

Illicit Discharge Detection and Elimination Plan

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Illicit discharge detection and elimination is an important part of a stormwater program because it is necessary detect and eliminate pollutants entering the local water ways.

- ✓ An illicit discharge is defined as any discharge to an MS4 that is not composed entirely of stormwater (with a few exceptions as noted within the City's stormwater ordinance).
- ✓ Discharges are considered illicit when the MS4 is not designed properly to accept, process, or discharge such non-stormwater wastes.
- ✓ Illicit discharges are polluted runoff from construction sites, pipes carrying untreated liquid and debris which empty into a water body, cracked sanitary systems, spills, improper disposal of waste and/or effluent from septic tanks.
- ✓ An illicit discharge program involves mapping the storm sewer system, collecting data on outfalls and stream assessments, construction inspection, hot spot identification, inspection and enforcement, illegal dumping, a tracking system, and a hotline.

For Goodlettsville a TMDL (Total Maximum Daily Load) has been written by TDEC for Mansker's Creek, Slater's Creek, and Lumsley Fork for stream segments within the City's jurisdiction that are impaired with e. coli. Refer to the TMDL manual guide to review TDEC's TMDL, the State's monitoring protocol, and the City's written response to the TMDL. *The City provides Analytical and Non-Analytical data to TDEC as required in permit.*

TDEC Requirements through the Stormwater Permit

4.2.3 Illicit Discharge Detection and Elimination

Permittees shall develop, or modify as necessary, implement and enforce an illicit discharge detection and elimination program. Newly designated permittees shall have this program implemented within 18 months of coverage under this permit. Currently permitted MS4s shall continue to implement their existing illicit discharge detection and elimination program.

1. New permittees must develop, and existing permittees must continue to develop, update and maintain, a storm sewer system map (preferably **Geographic Information System** based) that shows the location of system outfalls where the municipal storm sewer system discharges into waters of the state or storm sewer systems owned or operated by another MS4 jurisdiction. Updates to the map should be completed within 6 months of the completion of a system modification or addition. The deadline may be extended for larger changes such as large annexations. The map must be available for review upon request. The map must also show: a. the names and location of waters of the state that receive discharges from those outfalls; b. inputs into the storm sewer collection system, such as the inlets, catch basins, drop structures or other defined contributing points to the sewer shed of that outfall; and c. general direction of stormwater flow.
2. To the extent allowable under state or local law, permittees shall effectively prohibit, through **ordinance**, or other regulatory mechanism, non-stormwater discharges (unless allowed by subsection 1.3.3.2) into the storm sewer system and implement an appropriate Enforcement Response Plan (ERP).
3. The illicit discharge ordinance and the **ERP** must be developed and in effect within 18 months of coverage under this permit. Permittees must develop and implement a plan to detect, identify and eliminate non-stormwater discharges, including illegal disposal, throughout the MS4 jurisdiction.
4. This plan must also include the identification of **hot spots**. The permittee shall develop and implement standard procedures to be followed to investigate portions of the MS4 jurisdiction that,
5. Based on the results of **field screening** or other identification programs, indicate a reasonable potential of containing illicit discharges. Illicit discharge investigations, and the results of those investigations, shall be documented and include the locations, times, parameters and sampling results, discharge source, and any other pertinent information. The plan to eliminate identified

illicit discharges should be completed within 90 days of the initial report, and the discharge eliminated as soon as practicable.

6. All plans and procedures in the IDDE program must be documented in the **SWMP**.

1. GIS Mapping

Scope of Services

The City has implemented a perpetual contract through RFQ, to have the following information collected within the City's right-of-way as well as on commercial properties within the City limits.

- Collect geospatial information on combination inlets and area drains:
 - Coordinates, a picture, grate size, condition, structure type, approximate direction of stormwater flow, and whether or not there is standing water. Ownership will be determined geospatially in the office at the completion of the data collection.
- Collect geospatial information on headwalls:
 - Coordinates, a picture, riprap presence, condition, and flow direction. Ownership will be determined geospatially in the office at the completion of the data collection.
- Collect geospatial information on conveyances:
 - Coordinate, a picture (unless, in the case of channels, it is similar to an adjacent channel), material, approximate size, whether or not dry weather flow is present, condition, and approximate direction of stormwater flow. Ownership will be determined geospatially in the office at the completion of the data collection.
- Collect geospatial information on "other features":
- Provide access to GIS information publicly on the City Website Data Viewer.

