The Winston-Salem/Forsyth County wastewater treatment system exceeds all state and federal treatment standards

The Winston-Salem/Forsyth County Utility Commission operates two wastewater treatment plants that can treat up to 51 million gallons of sewage a day. The collection and treatment system includes 1,481 miles of sewer lines and 53 pumping stations. The Utility Commission and its staff work hard to meet or exceed all state and federal regulations for operating wastewater treatment plants and disposing of biosolids (sludge).

This brochure includes information about the performance of the Utility Commission's wastewater treatment plants and the sewer overflows in the collection system. It also includes details about the commission's preventative maintenance program to prevent potential problems, and compliance with state and federal standards during the fiscal year that ended June 30, 2005.

System Performance

From July 1, 2006, to June 30, 2007, the commission's sewage plants treated 12.49 billion gallons of wastewater. The Muddy Creek Wastewater Plant operated all year within the parameters established by its state and federal permits.

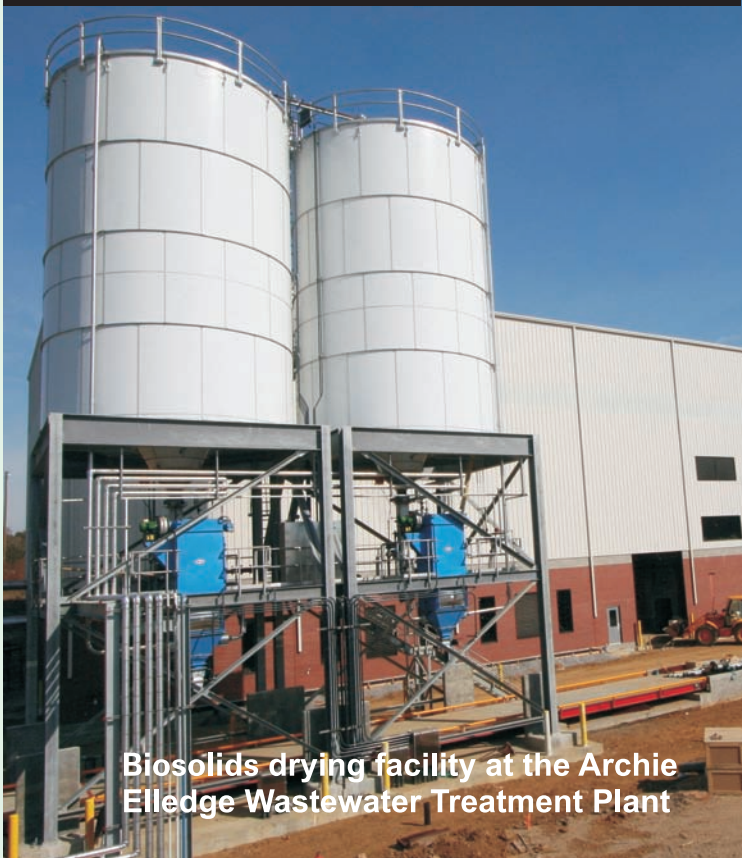
The Archie Elledge plant reported two violations of its permit, once when it exceeded the maximum limit for mercury in effluent in a treatment sample on Oct. 10, 2006 and again on Feb. 14, 2007. Monitoring of the chemicals used in the treatment process eliminated them as a source. The Utilities staff is now reviewing monitoring data for potential sources of mercury and will respond when a source is detected.

Despite these two violations the commission's wastewater plants far exceeded the minimum requirements set by the state, removing 97.2 percent of the regulated pollutants they received. On average, they discharged less than a sixth of the regulated pollutants allowed by law.

During the fiscal year there were 153 overflows in the sanitary sewer collection system, totaling 294,254 gallons, or 00.24 percent of the 12.49 billion gallons of wastewater the system collected. There were 12 overflows from treatment plants and pumping stations, totaling 332,027 gallons, or 0.0026 percent of the wastewater treated.

Winston-Salem • Forsyth County
City/County Utilities
Water • Sewer • Solid Waste Disposal

2006~2007 Wastewater Report



Biosolids drying facility at the Archie Elledge Wastewater Treatment Plant

FY 2006-2007 Treatment Plant & Pump Station Overflow/Spill Information

Month/Year	Flow Discharged from Treatment Plants, MGal	Overflows/ Spills	Overflow Volume, gallons
July 06	1,035.73	5	67,451
August 06	1,008.88	1	66,990
September 06	1,044.38	2	145,994
October 06	1,021.11	1	1,192
November 06	1,081.62	0	0
December 06	986.31	0	0
January 07	1,191.79	1	300
February 07	933.19	0	0
March 07	1,144.50	1	100
April 07	1,052.54	0	0
May 07	997.31	0	0
June 07	989.77	1	50,000
TOTAL	**12,487.1**	**12**	**332,027**

