

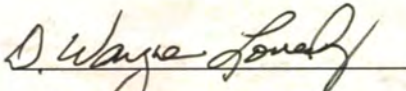
# Quarterly Progress Report

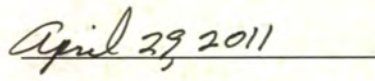
**Volume 24**

**First Quarter Report  
January 1 through March 31, 2011**

**Submitted to EPA on April 29, 2011**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

  
D. Wayne Loveday

  
Date



# Table of Contents

<b>Executive Summary</b>	<b>i</b>
<b>Section 1 Phase 1 Corrective Action Plan/Engineering Report (CAP/ER) and Phase 2 CAP/ER</b>	<b>1</b>
<b>Section 2 Comprehensive Performance Evaluation Program and Composite Correction Plan</b>	<b>11</b>
<b>Section 3 Process Controls Program</b>	<b>12</b>
<b>Section 4 Capacity Assurance Program</b>	<b>13</b>
<b>Section 5 Transfers of Ownership</b>	<b>14</b>
<b>Section 6 Compliance and Non-Compliance With the Consent Decree</b>	<b>15</b>
6.1 Submission of Deliverables	15
6.2 Violations Subject to Stipulated Penalties	16
<b>Section 7 Sanitary Sewer Overflows (SSOs), Bypasses, Diversions, and Effluent Limit Violations</b>	<b>17</b>
7.1 SSOs	17
7.2 Building Backups	17
7.3 Bypasses	17
7.4 Effluent Limit Violations	18
<b>Section 8 Water Quality Monitoring Data</b>	<b>21</b>
8.1 Sampling Conducted and Results	21
8.2 Projected Data Collection	22
<b>Appendices</b>	
Appendix A Capital Projects and Rehabilitation Credits	
Appendix B SSOs	
Appendix C Building Backups	
Appendix D Water Quality Monitoring Program Sampling Results	
Appendix E Unpermitted Discharges Subject to Stipulated Penalties	
Appendix F Notification of Force Majeure – Stipulated Penalty for Unpermitted Discharge, 3/18/11	

# Executive Summary

On February 11, 2005, the Knoxville Utilities Board (KUB) entered into a Consent Decree with the United States, the State of Tennessee, the Tennessee Clean Water Network, and the City of Knoxville. The following Quarterly Progress Report is submitted to fulfill the reporting requirements described in Section XIX of the Consent Decree.

Consent Decree language, pages 82-83: *“Beginning thirty (30) Days after the first Calendar Quarter following the Date of Entry, and thirty (30) Days after each Calendar Quarter thereafter until termination of the Consent Decree, KUB shall submit to the Parties, and simultaneously place in the PDR, a Quarterly Progress Report. Quarterly Progress Reports shall not be subject to the Public Review Requirement of Section VI.A.2. However, KUB shall receive questions and comments from the public for KUB’s review for a period of twenty (20) Days following placement in the PDR. Each Quarterly Progress Report shall contain:*

1. *A summary of compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including: the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during Calendar Quarter and expected during the next Calendar Quarter;*
2. *A summary of compliance with and activities related to implementation of the CPE and CCP;*
3. *A summary of implementation of and compliance with the Process Controls Program;*
4. *A summary of the implementation of the Capacity Assurance Program for the Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by Sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by Sewerbasin, and any exceptions granted for connections for essential services;*
5. *Identification of any transfer of an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof.*
6. *A description of the status of compliance or non-compliance with the requirements of this Decree and, if applicable, the reasons for non-compliance, including a list of all violations that are subject to stipulated penalties under Section X of this Decree.*
7. *A spreadsheet and summary of all SSOs, Bypasses, Diversions and effluent limit violations that occurred during the previous Calendar Quarter. Information on Building Backups may be provided in separate spreadsheets and summaries from other SSOs. The spreadsheets and summaries shall identify:*
  - a. *For all SSOs, the location, source, date, time, duration, pathway (if any), receiving water (if any), the reason for each SSO, the total SSO volume, the volume returned to the WCTS, and the volume not captured;*
  - b. *For all Bypasses and Diversions, the location, date, time, duration, volume and reason for each Bypass and Diversion; and the total Bypass and Diversion volumes;*
  - c. *For all effluent limit violations, all information required to be reported on KUB’s Discharge Monitoring Reports.*
8. *The water quality monitoring data and other information required pursuant to Section VII.D.1.(e).(v).”*

KUB compiled this Quarterly Progress Report to detail the events that occurred during the first quarter of 2011 from January 1 through March 31. This is the twenty-fourth quarterly report required of KUB under this Consent Decree.

### **Report Organization**

*Section 1: Phase 1 CAP/ER and Phase 2 CAP/ER* – Summarizes the compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during the Calendar Quarter and expected during the next Calendar Quarter.

*Section 2: Comprehensive Performance Evaluation and Composite Correction Plan* – Summarizes the compliance with and activities related to the implementation of those deliverables.

*Section 3: Process Controls Program* – Summarizes the implementation of and compliance with the deliverable.

*Section 4: Capacity Assurance Program* – Summarizes the implementation of the Capacity Assurance Program for the Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by sewerbasin, and any exceptions granted for connections for essential services.

*Section 5: Transfers of Ownership* – Identifies any transfers of ownership interest, operation, management, or other control of the treatment works, or any portion thereof.

*Section 6: Compliance and Non-Compliance with the Consent Decree* – Describes the status of compliance or non-compliance with requirements of the Consent Decree.

*Section 7: SSOs, Bypasses, Diversions, and Effluent Limit Violations* – Provides a spreadsheet and summary of all SSOs, Bypasses, Diversions, and effluent limit violations.

*Section 8: Water Quality Monitoring Data* – Summarizes all sampling that was conducted, the results of the sampling, and the projected data collection for the reporting period.

### **Status of Deliverables**

Below is a list of significant dates on which KUB submitted deliverables to EPA or received approval for deliverables. To date, KUB has submitted all deliverables in accordance with the schedule set forth in the Consent Decree.

#### January 28, 2011

- Submitted to EPA – Quarterly Progress Report 4<sup>th</sup> quarter 2010
- Submitted to EPA – SEP Periodic Report 2<sup>nd</sup> period 2010

#### March 1, 2011

- Submitted to EPA – Annual MOM Progress Report 2010

## Section 1 Phase 1 CAP/ER and Phase 2 CAP/ER

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of compliance with and activities related to implementation of the Phase 1 CAP/ER and Phase 2 CAP/ER, including the status of construction projects in comparison to the schedules that have been established pursuant to the Consent Decree for those projects; and schedule deadlines and milestones achieved during Calendar Quarter and expected during next Calendar Quarter.”*

KUB began developing a Corrective Action Plan/Engineering Report (CAP/ER) in January 2004, following the completion of the Phase I Sanitary Sewer Overflow Evaluation Report (SSOER) required by the Agreed Order with the Tennessee Department of Environment and Conservation (TDEC) and, subsequently, the Consent Decree. The objective of the Phase I CAP/ER is to identify facility improvements needed to address the conditions causing SSOs occurring in the collection system during the period of 2001-2004 with the goal of eliminating the SSO locations on the Long-Term List and to support future growth needs. KUB submitted the Phase 1 CAP/ER to EPA on October 28, 2005. Comments were received from EPA on February 23, 2006. Per EPA's letter, KUB submitted a 30-day response to EPA's comments on March 27, 2006. The Revised Phase 1 CAP/ER was submitted to EPA on May 22, 2006, and subsequently approved by EPA on June 30, 2006. All work necessary to meet the objectives of the Phase 1 CAP/ER will be completed by June 30, 2013. The Phase 2 CAP/ER was submitted to EPA on September 9, 2009, and approved on March 22, 2010.

### **EPA Approved Project Extensions and Changes**

All previously approved project extensions and changes are listed below.

- **1-1 Upper First Creek Collector Project (Mini-basin 1A1, 2A2, and 3D1)** – revised completion date was FY 08/09 and was completed on schedule.
- **1-20 Vine Middle School Rehabilitation Project** – revised completion date was FY 07/08 and was completed as scheduled.
- **2-4 Dutch Valley Collector Rehabilitation (Sewershed 10B1)** – revised completion date was September 2007 and was completed as scheduled.
- **2-5 Rickard and Wilson Collector Rehabilitation (Sewershed 10C1)** – revised completion date was September 2007 and was completed as scheduled.
- **S-1 Ginnbrook Pump Station Rehabilitation** – revised completion date was FY 08/09 and was completed as scheduled.
- **S-5 South Knoxville/Knob Creek Storage Facility** – Project was removed from CAP/ER and replaced with the project below.
- **Revised S-5 Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – revised completion date was FY 08/09 and was completed as scheduled.
- **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** – revised completion date was FY 09/10 and was completed as scheduled.
- **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – revised completion date is FY 10/11. An additional extension to FY 11/12 was requested and approved.
- **3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project** – revised completion date is June 30, 2012. An additional extension to FY 12/13 was requested and approved.
- **4-2 Gleason Drive Collector Rehabilitation Project** – revised completion date was June 30, 2010 and was completed as scheduled.
- **4-3 Middlebrook Pike Rehabilitation (Sub-basin 27C3)** – revised completion date was June 30, 2010 and was completed as scheduled.
- **4-4 Northshore Drive Trunk Replacement Project** – revised completion date is June 20, 2011. An additional extension to FY 11/12 was requested and approved.

- **4-6 Shadyland Drive Rehabilitation (Sub-basin 36A2) Project** – revised completion date was June 30, 2010 and was completed as scheduled.

### **Current Capital Improvement Plan for FY 04/05 - FY 10/11**

The following is a list of facility improvement projects included in the Capital Improvement Plan for fiscal years 04/05 to 10/11. These projects were in various stages during the reporting period, including preliminary engineering, design, construction, and completion. Many of these projects are “find and fix” rehabilitation projects. Find work is defined as the inspection (i.e. flow monitoring, CCTV, manhole inspections, smoke testing, etc.) and design phase of the project. Fix is defined as the construction phase that may include manhole rehabilitation/replacement, main line rehabilitation/replacement, and lower lateral rehabilitation/replacement. Other projects are trunkline capacity improvements or wet-weather storage. Each of these projects is considered part of the overall Phase 1 CAP/ER.

## **Phase I CAP/ER Ongoing Projects**

### **First Creek**

1. **1-19 Edgewood Drive Rehabilitation Project** –Project is under construction. The expected completion date is September 2011.
2. **1-21 College Park Rehabilitation Project** –Project is in design. The expected completion date for construction is June 2012.
3. **1-22 E. Jackson Avenue Rehabilitation Project** – Project is in preliminary engineering. The expected completion date for construction is June 2012.
4. **1-23 Oglewood Avenue Rehabilitation Project** –Project is under construction. The expected completion date for construction is September 2011.
5. **1-26 Cherry Street Rehabilitation Project** – Project is under construction. The expected completion date is July 2011.

### **Second Creek**

1. **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** – Construction has been completed on the lower trunk sewer work. The design of the upper portion is now complete. This portion of the work has required permitting from two different railroad owners. The permitting process has been slowed by redesign required by the railroad operators. Initial applications to the railroad were made in November 2009. Revisions have been made, and final plans were submitted in March 2010. Due to the dependency on railroad approval, KUB extended the project into FY11/12. A letter was sent to the railroad requesting the attention to this matter to be closed August 31, 2010. Construction is scheduled to begin in late May 2011, and the anticipated completion is the end of FY 11/12.
2. **2-16 1600 Block Elm Street Rehabilitation Project** - Design is complete and construction is underway. Construction will be complete by June 2011.

### **Third Creek**

1. **3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project (East Fork of Third Creek Trunk Replacement)** – Constructability issues, property acquisitions, and permitting for this large diameter project required that the project completion date be extended until FY 12/13. The project conditions are along commercial, industrial, and transportation (roadway and railroad) corridors with challenging topography. Project will require coordination with future TDOT road improvement projects, extensive railroad permitting, environmental permitting, and property acquisition. The project has been broken into two phases to provide more effective delivery. Phase I design is complete

and consists of the replacement of 3,200 ft of 30" pipe with 36" pipe. Construction will commence in June 2011 with a projected completion of July 2012. Phase II design is underway and consists of the replacement of 5,100 ft of 18-30" pipe with 36" diameter pipe. The projected start date is January 2012 and this phase has a 12-month duration.

2. **3-7 Neyland Drive Trunk Replacement (Lower Third Creek Trunk Replacement)** – Design is complete. Original scope has changed from replacement work along Neyland Drive to work on the existing trunk south of Tyson Park extending northwest along Third Creek. Construction has begun at the Third Creek siphon and will continue up to Tyson Park. Project is in bid phase.
3. **3-16 Painter Avenue Trunk Replacement Project** - The original scope of this project called for replacement of 2,200 ft of existing 42" sewer with 48" and 54" sewer to correct slight surcharging during a two-year rain event (no overflows currently occur and none are predicted). Subsequent modeling and analysis showed that rehabilitation of the collector sewer upstream will be more effective in reducing peak flows to this trunk sewer. This approach will prevent digging and replacing the trunk sewer along Third Creek that extends under a four-lane road and through a wetland area. KUB requested changing the scope of the project to rehabilitation (find and fix) of collection system in mini-basins 28B1. The project will be completed in the same time frame as approved for the original Painter Avenue trunk project but will now be referred to as 3-16 Painter Avenue Rehabilitation Project. Design work has been completed for this project, and the project will be bid on April 14, 2011. Construction is expected to begin in mid-May 2011.
4. **3-20 Citico Street Rehabilitation Project** – Project is in design.
5. **3-21 Deerfield Road Rehabilitation Project** – Construction is expected to begin in FY 11/12.
6. **3-23 Hillvale Circle Rehabilitation Project** – Project is in design.
7. **3-24 Montgomery Avenue Rehabilitation Project** – Project is in design.
8. **3-27 Montgomery Avenue Rehabilitation Project** - Project is in design.
9. **3-29 Highland Hills Road Rehabilitation Project** – Project is in design.

#### **Fourth Creek**

1. **4-4 Northshore Drive Trunk Sewer Replacement** – Project involves installation of approximately 4,000 lf of 36" trunk sewer in a major commercial district and through a major road intersection at Northshore and Kingston Pike. Project also involves a railroad crossing. Commercial property acquisitions required condemnation proceedings to obtain possession of easements on several properties along the route. Construction is expected to be complete January 2012.
2. **4-21 Black Bear Road Project** - Project is currently under construction.
3. **4-24 Kerri Way Project** - Project is currently under construction.
4. **4-25 Lonas Drive Project** - Project is currently under construction.
5. **4-26 Midpark Drive Project** - Project is currently under construction.
6. **4-28 Queensridge Pump Station Upgrade Project** – The scope of this project has changed from a pump station upgrade project to a 'find and fix' project in mini-basin 36. Once the collection system has been rehabilitated, the pump station upgrades will no longer be necessary. Project is currently under construction.
7. **4-31 Kingston Pike @ Gallaher View Project** - Project is currently under construction.

#### **South Knox**

1. **S-21 Alpine Avenue Rehabilitation Project** - Project is in preliminary engineering.

#### **Loves Creek and Eastbridge**

1. **L-4 Asheville Highway Rehabilitation** – Project is under construction. The expected completion date for construction is June 2011.

2. **L-6 Holston Hills Road Rehabilitation** – Project is in design. The expected completion date for construction is June 2011.
3. **L-7 Magnolia Avenue Rehabilitation** – Project is in design. The expected completion date for this project is June 2012.
4. **L-8 McDonald Drive Rehabilitation** – Project is in design. The expected completion date for construction is June 2012.
5. **EB-2 Strawberry Plains Pike Rehabilitation Project** – Project is in preliminary engineering.

#### **Williams Creek**

1. **W-5 Groner Avenue Rehabilitation Project** - Project is in preliminary engineering.

### **Phase I CAP/ER Completed Projects**

#### **First Creek**

1. **1-17 Fountain Road Trunkline Sewer Improvement Project** - Upsized 3,700 ft of gravity sewer using open cut and pipe bursting methods. Replaced manholes and services.
2. **1-13 Fair Drive Phase II** - Rehabilitated 3691 ft and replaced 2,458 ft of existing 8-12" gravity sewer along Fair Drive.
3. **1-18 Greenfield Drive Rehabilitation Project** - Replaced approximately 3,300 ft of existing sewer with 8" and 12" PVC and ductile iron pipe.
4. **Whites Creek Phase III** - Replaced 300 ft of 12", 300 ft of 16", 2,700 ft of 24", and 5,000 ft of 36" sewer.
5. **1-25 First Creek Sub-basins 3 and 4 Rehabilitation Project** – Rehabilitated 26,500 ft of line and replaced 10,500 ft. Project included CCTV, smoke testing, and manhole inspections.
6. **1-3 First Creek Storage Tanks** - Designed and built 9 MG wet-weather storage tank to control sewer overflows near Old Broadway during rain events. Designed and built 5 million gallon (MG) wet-weather storage tank to control sewer overflows near North Hoitt Avenue during rain events.
7. **1-15 Replace trunk sewer upstream of lower storage unit** – Replaced 1,600 feet of existing 42 inch and 130 feet of 24 inch pipe.
8. **1-5 Upper Fountain City Trunkline Replacement Project** - Replaced and upgraded approximately 6,000 ft of trunk sewer connecting lines in upper Fountain City to Upper First Creek storage tank. The project addressed SSOs along Broadway, Cedar Lane, and Fountain Road.
9. **1-2 Lower First Creek Collector Project (Sub-Basin 8B2)** – Characterized the condition of 24,900 ft of pipe to determine rehabilitation needs.
10. **1-20 Vine Middle School Rehabilitation Project** – Completed find and fix work to identify cause of overflow in the vicinity of 214 Bertrand Street.
11. **1-6 Sub-basin 08A1 Rehabilitation Project** - Rehabilitated approximately 21,067 ft, and replaced approximately 10,273 ft of sewer.
12. **1-1 Upper First Creek Collector Project (Mini-basin 1A1, 2A2, and 3D1)** – Estimated total quantities: 10,235 ft gravity sewer replaced/rehabbed; 32 new MHs installed; 175 MH rehab; 69 private laterals reinstated.
13. **1-27 Fair Drive Rehabilitation Project** – Preliminary engineering work discovered that 567 ft of 8" gravity main and 3 manholes were rehabilitated after the SSO occurred. No additional work is necessary to address the overflow at this location.
14. **1-4 Lower Fountain City Pipe Replacement Project** – Replaced 20 manholes. Replaced approximately 2,715 ft of sewer mains and rehabilitated 142 ft of sewer.

