Benefits of Low Impact Development

How LID Can Protect Your Community's Resources

LID Barrier Busters Fact Sheet Series

What Is Low Impact Development (LID)?

LID includes a variety of practices that mimic or preserve natural drainage processes to manage stormwater. LID practices typically retain rain water and encourage it to soak into the ground rather than allowing it to run off into ditches and storm drains where it would otherwise contribute to flooding and pollution problems (see **www.epa.gov/nps/lid**).

A green roof absorbs rainwater, reduces energy costs and offers wildlife habitat in urban Portland, Oregon.

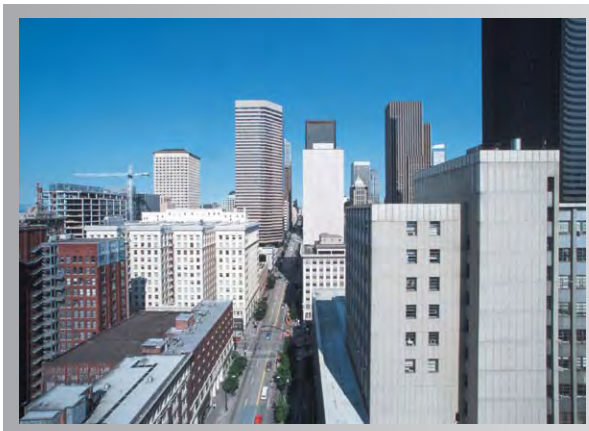
Why Should My Community Adopt LID?

LID Reduces Stormwater Runoff by Emphasizing Infiltration

As a community grows, so does the amount of surface area covered by parking lots, roads and rooftops (Figure 1). Rainfall cannot soak through these hard surfaces; instead, the rain water flows quickly across them—picking up pollutants along the way—and enters ditches or storm drains, which usually empty directly and without treatment into local waterways. Local streams in urban areas are overwhelmed by frequent urban flash flooding and stream habitats are smothered by sediments carried by the excessive flows.

Contrast this to an undeveloped watershed, where vegetation-covered soil soaks up rainfall rather than allowing it to run off the land (Figure 2). Water filters through the soil before reaching the groundwater table or being released slowly into streams. An undeveloped watershed provides clean, safe water.

Fortunately, by adding LID solutions, communities can help their watersheds act more like undeveloped watersheds—despite the ever-expanding numbers of roads and rooftops. LID practices such as natural or man-made swales, depressions and vegetated areas capture and retain water onsite, allowing time for water to soak into the soil where it is naturally filtered.



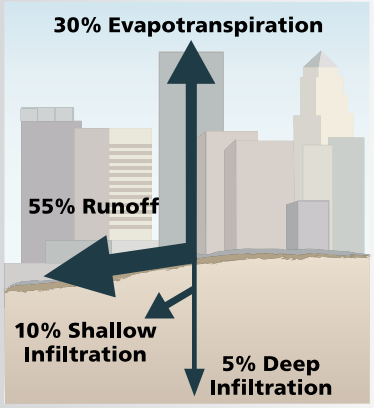


Figure 1. When roads, rooftops and parking lots cover much of the land, more than half of the rainfall runs off and flows directly into surface waters. In highly developed areas, such as in Seattle, Washington (above left), only 15 percent of rain water has the opportunity to soak into the ground.

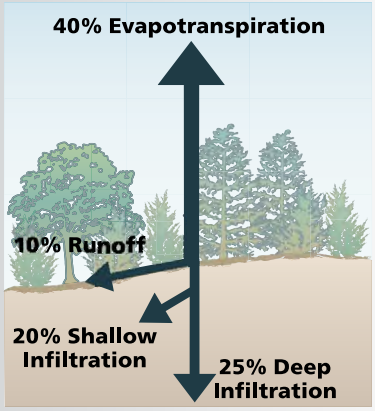


Figure 2. When vegetation and natural areas cover most of the land, such as in Oregon's Upper Tillamook Bay watershed (above left), very little water (only 10 percent) runs off into surface waters. Nearly half of the rainfall soaks into the soil. The remaining water evaporates or is released into the air by vegetation.

LID Provides Many Environmental and Economic Benefits

- **Improved Water Quality**. Stormwater runoff can pick up pollutants such as oil, bacteria, sediments, metals, hydrocarbons and some nutrients from impervious surfaces and discharge these to surface waters. Using LID practices will reduce pollutant-laden stormwater reaching local waters. Better water quality increases property values and lowers government clean-up costs.
- **Reduced Number of Costly Flooding Events.** In communities that rely on ditches and drains to divert runoff to local waterways, flooding can occur when large volumes of stormwater enter surface waters very quickly. Holistically incorporating LID practices reduces the volume and speed of stormwater runoff and decreases costly flooding and property damage.
- **Restored Aquatic Habitat.** Rapidly moving stormwater erodes stream banks and scours stream channels, obliterating habitat for fish and other aquatic life. Using LID practices reduces the amount of stormwater reaching a surface water system and helps to maintain natural stream channel functions and habitat.
- **Improved Groundwater Recharge**. Runoff that is quickly shunted through ditches and drains into surface waters cannot soak into the ground. LID practices retain more rainfall on-site, allowing it to enter the ground and be filtered by soil as it seeps down to the water table.
- **Enhanced Neighborhood Beauty**. Traditional stormwater management infrastructure includes unsightly pipes, outfalls, concrete channels and fenced basins. Using LID broadly can increase property values and enhance communities by making them more beautiful, sustainable and wildlife friendly.

When implemented broadly, LID can also **mitigate the urban heat island effect** (by infiltrating water running off hot pavements and shading and minimizing impervious surfaces), **mitigate climate change** (by sequestering carbon in plants), **save energy** (from green roofs, tree shading, and reduced/avoided water treatment costs), **reduce air pollution** (by avoiding power plant emissions and reducing ground-level ozone), **increase property values** (by improving neighborhood aesthetics and connecting the built and natural environments), and **increase groundwater recharge**, potentially slowing or reversing land and well field subsidence.

LID Techniques Can Be Applied at Any Development Stage

- **In undeveloped areas, a holistic LID design can be incorporated in the early planning stages**. Typical new construction LID techniques include protecting open spaces and natural areas such as wetlands, installing bioretention areas (vegetated depressions) and reducing the amount of pavement.
- **In developed areas, communities can add LID practices to provide benefits and solve problems**. Typical post-development LID practices range from directing roof drainage to an attractive rain garden to completely retrofitting streets with features that capture and infiltrate rainwater.

A landscaped curb extension calms traffic and captures and infiltrates street runoff in Portland, Oregon.

Rainfall soaks through permeable pavement and into the ground below in this parking area in west Des Moines, Iowa.

Street runoff collects in stormwater planters in Portland, Oregon.

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