

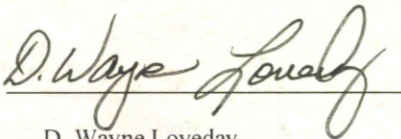
# Quarterly Progress Report

Volume 22

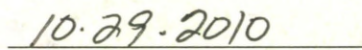
**Third Quarter Report**  
**July 1 through September 30, 2010**

**Submitted to EPA on October 29, 2010**

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



D. Wayne Loveday



Date



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# 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 second quarter of 2010 from July 1 through September 30. This is the twenty-second 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.

#### July 28, 2010

- Submitted to EPA – Annual CAP/ER Report 2010
- Submitted to EPA – Quarterly Progress Report 2<sup>nd</sup> quarter 2010
- Submitted to EPA – SEP Periodic Report 1<sup>st</sup> period 2010

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

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

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

### Requested Project Extensions and Changes

The following extensions were requested in the Annual CAP/ER Report 2010 submitted to EPA on July 28, 2010 and are awaiting approval.

Project and Reason	Original Completion Date	Revised Completion Date
<b>2-2 Lower Second Creek Replacement/Rehabilitation at Woodland</b> – 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. Providing six months for review and approval, the following schedule revisions are applied to this job: Fall 2010 - Bid and award construction project (270 day contract to substantial completion) Summer 2011 - Substantial Completion Due to the dependency on railroad approval, KUB is requesting an extension for the project into FY11/12. A letter has been sent to the railroad requesting the attention to this matter to be closed August 31, 2010.	<b>FY 08/09</b>  <b>FY 10/11</b> <b>(1<sup>st</sup> extension)</b>	<b>FY 11/12</b>
<b>3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project</b> – Constructability issues, property acquisitions, and permitting for this large diameter project require 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	<b>FY 09/10</b>  <b>FY 11/12</b> <b>(1<sup>st</sup> extension)</b>	<b>FY 12/13</b>

<p>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 consists of the replacement of 3,200 ft of 30" pipe with 36" pipe. Phase II consists of the replacement of 5,100 ft of 18-30" pipe with 36" diameter pipe. Design is 90% complete and property acquisitions/permitting are underway. The revised schedule is as follows:</p> <p>Phase I  Early 2011 - Bid and award  Late 2011 - Substantial completion</p> <p>Phase II  Late 2011 - Bid and award  Late 2012 - Substantial completion</p>		
<p><b>4-4 Northshore Drive Trunk Replacement Project</b> – 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 have required condemnation proceedings to obtain possession of easements on several properties along the route. The condemnation proceedings are scheduled to be complete by Fall 2010. The following construction schedule is expected:</p> <p>Fall 2010 - Bid and award  Summer 2011 - Substantial Completion  KUB is requesting a slight extension into FY 11/12 to provide for any additional challenges during construction.</p>	<p><b>FY 09/10</b></p> <p><b>FY 10/11 (1<sup>st</sup> extension)</b></p>	<p><b>FY 11/12</b></p>

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

All previously approved project extensions and changes are listed below.

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



- **3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project** – revised completion date is June 30, 2012. An additional extension to FY 12/13 was requested.
- **4-2 Gleason Drive Collector Rehabilitation Project** – revised completion date was June 30, 2010 and was completed as scheduled.
- **4-3 Middlebrook Pike Rehabilitation (Sub-basin 27C3)** – revised completion date was June 30, 2010 and was completed as scheduled.
- **4-4 Northshore Drive Trunk Replacement Project** – revised completion date is June 20, 2011. An additional extension to FY 11/12 was requested.
- **4-6 Shadyland Drive Rehabilitation (Sub-basin 36A2) Project** – revised completion date was June 30, 2010 and was completed as scheduled.

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

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

### **Ongoing Projects**

#### **First Creek**

1. **1-19 Edgewood Drive Rehabilitation Project** –Project is in design. The expected completion date for construction is June 2011. Project will be bid in November 2010.
2. **1-21 College Park Rehabilitation Project** –Project is in design. The expected completion date for construction is June 2012. Project will be bid in November 2010.
3. **1-23 Oglewood Avenue Rehabilitation Project** –Project is in design. The expected completion date for construction is June 2011. Project will be bid in November 2010.
4. **1-26 Cherry Street Rehabilitation Project** –Project is in design. The expected completion date for construction is June 2013. Project will be bid in November 2010.

#### **Second Creek**

1. **2-2 Lower Second Creek Replacement/Rehabilitation at Woodland** –Design is complete for the northern section, and railroad permits are being acquired. Construction has been completed for the southern portion of this project. Due to the dependency on railroad approval, KUB has requested an additional extension for the project into FY11/12. The remaining phase of the project has been bid with an anticipated start date of December 2010. The project duration is 365 days.
2. **2-16 1600 Block Elm Street Rehabilitation Project** - Design is complete and construction is underway.

#### **Third Creek**

1. **3-6 Interstate 40 and Middlebrook Pike Trunk Sewer Replacement** – Project is in design. Constructability issues, property acquisitions, and permitting for this large diameter project required that an additional extension be requested to extend completion until FY 12/13.
2. **3-7 Neyland Drive Trunk Replacement** – Design is complete. Original scope has changed from replacement work along Neyland Drive to work on the existing trunk south

of Tyson Park extending northwest along Third Creek. Construction has begun at the Third Creek siphon and will continue up to Tyson Park.

3. **3-14 McKamey Road Interconnection Project** - Project is in preliminary engineering.
4. **3-15 Ball Camp Pike Improvement Project** - Project is in preliminary engineering.
5. **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 is requesting changing the scope of the project to rehabilitation (find and fix) of collection system in mini-basins 28B1 and 34A2. 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.
6. **3-20 Citico Street Rehabilitation Project** – Project is in design.
7. **3-21 Deerfield Road Rehabilitation Project** – Project is in design.
8. **3-23 Hillvale Circle Rehabilitation Project** – Project is in design.
9. **3-24 Montgomery Avenue Rehabilitation Project** – Project is in design.
10. **3-27 Montgomery Avenue Rehabilitation Project** - Project is in preliminary engineering.
11. **3-29 Highland Hills Road Rehabilitation Project** – Project is in design.

#### **Fourth Creek**

1. **4-4 Northshore Drive Trunk Sewer Replacement** – Construction should commence in the 1st quarter 2011. Design is complete and condemnation procedures of several commercial properties along the route will be finalized on November 12, 2010. This will provide only approximately 270 days to complete the project. Additional time was requested to extend the project to allow some overlap into FY11/12. Project will be bid in October 2010. The duration of the contract will be 365 days.
2. **4-19 Northshore Drive Rehabilitation Project** - Project is in preliminary engineering.
3. **4-21 Black Bear Road Project** - Project is in preliminary engineering.
4. **4-23 5205 Bent River Blvd Project** - Project is in preliminary engineering.
5. **4-24 Kerri Way Project** - Project is in preliminary engineering.
6. **4-25 Lonas Drive Project** - Project is in preliminary engineering.
7. **4-26 Midpark Drive Project** - Project is in preliminary engineering.
8. **4-27 Southfork Project** - Project is in preliminary engineering.
9. **4-28 Queensridge Pump Station Upgrade Project** – Project is in preliminary engineering.
10. **4-31 Kingston Pike @ Gallaher View Project** - Project is in preliminary engineering.

#### **South Knox**

1. **S-15 Trunk Replacement in Sub-basin 40A2 Project** – Construction is underway.
2. **S-21 Alpine Avenue Rehabilitation Project** - Project is in preliminary engineering.

