

1.0 Introduction

Purpose: The goal of the document is to introduce Low Impact Development (LID) techniques and benefits (incentives), as well as to provide sufficient information (description and applicability, advantages, disadvantages, technical guidance, and cost) on each practice to demonstrate the strategies necessary to integrate innovative and highly effective LID storm water management techniques into design. As with any practice, storm water management is continuously evolving. Therefore this document should be used as a benchmark, and as LID storm water management techniques become more prevalent in Fort Wayne, new techniques and data may become available to provide further design suggestions and practices.

1.1. Developing the Storm Water Green Incentive Document (Credibility)

- 1) Extensive review of other cities'/states' LID techniques/Green Infrastructure and incentives was completed. The following cities'/ states' guidelines were reviewed: Chicago, Portland, Seattle, Minnesota, Milwaukee, Philadelphia, and Maryland (These documents and their URLs are referenced in the bibliography). Many of the reviewed design guidelines/green documents were authored by a consortium of experts in LID techniques including the following organizations: Natural Resources Defense Council (NRDC), the National Association of Clean Water Agencies, the Environmental Protection Agency (EPA), the Low Impact Development Center, and Universities. The document's intent is to consolidate as many viable sources as concisely and logically as possible into one document for the City of Fort Wayne. These documents were reviewed with three main focus points; 1) the city's or state's storm water design regulations, 2) technical design information, and 3) applicability to Fort Wayne.

- 2) Philadelphia's and Milwaukee's storm water design guidelines were primarily, but not exclusively, used in developing many of the BMP fact sheets for Fort Wayne. In addition, the LID technique center and EPA published a document, *LID for Big Box Retailers*, which is used for some of the design examples within this document (provided in Appendix 1). It is essential for the success of green infrastructure to keep in mind, that while some of the concepts in green design are transferable, regional conditions (rainfall intensity and patterns, evaporation, transpiration, soil properties, plant selection, etc.) are extremely crucial in the physical application of green design. Regional experts from both the private sector and academia were utilized to review the green design Fact Sheets.

1.2. Change in Storm Water Design Paradigm

A change in the design paradigm for storm water management is currently evolving around the world. Storm water design was (and often, still is) put off until the last stage of development. However, storm water is becoming one of the first planning tools when evaluating a site and is being looked at as a valuable natural resource, not a problem to be piped and conveyed into the nearest ditch, channel, or stream. Many developers and municipalities alike are realizing the benefits of incorporating storm water management into the initial planning stages and integrating various green infrastructures into both private and public development and redevelopment projects.

1.3. Why a Change in Design Paradigm

There are a number of reasons for this shift. The primary reasons are:

- 1) **Regulatory Changes.** Many cities and states have adopted a comprehensive watershed planning approach to further address common storm water management problems found across the world such as: combined sewer overflows (CSOs), stream deterioration (chemical, biological, physical, and recreational), and decreased groundwater recharge. Many cities and states have adopted not only quality and quantity design requirements, but also recharge volume, channel protection storage volume, and overbank flood protection volume requirements. Conventional storm water design cannot solely be used in order to meet these design criteria. LID/green infrastructure in many cases must be integrated into the design to meet these regulatory requirements.
- 2) **Availability of Reliable Data.** Many cities and states have been slow to adopt or accept LID techniques and the various green infrastructures into policy because of the lack of historical performance data. Cities and states do not want to rely on potentially maintenance-intensive techniques that may “fail” when the primary objective of storm water management has been to protect citizens from flooding. However, in the past decade there has been extensive research completed to provide scientific data on these techniques and the relatively low-maintenance requirements of most of the options. Recently the EPA has encouraged the use of green infrastructure, claiming that it can be both cost-effective and an environmentally preferable approach to reduce storm water runoff entering combined or separate sewer systems in combination with or in lieu of centralized hard infrastructure. (EPA, 2007)
- 3) **Consumer Demand.** Large corporations and companies are beginning to focus on social and environmental responsibility, allocating funds and effort to research into alternative energy sources and actions they can take to be better stewards of the environment.