

## *Pond sediment removal with Mini Dredge*

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### Objective

This pond had accumulated silt over time which needed to be removed as part of a remediation project. The contractor in charge of the remediation selected a Pirana Mini-Dredge to remove the silt and WaterSolve LLC was contracted to install and operate a Geotube® dewatering system to consolidate the material. The objective was to economically remove the silt from the pond and dewater it for subsequent usage on the site or removal to a landfill. WaterSolve's duties included identifying and providing the optimum chemistry, installing a liner and Geotube® container provide the chemical feed system, and be present to operate and manage the system.

### Geotube® Container Sizing

Geotube® containers are manufactured from high strength polypropylene fabric and designed to allow effluent water to escape through the pores of the fabric while retaining the chemically-conditioned solids. The contractor determined the 45' circumference by 57' long Geotube® container (204 cubic yard capacity) would be adequate to test the Pirana Mini-Dredge and determine the future use of the Geotube® dewatering system.



This Pirana Mini-Dredge has one engine to pump surface water to the dredge head for agitation and the other engine pumps the residual from the pond to the Geotube® container.



The red hose on the pump head delivers the agitation water to the spray nozzles and the strainer with the holes is the suction part of the dredge head.



The workers in the boat are pushing the dredge head into the pond sediment and the pond residuals are pumped to the Geotube® container.

### Conditioning Chemical

A representative sample of pond sediment was tested by a technician in the WaterSolve lab. Dewatering polymers were evaluated based on water release rate, water clarity, and flocculent appearance. In addition, dosing rate(s) were determined during bench-top dewatering experiments and recommendations provided during this phase of the program. A dual treatment program of the coagulant Solve 426 followed by the flocculent Solve 164 was recommended for dewatering this residual in a Geotube® container. The WaterSolve technician performed a Rapid Dewatering Trial which indicated the sediment could be diluted to 1.8% dry wt solids, treated with the Solve 426 followed by Solve 164, and dewatered to 10.4% dry wt solids in 1 hour. The results of this testing indicated the sediment would successfully dewater in a Geotube® container and the data collected was used to help estimate the cost of the project.



This sample shows excellent clarity, separation, and flocculation characteristics.



The coagulant Solve 426 is injected into the 3" mixing manifold .



The flocculent Solve 164 is injected into the mixing manifold with the polymer make-down unit.

## The Result

WaterSolve LLC was contracted to dewater the pond residuals into a 45' circumference by 57' long Geotube® container. A 25' by 60' containment area was prepared on the site and a liner was placed in the containment prior to deploying the Geotube® container. A 10-gph LMI chemical feed pump was assembled with a 3" mixing manifold to deliver the coagulant Solve 426 into the dredge pipeline. A The polymer make-down unit and mixing manifold were plumbed into the 3" pipeline to meter in the flocculent Solve 164. A sample port was placed prior to the Geotube® to provide visual observation of the treated residual and make changes as needed to the polymer feed rate. The Pirana Mini-Dredge was placed in the pond and a 3" discharge hose delivered the residual from the dredge to the Geotube® container. The pumping rate of the dredge was 200 to 300 gallons per minute. The operators in the pond worked from a boat to shove the dredge head into the pond sediment to remove the residual from the pond. The WaterSolve technician checked the sample port regularly and adjusted the feed rates of the Solve 426 and Solve 164 for optimum dewatering performance. In 5 days of dredging the Geotube® container had reached its 7' maximum fill height several times and the project was complete.



The Geotube container is beginning to fill and the filtrate water is exiting the containment pad and is on its way back to the pond.

The Geotube® container has reached the 7' maximum fill height several times and is full. It was left to dewater over the coming weeks.