Date	Location	Spill vol. (gal)	Cause
7-5-06	Reedy Fork Pump Station	22,688	flooding
7 -5- 06	Belews Creek Pump Station	960	lighting strike
7-23-06	Reedy Creek Pump Station	26,235	flooding
7-23-06	Belews Creek Pump Station	10,633	control system failure
7-26-06	Ebert St/Frat. Church Rd.	6,935	Ruptured valve
8-30-06	Belews Creek Pump Station	66,990	Tripped breakers
9-14-06	Reedy Fork Pump Station	5,694	flooding
9-14-06	Elledge Plant	140,300	flooding
10-21-06	Reedy Fork Pump Station	1,192	flooding
1-1-07	Elledge Plant	300	flooding
3-16-07	Elledge Plant	100	sump overflow
6-11-07	Elledge Plant	50,000	pump failure

Reducing sewage overflows

During FY 2006-2007, blocked sewer lines accounted for the majority of sewer overflows. More than half – 51.6 percent – of these blockages were caused by the accumulation of fats, oils, and grease in sewer pipes.

During the year 79 sewer overflows were caused by fats, oils and grease, down from 86 last year and 97 the year before that. These reductions reflect the effectiveness of the commission's Grease Interceptor Ordinance, which was put in place in 2003, and on-going public education efforts.

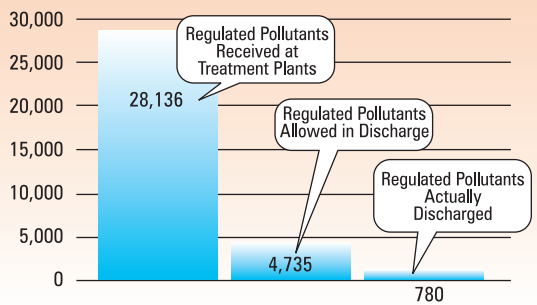
The commission's pro-active approach to cleaning sewer lines also contributed to the reducing in grease-related blockages. During FY 2006-07, the commission spent more than $8.6 million to rehabilitation of 70,932 feet of gravity-flow sewer mains, 366 manholes, and 700 service laterals. The mains were rehabilitated by means of pipe bursting, cured in place lining of pipes, point repairs, or a combination of these methods. The enhanced condition of these sewer mains and manholes not only contributed to the reduction of sewer overflows, but also reduced infiltration of storm water runoff and groundwater into the sewer collection system.

In addition, 76,419 feet of sewer mains were cleaned and inspected by closed-circuit TV, and 332,007 linear feet of sewer lines were hydraulically cleaned throughout the year. Staff and contractors improved the access to collection system easements by inspection and mowing and clearing approximately 93 miles of easements.

The City/County Utility Commission's goal is to have no overflows from the sewage collection system. As always, customers can help prevent sewage overflows by not dumping debris and fats, oils, or grease in to their sinks and toilets.

Wastewater Treatment Plant Efficiency

Tons of Pollutants per Year - FY 2006-2007



The treatment process removed approximately 27,356 tons of regulated pollutants during the period ending June 30, 2006.

FY 2006-2007 Performance Summary of Wastewater Collection System

Month/ Year	Total No. of SSO's	Permit or Reporting Violations	SSO w/ > 1000 gal. in water*	Total SSO Volume (gallons)	Total Sewer Collected** (M gallons)	SSO Percentage of Total
July 06	18	0	6	28,552	1,035.73	0.0028%
August 06	10	0	2	5,394	1,008.88	0.0005%
September 06	8	0	1	7,070	1,044.38	0.0007%
October 06	5	0	2	34,517	1,021.11	0.0034%
November 06	9	0	2	46,768	1,081.62	0.0043%
December 06	8	0	0	2,635	986.31	0.0003%
January 07	28	0	6	30,458	1,191.79	0.0026%
February 07	12	0	1	3,875	933.19	0.0004%
March 07	15	0	3	13,220	1,144.50	0.0012%
April 07	15	0	4	65,841	1,052.54	0.0063%
May 07	11	0	5	17,021	997.31	0.0017%
June 07	14	0	2	38,903	989.73	0.0040%
TOTAL	153	0	34	294,254	12,487,090	0.0039%

* See details below.

** This is the total volume of treated waste discharged from the plant but is assumed to be equal to what is collected. This measurement is in million gallons.

