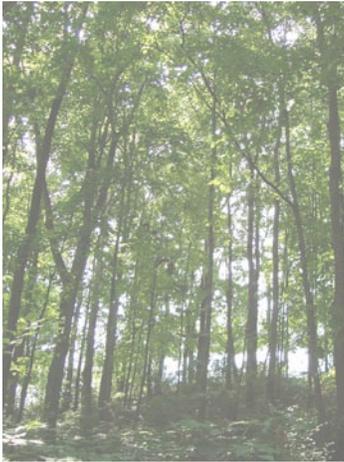


METROPOLITAN
SEWER DISTRICT
of greater
CINCINNATI



2010 Sustainability Report

REDEFINING THE
FUTURE

Preview

It's a First!

This is our first sustainability report, and one of the first to be published among municipal utilities in the U.S. Although private corporations and some utilities outside the U.S. have been reporting their sustainability performance for years, American wastewater utilities have just started to adopt this practice.

Purpose

In today's world, people recognize that an organization's performance should be measured in more than financial terms – that it is equally important to understand an organization's impacts on the natural environment, as well as the impacts on its people (employees, customers, vendors) and community (neighbors, elected officials, and partner organizations).

The purpose of this report is to share our vision for a sustainable future while documenting our 2009 baseline sustainability performance, including both challenges and achievements of the Metropolitan Sewer District (MSD) of Greater Cincinnati in all three of the following categories:

- Operational and environmental performance
- Social and community performance
- Financial and risk performance

We intend to publish sustainability metrics at regular intervals, and our aim is to show improvement over time.

What the Report Covers

In these pages, we describe MSD's baseline performance in 2009 and our goals for the future. We focus on activities that MSD controls directly, and we use sustainability indicators to measure our performance compared to long-term targets.



Reporting Standards and Performance Indicators

In preparing this report, we reached out to many MSD stakeholders, including community groups, industry representatives, environmental non-profit organizations, political leaders, and residential ratepayers. In these conversations, people told us what MSD performance issues are most important to them and which sustainability issues are top-of-mind. We used this input, alongside guidance provided by the Global Reporting Initiative (GRI) sustainability standard, to select the tailored sustainability performance indicators for this report. These indicators are summarized in the Sustainability at a Glance section and are supported by content throughout the report.

Thanks to Our Contributors and Advisors

A diversity of customers, employees, neighbors, elected officials, and government agencies graciously provided information for this report, and we sincerely thank these many partners for their contributions.



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What’s In It for You?

For customers, employees, and other MSD partners, this report provides a complete snapshot of how MSD is serving you.

We are at a turning point in MSD’s history, with a challenging environmental mandate to manage and a difficult economic climate. Because of these and other factors, we are adjusting our goals and improving our business processes. In this report, we share our plans with you.



Director's Perspective

While many of our challenges remain the same as 40 years ago, today's world demands much more of us than before.

- ▶ *We have inherited a system of aging infrastructure, some built as long ago as the 1800s. Much of our system is past its intended operational life, necessitating significant annual costs in replacements and upgrades.*
 - ▶ *Second, Cincinnati has the fifth highest volume of combined sewer overflow (CSO) in the U.S. As a result, water quality has been impacted in Mill Creek, the Little Miami River, the Great Miami River, the Ohio River and many tributaries. Consequently, we must meet the requirements of a federal mandate, or Consent Decree, to reduce CSOs and eliminate sanitary sewer overflows (SSOs). Project Groundwork, our program for meeting the Consent Decree, is the biggest public works program ever undertaken in Hamilton County, estimated to cost more than \$3.29 billion (\$2006).*
 - ▶ *Third, the economic downturn has created challenges for our community. Like everyone else, we are learning to do more with less.*
- Finally, in our region and elsewhere, both leaders and the public understand that human*
- ▶ *health and well-being depend upon the health of the natural environment – surface and ground waters, air, soils, and diversity within ecosystems. We therefore include environmental protection as one of our core responsibilities.*

These and other factors are reshaping the MSD organization, our vision, and our mission. In 2008, we redesigned our strategic plan, and in 2009 we began to implement it. The strategic plan builds on the concept of sustainability – on striking a balance between our mandated mission and environmental protection, community well-being, and fiscal responsibility.

Our organization looks, thinks, and acts differently from the MSD of the past. Within our core function to collect and treat wastewater, we are improving our business practices and building quality relationships with customers, local businesses, neighbors, elected officials, and employees. We are more focused on operating efficiently and reducing costs. We are contributing to the quality of life in the geographic region we serve, by getting involved in the community revitalization discussion by partnering with other organizations. And, more than ever, we are dedicated to protecting the natural environment. These strategies are leading us to make better decisions that will reduce liabilities and leave a positive legacy for future generations.

This Sustainability Report shares the first steps we have been making toward redefining MSD's accountability and how we serve our region. I encourage your feedback and invite you to join us in putting our energy into building a bright future.

Sincerely,



James A. (Tony) Parrott
Executive Director, Metropolitan Sewer District of Greater Cincinnati



“We can't solve problems by using the same kind of thinking we used when we created them.”

— Albert Einstein

Meet MSD

Who We Are, What We Do

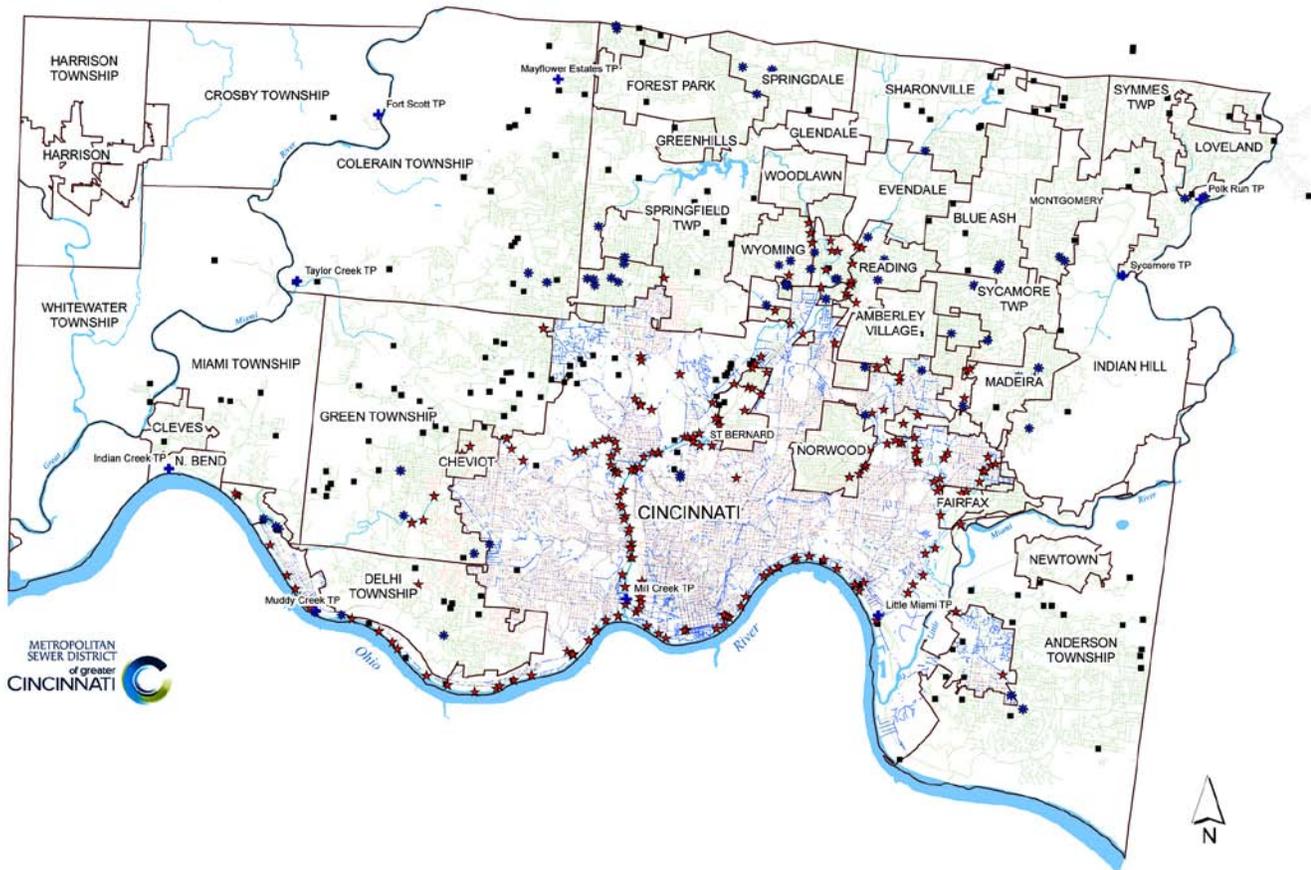
MSD is a publicly operated wastewater utility serving the City of Cincinnati, Hamilton County, other Hamilton County (Ohio) political subdivisions, as well as parts of three adjacent counties (Butler, Clermont, and Warren). In addition, the many visitors to our region—from sporting event spectators to family reunion attendees—use the services that our infrastructure provides. MSD’s ratepayer base includes approximately 230,000 residential and commercial users, and 250 industrial users, who represent a population of about 855,000. To date, the northwestern part of Hamilton County and portions of adjacent counties remain without public sewers.

Legend

<ul style="list-style-type: none"> — Combination Sewers Data Total length: 869 miles Sizes: 4" to 246" Age*: 1 to 145 years Average age**: approx. 90 years — Sanitary Sewers Data Total length: 2,107 miles Sizes: 1" to 156" Age*: 1 to 145 years Average age**: approx. 40 years — Storm Sewers Data 	<ul style="list-style-type: none"> ■ Pump Stations 117 Public, 61 Private ★ SSO (Sanitary Sewer Overflows) 63 Total ★ CSO (Combined Sewer Overflows) 214 Total 82 Diversion dams 81 Gratings 26 Regulators 12 Dual chambers 5 Overflows 3 Drop gates 1 High rate separator 1 Vortex valve
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*The oldest known sewer segments were built in 1865.
**The average age was calculated using sewer segments with known installation dates (about 76 percent of the sewer segments in the database).

Figure 1: MSD Sewer System



1828 Sewers are the first built for storm drainage in Cincinnati. Materials used include limestone and lumber from dismantled flatboats. Most sewer projects are done privately.

1860 Residential connections are permitted in Cincinnati.

1870 The Board of Sewer Commissioners is created in Cincinnati. Twelve miles of sewers are laid, equaling the total sewers built from 1830 to 1870.

1880 In Cincinnati, 70,000 of 270,000 homes now have access to sewers.

1886 Development of standards for wastewater treatment begins.

1887 First formal biological waste treatment (an intermittent sand filter) was tried.

1897 City of Cincinnati decides to provide sewerage to all residential areas to address drinking water contamination.

1907 Toilet paper is introduced in America. The original American product was similar to crepe paper.

1908 Ohio law requires cities to install sewage treatment facilities, with some exceptions along the Ohio River.

1914 Liquid chlorine is first applied for plant-scale disinfection.

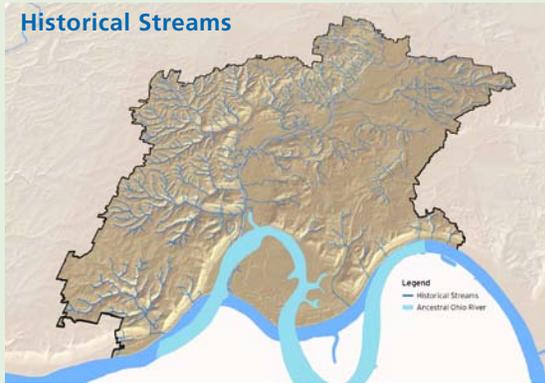
MSD manages a vast and complex network of infrastructure that is worth billions in physical assets. The sewage collection and treatment network spans an area that covers approximately 290 square miles, contains over 200,000 separate sewer connections, and includes approximately 2,994 miles of sanitary and combined sewers. MSD partners with other utilities and cities that are similarly dependent upon the Ohio River and its tributaries for wastewater discharge and drinking water, including Pittsburgh (Pennsylvania), Louisville (Kentucky), and Paducah (Kentucky).

In 2009, MSD operated seven major wastewater treatment plants, more than 120 pump stations, and three package treatment plants, which collectively treated approximately 167 million gallons per day of collected wastewater. Treated water (called effluent) is released into the region's creeks and rivers. We protect the natural environment by ensuring that wastewater is treated to required standards. Concurrently, we are also working to reduce the occurrences of wastewater entering waterways during heavy rain events, when the sewer system becomes overloaded.

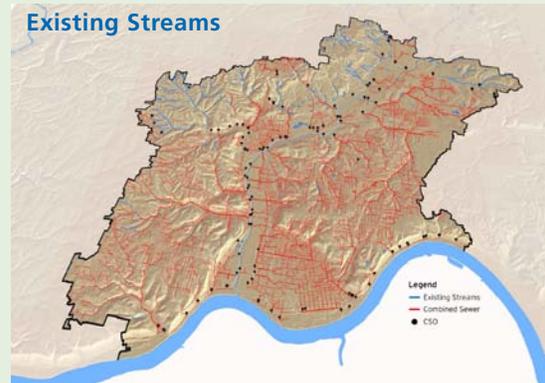
MSD uses a 5-year capital planning cycle for the repair, replacement, or improvement of its physical infrastructure assets. The capital budget is \$165 million for 2010, and is estimated at \$908 million for the 5-year planning cycle of 2010 to 2014.



Yesterday's Decisions are Today's Liability

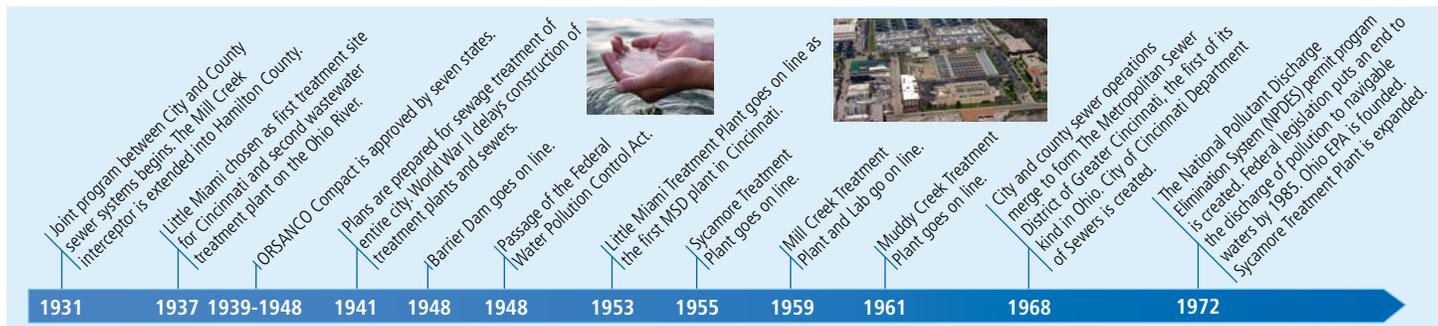


A few hundred years ago, prior to population growth and development in Cincinnati, there were over 300 miles of creeks and streams in the Lower Mill Creek watershed. These waterways naturally conveyed rainwater from hilltops, down hillsides, and through valleys to the Mill Creek and, eventually, to the Ohio River. As Cincinnati grew, these natural systems were replaced with roads, buildings, and sewer networks. Streams that once followed the natural landscape were directed into



over 600 miles of combined sewers. Over time, the capacity of the sewer network became inadequate and has led to the CSO problems that MSD is forced to address today.

