Stormwater initiative looking for sustainable, educational answers

Evaluation to set tone for approach new to Indiana

Purdue is about to embark on a major effort toward sustainability by addressing the environmental impact of campus stormwater runoff.

The University recently approved the selection of the engineers for the Campus-Wide Sustainable Stormwater Modifications Design, which, along with the Boiler MACT project and the High Voltage Project, is part of the long-term Strategic Infrastructure Improvements Initiative.

Purdue's groundwater-sourced potable water supply to campus is protected by a carefully managed wellhead protection area. Purdue also has its own municipal separate storm sewer system (MS4), as co-permittees under the Clean Water Act's National Pollutant Discharge Elimination System Phase II program ("NPDES Phase II") with the City of West Lafayette and Tippecanoe County. This storm water permit requires Purdue to improve stormwater treatment, and the wellhead protection program requires that Purdue protect its ground water from contamination. The NPDES Phase II permit and the wellhead protection requirements empower Purdue to improve existing conditions and address potential problems.

Purdue's initial approach to addressing the required improvements was a typical "end-of-the-pipe" approach involving a large concrete settling basin, to capture any possible pollutants as stormwater drains into a pond south of campus. This was the working concept as recently as the late 1990s.

However, as the planning evolved, Physical Facilities realized that the regulatory challenge placed in front of them was a tremendous opportunity to broaden the compliance by looking for "green" ways to address stormwater at its source.

Doing a new thing

Meliora Environmental Design, LLC, along with Andropogon Associates, Ltd., has been awarded a contract to evaluate the University's existing stormwater management plan and site conditions, and provide recommendations for the implementation of best management practices (BMPs). For every recommended improvement, the firm will also provide a cost-benefit analysis so that Purdue can strategize the implementation of the improvements.

This approach to sustainable stormwater is a first for the state of Indiana. Meliora and Andropogon previously worked with the University of North Carolina at Chapel Hill on a similar campus-wide project, and have done several individual sustainable stormwater projects at other universities, including the Cornell, Clemson, Penn State, Yale, and the University of Philadelphia.

Their collaboration at the University of North Carolina was so successful that they were asked to present their designs at the national Greenbuild conference in Chicago in November 2007.

After the evaluation and recommendation phase, Meliora will create a stormwater master plan out of which specific, individual projects will be scheduled. Ultimately Purdue will invest over $6 million on sustainable stormwater improvements and wellhead protection across the entire West Lafayette campus.

Examples of improvements that could be suggested include:

- Creating rain gardens, areas in which rainwater naturally collects into small ponds that are surrounded by plants that help filter any pollutants before the water drains into the ground below.
- Paving areas with porous surfaces which allow rainwater to drain into the earth while pollutants such as oil from vehicles remains on the surface to be removed manually.
- Green roofs.
- Stormwater re-use systems.

Living and learning

Such improvements will become a "learning laboratory" for campus. Signage at key locations will explain how the project functions and how it benefits campus and the environment, serving as a public outreach and education tool.

Purdue is hopeful that the projects together even reach the same standing as the University's work with preserving trees, to the point of anticipating a self-guided stormwater tour opportunity comparable to Purdue's self-guided Tree Tour.

Robin Ridgway, Physical Facilities' environmental regulatory consultant and chair of Purdue's Sustainability Council, stresses the multiple benefits of such a forward-thinking approach.

"Sustainability is not just about the far-reaching discoveries our researchers make here every day that will have a dramatic impact on everyone's lives in the future," she says. "Sustainability is also about the here and now; the impacts in real time that have tangible and direct benefits, both economically and environmentally.

"The Campus Sustainable Stormwater Project is a fantastic example of how daily problem solving on campus can be raised to a higher level of stewardship."

Improvements may help with landscaping needs and campus appearance. Other utility projects and construction projects currently in the design phase are being reviewed for opportunities to incorporate "green" stormwater solutions.

In addition, the project will be integrated with the Campus Master Plan, which is under development, and will change how future development of the campus gets done with respect to stormwater.

As the University commits itself to becoming a more sustainable campus, the stormwater improvements project is a significant step in that direction. The study will be complete by early this fall, and implementation of improvements is expected to get under way later this year.