REINING IN RUNOFF

Low-Impact Development Helps Townships Achieve Stormwater Goals

Low-impact development is growing in popularity with townships and engineers due to its effectiveness and cost efficiency. Flooding and MS4 requirements require solutions, and low-impact development checks plenty of boxes for townships that want to control where runoff goes and what it does once it gets there.

BY CHRIS BRADY / ASSISTANT EDITOR

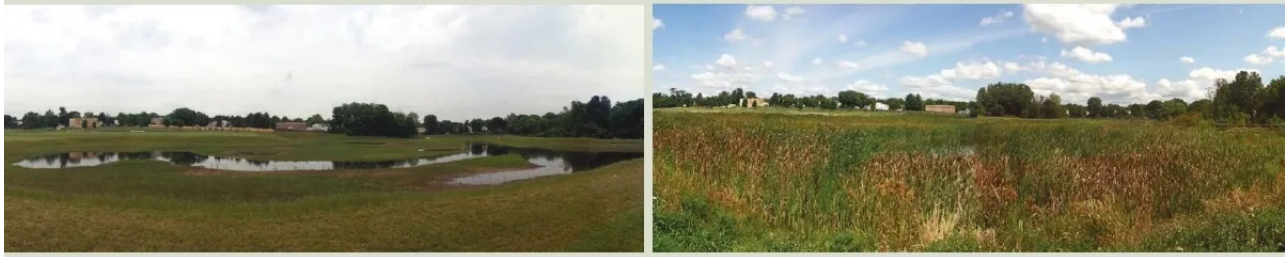
Mention stormwater, and you'll see the ears of township officials perk up. This newest unfunded mandate is one of the most discussed aspects of local governance in recent years thanks in part to MS4 *(municipal separate storm sewer system)* requirements placed on select large and small municipalities throughout a large swath of Pennsylvania, as well as flooding issues prevalent in many areas of the commonwealth.

While stormwater is a word township officials know well, the methods for dealing with it can vary widely. Topography at the development site, proximity to a wetland, and project size are but a few factors. Stormwater management today is increasingly diversified thanks to lessons learned, forward thinking, and common-sense ingenuity.

Low-impact development (LID), which is growing in popularity, incorporates everything from manmade retention systems and native vegetation rain gardens to the latest technologies, such as porous asphalt. Understanding the underlying problems and the many solutions are key to success for municipalities seeking to address issues related to stormwater without busting budgets or hindering development.

Stormwater runoff can pose many problems for townships. Luckily, there are plenty of remedies available to townships tasked with managing stormwater. From innovative techniques to simple natural options, townships can tackle the issue sometimes without worrying about busting the budget.

"One of the practices that this township has that is not universal is **we really encourage developers to sit down with us and explain what they are thinking of doing even before submitting anything else** so we can discuss what might work, what might not work."



Whitemarsh Township in Montgomery County oversaw the construction of a wetland project at an undeveloped township-owned parcel (McCarthy Park) with the goal of treating urban stormwater, improving water quality, adding additional storage volume, and restoring riparian corridor buffers and natural habitats. Shortly after construction, the basin was tested by a 100-year storm and demonstrated its capability to reduce peak runoff flow rates and mitigate downstream flooding. At left is the area before construction and at right is the completed wetland. *(Photos courtesy of Whitemarsh Township.)*

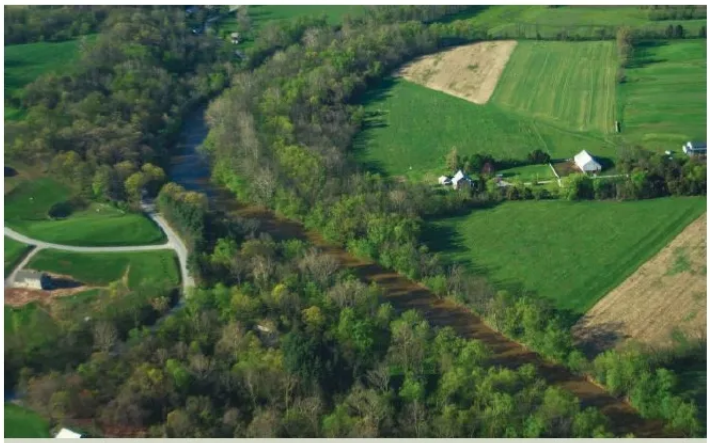
Understanding low-impact development

The U.S. Environmental Protection Agency defines low-impact development as systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat. LID is an approach to land development or redevelopment that works with nature to manage stormwater as close to its source as possible.

