



By G. Tracy Mehan, III

# Mixing Grey & Green

## Integrating asset management & green infrastructure

**T**he move toward green infrastructure (GI) and low-impact development (LID) as complements to traditional grey infrastructure, justifies more fully integrating them into utility planning by means of another cutting-edge technique: asset management of water, wastewater and storm water infrastructure as practiced in the U.K., Australia and New Zealand, and, increasingly, in the U.S. It offers the chance to address urban wet weather and other water quality issues in both utility service areas and their headwaters in a systematic, cost-effective and environmentally optimal manner.

There are different ways to characterize asset management. Veolia Water describes it as making the right decisions at the right times about the asset management schedule and its life or replacement. It entails three primary steps: the definition of a level of service, deciding the least costly way of delivering that service level, and determining how to manage the level of risk at an acceptable level. Of course, other basic steps need to be taken, such as an inventory of existing assets and a "criticality" analysis to understand what needs to be addressed immediately and which assets can be "run to failure" if necessary.

### Addressing Environmental Assets

Besides assuring effective delivery of chosen levels of service to customers, asset management enables more rational deployment of limited resources—both monetary and human. This is a direct benefit to at least one of sustainability's three bottom lines. There is an opportunity to address another bottom line, however—the environmental one, by factoring in the role of GI, LID and even rural watershed protection, all of them green assets that should be installed, maintained, protected, enhanced or restored in such a way as to provide the preferred level of service at the lowest cost. This also will generate multiple environmental benefits, such as aesthetic value, habitat, mitigation of urban heat islands, carbon sequestration and restoration of natural flow regimes to name a few.

The fusion of GI, LID and asset management requires reframing the idea of infrastructure in functional rather than purely material terms. The idea of "nature's" or ecological services comes from this understanding. In other words, what is the best way to obtain clean water at the lowest cost with the largest and most diverse amount of environmental benefits?

To reformulate asset management to accommodate GI, LID, source water and watershed protection, these new techniques should be included in the questions that guide traditional utility management:

1. What is the current state of my assets?
2. What is my required level of service?
3. Which assets are critical to sustained performance?
4. What are my best operations and maintenance and capital improvement plan investment strategies?
5. What is my best long-term funding strategy?

Questions one and three must be reconceived to include everything from green roofs, rain gardens and rain barrels at the site level to buffer strips, reforestation and afforestation at watershed scale as appropriate in the circumstances. Thus, asset management can effectuate the simultaneous evaluation of green and grey options.

### Creating Sustainable Infrastructure

A 2009 report from the Aspen Institute on its dialogue on sustainable infrastructure sets out three principles as the basis for its many recommendations for redefining the nation's concept of infrastructure and putting it on the "Sustainable Path." First, "the traditional definition of water infrastructure must evolve to embrace a broader, more holistic definition of sustainable water infrastructure that includes both traditional man-made water and wastewater infrastructure and natural watershed systems." Second, this principle "should be embraced by all public and private entities involved in water management, and these same entities have a shared role in ensuring their decisions consider and integrate a set of criteria that include environmental, economic and social considerations (the Sustainable Path)." The third principle states "that a watershed-based management approach is required for drinking water, wastewater and storm water services to ensure integrated, sustainable management of water resources."

The Aspen report states that water and wastewater utilities "can lead the way by developing policies and practices that promote preservation and restoration of water resources by fostering strategic partnerships to collaboratively use integrated water resources planning and management as a tool to examine assumptions concerning supply, demand and alternative methods of meeting unmet future demand and social, economic and environmental challenges."

There is a fast-growing body of literature on the economic, environmental and social benefits of GI and LID that creates an opportunity to integrate them with asset management techniques to optimize the triple-bottom-line approach and ensure the optimal mix of green and grey infrastructure in the utility portfolio. The same applies to the role of forests in source water watershed protection across the country. It is not an either/or proposition, but rather one of assessing the relative benefits to the triple bottom line.

Innovations in the extremely costly realm of combined sewer overflow (CSO) remediation illustrate the new role of GI, again, as a complement, not a substitute for, grey infrastructure such as underground tanks and tunnels that can, literally, run to billions of dollars. The Philadelphia Water Department, instead of spending \$6 billion on a traditional approach, convinced regulators that a green approach, costing something in the range of \$2.5 billion, will deal with the problem while saving money and resulting in a tremendous boost to the quality of life in a more verdant urban environment. Across the state, in the city of Lancaster, a green infrastructure plan for CSOs will reduce capital costs by \$121.7 million and wastewater pumping and treatment costs by \$661,000 per year. It also is estimated to generate \$2.8 billion in energy-, air quality- and climate-related benefits annually. The cost estimate of going green in Lancaster is in the range \$51.6 to \$94.5 million.

Harnessing GI, LID and asset management in service of utilities and the communities they serve, can institutionalize and make more consistent the evaluation of green and grey options as a matter of routine—and not just in the extraordinary cases of CSO consent decrees. The cost savings and multiple environmental benefits are waiting to be realized across the nation's water, wastewater and storm water utilities. **w&wd**

G. Tracy Mehan, III served as assistant administrator for water at the U.S. Environmental Protection Agency, and is a consultant and adjunct professor at George Mason University School of Law. Mehan can be reached at [mehan321@verizon.net](mailto:mehan321@verizon.net).

For more information, write in 1102 on this issue's reader service form on page 47.