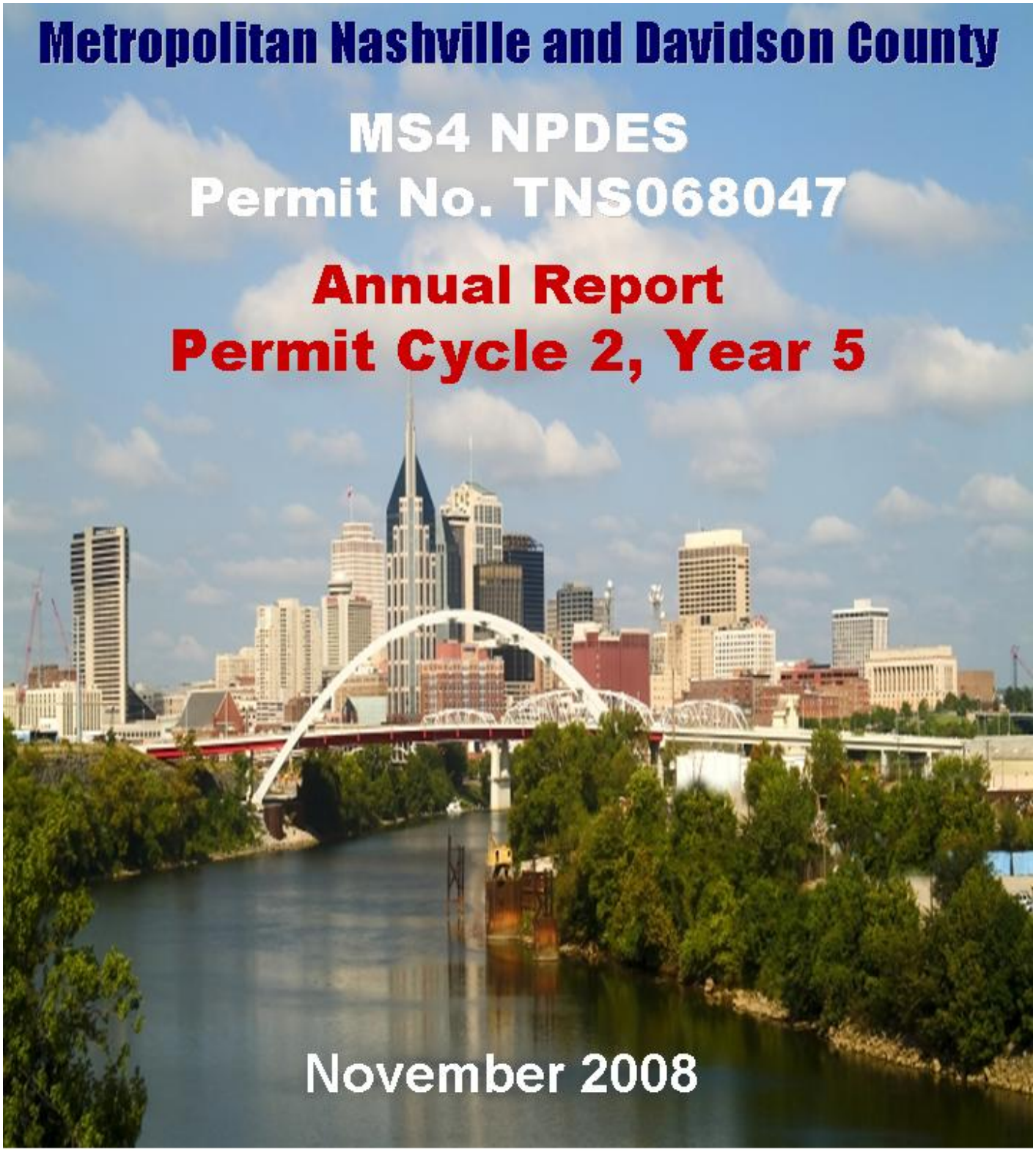
Metropolitan Nashville and Davidson County

MS4 NPDES
Permit No. TNS068047

Annual Report
Permit Cycle 2, Year 5



November 2008

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1.0 Contact List

The following table lists the people who contributed to and are responsible for the data collection and/or preparation of the annual report.

Table 1.1 Contact List

Name	Agency	Position	Phone
Scott Potter	Metro Water Services	Director of Metro Water Services	615-862-4505
Sonia Harvat	Metro Water Services	Metro Water Services Public Information Officer	615-862-4494
Charles Boddie	Metro Water Services	Metro Water Services Training Coordinator	615-862-8744
Tom Palko	Metro Water Services	Assistant Director, Stormwater Division	615-862-4510
Ricky Swift	Metro Water Services	Engineer/Manager, Stormwater Remedial Maintenance Division	615-862-4784
Paula Kee	Metro Water Services	Engineer, Stormwater Plan Review Section	615-880-2334
Steve Mishu	Metro Water Services	Engineer, Stormwater Plan Review Section	615-862-4780
Jennifer Knauf	Metro Water Services	Engineer, Stormwater Plan Review Section	615-862-4793
Gong-Yu Hsu	Metro Water Services	Engineer, Stormwater Plan Review Section	615-862-4518
Brian Halford	Metro Water Services	Engineer, Stormwater Plan Review Section	615-862-4582
B.J. Osborne	Metro Water Services	Engineer, Stormwater Plan Review Section	615-299-9900
Angela Foster	Metro Water Services	Engineer, Stormwater Plan Review Section	615-862-4495
Kimberly Moore	Metro Water Services	Engineer, Stormwater Codes	615-394-7948
Denny Bone	Metro Water Services	Administration Service Manager, Stormwater Maintenance Division	615-862-4537
Michael Hunt	Metro Water Services	System Services Manager, Stormwater NPDES Office	615-880-2420
Bonnye Holt	Metro Water Services	Office Support Representative, Stormwater NPDES Office	615-880-2420
Dale Binder	Metro Water Services	Construction Inspection Manager , Stormwater NPDES Office	615-880-2420
Harold Bryant	Metro Water Services	Construction Site Inspector, Stormwater NPDES Office	615-880-2420
Shawn Herman	Metro Water Services	Construction Site Inspector, Stormwater NPDES Office	615-880-2420
Tim Mathis	Metro Water Services	Construction Site Inspector, Stormwater NPDES Office	615-880-2420
Katherine O'Hara	Metro Water Services	Construction Site Inspector, Stormwater NPDES Office	615-880-2420
Denice Johns	Metro Water Services	Construction Site Inspector, Stormwater NPDES Office	615-880-2420
Amanda Owens	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Steve Winesett	Metro Water Services	Watershed Manager, Stormwater NPDES Office	615-880-2420
Megan Sitzler	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Michelle Barbero	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Rebecca Dohn	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Josh Hayes	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Mary Garmon	Metro Water Services	Water Quality Inspector, Stormwater NPDES Office	615-880-2420
Billy Lynch	Department of Public Works	Director of Public Works	615-862-8706
Mark Macy	Department of Public Works	Assistant Director - Engineering Division	615-862-8764
David Himes	Department of Public Works	Assistant Director - Operations Division	615-862-8755
Sharon Smith	Department of Public Works	Solid Waste Division	615-862-8715
Clayton Hand	Department of Public Works	Engineer, Solid Waste Division	615-862-8623
Mike Ryman	Department of Public Works	Technician Specialist Hazardous Materials Spill Response	615-862-8765
Sonny West	Codes Department	Zoning Administrator	615-862-6586

Name	Agency	Position	Phone
W.J. Curran	Metro Fire Department	Deputy Chief	615-862-5422
David Kleinfelter	Metro Planning Department	Planning Manager	615-862-7196
Brent Hager	Metro Public Health Department	Manager	615-340-5653
Greg Ballard	Metro Water Services	Overflow Abatement Program Manager	615-862-4922
Jim Paulus	Metro Water Services	System Services Overflow Response Program Manager	615-566-3836
Bob Parrish	Metro Parks Department	Parks and Recreation Superintendent	615-370-8051
Mike Bays	Metro Parks Department	Facilities Manager	615-370-8051
Kevin Penny	Mayor's Office of Emergency Management	Deputy Director	615-880-2951
Dianna Stephens	Metro General Services	Assistant Director, Building Operations Support Services	615-862-8959
Bill Malcolm	Metro Office of Fleet Management	Fleet Services Manager	615-862-8604
Hugh Garrison	Metro Water Services	Pretreatment Program Manager	615-862-4590
Denny Bone	Metro Water Services	Stormwater Remedial Maintenance Program Manager	615-862-4537
Anna Kuoppanmaki	Metro Water Services	GIS Analyst, Stormwater NPDES Office	615-880-2420
Thomas Hatfield	Metro Public Schools	Director of School Plant Maintenance	615-862-4300

2.0 Stormwater Management Plan (SWMP) Evaluation

2.1 Objective of the Program

The objective of the SWMP is to maintain or improve the quality of Davidson County water resources and "Waters of the State of Tennessee" to the Maximum Extent Practicable (MEP). This leads to an overall goal of achieving water quality improvements in every Davidson County stream reach included on the Tennessee Division of Environment and Conservation's (TDEC) 303(d) impaired streams list, whereby, each stream can be successfully removed from this list. To accomplish this overall goal, several smaller goals were established in the first permit cycle (1996 – 2001) as a basis for developing a variety of stormwater management programs that address specific issues. The following is a list of refined goals established to facilitate ongoing management program improvements and implementation:

A. Emphasize public education, awareness, and reporting as the primary non-structural Best Management Practice (BMP).

B. Minimize construction-related water quality impacts through developer and engineer education, continued improvement of the plans review process, and construction site inspections and monitoring.

C. Minimize long-term water quality impacts through effective, fair, equitable, and feasible site-design requirements and guidance.

D. Implement an effective, fair, equitable, and feasible enforcement program that reduces water quality impacts from accidental and/or intentional discharge of pollutants into the municipal separate storm sewer system (MS4).

E. Gain a greater knowledge of water quality problems within Metro to be used as a decision-making tool in the Capital Improvement Program (CIP).

F. Base programs on up-to-date stormwater management theory and practices.

G. Prioritize efforts to solve the worst problems first.

H. Identify problems that can be corrected with reasonable effort and fiscal commitment.

I. Establish and implement the financial, organizational, and legal foundations to support other program goals.

J. Goals, as developed in the permit application process, resulted in the following program elements being used to achieve the objectives of the SWMP:
   1. Structural Stormwater Controls and Collection Systems;
   2. New Development and Significant Redevelopment;
   3. Roadways;
   4. Landfills and Other Waste Treatment, Storage, or Disposal Facilities;
   5. Pesticides, Herbicides, Fertilizers, Oils, and Other Toxic Materials;
   6. Illicit Discharges and Improper Disposal;
   7. Industrial and High Risk Runoff;
   8. Construction Site Runoff;
   9. Habitat Improvement;
   10. Monitoring;
   11. Public Information and Education (PI&E); and
   12. Reporting.

2.2 Major Findings

As MWS has continued to implement the stormwater program, fewer new major impacts to the MS4 have been discovered. However, the following paragraphs describe some of the more notable findings impacting water quality of Davidson County streams during Permit Year 5.

2.2.1 Industrial Illicit Discharge

While performing a routine industrial inspection of a local food industry, an NPDES inspector noted a discharge of fats, oils, and grease into a roadside ditch that eventually routed to a tributary to the Cumberland River. Upon discovery of the illicit discharge, the Tennessee Department of Environment and Conservation (TDEC) was notified and the facility was issued a Notice of Violation (NOV) that instructed them to take immediate steps to remediate the discharge, determine the exact cause of the discharge, and implement a long-term solution plan to prevent future discharges. The illicit discharge was determined to be the result of an overflow from the facility's main pre-treatment sludge tank. The NPDES Office coordinated with TDEC to perform a follow-up co-inspection of the industrial facility that included an in-depth review of the facility's Stormwater Pollution Prevention Plan (SWPPP) and monitoring records. During the co-inspection, several other Tennessee Multi-Sector Permit (TMSP) record-keeping deficiencies were noted. As a result of the co-inspection, TDEC issued a Notice of Violation to the facility. In response to the NOVs from Metro and TDEC, the facility has remediated the overflow and is currently in the process of developing a long-term approach to preventing future overflows or spills from the pretreatment facility from entering the MS4 or tributary to the Cumberland River.

Overflow Material from Pretreatment Tank

Overflow Material at Pretreatment tank

Industrial Food Waste in Roadside Ditch

Industrial Food Waste in Stream

Figure 2.2.1.1 Photos of the Industrial Illicit Discharge

2.2.2 Complaint Received Illicit Discharge

The NPDES Office received a citizen complaint about large mats of algae growing in a particular portion of Mill Creek. Upon investigation, the NPDES Office determined the algae/bacteria growth to be the result of some type of sewage that was seeping into the ground and eventually discharging into the creek. The NPDES Office initiated a detailed investigation that included dye-tracing sanitary lines of area businesses, sampling and analyzing the discharge, and coordinating with MWS Pretreatment Section personnel. As a result of the lengthy investigation, the discharge was determined to be caused by a leaking line at an underground oil/water separator of an area business. After the facility repaired the leaking line, several follow-up inspections of the creek revealed that the discharge into the creek was much cleaner and the large algae growths were decaying.

Figure 2.2.2.2 Photos of the Illicit Discharge

2.2.3 Construction Illicit Discharge

A routine inspection by the NPDES Office of a subdivision with a grading permit from the MWS Stormwater Division yielded the discovery of substantial amounts of sediment being lost from the site during a rain event. In addition to the sediment loss, several containers of petroleum products were improperly stored outside allowing them to be directly exposed to the rain and stormwater runoff. A NOV and administrative penalty were issued to the site requiring them to take immediate actions to correct the deficiencies in order to prevent further sediment loss. As a result of the NOV and administrative penalty, the site performed the necessary compliance measures to prevent further sediment loss into a tributary within the Mill Creek watershed. Figure 2.2.3.1 depicts photographs of the illicit discharge.

Figure 2.2.3.1 Photos of the Construction Illicit Discharge during a Rain Event

2.3 Major Cycle 2 Accomplishments

MWS has continued to facilitate major accomplishments during the fifth permit year of the second permit cycle. These accomplishments include:

1. The NPDES Office successfully completed all of the permit requirements for the second permit cycle. Some of the major completions included successfully inspecting all of the permit-qualifying industrial facilities within the county. This involved inspecting a total of 85 industrial facilities during Cycle 2 of the MS4 permit. In addition to the industrial inspections, another major permit requirement that was completed during Permit Year 5 was the dry-weather field screening of over 1,900 grid areas within the county.

2. During the second permit cycle, MWS underwent a comprehensive regulation revision process that involved facilitating stakeholder meetings and researching new Best Management Practice (BMP) technology and other programs around the country. As a result newly revised regulations were developed to reflect technological advances and promote both low-impact development and better design practices for new development and significant re-development in the county. After the major revision to the Stormwater Management Manual MWS has initiated a process to continuously identify necessary changes to reflect the latest cutting-edge technology and to address issues observed with the

new regulations. As an example, during Permit Year 5, the Stormwater Plan Review Section decided to omit the use of straw bale BMPs from Volume 4 of the Stormwater Management Manual.

3. During the second permit cycle, the NPDES Office has made substantial improvements to the construction oversight portion of the program. Some of the improvements include the implementation of a construction site inspection form, working toward more prioritizing of inspections, implementation of the NOV tickets to facilitate a quicker enforcement period to bring a site into compliance, increased number of construction site inspections and enforcements. In Permit Year 5 alone, the NPDES Office performed 4,581 construction site related inspections. As part of the inspections, the construction site inspection staff inspects each site for erosion prevention & sediment control measures and infrastructure installation on all grading permitted sites within Metro's jurisdiction.

4. As a whole, the Stormwater Plan Review/Codes Review Sections and NPDES Office have increased staff levels significantly during the second permit cycle in an attempt to provide better oversight of construction sites and general water quality concerns around the county. The current staff levels include 11 personnel in the Plan Review/Codes Review Sections and 15 personnel in the NPDES Office that includes construction site inspectors and water quality inspectors. In Permit Year 5 the Stormwater Division created and filled two positions within the Codes Review Section that specifically addresses single family home construction impacts to water quality. This position has allowed Stormwater to provide more oversight to single family homes that are constructed small enough to not require a grading permit, but large enough to have the potential to cause erosion and sediment runoff.

5. During this past permit cycle, a Watershed Management Group was created with the NPDES Office with the overall goal of facilitating the removal of all streams on the 303(d) list of impaired streams. The monitoring portion of the program serves three main purposes. First, this section obtains baseline data and ambient conditions of the County's waters, which allows the group to understand where issues are occurring. Second, to provide data for MWS Engineers so that resources can be used more efficiently in their master planning activities and other infrastructure projects. Thirdly, to increase public awareness of water quality concerns and promote partnerships with private and other public entities to solve both point and non-point source water quality issues using a watershed approach. As a result of their activities, 61 miles of previously 303(d) listed streams were removed by TDEC from the list of streams of being impaired by pathogens. Further accomplishments from the Watershed Management Group are detailed in the report.

6. During cycle 2 of the permit, the NPDES Office has begun a better process for collection of outstanding penalties related to stormwater violations such as grading/construction without a permit, stream buffer disturbances, illicit discharges, etc. The NPDES Office has been able to contract with a collection agency that handles the collection of delinquent penalties.

7. During the second permit cycle, MWS introduced the "Adopt a Stream" program to promote public education, public outreach, and citizen involvement in maintaining clean watersheds. The program provides an opportunity for local businesses, watershed associations, civic groups, churches, schools, etc. to volunteer in protecting and enhancing the watershed in which they are part. By volunteering to "Adopt-A-Stream", each group agrees to at least one clean-up per year of their adopted stream (for a minimum of two years) and to stencil storm drains leading to the section of the adopted stream or creek. Each group is provided a custom sign featuring the adopted watershed and organization.

8. During the second permit cycle, the NPDES Office initiated an in-depth review of Metro-owned or operated facilities to ensure that practices on those facilities were not impacting stormwater/water quality. Inspections of numerous Metro facilities were performed during Permit Year 5. After

inspecting the Metro facilities, the NPDES Office began coordinating with respective departments and facilities to change practices/implement measures to minimize impacts to water quality. This process is still ongoing and much progress is expected to occur in the following permit year.

2.4 Enforcement Documentation

Enforcement documentation is an important component in the SWMP. MWS has a comprehensive enforcement program that includes the issuance of Notices of Violation (NOVs), Stop Work Orders (SWOs), and administrative penalties. MWS also reserves the right to take noncompliant sites to environmental court if NOVs and SWOs fail to bring a site into compliance or are not appropriate for a particular situation. Refer to Section 4.2 of this document for a detailed breakdown of documented enforcement statistics since the program's inception.

2.5 Overall Program Strengths

Understanding the strengths and weaknesses of a program is necessary in maintaining a successful SWMP. When strengths and weaknesses are identified, strong points can be featured as the program foundation and weaknesses can be addressed and improved upon each permit year.

One obvious strength of Metro's NPDES Program is the ongoing commitment from the Mayor and MWS officials to meet the requirements of the MS4 permit and improve Metro stormwater resources and waterways for future generations. This is demonstrated by MWS' efforts to make the NPDES program activities known throughout Metro. This continues to result in cross-departmental cooperation in the protection and improvement of stormwater quality. Interdepartmental communication within Metro concerning stormwater issues has increased each year of the NPDES Program's existence.

The commitment from the Mayor and officials of MWS has been further exemplified by the continued support of appropriate staffing levels to oversee development in the Metro area. At the end of Permit Year 5, staffing levels for the Stormwater Plan Review Section totaled 11 individuals, the stormwater NPDES Office totaled 15 individuals, and the Stormwater Routine Maintenance Division totaled 47 individuals. Despite staffing increases during the last few years, individual workloads have also increased. MWS staff works to provide quality service in a timely manner and continues to adopt priorities that ensure the most important stormwater concerns and all permit requirements are being addressed first. In addition, MWS pursued many training opportunities to keep up with growing technological advances. Over the past permit year, MWS staff have attended several training seminars or workshops. Table 2.5.1 presents some of the training sessions that the NPDES staff has attended.

Table 2.5.1 MWS Stormwater Staff Training

Training Session Names	Staff Attended	Training Date
TDEC Level I EPSC Workshop	Amanda Owens, Denice Johns, Megan Sitzlar, Mary Garmon	10/31/07
OSHA 10 Hour Course	Amanda Owens, Boots O'Hara, Megan Sitzlar, Mary Garmon	4/30/08-5/1/08
OSHA Hazwopper Refresher	Michael Hunt, Dale Binder, Denice Johns, Rebecca Dohn, Josh Hayes, Harold Bryant, Boots O'Hara, Amanda Owens, Shawn Herman, Tim Mathis, Steve Winesett, Michele Barbero, Mary Garmon, Megan Sitzlar	6/19/08
Building a Local Program to Maintain Your Stormwater Practices and Prevent Pollution from Municipal Operations (EPA Webcast)	Rebecca Dohn	12/6/07
BMP Performance (EPA Webcast)	Rebecca Dohn, Boots O'Hara,	2/6/08
The Art and Science of Stormwater Retrofitting	Rebecca Dohn	4/9/08
Conducting Illicit Discharge Detection and Elimination Investigations (IDDE 201) (EPA Webcast)	Rebecca Dohn, Michael Hunt, Mike Seremet, Shawn Herman, Amanda Owens, Boots O'Hara, Mary Garmon, Dale Binder, Megan Sitzlar, Michele Barbero, Tim Mathis, Denice Johns, Harold Bryant, Steve Winesett, Bonnie Holt	11/6/07
SESWA Conference	Rebecca Dohn	10/25/07-10/26/07
TN Growth Readiness Conference	Rebecca Dohn, Michael Hunt	5/20/08
LEED 101: Green Building Basics (USGBC Webcast)	Rebecca Dohn	2/9/08
Stormwater Development Workshop (Knoxville)	Dale Binder, Josh Hayes	4/8/08
TDEC Level I Refresher Course	Dale Binder, Rebecca Dohn, Michael Hunt	10/8/07
Green Development Workshop	Michael Hunt, Tom Palko, Josh Hayes	02/24/08-02/26/08
Tennessee Growth Readiness – Land Use Planning for Water Quality	Michael Hunt	04/24/08
TN MS4 Association Meeting	Michael Hunt	4/17/08
AWRA Annual Conference	Michael Hunt, Megan Sitzlar, Mary Garmon, Michele Barbero, Steve Winesett, Tom Palko	4/15/08-4/17/08
TDEC Meeting with the MS4 Community	Michael Hunt	12/11/08
Nashville Bar Association Tennessee Storm Water Enforcement Actions at the State and Local Level	Michael Hunt	11/14/07

2.6 Overall Program Weaknesses

Metro Water Services consistently prioritizes and examines how to best achieve both our permit objectives and community benefits. The stormwater quality program continues to make necessary changes and improvements to benefit Nashville/Davidson County. However, in the current state of our program, some areas of weakness do exist. The NPDES Office has identified the following items as areas in which improvements can be made:

The MS4 infrastructure updating process is still a work in progress. Personnel handling these GIS responsibilities continue to make strides in this area through the purchasing of GPS equipment and digitizing of approved construction plans. Since 1999, with the exception of one subsequent update in 2000, projects that served to create changes to the Metro MS4 have been logged and are included in future updating of the MS4 GIS. NPDES personnel have created an MS4 updating process for MWS Stormwater Capital Improvement maintenance projects, private development sites, and areas surrounding the perimeter of the Combined Sewer

System (CSS) in which no MS4 GIS coverage is available. Due to personnel changes and the large amount of MS4 updates needed for the system, the NPDES Office has struggled to keep get through the backlog of projects. In Permit Year 5, the NPDES Office issued a Request For Proposal (RFP) to area consultant firms to aid the NPDES Office in getting caught-up in the MS4 infrastructure updating process. Over the next permit year, the NPDES Office expects a firm to be awarded the contract and the updates on the backlog of projects to begin.

Currently, as described in the MS4 permit, Metro is required to inspect industrial facilities classified as: municipal landfills, hazardous waste treatment, storage and disposal facilities, industries under SARA Title III, Section 313, and facilities that MWS determines to be substantial loaders to the MS4. These categories only represent a fraction of the approximate 180 Tennessee Multi-Sector Permitted (TMSP) industrial sites within Davidson County. The NPDES Office has found that many of the SARA Title III, Section 313 sites have non-exposure exemption with virtually no potential for contaminated stormwater runoff, while other sites not within the above-mentioned categories actually pose a greater threat to discharging contaminated stormwater. The NPDES Office is currently pursuing other avenues with TDEC for the next permit cycle that will allow the NPDES Office to refine the industrial inspection program to focus more on sites with industrial processes and related pollutants being exposed to stormwater.

In performing the pollutant loading calculation for this cycle two, year five annual report, another important program area was found to be in need in some modifications moving forward. Cycle three permit activities will attempt to better reconcile sampling activities/data, GIS mapping resources, and various other program activities to more accurately approximate both mass pollutant loadings and pollutant reductions achieved by Best Management Practices.

2.7 Future Direction Of The Program

The MWS Stormwater NPDES Program continues to define its role in the governmental/regulatory community of Metro Nashville. As stated in previous annual reports, the NPDES program continually gathers information on the state of stormwater quality and trends in order to make positive impacts on the quality of Davidson County's water resources. Communication between governmental agencies has greatly improved and water quality partnerships have been established with other Metro Departments, such as Parks/Greenways and Schools. Open and direct communication is key to these partnerships and to the improvement of stormwater quality in the future.

Since issuance of the MS4 permit and in efforts to meet compliance requirements, the NPDES Program has understood that stormwater solutions should be allotted a sufficient amount of time for implementation so that a greater understanding of the system and the associated water quality issues develops within the community. This understanding is being generated through various program activities: inspections, investigations (including needed enforcement activities), monitoring, master planning, and public awareness/education.

Metro Water Services continues to refine its processes in order to identify and give attention to previously unidentified stormwater quality problems. MWS has conducted a feasibility study for a proposed dedicated stormwater funding source. The findings of the study have been submitted to Metro Council and sometime over the next permit year Metro Council and the Mayor will decide whether or not to move forward with the dedicated funding source. If approved, the dedicated funding source will finance and implement all MS4 permit conditions and the SWMP elements.

3.0 Summary Table

In the summary tables, the required activities that were accomplished during the permit year are denoted by a bullet (•), while activities not performed during the permit year are denoted by an "X". Those activities not required during a permit year are shown for reference but are shaded ( ).

Table 3.1 Summary Activity 1

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
OPERATIONS AND MAINTENANCE OF STRUCTURAL CONTROLS								
1a	Update Stormwater Inventory Geographic Information System (GIS)	Ongoing – by PY 4	•	•	•	•		Updates are an ongoing activity that required dedication throughout the year.
1b	Continue Existing System Maintenance	Ongoing	•	•	•	•	•	Maintenance activities are performed on a regular basis
1c	Inspections of Dry Creek Detention Facility	1 / quarter	•	•	•	•	•	Inspections are being performed more frequently than once per quarter
1d	Train Inspection and Maintenance Staff	PY 2 and PY 4		•		•		Staff receives training on the latest technology.
1e	Review Maintenance Procedures	PY 2 and PY 4		•		•		The NPDES Office has been working with various maintenance departments to ensure maintenance activities do not impact stormwater quality.
1f	Housekeeping Programs	Ongoing	•	•	•	•	•	The NPDES Office has instituted inspections of Metro facilities to ensure good housekeeping practices are being implemented.
1g	Stormwater Detention/Retention Facilities	PY 2		•				Metro has been performing routine maintenance on the Dry Creek retention basin.

Table 3.2 Summary Activity 2

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
CONTROL OF DISCHARGES FROM AREAS OF NEW DEVELOPMENT AND SIGNIFICANT REDEVELOPMENT								
2a	Ordinances, Regulations, and Guidance	----						
	Enforce Existing Ordinances and Regulations intended to limit long-term water quality impacts	Ongoing	●	●	●	●	●	Metro has sound stormwater management regulations in place
	Evaluate and Update Guidance Materials	PY 2 and PY 5		●			●	Updates to the Stormwater Management Manual are being considered on an ongoing basis.
	Public Education	Ongoing	●	●	●	●	●	Metro continues to educate the development community on proper regulations
2b	Report BMP Monitoring and Considerations	Annually	●	●	●	●	●	The NPDES Office has implemented a rigorous BMP inspection program
2c	Master Planning	----		●				
	Report water quality issues to Planning Commission	PY 2		●				The NPDES Office has been working closely with the Planning Department.
	Report water quality evaluations performed as part of new water quantity master planning efforts	PY 2 and PY 5		●			●	The NPDES Office has been working closely with the Corps of Engineers on the Mill Creek Master Plan.
	Report regional water quality practices evaluations performed in any master planning activities	PY 2 and PY 5		●			●	The Mill Creek study will be the first regional watershed study.
	Report watershed prioritization changes	PY 2 and PY 5		●			●	The NPDES Office's Watershed Management Group is collecting data on current watersheds.
	Report master planning performed per prioritized watersheds	PY 2 and PY 5		●			●	Same as above
2d	Training	Annually	●	●	●	●	●	

Table 3.3 Summary Activity 3

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
ROADWAYS								
3a	Catch Basin Cleaning	----						
	Prioritize	PY 1	●					
	Report and record	Annually	●	●	●	●	●	All catch basin cleaning is recorded in the City Works database.
3b	Downtown Street Sweeping	Ongoing	●	●	●	●	●	The Public Works department performs street sweeping services monthly
3c	Deicing Practices – Evaluate and Report	PY 1 and PY 3	●		●			Public Works has evaluated deicing practices and is using the method with the least impacts to water quality
3d	Evaluate Herbicides, Pesticides, and Fertilizers application and storage practices	PY 1 and PY 3	●		●			The NPDES Office has been working with various Metro departments on the proper storage and application of chemicals.
3e	Report on Spill Response Program	Annually	●	●	●	●	●	Metro's spill response program has remained the same through Permit Cycle 2.
3f	Report Modifications to Design and Construction	Each Compliance Report	●	●	●	●	●	The NPDES Office has been coordinating with Public Works engineering on the potential to incorporate low impact development measures in roadway design

Table 3.4 Summary Activity 4

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
LANDFILLS AND OTHER WASTE TREATMENT, STORAGE, OR DISPOSAL FACILITIES								
4a	Monitor Activities, Report on Issues	Ongoing	●	●	●	●	●	The public works waste management division monitors landfills within Davidson County. There are only two active landfills with the county. Both are privately owned and receive construction and demolition waste only.

Table 3.5 Summary Activity 5

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
PESTICIDES, HERBICIDES, AND FERTILIZERS								
5a	Operate Household Hazardous Waste Facility	At least 1/quarter	●	●	●	●	●	The household hazardous waste facility is open to the public..
5b	Commercial Distributors – Public Information	Ongoing	X	●	●	●	●	This permit element has been modified to focus on “applicators” vs. “distributors”
5c	Evaluate Metro Facilities Practices	PY 2		●				The NPDES Office has been coordinating with various departments on the proper maintenance activities.

Table 3.6 Summary Activity 6

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
ILLICIT DISCHARGES AND IMPROPER DISPOSAL								
6a	Refine Ordinances and Enforcement Measures	PY 1 and PY 3	●		●			Metro's illicit discharge ordinance is specific and sound. Enforcement practices are constantly under review for improvements.
6b	Update and Prioritize Dry-Weather Field Screening	PY 5					●	All required sites were screened during the permit cycle. Metro would like to modify this element to be a more effective screening tool during the 3rd permit cycle.
6c	Illicit Discharge Investigations	Ongoing	●	●	●	●	●	Metro has a comprehensive illicit discharge investigation program that is documented in the City Works database.
6d	Distribute Public Information to Residential/Commercial Areas	Ongoing	●	●	●	●	●	The NPDES Office routinely engages in area specific education and mass public education campaigns.
6e	Evaluate Reporting for Sanitary Sewer Seepage	PY 1 and PY 3	●		●			The NPDES Office has been working closely with the MWS System Services Division and the Health Department on proper response and reporting of spills/leaks/overflows of sanitary waste.

Table 3.7 Summary Activity 7

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5/Cycle 2
			1	2	3	4	5	
INDUSTRIAL AND HIGH RISK RUNOFF								
7a	Data Management – Update Industrial Site Databases	Annually	●	●	●	●	●	The industrial inspection database was updated annually through downloads from the EPA TRI explorer website.
7b	Inspections	---						
	Refine procedures/criteria to prioritize sites	PY 1, PY 3, and PY 5	●		●			Industrial inspections were prioritized based on TMSP Sector Code and Watershed
	Train Inspectors	PY 2 and PY 4		●		●		
	Inspect Facilities	Once by PY 5	●	●	●	●	●	All facilities in the Industrial Inspection database were inspected at least once by the end of Permit Year 5. Some facilities were inspected more than once.
	Coordinate inspection and enforcement activities with TDEC staff	Ongoing	●	●	●	●	●	The NPDES Office frequently reported inspection findings to TDEC.
	Report Inspection Locations	Ongoing	●	●	●	●	●	The NPDES Office frequently reported inspection findings to TDEC.
7c	Restaurant Impacts – Report activities that reduce water quality impacts	Annually	●	●	●	●	●	The NPDES Office has worked closely with the MWS FOG program and the Health Department to minimize impacts to water quality from restaurants

Table 3.8 Summary Activity 8

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5/Cycle 2
			1	2	3	4	5	
CONSTRUCTION SITE RUNOFF								
8a	Ordinances, Regulations, and Guidance	---						
	Enforce existing ordinances and regulations	Ongoing	●	●	●	●	●	The NPDES Office has a comprehensive enforcement program.
	Refine procedures to enhance enforcement	PY 1 and PY 3	●		●			The NPDES Office is currently pursuing options of increasing the amount of penalties that can be assessed.
	Evaluate and Update guidance materials	PY 1 and PY 3	●		●			The Stormwater Management Manual is under review for continuous updates.
	Public Education	Ongoing	●	●	●	●	●	The NPDES Office pursues numerous public education opportunities
	Require proof of coverage under the state's Construction General Permit	Ongoing	●	●	●	●	●	The NPDES Office requires the Construction Stormwater General Permit Notice of Coverage number before a grading permit is issued.
8b	Train Plans Reviewers and Inspectors	Annually	●	●	●	●	●	Stormwater staff is well trained on current technology.
8c	Records Management - EP&SC inspections	Ongoing	●	●	●	●	●	The Stormwater Department has gone to a Metro-wide database (KIVA) to track inspections and plan reviews.
8d	Plan Review and Inspection Resources	Ongoing	●	●	●	●	●	Metro has maintained sufficient levels to perform inspection and plan reviews
8e	Evaluate Metro Activities	PY 2		●				Metro Stormwater has been coordinating with various Metro departments on obtaining proper permit coverage and ensuring grading activities do not impact water quality.

Table 3.9 Summary Activity 9

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5/Cycle 2
			1	2	3	4	5	
STREAM HABITAT IMPROVEMENT REPORTING								
9a	Report habitat improvement activities/projects	Annually	•	•	•	•	•	The NPDES Office has coordinated with various Metro departments and private entities to report any stream habitat improvements within the county.

Table 3.10 Summary Activity 10

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5/Cycle 2
			1	2	3	4	5	
PUBLIC INFORMATION AND EDUCATION (PI&E)								
10a	Inform Public – General Housekeeping Procedures	Ongoing – at least one activity per year	●	●	●	●	●	Metro has accomplished this through participation in WaterWorks and general education practices.
	Inform Home Owner Associations – Detention Pond Maintenance	Ongoing – at least one activity per year	●	●	●	●	●	The NPDES Office has sent out flyers to owners of BMPs.
	Educate Engineering and Development Community – Long Term WQ Impacts	Ongoing – at least one activity per year	●	●	●	●	●	Metro Stormwater facilitates frequent meetings with the development community.
	Inform Public – Pesticides, Herbicides, and Fertilizers	Ongoing – at least one activity per year	●	●	●	●	●	Metro has accomplished this through participation in WaterWorks and general education practices.
	Inform Public – Oils and Hazardous Chemicals	Ongoing – at least one activity per year	●	●	●	●	●	
	Inform Public – Illicit Connections / Discharges	Ongoing – at least one activity per year	●	●	●	●	●	
	Educate Engineering and Development Community – Construction WQ Impacts	Ongoing – at least one activity per year	●	●	●	●	●	Metro Stormwater facilitates frequent meetings with the development community.
	Other Not Yet Identified Opportunities	Ongoing – at least one activity per year	●	●	●	●	●	The NPDES Office attends numerous events for public education.
10b	World Wide Web Site	----						The NPDES Office operates a detailed web page on stormwater education.
	Enhance Stormwater Website[1]	Ongoing	●	●	●	●	●	The NPDES Office continuously makes improvements to the website.
	Provide Reporting Mechanism	Ongoing	●	●	●	●	●	The NPDES Office facilitates reporting through the phone and website.
	Establish an Area Dedicated to Recognition	PY 4				●		The Adopt-A-Stream portion of the website recognizes groups performing stream clean-ups, etc.

Table 3.11 Summary Activity 11

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5/Cycle 2
			1	2	3	4	5	
REPORTING REQUIREMENTS								
11a	Compliance Report	End of each PY (+ 6 months)	•	•	•	•	•	Submitted within 6 months of the end of the permit year.
11b	Propose Third Permit Cycle Activities	End of PY 5 (+ 6 months)				•		The proposed third cycle activities were submitted in the Annual Report for Permit Year 4.

Table 3.12 Monitoring Summary Activities

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5/Cycle 2
			1	2	3	4	5	
MONITORING								
A	Ambient – 8 or more in-stream locations Sample each site at least 6 times annually	6X Annually (Bi-monthly)	●	●	●	●	●	Ongoing
B	Wet Weather – 3 or more outfall locations Sample each site at least 2 times annually	2X Annually	X	●	X	●	X	Unable to obtain all necessary samples in permit years 1, 3, and 5, due mostly to weather conditions and staff coordination issues
C	Industrial – Sampling based on inspections	As needed	●	●	●		●	Grab samples were only taken of sites in which issues were observed.
D	Bioassessment – Perform RPB III at 2 designated sites Perform RPB III at 1 or more reference sites	Annually	●	●	●	●	●	Ongoing
D	Bioassessment – Refine Procedures	PY 1	●					Ongoing
D	Bioassessment – Perform “quick assessments” as necessary	Annually	●	●	●	●	●	The assessments were performed as required
E	Loadings Estimate – Report EMC changes	PY 5					●	Ongoing
E	Loadings Estimate – Report annual volume and loading changes	Complete by end of PY 5					●	The loading estimate has been calculated using the “Simple Method”

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4.0 Narrative Report

This section of the annual report presents a discussion of the items depicted in the aforementioned Summary Tables, including descriptions of studies, analyses, and investigations performed. In addition, similar activities that are difficult to quantify in the summary table are described in this section. The narrative report is subdivided according to the eleven program elements of the permit as listed in Permit Part III B. For each program element, this section includes a discussion of each objective, activities performed in Permit Year 5 as well as previous permit years. Please note that all numbers of information reported in the Annual Report are for the period from July 1, 2007 through June 30, 2008. Technically, the MS4 permit specifies that Permit Year 5 ends on May 31, 2008. Despite this fact, Metro has always tracked all program statistics by fiscal year, which has always corresponded with previous permit years. Therefore, for this Annual Report, Metro is considering June of 2008 to also be included as part of Permit Year 5 of the second permit cycle.

4.1 Operation and Maintenance of Structural Controls (Part III.B.1)

The objective of this program element is to maintain an understanding of the collection system and its performance as a basis for maintenance activities that are intended to benefit stormwater quality. This program element focuses on optimizing the water quality benefits generated through the proper operation, inspection, and maintenance of the existing storm drainage system under the public domain. The proposed program element activity only pertains to stormwater infrastructure that directly and significantly impacts public infrastructure.

4.1.1 Update Stormwater Infrastructure Inventory GIS (Part III.B.1.a.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

The object of this activity is to maintain/update the stormwater GIS inventory system developed in the first cycle of the permit. The GIS system will be updated to show areas of new development, significant redevelopment, CSO separated areas, and Metro drainage construction/modification activities performed since the initial infrastructure inventory.

At the end of Permit Year 1, a full-time GIS employee was hired to perform the necessary MS4 updates. During Permit Year 2, the NPDES Office worked with consultants and internal staff to create a process by which the MS4 updates would occur. From this coordination, processes have been created to update the MS4 infrastructure to show Metro drainage improvements/modifications, areas of new development and significant redevelopment, and CSO separated areas. In Permit Year 3, the vastness of the updating process was realized and, in response, the NPDES Office hired a second (field-oriented) individual dedicated to updating the stormwater infrastructure. An aggressive approach was taken to bring six years of backlogged projects up to date in the GIS database. Key to this process was the utilization of Global Positioning System (GPS) equipment for prompt, accurate data collection.

The NPDES Office performs the updates using one of two methods. First, NPDES staff attempts to obtain any available engineered plans that can be scanned in, geo-referenced, and digitized into GIS. Using engineered plans to update the GIS database has proven to be more efficient as the plans typically depict the much-needed attribute data such as pipe size, type, and elevation. If plans are not available for areas that need to be updated (i.e. CSO fringe areas), the NPDES Office proceeds with the second option for updating by taking the GPS equipment in the field to collect the locations of pipes, inlets, outfalls, etc.

This aggressive approach has been effective in reducing the seven years worth of backlogged projects. Using both in-office digitization and field collection, over 700 archived construction projects have been updated into GIS.

Unfortunately, due to staffing conditions, the position for performing the field GPS MS4 updates became vacant and was never filled. Therefore, the majority of the updates in Permit Year 5 were done by digitizing plans in the office. Despite working with one less person, MWS continued to strive to update the MS4 infrastructure backlogged projects as much as possible. It wasn't until the latter part of Permit Year 5 that MWS realized that an outside contractor would be needed to complete the backlog of infrastructure updates. During Permit Year 5, MWS issued a Request for Proposal for a private firm to perform updates to Metro's MS4 GIS infrastructure inventory. Numerous proposals were received, and a firm is expected to be selected and under contract in the early portion of the next permit year.

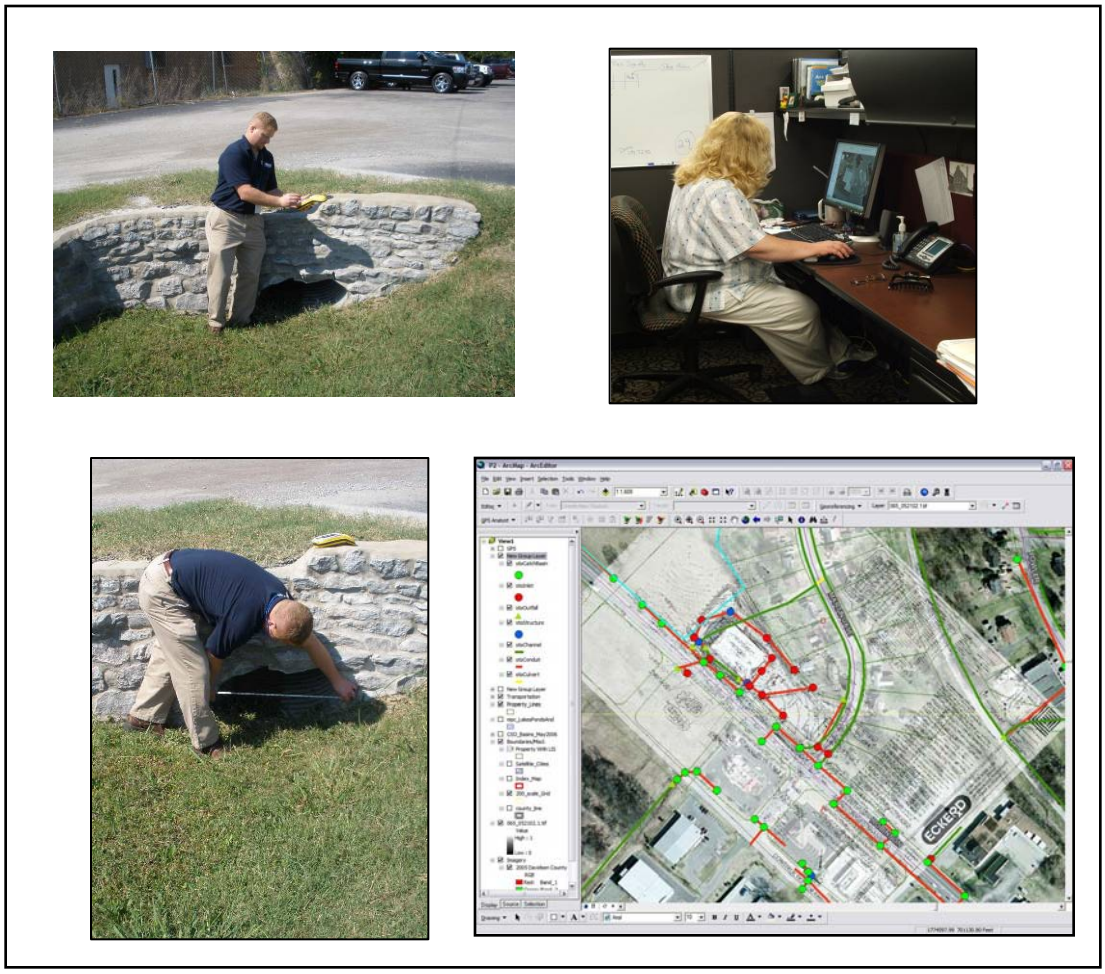

Figure 4.1.1.1 Photos of Typical GIS Updating Activities

4.1.2 Existing System Maintenance (Part III.B.1.b.)

Primary Contact: *Denny Bone, MWS, Stormwater Division, Routine Maintenance Department, 615.862.4537*

MWS stormwater maintenance sections continued to maintain the existing public stormwater drainage infrastructure during Permit Year 5. Maintenance activities were performed on public infrastructure and on private infrastructure that directly impacted public infrastructure. The determination of maintenance service

on private infrastructure was made on a case-by-case basis with potential projects identified through customer complaints and otherwise noted through MWS and/or NPDES MS4 permit-related activities.

The MWS Stormwater Routine Maintenance Department generally employs around eight maintenance crews who perform all of the work on the smaller, routine maintenance projects. The crews are assigned to large ditch maintenance, stormwater inlet construction, stormwater inlet cleanout, and stormwater masonry work. Routine maintenance work completed during Permit Year 5 as well as previous permit years is presented in Table 4.1.2.1. Based on review of invoices from the Southern Services Landfill, the Routine Maintenance Department hauled approximately 18,026 cubic yards of dirt, rock, and other waste debris cleaned out of inlets, storm pipes, and channels. Using an average weight of 1,800 pounds per cubic yard, this volume of material has been estimated to be approximately 32,446,800 pounds.

The MWS Stormwater Remedial Maintenance Department performs some of the larger drainage system repairs that in many cases require design and various levels of coordination and permitting. During Permit Year 5, the MWS Stormwater Remedial Maintenance Department continued to investigate drainage complaints, identify potential drainage projects, and oversee construction projects performed by contractors to remedy drainage issues. The department continued to utilize (on a more limited basis) the services of the consultant, AMEC, to prepare construction plans for drainage construction projects (Remedial and Capital Improvement Projects). In Permit Year 5, there were 565 service request investigations completed. Of the 565 investigations, 264 will become actual projects that will be designed and constructed (depending on funding), and 301 were closed for one of the following various reasons:

- Not a stormwater issue;
- Not an issue of functionality;
- Not a government responsibility;
- A problem that no longer exists; or
- Referred to another agency.

In addition, during Permit Year 5, approximately 112 projects were completed through design and/or construction. Many of these projects were investigated in previous permit years. The complaints that have not been resolved or closed remain open to be addressed by future construction projects.

Table 4.1.2.1 Existing System Routine Maintenance Activity Summary

		Total	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Ditch Maint.	Routine	656	137	352	84	66	14	3	0
	Complaint	2,541	0	203	557	374	403	445	559
	Class C	58	0	0	1	39	18	0	0
		3,255	***137***	***555***	***642***	***479***	***435***	***448***	***559***
Walls & HW	Routine	126	22	75	17	11	1	0	0
	Complaint	856	0	45	211	161	183	187	69
	Class C	1	0	0	0	0	1	0	0
		983	***22***	***120***	***228***	***172***	***185***	***187***	***69***
DW Pipes	Routine	1286	151	115	106	48	5	816	45
	Complaint	1213	0	139	249	279	286	165	95
	Class C	0	0	0	0	0	0	0	0
		2,499	***151***	***254***	***355***	***327***	***291***	***981***	***140***
Cross Drains	Routine	613	85	118	74	78	66	0	192
	Complaint	709	0	80	135	114	171	148	61
	Class C	18	0	0	0	10	8	0	0
		1340	***85***	***198***	***209***	***202***	***245***	***148***	***253***
Flooding	Routine	77	14	45	4	10	4	0	0
	Complaint	51	0	2	14	15	1	0	19
	Class C	4	0	0	0	2	2	0	0
		132	***14***	***47***	***18***	***27***	***7***	***0***	***19***
Debris Removal	Routine	173	39	59	26	26	23	0	0
	Complaint	283	0	44	29	28	41	1	140
	Class C	2	0	0	1	1	0	0	0
		458	***39***	***103***	***56***	***55***	***64***	***1***	***140***
Erosion	Routine	5	0	1	2	1	1	0	0
	Complaint	25	0	0	7	6	1	0	11
	Class C	1	0	0	0	1	0	0	0
		31	***0***	***1***	***9***	***8***	***2***	***0***	***11***
Mud Removal	Routine	76	4	3	8	7	51	3	0
	Complaint	226	0	0	3	8	71	144	0
	Class C	0	0	0	0	0	0	0	0
		302	***4***	***3***	***11***	***15***	***122***	***147***	***0***
Misc	Routine	2,673	35	420	590	396	219	1,013	0
	Complaint	1471	0	94	95	75	86	1,035	86
	Class C	4	0	0	0	3	1	0	0
		4,148	***35***	***514***	***685***	***474***	***306***	***2048***	***86***
Inlet Maint.	Routine	138,469	177	7,278	33,495	37,296	35,258	20,125	4,840
	Complaint	4,623	0	260	416	353	263	3,088	243
	Class C	5	0	0	0	5	0	0	0
		143,097	***177***	***7,538***	***33,911***	***37,654***	***35,521***	***23,213***	****5083***
Sinkhole	Routine	0	0	0	0	0	0	0	0
	Complaint	5	0	0	0	0	2	3	0
	Class C	0	0	0	0	0	0	0	0
		5	***0***	***0***	***0***	***0***	***2***	***3***	***0***
		Total	**FY2002**	**FY2003**	**FY2004**	**FY2005**	**FY2006**	**FY2007**	**FY2008**
	Routine	144,154	664	8,466	34,406	37,939	35,642	21,960	5,077
	Complaint	12,001	0	867	1,716	1,413	1,506	5,216	1,283
	Class C	93	0	0	2	61	30	0	0
	TOTAL	**156,248**	**664**	**9,333**	**36,124**	**39,413**	**37,178**	**27,176**	**6,360**

*Note- Inlet Maintenance numbers reflect a July 2008 change in the way work units are reported. Inlet reporting is now done at the work order level and not the work unit level. This does not reflect any change in the level of effort for this category of work.

Figure 4.1.2.1 Typical Complaint Investigation Photograph

4.1.3 Inspections of Dry Creek Detention Facility (Part III.B.1.c.)

Primary Contact: *Denny Bone, MWS, Stormwater Division, Routine Maintenance Department, 615.862.4537*

The NPDES Office transferred responsibilities in Permit Year 2 for inspection and necessary maintenance to the MWS Stormwater Routine Maintenance Department. The inspections performed since Permit Year 2 were performed by Routine Maintenance staff. The Routine Maintenance Department is currently inspecting and documenting the Dry Creek detention facility more frequently than once per quarter. Figure 4.1.3.1 is a typical photograph of the debris that routinely accumulates on the outfall structure of the facility.

Figure 4.1.3.1 Typical Maintenance Need at Dry Creek Detention Facility

4.1.4 Training (Part III.B.1.d.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro recognizes that periodic training is critical to the success of the water quality program. Since Permit Year 2, the NPDES Office has been conducting training programs for key inspection and maintenance staff from MWS and other Metro Departments. The training is intended to educate staff on proper maintenance activities that prevent impacts to water quality and how to recognize and report an illicit discharge when observed in the field. In Permit Year 5, training was performed for a group that was responsible for conducting grounds upkeep on all Metro owned school properties and key maintenance staff of the Metro Transit Authority. In order to help convey the message, the NPDES Office purchased a video titled "Municipal Storm Water Pollution Prevention Everyday Best Management Practices. It is the goal of NPDES to show the video produced by Excal Visual to all Metro maintenance staff within the upcoming permit year. During the third permit cycle, the NPDES Office will continue to look for innovative ways to educate all Metro maintenance staffs.

4.1.5 Maintenance Procedures (Part III.B.1.e.)

Primary Contact: *Denny Bone, MWS, Stormwater Routine Maintenance Department 615.862.4537.*

The NPDES Office has been providing oversight and insight to the Stormwater Maintenance sections on matters concerning the appropriate State and Federal permits needed and proper Erosion Prevention and Sediment Control (EPSC) measures to implement on maintenance jobs. The NPDES Office routinely educates maintenance managers on the need to install sound EPSC measures to prevent impacts from maintenance projects on storm water quality. Figure 4.1.5.1 depicts the typical installation of erosion control matting on a maintenance job to correct an erosion and drainage issue. In Permit Year 5, the NPDES Office initiated a detailed review of maintenance practices (housekeeping practices) on Metro facilities. As part of the effort, over 180 facilities were screened by either through use of Oblique Aerial Pictometry.

Figure 4.1.5.1 Routine Maintenance Typical Use of Erosion Control Matting

4.1.6 Housekeeping Programs (Part III.B.1.f.)

Primary Contact: *Sharon Smith, Public Works Waste Management Division 615.862.8715*

The Metro Public Works Division of Waste Management (DWM) provides trash collection service to all residents in the Urban Service District (USD), all businesses in the USD and the Downtown Business District (DBD), and all apartments, public housing, and Metro government buildings within the USD. Monthly recyclables are presented in Table 4.1.6.1. Monthly trash collection statistics for Permit Year 5 are presented

in Table 4.1.6.2. The table represents DWM trash collection, contracted residential trash collection, and convenience center trash collection.

In an effort to promote waste reduction among residents and businesses within Davidson County, DWM provides several opportunities for recycling. Metro has a curbside recycling program as well as several drop-off locations.

Curbside/Convenience Centers:

- Omohundro Center - 1019 Omohundro Place
- Anderson Lane Center - 939 Anderson Lane
- East Center – 943A Dr. Richard G. Adams Drive

Recycling Drop-Off Centers:

- Bellevue MTA Park & Ride - Coley Davis Road & Highway 70 South
- Elysian Fields Kroger – 3955 Nolensville Road (9 AM ~ Noon Saturday ONLY)
- Hermitage Hobby Lobby – 4101 Lebanon Road
- Hillsboro High School – 3812 Hillsboro Pike
- Dupont-Hadley Middle School – 1901 Old Hickory Blvd.
- Charlotte Center Strike & Spare – 3710 Annex Ave (corner of Charlotte Pike & Hillwood Blvd)
- Granbery Elementary School – 5501 Hill Road (9 AM ~ Noon Saturday ONLY)
- Joelton Middle School – 3500 Old Clarksville Highway
- Rivergate Recycling – 630 Myatt Drive
- McGavock High School – 3150 McGavock Pike
- Northwest Family YMCA – 3700 Ashland City Highway
- Tennessee State University – 38th Avenue and Albion Street
- Wal-Mart Neighborhood Market – 5531 Edmondson Pike

In Permit Year 5, approximately 33,010.350 tons of various recyclable materials were collected. This included metal, glass, plastic, oil, cardboard, and mixed paper. Brush collection is also provided by Metro Public Works as a curbside service. A route system is utilized to collect brush in the USD and General Services District. Residents of either area will have brush collected automatically at certain times every year. A collection map is available for residents to determine the dates of brush collection. Figure 4.1.6.1 is a map of locations of the Recycling Drop-Off Centers. Brush collection statistics are also presented in Table 4.1.6.2.

The Household Hazardous Waste Center, discussed further in Section 4.5.1, allows residents to drop-off recyclable goods as well as refuse. The recyclable statistics received by the waste center are presented in Table 4.1.6.1, while the refuse received is depicted in Table 4.1.6.2. Metro Public Works/Metro Beautification and Environment Commission also periodically runs educational slides on Channel 3, the local government TV channel. These educational slides include:

- Information and logistics for trash cart utilization;
- How to properly use the trash cart and the curb-side recycling;
- Metro Convenience Centers and Drop-off sites/locations; and
- Household Hazardous Waste disposal information and drop-off locations.

Figure 4.1.6.1 Division of Waste Management – Recycling Drop-Off Centers

The Recycling Education Center is a resource tool located at the Rivergate Recycling Center, where all of Nashville/Davidson county recyclables are transported for sorting. Children and adults learn first hand how a Materials Recovery Facility (MRF) operates – how materials are both separated and recycled, and they get the opportunity to view consumer products that are made from recycled materials.

In an effort to increase awareness and education, Metro Beautification began an initiative to educate and encourage schools on the importance of recycling. Figure 4.1.6.2 depicts the school recycling program initiative. In Permit Year 5, Metro Beautification continued to provide an array of ideas and resource materials for recycling and other environmental programs which included providing educational materials to over 80 schools. The Beautification and Environmental Education Programs Booklet has become a valuable guide for schools and communities in Nashville and Davidson County.

METRO NASHVILLE PUBLIC SCHOOL RECYCLING PROGRAM

Our School has a **recycling dumpster** for any kind of paper and cardboard. Please participate in our recycling program by separating the paper in your classrooms and offices from the trash and taking it to the recycling dumpster!

Here is what we can recycle at our school:

Any kind of paper

- Office paper
- Magazines
- Junk mail
- Newspaper
- Computer & notebook paper
- Phone books and paperback books
- Construction paper

Any kind of cardboard/paper box

- Cardboard boxes
- Food boxes (clean—no food)
- Brown paper bags

We can recycle "Anything that Tears!"

All boxes should be broken down and placed in the recycling dumpster. Remember, paper and boxes should be clean (no food).

