

Project Offers Tangible Solution to Nonpoint-Source Pollution

An urban Connecticut community installs high-tech antimicrobial catch basin filters in precedent-setting project.

By Judy I. Shane

“Cleaning up polluted street runoff in storm water before it flows into the Long Island Sound is the highest priority of The Filter Project,” said Hal Alvord, Director of Public Works in Norwalk, CT. He said that the heart of this approximately \$500,000 project involves fitting antimicrobial filtration systems to 275 storm drains in south Norwalk to catch trash, debris, animal waste, hydrocarbons, oil, grease, and bacteria before they enter the Sound.

“The project aims to demonstrate measurable results of the filters’ effectiveness over four seasons as well as to educate the public, Norwalk residents, and other municipalities about steps

they can take to protect our waterways,” Alvord said.

Norwalk, population 84,000, is different from other Connecticut municipalities in that it has a harbor, marinas, and a shellfish industry. Norwalk’s active shellfish industry has been crippled by the die-off, particularly of oysters, in recent years. Bacterial and chemical toxins entering Long Island Sound have impacted hatching and spawning facilities as well as active beds throughout Norwalk Harbor, and consumers have gotten sick from eating contaminated shellfish. People are equally at risk of exposure to toxins whether they fish in the Sound to feed their families or whether they use the waters for recreation.

The public health threats exist primarily because of bacteria.

Cleaning up the waterways is a formidable task. The Sound’s watershed houses eight million people with another 20 million living within 50 miles of it. “Norwalk’s storm drainage system developed over time to accommodate the tremendous growth in this area. Regulation has resulted in many improvements over the last few

decades, but it has done little to stop the largest source of toxins—nonpoint source pollution.”

Alvord said that The Filter Project specifically addresses nonpoint source pollution and is unique for a number of reasons. It involves public-private partnerships for funding and support; it uses a new technology, a formulation of the antimicrobial agent in AbTech Industries’ (www.abtechindustries.com) Smart Sponge® Plus filtration media; and it serves as a model to other municipalities of a tangible solution to address nonpoint source pollution.

Project Objectives

The Filter Project’s long-term goal is to demonstrate that Smart Sponge Plus4 filters are an effective way to reduce nonpoint source pollution and can be used as a tool to improve Long Island Sound’s water quality on a larger scale. The short-term goal is to create a technical intervention and community education model that can be replicated by other municipalities. Alvord provided four specific project objectives:

1. To field demonstrate in New England the effectiveness of Smart Sponge Plus4 in a catch basin insert application in reducing bacteria contamination in stormwater. To remove 75 percent of hydrocarbons and bacteria from discharge sites of select high impact stormwater systems before they enter the Long Island Sound.

2. To raise awareness of 500,000 people (Norwalk residents and the general



The lightweight Drop In series of the Ultra Urban Filter is quickly and easily installed.



In less than 45 minutes, these installers lifted the grate,...

public) about nonpoint source pollution, public health issues, and Long Island Sound water quality.

3. To inspire a new generation of environmental stewards by educating a minimum of 25 classes in the elementary, middle, and high school levels on ways they can protect the environment.

4. To secure the commitment of two Fairfield County municipalities to launch similar filter projects.

Alvord said that The Filter Project is a critical first step toward far-reaching change. “Education and intervention are not a one-time event. The project will become part of a continual process that will hopefully inspire a new generation of environmental stewards.”

Project Description

The area selected for the project includes two drainage areas. The first is a basin with 275 drains, equipped with the antimicrobial filters, which empty through one pipe into Norwalk Harbor on the way to the Long Island Sound. The area is bounded roughly by Henry Street and San Vincenzo Place, and Norwalk Harbor and the Metro-North railroad tracks. The second is the “control” basin that also flows through one pipe into the harbor. Alvord said that both drainage areas have a similar land use—residential, industrial, marinas, and nurseries.

“We’ll monitor the project by comparing the water quality of the two

drainage areas through scientific testing protocols. To measure the filters’ effectiveness at reducing contaminants, we’ll test water samples of the drain sites equipped with filters by comparing the water flowing into the filter to the water flowing out,” Alvord said. Longo & Longo, AbTech’s exclusive Connecticut-based distributor, will work with the city to service, maintain, and monitor the filters.

Baseline water samples have already been taken at one of the target locations and tested for *E.coli*, *Enterococcus*, oil, grease, TSS, TKN, hardness, COD, specific conductivity, and pH. Throughout the project’s grant period, the city will collect samples during ten rain events (eight hours each). Then, 15 of the treated drains and ten of the untreated

drains will be tested. Results will be compared to the baseline results.

