REPORT ON THE MANAGEMENT OPERATION AND MAINTENANCE OF THE MACON WATER AUTHORITY'S SEWER CONVEYANCE SYSTEM

JANUARY 1, 2004 THRU DECEMBER 31, 2004

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CMOM ANNUAL REPORT

Section 1: Introduction

1.1. Overview

The Macon Water Authority (MWA) continues to address water quality control issues for its collection and treatment systems to ensure compliance with the Clean Water Act and the Georgia Water Quality Control Act. The MWA seeks to make all of its operations more efficient through proper management. This report is intended to provide a summarized, but thorough analysis of system management, a description of operation and maintenance programs, an overview of the sewer rehabilitation progress, plans for the future improvements and upgrades, and a compilation of the monthly reports detailing sewer spills and overflows. This report is further intended to educate and inform our customers, the public, and other concerned stakeholders about MWA's continuous efforts to reduce, and where ever possible, eliminate impacts our operations may have on the environment.

1.2. Policy Statement

In accordance with the Clean water act of 1972 and the Georgia Water Quality Control Act, the Macon Water Authority (MWA) is committed to ensuring that the environment is protected from all sources of pollution; particularly the pollution that can result from the treatment, distribution, and collection of water and wastewater.

The MWA has ongoing programs that are designed to identify system needs, provide and obtain project funding, and implement projects for the necessary upgrades to its system, including a long-term Capital Improvement Plan and Sanitary Sewer Improvement Program.

In addition to these programs, Standard Operating Procedures have been established as guidelines for processes associated with water and wastewater management.

These actions, along with the MWA's willingness to work with the appropriate regulatory agencies, the Altamaha Riverkeeper, members of the public, or any other interested party, will help the MWA to achieve its goal of providing water and wastewater management services in a safe, efficient, and cost-effective manner; with an emphasis on the protection of the environment, and public health.

Section 2: Collection System Overview:

2.1. Spill Monthly Reports

2.1.1. Sanitary Sewer Spills

Appendix I is a list of the 67 sanitary sewer spills that occurred between January 1, 2004 and December 31, 2004. Information in this list includes date, location, cause, estimated volume in gallons, classification (major and minor), receiving waters, and basin. Please note that a sewage "spill" is a sanitary sewer overflow in which the sewage reaches the waters of the state, while an "overflow" is a sanitary sewer overflow that is contained before reaching the waters of the state.

2.1.2. Analysis of Spills

Appendix II contains the various data tables and charts used to analyze the 67 sanitary sewer spills occurring during this reporting period. Based upon these data, the following conclusions may be drawn:

a) Grease, roots, or a combination of grease and roots account for thirty-eight (38 – 56.7%) of the sixty-seven (67) spills. Efforts to reduce these types of blockages include the Root Control, Cleaning, and Grease Management Programs. These programs are described in Section 5 of this report. Thirteen (13 – 19.4%) of the sixty-seven (67) spills were hydraulic and related to the tropical storm rain events and power outages that occurred during the month of September of this reporting period. Based on the data of this reporting period as compared to the previous reporting period, our analysis confirms that reduction of sanitary sewer spills/overflows can be further accomplished by continued focus on grease and root control efforts. The installation of back-up generators at lift stations will also help reduce spills/overflows during inclement weather which results in power outages to the lift stations.

b) The average number of spills per month during this reporting period was 5.6. This value was a 19% reduction from the last reporting period value of 6.9. Also the average number of spills per quarter of 2004 decreased from quarter to quarter throughout the year (8.3 in the first quarter to 1.7 in the fourth quarter).

c) Ninety Percent (90%) of the total spills were of a volume less than 10,000 gallons, which are considered minor spills by regulatory agencies. Over Eighty-Three Percent (83.6%) were less than 3,000 gallons. While the smaller volume per spill does not excuse the occurrence, it does lessen the severity of impact.

All but one of the major spills over 10,000 gallons were caused by power outages and hydraulic overloads due to tropical storms during the month of September. One spill of over 10,000 gallons occured when a contractor did not properly plug a manhole at the end of a workday and a significant rain event occurred that night.

d) Rocky Creek was the secondary waterway most affected by sanitary sewer spills, with thirteen (13 – 19.4%) spills entering it.

e) Fifty percent (50%) of the spills were received by Wolf Creek, Boggy Branch, Lake Tobesofkee, Bowman Branch, Sabbath Creek and Ocmulgee River. Other basins receiving spills are detailed in Appendix II-5: Analysis by Receiving Water. The analysis highlights the number of spills compared to the total length of mains in each basin and the condition of pipes and manholes in each basin. This information is analyzed to help prioritize the basin priority for rehabilitation work efforts. This analysis is detailed in Appendix V: Spill Priority.

It is realized though, that all spills that occur in the MWA's collection area may eventually reach the Ocmulgee and Altamaha Rivers.

2.2. Collections Department and Contracted Work Reports

Appendix III contains a tabulation of the monthly collections department reports. More than 224 miles of the MWA's approximate 900 miles (about 25%) of sewer mains were cleaned during 2004. Most of the mains in the four basins with the largest number of spills were cleaned in 2004. Access to easements on which some of the mains are located in these four basins hindered cleaning efforts. Arrangements are being made to have these easements cleared. The MWA has installed grease emulsifier pumps on two trucks to aid in grease dispersing during cleaning operations. Additional maintenance measures include more than 92 miles of main videoing and more than 67 miles of easement clearing by in-house personnel; and approximately 28 miles of root control by contracted work. Approximately ten percent of MWA's mains were videoed in 2004.

Darryl Macy, a professional with 23 years experience in sewer maintenance, was hired as the manager of the Sewer Conveyance Department. Mark Steele, another professional with 5 years experience, was hired as supervisor for the cleaning and videoing section of the Sewer Conveyance Department. Because of the foresight, planning abilities and experience of these two individuals, the cleaning and videoing of MWA mains has increased significantly this year. Their innovative work is directly attributable to the reduced number of spills in the sewer system this year. They have instituted a "crew of the week" competition system in the section. Competition for incentives for being named the crew of the week has

increased productivity, reduced the number of spills and boosted employee morale.

Rehabilitation contracts focused on manhole relining and main rehabilitation. The manhole rehabilitation project is complete with 3734 vertical feet of manholes having been lined with a cement coating material. The sewer pipe rehabilitation (pipe-bursting and cure-in-place relining of mains 12" in diameter and smaller) is almost complete. A total of 22.2 miles of cure-in-place rehabilitation and 1.5 miles of pipe bursting rehabilitation have been completed. The Macon Water Authority approved the awarding of contracts totaling almost $6,000,000 to accomplish the work on these rehabilitation projects.

As stated above, the focused main cleaning, main videoing, contract rehabilitation work, root control contracts, and easement clearing have resulted in the decline in the number of spills in 2004. This point is illustrated in the Analysis of Spills (Trend and Moving Average) charts as shown on Appendix IV.

2.3. Permit Violations

The MWA did not experience any permit violations during the reporting period for the Amerson (Town Creek) Water Treatment Facility or the Lower Poplar and Rocky Creek Wastewater Treatment Facilities. NPDES permits for each treatment facility as well as water quality data showing the MWA's compliance with each NPDES permit may be obtained upon request from each of the plant's managers. The manager for the Amerson Water Treatment Plant is Gary McCoy. Mr. McCoy's phone number is 478-464-5653. The manager for both wastewater treatment plants is Mr. Terry Forrest. Mr. Forrest's phone number is 478-464-5681.

Section 3: Sanitary Sewer Improvement Plan

3.1. Introduction

In an effort to manage and maintain the sanitary sewer system and to reduce future sanitary sewer spills and overflows, the MWA has established a Capacity, Management, Operation, and Maintenance (CMOMs) program. Our program includes an organized, multi-phased management plan for monitoring the MWA sanitary sewer operation. Management of the MWA considers this program to be one of the most critical areas in the Authority. Therefore, a CMOMs Coordinator position was established last year to establish a viable program and to analyze goals and objectives. An environmental engineer was selected to fill the position, however, the person selected left the MWA for other employment opportunities in June after serving only a few months in the position. Although the position has been advertised since the vacancy occurred, there has been no one interviewed

who was considered to be fully qualified to fill the position. We will continue to seek to find a qualified applicant.

