

PROMOTING LOW IMPACT DEVELOPMENT IN YOUR COMMUNITY

Low Impact Development (LID) is an approach to stormwater management and site development that is gaining popularity throughout the country. Its attractiveness lies in its potential to lessen off-site stormwater impacts, reduce costs to municipalities and developers, and promote development that is “softer on the land” compared with typical traditional development. The approach, which is applicable to residential, commercial and industrial projects, and in urban, suburban and rural settings, often is linked with efforts by governments and citizens to foster more sustainable communities.

On the national and state levels, a focus in promoting LID to date has been on providing technical guidance on the approach – in the form of publications and training sessions. A tremendous amount of information on LID is now available online and elsewhere. While this is a positive development, the extent and detail of these resources can easily overwhelm public officials and citizens being introduced to the approach, especially those with non-technical backgrounds. If LID truly is to take hold in communities, there must be broad understanding of and support for the approach among local decision-makers and the public at large. In New England, educational and outreach efforts must also effectively address the suitability of the approach given the region’s harsh climate and some of its unique political characteristics.



*Bio-retention Area at Staples Parking Lot
Branford, Connecticut*

This fact sheet is intended as a resource for those interested in promoting LID in their communities. It offers concise information on the approach and how to promote it, providing online links for users wishing to access more detailed guidance. It may be particularly helpful to professional municipal staff seeking to spread the word regarding LID. It is also geared to other LID proponents – whether they are volunteer members of town boards or local citizens.

The fact sheet is divided into three sections. The first section describes what LID is and its benefits. The second section lists five general steps you can take to promote LID in your community. The final section provides five pointers for making your local land use regulations more “LID friendly.”

WHAT IS LOW IMPACT DEVELOPMENT?

Low Impact Development (LID) is an approach to site planning, design and development that reduces stormwater impacts. LID aims to mimic pre-development hydrology, treat stormwater as close to its source as possible, preserve natural drainage systems and open space, and incorporate small-scale controls that replicate natural processes in detaining and filtering stormwater. LID uses the “divide and conquer” theory to treat relatively small amounts of stormwater and utilize it in beneficial ways. This contrasts with conventional stormwater management approaches geared to concentrating and collecting runoff and exporting it off-site as a waste product.

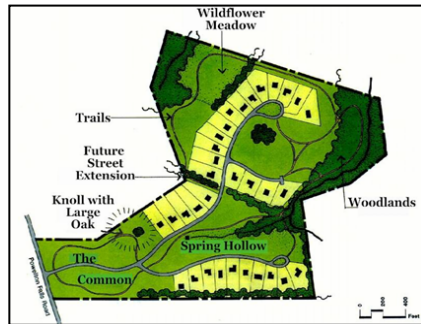


East End Community School Green Roof, Portland, Maine

Typical LID Techniques (Suitable for Cold Climates)

☑ **LID Site Planning and Design:**

Involves designing stormwater management systems that work with the site's natural hydrology by minimizing land disturbance and locating buildings and other improvements in a sensitive manner. Conservation subdivisions and "clustering" are common approaches for achieving these objectives, but there a number of other techniques that can be employed as well.



☑ **Reduced Impervious Surfaces:** As part of site planning and design, finding opportunities for reducing new roads, parking areas and other impervious surfaces. This includes sharing of parking lots and driveways.



☑ **Permeable Paving:** Where parking and drives are needed, using new products that allow rainwater to percolate into the ground while providing surface stability.



☑ **Bio-retention, also known as "rain gardens":** Landscape features used to collect, treat, and infiltrate rainwater.



☑ **Vegetated Swales:** Shallow drainage channels usually located adjacent to roadways (as an alternative to typical curb and gutter treatments) used to convey and filter stormwater.



☑ **Grassed Filter Strips:** Low-angle vegetated slopes, usually located adjacent to parking areas and other large impervious surfaces, that slow flows and treat stormwater.



☑ **Green Roofs:** Vegetated roof systems that capture rainfall and return it to the atmosphere.



☑ Other LID measures are well-suited to cold climates as well. An excellent summary of techniques can be found at the Massachusetts LID Toolkit at http://www.mapc.org/regional_planning/LID/LID_FAQs.html.

SUMMARY OF LID BENEFITS

- **Environmental Benefits:** Improved stormwater management; reduced impacts on wetlands, streams, lakes and coastal waters; enhanced water quality (both surface and groundwater); better protection of ecological and biological systems; and preservation of open space.
- **Benefits to Municipalities:** Reduced costs for new or expanded infrastructure and for maintenance of stormwater structures.
- **Benefits to Developers:** Cost savings as a result of reduced infrastructure (extent of stormwater structures, streets, curbs, gutters) and less clearing and grading. Also increased marketability of lots and projects.

