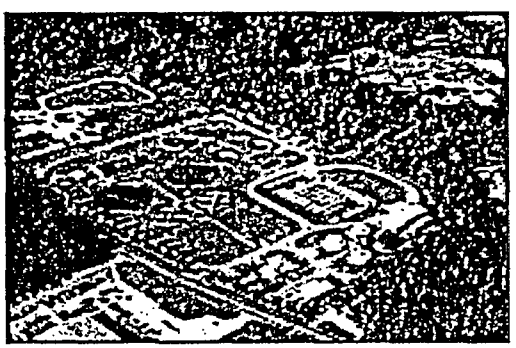
Wilmington 2002

City of Wilmington | Public Utilities

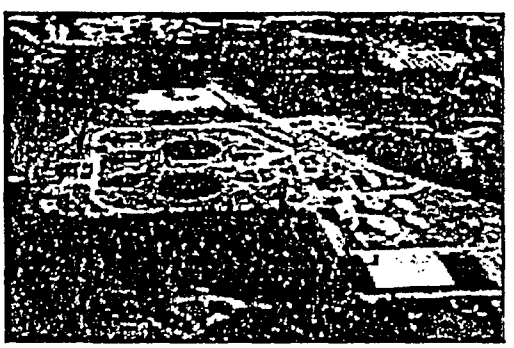
Annual Wastewater Report

Sewer Collection and Wastewater Treatment Facilities
Report for FY 2001-2002
(July 1, 2001 through June 30, 2002)

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 Douglas Carter
(910)799-5860

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

Sweeney Water Treatment Plant
Permit No. NC0002879
ORC Bill Fortune
(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. All customers will be notified of its availability by printed notice on water and sewer bills that are generated after August 31, 2002, 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.

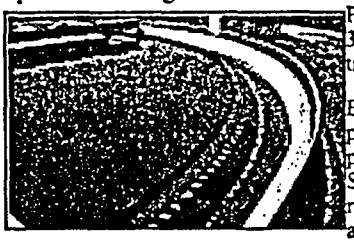
Hugh T. Caldwell

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. There are approximately 30,230 connections through which an average of 12.8 million gallons of wastewater travel 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 $5,310,500 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 almost 28,000 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.

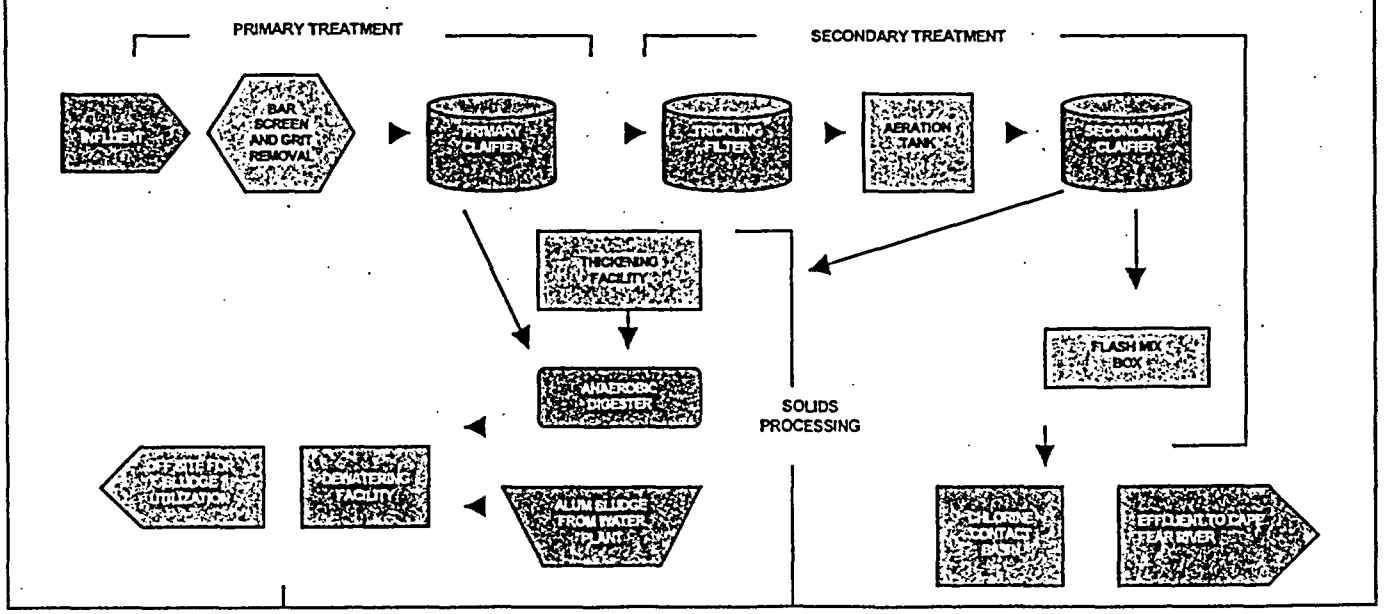
During this report period, the Public Utilities Department treated about 4.7 billion gallons of wastewater and returned it to our streams. Comparing all numerical limits within the NPDES permits with all corresponding measurements, the City achieved an overall 100% compli-

