Clean Air Partnership

Briefing Note

August 2023

Low Impact Development in Municipalities

Introduction

1. Low Impact Development (LID) is an innovative approach to urban planning and development that aims to reduce the impacts of stormwater by collecting and treating runoff as close to its source as possible, minimizing the environmental impact of human activities on natural resources.

2. LID systems and practices use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater to protect water quality and associated aquatic habitat. They are engineered landscape features that infiltrate, filter and store stormwater runoff. They also provide surfaces for evaporation to occur. By emulating natural or pre-development conditions at a site, LID practices help reduce the volume of runoff, removing nutrients, pathogens and metals.

3. When incorporated into multiple locations and different land use types across a watershed, LID is an effective tool for managing the impacts of stormwater, such as erosion, degrading water quality and associated costs. LID also helps to protect natural features and biodiversity.

Benefits of LID

- Mitigates stormwater runoff and peak discharges, reducing the volume and intensity of water flow.
- Enhances water quality through on-site natural filtration, leading to cleaner water sources.
- Minimizes water-related infrastructure damages, such as flooding and erosion, ensuring long-term infrastructure integrity.
- Alleviates pressure on aging municipal water management infrastructure, including fixes and upgrades, while also maintaining or improving source water quality through advanced wastewater treatment and reduced drinking water treatment needs.
- Replenishes the groundwater table, contributing to sustainable water resources.
- Eases the burden on wastewater treatment plants and combined sewer outflow systems during heavy rainfall events, ensuring more efficient and effective water management.

Indirect Benefits of LID:

- Increases green space for healthier living and work environments.
- Creates local green jobs and supports economy through tourism revenues.
- Contributes to wildlife habitats and creates carbon sinks.
- Reduces urban heat with permeable surfaces and lowers road maintenance costs.
- Enhances property values, increases road safety, and reduces road noise levels through vegetation buffers and traffic calming measures.

Barriers to Implementing LID

4. Municipalities encounter considerable difficulties in effectively monitoring, inspecting, and upkeeping their LID infrastructure, as well as ensuring that practices spanning private properties receive appropriate maintenance. Challenges to implementing Low Impact Development (LID) practices include:

    - Limited expertise in inspecting and maintaining LID projects and practices.
    - Necessity for legal arrangements to facilitate inspection and maintenance on private properties.
    - Increased complexity in managing distributed, decentralized, and small-scale LID practices.
    - Insufficient availability of comprehensive guidelines and templates for designing and implementing LID programs.

Examples of LID Infrastructure and Practices Advanced by Canadian Municipalities

5. LID practices encompass a wide variety of features ranging from local to watershed-wide scale. Some examples of practices implemented by Canadian municipalities include:

- **Green Roofs:** The City of Toronto's Green Roof Bylaw requires new buildings to include green roofs, reducing the urban heat island effect and mitigating stormwater runoff.

- **Stormwater Management Criteria:** The Region of Peel has pro-actively adopted the stormwater management criteria proposed in the anticipated Ontario Ministry of the Environment, Conservation and Parks' Low Impact Development Stormwater Management Guidance Manual. The Region of Peel updated Stormwater Design Criteria will be applied to the Region's stormwater infrastructure. The Region has also updated its rainfall intensity-duration-frequency curves to better account for changing precipitation patterns with climate change.

- **Permeable Pavements:** Vancouver's permeable pavement installations in parking lots and sidewalks enable water infiltration, reducing runoff and recharging groundwater.

- **Rainwater Harvesting:** The City of Victoria offers rainwater harvesting incentives to residents, encouraging the collection of rainwater for non-potable uses like irrigation and toilet flushing.

- **Bioretention Cells:** Halifax has integrated bioretention cells in urban parks and streetscapes, naturally filtering and absorbing stormwater before it enters the drainage system.

- **Rain Gardens:** Ottawa has implemented rain gardens in public spaces, allowing rainwater to collect and infiltrate, reducing the pressure on the city's stormwater infrastructure. Ottawa also offers residential rebates to install rainwater management systems.

- **Urban Tree Canopy Enhancement:** Calgary's "Branching out" initiative gives away free trees to residents to increase tree cover, mitigate runoff and enhance urban biodiversity.

- **LID-Focused Development Codes:** Victoria's development codes mandate LID practices for new construction projects, ensuring a unified approach to sustainable development.

- **Stream Daylighting:** Vancouver's restoration of buried urban streams involves "daylighting," or bringing them back to the surface, reducing flood risk and enhancing ecological systems.

- **Climate Adaptation Strategies:** Quebec City incorporates LID measures as part of its broader climate adaptation strategy, addressing potential climate change impacts.

Municipal Implications

6. Canadian municipalities are at the forefront of LID initiatives, showcasing innovative approaches to create environmentally resilient and sustainable urban spaces. By implementing LID practices, municipalities can promote sustainability, reduce stormwater runoff, protect water quality, and enhance overall urban resilience. LID technologies support groundwater and stream flow restoration, preserve water quality, reduce erosion risk, protect fisheries and enhance the recreational value of ecosystems.

7. Adopting LID practices enhances (or, in some cases, replaces) conventional stormwater approaches to protect water quality and biodiversity and increases community resilience to local impacts of climate change.

Related Resources and Further Reading

8. Rain City Strategy, City of Vancouver
9. Credit Valley Conservation Low Impact Development Resources
10. Urban Runoff: Low Impact Development, United States Environmental Protection Agency
11. Low Impact Development Stormwater Inspection and Maintenance Guide, Toronto and Region Conservation Authority
12. Risk and Return on Investment Tool (RROIT Version 1.0) Sustainable Technologies Evaluation Program

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