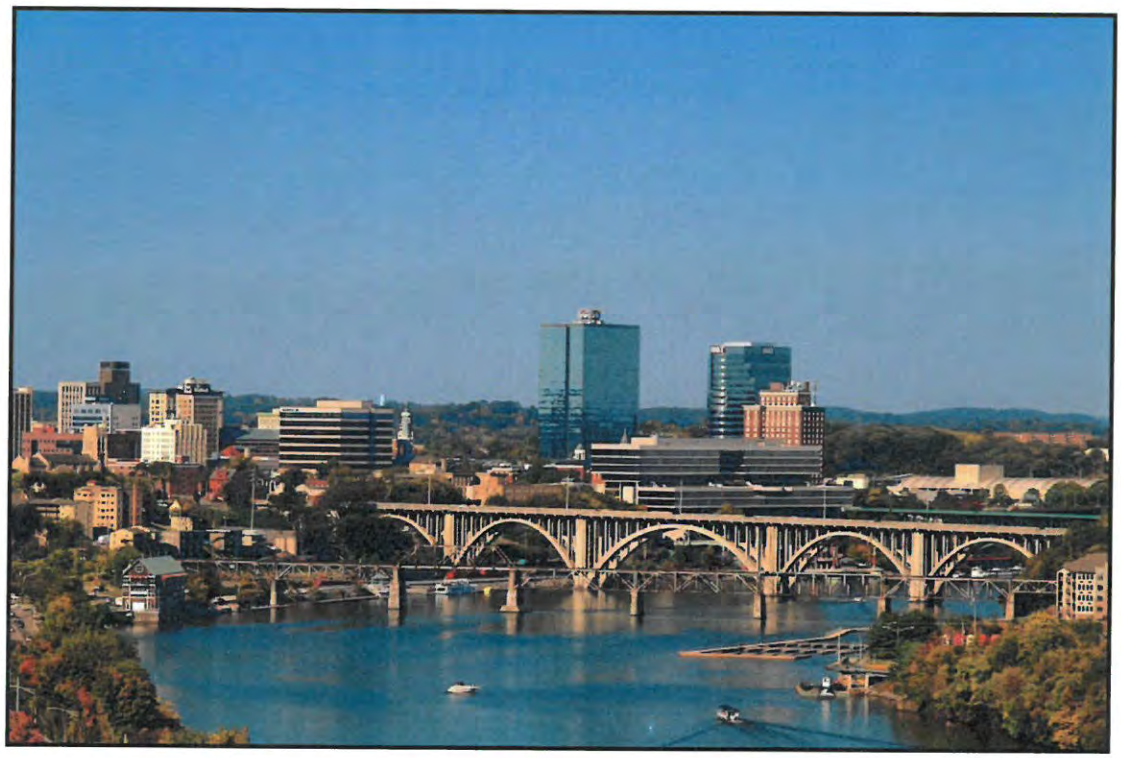
THE CITY OF KNOXVILLE
TENNESSEE

NPDES Permit
Annual Report and Reapplication



National Pollutant Discharge Elimination System
Stormwater Discharge Permit TNS068055
July 1, 2015 - June 30, 2016

CITY OF KNOXVILLE

CITY OF KNOXVILLE

Engineering
James R. Hagerman, P.E.
Director of Engineering

December 15, 2016

Mr. Michael Atchley
Tennessee Department of Environmental and Conservation
Division of Water Pollution Control
3711 Middlebrook Pike
Knoxville, TN 37921

RE: City of Knoxville, NPDES MS4 Permit # TNS068055
2015 – 2016 Annual Report & Reapplication

Dear Mr. Atchley:

The City of Knoxville is pleased to submit the twelfth annual report for the NPDES permit issued July 1, 2004. This annual report summarizes the NPDES activities during the twelve-month period of July 1, 2015 through June 30, 2016. The annual report was coordinated and prepared by the Engineering Department in conformance with the reporting requirements in the City's NPDES Permit Part VI.

If you have any questions or wish to discuss any of the NPDES Permit programs, please contact me by email at dhagerman@cityofknoxville.org or by phone at (865) 215-3251.

Sincerely,

David Hagerman, P.E., Stormwater Management

CC: Mr. Vojin Janjic

City County Building • Room 480 • 400 Main Street • P.O. Box 1631 • Knoxville, Tennessee 37901
Office: 865-215-2148 • Fax: 865-215-2631
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CITY OF KNOXVILLE

Engineering
James R. Hagerman, P.E.
Director of Engineering

December 15, 2016

Mr. Vojin Janjic
Tennessee Department of Environmental and Conservation
Division of Water Pollution Control
401 Church Street
L & C Annex, 6th Floor
Nashville, TN 37243-1534

RE: City of Knoxville, NPDES MS4 Permit # TNS068055
2015 – 2016 Annual Report & Reapplication

Dear Mr. Janjic:

The City of Knoxville is pleased to submit the twelfth annual report for the NPDES permit issued July 1, 2004. This annual report summarizes the NPDES activities during the twelve-month period of July 1, 2015 through June 30, 2016. The annual report was coordinated and prepared by the Engineering Department in conformance with the reporting requirements in the City's NPDES Permit Part VI.

If you have any questions or wish to discuss any of the NPDES Permit programs, please contact me by email at dhagerman@cityofknoxville.org or by phone at (865) 215-3251.

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David Hagerman, P.E., Stormwater Management

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Signature and Certification

NPDES STORMWATER PERMIT TNS068055
2015/2016 MUNICIPAL ANNUAL REPORT & REAPPLICATION

FOR: City of Knoxville, Tennessee

Federal regulations, 40 CFR 122.22 (a) (3) and 122.22 (d), require the application and reports for the NPDES permit to be signed and certified as follows:

> *For a municipality, State, Federal, or other public facility, by either a principal executive officer or ranking elected official.*
>
> *"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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering 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."*

Madeline Rogero
Mayor

12/15/16
Date

James R. Hagerman, P.E.
Director of Engineering

12/14/16
Date

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1.0 INTRODUCTION

In 1996, the Tennessee Department of Environment and Conservation (TDEC), Division of Water Pollution Control first issued the City of Knoxville a Phase 1 National Pollutant Discharge Elimination System (NPDES) Individual Permit (TNS068055) for the discharge of stormwater from the municipal separate storm drain system (MS4). Stormwater from the City of Knoxville discharges directly to the Tennessee River and to major creeks that drain to the Tennessee River. Only a small portion of the MS4 runoff drains to sinkholes, ponds, and lakes throughout the area. The current permit was approved and made effective July 1, 2004 and expired June 30, 2009. Although the City submitted a reapplication in December 2008 in the Year Four annual report, a revised reapplication is included in Appendix A of this year's report.

The NPDES Permit requires an annual progress report for the Stormwater Management Program (SWMP) as outlined in the Part 1 and Part 2 applications. This annual report was completed in accordance with the reporting requirements of Part VI of the permit and will complete the requirements for the permit year from July 1, 2015 through June 30, 2016.

The Stormwater Division of the City of Knoxville Engineering Department coordinated preparation and submittal of the system-wide annual report. Information for the annual report has been provided by the Engineering Department, the Public Service Department, and the Solid Waste Management office. The Engineering Department has compiled the available information into the format outlined in Part VI of the current NPDES Permit.

2.0 CONTACTS LIST

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Chad Weth, Director Public Service Department	(865) 215-2060	cweth@knoxvilletn.gov

Mailing Address: City of Knoxville
P.O. Box 1631, Suite 480
400 Main Street
Knoxville, TN 37901

3.0 STORMWATER MANAGEMENT PROGRAM (SWMP) EVALUATION

The objective of the City of Knoxville's SWMP is to protect the taxpayer's health, safety, and welfare through an economically viable comprehensive stormwater quality and quantity program. Although it would be impossible to list all of the City's water quality related accomplishments in this report, the City is proud to report some of the major accomplishments related to the SWMP that occurred during the twelfth year of this NPDES permit term.

- During the 2015-2016 permit year, the City installed a new pump and circulation system at Fountain City Lake. An operational Pond Management Plan has been finalized. Also during this permit year, a constructed wetland project was initiated for the lake to improve water quality.

Fountain City Lake

- The City's overall South Waterfront plan calls for creation of a continuous 3-mile-long public riverwalk. With a section completed at City View and sections being built at Suttree Landing Park, River's Edge, Riverfront Station and Riverwalk at the Bridges, more than one mile of new waterfront greenway is under construction or soon will be under construction. Construction on Suttree Landing Park portion shown below began in July 2015 and includes a 2,000-foot-long section of the riverwalk and a new tree-lined Waterfront Drive offering direct access to the park.

Suttree Landing Park

- The 27th annual River Rescue took place April 11, 2016. This event was coordinated by Ijam's Nature Center. The Spring 2016 River Rescue attracted 634 volunteers who collected 12.5 tons of trash and 78 tires from the shores of the Tennessee River and its tributaries.

- The City coordinated with the Knox County Sheriff's Department volunteers to remove over 76 tons of trash and debris from the city's drainage systems. The volunteers donated over 760 hours of labor in 12 locations, resulting in approximately $13,600 of savings to the City of Knoxville.

- A tributary of Second Creek along Banks Avenue was successfully restored after being placed in a culvert nearly half a century ago. The City of Knoxville contracted S&ME to provide design and construction support services for the replacement of approximately 200 feet of deteriorated 48" corrugated metal storm drain pipe with a more natural stream condition. The stream restoration resulted in a series of step pools to control the steep slope and provide aquatic habitat. The project also created a vegetated Riparian Buffer Zone (RBZ) to protect the stream. A bat pole was included to provide habitat and alleviate any concerns of mosquitoes. The Banks Avenue Regenerative Stream Restoration Project was honored by the American Association of Engineering Companies of Tennessee with an Honors Award at their award ceremony on March 8, 2016.

Banks Avenue pipe removal and stream restoration project

Since the stormwater quality program officially started in 1996, the City has defined a baseline to compare future surface water improvements and/or degradations. Although the continuing improvements are incremental and difficult to measure quantitatively, many programs initiated since the inception of this program have undeniably improved surface water quality throughout the City. The long-term results are becoming more apparent each year. Many of the SWMP tasks were implemented beyond the minimum requirements when economically feasible.

4.0 STORMWATER MANAGEMENT PROGRAM SUMMARY TABLE

SWMP activity summary tables for the last year of the NPDES permit program were compiled in accordance with the reporting requirements specified in Part VI(A)(2)(c) of the permit and are included on following pages.

4.0 Stormwater Management Program Summary Table

MONITORING TASKS WET/DRY WEATHER	SCHEDULE OF ACTIVITIES	SCHEDULE FOLLOWED	ACTIVITIES ACCOMPLISHED	COMMENTS
Repeat High Parameter Sites	2 Outfalls repeated	Yes	2	Each outfall tested at least four times this year
Field Screening Industrial Outfalls	Visits to Industrial outfalls	Yes	79	Continued retesting outfalls from Industrial areas (four times)
Total Field Screening Outfalls	150 Outfalls	Yes	198	All field data sheets available for inspection. Outfalls tested four times this year. Summary in Appendix
Full Suite Stormwater Analysis (one station per year)	One Station / year	Yes	1 sample	Full Suite sample obtained at Love Creek Monitoring Station.
Storm Samples at 5 monitoring stations	1 sample / quarter / 5 sites	Yes	20 samples	Summer: 5 samples, Fall: 5 samples, Winter: 5 samples, Spring: 5 samples
Ambient Samples at 5 monitoring stations	1 sample / quarter / 5 sites	Yes	20 samples	Summer: 5 samples, Fall: 5 samples, Winter: 5 samples, Spring: 5 samples
Storm Drain Televised	As Needed	Yes	6476 ft	Pipes are defined as sections between inlets, catch basins, junction boxes, or outlets.

STORMWATER MANAGEMENT & INDUSTRIAL PROGRAM TASKS	SCHEDULE OF ACTIVITIES	SCHEDULE FOLLOWED	ACTIVITIES ACCOMPLISHED	COMMENTS
Stormwater Quantity Requests for Service (Received / Resolved)	As Needed	Yes	798/669	Complaints are investigated as received and resolved as solutions or resources are available
Stormwater Quality Requests for Service (Received / Resolved)	As Needed	Yes	199/143	Complaints are investigated as received and resolved as solutions or resources are available
Site Development Workshop/Professional Training	Annually	Yes	460	Included Engineers, contractors, developers, & surveyors involved in land disturbing activities.
Stormwater GIS Field Investigations for Annexations	As Required	Yes	0	Newly annexed areas are investigated within 60 days for all storm drain features and possible pollution sources.

4.0 Stormwater Management Program Summary Table

STRUCTURAL CONTROLS	SCHEDULE OF ACTIVITIES	SCHEDULE FOLLOWED	ACTIVITIES ACCOMPLISHED	COMMENTS
Street Cleaning	Daily/Bi-Weekly	Yes	21,599 Miles	Daily for downtown streets. Frequency varies for other streets.
Litter Pick-up, Hand	As Needed	Yes	117,417 Bags	Routine Schedule
Catch Basin Cleaning and Repair	As Needed	Yes	1,659 Jobs	Per work order and requests
Ditching: Hand, Truck, & Track/Gradall	As Needed	Yes	9,960 Feet	Per work order and requests
Storm Drain Installation & Repair	As Needed	Yes	40 Jobs	Per work order and requests
Brush & Leaf Pick-up	Bi-Weekly	Yes	11,236 Loads	Bi-Weekly curb pick-up
Seed/Sod, ROW	As Needed	Yes	57 Jobs	Per work order and requests
Storm Drain Cleaning	As Needed	Yes	19,610 Feet	Per work order and requests
Grate Replacement	As Needed	Yes	113 Jobs	As Needed
Field Inventory & Inspection of On-Site Detention Facilities	Within 60 Months	Yes	180 visits	All new facilities are mapped after construction is complete. Existing facility's inventory is complete.
Creek Cleaning by Creek Restoration Crew	As Needed	Yes	6 Jobs	Creeks are inspected and cleaned on a routine schedule
Tree and Plant Planting	When Applicable	Yes	600 trees	Trees were planted by the City's Service Department
Total Waste Recycled	As Brought In	Yes	29,755 tons	297 tons of paper, metal, plastic, glass, etc. and over 29,460 tons of yard wastes

4.0 Stormwater Management Program Summary Table

EDUCATIONAL PROGRAM TASKS	SCHEDULE OF ACTIVITIES	SCHEDULE FOLLOWED	ACTIVITIES ACCOMPLISHED	COMMENTS
Publicize Hotline Number (311)	Within 24 Months	Yes	Undetermined	Published in phone book, on road signs, pamphlets, radio PSA's, business cards, vehicles, etc.
River Rescue	Annual Event	Yes	1 day event	12.5 tons of trash and 78 tires removed by 634 volunteers from 34 sites.
Earthfest	Annual Event	Yes	1 day event	An annual event with ~10,000 vistors.
Storm Drain Marking (cast or decal)	As Needed or by volunteers	Yes	Undetermined	Appx. 50 existing CB's marked with decals labeled "Dump No Waste-Drains to Waterway" & all new installs
Volunteer Creek Cleanups	Volunteers	Yes	10	A citizen based program that periodically hosts several creek cleanups in the spring and fall
Waterfest	Annual Event	Yes	1 Day Educational Event	A unique community event dedicated to educating citizens about water quality. Over 1000 youths, 150 teachers & parents, and 64 volunteers participated.
Pooper Scoopers	As Needed or by volunteers	Yes	110,000	Disposable dog waste containers were distributed to 48 different pooper scooper stations.

NEW DEVELOPMENT PROGRAM TASKS	SCHEDULE OF ACTIVITIES	SCHEDULE FOLLOWED	ACTIVITIES ACCOMPLISHED	COMMENTS
Residential/Commercial Inspections	As Required	Yes	4212	As Required
Final Inspections	As Required	Yes	281	As Required
Site Development Permits Reviewed	As Required	Yes	1292	As Required
Right of Way Permits Issued	As Required	Yes	49	As Required
As-Built Certificications Reviewed	As Required	Yes	145	As Required

5.0 NARRATIVE REPORT

The following narrative report is divided into the five main programs of the SWMP plus an additional section for specific Total Maximum Daily Load (TMDL) activities. The Phase 1 SWMP is described in the program element schedules listed in Part 2 of the permit application and Part IV of the permit. The main programs are listed as follows:

5.1 Residential and Commercial Program (RC).
5.2 Illicit Discharges and Improper Disposal Program (ILL).
5.3 Industrial and Related Facilities Program (IN).
5.4 Construction Site Runoff Program (CS).
5.5 Comprehensive Monitoring Program (MN).
5.6 TMDL Implementation and Activities.

Each of the above programs are further divided into separate program elements and related tasks that correspond to the Implementation Schedules listed in Part IV of the Permit and to the requirements listed in 40 CFR 122.26(d)(2)(iv). Each specific task is briefly discussed in accordance with the reporting guidelines outlined in Part VI of the NPDES Permit. Some sections of this report may be a paraphrased version of earlier reports when the particular task elements are ongoing.

5.1 RESIDENTIAL AND COMMERCIAL PROGRAM (RC)

Program of Structural and Source Controls for Reducing Pollutants to the Municipal Separate Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(A).

RC-1 Maintenance Activities for Structural Controls

SWMP Task: Continue Existing Maintenance Activities from Part 2 application

Status: Ongoing

The City's Public Service Department (PSD) currently performs maintenance of the municipal stormwater system using a database to track work tasks performed during the year. The database not only tracks labor categories (e.g., Equipment Operator) and labor hours devoted to each task, but also includes equipment type and costs. The PSD database produces summary reports for monthly and annual work production and costs. The database includes more than 80 task activities of which 18 are identified as relating directly or indirectly to stormwater management. Only a small portion of the stormwater conveyance system may be accessed by PSD, in areas located on public right-of-way (ROW) and city-held easements. The City generally assumes no responsibility for maintenance or improvements on private property even though crews may work in some of those areas to remove blockages, spills, and trash with permission or in emergencies.

Maintenance by the City within ROWs and easements is normally performed on an as-needed basis by the PSD, which has divided the City into six geographic maintenance zones. Approximately 75 percent of the storm drainage system maintenance work performed by the PSD is in response to direct calls from property owners, requests from the Engineering Department, and "311" calls. Under normal conditions, the PSD can respond to all complaints that are the responsibility of the City, as defined by the City's Stormwater and Street Ordinance (Ordinance). Other storm drainage system maintenance work is in response to maintenance needs detected by the PSD, such as repairing collapsed pipes, as well as routine duties relating to stormwater such as brush collection, leaf collection, street sweeping, and the cleaning of curb inlets. The Construction Division of the PSD performs non-routine storm drain maintenance and installation. The PSD logs all complaints by address and by category into a computerized database.

The City has several multipurpose construction crews that perform storm drain installation. These crews are primarily responsible for installing stormwater infiltration Best Management Practices (BMPs), box culverts, and reinforced concrete pipe, as well as performing major repair to existing storm drains and building catch basins. These crews also provide emergency response in the event of flooding. A Storm Drain Maintenance Crew performs maintenance tasks such as: clearing culverts of debris, flushing storm drains, hand and mechanical ditching, and performing minor catch basin repair. The City owns a fleet of vehicles including two sizes of Vactor Combination Sewer Cleaners, a ditching machine, a variety of trucks, vacuum sweepers and many types of excavators.

Vactor Combination Sewer Cleaner

SWMP Task: Develop Improved Stream Restoration and Channel Maintenance Program.

Status: Complete

Since the City's NPDES permit program began in 1996, many stream restoration projects have been completed along urban creeks throughout the city with the help of the Tennessee Stream Mitigation Program, TDEC, the Tennessee Valley Authority (TVA), the U.S. Army Corps of Engineers (USACE), the University of Tennessee, Knoxville (UTK), and the Community Action Committee (CAC) Americorps.

Since sediment, hydro-modification, and habitat alteration are the most common impairments in our urban creeks, the City will continue to focus on stream restoration projects where possible. Although these projects will certainly vary in scope, bio-stabilization techniques will be used instead of concrete or riprap. Whenever possible, the adjacent riparian zone will be enhanced with trees and native vegetation to provide cooling effects and help restore habitat.

The City will work with TDEC to obtain the appropriate Aquatic Resource Alteration Permit (ARAP) permits before work begins.

SWMP Task: Implement Improved Stream Restoration and Channel Maintenance Program.

Status: Ongoing

During this permit year, the City completed two stream restoration projects.

The Banks Avenue Regenerative Stream Restoration Project successfully restored a natural stream channel. This project is discussed in more detail in Section 3.0.

The Cavalier Avenue project included restoration of 580 feet of channelized stream. The project relocated the stream, re-established a floodplain, restored habitat, and added a vegetative RBZ. This project was combined with Ulster Avenue and Graves Street projects for a total of nearly 1,000 feet of stream restoration on Williams Creek just upstream of the Urban Forest Park.

Banks Avenue stream restoration

Cavalier Avenue stream restoration

SWMP Task: Implement Structural Controls To Prevent Floating Discharges to the TN River.

Status: Ongoing

Since the summer of 1999, the City has coordinated with various agencies and area businesses to reduce the amount of floating pollution entering the river from the urban creeks. The City studied and implemented various solutions. Short-term solutions have included increasing the frequency of maintenance at the mouths of the major creeks, adding more trash receptacles at bus stops, and increasing public awareness. Long-term solutions include installing Harbor Boom temporary skimmers on major creeks and requiring treatment devices at areas with a disproportionate amount of stormwater pollution (hotspots).

During the first permit term, the City donated a new boat and hundreds of feet of trash

skimmers which have helped the Isaac Walton League (IWL), FLLA, and Ijams to collect litter and debris along the riverfront in the downtown area. In addition, the City has contracted with Ijams to maintain a "Litter Free Zone" from the South Knoxville Bridge to the Alcoa Highway Bridge. Although the focus of this initiative has largely been to reduce unsightly trash from entering the river, the floating trash skimmers at the mouths of the creeks have effectively detained many oil/fuel spills until remediation personnel could respond. According to Ijams, the booms have successfully prevented tons of floating material that would otherwise have been discharged from the creeks into the river. The original trash skimmers and replacements were purchased with penalty funds collected from polluters.

SWMP Task: Require Standard Maintenance Agreement for On-site Facilities.

Status: Ongoing

Since 1997, permanent maintenance agreements and/or covenants have been required for all new stormwater detention facilities and special pollution abatement devices (e.g., oil/water separators and catch basin inserts). A covenant is defined in Section 22.5-34 of the Ordinance as a legal document entitled "Covenant for Permanent Maintenance of Stormwater Facilities," which replaced the original "agreement" referred to in the Part 2 application and Part IV of the permit. A covenant does not require the Mayor's signature or Council approval, and the end result for water quality protection and flood control is the same. Covenants are recorded in the office of the Knox County Register of Deeds before a site development permit is issued.

In the case of a lessee, Section 22.5-5 allows the City to require a Performance and Indemnity Agreement along with a surety bond or letter of credit to assure the stormwater facilities will be maintained and removed, if necessary, at the end of the lease. This is a provision to allow some property owners the ability to share the responsibility of maintenance with the lessee who will use the land and create the need for the stormwater facility.

The City will retain the right to inspect the stormwater facilities to insure they are properly maintained; however, the responsibility for the maintenance of stormwater facilities will remain with the property owner unless legally transferred to another person or entity by a properly recorded legal agreement. If the property owner does not maintain the facility properly, the City may authorize the maintenance to be completed and place a lien against the property for double the cost. To ensure access to the facility, a traversable access easement is recorded on the plat.

SWMP Task: Require Routine / Major maintenance of BMP facilities. Status: Ongoing

All stormwater facilities constructed since 1997 are required to be maintained according to the detailed agreement or covenant, which is recorded before the site development permit is issued. These agreements and covenants are discussed in the previous section above and also in the Ordinance Sections 22.5-5 and 22.5-34. At a minimum, woody vegetation must be cut annually and sediment must be removed as necessary from detention ponds to maintain

proper function of the facility. The standard maintenance requirements for large underground facilities (e.g., detention or oil/water separators) include a minimum of quarterly visual inspections and annual maintenance. Smaller BMPs, such as catch basin inserts, must be inspected at least monthly and maintained quarterly. The City is currently developing ordinance clarification that will better define property owner responsibility and ensure maintenance on all critical BMPs without covenants.

The City has designated a full time employee to inspect stormwater detention basins and to notify property owners of any maintenance needs. During this permit year the City inspected 180 detention ponds. Sediment from the maintenance of detention/water quality ponds, treatment devices, or from stream restoration activities must be removed from the stormwater facility and disposed properly in a landfill classified for such material or used as fill outside the stormwater drainage system. The City does not propose to duplicate TDEC's efforts to regulate contaminated sediments from any stormwater management sources.

RC-2 Planning for New Development

SWMP Task: Review Stormwater and Street Ordinance to evaluate possible improvements to existing water quality and quantity requirements for new development. Status: Complete

The City of Knoxville revised the Stormwater and Street Ordinance in 2005 and in 2013. The ordinance may be accessed at www.knoxvilletn.gov/engineering. A brief summary of the current development requirements for stormwater detention and water quality control is included in the following paragraphs.

Stormwater detention is required for the following categories of development:

(1) All road construction exceeding one-half (1/2) acre of impervious area;

(2) All commercial, industrial, educational, institutional and recreational developments of one (1) acre or more of disturbed area;

(3) Large single-family or duplex residential developments of five (5) acres or more of disturbed area or five (5) lots or more;

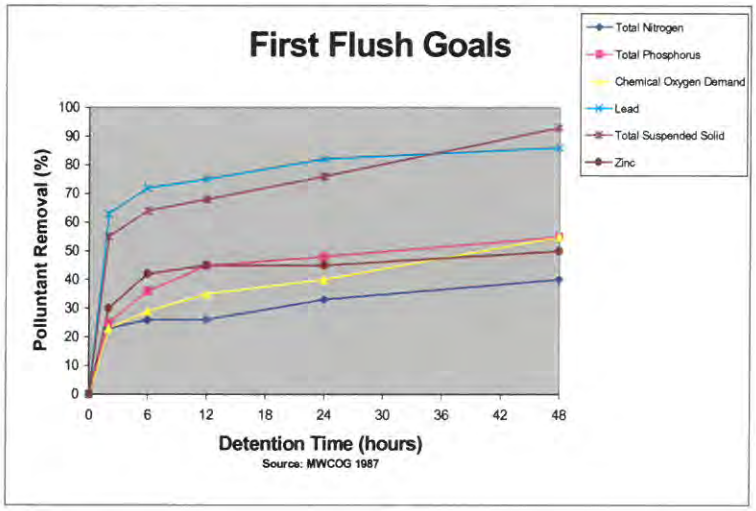
(4) Any site development which contains one-half (1/2) acre or more of additional impervious area.

(5) Any redevelopment that meets any of the four criteria above.

When a stormwater quantity detention pond is required, the Engineer must design the pond to control the runoff from 1-year, 2-year, 5-year, 10-year, 25-year and 100-year return frequency 24-hour storm events. The design Engineer must submit calculations to show that the detention facility will control the post development as required and that the downstream system is adequate to convey the flow from a 10-year storm. Detention may be waived for

some developments discharging directly into the Tennessee or Holston River, or if the developer submits supporting hydrologic and hydraulic computations to show that detention is unnecessary. For areas of redevelopment, detention requirements may be waived if the downstream stormwater system is adequate to convey the 2-year and/or 10-year 24-hour storms. The Ordinance clearly states that a waiver of detention requirements "does not exempt the developer from providing the first flush and/or water quality requirements" (Section 22.5-23).

The standard management method for water quality control from new development and redevelopment includes first flush control outlets in the quantity pond or in a separate quality device. The quality pond must be designed to collect the first one-half inch of direct runoff from the contributing drainage basin or the first 4,500 cubic feet of stormwater runoff, whichever is greater, and attenuate that runoff during a minimum period of 24 hours to a maximum period of 48 hours. Alternate treatment methods are accepted if they provide equivalent or better pollutant removal efficiencies than the standard first flush detention ponds.



The target removal efficiencies for the first flush treatment were estimated from the research and chart provided by the Metropolitan Washington Council of Governments' 1987 report titled "Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs." The target removal efficiencies for a 24-hour detention are estimated as follows: Total Suspended Solids – 76%, Lead – 81%, Zinc – 47%, Total Phosphorus – 44%, COD – 40%, and Total Nitrogen – 33%. The first flush for a flow-through device is determined by the flow rate using the 1.5 inch/24-hour design storm. The City chose 24-hour attenuation of the first flush since the pollutant removal rates for detention longer than 24 hours did not increase significantly. The City is proposing a different management method in the NPDES permit application in Appendix A.

In addition to first flush treatment, Section 22.5-37 of the Ordinance requires a Special Pollution Abatement Permit (SPAP) for certain land uses identified as "hotspots" or that contribute pollutants which would not be effectively removed by the standard first flush control. The SPAP requires the operator to submit the management and structural controls necessary to address the expected pollutants and sources of pollution from the site after development. The typical special pollution abatement requirement is to provide water quality treatment through a water quality BMP along with a management plan to keep the site free of

illicit discharges and pollution sources. Special land uses that need a SPAP include large parking lots; any type of vehicle maintenance, fueling, washing, and storage areas; scrap and recycling facilities; restaurants; grocery stores; animal housing facilities; and other areas with concentrated bacteria sources. Most of these land uses are expected to have a much higher potential for either floatable pollutants (e.g., oil, grease, hydrocarbons, trash) or soluble pollutants (e.g., bacteria, nutrients) that would not be collected in a standard first flush pond. As the City implements the requirements of the NPDES permit and as other TMDLs are issued, other land uses may be added to the SPAP program to control specific pollutants.

The pollution from common hotspots is typically caused by illicit dumping/discharges from employees and contractors or from an increased volume of vehicle traffic. The SPAP program has effectively reduced pollution in our waterways by requiring planning and education to prevent pollution before it occurs from these hotspot sources. This is more economical for the operator and the City since it reduces the need for enforcement, penalties, structural retrofits, and downstream remediation. Some businesses have reported that the pollution control requirements have paid for themselves by reducing other normal costs.

The current Ordinance requires a riparian buffer zone of 30 or 60 feet for a drainage area that is less than or greater than one square mile, respectively. The RBZ is measured from the top of the bank and extends perpendicularly for the length of the water body. The natural streamside buffer zone must be shown on the plat and maintained in a stable condition for the life of the development. The Ordinance does not allow any vertical or actively eroding creek banks to remain after development is complete. This may require the stream bank to be stabilized as part of the construction project. If stabilization is necessary, hard armor may only be used when bioengineering alternatives are not technologically feasible.

SWMP Task: Require "No Dumping" message cast into all curb irons and solid stormwater catch basin covers installed in new developments. Status: Complete

In January 2000, the City set a new standard to require a "No Dumping" message to be cast in all new curb irons, grates and solid stormwater manhole/junction box covers. The following year, the City included covers for stormwater treatment devices in this requirement. The message is an attempt to educate the public that the City's storm drain system is not a sewer for waste. When polluters are caught discharging or dumping pollutants into the storm drain, they often plead ignorance to the fact that the storm drain is directly connected to City waterways. Before setting the standard, the City contacted the major foundries to be sure they could manufacture the new irons and remain competitive in Knoxville. East Jordon

"No Dumping" message

Iron Works, NEENAH, John Bouchard & Sons, Acheson, and Deeter are the primary foundries that provide irons in Tennessee. Each of the foundries were able to provide the new pattern without any additional cost to the development community. This standard may be the most cost effective educational program in the City.

