July 14, 2017

*VIA email (john.antoszek@ontario.ca)*

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**Re: Low Impact Development Stormwater Management Guidance Manual**
**EBR Registry number: 012-9080**

The following brief has been prepared by the Green Infrastructure Ontario Coalition and the Canadian Environmental Law Association.

The undersigned applaud the Ontario Ministry of Environment and Climate Change (MOECC) for its initiative in developing runoff volume control targets to reduce urban stormwater runoff and associated water pollution. We look forward to working with the Ministry on both the development and implementation of a Low Impact Development Stormwater Management Guidance Manual (which the above-noted Registry notice indicates will be drafted and consulted upon at a later date) and the further evolution of rainwater management policy and practice (both urban and rural) in Ontario. Our comments are directed only at the consultant reports attached to the Registry notice.

## Urban stormwater management: the problem

Our support for the consultant's recommendations and underlying principles rests on our understanding of the profound hydrological transformation that has occurred as a result of urbanization, a long list of damaging impacts, and the need for corrective action.

In nature -- a forest or meadow -- very little of the rain that falls results in runoff. Instead, moisture is infiltrated into organic soils, intercepted by vegetation, and returned to the atmosphere through evapotranspiration. For at least 90 per cent of rainfall events by volume there is no runoff, and during heavier storms runoff volumes and flow rates are moderated.

Problems begin to occur with urban development, which reduces vegetation and exposed soils and expands impervious surfaces. In fact, measurable watershed degradation has been found when hard surfaces exceed just five to ten per cent of landscape. In highly urbanized areas, stormwater volumes may have increased by five or six times. Further, in the absence of vegetation, stormwater flows rapidly over the surface and through drainage systems, resulting in higher peaks and much shorter time-to-peak.



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This profound change in hydrology has numerous impacts, including

- increased erosion
- urban flooding
- water quality impacts from contaminated surface runoff (the "first flush"), which affects source waters for drinking water, recreational use, and aquatic habitat
- thermal pollution, affecting coldwater fish habitat
- combined sewer overflows, sewage treatment by-passes, and sewer backups
- loss of groundwater recharge, affecting drinking water supplies in some communities
- loss of baseflow regulation, creating low water conditions in waterways during droughts
- increased reliance on treated municipal water for irrigating yards and vegetation

Climate change is expected to exacerbate damage from stormwater volumes and peaks due to the increase in extreme wet weather events. Deteriorating and poorly maintained stormwater infrastructure is another complicating factor in communities that lack resources or have neglected to invest in infrastructure renewal.

More recently developed urban areas have overland flood control and stormwater ponds that are designed to accommodate storm volumes and settle suspended solids. However, there are growing concerns about the cost of maintaining and decommissioning ponds and their contribution of nutrients and other contaminants. Ponds are also an "end of pipe" solution that do not address or mitigate impacts to the water balance.

## A welcome shift in urban stormwater management practice

The MOECC has recognized deficiencies with the conventional stormwater management practice in Ontario and is proposing a new approach designed to minimize runoff and runoff pollution by managing rain where it falls. The recommended runoff volume control target will require new development and redevelopment projects to **control onsite the 90th percentile rainfall event.** This will be carried out via a mandatory control hierarchy that gives priority to measures that permanently retain rain onsite through infiltration, evapotranspiration, and harvesting and reuse.

As outlined below, this is an overdue and very welcome shift in how urban stormwater management is practised on the ground in Ontario.

Ontario has adopted the term green infrastructure to describe both natural features (e.g., woodlots, wetlands) and engineered features that manage rain onsite. Low impact development (LID) refers to engineered features that "work with nature" to manage rainfall onsite, such as bioswales, infiltration trenches, permeable pavement, enhanced soils, filter strips, rain gardens, green roofs, and others. Using a combination of natural green infrastructure and engineered LID best management practices, the built environment can function hydrologically much like a forest or a meadow.

The consultant's report posted on the Environmental Registry outlines a necessary shift in stormwater management practice that mandates the protection of natural systems through better site design and systematic implementation of low impact development in new development and redevelopments in Ontario. The negative impacts described above will be mitigated by reducing runoff volumes, filtering runoff, and delaying and reducing peak flows.

