

# Executive Summary

## Enhancing O&M Case Tracking for Stormwater BMPs

Recommended Operation and Maintenance Activity and Cost Reporting Parameters for Stormwater Best Management Practices (SIWM22T17/4851)

### The Central Issue

The Municipal Water Infrastructure Council (MWIC) Green Infrastructure (GI) task committee of the Environmental and Water Resources Institute of the American Society of Civil Engineers (EWRI-ASCE) identified a need for improved tracking of best management practice (BMP) operation and maintenance (O&M) activities and costs, particularly GI practices. To help meet this need, the MWIC GI task committee developed an initial recommended list of O&M reporting parameters in 2016, which were further refined during 2017-2018. This report describes the recommended O&M parameters to track for stormwater BMPs, including both activities and cost data. These parameters form the basis of data entry spreadsheets and a companion database that can be used to store collected data.

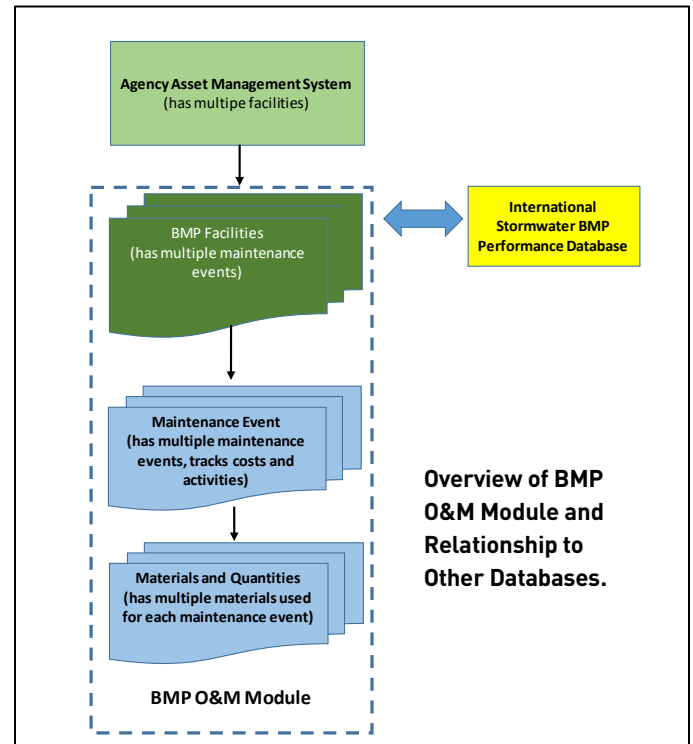
### Context and Background

This document provides an overview of the database structure of Stormwater Best Management Practices, including tables and fields for storing maintenance records and a narrative description of the cost reporting parameters. The objective of this effort was to improve the basis for recommended BMP maintenance activities and frequencies, as well as whole lifecycle cost estimation. The report provides recommendations for standardized O&M activity and cost tracking protocols for use by local governments and a tool to enable better understanding of types of maintenance activities and frequencies necessary for various BMP types.

### Findings and Conclusions

The reporting protocols in this guidance tool were converted into an Excel-based data entry structure for use in the O&M Database and the Community-enabled Lifecycle Analysis of Stormwater Infrastructure Costs (CLASIC) projects and for use by local governments as a template for internal use. Two versions of data entry spreadsheets were created: A basic, simplified version and a detailed version for data providers with more detailed information available. The spreadsheets can be downloaded from [www.bmpdatabase.org](http://www.bmpdatabase.org).

A simple Microsoft Access database was also developed to store collected cost data and can be used internally by local governments. Additionally, a national database is initially being populated by WRF's project team on the CLASIC



project. This database is used to validate cost equations used in the CLASIC tool and is available on [www.bmpdatabase.org](http://www.bmpdatabase.org). The initial population of the database will also include data already collected to support EWRI's 2017 publication Cost of Maintaining Green Infrastructure. Users of the data spreadsheets and/or database are encouraged to submit their data to the national database to advance the national state of the practice regarding costs of maintaining stormwater BMPs.

### Management and Policy Implications

One of the trends for seeking innovative solutions for stormwater management is to take a holistic look from the perspective of lifecycle cost analysis. The EPA-funded CLASIC project provides communities with a tool that takes into account the costs associated with planning, designing, acquiring, constructing, operating, maintaining, renewing, and replacing stormwater infrastructure. The collaboration with ASCE/EWRI specifically focused on the development of the O&M cost tracking protocol, which will support a rigorous lifecycle cost analysis for stormwater management as required by CLASIC project. Through this collaborative effort, an O&M cost tracking protocol that can be used by utilities



and municipalities across the country was developed. Through development of a standardized set of

parameters forming a reporting protocol, stormwater managers and practitioners will have a common basis for cost estimation and maintenance activity planning.

Related WRF Research	
Project Title	Research Focus
<b>Community-enabled Lifecycle Analysis of Stormwater Infrastructure Costs (CLASIC)</b>	Provides a life-cycle cost (LCC) analysis framework and publically accessible tool to guide decision makers in the selection of stormwater infrastructure alternatives. The CLASIC tool can assist communities with integrated planning processes by considering the life-cycle cost of MS4 and CSO, and co-benefits of green infrastructure.
<b>Annual Update of International Stormwater BMP Database (Urban Component) (SIWM1712)</b>	The International Best Management Practices Database is a searchable, online database that provides access to BMP performance data in a standardized format for roughly 700 BMP studies. Database listings include basic test site information, analytical parameters for the BMP, and PDF files that include key characteristics of the study, detailed statistical analysis of BMP performance, and a summary of precipitation and flow data.
<b>Update of International Stormwater BMP Database (Transportation/ Highway Component) (SIWM13T16)</b>	Provides enhancement to the Stormwater BMP Database to specifically implement BMP data entry and management, website enhancements, and online tool, advanced analysis, and training and outreach to State Departments of Transportation.
<b>BMP and LID Whole Life Cost Models: Version 2.0 (SW2R08)</b>	Models provide a framework for calculating capital and long-term maintenance costs of individual BMPs and low impact development techniques.
<b>Linking BMP Systems Performance to Receiving Water Protection - BMP Performance Algorithms (SWC1R06bmp)</b>	Provides algorithms that serve as the basis for the development of BMP performance modules within the BMP Selection/ Receiving Water Protection Toolbox for use with other models/algorithms to complete transport routing and delivery to the receiving water of interest.
<b>BMP SELECT Model: Version 2.0 and User's Guide (SWC1R06c)</b>	SELECT is a simple, planning level, spreadsheet tool that enables stormwater managers to examine the effectiveness of alternative BMP scenarios for controlling stormwater pollution and the whole life cost associated with each scenario.
<b>User's Guide to the WERF BMP Toolkit Framework Version 2.1 (SWC1R06F2T)</b>	Provides an integrated modeling platform to connect all data, models, and analysis tools for solving watershed management challenges, allowing movement of time series data between different water resources models. It is an advanced toolbox used for detailed planning and conceptual design of BMP systems and watershed management plans.
<b>Performance and Whole-Life Costs of Best Management Practices (BMPs) and Sustainable Urban Drainage Systems (SUDS) (01-CTS-21-TA)</b>	Documents performance and whole life costs of BMPs and sustainable urban drainage systems. This second phase of the project identifies preferred designs for a wide range of settings, as well as improved design procedures for more effective maintenance. Documents maintenance costs from the U.S. and UK, to allow planners to estimate future outlays and develop a funding system for sustaining ongoing maintenance requirements.

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