SWMP Task: Master planning for site location of regional BMP facilities for areas of new development. Status: Ongoing

Large development projects, including neighborhoods/residential or strategically located smaller developments are most suitable for siting regional BMPs. Regional BMPs would serve multiple upstream developments and typically have drainage areas ranging from 50 acres to several hundred acres. Since most development activity within the City is primarily "infill" that occurs on the limited number of remaining vacant parcels, there are limited opportunities for siting regional BMPs without impacting existing developments.

The City owns and maintains three regional detention facilities. Those facilities include the detention pond at the Acker Place development, the detention pond located at the Northwest Crossing shopping center on Clinton Highway, and the retention pond at Victor Ashe Park. However, private developers continue to build detention ponds for developments that have drainage areas ranging from a few acres to over 50 acres.

In 2005, the City partnered with Knox County to hire a consultant to review the stormwater ordinances for each agency and to develop a master plan and a Storm Water Management Model (SWMM) for First and Whites Creek. Although the initial project focused on flooding, it created a base model that was expanded to include water quality parameters and analysis for the watershed. This allows the identification of potential locations for regional detention. The full report for the quantity model has been completed, evaluating three locations of regional detention. One potential area for improvement is an existing online pond south of Adair Drive on a tributary to First Creek. The other two locations are located on Whites Creek immediately upstream of I-640 and at McCampbell Road. The City has a full time hydrologist who is leading the effort to replicate the model in other watersheds.

SWMP Task: Review, update, and maintain guidance criteria for BMPs on City web page (www.knoxvilletn.gov). Status: Ongoing

The City has a comprehensive BMP Manual that details guidance criteria describing acceptable types of BMPs, design standards, and maintenance requirements to meet the requirements of the Ordinance. Because maintenance of BMPs is critical to their long-term effectiveness in reducing pollutant loading from stormwater, the guidance criteria incorporate maintenance considerations with the design criteria to ensure that effective and maintainable BMPs are constructed in the City. The guidance criteria address the goals of the NPDES stormwater program by only allowing BMPs that are effective in reducing pollutants targeted by the NPDES stormwater regulations. The BMP Manual will continue to be updated at least annually as

needed and made available at www.knoxvilletn.gov/engineering.

RC-3 Maintenance Activities for Public Streets, Roads, and Highways

SWMP Task: Continue street maintenance activities outlined in the Part 2 application.

Status: Ongoing

Street cleaning is performed daily for the downtown streets and less frequently for all other streets throughout the City. Seven Elgin Megawind Multi-Purpose Sweeper Vacs are used in most service areas. In the downtown areas where maneuverability is key, an Elgin Pelican Street Sweeper is used. The Megawind vacuum trucks are also used to vacuum debris from catch basins and remove leaves in the fall. Mowing in City ROW is typically performed on a two to four week schedule between the months of April and September.

SWMP Task: Maintain current de-icing program and study alternatives and improvements.

Status: Ongoing

Snow removal, anti-icing, and de-icing of roadways are performed by the PSD and are essential programs to ensure public safety. Sodium chloride stored undercover at the Loraine Street facility is mixed with liquid calcium chloride and applied to highways and streets by spreaders as necessary. Application of de-icing/anti-icing materials targets highways and major arteries first, and residential streets next. Priorities follow the adopted Major Roads Plan of the City of Knoxville. Because of the importance of maintaining public safety and public commerce, the City aggressively pursues its road clearing operations.

The Public Service Department regularly evaluates snow removal activities/resources and revises the Snow Removal Plan as needed. The City has been able to significantly reduce the quantity of de-icing materials used by improved equipment, forecasting, chemicals, and operator training. A brine mixing facility is used as a source of de-icing solution during dry weather as a preventative measure, which further reduces the overall quantity of materials needed for de-icing operations. The City will continue to look for opportunities to minimize the use of de-icing materials to reduce costs and protect the environment.

RC-4 Evaluation of Flood Management Projects

SWMP Task: Evaluate regional BMP facilities for water quality retrofit. Status: Ongoing

The City owns and maintains three regional detention facilities. These facilities include the detention pond adjacent to Middlebrook Pike and Weisgarber Road at the Acker Place development, the detention pond located at the Northwest Crossing shopping center on Clinton Highway, and the regional retention pond at Victor Ashe Park. Although the regional basins were designed for flood control, the City found that it was possible to retrofit the sites

to achieve additional water quality benefits as well. All ponds built since 1997 are required to comply with the water quality requirements for new development.

The City continues to advance water quality improvements at the Acker Place detention pond in the Fourth Creek Watershed. A large section of Fourth Creek was restored downstream of the pond in the first year of the permit. In 2008, the City made significant improvements to the pond to reduce sediment off-loading from stream bank erosion, establish a flood plain, re-meander the channel to a more natural state, and restore vegetation. The City is currently evaluating further water quality retrofits to this regional pond through a partnership with an adjacent property development.

The regional pond at Northwest Crossing on Clinton Highway serves the Wal-Mart, Lowe's, and the surrounding area. The City accepted the maintenance of this pond and immediately designed a water quality retrofit to reduce the pollution in the stormwater runoff. Three large Crystal Stream stormwater treatment devices serve to effectively remove large amounts of trash, sediment, hydrocarbons and organic material from the runoff and prevent the discharge of those pollutants into the receiving stream. Additional outlet improvements are being evaluated now.

The retention pond at Victor Ashe Park was designed and built with water quality in mind. Three CrystalStream stormwater treatment vaults improve the quality of the stormwater runoff from the contributing parking lots, park, and subdivisions.

Maintenance and inspection of the CrystalStream units has been contracted out to CrystalStream's service company to ensure proper function at the regional ponds in Victor Ashe Park and Northwest Crossing.

SWMP Task: Maintain existing GIS inventory of on-site BMP facilities. Status: Ongoing

When the NPDES permit program first started, the City implemented a systematic method to inventory the existing detention ponds by using a Geographic Information System (GIS) grid of the city. Field crews inspected drainage features in each map grid and recorded the detention facilities in the GIS with a circled D. Since all new development must be certified to confirm that constructed facilities were built as planned, all new stormwater facilities are properly recorded in the GIS after construction.

Engineering staff will continue to maintain and update the existing inventory of ponds, pipes, water quality facilities and other drainage features as part of an ongoing GIS maintenance program. The City has several positions which maintain and update the GIS program including stormwater technicians designated to inspect and map field conditions, GIS staff who edit field note corrections, and a dedicated technician who inspects and records maintenance data related to stormwater detention/retention facilities. An Engineer and multiple technicians edit the GIS as changes are identified.

RC-5 Monitoring of Solid Waste Facilities

This program is described in the management section IN-3 for industrial facilities.

RC-6 Management Program for Pesticides, Herbicides, and Fertilizer

SWMP Task: Evaluate possible improvements to existing public education programs as part of the illicit connection and improper disposal program. Status: Ongoing

Public education programs for pesticides, herbicides, and fertilizer use have already been implemented in conjunction with City public education programs for collection and recycling of household hazardous waste (HHW). In addition to the solid waste and household hazardous waste informational programs, the City has developed a stormwater pollution program that includes helpful information regarding pesticide and fertilizer use. The Knoxville BMP Manual located at www.knoxvilletn.gov/engineering offers two BMPs for proper pesticide, herbicide, and fertilizer use and disposal. BMP AM-13 is targeted towards institutional and commercial applications while BMP RH-05 is directed towards residential and homeowner uses.

The HHW collection program, which includes collection of pesticide, herbicide, and fertilizer waste material, was officially implemented when the facility opened on April 22, 1997. More information about the HHW facility is included in the Illicit Discharges and Improper Disposal Program, Section ILL-6.

SWMP Task: Reevaluate effect of fertilizers as part of the City's ongoing monitoring program. Status: Ongoing

Pesticides, herbicides, and fertilizer used by the City are stored in a building at the Loraine Street Operations Center. This building is in compliance with all regulations regarding the storage of hazardous materials. The Horticulture and Grounds Maintenance section of the PSD is responsible for the application of pesticides, herbicides, and fertilizer. The herbicide "Roundup" is applied annually to City parks and ROWs to control unwanted weed growth. PSD personnel have been trained to apply the herbicide as needed. Fertilizer is only used for minor landscaping projects and stormwater runoff from these projects is not considered a threat to receiving water quality.

The City does not currently require registration by commercial applicators; however, commercial applicators must be licensed under State and Federal Regulations. There are no regulations restricting the use of these substances by individual landowners. A permanent household hazardous waste collection facility is open six days per week to collect all types of hazardous wastes including pesticides, herbicides, and fertilizer.

The control program for pesticide, herbicide, and fertilizer pollutants is difficult to define since their presence in urban runoff is not always evident. Current problems with pesticide, herbicide, and fertilizer pollutants are not believed to be significant, but are included as part of

the ongoing stormwater monitoring program. Pesticides, nutrients and other indicators of these pollutants are tested as part of the ongoing monitoring program described in Sections 5.5 and 6.0 of this report. To date, no significant traces of pesticides have been detected in the annual full-suite grab sample.

5.2 ILLICIT DISCHARGES AND IMPROPER DISPOSAL PROGRAM (ILL)

Program to Detect and Remove Illicit and Improper Discharges to the Municipal Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(B).

ILL-1 Ordinances

SWMP Task: Implement any new revisions to the Stormwater and Street ordinance.

Status: 12 Months

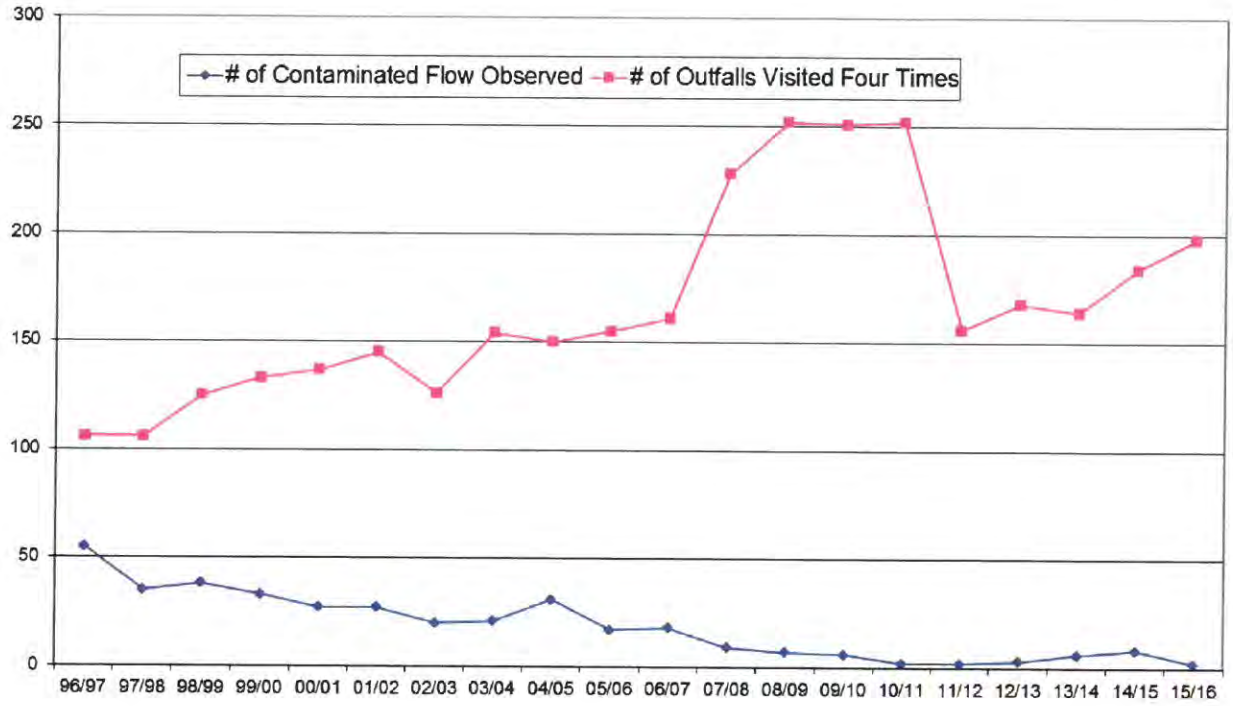
The Stormwater and Street Ordinance was developed to specifically prohibit non-stormwater discharges, increase penalties for illegal discharges, and to provide water quality regulations for new development. The first ordinance was effective June 20, 1997 and has been updated several times since then. The City is working to update the Ordinance in 2016. The current Ordinance is available at www.knoxvilletn.gov/engineering.

The Ordinance Section 22.5-52 specifically prohibits illicit discharges and illegal dumping to any portion of the MS4 or any area draining to the MS4. Illicit discharges are defined consistent with 40 CFR 122.26(b)(2) as any non-stormwater discharge to the MS4. Exemptions to the non-stormwater prohibition are listed in the ordinance in accordance with the list in 40 CFR 122.26(d)(2)(iv)(B)(1). This definition, along with the $5,000 penalty for violations, has formed the cornerstone of our successful enforcement program and will remain in place during this permit term.

ILL-2 Field Screening

SWMP Task: Perform follow-up analysis at all high-risk screening sites. Status: Ongoing

The Dry Weather Screening Program was developed and implemented during the first permit term to evaluate both randomly chosen outfalls and high-risk outfalls which were tested during the previous year. Each high-risk stormwater outfall is checked for flow after a period of dry weather. If flow is present, the discharge is tested with a Chemetrics colorimetric field test kit for the following parameters: phenols, ammonia, detergents, copper, and chlorine. Presence of odor, oil sheen, and surface scum are also recorded, along with measurements of turbidity, pH, color, temperature, and flow rate. If ammonia or chlorine is detected, the property owner and/or responsible utilities company is notified and the investigation continues until the source



Comparison of number of contaminated flows and total outfalls sampled by permit year.

of the discharge is located and eliminated. Outfall testing is repeated again between four and forty-eight hours after the first test. After a minimum of one month, this process is repeated for each outfall to complete a total of four tests per year.

Since the implementation of this program has successfully identified and eliminated many illegal dumps and illicit discharges, the City will continue to annually retest all sites that have high levels of parameters or signs of illegal dumping. Once an outfall has tested clean or dry during four site visits in a single year, it will only be retested if randomly selected from the list of inventoried outfalls. The number of high-risk outfalls that need to be retested each year will vary depending on the tested results of the previous year. However, the trend shows that the number continues to decrease as shown in the figure above.

As required by Part VI (A)(2)(e)(ii) of the NPDES permit, the results of the dry weather screening that occurred during the last permit year are included in Appendix B of this report. Since the beginning of the program, approximately 13,500 outfall-screening visits have been conducted. The results from each of those visits are tabulated in the database by outfall identification number, testing date, and visit number.

SWMP Task: Investigate 150 field-screening sites four times per year. Status: Ongoing

To insure that all outfalls are eventually tested each permit cycle, the City will continue to monitor a minimum of 150 outfalls annually throughout the new permit term. Last year the City visited 198 outfalls four times each. The monitored outfalls consisted of the previous year's two high-risk outfall sites plus 196 randomly selected outfalls from the GIS outfall inventory. The randomly selected outfalls are generated primarily from industrial and commercial land uses that are new, have not been tested in the last five years, or have potential for high pollutant loads, as well as outfalls that have large drainage areas and/or highly concentrated development.

The Engineering Department has developed an outfall database to maintain the testing data and site information for each outfall in the inventory. This outfall database is linked to the GIS to allow data access geographically for a single point or by report/query functions for many outfalls at a time. By maintaining a history of each outfall, illicit discharge trends may become apparent and therefore resolved with education or enforcement.

The Dry Weather Screening Program has been one of the most successful programs in reducing illicit discharges since its inception in 1997, as seen by the trend line and number of contaminated discharges displayed in the figure on the previous page. This program has resulted in over a 90 percent reduction in illicit discharges, including those from large and/or chronic polluters.

ILL-3 Investigation of the Storm Drain System

SWMP Task: Implement procedures for mapping, field surveys and upstream source identification. Status: Ongoing

The procedures for mapping, field surveys and upstream source identification were developed and included in the Part 2 Application in Section 5.3.5. The City will continue to utilize these procedures to maintain the effectiveness of the Illicit Discharge and Illegal Dumping Program. During FY 15-16 there were no updates to report for this procedure. If the procedure is updated, it will be included in the following annual report.

SWMP Task: Evaluate and update enforcement procedures, policies, monitoring and inspections. Status: Ongoing

The schedule for this task appropriately coincided with the schedule for Ordinance updates. The existing enforcement procedures and policies have been effective and were last updated as part of the Enforcement Response Plan for the Qualifying Local Program (QLP) requirements in 2013.

Depending on the violation, a first-time offender is usually educated and asked to remediate

the damage or correct the violation if possible. This is usually followed up with a letter to inform the violator of the City's expectations and to provide helpful BMPs to prevent future problems. More severe or repeated violations result in the issuance of a Notice of Violation (NOV). Copies of the NOV are distributed to the property owner or developer by certified mail, the City Law Department, and the Engineering Department's file. The NOV may order specific remedies and require the violator to submit reports and/or pollution prevention plans. Penalties, if any, are only issued after the NOV expires so the violation and remedies may be fully evaluated.

In the event that a penalty is assessed, a violator may appeal the penalty before the Environmental Appeals Board. The five volunteer members of the Environmental Appeals Board are appointed by the Mayor and consist of individuals with an expertise as follows:

1) One licensed professional engineer with three (3) years of engineering experience as a Professional Engineer;
2) One architect, engineer, landscape architect or surveyor with three (3) years of experience;
3) One representative of the development or industrial community;
4) One neighborhood representative; and
5) One member at large.

Board members serve a five-year term and may be re-appointed at the end of their term for one additional consecutive term. Members may be reappointed after skipping a term.

To help identify repeat violators, the City maintains an updated record of every NOV issued and a database for stormwater complaints. Follow-up monitoring and inspections are performed by the City and through self-inspections by industries. Enforcement actions resulting from the Dry Weather Screening Program are carried out as defined within that program, as a minimum, and any outfall with significantly high levels of contamination is identified as an illicit connection/illegal dump source and tested four times a year, every year, until the outfall is dry or clean on four consecutive visits. Sources of pollution identified by other means will be monitored as needed or specified for the individual situation. Section 22.5-53 of the Ordinance requires immediate reporting of spills and illicit discharges and Section 22.5-54 allows the City to require additional monitoring.

SWMP Task: Inspect stormdrain system and update features on GIS. Status: Ongoing

The City is dedicated to maintaining and updating the existing inventory of ponds, pipes, water quality facilities and other drainage features as part of an ongoing GIS maintenance program. This task is implemented by a concerted effort within the Engineering Department. Three GIS staff members, as well as a Stormwater Engineer and two technicians are responsible for updates to the stormwater GIS layers as changes occur. All new developments require a development certification submitted by a design professional upon completion. The analyst in the Stormwater Division records the storm drain features from the development certifications

into the GIS. Field personnel are instructed to log and report any discrepancies that are found between the maps and actual system in the field, and provide corrections to the editors so that mapping may be updated.

ILL-4 Spill Response Program

SWMP Task: Coordinate with Knoxville Emergency Response Team (KERT) and TDEC.

Status: Ongoing

The City of Knoxville Stormwater Division of the Engineering Department continues to coordinate with both the KERT and TDEC during emergency situations. Each agency has specific roles to play during an emergency event. When discharges enter the MS4, the City's Stormwater Quality Section assists with information gathering, investigations, GIS support, containment, remediation, follow-up monitoring, and enforcement when necessary.

The Knoxville-Knox County Emergency Management Agency (KEMA) and/or the Knoxville Fire Department (KFD) coordinate most major spills when they are called in to 911. KEMA also coordinates routine training and simulations for various situations throughout the year. Workshops are provided to simulate real scenarios and allow coordination of the field teams and the Emergency Operations Center (EOC). Engineering Department staff participate in the EOC while the KEMA, KFD, Knoxville Police Department, and Rural Metro units perform the field exercises.

The KFD and Engineering Department coordinate to respond to small spills and possible hazards as they are identified. The two groups will continue to work closely together to contain and remediate discharges in the street, stormdrain system, creeks or wherever necessary. The KFD maintains a fireboat downtown on the waterfront and a Hazardous Materials truck in one fire hall to assist with spills and significant discharges into the river, creeks or storm drains.

When a responsible party is identified for a spill or hazardous discharge, the Engineering Department staff follows normal investigation and enforcement procedures to ensure containment and remediation at the violator's expense. The City's HAZMAT team will work to contain the spill until the responsible party takes over. The HAZMAT team will then report back to the station to be ready for the next emergency while Stormwater staff monitor the remediation of site until the stormdrain and creek are restored.

This year, Stormwater staff responded to assist the Fire Department with a variety of spills including vehicle accidents that lost fuel, illegal dumping, and discharges from permanent facilities. The Stormwater management staff monitors water quality and provides technical assistance and enforcement. The small releases from accidents and illegal dumping were contained by the Fire Department and Stormwater management staff. Stormwater staff and/or PSD personal will typically remove and dispose of the materials from small spills. Larger spills are referred to a private remediation company or the responsible party. Engineering staff will continue to closely coordinate with other emergency personnel by attending the monthly

Local Emergency Planning Committee meetings and by maintaining a staff member on call after hours and on weekends to help respond to water quality emergencies.

ILL-5 Reporting of Illicit Discharges

SWMP Task: Maintain and monitor the "Water Quality Hotline" for public reporting.

Status: Ongoing

The objective of this task is to increase the public awareness of the City's role in water quality issues and to create a quick and anonymous method for citizens to report water quality concerns. The publicity of the hotline handled through a permanent 311 call center has already provided a consistent and convenient resource for concerned citizens. The City includes the 311 number in stormwater pollution prevention educational handouts such as magnets, brochures, presentations, business cards, and routine correspondence with residents.

The 311 Call Center has received a variety of calls including: industrial discharges, gray water discharges, broken laterals, commercial washing, and dumping by neighbors. The 311 number has been a popular and convenient method for callers to anonymously report problems that they have witnessed or created. Common calls are from neighbors or dissatisfied employees of polluters. This program has been very successful and will be continued throughout the permit term.

SWMP Task: Supplemental Public Education Programs. Status: Ongoing

River Rescue

The year 2016 was the 27th year for the River Rescue, which attracted 634 volunteers who collected 12.5 tons of trash and 78 tires from the shores of the Tennessee River. Ijams Water Quality Specialists plan for this event throughout the year by recruiting volunteers, surveying riverbank conditions, securing additional sponsors, and pinpointing areas in need of cleanup.

Adopt-A-Stream

The City of Knoxville has worked with Knox County and the Town of Farragut to administer the Adopt-A-Stream (AAS) program for 12 straight years. The City has provided the supervision and training in addition to gloves, trash bags, pitchforks, wheelbarrows, waders, and other tools for these activities.

University of Tennessee students on the 3rd Creek Greenway

Adopt-a-Watershed

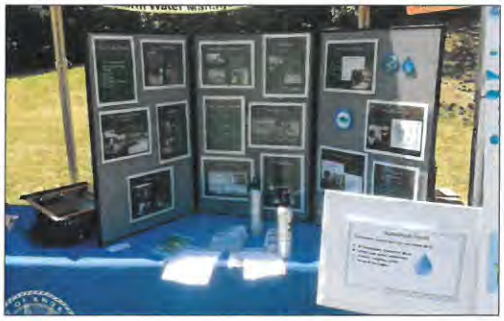
South Doyle Middle School Students

Currently, fourteen area high schools and middle schools are participating in the Adopt-a-Watershed (AAW) program. The Americorp volunteers coordinate the program with the individual schools. This program has helped implement the goals of the NPDES program and to increase public awareness of water quality issues. The primary goals of the AAW program include:

- Characterizing the school's watershed using, at minimum, two AAW characterization tools (e.g., watershed inventory, watershed mapping, windshield survey, stream walk).
- Monitoring the school's watershed stream(s), conducting, at minimum, chemical testing twice and a biological (i.e., macroinvertebrate and/or fish) assessment once per year.
- Conducting at least one water quality improvement activity such as tree planting, creation of storm drain placards, stream cleanup, stream bank restoration, and presentations to school groups/community organizations on the "state of the watershed" as determined by the students' characterization/monitoring efforts.

The City worked with the schools to provide support such as information, solid waste support for cleanups, GIS maps, testing supplies, training, and grants.

City Employee Training



Stormwater Engineering Educational Display at Earth Fest

The City has two stormwater pollution prevention videos from Excal Visual to train City employees. The *Illicit Discharge Detection & Elimination* and *Rain Check* videos outline BMPs for stormwater pollution prevention and has been shown to the Public Service, Engineering, and Fleet departments. To learn more about the videos, go to www.excalvisual.com. The City also participates in educational webinars, the Tennessee Stormwater Association (TNSA) symposium, and TDEC Erosion Prevention and Sediment Control (EPSC) certifications.

Public Displays and Presentations

In cooperation with the City of Knoxville Solid Waste Office, Stormwater staff presented displays and informational materials at several public events including the Dogwood Arts Festival, Home Show, and Earth Day Celebration.

Various environmental presentations were also made to citizens through groups such as the AAS and rain barrel workshops.

ILL-6 Used Oil & Toxic Materials Program

SWMP Task: Continue coordination of Recycling Program. Status: Ongoing

The Solid Waste Division manages the City of Knoxville's recycling program. The entire annual report of these programs is included in the Appendix C of this report. This program is an important part of the City's solid waste reduction efforts and will continue in the future.

SWMP Task: Maintain and Operate Household Hazardous Waste Facility. Status: Ongoing

When first opened in 1997, the City of Knoxville Household Hazardous Waste Facility was the first permanent HHW Collection Center in the State of Tennessee. The HHW Facility is open six days a week. The center accepts HHW from both Knoxville and Knox County residents. Knox County shares in the annual costs of operation. The capital expenditures associated with construction of this facility were partially paid for through a grant from the State of Tennessee. Activities at the center include:

- Diverting reusable products;
- Collecting, reusing and solidifying latex paint;
- Collecting car batteries, oil and antifreeze;
- Diverting selected acid and bases to wastewater treatment;
- Bulking flammable materials; and
- Packing miscellaneous HHW materials for safe shipment and disposal.

Upon entering the HHW Collection Center, customers pull into a covered drive-through unloading area, where technicians remove HHW from their vehicles. Material that is collected and is still usable is separated and made available for pickup by the public free of charge in a "reuse area". Usable material includes containers that have never been opened or materials that have not yet exceeded their useful shelf life. The staff then processes materials that are not reusable; diverting selected acids and bases to the wastewater treatment facility, bulking flammable materials, lab packing, and solidifying latex paint. After materials are processed, they are packed into 55-gallon drums that are placed in one of two prefabricated storage units. Each of these units has a special fire suppression system, and drainage/spill containment systems. The hazardous materials are then stored in the units and held until sufficient quantities are collected. The HHW is operated by technicians trained to the 40-hour OSHA site worker level and managed by an on-site foreman and manager.

5.3 THE INDUSTRIAL AND RELATED FACILITIES PROGRAM (IN)

Program to Monitor and Control Runoff from TSD and Industrial Facilities Subject to SARA Title III, Section 313 requirements, 40 CFR 122.26(d)(2)(iv)(C).

IN-1 Ordinances

SWMP Task: Evaluate and implement revisions to the prohibitions and exemptions of non-stormwater discharges in the existing Stormwater and Street Ordinance. Status: Complete

The Stormwater and Street Ordinance was developed to specifically prohibit non-stormwater discharges, increase penalties for illegal discharges, and to provide water quality regulations for new and redevelopment. The latest version of the Ordinance was implemented in 2013 and may be accessed at www.knoxvilletn.gov/engineering.

Section 22.5-52 of the Ordinance specifically prohibits illicit discharges and illegal dumping to any portion of the MS4 or any area draining to the MS4. Illicit discharges are defined according to 40 CFR 122.26(b)(2) as any non-stormwater discharge to the MS4 that is not specifically exempted in 40 CFR 122.26(d)(2)(iv)(b). This definition, along with the $5,000 maximum penalty for violations, have formed the cornerstone of our successful enforcement program.

SWMP Task: Implement any new revisions to the Stormwater and Street Ordinance.
Status: 12 months

This task is discussed in the management Section ILL-1.

IN-2 Inspection Element

SWMP Task: Continue inspection program for non-permitted commercial facilities (e.g., car lots, restaurants, service stations, and grocery stores. Status: Ongoing

The City has identified many common discharges from facilities that were not required to be permitted under the TDEC multi-sector general stormwater permit or individual NPDES permit programs. Rather than spend limited resources attempting to duplicate the efforts of TDEC and Environmental Protection Agency (EPA) by monitoring existing permitted facilities, the City added a Special Pollution Abatement Permit (SPAP) program for those specific land-uses that have proven to cause polluted runoff problems (hotspots). Section 22.5-37 of the Ordinance requires a SPAP on new development and redevelopment of projects for certain land uses. This program is used to eliminate gaps in the existing State and Federal permit programs through a local inspection program for otherwise non-permitted facilities.

The City has a dedicated Stormwater Technician to perform additional education and inspections for industry and certain commercial areas. The technician performs most of the industrial and commercial facility inspections on sites that currently have a SPAP. Other technicians also perform inspections as needed. A complete list of the SPAP facilities that were inspected during this permit year can be found in Appendix D.

Each of the SPAP facilities is required to have some type of structural stormwater treatment device (e.g., oil/water separators, catch basin insets, sand filters, grass swales) in addition to their pollution prevention management controls. During the SPAP inspection, the City typically reviews the facilities maintenance records, provides technical advice on proper maintenance scheduling, records the GPS coordinates of the stormwater treatment devices if needed, and updates the City's industrial and commercial facilities database. Inspection of the SPAP facilities occurs systematically to insure that the structural controls are maintained and the management controls are being followed.

Stormwater Quality compliance inspections for non-SPAP sites are conducted in direct response to specific complaints from citizens or tips from 311 calls. The City decides on a case-by-case basis whether this group of inspections will use education or enforcement to correct any problems found. In some cases, an existing facility that is not "new development" or undergoing "redevelopment" may be required to apply for a SPAP to correct violations.

The inspection program focuses on performing routine and/or random inspections on a variety of commercial sectors. The inspectors work with businesses to develop site-specific pollution prevention plans (SWPPPs), employee training, and structural modifications, if needed. The City's BMP manual has a wide assortment of information to assist a variety of businesses in developing their SWPPP. Since these businesses may not be regulated in a current permit program, many of the operators are not knowledgeable about how their actions impact water quality in area streams.

Section RC-2 of this report provides more details on the SPAP program.

SWMP Task: Collect and analyze Notices of Intent (NOIs) from Industrial Permit applicants.

Status: Ongoing

When NOIs are received from TDEC or directly from the private industry, the City reviews and evaluates the information for potential impacts to the municipal storm drain system. In the past, the NOIs have been instrumental in locating and removing discharges from local industries. During inspections or enforcement actions with an industry, the City may verify that an NOI has been filed.

