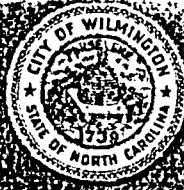


Wilson 2002 update

City of Wilmington

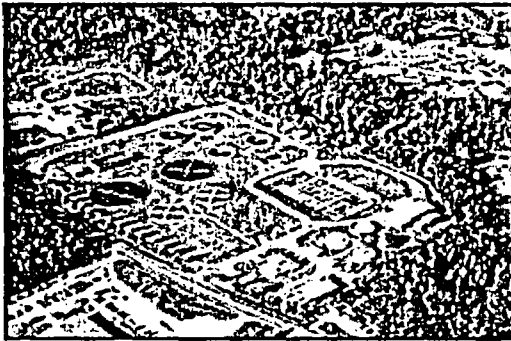


Public Utilities

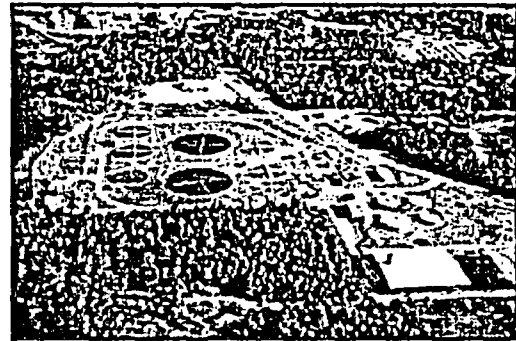
Annual Wastewater Report

Sewer Collection and Wastewater Treatment Facilities Report for FY 2003-2004 (July 1, 2003 through June 30, 2004)

The City of Wilmington's Public Utilities Department operates two wastewater treatment plants, a water treatment facility, and a sewage collection system that collects and transports the sewage to our wastewater plants. This report highlights the operation of the City's Wastewater Systems as required by the 1996 Clean Water Act. Questions, comments, or requests for additional copies of this report should be directed to the Administrative Division at (910) 341-7805. The following persons are designated as the "Operators in Responsible Charge" (ORC) of the respective systems:



James A. Loughlin
(Northside) Wastewater Treatment Plant
Permit No. NC0023965
ORC Geoffrey D. Cermak
(910)341-7890



M'Kean Maffitt
(Southside) Wastewater Treatment Plant
Permit No. NC0023973
ORC Milton S. Yann
(910)799-5860

Sewage Collection System
Permit No. WQCS00012
ORC William T. Justice
(910) 341-7885

Sweeney Water Treatment Plant
Permit No. NC0002879
ORC Tommy D. Overby
(910) 343-3690

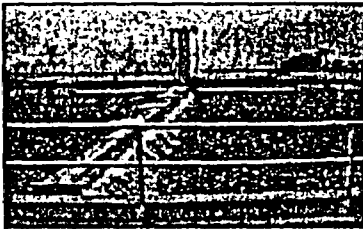
This report is available for viewing at all Public Utilities Division Facilities, the New Hanover County Main Library, City Hall, or by logging onto our web-site at www.ci.wilmington.nc.us. Customers will be notified of its availability by printed notice on water and sewer bills that are generated after August 31, 2004, and by notice on the City of Wilmington's Government Television Channel (GTV 8). This report has been completed by staff of the City's Public Utilities Department and is accurate to the best of our knowledge and belief.

Hugh T. Caldwell, P.E., Director
Public Utilities Department

System Overview

The City of Wilmington's sewage collection and wastewater treatment facilities provide service to homes, commercial establishments, and industries. For fiscal year 2003-2004, there were approximately 25,400 connections through which an average of 15.44 million gallons of wastewater traveled each day. This wastewater is collected, treated, and then discharged back into the Cape Fear River. The City also treats wastewater from the New Hanover County Water and Sewer District and from the Town of Wrightsville Beach.