LID has the potential to reduce infrastructure costs and land clearing costs while increasing property marketability. It also can reduce sediment and nutrient loads to waterways while preserving natural vegetation and trees.

The state Department of Environmental Protection (DEP) published the *Pennsylvania Stormwater Best Management Practices Manual* in 2006. The manual established a regulatory standard to reduce pollution and preserve the commonwealth's water resources through various best management practices, or BMPs, while providing for growth and development.

The goal is to control stormwater discharges and prevent runoff from adversely affecting water quality. When a landscape is changed, an entire natural hydrologic cycle can be changed. Impervious surfaces, such as streets, parking lots, and rooftops, prevent runoff from percolating into the ground and can cause it to collect debris, sediments, chemicals, and other pollutants as it moves, potentially to the nearest body of water.



A healthy riparian buffer can protect a waterway from storm runoff as well as sediment pollution, especially in agricultural areas. *(Photo courtesy of DCNR.)*

Stormwater 101: Getting started

Issues related to stormwater can have many root causes. Determining the cause is the first step toward resolution, according to Tyler Herb, financial services specialist with Herbert, Rowland & Grubic in Harrisburg.

"Is it failed infrastructure, a pipe that needs [to be] replaced or is the incorrect size? Is it that you have failing stormwater retention ponds? You can provide an increase in effectiveness by doing some stormwater BMPs," Herb says.

Taking a holistic approach can prove beneficial, he adds. Resolving infrastructure issues and addressing stormwater management requirements such as pollutant reduction can be intertwined. Engage with township staff and engineers to find the source of the problem, Herb suggests. A municipal problem may originate on private property, which can complicate things. Some issues can be addressed with simple maintenance while others will require engineering expertise.

PSATS offers seminars and workshops addressing these matters throughout the year and during the Annual Educational Conference slated for April 23-26 in Hershey. Upcoming webinars include "More Than Water: Other Benefits of Stream Restoration" on February 8 and "Preparing for a DEP MS4 Inspection" on February 22. More information is available at **www.psats.org/webinars**.

Simply acknowledging the issue is key as well. ➤

"What I've seen in municipalities is there are so many issues across the board," says Kara Kalupson, senior MS4 coordinator with RETTEW in Lancaster. "Stormwater doesn't seem to be as important as other issues they deal with, from police to roads, so they don't pay as much attention to it."

Transparency and a willingness to engage the public can go a long way toward ensuring a successful, seamless project, according to Charlie Guttenplan, director of planning and zoning for Whitemarsh Township in Montgomery County.

"One of the practices that this township has that is not universal is we really encourage developers to sit down with us and explain what they are thinking of doing even before submitting anything else so we can discuss what might work, what might not work," he says. "We encourage developers to meet with neighbors who will be impacted. We don't want our township meetings to be the first-time discussion."

Guttenplan says the township encourages this open forum both in and outside meetings. It allows developers to respect and respond to concerns of residents, which can potentially ward off criticisms that arise after something is in print or approved through the supervisors.