15. **1-11 Fountain City Trunkline Replacement Phase IV Project** – Replaced approximately 2,991 ft of sewer.
16. **1-12 Cedar Lane Area Sanitary Sewer Rehabilitation Project** – Rehabilitated approximately 8,500 ft of sewer.
17. **1-14 Wilderness Road Area Gravity Sewer Replacement Project** – Replaced approximately 5,440 ft of sewer.
18. **1-16 Clearview Street Sewer Project** – Replaced approximately 4,468 ft of sewer.
19. **1-24 Fulton Short Line Project** – Replaced approximately 520 lf of Completed find and fix work to identify cause of overflow in the vicinity of 214 Bertrand Street.

## **Second Creek**

1. **Second Creek Pilleaux PS Collector** - Rehabilitated 19,600 ft of collection system piping in mini-basin 05A4. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
2. **Second Creek Sub-basin 15 Rehabilitation** - Rehabilitated approximately 23,500 ft of pipe in mini-basin 15D2. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
3. **Second Creek 23E1** - Inspected a total of 28,067 ft of pipe for find and design rehabilitation needs for Mini-basin 23E1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
4. **Dutch Valley Collector Rehab (Mini-basin 10B1)** - Assessed and rehabilitated, where needed, approximately 16,400 ft of collector pipe. This project was combined with the Rickard and Wilson Collector Rehab project below.
5. **Rickard and Wilson Collector Rehab (Mini-basin 10C1)** - Assessed and rehabilitated, where needed, approximately 19,000 ft of collector pipe. Project was combined with Mini-basin 10B1.
6. **Second Creek Trunk Sewer Improvements Phase I** - Replaced approximately 4,100 ft of existing trunkline with 30" sewer.
7. **Second Creek Trunk Sewer Improvements Phase II** - Replaced approximately 3,700 ft of existing trunkline with 30" sewer and replaced approximately 1,400 ft of existing trunkline with 36" sewer.
8. **2-12 Camelia Road Rehabilitation Project** – Replaced 430 ft of 8" pipe and 2 manholes. 220 ft of 8" pipe was rehabbed using CIPP.
9. **2-13 Cedar Heights Road Rehabilitation Project** – Replaced 123 ft of 8" pipe and rehabbed 263 ft of 8" pipe with CIPP.
10. **2-14 Central Avenue Pike Rehabilitation Project** – Replaced 102 ft of 10" pipe, 25 ft of 18" pipe, 2 manholes. CIPP was used to rehab 659 ft of 8" pipe.
11. **2-18 Nicholas Road - Clinton Highway Rehabilitation Project** – Replaced 405 ft of 8" pipe and one manhole.
12. **2-22 Dale Avenue Rehabilitation Project** – The 8" main was replaced in 2003 with a 12" ductile iron main in Dale Avenue. No additional overflows have occurred.
13. **2-17 Shasta Drive Rehabilitation Project** – Replaced 714 ft of 8" pipe and 6 manholes. CIPP was used to rehab 2,149 ft of 8" pipe.
14. **2-20 Sierra Road Rehabilitation Project** – CIPP was used to rehab 969 ft of 8" pipe.
15. **2-1 Lower Second Creek Replacement/Rehabilitation at I40/I275 Junction** – Replaced 280 ft and 3 MHs, pipe burst 1959 ft; CIPP was used to rehab 2313 ft, 29 manholes were rehabbed, and 50 laterals were reinstated.
16. **2-11 Burnside Rehabilitation Project** – Replaced 517 ft of 8" sewer and 1651 ft of 12" sewer using pipe bursting. Six manholes were replaced and 3 were rehabbed.
17. **2-15 1000 Block Elm Street Rehabilitation Project** – Replaced 632 ft of 8" sewer and nine manholes. Rehabbed 1400 ft of 8" sewer using CIPP and rehabbed 3 manholes. One lateral was reinstated.

- 18. 2-19 Cumberland Avenue Rehabilitation Project** – Replaced 1448 ft of 8” sewer and 10 manholes. Rehabbed 525 ft of 8” sewer using CIPP and reinstated 12 laterals.
- 19. 2-21 Morelia Avenue Rehabilitation Project** – Replaced 382 ft of 8” sewer and two manholes. Rehabbed three manholes, 2375 ft of 8” sewer using CIPP, and reinstated 74 laterals.

### **Third Creek**

- 1. Mynderse, Western, and Canna** - Replaced approximately 1,700 ft of 8” sewer and pipe-burst approximately 3400 ft of 8” up to 10” and 12” pipe to address wet-weather capacity restrictions resulting in overflows near Pleasant Ridge Road.
- 2. Third Creek 28B1\*** - Investigated rehabilitation needs for collectors in mini-basin 28B1 (approximately 7900 ft of pipe). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair. Plans are being developed for a future rehabilitation project. No construction is planned in the short-term.  
\*The project named Third Creek 28B1 replaces Third Creek 28C1 that appeared in the Quarterly Progress Report for the Second Quarter 2005. After additional studies, it was determined that flows from 28B1 more likely contributed to overflows along Sutherland Avenue and North Bellemeade, as listed in the SSOER.
- 3. Third Creek Storage** - Designed and constructed 4.5 MG wet-weather storage tank to control sewer overflows near Western Avenue and Third Creek Road during rain events.
- 4. Upper McKamey Trunk Sewer Replacement** – Project replaced approximately 1600 ft of 12” and 15” trunk sewer. This project further enhanced improvements already made in Third Creek to address overflows along McKamey Road.
- 5. Third Creek Basin 11** – Assessed and rehabilitated approximately 129,657 ft in sub-basin 11. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 6. Third Creek Road Trunk Sewer Replacement** – Project included approximately 3,100 ft of 24” and 30” trunkline. The project replaced and upgraded the trunkline from Western Avenue along Third Creek to the Third Creek storage facility. It addressed overflows occurring at 5600 Western Avenue. Project was extended approximately 2,000 ft to reach the new location of the Third Creek Storage Facility at the KUB Hoskins Center.
- 7. Third Creek Basin 9 Phase I** – Assessed and rehabilitated collector sewer in 9A1, 9A2, 9A4, and 9D1 (CAP/ER Scope).
- 8. Third Creek Basin 9 Phase II** - Designed rehabilitation methods for collectors in Sub-basin 9 (approximately 177,900 ft). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 9. 3-11 Sutherland Avenue Collector Rehabilitation Project (Sub-basin 28B1)** – Replaced 303 ft of existing sewer and rehabilitated 3,332 ft of existing sewer collectors in mini-basin 28B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
- 10. 3-12 Clinch and 21st Street Collector Rehabilitation Project (Sub-basin 35B3)** – Replaced approximately 2,563 ft of existing sewer, rehabilitated 3,094 ft and replaced/rehabbed 25 manholes.
- 11. 3-8 Third Creek Bike Trail Trunk Replacement** – Improvements to improve the sewer hydraulics were made at the connection of the 12” main to a 36” trunk sewer running south of Sutherland Avenue along Third Creek bike trail. Improvements included approximately 50 feet of 12” line and a new manhole. Additionally, rehabilitation in SB 28B1 has reduced the peaks to the 12” line.
- 12. 3-22 Fountain Drive Rehabilitation Project** – Replaced approximately 750 ft of existing sewer, rehabilitated 800 ft and replaced/rehabbed 9 manholes.
- 13. 3-25 Rolling Ridge Interconnection Project** - Pump station was decommissioned and 1,950 ft of new gravity sewer was installed to divert flow from the station into existing gravity sewer.

14. **3-14 McKamey Road Interconnection Project** - Analysis that occurred during preliminary engineering for this project determined that it had been adequately addressed by previous construction work.
15. **3-15 Ball Camp Pike Improvement Project** - Analysis that occurred during preliminary engineering for this project determined that it had been adequately addressed by previous construction work.

#### **Fourth Creek**

1. **Pinebrook Drive Sewer Replacement** – Replaced 330 ft of 8" gravity sewer partially exposed by erosion of the bank of the adjacent drainage channel.
2. **Walker Springs Rehabilitation (Mini-Basin 32A4)** – Performed find, and design work in Mini-basin 32A4 in the Walker Springs area. Inspection included 43,000 ft of smoke testing, 43,000 ft of CCTV, and 228 manhole inspections. Plans will be developed for future rehabilitation work.
3. **Walker Springs Storage** – Designed and constructed 3.25 MG wet-weather storage tank to control sewer overflows near Walker Springs Pump Station during rain events.
4. **Papermill Drive Phases I, II, and III** – Designed and constructed replacement of approximately 4,000 ft of 15", 18", and 2,100 ft of 36" sewer in the Papermill Drive area to increase conveyance capacity and reduce sewer overflows.
5. **4-1 Chukar Road Rehabilitation** – Replaced 1,600 ft of pipe and nine manholes; rehabbed 900 ft of pipe and nine manholes.
6. **4-2 Gleason Road Rehabilitation** – Replaced 980 ft of 8" pipe and 12 manholes. CIPP was used to rehab 640 ft of 8" pipe and 480 ft of 12" pipe.
7. **4-3 Middlebrook Pike Rehabilitation** – Replaced 190 ft of 8" pipe and two manholes. CIPP was used to rehab 2,000 ft of 8" pipe. Two manholes were rehabbed as well.
8. **4-6 Shadyland Drive Rehabilitation** – Replaced 1,700 ft of 10" pipe and 9 manholes. CIPP was used to rehab 1,000 ft.
9. **4-19 Northshore Drive Rehabilitation Project** – Raised manholes 6, 7, and 8 to create additional storage in the trunkline upstream of the Fourth Creek WWTP.
10. **4-23 5205 Bent River Blvd Project** – Replaced air release valves, flushed the low pressure force main, and replaced the grinder pump at 5205 Bent River Blvd.
11. **4-27 Southfork Project** – Project was completed in conjunction with 4-1 Chukar Road Rehabilitation Project. Replaced 88 feet of 8 inch pipe and two manholes. Rehabilitated 140 feet of 8 inch pipe using CIPP.

#### **South Knox**

1. **Maryville Pike** – Designed and replaced 800–1,200 ft of 24" sewer located in Witherspoon Superfund site. Design rerouted sewer around site.
2. **South Haven Phase I and Phase II** – Relocated, rehabilitated, and upsized approximately 4,700 ft of existing collector sewers to increase conveyance capacity and reduce inflow and infiltration (I/I).
3. **Island Home Rehabilitation** – Rehabilitated 9,400 ft and replaced 1,200 ft of collector sewers to reduce I/I.
4. **East Ford Valley Rehabilitation** – Rehabilitated approximately 16,000 ft of sewers in Mini-basin 41A4. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
5. **Stone Road Rehabilitation** – Rehabilitated approximately 13,500 ft of sewers in Mini-basin 41B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
6. **South Haven Rehabilitation Phase III** – Rehabilitated approximately 21,700 ft of sewers in Mini-basin 40F1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.

7. **Ginnbrook Pump Station** – Evaluated pump station and force main to ensure adequate capacity. Also included improvements to wet-well, pump system, and valve vault. The force main was re-routed.
8. **Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – Rehabilitated 10,000 ft of 15" to 18" trunk sewer along West Ford Valley Road. Completed find work in sub-basins 41C1, 41C2, and 41A2. Completed trunkline rehabilitation on West Ford Valley. Rehabilitated collector line in sub-basin 41C1, C2, and A2.
9. **Mini-basin 41A6 Rehabilitation Project** – Rehabilitated approximately 21,000 ft of sewer in sub-basin 41A6.
10. **Blount Avenue Trunkline and Goose Creek Siphon Upgrade** – The trunkline upgrades between the siphon inlet structure and manhole 63-2 are complete. This work was included in phases I and II of the Blount Avenue Trunkline Replacement/ Rehabilitation Project. This construction successfully addressed historical overflows.
11. **S-6 Sevier Avenue and Jones Street Collector Project** – Rehabilitated approximately 3,100 ft of existing sewer and rerouted approximately 352 ft of 8" sewer.
12. **S-9 Ellis Road Rehabilitation Project** – Rehabilitated 2,250 ft of gravity sewer and replaced 6 MHs.
13. **S-11 Ford Valley Pump Station Rehabilitation Project** – Replaced pump station and added additional pump and generator to convey two-year storm within CAP requirements.
14. **S-20 Avenue A Rehabilitation Project** – CIPP was used to rehabilitate 1,585 ft of sewer. Seven manholes were rehabilitated, and 25 service lines were replaced.
15. **S-26 Trunk Sewer Replacement Project in Sub-basin 40F1** – This project was constructed as part of the South Haven Phase III work. Replaced 704 ft of 8" sewer and six manholes. Five laterals were reinstated.
16. **S-15 Trunk Replacement in Sub-basin 40A2 Project** – 3411 ft of gravity sewer was replaced, 16 manholes were rehabbed and 13 laterals were reinstated as part of this completed project.

#### **Loves Creek and Eastbridge**

1. **L-9 Shelbourne Road Rehabilitation** – 26,900 ft of gravity sewer was rehabilitated along with 30 manholes in sub-basins 6A4 and 6A5. This work addressed the SSO located on Shelbourne Road.
2. **EB-1 Maloneyville Road Rehabilitation** – Mechanical grinder was installed at Knox County Detention Facility to remove paper debris prior to discharge. Paper debris clogging the pumps was the cause of previous SSOs at Maloney Road pump station.
3. **L-1 Asheville Highway west of I-40 Trunk Replacement** – Upgraded 4,688 ft of existing pipe and replaced 20 manholes. Project was completed in FY 09/10, two years ahead of schedule.
4. **L-3 River View Rehabilitation** – Rehabilitated 4,627 ft of gravity sewer along with 8 manholes and 1 manhole was replaced. This work addressed the SSO located on Riverview Drive. Project was completed on FY 09/10, two years ahead of schedule.
5. **L-5 Brentwood Shortline Repair** – Rehabilitated 440 ft of gravity sewer. This work addressed the SSO located on Brentwood Road. Project was completed on FY 09/10, three years ahead of schedule.
6. **L-10 Washington Court Rehabilitation** – Rehabilitated 872 ft of gravity sewer. This work addressed the SSO located on Washington Court. Project was completed on FY 09/10, three years ahead of schedule.
7. **L-2 Boyds Bridge Pike and Holston Hills Trunk Replacement** – Replaced 4,456 feet of trunkline and 31 manholes.

## **Williams Creek**

1. **Delrose Force Main Replacement** – Designed and replaced approximately 5,000 ft of 16" ductile iron pipe force main that had severe structural problems.
2. **Williams Creek Trunk Line Replacement** – Designed and replaced approximately 3,700 ft of 24" sewer to correct structural problems.
3. **Williams Creek Sub-basin 19 Rehabilitation** – Performed rehabilitation in sub-basin 19A1, 19B1, and 19A2/A3 to reduce R-value to 2%. Investigative work was performed on the approximately 105,000 ft in the entire sub-basin 19 area. Completed rehabilitation projects in 19A1, 19B1, and 19A2/A3. The original CAP/ER completion date for the 19A2 project was in FY 10/11. This project was shifted to higher priority due to the large number of private lateral problems and CSSAP rating. Project coincided with water quality monitoring program work in Williams Creek.
4. **W-4 E. Fifth Avenue Sewer Replacement Project** – Replaced 956 ft with 8" PVC and four manholes.
5. **W-6 Selma Avenue – Harrison Street Rehabilitation Project** – Replaced 650 ft with 8" PVC and four manholes, and rehabbed 600 ft of 8" concrete.
6. **W-8 South Elmwood Street Rehabilitation Project** – Replaced 200 ft with 8" PVC and three manholes, and rehabbed 400 ft of 8" concrete.
7. **W-9 Williams Creek Trunk Line Replacement (Sub-basin 19A1)** – In lieu of replacement of 360 ft of 12" concrete with 15" sewer, problem was addressed by comprehensive rehab of mini-basin 19A1. Project included replacement with 8,900 ft of 8" PVC, 97 ft with 10" PVC, 179 ft with 12" PVC, and 76 manholes. Also rehabbed 21,200 ft of 8" concrete and 180 ft of 12" concrete.
8. **W-7 Sunset Avenue Rehabilitation Project** – Replaced 102 ft with 8" PVC.

## **Phase II CAP/ER**

The Phase II CAP/ER was submitted to EPA on September 9, 2009 and subsequently approved on March 22, 2010.

## **Phase II CAP/ER Ongoing Projects**

### **First Creek**

1. **FCR-1 1235 Watercress Drive** – Find and fix project to address overflow in vicinity of 1235 Watercress drive in mini-basin 07A2. This project is currently in design.
2. **FCR-2 4600 Upchurch Road** - Find and fix project to address overflow in vicinity of 4600 Upchurch Road in mini-basin 07A3. This project is currently in design.

### **Second Creek**

1. **SCR-1 4105 Central Avenue Pike** – Find and find work to identify and address overflow in vicinity of 4105 Central Avenue Pike. CCTV, smoke testing and manhole inspection are currently underway for this project.

### **Fourth Creek**

1. **4TH-2 Ten Mile Pump Station Removal** – Removal of Ten Mile pump station. This project is currently in design.

### **South Knox**

1. **STH-1 820 Goldfinch Drive** – Find and fix work to identify and address overflow in vicinity of 820 Goldfinch Drive. This project is currently in the design.

**Loves Creek and Eastbridge**

1. **L-9 Shelbourne Road Rehabilitation** – 26,900 ft of gravity sewer was rehabilitated along with 30 manholes in sub-basins 6A4 and 6A5. This work addressed the SSO located on Shelbourne Road.

**Phase II CAP/ER Completed Projects****Fourth Creek**

1. **4TH-1 6540 Creekhead Drive** – Sewer rehabilitation completed in mini-basin 32A4.

**Loves Creek and Eastbridge**

1. **LVS-1 1815 Wayland Road** – Replaced 18,433 ft of force main. New pump station to be built in the FY 12/13.
2. **EBR-1 7612 Bud Hawkins Road** – Replaced the pump station and force main with a 21-inch gravity sewer.
3. **EB-1 Maloneyville Road Rehabilitation** – Mechanical grinder was installed at Knox County Detention Facility to remove paper debris prior to discharge.

## **Section 2 Comprehensive Performance Evaluation Program (CPE) and Composite Correction Plan (CCP)**

Consent Decree language, pages 82-83: *"Each Quarterly Progress Report shall contain... A summary of compliance with and activities related to implementation of the CPE and CCP."*

The CPE was submitted to EPA on February 24, 2006, and was approved on July 24, 2006.

The CCP was submitted to the EPA on July 23, 2007. EPA disapproved it on January 4, 2008. The Revised CCP was submitted to EPA on January 5, 2009, and subsequently approved on January 20, 2009.

