

PERMITTING LOW IMPACT DEVELOPMENT (LID) UNDER THE STATE STORMWATER PROGRAM

Rules

Low Impact Development (LID) projects must work within the current rules. While EPA has not mandated LID, on October 18, 2012, EPA proposed that “performance standards could be met by reducing impervious cover and/or installing stormwater controls which infiltrate, evapotranspire and harvest and use rain water. Further EPA proposed that any volume that cannot be retained on site could be managed through treatment, off-site mitigation in the same water shed, or payment in lieu of. Currently the state only mandates LID in the Goose Creek, Waxhaw Creek, and Six Mile Creek Watershed.

Curve Method

DWQ allows the curve method to be used for LID projects to calculate the water quality volume that must be managed. (Reference NCDENR Stormwater BMP Manual, Chapter 3, Section 3.3.1 and Section 3.3.2).

Infiltration System Requirements in T15A: 02H .1008 (d)

Often, infiltration systems may be designed to provide infiltration of the water quality volume required for a site or a series of successive systems may be utilized. In general, the following requirements apply to infiltration systems:

- Infiltration systems shall be a minimum of 30 feet from surface waters and 50 feet from Class SA waters
- Infiltration systems shall be a minimum distance of 100 feet from water supply wells
- The bottom of infiltration systems shall be a minimum of two feet above the seasonal high water table¹
- Infiltration systems must be designed such that runoff in excess of the design volume by-passes the system and does not flush pollutants through the system
- Infiltration systems must be designed to completely draw down the design storage volume within five days and a hydrogeologic evaluation may be required to determine whether the system can draw down in five days
- Soils must have a minimum hydraulic conductivity of 0.52 inches per hour to be suitable for infiltration²
- Infiltration systems must not be sited on or in fill material
- If runoff is directed to infiltration systems during construction of the project, the system must be restored to design specifications after the project is complete and the entire drainage area is stabilized.

¹ The requirement for two feet above the seasonal high water table may impede LID.

² The requirement to have a minimum hydraulic conductivity of 0.52 inches per hour may impede LID.

Alternative Design Criteria in T15A: 02H .1008 (h)

Stormwater management systems consisting of other control options or series of control options may be approved by the Director on a case-by-case basis. This approval is given in cases where the applicant can demonstrate that the alternative design provides equal or better stormwater control.³

Recorded Drainage Easements

Under 15A NCAC 02H .1008 (c)(3), all stormwater management structures shall be located in recorded drainage easements⁴ for the purposes of operation and maintenance and shall have recorded access easements to the nearest public right-of-way. These easements shall be granted in favor of the party responsible for operating and maintaining the stormwater management structures

Operation and Maintenance Plan

Under 15A NCAC 02H .1008 (i), prior to approval of the development by the Division an operation and maintenance plan or manual shall be provided by the developer for stormwater systems, indicating the operation and maintenance actions that shall be taken, specific quantitative criteria used for determining when those actions shall be taken, and who is responsible for those actions. The plan must clearly indicate the steps that shall be taken and who shall be responsible for restoring a stormwater system to design specifications if a failure occurs and must include an acknowledgment by the responsible party. Development must be maintained consistent with the requirements in these plans and the original plans and any modifications to these plans must be approved by the Division.

A sustainable stormwater program must have a viable mechanism to ensure practices are installed and maintained over time. Maintenance costs are more evenly spread out over time. Instead of major maintenance ever two or three years or in the event of catastrophic failure, maintenance and repair costs are ongoing, but minimal. Unlike developments with one or two BMPs, a low impact development relies on a stormwater management system. The required maintenance plan or manual for that *system* must include an educational component and indicate:

- What inspections and maintenance actions that shall be taken,
- When those inspection and maintenance actions shall be taken, and
- Who is responsible for those actions.

North Carolina Licensing

Under 15A NCAC 02H .1008 (i). Stormwater systems must be designed by an individual who meets any North Carolina occupational licensing requirements for the type of system proposed. Upon completion of construction, the designer for the type of stormwater system installed must certify that the system was inspected during construction, was constructed in substantial conformity with plans and specifications approved by the Division and complies with the requirements prior to issuance of the certificate of occupancy.

³ Currently, determining equal or better is based on best professional judgment.

⁴ The requirement that all stormwater management structures shall be located in recorded drainage easements may impede LID.

Express Review

The cost for express review for high density is \$4,000 for a new application or major modification and \$2,000 for minor modification - the fee for LID is \$2000 and \$1000.

Disconnected Surfaces and Overland flow⁵

Disconnection practices may be applied in almost any location, but impervious surfaces must discharge into a suitable receiving area for the practices to be effective. Disconnection decouples roof leaders, roadways and other impervious areas from stormwater conveyance systems, allowing runoff to be collected and managed on site or dispersed into the landscape. Runoff is redirected onto pervious surfaces such as vegetated areas, reducing the amount of directly connected impervious area, reducing the runoff volume and filtering out pollutants. Pursuant to S229, "The Department shall deem runways, taxiways, and any other areas that provide for overland stormwater flow that promote infiltration and treatment of stormwater into grassed buffers, shoulders, and grass swales permitted pursuant to the State post-construction stormwater requirements."

Innovative Systems

Innovative systems⁶ can be cheaper and may require less land surface than traditional technologies. They can be engineered to target specific pollutants, find applications where available land is extremely limited, and allow dual use of the land surface, since some systems are underground. Generally, performance in North Carolina installations is not yet well documented, underground installations are not readily inspected, and typically lack provisions to warn of impending failure. Because of reduced size compared to traditional technologies, maintenance actions may be more frequent and the additional monitoring requirements can discourage some potential owners. Further, projects featuring innovative technology may take longer to review and approve. DWQ typically approaches permitting requirements on a case-by-case basis, and determines additional requirements in accordance with site conditions, the specifics of the device, the target pollutants, and the identified pollutant removal requirements for the governing regulatory program.

Application for a State Stormwater Permit

Central Office and each Regional Office has dedicated staff that are certified NC LID professionals. All LID applications should be directed to those dedicated staff.

Only complete applications packages will be accepted and reviewed by DWQ. A complete LID package includes the items listed below.

- The appropriate fee and main application form for State stormwater permits (SW Management Program Permit Application SWU-101)
- A complete set of stormwater plans drawn to scale and calculations. Rather than providing detailed designs of each stormwater control measure, the developer may provide typical designs with specific notes and/or tables that provide individual specifications for each BMP

⁵ Overland flow and disconnected surfaces is not clearly defined in the rules.

⁶ Current limitations on innovative systems may impede LID.

- Detailed construction sequences to ensure that infiltration areas remain largely undisturbed during construction
- A soils map signed and sealed by a licensed soil scientist, including the source of the soil classifications, existing land use, and pre-development curve numbers
- A map of seasonal high water table elevations and infiltration rates
- Maintenance plan and schedule. The developer may provide a maintenance agreement for the project, rather than providing separate maintenance agreements for each BMP.
- LID spreadsheet in lieu of the traditional supplement forms.

Spreadsheet for LID Projects

To expedite the permit application review process DWQ allows the use of a LID spreadsheet in lieu of the traditional supplement forms.

The LID -EZ spreadsheet developed by Withers and Ravenel for Brunswick and New Hanover Counties, and Wilmington, Cape Carteret, and Cedar Point has been approved by the State for use in the 20 coastal counties.

LID Demonstration

DWQ allows local governments with approved LID programs to determine whether or not a project is LID. Further, DWQ will allow a certified NC LID Professional to determine whether or not a project is indeed LID. The purpose of DWQ “approval” is to ensure a certain level of consistency state wide with respect to LID. Until those local programs are approved, DWQ (or a certified NC LID Professional) will still have to make the call as to whether or not the project is LID.

Otherwise the applicant must demonstrate that to the maximum extent technically feasible the design:

1. Preserve natural landscape features such as open space and tree cover, preserving soils with good infiltration rates, and minimizing effective imperviousness.
2. Treats stormwater runoff in smaller SCM placed throughout the site.
3. LID reduces runoff by utilizing SCM and techniques that promote infiltration of flows and groundwater recharge for the purpose of maintaining stream base flow, i.e., amended soils, rain gardens, and bio-retention cells and utilizing SCM that use and reuse stormwater runoff, i.e., cisterns, rain barrels, irrigating landscaping, etc.

The applicant must provide a narrative of LID techniques used that describes:

- The small-scale practices and controls used that are distributed throughout the site that allow for infiltration, retention, storage, filtering and collection at the point of generation and reduce or eliminate the need for a centralized structural stormwater runoff control device.
- Where and how trees, wetlands and common areas, drainage patterns, topography and soils were conserved.
- How the design preserves natural flow paths and existing vegetative, and preserves/protects environmentally sensitive site features such as riparian buffers, wetlands, steep slopes, mature trees, flood plains, woodlands and highly permeable soils.

- How the design provides infiltration and more contact time with the landscape by saving natural drainage patterns, use of sheet flow, use of vegetative swales, lengthening flow paths and flattening slopes.
- How the design incorporates alternative stormwater management practices such as functional landscape that act as stormwater facilities, flatter grades, depression storage and open drainage swales.
- How the design disconnects impervious area, reduces piped and/or vegetative conveyances, and breaks up impervious surfaces with pervious surfaces (grass filter strips in parking lots, rain gardens, swales, etc.).
- How the design reduces impervious surfaces through the use of permeable pavement, green roofs and locates pavement under existing (and preserved) tree canopies.
- How the project will minimize disturbance and/or restricts ground disturbance.
- How the design reduces paving and compaction of highly permeable soils to preserve absorptive capacity.
- How the design minimizes the size of construction easements and material storage areas, and sites stockpiles during the construction phase of a project
- How the project will minimize soil compaction on the site and restricts temporary storage of construction equipment in these areas.

The narrative should also address the following specific parameters:

- The percent pavement reduction by permeable pavement and/or narrow streets: percent should be maximized.
- The percent common areas: percent should be maximized.
- The percent tree canopy coverage provided or preserved: percent should be maximized.
- The percent open space preserved: percent should be maximized.
- The percent steep slopes preserved: percent should be maximized.
- Surface waters and drainage ways setback for built upon area: setbacks should be maximized.
- The overall length of piped and/or vegetative conveyances: overall length should be minimized.