Wastewater is treated at either of our two facilities: the James A. Loughlin Plant or the M'Kean Maffitt Plant. The James A. Loughlin Plant (Northside Plant), located at 2311 North 23rd Street, is permitted to treat up to 8 million gallons of wastewater daily, while the M'Kean Maffitt Plant (Southside Plant), located at 3436 River Road, is permitted to treat up to 12 million gallons daily.



Both wastewater treatment plants use physical, chemical, and biological processes to clean the wastewater. Screening and settling processes help remove most suspended materials. Biological processes, utilizing bacteria, aid with removing the remainder of the suspended materials and the dissolved substances. Leftover organic material undergoes further treatment at each plant. These nutrient-rich solids are used by local farming operations.

The City's Public Utilities Department is responsible for the daily operation of these facilities and with ensuring compliance with strict environmental standards. During this report period, operational wastewater expenditures of approximately \$7,297,160 were mostly funded by our customer's bi-monthly user charges. □



Wastewater Treatment Plant
Influent & Effluent
(before and after treatment)

Plant Performance

The City of Wilmington's treatment plants operate under NPDES permits. These complex permits include monitoring requirements and discharge limits. Some vary with seasons and have different maximums for daily values, weekly averages, monthly averages, and quarterly averages. Limits are set by the N.C. Department of Environment and Natural Resources to protect the streams receiving our discharge. Permits can be reviewed at our plants upon request.

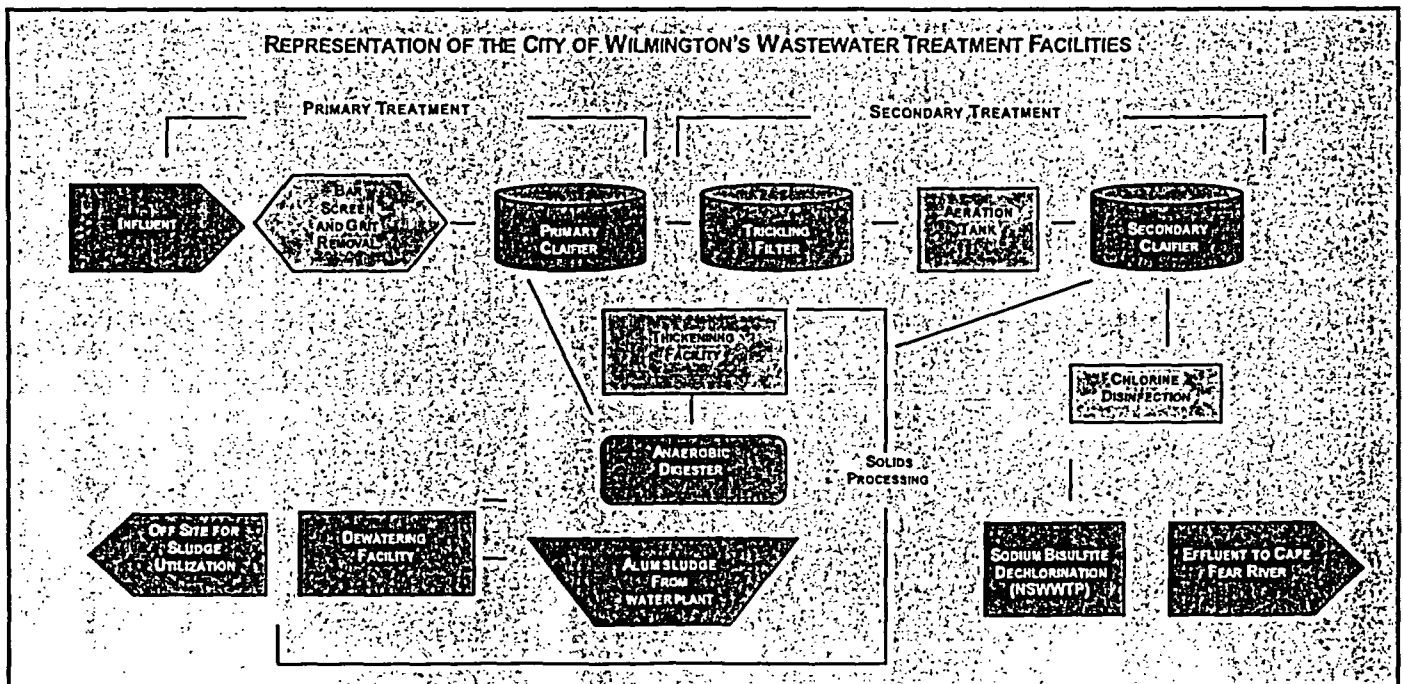
In compliance with these permits, the department's laboratory conducted over 33,000 lab analyses during this report period. Any one of these tests could have resulted in a value that caused us to violate the limits of the NPDES permit. A violation would result if a sample was not taken at its specified time, was accidentally dropped, or was allowed to linger longer than permitted before refrigeration and testing.