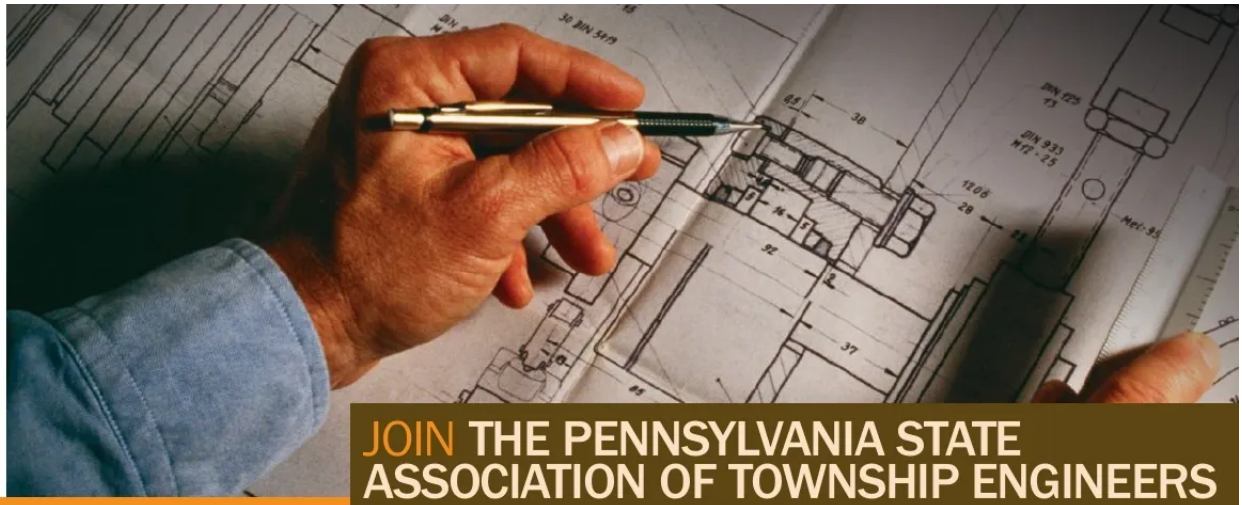
Success is community-driven

Whitemarsh Township has nearly 20,000 residents and varied development ranging from dense to rural. The township is actively working to update its 17-year-old Conservation Design Overlay District ordinance, which, coupled with the DEP model ordinance for stormwater management, sets parameters for development.

Low-impact design and development have been incorporated into numerous projects the township has overseen, including at parks and recreation sites and at the municipal site, where a rain garden was updated to manage runoff from roofs and impervious surfaces. Even in the historical districts, the township encourages the use of rain barrels and actively works to protect legacy trees to further reduce stormwater issues.

With aging retention basins, the township has contracted a firm to craft plans to keep those basins from becoming overrun with invasives and potentially leading to costly maintenance.

"With a wetland basin, you put all these plants in, and I think the thought is you just let it go, nature does its thing, but there's a lot more maintenance required than is realized," says Krista Heinreich of Gilmore & Associates, who serves as the township's



JOIN THE PENNSYLVANIA STATE ASSOCIATION OF TOWNSHIP ENGINEERS

Serve your township better.

BENEFITS OF MEMBERSHIP

- **Subscriptions to:**
  - The ***Township Engineer***, the official monthly e-newsletter of the Township Engineers Association
  - The digital edition of the ***Pennsylvania Township News***, the monthly magazine of the Pennsylvania State Association of Township Supervisors
  - The **PSATS *Morning News***, the award-winning daily e-newsletter that will keep you up to date on legislation and other breaking news affecting townships
- **Lower member rate** to attend all PSATS training courses, including semi-annual seminars addressing current issues and monthly webinars on topics of interest to municipal engineers
- **Sample ordinances** and resolutions
- **Online access** to the Members Only content on the PSATS website, including an online discussion group for municipal engineers
- Access to **Webinar PowerPass** *(additional fee; all eligible PSATS webinars for one price)*
- **Reduced advertising rates** in the *Pa. Township News* Professional Directory
  - $725 a year for a professional card *(a $100 discount off the $825 non-member rate)*

NETWORK with other township engineers and stay on top of municipal engineering issues

For more information about how you can begin receiving the benefits of membership in the

Pennsylvania State Association of Township Engineers

CALL (717) 763-0930, ext. 128

or visit engineers.psats.org and click on "Join Now."

ANNUAL DUES:
- Individual — $210
- Township engineer — $125 *(a licensed professional engineer employed full-time by a PSATS member township)*
- Engineering Firms — $400 *(up to 3 people)* or $750 *(4 or more people)*

engineer. "Now that these things have been in place some 10 to 20 years, the invasives have been discovered, and it's a more expensive pursuit to get rid of them once they really set in than to do some preventative maintenance along the way."

A retrofitted stormwater basin — which is designed primarily for flood prevention — can allow for not only the retention of stormwater but also the absorption and filtering of runoff, which ultimately protects nearby waterways. Township officials can consult with engineers on potential retrofitting of existing basins.

