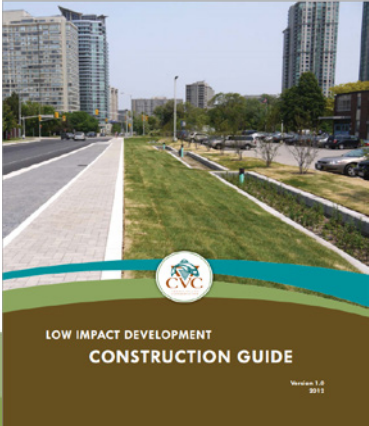


Reducing risk and building resiliency: The Credit River Watershed story



Risk

“Playing it safe is the riskiest choice we can ever make.”

Sarah Ban Breathnach

Definition of Insanity: doing the same thing over and over again and expecting different results.

Albert Einstein



Extreme Events

July flood listed as Ontario's most costly natural disaster

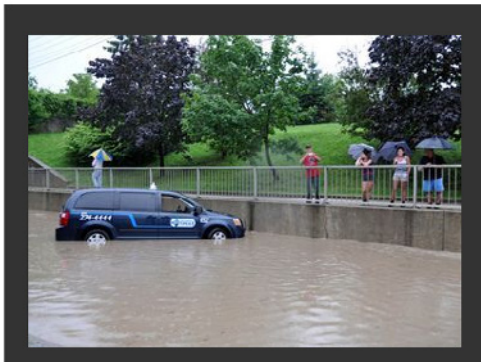
Mississauga News

By Carys Mills / Torstar Network

The storm and flash flooding that hit the GTA on July 8 has set a record for the province's most expensive natural disaster, according to the Insurance Bureau of Canada.

A preliminary estimate of insured property damage is already more than \$850 million, IBC said Wednesday.

"While these preliminary estimates are staggering, we do expect them to go even higher," IDC Ontario vice-president Ralph Palumbo said in a statement about the



Not just Extreme Events that are costly

Current Development

- 10-year event – \$47.5M*
- 100-year event – \$84M*
- 500-year event – \$109M*

New Development

- 10-year event – \$60M*
- 100-year event – \$96M*
- 500-year event – \$124M*

* Estimates for total building, content, and inventory loss (million 2010 \$)





What's at stake?

- 40% of Canada's economic activity
- Provides drinking water to 8.5 million Canadians
- \$450 M commercial and recreational fishing industry
- Lost revenue from beach closures 776 million to \$1.5 billion/ year



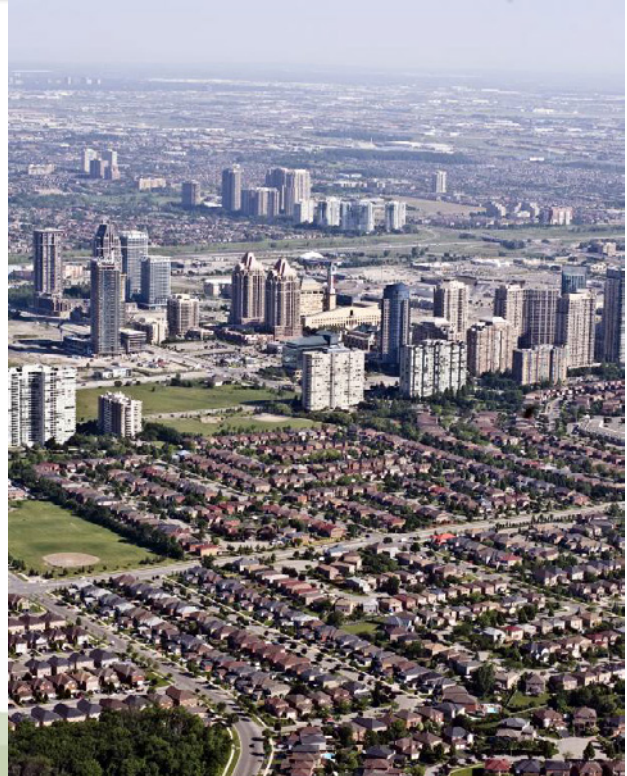
2013 RBC Canadian Water Attitudes Study

- **Canadians do not see a need for immediate investment in storm water management**
- **58% feel that municipalities are upgrading systems to handle excess storm water**



Mississauga's Story

- **75% of Mississauga has no flood control**
- **\$1.7 billion shortfall for SWM**
- **Only 15% of Mississauga has water quality treatment**
- **Spills cost up to \$ 500,000/year**



Brampton's Story

**Projected growth over 200,000
in next 20 years**

**Despite current end-of-pipe
SWM practices:**

- **Increasing trends in wet weather stream-flow**
- **Increasing pollutant loading**
- **Increasing erosion**

**Valley Lands public opening attracts crowds to
Brampton**



Orangeville's Story



How long will our precious aquifers last?