3.2. Condition Assessment

The MWA's first step in making an accurate assessment of the current capacity of the sanitary sewer system was to develop a Geographical Information System (GIS). A GIS program is vital for giving a visual picture of the MWA system and for tracking the program requirements and accomplishments. The MWA hired Mrs. Beth Stark, a GIS Professional, in December. Meetings have been reinstated with the Bibb County GIS system committee. The scanned tax map location of manholes and sewer mains are being replaced with survey locations tied to state plane coordinates along with various other data relating to the operation and condition of the sanitary sewer system.

3.2.1. Manhole Evaluation

The process of determining manhole locations and conditions was begun by dividing Bibb County into a number of sewer basins and sub-basins. Two contractors; Jordan, Jones, and Goulding (JJ&G) and Burton, Davis, and Associates; were then hired to physically inspect the manholes, aerial crossings, and easement areas of the system and provide pertinent information on each. Jordan, Jones and Goulding took the field data information and converted it into a format that is compatible with the MWA GIS software. This task was completed at the end of June 2004 and all collected data has been delivered to the MWA on manholes that could be found without clearing easements or breaking pavements. Data on these manholes will be collected by in-house employees.

The sewer assessment information included the condition of the manhole, the state plane coordinates of the manhole, the materials of construction of the manhole, location of all aerial mains, easement conditions, the direction of flow of the sewage in the mains, number and size of mains at a manhole, invert and rim elevations, and any repair work that could be visually determined on the manhole or main.

The MWA's GIS coordinator is currently performing Quality Assurance (QA) on the data submitted by JJ&G to determine the accuracy of the delivered information and to layout future steps to continue collecting data obtained by our in-house personnel. The MWA will develop projects to clear easements and to raise manholes to allow access and sewer system evaluation. MWA in-house personnel will gather the information on these remaining manholes, sewer mains, and update information on current surveyed manholes and sewer mains.

3.2.2. Sewer Main Condition Evaluation

Three methods used to evaluate the condition of sewer mains are video, smoke tests, and flow measurement. The videoing of mains with a closed circuit television (CCTV) camera to determine the pipe material, condition of the main, root intrusion into the system, condition of lateral connections, and infiltration points into the main. Performing smoke tests will show if there are breaks in mains, laterals, or if there are storm water connections to the sanitary sewer system. A third method is to install flow monitoring devices at various manholes in a particular basin to determine how much infiltration and/or inflow is entering into the system during rain events.

3.2.3. Aerial Crossings

Identifying aerial crossings including taking two digital pictures of each aerial crossing was a part of the original survey. This is an important part of the system assessment. The MWA is developing a database to annotate the inspection of the aerial crossings to ensure that they have good support structures and that no wash outs are occurring around support piers which can cause a main to break and result in a sewer spill. The digital pictures that were taken of all aerial crossings will be entered in the GIS system to update the data-base. In 2004 MWA personnel inspected and photographed all of the aerial mains identified in our GIS system. Previously unidentified aerial crossing were identified, inspected and recorded.

3.2.4. Hot Spots

Development of a hot spots list and a schedule for inspection has also been instituted. “Hot spots” are those areas where sewer overflows or spills have occurred. In the past all sewer spills and overflows were annotated with a multi-colored pin (a different color for each year) on a county map. This information is being transferred to the GIS database. A field has been developed to list all “hot spots” and annotate the dates each area is inspected. This information can be printed when requested. Hotspots are inspected daily by personnel in the sewer conveyance department, depending upon availability of resources.

3.3. Rehabilitation

3.3.1. Schedule

Once the condition of the entire system has been assessed, the MWA will be able to better develop projects and programs that repair both manholes and sewer mains. In the past, repairs to the sanitary system have been made based on where problems were occurring. The MWA's future strategy is to repair a basin or sub-basin completely and then move to another basin. However, working in more than one basin at any given time may occur, depending on the availability of resources. The priority of the basins will be made based on the age and pipe material, the number of spills and overflows that have occurred per length of pipe, and information that has been received from the video, smoke testing and flow monitoring programs. This will be a dynamic program with priorities changing as the inspection process progresses. The current prioritized list of basins for repairs can be found at Appendix V. The priority is made based on spills per mile of pipe in a basin. A "high" priority is given when the ratio is greater than 1. A "mid" priority is given when the ratio is between .10 and 1.0. A "low" priority is given when the ratio is less than .10.

3.3.2. Methods for Rehabilitating Sewer Mains

The MWA utilizes one of the four methods listed below to rehabilitate or replace existing sanitary sewer mains:

3.3.2.1. HDPE Lining

This process is accomplished by pulling a HDPE (high density polyethylene) liner, which has been electrically welded as one continuous pipe segment inside an existing pipe. One drawback of this method is that it reduces the inside diameter of a pipe. Sometimes the loss of pipe diameter can be offset by the slickness of the HDPE liner. The material of the old pipe may have large friction losses and the new slick pipe may actually increase flow in the pipe. Also, each lateral re-connection to the main, using this procedure, must be made by digging from ground level down to the connection.

3.3.2.2. Cured-in-Place

Another method is the cured-in-place procedure. This method has a felt liner coated with epoxy resins installed within a pipe. The liner is hardened against the inside of the host pipe through the use of steam or hot water. This liner is not as thick as a HDPE liner and may not affect the amount of flow due to the decreased friction because of the slicker surface of the liner. When using this procedure, lateral re-connections can be made from inside the pipe with a robotic cutting device.

3.3.2.3. Pipe Bursting

The third method is a pipe-bursting procedure. This method is the most expensive method and is generally used only when it is not economically feasible to reline or to dig up a main to replace it (i.e. mains located in established yards or mains located underneath large trees, under pavements or around other buried utilities). The pipe bursting procedure uses a hydraulic driven bursting tool which splits an old pipe between manholes and pulls behind it a new HDPE pipe of the same internal diameter and replaces the old main. This procedure requires the digging down on the new main to reconnect laterals. Pipe bursting can also be used to increase the size of our mains by pulling in a larger HDPE pipe.

3.3.2.4. Replacement

The last method for replacing sewer mains would be to dig up the old pipe and replace with a new one or to install a new pipe and abandon the old pipe.

3.3.3. Methods for Rehabilitating Manholes

Manhole repairs are typically made by spraying a water resistant cement coating on the inside wall of the manhole. Paved-over manholes can be raised using manhole risers.

Section 4: CMOM Program

4.1 Goals & Accomplishments

The CMOM Program had a successful beginning. Initial goals of the program included generating a policy aimed at reducing sanitary sewer overflows, maintaining a Microsoft Access database, taking digital pictures of locations and conditions of aerial crossings, and annotating sewer rehabilitation projects on a

master map. Program accomplishments included writing a draft of the revised program document; establishing databases to monitor sewer spills and overflows, tracking system maintenance and system rehabilitation, and entering information related to aerial crossings. Upcoming tasks will include conducting an internal assessment of the program document and incorporation of the information in the GIS databases mentioned above. Progress Reports are being written to EPD and the Altamaha Riverkeeper to keep them informed. Monthly progress reports are given to the MWA Board.

4.2 CMOMs Consent Agreement

The MWA is preparing information and justification to negotiate a CMOMs Consent Agreement similar to the agreements Zero-Tolerance counties have with the Georgia Environmental Protection Division (EPD). The purpose of the agreement is to reduce sanitary sewer spills and overflows by using the money that would be spent for sanitary sewer spill fines to fund system rehabilitation projects. After the EPD conducts an audit of the MWA's CMOMs Program, an agreement may be entered such that the MWA will not pay any fines for spills less than a certain volume. In return, the MWA may agree to increase the percentage of its annual sewer system operating budget to fund CMOMs components. Both parties will have the right to terminate the agreement based on pre-identified conditions.

Section 5: Current Projects

5.1. Manhole Evaluation Study

As previously discussed in Section (3.2.1.), JJ&G has delivered the manhole data in a usable form. This data is undergoing QA and is being incorporated into the GIS data-base where it will be used to help prioritize and coordinate manhole rehabilitation, help locate manholes, and help perform customer service. The in-house evaluation of "not-found" manholes will begin once the QA of the "found" data is completed.

5.2. Sanitary Sewer Evaluation Study (SSES)

5.2.1. Flow Monitoring

Flow monitoring is a process used to quantify local infiltration and inflow (I/I) into the sanitary sewer system. This usually involves isolating one or more sewer segments and measuring the flow. A rain gauge is also located in the area to measure rainfall.