Construction of the Kuwahee WWTP CCP Phase I Improvements will be managed to allow for sequencing of work and coordination of new construction, demolition of existing facilities, and maintenance of plant operations. Construction of the emergency stand-by generator building is complete. Kuwahee WWTP CCP Phase 1 Contract 1 Improvements have been advertised and bid. Bids are currently being reviewed and an award is eminent. Kuwahee WWTP Phase 1 Contract 2 Improvements will be advertised and bid in May 2011. Fourth Creek WWTP design has begun. Schedule is being tracked so all milestones are accomplished. CDM and KUB continue to work together to derive engineering solutions for the requirements of the CCP.

## Section 3 Process Controls Program

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of implementation of and compliance with the Process Controls Program.”*

The Process Controls Program (PCP) was initiated 18 times during this reporting period resulting in nine Diversion events (one at Loves Creek WWTP, four at Kuwahee WWTP, and four at Fourth Creek WWTP).

## Section 4 Capacity Assurance Program

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A summary of the implementation of the Capacity Assurance Program for that Calendar Quarter, including the number of, and anticipated flow from, sewer connections that have been authorized, by Sewerbasin, a description of the projects that have been authorized and the number of credits earned and banked by KUB that will be expended for those projects, by Sewerbasin, and any exceptions granted for connections for essential services.”*

The Capacity Assurance Program (CAP) was submitted to EPA for review on February 8, 2006. EPA reviewed and approved the program on April 7, 2006. KUB started reviewing building permits based on the approved CAP on June 6, 2006, which was within the 60-day timeframe for implementing the program after receiving EPA approval.

To review building permits more efficiently using the CAP criteria agreed on with the EPA, KUB worked with a consultant, Camp, Dresser, & McKee, to develop an Information Management System (IMS). The IMS assists KUB in managing the CAP program by determining the amount of wastewater each proposed building would add to KUB's wastewater system based on its location. The IMS also helps track rehabilitation credits that KUB earns through its CAP/ER and MOM programs.

Appendix A includes a list of capital projects that KUB performed to gain rehabilitation credit in its sewer system. As stated in the Consent Decree, the list of authorized sewer connections was maintained and updated as necessary until full implementation of the CAP as approved by EPA. Therefore, the list will no longer be included as part of this quarterly report.

There were no exceptions granted for connections for essential services during this reporting period.

## Section 5 Transfers of Ownership

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... Identification of any transfer of an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof.”*

There has been no transfer of an ownership interest, operation, management, or other control of the Treatment Works, or any portion thereof, during this reporting period.

## Section 6 Compliance and Non-Compliance With the Consent Decree

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain...A description of the status of compliance or non-compliance with the requirements of this Decree and, if applicable, the reasons for non-compliance, including a list of all violations that are subject to stipulated penalties under Section X of this Consent Decree.”*

### 6.1 Submission of Deliverables

To date, KUB has submitted all deliverables in accordance with the schedule set forth in the Consent Decree. The following sections detail all activity related to deliverables that occurred during the past quarter. Also noted are the dates each submittal was available for public comment in the Public Document Repository (PDR), when the deliverable was submitted to EPA, when EPA responded with comments, when KUB responded to those comments, and when EPA approval was received.

#### 6.1.1 Quarterly Progress Report Fourth Quarter 2010

Consent Decree language, pages 82-83: *“Beginning thirty (30) Days after the first Calendar Quarter following the Date of Entry, and thirty (30) Days after each Calendar Quarter thereafter until termination of the Consent Decree, KUB shall submit to the Parties, and simultaneously place in the PDR, a Quarterly Progress Report.”*

On January 28, 2011, KUB submitted to EPA and placed in the PDR the Quarterly Progress Report for the fourth quarter 2010. This deliverable was not subject to the Public Review Requirement of Section VI.A.2, but was available for public comment from January 28, 2011, until February 17, 2011. No comments were received during that period.

#### 6.1.2 SEP Periodic Report Second Period 2010

Consent Decree language, page 61: *“While the SEP is being planned and implemented, KUB shall submit semiannual reports to the Parties describing the progress of the SEP up to and during the most recent Calendar Quarter within one (1) Month after the end of the second and fourth Calendar Quarters following the Date of Entry.”*

On January 28, 2011, KUB submitted the SEP Periodic Report for the second period 2010 to EPA. This deliverable was not subject to public review but was posted in the PDR at the time of submission.

#### 6.1.3 Annual MOM Progress Report 2010

Consent Decree language, page 84: *“Beginning on March 1, 2006, and every twelve (12) Months thereafter until termination of this Consent Decree, KUB shall submit to the Parties, and simultaneously place in the PDR, an Annual MOM Progress Report.”*

On March 1, 2011, KUB submitted to EPA and placed in the PDR the Annual MOM Progress Report for 2010. This deliverable was not subject to the Public Review

Requirement of Section VI.A.2, but was available for public comment from March 1, 2011, until March 21, 2011. No comments were received during that period.

## 6.2 Violations Subject to Stipulated Penalties

During this reporting period, KUB incurred 30 Unpermitted Discharges. Table 1 below lists all violations subject to stipulated penalties as outlined in the Consent Decree. Appendix E lists any SSO that occurred during the first quarter 2011 that resulted in an unpermitted discharge along with its cause, volume, one- and three-day rainfall totals, and rainfall intensity.

**Table 1. Violations Subject to Stipulated Penalties**

<b>Violation</b>	<b>Date</b>	<b>Address</b>	<b>Cause</b>
Unpermitted Discharge	1/1/11	1411 Davanna Street	Heavy Rainfall
Unpermitted Discharge	1/1/11	5011 Kingston Pike	Heavy Rainfall
Unpermitted Discharge	1/1/11	1500 Lyons Bend Road	Heavy Rainfall
Unpermitted Discharge	1/7/11	5915 Neubert Springs Road	Heavy Rainfall
Unpermitted Discharge	2/16/11	604 Ben Hur Avenue	Blockage
Unpermitted Discharge	2/16/11	512 Flennwood Way	Blockage
Unpermitted Discharge	2/28/11	1500 Lyons Bend Road	Heavy Rainfall
Unpermitted Discharge	2/28/11	2500 Cedar Lane	Heavy Rainfall
Unpermitted Discharge	2/28/11	2008 Riverside Drive	Heavy Rainfall
Unpermitted Discharge	2/28/11	2004 Neyland Drive	Heavy Rainfall
Unpermitted Discharge	2/28/11	815 South Central Street	Heavy Rainfall
Unpermitted Discharge	2/28/11	1411 Davanna Street	Heavy Rainfall
Unpermitted Discharge	2/28/11	2536 Cecil Avenue	Heavy Rainfall
Unpermitted Discharge	2/28/11	2640 Morgan Circle	Heavy Rainfall
Unpermitted Discharge	2/28/11	2102 Washington Avenue	Heavy Rainfall
Unpermitted Discharge	2/28/11	4014 Holston Hills Road	Heavy Rainfall
Unpermitted Discharge	3/1/11	600 North Gallaher View Road	Heavy Rainfall
Unpermitted Discharge	3/1/11	1521 Fairmont Boulevard	Heavy Rainfall
Unpermitted Discharge	3/1/11	3741 Eakers Street	Heavy Rainfall
Unpermitted Discharge	3/1/11	411 West Baxter Avenue	Heavy Rainfall
Unpermitted Discharge	3/3/11	1216 Watercress Drive	Heavy Rainfall
Unpermitted Discharge	3/7/11	6540 Creekhead Drive	Blockage
Unpermitted Discharge	3/7/11	243 Gilbert Lane	Blockage
Unpermitted Discharge	3/9/11	1500 Lyons Bend Road	Heavy Rainfall
Unpermitted Discharge	3/9/11	2536 Cecil Avenue	Heavy Rainfall
Unpermitted Discharge	3/10/11	600 North Gallaher View Road	Heavy Rainfall
Unpermitted Discharge	3/10/11	2377 Neyland Drive	Heavy Rainfall
Unpermitted Discharge	3/17/11	6410 South Northshore Drive	Heavy Rainfall
Unpermitted Discharge	3/22/11	4719 Old Broadway	Heavy Rainfall
Unpermitted Discharge	3/29/11	702 Redwine Street	Construction Failure

## Section 7 SSOs, Bypasses, Diversions, and Effluent Limit Violations

Consent Decree language, pages 82-83: *“Each Quarterly Progress Report shall contain... A spreadsheet and summary of all SSOs, Bypasses, Diversions, and effluent limit violations that occurred during the previous Calendar Quarter. Information on Building Backups may be provided in separate spreadsheets and summaries from other SSOs. The spreadsheets and summaries shall identify:*

- a. For all SSOs, the location, source, date, time, duration, pathway (if any), receiving water (if any), the reason for each SSO, the total SSO volume, the volume returned to the WCTS, and the volume not captured;*
- b. For all Bypasses and Diversions, the location, date, time, duration, volume and reason for each Bypass and Diversion; and the total Bypass or Diversion volumes;*
- c. For all effluent limit violations, all information required to be reported on KUB’s Discharge Monitoring Reports.”*

### 7.1 SSOs

Appendix B lists all SSOs that occurred during this reporting period. During this period, there were 74 SSO events. Of that number, 39 were due to heavy rainfall, 22 were due to blockage, eight were due to broken pipe, three were due to construction failure, and two were due to grinder pump failure. Over 85 percent of the SSOs associated with heavy rainfall occurred on February 28, 2011, when our service area received an average of 2.8 inches of rain in approximately three hours. There were 34 overflows reported as a result of this storm. (See Appendix E)

Of the 74 SSO events, 40 were in the 0 – 1,000 gallons volume range, 12 were in the 1,001 – 10,000 range, 19 events totaled greater than 10,000 gallons, and the volume was unknown for three events. Durations for events during this period are as follows: 42 ranged from 0 – 2 hours, 24 ranged from 2.1 - 5 hours, five were greater than 5 hours, and the duration was unknown for three events. If an event is found after the overflow has stopped it is sometimes difficult to estimate volume and duration. In those instances, unknown is entered for volume and duration.

### 7.2 Building Backups

Appendix C lists all Building Backups that occurred during this reporting period. During this period, there were nine Building Backups. Four were due to heavy rainfall, and five were due to construction failure.

### 7.3 Bypasses

All Bypasses that occurred during this reporting period were in compliance with the Process Controls Program. For purposes of this Report, any Bypass in compliance with the Process Controls Program shall be referred to as a “Diversion” (see below). All Bypasses not in compliance with the Process Controls Program shall be referred to as a “Bypass.”

Table 2 contains all Diversion event information that occurred during this reporting period. During this reporting period, there were four Diversions at Kuwahee, four at Fourth Creek, and one at Loves Creek. No Bypasses occurred during this reporting period.

#### **7.4 Effluent Limit Violations**

Table 3 contains all effluent limit violations that occurred during this reporting period. The table contains the information as it is reported in KUB's Discharge Monitoring Reports. During this reporting period, there were no Effluent Limit Violations at Kuwahee, Fourth Creek, Loves Creek, or Eastbridge WWTPs.

**Table 2: Diversions**

WWTP	Did a Diversion occur?	Date Diversion gate opened	Time Diversion gate opened	Date Diversion gate closed	Time Diversion gate closed	Date Diversion flow reported	Duration (hrs)	Volume (MG)	Total Event Duration (hrs)	Total Event Volume (MG)	Reason for Event
Fourth Creek	Yes	01/01/2011	10:15			01/01/2011	13.0	3.9	13.0	3.9	High flow event due to excess rainfall
				01/01/2011	23:15						
Fourth Creek	Yes	02/28/2011	15:49			02/28/2011	8.18	5.21	34.18	9.05	High flow event due to excess rainfall
						03/01/2011	24.0	3.62			
				03/02/2011	02:00	03/02/2011	2.0	0.22			
Fourth Creek	Yes	03/06/2011	02:47			03/06/2011	22.22	8.73	26.72	9.15	High flow event due to excess rainfall
				03/07/2011	04:30	03/07/2011	4.5	0.42			
Fourth Creek	Yes	03/09/2011	11:07			03/09/2011	12.88	5.65	64.50	20.06	High flow event due to excess rainfall
						03/10/2011	24.0	10.94			
						03/11/2011	24.0	3.23			
				03/12/2011	03:37	03/12/2011	3.62	0.24			
Kuwahee	Yes	01/01/2011	12:00	01/01/2011	22:00	01/01/2011	10.0	8.72	10.0	8.72	High flow event due to excess rainfall
Kuwahee	Yes	02/28/2011	15:45			02/28/2011	8.25	17.1	20.5	29.01	High flow event due to excess rainfall
				03/01/2011	12:15	03/01/2011	12.25	11.91			
Kuwahee	Yes	03/06/2011	03:06	03/06/2011	23:30	03/06/2011	20.4	12.55	20.4	12.55	High flow event due to excess rainfall
Kuwahee	Yes	03/09/2011	14:04			03/09/2011	9.93	6.72	42.93	35.01	High flow event due to excess rainfall
						03/10/2011	24.0	26.28			
				03/11/2011	09:00	03/11/2011	9.0	2.01			
Loves Creek	Yes	02/28/2011	18:30	02/28/2011	22:15	02/28/2011	3.75	0.151	3.75	0.151	High flow event due to excess rainfall
Eastbridge	No										

**Table 3: Effluent Limit Violations**

<b>WWTP</b>	<b>Did an event occur?</b>	<b>Date</b>	<b>Parameter</b>	<b>Type</b>	<b>Limit</b>	<b>Value</b>
Kuwahee	No	-	-	-	-	-
Fourth Creek	No	-	-	-	-	-
Loves Creek	No	-	-	-	-	-
Eastbridge	No	-	-	-	-	-
SS - Settleable Solids	mg/l - milligrams per liter					
TSS - Total Suspended Solids	cfu –Colony Forming Unit					
ml/l – milliliters per liter	lbs - Pounds					

## Section 8 Water Quality Monitoring Data

Consent Decree language, pages 82-83: *"Each Quarterly Progress Report shall contain... The water quality monitoring data and other information required pursuant to Section VII.D.1.(e).(v)."*

### 8.1 Sampling Conducted and Results

Appendix D lists all sampling that was conducted during the reporting period and the results thereof. In addition to routine monitoring in all creeks, and responding to Sanitary Sewer Overflows (SSO), KUB Water Quality Personnel conducted investigative sampling in Baker, Second, and Williams creeks. KUB continues to utilize RT-PCR Bacteroides analysis on selected routine samples to investigate high *E. coli* counts when applicable.

There were analysis problems with the initial set of Spill Impact samples collected for the SSO located near Redwine Street on 3/29/11, so no bacteriological results are available. (Spill Impact Monitoring Report – Appendix D) The area was posted as required and follow-up monitoring was conducted.

Routine Water Quality Monitoring Data was reviewed over a prior six-month period, since counts were low on most creeks throughout this quarterly period.

#### First Creek

Bacteriological results for this creek (Routine Water Quality Monitoring Report – Appendix D) have stayed low for several months. One sample had *E. coli* results above the water quality standard of 941cfu/100 ml during last quarter (980 counts) on 11/2/10. No source testing or investigation on this creek was conducted or warranted.

#### Second Creek

The bacteriological results associated with the routine monitoring during this quarter (Routine Water Quality Monitoring Report – Appendix D) indicate the need for additional investigation at various locations. KUB continues to examine some of the sites that were suspect during a dry weather walk of the stream last spring (Table 1). Three areas near stream miles 0.9, 3.8, and 5.5 were resampled at the end of the quarter during warmer temperatures (Table 2). Results collected during routine and investigative monitoring have been inconsistent and some samples have been submitted for source testing. Additional monitoring is being conducted during the second quarter for further investigation.

#### Third Creek

There were no *E. coli* results above the water quality standard for any monitoring done on Third Creek during this quarter (Routine Water Quality Monitoring Report – Appendix D). Fecal counts were also low. Bacteriological counts have continued to be low over the last several months. No source testing or investigation was conducted.

#### Fourth Creek

There were no *E. coli* results above the water quality standard for any monitoring done on Fourth Creek during this quarter (Routine Water Quality Monitoring Report – Appendix D). Fecal counts were also low. Bacteriological counts have continued to be low over the last several months. Two samples collected during wet weather in October 2010 with 1100 and 1200 counts were only slightly above the water quality standard (Routine Water Quality Monitoring Report – Appendix D). These samples were not submitted for bacteroides

testing, since there was over an inch of rainfall on the day of sampling. Runoff brings potential contamination from other sources to the stream. No source testing or investigation was conducted on this stream.

#### Loves Creek

One sample had *E. coli* results above the water quality standard of 941cfu/100 ml during this quarter. The sample collected on 2/22/11 had *E. coli* results of 1400 but was not submitted for bacteroides testing, since there was rainfall on the day of sampling. All other monitoring for the quarter was below the water quality standard and counts have continued to be low over the last several months (Routine Water Quality Monitoring Report – Appendix D). No source testing or investigation was conducted on this stream.

#### Baker Creek

Bacteriological counts in this stream were slightly elevated in January during this quarter, and one sample collected at Site 0.36 was found to contain some amount of human source during wet weather conditions. Since the elevations are slight, inconsistent and only occur during wet weather, a leaking septic system or private lateral is suspect. KUB continues to sample a tributary that enters Baker Creek just above the routine Site 0.36 (Table 4) but so far no indication of human source along this tributary is evident. The most recent monitoring during warmer temperatures in March showed all results were below the water quality standard.

#### Goose Creek

Bacteriological counts in this stream were generally low during this quarter and most results were below the water quality standard. KUB will continue to look at any high counts at Site 1.19E during dry weather, since there was a slight indication of human source in a sample collected in December 2010. No source testing or investigation was conducted on this stream this quarter.

#### Williams Creek

There were no *E. coli* results above the water quality standard for any monitoring done on Williams Creek during this quarter (Routine Water Quality Monitoring Report – Appendix D). Fecal counts were also low. Bacteriological counts have continued to be low over the last several months except in late November 2010 near Site 2.02.

Water quality personnel have submitted routine and investigative samples for bacteroides testing due to some elevations in bacteriological counts around Site 2.02. This included sampling of the two tributaries just above this location. Although inconsistent, evidence of human source has been seen during wet weather conditions in this area (Table 3).

Previously, it was thought that a suspect lateral was only affecting the left fork of the tributary. Source testing results implicate both tributaries. Additional monitoring is planned for the second quarter to better identify the source. As the routine monitoring from the last six months illustrates the problem is transient and inconsistent and thus, likely from a private lateral. As previously mentioned, data during this quarter did not reveal any counts above the water quality standard, even at Site 2.02.