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

1. **L-2 Boyds Bridge Pike and Holston Hills Trunk Replacement** – Construction is underway. The expected completion date for construction is June 2011, one year ahead of schedule.
2. **L-4 Asheville Highway Rehabilitation** – Design is complete. Project will bid in November 2010. The expected completion date for construction is June 2011.



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

#### **Williams Creek**

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

## **Completed Projects**

#### **First Creek**

1. **Fountain Road** - Upsized 3,700 ft of gravity sewer using open cut and pipe bursting methods. Replaced manholes and services.
2. **Fair Drive Phase II** - Rehabilitated 3691 ft and replaced 2,458 ft of existing 8-12" gravity sewer along Fair Drive.
3. **Greenfield Lane** - 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. **First Creek Sub-basins 3 and 4 Rehabilitation** – Rehabilitated 26,500 ft of line and replaced 10,500 ft. Project included CCTV, smoke testing, and manhole inspections.
6. **Lower First Creek Storage** - Designed and built 5 million gallon (MG) wet-weather storage tank to control sewer overflows near North Hoitt Avenue during rain events.
7. **Upper First Creek Storage** - Designed and built 9 MG wet-weather storage tank to control sewer overflows near Old Broadway during rain events.
8. **Fountain City Trunkline Replacement** - 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. **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. **First Creek 8A1** - 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.

#### **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 260 ft and 3 MHs; CIPP was used to rehab 140 ft.
3. **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.
4. **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.
5. **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.
16. **2-21 Morelia Avenue Rehabilitation Project** – Replaced 382 ft of 8" sewer and two manholes. Rehabbed three manholes, 2375 ft of 8" sewer using CIPP, and reinstated 74 laterals.

### Third Creek

1. **Mynderse, Western, and Canna** - Replaced approximately 1,700 ft of 8" sewer and pipe-burst approximately 3400 ft of 8" up to 10" and 12" pipe to address wet-weather capacity restrictions resulting in overflows near Pleasant Ridge Road.
2. **Third Creek 28B1\*** - Investigated rehabilitation needs for collectors in mini-basin 28B1 (approximately 7900 ft of pipe). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair. Plans are being developed for a future rehabilitation project. No construction is planned in the short-term.  
\*The project named Third Creek 28B1 replaces Third Creek 28C1 that appeared in the Quarterly Progress Report for the Second Quarter 2005. After additional studies, it was determined that flows from 28B1 more likely contributed to overflows along Sutherland Avenue and North Bellemeade, as listed in the SSOER.
3. **Third Creek Storage** - Designed and constructed 4.5 MG wet-weather storage tank to control sewer overflows near Western Avenue and Third Creek Road during rain events.

4. **Upper McKamey Trunk Sewer Replacement** – Project replaced approximately 1600 ft of 12" and 15" trunk sewer. This project further enhanced improvements already made in Third Creek to address overflows along McKamey Road.
5. **Third Creek Basin 11** – Assessed and rehabilitated approximately 129,657 ft in sub-basin 11. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
6. **Third Creek Road Trunk Sewer Replacement** – Project included approximately 3,100 ft of 24" and 30" trunkline. The project replaced and upgraded the trunkline from Western Avenue along Third Creek to the Third Creek storage facility. It addressed overflows occurring at 5600 Western Avenue. Project was extended approximately 2,000 ft to reach the new location of the Third Creek Storage Facility at the KUB Hoskins Center.
7. **Third Creek Basin 9 Phase I** – Assessed and rehabilitated collector sewer in 9A1, 9A2, 9A4, and 9D1 (CAP/ER Scope).
8. **Third Creek Basin 9 Phase II** - Designed rehabilitation methods for collectors in Sub-basin 9 (approximately 177,900 ft). Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
9. **3-11 Sutherland Avenue Collector Rehabilitation Project (Sub-basin 28B1)** – Replaced 303 ft of existing sewer and rehabilitated 3,332 ft of existing sewer collectors in mini-basin 28B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
10. **3-12 Clinch and 21st Street Collector Rehabilitation Project (Sub-basin 35B3)** – Replaced approximately 2,563 ft of existing sewer, rehabilitated 3,094 ft and replaced/rehabbed 25 manholes.
11. **3-8 Third Creek Bike Trail Trunk Replacement** – Improvements to improve the sewer hydraulics were made at the connection of the 12" main to a 36" trunk sewer running south of Sutherland Avenue along Third Creek bike trail. Improvements included approximately 50 feet of 12" line and a new manhole. Additionally, rehabilitation in SB 28B1 has reduced the peaks to the 12" line.
12. **3-22 Fountain Drive Rehabilitation Project** – Replaced approximately 750 ft of existing sewer, rehabilitated 800 ft and replaced/rehabbed 9 manholes.
13. **3-25 Rolling Ridge Interconnection Project** - Pump station was decommissioned and 1,950 ft of new gravity sewer was installed to divert flow from the station into existing gravity sewer.

#### **Fourth Creek**

1. **Pinebrook Drive Sewer Replacement** – Replaced 330 ft of 8" gravity sewer partially exposed by erosion of the bank of the adjacent drainage channel.
2. **Walker Springs Rehabilitation (Mini-Basin 32A4)** – Performed find, and design work in Mini-basin 32A4 in the Walker Springs area. Inspection included 43,000 ft of smoke testing, 43,000 ft of CCTV, and 228 manhole inspections. Plans will be developed for future rehabilitation work.
3. **Walker Springs Storage** – Designed and constructed 3.25 MG wet-weather storage tank to control sewer overflows near Walker Springs Pump Station during rain events.
4. **Papermill Drive Phases I, II, and III** – Designed and constructed replacement of approximately 4,000 ft of 15", 18", and 2,100 ft of 36" sewer in the Papermill Drive area to increase conveyance capacity and reduce sewer overflows.
5. **4-1 Chukar Road Rehabilitation** – Replaced 1,600 ft of pipe and nine manholes; rehabbed 900 ft of pipe and nine manholes.
6. **4-2 Gleason Road Rehabilitation** – Replaced 980 ft of 8" pipe and 12 manholes. CIPP was used to rehab 640 ft of 8" pipe and 480 ft of 12" pipe.
7. **4-3 Middlebrook Pike Rehabilitation** – Replaced 190 ft of 8" pipe and two manholes. CIPP was used to rehab 2,000 ft of 8" pipe. Two manholes were rehabbed as well.

8. **4-6 Shadyland Drive Rehabilitation** – Replaced 1,700 ft of 10” pipe and 9 manholes. CIPP was used to rehab 1,000 ft.