After examining spill and overflow frequencies and causes, as well as system condition, the order of the three highest priority basins was reset as follows: 1) Beaverdam Creek, 2) Wolf Creek, and 3) Walnut Creek. Flow monitoring began in the Walnut Creek and Wolf Creek basins in early June 2004 and in mid June 2004 in the Beaverdam Creek Basin. The first phase of flow monitoring in all three basins is complete.

Woolpert LLC monitored the Beaverdam Creek Basin and reported that despite frequent and often high intensity rain events the basin experienced very small increases in flow from rain induced I/I.
DWC Technologies monitored the Wolf Creek Basin. DWC reported that there are no dry weather problems within the basin. The wet weather evaluation identified some areas of concern due to surcharge depths exceeding 100% while two locations recorded near full pipe flow.

RJN Group, Inc. monitored the Walnut Creek Basin and reported that only one meter location was recommended for further field investigation based on inflow. RJN also reported that the Emory Highway area was recommended for both I/I investigation. Neither area experienced significant increases.

The second phase of flow monitoring will begin in early 2005. The basins to be chosen for phase II will be determined using the same analytical techniques used to prioritize the phase I basins.

5.2.2. Smoke Testing

The purpose of smoke testing is to locate rainfall-dependent I/I sources, such as roof, yard, and area drain connections and broken main and lateral lines. After smoke is piped into a line, emissions of smoke from manholes and the ground indicate defects in manholes, lines, and laterals. These defects are likely sources for I/I. Smoke testing has not begun in any of the MWA sanitary sewer basins.

5.2.3. Closed Circuit Television (CCTV) Inspection

For small diameter mains, CCTV is the only practical method of inspection. The line must be cleaned prior to CCTV inspection. CCTV is performed by pulling a camera through the line, while observing the images on a monitor. The information is recorded on a videotape, CD or DVD. The evaluation of CCTV records helps identify structural problems, leaking joints and cracks, blockages, dropped joints, and areas of root intrusion. The MWA does CCTV inspection on new and existing sewer mains. During CY 2004 the MWA televised approximately 10% of our sewer mains. Approximately 85 miles were inspected as compared to approximately 17 miles in CY 2003. This is an increase of about 500%.

This increase is a direct result of the new management team in the sewer conveyance department as stated in paragraph 2.2 above.

5.3 Current Contracts

The MWA approved the expenditure of $7,200,000 over 18 months to accelerate the rehabilitation of its sanitary sewer system. Below is an update of how that money is being utilized.

5.3.1. Cured-in-Place Sewer Main Rehabilitation Method

Contracts totaling over $4.5 million were awarded to reline concrete and clay sewer mains using the "cured in place" method. Work under this contract has resulted in the rehabilitation of approximately 31.7 miles of 12" and smaller sewer mains. It also included cleaning, videoing, reconnecting laterals, and by-pass pumping when required. These two relining projects are about 90% complete.

5.3.2. Pipe Bursting Sewer Main Rehabilitation Method

A contract for $500,000 was awarded to up-size some 8" mains to 12" in east Bibb County and upsize some 6" mains to 8" in west Bibb County using the "pipe bursting" method. The increasing of the mains were needed to help eliminate spills because of undersized mains. This project is complete.

5.3.3. Cured-in-Place Relining Sewer Main Rehabilitation Method

A $1,000,000 project is scheduled to be bid in January 2005 to rehabilitate a 36" diameter sewer main along Pio Nono Avenue in the Rocky Creek Basin. The work should begin in March and be completed in six months.

5.3.4. Manhole Rehabilitation

A $500,900 contract awarded to rehabilitate an anticipated 600 manholes that were identified as being in either poor or fair condition during the manhole evaluation contract. The work is 90% complete.

5.3.5. Lift Station Repair

The Main Street and Indian Mounds lift stations are two of the seven larger lift stations in the MWA collection system. Both were built circa 1960 and were in immediate need of electrical, mechanical, and piping upgrades. The work at each lift station included installing new pumps, valves, hoists and standby generators, rehabilitating the wet wells, installing new ventilation systems, and upgrading the electrical system in each station. This project was completed in November 2004. The cost to

date for this project is $3,130,153. A design contract for the rehabilitation of the Riverside Cemetery lift station is scheduled to begin in January 2005. The same work accomplished at the two stations listed above will be incorporated into this project. Once this project is complete only two of the of MWA's larger lift stations, Allen Road and Corbin Avenue, will need to be rehabilitated. MWA plans to budget the upgrade of two small lift stations in the sewer conveyance department budget each year.

5.4. Grease Management Program

The MWA established its Grease Management Program (GMP) in October 2000 to target grease-related sanitary sewer spills and overflows. Under this program, all food service establishments are required to install a grease interceptor. The MWA GMP database entries currently total 792 commercial establishments.

The MWA Grease Management Inspector visits all food establishments every three months. He performs inspections on all grease interceptors to ensure their proper operation and maintenance of the interceptor. An inspection report is then issued to the establishment with either a passing or failing grade at the time of inspection. If an establishment fails an inspection, the manager/owner has 10 days to fix the problem and have a report sent to the MWA Engineering Department. If a report is not received and approved in the 10 day period, a re-inspection of the facility is made. A re-inspection fee has been approved by the Authority for these re-inspections. Hopefully, the re-inspections will serve as an additional incentive for businesses to maintain grease traps according to regulations.

To supplement the inspections, the MWA began use of Waste Manifest Forms in February 2004. These forms are helping to monitor the waste from septic tanks and commercial grease interceptors from their point of generation to disposal at the Lower Poplar Wastewater Treatment Facility. The long-term impact of the use of these forms has not been evaluated due to the relatively short term of use.

The MWA believes the Grease Management Program has resulted in a noticeable decrease in sanitary sewer spills and overflows due to the absence of grease from commercial grease generators. A recent MWA survey shows that recent sewer spills and overflows due to grease from restaurants, after the Grease Management Program became operational, have not been traced to any commercial grease generator.

A final element of the Grease Management Program, and possibly the most important, is public education. Efforts include billing inserts, newsletters, public service announcements, an informative website, as well as tours of facilities. The MWA is a strong proponent of keeping the public involved in every aspect of its operations.

5.5. Root Control

Root intrusion is one of the most common maintenance problems for sanitary sewer systems. Roots require only a capillary-sized hole before they will penetrate a pipe for the moisture and oxygen they need to grow. Once inside the pipe, roots provide a matrix on which blockages from grease and other solids will form.

The MWA currently uses two methods of root control: physical and chemical. Physical root removal involves the cutting away of roots with sewer cleaning equipment. This method only provides a short-term solution, due to the fact that the tree sees this as an injury and produces hormones to speed re-growth and recovery. This pruning effect often leads to bigger, bushier roots over time.

The use of chemical root control can retard root growth without long-term harm to the tree. During 2004 the MWA treated approximately 28 miles of sanitary sewer main by contract with the Duke's root control chemical. In CY 2004 approximately $300,000 was spent on root control contracts.

5.6. Elimination of Pump and Haul Systems

The MWA instituted a Pump and Haul (P&H) program to provide temporary sanitary sewer to several subdivisions until a permanent sewer leading to a Publicly-Owned Treatment Work (POTW) could be installed. In these systems, sewage was stored until a septic hauler truck could pump it out and haul it to the POTW for treatment services.

The EPD ruled P&H systems to be an unacceptable practice due to the possibility of a sanitary sewer overflow occurrence. The EPD issued to the MWA a consent order to eliminate the five systems by September 30, 2004. All P&H sites have been eliminated since August 31, 2004. Each P&H site was eliminated by installing either a gravity flow sewer or a sewer lift station. A list of the projects with costs is listed below:

Brown's Cove S/D	$248,673.52
LaGrange S/D	$468,300.20
Chandler Downs S/D	$429,444.88
Colaparchee Plantation S/D	$364,356.12
Winslow Oaks S/D	$284,610.60

Section 6: Future Projects

Future projects will be identified from the sanitary sewer evaluation study findings. This information will be included in the MWA five-year Capital Improvement Program. This document will be dynamic and may change based on priorities and funding. The five-year Capital Improvement Plan should be completed by July 2005.