We want to ensure that the decisions that we make today do not create liabilities for future generations. Exploring all solutions through a systematic, sustainable approach will help MSD make the right choices for correcting the wet weather issues.



“As the wastewater utility for nearly 855,000 residents throughout Hamilton County, MSD has one of the most important tasks in the community. At least that’s how I see it. For over 40 years, MSD has focused on providing services that help make this region a great place to live, work, and play.”

— James A. (Tony) Parrott, MSD Executive Director

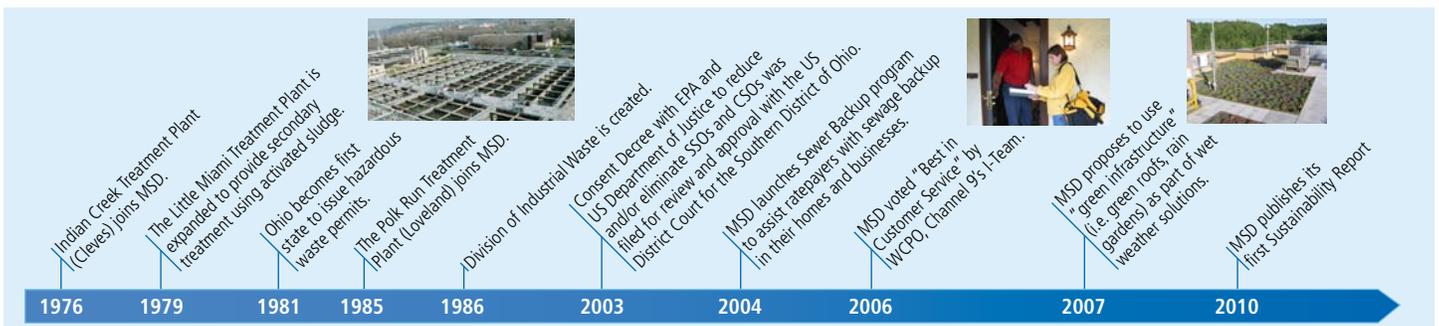
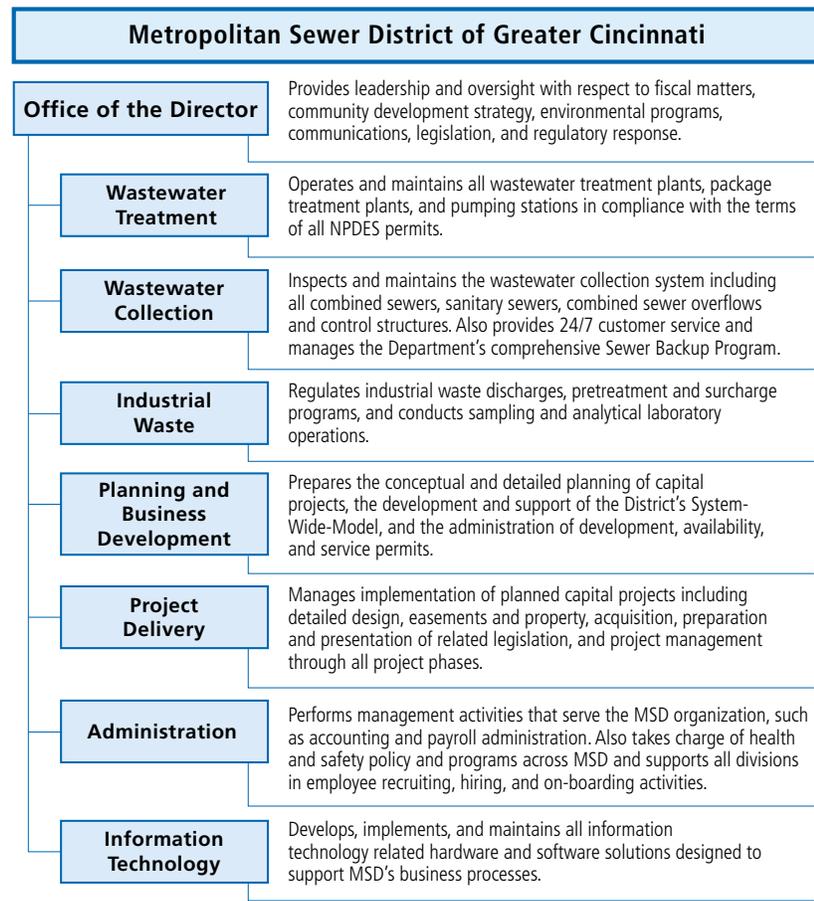


MSD’s Organization

MSD is a county sewer district established on April 10, 1968; prior to 1968, the County and the City maintained separate sewage operations. A 50-year contractual arrangement provides for City staff to manage and administer MSD’s operations. The Board of Hamilton County Commissioners approves MSD’s capital budget and the rate plan, sets sewer rates, and adopts policies for MSD governance. MSD is funded by customer sewer rates and does not receive tax money or appropriations to pay for operations or improvements. MSD participates in state and federal grant and loan programs to help maintain affordable sewer rates and is committed to growing these opportunities.

The MSD Executive Director manages the eight divisions shown in Figure 2, including the Office of the Director. The Director is also responsible for the City of Cincinnati’s Stormwater Management Utility (not shown).

Figure 2: MSD Organizational Chart



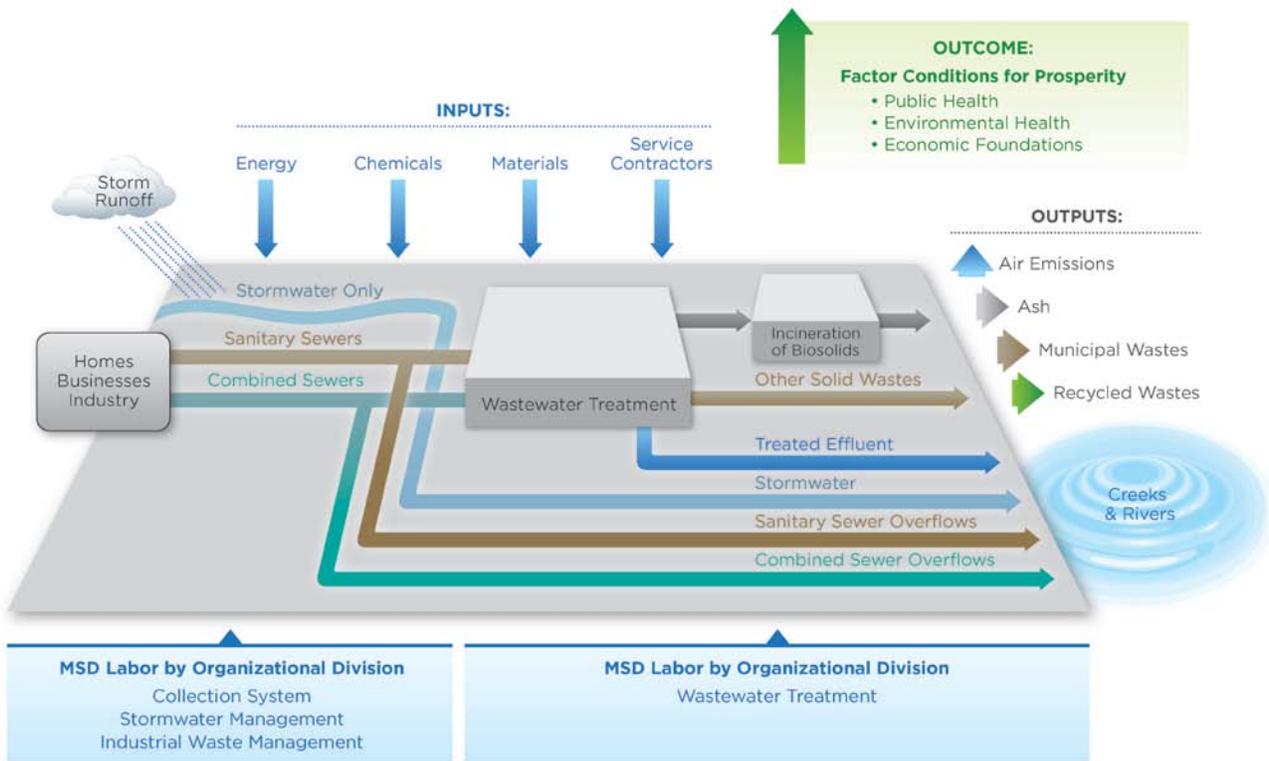
MSD's Operational System

Figure 3 depicts MSD's operational system. The collection system is made up of an extensive system of pipes that receive flow from homes, businesses, and runoff from older stormwater pipes that are combined with sewer collection pipes. Stormwater not conveyed to the treatment plants is managed to reduce flooding and backups, but does result in CSOs. This collection system brings wastewater to the second part of MSD's operations: the wastewater treatment system. These facilities treat wastewater and release effluent back into the region's creeks and rivers. The waste removed in treatment is referred to as sludge, which is incinerated at two MSD facilities.



The system delivers important community and public benefits by collecting and treating raw sewage. As we embark on Project Groundwork, the system will increase these benefits by reducing sewer overflows and helping to improve the economic vitality of our communities.

Figure 3: **MSD's Operational System**



Mission

Protect public health and the environment through water reclamation and watershed management.

Vision

Our diverse and inspired workforce is recognized regionally for exceptional service and commitment to our community and is a global leader in water reclamation, environmental services and organizational excellence.

Values

We commit to serve as professionals with honesty, integrity, accountability, and respect.

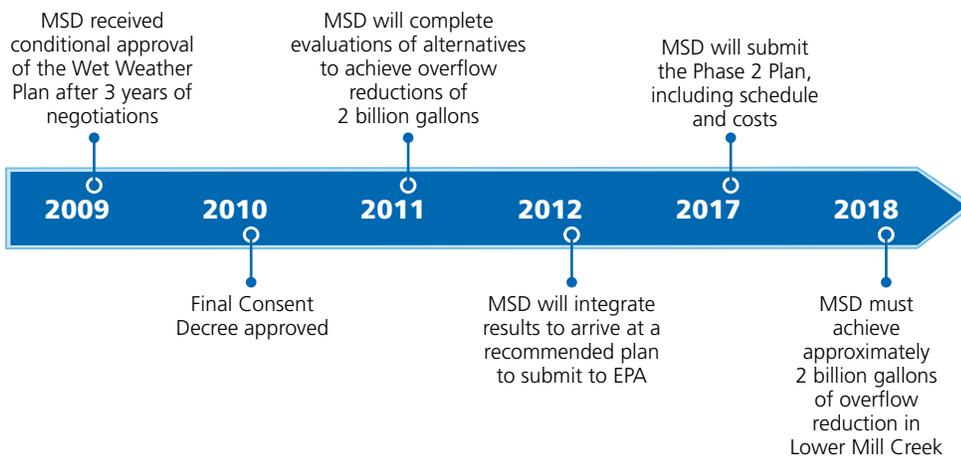
The Challenge Before Us

We stand at a historic crossroads for the future of Hamilton County and Cincinnati, where challenge meets opportunity. As a region, we face a downturn in economic activity, high unemployment, degradation of creeks and rivers, and loss of vegetative cover. As a utility, MSD feels the impacts of these and other challenges, including:

- The 180-year old sewer network, needing significant redesign and investment to update it
- Limited sewer capacity to handle heavy flows during rainy weather
- Loss of revenue
- Nearly 30 percent of the workforce is eligible for retirement by 2015, coupled with a restructuring of the local government workforce
- More stringent terms and conditions for financing

Most importantly, by federal mandate, MSD must reduce CSOs by 85 percent (of about 14 billion gallons of CSO annually) and eliminate SSOs entirely. These requirements are documented in a formal Consent Decree agreed to by MSD and regulators.

Figure 4: Consent Decree Timeline



Phase 1 must be completed in 10 years, by December 2018, and must result in 2 billion gallons of overflow reduction, based on a typical year of rainfall. MSD has until December 2012 to submit its preferred alternative Phase 1 Plan, and we estimate that Phase 1 spending will amount to \$1.145 billion. Details of the Consent Decree and Project Groundwork are available at the dedicated wet weather program Web site at www.projectgroundwork.org.



MSD and Sustainability

Defining Sustainability

Put simply, sustainability is the practice of striving toward a better future, one that:

- Improves human health and wellbeing
- Protects and restores the natural environment
- Fosters a stronger economy and financial well-being for businesses, organizations, families, and individuals.

These three parts are often called the “triple bottom line,” to signify that organizational performance looks beyond the financial bottom line to include social and environmental considerations, too.

The Importance of Sustainability

Over the last two decades, governments, corporations, utilities, and other institutions have been grappling with compound issues arising from the growth of urban centers: environmental degradation, economic development, public health challenges, land use, mobility, quality of life, and the availability of natural resources. Sustainability is important because its triple bottom line perspective offers a new, useful, and effective framework for making decisions and investments that result in innovative solutions. By using sustainable practices in problem-solving, we can create the best possible outcomes for people, the environment, and financial and/or economic considerations – over the long term and for many generations to come.



By using a sustainability framework in our strategies, planning, designs, and operations, we can be assured that we are making good decisions that will stand the test of time. For instance, MSD’s investments in energy efficiency are creating cost reductions that will benefit our ratepayers for decades, as well as reducing greenhouse gas (GHG) emissions—both of which are the right thing to do for our region and the global community. This win-win-win approach is why MSD’s 2009-2011 strategy addresses all three aspects of the triple bottom line:

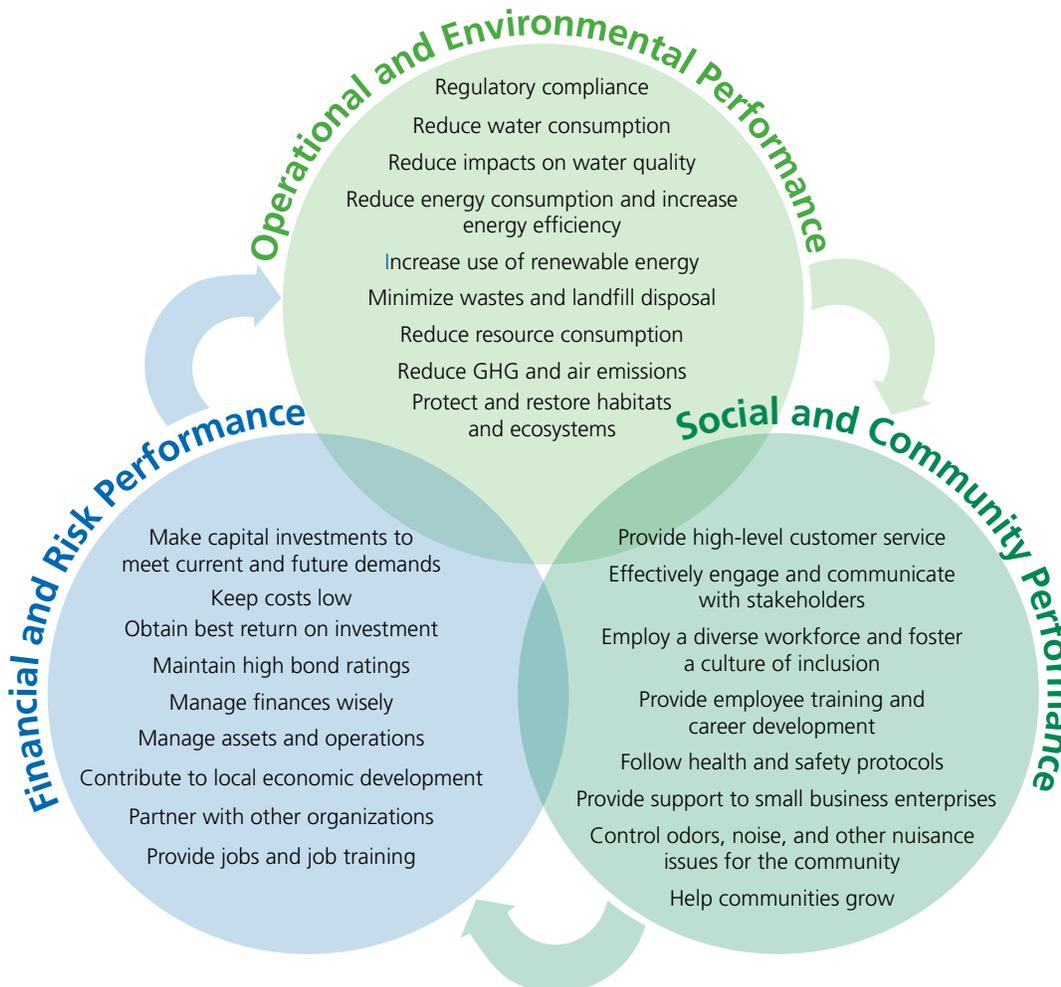
- Operational and environmental performance
- Social and community performance
- Financial and risk performance

The Performance sections of this report are organized according to these 3 aspects and contain the details of MSD’s sustainability performance. Figure 6 summarizes the many considerations within each aspect.