Figure 4.1.6.2 Metro Beautification – School Recycling Program

Table 4.1.6.1 Permit Year 5 Recycling Statistics in Tons

	July	August	September	October	November	December	January	February	March	April	May	June	Total
Recycling													
Curbside Recycling/In-house Recycling/Recycling Dumpsters													
Mixed Recyclables	1,198.43	1,048.21	1,029.65	1,182.05	1,012.74	1,188.82	1,284.42	1,078.97	1,232.78	1,268.48	1,202.21	1,266.01	13,992.77
Monthly Totals	**1,198.43**	**1,048.21**	**1,029.65**	**1,182.05**	**1,012.74**	**1,188.82**	**1,284.42**	**1,078.97**	**1,232.78**	**1,268.48**	**1,202.21**	**1,266.01**	**13,992.77**
Household Hazardous Waste Facility													
Oil	3.56	2.4	1.18	2.2	2.4	1	1.2	1.4	3.14	2.1	1.3	5	26.88
Antifreeze	0	0	0	0	0	0	0	0	0	0	0	0	0
Electronics	8.26	0	0	9.51	0	5.34	0	0	0	11.9	5.51	3.14	43.66
Batteries	2.04	2.66	1.83	2.69	1.25	0.35	1.05	0.88	1.44	1.77	0.7	2.39	19.05
Tanks	0.43	0	0.31	0	0	0	0.41	0	0.39	0	0.73	0.29	2.56
Clean Harbors	16.66	0	0	14.09	0	6.19	0	0	0	12.35	0	7.97	57.26
Monthly Totals	**30.95**	**5.06**	**3.32**	**28.49**	**3.65**	**12.88**	**2.66**	**2.28**	**4.97**	**28.12**	**8.24**	**18.79**	**149.41**
Drop Off Recycling Centers & Convenience Centers													
Carpet/Carpet Pad	20.44	13.14	16.79	11.68	22.63	16.06	13.87	18.62	22.63	17.52	28.47	23.36	225.21
Aluminum & Tin	10.64	9.44	8.58	8.11	9.57	9.69	9.41	12.7433,010.35	11.36	17.09	12.84	11.91	131.38
Glass	151.23	121.90	100.43	111.56	122.36	136.29	111.63	155.91	135.83	128.25	167.99	164.10	1,607.48
Mixed Paper	325.91	305.35	327.89	309.08	338.22	379.64	375.59	348.25	337.57	358.22	345.61	332.41	4,083.74
OCC	159.37	146.16	134.84	127.72	133.38	147.62	167.18	152.13	168.85	193.27	183.89	153.81	1,868.22
Plastic	31.47	25.85	24.87	25.14	28.25	27.08	27.07	26.96	37.27	50.94	38.23	30.91	374.04
Plastic Bottles & Metal Cans	33.71	29.61	23.44	31.31	27.90	29.18	27.66	27.31	37.69	46.43	46.14	31.16	391.54
Scrap Metal	56.97	66.80	58.50	41.32	57.56	40.53	33.48	41.97	40.42	53.61	46.80	54.49	592.45
Tires	356.96	1,176.15	475.01	1,276.18	876.40	1,183.25	796.66	515.35	398.70	979.38	114.82	2,562.69	9,594.11
Monthly Totals	**1,146.70**	**1,894.40**	**1,170.35**	**1,942.10**	**1,616.27**	**1,969.34**	**1,562.55**	**1,299.24**	**1,190.32**	**1,844.71**	**984.79**	**3,364.84**	**18,868.17**
												Total Recycling	**33,010.35**

Table 4.1.6.2 Permit Year 5 Waste/Brush Collection Statistics in Tons

	July	August	September	October	November	December	January	February	March	April	May	June	Total
Waste Collection													
Total Metro Public Works Trash Collection	3,810.40	4,042.20	3,514.70	4,020.99	4,049.79	3,512.03	4,001.91	3,618.23	3,751.12	4,339.12	4,153.83	3,640.97	46,455.29
Total Convenience Center Trash	1,365.67	1,255.69	1,246.90	1,284.84	1,012.72	967.57	891.03	823.06	872.12	1,079.37	1,188.84	1,097.30	13,085.11
Contracted Residential	7,913.39	8,099.96	6,881.11	7,556.03	8,291.14	7,189.24	7,956.70	7,003.65	7,433.93	8,895.14	8,924.18	7,581.14	93,725.61
Monthly Totals	**13,089.46**	**13,397.85**	**11,642.71**	**12,861.86**	**13,353.65**	**11,668.84**	**12,849.64**	**11,444.94**	**12,057.17**	**14,313.63**	**14,266.85**	**12,319.41**	**153,266.01**
Brush Collection													
Ungrounded -- Grapple Hook	395.59	518.48	448.34	616.94	817.64	568.07	582.66	584.21	580.13	743.31	808.35	909.89	7,573.61
Ungrounded -- Dropped Off	545.04	486.12	539.63	848.47	765.98	359.9	512.79	621.31	727.83	825.56	1550.33	1290.58	9,073.54
Ungrounded -- Contractor	865.57	878.67	799.80	1.012.14	1,205.58	844.97	688.74	584.21	672.18	829.81	1,065.43	1,045.54	9,480.50
Ground -- Dropped Off	75.24	58.96	43.84	31.48	119.22	31.35	88.8	97.06	79.77	95.33	195.95	102.8	1,019.80
Leaves -- Metro	0.00	0.00	0.00	0.00	14.82	132.08	26.83	26.77	5.95	0.00	-	0.00	206.45
Leaves -- Dropped Off	0.50	0.16	1.51	3.17	111.49	308.51	6.01	0.00	0.00	0.00	0.00	-	431.35
Monthly Totals	**1,881.94**	**1,942.39**	**1,833.12**	**1,500.06**	**3,034.73**	**2,244.88**	**1,905.83**	**1,913.56**	**2,065.86**	**2,494.01**	**3,620.06**	**3,348.81**	**27,785.25**

4.1.7 Stormwater Detention/Retention Facilities (Part III.B.1.g.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro recognizes that planning and acting upon an understanding of the location and function of post-construction stormwater detention/retention facilities, or best management practices (BMPs), is important to managing water quantity and quality concerns. The NPDES Office has been working on a long-term operation and maintenance strategy for BMPs, which will include educating the public on proper maintenance procedures/schedules for privately-owned facilities, as well as inspecting and enforcing on improperly functioning BMPs. The following paragraphs give a brief description of the BMP inspection and maintenance program.

BMP Tracking

NPDES BMP Database

In 2002, Metro hired a consultant to identify all of the projects within the jurisdiction of Metro approved for construction that contain a stormwater quantity and/or quality BMP. The plans for these projects were then scanned onto a hard drive, a GIS layer was created with their locations, and the BMPs were cataloged into a database. The NPDES Office has found, however, that not all of the approved projects were actually constructed, and a fraction of this database includes properties that were never developed. NPDES is continually updating the BMP database to reflect actual field conditions. All subsequent BMPs are entered into the database once the as-built certification is approved by the Stormwater Plan Review Section and final stabilization for the project has been reached.

For the 2006 revision to the Stormwater Regulations, Metro expanded the operation and maintenance agreements for all BMPs. These new agreements require a detailed plan describing the required maintenance for all BMPs on a development site. This agreement will transfer with the property so that subsequent owners are aware of their BMPs and their maintenance requirements. Property owners are required to annually inspect their BMPs and submit the inspection report to NPDES. KIVA will track the due dates for these inspection reports and alert NPDES staff when a report is due.

BMP Inspection Pilot Study & Inspection Program

In order to develop a successful BMP inspection and maintenance program, NPDES conducted a pilot BMP inspection study in 2004. In the pilot study, 100 BMPs installed from 1978 – 2002 were randomly selected for inspection. All (100%) of the BMPs inspected were found to be in need of some form of maintenance. In looking for trends, the BMPs were divided into land use type and ranked according to the percentage of the BMPs requiring major maintenance. The results were as follows:

- Condominiums 40%;
- Commercial 43%;
- Churches 71%;
- Schools 75%;
- Industrial 80%;
- Subdivisions 85%; and
- Apartments 100%.

Between the initial pilot study and the end of Permit Year 3, the NPDES Division inspected over 100 additional BMPs. As a result of these inspections, the NPDES Office issued formal letters to 14 BMP owners outlining maintenance needs and requirements.

In Permit Year 4, NPDES inspected all of the Metro-owned BMPs listed in the NPDES BMP database. A BMP inspection program was then developed to target deficient BMPs in TMDL watersheds. Using the results of the pilot study as a guide, NPDES inspected 20% of the BMPs at apartments, subdivisions, and industrial sites and 10% of the BMPs located at churches, commercial sites, and condominiums. Deficient BMPs were issued Notices of Violation (NOVs) that required both maintenance of the BMP and development of an inspection and maintenance schedule. NPDES compiled a list of BMP maintenance companies that were distributed with the NOVs and posted on its website (http://www.nashville.gov/stormwater/docs/pdfs/BMP_Maint_Companies.pdf). The companies on the list have agreed to provide NPDES with their maintenance reports, which include a quantification of the material removed.

MWS inspected 169 sites containing a total of 225 BMPs in Permit Year 5. This included 135 underground proprietary units. During Permit Year 4, MWS determined that these proprietary units consistently required the most maintenance. In many cases, the property owners were not aware of the BMP's existence. As a result of these inspections, MWS issued over 70 NOVs to property owners requiring maintenance of their BMPs. MWS NPDES will continue to inspect BMPs during the next year and educate property owners on proper maintenance.

BMP Public Education Program

In addition to performing inspections and enforcement on post-construction BMPs installed throughout the county, the NPDES Office has attempted (during the second permit cycle) to educate BMP owners of the need to perform maintenance. In Permit Year 3, the NPDES Office sent over one-thousand flyers to BMP owners that had addresses listed in the BMP database. The flyers notified the property owners that a stormwater BMP was located on their property and gave general inspection and maintenance information. The NPDES Office will consider additional educational measures in future permit years.

BMP Retrofit Program

During BMP inspections on Metro properties, special attention is given to the potential for retrofitting water quality BMPs. These include water quantity ponds with outlet structures that could be altered to detain water for longer periods of time. Small quantity ponds with adjacent open space for expansion into a larger pond that could add water quality treatment will also be noted. Other retrofit projects could entail adding a new BMP, such as a bioretention area, in series with the existing BMP to add to or increase water quality treatment. Given the current state of Metro's budget, performing BMP retrofits has not been a feasible option. In addition to lack of funding, there have been some safety concerns with the possibility of converting dry ponds to wet ponds. One potential BMP Metro is exploring is installing a demonstration project with rain gardens, infiltration basins, and other Low Impact Development measures at the Green Hills Public Library. This project is in the planning stages, and its completion will be dependent on funding.

Permit Cycle Term 3

The NPDES Office is committed to ensuring that the BMPs installed in Metro remain functional throughout their lifespan, and staff will continue their BMP inspection program by prioritizing to 303(d) and TMDL watersheds during Permit Cycle Term 3. NPDES staff will evaluate the program annually to determine the most effective means of pursuing ongoing, proactive compliance.

4.2 Control of Discharges from Areas of New Development and Significant Redevelopment (Part III.B.2.)

The goal of this portion of the SWMP is to satisfy the requirements of Permit Part III.B.2. This section was designed to minimize the long-term impacts of new development and significant redevelopment on water quality. Specific activities include enforcing ordinances and regulations that are supported by guidance materials for the proper placement of BMPs and educating local stakeholders about their roles in minimizing long-term water quality impacts.

4.2.1 Ordinances, Regulations and Guidance (Part III.B.2.a.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Ordinances, Regulations, and Guidance

During the previous permit year, the revised Stormwater Management Manual went into effect and includes changes in the following areas:

- Expanding stream buffers;
- Streamlining enforcement;
- Promoting Low Impact Development;
- Redefining stormwater quality program goals and requirements;
- Examining floodplain management and detention policies; and
- Better defining program responsibilities.

Since the time the new regulations went into effect, personnel from the NPDES Office have been tracking questions and issues that arise from the outside and within Metro and have formulated a list of future regulation changes. Metro Stormwater will coordinate with the development community over the next year to implement any additional changes that are deemed necessary.

Enforce Existing Ordinances and Regulations

The NPDES Office has continued to enforce the provisions of the existing stormwater regulations. Table 4.2.1.1 presents the documented enforcements conducted since 2002, while table 4.2.1.2 depicts the administrative penalties issued in the program's history. It is important to note that SWOs and NOVs are issued on the same enforcement letter. SWOs are reserved for sites with more significant stormwater issues, in which an on-going activity is causing an illicit discharge or other stormwater violation. In Permit Year 5, the NPDES Office reorganized the construction inspection staff to have one inspector solely dedicated to responding to complaints received on sites performing grading, filling, or other land disturbance activities without an active grading permit. Through this reorganization, there were a total of 342 enforcements issued with $46,150 of administrative penalties issued during Permit Year 5.

Table 4.2.1.1 NPDES Enforcement Cases

Time Frame	Notices of Violation	Stop Work Orders	Environmental Court Cases
April 2002 – June 2002	11	1	0
July 2002 - June 2003	47	23	0
July 2003 - June 2004	132	96	0
July 2004 - June 2005	151	46	5
July 2005 – June 2006	219	64	9
July 2006 – June 2007	140	50	1
July 2007 – June 2008	284	58	12
Totals	**984**	**338**	**27**

Table 4.2.1.2 Enforcement Penalties Assessed

Month	NOV	SWO	Monthly Total
Dec-03	$2,900	$2,000	$4,900.00
Jan-04	$3,500	$1,600	$5,100.00
Feb-04	$1,650	$3,100	$4,750.00
Mar-04	$2,850	$400	$3,250.00
Apr-04	$2,800	$4,450	$7,250.00
May-04	$2,450	$2,000	$4,450.00
Jun-04	$3,700	$4,400	$8,100.00
PY 1 Total	$19,850.00	$17,950.0050	$37,800.00
Jul-04	$3,300	$1,800	$5,100.00
Aug-04	$3,500	$3,300	$6,800.00
Sep-04	$2,350	$1,000	$3,350.00
Oct-04	$3,450	$1,800	$5,250.00
Nov-04	$7,200	$1,200	$8,400.00
Dec-04	$200	$400	$600.00
Jan-05	$1,000	$1,100	$2,100.00
Feb-05	$1,100	$1,400	$2,500.00
Mar-05	$3,900	$0	$3,900.00
Apr-05	$1,100	$300	$1,400.00
May-05	$1,000	$1,600	$2,600.00
Jun-05	$750	$800	$1550.00
PY2 Total	$68,550.00	$50,600.0050	$43,550.00
Jul-05	$1,450	$500	$1,950
Aug-05	$4,050	$0	$4,050
Sep-05	$3,250	$1,200	$4,450
Oct-05	$2,000	$500	$2,500
Nov-05	$3,250	$2,800	$6,050
Dec-05	$3,000	$400	$3,400
Jan-06	$3,900	$2,700	$6,600
Feb-06	$850	$500	$1,350
Mar-06	$4,750	$1,600	$6,350
Apr-06	$5,200	$700	$5,900

Month	NOV	SWO	Monthly Total
May-06	$4,350	$800	$5,150
Jun-06	$3,200	$300	$3,500
PY 3 Total	$39,250	$12,000	$51,250
Jul-06	$1,850	$1,200	$3,050
Aug-06	$4,700	$1,000	$5,700
Sept-06	$1,250	$400	$1,650
Oct-06	$450	$800	$1,250
Nov-06	$1,000	$800	$1,800
Dec-06	$2,300	$300	$2,600
Jan-07	$1,350	$1,000	$2,350
Feb-07	$2,800	$900	$3,700
Mar-07	$3,250	$1,500	$4,750
Apr-07	$2,850	$800	$3,650
May-07	$3,700	$300	$4,000
Jun-07	$1,500	$400	$1,900
PY 4 Total	$27,000	$9,400	$36,400
Jul-07	$3,050	$400	$3,450
Aug-07	$1,400	$0	$1,400
Sept-07	$1,800	$0	$1,800
Oct-07	$6,350	$100	$6,450
Nov-07	$1,950	$0	$1,950
Dec-07	$2,250	$800	$3,050
Jan-08	$5,650	$0	$5,650
Feb-08	$2,000	$700	$2,700
Mar-08	$2,750	$1,800	$4,550
Apr-08	$2,550	$1,300	$3,850
May-08	$3,800	$1,700	$5,500
Jun-08	$2,600	$3,200	$5,800
PY 5 Total	$36,150	$10,000	$46,150
Grand Total	**$151,100**	**$64,050**	**$215,150**

Public Education
Metro continues to educate the general public on local stormwater regulations using a variety of outlets, which include public access channel television advertisements, website information, facilitating periodic Stormwater Advisory Committee (SWAC) meetings, handouts, etc. The public education program is discussed in further detail in Section 4.10.

4.2.2 Stormwater Best Management Practices (Part III.B.2.b.)

Primary Contact: *Rebecca Dohn MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro continued to inspect BMP sites in Permit Year 5. There were no BMP sites sampled during Permit Year 5 to determine the pollutant reduction of different types of BMPs. Metro recognizes that regional facilities and the facilities retrofitted to improve pollutant capture efficiencies are important to the long-term success of an MS4 program. Refer back to Section 4.1.7 of this document for an explanation of the BMP monitoring and retrofitting considerations.

4.2.3 Master Planning (Part III.B.2.c.)

Primary Contact: *Tom Palko, MWS, Assistant Director, 615.862.4799*

Master planning is essential to the long-term success of a water quality management program. NPDES understands that the Metro Planning Department is a critical facilitator in this area and in related processes. Therefore, NPDES intends to continue to work closely with Metro Planning Department staff in the future to help facilitate this process as well as initiate internal Master Planning activities within the Stormwater Division as it relates to overall Stormwater quality and quantity considerations.

The Mill Creek watershed is still identified as a watershed of major importance in Davidson County due to the presence of the Nashville Crayfish (*Oconectes shoupi*). Metro Water provided funds to the U.S. Army Corps of Engineers (COE) to assist them in performing a study on the Mill Creek watershed to improve environmental sustainability within the watershed. The study includes the following three components: a feasibility study that identifies specific restoration projects that could be performed within the watershed, a watershed design manual, and a watershed management plan. It was originally anticipated that the study could be used as a model to be applied across other watersheds in the county, but it has since been noted that the differing characteristics between the watersheds may prohibit one model from being applied across the county. Currently, the feasibility study is still being drafted, while the watershed design manual has been drafted and is being reviewed by MWS and the Planning Department, which is expected to be completed in the fall of 2008. The COE expects to also begin work on the watershed management plan in the fall of 2008. Ecosystem restoration alternatives were proposed - specific to the Mill Creek Watershed. Some of the restoration alternatives proposed in the feasibility study are depicted in Table 4.2.3.1. Among the restoration alternatives listed below, the COE has prepared concept level plans for the Antioch Community Center, Middle School, and greenway portions.

Table 4.2.3.1 Specific Restoration Alternatives Proposed in the Mill Creek Feasibility Study

Restoration Alternative	Scope of Work
Ezell Park (Mill Creek mile 9.2-10.8)	Restore over 1.5 miles of riparian corridor, stabilize 940 feet of eroding banks, construct two rain gardens (total 1.5 acres), remove 4000 feet of exotic invasive species and provide environmental education.
Whittemore Branch at Antioch Community Center (Whittemore Branch mile 0.4; Mill Creek mile 13.1)	Bank stabilization, exotic species removal, widen the riparian corridor, construct rain gardens, and provide public education opportunity.
Antioch Middle School (Mill Creek mile 13.6)	Widen the riparian zone, remove exotic species, and construct rain gardens, and provide school environmental education.
New Metro Park at Culbertson Rd (Mill Creek mile 18.05-18.75)	Collaborate with Metro Parks to construct sustainable features, and provide public education opportunity.
Paragon Mills area - (Seven Mile Creek Mile 0.5-1.5)	Removal of exotic vegetation, construction of rain gardens, and community involvement
Whitfield, Caldwell, Thompson Lane, Pitts Park (headwaters of Sorgham Branch) and Sevenmile Creek Parks	Collaborate with Metro Parks to construct sustainable features, and provide public education opportunity.

Metro Stormwater will continue to work with the COE in future years to pursue these projects as funding allows. In addition, the NPDES Office watershed manager has remained focused on evaluating State-listed 303(d) impaired watersheds in Davidson County. The watershed management group expanded to a total of 4 people in the end of Permit Year 4 and the start of Permit Year 5. This increase in staffing levels has resulted in an expansion of the watershed management activities. A more detailed explanation of watershed management group activities can be found in Section 5 of this document.

4.2.4 Training (Part III.B.2.d.)

Primary Contact: *Tom Palko, MWS, Assistant Director, 615.862.4799*

Metro Stormwater believes firmly in the technical training of plans review engineers and inspector staff on the latest techniques and management practices to address long-term water quality. Table 2.5.1 in Section 2 of this document depicts the training NPDES staff received during Permit Year 5. In addition, the plan review engineers attended numerous seminars and conferences throughout the year to guarantee staff is abreast of the latest technology and trends. A list of those training sessions can be provided upon request.

Stormwater construction site inspectors and engineers have received Level I EPSC training from TDEC. The Level I training is a foundation-building course intended for individuals involved in land-disturbing activities covered by TDEC's Construction General Permit, including inspection and enforcement personnel from all levels of government, plan preparers and reviewers, designers, and engineers. The course gives participants a solid working knowledge of erosion prevention and sediment control (EPSC) practices. In addition, some of the Stormwater plan review engineers have received the Level II EPSC training, which is an advanced two-day course that is specifically designed for engineers, environmental designers, and plan preparers and reviewers. In the Level II course, detailed instruction is given on the engineering technologies needed to control stormwater on a construction site. Workshop participants obtain the tools needed to develop an acceptable, working erosion and sediment control plan as described in TDEC's *Tennessee Erosion & Sediment Control Handbook* and required by the Tennessee Construction Stormwater General Permit.

4.2.5 Future Direction of Element 2

Ordinances, Regulations, and Guidance

Metro Water Services will continue to strive toward more effective enforcement of local regulatory mechanisms in order to enhance water quality. The NPDES Office will continue to review the effectiveness of the regulations and reserves the right to provide updates when deficient areas are identified.

Best Management Practices (BMPs)

The NPDES Office recognizes that regional BMP facilities and the facilities retrofitted to improve pollutant capture efficiencies are important to the long-term success of an MS4 program, and will continue to implement the BMP inspection program in the upcoming permit years.

Master Planning

Master planning is essential to the long-term success of a water quality management program, and working closely with the Metro Planning Department is a critical facilitator in this area and related processes. Therefore, NPDES intends to work with the Metro Planning Department staff in the upcoming permit years to help facilitate the long-term planning process that promotes development responsible for stormwater quality.

Training

The Stormwater Division will continue to look for training opportunities for grading permit plan reviewers on the latest techniques and management practices to address long-term water quality issues. MWS will also provide training for the development community on stormwater program changes, such as those resulting from the regulation revision process.

4.3 Roadway Maintenance (Part III.B.3.)

The objective of this section is to satisfy Part III.B.3 by reducing impacts to stormwater runoff from roadways. This objective is accomplished by examining several programs including catch basin cleaning, downtown street sweeping, management practices for the use of de-icing chemicals, stormwater controls at salt storage areas, management practices in the use of herbicides, and spill response. Furthermore, roadway design criteria, construction requirements, and street maintenance responsibilities were explored.

4.3.1 Catch Basin Cleaning (Part III.B.3.a.)

Primary Contact: *Denny Bone, MWS, Stormwater Division, Routine Maintenance Department, 615.862.4537*

MWS Stormwater Routine Maintenance section continued the basic program of catch basin cleaning into the filth year of the Cycle 2 permit. Table 4.3.1.1 presents the statistics on catch basin cleaning from year 4 of the first NPDES permit cycle through year 5 of the second permit cycle. Since the stats have been tracked, over 138,000 catch basins have been cleaned.

Table 4.3.1.1 Catch Basin Cleaning

Type of Maintenance	PY 4 Cycle 1	PY 5 Cycle 1	PY 1 Cycle 2	PY 2 Cycle 2	PY 3 Cycle 2	PY 4 Cycle 2	PY 5 Cycle 2	Total Since Tracking Began
Routine	177	7,278	33,495	37,296	35,258	20,125	4,840	138,469
Complaint	0	260	416	353	263	3,088	243	4,623
Class C	0	0	0	5	0	0	0	5
Total	177	7,538	33,911	37,654	35,521	23,213	*5,083	143,097

*Note- Inlet Maintenance numbers reflect a July 2008 change in the way work units are reported. Inlet reporting is now done at the work order level and not the work unit level. This does not reflect any change in the level of effort for this category of work.

The Routine Maintenance Department uses two trucks mounted with a pressure wash and vacuum system to clean catch basins. They are used daily to clean storm inlets and pipes that are clogged. Maintenance crews perform inspections for required cleanings and are on call to address other reports of clogged inlets as they are received. A more detailed description of Routine Maintenance activities is included in the Section 4.1.2.

Figure 4.3.1.1 Typical Vacuum Truck Inlet Cleaning

4.3.2 Downtown Street Sweeping (Part III.B.3.b.)

Primary Contact: *David Himes, MDPW, Streets Services Division, 615.862.8716*

The Department of Public Works (MDPW) is responsible for downtown street sweeping. Since the first permit cycle, MDPW has increased their number of street sweeping machines to six. There are eight employees that utilize the sweepers daily. During Permit Year 5, MDPW swept approximately 19,834 miles of streets. The street sweeping program led to the collection and disposal of approximately 3,543 tons of debris that had collected on streets in Permit Year 5 that would have otherwise drained to storm drains. While the miles of streets swept this past permit year were down slightly from previous permit years, the amount of debris collected by sweepers actually increased. Public Works also strives to sweep every curbed and guttered street once per month. All of the material collected by the sweeper was disposed of at Allied Waste. Metro will continue to review the procedures associated with these programs to benefit stormwater runoff quality.

4.3.3 Deicing Practices (Part III.B.3.c.)

Primary Contact: *David Himes, MDPW Streets Services Division, 615.862.8716*

The management practices for storage and application of deicing chemicals were first addressed in the 1992 Part 2 Application. Since then, many initiatives have been undertaken that have minimized water quality impacts of roadway salt application, which is occasionally required during winter months to create safer driving conditions in Davidson County. Specific aspects of this program are summarized below.

Prior to the formation of the NPDES Program, MDPW conducted a series of studies to determine the safest, most effective, and most economical roadway deicing agent available. These studies concluded that salt was the best de-icing agent alternative for Metropolitan Nashville and Davidson County. MDPW has since initiated brine de-icing of roadways prior to winter storms to prevent ice from binding to roadways. This preventative measure has resulted in a reduction of the total amount of salt applied directly to the roads. Brine de-icing can be applied at a much lower rate with successful results, thus reducing chlorides in stormwater runoff and cutting salt usage costs.

MDPW Maintenance Section Salt Usage

Metro prepares for each winter season with approximately 8,000 tons of salt in storage, with any unused salt held until the following year. Metro MDPW currently receives its salt in 1,500-ton barge loads, which is transferred to three strategically located, covered bins. During the Permit Year 5 winter season, approximately 1,861 tons of salt/brine was applied to roadways in Davidson County. The majority of these deicing materials were applied during the month of January. Icy weather conditions have occurred infrequently in Davidson County over the past few years, and consequently MDPW has abundant salt reserves that must be stored. Closer attention has been given to management practices applied at salt storage bins.

Salt Storage Facilities

Metro currently has three salt storage facilities, which are located at MDPW East Center, MDPW West Center, and at the Smith Springs Facility. Brine solution is created at the South 5th facility and then stored in sealed units at each of the sites. All three sites have concrete bins in which salt is stored, making impacts to stormwater runoff non-existent if salt is not tracked outside of the bin areas. Each site has operating procedures aimed at eliminating and/or cleaning up salt tracked from the bins. The NPDES staff periodically inspects the three bin sites to monitor the effectiveness of these procedures. Any observed deficiencies are reported to the proper MDPW officials.

Salt and Brine Application Control
In 1996, spreader control systems were installed on all MDPW spreader trucks. These systems consist of a computer that dictates the salt spread rate based on a pre-set application rate (determined by the severity of weather conditions) that corresponds to truck speed. This means that as the trucks slow down or stop, the salt spreader slows or stops correspondingly - reducing the amount of salt that is wasted or over-applied. The spread rates used follows nationally recognized spread rates. This computer-aided system has resulted in a 25% annual reduction in salt use. It is reasonable to assume that these reductions are realized during each salt application season. In addition, MDPW has added additional trucks to apply a brine solution at a continuous rate on roadways of predetermined routes in anticipation of possible icy conditions. This further reduces the need to apply salt directly to roadways. Reducing direct salt application also helps prevent road damage due to salt application and creates a reduction in the possible consequences of salt runoff to water quality.

Automated Road Data
Metro can access automated data from five roadway sensor-sampling sites that supply real-time data (road surface temperature, moisture, salt brine percentage, and weather conditions including: temperature, wind speed, dew point, percent humidity) to the main MDPW office. Metro uses this information to determine when salt or brine application is needed or when salt needs to be reapplied. Additionally, Metro subscribes to a real-time weather radar service that allows officials to be more accurate in predicting when and if frozen precipitation is to begin. This prevents unnecessary application of salt in cases where expected snow or ice does not develop or move into Davidson County as predicted.

Salt and brine application controls and real-time road data have been instrumental in allowing Metro to better manage salt application in areas where water quality can be greatly affected by careless deicing practices, such as bridges located in close proximity to water bodies, waterways, or conveyances. Metro coordinates with the Corps of Engineers on icy roadway conditions on the Bell Road bridge over Percy Priest dam. The Corps of Engineers does not want salt applied to the section of road over the dam. Instead, this section of road is closed during hazardous driving conditions.

Metro's Salt Application Area
The State of Tennessee's Department of Transportation (TDOT) is responsible for both the Interstate and State Highway systems. In actuality, the State only has the resources to salt the Interstate system and approximately one-half of the State Highway system within Davidson County. Therefore, MDPW currently salts the other half of the State Highway system and all major Metro roads. MDPW has formulated a list of roads within Davidson County that are the most problematic during icy conditions. These roads are the first to receive salt with other roads being salted as deemed necessary by MDPW, based on information received from the Police Department, other Metro Departments, citizens, etc.

4.3.4 Herbicides, Pesticides, and Fertilizers (Part III.B.3.d.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division NPDES Office, 615.880.2420*

During the formative stages of Metro's MS4 NPDES permit program, evaluations of the applications and storage practices of herbicides, pesticides, and fertilizers were focused on MDPW, where NPDES staff initially served. During the investigation of usage practices, it was determined that little, if any, routine usage of these substances occurred. The same situation is also true for Metro Water Services (MWS), where NPDES Office staff currently serves. In an effort to gain more knowledge about the amounts, types, storage, and application practices of Metro departments, the NPDES Office sent out general information request sheets to various Metro departments. In Permit Year 4 and 5, the NPDES began to implement an Environmental Compliance Inspection (ECI) program that focused on Metro owned or operated locations, especially those properties identified in the general information request forms as containing pesticides, herbicides, insecticides, and automotive fluids.

As part of the ECI, the NPDES Office obtained a list of Metro-owned properties from Real Properties Services, mapped the properties using GIS, and created an inspection database in Microsoft Access. Since many of the Metro properties are office buildings that do not have the potential stormwater runoff issues, the NPDES Office began screening the list of sites using oblique aerial pictometry. The pictometry program purchased by Metro has aerials from 2007 that provides the viewer with a "birds-eye" view of properties on the ground. The program also allows the user to adjust the position of view from north, south, east, to west. Figure 4.3.4.1 displays the typical view of a property from various directions that is available through the pictometry program.

In total, there were 185 Metro properties identified and mapped in GIS by the NPDES Office. All of the sites were first screened in the office using the pictometry program, which resulted in approximately 107 of the sites being archived and removed from the list of sites to be field inspected. Actual field or windshield inspections were then performed on the remaining properties to determine if any stormwater issues were present. As a result of the field inspections, another ten properties were archived as they were found to not have the potential to present an impact to stormwater quality. Most of the Metro properties were found to be in good order with no pollution issues, however, there were a few that were found to have some minor housekeeping issues. The NPDES Office will continue to work with the various Metro departments to make sure any site deficiencies are corrected. The 68 properties that were left active in the database will be revisited by the NPDES Office. The frequency of field inspections will be dependent on the type of facility. For example, fire stations will be inspected less frequently than the Parks department golf course maintenance buildings. The ECI program will be a continuous program with the goal of ensuring Metro properties and practices are not contributing to pollutant runoff.

Figure 4.3.4.1 Typical View of a Site from the Pictometry Program

4.3.5 Spill Response Program (Part III.B.3.e.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

The Metropolitan Nashville and Davidson County Emergency Management Plan (EMP) has developed policies and procedures to coordinate multi-departmental response and recovery from spill incidents. In the Nashville-Davidson County area, small-scale emergencies are typically managed on the scene. Primary responsibility varies among the different agencies depending upon the type of incident. The principal agency should be responsible for taking control of the on-the-scene management of the incident by directing rescue, recovery, and control. The primary HAZMAT responsibilities fall to the Fire Department (Hazard 12 unit)

with MDPW contributing two HAZMAT teams and Water Services contributing one HAZMAT team. Principal agency assignments are explained in detail within the EMP. If more than one Metro agency is involved, coordination of overall emergency management related activities is done through the Office of Emergency Management (OEM).

Figure 4.3.5.1 illustrates the order of response and communication protocol. The EMP calls for the Fire Department to be the first contact in the event of a spill. The Fire Department responds, assesses the situation, notifies OEM, and calls MDPW HAZMAT to either perform the cleanup or to notify remediation contractors if the scope of the spill is greater than MDPW can address. The response times for all Fire Department locations in the county are estimated to be less than four minutes. The HAZMAT team is able to respond throughout the county within six to ten minutes. The NPDES Office has someone on call 24 hours a day, 7 days a week, to respond to spills from internal notifications or from OEM that are believed to involve stormwater/MS4 related issues. During Permit Year 5, the NPDES Office documented approximately 51 spill responses in the City Works database (a slight increase from Permit Year 4). A list of spill responses by the NPDES Office is included in Attachment A. The spill response numbers for the NPDES Office include field responses to wrecks and sanitary sewer overflows or line breaks. In general, the role of the NPDES Office is to document the extent of the impact to the MS4 and/or any area receiving waters. In some instances, especially with the sanitary sewer overflows, the NPDES Office will provide guidance on proper clean-up procedures. In addition, some spill calls that are received and responded to during normal business hours are treated as water quality complaints/illicit discharge investigations when they are logged into City Works.

In addressing spill issues, the policy for the Fire Department policy, except in case of emergency, is to no longer wash spills into the MS4. Instead, bag absorbents are used to capture and/or contain spilled material. The MDPW HAZMAT teams generally respond to all roadway spills, except interstates and federal highways. On smaller spills, the MDPW HAZMAT team usually performs any necessary cleanup. A list of spills that the MDPW HAZMAT team responded to in Permit Year 5 is included in Attachment A. Larger spills that require more involved cleanup activities are usually contracted out for clean-up. If the party responsible for the spill can be identified, Metro seeks compensation for the remedial activities. If identification of the responsible party is impossible, the costs of remedial services are ultimately borne by Metro.

Spills that occur at locations allowing rapid migration into waterways or conveyances would represent a potentially severe threat to water quality in Davidson County. Such spill locations would include sites near the proximity of creeks or streams, sites from which closed impervious stormwater sewer systems route directly to creeks or streams, spills from mobile vehicles on or near waterway bridges, and spills from vessels on waterways. In looking at specific industry types that have the greatest likelihood of having an impact on water quality, companies that transport large volumes of chemicals on a routine basis such as railroad, trucking, and barge companies would be considered to present the greatest threat of an impacting spill. Companies that handle or utilize chemicals and/or compounds that are extremely poisonous, hazardous, toxic, etc. would also be considered to pose a threat to water quality and should have sophisticated spill prevention measures in place. The NPDES program gives special attention to these and all industries during inspections and complaint investigations to ensure that necessary precautions are taken at each site to prevent spills from impacting water quality.

Historical spill data for Davidson County indicates that the majority of spills do not generally pose an immediate threat to “Waters of the State”. Most spills did not reach waterways or conveyances such that water quality impacts to “Waters of the State” occurred. However, the NPDES Office will continue to monitor spill trends within the county and will remain ready to take necessary actions to address pertinent spill issues. Figure 4.3.5.2 depicts some photos of typical spills the NPDES Office staff have responded to during Permit Year 5.

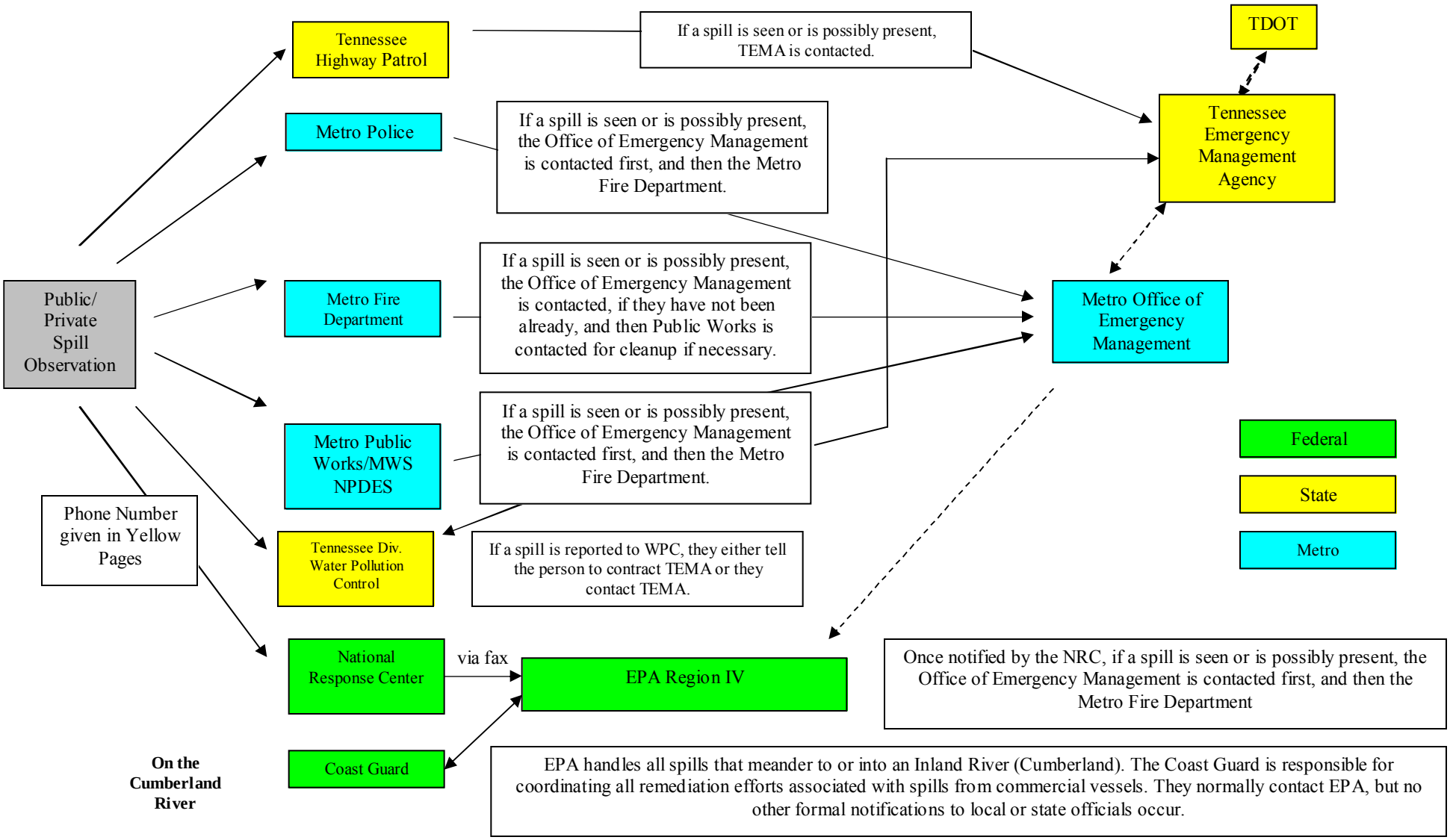

Figure 4.3.5.1 Metro EMP Order of Response and Communication Protocol for Spills

Figure 4.3.5.2 Photos of Spills and Cleanup Activities

In general, the NPDES Office only responds to spills involving storm drains and creeks. Excluding sanitary sewer overflows, the majority of spills that NPDES responds to are located along roadways. Since many of the spills happen on highways and interstates, the NPDES Office continues to pursue coordination with the Tennessee Department of Transportation (TDOT) to better address spill issues on State roadways/Interstates (from which spills might otherwise route into the Metro MS4). Figure 4.3.5.3 depicts the locations of some of the spill/overflow response investigations conducted by NPDES in Permit Year 5.

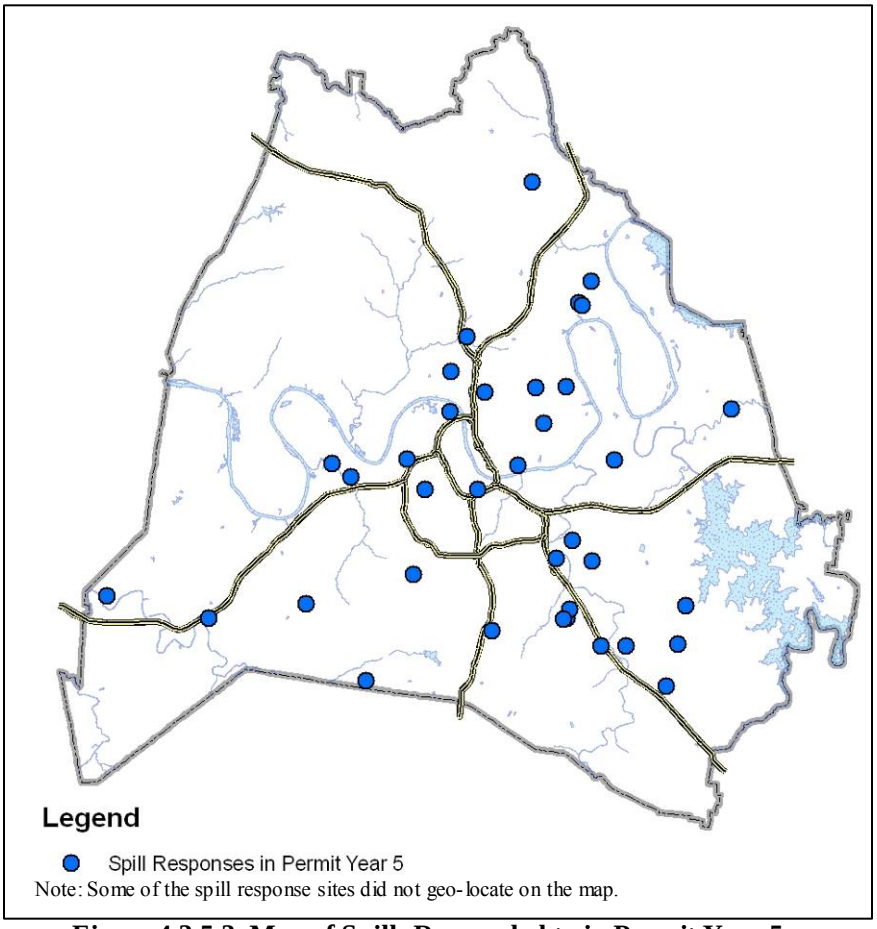

Figure 4.3.5.3 Map of Spills Responded to in Permit Year 5

4.3.6 Design and Construction (Part III.B.3.f.)

Primary Contact: *Tom Palko, MWS, Assistant Director, 615.862.4799*

Roadway design criteria and construction requirements have been reviewed by Metro. The following design considerations were recommended to the MDPW Engineering Office for reducing the impact of roadways on stormwater pollution:

1. Consider use of permanent treatment control BMPs for all new roads and extensions of roads in newly developed areas.
2. Consider use of permanent treatment control BMPs for projects involving rehabilitation of existing roads if roadway runoff potentially impacts a sensitive water body.
3. Use swales and buffer strips whenever possible.
4. Consider the use of vegetated or bioengineered drainage ditches in lieu of rip-rap whenever possible.
5. Integrate permanent treatment BMPs with temporary construction BMPs whenever possible.
6. Develop design guidelines for permanent treatment BMPs on the basis of specific hydrologic characteristics of the Metro area.

4.3.7 Future Direction of Element 3 - Roadways:

Catch Basin Cleaning and Downtown Street Sweeping

The Stormwater Routine Maintenance Department will continue the ongoing program of catch basin cleaning throughout the permit cycle. The number of catch basins cleaned due to complaints as well as the routine maintenance program is anticipated to increase. The MDPW will continue the ongoing program of sweeping the streets on a monthly basis in the downtown Metropolitan area.

De-icing Chemicals

The MDPW will continue to utilize a combination or either salt or a brine solution as de-icing agents for Metropolitan Nashville and Davidson County. The NPDES Office will continue to evaluate de-icing applications and storage practices to determine if any additional or alternative measures might benefit water quality from roadway runoff and salt bin storage locations.

Herbicides, Pesticides and Fertilizers

The NPDES Office will continue the Environmental Compliance Inspection program for Metro facilities and practices that store and apply chemicals, and will also continue to educate all Metro departments on proper techniques of land maintenance, including the application of chemicals.

Spills

The NPDES Office will continue to work with other Metro departments in responding to and documenting the water quality impacts and cleanup efforts of spills and sanitary sewer overflows. The NPDES Office has also entered into discussions with TDOT to reconcile their new MS4 NPDES permit obligations relating to spill response on State roadways in an effort to clearly identify respective responsibilities.

Design and Construction

Any modifications to the standards and procedures applied to reviewing roadways proposed by developers and/or Metro road construction projects will be reported if they are found to benefit water quality. The NPDES Office will continue to work with Public Works to try to promote water quality considerations in roadway design.

4.4 Landfills and Other Waste Treatment, Storage, or Disposal Facilities (Part III.B.4)

The objective of this program element of the SWMP is to satisfy Part III.B.4, which will minimize the impacts of municipal facilities on stormwater quality. This includes the investigation of closed and open municipal landfills and other treatment, storage or disposal facilities for municipal waste, including transfer stations, maintenance and storage yards for transportation fleets, and sludge application sites. These investigations are to be used as a basis for establishing procedures and prioritize control measures for reducing pollution in stormwater discharges at these sites.

4.4.1 Monitor Water Quality-Related Activities (Part III.B.4.a)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Active Landfills

The MDPW, Division of Waste Management (DWM) is responsible for monitoring active and closed landfills within Metro Davidson County. Currently, Southern Services and MS-COT Services construction and demolition landfills are the only two active landfills operating in the county. These landfills operate under TDEC Division of Solid Waste Management permits. There are no active landfills within Davidson County that receive household hazardous waste. There has been no stormwater runoff issues reported to the NPDES Office by the DWM. NPDES staff has visited the Southern Services Landfill on numerous occasions with only minor issues noted. The landfill is required to wash down the road periodically for dust control measures. During Permit Year 3, NPDES staff met with personnel from the landfill and made them aware that washing of the road was causing some suspended solids to discharge directly into a nearby ditch. The landfill quickly installed a rock check with filter fabric to filter the runoff as a result of the road washing. (See Figure 4.4.1.1) Through observations from follow-up inspections by the NPDES Office, these control measures have proven to be effective.

Figure 4.4.1.1 Photograph of the Rock Check Dam Placed at the Exit to Southern Services Landfill

Inactive Landfills

The most recent Metro-operated landfill to close was the Thermal Ash Monofill located in North Nashville. The capping and stabilization of this landfill was completed during Permit Year 2.

The DWM currently monitors 5 inactive landfills, which include: the Bordeaux Landfill, Thermal Ash Monofill, Due West Landfill, Lebanon Road Landfill, and River Hills Thermal Ash Landfill. In previous permit years, the DWM was responsible for monitoring two of the closed landfills (River Hills Thermal Ash Landfill and the Metro Thermal Ash Monofill) for stormwater runoff, as they had active Tennessee Multi-Sector Permits (TMSP) for industrial stormwater runoff. During Permit Year 4, the DWM received a letter terminating the TMSP coverage for the River Hills Thermal Ash Landfill and, therefore, were only required to monitor/sample the Thermal Ash Monofill for stormwater runoff. The results for the 2007 (Permit Year 5) sampling of the Thermal Ash Monofill are contained in Table 4.4.1.1. The elevated aluminum and magnesium levels are believed to be due to a portion of the site not being completely stabilized at the time sampling occurred. Since this time, the Thermal Ash Monofill has been completely closed and capped and the DWM expects to request termination of TMSP coverage from TDEC as they did with the Riverhills Thermal Ash Landfill. Photographs of the Metro-monitored landfills are depicted in Figure 4.4.1.2.

Table 4.4.1.1 Stormwater Sampling Results from Permit Year 5

Landfill Name	Landfill Type	Address	Contact Name	Contact Phone	Sample Results (mg/l)			
					Al	Fe	Mg	TSS
Metro Thermal Ash Monofill	Municipal Combustor Ash Monofill	1915 Cement Plant Road	Clayton Hand	862-8623	5.1	3.8	2.8	55

Figure 4.4.1.2 Municipally-Operated Landfills (Inactive)

Bordeaux Landfill

River Hills Landfill

Due West Landfill

Lebanon Road Landfill

Thermal Ash Monofill

Treatment, Storage, and Disposal Facilities Investigation

In addition to active and inactive landfills located within Davidson County, there are three privately-operated waste transfer stations that receive and temporarily store household hazardous waste: Waste Management, Tennessee Waste and Allied Waste. The Tennessee Waste transfer station just received their permit in February 2008, while the Waste Management and Allied Waste transfer stations were in operation during Permit Year 5 and were routinely inspected by the DWM.

According to the latest list produced by the EPA Envirofacts RCRA query, there are eight recognized Treatment, Storage, and Disposal (TSD) sites located within Davidson County. However, upon investigation by the NPDES Office, it was found that only three of these facilities are still in operation. All of the facilities were inspected during the 2nd permit cycle. Table 4.4.1.2 lists the TSD sites downloaded from the EPA Envirofacts website that were found to still be in operation.

Table 4.4.1.2 List of TSD Sites Downloaded from the EPA Envirofacts Website

Facility Name	Facility Address	Handler ID#
Clean Harbors/Safety Kleen	215 Whitsitt Road	TND981474125
E. I. Dupont De Nemours & Co	1002 Industrial Road	TND047001979
Lion Oil Company, Nashville Terminal	90 Van Buren Street	TND052143070

Note: this list was based on a list downloaded from the EPA Envirofacts web site. The Envirofacts query was based on data from June 8, 2006. There were several other facilities on the list that are no longer in operation and are omitted from this list.

Solid Waste Haulers

The Department of Public Works, Waste Management Division issues licenses to haulers of municipal waste in Davidson County. The NPDES Office and the WMD previously agreed to implement, as a condition of receiving the annual solid waste haulers license, a certification statement to be signed by a designated representative of the licensee that stipulates the operations permitted by the license shall not contribute to neither illicit discharges nor stormwater runoff pollution. Figure 4.4.1.3 is a copy of this new certification statement, while Table 4.4.1.3 depicts the current list of certified waste haulers.

4.4.2 Future Direction of Element 4

Metro will continue routine inspections of all active and inactive municipally-owned or privately-owned landfills within Davidson County. Treatment, storage, and disposal facilities as well as solid waste haulers will continue to be monitored as necessary.

Figure 4.4.1.3 Certification Statement

Karl Dean
Mayor

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

DEPARTMENT OF WATER AND SEWERAGE SERVICES
STORMWATER DIVISION
NPDES OFFICE
1607 COUNTY HOSPITAL ROAD
NASHVILLE, TN 37218

Stormwater Quality Certification Statement for Metro Division of Solid Waste Licensees

On July 1, 2003, the Metropolitan Government of Nashville & Davidson County (Metro) was issued an NPDES Permit from the Tennessee Division of Water Pollution Control in accordance with the Federal Water Quality Act of 1987. This permit requires Metro to initiate various programs and activities aimed at eliminating both illicit and contaminated stormwater discharges within Nashville/Davidson County. Due to these permit responsibilities; henceforth, any entity wishing to secure and maintain a Solid Waste Hauler's License from the Metro Public Works Division of Solid Waste Management must sign and abide by the certification statement below.

I hereby certify, as a duly designated representative of _____ (the licensee), that _____ (the licensee) shall maintain and conduct its entire operation so as to not create or contribute to water pollution within Metro. _____ (the licensee) further understands that failure to meet this requirement can result in a revocation of its Metro Solid Waste haulers license and may additionally lead to other enforcement actions on the part of Metro's NPDES Program.

Note: Water Pollution is considered to include, but is not limited to; illicit discharges (to storm drains, ditches, or creeks) and/or contaminated stormwater runoff and discharges. This stipulation applies to locations utilized by the Solid Waste license holder on a routine basis to conduct its business such as; fleet maintenance/storage sites, transfer stations, and any other location that might be impacted by the license holder's operations. This stipulation shall also extend to any other operational activities related to the exercising of rights granted by the Metro Solid Waste Hauler's License. If you have any questions as to what would create or constitute a water pollution issue, please contact Metro's NPDES/Water Quality Program at (615) 880-2420.

_____ **Signature** _____ **Date**

_____ **Title**

Disclaimer: This certification represents no additional requirements to the licensee as it pertains to State and Federal environmental regulations.

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Table 4.4.1.3 Solid Waste Haulers Companies that have Signed the Water Quality Certificate

Certificate #	Issued to	Address	Date issued	Type of Operation
08-001	Gray's Disposal	522 Thompson Lane, Nashville, TN 37204	01-Jul-07	30-Jun-08
08-002	Waste Removal Services, LLC	164-B Old Carters Creek Pike, Franklin, TN 37064	01-Jul-07	30-Jun-08
08-003	Clean Earth Sanitation, Inc.	320 Century Court, Franklin, TN 37064	01-Jul-07	30-Jun-08
08-004	Crick Disposal Services, Inc.	2635 Hart Street, Nashville, TN 37207	01-Jul-07	30-Jun-08
08-006	Welsh Disposal	325 Hillcrest Drive, Madison, TN 37115	01-Jul-07	30-Jun-08
08-007	Hudgins Disposal Service	400 Crutcher Street, Nashville, TN 37206	01-Jul-07	30-Jun-08
08-008	Waste Management, Inc.	1428 Antioch Pike, Antioch, TN 37013	01-Jul-07	30-Jun-08
08-009	Waste Management, Inc.	1428 Antioch Pike, Antioch, TN 37013	01-Jul-07	30-Jun-08
08-010	J. E. McMurtry	103 Donald Street, Nashville, TN 37207	01-Jul-07	30-Jun-08
08-011	TRI STAR Waste Systems, Inc.	701 41st Avenue N. Nashville, TN 37209	01-Jul-07	30-Jun-08
08-012	Red River Service Corp.	120 Ewing Drive, Nashville TN, 37207	01-Jul-07	30-Jun-08
08-013	Shamrock Rolloff, LLC	3534 Central Pike, Hermitage, TN 37076	01-Jul-07	30-Jun-08
08-014	Mercie Threadkill	4571 Clarksville Hwy., Nashville, TN 37202-4153	01-Jul-07	30-Jun-08
08-015	MS-COT SERVICES LLC	3516 Central Pike, Hermitage, TN 37076	01-Jul-07	30-Jun-08
08-017	Landscape Services, Inc.	204 River Hills Drive, Nashville, TN 37210	01-Jul-07	30-Jun-08
08-018	Southeastern Recycling	15 Fairfield Avenue, Nashville, TN 37210	01-Jul-07	30-Jun-08
08-019	H. E. Parmer Co., Inc.	1635 County Hospital Rd, Nashville, TN 37218	01-Jul-07	30-Jun-08
08-020	Waste Management, Southern Services Landfill	4651 Amy Lynn Drive, Nashville, TN 37218	01-Jul-07	30-Jun-08
08-021	City of Goodlettsville	215 Cartwright Street, Goodletsville, TN 37072	01-Jul-07	30-Jun-08
08-027	Trash Express	4016 Brick Church Pike, Nashville, TN 37207	01-Jul-07	30-Jun-08
08-028	Allied Waste Services of Nashville	700 Murfreesboro Road, Nashville, TN 37210	01-Jul-07	30-Jun-08
08-031	Cordell Johnson	315 Hickory Street, Madison, TN 37116	01-Jul-07	30-Jun-08
08-034	Clarksville Disposal	714 Red River Street, Clarksville, TN 37040	01-Jul-07	30-Jun-08
08-039	Olympic Disposal, INC.	148 Volunteer Drive, Hendersonville, TN 37075	01-Jul-07	30-Jun-08
08-040	Odom - Vooys Partnership	148 Volunteer Drive, Hendersonville, TN 37075	01-Jul-07	30-Jun-08
08-041	Seventh Transport, Inc.	3620 Hwy 641 South, Camden, TN 38320	01-Jul-07	30-Jun-08
08-042	PDQ Disposal, Inc.	625 Hamilton Avenue, Nashville, TN 37203	01-Jul-07	30-Jun-08
08-043	Burnice Winfrey Disposal, Inc.	1600 Emerald Drive, Nashville, TN 37128	01-Jul-07	30-Jun-08
08-044	Waste Industries, Inc.	7320 Centennial Blvd, Nashville, TN 37209	01-Jul-07	30-Jun-08
08-045	MLT Disposal	4571 Clarksville Hwy., Nashville, TN 37218	01-Jul-07	30-Jun-08
08-054	Sweeping Corp of Americ a, Inc.	713 Mel Park Dr, Nashville, TN 37204	01-Jul-07	30-Jun-08
08-059	BFI/AAA Transfer Station	7320 Centenial Blvd, Nashville, TN 37210	01-Jul-07	30-Jun-08
08-060	AAA Transfer Station	1160 Freightliner Drive, Nashville TN 37210	01-Jul-07	30-Jun-08
08-061	American Disposal Service, LLC	340 Rockland Road, Hendersonville, TN 37075	01-Jul-07	30-Jun-08

4.5 Use of Pesticides, Herbicides, Fertilizers, Oils, and Other Toxic Materials (Part III.B.5)

The objective of this section of the SWMP is to satisfy Part III.B.5 regarding the education of the public on the proper use, handling, storage, and disposal of pesticides, herbicides, fertilizers and other household hazardous wastes. This public education element is an ongoing effort.

4.5.1 Operate Household Hazardous Waste Facility (Part III.B.5.a.)

Contact Name: *Sharon Smith, Public Works, Waste Management Division 615.862.8727*

The DWM operates a household hazardous waste (HHW) facility. The HHW facility or East Recycling Convenience Center is located at 941 Richard Adams Road. The HHW facility is open to all residents of Nashville and Davidson County 361 days a year.

A full-time hazardous waste technician assists customers with unloading waste and then packages the material and finds receptacles for the collected material. Items accepted at the facility include newspaper, mixed paper, paper board, cardboard, aluminum, tin, glass containers, plastic bottles, appliances, furniture, other bulk items, used oil, antifreeze, batteries, cleaners/solvents, insecticides, and lawn and pool chemicals. Items not accepted include ammunition, business and industrial waste, explosives/fireworks, and medical waste. Commercial vehicles, rental trucks, and vans are not allowed at the site.

Information on hazardous waste is provided to the public on both the Public Works website and in an educational pamphlet to the right. The DWM's website is: http://www.nashville.gov/Recycle/. Information is provided on identifying hazardous wastes, finding alternatives to hazardous products, and disposing of waste properly.

4.5.2 Commercial Distributors (Part III.B.5.b.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

During Permit Year 2, the NPDES program began an educational campaign directed toward commercial distributors, as well as landscaping companies who are involved in the application of such chemicals. Metro first obtained a list of Davidson County commercial distributors and landscaping companies through the yellow pages. Once a list was obtained, Metro created and sent a brochure detailing the proper chemical application methods and guidelines to each business on the list. During Permit Year 3, the NPDES Office began to refocus efforts from educating the "commercial distributors" to educating the businesses that are applying chemicals. In Permit Year 4, the NPDES Office created a brochure for distribution to food service establishments/restaurants that explains the impacts of biodegradable chemicals on water quality. Approximately 400 such brochures were distributed in Permit Year 5. In addition, whenever water quality issues arise in certain areas, the NPDES Office hands out educational materials to businesses and residences to explain the impact improper application of chemicals can have on the environment.

4.5.3 Metro Facilities (Part III.B.5.c.)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro recognizes the importance of preventing stormwater pollution from occurring on Metro properties. The Metropolitan Government of Nashville owns nearly 14,000 acres of land, making it one of the largest landowners in the County. While the majority of the Metro land is owned by the Parks Department and has been left in its natural wooded state, there are many other Metro properties that receive routine land maintenance activities. During Permit Year 2, the NPDES Office developed a campaign to educate all Metro departments that perform land maintenance activities. The NPDES Office continued to educate other Metro departments in permit years 3 through 5. On June 22, 2006, NPDES staff held a MS4 permit seminar in which all Metro department heads were invited. Many Metro departments were represented at this meeting including: Planning Department, Public Works, MWS System Services, the Mayor's Office,

Nashville Electric Service, Health Department, Fire Department, Office of Fleet Maintenance, Codes Department, and Real Properties Services. The focus of the meeting was to educate other Metro departments on responsibilities of the MS4 permit. A large part of the meeting was devoted to the management of Metro properties and maintenance procedures and how they can impact water quality.