## **8.2 Projected Data Collection**

During the second quarter of 2011, KUB will continue to monitor the 24 routine sampling locations in the sewer basins of eight area creeks. KUB will collect samples from the following locations during the second quarter of 2011:

***Sample Locations by Creek Mile or Site Number***

<b>Creek Name</b>	<b>Creek Mile #</b>	<b>Creek Mile #</b>	<b>Creek Mile #</b>
<b>First Creek</b>	1.74	2.57	6.33
<b>Second Creek</b>	0.30	1.54	5.76
<b>Third Creek</b>	0.87	2.08E	4.80W
<b>Fourth Creek</b>	1.75	2.79	3.29
<b>Baker Creek</b>	0.36	0.53	1.45
<b>Goose Creek</b>	0.40	1.19E	1.80E
<b>Loves Creek</b>	0.85	1.89	3.45
<b>Williams Creek</b>	0.89	1.70	2.02

## **Appendix A**

### **Capital Projects and Rehabilitation Credits**

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
1	Comprehensive Rehab 03B1a	Comprehensive Rehabilitation	1st Creek	Kuwahee	321,030	Project Complete
2	Comprehensive Rehab 03B2a	Comprehensive Rehabilitation	1st Creek	Kuwahee	302,366	Project Complete
3	Comprehensive Rehab 04B1a	Comprehensive Rehabilitation	1st Creek	Kuwahee	334,626	Project Complete
4	Comprehensive Rehab 08A1	Comprehensive Rehabilitation	1st Creek	Kuwahee	1,589,952	Project Complete
5	McC Campbell Lane Sewer Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	25,543	Project Complete
6	Knox Road Trunkline Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	36,728	Project Complete
7	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
8	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
9	vented manhole cover replacement (7A1)	Manhole Cover	1st Creek	Kuwahee	13,333	Project Complete
10	Comprehensive Rehab 15D2	Comprehensive Rehabilitation	2nd Creek	Kuwahee	1,450,008	Project Complete
11	Comprehensive Rehab 05A4 & 05A3	Comprehensive Rehabilitation	2nd Creek	Kuwahee	43,904	Project Complete
12	Comprehensive Rehab 09A2	Comprehensive Rehabilitation	3rd Creek	Kuwahee	296,664	Project Complete
13	Comprehensive Rehab 09A1	Comprehensive Rehabilitation	3rd Creek	Kuwahee	219,345	Project Complete
14	Walker Springs Storage Tank	Storage Tank	4th Creek	Fourth Creek	3,250,000	Project Complete
15	Comprehensive Rehab 40F1	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	83,600	Project Complete
16	Comprehensive Rehab 41A4	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	371,994	Project Complete
17	Comprehensive Rehab 41B1	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	152,958	Project Complete
18	Wilson Ave, Chesnut St., Donnell St. (Asset Replacement)	Find & Fix Gravity Main	Williams Creek	Kuwahee	28	Project Complete
19	Williams Creek Trunkline Replacement	Find & Fix Gravity Main	Williams Creek	Kuwahee	168,667	Project Complete
20	Rushland Park Off Site Sewer Rehabilitation	Find & Fix Gravity Main	Loves Creek	Loves Creek	3,803	Project Complete
21	Emily Avenue Pump Station Abandonment	Find & Fix Gravity Main	Loves Creek	Loves Creek	141,600	Project Complete
22	Fair Drive - Phase I	Find & Fix Gravity Main	1st Creek	Kuwahee	130,928	Project Complete
23	Comprehensive Rehab 23E1	Comprehensive Rehabilitation	2nd Creek	Kuwahee	4,215,003	Project Complete
24	vented manhole cover replacements (08B2)	Manhole Cover	1st Creek	Kuwahee	4,669	Project Complete
25	vented manhole cover replacement (16B1)	Manhole Cover	1st Creek	Kuwahee	667	Project Complete
26	vented manhole cover replacements (28C1)	Manhole Cover	3rd Creek	Kuwahee	1,334	Project Complete
27	10" mainline replacement (33A2)	Find & Fix Gravity Main	4th Creek	Fourth Creek	5,409	Project Complete
28	vented manhole cover replacements (22C2)	Manhole Cover	3rd Creek	Kuwahee	16,002	Project Complete
29	vented manhole cover replacements (63)	Manhole Cover	Sinking Creek	Loves Creek	66,665	Project Complete
30	10" mainline replacement (6C1)	Find & Fix Gravity Main	Loves Creek	Loves Creek	24,620	Project Complete
31	Comprehensive Rehab 06A5	Comprehensive Rehabilitation	Loves Creek	Loves Creek	263,358	Project Complete
32	Comprehensive Rehab 06A4	Comprehensive Rehabilitation	Loves Creek	Loves Creek	386,304	Project Complete
33	vented manhole cover replacement (39D2)	Manhole Cover	South Knox / Knob Creek	Kuwahee	667	Project Complete
34	vented manhole cover replacement (39D4)	Manhole Cover	South Knox / Knob Creek	Kuwahee	667	Project Complete
35	vented manhole cover replacement (39D3)	Manhole Cover	South Knox / Knob Creek	Kuwahee	2,668	Project Complete
36	vented manhole cover replacement (20A6)	Manhole Cover	Loves Creek	Loves Creek	1,334	Project Complete
37	vented manhole cover replacement (20A7)	Manhole Cover	Loves Creek	Loves Creek	667	Project Complete
38	vented manhole cover replacement (13A2)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
39	vented manhole cover replacement (13B1)	Manhole Cover	3rd Creek	Kuwahee	13,335	Project Complete
40	vented manhole cover replacement (28B1)	Manhole Cover	3rd Creek	Kuwahee	1,334	Project Complete
41	12" mainline replacement (44)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	4,278	Project Complete
42	manhole frame seal repair (67)	Manhole Repair	Loves Creek	Loves Creek	2,304	Project Complete
43	Whites Creek Trunk Line Replacement (02)	Find & Fix Gravity Main	1st Creek	Kuwahee	50,106	Project Complete
44	Comprehensive Rehab 09D1	Comprehensive Rehabilitation	3rd Creek	Kuwahee	381,376	Project Complete
45	Comprehensive Rehab 09A4	Comprehensive Rehabilitation	3rd Creek	Kuwahee	408,317	Project Complete
46	Lower First Creek Storage Tank	Storage Tank	1st Creek	Kuwahee	5,000,000	Project Complete
47	vented manhole cover replacement (11B2)	Manhole Cover	3rd Creek	Kuwahee	13,333	Project Complete
48	vented manhole cover replacement (13C1)	Manhole Cover	3rd Creek	Kuwahee	2,667	Project Complete
49	vented manhole cover replacement (22A2)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
50	vented manhole cover replacement (22B1)	Manhole Cover	3rd Creek	Kuwahee	667	Project Complete
51	Creek Head Drive sewer line replacement (32A4)	Find & Fix Gravity Main	4th Creek	Fourth Creek	11,132	Project Complete
52	Manhole replacement (19A3)	Find & Fix Gravity Main	Williams Creek	Kuwahee	207	Project Complete
53	Papermill drive sewer line replacement (33A2)	Find & Fix Gravity Main	4th Creek	Fourth Creek	103,769	Project Complete
54	Wells Rd sewer line replacement (39C2)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	1,728	Project Complete
55	Power Park Manhole Rehab (45)	Find & Fix Gravity Main	Knob Creek	Kuwahee	3,596	Project Complete
56	Blount Ave abandoned lateral (39A1)	Disconnect abandoned lateral	South Knox / Knob Creek	Kuwahee	2,000	Project Complete
57	Woodbine Ave sewerline Rehab (19A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	2,683	Project Complete
58	Pleasant Ridge Rd Sewer line improvements (09A1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	207	Project Complete
59	Papermill drive sewer line replacement (27A1)	Find & Fix Gravity Main	Fourth Creek	Fourth Creek	18,211	Project Complete
60	Wilson Rd Manhole Rehab (10C1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	831	Project Complete
61	Maryville Pike Trunk Replacement (39C1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	72,880	Project Complete
62	Upper McKamey Trunk Replacement (11B1 11B2)	Find & Fix Gravity Main	3rd Creek	Kuwahee	64,324	Project Complete
63	Fox Manor Blvd sewer line replacement (32A4)	Find & Fix Gravity Main	4th Creek	Fourth Creek	31,510	Project Complete
64	Power Park Manhole Rehab (47)	Manhole Repair	South Knox / Knob Creek	Kuwahee	7,700	Project Complete

Capital Projects and Rehabilitation Credits

65	Sutherland Ave Sewer Line Replacement (28B1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	20,383	Project Complete
66	Fountain City Trunkline Replacement (03B1 03B2)	Find & Fix Gravity Main	1st Creek	Kuwahee	72,512	Project Complete
67	vented manhole cover replacement (11B2)	Manhole Cover	4th Creek	Fourth Creek	13,333	Project Complete
68	vented manhole cover replacement (39D2)	Manhole Cover	South Knox / Knob Creek	Kuwahee	13,333	Project Complete
69	Comprehensive Rehabilitation 19A2	Comprehensive Rehabilitation	Williams Creek	Kuwahee	521,631	Project Complete
70	17B1 Manhole Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	1,803	Project Complete
71	Vine Middle School sewerline Rehab (24D1)	Find & Fix Gravity Main	1st Creek	Kuwahee	23,491	Project Complete
72	Comprehensive Rehabilitation (08B2)	Comprehensive Rehabilitation	1st Creek	Kuwahee	841,370	Project Complete
73	Third Creek Storage Tank (21A1)	Storage Tank	3rd Creek	Kuwahee	4,000,000	Project Complete
74	Comprehensive Rehabilitation (19A1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	313,938	Project Complete
75	Comprehensive Rehabilitation (19B1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	328,300	Project Complete
76	Comprehensive Rehabilitation (10B1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	191,698	Project Complete
77	Comprehensive Rehabilitation (10C1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	67,840	Project Complete
78	Disconnected Stormwater Detention Pond Sevier Ave (40C1)	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	97,333	Project Complete
79	Sub Basin 63 Sinking Creek Drainage rehabilitation (63)	Comprehensive Rehabilitation	South Knox / Knob Creek	Loves Creek	72,110	Project Complete
80	West Ford Valley Trunkline replacement (41A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	236,704	Project Complete
81	Blount Avenue Trunkline Replacement (39A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	225,376	Project Complete
82	Brookvale Point Repairs (02A3)	Find & Fix Gravity Main	1st Creek	Kuwahee	52,079	Project Complete
83	Park Pump Point Repairs (45)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	11,522	Project Complete
84	Wayland Road Storage Tank (67)	Storage Tank	Loves Creek	Loves Creek	20,000	Project Complete
85	Comprehensive Rehab (19A3)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	325,090	Project Complete
86	Comprehensive Rehab (41A2)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	39,330	Project Complete
87	Comprehensive Rehab (41A5)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	119,327	Project Complete
88	Jersey Ave sewer rehabilitation (SubBasin 23)	Find & Fix Gravity Main	1st Creek	Kuwahee	419	Project Complete
89	East Magnolia sewer rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	846	Project Complete
90	Walker Blvd Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	1086	Project Complete
91	Kingston Court Sewer Rehabilitation (SubBasin 29)	Find & Fix Gravity Main	3rd Creek	Kuwahee	3727	Project Complete
92	Clinch Ave Sewer Rehabilitation (SubBasin 30)	Find & Fix Gravity Main	1st Creek	Kuwahee	442	Project Complete
93	Badgett Drive Sewer Rehabilitation (SubBasin 22)	Find & Fix Gravity Main	3rd Creek	Kuwahee	214	Project Complete
94	Dickson Street Sewer Rehabilitation (SubBasin 20)	Find & Fix Gravity Main	Loves Creek	Loves Creek	417	Project Complete
95	W New Street Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	2844	Project Complete
96	Rennoc Rd Sewer Rehabilitation (SubBasin 4)	Find & Fix Gravity Main	1st Creek	Kuwahee	2853	Project Complete
97	Spicewood Lane Sewer Rehabilitation (SubBasin 13)	Find & Fix Gravity Main	3rd Creek	Kuwahee	216	Project Complete
98	Chapman Highway Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	212	Project Complete
99	McCroskey Ave Sewer Rehabilitation (SubBasin 17)	Find & Fix Gravity Main	1st Creek	Kuwahee	1,076	Project Complete
100	East 5th Ave Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	447	Project Complete
101	Simms Rd Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,955	Project Complete
102	Maynard Ave Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	423	Project Complete
103	Minibasin 10B1 & 10C1 find & fix	Find & Fix Gravity Main	2nd Creek	Kuwahee	15,689	Project Complete
104	Third Creek Trunkline Replacement	Find & Fix Gravity Main	3rd Creek	Kuwahee	483,793	Project Complete
105	Disconnected Stormwater 15" discharge pipe Island Home blvd	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	1,720,000	Project Complete
106	Paved Manhole Rehabilitation 40A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	20,140	Project Complete
107	Paved Manhole Rehabilitation 40F2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	6,515	Project Complete
108	Paved Manhole Rehabilitation 40G1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,571	Project Complete
109	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,576	Project Complete
110	Paved Manhole Rehabilitation 03C1	Find & Fix Gravity Main	1st Creek	Kuwahee	3,615	Project Complete
111	Paved Manhole Rehabilitation 02A1	Find & Fix Gravity Main	1st Creek	Kuwahee	6,491	Project Complete
112	Paved Manhole Rehabilitation SB 38	Find & Fix Gravity Main	3rd Creek	Kuwahee	5,797	Project Complete
113	Paved Manhole Rehabilitation 18A1	Find & Fix Gravity Main	1st Creek	Kuwahee	4,540	Project Complete
114	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	34,671	Project Complete
115	Paved Manhole Rehabilitation 39D1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	8,000	Project Complete
116	Paved Manhole Rehabilitation 39A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,335	Project Complete
117	Paved Manhole Rehabilitation 39C3	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	26,670	Project Complete
118	Broken Manhole Lid Replacement (67)	Find & Fix Gravity Main	Loves Creek	Loves Creek	26,666	Project Complete
119	Manhole Replacement (61)	Find & Fix Gravity Main	Loves Creek	Loves Creek	2,304	Project Complete
120	Woodbine Aver Sewer Rehab Phase II (19A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	855	Project Complete
121	Comprehensive Sewer Rehab (41A6)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	951,328	Project Complete
122	Comprehensive Sewer Rehab (41C1)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	161,680	Project Complete
123	Comprehensive Sewer Rehab (41C2)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	94,332	Project Complete
124	Davenport Trunkline Replacement (15A1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	86,423	Project Complete
125	Forks of the River Trunkline Replacement (60)	Find & Fix Gravity Main	Riverdale	Kuwahee	62,037	Project Complete
126	Brooks & Ester Sewer Rehabilitation (25A2)	Find & Fix Gravity Main	Williams Creek	Kuwahee	14,186	Project Complete
127	Grand Ave Sewer Rehabilitation (23B1)	Find & Fix Gravity Main	2nd Creek	Kuwahee	885	Project Complete
128	Clinch Ave & 21st Rehabilitation (35B3)	Find & Fix Gravity Main	3rd Creek	Kuwahee	15,453	Project Complete
129	Blount Ave Trunkline phase II (39A2)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	124,150	Project Complete
130	Trunkline at Woodland Ave	Trunkline Replacement	2nd Creek	Kuwahee	106,558	Project Complete
131	Keowee Ave, Sandusky Rd, and Sutherland Ave	Find & Fix Gravity Main	3rd Creek	Kuwahee	6,367	Project Complete

Capital Projects and Rehabilitation Credits

132	Antietam Rd	Find & Fix Gravity Main	1st Creek	Kuwahee	1,760	Project Complete
133	Cheyenne Dr	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	1,760	Project Complete
134	Chambliss Ave	Find & Fix Gravity Main	3rd Creek	Kuwahee	2,642	Project Complete
135	Godfrey St	Find & Fix Gravity Main	1st Creek	Kuwahee	218	Project Complete
136	Shortline-Ave B	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	7,332	Project Complete
137	Second Creek SSO Abatement	Find & Fix Gravity Main	2nd Creek	Kuwahee	163,471	Project Complete
138	Shortline- Maplehurst	Find & Fix Gravity Main	1st Creek	Kuwahee	6,062	Project Complete
139	Shortline- Parkhill	Find & Fix Gravity Main	4th Creek	Fourth Creek	1,755	Project Complete
140	Shortline- Essary	Find & Fix Gravity Main	1st Creek	Kuwahee	215	Project Complete
141	Shortline- Ridgecrest	Find & Fix Gravity Main	1st Creek	Kuwahee	3,058	Project Complete
142	4th Creek SSO Abatement Project	Find & Fix Gravity Main	4th Creek	Fourth Creek	266,200	Project Complete
143	Ashville Highway Trunkline Replacement (20A3)	Find & Fix Gravity Main	Loves Creek	Kuwahee	372,780	Project Complete
144	Minibasin 06A2 & 06A3 Comprehensive Rehabilitation	Comprehensive Rehabilitation	Loves Creek	Loves Creek	275,630	Project Complete
145	Sevier Ave & Jones Ave Find & Fix Rehabilitation (40C1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	50,537	Project Complete
146	Manhole Rehabilitation - National Drive (60)	Find & Fix Gravity Main	Riverdale	Kuwahee	4,608	Project Complete
147	Washington Ave Sewer Replacement (24B1)	Find & Fix Gravity Main	1st Creek	Kuwahee	14,643	Project Complete
148	Second Creek SSO Abatement phase II	Find & Fix Gravity Main	2nd Creek	Kuwahee	40,973	Project Complete
149	Highland Hills (37A3)	Find & Fix Gravity Main	4th Creek	Fourth Creek	13,017	Project Complete
150	Moses Ave (29D1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	1,761	Project Complete
151	Dance Ave (28A1)	Find & Fix Gravity Main	3rd Creek	Kuwahee	1,889	Project Complete
152	Texas Ave (SB 15)	Find & Fix Gravity Main	2nd Creek	Kuwahee	85,030	Project Complete
153	Ellis Road find & fix (41A3)	Find & Fix Gravity Main	Knob Creek	Kuwahee	61,614	Project Complete
154	Ford Valley Pump Station & gravity sewer	Find & Fix Gravity Main	Knob Creek	Kuwahee	14,520	Project Complete
155	Crestwood Pump Station & Gravity Sewer	Find & Fix Gravity Main	Loves Creek	Loves Creek	3,950	Project Complete
156	Washington Pike Manhole Rehab MH IPID 20414153	Find & Fix Gravity Main	Eastbridge	Eastbridge	576	Project Complete
157	Wassman & 8th Ave	Find & Fix Gravity Main	1st Creek	Kuwahee	8,750	Project Complete
158	Lebanon Street Sewer Improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	13,145	Project Complete
159	Minibasin 35B2 UT sewer improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	39,952	Project Complete
160	Minibasin 35B3 UT sewer improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	27,132	Project Complete
161	Boyd's Bridge Trunkline Replacement	Find & Fix Gravity Main	Loves Creek	Loves Creek	137,695	Project Complete
162	Minibasin 17B1 & 01A1	Find & Fix Gravity Main	1st Creek	Kuwahee	69,883	Project Complete