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 46 full-time permanent positions. Of those, 37 staff members possess wastewater system certifications. The Utility Services Division has 22 employees dedicated to line maintenance and wastewater collection.

REPRESENTATION OF THE CITY OF WILMINGTON'S WASTEWATER TREATMENT FACILITIES



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 cleaned and maintained approximately 55 miles of sewer mains right-of-ways.
- An inflow and infiltration (I/I) study, completed in 1995, identified problem areas in our collection system. Budget provisions were made during this report period to replace the deteriorated Cowan Street sewer outfall. Approximately 3,300 feet of 12"-24" sewer outfall has been replaced from the Cowan pump station to McRae Street during the past year.
- A listing of incidents that exceeded 1,000 gallons of discharge of wastewater from our collection system or from the treatment facilities is included in this report. There were no detected environmental impacts from any of these incidents.

- Pump station #25, located on Independence Boulevard, is currently under construction. It is one of thirty pump stations located throughout the City's service area to assist in the transportation of wastewater to both treatment facilities.

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.

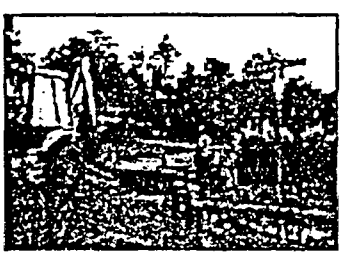
An increasingly common cause of overflows is sewer pipes blocked by grease. Grease is a by-product of cooking and is found in several things such as cooking oil, butter, meat, dairy products, and food scraps. Grease gets into the sewer from household drains, usually through the kitchen sink, as well as from poorly maintained grease traps in restaurants and other businesses. Grease sticks to the insides of sewer pipes and builds up over time. Eventually, the entire pipe becomes blocked, resulting 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 4.7 billion gallons of sewage treated by Wilmington during the 2001-2002 reporting period, approximately 59,400 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.



- Regulation of grease discharge 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
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2001/2002 Highlights

Reducing Sanitary Sewer Overflows

Each year, there are more than 15,000 sewer overflows in North Carolina. Many of these overflows are directly related to the improper disposal of oil and grease in kitchen drains. The City initiated an education campaign for food service managers and residential customers to educate them about the damaging effects of fats, oils, and greases on the home, the sewer collection system, and the environment. More than 200 restaurant managers have been visited and given information about proper use and maintenance of grease traps and interceptors. The City has broadcast educational videos on GTV, has given presentations to local organizations, has provided information to homeowner's associations, and has actively served on several committees composed of stakeholders interested in protecting our environment.

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.

One such project was the start of the Downtown Infrastructure Study by Camp, Dresser, and McKee Engineering Consultants. This project will identify and evaluate the sewer infrastructure for rehabilitation and upgrades. This information will be used to develop and prioritize capital improvements in the downtown area.

