What If?

Integrated solutions to complex watershed challenges

By Tony Parrott, MaryLynn Lodor, Sharon Jean-Baptiste & Laith Alfaqih

What if a sewer project could be more than just another infrastructure project? What if this capital investment could be compounded to strategically create multiple benefits for a sewer district and the communities it serves? What if it could be a catalyst for community transformation, and do more than improve storm water management and reduce combined sewer overflows (CSO)? What if it created a network of community assets that attracted new interest and diverse investments?

These are all questions the Metropolitan Sewer District of Greater Cincinnati (MSD) asked itself as it faced a multibillion dollar, multiyear consent decree program, branded Project Groundwork. As the largest public works program in the history of the Greater Cincinnati area, this wet-weather improvement program presented a once-in-a-lifetime opportunity to create a transformative model for implementing wet weather solutions.

Located in southwestern Ohio and primarily serving Hamilton County, MSD is one of the top CSO dischargers in the country. An estimated 11 billion gal of CSO enter the district's receiving streams, including Mill Creek and the Ohio River, in a typical-year storm event. In addition, there are 63 sanitary sewer overflow (SSO) locations within the MSD system.

In 2009, MSD received federal approval for its consent decree program, which required that the first phase of infrastructure improvements eliminate SSOs and significantly reduce CSO volume in Lower Mill Creek by the end of 2018. The estimated cost for this plan was $1.4 billion, most of which would be borne by the district's ratepayers.

MSD's Impetus

Driven by the consent decree, MSD seized the opportunity to align its business strategies with proactive outcomes that would yield mutual benefits for the impacted communities (enhanced outcomes and community assets) as well as MSD (water quality improvement, fortification of revenue base and sustainability as a public utility). The organization embarked on a journey to develop an integrated approach to evaluating watershed conditions and challenges from the natural resources, built environment and community economics perspectives, in order to identify opportunities that would create value for MSD and its service communities.

By understanding current

MSD sought business strategies that would yield benefits for both itself and local communities, including improved water quality and enhanced sustainability.

conditions in a community and identifying watershed-based solutions that can leverage MSD's investment to reduce sewer overflows and meet federal mandates, MSD can become a catalytic partner for a community's vision for the future. The potential community benefits, which are centered on connectedness and prosperity, include expansion of parks and green spaces, improvements in transportation and pedestrian walkability, opportunities for improved mixed-use and affordable housing, and incentives for business retention or redevelopment.

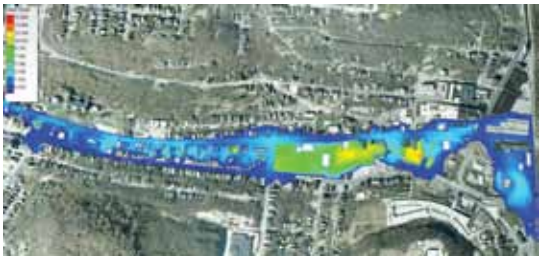
The Beginning

MSD initiated this watershed planning approach in 2009 in the Lick Run watershed, and since then has taken this "Communities of the Future" model to other watersheds within the Lower Mill Creek watershed, which is the focus area of the first phase of the consent decree program. This planning approach has shaped MSD's program and wet-weather strategy, which leads with source control and optimizes conveyance,storage systems and product control facilities. This integrated approach, called the sustainable watershed evaluation planning process (SWEPP), allows MSD to develop an enhanced triple-bottom-line outcome with environmental and social community benefits that can be realized through cost-effective infrastructure improvements and attraction of integrated public/private planning and investment. Specifically, the SWEPP follows a step-wise process to facilitate the development of innovative solutions that prioritize watershed improvement projects and meet the Clean Water Act requirements while creating value and aligning with priorities for communities:

1. Data collection and inventory analysis;
2. Identification of opportunities and constraints; and
3. Development and evaluation of watershed alternatives.

These steps result in the development of a preliminary watershed master plan that MSD can use to make decisions about future capital and operations and maintenance investments to meet multiple objectives. Closely aligned to the U.S. Environmental Protection Agency's integrated framework for watershed assessment and management, the SWEPP approach creates flexibility for MSD to meet its Clean Water Act requirements.

The community engagement component of this watershed planning approach was critical to the success of development and evaluation. MSD formed the Communities of the Future Advisory Committee (CFAC), which is facilitated by the Hamilton County Planning Commission and includes



The projected existing surface flooding in the Lower Mill Creek watershed before implementing wet-weather management solutions (left) and after (right).

representatives from across the region, such as neighborhood councils, business associations, watershed planning groups, and city and county public officials. CFAC assists MSD in facilitating several public outreach and engagement events to understand existing conditions, vet opportunities and develop recommendations for alternative sustainable solutions in communities.

Sustainable Solutions

Over the past few years, MSD has used the SWEPP principles to develop sustainable solutions for wet-weather management in the Lower Mill Creek watershed, which includes Lick Run, West Fork, Bloody Run and Kings Run. This effort culminated in a study that summarized recommendations for leading with the source control and optimized conveyance and storage systems that had been proposed in the original consent decree plan. Known as the Revised Original Lower Mill Creek Partial Remedy, the recommended suite of watershed-based solutions present a cost-competitive alternative with higher benefits and outcomes than traditional wet-weather solutions like a deep tunnel, consolidation sewers or a high-rate treatment facility. This alternative remedy has been submitted to federal regulators for approval.

These alternative solutions pursue sustainable and integrated technologies to achieve storm water management (off-loading storm water from the combined sewer system, managing peak flows and providing water quality volume treatment) and right-size critical sewer infrastructure (lower capital expenditure and lower operations and maintenance cost associated with pumping, storage and treatment). MSD's source control approach incorporates a variety of project opportunities, and includes green infrastructure, or storm water BMPs, which provide added community benefits, such as the types of partnerships and neighborhood connectivity opportunities listed below.

- Direct-impact projects require direct invesment by MSD for

planning, design and construction, and long-term maintenance. These projects can include source control, conveyance/storage projects and product control.

- Enabled-impact projects represent a leveraged infrastructure investment, or are opportunities for cost sharing and collaboration between MSD and key watershed stakeholders, such as reforestation, porous pavement, bioswales, living walls, bioretention facilities or downspout disconnection. Enabled-impact projects include partnerships with MSD and public or private entities to implement source control solutions to reduce the volume of storm water entering the combined system. Projects in this category can provide additional value and benefits to direct-impact projects, which in turn can lead to better community understanding of sustainable infrastructure.
- "Inform and influence" projects engage and educate watershed partners and the broader public in making sustainable decisions that provide water quantity and quality benefits. Examples include forming partnerships with educational institutions or community thought leaders to create highly visible projects within the community and foster long-lasting, interagency relationships.

MSD's commitment to green infrastructure as part of its wet-weather strategy began with its Green Demonstration Program, which was created in 2005 to partner with public and private property owners to plan, design, install and evaluate green infrastructure technologies. The initiative evolved into the Enabled Impact Program and has resulted in more than 30 project installations in the Greater Cincinnati area. Project partners include the Cincinnati Zoo, Clark Montessori school, Cincinnati State Technical and Community College, San Antonio Church and the Cincinnati Metropolitan Housing Authority.

MSD's journey continues to evolve. As the organization focuses on Phase I of its consent decree program and potentially an alternative remedy that yields an integrated sustainable wet-weather solution, it also has embarked on planning for the next phase of its wet-weather program. The opportunities to leverage lessons learned through Phase I planning and implementation, explore advanced tools and technologies, and expand business strategies will place MSD at the cusp of effective and sustainable utility planning to meet municipal challenges. SWS

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