## **Appendix B**

### **SSOs**

Date	Time	Street #	Street	Plant	Watershed	Basin	Overflow Location	Pathway	Receiving Water	Cause of SSO/KUB Response	Total Volume (Gallons)	Recovered Volume (Gallons)	Non-Recovered Volume (Gallons)	Duration (Hours)	Unpermitted Discharge
1/1/2011	5:30 PM	1411	DAVANNA STREET	KUW	Second Creek	15	MH 8	Pavement to Ditch to Storm Drain to Second Creek and Soil Saturation	Second Creek	Rainfall in the area produced I & I and high flows in sewer mains.	5,630	30	5,600	3	Yes
1/1/2011	11:20 AM	1500	LYONS BEND ROAD	FC	Fourth Creek	37	MH 1 & MLSS Wetwell	Conveyance to Fourth Creek Embayment and Wet Well to Ground to Storm Drain to Tennessee River	Fourth Creek / Tennessee River	Rainfall in the area produced I & I and high flows in sewer mains.	380,000	0	380,000	2.82	Yes
1/1/2011	2:40 PM	5011	KINGSTON PIKE	FC	Fourth Creek	37	MH 58	Pavement to Storm Drain to Ditch at Railroad to Unnamed Tributary to Fourth Creek	Fourth Creek	Rainfall in the area produced I & I and high flows in sewer mains.	600	0	600	3	Yes
1/7/2011	11:30 AM	5815	NEUBERT SPRINGS ROAD	KUW	Knob Creek	41	Unnamed Manhole at Facility	Ground to Swale to Knob Creek and Soil Saturation	Knob Creek	Rainfall in the area produced I & I and high flows in sewer mains.	224,000	0	224,000	4.4	Yes
1/7/2011	3:25 PM	2526	EAST FIFTH AVENUE	KUW	Williams Creek	19	leanouts at 2522, 2524, 2526 & 2528 E. Fifth	Lateral Cleanout to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	900	0	900	2	No
1/8/2011	6:45 PM	2726	WILSON AVENUE	KUW	Williams Creek	19	MH 8-1	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	760	0	760	1.5	No
1/12/2011	9:06 PM	3822	NERVA ROAD	KUW	Second Creek	10	MH 17-78	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	300	0	300	1	No
1/20/2011	9:44 AM	5405	GREEN VALLEY DRIVE	LC	Loves Creek	26	Air Release Valve	Pavement to Soil Saturation and Recovery		An air release valve was repaired.	20	10	10	0.5	No
1/24/2011	1:24 PM	5926	ANTIGUA LANE	KUW	Third Creek	11	MH 22-11	Ground to Swale to Soil Saturation and Recovery		An offset joint on the sewer main was repaired.	500	400	100	5	No
1/24/2011	1:35 PM	500	MIMOSA AVENUE	KUW	South Knoxville	40	MH 1-85	Ground to Ditch at Railroad Tracks to Soil Saturation and Recovery		A collapsed manhole was repaired.	10,000	5,000	5,000	5	No
1/25/2011	10:31 AM	5235	BENT RIVER BOULEVARD	FC	Fourth Creek	43	Broken Pipe	Broken Pipe to Soil Saturation		A section of broken force main was repaired.	10	0	10	1	No
1/26/2011	9:53 AM	117	SIXTEENTH STREET	KUW	Second Creek	23	MH 21-33	Pavement to Soil Saturation and Recovery		A section of broken gravity main was repaired.	700	350	350	1.5	No
1/27/2011	3:00 PM	3914	ROBERTS ROAD	EB	Eastbridge	113	Abandoned Air Release Valve	Abandoned Air Release Valve to Ground to Soil Saturation and Recovery		A service was not relocated during construction.	375	100	275	2	No
1/31/2011	9:09 AM	4216	VALENCIA ROAD	KUW	Third Creek	38	MH 49-9	Pavement to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by roots.	65	35	30	2	No
2/6/2011	12:45 PM	1908	EDGEWOOD AVENUE	KUW	First Creek	16	Water Meter Well	Broken Pipe to Subsurface to Water Meter Well to Pavement to Soil Saturation		A section of broken gravity main was repaired.	180	35	145	1	No
2/15/2011	3:58 PM	6140	KIRBURY LANE	FC	Fourth Creek	33	MH 65-19	Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	10	0	10	1	No
2/15/2011	9:05 AM	2236	MARTIN LUTHER KING JR DRIVE	KUW	First Creek	24	MH 60-154	Pavement to Storm Drain to Recovery and Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	30	20	10	1	No
2/15/2011	9:53 PM	3413	KINGSTON PIKE	KUW	Third Creek	29	Temporary Sewer Main	Soil Saturation		A failed connection at the temporary system was repaired.	25	0	25	1	No
2/16/2011	10:47 AM	512	FLENNWOOD WAY	KUW	South Knoxville	39	MH 61	Swale to Unnamed Tributary to Goose Creek and Recovery and Soil Saturation	Goose Creek	The sewer main was flushed to remove the blockage caused by grease and debris.	3,200	2,800	400	3	Yes
2/16/2011	1:46 PM	604	BEN HUR AVENUE	KUW	Williams Creek	25	Abandoned Lateral Cleanout	Lateral Cleanout to Pavement to Ground to Soil Saturation to Unnamed Tributary to Williams Creek	Williams Creek	The sewer main was flushed to remove the blockage caused by debris.	500	100	400	1.5	Yes
2/16/2011	6:05 PM	5720	ASHEVILLE HIGHWAY	LC	Loves Creek	20	MH 11-3	Ditch to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	2,300	2,000	300	3	No
2/17/2011	11:19 PM	850	TALLY HO DRIVE	KUW	South Knoxville	39	MH 62-21	Ground to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease and roots.	150	0	150	1	No
2/23/2011	10:48 AM	1932	OLD AMHERST ROAD	FC	Fourth Creek	27	Lateral Cleanout	Lateral Cleanout to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by grease.	3,000	1,000	2,000	4	No
2/23/2011	1:40 PM	6505	VINTAGE DRIVE	KUW	Third Creek	11	MH 48-38	Ground to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by debris.	150	0	150	1	No
2/24/2011	12:48 PM	1204	PICKWICK ROAD	LC	Loves Creek	26	Lateral Cleanout	Lateral Cleanout to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	30	0	30	1	No
2/25/2011	1:30 PM	1124	DELAWARE AVENUE	KUW	Second Creek	15	MH 21-53	Pavement to Storm Drain to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by grease and debris.	500	400	100	2	No
2/28/2011	3:49 PM	1500	LYONS BEND ROAD	FC	Fourth Creek	37	MH 1	Conveyance to Fourth Creek Embayment	Fourth Creek	Rainfall in the area produced I & I and high flows in sewer mains.	590,000	0	590,000	5.75	Yes
2/28/2011	3:07 PM	113	DRINNEN AVENUE	KUW	South Knoxville	39	MHs 28-26 & 28-27	Pavement to Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	600	0	600	2	No
2/28/2011	4:21 PM	2500	CEDAR LANE	KUW	First Creek	4	MH 22-13	Pavement to Unnamed Tributary to First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	500	0	500	1	Yes
2/28/2011	4:22 PM	2008	RIVERSIDE DRIVE	KUW	Williams Creek	25	MH 2	Pavement to Soil Saturation to Williams Creek	Williams Creek	Rainfall in the area produced I & I and high flows in sewer mains.	720,000	0	720,000	4	Yes
2/28/2011	4:27 PM	2004	NEYLAND DRIVE	KUW	Second Creek	35A	MH 1	Tennessee River	Tennessee River	Rainfall in the area produced I & I and high flows in sewer mains.	360,000	0	360,000	0.5	Yes
2/28/2011	5:26 PM	815	SOUTH CENTRAL STREET	KUW	First Creek	30	MH 3-7	Pavement to Storm Drain to First Creek		Rainfall in the area produced I & I and high flows in sewer mains.	100	0	100	8	Yes
2/28/2011	6:01 PM	3814	WOODLAKE DRIVE	KUW	First Creek	1	Lateral Cleanout	Lateral Cleanout to Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	400	0	400	4	No
2/28/2011	6:33 PM	1411	DAVANNA STREET	KUW	Second Creek	15	MH 8	Pavement to Ditch to Storm Drain to Second Creek and Soil Saturation	Second Creek	Rainfall in the area produced I & I and high flows in sewer mains.	5,800,000	0	5,800,000	4	Yes
2/28/2011	7:07 PM	3218	AVONDALE AVENUE	KUW	First Creek	8	Broken Lateral & BBU at 3218 & 3220 Avon	Pavement to Soil Saturation and BBU		The sewer main was flushed to remove the blockage caused by grease and influenced by heavy rainfall.	1,500	0	1,500	3	No
2/28/2011	7:35 PM	2536	CECIL AVENUE	KUW	First Creek	18	MH 30-11	Pavement to Storm Drain to Ditch at Railroad Tracks to Unnamed Tributary to First Creek and Soil Saturation	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	410,000	0	410,000	3	Yes
2/28/2011	8:06 PM	2640	MORGAN CIRCLE	KUW	Third Creek	35B	MH 4-19	Ground to Storm Drain to Tennessee River	Tennessee River	Rainfall in the area produced I & I and high flows in sewer mains.	1,500	0	1,500	3	Yes
2/28/2011	9:15 PM	1127	EAST MOODY AVENUE	KUW	South Knoxville	40	MH 40-3	Pavement to Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	600	0	600	2	No
2/28/2011	9:59 PM	923	OAKLETT DRIVE	KUW	Second Creek	5	Wetwell	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	9,000	0	9,000	1.5	No
2/28/2011	11:52 PM	2102	WASHINGTON AVENUE	KUW	First Creek	24	MH 25-114	Soil Saturation to Storm Drain to First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	190,000	0	190,000	4	Yes
2/28/2011	4:10 PM	4014	HOLSTON HILLS ROAD	LC	Loves Creek	26	MHs 72 & 75	Soil Saturation to Loves Creek	Loves Creek	Rainfall in the area produced I & I and high flows in sewer mains.	295,000	0	295,000	3	Yes
2/28/2011	2:37 PM	4800	MALONEYVILLE ROAD	EB	Eastbridge	109	Bar Screen	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	3,750	0	3,750	1.25	No
3/1/2011	4:15 PM	1940	OLD AMHERST ROAD	FC	Fourth Creek	27	MH 22-117	Soil Saturation		The sewer main was flushed to remove the blockage caused by debris and influenced by heavy rainfall.	50	0	50	1	No
3/1/2011	10:30 PM	600	NORTH GALLAHER VIEW ROAD	FC	Fourth Creek	32A	MH 77	Ground to Ten Mile Creek	Ten Mile Creek	Rainfall in the area produced I & I and high flows in sewer mains.	24,000	0	24,000	2	Yes
3/1/2011	10:05 AM	1521	FAIRMONT BOULEVARD	KUW	First Creek	16	Temporary Lateral Connection	Ground to First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	30	0	30	1	Yes
3/1/2011	12:13 PM	3741	EAKERS STREET	KUW	South Knoxville	40	MH 47	Soil Saturation to Swale to Baker Creek	Baker Creek	Rainfall in the area produced I & I and high flows in sewer mains.	67,500	0	67,500	3	Yes
3/1/2011	2:43 PM	2415	TECOMA DRIVE	KUW	First Creek	8	Lateral Cleanout	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	60	0	60	3	No
3/1/2011	6:00 PM	411	WEST BAXTER AVENUE	KUW	Second Creek	23	MH 49	Ditch to Soil Saturation and Second Creek	Second Creek	Rainfall in the area produced I & I and high flows in sewer mains.	800,000	0	800,000	4	Yes
3/1/2011	7:20 PM	5205	HAYNES-STERCHI ROAD	KUW	Second Creek	5	MH 35-4	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by debris and influenced by heavy rainfall.	500	0	500	1	No
3/2/2011	8:00 AM	2430	HIGHLAND DRIVE	KUW	First Creek	4	Lateral Cleanout	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	120	0	120	2	No
3/2/2011	4:17 PM	3011	EAST GOV JOHN SEVIER HIGHW	EB	Riverdale	65	Wastewater Pumping Facility	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	21,600	0	21,600	3	No
3/2/2011	5:05 PM	4600	UPCHURCH ROAD	KUW	First Creek	7	MH 45	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	100	0	100	2	No
3/2/2011	5:00 PM	4105	CENTRAL AVENUE PIKE	KUW	Second Creek	10	MH 17-8	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	100	0	100	1	No
3/2/2011	11:00 AM	5508	GREEN VALLEY DRIVE	LC	Loves Creek	26	Broken Pipe	Pavement to Soil Saturation and Recovery		A section of broken force main was repaired.	2,025	2,000	25	1	No
3/2/2011	5:46 PM	781	BAGWELL LANE	LC	Loves Creek	63	Wastewater Pumping Facility	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	576,000	0	576,000	12	No
3/3/2011	4:04 PM	1216	WATERCRESS DRIVE	KUW	First Creek	7	MH 29-9	Pavement to Soil Saturation and First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	50	0	50	1	Yes
3/4/2011	10:06 PM	304	SEVENTH AVENUE	KUW	First Creek	18	MH 15	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	200	0	200	1	No
3/6/2011	9:18 AM	2536	CECIL AVENUE	KUW	First Creek	18	MH 30-11	Pavement to Storm Drain to Ditch at Railroad Tracks to Unnamed Tributary to Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	1,500	0	1,500	3	No
3/7/2011	4:50 PM	6540	CREEKHEAD DRIVE	FC	Fourth Creek	32A	MH 49-4	Ground to Ten Mile Creek and Soil Saturation	Ten Mile Creek	The sewer main was flushed to remove the blockage caused by debris and influenced by heavy rainfall.	12,200	0	12,200	1	Yes
3/7/2011	9:48 AM	4420	ALTA VISTA WAY	KUW	Third Creek	38	Broken Pipe	Ground to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by debris.	13,000	7,000	6,000	2	No
3/7/2011	7:08 PM	243	GILBERT LANE	KUW	South Knoxville	40	Lateral Cleanout	Ground to Unnamed Tributary to Baker Creek and Soil Saturation	Baker Creek	The sewer main was flushed to remove the blockage caused by grease.	5,000	0	5,000	2	Yes
3/9/2011	11:37 AM	1500	LYONS BEND ROAD	FC	Fourth Creek	37	MH 1	Conveyance to Fourth Creek Embayment	Fourth Creek	Rainfall in the area produced I & I and high flows in sewer mains.	160,000	0	160,000	2.38	Yes
3/9/2011	11:07 AM	2536	CECIL AVENUE	KUW	First Creek	18	MH 30-11	Pavement to Storm Drain to Ditch at Railroad Tracks to Unnamed Tributary to Soil Saturation and First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	98,000	0	98,000	8	Yes
3/9/2011	2:23 PM	5405	GREEN VALLEY DRIVE	LC	Loves Creek	26	Air Release Valve	Pavement to Soil Saturation		An air release valve was repaired.	150	0	150	1	No
3/10/2011	11:47 AM	600	NORTH GALLAHER VIEW ROAD	FC	Fourth Creek	27	MH 77	Ground to Ten Mile Creek	Ten Mile Creek	Rainfall in the area produced I & I and high flows in sewer mains.	468,000	0	468,000	39	Yes
3/10/2011	2:08 PM	2377	NEYLAND DRIVE	KUW	Third Creek	35B	MH 3	Ground to Third Creek	Third Creek	Rainfall in the area produced I & I and high flows in sewer mains.	Unknown	0	Unknown	Unknown	Yes
3/12/2011	1:35 PM	1712	POLKWRIGHT LANE	FC	Fourth Creek	37	Residential Grinder Pump	Wetwell to Soil Saturation		Grinder Pump Failure. Pump was repaired	5	0	5	1	No
3/12/2011	5:00 PM	1218	GLADE HILL DRIVE	FC	Loves Creek	32A	MHs 30-50 & 30-52	Pavement to Soil Saturation and Ground to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	670	20	650	2.5	No
3/13/2011	10:36 AM	1716	POLKWRIGHT LANE	FC	Fourth Creek	37	Residential Grinder Pump	Wetwell to Soil Saturation		Grinder Pump Failure. Pump was repaired	5	0	5	1	No
3/17/2011	2:29 PM	6410	SOUTH NORTHSHORE DRIVE	FC	Fourth Creek	37	MH 8	Ground to Fourth Creek	Fourth Creek	Rainfall in the area produced I & I and high flows in sewer mains.	Unknown	0	Unknown	Unknown	Yes
3/19/2011	2:21 PM	123	INGERSOLL AVENUE	KUW	South Knoxville	39	Lateral Cleanout	Lateral Cleanout to Soil Saturation		The sewer main was flushed to remove the blockage caused by debris.	12	2	10	1	No
3/22/2011	4:57 PM	4719	OLD BROADWAY	KUW	First Creek	7	MH 2 & 63	Ground to Unnamed Tributary to First Creek and Soil Saturation	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	Unknown	0	Unknown	Unknown	Yes
3/24/2011	1:21 PM	409	NORTH BELLEMEADE AVENUE	KUW	Third Creek	28	MH 3-53	Ground to Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	300		300	1	No
3/29/2011	12:10 PM	702	REDWINE STREET	KUW	South Knoxville	39	MH 5	Ground to Goose Creek and Soil Saturation	Goose Creek	There was a failure of a construction bypass pumping system.	100	0	100	0.25	Yes

## **Appendix C**

### **Building Backups**

Date	Time	Street #	Street	Plant	Watershed	Basin	Overflow Location	Cause of SSO/KUB Response	Total Volume (Gallons)	Recovered Volume (Gallons)	Non-Recovered Volume (Gallons)	Duration (Hours)
2/2/2011	4:27 PM	2101	EDGEWOOD AVENUE	KUW	First Creek	16	BBU	The BBU caused by sewer main cleaning.	50	50	0	0.25
2/7/2011	10:00 AM	800	TYSON STREET	KUW	Second Creek	23	BBU	The service lateral was not reconnected to the sewer main during construction.	1100	1100	0	Unknown
2/28/2011	3:10 PM	143	SOUTH VAN GILDER STREET	KUW	First Creek	24	BBU	Rainfall in the area produced I & I and high flows in sewer mains.	5	5	0	0.5
2/28/2011	9:35 PM	1912	PARIS ROAD	KUW	Third Creek	13	BBU	Rainfall in the area produced I & I and high flows in sewer mains.	30	30	0	0.5
3/2/2011	1:10 AM	2800	FAIRVIEW STREET	KUW	First Creek	16	BBU	There was a failure of a construction bypass pumping system.	40	40	0	1
3/4/2011	1:08 PM	4317	HIAWATHA DRIVE	KUW	Third Creek	38	BBU	Rainfall in the area produced I & I and high flows in sewer mains.	40	40	0	1
3/4/2011	1:08 PM	115 & 2115	EDGEWOOD AVENUE	KUW	First Creek	16	BBU	Rainfall in the area produced I & I and high flows in sewer mains.	1100	1100	0	1
3/22/2011	6:58 PM	4924	LONAS ROAD	FC	Fourth Creek	33	BBU	The BBU caused by sewer main cleaning.	200	200	20	1.5
3/24/2011	8:50 AM	205	WEST BAXTER AVENUE	KUW	Second Creek	23	BBU	There was a failure of a construction bypass pumping system.	200	200	0	1

