STORMWATER BEST MANAGEMENT PRACTICES

Bio-swale
Sommet Subdivision,
Kirkwood, MO.

Low Impact Development (LID) strives to use natural functions such as green buffers, infiltration features, and tree preservation to manage water runoff, nonpoint source pollution, and avoid erosion and flooding

Residential Rain Garden
Olivette, MO.

EAST-WEST GATEWAY
Council of Governments
Creating Solutions Across Jurisdictional Boundaries

The Regional Water Quality Plan

Congress passed the Clean Water Act (CWA) in 1972 to "restore and maintain the chemical, physical and biological integrity of the nation's waters." Two primary goals were: 1) the elimination of the discharge of pollutants into navigable waters; and 2) to attain "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water." Under Section 208 of the CWA, in 1975, the Governor of Missouri designated East-West Gateway Council of Governments as the agency responsible for preparing the Water Quality Management Plan for the Missouri portion of the region: the counties of Franklin, Jefferson, St. Charles, St. Louis and the city of St. Louis.

Completed in 1978, the Regional Water Quality Plan stated, "Local governments need to have a major role in devising the 208 Plan because local governments will have primary responsibility for enforcing and financing most aspects of the plan. Control of nonpoint sources, for example, involves programs ranging from zoning and building regulations to street sweeping and leaf collection." More than 30 years later, local authorities continue to focus on issues identified in the plan, including organization and management of "sewer development and pollution cleanup,… a management approach sensitive to watershed-wide as well as local concerns… and control of pollution from urban stormwater and construction site runoff."

This brochure provides a brief survey of some of the stormwater best management practices (BMP) developed over the last thirty years to reduce stormwater runoff and improve water quality. Low Impact Development (LID) strategies offer a range of solutions to reduce nonpoint source pollution and stormwater volume, slow runoff, lower maintenance costs, and improve landscaping around homes, commercial and institutional buildings, parking lots and roads.

LOW IMPACT DEVELOPMENT

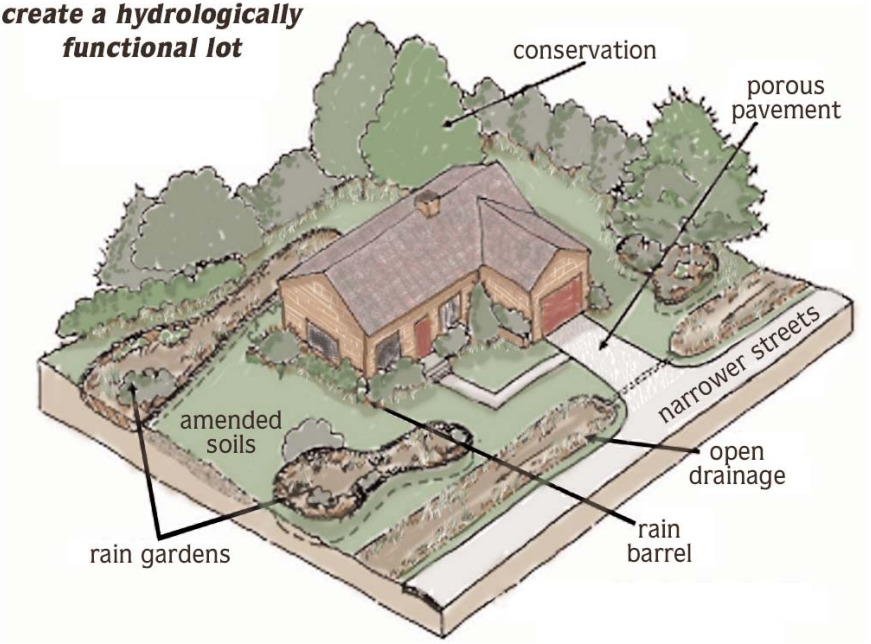
Green approaches for clean water and healthy communities

Low Impact Development (LID) is a new way of thinking. LID focuses on building codes and design standards to plan and engineer any type of community plan or individual site to maintain or restore hydrologic and ecological function. Communities can increase land value and reduce administrative and infrastructure costs by implementing LID practices.