During this report period, the Public Utilities Department treated about 5.63 billion gallons of wastewater and returned it to our streams. Comparing all numerical limits within the NPDES permits with all corresponding measurements, the City achieved an overall 100% compliance. □

Staff Training & Certification

Wastewater collection and treatment facilities require highly-skilled technical staff to operate and maintain them effectively and efficiently. Wastewater treatment and collection personnel are certified through the Water Pollution Control System Operators Certification Commission and are governed by N.C. State law and regulations administered through NCDENR. To become certified, one must have suitable education and experience, must satisfactorily complete required coursework, and must pass a state-administered examination. In addition to initial certification, wastewater operators are required to attend six hours of continued education annually to maintain each certification they possess.

During the period covered by this report, the Wastewater Treatment Division was authorized to staff 51 full-time permanent positions. Of those, 33 staff members possess wastewater system certifications. The Utility Services Division had 25 employees dedicated to line maintenance and wastewater collection. □



Water Treatment Plant

The City of Wilmington operates a 25 million gallon per day water treatment plant withdrawing water from the Cape Fear River above U.S. Lock & Dam #1 in Bladen County. Raw water from the river is pumped 23 miles to the plant. The plant operation is a combination of conventional treatment and upflow clarification with ozonation as the primary disinfection method followed by filtration and chlorine disinfection, fluoridation, corrosion control, and pH adjustment. During the sedimentation and clarification process, alum sludge is created from the colloidal and organic matter being removed from the raw water. During the filter cleaning process, filters are backwashed and solids are collected and are then discharged into a holding tank. All sludge and backwash water is processed through a clarification process. The sludge is collected for further processing. The effluent water is discharged into the Northeast Cape Fear River under a National Pollutant Discharge Elimination System permit (NPDES).

Settled and thickened sludge is transferred by pipeline into a holding tank at the James A. Loughlin Wastewater Treatment Facility where it undergoes additional treatment. Daily flows are recorded and weekly grab samples are analyzed for pH, residual chlorine, total suspended residue, iron, aluminum, and settleable matter. □

Collection System

Did you know?

- The City of Wilmington operates a sewage collection system comprised of 370 miles of gravity line, 10,400 manholes, 30 pump stations, and 25 miles of pressurized sewage force main.
- The City of Wilmington cleans and maintains about 64 miles of sewer mains right-of-ways.
- The Public Utilities Department conducted an infiltration and inflow (I/I) study in 1995 and 2002 to inspect and evaluate all major sewer outfall and collector mains. The Greenville Loop force main is scheduled to have about 1,100 feet of 21" outfall replaced from Greenville Loop Road to wastewater pumping station #24 on Pine Grove Drive. Additionally, the Mineral Springs outfall will have approximately 1,400 feet of 12" terra cotta sewer outfall replaced from Colwell Avenue to Confederate Drive during 2005.
- During this reporting period, Pumping Station 36 was equipped with a grinder to reduce the size of debris within its wastewater. Unless properly handled, this debris has a tendency to clog pipes and pumps. It replaces a poorly performing bar screen which had demanded excessive maintenance.