ALL IT TOOK WAS A few weeks of drought to make some Dufferin residents wonder how long our precious aquifers, which provide drinking water for virtually everyone in the county, will last.

To Meet these Challenges

- Adopting Low Impact Development (LID) for new development and existing urban areas
- Climate Change will exacerbate impact of urbanization



No SWM Scenario

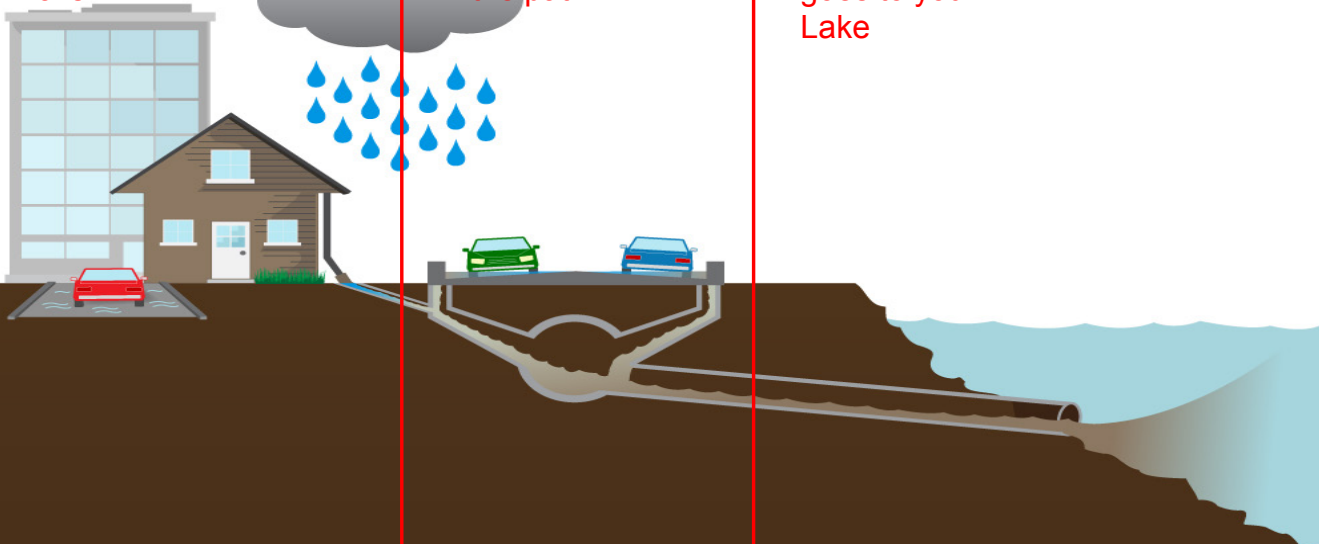
Typical development:

No LID infrastructure

Treat it where it falls

Treat it along the path

Treat it before it goes to your Lake



Treat it Where it Falls:

Green Roof



Rainwater Harvesting



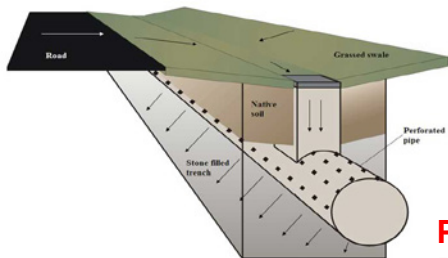
Permeable Pavement



Bioretention Planter



Treat it Along the Path:



**Treat it Before it Goes
to your Lake:**



Wetpond

Wetland



Green Infrastructure Focus Areas

Urban
Agriculture

Urban
Forest

Stormwater
Systems

Public
Spaces

Natural
Heritage

LID

Green Roofs
Rain Gardens
Permeable Pavement
Perforated Pipe
Bioswales
Ponds
Wetlands