## **Appendix D**

### **Water Quality Monitoring Program Sampling Results**



**Water Quality Monitoring  
Report**

**Routine Water Quality Monitoring Report**

**10/1/2010 Through 3/31/2011**

**Knoxville Utilities Board**

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b>First Creek</b>											
1.74	10/19/2010	12:35	8.1	15.4	9.7	310	290	N/A	N/A	Dry	R
2.57	10/19/2010	12:17	8.2	15.0	10.1	90	120	N/A	N/A	Dry	R
6.33	10/19/2010	12:05	7.6	16.5	8.2	270	480	N/A	N/A	Dry	R
1.74	11/2/2010	09:56	8.0	13.2	9.9	340	490	N/A	N/A	Dry	R
2.57	11/2/2010	09:45	8.1	13.2	10.1	360	170	N/A	N/A	Dry	R
6.33	11/2/2010	09:30	7.8	14.3	8.9	450	980	N/A	N/A	Dry	R
1.74	12/15/2010	10:39	7.3	5.6	12.0	290	240	N/A	N/A	Wet	R
2.57	12/15/2010	10:27	7.5	4.9	12.3	340	390	N/A	N/A	Wet	R
6.33	12/15/2010	10:16	8.0	9.2	9.9	300	440	N/A	N/A	Wet	R
1.74	1/20/2011	09:38	7.9	8.6	11.9	2600	> 2400	N/A	N/A	Wet	R
2.57	1/20/2011	09:25	7.5	8.2	11.5	120	140	N/A	N/A	Wet	R
6.33	1/20/2011	09:14	7.5	11.5	9.5	580	690	N/A	N/A	Wet	R
1.74	2/8/2011	11:05	9.0	8.4	12.0	540	920	N/A	N/A	Dry	R
2.57	2/8/2011	10:45	9.0	7.7	12.2	340	550	N/A	N/A	Dry	R
6.33	2/8/2011	10:15	8.5	10.1	9.7	130	260	N/A	N/A	Dry	R
1.74	3/7/2011	11:02	7.5	7.9	10.8	820	920	N/A	N/A	Wet	R
2.57	3/7/2011	10:50	7.7	9.7	10.5	590	610	N/A	N/A	Wet	R
6.33	3/7/2011	09:45	8.2	11.5	9.4	390	520	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



## Routine Water Quality Monitoring Report

10/1/2010 Through 3/31/2011

**Knoxville Utilities Board**  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Second Creek</u></b>											
0.30	10/28/2010	09:27	7.9	17.2	9.5	40	24	N/A	N/A	Wet	R
1.54	10/28/2010	09:45	7.8	17.0	8.9	1100	460	N/A	N/A	Wet	R
5.76	10/28/2010	10:12	7.3	16.2	5.1	1800	580	N/A	N/A	Wet	R
0.30	11/17/2010	10:50	8.2	13.1	10.0	1200	1700	N/A	N/A	Wet	R
1.54	11/17/2010	10:26	7.9	13.3	9.3	400	770	N/A	N/A	Wet	R
5.76	11/17/2010	09:32	7.2	15.2	5.0	99	71	N/A	N/A	Wet	R
0.30	12/21/2010	10:38	8.3	9.1	10.8	9	3	N/A	N/A	Wet	R
1.54	12/21/2010	10:27	7.3	9.9	10.2	200	180	N/A	N/A	Wet	R
5.76	12/21/2010	10:08	7.2	14.0	6.2	8200	820	N/A	N/A	Wet	R
0.30	1/25/2011	10:03	7.1	9.0	11.0	2200	> 2400	N/A	N/A	Dry	I
1.54	1/25/2011	09:53	7.6	9.4	11.2	130	190	N/A	N/A	Dry	R
5.76	1/25/2011	09:37	7.4	14.8	5.2	63	50	N/A	N/A	Dry	R
0.30	2/23/2011	10:19	8.6	10.6	11.4	19000	1200	N/A	N/A	Wet	I
1.54	2/23/2011	09:56	9.2	10.8	11.7	38000	2400	N/A	N/A	Wet	R
5.76	2/23/2011	09:40	8.6	14.7	6.7	< 1	20	N/A	N/A	Wet	R
0.30	3/29/2011	13:02	8.1	13.1	10.3	170	140	N/A	N/A	Wet	R
1.54	3/29/2011	12:40	7.8	13.7	10.6	220	160	N/A	N/A	Wet	R
5.76	3/29/2011	11:55	7.2	14.9	6.0	< 10	< 1	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



## Routine Water Quality Monitoring Report

10/1/2010 Through 3/31/2011

**Knoxville Utilities Board**  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Third Creek</u></b>											
0.87	10/11/2010	12:10	8.2	21.2	8.6	280	130	N/A	N/A	Dry	R
2.08E	10/11/2010	10:13	8.0	15.7	7.7	160	300	N/A	N/A	Dry	R
4.80W	10/11/2010	09:47	7.9	15.3	8.9	320	270	N/A	N/A	Dry	R
0.87	11/15/2010	10:07	8.3	12.5	9.6	36	180	N/A	N/A	Wet	R
2.08E	11/15/2010	09:55	8.1	12.3	8.5	380	300	N/A	N/A	Wet	R
4.80W	11/15/2010	09:35	7.9	13.3	8.9	260	340	N/A	N/A	Wet	R
0.87	12/8/2010	09:30	8.3	6.9	11.2	104	59	N/A	N/A	Dry	R
2.08E	12/8/2010	09:43	7.6	5.7	10.9	210	170	N/A	N/A	Dry	R
4.80W	12/8/2010	10:06	8.1	9.9	10.0	140	140	N/A	N/A	Dry	R
0.87	1/24/2011	11:47	7.8	7.9	12.7	99	130	N/A	N/A	Dry	R
2.08E	1/24/2011	11:30	8.6	7.0	12.3	72	36	N/A	N/A	Dry	R
4.80W	1/24/2011	11:12	8.1	10.3	10.8	230	120	N/A	N/A	Dry	R
0.87	2/14/2011	09:36	9.0	8.7	10.0	200	120	N/A	N/A	Dry	R
2.08E	2/14/2011	09:21	8.9	7.7	8.3	95	65	N/A	N/A	Dry	R
4.80W	2/14/2011	09:05	8.2	11.2	9.2	90	110	N/A	N/A	Dry	R
0.87	3/16/2011	09:46	8.0	12.7	9.6	360	240	N/A	N/A	Wet	R
2.08E	3/16/2011	09:33	8.4	12.5	9.5	91	79	N/A	N/A	Wet	R
4.80W	3/16/2011	09:20	7.5	13.5	8.9	110	86	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



## Routine Water Quality Monitoring Report

10/1/2010 Through 3/31/2011

**Knoxville Utilities Board**  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Fourth Creek</u></b>											
1.75	10/26/2010	10:57	7.9	18.4	8.9	1500	1100	N/A	N/A	Wet	R
2.79	10/26/2010	10:29	7.6	17.9	8.7	1400	1200	N/A	N/A	Wet	R
3.29	10/26/2010	10:17	8.0	17.3	9.6	730	650	N/A	N/A	Wet	R
1.75	11/15/2010	10:52	7.9	13.9	9.3	150	140	N/A	N/A	Wet	R
2.79	11/15/2010	10:41	8.1	13.8	9.0	90	330	N/A	N/A	Wet	R
3.29	11/15/2010	10:29	8.2	13.5	9.9	81	330	N/A	N/A	Wet	R
1.75	12/20/2010	09:31	8.1	9.6	10.5	130	130	N/A	N/A	Dry	R
2.79	12/20/2010	09:15	8.2	10.6	10.0	9	88	N/A	N/A	Dry	R
3.29	12/20/2010	09:23	8.2	10.8	10.4	27	170	N/A	N/A	Dry	R
1.75	1/24/2011	10:25	7.9	10.5	11.4	140	150	N/A	N/A	Dry	R
2.79	1/24/2011	10:37	8.5	11.1	10.7	140	240	N/A	N/A	Dry	R
3.29	1/24/2011	10:46	8.4	11.6	10.9	140	180	N/A	N/A	Dry	R
1.75	2/21/2011	09:56	8.4	14.5	9.3	490	460	N/A	N/A	Dry	R
2.79	2/21/2011	10:12	8.4	14.0	9.4	45	67	N/A	N/A	Dry	R
3.29	2/21/2011	10:24	8.5	14.3	9.6	45	43	N/A	N/A	Dry	R
1.75	3/16/2011	10:06	7.3	13.3	9.5	290	290	N/A	N/A	Wet	R
2.79	3/16/2011	10:12	7.6	13.7	9.3	200	130	N/A	N/A	Wet	R
3.29	3/16/2011	10:21	7.7	13.9	9.7	99	84	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



Water Quality Monitoring  
Report

Routine Water Quality Monitoring Report

10/1/2010 Through 3/31/2011

Knoxville Utilities Board

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Baker Creek</u></b>											
0.36	10/20/2010	09:09	7.8	15.5	7.5	4200	> 2400	< 5	< 5	Wet	R
0.53	10/20/2010	09:29	8.1	15.5	8.0	2300	> 2400	6.1	< 5	Wet	R
1.45	10/20/2010	09:01	7.7	15.9	7.3	4800	1100	9.9	< 5	Wet	I
0.36	11/9/2010	10:02	8.0	11.1	9.6	1000	870	N/A	N/A	Dry	R
0.53	11/9/2010	10:22	8.2	10.7	9.8	1000	870	N/A	N/A	Dry	R
1.45	11/9/2010	09:45	7.9	11.9	9.3	1200	1000	N/A	N/A	Dry	I
0.36	12/20/2010	10:25	8.0	7.6	10.8	810	610	N/A	N/A	Dry	R
0.53	12/20/2010	10:40	8.2	8.4	10.9	300	360	N/A	N/A	Dry	R
1.45	12/20/2010	10:10	7.8	8.1	10.3	54	370	N/A	N/A	Dry	R
0.36	1/27/2011	09:08	8.6	8.1	10.1	2700	> 2400	8.2	8.4	Wet	I
0.53	1/27/2011	09:30	8.8	8.0	10.9	1200	2000	N/A	N/A	Wet	I
1.45	1/27/2011	08:59	8.5	9.0	9.9	510	920	N/A	N/A	Wet	R
0.36	2/28/2011	10:02	7.6	14.1	8.6	2200	1600	N/A	N/A	Wet	I
0.53	2/28/2011	09:15	7.5	13.9	9.4	950	1200	N/A	N/A	Wet	I
1.45	2/28/2011	09:27	7.7	14.3	8.8	150	220	N/A	N/A	Wet	R
0.36	3/24/2011	10:55	8.2	11.7	9.8	1500	980	N/A	N/A	Wet	I
0.53	3/24/2011	11:10	8.1	13.0	9.8	1400	920	N/A	N/A	Wet	R
1.45	3/24/2011	11:37	7.5	13.0	9.1	440	360	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



**Water Quality Monitoring  
Report**

**Routine Water Quality Monitoring Report**

**10/1/2010 Through 3/31/2011**

**Knoxville Utilities Board**

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Goose Creek</u></b>											
0.40	10/12/2010	11:17	7.9	15.4	8.7	490	370	N/A	N/A	Dry	R
1.19E	10/12/2010	11:00	7.8	15.3	7.7	730	> 2400	N/A	N/A	Dry	I
1.80E	10/12/2010	10:51	8.0	15.4	9.0	72	210	N/A	N/A	Dry	R
0.40	11/3/2010	09:25	7.7	13.3	7.7	370	440	N/A	N/A	Wet	R
1.19E	11/3/2010	09:05	7.9	13.6	8.4	490	650	N/A	N/A	Wet	R
1.80E	11/3/2010	09:12	8.2	13.0	8.8	210	390	N/A	N/A	Wet	R
0.40	12/9/2010	10:25	7.2	6.0	10.6	440	550	N/A	N/A	Dry	R
1.19E	12/9/2010	10:16	7.7	6.8	10.8	910	1400	< 5	5.3	Dry	I
1.80E	12/9/2010	10:07	8.6	8.0	10.5	72	140	N/A	N/A	Dry	R
0.40	1/13/2011	09:38	7.7	5.8	10.8	550	730	N/A	N/A	Wet	R
1.19E	1/13/2011	09:25	7.1	6.3	11.2	1000	1300	N/A	N/A	Wet	I
1.80E	1/13/2011	09:15	7.8	7.5	10.8	90	120	N/A	N/A	Wet	R
0.40	2/7/2011	12:51	9.9	8.7	13.1	2000	820	N/A	N/A	Wet	R
1.19E	2/7/2011	13:05	8.0	9.1	13.6	7000	1300	N/A	N/A	Wet	I
1.80E	2/7/2011	13:15	8.5	10.0	10.3	120	220	N/A	N/A	Wet	R
0.40	3/23/2011	10:21	7.4	14.7	8.7	430	440	N/A	N/A	Wet	R
1.19E	3/23/2011	10:13	7.9	15.2	8.9	530	520	N/A	N/A	Wet	R
1.80E	3/23/2011	09:56	7.8	15.0	8.6	210	160	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



## Routine Water Quality Monitoring Report

10/1/2010 Through 3/31/2011

**Knoxville Utilities Board**  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865) 594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Loves Creek</u></b>											
0.85	10/18/2010	10:02	7.9	13.3	9.3	300	340	N/A	N/A	Dry	R
1.89	10/18/2010	09:45	7.5	13.6	8.4	63	66	N/A	N/A	Dry	R
3.45	10/18/2010	09:32	7.7	13.9	8.9	27	80	N/A	N/A	Dry	R
0.85	11/1/2010	09:50	7.5	13.7	8.8	230	160	N/A	N/A	Dry	R
1.89	11/1/2010	09:21	7.7	13.1	9.4	45	78	N/A	N/A	Dry	R
3.45	11/1/2010	09:37	7.7	13.6	9.0	45	83	N/A	N/A	Dry	R
0.85	12/7/2010	09:21	7.2	8.5	10.0	77	110	N/A	N/A	Wet	R
1.89	12/7/2010	09:09	7.1	10.0	8.5	200	84	N/A	N/A	Wet	R
3.45	12/7/2010	08:57	7.8	6.8	10.3	360	74	N/A	N/A	Wet	R
0.85	1/20/2011	10:30	8.2	8.6	10.9	36	41	N/A	N/A	Wet	R
1.89	1/20/2011	10:42	7.7	10.0	10.0	36	53	N/A	N/A	Wet	R
3.45	1/20/2011	10:51	8.2	7.5	11.2	27	24	N/A	N/A	Wet	R
0.85	2/22/2011	11:11	8.4	12.7	9.4	190	310	N/A	N/A	Wet	R
1.89	2/22/2011	10:52	7.9	12.8	9.5	1400	1400	N/A	N/A	Wet	R
3.45	2/22/2011	10:36	8.5	11.8	10.1	190	580	N/A	N/A	Wet	R
0.85	3/14/2011	09:47	7.6	13.1	8.8	50	69	N/A	N/A	Dry	R
1.89	3/14/2011	09:31	7.3	13.5	7.8	27	24	N/A	N/A	Dry	R
3.45	3/14/2011	09:12	7.7	13.1	8.5	18	37	N/A	N/A	Dry	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



**Water Quality Monitoring  
Report**

**Routine Water Quality Monitoring Report**

**10/1/2010 Through 3/31/2011**

**Knoxville Utilities Board**

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Williams Creek</u></b>											
0.89	10/13/2010	09:14	8.0	15.3	9.3	99	160	N/A	N/A	Wet	R
1.70	10/13/2010	09:23	7.7	16.1	7.7	520	440	N/A	N/A	Wet	R
2.02	10/13/2010	09:46	8.0	17.5	8.0	1500	530	N/A	N/A	Wet	R
0.89	11/1/2010	10:59	7.3	13.5	10.0	200	46	N/A	N/A	Dry	R
1.70	11/1/2010	10:50	7.9	15.1	8.8	200	150	N/A	N/A	Dry	R
2.02	11/1/2010	10:38	8.0	15.4	8.5	540	270	N/A	N/A	Dry	R
2.02	11/16/2010	09:06	7.7	15.6	7.7	3500	1700	31.5	24.2	Wet	I
2.02	11/18/2010	10:14	7.9	15.4	7.9	34000	> 2400	230.0	113.2	Wet	I
0.89	12/7/2010	10:08	7.5	9.0	10.5	63	93	N/A	N/A	Wet	R
1.70	12/7/2010	09:45	7.8	9.7	9.6	140	310	N/A	N/A	Wet	R
2.02	12/7/2010	09:56	7.5	11.2	9.2	180	270	N/A	N/A	Wet	R
0.89	1/18/2011	11:59	8.2	10.3	11.3	9	29	N/A	N/A	Wet	R
1.70	1/18/2011	12:12	7.8	9.8	12.2	54	52	N/A	N/A	Wet	R
2.02	1/18/2011	12:21	8.1	10.9	10.2	160	110	N/A	N/A	Wet	R
0.89	2/3/2011	13:19	9.4	8.3	13.0	150	150	N/A	N/A	Wet	R
1.70	2/3/2011	12:49	8.6	9.5	11.0	140	120	N/A	N/A	Wet	R
2.02	2/3/2011	13:04	7.6	9.7	11.9	150	320	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



**Water Quality Monitoring  
Report**

**Routine Water Quality Monitoring Report**

**10/1/2010 Through 3/31/2011**

**Knoxville Utilities Board**

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Williams Creek</u></b>											
0.89	3/17/2011	11:35	7.7	14.1	9.2	130	110	N/A	N/A	Wet	R
1.70	3/17/2011	11:56	7.6	13.8	9.5	170	96	N/A	N/A	Wet	R
2.02	3/17/2011	12:09	7.7	13.9	9.6	72	91	N/A	N/A	Wet	R

\*Status: I = Site Under Investigation, R = Reportable for monitoring purposes

Precipitation event = "Wet" if the total amount of rainfall for four days prior to the sample was greater than 0.1 inches.