How do spills happen?



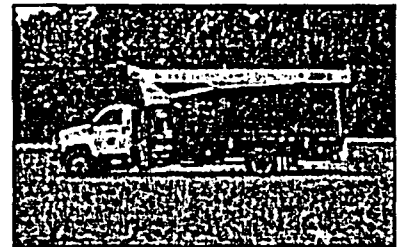
There are several possible causes of sewer overflows. Tree roots can find their way into sewer lines and create obstructions. Foreign objects can be dropped in sewers and manholes. Excessive rainfall can cause overloading of sewer lines or pump stations can malfunction due to mechanical or electrical failure.

An increasingly common cause of overflows is sewer pipes blocked by grease that result in raw sewage overflowing into parks, yards, and streets. The cleanup causes increased operation and maintenance costs for our department

It should be noted that of the 5.63 billion gallons of sewage treated by Wilmington during the 2003-2004 reporting period, approximately 20,000 gallons escaped our system, which is considerably less than 0.1% of the total.

Ways we are helping...

- On-going cleaning and inspection program to monitor and maintain our sewer system, including rodding, high pressure washing, and closed circuit television inspection of lines.
- Replacing and refurbishing old, leaking sewer lines to reduce the amount of rainwater entering our collection system.

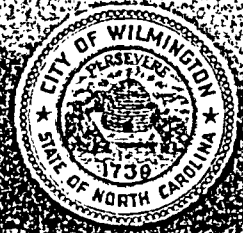


- Mobile cranes are used to transport, install, and remove wastewater process equipment at various facilities and locations throughout the City. The City purchased a medium-duty crane (above) and can now handle small and medium sized tasks. Only the largest of projects will require continued rental of this type
- Education and regulation of grease discharges in those areas where we are experiencing grease buildup in lines.



We're on the web!
www.ci.wilmington.nc.us

City of Wilmington
Public Utilities Department
P.O. Box 1510
Wilmington, NC 28402-1510
Phone: (910) 341-7505
Fax: (910) 341-5881



2003/2004 Highlights

Reducing Sanitary Sewer Overflows

According to the Department of Environment and Natural Resources there are more than 15,000 sewer overflows in North Carolina each year. Many of these overflows are directly related to the improper disposal of fats, oils, and grease used in cooking. Grease congeals in sewer pipes, wet wells, and pumps. The congealed grease contributes to sewer clogs, overflows, and may even cause waste to backup into plumbing.

City ordinance requires commercial sewer customers such as restaurants to discharge kitchen wastewater into grease interceptors before the waste enters the sanitary sewer system. This pretreatment of the kitchen wastewater helps to keep fats, oils and grease out of the sewer. Interceptors are maintained on a regular basis. Public Utilities staff monitor these facilities to ensure compliance with the ordinance. Additionally, Public Utilities staff educate restaurant managers and employees about proper disposal of kitchen waste. Staff are available to make presentations to interested groups about proper waste disposal.

Fats, oils, and grease from residential kitchens have the same potential as waste from commercial kitchens to impact the sewer systems waste. Residential customers can follow a few simple steps to help keep plumbing free of greasy clogs.

- Put oil and grease and food scraps in collection containers, such as a Fat Trapper, not down drains. Call Environmental Compliance at 343-3910 to order a Fat Trapper.
- Remove oil and grease from kitchen utensils, equipment, and food preparation areas with scrapers, towels, or brooms.
- Keep grease out of wash water.

Wastewater Infrastructure

The City's wastewater infrastructure is continuously evaluated to identify and implement major and minor repair, renewal, replacement, and renovation projects. These projects represent a significant investment in the City's wastewater systems in order to maintain their value by keeping them in reliable, efficient condition.

The project development for sewer improvements identified in a 50-year Downtown Infrastructure Study continues to move forward. As a result of the study, the City is designing plans to begin rehabilitative work in specific downtown target areas. Construction efforts are estimated to begin in the year 2005. It is very important that improvements to the water and sewer infrastructure in the downtown area be made to keep pace with the planned development and enhance this important resource in the economy of southeastern North Carolina.