Since the meeting, the NPDES Office has continued coordination with the various departments to obtain information specific to there department's practices and potential impacts on water quality. Some of the information obtained from the various departments includes storage locations of chemicals such as fertilizers, pesticides, fuel oil, etc. As part of this process, the NPDES Office worked with the Office of Fleet Maintenance to install fuel oil clean-up kits at each of the above-ground fuel stations. In Permit Year 3 the Metro Office of Fleet Maintenance built and opened a new Metro fleet maintenance facility (Metro Southeast). This facility performs maintenance on all light vehicles and small equipment throughout Metro; maintenance that was previously performed at numerous facilities across the county. The Metro Southeast facility is completely indoors and there appears, upon NPDES inspection and discussions with Fleet Management regarding the operation of the facility, to be no impacts to water quality.

In Permit Year 4, the NPDES Office prepared a Stormwater Pollution Prevention Plan (SWPPP) for the Tennessee State Fairgrounds to mitigate the potential pollution sources that could enter Metro's MS4 at this specific location. The goal of the SWPPP is to improve water quality by reducing the amount of pollutants potentially contained in the storm water runoff being discharged to Brown's Creek. As mentioned in Section 4.3.4, the NPDES Office initiated an Environmental Compliance Inspection (ECI) program in Permit Year 5 for all Metro-owned. As a result of the ECI, a few properties were found to have minor housekeeping issues and the NPDES Office began coordination to bring those sites into compliance.

4.5.4 Future Direction of Element 5

Operate Household Hazardous Waste Facility

The East Recycling Convenience Center (HHW facility) is anticipated to remain open 361 days a year to all residents of Davidson County. Residents can bring up to 15 gallons or 100 pounds of household hazardous waste each month. There is no fee to drop-off household hazardous waste at the East Convenience Center.

Commercial Distributors

The NPDES Office will continue efforts to educate businesses that may be applying chemicals. In addition, the NPDES Office intends in future permit years to work with the Tennessee Department of Agriculture to see if educational materials could be given out as part of the commercial applicator licensing process.

Metro Facilities

The NPDES Office will continue to implement its ECI with all Metro departments on the proper handling and use of chemicals and hazardous substances as well as general housekeeping procedures. .

4.6 Illicit Discharges and Improper Disposal (Part III.B.6)

This element is designed to meet Part III.B.6 by facilitating an ongoing program to detect and stop illicit discharges and improper disposal of wastewater or solid wastes into the municipal separate storm sewer system (MS4). Components of the ongoing program include performing inspections, developing and enforcing ordinances, performing dry weather field screening and investigations, performing spill response documentation, performing public information/education activities, and limiting impacts to water quality from sanitary sewer seepage/overflows.

4.6.1 Ordinances and Enforcement Measures (Part III.B.6.a)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro Nashville has a strong Code of Law that clearly defines illicit discharges. The NPDES Office has reviewed the regulations and the enforcement powers for illicit discharges and believes them to be adequate and unnecessary to change. Metro Nashville's main Code of Law addressing illicit discharges is §15.64.205. Metro Code of Law can be found at the following link: http://www.nashville.gov/law/disclamer.htm

4.6.2 Dry Weather Field Screening (Part III.B.6.b)

Primary Contact: *Josh Hayes, MWS, Stormwater Division, NPDES Office, 615.880.2420*

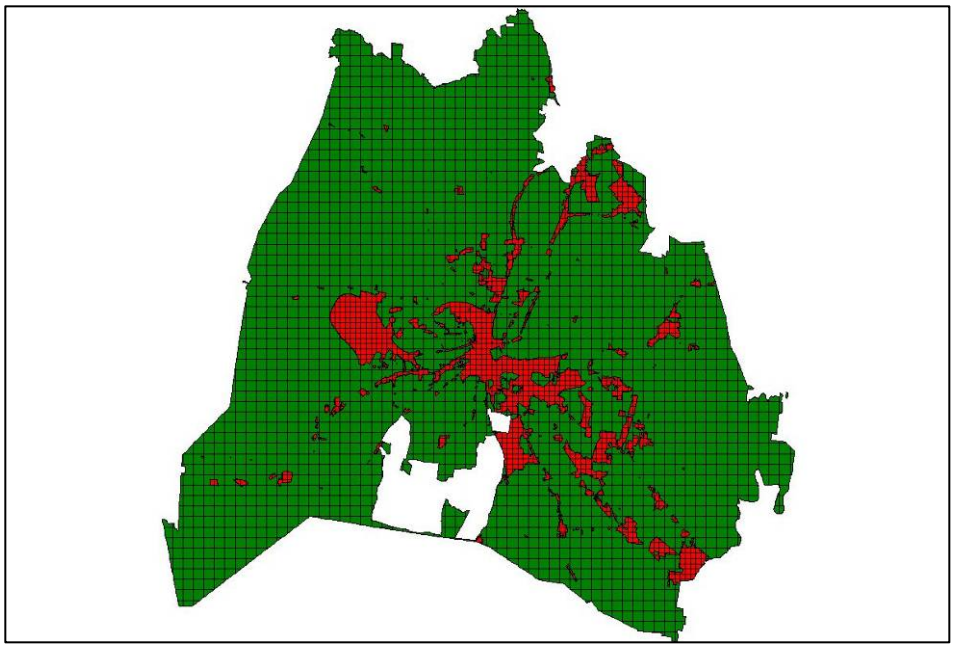
During the first permit cycle, approximately 4400 total sites were investigated through the dry weather field screening program. Unfortunately, a large portion of these sites were in rural/residential areas of Davidson County (1/2 mi grids) which had a very low potential to produce illicit discharges. Consequently, for cycle 2, NPDES made a request to TDEC (which was accepted) to omit the 1/2 mi grid sampling and instead concentrate in the industrial/commercial areas of the county (1/4 mi grids) where experience has shown the majority of illicit discharges to occur. The ¼ mile grid was created from updated GIS-based land use/zoning data, developed by the Metro Planning Commission, to guide and monitor dry-weather field screening activities (See Figure 4.6.2.1). Field screening was completed in Permit Year 5. The second cycle field screening involved inspecting outfalls in approximately 993 ¼ mile grids. Despite the heavy burden of staffing time and resources necessary to perform the field screening, very few illicit discharges were discovered by performing dry weather field screening.

Please note that in previous annual reports, it was stated that nearly 2,000 separate outfall points would be screened. The number of actual outfalls screened in the field, however, turned out to be far less, as many of the nearly 2,000 ¼ mile grids did not contain sufficient drainage with outfalls to be screened, therefore, no field screening was performed in those areas.

Since NPDES has been conducting Field Screening, several inefficiencies have been noted in the current protocol:

- Each "point" screened yields a snap shot of Metro's MS4 points and is not a true indicator of what is occurring in that area. *Example*: NPDES could investigate an outfall during a permit cycle (meaning this outfall was observed *once* in a 5 year span). While the odds of observing a chronic illicit discharge may be very good, the odds of observing an intermittent illicit discharge are extremely small. Nearly all illicit discharges observed during the field screening process were discovered visually, while driving to the target field screening point and not at the field screening point itself.

- Many of the businesses contacted during regular NDPES complaint investigations have little or no prior knowledge of the current stormwater/environmental regulations relating to MS4s and illicit discharges. *Example*: NPDES would physically drive into a ¼ grid once during a permit cycle, observe the area and leave. That now leaves the 5 or 10 businesses in that grid to conduct business for another 1825 days (5 years X 365 days), unaware of the current regulatory guidelines. Obviously, this leaves an extremely large potential for illicit discharges.



Non-residential areas are designated in red.

Figure 4.6.2.1 Field Screening Grid

In June 2005 (during Permit Year 2), NPDES initiated an educational program to increase the effectiveness of the Field Screening program in conjunction with the Field Screening sweeps. NPDES began with those businesses located along four of the major roads in the city: Lebanon Pike, Dickerson Pike, Murfreesboro Pike, and Nolensville Rd. These four roads contain a large percentage of the ¼ mi grids needing to be field screened. This served as an opportunity to educate businesses on current Metro NPDES regulations. Several different business/activity specific brochures were created and distributed to each business as part of this educational effort. The results of this approach has been extremely positive; meeting the business owners gave insight on the regulations and promoted awareness on enforcement if found to be out of compliance.

During cycle 2, nearly every business on Gallatin Rd. and its feeder streets was screened using this new proposed field screening method (in conjunction with the present field screening protocol), totaling approximately 250 businesses. The amount of illicit discharges found by visiting commercial sites individually on Gallatin Pike alone (15-20) was drastically higher than those detected throughout the entire county using the original FS protocol (<3). One final example: It's not uncommon for an auto garage to have a few gallons of oil spilled on their lot and in the garage itself. The garage owners sometimes do no understand the environmental issues this can create. Without a phoned in complaint, chances are slim that NPDES would ever venture far enough onto such a property to observe these issues.

Proposed Permit Cycle 3

NPDES proposes field screening modifications to the Permit Cycle Term 3 Field Screening Permit. The new approach will greatly reduce the amount of pollutants entering streams; which will enable NPDES staff to concentrate inspection time on the source of the pollutant. The proposed modifications are as listed:

1) Field screening sites will move from an infrastructure point based system to an individual commercial business system. Businesses will include all restaurants, food establishments, auto body repair facilities, car washes, or any other business that would appear to have a potential to create stormwater pollution issues. Educational literature will be distributed to businesses at the time of screening/inspection.

2) The previous ¼ grid system for choosing sites will be abandoned for a major roadway/street coverage approach. NPDES will educate and inspect/screen the majority of commercial businesses on the four major roads or "hot spots" in Davidson County. This will include: Gallatin Rd, Dickerson Rd., Murfreesboro Rd., and Nolensville Rd. NPDES will have the flexibility to identify other businesses deemed in need of screening/inspections based on visual inspections, past enforcements, proximity to 303(d) listed streams, and complaints.
3) Sampling and subsequent analysis will only be conducted if it is uncertain or not obvious that a discharge contains pollutants.

Under the proposed protocol, NPDES will go to sites as educators and can meet with the business owner/manager, conduct a screening of the site with the owner/manager or employee(s), discuss and explain issues and impacts to the community, make recommendations, provide direction on being compliant, and distribute educational material. The educational material distributed and the knowledge obtained will serve as a *preventative* measure tool.

4.6.3 Illicit Discharge Investigations (Part III.B.6.c)
Primary Contact: *Rebecca Dohn, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Detection
MWS has a comprehensive illicit discharge detection program in place. Illicit discharges are detected through a variety of methods that include field screening, citizen complaints, thermograph investigations, and staff observations, as well as findings from the recently-established watershed management group. Citizen complaints and field screening activities are conducted primarily by NPDES water quality inspectors. Other potential illicit discharges, however, are detected through proactive field detection measures implemented under the watershed management program.

As mentioned earlier, the NPDES Office formulated the watershed management group during Permit Year 4 with the goal of improving water quality by increasing public awareness of water quality issues, developing and coordinating partnership resources, and increasing stream monitoring and illicit discharge detection efforts. The watershed management group conducts 4 main components that aid to identify potential illicit discharges to the MS4 and waters of the State: TMDL monitoring program, stream walk program, thermograph investigation program, and the 303(d) program. The following gives a brief description of the watershed management programs.

TMDL Monitoring Program:
The TMDL monitoring program is required by the MS4 NPDES permit, which mandates flow-weighted sampling of all impaired streams with an approved TMDL within a five year period. The TMDL monitoring program by the watershed management group exceeds those permit requirements by monitoring streams on a quarterly basis. By conducting TMDL monitoring more frequently, it has helped to detect additional illicit discharges that would have otherwise gone undetected.

Stream Walk Program:
The stream walk program is a subcomponent of the TMDL monitoring program, which requires Metro to conduct field walks on every stream listed in a TMDL within a five year period. The stream walk program has been one of the most effective approach to identifying illicit discharges, especially in small and mid-sized waters. During stream walks, the watershed group has followed the Maryland Protocol, however, they are in the process of modifying this protocol to better fit the needs of the department.

303(d) Monitoring Program:
The 303(d) monitoring program is a completely proactive non-permit required program aimed at conducting a more rapid assessment of streams that are listed on the 303(d) list that are not listed in a TMDL. The basis of the program was to augment the TMDL monitoring program by removing streams from the 303(d) list before TMDLs are written for them. The monitoring consists of conducting non-flow weighted grab sampling to compile a database of ambient conditions for de-listing considerations. By conducting 303(d) monitoring, illicit discharges are detected many times by conducting the actual field sampling. In some instances, potential illicit discharges are detected through analyzing the data from the sampling resulting in the initiation of subsequent illicit discharge investigations.

Thermograph Investigation Program:
The thermograph investigation enables staff to identify leaking sanitary sewers and other illicit discharges based on elevated temperatures of illicit flows compared to ambient stream temperatures. The thermography study with cooperation from the Police Department was expanded from four creeks in 2003 to ten creeks in 2004 and includes Richland, Mill, Sevenmile, Manskers, Pages, McCrory, Gibson, Stoners, Browns, and the Stones River. Unfortunately, during the last two permit years, equipment failure has resulted in only partial watershed thermograph flights being conducted. Meetings have been held between the Police Department and NPDES and arrangements are in place to do flights in the coming months.

Elimination
Once a potential illicit discharge is detected, a comprehensive investigation is initiated and tracked. All illicit discharge investigations are treated as water quality complaints and are logged into databases that track the investigation status. During Permit Year 3, NPDES transitioned from an internal database within the NPDES Office to a Metro-wide City Works database. Any water quality complaint, spill/overflow response calls, and/or construction complaints of non-grading permit sites are logged into the City Works database for investigation documentation. Figure 4.6.3.1 is a screen capture of the City Works database. The database works within a GIS program that allows the user to map the location of a complaint if a valid address is available.

In Permit Year 5, there were approximately 356 complaint investigations initiated in the City Works database. Of the 356 complaints tracked, 170 of them were related to construction activities, 135 were considered general water quality complaints, and 51 were spill or sanitary overflow response.

Since Permit Year 2, the NPDES Office has been analyzing illicit discharge (water quality complaint) investigations to determine if any trends were present that could affect policy decisions on public education, enforcement, etc.

The ultimate goal of an illicit discharge investigation is to eliminate pollution. The process of achieving corrective action is different for each scenario and is handled on a case by case basis. Upon discovery of an accidental illicit discharge, the NPDES Office contacts the discharger to resolve the issue. If the discharge is considered a recurring or negligent event and depending of the type of discharge, the NPDES Office reports/coordinates with TDEC-WPC as necessary on illicit discharge issues. The illicit discharge investigations involve sampling and other water quality field tests depending on the type and severity of the discharge. In some cases, sampling becomes very important in the documentation of illicit discharges, especially in cases that involve enforcement. Whenever possible, the NPDES Office attempts to use public education to achieve compliance as appropriate when water quality impacts are not yet present (and can be avoided by the facility conducting site cleanup(s) and/or modify site operational practices, however, in certain cases, enforcement is necessary).

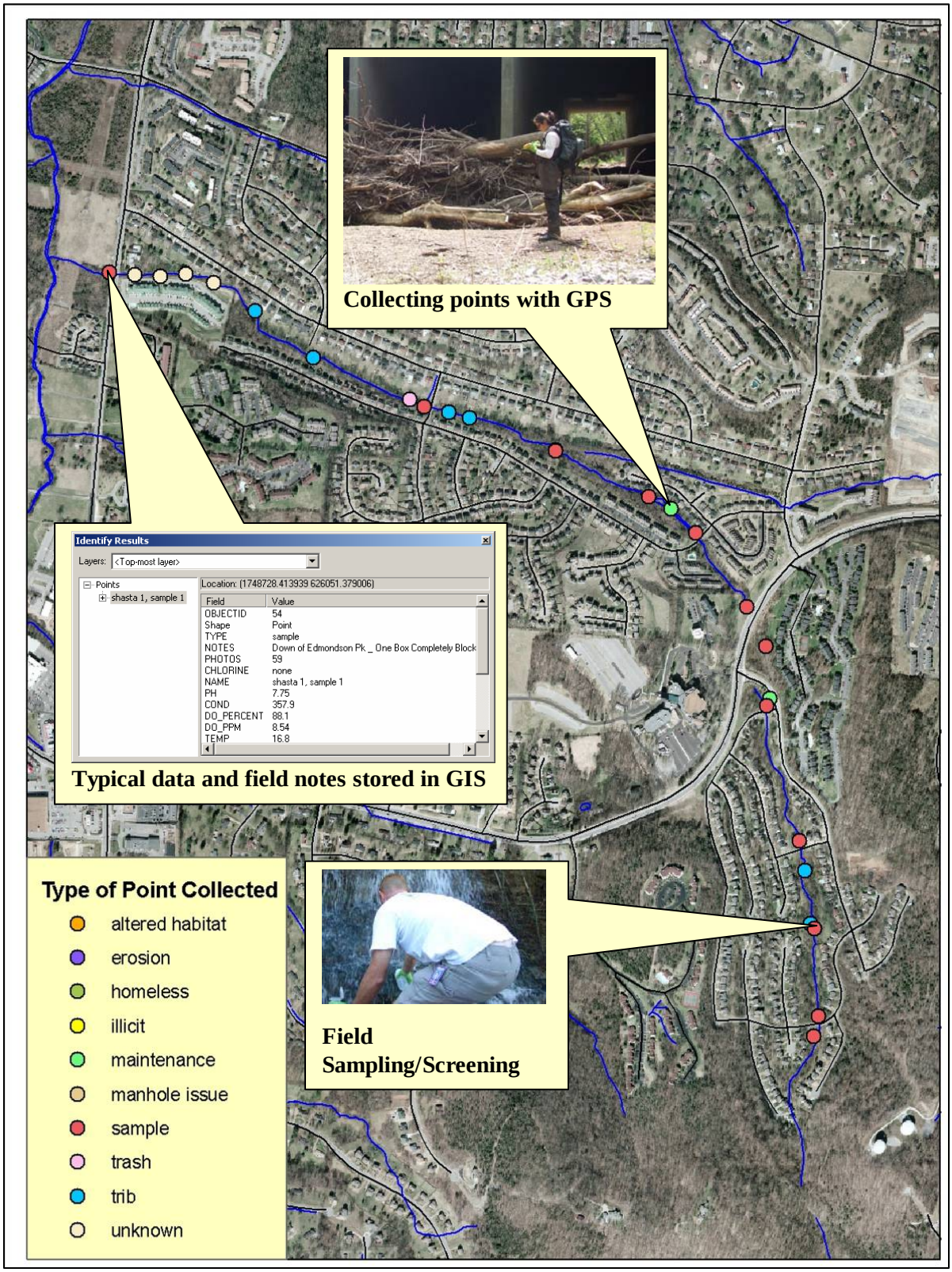


Figure 4.6.5.2 Example Segment of Stream Walk Data Collection

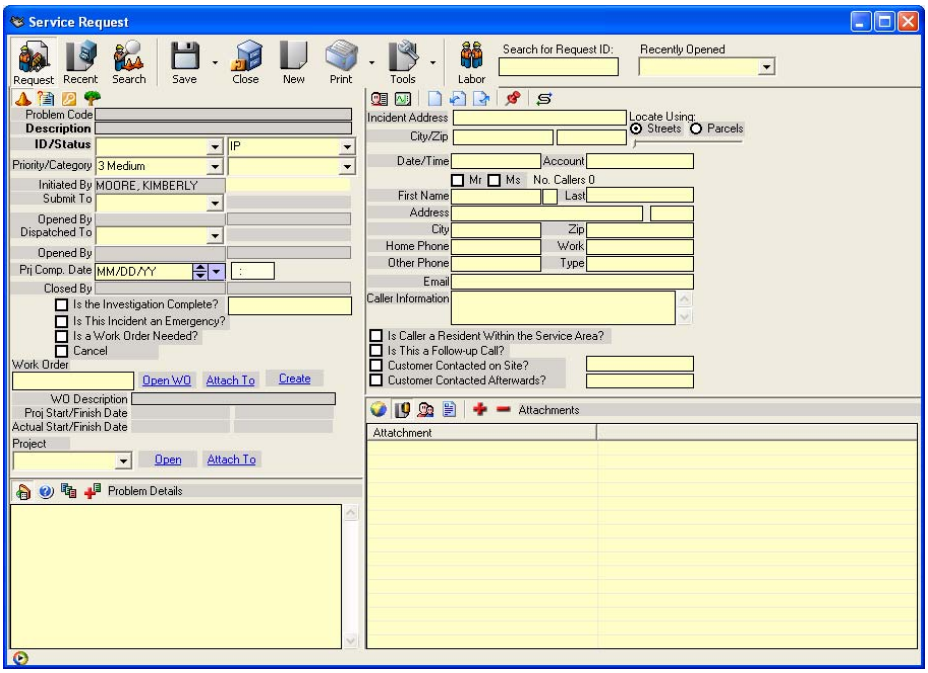


Figure 4.6.3.1 City Works Database for Complaint Investigations

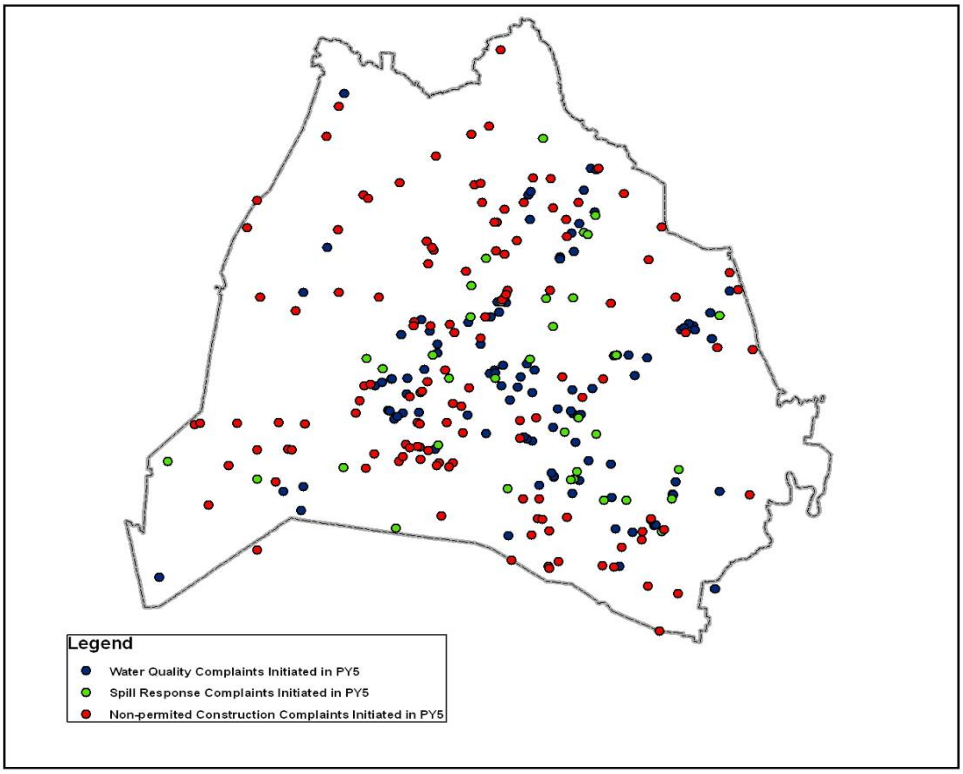


Figure 4.6.3.2 Geographical Distribution of Complaints Initiated in City Works during Permit Year 5

4.6.4 Public Information in Residential/Commercial Areas (Part III.B.6.d)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Public information activities associated with illicit discharges and improper disposals in residential and commercial areas are detailed in Section 4.10.1.

4.6.5 Sanitary Sewer Seepage (Part III.B.6.e)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

The NPDES Office periodically evaluates the protocols for reporting potential sanitary sewer seepage into the MS4 or "Waters of the State". NPDES staff participates in Overflow Abatement Program (OAP) meetings to discuss current investigations related to possible sewage seeps and proposed courses of action. The Overflow Abatement Program is an on-going effort to improve the water quality of the Cumberland River and its tributaries in Middle Tennessee. Significant progress has been made over the last decade in the reduction of combined sewer overflows (CSO) and sanitary sewer overflow (SSO) points.

Rehabilitation and replacement of defective sanitary sewer lines has been an integral part of Metro Water Services' Overflow Abatement Program since it's inception in 1990. Many of the programs are designed to increase the capacity to transmit and treat sanitary flow, which was reduced due to deterioration and leakage of both stormwater and ground water into the sewer lines. Capacity increasing projects include installation of parallel sewer lines, upsizing pumping stations, installation of inflow equalization basins and treatment plant expansions, and rehabilitating or replacing lines. Flows are actually reduced with rehabilitation to normal design levels, particularly during wet weather events due to the exclusion of stormwater infiltration. Eliminating hydraulic overloading brought about by inflow and infiltration reduces overflows and bypasses of wastewater from the collection system, thereby improving the quality of stream water in our community.

During Permit Year 5, approximately $6.4 million dollars were spent on sanitary sewer rehabilitation projects that included improvements being performed to 12.65 miles of sewer line. In addition, approximately $4.24 million has been spent on the reconstruction of the Dodson Chapel wastewater pumping station and the addition of the 3 MG equalization basin. Completion of this project should greatly reduce the amount of overflows from entering Stoners Creek and the Stones River. Additional Information on OAP is also available to the public at the following website: www.nashvilleoap.com/home.html.

Focus has also been given in the past couple of years to proper remediation of sanitary seeps or overflows once discovered. As mentioned in Section 4.1.5, the NPDES Office and MWS System Services worked together to develop a Sewer Overflow Response Plan (SORP) to remediate sanitary sewer spills, overflows, and/or seeps. During Permit Year 5, the NPDES Office responded to numerous sanitary sewer overflows and provided technical guidance on proper remediation.

Sanitary sewer seeps are identified through the OAP ambient monitoring program, citizen complaints, and activities conducted by the watershed management group mentioned above.

In addition to analyzing the potential impacts from sanitary sewer leaks/failures the NPDES Office program also researches the potential impacts of septic system failures. At the end of Permit Year 5 the NPDES Office obtained a list of reported septic system failures from the Metro Health Department to determine if any trends are present that might explain elevated bacterial levels in creeks. Table 4.6.5.1 is a list of septic system failures reported by the Metro Health Department in Permit Year 5

4.6.6 Future Direction of Element 6 – Illicit Discharges and Improper Disposal

Ordinances and Enforcement Measures

Metro Water Services (MWS) will continue to review the ordinance and enforcement measures for effectiveness.

Dry-weather Field Screening

Field screening will continue to be conducted within land uses that are predominantly non-residential, industrial/commercial businesses. Field screening in residential areas will occur as citizen complaints arise.

Illicit Discharge Investigations

The illicit discharge investigation program is an ongoing program to identify discharge sources, educate responsible parties, and implement enforcement measures as appropriate. The program will continue through the second permit cycle with modifications to the investigation procedures as technology develops.

Public Information in Residential/Commercial Areas

Public information activities associated with illicit discharges and improper disposal in residential and commercial areas are presented in Section 4.10.1.

Sanitary Sewer Seepage

Metro will continue to evaluate protocols for reporting potential sanitary sewer seepage into the MS4 and/or "Waters of the State". NPDES staff will work more closely with the MWS System Services Division on proper response/remediation of sanitary sewer spills and overflows. In addition, MWS will use lessons learned from the 2004 aerial infrared flight to improve the process of identifying leaks and illicit discharges by making it more efficient, expanding the scope of flights, and creating quicker responses to illicit discharges.

Table 4.6.5.1 Reported Septic System Failures in Permit Year 5

Date	Location	Actions
7/3/2007	12600011200 -- Heath Rd	Mitigated 7-12-07
7/5/2007	16200002800 -- Blue Hole Rd	Mitigated 9-14-07
7/23/2007	12600000700 -- Highway 70	Mitigated 7-25-07
7/23/2007	03900009600 -- Simpkins Rd	Mitigated 8-9-07
7/25/2007	15810000100 -- Old Hickory Bv	Mitigated 8-13-07
8/7/2007	06300023700 -- Neelys Bend Road	Mitigated 9-21-07
8/13/2007	02100016700 -- Clarksville Hwy	Mitigated 9-19-07
9/11/2007	01500019300 -- Whites Creek Pk	Mitigated 11-6-07
9/11/2007	13800002100 -- Couchville Pk	Mitigated 9-24-07
9/18/2007	05414003000 -- Risin Sun Ln	Mitigated 9-25-07
10/3/2007	03900001302 -- Old Hickory Bv	Mitigated 12-5-07
10/23/2007	15700000800 -- Chickering Rd	Mitigated 10-24-07
11/20/2007	05413006000 -- Brandywine Dr	Mitigated 11-28-07
11/30/2007	07500002600 -- Rachels Ln	Mitigated 12-19-07
1/8/2008	10800013100 -- Elm Hill Pk	Mitigated 1-29-08
1/10/2008	12100003700 -- Pulley Rd	Mitigated 3-17-08
1/18/2008	01500012800 -- Wilkinson Rd	Mitigated 2-1-08
1/28/2008	11612010900 -- Estes Rd	Mitigated 2-7-08
2/11/2008	18100004600 -- Nolensville Rd	Mitigated 4-2-08
2/21/2008	14806005200 -- Ezell Rd	Mitigated 2-26-08
2/28/2008	14200003300 -- Highway 70 S	Mitigated 5-30-08
3/3/2008	02200003200 -- Union Hill rd	Mitigated 3-27-08
3/10/2008	00400015500 -- Cougar Cove	Mitigated 4-14-08
3/11/2008	00700003800 -- Springfield Hwy	Mitigated 3-13-08
3/17/2008	11000013200 -- Hessey Rd	Mitigated 4-16-08
3/21/2008	01400014500 -- Old Clarksville Pk	Mitigated 4-2-08
3/27/2008	15807003200 -- Stonehaven Dr	Mitigated 4-3-08
4/3/2008	02900019000 -- Cantarutti Rd	Mitigated 4-29-08
4/3/2008	03000011900 -- Simpkins Rd	Repair Pending
4/11/2008	02100000900 -- Old Clarksville Pk	Mitigated 8-18-08
4/15/2008	00400004100 -- Whites Creek Pk	Mitigated 5-7-08
4/16/2008	00800002200 -- Whites Creek Pk	Mitigated 6-5-08
4/16/2008	12010004100 -- School Lane	Mitigated 4-28-08
5/5/2008	07400004100 -- Neelys Bend Rd	Repair Pending
5/8/2008	04411018500 -- Jones Circle	Mitigated 5-21-08
5/12/2008	01500020400 -- Morgan rd	Repair Pending
5/12/2008	17300010500 -- Pettus Rd	Mitigated 6-4-08
5/22/2008	15500013200 -- Collins Rd	Mitigated 6-25-08
5/29/2008	01500019300 -- Whites Creek Pk	Mitigated 7-18-08
6/12/2008	12713002600 -- Merrymount Dr	Mitigated 7-2-08
6/16/2008	03900016900 -- Simpkins Rd	Repair Pending
6/19/2008	18100004200 -- Nolensville Pk	Mitigated 7-24-08
6/20/2008	02800012600 -- Grays Point Rd	Mitigated 8-11-08

Information received from Metro Health Department

4.7 Industrial and High Risk Runoff (Part III.B.7)

The objective of this element is to satisfy Part III.B.7 of the permit, which requires Metro to minimize the impact of high-risk stormwater runoff from industrial facilities, municipal facilities and restaurants. This objective is to be accomplished through inspecting industrial sites, landfill and waste disposal facilities, transfer and storage facilities, researching problems associated with restaurant stormwater runoff, and monitoring selected industries.

4.7.1 Data Management (Part III.B.7.a)

Primary Contact: *Josh Hayes, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro is required to monitor and control pollutant runoff from the following types of industries and activities:

- Municipal landfills (see Section 4.4 of this report);
- Hazardous waste treatment, storage and disposal facilities (see Section 4.4 of this report);
- Industries subject to SARA Title III Section 313; and
- Industrial facilities that the municipal permit applicant determines are contributing a substantial loading of pollutants to the municipal storm sewer system.

The database for tracking industrial inspections of these facilities was created during Permit Year 1. In the beginning of Permit Year 2, the NPDES Office emailed a copy of the database to TDEC-WPC for review. The database has been updated in each permit year to reflect updates to the Environmental Protection Agency (EPA) Envirofacts website. In addition, several industrial facilities were added to the inspection list as the office deemed necessary by the NPDES Office. At the start of Permit Year 5, there were 15 industrial sites remaining to be inspected.

4.7.2 Inspections (Part III.B.7.b)

Primary Contact: *Josh Hayes, MWS, Stormwater Division, NPDES Office, 615.880.2420*

On August 3, 2004, NPDES staff met with TDEC personnel to discuss industrial stormwater inspection procedures and necessary coordination between the two agencies. It was determined that the NPDES Office would continue inspections of industrial facilities regardless of the facility's state permit status and that follow-up documentation would be provided to TDEC for each site.

Refine Procedures/Criteria to Prioritize Sites

During the first and second permit year, inspection prioritization was given to those sites the NPDES Office had previous involvement with respect to pollutant runoff, facilities located in direct proximity of water bodies, and sites discovered to have pollutant runoff through field screening and/or complaint investigations. In the third permit year, inspection prioritization was given to facilities TDEC listed as "priority 1" on their industrial inspection database. In Permit Year 4, the NPDES Office took a watershed approach to prioritizing industrial inspections to be done in the more impaired watersheds first. In Permit Year 5, the NPDES Office focused first on the remaining sites with the lower sectors of the Tennessee Multi-sector Permit.

Train Inspectors

In Permit Year 1, NPDES staff attended industrial inspection training in Memphis that was sponsored by the University of Tennessee. During Permit Year 2, NPDES staff sought additional training by observing an industrial inspection performed by TDEC staff. Currently, there are three inspectors in the NPDES Office that are trained in the proper industrial stormwater inspection procedures. In Permit Year 5, the NPDES Office coordinated with TDEC on several other industrial inspections, which has been beneficial in making sure staff are performing inspections as per TDEC's requirements. NPDES will continue to look for additional training opportunities for industrial inspection staff.

Inspect Facilities

The NPDES Office inspected the remaining 15 industrial facilities during Permit Year 5. It is important to note that some of the facilities were found to be out of business therefore a full blown inspection could not be performed. Inspection result letters were sent to each of the facilities in which inspections could be performed, which outlined specific site remediation required by the NPDES Office.

Coordinate Inspection and Enforcement Activities with TDEC Staff
As mentioned above, the NPDES program and TDEC made an effort to coordinate inspections on industrial facilities, but it was decided that NPDES would perform inspections independent of TDEC, unless extraneous circumstances were encountered that required coordination. The NPDES program coordinates all enforcement/follow-up activities with TDEC by copying them on all correspondence relating to industrial inspections.

In Permit Year 5, NPDES did coordinate with TDEC on two separate industrial inspections (Choice Foods and Springs Global). The Choice Foods coordinated inspection was a result of numerous permit violations (See Section 2.2.1) found by the NPDES Office during the original industrial inspection.

Report Inspection Locations
TDEC was forwarded a copy of all of the follow-up inspection letters (via email) that were sent out to each industrial facility.

4.7.3 Restaurant Impacts (Part III.B.7.c)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*
Hugh Garrison, MWS, Operations Division, Pretreatment section, 615.862.4590

MWS has a focused grease management program known as the Fats, Oils, and Grease (FOG) Program to address overflows and blockages of the sanitary sewer system caused by improper disposal of these substances. Overflow or backflow discharges caused by blockages affect ambient water quality. The objectives of this program include:

1. Operation and Maintenance cost reduction,
2. Collection system improvement,
3. Policy development on grease control equipment, and
4. Better tracking of collection system maintenance responses.

The FOG program issues permits to Food Services Establishments (FSE) including restaurants, schools, prisons, entertainment venues, and other food-servicing programs. Through cooperation with and participation by the Metro Health Department, the FOG staff, and subcontractor staff; the goal is to inspect every restaurant within Davidson County annually. During Permit Year 5, excluding the month of June, 2008, approximately 1,492 Food Service Establishments (FSE) were inspected through the FOG program (148 new, 1344 re-inspections). Excluding June 2008, there were approximately 126 Noncompliance Notifications (NCN) and 4 Notices of Violations issued during Permit Year 5. Approximately 43 of the site deficiencies were noted as having a potential to impact stormwater, which are routed to NPDES staff for additional consideration/inspection.. In Permit Year 5, there were 13 recorded sanitary overflows directly contributed to fats, oils, and grease.

Table 4.7.3.1 is a summary of Noncompliance Notifications issued for stormwater impacts at FSEs during FOG inspections since Permit Year 2. The stormwater impacts include FOG spills, FOG around recycling bins or dumpsters, FOG from vent hoods, overflowing traps or interceptors, pouring floor wash water or food waste water into parking lots, etc. The number of NCNs for stormwater has increased since Permit Year 2. The increase is due to: 1) FOG inspectors initial concentrations were on sanitary sewer FOG impacts, whereas, now stormwater impacts are being more closely monitored, 2) new inspectors have issued NCNs for slight to moderate stormwater impacts, whereas in the past even mild problems would receive a verbal notice.

Table 4.7.3.1 Stormwater Deficiencies on Issued Noncompliance Notices in Permit Year 5

Permit Year	Stormwater Noncompliance Issues
Permit Year 2	51
Permit Year 3	61
Permit Year 4	74
Permit Year 5	43

The permit program requires FSEs to have their GCE (Grease Control Equipment) certified annually. A copy of the grease interceptor/trap certificate is included in Appendix A. In an attempt to improve maintenance of GCE, the MWS FOG program created a "Grease Interceptor Maintenance Guide" that is distributed to FSEs. A copy of the English and Spanish versions of the guide is included in Appendix B. Items examined during the certification process include: (1) no holes are present causing the leaking of grease into the restaurant or the ground, (2) baffles are in place, (3) tees are present on inlets and outlets of grease interceptors, and (4) access to each chamber of the grease interceptor is provided for proper maintenance/inspection.

A copy of a field inspection sheet is depicted in Figure 4.7.3.1. In subsequent investigations, grease found on walls of the trap results in the issuance of a warning, and grease found in the sanitary sewer results in a Notice of Violation (NOV), a copy of which can be found in Figure 4.7.3.2.

NPDES staff also investigates various restaurant-related complaints as part of its illicit discharge investigation program. See Section 4.6 for more information on Metro's illicit discharge detection and elimination program.

New regulations for Mobile Food Units state that "no material (solid or liquid waste) shall be discharged to the MS4 (or to a locale where such material may be washed via stormwater runoff into the MS4) as it relates to the operation of a mobile food unit per Metro Ordinance, Title 15, section 15.64.205."

4.7.4 Future Direction of Element 7 – Industrial and High Risk Runoff

Data Management

A new database of industrial facilities to inspect will be created in third cycle of the permit. The industrial inspection database will be routinely updated in future permit years to include inspection results, site follow-up/remediation, and EPA updates to the SARA Title III, Section 313 sites.

Inspections

Metro proposes that it will periodically refine procedures to prioritize sites for inspection based on SIC code, State industrial stormwater data, and other pertinent information. Inspections for all of the industrial sites on the list will continue over future permit years. NPDES will continue to coordinate all inspection results and enforcement actions with TDEC. At the end of each permit year, NPDES will provide a map to TDEC depicting the locations and inspection status of industrial sites and a list of industrial sites that will be inspected in the following permit year. In future permit years, the NPDES Office also wishes to initiate discussions with TDEC in hopes of developing an agreement in which the NPDES Office could inspect and enforce under the auspice of the TDEC TMSP.

Restaurant Impacts

Through the FOG program and in coordination with its subcontractors and the Health Department, MWS plans to inspect every FSE each year. Inspection priority will be based on emergencies and hotspots, while program emphasis will be placed on continued education and enforcement. FOG plans to continue its partnerships with the Metro Health Department, the Fire Marshall's Office, Codes Department, and Metro Schools with hopes to develop relationships with other Metro entities in the future. The NPDES Office has begun the process of educating (through enforcement and brochures) various restaurants on proper disposal of mop wash water and other waste.

FOOD SERVICE ESTABLISHMENT GREASE CONTROL INSPECTION FORM

Facility Name: _____ **Inspection Date:** _____

Facility Representative: Mr. / Ms. _____ **Title:** _____

Phone: _____ **Owner/Regional Manager Name:** _____

Facility Address: _____ Mail Address: _____ (if different)

_____ _____

Handy Map ID: _____ **Sewer Plat ID:** _____ **GPS ID:** _____

1. **Grease Interceptor**? ____ Yes ____ No
(For #1, if "NO" then go to # 14)

2. Interceptor Size (gallons) __500 __750 __1000 __1500 __2000 __ 3000 ___Two Interceptors in series other:_____

3. Manhole Access to Interceptor: 1 2 3 4

4. Estimated Grease Layer Depth:

5.Effluent T visible? ___Yes ___No (inspector can see the T)

6. Effluent T attached & in good condition: __Yes __No __ Unknown

7. Grease Interceptor Hauler used: _____

9.Bacteria/Enzymes used:___Yes___No Product Name:_____

10. Frequency Interceptor Cleaned? _____

11. Complete Contents Pumped? ____Yes ___ No

12.Records of Maintenance/Cleaning Available? ____ Yes ____ No

13. Last date cleaned: _____

Grease Trap

14. **Grease Trap**? Yes No

15. Location: Under sink trap Floor trap Outside "floor" trap

(For # 14, if "NO" then go to #20)

16. *Grease Trap flow-through rating / grease capacity Estimate:* __ 5 gpm/ 10 lb __ 10 gpm/ 20 lb __15gpm/30lb ___ 20 gpm / 40 lb ___ 35 gpm / 70 lb ___50 gpm / 100 lb ___ Other:_____

17. Frequency Trap is cleaned:

18. Maintenance/Cleaning Records: Yes No

19. Grease Trap comments/location disposed of waste: _____

BMPs & outside conditions, other than grease interceptor or trap

20. Best Management Practices Implemented ___**Yes** ___**No**

21. Grease Recycle Bin ___Yes ___No

22. Cleanout Covers missing or damaged? ___Yes ___No (# Cleanout covers missing: _____ damaged: _____)
(Facility needs to repair missing or damaged cleanout covers immediately)

23. FOG impact at dumpster or around recycle bin? ___Yes ___ No (if Yes give explanation below)

24. DOWNSTREAM MANHOLE: ___ Evidence of Grease in Manhole (__slight __ moderate __ heavy)

Comments: _____

25. **SAMPLE POINT** Access? __ Yes __No Effluent Temp: _____ Effluent pH:_____

26. Sample point ID: ___Interceptor Effluent T ___Downstream MH ___Cleanout ___Sample drop box

27. Picture ID:_____ *II* ____ **of Interceptor** ____ **of downstream MH** ____**other:**_____

Visual inspection results, comments: _____

Inspector Name: _____ Signature: _____

Facility Representative Signature: _____

Inspection form copy provided to facility? ____Yes

Figure 4.7.3.1 FSE Grease Control Inspection Form

Department of Water & Sewerage Services, Environmental Compliance
Noncompliance Notification

DATE ISSUED:_____ Issued by:_____ DATE RESPONSE DUE:_____

Facility:_____ Address:_____
The following marked box(es) ☒ indicate deficiencies or areas of concern that need to be addressed.

☐ Grease Interceptor Effluent T not attached or not acceptable, allowing fats, oils and grease to be discharged. *(replace effluent T and make sure length of T is adequate, to within 18" of bottom of interceptor tank).*

☐ Grease Interceptor Effluent T not visible or accessible for inspection. *(need to verify during pumping of interceptor if effluent T is attached and in good condition, or will have to take action to install access opening over effluent T to ensure it is attached to prevent fats, oils and grease from being discharge. Also you need access to outlet compartment so it can be cleaned properly).*

☐ Grease Interceptor mid baffle wall or side walls indicates deterioration of concrete. *(inspect grease interceptor at the time the grease interceptor is completely pumped, check to ensure deterioration of concrete is not going to cause the mid baffle wall or outside walls to collapse or cause tank contents to leak out of the interceptor. Normally, the concrete thickness on most interceptors is 4", it is recommended that if deterioration of concrete is greater than 50% then the interceptor needs to be repaired or replaced.)*

☐ Grease Interceptor fats, oils and grease layer and food solids layer are greater than 25% of the capacity of the interceptor tank. *(interceptor needs to be pumped immediately, provide record of pumping to Metro; get interceptor on regular schedule to be pumped, minimum of every 3 months but some larger facilities may have to pump monthly to ensure grease does not cause problems).*

☐ Fats, oils and grease evident in downstream manhole from facility, immediate action needs to be taken. *(this could include installing new grease interceptor, controlling flows through the interceptor to prevent washout of grease to the sewer, implementing strict BMPs for all personnel to control grease discharges or other action)*

☐ Facility has no grease control equipment installed. *(if large facility you will need to install an appropriate sized interceptor or trap, refer to Metro Water Services' brochure on minimum size of grease control equipment).*

☐ No Records of interceptor or trap maintenance available at the facility for inspection review. *(keep copy of all grease waste hauler manifests and records at the facility location, if the traps are cleaned by facility personnel then keep written record onsite of cleaning date, person doing cleaning and location the grease and food waste was disposed)*

☐ Sewer cleanout covers need to be replaced, allowing rainfall inflow to sewer system.

☐ Fats, oils and grease on ground around recycle bin or dumpster, causing stormwater impact.
RESPONSE FROM FACILITY (attach additional information if necessary): Mail Response to:
Metro Water Services, ATTN: FOG Program, 1607 County Hospital Rd., Nashville, TN 37218
Facility Contact Name furnishing response:_____Title:_____
(White copy: Metro; Yellow Copy: Facility to submit with response; Pink Copy: For Facility's records)

Figure 4.7.3.2 FOG Notice of Violation

4.8 Construction Site Runoff (Part III.B.8)

This section of the program is designed to satisfy Part III.B.8 of the permit, which is intended to limit the impact of stormwater runoff from construction sites through the establishment of procedures enforced through ordinances for site planning. The procedures will be implemented by plan reviewers, inspectors, as well as through an extensive public education program.

4.8.1 Ordinances, Regulations, and Guidance (Part III.B.8.a)

Primary Contact: *Rebecca Dohn, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro took significant steps in the first and second permit year to enhance local regulatory mechanisms designed to improve water quality by beginning to revise the Stormwater Management Manual. During Permit Year 1, the Stormwater program focused on identifying inadequacies in the stormwater regulations. As mentioned above, throughout the second permit year, an extensive regulations revision process began that involved numerous meetings and discussions with stakeholder groups consisting of members from Metro Council, the Metro Stormwater Management Committee, the development and engineering community, state and local organizations, and the general public.

In Permit Year 4 the new stormwater regulations went into effect. Metro conducted training sessions with staff and the development community on the changes and how to use the site development tool. During Permit Year 5 the NPDES Office continued to educate the development community on the new regulations and documented all questions and issues that arose during the transition to the new regulations. The NPDES Office devotes a staff member to document opportunities to revise/improve stormwater regulations on a continual basis. Issues documented by the NPDES Office in the past year will be incorporated as minor revisions to the manual in the upcoming year. The development community will be apprised of any changes.

Metro recognizes the importance of having a sound public education program to prevent polluted construction site runoff. During Permit Year 5, NPDES continued with its public education program geared toward construction site run-off. The public education program is explained in further detail in Section 4.10. One of the specific areas of public education was facilitating the Stormwater Advisory Council (SWAC) meetings that held mostly monthly with local engineers and the development community. At the SWAC meetings, Metro discusses numerous stormwater issues including the revised regulations.

Metro currently requires grading permit applicants to submit a copy of their Notice of Coverage (NOC) for a Tennessee Construction General Permit (CGP) prior to receiving approval of grading plans. This policy insures that a permittee is aware of the CGP requirements. In addition, MWS plan review engineers require all other applicable State and Federal permits, such as State Aquatic Resource Alteration Permits (ARAP) and U.S. Army Corps of Engineers Section 404 Permits, to be obtained prior to plan approval.

4.8.2 Training (Part III.B.8.b)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*
Refer to Section 2.5 for the training received by MWS stormwater staff in Permit Year 5.

4.8.3 Records Management (Part III.B.8.c)

Primary Contact: *Dale Binder, MWS, Stormwater Division, NPDES Office, 615.880.2420*

In Permit Year 5, NPDES staff conducted 5,311 construction site inspections. The construction site inspections include inspections for erosion control, infrastructure installations, and final sign-offs. Please note that in previous annual reports, the number of inspections were tracked by each inspector and in some instances the inspections were of non-construction sites (complaints). Previously, each inspector not only inspected sites with grading permits, but also investigated complaints of construction sites without active grading permits. Given the amount of complaints of non-permitted sites, grading permit inspectors were having to take time away from their grading permit site inspections to pursue these "unpermitted" site issues. In Permit Year 5, the NPDES Office restructured the construction inspection staff

to devote one inspector to handle all complaints of non-permitted grading activities, thus, freeing up dedicated grading permit inspectors to focus solely on permitted sites. In addition to the above number of inspections of grading permit sites, there were 1,016 inspections performed on non-permitted construction complaints. Table 4.8.3.1 depicts the total number of construction-related inspections performed for the past six fiscal years. All inspections are now tracked either by the city-wide KIVA and/or City Works databases.

Table 4.8.3.1 Summary of Inspections by Construction Site Inspectors per Fiscal Year (July-June)

Total FY03	198	61	28	46	113	2,235	0	0	2,681
Total FY04	270	80	44	53	122	4,139	0	0	4,708
Total FY05	271	23	59	56	177	4,923	0	0	5,509
Total FY06	273	100	85	85	244	4,799	69	66	5,721
Total FY07	257	112	143	90	157	5,349	190	254	6,552
Total FY08	176	132	141	107	174	4,581	382	634	6,327
Total	1,445	508	500	437	987	26,026	641	954	**31,498**
Inspection Type	Initial EPSC	Bond Reduction	Bond Release	Temp U&O	Final U&O	Routine GP	Initial Complaint	Follow-up Complaint	Total

Note: The shaded columns represent the inspections performed on non-permitted construction sites. For FY 03, FY 04, and FY 05, inspections of non-permitted sites were counted in the routine GP column.

4.8.4 Plan Review and Inspection Resources (Part III.B.8.d)

Primary Contact: *Tom Palko, MWS, Assistant Director, 615.862.4799*

In Permit Year 5, the construction inspection staffing levels within the NPDES Office was maintained at a total 7 personnel. The construction site inspection staff, however, was able to restructure in order to become more efficient, as explained above. This increased efficiency has allowed Metro to conduct more numerous and frequent inspections of construction sites (permitted and non-permitted).

In Permit Year 5, the Stormwater Plan Review Section maintained the level of previous years with five total engineers. An additional engineer and inspector, however, was added to the Stormwater Codes Compliance Division. The new engineer will focus on working with single family home construction to limit the impacts of stormwater runoff. Single family home construction normally does not require a grading permit, however, can often pose a runoff problem. Given the amount of development across the county, the Plan Review Section continued to experience a backlog of plan submittals. In order to compensate for some of the backlogs, the Plan Review Section contracted out a portion of its grading permit plan review to an environmental engineering firm. There were approximately 1,970 sets of plans submitted to the Plan Review Section in Permit Year 5. These submittals include, among other things, initial and re-submittal of grading plans, as-builts, consultant plan reviews and/or Preliminary Planned Urban Development submittals. Overall, there were 871 plans that were approved or designated as "no permit needed" by the Plan Review Section during Permit Year 5. Table 4.8.4.1 contains a more detailed description of the Plan Review Section's numbers.

Table 4.8.4.1 Summary of Plans Reviewed by Stormwater During Permit Year 5

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Number of Plan Submittals	195	183	146	192	157	153	160	145	164	175	140	160	1,970
Number of Plan Approvals	98	95	67	94	77	53	69	65	60	73	57	63	871
Number of Projects Approved Using Low Impact Development Techniques	88	76	74	83	77	89	88	75	100	98	80	93	1,021

Note: Plan Submittal Numbers Include: Access database tracked Preliminary PUDs and also KIVA tracked Grading Plans and As-Builts (all initial submittals, resubmittals, additional information submitted, and contractor (i.e. consultant) returned to MWS). The Access query is called 'Results Matter_Submitted'. The KIVA report is called "SWGR DECISIONS BY ACT / EMPL". Plan Approvals Numbers Include: a review result of Approved, Conditionally Aproved (Approved Except as Noted), No Permit Required & Plans Returned to MWS (when reviewed by external engineer). The KIVA report is called "SWGR SUMMARY BY ACTIVITY". Plans Not Approved Numbers Include: a review result of Returned for Corrections or Denied. The KIVA report is called "SWGR SUMMARY BY ACTIVITY".

The actual issuance of grading permits is performed by inspectors within the NPDES Office. Once the grading, drainage and erosion control plans are approved by the Plan Review Section, the NPDES Office facilitates a pre-construction meeting with the developer, contractor, and erosion prevention and sediment control (EPSC) specialist. After the pre-construction meeting, a temporary grading permit letter is issued for the installation of (only) EPSC measures as discussed during the pre-construction meeting. Once the EPSC measures are installed correctly and verified by NPDES staff, the grading permit is issued for complete site grading per the approved site plans. During Permit Year 5, the NPDES Office facilitated 222 pre-construction meetings and issued approximately 165 grading permits. The NPDES Office was also responsible during the last permit year for inspection of all the active construction sites within the county. At the end of Permit Year 5, there were nearly 664 active grading permit sites that required NPDES inspection. A complete breakdown of grading permits issued in the last six fiscal years is provided in Table 4.8.4.2.

Table 4.8.4.2 Summary of Grading Permit Inspections per Fiscal Year (July-June)

	Preconstruction Meetings	Grading Permits Issued	Permits Completed
Total FY03	257	198	102
Total FY04	305	270	159
Total FY05	284	271	220
Total FY06	296	252	196
Total FY07	251	239	188
Total FY08	222	165	205
Total	1,615	1,395	1,070

4.8.5 Metro Activities (Part III.B.8.e)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

The NPDES Office has routinely educated other Metro Departments on the potential impacts to Metro construction activities could have on water quality. As it currently stands, the NPDES Office has informed other departments that construction activities meeting certain criteria will require grading permits. The NPDES Office has also educated other departments on the need to control erosion and sediment runoff from smaller land disturbing activities that may not rise

to the level of obtaining a grading permit. While performing the ECI program mentioned in Section 4.3.4 of this document land disturbance activities and the potential for sediment runoff is one of the areas looked at.

4.8.6 Future Direction of Element 8 – Construction Site Runoff

Ordinances, Regulations and Guidance

In future permit years, the stormwater regulations will be continually analyzed for potential changes that can be implemented.

Training

Plan reviewers and construction site inspectors will continue to be informed of and educated on the latest and most effective management practices. The two groups will continue to coordinate to learn from plans review and field inspection experiences.

Records Management

Inspections and any enforcement actions will continue at a steady rate through future permit years. These inspections will be documented and reported in KIVA and/or City Works for effective records management

Plan Review and Inspection Resources

The Stormwater Program will continue to evaluate whether the staffing levels of the inspection and Plan Review Sections are effective in meeting the permit needs to control construction site runoff.

Metro Activities

The NPDES Office will continue to coordinate with other departments through implementation of the grading permits and ECI program to ensure development at Metro sites or Metro's maintenance activities are not resulting in runoff issues.

4.9 Habitat Improvement (Part III.B.9)

The objective of Part III.B.9 of the permit is for MWS to investigate and report potential areas of stream habitat improvement within Davidson County.

4.9.1 Report Habitat Improvement Activities/Projects (Part III.B.9.a)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

Metro recognizes the benefits of habitat improvements can bring to water quality of Davidson County streams. Many of Metro's departmental activities, while designed to benefit society, also provide improvements to aquatic habitat and water quality. One example is the many projects conducted by the Metro Parks Department that are designed to provide recreational opportunities. These activities may ultimately provide long-term habitat improvement and increased water quality. One particular effort has been the establishment by the Metropolitan Council of the Greenways Commission of Metro Parks and its Citizens Advisory Committee (CAC). The Commission and the CAC oversee the community's public/private greenways effort. Several greenways, featuring hiking, biking, horseback riding trails, and walking/running paths have been established along streams in Nashville. MWS presently has a staff member on the greenway committee to promote and enhance habitat and water quality improvements of the program. Overall, greenway projects have improved habitat and water quality across the county by preserving, through a conservation easement, many miles of stream corridors that would, otherwise, be subject to potential development. Greenways are developed by Metro to improve the qualities that make Nashville a desirable environment for work and play.

- **Greenways offer recreational opportunities** by providing safe, accessible routes for walking, running, bicycling, and other forms of exercise, and for enjoying increasingly hard-to-find natural areas close to home.
- **Greenways improve environmental quality** by protecting plant and animal habitat. They help clean our water and air through the dedication of sensitive areas, such as floodplains, wetlands, and forests, to low-impact uses.
- **Greenways facilitate alternative transportation** by providing bicycle- and pedestrian-friendly routes between home, work, and other destinations. By providing such non-automotive facilities, greenways are a part of the infrastructure necessary for an integrated approach to transportation planning.

Metro Parks manages over 36.5 miles of greenway within Davidson County. Additionally, Metro Parks manages several parks and nature centers throughout the county that implement various education programs to promote environmental stewardship. Additionally, Metro Parks has taken the lead to implement several other habitat improvement measures and demonstration projects at various facilities. For example, Metro Parks incorporated environmental sustainability features into the design at three nature centers: Shelby Bottoms Nature Center, Bells Bend Nature Center, and the Beaman Park Nature Center. (See Attachment A for additional information on the nature centers) In 2008, the Governor's Environmental Stewardship Award for "Building Green" was presented to the Metro Parks and Recreation Department for the new "Three Green Nature Centers". The structures include numerous sustainable features in their architectural design, including a green roof, rain chains, and waterless urinals.

Another program performed by Metro Parks that directly benefits water quality and, therefore, stream habitat is the "Bag It" campaign. The "Bag It" campaign is an effort to encourage Metro park users to use the mutt mittens provided at most parks to clean up their pet waste. During Permit Year 5, Metro Parks purchased an estimated 351,200 dog waste bags to be used at various park locations. Metro Parks estimates that in distributing the pet waste bags approximately 94,824 lbs (47.41 tons) of pet waste were removed from park properties that would have otherwise resulted in contaminated stormwater runoff. Metro Parks has established exclusive 'dog park' locations at several of its parks in Davidson County. Figure 4.9.1.1 is a brochure of the "Bag It" campaign distributed by Metro Parks to the public, specifically dog owners.

Figure 4.9.1.1 Metro Dog Parks – "Bag It" Campaign

The Stormwater floodplain buyout program is also another example of a program within Metro that is providing a benefit to water quality. The primary objectives of the Home Buyout Program are to: 1) assess residential, floodplain properties on the FEMA repetitive loss list for buyout, and 2) evaluate areas that repetitively flood, not located in the floodplain that could be considered for buyout. This program utilizes funds allotted from the Capitol Improvement budget and matching FEMA funds to purchase residential properties that qualify. To qualify, an application for the property or area must be submitted to FEMA for review and processing. Once a property qualifies for buyout, the property is purchased, the house and/or structure are carefully demolished, and the property is established as open space. In total, over 40 homes have been purchased and removed from the floodplain. Removal of the homes not only adds storage capacity to the floodplain, but increases the riparian habitat for streams. Figure 4.9.1.2 depicts one particular successful floodplain buyout property located on Blackman Road within the Mill Creek watershed.

Before

After (From Bird's-Eye Pictometry)

Figure 4.9.1.2 Before and After Photographs - Blackman Road Floodplain Buyout Property

In Permit Year 5, a riparian buffer enhancement project was completed for the Blackman Road floodplain buyout site. Over 160 native trees and shrubs were planted within the riparian zone for Sevenmile Creek, which is inhabited by the federally endangered Nashville Crayfish. An enhancement project on at the Blackman Road buyout property is projected to be completed in Permit Year 5. Representative photographs of before and after the tree planting are depicted in Figure 4.9.1.3.

