

1.2 Development Strategies

Description

Several named strategies coalesce stormwater management principles and practices into an organized approach to reduce a development's impact on our natural resources. While these methods may have different objectives or use different terminology, in many ways they overlap and complement each other. They each promote techniques to minimize impervious area and then use the preserved landscape to slow, abstract, and filter stormwater runoff. These strategies also encourage replicating the natural landscape through green infrastructure. By using green infrastructure, the designer is taking advantage of all the hydrologic tools available to manage stormwater.

Green infrastructure is a suite of practices that manage wet weather flows by using or mimicking the natural processes that result in the storage, infiltration, evapotranspiration, or use of stormwater.

This chapter introduces three common strategies and lists resources for further study. Site designers are encouraged to consider these approaches early in the planning of a development. Employing even some of the techniques behind these strategies can provide substantial environmental and community benefits.

Developers may find these strategies create a marketable asset as well provide stormwater management. According to the University of Illinois Extension, cluster development can reduce the costs of development (for example less grading) while increasing the market price of individual lots in comparison with traditional subdivisions.

Low Impact Development

According to the Low Impact Design Center, low impact design (LID) “seeks to design the built environment to remain a functioning part of an ecosystem rather than exist apart from it.” This is accomplished by integrating small-scale, dispersed practices throughout the development's open space. These practices rely on natural features or are engineered to mimic natural hydrology and processes by infiltrating, evaporating, transpiring, and detaining stormwater. The result is a multifunctional landscape that manages stormwater where it is generated as opposed to the conventional end-of-pipe approach of capturing stormwater in a drainage system that routes it to a singular, principal control. LID could be viewed as a “micro-managing” approach to stormwater.

The LID designer's goal is relatively straightforward – to retain the pre-development hydrology of the site. The designer should strategically route stormwater flow to lower the time of concentration using practices such as grass swales, filter strips, and impervious surface disconnection. Then uniformly distribute stormwater practices such as permeable pavement or bioretention to create manageable runoff volumes for storage and infiltration. Using a variety of detention, retention, and conveyance practices maximizes the treatment mechanisms applied. Multiple practices also ensure that should a practice fail, the site will still be managed by other controls.

LID Resources

- lowimpactdevelopment.org
- National Institute of Building Sciences. *Whole Building Design Guide*. wbdg.org/resources/low-impact-development-technologies
- U.S. EPA. *LID Barrier Buster Fact Sheet Series*. epa.gov/nps/urban-runoff-low-impact-development

Cluster/Conservation Development

The main objective of cluster or conservation development is to preserve the area's environmental features. This is achieved by siting homes on smaller lots without reducing the total number of homes or density on a given acreage. Clustering the same number of homes on a smaller portion (less than 60 percent) of the total available land does not decrease development yield of a traditional subdivision but creates large areas of protected open space to be shared by residents and possibly the entire community. The resulting tract of green space can be used to protect environmentally sensitive areas or other unique characteristics of the land, as park or recreational land, for agricultural production, or simply to preserve the open character of rural communities. Linking the open space of cluster developments creates larger corridors, amplifying their benefits and utility to a community.

A well-designed cluster development provides stormwater management benefits by way of reduced pavement area with extensive open space. Maximize these benefits by preserving or restoring soil quality within the open space to promote infiltration. It may be possible to route stormwater from the developed area to open space where forest, constructed wetlands, or deep-rooted meadow plants can store, filter, and infiltrate runoff.

Homeowners may be granted equal access to the open space, or it may be designated for full public use. This will determine if management and protection of the land will be the responsibility of a homeowners' association, the local community, or perhaps a special tax district. In most cases, the open space is permanently protected from future development through a conservation easement.

According to the University of Illinois Extension, cluster development can reduce the costs of development (for example less grading) while increasing the market price of individual lots in comparison with traditional subdivisions.

Local jurisdictions are encouraged allow variances to frontage, lot size, setback, and other local ordinances where necessary to facilitate a reasonable cluster/conservation development.

Cluster/Conservation Development Resources

- Randall, A. 1999. *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks*. Island Press. Washington, DC.
- Meck, S. 2007. *Zoning Practice - Cluster Development*. American Planning Association. Chicago, IL.

Green Streets

Green Streets is an approach to better manage stormwater from public rights-of-way and associated off-street surface parking areas in addition to providing community benefits such as safe, accessible, and more aesthetically pleasing travel corridors. Like the previous strategies, an objective of green streets is to reduce the impervious surface footprint and to treat stormwater at its source. Practices such as permeable pavements, bioretention, swales, and trees are often used on green streets to slow and filter stormwater runoff. Green streets may apply the concepts and practices of LID to arterial, residential, and commercial roads as well as multi-use paths.

Green Street Resources

- U.S. EPA. 2021. *Green Streets Handbook* (EPA 841-B-18-001).
- National Association of City Transportation Officials. *Urban Street Design Guide*.
- Southeast Michigan Council of Governments. 2013. *Great Lakes Green Streets Guidebook: A Compilation of Road Projects Using Green Infrastructure*.
- Philadelphia Water Department. 2014. *City of Philadelphia Green Streets Design Manual*.

References

Low Impact Development Center, Inc. Low Impact Development Urban Design Tools Website. Accessed Oct. 27, 2022 at www.lid-stormwater.net.

Ohio. 2006. Rainwater and Land Development Manual. Department of Natural Resources. Columbus, OH.

University of Illinois Extension. Cluster/Conservation Development. Accessed Oct. 27, 2022 at web.extension.illinois.edu/lcr/cluster.cfm

U.S. EPA. 2012. Maintenance of Low Impact Development. LID Barrier Factsheet. EPA 841-N-12-003F.