

Bioretention and Low Impact Development

LID strives to reduce erosive stormwater runoff and pollutants to receiving streams by maximizing water infiltration on site, resulting in many smaller, on-lot stormwater treatment areas instead of one large structure. Infiltration is accomplished using non-structural techniques such as bioretention.

A bioretention cell consists of a porous soil mix of sand, top soil, and compost covered with a layer of organic mulch. As stormwater runoff moves through the mulch layer into the well-drained planting mix, surface pollutants are trapped or filtered out. At the same time, plant root systems and microscopic biological activity in the soil provides additional treatment and absorption of nutrients, metals and other pollutants. Montgomery County (Maryland) encourages the use of LID sustainable design techniques for new and re-development to minimize runoff and to reduce pollution in the stream system.

<http://www.cabmphandbooks.com/Development.asp>

Infiltration Trench: long, narrow, rock-filled trench with no outlet that received stormwater runoff, pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective. Effectiveness for bacteria removal – high, up to 90%. Advantages: provides 100% reduction in the load discharged to surface waters; unobtrusive. Limitations: high failure rate if soil and subsurface conditions are not suitable, risk of groundwater contamination in very coarse soils; difficult to restore functioning of infiltration trenches once clogged. Cost: five to fifty dollars per cubic foot of stormwater treated. Maintenance costs: ~ 20% of construction costs.

Infiltration Basin: shallow impoundment that is designed to infiltrate stormwater. Effectiveness for bacteria removal – high, this technology eliminates discharge to surface waters except for the very largest storms; consequently, complete removal of all stormwater constituents can be assumed. Advantages: provides 100% reduction in the load discharged to surface waters. Limitations: risk of groundwater contamination in very coarse soils; difficult to restore functioning of infiltration trenches once clogged. Cost: \$2/ft of storage for a 0.25-acre basin. Maintenance costs: 5-10% of construction costs.

Retention/Irrigation: refers to the capture of stormwater runoff in a holding pond and subsequent use of the captured volume for irrigation of landscape or natural pervious areas, virtually no discharge to receiving waters. Main advantage: use of an irrigation system to spread the runoff over a larger area for infiltration allows them to be used in areas with low permeability soils. Effectiveness of bacteria removal – high. Limitations: relatively expensive due to mechanical systems, power requirements, and high maintenance needs, needs to be inspected and maintained regularly

<http://www.bmpdatabase.org/Docs/2007%20BMP%20Database%20User's%20Guide%202%200.pdf>