaking water and deteriorating conditions.
- Smoke testing consists of introducing a harmless, non-toxic theatrical-type smoke through manholes into sewer pipes and observing where smoke exits. The exiting smoke can indicate a broken pipe or identify where roof or foundation drains are improperly connected to the sewer system.

- Dye testing involves pouring non-toxic fluorescent colored dye down roof drains or catch basins to see if that dye makes its way into the sewer. This provides verification that the storm drainage being tested is directly connected to the sewer.

The city also has a crew that rehabs manholes to eliminate leaks.

The City has an ongoing Capital Improvements Program (CIP) planned in 5 and 10-year segments to maintain, replace and expand segments of the wastewater collection system to meet increasing demands.

Collection System Maintenance and Projects completed:

- 37.4 miles of pipe cleaned
- 14.5 miles of pipe inspected
- 5,004 feet of sewer taps inspected
- 2,342 feet of pipe replaced
- 91 sewer services replaced
- 25 grease blockages cleared from sewer mains

Our Mission is to “Protect our Environment and Water Quality, through Teamwork and Excellent Service, now and for future generations.”

This report provides information concerning the City of Wilson’s wastewater collection and treatment system performance for July 1, 2022 to June 30, 2023 as required in the North Carolina Clean Water Act of 1999 (House Bill 1160).

If you have any questions about the information contained in this report, or would like to learn more about your wastewater collection system or the Hominy Creek Water Reclamation Facility, please call (252) 399-2492.

HOMINY CREEK WATER RECLAMATION FACILITY (WRF)

The WRF is located in Wilson at 3100 Stantonsburg Road. It is a state-of-the-art regional treatment plant that processes wastewater for approximately 20,900 metered customers and a service population of approximately 50,000. The City of Wilson also treats wastewater from the Town of Black Creek, the Town of Lucama, the Town of Saratoga, and the Town of Sims.



The term water reclamation defines the treatment or processing of wastewater to make it reusable with specific treatment reliability. Reclaimed water must also comply with very stringent water quality criteria. The term water reuse defines the use of treated wastewater for beneficial uses, such as agricultural irrigation and industrial cooling. The City of Wilson is committed to reusing reclaimed water in areas that drinking water is not needed such as irrigation water for Wedgewood Golf Course, the Burt Gillette Athletic Complex and industrial process/cooling water. The reclaimed water system is part of the City’s water conservation plan.

Table Definitions & Key

- < - less than
- > - greater than
- MGD (Million Gallons per Day)** - a unit of measurement for flow volume.
- NTU (Nephelometric Turbidity Units)** - a unit of measurement for turbidity. The lower the value, the clearer the water.
- PPM (Parts per Million)** - a unit of measurement. Parts per million compares to 1 minute in 2 years.
- PPB (Parts per Billion)** - a unit of measurement. Parts per billion compares to 1 minute in 2,000 years.
- SU (Standard Units)** - a unit of measurement for pH.
- Ammonia** - one of several forms of nitrogen that exist in aquatic environments. Excessive ammonia can cause toxic effects to aquatic life. Ammonia is measured in PPM.
- BOD (Biochemical Oxygen Demand)** - a required test that determines the amount of oxygen required by microorganisms to consume pollutants. BOD is measured in PPM.
- Chronic Toxicity** - a required test used to determine the potential effects of treated wastewater discharged into the receiving stream. The test ensures that treated wastewater discharged into surface waters does not negatively impact aquatic ecosystems.
- DO (Dissolved Oxygen)** - a required test used to determine the amount of oxygen that is present in water. It is a direct indicator of an aquatic resource’s ability to support aquatic life. DO is measured in PPM.
- FC (Fecal Coliform)** - a required test used to determine the presence of disease causing organisms. FC are harmless but are used as indicators of other organisms (if FC are present others may be present). FC is measured as number of colonies per 100 milliliters of sample.
- pH** - a required test used to determine the hydrogen ion concentration in water. It is used to indicate basicity or acidity of a solution on a scale of 0 to 14, with pH 7 being neutral.
- TN (Total Nitrogen)** - a required test used to determine the sum of the different forms of nitrogen found in water, including nitrate, nitrite and ammonia. Nitrogen is a critical nutrient required for all life but elevated concentrations can result in excessive growth of algae and aquatic plants. TN is measured in PPM.
- TP (Total Phosphorus)** - a required test used to determine all the different forms of phosphorus found in water. Phosphorus is a critical nutrient required for all life but elevated concentrations can result in excessive growth of algae and aquatic plants. TP is measured in PPM.
- TRC (Total Residual Chlorine)** - a required test used to determine the total amount of remaining chlorine present in water. Chlorine is added to destroy or deactivate disease-producing microorganisms. Excess residual chlorine may cause adverse effects to aquatic life. TRC is measured in PPB.
- TSS (Total Suspended Solids)** – a required test that measures the amount of suspended solids in a sample. TSS are measured in parts PPM.
- Turbidity** - a required test that measures clarity of water. It is used to indicate water quality and filtration effectiveness. Turbidity is measured in NTU.

