

QUICKNOTES

*Planning fundamentals
for public officials and
engaged citizens*

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Low-Impact Development

WHAT IS LID?

Low-impact development (LID) is the general term for a wide array of site planning principles and engineered treatment practices used to manage both water runoff volume and water quality. LID is an ecologically friendly approach to site development and stormwater management. It encourages sustainability by minimizing development impacts to the land, water, and air. LID's goal is to use multiple on-site techniques to avoid generating runoff and increase the landscape's ability to detain rainwater and capture pollutants. Rather than rely on one single device for control, such as a detention pond, it relies on the cumulative benefits of many small-scale prevention and treatment techniques.

LID can be applied to any type of development. The key is to select the most appropriate LID principles and practices that work best for the particular hydrology and geology of the land. The goal is to mimic the unique water balance of a site. LID techniques are especially useful for urban retrofit and redevelopment projects and play an important role in restoring waters degraded by existing uncontrolled urban development. LID technology has been in practice for over 15 years. It has demonstrated its effectiveness in advancing long-term economic and environmental benefits, protecting sensitive aquatic resources, and supporting sustainability.

LID STRATEGIES AND TECHNIQUES

LID can be used in new development or urban retrofit and redevelopment settings. Applying LID to new development involves using a five-step systematic approach to reducing and controlling runoff. First, on a project scale, optimize conservation of natural features (trees, wetlands, streams, and special areas), drainage patterns, topography, and soils in defining the building envelope. The conservation areas are to be used to treat runoff using their natural ability to filter and soak up runoff. Second, at the individual lot level, minimize impacts by saving existing vegetation and soils, while limiting the use of impervious surfaces and pipes. Third, slow the water down by preserving the natural drainage pathways and use of vegetated swales. Fourth, compensate for runoff increases by using various LID-engineered practices such as rain gardens, infiltration practices, small-scale detention swales, and filtration practices. Fifth, prevent pollution by influencing human behavior through education to reduce the introduction of pollutants into the environment.

LID techniques are ideal for urban retrofit and redevelopment. The small-scale treatment practices can be easily integrated into the urban landscape by using tree box filters, bioretention landscaping, porous surfaces, and green roofs. LID practices now make it possible to reverse the impacts of existing uncontrolled urban development. It does this by replacing nonfunctional landscape features with multifunctional detention and filtration practices.

WHAT MAKES LID SO ATTRACTIVE?

A growing number of state and local programs are incorporating LID as a site planning principle due to its many benefits:

Universally Applicable. Regardless of climate, hydrology, or geology, there are many LID techniques that can be applied to meet stormwater goals.

Economically Sustainable. In many instances, the impacts from LID have been shown to be less costly to construct and maintain. Savings are typically achieved by reducing or eliminating the use of stormwater management ponds; minimizing reliance on pipes, inlet structures, curbs and gutters;

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*Tree box filters and infiltration
parking areas along the roadway.*



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and reducing roadway paving, grading, and clearing. LID's bottom line is environmentally friendly land development at less cost.

Environmentally Sustainable. LID's goal for new development is to mimic the natural water balance of the site. Careful use of LID will avoid adverse water quality and flooding impacts. Further, since LID relies to a great extent on natural vegetative practices, these techniques will work long-term to capture and cycle pollutants with only minimum landscape maintenance.

Multiple Design Benefits. Many LID techniques can reduce water consumption through the use of native plants to reduce the need for irrigation and by using rain barrels to capture and use runoff. Green roofs, with their insulation properties, can reduce heating and air conditioning costs. LID's use of vegetation can improve air quality, save energy, and improve aesthetics and property values.

Ideal for Urban Retrofit. LID practices have become a most useful tool for urban retrofit and redevelopment and are playing an important role in restoring waters degraded by existing uncontrolled urban development. Major cities, including Philadelphia, Washington, D.C., Milwaukee, and Portland, Oregon, are retrofitting their urban landscapes with LID practices to reduce the volume runoff and improve water quality, which can reduce combined sewer overflows and help meet receiving water quality goals.

Not a Growth Management Tool. LID is not a technique that affects growth management concerns such as the rate or location of growth, the overall density of new development, or the compactness of the settlement pattern. While conservation design and cluster development can have beneficial impacts on water retention and water quality, LID focuses on technology-based approaches that impact flooding and water quality.

REMAINING CHALLENGES

Today there are few technical challenges or barriers preventing LID's widespread use. Technical design guidance is available on all aspects of LID site planning, practice design and maintenance. Numerous manufacturers now provide many types of storage, filtration and infiltration practices such as porous surface systems, tree box filter systems, infiltration systems, bioretention soil mixtures, rainwater capture devices, and green roof systems. Regulatory guidance exists at the federal, state, and local levels. Monitoring and research has studied LID's performance, economics, maintenance needs, and design specifications.

The biggest challenge to full implementation of a LID approach is the effort required to overcome the inertia that prevents changes in conventional institutional thinking. LID is innovative and unconventional. Some of its principles and practices may conflict with existing stormwater management approaches, subdivision regulations, and building codes. Development of a LID program requires significant effort to address these conflicts and to provide new design guidance.

Getting LID institutionalized requires a collaborative effort between a variety of stakeholders—government, the development community, and environmental groups. The first step is to determine which LID principles and practices work best to meet local political, economic, and stormwater goals. This requires an open discussion of the best mix of prevention and conservation measures and engineered treatment practices. Once the LID principles have been defined the next step is to develop technical guidance. This must be customized to address local hydrology, geology, and climate issues and to resolve any technical conflicts with existing codes and regulations. This process can take one to two years to complete.

The bottom line: Low-impact development techniques should be considered important components in any community's strategy to advance sustainability and resilience.

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"LID encourages sustainability by minimizing development impacts to the land, water, and air."

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2. Other Resources

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The Low Impact Development Center, Inc., <http://www.lowimpactdevelopment.org>.