SWMP Task: Identify potential industrial discharges through Illicit Connection and Improper Disposal Program for both stormwater and non-stormwater discharges). Status: Ongoing

The Illicit Connection and Improper Disposal Program defined in the City's Part 2 NPDES stormwater permit application and in the previous section of this report, primarily addresses runoff from industrial facilities. A large portion of dry weather screening occurs from areas of industrial use or outfalls indicated by a "300" in the identification number. Illicit connections or improper disposal from industrial facilities that are discovered while inspecting the storm drain system under this program are recorded in the facility's file in the Work Manager Database. The City contacts the industrial facility directly, along with TDEC if necessary, to identify the problem and work on an appropriate solution. If enforcement action is necessary, the City will track the situation until the illicit connection is corrected, the illegal dumping stopped, or until the facility receives a valid NPDES permit for the discharge.

SWMP Task: Review and update inspection program as part of Pollution Prevention Plans for Municipal Industrial Facilities (MIFs). Status: Ongoing

The City has developed an inspection and pollution prevention program for municipal industrial facilities. Currently only five MIFs are operated in the City. These facilities include:

- The Solid Waste Management Facility (SWMF) on Elm Street,
- The fleet truck and heavy equipment garage on Loraine Street,
- The fleet and police garage at Prosser Road,
- The Knoxville Area Transit (KAT) bus station on Magnolia Avenue, and
- The KAT Station on Church St.

Each facility is currently evaluated and inspected regularly by Stormwater staff and will continue to be inspected at least annually in the future. The KAT facility is the newest of the MIFs and was built using LEED standards including stormwater quality treatment devices for the runoff.

The inspection and monitoring program has been productive at all of the MIFs in the past. Structural and management BMPs have been installed to control pollution and improve the water quality of runoff from each facility. The SWMF has been retrofitted with structural controls to reduce the solids, sediment, hydrocarbons, and bacteria in the runoff from the paved areas. Additional water quality improvements have been constructed at the SWMF that include new grit/sediment sumps, floatables skimmers, grass swale, and low flow modifications to the detention pond.

IN-3 Monitoring Element

SWMP Task: Collect monitoring data from industrial stormwater dischargers and/or from TDEC. Assess impacts to the storm drain system. Status: Ongoing

As part of the NPDES Permit for stormwater discharges associated with industrial activity, applicants are required to monitor, at least bi-annually, representative stormwater outfalls identified in the facilities' SWPPPs. Applicants must monitor in accordance with TDEC Rule 1200-4-10-.04. The Stormwater and Street Ordinance authorizes the City to require additional monitoring from industries not covered under the TDEC programs whenever necessary. This will usually be required in conjunction with some enforcement action after a problem has been observed. The City maintains this information to assess the impact of the monitored discharges on the water quality of the storm drain system as the City receives the data.

If the City determines that additional data needs to be provided in the monitoring program for an industry (e.g., reports on additional parameters), requirements for an expanded program for subsequent monitoring events is coordinated with TDEC and/or the industrial discharger.

SWMP Task: Continue monitoring program at non-permitted commercial facilities using guidelines pursuant to 40 CFR 122.26(d)(2)(iv)(c)(2). Identify pollutants and sources.
Status: Ongoing

The City has developed a program to sample commercial hotspot sites that do not require TDEC or EPA permits. The land uses that require a City of Knoxville SPAP (see Section RC-2) are targeted for samples. The standard operating procedures for the City's wet weather sampling program are used except grab samples are substituted for the automatic sampler stations.

The samples from the hotspot land uses are analyzed for a wide range of parameters which vary depending on the pollutants of concern for each land use. For example, restaurants and grocery stores will likely have runoff containing a higher nutrient load from their dumpster/grease bin area than a new auto dealership. Both will likely have oil/grease, sediments, and metals from the vehicle traffic. Other land uses such as an animal kennel will obviously have an entirely different set of concerns. This monitoring data may play an important role in determining the future direction of the SPAP program and to verify the suitability and effectiveness of the SPAP runoff controls.

In addition to the stormwater sampling above, all outfalls from industrial areas have been tested as part of the dry weather field-screening program to identify potential specific sources of the pollutants. Each year the City chooses random outfalls from industrial areas as the primary dry weather screening locations. These outfalls are tested with field screening kits using additional laboratory tests as necessary.

Additional monitoring and reports from Hazardous Waste Treatment Storage and Disposal Facilities (HWTSDF) and industrial facilities subject to SARA Title III, Section 313 may be

required when a problem has occurred, when the City has reason to believe a pollution problem exists, when TDEC or EPA do not already require sufficient testing, or if the City is mandated to test and report those facilities. Legal authority to require reports is maintained under Section 22.5-54 of the Ordinance.

SWMP Task: Continue monitoring program at non-permitted commercial facilities and analyze the results from ongoing commercial monitoring program. Schedule: Ongoing

The City has initiated an annual sampling program at the storage and maintenance areas at the City's Loraine Street facility, Solid Waste Management Facility, and the KAT bus station. Samples are also collected at non-permitted commercial facilities such as restaurants, gas stations, car lots, grocery stores and other known hotspots. The sampling locations will change each year to ensure a wide variety of sites within each commercial group.

SWMP Task: Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial facilities subject to SARA Title III, Section 313. Schedule: Ongoing

The Stormwater and Street Ordinance Section 22.5-54 states, *"The Director of Engineering may require any person engaging in any activity or owning any property, building or facility (including but not limited to a site of industrial activity) to undertake such reasonable monitoring of any discharge(s) to the stormwater system operated by the City and to furnish periodic reports of such discharges."* The City will maintain this legal authority to require monitoring from all facilities necessary when the Ordinance is updated in the next permit term. Additional monitoring may be required when a problem first occurs or still exists, when the City has reason to believe a pollution problem exists, when TDEC or EPA do not already require sufficient testing, or if the City is mandated to test and report those facilities.

SWMP Task: Evaluate and update the monitoring program for Municipal Industrial Facilities. Status: Annually

The City has implemented limited testing at these facilities including ambient monitoring, dry weather screening, and industrial stormwater inspections conducted by Stormwater staff. Initial monitoring inspections resulted in some of the structural modifications mentioned above in Section IN-2 as well as updated management policies and procedures. The City evaluates the current monitoring at MIFs annually to test effectiveness of installed structural controls, using appropriate sampling frequency and laboratory analyses.

The Dry Weather Screening Program will continue to monitor the outfalls from all MIFs to insure that management controls are effective.

SWMP Task: Manage and Conduct Monitoring Program at MIFs. Status: Ongoing

Each year, the MIF outfalls are inspected at least once for non-stormwater flow in dry weather. If flow is observed, the normal dry weather screening parameters are analyzed, recorded, and investigated. In addition to the dry weather screening, grab samples are collected from storage/maintenance areas at the City's Loraine Street facility, the Solid Waste Management Facility, Prosser Road Police Garage, and the KAT bus station (see analysis results on p. 54).

MIF monitoring programs to test effectiveness of installed structural controls have taken place at the Loraine Street facility and the SWMF. Two vault-type stormwater treatment units were installed side-by-side at the Loraine Street facility for a full-scale BMP investigation project. Inflow and effluent samples were collected from each of the structural devices to determine the efficiency of each unit. After a significant amount of bacteria was found in the runoff at the SWMF, the City installed an Aqua-Swirl and Aqua-Filter system for sediment and bacteria removal. Monitoring results indicate significant removal rates for sediment and bacteria. Stormwater runoff from the SWMF is sampled annually as described in IN-3.

5.4 CONSTRUCTION SITE RUNOFF PROGRAM (CS)

Program to Implement and Maintain BMP Plans to Reduce Construction Site Runoff to the Municipal Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(D).

CS-1 Site Planning

SWMP Task: Requires construction sites greater than 10,000 sq. ft. to submit Erosion and Sediment (E&S) Control Plans. Status: Ongoing

The Ordinance specifically requires construction sites greater than 10,000 square feet to provide erosion prevention and sediment control (EPSC) plans in Section 22.5-27(j)(1) . The current Ordinance may be accessed at www.knoxvilletn.gov/engineering.

SWMP Task: Require Site Plans Submittals per the City of Knoxville BMP Manual.
Status: Ongoing

The Stormwater and Street Ordinance requires all EPSC plan submittals and all site development work to comply with the City's Land Development Manual (LDM) or the Tennessee Erosion and Sediment Control Handbook (whichever is more restrictive), current as of the date of the submission of the plans. The City will continue to maintain the requirement for compliance with the City's BMP manual or an equivalent BMP going forward.

SWMP Task: Review and update minimum criteria for plan review and checklists.

Status: Ongoing

The City is continuing to review and update specific procedures for construction site plans (including EPSC) review and approval. The procedures include an evaluation of plan completeness and overall BMP effectiveness. Construction site plan reviewers are certified under the Tennessee Erosion Prevention and Sediment Control Training Program for Construction Sites, Level 2 or equivalent. New plans reviewers are required to be certified in 12 months. The City has developed a list of minimum criteria to supplement the State checklist for various categories of site plans (residential, commercial, etc.). The City plans review staff uses the minimum criteria and checklists to insure consistency in the plan review process. The checklists are available at www.cityofknoxville.org/engineering as part of the LDM.

SWMP Task: Require Pre-construction Assistance Meetings with Developers/Contractors for any project that requires a performance bond. Status: Ongoing

The City of Knoxville requires that a Pre-construction Assistance Meeting be scheduled with the contractor, and/or the developer, design engineer, and the City staff before a Site Development Permit is issued. This meeting is scheduled after the Site Development plans are ready for approval but before construction begins. The meeting ensures that all parties involved with the construction project are equally aware of the City's expectations. Topics covered in the meeting may include:

- The Development Inspection Checklists,
- The Stormwater and Street Ordinance,
- The Engineering Department Enforcement Policy,
- Construction Best Management Practices,
- Inspection Schedules,
- State of Tennessee Erosion and Sediment Control Handbook,
- The City of Knoxville BMP manual,
- TDEC's ARAP,
- Construction General Permit (CGP) SWPPP,
- Special notes and considerations for the particular site, and
- Other important information relevant to the project.

The Pre-construction Assistance Meeting format will continue to be reviewed and updated throughout the permit term as new policies, procedures, BMPs, and other regulations necessitate. Since the assistance meetings have been successful at increasing compliance and reducing enforcement, they are an ongoing policy.

CS-2 BMP Requirements

SWMP Task: Require Construction BMPs from the City BMP manual or equivalent.

Status: Ongoing

The City is continuing to require, per Section 22.5-27 of the Ordinance, that all EPSC plans comply with either the City's BMP Manual or the Tennessee Erosion and Sediment Control Handbook (whichever is more restrictive), current as of the date of initial construction site development mobilization. The requirement to use BMPs from the BMP Manual or TDEC manual applies to Utility, Single Family Residential (> 10,000 SF), Large Residential and Commercial Developments.

SWMP Task: Evaluate additional BMP requirements and design modifications. Maintain the updated BMP requirements on the City's web page. Status: Ongoing

Section 22.5-22 of the Ordinance authorizes the Engineering Department to develop a development design manual as the standard for which the Ordinance requirements are met. The guidance criteria in the manual describe acceptable types of BMPs, design standards, and maintenance requirements for BMPs to be used throughout the City to meet the requirements of the Ordinance. To ensure that effective post-development BMPs are constructed and maintained in the City, a standard maintenance covenant is executed before site development plans are approved. The guidance criterion addresses the goals of the NPDES stormwater program by allowing only BMPs which are effective in reducing the targeted pollutants. The BMP Manual will continue to be updated at least annually as needed and made available at www.knoxvilletn.gov/engineering.

SWMP Task: Continue to require construction site Good Housekeeping practices.

Status: Ongoing

To ensure that construction sites are kept clean and orderly, and to minimize pollutants in stormwater runoff as a result of other construction activities, the City is continuing to require good housekeeping measures on all active construction sites. The good housekeeping practices included in the BMP Manual address the following considerations:

- Designated areas for construction equipment maintenance and repair,
- Prohibition of discharges of oil and grease into the MS4 or receiving waters,
- Designated areas for construction equipment washing to ensure washwater is discharged to a maintained temporary holding basin or sediment trapping device, Designated construction site entrances, exits, and staging areas for all site traffic,
- Provision of storage areas for construction materials and receptacles for liquids (solvents, paints, acids) and solids in accordance with manufacturers recommendations,

- Provision of adequate waste storage areas and ensuring that the locations for collection of waste materials do not receive concentrated runoff, and
- Provision of adequate sanitary facilities on construction sites in accordance with Health Department Regulations.

Good Housekeeping issues are reviewed with the contractor, engineer, and developer during the pre-construction assistance meeting.

CS-3 Inspection / Enforcement

SWMP Task: Maintain expanded inspections to include smaller construction sites (single family). Status: Ongoing

The City of Knoxville includes single-family residential sites as part of new development construction inspections. The Engineering Department also has a staff person dedicated to triage plans review to focus primarily on small projects. The City is maintaining adequate personnel to allow for inspections on these smaller sites. Although the small sites do not require the same type of frequency of inspections as the larger sites, all small sites are inspected at some point in the construction process.

SWMP Task: Implement routine site inspections on commercial and large residential developments (e.g. rough grading, E&S control installation, final grading, and final stabilization.) Status: Ongoing

The Engineering Department is continuing site inspections for large residential and commercial developments. Inspections are performed during rough grading, final grading, and at various other times during the construction process. Although the site inspections are not always scheduled with the contractor or developer, City Stormwater staff may visit the construction sites approximately every three weeks or sooner if necessary. The time frame for some project inspections will vary due to the specific project.

These inspections are performed to ensure compliance with the approved erosion and sediment control plan, good housekeeping measures, and the design plan.

For bonded projects, the developer is given a letter, which authorizes the installation of EPSC after the submitted site development plan is approved, but before the permit is issued. After the erosion prevention and sediment controls are in place, a licensed professional certifies that the installation has been completed according to the EPSC plan. The site development permit is issued after the Engineering Department receives the certification and all other items complete.

SWMP Task: Require post-construction Development Certifications from licensed design professionals before bond release to ensure the stormwater facilities are built as planned. Status: Ongoing

The City requires all developments with a bond to submit to a post-construction Development Certification before the bond is released. A licensed Professional Engineer and Land Surveyor must certify that the roads and stormwater features (quality and quantity) comply with the approved plans. Some deviation from the permitted plan may be allowed during construction as long as the final project still meets the City's minimum requirements. If the final certified project does not meet the minimum requirements, further adjustments must be made before the entire bond is released to the developer. This program requires a second plan review by the Engineering Department after construction has finished to insure proper results in the field.

The Development Certification requires the following components when applicable:

- As-built drawings
- Complete detention calculations
- Roadway inspection reports
- Final site inspection in accordance with checklist
- Verification that all stormwater quantity and quality facilities are covered by Covenants for Permanent Maintenance of Stormwater Facilities
- Engineering certification or soil retaining calculations for critical retaining walls

This program has been successful and will be continued.

SWMP Task: Maintain enforcement procedures, policies, and follow-up monitoring/ inspections. Status: Ongoing

During this permit year, 288 Notices of Violations were written for construction site runoff violations, 32 of those resulted in civil penalties totaling $45,554. The standard procedure detailing enforcement remedies (e.g., issuance of NOVs, penalties, and the appeal process) may be found in management Section ILL-3 for illicit and improper discharges.

CS-4 Training Programs

SWMP Task: Co-Sponsor E&S Control Practice Seminars for all participants. Status: Annually

The City is continuing to promote and support the TDEC certification program in place of a separate competing erosion control workshop. Each year, the City sends inspectors and supervisors to the training program as needed to maintain current certifications. During FY 15-16, all the new inspectors received this training while some inspectors were retrained.

The City also cosponsored the TNSA East Tennessee Development Symposium for the development community on November 18-19, 2015. The two day event features local and national sponsors and speakers, showcasing the latest in Low Impact Development (LID), erosion prevention and sediment control, propriety stormwater controls, and local NPDES requirements.

SWMP Task: Provide training for City plans review staff. Status: Ongoing

In an effort to fully train the Stormwater Management staff, the City has participated in several stormwater seminars around the region. Most staff members at the Engineer level will attend at least one, but typically more, seminars or training workshops annually. Typical seminars attended each year include: stormwater modeling, National Association of Flood and Stormwater Management Agencies (NAFSMA) conference, regulatory updates, erosion control certification, NPDES updates, ASCE seminars, software workshops, TNSA Stormwater Symposium, and others. All licensed engineers must complete at least twelve hours of professional development each year. In addition to the stormwater management seminars attended, the Engineering staff have sponsored, planned, and presented a series of annual workshops/seminars to better educate the staff and development community about the development and plans review processes. Some of the topics of the City-sponsored development process training sessions include:

- Technical Requirements of the Stormwater and Street Ordinance
- Construction Site Erosion and Sediment Control design and implementation
- Site Development Permit Review
- SPAP program
- Performance and Indemnity Agreements, Permanent Maintenance Covenants for Stormwater Facilities
- Plat Review Process and Procedures
- Development Certifications

The City is continuing to provide training to the Engineering staff by participating in seminars locally and outside the city; in-house training by professional engineers; tuition reimbursement for university engineering classes; and cooperating with TDOT, TDEC, TVA, UTK, and other agencies to provide professional training for the staff. Training of the plans review and inspections staff is an ongoing program within the Engineering Department.

5.5 COMPREHENSIVE MONITORING PROGRAM (MN)

Program to Collect Quantitative Data to Determine the Impacts of Urban Stormwater on the Natural Environment, pursuant to 40 CFR 122.26(d)(2)(iii)(A).

MN-1 Seasonal Storm Event Monitoring

SWMP Task: Review and update the Standard Operating Procedures (SOP) for the seasonal sampling program. Status: Ongoing

The City continues to revise the SOP to keep it current and valid for the monitoring/sampling procedures, equipment, software, testing parameters, and site locations that are in use.

SWMP Task: Maintain at least five (5) automatic monitoring stations. Status: Ongoing

The five monitoring stations are currently located on First Creek (KAT), Love Creek, Williams Creek, Fourth Creek (Walden) and Third Creek. The specific locations are noted on the large inventory map in Appendix E of this report.

Each monitoring station consists of a tipping bucket rain gauge, automatic sampler with 24 individual bags, area velocity flow meter and network interface module. The intake line and flow sensors are installed in the low flow path for continuous monitoring of the following data: rainfall, total flow, flow rate, level and velocity. In addition to the above data, the Third Creek station collects the following data: specific conductance, conductivity, total dissolved solids, salinity, dissolved oxygen, temperature and pH.

SWMP Task: Collect twenty (20) flow-weighted composite storm samples annually.
Schedule: Ongoing

Each year, the automatic sampling stations collect twenty (20) flow-weighted composite storm samples. Each of the five monitoring stations collect four (4) storm samples each year with at least one storm sample per quarter to help distribute the sampling events seasonally.

After a qualifying rain event, a technician interrogates the sampler in the field via laptop or desktop computer and calculates the appropriate flow-weighted composite sample. Once the composite sample is prepared, it is packed on ice and transported to the laboratory by courier for analysis.

Each of the flow-weighted storm samples are analyzed for thirteen (13) routine parameters. Only pH is recorded in the field. The remaining routine parameters are analyzed and recorded in the laboratory in accordance with 40 CFR 122.26 and 40 CFR 136. The routine parameters tested in the laboratory are listed in the table below:

Routine Parameters for Laboratory Analysis		
Total Suspended Solids (TSS)	Nitrate + Nitrite Nitrogen (as N)	Total Recoverable Lead
Total Dissolved Solids (TDS)	Total Nitrogen	Total Recoverable Zinc
Total Ammonia Nitrogen (as N)	Biochemical Oxygen Demand (BOD_5)	Ortho Phosphorus
Total Kjeldahl Nitrogen	Chemical Oxygen Demand (COD)	Total Phosphorus

SWMP Task: Collect five (5) wet weather bacteria samples. Schedule: Ongoing

Five bacteria samples were collected this year. One grab sample was collected manually at each monitoring station during a qualified storm event. Since the TMDL includes both fecal coliform and E. coli standards, both parameters were analyzed in the laboratory.

SWMP Task: Collect five (5) full-suite grab samples (one/station/permit).

Schedule: Ongoing

Each year, one monitoring station is selected for a full-suite grab sample. The five stations are rotated throughout the permit term to allow one sample from each location. The full-suite sample was obtained from the Love Creek location this year. In addition to the 13 routine parameters, the full-suite grab sample includes analysis for oil & grease and all the pollutants listed in Tables II & III of 40 CFR 122 Appendix D including: volatiles, pesticides, acids, base/neutrals, toxic metals, total phenol, and cyanide.

SWMP Task: Analyze results from ongoing monitoring program. Schedule: Complete

Sampling data were collected, evaluated, and analyzed by City staff as part of the ongoing seasonal monitoring program. The updated seasonal pollutant loading and event mean concentration for the major watersheds within the MS4 may be estimated from the City monitoring data and/or from other regional data, which may include:

- National Urban Runoff Program (NURP) study,
- United States Geological Society (USGS) Open-File Report 94-68 titled "Rainfall, Streamflow, and Water-Quality Data for Five Small Watersheds, Nashville, Tennessee, 1990-1992",
- USGS Water-Resources Investigations Report 95-4140,
- USGS Open-File Report 93-xxx titled "Stormwater Data for Knoxville, TN '91-'92, and
- Any available data from TVA, EPA, and the State of Tennessee.

The latest results of the analysis are included in the appendix for the year five annual report. An estimate of the total annual runoff from each of the major watersheds within the City will be provided in each annual report (see Section 6.2.4 in this report). Due to ongoing annexations, watersheds or portions of watersheds may be added to this estimate as needed.

MN-2 Dry Weather Screening and Industrial/Commercial Site Monitoring

SWMP Task: Dry Weather Screening as described in ILL-2. Status: Annually

SWMP Task: Implement Commercial/Industrial Monitoring in IN-3. Status: Ongoing

The City samples runoff from commercial sites such as restaurants, automotive facilities, and large parking lots. The purpose of this sampling is to determine the magnitude and variety of pollutants discharging from sites that have been targeted as pollution hotspots, which may be potentially regulated under the SPAP program to reduce pollution in City waterways. The list of SPAP land uses is presented in the current Ordinance.

MN-3 Ambient & Biological Monitoring

SWMP Task: Implement ongoing Ambient Sampling Program. Schedule: Ongoing

The City conducts a quarterly ambient sampling program in which at least twenty (20) ambient samples are collected each year at a rate of one sample per quarter from each of the five monitoring station locations.

The samples are collected manually by a single grab procedure. Each ambient sample collected is analyzed for the 13 routine parameters listed in MN-1. Since all of the locations have some flow in ambient conditions, the samples can be retrieved at the same location as the storm event samples. This is an added convenience for direct comparison of storm event and ambient samples as well as allowing more options for collecting samples automatically.

SWMP Task: Continue the Biological Monitoring Program (IBI, RBP III and stream surveys).
Status: Ongoing

In 2013, the City was granted QLP status from TDEC. Under the finalized QLP incentives, Index of Biological Integrity (IBI) is no longer required. The City is required to perform visual stream assessments on streams listed for siltation. The biological monitoring program is now project site specific, to monitor local impacts of stream restoration projects.

MN-4 Training Programs

SWMP Task: Implement Monitoring Training Program for staff and/or volunteers.
Status: Ongoing

Ongoing training is necessary for staff and volunteers as part of sampling programs, stream walks, and the AAS program. All new staff, interns, and volunteers receive the appropriate training for their specific monitoring project as necessary. A mock IBI was conducted with Central High during this permit year, along with training a new staff member for the monitoring stations, and several informative webinars on water monitoring.

5.6 TMDL IMPLEMENTATION AND ACTIVITIES

A TMDL Implementation Plan was approved by EPA on January 15, 2003 for the Fort Loudoun Lake Watershed (HUC 06010201) for the following creek systems: First Creek, Second Creek, Third Creek, Fourth Creek, and Goose Creek.

The City of Knoxville addressed the following bacteria sources and activities as required by the TMDL and permit.

Farm Animals — Schedule: Complete

At the end of year two, the City contracted the CAC Americorps Water Quality Team (AWQT) to begin a study of the potential bacteria impact of farm animals on the 303(d) streams in Knoxville. Using agricultural zoning maps and GIS, the AWQT started to field verify potential livestock sites. During year two and three, they checked each site for signs of livestock access and runoff to the creek as well as erosion caused by access. Five properties in the Third Creek watershed contained a total of 94 head of livestock, including horses and cattle. Grab samples were collected from upstream and downstream of the study sites and delivered to the State of Tennessee's Laboratory for bacteria analysis. The data was compiled and analyzed during year three but did not indicate that the livestock create a significant impact on the bacteria in the stream. In fact, two of the sampled sites showed a decrease in both fecal coliform and E. coli from the upstream sample to the downstream sample. A third property was sampled on three different dates with upstream and downstream samples. Only one of the downstream samples showed an increase in bacteria levels. The City may reevaluate the effect of livestock on urban streams in the future but at this time there is no evidence to indicate that livestock are a significant source of bacteria in Knoxville's streams. Due to codes and zoning, the properties that do contain livestock will likely shrink or be eliminated in the future.

Wild Birds — Schedule: Ongoing

During year one, the CAC AWQT volunteered to study the biological impact that waterfowl populations have on our local waterways. The City identified 56 possible waterfowl locations that could be either a source or sink for bacteria. The AWQT visited those locations in the fall and spring, counted the number of birds, and selectively sampled for ammonia. Six sites that had a large number of waterfowl or high concentrations ammonia were analyzed for fecal coliform and E. coli. Four sites were considered to be sources of bacterial pollution since they discharged to creeks and two were considered sinks since they had no outlet to waters. The results of the initial investigation were reported in year one.

The initial investigation reduced the original 56 possible locations down to only four sites that need to be analyzed for structural retrofit or some management control to reduce the bacteria

levels entering the stream or river. Since two of those sites enter the Tennessee River directly, the City is concentrating on analyzing, designing and implementing some mitigation measure for the remaining two sites, which discharge directly into 303(d) streams listed in the bacteria TMDLs.

The City also partners with Izaak Walton League (IWL) to investigate ways to reduce waterfowl populations at the Fountain City Lake. The IWL and the Lions maintain duck food vending machines that were installed to reduce the popular use of bread, which has been linked to unhealthy ducks and degraded water quality. This management practice will continue as part of the pond management program.

Domestic Pets — Status: Ongoing

The City partners with the IWL and Prestige Cleaners to encourage the use of pooper-scoopers in City parks and the Central Business Improvement District (CBID). A total of 48 pet waste bag dispensers are located within the City. Approximately 110,000 pooper-scoopers bags were restocked last year throughout the City, which helps to reduce pet waste downtown. Additional dispensers may be added in other parks in the future. The City has distributed pooper-scoopers to vet clinics, pet stores, and during public functions such as Bark-in-the-Park and Earth Fest. Posters are displayed at these functions to help educate the pet owners of their responsibility to manage their pet's waste. The City also has a pet waste ordinance (O-98-03) to require the owner or custodian of any pet to collect and remove all solid pet wastes from all areas within the CBID.

Pooper scooper bag dispenser

Outside Dumping of Animal Wastes — Status: Ongoing

In year one, the City investigated possible bacterial pollution sources from the Knoxville/Knox County animal shelter. The City helped the shelter personnel set up a maintenance schedule for quarterly inspections and annual cleanout of their Nutrient Baffle Box.

Fish/Bait Shops — Status: Complete

The City inspected Rea Springs Live Bait, Seymour Bait & Tackle, and Conservation Fisheries Inc. as possible sources of bacterial pollution. The effluent from Seymour Bait & Tackle and Conservation Fisheries Inc. discharged directly to a KUB sewer line. The effluent from Rea

Springs Live Bait shop (now closed) discharged to a constructed wetland and then into First Creek. The City notified TDEC of the results of the bacterial sampling of the effluent entering First Creek, which were well below the threshold for human contact.

Private Leaking Laterals

Status: Ongoing

The City has continued to coordinate with KUB to identify and correct sanitary sewer discharges as necessary. A standard procedure has been developed to insure that each possible contamination source is investigated after a problem is identified during dry weather screening. When high ammonia or fecal coliform levels are detected in the MS4, KUB and City personnel cooperate to identify the contamination source through dye testing or manhole-by-manhole testing. Once a source has been identified, KUB is responsible for correcting problems in the main sanitary sewer system while the City works with KUB and the private property owners to correct problems on private property. These coordinated inspections have identified private residences, industries, and businesses with plumbing or floor drains connected to the MS4 instead of the sanitary sewer system. This type of close coordination with all sewer utilities is essential for solving illicit discharges to the MS4 and will continue going forward.

A Memorandum of Understanding has clarified the cooperative roles and responsibilities of both the City and KUB with respect to the City's stormwater management program and compliance with the MS4 NPDES permit. A copy of the MOU was included in the appendix of the FY 03/04 annual report.

Human Wastes (Outdoor Elimination by Humans)

Schedule: Completed

In year two, the City implemented a survey and inventory of homeless populations in Knoxville. The Engineering Department was able to add a few questions to the survey to determine how transients use the creeks while living outdoors. The results of the survey indicate that there is likely some impact on stream water quality by homeless people.

Dr. Nooe issued the following statement regarding his homeless study for the City of Knoxville: *"In the February, 2006, survey of homelessness, we had planned to examine use of creeks and streams by those persons living in outside locations. However, finding a limited number of persons in the six camps visited, the data are incomplete. There are several observations based on visits to camps and conversations with outreach workers that I can share. Homeless camps are*

Second Creek homeless camp

scattered throughout the county. Many are located in or near center city, but others can be found in various sections such as west in the Cedar Bluff and Lovell Road area. There appear to be approximately 18-20 camps along creeks and streams, with an average of 4-6 persons staying in each camp. Occasionally, someone will use the water for bathing, but the most frequent use seems to be cooling food and beverages (tying the food in a plastic bag and suspending it in the water). We did not observe directly using the water for disposal of waste, but the proximity suggests possible runoff."

The number of homeless camps along the densely concentrated area of Second Creek from the 1982 World's Fair Park to approximately Bernard Avenue has been growing. The high population may be fuelled by the location of the Food Pantry and other assistance services nearby. Although populations and density vary, there were over 32 camps with over 60 inhabitants located in this area, predominantly in the RBZ. Water quality is directly impacted by these camps. Debris, trash, bank erosion, food waste, and human waste appear prevalent along the impacted sections of creek. Bacteria samples taken within the camping corridor showed increased levels of E. coli and fecal coliform compared to samples taken upstream of the camping corridor.

Two cleanup efforts were completed. The first was in July 2015, and netted a total of 19 tons of debris and waste from the creek and creek banks. The second and more extensive cleanup was in May 2016, and included removal of the homeless camps. During this cleanup effort over 200 tons of debris and waste was removed from the RBZ and creek banks. The RBZ was trimmed so that bush overgrowth was removed and would no longer obstruct campsites and/or make the RBZ attractive to the homeless as a campsite. Grown cover and canopy shading remain intact.

