August 2002

UNION COUNTY, NORTH CAROLINA

DEPARTMENT OF PUBLIC WORKS

WASTEWATER SYSTEM PERFORMANCE SUMMARY

(FISCAL YEAR 2001-2002)

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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 2001-2002 fiscal year the wastewater system was comprised of 6 wastewater treatment plants (WWTP), over 60 wastewater pumping stations and over 320 miles of pipe with over 12,000 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 3.0 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.

- **CL_2 – 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.
- **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).
- **NH_3** – **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 2001-2002)

During the 2001-2002 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. With over 3900 effluent monitoring tests performed, this facility maintained 99.9% compliance with permitted monthly average limits for the fiscal year 2001-2002. 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. With over 2600 monitoring tests performed, this facility maintained 100% compliance with permitted limits for the fiscal year 2001-2002. 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. With over 1000 monitoring tests

performed, this facility maintained 99.9% compliance with permitted limits for the fiscal year 2001-2002. 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. This facility maintained 100% compliance with permitted limits for the fiscal year 2001-2002. 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. With over 1200 monitoring tests performed, this facility maintained 99.9% compliance with permitted limits for the fiscal year 2001-2002. Please refer to Table 3-5.

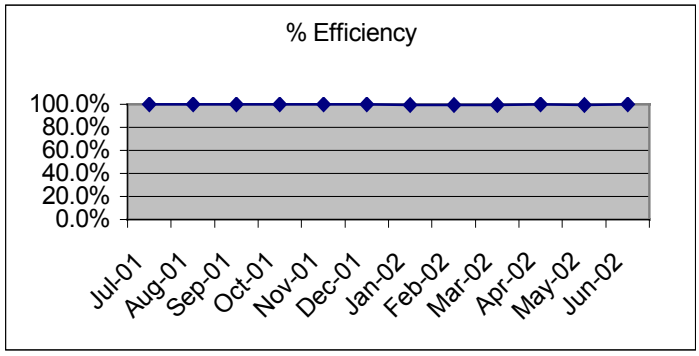
3.6 Grassy Branch Wastewater Treatment Plant

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. With over 950 monitoring tests performed, this facility maintained 99.8% compliance with permitted limits for the fiscal year 2001-2002. Please refer to Table 3-6.

TABLE 3-1

Twelve Mile Creek Water Reclamation Facility
NPDES Permit #: NC0085359
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	2.5 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
Cl_2	17 ug/l
BOD_5	(Apr.-Oct.) 5 ppm
	(Nov.-Mar.)10 ppm
NH_3	(Apr.-Oct.) 2 ppm
	(Nov.-Mar.) 4 ppm
TSS	30 ppm
Fecal	200 gm/100ml
DO	≥ 6 ppm

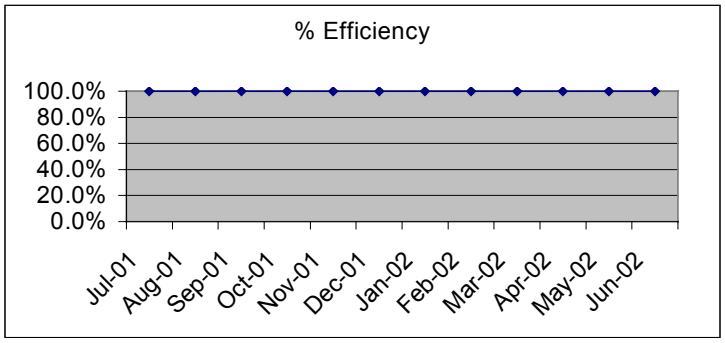


Of nearly 3920 tests performed, Twelve Mile WWTP maintained an average 99.9% compliance to permitted parameters for fiscal year ending June 2002.

