Minnehaha Creek Watershed District

WaterPro

Information for professionals working with water issues.

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INSIDE THIS ISSUE

Talk back and WIN!

Win a $25 gift certificate, donated by Lord Fletcher's Restaurant! Go to http://www.minnehahacreek.org/waterpro_survey.php for more information.

Small scale yields large results in Low Impact Development

MEET STORMWATER STANDARDS WITH LID

In the late 1980's, planners in Prince George's County, Maryland needed a solution to the "growing economic and environmental limitations of conventional stormwater management." Larry Coffman was among the group that developed a new approach and christened it "low impact development (LID)." According to Coffman, "LID allows for greater development potential with less environmental impacts through the use of smarter designs and advanced technologies that achieve a better balance between conservation, growth, ecosystem protection, public health, and quality of life."

Rain as a Resource

LID is based on the philosophy that stormwater should be treated as a resource, not a waste product. Rather than using one or two large, costly treatment facilities at the base of a drainage area, LID uses small cost-effective features at the lot level. These are designed to store and treat rainwater where it falls. If done correctly, LID features are viewed as an amenity by landowners. LID can be incorporated into new development as well as redevelopment projects.

An integrated, sustainable approach

The landscape features upon which LID relies are known as Integrated Management Practices, or IMPs. Nearly every component of the urban landscape can be re-engineered into an IMP. This includes open space, rooftops, streetscapes, parking lots, medians, sidewalks, and even tree boxes.

The key to successfully implementing LID is to use a variety of IMPs together so that redundancy is built into the system, reducing failure rates.

Many communities face the challenge of meeting complex stormwater regulations with aging infrastructure and increasing growth pressure. LID is a more sustainable and reliable alternative to traditional pipes and ponds, and is increasingly popular among regulatory agencies.

LID copies nature on a small scale

Because a main tenet of LID is to mimic a site's natural hydrology, LID sites are better integrated into the natural surroundings. LID projects exhibit reductions in erosion as well as volume, velocity, sediment loads and contamination of stormwater runoff.

LID practices have been proven less expensive, more easily maintained, and less harmful to receiving waters than traditional stormwater management facilities.

(continued on page 2)

Pervious pavement like the surfaces at the Minnesota Landscape Arboretum's Rain Water Runoff Model illustrate a key element of Low Impact Development: surfaces specially designed and engineered to prevent, rather than capture or direct, stormwater runoff.

LOW IMPACT DEVELOPMENT *(continued from page 1)*

Grass swales, permeable pavements and rain barrels are just a few of the many and varied LID practices. LID also protects environmentally sensitive site features like riparian buffers, wetlands, steep slopes, mature trees, flood plains, woodlands and highly permeable soils. These techniques take advantage of the storage, infiltration and ground water recharge functions naturally present before a site is developed (EPA).

Because LID minimizes changes to site topography, innovative developers also slashed their lot preparation costs by 30 percent with LID practices, saving on clearing and grading, in addition to using natural drainage rather than pipelines.

Vegetated swales at the HB Fuller Company Parking Lot in Vadnais Heights, MN, reduced stormwater runoff by 73%, phosphorus by 70%, and sediment by 94%.

Ten Common LID Practices

1. Rain Gardens and Bioretention
2. Rooftop Gardens
3. Sidewalk Storage
4. Vegetated Swales, Buffers and Strips; Tree Preservation
5. Roof Leader Disconnection
6. Rain Barrels and Cisterns
7. Permeable Pavers
8. Soil Amendments
9. Impervious Surface Reduction and Disconnection
10. Pollution Prevention and Good Housekeeping.

—NRDC Stormwater Strategies

EPA documented more than 90 percent pollutant reductions.

According to a review of low impact development projects around the United States (United States Environmental Protection Agency (EPA), 2000), LID practices were in general effective at reducing runoff volume and treating the first flush (first 1/2 inch) of rainfall. They had up to 98 percent success rates in the removal of heavy metals and nutrient removal rates as high as 92 percent.

More recently, the University of Washington and the Puget Sound Action Team noted that **low impact development approaches can be applied on glacial outwash, alluvium soils, dense silt loams and till mantled areas.** (Technical Guidance Manual for Puget Sound, January 2005).