Trash collected from Second Creek Cleanup

Illicit Connections to Storm Drain System — Status: Ongoing

The Illicit Connections and Illegal Dumping Program (ILL) is an ongoing program reported in Section 5.2 of this report.

6.0 MONITORING REPORTS SUMMARY

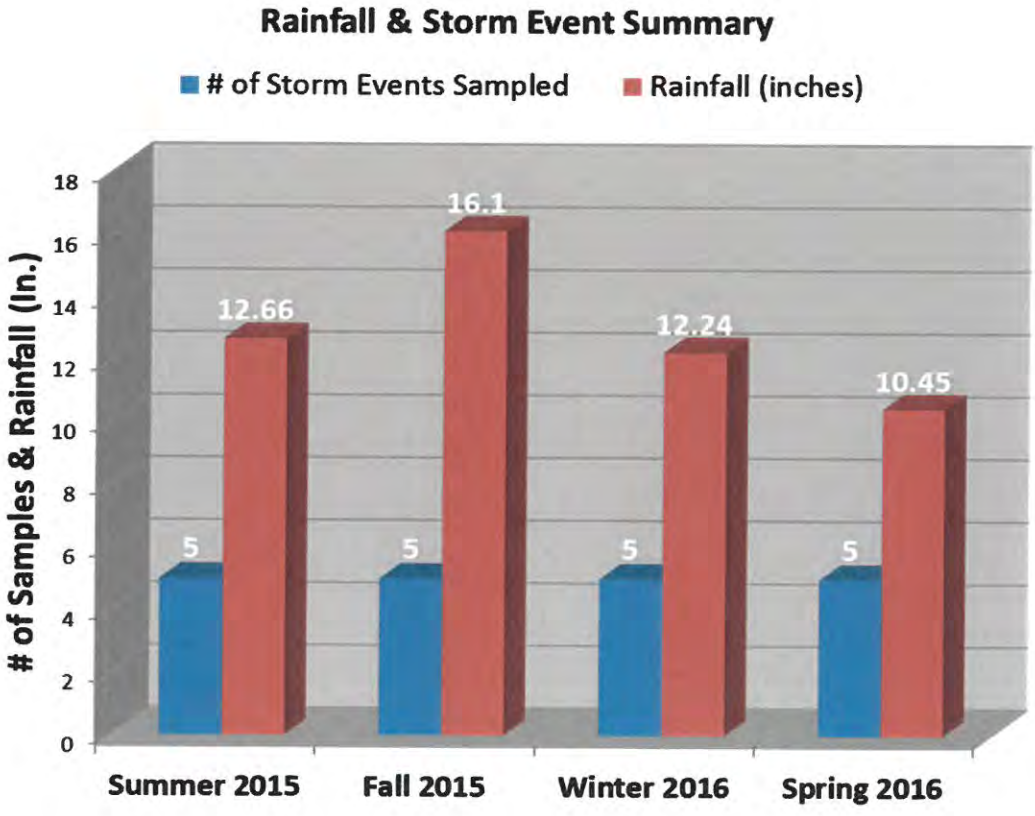
6.1 DRY-WEATHER SCREENING PROGRAM - NEW OUTFALL INVENTORY

During the past permit year, no outfalls were removed from the City's outfall inventory and three outfalls were added. Outfalls are typically added as a result of re-development or annexations and removed as a result of drainage alterations. All updated outfalls are clearly marked on the inventory map located in Appendix E.

6.2 ONGOING STORMWATER MONITORING PROGRAM.

6.2.1 Area Rainfall Data & Storm Event Summary

During the July 1, 2015 to June 30, 2016 monitoring period, an average of 51.45 inches of rainfall was recorded and 20 storm events were sampled from the City's five ISCO monitoring stations. Section V of the current NPDES Permit requires a sampling frequency for routine wet-weather samples of one storm event per season per station. This requirement was met. The graph below shows the relationship between the amounts of rainfall received and the number of storm events sampled per season. Monitoring data summaries for each of the sampling locations are included for TDEC's review on the following pages.



6.2.2 Laboratory Analysis Summary
Third Creek Monitoring Station

Quarter	Date	Type	pH	Flow	Rainfall amount	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli (grab)	Fecal Colif. (grab)
Units				cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
SUMMER 2015	7/29/15	Comp	7.0	644,373	0.36	11.0	43.0	290.0	220	0.75	0.10	1.900	1.900	0.02200	0.220	0.38	0.025		
FALL 2015	10/28/15	Comp	7.0	3,216,670	1.09	5.0	10.0	2.9	339	1.47	0.10	0.100	0.100	0.00500	0.030	0.10	0.025	>2,420	X
WINTER 2016	2/21/16	Comp	7.0	1,298,240	0.17	5.0	18.7	34.5	244	1.50	0.1	0.327	0.327	0.00824	0.030	0.10	0.025		
SPRING 2016	5/11/16	Comp	8.0	495,829	0.15	5.0	46.6	27.0	265	1.23	0.10	0.100	0.100	0.00500	0.030	0.10	0.025		
Sample Average			**7.3**	**1,413,778**	**0.44**	**6.50**	**29.6**	**88.6**	**267**	**1.24**	**0.10**	**0.607**	**0.607**	**0.01006**	**0.078**	**0.17**	**0.025**	**N/A**	**N/A**
								na	na	na	*****	2.35	3.31	0.18	0.176	0.16			
***Characteristics of Urban Stormwater Range**						1 - 700	5 - 3.100	2 - 11.300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10			

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

X = Confluent growth Unable to determine count due to quantity of growth.

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

6.2.2 Laboratory Analysis Summary
Williams Creek Monitoring Station

Quarter	Date	Type	pH	Flow	Rainfall amount	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli (grab)	Fecal Colif. (grab)
Units				cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
SUMMER 2015	08/18/15	Comp	7.0	2,038,030	0.40	5.0	10	107	210	0.757	0.10	1.04	1.04	0.0221	0.0717	0.138	0.025		
FALL 2015	11/19/15	Comp	7.0	5,053,650	1.35	6.1	42	77	153	0.83	0.10	1.07	1.07	0.0128	0.0532	0.144	1.07	>2,420	>6,000
WINTER 2016	03/31/16	Comp	7.0	1,611,580	0.78	37.2	47	256	172	0.77	0.10	0.52	0.52	0.0472	0.1790	0.175	0.025		
SPRING 2016	06/15/16	Grab **	7.0	42,020	0.34	7.4	21.8	34	120	0.76	0.10	0.75	0.75	0.0078	*0.0300*	0.149	0.05		
Sample Average			**7.0**	**2,186,320**	**0.72**	**13.9**	**30.0**	**118.4**	**163.8**	**0.78**	**0.10**	**0.84**	**0.84**	**0.0225**	**0.083**	**0.15**	**0.292**	**N/A**	**N/A**
										na	na	*****	2.35	3.31	0.18	0.176	0.16		
*Characteristics of Urban Stormwater Range						1 - 700	3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10			

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

** Grab sample was taken instead of a Composite due to equipment failures and subsequent storm event timing/creek flow.

6.2.2 Laboratory Analysis Summary
First Creek Monitoring Station (KAT)

Quarter	Date	Type	pH	Flow	Rainfall amount	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli (grab)	Fecal Colif. (grab)
Units				cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
SUMMER 2015	9/25/15	Grab **	7.0	8,775,680	0.73	5.0	10	1.0	311	1.11	0.10	0.322	0.322	0.005	0.030	0.10	0.032		
FALL 2015	11/19/15	Comp	7.0	16,164,200	1.26	6.4	62.3	105.0	127	0.502	0.25	1.140	1.140	0.01200	0.115	0.123	0.0380	>2,420	>6,000
WINTER 2016	2/22/16	Comp	7.0	5,888,650	0.26	17.2	35	23.6	207	1.25	0.10	0.262	0.262	0.00657	0.030	0.10	0.025		
SPRING 2016	4/22/16	Comp	7.0	7,294,470	0.68	48.1	85	30.9	238	1.16	0.10	0.678	0.678	0.005	0.030	0.10	0.025		
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**0.14**	**0.60**	**0.60**	**0.00714**	**0.051**	**0.11**	**0.030**	**N/A**	**N/A**
***National NURP Study Average**						11.9	90.8	na	na	na	*****	2.35	3.31	0.18	0.176	0.16			
***Characteristics of Urban Stormwater Range**						1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10			

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

** Grab sample was taken instead of a Composite due to equipment failures and subsequent storm event timing/creek flow.

6.2.2 Laboratory Analysis Summary
Walden Drive Monitoring Station

Quarter	Date	Type	pH	Flow	Rainfall amount	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli (grab)	Fecal Colif. (grab)
Units				cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
SUMMER 2015	08/07/15	Comp	7.5	283,119	0.07	8.30	21.0	41.1	220	0.820	0.10	0.807	0.810	0.0050	0.0300	0.128	0.025	x	x
FALL 2015	11/02/15	Comp	7.0	1,642,250	0.50	3.50	36.2	46.1	90	0.342	0.10	0.496	0.496	0.00562	0.0565	0.100	0.025	>2,420	>6,000
WINTER 2016	03/31/16	Comp	7.0	1,015,240	0.66	15.80	31.7	261	106	0.418	0.10	0.331	0.331	0.0104	0.1300	0.100	0.025	x	x
SPRING 2016	06/15/16	Grab **	7.0	372,601	0.26	7.70	17.3	148.0	126	0.699	0.10	0.816	0.816	0.00835	0.0958	0.286	0.025	x	x
Sample Average			**7.1**	**828,303**	**0.37**	**8.8**	**26.6**	**124.1**	**136**	**0.570**	**0.10**	**0.613**	**0.613**	**0.0073**	**0.07808**	**0.154**	**0.025**	**N/A**	**N/A**
***National NURP Study Average**						11.9	90.8	na	na	na	*****	2.35	3.31	0.180	0.176	0.16			
***Characteristics of Urban Stormwater Range**						1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10			

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

** Grab sample was taken instead of a Composite due to equipment failures and subsequent storm event timing/creek flow.

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

6.2.2 Laboratory Analysis Summary
Love Creek Monitoring Station

Quarter	Date	Type	pH	Flow	Rainfall amount	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli (grab)	Fecal Colif. (grab)
Units				cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
SUMMER 2015	8/18/15	Comp	8.0	636,979	0.36	18.1	51	19.2	357	1.070	0.10	0.10	0.10	0.0050	0.030	0.10	0.025		
FALL 2015	11/19/15	Comp	7.0	48,378,400	1.46	8.0	77	58.8	167	0.547	0.10	1.490	1.490	0.0050	0.030	0.10	0.025	2420	4500
WINTER 2016	2/21/16	Comp	7.0	6,281,180	0.30	11.0	15	11.7	261	1.320	0.10	0.262	0.262	0.0050	0.030	0.10	0.025		
SPRING 2016	4/22/16	Comp	7.0	2,433,910	0.29	11.7	33	4.6	300	1.250	0.10	0.775	0.775	0.0050	0.030	0.10	0.025		
											.100	**0.657**	**0.657**	**0.0050**	**0.030**	**0.10**	**0.025**	**N/A**	**N/A**

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

***National NURP Study Average**						11.9	90.8	na	na	na	*****	2.35	3.31	0.18	0.176	0.16			
***Characteristics of Urban Stormwater Range**						1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10			

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

6.2.2 Laboratory Analysis Summary

Various Hot Spot Wet Weather Sampling Results

Point Source Sample Site	Location	Date	Type	pH	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	Oil/ Grease	E. Coli	Fecal Colif.
					mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mpn/ 100mL	cfu/ 100 mL
OnSite Environmental	Curb Cut	12/15/15	Grab	6.0	39.3	192	87.0	95.0	0.156	0.10	0.838	0.838	0.00898	0.152	0.274	0.0490	16.2	488	1,300
OnSite Environmental	Catch Basin	12/15/15	Grab	6.0	304.0	555	171.0	205	0.114	0.10	3.11	3.11	0.00588	0.165	0.730	0.119	102.0	>2420	23,000
2nd Creek Station 1	Bernard @ RR Bridge	10/22/15	Grab	7.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	37	3
2nd Creek Station 2	Homeless Camp One	10/22/15	Grab	7.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	687	480
2nd Creek Station 3	Homeless Camp Two	10/22/15	Grab	7.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2	2
Young Williams	Catch Basin	5/11/16	Grab	5.0	11.8	158	90.5	76	1.72	0.10	2.25	2.25	0.0050	0.176	0.269	0.0280	n/a	1	273
Chilhowee Lake	Floating Dock	6/9/16	Grab	7.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	345	1,400
Average				**6.4**	**118.4**	**302**	**116.2**	**125**	**0.66**	**0.10**	**2.1**	**2.07**	**0.01**	**0.164**	**0.42**	**0.065**	**59.1**	**260**	**3780**
*National NURP Study Average					11.9	91	na	na	na	*****	2.35	3.31	0.18	0.176	0.16				
*Characteristics of Urban Stormwater Range					1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10				

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

Microbiological analysis: Results greater than the detectable range are listed in italics – maximum E. coli value from lab is 2420 and maximum Fecal Colif is 6000.

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

6.2.2 Laboratory Analysis Summary

Laboratory Analysis Summary - Seasonal Storm Sampling Program

July 1, 2015 thru June 30, 2016

Site	Quarter	pH	Average Sampled Volume	Rainfall per Event	BOD	COD	Total Suspended Solids (TSS)	Total Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia nitrogen	Total Kjeldahl nitrogen	Total organic nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate
Units			cu-ft	inches	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
KAT First Creek	Sum '14	7.0	8,775,680	0.73	5.0	10	1	311	1.11	0.10	0.32	0.32	0.005	0.030	0.10	0.032
	Fall '14	7.0	16,164,200	1.26	6.4	62	105	127	0.50	0.25	1.14	1.14	0.012	0.115	0.12	0.038
	Wtr '15	7.0	5,888,650	0.26	17.2	35	24	207	1.25	0.10	0.26	0.26	0.007	0.030	0.10	0.025
	Spr '15	7.0	7,294,470	0.68	48.1	85	31	238	1.16	0.10	0.68	0.68	0.005	0.030	0.10	0.025
Average:		**7.0**	**9530750.0**	**0.73**	**19.2**	**47.9**	**40.1**	**220.8**	**1.01**	**0.14**	**0.60**	**0.60**	**0.007**	**0.051**	**0.11**	**0.030**
Love Creek	Sum '14	8.0	636979.0	0.36	18.1	51	19	357	1.07	0.10	0.10	0.10	0.005	0.030	0.10	0.025
	Fall '14	7.0	48378400.0	1.46	8.0	77	59	167	0.55	0.10	1.49	1.49	0.005	0.030	0.10	0.025
	Wtr '15	7.0	6281180.0	0.30	11.0	15	12	261	1.32	0.10	0.26	0.26	0.005	0.030	0.10	0.025
	Spr '15	7.0	2433910.0	0.29	11.7	33	5	300	1.25	0.10	0.78	0.78	0.005	0.030	0.10	0.025
Average:		**7.3**	**14432617.3**	**0.60**	**12.2**	**43.9**	**23.6**	**271.3**	**1.05**	**0.10**	**0.66**	**0.66**	**0.005**	**0.030**	**0.10**	**0.025**
Third Creek	Sum '14	7.0	644373.0	0.36	11.0	43	290	220	0.75	0.10	1.90	1.90	0.022	0.220	0.38	ND
	Fall '14	7.0	3216670.0	1.09	5.0	10	3	339	1.47	0.10	0.10	0.10	0.005	0.030	0.10	0.025
	Wtr '15	7.0	1298240.0	0.17	5.0	19	35	244	1.50	0.10	0.33	0.33	0.008	0.030	0.10	0.025
	Spr '15	8.0	495829.0	0.15	5.0	47	27	265	1.23	0.10	0.10	0.10	0.005	0.030	0.10	0.025
Average:		**7.3**	**1413778.0**	**0.4**	**6.5**	**29.6**	**88.6**	**267.0**	**1.24**	**0.10**	**0.61**	**0.61**	**0.010**	**0.078**	**0.17**	**0.025**
Drive Fourth Creek									0.82	0.10	0.81	0.81	0.01	0.03	0.13	ND
	Fall '14	7.0	1642250.0	0.50	3.5	36	46	90	0.34	0.10	0.50	0.50	0.006	0.057	0.10	0.025
	Wtr '15	7.0	1015240.0	0.66	15.8	32	261	106	0.42	0.10	0.33	0.33	0.010	0.130	0.10	0.025
	Spr '15	7.0	372601.0	0.26	7.7	17	148	126	0.70	0.10	0.82	0.82	0.008	0.096	0.29	0.025
Average:		**7.1**	**828302.5**	**0.37**	**8.8**	**26.6**	**124.1**	**135.5**	**0.57**	**0.10**	**0.61**	**0.61**	**0.007**	**0.078**	**0.15**	**0.025**
Williams Creek	Sum '14	7.0	2038030.0	0.40	5.0	10	107	210	0.76	0.10	1.04	1.04	0.022	0.072	0.14	0.025
	Fall '14	7.0	5053650.0	1.35	6.1	42	77	153	0.83	0.10	1.07	1.07	0.013	0.053	0.14	1.070
	Wtr '15	7.0	1611580.0	0.78	37.2	47	256	172	0.77	0.10	0.52	0.52	0.047	0.179	0.18	0.025
	Spr '15	7.0	42020.0	0.34	7.4	22	34	120	0.76	0.10	0.75	0.75	0.008	0.030	0.15	0.049
Average:		**7.0**	**2186320.0**	**0.72**	**13.9**	**30.0**	**118.4**	**163.8**	**0.78**	**0.10**	**0.84**	**0.84**	**0.022**	**0.083**	**0.15**	**0.292**
National NURP Study Average					11.9	90.8	na	na	na	*****	2.35	3.31	0.18	0.176	0.16	
Characteristics of Urban Stormwater Range					1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 125	

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

-Winter (Jan., Feb., and March); Spring (April, May, and June); Summer (July, Aug., and Sept.); Fall (Oct., Nov., and Dec.)

-The Characteristics of Urban Stormwater and National NURP Study Average data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS

6.2.2 Laboratory Analysis Summary

Seasonal Ambient Grab Samples 2015 - 2016

Summer 2015	Date	pH	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite Nitrogen	Ammonia Nitrogen	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli	Fecal Colif.
First Creek	7/27/15	8.0	5.0	10	5.7	270	1.50	0.10	0.10	0.10	0.005	0.030	0.25	0.032	727	360
Love Creek	7/27/15	8.0	5.0	10	3.3	340	1.10	0.10	0.10	0.10	0.0050	0.030	0.20	0.025	461	1200
Third Creek	7/27/15	8.0	5.0	10	3.8	200	1.40	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	313	390
Fourth Creek	7/27/15	7.5	5.0	10	2.5	290	1.10	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	816	700
Williams Creek	7/27/15	8.5	5.0	10	5.5	320	1.30	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	194	320
Average		**8.0**	**5.0**	**10.0**	**4.2**	**284.0**	**1.3**	**0.10**	**0.10**	**0.10**	**0.0050**	**0.030**	**0.15**	**0.026**	**502**	**594**

Fall 2015	Date	pH	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite Nitrogen	Ammonia Nitrogen	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli	Fecal Colif.
First Creek	10/19/15	7.0	5.0	10	1.0	268	4.58	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	125	104
Love Creek	10/19/15	7.0	5.0	10	1.0	304	1.10	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	365	270
Third Creek	10/19/15	7.0	5.0	10	1.0	269	1.10	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	248	280
Fourth Creek	10/19/15	7.0	5.0	10	1.0	277	1.07	0.10	0.10	0.1	0.0050	0.030	0.10	0.025	147	118
Williams Creek	10/19/15	7.0	5.0	10	1.0	277	1.59	0.10	0.10	0.10	0.0050	0.030	0.10	0.025	113	106
Average		**7.0**	**5.0**	**10**	**1.0**	**279**	**1.89**	**0.10**	**0.10**	**0.10**	**0.0050**	**0.030**	**0.10**	**0.025**	**200**	**176**

Winter 2016	Date	pH	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite Nitrogen	Ammonia Nitrogen	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli	Fecal Colif.
First Creek	2/29/16	7.0	5.0	10	3.9	207	1.45	0.10	0.10	0.10	0.0050	0.030	0.10	0.0250	105	43
Love Creek	2/29/16	7.0	5.0	10	3.3	275	1.27	0.10	0.10	0.10	0.0050	0.030	0.10	0.0250	84	54
Third Creek	2/29/16	7.0	5.0	10	3.0	231	1.64	0.10	0.10	0.10	0.0050	0.030	0.10	0.0280	122	110
Fourth Creek	3/10/16	7.0	5.0	10	27.2	334	1.29	0.10	0.328	0.328	0.0050	0.030	0.10	0.0250	71	60
Williams Creek	2/29/16	7.0	5.0	10	2.5	287	1.69	0.10	0.10	0.10	0.0050	0.030	0.10	0.0250	54	70
Average		**7.0**	**5.0**	**10.0**	**8.0**	**266.8**	**1.5**	**0.10**	**0.15**	**0.15**	**0.0050**	**0.030**	**0.10**	**0.0256**	**87**	**67**

Spri					Suspended	Dissolved	Nitrate +	Ammonia	Total	Total	Lead	Zinc	Total Phosphorus	Ortho Phosphate	E. Coli	Fecal Colif.
First C											0.0050	0.030	0.10	0.0340	260	280
Love Creek	5/9/16	7.0	5.0	12.1	2.90	319	0.713	0.10	0.10	0.10	0.0050	0.030	0.10	0.0250	58	100
Third Creek	4/27/16	7.0	5.0	12.0	1.00	276	1.170	0.10	0.10	0.10	0.00516	0.030	0.10	0.0370	153	164
Fourth Creek	4/27/16	7.0	5.0	12.7	3.10	260	1.260	0.10	0.10	0.10	0.0050	0.030	0.10	0.0550	291	460
Williams Creek	5/9/16	7.0	5.0	10.0	1.00	261	1.520	0.10	0.10	0.10	0.0050	0.030	0.10	0.0250	179	173
Average		**7.0**	**5.0**	**15.5**	**1.80**	**271**	**1.145**	**0.10**	**0.10**	**0.10**	**0.00503**	**0.030**	**0.10**	**0.0352**	**188.2**	**235.4**

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

6.2.2 Laboratory Analysis Summary

Municipal Wet Weather Sampling Results

Point Source Sample Site	Period/Unit	Date	Type	pH	BOD	COD	Suspended Solids (TSS)	Dissolved Solids (TDS)	Nitrate + Nitrite nitrogen	Ammonia	Total Kjeldahl Nitrogen	Total Organic Nitrogen	Lead	Zinc	Total Phosphorus	Ortho Phosphate	Oil/ Grease	E. Coli	Fecal Colif.
	ANNUAL				mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	CFU/100ml	
KAT	Treated Outfall	25-Sep	Grab	7.0	5.0	32.8	4.0	128	0.276	0.10	0.621	0.621	0.0050	0.100	0.460	0.3180	5.3	>2420	>2420
Loraine Street Treatment Units	Pretreated	25-Sep	Grab	7.0	5.0	78.5	38.8	375	0.115	0.10	0.740	0.740	0.0050	0.149	0.781	0.0460	10.0	730	>2420
	East Suntree	25-Sep	Grab	7.0	5.0	69.6	45.7	41	0.109	0.10	0.567	0.567	0.0050	0.114	0.514	0.0250	6.67	980	>2420
	West Baysaver	25-Sep	Grab	7.0	3.9	78.8	61.0	49	0.120	0.10	0.955	0.955	0.0050	0.133	0.545	0.0250	10.0	1,700	>2420
Transfer Station	*Pretreated*	25-Sep	Grab	7.0	8.0	226.0	181.0	38	0.100	0.10	0.662	0.662	0.1350	0.512	0.431	0.0250	5.3	>24000	>24000
	Treated	25-Sep	Grab	7.0	16.8	251	178.0	84	0.235	0.10	1.180	1.180	0.1210	0.460	0.465	0.0300	6.18	>24000	>24000
							422.0	*123*	*3.230*	0.10	*2.630*	*2.630*	*0.2960*	*0.816*	*0.804*	*0.0250*	*11.3*	>16000	>24000
							10.6	56	0.359	0.10	0.404	0.404	0.0050	0.308	0.100	0.0340	5.3	6	80
Average				**6.9**	**11.0**	**147.5**	**117.6**	**112**	**0.568**	**0.10**	**0.970**	**0.970**	**0.0721**	**0.324**	**0.513**	**0.0660**	**7.5**	**854**	**80**
*National NURP Study Average					11.9	90.8	na	na	na	*****	2.350	3.310	0.18	0.176	0.16				
*Characteristics of Urban Stormwater Range					1 - 700	5 - 3,100	2 - 11,300	200 - 14,600	na	0.1 - 2.5	0.01 - 4.5	na	0.0 - 1.9	na	0.1 - 10				

BDL: Results from lab procedures were below test detectable limits. Laboratory procedural limit values were used (in place of BDL) to determine averages for this report: BOD-5.0, COD-10, Ammonia-0.10, Nitrate-0.10, Organic Nitrogen-0.10, Oil & Grease-5.3, Ortho Phosphate-0.025, Total Phosphate-0.10, Kjeldahl-0.10, TDS-10, TSS-1, Lead-0.0050, Zinc-0.030

Microbiological analysis: Results greater than the detectable range are listed in italics – maximum E. coli value from lab is 2420 and maximum Fecal Colif is 6000.

* Data was taken from tables 4-1 and 4-2 of the Stormwater Management for Maine: BMPS.

6.2.3 Noncompliance

As noted in Section 6.2.2 tables, a few grab samples were taken in lieu of composite samples.

6.2.4 Estimated Runoff from Major Watersheds within the MS4 Area

Part VI (A)(2)(e)(i)(3) of the NPDES permit requires an estimate of the total volume of urban runoff discharged by the City of Knoxville for the year. This estimate is based on total rainfall for the year and the estimated imperviousness of different land uses. The total rainfall for the year was determined to be an average of the annual rainfall recorded during the year from the City's five stormwater monitoring stations located throughout the City and the National Weather Service's rain gage at the McGhee Tyson Airport. The average recorded annual rainfall amount was 51.45 inches.

To estimate the total runoff volume, the City utilized GIS to determine approximate areas for each watershed within the city limits along with the corresponding land uses. Each land use is assigned an approximated impervious percentage according to the Camp Dresser and McKee Watershed Management Model described in the Part 2 application, pages 4-14 to 4-18.

It was assumed for each watershed that 95 percent of the rainfall from the impervious fraction, and 15 percent of the rainfall from the pervious fraction of each land use are converted to runoff. Therefore the impervious runoff coefficient and the pervious runoff coefficient are assumed to be 0.95 and 0.15, respectively. For example, based upon an average annual rainfall volume of 51.45 inches/year, the average annual runoff from a single-family residential land use (25% impervious) is 21.25 in/yr (51.45*[(0.15*0.75)+(0.95*0.25)]). The runoff coefficient for a single land use is the sum of the impervious percentage multiplied times the impervious runoff coefficient plus the pervious percentage multiplied by the pervious runoff coefficient. For the previous example, the average runoff coefficient for the single-family residential land use is 0.35 = [0.15*0.75]+[0.95*0.25]. For a watershed, the average runoff coefficient is an area weighted average of each land use runoff coefficients times the percentage of the area of each land use.

The runoff from the major watersheds within the MS4 area was estimated by a formula in Camp Dresser & McKee's Watershed Management Module shown below:

$$Q_i = P \times C_i \times A_i$$

where:

P = total precipitation (inches/year)
C = land use area weighted runoff coefficient = 0.15*Pervious% + 0.95*Impervious%
A = drainage area (acres) = acres x (43,560 ft^2/acre) = ft^2
Q = $\sum Qi$ = total runoff rate / 1,000,000 = Mgal
Q_{tot} = **38,921** million gallons for FY 15/16

Please find the analysis for the each watershed and for the entire city in the following table.

6.2.4 ESTIMATED RUNOFF FROM MAJOR WATERSHEDS WITHIN THE MS4

July 1, 2015 - June 30, 2016

Watershed	Agricul./ Forest/ Vacant, Public Parks	Vacant (>10)	Rural Res.	Single Family Res.	Private Rec., Public Land	Multi-Family Res., Church	Insti-tutional	Mining, Office/ Service	Manu-facturing/ Whole-sale	Commer., Trans./ Utility/ Commun.	Major Roads/ Hwys/ ROWs	Under Const	Not Loaded	Total Acres in Watershed	Acres in the City Limits	Est. % Imperv-ious	C Value	Total Rainfall during 13/14 (in./yr)	Total Runoff for 13/14 (Mgal/yr)
Baker Cr.	412	2	107	640	90	77	32	1	1	3	269	13	27	1,674	1,674	32	0.41	51.45	954
East Fork	313	0	10	475	302	78	73	31	195	235	584	33	180	2,509	2,509	53	0.57	51.45	2,008
First Cr.	724	0	300	3,152	544	501	110	157	127	556	1,412	51	116	7,750	7,750	44	0.50	51.45	5,404
Fourth Cr.	965	57	423	2,026	468	406	93	206	201	568	881	61	414	6,769	5,920	41	0.48	51.45	3,949
Goose Cr.	639	40	126	669	213	67	8	21	77	131	327	34	29	2,381	1,755	35	0.43	51.45	1,049
Grassy Cr.	2,230	176	561	610	215	24	0	14	31	95	211	39	95	4,301	433	17	0.29	51.45	173
Holston R.	2,362	69	371	1,222	417	45	5	2	219	33	805	32	50	5,632	2,455	28	0.37	51.45	1,273
Inman Br.	563	33	214	138	4	12	0	0	0	0	145	0	34	1,143	99	21	0.31	51.45	44
Knob Cr.	1,719	195	481	843	125	84	1	19	1	29	296	4	169	3,966	989	19	0.30	51.45	420
Knob Fork	1,659	26	398	675	182	56	5	93	6	124	257	19	252	3,752	823	22	0.33	51.45	376
Love Cr.	1,735	102	505	1,625	311	212	51	94	178	408	1,038	46	103	6,408	5,090	36	0.44	51.45	3,136
Second Cr.	443	0	90	1,281	346	247	29	107	140	542	1,161	35	82	4,503	4,498	53	0.57	51.45	3,588
Sinking Cr.	1,614	146	459	1,266	284	90	17	33	31	267	881	12	347	5,447	2,434	33	0.41	51.45	1,411
Swanpond Cr.	3,892	303	833	604	121	36	4	79	240	232	457	65	285	7,151	499	19	0.30	51.45	212
Ten Mile Cr.	1,879	0	638	3,421	165	895	55	115	58	615	1,500	24	641	10,006	3,921	38	0.45	51.45	2,468
Third Cr.	1,757	79	436	3,003	406	512	184	124	225	443	1,252	98	220	8,739	8,417	37	0.45	51.45	5,253
TN River	7,197	503	2,269	4,681	2,910	403	187	72	170	238	990	121	1,113	20,854	8,232	22	0.33	51.45	3,764
Toll Cr.	535	69	154	222	42	26	1	0	37	4	93	42	4	1,229	767	22	0.32	51.45	346
Turkey Cr.	3,353	235	603	2,693	264	343	121	104	91	442	1,161	68	738	10,216	1,677	29	0.38	51.45	901
Whites Cr.	2,733	154	782	1,298	575	59	31	11	49	126	608	51	578	7,055	1,634	23	0.34	51.45	769
Williams Cr.	358	11	47	561	46	96	125	17	10	61	276	3	30	1,641	1,605	37	0.45	51.45	1,009
Woods Cr.	1,220	106	281	371	0	26	0	2	140	43	261	1	157	2,608	143	23	0.33	51.45	67
Sink-East	1,226	0		728	9	17	0	17	3	27	0	0	0	2,027	91	12	0.24	51.45	31
Beaver Cr	21,174	0	0	21,230	1,292	845	4	259	283	712	0	160	0	45,959	162	16	0.28	51.45	63
Tuckahoe	4,293	0	0	1,829	18	14	0	8	2	1	0	4	0	6,169	229	8	0.22	51.45	70
Fr.Broad riv	8,954	0	0	2,744	73	40	24	24	497	117	0	166	0	12,639	551	11	0.24	51.45	184
COK Total	73,949	2,306	10,088	58,007	9,422	5,211	1,160	1,610	3,012	6,052	14,865	1,182	5,664	192,528	64,357				**38,921**

The runoff from the major watersheds within the MS4 area was estimated by a formula in Camp Dresser & Mckee's Watershed Management Module. Q = P x C x A

where, P = total precipitation (inches/year) = 51.45 in./yr. = 4.29 ft./yr.