Day Before Planting

Seven Months Later

Figure 4.9.1.3 Blackman Road Riparian Enhancement Project (Before and After)

In addition to incorporating habitat improvement measures into Metro Departmental activities, the NPDES Office has been forming partnerships with other agencies and organizations to perform various habitat improvement projects. In one particular project Metro partnered with the Tennessee Department of Agriculture and several other State and local agencies on the Sevenmile Creek Watershed Community Project.

In addition, over the past couple of years, the NPDES Office has coordinated with other non-profit groups to perform habitat improvement projects. During routine field work in Permit Year 3, NPDES staff discovered a large segment of a tributary to Mill Creek (Pavillion Branch) in which habitat had been altered. This stream was located on a large parcel of state-owned property. Dr. Steve Winesett arranged a meeting with the Tennessee Stream Mitigation Program (TSMP) to see if this site would classify as an in-lieu fee mitigation project. After several meetings, the TSMP decided to perform a stream restoration project on the impaired segment. The primary objectives of the project were to re-establish in-stream habitat by restoring bedform diversity in the form of pools and riffles, enhancing the ability of the site to filter stormwater by utilizing constructed best management practices, and establishing a protected riparian corridor comprised of native vegetation. This project provided a rare opportunity to complete larger scale stream restoration in an urban landscape, especially in the Mill Creek watershed. Nashville Crayfish habitat was also installed in the hope of attracting the species to the tributary. The project was completed in Permit Year 4. Some representative photographs are depicted in Figure 4.9.1.4.

Restored Meandering Stream (During Construction)

After Construction

Figure 4.9.1.4 Pavillion Branch Restoration Project Representative Photograph During Construction

An additional habitat improvement method the NPDES Office routinely engages in is coordinating and facilitating volunteer stream clean-up events. During Permit Year 5, MWS facilitated 6 volunteer stream clean-up events and as a result, tons of garbage were removed from Davidson County's streams and lakes. The removal of this trash has in effect improved the in-stream habitat of many miles of streams.

4.9.2 Future Direction of Element 9 – Habitat Improvement

The objective of this program element is to make TDEC-WPC aware of habitat improvement activities in the permit area. In satisfying this permit element, Metro takes the opportunity to search for other areas within different departments where habitat improvement could be integrated into normal department tasks. The NPDES Office will continue to report any habitat improvement projects performed in the county during future annual reports.

4.10 Public Information and Education (Part III.B.10)

This element is designed to meet Part III.B.10 of the permit by facilitating an ongoing program of public education and outreach efforts. Areas of education include general housekeeping procedures such as the use, storage, and disposal of pesticides, herbicides, fertilizers, used oils, and other hazardous chemicals; identification and prevention of illicit connections and discharges and long-term water quality impacts; responsible construction that prevents erosion and sediment loss; and detention pond maintenance. These topics are presented to audiences ranging from school children to homeowners' associations to developers and engineers.

The NPDES Office is committed to addressing the public education requirements of the permit. The public education program involves a joint effort between NPDES staff and the MWS Public Information Officer (PIO), Sonia Harvat, as well as other key Metro departments.

4.10.1 Public Education of Other Elements (Part III.B.10.a)

Primary: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*
Sonia Harvat, MWS Public Information Officer, 615.862.4494

Inform Public - General Housekeeping Procedures

The following components of the public education program are geared toward educating the general public on proper housekeeping measures:

- The NPDES Office's watershed management group and the MWS Public Information Officer (PIO) held several public education events throughout the year. For those events and future events, the NPDES built a representative stream model to educate the public on the biological dependence on healthy streams. Representative photographs of events are presented in Figure 4.10.1.1. Some of the events are designed to be a hands-on training, while others are designed to present stormwater quality materials to the public.

2008 Earth Day

Percy Priest Environmental Awareness Day

Figure 4.10.1.1 Photographs of Public Education Events held in Permit Year 5

- In previous permit years, the NPDES Office developed a general brochure that summarizes the Stormwater Program and explains ways for the general public to prevent stormwater pollution. This brochure, titled "Water – Protect It With Your Lifestyle", is given out at some of the presentations and events where NPDES staff are present and is available for pick up at several Metro offices (See Appendix B). The NPDES Office has also purchased and distributed numerous public education items with the stormwater logo such as tape measures, pens, cups, and magnets.

- A Stormwater Pollution Hotline (313-PURE) is provide for reports related to any discharge or activity that is contributing to water pollution. The hotline functions 24-hours a day, 7-days a week and is managed through the NPDES Office. This hotline number is included on all of NPDES educational materials. The NPDES Office has also created a website that provides the public a forum for reporting stormwater quality problems via email. The address to the website is: www.nashville.gov/stormwater/.

- Metro runs videos and powerpoint slideshows on Channel 3 (public access channel) throughout different times of the year that specifically addresses construction site stormwater runoff and the grading permit process and illicit discharges.

- The Stormwater Program has a logo and slogan (Pure Nashville…Right as Rain) that is extensively promoted on program materials such as vehicles, website, etc.

- NPDES staff and the MWS PIO give numerous presentations to educate the general public on what stormwater pollution is and how the public can help to reduce pollution. A list of the presentations provided by NPDES staff are attached in Appendix A. Many of these presentations are also available on the Metro Stormwater website.

- NPDES staff uses government-issued vehicles in performing its functions of sampling, complaint investigation, and construction inspection. In an effort to promote its program and public awareness, the logo and hotline phone number are displayed on the nine NPDES Office fleet vehicles. See Figure 4.10.1.2.

Figure 4.10.1.2 NPDES Truck and Van

- Water Works! is a public education program through the Middle Tennessee State University (MTSU) Center for Environmental Education designed to promote clean water in Tennessee through a series of public service announcements, both video and audio, promoting water quality through responsible action. Water Works! Has been partnering with the Phase I and II MS4 municipalities in Tennessee to complete their required public education mandate. The NPDES Office has been participating in the education campaign throughout cycle 2 of the permit. The NPDES Office contributed to the program in

Permit Year 5 as well. Unfortunately, the Water Works! program ended in March of 2008, however, efforts are ongoing to continue the program. If by chance, the program is not extended through future permit years, the NPDES Office will pursue other broad reaching public education measures to possibly include distributing Water Works! Produced video to the local public access channel (Channel 3), performing mass mailings of stormwater educational materials, etc.

- MWS routinely sends out notices to all properties located in the special flood hazard area, approximately 10,000 properties. The pamphlet, found in Appendix B, is individualized to show a map of the owner's property and floodplain. The pamphlet also includes general information about flood hazard areas, flood insurance, safety, permitting requirements, drainage system maintenance, and illicit discharges.

Inform Homeowner Associations - Detention Pond Maintenance

During this permit cycle, the NPDES Office began a pilot BMP inspection program. The program was initiated to identify compliance issues with detention ponds and the best available methods to bring a site into compliance. It was determined from the pilot inspection program that there are many compliance issues associated with existing detention ponds. In Permit Year 3, the NPDES Office sent over 1,000 flyers to BMP owners that had addresses listed in the BMP database. The flyers notified the property owners that a stormwater BMP was located on their property and gave general inspection and maintenance information. Since Permit Year 3, the NPDES Office has been performing inspections on various BMPs and sending out Notices of Violations to individual owners for BMPs found not to be properly maintained.

Educate Engineering and Development Community – Long Term Water Quality/Construction Water Quality Impacts

The NPDES Office works along with TDEC and the University of Tennessee in presenting the TDEC Erosion Prevention and Sediment Control Training and Certification Workshops in the Nashville area. This class is a foundation-building course open to the public, but intended for all levels of government. The course aims to build a solid working knowledge of erosion and sedimentation processes and the hydrologic cycle. It provides a better understanding of the impact of erosion on Tennessee's natural resources and of Best Management Practices for erosion prevention and sediment control on construction sites. The NPDES Office attends and teaches a section on local stormwater regulations and the grading permit process at each workshop held in the Nashville area.

In addition to NPDES involvement with the TDEC Level 1 workshops, the MWS stormwater department facilitated routine meetings with the development community called the Stormwater Advisory Committee (SWAC). One of the main focuses of the SWAC was to educate developers, private engineers, etc. on the new stormwater management manual regulations that promote green infrastructure and low impact BMP technology.

Oils and Hazardous Materials – Education for the General Public

Nashville operates a household hazardous waste collection facility open seven days a week available to Metro Nashville residents exclusively. The facility is located at the East Center off Trinity Lane. Residents can bring up to 15 gallons or 100 pounds of household hazardous waste each month. There is no fee to drop-off household hazardous waste at the East Convenience Center. In addition, Public Works has provided outreach to the public thorough events, and brochures to educate the public on recycling and waste management. Over the past few years, Public Works has focused on school based recycling education making presentations at elementary schools throughout Nashville.

As mentioned in Section 4.5, the NPDES Office initiated a campaign in Permit Year 2 to educate commercial distributors of herbicides, pesticides, and fertilizers, as well as landscaping companies that routinely apply these chemicals. In Permit Year 3, the NPDES Office began to work on a brochure that will be handed out to each Food Service Establishment (FSE) that will, among other things, explain stormwater impacts of different chemicals used by businesses such as cleaning detergents. Distribution of the brochure to FSEs continued through Permit Years 4 and 5.

Illicit Connections/Discharges – Education for the General Public

The NPDES Office continued the ongoing process of educating the public on reporting spills, illegal dumping, illicit connections, and other water quality problems through several types of media, including the use of the telephone hotline, distributing educational brochures, public service announcements, educational events, etc.

The newest and most prevalent form of public education and notification was developed in Permit Year 1. In 2003, MWS personnel conceived a cartoon character, "Toxic Dude", who is consumer-friendly and approachable. A graphic designer was hired to bring the staff's concept to life. The cartoon includes a sign that mirrors the design of the catch basin markers used on storm drains. "Toxic Dude" is reminded by fish "What You Dump in a Storm Drain Ends Up in My Home!" and encourages readers "Don't Dump On Us!" (See Figure 4.10.1.3). The stormwater website and hotline numbers are included in the graphic for additional information. The toxic dude logo has been used on several public education materials such as bus benches, t-shirts, coffee mugs, etc.

Figure 4.10.1.3 Toxic Dude

In Permit Year 3, the MWS Public Information Officer the "Adopt a Watershed" program, to further increase awareness in the general public on the impacts illicit discharges can have on water quality of streams. The program is going to be watershed-based. The "Adopt a Watershed" program assigns volunteer groups to specific watersheds where they will perform a variety of water quality improvement activities such as inlet stenciling, stream clean-ups, etc. An example stencil is depicted in Figure 4.10.1.4.

Figure 4.10.1.4 Typical Stencil Sign based on Watersheds

The program provides an opportunity for local businesses, watershed associations, civic groups, churches, schools, etc. to volunteer in protecting and enhancing the watershed in which they live. By volunteering to Adopt-A-Stream, each group agrees to at least one cleanup per year of their adopted stream (for a minimum of two years) and to stencil storm drains leading to the section of the adopted stream or creek. Each group is provided a custom sign featuring the adopted watershed and organization. Figure 4.10.1.5 is an example of an "Adopt a Stream" sign.

Figure 4.10.1.5 Adopt A Stream Sign

4.10.2 World Wide Web Site (Part III.B.10.b)
Primary Contact: *Anna Kuoppamaki, MWS, Stormwater Division, Plan Review Section, 615.862.4792*

Metro's Cycle 2 NPDES permit contains references to Metro Public Works as the Department that oversees the NPDES permit implementation. However, in April 2002, the Stormwater Program moved from Metro Public Works to Metro Water Services. The NPDES Office and permit management is now located within the Metro Water Services, Stormwater Division. The website can be found on the World Wide Web at www.nashville.gov/stormwater (see Figure 4.10.2.1). This site contains an enormous amount of information including summaries about the NPDES MS4 program activities, documents pertaining to NPDES requirements, informative articles to educate the public about water quality impacts and preventative measures, and links to many websites that provide further information about water quality friendly activities and programs in Nashville.

In previous permit years the NPDES Office was given the authority to design and make changes to the Metro stormwater web page. Since this time, the NPDES Office has been routinely updating the web site to make sure only the most up to date information is available. In Permit Year 5, the Metro Nashville stormwater web page was visited 78,494 times.

Figure 4.10.2.1 Metro Stormwater Webpage

4.10.3 Future Direction of Element 10 – Public Information and Education

Public Education of Other Elements

Over the next couple of permit years, the NPDES Office, through cooperation with the PIO, looks to significantly boost the public education program. Metro believes that public education plays, perhaps, the largest role in improving the water quality of the Davidson County streams on a long-term basis. The NPDES Office will continue to formulate and distribute educational materials that will promote a better awareness of stormwater pollution prevention within Davidson County. The NPDES Office is also committed to pursuing various other educational mechanisms/opportunities within the community. One particular area that the NPDES Office and PIO will look to enhance the education of Metro school students. NPDES is hopeful that the Davidson County Board of Education will adopt the program to be included as a part of the Davidson County Public Schools science curriculum. It is the intent of the NPDES Office to facilitate similar programs at any of the various private schools in Davidson County that would like to cover such topics.

World Wide Web Site

As new presentations and revisions to the stormwater program are developed, information will be included on the webpage. It is the desire of MWS to keep the development community and the general public up to date with program changes and/or additions.

4.11 Reporting

This section is designed to meet Part III.B.11 of the permit by summarizing program elements and revisions each permit year and by quantitative and qualitative controls assessment when appropriate. Components of this ongoing element include ongoing data collection, data compilation, and submitting the annual report.

4.11.1 Compliance Report (Part III.B.11.a)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

During Permit Year 5, Metro recorded and assessed program activities for the year and compiled the annual compliance report. In addition, many sections of the year 5 annual report include a summary of the complete Cycle 2 activities.

4.11.2 Propose Third Permit Term Cycle Activities (Part III.B.11.b)

Primary Contact: *Michael Hunt, MWS, Stormwater Division, NPDES Office, 615.880.2420*

In the year 4 annual report, the NPDES Office prepared a proposal on its activities for third permit cycle.

4.11.3 Future Direction of Program Element 11 – Reporting

Metro will continue to track pertinent components of its stormwater management program to aid in the development of the annual report. Databases will be maintained and updated as an ongoing effort. Also, Metro will investigate the development of management tools to facilitate more efficient data collection and report generation for future annual reports.

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5.0 Monitoring Programs

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5
			1	2	3	4	5	
A	Ambient – 8 or more in-stream locations Sample each site at least 6 times annually	6X Annually (Bi-monthly)	●	●	●	●	●	
B	Wet Weather – 3 or more in-stream locations Sample each site at least 2 times annually	2X Annually	X	●	X	●	X	One sample event at one location was not obtained in PY 5. Explained in Section 5.1
C	Industrial – Sampling based on inspections	As needed	●	●	●	●	●	
D	Bioassessment – Perform RPB III at 2 designated sites Perform RPB III at 1 or more reference sites	Annually	●	●	●	●	●	
D	Bioassessment – Refine Procedures	PY 1	●					
D	Bioassessment – Perform "quick assessments" as necessary	Annually	●	●	●	●	●	
E	Loadings Estimate – Report EMC changes	PY 5					●	
E	Loadings Estimate – Report annual volume and loading changes	Complete by end of PY 5					●	

5.1 Wet Weather Sampling

With the exception of Sugartree Creek, all three wet weather sampling sites were sampled twice during Permit Year 5. Sugartree Creek was sampled only once due to the lack of supporting wet weather conditions for that watershed. Since one of the sampling events was missed during Permit Year 5, the NPDES Office intends to conduct an additional sampling event for the Sugartree watershed. The following paragraphs give a brief history of the wet weather sampling program.

The NPDES Office developed the wet weather sampling program in the first permit cycle. The sampling program was designed as a wet weather characterization approach that focused on stream monitoring to quantify the status and trends in water quality. The data collected was intended to assist the section in ranking stormwater management program resources and practices, and to establish goals for the waterways. Metro has been directed by the permit to obtain samples from an optimum event, and had been striving to sample events where qualifying amounts occur at selection sites for more useful comparative data analysis. This permit requirement had proven difficult to achieve and produced very few useful sampling results. During Permit Year 3, the NPDES Office was only able to sample one wet weather event on the Ewing Creek Watershed. Due to the weather patterns, the remaining sampling events were not able to be obtained.

During Permit Year 3, the NPDES Office coordinated with TDEC to modify the wet weather sampling program to be more aligned with Metro's newly developed Watershed Water Quality Program. The water quality program will combine intensive sampling with pollutant source tracking, development of partnerships with other stakeholders, and public education to remove streams from the 303(d) list. In Permit Year 4, the NPDES Office received approval to perform the modification. Instead of monitoring the same three streams, twice per year during qualifying rain events, the NPDES Office will continue to obtain wet weather samples at the Sugartree Creek site, but will replace the Ewing and

Sevenmile Creek sites with drainages that flow to "TMDL" streams. The new sample sites are in the Harpeth River Watershed located off General George Patton Road and the Stoners Creek Watershed located off Lebanon Pike. In addition, the modification to the wet weather sampling program is that all three sample sites will not have to be sampled simultaneously during the same rain event. This allows the NPDES Office more flexibility in routing staff during storm events and greatly improves probability that all samples will be collected during the permit year. Trained NPDES staff members perform all sample collection and handling. Analyses are conducted by a contracted lab using EPA approved methods. Figures 5.1.1, 5.1.2, and 5.1.3 are maps, locations, and outfall photographs of the wet weather sample sites.

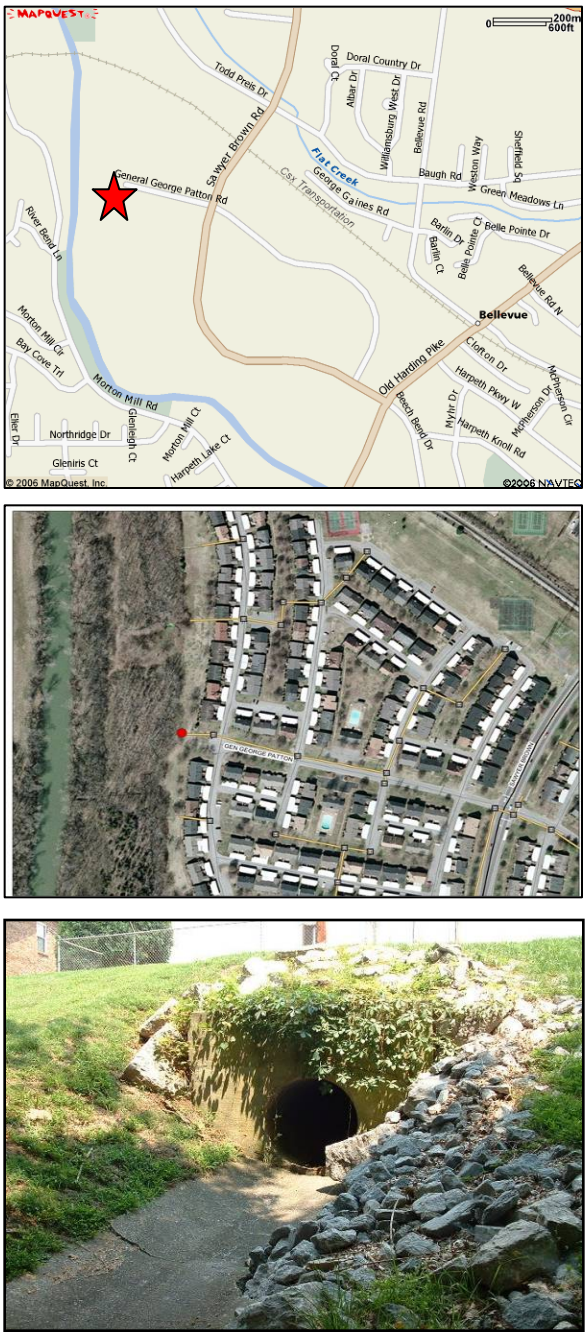

Figure 5.1.1 Harpeth River Wet Weather Monitoring Location

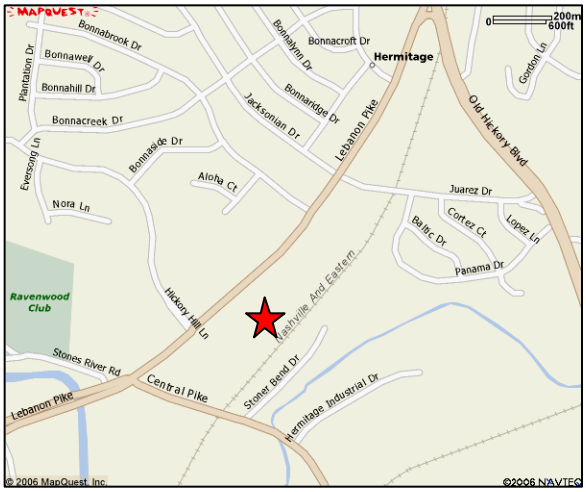

Figure 5.1.2 Stoners Creek Wet Weather Monitoring Location

Figure 5.1.3 Sugartree Creek Wet Weather Sample Site Location

The wet weather monitoring data and other observations are stored in a database illustrated in Figure 5.1.4. Appendix C presents detailed records of the wet-weather sampling activities conducted in Permit Year 5.

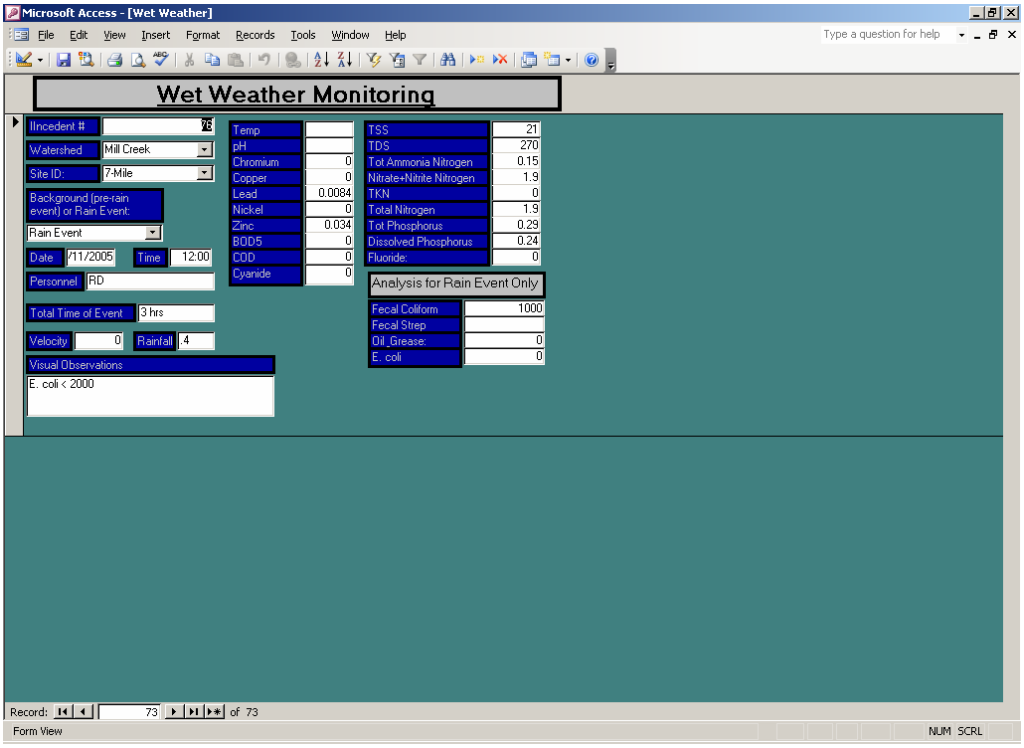

Figure 5.1.4 Wet Weather Monitoring Database

5.2 Total Maximum Daily Load (TMDLs)

During Permit Year 4, NPDES coordinated with TDEC-WPC to discuss TMDLs and the pathogen (*E. coli*) requirements in the Harpeth River watershed (Davidson County). As a result of the meeting, the Watershed Group within the NPDES program was formed to include four dedicated personnel. An approved TMDL pathogen monitoring plan was developed and implemented in Year 5. Specific requirements of the monitoring plan were defined as five flow weighted samples collected within a 30-day period with each individual sample collected more than twelve (12) hours apart. A QA/QC program approved by the state was developed to maintain sample collection and data integrity. The Harpeth and Stones River TMDL designated streams were the first focus of the monitoring plan. In Year 5, the Watershed Group began monthly sampling (five non-flow weighted samples/30 day period) of 303(d) *E. coli* impaired streams in attempt to prevent additional TMDL development in Davidson County.

In 2008, the Watershed Group was successful in removing the following 303(d) streams for *E.coli* impairment:

- Earthman Fork ……..11.0 miles
- Cummings Branch ……..2.6 miles
- Ewing Creek ……..17.6 miles
- Unnamed tributary to Richland Creek…… .1.1 miles
- Mill Creek @ Antioch Pike……..5.9 miles
- Mill Creek @ Concord Road ……8.1 miles
- Dry Fork ……9.9 miles
- Richland Creek @ West End ……...4.0 miles

In April 2008, TDEC-WPC released the EPA approved Lower Cumberland (Cheatham Lake) Watershed TMDL which changed many of the 303d pathogen impaired streams to TMDL designated streams. As a result, the Watershed Group adapted their schedules and sampling methods to comply for upcoming permit years.

Semi-quantitative single habitat (SQSH kick or bank) bioassessments must be conducted on TMDL designated streams impaired for siltation, habitat alteration, and nutrients and must be collected within a 5-year window similar to other TMDL requirements. A biorecon (Reconnaissance/Screening), a more rapid screening tool, will be used to prevent 303d streams which are impaired for siltation, habitat alteration, or nutrients from becoming TMDL streams. Macroinvertebrates must be identified to Genus level for TMDL streams and to Family level for 303d listed streams. In Year 5, the Watershed Group began collecting background data on TMDL and 303d streams using the biorecon method. Future invertebrate collections will occur March through May using appropriate methods.

Both pathogen and siltation/habitat alteration TMDL designated streams require visual stream surveys and impairment inventories. The purpose of the visual stream assessments are not only to isolate sources of contaminants but also to provide MWS a way to prioritize areas that are in need of increased scrutiny and attention. Although several documents have been approved for use by MS4's, MWS adopted the protocols set forth in Maryland's Stream Corridor Assessment Survey. All streams and tributaries impacted by the MS4 or in proximity to water and/or sewer lines will be assessed. Those tributaries not impacted by the MS4 or water/sewer lines will be assessed for potential impacts using GIS images. All field data will be electronically stored and accessible by ArcGIS.

Many of the proposed monitoring measures described above were implemented in Permit Year 5 and will continue through future permit years. The Watershed Group collected 960 pathogen samples, 24 benthic samples, and assessed 63.5 miles of impaired streams during Permit Year 5. The primary monitoring focus for the Watershed Group in Year 5 was assessing streams impaired for E.coli and siltation/habitat alteration. Future work will include monitoring of other EPA/TDEC listed parameters, such as dissolved oxygen, nutrients, and others. Please refer to Appendix C for all listed parameters and a list of 303d and TMDL streams in Davidson County.

5.3 Ambient Monitoring Program

Ambient stream monitoring occurs in three Metro watersheds and includes both grab samples and the measurement of field parameters. In two of the ambient watersheds, samples are collected in the two main upstream tributaries and at a downstream location near the mouth of the stream. The sampling sites in the other ambient watershed are near the mouth of the stream and at a point approximately two-thirds up the stream's length. The ambient sample site locations are described for each watershed below:

- Ewing Creek: North and South tributaries approximately 20 ft. upstream of their confluence accessed through Ewing Lane and the main Ewing Creek branch at the Knight Drive bridge.
- Sugartree Creek: Upstream near the Hobbs Road crossing and downstream under the Kroger on Harding Place.
- Sevenmile Creek: East and West tributaries approximately 20 ft. upstream of their confluence accessed through the Players Club apartment complex and the main Sevenmile Creek branch at the Antioch Pike bridge.

Ambient monitoring is conducted on the first three Wednesdays of even numbered months. Samples are analyzed for the parameters listed in the permit and field measurements of pH, dissolved oxygen, temperature, and conductivity are taken. Ambient analysis is performed by the MWS lab, excluding COD and TKN, which is analyzed by a contracted lab. Ambient monitoring results are entered and stored in the database displayed in Figure 5.3.1. The ambient sampling data for permit year 5 is presented in Appendix C.

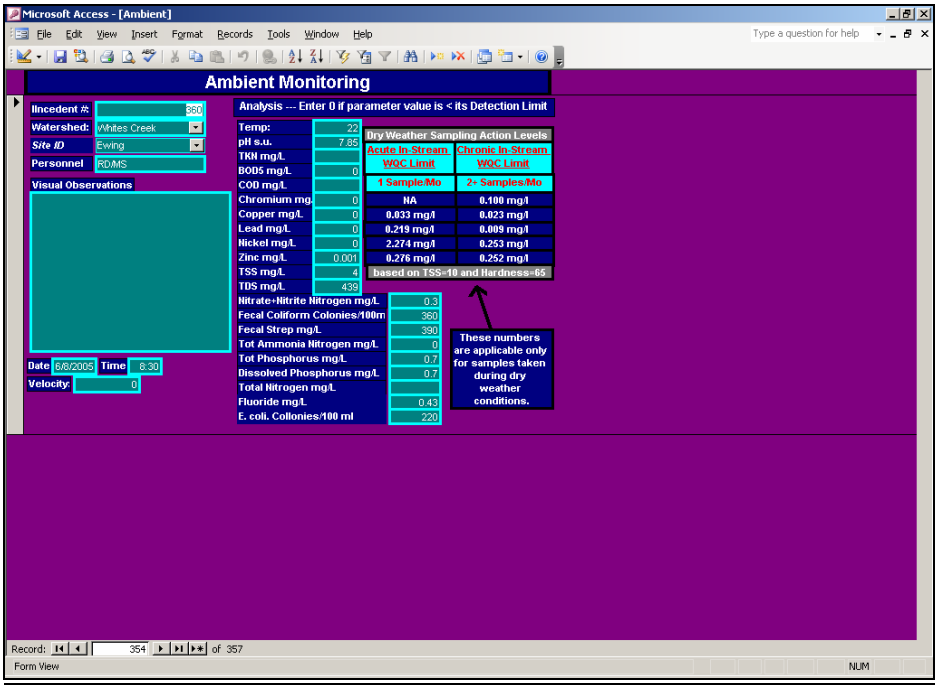

Figure 5.3.1 Ambient Weather Monitoring Database

5.4 Industrial Sampling

In Permit Year 5, the NPDES Office did not perform industrial sampling.

5.5 Biological Assessment

Metro conducted its program of periodic biological assessment of two urban streams and one reference stream during Permit Year 5. Unfortunately due to weather conditions, during the fall of 2007, all of the streams were unable to be assessed due to very dry conditions. Early in April of 1999, the NPDES Office submitted its chosen bioassessment sampling sites and protocols to TDEC. The Director of Water Pollution Control subsequently approved the submittal. The NPDES Office originally chose Sevenmile Creek and Sugartree Creek as the two stream bioassessment locations. These sites were chosen because they allowed the NPDES Office to combine new biological data with sampling data that has been and will be gathered; thus providing a better understanding of the streams' conditions and how activities and situations affect watersheds. Although Sevenmile Creek wasn't actually listed as a currently impacted stream, it was anticipated that it would be designated by TDEC in the 2004 303(d) list. In addition, the "endangered" Nashville Crayfish (*Orconectes shoupi*) are present in Sevenmile Creek, and it was decided that this stream should be monitored carefully and improved to ensure the well-being of the species. Subsequently, in Permit Year 5 of the first permit cycle, the NPDES Office determined that Sugartree did not have the base flow necessary to collect adequate biological data. The NPDES Office consulted with TDEC staff and chose Browns Creek as the second stream for biological assessments. It is anticipated that Browns Creek will maintain the base flow necessary to support biological monitoring and was sampled during the second permit cycle. Whites Creek was designated as the reference stream.

Metro's Standard Operating Procedure (SOP) of the Rapid Bioassessment Protocol (RBP) III, developed in September of 1999, was refined during the first permit cycle. Figures 5.5.1 through 5.5.3 depict samples of stream survey forms that are used in the field.

Stream Survey Information **Storet #**

Stream: Browns Creek
Stream Location:
County Code:(FIPS) ____ Field # ____ Assessors: ____ MS
Major Basin: ____ Date: 05/10/2004
WBID#/HUC: Time: 11:00 AM
WBID Name: ____ Stream mile: ____
Lat/Long Deg: ____ Stream Order: ____
Lat/Long Dec: ____ Reach file: ____
USGS Quad: ____ 3Q20: ____
Drains to: ____ rm ____ rm ____ Elevation (ft): ____
Ecological Subregion: ____
Objectives:

Samples Collected **Meters used:**

Chemicals Y or **N** Life Assessed? **Macroinvertebrates** Fish Algae Other:
Additional List Attached? Yes / **No** Samples Returned? Yes or **No** Sampling Method: ____

Field Analysis:

pH	8.2	SU	Dissolved Oxygen	99.90	%
Conductivity		UMHOS	Time	11:45 AM	
Temperature	17.5	C	Others		

Previous 48 hours Precip: UNKNOWN **NONE** LITTLE MODERATE HEAVY FLOODING
Ambient Weather: SUNNY **CLOUDY** BREEZY RAIN SNOW

Watershed Characteristics **App. % of watershed observed:**

Upstream Surrounding Land Use: (estimated %)

Pasture		Urban	15	Residential	15
Crops		Industry	70	Other	
Forest		Mining			

Impacts: rated S(light), M(oderate), H(igh) magnitude. Blank = not observed

Causes		Sources	
Pesticides (0200)	Habitat Alt. (1600)	Point Source: Indust (0100) **S**	Municipal (2000)
Metals (0500)	Thermal Alt. (1400)	Logging (2000)	Mining (5000)
Ammonia (0600)	Pathogens (1700)	Construction; Land Dev. (3200)	Road/Bridge (3100)
Chlorine (0700)	Oil & Grease (1900)	U/S Dam (8800)	Urban Runoff (3100)
Nutrients (0900) **S**	Unknown (0000)	Riparian Loss (7600)	Bank Destabilization (7700)
pH (1000)	Siltation (1100)	Agriculture: Row Crop (1000)	Intensive Feedlot (1600)
Organic Enrichment / Low D.O. (1200)		Livestock grazing-riparian (1410)	Dredging (7200)
Other:		Other:	

Physical Stream Characteristics **Length of stream area assessed (m):**

Surrounding Land Use (facing downstream):

Estimate %	RDB	LDB		RDB	LDB		RDB	LDB
Pasture			Urban	15	15	Residential		
Crops			Industry	70	70	Other		
Forest	15	15	Mining					

% Canopy Cover: ___80_____ Open (0-10) Partly shaded (11-45) Mostly shaded (46-80) Shaded (>80)
Bank Height (m): ___5_____ High water mark (m): ____
Sediment Deposits: None **Slight** Moderate Excessive Blanket
Type: Sludge Mud **Sand** **Silt** None Other Contaminated Y or N
Turbidity **Clear** Slight Moderate High Opaque
Excessive Algae Present? **None** Slight Moderate Choking
Aquatic Vegetation Rooted Floating Type ____
Additional Comments: (Oil sheen, Odor, Color) Strong Vomit Odor

Physical Stream Characteristics (cont.)

	Riffle	Run	Pool
Depth (m)	3"	8"	18"
Width (m)	3	3	4
Reach Length (m)	40	40	20

Staff Guage/ Bench Ht.
Velocity (CFS)
Flow (CFS)
Habitat Assessment Scor
RR# ____

Gradient (sample reach): Flat Low Moderate High Cascade
Size (stream width): Very Small (<1.5m) Small (1.5-3m) Medium (3-10m) Large (10-25m)

Substrate (%) **(Visual estimates)**

	Riffle	Run	Pool		Riffle
Boulder (>10")	45%	25%	10%	Clay (slick)	1%
Cobble (2.5-10")	20%	25%	15%	Silt	5%
Gravel (0.1-2.5")	15%	15%	5%	Detritus (CPOM)	3%
Bedrock	5%	10%	60%	Muck-Mud (FPOM)	1%
Sand	5%	10%	5%	MARL (shell frag.)	%

Biological Assessment

List Log Numbers of Samples ____

Relative Abundance of Taxa

Dominant (>50): ____
Very Abundant (30-40):
Abundant (10-29):
Common (3-9): ____
Rare (<3): ____

Stream Use Support: **Specifically Classified for:** (circle)

Dom. H2O Supply Ind. H2O Supply Navigation Tier II/ Tier III Trout>> N
Water Withdrawl noted ____
Is stream posted? Fish Tissue Advisory: Do Not Consume Precauti
Bacteriological Advisory

Based on Observations and Data, stream is: (circle)
Fully Supporting (FS) Supporting, but Threatened (TH) Partially Supporting (PS) Nonsup

Comments: Photos **Y** or N Roll # Photo #
8 Crayfish

Stream Sketch

Figure 5.5.1 Sample Stream Survey

HABITAT ASSESSMENT FIELD DATA SHEET -- LOW GRADIENT STREAMS

STREAM NAME Browns		LOCATION	
STATION RIVERMILE		STREAM CLASS	
LAT. LONG.		RIVER BASIN	
STORET #		AGENCY	
INVESTIGATORS			
FORM COMPLETED BY		DATE 5/11/04 TIME 11:00 **AM** PM	REASONS FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat ; lack of habitat is obvious; substrate unstable or lacking.
SCORE 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characteristics	Mixture of substrate materials with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large deep, very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower bank, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 18	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Figure 5.5.2 Sample Habitat Assessment Field Data Sheet (Front)

HABITAT ASSESSMENT FIELD DATA SHEET -- LOW GRADIENT STREAMS

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 19	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank had erosional scars.
Score (LB) 8	Left Bank 10 9	8 7	5 4	2 1 0
Score (RB) 8	Right Bank 10 9	8 7	5 4	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
Score (LB) 7	Left Bank 10 9	8 7	5 4	2 1 0
Score (RB) 7	Right Bank 10 9	8 7	5 4	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
Score (LB) 10	Left Bank 10 9	8 7	5 4	2 1 0
Score (RB) 7	Right Bank 10 9	8 7	5 4	2 1 0

Total Score= 144

Figure 5.5.3 Sample Habitat Assessment Field Data Sheet (Back)

Reference Stream	Whites 5/11/04
Test Stream	7-Mile
Date	05/11/2004

Special Notes - Do not use "0"s when enteri
You must enter DIC's
You must enter habitat scor

Phylum / Class / Order / Suborder	Tolerance Value	Functional Feeding Group	Reference Stream Abundance	Test Stream Abundance
Taxa	(TV)	(FFG)	(a)	(b)
Platyhelminthes				
Turbellaria				
Planariidae	6.1	2		2
Annelida				
Oligochaeta				
Lumbriculidae	7.03	7	1	4
Naididae	6.10	4		
Mollusca				
Gastropoda				
Ancylidae	7.02	4		
Physidae	8.80	4		
Planorbidae	6.30	4		
Pleuroceridae	3.40	4	17	11
Pelecypoda				
Corbiculidae	6.10	2		
Sphaeriidae	6.60	2		
Arthropoda				
Crustacea				
Amphipoda				
Gammaridae	6.60			
Crangonyx	7.87	3		2
Gammarus	9.10	3		
Hyalellidae				
Hyallela	7.75	3		
Decapoda				
	7.50	6	1	9
Isopoda				
Asellidae				
Asellus	9.11	3		
Lirceus	7.85	3	58	7
Arachnoidea				
Hydracarina	5.53	5		
Insecta				
Ephemoroptera				
Baetidae	6.10	3	49	102
Caenidae				
Caenis	7.41	3		
Ephemeridae				
Hexagenia	4.90	3		
Ephemerellidae				
Eurylophella	4.34	3	1	
Serratella	1.57	3		
Heptageniidae				
Stenacron	3.58	4		

Reference Site =	a
Test Site =	b
Ttl. Organisms - a	202
Ttl. Organisms - b	200
Taxa Richness - a	16
Taxa Richness - b	14

Comparitive Taxa Richness	%	88
North Carolina Biotic Index Comparitive NCBI	%	104
Functional Feeding Group % Similarity - FFGPS	%	79
Indicator Assemblage Index (IAI)		0.67
Dominants in Common		2
Percent EPT Index	%	43
Community Loss Index		0.50

Metric	Scoring Criteria			
	6	4	2	0
1. Taxa Richness	6	----	----	----
2. NCBI	6	----	----	----
3. FFGPS	----	4	----	----
4. IAI	----	4	----	----
5. DIC	----	----	2	----
6. EPT Index	----	----	----	0
7. CLI	6	----	----	----

BIOLOGICAL CONDITION		0.67
Habitat Percent Comparibility	%	78

NCBI= $\Sigma \frac{xi\ ti}{n}$

NCBI=	
Ref. 5.98	Test 5.77

Calculation Column tv*a/n	Calculation Column tv*b/n
0.00	0.06
0.00	0.00
0.00	0.00
0.00	0.00
0.03	0.14
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.29	0.19
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.04	0.34
0.00	0.00
0.00	0.00
0.00	0.00
2.25	0.27
0.00	0.00
0.00	0.00
1.48	3.11
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.02	0.00
0.00	0.00
0.00	0.00
0.00	0.00

Comparitive Biotic Index =
NCBI sample a x 100
NCBI sample b

$S_{ab} = \Sigma$ min (P_{ia}, P

Number of Individu in each FFG

FFG	# A
0	0
1	1
2	37
3	117
4	32
5	9
6	1
7	1

Relative Abundance Each FFG (%)

FFG	# A / P_{ia}
0	0.000
1	0.005
2	0.183
3	0.579
4	0.158
5	0.045
6	0.005
7	0.005

Min (P_{ia}, P_{ib})

0	0.000
1	0.000
2	0.075
3	0.555
4	0.135
5	0.010
6	0.005
7	0.005

QSI / Sab =	0.79
FFGPS =	79

Figure 5.5.4 Example Biological Assessment Calculation Sheet
(Note: this presents only a portion of the assessment datasheet)

Figure 5.4.5 depicts typical photographs of Whites Creek, the reference stream, which was assessed in fall and spring of the permit year.

Figure 5.5.5 Whites Creek (Reference Stream) Bioassessment

Table 5.1 summarizes the bioassessment findings for both the reference stream and the test streams. This data is derived through biometric calculations generated through procedures outlined in Tennessee's Biological Standard Operating Procedure Manual.

Table 5.1 Bioassessment Findings

Date	Test Stream	Reference Stream	Biological Score %
5/4/2000	Whites Creek		---
11/20/2000	Whites Creek	"too dry, not done"	---
5/11/2001	Whites Creek	Whites 5/4/00	76
10/10/2001	Whites Creek	Whites 5/11/01	86
6/4/2002	Whites Creek	Whites 5/11/01	76
10/28/2002	Whites Creek	Whites 10/10/01	71
5/13/2003	Whites Creek	Whites 6/4/02	71
10/22/2003	Whites Creek	Whites 10/21/02	76
5/11/2004	Whites Creek	Whites 5/13/03	67
10/15/2004	Whites Creek	Whites 10/22/03	67
5/11/2005	Whites Creek	Whites 5/11/04	81
10/18/2005	Whites Creek	Whites 10/15/04	90
5/16/2006	Whites Creek	Whites 5/11/05	62
10/18/2006	Whites Creek	Whites 10/18/05	81
5/8/2007	Whites Creek	Whites 5/16/06	86
10/15/2007	Whites Creek	Season Too Dry - Assessment Not done	
5/3/2000	Sevenmile	Whites 5/4/00	52
11/20/2000	Sevenmile	"too dry, not done"	---
5/7/2001	Sevenmile	Whites 5/11/01	90
10/9/2001	Sevenmile	Whites 10/10/01	57
5/3/2002	Sevenmile	Whites 6/4/02	52
10/21/2002	Sevenmile	Whites 10/21/02	52
5/13/2003	Sevenmile	Whites 5/13/03	57
10/21/2003	Sevenmile	Whites 10/22/03	52
5/11/2004	Sevenmile	Whites 5/11/04	67
10/14/2004	Sevenmile	Whites 10/15/04	86
5/10/2005	Sevenmile	Whites 5/11/05	62
10/17/2005	Sevenmile	Whites 10/18/05	76
5/15/2006	Sevenmile	Whites 5/16/06	76
10/17/2006	Sevenmile	Whites 10/18/06	78
5/9/2007	Sevenmile	Whites 5/8/07	62
10/15/2007	Sevenmile	Season Too Dry - Assessment Not done	
5/19/2008	Sevenmile	Whites 5/19/08	81
5/29/2001	Browns	Whites 5/11/01	52
10/9/2001	Browns	Whites 10/10/01	38
5/30/2002	Browns	Whites 6/4/02	48
10/23/2002	Browns	Whites 10/21/02	33
5/13/2003	Browns	Whites 5/13/03	29
10/23/2003	Browns	Whites 10/22/03	38

Date	Test Stream	Reference Stream	Biological Score %
5/10/2004	Browns	Whites 5/11/04	24
10/13/2004	Browns	Whites 10/15/04	62
5/11/2005	Browns	Whites 5/11/05	33
10/17/2005	Browns	Not done-severe illicit discharge made conditions hazardous to health	
5/15/2006	Browns	Whites 5/16/06	43
10/17/2006	Browns	Whites 10/18/06	67
5/9/2007	Browns	Whites 5/8/07	52
10/15/2007	Season Too Dry - Assessment Not done		
5/19/08	Browns	Whites 5/19/08	43
Spring 2000	Sugartree	Whites 5/4/00	24
Fall 2000	Sugartree	"too dry, not done"	---

5.6 Loading Estimates

In Permit Year 5, Metro is responsible for reporting the Event Mean Concentrations (EMC) of a representative storm event and how they were derived, estimated seasonal pollutant loading calculations for the entire MS4 area, and total runoff volume. During Permit Year 3, the NPDES Office began to evaluate the method for determining the appropriate EMC to use for each pollutant load calculation. The original goal was to be able to derive EMC loading numbers for each parameter from wet weather sampling data. Unfortunately, in analysis of our wet weather data, it was determined that our Cycle 2 sampling data could not be used for the calculation. This is in large part due to the changing of wet weather sampling sites from receiving streams to outfall points. In addition, weather patterns of the last couple of years have prevented the NPDES Office from obtaining all of the desired wet weather sampling events, thus resulting in a sample size that is much too small to use for such a purpose.

Since EMC values can not be obtained from Nashville's MS4 wet weather sampling data, the NPDES Office decided to use values derived from other Phase 1 MS4 cities. The NPDES Office found the best source of EMC values to be in the study titled "Evaluation of NPDES Phase 1 Municipal Stormwater Monitoring Data" conducted by the University of Alabama and the Center of Watershed Protection. This study, which was funded by an EPA Office of Water grant in 2001 summarizes the mean values of wet weather sampling results for a period of ten years from over 200 municipalities. The NPDES Office used the reported mean values of all of the MS4 sampling programs as the EMCs for each biological and chemical parameter as listed per certain major land use categories. For land use categories or chemical parameters where results were not listed within the study, the EMC values used in Metro's Cycle 1 calculation, were used in this cycle's calculation. Refer to Table 5.6.5 for a breakdown of EMC values used in the loading calculation.

Due to employee turnover, most of the staff present during Permit Cycle 1 are no longer with the NPDES Office, which has made it difficult to perform the Cycle 2 loading calculations in the same manner. For the cycle 1 calculations, the NPDES Office used a model derived by a consultant to calculate the loadings. The impervious area acres per each watershed were estimated from land use types per each watershed. Since the first permit cycle, Metro's GIS technology has progressed to a point that imperviousness can be much more accurately calculated using GIS coverages. For cycle 2 calculations, the NPDES Office extracted imperviousness coverage (i.e. paved roadways, building footprints, sidewalks, parking lots, and greenway trails) from each watershed to calculate the percent impervious. As a result, a much more accurate estimate of imperviousness for each watershed was obtained, which was not obtained for the cycle 1 calculation and, therefore, a comparison between Cycle 1 and Cycle 2 values are not applicable.

For the 2nd permit cycle the NPDES Office decided to use the widely accepted "Simple Method" to perform the loading estimate. The NPDES Office obtained an explanation on how to use the "Simple Method" calculation from the Stormwater Center website at: http://www.stormwatercenter.net/monitoring%20and%20assessment/simple%20meth/simple.htm. The "Simple Method" calculates the loading estimates based on land use types, percent imperviousness, and annual rainfall, which are respectively summarized in Tables 4.6.1, 4.6.2, and 4.6.3. Using the "Simple Method" a few steps in the calculation are required. The first step is to calculate the annual runoff in each watershed. The calculation for each watershed is depicted in Table 5.6.4. The following equation was used in the annual runoff calculation:

$$R = P * P_j * R_v$$

Where:
P = Annual rainfall (inches);
P_j = Fraction of annual rainfall events producing runoff (assumed to be 0.9); and
R_v = Runoff coefficient.

The runoff coefficient is calculated using the following equation:

$$R_v = 0.05 + 0.9(I_a)$$

Where:
I_a = Percent Impervious

Once the annual runoff (inches) was calculated, the loading calculations for each watershed were performed. For chemical pollutant parameters, the following equation was used:

$$L = 0.226 * R * C * A$$

Where:
0.226 = Unit conversion factor
L = Annual load (pounds)
R = Annual runoff (inches)
C = Pollutant concentration (Event Mean Concentrations) (mg/l)
A = Watershed land area (acres)

For the biological pollutant load calculation, the following equation was used:

$$L = 0.00103 * R * C * A$$

Where:
L = Annual load (billion colonies)
0.00103 = Unit conversion factor
R = Annual runoff (inches)
C = Pollutant concentration (Event Mean Concentration) (colonies/100ml)
A = Watershed land area (acres)

The NPDES Office performed the loading calculations on the following pollutants:

- Fecal coliform
- Total Suspended Solids (TSS)
- Total Dissolved Solids (TDS)
- Total Phosphorus (TP)
- Dissolved Phosphorus (DP)
- NO_2/NO_3 Nitrogen
- Chemical Oxygen Demand (COD)
- Biological Oxygen Demand ($BOD^{(5)}$)
- Zinc (Zn)
- Lead (Pb)
- Cadmium (Cd)
- Copper (Cu)
- Total Kjeldahl Nitrogen (TKN)

The results for the pollutant loading calculations for each watershed are summarized in Tables 5.6.6 and 5.6.7. Please note the results of this calculation do not account for the more than 1,900 BMPs such as detention ponds and underground water quality filtration units that site developments have been required to install since the advent of Metro's stormwater regulations. Until Metro can factor the BMP pollutant load reduction into the equation, or use the wet weather sampling data to derive the EMC values, a true assessment of the MS4 stormwater management program can not be performed.

Table 5.6.1 Imperviousness per Watershed

Watershed	Building Footprint (Acres)	Paved Parking Lot (Acres)	Unpaved Parking Lot (Acres)	Paved Roadway (Acres)	Unpaved Roadway (Acres)	Unpaved Roadways Considered to be Impervious (50% of total area) (Acres)	Sidewalk (Acres)	Greenway (Acres)	Surface Water (Acres)	Total Impervious Area (Acres)	Total Watershed Area (Acres)	Total Watershed Land Area (Acres)	Percent Impervious Per Watershed
Back Creek	3.55	0	0	14.88	0	0	0	0	24.64	18.43	1,620.26	1,595.62	**1.16%**
Browns Creek	826.67	971.03	137.11	668.97	18.30	9.15	24.58	6.79	42.67	2,644.30	8,847.37	8,804.70	**30.03%**
Bull Run Creek	9.21	0	0	32.86	5.62	2.81	0	0	39.05	44.88	2,952.05	2,913.00	**1.54%**
Cooper Creek	233.12	73.12	8.33	173.41	0.29	0.145	8.62	7.65	17.74	504.40	2,373.63	2,355.89	**21.41%**
Cub Creek	4.76	0.52	0	16.88	0	0	0	0	23.87	22.16	1,605.16	1,581.29	**1.40%**
Cumberland River	2,353.56	2,109.86	386.66	2,172.48	188.73	94.37	209.48	19.84	4,905.00	7,346.25	51,093.76	46,188.76	**15.90%**
Davidson Branch	114.25	58.36	0.51	125.92	0.85	0.425	0.93	9.08	15.56	309.48	2,391.79	2,376.23	**13.02%**
Dry Creek	283.30	210.43	42.36	267.22	16.96	8.48	3.81	6.75	39.58	822.35	5,635.37	5,595.79	**14.70%**
Ewing Creek	373.61	287.46	37.43	521.34	14.43	7.215	10.20	23.18	110.01	1,260.44	9,003.38	8,893.37	**14.17%**
Gibson Creek	265.27	255.27	16.18	213.19	0.60	0.30	11.57	5.29	12.89	767.07	2,749.19	2,736.30	**28.03%**
Gizzard Branch	138.65	246.68	0.30	101.41	1.89	0.945	2.54	3.91	18.93	494.44	1,466.61	1,447.68	**34.15%**
Harpeth River	622.06	307.02	4.34	676.39	27.49	13.75	23.67	8.17	369.88	1,655.40	18,170.91	17,801.03	**9.30%**
Indian Creek	10.25	0.83	0	30.92	2.96	1.48	0	0	80.17	43.48	3,929.99	3,849.82	**1.13%**
Island Creek	0.61	0	0	9.77	0	0	0	2.89	6.36	13.27	516.92	510.56	**2.60%**
Little Harpeth River	189.23	74.09	1.37	278.78	56.79	28.40	3.71	4.41	139.94	579.98	8,889.23	8,749.29	**6.63%**
Loves Branch	95.90	64.16	0.75	131.38	14.7	7.35	1.82	5.29	16.80	306.65	1,457.59	1,440.79	**21.28%**
Marrowbone Creek	67.06	16.13	4.72	171.24	10.68	5.34	0	0	253.98	264.49	12,182.46	11,928.48	**2.22%**
Mansker Creek	300.76	290.70	8.79	422.47	16.37	8.185	6.93	32.36	191.78	1,070.20	13,075.79	12,884.01	**8.31%**
Mill Creek Lower	1734.00	1969.56	112.70	1399.78	49.72	24.86	37.04	22.58	256.28	5,300.52	13,376.47	13,120.19	**40.40%**
Mill Creek Upper	489.66	337.17	9.79	533.42	11.94	5.97	26.03	25.6	198.68	1,427.64	14,479.56	14,280.88	**10.00%**
Overall Creek	87.76	65.93	6.73	168.20	10.68	5.34	1.92	7.86	59.62	343.74	4,950.36	4,890.74	**7.03%**
Pages Branch	142.80	122.44	92.95	156.61	15.1	7.55	7.54	2.52	14.20	532.41	2,068.73	2,054.53	**25.91%**
Percy Priest Lake, Lower	352.62	356.66	41.93	310.52	11.09	5.545	9.97	18.26	2,319.63	1,095.51	13,376.47	11,056.84	**9.91%**
Percy Priest Lake, Upper	531.95	238.71	9.62	501.26	37.85	18.925	15.35	2.09	7,122.69	1,317.91	19,575.01	12,452.32	**10.58%**
Pond Creek	3.27	0	0.41	9.25	2.88	1.44	0	0	19.17	14.37	1,688.32	1,669.15	**0.86%**
Richland Creek	1109.39	595.24	67.22	984.18	52.6	26.30	39.85	7.05	111.10	2,829.23	14,680.11	14,569.01	**19.42%**
Sevenmile Creek	959.38	643.34	25.04	793.74	8.10	4.05	28.08	3.51	97.30	2,457.14	10,962.35	10,865.05	**22.62%**
South Harpeth River, Lower	33.07	2.04	2.35	122.63	33.91	16.955	0	0	180.10	177.05	9,256.78	9,076.68	**1.95%**
Stoner Creek	494.48	351.59	38.02	501.52	6.81	3.405	17.17	9.74	85.12	1,415.93	7,543.58	7,458.46	**18.98%**
Stones River	370.52	463.40	43.00	435.98	19.79	9.895	12.22	20.10	262.27	1,355.12	9,258.64	8,996.37	**15.06%**
Sugartree Creek	315.25	171.34	0	203.72	2.62	1.31	6.88	0	16.09	698.50	3,030.72	3,014.63	**23.17%**
Sulpher Creek	19.92	3.81	0	79.59	4.5	2.25	0	0.43	58.08	106.00	3,839.61	3,781.53	**2.80%**
Sycamore Creek	98.91	37.56	1.77	279.05	17.34	8.67	0.10	13.16	224.81	439.22	13,066.82	12,842.01	**3.42%**
Whites Creek	478.75	194.27	68.69	809.71	37.3	18.65	6.01	38.7	489.76	1,614.78	31,738.54	31,248.78	**5.17%**
Overall County	**14,524.74**	**11,594**	**1,297.87**	**14,389.09**	**795.1**	**397.55**	**764.01**	**389.41**	**18,012**	**43,356.76**	**329,224.00**	**311,212.00**	**13.93%**

Note: This calculation was performed by extracting GIS coverages of known impervious areas (roads, buildings, sidewalks, etc.). Impervious areas not captured in GIS would not be covered in this calculation. For calculation purposes, approximately 50% of the unpaved roads (gravel) were considered to be impervious. Impervious calculations were not performed on the Combined Sewer System drainage areas.

