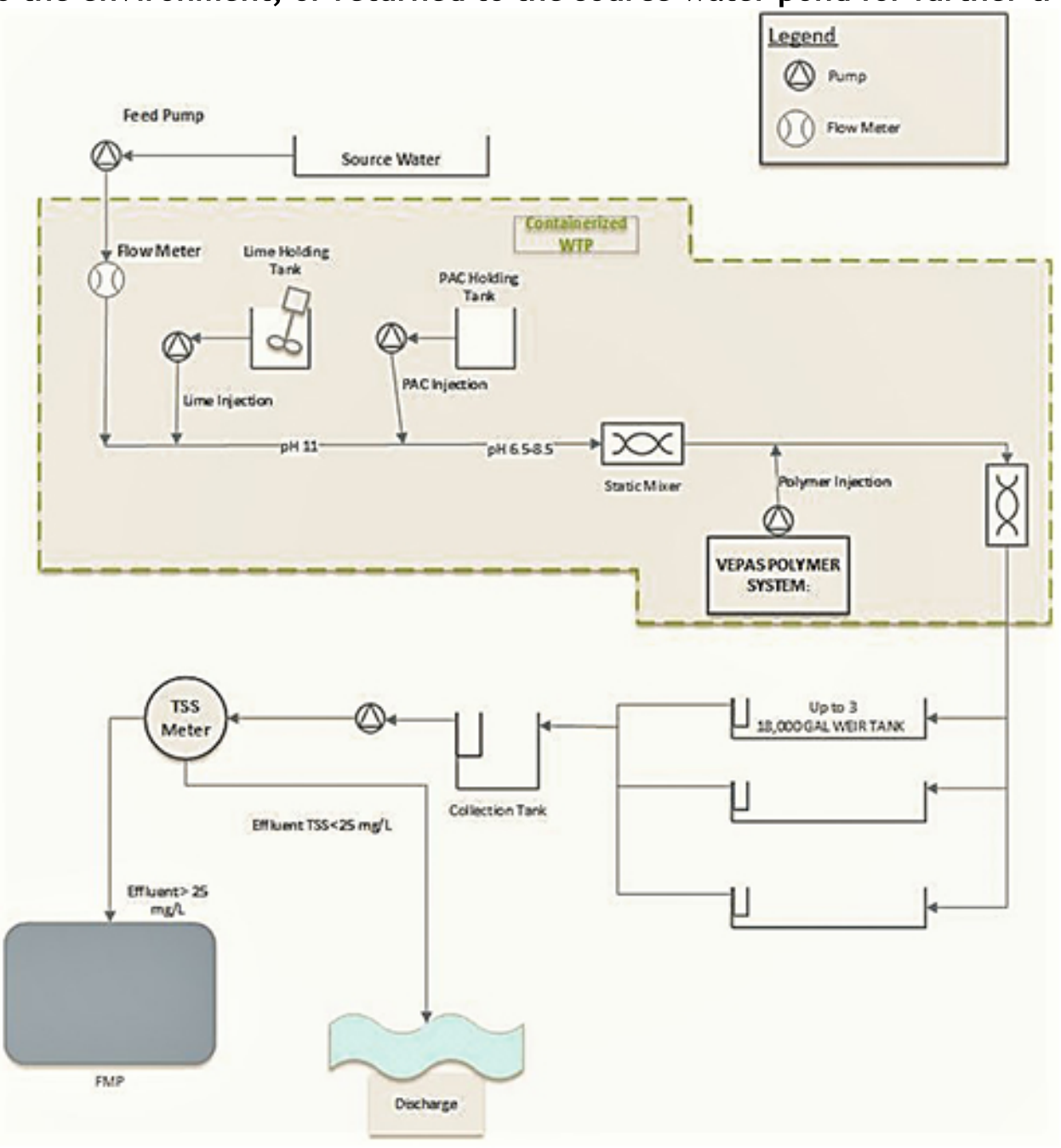
Water Treatment for Heavy Metals Removal