“We need a decision tool with a future-oriented focus, in order to meet the quality of life expectations of communities of the future and to comply with future regulations with our 180-year-old sewer infrastructure. The Triple Bottom Line-based decision process will certainly serve that need.”

— Biju George, MSD Deputy Director

Figure 6. Sustainability Considerations Included in MSD’s Triple Bottom Line



New Times, New Strategies

We are in uncharted territory; our region has never faced these issues before, in this combination, or at this scale. Our challenge is to comply with the federal mandates and fix the problems created by previous decades of decisions while avoiding the creation of liabilities for future generations.

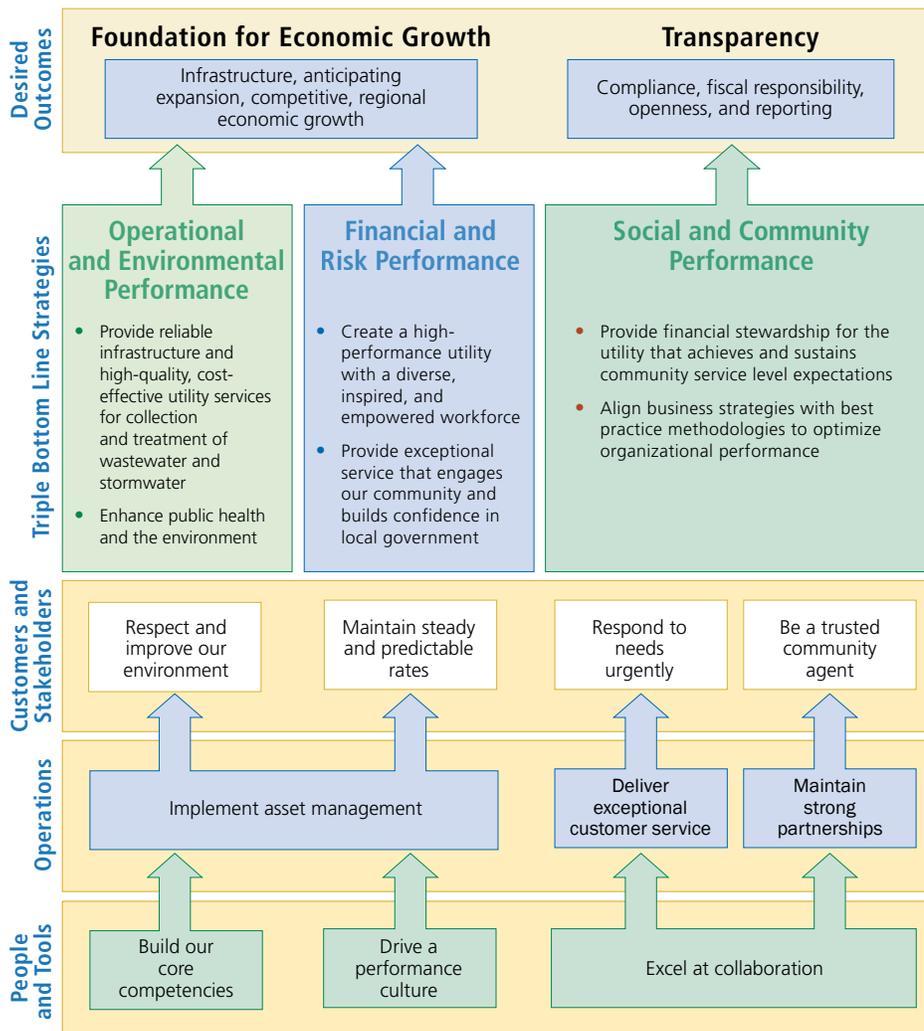
In this new reality, we must employ new ways of thinking, new tools, and new partnerships. We must foster relationships with customers, neighborhoods, and other partners – and we must coordinate our efforts across the region. In essence, we must be an active participant in shaping our community’s future.

In a strategic planning process that started in 2008, Executive Director Parrott led MSD through an intensive process that involved all MSD divisions and many working groups. The steering committee identified a comprehensive list of goal areas and 80 detailed paths of action. The outcome was MSD’s 2009-2011 Strategic Plan, available on MSD’s Web site (www.msdcg.org). It adopts a “triple bottom line” approach, in that it addresses environmental and stakeholder goals alongside financial costs and benefits. Figure 5 summarizes the framework of the strategic plan and its priorities.

“What is sustainability? For the Greater Cincinnati area, it means maintaining a clean river and controlling pollution in creeks and waterways. It means preserving the landscape – not destroying what nature has given this area. It means community – making Cincinnati a place where people want to live.”

— Margie Anderson,
MSD Superintendent of
Administration

Figure 5: MSD’s Strategy Map is Built on the Triple Bottom Line



On the Horizon

The maxim “you can’t know where you’re going until you know where you’ve been” sums up the purpose of our first Sustainability Report. As the first in a series that we plan to publish regularly, this report establishes our baseline, or yardstick, for measuring our sustainability performance in the coming decades. We now know “where we’ve been.”

Overall, we’re pleased with this initial assessment of our performance. MSD’s energy consumption has fallen year over year for the last 5 years, we have maintained an excellent record in water quality regulatory compliance, and our new fluidized bed incinerators at the Mill Creek plant are generating fewer air emissions. We’re especially proud of our productive relationships with community partners, fostering a culture of diversity and inclusion within MSD, and providing a robust internship program to high school and college students. Finally, our financial strength is one of our key assets, as reflected in our improved bond rating. In the last 2 years, we have put several mechanisms in place to protect this essential asset, including a financial policy and a structured approach to risk management.

At the same time, our 2009 baseline assessment of sustainability performance shows that several areas need improvement. Many of these are, in fact, areas of opportunity. In our operations, for example, we can further reduce GHG emissions, lower chemical consumption, and increase our recycling rate. All of these have the potential to lead to cost reductions. In the area of social and community performance, we will continue to expand the ways in which we foster and improve stakeholder relationships. In addition, we will monitor our progress toward achieving small business enterprise (SBE) participation goals. Financially, our main challenge for the future will be to keep sewer rates affordable while paying for Project Groundwork infrastructure projects.

We have two over-arching goals in enhancing our sustainability performance into the future:

- **To operate as efficiently and effectively as we can.** Within the operating parameters of our sewer and wastewater treatment systems and within the natural and built environment in which we work, we will continue to focus on reducing the primary environmental impacts and costs of our operations: energy consumption, GHG emissions, air emissions, and chemical consumption.
- **To create sustainable communities in our region.** Through the Communities of the Future initiative and Project Groundwork, as well as other ongoing initiatives, we will continue to work with other government agencies and community partners to create a high quality of life, deliver high quality treated wastewater, and help promote a vibrant economy in our region.

Ultimately, we are striving to correct the CSO issues we have inherited from the past and to build an attractive future based on a foundation of smart, sustainable decisions.



Sustainability At a Glance

This section provides an overview of MSD's sustainability performance in 2009. Please refer to the Performance sections of this report for more detailed information, graphs, and pictures illustrating our efforts. Because 2009 is taken as the baseline year for measuring our sustainability performance, some indicators have baseline data but may not yet have long- or short-term performance targets established. Targets are long-term, unless otherwise indicated.

Legend	*Where applicable, we show the Global Reporting Initiative (GRI) indicator that corresponds to MSD sustainability performance indicators. Blank spaces indicate sustainability performance indicators that are not covered by the GRI, because they reflect unique aspects of MSD operations and stakeholder interests.
● Better than Target	
⊙ On Target	
○ Needs Improvement	

Operational and Environmental Performance

Key Performance Indicator	Target	2009 Performance (Baseline)	2009 Rating	GRI*
Water quality regulatory compliance	Greater than 95 percent regulatory compliance across all plants in any given year	Greater than 97 percent regulatory compliance across all plants	●	EN28
Natural gas and electricity consumption	In development	661,687 Gigajoules (GJ) 10.9 GJ per million gallons treated	Baseline	EN3
Fuel consumption	In development	201,358 gallons 3.31 gallons per million gallons treated	Baseline	EN3
Chemical consumption:				EN1
Sodium hypochlorite		506,527 gallons		
Polymer	In development	22,514 gallons	Baseline	
Coagulant		88,889 pounds		
Sodium hydroxide		16,338 gallons		
Sludge dewatering	22.5 to 25 percent solids content	26.8 percent at Mill Creek 22.0 percent at Little Miami	○	
Incinerator air emissions	All regulated pollutants fall below required limits.	Achieved	●	
	Operating conditions stay within permit ranges.	Experienced excursions in operating conditions with respect to opacity, percent oxygen in stack gas, and scrubber pressure drop.	○	
Greenhouse gas emissions	In development	83,408 metric tonnes CO ₂ -e 1.37 metric tonnes CO ₂ -e per million gallons treated	Baseline	EN16
Waste disposal	In development	Sludge Cake: 1,144 dry tons Screenings, grit, and scum: 7,354 tons Ash: 13,672 tons	Baseline	EN22
Recycling	In development	20 percent paper recycled	○	

Strategic Plan Goals

- Provide reliable infrastructure and high-quality, cost-effective utility services for collection and treatment of wastewater and stormwater
- Enhance public health and the environment

Sustainability Goals

- Deploy energy and material resources efficiently
- Minimize waste
- Protect air quality and minimize odors
- Reduce GHG emissions
- Protect and enhance water quality
- Comply with environmental regulations

2009 Operational and Environmental Facts	Quantity	GRI*
Wastewater treated	60,800 million gallons 167 million gallons per day	EN21
Sludge produced	34,976 tons 0.58 ton per million gallons treated	EN22

Social and Community Performance

Key Performance Indicator	Target	2009 Performance (Baseline)	2009 Rating	GRI*
Customer service for Water in Basement (WIB) Program:				
Customers are satisfied with the WIB program	Maintain or improve upon 2009 performance	88 percent	Baseline	
Customers are satisfied that the Customer Service Investigation Team investigates the sewer backup within a reasonable time		93 percent	Baseline	
Customers feel that the Investigation Team was respectful		91 percent	Baseline	
Customers felt that the informational materials they were given were clear and easy to understand		90 percent	Baseline	
Community engagement:				
Stakeholders understand MSD's operational scope is to collect and treat wastewater and maintain sewer systems	At least 80 percent	82 to 94 percent	●	
Stakeholders believe that MSD's operational scope includes purifying and providing drinking water	0 percent (MSD does not purify or provide drinking water)	26 to 42 percent	○	
Stakeholder opinions about quantity and quality of communications and interactions with MSD	At least 80 percent are favorable	23 to 51 percent	○	
Employee and leadership demographics	Mirror diversity distribution found in Hamilton County	Achieved	●	LA1, LA13
Health and safety:				
Incidence rate	< 8.1	7.3	●	LA7
Fatalities	0	0	⊙	LA7
Lost days	In development	263.02	Baseline	LA7
Hours of health and safety training per year	In development	4,092 hours 6.62 hours/employee	Baseline	LA10
Employee training and development	In development	11,830.1 hours	Baseline	LA11
SBE and local workforce development:				
SBE participation in construction contracts	30 percent	7.6 percent	○	EC6
SBE participation in commodities and general services contracts	15 percent	7.1 percent	○	EC6
SBE participation in professional services contracts	10 percent	19.6 percent	●	EC6

Strategic Plan Goals

- Create a high-performance utility with a diverse, inspired, and empowered workforce
- Provide exceptional service that engages our community and builds confidence in local government

Sustainability Goals

- Provide exceptional service
- Effectively engage stakeholders
- Comply with environmental regulations
- Promote diversity and inclusion in the workplace
- Promote employee health and safety
- Develop the workforce for present and future excellence

2009 Social and Community Facts	Quantity	GRI*
Population served	855,000	
Number of employees	607	LA1
Number of interns and co-op students	56	LA11

Financial and Risk Performance

Key Performance Indicator	Target Performance	2009 Performance (Baseline)	2009 Rating	GRI*
Operating expenditures (less depreciation)	In development	\$103,825,000 \$1,707.65 per million gallons treated	Baseline	EC1
Debt service coverage	Minimum 1.5	2.9	●	EC1
Debt service as a percentage of operating expenses	Maximum 50 percent	38.2 percent	●	EC1
Cash contributed to capital	20 percent to 30 percent	25.25 percent	●	EC1
Bond rating	Minimum AA+ by Standard and Poor	AA+	⊙	
Risk management strategy	Complete by 2010	Completed summer 2010	●	
Risk management reporting	Report quarterly	To begin in 2011	Baseline	

Strategic Plan Goals

- Provide financial stewardship for the utility to achieve and sustain community service level expectations
- Align business strategies with best practice methodologies to optimize organizational performance

Sustainability Goals

- Maintain financial solvency and liquidity for short- and long-term funding needs
- Maintain a high credit rating
- Maintain affordable sewer rates
- Manage risks proactively

2009 Financial Facts	Quantity	GRI*
Minimum quarterly bill, 6" meter	\$2,745.19	
Minimum quarterly bill, 3" meter	\$838.96	
Minimum quarterly bill, 5/8" meter	\$76.83	
Revenues	\$201,273,000	EC1
Total Expenditures	\$199,426,000	EC1
Annual Capital Expenditure	\$124,500,000	EC1
Total borrowed capital	\$127,400,000	
Borrowed capital from grants and low-interest loans	\$88,800,000	EC4

Glossary

Ash The residual material resulting from incinerating sludge, in which all volatile organic compounds are burned off.

Asset management A set of systematic and coordinated activities through which an organization optimally manages its assets, their associated performance, and risks and expenditures over their life cycle for the purpose of achieving its organizational strategic plan.

Brownfield As defined by the EPA, a brownfield is “real property, the expansion, development, redevelopment, or reuse of which may be complicated by the presence, or potential presence of a hazardous substance, pollutant, or contaminant.”

Capital Borrowed money for infrastructure improvement projects.

Combined sewer overflow (CSO) A structure designed to overflow when a combined sewer is filled with sewage and stormwater beyond its volume and/or pressure capacity, usually during wet weather.