Section 7: Concluding Remarks

This report summarizes the MWA's commitment to reduce sanitary sewer overflows through the proper management, operation, and maintenance of its collection and treatment system. In summary, the completion of nearly $6 million dollars of rehabilitation projects on our sewer infrastructure, the addition of a CMOMs coordinator position, the hiring of two highly effective sewer conveyance professionals to improve management in the sewer conveyance department (that was evidenced by the large increase of completed sewer maintenance actions in that department along with a significant reductions in sewer spills), the elimination of all pump and haul operations, the rehabilitation of two large sewer lift stations, the decision to use a GIS system to help MWA better manage its sewer infrastructure and track sewer maintenance actions, the flow monitoring of sewer systems to pinpoint infiltration and inflow, and the commitment of the Authority Board members to keep funding of sewer projects and equipment at a high priority are the beginning of a solid foundation to build upon and improve on for the coming years. These actions, along with the MWA's willingness to work with the appropriate regulatory agencies, the Altamaha Riverkeeper, members of the public, and any other interested party, will help the MWA to achieve its goal of providing water and wastewater management services in a safe, efficient, and cost-effective manner; with an emphasis on the protection of the environment, public health, and public interest. The management and staff of the MWA are confident that this report will aid in the efforts to educate and inform MWA customers, the public and other concerned stakeholders about MWA's going efforts to reduce, and where ever possible, eliminate impacts the operations may have on the environment.

APPENDIX

APPENDIX I: MWA SANITARY SEWER SPILLS FROM JANUARY 1, 2004 - DECEMBER 31, 2004

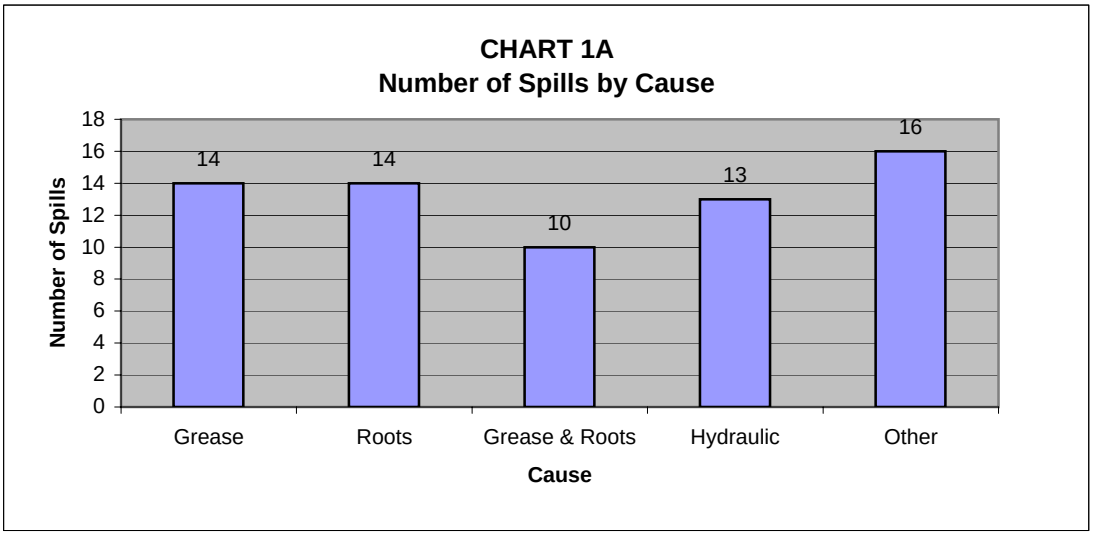
	DATE	NUMBER	SPILL LOCATION	SANITARY BASIN	CAUSE OF SPILL	VOLUME (gallons)	MINOR SPILL	MAJOR SPILL	RECEIVING WATERS
1	1/2/2004	2589	Willis Dr	Walnut Creek	Roots	2,700	Minor		Ditch feeding into Walnut Crk
2	1/13/2004	2941	Crestline Dr	Corbin	Grease	900	Minor		Ditch feeding into Bowman Crk
3	1/15/2004	2124	Riverside Dr	Riverside	Grease	1,200	Minor		Ditch feeding Ocmulgee River
4	1/22/2004	3110	Riggins Mill Rd	Walnut Creek	Roots	1,800	Minor		Ditch feeding into Boggy Branch
5	1/26/2004	2840	S Pierce Dr	Corbin	Hydraulic	2,100	Minor		Bowman Branch
6	1/26/2004	1915	Second St	Bay Street	Grease & Sand	1,800	Minor		Unnamed ditch
7	1/27/2004	2827	Pierce Dr N	Corbin	Grease	750	Minor		Bowman Branch
8	1/30/2004	113	Nautical Pointe	Tobesofkee	Station Failure	1,800	Minor		Lake Tobesofkee
9	1/30/2004	2218	Ingleside Ave	Riverside	Grease	1,200	Minor		Ditch feeding Bowman Branch
10	2/6/2004	2840	South Pierce Dr	Corbin	Hydraulic	600	Minor		Bowman Branch
11	2/12/2004	2965	Crestline Dr	Corbin	Grease	800	Minor		Ditch Feeding into Savage Branch
12	2/12/2004	2840	South Pierce Dr	Corbin	Hydraulic	900	Minor		Bowman Branch
13	2/12/2004	4151	Log Cabin Dr	Lower Rocky Creek	Grease & Rags	450	Minor		Ditch feeding into Rocky Creek
14	2/13/2004	468	Wesleyan Dr	Sabbath Creek	Roots	600	Minor		Ditch feeding into Sabbath Creek
15	2/13/2004	1110	Jean St.	Bay Street	Grease	900	Minor		Unnamed storm drainage ditch
16	2/16/2004	5000 blk	Bowman Rd	Beaver Dam Creek	Grease & Roots	1,500	Minor		Ditch feeding into Beaver Dam Cr
17	2/22/2004	2905	King Alfred Dr	Corbin	Roots	900	Minor		Ditch feeding into Savage Branch
18	2/27/2004	2905	King Alfred Dr	Corbin	Roots	400	Minor		Ditch feeding into Savage Branch
19	3/2/2004	4290	Old Club Rd East	Wolf Creek	Grease & Roots	1,060	Minor		Ditch feeding into Wolf Creek
20	3/4/2004	Deadend	North Macon PK. Dr.	Sabbath Creek	Grease & Roots	2,700	Minor		Ditch feeding into Sabbath Creek
21	3/15/2004	4100	Broadway	Lower Rocky Creek	Grease	1,200	Minor		Ditch feeding into Rocky Creek
22	3/15/2004	696	Sioux Dr	Sabbath Creek	Grease & Roots	1,800	Minor		Sabbath Creek
23	3/18/2004	2974	Victoria Cir	Corbin	Roots	1,100	Minor		Ditch feeding into Savage Branch
24	3/22/2004	722	Old Lundy Rd	Corbin	Roots	1,650	Minor		Ditch feeding into Savage Creek
25	3/27/2004	2141	General Winship Dr	Riverside	Fallen Tree	4,200	Minor		
26	4/1/2004	4100	Broadway	Lower Rocky Creek	Wood In Line	500	Minor		Ditch feeding Rocky Creek
27	4/5/2004	3856	Pio Nono Ave	Lower Rocky Creek	Grease	4,200	Minor		Ditch feeding Rocky Creek
28	4/14/2004	2840	South Pierce Dr	Corbin	Reliner Material	50	Minor		Bowman Branch
29	4/16/2004	4869	Wesleyan Woods Dr	Sabbath Creek	Roots	1,200	Minor		Ditch feeding Sabbath Creek
30	4/19/2004	1694	Second Ave	Riverside	Grease	1,500	Minor		Unnamed drainage ditch
31	4/20/2004	3300	North Ingle Pl	Sabbath Creek	Roots	1,400	Minor		Sabbath Creek
32	4/22/2004	Dead End	Hill Pl.	Sabbath Creek	Grease & Roots	675	Minor		Ditch feeding into Sabbath Creek
33	4/28/2004	2964	Claridge Ct.	Corbin	Grease	1,050	Minor		Ditch feeding into Savage Branch
34	4/28/2004	2800	Masseyville Rd	Walnut Creek	Grease	900	Minor		Unnamed drainage ditch
35	5/3/2004	1730	Wren Ave	Lower Rocky Creek	Roots	450	Minor		Ditch feeding into Rocky Creek
36	5/9/2004	4925	Wesleyan Woods Dr	Sabbath Creek	Grease & Roots	5,600	Minor		Ditch feeding into Sabbath Creek
37	5/18/2004	5010	Eisenhower Pkwy.	Tobesofkee	Grease & Debris	4,500	Minor		Ditch feeding into Tobesofkee