Five basic steps for site design

1. Identify valuable conservation areas on the site such as wetlands, significant trees or tracts of forest, steep slopes, habitat, cultural resources or stream buffer zones.
2. Protect these conservation areas by excluding them from the area to be developed.
3. Plan houses in the remaining area in a way that would maximize residents' enjoyment of protected areas by providing access to open space and preserving views.
4. Align roads and trails on the site to provide pedestrian and vehicle access, maximize greenspace and utilize greenspace for stormwater management options.
5. Draw lot lines around the homesites.

LID Site:
create a hydrologically functional lot



Strategies for water quality protection

- **Conservation measures**—*including protection of wetlands, streams, woodlands and stream and lake buffers*
- **Minimizing stormwater volume**—*using pervious surfaces and disconnecting downspouts*
- **Slowing stormwater runoff**—*allowing infiltration, pollution uptake and ground moisture recharge*
- **Integrated management practices**—*including multiple-systems, treatment train approach such as bio-swales, bio-retention, grass filter strips, rain gardens, and amended soils, etc.*
- **Pollution prevention**—*reducing nonpoint source pollutants that enter streams and lakes*

Bio-retention, rain gardens and planters

Reduce stormwater volume, slow runoff, hold and treat runoff using natural functions

In parking lots and around buildings, construction of planters and filtration basins provide attractive green space while improving water quality and reducing runoff volume. Rain gardens, micro-scale ponds and catchment areas hold and slowly release water to the environment.

Much of this water, especially in small storm events, is released through infiltration, evaporation and transpiration, so that it does not overload the local stream.

These practices help to recharge groundwater and protect stream health.

The typical bio-retention system includes an inflow component, a pretreatment element, an overflow structure, a shallow ponding area designed to dissipate within a period of time that will prevent mosquitoes from breeding, a surface organic layer of mulch, a planting soil bed, plant materials, and an under-drain system to convey treated runoff to a downstream facility.

Native plants and trees increase moisture uptake.

A design using many small-scale catch basins, instead of one large detention pond, reduces the need for earth moving and enables preservation of more natural landscape.

***Curb Bumpout** catches, retains, and filters stormwater. CityGarden, Ninth and Market, St. Louis, MO.*

Green Roof
William Kerr Foundation
City of St. Louis, MO.

Green Buffer *and tree preservation.*
Newly constructed bio-retention.
Rock Hill Trails Subdivision,
Wood River, IL.

Other LID Strategies

Tree Preservation
Natural tree cover reduces the volume of rain reaching the ground, reduces the energy of rain that does reach the ground and serves to reduce the volume of runoff by 10 to 30 percent. Newly planted trees require several years before they can reduce flows.

Green Buffers
Protection of stream corridors with green buffers serves to reduce erosion, improve water quality, and reduce flooding. Buffers protect the floodways and provide storage capacity even on small streams.

Green Roofs
The emergence of green roof technology has provided an opportunity to retain significant amounts of water on the flat roofs of buildings.

Soil Amendments
Used where needed to provide improved infiltration and storage capacity.

Vegetated Swales
Instead of piping water that flows off streets, driveways and parking lots, LID recommends constructing swales that slow the flow and support infiltration. These swales work effectively as vegetated borders to parking lots, and along roads in certain kinds of new subdivisions.

Roof Downspout Disconnection
Removal of direct connections from roofs to sewers can significantly reduce volumes in storm sewers or combined sewer overflow systems.

Rain Water Harvesting
Downspouts and drains can be connected to rain barrels or cisterns to provide a supply of water for use in the garden.

Impervious Surface Reduction
Shorter driveways and site design strategies that reduce street length and width can all serve to reduce impervious surfaces within a development. These actions can reduce development and maintenance costs and protect or improve stream quality.

Permeable Pavements
Reducing impervious surfaces has been shown to improve stream quality. Generally permeable pavers are combined with an under-bed that will retain and hold water allowing it to infiltrate into the soil and/or move slowly into other drainage systems. Permeable pavements are especially useful in large parking lots that are used infrequently, such as church parking or the outer parking lots of shopping centers.

Rain Barrel, Kimmswick, MO.

Bio-retention *at edge of parking lot,*
St. Louis, MO.

LID

reduce stormwater volume

slow runoff

improve water quality

lower maintenance

encourage owner participation

less cost

simple ideas and design

smarter landscaping adds to property value

For more details, technical information
and links to additional resources,
please visit www.ewgateway.org/LID

EAST-WEST GATEWAY
Council of Governments

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