Implementing LID

We need
a new
approach



Residential Surveys

- Landscape = reflection of themselves
- Sustainable or Eco Landscaping perceived to be giving up decks, weedy= LOSS
- 44% of respondent didn't know what a watershed was
- **Current outreach material NOT leading to adoption**



YOUR DREAM
GARDEN

Fusion
LANDSCAPING GUIDE FOR HOMEOWNERS





Imagining the beauty of fusion landscaping

The tranquil patch of green enveloping your home is more than just grass and trees, shrubs and flowers. It's an open-air sanctuary from the hustle and bustle of everyday life, an oasis where you can kick off your shoes, play with the kids or relax and catch up on reading.

Or, at least, it should be.

However, creating and tending a beautifully designed landscape in tune with its surroundings can be demanding and time-consuming.

Now there's something better. Fusion landscaping is an exciting, innovative trend in landscaping and garden design that brings together the lush splendor of traditional gardens with modern, eco-friendly plants, flowers, colours and textures. The result is an exciting and stylish landscape that reflects the way you're living today, one that's affordable, easy to maintain and conserves water.

Turn the page and we'll guide you through some simple steps that can help you create your own eco-ohio garden escape.

What we've Learned from our Monitoring





**LID Road Reconstruction
Projects can save up to
25% vs. Conventional SWM
when land costs included**

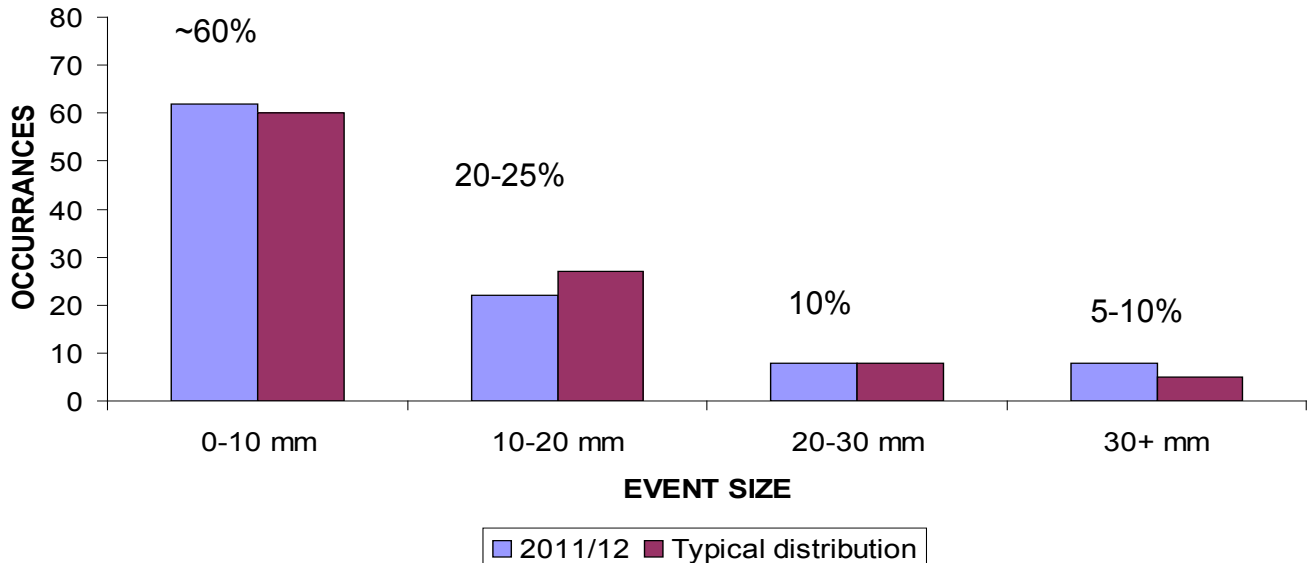
**Partnership between the
City, School Board, CVC**