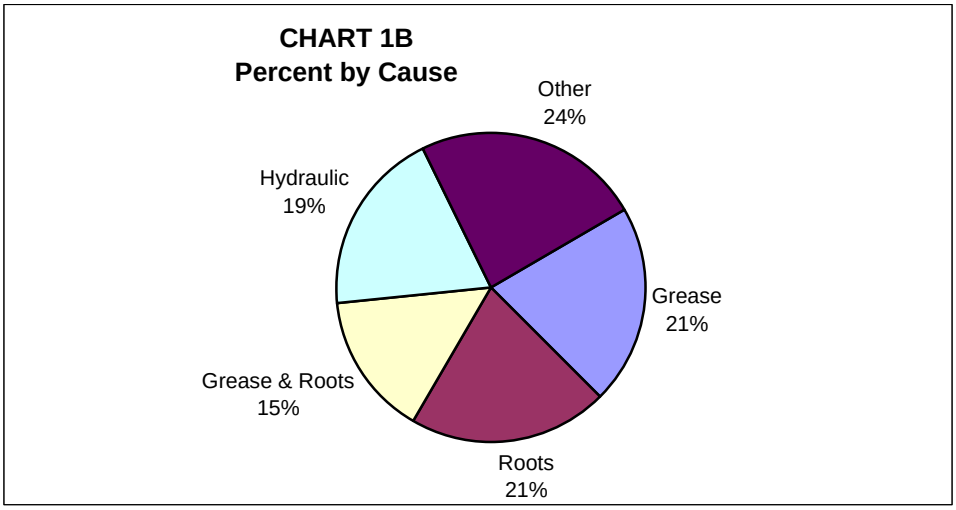
38	6/5/2004	104	Clarendon Ct(ashford)	Wolf Creek	Station Failure	8,280	Minor		Ditch feeding into Rocky Creek
39	6/5/2004	752	St. Andrews Dr	Wolf Creek	Grease & Roots	8,400	Minor		Ditch feeding into Wolf Creek
40	6/8/2004	3443	McKenzie Dr.	Lower Rocky Creek	Grease	400	Minor		Ditch feeding into Rocky Creek
41	6/14/2004	1039	Joseph St	Lower Rocky Creek	Roots	2,400	Minor		Ditch feeding into Rocky Creek
42	6/21/2004	169	Clinton St	Main Street	Grease & Roots	1,800	Minor		Unnamed drainage Ditch
43	6/23/2004	Corner	Emery & Industrial E	Walnut Creek	Contractor Error	23,457		Major	Ditch feeding Boggy Branch
44	6/30/2004	1787	Christopher Trace	Tobesofkee	Roots	300	Minor		Lake Tobesofkee
45	7/18/2004	Boatramp	Spring St.	Bay Street	Hydraulic	1,050	Minor		Ocmulgee River
46	7/23/2004	Deadend	Vinson Ave	Tobesofkee	Fallen Tree	1,800	Minor		Ditch feeding Tobesofkee Creek
August			No Spills						
47	9/7/2004	1805	Christophers Trace	Tobesofkee	Power Outage	1,500	Minor		Lake Tobesofkee
48	9/7/2004		Flintrock L/Station	Tobesofkee	Power Outage	750	Minor		Lake Tobesofkee
49	9/7/2004		Edgewater L/Station	Tobesofkee	Power Outage	900	Minor		Lake Tobesofkee
50	9/7/2004	2906	Picket Ridge	Corbin	Grease & Roots	2,400	Minor		Unnamed Drainage Ditch
51	9/7/2004		Industrial Way East	Walnut Creek	Power Outage	70,000		Major	Boggy Branch
52	9/8/2009	3135	Ingleside Ave	Corbin	Roots	2,250	Minor		Bowman Creek
53	9/28/2004	1268	Twin Pines Dr	Main Street	Hydraulic	3,150	Minor		Ditch feeding Ocmulgee River
54	9/28/2004	Underpass	Bay St	Bay Street	Hydraulic	43,500		Major	Unnamed Creek to Ocmulgee River
55	9/28/2004	5363	Yorktown Rd	Wolf Creek	Hydraulic	2,200	Minor		Ditch feeding Wolf Creek
56	9/28/2004	1800	Waterville Rd	Bay Street	Hydraulic	16,875		Major	Ditch feeding Ocmulgee River
57	9/28/2004	2367	Price Dr	Lower Rocky Creek	Hydraulic	1,200	Minor		Ditch feeding Tobesofkee Creek
58	9/28/2004	1901	Eisonhower Pkwy.	Lower Rocky Creek	Hydraulic	51,750		Major	Ditch feeding Rocky Creek
59	9/28/2004		Riverside Cemetary	Riverside	Hydraulic	6,750	Minor		Vineville Branch
60	9/28/2004	2000 Blk	Eisonhower Pkwy.	Lower Rocky Creek	Hydraulic	9,000	Minor		Ditch feeding Rocky Creek
61	9/28/2004		Industrial Way East	Walnut Creek	Hydraulic	121,200		Major	Ditch feeding Boggy Branch
62	9/30/2004	4611	Pine Valley Dr	Lower Rocky Creek	Grease	6,375	Minor		Ditch feeding Rocky Creek
63	10/13/2004	4344	W. Highland Dr.	Lower Rocky Creek	Grease & Roots	2,875	Minor		Ditch feeding Rocky Creek
64	11/12/2004	3222	West Mary Dr	Lower Rocky Creek	Rags & Debris	1,895	Minor		Ditch feeding Rocky Creek
65	12/3/2004	2121	Sanjo Dr	Tobesofkee	Broken Force Main	9,590	Minor		Lake Tobesofkee
66	12/21/2004	188	Arlington Row	Wolf Creek	Roots	800	Minor		Wolf Creek
67	12/29/2004	829	Pierce Ave	Corbin	Grease	1,500	Minor		Beaverdam Creek

Appendix II - 1: Analysis by Cause

DATA TABLE 1

Cause	# Spills	% of Total
Grease	14	20.9%
Roots	14	20.9%
Grease & Roots	10	14.9%
Hydraulic	13	19.4%
Other	16	23.9%



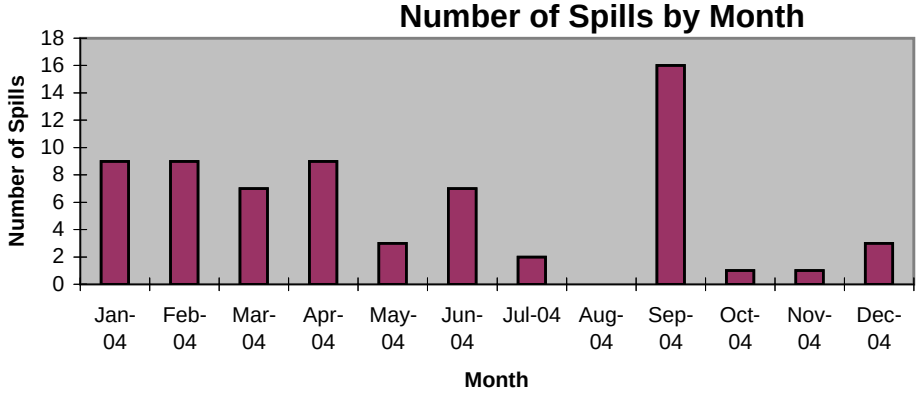


Appendix II - 2: Analysis by Month

DATA TABLE 2

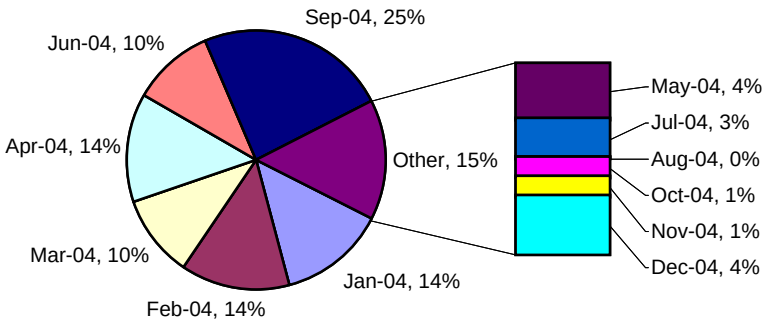
Month	# Spills	% of Total
Jan-04	9	13.4%
Feb-04	9	13.4%
Mar-04	7	10.4%
Apr-04	9	13.4%
May-04	3	4.5%
Jun-04	7	10.4%
Jul-04	2	3.0%
Aug-04	0	0.0%
Sep-04	16	23.9%
Oct-04	1	1.5%
Nov-04	1	1.5%
Dec-04	3	4.5%

