

## **Rhode Island's New Stormwater Guidance Manual**

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In the past stormwater management was primarily an engineering exercise to collect and dispose of water as quickly as possible. The new draft *Rhode Island Stormwater Design and Installation Standards Manual* will dramatically change stormwater management to include more creative planning and site design as well as better engineering practices.

Stormwater management has evolved dramatically throughout the country since it was first adopted and applied in the late 1970's. In 1993, the Rhode Island Department of Environmental Management (DEM) and the Rhode Island Coastal Resources Management Council (CRMC) published the first *Rhode Island Stormwater Design and Installation Standards Manual*. That original manual was intended to provide guidance in designing effective stormwater best management practices (BMPs), based on accepted practices of the time.

Since that manual was completed, stormwater and water quality management programs have evolved to address a more advanced scientific understanding of the water quality impacts of stormwater runoff. DEM has documented widespread impairments in surface water quality largely attributable to stormwater runoff. Effective management of stormwater now demands attention to both the quantity and quality of stormwater runoff. During this same period, new methodologies have been developed to provide better treatment to runoff.

Furthermore, in 2007 the Rhode Island General Assembly adopted "The Smart Development for a Cleaner Bay Act" (the Bay Act). The Bay Act states that "stormwater, when not properly controlled and treated, causes pollution of the waters of the state..." and "development often results in increased stormwater runoff by increasing the size and number of paved and other impervious surfaces..." The Bay Act requires DEM and CRMC to amend the 1993 Stormwater Design and Installation Standards Manual to:

- a) Maintain groundwater recharge to predevelopment levels;
- b) Maintain post-development peak discharge rates to not exceed pre-development rates; and
- c) Use Low Impact Development (LID) techniques as the primary method of stormwater control to the maximum extent practicable.

To more effectively manage the impacts of stormwater and prevent adverse impacts to water quality, habitat and flood storage capacity, CRMC and DEM updated the 1993 manual to reflect current science concerning stormwater management. The revised manual provides guidance for stormwater management on new development and redevelopment projects and, most importantly, incorporates LID as the "industry standard" for all sites, representing a fundamental shift in how development projects are planned and designed.

LID is a more comprehensive approach to managing stormwater that is integrated into a project to minimize the hydrological impacts of development. Stormwater is managed in smaller, cost-effective treatment practices located throughout the development project rather than being conveyed and managed in large, costly pond facilities located at the bottom of drainage areas. The primary goal of LID is to mimic the predevelopment hydrology by using site planning and design techniques that store, infiltrate, evaporate, and detain runoff as close as possible to the point where precipitation reaches the ground. Use of these techniques helps to reduce off-site runoff and ensure adequate groundwater recharge.

LID can be used to accommodate growth while reducing the environmental impact of site development. Many of the LID concepts employ non-structural on-site treatment that can reduce the cost of infrastructure while maintaining or even increasing the value of the property relative to conventionally-designed developments. The objectives of LID include:

- Preserve natural areas, native vegetation and reduce the impact on watershed hydrology;
- Protect surface waters, wetlands and natural drainage areas from development;
- Reduce impervious cover and the generation of stormwater runoff volume;
- Manage water (quantity and quality) as close to the source as possible and minimize the use of large or regional collection and conveyance;
- Utilize less complex, non-structural methods for stormwater management that are lower in cost and less maintenance than conventional structural controls; and
- Create a multifunctional landscape.



*This development was built using LID. Native vegetation was left to maintain natural hydrology, the road width and driveways were reduced, and road runoff is treated by engineered grass swales along the side of the road*

The new Stormwater Manual establishes twelve required minimum stormwater management standards for development and redevelopment projects. The first minimum standard is compliance with LID site planning and design practices. The purpose of this standard is to provide a process by which LID is considered at an early stage in the planning process such that stormwater impacts are prevented rather than mitigated. In the past the landscape was altered significantly to fit the style of development, whereas the LID process is reversed where development is shaped to fit the landscape. This new approach to stormwater management follows three broad steps:

1. Avoid the Impacts: Preserve, and where possible restore, natural features. Protecting as much undisturbed land as possible and minimizing the hydrologic alteration of a site is an important first step in stormwater management.
2. Reduce the Impacts: Once sensitive resources have been avoided the next step is to reduce the impact of land alteration by minimizing impervious areas in order to reduce the volume of runoff, increase groundwater recharge, and reduce pollutant loadings from a site. Traditional development often includes excessive amounts of impervious cover that can be reduced by thoughtful site planning.
3. Manage the Impacts: After making every effort to avoid and reduce potential development impacts, the next step is to effectively manage the remaining stormwater runoff. Instead of conventional curb and gutter pipe-to-pond management, precipitation will be infiltrated as close as possible to the point it reaches the ground using vegetated conveyance and treatment systems.

Unlike the first manual that relied exclusively on engineering practices to manage stormwater runoff, the new manual encourages the use of good planning and community land use authority to avoid and reduce the impacts of stormwater. The best way to avoid and reduce the impacts of development is for communities to adopt land use standards to allow site designers the flexibility to comply with LID standards. For example, techniques such as conservation development, flexible lot configurations and building envelopes are very effective practices to *avoid the impacts* by preserving undisturbed natural areas and guiding growth away from surface waters and wetlands and to maintain pre-development hydrology.

The most effective practices to *reduce the impacts* encourage less impervious surfaces in new and redevelopment. The reduction of new road surfaces, driveways, sidewalks and decreased parking areas, where possible, will all help limit the volume of stormwater generated. To help manage the impacts through vegetated treatment and conveyance systems, communities should also eliminate curb and gutter drainage requirements and allow side of the road drainage, where appropriate, to encourage infiltration of runoff.

The new Stormwater Manual contains very specific engineering design criteria for structural stormwater best management practices. Moreover, a companion *Community LID Guidance Manual* is also being developed that will provide options for local

planning officials on how their ordinances may be amended to avoid and reduce the impacts from development and encourage more effective compliance with LID.

The new Manual, currently available for review by the public and key stakeholders, may be found on the DEM and CRMC websites. The DEM link is as follows:

<http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/pdfs/desgnmnl.pdf>

A final Manual is anticipated to be adopted by the fall of 2009. Training for both the new Stormwater Manual and the companion Community LID Guidance will be offered by DEM, the Narragansett Bay Research Reserve's Coastal Training Program, and URI Cooperative Extension to site designers, developers and municipal officials.