CASE STUDY

SOLMAX

ISHØJ LAKE, DENMARK

Dewatering and sediment management enhances water quality

Industry: Water
Sub-industry: Coastal protection and reclamation
Location: Denmark
Product: **GEOTUBE®**

Ishøj Lake, nestled within an urban park near Copenhagen, Denmark, serves as a vital artificial and protected water body that has recently encountered significant environmental challenges. Over time, sediment accumulation, largely driven by urban runoff, has substantially degraded the lake's water quality and disrupted its ecosystem, adversely affecting the local wildlife. This escalating issue prompted a reevaluation of sediment management practices, as traditional mechanical dredging methods previously employed proved to be highly invasive and disruptive.

The conventional dredging techniques not only introduced disturbances such as noise, odors, and heavy traffic to the community but were also ecologically detrimental. These methods were inefficient in handling the contaminants within the sediments, which included hydrocarbons and heavy metals like nickel, zinc, and cadmium, posing severe environmental and health risks. The ineffectiveness of these approaches, coupled with their ecological and social impacts, highlighted the urgent need for a less invasive and more sustainable solution.

In response to these challenges, the project adopted **GEOTUBE** technology, as an alternative to traditional dredging. This technology facilitated on-site dredging and

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dewatering of the sediment, significantly cutting down transportation and disposal costs. It allowed for the treated sediment to be repurposed for park landscaping, enhancing both the park's aesthetic and ecological value. This innovative approach not only addressed the logistical and environmental issues effectively but also transformed a waste problem into a resource, marking a progressive step in managing urban water bodies sustainably.

Overview

Ishøj Lake, strategically positioned in the urban park near Copenhagen, Denmark, is an artificially constructed and now protected area that has faced challenges due to sediment accumulation. This accumulation, primarily from urban runoff, significantly degraded water quality and disrupted the local ecosystem, affecting wildlife significantly.

Challenge

Previously, Ishøj Lake underwent mechanical dredging, which proved to be highly invasive and disruptive to both the environment and the local community. The traditional methods caused considerable nuisances such as noise, odors, and heavy traffic, which were not only bothersome but also ecologically damaging. Additionally, these methods failed to address the high contaminant levels effectively. For instance, sediment samples prior to the project showed hydrocarbon concentrations in the range of C20-C35 at up to 345 mg/kg of dry total solids (about 12.2 oz/cu yd). Other significant contaminants included heavy metals such as nickel, zinc, and cadmium, which posed serious environmental and health risks. The need for an innovative, less invasive solution was clear, prompting a shift towards more sustainable sediment management practices.

Solution

The innovative approach adopted involved the use of **GEOTUBE** technology, a significant shift from traditional methods. This technology allowed for the dredging and subsequent dewatering of approximately 10,000 m^3 (about 353,147 cu ft) of sediment directly on-site. One of the primary benefits of this method was the drastic reduction in transportation and disposal costs. Instead, the sediment was treated and reused for landscaping within the park, enhancing its aesthetic and functional value. This solution not only addressed the logistical and environmental issues but also turned a waste product into a valuable resource for park development.

The implementation of the **GEOTUBE** technology had several phases. Initially, about 10,000 cubic meters (about 353,147 cubic feet) of sediment were hydraulically dredged and then contained within geotextile tubes. These tubes facilitated the dewatering process, consolidating the sediment while allowing the clear effluent to be released back into the lake, significantly improving water clarity. The process also involved the careful selection and application of flocculants, which were tested on-site to determine the most effective types and dosages to use, ensuring optimal solid-liquid separation.

The technical outcomes of the project were highly positive. The dewatered sediments showed significantly reduced levels of contaminants, with hydrocarbons, nickel, zinc, and cadmium all dropping to safer levels, thereby mitigating potential environmental and health hazards. Additionally, the increase in water volume and clarity enhanced the habitat for aquatic life, promoting biodiversity within the lake. The clear effluent indicated an effective separation of solids and liquids, showcasing the efficiency of the dewatering technology.

The economic benefits were paralleled by substantial community gains. By using the **GEOTUBE** technology, the project avoided the common disturbances associated with dredging activities such as noise, dust, and traffic, which typically impact local life. Furthermore, the area around the lake was upgraded for recreational use, adding significant value to the community by enhancing public spaces and encouraging outdoor activities.

All activities were conducted in strict compliance with environmental regulations to ensure there were no adverse effects on protected habitats or wildlife. The project team secured all necessary permits and consistently monitored the site to adhere to safety and environmental standards.

The project is noted for its sustainability, primarily due to its low carbon footprint and the innovative use of materials. The encapsulation of sediments in geotextile tubes prevented any leakage of contaminants, aligning with modern environmental practices. This method proved not only effective in solving the immediate issues but also served as a model for similar challenges in other urban areas.

The success of the Ishøj Lake project demonstrates the viability of near-situ sediment dewatering as a superior alternative to conventional dredging and disposal methods. It offers a template for other communities facing similar sediment management challenges, providing a blend of environmental, economic, and social benefits. The paper advocates for the broader adoption of this technology, highlighting its potential to transform urban water bodies into thriving ecological and community assets.

In conclusion, the Ishøj Lake project exemplifies how innovative engineering solutions can significantly mitigate environmental challenges while delivering extensive benefits to the community, setting a precedent for future projects worldwide.