#### **South Knox**

1. **Maryville Pike** – Designed and replaced 800–1,200 ft of 24” sewer located in Witherspoon Superfund site. Design rerouted sewer around site.
2. **South Haven Phase I and Phase II** – Relocated, rehabilitated, and upsized approximately 4,700 ft of existing collector sewers to increase conveyance capacity and reduce inflow and infiltration (I/I).
3. **Island Home Rehabilitation** – Rehabilitated 9,400 ft and replaced 1,200 ft of collector sewers to reduce I/I.
4. **East Ford Valley Rehabilitation** – Rehabilitated approximately 16,000 ft of sewers in Mini-basin 41A4. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
5. **Stone Road Rehabilitation** – Rehabilitated approximately 13,500 ft of sewers in Mini-basin 41B1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
6. **South Haven Rehabilitation Phase III** – Rehabilitated approximately 21,700 ft of sewers in Mini-basin 40F1. Project included inspection (CCTV, smoke test, manhole inspections), design, and rehabilitation of lines requiring repair.
7. **Ginnbrook Pump Station** – Evaluated pump station and force main to ensure adequate capacity. Also included improvements to wet-well, pump system, and valve vault. The force main was re-routed.
8. **Neubert Springs Collector and West Ford Valley Trunk Rehabilitation** – Rehabilitated 10,000 ft of 15” to 18” trunk sewer along West Ford Valley Road. Completed find work in sub-basins 41C1, 41C2, and 41A2. Completed trunkline rehabilitation on West Ford Valley. Rehabilitated collector line in sub-basin 41C1, C2, and A2.
9. **Mini-basin 41A6 Rehabilitation Project** – Rehabilitated approximately 21,000 ft of sewer in sub-basin 41A6.
10. **Blount Avenue Trunkline and Goose Creek Siphon Upgrade** – The trunkline upgrades between the siphon inlet structure and manhole 63-2 are complete. This work was included in phases I and II of the Blount Avenue Trunkline Replacement/ Rehabilitation Project. This construction successfully addressed historical overflows.
11. **S-6 Sevier Avenue and Jones Street Collector Project** – Rehabilitated approximately 3,100 ft of existing sewer and rerouted approximately 352 ft of 8” sewer.
12. **S-9 Ellis Road Rehabilitation Project** – Rehabilitated 2,250 ft of gravity sewer and replaced 6 MHs.
13. **S-11 Ford Valley Pump Station Rehabilitation Project** – Replaced pump station and added additional pump and generator to convey two-year storm within CAP requirements.
14. **S-20 Avenue A Rehabilitation Project** – CIPP was used to rehabilitate 1,585 ft of sewer. Seven manholes were rehabilitated, and 25 service lines were replaced.
15. **S-26 Trunk Sewer Replacement Project in Sub-basin 40F1** – This project was constructed as part of the South Haven Phase III work. Replaced 704 ft of 8” sewer and six manholes. Five laterals were reinstated.

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

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

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

#### **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.

## **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.

Following pilot plant operation of the Biologically Enhanced High Rate Clarification (BEHRC) at the Kuwahee WWTP in the first quarter of 2010, BEHRC pilot testing was successfully completed at the Fourth Creek WWTP. During the testing at Fourth Creek, representatives from both EPA and TDEC were provided a project update presentation and field observation of the BEHRC pilot plant in operation.

Data collected and analyzed during the pilot studies confirmed that greater than 85 percent total suspended solids and total CBOD/BOD removal could be achieved through the BEHRC process at both the Kuwahee and Fourth Creek WWTPs. The results of the pilot testing are currently under evaluation by the process engineering team to confirm design parameters. Based on the performance of the BEHRC pilot system, BioWin models have also been updated for both WWTPs to evaluate the predicted impacts of the BEHRC system on the existing biological treatment system.

Construction of the Kuwahee WWTP CCP Phase I Improvements are being managed to allow for sequencing of work and coordination of new construction, demolition of existing facilities, and maintenance of plant operations. The first two areas of construction of the CCP Phase I improvements made significant progress this quarter. Construction was completed on upgrades to the existing primary sludge gravity thickener. Construction of the emergency stand-by generator building also progressed on schedule with an anticipated final completion date by the end of 2010.

Incorporating the result of the 2009 Chemically Enhanced Primary Treatment (CEPT) pilot results and the current BEHRC work, preliminary design of the remaining Kuwahee WWTP CCP Phase I improvements were initiated. A draft preliminary design report was recently completed defining the design criteria and conceptual layout of permanent CEPT facilities, a new gravity sludge thickener and related on-site piping and storage modifications. Design and construction activities for all of the Kuwahee WWTP CCP Phase I Improvements are on schedule to meet the approved CCP Implementation Plan.

Design of CCP tasks continues. Review of 60% design sets is in progress. Schedule is being tracked so all milestones are accomplished. CDM and KUB continue to work together to derive engineering solutions for the requirements of the CCP.

## Section 3 Process Controls Program

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

The Process Controls Program (PCP) was initiated 11 times during this reporting period resulting in one Diversion event (at Kuwahee 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 Annual CAP/ER Report 2010

Consent Decree language, page 24: *“On an annual basis, beginning on July 30, 2006, KUB shall submit a report which shall include specific dates for beginning and completing all work identified in both the Phase 1 CAP/ER and Phase 2 CAP/ER for the upcoming twelve (12)-month period.”*

On July 28, 2010, KUB submitted the Annual CAP/ER Report 2010 to EPA. This deliverable was not subject to the Public Review Requirement of Section VI.A.2, but was available for public comment from July 28, 2010, until August 17, 2010. No comments were received during that period. Accompanying the submission was the request to extend the schedules for the following projects; 2-2 Lower Second Creek Replacement/Rehabilitation at Woodland, 3-6 Interstate 40 and Middlebrook Pike Trunk Replacement Project, and 4-4 Northshore Drive Trunk Replacement Project.

#### 6.1.2 Quarterly Progress Report Second Quarter 2010

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

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

#### 6.1.3 SEP Periodic Report First Period 2010

Consent Decree language, page 61: *“While the SEP is being planned and implemented, KUB shall submit semiannual reports to the Parties describing the progress of the SEP up to and during the most recent Calendar Quarter within one*

*(1) Month after the end of the second and fourth Calendar Quarters following the Date of Entry.”*

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

## **6.2 Violations Subject to Stipulated Penalties**

During this reporting period, KUB incurred six 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 third quarter 2010 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	7/5/2010	3808 West Blount Avenue	Blockage
Unpermitted discharge	7/15/2010	2201 Highland Avenue	Blockage
Unpermitted discharge	8/16/2010	1104 McCalla Avenue	Broken pipe
Unpermitted discharge	8/16/2010	815 South Central Street	Heavy rainfall
Unpermitted discharge	9/11/2010	1411 Davanna Street	Heavy rainfall
Unpermitted discharge	9/12/2010	5915 Neubert Springs Road	Electrical failure

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

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

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

### 7.1 SSOs

Appendix B lists all SSOs that occurred during this reporting period. During this period, there were 23 SSO events. Of that number, nine were due to blockage, four were due to broken pipe, three were due to a residential grinder pump failure, three were due to heavy rainfall, two were due to construction failure, one was due to mechanical failure, and one was due to electrical failure. Of the 23 SSO events, 16 were in the 0 – 1000 gallons volume range, four were in the 1001 – 10,000 range, and three events totaled greater than 10,000 gallons. Durations for events during this period are as follows: 12 ranged from 0 – 2 hours, seven ranged from 2.1 - 5 hours, and four were greater than 5 hours. If an event is found after the overflow has stopped it is sometimes difficult to estimate volume and duration. In those instances, unknown is entered for volume and duration.

### 7.2 Building Backups

Appendix C lists all Building Backups that occurred during this reporting period. During this period, there were two Building Backups. One was due to construction failure, and one was due to blockage.

### 7.3 Bypasses

No Bypasses occurred during this reporting period.

### 7.4 Diversions

Table 2 contains all Diversion event information that occurred during this reporting period. During this reporting period, there was one Diversion at Kuwahee, and none at Fourth Creek, Loves Creek, and Eastbridge WWTPs.

### 7.5 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 was one Effluent Limit Violation at Kuwahee, and none at Fourth Creek, Loves Creek, or Eastbridge WWTPs.