Breaking the Connections

Hard surfaces like roads, rooftops and parking lots are the biggest cause of stormwater problems, and reducing them is a key element of LID. More important, however, is to break up the connections between the hard surfaces and nearby water resources. This can be done by using LID features like pervious pavements and green roofs, or simply by redirecting runoff to vegetated areas and exposing polluted water to plants and soil. (Read more about biofiltration on the page3).

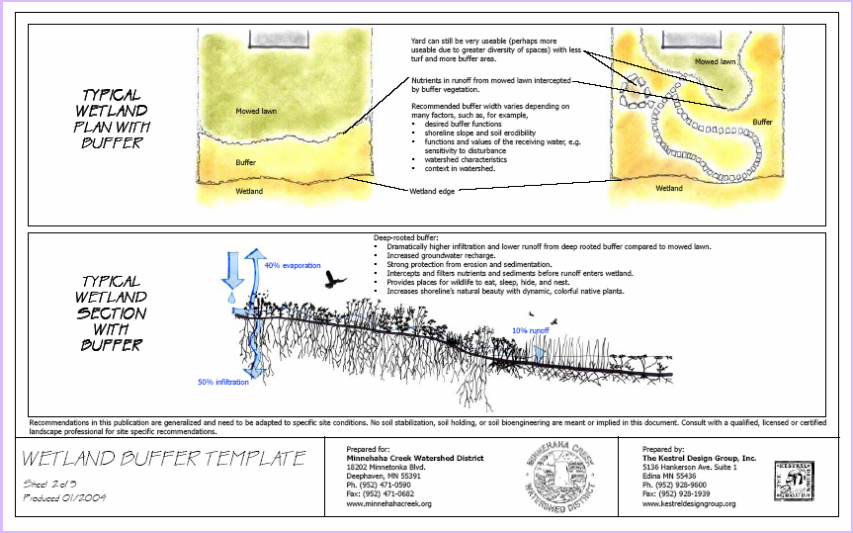
The **City of Mound** is taking LID principles to heart in its new downtown redevelopment. The Minnehaha Creek Watershed District (MCWD) and the city are partnering on a LID-intensive redevelopment project that features rain gardens, sidewalk retention facilities, rain barrels, and others. According to Mike Wyatt, MCWD planner, this is a landmark project. "Mound recognizes the importance of protecting the quality of Lake Minnetonka, and sees LID as critical to the success of their downtown redevelopment. And MCWD recognized the importance of what Mound was doing, so it pitched in financially to make sure it happened. We look forward to working with other communities in the district on LID projects."

NEW: LID CORNER

In 2006, LID practices will be featured in each issue of ***WaterPro***. Look for information on individual LID practices, as well as commonly asked questions about LID. We will also be adding resources at www.minnehahacreek.org.

Local communities that want to increase the use of Low Impact Development within the District are encouraged to contact MCWD.

LID IN PRACTICE: BIOFILTRATION



Riparian Buffers remove pollutants and stabilize shorelines while providing natural landscapes and wildlife habitat. See http://www.minnehahacreek.org/riparian.php to download buffer templates and learn about limited grants to assist landowners who wish to establish riparian buffers.

Biofiltration is Key in Low Impact Development Systems

Biofiltration uses plants, soil, and soil microbes to reduce contamination and sediment loading from runoff. Previously successful as a technique for large scale open spaces, it is also a key component of the micro-scale bioretention features common to LID projects.

LID designs convey runoff to rain gardens, swales other vegetated areas. Vegetation intercepts runoff, boosts infiltration and evaporation, removes sediments, and improves soils. It facilitates adsorption and other chemical processes in the soil that remove contaminants, including microbial decomposition of hydrocarbons. Plants also directly uptake pollutants like heavy metals.

A number of studies have documented the effectiveness of biofiltration in reducing the following:

- Runoff Volume: 73%
- Phosphorus: 70%
- Sediment: 94%

1998 Ramsey-Washington Metro Watershed District and H.B. Fuller Company, parking lot study.

- Total suspended solids: 86%
- Heavy metals: over 90%
- Phosphorus: around 80%
- Ammonia: 70%-80%

Low Impact Development Center and the US EPA .