Table 5.6.2 Percent Major Land Use Categories per Watershed

Watershed	Percent Commercial	Percent Industrial	Percent Residential	Percent Open Space/Natural/Misc.	Percent Transportation	Total Watershed Land Area (Acres)	Estimated Commercial Land Area (Acres)	Estimated Industrial Land Area (Acres)	Estimated Residential Land Area (Acres)	Estimated Open Space/Natural Land Area (Acres)	Estimated Transportation Land Area (Acres)
Back Creek	0.00%	0.00%	89.22%	9.87%	0.92%	1,595.62	0.00	0.00	1,423.61	157.49	14.68
Browns Creek	9.75%	8.94%	49.08%	24.20%	8.03%	8,804.70	858.46	787.14	4,321.35	2,130.74	707.02
Bull Run Creek	0.02%	0.00%	44.04%	54.64%	1.30%	2,913.00	0.58	0.00	1,282.89	1,591.66	37.87
Cooper Creek	8.38%	1.27%	65.22%	17.81%	7.32%	2,355.89	197.42	29.92	1,536.51	419.58	172.45
Cub Creek	0.61%	0.00%	74.83%	23.51%	1.05%	1,581.29	9.65	0.00	1,183.28	371.76	16.60
Cumberland River (Overall)	13.31%	5.17%	38.39%	37.19%	5.93%	46,188.76	6,147.72	2,387.96	17,731.86	17,177.60	2,738.99
Davidson Branch	5.58%	0.92%	72.87%	15.33%	5.30%	2,376.23	132.59	21.86	1,731.56	364.28	125.94
Dry Creek	5.54%	4.91%	52.88%	31.58%	5.09%	5,595.79	310.01	274.75	2,959.05	1,767.15	284.83
Ewing Creek	7.41%	4.97%	44.22%	37.45%	5.95%	8,893.37	659.00	442.00	3,932.65	3,330.57	529.16
Gibson Creek	14.78%	1.07%	60.37%	16.00%	7.78%	2,736.30	404.43	29.28	1,651.90	437.81	212.88
Gizzard Branch	31.23%	1.69%	35.53%	24.52%	7.04%	1,447.68	452.11	24.47	514.36	354.97	101.92
Harpeth River	3.33%	0.05%	45.58%	47.16%	3.87%	17,801.03	592.77	8.90	8,113.71	8,394.97	688.90
Indian Creek	1.01%	0.00%	56.95%	41.18%	0.86%	3,849.82	38.88	0.00	2,192.47	1,585.36	33.11
Island Creek	0.00%	0.00%	29.22%	68.89%	1.89%	510.56	0.00	0.00	149.19	351.72	9.65
Little Harpeth	5.77%	0.07%	45.37%	45.01%	3.78%	8,749.29	504.83	6.12	3,969.55	3,938.06	330.72
Loves Branch	6.97%	0.49%	49.22%	33.30%	10.02%	1,440.79	100.42	7.06	709.16	479.78	144.37
Marrowbone Creek	0.69%	0.14%	45.74%	51.93%	1.49%	11,928.48	82.31	16.70	5,456.09	6,194.46	177.73
Mansker Creek	3.26%	1.76%	59.22%	32.41%	3.36%	12,884.01	420.02	226.76	7,629.91	4,175.71	432.90
Mill Creek Lower	19.81%	9.29%	40.70%	23.00%	7.21%	13,120.19	2,599.11	1,218.87	5,339.92	3,017.64	945.97
Mill Creek Upper	5.70%	1.10%	47.81%	41.62%	3.77%	14,280.88	814.01	157.09	6,827.69	5,943.70	538.39
Overall Creek	5.48%	4.76%	52.33%	33.79%	3.64%	4,890.74	268.01	232.80	2,559.32	1,652.58	178.02
Pages Branch	17.58%	6.64%	34.17%	33.31%	8.30%	2,054.53	361.19	136.42	702.03	684.36	170.53
Percy Priest Lake Lower	2.90%	6.14%	24.48%	64.07%	2.40%	11,056.84	320.65	678.89	2,706.71	7,084.12	265.36
Percy Priest Lake Upper	1.92%	0.12%	22.81%	72.39%	2.75%	12,452.32	239.08	14.94	2,840.37	9,014.23	342.44
Pond Creek	0.09%	0.00%	62.81%	36.38%	0.72%	1,669.15	1.50	0.00	1,048.39	607.24	12.02
Richland Creek	10.89%	2.89%	56.41%	22.60%	7.22%	14,569.01	1,586.57	421.04	8,218.38	3,292.60	1,051.88
Sevenmile Creek	10.19%	1.47%	60.35%	20.67%	7.31%	10,865.05	1,107.15	159.72	6,557.06	2,245.81	794.24
South Harpeth River Lower	0.59%	0.00%	46.34%	51.38%	1.69%	9,076.68	53.55	0.00	4,206.13	4,663.60	153.40
Stoners Creek	10.34%	3.17%	54.24%	25.52%	6.74%	7,458.46	771.20	236.43	4,045.47	1,903.40	502.70
Stones River	32.81%	1.23%	30.94%	30.09%	4.92%	8,996.37	2,951.71	110.66	2,783.48	2,707.01	442.62
Sugartree Creek	8.97%	0.03%	65.58%	18.61%	6.81%	3,014.63	270.41	0.90	1,976.99	561.02	205.30
Sulpher Creek	0.50%	0.11%	56.96%	40.24%	2.19%	3,781.53	18.91	4.16	2,153.96	1,521.69	82.82
Sycamore Creek	0.75%	0.01%	59.08%	37.89%	2.27%	12,842.01	96.32	1.28	7,587.06	4,865.84	291.51
Whites Creek	3.07%	0.56%	19.97%	73.72%	2.67%	31,248.78	959.34	174.99	6,240.38	23,036.60	834.34

Note: There are a variety of land uses within Davidson County. In order to determine the major categories, the NPDES used GIS to lump a majority of the diverse land uses into one of the five major categories. The percentages were estimated based on total watershed area. Using the estimated percentages, the land use acres were calculated from the total watershed land area. The Open Space/Natural/Misc. includes park land, rural residential, agriculture, undeveloped land, etc.

In performing the runoff volume the NPDES Office obtained Nashville's Permit Year 5 rainfall amounts from the National Weather Service website. Please note that the runoff calculations reported in the Permit Year 4 Annual Report were found to be incorrect. The total annual runoff estimates for each watershed is illustrated in Table 5.6.4.

Table 5.6.3 Monthly Rainfall Totals for Nashville, Davidson County

Month	Rainfall Data (inches)
July-07	1.47
August-07	1.38
September-07	1.99
October-07	4.95
November-07	6.20
December-07	3.83
January-08	4.76
February-08	2.53
March-08	5.56
April-08	7.20
May-08	5.54
June-08	2.21
Total	**47.62**
Average Total	**3.97**

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Table 5.6.4 Annual Runoff Estimates ($R = P * P_j * Rv$)

Watershed	(P) Rainfall Total (in.)	(Pj) Fraction of Rain Events Producing Runoff	(Ia) Percent Impervious per Watershed	(Rv) Runoff Coefficient (Rv= 0.05+0.9Ia)	Annual Runoff (in.)	Annual Runoff (ft)	Total Watershed Land Area (acres)	Total Watershed Land Area (ft^2)	Estimated Total Runoff Volume (ft^3)
Back Creek	47.62	0.9	1.16	0.06	2.57	0.01	1,595.62	69,505,207.2	695,052.07
Browns Creek	47.62	0.9	30.03	0.32	13.71	0.03	8,804.70	383,532,732	11,505,981.96
Bull Run Creek	47.62	0.9	1.54	0.06	2.57	0.01	2,913.00	126,890,280	1,268,902.8
Cooper Creek	47.62	0.9	21.41	0.24	10.29	0.02	2,355.89	102,622,568.4	2,052,451.37
Cub Creek	47.62	0.9	1.40	0.06	2.57	0.01	1,581.29	68,880,992.4	688,809.92
Cumberland River	47.62	0.9	15.90	0.19	8.14	0.02	46,188.76	2,011,982,385.6	40,239,647.71
Davidson Branch	47.62	0.9	13.02	0.17	7.29	0.01	2,376.23	103,508,578.8	1,035,085.79
Dry Creek	47.62	0.9	14.70	0.18	7.71	0.02	5,595.79	243,752,612.4	4,875,052.25
Ewing Creek	47.62	0.9	14.17	0.18	7.71	0.02	8,893.37	387,395,197.2	7,747,903.94
Gibson Creek	47.62	0.9	28.03	0.3	12.86	0.03	2,736.30	119,193,228	3,575,796.84
Gizzard Branch	47.62	0.9	34.15	0.36	15.43	0.03	1,447.68	63,060,940.8	1,891,828.22
Harpeth River	47.62	0.9	9.30	0.13	5.57	0.01	17,801.03	775,412,866.8	7,754,128.67
Indian Creek	47.62	0.9	1.13	0.06	2.57	0.01	3,849.82	167,698,159.2	1,676,981.59
Island Creek	47.62	0.9	2.60	0.07	3	0.01	510.56	22,239,993.6	222,399.9
Little Harpeth River	47.62	0.9	6.63	0.11	4.71	0.01	8,749.29	381,119,072.4	3,811,190.72
Loves Branch	47.62	0.9	21.28	0.24	10.29	0.02	1,440.79	62,760,812.4	1,255,216.25
Marrowbone Creek	47.62	0.9	2.22	0.07	3	0.01	11,928.48	519,604,588.8	5,196,045.89
Mansker Creek	47.62	0.9	8.31	0.12	5.14	0.01	12,884.01	561,227,475.6	5,612,274.76
Mill Creek Lower	47.62	0.9	40.40	0.41	17.57	0.03	13,120.19	571,515,476.4	17,145,464.29
Mill Creek Upper	47.62	0.9	10.00	0.14	6	0.01	14,280.88	622,075,132.8	6,220,751.33
Overall Creek	47.62	0.9	7.03	0.11	4.71	0.01	4,890.74	213,040,634.4	2,130,406.34
Pages Branch	47.62	0.9	25.91	0.28	12	0.02	2,054.53	89,495,326.8	1,789,906.54
Percy Priest Lake, Lower	47.62	0.9	9.91	0.14	6	0.01	11,056.84	481,635,950.4	4,816,359.5
Percy Priest Lake, Upper	47.62	0.9	10.58	0.15	6.43	0.01	12,452.32	542,423,059.2	5,424,230.59
Pond Creek	47.62	0.9	0.86	0.06	2.57	0.01	1,669.15	72,708,174	727,081.74
Richland Creek	47.62	0.9	19.42	0.22	9.43	0.02	14,569.01	634,626,075.6	12,692,521.51
Sevenmile Creek	47.62	0.9	22.62	0.25	10.71	0.02	10,865.05	473,281,578	9,465,631.56
South Harpeth River, Lower	47.62	0.9	1.95	0.07	3	0.01	9,076.68	395,380,180.8	3,953,801.81
Stoner Creek	47.62	0.9	18.98	0.22	9.43	0.02	7,458.46	324,890,517.6	6,497,810.35
Stones River	47.62	0.9	15.06	0.19	8.14	0.02	8,996.37	391,881,877.2	7,837,637.54
Sugartree Creek	47.62	0.9	23.17	0.26	11.14	0.02	3,014.63	131,317,282.8	2,626,345.66
Sulpher Creek	47.62	0.9	2.80	0.08	3.43	0.01	3,781.53	164,723,446.8	1,647,234.47
Sycamore Creek	47.62	0.9	3.42	0.08	3.43	0.01	12,842.01	559,397,955.6	5,593,979.56
Whites Creek	47.62	0.9	5.17	0.1	4.29	0.01	31,248.78	1,361,196,856.8	13,611,968.57
Overall County	47.62	0.9	13.93	0.18	**7.71**	**0.02**	**311,212.00**	13,556,394,720	271,127,894.4

Annual Rainfall, P, is the total rainfall (inches). The runoff coefficient, R_v=0.05 + 0.9(Ia) where "Ia" is the impervious fraction (see Table 5.6.1). Conversion factors: 1 acre = 43,560 ft^2.

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Table 5.6.5 Event Mean Concentrations (C) of Pollutants by Analyzed Land Uses

Land Use	Fecal coliform	TSS	TDS	Total Phosphorus	Dissolved Phosphorus[1]	NO2/NO3 Nitrogen	COD	BOD(5)	Zinc	Lead	Cadmium	Copper	TKN
Industrial	2400[1]	90[1]	84[1]	.27[1]	0.17[2]	0.75[1]	61[1]	9[1]	.220[1]	.0237[1]	.0019[1]	.0218[1]	.0014[1]
Commercial	3000[1]	48[1]	74[1]	.23[1]	0.17[2]	0.62[1]	60[1]	12[1]	.150[1]	.017[1]	.0009[1]	.015[1]	.0016[1]
Residential	7750[1]	50[1]	69[1]	.31[1]	0.29[2]	0.58[1]	55.5[1]	9.05[1]	.073[1]	.012[1]	.0005[1]	.0111[1]	.00142[1]
Open Area/Vacant Land/Misc.[1]	5000[1]	72.3[2]	134[2]	.33[2]	0.14[2]	0.85[2]	71.6[2]	25.4[2]	.033[2]	.020[2]	.001[2]	.007[2]	.0010[2]
Transportation	1700[1]	99[1]	77.5[1]	0.25[1]	1.93[2]	0.28[1]	100[1]	8[1]	.200[1]	.0275[1]	.001[1]	.035[1]	.002[1]

Note: The Event Mean Concentrations for each land use were obtained from three sources: (1) The median values from a study conducted by the University of Alabama and the Center of Watershed Protection, which was titled "Evaluation of NPDES Phase I Municipal Stormwater Monitoring Data. (2) The Event Mean Concentrations used for the calculations for the end of the 1st permit cycle which were derived from the Nashville MS4 Wet Weather sampling program. The Fecal coliform number for Open Area/Vacant land is Medium value of all land uses from source 1.

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Table 5.6.6 Seasonal Loading Estimates for Chemical Parameters

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Back Creek																												
Industrial	2.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	2.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,423.61	29,205.39	41,343.06	57,053.42	256.33	239.79	479.58	45,890.79	7,483.09	60.36	9.92	0.41	9.18	1.17
Open/Vacant Land	2.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	157.49	2,084.46	6,613.52	12,257.43	30.19	12.81	77.75	6,549.49	2,323.42	3.02	1.83	0.09	0.64	0.09
Transportation	2.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	14.68	66.06	844.12	660.799	2.13	16.46	2.39	852.64	68.21	1.71	0.23	0.01	0.30	0.02
Total																**31,355.91**	**48,800.70**	**69,971.65**	**288.64**	**269.05**	**559.72**	**53,292.93**	**9,874.73**	**65.08**	**11.99**	**0.51**	**10.12**	**1.28**
Browns Creek																												
Industrial	13.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	787.14	26,677.06	219,502.96	204,869.43	658.51	414.62	1,829.19	148,774.23	21,950.30	536.56	57.80	4.63	53.17	3.41
Commercial	13.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	858.46	36,367.71	127,675.39	196,832.89	611.78	452.18	1,649.14	159,594.24	31,918.85	398.99	45.22	2.39	39.90	4.26
Residential	13.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	4,321.35	472,928.87	669,476.51	923,877.58	4,150.75	3,882.96	7,765.93	743,118.92	121,175.25	977.44	160.67	6.69	148.62	19.01
Open/Vacant Land	13.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	2,130.74	150,444.09	477,325.52	884,669.70	2,178.66	924.28	5,611.71	472,704.11	167,691.12	217.87	132.04	6.60	46.21	6.60
Transportation	13.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	707.02	16,972.87	216,876.65	169,777.17	547.67	4,228.00	613.39	219,067.32	17,525.39	438.13	60.24	2.19	76.67	4.38
Total																**703,390.60**	**1,710,857.02**	**2,380,026.77**	**8,147.37**	**9,902.05**	**17,469.36**	**1,743,258.82**	**360,260.90**	**2,568.99**	**455.98**	**22.52**	**364.58**	**37.67**
Bull Run Creek																												
Industrial	2.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	0.58	4.61	16.17	24.93	0.08	0.06	0.21	20.21	4.04	0.05	0.01	0.00	0.01	0.00
Residential	2.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,282.89	26,318.52	37,256.41	51,413.84	230.99	216.09	432.17	41,354.61	6,743.41	54.39	8.94	0.37	8.27	1.06
Open/Vacant Land	2.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,591.66	21,066.42	66,839.03	123,878.71	305.07	129.43	785.80	66,191.91	23,481.49	30.51	18.49	0.92	6.47	0.92
Transportation	2.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	37.87	170.42	2,177.57	1,704.66	5.50	42.45	6.16	2,199.57	175.97	4.40	0.60	0.02	0.77	0.04
Total																**47,559.96**	**106,289.18**	**177,022.14**	**541.64**	**388.02**	**1,224.34**	**109,766.30**	**30,404.90**	**89.35**	**28.04**	**1.32**	**15.52**	**2.03**
Cooper Creek																												
Industrial	10.29	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	29.92	761.07	6,262.21	5,844.73	18.79	11.83	52.19	4,244.39	626.22	15.31	1.65	0.13	1.52	0.10
Commercial	10.29	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	197.42	6,277.19	22,037.19	33,974.00	105.59	78.05	284.65	27,546.49	5,509.30	68.87	7.80	0.41	6.89	0.73
Residential	10.29	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,536.51	126,208.82	178,660.77	246,551.87	1,107.70	1,036.23	2,072.46	198,313.46	32,337.60	260.84	42.88	1.79	39.66	5.07
Open/Vacant Land	10.29	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	419.58	22,235.01	70,546.73	130,750.51	322.00	136.61	829.39	69,863.71	24,784.05	32.20	19.52	0.98	6.83	0.98
Transportation	10.29	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	172.45	3,107.17	39,702.90	31,080.55	100.26	774.01	112.29	40,103.94	3,208.31	80.21	11.03	0.40	14.04	0.80
Total																**158,589.25**	**317,209.80**	**448,201.66**	**1,654.34**	**2,036.72**	**3,350.98**	**340,071.98**	**66,465.49**	**457.43**	**82.88**	**3.71**	**68.93**	**7.68**
Cub Creek																												
Industrial	2.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	9.65	76.63	269.04	414.76	1.29	0.95	3.48	336.29	67.26	0.84	0.10	0.01	0.08	0.01
Residential	2.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,183.28	24,275.02	34,363.63	47,421.82	213.05	199.31	398.62	38,143.63	6,219.82	50.17	8.25	0.34	7.63	0.98
Open/Vacant Land	2.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	371.76	4,920.43	15,611.42	28,934.04	71.26	30.23	183.54	15,460.28	5,484.51	7.13	4.32	0.22	1.51	0.22
Transportation	2.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	16.60	74.70	954.52	747.22	2.41	18.61	2.70	964.16	77.13	1.93	0.27	0.01	0.34	0.02
Total																**29,346.78**	**51,198.61**	**77,517.84**	**288.01**	**249.10**	**588.33**	**54,904.37**	**11,848.72**	**60.07**	**12.93**	**0.57**	**9.56**	**1.22**
Cumberland River																												
Industrial	8.14	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	2,387.96	48,050.72	395,368.81	369,010.89	1,186.11	746.81	3,294.74	267,972.19	39,536.88	966.46	104.11	8.35	95.77	6.15
Commercial	8.14	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	6,147.72	154,631.14	542,860.40	836,909.78	2,601.21	1,922.63	7,011.95	678,575.50	135,715.10	1,696.44	192.26	10.18	169.64	18.10
Residential	8.14	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	17,731.86	1,152,172.82	1,631,011.95	2,250,796.49	10,112.27	9,459.87	18,919.74	1,810,423.26	295,213.16	2,381.28	391.44	16.31	362.08	46.32
Open/Vacant Land	8.14	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	17,177.60	720,102.17	2,284,723.38	4,234,480.41	10,428.20	4,424.08	26,860.51	2,262,602.96	802,655.24	1,042.82	632.01	31.60	221.20	31.60
Transportation	8.14	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	2,738.99	39,039.21	498,836.80	390,503.56	1,259.69	9,724.80	1,410.85	503,875.56	40,310.04	1,007.75	138.57	5.04	176.36	10.08
Total																**2,113,996.06**	**5,352,801.34**	**8,081,701.12**	**25,587.47**	**26,278.19**	**57,497.79**	**5,523,449.47**	**1,313,430.43**	**7,094.74**	**1,458.40**	**71.47**	**1,025.06**	**112.24**

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Davidson Branch																											
Industrial	7.29	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	21.86	393.94	3,241.37	3,025.28	9.72	6.12	27.01	2,196.93	324.14	7.92	0.85	0.07	0.79	0.05
Commercial	7.29	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	132.59	2,986.74	10,485.47	16,165.10	50.24	37.14	135.44	13,106.84	2,621.37	32.77	3.71	0.20	3.28	0.35
Residential	7.29	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,731.56	100,763.68	142,640.72	196,844.19	884.37	827.32	1,654.63	158,331.20	25,817.97	208.26	34.23	1.43	31.67	4.05
Open/Vacant Land	7.29	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	364.28	13,676.35	43,391.99	80,422.23	198.05	84.02	510.14	42,971.88	15,244.21	19.81	12.00	0.60	4.20	0.60
Transportation	7.29	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	125.94	1,607.60	20,541.63	16,080.57	51.87	400.46	58.10	20,749.12	1,659.93	41.50	5.71	0.21	7.26	0.41
Total																**119,428.29**	**220,301.18**	**312,537.37**	**1,194.27**	**1,355.06**	**2,385.32**	**237,355.96**	**45,667.62**	**310.25**	**56.51**	**2.50**	**47.19**	**5.47**
Dry Creek																											
Industrial	7.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	274.75	5,236.49	43,086.68	40,214.23	129.26	81.39	359.06	29,203.19	4,308.67	105.32	11.35	0.91	10.44	0.67
Commercial	7.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	310.01	7,385.65	25,928.64	39,973.32	124.24	91.83	334.91	32,410.80	6,482.16	81.03	9.18	0.49	8.10	0.86
Residential	7.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,959.05	182,114.95	257,801.31	355,765.81	1,598.37	1,495.25	2,990.50	286,159.46	46,662.04	376.39	61.87	2.58	57.23	7.32
Open/Vacant Land	7.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,767.15	70,167.34	222,625.31	412,611.22	1,016.13	431.09	2,617.31	220,469.87	78,211.38	101.61	61.58	3.08	21.55	3.08
Transportation	7.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	284.83	3,845.26	49,134.18	38,463.63	124.08	957.87	138.97	49,630.49	3,970.44	99.26	13.65	0.50	17.37	0.99
Total																**268,749.70**	**598,576.12**	**887,028.21**	**2,992.08**	**3,057.42**	**6,440.74**	**617,873.82**	**139,634.68**	**763.61**	**157.63**	**7.55**	**114.70**	**12.93**
Ewing Creek																											
Industrial	7.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	442.00	8,424.13	69,315.06	64,694.05	207.95	130.93	577.63	46,980.21	6,931.51	169.44	18.25	1.46	16.79	1.08
Commercial	7.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	659.00	15,699.95	55,117.49	84,972.80	264.10	195.21	711.93	68,896.87	13,779.37	172.24	19.52	1.03	17.22	1.84
Residential	7.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	3,932.65	242,035.24	342,624.27	472,821.49	2,124.27	1,987.22	3,974.44	380,312.94	62,014.99	500.23	82.23	3.43	76.06	9.73
Open/Vacant Land	7.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	3,330.57	132,245.28	419,584.74	777,653.59	1,915.12	812.47	4,932.88	415,522.37	147,405.98	191.51	116.07	5.80	40.62	5.80
Transportation	7.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	529.16	7,143.77	91,281.97	71,458.11	230.51	1,779.54	258.17	92,204.01	7,376.32	184.41	25.36	0.92	32.27	1.84
Total																**405,548.37**	**977,923.53**	**1,471,600.05**	**4,741.95**	**4,905.37**	**10,455.05**	**1,003,916.39**	**237,508.17**	**1,217.83**	**261.43**	**12.65**	**182.97**	**20.29**
Gibson Creek																											
Industrial	12.86	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	29.28	930.81	7,658.84	7,148.25	22.98	14.47	63.82	5,190.99	765.88	18.72	2.02	0.16	1.86	0.12
Commercial	12.86	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	404.43	16,071.00	56,420.12	86,981.02	270.35	199.82	728.76	70,525.15	14,105.03	176.31	19.98	1.06	17.63	1.88
Residential	12.86	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,651.90	169,575.71	240,050.80	331,270.11	1,488.31	1,392.29	2,784.59	266,456.39	43,449.20	350.47	57.61	2.40	53.29	6.82
Open/Vacant Land	12.86	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	437.81	28,995.72	91,996.94	170,506.09	419.90	178.14	1,081.57	91,106.24	32,319.81	41.99	25.45	1.27	8.91	1.27
Transportation	12.86	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	212.88	4,793.60	61,251.89	47,949.71	154.68	1,194.10	173.24	61,870.59	4,949.65	123.74	17.01	0.62	21.65	1.24
Total																**220,366.84**	**457,378.59**	**643,855.17**	**2,356.22**	**2,978.83**	**4,831.98**	**495,149.36**	**95,589.57**	**711.24**	**122.07**	**5.51**	**103.34**	**11.33**
Gizzard Branch																											
Industrial	15.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	24.47	933.36	7,679.82	7,167.83	23.04	14.51	64.00	5,205.21	767.98	18.77	2.02	0.16	1.86	0.12
Commercial	15.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	452.11	21,556.02	75,676.27	116,667.58	362.62	268.02	977.49	94,595.34	18,919.07	236.49	26.80	1.42	23.65	2.52
Residential	15.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	514.36	63,353.71	89,683.30	123,762.95	556.04	520.16	1,040.33	99,548.46	16,232.68	130.94	21.52	0.90	19.91	2.55
Open/Vacant Land	15.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	354.97	28,207.51	89,496.14	165,871.13	408.49	173.30	1,052.17	88,629.65	31,441.24	40.85	24.76	1.24	8.66	1.24
Transportation	15.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	101.92	2,753.67	35,185.93	27,544.54	88.85	685.95	99.52	35,541.34	2,843.31	71.08	9.77	0.36	12.44	0.71
Total																**116,804.26**	**297,721.45**	**441,014.03**	**1,439.03**	**1,661.94**	**3,233.49**	**323,519.99**	**70,204.28**	**498.13**	**84.88**	**4.07**	**66.52**	**7.14**
Harpeth River																											
Industrial	5.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	8.90	122.54	1,008.31	941.09	3.02	1.90	8.40	683.41	100.83	2.46	0.27	0.02	0.24	0.02
Commercial	5.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	592.77	10,202.34	35,817.16	55,218.11	171.62	126.85	462.64	44,771.44	8,954.29	111.93	12.69	0.67	11.19	1.19
Residential	5.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	8,113.71	360,756.03	510,685.02	704,745.33	3,166.25	2,961.97	5,923.95	566,860.37	92,433.99	745.60	122.56	5.11	113.37	14.50
Open/Vacant Land	5.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	8,394.97	240,813.91	764,048.77	1,416,079.32	3,487.36	1,479.49	8,982.59	756,651.34	268,421.01	348.74	211.36	10.57	73.97	10.57
Transportation	5.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	688.90	6,718.89	85,852.91	67,208.09	216.80	1,673.70	242.82	86,720.11	6,937.61	173.44	23.85	0.87	30.35	1.73
Total																**618,613.72**	**1,397,412.17**	**2,244,191.94**	**7,045.06**	**6,243.91**	**15,620.40**	**1,455,686.68**	**376,847.72**	**1,382.17**	**370.72**	**17.23**	**229.14**	**28.02**

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Indian Creek																											
Industrial	2.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	38.88	308.76	1,083.95	1,671.09	5.19	3.84	14.00	1,354.94	270.99	3.39	0.38	0.02	0.34	0.04
Residential	2.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,192.47	44,978.58	63,671.52	87,866.70	394.76	369.29	738.59	70,675.39	11,524.55	92.96	15.28	0.64	14.14	1.81
Open/Vacant Land	2.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,585.36	20,983.03	66,574.48	123,388.38	303.87	128.91	782.69	65,929.91	23,388.54	30.39	18.42	0.92	6.45	0.92
Transportation	2.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	33.11	149.00	1,903.86	1,490.40	4.81	37.12	5.38	1,923.10	153.85	3.85	0.53	0.02	0.67	0.04
Total																**66,419.36**	**133,233.81**	**214,416.57**	**708.63**	**539.16**	**1,540.66**	**139,883.33**	**35,337.92**	**130.58**	**34.61**	**1.60**	**21.59**	**2.80**
Island Creek																											
Industrial	3	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	3	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	3	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	149.19	3,572.73	5,057.54	6,979.41	31.36	29.33	58.67	5,613.87	915.41	7.38	1.21	0.05	1.12	0.14
Open/Vacant Land	3	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	351.72	5,434.07	17,241.10	31,954.47	78.69	33.39	202.70	17,074.18	6,057.04	7.87	4.77	0.24	1.67	0.24
Transportation	3	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	9.65	50.69	647.73	507.06	1.64	12.63	1.83	654.27	52.34	1.31	0.18	0.01	0.23	0.01
Total																**9,057.49**	**22,946.37**	**39,440.93**	**111.69**	**75.35**	**263.20**	**23,342.32**	**7,024.80**	**16.56**	**6.16**	**0.30**	**3.02**	**0.40**
Little Harpeth River																											
Industrial	4.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	6.12	71.26	586.30	547.22	1.76	1.11	4.89	397.38	58.63	1.43	0.15	0.01	0.14	0.01
Commercial	4.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	504.83	7,347.25	25,793.82	39,765.48	123.60	91.35	333.17	32,242.28	6,448.46	80.61	9.14	0.48	8.06	0.86
Residential	4.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	3,969.55	149,245.45	211,271.36	291,554.48	1,309.88	1,225.37	2,450.75	234,511.21	38,240.12	308.46	50.71	2.11	46.90	6.00
Open/Vacant Land	4.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	3,938.06	95,523.55	303,074.90	561,715.58	1,383.33	586.87	3,563.12	300,140.57	106,474.45	138.33	83.84	4.19	29.34	4.19
Transportation	4.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	330.72	2,727.52	34,851.78	27,282.96	88.01	679.43	98.57	35,203.82	2,816.31	70.41	9.68	0.35	12.32	0.70
Total																**254,915.02**	**575,578.17**	**920,865.72**	**2,906.58**	**2,584.14**	**6,450.50**	**602,495.26**	**154,037.95**	**599.24**	**153.51**	**7.15**	**96.77**	**11.77**
Loves Branch																											
Industrial	10.29	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	7.06	179.58	1,477.65	1,379.14	4.43	2.79	12.31	1,001.52	147.76	3.61	0.39	0.03	0.36	0.02
Commercial	10.29	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	100.42	3,192.96	11,209.47	17,281.27	53.71	39.70	144.79	14,011.84	2,802.37	35.03	3.97	0.21	3.50	0.37
Residential	10.29	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	709.16	58,250.35	82,459.00	113,793.42	511.25	478.26	956.52	91,529.49	14,925.08	120.39	19.79	0.82	18.31	2.34
Open/Vacant Land	10.29	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	479.78	25,425.22	80,668.55	149,510.18	368.20	156.20	948.39	79,887.53	28,339.99	36.82	22.31	1.12	7.81	1.12
Transportation	10.29	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	144.37	2,601.23	33,238.08	26,019.71	83.93	647.97	94.01	33,573.82	2,685.91	67.15	9.23	0.34	11.75	0.67
Total																**89,649.35**	**209,052.75**	**307,983.72**	**1,021.52**	**1,324.93**	**2,156.02**	**220,004.20**	**48,901.11**	**263.00**	**55.70**	**2.52**	**41.73**	**4.53**
Marrowbone Creek																											
Industrial	3	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	16.70	123.85	1,019.03	951.10	3.06	1.92	8.49	690.68	101.90	2.49	0.27	0.02	0.25	0.02
Commercial	3	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	82.31	763.01	2,678.70	4,129.66	12.84	9.49	34.60	3,348.37	669.67	8.37	0.95	0.05	0.84	0.09
Residential	3	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	5,456.09	130,659.72	184,961.45	255,246.80	1,146.76	1,072.78	2,145.55	205,307.21	33,478.02	270.04	44.39	1.85	41.06	5.25
Open/Vacant Land	3	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	6,194.46	95,704.41	303,648.71	562,779.08	1,385.95	587.98	3,569.87	300,708.82	106,676.03	138.59	84.00	4.20	29.40	4.20
Transportation	3	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	177.73	933.62	11,929.59	9,338.82	30.13	232.57	33.74	12,050.09	964.01	24.10	3.31	0.12	4.22	0.24
Total																**228,184.60**	**504,237.49**	**832,445.46**	**2,578.73**	**1,904.73**	**5,792.25**	**522,105.18**	**141,889.64**	**443.60**	**132.92**	**6.24**	**75.76**	**9.80**
Mansker Creek																											
Industrial	5.14	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	226.76	2,881.23	23,707.21	22,126.73	71.12	44.78	197.56	16,068.22	2,370.72	57.95	6.24	0.50	5.74	0.37
Commercial	5.14	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	420.02	6,671.01	23,419.78	36,105.49	112.22	82.95	302.51	29,274.72	5,854.94	73.19	8.29	0.44	7.32	0.78
Residential	5.14	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	7,629.91	313,055.59	443,160.43	611,561.40	2,747.59	2,570.33	5,140.66	491,908.08	80,212.04	647.01	106.36	4.43	98.38	12.59
Open/Vacant Land	5.14	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	4,175.71	110,535.22	350,703.57	649,990.02	1,600.72	679.09	4,123.07	347,308.10	123,207.06	160.07	97.01	4.85	33.95	4.85
Transportation	5.14	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	432.90	3,896.16	49,784.52	38,972.73	125.72	970.55	140.80	50,287.40	4,022.99	100.57	13.83	0.50	17.60	1.01
Total																**437,039.21**	**890,775.51**	**1,358,756.37**	**4,657.38**	**4,347.70**	**9,904.60**	**934,846.52**	**215,667.76**	**1,038.80**	**231.74**	**10.72**	**163.00**	**19.59**

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Mill Creek Lower																											
Industrial	17.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	1,218.87	52,939.23	435,592.20	406,552.72	1,306.78	822.79	3,629.94	295,234.72	43,559.22	1,064.78	114.71	9.20	105.51	6.78
Commercial	17.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	2,599.11	141,109.06	495,388.70	763,724.25	2,373.74	1,754.50	6,398.77	619,235.88	123,847.18	1,548.09	175.45	9.29	154.81	16.51
Residential	17.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	5,339.92	748,937.26	1,060,193.06	1,463,066.42	6,573.20	6,149.12	12,298.24	1,176,814.29	191,894.94	1,547.88	254.45	10.60	235.36	30.11
Open/Vacant Land	17.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	3,017.64	273,052.66	866,335.13	1,605,655.71	3,954.23	1,677.55	10,185.13	857,947.38	304,355.63	395.42	239.65	11.98	83.88	11.98
Transportation	17.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	945.97	29,102.83	371,871.38	291,111.44	939.07	7,249.61	1,051.76	375,627.66	30,050.21	751.26	103.30	3.76	131.47	7.51
Total																**1,245,141.05**	**3,229,380.48**	**4,530,110.53**	**15,147.01**	**17,653.57**	**33,563.83**	**3,324,859.92**	**693,707.19**	**5,307.43**	**887.55**	**44.83**	**711.03**	**72.89**
Mill Creek Upper																											
Industrial	6	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	157.09	2,329.96	19,171.26	17,893.18	57.51	36.21	159.76	12,993.86	1,917.13	46.86	5.05	0.40	4.64	0.30
Commercial	6	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	814.01	15,091.75	52,982.28	81,681.02	253.87	187.65	684.35	66,227.85	13,245.57	165.57	18.76	0.99	16.56	1.77
Residential	6	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	6,827.69	327,012.21	462,917.38	638,825.99	2,870.09	2,684.92	5,369.84	513,838.29	83,788.05	675.86	111.10	4.63	102.77	13.15
Open/Vacant Land	6	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	5,943.70	183,660.33	582,713.22	1,079,994.06	2,659.69	1,128.35	6,850.71	577,071.46	204,715.29	265.97	161.19	8.06	56.42	8.06
Transportation	6	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	538.39	5,656.33	72,275.63	56,579.41	182.51	1,409.01	204.42	73,005.68	5,840.45	146.01	20.08	0.73	25.55	1.46
Total																**533,750.57**	**1,190,059.77**	**1,874,973.66**	**6,023.68**	**5,446.14**	**13,269.08**	**1,243,137.14**	**309,506.49**	**1,300.27**	**316.18**	**14.82**	**205.94**	**24.73**
Overall Creek																											
Industrial	4.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	232.80	2,710.52	22,302.57	20,815.73	66.91	42.13	185.85	15,116.18	2,230.26	54.52	5.87	0.47	5.40	0.35
Commercial	4.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	268.01	3,900.59	13,693.72	21,111.16	65.62	48.50	176.88	17,117.16	3,423.43	42.79	4.85	0.26	4.28	0.46
Residential	4.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,559.32	96,224.23	136,214.69	187,976.27	844.53	790.05	1,580.09	151,198.30	24,654.86	198.87	32.69	1.36	30.24	3.87
Open/Vacant Land	4.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,652.58	40,085.81	127,183.31	235,720.11	580.50	246.27	1,495.24	125,951.94	44,681.27	58.05	35.18	1.76	12.31	1.76
Transportation	4.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	178.02	1,468.17	18,760.02	14,685.88	47.37	365.73	53.06	18,949.52	1,515.96	37.90	5.21	0.19	6.63	0.38
Total																**144,389.31**	**318,154.31**	**480,309.14**	**1,604.93**	**1,492.67**	**3,491.12**	**328,333.10**	**76,505.78**	**392.13**	**83.81**	**4.04**	**58.87**	**6.81**
Pages Branch																											
Industrial	12	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	136.42	4,046.76	33,297.39	31,077.57	99.89	62.90	277.48	22,568.23	3,329.74	81.39	8.77	0.70	8.07	0.52
Commercial	12	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	361.19	13,392.93	47,018.27	72,486.50	225.30	166.52	607.32	58,772.84	11,754.57	146.93	16.65	0.88	14.69	1.57
Residential	12	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	702.03	67,247.45	95,195.27	131,369.47	590.21	552.13	1,104.27	105,666.75	17,230.34	138.99	22.85	0.95	21.13	2.70
Open/Vacant Land	12	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	684.36	42,293.45	134,187.67	248,701.90	612.47	259.84	1,577.59	132,888.48	47,142.00	61.25	37.12	1.86	12.99	1.86
Transportation	12	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	170.53	3,583.18	45,785.26	35,842.00	115.62	892.58	129.49	46,247.74	3,699.82	92.50	12.72	0.46	16.19	0.92
Total																**130,563.77**	**355,483.86**	**519,477.43**	**1,643.49**	**1,933.97**	**3,696.14**	**366,144.03**	**83,156.47**	**521.05**	**98.11**	**4.85**	**73.07**	**7.57**
Percy Priest Lake, Lower																											
Industrial	6	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	678.89	10,069.30	82,851.74	77,328.29	248.56	156.50	690.43	56,155.07	8,285.17	202.53	21.82	1.75	20.07	1.29
Commercial	6	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	320.65	5,944.85	20,870.47	32,175.30	100.00	73.92	269.58	26,088.08	5,217.62	65.22	7.39	0.39	6.52	0.70
Residential	6	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,706.71	129,637.88	183,514.94	253,250.61	1,137.79	1,064.39	2,128.77	203,701.58	33,216.20	267.93	44.04	1.84	40.74	5.21
Open/Vacant Land	6	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	7,084.12	218,899.31	694,518.62	1,287,212.94	3,170.00	1,344.85	8,165.16	687,794.38	243,994.09	317.00	192.12	9.61	67.24	9.61
Transportation	6	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	265.36	2,787.87	35,622.99	27,886.68	89.96	694.47	100.75	35,982.82	2,878.63	71.97	9.90	0.36	12.59	0.72
Total																**367,339.20**	**1,017,378.75**	**1,677,853.83**	**4,746.31**	**3,334.12**	**11,354.69**	**1,009,721.92**	**293,591.71**	**924.64**	**275.27**	**13.94**	**147.17**	**17.52**

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Percy Priest Lake, Upper																											
Industrial	6.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	14.94	237.47	1,953.95	1,823.68	5.86	3.69	16.28	1,324.34	195.39	4.78	0.51	0.04	0.47	0.03
Commercial	6.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	239.08	4,750.21	16,676.46	25,709.54	79.91	59.06	215.40	20,845.58	4,169.12	52.11	5.91	0.31	5.21	0.56
Residential	6.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,840.37	145,789.02	206,378.44	284,802.25	1,279.55	1,196.99	2,393.99	229,080.07	37,354.50	301.31	49.53	2.06	45.82	5.86
Open/Vacant Land	6.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	9,014.23	298,501.72	947,079.30	1,755,306.03	4,322.77	1,833.90	11,134.40	937,909.79	332,722.19	432.28	261.99	13.10	91.70	13.10
Transportation	6.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	342.44	3,855.51	49,265.07	38,566.09	124.41	960.42	139.34	49,762.70	3,981.02	99.53	13.68	0.50	17.42	1.00
Total																**453,133.93**	**1,221,353.22**	**2,106,207.60**	**5,812.49**	**4,054.07**	**13,899.42**	**1,238,922.48**	**378,422.21**	**890.01**	**331.62**	**16.01**	**160.61**	**20.54**
Pond Creek																											
Industrial	2.57	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	2.57	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	1.50	11.91	41.82	64.47	0.20	0.15	0.54	52.27	10.45	0.13	0.01	0.00	0.01	0.00
Residential	2.57	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,048.39	21,507.75	30,446.29	42,015.89	188.77	176.59	353.18	33,795.39	5,510.78	44.45	7.31	0.30	6.76	0.86
Open/Vacant Land	2.57	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	607.24	8,037.13	25,500.00	47,261.42	116.39	49.38	299.79	25,253.11	8,958.51	11.64	7.05	0.35	2.47	0.35
Transportation	2.57	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	12.02	54.09	691.16	541.06	1.75	13.47	1.95	698.15	55.85	1.40	0.19	0.01	0.24	0.01
Total																**29,610.87**	**56,679.28**	**89,882.84**	**307.10**	**239.59**	**655.46**	**59,798.92**	**14,535.59**	**57.62**	**14.57**	**0.66**	**9.49**	**1.23**
Richland Creek																											
Industrial	9.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	421.04	9,814.85	80,758.08	75,374.21	242.27	152.54	672.98	54,736.03	8,075.81	197.41	21.27	1.70	19.56	1.26
Commercial	9.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	1,586.57	46,230.59	162,300.78	250,213.70	777.69	574.82	2,096.39	202,875.98	40,575.20	507.19	57.48	3.04	50.72	5.41
Residential	9.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	8,218.38	618,638.35	875,742.35	1,208,524.45	5,429.60	5,079.31	10,158.61	972,074.01	158,509.37	1,278.58	210.18	8.76	194.41	24.87
Open/Vacant Land	9.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	3,292.60	159,903.47	507,338.01	940,294.52	2,315.65	982.40	5,964.55	502,426.03	178,234.93	231.57	140.34	7.02	49.12	7.02
Transportation	9.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	1,051.88	17,368.57	221,932.82	173,735.29	560.44	4,326.57	627.69	224,174.56	17,933.96	448.35	61.65	2.24	78.46	4.48
Total																**851,955.82**	**1,848,072.05**	**2,648,142.17**	**9,325.66**	**11,115.63**	**19,520.22**	**1,956,286.61**	**403,329.27**	**2,663.10**	**490.92**	**22.76**	**392.28**	**43.04**
Sevenmile Creek																											
Industrial	10.71	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	159.72	4,228.61	34,793.63	32,474.05	104.38	65.72	289.95	23,582.35	3,479.36	85.05	9.16	0.73	8.43	0.54
Commercial	10.71	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	1,107.15	36,639.91	128,630.99	198,306.11	616.36	455.57	1,661.48	160,788.74	32,157.75	401.97	45.56	2.41	40.20	4.29
Residential	10.71	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	6,557.06	560,579.94	793,555.07	1,095,106.00	4,920.04	4,602.62	9,205.24	880,846.13	143,633.47	1,158.59	190.45	7.94	176.17	22.54
Open/Vacant Land	10.71	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	2,245.81	123,871.02	393,015.08	728,409.70	1,793.84	761.03	4,620.51	389,209.96	138,071.69	179.38	108.72	5.44	38.05	5.44
Transportation	10.71	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	794.24	14,894.55	190,320.19	148,988.03	480.61	3,710.28	538.28	192,242.62	15,379.41	384.49	52.87	1.92	67.28	3.84
Total																**740,214.03**	**1,540,314.96**	**2,203,283.89**	**7,915.23**	**9,595.22**	**16,315.46**	**1,646,669.79**	**332,721.68**	**2,209.48**	**406.76**	**18.44**	**330.13**	**36.65**
South Harpeth River, Lower																											
Industrial	3	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	3	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	53.55	496.41	1,742.73	2,686.71	8.35	6.17	22.51	2,178.41	435.68	5.45	0.62	0.03	0.54	0.06
Residential	3	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	4,206.13	100,726.30	142,587.81	196,771.17	884.04	827.01	1,654.02	158,272.47	25,808.39	208.18	34.22	1.43	31.65	4.05
Open/Vacant Land	3	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	4,663.60	72,052.62	228,606.87	423,697.39	1,043.43	442.67	2,687.63	226,393.53	80,312.79	104.34	63.24	3.16	22.13	3.16
Transportation	3	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	153.40	805.81	10,296.51	8,060.40	26.00	200.73	29.12	10,400.52	832.04	20.80	2.86	0.10	3.64	0.21
Total																**174,081.14**	**383,233.93**	**631,215.67**	**1,961.83**	**1,476.58**	**4,393.28**	**397,244.93**	**107,388.91**	**338.77**	**100.94**	**4.72**	**57.97**	**7.48**
Stoner Creek																											
Industrial	9.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	236.43	5,511.41	45,348.74	42,325.49	136.05	85.66	377.91	30,736.37	4,534.87	110.85	11.94	0.96	10.98	0.71
Commercial	9.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	771.20	22,471.77	78,891.17	121,623.89	378.02	279.41	1,019.01	98,613.96	19,722.79	246.53	27.94	1.48	24.65	2.63
Residential	9.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	4,045.47	304,522.65	431,081.24	594,892.11	2,672.70	2,500.27	5,000.54	478,500.17	78,025.70	629.38	103.46	4.31	95.70	12.24
Open/Vacant Land	9.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,903.40	92,437.67	293,284.08	543,569.39	1,338.64	567.91	3,448.01	290,444.54	103,034.80	133.86	81.13	4.06	28.40	4.06
Transportation	9.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	502.70	8,300.55	106,063.07	83,029.17	267.84	2,067.69	299.98	107,134.42	8,570.75	214.27	29.46	1.07	37.50	2.14
Total																**433,244.05**	**954,668.30**	**1,385,440.05**	**4,793.25**	**5,500.94**	**10,145.45**	**1,005,429.46**	**213,888.92**	**1,334.90**	**253.93**	**11.88**	**197.23**	**21.78**

	Runoff Total	Fecal coliform (C)	TSS (C)	TDS (C)	Total P (C)	DP (C)	NO2/ NO3 (C)	COD (C)	BOD (C)	Zn (C)	Pb (C)	Cd (C)	Cu (C)	TKN (C)	Total Watershed Land Area Per Land Use (A)	Fecal coliform (L)	TSS (L)	TDS (L)	Total P (L)	DP (L)	NO2/NO3 (L)	COD (L)	BOD (L)	Zn (L)	Pb (L)	Cd (L)	Cu (L)	TKN (L)
Stones River																											
Industrial	8.14	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	110.66	2,226.71	18,321.71	17,100.26	54.97	34.61	152.68	12,418.05	1,832.17	44.79	4.82	0.39	4.44	0.29
Commercial	8.14	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	2,951.71	74,243.18	260,644.02	401,826.20	1,248.92	923.11	3,366.65	325,805.03	65,161.01	814.51	92.31	4.89	81.45	8.69
Residential	8.14	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,783.48	180,863.71	256,030.06	353,321.48	1,587.39	1,484.97	2,969.95	284,193.36	46,341.44	373.80	61.45	2.56	56.84	7.27
Open/Vacant Land	8.14	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	2,707.01	113,480.57	360,048.50	667,309.80	1,643.37	697.19	4,232.94	356,562.55	126,490.07	164.34	99.60	4.98	34.86	4.98
Transportation	8.14	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	442.62	6,308.72	80,611.88	63,105.26	203.57	1,571.52	227.99	81,426.15	6,514.09	162.85	22.39	0.81	28.50	1.63
Total																**377,122.89**	**975,656.17**	**1,502,663.00**	**4,738.21**	**4,711.41**	**10,950.21**	**1,060,405.13**	**246,338.77**	**1,560.29**	**280.57**	**13.63**	**206.09**	**22.85**
Sugartree Creek																											
Industrial	11.14	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	0.90	24.78	203.93	190.33	0.61	0.39	1.70	138.22	20.39	0.50	0.05	0.00	0.05	0.00
Commercial	11.14	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	270.41	9,308.22	32,678.16	50,378.83	156.58	115.74	422.09	40,847.70	8,169.54	102.12	11.57	0.61	10.21	1.09
Residential	11.14	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	1,976.99	175,803.93	248,867.46	343,437.09	1,542.98	1,443.43	2,886.86	276,242.88	45,045.01	363.35	59.73	2.49	55.25	7.07
Open/Vacant Land	11.14	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	561.02	32,186.28	102,119.87	189,267.82	466.11	197.74	1,200.58	101,131.16	35,876.14	46.61	28.25	1.41	9.89	1.41
Transportation	11.14	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	205.30	4,004.61	51,170.28	40,057.54	129.22	997.56	144.72	51,687.15	4,134.97	103.37	14.21	0.52	18.09	1.03
Total																**221,327.82**	**435,039.70**	**623,331.61**	**2,295.50**	**2,754.86**	**4,655.96**	**470,047.11**	**93,246.05**	**615.95**	**113.82**	**5.04**	**93.49**	**10.61**
Sulpher Creek																											
Industrial	3.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	4.16	35.27	290.23	270.88	0.87	0.55	2.42	196.71	29.02	0.71	0.08	0.01	0.07	0.00
Commercial	3.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	18.91	200.42	703.62	1,084.74	3.37	2.49	9.09	879.52	175.90	2.20	0.25	0.01	0.22	0.02
Residential	3.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	2,153.96	58,975.37	83,485.34	115,209.76	517.61	484.21	968.43	92,668.72	15,110.85	121.89	20.04	0.83	18.53	2.37
Open/Vacant Land	3.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,521.69	26,879.89	85,283.90	158,064.21	389.26	165.14	1,002.65	84,458.19	29,961.42	38.93	23.59	1.18	8.26	1.18
Transportation	3.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	82.82	497.41	6,355.84	4,975.53	16.05	123.91	17.98	6,420.04	513.60	12.84	1.77	0.06	2.25	0.13
Total																**86,588.37**	**176,118.92**	**279,605.12**	**927.16**	**776.30**	**2,000.56**	**184,623.18**	**45,790.80**	**176.56**	**45.72**	**2.10**	**29.33**	**3.71**
Sycamore Creek																											
Industrial	3.43	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	1.28	10.85	89.30	83.35	0.27	0.17	0.74	60.53	8.93	0.22	0.02	0.00	0.02	0.00
Commercial	3.43	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	96.32	1,020.87	3,583.94	5,525.23	17.17	12.69	46.29	4,479.92	895.98	11.20	1.27	0.07	1.12	0.12
Residential	3.43	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	7,587.06	207,733.51	294,066.86	405,812.26	1,823.21	1,705.59	3,411.18	326,414.21	53,226.10	429.34	70.58	2.94	65.28	8.35
Open/Vacant Land	3.43	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	1,865.84	32,959.13	104,571.96	193,812.49	477.30	202.49	1,229.41	103,559.51	36,737.59	47.73	28.93	1.45	10.12	1.45
Transportation	3.43	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	291.51	1,750.79	22,371.30	17,512.89	56.49	436.13	63.27	22,597.27	1,807.78	45.19	6.21	0.23	7.91	0.45
Total																**243,475.15**	**424,683.36**	**622,746.22**	**2,374.45**	**2,357.07**	**4,750.89**	**457,111.44**	**92,676.39**	**533.68**	**107.01**	**4.68**	**84.46**	**10.37**
Whites Creek																											
Industrial	4.29	2400	90	84	0.27	0.17	0.75	61	9	0.22	0.0237	0.0019	0.0218	0.0014	174.99	1,855.75	15,269.38	14,251.42	45.81	28.84	127.24	10,349.25	1,526.94	37.33	4.02	0.32	3.70	0.24
Commercial	4.29	3000	48	74	0.23	0.17	0.62	60	12	0.15	0.017	0.0009	0.015	0.0016	959.34	12,717.11	44,645.69	68,828.77	213.93	158.12	576.67	55,807.11	11,161.42	139.52	15.81	0.84	13.95	1.49
Residential	4.29	7750	50	69	0.31	0.29	0.58	55.5	9.05	0.073	0.012	0.0005	0.0111	0.00142	6,240.38	213,701.35	302,514.90	417,470.56	1,875.59	1,754.59	3,509.17	335,791.54	54,755.20	441.67	72.60	3.03	67.16	8.59
Open/Vacant Land	4.29	5000	72.3	134	0.33	0.14	0.85	71.6	25.4	0.033	0.02	0.001	0.007	0.001	23,036.60	508,959.12	1,614,813.64	2,992,877.29	7,370.52	3,126.89	18,984.67	1,599,179.21	567,306.59	737.05	446.70	22.33	156.34	22.33
Transportation	4.29	1700	99	77.5	0.25	1.93	0.28	100	8	0.2	0.0275	0.001	0.035	0.002	834.34	6,267.39	80,083.67	62,691.77	202.23	1,561.23	226.50	80,892.60	6,471.41	161.79	22.25	0.81	28.31	1.62
																743,500.71	**2,057,327.29**	**3,556,119.81**	**9,708.08**	**6,629.66**	**23,424.26**	**2,082,019.71**	**641,221.56**	**1,517.35**	**561.38**	**27.33**	**269.47**	**34.27**

Bacteria Equation L = .00103*R*C*A
Chemical Equation: L= .226*R*C*A
L = Annual Load (pounds for chemical parameters and billion colonies for Fecal coliform)
R = Annual Runoff (Inches)
C = Pollutant Concentrations (Event Mean Concentrations) (mg/l for chemical parameters and mpn/100ml for Fecal coliform)
A = Area (Acres)

Table 5.6.7 Seasonal Loading Estimates For Overall County

Watershed Name	Fecal coliform (Billion Colonies)	TSS (lbs)	TDS (lbs)	Total P (lbs)	DP (lbs)	NO2/NO3 Nitrogen (lbs)	COD (lbs)	BOD(5) (lbs)	Zn (lbs)	Pb (lbs)	Cd (lbs)	Cu (lbs)	TKN (lbs)
Back Creek	31,355.91	48,800.70	69,971.65	288.64	269.05	559.72	53,292.93	9,874.73	65.08	11.99	0.51	10.12	1.28
Browns Creek	703,390.60	1,710,857.02	2,380,026.77	8,147.37	9,902.05	17,469.36	1,743,258.82	360,260.90	2,568.99	455.98	22.52	364.58	37.67
Bull Run Creek	47,559.96	106,289.18	177,022.14	541.64	388.02	1,224.34	109,766.30	30,404.90	89.35	28.04	1.32	15.52	2.03
Cooper Creek	158,589.25	317,209.80	448,201.66	1,654.34	2,036.72	3,350.98	340,071.98	66,465.49	457.43	82.88	3.71	68.93	7.68
Cub Creek	29,346.78	51,198.61	77,517.84	288.01	249.10	588.33	54,904.37	11,848.72	60.07	12.93	0.57	9.56	1.22
Cumberland River	2,113,996.06	5,352,801.34	8,081,701.12	25,587.47	26,278.19	57,497.79	5,523,449.47	1,313,430.43	7,094.74	1,458.40	71.47	1,025.06	112.24
Davidson Branch	119,428.29	220,301.18	312,537.37	1,194.27	1,355.06	2,385.32	237,355.96	45,667.62	310.25	56.51	2.50	47.19	5.47
Dry Creek	268,749.70	598,576.12	887,028.21	2,992.08	3,057.42	6,440.74	617,873.82	139,634.68	763.61	157.63	7.55	114.70	12.93
Ewing Creek	405,548.37	977,923.53	1,471,600.05	4,741.95	4,905.37	10,455.05	1,003,916.39	237,508.17	1,217.83	261.43	12.65	182.97	20.29
Gibson Creek	220,366.84	457,378.59	643,855.17	2,356.22	2,978.83	4,831.98	495,149.36	95,589.57	711.24	122.07	5.51	103.34	11.33
Gizzard Branch	116,804.26	297,721.45	441,014.03	1,439.03	1,661.94	3,233.49	323,519.99	70,204.28	498.13	84.88	4.07	66.52	7.14
Harpeth River	618,613.72	1,397,412.17	2,244,191.94	7,045.06	6,243.91	15,620.40	1,455,686.68	376,847.72	1,382.17	370.72	17.23	229.14	28.02
Indian Creek	66,419.36	133,233.81	214,416.57	708.63	539.16	1,540.66	139,883.33	35,337.92	130.58	34.61	1.60	21.59	2.80
Island Creek	9,057.49	22,946.37	39,440.93	111.69	75.35	263.20	23,342.32	7,024.80	16.56	6.16	0.30	3.02	0.40
Little Harpeth River	254,915.02	575,578.17	920,865.72	2,906.58	2,584.14	6,450.50	602,495.26	154,037.95	599.24	153.51	7.15	96.77	11.77
Loves Branch	89,649.35	209,052.75	307,983.72	1,021.52	1,324.93	2,156.02	220,004.20	48,901.11	263.00	55.70	2.52	41.73	4.53
Marrowbone Creek	228,184.60	504,237.49	832,445.46	2,578.73	1,904.73	5,792.25	522,105.18	141,889.64	443.60	132.92	6.24	75.76	9.80
Mansker Creek	437,039.21	890,775.51	1,358,756.37	4,657.38	4,347.70	9,904.60	934,846.52	215,667.76	1,038.80	231.74	10.72	163.00	19.59
Mill Creek Lower	1,245,141.05	3,229,380.48	4,530,110.53	15,147.01	17,653.57	33,563.83	3,324,859.92	693,707.19	5,307.43	887.55	44.83	711.03	72.89
Mill Creek Upper	533,750.57	1,190,059.77	1,874,973.66	6,023.68	5,446.14	13,269.08	1,243,137.14	309,506.49	1,300.27	316.18	14.82	205.94	24.73
Overall Creek	144,389.31	318,154.31	480,309.14	1,604.93	1,492.67	3,491.12	328,333.10	76,505.78	392.13	83.81	4.04	58.87	6.81
Pages Branch	130,563.77	355,483.86	519,477.43	1,643.49	1,933.97	3,696.14	366,144.03	83,156.47	521.05	98.11	4.85	73.07	7.57
Percy Priest Lake, Lower	367,339.20	1,017,378.75	1,677,853.83	4,746.31	3,334.12	11,354.69	1,009,721.92	293,591.71	924.64	275.27	13.94	147.17	17.52
Percy Priest Lake, Upper	453,133.93	1,221,353.22	2,106,207.60	5,812.49	4,054.07	13,899.42	1,238,922.48	378,422.21	890.01	331.62	16.01	160.61	20.54
Pond Creek	29,610.87	56,679.28	89,882.84	307.10	239.59	655.46	59,798.92	14,535.59	57.62	14.57	0.66	9.49	1.23
Richland Creek	851,955.82	1,848,072.05	2,648,142.17	9,325.66	11,115.63	19,520.22	1,956,286.61	403,329.27	2,663.10	490.92	22.76	392.28	43.04
Sevenmile Creek	740,214.03	1,540,314.96	2,203,283.89	7,915.23	9,595.22	16,315.46	1,646,669.79	332,721.68	2,209.48	406.76	18.44	330.13	36.65
South Harpeth River, Lower	174,081.14	383,233.93	631,215.67	1,961.83	1,476.58	4,393.28	397,244.93	107,388.91	338.77	100.94	4.72	57.97	7.48
Stoner Creek	433,244.05	954,668.30	1,385,440.05	4,793.25	5,500.94	10,145.45	1,005,429.46	213,888.92	1,334.90	253.93	11.88	197.23	21.78
Stones River	377,122.89	975,656.17	1,502,663.00	4,738.21	4,711.41	10,950.21	1,060,405.13	246,338.77	1,560.29	280.57	13.63	206.09	22.85
Sugartree Creek	221,327.82	435,039.70	623,331.61	2,295.50	2,754.86	4,655.96	470,047.11	93,246.05	615.95	113.82	5.04	93.49	10.61
Sulpher Creek	86,588.37	176,118.92	279,605.12	927.16	776.30	2,000.56	184,623.18	45,790.80	176.56	45.72	2.10	29.33	3.71
Sycamore Creek	243,475.15	424,683.36	622,746.22	2,374.45	2,357.07	4,750.89	457,111.44	92,676.39	533.68	107.01	4.68	84.46	10.37
Whites Creek	743,500.71	2,057,327.29	3,556,119.81	9,708.08	6,629.66	23,424.26	2,082,019.71	641,221.56	1,517.35	561.38	27.33	269.47	34.27
Overall County	**12,694,453.49**	**30,055,898.14**	**45,639,939.30**	**147,584.97**	**149,173.45**	**325,850.76**	**31,231,677.74**	**7,386,624.18**	**38,053.91**	**8,086.24**	**387.88**	**5,666.10**	**638.22**

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5.7 Future Direction

Metro will continue to meet its monitoring requirements throughout the remaining permit cycle and will analyze the benefits received from the monitoring programs. Metro intends to be able to use the monitoring data more effectively during the third permit cycle. Metro intends to derive EMC values that are at least in part from the wet weather sampling program data and in an effort to calculate load reductions, will attempt to map all of the BMPs into GIS, as well as determine the drainage area served by each BMP.

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6.0 Assessment of Controls

The effectiveness of the SWMP is assessed for the following reasons:

- To determine whether the most cost-effective best management practices are included in the stormwater management program;
- To assist in design of ongoing monitoring, inspection, and surveillance programs that help refine estimates of program effectiveness;
- To serve as a baseline and ongoing measure of the program's progress; and
- To develop a strategy to evaluate progress toward achieving water quality goals.

Direct measurements of the effectiveness of the SWMP include:

- Expected pollutant load reductions (part 2 application);
- Removal efficiencies of BMPs;
- Reductions in the volume of stormwater discharged; and
- Reductions in event mean pollutant concentrations.

