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Cost of Maintaining Green Infrastructure

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Data Providers/Information Sources

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CHAPTER 1
Introduction

Green infrastructure (GI), also known as green stormwater infrastructure (GSI), uses processes found in the natural environment to manage stormwater, with the end goal of reducing stormwater runoff volumes and corresponding pollutant loading from urban surfaces. These processes include storing, filtering, infiltrating, evaporating, and evapotranspiring stormwater while sequestering pollutants in the facility. Interactions among soil, vegetation, and water are key to managing stormwater with GI. GI practices can be implemented at a range of scales, such as regional (watershed scale), sub-regional (neighborhood scale), and widely distributed (smaller scale and single-lot scale). Distributed-scale GI practices have become more common, especially in high-density urban areas, where space is limited and the need for runoff volume reduction is great, such as in communities addressing combined sewer overflows (CSOs). Like traditional stormwater best management practices (BMPs) or control measures (SCMs), GI practices require maintenance to function effectively. Distributed GI practices have now been in place in some communities long enough to evaluate the comprehensive (whole-life) costs of implementation and maintenance.

In 2015, the Environmental and Water Resources Institute's (EWRI's) Municipal Water Infrastructure Council (MWIC) established two task committees to support municipalities implementing GI approaches. The committees are focused on these topics: (1) Comprehensive Costs of Implementing and Maintaining GI and (2) Sustaining Commitments to Municipal Stormwater System Infrastructure. This report has been completed to support the objectives of these two task committees. The primary focus of this report is compiling data to support whole-life cost estimates for a suite of small-scale distributed GI technologies, with particular emphasis on maintenance costs. The approach originally envisioned for this report involved contacting and surveying municipalities and organizations across the country regarding operation of their GI programs. Technologies of most interest included permeable pavements (parking lots, green streets, green alleys), infiltration/filtering technologies (rain gardens, street-side and bump-out planters, green gutters, tree trenches and pits, infiltration basins and trenches, media filters), and green building technologies (green roofs, green walls, planter boxes, disconnecting downspouts, rainwater harvesting). Information on more traditional technologies such as wetlands and detention ponds were also compiled when available. As part of this effort, information was pursued for the "hard costs"

(initial construction, operation and maintenance [O&M], and ultimate rehabilitation) and "soft costs" (planning, engineering, and administration) of small-scale distributed GI technologies.

During the course of the survey effort, it became apparent that GI maintenance cost data were relatively limited. Thus, two additional tasks were integrated into this report: a summary of currently available GI cost tools (Chapter 6) and recommendations for improved reporting of GI maintenance cost data (Chapter 7).

CHAPTER 2
Survey Approach

The initial GI survey supporting this report focused on a list of national contacts identified by the MWIC GI task committees, with the list naturally expanding as the survey progressed. Prior to beginning the survey, a list of survey questions was developed to guide interviews with contacts, as summarized in the Appendix. When possible, this list of questions was sent to the contact point ahead of a scheduled phone conversation. Examples of information requested included GI program structure, types and frequency of maintenance activities, maintenance program costs, data tracking approach, and budgeting. Table 2-1 summarizes the contacts that were made and identifies whether GI cost data were provided or might be provided in the future as programs mature. Some communities did not respond or did not have data to share.

The highest-priority information requested was O&M data for GI. Survey discussions included questions about personnel that perform O&M (number of people, expertise, hours, pay rate); number, size, and age of facilities maintained; equipment use and cost; maintenance procedures (proactive, routine, and restorative); pretreatment practices (including street sweeping and other structural pretreatment); and any other costs outside of personnel and equipment. Other data of interest, although lower in priority, included other general stormwater program information such as annual budgets, stormwater master plans, software and other tools associated with stormwater needs assessment, training programs, and recommended design components to facilitate maintenance.

Although some municipalities were able to provide detailed maintenance cost information, most entities either had programs that were too new to be able to provide a useful data set or had programs that were so small that maintenance cost data for GI was rolled into a budget where it had not been tracked separately for each installation. In other cases, the local government may have had the information in some form, but did not have the resources to retrieve the requested information.