Consent Decree A legal agreement between a state and/or federal EPA that mandates a utility to make infrastructure improvements to improve environmental conditions.

Diversity and inclusion The practice of valuing the talents of all people, regardless of age, gender, race, disabilities, or other criteria.

Ecosystem A defined, biological community of animals, plants, fungi, and bacteria with unique and interconnected relationships to the physical and chemical environment in a given geographic area.

Effluent The treated output flow of a wastewater treatment plant.

Environmental footprint The total environmental impact resulting from an entity's use of energy, materials, and water and the resulting generation of wastes and byproducts. A subset of this is the carbon footprint, which includes the total greenhouse gas emissions resulting from an entity's activities.

Gigajoule (GJ) A metric unit of energy, equal to 277.8 kilowatt-hours.

Grit and screenings The heavy and typically inorganic solids (such as metals, plastics, and sand) that are filtered out of wastewater before the flow enters the complex biological and chemical treatment processes of a wastewater treatment plant.

Incineration The process of heating waste materials in order to burn off volatile organic compounds and water while reducing the volume of the waste.

Influent The untreated wastewater or raw sewage coming into a wastewater treatment plant.

Package treatment plant A self-contained treatment plant designed for small flows; typically installed in remote locations. Package treatment plants use aerobic (with oxygen) digestion to treat sewage, in combination with mechanical aeration and settling before releasing treated water.

Pump station A facility within the sewer collection system that is designed to pump sewage toward a wastewater treatment plant.

Sanitary sewer overflow (SSO) A structure designed to overflow when a sanitary sewer is filled beyond its volume or pressure capacity, usually during wet weather.

Sludge, sludge cake Sludge is the solid waste material that settles out in the wastewater treatment process, sometimes called biosolids. Sludge cake is sludge after it has been dewatered and compressed.

Small business enterprise (SBE) In Hamilton County, a small business must be a business concern that is independently owned and operated, and meets the detailed definitions or size standards of the U.S. Small Business Administration, as provided at www.sba.gov/size.

Source control The practice of reducing stormwater runoff as close to the point where rainfall occurs (“the source”), through storage, infiltration, or diversion techniques.

Stakeholder The range of people and organizations with direct and indirect vested interests in MSD's activities. Primary stakeholders include customers (the ratepayers), employees, bond investors, community partners, neighbors, local government partners, regulators, and advocacy groups.

Volatile organic compound (VOC) VOCs are generally hydrocarbons that evaporate easily, have low- to-medium water solubility, and low molecular weights (see <http://toxics.usgs.gov/definitions/vocs.html>). VOCs include fuels, solvents, hydraulic fluid, and paint thinners. They are contaminants of concern in drinking water supplies because many are toxic and are known or suspected human carcinogens.

Wet weather A general term describing storms that generate sufficient stormwater runoff to cause flooding and overflow events in combined sewers and sanitary sewers.

Project Groundwork: Sustainable Infrastructure Broadens the Options

Consent Decree Negotiation Facilitates Sustainable Infrastructure Solutions

Consent Decrees are the product of intensive negotiation between all parties involved. In MSD's case, we worked with the regulators and other interested parties to ensure the affordability of the program, flexibility in project selection, and that MSD's wet weather strategy supports the goals of the Consent Decree. The Consent Decree provides for the incorporation of sustainable source control solutions, and MSD has adopted a three-pronged approach to evaluate and implement these techniques. The strategic prong focused on optimizing the solutions for reducing CSOs, especially stormwater source control. The flexibility prong enabled us to investigate and demonstrate the value of sustainable infrastructure solutions in the overall wet weather program approach. Finally, and importantly, the economic prong insisted on an affordable solution for ratepayers. Because of this focus, our source control demonstration projects are documenting the economic value of these solutions in addition to technical parameters.

Project Groundwork is MSD's program for meeting the requirements of the federally mandated Consent Decree. The detailed projects and plans for Project Groundwork are posted at the dedicated program Web site, at www.projectgroundwork.org.

Project Groundwork is one of the largest public works projects in the history of our community, costing an estimated \$3 billion by the time the second phase is complete, and involving the construction of new, separated sewer infrastructure, enhanced treatment capacity at MSD's wastewater treatment plants, and installation of rainwater source controls.

In this section, we present a special aspect of Project Groundwork's Wet Weather Strategy that incorporates both environmental and social aspects of sustainability – the sustainable infrastructure strategy for “source control” and the potential community benefits that can be realized through integrated public/private planning and investment.

Source Control: A Key Aspect of the Wet Weather Strategy

To achieve the required improvements, MSD's Wet Weather Strategy focuses on storage and conveyance, treatment, and source control. The first two approaches represent a more traditional approach to wet weather improvements, which entails collecting, conveying, and treating combined rainwater and sewage. The third approach – source control – is more strategic. It involves diverting rainwater from the sewer system, thereby eliminating the need to convey and treat essentially “clean” water.

Source control techniques use natural systems (such as forests, fields, ponds, and streams), or simulations of natural systems (such as green roofs, porous pavement, bioswales, and raingardens). These systems are designed to detain or drain stormwater into the soil or allow it to evaporate into the atmosphere. Sometimes, this type of infrastructure is called “green” or “sustainable” because it mimics the processes that nature uses to soak up rain.

Figure 7 shows a variety of source control techniques being evaluated. Source control is the greatest leverage point for solving the CSO problem as required by the Consent Decree, because clean rainwater entering the sewer system is the primary cause of CSOs. If these types of solutions are installed at many locations within a watershed, they could radically reduce the amount of stormwater entering the sewer system during a rainstorm.

Figure 7: Sustainable Source Control Techniques



Bioswales are designed to capture stormwater, filter out pollutants, and reduce flooding.



Green roofs not only detain stormwater – they also insulate buildings and create habitat for birds and insects.



Reforestation restores the natural water balance in the region and enhances water quality in streams.



Community garden create permeable open space and make great places for people to meet and play.



Native meadows naturally absorb rainwater, keeping it out of storm drains and streams.



Pervious pavers help rainwater seep into the ground, thereby helping to reduce stormwater runoff.

MSD's SWEP – Looking at Sustainable Wet Weather Solutions by Watershed

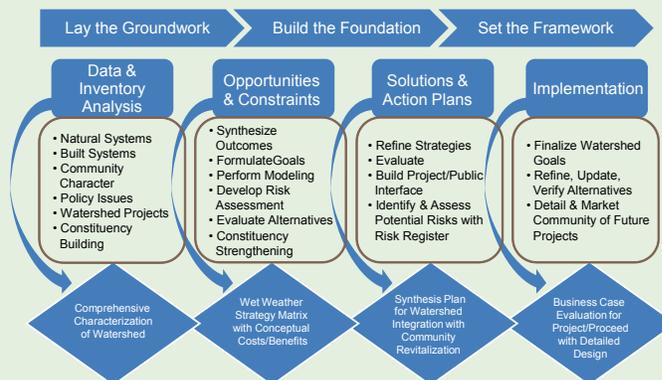
To create successful outcomes for wet weather projects, MSD needed to develop a systematic approach to identify opportunities for source control of rainwater. Keeping rainwater from entering the sewer system can lower construction costs of future infrastructure, and more importantly can provide the best opportunity to keep future annual costs as low as possible.

MSD developed the Sustainable Watershed Evaluation Process (SWEP), to take stock of ambient conditions and consider a wide range of options and strategies before determining the best way for reducing the volume of CSOs.

In South Fairmount (see the story on page 21), the SWEP was used to identify and evaluate existing and historical conditions of natural resources, infrastructure (roads, sewers), and socio-economic factors. The evaluation allowed MSD to develop a wet weather strategy and systematically determine how to best address wet weather needs in

different locations and conditions. The process identified four different approaches to be deployed throughout the Lick Run watershed to achieve a potential reduction of over 1 billion gallons of overflow reduction.

The MSD Sustainable Watershed Evaluation Process



Aside from reducing CSOs, source control offers many other environmental and social benefits. When rainwater is removed, it frees up capacity in the sewer system for sanitary sewage flow and vastly reduces the number of overflows into local streams. This reduces the public health threat caused by the pollutants in the CSOs, improves water quality for recreation and aquatic life, and eliminates offensive odors and unsightly debris. It also lowers the operation and maintenance costs at wastewater treatment facilities.

MSD's program to support and investigate source control options follows three avenues, with the purpose of substantiating the technical, economic, social, and environmental costs and benefits of these techniques.

- **Direct Implementation** – Through Project Groundwork, MSD has begun the planning, design, and implementation of sustainable CSO reduction projects. These projects are funded and staffed by MSD.
- **Enabled Implementation** – MSD has assisted project partners to construct demonstration and early success projects.
- **Inform and Influence** – MSD encourages other organizations to research and deploy source control installations, by providing information and education.

MSD selected projects to demonstrate early successes and measure real impacts in terms of source control. The following project examples feature the kind of sustainable solutions, community partnerships, and results that MSD is striving to achieve.



Rain barrels collect stormwater from roofs making it available for garden irrigation.



Rain gardens soak up stormwater before it runs off into streets and sewers.

American Red Cross Demonstrates and Educates

The American Red Cross recently built a new headquarters located just off Interstate 71, between Evanston Avenue and Realistic Avenue, in Cincinnati. The project site is located at a CSO structure currently averaging 58 annual overflows, resulting in 201 million gallons of annual overflow volume.

As part of Project Groundwork's enablement projects, MSD sponsored the American Red Cross' effort to construct two source control features, including a 2,000-square-foot, sloped, vegetative roof and a 13,330 square-foot bio-infiltration area. The sloped roof will be highly visible and will demonstrate the effectiveness of green roofs in reducing the volume of rooftop runoff. The bioinfiltration basin will store stormwater so that it doesn't contribute to peak flows in combined sewers, and it will reduce stormwater flow overall by enabling stormwater seepage into the ground. As a result, in a typical year of rainfall, the combined annual runoff volume could be reduced by nearly 978,000 gallons.

The American Red Cross coupled a significant educational program with these features, so that visitors could learn about the benefits of source control. The educational program included posters, brochures and flyers that highlight the stormwater management systems and MSD's role in this project. An interactive, electronic touch-screen display describes the major components. The data from a flow monitor is also incorporated into the interactive display.



North Fairmount Spray Aquatic Park: Early Success with Source Control

Like many cities, the Cincinnati Recreation Commission (CRC) is making investments and enhancing community value by reinventing urban aquatic parks. The Commission is pressed to eliminate traditional swimming pools and construct facilities with lower operating costs, such as spray water parks. Since many of the CRC facilities are also located within the same watersheds where MSD needs to remove stormwater from the combined sewer system, MSD is seeking to collaborate with some of these planned public investments.

In the Denham Watershed, the CRC had planned to construct a spray park in the North Fairmount Community and MSD was looking for strategic stormwater source reduction projects. These dual goals can give rise to a collaboration that created a win-win-win for the CRC, MSD, and the community of North Fairmount.

The result is a spray park funded by CRC and scheduled to open in June 2011, for which MSD is contributing buried infrastructure (a 60" separate storm sewer within the park footprint for future MSD stormwater separation work), porous concrete for the walkways around the park, and a 2-acre bio-infiltration basin to improve water quality. The addition of the bio-infiltration basin will expand the park boundary and add environmental education features, thereby enhancing the park's value to the community. While the CRC project requires MSD to accelerate its timeline for Project Groundwork in this area, doing so will reduce the negative impact of future construction on the same property.



Wyoming Rain Barrel Project Uses the Power of Multiplication



In the City of Wyoming, the total average overflow volume amounts to about 9 million gallons per year. As part of a pilot program to reduce CSOs to the Mill Creek, MSD and the City of Wyoming teamed up to offer Wyoming residents rain barrels at a sharply discounted price. Rain barrels help manage stormwater runoff by cutting down on the amount of runoff entering the storm sewer system. While one rain barrel may not have a great impact, the installation of many can help reduce the regional combined sewer overflow problem. For example, a 1,000-square-foot roof can generate 24,600 gallons of runoff a year. Multiply this by a thousand homes, and the runoff volume climbs into the millions of gallons.

In June 2010, 206 rain barrels were sold to property owners. Roughly half the property owners purchased more than one barrel. MSD is working on how to verify that rain barrels were installed and to quantify the volume of rooftop runoff captured by the rain barrels.

Cincinnati Zoo Leads in Green Infrastructure Projects

Aiming for high impact and high visibility, MSD partnered with the Cincinnati Zoo in an effort to remove the Zoo from the stormwater grid. The first project, located at the Zoo's Main Entry, incorporates over 30,000 square feet of pervious pavers; a rainwater harvesting, storage, and irrigation reuse system; and bioinfiltration of collected runoff via the nearby elephant moat.

MSD is monitoring these features through a series of shallow wells and measuring flow volumes in the nearby combined sewer. MSD provided funding for installation of small-scale stormwater controls, including a rain garden, pervious concrete and a green roof in an educational Green Garden located behind the entry court. This project was completed in April 2009. Since then, over 1 million zoo visitors have walked over the pervious paving and enjoyed viewing lush vegetation kept healthy by the reuse of rainwater.

The second project, now under construction, is in the new African Savannah exhibit. MSD funding will be used to replace an asphalt parking lot with pervious surfaces, including grasses, with enhanced soils and porous concrete walkways. A new 55,000-gallon underground storage facility will re-distribute rainwater collected from nearby roofs and hard surfaces to an irrigation system, and replenish water in Swan Lake and the Zoo's bear pools. We anticipate that these features will capture between 12 and 15 million gallons of stormwater runoff in a typical year.



MSD worked with the Zoo to help design, fund, manage, and construct this project. Focused on enabled implementation of projects such as this, opportunities for cost sharing and collaboration between MSD and key watershed stakeholders are a vital element to MSD's approach to help reduce overall treatment costs and meet the demands of the Consent Decree. Through an internal grant program, MSD is able to offer funding to support these types of green infrastructure improvements. In return, MSD hopes to demonstrate savings in CSO control and treatment costs as green infrastructure is integrated into the traditional pipe catchment method.

Furthering our partner's goals as well, the stormwater source control improvements at the Zoo has contributed to part of an ongoing, award-winning effort by the Cincinnati Zoo to establish itself as "the greenest zoo in America." The Cincinnati Zoo will now serve as a nationwide educational resource to learn not only about elephants and giraffes, but also about the many benefits of source control.



Cincinnati Zoo New Main Entry with MSD-Funded Storm Water Control

Transformation in Center Hill: From Landfill to Light Industrial Development



Through early actions surrounding the Consent Decree, MSD began design and construction of six Supplemental Environmental Projects (SEPs). Starting in 2004, our collaboration with Mill Creek Restoration, a local nonprofit organization dedicated to improvement and restoration of the Mill Creek watershed, ensured that the SEP projects would leverage work that was already being done.

Four of the SEPs involved stabilizing a stream bank and constructing more than a mile of Greenway trail extending to the Elmwood Place Landfill and the Center Hill Landfill. The projects included building leachate collection systems that would prevent further landfill pollution from entering the creek. At the same time, the City of Cincinnati was assessing and remediating the landfills as a part of their Strategic Property for Urban Redevelopment (SPUR) program. The 60-acre Center Hill site, a SPUR district, is located less than a mile west of

the Winton Hills neighborhood and could support up to 500,000 square feet of new light industrial space. If the project achieves its potential, City officials estimate that it could bring up to 500 new jobs to the area, while adding \$1 million in annual property tax revenue and just under \$500,000 in earnings tax revenue.