The permit requires the estimation of expected reductions of pollutants from discharges of the MS4 as the result of the municipal stormwater management program. This includes identifying known impacts of stormwater controls on groundwater quality. It is difficult to quantify the performance of controls, since no reasonable conclusions can be made on monitoring and other programs that have recently been initiated. It is recognized that the measures described in this annual report will provide a better definition of the problems and make a positive impact on Metro's contribution to the quality of the "Waters of the State" and groundwater. As more long-term monitoring information and other types of data become available, assessments of the controls operated or otherwise implemented by the NPDES Office will be conducted.

Generally speaking, the post-development BMP requirements for developed sites since 1998 have served to provide a 70 to 80 percent reduction in Total Suspended Solids (TSS) and other selected runoff pollutant parameters for those respective developed properties. The amount of acreage served by these measures, which serve to reduce stormwater pollutants, will obviously increase as time goes on. In addition, the NPDES Office's increased focus on EPSC measures on construction sites over the past few years has undoubtedly kept hundreds of thousands (if not millions) of tons of sediment on sites as opposed to being washed into the MS4 and local streams. As Metro moves through its anticipated third permit cycle, it intends to enhance stormwater modeling capabilities to allow more technical considerations of pollutant load reductions. To accomplish this, the NPDES Office will need to map within GIS all of the BMPs installed since the stormwater requirements went into effect and determine the exact amount of drainage acreage the BMPs serve. This mapping and drainage delineation project will be done in conjunction with the BMP inspection program. Metro's goal with the BMP inspection and enforcement plan, is to expect the BMPs to be functioning at 100% capability.

One of the more practicable ways to measure the success of the SWMP is to use quantifiable indirect measurements. Some indirect measurements that can be used to assess the effectiveness of the SWMP include:

- Amount of recyclables performed by Metro (glass, oil, plastic, paper, etc.);
- Amount of waste collected by Metro;
- Number of water quality complaints received;
- Number of construction plans submitted for stormwater review;
- Number of construction plans approved through stormwater;
- Number of stormwater-related enforcements; and
- Number of stormwater-related inspections.

Table 6.1 depicts a comparison between the permit years of Cycle 2 of some evaluated categories. More categories may be added to the comparison in future permit years as the program develops. In addition, future control assessments may include a listing of projects implemented to improve State-listed 303(d) streams. In Permit Year 2, MWS hired a watershed/water quality manager whose sole job is to develop and oversee implementation of a Watershed Management Plan. The goal of the Watershed Management Plan is to reduce/eliminate pollutant runoff into community waters with special focus given to State-listed 303(d) streams. Future annual reports will include a section devoted to reporting projects and/or specific activities that have been undertaken to improve the water quality of State-listed 303(d) streams.

Table 6.1 Indirect Measurement Statistics for Permit Years

Categories	Permit Year 1	Permit Year 2	Permit Year 3	Permit Year 4	Permit Year 5
Recycled Oil	16 tons	9.1 tons	17.82 tons	20.27 tons	26.88 tons
Recycled Plastic	266 tons	300.42 tons	**233.28 tons	** 244.86 tons	**374.04
Recycled Paper	4,477 tons	2,573.84 tons	2,954.69 tons	3,333.47 tons	***4,083.74
Recycled Glass	1,798 tons	1,052.7 tons	1,107.05 tons	1,116.52 tons	1607.48
Total Brush Collection	25,613.10 tons	31,702.78 tons	30,498.85 tons	30,269.40 tons	27,785.25
Total Waste Collected	159,595.04 tons	157,622.99 tons	150,972.54 tons	152,430.24 tons	153,266.01
# of Water Quality Complaints Investigations Initiated	161	213	287	156	135
# of Construction Plans Submitted to Stormwater	868	1,562	1,427	1,505	1,970
# of Construction Plans Approved or no Permit Needed	387	449	507	619	871
# of Stormwater Enforcements (NOVs and SWOs)	228	197	283	190	342
# of Stormwater Inspections	4,024	2,561*	5,072	5,349	4,581

*This inspection tally does not include the 5 stormwater infrastructure inspectors, who, during Permit Year 2, began inspecting construction sites for stormwater runoff. Recordkeeping for Permit Year 3 has been modified to include EPSC-related inspections done by infrastructure inspectors.
**The recycled plastic total does not include plastic bottles collected with metal cans.
***The recycled paper number does not include paper material collected in mixed recyclables from the curbside pick-up.
****Permit Year 5 inspection numbers don't include inspections performed on construction sites without a grading permit, which has caused a reduction in total numbers.

It is impossible to analyze trends or draw conclusions from three years worth of data. At the end of Permit Year 5, the data from each permit year will be analyzed to determine if any trends are present that would indicate that the SWMP is or is not functioning as designed.

7.0 Summary of Modifications, Replacements, or Changes

During Permit Year 3, Metro determined it necessary to modify two MS4 permit elements that will greatly benefit the effectiveness and efficiency of Metro's SWMP. In addition, in the Permit Year 4 Annual Report, the NPDES Office submitted, as an Appendix, proposed changes to incorporate into the third cycle of the permit. The following paragraphs discuss the changes that have already been approved by TDEC.

7.1 Permit Element 5b-Use of Pesticides, Herbicides, Fertilizers, Oils, and Other Toxic Materials Commercial Distributors – Public Information

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY5
			1	2	3	4	5	
PESTICIDES, HERBICIDES, AND FERTILIZERS								
5a	Operate Household Hazardous Waste Facility	At least 1/quarter	●	●	●	●	●	
5b	Commercial Distributors – Public Information	Ongoing	X	●	X	●	●	This permit element has been modified to focus on "applicators"
5c	Evaluate Metro Facilities Practices	PY 2		●				

Under this permit requirement, Metro is required to distribute educational materials to businesses that sell/distribute chemicals. Metro has concluded this activity to be ineffective. Metro believes that a more effective activity would be to educate the commercial and industrial applicators. In other words, instead of educating the companies and businesses that sell the chemicals, education focus should be shifted toward the businesses and industries that apply chemicals. In Permit Year 4 and 5, the NPDES Office coordinated with the Health Department to distribute public education brochures to all Food Service Establishments (FSE) in Metro Davidson County. Part of the focus of this flyer is devoted to the use of chemicals such as detergents. Figure 7.1.1 depicts the brochure distributed to FSEs.

Figure 7.1.1 Public Education Brochure for Food Service Establishments

7.2 Monitoring Programs

Wet Weather Sampling

Activity ID	Activities Required By SWMP	SWMP Schedule	Permit Year Accomplished					Comments for PY 5
			1	2	3	4	5	
MONITORING								
B	Wet Weather – 3 or more in-stream locations Sample each site at least 2 times annually	2X Annually	X	●	X	●	X	Two of the Three sampling locations were modified during Permit Year 3.

As mentioned earlier, Metro modified the wet weather sampling program. The modifications are discussed in detail in Section 5.1.

8.0 Fiscal Analysis

Metro remains committed even during tough economic times to not only meeting, but exceeding, its MS4 NPDES permit compliance obligations. As it currently stands, the Stormwater program and associated activities is solely funded by Metro Water Services (MWS) revenues. Permit-specific activities performed by other Metro Departments are paid for by ad valorem property taxes on property in The General Services District (countywide). Over the last couple of years, MWS has been pursuing a dedicated funding source for stormwater management activities. The stormwater utility fee if approved by the Metro Council and Mayor would be a fee that is based on the amount of impervious area for each property owner. Revenues from the fee would fund the entire stormwater program including the NPDES Office, which oversees the MS4 permit.

This annual report reflects the budget information for Permit Year 5. Table 8.1 shows the budgets for fiscal year 2008 and projected budget for fiscal year 2009.

Table 8.1 Stormwater Budget

Stormwater Division		Annual Expenditure FY2008	Annual Expenditure "Projected" FY2009
Operating Budget	Administration	$1,068,197.5	$1,169,500
	Engineering and Permits	$796,375.13	$1,070,500
	NPDES Office	$1,223,749.83	$1,347,600
	Pumping Stations	$5,530.39	$8,000
	Remedial Maint.	$9,63148.95	$819,700
	Routine Maint.	$3,094,425.83	$3,361,900
Capital Budget	Capital Projects	$3,080,512.62	$2,005,200
	Non Allocated	N/A	-$245,100
	Total	$10,231,940.25	$9,537,300

This table shows the program elements and their associated stormwater activities. These activities have a direct affect on water quality in Nashville and are further described below:

- Administration – manages programs, provides public with information, offers clerical and support staff and covers costs such as vehicle support;
- Engineering – reviews plans, serves development community, applies regulations;
- NPDES – oversees construction, protects viability of streams, performs stream monitoring and walks, ensures water quality through various inspection and education programs;
- Remedial Maintenance – minor construction to restore existing drainage systems without major improvement or upgrades;
- Routine Maintenance – restores function of the existing system through cleaning and stabilizing without major construction; and
- Capital Projects – improvements or upgrades to existing drainage systems or construction of needed drainage systems.

Several other Metro Programs/Entities (which are not included in the referenced financial information) also benefit water quality in the Nashville area. These programs include the MWS FOG program, various Metro Parks environmental-related programs/initiatives, solid waste disposal, recycling and litter control, Metro Beautification, various Metro Schools environmental programs, etc. It is often extremely difficult and somewhat subjective to attempt to quantify the resources expended by other staff and Metro Programs for water quality-related activities vs. what those same staff and Programs expend on their other non-water quality-related activities. Therefore, it should be noted that while the aforementioned figures apply to the main office responsible for fulfilling Metro's Phase I MS4 NPDES permit obligations (MWS NPDES Office), there are various other Metro expenditures not included in this figure.

9.0 References

Pitt, R., Maestre, A., and Morquecho, R. 2004. "Evaluation of NPDES Phase 1 Municipal Stormwater Monitoring Data." Prepared for the U.S. EPA and Presented at Various Conferences.

Stormwater Center Website. Explanation of the Simple Rule Calculation, 2008. http://www.stormwatercenter.net/monitoring%20and%20assessment/simple%20meth/simple.htm

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Appendix A

Supporting Storm Water Management Program Documents

List of Spill Response Investigations Documented in the City Works in Permit Year 5

Service Request #	Date Time Initiated	Problem Address	Handy Map Page
134692	7/9/2007 7:05	I40 EAST @ WILSON CO LINE	
134845	7/10/2007 7:29	215 HICKORY FORGE DR	128-L
135368	7/16/2007 9:39	217 PINEWAY DR	90-J
135460	7/17/2007 7:41	908 TRICE DR	64-E
135465	7/17/2007 8:06	432 NEELEYS BEND RD	28-D
138578	7/31/2007 7:02	380 HARDING PL	113-C
138579	7/31/2007 7:19	380 HARDING PL	113-C
138782	8/1/2007 16:13	MNAA	
139759	8/15/2007 14:41	544 BELL RD	115-M
141047	9/5/2007 6:33	333 RIO VISTA DR	
141358	9/10/2007 7:35	4721 RICHARDS CT	114-L
141359	9/10/2007 7:57	1586 MCGAVOCK	48-C
141568	9/12/2007 6:25	321 WHITE SWANS	122-K
141936	9/18/2007 6:00	GREAT CIRCLE & ATHENS	
141937	9/18/2007 6:17	2725 COMBS DR	35-N
142099	9/19/2007 15:46	KIRKLAND AVE & GALLATIN RD.	47-D
142355	9/25/2007 7:20	709 5TH AVE S	66-P
142447	9/26/2007 8:25	GLENGARRY DR	
143426	10/10/2007 8:32	2417 LEBANON PIKE	69-C
143548	10/11/2007 10:53	970 FIBER GLASS RD	78-K
143937	10/18/2007 6:21	2300 PATTERSON ST	65-P
144238	10/23/2007 7:55	7931 MCCRORY LANE	94-J
144800	10/31/2007 8:33	I24	26-F
145660	11/14/2007 7:15	1132 MURFREESBORO PIKE	89-C
145661	11/14/2007 7:22	2201 BANDYWOOD DR	86-O
145662	11/14/2007 7:30	1001 HUNTERS LANE	
145753	11/14/2007 15:07	I65 & SPRING STREET OFF RAMP	
145993	11/19/2007 13:18	PORTER RD	58-A
146021	11/19/2007 14:28	NASHBORO BLVD	104-M
146371	11/28/2007 11:05	827 STONEBROOK BLVD	
146795	12/5/2007 6:17	311 CANNA DR	97-K
147093	12/10/2007 14:44	3720 DICKERSON PIKE	
147729	12/26/2007 7:55	32 E THOMPSON LANE	89-K
147737	12/26/2007 8:26	1755 LAKE ROAD	
147739	12/26/2007 8:42	591 N DUPONT AVE	20-J
147940	12/31/2007 6:45	287 PARAGON MILLS RD	102-P
149710	1/30/2008 6:29	3939 APACHE TRAIL	114-J
149726	1/30/2008 9:30	ED TEMPLE	65-B
150040	2/4/2008 6:29	4940 STILLWOOD DR	112-E
150041	2/4/2008 6:29	4940 STILLWOOD DR	
150167	2/5/2008 6:51	901 VILLAGE CT	67-C
150262	2/6/2008 6:21	7670 HIGHWAY 70 S	106-B
150263	2/6/2008 7:18	380 HARDING PIKE	113-B

Service Request #	Date Time Initiated	Problem Address	Handy Map Page
150996	2/19/2008 13:04	3268 BRICK CHURCH PIKE	26-P
153477	3/26/2008 6:52	947 HITT LN	6-M
153681	3/28/2008 7:38	831 NETHERLANDS DR	51-M
156273	4/30/2008 6:18	401 ELAINE CT	28-D
156276	4/30/2008 7:37	245 GREAT CIRCLE RD	46-N
156415	5/1/2008 6:49	245 GREAT CIRCLE RD	46-N
156417	5/1/2008 7:29	106 24TH ST	63-D
157064	5/8/2008 10:00	2201 DICKERSON PIKE	46-H

List of Water Quality Investigations Documented in City Works in Permit Year 5

Service Request #	Date Time Initiated	Problem Address	Map Page
134846	7/10/2007 8:04	2421 LEBANON PK	69-C
136441	7/30/2007 6:33	4001 GALLATIN PK	28-N
138828	8/2/2007 12:59	2634 MURFREESBORO PIKE	115-H
138846	8/2/2007 14:20	303 OCEOLA	64-N
139583	8/14/2007 11:23	3000 NOLENSVILLE RD	88-P
139988	8/20/2007 9:38	2126 ABBOTT MARTIN RD	86-O
140001	8/20/2007 10:02	4202 HARDING PIKE	
140015	8/20/2007 10:52	6020 PANAMA DR	61-B
140287	8/23/2007 9:44	408 6TH AVE S	66-L
140567	8/28/2007 6:56	208 CRUTCHFIELD	
140568	8/28/2007 7:24	1041 MURFREESBORO PIKE	79-P
141072	9/5/2007 9:03	HAWKS NEST DRIVE & BRIDGECROSS PKY	
141378	9/10/2007 9:01	1019 PATRICIA DR	79-P
141386	9/10/2007 9:19	818 TUCKAHOE	18-L
142056	9/19/2007 10:33	922 DRUMMOND DR.	89-P
142254	9/24/2007 6:55	407 CRAIGHEAD ST	
142832	10/2/2007 6:59	5544 OLD HICKORY BOULEVARD	61-G
142833	10/2/2007 7:10	110 STEWARTS FERRY PIKE	70-A
142834	10/2/2007 7:40	4220 HARDING PIKE	75-P
143045	10/4/2007 7:44	4220 HARDING RD	75-P
143052	10/4/2007 9:10	2523 DICKERSON PK	13-P
143056	10/4/2007 9:28	7061 HIGHWAY 70 SOUTH	107-B
143069	10/4/2007 10:35	4869 TORBAY DR	113-G
143071	10/4/2007 11:01	1413 DICKERSON PIKE	46-M
143417	10/10/2007 7:59	2404 BELMONT BLVD	77-N
143420	10/10/2007 8:10	3590 HERMITAGE IND DR	61-B
143433	10/10/2007 8:44	2400 LEBANON PIKE	69-B
143595	10/12/2007 6:25	1413 DICKERSON PK	13-P
143596	10/12/2007 6:37	2927 HARLIN DR	88-K
143793	10/16/2007 6:14	4015 GALLATIN RD	28-N
143938	10/18/2007 7:49	61 EAST THOMPSON LANE	89-F
143979	10/18/2007 14:02	4224 ANDREW JACKSON	51-L
145269	11/8/2007 7:29	3424 COUNTRY WAY RD	116-H
145276	11/8/2007 8:35	4900 CENTENNIAL	
145575	11/13/2007 6:16	912 RIVERGATE PW	14-D
145769	11/15/2007 7:04	908 BLUFF RD	
146051	11/20/2007 6:40	4701 LEBANON PIKE	41-N
146152	11/26/2007 6:57	4560 HARDING PIKE	85-B
146831	12/5/2007 12:17	2400 WEST HEIMAN ST	55-O
147114	12/11/2007 8:22	1120 MURFREESBORO RD	89-C
147116	12/11/2007 8:25	4023 NOLENSVILLE RD	102-N
147117	12/11/2007 8:28	4021 NOLENSVILLE RD	102-N
147119	12/11/2007 8:42	73 WHITE BRIDGE RD	75-O

Service Request #	Date Time Initiated	Problem Address	Map Page
147289	12/13/2007 6:46	26 WHITE BRIDGE PK	75-O
147290	12/13/2007 7:01	989 MURFREESBORO PK	79-O
147291	12/13/2007 7:42	40 WHITE BRIDGE RD	75-O
147584	12/19/2007 6:24	OSAGE ST	
148244	1/7/2008 8:52	2512 OSAGE ST	55-K
148908	1/15/2008 7:29	2200 HARDING PL	
149013	1/16/2008 7:17	2000 GALLATIN PIKE	28-N
149072	1/16/2008 14:03	302 MURFREESBORO PIKE	78-B
149163	1/18/2008 6:44	5212 HARDING PIKE	103-K
149709	1/30/2008 6:27	4601 MURPHY RD	75-G
150268	2/6/2008 8:04	853 BELL RD	128-K
150637	2/12/2008 8:31	550 HARDING PLACE	112-C
150883	2/19/2008 7:16	310 PEABODY ST	66-L
150884	2/19/2008 7:21	1162 ANTIOCH PIKE	102-H
150886	2/19/2008 7:58	3635 BAXTER RD	1-N
151157	2/21/2008 6:29	367 ELYSIAN FIELDS	
151158	2/21/2008 7:47	409 INDIAN TRAIL	28-L
151509	2/27/2008 9:32	807 GALLATIN PIKE S	28-B
151639	2/29/2008 7:31	1529 4TH AVE S	78-E
152023	3/6/2008 6:45	218 MAPLE ST.	19-P
152394	3/11/2008 13:20	130 W TRINITY LN	46-H
152875	3/18/2008 13:31	3455 LEBANON RD	51-N
153209	3/21/2008 6:38	2705 MURFREESBORO PKE	115-H
153680	3/28/2008 7:09	2633 LEBANON PIKE	69-D
153682	3/28/2008 7:41	1877 AIRLANE DR	79-D
153683	3/28/2008 7:53	2531 GLENROSE DR	89-E
155032	4/15/2008 6:42	238 W TRINITY LANE	46-H
155033	4/15/2008 6:55	4500 HARDING PIKE	85-C
155606	4/22/2008 6:41	1000 OLD DRY CREEK RD	
155607	4/22/2008 6:57	1469 GALLATIN PIKE	28-N
155705	4/23/2008 6:49	1473 COUNTY HOSPITAL RD	54-G
155706	4/23/2008 6:55	714 FESSLERS LANE	78-C
155861	4/24/2008 11:58	1155 BELL RD	127-M
156274	4/30/2008 6:31	3115 CLARKSVILLE PIKE	45-N
156310	4/30/2008 11:19	957 RICHARDS RD	114-K
156313	4/30/2008 11:27	601 THOMPSON LANE	88-K
156416	5/1/2008 7:14	295 COMROE	113-C
156418	5/1/2008 7:35	3941 NOLENSVILLE RD	102-N
156422	5/1/2008 8:21	1440 GALLATIN RD	14-M
156520	5/2/2008 6:16	2723 LAKELAND	69-M
156521	5/2/2008 6:23	3064 HIDDEN CREEK DR.	142-P
156841	5/6/2008 10:27	3402 CLIFTON PIKE	65-E
156946	5/7/2008 8:41	1 VANTAGE WY	46-N
156950	5/7/2008 8:51	11 VAUGHNS GAP RD	
158132	5/21/2008 6:28	1901 ED TEMPLE BLVD	55-B

Service Request #	Date Time Initiated	Problem Address	Map Page
158573	5/28/2008 7:58	4406 CHARLOTTE	64-R
158574	5/28/2008 8:06	655 COLICE JEANNE RD	106-H
158576	5/28/2008 8:21	3420 LEBANON RD	61-A
158928	6/2/2008 9:09	1136 2ND AVE N	56-K
159055	6/3/2008 6:48	5106 OLD HICKORY BLVD	42-C
159101	6/3/2008 11:13	957 RICHARDS RD	114-K
159174	6/4/2008 6:07	1019 PATRICIA DR	79-P
159379	6/6/2008 6:25	1624 ELM HILL PIKE	79-C
159605	6/10/2008 8:17	315 3RD AVE S	66-L
159692	6/10/2008 13:05	5409 CHARLOTTE PIKE	64-O
159927	6/13/2008 9:28	3435 LEBANON PIKE	60-D
161889	6/26/2008 14:54	544 SINGER DR	20-E
134979	7/11/2007 9:41	3938 W VALLEY DR	113-M
138817	8/2/2007 12:08	3416 OLD HICKORY BV	30-M
139044	8/6/2007 14:43	1038 4TH AVENUE NORTH	77-D
140703	8/29/2007 9:47	1 FOX VALE LN	147-F
141101	9/5/2007 11:16	1816 8TH AVENUE SOUTH	
141786	9/14/2007 12:02	2122 HILLSBORO RD	99-B
142646	9/27/2007 15:20	839 SUTTON HILL RD	87-L
143101	10/4/2007 13:52	1211 BRICK CHURC PIKE	46-P
143161	10/5/2007 13:09	2642 EDGE OF LAKE	115-D
143871	10/17/2007 7:48	5345 CHARLOTTE AVENUE	64-O
144254	10/23/2007 10:00	5610 OLD HICKORY BV	23-F
144260	10/23/2007 10:13	4244 ANDREW JACKSON	
147396	12/14/2007 13:46	816 HILLWOOD BLVD	74-G
147707	12/21/2007 10:23	HERMITAGE & DECATUR	67-K
148560	1/10/2008 9:11	1412 BRICK CHURCH PIKE	
149211	1/18/2008 15:43	1500 BRENTRIDGE DRIVE	127-K
152505	3/12/2008 13:22	915 VISCO DRIVE	67-L
157552	5/14/2008 9:50	105 RUSTIC CT	59-E
158652	5/28/2008 15:12	Reostone Quarry	
159939	6/13/2008 10:30	BELL GRIMES & THACKERY	
160382	6/17/2008 15:41	121 SPENCE LANE	68-F
149670	1/29/2008 11:08	720 DAVIDSON ST	66-H
150885	2/19/2008 7:27	3901 CLARKSVILLE PIKE	44-D
153744	3/28/2008 15:27	MT. VIEW ROAD & BELL ROAD	128-K
159459	6/6/2008 15:06	5720 HEARTHSTONE LN	125-N
155949	4/25/2008 12:19		
158880	5/30/2008 14:48	1820 GALLATIN PIKE	15-A
159341	6/5/2008 13:32	1301 DAVIDSON ST	67-F
160797	6/19/2008 13:04	7401 HIGHWAY 100	120-B
147764	12/26/2007 11:10	330 PLUS PARK BLVD	79-N
171950	7/16/2007 15:04	1360 BRICH CHURCH PK	
171956	10/2/2007 15:16	FIRESTONE PKWY AND J.P. HENNESSY DR	159-L
171959	10/18/2007 15:28	3803 ROLLAND RD	76-N

Service Request #	Date Time Initiated	Problem Address	Map Page
171967	2/8/2008 15:37	6003 NEIGHBORLY AVE	75-A
171969	1/3/2008 15:47	806 RED TANAGER CT	

List of Construction-Related Investigations of Non-Permitted Sites in Permit Year 5

Service Request #	Date Time Initiated	Problem Address	Map Page
150570	2/11/2008 12:10	217 WESLEY CT	83-B
134857	7/10/2007 8:33	4TH @ CHARLOTTE	
135689	7/19/2007 8:04	402 LARKWAY CT	126-F
139042	8/6/2007 14:36	4310 C LONE OAK RD	
139243	8/8/2007 15:25	2330 BAKER RD	2-D
144451	10/25/2007 11:59	118 38TH AVE N	76-A
144515	10/26/2007 10:02	5531 EDMONDSON PIKE	125-P
144572	10/26/2007 15:11	4414 ASHALND CITY HWY	44-A
145099	11/6/2007 8:54	442 PARAGON MILLS	
145185	11/6/2007 15:36	2141 FAIRFAX AVE	76-M
145208	11/7/2007 9:16	7416 MAGGIE DR	158-J
145443	11/9/2007 12:30	5100 WHITES CREEK	11-F
145610	11/13/2007 9:46	1125 RADNOR GLEN	123-C
145854	11/15/2007 14:30	WALKER LANE	19-K
145856	11/15/2007 14:49	6115 CHARLOTTE PIKE	63-R
145979	11/19/2007 11:35	0 BUENA VISTA PIKE	34-A
146090	11/20/2007 14:34	4264 JAMESBOROUGH PL	99-H
146123	11/21/2007 9:46	813 HILLWOOD	74-L
146353	11/28/2007 8:15	707 CANTRELL AVE	85-D
146400	11/28/2007 14:10	2829 CLARKSVILLE PIKE	55-B
146754	12/4/2007 9:50	108 W. WEBSTER ST.	28-B
147172	12/11/2007 13:19	2505 DICKERSON PIKE	46-D
147180	12/11/2007 13:28	713 LYNNBROOK	86-A
147184	12/11/2007 13:37	4884 OLD HICKORY	42-G
147341	12/13/2007 14:12	212 SHADY GROVE	
147429	12/17/2007 8:04	0 MT PISGAH RD	140-R
147528	12/18/2007 7:37	4010 BLUEBERRY HILL RD	10-P
147529	12/18/2007 7:52	2504 POLO PLACE	140-R
147699	12/21/2007 9:33	0 ELM HILL PIKE	69-N
147890	12/28/2007 8:23	556 BRENTVIEW HILLS	
147942	12/31/2007 8:00	116 CLYDELAN CT	97-M
148549	1/10/2008 7:36	2300 CLIFTON AVE	65-L
148667	1/11/2008 7:50	2005 19TH AVE. S	76-M
148668	1/11/2008 7:52	4016 DORCAS	85-P
148759	1/11/2008 15:23	3494 DICKERSON PIKE	27-F
148767	1/11/2008 16:12	1312 HARDING PLACE	99-L
148771	1/14/2008 7:18	4107 ESTES	98-D
148847	1/14/2008 10:44	5821 CHASEVIEW	
149353	1/23/2008 13:20	5024 CHURCHILL	112-K
149389	1/24/2008 7:11	3950 DICKERSON PK	
149451	1/24/2008 15:31	MCMURRAY DRIVE	125-H
149542	1/28/2008 9:14	3501 TRAIL HOLLOW	
149544	1/28/2008 9:22	1410 CLIFTON LANE	87-J

Service Request #	Date Time Initiated	Problem Address	Map Page
149573	1/28/2008 10:53	SNEED RD	134-F
149950	2/1/2008 10:03	1014 16TH AVE. S	77-A
150001	2/1/2008 13:32	4402 SUNNYBROOK	98-G
150168	2/5/2008 7:20	BELL RD	128-J
150169	2/5/2008 7:48	5103 CLARKSVILLE	
150242	2/5/2008 14:21	1501 LEBANON PIKE	68-K
150608	2/11/2008 14:54	6640 OLD CLARKSVILLE PIK	
150770	2/13/2008 14:53	7925 CHARLOTTE PIKE	95-B
151615	2/28/2008 13:20	106 GLENROSE AVE	88-C
151617	2/28/2008 13:32	6001 OLD HICKORY BLVD	142-O
151640	2/29/2008 7:37	424 CUMBERLAND PLACE	99-F
151941	3/5/2008 7:57	2113 SHARONDALE	86-C
151975	3/5/2008 13:01	LUCAS LANE	
152035	3/6/2008 9:28	2245 KLINE AVE	88-B
152038	3/6/2008 9:45	820 HUNTWOOD PLACE	96-A
152045	3/6/2008 10:15	7575 OLD CHARLOTTE PIKE	82-D
152051	3/6/2008 10:35	811 BEAZER LANE	128-L
152093	3/6/2008 15:34	4120 GOURLEY RD	94-C
152095	3/6/2008 15:42	8485 OLD CHARLOTTE PIKE	94-C
152294	3/10/2008 15:43	8080 OLD CHARLOTTE PIKE	94-D
152440	3/12/2008 7:31	1324 BELLSHIRE DR	17-M
152444	3/12/2008 8:28	1216 DICKERSON PIKE	14-E
152493	3/12/2008 11:59	4312 WESTLAWN	75-H
152679	3/14/2008 14:37	2225 11TH AVE	55-C
152815	3/18/2008 9:26	3528 TRIMBLE CT	99-E
152917	3/19/2008 8:06	1328 BELLSHIRE	17-L
153121	3/20/2008 10:46	705 N GRAYCROFT AVE	19-E
153259	3/21/2008 15:10	3707 WHITES CREEK PIKE	25-K
153620	3/27/2008 10:50	4175 CREEK TRAIL	
154108	4/3/2008 13:07	5657 LICKTON PIKE	6-F
154111	4/3/2008 13:15	1711 SOUTH HAMILTON	54-D
154574	4/9/2008 7:29	101 E CAMBELL	19-C
155034	4/15/2008 7:33	133 37TH AVE N	76-A
155107	4/15/2008 13:28	5529 OLD HICKORY BLVD	61-R
155257	4/16/2008 14:11	0 VISTA LANE	35-E
155584	4/21/2008 14:55	7734 HIGHWAY 70S	
155585	4/21/2008 14:59	0 CANE RIDGE RD	143-A
155812	4/24/2008 8:21	13609 OLD HICKORY BLVD	158-M
155900	4/24/2008 15:17	1010 CINDER RD	15-P
155945	4/25/2008 11:45	8231 HIGHWAY 70 S	94-R
156836	5/6/2008 10:17	GWYNNWOOD DR	
156856	5/6/2008 11:17	1314 BAPTIST WORLD CENTER DR	46-P
156883	5/6/2008 12:40	1326 BAPTIST WORLD CENTER	
157104	5/8/2008 13:33	4701 ASHLAND CITY HWY	43-A
157385	5/13/2008 6:42	232 HARDING PLACE	97-D

Service Request #	Date Time Initiated	Problem Address	Map Page
157452	5/13/2008 11:43	700 WINTER CT	141-J
157515	5/14/2008 6:45	3875 WHITES CREEK PIKE	25-E
157817	5/16/2008 15:27	4728 INDIAN SUMMER	12-K
157994	5/20/2008 7:35	5521 CLARKSVILLE PIKE	10-H
158215	5/21/2008 15:08	100 RIVER CT	
158224	5/21/2008 15:43	2906 FOSTER CREIGHTON AVE	88-K
158247	5/22/2008 8:35	2408 DICKERSON PIKE	46-D
158254	5/22/2008 9:20	1214 DICKERSON PIKE	14-E
158260	5/22/2008 9:52	2632 BRICK CHURCH PIKE	
158295	5/22/2008 11:46	8439 MCCRORY LANE	118B-O
158589	5/28/2008 9:27	4928 INDIAN SUMMER DR	12-K
159056	6/3/2008 7:13	0 RIVER TRACE	42-A
159267	6/5/2008 7:01	3108 BLEVINS RD.	
159604	6/10/2008 8:15	3421 MEADOWLAKE TERRACE	
159715	6/10/2008 15:21	5484 LICKTON PIKE	6-E
159723	6/10/2008 16:01	0 BENZING RD	
159821	6/12/2008 6:41	5115 BRIARWOOD	112-M
159954	6/13/2008 12:08	CRAFT RD	
160184	6/17/2008 7:32	HIGHWAY 431	46-D
160868	6/20/2008 6:57	2326 CLAY LICK	5-P
161292	6/24/2008 7:55	2120 ROSA L PARKS BLVD	
161324	6/24/2008 9:08	RED FEATHER	
161435	6/24/2008 14:19	1209 LYRIC	17-H
161883	6/26/2008 14:45	3678 DICKERSON PIKE	18-B
161887	6/26/2008 14:52	1006 GILLOCK ST	37-N
162093	6/27/2008 14:24	96 TAYLOR ST	56-F
142765	10/1/2007 9:58	0 CAMPBELL RD	13-G
143143	10/5/2007 10:08	5020 LITTLE MARROWBONE	
143146	10/5/2007 10:47	1919 GALLATIN PIKE	15-A
143774	10/15/2007 15:16	5491 CLARKSVILLE PIKE	10-H
143794	10/16/2007 8:15	131 BELLVUE ROAD	
144138	10/19/2007 15:52	3249 MASONWOOD DRIVE	26-M
145879	11/16/2007 8:40	6481 CLARKSVILLE PIKE	4-K
150524	2/11/2008 7:47	4612 INDIAN SUMMER DRIVE	
161445	6/24/2008 14:45	1209 LYRIC	17-H
161482	6/24/2008 16:34	4104 PEEBLES	
161484	6/24/2008 16:34	4104 SKYLINE	85-R
142033	9/19/2007 7:29	7647 SAWYER BROWN RD	96-A
134268	7/2/2007 11:15	4820 LEBANON RD	41-O
134844	7/9/2007 16:20	421 VAILVIEW DR	26-R
134223	7/2/2007 9:18	3316 SKYLINE DRIVE	86-N
134382	7/3/2007 13:38	METRO PARKS-CUMBERLAND RIVER GREENWAY	
135753	7/19/2007 13:07	424 CUMBERLAND PL	99-F
136014	7/24/2007 8:09	721 PALMETTO CT	140-J
136278	7/26/2007 11:18	7464 STECOAH CT	

Service Request #	Date Time Initiated	Problem Address	Map Page
136518	7/30/2007 13:21	7474 BIDWELL RD	4-C
138602	7/31/2007 11:51	131 MEGHANA DR	
139313	8/9/2007 14:35	11TH ARCADE	21-P
140422	8/24/2007 14:51	408 AMERICAN RD	74-D
140801	8/30/2007 10:13	106 JACKSONIAN	50-D
140945	9/4/2007 8:46	2535 DICKERSON RD	36-N
143818	10/16/2007 10:35	1852 WOODLAND POINTE DR	
146142	11/21/2007 12:01	2215 HOBBS RD	99-A
148567	1/10/2008 9:36	104 HARROW CT	106-D
150712	2/12/2008 15:26	1814 COUNTY HOSPITAL RD	44-R
153446	3/25/2008 14:19	1533 HARDING PLACE	99-K
154667	4/9/2008 14:27	1453 OCOEE TRL	30-N
155644	4/22/2008 11:06	1010 CINDER RD	15-P
157066	5/8/2008 10:07	8240 OLD SPRINGFIELD HWY	3-F
157259	5/12/2008 9:53	3304 NEVADA AVENUE	65-N
158784	5/29/2008 14:18	723 PATRICIA DRIVE	79-G
158786	5/29/2008 14:29	2712 DONNA HILL DRIVE	49-F
159339	6/5/2008 13:13	161100B20700CO	125-M
147302	12/13/2007 9:27	3616 WHITES CREEK PIKE	25-K
140442	8/26/2007 11:19	4002 HARDING	98-G
147024	12/10/2007 7:25	4305 CENTRAL PIKE	62-P
149234	1/22/2008 9:14	HOBSON PIKE	
151820	3/4/2008 7:45		
143826	10/16/2007 10:51	729 MCMURRAY DRIVE	125-G
143827	10/16/2007 10:53	1420 RURAL HILL ROAD	128-F
143828	10/16/2007 10:57	1412 RURAL HILL ROAD	128-F
143905	10/17/2007 13:11	2088 STANFORD VILLAGE DRIVE	142-N
143909	10/17/2007 13:15	CLASSIC MEADOWS	
156104	4/28/2008 12:10	761 DARDEN PLACE	74-P
157711	5/15/2008 10:45	BLUE HOLE COURT	142-C
134596	7/6/2007 9:51	1812 WOODLAND FARMS COURT	41-E
141514	9/11/2007 11:09	2521 HOBSON PK	117C-L
142456	9/26/2007 8:58	1921 10TH AVE N	55-H
144416	10/25/2007 8:06	6125 MT PISGAH	17200006400
144735	10/30/2007 10:11	3536 CENTRAL PIKE	61-E
147307	12/13/2007 10:01	5683 HIGDON RD	
153866	4/1/2008 6:30	980 BATTLE ROAD	

List of Public Works HAZMAT Team Spill Responses in Permit Year 5

Date	Location	Situation	Actions
07/02/2007	Broadway @ 4th Ave. N.	oil spill	put down 50 lbs of absorbent
07/02/2007	8th Ave. @ Monroe St.	blood clean up	put down bleach and water and 50 lbs of absorbent
07/03/2007	Bluff Rd.	oil in gal containers beside creek (7)	picked up the oil
07/08/2007	Knowles St @ 17 th. Ave. N.	blood clean up	put down bleach and water and picked up bloody towels etc.
07/14/2007	Wedgewood Ave. @ I-65 S on ramp	about 40 to 50 gallons of cooking grease on road and on ramp	put down absorbent on roadway. TDOT also put down absorbent , they had their spreader with them
07/15/2007	Nall St @ Robertson Ave.	oil substance in road	put down absorbent
07/15/2007	644 Denver Dr. @ Topeka Dr.	oil spill about 15 gallons	put down absorbent and broomed material around because of thickness
07/18/2007	Woodmont Blvd. @ Benham	oil spill	used 200 lbs of spill gone
07/19/2007	I-40 W @ Charlotte Pk. off ramp	oil spill	used 1300 lbs spill gone
07/21/2007	214 2nd. Ave N.	oil on road	put 25 lbs absorbent on road
07/23/2007	336 Berry St.	blood wash down	cleaned up w/bleach water solution
07/25/2007	3800 Charlotte Ave	approx 100 gals. of diesel spilled on fuel island at west center	10 cubic yd. of sand/1000 lbs spill-gone to cover and pick up. First response notified.
07/25/2007	Wheeler Ave. @ Nolensville Pk.	diesel spill	used 50 lbs spill gone to cover product
07/27/2007	10th Ave. N. @ Herman St.	antifreeze spill in rd	used 50 lbs spill gone
07/29/2007	Dickerson Pk @ West Maplewood Dr.	oil spill	used 10 lbs spill gone
08/01/2007	Davidson Rd. @ Lamar Dr.	hydraulic spill	used 100 lbs spill-gone to cover
08/12/2007	Briley @ centennial Blvd	oil in road	covered w/15 lbs. spill gone
08/14/2007	Elm Hill Pk. @ Fesslers Ln	diesel on road	70lbs of absorbent on road
08/19/2007	Broadway @ 4th Ave. N.	antifreeze spill	used 10 lbs of spill-gone
08/22/2007	Brick Church @ Ewing Dr.	oil spill	covered with spill gone approx. 1000 lbs
08/22/2007	14th Av. @ Whelless Rd.	blood wash down	clean w/bleach water solution and put in 5- gal bucket.
08/30/2007	O.H.B. @ Hwy. 70 S.	oil spill	put down 400 lbs of spill gone
08/30/2007	5th Ave. S. @ Broadway	oil spill	put down 100 lbs absorbent
09/01/2007	Lickton Pk. @ Claylick Dr.	oil spill	put down 100 lbs of spill-gone and broomed
09/09/2007	Shutes Ln @ Saundersvile	roadway slippery	covered w/1500 lbs spill gone
09/12/2007	Centennial @ Briley	diesel spill (approx 20 gal.)	covered with spill gone (300 lbs)

Date	Location	Situation	Actions
09/15/2007	5th @ Deaderick St.	blood wash down	cleaned up w/bleach water solution and 5 lbs spill gone and placed in 5 gal. bucket
09/20/2007	1508 Amberwood	blood washdown	bleach water solution; cleaned up w/spill gone
09/20/2007	Briley @ Ellington Pkwy	blood and flesh clean up	Put down bleach and water, absorbent and put in bio-hazard bag and bucket
09/20/2007	Dickerson Pk. @ W. Maplewood Ln.	blood clean up due to fatal accident	used bleach/water solution and 2 lbs. of spill gone
09/23/2007	East Campbell @ One Mile Pkwy.	5 -gal oil in road	put down 450 lbs of spill gone over spill
09/25/2007	2124 Mc Author Dr	fuel spill	put down absorbent and broomed, brought container to special ops
09/26/2007	Gallatin @ Greenwood	Aprox. 5-10 gal of diesel on road	put down 150 lbs spill gone
10/03/2007	Anderson Ln @ Becklea St.	blood washdown	sprayed bleach/water and put down absorbent
10/10/2007	Rosa L Parks @ I-65	oil spill	used 1150 lbs of spill gone
10/19/2007	McCory Ln @ Hwy 70	approx 70 gals. hydraulic fluid on road	covered spill with spill gone (used approx 1500 lbs.)
10/21/2007	1330 Vultee Blvd	blood clean up	put down bleach and water and 25 lbs absorbent
10/24/2007	118 7th Ave N.	3 units of blood	put blood units in 5 gal bucket
10/28/2007	Briley @ Ellington	oil in roadway 10-15 qts.	covered with 15 lbs spill gone
10/29/2007	Murfreesboro Rd. @ Old Murfreesboro Rd	approx. 20 - 30 gals. of diesel on road	covered with 900 lbs of spill gone…. First Response cleaned up
11/01/2007	210 S Gallatin Rd.	blood wash down	cleaned blood with bleach/water solution
11/03/2007	Charlotte Pk. @ 40th Ave. N.	blood clean up	put bleach/water and absorbent
11/10/2007	Charles S. Davis @ Murfreesboro Pk.	blood clean up	Put into 5 gallon bucket and sprayed down bleach/water
11/20/2007	Mcgavock @ Cooper Lane	hydraulic oil on roadway	covered w/800 lbs spill gone
11/25/2007	Shute Ln. @ Saundersville	oil on roadway	covered with 600 lbs spill gone
12/08/2007	Sandhurst Dr. @ Cheyenne Blvd.	oil in road	put down 150 lbs absorbent
12/14/2007	6th Ave. @ Oak St.	blood washdown	cleaned with bleach/water solution
12/14/2007	Bell Rd. @ Elm Hill Pk.	fluids in road from MVA (fatal)	covered fluids on roadway with 300 lbs spill gone
12/17/2007	Ellington @ Hart Ln	approx. 15 - 20 gal. gas on road	covered with spill gone --200 lbs
12/17/2007	316 Broadway	blood washdown	cleaned with bleach/water solution
12/18/2007	Charlotte Pk. @ 18th Ave. in the alley	oil in alley	covered with approx. 600 lbs spill gone
12/26/2007	Nolensville Rd. @ Elgin St.	blood on road	used bleach/water and absorbent and put in 5 gal. bucket.

Date	Location	Situation	Actions
01/15/2008	Great Circle @ Vantage way	hydraulic oil approx 10-15 gal.	covered w/spill gone and put in 5 gal buckets for disposal
02/10/2008	2nd Ave. N. @ Church St.	blood clean up	put down absorbent and bleach/water to clean sidewalk
02/11/2008	6th Ave. N. @ Jefferson St.	oil spill	covered product with spill gone approx. 200 lbs.
02/14/2008	4th Ave. @ Peabody	oil spill (approx 1-2 gal)	covered with 25 lbs. spill gone
02/15/2008	118 7th Ave. North	blood wash down	cleaned up w/bleach water solution and spill gone and placed in 5-gal bucket
02/15/2008	Gleaves @ 9th Ave.	blood wash down	cleaned with bleach/water solution and put in 5-gal bucket
02/17/2008	7th Ave. N @ Garfield St.	blood clean up	put down bleach/water and put in 5-gal bucket
02/18/2008	Glenrose @ Foster	blood wash down from traffic accident (fatal)	cleaned with bleach/water solution and covered with approx 10 lbs. spill gone
02/27/2008	McCory Creek @ Elm Hill	approx. 10-15 gal of fuel on road	covered with 1000 lbs spill gone
02/28/2008	N. 1st @ Spring St.	5 gal oil spill	covered with 25 lbs of spill gone
03/07/2008	Ellisian Fields @ Lynn Dr.	oil on road	covered product with approx. 500 lbs spill gone
03/16/2008	5701 Nollensville Rd	shooting / blood clean up	put bleach and water on blood used 10 lbs absorbent
03/28/2008	31st @ Alameda	blood wash down	cleaned with bleach water solution and put in 5 gal. bucket
04/01/2008	1501 Church St.	gas spill approx 2-gal.	approx 2-gal gas spill covered with spill gone and swept up and put in bucket
04/04/2008	Riverside @ Lakeview Dr.	spill (approx. 2--5 gals. gas)	covered with spill gone 100lbs
04/10/2008	Union St At 5th Ave North	oil on road	put down 300 lbs of absorbent on spill
04/12/2008	3rd. Ave. N @ Commerce St.	oil in road	put down 50 lbs spill gone
04/12/2008	Hickory Hills Blvd @ OHB	oil spill	picked up sand that fire dept. put down to cover the spill
04/15/2008	Eatons Creek @ Carrington Pl.	hydraulic spill from solid waste truck	put 150 lbs of spill gone on product and roadway
04/16/2008	6110 California Ave. (in the alley behind this location)	approx. 75 gals. of oil dumped in alley	cleaned up oil and used approx 800 lbs spill gone
04/17/2008	Lebanon Pk. @ Spence Ln.	oil spill	put down 1300 lbs spill gone (approx 3 miles long)
04/17/2008	270 Tampa Dr	blood clean up	put down bleach and water mixture, absorbent and put into sealed container
04/21/2008	Myatt Dr. @ Spring Branch	oil in roadway	covered with approx 300 lbs of spill gone
04/22/2008	1st Ave. S @ Broadway	oil on roadway	put down spill gone and broomed
04/23/2008	Gallatin @ Walton Ln	oil spill 2 blocks long	covered with spill gone (700lbs)
04/25/2008	Main Stream Dr. @ Rosa L Parks Blvd.	diesel spill	put down absorbent but First Response did the clean up
04/26/2008	Whites Creek Pk @ Scotts Market	gas spill approx 5-10 gallons	covered with 100lbs spill gone
05/01/2008	114 Whitsette Rd.	blood clean-up	put bleach/water and absorbent (10 lbs)

Date	Location	Situation	Actions
05/03/2008	6974 Clarksville Pk.	fatal/blood clean up	put bleach/water solution and absorbent on the road
05/04/2008	5004 Olivia Dr. @ Bart Dr.	oil on road	driver/home owner put absorbent down on road
05/06/2008	Caoital Blvd @ Union St	blood clean up	put down bleach and water to clean area
05/07/2008	O.H.B. @ Vaughns Rd.	oil spill	Approx. 5 gallons of oil in road / covered with spill gone
05/09/2008	30th Av. @ Hadley Av.	form oil in road	covered with 600 lbs spill gone
05/11/2008	Hillsboro Dr. @ Hillsboro Pk	oil in road	put down 500 lbs spill gone. It was raining very hard so I returned later to check on situation.
05/16/2008	Hermitage ave. @ Decator	approx 10-15 gallons of oil on road	covered w/ 400 lbs spill gone
05/22/2008	3743 Nolensville Rd.	blood wash down	cleaned w/ bleach water solution and put in bucket for disposal
06/04/2008	Nolensville Rd. @ Lenox Village	fatal/blood clean up	put bleach and water and absorbent on road
06/05/2008	2218 Dearborn Dr. @ Barker Rd.	blood on ground and grass	used bleach/water and absorbent on the blood
06/05/2008	Centennial Park @ 25th Ave. n.	blood clean up	could not find with the info I had.
06/07/2008	925 16th Ave. N.	blood clean up	put bleach/water and absorbent on the sidewalk
06/21/2008	McCory Creek @ Niagara	oil in road	covered with 75 lbs spill gone
06/25/2008	Oak Valley Dr. @ Dickerson Pk.	paint in rd.	put down absorbent / put dry paint in 5-gal. bucket
06/26/2008	8th Ave @ Division	Grease spill on road (approx 20-30 gal)	covered with spill gone (approx 1600 lbs)
06/26/2008	3301 33rd Ave. N. at Alameda St	blood clean up (shooting)	put down bleach and water, broomed with absorbent, put in sealed container

Industrial Facilities Inspected During Cycle 2

Facility	Address	Watershed	Date of Inspection
Perfection Moulders Inc.	213 Connell St.	Manskers	8/10/2006
Mid-State Plating	2424 14th Ave	Cumberland River	N/A (Not In Business)
Harper Industries (Nashville Plant 1)	1136 Second Ave North	Cso	N/A (Not In Business)
Safety-Kleen (Wt) Inc./Clean Harbors	1640 Antioch Pike	Mill Creek	5/31/2006
Metro Ready Mix (Nashville Plant 2))	1020 Visco Dr	Cumberland River	01/10/2008
Metro Ready Mix - Vulcan Quarry	6961 River Road	Overall Creek	01/11/06
North American Composites	582 Brick Church Park Dr.	Ewing Creek	01/15/08
Bruce Hardwood Flooring L.P. Nashville Plant (Armstrong)	5400 Centennial Blvd.	Richland	01/19/05
Rhodia Inc. (Innophos)	4600 Centennial Blvd.	Cumberland	01/19/05
Polar Technology Llc	1360 Foster Ave	Mill Creek Lower	01/23/08
Metro Ready Mix Concrete	1136 2nd Ave. N	Cso	02/09/06
Alladin Temp Rite	1124 Mezler Rd.	Browns Creek	02/09/06
Imi - Cowan Court	2531 Park Dr.	Cumberland River	02/11/08
Lambs Cleaners	310 East Trinity Lane	Pages Branch	03/02/07
Service Paint & Coatings Co. Inc.	3048 Brandau Rd.	Stones Creek	03/02/07
John P Saad & Sons, Inc.	3655 Trousdale Dr	Sevenmile Creek	03/02/2007
Ashland Distribution Co.	2315 Clifton Ave.	Cso	03/03/06
Smyrna (Eagle) Ready Mix	3040 Brandau Rd.,	Stones Creek	03/06/2007
Nashville Ready Mix	605 Cowan St.	Cumberland River	03/07/06
U.S. Smokeless Tobacco Mfg. L.P.	800 Harrison St.	Cso	03/11/08
Imperial Adhesives Inc.	6100 Centennial Blvd.	Richland	03/21/07
Springs Global Us Nashville Plant	7201 Cockrill Bend Industrial	Cumberland River	03/25/08
Metroplex L'imited	2300 Clifton Pike	Cso	04/02/08
Motiva Nashville Terminal	1717 61st Ave N		04/02/08
Quebecor World Retail Group	2947 Brick Church Pike	Ewing Creek	04/03/2007
Tyson Foods, Inc. (Formerly Ibp)	201 Cartwright St.	Manskers	04/03/2007
Advanced Plating Inc.	1425 Cowan Court Drive	Cumberland River	04/13/07
Mid South Wire	1070 Visco Dr.	Cumberland	04/20/05
Quality Plating	705 Fort Negly Ct	Cso	04/26/05
Reostone Quarry	6614 Robertson Ave.	Richland Creek	05/10/06
Pepsi Cola	715 Thompson Ln.	Browns Creek	05/24/05
Ergon Terminaling Inc. Nashville	1114 Visco Dr.	Cumberland	05/25/06
Ikg Inds	860 Visco Dr	Cumberland	06/01/06

Facility	Address	Watershed	Date of Inspection
Meguiar's Inc.	3258 Ezell Pike	Mill Creek	06/08/05
Thomas Nelson Inc.	501 Nelson Pl.	Mill Creek	06/08/06
Exxon Mobil Corp. Nashville Terminal	1741 Ed Temple Blvd.	Cumberland	06/27/06
U.S. Tva Pinhook 500 Kv Substation	1815 Hobson Pike, Antioch	Stones Creeek	06/27/2007
Warren Paint & Color Co.	700 Wedgewood Ave.	Cso	06/28/06
Safety-Kleen Corp. 3-109-01	215 Whitsett Rd	Sevenmile	06/29/06
Visteon Corp. Nashville Glass Plant	7200 Centennial Blvd.	Cumberland	06/30/06
National Paint & Coatings Co.	3651 Trousdale Dr.	Sevenmile	07/18/06
North American Galvanizing Co. Nashville	200 32nd Ave. N.	Richland Creek	07/26/04
Marcus Paint Co.	638 Benton Ave.	Browns Creek	07/26/04
Whirlpool Corp.	1714 Heil Quaker Blvd.	Stones Creek	08/01/06
Purina Mills L.L.C.	3601 Trousdale Dr.	Browns Creek	08/03/05
Purity Dairies Inc.	360 Murfreesboro Rd.	Browns Creek	08/11/05
Marathon Ashland Petroleum L.L.C.	930 Youngs Ln.	Cumberland River	08/26/04
Du Pont Old Hickory Plant	1002 Industrial Rd.	Cumberland	09/30/04
Key Oil Co.	1232 3rd Ave. N.	Cso	1/03/08
Thermal Ash Phase 3	Cement Plant Rd	Cumberland	1/18/05
Ouimet Corp.	2967 Sidco Dr.	Browns Creek	1/23/2007
Peterbilt Motors Co.	430 Myatt Dr.	Cumberland	1/8/08
Lojac	Hermitage	Stoners Creek	10/12/06
Building Materials Manufacturing (Gaf)	970 Fiber Glass Road	Browns Creek	10/15/04
Ferro Corp. (International Paints, Akzo Nobel)	20 Culvert St.	Browns Creek	10/15/04
Nashville Wire Products	295 Driftwood St	Cso	11/04/04
Nashville Wire Prods.	295 Driftwood Ave.	Cumberland	11/04/04
Imi (Irving Materials Ready Mix)	6616 Robertson Ave.	Cumberland River	11/10/04
Bp Nashville Terminal	1409 51st Ave. N.	Richland Creek	11/19/04
Cone Solvents Inc.	1830 Linder Industrial Dr.	Richland Creek	11/23/04
Nashville Chemical & Equipment Co. Inc.	7001 Westbelt Dr.	Cumberland	11/24/04
Nashville Chemical & Equipment Co Inc	7001 Westbelt Dr		11/24/04
Aerostructures (Vought Industries)	1431 Vultee Boulevard	Mill Creek	12/01/04
National Linen Service	3101 Charlotte Ave	Cso	12/08/04
Odom's Tennessee Pride Sausage Inc.	1201 Neely's Bend Rd.	Cumberland River	12/10/07
Country Delite Farms	1401 Church Street	Cso	12/12/07
Cumberland Terminals Inc	7260 Centennial Blvd		12/13/04
Cumberland Terminals Inc.	7260 Centennial Blvd.	Cumberland	12/13/04

Facility	Address	Watershed	Date of Inspection
Chemrock	2601 Osage Street	Cumberland River	12/16/04
Lawson Ready Mix	5915 River Rd	Overall Creek	12/29/05
Harcros Chemicals Inc.	1418 Poplar Ln.	Mill Creek	12/8/06
Metalworking Products	1 Teledyne Place, Lavergne	Stones Creek	12/8/06
Reemay Inc (Dba) Bba Fiberweb	70 Old Hickory Blvd	Cumberland River/Old Hickory	2/19/08
Lion Oil Company	90 Van Buren Street	Cumberland River	2/21/08
Portion Pac (Choice Foods Of America)	189 Spence Lane	Cumberland River	4/22/08
Nashville Ready Mix	1436 Cowan St.	Cumberland River	4/7/06
Springs Inds. Inc. Bath Fashions Div.	7201 Cockrill Bend Rd.	Richland Creek	6/03/04
Emmanuel Stained Glass Studios Inc.	410 Maple Avenue	Mill Creek	6/26/07
Reddy Ice Nashville	7261 Centennial Blvd.	Cumberland River	7/14/04
Apac Nashville City Asphalt Plant (Lojac)	500 Cowan St.	Cumberland River	7/20/06
Kohl & Madden (Sun Chemical	414 Harding Ind. Dr.	Mill Creek	8/25/06
NASHVILLE TN TERMINAL (Aka Marathon Oil)	930 YOUNGS LN.	Cumberland River	8/26/04
A. Schulman Inc. Nashville Plant	481 Allied Dr.	Sevenmile Creek	8/29/06
Afl Wire Prods. Nashville	5901 California Ave.	Richland	9/22/04
Afl Wire Prods. Nashville	900 63rd Ave. N.	Richland Creek	9/22/04

Metro Nashville's Stormwater Ordinance

ORDINANCE NO. BL2007-1440

An ordinance amending Title 15 of the Metropolitan Code pertaining to the storm water division of the Department of Water and Sewerage Services, all of which is more specifically described herein.

WHEREAS, Section 8.402 of the Charter of the Metropolitan Government of Nashville and Davidson County delegates the authority for the design, construction, maintenance, repair and cleaning of storm sewers to the Department of Public Works; and

WHEREAS, since the adoption of the Charter in 1963, state and federal water quality regulations have been enacted, including the Clean Water Act of 1977 and the National Pollution Discharge Elimination System permit (NPDES) requirements, that affect the Metropolitan Government's storm water management functions and require the Metropolitan Government to take certain protective actions; and

WHEREAS, in May 2002, the Metropolitan Department of Water and Sewerage Services and the Metropolitan Department of Public Works entered into a memorandum of understanding placing the personnel and operational activities relating to the storm water responsibilities with MWS; and

WHEREAS, in order to protect the health and safety of the citizens of Nashville and Davidson County, the Metropolitan Council deems it appropriate that the Metropolitan Code be amended to specifically create a storm water division within Metro Water Services and to provide for the creation of a reasonable storm water user fee to act as a funding mechanism for the storm water division; and

WHEREAS, it is the express intent of the Metropolitan Council that no part of this ordinance be deemed to be a transfer of the authority delegated by the Charter to the Department of Public Works regarding the construction and maintenance of storm sewers.

NOW, THEREFORE, BE IT ENACTED BY THE COUNCIL OF THE METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY:

Section 1. That Title 15 of the Code of the Metropolitan Government of Nashville & Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by adding the following new definitions to Section 15.64.010:

"Storm water facilities" or "flood control facilities" shall mean all natural and manmade conveyances and structures for which the partial or full purpose or use is to convey surface flood runoff water within the jurisdictional boundaries of the Metropolitan Government. This includes all natural conveyances (1) for which the Metro Government has assumed a level of maintenance responsibility; (2) to which the Metro Government has made improvements; (3) which have or may pose a threat to public property because of flooding; or (4) or for which the Metro Government is accountable under federal or state regulations for protecting the water quality within its jurisdictional boundaries.

"Storm water" shall mean storm water run-off, snow melt run-off, surface run-off, street wash waters related to street cleaning and maintenance, infiltration other than infiltration contaminated by seepage from sanitary sewers or other discharges and drainage.

Section 2. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by adding the following new Section 15.64.015 "Storm water division".

15.64.015 Storm Water Division.

There is hereby created a Storm Water Division within the Metropolitan Department of Water and Sewerage Services ("MWS"), which in coordination with the Department of Public Works, the Metropolitan Finance Director, the Metropolitan Department of Codes Administration and the Metropolitan Planning Commission, shall have the responsibility for compliance with the Clean Water Act of 1977, as amended and the National Pollution Discharge Elimination System permit (NPDES) and applicable regulations for storm water discharges; developing storm water management plans; identifying capital requirements and developing necessary financing for maintenance and rehabilitation of existing and new storm water facilities; collecting fees and charges for the division; educating the public on the importance of storm water management and pollution control; developing written regulations and technical guidelines as may be necessary to enforce the terms of this chapter; and other related duties as required by the director ("Director") of MWS. Nothing in this chapter shall constitute a transfer of the authority from the department of public works to MWS regarding the design, construction, maintenance, repair, and cleaning of storm sewers, which authority is delegated to the department of public works by Section 8.402 of the Charter.