Rather than viewing rain as a threat or a waste product, rainwater is viewed as "as a resource which is to be managed as close to the source area as possible (i.e., onsite) using approaches which focus on runoff prevention." (p. 101)

Importantly, controlling runoff volumes is known to be a reliable strategy for protecting water quality, more cost-effective than end-of-pipe treatment, and more consistent in achieving absolute reductions in pollutant loads. Reducing runoff eliminates the "first flush" of surface contaminants -- salt, pet waste, cigarette butts, heavy metals, oil, etc. It also reduces rainwater volumes in combined sewers, helping to reduce overflows.

The consultant proposes runoff volume control targets "founded on the principles of maintaining the pre-development water balance and returning precipitation volume to the natural pathways of runoff, evapotranspiration, and infiltration in proportions which are in keeping with watershed conditions prior to development." (p. 101)

The targets are designed to ensure that rainfall is managed onsite up to the 90th percentile rainfall event by volume. In practice, based on rainfall measurements which vary throughout the province, the proposed runoff volume control targets range from 23mm to 32mm (see map). In other words, depending on location, the first 23-32 mm of rainwater must be captured, and treated as described below.

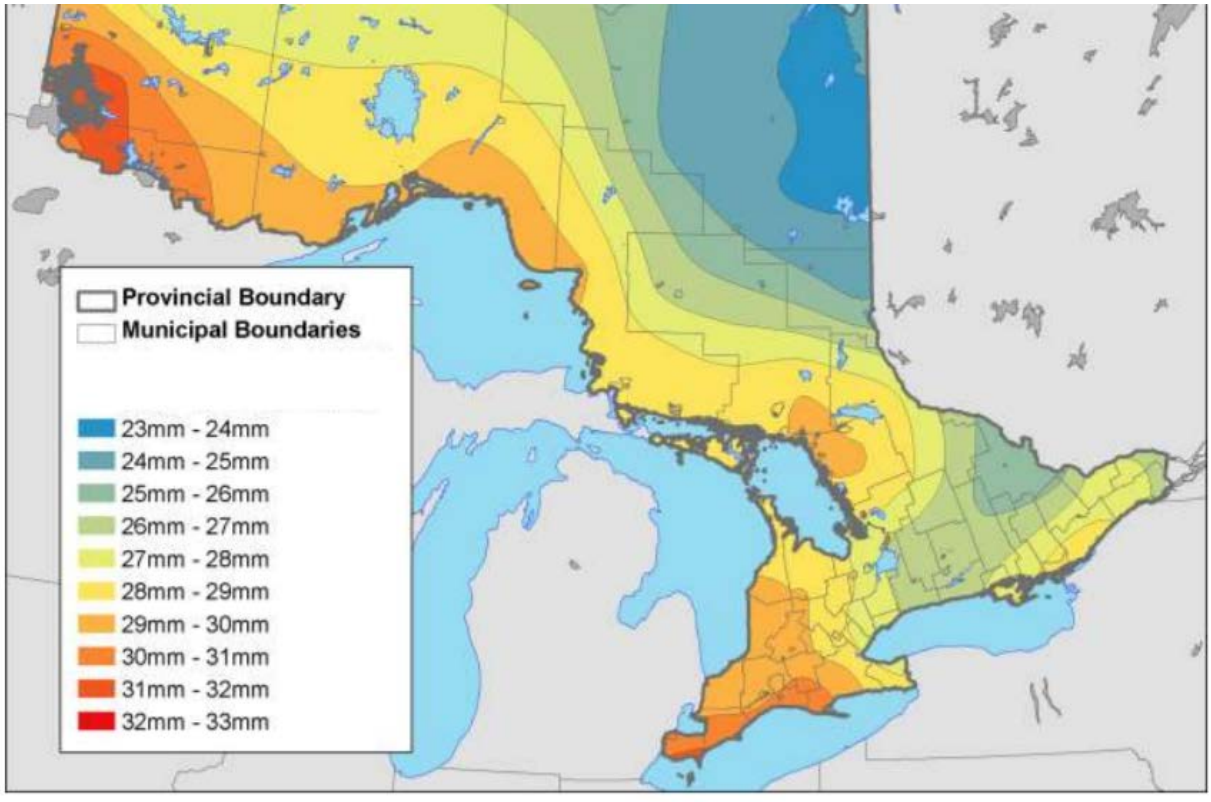


**Figure 3.67 – Recommended Regional 90% Percentile Volume Targets for Ontario**
(represented by the 95th percentile daily rainfall contours April - October, where daily volume exceeds 2 mm).

