

# Quarterly Progress Report

Volume 27

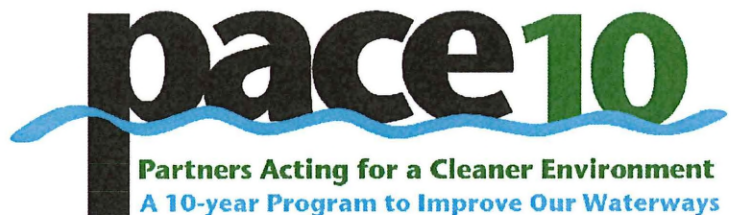
Fourth Quarter Report  
October 1 through December 31, 2011

Submitted to EPA on January 30, 2012

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*  
D. Wayne Loveday

*January 30, 2012*  
Date



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# 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>12</b>
<b>Section 3 Process Controls Program</b>	<b>13</b>
<b>Section 4 Capacity Assurance Program</b>	<b>14</b>
<b>Section 5 Transfers of Ownership</b>	<b>15</b>
<b>Section 6 Compliance and Non-Compliance With the Consent Decree</b>	<b>16</b>
6.1 Submission of Deliverables	16
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	17
<b>Section 8 Water Quality Monitoring Data</b>	<b>19</b>
8.1 Sampling Conducted and Results	19
8.2 Projected Data Collection	21
<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	

# 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 fourth quarter of 2011 from October 1 through December 31. This is the twenty-seventh 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.

#### October 28, 2011

- Submitted to EPA – Quarterly Progress Report 3<sup>rd</sup> quarter 2011

## 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 was 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 was FY 11/12. 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 was FY 10/11. 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.
- **1-19 Edgewood Drive Rehabilitation Project** – revised completion date is FY 11/12.
- **3-7 Neyland Drive Trunk Replacement (Lower Third Creek Trunk Replacement)** – revised completion date is FY 12/13.
- **4-28 Queensridge (Queensbury) Pump Station Upgrade Project** – revised completion date is FY 11/12.

#### **Current Capital Improvement Plan for FY 04/05 - FY 11/12**

The following is a list of facility improvement projects included in the Capital Improvement Plan for fiscal years 04/05 to 11/12. 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. Scope of work was expanded after investigations showed that additional sewer lines and manholes needed to be rehabilitated. This project was combined with 1-23 Oglewood Avenue Rehabilitation Project due to the proximity of the SSO locations to be addressed by both projects. Because Edgewood covers a large area and Oglewood is fairly small and located within two blocks of Edgewood, KUB chose to take advantage of the economy of scale for construction and design work by combining the two projects into one. This project will be completed by June 30, 2012.
2. **1-21 College Park Rehabilitation Project** –Project is in bid phase. The current completion date for construction is June 2012. KUB will be requesting a six-month extension for the following reasons: 1) project requires replacement and new alignment of sewer mains on Gresham Middle School property, which requires acquisition of an easement from Knox County Schools; and 2) for public safety, officials at Gresham Middle School will not allow construction on school property until the end of the school year on May 23, 2012. If the extension is approved, the expected completion date for construction will be January 2013.
3. **1-22 E. Jackson Avenue Rehabilitation Project** – Project is in preliminary engineering. The expected completion date for construction is June 2013.
4. **1-23 Oglewood Avenue Rehabilitation Project** –Project is under construction as combined with 1-19 Edgewood Drive Rehabilitation Project above and will be completed by June 30, 2012.

## **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 FY 11/12. The project is under construction. KUB will be requesting an additional extension to January 2013 due to construction delays caused by a 750 foot tunnel beneath multiple railroads.

## **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, which consists of the replacement of 3,200 ft of 30" pipe with 36" pipe, is under construction with a projected completion of August 2012. Phase II design is underway and consists of the replacement of 5,100 ft of 18-30" pipe with 36" diameter pipe. Phase II construction is expected to start in March 2012.
2. **3-7 Neyland Drive Trunk Replacement (Lower Third Creek Trunk Replacement)** – 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. Constructability issues, property acquisitions, and permitting for this large diameter project required that KUB extend the project completion date until FY 12/13. Project is under construction.
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. Project is under construction and will be complete in FY 11/12.
4. **3-20 Citico Street Rehabilitation Project** – Project is under construction and is scheduled to be complete FY 11/12.
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 under construction and is scheduled to be complete FY 11/12.
7. **3-24 Montgomery Avenue Rehabilitation Project** – Project is under construction and is scheduled to be complete FY 11/12.

8. **3-27 Montgomery Avenue Rehabilitation Project** - Project is under construction and is scheduled to be complete FY 11/12.
9. **3-29 Highland Hills Road Rehabilitation Project** – Project is under construction and is scheduled to be complete FY 11/12.

#### **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 FY 11/12.

#### **South Knox**

1. **S-21 Alpine Avenue Rehabilitation Project** - Project is under construction and is scheduled to be completed in FY 12/13.

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

1. **L-7 Magnolia Avenue Rehabilitation** – Project is in design. The expected completion date for this project is FY 12/13.
2. **EB-2 Strawberry Plains Pike Rehabilitation Project** – Project is in bid phase. The expected completion date is FY 11/12.

#### **Williams Creek**

1. **W-5 Groner Avenue Rehabilitation Project** - Project is in design. The expected completion date is FY 12/13.

## **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.
20. **1-26 Cherry Street Rehabilitation Project** – Upsized approximately 1,150 ft of sewer trunklines and replaced two manholes and rehabilitated two manholes.

## **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.
20. **2-16 1600 Block Elm Street Rehabilitation Project** – Pipe burst 285 ft of existing 8" sewer and replaced two manholes.

