

UNIVERSITY OF MINNESOTA

34th Annual
Water Resources Conference
October 30, 2001

And a Special Workshop
Designing and Evaluating Low Impact Developments
October 31, 2001



The University of Minnesota and the American Society of Civil Engineers, Minnesota Section, have collaborated for 34 years to offer the annual Water Resources Conference, which provides the opportunity to examine current ideas and issues in water resources.

Sponsored by:
Minnesota Section, American
Society of Civil Engineers
University of Minnesota Water
Resources Center

Facilitated by:
College of Continuing Education,
University of Minnesota

New location
this year!
The Thunderbird Hotel
and Conference Center,
Bloomington, Minnesota



34th Annual

Water Resources
Conference
October 30, 2001



Registration and Fees

The early registration fee for the **34th Annual Water Resources Conference** (must be postmarked by October 16) is \$130, which includes materials, lunch, and refreshment breaks. A \$20 additional fee will be added for any registration after October 16. Application should be made on the attached form and mailed or faxed to the University of Minnesota. You may also register online; please see the registration form for details.

The early registration fee for the **Designing and Evaluating Low Impact Developments Workshop** (must be postmarked by October 16) is \$100, which includes materials, lunch, and refreshment breaks. A \$20 additional fee will be added for any registration after October 16.

Cancellations

A refund, minus a \$15 cancellation fee, will be made if registration is cancelled in writing by October 25, 2001. Cancellations after this date are not eligible for a refund.

Continuing Education Units (CEUs)

Conference attendees will be awarded 0.6 CEUs for the 34th Annual Water Resources Conference and 0.6 CEUs for the workshop on Designing and Evaluating Low Impact Developments. One CEU is defined as 10 contact hours of participation in an organized continuing

education experience under responsible sponsorship, capable direction, and qualified instruction. Participants who wish to receive CEUs are expected to attend all the scheduled sessions of the conference. CEUs will be posted in your name, are available on a transcript at the University's Admissions and Records Office, and are transferable throughout the country to those institutions recognizing such units.

Location and Parking – New Location this Year!

The conference will be held at the **Best Western Thunderbird Hotel and Convention Center** in Bloomington, Minnesota. The address is 2201 East 78th Street (just north of the Mall of America, directly off 494; take the 24th Avenue exit). Please check the Thunderbird Hotel Web site at www.bestwestern.com for directions. There is ample free parking surrounding the hotel.

Lodging

Convenient lodging for out-of-town participants is available at the Thunderbird Hotel. To make your hotel reservations, please call 1-800-328-1931 (M-F) or the hotel directly at 952-854-3411. A block of rooms has been reserved at the special rate of \$85 for single or double occupancy. Be sure to mention that you are attending the University of Minnesota **Water Resources Conference** to receive the special rate. Reservations **MUST BE MADE BY OCTOBER 8** to receive the special room discount.

For Further Information Contact:

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This publication is available in alternative formats upon request. Please call 612-625-6748.

Program

Tuesday, October 30

Moderators:

Rick Voigt, James Fallon

7:00 a.m.	Registration (Continental breakfast)	9:20	Refreshment Break
8:00	Opening Remarks <i>Rick Voigt,</i> Polaris Group, Inc. and 2002 Conference Chair	9:40	LID – The Planning Perspective <i>To be announced</i>
8:10	Low Impact Development (LID) – The Big Picture/Twin Cities Metropolitan Area Issues <i>Gary Oberts,</i> Metropolitan Council Environmental Services	10:15	LID – Cost Benefit Analysis <i>Jerry Fruin,</i> Department of Applied Economics, University of Minnesota
8:45	LID – The Engineering Perspective <i>Neil Weinstein,</i> Low Impact Development Center, Rockville, Maryland	10:50	Panel Discussion Moderator: <i>Rocky Keehn,</i> SEH
		11:45	Recognition Presentation <i>Dave Ford,</i> Minnesota Department of Natural Resources
		12:00 noon	Luncheon Presentation History of St. Anthony Falls Engineering <i>David Wiggins,</i> Mississippi River National Center, National Park Service