Sanitary Sewer Overflows attributable to:

Grease	51.3%
Roots	16.9%
Debris in line	16.2%
Surcharging	.6%
Severe Nat. Cond.	.6%
Vandalism	1.37%
Other	5.20%

Individual Listing of Overflows Greater Than 1,000 Gallons That Reached Surface Waters

Location	Spill Volume
July-06	
3856 Barkwood Dr.	1,400
306 Century Blvd	1,252
571 Dark Bridge Rd.	1,905
1005 Phineas Dr.	1,600
N. Patterson Ave	2,000
4007 Macarthur St	2,400
August-06	
Cole	1,270
2675 Knob Hill Dr	1,100
September-06	
4025 Oak Ridge Dr	5,010
October-06	
Linville Rd/Myer Lee Outfall	28,800
Linville Rd/Myer Lee Outfall	4,800
November-06	
4655 Brownsboro Rd	40,000
1600 South Hawthorne Rd	1,252
December-06	
No spills over 1,000 gals.	

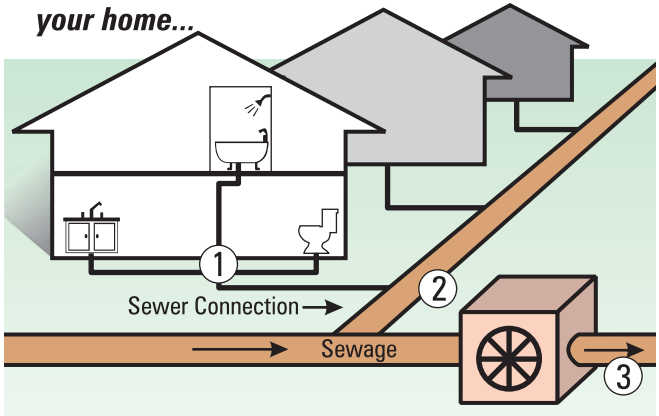
Location	Spill Volume
January-07	
4665 Brownsboro Rd	4,500
102 Cleveland Ave	1,400
114 Willow Trace Apts.	3,340
4825 Commercial Plaza	1,200
258 Greyhound St	2,925
258 Linden St	3,900
February-07	
40 & Silas Creek Pkwy	1,625
March-07	
4825 Commercial Park Dr	1,100
2625 Gould St	4,500
2147 Bethabara Park Blvd	2,500
April-07	
4665 Brownsboro Rd	18,750
3614 Kingston Rd	1,270
1 Brookview Dr	5,300
1 Brookview Dr	5,300

Location	Spill Volume
May-07	
1 Cloverdale Ave	1,200
4665 Brownsboro Rd	2,813
222 North Hills Town Houses	1,270
1 Cranford St Outfall	1,380
1189 Pleasant St	1,300
June-07	
1509 Martin Luther King Jr Dr	9,150
624 Liberia St	6,846

The Wastewater Treatment Process

1. **Sewer connections** drain water from toilets, showers, baths and sinks in buildings to a gravity sewer.
2. **Gravity sewers** flow downhill to sewer interceptors.
3. Interceptors send wastewater to the treatment plant. **Pump stations** along the way help keep the sewage flowing to the plant.
4. The sewage flows through a **bar screen** to remove branches, limbs, and other objects.
5. In the **grit chamber** the flow of sewage is slowed to allow sand and rocks to settle to the bottom for removal.
6. In the **primary clarifier**, solids fall to the bottom and form a sludge. That, along with scum floating on the surface, are removed and sent to large tanks called **digesters**.
7. The primary clarified wastewater now goes to an **activated sludge basin**, where microbes remove contaminants via a biological process. Air is pumped into the water to speed the process.
8. The **final clarifier** separates water from solids formed in the activated sludge basin.
9. **Chlorine** is added to kill any remaining bacteria.
10. The wastewater then flows through a **contact basin** that holds the water for about 90 minutes while the chlorine disinfects the water.
11. The treated wastewater is dechlorinated to prevent impacting aquatic life and then **discharged to a stream**.

