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# ENVIRONMENTAL Fact Sheet

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WD-WMB-17

2010

## Low Impact Development and Stormwater Management

### What is Stormwater

Stormwater is water from rain or melting snow that does not soak into the ground. In a forest, meadow, or other natural environment, stormwater usually soaks into the ground and is naturally filtered. When forests and meadows are developed, they are commonly replaced with residential neighborhoods, shopping centers, and other areas that introduce impervious surfaces such as houses, buildings, and roads and parking lots. Impervious surfaces prevent rain or melting snow from soaking into the ground and create excess stormwater runoff.

Excess stormwater runoff creates problems when stream channels have to accommodate more flow than nature designed them to. When this happens, flooding is more frequent, banks erode, and the groundwater table is lowered. Stormwater can also become polluted with trash and debris, vehicle fluids, pesticides and fertilizers, pet waste, sediment, and other pollutants when it flows over impervious surfaces, lawns, and other developed areas. These pollutants get picked up with the stormwater runoff and eventually flow untreated into nearby lakes, streams and other bodies of water.

Stormwater has been identified as a major source of water pollution in the United States. In New Hampshire, stormwater has been identified as contributing to over 80 percent of the surface water quality impairments in the state. All across New Hampshire, communities, businesses, and property owners are experiencing the challenge of managing stormwater to maintain transportation and storm drainage infrastructures, protect water quality, and to simply keep their driveways and landscaping from washing out each year.

Low impact development can be used to reduce the amount of stormwater that runs off impervious surfaces and protect nearby surface waters from stormwater pollution.

### What is Low Impact Development?

Low impact development (LID) is a stormwater management approach. Unlike conventional stormwater management, which focuses on piping stormwater away from a site to large centralized stormwater treatment areas, LID focuses on controlling stormwater by using small, decentralized methods to treat stormwater close to the source. The primary goals of LID are accomplished through LID site planning and LID treatment practices and include:

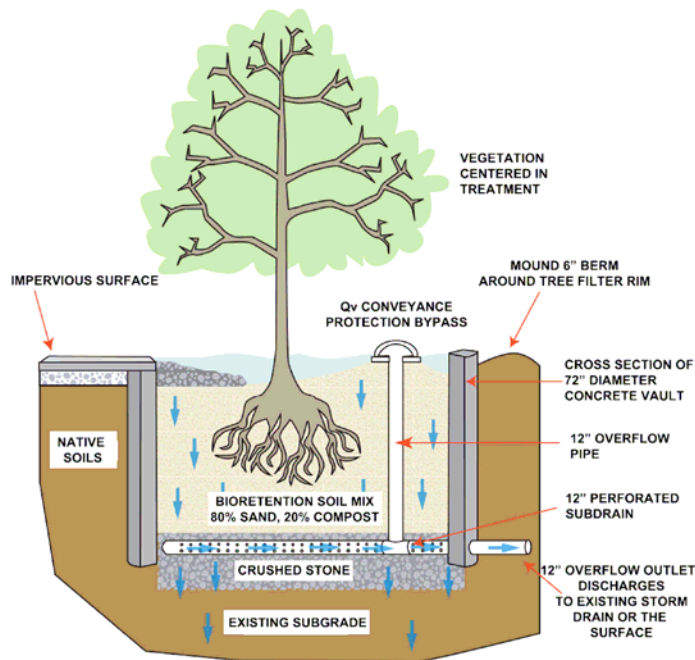
- Lessening the impact of development, and the impact of stormwater resulting from that development, on the natural environment.
- Using the land more efficiently.
- Lowering capital and operating costs associated with development.

## LID Site Planning

LID site planning reduces the amount of stormwater generated on a site through source control and protection of the site's existing hydrologic features, such as topography, vegetated buffers, wetlands, floodplains and high-permeability soils. More information on LID site planning can be found in [Chapter 6 of the New Hampshire Stormwater Manual: Volume 1 Stormwater and Antidegradation](#).