**Table 2: Bypasses and Diversions**

WWTP	Did an event occur?	Type of Event	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	No											
Kuwahee	Yes	Diversion	9/11/2010	14:00			9/11/2010	3.50	2.9	3.50	2.9	High flow event due to excess rainfall
Loves Creek	No											
Eastbridge	No											

**Table 3: Effluent Limit Violations**

WWTP	Did an event occur?	Date	Parameter	Type	Limit	Value
Kuwahee	Yes	8/16/2010	Semi-Annual Biomonitoring	Chronic Ceriodaphnia	5% Minimum	2.3%
Fourth Creek	No	-	-	-	-	-
Loves Creek	No	-	-	-	-	-
Eastbridge	No	-	-	-	-	-
SS - Settleable Solids		mg/l - milligrams per liter				
TSS - Total Suspended Solids		cfu –Colony Forming Unit				
ml/l – milliliters per liter		lbs - Pounds				

## Section 8 Water Quality Monitoring Data

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

### 8.1 Sampling Conducted and Results

Appendix D lists all sampling that was conducted during the reporting period and the results thereof. In addition to routine monitoring in all creeks, and responding to Sanitary Sewer Overflows (SSO), KUB Water Quality Personnel conducted investigative and/or source sampling in First, Second, Third, Fourth, Baker, Williams and Goose Creeks during this quarterly period. KUB continued to utilize RT-PCR Bacteroides analysis on selected routine samples to investigate high *E. coli* counts when necessary.

#### First Creek

KUB submitted select samples from First Creek routine monitoring for bacteroides testing because of elevated *E. coli* counts during the first quarter. An updated Routine Monitoring Report for this stream from last quarter has been included with this water quality monitoring report. (The bacteroides results were not available last quarter.) Source testing indicated low levels of human bacteriodes in one of the three samples collected at Site 6.33. Although the National Weather Service Site only recorded a trace amount of rain on the day of sampling, rain gauges near the stream recorded almost 0.5 inches on 6/14/10. This would have significantly impacted run-off to the stream and makes the low source of human bacteriodes difficult to pinpoint.

This quarter, samples with high *E. coli* counts were also submitted for bacteroides testing and a significant amount of human source was revealed at Site 1.74 on 8/16/10, prompting further investigation of the area. No apparent cause could be identified, but rain gauges located within this basin revealed that greater than one inch of localized rain fell in this particular area the day of sampling. Again this would have brought run-off from a wide spread area to the stream. Routine monitoring of First Creek on 9/3/10 showed a significant drop in bacteriological counts. Monitoring will continue and additional source testing will be conducted.

#### Second Creek

Bacteriological results for this creek were low and/or met the water quality standard during most of this quarter at the routine monitoring sites. At least two of the samples collected on 9/28/10 have been submitted for bacteriodes testing, since the *E. coli* counts were elevated. These will not be available until next quarter.

KUB conducted a dry weather walk of the stream last quarter and was able to identify three areas that are currently under further investigation (See Second Creek Table 1A). Two areas near stream miles 3.8 and 5.5 were resampled again this quarter and submitted for source testing (See Second Creek Table 1B). The resampling near stream mile 3.8 did not show any elevated *E. coli* counts during the quarter, but will continue to be checked. Sampling above mile location 3.8 before the stream goes underground last quarter did not reveal any problems. At this time the suspect area appears to be underground.

Although inconsistent, some evidence of high bacteriological counts also continues to be seen above stream mile 5.5. Additional monitoring this quarter seems to indicate that the



left tributary that joins the stream in this area needs further investigation. Several laterals were dye tested in this area previously, but no apparent problems have been identified.

KUB is also working with the City of Knoxville Stormwater group to identify the problem coming from the stormwater pipe around mile 1.0.

#### Third Creek

Routine monitoring samples with elevated counts during this quarter were submitted for Bacteroides testing, but no evidence of human source was detected. Bacterioides results for those samples collected on 9/27/2010 will not be available until the next quarter.

An SSO occurred at 2201 Highland Avenue on 7/15/10 that was subsequently reported as an unpermitted discharge because a portion of the discharge entered the storm drain. On the day of the event, Water Quality personnel attempted to trace the discharge and determine where the material might have reached Third Creek but were unable to do so. The material entered the storm system approximately a half mile away and only 100 gallons went unrecovered. If it reached the stream it would have likely impacted the water after a rainfall event. Routine monitoring on Third Creek was conducted on 7/21/10 during the next wet weather period and subsequently tested for human Bacteroides as a precaution. No evidence of human source was identified.

#### Fourth Creek

All bacteriological results for this creek were low and/or met the water quality standard during this quarter. No human source testing was initiated. A potential water quality concern was investigated on 8/4/2010 due to a customer concern (Table 2), but it was not sewer related. The turbid water conditions were a result of water main leak, which was identified by the level of fluoride in the tap water. The leak was repaired and the customer was notified.

#### Loves Creek

KUB submitted select samples from Loves Creek routine sampling for bacteroides testing because of elevated *E. coli* counts during the first quarter. (These results were not available for the last report.) Source testing indicated the presence of human bacterioides in two of the three samples (Table 3), which prompted further investigation of the area. No apparent cause could be identified, but rain gauges located within this basin revealed that over 0.4 inches of rain fell within a two-hour period in the area. This could have brought run-off from a widespread area to the stream. Routine monitoring of Loves Creek during this quarter showed low counts as normal during both wet and dry weather conditions.

#### Baker Creek

Routine monitoring and human source testing data did not reveal any sewer impacts to this stream this quarter. One routine sample at site 0.36 collected on 9/21/10 has been submitted for source testing, but results will not be available until the next quarter. KUB also sampled a tributary that enters Baker Creek just above the routine site 0.36 three times this quarter (Table 4). Occasional high counts during wet weather at site 0.53 and 0.36 prompted this additional investigative sampling. Fecal results from the tributary on 7/27/10 were elevated so the sample was submitted for bacteroides analysis, but no evidence of human source was apparent. Investigation of a potential small, inconsistent source directly in or around this area will continue, especially during wet weather conditions.

### Goose Creek

During the last two quarters the bacteriological results for this creek have continued to be unusually low. In July sample Site 1.19 was analyzed for typical corrosion metals and fluoride to further investigate the situation. Although none of the corrosion metal levels were elevated, the fluoride was slightly higher (0.6 mg/l) than typical ground or wastewater concentrations. The stream was further sampled and a water main leak was discovered near Ogle Avenue and subsequently repaired by KUB. A review of the situation indicates a break in the main likely occurred during the cold winter months and went unnoticed. Bacteriological counts in the stream have returned to more normal levels this quarter, and elevated fecal and *E.coli* counts, which were observed during routine monitoring, were submitted for bacteroides analysis. However, no evidence of human source was apparent.

### Williams Creek

Water quality personnel continue to submit routine monitoring samples for bacteroides testing due to elevations in fecal coliform counts around Site 2.02. Although inconsistent, some evidence of human source continues to be seen during wet weather conditions in this area. Two additional samples at Routine Site 2.02 were collected as additional follow-up to the 7/15/10 routine monitoring under differing weather conditions, and submitted for bacteroides analysis. However, no evidence of human source was apparent. Sampling of the two tributaries just above this location was also conducted at the same time (Table 5). Only under wet weather conditions was the human bacterioides component evident and it appeared to be tied primarily to the left fork or tributary. However, some slight evidence of human source was apparent under dry weather conditions during the routine monitoring on the 9/7/2010, so further investigation of the left fork is underway.

Lateral repairs are still continuing in some areas of Williams Creek, which may address some of these smaller and inconsistent water quality impacts over the coming months.

