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# WATER CANADA

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## LEADING THE WAY

The Atlantic First Nations Water Authority



## Cost-effective Cleanup

### Innisfil's Erosion and Advanced Sedimentation Pilot Project

BY BRAD GRIKO

*"With an average of 90 per cent phosphorus reduction in the three SWMF's, eutrophication's negative impacts including harmful algal blooms, dead zones, and fish kills, are also reduced."*



**Brad Griko**  
vice president, sales and marketing, Clearflow

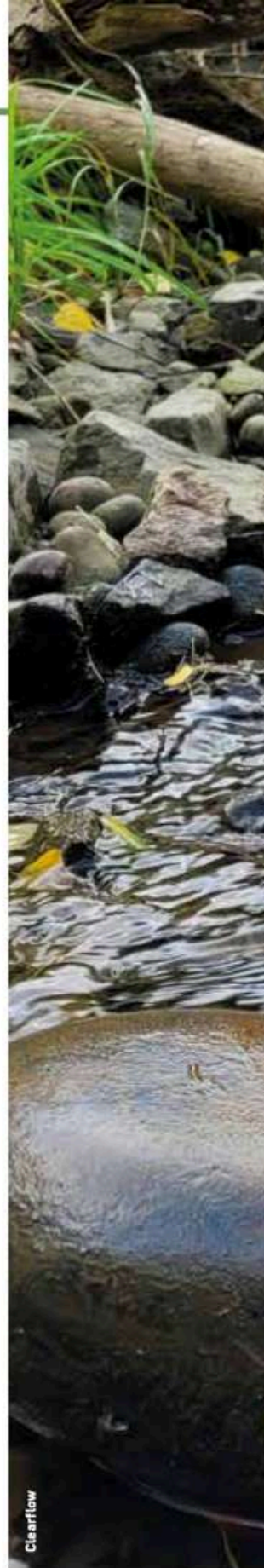
**M**UNICIPALITIES HAVE LONG struggled with adequately funding stormwater management infrastructure and watershed protection. The ever-inflating costs of engineering, construction, and equipment have left a large gap between funding and potential projects. This has often resulted in poor quality water leaving our towns and cities and entering the natural environment. For decades industries like mining have had to meet water quality regulations for their sites' stormwater runoff and those standards continue to become increasingly stringent. Yet, many municipalities in Canada have largely been spared these regulations in part due to the costs required to meet this challenge.

Industry has been able to effectively comply with stormwater regulations by leveraging emerging technologies to protect the environment. In a recently completed study funded by the Federation of Canadian Municipalities, one such technology was piloted to treat municipal stormwater.

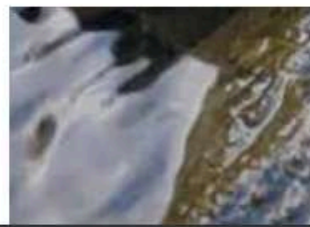
#### The project

The Town of Innisfil (Ontario) and Greenland Consulting Engineers applied for and coordinated the Innisfil Erosion and Advanced Sedimentation Pilot Project. The project sought to assess advanced sedimentation technologies (ASTs) to reduce the sediment and nutrient loading rates to Lake Simcoe from runoff generated by development sites under various stages of construction, with the goals to:

- Demonstrate the effectiveness of ASTs using Clearflow products applied towards un-stabilized sites (construction)
- Reduce erosion and discharge of sediment (and associated nutrients) from new development to watercourses within the Town of Innisfil and tributaries to Lake Simcoe



Clearflow

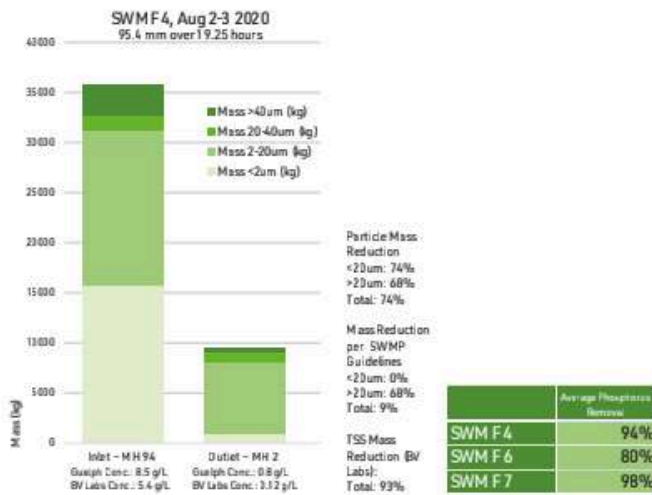






Clearflow's Gel Flocculant Block in action.