2001 Water Resources Planning Committee

<i>John Boynton</i>	Minnesota Department of Transportation
<i>Patrick Brezonik</i>	Water Resources Center, University of Minnesota
<i>James Fallon</i>	U.S. Geological Survey*
<i>Pat Foley</i>	U.S. Army Corps of Engineers
<i>David Ford</i>	Minnesota Department of Natural Resources
<i>Dennis Fuchs</i>	Stearns County Soil & Water Conservation District
<i>Dick Grefe</i>	College of Continuing Education, University of Minnesota
<i>Miki Hondzo</i>	Department of Civil Engineering, University of Minnesota
<i>Rocky J. Keehn</i>	SEH, Inc., St. Paul
<i>Barbara Liukkonen</i>	Water Resources Center, University of Minnesota
<i>Nels Nelson</i>	Barr Engineering, Minneapolis
<i>Christina Peterson</i>	City of Bloomington
<i>Wayne Sicora</i>	Parsons Transportation Group, Minneapolis
<i>Gene Soderbeck</i>	Minnesota Pollution Control Agency
<i>Rick Voigt</i>	Polaris Group, Inc. Bloomington
<i>Paul Wotzka</i>	Minnesota Department of Agriculture
<i>Keith Yapp</i>	Bonestroo, Rosene, Anderlik & Associates, St. Cloud

* Conference Chair

Concurrent Sessions

Session A - Low Impact Development

1:00	<p>Moderators: <i>Dave Ford, Gene Soderbeck</i></p> <p>Aesthetics of Water Resources Design <i>L. Peter MacDonagh, The Kestrel Design Group, Inc., Edina</i></p> <p>Aesthetics play a crucial role in the ecological design of Water Resource Improvement Projects that occur in densely populated areas. Without public support, no one will "own" the land and it will quickly become another degraded public works project – ugly and unsafe. This presentation will focus on a series of Public Water Resource Quality Improvement Projects that involve public education work shops, citizen participation, and various aesthetic devices.</p>	1:30	<p>Manshire Village, East Troy, Wisconsin <i>Mitch Johnson, P.E., and Cecilio Olivier, P.E.</i> <i>Emmons & Olivier Resources, Lake Elmo</i></p> <p>This sandy creek side site on the edge of a little town in Wisconsin became a centerpiece for progressive storm water practices when a few fresh ideas settled into place. By integrating twin and quad homes with roof gardens, front yard rain gardens, native prairie no-mow lawns, and a combination of storm water retention and infiltration basins for storage and pretreatment, we were able to design this five-acre site to maintain pre-development runoff rates and volumes for up to a 100-year frequency storm.</p>	2:00	<p>Urban BMP Manual for Small Sites (under 5 acres) <i>Gary Oberts, Planning Analyst, Metropolitan Council Environmental Services; Charles Hathaway, Project Engineer, and Fred Rozumalski, Ecologist, Barr Engineering Company, Minneapolis</i></p> <p>A manual of commonly used "best management practice" (BMP) design has been prepared for use on new and redeveloped sites less than five acres. Forty BMPs, a selection matrix, climatic factors, an annotated bibliography, local examples, and model ordinances are contained in the manual. Each BMP has a section complete with description and design details, purpose statement, advantages/limitations, graphics, maintenance, and much more.</p>
2:30 Refreshment Break					
3:00	<p>Low Impact Development – Infiltration Moderators: <i>Christina Peterson and John Boynton</i></p> <p>Infiltration as a Watershed Management Tool <i>Brett H. Emmons and Camilla Correll, Emmons & Olivier Resources, Inc., Lake Elmo</i> <i>Matt Moore, South Washington Watershed District</i></p> <p>The South Washington Watershed District (SWWD) is emphasizing the preservation of natural infiltration in a rapidly urbanizing landscape. Infiltration benefits include protecting water quality, quantity, and groundwater. Managing infiltration has included field monitoring and modeling since 1997. The process included a technical advisory committee to ensure sound storm water management decisions.</p>	3:30	<p>The Aesthetics of Infiltration BMPs <i>Fred Rozumalski, Barr Engineering Company, Minneapolis</i></p> <p>One of the primary objections to the implementation of rainwater gardens and other infiltration BMPs is the perception that they will look messy and detract from the beauty of a site. Understand where people are coming from and what they expect in our Midwestern landscapes, and see how this pertains to the design of storm water treatment practices.</p>	4:00	<p>Ideas, Concepts of Basins <i>William McCully, CE, P.E., University of Cape Town</i> <i>Derek Lash, CE, Michigan Technological University</i></p> <p>The speaker will present some new ideas which alleviate storm water runoff problems with the use of dry detention basins. With slight modifications to the pond design, a dry detention basin could be transformed into a multi-use area. Uses would include infiltration basins, overflow parking areas, filtering mechanisms, open spaces, and recreation and public value credit areas.</p>
4:30 Adjourn and Reception					

Concurrent Sessions

Session B - Rural Issues

Moderators:

Paul Wotzka, Dennis Fuchs

1:00 **The Dual Nature of Nonpoint Agricultural Pollution: Farm Level Production Decisions and Site Characteristics**

Mary Renwick, Water Resources Center, University of Minnesota

Policy makers increasingly demand information on the economic and environmental implications of alternative agricultural production practices. Pollution from agricultural sources depends both on production practices and site conditions. This talk examines the linkages between management practices, profits, and water quality.

2:00

Using ArcView GIS and the HEC-GeoHMS extension, the original digital elevation model (DEM) of the Upper Devils Lake drainage basin was subtracted from a filled, depressionless DEM grid, creating a new grid with only the depths in all of the depressions. Classification of the depressions utilized aerial photos (digital orthoquads), USGS digital quad maps, National Wetlands Inventory data, and flow direction data generated by HEC-GeoHMS.

Ecological and Flood Damage Reduction Indicators for Watershed Decision Analysis

Mark R. Deutschman, Ph.D., and Cheryl D. Feigum, Ph.D., Houston Engineering, Inc., Jerry Bennett, Wild Rice Watershed District, Ada, Minnesota

The Wild Rice Watershed District, a local governmental unit responsible for water resource management within a 2,080 mile area in northwestern Minnesota, began the "Systems Approach Planning Process" (SAPP) in 1996. The SAPP is a comprehensive,

consensus-based planning process aimed at: 1) identifying high priority natural resource and flooding problems; 2) establishing written natural resource and flood damage reduction goals; and 3) identifying, selecting, and implementing the "best" alternative to achieve the goals.

A unique aspect of the SAPP was the development and use of quantifiable ecological and flood damage reduction "indicators." These indicators were developed as a method to evaluate the ability of various alternatives to attain the goals established by the District, thereby aiding in the decision analysis process. Indicators were linked to specific ecological and flood damage reduction endpoints. The endpoints represent ecological and flooding processes or mechanisms. Measurement variables quantify the change in the condition of the resource for the proposed alternatives.

1:30 **Delineation and Classification of Prairie Pothole Wetlands Using GIS and Aerial Photos**

Richard L. Voigt, Jr., P.E., Polaris Group, Inc., A. Jake Gusman, P.E., West Consultants, Inc., Selena M. Forman, Ph.D., P.E., West Consultants, Inc., and Hydraulics & Hydrology Branch, St. Paul District, U.S. Army Corps of Engineers

2:30

Refreshment Break

Modeling and Flooding

Moderators:

Jim Fallon and Dave Ford

3:00 **San Antonio River Tunnel Model Study at St. Anthony Falls Lab**

*John R. Thene, St. Anthony Falls Laboratory, University of Minnesota
John Gulliver, Department of Civil Engineering, University of Minnesota*

The San Antonio River Tunnel diverts 7,000 cfs under San Antonio. It includes a side channel spillway, drop shaft and a 3-mile, 24.3-foot tunnel. During its first major flood, the vortex suppressor failed under fatigue. John Thene will present the problem diagnosis and solution, and investigate the lessons in design.

3:30

Grand Forks/East Grand Forks Flood Damage Reduction and Recreation Project

Lisa Hedin, U.S. Army Corps of Engineers, St. Paul District

Record flooding in the Red River Valley during the spring of 1997 captured national interest. Since then a flood damage reduction project with recreation features has been formulated and designed, and construction is underway in the cities of Grand Forks, North Dakota and East Grand Forks, Minnesota. This session will focus on identification of the plan and challenges to its implementation.

4:00

Planning and Implementation of Infiltration Measures for Volume Control and Protection of Trout Streams in Lakeville, Minnesota
*Greg Wilson, Barr Engineering Company, Minneapolis
City of Lakeville Representative (to be announced)*

The City of Lakeville South Creek Management Plan was prepared to minimize impact and preserve habitat for trout streams. Study goals and recommended protective measures addressed infiltration, stream buffer design, and baseflow under drought conditions. Resulting construction projects and the monitored effectiveness of these protective measures will also be discussed.

4:30

Adjourn and Reception

Concurrent Sessions

Session C - Ponding and Restoration

Moderators:
John Boynton and James Fallon

1:00 **Storm Water Basin Sedimentation Rate and Composition Study**

Eric Macbeth, Gun Club Lake Watershed Management Organization, Minneapolis
Todd Hubmer, WSB & Associates, Inc.

Five storm water basins, each with differing land uses, were selected for this study. Sediment accumulation rates were measured and samples were collected in each basin. Samples were analyzed for phosphorous and metal content. This report will summarize how land use affects the accumulation of sediment in storm water basins.

1:30

Prestemon Park Wetland Restoration

Bob Barth & Dan Edgerton, Bonestroo, Rosene, Anderlik & Associates, Inc., St. Cloud
Kevin Hansen, City of Columbia Heights

This project began as one of several elements intended to relieve chronic flooding at the intersection of 40th Avenue NE and McKinley Street NE in the City of Columbia Heights. The presentation will focus on the complex nature of both flood control and natural area restoration within a highly urbanized environment.

2:00

Mouse River Park Streambank Bioengineering, Renville County, North Dakota

John Smyth & Keith Yapp, Bonestroo, Rosene, Anderlik & Associates, Inc.

Severe streambank erosion had occurred on the Mouse River in Renville County. A number of cabins located in Mouse River Park were under immediate threat of structural damage as a result of the erosion. The county proposed a demonstration project that used four different bioengineering techniques to address the erosion problem. This session will discuss the techniques used.

2:30

Refreshment Break

Lake Analysis

Moderators:
Nels Nelson and Christina Peterson

3:00 **Managing Phosphorus by Alum Treatment**

Keith Pilgrim and Patrick Brezonik, Ph.D., Department of Civil Engineering, University of Minnesota

Urbanization and the current system for the conveyance of storm water in developed areas have caused excess nutrient loading to lakes. The speaker will try to identify the reason for the apparent failure of techniques that depend upon settling to remove phosphorus to restore lakes and how alum might be used to address this problem.

3:30

Clear Lake Water Quality Improvements, Clear Lake, Iowa

Rich Brasch, Ismael Martinez, and Ted Field, Bonestroo, Rosene, Anderlik and Associates, Inc., St. Cloud

Storm drains discharging to the waterfront in downtown Clear Lake, Iowa were known sources of high bacteria loadings to the adjacent public beach. The city of Clear Lake was interested in implementing structural BMPs to protect lake front water quality while at the same time continuing their search for the cause of the high bacteria contributions. Because of space constraints in the fully developed downtown area, conventional BMPs such as detention basins were not a viable option. This session deals with the design and installation of a unique below-ground storm water filtration system that was installed in late 2000 to treat runoff prior to discharge.

4:00

Engineering Aspects of a Lake Water Quality Improvement Project

Suresh Hettiarachchi, Robert Beduhn, Anthony Luft, David Johnson, and Keith Quernemoen, HDR Engineering Inc., Minneapolis
Eric Evenson, Minnehaha Creek Watershed District, Minneapolis

This session will discuss the many conflicts, design, and construction issues that had to be solved by the engineering team surveying the multiphase/multicomponent project, initiated by the Minnehaha Creek WD to reverse the deterioration of water quality in Lake Nokomis due to high phosphorus loading.

4:30

Adjourn and Reception



Special Workshop

Designing and Evaluating Low Impact Developments

Wednesday, October 31, 2001
8:30 a.m.-4:30 p.m.

Purpose

This workshop will provide hands-on training on how to design and evaluate development projects to meet the goals and objectives of "low impact development." LID is an innovative approach to storm water management that emphasizes the control of runoff at the source. Attendees will be introduced to a new perspective in urban storm water managements and will gain a practical understanding of how to apply this powerful new technological solution for watershed and water resources protection.

Who Should Attend

This is a technical course intended for design professionals and will be of particular interest to land use/development planners, civil/environmental engineers, landscape architects, and environmental professionals/consultants. A sound understanding of storm water management approaches and the ability to easily use a calculator are prerequisites for this workshop.



Learning Objectives

- Course participants can expect to:
- 1) Understand the limitations of conventional (end of the pipe) storm water management
 - 2) Learn the current state-of-the-art ecosystem-based storm water management
 - 3) Understand the new paradigms, principles, and practices of LID watershed management
 - 4) Understand the application of these technologies to meet the requirements and objectives of current and future storm water management goals
 - 5) Learn the LID Site Planning Process and how this meshes with Conservation Site Design
 - 6) Know how to apply the LID Hydrologic Analysis and other LID evaluation systems
 - 7) Understand how to promote these practices locally
 - 8) Understand how these approaches perform in a northern climate and what modifications may be necessary for Minnesota

Highlights

The course will demonstrate how to develop land and maintain the predevelopment hydrologic regime by using new storm water management principles and practices to create a hydrologically functional landscape. Urban applications will demonstrate and review the principles and practices for retrofit of existing infrastructure. Voluntary and regulatory incentives for implementing LID will be discussed. Cold climate issues will also be addressed. Participants will receive hands-on training through worked examples and calculations.

Materials

Attendees will receive copies of the *Low Impact Design Manual*, *Dakota LID Evaluation System*, and handouts on public education, bioretention, and presentation materials. All materials will be provided on CD.

Format

The one-day lecture/participation course presented primarily with instructional and diagrammatic slides, and handouts. Handouts will include outlines of slides and overheads and papers on various aspects of LID technology. Open discussion and questions will be encouraged throughout the session. Local design examples will be presented and participants will work through the LID design approach and application.

Instructors

- Neil Weinstein*, Low Impact Development Center, Inc.
- Jason Naber*, Emmons and Olivier Resources, Inc.
- Jay Riggs*, Dakota Soil and Water Conservation District

Workshop fee: \$100 by October 16, \$120 after October 16

This workshop awards 0.6 CEUs.

Please bring a calculator with you to the workshop.

Registration

34th Annual Water Resources Conference
October 30, 2001

Designing and Evaluating Low Impact Developments Workshop
October 31, 2001

ENGR 0009 -001/002
318-2834

Name (Last) (First) (M.I.)

Social Security No. (for CEUs)

Business Address (Street) (City) (State) (Zip)

Employer Title/Position

Work Telephone Fax E-mail

- I agree to be listed on the conference registrant list for distribution to participants.
- I would like to select a vegetarian meal for the luncheon.

Fee Information:

34th Annual Water Resources Conference, October 30

- 001** \$130 registration fee postmarked by October 16
- \$150 registration fee postmarked after October 16
- I cannot attend; please notify me of future offerings.

Designing and Evaluating Low Impact Developments Workshop, October 31

- 002** \$100 registration fee postmarked by October 16
- \$120 registration fee postmarked after October 16

Payment Method:

- Check or money order payable to **University of Minnesota** is enclosed.
- Bill my employer (purchase order or letter of authorization must be enclosed).
- Please charge my credit card for \$_____

___VISA ___MasterCard ___Discover/NOVUS ___American Express

Account No. Expires

Name as printed on card

Signature

Please circle which concurrent Water Resources session you plan to attend.

1:00 p.m.	A	B	C
3:00 p.m.	A	B	C

If your check is returned because of insufficient funds or closed account, or because you have made a stop payment request, you will be charged a check handling fee of \$20.

Mail registration (along with payment) to:

ENGR 0009
University of Minnesota
20 Coffey Hall
1420 Eckles Avenue
St. Paul, MN 55108-6069

Or register online at:

<http://register.cce.umn.edu>.
• Enter event ID number 173348 (34th Water Resource Conference)
• Enter event ID number 173420 (Special Workshop) (credit card registrations only)

The information on this form is private data, used to identify and locate you, obtain payment, and enable instructors to better know their audience. Information on this form, except Social Security number, may be shared with instructors and program cosponsors. Name, address, and payment method are mandatory. If you desire CEU certification and do not supply a Social Security number, an alternative identifier will be used.

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612-624-5359 (with purchase order or credit card information)