### 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 a two-phased construction project to address issues in mini-basin 32A4. Construction was completed in 2009.
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.
12. **4-21 Black Bear Road Project** – Replaced approximately 261 ft of existing 8" sewer and rehabilitated one manhole. Project included CCTV, manhole inspections, and smoke testing.
13. **4-24 Kerri Way Project** – Replaced approximately 439 ft of existing 8" sewer and five manholes. Approximately 92 ft of existing 8" sewer was rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
14. **4-25 Lonas Drive Project** – Replaced approximately 326 ft of existing 8" sewer and five manholes. Approximately 4,688 ft of existing 8" sewer and nine manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
15. **4-26 Midpark Drive Project** – Replaced two manholes. Approximately 440 ft of existing 8" sewer and three manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
16. **4-31 Kingston Pike @ Gallaher View Project** – Replaced one manhole. Approximately 1,068 ft of existing 8" sewer and six manholes were rehabilitated. Project included CCTV, manhole inspections, and smoke testing.
17. **4-28 Queensridge (Queensbury) Pump Station Upgrade Project** – The terminal manhole for the Queensbury force main has been replaced and the piping configuration for this manhole was also adjusted to lessen pressure restrictions allowing access to the force main for cleaning. Both pumps were also replaced.

#### **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 final 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.
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.
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.
7. **L-2 Boyds Bridge Pike and Holston Hills Trunk Replacement** – Replaced 4,456 feet of trunkline and 31 manholes.
8. **L-4 Asheville Highway Rehabilitation** – Rehabilitated 1,560 ft of sewer mains and 12 manholes.
9. **L-6 Holston Hills Road Rehabilitation** – Rehabilitated 1,356 ft of sewer mains.
10. **L-8 McDonald Drive Rehabilitation** – Rehabilitated 285 ft of sewer main, replaced 316 ft of sewer main and two 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. The expected completion date is June 2014.
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. The expected completion date is June 2014.

### **Second Creek**

1. **SCR-1 4105 Central Avenue Pike** – Find and fix work to identify and address overflow in vicinity of 4105 Central Avenue Pike. CCTV, smoke testing and manhole inspection have been completed. This project is currently in the design phase.

**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 under construction.

## **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** – Force main replacement was complete in 2009.
2. **EBR-1 7612 Bud Hawkins Road** – Replaced the pump station and force main with a 21-inch gravity sewer.

## **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.

All construction projects are on schedule with the plan outlined in the approved CCP.

### **Kuwahee WWTP Phase I, Contract I**

Construction started in June and to date the contractor has completed demolition of the existing sub-stations and old gravity thickener pad. They are currently placing and installing Motor Control Centers for the new gravity thickener. Construction is at 60% complete. Future tasks include installation of the new gravity thickener, new dilution water pumps, and completion of the Chemically Enhanced Primary Treatment (CEPT) equipment. This project is scheduled to be complete prior to the December 2012 deadline.

### **Kuwahee WWTP Phase I, Contract II**

Construction started in August and to date the contractor is 90% complete with demolition of the equipment in the old UNOX tanks and trough, secondary sludge pump station, and the secondary settling tanks. Future tasks include installation of new piping in addition to diversion and distribution boxes to improve process control and prepare for future Biologically Enhanced High Rate Clarification (BEHRC) treatment. This project is scheduled to be complete prior to the December 2012 deadline.

### **Fourth Creek WWTP Phase I**

Bidding for this contract will open in January 2012 with construction work to begin in February 2012. The current construction estimate is \$17.2M with a substantial completion date of July 2013. Major tasks include a new wet weather screening structure, High Rate Clarification Pump Station, Chemical Storage Building, High Rate Clarifier, Drain Pump Station, Generator Building, Chlorine Contact Tank, Effluent Pumps, and transformer replacement.

## 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 26 times during this reporting period resulting in three Diversion events (two at Kuwahee WWTP, and one 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 Third Quarter 2011

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

### 6.2 Violations Subject to Stipulated Penalties

During this reporting period, KUB incurred five 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 fourth 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	11/16/2011	1216 Watercress Drive	Heavy Rainfall
Unpermitted Discharge	11/22/2011	2885 Tazewell Pike	Construction Failure
Unpermitted Discharge	11/28/2011	1500 Lyons Bend Road	Heavy Rainfall
Unpermitted Discharge	11/28/2011	1216 Watercress Drive	Heavy Rainfall
Unpermitted Discharge	12/13/2011	1300 Alcoa Highway	Blockage

## 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 27 SSO events. Of that number, 11 were due to blockage, five were due to broken pipe, four were due to heavy rainfall, four were due to grinder pump failure, and three were due to construction failure.

Of the 27 SSO events, 23 were in the 0 – 1,000 gallons volume range, two were in the 1,001 – 10,000 range, and two events totaled greater than 10,000 gallons. Durations for events during this period are as follows: 22 ranged from 0 – 2 hours, three ranged from 2.1 - 5 hours, and two were greater than 5 hours.

### 7.2 Building Backups

Appendix C lists all Building Backups that occurred during this reporting period. During this period, there were three Building Backups. Of those three events, one was due to construction failure, one was due to blockage, and one was due to broken pipe.

### 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 two Diversions at Kuwahee and one at Fourth 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 two Effluent Limit Violations for Fourth Creek WWTP and none for Kuwahee, Loves Creek, and 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	11/28/2011	12:12			11/28/2011	11.8	4.98	36.8	11.85	High flow event due to excess rainfall
						11/29/2011	24	6.79			
				11/30/2011	01:00	11/30/2011	1.0	0.08			
Kuwahee	Yes	11/16/2011	16:30			11/16/2011	4.25	2.8	4.25	2.8	High flow event due to excess rainfall
				11/16/2011	20:45						
Kuwahee	Yes	11/28/2011	06:40			11/28/2011	9.82	7.99	15.07	10.36	High flow event due to excess rainfall
				11/28/2011	12:50						
		11/28/2011	20:18			11/29/2011	5.25	2.37			
				11/29/2011	05:15						
Loves Creek	No										
Eastbridge	No										

**Table 3: Effluent Limit Violations**

WWTP	Did an event occur?	Date	Parameter	Type	Limit	Value
Kuwahee	No	-	-	-	-	-
Fourth Creek	Yes	11/28/2011	Daily Max	E. coli	487/100 ml	820/100 ml
Fourth Creek	Yes	12/07/2011	Daily Min % Removal	BOD	40%	-80%
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 this reporting period and the results thereof. In addition to routine monitoring in all creeks, and responding to Sanitary Sewer Overflows (SSOs), KUB Water Quality Personnel conducted some investigative sampling in Baker, Goose, and Fourth Creeks. KUB continues to utilize RT-PCR Bacteroides analysis if necessary to investigate the source of any high *E. coli* counts that reoccur.

#### First Creek

The bacteriological results associated with the routine monitoring for First Creek during this quarter (Routine Water Quality Monitoring Report – Appendix D) were below the water quality standard of 941cfu/100 ml and have continued to stay low for some time. The only exception requiring investigation were isolated high counts last quarter on 9/21/11 at two locations (1.74 and 2.57). These elevated *E.coli* results could not be reproduced later that month or since during routine monitoring under various weather conditions. There are no indications of sewer leaks along the stream.

#### Second Creek

All results for this quarter were below the water quality standard of 941cfu/100 ml (Routine Water Quality Monitoring Report – Appendix D). As mentioned in the last quarterly report, the furthest routine sampling site on Second Creek was moved downstream near Inskip Park (Site 5.11), since this area is near public access to the stream and is more representative of stream flow. Any previous water quality concerns with site 5.76 were resolved after elimination of a problem on property issue (dumpster pad drainage).

#### Third Creek

The only routine samples that had *E. coli* results above the water quality standard of 941cfu/100 ml were collected on 11/29/11 when the area had received almost three inches of rain on the previous two days (Routine Water Quality Monitoring Report – Appendix D). Runoff brings potential contamination from other sources to the stream and likely contributed to the high counts observed on this date.

#### 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). Bacteriological counts have continued to be below the water quality standard over the last four quarters. No investigative testing has been needed.

#### Loves Creek

The bacteriological results associated with the routine monitoring for Loves Creek during this quarter (Routine Water Quality Monitoring Report – Appendix D) were below the water quality standard of 941cfu/100 ml and have continued to stay low for some time. One set of routine monitoring samples had *E. coli* results above the water quality standard of 941cfu/100 ml during last quarter on 7/12/11, but were taken on a day when a total 0.50 inches of rain fell in the area. All other monitoring was below the water quality standard over the last four quarters.



### Baker Creek

All routine monitoring in this stream during this quarter was conducted during wet weather conditions (Routine Water Quality Monitoring Report – Appendix D). Investigation still continues in this creek. Results counts have continued to be elevated over the last several months primarily near routine Sites 0.36 and 0.53, but not consistently from month to month. Routine sampling in September revealed all counts to be far below the water quality standard of 941cfu/100 ml except those from the tributary that enters Baker Creek just above the routine Site 0.36. However, counts increased again at Sites 0.36 and 0.53 during this quarter albeit during wet weather conditions. Monitoring of the tributary (Table 1) over time has revealed that the source is coming from something nearer the tributary than the main stream. More investigative monitoring continues along the tributary and this quarter monitoring indicates the source may be nearer to Mayfield Drive. Since the elevations are inconsistent and seen primarily during wet weather in this largely residential area, a leaking septic system or defective private lateral is suspect.

### Goose Creek

Routine monitoring in this stream still indicates that more investigation is needed near Site 1.19E. *E. coli* results above the water quality standard of 941cfu/100 ml were obtained during this quarter (Routine Water Quality Monitoring Report – Appendix D) during both wet and dry weather conditions. The area upstream and near site 1.19E is being investigated to determine the potential source of the contamination and more monitoring of nearby tributaries is underway (Table 2A).

Wet weather investigative sampling was also conducted on this stream during November when the creek area received over an inch of rain in 24 hours (Table 2B). After five days of dry weather and monitoring during this period of time to determine the baseline counts, samplers performed wet weather monitoring according to the program's wet weather protocol. As levels in the stream began to rise from the rainfall on 11/16/11 sampling was conducted and counts peaked. The following morning on 11/17/11 when stream flow was still high but the elevation in the nearby sewers had risen from any resulting infiltration, sampling was conducted again. In fact two sets of samples were collected on this day, but bacteriological counts had dropped significantly in both cases. Results obtained on 11/17/11 and 11/18/11, are typical of those seen routinely in this stream. There is no apparent problem with leaking sewer mains in this area during heavy rainfall, since the peak counts occurred during the start of heavy rainfall and stream swelling rather than after sewer flow had increased from any infiltration. A second round of wet weather monitoring will be conducted on this stream in the future.

### Williams Creek

The only routine samples that had *E. coli* results above the water quality standard of 941cfu/100 ml were collected on 10/21/11 when the area had received over two inches of rain on the previous two days (Routine Water Quality Monitoring Report – Appendix D). Runoff brings potential contamination from other sources to the stream and likely contributed to the high counts observed on this date. Otherwise, bacteriological results for this stream have remained low over the last two quarters. In early May 2011 a blockage related SSO impacted the stream near Site 2.02 and some samples collected in that area continued to be elevated in the second quarter. No investigative sampling was necessary this quarter, but counts will continue to be monitored closely.

### Spill Impact Monitoring

Stream monitoring and posting was conducted in conjunction with an SSO on Tazewell Pike during wet weather because of the public access to the stream in this area. Stream monitoring and posting was also conducted in conjunction with an SSO on Hansmore

Place even though there was no visible indication of it reaching the nearby tributary and it was not required (Table 3). There was approximately an inch of rain on 11/3/2011, which could have impacted the counts obtained the day the SSO was reported.

## 8.2 Projected Data Collection

During the first quarter of 2012, 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 first quarter of 2012:

### *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	5.11
<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
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

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
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 Awer 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
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
163	Lake Forest Sewer Improvements 41A6	Find & Fix Gravity Main	Knob Creek	Kuwahee	35,202	Project Complete
164	Bennett Place Sewer Improvements 32B	Find & Fix Gravity Main	4th Creek	Fourth Creek	25,112	Project Complete
165	40A2 Phase I Trunkline Replacement	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	195,583	Project Complete
166	Jersey Ave, Ball Camp & Hiwassee Sewer Improvments	Find & Fix Gravity Main	3rd Creek	Kuwahee	13,059	Project Complete
167	W Glenwood, Nathaniel & Boyd St Shortline project 22B1, 17A1, 01A1	Find & Fix Gravity Main	1st Creek	Kuwahee	13,059	Project Complete
168	Minibasin 23D1/F1	Comprehensive Rehabilitation	2nd Creek	Kuwahee	50,577	Project Complete
169	Minibasin 18B1 find & fix	Find & Fix Gravity Main	1st Creek	Kuwahee	4,929	Project Complete
170	Second Creek Storage Tank	Storage Tank	2nd Creek	Kuwahee	5,500,000	Project Complete
171	Lower Third Creek Storage Tank	Storage Tank	3rd Creek	Kuwahee	6,500,000	Project Complete
172	Noelton Drive Sewer Improvements	Find & Fix Gravity Main	3rd Creek	Kuwahee	5,042	Project Complete
173	Old Kingston Pike Sewer improvments	Find & Fix Gravity Main	3rd Creek	Kuwahee	301	Project Complete

## **Appendix B**

### **SSOs**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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
10/1/2011	3:30 PM	206	Hillview Avenue	LC	Loves Creek	6	MH 29-145 & Lateral Cleanout	Ground to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	500	0	500	1	No
10/1/2011	12:50 PM	4304	Roberts Road	LC	Eastbridge	113	Residential Grinder Pump	Wet Well to Soil Saturation		Grinder pump failure. Repaired & area cleaned.	6	1	5	0.5	No
10/3/2011	1:41 PM	1915	Lyons Bend Road	FC	Fourth Creek	43	Residential Grinder Pump	Wet Well to Soil Saturation		Grinder pump failure. Repaired & area cleaned.	6	1	5	0.5	No
10/17/2011	6:26 AM	4304	Roberts Road	LC	Eastbridge	113	Residential Grinder Pump	Wet Well to Soil Saturation		Grinder pump failure. Repaired & area cleaned.	1	0	1	0.25	No
10/21/2011	9:38 AM	5401	Montcrest Road	KUW	First Creek	4	MH 35-25	Ground to Soil Saturation		Broken sewer - Sewer main collapse. Sewer main was repaired.	50	0	50	1	No
11/2/2011	12:55 PM	409	North Winston Road	FC	Fourth Creek	32B	MH17-1	Pavement to Soil Saturation		Pipe/Manhole Failure- Sewer Main Collapse. Sewer main was repaired.	50	0	50	2	No
11/5/2011	9:04 PM	846	Hansmore Place	FC	Fourth Creek	36	MH 3-325	Soil Saturation		The sewer main was flushed to remove the blockage caused by debris.	100	0	100	3	No
11/6/2011	11:54 PM	1708	Pinetree Lane	FC	Fourth Creek	32A	Lateral Cleanout	Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by grease.	62,000	6,000	56,000	72 - Intermittently	No
11/12/2011	6:30 AM	1017	Andes Road	KUW	Loves Creek	26	MH 72-152	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	250	0	250	2	No
11/16/2011	2:24 PM	1216	Watercress Drive	KUW	First Creek	7	MH 29-9	Ground to First Creek & Soil Saturation	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	200	0	200	1	Yes
11/16/2011	6:18 PM	1908	Jefferson Ave	KUW	First Creek	24	Lateral Cleanout	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	50	0	50	1	No
11/17/2011	11:22 AM	1919	Tennessee Ave	KUW	Third Creek	22	2 Lateral Cleanouts	Lateral Cleanouts to Ground to Soil Saturation and Storm Sewer to Recovery		The sewer main was flushed to remove the blockage caused by debris.	900	450	450	2	No
11/22/2011	12:55 PM	2885	Tazewell Pike	KUW	First Creek	8	Unnamed MH	Ground to Soil Saturation and First Creek	First Creek	Construction Failure - sewer main was returned to normal operations.	1,500	0	1,500	2	Yes
11/23/2011	12:15 PM	5405	Lance Drive	KUW	Third Creek	21	MH 10-85	Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	300	0	300	3	No
11/23/2011	12:31 PM	5525	Lonas Drive	FC	Fourth Creek	27	MH 9-21	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease.	40	20	20	1	No
11/26/2011	1:45 PM	2520	Woodland Reserve Lane	FC	Fourth Creek	43	Broken Force Main	Broken Force Main to Pavement to Storm Drain to Soil Saturation		Pipe/Manhole Failure- Broken Force Main. Force Main was repaired.	200	0	200	2	No
11/28/2011	9:51 AM	2110	Atchley Streect	KUW	South Knox	40	MH 1-80	Pavement to Soil Saturation and Recovery		Pipe/Manhole Failure- Sewer Main Collapse. Sewer main was repaired.	100	50	50	2	No
11/28/2011	6:54 PM	1500	Lyons Bend Road	FC	Fourth Creek	37	MH 1	Fourth Creek	Fourth Creek	Rainfall in the area produced I & I and high flows in sewer mains.	398,650	0	398,650	6.42	Yes
11/28/2011	7:15 PM	1216	Watercress Drive	KUW	First Creek	7	MH 29-9	Ground to First Creek and Soil Saturation	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	150	0	150	2	Yes
12/4/2011	10:24 AM	3319	Fountain Park Blvd	KUW	First Creek	18	MH 72	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease and debris.	325	0	325	4.5	No
12/4/2011	10:31 AM	520	Cherokee Blvd	KUW	Third Creek	38	Broken Gravity Main	Subsurface to Storm Sewer to Recovery and Ditch to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots and debris.	3,500	1,000	2,500	1	No
12/10/2011	12:36 PM	5209	Murphy Road	KUW	First Creek	2	Residential Grinder Pump	Wet Well to Soil Saturation & Building Backup		Construction Failure - grinder pump reinstated & area cleaned.	30	5	25	2	No
12/10/2011	5:37 PM	621	Milligan Street	KUW	Williams Creek	19	Residential Grinder Pump	Wet Well to Soil Saturation		Construction Failure - grinder pump reinstated & area cleaned.	10	5	5	1	No
12/13/2011	7:59 PM	1300	Alcoa Hwy	KUW	Third Creek	35B	MH 18-3	Pavement to Storm Drain to Third Creek	Third Creek	The sewer main was flushed to remove the blockage caused by debris.	650	0	650	1	Yes
12/24/2011	1:30 AM	5347	Bent River Blvd	FC	Fourth Creek	43	Residential Grinder Pump	Wet Well to Soil Saturation		Grinder pump failure. Repaired & area cleaned.	5	0	5	1	No
12/29/2011	11:45 PM	300	East Columbia Ave	KUW	Second Creek	15	Lateral Cleanout	Lateral Cleanout to Soil Saturation and Recovery		Pipe/Manhole Failure- Sewer Main Collapse. Sewer main was repaired.	25	10	15	1	No
12/31/2011	7:45 PM	3602	East Kesterwood Drive	KUW	First Creek	4	Lateral Cleanout	Lateral Cleanout to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	375	0	375	2	No

## **Appendix C**

### **Building Backups**



1	2	3	4	5	6	7	8	9	10	11	12	13
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)
12/10/2011	12:36 PM	5209	Murphy Road	KUW	First Creek	2	BBU	Construction Failure - grinder pump reinstated & area cleaned.	30	5	25	2
12/22/2011	8:15 AM	5733	Wilkerson Road	KUW	Third Creek	9	BBU	The sewer main was flushed to remove the blockage caused by debris.	310	300	10	4
12/29/2011	4:00 PM	4525	Old Kingston Pike	KUW	Third Creek	34	BBU	Pipe/Manhole Failure- Sewer Main Collapse. Sewer main was repaired.	50	50	0	3

## **Appendix D**

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



## Routine Water Quality Monitoring Report

10/1/2011 Through 12/31/2011

**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)	Precipitation Event	Status
<b><u>First Creek</u></b>									
1.74	10/24/2011	09:12	7.7	14	9.4	340	310	Dry	R
2.57	10/24/2011	09:24	7.8	13	9.9	450	410	Dry	R
6.33	10/24/2011	09:51	7.7	14	8.3	240	180	Dry	R
1.74	11/10/2011	12:02	8.1	12	10	150	170	Wet	R
2.57	11/10/2011	12:54	7.8	13	11	220	190	Wet	R
6.33	11/10/2011	13:07	7.8	13	9.5	230	230	Wet	R
1.74	12/12/2011	11:25	7.9	10	11	140	240	Dry	R
2.57	12/12/2011	10:19	7.7	10	11	230	190	Dry	R
6.33	12/12/2011	09:25	7.5	12	9.1	160	140	Dry	R
<b><u>Second Creek</u></b>									
0.30	10/24/2011	10:31	8.2	15	10	590	550	Dry	R
1.54	10/24/2011	10:17	8.1	14	9.6	300	190	Dry	R
5.11	10/24/2011	10:02	7.5	14	6.7	300	390	Dry	R
0.30	11/2/2011	12:00	8.0	13	11	640	730	Dry	R
1.54	11/2/2011	11:34	8.0	13	11	180	160	Dry	R
5.11	11/2/2011	11:19	7.5	14	7.6	260	280	Dry	R
0.30	12/12/2011	10:02	7.5	11	11	340	320	Dry	R
1.54	12/12/2011	09:45	7.8	11	10	380	300	Dry	R
5.11	12/12/2011	09:10	7.3	14	7.4	45	56	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**

**10/1/2011 Through 12/31/2011**

**Knoxville Utilities Board**

Water Quality Laboratory  
Debbie Ailey, Lab Supervisor  
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Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<b><u>Third Creek</u></b>									
0.87	10/25/2011	09:57	8.1	13	9.8	320	310	Dry	R
2.08E	10/25/2011	09:40	7.8	13	8.9	550	650	Dry	R
4.80W	10/25/2011	09:11	7.8	14	9.2	27	73	Dry	R
0.87	11/29/2011	11:14	7.8	11	9.7	2000	1300	Wet	R
2.08E	11/29/2011	10:00	7.2	12	9.8	5900	1700	Wet	R
4.80W	11/29/2011	09:17	7.2	12	9.3	1200	690	Wet	R
0.87	12/13/2011	09:46	7.9	12	10	170	150	Dry	R
2.08E	12/13/2011	09:30	7.5	13	9.3	27	26	Dry	R
4.80W	12/13/2011	09:16	8.0	12	9.6	54	100	Dry	R
<b><u>Fourth Creek</u></b>									
1.75	10/25/2011	10:49	8.1	14	10	140	300	Dry	R
2.79	10/25/2011	10:31	7.9	14	9.3	220	190	Dry	R
3.29	10/25/2011	10:20	8.1	14	10	99	58	Dry	R
1.75	11/14/2011	10:46	7.7	16	9.3	160	220	Dry	R
2.79	11/14/2011	11:01	7.9	16	8.7	370	250	Dry	R
3.29	11/14/2011	11:17	8.1	16	9.5	72	40	Dry	R
1.75	12/19/2011	11:25	7.9	12	11	180	250	Wet	R
2.79	12/19/2011	11:44	7.9	13	10	160	110	Wet	R
3.29	12/19/2011	12:06	8.0	13	11	45	68	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

10/1/2011 Through 12/31/2011

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	Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<b><u>Baker Creek</u></b>										
	0.36	10/20/2011	10:50	7.5	13	8.4	2100	1700	Wet	I
	0.53	10/20/2011	10:19	7.8	13	9.0	2600	1700	Wet	I
	1.45	10/20/2011	10:02	7.6	14	8.4	410	650	Wet	R
	0.36	11/29/2011	13:06	7.6	13	9.0	570	770	Wet	R
	0.53	11/29/2011	13:20	7.7	13	9.3	540	820	Wet	R
	1.45	11/29/2011	12:47	7.4	12	8.7	510	920	Wet	R
	0.36	12/27/2011	11:28	7.4	11	9.5	4000	> 2400	Wet	I
	0.53	12/27/2011	11:40	7.5	10	10	5300	> 2400	Wet	I
	1.45	12/27/2011	11:50	7.4	10	9.9	4000	2400	Wet	R
<b><u>Goose Creek</u></b>										
	0.40	10/10/2011	10:46	7.6	16	7.6	820	1400	Wet	I
	1.19E	10/10/2011	10:32	7.7	17	8.2	2600	2400	Wet	I
	1.80E	10/10/2011	10:38	7.8	16	8.7	1500	340	Wet	R
	0.40	11/1/2011	09:11	8.1	11	9.2	1800	2400	Dry	I
	1.19E	11/1/2011	09:19	7.9	11	9.9	450	520	Dry	R
	1.80E	11/1/2011	09:32	8.0	11	9.2	27	75	Dry	R
	0.40	12/21/2011	09:45	7.7	12	9.0	500	580	Wet	R
	1.19E	12/21/2011	09:31	7.8	13	9.4	24000	> 2400	Wet	I
	1.80E	12/21/2011	09:17	8.0	13	9.3	440	580	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

10/1/2011 Through 12/31/2011

**Knoxville Utilities Board**  
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	Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Precipitation Event	Status
<b><u>Loves Creek</u></b>										
	0.85	10/12/2011	10:05	7.5	17	7.5	590	770	Wet	R
	1.89	10/12/2011	09:51	7.2	16	6.8	560	690	Wet	R
	3.45	10/12/2011	09:35	7.6	17	7.7	370	440	Wet	R
	0.85	11/9/2011	09:47	7.1	13	9.0	320	310	Wet	R
	1.89	11/9/2011	09:16	7.4	14	8.8	81	86	Wet	R
	3.45	11/9/2011	09:05	7.8	13	9.9	140	69	Wet	R
	0.85	12/15/2011	09:39	7.5	13	9.7	110	93	Wet	R
	1.89	12/15/2011	09:20	7.3	13	8.6	54	55	Wet	R
	3.45	12/15/2011	09:11	7.8	12	9.7	110	88	Wet	R
<b><u>Williams Creek</u></b>										
	0.89	10/21/2011	09:02	7.9	14	9.5	2600	> 2400	Wet	R
	1.70	10/21/2011	08:49	7.7	15	8.7	2400	1700	Wet	R
	2.02	10/21/2011	08:40	7.7	16	8.6	820	580	Wet	R
	0.89	11/9/2011	10:35	7.7	14	10	99	110	Wet	R
	1.70	11/9/2011	10:51	7.5	15	8.0	140	140	Wet	R
	2.02	11/9/2011	11:06	8.0	16	8.9	260	160	Wet	R
	0.89	12/14/2011	10:19	7.8	13	10	270	190	Dry	R
	1.70	12/14/2011	10:35	7.7	13	9.5	380	280	Dry	R
	2.02	12/14/2011	10:47	7.9	14	9.8	520	410	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.

