



Chapter 1 INTRODUCTION

1.1 Purpose of BMP Manual

The purpose of this manual is to establish minimum standards for the design and implementation of measures to prevent and control erosion, sediment, and other forms of stormwater pollution. The BMP Manual is intended primarily to assist developers, engineers, contractors, inspectors, and property owners in the selection and use of Best Management Practices (BMPs) for the design of new facilities. However, most of the BMPs can also be installed on an existing site or facility in order to improve the environmental quality of stormwater.

It is important to realize that most BMPs are applicable to every type of land use (residential, commercial, industrial, and institutional). This is because everyone must protect our water resources. Therefore, it is important to look through all categories of BMPs to ensure that the most effective measures are selected.

1.2 Organization of BMP Manual

The BMP Manual includes a brief introduction to stormwater BMPs, the theory of erosion control, the steps in selecting which BMPs to use, and a series of focused and concise fact sheets for each type of BMP to be used in the City of Knoxville. The revision date (month and year) is included on each page to allow easy identification of the latest version of each BMP.

The fact sheets are categorized so that they may be used as quick references or for detailed design, inspection and maintenance guidance. In this way, the fact sheets are designed to be stand-alone documents that may be distributed to facilitate focused discussion about each practice. BMP categories are:

AM	Activities and Methods
ES	Erosion and Sediment
IC	Industrial and Commercial
RH	Residential and Homeowners
ST	Stormwater Treatment

It is common to categorize BMPs as either structural or non-structural, depending on whether there is a physical control or a management approach to reducing pollution. These two categories are not used in this BMP Manual. Most practices listed as **AM** are non-structural practices, which are activities performed in an attentive way with stormwater quality in mind. Practices listed as **ES** or **ST** in the BMP Manual are mainly structural practices that involve installation or construction of a physical barrier or device to accomplish pollution reduction.



The BMPs listed under **AM** are generally applicable to all types of existing land uses, such as commercial establishments, industries, residences, institutions, or churches. Likewise, the BMPs listed under **IC** will apply to many properties other than industries or commercial facilities that involve material storage and handling, routine maintenance and repair, or waste disposal. The BMPs listed under **RH** are intended to help city residents and owners of residential properties in preventing pollution impacts.

1.3 Preparation of BMP Manual

Camp Dresser & McKee, Inc. had prepared the original version of this manual for the City of Knoxville in March 2000. Camp Dresser & McKee has prepared many stormwater manuals and BMP manuals for various state and municipal governments across the country. The style and format of this BMP manual closely matches the BMP manuals that were prepared for the California Stormwater Quality Task Force (References 30 through 32). Camp Dresser & McKee also relied heavily upon the stormwater quality handbooks that they had prepared for Caltrans (References 33 through 35).

The BMP fact sheets refer to the list of references by using the reference numbers only. In each case, it is the intention of the City of Knoxville to give appropriate credit whenever possible.

1.4 Stormwater Quantity and Quality

For years, the City of Knoxville has been addressing stormwater quantity (drainage and flooding) through ordinances, which are approved by City Council. Stormwater quantity management historically involved controlling the volume and flow rate of runoff from larger storm events. Currently, the Stormwater and Street Ordinance, effective June 1997, defines the magnitude of storms and the detention and design requirements currently approved by the City Council. The ordinances will continue to be in effect, and are supplemented by the Knoxville Land Development Manual prepared by the Stormwater Engineering Division.

The BMP Manual helps to place new emphasis on stormwater quality. The City of Knoxville is now encouraging that stormwater quality management techniques be applied to new development and redevelopment in the form of structural and non-structural BMPs. Stormwater quality management involves pollutant control, capture, and/or treatment of stormwater. Some of the pollutants are referred to as “point sources”, which means that there is a recognizable source such as regulated discharges, accidental spills, illegal dumping, or illicit connections. The BMP Manual also includes some discussion on minimizing unregulated point sources, but primarily focuses on nonpoint source pollution.

Nonpoint source pollution comes in the form of particulates or dissolved pollutant matter being transported by runoff over surfaces and conveyed to the storm drain system, streams, and other waterways. Nonpoint source pollution principally includes sediment eroded from denuded areas during construction and pollutants from impervious surfaces, which can be easily transported or conveyed.



Nonpoint source pollution is most prevalent in runoff from frequent storm events that are smaller than design storm events used in sizing storm drainage structures. Typically, these events have less than 1 inch of rainfall. This is the rainfall amount generally considered in preparing the selection, size, approach, and maintenance criteria presented in the BMP fact sheets. During dry weather as well as during precipitation events, all BMPs must be carefully followed to ensure continued performance.

