What is Low Impact Development (LID)?

LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. The practice has been successfully integrated into many municipal development codes and storm water management ordinances throughout the United States. Specifically, LID aims to:

- Preserve Open Space and Minimize Land Disturbance;
- Protect Natural Systems and Processes (drainage ways, vegetation, soils, sensitive areas);
- Reexamine the Use and Sizing of Traditional Site Infrastructure (lots, streets, curbs, gutters, sidewalks) and Customize Site Design to Each Site;
- Incorporate Natural Site Elements (wetlands, stream corridors, mature forests) as Design Elements; and
- Decentralize and Micromanage Storm Water at its Source.

Source: City of Portland, BES

Courtyard with Bioretention Areas

Buckman Heights Community
Portland, OR

Cover Photo: R. Arendt

Questions and Answers

Information on the most frequently asked low impact development questions.

Public Safety

Q. I am aware that in some instances, LID advocates the reduction of street widths and the reduced use of sidewalks to decrease impervious surfaces. Isn't this a threat to public safety?

A. No. Studies have shown that reduced street widths still provide all the functions of access, parking, and circulation for residents and emergency vehicles alike. Depending on density, minimizing the use of sidewalks may help to reduce development costs, increase housing affordability, and reduce impervious surfaces.

Q. Don't LID storm water management practices increase the likelihood of flooding?

A. No. LID designs provide adequate conveyance of storm water by using designs that maintain predevelopment volumes and rates of runoff. Since bioretention areas are designed to completely drain within a specified period of time, they do not provide breeding grounds for mosquitos. Overflow controls within bioretention areas control the risk of flooding.

Public Perception

Q. Aren't homeowners concerned about maintaining storm water controls on their properties?

A. Environmental stewardship is everyone's responsibility. Most homeowners view these systems as additional landscaping and once they are aware of the benefits that these systems provide to local hydrology, few remain opposed.

Maintenance

Q. LID practices sound great, but who maintains all of the open space and various storm water controls?

A. Communities designed using LID practices often rely on a combination of homeowner stewardship and maintenance agreements. When designed correctly, most homeowners perceive these systems as value-added builder amenities and actively provide for their maintenance.

For More Information

- Low Impact Development Center
  http://www.lowimpactdevelopment.org
- Prince George's County, Maryland
  http://www.goprincegeorgescounty.com
- NAHB Research Center Toolbase Services
  http://www.toolbase.org
- U.S. EPA
  http://www.epa.gov/owow/nps/urban.html

NAHB RESEARCH CENTER

*Assumes paving costs of $15/sq. yd.

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Municipal Guide to Low Impact Development

Would you be interested in saving upwards of $70,000* per mile in street infrastructure costs by eliminating one lane of on-street parking on residential streets?

Did you know that communities designed to maximize open space and preserve mature vegetation are highly marketable and command higher lot prices?

Are you aware that most homeowners perceive Low Impact Development practices, such as bioretention, as favorable since such practices are viewed as additional builder landscaping?

Did you know that by reducing impervious surfaces, disconnecting runoff pathways, and using on-site infiltration techniques, you can reduce or eliminate the need for costly storm water ponds?

Source: Low Impact Development Center

Grassed Swale and Narrow Street

Montgomery County, MD

Source: Applied Ecological Services, Inc.

Bioretention with Native Vegetation

Prairie Crossing Grayslake, IL

LID Benefits

In addition to the practice just making good sense, low impact development techniques can offer many benefits to a variety of stakeholders.

Municipalities

- Protect regional flora and fauna
- Balance growth needs with environmental protection
- Reduce municipal infrastructure and utility maintenance costs (streets, curbs, gutters, sidewalks, storm sewer)
- Increase collaborative public/private partnerships

Developers

- Reduce land clearing and grading costs
- Potentially reduce infrastructure costs (streets, curbs, gutters, sidewalks)
- Reduce storm water management costs
- Potentially reduce impact fees and increases lot yields
- Increase lot and community marketability

Environment

- Preserve integrity of ecological and biological systems
- Protect site and regional water quality by reducing sediment, nutrient, and toxic loads to water bodies
- Reduce impacts to local terrestrial and aquatic plants and animals
- Preserve trees and natural vegetation

Case Study

Somerset is an 80-acre development in Prince George's County, Maryland consisting of 199 homes on 10,000-square-foot lots. During its creation, the developer used LID practices to reduce the storm water management burden. By using LID, the developer:

- Eliminated the need for storm water ponds by using bioretention techniques saving approximately $300,000;
- Gained six additional lots and their associated revenues; and
- Reduced finished lot cost by approximately $4,000.

Lot with Bioretention

Grassed Swale and Street without Curb and Gutter

Bioretention Area and Open Space

Photos: Low Impact Development Center

Description	Conventional Design	Bioretention System
Engineering Redesign	0	$110,000
Land Reclamation (6 lots x $40,000 Net)	0	<$240,000>
Total Costs	$2,457,843	$1,541,461
Total Costs (-Land Reclamation + Redesign Costs)	$2,457,843	$1,671,461
Total Cost Savings = $916,382		
Cost Savings Per Lot = $4,604		

Source: D. Winogradoff

Cost Comparison: Conventional Design vs. Bioretention

Aerial View of Somerset Development Site Plan, Prince George's County, MD

Hydrologic Comparison between Conventional Storm Water Management and LID

Hydrologic alterations within the landscape occur whenever land is developed. Conventional development approaches to storm water management have used practices to quickly and efficiently convey water away from developed areas. Usually these practices are designed to control the peak runoff rate for predetermined storm events, usually the 2- and 10-year storms. While these systems have worked to some degree, they still have not accounted for the increased runoff rates and volumes from smaller, more frequent storms, nor have they addressed the larger watershed functions of storage, filtration, and infiltration.

In contrast, LID utilizes a system of source controls and small-scale, decentralized treatment practices to help maintain a hydrologically functional landscape. The conservation of open space, the reduction of impervious surfaces, and the use of small-scale storm water controls, such as bioretention, are just a few of the LID practices that can help maintain predevelopment hydrological conditions.