## **8.2 Projected Data Collection**

During the fourth quarter of 2010, 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 fourth quarter of 2010:

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

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

In the fourth quarter of 2010, KUB will conduct Wet Weather investigations on Goose Creek and Fourth Creek as weather permits.

## **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	McCampbell 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 replacements (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

## Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
68	vented manhole cover replacement (39D2)	Manhole Cover	South Knox / Knob Creek	Kuwahee	13,333	Project Complete
69	Comprehensive Rehabilitation 19A2	Comprehensive Rehabilitation	Williams Creek	Kuwahee	521,631	Project Complete
70	17B1 Manhole Replacement	Find & Fix Gravity Main	1st Creek	Kuwahee	1,803	Project Complete
71	Vine Middle School sewerline Rehab (24D1)	Find & Fix Gravity Main	1st Creek	Kuwahee	23,491	Project Complete
72	Comprehensive Rehabilitation (08B2)	Comprehensive Rehabilitation	1st Creek	Kuwahee	841,370	Project Complete
73	Third Creek Storage Tank (21A1)	Storage Tank	3rd Creek	Kuwahee	4,000,000	Project Complete
74	Comprehensive Rehabilitation (19A1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	313,938	Project Complete
75	Comprehensive Rehabilitation (19B1)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	328,300	Project Complete
76	Comprehensive Rehabilitation (10B1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	191,698	Project Complete
77	Comprehensive Rehabilitation (10C1)	Comprehensive Rehabilitation	2nd Creek	Kuwahee	67,840	Project Complete
78	Disconnected Stormwater Detention Pond Sevier Ave (40C1)	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	97,333	Project Complete
79	Sub Basin 63 Sinking Creek Drainage rehabilitation (63)	Comprehensive Rehabilitation	South Knox / Knob Creek	Loves Creek	72,110	Project Complete
80	West Ford Valley Trunkline replacement (41A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	236,704	Project Complete
81	Blount Avenue Trunkline Replacement (39A1)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	225,376	Project Complete
82	Brookvale Point Repairs (02A3)	Find & Fix Gravity Main	1st Creek	Kuwahee	52,079	Project Complete
83	Park Pump Point Repairs (45)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	11,522	Project Complete
84	Wayland Road Storage Tank (67)	Storage Tank	Loves Creek	Loves Creek	20,000	Project Complete
85	Comprehensive Rehab (19A3)	Comprehensive Rehabilitation	Williams Creek	Kuwahee	325,090	Project Complete
86	Comprehensive Rehab (41A2)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	39,330	Project Complete
87	Comprehensive Rehab (41A5)	Comprehensive Rehabilitation	South Knox / Knob Creek	Kuwahee	119,327	Project Complete
88	Jersey Ave sewer rehabilitation (SubBasin 23)	Find & Fix Gravity Main	1st Creek	Kuwahee	419	Project Complete
89	East Magnolia sewer rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	846	Project Complete
90	Walker Blvd Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	1086	Project Complete
91	Kingston Court Sewer Rehabilitation (SubBasin 29)	Find & Fix Gravity Main	3rd Creek	Kuwahee	3727	Project Complete
92	Clinch Ave Sewer Rehabilitation (SubBasin 30)	Find & Fix Gravity Main	1st Creek	Kuwahee	442	Project Complete
93	Badgett Drive Sewer Rehabilitation (SubBasin 22)	Find & Fix Gravity Main	3rd Creek	Kuwahee	214	Project Complete
94	Dickson Street Sewer Rehabilitation (SubBasin 20)	Find & Fix Gravity Main	Loves Creek	Loves Creek	417	Project Complete
95	W New Street Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	2844	Project Complete
96	Rennoc Rd Sewer Rehabilitation (SubBasin 4)	Find & Fix Gravity Main	1st Creek	Kuwahee	2853	Project Complete
97	Spicewood Lane Sewer Rehabilitation (SubBasin 13)	Find & Fix Gravity Main	3rd Creek	Kuwahee	216	Project Complete
98	Chapman Highway Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	212	Project Complete
99	McCroskey Ave Sewer Rehabilitation (SubBasin 17)	Find & Fix Gravity Main	1st Creek	Kuwahee	1,076	Project Complete
100	East 5th Ave Sewer Rehabilitation (SubBasin 24)	Find & Fix Gravity Main	1st Creek	Kuwahee	447	Project Complete
101	Simms Rd Sewer Rehabilitation (SubBasin 39)	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,955	Project Complete
102	Maynard Ave Sewer Rehabilitation (SubBasin 16)	Find & Fix Gravity Main	1st Creek	Kuwahee	423	Project Complete
103	Minibasin 10B1 & 10C1 find & fix	Find & Fix Gravity Main	2nd Creek	Kuwahee	15,689	Project Complete
104	Third Creek Trunkline Replacement	Find & Fix Gravity Main	3rd Creek	Kuwahee	483,793	Project Complete
105	Disconnected Stormwater 15' discharge pipe Island Home blvd	Disconnect Storm Sewer	South Knox / Knob Creek	Kuwahee	1,720,000	Project Complete
106	Paved Manhole Rehabilitation 40A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	20,140	Project Complete
107	Paved Manhole Rehabilitation 40F2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	6,515	Project Complete
108	Paved Manhole Rehabilitation 40G1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,571	Project Complete
109	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	2,576	Project Complete
110	Paved Manhole Rehabilitation 03C1	Find & Fix Gravity Main	1st Creek	Kuwahee	3,615	Project Complete
111	Paved Manhole Rehabilitation 02A1	Find & Fix Gravity Main	1st Creek	Kuwahee	6,491	Project Complete
112	Paved Manhole Rehabilitation SB 38	Find & Fix Gravity Main	3rd Creek	Kuwahee	5,797	Project Complete
113	Paved Manhole Rehabilitation 18A1	Find & Fix Gravity Main	1st Creek	Kuwahee	4,540	Project Complete
114	Paved Manhole Rehabilitation 39E1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	34,671	Project Complete
115	Paved Manhole Rehabilitation 39D1	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	8,000	Project Complete
116	Paved Manhole Rehabilitation 39A2	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	13,335	Project Complete
117	Paved Manhole Rehabilitation 39C3	Find & Fix Gravity Main	South Knox / Knob Creek	Kuwahee	26,670	Project Complete
118	Broken Manhole Lid Replacement (67)	Find & Fix Gravity Main	Loves Creek	Loves Creek	26,666	Project Complete
119	Manhole Replacement (61)	Find & Fix Gravity Main	Loves Creek	Loves Creek	2,304	Project Complete
120	Woodbine Ave 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

Capital Projects and Rehabilitation Credits

	Project Name	Credit Type	Basin	WWTP	Credits Banked (gpd)	Status
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

