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STORM WATER MANAGEMENT
PUTTING REAL LIFE TO THE TEST IN CONNECTICUT

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Bruce Morton,
Aqua Solutions

Resource managers know intuitively that by controlling water running off the land, sediment and pollutants ending up in coastal waters will be reduced. Thanks to an innovative experiment in Connecticut, managers are now getting proof.

"That's why we pursued this project. There weren't any studies out there done on a long-term basis that documented the fact that if you develop in a certain way and use BMPs [best management practices] you can reduce runoff and improve the quality of the runoff," says Mel Cote, manager of the Water Quality Unit of the U.S. Environmental Protection Agency's (EPA) New England Regional Office.

The Jordan Cove National Urban Watershed Monitoring project is a 10-year monitoring initiative comparing the quantity and quality of runoff between a traditionally developed residential subdivision and environmentally sensitive development.

Results from the Jordan Cove project may help provide the documentation communities around the country need to re-evaluate outdated storm water management regulations that often tie the hands of developers willing to change the way they do business.

"What we hope to do with the results," Cote says, "is show that the environmental

benefits of building this way outweigh the cost of going through the process of changing regulations."

The One and Only

Jordan Cove is the first storm water project in the country dealing with urban and suburban development, and is one of 23 national monitoring projects funded by the EPA's Nonpoint Source Management Program under section 319 of the federal Clean Water Act.

While 22 of the projects address agricultural runoff, Cote says most of the nitrogen in the Long Island Sound is coming from urban and suburban land use.

"We knew we needed to do a better job managing urban and suburban areas to control nitrogen," says Paul Stacey, supervising environmental analyst for Connecticut's Department of Environmental Protection, "but other than a few places in the Chesapeake Bay area, we really hadn't seen this consolidation of so many real-life BMPs in one residential development put to the test."

Managers from state and federal agencies and researchers from the University of Connecticut often discussed "conceptually, what we might do better," Stacey says. Eventually, talk turned to putting a number of BMPs to the test "all at once in a real neighborhood. That's when things got complicated."

Critical Pieces

Certain elements of the Jordan Cove project had to come together perfectly, or there would have been no project.

Needed was a soon-to-be-developed piece of coastal property with just the right topography in an environmentally aware community that would be willing to bend its zoning regulations. Key was a developer willing to put in the extra time and investment while working with local, state, and federal regulators, as well as academic researchers, all of whom had to be committed enough to the project to carry it through to fruition.

"The story is not the fact that we have all these engineering details; it's the fact that it actually happened at all," says Bruce Morton, co-owner of Aqua Solutions and the project's coordinator.

In 1995, after a year of searching, the project group found its site, an 18-acre parcel located in a small watershed that drains into Jordan Cove, an estuary connected to Long Island Sound.

The property had been a family farm, and the owner was willing to develop part of it in

an environmentally sound manner.

The parcel was located in the town of Waterford, which is known as an environmentally progressive community.

To conduct the paired watershed experiment, the property would be split roughly in half. On one half, a subdivision would be built using traditional building practices following the town's zoning requirements. On the other, a neighborhood would be built using practices that are more conducive to reducing runoff and protecting water quality. An existing subdivision nearby served as a control site.

Monitoring, led by University of Connecticut's Dr. Jack Clausen, was begun on all three sites and was conducted for nearly two years before construction began. Monitoring has continued through construction, which was completed in 2003, and will continue for the next two years.

Exceptions to the Rules

While baseline data were being collected, committee members completed the most challenging part of the project—getting the variances and approvals needed from all of the various town commissions and officials.

"A lot of our proposed measures in the BMP area are not standard building measures and did not fit into the confines that most towns have on the books," explains Cote.

What the town didn't allow in its regulations had to go through variance procedures.

"That in itself was one of the major obstacles," he says. "In most towns and cities, zoning regulations are pretty strict, and a lot of what they allow is not good for the environment."

Stacey notes that the response of Waterford officials was "very flexible and very interested. We made certain adjustments that you might expect along the way, but we were able to pretty much implement the project as we saw it."

More Equals Better

With the community's approvals in hand, construction of the traditional subdivision began in 1997, and ground was broken for the experimental neighborhood in March 2000. Construction on the BMP site was complete in 2002, and the traditional site was completed last year.

In the traditional neighborhood, curbs and catch basins collect runoff, which is then piped through a detention pond treatment system before entering a nearby stream and Jordan Cove. Houses were built in a "cookie-cutter" fashion, streets are impervious,

and vegetation is minimal.

Homeowners in this area, although aware of the monitoring project, are not part of the experiment, says project coordinator Morton. "We didn't want to interfere with their activity or give them special training because we wanted a real, actual neighborhood under traditional conditions."

In the experimental section, housing is clustered to minimize impervious coverage, permeable driveways are shared, and deed restrictions prohibit expansion of impervious surfaces. Rainwater from roofs is funneled into special "rain gardens," grass swales line the narrower, permeable road, and the center of the cul-de-sac is a vegetated infiltration basin. Lawns have areas designated as "low-mow" or "no-mow."

All of the experimental homes were sold before they were built, and educating those homeowners is an important part of the project, Stacey says. Education guidelines were written into the bylaws of the homeowners' association, presentations are made at association meetings, and graduate students conducting the monitoring answer homeowner questions.

A Question of Money

By the end of the 10-year project, Cote says, they will have spent $1 million in section 319 grant funds. He notes that 70 to 80 percent of those funds will have been used to pay for monitoring—equipment, graduate students, analysis, collection, and publishing.

The rest went to subsidize the developer for any BMP costs that went above and beyond what he would have had to pay for traditional approaches.

The experimental neighborhood took more time—and therefore money—than the traditional neighborhood, but much of that was due to the extra time it took to sell the town on the plan, and the learning curve of contractors unfamiliar with some of the practices.

"We learned that this type of development doesn't cost more and may cost less in the longer term, particularly as products become more accepted and there is a greater demand," Cote says. "By and large, we feel if BMPs were on a level playing field, a green neighborhood would be less expensive to build than a traditional one."

So Far, So Good

Not only may BMPs be cost effective, monitoring is showing that they also are working.

"The early results are, 'absolutely.' We've had a year now to monitor the BMP site and the results are extremely positive. We are seeing what we expected and maybe even a little better," Cote says.

Preliminary results are showing that there is less runoff from the BMP area on a per unit basis and the quality of what does run off is improved.

"This will give managers more ammunition to help them sell low-impact development," Morton says. "If we're serious about dealing with water quality in the long term, this is something we are going to have to do to succeed."

Reaching Out

Managers, it seems, are interested in getting that ammunition. So far, 29 states and 3 countries have wanted more information on the Jordan Cove project.

"It's a bit of a showcase," says Morton, who regularly helps conduct tours of the neighborhood for regulators, design professionals, academics, and citizens. He notes that one of the project goals is to develop model guidelines that other towns can use to implement BMPs, and Washington State University is undertaking a similar project looking at their effectiveness in different soil types.

Cote adds, "What we've learned is that we can develop in a way that creates less pollution than how we've developed in the past. The practices exist, they are not expensive, and they are often aesthetically pleasing and attractive. It won't get us to 100 percent removal, but it will be worth the cost."

For more information on the Jordan Cove National Urban Watershed Monitoring project, point your browser to www.canr.uconn.edu/jordancove/. You may also contact Bruce Morton at (860) 295-1505 or aquasolutions@snet.net, Paul Stacey at (860) 424-3728 or paul.stacey@po.state.ct.us, and Mel Cote at (617) 918-1553 or cote.mel@epa.gov.

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