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Innovative design cuts street runoff

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SEATTLE POST-INTELLIGENCER REPORTER

Neighbors on Second Avenue Northwest in Seattle's Broadview neighborhood are used to the dog-walkers and other pedestrians who stroll through their narrow, winding street, eyeing the abundant gardens in front of the modest houses.

But the tour buses are amusing.

Red Rugosa rose hips and the white berries of snowberry shrubs mix with shades of green plants small and tall, from ferns and grasslike beaked sedge to vine maples and Oregon ash.

Botanical beauty aside, these streetside gardens are hard at work. And that's what attracts tour groups of government types from as far away as New Zealand.

Dubbed "SEA Street" for Street Edge Alternatives, the 660-foot-long "superblock" at Northwest 117th Street and Second Avenue was a prototype for controlling stormwater runoff.

"We're all just kind of amazed at the attraction of it," said Eric Neaville, who lives on the block. "It just kind of cracks us up."

Some neighborhoods around here don't have stormwater drains. Rain pours off roofs, driveways and streets and washes into ditches, carrying pollutants into Pipers Creek.

"Ultimately, it all ends up in the Sound or the lake," said Denise Andrews, a strategic adviser for Seattle Public Utilities' drainage and wastewater programs. "Our objective is to now engineer our streets in a new way. We are mimicking nature's functions. We'll never replace the conifer forests that existed."

North and south of this block, lawns edge up to asphalt, with parking strips in front of homes. On SEA Street, the driving lane is narrower with limited angle parking. Swales are lined with rocks and chock full of plants, and they are covered with a soil mix that imitates the "duff" of a forest floor. The swales are connected with short pieces of underground pipe.

After taking measurements for two seasons -- one dry, the other wet -- a University of Washington professor found that the design reduced runoff by 98 percent.

From March to July 2000, before the street was redesigned, almost 8 inches of rain fell and nearly 5,000 cubic feet ran off the surrounding 2.3 acres, Andrews said. During the same period a year later, 9 inches of rain fell, but there was only 132 cubic feet of runoff, according to the analysis done by UW's Richard Horner.

The system is designed to handle a storm of a size expected to happen every two years. Anything bigger will cause water to back up from the last swale on the block and run into the open ditches around the neighborhood.

"That's OK, we expect that," Andrews said. "But these are amazing numbers for what the system's designed to do."

The design is an example of "low-impact development," a way of treading more lightly on the Earth.

SEA Street is "the best example right now around Puget Sound," said Bruce Wulkan, head of the stormwater program for the state's Puget Sound Water Quality Action Team.

"Not only is it beautiful, but it works," he said.

Although the SEA Street price tag was \$800,000, Andrews said use of a natural drainage system costs about the same as a typical curb-and-gutter design. And that's before the environmental benefits. The prototype carried additional costs for documenting the project and fixing mistakes as it progressed.

Redesigning the Broadview block required neighborhood buy-in. That's where resident Joe O'Leary came in.

The civil engineer and consultant already worked on stormwater issues, and he pitched a proposal to the city -- and his neighbors -- for choosing their block for the makeover.

The idea of a tax-free improvement that would likely boost property values was enticing.

"We'd be crazy not to try to do this," said O'Leary, who, like some other residents, had previous flooding problems in his basement. He gathered nearly unanimous support.

"We all stuck together and I made a lot of new friends," he said. "All for water quality."

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This story can be found at:

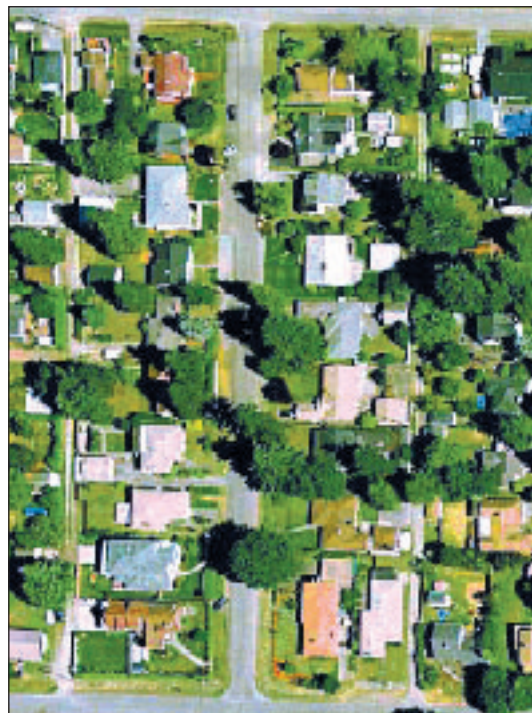
http://seattlepi.nwsourc.com/local/95881_model20.shtml

A PILOT PROJECT TO REDUCE RUNOFF

In a pilot project using "green" engineering, a block in Seattle's Broadview neighborhood reduced stormwater runoff by 98 percent. Seattle Public Utilities spent \$800,000 to create a natural drainage system in place of the traditional curb-and-gutter designs that send tainted runoff into area waters.



