

August 2003

UNION COUNTY, NORTH CAROLINA

DEPARTMENT OF PUBLIC WORKS



WASTEWATER SYSTEM PERFORMANCE SUMMARY

(FISCAL YEAR 2002-2003)

TABLE OF CONTENTS

1.0 INTRODUCTION _____ **1**

2.0 DEFINITIONS _____ **1**

3.0 SYNOPSIS OF WASTEWATER TREATMENT FACILITIES _____ **3**

3.1 Twelve Mile Creek Water Reclamation Facility _____ **3**

3.2 Crooked Creek Water Reclamation Facility _____ **3**

3.3 Hunley Creek Wastewater Treatment Plant _____ **3**

3.4 Olde Sycamore Water Reclamation Facility _____ **4**

3.5 Tallwood Estates Wastewater Treatment Plant _____ **4**

3.6 Grassy Branch Wastewater Treatment Plant _____ **4**

 TABLE 3-1 _____ **5**

 TABLE 3-2 _____ **6**

 TABLE 3-3 _____ **7**

 TABLE 3-4 _____ **8**

 TABLE 3-5 _____ **9**

 TABLE 3-6 _____ **10**

4.0 BIOSOLIDS MANAGEMENT _____ **11**

5.0 SYNOPSIS OF WASTEWATER COLLECTION SYSTEM _____ **11**

1.0 INTRODUCTION

House Bill 1160, the Clean Water Act of 1999, was ratified by the North Carolina General Assembly on July 20, 1999 and signed into law by the Governor on July 21, 1999. This legislation placed significant reporting requirements on entities that own or operate wastewater systems. This Performance Summary is intended to establish compliance with said rule.

The Union County Public Works Department is charged with the management, operation and maintenance of the County's sanitary sewer system. During the 2002-2003 fiscal year the wastewater system was comprised of 6 wastewater treatment plants (WWTP), over 60 wastewater pumping stations and over 375 miles of pipe with over 14,000 connections. In addition to the 6 WWTP's which have a combined rated treatment capacity of 4.9 million gallons per day (MGD), the County, through contractual agreement, has 1.95 MGD and 1.0 MGD of purchased capacity at the City of Monroe WWTP and Charlotte's McAlpine Creek WWTP respectively.

Public Works' Mission Statement is as follows:

Develop water, sewer and solid waste infrastructure that supports residential, commercial, industrial and agricultural needs while meeting Federal/State regulations and providing our customer base with acceptable levels of service at cost effective rates

2.0 DEFINITIONS

For the purposes of this Performance Report the following definitions apply:

- **Aerobic** – A condition in which atmospheric or dissolved molecular oxygen is present in the aquatic environment.
- **Automatic Telephone Dialer or ATD** – A device connected to the telephone system that will alert programmed telephone numbers of equipment status.
- **Biological Nutrient removal** – The process of removing nitrogen and phosphorus from wastewater using biological processes as opposed to chemical means.
- **Biosolids** – A primarily organic solid product, produced by wastewater treatment processes that can be beneficially recycled. The word *biosolids* is replacing the word *sludge*.
- **BOD – Biochemical Oxygen Demand** – The rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. The BOD Test is a procedure that measures the rate of oxygen use under controlled conditions of time and temperature. BOD is typically used to express the “strength” of wastewater.