During the reporting period, Pump Station No. 44 was completed and placed into service. With the completion of its emergency generator project, both of City's wastewater treatment plants and all of its thirty pump stations are now served by emergency generators, thus assuring continuous availability of power at all powered locations.

The City has identified a number of infrastructure improvement projects which have attained varying stages of implementation during the reporting period. These projects include new digester heat exchanger and dechlorination systems at the Northside WWTP, electrical improvements at Pump Station No. 9, a new bar screen, conveyor, and emergency generator at Pump Station No. 14, a new grinder at Pump Station No. 39, and new variable frequency drives at Pump Station Nos. 34 and 35.

Finally, being conscious of the appearance of our facilities, we continuously seek to maintain them in a neat, clean, pleasant condition while enhancing them through use of such beautification features as privacy screens and landscaping.

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 rapid growth with a corresponding increase in wastewater production.
- As the wastewater treatment plants reach capacity, both prudent practical planning as well as NCDENR 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.

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 $2.2 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.
- **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.
- **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 on the City, deparment, division, and section levels to provide a safe work environment for its employees. Regular procedures reviews and facilities inspections are conducted to identify any program deficiencies for corrective action. 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.
- **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 18,520 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.

Annual Performance Summary Report
July 1, 2001 through June 30, 2002

SWEENEY WTP—NC0002878

Parameter	Date	Type of Violation or Deficiency	Corrective Action
Effluent pH	11/08/01	Monitoring	Analyzed outside 15 minute hold time; modified lab testing procedure.
Effluent pH, TSS, Settleable Matter	11/08/01	Permit-daily maximum	Sodium hydroxide chemical spill; modified internal operational procedures.
Effluent pH, TSS, Settleable Matter	11/09/01	Permit-daily maximum	Sodium hydroxide chemical spill; modified internal operational procedures.
Effluent TSS, Settleable Matter	11/30/01	Permit-monthly average	Sodium hydroxide chemical spill; modified internal operational procedures.

JAMES A. LOUGHLIN (NORTHSIDE) WWTP—NC0023965

Parameter	Date	Type of Violation or Deficiency	Corrective Action
Influent & Effluent BOD	11/01/01	Monitoring	Analyzed outside hold time; modified internal administrative procedures.
Influent & Effluent BOD	11/18/01	Monitoring	Subcontract lab quality control failure; requested evaluation of QC standards.

M'KEAN MAFFITT (SOUTHSIDE) WWTP—NC0023973

Parameter	Date	Type of Violation or Deficiency	Corrective Action
Influent & Effluent BOD	11/01/01	Monitoring	Analyzed outside hold time; modified internal administrative procedures.
Influent & Effluent BOD	11/18/01	Monitoring	Subcontract lab quality control failure; requested evaluation of QC standards.

System Overflows Exceeding 1,000 Gallons

COLLECTION SYSTEM OVERFLOWS

Permit	Incident Started	Volume	Watershed	Location	Probable Cause
WQCS00012	08/29/01	>15,000	Smith Creek	Ringo Road and Hunter's Trail	Blocked sewer main, damaged main.
WQCS00012	02/11/02	18,000		4220 Independence Boulevard	Contractor damage sewer pipe.
WQCS00012	06/15/02	>1,000	Greenfield Lake	Carolina Beach Road and Burnett Boulevard	Blocked sewer main.
Total Gallons Lost		**34,000**			

WASTEWATER PLANTS AND PUMP STATION OVERFLOWS

Permit	Incident Started	Volume	Watershed	Location	Probable Cause
	No Incidents to Report				
Total Gallons Lost		**0**			

WATER PLANT/ALUM SLUDGE FACILITY OVERFLOWS

Permit	Incident Started	Volume	Watershed	Location	Probable Cause
NC0002879	09/25/01	8,400	N.E. Cape Fear	Sweeney Water Treatment Plant	Hydraulic over load of pipe and manhole.
NC0002879	03/27/02	17,000	Smith Creek	Castle Hayne Road	Pipe and fitting failure.
Total Gallons Lost		**25,400**			