CHART 2A
Number of Spills by Month



Avg. = 5.6

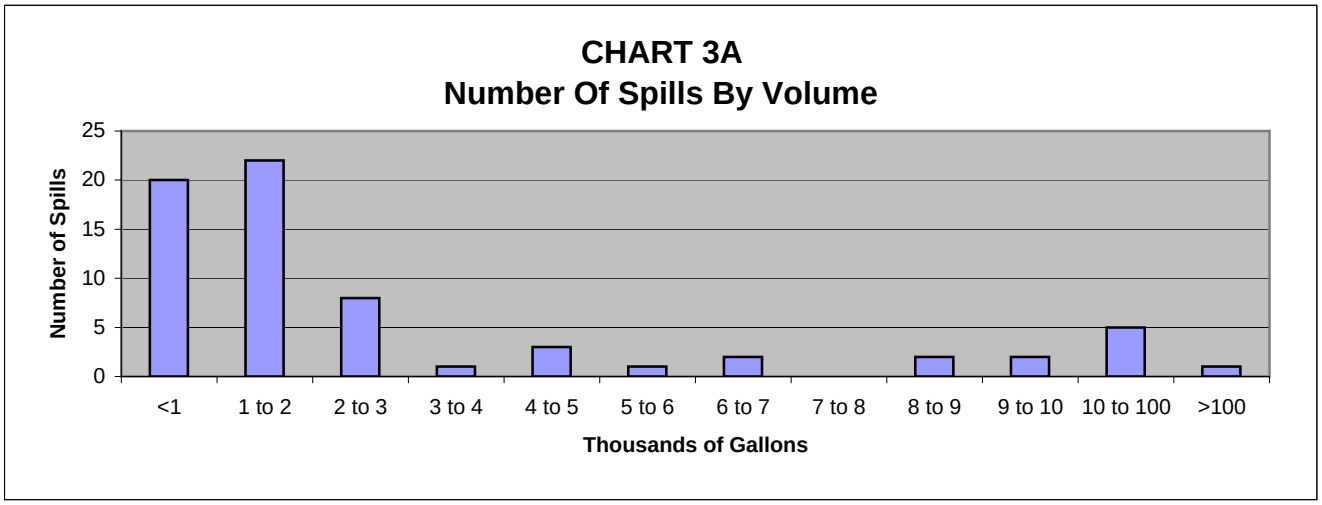
CHART 2B
Percent by Month

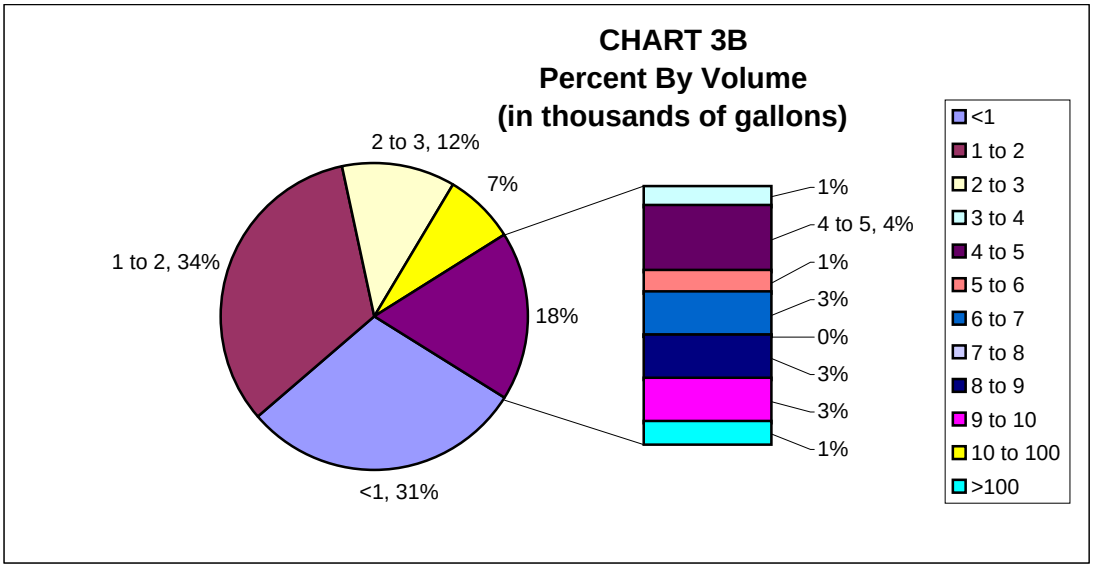


Appendix II - 3: Analysis By Volume

DATA TABLE 3

Thousands of gallons	# spills	% of Total
<1	20	29.9%
1 to 2	22	32.8%
2 to 3	8	11.9%
3 to 4	1	1.5%
4 to 5	3	4.5%
5 to 6	1	1.5%
6 to 7	2	3.0%
7 to 8	0	0.0%
8 to 9	2	3.0%
9 to 10	2	3.0%
10 to 100	5	7.5%
>100	1	1.5%