MWS shall be responsible for plan approval and construction inspection of both private storm water facilities and public storm water facilities not owned by the Metropolitan Government. Notwithstanding the foregoing, MWS shall not accept storm water management responsibilities for property located within the jurisdictional boundaries of any other government entity within Davidson County unless such responsibility has been agreed to, contracted for and approved by the Metro Council and the appropriate authority for the other government entity. Additionally, MWS may accept the responsibility for the operation and maintenance of private storm water facilities only pursuant to criteria defined and adopted by the storm water management committee and upon a written agreement approved by the Metropolitan Council.

Section 3. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by adding the following new Section 15.64.031 "Funding":

15.64.031 Funding.

To accomplish the purposes of this chapter and pursuant to T.C.A. § 68-221-1107, the Storm Water Division may collect storm water user fees. Such fees shall be reasonable in amount and based on actual or estimated use of storm water and or flood control facilities of the Metropolitan Government. Storm water user fees may be augmented by other funding sources, including but not limited to, allocations of local option sales tax and general tax revenue to storm water drainage improvement projects, collection of fees for special services including but not limited to plans review and inspections, and establishment of a capital recovery fee or fees consistent with state law.

A storm water user fee credit may be applied in those cases where a property owner operates and maintains private storm water facilities or through other actions and activities help reduce or eliminate the burden of storm water quantity and quality control service requirements and costs that a property or properties pose for the Metropolitan Government. All storm water user fees and other funding sources shall be approved by ordinance of the Metropolitan Council. All revenues generated by or on behalf of the Storm Water Division shall be deposited in a storm

water fund and used by the Division exclusively for the functions and purposes of the storm water division as provided in this chapter. Storm water fee credits shall be defined, adopted and implemented by the storm water management committee.

Section 4. That Title 15 of the Code of The Metropolitan is hereby amended by adding the following new Section 15.64.032 "Storm water fees":

15.64.032 Storm water fees.

The Director of MWS is hereby directed to develop, with the assistance of a qualified consultant, a complete business plan for the Storm Water Division including, but not limited to, a cost of service analysis, rate study and capital improvement plan and to recommend to the Metropolitan Council no later than February 1, 2008, a fee schedule for the funding of Storm Water Division.

Section 5. That Title 15 of the Code of The Metropolitan is hereby amended by adding the following new Section 15.64.033 "Collection of fees":

15.64.033 Collection of fees.

The frequency of billing is to be established by the Director of MWS based on an assessment of the most efficient, effective and equitable method of billing and collections available to the Storm Water Division.

Section 6. That Title 15 of the Code of The Metropolitan Government is hereby amended by adding the following new Section 15.64.034 "Reports of storm water division":

15.64.034 – Reports of storm water division.

The Director of MWS shall submit an annual written report to the Metro Council, and shall personally appear annually before a joint meeting of the council public works and budget and finance committees on the storm water management program. Such report shall contain, at a minimum:

The status of the storm water management program in Metro.
The fee structure imposed to fund the implementation of the storm water program and the adequacy of funds to implement the program.
Any long-range plans which have been developed to implement the provisions of this chapter.
The status of any projects to control storm water run off.
Any other information deemed relevant by the Director.

Section 7. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by amending Section 15.64.050 "Storm water management committee –Organization" by deleting the phrase "director of public works" and substituting in lieu thereof the phrase "director of the Department of Water and Sewerage Services."

Section 8. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by amending Section 15.64.100 "Appeals procedure" by deleting the phrase "director of public works" and substituting in lieu thereof the phrase "director of the Department of Water and Sewerage Services."

Section 9. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by

amending Section 15.64.110 "Issuance of building and occupancy permits" by deleting the phrases "director of public works" and the "department of public works" and substituting in lieu thereof the phrase "director of the Department of Water and Sewerage Services."

Section 10. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by amending Section 15.64.130 "Review of building permits" by deleting the phrases "director of public works" and "department of public works" and substituting in lieu thereof the phrases "director of the Department of Water and Sewerage Services" or "Department of Water and Sewerage Services," as appropriate.

Section 11. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by amending Section 15.64.180 "Alteration of floodplains and drainage channels" by deleting the phrases "director of public works" and "department of public works" and substituting in lieu thereof the phrases "director of the Department of Water and Sewerage Services" or "Department of Water and Sewerage Services," as appropriate.

Section 12. That Title 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by amending Section 15.64.200 "Flood proofing measures" by deleting the phrases "director of public works" and "department of public works" and substituting in lieu thereof the phrases "director of the Department of Water and Sewerage Services" or "Department of Water and Sewerage Services," as appropriate.

Section 13. That 15 of the Code of The Metropolitan Government of Nashville and Davidson County, Water, Sewer and Other Public Places be and the same is hereby amended by Section 15.64.205 "Non-storm water discharges" by deleting the phrases "director of public works" the "department of public works" and substituting in lieu thereof the phrases "director of the Department of Water and Sewerage Services" or "the Department of Water and Sewerage Services," as appropriate.

Section 14. That this Ordinance shall take effect from and after its passage, the welfare of The Metropolitan Government of Nashville and Davidson County requiring it.

Sponsored by: Emily Evans, Parker Toler, Jim Hodge

Amendment No. 1
To
Ordinance No. BL2007-1440

Mr. President:

I move to amend Ordinance No. BL2007-1440 by deleting Section 4 in its entirety and substituting in lieu thereof the following new Section 4:

"Section 4. That Title 15 of the Code of The Metropolitan is hereby amended by adding the following new Section 15.64.032 "Storm water fees":

15.64.032 Storm water fees.
A. The Director of MWS is hereby directed to develop, with the assistance of a qualified consultant, a complete business plan for the Storm Water Division including, but not limited to, a cost of service analysis, rate study and capital improvement plan and to recommend to the Metropolitan Council no later than February 1, 2008, a fee schedule for the funding of Storm

Water Division.
B. Upon recommending a fee schedule for the funding of the Storm Water Division, the Director of MWS shall also provide the Council with a reduced water and sewer rate schedule that would offset the amount of revenue to be generated by the new storm water user fee.
C. The Director of MWS shall also provide the Council not later than February 1, 2008, with a report outlining all sources of funding for Storm Water Division. This report shall include both capital and operating funds, as well as a chart detailing the amount from each source of funding."

Sponsored by: Jim Gotto

LEGISLATIVE HISTORY	
Introduced:	May 15, 2007
Passed First Reading:	May 15, 2007
Referred to:	Budget and Finance Committee Public Works Committee
Deferred:	June 5, 2007
Amended:	June 19, 2007
Passed Second Reading:	June 19, 2007
Passed Third Reading:	July 17, 2007
Approved:	July 23, 2007
By:	

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Appendix B

Public Education

Public Education/Outreach by NPDES Staff in Permit Year 5

Date	Forum/Outreach Group	Presenter	Estimated Audience Size
6/19/2008	Cumberland River Swim	Watershed Group-Steve Winesett, Mary Garmon	100
6/21/2008	Shelby Bottoms Water Festival	Watershed Group-Megan Sitzlar, Mary Garmon	300
	Metro Council discussion	Watershed Group-Steve Winesett	40
5/15/2008	TMDL round table event/HRWA, MWS	Watershed Group-Steve Winesett, Megan Sitzlar	20
5/3/2008	Percy Priest Clean Up	Watershed Group-Mary Garmon/Steve Winesett/Butch Bryant/Sonia Ericson	500
5/13/2008	Percy Priest Environmental Awareness Day	Watershed Group-Megan Sitzlar, Michele Barbero, Mary Garmon/Mike Seremet	100
4/19/2008	Earth Day Event at Centennial Park	Watershed Group-Mary Garmon/Michelle Barbero/Megan Sitzlar	100
4/17/2008	Direct Report Meeting	Watershed Group-Steve Winesett	30
4/16/2008	AWRA Conference	Watershed Group-Megan Sitzlar	150
4/22/2008	TDEC Level One Erosion Control Workshop	Dale Binder	135
3/19/2008	Tennessean Interview	Watershed Group-Steve Winesett	2000 (estimated)
2/25/2008	Green Development Conference Educational Booth	Josh Hayes	200
2/19/2008	Local News Cast/General Public	Watershed Group-Steve Winesett/ Megan Sitzlar	5000 (estimated)
2/13/2008	TW Frierson Contractor, Inc.	Tom Palko	46
2/13/2008	TW Frierson Contractor, Inc.	Dale Binder	46
2/13/2008	TW Frierson Contractor, Inc.	Michael Hunt	46
2/7/2008	CRC high school projects	Watershed Group-Megan Sitzlar	4
2/4/2008	TDEC Level One Erosion Control Workshop	Dale Binder	130
11/15/2007	Nashville Bar Association	Michael Hunt	40
9/27/2007	Stormwater Presentation to New Members of Metro Council/Mayor's Office	Scott Potter	14
9/20/2007	Nashville Chamber of Commerce	Michael Hunt/Butch Bryant/Watershed Group-Steve Winesett	15
8/22/2007	TDEC Level One Erosion Control Workshop	Dale Binder	140
7/27/2007	CAI - Community Association Institute	Michael Hunt and Rebecca Dohn	55

MWS Public Information Officer Presentations in Permit Year 5

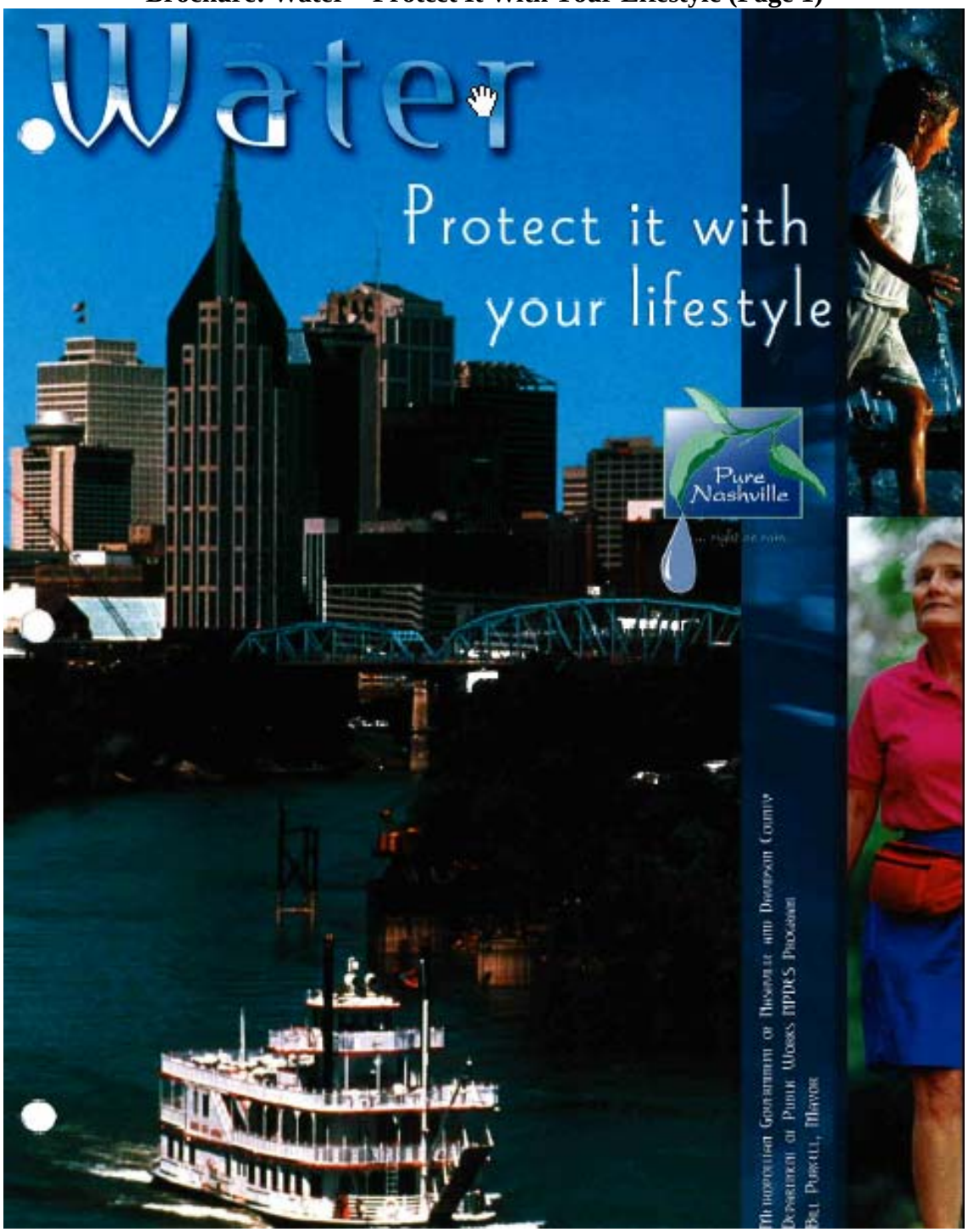
Date	Type	Event Or School	Subject
7/4/07	C	4th Of July Celebration	Misting Tents & Water Tower
7/12/07	S	TSU Summer Enrichment Camp	Water Presentation
7/20/07	S	YMCA	Water Presentation
7/28/07	C	Brewers Fest	Water Tower & Misting Tent
8/7/07	C	Night Out Against Crime	Water Tower
8/7/07	T	Nashville Chamber	Omohundro
8/12/07	C	1st Day Of School Festival	
8/15/07	C	S. Nashville Civitan Presentation	Water
8/25/07	C	Dragon Boat Races	Water Tower
9/5/07	T	Brandywine Resident	Whites Creek
9/6/07	C	Retired Military Officers Presentation	History/Treatment
9/15/07	C	Wine On River	Water Tower
9/18/07	S	Creive Hall	The Journey Of Your Water
9/19/07	C	S. Nashville Exchange Club	History/Treatment
9/26/07	T	Council	8th Ave Reservoir
9/26/07	T	TSU	Whites Creek
10/6/07	C	Bordeaux Sr. Awareness Festival	MWS (General)
2/28 -3/4	C	Lawn & Garden Show	Impaired Streams
4/21/2007	C	Earth Day	Impaired Streams
4/28/2007	C	Country Music Marathon	
6/8-6/10	C	CMA Music Festival	Misting Tents
9/7-9/16	C	State Fair	Water Tower
9/9/-9/17	C	State Fair	Water Tower/Treatment
9/22/07	C	Team Green Stream Clean Up	Adopt-A-Stream
10/2/07	C	AWWA Workshop	Crisis Communications
10/3/07	C	Bordeaux Senior Day	Water Treatment
10/4/07	C	Master Composter Class	Biosolids
10/8/07	T	School Of Science & Math @ Vandy	WTP
10/8/07	T	School Of Science & Math @ Vandy	WWTP
10/8/07	C	SW Community Meeting	SW
10/9/07	S	Paerl-Cohn HS	The Journey Of Your Water
10/9/07	S	Paerl-Cohn HS	The Journey Of Your Water
10/9/07	S	Paerl-Cohn HS	The Journey Of Your Water

Date	Type	Event Or School	Subject
10/11/07	C	SW Community Meeting	SW
10/12/07	C	MECCC Golf Scramble	Water Tower
10/23/07	S	Neely's Bend	The Journey Of Your Water
10/24/07	S	Neely's Bend	The Journey Of Your Water
10/24/07	T	Vanderbilt University	WWTP
10/24/07	C	SESWA Conference	LID/Pervious Surfaces
10/26/07	T	TN Dental Hygenists	WTP
10/31/07	C	TAC	Permits/Engineering/FOG
11/1/07	C	SW Community Meeting	SW
11/3/07	C	TSU Homecoming Parade	
11/7/07	C	SW Community Meeting	SW
11/14/07	T	MLK	WTP
11/14/07	T	JATC	WTP
11/16/07	T	MLK/TSPE	WTP
11/29/07	S	Bailey Middle School	Career Day
12/6/07	S	John Early Magnet School	Dareer Day
12/7/07	C	Nashville Gas Christmas Parade	
1/25/08	C	Adopt-A-Stream Sign Posting: Richland Creek Watershed Alliance	
1/29/08	C	Adopt-A-Stream Sign Posting: Cumberland River Compact	
1/30/2008	T	Wastewater Treatment Plant Tour: Hume-Fogg Magnet High School	
2/6/2008	T	Wastewater Treatment Plant Tour: MLK High School	
2/11/2008	S	Martha Vaught Middle School	Basic Water Treatment
2/24-2/26	C	Green Development Conference	SW Program
2/26/2008	T	Hume-Fogg	Water
2/26/2008	S	Hattie Cotton Career Night	Science
2/27/2008	T	TSU Environmental Science	Wastewater
2/29/2008	T	Vandy Medical School	Water
2/28 - 3/2	C	Lawn & Garden Show	Rainbarrels & Rain Gardens
3/5/2008	T	Water Treatment Plant Tour: Hume-Fogg High School	Water Plant Tour
3/6/2008	T	St. Paul Christian	Water
3/7/2008	T	WWTP Tour: Vandy Medical School	Wastewater
3/7/2008	T	Vandy Medical School	Wastewater

Date	Type	Event Or School	Subject
3/12/2008	S	Career Fair	Careers
3/26/2008	T	TSU Environmental Science & Boy Scouts	Wastewater Tour
3/27/2008	T	WWTP Tour: Hillwood High School	Wastewater Tour
4/1/2008	T	Harpeth Hall School	Water Treatment Tour
4/10-11/2008	C	Lentz Health Fair	
4/16/2008	C	Earth Day Celebration-Nashville Tech	Earth Day Celebration
4/19/2008	C	Earth Day Celebration-Centennial Park	Earth Day Celebration
4/22/2008	T	K.R. Harringt WP Tour - LEAD Academy	Water Plant Tour
4/24/2008	T	K.R. Harringt WP Tour - LEAD Academy	Water Plant Tour
4/25/2008	S	Career Fair: Martha Vaught Middle School	Career Fair
4/26/2008	C	Country Music Marathon	MWS Water Table For Runners
5/2/2008	S	Career Fair: Dalewood Middle School	Career Fair
5/3/2008	C	Percy Priest Lake Clean-Up Event	Lake Clean-Up
5/7/2008	S	Career Fair: MT View Elementary	Career Fair
5/13/2008	C	Environmental Awareness Day	Environmental Awareness
5/13/2008	T	K.R. Harringt WP Tour - LEAD Academy	Water Treatment Tour
5/15/2008	S	Career Fair: Cumberland Elementary	Career Fair
5/16/2008	S	Career Fair: Hermitage Elementary	Career Fair
5/16/2008	S	Career Fair: Antioch Middle School	Career Fair
6/4-6/8/2008	C	CMA Music Fest (Fan Fair)	Misting Tents
6/7/2008	C	Catfish Rodeo	SW Education
6/12/2008	T	Wastewater Plant Tour: University School	Wastewater Plant Tour
6/13/2008	S	Water Presentation: Kirkpatrick Enhanced Option Elementary School	Water Treatment & Pollution Prevention
6/19/2008	S	Water Presentation: Buena Vista Enhanced Option Elementary	Water Presentation
6/21/2008	C	Shelby Nature Center Water Festival	Stream Model, Enviroscape, Water Truck, & Water Treatment Display.
6/21/2008	C	Taste Of Music City-Gateway Bridge	Water Truck
6/29/2008	C	Cumberland River Swim	Environmental Awareness

Note: C = Community, S = School, and T = Tour

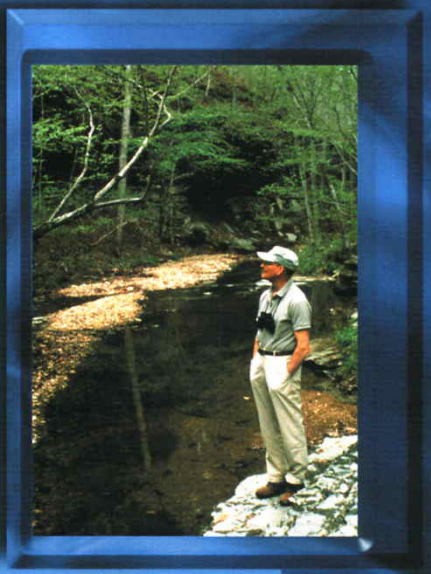
Brochure: Water – Protect It With Your Lifestyle (Page 1)



Brochure: Water – Protect It With Your Lifestyle (Page 1)

The Clean Water Challenge

According to the Environmental Protection Agency, the primary cause of water quality problems in the U.S. today is not from factories or waste-water treatment plants, but rather something called "nonpoint source pollution." Nonpoint source pollution is runoff from rainfall, snowmelt, or irrigation that picks up soil and contaminates as it runs over land or under ground, eventually depositing them into surface waters or introducing them into ground water.



To address specifically the problem of pollution from storm water runoff, industries and municipalities across the nation are being required to obtain National Pollutant Discharge Elimination System (NPDES) permits. The Tennessee Department of Environment and Conservation, under the direction of our nation's Clean Water Act, issued an NPDES permit to Davidson County, making us responsible for improving and protecting the quality of water allowed to enter the "Waters of the State." This means that any ditch, culvert, or conveyance that routes water to area streams and rivers must be kept free of pollutants.

What Metro N is Doing

In Metropolitan Nashville/Davidson County, storm water that flows into drainage ditches, gutters, and storm drains is not treated before it makes its way into our waterways. As a result, the products of our everyday activities - oil and gasoline, litter, pet wastes, pesticides, fertilizers, wash water, even soil and yard clippings - get swept up in storm water and become pollutants that can kill aquatic life, limit the use of our waters for recreational and other purposes, and create eyesores. More than half of the contamination in our waterways today is caused by storm water pollution.

The goal of the Metropolitan Government of Nashville and Davidson County (Metro) NPDES permit is to develop and implement storm water pollution controls that will make our waterways "fishable, swimmable, and environmentally safe." As part of this effort, the Department of Public Works has in place a multifaceted storm water management program that addresses:

CONSTRUCTION: We encourage and enforce proper erosion control measures at construction sites.

Brochure: Water – Protect It With Your Lifestyle (Page 3)

THE CLEAN WATER

Brochure: Water – Protect it with your Lifestyle (Page 3)

ASHVILLE

SPILL RESPONSE: Metro has an established hazardous materials spill response plan that minimizes damage to the environment.

INDUSTRIAL INSPECTIONS: We are providing ongoing inspection and/or monitoring of local industries for environmental compliance.

MONITORING: We regularly monitor the water quality of our local streams/watersheds.

ROADWAYS: We are increasing street sweeping efforts and are utilizing more efficient, environmentally friendly road salting methods.

ILLICIT DISCHARGE AND DUMPING: We are identifying illegal discharges to our storm water conveyances and enforcing discharge regulations.

PUBLIC EDUCATION: We are developing and carrying out programs and methods to educate the public and industries on storm water-related environmental issues.

PUBLIC REPORTING: We provide a storm water pollution telephone hotline (313-PURE) for reports related to any discharges or activity that is contributing to water pollution. An inspector follows up on all notifications.

INFRASTRUCTURE: We have inventoried and documented the location and condition of the county's storm water drainage system.

DEVELOPMENT/REDEVELOPMENT: We consider, implement, and encourage best management practices to minimize negative environmental impacts from storm water runoff.

WHAT METRO I IS DOING

Healthy lakes, rivers, and streams directly impact property values and the quality of life we enjoy. Each of us has a responsibility to be a part of Metro's pollution solution by controlling what we purposefully and inadvertently put down our storm drains. This responsibility begins by understanding where pollutants come from. For example, many common household products - such as oven cleaners, paint and paint removers, cleaning fluids, and moth balls - and motor oil contain toxic ingredients that can become a threat to public health and the environment if not properly used or discarded. Wash water contains detergents, oil, grease, metals, dirt, and other pollutants released by the washing process. Fertilizers and pesticides washing off our lawns can deplete lakes and rivers of oxygen needed by aquatic life and wildlife. Even waste from the family pet can contain bacteria and viruses that contaminate waterways.

By following the suggestions on the back of this publication, you take an important step in helping to clean up our waterways and assist Metro in meeting its NPDES permit requirements.

Brochure: Water – Protect It With Your Lifestyle (Page 4)

Minimizing Storm Water Pollution: What You Can Do

AROUND THE HOME

- Use household cleaners that are labeled nontoxic and biodegradable, and use the smallest quantity possible.
- Properly use and store all toxic products, including cleaners, solvents, and paints. Clean up spills immediately. Follow label directions regarding container disposal or take to a local collection site.
- Recycle reusable materials, and throw litter into trash cans that are tightly covered.
- Dispose of paint in an enviromentally friendly manner. For disposal methods, visit www.nashville.org/pw/paint.html or call 615-862-8620.

IN THE YARD

- Use pesticides, herbicides, and fertilizers sparingly and in accordance with label instructions. Do not apply if rain is expected or near ditches, gutters, or storm drains. Use products labeled nontoxic, biodegradable, or water-soluble when possible.

- "Go natural" by using natural fertilizers such as compost or bone meal and natural insect repellents, such as marigolds (for nematodes and white flies), soapy water from dishes (for flowers and roses), or spearmint gum (for moles).
- Do not over irrigate - this can cause sediment to wash into storm drains.
- Do not blow, sweep, or rake leaves or grass clippings into gutters or storm drains. Compost yard waste or bag and dispose using solid waste collection programs.
- Divert rainspouts and garden hoses from paved surfaces onto grass.
- Pick up animal wastes and dispose of in garbage cans or by flushing down toilets.

VEHICLE- AND BOAT-RELATED ACTIVITIES

- Take used motor oil to a participating oil recycling center. For a list of centers and to find out how to dispose of antifreeze, transmission fluids, engine cleaners, and battery acid, call 615-862-8620 or visit our web site.
- Properly maintain your car or boat to reduce the leakage of oil and other fluids.
- Wash cars on lawns or ground rather than paved surfaces to minimize runoff, and use biodegradable, nonphosphate soap.
- Use marine sanitation devices or pump-out facilities to get rid of boat sewage.
- When spills occur, use kitty litter, sawdust, or wood chips to soak up fluid and dispose in garbage can.

GENERAL

- Report illicit discharges or illegal dumping into storm drains by calling Metro's storm water pollution hotline at 615-313-PURE.
- For more information about Metro's solid waste collection programs, please call 615-862-8620.

Metro Water Services NPDES Program

1607 County Hospital Road
Nashville, TN 37208
Stormwater Pollution Hotline: (615) 313-PURE
www.nashville.gov/stormwater

Bill Purcell, Mayor

If you need any assistance or accommodation(s), please contact Mr. Joseph A. Estes, Sr., Metro Water Services, ADA Coordinator, 1600 2nd Avenue North, Nashville, TN 37208-2206; telephone 615-862-4862.

Metro Parks Brochure on Pet Waste Clean-up

metro parks

Fun With Your Dog!

Nashville's Canine Clean-Up Campaign - The Tail of a Clean City

Residents of Davidson County, as with most other areas of the nation, are crazy about their dogs! The Shelby Dog Park is the first project that the Department has launched to fill a void for our furry friends. No one could have anticipated the enormous popularity of the city's first official dog park!

In an effort to help meet the demands for locations to enjoy recreational time with our dogs, the Metro Board of Parks and Recreation has been working to identify ways to meet the needs of a growing population that considers their dogs as part of their family.

But along with enjoying our dogs in both public and private spaces comes the responsibility of cleaning up after our pets. Nationwide the problem of land and water pollution caused by dog waste is growing. So together with the Nashville Humane Association, the Tennessee Veterinarian Medical Association, Metro Public Health Department/Metro Animal Services and Metro Water Services, Metro Parks and Recreation is making a public appeal to dog owners to please clean up after their dogs.

We are launching a ***"Bag It!"*** Public Service Campaign. The campaign encourages dog owners to help us keep our parks clean by using the plastic mutt mitts provided in most parks and picking up after their pets. It's a simple message with a big impact – keeping the environment clean and healthy for *everyone*.

We hope you will participate in our efforts to **Keep Our Parks Clean**.

Stormwater Checklist Codes Handout for Demolition Sites with Intent to Build

(85 Issued to Demolition and Building Permit Applicants During Permit Year 5)

STORMWATER Checklist - Metropolitan Government of Davidson County, Nashville
Fill-In Lot Developments

Certain types of single lot residential developments (that include land clearing, grading, excavating, filling, and/or demolition activities) often do not require a Metro Grading Permit. However, significant stormwater-related issues can be created by these projects when adjacent parcels are already developed.

Metro's goal is to prevent construction site sediment, trash, and debris from reaching the Municipal Separate Storm Sewer System (MS4). We need your help to protect the water quality of Davidson County's streams. Please provide the following information and submit to the Stormwater Office at Codes (3rd floor, Metro Office Building) with your Building Permit application.

A. Project Data

Mark items "NA" if they are not applicable to you/your development

Applicant Name:			**Property Address:**		
Address:			**Subdivision Name/Development Name:**		**Lot #:**
City:	**State:**	**Zip:**	**Phone # :**	**E-mail:**	
Building Permit #:	**Demo Permit #:**		**Map and Parcel:**		

B. Site Plan

Attach a copy of the site plan showing the following specifications

☐ Lot layout with dimensions ☐ Building layout ☐ Erosion prevention and sediment control (EPSC) ☐ Areas of disturbance

☐ Buffers (stream, floodway) ☐ 100-yr floodplain (if any) ☐ Contours (existing and proposed) ☐ Scale on drawing

☐ Ditches and Drainage pipe(s) with size, capacity, material ☐ All points where stormwater leaves the site

C. General Comments

Check all applicable comments

☐ Driveway/drainage pipe material/size has been approved by Metro Water Services, Stormwater Plans Review: (615)862-6504 contact Kimberly Moore. Drainage pipe installation greater than 24 feet in length would require engineered grading permit plan submittals to Metro Water Services, Stormwater Development Review Section: (615)862-4588. Drainage easement questions should be researched via the Metro Register of Deeds at (615)862-6790. NOTE: stormwater easements have only been recorded since the late 1970s, therefore, important drainage easements may not be designated as official drainage easements to communicate stormwater flows.

☐ The total land disturbance (clearing, grading, and excavating) is less than 10,000 square feet and/or the total amount of cut and/or fill required for the site is less than 100 cubic yards. (NOTE: sites disturbing more than these amounts require engineered grading permit plan submittals to Metro Water Services, Stormwater Development Review Section: (615)862-4588.

☐ The site disturbance will not encroach on the Metro designated no-disturb stream and floodway buffers. For locations of Metro designated buffers call 615-862-6504. (Note: If your site will encroach on a stream or floodway buffer, a variance must be obtained from the Stormwater Management Committee: (615)880-2334 contact Paula Kee.

☐ All of the site's drainage outfalls (point at which stormwater would drain from your site) have been identified. (Note: Some sites may have ditches conveying a direct stormwater flow from the site, while others may just "sheet flow" off site.)

☐ The site-specific EPSC measures will be installed **prior** to any site disturbance.

☐ The site has been configured so that construction traffic will not track mud/sediment onto area streets when leaving the site.

☐ All EPSC measures will be removed once the disturbed areas are stabilized with vegetation.

☐ No post-development drainage nuisance issues for adjacent property owners, the Metro drainage easement, or Metro public right of way will result from completion of this project. Any damage to existing drainage structures from construction activities will be replaced by comparable materials at the builder's expense.

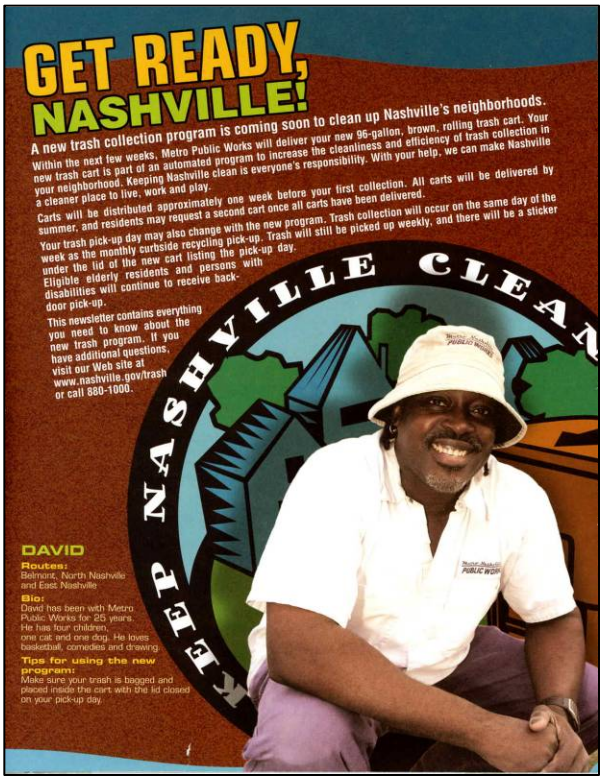
I certify that I have reviewed this document and understand the stormwater requirements herein. I understand that these requirements will be inspected and enforced by the Metro Water Services, Stormwater Office and failure to comply may result in the issuance of a Stop Work Order, monetary penalties, or Environmental Court Injunctions.

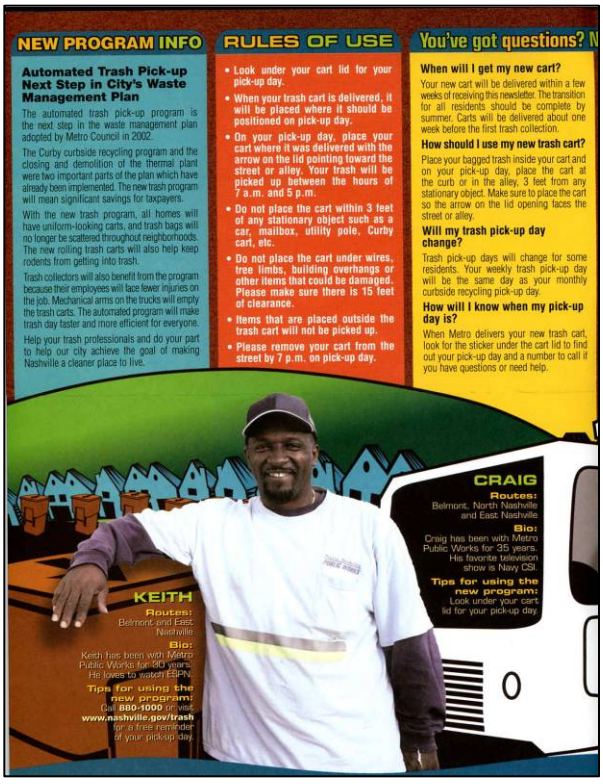
Print Name:	**Signature:**	**Date:**

If you have any questions, please contact MWS Stormwater Section at Codes. **Call**: (615)862-6504 or (615)862-6038, **Fax**: (615)862-6514.

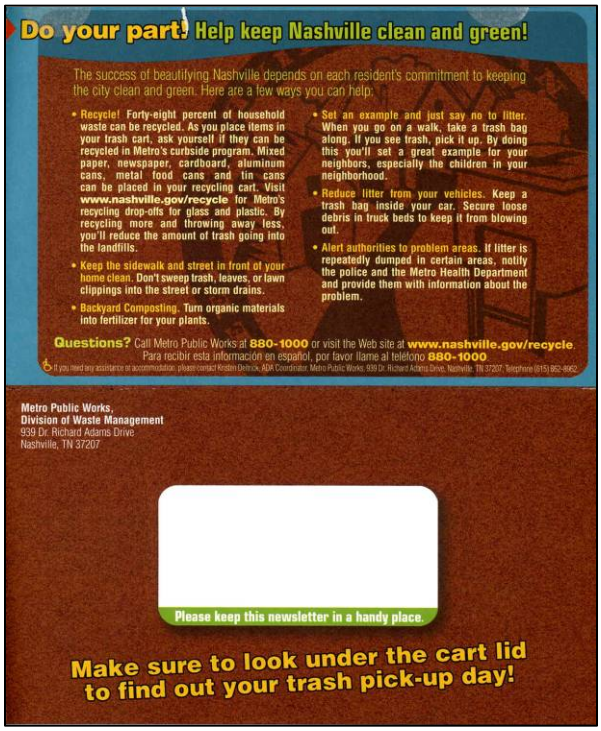
Revised December 2007

Metro Waste Management Division Mailing/Website Brochure (Page 1 & 2)





Metro Waste Management Division Mailing/Website Brochure (Page 3 & 4)



Fats, Oils, and Grease Program Handout (Page 1)

Sewer Cleanouts: Regularly check all sewer cleanouts on your facility's property to make sure the covers are solid and secure. Replace damaged or missing cleanout covers immediately to prevent rainwater inflow and problems.

Damaged cleanout cover

Missing cleanout cover

STORMWATER...
MINIMIZE YOUR RESTAURANT'S
STORMWATER IMPACTS

1. **Maintain clean area around the grease recycle bin.** Make employees aware to be careful not to spill any fats, oils and grease. If there is a spill, clean it immediately.

Stormwater impact from recycle bin spill

2. **Do NOT pour oils or grease down storm grates, storm drains, sewer drains or on the ground.**

Grease evidence at storm gate. Grease was discharged into stream Enforcement action was taken.

3. **Clean vent hoods regularly** to prevent fats, oils and grease discharge to the roof of your facility or on ground near your facility.
4. Design and locate dumpsters and outdoor wash areas to minimize stormwater impacts.

Restaurants & Food Service Establishments need to make sure they:

1. Have proper grease control equipment **installed**.
2. **Maintain** (routinely clean or pump out) grease control equipment. Check interceptor regularly to make sure it has outlet Ts, and the structure is in good operating condition.
3. **Keep records on-site** of grease control equipment pumping/cleaning and maintenance to provide to Metro inspectors.
4. **Implement Best Management Practices.**

BEST MANAGEMENT PRACTICES (BMPs)

- Recycle waste cooking oil. Do NOT pour down sinks or any drains. Do NOT pour into any storm grate or on ground.
- "Dry wipe" all pots, pans, & plates prior to dishwashing. Dry wiping and scraping pots, pans, & plates' food particles and grease residue into the trash helps prevent grease buildup in your sewer lines and Metro's sewer lines.
- Use strainers in sink drains to catch food scraps and other solids, and empty strainer contents into trash.
- Post "NO GREASE" signs above sinks.
- Food grinders are allowed but the use is discouraged since these will contribute to grease discharge and decrease efficiency of interceptors and traps.
- Educate and train kitchen staff that grease control is important and inform them how they can work to provide a positive impact on the environment and your plumbing system.

Metro Department of Water & Sewerage Services

GREASE CONTROL EQUIPMENT

Policy for

New Food Service Establishments
and
Upgrade to Existing Food Service Establishments

Grease Interceptor Installation

As per Metro Code of Laws all food service establishments need to control fats, oils and grease discharges from their facility. This brochure is provided as guidance for new restaurants and existing facilities that are upgrading, or have change of ownership.

Fats, Oils, and Grease Program Handout (Page 2)

Why is Grease Control Equipment Installation Required?

Fats, oils and grease can cause serious problems in the sewer system and in a restaurant or food service establishment. Problems include raw sewage overflows due to blocked sewer lines, rancid odors, potential contact with microorganisms that can cause hepatitis and gastroenteritis, expensive cleanup, repair and replacement of damaged property. Sewer line blockages due to fats, oils and grease from food service establishments have increased cost to the Metro Department of Water & Sewerage Services and increased reporting of sanitary sewer overflows to the Tennessee Department of Environment & Conservation and the EPA.

What is a food service establishment?

Any facility or business engaged in preparing, serving or making food available for consumption.

There are 5 classifications for food service establishments with **minimum** grease control equipment requirements.

Class 1: Deli, mobile food vendors, defined by NAICS* 72213 & 722330 (minimum 20 gallon per minute/40 pound capacity grease trap)

Class 2: Limited Service Restaurants/Caterers, defined by NAICS 722211 & 722320 (minimum 500 gallon grease interceptor)

Class 3: Full Service Restaurants, defined by NAICS 722110 (minimum 1000 gallon grease interceptor)

Class 4: Buffet and Cafeteria Facilities, defined by NAICS 72212 (minimum 1500 gallon grease interceptor)

Class 5: Institutions-schools, hospitals, prisons, defined by NAICS 722310 (minimum 2000 gallon grease interceptor)

***NAICS:** North American Industry Classification System

1. What must a new food service establishment, or upgrade to existing food service establishment, or change in ownership of an existing food service establishment do?

Submit a Fats, Oils & Grease (FOG) Control Plan to:

Metro Water Services
Environmental Compliance
FOG Control Plan
1607 County Hospital Road
Nashville, TN 37218

2. What needs to be included in the FOG Control Plan?

- Identification and number of all cooking and food preparation equipment (i.e. fryers, grills, woks, etc...)
- The number and size of dishwashers, sinks, floor drains, mop sinks and other plumbing fixtures
- Type of Food Service Establishment classification (see inside left of brochure)
- Type of food to be served
- Plans for the grease interceptor, including dimensions and location

3. What does Metro Water Services do when the FOG Control Plan is received?

Metro Water Services will review the FOG Control Plan, grease interceptor sizing and approve, or make changes as necessary to aid in the protection of a FOG discharge from the food service establishment. Remember, the 3 compartment sink is NOT the only source of grease.

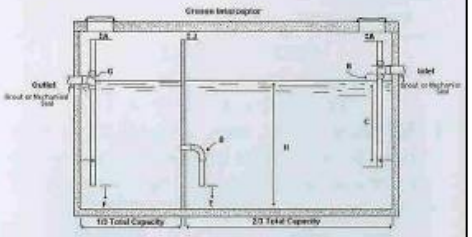
Grease Control Equipment Specifications

Grease Control Equipment must remove fats, oils & grease at or below the Metro Code of Laws Title 15.60.70 limit of 100 mg/L. Failure to comply, will require enforcement action in accordance with the Enforcement Response Plan as required in Metro Code of Laws Title 15.60.390.

GREASE CONTROL EQUIPMENT

GREASE INTERCEPTOR..

Is an underground tank with usual capacities ranging from 500 gallons to 2000 gallons. Interceptors need to be cleaned (pumped out) of complete contents at a recommended minimum frequency of every 90 days. Some facilities will need to pump interceptors more frequently (i.e. monthly). Class 2 through Class 5 food service establishments need to have grease interceptors installed.



A.) Minimum 6", but not less than pipe diameter.
B.) Inlet pipe invert to be 2 1/2" above liquid surface.
C.) Inlet pipe to terminate 2/3 depth of water level.
D.) 90 degree Sweep, minimum size- 6".
E.) 12" from floor to end of sweep.
F.) 12" from floor to end of outlet pipe
G.) Outlet pipe no smaller than inlet pipe, minimum- 4".
H.) Minimum depth of liquid capacity- 42".
I.) Maximum distance from ceiling- 6"

GREASE TRAP...

Is an indoor, "under the sink" unit with minimum size requirement of 20 gallon per minute / 40 pound capacity trap. Traps are for Class 1 facilities only. Traps must have flow restrictor installed and be vented. Traps should be cleaned regularly (every 2 weeks) to prevent grease discharge from the food service establishment.

Pictorial Tour of Three Green Nature Centers (Page 1)

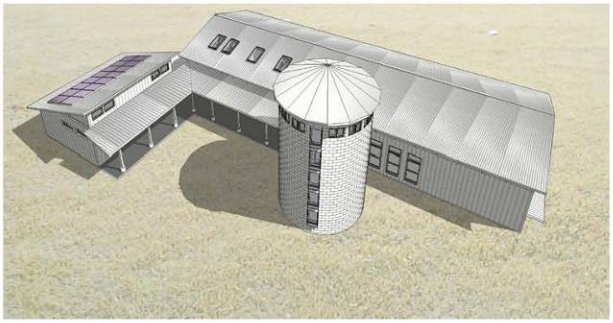
Pictorial Tour of Three Green Nature Centers
Metro Nashville Parks and Recreation
March 2008

All three nature centers incorporate sustainability features to connect people with nature, educate the public and minimize the impact to the surrounding natural area parks.

The design for each nature center was based on a detailed interpretive plan written in 2006 through a four day workshop with over 100 local stakeholders. A unique interpretive theme and educational emphasis was developed or Park. The interpretive plan helped guide the building, site, and exhibit design, and environmental education approach.

Shelby Bottoms Nature Center is the centerpiece of 810 acre site on the Cumberland River in East Nashville. It includes 3 miles of frontage along the Cumberland River and connects to 12 miles of Metro Greenway trail system. The building is 3175 square feet and incorporates water as its key theme. The building connects to the river with a "barge" design concept.

Bells Bend Nature Center is located in western Davidson County on an 808 acre rural and pastoral preserve that is bordered by the Cumberland River. The park opened in 2007 with four miles of trail. The 2828 square foot building is located on the edge the park on an home and barn site and designed to fit into the agricultural landscape of the area. The three-fold theme encourages cultivating knowledge of the natural world, understanding the cultural impacts upon the land, and developing outdoor recreation skills.



The Beaman Park Nature Center was designed as a tree house in the woods and is located in a rugged natural area with over 1600 acres of wooded hills and hollows. The 2201 square foot facility promotes the theme of a quiet sanctuary that inspires visitors to learn and experience a connection to the natural world.

Pictorial Tour of Three Green Nature Centers (Page 2)

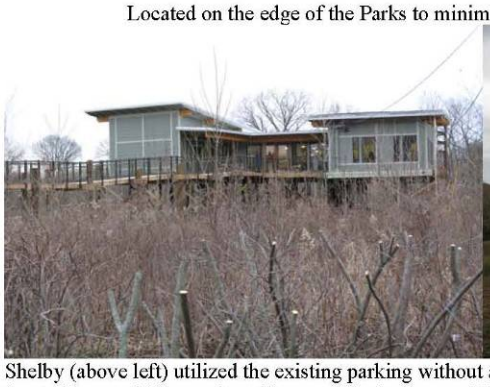
Following are examples of sustainability features employed **in all three nature centers**:

EarthCraft House Certified Building

Joe Cooper, Southface Technical Provider, conducts one of two EarthCraft House certification inspections conducted at each of the nature centers. All three structures are certified by the program for overall sustainability features. The focus is site planning, energy efficient building envelopes and systems, energy star certification, water conservation, indoor air quality and resource efficient design and building materials. 150 points are required for certification. Over 200 points puts buildings in the "Select" category – Shelby Bottoms scored 202 and Bells Bend 221. Beaman Park is still being scored. Due to the small, house-like square footage these centers qualified for the EarthCraft certification system. The EarthCraft logo states "Sensibly Built for the Environment".

Small footprints of buildings (3175 square feet and less) with maximum uses of porches and outdoor spaces

Located on the edge of the Parks to minimize disturbance to the natural

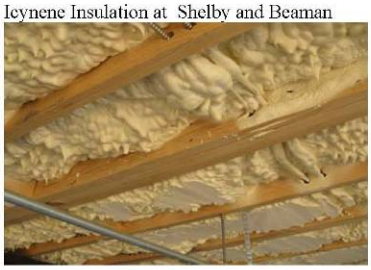


Shelby (above left) utilized the existing parking without adding additional spaces. Bells Bend (above right) is located on an old home site with one of the barns providing additional programming space. Beaman (not pictured) is located on a recently logged site.

Pictorial Tour of Three Green Nature Centers (Page 3)

High Performance Building Envelopes and HVAC Systems and long lasting, light colored metal roofs

Icynene Insulation at Shelby and Beaman



Long lasting fiber cement exterior siding

High Performance, Low E Double Insulation Windows

Natural Daylighting and Operable Windows

Pictorial Tour of Three Green Nature Centers (Page 4)

Programmable Thermostats and Low VOC paints

Compact Florescent Fixtures and Ceiling Fans

Restrooms with low flow water closets and automated sensors on faucets, toilets and lights, and ceiling fans and operable windows as well as educational information on water conservation

Each waterless urinal (pictured above) saves 40,000 gallons of water (and sewage) a year.

Energy Star Appliances and equipment throughout the buildings

Pictorial Tour of Three Green Nature Centers (Page 5)

Recycled content was used in finishes of cabinetry, toilet partitions, and furnishing. Some furnishings are reused from other facilities and were obtained through Metro Surplus. Desk chairs contain 51% recycled material and are 98% recyclable.

Local materials, native landscaping, no irrigation and minimum turf and minimal site lighting. Limestone boulders are used at Beaman (below left) in the bus parking area and also as seating and landscaping features. Local native plants are used specifically for each natural area park. Shelby features wetland plants, Beaman Highland Rim forest species and Bells Bend bottomland and upland plants.

Located adjacent to Metro Greenway along Cumberland River, the Shelby site encourages use of alternative transportation and physical activity. Beaman and Bells also are part of the parks and greenways system and offer many opportunities for fitness and healthy activities outdoors.

Pictorial Tour of Three Green Nature Centers (Page 6)

In addition to the above features in all three nature centers, each center features its own unique and outstanding features for sustainability.

SPECIAL FEATURES OF SHELBY BOTTOMS NATURE CENTER

Shelby Bottoms building was designed by Everton Oglesby Architects with water theme, incorporating a "barge" concept for the site along the Cumberland River. It is raised on pylons for minimal site impact and ability to weather high water events.

Nashville's first green roof over occupied public space rests atop Shelby Bottoms. This feature was made possible through a public / private partnership with the Cumberland River Compact, who helped to raise the additional $87,000 cost for the green roof feature.

.

Solar shades on the river facing windows reduce solar heat gain in summer months

During construction, a crane was required to lift the special soil medium to cover the green roof structure.

Pictorial Tour of Three Green Nature Centers (Page 7)

Sandy Bivens shows off newly completed Green Roof atop Shelby Bottoms Nature Center. The extensive green roof includes 4 inches of special soil medium and 7 varieties of drought tolerant sedum plants that will spread to form a solid vegetative covering over the next 2-3 years.

The Green Roof covers public meeting space and office. Benefits include energy conservation, sound dampening, stormwater management, reduced heat island effect, and long life for the roof membrane.

Metro Parks staff (above) take special briefing by Tremco horticulturalist on maintenance of green roof structure and vegetation.

Rain chains demonstrate rain fall runoff off different roof top sections. The metal roof sections runoff rapidly. The Green Roof sections runoff is delayed and much slower over time.

Roof runoff is collected into rain catch basins.

Pictorial Tour of Three Green Nature Centers (Page 8)

An educational exhibit shows visitor how the green roof layers, what plants are there and the many benefits to green roofs.

A pot of sedums shows visitors what is planted atop the Green Roof.

Shelby Bottoms Nature Center was award 2007 Merit Honor Award by American Institute of Architects. Pictured (LtoR) Architect Tracey Ford, Gary Everton with Everton Oglesby Architiect, Sandy Bivens, Metro Parks Superintendent of Nature Centers.

Pictorial Tour of Three Green Nature Centers (Page 9)

SPECIAL FEATURES OF BELLS BEND NATURE CENTER

Bells Bend and Beaman Nature Centers feature pervious concrete sidewalks made possible through a partnership with the Tennessee Concrete Association (below).

Photovoltaic cells were installed on the roof by Steve Johnson and his staff (above). These PV cells are made in Memphis. Energy generated will be approximately 4,400 kwh a year, which will pay for an additional 4,400 kwh a year through the NES Generation Partners program. Over 25 years, 185,035 lbs of CO2, the leading greenhouse gas will be avoided. NES, TVA, and Lightwave Electric officials check the system (left).

Pictorial Tour of Three Green Nature Centers (Page 10)

Barnwood salvaged from the site was reused for the classroom door and reception desk

The concrete floor has a river design stained on it.- representing Poplar Hollow Creek as it flows into the Cumberland River. This was recommended in the Metro Parks Nature Center Interpretive Plan. The river display will be used as an educational tool and was made possible through a partnership with Fuller Industries.

Pictorial Tour of Three Green Nature Centers (Page 11)

SPECIAL FEATURES OF BEAMAN PARK NATURE CENTER

The Beaman Park Nature Center is sited on the very edge of this large natural area park and just off a state highway - Old Hickory Boulevard. This is the smallest center with 2201 square feet.

To minimize disturbance to the park, the entrance drive is on a ridge top and follows an old logging road. The site was logged within the last 20 years.

Beaman and Shelby are built on poles to help minimize disturbance to site. This also contributes to the feel of the tree house in the woods as well as offers expansive views into the forest.

Pictorial Tour of Three Green Nature Centers (Page 12)

The Beaman Park Nature Center features geothermal system for heating and cooling. Three 300 foot wells were dug and pipes installed which will use the earth's constant temperature to save energy.

The geothermal heat pump is energy efficient, environmentally clean and cost effective.

Pictorial Tour of Three Green Nature Centers (Page 13)

Logs collected from the site were collected to build a mantle, furniture, bowls and other items for the nature center.

Friends of Beaman Park worked to raise funds and sensitively build over one mile of trail and a bridge across Henry Creek to connect the existing trail system to the nature center site.

Pictorial Tour of Three Green Nature Centers (Page 14)

PUBLIC EDUICATION AND OUTREACH

The buildings themselves are part of the educational exhibit for visitors at each center.

The Nature Centers host many public and community meeting.

Lighting, when necessary, is with high efficiency fluorescent fixtures.

HVAC duct work is located inside building envelope for maximum efficiency with zero duct leakage to outside space.

Shelby Bottoms Nature Center is hosting the Cumberland River Compact's monthly meetings of the Building Outside the Box Committee.

Pictorial Tour of Three Green Nature Centers (Page 15)

Over three hundred people turned out for Mayor Purcell's Dedication Ceremony for the Shelby Bottoms Nature Center in September 2007. Hundreds more have visited in its first three months.

Metro Park staff are busy with educational programming and designing exhibits.

A Green Roof exhibit (below) is on display at the Shelby Bottoms Nature Center. Cumberland River Compact staff Margo Farnsworth (left) and Gwen Griffith (right) helped raise funds to make the public, educational, and beneficial, green roof possible.

Pictorial Tour of Three Green Nature Centers (Page 16)

Water conservation and new ideas are always being discussed at the nature centers. "Sink Positive" has everyone interested in how much water goes down the toilet each flush.

Reduce, Reuse, Recycle!

Green exhibits and information are always available at the nature centers.
Workshops and programming on green topics and sustainability are scheduled regularly.

THE END!

But it's really just the beginning!

Local News Article (Green Development in Nashville)

CREATING PLACES

Green trend not limited to Kermit

Legendary Muppet Kermit the Frog is famous for singing, "It's not easy being green."

WILLIAM WILLIAMS

But "building green" is no puppet show for an increasing number of Nashville developers. Despite incurring additional up-front expenses while opting for environmentally sound projects, they are embracing the movement.

Loosely defined, "green buildings" include, for example, rooftop terraces and recycled construction materials.

But the greenest structures are those that have third-party verification, with LEED (Leadership in Energy and Environmental Design) certification being the most widely recognized. The United States Green Building Council (USGBC) oversees the LEED Green Building Rating System, a program still in toddler clothing and as familiar to most Americans as Icelandic cuisine.

Only recently, Nashville boasted only one LEED-certified building: the downtown home to Hastings Architecture Associates LLC.

However, Vanderbilt University has unveiled two silver-level LEED-certified buildings comprising its VU Commons complex and designed by Street Dixon Rick Architecture PLC. Five more are expected to follow.

Currently underway are Terrazzo (silver), the Freeman Webb Corporate Headquarters (gold), Fifth & Main (silver), Griffin Plaza (silver) and The Acropolis (platinum).

Almost overnight, Music City has become LEED City.

Jamie Qualk is a member of the USGBC Middle Tennessee Chapter and director of LEED facilitation sales for Smith Seckman Reid Inc.'s Sustainable Solutions Group, which focuses primarily on commissioning services.

Qualk — who is as passionate about architecture, engineering

CONTINUED ON PAGE 10 >

Rendering courtesy of Iain Stewart

The Freeman Webb Corporate Headquarters building, under construction in Bedford Commons in Green Hills, has achieved a LEED silver-level pre-certification.

Local builders LEED in green certified sites

< < FROM PAGE 9

and green building as George Plaster is obsessed with sports — says developers are recognizing the interrelated nature of commissioning in general and LEED certification in specific. Not surprisingly, he feels it is worth builders paying more (from 2 to 10 percent) on the front end to achieve LEED status.

Compared to conventional buildings, Qualk notes LEED-certified structures (there are about 800 in the United States) provide a 30-50 percent annual energy savings and a 40 percent water savings.

In addition, Qualk says studies show the nation's LEED buildings have resulted in $58 billion saved annually in unused sick time (due to improved indoor environmental quality) and $180 billion saved annually thanks to 6-15 percent increased worker productivity.

Not that LEED has been roundly received. In addition to cost considerations, some developers lament that cumbersome documentation requirements can stymie contractors unfamiliar with green building applications.

Tony Wernke and Greg Yoko, founders of the monthly publication *Land Development Today*, have argued that many of the nation's green programs focus almost exclusively on structures and "virtually ignore the part of the project that can impact its 'greenness' and sustainability: the site."

Despite the challenges, some Nashville developers are unfazed.

Kent Burns, president of Freeman Webb Investments Inc., says the added initial expense for the company headquarters building in Bedford Commons (designed by Hastings and now under construction with a pre-certified LEED gold rating) will be money well spent.

"It's a growing trend," Burns says of LEED. "And we wanted this to be the nicest building in Green Hills."

How could it not be?

The Freeman Webb Corporate Headquarters exterior alone — with its sleek glass, metal and brick components

Rendering courtesy of Acropolis Partners and Scott Johnston

West End Park's The Acropolis is slated to be the first LEED platinum-rated building in Nashville.

forming a striking combination of rectangles and squares — will catapult the structure past Green Hills' uninspired architectural forms.

FWCH will offer carpets made from recycled materials. Double-paned windows and skylights will minimize cooling costs and the need for artificial light.

Sensors will detect when rooms are empty and switch off lights automatically. High-efficiency faucets and toilets will reduce water usage.

Drive a hybrid car? The building will offer you preferred parking.

Not far away, in the radically transforming West End Park district, Developer Acropolis Partners LLC is hoping to have its six-townhome Acropolis (designed by Preston Quirk) join an elite list of about 10 residential buildings nationwide with platinum LEED certification.

Reading the lengthy list of Acropolis green goodies is enough to cause an environmentalist to improperly digest his or her tofu and lentils meal due to excess excitement.

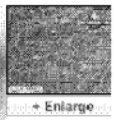
The Metro Council has taken notice of the green thing, having recently passed an ordinance mandating that all municipally funded projects with $2 million-plus price tags attain a LEED silver rating.

Though much work remains, Qualk is encouraged, noting, "What Nashville has done so far is fairly progressive."

Take note, Kermit. Maybe it's not so bad being green. CP

William Williams writes about Nashville's manmade environment. Contact him at bill37206@yahoo.com

Local Television News Report (Removing Streams from 303(d) List



Nashville,T
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Closings

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Metro Works To Clean Polluted Waterways

Several Area Streams Could Soon Be Removed From List

Reported By Anne Marshall

POSTED: 5:42 pm CST
February 19, 2008
UPDATED: 6:11 pm CST
February 19, 2008

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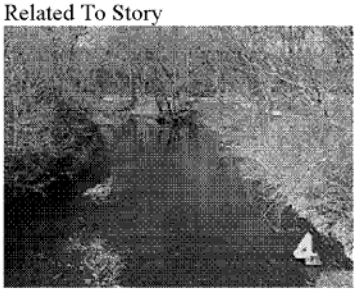


- **Video:** Davidson County Waterways See Improved Quality

NASHVILLE, Tenn. -- More than 60 miles of streams and creeks in Davidson County could soon be deemed safe.

Video: Davidson County Waterways See Improved Quality

The waterways, once considered too dirty to swim, play or fish in may be taken off a list of polluted waterways soon.

Rachel Matthews said she enjoys spending time next to an area creek at lunchtime every day.

Local News Article (Restoring Watershed)

Projects have helped restore watershed

BY SCOTT A. POTTER • MAY 20, 2008

Since 2002, 72 miles of streams in Davidson County — including 33 miles of the Cumberland River — that were previously identified as contaminated because of wastewater overflow have been recommended for removal from the Environmental Protection Agency's list of impaired streams by the Tennessee Department of Environment and Conservation (TDEC).