- **CL₂ – Chlorine Residual** – The amount of chlorine present in the final effluent after disinfection. Typically measured in micrograms per liter or milligrams per liter.
- **D.O. – Dissolved Oxygen** – Molecular (atmospheric) oxygen dissolved in a liquid.
- **Effluent** – Treated wastewater flowing from the treatment system.
- **Extended Aeration** – A type of wastewater treatment facility in which the wastewater is retained and treated for a minimum of 24 hours at design flow before discharge occurs.
- **Impeller**- A rotating set of vanes in a pump designed to pump or lift water.
- **Inflow and Infiltration (I&I)** - extraneous water that enters the sanitary sewer system through openings and/or defects in the collection system.
- **Fecal Coliform** – The coliform (bacteria) found in the feces of warm blooded animals. The presence of coliform-group bacteria is an indication of possible pathogenic bacterial contamination.
- **MGD – Million Gallons per Day** – Volumetric measurement of flow converted to millions. Example .150 MGD x 1,000,000 = 150,000 gallons per day (gpd).
- **NH₃ – Nitrogen as Ammonia** – A compound found naturally in wastewater. The compound is produced by the deamination of organic nitrogen containing compounds.
- **NPDES Permit – National Pollutant Discharge Elimination System** - Permits, required by the Federal Water Pollution Control Act Amendments of 1972, which regulate discharges to surface waters.
- **pH** – The expression of the intensity of the basic or acidic condition of a liquid.
- **Pump Station** – A holding tank with pumps that forces wastewater uphill when flow by gravity is not possible.
- **SBR – Sequencing Batch Reactor** – A type of wastewater treatment facility that treats and discharges water in batches as opposed to continuous flow.
- **Telemetry** – A system by which information pertaining to remote equipment status is transmitted via radio waves to a central location.
- **TSS – Total Suspended Solids** – Particles suspended in a liquid.
- **Turbidity** – The measurement of the clearness or cloudiness of a liquid.

3.0 SYNOPSIS OF WASTEWATER TREATMENT FACILITIES (Fiscal Year 2002-2003)

During the 2002-2003 fiscal year the Department of Public Works operated and maintained a total of six (6) wastewater treatment facilities. Although each Permit requires facility visitation daily, excluding weekends and holidays, Public Works' wastewater treatment facilities are checked 7 days per week 365 days per year. All treatment facilities are equipped with emergency back-up power generators. Each treatment facility is equipped with either telemetry or an automated telephone dialer. In addition to telemetry or ATD, each facility has both audible and visual trouble alarms. Wastewater treatment plant staff rotate "call duty" for after hour situations that may arise.

A brief overview of each facility and Performance Summary Graph for each facility is provided herein.

3.1 Twelve Mile Creek Water Reclamation Facility

Permit No. NC0085359. Twelve Mile is an extended aeration facility utilizing biological nutrient removal and tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). Twelve Mile effluent is discharged into Twelve Mile Creek, which is part of the Catawba River Basin. The facility is permitted to discharge up to 2.5 MGD of treated wastewater. Twelve Mile is located at 3104 Providence Road South and serves Waxhaw as well as portions of Indian Trail and Stallings. Please refer to Table 3-1.

3.2 Crooked Creek Water Reclamation Facility

Permit No. NC0069841. Crooked Creek is an extended aeration facility utilizing tertiary filtration. Disinfection is accomplished via chlorination/dechlorination. Crooked Creek effluent is pumped over 17,000 feet to discharge into the North Fork Crooked Creek which lies in the Yadkin Pee Dee River Basin. This facility is permitted to discharge up to 1.9 MGD of treated wastewater. Crooked Creek is located at 4015 Sardis Church Road and serves the Indian Trail, Lake Park and Stallings areas. Please refer to Table 3-2.

3.3 Hunley Creek Wastewater Treatment Plant

Permit No. NC0072508. Hunley Creek is a Sequencing Batch Reactor. Disinfection is accomplished via chlorination/dechlorination. Hunley Creek effluent is discharged into Goose Creek, which lies in the Yadkin Pee Dee River Basin. This facility is permitted to discharge up to .231 MGD of treated wastewater. Hunley Creek is located at 6913 Stevens Mill Road and serves the subdivisions of Shanamara, Hunley Creek and Stevens Mill. Please refer to Table 3-3.

3.4 Olde Sycamore Water Reclamation Facility

Permit No. WQ0011928. Olde Sycamore is an extended aeration facility with tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). This facility is permitted to discharge up to .150 MGD of treated wastewater. Olde Sycamore is located within and serves the Olde Sycamore Golf Community located off Highway 218 and Rock Hill Church Road. Olde Sycamore effluent is discharged to a manmade impoundment where it is then pumped onto the Olde Sycamore Golf Course as a source of irrigation. Please refer to Table 3-4.

