



Applied Polymer Systems, Inc.

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Innovations

Croft Pond at Nashville Zoo

Nashville Zoo offers many animal species found around the world. These beautiful creatures can be found in equally beautiful habitats. One of the first habitats you see upon entering the zoo is Croft Pond. This habitat has been home to various species of waterfowl, from Saddle-billed Storks to Black Neck Swans, and is mainly a large pond measuring roughly 90' x 260' with 23,400 ft² surface area.

Historically the Croft Pond has water quality problems due to low flow in the summer, leaks, a contaminated spring, and stormwater run-off from an industrial park. In 2004 Rick Swartz, the President of Nashville Zoo, had contacted Jen-Hill to make repairs twice to try and seal the dam unsuccessfully. Bald Cypress roots, Rivercane roots, and Muskrats had allowed avenues to develop outside the concrete



A Black Neck Swan, one of the current residents of Croft Pond.



Croft Pond, once drained revealed 8 feet of sediment.

Even the small trackhoe that was brought in and placed on the bank had trouble. Between the muskrat activity along the banks, and the large crevices in the concrete bottom of the pond, it was too unstable to operate safely.

For Technical Information or questions please contact:

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In March of 2005, Gary Moody, a Stormwater and Water Quality Consultant from Jen-Hill, was called to the site because the lake had completely drained after a mild storm event. Due to the location of Croft Pond in the central area of the zoo, normal repair methods would not be possible.

But before repairs could be made, the sediment needed to be removed. However, the soupy mess that was left at the bottom of the pond would be extremely difficult to remove with conventional methods. It was estimated that there was 7000 tons of sediment to be removed, covered by 3 feet of water. Kevin Surprise, of 5K Construction, found that large excavating equipment could not be used, as there was limited access to the pond due to the zoo's surrounding walkways.



The uneven terrain provided a challenge to the machinery.



Pumping off of excess water to expose the sediment before removal.

To start, the upstream water was re-routed back into a wetland through the Zoo's pumping system, effectively creating a zero-flow environment at the pond site. Each day the pumps were started early and the clean water discharged over the Floc Logs to remove the suspended solids before diversion into a stormwater detention area, built with Jen-Hill flex max gabions that had been constructed previously as part of the requirements for the Elephant exhibit. Floc Logs were also used to stabilize the spring-fed stream pouring the organic materials into the Croft Pond, as well as the stormwater ditch flowing into the site.

After 2 hours of dewatering each morning, sediment removal would begin on the areas isolated and stabilized using APS Silt Stop powder the afternoon before.



APS Silt Stop solidified the sediment for easier removal.



Project Complete: Croft Pond, fully restored.

Because of these limitations, Gary Moody decided to use Applied Polymer System's Silt Stop and Floc Log products. He had worked with these products before, and was familiar with their superior performance. Since APS's polymer products are matched to the specific lithology of each site they are used at, Gary sent soil and water samples to the APS testing lab to match the PAM blend to the site.

For this project, 250 pounds of APS 705 & 712 Silt Stop powders were used, along with 8 APS 703d Floc Logs. The project cost over \$130,000 and took 28 days to complete while the zoo remained open. This saved the zoo a fortune, as there was realistically no other way to do the project between the constraints of the limited access to the site, and keeping the rest of the zoo fully operational.

Occasionally the Silt Stop powder was added directly to the water surface and then mixed into the water and underlying soils by submerging a pump nozzle into the water and soils beneath thus solidifying the soils for removal. Once the muck had solidified, it could be easily scooped up and transferred into a single-axle dump truck and hauled away.

After the sediment was removed, an island was constructed for the birds. Repairs to the dam were made with the GSE Polylock and a geo-membrane. This barrier prevents the pond from accidentally draining again, and protects the water from further off-site contaminates. Re-vegetation of the exhibit, overseen by Kelly Flora and Ben Moody, used native Riparian plants, special grasses, and wetland sod grown by Jen-Hill. The project was completed on time and on budget, allowing the pond to reopen as the new Black Neck Swan exhibit.