A "mandatory control hierarchy" is recommended that gives priority to LID measures that **permanently retain** rainfall volumes onsite, through infiltration, evapotranspiration, and harvesting and reuse. Permanent retention

means that rain does not become runoff. Harvesting includes reuse for irrigation but may also include replacement of treated water for internal plumbing uses.

The second and lower priority option in the hierarchy is the use of low impact development to capture, treat, and release rainwater. Volumes are reduced, peak flows are attenuated, and the rainwater that is eventually released is filtered and cleaned.

The third and lowest priority option in the hierarchy is the use of non-LID measures to detain and release rainwater. Measures include detention ponds and underground tanks, and end-of-pipe treatment systems.

Appropriately, the consultant indicates that the province's runoff control targets will be considered as minimums. Local jurisdictions may set higher targets based on watershed and subwatershed plans, drinking water source protection plans, nutrient control plans, and other initiatives.

## Comments

We are supportive of the proposed approach.

It builds on best practices in other comparable jurisdictions, including those with soil and climate conditions similar to Ontario.

It is based on science.

It employs numerical targets, which create a much higher degree of accountability for results than general policy statements expressing aspirational goals. The use of numerical targets, combined with accepted modelling techniques, provides clarity to all actors -- developers, consultants, municipalities, regulators, and others -- that the targets are in fact being met.

The proposed targets put the focus where it belongs, on the volume of stormwater, which affects both volume- and peak-related impacts (e.g., flooding, erosion) and water quality. Putting runoff controls at the heart of this approach as a measurable indicator is much preferable to a policy that merely encourages green infrastructure and low impact development. Runoff volumes are the bottom line. They are the outcome rather than the means. Reducing runoff volumes also reduces runoff pollution. A performance-based standard helps to ensure successful implementation.

The consultant has taken considerable care to derive targets for Ontario based on local rainfall regimes. Variable targets introduce an element of complexity relative to a single province-wide target. A single province-wide standard, e.g., 27 mm, would be easier to understand. However, Ontario is large and climatologically diverse province, and a uniform standard would be subject to criticism as unfair and unscientific. Therefore, regional rather than province-wide targets are the preferred option.

Finally, consistent with the focus on outcomes, considerable flexibility has been incorporated into the application of the runoff volume control targets, to enable solutions that are tailored to particular site conditions while achieving the target. The approach specifies the outcomes (control targets), and a hierarchy of means for achieving them, but leaves choices about specific measures to be resolved in each context.

## Consistent with established policies

The proposed runoff volume control targets will have a momentous impact on stormwater management practice in Ontario. However, it is worth noting that this approach is entirely consistent with established policy direction that has been in place for decades in this province, and that has been reinforced on multiple occasions in recent years. Runoff volume controls, which may seem to some to be radical and new, in fact implement existing policy.

Some relevant policy statements include:

- *1991 MOE Interim Stormwater Quality Control Guidelines for New Development.* "Source controls which reduce the amount impervious area or restrict the discharge of stormwater to sewers should be used first to achieve specified volume controls. Vegetative and structural best management practices which enhance infiltration are gaining agency and public acceptance. Stormwater quality ponds should be considered as the last line of defense and applied only after all opportunities for infiltration of stormwater have been exhausted."[1]
- *2003 Stormwater Management Planning and Design Manual*[2]. As part of a treatment train approach, "lot level and conveyance controls are required to maintain the natural hydrologic cycle to the greatest extent possible."[3] This is particularly true for infiltration-based controls.
- The March 2010 *Policy Review of Municipal Stormwater Management in Light of Climate Change*[4] endorsed "source controls" (i.e., LID) to reduce runoff, including flooding. The urgent need to implement these recommendations was highlighted by the Environmental Commissioner of Ontario in its 2014 report "Sink, swim or tread water: adapting infrastructure to extreme weather events".[5]
- *Provincial Policy Statements, 2014*[6] supports "green infrastructure to complement infrastructure."[7] Further, "[p]lanning for stormwater management shall … promote stormwater management best practices, including stormwater attenuation and re-use, and low impact development."[8]
- *Great Lakes Strategy/Great Lakes Protection Act.* The *Great Lakes Protection Act, 2015*, "enshrines"[9] Ontario's Great Lakes Strategy,[10] which contains numerous references to the need for green infrastructure to protect Great Lakes water quality, and recommendations for implementation, including:[11]

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[1] Interim Stormwater Quality Control Guidelines For New Development, May 1991, Ontario Ministry of Environment, p. 8

[2] https://www.ontario.ca/document/stormwater-management-planning-and-design-manual-0

[3] See section 1.5 Urban stormwater management practices, 2003 Stormwater Management Planning and Design Manual, *ibid*.