These "other features" may include stormwater ponds, manholes, exposed pipes, or other features the City may want to know about.

2. Ordinance Provision

18-309. Illicit discharges.

(1) Scope. This section shall apply to all

water generated on developed or undeveloped land entering the city's separate storm sewer system.

(2) Prohibition of illicit discharges. No person shall introduce or cause to be introduced into the municipal separate storm sewer system any discharge that is not composed entirely of stormwater or any discharge that flows from stormwater facility that is not inspected in accordance with § 16-506 shall be an illicit discharge. Non-stormwater discharges shall include, but shall not be limited to, sanitary wastewater, commercial car wash wastewater, lawn mowing debris, lawn care chemicals, grease, soap, cleaning chemicals, radiator flushing disposal, spills from vehicle accidents, carpet cleaning wastewater, effluent from septic tanks, improper oil disposal, laundry wastewater/gray water, improper disposal of auto and household toxics. The commencement, conduct or continuance of any non-stormwater discharge to the municipal separate storm sewer system is prohibited except as described as follows:

(a) Uncontaminated discharges from the following sources:

- (i) Water line flushing or other potable water sources;
- (ii) Landscape irrigation or lawn watering with potable water;
- (iii) Diverted stream flows;
- (iv) Rising ground water;
- (v) Groundwater infiltration to storm drains;
- (vi) Pumped groundwater;
- (vii) Foundation or footing drains;
- (viii) Crawl space pumps;
- (ix) Air conditioning condensation;
- (x) Springs;
- (xi) Non-commercial washing of vehicles;
- (xii) Natural riparian habitat or wetland flows;
- (xiii) Swimming pools (if de-chlorinated - typically less than one (1) PPM chlorine);
- (xiv) Firefighting activities;
- (xv) Any other uncontaminated water source.

(b) Discharges specified in writing by the city as being necessary to protect public health and safety.

(c) Dye testing is an allowable discharge if the city has so specified in writing.

(d) Discharges authorized by the Construction General Permit (CGP), which comply with section 3.5.9 of the same:

- (i) Dewatering of work areas of collected stormwater and ground water (filtering or chemical treatment may be necessary prior to discharge);
- (ii) Waters used to wash vehicles (of dust and soil, not process materials such as oils, asphalt or concrete) where detergents are not used and detention and/or filtering is provided before the water leaves site;
- (iii) Water used to control dust in accordance with CGP section 3.5.5;
- (iv) Potable water sources including waterline flushing from which chlorine has been removed to the maximum extent practicable;

- (v) Routine external building wash-down that does not use detergents or other chemicals;
- (vi) Uncontaminated groundwater or spring water; and
- (vii) Foundation or footing drains where flows are not contaminated with pollutants (process materials such as solvents, heavy metals, etc.).

3. Enforcement Response Plan (ERP)

Purpose

The intent of this document is to provide guidance in enforcing the City's existing stormwater management ordinance and to help eliminate illicit discharges to the City's stormwater system.

Documentation

Stormwater ordinances in place are **18-309** and **18-310**.

Construction sites that have not been issued a Notice of Termination (N.O.T.) are inspected on a routine basis by both the City and the developer. The City's Inspector is the main contact in charge of routine inspections. The City documents construction site inquiry calls to the office.

Construction sites that have been issued an N.O.T. are required to submit an annual post-construction long-term maintenance agreement report to the City by July 1. The Inspector maintains these files.

Hot Spot/Priority Areas are chosen based on review utilizing the EPA's Hot Spot Site Investigation Form and are required to conduct inspections and submit those reports to the Inspector. Hot Spot locations are provided with their self-inspection checklist, a suggested list of Best Management Practices (BMPs) and a letter from the Inspector briefly explaining the process.

Citizens are able to report illicit discharges to the Stormwater offices via the hotline, website, email, or telephone call to the office. Once received, they are entered into the Call Center database program and emailed to the appropriate personnel for investigation. Personnel have up to seven (7) days to respond to the inquiry.

Drainage infrastructure Information is placed within the GIS system and maps are created identifying potential areas of concern.

Dumping activities are responded to by the Stormwater Department. If possible, waste is gone through to determine person(s) responsible for

dumping. Should person(s) responsible be prosecuted, prosecution could fall underneath penalties for violating the stormwater ordinance.

