Solutions at a Glance:

CAPTURING THE POWER OF RAIN

By Deb Guenther, Mithun

Urban infrastructure you can see re-connects people with natural systems

Channels in the Augustenbourg neighborhood of Malmö, Sweden are designed to drain water into surrounding wetlands during heavy storm flow (photo by Mark Brumbaugh, Brumbaugh & Associates)

Remember when you were eight years old or so, building your boat of leaves and twigs and watching it run down the stream between the rocks, perhaps down the gutter along the curb or maybe it was a grass lined ditch? Whether you thought about it or not, you were watching part of the path a raindrop takes when going from sky to sea. The average person doesn't think much about storm water because our cities, as they are designed now, don't give us much chance to notice. Eyebrows are raised only when rains flood basements or intersections or when costs of new pipes run in the millions. Yet, increasingly, urban designers, landscape architects, civil engineers, artists, public agencies, politicians and even members of the general public are not just paying attention to urban storm water systems when they fail, they are now coming up with ways of reconfiguring it to address a variety of different issues.

Groups of Seattle developers, designers and public agency representatives have been visiting places that have built multiple-use "green infrastructure" as part of sustainable neighborhood study tours to Copenhagen, Denmark and Malmö, Sweden. Rather than an invisible pipe under the street, a myriad of strategies are used to mimic the patterns of natural water systems by capturing and slowing water close to where it falls. These strategies not only improve water quality by reducing erosion, replenishing groundwater and keeping water temperatures low, they also create habitat, make special places, and decrease public expenditures. In some cases, developable land is even increased by trading storm water management ponds that take up space for swales and trenches that are more flexibly located.

As the study tour group wandered the neighborhoods, they noticed a variety of methods used to create a "green infrastructure" system, which added vitality to the urban landscape. The mosaic of the cityscape was enhanced with new ways of using old stand-bys such as scuppers, downspouts, trench drains, swales, splash blocks, weirs, gabions and planters. "Sometimes the best solutions are the simplest," said Liz Dunn, a Seattle developer on the tour. "This goes back to ideas that have been around for awhile. Perhaps the toughest part is just getting the word out about how well these ideas still work. For Seattle, this could be a low-tech triumph in a high tech town."

How it Works in the Rain Capital

Seattle has been hard at work on some of these ideas. Today, neighborhoods such as Bitter Lake and High Point are not just discussing, but implementing alternative means of storm water management. These techniques leverage the ability of plants and soil

to filter water, integrate green spaces within a community, and retrofit existing neighborhoods.

For example, on High Point, an ambitious, 130-acre urban redevelopment by the Seattle Housing Authority in West Seattle, Mithun worked with SvR Design and Nakano Associates to link a series of new community parks with a natural drainage system of grass-lined and vegetated swales within the rights-of-way.

Downspouts draining into an open surface channel keep plants well watered (photo by Deb Guenther, Mithun)

The bioswales create an ecological basis for the community's design, contributing to a hierarchy of open spaces and connections. They also improve salmon habitat; High Point comprises one-tenth of the Longfellow Creek watershed, which has one of the highest Coho salmon return counts among Seattle creeks.

High Point's natural drainage system is now a model for achieving aggressive water quality goals within the limitations of a traditional curb, gutter and sidewalk streetscape. To incorporate this natural drainage system, six City of Seattle agencies collaborated to negotiate land use. The process stimulated a larger look at Seattle's drainage systems and helped to initiate revisions to the city's street improvement design manual. The first phase of the project will be completed in 2006.

Another example of local sustainable storm water techniques is Bitter Lake's bioswales in the Pipers Creek watershed. For a five-block area without sidewalks, driveways were reconfigured and approximately 11% of the streets' square footage was turned into swales, which are patches of soil planted with trees and other vegetation.

Referred to as SEA Streets, an acronym for Street Edge Alternative, the swales' 100 evergreens and 1,100 shrubs mimic natural drainage processes that existed before development, and have reduced the amount of storm water leaving the street by 98%. That means only 2% of the water that once left the street needs to be treated, processed and piped because the plants and soil now do the work. It is estimated that if water can percolate through two to three feet of soil, contaminants are removed just as well as traditional mechanical means, if not better. Considering life-cycle costs and combining landscape and infrastructure needs within one budget, these types of sustainable systems can be less expensive.

Stimulating a Change in Thinking

That's great for residential neighborhoods but how does it work downtown? What if we started by setting the goal of capturing about 98% of the rainwater within our downtown, like the way nature functioned before there was a city? How would we design our infrastructure differently if this were in fact our objective?

Mithun asked this question when it began investigating ways to approach the design of a sustainable neighborhood in the Lloyd Crossing area of Portland. Mithun worked with the Portland Development Commission, the landowner Ashforth-Pacific and a consultant team that included GreenWorks and civil engineer Tom Puttman, now with David Evans Associates. The results proposed were even more ambitious – 100% of rainwater retention from the streets in bioswales located at each intersection, and functional plantings that would hold and filter rainwater and contribute to the distinct character of the green neighborhood.

To find out more about how this could work in Seattle, the study tours have been targeting some of the best samplings worldwide. An upcoming tour to Berlin will take a look at a prime example of nature's water cycle being put to work in a downtown area – Potsdamer Platz. Completed in 1998, this collection of buildings and plazas in the center of the city incorporates water features that gather and re-use rainwater for flushing toilets, irrigation and fire systems. Ultimately, thinking differently about managing storm water is based on a macro perspective that considers the whole city as part of the ecosystem.

The Urban Sustainability Study Groups to Sweden and Denmark

International Sustainable Solutions (www.i-sustain.com) encourages the implementation of sustainability practices and products by facilitating the sharing of knowledge and the creation of market opportunities. Starting in 2004, International Sustainable Solutions has been bringing groups of architects, engineers, developers and others from the Pacific Northwest to Scandinavia and other parts of Europe to look at advanced urban sustainability projects.

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