Water Quality Monitoring  
Report

Spill Impact Sampling Results  
Water Quality Monitoring Program

Knoxville Utilities Board  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

**Event Date** 2/16/2011  
**Street Address:** 512 Flenwood Way  
**Description:** Blockage caused by grease and debris

**Estimated unrecovered volume** 400 gallons

**Sampling Notes:** There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	2/16/2011	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	2/16/2011	11:55	11.0	12.8	8.3	310	580
Downstream of SSO Discharge	2/16/2011	12:08	12.6	10.4	7.7	25000	> 2400
Upstream of SSO Discharge	2/21/2011	13:30	11.5	14.9	8.0	1700	1200
Downstream of SSO Discharge	2/21/2011	13:37	11.9	14.0	7.9	730	1200



Water Quality Monitoring  
Report

Spill Impact Sampling Results  
Water Quality Monitoring Program

Knoxville Utilities Board  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

**Event Date** 2/16/2011  
**Street Address:** 607 Ben Hur Ave.  
**Description:** Blockage caused by debris

**Estimated unrecovered volume** 400 gallons

**Sampling Notes:** There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	2/16/2011	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	2/16/2011	14:48	9.4	14.2	8.1	27	86
Downstream of SSO Discharge	2/16/2011	14:33	11.2	13.8	8.3	180	> 2400
Upstream of SSO Discharge	2/21/2011	12:48	10.6	15.4	8.1	18	36
Downstream of SSO Discharge	2/21/2011	12:37	11.3	15.5	8.4	36	38



Water Quality Monitoring  
Report

Spill Impact Sampling Results  
Water Quality Monitoring Program

Knoxville Utilities Board  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

**Event Date** 3/7/2011  
**Street Address:** 243 Gilbert Ln.  
**Description:** Blockage due to grease influenced by heavy rainfall

**Estimated unrecovered volume** 5,000 gallons

**Sampling Notes:** There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	3/7/2011	0	1.92

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	3/7/2011	22:12	9.2	10.4	7.8	530	920
Downstream of SSO Discharge	3/7/2011	22:24	9.0	10.1	7.3	8000	1100
Upstream of SSO Discharge	3/14/2011	10:12	9.4	11.1	7.4	330	360
Downstream of SSO Discharge	3/14/2011	10:18	7.4	11.3	7.2	320	360



Water Quality Monitoring  
Report

**Spill Impact Sampling Results**  
**Water Quality Monitoring Program**

**Knoxville Utilities Board**  
Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

**Event Date** 3/29/2011  
**Street Address:** 702 Redwine St.  
**Description:** Failure of a construction by- pass pumping system.

**Estimated unrecovered volume** 100 gallons

**Sampling Notes:** There was no industry upstream of the SSO, therefore no Priority Pollutant samples were collected.

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	3/29/2011	0	0.63

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	3/29/2011	14:50	13.0	16.5	8.0		
Downstream of SSO Discharge	3/29/2011	14:59	13.3	15.5	8.0		
Upstream of SSO Discharge	3/31/2011	09:27	8.4	11.7	7.6	< 10	410
Downstream of SSO Discharge	3/31/2011	09:35	8.5	11.2	7.6	1000	340

# Knoxville Utilities Board

## Water Quality Monitoring Program

### Investigative Water Quality Monitoring Report 04/01/2010 Through 06/30/2010

**Table 1: Second Creek Dry Weather Walk**

Initial Collection Date	Initial Collection Time	Sample ID #	Sample Location	Approximate Stream Mile	DO	pH	Water Temperature	Fecal Coliform	Fecal Coliform Retest 4/15/10	E. coli Test 4/15/10	Total Bacteroides mg/L on 4/6/10 & 4/15/10	Human Bacteroides mg/L on 4/6/10 & 4/15/10	Comments
4/6/2010	7:41	1	Above sewer crossing @ Neyland Dr., Mouth of 2nd Ck	0.14	9.0	8.0	17	99					
4/6/2010	7:56	2	foot bridge @ World's Fair Park, below sewer crossing @ Cumberland	0.32	9.3	8.0	16	27					upstream creek goes underground
4/6/2010	8:20	3	Foot Bridge @ Foundry	0.82	8.7	8.0	16	2100	490	770	27.4	< 5.0	homeless camps upstream
4/6/2010	8:35	4	right bank storm drain	0.85	N/A	N/A	N/A	2400			28.1	30.5	storm pipe coming from Foundry
4/6/2010	8:51	5	McGhee St. foot bridge, above/below sewer crossing	1.12	8.4	8.0	16	4500	550	550	31.5	5.4	sewer crossings and homeless camps
4/6/2010	8:58	6	Right bank storm pipe above McGhee St.	1.13	N/A	N/A	N/A	< 10					storm pipe
4/6/2010	9:14	7	downstream of tributary, above/below sewer crossing	1.41	8.6	8.0	16	3900	410	460	32.9 & 21.4	9.5 & < 5.0	homeless area
4/6/2010	9:19	8	Right bank tributary	1.43	8.5	7.6	13	9	4400	>2400			little discoloration in stream bed
4/6/2010	9:40	9	Bernard St. Bridge, above/below tributary and sewer crossing	1.58	9.5	8.0	16	2700	310	490	22.9	< 5.0	
4/6/2010	9:59	10	downstream of Baxter Ave., above/below sewer crossing	1.8	9.1	8.0	16	2200	160	280	26.4	< 5.0	homeless camp, 2 12" temp sewer lines laying in creek bed
4/6/2010	10:13	11	under Woodland Ave. bridge, above/below sewer crossings	2.24	10.0	8.2	16	910					homeless area
4/6/2010	10:45	12	right bank tributary below Sysco	2.79	7.2	7.3	14	< 10					tributary to deep pool, lots of minnows in main stream
4/6/2010	10:50	13	above tributary below Sysco	2.79	8.5	7.7	15	1500	360	520	18.2	< 5.0	deep pool, a lot of minnows
4/6/2010	13:12	14	upstream of crossing before going under interstate	3.47	9.9	8.3	17	1200			17.2	< 5.0	mainstream
4/6/2010	13:27	15	emergence from under interstate	3.85	9.9	8.2	16	27000	>60000	>2400	54.2 & 307	32.3 & 250	
4/6/2010	14:00	16	Clinton Highway, stream under interstate	4.45	11.0	8.3	18	45	32	23			deep pool, a lot of minnows
4/7/2010	8:30	17	below Kubota, above/below sewer crossings	4.91	8.0	7.7	16	99					took fluoride sample of water running adjacent to creek
4/7/2010	8:40	18	Inskip, left bank pipe at sewer manhole	5.11	5.6	7.3	15	9					lb pipe had a lot of flow
4/7/2010	8:56	19	Inskip Ball Park, above sewer crossing and tributary	5.12	7.4	7.8	16	260					creek getting smaller, more vegetation
4/7/2010	9:10	20	Merchants Rd, behind Outback and Ball Park, left bank tributary	5.32	5.0	7.5	15	380					little flow
4/7/2010	9:17	21	Merchants Rd. above left bank tributary, below sewer crossing	5.41	6.7	7.3	16	81					a lot of vegetation
4/7/2010	9:29	22	Routine site 5.76, above sewer crossing at IHOP	5.48	6.6	7.4	15	< 10					left pipe looking upstream
4/7/2010	9:36	23	Merchants Rd., center pipe, at IHOP	5.48	8.4	7.7	15	90					center pipe at 5.76
4/7/2010	9:46	24	Merchants Rd., left bank tributary at IHOP	5.48	6.9	7.6	17	1900			24	13.4	upstream
4/7/2010	9:50	25	Merchants Rd., right bank tributary at IHOP	5.48	6.6	7.5	16	< 10					RB walking upstream, very little flow
4/7/2010	10:02	26	Merchants Rd., 4' PVC pipe, left bank pipe at IHOP	5.54	N/A	N/A	N/A	< 10					

# Knoxville Utilities Board

## Water Quality Monitoring Program

### Investigative Water Quality Monitoring Report

07/01/2010 Through 3/31/2011

**Table 2: Second Creek Investigative Sampling**

	Collection Date	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Bacteriodes	Human Bacteriodes
		(mg/L)	(°C)	s.u.	(CFU/ 100mL)	(MPN)	(mg/L)	(mg/L)
~300 yards Upstream from Routine Site 5.76 (behind IHOP)	7/29/2010	8.4	25	7.2	53000	> 2400	23.3	< 5
	8/30/2010	4.0	17	7.0	170	71	N/A	N/A
	9/28/2010	4.5	16	7.1	1100	77	N/A	N/A
	10/28/2010	6.0	16	6.9	300	490	N/A	N/A
	11/17/2010	5.9	14	7.4	99	86	N/A	N/A
	12/21/2010	8.0	10	7.5	9	44	N/A	N/A
	3/29/2011	7.3	14	7.3	9	35	N/A	N/A
Left pipe looking downstream at Routine Site 5.76 (in front of IHOP)	7/29/2010	6.9	17	7.6	16000	2400	23.7	9
	8/30/2010	8.8	18	8.0	910	300	N/A	N/A
	9/28/2010	7.8	16	7.5	1500	520	N/A	N/A
	10/28/2010	8.0	16	7.4	820	550	N/A	N/A
	11/17/2010	7.7	14	7.3	310	310	N/A	N/A
	3/29/2011	7.7	14	7.3	32	24	N/A	N/A
Dry Weather Walk #15 - Emmergence from under interstate at approximate stream mile 4.0	7/29/2010	9.0	20	8.0	3800	180	N/A	N/A
	8/30/2010	9.1	18	8.2	72	54	N/A	N/A
	9/28/2010	9.2	17	8.0	730	650	N/A	N/A
	10/28/2010	9.6	17	7.8	260	550	N/A	N/A
	11/17/2010	9.5	14	8.2	430	440	N/A	N/A
	3/29/2011	9.4	14	7.9	3000	>2400	N/A	N/A
Foundry right bank storm pipe - approximate stream mile 0.9	11/17/2010	N/A	N/A	N/A	>1600	> 2400	N/A	N/A
	3/30/2011	N/A	N/A	N/A	950	820	N/A	N/A

## Knoxville Utilities Board

### Water Quality Monitoring Program

#### Investigative Water Quality Monitoring Report

10/01/2010 Through 3/31/2011

**Table 3: Williams Creek Investigative Sampling**

	Collection Date	Weather Condition	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Bacteriodes	Human Bacteriodes
			(mg/L)	(°C)	s. u.	(cfu/100 ml)	(MPN)	(mg/L)	(mg/L)
Left Fork Above 2.02 - Sample 1	11/16/2010	Wet	7.9	16	7.7	3200	>2400	19.7	9.2
Left Fork Above 2.02 - Sample 2	11/16/2010	Wet	7.9	16	7.7	2200	>2400	16.7	15.2
Right Fork Above 2.02 - Sample 1	11/16/2010	Wet	7.8	15	7.6	9000	>2400	129	137
Right Fork Above 2.02 - Sample 2	11/16/2010	Wet	8.0	16	7.8	3400	>2400	10	<5
Left Fork Above 2.02 - Sample 1	11/18/2010	Wet	8.3	16	7.9	1400	2000	15.5	9.9
Left Fork Above 2.02 - Sample 2	11/18/2010	Wet	8.6	17	8.0	1400	1700	23.9	16.2
Right Fork Above 2.02 - Sample 1	11/18/2010	Wet	7.9	13	8.0	>1600	>2400	1442	700
Right Fork Above 2.02 - Sample 2	11/18/2010	Wet	9.4	15	7.9	4600	920	15.2	5.2

## Knoxville Utilities Board

### Water Quality Monitoring Program

#### Investigative Water Quality Monitoring Report 10/01/2010 Through 3/31/2011

**Table 4: Baker Creek Investigative Sampling**

	Collection Date	Weather	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Bacteriodes	Human Bacteriodes
			(mg/L)	(°C)	S.U.	(CFU/ 100mL)	(MPN)	(mg/L)	(mg/L)
Left Bank Tributary Above SM 0.36	10/20/2010	Wet	7.6	14	7.8	5500	1400	< 5	< 5
Left Bank Tributary Above SM 0.36	11/9/2010	Dry	9.7	8	8.2	730	1700	N/A	N/A
Left Bank Tributary Above SM 0.36	12/20/2010	Dry	11.5	3	8.0	810	1300	N/A	N/A
Left Bank Tributary Above SM 0.36	1/27/2011	Wet	11.7	5	7.0	22000	1300	< 5	< 5
Left Bank Tributary Above SM 0.36	2/28/2011	Wet	8.8	13	7.9	5300	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	3/24/2011	Wet	9.8	12	8.2	2300	1000	N/A	N/A
Left Bank Tributary Above SM 0.36 near Gilbert Lane	3/24/2011	Wet	9.1	12	7.7	730	580	N/A	N/A
Left Bank Tributary Above SM 0.36 near Mayfair Dr.	3/24/2011	Wet	9.7	12	8.2	540	650	N/A	N/A

## **Appendix E**

### **Unpermitted Discharges Subject to Stipulated Penalties**

## **First Quarter 2011 Unpermitted Discharge Data and Analysis**

Appendix E lists any SSO that occurred during the first quarter 2011 that resulted in an unpermitted discharge along with its cause, volume, one- and three-day rainfall totals, and rainfall intensity.

Of the 30 unpermitted discharges that occurred during the first quarter 2011, 25 were caused by heavy rainfall, four were due to blockages, and one was due to a construction failure.

On February 28, 2011, the Knoxville area experienced a significant rainfall event that caused substantial flooding. Rain gauges located within KUB's service area, and which are maintained by KUB, recorded rain totals ranging from 1.8 to 3.6 inches on this date. The rainfall from these gauges indicated a daily average of 2.84 inches for the overall area, but the majority of our service area received over three inches of rain. The gauges also revealed that the heaviest rainfall fell within a three-hour period, resulting in intensities up to 1.9 inches per hour in some locations. Historical data from the National Weather Service (NWS) shows this event to be a 35-year storm. This estimate is based on the application of historical intensity, duration, and frequency data.

Runoff caused water levels in area streams and storm sewers to rise and overflow, covering nearby streets and manholes. Widespread flooding like this occurred in many locations and much of our wastewater collection system was under water for a period of time. This resulted in significant amounts of inflow and infiltration into the KUB wastewater system. All four of KUB's wastewater storage tanks were filled to maximum capacity. The storage tanks retained approximately 22 million gallons of rainwater to prevent sewer overflows. All of KUB's plants received record influent flows, which exceeded their design capacity, but the plants operated in accordance with the approved Process Controls Program to manage storm flow. There were no plant permit violations, and sludge blanket levels were maintained preventing a washout that day and on subsequent days despite additional, significant rainfall later in the week.

A total of 32 overflows were reported as a result of this rain on February 28, 2011. In a letter dated March 18, 2011, KUB requested that the EPA consider this weather event and the number of SSOs that occurred, under the provisions of Force Majeure as defined in the Consent Decree. The greatest number of overflows occurred in areas of KUB's system that received the greatest amount of rainfall and greatest intensity. Over half the overflows occurred in the northern portion of our service area where at least 3.6 inches of rain fell at intensities that reached 1.9 inches per hour. Rain gauges throughout our system revealed the average rainfall intensity across the service area to be 1.83 inches per hour. This is notably above 0.84 inches per hour, which is the peak flow intensity associated with a two-year/24-hour storm event.

Fifteen of the unpermitted discharges listed in Table 1 of Section 6.2 were a result of the high intensity storm. Four of those events are also noted for their low volumes.

Category	Count
Mech/Elec. Failure	0
Vandalism	0
3-day rain > 4 in.	0
1-day > 3 in.	0
Vol 501 - 1000 gal	1
Vol < 500 gal.	7
Intensity > 0.84 in/hr	11

Appendix E										
Unpermitted Discharges in 2011										
		Overflow volume of 500 gallons or less			1-day rainfall greater than 3"					
		Overflow volume of 501 - 1000 gallons			3-day rainfall greater than 4"					
		Vandalism			Intensity > 0.84 in/hr					
		Electrical or mechanical failure								
Reporting				Unrecovered	Receiving		Rainfall Totals		Peak Rainfall	Force Majeure
Period	Date	Location	Event	Volume (Gal.)	Stream	Cause	1-Day*	3-Day**	Intensity (in/hr)	event
1st 2011	1/1/2011	1411 Davanna Street	Unpermitted Discharge	5,600	Second Creek	Heavy Rainfall	2.4	2.52		
1st 2011	1/1/2011	5011 Kingston Pike	Unpermitted Discharge	600	Fourth Creek	Heavy Rainfall	2.4	2.52		
1st 2011	1/1/2011	1500 Lyons Bend Road	Unpermitted Discharge	380,000	Fourth Creek / Tennessee River	Heavy Rainfall	2.4	2.52		
1st 2011	1/7/2011	5915 Neubert Sprigs Road	Unpermitted Discharge	224,000	Knob Creek	Heavy Rainfall		0.25		
1st 2011	2/16/2011	512 Flenndwood Way	Unpermitted Discharge	400	Goose Creek	Blockage				
1st 2011	2/16/2011	604 Ben Hur Avenue	Unpermitted Discharge	400	Williams Creek	Blockage				
1st 2011	2/28/2011	1500 Lyons Bend Road	Unpermitted Discharge	590,000	Fourth Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2500 Cedar Lane	Unpermitted Discharge	500	First Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2008 Riverside Drive	Unpermitted Discharge	720,000	Williams Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2004 Neyland Drive	Unpermitted Discharge	360,000	Tennessee River	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	815 South Central Street	Unpermitted Discharge	100	First Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	1411 Davanna Street	Unpermitted Discharge	5,800,000	Second Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2536 Cecil Avenue	Unpermitted Discharge	410,000	First Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2640 Morgan Circle	Unpermitted Discharge	1,500	Tennessee River	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	2102 Washington Avenue	Unpermitted Discharge	190,000	First Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	2/28/2011	4014 Holston Hills Road	Unpermitted Discharge	295,000	Loves Creek	Heavy Rainfall	2.84	2.84	1.83	Yes
1st 2011	3/1/2011	600 North Gallaher View Road	Unpermitted Discharge	24,000	Ten Mile Creek	Heavy Rainfall	***	2.84	1.83	Yes
1st 2011	3/1/2011	1521 Fairmont Boulevard	Unpermitted Discharge	30	First Creek	Heavy Rainfall	***	2.84	1.83	Yes
1st 2011	3/1/2011	3741 Eakers Street	Unpermitted Discharge	67,500	Baker Creek	Heavy Rainfall	***	2.84	1.83	Yes
1st 2011	3/1/2011	411 West Baxter Avenue	Unpermitted Discharge	800,000	Second Creek	Heavy Rainfall	***	2.84	1.83	Yes
1st 2011	3/3/2011	1216 Watercress Drive	Unpermitted Discharge	50	First Creek	Heavy Rainfall	***			Yes
1st 2011	3/7/2011	6540 Creekhead Drive	Unpermitted Discharge	12,200	Ten Mile Creek	Blockage		1.62	0.29	
1st 2011	3/7/2011	243 Gilbert Lane	Unpermitted Discharge	5,000	Baker Creek	Blockage		1.62	0.29	
1st 2011	3/9/2011	1500 Lyons Bend Road	Unpermitted Discharge	160,000	Fourth Creek	Heavy Rainfall	2.58	3.68	0.34	
1st 2011	3/9/2011	2536 Cecil Avenue	Unpermitted Discharge	98,000	First Creek	Heavy Rainfall	2.58	3.68	0.34	
1st 2011	3/10/2011	600 North Gallaher View Road	Unpermitted Discharge	468,000	Ten Mile Creek	Heavy Rainfall	0.18	3.86	0.34	
1st 2011	3/10/2011	2377 Neyland Drive	Unpermitted Discharge	Unknown	Third Creek	Heavy Rainfall	0.18***	3.86	0.34	Yes
1st 2011	3/17/2011	6410 South Northshore Drive	Unpermitted Discharge	Unknown	Fourth Creek	Heavy Rainfall	***	0.44		Yes
1st 2011	3/22/2011	4719 Old Broadway	Unpermitted Discharge	Unknown	First Creek	Heavy Rainfall				
1st 2011	3/29/2011	702 Redwine Street	Unpermitted Discharge	100	Goose Creek	Construction Failure	0.08	0.72		
*1-Day Rainfall Total is the rain that occurred on the day of the SSO										
**3-Day Rainfall Total is the total amount of rain that occurred on the day of the SSO and the the 2 days prior										
***This overflow is believed to be the result of the significant rainfall event that occurred on 2/28/2011. Evidence that the overflow occurred was found some time following the actual event. The rainfall shown for this event correlates to the amount received on the date the event was reported to KUB.										

