



Calvert County Environmental Commission

Low Impact Development (or LID)

1. What exactly is low impact development?

The term low impact development (LID) refers to methods used to manage rainfall close to where it falls. The point is to provide ways for rainfall, as it becomes stormwater, to soak into the ground more easily, rather than flowing over relatively long distances, picking up debris, sediment and chemical pollutants (such as nitrogen and phosphorus compounds) along the way. These pollutants negatively affect streams and rivers as the stormwater flows into them. LID methods are intended to preserve, restore and create green space using soils, vegetation, and rainwater harvest techniques.

LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. Typically, LID methods are chosen and implemented during development and redevelopment (construction) projects. They are intended to reduce or help offset impervious surfaces that are built as part of these projects. For example, builders may utilize LID methods such as minimizing the area of site disturbance, installing gravel driveways rather than impermeable concrete or asphalt, providing gentle slopes through grading, eliminating channeling that would result in soil erosion, or building detention ponds for stormwater. Developers and residents can use a variety of additional methods such as rain gardens, cisterns and rain barrels, landscaping infiltration, permeable pavements, disconnection of rooftop runoff and swales. These LID methods are described later in this document.

By implementing LID principles and practices, water can be managed in a way that reduces the impact of built-up areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can help maintain or restore a watershed's hydrologic and ecological functions. Overall, LID promotes the view of rainwater as a resource to be preserved and protected, not a nuisance to be eliminated.

2. How does LID help protect the environment?

According to the U.S. Environmental Protection Agency (EPA), LID protects the environment in the following ways.

- **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 methods will reduce pollutant-laden stormwater reaching local waters. Better water quality increases property values and lowers 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 quickly. Incorporating LID methods reduces the volume and speed of stormwater runoff and decreases costly flooding and property damage.
- **Restored Aquatic Habitat:** Rapidly moving stormwater can erode stream banks and scour stream channels, obliterating habitat for fish and other aquatic life. Using LID methods reduces the amount of stormwater reaching surface waters 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 methods retain more rainfall near the source, 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 (detention ponds). In a broad sense, using LID methods can increase property values and enhance communities by making them more beautiful, sustainable and wildlife friendly.

3. Is LID used only for construction projects, or can these techniques be applied to residents' properties and public spaces?

Residents certainly can consider implementing one or more LID methods on their properties simply for environmental and aesthetic reasons. Many LID methods, such as those presented below, are relatively inexpensive to install and require only minimal upkeep. Their use in residential and commercial properties can help to improve surface water quality and replenish groundwater. They can also be aesthetically pleasing. Therefore, we encourage their use as voluntary measures, even beyond the County's construction requirements.

It is important to note that LID methods must be considered when planning construction projects in the county. According to the Calvert County Stormwater Management Ordinance (a link to the ordinance is provided below), no person shall develop any land for residential, commercial, industrial, or institutional uses without having provided stormwater management measures that control or manage runoff from such developments, except as provided within this section. This applies to all development and redevelopment projects that disturb 5,000 ft² or more of land. Maryland's Stormwater Management Act of 2007 requires establishing a comprehensive process for stormwater management approval, implementing Environmental Site Design (ESD) to the Maximum Extent Practicable (MEP), and ensuring that structural practices are used only when absolutely necessary. Thus, LID methods are significantly preferable for use in construction projects over the use of commercially-built structures such as concrete sand filtration units.

4. What kinds of LID methods can Calvert County residents take to help protect water quality?

County residents can implement many types of LID methods on their property to help protect local waterways. They include the following examples:

- Rain Gardens: Rain gardens are shallow excavated landscape features or saucer-shaped depressions that temporarily hold runoff for a short period of time. Rain gardens typically consist of an absorbent-planted soil bed, a mulch layer, and planting materials such as shrubs, grasses, and flowers. Rain gardens placed below downspouts, roof drains, or curb openings capture stormwater which is typically absorbed into the soil over one or two days.

- Cisterns and Rain Barrels: These rainwater harvesting methods intercept and store rainfall for future use. Stored water may be used for outdoor landscaping irrigation, vehicle washing, or a non-potable water supply. The capture and reuse of rainwater promotes conservation, as well as reduces runoff volumes and the discharge of pollutants downstream.

- **Landscaping Infiltration:** Landscape infiltration utilizes vegetative planting areas to capture, store and treat stormwater runoff. Rainwater is stored initially, percolates through the planting soil and a gravel layer below, and then infiltrates into native soil.
- **Permeable Pavements:** Permeable pavements are used to reduce the total area of impervious surfaces on a property, such as buildings/structures, concrete or asphalt driveways and concrete sidewalks. Permeable pavements typically consist of a porous surface course with a graded stone base or sand drainage layer. Stormwater can drain through the surface course, is captured in the drainage system and infiltrates into the underlying soil.
- **Disconnection of Rooftop Runoff:** Rooftop disconnection involves directing flow from downspouts onto vegetated areas where it can soak into or filter over the ground. This typically disconnects the rooftop from the storm drain system and reduces both runoff volume and pollutants delivered to receiving waters.
- **Swales:** Swales are channels that provide conveyance, water quality treatment, and flow attenuation of stormwater runoff. Swales provide pollutant removal through vegetative filtering, sedimentation, biological uptake and infiltration into the underlying soil. There are several types of swales, including grass swales, wet swales and bio-swales. Implementation of each depends on soil type, topography and drainage characteristics.

Other LID methods can be found by reviewing the references listed on the last page.

In selecting vegetation (plants, shrubs, grasses and trees) for LID methods, residents should always use vegetation native to this area that only needs minimal maintenance and infrequent watering.

5. How is the Calvert County Government using LID methods?

The Calvert County Comprehensive Plan (August 2019) includes significant provisions for stormwater management throughout the county. In the Water Resources Chapter of the Comp. Plan, a key goal is to “install or enhance storm water management systems to reduce pollution in the county streams, Patuxent River, and Chesapeake Bay.”

According to the Plan, the County will conduct the following LID-related tasks to achieve this goal:

- Convert dry extended detention ponds and grass swales to wet ponds, wetlands, and bioswales where appropriate.
- Convert approximately 200 miles of grass swales to bioswales and install an additional 160 miles of new grass swales along county and private roadways.
- Pursue implementation of regenerative stormwater conveyances or other vegetated flow attenuation wherever appropriate.
- Construct or upgrade approximately 160 miles of grass swales along currently unmanaged county and privately-owned roadways to provide water quality treatment.
- Incentivize removal of unused impermeable areas, green roof retrofits, and expanded use of permeable pavement.

- Incentivize the use of microscale environmentally sensitive design practices on approximately 600 existing commercial properties that drain to regional facilities or pre- 2000 stormwater management facilities to reduce nutrient loading closer to the source.
- Incentivize the construction of bioretention, micro-bioretention, and raingarden facilities on approximately 1,250 single family residential lots, focusing primarily on densely populated areas, such as Chesapeake Ranch Estates, where facilities can treat multiple homes.

To learn more about Low Impact Development and the LID methods described above, check out the following websites.

[Urban Runoff: Low Impact Development | Polluted Runoff: Nonpoint Source \(NPS\) Pollution | US EPA](#)

[Low-impact development \(U.S. and Canada\) - Wikipedia](#)

[Department of Environment's New Stormwater Regulations Will Help Protect Chesapeake Bay and Urban Waterways \(maryland.gov\)](#)

[Maryland Stormwater Design Manual](#)

[Storm-Water-Management-Ordinance \(calvertcountymd.gov\)](#)

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