**Knoxville Utilities Board**  
Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
10/01/2010 Through 12/31/2011

**Table 1: 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	7/27/2010	Dry	8	23	8.2	11000	290	22.1	< 5
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	4/21/2011	Wet	9.2	15	7.8	1300	1100	N/A	N/A
Left Bank Tributary Above SM 0.36	5/25/2011	Dry	8.5	18	8.0	13000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	6/28/2011	Wet	7.7	20	8.5	8000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	7/21/2011	Wet	7.6	22	7.2	11000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	8/22/2011	Dry	7.7	22	8.0	16000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	9/28/2011	Wet	9.0	16	7.9	5300	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	10/20/2011	Wet	9.0	12	7.7	2000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	10/27/2011	Dry	8.6	13	7.7	2800	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36	11/29/2011	Wet	8.6	11	7.6	590	1600	N/A	N/A
Left Bank Tributary Above SM 0.36	12/27/2011	Wet	10.0	9	7.6	4000	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36 near Gilbert at McClung	3/24/2011	Wet	9.1	12	7.7	730	580	N/A	N/A
Left Bank Tributary Above SM 0.36 near Gilbert at McClung	10/20/2011	Wet	8.7	13	7.6	1000	920	N/A	N/A
Left Bank Tributary Above SM 0.36 near Gilbert at McClung	10/27/2011	Dry	8.5	15	7.6	530	160	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
Left Bank Tributary Above SM 0.36 near Mayfair Dr.	10/20/2011	Wet	9.5	12	8.0	4500	> 2400	N/A	N/A
Left Bank Tributary Above SM 0.36 near Mayfair Dr.	10/27/2011	Dry	9.1	14	7.9	3300	> 2400	N/A	N/A

## Knoxville Utilities Board

### Water Quality Monitoring Program

#### Investigative Water Quality Monitoring Report 10/1/2011 - 12/31/2011

**Table 2A: Goose 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)
Right Fork Above Site 1.19E	11/1/2011	11	10	8.3	90	260	N/A	N/A
Left Fork Above Site 1.19E	11/1/2011	9.3	11	8.0	590	580	N/A	N/A



## Knoxville Utilities Board

### Water Quality Monitoring Program

#### Investigative Water Quality Monitoring Report 10/1/2011 - 12/31/2011

**Table 2B: Goose Creek Wet Weather Investigative Sampling**

	Collection Date	Rainfall	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform
		inches	(mg/L)	(°C)	s.u.	(CFU/ 100mL)
Site 0.40	11/14/2011	0.00	8.8	15	7.6	290
	11/16/2011	1.25	9.2	15	8.2	28000
	11/17/2011	0.05	8.9	13	7.3	1900
	11/17/2011	0.05	9.0	13	7.6	1600
	11/18/2011	0.00	9.6	11	7.8	1900
Site 1.19E	11/14/2011	0.00	9.1	16	7.7	1100
	11/16/2011	1.25	8.8	14	7.7	28000
	11/17/2011	0.05	8.9	13	7.5	2100
	11/17/2011	0.05	9.3	13	7.6	3000
	11/18/2011	0.00	9.9	10	7.6	1400
Site 1.80E	11/14/2011	0.00	8.6	16	7.9	300
	11/16/2011	1.25	9.1	15	7.5	33000
	11/17/2011	0.05	9.0	13	7.6	910
	11/17/2011	0.05	9.2	14	7.6	370
	11/18/2011	0.00	9.9	11	7.8	150

**Knoxville Utilities Board**  
Water Quality Monitoring Program

Investigative Water Quality Monitoring Report  
10/1/2011 - 12/31/2011

**Table 3: Tributary to Fourth 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)
7441 Lawford Drive (Below SSO on 11/5/11 at Handsmore)	11/5/2011	7.2	11	8.5	55000	1200	N/A	N/A
7441 Lawford Drive (Below SSO on 11/5/11 at Handsmore)	11/21/2011	8.4	15	7.6	110	170	N/A	N/A



Water Quality Monitoring  
Report

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

**Knoxville Utilities Board**  
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**Event Date** 11/22/2011  
**Street Address:** 2885 Tazewell Pk.  
**Description:** Construction Failure

Ground to Soil Saturation and Trib to First Creek

**Estimated unrecovered volume** 1500 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
	11/22/2011	0.76	1.87

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	11/22/2011	14:28	8.5	17	7.9	22000	> 2400
Downstream of SSO Discharge	11/22/2011	14:35	7.5	17	7.6	56000	> 2400
Upstream of SSO Discharge	12/1/2011	10:25	10	9.3	9.2	430	610
Downstream of SSO Discharge	12/1/2011	10:36	10	9.0	9.0	500	1100



Water Quality Monitoring  
Report

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

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**Event Date** 12/13/2011  
**Street Address:** 1300 Alcoa Hwy.  
**Description:** Blockage Debris

Pavement to Storm Drain to Third Creek

**Estimated unrecovered volume** 650 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
	12/13/2011	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	12/14/2011	08:10	9.9	12	8.0	200	140
Downstream of SSO Discharge	12/14/2011	08:50	10	12	7.9	220	410

## **Appendix E**

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

## Fourth Quarter 2011 Unpermitted Discharge Data and Analysis

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

Of the five unpermitted discharges that occurred during the fourth quarter 2011, three were caused by heavy rainfall, one was due to construction failure, and one was due to blockage.

The table below summarizes events impacted by factors that were difficult to control or events that had minimal impact on the environment due to their low volume.

Category	Count
Mech/Elec. Failure	0
Vandalism	0
3-day rain > 4 in.	0
1-day > 3 in.	0
Vol 501 - 1000 gal	0
Vol < 500 gal.	2
Intensity > 0.84 in/hr	0

## Appendix E

### Unpermitted Discharges in 2011

Yellow	Overflow volume of 500 gallons or less	Orange	1-day rainfall greater than 3"
Green	Overflow volume of 501 - 1000 gallons	Grey	3-day rainfall greater than 4"
Pink	Vandalism	Blue	Intensity > 0.84 in/hr
Cyan	Electrical or mechanical failure		