## **Appendix F**

**Notification of Force Majeure – Stipulated Penalty for  
Unpermitted Discharge, letter dated March 18, 2011**



Knoxville Utilities Board

---

## RECORD COPY: DO NOT ALTER OR DESTROY

March 18, 2011

### VIA CERTIFIED MAIL

Molly Davis  
Acting Chief, Clean Water Enforcement Branch  
Water Management Division  
U.S. Environmental Protection Agency, Region 4  
Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303

Re: Notification of Force Majeure – Stipulated Penalty for Unpermitted Discharge:  
U.S., et al. v. Knoxville Utilities Board (KUB): Case Nos. 3:04-CV-568 and 3:03-CV-497;  
DOJ Case No. 90-5-1-1-08186

Dear Ms. Davis:

In conformance with the *Force Majeure* provision in Section XI for the Knoxville Utilities Board (KUB) Consent Decree, this letter provides notification of delay or prevention of performance with the objective of the Consent Decree to achieve the goal of elimination of Sanitary Sewer Overflows, including Unpermitted Discharges and the related imposition of Stipulated Penalties under Section X.A.1. of the Consent Decree. This delay or prevention of compliance occurred despite KUB's best efforts, due to a significant rainfall event in the Knoxville area on February 28, 2011, described in additional detail below.

On February 28, 2011 the Knoxville area experienced a significant rainfall event that caused substantial flooding. Rain gauges maintained by the KUB located within KUB's service area (See Figure 1) recorded rain totals ranging from 1.8 to 3.6 inches on this date. The rainfall data from these gauges indicated a daily average of 2.9 inches for the overall area, but the majority of our service area received over 3 inches on average. These gauges also revealed that the heaviest rainfall fell within a three-hour period, resulting in intensities up to 1.9 inches per hour in some locations. (See Figure 2) Historical data from the National Weather Service (NWS) shows this event to be a 35-year storm. This estimate is based on the application of historical intensity, duration and frequency data.

Runoff caused water levels in area streams and storm sewers to rise and then overflow covering nearby streets and manholes (See Figure 3). Widespread flooding like this occurred in many locations and much of our wastewater collection system was under water for a period of time. This resulted in significant amounts of inflow and infiltration into the KUB wastewater system. All four of KUB's wastewater storage tanks were filled to maximum capacity. The storage tanks retained approximately 22 million gallons of rainwater to prevent sewer overflows. All of KUB's plants received record influent flows, which exceeded their design capacity, but the plants were operated in accordance with the approved Process Control Program to manage the storm flow. There were no plant permit violations, and sludge blankets were maintained preventing a washout that day and on subsequent days despite additional, significant rainfall later in the week.

A total of 32 overflows were timely reported as a result of this rain on February 28, 2011 (See Figure 1 and Table 1). Half of these overflows were reported after February 28, 2011, when the stormwater flows subsided and the area dried, leaving evidence that indicated a potential overflow had occurred at that location. In these situations the overflow volumes were based on KUB's best estimates for the magnitude and duration of the overflow. Approximately half of the confirmed overflows had volumes of less than 1000 gallons, and at least 25% of the overflows that occurred were less than 100 gallons in total volume.

It is also apparent that the greatest number of overflows occurred in the areas of the KUB system that received the greatest amount of rainfall. Figure 1 shows that at least 3.6 inches of rain fell in the northern portion of our service area where over half of the overflows were observed. This is in comparison to few, if any, overflows being confirmed in the area near Rain Gauge 2 where only 1.8 inches of rain fell. Figure 2 indicates that rainfall intensities were actually the lowest in the eastern portion of our service area and never exceeded 0.4 inches per hour. This area of our system also experienced fewer overflows due to the moderate rainfall.

KUB will continue to implement the Work under the Consent Decree and these overflows will not cause any delay in performance of the Work. KUB respectfully requests that the February 28, 2011 storm event be recognized as a Force Majeure event and that stipulated penalties under Section X not be imposed. This is consistent with provision of Section X.G., which provides discretion to EPA as to whether or not to impose a stipulated penalty, and with Section XII.E, which provides that stipulated penalties will not be imposed for a Force Majeure event.

Ms. Molly Davis  
March 18, 2011  
Page 3

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thank you for your assistance. If you require additional information, please call me at (865) 594-7531.

Sincerely,



Bill R. Elmore  
Executive Vice President and Chief Operating Officer

Enclosures

cc: Chief, Environmental Enforcement Section  
Environment and Natural Resources Division, DOJ  
E. Joseph Sanders, General Counsel, TDEC  
Renee Victoria Hoyos, Executive Director, TCWN  
Daniel Brown, Mayor, City of Knoxville  
Hiram G. Tipton, Hodges, Doughty & Carson, PLLC  
Phil Simmons, TDEC  
Susan H. Richardson, Kilpatrick Stockton, LLP  
John West, TDEC  
Wayne Loveday, Vice President, KUB

The map displays the city of Knoxville, Tennessee, with its major roads and water bodies. The locations of Sewer System Outfalls (SSOs) are marked with black dots and labeled with codes: RG01, RG02, RG03, RG04, RG05, RG06, RG07, and RG08. Other infrastructure shown includes storage tanks, treatment plants, rain gauges, sewer force mains, and sewer gravity mains. The map also indicates the locations of the Raccoon Valley, Rife Range, Brown Gap, Tazewell Pk, Washington Pk, and Eastbridge. The legend in the bottom left corner defines the symbols used for SSOs, storage tanks, treatment plants, rain gauges, sewer force mains, sewer gravity mains, roads, and rivers/creeks.

Symbol	Description
Black dot	SSO Event
Black circle with cross	Storage Tanks
Black square	Treatment Plants
Black circle	Rain Gauge
Black line	Sewer Force Mains
Black line	Sewer Gravity Mains
Black line	Roads
Black line	Rivers/Creeks

Figure 2

**Rain Event February 28, 2011**  
**Rain Gauge (RG) Data for Rainfall Intensity**

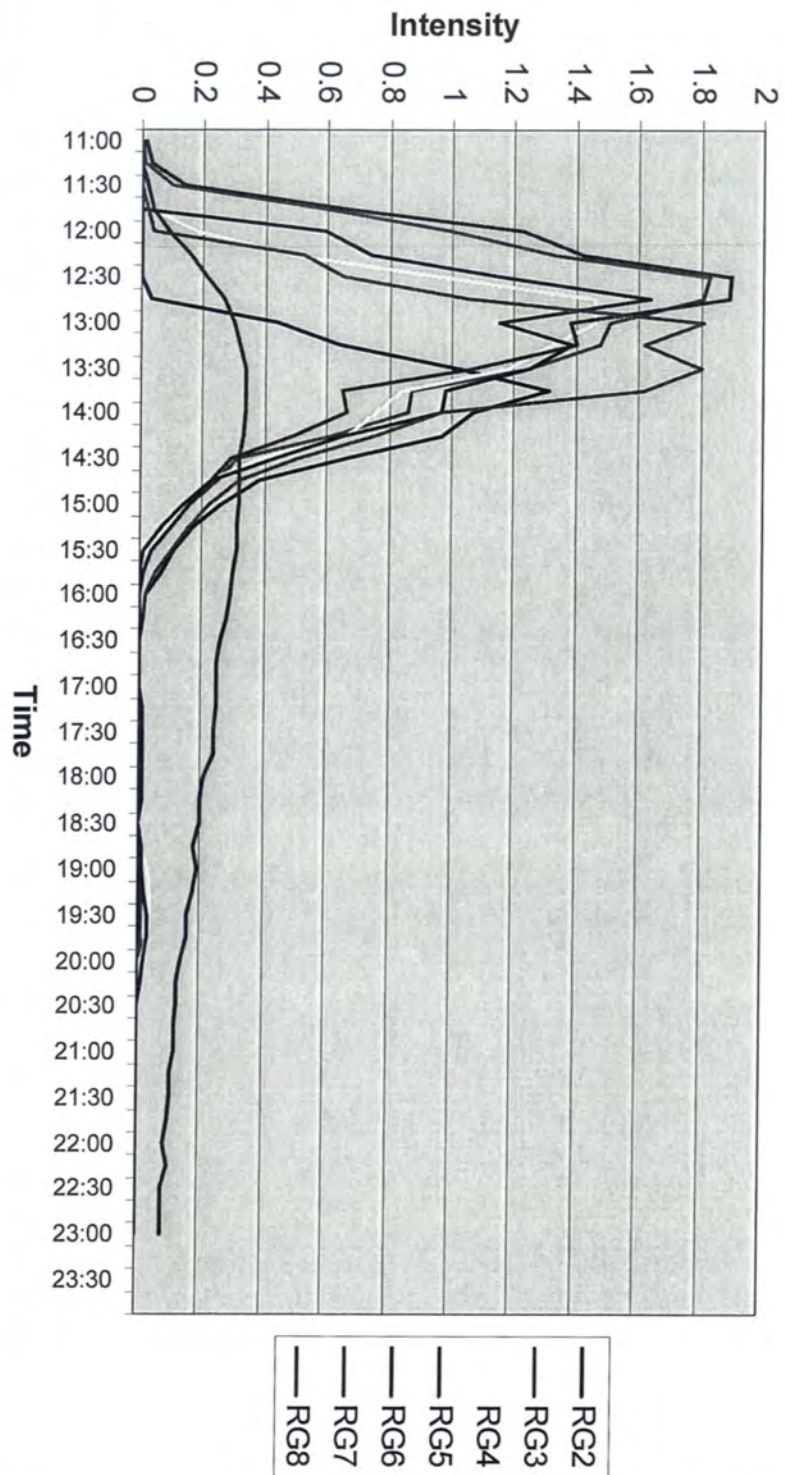


Figure 3

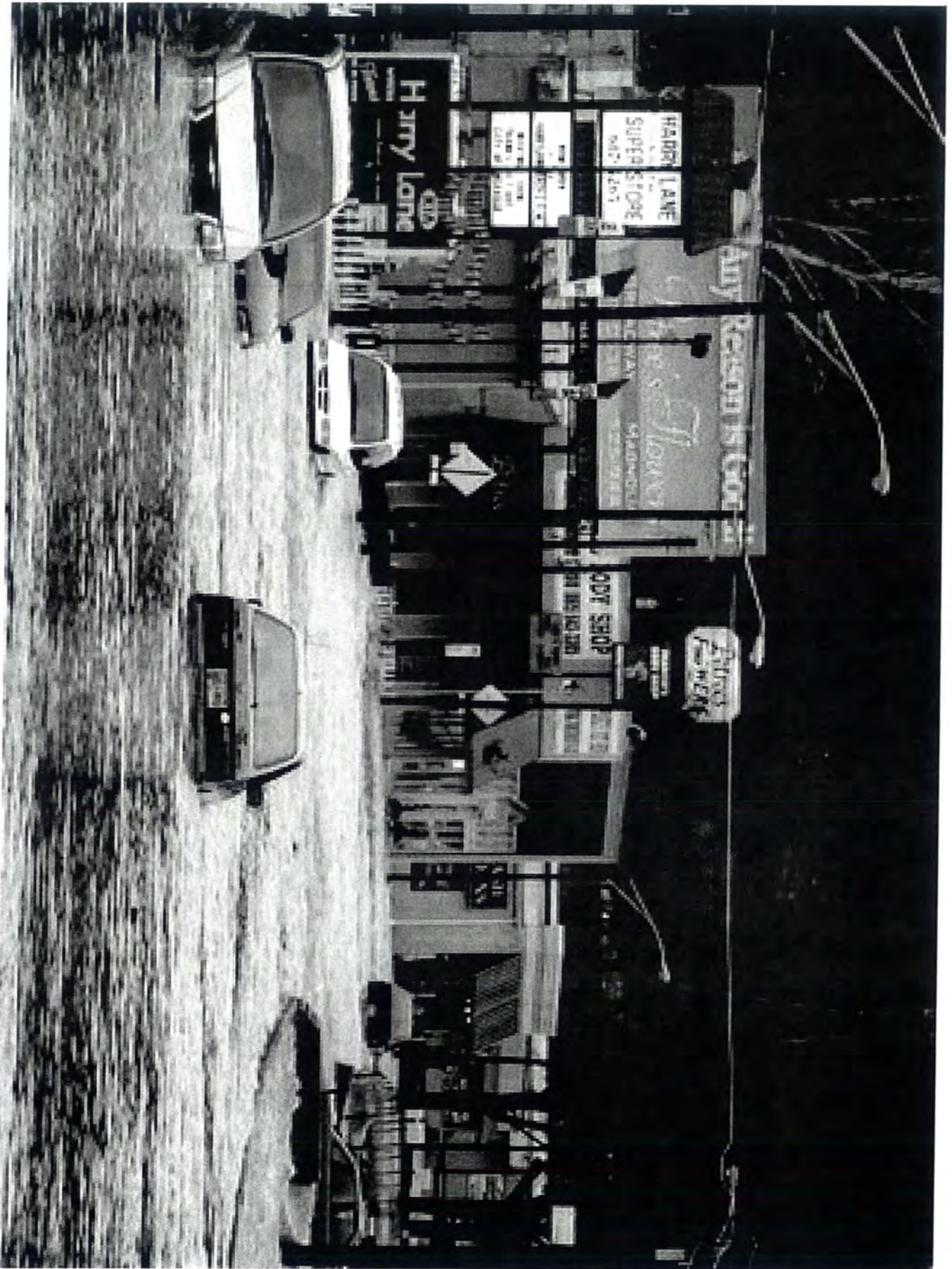


Table 1

Report Date	Location	Discharge Point	Cause	Unpermitted Discharge	Volume
1 28-Feb	4800 Maloneyville Road	Pump Station	I/I	N	3,750
2 28-Feb	113 Drinnen	MHs 28-26 & 28-27	I/I	N	600
3 28-Feb	4014 Holston Hills Road	MHs 72 & 75	I/I	Y	295,000
4 28-Feb	2008 Riverside Drive	MH 2	I/I	Y	720,000
5 28-Feb	2500 Cedar Lane	MHs 22-13 & 22-30	I/I	Y	530
6 28-Feb	1500 Lyons Bend Road	MH 1	I/I	Y	590,000
7 28-Feb	2004 Neyland Drive	MH 1	I/I	Y	360,000
8 28-Feb	815 S. Central Street	MH 3-7	I/I	Y	100
9 28-Feb	3814 Woodlake Drive	Lateral Cleanout	I/I	N	400
10 28-Feb	1411 Davanna Street	MH 8	I/I	Y	5,800,000
11 28-Feb	3218 Avondale Avenue	MH 22-23, Broken Lateral	Blockage Influenced by I/I	N	1,500
12 28-Feb	2536 Cecil Avenue	MH 30-11	I/I	Y	410,000
13 28-Feb	2640 Morgan Circle	MH 4-19	I/I	Y	1,500
14 28-Feb	1127 E. Moody Avenue	MH 40-3	I/I	N	600
15 28-Feb	923 Oaklett Drive	Pump Station	I/I	N	9,000
16 28-Feb	2102 Washington Avenue	MH 25-114	I/I	Y	190,000
17 1-Mar	1521 Fairmont Blvd	Temp Lateral Connection	I/I	Y	30
18 1-Mar	3741 Eakers Street	MH 47	I/I	Y	67,500
19 1-Mar	2415 Tecoma Drive	Lateral Cleanout	I/I	N	60
20 1-Mar	1940 Old Amherst Road	MH 22-117	I/I	N	50
21 1-Mar	7927 West Cliff Drive	MH 36-12	Blockage Influenced by I/I	N	50
22 1-Mar	411 W. Baxter Avenue	MH 49	I/I	Y	800,000
23 1-Mar	5205 Haynes-Sterchi Road	MH 35-4	Blockage Influenced by I/I	N	500
24 1-Mar	600 N. Gallaher View Road	MH 77	I/I	Y	24,000
25 2-Mar	2430 Highland Drive	Lateral Cleanout	I/I	N	120
26 2-Mar	781 Bagwell Lane	Pump Station	I/I	N	576,000
27 2-Mar	3011 E. Gov. John Sevier Hwy	Pump Station	I/I	N	21,600
28 2-Mar	4600 Upchurch Road	MH 45	I/I	N	100
29 3-Mar	4105 Central Avenue Pike	MH 17-8	I/I	N	100
30 3-Mar	1216 Watercress Drive	MH 29-9	I/I	Y	50
31 4-Mar	304 Seventh Avenue	MH 15	I/I	N	200
32 10-Mar	2377 Neyland Drive	MH 3	I/I	Y	Unknown
33 17-Mar	6410 S. Northshore	MH 8	I/I	Y	Unknown