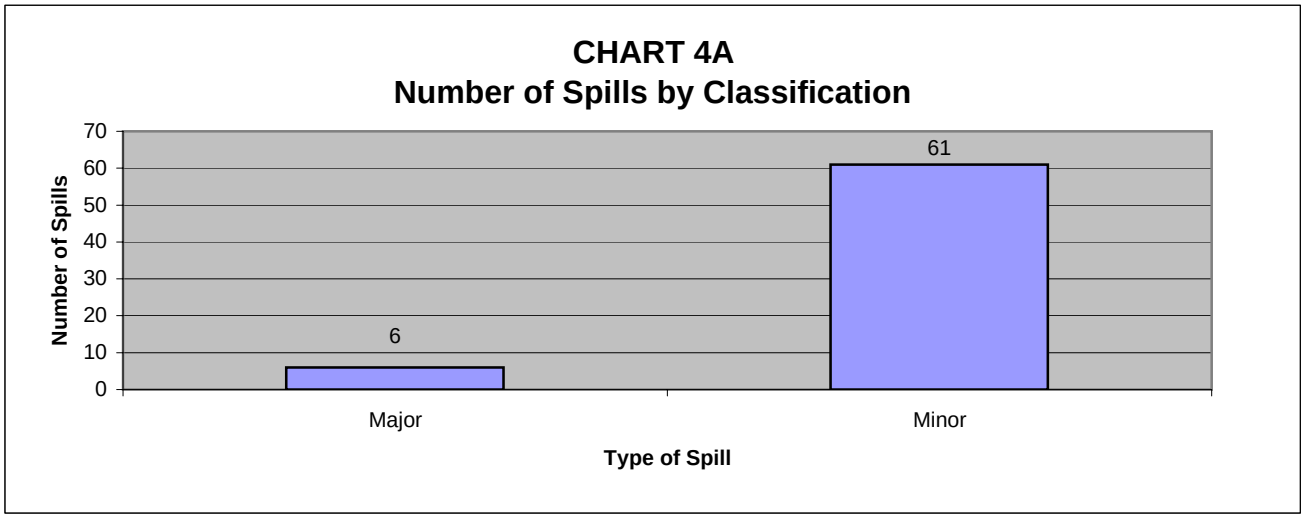


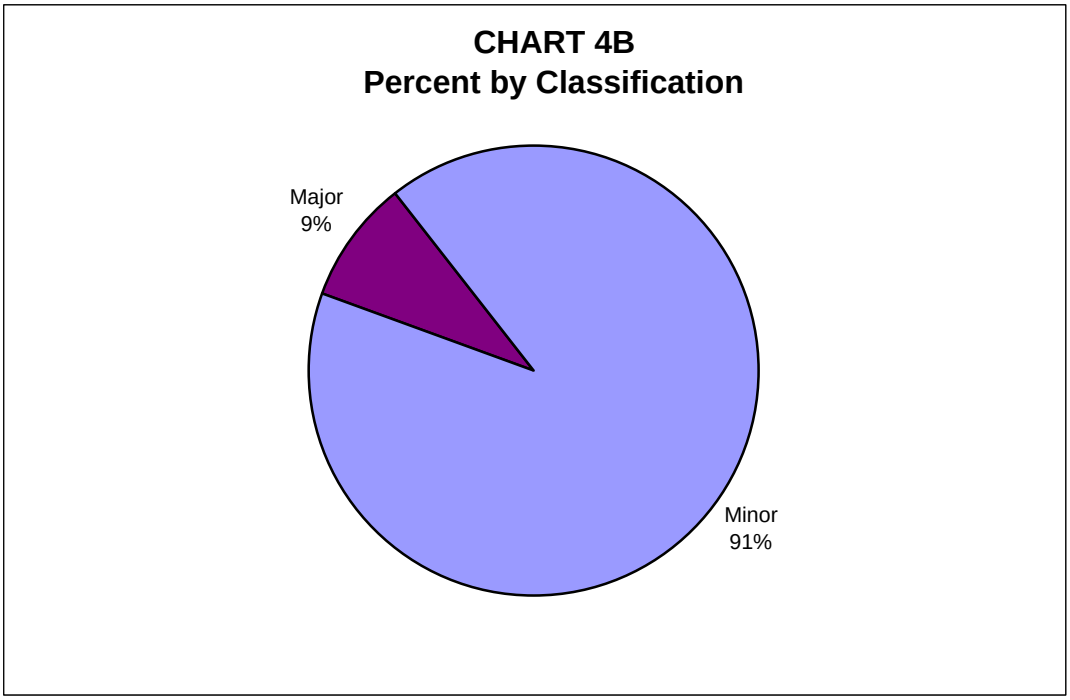


Appendix II - 4: Analysis by Classification

DATA TABLE 4

Classification	# of Spills	% Total
Major	6	9.0%
Minor	61	91.0%

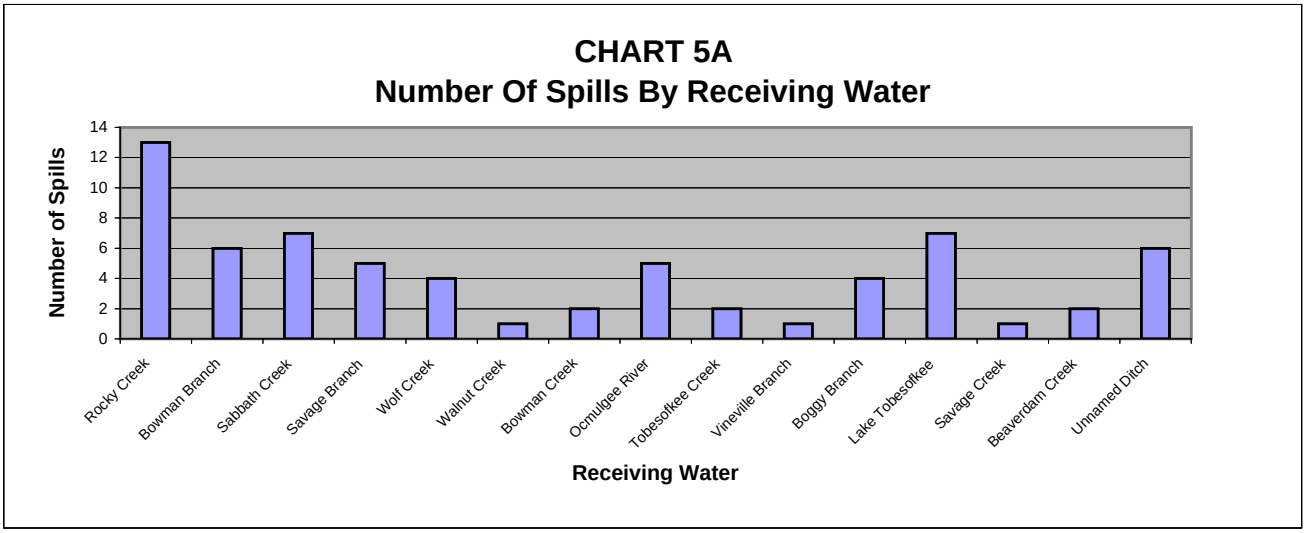


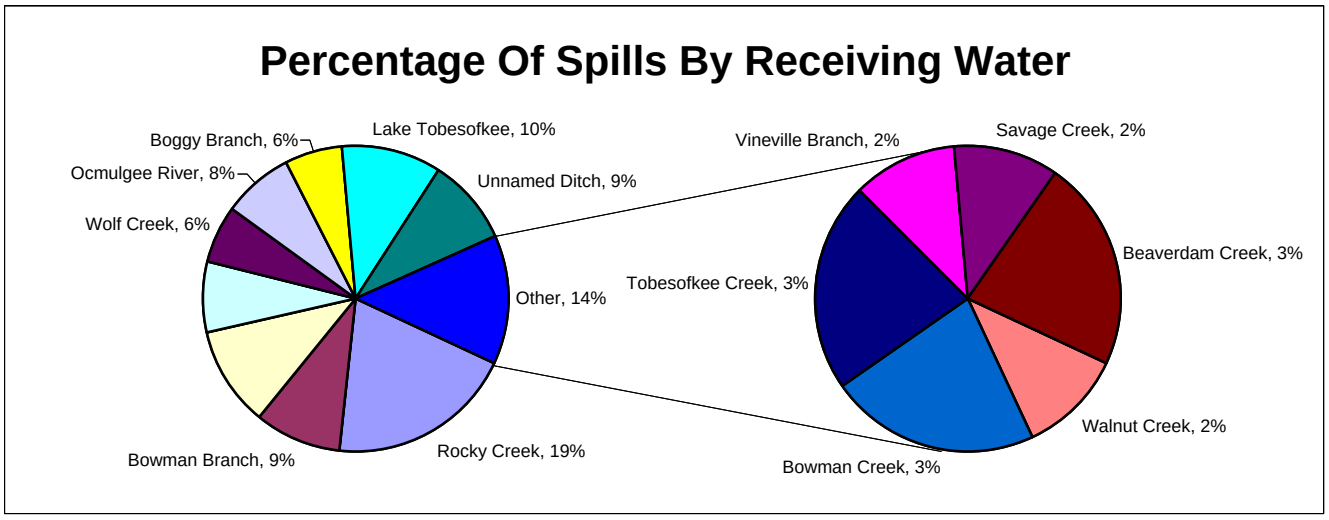


Appendix II - 5: Analysis by Receiving Water

DATA TABLE 5

Receiving Water	# Spills	% of Total
Rocky Creek	13	19.7%
Bowman Branch	6	9.1%
Sabbath Creek	7	10.6%
Savage Branch	5	7.6%
Wolf Creek	4	6.1%
Walnut Creek	1	1.5%
Bowman Creek	2	3.0%
Ocmulgee River	5	7.6%
Tobesofkee Creek	2	3.0%
Vineville Branch	1	1.5%
Boggy Branch	4	6.1%
Lake Tobesofkee	7	10.6%
Savage Creek	1	1.5%
Beaverdam Creek	2	3.0%
Unnamed Ditch	6	9.1%





Appendix II - 6: Analysis by Basin

DATA TABLE 6

Basin	# Spills	% of Total
Lower Rocky Creek	13	19.7%
Corbin Avenue	14	21.2%
Tobesofkee	8	12.1%
Sabbath Creek	7	10.6%
Walnut Creek	6	9.1%
Wolf Creek	5	7.6%
Bay Street/Downtown	5	7.6%
Riverside Drive	5	7.6%
Main Street	2	3.0%
Beaverdam Creek	1	1.5%
Swift Creek	0	0.0%
Upper Rocky Creek	0	0.0%
Colaparchee Creek	0	0.0%
Echeconnee Creek	0	0.0%
Langford Creek	0	0.0%
Wilson Airport	0	0.0%