NPDES PERMIT COMPLIANCE (NC0023906)

The WRF was compliant with all NPDES permit limits this year.

PLANT PERFORMANCE

Pollutant	Concentration	Pollutant	Concentration
Ammonia Nitrogen	PPM	Flow	Million Gallons per Day (MGD)
Average	0.04	Average	7.95
Permit Limit	1.0/3.0 (summer - monthly/weekly) 2.0/6.0 (winter - monthly/weekly)	Permit Limit	14.00 (monthly)
Biochemical Oxygen Demand	PPM	pH	SU
Average	0.1	Minimum - Maximum	6.6 – 7.8
Permit Limit	5.0/7.5 (summer - monthly/weekly) 10.0/15.0 (winter - monthly/weekly)	Permit Limit	Within 6.0 – 9.0 (daily)
Chronic Toxicity		Total Nitrogen	Lbs/Yr
Test Performed Quarterly	Passed all	Pounds Discharged	49,455
Permit Limit	Pass or Fail	Permit Limit	157,886
Dissolved Oxygen	PPM	Total Phosphorus	PPM
Average	9.2	Average	0.17
Permit Limit	> 7.0 (daily)	Permit Limit	2.00 (quarterly)
Fecal Coliform	Colonies/100 milliliters (ml) of sample	Total Residual Chlorine	PPB
Average	2	Average	0.04
Permit Limit	200/400 (monthly/weekly)	Permit Limit	18.0 (daily)
		Total Suspended Solids	PPM
		Average	<0.1
		Permit Limit	30.0/45.0 (monthly/weekly)

REUSE PERMIT COMPLIANCE (WQ0018709)

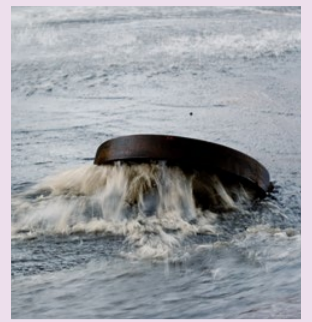
The WRF was compliant with all Reuse permit limits this year.

PLANT PERFORMANCE

Pollutant	Concentration	Pollutant	Concentration
Ammonia Nitrogen	PPM	Total Suspended Solids	PPM
Average	0.10	Average	<0.01
Permit Limit	4.0/6.0 (monthly/daily)	Permit Limit	5.0/10.0 (monthly/daily)
Biochemical Oxygen Demand	PPM	Turbidity	NTU
Average	0.8	Average	0.48
Permit Limit	10.0/15.0 (monthly/daily)	Permit Limit	10.0 (daily)
Fecal Coliform	Colonies/100 milliliters (ml) of sample		
Average	1		
Permit Limit	14/25 (monthly/daily)		

SANITARY SEWER OVERFLOWS (SSOs)

Sanitary sewer overflows (SSOs) occur when untreated sewage is discharged into the environment prior to reaching the sewer treatment facilities. These typically occur at manholes, pump stations, or broken sewer pipes. Infiltration/inflow (I/I) is unwanted water that enters the sewer collection system through deteriorating older pipes, leaking manholes or illegal connections such as roof drains, etc. During heavy rains, pipes can become overloaded from I/I and cause SSOs. Pipe stoppages caused by fats, oils, grease, debris, and non-flushable items can also lead to SSOs. Replacing and rehabilitating these lines and manholes reduces I/I into the sanitary sewer system, thus protecting the public health, improving treatment plant efficiency and reducing system maintenance. Generators provide emergency back-up power for pump stations and help prevent SSOs.



During fiscal year 2022-2023, the City of Wilson experienced eighteen (18) reportable SSOs. The WRF treated 2.9 billion gallons of wastewater during this period.

