

Incorporating Low Impact Development (LID) into Local Bylaws



Left: Polluted stormwater.



Above: A typical rural subdivision, with excessive clear-cut land and a wide roadway. Below: A subdivision that incorporates LID principles, including narrower roadways and small-scale stormwater features.



Left: Stormwater being treated in a road-side bio-retention area.

Stormwater runoff from agricultural lands, roads, lawns, and other surfaces is now the most common source of water pollution in the U.S. At the same time, more extreme rainfall events and droughts due to climate change are resulting in greater flooding and increased stress on waterbodies - including public drinking water supplies.

The traditional approach to development treats stormwater as a waste product to be collected and piped to centralized detention ponds or municipal storm sewers that drain into rivers and streams. Pollution such as sediment, heavy metals, fertilizers, and oils picked up along the way can end up in those rivers and streams.

A low impact development (LID) approach works with the natural features of a site, reduces impervious surfaces like roads and parking lots, and uses smaller, decentralized stormwater management techniques, which are often less costly than traditional stormwater systems. Keeping stormwater runoff close to where it falls reduces the amount of pollutants it can pick up from lawns and roadways. LID also helps maintain rural character in less developed areas, and provides more green space in urban and suburban areas. Local bylaws can support, or hinder, the use of LID in development and redevelopment projects.

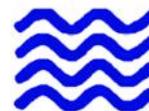
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Franklin Regional Council of Governments
frcog.org



Millers River Watershed Council
millerswatershed.org

Principles of LID

Reduce the amount of stormwater runoff in the first place:

- ◆ Build on brownfields or previously disturbed sites.
- ◆ Reduce impervious surface area – narrower/shorter roads and driveways, avoid excessive parking, use permeable pavement, green roofs.
- ◆ Minimize tree clearing and grading.
- ◆ Maintain natural topography and minimize cut and fill.

Focus on infiltration of stormwater close to where it falls – smaller is better:

- ◆ Use smaller, decentralized techniques - rain gardens, swales, tree box filters, etc.

Think of stormwater as a resource, not a waste product to pipe away:

- ◆ Use rain barrels and cisterns to collect rainwater for landscaping.
- ◆ Use harvested rainwater for toilet flushing and other grey water uses.
- ◆ Utilize drought or wetland resistant native plants for landscaping that are appropriate to the site.

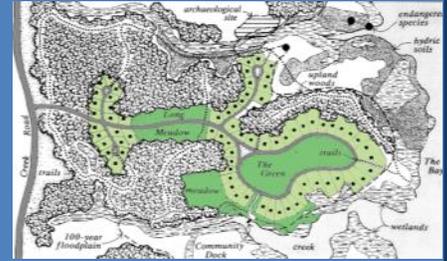
Check your local bylaws and regulations for barriers to utilizing LID:

- ◆ Zoning, Subdivision Regulations, Board of Health Regulations, Wetlands Bylaw, Department of Public Works/Highway Department.

LID Techniques

Site Planning

Homes and roads are sited in the least environmentally sensitive areas.



Bioretention / Rain Gardens



Planted areas that collect, clean, and infiltrate stormwater.

Vegetated Swales & Filter Strips



Grass or planted drainage ditches along roads and in parking areas that slow and filter runoff.

Permeable Pavement & Porous Asphalt

Allows water to filter through, reducing runoff. Good for parking areas, sidewalks, and driveways.



Photo: Chris Curtis. Porous pavers and asphalt at New England Environmental, Inc. Amherst, MA.

LID in Local Bylaws

Water Harvesting



Runoff from roofs is collected in rain barrels or cisterns for outdoor watering or for indoor non-potable uses such as toilet flushing.

Low Impact Roads and Parking Lots

Swales and rain gardens along roads and in cul-de-sac and parking lot islands treat stormwater runoff.



Street Trees

Trees intercept rain on leaves and branches, and absorb water through their roots, reducing flooding and preventing runoff from entering storm drains and waterways.



Green Roofs



Vegetative layer grown on a roof reduces and slows stormwater runoff and filters pollutants.

Zoning Bylaws:

- ✓ Allow open space development/ natural resource protection zoning by-right. This development option provides for flexible lot sizes, protected open space, and sites homes in areas with the least impact on natural features. Allow LID techniques on common land.
- ✓ Permit LID techniques to be located in required setback areas and buffer strips.
- ✓ Allow permeable paving for parking stalls, spillover parking, and residential driveways; allow shared parking for uses with different peak demand times; encourage or require vegetated islands with bioretention functions in parking lots.
- ✓ Make stormwater management a priority for site plan review. Encourage LID and require discussion of alternatives when LID is not proposed. Explicitly list LID preferences and reference stormwater standards.

Subdivision Regulations:

- ✓ Encourage LID and require discussion of alternatives when LID is not proposed.
- ✓ Allow minimum pavement width of 18 - 22 feet on low traffic residential streets. Encourage vegetated islands in cul de sacs instead of asphalt.
- ✓ Do not require the use of conventional curbs for the full length of streets in residential neighborhoods to allow for roadside swales and bioretention. Allow perforated curbs or curbs that are flush with the pavement.
- ✓ Allow the use of permeable paving for sidewalks and road shoulders.
- ✓ Trees should be planted at least every 40 feet along both sides of the right of way.

Additional Resources

What are **Green Infrastructure** and **Low Impact Development (LID)**?

The terms “green infrastructure” and “low impact development” are often used interchangeably, and definitions for both terms are evolving over time. Green infrastructure is an approach to managing stormwater using techniques designed to infiltrate stormwater close to where it falls or to capture it for future use. Green infrastructure is mostly above ground and can complement or replace traditional “gray” infrastructure, which is mostly underground. Green infrastructure generally refers to the stormwater management techniques used to help implement LID. LID encompasses these techniques as well as broader land management principles that seek to reduce the impact of development on the natural hydrology of a site, region, or watershed, through conscientious site planning and development practices.

See the *Integrating Green Infrastructure into Public Projects* pamphlet to learn how to add green infrastructure elements to public roadway, park, and building projects, and the *Economic Benefits of Low Impact Development (LID) Projects for Stormwater Management: Highlights from Recent Literature* pamphlet to see how LID and green infrastructure can be less costly than traditional stormwater infrastructure.

RESOURCES:

Massachusetts Smart Growth / Smart Energy Toolkit: http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html

Massachusetts Stormwater Handbook: <http://www.mass.gov/eea/agencies/massdep/water/regulations/massachusetts-stormwater-handbook.html>

Massachusetts Watershed Coalition, Community Guide to Growing Greener: <http://commonwaters.org/resources/community-guide-to-growing-greener>

Metropolitan Area Planning Council (MAPC) Low Impact Development Toolkit, Local Codes Checklist: <http://www.mapc.org/resources/low-impact-dev-toolkit/local-codes-lid>

U.S. Environmental Protection Agency (EPA) Water Quality Scorecard: <http://www2.epa.gov/smartgrowth/water-quality-scorecard-incorporating-green-infrastructure-practices-municipal>

American Planning Association - Massachusetts Chapter, and the Home Builders Association of Massachusetts, *Sustainable Neighborhood Road Design: A Guidebook for Massachusetts Cities and Towns*: http://www.apa-ma.org/apa-ma_documents/Publications/NRB_Guidebook_2011.pdf