Chemical Reactions Clean Water in Seconds

According to LID expert Larry Coffman, biofiltration does not rely on long residence times. "There are chemical reactions taking place the second the polluted water contacts the plant-soil-microbe complex. We can make contact, and pass the stormwater along if we have to, and still see significant pollutant reductions."

City of Orono Protects Wetland Riparian Buffers

The Orono City Council in August approved changes to its Municipal Code that protect riparian buffers at the edges of lakes, streams and rivers in city limits.

The newly adopted provisions require property owners to leave undisturbed or create native plant wetlands that extend 75 feet inland from the shore when a property is developed or redeveloped. The code prohibits most structures and facilities for an added 20 feet area identified as the buffer setback.

A riparian buffer is defined as an existing buffer in the ordinance if it has been undisturbed for ten years or more, and is populated with dense native grasses and a variety of trees and shrubs. Non-native invasive plants like European buckthorn must be removed to maintain the health of the buffer ecosystem. Disturbed buffers (those disturbed within ten years, or without strong native plant communities) must be restored or re-ceated according to guidelines set forth in the code.

"Riparian buffers are invaluable tools to protect water quality," said Minnehaha Creek Watershed District planner Mike Wyatt, who worked with Orono to develop the new ordinance. "Buffers stabilize shorelines, reduce erosion and filter stormwater runoff. They provide beautiful homes for wildlife communities important to the quality of life in the watershed."

Go to www.minnehahacreek.org/riparian.php to view suggested riparian buffer designs, specifications, and plant lists.

Funds foster watershed outreach and education

AT MINNEHAHA CREEK WATERSHED DISTRICT

Ten new Cynthia Krieg Stewardship grants awarded to support watershed projects

Cynthia Krieg was a catalyst for change, a woman who inspired others to care about the people and issues within their own communities. On November 17 the MCWD board awarded a total of $99,000 in Cynthia Krieg Watershed Stewardship Grants to ten of seventeen applicants for the fall 2005 grant cycle. The projects are: **Committee on Urban Environment - Minneapolis Blooms Program:** $18,490 to conduct rain garden workshops, provide technical assistance and give 'mini-grants' to landowners wishing to install rain gardens; **Orono Intermediate School:** $8,375 to integrate water study into art, science, and music, with a community wide water festival in spring 2006; **MN Lakes Association:** $8,250 to conduct workshops on the Minnesota Lake Ecology Curriculum and lead schools in lake related service learning projects; **Kenny Neighborhood Association:** $7,500 to do neighborhood wide grass-roots education and restoration on Grass Lake in Minneapolis; **Great River Greening:** $12,600 towards production of *Plants for Stormwater Design Volume II*, including a chapter dedicated to the value of trees in stormwater management; **Eisenhower Elementary School:** $12,000 for design and construction of their 'We are Water' watershed-themed playground; **Fulton Neighborhood Association:** $9,675 to assist residents with gutter redirection, rain barrels, and rain gardens; **Gleason Lake Improvement Association:** $16,220 to integrate installation of stormwater management facilities with elementary water studies; **Carandolet Catholic School:** $1,400 to implement watershed service learning and install native plants; and **MTS Communication Arts High School:** $4,500 to start a volunteer stream monitoring program. See http://www.minnehahacreek.org/ckrieg. php for more information about the Cynthia Krieg Watershed Stewardship Fund.

Save the Date!

March 21 –22, 2006

Larry Coffman, LID pioneer, will lead a Low Impact Development workshop for local officials, engineers, public works staff, and developers.

Brought to you by
Minnehaha Creek Watershed District
& MN Landscape Arboretum Public Policy Program.

MCWD staff take on new roles

Renae Clark, former permitting officer, was recently named MCWD's new Senior Technician. Clark replaces Jim Hafner who, after 9 years with the district, accepted a position with the City of Blaine. James Wisker, MCWD compliance officer, will assume Clark's former position.

Minnehaha Creek Watershed District

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