[4] https://www.ontario.ca/page/policy-review-municipal-stormwater-management-light-climate-change

[5] http://docs.assets.eco.on.ca/reports/climate-change/2014/2014-GHG-Sink-Swim.pdf

[6] http://www.mah.gov.on.ca/AssetFactory.aspx?did=10463

[7] Provincial Policy Statement, 2014, *ibid*., Policy 1.6.2, p.15

[8] Provincial Policy Statement, 2014, *ibid*., Policy 1.6.6.7e, p.17

[9] *Great Lakes Protection Act, 2015*, s5. See also: https://news.ontario.ca/ene/en/2015/10/ontario-strengthens-environmental-protections-for-the-great-lakes.html

[10] www.ontario.ca/document/ontarios-great-lakes-strategy?_ga=1.34179233.1227227673.1436473436

[11] See a useful compendium of recommendations from the interim Strategy, in the November 2012 Low Impact Development Discussion Paper prepared by Conservation Ontario and several CAs. See: www.sustainabletechnologies.ca/wp/wp-content/uploads/2014/09/LID-Discussion-Paper_Nov-2012.pdf

- "enhancing the Province's approach to stormwater approvals with greater emphasis on effluent quality and quantity, in turn drive greater use of innovative source control measures,"[12]
- incorporating LID early in the municipal planning process, and
- promoting green infrastructure as part of a strategy to reduce combined sewer overflows.

- *2014 Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health*[13] pledges Ontario (p. 19) to: "Update Ontario's municipal wastewater policy and approvals process, including:
  - "policies specific to stormwater, green infrastructure, construction runoff and sediment management;
  - "guidance to facilitate the uptake of innovative source control measures that reduce stormwater volumes and enhance resilience to climate change, such as green infrastructure and low impact development;
  - "encouragement of the use of green infrastructure and low impact development early in municipal planning decisions, so that stormwater and climate change adaptation are considered as part of project design and approvals."
- *Interpretation Bulletin: expectations re: Stormwater Management, February 2015.* The Ministry's Bulletin[14] "clarified" that the first principle of provincial stormwater policy is to "mimic a site's natural hydrology" and to "control precipitation as close as possible to where it falls by employing lot level and conveyance controls otherwise known as Low Impact Development.' The Bulletin supports adoption of LID "in order to maintain the natural hydrologic cycle to the greatest extent possible." Plans were announced to specify runoff volume control expectations.
- *Growth Plan for the Greater Golden Horseshoe, 2017.*[15] The Plan includes the integration of green infrastructure and low impact development as part of the definition of a complete community. (p 14). It directs that stormwater management master plans be developed that "incorporate appropriate low impact development and green infrastructure." (p. 37) Plans for large scale development need to incorporate "an integrated treatment approach to minimize stormwater flows and reliance on stormwater ponds, which includes appropriate low impact development and green infrastructure." (p. 37) Policies are mandated to address climate change and extreme wet weather events that include green infrastructure and LID. (p.52)

Runoff volume control targets and associated guidance will give effect to provincial policies that have been in place for more than a quarter century but implemented to a very limited extent. The Ministry recognized that this direction has not been widely adopted to date due to "gaps in ministry support for implementing LID."[16] The time has come for Ontario to put into practice this long-established policy direction, which has been embraced not just in Ontario, but in numerous jurisdictions throughout North America, Europe, and elsewhere.

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[12] See "Reduce stormwater and wastewater impacts", Ontario's Great Lakes Strategy, *ibid*.
[13] https://www.ec.gc.ca/lcpe-cepa/E9A42FF1-3E84-4451-A339-23EE153A3C74/aco_grand_lacs-coa_great_lakes-2014-eng.pdf
[14] Interpretation Bulletin: Ontario Ministry of Environment and Climate Change expectations re: Stormwater Management, February 2015. www.sustainabletechnologies.ca/wp/wp-content/uploads/2015/02/
[15] http://placestogrow.ca/images/pdfs/ggh2017/en/growth%20plan%20%282017%29.pdf
[16] Interpretation Bulletin, p. 4

Low impact development is the way of the future, and the future is now.