CHART 6A
Number Of Spills By Basin

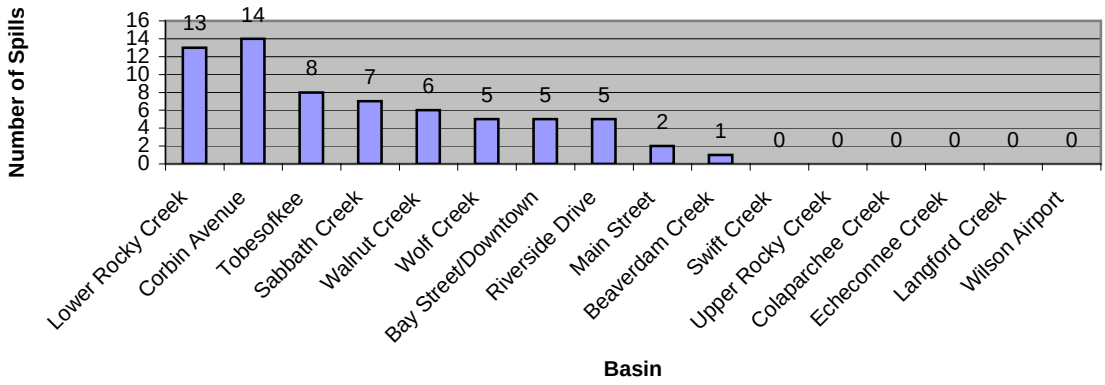
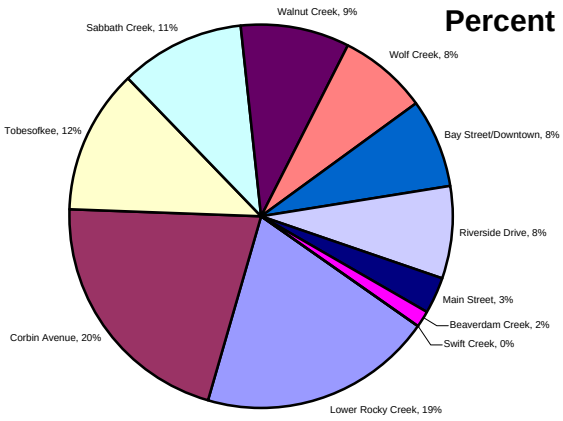


CHART 6B
Percent By Basin



APPENDIX III

MWA Collections Department Reports January 1, 2004 - December 31, 2004

Item	Unit of Measure	Jan '04	Feb '04	Mar '04	Apr '04	May '04	Jun '04	Jul '04	Aug '04	Sep '04	Oct '04	Nov '04	Dec '04	Total	
Mains Cleaned	Linear Feet	22,335	38,015	97,190	83,608	57,830	76,181	89,976	95,848	134,465	115,325	106,399	115,746	**1,032,918**	**733,940**
Mains Videoed	Linear Feet	17,566	31,069	56,236	57,799	33,293	46,543	20,153	75,742	37,873	34,431	31,970	32,173	**474,848**	**278,885**
Total Easement Cleared	Linear Feet	42,058	11,595	10,313	35,109	51,430	8,363	65,531	57,645	14,499	17,273	41,760	100	**355,676**	**205,171**
Re-Clearing Old Easement	Linear Feet	35,374	11,595	6,474	22,866	35,794	7,578	65,531	21,953	1,534	14,520	34,833	0	**258,052**	**145,949**
Clearing Easement	Linear Feet	6,684	0	3,839	12,243	15,636	785	0	35,692	12,965	2,753	6,927	100	**97,624**	**59,222**
Service Calls Worked	Each	203	248	313	360	306	374	485	585	754	546	509	513	**5,196**	**3,766**
Manholes Rehabbed	Vertical Feet	0	67	373	0	346	643	600	396	441	328	236	302	**3,732**	**2,947**
Total Sewer Main Rehab	Linear Feet	9,859	10,410	15,359	19,133	20,795	19,138	5,409	8,045	6,954	3,554	2,911	2,967	**124,534**	**48,968**
Cure-In-Place	Linear Feet	8,707	9,256	14,109	18,102	20,033	17,655	5,409	8,045	6,502	3,554	2,911	2,967	**117,250**	**47,034**
Pipe Bursting	Linear Feet	1,152	1,154	1,250	1,031	762	1,483	0	0	452	0	0	0	**7,284**	**1,934**
Root Control	Linear Feet	12,286	0	0	0	0	0	28,923	106,019	0	0	0	0	**147,228**	**134,942**

APPENDIX IV
12 MONTH MOVING AVERAGE, TREND, & PERCENTAGE

DATA TABLE

Month	# Spills	% of Total
Jan-04	9	13.4%
Feb-04	9	13.4%
Mar-04	7	10.4%
Apr-04	9	13.4%
May-04	3	4.5%
Jun-04	7	10.4%
Jul-04	2	3.0%
Aug-04	0	0.0%
Sep-04	16	23.9%
Oct-04	1	1.5%
Nov-04	1	1.5%
Dec-04	3	4.5%

CHART 4A
Number of Spills by Month

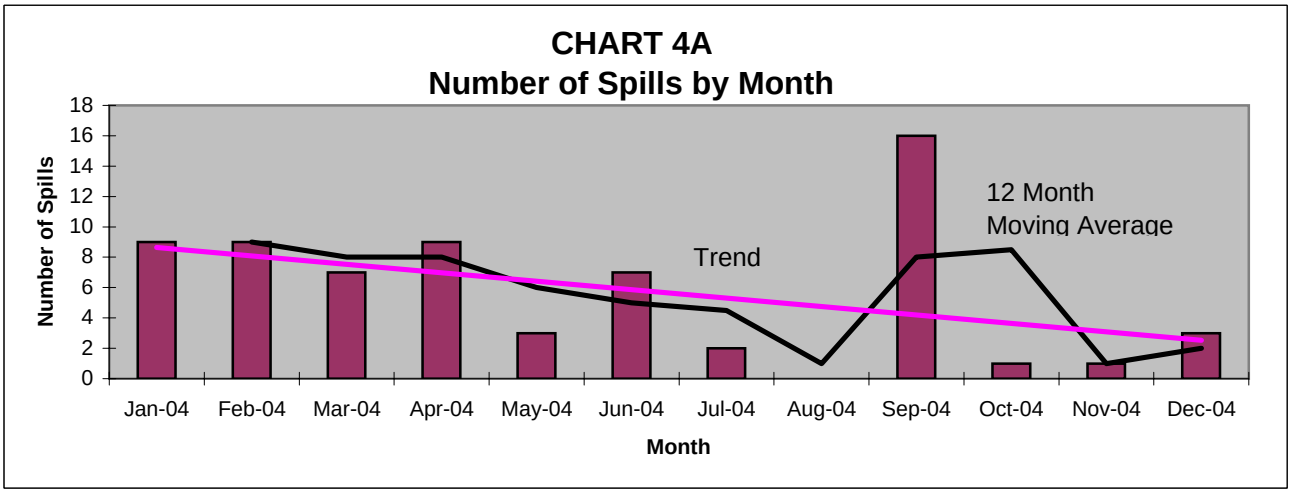
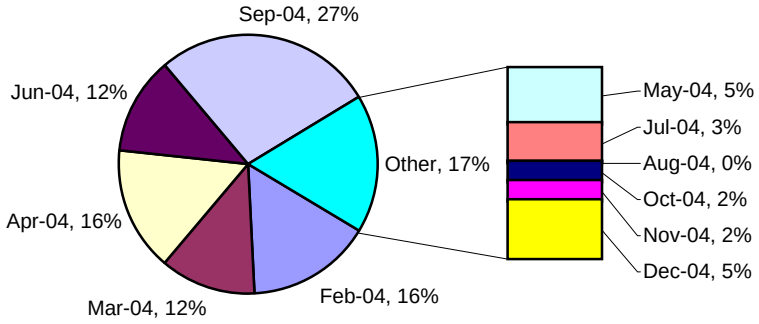


CHART 4B
Percent by Month



APPENDIX V

SPILL PRIORITY

Priority	Basin	Total Spills & Overflows	% of Total	Miles of Pipe	% of Total	Spills/ Mile Pipe
Mid	LRC	13	19.4%	29.6	3.6%	0.44
Mid	COR	15	22.4%	50.9	6.2%	0.29
Mid	TOB	8	11.9%	53.1	6.5%	0.15
Mid	WOL	5	7.5%	41.6	5.1%	0.12
Mid	RIV	5	7.5%	42.8	5.2%	0.12
Low	SAB	7	10.4%	80.1	9.8%	0.09
Low	WC	6	9.0%	69.3	8.5%	0.09
Low	BAY	5	7.5%	72.5	8.9%	0.07
Low	MST	2	3.0%	57.1	7.0%	0.04
Low	BDC	1	1.5%	256.9	31.5%	0.00
Low	SPD	0	0.0%	62.1	7.6%	0.00
Total		67	100.0%	815.8	100.0%	0.08

Low = 0.00-0.10
Mid = 0.10-1.00
High = >1.00

LRC Lower Rocky Creek
WOL Wolf Creek
TOB Tobesofkee
COR Corbin
RIV Riverside
WC Walnut Creek
SAB Sabbath Creek
MST Main Street
SPD South Pierce Drive
BAY Bay Street
BDC Beaver Dam Creek