During the reporting period, a number of infrastructure projects were completed and placed into service. These projects include repair/replacement of the trickling filter distribution mechanism at the Northside and Southside Wastewater Treatment Plants; extension of fiber optic communications networks to the Northside and Southside Wastewater Treatment Plants; replacement of the Southside Wastewater Treatment Plant anaerobic digester heat exchanger; overhaul of the Pump Station 35 vapor treatment system; and replacement of the bar screen with a grinder at Pump Station 36.

A number of infrastructure improvement initiatives have attained varying degrees of development and implementation during the reporting period. These projects include Southside Wastewater Treatment Plant gravity belt thickener replacement; Pump Station 9 power and controls and grinder improvements; Pump Station 14 emergency generator replacement; Pump Stations 34 and 35 variable output drive replacement; Pump Station 10 sluice gate replacement, bar screen installation and conveyor replacement, and repair of corrosion-related structural deterioration within the influent vault and wet well; Pump Station 12 sluice gate replacement and installation of grinders replacing its bar screen; Pump Station 42 construction; Pump Station 43 SCADA (remote monitoring and control provisions) installation; pump station flow measurement; and continued implementation of operational data management, maintenance management, and process automation system software upgrades.

Planning for the Future

The City continues to carefully consider the planning and design of wastewater facilities over the next several years to meet projected capacity and treatment requirements.

- The City and surrounding areas have experienced and continue to experience growth with a corresponding increase in wastewater production.
- As the wastewater treatment plants reach capacity, both prudent practical planning as well as NC DENR regulations dictate consideration of future needs. The City of Wilmington, together with New Hanover County, commissioned and completed a wastewater infrastructure study to identify and implement their future wastewater treatment needs through the year 2020.
- Significant progress has been made on the Northside Wastewater Treatment Plant expansion upgrade project. This facility is being designed to increase its capacity from 8 MGD to 16 MGD while providing better overall treatment. Project plans, specifications and permits near comple-

Programs designed to better serve you...

- **Water and Sewer Capital Improvement**
Prioritizes sewer collection and force mains for rehabilitation and replacement to alleviate sewer backups, infiltration, or spill problems. Almost one-million dollars was budgeted for various projects during this report period.
- **Odor and Corrosion Control**
Provides steps to prevent nuisance odor by allowing fumes to pass through granular activated carbon. Hydrogen peroxide is injected to control the corrosiveness of the composition. The technical feasibility of an alternative product, magnesium hydroxide, was also verified through extensive field testing.
- **Pump Station Rehabilitation Team**
Comprised of utility administrators, engineers, pump station operators, and maintenance personnel who meet on a monthly basis to identify deficiencies and recommend actions to improve the pumping station systems.
- **Coastal Environment**
Planned improvements to the treatment plants will expand capacity to support new customers and to improve the quality of effluent to the Cape Fear River.
- **Lower Cape Fear River Program**
The City of Wilmington takes an active role in organizations that are dedicated to preserving the quality of our waterways.
- **Safety**
The City's safety committees are active at the City, department, division, and section levels to provide a safe work environment for its employees. The City's wastewater employees were recently recognized by the North Carolina Department of Labor for outstanding safety achievement and health efforts contributing to reductions in injuries and illness and for promoting safer working conditions. Risk Management Plan (RMP) audit and update requirements were satisfactorily completed.
- **Residuals Management**
Solids are referred to as residuals, or when returned to the soil, biosolids. Residuals have beneficial amendment and nutrient value when recycled in this manner. During this report period, the City processed a total of 20,900 cubic yards of residuals. Approximately 1,900 acres throughout New Hanover, Brunswick, Pender, Columbus, and Bladen Counties have been approved and permitted to receive these residuals. Renewal of the City's Class B residuals (land application) permit was initiated.