- July 22, 2022**
3527 NC Highway 42 W
Total: 13,000 gallons
Cause: Pipe failure
- July 26, 2022**
614-618 Park Avenue W
Total: 300 gallons
Cause: Pipe blockage due to rags & non-flushable wipes
- August 7, 2022**
3527 NC Highway 42 W
Total: 6,500 gallons
Cause: Pipe failure
- August 31, 2022**
2115 Lane Street SE
Total: 900 gallons
Cause: Vandalism
- October 11, 2022**
1901 Lipscomb Road E
Total: 60 gallons
Cause: Pipe failure and blockage due to grease
- October 21, 2022**
1603 Kincaid Avenue N
Total: 100 gallons
Cause: Pipe blockage due to grease
- October 29, 2022**
800 Mercer Street SW
Total: 800 gallons
Cause: Pipe blockage due to grease
- December 6, 2022**
2307 Hunter Street SW
Total: 150 gallons
Cause: Pipe blockage due to grease
- January 11, 2023**
3316 Boyette Drive SW
Total: 6,000 gallons
Cause: Pipe failure
- January 30, 2023**
4419 Ward Boulevard
Total: 200 gallons
Cause: Pipe blockage due to debris
- February 13-14, 2023**
3316 Boyette Drive SW
Total: 63,000 gallons
Cause: Inflow & infiltration during severe rain event
- March 13, 2023**
2723 Tilghman Road N
Total: 300 gallons
Cause: Pipe blockage due to grease
- March 23, 2023**
3527 NC Highway 42 W
Total: 1,000 gallons
Cause: Pipe failure
- April 10, 2023**
429 Hines Street S
Total: 150 gallons
Cause: Pipe blockage due to grease
- April 24, 2023**
3527 NC Highway 42 W
Total: 72,000 gallons
Cause: Failure of contractor’s bypass pump
- May 3, 2023**
303 Forrest Road W
Total: 120 gallons
Cause: Pipe blockage due to grease
- June 1, 2023**
2126 Cockran Street SW
Total: 300 gallons
Cause: Pipe blockage due to grease
- June 12, 2023**
6310 Ward Boulevard
Total: 50 gallons
Cause: Pipe blockage due to grease

Customers who observe a sanitary sewer overflow should report these as emergencies to the City of Wilson’s Unified Communications Center at (252) 399-2424.

Cientes que observan un desbordamiento del drenaje sanitario, deben reportar estas situaciones de emergencia al centro de comunicaciones unificadas de la Ciudad de Wilson, al telefono (252) 399-2424.

WHAT THE CUSTOMER CAN DO TO HELP

In order to help the City of Wilson continue a high standard of water quality and protection of the environment, please follow these simple steps:

- DO NOT use the toilet as a wastebasket** – place a wastebasket in each bathroom for the disposal of solid waste, disposable diapers, condoms, and personal hygiene products that DO NOT belong in the sewer system.
- DO NOT use the sink to dispose of food scraps** – place food scraps in the garbage for disposal with solid wastes, or better yet, start a compost pile.

STOP THE CLOG!

The majority of sewer backups and overflows caused by fats, oils, and grease (FOG) originate in residential areas. You can help prevent clogs by learning about FOG and how to dispose of it. By following three simple steps, you can make sure your pipes keep flowing properly. *What should you do? It’s easy!*

- 1. CAN IT!**
Once cooled, pour leftover oils and grease into a sturdy container, like an empty coffee can or glass jar.
- 2. SCRAPE IT!**
Before washing, scrape out fats, oils and grease residuals from pots, pans and dishes.
- 3. TRASH IT!**
Put fatty and greasy food scraps in the garbage, not the drain.

FOR MORE WATER QUALITY INFORMATION

- City of Wilson – Water Resources**
(252) 399-2492
www.wilsonnc.org/water-resources
- North Carolina Department of Environmental Quality**
(919) 733-2321
www.deq.nc.gov
- U.S. Geological Survey**
www.usgs.gov
- Lower Neuse Basin Association**
www.lnba.net
- U.S. Environmental Protection Agency**
www.epa.gov
- American Rivers**
www.americanrivers.org
- N.C. Environmental Education**
www.eenorthcarolina.org
- River Guardian Foundation, Inc.**
www.riverguardfdn.org
- Water’s Worth It**
www.watersworthit.org
- Sound Rivers**
www.soundrivers.org
- Love a Sea Turtle**
www.loveaseaturtle.com

AFFILIATIONS

- The City of Wilson Water Reclamation Division is affiliated with the following organizations:
- Water Environment Federation
 - American Water Works Association
 - N.C. Water Quality Association
 - N.C. One Water
 - N.C. Pretreatment Consortium
 - N.C. Rural Water Association

PROTECTING THE NEUSE RIVER

The Lower Neuse River Basin Association, Inc. (LNBA) and the Neuse River Compliance Association, Inc., (NRCA) are 501(c) (3) non-profit corporations comprised of municipalities and industries located in the Neuse River Basin. The mission of these organizations is to monitor and preserve the waters of the Neuse River and Neuse River estuary through innovative and cost-effective wastewater treatment and reduction strategies. The NRCA group is composed of 28 wastewater treatment facilities located in the Neuse River Basin. NRCA was issued North Carolina’s first basin-wide NPDES permit for nitrogen control January 1, 2003 and was reissued in 2008, 2013, and 2018. The group was given a mandate to reduce their Total Nitrogen discharge by 30%. Through the combined efforts of its entire membership, the NRCA exceeded the mandated 30% nitrogen reduction by removing over 63% of their nitrogen loading to the Neuse River estuary in 2022.

The City of Wilson is proud to be a charter member of both the LNBA and NRCA.