

# Erosion Control Technologies

## Restore Historic Reservoir

by Kelly McCoy

**WHILE** the retreating Laurentide Glacier sculpted Fresh Pond and the surrounding hills in Massachusetts about 15,000 years ago, just recently erosion control specialist John Engwer, president of Norfolk, MA-based Phase II Stormwater Products and Landscapes Express joined a long line of New Englanders who have put their expertise to work for this historic reservoir and reservation.

### Fresh Pond's Storied History

Long after the glaciers created Fresh Pond, Native Americans found an abundance of fish in the ponds and streams of this area, and plentiful wildlife in the woods and marshes. The rich environment also attracted European settlers. In the mid 1800s, the Pond was privately owned and became the site of a flourishing ice industry. In 1864, 95,000 tons of ice was shipped from Fresh Pond to places as far away as Europe, China and India.

Meanwhile, in 1852, the growing city of Cambridge (across the Charles River from Boston) needed a reliable source for drinking water and a pumping station was installed on Fresh Pond. In 1888, amid growing concerns about pollution of the pond from agricultural and industrial uses, the Massachusetts Legislature granted the right of eminent domain to acquire all the land that is currently part of the Reservation from private owners in the interest of protecting the purity of the water. A reservoir was created and the state gave control to the city of Cambridge.

In 1884, at the recommendation of members of the Cambridge Water Board, the premiere landscape architecture firm in the U.S. at the time, Olmstead, Olmstead and Elliot, was employed to consult on the property. Over the next 15 years, Frederick Law Olmstead (the creator of New York's Central Park and



**More than 206,000 square feet of EarthBlanket™ were installed hydraulically to provide erosion management for steep slopes surrounding Fresh Pond Reservoir. Photo credit: Thomas Benjamin, VHB, Inc.**

Boston's Metropolitan Park System including the Fenway, Boston Common and Boston Public Gardens) supervised the regrading of the Fresh Pond lands and the planting of thousands of trees, shrubs and groundcover throughout the Fresh Pond area.

During the 1900s, Cambridge installed a water filtration plant (in 1915), a golf course, playground and other public use facilities. During WWII, the area fell into disrepair and part was sold off for private housing development. In the 1960s the Cambridge Plant and Garden club began an initiative to remove the trash and beautify the property. Ninety-three truckloads of debris were removed from the area.

### Erosion Control Expertise Utilized on New Initiatives

In the 1990s, a series of studies were undertaken to re-evaluate the Fresh Pond

Reservoir and its landscape in the light of last 30 years of ecological research and awareness. It is as part of this spirited initiative that John Engwer and Landscapes Express were introduced with their erosion control and soil restoration knowledge and techniques.

"We were brought in by Tom Benjamin, a highly experienced landscape architect who joined the Boston firm Vanasse Hangen Brustlin, Inc.," explained Engwer. "Tom has more than 15 years of experience in progressive ecological design and he was perfect for the Fresh Pond project."

The current project, known as the Northeast Sector Project, is a combination of Benjamin's landscape management and restoration designs created in close collaboration with Boston's Carol R. Johnson Associates, Inc., recommendations from the Fresh Pond Reservation Master Plan as well as the preceding

Fresh Pond Reservation Natural Resource Inventory and Natural Resource Stewardship Plan. The project has been funded jointly by the Community Preservation Act and the City of Cambridge.

This most recent Fresh Pond project has had four goals all related to preserving the Reservoir's Class A drinking water supply:

- Improve the health of Fresh Pond Reservation and Reservoir by reducing erosion and enhancing natural filtering processes.
- Reduce invasive plant species and increase native species diversity.
- Create beautiful, universally accessible space within the Reservation.
- Produce new, inviting active use areas further from the Reservoir.

The erosion control specialist was asked to accomplish the first goal.

"With so much of our landscape, but especially with a reservoir project, reducing erosion and keeping the soil on these slopes in place is essential," said Engwer. "After the undesirable vegetation (inva-



**Installation of FilterMitts was key in the protection of public drinking water. Photo credit: Phase II Stormwater Products.**

sives) was removed, the exposed soil was vulnerable to erosion and we wanted to come up with the most sustainable and environmental thinking about how to protect the land, keep sediment out of the reservoir and maintain the natural habitat."

To that end, almost 10,000 linear feet of sediment retention fiber rolls (SRFR) Microbial Filtermitts™ were installed to help assist with filtration to promote clean water. Then more than 206,000

square feet of compost blanket, EarthBlanket™, was installed. Both proprietary products were developed by the erosion control specialists.