Reporting Period	Date	Location	Event	Unrecovered	Receiving	Cause	Rainfall Totals		Peak Rainfall Intensity (in/hr)	Force Majeure event
				Volume (Gal.)	Stream		1-Day*	3-Day**		
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 Springs Road	Unpermitted Discharge	224,000	Knob Creek	Heavy Rainfall		0.25		
1st 2011	2/16/2011	512 Flenwood 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		
2nd 2011	4/16/2011	2004 Riverside Drive	Unpermitted Discharge	2000	Williams Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	6410 S Northshore Drive	Unpermitted Discharge	19000	Fourth Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	1500 Lyons Bend Road	Unpermitted Discharge	350000	Fourth Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	2536 Cecil Avenue	Unpermitted Discharge	24000	First Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	1411 Davanna Street	Unpermitted Discharge	1350	Second Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	4719 Old Broadway	Unpermitted Discharge	24500	First Creek	Heavy Rainfall	1.33	2.54	0.74	

Reporting Period	Date	Location	Event	Unrecovered Volume (Gal.)	Receiving Stream	Cause	Rainfall Totals		Peak Rainfall Intensity (in/hr)	Force Majeure event
							1-Day*	3-Day**		
2nd 2011	4/16/2011	3741 Eakers Street	Unpermitted Discharge	1900	Baker Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	2004 Neyland Drive	Unpermitted Discharge	20000	Tennessee River	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	600 N Gallaher View Road	Unpermitted Discharge	264000	Ten Mile Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/16/2011	2544 Fair Drive	Unpermitted Discharge	100	First Creek	Heavy Rainfall	1.33	2.54	0.74	
2nd 2011	4/18/2011	304 Seventh Avenue	Unpermitted Discharge	200	First Creek	Heavy Rainfall	0	1.33	0.74	
2nd 2011	4/21/2011	4505 Middlebrook Pike	Unpermitted Discharge	72000	Third Creek	Heavy Rainfall	0	0.26	0.15	
2nd 2011	4/28/2011	6410 S Northshore Drive	Unpermitted Discharge	8700	Fourth Creek	Heavy Rainfall	0.28	2.894	1.32	
2nd 2011	4/28/2011	3741 Eakers Street	Unpermitted Discharge	100	Baker Creek	Heavy Rainfall	0.28	2.894	1.32	
2nd 2011	4/28/2011	1500 Lyons Bend Road	Unpermitted Discharge	680000	Fourth Creek	Heavy Rainfall	0.28	2.894	1.32	
2nd 2011	4/28/2011	600 N Gallaher View Road	Unpermitted Discharge	36000	Ten Mile Creek	Heavy Rainfall	0.28	2.894	1.32	
2nd 2011	4/29/2011	6928 Westland Drive	Unpermitted Discharge	57000	Fourth Creek	Broken Sewer Main	0	2.894	1.32	
2nd 2011	5/9/2011	2639 Louise Avenue	Unpermitted Discharge	270000	Williams Creek	Blockage	0	0	0	
2nd 2011	6/6/2011	114 Tillery Drive	Unpermitted Discharge	7500	Second Creek	Broken System - Sag	0	0	0	
2nd 2011	6/7/2011	814 W Fourth Avenue	Unpermitted Discharge	5400	Second Creek	Blockage	0	0	0	
2nd 2011	6/24/2011	1411 Davanna Street	Unpermitted Discharge	100	Second Creek	Heavy Rainfall	2.09	2.93	1.37	
2nd 2011	6/24/2011	1216 Watercress Drive	Unpermitted Discharge	60	First Creek	Heavy Rainfall	2.09	2.93	1.37	
2nd 2011	6/29/2011	4014 Holston Hills Road	Unpermitted Discharge	200	Loves Creek	Heavy Rainfall	0	0	0	
3rd 2011	7/7/2011	800 Graves Street	Unpermitted Discharge	400	Williams Creek	Blockage	0.25	0.34	0.23	
3rd 2011	7/7/2011	2004 Riverside Drive	Unpermitted Discharge	1000	Williams Creek	Heavy Rainfall	0.25	0.34	0.23	
3rd 2011	7/11/2011	1313 Adair Drive	Unpermitted Discharge	Unknown	First Creek	Heavy Rainfall	***0	0	0	
3rd 2011	9/5/2011	1308 Adair Drive	Unpermitted Discharge	500	First Creek	Heavy Rainfall	3.6	4.07	0.71	
3rd 2011	9/5/2011	1903 Jefferson Avenue	Unpermitted Discharge	2700	First Creek	Heavy Rainfall	3.6	4.07	0.71	
3rd 2011	9/5/2011	1500 Lyons Bend Road	Unpermitted Discharge	1240000	Fourth Creek	Heavy Rainfall	3.6	4.07	0.71	
3rd 2011	9/6/2011	5011 Kingston Pike	Unpermitted Discharge	2000	Fourth Creek	Blockage	0.6	4.38	0.71	
3rd 2011	9/6/2011	6410 S Northshore Drive	Unpermitted Discharge	13000	Fourth Creek	Heavy Rainfall	0.6	4.38	0.71	
4th 2011	11/16/2011	1216 Watercress Drive	Unpermitted Discharge	200	First Creek	Heavy Rainfall	1.25	1.59	0.68	
4th 2011	11/22/2011	2885 Tazewell Pike	Unpermitted Discharge	1500	First Creek	Construction Failure	0.76	1.87	0.48	
4th 2011	11/28/2011	1500 Lyons Bend Road	Unpermitted Discharge	398650	Fourth Creek	Heavy Rainfall	1.91	2.59	0.25	
4th 2011	11/28/2011	1216 Watercress Drive	Unpermitted Discharge	150	First Creek	Heavy Rainfall	1.91	2.59	0.25	
4th 2011	12/13/2011	1300 Alcoa Highway	Unpermitted Discharge	650	Third Creek	Blockage	0	0	0	

\*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

\*\*\*Evidence that these overflows occurred was found some time following the actual event. The rainfall shown for these events correlate to the amount received on the date the events were reported to KUB.