Within 5 years, the City of Cincinnati obtained the Covenant Not to Sue (CNS) from the Ohio Environmental Protection Agency, making the site ready for redevelopment as the Center Hill Commerce Park. Now, with filling operations nearly complete, the City is preparing for negotiations with several light industrial end-users that have expressed an interest in the site. A lasting legacy of MSD's contribution, this SPUR district has the first mile of constructed Greenway Trail along Mill Creek.

Bioinfiltration Basins at St. Francis Court Apartments

Located in Cincinnati's South Fairmount neighborhood, the St. Francis Court Apartments occupy nearly 11 acres just north of Queen City Avenue. This landmark property was formerly the St. Francis - St. George Hospital. During rainstorms, stormwater used to flow down the steep hillsides south of Harrison Avenue to the St. Francis property. On the property's eastern vacant concrete parking lots, stormwater had nowhere to go but into the combined sewer system.

Based on a typical year of rainfall, annual stormwater flow from the property is about 417,000 gallons. To help reduce the volume of stormwater runoff from this site, the property owner agreed to partner with MSD on the project to remove two underutilized parking lots and replace them with two large rain gardens, also known as bio-infiltration basins.

Although the basins look like regular gardens, they use special soils and native plant species to absorb and clean stormwater runoff. The upper rain garden captures stormwater flowing off the adjacent hillside. The lower rain garden captures excess flow from the upper garden. The site also includes a walking path for maintenance as well as community gardens for residents to grow plants and vegetables. In addition, trees were planted along the eastern half of the property and along the southern edge of the main parking lot to help provide shade and stormwater benefits.

This project provides numerous benefits to both MSD and the South Fairmount community, including:

- The rain gardens will reduce the volume of stormwater entering MSD's combined sewer system by about 27 percent.



- The garden plants will absorb and cleanse stormwater while simultaneously providing habitat and food sources for insects, birds, and butterflies.
- Trees will help capture rainfall while also providing attractive landscaping for this highly visible site.
- Community gardens will give residents an opportunity to meet each other and grow their own produce.

Leverage for Creating Community Value

The Consent Decree requires MSD to make significant investments in wet weather infrastructure in order to achieve the mandated reduction in CSOs. The scope and scale of these investments offers a unique platform, from which MSD and its partners can leverage additional investments in brownfield development, urban revitalization, and the creation of livable communities.

Sustainable stormwater source control, described earlier, is a central part of this strategy. Because sustainable source control solutions typically feature vegetation, landscaping, and water features, they can do double-duty as parks and trails for walking and biking. Such amenities, according to the Trust for Public Land, are important investments in community well-being that contribute to economic development and urban renewal. MSD is contributing its expertise in source control to several projects aimed at community revitalization, including the examples shown here.

Communities of the Future Brings Sustainability Into Focus Through Source Control

An MSD initiative called Communities of the Future is leading the development of an alternative vision for MSD's largest CSOs – a vision that addresses the source of the problem (rainwater) and marries this source control strategy with community revitalization. MSD has designated the Lick Run as our first, fully integrated effort to develop a sustainable solution for the community based on source control.

South Fairmount was first settled in the early 1800s around the Lick Run, the primary stream in this watershed that drains to Mill Creek. As Cincinnati grew, roadways, buildings and sewer pipes gradually replaced streams and trees. The resulting increase in runoff led to increased frequency and intensity of flooding events and sewer overflows. Gradually, Mill Creek and tributaries like Lick Run became the dumping ground for human and industrial waste.

To move the waste away from the South Fairmount neighborhood and resolve this public health threat, several tributaries of Lick Run were enclosed within a large sewer pipe. That 19.5-foot-diameter pipe remains today, running a distance of 3,700 feet along buildings and streets. It connects to CSO #5, a relief outfall at the east end of Queen City Avenue that overflows into Mill Creek during heavy rains. Each year, about 1.7 billion gallons of combined sewage and stormwater overflow

through this CSO. Of that total, only 25 percent is sewage; the rest comes from stormwater drains and what used to be natural stream flow.

Today, the South Fairmount area faces many challenges. People who live in this neighborhood bear one of the highest unemployment rates, lowest median household incomes, and highest school dropout rates in the region. The area also has a high volume of under-utilized lands, brownfields, and abandoned properties.

The Communities of the Future watershed solution for Lick Run includes the installation of over 75,000 linear feet of strategic storm sewers or reconstructed waterways along with retention basins for storage. Reforestation and downspout disconnections were identified as other strategic methods to apply in selected areas, resulting in a whole-systems approach to wet weather control. The resulting improvements can help to spur revitalization efforts and improve the quality of life within the neighborhood, while achieving the wet weather goal of reducing the amount of water that must be sent to a tunnel to be pumped and treated.

The pictures below illustrate source control and reconstructed waterway solutions that create community value in Kalamazoo, Michigan, and could be used for the Lick Run.



Revive Cincinnati Puts Source Control to Work

The Cincinnati I-75 Corridor is a dynamic area with key transportation routes and infrastructure, major industry, and established neighborhoods. The City of Cincinnati and MSD are jointly conducting the Revive Cincinnati neighborhood study, which capitalizes on Ohio Department of Transportation investments, GO Cincinnati, Agenda 360, and multiple community renewal efforts. The project has four focus areas:

- Mitchell Avenue Interchange
- I-74 Interchange
- Hopple Street Interchange
- Queensgate/Central Business District

The project seeks to create beautiful, viable neighborhoods along the I-75 corridor that offer attractive places to live, work, and play. To achieve this vision, the City of Cincinnati and MSD studied

opportunities for creating community value, neighborhood revitalization, and transportation improvements. After an extensive community involvement process, the final plan for Revive Cincinnati will be put before the City Council for adoption in the final quarter of 2010. The Revive Cincinnati plan will also be incorporated into the City of Cincinnati's Comprehensive Plan.

MSD's contribution to the plan was to promote the use of source control to meet two goals: improve stormwater management and create positive conditions for economic development. The plan includes ecosystem restoration through planting trees, adding wetlands, and building raingardens throughout the corridor. The result will reduce peak stormwater flows while enhancing property values, create more livable communities, and attract new businesses.



Operational and Environmental Performance

The day-to-day operation of MSD's wastewater infrastructure is much like a manufacturing process, consisting of inputs, finished products, and by-products. In our sewage treatment system, the primary inputs include wastewater, energy, and chemicals. From these "raw materials," we generate one finished "product": treated water in compliance with water quality regulations. Our wastewater treatment processes also generate a variety of by-products, including sludge, air emissions, GHG emissions, odors, solid wastes, and recyclable wastes.

Our environmental footprint consists of the materials and energy we consume, the wastes and emissions we produce, and the quality of the treated water we produce. Any improvements we can make in treatment processes, efficiency, conservation, and waste and emissions reductions will, therefore, reduce our environmental footprint. However, our number one contribution to our region's environmental health is returning clean water to local waterways.

In addition, meeting the requirements of the federal Consent Decree to reduce overflows from entering streams, creeks, and rivers is a critical component of improving our region's water quality as well as public health. Performance indicators related to the Consent Decree are published separately, at www.msdcg.org and www.projectgroundwork.org.

In this section, we present a variety of sustainability indicators relating to our operational and environmental performance. They have been selected to represent products, inputs, and by-products, as shown to the right.

“MSD is incorporating and really practicing and evaluating what we do, by looking at the triple bottom line. It's no longer looking at just regulatory impacts – but also adding the people piece and the financial piece. We have to adopt triple bottom line as a practice if we are going to succeed. It's the way we do business.”

— Beverly Head
Superintendent of Industrial Waste Division



Strategic Plan Goals

- Provide reliable infrastructure and high-quality cost-effective utility services for collection and treatment of wastewater and stormwater
- Enhance public health and the environment



Sustainability Goals

- Deploy energy and material resources efficiently
- Minimize waste
- Protect air quality and minimize odors
- Reduce GHG emissions
- Protect and enhance water quality
- Comply with environmental regulations



Key Performance Indicators for Sustainability

- MSD Products
 - Water quality regulatory compliance
- MSD Inputs
 - Wastewater
 - Energy consumption
 - Chemical consumption
- MSD By-products
 - Sludge dewatering
 - Incinerator air emissions
 - GHG emissions
 - Odor control
 - Waste disposal
 - Recycling

Water Quality Regulatory Compliance

Effluent water quality is driven by water quality regulations; as a result, MSD measures performance in this area with respect to regulatory compliance. Figure 8 summarizes 2009 regulatory compliance with respect to water quality regulations.

Industrial Pretreatment Program

Industrial wastewater discharges – typically large in volume and highly concentrated in the pollutants they contain – can affect the chemical and biological balance of MSD’s wastewater treatment processes and inadvertently put MSD’s regulatory compliance record at risk. To prevent these undesirable outcomes, MSD operates a pretreatment program for industrial customers. The program helps protect the sewer system from accidental industrial releases, avoids interference with MSD wastewater treatment processes, and maintains MSD’s compliance with federal regulations.

Under the program, MSD issues permits to 125 Significant Industrial Users (SIUs), establishes local limits for each user, and requires sampling of the wastewater discharges from their facilities. MSD determines regulatory and permit compliance by conducting regular sampling and inspection at each SIU site, at least annually. When an SIU’s wastewater discharge exceeds the allowable levels, MSD begins enforcement actions that may result in penalties for the SIU. In certain cases, SIUs can offset portions of the penalties by undertaking Environmental Enhancement Activities. This allows for environmentally beneficial projects or practices that resolve or address compliance violations, such as making changes in manufacturing processes. In 2009, MSD recorded 8 companies in significant non-compliance and invoiced roughly \$13,000 in fines.

MSD also issues permits to approximately 75 non-SIUs to help them employ Best Management Practices for their operations. For companies involved in enforcement actions, MSD encourages the company to invest in solving their compliance problem in lieu of paying penalties.



Figure 8: **Excursion Occurrences in 2009**

MSD Wastewater Treatment Plant	Number of Excursions ^a in 2009	Total Compliance Points ^b	Percent Compliance ^c
Mill Creek	2	1,579	99.87
Little Miami	1	1,813	99.94
Muddy Creek	0	1,467	100
Sycamore	3	1,701	99.82
Polk Run	3	1,521	99.80
Taylor Creek	0	1,533	100
Indian Creek	2	1,150	99.80
Mayflower Estates	3	432	99.30
Wesselman Woods	10	432	97.69

- ^a An excursion is an event that results in effluent from the wastewater treatment plant exceeding regulated water quality parameters.
- ^b A compliance point is defined as the number of times a permitted water quality parameter is measured in one year. For instance, the daily limit on pH would have 365 compliance points for the year. A monthly average of a parameter would have 12 compliance points for the year.
- ^c Percent compliance is calculated as $[(\text{total compliance points} - \text{number of excursions in one year}) / \text{total compliance points}] * 100$ percent.

An Award for Exceptional Regulatory Compliance

In 2008, MSD was one of only four wastewater utilities in the country to receive the prestigious Excellence in Management Award presented by the National Association of Clean Water Agencies (NACWA). Awards are given for exceptional regulatory compliance with the NPDES permitting requirements. This 2008 award honors MSD management and staff for their significant efforts toward improved water quality of their effluent and sets the bar for high performance in the future. For example, the Taylor Creek plant earned the NACWA Platinum award for achieving five years without a single regulatory compliance violation.



MSD and Food Company Wornick Collaborate for a Win-Win



MSD and Wornick Foods recently collaborated to achieve a sustainable solution for both organizations. Wornick is a leading supplier of ready-to-serve foods. Since 1995, the company has discharged process water from food sterilization at its Blue Ash facility into MSD sewers.

In 2009, Wornick embarked on a \$3 million capital project to recycle its process water

and add chilling capacity. To be completed by the end of 2010, this initiative will reduce water usage by 80 percent and proportionately reduce wastewater discharge to MSD. The resulting cost savings amount to more than \$1 million annually.

Even though MSD will lose revenue from the resulting sewer flow reduction, MSD will benefit from freed-up sewer line capacity. The reduction in Wornick's wastewater discharge could result in fewer sewer overflows and lower equipment operating costs at SSO 700 (in Reading), the sanitary sewer line that serves Wornick and which overflows during heavy rains. SSO 700 is the highest-volume SSO in the MSD system. It passes wastewater through three 1.2-million-gallon settling tanks to a chemically enhanced, high-rate treatment facility and ultraviolet system, prior to

discharging into Mill Creek.

"We are the biggest industrial user in this area," said Michael Hyche, VP of Operations for Wornick Foods. "We're reusing our process water instead of discharging it to MSD, and MSD is gaining additional capacity in its sewer line."

Prior to the start of the project, MSD Superintendent Beverly Head (of the Division of Industrial Waste) and Mike Cappel met with Wornick personnel to review preliminary engineering plans. "We try to work closely with our industrial customers to meet their needs," said Ms. Head. "They'll be our customers for a long time if they can control their own costs and be satisfied with our service."

New Engineering Building Gets LEED Gold Certification

In April 2010, MSD's new LEED® Gold certified engineering building was completed and dedicated in an opening ceremony. The three-story, 58,000+ square-foot structure is owned by the City of Cincinnati and will be known as the Metropolitan Sewer District of Greater Cincinnati Wastewater Engineering and Educational Center. About 150 employees and support staff moved into the building in April 2010. They work for or support our Project Delivery (PD) and Project & Business Development (PBD) divisions, and their primary functions are to develop and execute Project Groundwork.

The facility, a collaboration between MSD and various City and County Departments, was built on a former brownfield site using

energy efficient materials with recycled content. Energy-conserving components include a white reflective rubber roof, solar panels, and a special cooling system. The building also uses energy-efficient lighting and makes use of natural light.

The building is accessible to mass transit and offers bicycle racks and outlets for four electric cars. Outside, the new structure boasts a rain garden and two green roofs to control stormwater. To reduce water usage, the building features highly efficient fixtures and occupant sensors. The building will serve as a "green education center" for the Cincinnati community. A special kiosk is being placed in the lobby to help educate visitors about its green features.



What is LEED®?

LEED stands for Leadership in Energy and Environmental Design. It is an internationally recognized green building certification program developed by the U.S. Green Building Council (www.usgbc.org). There are four LEED categories - certified, silver, gold and platinum - which are achieved based on a point system. For more information, visit www.usgbc.org.

Getting out of the FOG – MSD’s Grease Prevention Program

In 2009, MSD’s Industrial Waste Division focused on grease prevention. Fats, oils, and grease (FOG) cause many problems in sanitary sewer lines. FOG builds up on the sides of the pipes, resulting in sewer blockages that can cause backups, flooding, and environmental spills. Blockages cause problems for MSD industrial customers who have to pay for damages and remediation due to FOG buildup, and MSD’s operational costs rise due to maintenance and remediation costs.

The FOG program targets restaurants, cafes, lunch counters, cafeterias, bars, clubs, and kitchens at hotels, hospitals, factories, and schools, and it consists of four key components:

- **Prevention Program:** MSD is working with new food industry customers by reviewing permit applications and plans to ensure that the business has the appropriate grease traps installed for their volume load.

- **Reaction program:** If blockages do occur, MSD’s first priority is to get sewers flowing again. Then, MSD works with the food service business that caused the problem to diagnose the issue and prevent blockages from happening again.
- **Rehabilitation:** In response to customer requests, MSD developed a rehabilitation program with defined standards and processes to aid food service industrial clients in preventing future problems.
- **Proactive maintenance:** Looking at the collection system, MSD is using its advanced Computer Aided Graphic Information System (CAGIS) program to actively seek out sanitary sewer blockages before they become a problem.