TABLE 3-2

Crooked Creek Water Reclamation Facility
NPDES Permit #: NC0069841
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	1.900 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
Cl_2	17 ug/l
BOD_5	(Apr.-Oct.) 5 ppm
	(Nov.-Mar.)10 ppm
NH_3	(Apr.-Oct.) 2 ppm
	(Nov.-Mar.) 4 ppm
TSS	30 ppm
Fecal	200 gm/100ml
DO	≥ 6 ppm

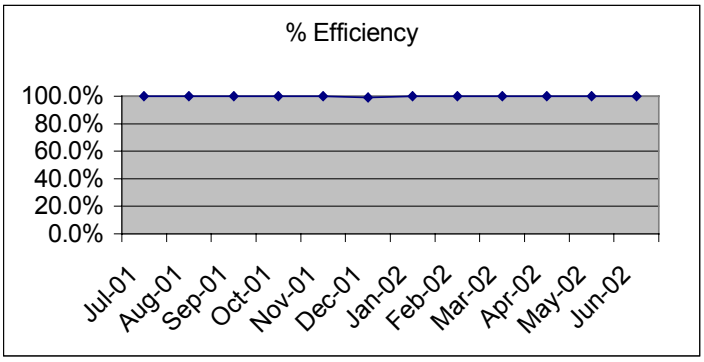


Of nearly 2670 tests performed, Crooked Creek WWTP maintained a 100% compliance to permitted parameters for fiscal year ending June 2002.

TABLE 3-3

Hunley Creek Wastewater Treatment Plant
NPDES Permit #: NC0072508
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	0.231 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
Cl_2	20 ug/l
BOD_5	30 ppm
NH_3	(Apr.-Oct.) 2 ppm
	(Nov.-Mar.) 4 ppm
TSS	30 ppm
Fecal	200 gm/100ml
DO	≥ 5 ppm

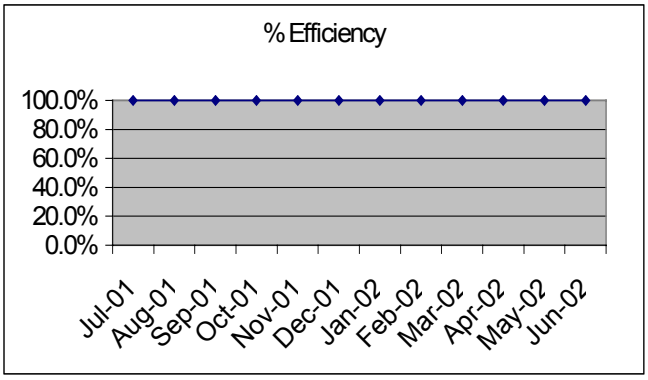


Of nearly 1335 tests performed, Hunley Creek WWTP maintained an average 99.9% compliance to permitted parameters for fiscal year ending June 2002.

TABLE 3-4

Olde Sycamore Water Reclamation Facility
NPDES Permit #: WQ0011928
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	0.150 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
BOD_5	10 ppm
NH_3	4 ppm
TSS	30 ppm
Fecal	14 gm/100ml
Turbidity	10 NTU

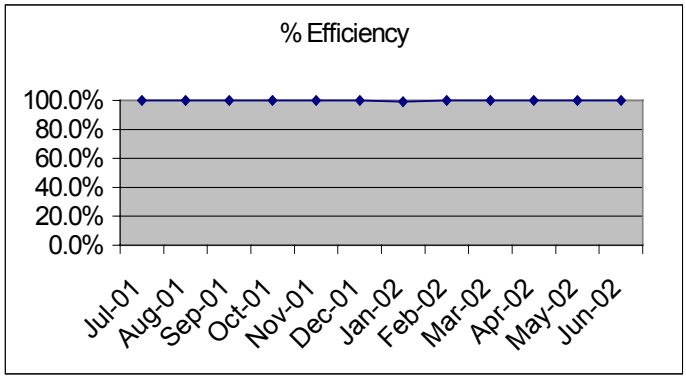


Of nearly 1200 tests performed, Olde Sycamore WWTP maintained a 100% compliance to permitted parameters for fiscal year ending June 2002.