1.5 Background

The City of Knoxville, like many other cities across the United States, is required to have a National Pollutant Discharge Elimination System (NPDES) permit to discharge stormwater from the municipal separate storm drain system (MS4). Because development activities may significantly contribute to the discharge of pollutants, the NPDES permit requires that the City of Knoxville encourage, promote, and require implementation of certain practices and procedures for the purpose of reducing or limiting discharge of pollutants to stormwater channels.

To accomplish this goal, the City of Knoxville has ordinances and standards, which require BMP implementation and inspections as part of land development activities. Some of these ordinances and standards have been developed and adopted specifically to address stormwater quality concerns, while others were originally developed to address other concerns, but are also effective in promoting improved stormwater quality in development activities. Development of a BMP Manual was required by NPDES Permit No. TNS068055 issued in 1996 for the City of Knoxville. The principal ordinances and standards for the City of Knoxville that affect the selection of BMPs are listed below.

- A. NPDES Stormwater Discharge Permit Application (also called NPDES MS4 Permit Application), Part I - April 1993 and Part II – May 1993, prepared for the City of Knoxville by Camp Dresser & McKee, Inc. Submitted to TDEC Division of Water Pollution Control.
- B. NPDES Stormwater Discharge Permit No. TNS068055 (also called NPDES MS4 Permit), issued for the City of Knoxville from the TDEC Division of Water Pollution Control, effective on July 1, 1996. In 2003, TDEC has revised and reissued this permit to incorporate more stringent federal standards and guidelines.
- C. The Knoxville Stormwater and Street Ordinance (Chapter 22.5 of the City Code), initially issued in June 1997 and last revised in May 2003.

1.6 Erosion and Sediment Control Plan

The City of Knoxville Engineering Department requires that an Erosion and Sediment Control Plan (ESCP) must be submitted for most types of development. This plan should incorporate common erosion control BMPs (such as the ES section of this BMP Manual). The erosion control BMPs are intended to expand upon commonly used documents such as the Tennessee Erosion and Sediment Control Handbook, which was originally published in July 1992 (reference 115). The Tennessee Erosion and Sediment Control Handbook (2nd Edition) was reissued in March 2002 and is available on the TDEC website.



Laws regarding erosion and sediment control are somewhat flexible and performance-oriented. The property owner and developer shall choose methods and means necessary to prevent or reduce erosion and to control the amount of sediment leaving the site. A combination of structural control measures and non-structural management practices generally will be the most cost-effective method to control erosion and sediment. The erosion process is described in detail in Chapter 2 and measures should be taken to reduce erosion and sediment at each step in the process.

The overall requirements of an ESCP are described in Chapter 5. In addition, typical checklists to review plan submittals are also included. The use of checklists prior to plan review submittals will standardize the format for developers, engineers, contractors, inspectors, and owners.

1.7 Stormwater Pollution Prevention Plan

The City of Knoxville Engineering Department may require a stormwater pollution prevention plan (SWPPP), even if not required by the Tennessee Department of Environment and Conservation (TDEC). Guidance in preparing a SWPPP to be submitted to the City of Knoxville is given in Chapter 6.

TDEC requires a contractor to submit a SWPPP for all construction sites that disturb 1 or more acres of land (covered under the NPDES General Permit for Construction Stormwater). TDEC also requires a SWPPP for industrial activity with the potential to pollute waters of the state (covered under the NPDES General Permit for Industrial Stormwater). See the TDEC website listed in Chapter 8 for additional information on these two general statewide permits and how to obtain coverage. The TDEC website has a comprehensive summary of environmental permits that are required to meet state and federal regulations.

As part of the process of obtaining a NPDES Permit, a Notice of Intent (NOI) must be filed with the affected operator of a municipal separate storm drain system, such as the City of Knoxville Engineering Department. In addition to the NOI, the City of Knoxville also requires that a copy of any NPDES permit must be submitted within 60 days of being issued by TDEC (as required in Section 22.5-39 of the Stormwater and Street Ordinance).

1.8 Special Pollution Abatement Permit

The City of Knoxville Engineering Department requires a special pollution abatement permit for new development or redevelopment with certain land uses which are known to produce pollutants that are detrimental to water quality, even if the land use is normally exempt from the state-mandated NPDES permitting process. This permit is required on the basis of: 1) the type of business or land use, 2) a history of air or water pollution at this site, 3) a history of air or water pollution by this owner/operator at other sites, 4) the potential to impact environmentally sensitive areas such as wetlands, or 5) at the discretion of the Engineering Director upon sound engineering judgment. Further guidance on preparing a special pollution abatement permit is given in Chapter 7.