3.5 Tallwood Estates Wastewater Treatment Plant

Permit No. NC0069523. Tallwood is an extended aeration facility with tertiary filtration. Disinfection is accomplished via tablet chlorination. This facility is permitted to discharge up to .05 MGD of treated wastewater. Tallwood is located within and serves the Tallwood Subdivision off Brief Road. Tallwood effluent is discharged to Clear Creek, which lies in the Yadkin Pee Dee River Basin. Please refer to Table 3-5.

3.6 Grassy Branch Wastewater Treatment Plant

Permit No. NC0085812. Grassy Branch is an extended aeration facility with tertiary filtration. Disinfection is accomplished via UV (ultraviolet light). This facility is permitted to discharge up to .05 MGD of treated wastewater. Grassy Branch is located at 1629 Old Fish Road and currently serves the Unionville Elementary, Piedmont Middle and Piedmont High Schools. Grassy Branch effluent is discharged to Crooked Creek which lies in the Yadkin Pee Dee River Basin. Please refer to Table 3-6.

TABLE 3-1

Twelve Mile Creek Water Reclamation Facility
NPDES Permit #: NC0085359
Fiscal Year: 2002-2003 Effluent Limits and Performance

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	2.500 MGD	0.900	0.890	0.870	0.960	1.460	1.260	1.380	1.840	2.080	2.010	1.870	1.740
pH	6-9 SU	7.50-7.82	7.40-7.85	7.51-7.81	7.39-7.71	7.37-7.75	7.60-8.82	7.56-7.74	7.45-7.65	7.36-7.67	7.29-7.64	7.37-7.62	7.32-7.64
BOD₅	5 mg/l	0.21	0.00	1.61	0.21						0.34	0.10	0.69
AMMONIA NITROGEN	10 mg/l					0.00	2.77	0.00	1.44	0.68			
AMMONIA NITROGEN	2 mg/l	0.00	0.32	0.56	0.21						0.13	0.00	0.36
AMMONIA NITROGEN	4 mg/l					0.43	1.39	0.10	0.59	0.44			
TOTAL SUSPENDED RESIDUE	30 mg/l	0.19	0.00	0.20	0.00	0.00	4.72	0.30	1.68	0.99	1.69	1.32	1.35
FECAL COLIFORM	200/100 ml	2	2	4	1	1	19	2	2	1	1	2	4
DISSOLVED OXYGEN	≥ 6 mg/l	7.75	7.55	7.81	8.18	8.77	9.47	9.83	9.74	9.71	9.30	8.76	8.20
TOTAL PHOSPHOROUS	41.7 #/day	-	-	-	-	-	-	6.79	15.65	12.27	10.06	8.89	21.77

No violations for entire fiscal year

TABLE 3-2

**Crooked Creek Water Reclamation Facility
NPDES Permit #: NC0069841
Fiscal Year: 2002-2003 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	1.900 MGD	0.874	0.879	1.155	1.256	1.439	1.638	1.158	1.659	1.695	1.794	1.548	1.382
pH	6-9 SU	6.54-7.49	7.18-7.59	7.15-7.62	6.96-7.46	7.02-7.34	6.98-7.48	6.88-7.63	6.48-7.32	6.52-7.45	6.03-7.54	6.74-7.77	6.46-7.48
Cl₂	17 ug/l	1.00	1.38	0.00	6.90	5.42	7.50	2.17	1.00	5.54	7.61	10.90	1.69
BOD₅	5 mg/l	2.55	2.29	1.60	5.96 ¹						3.04	5.26 ²	5.43 ³
	10 mg/l					5.62	4.49	25.7 ⁴	16.7 ⁴	7.83			
AMMONIA NITROGEN	2 mg/l	0.46	0.78	0.00	0.11						0.00	0.17	0.00
	4 mg/l					0.00	2.09	0.80	0.17	0.10			
TOTAL SUSPENDED RESIDUE	30 mg/l	0.00	0.00	0.62	3.89	2.33	4.34	33.5 ⁵	14.40	7.54	4.43	4.74	5.45
FECAL COLIFORM	200/100 ml	2	2	6	12	26	5	184	30	6	4	27	3
DISSOLVED OXYGEN	≥ 6 mg/l	7.51	7.48	7.85	7.99	8.93	9.82	10.34	9.81	9.56	9.44	8.68	8.14