See *The Municipal Guide to Low Impact Development* for a good overview of LID benefits.
http://www.toolbase.org/PDF/DesignGuides/Municipal_LID.pdf

5 THINGS YOU CAN DO PROMOTE LID IN YOUR COMMUNITY

LID makes good sense, but new ideas sometimes need help taking hold. Below are five general steps you can take to help promote LID in your community.

1. **Learn More about the Approach** (and become an LID Advocate)

Although Low Impact Development is gaining popularity, it is still a relatively new approach. Learning more about it and how it might best work in your community is a good first step, allowing you to become an informed advocate of the approach. A number of excellent websites – with information ranging from the general to the specific – now exist on LID, including:

- **Introduction to Low Impact Development.** Helpful FAQs and other information from the Low Impact Development Center. <http://www.lid-stormwater.net/intro/background.htm>
- **Municipal Guide to Low Impact Development.** A good 2-page summary of LID benefits and principles. http://www.toolbase.org/PDF/DesignGuides/Municipal_LID.pdf
- **Massachusetts Low Impact Development Toolkit.** Contains a suite of materials focused on LID techniques. <http://www.mapc.org/LID.html>
- **The Practice of Low Impact Development.** An in-depth treatment of LID techniques from U.S. HUD. <http://www.huduser.org/Publications/PDF/practLowImpctDevel.pdf>



You can also learn more about the approach at one of the LID conferences or training sessions which are periodically held throughout New England and elsewhere. View the following sites for upcoming LID and stormwater-related events:

- Mass Coastal Zone Management Office – *Coastal Calendar page*: <http://www.mass.gov/czm/calendar.htm>
- Maine DEP – *Nonpoint Source Training and Resource Center page*: <http://www.maine.gov/dep/blwq/training/index.htm>
- Stormwater Authority – *Events/Education page*: http://www.stormwaterauthority.org/events_education

2. **Spread the Word** (particularly to those who will be most involved in LID decision-making)

Once people learn about the multiple benefits of LID, they often become strong advocates themselves. You can help spread the word in several ways:

- Inform people about the approach in general, and pass along good websites (including this one) and upcoming training sessions either informally or through targeted outreach efforts.
- Request a presentation or information from an organization in your area with expertise in LID. Try:
 - **Connecticut.** CT NEMO (Nonpoint Education for Municipal Officials). Website: <http://nemo.uconn.edu/>. Contact: John Rossum (860) 345-5225 or nemo@uconn.edu.
 - **Rhode Island.** URI Seagrant – *SUCCESS* Extension Program. Website: <http://seagrant.gso.uri.edu/ecosystems/index.html>. Contact: Virginia Lee. (401) 874-6842
 - **Massachusetts.** CZM Office. Website: <http://www.mass.gov/czm/smartgrowth/lid/index.htm>. Contact: Andrea Cooper (617) 626-1222 or andrea.cooper@state.ma.us.
 - **Vermont.** Vermont Sea Grant. Website: <http://www.uvm.edu/%7Eseagrant/extension/nemo.html>. Contact: Emma Melvin (802) 656-9110 or emma-lynn.melvin@uvm.edu.
 - **New Hampshire.** UNH Stormwater Center. Website: <http://www.unh.edu/erg/cstev/>. Contact: Robert Roseen. (603) 862.4024 or robert.roseen@unh.edu.

- Maine. Maine NEMO. Website: <http://www.mainenemo.org/>. Contact: LaMarr Cannon, at (207) 771-9020, or lcannon@maine.rr.com.
- Make your own presentation: Several good introductory PowerPoint presentations are available online, which you can adapt for your own use. Try the following:
 - ☑ From Buzzards Bay Estuary Project: <http://www.buzzardsbay.org/download/2-11-04lidshow.pdf>
 - ☑ From Mass Low Impact Development Toolkit: http://www.mapc.org/regional_planning/LID/LID_Toolkit_Slide_Show.ppt
- Hold ongoing discussions: Once people and groups are familiar with the approach, it is important to discuss details how the approach can best be applied and promoted in the community.