Objectives of LID site planning include:

- Minimizing areas of disturbance
- Maintaining and restoring natural buffers
- Minimizing impervious cover
- Disconnecting impervious cover
- Minimizing soil compaction



**Example tree box filter design (UNH Stormwater Center 2007a) and installation in the Hodgson Brook Watershed in Portsmouth, NH.**

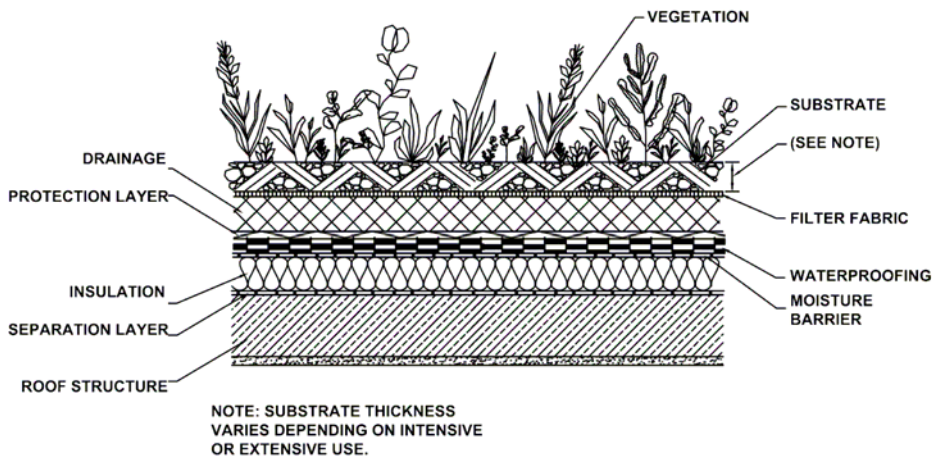
## LID Practices

Once LID site planning has been used to minimize the amount of stormwater generated on the site, site-level, decentralized LID treatment practices are used to treat any stormwater runoff that resulted from development. LID treatment practices are typically designed as open, vegetated systems that rely on plants and their root systems as well as permeable soils to slow the flow of water and encourage infiltration and filtration. This reduces both the velocity and volume of stormwater, as well as provides treatment of stormwater pollutants.

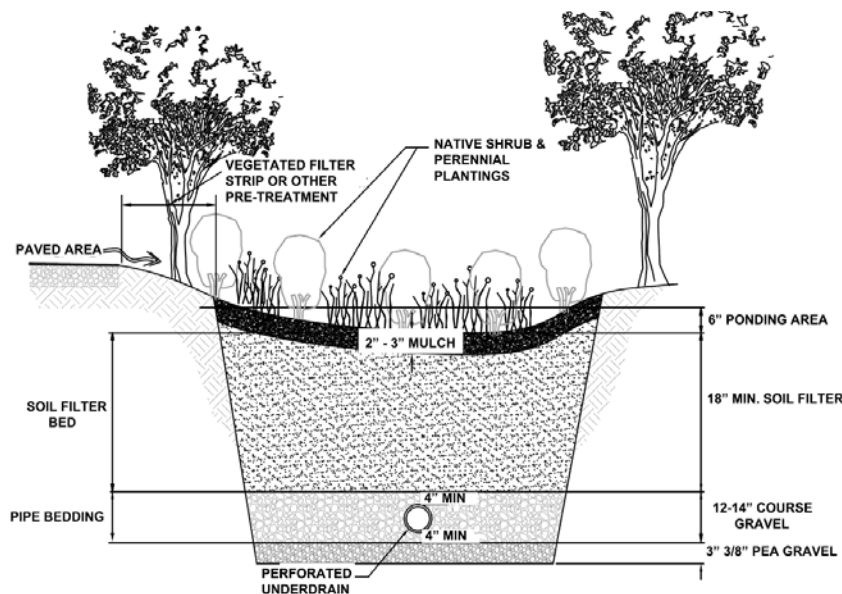
LID treatment practices can be used in existing development and can also be used in redevelopment projects to improve existing stormwater management. In redevelopment situations, LID focuses on minimizing and disconnecting existing impervious surfaces and implementing LID treatment practices for water quality, where feasible. More information on LID treatment practices can be found in [Chapter 4 of the New Hampshire Stormwater Manual: Volume 2 Post-Construction Best Management Practices Selection & Design](#).