When a complaint is received, the inspector and/or Stormwater Coordinator or assigned employee, checks on the complaint and addresses it accordingly within seven (7) days. Notes are taken and the information is documented.

4. Hot Spots

18-302. Definitions. For the purpose of this chapter, the following definitions shall apply: Words used in the singular shall include the plural, and the plural shall include the singular; words used in the present tense shall include the future tense. The word "shall" is mandatory and not discretionary.

(17) "Hotspot" means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater. The following land uses and activities are deemed stormwater hotspots, but that term is not limited to only these land uses:

- (a) Vehicle salvage yards and recycling facilities;
- (b) Vehicle service and maintenance facilities;
- (c) Vehicle and equipment cleaning facilities;
- (d) Fleet storage areas (bus, truck, etc.);
- (e) Industrial sites (included on standard industrial classification code list);
- (f) Marinas (service and maintenance);
- (g) Public works storage areas;
- (h) Facilities that generate or store hazardous waste materials;
- (i) Commercial container nursery;
- (j) Restaurants and food service facilities; or
- (k) Other land uses and activities as designated by an appropriate review authority.

Hot Spot Regulation

Procedures for Implementation of the City of Goodlettsville's "Hot Spot" Storm Water Pollution Prevention Program

Purpose

To protect, maintain, and enhance the environment, public health, safety, and general welfare of the citizens of the City by controlling pollutant discharges to the City's storm water system and to maintain and improve the quality of receiving waters into which the storm water flows.

Definition

A hot spot (“priority area”) means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

Scope

This document identifies the types of establishments the City considers to be stormwater hot spots and sets forth the City’s minimum guidelines (suggested Best Management Practices (BMPs) to diminish contamination of stormwater runoff.

Applicable Permits and Laws

Municipal Separate Storm Sewer System (MS4) General Permit Issued by the Tennessee Department of Environment and Conservation (TDEC)

The City is required by TDEC and the EPA to identify hot spot (“priority areas”) within its jurisdiction and to help better manage stormwater runoff.

Public Education and Outreach, MS4 General Permit Section 4.2.1.1.1 Illicit Discharge Detection and Elimination, MS4 General Permit Section 4.2.3.2

TCA§68-221-1105 provides that, among other power municipalities have with respect to stormwater facilities, is the power by ordinance or resolution to:

1. Exercise general regulation over the operation and maintenance of stormwater facilities in the municipality;
2. Adopt rules and regulations deemed necessary to accomplish the purposes of this statute;
3. Establish standards to regulate the quantity of stormwater discharged and to regulate stormwater contaminants as may be necessary to protect water quality;
4. Review and approve plans and plats for stormwater management;
5. Issue permits for storm water discharges;
6. Suspend or revoke permits when it is determined that the permittee has violated any applicable ordinance, resolution, or condition of the permit;
7. Regulate and prohibit discharges into storm water facilities of sanitary, industrial, or commercial sewage or water that have otherwise been contaminated; and
8. Expend funds to remediate or mitigate the detrimental effects of contaminated land or other sources of storm water contamination.

5. Field Screening Procedure

A. Non Analytical Assessments

As part of the mission of academic excellence through research and community engagement, the Western Kentucky University (WKU) Department of Public Health, Environmental Health Science Program proposes to assist the City of Goodlettsville, Tennessee in a project to conduct watershed health assessments. This project will be conducted in compliance with standards set forth by of the Tennessee Department of Environment and Conservation (TDEC) and the Environmental Protection Agency for Small Municipal Separate Storm Sewer Systems (MS4s) during a permit cycle.

The purpose of this study is to assess the health of the watersheds within the City of Goodlettsville's MS4. This assessment will be composed of objectives that meet the requirements of the City's Phase II MS4 permit. Objectives of this study include the following:

- Non-analytical monitoring to include visual stream surveys and impairment inventories, which includes evaluating the physical attributes of the stream corridors, within the City of Goodlettsville's MS4. Surveys will include assessments immediately upstream and downstream from discharges from the MS4. Visual stream surveys will be conducted on the approximately 12 miles of streams within the MS4, to include Mansker Creek, Lumsley Fork, Madison Creek, and Dry Creek. Slaters Creek will not be included in the visual assessment as it is outside of the City's MS4.
- Submission of all completed forms and data collected to the City of Goodlettsville, TN.