Having an active, engaged citizenship has proven beneficial as Whitemarsh Township tackles projects from new development to township park upgrades.

"Our residents are pretty well-informed, and when they see things go in, they are happy and sort of know what they are," says Heinreich. "We have an active EAB [Environmental Activity Board], just a lot of well-informed, environmentally conscious residents."

Tom Blomstrom, director of parks and recreation for the township, credits "enviroteers" with planting native trees and re-establishing tree canopy in the community alongside the Shade Tree Commission, Pennsylvania Tree Tenders, and Colonial Canopy Trees. Smaller townships with smaller volunteer bases can benefit from numerous resources available through county conservation districts.

Just over a decade ago, Whitemarsh Township completely renovated Leeland Park by adding porous asphalt walking paths, rain gardens, and more open space to the three-acre park. At another park, the township constructed a large wetland to help control stormwater runoff and improve water quality. The project on the five-plus acre parcel included naturalization of an existing detention basin, riparian corridor restorations, and revegetation and reforestation of disturbed areas.

Shortly after construction, the area saw a 100-year storm. The improved basin reduced peak runoff flow and mitigated downstream flooding, according to township officials.

Guttenplan credits the township Shade Tree Commission for its help with various projects. The commission remains active and recently completed another planting in the township, he says.

"Our Shade Tree Commission doesn't allow much beyond native [trees], whether in land development or parks," he says. "We have a lot of advisory groups — Open Space Committee, Parks and Recreation Board, Planning Commission — and the folks on those committees and boards are extremely committed to what they are doing. A lot are long-term members. In addition to those groups, citizens are vigilant as well and attend a lot of those meetings."

"Riparian **forest buffers are a great way to help meet not only those MS4 problems,** but also any sort of stream problem."

Taking an aggressive approach to stormwater

Cranberry Township in Butler County is actively working on projects related to stormwater and just wrapped a major effort with the completion of the Community Park Stream Restoration project. Dan Santoro, township manager, says that in addition to MS4 requirements, the township works to reduce flooding and sediment issues in the watershed.

"The majority of the pollutants in the watershed are sediment-based," he says.

The township embraces educational and outreach efforts, just as it has mitigation and remediation efforts, Santoro says. The township recently secured another grant through the county to be used toward streambank restoration. That multimillion-dollar project is headed toward design and permitting.

Cranberry is also part of a multimunicipal effort to address stormwater management and flood reduction in 10 municipalities, the result of a comprehensive Connoquenessing Creek watershed study. Much of it is centered around the reduction of stormwater release rates. The township itself manages stormwater release rates through its own ordinance, some as much as 50% upstream, Santoro says.

None of this is new to the township, he says. For decades, Cranberry Township has actively addressed stormwater issues, using such tools as low-impact development. Perhaps the biggest change the township has seen is addressing not just how much stormwater there is but also what is in the waterways.

"We treat water quality, not just quantity," Santoro says. "Those requirements have been around a little while now; they are not new. From Cranberry's perspective, we've been seriously engaged with stormwater management the last three decades. When development started happening, we got aggressive."

