



## IMPROVEMENTS IN STORMWATER MANAGEMENT SPURRED BY LOW IMPACT DEVELOPMENT TECHNIQUES

A concept first advanced in 1990<sup>1</sup>, evidence of Low Impact Development (LID) can now be seen across North America. Like many infrastructure transformations, this growth in LID design has benefitted from regulatory changes; compliance versus cost remains an important motivator in any commercial venture. Through their efforts, LID pioneers have demonstrated a range of social and aesthetic benefits that have complimented the economics of this approach.

Municipalities across the country are leading the charge. Developers are being asked to manage stormwater onsite because local infrastructure is rarely designed to tackle the larger volumes encountered with modern developments. Guidelines have become mandates and design standards, trying to achieve an end result of better environmental management. Guided by national bodies like the U.S. Environmental Protection Agency (EPA) and national legislation like the U.S. Clean Water Act, municipalities are including LID techniques in their Integrated Stormwater Management Plans. With these

regulations and guidelines in place, developers are mandated to follow by controlling stormwater as close as possible to its source. This helps mimic the natural movement of the water, improving the management of local and global ecosystems, with a goal of improved sustainability. Keeping water on site long enough to allow for evapotranspiration is crucial to protecting the receiving waterbodies. Results include a reduction in runoff volume, an increased time of concentration, reduced peak flow and peak flow duration as well as improved water quality.

Population growth leads to development; development creates hard surfaces where porous soil once existed. LID techniques address this in various ways. One example is the use of permeable surfaces, which allow stormwater to infiltrate into the ground. Two other examples – Green Roofs and Infiltration Bio swales/Rain Gardens – are also explored in this Insight. Together, they contribute to the EPA’s vision:

*“Multi-functional site design, landscapes, streetscapes and architecture that restores vital ecosystem services necessary to protect the integrity of our receiving waters.”<sup>2</sup>*

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# Nilex Insight

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## Green Roofs

Green roofs mimic preconstruction tree canopies, grasslands and natural vegetation. Slowing stormwater runoff at the roof surface allows for evaporation and transpiration, mimicking the hydrologic characteristics that more closely match open space than impervious surfaces.

Toronto's Green Roof Bylaw emphasizes the value in this approach and many other municipalities such as Richmond and Vancouver, are following with similar bylaws and policies and changes to their integrated storm water management plans to include green roofs.

Direct runoff from traditional roofs is a key contributor to pollutant release. By contrast, vegetated roof covers can significantly reduce this source of pollution, while also benefitting cities by improving energy efficiency (reductions in heating and cooling costs), reducing urban heat island effects, generating oxygen and clean air as well as creating greenspace for passive recreation or aesthetic enjoyment. Nilex has worked with multiple green roof installers to find solutions unique to each site and each owner.

## Infiltration Detention / Rain Garden bio-swales

The concept behind an on-site Rain Garden bio-swale is simple: Allow stormwater to infiltrate back into the ground as it would have through natural processes. This recharges groundwater tables and aquifers, keeps base flows to adjacent waterways consistent, and provides filtration to remove metals and pollutants.

Large retailers (with large parking lots) have worked with Nilex to install these systems, and the trend looks to continue as they strive to do their part to manage stormwater. Costco and Lowe's have pursued on-site detention systems on both sides of the border, eliminating the need – both in valuable real estate space and construction/maintenance costs – for an on-site stormwater retention pond. Nilex incorporated this LID technique during the construction of its head office in Edmonton,<sup>3</sup> while lifestyle retailer Mountain Equipment Co-Op<sup>4</sup> took it one

step further by installing a system for its North Vancouver location that eliminated the need for connection to the municipal stormwater system and qualified them for LEED Gold status.

## Permeable surfaces

Another practical technique is to effectively allow storm water to permeate into the ground where it falls on hard surfaces. Permeable surface reduces the volume collected by municipal stormwater infrastructure by allowing water to infiltrate back into the ground. This recharges ground water tables and aquifers, keeps base flows to adjacent waterways the same as preconstruction and provides natural filtration that removes metals and pollutants.

From an environmental perspective, the keys to successful permeable surfaces are to remove stormwater from the surface quickly, at its source, and let it infiltrate naturally. From a practical perspective, these surfaces must achieve this while still being capable of traffic loading without unnecessary ponding. Nilex has enjoyed success with recent installations of these permeable surfaces, using PaveDrain<sup>5</sup>.

## Conclusion

We must remind ourselves that the most important outcome of low impact development techniques is the huge reduction of negative impact on our environment, effectively returning our storm water runoff and effective baseflow to positively manage not only the quantity of our natural water, but the quality as well. We are then able to effectively sustain our natural habitats attached to our aquifers, streams and creeks, rivers and lakes, and our oceans the way nature intended.

<sup>1</sup> [https://en.wikipedia.org/wiki/Low-impact\\_development\\_\(U.S.\\_and\\_Canada\)](https://en.wikipedia.org/wiki/Low-impact_development_(U.S._and_Canada))

<sup>2</sup> <http://www.epa.gov/owow/NPS/lid?>

<sup>3</sup> <http://nilex.com/projects/nilex-head-office-stormwater-management>

<sup>4</sup> <http://nilex.com/projects/mountain-equipment-co-op>

<sup>5</sup> <http://nilex.com/products/pavedrain>

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Should you require clarification on Low Impact Development techniques, please do not hesitate to contact Nilex at 303-766-2000 or [info@nilex.com](mailto:info@nilex.com).