High-Tech Solution

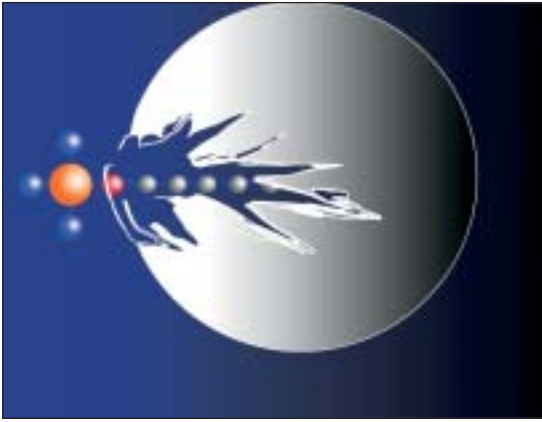
Norwalk is using Abtech’s fourth generation antimicrobial Smart Sponge Plus4 in the high volume stormwater catch basins selected for this project. The antimicrobial agent is an Organosilane derivative widely used in a variety of fields including medical, consumables, pool equipment, and consumer goods, and it is registered with the EPA in various applications, having been proven effective against a wide variety of microorganisms. It also acts as a fungi static, odor, and mildew control.

The product employs an antimicrobial agent, chemically bound to the polymer filtration material, which looks like popcorn, to inactivate health-threatening microorganisms. “The mechanism is based on the agent’s electromagnetic interaction with the microorganism cell membrane, causing the microorganism disruption, but no chemical or physical change in the agent. Consequently, the antimicrobial agent is not depleted over time and it maintains its long-term effectiveness,” said Rodolfo Manzone, Ph.D., company president and chief technology officer.

Field and laboratory tests have confirmed the material’s capability to absorb—depending upon the type of contaminant—up to five times its own weight. The absorption is permanent and the saturated product does not leach or leak contaminants; rather, it trans



...placed the filter, and put the grate back in place, completing the installation.



The antimicrobial agent destroys the cell wall of bacteria molecules.

forms the contaminants into solid wastes at a low cost.

The company recently validated its antimicrobial technology in outfall pipes in Scarborough Beach, RI. In both dry and wet weather sampling, the maximum removal rates for fecal coliform ranged from 89.4 to 99.6 percent. In the same sampling process for *Enterococcus*, the maximum removal rates ranged from 96.2 to 99.9 percent.

The product's success is not only based on its effectiveness at removing hydrocarbons, bacteria, and other pollutants, but also on its ability to encapsulate and transform hydrocarbon pollutants into a stable solid for easy disposal or recycling, essentially a closed-loop solution to water pollution. Also, the material is fully recyclable through waste-to-energy. The EPA has included the company's Ultra-Urban Filter series with Smart Sponge technology

in the Best Management Practice (BMP) listing under the federal environmental guidelines that apply to local and state governments.

The majority of the company's customers are municipalities. Twenty-eight states have installations, and other products have been designed using the same technology to capture hazardous runoff in commercial areas, such as new development and redevelopment sites, park-

ing lots, gas stations, airports, industrial sites, and marinas.

Alvord said the project is the first-large scale use of AbTech's filtration technology in catch basins in a cold climate. "We've been looking for new and innovative approaches to solving the critical threat to our waterways. We see this project as a great opportunity to participate on the ground level using cutting edge technology to address non-point source pollution."

Public Education and Outreach

Jack Schneider, Education Coordinator of Norwalk's Maritime Aquarium, described the educational aspects of The Filter Project. He said that part of the grant for The Filter Project includes a general public educational outreach program, which will be implemented by the Aquarium and the Norwalk River Watershed Initiative.

"We currently have a display at the aquarium that shows the Norwalk River watershed and provides information on how to prevent pollution. We want peo-

Project Partners

Soundkeeper

The Long Island Soundkeeper (Soundkeeper) is an environmental education and advocacy organization dedicated to the protection and enhancement of the Long Island Sound ecosystem. The organization was founded in 1987 out of the concerns of commercial fishermen and shell fishermen. It was the second water "keeper" program established in the United States. Because of Soundkeeper's accomplishments, it has served as a model for many other keeper groups. Soundkeeper's approach to the environment is grounded in practical issues of economic vitality, natural resource protection, and public health. During its 17 years in Norwalk, Soundkeeper has achieved a high level of effectiveness with its legislative advocacy, education, and outreach programs. The key to its effectiveness has been its high visibility, knowledge of the issues and law, commitment to practical solutions, and ability to work with diverse populations. Soundkeeper is known both for stopping polluters and for creating programs that build awareness and serve the improvement of water quality and marine habitat. The organization has a track record of success partnering with other organizations in order to trigger long-term change through both scientific intervention and education.

The Maritime Aquarium at Norwalk

The Maritime Aquarium at Norwalk has extensive expe-

rience developing science education curricula and already addresses Long Island Sound water quality issues in their classes. Annual attendance at the Aquarium averages over 525,000 visitors per year, making it one of the largest attractions in Connecticut. Among the Aquarium's visitors are more than 125,000 schoolchildren on field trips, many of whom participate in marine-science programs offered by an active education department. To support the growing number of visitors and educational programs, the Maritime Aquarium opened a new \$9.5-million Environmental Education Center.