## **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
7/5/2010	9:59 AM	3808	WEST BLOUNT AVENUE	KUW	South Knoxville	39	Broken Sewer Lateral	Broken Lateral to Wet Weather Conveyance to Storm Drain Culvert to Unnamed Tributary to Goose Creek	Goose Creek	The sewer main was flushed to remove the blockage caused by grease and debris.	13,000	5500	7500	24	Yes
7/11/2010	11:30 AM	415	FORESTAL DRIVE	KUW	First Creek	8	MH 7-91	Pavement to Ditch to Soil Saturation and Recovery		The sewer main was flushed to remove the blockage caused by grease.	200	100	100	2	No
7/13/2010	11:33 AM	4605	CROSBY DRIVE	KUW	Third Creek	28	Lateral Cleanout	Lateral Cleanout to Soil Saturation		The sewer main was flushed to remove the blockage caused by roots and grease.	1,450	0	1,450	2	No
7/15/2010	8:17 PM	2201	HIGHLAND AVENUE	KUW	Third Creek	29	MH 9-29	Pavement to Storm Drain to Third Creek	Third Creek	The sewer main was flushed to remove the blockage caused by debris.	100	0	100	1	Yes
7/25/2010	9:28 AM	5363	BENT RIVER BOULEVARD	FC	Fourth Creek	43	Residential Grinder Pump	Wet Well to Soil Saturation		There was a mechanical failure of the residential grinder pump.	200	0	200	4	No
7/28/2010	6:30 PM	8530	CROSSWIND LANDING LANE	EB	Northeast Knox	110	Wet Well	Wet Well to Soil Saturation		The SSO was caused by a vacuum pump malfunction within the pump station.	3,000	0	3,000	5	No
7/29/2010	6:11 PM	720	WOODVIEW DRIVE	KUW	Second Creek	5	MH 35-2	Soil Saturation		The sewer main was flushed to remove the blockage caused by roots.	2	0	2	1	No
8/2/2010	3:22 PM	4503	MCGINNIS ROAD	EB	Northeast Knox	113	Broken Force Main	Soil Saturation		The SSO was caused by a broken sewer main.	15	0	15	3	No
8/3/2010	2:40 PM	2641	MARYVILLE PIKE	KUW	South Knoxville	45	Residential Grinder Pump	Wet Well to Soil Saturation		There was a mechanical failure of the residential grinder pump.	20	0	20	4	No
8/3/2010	3:29 PM	2636	MARYVILLE PIKE	KUW	South Knoxville	45	MH 10-2	Soil Saturation		The SSO was caused by a failure of a construction bypass pumping system.	60	0	60	0.15	No
8/9/2010	1:58 PM	6401	OLD VALLEY ROAD	KUW	South Knoxville	41	MH 67-3	Soil Saturation		The sewer main was flushed to remove the blockage caused by debris.	35	0	35	3	No
8/12/2010	9:20 AM	4351	FALCONITE WAY	KUW	Third Creek	13	MH 10	Soil Saturation and Recovery		The SSO was caused by a broken pipe.	7,500	4,000	3,500	24	No
8/16/2010	12:28 PM	1104	MCCALLA AVENUE	KUW	First Creek	24	MH 11-1	Pavement to Storm Drain to First Creek	First Creek	There was a partial blockage in the sewer main caused by a broken pipe and influenced by heavy rainfall.	1,000	0	1000	2	Yes
8/16/2010	1:25 PM	815	SOUTH CENTRAL STREET	KUW	First Creek	30	MH 3-7	Pavement to Storm Drain to First Creek	First Creek	Rainfall in the area produced I & I and high flows in sewer mains.	250	0	250	0.5	Yes
8/16/2010	3:52 PM	2706	MYNDERSE AVENUE	KUW	Third Creek	22	MH 18-3	Pavement to Soil Saturation		The sewer main was flushed to remove the blockage caused by grease and influenced by heavy rainfall.	50	0	50	1	No
8/26/2010	12:15 PM	800	BENNETT PLACE	FC	Fourth Creek	32B	Broken Sewer	Soil Saturation		The sewer main was flushed to remove the blockage caused by debris.	7,750	1,000	6,750	24	No
8/27/2010	6:23 PM	1700	EVENING SHADE LANE	FC	Fourth Creek	37	Broken Force Main	Broken Force Main to Pavement		The SSO was caused by a broken force main.	10	5	5	3	No
8/30/2010	10:15 AM	5307	BENT RIVER BOULEVARD	FC	Fourth Creek	43	Residential Grinder Pump	Wet Well to Soil Saturation		There was a mechanical failure of the residential grinder pump.	15	0	15	1	No
9/6/2010	6:54 PM	8083	KINGSTON PIKE	FC	Fourth Creek	32	MH 9-4	Subsurface to ditch to soil saturation and recovery		The sewer main was damaged during a gas main installation.	24,000	22,000	2,000	48	No
9/11/2010	11:18 AM	1411	DAVANNA STREET	KUW	Second Creek	15	MH 8	Pavement to ditch to storm drain to Second Creek and Soil Saturation	Second Creek	Rainfall in the area produced I & I and high flows in sewer mains.	1,000	0	1,000	1	Yes
9/11/2010	3:30 PM	1408	ADAIR DRIVE	KUW	First Creek	7	MH 26	Soil Saturation		Rainfall in the area produced I & I and high flows in sewer mains.	60	0	60	1	No
9/12/2010	2:00 AM	5915	NEUBERT SPRINGS ROAD	KUW	South Knoxville	41	Unnamed MH at Facility	Ground to swale to Knob Creek and soil saturation	Knob Creek	The SSO was caused by temporary electrical power failure during high rainfall event.	294,000	0	294,000	3.5	Yes
9/26/2010	7:45 AM	906	BATHURST ROAD	FC	Fourth Creek	32	MH 4-23	Soil Saturation		Their was a partial blockage in the sewer main caused by roots and influenced by heavy rainfall	5	0	5	1	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)
7/16/2010	2:28 AM	1700	CLINCH AVENUE	KUW	Second Creek	35a	BBU	The service lateral was not reconnected to the sewer main during construction.	500	500	0	4
7/22/2010	6:00 PM	1317	LOUISIANA AVENUE	KUW	Second Creek	15	BBU	The sewer main was flushed to remove the blockage caused by roots.	500	500	0	3

## **Appendix D**

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



Water Quality Monitoring  
Report

Spill Impact Sampling Results  
Water Quality Monitoring Program

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

**Event Date** 7/5/2010

**Street Address:** 3808 Blount Ave.

**Description:** 3808 Blount Ave. (Broken Sewer Lateral ) previously reported as 3800 Blount Ave. There was a partial blockage caused by grease and debris.

**Estimated unrecovered volume** 7,500 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
	7/5/2010	0	0

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	7/5/2010	11:44	7.8	23	7.5	< 10	< 1
Downstream of SSO Discharge	7/5/2010	11:55	7.8	23	7.5	55,000	1200
Upstream of SSO Discharge	7/14/2010	12:10	7.9	23	7.6	45	36
Downstream of SSO Discharge	7/14/2010	12:23	7.9	23	7.9	< 10	150



Water Quality Monitoring  
Report

Spill Impact Sampling Results  
Water Quality Monitoring Program

Knoxville Utilities Board  
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835 East Jackson Avenue  
Knoxville, Tennessee 37915  
(865) 594-8286 Fax: (865)594-8245

**Event Date** 9/12/2010  
**Street Address:** 5916 Neubert Spring Rd.  
**Description:** Power Failure to pump station.

R. Underwood responded put out two signs.

**Estimated unrecovered volume** 300,000 gallons

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

Precipitation (McGhee-Tyson Airport)	Date	Total - Day of Event	Total - Prior 4 Days
	9/12/2010	0	1.74

Sample Location	Sample Date	Sample Time	Dissolved Oxygen	Temperature (Celsius)	pH	Fecal Coliform	E-Coli (MPN)
Upstream of SSO Discharge	9/12/2010	05:20	6.5	20	7.5	33000	2400
Downstream of SSO Discharge	9/12/2010	05:30	6.7	19	7.7	20000	1400
Upstream of SSO Discharge	9/22/2010	13:30	6.9	19	7.7	400	360
Downstream of SSO Discharge	9/22/2010	13:45	6.3	19	7.7	3	290