¹ BOD₅ parameter violated last 2 weeks of month leading to a monthly BOD₅ violation

² BOD₅ parameter violated third week of month leading to a monthly BOD₅ violation

³ Total Suspended Residue parameter violated third week of month leading to a monthly Total Suspended Residue violation

⁴ BOD₅ parameter violated first 2 weeks of month leading to a monthly BOD₅ violation

⁵ BOD₅ monthly violation. No weekly maximum BOD₅ violations during month

⁶ BOD₅ monthly violation. No weekly maximum BOD₅ violations during month

TABLE 3-3

Hunley Creek Wastewater Treatment Plant
 NPDES Permit #: NC0072508
 Fiscal Year: 2002-2003 Effluent Limits and Performance

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	0.231 MGD	0.148	0.151	0.165	0.169	0.193	0.213	0.183	0.219	0.237 ⁴	0.253 ⁴	0.217	0.204
pH	6-9 SU	6.00-6.50	6.30-7.30	6.10-7.20	6.70-7.30	6.40-7.10	6.30-6.90	6.10-7.00	6.50-7.00	6.40-7.00	6.00-7.00	6.10-6.90	6.20-7.30
Cl ₂	20 ug/l	0.00	0.00	4.75	0.00	3.25	1.60	7.10	3.71	1.80	2.33	14.2 ⁹	10.7 ¹⁰
BOD ₅	30 mg/l	10.23	8.20	14.10	6.11						27.60	14.30	13.00
AMMONIA NITROGEN	30 mg/l					7.21	13.50	25.80	51.4 ²	33.8 ⁵			
	2 mg/l	4.39	0.00	0.25	0.00						0.51	0.00	0.00
	4 mg/l					0.00	0.69	0.98	1.44	0.00			
TOTAL SUSPENDED RESIDUE	30 mg/l	8.13	7.73	17.30	5.96	7.08	15.80	17.40	40.3 ³	30.13 ⁶	16.60	9.00	8.60
FECAL COLIFORM	200/100 ml	15	13	28	5	13	16	86 ¹	4	0	143 ⁸	16	6
DISSOLVED OXYGEN	≥ 5 mg/l	5.37	5.49	5.53	6.00	5.94	5.96	6.00	6.19	5.50	5.52	6.13	5.60

- ¹ Fecal Coliform parameter violation for exceeding weekly maximum limit first week of month. Monthly average was within permit limits
- ² BOD₅ parameter violated last week of month leading to a monthly BOD₅ violation
- ³ Total Suspended Residue parameter violated last week of month leading to a monthly Total Suspended Residue violation
- ⁴ Average daily flow violated flow parameter for the month due to rains
- ⁵ BOD₅ parameter violated first 2 weeks of month leading to a monthly BOD₅ violation
- ⁶ Total Suspended Residue parameter violated monthly Total Suspended Residue limit. No weekly maximum TSR violations
- ⁷ Average daily flow violated flow parameter for the month due to rains
- ⁸ Fecal Coliform parameter violated second and third weeks of month. No monthly Fecal Coliform violation
- ⁹ Daily Residual Chlorine parameter violation last week of month. No monthly Residual Chlorine parameter violation
- ¹⁰ Daily Residual Chlorine parameter violation last week of month. No monthly Residual Chlorine parameter violation