C = land use area weighted runoff coefficient = 0.15*Pervious% + 0.95*Impervious%

A = drainage area (acres) = acres in watershed x (4.35E4 ft2/acre) = Ai ft2

Q = total runoff rate = sum of each watershed's Qi.

Total estimated runoff for Year Eleven = 38,921 Mgal

Approximate area and land use for each watershed was determined through the City's GIS. Total yearly rainfall amount was determined by averaging the amount of rain collected from the City's five monitoring stations located throughout the city (refer to map in appendix). Runoff coefficient (C) was calculated by adding 15 % of the pervious fraction to 95% of the impervious fraction in each watershed. This assumes that the fraction of rainfall producing runoff is 15% and 95% from pervious and impervious surfaces respectively. The summary of the runoff calculations are provided in the table above. Calculations for some of the watersheds were left out due to the insignificant amount of runoff that would be produced.

7.0 ASSESSMENT OF CONTROLS: ESTIMATED POLLUTANT LOADING REDUCTIONS FROM THE MS4

Since the NPDES permit was first issued in 1996, the City of Knoxville has developed and implemented all of the scheduled programs. The ongoing monitoring program and the dry weather-screening program were started during the 1996-1997 permit year. Each required program has been implemented annually since that time. Data has been collected, analyzed, and archived for future reference.

Quantitative estimates of pollutant loads and event mean concentrations (EMC) were reported as required in the fifth annual report for each permit term. The latest estimates have lower EMC values for BOD, COD, TSS, TKN, Pb and Zn. In addition, the lateest estimates have higher EMC values for Nitrate + Nitrite Nitrogen (as N) and Dissolved Phosphorus. However, as described in the Dry Weather Screening Program (ILL-2), noticeable reductions in contaminated outfalls have been observed since the program began.

Although testing data may not be available to substantiate the impact of all of the illicit discharges and illegal dumping problems, which have been resolved, the positive effect on water quality within the MS4 and Waters of the State is irrefutable. Many industries have removed illicit discharges, homeowners and utilities have replaced sections of leaking or broken sanitary sewers, the last known sections of the combined sewers were separated, unknown combined sewer systems have been located and planned for repair, creek restoration and cleanup activities are continuing, and many educational and volunteer programs have been sponsored, conducted, and/or coordinated to reduce dumping. From 2004 to 2016, the Knoxville Utilities Board completed over one-half billion dollars of sewer infrastructure improvements to reduce sewage overflows and ex-filtration.

Structural controls for water quality include stormwater treatment facilities on most new development and significant redevelopment throughout the City since 1997. Covenants are in place to insure that these water quality facilities are maintained and/or replaced as needed. The City has also installed oil/water separators and/or stormwater treatment devices at the following locations: the KAT bus facility on First Creek, Victor Ashe Park, Northwest Crossing regional detention pond, the Prosser Road garage, the Loraine Street Public Works facility, and the Solid Waste Transfer Station. The City has completed additional structural controls at the Solid Waste Transfer Station. Floating trash skimmers have been installed near the mouth of some major creeks to prevent floating pollutants from discharging to the river. Ijams Nature Center has been contracted to maintain and replace the skimmers as needed.

All of the programs implemented to improve water quality in the creeks and river throughout the City should provide some quantitative evidence of improvement in future years. This data will be reported as it becomes apparent.

8.0 SUMMARY OF MODIFICATIONS TO THE SWMP AND PROPOSED CHANGES AS OUTLINED IN THE NPDES PERMIT REAPPLICATION PROPOSAL

The first NPDES MS4 permit cycle for the City of Knoxville (July 1, 1996 – June 30, 2004) established the NPDES program and provided a better understanding of the City's stormwater quality discharge status and trends as a basis for determining what measures are needed to manage and improve receiving water quality. The second permit cycle (July 1, 2004 – present) improved the program and prepared the City to once again propose a new permit with strategic new regulations and proactive responses to water quality impacts and trends.

Appendix A presents the City's proposed program elements for the third permit. If approved, the permit should become effective July 1, 2017. Concurrent with the changes outlined in the permit reapplication, the City proposes to modify the existing SWMP in compliance with Part III (G)(2)(a) on page 8 of the most recent NPDES Permit. As SWMP modifications are developed and implemented, they will be reported as required in the subsequent annual report.

The permit reapplication includes updated implementation schedules for each of the five major programs listed below, which incorporate changes in the program nomenclature. To better meet the City's goals of protecting water quality, some program tasks are proposed that were not included in the previous permits, while other program tasks have been replaced or deleted because they were completed, ineffective or outdated. Highlights of proposed modifications to the SWMP to maximize water quality-based outcomes include improvements in BMP tracking, promotion of green infrastructure, improved runoff reduction design requirements, an offsite mitigation bank, and improvements in monitoring program effectiveness. Where ever appropriate, the permit reapplication will update the original SWMP as described in the program element schedules listed in Part 2 of the first permit application and Part III of the current permit.

The proposed programs for the new permit include:

1. Permanent Stormwater Management of Source Controls (PC)
2. Illicit Discharges Detection and Elimination Program (IDDE)
3. The Industrial and Related Facilities Program (IN)
4. Construction Site Runoff Program (CS)
5. Comprehensive Monitoring Program (MN)

Each of the above programs are further divided into separate program elements and related tasks that correspond to the requirements listed in 40 CFR 122.26(d)(2)(iv) and will replace the Implementation Schedules listed in Part IV of the current Permit. Each specific task is briefly discussed in accordance with the reporting guidelines outlined in Part VI of the current NPDES Permit. All changes for the new permit term will be effective according to the agreed schedules approved by TDEC after the new permit is issued.

9.0 FISCAL ANALYSIS

The Fiscal Analysis for this annual report lists the permit year budget sources and amounts along with estimates for the following permit year. Sources of funds are listed for each major program. Due to complexity, all of the support activities such as purchasing, payroll, legal support, information systems, fleet management, and human resources are not reflected in the table. Future funding sources may change if a stormwater utility fee is implemented.

Program Description	Fund Source	Actual FY 15/16	Est. FY 16/17
Solid Waste Recycling (includes: composting, education, staff, etc.)	Fund 230	$2,108,750	$2,353,750
Household Hazardous Waste Facility	Fund 230	$165,455	$180,000
Stormwater Mgmt Operating expenses	Fund 220	$2,735,950	$2,704,520
PSD – MS4 Maintenance	Fund 100	$3,428,302	$3,500,000
Transfer Station Stormwater Improvements	Fund 401	$434,517	$260,000
Cross Park Dr. Drainage Improvements	Fund 401	$562,896	$0
Williams Creek/Selma	Fund 401	$0	$28,300
Cumberland Avenue Streetscapes (*estimated)	Fund 401	$4,381,584*	$1,500,000
N. Central Avenue Streetscapes (*estimated)	Fund 401	$0	$98,835
Marble Avenue Streetscapes (*estimated)	Fund 401	$241,523*	$500,000
700 Block of Gay St. Streetscapes (*estimated)	Fund 401	$856,947*	$796,415
Suttree Landing Park & Roadway (*estimated)	Fund 401	$968,135*	$331,600
Dale Avenue Water Quality Feature	Fund 401	$117,880	$0
Westland Dr. Improvements	Fund 401	$502,308	$0
Neighborhood Drainage Projects	Fund 401	$295,702	$871,345
Fountain City Lake Improvements	Fund 401	$277,683	$275,000
CIPP for small CMP	Fund 401	$64,000	$0
Chilhowee Park CIPP	Fund 401	$117,255	$0
Total Estimated Stormwater Costs		**$17,258,887***	**$13,399,765**

APPENDIX A

City of Knoxville NPDES Permit Reapplication

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF SWMP ELEMENTS AND PROGRAMS

PROGRAM OF STRUCTURAL AND SOURCE CONTROLS FOR REDUCING POLLUTANTS TO THE MUNICIPAL SEPARATE STORM SEWER SYSTEM 122.26 (d)(2)(iv)(A)

Permanent Stormwater Management of Source Controls (PC)

CODE	ACTIVITY	SCHEDULE
PC-1	**Maintenance Activities for Structural Controls**	
	- Review and update the SWMP (orginally "Part 2 application").	Full implementation after 12 months
	- Implement stream restoration capital improvements.	Ongoing
	- Implement inspections and maintenance activities of stream, channel, and structural controls.	Ongoing
	- Maintain or regulate structural controls to prevent floating discharges to the TN River.	Ongoing
	- Maintain or regulate water quality Riparian Buffer Zones (RBZ) to protect streams.	Ongoing
	- Implement requirement for routine and major maintenance of BMP facilities.	12 months
PC-2	**Planning for New Development**	
	- Modify as necessary existing new development and significant redevelopment requirements in Stormwater and Street Ordinance.	24 months
	- Implement requirement for Standard Maintenance Covenants for onsite facilities.	Ongoing
	- Implement new method for water quality treatment volume (WQTV) management.	24 months
	- Develop watershed masterplans based on visual stream assessments, investigations, and SWMM modeling (see MN-3).	36 months
	- Update BMP manual and maintain guidance criteria for BMPs on City web site.	Annually
	- Continue existing procedures for project review, approval and enforcement for projects requiring a general construction permit, modifying as necessary.	Ongoing
PC-3	**Maintenance for Public Streets, Roads, and Highways**	
	- Revise and continue Public Service Department Street Maintenance Program as outlined in SWMP (previously "Part 2 application").	Ongoing
	- Maintain improved de-icing program.	Ongoing
PC-4	**Flood Management Projects**	
	- Continue to evaluate new City owned Regional Flood Management Facilities for the feasibility of water quality retrofits.	Annually
	- Maintain GIS inventory of on-site BMP facilities, including newly constructed facilities.	Ongoing
PC-5	**Monitoring of Solid Waste Facilities**	
	- See IN-3 per 40 CFR 122.26 (d)(2)(iv)(C).	Ongoing
PC-6	**Management of Pesticides, Herbicides, and Fertilizer**	
	- Reevaluate and implement new targeted public education program, including City staff.	24 months
	- Reevaluate effect of fertilizers as part of the City's ongoing monitoring program.	Ongoing
PC-7	**Annual Reporting**	
	- Annual reporting to TDEC concerning progress of this program.	Within 6 months after end of each year

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF SWMP ELEMENTS AND PROGRAMS

PROGRAM TO DETECT AND REMOVE ILLICIT AND IMPROPER DISCHARGES TO THE MS4
122.26(d)(2)(iv)(B)

The Illicit Discharge Detection and Elimination Program(IDDE)

CODE	ACTIVITY	SCHEDULE
IDDE-1	**Ordinances**	
	- Review/update existing ordinance for prohibitions, exemptions, and $5,000 penalities for non-stormwater discharges.	12 months
IDDE-2	**Field Screening**	
	- Perform follow-up analysis at all high-risk field screening sites from previous year.	Ongoing
	- Investigate 150 outfalls four times per year and test any dry weather flow.	Ongoing/Annually
IDDE-3	**Investigation of Storm Drain System**	
	- Implement procedures for mapping, field surveys and upstream source identification.	Ongoing
	- Evaluate and update enforcement procedures, policies, monitoring, and inspections.	Ongoing
	- Conduct continuous QA/QC on storm drain system and maintain core features on GIS.	Annually
IDDE-4	**Spill Response Program**	
	- Coordinate with Knoxville Emergency Response Team (KERT) and Tennessee Department of Environment and Conservation (TDEC).	Ongoing
IDDE-5	**Reporting of Illicit Discharges and Public Education Program**	
	- Maintain and monitor 311 hotline Call Center for public reporting of water quality concerns	Ongoing
	- Develop method for public online reporting of illicit discharges.	Full implementation after 12 months
	- Document date, location, investigation, response and resolution of illicit discharge complaints in data management systems.	Ongoing
	- Inspect and maintain health hazard warning signs on 303(d) listed creeks and other bodies of water on city property that have water quality issues.	Annually
	- Reevaluate and implement new targeted public education program to prevent illicit discharges/connections.	24 months
IDDE-6	**Used Oil & Toxic Materials Program**	
	- Maintain online public information about proper management and disposal of used oil and toxic materials from both private and public facilities.	Ongoing
	- Require "No Dumping" message cast into all curb irons and solid stormwater catch basin covers installed on new developments.	Ongoing
IDDE-7	**Control Infiltration**	
	- Maintain adequate legal authority and coordinate with sewer utilities to resolve illicit connection or unauthorized discharges to the MS4.	Ongoing
IDDE-8	**Annual Reporting**	
	- Annual reporting to TDEC concerning progress of this program.	Within 6 months after end of each year

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF SWMP ELEMENTS AND PROGRAMS

PROGRAM TO MONITOR AND CONTROL RUNOFF FROM TSD AND INDUSTRIAL FACILITIES SUBJECT TO SARA III, SECTION 313 122.26(d)(2)(iv)(C)

The Industrial and Related Facilities Program (IN)

CODE	ACTIVITY	SCHEDULE
IN-1	**Ordinances**	
	- Implement any necessary revisions to the Stormwater and Street Ordinance, including prohibitions and exemptions of non-stormwater discharges (see IDDE-1).	Full implementation after 12 months
	- Require Stormwater Pollution Prevention Plans (SWPPPs) from Municipal Industrial Facilities (MIFs) and report updates annually.	Full implementation after 12 months
IN-2	**Inspection Element**	
	- Require inspections for all Special Pollution Abatement Permit (SPAP) sites.	Ongoing
	- Perform followup inspections at 100 SPAP sites.	Annually
	- Inspect potential industrial discharges through IDDE program (both SW and non-SW discharges).	Ongoing
	- Accept and evaluate Notice of Intents (NOIs) from Industrial Permit applicants.	As received
	- Conduct visual inspections at MIFs to verify SWPPP compliance.	Annually
IN-3	**Monitoring Element**	
	- Collect monitoring data from permitted industrial stormwater dischargers and/or from TDEC. Assess impacts to storm sewer system.	Ongoing
	- Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial Facilities subject to SARA Title III, Section 313. Request monitoring data/reports as necessary.	Ongoing
	- Evaluate and update the monitoring program for Municipal Industrial Facilities (MIFs) in each annual report as necessary.	Annually
	- Continue dry weather screening at outfalls from predominantly industrial areas (see IDDE-2).	Ongoing/Annually
	- Collect wet-weather samples from all MIFs each permit term.	One Facility Annually
IN-4	**Annual Reporting**	
	- Annual reporting to TDEC concerning progress of this program.	Within 6 months after end of each year

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF SWMP ELEMENTS AND PROGRAMS

PROGRAM TO IMPLEMENT AND MAINTAIN BMP PLANS TO REDUCE CONSTRUCTION SITE RUNOFF TO THE MS4 122.26(D)(2)(IV)(D)

Construction Site Stormwater Runoff Pollutant Control (CS)

CODE	ACTIVITY	SCHEDULE
CS-1	**Site Planning**	
	- Require by ordinance construction sites greater than 10,000 SF to submit Erosion Prevention and Sediment Control Control (EPSC) Plans .	Ongoing
	- Maintain current inventory of State of Tennessee Construction General Permit (CGP) permitted sites as required by Qualifying Local Program (QLP) status .	Ongoing
	- Require site plan submittals per the City of Knoxville Land Development Manual or equivalent.	Ongoing
	- Review and/or update minimum criteria for plan review and inspection checklists.	Ongoing
	- Require Preconstruction Meetings with developer/contractors for projects requiring a bond (i.e., priority sites).	Ongoing
CS-2	**Nonstructural and Structural BMPs**	
	- Require construction BMPs for EPSC from the City of Knoxville BMP manual or equivalent.	Ongoing
	- Develop improvements for the BMP Manual and Stormwater and Street Ordinance to insure that all minimum construction BMP requirements are equivalent or more protective than the CGP, as required by QLP status.	24 months
	- Require construction site Good Housekeeping practices to avoid adverse impacts to water quality.	Ongoing
CS-3	**Inspection/Enforcement**	
	- Maintain expanded inspections program including smaller construction sites (single family).	Ongoing
	- Implement routine site inspections on commercial and subdivision developments (e.g., rough grading, EPSC, permanent BMP installation, final grading and final stabilization), and stormwater systems.	Monthly
	- Require all post-construction Development Certifications from licensed design professionals before bond release to insure the stormwater facilities are built as planned.	Ongoing
	- Update and implement inspection, inspector certification, and enforcement procedures, policies, and follow-up monitoring/inspections.	Ongoing
CS-4	**Training Programs**	
	- Sponsor Educational Seminar(s) for City staff, developers, engineers, and contractors.	Biannually
	- Provide training for Stormwater Division Engineers and Inspectors.	Annually
CS-5	**Annual Reporting**	
	- Annual reporting to TDEC concerning progress of this program.	Within 6 months after end of each year

SCHEDULE FOR DEVELOPMENT AND IMPLEMENTATION OF SWMP ELEMENTS AND PROGRAMS

PROGRAM TO COLLECT QUANTITATIVE DATA TO DETERMINE THE IMPACTS OF URBAN STORMWATER ON THE NATURAL ENVIRONMENT 122.26(d)(2)(iii)(A)

The Comprehensive Monitoring Program (MN)

CODE	ACTIVITY	SCHEDULE
MN-1	**Analytical Monitoring**	
	-Review and update the Standard Operating Procedures (SOP) for the monitoring program.	Annually
	- Complete visual stream surveys for all streams within the MS4 using the City of Knoxville Visual Stream Assessment Protocol.	Minimum two (2) streams per year, all within permit term
	- Conduct biological stream sampling and habitat assessment for Stream Segments with Unavailable Parameters for siltation, habitat alteration and/or nutrients, collecting one sample per Stream Segment.	All Stream Segments in permit term
	- Collect five (5) E. coli bacteria samples within 30 days to establish a geometric mean for each Stream Segment with Unavailable Parameters for pathogens.	All Stream Segments in permit term
MN-2	**Dry Weather Screening & Industrial/Commercial Site Monitoring**	
	- Investigate at least 150 outfalls four times per year and test any dry weather flow, including follow-up analysis at all high risk field screening sites from previous year (see IDDE-2).	Ongoing/Annually
	- Collect monitoring data from permitted industrial stormwater dischargers and/or from TDEC. Assess impacts to storm sewer system (see IN-3).	Ongoing
	- Collect wet-weather samples from all MIFs each permit term (see IN-3).	One Facility Annually
	- Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial Facilities subject to SARA Title III, Section 313. Request monitoring data/reports as necessary (see IN-3).	Ongoing
MN-3	**Masterplanning and Modeling**	
	- Maintain watershed MikeUrban/SWMM model(s).	Annually as needed
	- Develop watershed masterplans based on visual stream assessments, investigations, and SWMM modeling (see PC-2).	36 months
	- Study a specific major City watershed, develop a watershed model, and create a detailed management plan that can be implemented to reduce flooding and improve water quality.	One (1) watershed per five year permit term
MN-4	**Training Program**	
	- Implement Training Program for Staff and/or Volunteers.	Ongoing
MN-5	**Annual Reporting**	
	- Annual reporting to TDEC concerning progress of this program.	Within 6 months after end of each fiscal year

PERMANENT STORMWATER MANAGEMENT OF SOURCE CONTROLS (PC)

Program of Structural and Source Controls/or Reducing Pollutants to the Municipal Separate Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(A).

PC-1 Maintenance Activities for Structural Controls

SWMP Task: Review and update the Stormwater Management Plan (SWMP) (originally "Part 2 application"). Schedule: 12 months

The Stormwater Management Plan (SWMP - previously referred to as the "Part II Application") for maintenance activities and structural controls was developed in Part 2 of the initial permit application. It will be reviewed and updated annually as needed in the new permit term. Current or revised Standard Operating Procedures (SOPs) will be implemented for conducting inspections and maintaining structural controls and roadway stormwater collection systems operated by the City.

SWMP Task: Implement stream restoration capital improvements. Schedule: Annually

Capital improvement projects for stream restoration, channel maintenance, and/or other Best Management Practices (BMPs) will continue to be identified, designed, and/or constructed annually to resolve existing flooding, erosion, TMDLs, and other targeted needs.

SWMP Task: Implement inspections and existing maintenance activities of stream, channel, and structural controls. Schedule: Ongoing

The City will continue routine inspections of the channel system and review/update channel maintenance guidance procedures and scheduling in the SWMP. Inspections will allow the evaluation of impacts on water quality structural controls for reducing pollutants in discharges from municipal separate storm drains and to examine existing projects for incorporating additional water quality protection devices or practices.

SWMP Task: Maintain or regulate structural controls to prevent floating discharges to the TN River. Schedule: Ongoing

A control program is in place to capture and remove litter, debris, oil, and other floatables from the major urban creeks through an annual contract.

The City will maintain, improve, or regulate structural controls for preventing floatables from entering the Tennessee River. Although the focus of this program has largely been to reduce unsightly trash from entering the river, the floating trash skimmers at the mouths of the creeks have effectively detained many oil/fuel spills until remediation personnel could respond. As an added measure, certain land uses identified as "hotspots" are required to maintain structural

controls through a Special Pollution Abatement Permit (SPAP) to prevent discharge of floatables offsite (see PC-2).

SWMP Task: Maintain or regulate water quality Riparian Buffer Zones (RBZ) to protect streams. Schedule: Ongoing

The City has developed and implemented requirements to reestablish, protect and maintain permanent water quality Riparian Buffer Zones (RBZs) in the Stormwater and Street Ordinance (Ordinance). These regulations provide additional stream water quality treatment in all riparian areas throughout the City including New Development Projects. The water quality RBZ is either 30' or 60' and is measured from the top of bank and extending perpendicular from each bank for the length of the water body. The RBZ widths depend on the size of the drainage area.

SWMP Task: Implement requirement for routine and major maintenance of BMP facilities. Schedule: 12 months

All stormwater facilities constructed since 1997 are required to be inspected and maintained to comply with a detailed agreement or covenant, which is recorded before a site development permit is issued. The City is currently developing ordinance clarification that will better define property owner responsibility and ensure maintenance on all critical BMP facilities without covenants.

During the last permit term, the City designated a full time employee to inspect stormwater detention basins and to encourage property owners to maintain these devices. Sediment from the maintenance of detention/water quality ponds, treatment devices, or from stream restoration activities must be removed from the stormwater facility and disposed properly in a landfill classified for such material or used as fill outside the stormwater drainage system. The City does not propose to duplicate TDEC's efforts to regulate contaminated sediments from any stormwater management sources.

PC-2 Planning for New Development

SWMP Task: Modify as necessary existing new development and significant redevelopment requirements in Stormwater and Street Ordinance. Schedule: 24 months

The City will review and modify as necessary the existing Ordinance to reduce the discharge of pollutants from municipal separate storm drains which receive discharges from New Development Projects and significant redevelopment. The Ordinance will address controls to reduce pollutants in discharges from municipal separate storm drains after construction is completed. The current Ordinance may be accessed at www.knoxvilletn.gov/engineering.

The current standard management method for water quality control from new development and redevelopment includes first flush control outlets in the quantity pond or in a separate quality pond. Alternate treatment methods are accepted if they provide equivalent or better pollutant removal efficiencies than the standard first flush detention ponds. In addition to first

flush treatment, the Ordinance requires a Special Pollution Abatement Permit for certain land uses that are known to either contribute a disproportionate amount of stormwater pollution (a.k.a. hotspots) or contribute pollutants which would not be effectively removed by the standard first flush control.

SWMP Task: Implement requirement for Standard Maintenance Covenants for onsite facilities. Schedule: Ongoing

The current Ordinance requires the owner of the property to execute a legal document entitled "Covenants" and record it in the office of the Knox County Register of Deeds before a site development permit is issued. The City does not plan to modify this requirement.

SWMP Task: Implement new method for water quality treatment volume (WQTV) management. Schedule: 24 months

The City proposes to develop and implement a representative storm event or runoff volume to manage of the water quality treatment volume (WQTV) during post-construction. Although permanent stormwater control measures (SCMs) for treatment of the entire WQTV are preferred, equivalent methods for treatment of a portion of the WQTV will be evaluated and implemented as necessary.

SWMP Task: Develop watershed masterplans based on visual stream assessments, investigations, and SWMM modeling. Schedule: 36 months

During the new permit term, the City proposes to develop masterplan(s) for all major creeks based on visual stream assessments and inspections. A major creek is defined as a creek with a watershed greater than 50 acres and more than fifty percent of the drainage area contained within the City limits. Additional watersheds will be added if the City limits expand to include more than fifty percent of the area in that watershed. Develop MikeUrban/SWMM model on priority watersheds to validate and improve the watershed masterplan.

SWMP Task: Update BMP manual and maintain guidance criteria for BMPs on City web site. Schedule: Annually

Because maintenance of BMPs is critical to their long-term effectiveness in reducing pollutant loading from stormwater, the City will constantly evaluate guidance criteria as new technology or future needs develop. At least once per year, the most effective types of BMPs, design standards, and maintenance requirements for BMPs to be used throughout the City will be incorporated into the BMP manual. The manual may be accessed at www.knoxvilletn.gov/engineering.

SWMP Task: Continue existing procedures for project review, approval and enforcement for projects requiring a construction permit, modifying as necessary. Schedule: Ongoing

The City will continue to evaluate and update the program to ensure an effective project review and approval procedures for implementation of appropriate SCM maintenance procedures for projects requiring a construction permit. This SWMP-documented program will continue to provide procedures for City inspections and enforcement action for failure to maintain SCMs to sustain pollutant removal efficiency during the life of a New Development Project.

PC-3 Maintenance for Public Streets, Roads, and Highways

SWMP Task: Revise and continue Public Service Department Street Maintenance Program as outlined in SWMP (previously "Part 2 application"). Schedule: Ongoing

The City will update and continue the program for street maintenance to prevent or further reduce pollutant runoff. All maintenance procedures and plans in the Public Service Department Street Maintenance Program will be included in the SWMP.

SWMP Task: Maintain improved de-icing program. Schedule: Ongoing

The Public Service Division evaluates snow removal activities and materials and revises the Snow Removal Plan to minimize costs without sacrificing safety. The City has been able to significantly reduce the quantity of de-icing materials used by improved equipment, forecasting, brine use, and operator training. The City will continue to look for opportunities to minimize the use of de-icing materials to reduce costs and protect the environment as alternatives become available.

PC-4 Flood Management Projects

SWMP Task: Continue to evaluate new City owned Regional Flood Management Facilities for the feasibility of water quality retrofits. Schedule: Annually

The City owns and maintains regional detention facilities that were originally designed for flood control, but have been since retrofitted to achieve additional water quality benefits. Engineering staff will continue to evaluate these existing facilities and any new City owned Regional Flood Management Facilities on an annual basis in order to insure proper function of BMPs and to examine opportunities to improve the effectiveness of removing stormwater pollutants of concern.

SWMP Task: Maintain Geographic Information Systems (GIS) inventory of on-site BMP facilities, including newly constructed facilities. Schedule: Annually

Engineering staff will continue to maintain and update the existing inventory of permanent stormwater control measure assets incorporating BMPs on existing and New Development Projects, as part of an ongoing GIS maintenance and improvement program. The asset management software is coupled with the GIS platform that provides a spatial representation of green infrastructure facilities and an inventory of green infrastructure project data. For the inventory of detention basins, proprietary SPAP devices and other green infrastructure projects, the system collects information on green infrastructure attributes including design specifications, location, as well as ownership and responsible maintenance information.

PC-5 Monitoring of Solid Waste Facilities

SWMP Task: Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial Facilities subject to SARA Title III, Section 313. Schedule: Ongoing

See IN-3 per 40 CFR 122.26 (d)(2)(iv)(C).

PC-6 Management of Pesticides, Herbicides, and Fertilizer

SWMP Task: Reevaluate and implement new targeted public education program, including City staff. Schedule: 24 months

The City will continue to implement its targeted education and outreach program to raise awareness among the general public and professional chemical applicators and distributors (including municipal facilities) about the proper storage, use, and disposal of pesticides, herbicides, and fertilizers. Education programs for pesticides, herbicides, and fertilizer use have already been implemented in conjunction with City public education programs for collection and recycling of household hazardous waste (HHW). The City will continue to track and maintain records of public involvement and educational activities, and summarize these in the annual report. The Knoxville BMP Manual located at www.knoxvilletn.gov/engineering offers two BMPs for proper pesticide, herbicide, and fertilizer use and disposal.

SWMP Task: Reevaluate effect of fertilizers as part of the City's ongoing monitoring program. Schedule: Ongoing

As part of the ongoing stormwater monitoring program, the City will continue to monitor the significance and effects of fertilizers through annual base-line testing of the receiving waters to evaluate the effect of fertilizer products on water quality of the MS4 and downstream receiving waters. The City proposes to report each year's monitoring results in the corresponding annual report.

ILLICIT DISCHARGES DETECTION AND ELIMINATION PROGRAM (IDDE)

Program to Detect and Remove Illicit and Improper Discharges to the Municipal Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(B).

IDDE-1 Ordinances

SWMP Task: Review/update existing Ordinance for prohibitions, exemptions, and $5,000 penalties for non-stormwater discharges. Schedule: Ongoing

The Stormwater and Street Ordinance was developed to specifically prohibit non-stormwater discharges, increase penalties for illegal discharges, and to provide water quality regulations for new development. The first Ordinance was effective June 20, 1997. The Ordinance has been updated several times since then. The current ordinance is available at www.knoxvilletn.gov/engineering.

The Ordinance specifically prohibits illicit discharges and illegal dumping to any portion of the MS4 or any area draining to the MS4. Illicit discharges were defined consistent with 40 CFR 122.26(b)(2) as any non-storm water discharge to the MS4, which is not specifically exempted in the Ordinance. This definition, along with the $5,000 penalty for violations, has formed the cornerstone of the City's successful enforcement program.