The Norwalk River Watershed Initiative

The Norwalk River Watershed Initiative (NRWI) is a unique partnership among federal and state agencies, watershed towns, local groups, and residents to address local water quality and resource protection problems and opportunities in the Norwalk River Watershed. Municipal partners include New Canaan, Norwalk, Redding, Ridgefield, Weston, and Wilton, CT and Lewisboro, NY. NRWI was born out of a 1995 agreement between the US Department of Agriculture's Natural Resources Conservation Service and the EPA. At that time, the Norwalk River was selected as a model watershed to support the implementation of the Long Island Sound Comprehensive Conservation and Management Plan.

Improving Disaster Preparedness

From September 11 to Hurricane Katrina, the past five years have had a major impact on the way our nation views, plans for, and manages disasters. Disasters—natural or man-made—can cause major health, safety, and economic impacts.

The Infrastructure Security Partnership (TISP) formed a Task Force on Regional Disaster Resilience in October 2005. TISP is a national non-profit consortium representing the engineering and design community and other public and private sector organizations concerned about disaster preparedness. The TISP Task Force immediately began work on a guide that would identify readiness gaps, recommend solutions, and provide a benchmark for gauging a region's level of disaster resilience.

The guide includes a detailed inventory of needs that have been identified through infrastructure vulnerability assessments and studies; interdependencies exercises and lessons learned from major events, including natural disasters; major

manmade technological disruptions, i.e., the August 14, 2003 power blackout; and terrorist events. It provides recommended specific tasks, activities, and projects to meet these needs and is broken into 12 key areas, each including a needs assessment and short, medium, and long-term recommended actions. The 12 key areas are: Awareness and Understanding of Interdependencies; Appreciation of Cyber Threats, Incidents, and Restoration Needs; Risk Assessment and Protection/Mitigation; Cooperation and Coordination; Information Sharing and Alert and Warning; Reliable and Interoperable/Compatible Communications and Information; Roles and Responsibilities/Incident Management (Physical and Cyber); Recovery and Reconstruction; Business Continuity and Continuity of Operations; Logistics and Supply Chain Management; Public Information/Risk Communications; and Exercises, Training, and Education. For more information, or to receive a copy of the guide, please visit www.tisp.org.

ple to understand that what they do upstream affects others downstream. The Maritime Aquarium will educate 25 classes in middle school and high school to foster an understanding of what individuals can do to protect the environment," Schneider said.

The school educational program includes demonstrations of the filtration technology and a model of a watershed—an enviroscape—that shows how nonpoint pollution affects the environment. Schneider said that the enviroscape could simulate an oil spill or faulty septic system demonstrating the effects of nonpoint source pollution.

Norwalk River Watershed Initiative's Coordinator, Jessica Kaplan, said that the Initiative would implement the general public education outreach program, which will include residents, community groups, press, government officials, and businesses. "The educational component of the project is about cleaning up our own neighborhoods," she said. "The point is to motivate people to see how their actions affect the environment. If we can bring home to people just five ways they can change their actions, we've got a good start toward remedying nonpoint source pollution."

Norwalk will evaluate The Filter Project's success according to the percentage of reduction in hydrocarbons, and bacteria entering Long Island Sound from the targeted catch basins.

The monitoring will be an effort shared by the Soundkeeper, the City of Norwalk, and Longo & Longo. Although the project is a three-year campaign, it will be sustained well after the grant period has ended. Alvord said that the goal is to maintain long-term change in urban watershed areas through consistent maintenance of the catch basin filters.


In July 2005, the project broke bureaucratic barriers by bringing together local, regional, and national business and government officials. Norwalk partnered with the Long Island Soundkeeper, the Maritime Aquarium, the Norwalk River Watershed Initiative, and AbTech (See box.), with support from Senator Joseph Lieberman, the EPA, the Connecticut Department of Environmental Protection, and private funding sources.

Funding Support

When Soundkeeper's Terry Backer approached Norwalk's Mayor Alex Knopp, he received immediate support for the project. "I'm proud Norwalk is taking a leadership role in cleaning up Long Island Sound, given its significance to Norwalk and our whole state. It's essential that we test new technologies for reducing the polluted run-off from the local rivers and waterways that feed into the Sound," Knopp said.

After Norwalk approved the project, the key was to acquire funding. The Long Island Soundkeeper put its experienced grant writer, Kim Courtney, on the task. Courtney said she has never seen such a commitment from all levels of the public and private sector. "It's amazing to see how everybody came together on this project. From the beginning it took on a life of its own. U.S. Senator Lieberman sponsored legislation to land a \$397,000 grant from the U.S. Environmental Protection Agency, the Fairfield County Community Foundation put up \$20,000, a private individual donated \$5,000, and the city and the state Department of Environmental Protection will provide for the remainder."

Courtney said there was another reason the project had received such strong support. "It offers a tangible and visible solution to water pollution. Through a test tube demonstration, you can show people the dirty water; they see it go through the sponge and it comes out clear."

The test tube demonstration Courtney refers to was demonstrated at the Norwalk City Hall by Knopp and Backer. The mayor poured a mixture of black oil and water through a test tube apparatus containing Smart Sponge Plus. The black liquid emerged from the other end of the test tube crystal clear. 

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