TABLE 3-4

**Olde Sycamore Water Reclamation Facility
NPDES Permit #: WQ0011928
Fiscal Year: 2002-2003 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	0.150 MGD	0.041	0.042	0.047	0.054	0.052	0.047	0.040	0.049	0.054	0.053	0.063	0.065
pH	6-9 SU	6.50-7.70	6.90-7.90	7.40-7.80	7.10-7.80	6.80-7.40	6.80-7.40	6.90-7.50	6.60-7.40	6.20-7.10	6.10-7.10	6.30-7.80	6.00-7.10
BOD ₅	10 mg/l	0.00	0.00	0.00	0.00	1.61	3.07	3.24	1.76	4.16	2.83	1.93	1.75
AMMONIA NITROGEN	4 mg/l	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
TOTAL SUSPENDED RESIDUE	5 mg/l	0.00	0.00	0.00	0.00	0.00	2.20	1.75	2.55	0.38	0.86	1.00	0.00
FECAL COLIFORM	14/100 ml	1	0	2	0	1	0	0	1	0	0	2	1
TURBIDITY	≤ 10 NTU	0.50	0.40	0.40	0.20	0.40	1.40	0.95	1.00	0.80	0.80	1.07	0.80

No violations for entire fiscal year

TABLE 3-5

**Tallwood Estates Wastewater Treatment Plant
NPDES Permit #: NC0069523
Fiscal Year: 2002-2003 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	0.050 MGD	0.013	0.013	0.015	0.016	0.021	0.024	0.016	0.031	0.034	0.034	0.024	0.025
pH	6-9 SU	6.10-7.40	6.40-7.70	6.20-7.70	6.00-7.30	6.50-7.50	6.60-7.40	6.60-7.40	6.50-7.40	6.20-7.20	6.00-7.40	6.10-7.80	6.10-7.10
BOD₅	5 mg/l	1.41	0.72	0.00	0.00						3.99 ¹	2.62	2.40
	10 mg/l					2.12	4.97	2.97	3.06	3.31			
AMMONIA NITROGEN	2 mg/l	0.00	0.00	0.00	0.00						0.00	0.00	0.00
	4 mg/l					0.00	0.00	0.00	0.00	0.00			
TOTAL SUSPENDED RESIDUE	30 mg/l	0.00	0.00	0.00	0.00	1.25	6.74	2.20	8.49	4.10	18 ²	12.70	2.42
FECAL COLIFORM	200/100 ml	0	0	3	2	4	5	3	3	2	9 ³	3	1
DISSOLVED OXYGEN	≥ 6 mg/l	7.32	7.28	7.28	8.03	8.86	9.62	10.32	9.96	9.38	8.99	8.44	8.20

¹ BOD₅ parameter violated second week of month. No monthly BOD₅ violation

² Total Suspended Residue parameter violated second week of month. No monthly Total Suspended Residue violation

³ Fecal Coliform parameter violated second week of month. No monthly Fecal Coliform violation

TABLE 3-6

**Grassy Branch Wastewater Treatment Plant
NPDES Permit #: NC0085812
Fiscal Year: 2002-2003 Effluent Limits and Performance**

PARAMETER	LIMIT	JUL '02	AUG '02	SEP '02	OCT '02	NOV '02	DEC '02	JAN '03	FEB '03	MAR '03	APR '03	MAY '03	JUN '03
FLOW	0.050 MGD	0.005 7.30-7.90	0.010 7.00-7.80	0.014 6.40-8.00	0.013 6.50-8.10	0.012 7.50-7.80	0.006 7.30-7.80	0.005 7.30-8.20	0.008 7.20-8.10	0.008 6.50-6.80	0.012 6.40-7.20	0.008 6.20-7.80	0.005 6.70-7.90
pH	6-9 SU	0.00	0.00	0.00	0.00	0.00	0.59	4.57	4.16	2.19	2.69	1.28	0.00
BOD₅	5 mg/l												
	10 mg/l												
AMMONIA NITROGEN	2 mg/l	0.00	0.00	0.00	0.68						1.06	0.00	0.00
	4 mg/l												
TOTAL SUSPENDED RESIDUE	30 mg/l	2.85	2.40	1.70	0.00	0.00	0.64	3.40	4.03	3.25	2.52	2.00	0.80
FECAL COLIFORM	200/100 ml	4	3	10	7	2	1	18	2	10	4	8	1
DISSOLVED OXYGEN	≥ 6 mg/l	7.41	7.21	7.37	7.91	8.93	9.86	9.81	9.57	8.45	7.53	7.13	7.70

No violations for entire fiscal year

4.0 BIOSOLIDS MANAGEMENT

Biosolids are managed and disposed of in accordance with Permit No. WQ 0007486 issued by the North Carolina Department of Environment and Natural Resources. Biosolids are stored at both the Crooked Creek and Twelve Mile Creek WWTP's. The solids are aerobically digested and then applied as "fertilizer" to permitted sites. The solids are considered stabilized, and thus suitable for land application, when the volatile solids content is reduced by 38%. If this 38% volatile solids reduction can not be achieved, then alkaline stabilization, injection or incorporation is employed to ensure Permit compliance.