As the citizens of your community will have a strong bearing on whether LID takes hold in your community – both as they weigh in on possible new regulations to promote the practice or as neighbors to proposed projects – conducting outreach efforts to the general public is an excellent idea. There are three groups within your municipal government, however, that deserve particular attention as you spread the word:

- Planning Board members: By acquainting board members with LID principles and techniques, they will be more likely to respond positively to the approach when it is proposed, and even become strong advocates for its use in applicable situations.
- Public Works and Public Safety Departments: LID techniques are sometimes viewed skeptically by public works or safety departments because they represent a departure from long-established practices governing stormwater control, or roads, access and parking. Holding up-front meetings to discuss such concerns often is helpful.
- Selectmen/Councilors/Managers/Commissioners: It is also a good idea to familiarize elected officials and municipal administrators with LID as they will be involved in the process of revising regulations or need to respond to citizen inquiries regarding the approach.

3. Reach Out to Developers

Many communities are recognizing the benefits of establishing stronger working relationships with developers in fostering more sustainable development practices. Low Impact Development represents an excellent opportunity for such cooperation. Both in one-on-one interactions and as part of organized group gatherings, developers can be acquainted with the approach and its benefits, and encouraged to integrate LID features into proposed projects.

In talking with developers and organizing outreach efforts, two issues deserve particular attention. The first is the cost of implementing LID approaches. Although LID often is touted for its cost-saving benefits, developers may need assurances that the approach makes economic sense. Several websites provide useful information in this regard:

- ***Builders' Guide to Low Impact Development***
http://www.toolbase.org/PDF/DesignGuides/Builder_LID.pdf#search=%22a%20builder's%20guide%20to%20low%20impact%20development%22
- ***LID Strategies and Tools for Local Governments: Building a Business Case***
http://lowimpactdevelopment.org/lidphase2/econ_assess.htm

	Conventional	Low Impact
Grading/Roads	\$569,698	\$426,575
Storm Drains	\$225,721	\$132,558
SWM Pond/Fees	\$260,858	\$ 10,530
Bioretention/Micro	—	\$175,000
Total	\$1,086,277	\$744,663
Unit Cost	\$14,679	\$9,193
Lot Yield	74	81

Example of Construction Cost Analysis of Conventional versus LID Development

The second issue has to do with the receptiveness of town boards and of the community at large. Before proposing an LID project, developers may want see positive indications of support for the approach among town officials and citizens. Such support may be evident as a result of your successful efforts in spreading the word about LID or by revising local land use regulations to better accommodate the approach. Developers themselves can build understanding and support for LID through neighborhood meetings and pre-development workshops.

4. **Get Projects on the Ground**

A completed project that employs LID principles and techniques is a powerful public relations tool for promoting the approach. There's nothing like having a successful project to help to convert skeptics and galvanize supporters. If a project is constructed in your community or region, work to publicize it and use it as a learning experience that can be built upon.

If private LID projects are slow in coming to your community, consider integrating LID features into municipal projects. New school facilities or improvements may be a particular good opportunity, as they are high visibility, and can incorporate an educational component.

Opportunities may also exist for the formation of partnerships in which multiple organizations propose or finance LID-oriented projects. One example would be a non-profit housing organization, which is able to partner with an environmental funder to help cover the cost of LID features.

A variety of LID projects have been constructed or are underway in New England. The following sites describe LID projects in the region and in other states:

- ***NEMO LID Stormwater Treatment Practice Database***. Excellent listing of LID projects in Connecticut. <http://www.clear.uconn.edu/tools/lid/index.htm>
- ***Mass Smart Growth Toolkit***. Three case studies in the Bay State. http://www.mass.gov/envir/smart_growth_toolkit/pages/SG-CS-lid.html
- ***National LID Clearinghouse***. A listing of projects nationwide with additional links. <http://www.lid-stormwater.net/clearinghouse/effectiveness.htm>
- ***Greenroofs.com***. A listing of green roof projects. <http://www.greenroofs.com/projects/plist.php>

5. **Make Sure Your Local Regulations are “LID-Friendly”**

If the land use regulations of your city or town currently prohibit or discourage certain LID practices, it is doubtful that your community will get many proposals for developments incorporating them. On the other hand, if your ordinances or bylaws contain provisions that not only allow, but also promote the approach, LID projects are much more likely to be proposed and built. Because of the importance of this consideration, a separate “Top Five” fact sheet follows this one.



*Rain Garden Demonstration Project
Salem, New Hampshire*



*Porous Asphalt Parking Lot
University of Rhode Island, Kingston*

5 THINGS YOU CAN DO PROMOTE LID IN YOUR LOCAL REGULATIONS

Local regulations are often identified as a significant impediment to LID. In some cases, these regulations prohibit or discourage certain LID techniques. Perhaps more commonly, ordinances or bylaws are silent on the approach, leaving planning boards and developers to rely on the “conventional” approaches to stormwater or site design. A fairly comprehensive checklist for evaluating local regulations can be found in the Massachusetts LID Toolkit at

http://www.mapc.org/regional_planning/LID/LID_codes.html. The following Top 5 list offers more concise guidance.