**Street runoff controlled
outside municipal ROW**

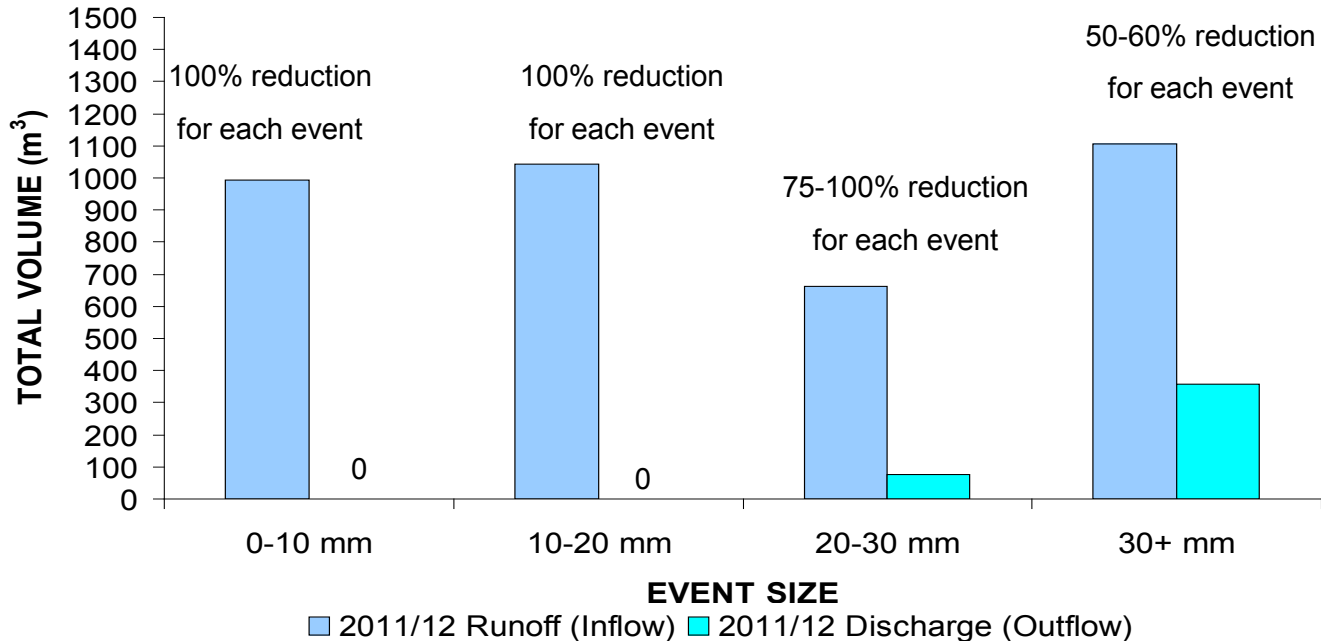


Precipitation at Elm Drive

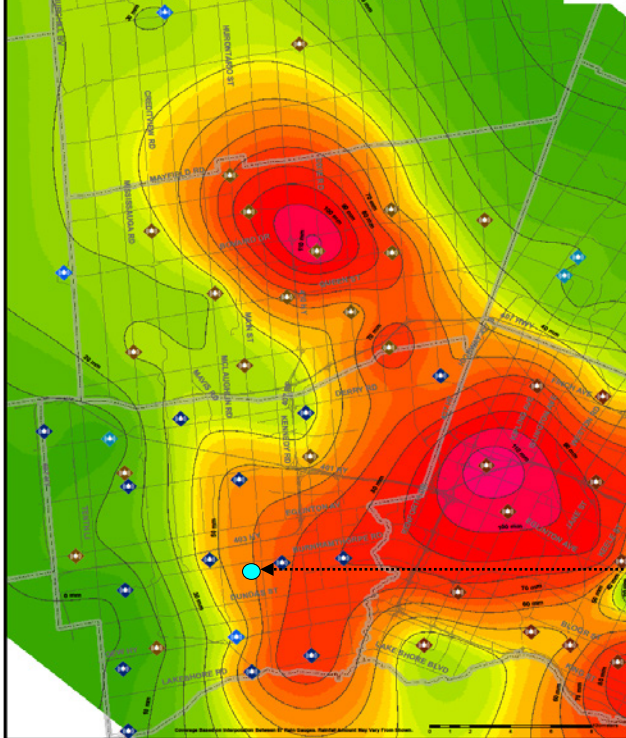
- 2011 – 40% more rain than typical for August to November
- 2012 - 10% less than typical