TABLE 3-5

Tallwood Estates Wastewater Treatment Plant
NPDES Permit #: NC0069523
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	0.050 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
BOD_5	(Apr.-Oct.) 5 ppm
	(Nov.-Mar.)10 ppm
NH_3	(Apr.-Oct.) 2 ppm
	(Nov.-Mar.) 4 ppm
TSS	30 ppm
Fecal	200 gm/100ml
DO	≥ 6 ppm

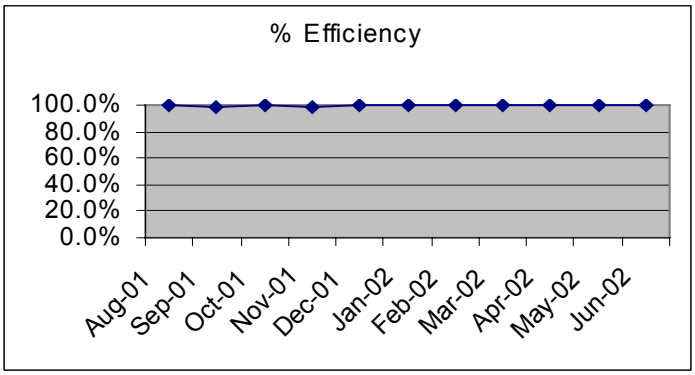


Of over 1240 tests performed, Tallwood WWTP maintained an average 99.9% compliance to permitted parameters for fiscal year ending June 2002.

TABLE 3-6

Grassy Branch Wastewater Treatment Plant
NPDES Permit #: NC0085812
Fiscal Year: 2001-2002 Effluent Limits

Parameter	Limit
Flow	0.050 MGD
pH, Max.	≤ 9 SU
Min.	≥ 6 SU
Cl_2	17 ug/l
BOD_5	(Apr.-Oct.) 5 ppm
	(Nov.-Mar.)10 ppm
NH_3	(Apr.-Oct.) 2 ppm
	(Nov.-Mar.) 4 ppm
TSS	30 ppm
Fecal	200 gm/100ml
DO	≥ 6 ppm



Of 955 tests performed, Grassy Branch maintained an average 99.8% compliance to permitted parameters for fiscal year ending June 2002.
Note: No flow for month of July 2001 due to school summer vacation.

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. The biosolids program was compliant with all applicable rules for the 2001-2002 fiscal year.

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 320 miles of pipe with approximately 12,000 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 check 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 of storm water into the sanitary sewer system. Additionally, Public works has ongoing programs to inspect and clean sanitary sewer lines.

During the Fiscal Year 2001-2002, the County's wastewater system collected and conveyed for treatment in excess of 1.3 billion gallons. Of the 1.3 billion gallons of wastewater handled, 12 spills with a combined estimated volume of 1.8 million gallons spilled from the system. A brief description of each spill is presented below:

- On October 29, 2001 Union County personnel responded to a report of a sanitary sewer overflow off Mclendon Drive in Stallings. Public works staff removed concrete and miscellaneous construction debris from the sewer line. An estimated 400,000 gallons of wastewater entered a wet weather tributary of

Davis Mine Creek. Twelve (12) fish were retrieved from a quarter mile stretch of the creek. Public Works staff dammed Davis Mine Creek with sandbags in an effort to contain the spill. In excess of 384,000 gallons of wastewater was pumped back into the sewer system. Lime was spread over the affected area as part of the remediation efforts. The spill was not of magnitude to cause endangerment to human health. The North Carolina Department of Environment and Natural Resources, Division of Water Quality was notified of the incident.

- On January 20, 2002 at 9:30 AM a sanitary sewer overflow was discovered at manhole 13 in the Trellis Subdivision. Upon investigation it was determined that the spill was caused by a power failure at the Trellis Pump Station. As a result of the spill, 630 gallons of untreated wastewater entered an unnamed tributary of Ray's Fork. The area was remediated and lime was spread on the affected area. A report was submitted to the North Carolina Department of Environment and Natural Resources, Division of Water Quality.

- On January 23, 2002 at approximately 8:00 AM and ending at approximately 1:30 PM on January 26, 2002 an estimated 835,00 gallons of wastewater and storm water combined spilled from a portion of the of the Union County Sewer System. The estimated volume is cumulative and is the result of a series of intermittent wastewater spills that occurred within a contiguous system serving portions of Eastern Union County. The intermittent spills were the direct result of storm water from heavy area rains entering the sewer system. All wastewater pumps and associated equipment were operating properly and at capacity. Untreated wastewater entered both Rays Fork and New Salem Branch in the Marshville\Wingate area. Stream samples taken during the event indicated that wastewater was not present in sufficient quantity to result in the immediate endangerment of human health or the environment. Public Works staff monitored the sites “around the clock”. Remediation efforts at the spill sites included the removal and proper disposal of paper and plastic products and the spreading of lime (lime is used to neutralize pathogenic organisms and the like). Public Works has an ongoing program to identify and correct any defects in the wastewater system that would result in storm water entering. The North Carolina Department of Environment and Natural Resources, Division of Water Quality was notified.