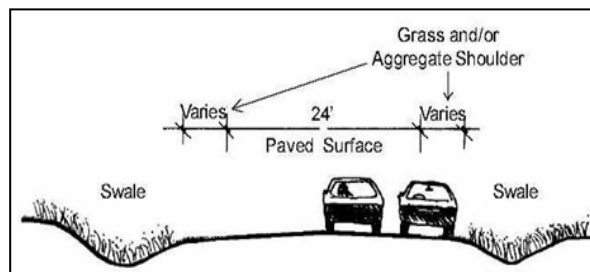
1. **Make Sure They Don’t Prohibit/Discourage LID Measures**

A first step is ensuring that LID techniques aren’t prohibited or discouraged in your regulations— either explicitly or implicitly. Try reviewing the seven LID techniques described on page 2 (or other ones described in LID literature), and evaluate how your regulations would treat proposals using each technique. Although you may discover outright prohibitions on certain measures (for example, not allowing pervious pavement treatments in commercial parking areas), be attuned to provisions that may act to discourage LID features – such as treating them as structures that must meet setback requirements or not allowing them to be accounted for in determining required areas for landscaping or open space.

2. **Revise Street and Parking Standards to Reduce Impervious Surfaces**

LID’s focus on reducing impervious surfaces often runs afoul of local regulations. Ordinances and bylaws typically set minimum standards, that, while intended to ensure adequate traffic circulation, parking and access for public safety vehicles, can result in excessive paving, at least for certain types of projects or improvements.

Consider reevaluating your standards that dictate the size of roads, drives and parking areas. The goal should not be to look solely at pavement reduction, but on ways that circulation, safety and parking needs can be approached in a balanced fashion. Areas that deserve particular attention include:



Example of Reduced Pavement Width for low volume streets

- Required pavement widths on residential streets. Consider allowing widths of 24 feet or less for these streets (18-22 feet may be a reasonable standard for low-volume streets). For a good discussion of both street width and design, see http://www.metrocouncil.org/Environment/Watershed/BMP/CH3_RPPImpStreet.pdf
- The turning radius for cul-de-sacs. Reducing the radius of a cul-de-sac from 40 feet to 30 feet, for example, yields a 45% reduction in paved surface. Emergency vehicle access should be a consideration, but should be balanced with other objectives. See excellent discussion at http://www.metrocouncil.org/environment/Watershed/BMP/CH3_RPPImpCuldeSac.pdf
- Standards governing number of parking spaces. If your regulations require more than 3 spaces per 1,000 square feet of gross floor areas for offices, and 4.5 spaces per 1,000 square feet of gross floor area of retail, consider reducing these standards.
- Other Opportunities for More Efficient Parking Areas. In evaluating parking standards and making changes, take into account the availability of on-street-parking and excess parking capacity in the vicinity, as well opportunities for allowing smaller spaces for compact cars and shared parking among businesses with different peak use profiles.

3. **Pay attention to Street and Parking Lot Layout and Design**

Besides allowing for the reduction of paved areas, your local regulations can promote design of roads and parking areas that incorporate a decentralized approach to stormwater management consistent with LID principles. Three good examples of this are:

- Using of vegetated swales as an alternative to curbs and gutters. Typical standards either mandate or strongly promote curb and gutter profiles for streets, which serves to concentrate stormwater and increase its velocity. Consider adopting provisions that allow or encourage “open section” roadways that utilized vegetated swales, especially for more rural projects.
- Incorporating LID measures into parking lot design and landscaping. Ordinance language can also be revised to promote breaking up large paved expanses into multiple parking areas punctuated with natural vegetation and bio-retention areas. If your regulations now require parking areas to be paved, consider allowing use of permeable paving treatments as well. To build familiarity with the approach, your regulations might be revised to require porous paving for overflow parking areas.
- Installing rain gardens into cul-de-sac design. Cul-de-sac islands, in conjunction with open curb treatments, can serve as infiltration areas for the paved areas that surround them.



LID parking lot design

4. **Incorporate LID Site Planning/Design Principles (including promotion of conservation subdivisions)**

Some of the best opportunities for creating LID projects occur at the site planning and design stage. By careful attention to natural features, drainage patterns and the placement of buildings and improvements, projects can be made to work with, rather than against, the site’s existing hydrology. Your local regulations can help promote this approach to site planning and design.