BEFORE



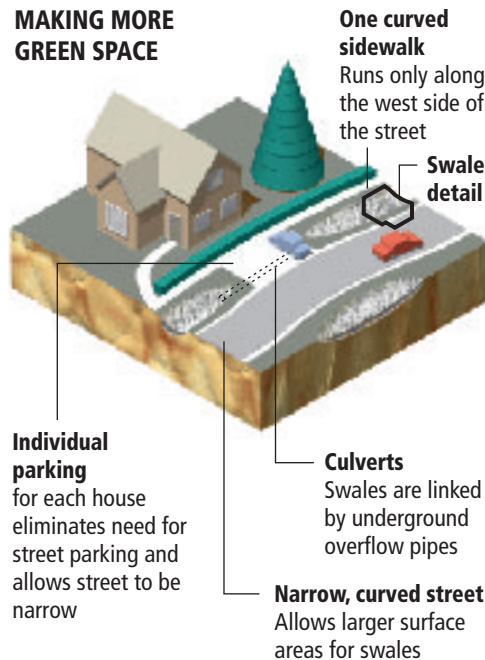
AFTER



DESIGN FEATURES OF A NATURAL DRAINAGE SYSTEM

Urban development removed many of the trees and natural surfaces that soaked up rain like a sponge. Without those natural barriers, rain not only has the potential to cause flooding and erosion, but it collects pollution and can overwhelm sewer systems. A natural drainage system slows the flow of runoff by making more water soak into the ground.

MAKING MORE GREEN SPACE

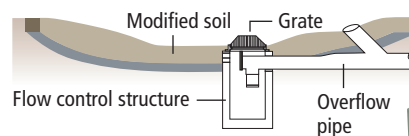


SWALES: STEERING STORMWATER

A major feature of the project involved creating carefully graded and landscaped swales along the street to collect most of the runoff. Three types of swales were used on this project. All swales are filled with modified soils to speed absorption and vegetation to slow runoff but they serve different purposes during larger storms.

► Flow control swale

Regulates flow of stormwater for all swales



❶ Flow direction

Water from other swales flows downstream through underground overflow pipes into flow control swale

❷ Absorption

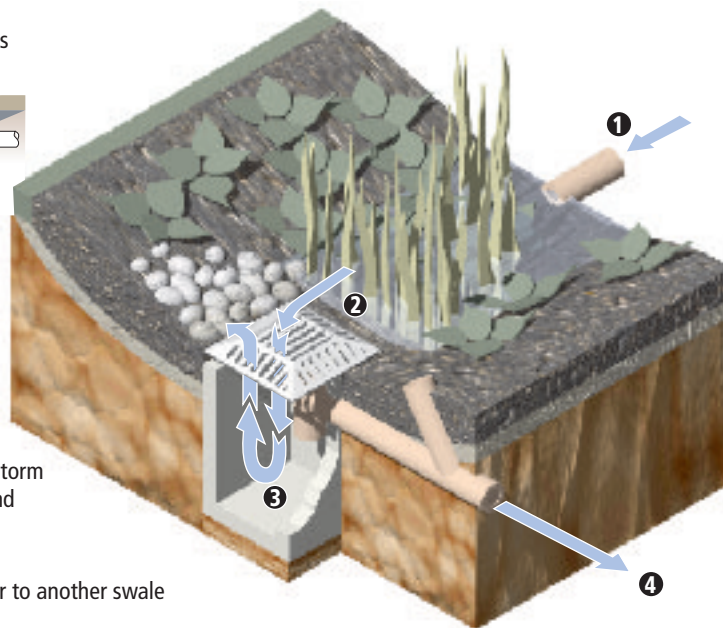
Modified soil absorbs water until it begins to pool

❸ Ponding

During heavy rains the catch basin backs storm water up through the grate, creating a pond in the swale

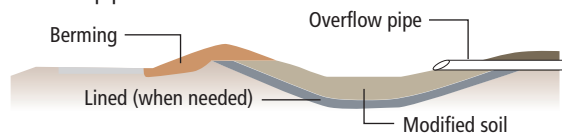
❹ Overflow port

Another overflow pipe carries excess water to another swale



► Conveyance swale

Drains excess water to other swales through connecting overflow pipes



► Holding swale

Absorbs the most water into ground and receives water from other swales