## Routine Water Quality Monitoring Report

**4/1/2010 Through 6/30/2010**

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

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>First Creek</u></b>											
1.74	4/12/2010	10:41	8.1	15	11	240	570	N/A	N/A	Wet	R
2.57	4/12/2010	11:19	8.0	15	11	99	220	N/A	N/A	Wet	R
6.33	4/12/2010	10:57	7.9	14	11	350	360	N/A	N/A	Wet	R
1.74	5/12/2010	09:50	8.1	17	8.5	280	2400	51.4	< 5	Dry	R
2.57	5/12/2010	10:03	8.1	17	8.6	1400	1000	56.7	< 5	Dry	I
6.33	5/12/2010	10:20	7.8	16	8.0	5200	1300	28.2	< 5	Dry	I
1.74	6/14/2010	10:27	8.1	23	7.7	1200	550	N/A	N/A	Dry	R
2.57	6/14/2010	10:10	8.2	22	7.9	730	980	27.0	< 5	Dry	I
6.33	6/14/2010	10:00	7.8	20	7.3	1700	> 2400	10.0	7.7	Dry	I

\*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**

**7/1/2010 Through 9/30/2010**

**Knoxville Utilities Board**

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

Creek Mile #	Sample Date	Sample Time	pH	Sample Temp (C)	Dissolved Oxygen (mg/l)	Fecal Coliform (CFU/100 ml)	E. Coli (MPN)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>First Creek</u></b>											
1.74	7/13/2010	11:20	7.5	23	7.9	2800	870	N/A	N/A	Wet	R
2.57	7/13/2010	11:09	7.8	22	8.0	2800	820	N/A	N/A	Wet	R
6.33	7/13/2010	09:50	7.3	22	6.5	29000	> 2400	50.6	< 5	Wet	I
1.74	8/16/2010	12:42	8.3	26	7.8	> 60000	> 2400	253	53.5	Dry	R
2.57	8/16/2010	12:30	8.0	26	7.8	48000	> 2400	141	< 5	Dry	R
6.33	8/16/2010	12:15	7.8	26	7.9	23000	> 2400	164	5.3	Dry	I
1.74	9/3/2010	10:00	7.5	20	7.9	360	260	N/A	N/A	Dry	R
2.57	9/3/2010	09:43	7.6	19	8.7	370	260	N/A	N/A	Dry	R
6.33	9/3/2010	09:32	7.6	20	5.8	420	440	N/A	N/A	Dry	R
<b><u>Second Creek</u></b>											
0.30	7/29/2010	11:05	7.9	22	8.1	1700	690	N/A	N/A	Wet	R
1.54	7/29/2010	10:53	8.0	23	8.1	2200	770	N/A	N/A	Wet	R
5.76	7/29/2010	10:15	7.2	17	2.6	41000	290	1140	< 5	Wet	R
0.30	8/30/2010	11:10	7.9	22	8.7	9	3	N/A	N/A	Dry	R
1.54	8/30/2010	10:50	7.7	22	8.5	390	150	N/A	N/A	Dry	R
5.76	8/30/2010	10:05	7.3	17	6.0	140	23	N/A	N/A	Dry	R
0.30	9/28/2010	11:32	8.0	18	9.0	2300	> 2400	N/A	N/A	Wet	R
1.54	9/28/2010	11:16	7.9	17	8.4	8000	1300	N/A	N/A	Wet	R
5.76	9/28/2010	10:41	7.2	17	5.5	200	520	N/A	N/A	Wet	R

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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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Third Creek</u></b>											
0.87	7/21/2010	09:44	8.3	22	8.0	1000	340	N/A	N/A	Wet	R
2.08E	7/21/2010	10:00	7.9	23	6.2	2400	2000	35.2	< 5	Wet	I
4.80W	7/21/2010	10:12	8.3	19	7.7	340	290	N/A	N/A	Wet	R
0.87	8/18/2010	13:37	8.3	23	8.4	1100	410	N/A	N/A	Dry	R
2.08E	8/18/2010	13:28	6.5	24	8.0	7000	820	7.0	< 5	Dry	R
4.80W	8/18/2010	13:10	7.9	20	10.3	350	390	N/A	N/A	Dry	R
0.87	9/27/2010	12:47	7.5	19	7.8	> 6000	> 2400	N/A	N/A	Wet	R
2.08E	9/27/2010	12:32	7.5	19	7.8	23000	> 2400	N/A	N/A	Wet	I
4.80W	9/27/2010	12:20	7.8	17	8.2	2600	> 2400	N/A	N/A	Wet	R
<b><u>Fourth Creek</u></b>											
1.75	7/20/2010	14:23	7.8	23	8.2	400	270	N/A	N/A	Wet	R
2.79	7/20/2010	14:09	7.2	21	8.5	510	200	N/A	N/A	Wet	R
3.29	7/20/2010	13:57	8.2	20	9.0	500	220	N/A	N/A	Wet	R
1.75	8/10/2010	10:14	7.9	22	8.7	27	330	N/A	N/A	Dry	R
2.79	8/10/2010	10:26	8.0	20	9.0	81	230	N/A	N/A	Dry	R
3.29	8/10/2010	10:35	8.2	20	9.5	180	220	N/A	N/A	Dry	R
1.75	9/15/2010	09:59	7.8	18	8.5	950	440	N/A	N/A	Dry	R
2.79	9/15/2010	09:45	7.8	18	9.1	320	460	N/A	N/A	Dry	R
3.29	9/15/2010	09:32	8.1	17	9.0	380	440	N/A	N/A	Dry	R

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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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Baker Creek</u></b>											
0.36	7/27/2010	09:24	7.8	20	7.6	1700	450	N/A	N/A	Dry	R
0.53	7/27/2010	09:42	8.1	23	8.7	2100	920	N/A	N/A	Dry	R
1.45	7/27/2010	09:15	8.1	19	8.6	3400	2000	14.3	< 5	Dry	I
0.36	8/23/2010	13:29	7.8	20	7.5	1800	1300	5.3	< 5	Wet	I
0.53	8/23/2010	13:48	7.8	21	7.9	1500	730	N/A	N/A	Wet	R
1.45	8/23/2010	13:18	8.0	20	8.3	1400	> 2400	< 5	< 5	Wet	I
0.36	9/21/2010	10:42	7.8	19	7.6	22000	> 2400	N/A	N/A	Dry	I
0.53	9/21/2010	11:00	8.1	19	8.0	3600	2400	N/A	N/A	Dry	R
1.45	9/21/2010	10:27	8.0	18	8.2	2300	1300	N/A	N/A	Dry	I
<b><u>Goose Creek</u></b>											
0.40	7/22/2010	12:22	7.5	23	6.9	1900	490	N/A	N/A	Wet	R
1.19E	7/22/2010	12:11	7.9	24	7.6	< 10	2	N/A	N/A	Wet	R
1.80E	7/22/2010	11:50	8.0	21	8.0	210	460	N/A	N/A	Wet	R
0.40	8/19/2010	12:27	7.7	22	6.7	30000	440	44.0	< 5	Wet	R
1.19E	8/19/2010	12:39	7.9	22	7.5	46000	> 2400	19.3	< 5	Wet	I
1.80E	8/19/2010	12:57	8.1	20	7.9	9000	1000	12.6	< 5	Wet	R
0.40	9/3/2010	09:07	6.5	20	7.5	2100	980	15.3	< 5	Dry	R
1.19E	9/3/2010	08:57	7.8	19	7.8	1400	1400	N/A	N/A	Dry	I
1.80	9/3/2010	08:51	7.8	18	8.5	2800	360	N/A	N/A	Dry	R