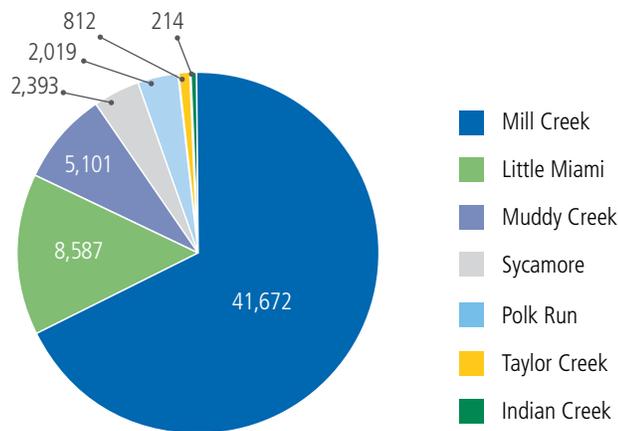
In combination, all four aspects of the program help prevent the unpleasant consequences of sewer blockages from impacting MSD’s customers while reducing costs for all.

Wastewater

MSD operates seven major wastewater treatment plants in Hamilton County. The Mill Creek Wastewater Treatment Plant (WWTP) in Lower Price Hill is the largest, treating 114 million gallons of wastewater a day. Three additional plants serve developments at Fort Scott, Mayflower Estates, and Wesselman Woods. The Wesselman Woods package treatment plant was decommissioned in 2010. Figure 9 shows how much incoming flow was treated by these treatment plants in 2009.

Figure 9: **2009 Wastewater Volume Treated by MSD Facilities** (million gallons)

Total = 60,800 million gallons



Notes:

1. Fort Scott was not fully operational and did not have any reportable flows in 2009.
2. Mayflower Estates averaged 0.032 million gallons per day in 2009.
3. Wesselman Woods averaged 0.04 million gallons per day in 2009.
4. Flows from these small plants were transported to Mill Creek for treatment.



Condition Assessments Put Maintenance on Track for the Long Term

With a complex underground system that cannot be observed first hand, pipes must be inspected using closed-circuit television technology to produce a high-quality record of the collections system. MSD televises approximately 300 miles, or nearly 1.6 million feet, of sewer each year. With this information, MSD is able to assess the condition of pipes in the systems and evaluate priorities for rehabilitation or replacement, while increasing staff productivity.

Energy Consumption

Next to water quality protection, energy consumption is the second largest component of MSD's total environmental footprint. Energy is needed to pump sewage from all parts of the sewage collection system to each wastewater treatment plant and through various plant processes, as well as to keep the lights on and computers running.

MSD's primary energy sources include natural gas, purchased electricity, and fuel for fleet vehicles. In alignment with the Cincinnati Green Plan, MSD is working to better manage energy consumption, to reduce both operational costs and GHG emissions. Figures 10 and 11 show MSD's total 2009 energy consumption.

MSD's general facilities (offices and warehouses) also consume energy, which is included in the energy consumption totals listed below. In these buildings, energy consumption is easily reduced by auditing and improving light fixtures and the heating and cooling systems. MSD's Industrial Division began this process by installing energy-efficient light fixtures, as well as motion detectors. Set-back temperature controllers were also installed, along with climate controllers.

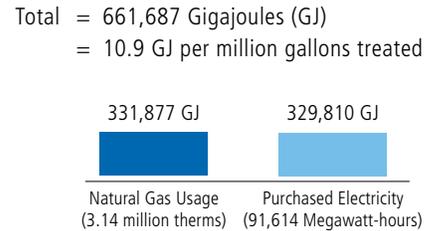
In 2010 and 2011, MSD has scheduled major building audits to further reduce energy consumption and the related costs. In addition, we have scheduled two initial sites for energy optimization efforts: the Polk Run and Little Miami treatment plants. At these locations, we will focus on metering, equipment functionality, lighting upgrades, and process improvements. At the Polk Run plant, these initial efforts are estimated to save \$80,000 annually.

Chemical Consumption

Chemicals are an integral component of wastewater treatment, allowing MSD to treat millions of gallons a day, efficiently, while meeting regulatory requirements for effluent water quality. Figure 12 shows MSD's chemical consumption in 2009. Chemicals also constitute a significant operating cost. For these reasons, MSD seeks to reduce chemical consumption on an ongoing basis. For example:

- In prior years, MSD completed installing ultraviolet (UV) disinfection systems at all small-volume plants. While UV disinfection consumes more energy than pure chemical disinfection, it produces a higher-quality effluent and uses less chlorine. For MSD, the cost benefit is acceptable at small facilities.
- While the Mill Creek and Little Miami treatment plants use hypochlorite for disinfection, both plants closely monitor usage on a daily basis to ensure the minimal amount needed is used for varying flow conditions and changing composition of incoming wastewater. MSD is currently reviewing alternatives for various chemicals to further reduce chemical consumption and reduce costs.
- In 2009, the Sycamore treatment plant started chemical reduction efforts related to treating phosphorus for odor control. Here, we are testing biological treatment of phosphorus, which would allow for a potential 8,000 gallon annual reduction of poly-aluminum chloride, based on 2009 usage. Testing and the transition to biological treatment will be completed by the end of the third quarter in 2010. In addition, odor issues have subsided at the treatment plant for several years; for this reason, it may be possible to discontinue the use of hypochlorite for odor control. If hypochlorite can be eliminated, the annual consumption of this chemical would be reduced by about 7,000 gallons. Currently, we are monitoring odor issues with the discontinuation of hypochlorite.

Figure 10: 2009 Natural Gas and Electricity Consumption

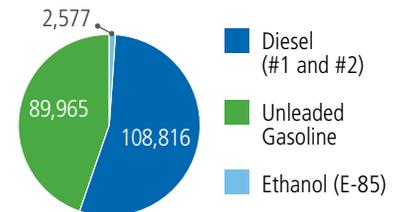


Notes:

1. Natural gas is consumed by stationary combustion sources, which include the incinerators at the Mill Creek and Miami treatment plants, all Mill Creek facilities including the Gest Street Garage and auxiliary facilities, the Galbraith Road Collections office and auxiliary facilities, the MSD Administration Building, the MSD septic receiving station, and Muddy Creek, Sycamore Creek, Taylor Creek, and Polk Run treatment plants.
2. Purchased electricity is represented for all MSD treatment plants, auxiliary facilities, Gest Street Garage, and the MSD Administration building.

Figure 11: 2009 Fuel Consumption in Gallons

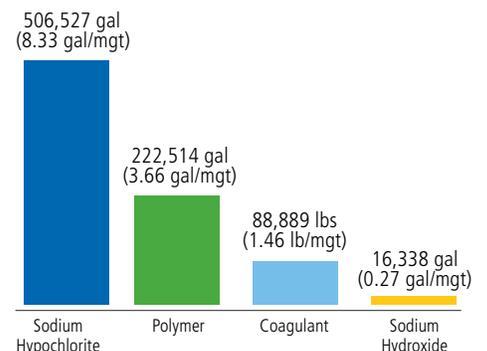
Total = 201,358 gallons
 = 3.31 gallons per million gallons treated



Notes:

1. Fuel for fleet vehicles is of three types: diesel, unleaded gasoline and E-85 (gasoline consisting of 85 percent ethanol, a grain-derived fuel). The fleet includes over 300 passenger vehicles, vans, trucks, construction equipment, and pumps.
2. In keeping with the Cincinnati Green Plan, MSD supports fuel reduction by implementing and abiding by the City's no-idling policy and including alternative and flex fuel vehicles in the fleet. Currently, there are 8 hybrid vehicles and 45 flex fuel vehicles in the fleet, of which 28 were purchased in 2009.

Figure 12: Chemical Consumption for Wastewater Treatment Operations in Gallons or Pounds per Million Gallons treated (mgt)



Sludge Dewatering

Aside from effluent, MSD's second biggest output is sludge. Sludge is a semi-solid by-product of the wastewater treatment process. The options for disposing of sludge include incineration, landfilling, composting, or application to agricultural lands as fertilizer. MSD uses incineration, because the benefits outweigh the costs and concerns. For example, incineration does not have the same public safety issues, costs, or fuel, air emissions, and landfill space concerns associated with the landfilling option. Figure 13 shows how much sludge was produced by each plant in 2009.

For MSD, the primary environmental issue associated with sludge is finding the best balance between energy and chemical consumption. Dewatering processes apply polymer chemicals to thicken the sludge, and energy is required to run belt presses and centrifuges that remove the water. The resulting product (called "sludge cake") requires less energy for efficient incineration. In addition, because sludge cake is more compact, MSD uses less fuel to transport it from the treatment plants to the incinerators. The challenge is to adjust the system so that both energy and chemical consumption are minimized in both the dewatering and incineration processes. Optimization efforts at the Polk Run treatment plant have dewatered sludge further, thereby reducing sludge hauling by about 40 percent and saving approximately \$34,000 per year.

In 2009, MSD had a target range of solids in sludge between 22.5 percent and 25 percent. At the Mill Creek and Little Miami facilities respectively, the average solids contents in 2009 were 26.8 percent and 22.0 percent. With the installation of the new fluidized bed incinerators at Mill Creek, MSD is working with industry experts to determine the optimal operating range to achieve quality outputs at the least costs for energy and chemicals.

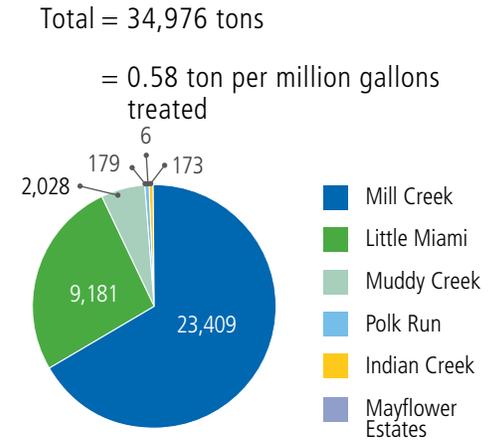
Incinerator Air Emissions

MSD operates sludge incinerators at two locations: Mill Creek and Little Miami plants. In 2000, MSD installed a fluidized bed incinerator at the Little Miami treatment plant, designed to handle all sludge produced at this facility. The equipment proved so efficient and clean that MSD made plans to replace the six multi-hearth incinerators that were built at Mill Creek in the late 1950s and 1980s. MSD is now completing the installation of three new fluidized bed incinerators at the Mill Creek wastewater treatment facility.

The original Mill Creek units were fueled with natural gas and fuel oil. Typically, two of the six were in operation at an average feed rate of 1.6 dry tons per hour. These older incinerators burned digested sludge, which had to be heated to remove volatile organic compounds. This system cost MSD \$2 million a year in natural gas.

The new Mill Creek incinerators started operation in the mid to late 2010. They cost \$75 million to permit and construct, and are anticipated to save about \$1 million in fuel costs a year. The new incinerators burn undigested sludge, which means the incinerators can be self-fired by the thermal energy contained in the waste being burned. The old incinerator building will be demolished, and the Mill Creek digesters will be decommissioned.

Figure 13: 2009 Sludge Production, in Dry Tons, by Treatment Plant



Notes:

1. Sludge from the Sycamore and Taylor Creek plants is transported to Little Miami and Mill Creek treatment plants, respectively, for incineration.
2. Fort Scott development plant was not fully operational in 2009 and did not generate a measurable quantity of sludge.
3. Nearly 97 percent of MSD sludge was incinerated, with the remainder (1,144 tons) transported to a landfill.

Benefits of Fluidized Bed Incineration

This type of incinerator uses a bed of hot sand or granular material to burn sludge. A high-velocity airstream passes through the bottom of the bed, causing the granular material to behave like a fluid. The benefits of fluidized bed incineration are:

- No landfilling
- No hauling
- Less pollution: Air emissions will be reduced by 75 percent or better, compared to current incinerator emissions
- Fewer visible emissions — no yellow or gray haze
- Fewer odors
- No venting to the atmosphere during emergency situations
- Ability to meet more rigorous emission standards in the future

The rated capacity of the three new incinerators is 4 dry tons per hour each, for a total of 12 dry tons per hour. When operating continuously, they can be autogenous, or self-fueling. This feature will dramatically reduce fuel consumption and air emissions, including GHG emissions.

Figure 14 shows the average incinerator air emissions in 2009, before the new incinerators came on line. We anticipate the future air emissions will be significantly improved, once data from the new units is available. All regulated pollutants were below regulated limits in 2009. We experienced instances in operating conditions when opacity fell below permit limits, percent oxygen in stack gas went above permit limits, and scrubber pressure drop went below the permit limit.



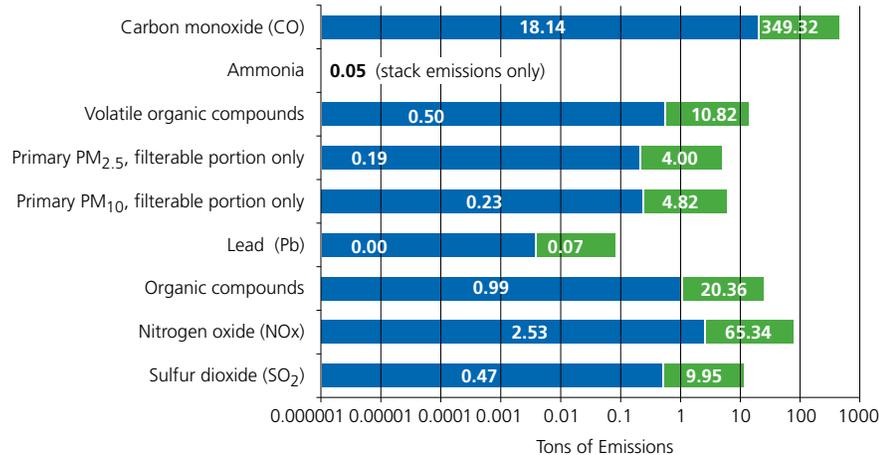
Figure 14: **Total Air Emissions from MSD Incinerators in 2009**



Mill Creek Incinerator Emissions (Old Multi-Hearth Incinerators)

2009 Total = 487.78 tons

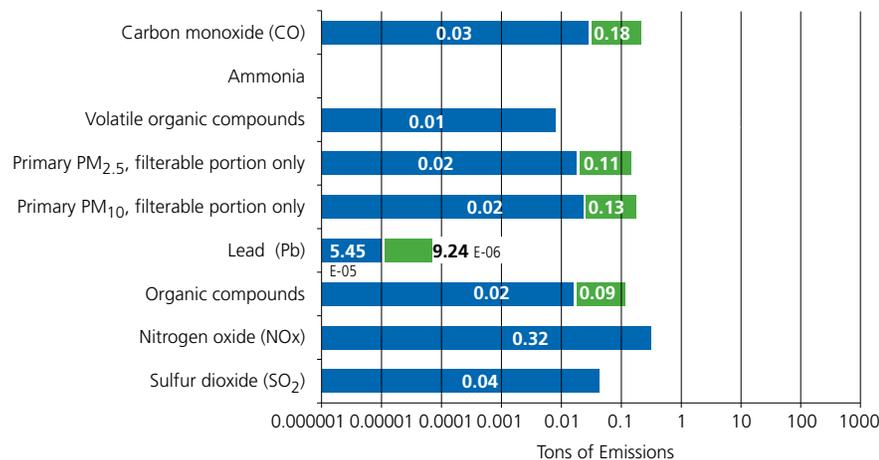
= 0.01 ton per million gallons treated



Little Miami Incinerator Emissions (Fluidized Bed Incinerators)

2009 Total = 0.97 ton

= 0.000016 ton per million gallons treated^a

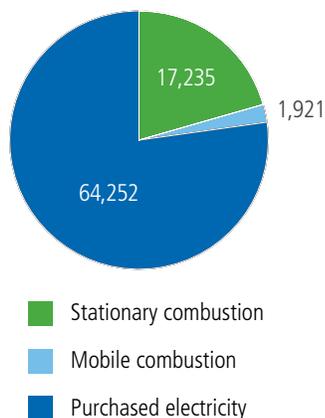


■ Fugitive emissions ■ Stack emissions

^a Includes both stack and fugitive emissions. Stack emissions are process emissions that can reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Fugitive emissions comprise all other emissions not characterized as stack emissions.