*Project incorporating LID site plan principles
(left – site plan, right – as built)
The Pinehills, Plymouth, Massachusetts.*

Conservation subdivisions are an approach to site planning and design that can facilitate LID objectives as well as provide other benefits. At the very least, your regulations should allow for the somewhat modified review process needed to facilitate these projects, and the flexibility to allow clustering of buildings or lots to create open space. Ideally, your regulations should require or strongly encourage conservation subdivisions. A wealth of online resources exists on the approach. A particularly good reference to give those who are unfamiliar with or skeptical of conservation subdivisions is a resource developed by *Land Choices* at <http://www.landchoices.org/ConservationSubdivisions.htm>.

Even projects that don’t involve lot size reductions or clustering can be designed to better meet LID objectives. Your regulations may already contain standards such as minimizing site disturbances and retaining natural features. Such provisions can be given more teeth by requiring mapping of significant natural features or submission of tree preservation plans. Preapplication conferences or “sketch plan” meetings represent an excellent opportunity to discuss project planning and design issues – consider adding more guidance in your regulations regarding expectations and submittals for this stage of the process.

5. Add Additional LID-promoting Provisions to Your Regulations

Steps 1-4 above are geared to making relatively modest changes to your local regulations to better accommodate LID development. If your community wants to not only allow, but to more strongly encourage LID techniques, you should consider the adoption of additional language that promotes or provides more guidance on the approach.

A cautionary note: this step should be taken with careful deliberation. When it comes to adding language on LID to your regulations, you are generally better off selectively incorporating standards of performance that are likely to be well understood and applied – as opposed to the bulk adoption of pages of detailed design specifications of various LID techniques and practices.

If adopting a new ordinance or bylaw is the route you want to take, it's generally preferable to adopt a comprehensive integrated stormwater management model that includes LID principles and standards and which applies to all projects covered by other ordinances or bylaws (e.g. zoning, subdivision, site plan and shoreland). Another option is to integrate LID provisions into existing stormwater regulations that are likely to be located in your town's land use regulations. If you want to provide additional design specifications, consider adopting a technical appendix to your regulations. Your planning department or board can also maintain links to LID manuals to assist developers and others who want detailed guidance.

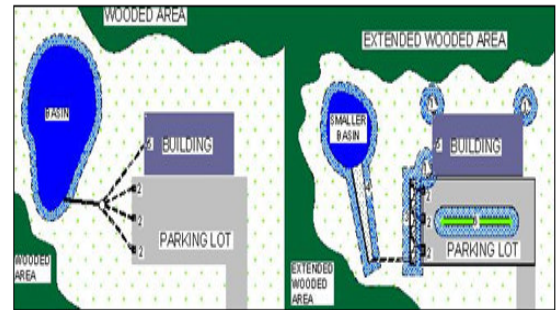


Illustration from Maine DEP Stormwater BMP Manual showing LID alternative to typical commercial development

The following resources may be helpful as you consider incorporating additional LID language or conducting a more global evaluation of your local regulations prior to beefing them up to better address stormwater management and water quality protection as a whole:

- **Massachusetts Model LID Bylaw**. May not be appropriate for wholesale adoption in other states, but could be easily adapted. Its approach to awarding credits for use of LID approaches, as laid out in a technical appendix, may be particularly worthy of consideration. http://www.mass.gov/envir/smart_growth_toolkit/bylaws/LID-Bylaw.pdf
- **Maine Stormwater Best Management Practices Manual**. The chapters on LID as a stormwater management approach are a source of both excellent information and principles/standards that might be integrated into local regulations. Chapters on LID technical practices may be more appropriate as an ordinance appendix or reference. <http://www.maine.gov/dep/blwq/docstand/stormwater/stormwaterbmpps/index.htm>
- **Codes and Ordinance Worksheet** (from handbook. "Better Site Design: A Handbook for Changing Development Rules in Your Community" published by Center for Watershed Protection). Useful in conducting an overall assessment of your regulations, with a focus on how well they protect water quality. http://www.cwp.org/COW_worksheet.htm.
- **Municipal Regulation Checklist** (from NJ Stormwater BMP Manual). Another evaluative tool, with a focus on integrating LID provisions into regulations. http://www.njstormwater.org/tier_A/pdf/NJ_SWBMP_B.pdf

Finally, keep an eye out for new resources focused on promoting LID in your local regulations, either developed by your state environmental agency or by non-profit groups. Your regional planning agencies or councils of government may also be a good resource, especially on what communities in your region are active in promoting LID and other stormwater approaches.

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