The site of an abandoned mine, located in Central Ontario, is contaminated with hazardous waste as a result of tailings from the mining operations. The mining operations began in 1873 and processed gold, along with silver ores, stellite and cobalt. The resources eventually became exhausted, and in 1914 the site became primarily an area for the disposal of hazardous waste and mining by-products. The site was finally abandoned in 1979. In 2012, a clean-up project was initiated by the Ministry of the Environment to remove contaminants from sediment, ground and surface water. The contaminants of concern are arsenic, cobalt, copper, and nickel.

The Solution...

Geo-dredging was selected by the general contractor to undertake the water treatment aspect of the site clean-up in the summer of 2015. Geodredging technicians operated and maintained a water treatment system to produce a treated effluent in compliance with all of the parameters outlined in the Environmental Compliance Approval (ECA) for discharge into a nearby river.

The water treatment system uses real time chemical addition to the contaminated water, to precipitate out the heavy metals of concern. The first chemical added is lime, which is added to raise the pH of the water. Once the pH is increased to a level that is ideal for the metal precipitation, Poly Aluminum Chloride (PAC) is added. PAC is the main precipitating agent, which helps to remove the soluble metals in the water, while at the same time lowering the pH, ensuring that the concentrations of each contaminant are low enough to discharge into the nearby river in accordance with the ECA. Finally, a polymer is added to flocculate the precipitated metals to form a sludge. The treated water is then sent through a series of weir tanks where the sludge is settled while the effluent passes through and enters a sump. The effluent water TSS is continuously monitored to determine whether it discharged into the environment, or returned to the source water pond for further treatment.



BISHOPWATER

220 Carswell St.,
Renfrew, ON
K7V2G4

www.bishopwater.ca
Phone: 343-361-0463
Fax: 1-844-272-6102
Email: info@bishopwater.ca
@bishopwatertech

The Performance...

Geo-dredging technicians worked with diligence to ensure that all the effluent produced by the water treatment system met the guidelines outlined in the ECA. From June 2015 to August 2015, the Water Treatment System treated 15238.5m3 of contaminated water, and managed to constantly produce an effluent that was always in compliance with the ECA limits. Geodredging will look to build on their success when the site clean-up resumes in the summer of 2016.

	Arsenic (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Nickel (mg/L	Tss (mg/L)	pH
Jun-15 Avg. Influent	1.22	0.026	0.014	0.024	6.38	7.67
Jul-15 Avg. Influent	1.08	0.015	0.017	0.019	2.14	8.09
Aug-15 Avg. Influent	1.29	0.020	0.031	0.022	13.62	8.13
Effluent Limit	**0.1**	**0.049**	**0.02**	**0.037**	**25**	**6.5-8.5**
Jun-15 Avg. Effluent	0.027	0.006	0.004	0.010	7.62	7.82
Jul-15 Avg. Effluent	0.032	0.003	0.005	0.007	6.64	8.09
Aug-15 Avg. Effluent	0.033	0.002	0.006	0.005	6.23	7.95

How the Geotube® works...

Step 1: Filling

Step 2: Dewatering

Step 3: Consolidation

Dewatering with Geotube® technology is a three-step process.

In the confinement stage, the Geotube® container is filled with dredged waste materials. The Geotube® containers unique fabric confines the fine grains of the material.

In the dewatering phase, excess water simply drains from the Geotube® container. The decanted water is often of a quality that can be reused or returned for processing or native waterways without additional treatment.

In the final phase, consolidation, the solids continue to densify due to desiccation as residual water vapor escape through the fabric. Volume reduction can be as high as 90 percent.

BISHOPWATER

220 Carswell St.,
Renfrew, ON
K7V2G4

www.bishopwater.ca
Phone: 343-361-0463
Fax: 1-844-272-6102
Email: info@bishopwater.ca
@bishopwatertech