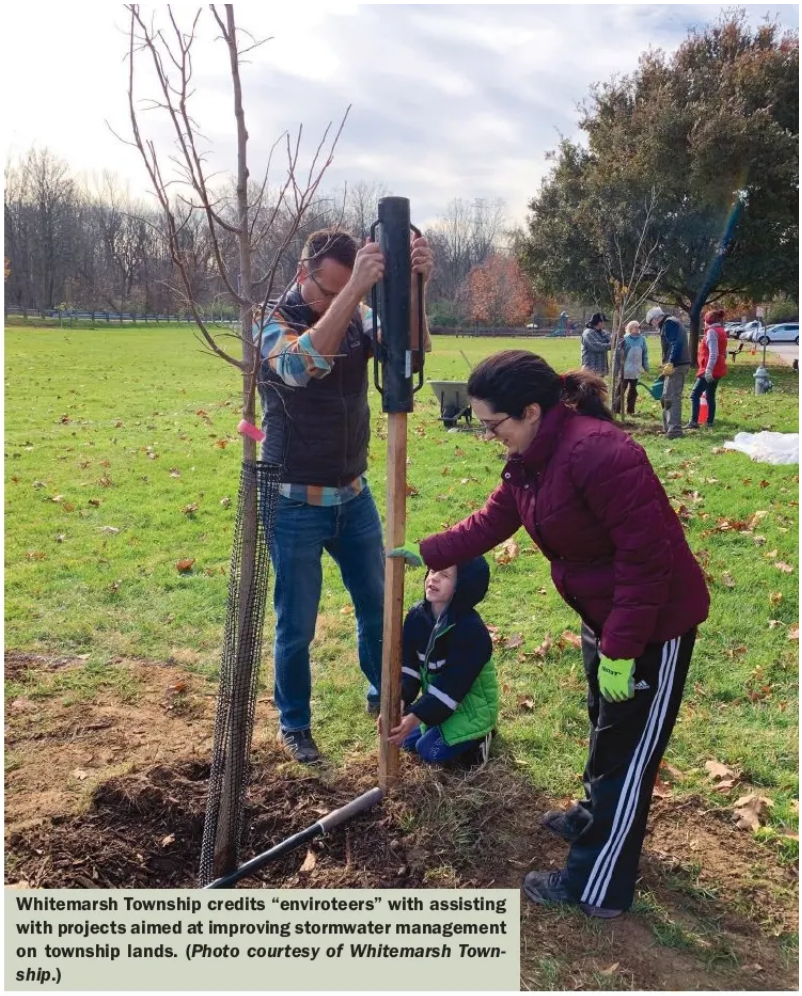
Incorporating LID into new development

South Londonderry Township in Lebanon County requires infiltration at new development sites whenever possible. When it came time to develop The Village at Springbrook Farms several years ago, engineers studied the site's natural conditions and created a stormwater management system that mimicked the existing landscape with a

goal of keeping stormwater as close to the source as possible.

Using pervious concrete sidewalks, porous pavement, vegetated swales with infiltration systems, infiltration basins and beds, rain gardens, and bioretention areas, more than 100 storage/infiltration BMPs were distributed throughout the site, according to Stormwater PA. The system treats pollutants, recharges the groundwater, maintains the water table, and provides flood control while preventing destructive effects downstream. *(To see a case study on the project, go to **www.stormwaterpa.org/low-impact-development.html**.)*

"It's always best if you can keep the water on site and percolate it down through the ground right where it falls," Scott Campbell, project developer and owner of the Brownstone Real Estate Company, told Stormwater PA. "As time goes on, people will come to desire these types of communities, and we



Whitemarsh Township credits "enviroteers" with assisting with projects aimed at improving stormwater management on township lands. (*Photo courtesy of Whitemarsh Township.*)

hope to be able to use that as a marketing feature here."

Riparian buffers and meadows

Pennsylvania has 86,000 miles of rivers, streams, and creeks, according to Trout Unlimited, second only to Alaska. Protecting those waterways is vital to public health, as well as the health of native trout and aquatic species, wildlife, livestock, and more. Outdoor recreation is a multibillion-dollar industry in Pennsylvania, and the rivers, streams, and creeks of the commonwealth play a significant role.

Stream buffers are a natural solution for cleaner water and healthier land, according to the state Department of Conservation and Natural Resources (DCNR). Stream buffers improve wildlife habitats, enrich the landscape, reduce erosion, and provide for cleaner water. Trees and shrubs filter pollution, and streamside buffers improve natural conditions for wildlife.

"Riparian forest buffers are a great way to help meet not only those MS4 problems, but also any sort of stream problem," says Teddi Stark, Watershed Forest Program Manager with DCNR. "Riparian forest buffers are just the planting of trees or shrubs along a waterway, a stream, river, pond, or lake. They help stabilize the streambank, protect it from erosion, and… help filter pollution flowing from land into a waterway. They can reduce water treatment costs and can help slow floodwaters. They will soak up the bulk of water."

Think of the buffers as sponges, Stark says. Results won't be immediate, as plants and trees need time to take root. The investment is minimal, and a bit of maintenance can pay dividends in a short amount of time and well into the future. DCNR provides grant opportunities for townships as well as individuals and groups seeking to take on such projects (*see page 32 for more information*).