5.0 SYNOPSIS OF WASTEWATER COLLECTION SYSTEM (Fiscal Year 2001-2002)

Currently the Department of Public Works operates and maintains over 60 wastewater pumping stations and nearly 375 miles of pipe with approximately 14,000 connections. The pumping stations are equipped with both audible and visual alarms. In addition to audible and visual alarms, many stations are equipped with ATD's or telemetry. All stations without ATD's or telemetry are checked daily, including weekends and holidays. Pump stations with ATD's or telemetry are checked once per week at a minimum. Emergency back-up power is available via a combination of permanent and portable generators. Wastewater collection staff rotate "call duty" for after hour situations that may occur.

Public Works maintains emergency response equipment in a ready state at all times. This emergency equipment varies in nature from spare electrical parts and plumbing supplies to vacuum trucks and backhoes. Worker safety is of utmost importance. Safety equipment such as night lighting, gas monitors, and reflective cones/signs are also maintained in a ready state.

Public Works has ongoing programs to identify and correct problems associated with the inflow and infiltration (I&I) of storm water into the sanitary sewer system and to inspect and clean sewer lines. During the fiscal year 2002-2003 over 88,520 feet of pipe were smoke tested to identify potential sources of I&I. An additional 17,474 feet of main lines have been viewed via CCTV to isolate the source(s) of I&I. Over 1,000 manholes were inspected for inflow and infiltration sources (and repaired as appropriate) and approximately 57 miles of pipe were cleaned throughout the system.

Major system improvements during the fiscal year 2002-2003 include:

- A flow-monitoring study to quantify and better isolate inflow and infiltration in the system serving the eastern portion of the county.
- The complete rehabilitation of 54 manholes in the Crooked Creek Wastewater Treatment Plant service area.

- Over 900 feet of pipe rehabilitation on the system serving the eastern part of the county.
- Public Works spent over \$45,000.00 in pump upgrades to Ray's Fork Pump Station.

During the Fiscal Year 2002-2003, the County's wastewater system collected and conveyed for treatment in excess of 1.56 billion gallons. Fifty-one spills with a combined estimated volume of 2.57 million gallons occurred within the system. A brief description of each spill is presented below:

DATE	LOCATION	CAUSE	VOLUME (GALLONS)	SURFACE WATER
August 10,2002	Manhole 33 in Stonegate sub.	Grease @ Grit Build up	450	No Surface Water Hit
August 12,2002	Manhole S1.3 in Shannamara Sud.	Pump station failure	720	No Surface Water Hit
August 31, 2002	Manhole 1 at Pump Station 1	I&I	43,722	Ray's Fork
August 31, 2002	Manhole 1&2 Crooked Creek Pump Station	I&I	2,400	South Fork Crooked Creek
August 31, 2002	Spring Hill Pump Station	I&I	660	Tributary Crooked Creek
October 11, 2002	Manhole 1 at Pump Station 1	I&I	41,640	Ray's Fork
November 2,2002	3443 Shadow Lake Lane	Debris	300	No Surface Water Hit
November 3,2002	120 Windy Rush Court	Debris	100	No Surface Water Hit
November 12,2002	Manhole 1 at Pump Station 1	I&I	66,000	Ray's Fork
November 16,2002	Manhole 2 at Pump Station 1	I&I	130,500	Ray's Fork
December 13,2002	Manhole 1 at Pump Station 1	I&I	124,155	Ray's Fork
February 6,2003	Manhole 18 Located off Monroe-Ansonville Rd	I&I	97,440	Meadows Branch
February 18,2003	Manhole 19 Located off Monroe-Ansonville Rd	I&I	8,415	Meadows Branch
February 22,2003	Manhole 19,20,@2699 off McIntyre Road	I&I	97,000	Meadows Branch
February 22,2003	Pump Station 21/25 off Sharon Dr. in Waxhaw	I&I	19,000	Rone Branch
February 27,2003	Pump Station 21/25 off Sharon Dr. in Waxhaw	I&I	6,000	Rone Branch
February 27,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	157,440	Meadows Branch
March 1,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	71,250	Meadows Branch
March 6,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	224,640	Meadows Branch
March 6,2003	Manhole 2 at Pump Station 1	I&I	7,875	Ray's Fork
March 6,2003	Pump Station 21/25 off Sharon Dr. in Waxhaw	I&I	16,200	Rone Branch
March 10,2003	Jaars Pump Station	Force Main Break	800	No Surface Water Hit
March 16,2003	Manhole 19 Located off Monroe-Ansonville Rd	I&I	44,650	Meadows Branch
March 19,2003	Manholes 2697,2698,2699 off McIntyre Rd	I&I	136,395	Meadows Branch
March 20,2003	Pump Station 21/25 off Sharon Dr. in Waxhaw	I&I	27,600	Rone Branch
March 20,2003	Manhole 2 at Pump Station 1	I&I	2,400	Ray's Fork
March 21,2003	Manhole 2645 at Pump Station 3	I&I	400	New Salem Branch
April 9,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	372,060	Meadows Branch
April 9,2003	Manhole 1 at Pump Station 1	I&I	38,430	Ray's Fork
April 9,2003	Manhole 1&2 Crooked Creek Pump Station	I&I	38,000	South Fork Crooked Creek
April 9,2003	Spring Hill Pump Station	I&I	600	Tributary Crooked Creek
April 9,2003	Manhole off Pine Oak Ln. in Waxhaw	I&I	8,000	Tributary Twelve Mile Creek
April 9,2003	Pump Station 21/25 off Sharon Dr. in Waxhaw	I&I	20,000	Rone Branch
April 18,2003	Manholes 2698 @ 2699 off McIntyre Rd	I&I	56,000	Meadows Branch
May 5,2003	Manholes 2698 @ 2699 off McIntyre Rd	I&I	124,000	Meadows Branch
May 6,2003	Manhole off Fincher RD in Indian Trial	I&I	12,870	Davis Mine Creek
May 6,2003	Manhole 2644 off HWY 205 near Marshville	I&I	36,600	New Salem Branch

August 2003

May 10,2003	Manhole 1 at Pump Station 1	I&I	29,190	Ray's Fork
May 12,2003	Manhole 5 off Stevens Mill Rd near Stallings	Main Line Blockage	110,400	North Fork Crooked Creek
May 22,2003	Manholes 2697,2698,2699 off McIntyre Rd	I&I	187,500	Meadows Branch
May 22,2003	Manhole 2644 @ 2645off HWY 205 near Marshville	I&I	60,030	New Salem Branch
May 22,2003	Manhole 1 Crooked Creek Pump Station	I&I	2,700	South Fork Crooked Creek
May 25,2003	Helmsville Road Pump Station	Power Outage	875	South Fork Crooked Creek
May 31,2003	Corner of Poplin Road @ Hartis Road	Force Main Break	420	No Surface Water Hit
June 7,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	74,800	Meadows Branch
June 16,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	59,700	Meadows Branch
June 17,2003	Manhole 2644 off HWY 205 near Marshville	I&I	1,350	New Salem Branch
June 18,2003	Manhole 2644 off HWY 205 near Marshville	I&I	4,200	New Salem Branch
June 18,2003	Manhole 2698 off McIntyre Rd.in Wingate	I&I	720	Meadows Branch
June 22,2003	Manhole 1591 near Goldmine RD	Grease @ Grit Build up	2,700	Twelve Mile Creek
June 23,2003	Outside Fence at Olde Sycamore WWTP	Cut Force Main	630	No Surface Water Hit