Figure 15: MSD's 2009 Carbon Footprint

Total = 83,408 metric tonnes CO₂-e
 = 1.37 metric tonnes per million gallons treated



Notes:

1. Stationary combustion sources include the incinerators at the Mill Creek and Little Miami treatment plants, all Mill Creek facilities including the Gest Street Garage and auxiliary facilities, the Galbraith Road Collections office and auxiliary facilities, the MSD Administration Building, the MSD septic receiving station, and Muddy Creek, Sycamore Creek, Taylor Creek, and Polk Run treatment plants.
2. Total emissions for mobile combustion were calculated using the fuel consumption data presented above and national averages for fuel economy by vehicle type.
3. Carbon dioxide equivalents represent the universal unit for comparing emissions of the various GHGs to one unit of CO₂ based upon their GWP value. Global warming potentials (GWPs) from the Intergovernmental Panel on Climate Change Second Assessment Report were used to convert non-CO₂ gases to carbon dioxide equivalents (CO₂-e). Global warming potentials indicate the degree of warming to the atmosphere that would result from the emission of one unit of a given GHG compared to one unit of CO₂. All non-CO₂ gases are expressed as CO₂-e within the emissions inventory.

Greenhouse Gas Emissions

MSD's 2009 GHG emissions inventory establishes a baseline of GHG emissions associated with MSD operations and facilities. Our primary emission sources arise from stationary combustion of natural gas, use of purchased electricity, and mobile combustion (fleet vehicle fuel consumption). The total emissions for 2009 amounted to 83,408 metric tons of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), expressed as carbon dioxide equivalents (CO₂-e).

For the future, our goals are to develop a carbon-reduction policy and to reduce our carbon footprint over time by improving energy efficiency and cutting consumption of carbon-based fuels. In addition, we want to bring our GHG-reduction efforts into alignment with regional government initiatives and set appropriate targets for GHG reductions. We will also expand the scope of future GHG inventories to include secondary sources of emissions, such as emergency and backup generators, treatment plant processes, employee commuting, treatment chemical use, and sludge disposal.

Mill Creek Plant Cuts Blower Usage

In October 2009, the Mill Creek treatment plant set a new low record of 1,590 kilowatt-hours (kWh) for blower usage in secondary treatment, 30 percent less than the average monthly usage of 2,300 kWh in 2006.

Blowers keep aeration tanks properly mixed, so that the microorganisms, or bugs, can thrive. The bugs consume the solids in the wastewater. Until recently, the conventional wisdom was that 4 milligrams per liter of dissolved oxygen was optimal; however, that amount of air consumes a tremendous amount of energy and is, therefore, expensive to generate.

Mill Creek personnel are now challenging the rule of thumb, as part of an optimization process begun in 2007. "We didn't change our equipment as much as we changed our philosophy," said Tim Hauck, plant supervisor. "We found that we could use less air, more effectively, and without compromising quality. Our electric costs for 2009 are about \$200,000 less than what we spent in 2006."

Continuous Process Improvement Teams

MSD's Continuous Process Improvement teams were formed several years ago in the wastewater treatment division. These teams look at influent screening, liquid stream, and solid stream processes optimize resources and reduce wastes. Improvements are measured using defined indicators, some of which apply to material and energy use:

- Electrical usage for aeration
- Electrical usage for secondary by-pass
- Electrical usage for blowers
- Natural gas usage for incineration
- Hypochlorite usage
- Polymer usage

Effective measuring and management of these areas allow MSD to streamline treatment processes and reduce operational costs.

Odor Control

Currently, MSD considers odor control in all new projects. For instance, a new Septage Receiving Station at the Mill Creek Treatment Plant was put into operation in June of 2009. Located at the southeast corner of Gest and Evans streets, the station accepts sanitary waste and grease from public and private sources. Community concerns about odors prompted the construction of this building, which includes two high bays equipped with a carbon filter odor control unit. This automated station replaced the open manhole at the north end of the Mill Creek plant. This project, costing \$4.2 million, was begun in November 2007 and completed in May 2009 with a formal dedication.

“There has been a big improvement in the smells that come from the Mill Creek treatment plant over the last few years. Living up the hill from MSD has become less noticeable as the incidents of odors have become dramatically less.”

-- Jeanne Nightingale,
Resident on Glenway Avenue

MSD and Lower Price Hill CAP: Relationships Foster Solutions

In an effort to address odor issues affecting the Lower Price Hill community, the Community Advisory Panel (CAP) was established in February 2002 by a Memorandum of Agreement (MOA) between MSD and the Cincinnati Office of Environmental Management. The agreement required MSD to increase public announcements when odor issues were anticipated, to develop a 5-year plan for odor control improvements, and invest a minimum of \$25,000 by 2005 for specific odor control projects.

In the first year, MSD and the CAP tackled odor issues through research, discussion, and operational improvements. In December 2002, when a Cincinnati City Council decision to repeal the Title X air quality ordinance made the MOA null and void, MSD chose to continue working with the CAP to identify additional odor sources. As a result, MSD significantly updated infrastructure and commissioned a septage receiving station that reduces and better contains odors. These improvements were voluntary and went beyond the requirements of the original MOA.

In working with the CAP, we experienced first hand the benefits of

stakeholder engagement. As a result, MSD chose to continue hosting CAP meetings once a quarter, to foster the relationship with the Lower Price Hill community on the foundation of common interests and two-way communications that had been built. Over time, the focus of the meetings has expanded beyond odor control issues to include other operational topics and partnerships such as support of the Oylar School-Based Health Center and the Lower Price Hill Day community event. In 2009, MSD brought the new septage receiving station on line and dedicated the facility to the Lower Price Hill Community. Additionally, we completed an odor control study to evaluate odor control systems. Looking forward, we are currently reviewing the design for decommissioning the anaerobic digesters, a current source of odor issues.

To report odor complaints, please call the Hamilton County Air Quality 24-hour hotline (513-946-7777 or 800-889-0474) or follow instructions at the complaints website at <http://www.hcdoes.org/airquality/webpages/complaints.htm>.

Waste Disposal

MSD's largest solid waste stream consists of sludge cake, all of which is incinerated when the incinerators are properly functioning. Hauling sludge cake to a landfill is only used as a backup measure. Other solid waste streams generated by the wastewater treatment process are handled as follows:

- **Screenings, grit, and scum.** As wastewater enters each treatment plant, a screening process removes particles such as paper towels and other non-biodegradable materials, as well as grit (such as sand or gravel). Further in the treatment process, scum accumulates at the top of the clarifiers (large settling tanks), which MSD skims off. MSD collects screenings, grit, and scum from each facility and transports it to the Mill Creek treatment plant. MSD contracts with a waste hauler to collect the accumulated screenings and grit and remove them to a disposal facility. Scum is reprocessed at the Mill Creek plant before it is also hauled away for disposal.
- **Ash.** This material is the result of incineration; it is put into lagoons for storage and then hauled by a waste management company to a disposal facility, where it is used as landfill cover. Lagoons are located at the Mill Creek and Little Miami plants, in proximity to the incinerators that produce the ash. Mill Creek's lagoon is emptied several times a year; however, the Little Miami lagoon can go as long as 10 years without having to be emptied.



Figure 16 summarizes the quantities of MSD's wastewater treatment-related solid waste disposed of in 2009.

Figure 16: **2009 Waste Disposed in Solid Waste Landfills**

Solid Waste Type	Quantity Disposed in Landfills in 2009
Sludge cake	1,144 dry tons
Screenings, grit, and scum	7,354 tons
Ash	13,672 tons

Recycling

In 2009, MSD reviewed its recycling practices for paper, cardboard, wood pallets, computers, ink and toner cartridges, aluminum cans, plastic, glass, oil, metal, yard waste, and batteries. We found that paper is the only material that we recycle consistently, at an estimated rate of 20 percent of total paper waste. All other materials such as ink and toner cartridges were either thrown in the trash or were sporadically recycled. Our current practices leave plenty of room for improvement, and we plan to establish formal targets and change practices throughout the organization to improve our performance.

Simple Changes Make a Big Difference

Since the mid nineties, MSD's Industrial Division has investigated and implemented analytical methods and procedures to minimize sample and reagent use, thereby reducing the amounts of chemicals and disposables used for testing. In 2009, we purchased automatic samplers for several instruments and a flow injection analyzer for the analysis of nutrients.

As a result, the overall generation of laboratory wastes and the related disposal costs have decreased significantly. For example, in 2009, no chemical waste removal was needed. Price quotes received in 2010 for removal of wastes accumulated over the 2-year period were halved, although the number of analyses remained the same or increased.



Chemical Composition of Ash

Ash is the residual material from sludge incineration, during which all volatile compounds are burned off. Because MSD stores ash in lagoons prior to land filling, testing the concentration of hazardous or carcinogenic constituents is important for both the safety of the crews and the community. The ash is composed of sand, with some metal residuals. Keeping the ash wet allows for the metals to settle at the bottom of the pond. In 2009, the average concentration of heavy metals in the ash lagoons is shown below.

2009 Concentration of Regulated Contaminants in Ash

Regulated Contaminant	2009 Average Concentration in Ash (mg/L)	Regulated Limit (mg/L)
Arsenic	<0.05	5
Barium	<0.05	100
Cadmium	<0.05	1
Chromium	<0.05	5
Lead	<0.05	5
Mercury	<0.0020	0.2



Social and Community Performance

Sustainability is just as much about people and communities as it is about environmental well-being and economic strength. MSD's strategic plan emphasizes relationships with three primary partners: customers, community stakeholders, and our workforce. This section describes what we are doing to promote healthy relationships with each of these groups.

Customer Service

Our primary focus in customer service is the Water in Basement (WIB) program, as this program ensures our customers receive prompt service in emergency situations. We actively ask program participants to evaluate the assistance they received, and we measure our performance in terms of speed and quality of response to our customers.

Figure 17 summarizes our 2009 customer service performance for the WIB program.

Figure 17: **Customer Service Performance^a for the Water in Basement (WIB)^b Program**

Performance Indicator	2009 Baseline Performance	Target Performance
Customer satisfied with the WIB program	88 percent	Maintain or improve upon 2009 baseline performance
Customers are satisfied that the Customer Service Investigation Team investigates the sewer backup within a reasonable time	93 percent	
Customers feel that the Investigation Team was respectful	91 percent	
Customers felt that the informational materials they were given were clear and easy to understand	90 percent	

^a Customer service performance data is based on a survey that was issued to all 417 customers who were serviced in 2009. There were 105 survey respondents, a generally favorable response rate to this type of survey. This survey is not related to separate and different Consent Decree requirements.

^b The WIB program is soon to be renamed the Sewer Backup program.

Strategic Plan Goals

- Provide exceptional service that engages our community and builds confidence in local government
- Create a high-performance utility with a diverse, inspired, and empowered workforce



Sustainability Goals

- Provide exceptional service
- Effectively engage stakeholders
- Comply with environmental regulations
- Promote diversity and inclusion in the workplace
- Promote employee health and safety
- Develop the workforce for present and future excellence



Key Performance Indicators for Sustainability

- Customer service
- Community partnerships
- Community engagement
- Diversity and inclusion
- Health and safety
- Employee training and development
- Small business and local workforce development

Service for the WIB Program

For many years, property owners and tenants were responsible for cleanup and damages caused by sewage backups. In January 2004, MSD launched the WIB program, soon to be renamed as the Sewer Backup Program, to prevent and respond to sewage backups in the MSD service area. The program was the first of its kind in the country.

The WIB program provides cleanup assistance — after a sewer backs up into a private home or business— at no cost to the property owner or tenant, provided the backup was caused by a problem in the public sewer. The program also provides assistance for filing damage claims and preventing future sewer backups.

WIB Program 2009 Facts

- In 2009, MSD received 4,806 calls about sewer backup issues.
- The program cleaned up more than 278 properties and installed sewer backup prevention equipment on about 22 properties to prevent chronic backups.
- The program cost about \$3,874,110 to operate. Additional monies were spent on capital improvements to correct sewer backup issues.

If you are an MSD customer experiencing a sewage backup from your floor drain, call MSD 24/7 at (513) 352-4900



Community Partnerships

One of MSD's key strategies is to establish community and regional partnerships focused on sustainability and quality of life issues. In partnership with other organizations, MSD is able to build community relationships, promote environmental health, and contribute to economic development. Therefore, our ties to other organizations are vital to our ability to contribute to the quality of life in our service area. MSD's partners come from many sectors, as Figure 18 shows.



Figure 18: Snapshot of MSD's Key Partners

Governments and Utilities	Neighborhood Organizations	Environmental Advocacy Groups	Academic Institutions	Business Organizations	Green Demonstration Project Partners
Hamilton County City of Cincinnati Greater Cincinnati Waterworks City of Cincinnati Stormwater Management Utility Cincinnati Parks Cincinnati Recreation Commission Port Authority of Greater Cincinnati U.S. EPA Ohio EPA ORSANCO U.S. Geological Survey FEMA OKI Regional Council of Governments	Lower Price Hill Community Council East Price Hill Improvement Association West Price Hill Civic Club Local Initiative for Sustainable Communities	Mill Creek Restoration Project Mill Creek Watershed Council of Communities Sierra Club US Green Building Council, Cincinnati Chapter	Cincinnati Public Schools University of Cincinnati Cincinnati State Technical and Community College Xavier University Ohio State University Cooperative Extension	Chamber of Commerce Agenda 360 Various community development corporations	American Red Cross Christ Hospital Cincinnati DOTE Cincinnati Museum Center Cincinnati Public Schools Cincinnati State Technical and Community College Cincinnati Zoo Civic Garden Center City of Wyoming Wyoming Environmental Commission

With our resources combined, we can achieve ambitious projects that help the overall quality of our region. For example, our 2009 efforts included the following:

- **Mill Creek Restoration School Education Program** – MSD helps sponsor this comprehensive, year-round, interdisciplinary, environmental educational program. The program is offered to middle school and high school students from the Cincinnati Public School District and from suburban and parochial districts in the watershed. The program emphasizes analytical and creative thinking and uses “hands on” learning experiences that include data collection, problem solving, and action taking.

- Hamilton County Construction Coordination** – Construction activities associated with infrastructure improvement projects undertaken by multiple government agencies and utilities often create inconveniences for area residents and business owners. To help ease the frustration and improve coordination between projects, MSD partners with other utilities and governmental agencies to support CAGIS, a new electronic information system that displays planned projects and scheduling information. According to Jeff Aluotto, Assistant County Administrator, “A synchronized approach to non-emergency construction reduces instances of repetitive work in the same area, which is an understandable source of frustration to area residents.”
- Oyler School-Based Health Center** – MSD employees have taken up the challenge: to support the Oyler School-Based Health Center through a variety of fundraisers. Over the past year, employees have raised more than \$10,000 for this worthy cause. Oyler is a K-12 school for children in Lower Price Hill, which shares the neighborhood with MSD. “We are so proud to be a part of this initiative. The school-based Health Center is an important link to successful educational outcomes at Oyler School, and it gives our employees a chance to be a part of the success in our working neighborhood,” says Bijou George, MSD Deputy Director.

