BISHOPWATER

Case study:
Onsite dewatering reduces disposal volume and hauling for remediation project

- Bishop Solids Management Solution
- Sediment dewatering
- Chedoke Creek,Hamilton, ON

The challenge:

Minimizing truck traffic and disposal cost to remove thousands of tonnes of dredged sediments

For several months in 2023, thousands of tonnes of dredged sediment lay alongside a busy highway in Hamilton, Ontario as a major environmental remediation project occurred in the Chedoke Creek. But most passers-by never saw huge mounds of sediment nor were they inconvenienced by a daily convoy of trucks removing mucky material from the site.

Instead, the City of Hamilton selected the team of Bishop Water, Milestone Environmental Contracting and Eco Technologies to hydraulically dredge sediment from the creek, then pump it through a pipe that stretched almost 400 metres to the Bishop Solids Management Solution (BSMS).

This simple, low-energy system uses Geotube containers, polymers and passive, gravity-based dewatering to produce dry solids that can be easily loaded into trucks for relocation or disposal.

Multiple temporary dewatering cells were constructed on the opposite side of a major highway. As dredged material was pumped at up to 4,000 L/min, polymer was injected directly into the sludge line to flocculate fine particles and accelerate water release from the Geotubes.

The solution:

Gravity-based onsite dewatering enables significant reduction in slurry volume

Although an enormous volume of slurried sediments was dredged from the creek—nearly 140,000 m^3—the dewatering process significantly reduced the volume, which meant far fewer trucks were needed to remove the material from the site. During pumping the average solids concentration of the slurry was in the range of three to five percent, but after a few days of dewatering, the solids increased dramatically to more than 70%.

The BSMS also enabled sediment removal to proceed quickly since the dredge could pump material at rates as high as 4,000 L/min through an 8-inch line.
A manifold system then split the flow and directed it to multiple Geotubes.

The results:

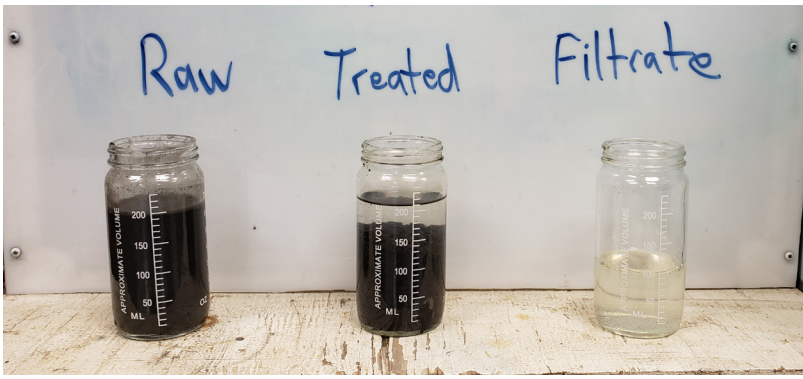
Effective water containment and management

In total, 11 massive Geotube containers—120 feet in circumference and 100 feet long—were set up in lined dewatering cells to capture and dewater the dredged sediments.

Throughout the pumping and dewatering process, Bishop Water technicians drew slurry samples several times per day from multiple points to optimize polymer dosing, flocculation and Geotube performance.

Process parameters were also continuously monitored by flow and solids meters, which relayed the information to the control equipment in the polymer trailer. Polymer dosing was automatically adjusted based on the amount of solids in the feed fline and the flow rate.

The tightly woven polypropylene Geotube fabric, combined with polymer conditioning of the sediment, enables the Geotube to produce low TSS filtrate that can often be discharged without additional treatment. For this project the filtrate was collected and directed to the city sewer.



Jar testing illustrates the effectiveness of the polymer and Geotube filtration. From left, a sample of the untreated sediment; following polymer addition and floccculation the solids settle to the bottom of the jar; clear filtrate is shown after flocculated material is filtered through a cone fitted with a disc of Geotube fabric.

Sediment removal was completed by mid-November, 2023 after nearly four months of dredging. Nearly 140,000 m3 of slurried material was pumped to the Geotubes during the project at an average solids concentration of 2.85%. The Geotubes remained on site for a few more weeks to continue passively releasing water and by the end of the year, all the dewatered material had been removed from the site.

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