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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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Loves Creek</u></b>											
0.85	7/14/2010	08:40	7.6	20	7.8	360	310	N/A	N/A	Wet	R
1.89	7/14/2010	08:55	7.3	20	7.9	72	310	N/A	N/A	Wet	R
3.45	7/14/2010	09:07	7.8	21	6.6	360	430	N/A	N/A	Wet	R
0.85	8/10/2010	13:12	7.9	24	8.3	560	380	N/A	N/A	Dry	R
1.89	8/10/2010	12:57	7.6	23	7.9	36	170	N/A	N/A	Dry	R
3.45	8/10/2010	12:47	7.8	27	7.0	260	84	N/A	N/A	Dry	R
0.85	9/15/2010	10:59	7.9	19	8.3	820	440	N/A	N/A	Dry	R
1.89	9/15/2010	10:40	7.4	19	7.7	570	200	N/A	N/A	Dry	R
3.45	9/15/2010	10:29	7.7	20	7.5	270	280	N/A	N/A	Dry	R

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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)	Total Bacteroides (mg/L)	Human Bacteroides (mg/L)	Precipitation Event	Status
<b><u>Williams Creek</u></b>											
0.89	7/15/2010	10:00	7.7	19	8.6	1500	320	N/A	N/A	Wet	R
1.70	7/15/2010	09:46	7.4	18	7.5	140	360	N/A	N/A	Wet	R
2.02	7/15/2010	09:35	7.5	21	7.8	5300	320	26.7	< 5	Wet	R
2.02	7/22/2010	14:35	9.0	27	7.8		> 2400	62.9	< 5	Wet	I
2.02	7/23/2010	10:09	7.8	22	7.3		460	N/A	N/A	Dry	R
0.89	8/25/2010	11:08	7.9	20	8.7	570	150	N/A	N/A	Dry	R
1.70	8/25/2010	11:00	7.7	19	7.2	1000	1000	5.1	< 5	Dry	R
2.02	8/25/2010	10:49	8.0	21	7.4	3000	1300	9.7	< 5	Dry	I
0.89	9/7/2010	10:32	7.8	18	9.2	1000	360	N/A	N/A	Dry	R
1.70	9/7/2010	10:17	7.4	18	7.6	1000	610	N/A	N/A	Dry	R
2.02	9/7/2010	09:55	8.0	19	7.8	> 60000	> 2400	24.6	7.4	Dry	I

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## Water Quality Monitoring Program

### Investigative Water Quality Monitoring Report

04/01/2010 Through 06/30/2010

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

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

**Knoxville Utilities Board**  
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**Table 1B: Second Creek Investigative Sampling**

	Collection Date	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform	E. coli	Total Bacteriodes	Human Bacteriodes
		(mg/L)	(°C)	s.u.	(CFU/ 100mL)	(MPN)	(mg/L)	(mg/L)
~300 yards Upstream from Routine Site 5.76 (behind IHOP)	7/29/2010	8.4	25	7.2	53000	> 2400	23.3	< 5
	8/30/2010	4.0	17	7.0	170	71	N/A	N/A
	9/28/2010	4.5	16	7.1	1100	77	N/A	N/A
Left pipe looking downstream at Routine Site 5.76 (in front of IHOP)	7/29/2010	6.9	17	7.6	16000	2400	23.7	9
	8/30/2010	8.8	18	8.0	910	300	N/A	N/A
	9/28/2010	7.8	16	7.5	1500	520	N/A	N/A
Dry Weather Walk #15 - Emergence from under interstate at approximate stream mile 4.0	7/29/2010	9.0	20	8.0	3800	180	N/A	N/A
	8/30/2010	9.1	18	8.2	72	54	N/A	N/A
	9/28/2010	9.2	17	8.0	730	650	N/A	N/A

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**Table 2: Fourth Creek Investigative Sampling**

	Collection Date	Fluoride	Dissolved Oxygen	Water Temp	Water pH	Fecal Coliform
		(mg/L)	(mg/L)	(°C)	S.U.	(CFU/ 100mL)
7011 Lawford Rd. Trib to Fourth Creek	8/4/2010	0.49	6.7	26	7.8	380
7319 Bellingham Rd.Trib to Fourth Creek	8/4/2010	0.51	6.6	26	7.8	180

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**Table 3: Loves 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)
Routine Site 0.85	6/9/2010	Wet	7.8	20	7.9	1000	> 2400	46.7	126.8
Routine Site 1.89	6/9/2010	Wet	7.7	21	7.6	6400	> 2400	35.3	5.8
Routine Site 3.45	6/9/2010	Wet	7.4	22	7.9	23000	> 2400	16	<5



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### Water Quality Monitoring Program

#### Investigative Water Quality Monitoring Report 07/01/2010 Through 09/30/2010

**Table 4: Baker Creek Investigative Sampling**

	Collection Date	Collection Time	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 0.36	7/27/2010	9:37	Dry	8.0	23	8.2	11000	290	22.1	< 5
Left Bank Tributary Above 0.36	8/23/2010	15:40	Wet	7.4	23	7.7	1500	440	N/A	N/A
Left Bank Tributary Above 0.36	9/21/2010	10:49	Dry	7.2	20	7.6	3700	2000	N/A	N/A

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**Table 5: Williams Creek Investigative Sampling**

	Collection Date	Weather Condition	Dissolved Oxygen	Water Temp	Water pH	E. coli	Total Bacteriodes	Human Bacteriodes
			(mg/L)	(°C)	s. u.	(MPN)	(mg/L)	(mg/L)
Left Fork Above 2.02 - Sample 1	7/22/2010	Wet	7.7	27	8.6	>2400	51.4	5.6
Left Fork Above 2.02 - Sample 2	7/22/2010	Wet	7.9	27	8.6	>2400	55.1	13.1
Right Fork Above 2.02 - Sample 1	7/22/2010	Wet	7.8	27	8.7	>2400	48.6	<5
Right Fork Above 2.02 - Sample 2	7/22/2010	Wet	7.9	28	8.9	>2400	66.9	<5
Left Fork Above 2.02 - Sample 1	7/23/2010	Dry	7.4	22	7.8	440	N/A	N/A
Left Fork Above 2.02 - Sample 2	7/23/2010	Dry	8.2	21	7.8	410	N/A	N/A
Right Fork Above 2.02 - Sample 1	7/23/2010	Dry	8.4	25	7.8	730	N/A	N/A
Right Fork Above 2.02 - Sample 2	7/23/2010	Dry	8.1	22	7.8	1400	30.2	<5

## **Appendix E**

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

## Third Quarter 2010 Unpermitted Discharge Data and Analysis

Appendix E lists any SSO that occurred during the third quarter 2010 that resulted in an unpermitted discharge along with its cause, volume, one- and three-day rainfall totals, and rainfall intensity.

Three of the six unpermitted discharges were caused or influenced by heavy rainfall. During the reporting period there were two significant rainfall events that produced rainfall rates of 1.1 and 1.36 inches per hour, respectively.

One discharge was caused by an electrical failure at a pump station during a storm event. The high volume discharged during this event was due to a submerged level control device. In the short period of time between the initial power failure and the generator coming on, the pump station wetwell filled quickly due to inflow and infiltration. The level control device was submerged when the generator power came on and was unable to reference a true echo, resulting in a false reading causing the pumps to stop.

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	1
Vandalism	0
3-day rain > 4 in.	0
1-day > 3 in.	0
Vol 501 - 1000 gal	2
Vol < 500 gal.	2

