Green Infrastructure and Low Impact Development

Green infrastructure (GI) and low impact development (LID) are two terms that often arise during discussions about water harvesting, especially with the EPA's focus on using these techniques to help combat non-point source pollution. Non-point source pollution is water pollution that comes from diffuse sources, such as stormwater runoff in urban areas. The agency defines green infrastructure as a stormwater management technique that "uses vegetation and soil to manage rainwater where it falls. By weaving natural processes into the built environment, green infrastructure provides not only stormwater management, but also flood mitigation, air quality management, and much more." LID is defined as "an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. 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." As these two definitions show, GI and LID have a lot in common, and in fact, the terms are often used interchangeably. In some ways, GI and LID can be thought of as large-scale passive water harvesting.

Several types of stormwater management applications are used in GI/LID. These include:

GI/LID Practice	Definition[i]
Bioretention	Soil and plant-based filtration devices that remove pollutants through a variety of physical, biological, and chemical treatment processes
Green roofs	Vegetated roof covers that help to mitigate the effects of urbanization on water quality by filtering, absorbing or detaining rainfall
Permeable pavement	Alternative paving material to locally infiltrate rainwater and reduce the runoff leaving a site. Can be composed of pavers, cement, or asphalt
Rain barrels and cisterns	Large and small tanks used to store rainwater collected from a catchment area such as a roof
Soil amendments	Used to minimize development impacts on native soils by restoring their infiltration capacity and chemical characteristics. After soils have been amended their improved physical, biological and hydrological characteristics will make them more effective agents of stormwater management
Tree box filters	Mini bioretention areas installed beneath trees that can be very effective at controlling runoff, especially when distributed throughout the site

The EPA website, and others, has several great resources on GI and LID, including studies showing that these techniques can be more cost effective than traditional, "gray infrastructure." Gray infrastructure is the term used for tradition forms of stormwater management such as pipes and storm drains.

Further reading and resources:

- http://www.lid-stormwater.net/lid_techniques.htm
- http://water.epa.gov/polwaste/green/
- http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm
- http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_action_strategy.pdf

[i] "LID Techniques," http://www.lid-stormwater.net/lid_techniques.htm