An additional 27 stream miles are under consideration for removal by TDEC. During the 2002 ceremony celebrating the Cumberland River's restoration, EPA's deputy regional administrator applauded Nashville's accomplishment, stating "you have enabled this river to become a great resource for this city."

Our success in eliminating overflows into the watershed is due to the investment of more than $650 million for 273 projects, including rehabilitation of 317 miles of sewer-pipe, treatment-plant and pump-station flow optimization, and technology enhancements throughout the wastewater system.

Since 1990, Metro Water Services' overflow abatement program (OAP) has reduced the number of overflows by half and reduced the gallons of overflows by 90 percent. To provide context, before the OAP, 164 locations experienced chronic sewer overflows. To date, 137 have been eliminated, and we are finalizing the plan to eliminate those remaining.

As storm-water runoff is recognized as a fundamental contributor to water pollution, storm-water management is critical to watershed health: Metro Water Services' compliance with our EPA permit to discharge storm water into the rivers and streams of our watershed plays an important role in overall ecosystem health.

public-private partnerships

Proper collection and conveyance of storm water, coupled with public and private sector partnership in design and construction of environmentally responsible development, complements the efforts of the OAP. Numerous examples of private- sector investment in our watershed's health exist in Nashville. It is clear this partnership is successful.

While we are proud of the reduction in overflows and the resulting improvement in water quality, we still have work to do. Nashville's first sewer, built in 1884, is still in service. This aging infrastructure requires constant maintenance and significant capital investment.

It is difficult to grasp the scope and complexity of 3,036 miles of pipe, three major wastewater treatment facilities with the capacity to reclaim 465 million gallons of water each day, and 104 wastewater pump

Local News Article (Parks Nature Centers)

"Green" nature centers, other Nashville projects honored

Metro Park's "green" nature centers are among the 14 winners of this year's Governor's Environmental Stewardship Awards.

Other Nashville winners are the Harpeth Hall School, Vanderbilt University and Kilowatt Ours Youth Initiative.

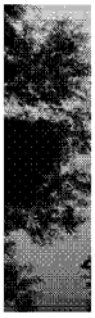
"Taking care of our precious natural resources is essential to preserving Tennessee's outdoor tradition," Gov. Phil Bredesen said in an emailed announcement. "I want to express my congratulations to each of these individuals, organizations and groups whose stewardship is helping us protect Tennessee's air, land and water." This is the 22nd year the awards have been given. The winners and details the state provided about them follow:

Category: Building Green Metro Nashville Parks "Green" Nature Centers

Metro Nashville Parks and Recreation developed and built three new nature centers that include sustainable building and design techniques – Shelby Bottoms Greenway, Beaman Park and Bells Bend Park. There were more than 25 sustainable features designed into each center, focusing on site sustainability, water-use efficiency, energy consumption and atmospheric impact, use of materials and resources, indoor air quality and design innovation. Some features include a green roof, rain-chains, rain catch basins, solar shades, electricity generation utilizing photovoltaic cells, geothermal heat pumps and pervious concrete sidewalks.

Category: Environmental and Education Outreach Kilowatt Ours Youth Initiative (Jennifer Barrie) The goal is to create and to foster an energy conservation ethic among young people. Students are engaged in an interactive program that trains them to become energy leaders in their homes, schools and communities. The Youth Initiative has developed standards-based curriculum materials and resources and created a peer education program that engages students in the process of assessing energy use and taking energy-saving steps in their homes and schools. The program targets students in grades 4-12. It is being implemented in Nashville schools and seeks to expand across the state. To date, the Youth Initiative has reached more than 5,000 students in 30 schools, trained 1,700 students to conduct home energy assessments, conducted five teacher training workshops, registered 500 students on the Web site and disseminated the curriculum to more than 850 educators across the United States. In January 2008, the peer education program was launched. The program trained 15 college students to be energy role models, educating younger students about energy conservation and renewable power.

Category: Green Schools – K-12 The Harpeth Hall School – Environmental Stewardship The school formed a campus-wide Environmental Stewardship Committee to look broadly at the school's environmental practices to explore more green initiatives, expand existing programs and make it a leader for environmental sustainability among educational facilities. Some of the 2007-2008 initiatives include adding more recycling bins on campus; eliminating plastic take-out containers and styrofoam cups and replacing them with recyclable paper containers; serving locally produced fruits and vegetables in the dining hall; using green



Local News Article (Budget Funding)

4 ■ THURSDAY, SEPT. 27, 2007
CP City News
■ SMART, FAST, FREE & ONLINE

Sewer lawsuit could cause Metro a budget pain

BY BILL HARLESS

Metro may have to dip into its reserves to plug a multimillion gap in the already-tight Metro Water Department budget this year.

As the city continues in its lawsuit against the towns of Brentwood, Millersville and LaVergne demanding they pay their bills for wholesale sewer service in full, the Metro Water Department is facing a budget gap of around $3 million — money the Metro Council budgeted for the department this spring based on the higher wholesale sewer rates.

Dewey Branstetter, an attorney representing the three cities in the case, said they hope to be able to settle the issue in negotiations with new Nashville Mayor Karl Dean but said that if the lawsuit is followed all the way through court, he does not anticipate it ending until after the current fiscal year — when Metro would have to account for the budget gap.

'Litigation could drag on'

"We would like to be able to reach an amicable resolution with Metro," Branstetter said. "We believe that that's appropriate and that there should be a way to resolve the case, because if we don't, the litigation could drag on for many, many months. … I would not anticipate a final resolution before June 30, 2008."

The Metro Council passed an ordinance earlier this year charging the following higher sewer rates — Belle Meade, $1.49 per hundred cubic feet of sewage; Brentwood, $1.15; Millersville, $1.32; and LaVergne, $1.41. The rates would increase annually until 2010, topping out at $1.56, $1.24, $1.40 and $1.48 respectively. Of the cities, Belle Meade is the only city paying its bill in full. In total, the higher rates would net Metro about $3.7 million this fiscal year.

However, both the Metro Water Department and the Metro Finance Department said yesterday they believe Metro will be able to cover the gap if the higher payments are not received by the end of the fiscal year.

"I'm comfortable [with] the ability of Water Services of being able to absorb a $3.7 million shortfall in revenue this year," interim Metro Finance Director Gene Nolan said, noting that Metro has an unencumbered fund balance totaling several tens of millions of dollars it can draw from for various expenses.


EVANS

Water Department spokeswoman Sonia Harvat said the department has a contingency account — totaling 4 percent of the department's roughly $179 million operating budget — it can pull from if necessary.

Metro Councilwoman Emily Evans said Metro could also sell the amount of the unpaid sewer bills as an accounts receivable, if absolutely necessary.

'We're getting more cash flow'

Evans, who follows the Water Department budget closely, said the department — despite the tightness of its budget — is financially healthy this year. She said the fact that water consumption increased as a result of this summer's drought actually helped Metro.

"When we budget our expenses, we budget them for an average year, so the unit cost for a gallon of water — the costs associated with that and how we man our water plants and so forth — is based on an average year. If we're producing more water, we're stretching those costs out over [greater amounts of] water, and so we're getting more cash flow. Now, that doesn't mean we're going to be rolling in more money — at all."

Brentwood, Millersville and LaVergne claim Metro is including costs specific to Davidson County residents in the higher rates it is charging them.

The towns recently moved to dismiss the lawsuit, which is pending in the Davidson County Chancery Court.

Harvat said she is confident that Metro will receive the money it believes the three towns owe it this fiscal year.

"Even though it could have some cash flow implications, we really don't see any long-term issues," Harvat said. "Obviously, the delay of the payments is occurring, but we feel that it is a receivable and it will ultimately be collected. Right now, there are no contingency plans in place [for filling the possible budget gap], and we're not even looking at one. We're confident that it will be collected." CP

Local News Article (Proposed Stormwater Utility)

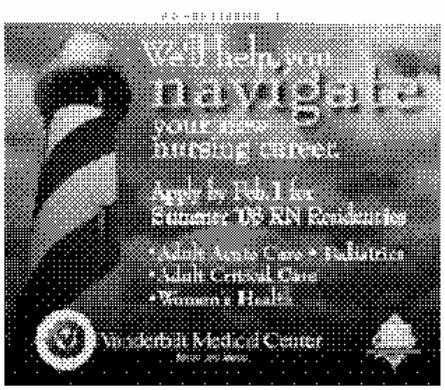
Metro needs fair storm-water fees

BY ALAN DOOLEY • FEBRUARY 11, 2008

tennessee voices

Like many homeowners in Metro Nashville, I live along a creek in a subdivision built before the 1980s, when Metro enacted meaningful storm-water controls for new development.

As a result, there were no retainage structures built for the neighborhood or for upstream commercial development to control storm-water runoff. Since the early '90s, numerous homes along our creek have had problems with drainage ditches and culverts being clogged and eroded. Metro Water Services' Stormwater Division has been able to take care of some of the issues, but most are not severe enough to be given the highest priority, and so many have been waiting years to have their issues addressed.



Last fall, many in our neighborhood attended a presentation and meeting with the Stormwater Division, and we were impressed with their progressive vision to solve Metro's storm-water problems. I don't like new fees any more than anyone else, but it is obvious from available funding statistics that the Stormwater Division has been underfunded for many years.

I applaud efforts to correct inequities in the funding for storm water. It is ludicrous that a single- family home, with a minimal amount of impervious surface, pays the same amount to fund storm water as a commercial or institutional structure with a large parking lot!

The long-term effect of an equitable fee will be that large building and parking lot owners will employ sustainable strategies to reduce their storm water, because they will have a financial incentive to do so.

Local News Article (Stormwater Funding Plan)

Publication: The City Paper; Date:2007 Oct 09; Section:City Voices; Page Number: 6

EDITORIAL

Metro dwellers should keep eye on stormwater plan

Metro government is in the first stages of launching a new stormwater program, and Nashville residents need to pay attention to every facet of the process. Yes, it is difficult for regular folks to pay attention to something seemingly as dull as stormwater management. That is, unless yours is one of many Metro yards or neighborhoods that floods when it rains.

Stormwater management is increasingly becoming a problem in the Middle Tennessee area. As development and road projects spread along with other infrastructure, stormwater systems in contiguous counties and in Metro have not kept pace. It is perhaps easier to sell citizens on the concept of spending tax dollars for teachers, police or tangible things like municipal buildings. But, unless they are in the path of a recurring flood or water problem, stormwater is an abstract concept to most.

It should not be as the federal government can and will hit the city with a serious financial brick to the head if Metro does not get its stormwater act together.

An audit of Metro's water services over the summer from the Environmental Protection Agency mandated the city come up with a self-funding stormwater program. Presently, the program is funded off the table scraps of the larger Metro water program. Failure to create such a program could result in heavy fines shouldered by taxpayers.

Metro dwellers should also keep an eye on this program because of the funding it needs — an estimated $25 million annually. With these demands brought on by growth and development also come a need for more city bureaucracy. The expected cost to Metro residential water users would be about $60 per year or about $5 a month.

There is certainly a need for this program. It is an environmental issue as much as a quality of life issue as stormwater runoff is often the cause of sewer overflows. All of these infrastructure needs are connected, and Metro has already been fined heavily for its sewer system overflows.

Metro Council and new Mayor Karl Dean need to make sure they are implementing a stormwater system that will handle the needs of the city for years to come. Public hearings that began this week are an opportunity for Metro residents to tell officials what they need and expect from this program, and they should participate. CP

2008 Consumer Confidence Report (Page 1)

2008 CONSUMER CONFIDENCE REPORT

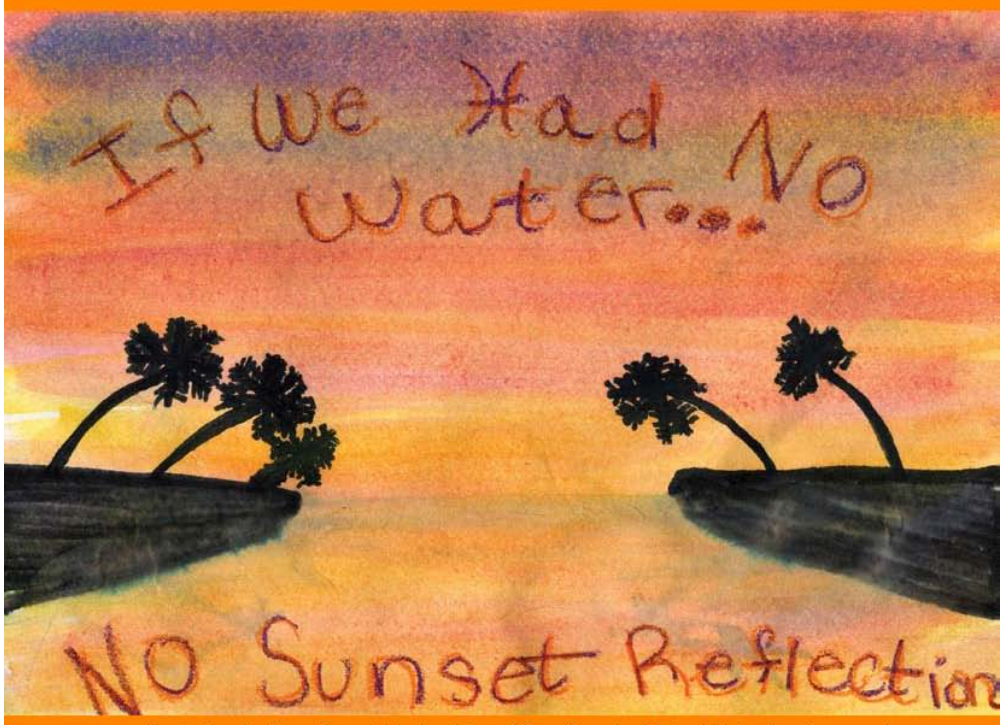


Illustration by Sena Seged, 11, daughter of Sam Seged, a Metro Water Services employee.

2008 Consumer Confidence Report (Page 2)

Delivering A Clean and Safe Water Supply

At Metro Water Services, our top priority is to provide our customers with a clean and safe water supply. As a department of the Metropolitan Government of Nashville and Davidson County, we service 171,627 water accounts, providing drinking water to customers in Davidson County and portions of Rutherford and Williamson counties.

We are pleased to deliver our 2008 Consumer Confidence Report, which shows your water meets or exceeds all of the United States Environmental Protection Agency (EPA) health standards and all state and federal requirements. For more information about Metro Water Services and the quality of your water, visit our Web site at www.nashville.gov/water.

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.

Important Health Information » Some people may be more vulnerable to impurities in drinking water than the general population. Immuno-compromised persons such as cancer patients undergoing chemotherapy, those who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at-risk for infection. These people should seek advice from their health care providers about drinking water.

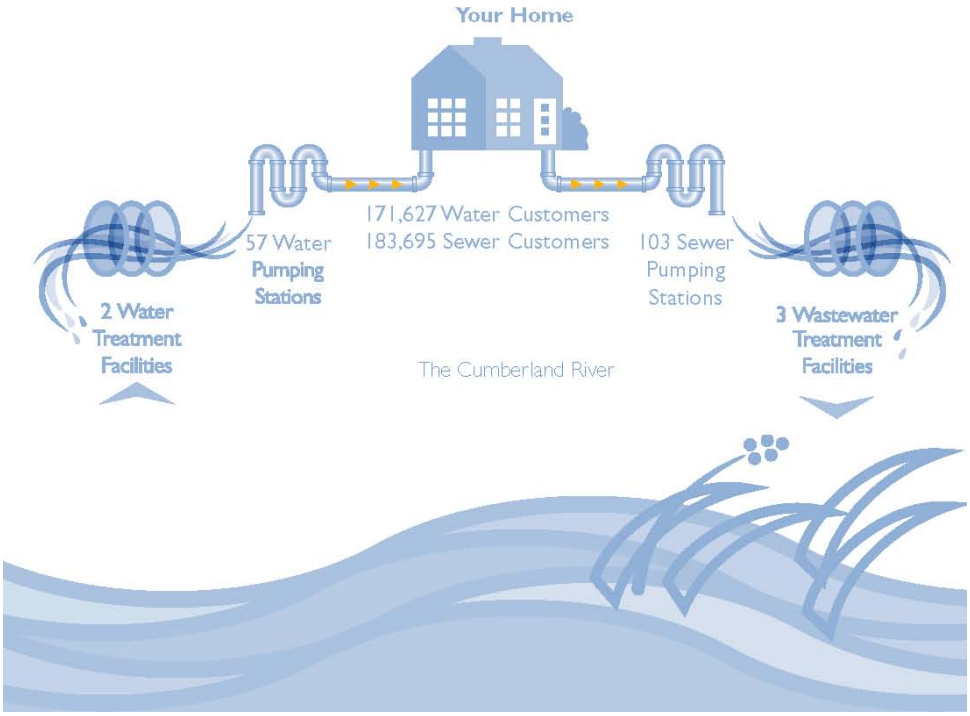
2008 Consumer Confidence Report (Page 3)

The Journey of Your Water

Nashville's water supply comes from the Cumberland River, which provides a steady and excellent source of water for both the K.R. Harrington and Omohundro water filtration plants.

As the water journeys from the river to your tap, it goes through several steps to ensure its quality. First, it is screened to remove twigs and other sizable objects. Next, chemicals, known as coagulants, are added to the water and mixed well. As these chemicals leave the water, they remove contaminants such as mud and algae.

The water then slowly flows through settling tanks, where larger particles are allowed to sink to the bottom. The water from the settling tanks passes through filters and becomes crystal clear. Before it enters the distribution system, a small amount of chlorine and fluoride are added to prevent bacteria from developing and help in preventing tooth decay.



2008 Consumer Confidence Report (Page 4)

Drawing From the River

Nashville is fortunate to have the Cumberland River as its abundant supply of water. The EPA has given the Cumberland River a good grade for water quality. For more information, visit http://cfpub.epa.gov/surf/huc.cfm?huc_code=05130202.

The Tennessee Department of Environment and Conservation (TDEC) has prepared a Source Water Assessment Program (SWAP) Report for the untreated water sources serving this water system. A copy of the Water Assessment Report will be available for review at Metro Water's Administrative Library, located at 1600 Second Ave. North. A source water assessment summary is available at www.state.tn.us/environment/dws/dwassess.shtml.

The Cumberland River Source is rated highly susceptible to potential contamination. Metro Water Services has two water treatment plants and has the ability to withdraw water from more than one river level to minimize the chance of contamination.

Cryptosporidium » Trace amounts of cryptosporidium were detected in untreated river water during 2007. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

2008 Consumer Confidence Report (Page 5)

Sources of Drinking Water

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

To ensure that tap water is safe to drink, the EPA prescribes regulations that limit the amount of certain impurities in water provided by public water systems. The Food and Drug Administration regulates bottled water.

The sources of drinking water (both tap water and bottled water) include lakes, streams, ponds, reservoirs, springs, wells, and, in Nashville's case, the Cumberland River. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and can pick up substances resulting from the presence of animals or from human activity. Impurities that may be present in source water include:

- Biological contaminants, such as viruses and bacteria, which may come from septic systems, sewage treatment plants, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm run-off, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water run-off and residential uses.
- Organic chemicals, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water run-off and septic systems.
- Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

Every day, seven days a week, samples of river, treated and finished water are tested in our laboratories to ensure the highest quality for our customers.

More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

2008 Consumer Confidence Report (Page 6)

Important Numbers

Communication Services
(615) 862-4494
Educational programs about water, stormwater and wastewater or questions about your water quality report

Customer Service Center
(615) 862-4600
To start or change water service or inquire about your water bill

24-Hour Emergency Number
(615) 862-4600
Construction questions, water quality concerns or to report a leak in the street

Customer Connections
(615) 862-7225
Water and sewer connection permits

Backflow Preventer Inspection
(615) 862-4562

Central Laboratory
(615) 862-4591

Public Participation
The public may participate in decisions concerning water quality by attending the Metropolitan Council meetings held on the first and third Tuesdays of each month in the Council Chambers in the Metro Courthouse, One Public Square.

ADA Information
If you need assistance or an accommodation, please contact Joseph A. Estes, Sr., 1600 Second Ave. North, Nashville, TN 37208-2206 or (615) 862-4862.
Visit our Web site at www.nashville.gov/Water

2008 Consumer Confidence Report (Page 7)

Water Quality Table

MWS tests for 105 contaminants that may be present in drinking water. The tables below show those contaminants that were detected January 1 through December 31, 2007, all of which were at safe levels. If you would like a complete list of all substances for which we test, please call (615) 862-4494 to request a Water Quality Letter, or visit our Web site at www.nashville.gov/Water.

Metro Nashville's Water Department #1 is required by state and federal regulations to test for specified unregulated organic and inorganic chemicals. This testing has been performed and reported. All results are available for public inspection at Metro Water Services' Central Laboratory, 1600 Second Ave. North. For more information, please contact Scott Dawson at 862-4591 or visit our Web site at www.nashville.gov/Water.

REGULATED AT THE WATER TREATMENT PLANT

Parameter and Units of Measure	Highest Average Level Detected	Range of Levels Detected	MCL	MCLG	Major Sources of the Substance
Fluoride (mg/L)	1.02	0.84 - 1.15	4	4	Water additive that promotes strong teeth
Nitrate (mg/L)	0.20	0.18 - 0.23	10	10	Runoff from fertilizer use
Sodium (mg/L)	6.5	4.3 - 8.7	N/A	N/A	Natural deposit erosion
Turbidity (NTU)	0.12	0.05 - 0.88	TT = 1 NTU	0	Natural river sediment. Turbidity is a measurement of water clarity, which aids in determining the effectiveness of our filters.
	99.98%	N/A	TT = % of samples <0.3 NTU		

REGULATED IN THE DISTRIBUTION SYSTEM

Total Coliform	0.33%	0.0% - 0.33%	5%	0%	Human and animal fecal waste
Total Trihalomethanes (THM) (µg/L)	32.1	18.2 - 43.2	80	0	Disinfection chemical (chlorine) combining with organic matter in the river water
Stage 2 DBP for IDSE		16.5 - 92.5			
Total Haloacetic Acids (HAA) (µg/L)	30.0	15.9 - 39.4	60	0	
Stage 2 DBP for IDSE		14.6 - 88.0			
Chlorine (mg/L)	1.61	0.0 - 4.0	MRDL - 4	MRDLG - 4	Water additive used to control microbes
Total Organic Carbon* (mg/L)	N/A	N/A	TT	N/A	Naturally present in the environment
Radium 228 (2006 analyses) pCi/L	2.85	<0.59 - 2.85	5 pCi/L	0	Erosion of natural deposits

REGULATED AT THE CUSTOMER'S TAP

Parameter	90th Percentile	Sites Exceeding AL	MCL	MCLG	Major Sources of the Substance
Copper (mg/L)	0.280	0 of 50	AL = 1.3	1.3	Corrosion of household plumbing systems
Lead (µg/L)	2	0 of 50	AL = 15	0	

* We met the treatment technique requirement for total organic carbon.

Terms Used In This Report

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

(mg/L): Milligrams per Liter or parts per million.

(µg/L): Micrograms per Liter or parts per billion.

AL (Action Level): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

NTU (Nephelometric Turbidity Units): Standard units for measurement of water clarity.

pCi/l (Picocuri per liter): Unit of measurement for radioactive substances.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health.

Permit Year 5 Internet Services Report

Stormwater

http://www.nashville.gov/stormwater

Custom Report: 7/1/07 -6/30/08

July 1, 2007 12:00:00 AM – June 30, 2008 11:59:59 PM

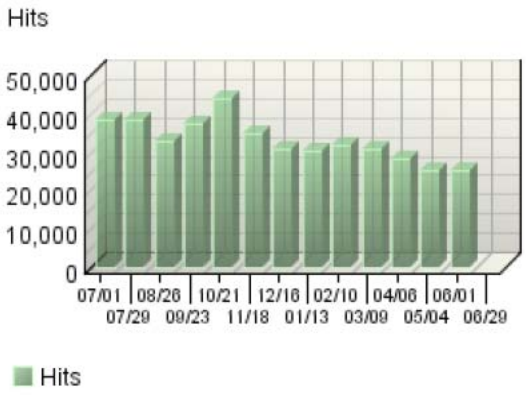
www.netiq.com
This report was generated by WebTrends 7 -Professional, Version: 7.0d, Build: 13917 .
Friday, October 10, 2008 2:44:26 PM
Final report conversion by WebTrends Report Exporter, Version 7.0d (build 13916)

Table of Contents

Overview Dashboard

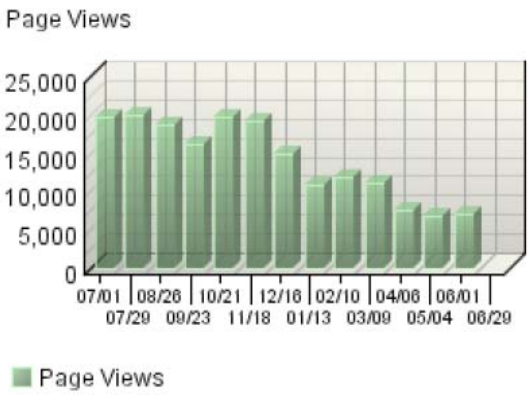
This displays key graphs and tables that provide an overview of the entire report. Click on the title of a graph or
table to navigate to the corresponding page.

Visits Trend Hits Trend



Visitor Summary Page Views Trend

Visitors	27,300
Visitors Who Visited Once	21,784
Visitors Who Visited More Than Once	5,516
Average Visits per Visitor	2.88



Visit Summary

Visits	78,494
Average per Day	214
Average Visit Duration	00:03:34
Median Visit Duration	00:01:12
International Visits	0.00%
Visits of Unknown Origin	100.00%
Visits from Your Country: United States (US)	0.00%

Hit Summary

Successful Hits for Entire Site	428,019
Average Hits per Day	1,169
Home Page Hits	29,324

Overview Dashboard

Page View Summary
Page Views 183,520

Average per Day	501
Average Page Views per Visit	2.34

Appendix C

Monitoring Program Data

Wet Weather Sampling Data for Permit Year 5 of Permit Cycle 2

ID #	Watershed	Site ID	Background (pre-rain event) or Rain Event	Date	Time	Personnel	Total Time of Event	Velocity	Rainfall	Visual Observations	Temp	pH	Oil & Grease	TKN	BOD 5	COD	Lead	Nickel	Copper	Zinc	TSS	Nitrate+ Nitrite Nitrogen	Fecal Coliform	Fecal Strep	E coli	Tot Ammonia Nitrogen	TDS	Tot Phosphorus	Dissolved Phosphorus	Chromium	Total Nitrogen	Fluoride	Cyanide
99	Stones River	Stoners	First Flush	5/2/2008	12:17	RD/MB		0					0	8.7	38	200	0.01	0	0.086	1.4	84	3.2	1700		900	0.68	330	6.1	3.4	0		0	0
100	Stones River	Stoners	Rain Event	5/2/2008	12:18	RD/MB		0					0	2.1	18	59	0.007	0	0	0.17	92	0.47	14000		3600	0.68	68	0.91	0.15	0			0
94	Harpeth River	Harpeth	Rain Event	10/22/2007	9:30	MS/MG	3 Hrs	0	.6				0	0	0	0	0.007	0	0	0.08	17	0	2300		180	0	0	0	0	0	0	0	0.012
93	Harpeth River	Harpeth	First Flush	10/22/2007	9:30	MS/MG	3 Hrs	0	.6				0	4.5	17	170	0.013	0	0.041	1	66	1.1	4600		0	0.33	430	0.54	0.41	0	5.6	0	0
95	Stones River	Stoners	First Flush	10/22/2007	10:30	RD/SH	2.5 Hrs	0	.6				0	1.5	11	130	0.013	0	0.022	0.29	130	0.44	37000		700	0.21	140	0.96	0.85	0	1.94	0	0
96	Stones River	Stoners	Rain Event	10/22/2007	10:30	RD/SH	2.5 Hrs	0	.6				0	0	0	0	0.04	0	0	0.29	120	0	7000		210	0	28	0.19	0	0	0	0	0
97	Richland Creek	Sugartree	First Flush	10/22/2007	11:15	MS/MB	3 Hrs	0	.6				0	1.2	6	0	0	0	0	0	28	0.69	16000		4500	0	200	0.53	0.52	0	1.89	0	0
98	Richland Creek	Sugartree	Rain Event	10/22/2007	11:15	MS/MB	3 Hrs	0	.6				0	0.6	0	0	0	0	0	0.039	48	0.19	16000		2000	0	87	0.38	0	0	0.82	0	0

Ambient Sampling Data for Permit Year 5 of Permit Cycle 2

ID #	Watershed	Site ID	Date	Time	Personnel	Velocity	Visual Observations	Temp	pH	TKN	BOD5	COD	Lead	Nickel	Copper	Zinc	TSS	Nitrate+Nitrite Nitrogen	Fecal Coliform	Fecal Strep	Tot Ammonia Nitrogen	TDS	Tot Phosphorus	Dissolved Phosphorus	Chromium	Total Nitrogen	Fluoride	E colli	DOmg	DOpercent	Cond	Enterococcous
551		Sevenmile east	6/18/2008	8:10	MG/MAS	0	sunny, 80s	18.6	7.1	0.27	0	0	0	0	0	0	8	0.7	1800	2100	0	476	1	1	0	0.97	0.41	1500	7.55	81.7	605	1700
550		Sevenmile w.(Brentwood branch)	6/18/2008	8:10	MG/MAS	0	sunny, 80s	18.3	7	0.71	0	0	0	0	0.001	0.004	7	0.6	400	2000	0	477	1.1	1.1	0	1.31	0.52	350	7.36	78.5	607	1400
552		Sevenmile	6/18/2008	9:20	MG/MAS	0	sunny, 80s	19.4	7.4	0.11	0	0	0	0	0	0	0	1	640	1800	0	378	1	1	0	1.11	0.48	480	7.58	82.2	520	620
547		Ewing	6/11/2008	8:45	MAS/SW	0	sunny, 80s	21.8	7.4	0.43	0	0	0	0	0	0.003	4	1.1	320	440	0.08	499	0.8	0.8	0	1.53	0.45	230	7.31	83.3	684	180
548		Ewing north	6/11/2008	10:00	MAS/SW	0	sunny, 80s	22.3	7.7	0.47	0	0	0	0	0	0	3	0.8	160	790	0.05	480	0.8	0.8	0	1.27	0.38	130	8.34	95.8	684	200
549		Ewing south	6/11/2008	10:10	MAS/SW	0	sunny, 80s	22.3	7.7	0.78	0	0	0	0	0	0.003	2	1.8	2100	290	0.03	537	0.8	0.8	0	2.58	0.59	1800	8.4	97	739	80
542		trip blank	6/4/2008	7:30	MG/MAS	0	sunny, 90s			0.18	0	0	0	0.005	0	0.006	0	0	0	0	0	29	0.1	0.1	0	0.18	0	0	0	0	0	0
543		field blank	6/4/2008	8:00	MG/MAS	0	sunny, 90s			1.4	0	0	0	0.014	0.0047	0	0	0.1	0	0	0	28	0.1	0.1	0	1.5	0.05	0	0	0	0	0
544		Sugartree	6/4/2008	8:00	MG/MAS	0	sunny, 90s	19.2	6.6	0.37	0	0	0	0.004	0	9E-04	0	1.4	400	690	0	357	0.8	0.8	0	1.77	0.35	160	5.52	60.1	569	220
545		Sugartree Dup	6/4/2008	8:00	MG/MAS	0	sunny, 90s	19.2	6.7	0.18	0	0	0	0.009	0	0.014	0	1.5	370	650	0	368	0.8	0.8	0	1.68	0.36	160	5.47	59.9	570	220
546		Sugatree south	6/4/2008	8:20	MG/MAS	0	sunny, 90s	21.4	7.5	0.36	0	0	0	0.003	0	0	7	0.5	910	2000	0	496	0.8	0.8	0	0.86	0.5	640	7.28	82.4	635	450
539		Sevenmile east	4/16/2008	8:55	RD/MS	0	sunny, ~50F	11.7	8	0	0	0	0	0	0	0.008	1	0.12	1600	440	0	340	0.8	0.8	0	0.12	0.31	1600	10.04	94	547	510
540		Sevenmile w.(Brentwood branch)	4/16/2008	9:00	RD/MS	0	sunny, ~50F	11.5	8.1	0	0	0	0	0	0	0.014	0	0.11	300	220	0	333	0.9	0.9	0	0.11	0.38	300	9.98	91.6	540	420
541		Sevenmile	4/16/2008	9:25	RD/MS	0	sunny, ~50F	11.6	8.2	0	0	0	0	0	0	0.001	0	0.15	320	320	0	306	0.9	0.9	0	0.15	0.37	320	11.5	104.7	505	2500
536		Ewing	4/9/2008	9:15	MG/MB	0	raining, dry & warm previous day	14.4	8	1.1	0	0	0.003	0.003	0.022	0.032	2	0.17	160	135	0	463	0.7	0.7	0	1.27	0.41	130	9.33	92.2	613	230
537		Ewing north	4/9/2008	9:45	MG/MB	0	raining, dry & warm previous day	14.2	8	0.61	0	0	0	0	0	0.003	2	0.14	180	180	0	431	0.7	0.7	0	0.75	0.29	130	9.33	91.1	574	280
538		Ewing south	4/9/2008	9:55	MG/MB	0	raining, dry & warm previous day	14.4	8	0	0	0	0	0.001	0.002	0.008	0	0.34	200	180	0	682	0.6	0.6	0	0.34	0.26	140	8.99	87.6	869	180
531		trip blank	4/2/2008	8:10	MB/SW	0				0	0	0	0	0	0.0007	4E-04	0	0	0	0	0	15	0.1	0.1	0	0	0.06	0	0	0	0	0
532		field blank	4/2/2008	9:10	MB/SW	0	mild & sunny, rain previous 2 days			0	0	0	0	0	0.0018	0	0	0	0	0	0	20	0.1	0.1	0	0	0.03	0	0	0	0	0
534		Sugartree	4/2/2008	9:10	MB/SW	0	mild & sunny, rain previous 2 days	10.8	8	0.82	0	0	0	0	0.0012	0.001	1	0.13	117	153	0	349	0.5	0.5	0	0.95	0.37	108	11	99.2	529	117
535		Sugartree Dup	4/2/2008	9:10	MB/SW	0	mild & sunny, rain previous 2 days	10.8	8	0	0	0	0	0	0.0009	0.004	0	0.13	100	117	0	343	0.5	0.5	0	0.13	0.35	100	11.01	99.6	529	81
533		Sugatree south	4/2/2008	9:40	MB/SW	0	mild & sunny, rain previous 2 days	11.8	8.2	0	0	0	0	0	0.0036	0.009	1	0.05	120	171	0	354	0.5	0.5	0	0.05	0.33	120	11.08	102.2	544	171
528		Sevenmile east	2/20/2008	10:00	MAS/MB	0	windy, near 40 F	9.7	8.1	0.72	0	0	0	0	0.0017	0.002	3	1.7	73	9	0	363	0.8	0.8	0	2.42	0.34	73	13.21	116.8	582	9
529		Sevenmile w.(Brentwood branch)	2/20/2008	10:10	MAS/MB	0	windy, near 40 F	9.2	8.3	0.73	2	0	0	0	0.0008	4E-04	2	1.4	45	54	0	382	0.6	0.6	0	2.13	0.41	36	13.47	117.4	571	23
530		Sevenmile	2/20/2008	10:40	MAS/MB	0	windy, near 40 F	9.5	8.5	0.66	2	0	0	0	0.0008	0.002	3	1.8	82	27	0	356	0.6	0.6	0	2.46	0.39	73	14.26	124.8	531	18
525		Ewing	2/13/2008	10:00	MAS/SW	0	cold, light snow, rain on	6.1	7.1	0.78	0	0	0	8E-04	0.0009	0.003	3	2.4	80	99	0	447	0.8	0.8	0	3.18	0.33	80	14.22	114.8	614	210

ID #	Watershed	Site ID	Date	Time	Personnel	Velocity	Visual Observations	Temp	pH	TKN	BOD5	COD	Lead	Nickel	Copper	Zinc	TSS	Nitrate+Nitrite Nitrogen	Fecal Coliform	Fecal Strep	Tot Ammonia Nitrogen	TDS	Tot Phosphorus	Dissolved Phosphorus	Chromium	Total Nitrogen	Fluoride	E colli	DOmg	DOpercent	Cond	Enterococcous
							2/12																									
527		Ewing north	2/13/2008	10:30	MAS/SW	0	cold, light snow, rain on 2/12	5.9	7.3	1	0	0	0	0	0.001	0.005	2	2.5	120	135	0	419	0.7	0.7	0	3.5	0.31	120	13.83	111	584	173
526		Ewing south	2/13/2008	10:45	MAS/SW	0	cold, light snow, rain on 2/12	7.1	7.3	0.92	0	0	0	0	0.0016	0.058	0	2.5	120	45	0	552	0.5	0.5	0	3.42	0.41	64	13.91	111.9	751	135
520		Trip Blank	2/6/2008	8:15	MB/MG/MAS	0				0	0	0	0	0	0.0025	0.002	1	0.1	0	0	0	18	0.1	0.1	0	0.1	0.09	0	0	0	0	0
521		Field Blank	2/6/2008	9:20	MB/MG/MAS	0				0	0	46	0	0	0.002	8E-04	0	0.1	0	0	0	87	0.1	0.1	0	0.1	0.09	0	0	0	0	0
522		Sugartree	2/6/2008	9:20	MB/MG/MAS	0	windy, severe weather the previous night	14.5	7.9	0.94	0	0	0	0	0.0032	0.004	6	2.4	740	1900	0	277	0.8	0.8	0	3.34	0.35	500	9.69	95.7	478	1800
523		Sugartree Dup	2/6/2008	9:20	MB/MG/MAS	0	windy, severe weather the previous night	14.4	8	1.1	0	0	0	0	0.0016	0.01	1	2.4	670	2200	0	282	0.8	0.8	0	3.5	0.35	410	9.56	94	478	1800
524		Sugatree south	2/6/2008	10:00	MB/MG/MAS	0	windy, severe weather the previous night	14.6	8.2	0.62	0	0	0	0	0.0089	0.005	4	1.5	100	410	0	331	0.7	0.7	0	2.12	0.33	90	10.48	103.4	528	310
518		Sevenmile east	12/19/2007	9:00	MG/SW	0		10.7	8.1	0	0	0	0	0	0.001	0	3	0.33	240	72	0	431	0.8	0.8	0	0	0.32	200	10.62	95.6	647	54
517		Sevenmile w.(Brentwood branch)	12/19/2007	9:10	MG/SW	0		10	8.1	0	0	0	0	0	0.0005	0	4	0.23	45	72	0	427	0.7	0.7	0	0	0.44	45	10.47	92.9	637	36
519		Sevenmile	12/19/2007	9:40	MG/SW	0		10.4	8.4	0	0	0	0	0	0.0011	0	5	0.51	130	162	0	393	0.8	0.8	0	0.51	0.4	120	11.82	106.1	590	72
515		Ewing	12/12/2007	9:10	MB/MG/MS	0	rainy, upper 50s	15.5	7.9	0	0	0	0.001	0	0.0015	0.007	17	0.17	900	18100	0.08	399	0.9	0.9	0	0.17	0.27	900	8.64	86.7	493	11800
514		Ewing north	12/12/2007	9:35	MB/MG/MS	0	rainy, upper 50s	15	7.9	0	2	0	0.002	0	0.0022	0.01	20	0.12	3600	4200	0.1	330	0.7	0.7	0	0.12	0.3	2400	8.93	88.7	586	3000
516		Ewing south	12/12/2007	9:45	MB/MG/MS	0	rainy, upper 50s	15.4	7.6	0	2	0	8E-04	0	0	0.014	13	0.06	25000	1380	0.09	376	0.8	0.8	0	0.06	0.3	15000	8.52	85.4	526	930
509		Trip Blank	12/5/2007	8:30	MB/MG					0	0	0	0	0	0.0005	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0				0
510		Field Blank	12/5/2007	9:20	MB/MG					0	0	0	0	0	0	0.001	0	0	0	0	0	0	0.1	0.1	0	0	0.03	0				0
511		Sugartree	12/5/2007	9:20	MB/MG	0	sunny, near 60, rained 0.5" ~55 hrs ago	13.5	7.4	1	0	0	0	0	0.0006	0.002	2	0.4	50	72	0	390	0.8	0.8	0	1.4	0.31	50	7.93	73.1	620	63
513		Sugartree south Dup	12/5/2007	10:00	MB/MG	0	sunny, near 60, rained 0.5" ~55 hrs ago	10.7	8	0	0	0	0	0	0.0012	0.002	14	0.1	81	170	0	420	0.5	0.5	0	0.1	0.35	72	10.26	92.5	661	150
512		Sugatree south	12/5/2007	10:00	MB/MG	0	sunny, near 60, rained 0.5" ~55 hrs ago	10.8	8	0	0	0	0	0	0.0013	0.001	7	0.1	120	120	0	438	0.5	0.5	0	0.1	0.35	110	10.33	93.2	586	110
506		Sevenmile east	10/17/2007	8:50	MG/MS	0	mid 70s, previous night rain	19.1	7.7	0	0	0	0	0	0.001	0.035	7	0.35	550	820	0.09	412	0.3	0.3	0	0.35	0.38	550	7.3	79.3	667	610
507		Sevenmile w.(Brentwood branch)	10/17/2007	8:50	MG/MS	0	mid 70s, previous night rain	18.4	7.8	0	0	0	0	0	0.001	0.019	6	0.31	480	1050	0.1	453	0.3	0.3	0	0.31	0.47	400	7.52	80.7	700	600
508		Sevenmile	10/17/2007	9:40	MG/MS	0	mid 70s, previous night rain	20.1	7.7	0	2	0	0	0	0.003	0.004	4	0.26	300	240	0.09	333	0.3	0.3	0	0.26	0.46	260	6.69	73.6	536	220
503		Ewing	10/10/2007	9:15	MB/MG	0	sunny, near 70	18.5	7.5	0	0	0	0	0	0	0.004	9	0.46	99	360	0.1	447	0.6	0.6	0	0.46	0.57	90	4.72	50.5	659	300
504		Ewing north	10/10/2007	9:45	MB/MG	0	sunny, near 70	17.2	8	0	0	0	0	0	0	0.002	38	0.47	260	270	0.06	593	0.7	0.7	0	0.47	0.39	150	8.52	88.9	840	260
505		Ewing south	10/10/2007	10:00	MB/MG	0	sunny, near 70	17.4	7.9	0	2	0	0	0	0	0.002	130	0.12	220	280	0.06	405	0.7	0.7	0	0.12	0.7	80	8.27	85.4	602	197
498		Trip Blank	10/3/2007	8:00	MG/MS	0				0	0	0	9E-04	0.007	0.0007	0.001	0	0.29	0	0	0	0	0.1	0.1	0	0.29	0.05	0	0	0	0	0
499		Field Blank	10/3/2007	9:00	MG/MS	0				0	0	0	8E-04	0.005	0.001	0	0	0.35	0	0	0	0	0.1	0.1	0	0.35	0.05	0	0	0	0	0
502		Sugatree	10/3/2007	9:00	MG/MS	0	Mid 70s, sunny	20	7.9	0	2	0	0	0.003	0.0008	0.004	2	0.63	1300	630	0	554	0.7	0.7	0	0.63	0.57	300	6.28	69	751	420

ID #	Watershed	Site ID	Date	Time	Personnel	Velocity	Visual Observations	Temp	pH	TKN	BOD5	COD	Lead	Nickel	Copper	Zinc	TSS	Nitrate+Nitrite Nitrogen	Fecal Coliform	Fecal Strep	Tot Ammonia Nitrogen	TDS	Tot Phosphorus	Dissolved Phosphorus	Chromium	Total Nitrogen	Fluoride	E colli	DOmg	DOpercent	Cond	Enterococcous
		south																														
501		Sugartree	10/3/2007	9:30	MG/MS	0	Mid 70s, sunny	19.1	7.1	0	4	0	0.001	0.005	0.0023	0.024	29	0.83	1100	450	0.05	496	1.2	1.2	0	0.83	0.36	540	2.18	22.7	681	410
500		Sugartree Dup	10/3/2007	9:30	MG/MS	0	Mid 70s, sunny	19.1	7.2	0	2	0	0.005	0.006	0.0029	0.025	27	0.84	790	480	0.04	454	1.1	1.1	0	0.84	0.35	190	2.19	24.4	682	450
497		Trip Blank	8/15/2007	8:45	MAS/MG/MB	0				0	0	0	0	0	0	0	0	0	0	0	0.1	7	0.05	0.05	0	0	0.2	0	0	0	0	0
496		Field Blank	8/15/2007	9:20	MAS/MG/MB	0				0	0	0	0	0	0	0.003	0	0	0	0	0.1	30	0.06	0.06	0	0	0.2	0	0	0	0	0
494		Sevenmile east	8/15/2007	9:20	MAS/MG/MB	0		23.3	7.7	0	0	0	0	0	0.0006	0.002	11	0.44	730	1500	0.1	499	2	2	0	0.44	0.45	730	6.71	78.9	652	1400
495		Sevenmile w.(Brentwood branch)	8/15/2007	9:20	MAS/MG/MB	0		23.6	7.7	0	0	0	0	0	0	0.006	3	0.29	360	2600	0.2	367	1.5	1.5	0	0.29	0.53	280	6.48	76.4	662	2200
493		Sevenmile	8/15/2007	10:00	MAS/MG/MB	0		25.1	7.6	0	0	0	0	0	0	0.002	3	0.33	73	310	0.1	373	0.9	0.9	0	0.33	0.53	73	6.23	75.5	540	250
490		Ewing	8/8/2007	9:35	MAS/MB/SW	0		27.3	7.7	0	0	0	0	0.002	0	0	0	0.16	90	200	0.15	428	0.8	0.8	0	0.16	0.51	30	2.99	38.3	621	144
491		Ewing north	8/8/2007	10:50	MAS/MB/SW	0		27.5	7.9	0	0	0	0	0	0	0	16	0.26	110	900	0.05	564	2.6	2.6	0	0.26	0.38	100	7.5	95	703	770
492		Ewing south	8/8/2007	11:00	MAS/MB/SW	0		27	7.8	0	0	0	0	0	0	0	10	0.26	230	630	0.05	473	0.9	0.9	0	0.26	0.64	160	7.58	95	625	530
487		Sugartree	8/1/2007	8:50	MB/MG	0		23.2	7.1	0	2	0	0.001	0	0.0016	0.005	3	0.24	170	2200	0.2	467	0.9	0.9	0	0.24	0.36	30	1.99	23.3	692	1400
488		Sugartree Dup	8/1/2007	8:55	MB/MG	0	dup	23.2	7.1	0	2	0	0.002	0	0.0008	0.012	6	0.24		4200	0.2	432	1	1	0	0.24	0.37		2.06	24.2	692	1600
489		Sugatree south	8/1/2007	9:20	MB/MG	0		23.8	7.6	0	2	0	0.002	0	0.0005	0.007	16	0.3	2000	2100	0.1	574	0.7	0.7	0	0.3	0.54	1200	6.95	82.3	789	3000

TMDL Status of Streams within Davidson County

HUC - 8	HUC - 11	STREAM NAME	Group	Miles Impaired	Pathogen TMDL approval date	Pathogens (2006)	Pathogens (2008)	Habitat Alt/Silt TMDL approval date	Habitat Alt/Silt (2006)	Habitat Alt/Silt (2008)	Nutrients TMDL approval date	Nutrients (2006)	Nutrients (2008)	TMDL approval date	Low DO TMDL approval date	Low DO (2006)	Low DO (2008)	Chlorine (2006)	Chlorine (2008)	Oil & Grease (2006)	Oil & Grease (2008)	Odor (2006)	Odor (2008)	Sulfides (2006)	Sulfides (2008)	Flow Alt. (2006)	Flow Alt. (2008)	Iron (2006)	Iron (2008)	TDS (2006)	TDS (2008)
TN05130203	539-1000	EAST FORK HAMILTON CREEK	1	6					L (HA/S)	H (HA/S)																					
TN05130203	539-0100	WEST FORK HAMILTON CREEK	1	1.8					L (HA/S)	H (HA/S)																					
TN05130203	232-1000	SUGGS CREEK	1	18.1					L (S)	H (HA/S)																					
TN05130203	001-0150	MCCRORY CREEK	1	10.7	6/3/04 (Fecal)	TMDL	TMDL	10/31/2002	TMDL (HA)	TMDL (HA)	5/16/2008	H (NO3)	H (NO3)/TMDL (TN)																		
TN05130203	001-0100	MCCRORY CREEK	1	1.4	6/3/04 (Fecal)	TMDL	TMDL	10/31/2002	TMDL (HA)	TMDL (HA)	5/16/2008	H (NO3)	H (NO3)/TMDL (TN)																		
TN05130203	035-0400	UNNAMED TRIB TO STONERS CREEK	1	1.4				10/31/2002	TMDL (S)	TMDL (S)																					
TN05130203	035-1000	STONERS CREEK	1	1.9	6/3/04 (Fecal)	TMDL	TMDL	10/31/2002	TMDL (S)	TMDL (S)																					
TN05130203	001-1000	STONES RIVER	1	6.7												L	L					L	L	L	L	L	NA (4c)				
TN05130203	036-0100	EAST BRANCH HURRICANE CREEK	1	7.3				10/31/2002	N/A (HA/S) TMDL (S)	N/A (HA/S) TMDL (S)																					
TN05130203	036-0200	WEST BRANCH HURRICANE CREEK	1	3.5				10/31/2002	TMDL (S)	TMDL (S)	5/16/2008	M	TMDL (TP, TN)	5/16/2008	5/16/2008		TMDL															
TN05130203	036-1000	HURRICANE CREEK	1	8.5				10/31/2002	TMDL (S)	TMDL (S)	5/16/2008	H	TMDL (TP, TN)	5/16/2008	5/16/2008		TMDL															
TN05130202	007-5000	MILL CREEK	5	8.1	4/17/2008	M			M (S)	M (S)		M	M (TP)			M	H														
TN05130202	007-1100	HOLT CREEK	5	6.2			L		M (S)	M (S)																					
TN05130202	007-0900	OWL CREEK	5	11.8						H (HA/S)			M (TP)																		
TN05130202	007-0800	INDIAN CREEK	5	5.7			H					M (TP)	M (TP)																		
TN05130202	007-0700	TURKEY CREEK	5	1.6					M (S)	M (S)																					
TN05130202	007-0600	COLLINS CREEK	5	6.7					M (S)	M (HA/S)																					
TN05130202	007-1200	WHITTEMORE BRANCH	5	2.9					M (HA)	H (HA)																					
TN05130202	007-3000	MILL CREEK	5	5.9	4/17/2008	M			M (S)	M (S)		M	M			M	M														
TN05130202	007-1300	SORGHUM BRANCH	5	3.1					M (HA/S)	H (HA/S)																					
TN05130202	007-1490	CATHY JO BRANCH	5	1.1						H (HA/S)			M																		
TN05130202	007-1410	SHASTA BRANCH	5	1	4/17/2008	M	TMDL																								
TN05130202	007-1450	SEVENMILE CREEK	5	2	4/17/2008	M	TMDL					M	M (TP)																		
TN05130202	007-1400	SEVENMILE CREEK	5	2.4	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M (TP)				M														
TN05130202	007-0300	FINLEY BRANCH	5	1.2	4/17/2008	M	TMDL			H (HA)								M													
TN05130202	007-2000	MILL CREEK	5	4					M (S)	M (S)		M	M			M	M														
TN05130202	007-1500	PAVILLION BRANCH	5	1.3	4/17/2008	M	TMDL																								
TN05130202	007-0150	SIMS BRANCH	5	1.4					M (HA)	H (HA)						M	M														
TN05130202	007-0100	SIMS BRANCH	5	1.5	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M (TP)			M	M														

HUC - 8	HUC - 11	STREAM NAME	Group	Miles Impaired	Pathogen TMDL approval date	Pathogens (2006)	Pathogens (2008)	Habitat Alt/Silt TMDL approval date	Habitat Alt/Silt (2006)	Habitat Alt/Silt (2008)	Nutrients TMDL approval date	Nutrients (2006)	Nutrients (2008)	TMDL approval date	Low DO TMDL approval date	Low DO (2006)	Low DO (2008)	Chlorine (2006)	Chlorine (2008)	Oil & Grease (2006)	Oil & Grease (2008)	Odor (2006)	Odor (2008)	Sulfides (2006)	Sulfides (2008)	Flow Alt. (2006)	Flow Alt. (2008)	Iron (2006)	Iron (2008)	TDS (2006)	TDS (2008)
TN05130202	007-1000	MILL CREEK	5	3.5					M (S)	M (S)		M	M (TP)			M	H														
TN05130202	220-2000	MANSKERS CREEK	5	7.6	4/17/2008	M	TMDL		M (S)	M (S)																					
TN05130202	220-0200	WALKERS CREEK	5	7.8	4/17/2008	M	TMDL																								
TN05130202	220-0100	LUMSLEY FORK	5	4.7	4/17/2008	M	TMDL																								
TN05130202	220-1000	MANSKERS CREEK	5	7.9	4/17/2008	M	TMDL		M (S)	M (S)																					
TN05130202	220-0210	Un-named trib to Walkers	5	1.47																							NA (4c)				
TN05130202	023-0300	WEST FORK BROWNS CREEK	5	3.6	4/17/2008	M	TMDL					M	M (NO3-NO2, TP)																		
TN05130202	023-0200	MIDDLE FORK BROWNS CREEK	5	3.5			H		M (HA)	H (HA)			M (NO3-NO2, TP)																		
TN05130202	023-0100	EAST FORK BROWNS CREEK	5	2.2	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M (NO3-NO2, TP)							M	L										
TN05130202	023-2000	BROWN'S CREEK	5	4.1	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M (NO3-NO2, TP)							M	L										
TN05130202	023-1000	BROWN'S CREEK	5	0.2	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M (NO3-NO2, TP)							M	L										
TN05130202	314-3000	RICHLAND CREEK	5	4	4/17/2008	M			M (HA)	H (HA)		M	M (TP)																		
TN05130202	314-0750	VAUGHNS GAP BRANCH	5	1.9	4/17/2008	M	TMDL		M (HA)	H (HA)																					
TN05130202	314-0700	VAUGHNS GAP BRANCH	5	0.6	4/17/2008	M	TMDL		M (HA)	H (HA)																					
TN05130202	314-0800	JOCELYN HOLLOW BRANCH	5	2	4/17/2008	M	TMDL																								
TN05130202	314-2000	RICHLAND CREEK	5	6.7	4/17/2008	M	TMDL		M (HA)	H (HA)			M (TP)																		
TN05130202	314-0400	SUGARTREE CREEK	5	4.3	4/17/2008	M	TMDL		M (HA)	H (HA)		M	M																		
TN05130202	314-0300	BOSLEY SPRINGS BRANCH	5	1.5	4/17/2008	M	TMDL		M (HA)	H (HA)			M (NO3-NO2)																		
TN05130202	314-0200	MURPHY ROAD BRANCH	5	1.5	4/17/2008	M	TMDL																								
TN05130202	314-0100	UNNAMED TRIB TO RICHLAND CREEK	5	1.1	4/17/2008	M																									
TN05130202	314-1000	RICHLAND CREEK	5	1.9	4/17/2008	M	TMDL		M (HA)	H (HA)			M (TP)																		
TN05130202	209-1000	COOPER CREEK	5	3.9	4/17/2008	M	TMDL		M (HA)	H (HA)																					
TN05130202	010-0600	CUMMINGS BRANCH	5	2.6	4/17/2008	M																									
TN05130202	010-0700	LITTLE CREEK	5	6.2	4/17/2008	M			M (1.1) (S)	H (HA/S-5.1 of 6.2)																					
TN05130202	010-0400	EARTHMAN FORK	5	11	4/17/2008	M																									
TN05130202	010-0300	DRY FORK	5	9.9	4/17/2008	M																									
TN05130202	010-0100	EATONS CREEK	5	7.9						H (HA/S)																					
TN05130202	010-0800	EWING CREEK	5	17.6	4/17/2008	M			M (HA)	H (HA)																					
TN05130202	010-0200	DRAKES BRANCH	5	2.7	4/17/2008	M	TMDL																								
TN05130202	010-1000	WHITES CREEK	5	2.9	4/17/2008	M	TMDL					M	H																		
TN05130202	212-1000	GIBSON CREEK	5	3.7	4/17/2008	M	TMDL		M (HA)	H (HA)																	NA (4e)	NA (4e)			

HUC - 8	HUC - 11	STREAM NAME	Group	Miles Impaired	Pathogen TMDL approval date	Pathogens (2006)	Pathogens (2008)	Habitat Alt/Silt TMDL approval date	Habitat Alt/Silt (2006)	Habitat Alt/Silt (2008)	Nutrients TMDL approval date	Nutrients (2006)	Nutrients (2008)	TMDL approval date	Low DO TMDL approval date	Low DO (2006)	Low DO (2008)	Chlorine (2006)	Chlorine (2008)	Oil & Grease (2006)	Oil & Grease (2008)	Odor (2006)	Odor (2008)	Sulfides (2006)	Sulfides (2008)	Flow Alt. (2006)	Flow Alt. (2008)	Iron (2006)	Iron (2008)	TDS (2006)	TDS (2008)
TN05130202	212-0100	NEELEYS BRANCH	5	1.7	4/17/2008	M	TMDL																								
TN05130202	027-2000	DRY CREEK	5	5.9					M (HA)	H (HA)																					
TN05130202	027-1000	DRY CREEK	5	0.5	4/17/2008	M	TMDL																								
TN05130202	211-1000	LOVES BRANCH	5	2					M (HA)	H (HA)																					
TN05130202	202-2000	PAGES BRANCH	5	4.5	4/17/2008	M	TMDL																								
TN05130202	202-1000	PAGES BRANCH	5	0.6	4/17/2008	M	TMDL																								
TN05130202	001T-0700	Davidson Branch	5	2.83			H																								
TN05130202	001T-0600	Unnamed trib to Cheatham Res	5	1																									H		H
TN05130202	001-3000	CHEATHAM Res	5	994ac		M	M																								
TN05130204	021-0100	OTTER CREEK	1	4.6				10/31/2002	TMDL (HA/S)	TMDL (HA/S)																					
TN05130204	021-1000	LITTLE HARPETH RIVER	1	4.1	3/24/2006	TMDL	TMDL	10/31/2002	TMDL (HA/S)	TMDL (HA/S)					9/2004	TMDL	TMDL														
TN05130204	009-3000	HARPETH RIVER	1	16.8							9/2004	TMDL (TP,TN)	TMDL (TP,TN)		9/2004	TMDL	TMDL														
TN05130204	009-0900	TRACE CREEK	1	4.9				10/31/2002	TMDL (HA)	TMDL (HA)	9/2004	TMDL (TP,TN)	TMDL (TP,TN)		9/2004	TMDL	TMDL														
TN05130204	009-2000	HARPETH RIVER	1	18.8							9/2004	TMDL (TP,TN)	TMDL (TP,TN)		9/2004	TMDL	TMDL														
TN05130204	009-0200	NEWSOM BRANCH	1	1.7				10/31/2002	TMDL (S)	TMDL (S)	9/2004	TMDL (TP,TN)	TMDL (TP,TN)		9/2004	TMDL	TMDL														
TN05130204	009-1100	BEECH CREEK	1	3.6				10/31/2002	TMDL (HA/S)	TMDL (HA/S)	9/2004	TMDL (TP,TN)	TMDL (TP,TN)		9/2004	TMDL	TMDL														

# of stream segments = 76

Watershed Color-Code

- Stones River
- Mill Creek
- Manskers Creek
- Brown's Creek
- Richland Creek
- Cooper Creek
- Whites Creek
- Gibson Creek
- Dry Creek
- Loves Branch
- Pages Branch
- Davidson Branch
- Cheatham Reservior
- Harpeth River