WKU will provide a Principal Investigator, Dr. Ritchie Taylor, to oversee and manage the project. Graduate Research Assistants, under direction of Dr. Taylor, will ensure the field and lab operations follow specific TDEC and applicable protocols. Graduate Research Assistants will conduct the day-to-day field operations, with assistance from other graduate or undergraduate students. All components of the study will be reviewed and directed by Dr. Taylor.

Methods

Components of this study will follow specified TDEC methods. Methods for non-analytical monitoring are specified in the general National Pollutant

Discharge Elimination System (NPDES) permit requirements for Small MS4s in Tennessee.

Non-Analytical Monitoring

In order to meet the general NPDES permit requirements for small MS4s in Tennessee, non-analytical monitoring is prescribed where discharges from the MS4 have been identified as the source of siltation, habitat alteration, and/or pathogen impairment. To meet this requirement, Visual Stream Surveys and Impairment Inventories must be performed.

- At a minimum, a visual stream survey must be performed immediately upstream and downstream of each MS4 outfall that discharges into an impaired segment.
- The MS4 shall refer to existing protocols by the EPA, Natural Resources Conservation Service, and/or the Maryland Department Natural Resources.

WKU will evaluate the stream assessment and outfall inventory procedures that were developed and used by the City of Goodlettsville in the past. In comparison to the protocols specified in the permit, WKU may develop modified assessment forms to better assess stream corridors and impairment. To accomplish this task, WKU will first conduct an assessment of the Manskers Creek stream corridor, including an outfall inventory, with the three procedures specified in the permit and with the City of Goodlettsville's visual assessment forms. Following this analysis, the team will compare the results, decide on the assessments that provide the most beneficial information to the City, and develop a modified assessment strategy, if deemed necessary. The intent of this first step is to determine the most efficient methodology for a small MS4 to evaluate habitat and impairment. Based on the findings for Manskers Creek, the same approach will be applied to all other stream segments, or the modified assessment strategy developed will be applied to all other segments.

The streams that are the subject of non-analytical monitoring in the City of Goodlettsville, TN, are Manskers Creek, Lumsley Fork, Madison Creek, and Dry Creek, for an estimated total of approximately 12 miles of streams. Slaters Creek is not included in the non-analytical monitoring as it is outside of the jurisdictional boundary of the City.

Following a modified version of the Maryland Department of Natural Resources' survey methods, a WKU Graduate Research Assistant, as supervised by an environmental health scientist and Dr. Taylor, will conduct the visual stream assessments. Stream segments will be surveyed at a rate of approximately 1.5-stream miles/day. These surveys will take place during dry weather conditions, defined as at least 48 hours after the last runoff producing rain event. Due to the unpredictability of the dry weather

requirement, provisions for flexibility in the work schedule have been budgeted.

NON-ANALYTICAL ASSESSMENT 2019

Visual Stream Assessment - Maryland Protocol - Fish Barriers						
	Lat Coord	Long Coord	Barrier Type	Severity	Correctability	Access
Slater						
3	36.34318	-86.71601	Natural falls	4	3	4
Lumsley Fork						
1	36.3319	-86.72953	Natural falls	4	2	2
2	36.3339	-86.72785	Natural falls	3	2	1
2	36	-86.72737	Natural falls	4	2	1
2	36.33432	-86.72684	Natural falls	4	2	1
2	36.33479	-86.72626	Natural falls	4	2	1
3	36.33635	-86.72282	Natural falls	4	2	1
3	36.3384	-86.72045	Natural falls	4	2	1
3	36.33946	-86.71919	Pipe	3	4	3
Dry Creek						
1	36.29969	-86.73058	Natural falls	3	2	4
1	36.29978	-86.72997	Natural falls	4	2	4
1	36.29968	-86.72875	Natural falls	4	2	4
1	36.29959	-86.72824	Natural falls	3	2	4
1	36.29943	-86.72769	Natural falls	Stream Stoppage after this point - no flow.		