Examples of LID treatment practices include:

- Bioretention and Rain Gardens
- Dry Wells
- Rooftop Gardens and Green Roofs
- Vegetated Swales, Buffers, and Strips
- Soil Amendments
- Permeable Pavement
- Tree Box Filters
- Rain Barrels and Cisterns



**Example green roof design (Maine DEP 2006, EPA 2006a) and installation at the Mount Washington Hotel, Bretton Woods, NH.**



**Rain garden and pervious pavement installation in downtown Peterborough, NH.**

### Barriers to LID

Although LID is not new, it is still considered innovative. Because of this, there are several potential barriers to implementing LID. For example:

- *Cost Concerns* – Many people are deterred from using LID practices because they believe they are more costly than conventional stormwater management practices, when in reality, LID practices can actually cost less than conventional stormwater management due to a reduced

need for catch basins and piping. Also, with less infrastructure involved, LID can reduce the long-term cost of operation and maintenance.

- *Conflicting Local Ordinances* – Municipal ordinances and bylaws, such as minimum roadway widths, minimum parking requirements, and curb and gutter conveyance design, can conflict with LID principles. Local regulations can be modified or waivers or variances can be granted to allow for LID, or municipalities can adopt stormwater ordinances that require LID. More information on New Hampshire local ordinances can be found at: [des.nh.gov/organization/divisions/water/wmb/repp/innovative\\_land\\_use.htm](http://des.nh.gov/organization/divisions/water/wmb/repp/innovative_land_use.htm)
- *Lack of Confidence* – Many people lack confidence in the performance of LID practices. LID has been used successfully in New England and across the country. Specifically, the University of New Hampshire Stormwater Center (UNHSC) has tested several LID practices and has data showing their efficiency in New Hampshire's climate. ([www.unh.edu/erg/cstev/](http://www.unh.edu/erg/cstev/))
- *Site Constraints* – There are concerns that LID practices do not work in cold climates or on sites that have poorly draining soils, are close to groundwater, or other site constraints. The UNH Stormwater Center has shown that properly designed and installed LID practices perform well in New Hampshire.
- *Maintenance Concerns* – All best management practices need maintenance. The type of maintenance required for LID practices is often different than conventional systems. Because most LID practices are vegetated, maintenance focuses on maintaining healthy vegetation as well as removing sediment and other debris as necessary. LID practices tend to be smaller and usually do not require the use of heavy equipment to conduct maintenance.

### **For More Information**

Additional information on Low Impact Development can be found in the following resources:

- DES Innovative Land Use Planning Techniques Handbook – [http://des.nh.gov/organization/divisions/water/wmb/repp/innovative\\_land\\_use.htm](http://des.nh.gov/organization/divisions/water/wmb/repp/innovative_land_use.htm)
- The University of New Hampshire Stormwater Center – [www.unh.edu/erg/cstev/](http://www.unh.edu/erg/cstev/)
- EPA's National LID website – [www.epa.gov/owow/nps/lid](http://www.epa.gov/owow/nps/lid)
- EPA New England Stormwater website – [www.epa.gov/region1/topics/water/stormwater.html](http://www.epa.gov/region1/topics/water/stormwater.html)
- Center for Watershed Protection website – [www.cwp.org](http://www.cwp.org)
- Low Impact Development Center website – [www.lowimpactdevelopment.org](http://www.lowimpactdevelopment.org)