- Beginning at approximately 12:30 AM on February 7, 2002 and ending at approximately 12:15 AM on February 9, 2002, a combination of storm water and wastewater spilled from a portion of the Union County sewer system. The spill is attributable to heavy rains in the area. An estimated 509,565 gallons spilled from a manhole off Walkup Ave. in Monroe. The spill entered Rays Fork. All wastewater pumps and associated equipment was operating properly and at capacity. Public Works diverted all available resources to the area in an effort to determine the storm waters entry point into the wastewater system. Based on the findings, appropriate corrective actions are being taken. Stream samples taken 2\7\02, and follow up samples taken 2\12\02, indicated that the spill posed

no immediate risk to human health or the environment. The North Carolina Department of Environment and Natural Resources, Division of Water Quality was notified.

- Beginning at approximately at 8:00 PM on March 2, 2002 and ending approximately 2:40 PM on March 3, 2002, a combination of storm water and wastewater spilled from a portion of the Union County Sewer System. The spill is attributable to heavy rains in the area. An estimated 89,800 gallons spilled from a manhole off Walkup Ave. in Monroe. The spill entered Ray's Fork. All wastewater pumps and associated equipment was operating properly and at capacity. Public Works diverted all available resources to the area in an effort to determine the storm waters entry point into the wastewater system. Appropriate corrective actions have been taken. Stream samples taken 3\3\02 indicated that the spill posed no immediate threat to human health or the environment. The North Carolina Department of Environment and Natural Resources, Division of Water Quality was notified.

- Beginning at approximately 8:00 a.m. March 21, 2002 and ending at approximately 4:00 p.m. on the same day, a combination of storm water and wastewater spilled from a portion of the Union County Sewer System. The spill is attributable to heavy rains in the area. An estimated 7,000 gallons spilled from a manhole located off Walkup Ave. in Monroe. The spill entered Ray's Fork. All wastewater pumps and associated equipment were operating properly and at capacity. Public Works diverted all available resources to the area in an effort to determine the storm waters entry point into the wastewater system. Appropriate corrective actions have been taken. Stream samples taken the day of the spill indicated there is no immediate endangerment to human health or the environment. The North Carolina Department of Environment and Natural Resources, Division of Water Quality was notified.

- On January 5, 2002 a sanitary sewer overflow occurring at manhole #15 on Lake Park outfall was discovered. An estimated 840 gallons of untreated wastewater spilled. A build-up of gravel and miscellaneous debris in the sewer line caused the spill. The area was remediated. The spill did not enter waters of the State.

- On January 30, 2002 a sanitary sewer overflow at manhole #9 on Bob White Circle was reported by a customer. The cause of spill is attributable to the buildup of grease and solids in sewer line. Approximately 270 gallons spilled on the roadway and roadside. The area was remediated. The spill did not enter waters of the State.

- On February 12, 2002 a sanitary sewer overflow occurred at the JARRS Pump Station. The cause of the spill was determined to be a tripped power control breaker. Approximately 750 gallons spilled around the pump station. The area was remediated. The spill did not enter waters of the State.

- On May 31, 2002 a sanitary sewer overflow occurred at the Springhill Pump Station. Weekend "call" personnel responded to a high-water alarm. The cause of spill is attributable to low incoming power voltage. Approximately 500 gallons spilled around the station. The area was remediated. The spill did not enter waters of the State.

- On June 29, 2002 a sanitary sewer overflow occurred at the Springhill Pump Station. Approximately 300 gallons spilled around the station. The cause of the spill is attributable to area thunderstorms and consequential loss of incoming power. The area was remediated. The spill did not enter waters of the State.

If there are questions or comments about this report, please contact the Union County Public Works Department at (704) 296-4210.