Analytical Testing

B. Biological Monitoring and Habitat Assessment

Specified requirements for biological sampling are to be performed in stream segments where a loss of biological integrity was identified and the MS4 has been determined to be the source of siltation and/or habitat alteration (TDEC, 2012). In these stream segments, as specified in the general NPDES permit, the Semi-Quantitative Single Habitat (SQSH) Method was performed to conduct biological stream sampling (TDEC, 2011). Specifically, Semi-Quantitative Riffle Kick (SQKICK) samples were collected according to Protocol G in Streams listed as having a loss of biological integrity and impaired for siltation and/or habitat alteration in the City of Goodlettsville's MS4 (TDEC, 2012). The streams sampled included two sites on Mansker Creek, Site 001 at Northcreek Park and Site 002 upstream near Old Louisville Road and at the double arch bridge, and one location on Madison Creek, Site 007 near Moss-Wright Park (Figure 1). Madison Creek was included in the study as it is within the City's MS4 jurisdiction. However, the City of Goodlettsville's MS4 was not listed as the source of impairment (TDEC, 2012).

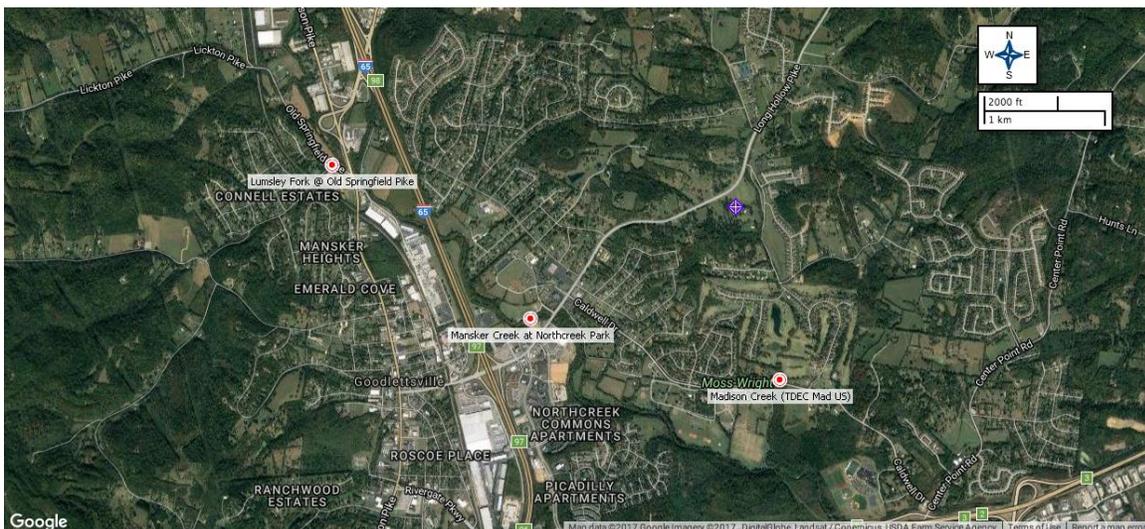


Figure 1. Location of bio assessment sites in the City of Goodlettsville MS4 jurisdiction.

Bio assessment samples were collected in August of 2016. A series of two SQKICK samples were collected at the sampling locations shown in Figure 1. Collection of two samples was performed at each site to ensure that the required 160-240 organisms would be achieved after sorting. SQKICK samples were taken in appropriate riffle habitats located in each sampling reach, according to the TDEC methodology (TDEC, 2011). A kick net was used for sample collection. At each location two semi-quantitative samples for macroinvertebrates were collected with the SQKICK method (TDEC, 2011). A habitat assessment was done at each location to quantify the physical condition of each stream reach. Habitat assessments were recorded on the appropriate forms (TDEC, 2011).

Water Quality

Water quality measurements were collected at each sample site to include dissolved oxygen (mg/L), pH (s.u.), specific conductance ($\mu\text{s}/\text{cm}$), temperature ($^{\circ}\text{C}$), and turbidity (NTU), as per standard TDEC protocols (2011). A YSI multi-probe water quality probe and interface was used to measure water quality. Measurements taken were recorded in a bound field notebook. The meter was calibrated at the beginning and end of the sampling day pursuant to standard methods (TDEC, DWPC, 2011).

Subsampling of Macroinvertebrate Samples

Sorting required that samples were cleaned of major debris and macroinvertebrates were removed from the sample. The general procedure was to reduce semi-quantitative samples to 160 – 240 organisms and produce a subsample. To begin, each sample was placed in a 500-micron sieve and rinsed. Once a sample was cleaned, it was moved to a gridded sub sampler for collection of the required organisms. Each grid within the sub sampler was numbered.

