Low Impact Development

Stormwater Series

What is low impact development?

Runoff from rainwater, often referred to as stormwater, is a primary contributor to nonpoint source (NPS) pollution of our waterways. Low Impact Development (LID) is a strategy designed to minimize the impact of development on a site by limiting the amount of stormwater and NPS pollution that is transported to our streams, rivers, lakes, and coastal waters. Typically, when it rains an undeveloped site generates less stormwater runoff because significant amounts of water seep into the ground (groundwater recharge) and moisture from soil, trees, shrubs, and grasses evaporates into the air (process of evapotranspiration). Increased development alters the landscape, removing and replacing vegetation with impervious cover, such as roads, driveways, rooftops, and sidewalks. These impervious surfaces inhibit groundwater recharge while increasing the quantity of stormwater runoff (see Figure 1). The LID approach to land development integrates the use of better site design techniques (e.g., cluster development, tree preservation) and stormwater management practices (e.g., bioswales, pervious materials, rainwater harvesting) to maintain the natural distribution of rainwater, and treat stormwater runoff on site.

Distribution of rainwater

Conceptual water budgets for undeveloped and developed sites in the lowcountry. The size of the arrows is indicative of the volume of rainwater entering or leaving a site.

Additional Resources

Polluted Stormwater Brochure

Halfacre, A.C., D.R. Hitchcock, and J.A. Schuler. 2007. Community Associations and Stormwater Management: A Coastal South Carolina Perspective
www.urbanestuary.org

Green Solutions to Pollution: Homeowner Practices for Managing Stormwater and Polluted Runoff
www.dnr.sc.gov/marine/NERR/traininggreenhomes.html

Green Homes 101
www.dnr.sc.gov/marine/NERR/traininggarden.html

Carolina Yards and Neighborhoods
www.clemson.edu/extension/natural_resources/water/carolina_yards

Carolina Clear
www.clemson.edu/public/carolinaclear

Clemson’s Home and Garden Information Center
www.clemson.edu/extension/hgic

Low Impact Development Center, Inc.
www.lowimpactdevelopment.org

Figure 1
Oak Terrace Preserve LID
Stormwater Management Practices

Oak Terrace Preserve, a community in North Charleston S.C., employs a network of LID practices designed to disperse stormwater throughout the development to promote infiltration and groundwater recharge. These LID practices include bioswales, pervious alleys, pocket parks, and a forebay, and are interconnected with perforated piping to continually promote infiltration and retention of stormwater on site, while also preventing flooding of adjacent properties. In addition, a pervious walkway and on-site rainwater harvesting techniques (e.g., rain barrels) are used throughout the site but they are not connected to the piped network.

- **Bioswales** (often referred to as bioretention swales) receive stormwater runoff from roads and the front of homes. The swales, combined with soils and plants, provide an area for temporary retention of stormwater, promote infiltration, and filtration and uptake of pollutants.
- **Pervious alleys**, placed behind the homes in Oak Terrace Preserve, are designed with void spaces and underlined with pervious stones to promote infiltration and groundwater recharge.
- **Depressional areas**, or **pocket parks**, are found throughout Oak Terrace Preserve and serve dual purposes, both functional (stormwater detention) and aesthetic (natural areas). These pocket parks are connected to the drainage network, and in the event of heavy rainfall, temporarily detain stormwater.
- A **terminal pond**, or **forebay**, is located at the end of the network of LID practices and offers another opportunity to retain stormwater and its pollutants before flowing into the adjacent forested wetland, and ultimately, a tidal creek (Filbin Creek). This pond is designed with a deeper pooling area to promote settling of sediments and sediment-associated pollutants within the stormwater, as well as a vegetated buffer, to promote pollutant and stormwater uptake through the plants.

**LID Maintenance**

LID practices use natural processes (e.g., detention and infiltration of stormwater) to manage stormwater runoff from the neighborhood and maintenance needs are fairly minimal. However, the LID practices are stormwater management techniques, used to minimize downstream pollution and flooding, which require routine maintenance and inspections to ensure that they are functioning properly. Generally, LID practices require bi-annual to annual maintenance which is dependent on the type of LID practice used and is based upon routine inspections. A list of specific maintenance guidelines has been developed for the LID stormwater practices of Oak Terrace Preserve and is available online at [www.scseagrant.org/pdf_files/LID_maintenance.pdf](http://www.scseagrant.org/pdf_files/LID_maintenance.pdf) or call S.C. Sea Grant Consortium at (843) 953-2078.