Graph A: The data indicates that during a heavy rainfall event the size of the particulate below 40 microns was substantial.

● By achieving the previous two goals, directly contribute to a net reduction in future municipal liability when complying with Lake Simcoe Protection Plan (LSPP) requirements

Several water quality parameters were to be studied and included total suspended solids (TSS), total phosphorus (TP), and particle distribution analysis.

In conducting the study, it was important that the AST be safe for fish and invertebrates as well as be able to work with existing infrastructure. The Sleeping Lion Subdivision Development (Cortel Group) was the selected site and three stormwater management facilities (SWMFs) in their various stages of completion would be used in the pilot. Clearflow Group, an Alberta-based, Indigenous-owned company with a long history of assisting industry in meeting regulatory compliance was chosen to provide Gel Flocculant Block technology as a ready-to-use solution.

**The tech**

Unlike most current solutions which provide basic filtration, the gel blocks would provide an effective physiochemical solution called flocculation. The advantage being its ability to reduce TSS and phosphorus particles under both low and very high flow rates which is a challenge for most existing equipment. Eliminating the need to build new infrastructure and installing the blocks in existing large diameter mains was a simple and straightforward process. Once in place, they require little-to-no maintenance. Designed to be self-dosing and self-limiting, the anionic flocculant requires only the flow energy imparted by gravity in the collection system to work. Because they do not simply dissolve, the gel flocculants can be installed in pipes or open ditches prior to snow melt. Once spring flow begins, flocculant is released and treatment starts.

SWMF's are designed to capture particles larger than 40 microns using Stoke's Law where flow velocity and particle size determines settling over a given distance. During large flow events, a SWMF's ability to provide particles adequate settling time is greatly decreased.

**The results**

As part of the study, particle analysis was conducted to better understand the size and amount of TSS in the water. Results can be seen in *graph A* where MH 94 represents the inflow and MH 2 the flow leaving the pond. The data indicates that during a heavy rainfall event the size of the particulate below 40 microns was substantial. In this instance, without the gel flocculants it is likely that sediments carrying heavy metals and phosphorus that sorbed onto the suspended particles would have ended up in Lake Simcoe. Instead, that material was deposited in the SWMF, greatly improving downstream water quality.

With an average of 90 per cent phosphorus reduction in the three SWMF's, eutrophication's negative impacts including harmful algal blooms, dead zones, and fish kills, are also reduced.

According to Mark Palmer, president of Greenland Consulting Engineers, "This project has demonstrated what many practitioners in water resource engineering have thought for a long time: that there are large amounts of sediment being discharged to waterbodies from development under construction. The good news is, this project has also shown there are engineering solutions to this problem, including the use of ASTs available from the Clearflow Group that are easy to implement during the construction phase of development."

The Lake Simcoe Region Conservation Authority (LSRCA) has taken a strong role protecting Lake Simcoe and its surrounding watershed from sediment and nutrient loading. In 2018, with a first-of-its-kind in Canada policy, a plan was enacted requiring any new development in the watershed to control 100 per cent of the phosphorus leaving the property. A one-time offsetting fee was attached to the policy for instances where the zero-phosphorus goal could not be achieved.

A benefit to cost analysis of the AST implementation for the Innisfil project was completed and a ratio of at least 1.44 was determined. This did not factor in avoided costs from environmental degradation and restoration.

**The outlook**

Innisfil development engineer Glenn Switzer was also very pleased with the results and said that while "projects like these typically require substantial capital investment, using the Clearflow Gel flocculant [meant] we were able to optimize the use of our existing infrastructure. This saved time, money, and environmental impact. Treating stormwater has now become much more effective and affordable."