Grants require a 20% match, which can include in-kind services, such as volunteer labor, use of township equipment, and more. Trees and other plants — free or discounted — may be available through local conservation districts and the Chesapeake Bay Foundation *(go to **www.cbf.org** to learn more).*

Buffers are not new to the landscape but are gaining in popularity given the success of those planted decades ago, Stark says.

"Those that are well-cared for and maintained are starting to produce results," she says. "We're also seeing that paradigm shift, that a clean, maintained stream is not mowed up to the bank. With the increase in storm events we are seeing in Pennsylvania, people are more interested in doing something about it."

DCNR has a team of seven regional watershed forestry specialists who can visit a township site, assess the situation, and make recommendations, including funding options. For more information about forested buffers, go to **www.dcnr.pa.gov,** choose the Conservation tab and then Water in the drop-down menu, and then select Riparian Buffers in the menu on the right.

Grant funding can also help townships convert a mowed space to a forested area or meadow to help address stormwater, Stark says. ➤

"We've been **seriously engaged with stormwater management the last three decades.** When development started happening, we got aggressive."

Native meadows can reduce runoff, recharge groundwater, reduce pollution, protect wildlife habitat, and beautify the landscape, according to Penn State Extension. Meadows, which are natural to Pennsylvania, consist of native flowers and grasses that are mowed infrequently. They can be planted in place of traditional mowed areas and are meant to be low maintenance.

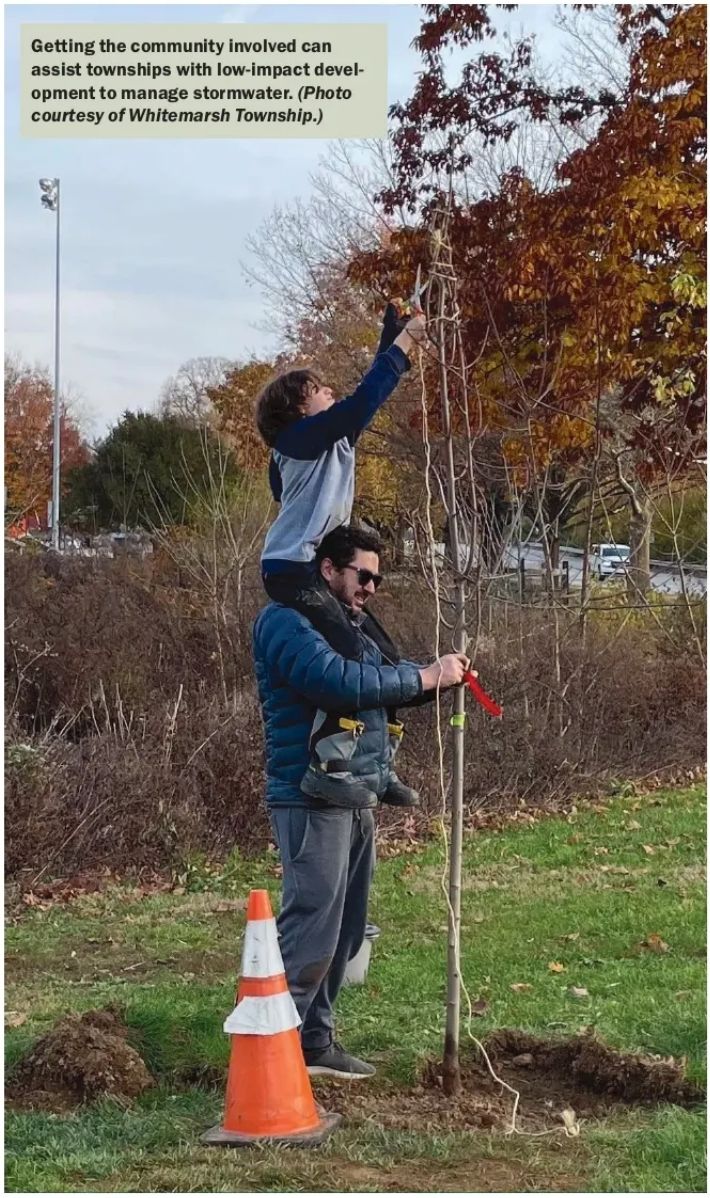
Native meadows work thanks to taller plant structures, which feature longer root systems than mowed grasses and allow for the slowing of water and settling of potential pollutants. This process can reduce sediment and pollutants from flowing into local waterways. Soils are improved through the amount of decomposing organic matter, which allows for rainwater infiltration.