Grids for sampling were determined by selecting four grids randomly. All material and organisms were removed from each randomly selected grid in sequential order until a subsample of 160-240 organisms was achieved. The subsample was then sorted to remove organisms. If a subsample was determined to have more than the 240 organisms' quota, then the sample was again subsampled until the 160-240 organisms' quota was achieved.

Material from each subsample was then repeatedly transferred to a petri dish to sort organisms from the subsample. Macroinvertebrates were removed using a dissecting microscope. Organisms sorted from the subsamples were preserved and stored in vials for later taxonomic identifications.

Macroinvertebrate Taxonomy

Macroinvertebrate identifications followed taxonomic procedures specified in the TDEC (2011) procedure and was completed to the genus level, with the exceptions for family identification specified in the method and with *Baetidae* and *Chironomidae*. Organisms were identified following the appropriate keys. Macroinvertebrates were identified to the appropriate taxonomic level, genus or family, and all organisms of a genus (family) were placed in a specific vial. A label indicating the sample ID, date, and organism was placed in each vial. All data for taxonomic identifications were recorded on a bench sheet and stored in a database.

Following taxonomic identifications, macroinvertebrate data analysis was completed for each sampling site based on biometrics calculated from the raw benthic data (TDEC, 2011). Metrics followed those specified by TDEC (2011). All data were then reduced to produce a Tennessee Macroinvertebrate Index (TMI) score. In this way, results were used to compare to the standard of 32 for meeting the bio criteria requirement. Also, data reduction allows that the sites can be evaluated.

Table 1. Biometrics for SQKICK Sites in the City of Goodlettsville's Stormwater Jurisdiction.

Metric	Lumsley Fork Near Mansker Creek Site TDEC Lum	TMI 71h	Madison Creek Upstream of Caldwell Drive Site TDEC Mad US	TMI 71h	Mansker Creek at North Creek Park Site TDEC Man NC	TMI 71h
Taxa Richness (TR)	11	2	11	2	12	2
EPT Richness (EPT)	4	2	3	0	6	2
% EPT-Cheum	68.9	6	41.0	4	61.6	6
% OC	14.0	6	34.8	4	20.7	6
NCBI	4.4	4	5.3	4	5.6	4
% Clingers	71.3	6	41.6	4	36.9	2
% TNutol	1.2	6	28.2	4	12.1	6
TMI Total		32		22		28
Target TMI = 32						

6. Stormwater Management Plan (SWMP)

City of Goodlettsville's Stormwater Management Plan (SWMP)

Introduction

This Stormwater Management Plan (SWMP) is required under U.S. Environmental Protection Agency (U.S. EPA) Phase II stormwater regulations, promulgated under the Federal Clean Water Act (CWA). These regulations require the City of Goodlettsville to obtain coverage under a National Pollutant Discharge Elimination System (NPDES) permit. The permit covers stormwater discharges associated with the

municipality's separate storm sewer system (MS4) and requires the City to report annually on its progress. The latest stormwater permit issued by TDEC is valid from February 8, 2017 through September 30, 2021.

U.S. EPA's Stormwater Phase II Final Rule establishes that an MS4 stormwater management program is intended to improve the quality of the nation's waterways. Common stormwater pollutants include oil and grease from roadways and parking lots, pesticides, herbicides and fertilizers from lawns, sediment from construction sites and trash. Pollutants are deposited into waterways, impacting beneficial uses of the resources and interfering with the habitat for fish, aquatic organisms and wildlife.

After years of water sampling testing analysis, the State of Tennessee has determined each stream within Goodlettsville's jurisdiction is impaired with either e.Coli, siltation and/or as a result of habitat alterations. Based on these test results and the City's proximity to Nashville, Goodlettsville was charged with implementing a stormwater, or water quality program. In 2003, Goodlettsville implemented its stormwater program. The City of Goodlettsville encompasses approximately 14 square miles with an urban growth boundary of almost 4 miles and a population of approximately 18,000 citizens.

The purpose of the SWMP is to identify pollutant sources potentially affecting the quality and quantity of stormwater discharges, to provide Best Management Practices (BMPs) for municipal and development activities, and to provide measureable goals to assess the effectiveness of implemented BMPs.