Volume Reduction



Rainfall Distribution of July 8th, 2013 Storm Event Lower Credit River Watershed



July 8th 2013 Storm Greater than 100 Year Event

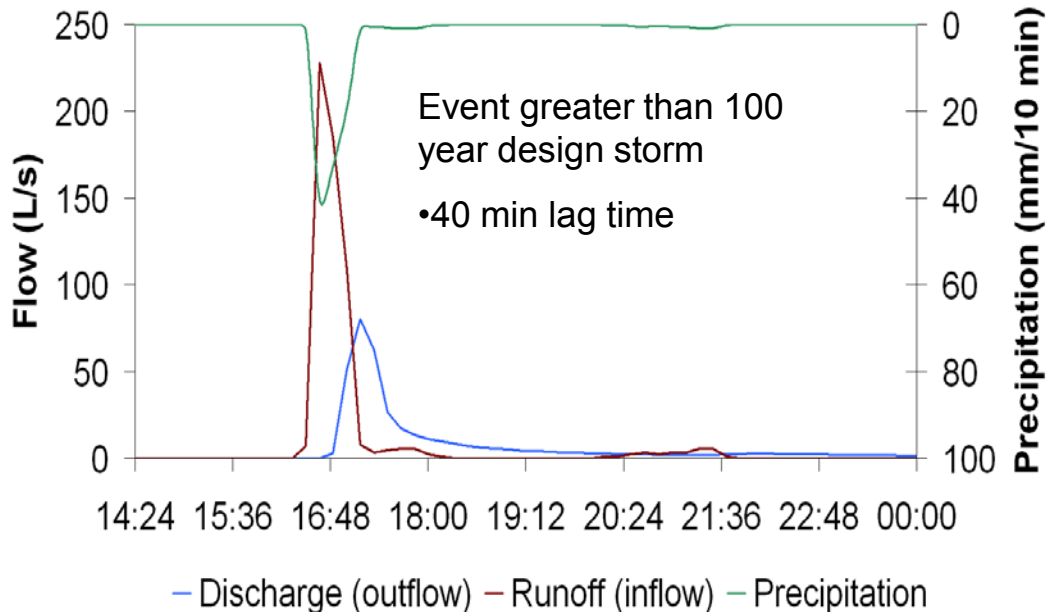
Elm Drive LID Site

Maximum 180 Minute Rainfall July 8th 2013 Event CVC Watershed, Ontario	Legend <ul style="list-style-type: none"> ◆ CVC Rain Gauge ◆ Cole Rain Gauge ◆ Muskoka Rain Gauge ◆ Peel Rain Gauge ◆ Toronto Rain Gauge 	Municipal Boundary Tiered Rainfall (mm) <table border="0"> <tr><td>0 - 5</td><td>66 - 70</td></tr> <tr><td>5 - 10</td><td>71 - 80</td></tr> <tr><td>10 - 15</td><td>81 - 90</td></tr> <tr><td>15 - 20</td><td>91 - 100</td></tr> <tr><td>20 - 25</td><td>100 - 110</td></tr> <tr><td>25 - 30</td><td>110 - 120</td></tr> <tr><td>30 - 35</td><td>120 - 130</td></tr> <tr><td>35 - 40</td><td>130 - 140</td></tr> <tr><td>40 - 45</td><td>140 - 150</td></tr> <tr><td>45 - 50</td><td>150 - 160</td></tr> <tr><td>50 - 55</td><td>160 - 170</td></tr> <tr><td>55 - 60</td><td>170 - 180</td></tr> <tr><td>60 - 65</td><td>180 - 190</td></tr> <tr><td>65 - 70</td><td>190 - 200</td></tr> <tr><td>70 - 75</td><td>200 - 210</td></tr> <tr><td>75 - 80</td><td>210 - 220</td></tr> <tr><td>80 - 85</td><td>220 - 230</td></tr> <tr><td>85 - 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July 8th 2013 Thunder Storms

104 mm over 5 ½ hrs – 240 mm/hr peak intensity for 10 min interval



Christine Zimmer, PEng MScEng
Credit Valley Conservation
czimmer@creditvalleyca.ca
905-670-1615 ext 229

