



## Building Forward: Principles of Successful LID Construction, Certification, Inspection and Maintenance

*This training event was produced through the Climate Change Adaptation Platform, with support from Natural Resources Canada and in partnership with the Cataragui Region Conservation Authority (CRCA) and the City of Kingston.*

**Date:** December 4, 2019

**Location:** INVISTA Centre - Rooms A&B, Kingston, ON

**Instructors:**

Jen Hill - Toronto and Region Conservation Authority

Kyle Vander Linden - Credit Valley Conservation

**Course Description:**

Low Impact Development (LID), an innovative stormwater management approach that treats, infiltrates, filters, and retains runoff at the source, is quickly becoming the new norm in Ontario. This course will focus on three critical components of developing functioning LID practices: construction, inspection and maintenance.

The first half of the day will focus on LID Construction. Construction of LID practices involves techniques and specifications that differ from traditional stormwater management construction practices. Failing to follow proper LID construction processes can result in barren bioretention landscapes, clogged infiltration practices, uneven permeable pavements, and ultimately costly post-construction repairs. Instructors will take participants through the principles of LID construction, highlighting potential errors, lessons learned from various Ontario projects and explain proper techniques.

The second half will provide guidance on inspection and maintenance of LID practices. Municipalities already face significant challenges in tracking, inspecting and maintaining their own conventional stormwater infrastructure while ensuring practices on private property are also adequately maintained. Integrating green stormwater infrastructure like low impact development (LID) best management practices (BMPs), into municipal asset management programs presents additional challenges, but ways to overcome them do exist. Participants will learn about essential steps in program design, inspection and testing protocols, and the specific maintenance needs for bioretention and other LID practice types. The experienced instructors will also impart valuable lessons learned from Ontario case studies.

**Learning Objectives** – Upon completion of this course participants will be able to:

- Identify how LID construction differs from the construction of a conventional stormwater management site.
- Understand LID construction considerations from mass grading through final assumption.
- Understand the materials used in bioretention and other common LID practices
- Know the common methods for constructing bioretention practices and specifying their materials along with other common LID practices.
- Effectively stabilize and establish vegetated stormwater management practices.
- Be aware of common construction pitfalls and how to avoid them.
- Identify components of stormwater infrastructure asset management programs that are critical for developing the capacity to manage LID BMPs.
- Recognize key components of LID BMPs that require inspection and maintenance and equipment needs.
- Understand maintenance and operation procedures for bioretention and other LID practices

Time	Task
8:00 – 8:30 am	<b>Arrival and Registration</b>
8:30 – 8:40 am	<b>Introductions, Housekeeping and Overview of the Day</b>
8:40 – 9:15 am	<b>Critical Processes for LID Construction</b> <ul style="list-style-type: none"> <li>○ Siting / Verifying Design</li> <li>○ Tender and Contract</li> <li>○ Activity 1 – Design Verification (Alwington Ave)</li> </ul>
9:15 – 10:00 am	<b>Preparing for the Pre –Construction Meeting</b> <ul style="list-style-type: none"> <li>○ Is Critical Information Missing</li> <li>○ Establishing Key Inspection Points</li> <li>○ Activity 2 – Inspection Points (Alwington Ave)</li> </ul>
10:00 - 10:15 am	<b>NETWORKING BREAK</b>
10:15 – 10:30 am	<b>Mobilizing, Access and Staging</b>
10:30 – 11:30 am	<b>Erosion and Sediment Control</b> <ul style="list-style-type: none"> <li>○ Non-structural Elements</li> <li>○ Activity 3 – Perimeter Controls and Project Phasing (Alwington Ave)</li> <li>○ Structural Elements</li> <li>○ Activity 3b – ESC Structural Elements (Alwington Ave)</li> </ul>
11:30 – 12:00 pm	<b>Plan of Excavation</b> <ul style="list-style-type: none"> <li>○ Grading</li> <li>○ Granular Backfill</li> <li>○ Underground Infrastructure</li> <li>○ Activity 4 – Backfill and Subsurface Infrastructure (Alwington Ave)</li> </ul>
12:00 – 12:30 pm	<b>LUNCH</b>
12:30 – 1:45 pm	<b>Coming to Finish Grade</b> <ul style="list-style-type: none"> <li>○ Material Testing</li> <li>○ Biomeia Installation</li> <li>○ Planting</li> <li>○ Activity 5 – Bioretention Construction Order / LID Materials Sheet</li> <li>○ Other Common LID Practices: Permeable Pavers and Porous Concrete</li> </ul>
1:45 – 2:30 pm	<b>Operation and Maintenance for Surface Features</b> <ul style="list-style-type: none"> <li>○ Bioretention Filtration Certification Protocols</li> <li>○ Routine Operation and Maintenance Processes for Bioretention</li> <li>○ Routine Operation and Maintenance Processes for Permeable Pavement</li> </ul>
2:30 – 2:45 pm	<b>NETWORKING BREAK</b>
2:45 – 4:00 pm	<b>Operation and Maintenance for Subterranean Features</b> <ul style="list-style-type: none"> <li>○ Sumps</li> <li>○ Perforated pipes and underdrains</li> <li>○ Chambers</li> <li>○ Wells</li> <li>○ Visual Inspection Indicators and Triggers for Follow-up Action; Case studies: Etobicoke Exfiltration System; Elgin Mills and Mayfield underground infiltration systems.</li> </ul>

The Sustainable Technologies Evaluation Program (STEP) is a conservation authority initiative. Current partners are:

