



St. Anthony Falls Lab and the Water Resources Center at the University of Minnesota present the:

Assessment of Stormwater Best Management Practices Newsletter


A quarterly newsletter designed to share news, current assessment efforts, and contact information related to the development of an assessment protocol for stormwater best management practices.

Projects sponsored by:



<http://wrc.umn.edu/outreach/stormwater/bmpassessment/index.html>

***Stormwater BMP Effectiveness Evaluation:
Quest for More Accurate, Cheaper, and Faster Methods of Assessment
February, 2007***



Executive Summary

Partnerships are crucial to our quest for improving the assessment of stormwater BMP effectiveness for cities, counties, watershed districts and associated water managers. For more information, or if you would like to share information, data, or coordinate efforts, please contact Andy Erickson (eric0706@umn.edu).

This newsletter features:

- Project progress
 - Assessment of Stormwater Best Management Practices
 - Rain Garden Assessment (funded by Met Council)
 - Proprietary Device Assessment (funded by LRRB and Met Council)
 - Sampling suspended solids
- Project Outreach and Collaboration
 - Technical Advisory Panel (TAP) meetings
 - Workshops
 - Project website
 - Project presentations
 - “Reinventing the Wheel”
- Current/Future Assessment Efforts Update

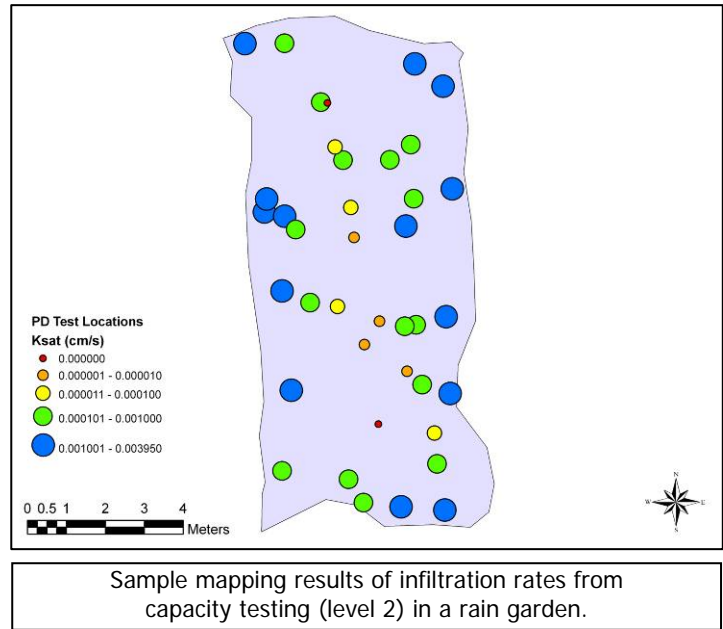
Project Progress

The Minnesota Pollution Control Agency (MPCA) has contracted the University of Minnesota, through St. Anthony Falls Lab and the Water Resources Center, to develop and test a guidance document for the **Assessment of Stormwater BMPs**. The assessment document will provide guidance for municipalities, counties, engineering firms, and other entities on how to assessment stormwater BMPs using the four levels of assessment: (1) visual inspection, (2) capacity testing, (3) simulated runoff testing, and (4) monitoring.

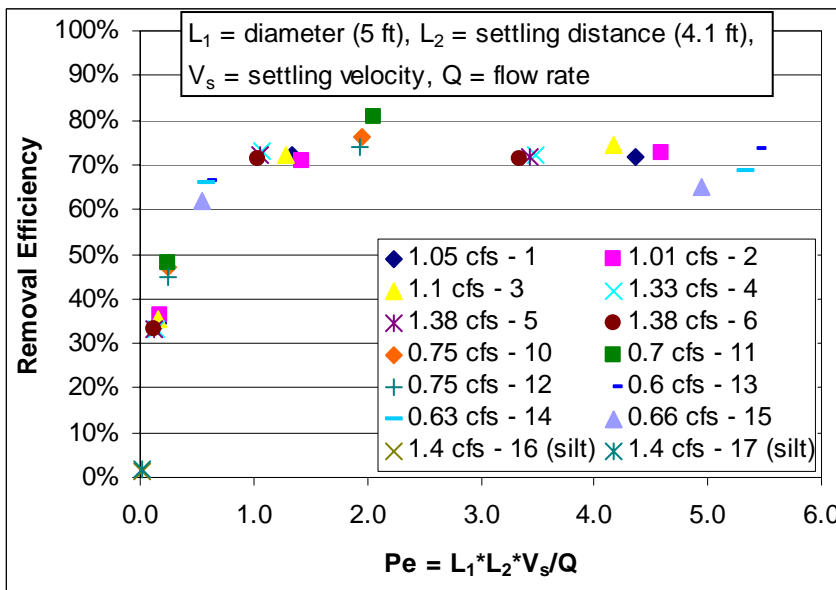
The project team is revising the Assessment document chapters and the first draft is scheduled for public review in starting in February, 2007. If you would like information about the public review, please contact Andy Erickson (eric0706@umn.edu). The outline for the assessment document is:

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|-------------------------------------|--|
| 1. Introduction | 10. Sedimentation Practices |
| 2. Stormwater Processes | 11. Biologically Enhanced Practices |
| 3. Developing an Assessment Program | 12. Data Analysis and Reporting Results |
| 4. Water Budget Measurement | 13. Future of the Protocol |
| 5. Sampling Methodology | Appendix A: Case Studies |
| 6. Analysis of Water and Soil | Appendix B: Selection and Use of Permeameters and Infiltrimeters |
| 7. Source Reduction | Appendix C: Standard Procedures for Visual Inspection of Stormwater BMPs |
| 8. Filtration Practices | |
| 9. Infiltration Practices | |

Funds provided by the Metropolitan Council Environmental Services (Met Council) are being used to assess **rain gardens** in the Twin Cities metropolitan area. Level 1 assessment, visual inspection, was used as part of site selection to prevent futile assessment of rain gardens that are not functioning. Level 2 assessment, capacity testing, was applied to several rain gardens around the Twin Cities metropolitan area to estimate infiltration rates. A sample of the results from level 2 assessment is shown in the figure at right. Additionally, level 3 assessment, simulated runoff testing, of some rain gardens has been conducted to estimate infiltration rates and correlate level 2 and level 3 assessment results and laboratory calibration of several infiltrometers and permeameters continues at St. Anthony Falls Lab (SAFL).



The field testing of **underground proprietary devices** is still underway through a project funded by both Met Council and the Local Road Research Board (LRRB). Level 3 assessment, simulated runoff testing, has been used to evaluate the sediment retention efficiency of four devices located throughout the Twin Cities Metropolitan Area for sand and silt sized particles. Some tracer studies have also been conducted



to measure the hydraulic conditions of some devices. A sample performance curve of removal efficiency versus Peclet (pronounced peck-lay) number is shown at left. The Peclet number is a dimensionless parameter that relates advection to diffusion and can be used to compare devices of varying size for various particle size distributions.

The MPCA has also provided funding for experiments to investigate the accuracy and limitations of automatic samplers for **sampling suspended solids**. Automatic samplers are ideal for sampling because personnel are not

required to be present during a storm event for samples to be collected. Laboratory tests have shown, however, that automatic samplers do not collect representative samples because sampler intake location and the velocity at which the sample is taken can affect the accuracy of automatic samplers. Experiments are being conducted to improve current sampling techniques and evaluate new methods for sampling suspended sediment.

Project Outreach and Collaboration

The assessment project has hosted three **Technical Advisory Panel (TAP)** meetings at St. Anthony Falls Lab (SAFL) in Minneapolis, MN. The TAP is composed of consultants, city engineers, watershed districts, and other organizations specializing in water and stormwater management which provide specific technical guidance on the protocol and the project. The next TAP meeting is currently being scheduled for late February, early March, 2007.

The public review of the assessment document will include three **workshops** scheduled for March, 2007 in Duluth, Rochester, and St. Paul, MN with potentially more workshops to follow. Those that attend the workshops can review and comment on the assessment document, learn more about the project and partnering efforts, and use data from case studies to assess stormwater BMPs based on the methods described in the assessment document.

The project team has developed a **website** for information about the project including helpful links, contact information, past newsletters, and presentations. More information and downloads will be added as they become available. The website is hosted by the Water Resources Center at <http://wrc.umn.edu/outreach/stormwater/bmpassessment>.

Additionally, the assessment document and associated research will be, or has been featured in several **presentations**, including:

- EWRI World Environment & Water Resources Congress, Tampa, FL (May 15-19, 2007)
- Ramsey Washington Metro Watershed District, Little Canada, MN (Feb 5, 2007)
- Environmental Engineering Seminar Series, Minneapolis, MN (Feb 2, 2007)
- Water Resources Seminar Series, St. Paul, MN (Jan 26, 2007)
- Water Resources Seminar Series, St. Paul, MN (Nov 2006)
- AWRA Annual Water Resources Conference, Baltimore, MD (Nov 6-9, 2006).
- MN Water 2006 and Annual Water Resources Joint Conference, Brooklyn Center, MN (October 24-25, 2006).
- EPA Region 5 TMDL Workshop, Kalamazoo, MI (Oct 16-19, 2006)
- Infiltration BMP Workshop, Corcoran, MN (Oct 11, 2006)
- 14th Annual Non-point Source Monitoring Workshop, Minneapolis, MN (Sept. 24-28, 2006)

In an effort to avoid “**reinventing the wheel**,” members of project team have been visiting regionally and nationally recognized experts in stormwater management and assessment. Such visits include Michael Barrett at the University of Texas (July, 2006), the University of New Hampshire Stormwater Center (August, 2006), and the Wisconsin Standards Oversight Council (September, 2006). In addition, our team is represented on the ASTM subcommittee of Stormwater Management Products which will meet in June, 2007. Team members look forward to contacting and visiting other experts in the field of stormwater in the future. If you would like more information, or have information that we might be interested in, please contact Andy Erickson (eric0706@umn.edu).

Current/Future Assessment Efforts

These highlights of ongoing work are not inclusive. Contact Andy Erickson (eric0706@umn.edu) with any additional items to share. The assessment project is led by Dr. John Gulliver, department head of Civil Engineering and Dr. James Anderson, co-director of the Water Resources Center at the University of Minnesota.

- The City of Plymouth has funded a study on street sweeping efficiency (**Shahram Missaghi**)
- Wisconsin DNR is monitoring proprietary device efficiency for size distribution of soil particles and suspended solids for different land uses and watersheds. Stormceptor[®] is complete, Downstream Defender[®] is next. (**Roger Bannerman**)
- Wisconsin DNR is conducting a study on the effects of street sweeping. (**Roger Bannerman**)
- Ramsey Washington Metro Watershed District is currently monitoring several sites and intends to monitor its new facility for green roof and porous asphalt effectiveness. (**Cliff Aichinger**)
- University of Minnesota (UMN) is assessing rain gardens for infiltration effectiveness while developing a protocol for testing infiltration and filtration stormwater BMPs with funds received from Metropolitan Council Environmental Services. (**Andy Erickson**)

- University of Minnesota (UMN) is assessing approximately 4 underground proprietary devices for sediment retention effectiveness while developing a protocol for field testing these proprietary stormwater BMPs with funds received from the Local Road Research Board and Metropolitan Council Environmental Services. (**Omid Mohseni**)
- Three Rivers Park District is monitoring six (as three paired) watersheds for the effects of restricting phosphorus fertilizers in Maple Grove and Plymouth as well as other practices and sites. (**John Barton**)
- Dakota County Soil and Water Conservation District is measuring infiltration rates at demonstration rain garden sites using the Turf-Tec infiltrometer commercially available to golf course managers. (**Mike Isensee**)
- Dakota Soil and Water Conservation District is evaluating rain gardens in the Twin Cities for cold climate infiltration during winter months through a WERF grant. University of Minnesota is coordinating with this effort to continue infiltration measurements throughout the year. (**Jim Davidson**)
- Partner contract with UMN and MPCA to model the effects of urban stormwater runoff on trout stream temperatures is currently gathering data and developing a model. (**Heinz Stefan**)

Thank you for taking the time to read this newsletter. If you have any questions or suggestions, please contact Andy Erickson (eric0706@umn.edu).

Sincerely,

Stormwater Best Management Practices Assessment Project Team

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