## The way forward

We will be pleased to work with the Ministry as the Low Impact Development Stormwater Management Guidance Manual is developed and implemented. We believe the government is on the correct course for the sake of the Ontario environment and economy, including climate resilience, water quality, infrastructure investments, and more. We also look forward to working with the Ministry more broadly to improve stormwater management policy in other contexts.

We conclude with some thoughts about further actions needed to fulfill the spirit and promise of this initiative. We urge that sufficient resources be assigned to enable the Ministry to ensure timely implementation of the targets and associated actions in partnership with interested stakeholders, including municipalities, conservation authorities, non-governmental organizations, trade and professional associations, citizens groups, and others. Priorities include:

- capacity development/training/education -- ensure that the runoff volume controls and implementing measures are understood by all parties, including developers, builders, municipalities, consultants, and interested members of the public
- demonstration projects -- to popularize LID measures and build support
- research and dissemination -- to demonstrate cost-effectiveness
- asset management and infrastructure planning -- so that green infrastructure/LID is fully incorporated into infrastructure planning, funding, and maintenance
- integration of similar principles on rural/agricultural lands -- so that the benefits of runoff volume controls are realized on a watershed scale, and across the entire landscape of Ontario
- incorporation of LID across the existing developed urban landscape -- especially in light of the province's "intensification first" policy, by promoting and supporting available measures to retrofit the urban landscape (see the Soak it Up! Toolkit.[17])

Thirty-three organizations and individuals endorse this submission (see below).

Sincerely,
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Anastasia M Lintner
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Cc: Dianne Saxe, Environmental Commissioner of Ontario (dianne.saxe@eco.on.ca)

[17] http://www.raincommunitysolutions.ca/en/toolkit/

**Signed on and supported by the following organizations:**

1. Alice Casselman, Founding President on behalf of Association for Canadian Educational Resources
2. Chris McLaughlin, Executive Director on behalf of the Bay Area Restoration Council
3. Christine Mettler, Communications and Special Projects Lead on behalf of the Canadian Freshwater Alliance
4. Derek Coronado, Executive Director on behalf of the Citizens Environmental Alliance of Southwestern Ontario
5. Naomi Grant, Co-Chair on behalf of Coalition for a Liveable Sudbury
6. Ellen Mortfield, Executive Director on behalf of Ecosuperior Environmental Programs
7. Matt Balfe, Director of Business Development on behalf of Fowler Construction Company
8. Jill Ryan, Executive Director on behalf of Freshwater Future
9. Michael Gemmel, Executive Director on behalf of Green Venture
10. Paul Johanis, Chair, on behalf of Greenspace Alliance of Canada's Capital
11. Alexandra Link, Director, on behalf of Humber Arboretum and Centre for Urban Ecology
12. Michael Walters, Chief Administrative Officer, on behalf of Lake Simcoe and Region Conservation Authority
13. Linda Heron, Chair on behalf of Ontario Rivers Alliance
14. Heather Ray, Manager of Water Programs, on behalf of Peterborough Green-Up Association
15. Marcus Ginder, Managing Director on behalf of Riversides
16. Helen Mills, RAINScape TO Program Lead, on behalf of Toronto Green Community

**The following individuals have also signed on to support these comments:**

17. Michael Albanese, Eco-Landscaper/Consultant, AVESI Stormwater Services
18. Connie Zehr, Professor, Centennial College Environmental Technology
19. Diana Chang, Parks Planner, City of Toronto
20. Margaret (Peggy) Hutchinson), Mediator
21. Iola Price, President, Ontario Invasive Plants Council
22. Dean Young, Project Manager, Toronto and Region Conservation Authority
23. Robert Chlumsky, MASc Student, Univerity of Waterloo
24. Ellise Gasner
25. Erwin Dreessen
26. Sheila Boudreau, Landscape Architect
27. Ian Whyte
28. Guy Forget, P.Eng., Senior Water Resources Engineer
29. Cristina Senjug
30. Todd Smith, Landscape Architect
31. Rose Bergeron
32. Darnel Harris
33. John Almstedt, Citizen Scientist associated with Ottawa Riverkeeper, Bonnechere River Watershed Project, Ottawa River Institute, Lake Clear Conservancy, Friends of the Gatineau