IDDE-2 Field Screening

SWMP Task: Perform follow-up analysis at all high-risk screening sites. Schedule: Ongoing

A high-risk dry weather screening site is an outfall where elevated levels of pollution were detected in the previous year. The parameters tested include phenols, ammonia, detergents, copper, chlorine, turbidity, pH, color, and temperature.

SWMP Task: Investigate 150 field-screening sites four times per year. Schedule: Ongoing

Dry weather field screening is the primary method used to randomly seek out illicit discharges to the storm drain system. The monitored outfalls will consist of the previous year's high-risk outfall sites plus randomly selected outfalls from the general outfall inventory. The randomly selected sites will be selected from areas of primarily industrial use and from areas that had not been previously tested. The City will also select outfalls throughout the city with some preference given to newly developed areas.

The SOP for dry weather screening was developed in Part 1 of the initial permit application and continues to be updated as part of the SWMP.

IDDE-3 Investigation of the Storm Drain System

SWMP Task: Implement procedures for mapping, field surveys and upstream source identification. Schedule: Ongoing

The procedures for mapping, field surveys and upstream source identification were developed and included in the City's Stormwater Management Plan. The City will continue to utilize these procedures to maintain the effectiveness of the Illicit Discharge Detection and Elimination Program. Updated SOPs will be maintained in the SWMP.

SWMP Task: Evaluate and update enforcement procedures, policies, monitoring and inspections. Schedule: Ongoing

The schedule for this task will continue to coincide with the schedule for Ordinance updates. The existing enforcement procedures and policies have been effective and were last updated as part of the Enforcement Response Plan (ERP) for the Qualifying Local Program (QLP) requirements in 2013. Future updates to the ERP and policies can be found online in the Land Development Manual (LDM) at www.knoxvilletn.gov/engineering.

Follow-up monitoring and inspections will be performed by the City and through self-inspections by industries. Enforcement actions resulting from the Dry Weather Screening Program will be followed as defined within that program as a minimum. Any outfall with significantly high levels of contamination is identified as an illicit connection/illegal dump source and will be tested four times a year, every year, until the outfall is dry or clean on four consecutive visits. Sources of pollution identified by other means will be monitored as needed or specified for the individual situation. The Stormwater and Street Ordinance requires immediate reporting of spills and illicit discharges and allows the City to require additional monitoring.

SWMP Task: Conduct continuous QA/QC on storm drain system and maintain core features on GIS. Schedule: Annually

The City is dedicated to maintaining and updating the existing inventory of ponds, pipes, water quality facilities and other drainage features as part of an ongoing GIS maintenance program. This task is implemented by a concerted effort within the Engineering Department.

The Outfall Inventory Database is linked to the GIS to allow data access geographically for a single point or by report/query functions for many outfalls at a time. The GIS map is available for review upon request from the Knoxville, Knox County, Knoxville Utilities Board Geographic Information System (KGIS) office, and contains over 200 layers including: the names and location of Waters of the State that receive discharges from those outfalls, inputs into the storm drain collection system, such as the inlets, catch basins, drop structures or other defined contributing points to stormwater drainage for that outfall, and general direction of

stormwater flow as indicated by the topographic layer derived from Digital Terrain Models and LiDAR at 2-foot contours.

To map the stormwater system, the City uses office and field-based methods. The City is also developing an Asset Management Inventory focusing on integrity of catch basins and conduits. Hotspot priority sites, detention ponds, and other stormwater facilities are mapped on the GIS along with their corresponding covenants for maintenance.

The City has made a substantial investment in mapping and is continuing to update its storm system map from as-built information for new development as time permits. Storm drainage systems from both private development and public works projects are regularly updated in the City's GIS system showing enhancement of existing systems with green infrastructure BMPs.

IDDE-4 Spill Response Program

SWMP Task: Coordinate with Knoxville Emergency Response Team (KERT) and Tennessee Department of Environment and Conservation (TDEC). Schedule: Ongoing

The City, 911, Knoxville Fire Department and the Engineering Department will continue to coordinate with both KERT and TDEC and respond to spills and other emergency situations as they are identified, 24 hours per day, seven days per week.

IDDE-5 Reporting of Illicit Discharges and Public Education Program

SWMP Task: Maintain and monitor 311 hotline Call Center for public reporting of water quality concerns. Schedule: Ongoing

Since the original permit was issued, the City has added a full-time 311 Call Center that receives and distributes all calls from citizens for service, including water quality concerns. A customer service representative follows a script to collect consistent information from Customer Service Request SOPs for Water Quality Inspection, Water Drainage Inspection, Sinkhole/Cave-In, Creek Maintenance, and Construction Contractor Complaint. The 311 representative enters the service request into a tracking system and forwards the appropriate requests to the Stormwater Engineering Division following an SOP for email generation.

SWMP Task: Develop method for public online reporting of illicit discharges.
Schedule: Full implementation after 12 months

The City will develop a Citizen Portal for the public to report suspected illicit discharges through the City of Knoxville website, 24 hours per day, 7 days per week. Information entered through the portal will be conveyed to the Stormwater staff by email.

SWMP Task: Document date, location, investigation, response and resolution of illicit discharge complaints in data management systems. Schedule: Ongoing

The City proposes to continue to improve the current program, where complaints about illicit discharges or other water quality impacts are investigated as received and resolved as solutions or resources are available. During the course of these investigations, stormwater personnel rely on existing maps to conduct preliminary analysis prior to the site visit, to determine the origin of illicit discharges reported downstream, and to respond to spills by identifying and recovering illicit discharges at appropriate downstream locations. Inspection and observations made during 311 requests and emergency response actions are often used as opportunities to verify and if necessary, update existing data on the GIS.

After the initial investigation in the field, data about activities are recorded in an internal record keeping system. Information includes incident date, inspector, type, details, and address; caller information (if available); assessment information and recommendations. As the investigation and recommendations for further action develop, updates are entered. When the incident is resolved, the case is marked as closed. Successful resolutions often are preceded by issuance of a Notice of Violation, follow-up discussion with the facility's representative or individual responsible for the illicit discharge about remedies to mitigate and/or remediate the hotspot, and/or issuance of a SPAP.

SWMP Task: Inspect and maintain health hazard warning signs on 303(d) listed creeks and other bodies of water on city property that have water quality issues.

Schedule: Annually

The current permit has TMDL implementation tasks, including the following requirement: "...to post and maintain advisory signs at streams that are designated as unsafe for recreation." As required by the TMDL implementation plan, the signs were installed at appropriate locations approved by TDEC and at strategic locations for maximum public exposure. The signage includes contact information to report illicit discharges and illegal dumps to the City. The City will continue to post and maintain these signs to protect human health.

SWMP Task: Reevaluate and implement new targeted public education program to prevent illicit discharges/connections. Schedule: 24 months

The City will continue to implement its public education and outreach program to prevent illicit discharges/connections and document it in the SWMP, including public notice requirements and targeted events/participants. The focus of the program will continue to be on impacts of stormwater discharges to water bodies and the steps that the public can take to reduce pollutants in stormwater runoff. The program will target specific pollutants and sources that may cause or contribute to impairment (e.g., hotspots). The City will continue to track and maintain records of public involvement and educational activities, and summarize these in the annual report.

IDDE-6 Used Oil & Toxic Materials Program

SWMP Task: Maintain online public information about proper management and disposal of used oil and toxic materials at both private and public facilities. Schedule: Ongoing

Both Knoxville and Knox County residents may use the Household Hazardous Waste (HHW) Collection Center located at 1033 Elm Street. Only residential material is accepted; businesses and industries must contract privately for the disposal of hazardous waste. A maximum of 100 pounds or 10 gallons of HHW is accepted per vehicle per day.

Information about the hours and location of the HHW Collection Center and the types of HHW accepted will continue to be posted at:
http://www.knoxvilletn.gov/government/city_departments_offices/public_service/solid_waste/household_hazardous_waste.

SWMP Task: Require "No Dumping" message cast into all curb irons and solid stormwater catch basin covers installed on new developments. Schedule: Ongoing

The City proposes to continue the requirement that all castings include an environmental message. Since January 2000, the City has required a "No Dumping" message to be cast in all new curb irons grates and solid stormwater manhole/junction box covers. The following year, the City included covers for stormwater treatment devices in this requirement. The message is used to educate the public that the City's storm drain system is not a sewer for their waste. Since there was no additional cost from the foundries that provide the irons in Tennessee, this method of messaging is one of the most cost effective educational program in the City.

IDDE-7 Control Infiltration

SWMP Task: Maintain adequate legal authority and coordinate with sewer utilities to resolve illicit connection or unauthorized discharges to the MS4. Schedule: Ongoing

The City will continue to coordinate with the sewer utilities to resolve any illicit connections or any unauthorized discharges to the MS4 as they are identified. The City will maintain adequate legal authority over illicit discharges.

THE INDUSTRIAL AND RELATED FACILITIES PROGRAM (IN)

Program to Monitor and Control Runoff on TSD and Industrial Facilities Subject to SARA Title III, Section 313, requirements, 40 CFR 122.26(d)(2)(iv)(C).

IN-1 Ordinances

SWMP Task: Implement any necessary revisions to the Stormwater and Street Ordinance, including prohibitions and exemptions of non-stormwater discharges.

Schedule: Full implementation after 12 months

This task is described in the management section IDDE-1 for illicit discharge detection and elimination.

SWMP Task: Require Stormwater Pollution Prevention Plans (SWPPPs) from Municipal Industrial Facilities (MIFs) and report updates annually.

Schedule: Full implementation after 12 months

The City will update the SWMP to require a SWPPP from each City MIF to prevent and reduce pollutant runoff from these City operations. The SWMP will also require MIF personnel to evaluate the SWPPP annually in order to update as necessary.

IN-2 Inspection Element

SWMP Task: Require inspections for all Special Pollution Abatement Permit (SPAP) sites.

Schedule: Ongoing

The City proposes to continue its SPAP inspection program for those specific land uses that have proven to cause polluted runoff problems (hotspots). The Ordinance requires a SPAP on new development and redevelopment of projects for certain land uses. This program is used to eliminate gaps in the existing State and Federal permit programs through a local inspection program for otherwise non-permitted facilities.

SWMP Task: Perform follow-up inspections at 100 SPAP sites. Schedule: Annually

Although responsibility for maintenance of stormwater facilities at SPAP sites remains with the property owner, the City will retain the right to inspect stormwater facilities with SPAPs to insure that BMPs remain effective in maintaining stormwater outfall discharge quality. The City proposes to perform inspections at 100 sites participating in the SPAP program annually.

SWMP Task: Inspect potential industrial discharges through IDDE program (both SW and non-SW discharges). Schedule: Ongoing

Field screening activities described in the IDDE program primarily addresses runoff from industrial facilities. Potential Illicit connections or improper disposal from industrial facilities that are discovered during field screening or stormwater complaints will be fully inspected through tracking the situation until the illicit connection is corrected and the illegal dumping stopped.

SWMP Task: Accept and evaluate Notice of Intents (NOIs) from Industrial Permit applicants. Schedule: As received

When NOIs are received from TDEC or directly from the private industry, the City proposes to review and evaluate the information for potential impacts to the municipal storm drain system. In the past, the NOIs have been instrumental in locating and removing discharges from local industries. During inspections or enforcement actions with an industry, the City may verify that an NOI has been filed.

SWMP Task: Conduct visual inspections at MIFs to verify SWPPP compliance. Schedule: Annually

Visual inspections are often a good general indicator of facility housekeeping and provide the facility with a rapid, simple, and cost-effective assessment of its stormwater quality and SWPPP implementation. City Stormwater staff will conduct visual inspections of City MIFs annually to verify compliance with the site SWPPP and to look for opportunities to improve pollution prevention practices.

IN-3 Monitoring Element

SWMP Task: Collect monitoring data from permitted industrial stormwater dischargers and/or from TDEC. Assess impacts to storm sewer system. Schedule: Ongoing

The current Stormwater and Street Ordinance authorizes the City to require additional monitoring from industries not covered under the TDEC programs whenever necessary. This will usually be required in conjunction with some enforcement action after a problem has been observed. The City proposes to continue to maintain this information to assess the impact of the monitored discharges on the water quality of the storm drain system as the City receives the data.

If the City determines that additional data needs to be provided in the monitoring program for an industry (e.g., reports on additional parameters), requirements for an expanded program for subsequent monitoring events will be coordinated with TDEC and/or the industrial discharger.

SWMP Task: Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial Facilities subject to SARA Title III, Section 313. Request monitoring data/reports as necessary. Schedule: Ongoing

The City will maintain the legal authority as specified in the Ordinance to require monitoring. Additional monitoring may be required when a problem has occurred or still exists, when the City has reason to believe a pollution problem exists, when TDEC or EPA do not already require sufficient testing, or if the City is mandated to test and report those facilities. Legal authority to require reports will continue to be maintained in the Ordinance.

SWMP Task: Evaluate and update the monitoring program for Municipal Industrial Facilities (MIFs) in each annual report as necessary. Schedule: Annually

The City has implemented limited testing at these facilities including ambient monitoring, dry weather screening, and industrial stormwater inspections conducted by Stormwater staff. The City will continue to evaluate the current monitoring at MIFs annually to test effectiveness of installed structural controls, using appropriate sampling frequency and laboratory analyses.

The Dry Weather Screening Program will continue to monitor the outfalls from all MIFs to insure that management controls are effective.

SWMP Task: Continue dry weather screening at outfalls from predominantly industrial areas.
Schedule: Ongoing/Annually

This task is described in the management section IDDE-2 for field screening.

SWMP Task: Collect wet-weather samples from all MIFs each permit term.
Schedule: One Facility Annually

All Municipal Industrial Facilities will be inspected by Engineering staff and undergo wet weather grab sampling once per permit term (60 months). At least one MIF will be monitored each year to test effectiveness of installed structural controls, using appropriate sampling frequency and laboratory analyses. Each of the storm samples will be analyzed for the eight (8) routine parameters, oil/grease, and E. coli; pH will be recorded in the field. The remaining routine parameters will be analyzed and recorded in the laboratory in accordance with 40 CFR 122.26 and 40 CFR 136. The Dry Weather Screening Program will continue to monitor the outfalls from all MIFs to insure that management controls are effective. Currently five MIFs are operated in the City. Each facility will be tested once during a qualifying rain event annually. These facilities include:

- The Solid Waste Management Facility (SWMF) on Elm Street,
- The fleet truck and heavy equipment garage on Loraine Street,
- The fleet and police garage at Prosser Road,
- The Knoxville Area Transit (KAT) bus station on Magnolia Avenue, and
- The KAT Station on Church Street.

CONSTRUCTION SITE RUNOFF PROGRAM (CS)

Program to Implement and Maintain BMP Plans to Reduce Construction Site Runoff to the Municipal Storm Sewer System, 40 CFR 122.26(d)(2)(iv)(D).

CS-1 Site Planning

SWMP Task: Require by ordinance construction sites greater than 10,000 SF to submit Erosion Prevention and Sediment Control (EPSC) Plans. Schedule: Ongoing

The City will continue to require erosion prevention and sediment controls (EPSC) using BMPs for New Development Projects with greater than 10,000 SF of disturbed area. The most effective types of EPSC BMPs will be incorporated into the BMP manual. The manual may be accessed at www.knoxvilletn.gov/engineering.

SWMP Task: Maintain current inventory of State of Tennessee Construction General Permit (CGP) permitted sites as required by Qualifying Local Program (QLP) status. Schedule: Ongoing

The City will continue to maintain an inventory of public and private construction sites with Construction General Permits. The inventory will be updated as new projects are permitted and existing projects are completed.

SWMP Task: Require site plan submittals per the City of Knoxville Land Development Manual or equivalent. Schedule: Ongoing

The Stormwater and Street Ordinance requires all EPSC plan submittals and all site development work to comply with the City's LDM or the Tennessee Erosion and Sediment Control Handbook (whichever is more restrictive), current as of the date of the submission of the plans. The City proposes to maintain the requirement for compliance with the City's BMP manual or an equivalent BMP throughout the duration of the new permit.

SWMP Task: Review and/or update minimum criteria for plan review and inspection checklists. Schedule: Ongoing

The City will continue to review/update and implement specific procedures for construction site plans (including EPSC) review and approval. The procedures will include an evaluation of plan

completeness and overall BMP effectiveness. Construction site plan reviewers are certified under the Tennessee Erosion Prevention and Sediment Control Training Program for Construction Sites, Level 2 or equivalent. New plans reviewers will be required to be certified in 12 months. The City has developed a list of minimum criteria to supplement the State checklist for various categories of site plans (residential, commercial, etc.). The City Plans Review staff uses the minimum criteria and checklists to insure consistency in the plan review process. The checklists are available at www.cityofknoxville.org/engineering as part of the LDM.

SWMP Task: Require Preconstruction Meetings with developer/contractors for projects requiring a bond (i.e., priority sites). Schedule: Ongoing

Since 1999, the City of Knoxville has required that a Pre-construction Assistance Meeting be scheduled with the developer, contractors, design Engineers, and the City staff before a Site Development Permit is issued or a City project commences. The City will continue to implement its requirement for pre-construction meetings with construction site operators for priority construction activities, which are scheduled after the site development plans are ready for approval but before construction begins. The meeting insures that all parties involved with the construction project are equally aware of the City's expectations. The Pre-construction Assistance Meeting format will continue to be reviewed and updated throughout the new permit term as new policies, procedures, BMPs, and other regulations necessitate.

CS-2 Nonstructural and Structural BMPs

SWMP Task: Require construction BMPs for EPSC from the City of Knoxville BMP manual or equivalent. Schedule: Ongoing

The City will continue to implement the Ordinance requirement that all erosion and sediment control plans comply with either the City's BMP manual or the Tennessee Erosion and Sediment Control Handbook (whichever is more restrictive), current as of the date of initial construction site development mobilization. The requirement to use BMPs from the BMP manual or TDEC manual applies to Utility, Single Family Residential (> 10,000 SF), Large Residential and Commercial Developments. The City proposes to maintain the requirement for compliance with the City's BMP manual or an equivalent BMP throughout the duration of the new permit.

SWMP Task: Develop improvements for the BMP Manual and Stormwater and Street Ordinance to insure that all minimum construction BMP requirements are equivalent or more protective than the CGP, as required by QLP status. Schedule: 24 months

As required by QLP status, the City proposes to review the current regulations and develop any necessary improvements for the BMP Manual and the Stormwater and Street Ordinance to insure that all minimum construction BMP requirements are either equivalent or more protective than the State's CGP.

SWMP Task: Require construction site Good Housekeeping practices to avoid adverse impacts to water quality. Schedule: Ongoing

To ensure that construction sites are kept clean and orderly, and to minimize pollutants in stormwater runoff as a result of other construction activities, the City will maintain requirements for construction site operators to implement waste management control measures to avoid adverse impacts to water quality. The City will provide oversight of contractor activities, including review of Good Housekeeping issues at pre-construction meetings, to ensure that contractors are using appropriate control measures and SOPs. These minimum oversight procedures will be described in the SWMP.

CS-3 Inspection/Enforcement

SWMP Task: Maintain expanded inspections program including smaller construction sites (single family). Schedule: Ongoing

The City proposes to continue new development construction inspections on single-family residential units. City resources will be maintained to allow for inspections on these smaller residential sites.

SWMP Task: Implement routine site inspections on commercial and subdivision developments (e.g., rough grading, EPSC, permanent BMP installation, final grading and final stabilization), and stormwater systems. Schedule: Monthly

The City Engineering Department will continue to implement site inspections for large residential and commercial developments. Although the site inspections are not always scheduled with the contractor or developer, City staff will visit the construction sites every month or more frequently, as necessary. The time frame for some project inspections will vary due to the specific project. These inspections are performed to insure compliance with the approved erosion and sediment control plan, good housekeeping measures, and the design plan. Construction site plan inspectors are certified under the Tennessee Erosion Prevention and Sediment Control Training Program for Construction Sites, Level 1 or equivalent.

SWMP Task: Require all post-construction Development Certifications from licensed design professionals before bond release to insure the stormwater facilities are built as planned. Schedule: Ongoing

Prior to the release of a bond, the City will continue to require a development certification to be completed that shows that roads and stormwater features have been field verified, represent the as-built field conditions, and comply with the approved plans. The City Ordinance requires that this certification be stamped by the appropriate design professional who was required to stamp the original site development permit, as well as a registered land surveyor

licensed to practice in the State. If the final certified project does not meet the minimum requirements, further adjustments must be made before the entire bond will be released to the developer. This program requires a second plan review by the Engineering Department after construction has finished to insure proper results in the field.

SWMP Task: Update and implement inspection, inspector certification, and enforcement procedures, policies, and follow-up monitoring/inspections. Schedule: Ongoing

This task will coincide with the implementation of Ordinance update. The policies and procedures will include construction site inspections and meetings based on various criteria, checklists, and documentation procedures. The City will evaluate necessary changes to be comparable to any State guidelines for QLPs. All updates will be implemented as any updates to the Ordinance become effective.

CS-4 Training Programs

SWMP Task: Sponsor Educational Seminar(s) for City staff, developers, engineers, and contractors. Schedule: Biannually

The City will continue to develop and implement a series of workshops/seminars biannually to educate City staff and the development community about current regulations and procedures for the entire development process. The Engineering staff sponsors, plans and presents the information discussed at these seminars.

SWMP Task: Provide training for Stormwater Division Engineers and Inspectors.
Schedule: Annually

The City will continue to provide the opportunity for staff members at the Engineer level to attend at least one seminar or training workshop annually. These training opportunities allow licensed Engineers on City staff to complete at least twelve hours of professional development each year as required by the Tennessee Board of Architectural and Engineering Examiners. Training of the Plans Review and Inspections staff will also be developed and implemented as an ongoing program within the Engineering Department. All plans reviewers will maintain certification under the Tennessee Erosion Prevention and Sediment Control Training Program for Construction Sites, Level 2 or equivalent. All construction site plan inspectors will maintain certification under the Tennessee Erosion Prevention and Sediment Control Training Program for Construction Sites, Level 1 or equivalent.

COMPREHENSIVE MONITORING PROGRAM (MN)

Program to Collect Quantitative Data to Determine the Impacts of Urban Stormwater on the Natural Environment, pursuant to 40 CFR 122. 26(d)(2)(iii)(A).

MN-1 Seasonal Storm Event Monitoring

SWMP Task: Review and update the Standard Operating Procedures for the seasonal sampling program. Status: Annually

The City will continue to revise the SOP to keep it current and valid for the monitoring/sampling procedures, equipment, software, testing parameters, and site locations that are in use.

SWMP Task: Complete visual stream surveys for all streams within the MS4 using the City of Knoxville Visual Stream Assessment Protocol.
Schedule: Two (2) streams per year, all within permit term.

The City will complete visual stream surveys for all major creeks (see PC-2 for criteria) within the MS4 using the City of Knoxville Visual Stream Assessment Protocol. Survey a minimum of two (2) major creeks per year, with all major creeks to be completed within the permit cycle.

SWMP Task: Conduct biological stream sampling and habitat assessment for Stream Segments with Unavailable Parameters for siltation, habitat alteration and/or nutrients, collecting one sample per Stream Segment.
Schedule: All Stream Segments in permit term

For stream segments identified by as waters with unavailable parameters for siltation, habitat alteration and/or nutrients, biological stream sampling and habitat assessment will be performed utilizing the Semi-Quantitative Single Habitat (SQSH) Method as identified in the most current version of the Quality System Standard Operating Procedure for Macroinvertebrate Stream Survey. At least one sample per stream segment will be collected, with all segments within the MS4 jurisdiction sampled in a five-year period.

SWMP Task: Collect five (5) E. coli bacteria samples within 30 days to establish a geometric mean for each Stream Segment with Unavailable Parameters for pathogens.
Schedule: All Stream Segments in permit term

For stream segments identified as waters with unavailable parameters for pathogens, the City will perform bacteriological stream sampling utilizing methods identified in the most current version of the Quality System Standard Operating Procedure for Chemical and Bacteriological Sampling of Surface Water. Monitoring shall include the collection of five samples within a thirty-day period (to establish a geometric mean), and be performed during the summer

(March through November). At least one series of five samples per stream segment will be collected, with all segments within the MS4 jurisdiction sampled in a five-year period.

MN-2 Dry Weather Screening and Industrial/Commercial Site Monitoring

SWMP Task: Investigate at least 150 outfalls four times per year and test any dry weather flow, including follow-up analysis at all high risk field screening sites from previous year.
Schedule: Ongoing/Annually

Refer to IDDE-2 Field Screening Management Program.

SWMP Task: Collect monitoring data from permitted industrial stormwater dischargers and/or from TDEC. Assess impacts to storm sewer system. Schedule: Ongoing

This task is described in the Monitoring Element Section IN-3 for industrial and related facilities.

SWMP Task: Collect wet-weather samples from all MIFs each permit term..
Schedule: One Facility Annually

This task is described in the Monitoring Element Section IN-3 for industrial and related facilities.

SWMP Task: Maintain adequate legal authority to require monitoring and reports from TSDs and Industrial Facilities subject to SARA Title III, Section 313. Request monitoring data/reports as necessary. Schedule: Ongoing

This task is described in the Monitoring Element Section IN-3 for industrial and related facilities.

MN-3 Masterplanning and Modeling

SWMP Task: Maintain watershed MikeUrban/SWMM model(s). Annually as needed

Develop MikeUrban/SWMM model on priority watersheds to validate and improve the watershed masterplan (see PC-2 about watershed masterplanning).

SWMP Task: Develop watershed masterplans based on visual stream assessments, investigations, and SWMM modeling. Schedule: 36 months

Create a stormwater masterplan for each specific named major City watershed at a rate of one (1) major watershed per year (see PC-2 about watershed masterplanning).

SWMP Task: Study a specific major City watershed, develop a watershed model, and create a detailed management plan that can be implemented to reduce flooding and improve water quality.

Schedule: One (1) watershed per five year permit cycle

Study a specific major City watershed, develop a MikeUrban/SWMM watershed model, and create a detailed management plan that can be implemented to reduce flooding and improve water quality.

MN-4 Training Program

SWMP Task: Implement Training Program for Staff and/or Volunteers. Schedule: Ongoing

Ongoing training is necessary for staff and volunteers as part of sampling programs, stream walks, and the Adopt-A-Stream program. All new staff, interns, and volunteers will continue to receive the appropriate training for their specific monitoring project as necessary. New staff will be trained to operate and maintain the monitoring stations. Several informative webinars on water monitoring will be used to supplement this training. The City may continue to partner with organizations to educate citizens about what they can do to contribute to the health of our water resources, as well as the positive impacts that have been achieved through existing programs. Training programs described in Section CS-4 dovetail with these activities.