Stormwater basins: Who's responsible?

Installing BMPS often leads to a common question once a project is finished: Who is responsible for the upkeep? The short answer is the landowner, but that's not the whole story. Municipalities have responsibilities as well.

According to DEP, the project phase and whomever holds the permits ultimately determines who is responsible for maintenance. Municipalities have a responsibility to ensure operation and maintenance on certain sites.

"During construction, stormwater BMPs are the responsibility of the permittee who holds the NPDES [National Pollutant Discharge Elimination System] construction permit for the site," says Jamie Eberl, environmental group manager with DEP. "Once construction is complete and the… permit is terminated, the stormwater BMP becomes the responsibility of the landowner who owns the property on which the BMP



Getting the community involved can assist townships with low-impact development to manage stormwater. ***(Photo courtesy of Whitemarsh Township.)***

Priced For No Bid Purchase

For New or Used Tractors

Mini Mo 13 Shown

MōTrim INC.®

P.O. Box 850 Cambridge, Ohio 43725

Ph-740-439-2725 FAX 740-432-2098

www.motrim.net

"We're also seeing that paradigm shift, that **a clean, maintained stream is not mowed up to the bank.** With the **increase in storm events we are seeing in Pennsylvania, people are more interested in doing something** about it."

is located, unless a different person is identified in the notice of termination and has agreed to long-term operation and maintenance of postconstruction stormwater management (PCSM) BMPs. As an example, stormwater systems are often the responsibility of a homeowners association as common areas where they exist.

"A permittee or co-permittee that fails to transfer long-term operation and maintenance of the PCSM BMP or otherwise fails to comply with this requirement remains responsible with the landowner for long-term operation and maintenance of the PCSM BMPs on the property."

The duty of the municipality can range from simple oversight to the adoption of a stormwater ordinance or operating procedure.

Municipalities with MS4 NPDES permits must ensure adequate operation and maintenance of all post-construction BMPs on projects that disturb one or more acres, as well as smaller projects that are part of a larger common plan, Eberl says. MS4 permittees must also enact, implement, and enforce an ordinance or standard procedure to require post-construction stormwater management on new development or redevelopment projects and impose penalties for non-compliance.

Stormwater affects all municipalities, and managing it effectively and cost efficiently has become a primary concern for township officials. By using and encouraging low-impact development practices, townships can reduce flooding, mitigate pollution, and protect waterways while infiltrating stormwater on-site. This not only helps meet MS4 requirements but also creates more livable communities. ✦

PICKING UP THE TAB

Grants help townships manage stormwater, engage public

The good news is there are plenty of grant opportunities through any number of local, state, and federal agencies, as well as local environmental groups, stewardships, and others willing to assist with low-impact design or development projects.

"We've had a lot of success with grants," says Krista Heinrich of Gilmore & Associates, the engineer for Whitemarsh Township in Montgomery County. "Funding is always the problem. Everybody wants to be good stewards of the environment, but it can be expensive. We've been able to do a $1 million stormwater project every year. That's what's important to residents, and there's a lot of demand."

The state Department of Conservation and Natural Resources (DCNR) offers numerous grant opportunities related to waterway projects, including the Community and Watershed Forestry Funding (CWFF) grants, which are open from January through April. The CWFF provides financial assistance for projects such as buffers, lawn conversion, and conversion of mowed spaces to managed upland forest or perennial native meadows. For a full list of grants, go to **www.dcnr.pa.gov**, choose Grants under the Communities tab, and then select the Rivers Conservation, Community, and Watershed Forestry Grants box in the column on the right.

Grants can help pay for riparian buffers, meadows, and other stormwater control methods.

Teddi Stark, Watershed Forestry Program manager with DCNR, suggests township engage residents through an educational campaign. Keeping residents apprised of what is happening and why can resolve issues that may pop up. Ongoing education is key, too, and can be incorporated into grant funding.

"A little education to the residents of the area certainly goes a long way," she says. "Grants can help pay for signage."