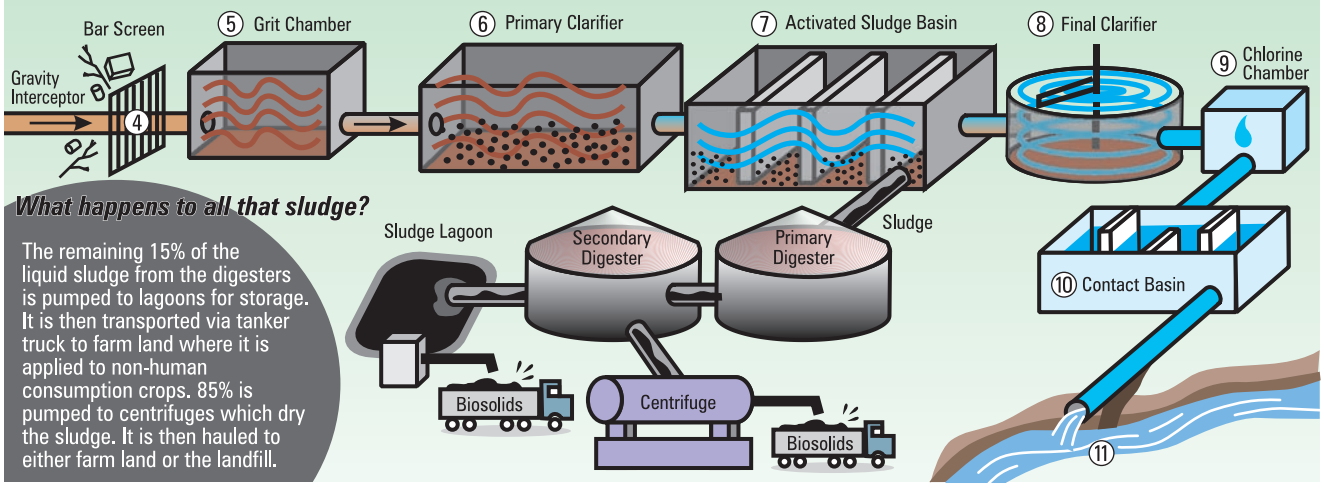
The collection system begins in your home...



The two treatment plants that the Utility Commission operates have a combined capacity of treating 51 million gallons a day.

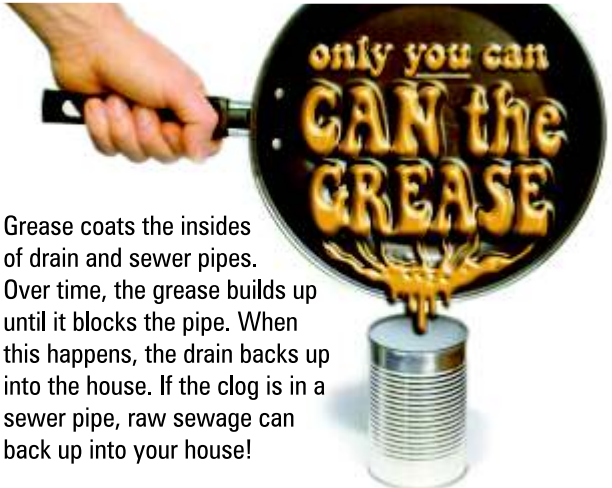
The Archie Elledge Wastewater Treatment Plant operates under NPDES Permit NC0037834 and the Muddy Creek Wastewater Treatment Plant operates under NPDES permit NC0050342.

The residual biosolids produced by the plants are processed by anaerobic digesters and disposed by application onto farm land or burial in a lined landfill. Biosolids applied to farm fields are regulated by the North Carolina Division of Water Quality under Permit WS0000094.



What happens to all that sludge?

The remaining 15% of the liquid sludge from the digesters is pumped to lagoons for storage. It is then transported via tanker truck to farm land where it is applied to non-human consumption crops. 85% is pumped to centrifuges which dry the sludge. It is then hauled to either farm land or the landfill.



Grease coats the insides of drain and sewer pipes. Over time, the grease builds up until it blocks the pipe. When this happens, the drain backs up into the house. If the clog is in a sewer pipe, raw sewage can back up into your house!

Follow these steps for clog-free drains:

1. *Pour or scrape grease from pots and pans into a can.*

2. *Store the can in your refrigerator.*

3. *When the can is full and the grease is chilled solid, throw it in the garbage.*

4. *Pour used liquid frying oil into containers that can be capped and thrown in the garbage.*

To report a sewer spill, please call our Construction and Maintenance Office at 650-7650 or, if after hours, call our 24-hour Emergency Number at (336)727-2345.

What you can do

Our wastewater collection system is designed to handle three things: used water, human body waste, and toilet paper. It's very important to keep all foreign materials, such as grease and other household debris, from entering the system because they can cause blockages that lead to sewage spills.

DON'T use the toilet as a waste basket. Put a waste basket in each bathroom for disposing of trash, disposable diapers, and personal hygiene or contraceptive products.

This report is published in accordance with the requirements of the North Carolina Clean Water Act of 1999 and provides information on the publicly operated treatment works and collection system operated by the Winston-Salem/Forsyth County Utility Commission. It covers the period from July 1, 2005 through June 30, 2006. This report is published and released to our customers annually.

If you have questions regarding the commission's programs or need additional information regarding this report, please call (336) 727-8418. Copies of this report may be obtained by calling the Utilities Administration office at (336) 727-8418. This report is also available at all branches of the Forsyth County public libraries and it is posted on the City of Winston-Salem's website at www.cityofws.org.

Winston-Salem

Published by the
Winston-Salem/Forsyth County Utility Commission
P.O. Box 2511
Winston-Salem, N.C. 27102
336-727-8418

Designed by the City of Winston-Salem
Marketing & Communications Department