APPENDIX B

Dry Weather Screening Results Summary

List of outfalls tested during the permit year with status

Dry Weather Screening - Sample Events for 2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
00-100-0121	SCHEDULED	8/17/2015	8/17/2015	2/1/2016	2/1/2016
00-300-0240	SCHEDULED	8/17/2015	8/17/2015	2/1/2016	2/1/2016
00-300-0260	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-300-0285	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-400-0360	SCHEDULED	8/17/2015	8/17/2015	2/1/2016	2/1/2016
00-300-0385	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-300-0412	SCHEDULED				
00-300-0415	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-300-0475	SCHEDULED	8/17/2015	8/17/2015	2/1/2016	2/1/2016
00-100-0505	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-500-0515	SCHEDULED	8/21/2015	8/21/2015	2/1/2016	2/1/2016
00-200-0520	SCHEDULED	8/17/2015	8/17/2015	2/1/2016	2/1/2016
01-500-0002	SCHEDULED	8/24/2015	8/24/2015	2/5/2016	2/5/2016
01-300-0065	SCHEDULED	8/24/2015	8/24/2015	2/5/2016	2/5/2016
01-300-0070	SCHEDULED	8/24/2015	8/24/2015	2/5/2016	2/5/2016
01-300-0072	SCHEDULED	8/24/2015	8/24/2015	2/5/2016	2/5/2016
01-300-0076	SCHEDULED	8/24/2015	8/24/2015	2/5/2016	2/5/2016
01-300-0112	SCHEDULED	8/25/3015	8/25/2015	2/5/2016	2/5/2016
01-300-0115	SCHEDULED	8/25/2015	8/25/2015	2/5/2016	2/5/2016
01-300-0120	SCHEDULED	8/25/2015	8/25/2015	2/5/2016	2/5/2016
01-300-0124	SCHEDULED	8/25/2015	8/25/2015	2/5/2016	2/5/2016
01-300-0127	SCHEDULED	8/25/2015	8/25/2015	2/5/2016	2/5/2016
01-300-0128	SCHEDULED	8/25/2015	8/25/2015	2/5/2016	2/5/2016
01-300-0131	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016
01-300-0133	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016
01-300-0136	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
01-300-0138	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016
01-300-0142	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016
01-300-0143	SCHEDULED	8/26/2015	8/26/2015	2/12/2016	2/12/2016
01-300-0147	SCHEDULED	8/28/2015	8/28/2015	2/12/2016	2/12/2016
01-300-0149	SCHEDULED	8/28/2015	8/28/2015	2/12/2016	2/12/2016
01-100-0155	SCHEDULED	8/28/2015	8/28/2015	2/12/2016	2/12/2016
01-100-0225	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-100-0230	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-100-0245	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-400-0250	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-400-0255	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-400-0260	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-400-0265	SCHEDULED	8/31/2015	9/1/2015	2/19/2016	2/19/2016
01-300-0350	SCHEDULED	9/4/2015	9/4/2015	2/29/2016	2/29/2016
01-100-0375	SCHEDULED	9/4/2015	9/4/2015	2/29/2016	2/29/2016
01-400-0410	SCHEDULED	9/4/2015	9/4/2015	2/29/2016	2/29/2016
01-400-0479	SCHEDULED	9/8/2015	9/8/2015	2/29/2016	2/29/2016
01-300-0520	SCHEDULED	9/8/2015	9/8/2015	2/29/2016	2/29/2016
01-400-0535	SCHEDULED	9/8/2015	9/8/2015	2/29/2016	2/29/2016
01-100-0560	SCHEDULED	9/8/2015	9/8/2015	2/29/2016	2/29/2016
01-400-0651	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
01-100-0660	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
01-200-0695	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
01-200-0715	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
01-200-0810	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
01-400-0835	SCHEDULED	9/15/2015	9/15/2015	3/1/2016	3/1/2016
02-100-0053	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0090	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
02-100-0097	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0098	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0100	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0102	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0103	SCHEDULED	9/21/2015	9/21/2015	3/1/2016	3/1/2016
02-100-0130	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0148	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0171	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0172	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0174	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0176	SCHEDULED	9/22/2015	9/22/2015	9/22/2015	3/7/2016
02-300-0178	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2015
02-300-0179	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0181	SCHEDULED	9/22/2015	9/22/2015	3/7/2016	3/7/2016
02-300-0182	SCHEDULED	9/23/2015	9/23/2015	3/7/2016	3/7/2016
02-300-0183	SCHEDULED	9/23/2015	9/23/2015	3/7/2016	3/7/2016
02-300-0190	SCHEDULED	9/23/2015	9/23/2015	3/7/2016	3/7/2016
02-100-0210	SCHEDULED	9/23/2015	9/23/2015	3/7/2016	3/7/2016
02-400-0220	SCHEDULED	9/23/2015	9/23/2015	3/7/2016	3/7/2016
02-300-0230	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-300-0245	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-300-0250	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-300-0295	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-300-0359	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-300-0366	SCHEDULED	9/28/2015	9/28/2015	3/8/2016	3/8/2016
02-100-0380	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
02-100-0405	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
02-400-0415	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
02-100-0425	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
02-200-0437	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
02-100-0515	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
02-200-0530	SCHEDULED	10/7/2015	10/7/2015	3/8/2016	3/8/2016
03-300-0010	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-300-0015	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-300-0035	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-100-0045	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-300-0075	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-300-0115	SCHEDULED	10/8/2015	10/8/2015	3/9/2016	3/9/2016
03-100-0374	SCHEDULED	10/12/2015	10/12/2015	3/9/2016	3/9/2016
03-100-0380	SCHEDULED	10/12/2015	10/12/2015	3/9/2016	3/9/2016
03-300-0385	SCHEDULED	10/12/2015	10/12/2015	3/9/2016	3/9/2016
03-300-0398	SCHEDULED	10/12/2015	10/12/2015	3/9/2016	3/9/2016
03-300-0400	SCHEDULED	10/12/2015	10/12/2015	3/9/2016	3/9/2016
03-100-0403	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
		10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-100-0410	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-400-0422	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-100-0455	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-100-0465	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-500-0535	SCHEDULED	10/15/2015	10/15/2015	3/10/2016	3/11/2016
03-300-0550	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-300-0615	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-100-0620	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-300-0625	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-300-0640	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-300-0670	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
03-200-0680	SCHEDULED	10/16/2015	10/16/2015	3/17/2016	3/17/2016
03-400-0750	SCHEDULED				
03-200-0907	SCHEDULED				
04-100-0015	SCHEDULED	8/27/2015	8/27/2015	2/12/2016	2/12/2016
04-500-0017	SCHEDULED	8/27/2015	8/27/2015	2/12/2016	2/12/2016
04-500-0117	SCHEDULED	8/27/2015	8/27/2015	2/12/2016	2/12/2016
04-500-0132	SCHEDULED	8/27/2015	8/27/2015	2/12/2016	2/12/2016
04-100-0155	SCHEDULED	10/19/2015	10/19/2015	3/21/2016	3/21/2016
04-500-0239	SCHEDULED	10/19/2015	10/19/2015	3/21/2016	3/21/2016
04-400-0320	SCHEDULED	10/19/2015	10/19/2015	3/21/2016	3/21/2016
04-300-0345	SCHEDULED	10/19/2015	10/19/2015	3/21/2016	3/21/2016
05-400-0060	SCHEDULED	10/19/2015	10/19/2015	3/21/2016	3/21/2016
05-100-0100	SCHEDULED	10/20/2015	10/20/2015	3/22/2016	3/22/2016
05-100-0165	SCHEDULED	10/20/2015	10/20/2015	3/22/2016	3/22/2016
05-500-0195	SCHEDULED	10/20/2015	10/20/2015	3/22/2016	3/22/2016
05-500-0205	SCHEDULED	10/20/2015	10/20/2015	3/22/2016	3/22/2016
06-100-0060	SCHEDULED	10/22/2015	10/22/2015	3/22/2016	3/22/2016
06-500-0215	SCHEDULED				
07-500-0010	SCHEDULED	10/22/2015	10/22/2015	3/22/2016	3/22/2016
07-400-0030	SCHEDULED	10/22/2015	10/22/2015	3/22/2016	3/22/2016
07-100-0055	SCHEDULED	10/22/2015	10/22/2015	3/21/2016	3/22/2016
07-100-0090	SCHEDULED	10/23/2015	10/23/2015	3/23/2016	3/23/2016
07-100-0130	SCHEDULED	10/23/2015	10/23/2015	3/23/2016	3/23/2016
07-100-0205	SCHEDULED	10/23/2015	10/23/2015	3/23/2016	3/23/2016
08-400-0065	SCHEDULED	10/23/2015	10/23/2015	3/23/2016	3/23/2016
08-400-0075	SCHEDULED				
08-500-0115	SCHEDULED	10/26/2015	10/26/2015	3/23/2016	3/23/2016
08-500-0130	SCHEDULED	10/26/2015	10/26/2015	3/23/2016	3/23/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
10-300-0401	SCHEDULED	10/23/2015	10/23/2015	3/23/2015	3/23/2016
10-100-0440	SCHEDULED	11/5/2015	11/5/2015	4/4/2016	4/4/2016
10-300-0444	SCHEDULED	11/5/2015	11/5/2015	4/4/2016	4/4/2016
10-300-0445	SCHEDULED	11/5/2015	11/5/2015	4/4/2016	4/4/2016
10-100-0450	SCHEDULED	11/5/2015	11/5/2015	11/5/2016	4/4/2016
10-100-0530	SCHEDULED	11/5/2015	11/5/2015	4/4/2016	4/4/2016
10-200-0535	SCHEDULED	11/5/2015	11/5/2015	4/4/2016	4/4/2016
10-500-0550	SCHEDULED	11/13/2015	11/13/2015	3/24/2016	3/24/2016
10-100-0562	SCHEDULED	11/13/2015	11/13/2015	3/24/2016	3/24/2016
10-100-0564	SCHEDULED	11/13/2015	11/13/2015	3/24/2016	3/24/2016
11-200-0595	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-100-0596	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-100-0598	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-100-0601	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-300-0602	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-300-0610	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-300-0611	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-300-0613	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
11-300-0614	SCHEDULED	11/16/2015	11/16/2015	4/11/2016	4/11/2016
12-500-0575	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-100-0600	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-200-0716	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-500-0720	SCHEDULED				
12-100-0723	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-200-0741	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-200-0745	SCHEDULED	11/17/2015	11/17/2015	4/18/2016	4/18/2016
12-100-0748	SCHEDULED				
12-200-0751	SCHEDULED				

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
13-300-0145	SCHEDULED	11/23/2015	11/23/2015	4/21/2016	4/21/2016
13-300-0170	SCHEDULED	11/23/2015	11/23/2015	4/20/2016	4/21/2016
13-300-0181	SCHEDULED	11/23/2015	11/23/2015	4/20/2016	4/20/2016
13-300-0184	SCHEDULED	11/23/2015	11/23/2015	4/20/2016	4/21/2016
13-300-0185	SCHEDULED	11/23/2015	11/23/2015	4/20/2016	4/20/2016
13-300-0190	SCHEDULED	11/23/2015	11/23/2015	4/20/2016	4/21/2016
13-300-0227	SCHEDULED	11/24/2015	11/25/2015	4/25/2016	4/25/2016
13-100-0240	SCHEDULED				
13-200-0255	SCHEDULED	11/24/2015	11/25/2015	4/25/2016	4/25/2016
13-100-0285	SCHEDULED	11/24/2015	11/25/2015	4/25/2016	4/25/2016
13-300-0350	SCHEDULED	11/24/2015	11/25/2015	4/25/2016	4/25/2016
13-300-0365	SCHEDULED	11/24/2015	11/25/2015	4/25/2016	4/25/2016
18-100-0701	SCHEDULED				
31-300-0505	SCHEDULED	12/7/2015	12/7/2015	4/26/2016	4/27/2016
50-400-0065	SCHEDULED	12/7/2015	12/7/2015	4/26/2016	4/27/2016
50-100-0130	SCHEDULED	12/7/2015	12/7/2015	4/26/2016	4/27/2016
50-100-0135	SCHEDULED	12/7/2015	12/7/2015	4/26/2016	4/27/2016
50-400-0146	SCHEDULED	12/7/2015	12/7/2015	4/26/2016	4/27/2016
53-100-0075	SCHEDULED	12/8/2015	12/9/2015	5/16/2016	5/16/2016
53-100-0128	SCHEDULED	10/11/2015	10/11/2015	5/16/2016	5/16/2016
53-100-0129	SCHEDULED	12/8/2015	12/9/2015	5/16/2016	5/16/2016
53-200-0137	SCHEDULED	12/8/2015	12/9/2015	5/16/2016	5/16/2016
53-100-0139	SCHEDULED	12/8/2015	12/8/2015	5/16/2016	5/16/2016
53-500-0220	SCHEDULED	1/4/2016	1/4/2016	4/6/2016	4/6/2016
53-300-0275	SCHEDULED	1/4/2016	1/4/2016	4/6/2016	4/6/2016
54-500-0005	SCHEDULED				
55-200-0151	SCHEDULED				
70-300-0615	SCHEDULED	1/4/2016	1/4/2016	4/6/2016	4/6/2016

Outfall Name	Outfall Status	Visit #1	Visit #2	Visit #3	Visit #4
79-200-0040	SCHEDULED				
79-500-0050	SCHEDULED				
79-200-0341	SCHEDULED	1/14/2016	1/14/2016	4/5/2016	4/5/2016
79-500-0343	SCHEDULED	1/14/2016	1/14/2016	4/5/2016	4/5/2016
79-200-0344	SCHEDULED	1/14/2016	1/14/2016	4/5/2016	4/5/2016
79-300-0376	SCHEDULED	1/14/2015	1/14/2015	4/5/2016	4/5/2016
79-100-0380	SCHEDULED	1/14/2016	1/14/2016	4/5/2016	4/5/2016

TYPE CODE	COUNT
100	60
200	20
300	80
400	21
500	20

Dry Weather Screening Data for 2016

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
00-100-0121																
2016	8/17/15	1	No													
2016	8/17/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-300-0240																
2016	8/17/15	1	No													
2016	8/17/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-300-0260																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-300-0285																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-400-0360																
2016	8/17/15	1	No													
2016	8/17/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
00-300-0385																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-400-0413																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-300-0415																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-300-0475																
2016	8/17/15	1	No													
2016	8/17/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-100-0505																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
00-500-0515																
2016	8/21/15	1	No													
2016	8/21/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
00-200-0520																
2016	8/17/15	1	No													
2016	8/17/15	2	No													
2016	2/1/16	3	No													
2016	2/1/16	4	No													
01-500-0002																
2016	8/24/15	1	No													
2016	8/24/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0065																
2016	8/24/15	1	No													
2016	8/24/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0070																
2016	8/24/15	1	No													
2016	8/24/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0072																
2016	8/24/15	1	No													
2016	8/24/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0076																
2016	8/24/15	1	No													
2016	8/24/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
01-300-0112																
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
2016	8/25/15	1	No													
01-300-0115																
2016	8/25/15	1	No													
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0120																
2016	8/25/15	1	No													
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0124																
2016	8/25/15	1	No													
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0127																
2016	8/25/15	1	No													
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													
01-300-0128																
2016	8/25/15	1	No													
2016	8/25/15	2	No													
2016	2/5/16	3	No													
2016	2/5/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
01-300-0131																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0133																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0136																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0138																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0142																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0143																
2016	8/26/15	1	No													
2016	8/26/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
01-300-0147																
2016	8/28/15	1	No													
2016	8/28/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-300-0149																
2016	8/28/15	1	No													
2016	8/28/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-100-0155																
2016	8/28/15	1	No													
2016	8/28/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
01-100-0225																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-100-0230																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-100-0245																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
01-400-0250																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-400-0255																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-400-0260																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-400-0265																
2016	8/31/15	1	No													
2016	9/1/15	2	No													
2016	2/19/16	3	No													
2016	2/19/16	4	No													
01-300-0350																
2016	9/4/15	1	No													
2016	9/4/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-100-0375																
2016	9/4/15	1	No													
2016	9/4/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
01-400-0410																
2016	9/4/15	1	No													
2016	9/4/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-400-0479																
2016	9/8/15	1	No													
2016	9/8/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-300-0520																
2016	9/8/15	1	No													
2016	9/8/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-400-0535																
2016	9/8/15	1	No													
2016	9/8/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-100-0560																
2016	9/8/15	1	No													
2016	9/8/15	2	No													
2016	2/29/16	3	No													
2016	2/29/16	4	No													
01-400-0651																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
01-100-0660																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
01-200-0695																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
01-200-0715																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
01-200-0810																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
01-400-0835																
2016	9/15/15	1	No													
2016	9/15/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0053																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
02-100-0090																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0097																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0098																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0100																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0102																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													
02-100-0103																
2016	9/21/15	1	No													
2016	9/21/15	2	No													
2016	3/1/16	3	No													
2016	3/1/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
02-100-0130																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0148																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0171																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0172																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0174																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0176																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	9/22/15	3	No													
2016	3/7/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
02-300-0178																
2016	3/7/15	4	No													
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
02-300-0179																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0181																
2016	9/22/15	1	No													
2016	9/22/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0182																
2016	9/23/15	1	No													
2016	9/23/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0183																
2016	9/23/15	1	No													
2016	9/23/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0190																
2016	9/23/15	1	No													
2016	9/23/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
02-100-0210																
2016	9/23/15	1	No													
2016	9/23/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-400-0220																
2016	9/23/15	1	No													
2016	9/23/15	2	No													
2016	3/7/16	3	No													
2016	3/7/16	4	No													
02-300-0230																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-300-0245																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/8/16	4	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
02-300-0250																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-300-0295																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
02-300-0359																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-300-0366																
2016	9/28/15	1	No													
2016	9/28/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-100-0380																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-100-0405																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-400-0415																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-100-0425																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
02-200-0437																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-100-0515																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
02-200-0530																
2016	10/7/15	1	No													
2016	10/7/15	2	No													
2016	3/8/16	3	No													
2016	3/8/16	4	No													
03-300-0010																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-300-0015																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-300-0035																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
03-100-0045																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-300-0075																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-300-0115																
2016	10/8/15	1	No													
2016	10/8/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-100-0374																
2016	10/12/15	1	No													
2016	10/12/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-100-0380																
2016	10/12/15	1	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
2016	10/12/15	2	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/9/16	3	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/9/16	4	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
03-300-0385																
2016	10/12/15	1	No													
2016	10/12/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
03-300-0398																
2016	10/12/15	1	No													
2016	10/12/15	2	No													
2016	3/9/16	3	No													
2016	3/9/16	4	No													
03-300-0400																
2016	10/12/15	1	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
2016	10/12/15	2	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/9/16	3	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/9/16	4	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
03-100-0403																
2016	10/15/15	1	No													
2016	10/15/15	1	No													
2016	10/15/15	2	No													
2016	10/15/15	2	No													
2016	3/10/16	3	No													
2016	3/10/16	3	No													
2016	3/11/16	4	No													
2016	3/11/16	4	No													
03-100-0410																
2016	10/15/15	1	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
2016	10/15/15	2	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/10/16	3	No													
2016	3/11/16	4	No													
03-400-0422																
2016	10/15/15	1	No													
2016	10/15/15	2	No													
2016	3/10/16	3	No													
2016	3/11/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
03-100-0455																
2016	10/15/15	1	No													
2016	10/15/15	2	No													
2016	3/10/16	3	No													
2016	3/11/16	4	No													
03-100-0465																
2016	10/15/15	1	No													
2016	10/15/15	2	No													
2016	3/10/16	3	No													
2016	3/11/16	4	No													
03-500-0535																
2016	10/15/15	1	No													
2016	10/15/15	2	No													
2016	3/10/16	3	No													
2016	3/11/16	4	No													
03-300-0550																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
03-300-0615																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/17/16	4	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
03-100-0620																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/17/16	4	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
03-300-0625																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
03-300-0640																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
03-300-0670																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
03-300-0675																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
03-200-0680																
2016	10/16/15	1	No													
2016	10/16/15	2	No													
2016	3/17/16	3	No													
2016	3/17/16	4	No													
04-100-0015																
2016	8/27/15	1	No													
2016	8/27/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
04-500-0017																
2016	8/27/15	1	No													
2016	8/27/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
04-500-0117																
2016	8/27/15	1	No													
2016	8/27/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
04-500-0132																
2016	8/27/15	1	No													
2016	8/27/15	2	No													
2016	2/12/16	3	No													
2016	2/12/16	4	No													
04-100-0155																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	No													
2016	3/21/16	4	No													
04-500-0239																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/21/16	4	Yes	0.50	7.0	0	0	0	0	0		0	0	No	No	No
04-400-0240																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	No													
2016	3/21/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
04-400-0241																
2016	3/21/15	4	No													
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	No													
04-400-0320																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	No													
2016	3/21/16	4	No													
04-300-0345																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	Yes	10	7.0	1.00	0	0	0	0		0	0	No	No	No
2016	3/21/16	4	Yes	10	7.0	1.00	0	0	0	0		0	0	No	No	No
05-400-0060																
2016	10/19/15	1	No													
2016	10/19/15	2	No													
2016	3/21/16	3	No													
2016	3/21/16	4	No													
05-100-0100																
2016	10/20/15	1	No													
2016	10/20/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
05-100-0165																
2016	10/20/15	1	No													
2016	10/20/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
05-500-0195																
2016	10/20/15	1	No													
2016	10/20/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
05-500-0205																
2016	10/20/15	1	No													
2016	10/20/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
06-100-0060																
2016	10/22/15	1	No													
2016	10/22/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
07-500-0010																
2016	10/22/15	1	No													
2016	10/22/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
07-400-0030																
2016	10/22/15	1	No													
2016	10/22/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
07-100-0055																
2016	10/22/15	1	Yes	5	7.0		0	0	0	0		0		No	No	No
2016	10/22/15	2	Yes	5	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/21/16	3	No													
2016	3/22/16	4	Yes	5	7.0	0	0	0	0	0		0	0	No	No	No

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
07-100-0090																
2016	10/23/15	1	No													
2016	10/23/15	2	No													
2016	3/23/16	3	No													
2016	3/23/16	4	No													
07-100-0130																
2016	10/23/15	1	No													
2016	10/23/15	2	No													
2016	3/23/16	3	No													
2016	3/23/16	4	No													
07-100-0205																
2016	10/23/15	1	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
2016	10/23/15	2	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/23/16	3	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
2016	3/23/16	4	Yes	3	7.0	0	0	0	0	0		0	0	No	No	No
07-400-0215																
2016	10/22/15	1	No													
2016	10/22/15	2	No													
2016	3/22/16	3	No													
2016	3/22/16	4	No													
08-400-0060																
2016	3/23/15	3	No													
2016	10/23/15	1	No													
2016	3/23/16	4	No													
2016	10/23/16	2	No													
08-400-0065																
2016	10/23/15	1	No													
2016	10/23/15	2	No													
2016	3/23/16	3	No													
2016	3/23/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
08-500-0115																
2016	10/26/15	1	No													
2016	10/26/15	2	No													
2016	3/23/16	3	No													
2016	3/23/16	4	No													
08-500-0130																
2016	10/26/15	1	No													
2016	10/26/15	2	No													
2016	3/23/16	3	No													
2016	3/23/16	4	No													
10-300-0401																
2016	3/23/15	3	No													
2016	10/23/15	1	No													
2016	10/23/15	2	No													
2016	3/23/16	4	No													
10-100-0440																
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	3	No													
2016	4/4/16	4	No													
10-300-0444																
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	3	No													
2016	4/4/16	4	No													
10-300-0445																
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	3	No													
2016	4/4/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
10-100-0450																
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	4	No													
2016	11/5/16	3	No													
10-100-0530																
2016			No													
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	3	No													
2016	4/4/16	4	No													
10-200-0535																
2016	11/5/15	1	No													
2016	11/5/15	2	No													
2016	4/4/16	3	No													
2016	4/4/16	4	No													
10-500-0550																
2016	11/13/15	1	No													
2016	11/13/15	2	No													
2016	3/24/16	3	No													
2016	3/24/16	4	No													
10-100-0562																
2016	11/13/15	1	No													
2016	11/13/15	2	No													
2016	3/24/16	3	No													
2016	3/24/16	4	No													
10-100-0564																
2016	11/13/15	1	No													
2016	11/13/15	2	No													
2016	3/24/16	3	No													
2016	3/24/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
11-200-0595																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-100-0596																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-400-0597																
2016	11/16/15	1	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
2016	11/16/16	2	No													
11-100-0598																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-100-0601																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-300-0602																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
11-300-0610																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-300-0611																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-300-0613																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
11-300-0614																
2016	11/16/15	1	No													
2016	11/16/15	2	No													
2016	4/11/16	3	No													
2016	4/11/16	4	No													
12-500-0575																
2016	11/17/15	1	Yes	0.10	7.0	0	0	0	0	0		0	0	No	No	No
2016	11/17/15	2	Yes	0.10	7.0	0	0	0	0	0		0	0	No	No	No
2016	4/18/16	3	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
2016	4/18/16	4	Yes	2	7.0	0	0	0	0	0		0	0	No	No	No
12-100-0600																
2016			No													
2016	11/17/15	1	No													
2016	11/17/15	2	No													
2016	4/18/16	3	No													
2016	4/18/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
12-200-0716																
2016	11/17/15	1	No													
2016	11/17/15	2	No													
2016	4/18/16	3	No													
2016	4/18/16	4	No													
12-100-0723																
2016	11/17/15	1	No													
2016	11/17/15	2	No													
2016	4/18/16	3	No													
2016	4/18/16	4	No													
12-200-0741																
2016	11/17/15	1	No													
2016	11/17/15	2	No													
2016	4/18/16	3	No													
2016	4/18/16	4	No													
12-200-0745																
2016	11/17/15	1	No													
2016	11/17/15	2	No													
2016	4/18/16	3	No													
2016	4/18/16	4	No													
13-300-0145																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/21/16	3	No													
2016	4/21/16	4	No													
13-300-0170																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/20/16	3	No													
2016	4/21/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
13-400-0180																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/20/16	3	No													
2016	4/21/16	4	No													
13-300-0181																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/20/16	3	No													
2016	4/20/16	4	No													
13-300-0184																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/20/16	3	No													
2016	4/21/16	4	No													
13-300-0185																
2016	11/23/15	1	Yes	5	7.0	1.00	0	0	0	0		0	0	No	No	No
2016	11/23/15	2	Yes	5	7.0	1.00	0	0	0	0		0	0	No	No	No
2016	4/20/16	3	No													
2016	4/20/16	4	No													
13-300-0190																
2016	11/23/15	1	No													
2016	11/23/15	2	No													
2016	4/20/16	3	No													
2016	4/21/16	4	No													
13-300-0227																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
13-400-0245																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													
13-200-0255																
2016	11/24/15	1	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
2016	11/25/15	2	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
2016	4/25/16	3	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
2016	4/25/16	4	Yes	1	7.0	0	0	0	0	0		0	0	No	No	No
13-400-0280																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													
13-100-0285																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													
13-300-0350																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													
13-300-0365																
2016	11/24/15	1	No													
2016	11/25/15	2	No													
2016	4/25/16	3	No													
2016	4/25/16	4	No													

Outfall Permit Year	Date	Visit #	Flow ?	Flow Rate (gpm)	pH (su)	Chlorine (ppm)	Copper (ppm)	Phenol (ppm)	Detergents (ppm)	Ammonia (ppm)	Fecal Sample (mpn/100ml)	Turbidity (ntu)	Color	Odor?	Surface Scum	Oil Sheen
31-300-0505																
2016	12/7/15	1	No													
2016	12/7/15	2	No													
2016	4/26/16	3	No													
2016	4/27/16	4	No													
50-400-0065																
2016	12/7/15	1	No													
2016	12/7/15	2	No													
2016	4/26/16	3	No													
2016	4/27/16	4	No													
50-100-0130																
2016	12/7/15	1	No													
2016	12/7/15	2	No													
2016	4/26/16	3	No													
2016	4/27/16	4	No													
50-100-0135																
2016	12/7/15	1	No													
2016	12/7/15	2	No													
2016	4/26/16	3	No													
2016	4/27/16	4	No													
50-400-0146																
2016	12/7/15	1	No													
2016	12/7/15	2	No													
2016	4/26/16	3	No													
2016	4/27/16	4	No													
53-100-0075																
2016	12/8/15	1	Yes	5	7.0	0	0	0	0	0		0	0	No	No	No
2016	12/9/15	2	Yes	5	7.0	0	0	0	0	0		0	0	No	No	No
2016	5/16/16	3	Yes	5	7.0	0	0	0	0	0		0	0	No	No	No
2016	5/16/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
53-100-0128																
2016	10/11/15	1	No													
2016	10/11/15	2	No													
2016	5/16/16	3	No													
2016	5/16/16	4	No													
53-100-0129																
2016	12/8/15	1	No													
2016	12/9/15	2	No													
2016	5/16/16	3	No													
2016	5/16/16	4	No													
53-200-0137																
2016	12/8/15	1	No													
2016	12/9/15	2	No													
2016	5/16/16	3	No													
2016	5/16/16	4	No													
53-100-0139																
2016	12/8/15	1	No													
2016	12/8/15	2	No													
2016	5/16/16	3	No													
2016	5/16/16	4	No													
53-400-0150																
2016	1/4/16	1	No													
2016	1/4/16	2	No													
2016	4/6/16	3	No													
2016	4/6/16	4	No													
53-500-0220																
2016	1/4/16	1	No													
2016	1/4/16	2	No													
2016	4/6/16	3	No													
2016	4/6/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
53-300-0275																
2016	1/4/16	1	No													
2016	1/4/16	2	No													
2016	4/6/16	3	No													
2016	4/6/16	4	No													
70-300-0615																
2016	1/4/16	1	No													
2016	1/4/16	2	No													
2016	4/6/16	3	No													
2016	4/6/16	4	No													
79-200-0341																
2016	1/14/16	1	No													
2016	1/14/16	2	No													
2016	4/5/16	3	No													
2016	4/5/16	4	No													
79-500-0343																
2016	1/14/16	1	No													
2016	1/14/16	2	No													
2016	4/5/16	3	No													
2016	4/5/16	4	No													
79-200-0344																
2016	1/14/16	1	No													
2016	1/14/16	2	No													
2016	4/5/16	3	No													
2016	4/5/16	4	No													
79-300-0376																
2016	1/14/15	1	No													
2016	1/14/15	2	No													
2016	4/5/16	3	No													
2016	4/5/16	4	No													

Outfall *Permit Year*	*Date*	*Visit #*	*Flow ?*	*Flow Rate (gpm)*	*pH (su)*	*Chlorine (ppm)*	*Copper (ppm)*	*Phenol (ppm)*	*Detergents (ppm)*	*Ammonia (ppm)*	*Fecal Sample (mpn/100ml)*	*Turbidity (ntu)*	*Color*	*Odor?*	*Surface Scum*	*Oil Sheen*
79-100-0380																
2016	1/14/16	1	No													
2016	1/14/16	2	No													
2016	4/5/16	3	No													
2016	4/5/16	4	No													

Shaded rows represent samples which contained eleveated levels for at least 1 sampled parameter.

Oracle - Dry Weather Screening Data

Elevated readings have been underlined.

Below is a listing of sample parameters and their elevated reading criteria:

pH	< 6.5 or > 9 su
Chlorine	> 0.2 ppm
Copper	>= 0.1 ppm
Phenol	>= 0.1 ppm
Detergents	> 0.25 ppm
Ammonia	>= 1 ppm
Fecal Sample	>= 200 mpn/100 ml

APPENDIX C

City of Knoxville Solid Waste Office 2015 Annual Report

Public Service Department
Solid Waste Division
2015 Annual Report

CITY OF KNOXVILLE

MAYOR MADELINE ROGERO

Public Works
David Brace, Senior Director

Public Service Department
Chad Weth, Director

INTRODUCTION

In 2015, the City of Knoxville Public Service Department continued to show positive results in the development of its solid waste management programs. We completed our sixteenth (16) full year of operations at the Household Hazardous Waste (HHW) Collection Facility. The Public Service Department is in its fourteenth year (14) of providing garbage collection and recycling services in the Central Business Improvement District (CBID). In addition, the City has worked tirelessly to refine and continue its household curbside single stream recycling program. This new service started on October 1, 2011 with much fanfare and excitement from City customers; approximately 22,500 households are participating in the curbside recycling program, with additional participation from downtown residents. All of these initiatives reflect the Solid Waste Division's progressive thinking and innovative approach in the development of a truly comprehensive solid waste management program.

The following pages summarize our solid waste activities for the calendar year 2015. The final page is a compilation and analysis of residential waste stream data indicating that:

* The total waste stream decreased by 5,171.1 tons from 2014
* The diversion rate decreased to 53.38% from 58.27% in 2014
* The recycling rate increased to 28.98% from 28.14% in 2014

I. RECYCLING

In July 2015 the City initiated a carpet recycling program at the transfer station and sent 84 tons of carpeting material for recycling rather than to the landfill.

A total of 2,002.53 tons of recyclables were collected at the City's five drop-off recycling centers in 2015.

Goodwill Industries is in its final year of a five year contract to assist in the on site staffing of the City's recycling drop off centers. Rock-Tenn Recycling is in year four of a five year contract to handle processing of recyclable materials collected at all drop off centers and for single stream curbside recycling materials. Waste Connections of Tennessee, Inc. is in year four of a five year contract to haul recyclable materials from City drop centers and those households participating in curbside recycling. Processing of single stream materials is an added cost to the City; however, Rock-Tenn Recycling continues to revenue share on separated materials collected at the City's five drop centers based on market values which have been low the past four years.

During 2015, over 149 tons of cardboard and over 227 tons of singlestream were collected from the downtown area.

One major initiative of the Solid Waste Office has been the continued goal towards expanding the a household curbside single stream recycling program. During 2014 the City was able to secure another 3,000 carts and began delivering the carts to those residents on the waiting list for a cart. Approximately 1,200 carts had been delivered in 2014 and 2015. Even with that expansion the waiting list grew to about 1,000 more households interested in recycling. .

II. MUNICIPAL SOLID WASTE (MSW)

A total of 41,732.18 tons of garbage were collected from Knoxville homes in 2015, up from 40,442.07 tons in 2014, as part of the weekly garbage collection service the City offers via its contractor, Waste Connections of Tennessee, Inc. The City is currently in a five year contract extension with Waste Connections of Tennessee, Inc. that expires in 2016. The extension eliminated a backdoor collection service inequity offered to only some households and now offers subsidized backdoor service only to those with a verified medical or age necessity. Current collection costs per this contract are:

Jan. - Dec. 15 Curbside Collection	$6.87 / house/month	57,464 residents
Jan. - Dec. 15 Backdoor Collection	$6.87 / house/month	2,569 residents

All household garbage is disposed of at the Chestnut Ridge Landfill operated by Waste Management. The City is currently in a new 10-year contract with Waste Management that expires in 2020. Contract prices change in October of each year based on the CPI.

Oct. '14 - Sep. '15	$21.72 / ton
Oct. '15 - Sep. '16	$21.68 / ton

III. YARD WASTE COLLECTION / MULCHING

A total of 31,591.34 tons of yard waste was collected by City Public Service Department crews in 2015. This number decreased slightly by 1,100.7 tons from 2014. All yard waste is taken to Shamrock Organic Products where it is recycled into mulch and soil products or sold for boiler fuel at a nearby paper plant. The City is currently in a five year contract with Shamrock which expires in September 2016. Costs for disposal in 2014 at Shamrock are as follows:

Jan. 15—Dec. 15	$28.82 / ton

IV. SOLID WASTE MANAGEMENT FACILITY

Transfer Station

The design of the Public Service Department, Solid Waste Division Transfer Station encourages separation of C&D from municipal solid waste. This allows for the City to save money by sending C&D waste to a Class III landfill and for compliance with the State of Tennessee mandate for a reduction in the volume of waste placed in Class I landfills. In 2015, we diverted 19,015.92 tons of C&D waste to a Class III landfill (down from 24,193.73 tons in 2014), at a rate of $16.49 a ton. This amount represented 56% of the waste received at the Transfer Station.

Household Hazardous Waste (HHW) Collection Center

Staffed by Public Service Department Solid Waste Management Facility employees, the HHW Facility is operated by the City with equal funding for operating and disposal costs from Knox County and the City of Knoxville. All City and County residents are permitted to use the facility. In 2015, this facility was visited by 6,520, an increase from 5,842 vehicles in 2014. In 2015, the HHW facility processed 79.6 tons of actual HHW and solidified an additional 124.5 tons of latex paint.

V. EDUCATION

The Public Service Department Solid Waste Office engaged in many activities and special awareness programs throughout 2015 to educate Knoxville residents and visitors about waste reduction, recycling, composting and other solid waste issues.

America Recycles Day - The City of Knoxville, along with several other local organizations, participated in the thirteenth annual America Recycles Day, a national education campaign aimed at increasing citizens' commitment to recycling and buying recycled goods.

EarthFest - The Solid Waste Office helped develop this program fifteen years ago and once again played an active role on the steering committee. About 5,000 people attended the event at World's Fair Park which hosted exhibitors from the region's environmental community.

Used Residential Thermometer Exchange - The Solid Waste Office started an ongoing mercury thermometer exchange program in 2005. The exchanges, conducted in cooperation with the Tennessee Department of Environment and Conservation, the City of Knoxville Public Service Department and the Safe Kids Coalition of the Greater Knox Area, collected 115 mercury thermometers from City and County residents in 2015. New digital thermometers were given out for each used mercury thermometer that was turned in.

Unwanted Medicines Collection Event - The Solid Waste Office coordinated several unwanted medicines collection events in cooperation with the Knoxville Police Department, Knox County Solid Waste Office and Health Department and The University of Tennessee Student Pharmacy Association. This program was initiated by the City in November of 2008 and has grown rapidly since its inception. Over 3,967 pounds of medications were collected during 2015. KPD maintains a permanent secure medications collection container at the KPD safety building with access for the public 24/7.

Other - In 2015, the Solid Waste Office continued to produce and distribute educational brochures and promotional items. Staff of the Solid Waste Office participated in several educational events using our exhibit booth display at the City County Building and at events including EarthFest, the Dogwood Arts' House and Garden Show and, America Recycles Day Events.

CONCLUSION

The 2015 year has been both an exciting and challenging time for solid waste within the City of Knoxville.

The City's household curbside single stream recycling program continues to grow and has a waiting list of about 1,000 residents. The recycling markets have been volatile but our partnerships with the community and industry have allowed us to continue to offer recycling services to City residents and expanding the commodities we will accept for recycling as new technologies emerge.

The Solid Waste Management Facility continues to experience high demand, and we look forward

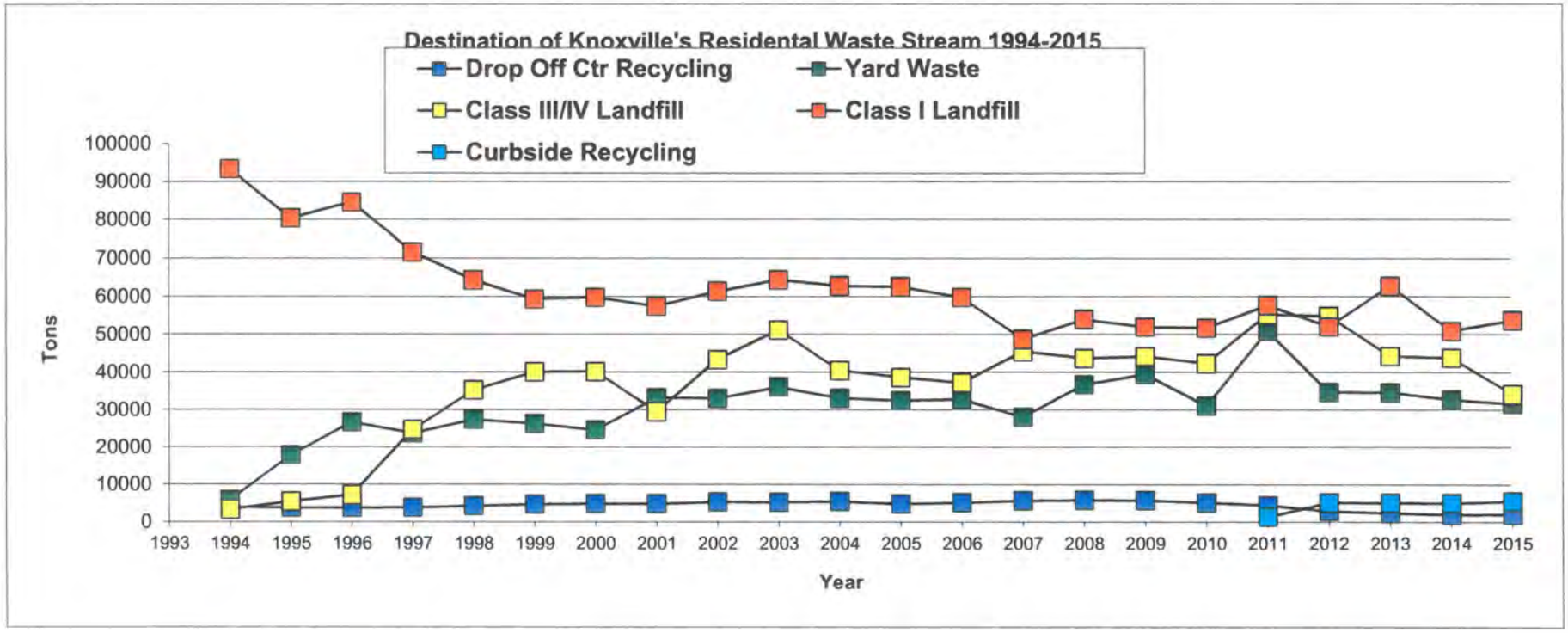
to some improvements in 2016, including a new compactor, new fencing and security at the entrance, ability to take credit cards, and other improvements. The HHW facility also seeks to improve their services by increasing awareness and benefits of the facility.

John Homa retired after 17 years of dedicated work to the City's solid waste management program, and left big shoes to fill.

And lastly, two major contracts (yard waste and trash/recycling hauling) expire and will go out for bid. We will look for opportunities to modernize our waste collection services, processing, and expanding the recycling program, with the goal of offering recycling to all interested residents.

The City of Knoxville Solid Waste team is focused on providing great services with a focus on both environmental and fiscal responsibility.

More information on the City's Public Service Department, Solid Waste Division and Sustainability Office can be found at the City's website at: http://www.knoxvilletn.gov/.


Destination of Knoxville's Residental Waste Stream 1994-2015
Drop Off Ctr Recycling
Yard Waste
Class III/IV Landfill
Class I Landfill
Curbside Recycling
Tons
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
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2006
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2008
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2010
2011
2012
2013
2014
2015
Year

Annual Report 2015 Drop Off Centers	Goodwill Magnolia & Alice	Goodwill 225 Moody Av.	Kroger 4440 Western Av.	Goodwill 341 Parkvillage	Downtown 227 Willow Av.	Drop Off Center Totals	Curbside Recycling City Wide Totals	Totals
Aluminum	6660 lbs	5040 lbs	3100 lbs	31680 lbs	3570 lbs	50050.00 lbs	57581 lbs	53.82 tons
Steel	7520 lbs	13080 lbs	5300 lbs	33660 lbs	5610 lbs	65170.00 lbs	174763 lbs	119.97 tons
Plastics	71880 lbs	93080 lbs	56440 lbs	337778 lbs	37640 lbs	596818.00 lbs	748572 lbs	672.70 tons
Clear Glass	13987 lbs	32354 lbs	16187 lbs	110912 lbs	17288 lbs	190727.24 lbs	518228 lbs	354.48 tons
Brown Glass	13987 lbs	32354 lbs	16187 lbs	110913 lbs	17288 lbs	190727.91 lbs	518228 lbs	354.48 tons
Green Glass	13987 lbs	32354 lbs	16187 lbs	110913 lbs	17288 lbs	190727.91 lbs	518228 lbs	354.48 tons
Newspaper	75720 lbs	136880 lbs	63420 lbs	390620 lbs	26500 lbs	693140.00 lbs	3454854 lbs	2074.00 tons
Mixed Paper	125700 lbs	166720 lbs	108333 lbs	746666 lbs	99000 lbs	1246419.00 lbs	3454854 lbs	2350.64 tons
Cardboard	100540 lbs	100120 lbs	126300 lbs	371448 lbs	82880 lbs	781288.00 lbs	1727427 lbs	1254.36 tons
Drop Off Center Totals	214.99 tons	305.99 tons	205.73 tons	1,122.29 tons	153.53 tons	2,002.53 tons	5,586.37 tons	7,588.90 tons

KPD / Lorain St.	41.22 tons
Cardboard Down Town	149.02 tons
Downtown Curbside	227.50 tons

Ball Parks	2.43 tons
Carpet	84.00 tons

Goodwill Lease Containers	487.90 tons

	Leaves	Brush	Total
Mulching Site	6134.00 tons	25457.34 tons	31591.34 tons

	Scrap Metal	Rec. Tlr.	HHW REC.	HHW Divert.	C&D for Class III	Compacted	Computers	Tires	Total
Transfer Station	266.32 tons	3.10 tons	40.52 tons	5.59 tons	19015.92 tons	11668.17 tons	33.69 tons	138.17 tons	31,171.48 tons

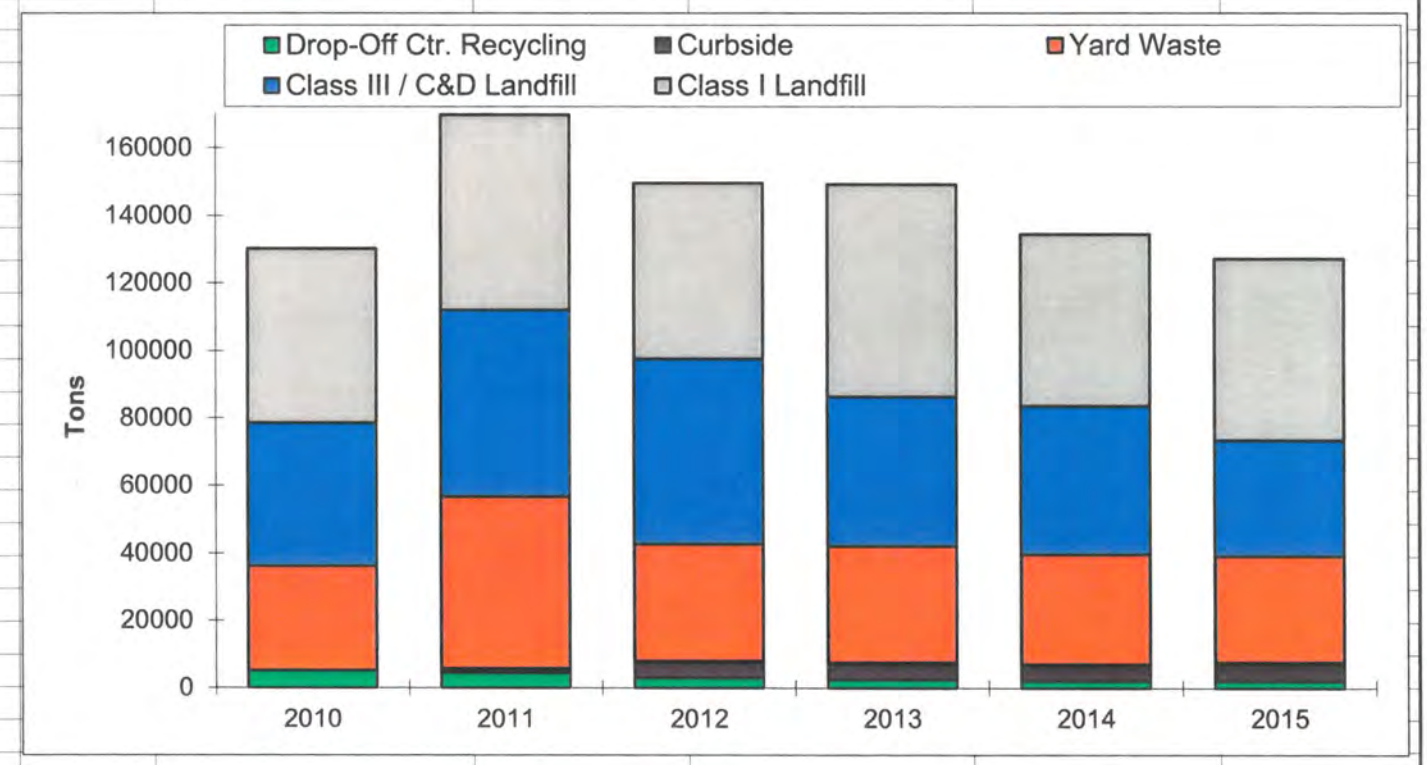
	Household Trash	Misc. Trash	Total
Landfill Class I	41732.18 tons	326.30 tons	53,726.65 tons

	Transfer Station	Construction	Codes	Total
Landfill Class III	19015.92 tons	8411.40 tons	6778.50 tons	34,205.82 tons

Total Waste Recycled	40,654.11 tons
Total Waste Diverted, Class III & Rec.	74,865.52 tons
Total Waste Landfilled, Class I	53,726.65 tons
Total Wastestream	128,592.17 tons

Recycling	31.61%
Diversion	58.22%
** Recycling*	9.92%
* Yard Waste Not Included w/ just residential trash	16.22%

	Drop-Off Ctr. Recycling	Curbside	Yard Waste	Class III / C&D Land	Class I Landfill
2010	5183.87	0	30991.11	42363.67	51674.53
2011	4459.85	1314.82	50891.46	55230.89	57677.52
2012	2893.67	5198.18	34641.25	54839.96	52052.03
2013	2369.03	5166.44	34592.73	44265.22	62796.04
2014	1950.29	5083.34	32692.04	43815.95	50890.35
2015	2002.53	5586.37	31591.34	34205.82	53726.65



APPENDIX D

Table of SPAP Facility Inspections
(Attached separately)

Commerical and Industrial Facilities Inspected During 2015-2016

Permit Number	Project Name	Address	Street Name	Inspection Date	Inspector	Water Quality Device
12-031	Pilot Food Mart #217	4800	N Broadway	10/06/2015	Dynamis Inc.	media filtration inserts
04-004	Pilot Food Mart-187	100	Merchant Drive	10/07/2015	Dynamis Inc.	Catch Basin Inserts
04-027	Ingles Markets Gas Express #399	430	East Emory Road	10/07/2015	Dynamis, Inc.	Stormceptor Oil/Water Separator
08-028	Ingles Expansion	430	E Emory Rd	10/07/2015	Dynamis, Inc.	
12-030	Pilot Food Mart #215	410	Merchants Drive	10/07/2015	Dynamis Inc.	Flow Guard-Plus Filtration inserts
14-087	KUB Fleming Center Fueling Station	835	E Jackson Ave	10/08/2015	Janalyn Brown	Double-walled fuel tanks, water diverter, etc.
00-006	Sam's Club Fueling Station	8435	Walbrook Rd	12/03/2015	Restoration Recovery	Aqua-Swirl AS-8
03-004	Chapman Hwy Wal-Mart Supercenter	7420	Chapman Hwy	12/03/2015	Resource Recovery	Oil and grit seperator
05-019	Wal-Mart Knoxville East	3051	Kinzel Way	12/03/2015	Resource Recovery	Crystal Streams Vault Unit
08-045	Wal-Mart Supercenter	10900	Parkside Dr	12/03/2015	Resource Recovery	Stormceptor
12-067	Fed Ex Ground	3700	Middlebrook Pike	12/03/2015	Resource Recovery	Crystal Stream 1056
16-009	Walmart Store #1320	7420	Chapman Highway	12/03/2015	Resouce Recovery	
12-029	Pilot Food Mart #119	2518	N Broadway	12/06/2015	Dynamis, Inc.	Catch Basin Inserts
14-079	Pilot Food Mart #334	412	N Cedar Bluff Rd	12/07/2015	Dynamis, Inc.	Catch Basin Inserts
12-028	Pilot Food Mart #138	136	N Northshore Dr	12/09/2015	Dynamis, Inc.	Catch Basin Inserts
03-005	Shops	7420	Chapman Hwy	12/15/2015	Storm System Services	Oil and grit seperator
09-006	Kroger #698	5201	N Broadway	12/15/2015	Storm System Services	Flo Guard Plus
13-003	Sam's Club #6572-03-Knoxville East	2920	Knoxville Center Drive	12/15/2015	J. Shubzda	Aqua Swirl, 3 units
12-036	Pilot Food Mart #111	1826	Western Ave	12/16/2015	Dynamis, Inc.	
14-080	Pilot Food Mart #244	2218	Cumberland Ave	12/16/2015	Dynamis, Inc.	Catch Basin Inserts
12-023	Pilot	5216	Middlebrook Pike	12/17/2015	Dynamis Inc.	Ultra Drain Guards Plus Sediment & Oil Insert
13-002	CarMax #7241	11225	Parkside Dr	12/29/2015	David Harris	Aqua-Swirl AS-9
14-007	CarMax #7241	11225	Parkside Drive	12/29/2015	David Harris	Aqua-Swirl AS-9
12-035	Pilot Food Mart #105	206	Walker Springs Rd	12/31/2015	Dynamis Inc.	Fossil Filter Flo-Guard
12-037	Pilot Food Mart #158	405	Lovell Rd	12/31/2015	Dynamis Inc.	Fossil Filter Flo Guard
12-038	Pilot Food Mart #166	4603	Chapman	12/31/2015	Dynamis Inc.	catch basin inserts
14-081	Pilot Food Mart #105	206	Walker Springs Rd	12/31/2015	Dynamis, Inc.	Catch Basin Inserts
07-027	KUB Hoskins Operation Center	4505	Middlebrook Pike	01/11/2016	Brooke Sinclair	Suntree Inserts
13-048	CVS Pharmacy #3762	9175	Kingston Pike	01/25/2016	Storm System Services	
01-001	Lakeside Center	2016	Lakeside Center Way, Suite 25	01/31/2016	US Tanks	Aqua-Swirl
01-011	Knoxville News Sentinel	2332	News Sentinel Dr	01/31/2016	US Tanks	Vortechnics
02-007	Lakeside Center III			01/31/2016	US Tanks	ADS unit
05-011	Home Depot	140	Green Rd	01/31/2016	US Tanks	Suntree Nutrient Separating Baffle Box
06-021	Building 400, The Village at Northshore Town Cente	2099	Thunderhead Rd, STE TBD	01/31/2016	US Tanks	Kristar Flogard
08-005	El Mezcal Mexican Restaurant	118	N Forest Park Blvd	01/31/2016	US Tanks	Suntree Curb Inlet Basket
10-025	Earth Fare, Inc. #400	10903	Parkside Drive	01/31/2016	US Tanks	3 Catch basin inserts
11-006	Home Depot Store #0731	4710	Centerline Dr	01/31/2016	US Tanks	Catch Basin Inserts
11-013	Home Depot #773	140	Green Road	01/31/2016	US Tanks	Suntree Nutrient Separating Baffle Boxes
11-015	Panda One	7741	S Northshore Dr.	01/31/2016	US Tanks	5 Catch Basin Inserts
12-024	Harman Ice	2727	Middlebrook Pike	01/31/2016	US Tanks	Catch Basin Insert
13-010	Knoxville News Sentinel	2332	News Sentinel Dr	01/31/2016	US Tanks	Vortechnics
13-017	South College Northern Parking Lot	400	Goodys Lane	01/31/2016	US Tanks	Suntree catch basin inserts
14-035	Building 400/Village of Northshore Town Center	2099	Thunderhead Road	01/31/2016	US Tanks	
15-033	One Lakeside Centre	2035	Lakeside Centre Way	01/31/2016	US Tanks	ADS Vaults
15-033.5	Three Lakeside Centre	2160	Lakeside Centre Way	01/31/2016	US Tanks	ADS Vaults
14-023	Toyota Knoxville	10415	Parkside Drive	02/08/2016	Doug White	
14-022	Lexus of Knoxville	10315	Parkside Drive	02/09/2016	Doug White	
14-024	PDI	10416	Parkside Drive	02/10/2016	Doug White	Suntree vault
09-049	Breadbox Fueling Station	4703	Centerline Drive	02/17/2016	J. Shubzda	Infiltration swales

Commerical and Industrial Facilities Inspected During 2015-2016

Permit Number	Project Name	Address	Street Name	Inspection Date	Inspector	Water Quality Device
11-011	Cook Out Restaurant	6920	Kingston Pike	02/17/2016	J. Shubzda	Catch Basin Insert
04-014	Colonial Pinnacle-Phase I	11325	Parkside Drive	02/23/2016	J. Shubzda/L. Marcum	Oil water separators
12-034	Zoes Kitchen - Turkey Creek	11378	Parkside Dr	02/23/2016	J. Shubzda	Managerial Controls
13-007	Chipotle Mexican Grill	11380	Parkside Dr	02/23/2016	J. Shubzda	Enviromatic Viroguard
15-067	Bonefish Grill	11395	Parkside Drive	02/23/2016	J. Shubzda	Master planning for Turkey Creek
08-025	East TN Healthcare Development	1451	Old Weisgarber Rd	02/24/2016	US Tanks	Catch Basin Inserts and 2 vaults
10-006	The Grill at Highlands Row, LLC	4705	Kingston Pike	02/24/2016	US Tanks	Catch Basin Inserts
10-018	Salsaritas	100	Jack Dance Street	02/24/2016	US Tanks	Catch Basin Insert
10-046	Just Ripe, LLC	513	Union Ave	02/24/2016	J. Davis	Managerial Controls
11-008	Lonsdale Market & Deli	3208	Rudy St	02/24/2016	J. Davis	Catch Basin Inserts Kristar
15-025	The Grill at the Highlands Row, LLC	4705	Old Kingston Pike	02/24/2016	US Tanks	Catch Basin Inserts
15-088	Sticky Rice Café	120	Jack Dance Street	02/24/2016	US Tanks	Catch Basin Insert
10-043	Haru Hibachi and Sushi	5211	Kingston Pike	02/25/2016	J. Shubzda	Managerial Controls
11-007	Krispy Kreme Doughnut Shop	6201	Kingston Pike	02/25/2016	J. Shubzda	Catch Basin Insert Flexstorm
12-032	Archer's BBQ	5415	Kingston Pike	02/25/2016	J. Shubzda	Managerial Controls
12-039	Archer's BBQ	311	S Weisgarber	02/25/2016	J. Shubzda	grease gutter sidekick/Powerwash.com
12-052	Snappy Tomato Bearden Center	5905	Kingston Pike	02/25/2016	J. Shubzda	Catch basin inserts
11-025	Cherokee Distributing Suppl Parking	200	Miller Main Circle	02/26/2016	J. Shubzda	5 Catch Basin Inserts
16-011	Cherokee Distributing Supplemental Parking	200	Miller Main Circle	02/26/2016	J. Shubzda	5 Catch Basin Inserts
10-052	Bearden Hill Fieldhouse	6600	Kingston Pike	03/02/2016	J. Shubzda	Managerial Controls
11-019	Kingston Pike Center	4602	Kingston Pike	03/02/2016	J. Shubzda	
14-066	Hurricane Grill and Wings	319	Lovell Road	03/03/2016	J. Shubzda	Suntree CB Inserts
02-006	Chapman Hwy Car Wash	4605	Chapman Hwy	03/10/2016	L. Marcum	sand filter
08-007	Greenbrier Ridge Apts	1505	Greenbrier Ridge Way	03/11/2016	J. Shubzda/L. Marcum	Suntree Catch Basin Inserts
09-025	Sangria's	35	Market Square	03/15/2016	J. Shubzda	Managerial Controls
14-056	Cedar Springs Presbyterian Church	9132	Kingston Pike	03/15/2016	J. Shubzda	Catch Basin Inserts
14-102	Park West Church of God	7635	Midlebrook Pike	03/15/2016	J. Shubzda	
05-012	Reily Foods/JFG Coffee	3434	Mynatt Avenue	03/16/2016	J. Shubzda	Downspout Filter/Grassy Swale
16-005	Reily Foods Co./JFG Coffee	3434	Mynatt Avenue	03/16/2016	J. Shubzda	Grassy swale
11-020	Academy Sports & Outdoors	145	Moss Grove Blvd	03/18/2016	J. Shubzda	2 Suntree Vaults
09-022	Breadbox Asheville Hwy	6220	Asheville Hwy	03/21/2016	J. Shubzda	Catch Basin Inserts
06-007	Gillespie Import Service	7685	S Northshore Dr.	03/23/2016	J. Shubzda	Oil/water separators
14-096	Pups Pit BBQ LLC	7660	S Northshore Drive	03/24/2016	J. Shubzda	Manigerial Controls
12-010	Sysco Knoxville	900	Tennessee Ave	04/07/2016	J. Shubzda	Large Suntree
06-035	Starbucks - Emory Rd.	401	E Emory Rd.	05/03/2016	J. Shubzda	Suntree Technologies
12-075	Zaxby's Emory Rd.	607	E Emory Rd.	05/03/2016	J. Shubzda	4 Suntree CB
13-060	Cookout Restaurant	435	E Emory Road	05/03/2016	J. Shubzda	Baysaver 3K Separator Unit
14-015	Jets Pizza	619	E Emory Road	05/03/2016	J. Shubzda	Suntree Catch Basin Inserts
14-019	Froyoz	623	E Emory Rd	05/03/2016	J. Shubzda	Suntree Catch Basin Inserts
14-020	Petro's Chili & Chips	631	E Emory Road	05/03/2016	J. Shubzda	Suntree Catch Basin Inserts
15-004	The Shops of Emory Road	603	E Emory Road	05/03/2016	J. Shubzda	Suntree Catch Basin Inserts
15-036	Taco Bell	611	E Emory Road	05/03/2016	J. Shubzda	
14-048	E.T. Subway LLC #58418	2501	University Commons Way	05/17/2016	J. Shubzda	3 Contech Swirl Units
14-060	Fresh To Order at University Commons	2421	University Commons Way	05/17/2016	J. Shubzda	3 Contech Swirl Units
14-062	Bojangles at University Commons	2469	Univerisity Commons Way	05/17/2016	J. Shubzda	3 Contech Swirl Units
14-085	Jersey Mike's Subs	2415	University Commons Way	05/17/2016	J. Shubzda	3 Contech Swirl Units
14-116	Bluetick's	2525	University Commons Way	05/17/2016	J. Shubzda	3 Contech Swirl Units

Commerical and Industrial Facilities Inspected During 2015-2016

Permit Number	Project Name	Address	Street Name	Inspection Date	Inspector	Water Quality Device
13-013	Weigel's #15	6927	Kingston Pike	05/19/2016	J. Shubzda	Suntree CB Inserts
13-032	Papermill Plaza	6700	Papermill Drive	05/19/2016	J. Shubzda	2 Downstream Defenders
13-036	The Coop Café	3701	Sutherland Avenue	05/19/2016	J. Shubzda	Managerial Controls
14-025	Weigel's #32	9148	Fox Lonas Road	05/19/2016	J. Shubzda	Suntree CB Inserts
10-024	Three Minue Magic Car Wash	4725	N Broadway	05/26/2016	J. Shubzda	Catch Basin Inserts and Infiltration area
14-021	Charter Foods dba Taco Bell	5322	Millertown Pike	05/26/2016	J. Shubzda	Suntree Catch Basin Inserts
14-099	Jet's Pizza	4943	Millertown Pike	05/26/2016	J. Shubzda	
11-040	NTB	8088	Kingston Pike	06/02/2016	J. Shubzda	Catch Basin Insert and Infiltration Pits
12-044	Rogers Place	8817	Kingston Pike	06/02/2016	J. Shubzda	Managerial Controls
11-049	Suburban Plaza	8025	Kingston Pike	06/08/2016	Turn Key Plumbing	Flex Storm and Flume guard
12-048	University Commons - Publix Supermarket	2415	University Commons Way	06/08/2016	J. Shubzda	3 Contech Swirl Units
12-049	University Commons - Publix Supermarket	2415	University Commons Way	06/08/2016	J. Shubzda	3 Contech Swirl Units
11-031	Lime Fresh Mexican Grill	501	Market Street	06/15/2016	J. Shubzda	Manigerial Controls
11-032	Kroger Store GA 684	135	N Cedar Bluff Road	06/16/2016	Storm System Services	Vaults and Catch Basin Inserts
07-004	Sonic Drive-In	7519	Mountain Grove Rd	06/21/2016	J. Shubzda	Catch Basin Inserts-Kristar
08-013	South Grove, Gondoliers	7644	Mountain Grove Dr	06/21/2016	J. Shubzda	Catch Basin Inserts
08-043	South Knoxville Carwash	7525	Mountain Grove Rd	06/21/2016	J. Shubzda	2 Kristar Catch Basin Inserts
10-036	First Tennessee Bank	7555	Mountain Grove Drive	06/21/2016	J. Shubzda	Suntree Catch Basin Inserts
10-037	Chick-Fil-A	7565	Mountain Grove Drive	06/21/2016	J. Shubzda	Suntree Catch Basin Inserts
11-021	McDonald's South Grove	7545	Mountain Grove Dr	06/21/2016	J. Shubzda	
14-026	Weigel's #67	7514	Mountain Grove Drive	06/21/2016	J. Shubzda	Suntree CB Insert
14-054	Gas-N-Go at Food City South Grove	7644	Mountain Grove Road	06/21/2016	J. Shubzda	
13-030	First Transit Inc.	1700	N Cherry St.	06/23/2016	J. Shubzda	Suntree Vault
11-047	McDonalds Strawberry Plains	7402	Strawberry Plains Pike	06/24/2016	J. Shubzda	Catch Basin Inserts and Flume Guards
11-054	Free Service Tire	1525	N Cherry St.	06/24/2016	J. Shubzda	
13-054	Waffle House	5416	Asheville Hwy	06/24/2016	J. Shubzda	
06-003	Couva Calypso Café	7805	Montvue Center Way	06/28/2016	J. Shubzda	Secondary Grease Collection
14-036	Longhorn Steakhouse	120	Montvue Road	06/28/2016	J. Shubzda	Flume guards and Infiltration
12-046	Burgess & Davis Bldg	3920	Asheville Hwy	06/29/2016	J. Shubzda	Managerial Controls
11-004	Sam & Andy's	2613	W Adair Dr.	06/30/2016	G. Lowe	Managerial Controls
16-077	Sam & Andy's	2613	W Adair St	06/30/2016	G. Lowe	Managerial Controls

APPENDIX E

NPDES Permit Program Inventory Map

(Attached separately)

The entire inventory map is not reproduced as part of the online version of the Year 20 Annual Report. The entire map is approximately 66 inches by 32 inches (covering an area of approximately 33 miles by 16 miles) at a scale of 1- inch equals one-half mile.

To view the entire map, please contact the Stormwater Engineering Division at (865) 215-2148.