EarthBlanket, which is applied by a hydraulic blower truck, is made of a compost-based mulch that is applied on top of the existing soil, to protect the soil from being eroded and compacted by rainfall. The compost, which is made from select yard waste, shredded wood (from tree trimmings) and food waste, cushions the soil from the impact of rain and holds large amounts of water. On slopes, it allows water to move uniformly across the soil without creating gullies. It does not contain any sewage sludge, glass or toxic materials.

"The quality of the compost is key when using this technique," said Engwer. "It's the special compost blend that enriches the soil and assists in erosion control that can literally change a landscape."

According to Engwer, his approach to stormwater management is set apart by an emphasis on beneficial microorganisms and their correct application. The

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**Installation of the proprietary compost blanket product that was chosen because it not only stabilizes the slopes, but also cleans the water. Photo credit: Thomas Benjamin, VHB, Inc.**

microorganisms revitalize polluted stormwater, limit soil erosion, and support plant growth. A complete soil food web comprises large populations of

interrelated, diverse organisms.

Each gram of soil may contain:

- Total Bacteria, 15 - 30 micrograms
- Total fungi, 100-300 micrograms

- Protozoa, 10,000 micrograms
- Beneficial Nematodes, 20 - 30 micrograms

These beneficial microorganisms function in the soil to:

- Improve soil pore space, increasing water infiltration and root growth
- Metabolize pollutants, reducing water contamination
- Increase soil surface tension, reducing movement of soil particles
- Increase water storage in soil, reducing water use
- Increase soil carbon storage, helping to clean air
- Improve plant nutrient uptake, supporting healthy plants

Unlike any other product on the market, the totally biodegradable SRFR's (which look like fabric tubes) are filled with the same high-quality compost mulch that is used in the EarthBlanket. The tubes not only help to prevent erosion, but also protect the pond. Acting like a dam, they detain surface-water runoff. Some of this water will percolate into the soil, and some will be released

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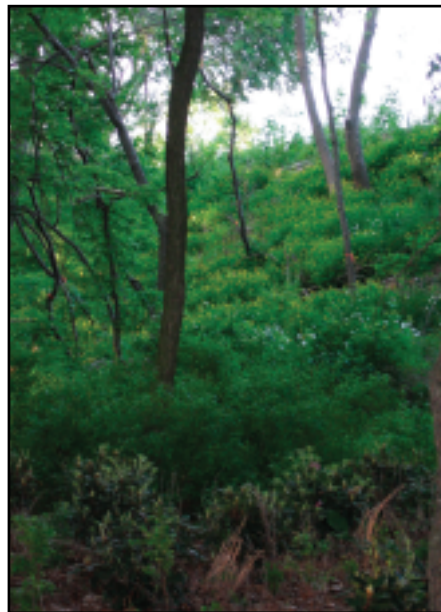


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slowly through the tube. When water is detailed behind the tubes, sediment settles out and is kept from moving further. The compost inside actually holds onto contaminants, and the microorganisms in the compost will inactivate or breakdown these materials.

According to Engwer, these SRFR's offer a superior alternative to hay bales and silt fences for many reasons, not the least of which is the total biodegradable construction, which allows them to degrade into the landscape over time, eliminating the need for removal. They also offer a friendly environment to animals that naturally traverse the landscape. Silt fences and hay bales often impede the natural migration of wildlife and negatively impact the area and its inhabitants. When filled with high-quality compost, this technology also eliminates the strong possibility (often seen with unqualified compost and hay bales) that seeds of invasive plants will take root and repopulate the area with the same type of vegetation that was cleared in the first place. It is for this reason that Engwer's companies use the highest standards when testing



**New erosion control management has resulted in an ecological renaissance at Fresh Pond in Cambridge, MA. Photo credit: Thomas Benjamin, VHB, Inc.**

their compost mixtures.

**The End Result Looks Toward a Greener Future**

The Fresh Pond landscape, crafted by

nature 15,000 years ago, has supported a wide variety of human expectations over its history. Today, in addition to a reservoir of drinking water, Fresh Pond is a favorite place for many people who enjoy walking, running, bike riding, and rollerblading on the 2-1/4 mile perimeter road. Birders come to observe a wide variety of resident birds, as well as numerous migrating songbirds and waterfowl that pass through every year. Artists, naturalists and students also treasure this green oasis in its urban setting.

Engwer and his team have been proud to be part of this most recent ecological renaissance and feel confident that these erosion management techniques will help preserve the landscape for years to come. **L&W**

For more information, contact John Engwer at (508)384-1984 or email: john@phaseiistormwaterproducts.com or go to phaseiistormwaterproducts.com.



Seen in *Boston* magazine, on WCVB-TV and *This Old House*.



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