MSD Partners with Strategic Program for Urban Redevelopment (SPUR)

In December 2001, the City launched SPUR, a program that utilizes interdepartmental expertise to identify, recommend, and prioritize brownfield redevelopment throughout the City. Brownfield redevelopment allows our community to reclaim and improve its lands, making previously developed property viable for new development.

The City of Cincinnati is committed to its proactive approach in the redevelopment and revitalization of Cincinnati's brownfield properties. Accordingly, the SPUR team's mission is to identify and remove real or perceived barriers to development. The SPUR team consists of members from the Cincinnati Departments of Community Development & Planning, Environmental Compliance, Budget, Law, and Real Estate.

Because sewer capacity is a primary requirement – and sometimes a limitation – for land development, MSD is a primary partner with the City of Cincinnati on most SPUR projects. Working with the City, MSD provides the technical support and expertise needed to ensure adequate sewage capacity for new developments while meeting regulatory requirements and the demands of the Consent Decree.

Sixth Annual MSD Stakeholder Breakfast

MSD's annual breakfasts began as MSD's response to stakeholder requests to have more opportunities to talk with MSD. Over the last 6 years, the Stakeholder Breakfast has evolved into a welcome annual event that gives MSD an opportunity to interact face-to-face with the leaders of all of the communities and political subdivisions that we serve, present our challenges and achievements for the year, and answer questions from our stakeholders. In 2008, we changed the name of the event to “MSD In Your Community,” to reflect the change in focus from just capital projects to a broader view our utility's roles and activities in the community. The event format features presentations by MSD and other leaders, followed by break-out sessions to allow detailed discussion of selected topics. Highlights of the 2009 breakfast included presentations about stormwater source control techniques by Mark Fisher from the Cincinnati Zoo and Jeff Aluotto, Assistant County Administrator.



Community Engagement

MSD understands the intrinsic value of engaging community partners. As a result, we have updated our comprehensive Communication Plan to help educate employees, customers, stakeholders, and the media learn about the operations and initiatives of MSD.

In addition, as part of MSD's commitment to involve community leaders and stakeholders in Project Groundwork, MSD established an Advisory Committee in 2009 to assist in the development of integrated wet weather reduction strategies and projects that link our efforts to other community goals such as community revitalization and economic recovery.

The committee advises MSD on its Community of the Future vision, and assists MSD in aligning Project Groundwork initiatives with other regionally significant efforts such as Agenda 360, the upcoming City of Cincinnati's Comprehensive Plan Update, and new federal and state partnerships to develop more sustainable, livable communities.

Members of the committee are drawn from over 30 local, state, and federal governmental organizations as well as environmental advocacy groups, academia, and business interests. Overall, these members help MSD represent triple bottom line concerns relating to social, environmental and economic quality and impacts.



“Communication is about education... The formula for becoming a top-notch utility not only includes how you utilize your time and develop your employees, but also how you communicate as an organization, both internally and with customers and political leaders. Good communication helps us and others better understand processes, personalities, and initiatives.”

— James A. (Tony) Parrot,
MSD Executive Director

MSD's 2009 United Way Campaign Raises \$17,500

Through the generosity of employees and fundraising events, MSD's contribution to the 2009 City of Cincinnati United Way "Live United" campaign raised more than \$17,500. Food, food, and more food was the theme of MSD's many fundraising events. Hosted by various MSD divisions, fundraising events included an ice cream social, a bake sale, a breakfast, and the favorite: a chili cook-off. Although the bulk of the total was raised through voluntary employee donations, the fundraisers added more than \$1,000 to the campaign total. "The fundraisers are an additional way for us to help United Way and have fun at the same time," said Traci Sena, campaign co-chair. "It was a tough campaign this year due to the economy, but everybody pitched in," said Margie Anderson, Superintendent of the Administration Division.



MSD engages our stakeholders through a variety of ways, including the annual “MSD In Your Community” breakfast, local community meetings, focus groups, as well as through our Web site and printed materials. In July 2010, we conducted an extensive survey to help us understand the community’s perspective on the number and quality of these interactions and how well informed people are about our utility. The survey involved 209 people who participated in 20 focus groups that took place in a diversity of neighborhoods in MSD’s service area.

We learned that most people understand MSD’s mission and scope of removing and treating wastewater, as well as maintaining the sewer systems. About half also understood that MSD’s work helps to maintain the quality of the rivers, creeks, and streams in our region. Surprisingly, a sizable percentage of survey respondents (between 30 and 40 percent) believe that MSD purifies and provides drinking water; however, this work is performed by Cincinnati WaterWorks, a drinking water utility.

With respect to the quality of interactions with MSD, about half of our survey respondents described their experience as positive or neutral. About 10 percent had very positive experiences and about 4 percent had negative experiences.

As Figure 19 shows, more than half the survey respondents indicated that MSD is providing an adequate number and quality of community engagement opportunities. However, in the area of providing frequent enough, clear, and transparent communications, almost half of the people we interviewed saw room for improvement. Specifically, homeowners want more information about water recycling, conservation, and sewer maintenance. Our first step in addressing this gap is to develop a detailed stakeholder communication plan as part of our Comprehensive Communication Plan. Future stakeholder surveys will tell us if our efforts are filling that gap.



Figure 19: Results of the 2010 MSD Stakeholder Survey

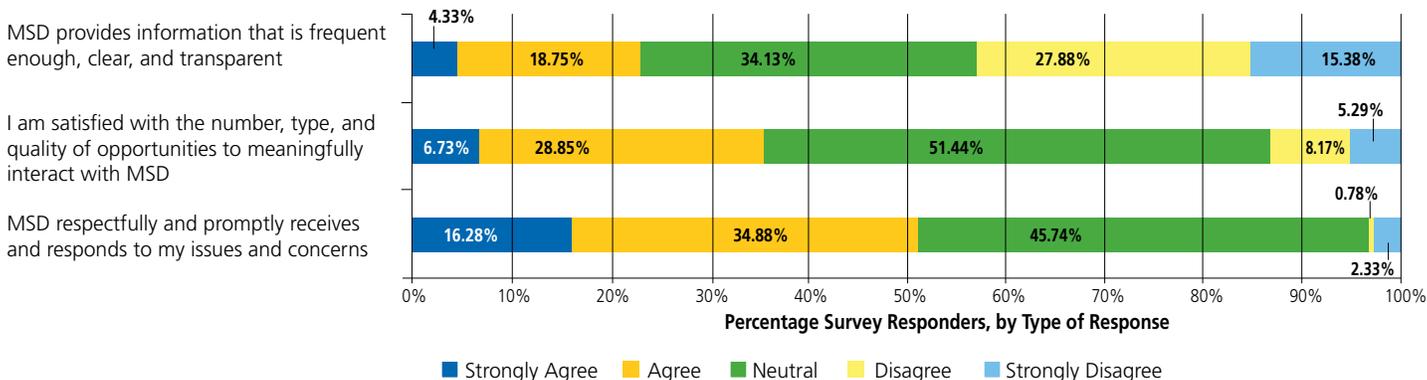
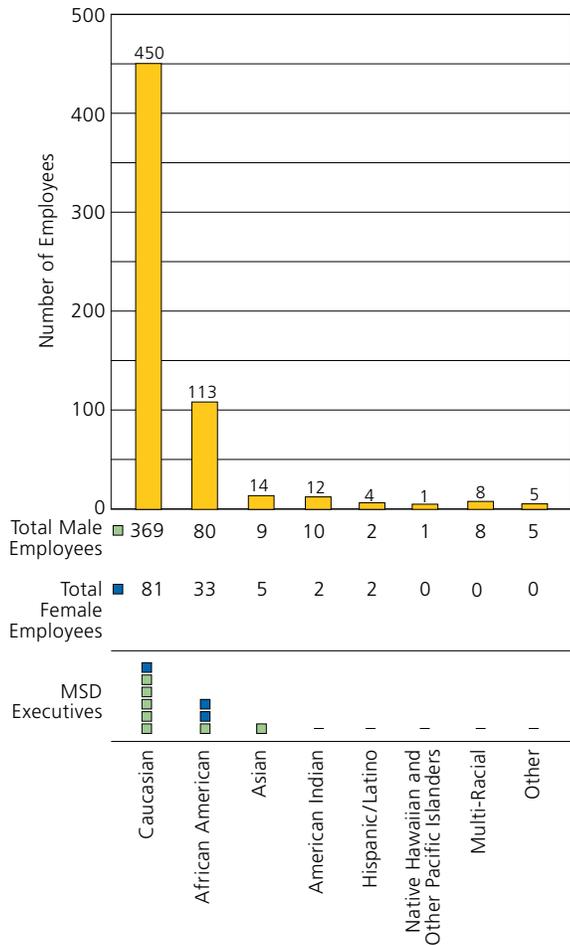


Figure 20: 2009 MSD Employee and Leadership Demographics

Total Employees = 607



MSD Workforce Demographics, Diversity, and Inclusion

Our workforce is the most essential component of our entire organization. The expertise and day-to-day dedication of our employees and various suppliers and contractors are critical ingredients in our ability to achieve our mission. In this section, we describe our goals with respect to MSD’s employees, who are also City of Cincinnati employees. Many of our employees belong to the labor unions listed at left.

Employee and Leadership Demographics

We strive for diversity in our employee workforce and organizational leadership. Figure 20 shows the diversity of MSD’s current workforce and executive leaders, numbering 607 people. MSD’s executive leadership team consists of the Executive Director, the Deputy Director, and the heads of each MSD Division. The distribution of our people among different races and ethnicities closely mirrors the diversity in Hamilton County.



Employee Unions

MSD has a combination of represented and non-represented employees. Non-represented employees are covered by a bargaining union or a negotiated Labor Management Agreement with the City of Cincinnati. They generally work in sensitive positions such as in the Director’s office or in Human Resources.

Represented employees belong to one of three labor unions:

- American Federation of State County and Municipal Employees
- Cincinnati Organized and Dedicated Employees (CODE)
- The Cincinnati Building Trade Council

Labor and Management employees often work together to establish new or enhanced work processes and procedures.

Culture of Inclusion

Beginning in 2006, MSD's leadership team committed to defining the nature of diversity and inclusion, as part of moving towards a "collaborative business culture." In 2007-2008, MSD created an organizational diversity and inclusion team, the "Mediators of Change." This team developed and adopted diversity and inclusion policy standards and trained the entire MSD workforce in the policy.

Through the efforts of our Mediators of Change team, MSD redefined diversity to include diversity of race, gender, and age, as well as diversity of skill sets and perspectives. During 2008 strategic planning, MSD developed a corresponding Values Statement that reflects a guiding principle about how employees intend to function and operate: "We commit to serve as professionals with honesty, integrity, accountability, and respect."

In 2009, the Mediators of Change hosted an intensive values-based training for MSD's leadership team and throughout the utility. The training featured an exploration of core values, how individuals can use them within the organization during challenging times, and identification of current practices and personal behaviors that are in conflict with these values. The trainings concluded with plans and commitments to create an environment that fosters inclusion and enables improved communication between employees, across the organization, and with the community. MSD leaders invested in this training, because it helped to establish the necessary foundation on which to build a stronger MSD and lead changes that will be required into the future.

Developing a culture of inclusion is an on-going effort, which MSD continues to pursue. In 2010, the Mediators of Change sponsored various diversity awareness events and published a monthly diversity calendar that highlights occasions such as the World Day for Cultural Diversity for Dialogue and Development. This calendar is designed to deepen employee appreciation for the variety of events and activities celebrated by other races, cultures, and ethnicities. In addition the Mediators of Change team sponsors multi-cultural events; employee trainings in conflict resolution, listening, and peer coaching; and cross-cultural and mentoring opportunities for career enhancement.



Diversity Efforts Gain Recognition for MSD

In 2009, MSD was recognized for our efforts and achievements in diversity by the American Public Works Association, in receiving the prestigious the "Diversity Exemplary Practices Award." The award recognizes individuals and organizations that have made outstanding contributions to diversity. APWA defines diversity as the "value of all individuals and different perspectives, of those individuals, and providing the process for all to feel included as a part of the whole."



Health and Safety

At MSD wastewater facilities and on project sites, the health and safety of our personnel and the community are paramount. Community safety issues, such as potential chemical releases, are covered under MSD’s emergency response plans, which are prepared specifically for each MSD division. MSD operates under a Health and Safety policy that has been in place since 1982 and which is periodically updated. The policy was established to ensure that MSD complies with applicable local, state, and federal health and safety regulations.

In 2009, the reported injuries consisted of pulled muscles, strains, sprains, cuts, chemical exposure, insect bites, fractures, bruises, contusions, and burns.

MSD’s Health & Safety team has overall responsibility for safe work practices by MSD employees and contractors working on MSD projects. The team ensures that policies are up to date, and it conducts audits and inspections of construction sites, collection facilities, wastewater treatment facilities, and CSO and SSO structures. The team reviews site safety plans and emergency response plans, manages security contractors, and investigates workplace accidents and incidents of workplace violence. Four divisional safety teams review accidents and injuries and assist with divisional safety issues, including making recommendations to division superintendents. The team also supports the divisional supervisors in providing employee training, personal protective equipment (PPE), and accident and injury reporting. Furthermore, the Health & Safety team encourages employee involvement in decisions that affect their health and safety, such as inspections and hazard analysis, revising safe work rules, training, or assisting in accident investigations, and plant inspections.

MSD’s Health & Safety team coordinates with City of Cincinnati, as follows:

- **Chemical Emergency Response Team** – A joint team run by the City of Cincinnati’s Fire and Health Departments. MSD may be called out to assist with chemical emergencies as the need arises.
- **CHASE (Combined Health & Safety Effort) Committee** – a City-wide health and safety effort that ensures there is an effective feedback loop between the Department’s Labor/Management Committee and the members of the CHASE Committee.

We emphasize both “upstream” and “downstream” metrics to assess the effectiveness of our health and safety program. Upstream efforts focus on prevention, and they include a wide array of health and safety training opportunities; easy access to online training calendars, checklists and guidelines; and extensive communications to employees through newsletters, and seasonal health and safety bulletins. Our upstream metrics, therefore, focus on health and safety training. In contrast, downstream metrics consist of injury rates, incidences of

fatalities, and lost days. These metrics reflect how effective our training efforts are. In both cases, we reference our performance to industry standards.

Figure 21: MSD 2009 Health and Safety Performance

Health and Safety Indicators	Target Performance	2009 Performance
Incidence Rate ^a	less than 8.1 ^b	7.3 ^c
Fatalities	0	0
Lost Days	In development	263.02
Hours of Health and Safety Training per year ^c (total)	In development	4,092
Hours of Health and Safety Training per year, per employee		6.62

^a Incidence rate = (number of injuries/total hours worked by all employees in 2009) x 200,000.
^b Incidence rate target represents the 2008 overall incidence rate recorded by the U.S. Bureau of Labor and Statistics (BLS) for Water, Sewage, and other Utilities (NAICS code 2213), Table SNR05.
^c MSD incidence rate is based on 43 total injuries reported in 2009.
^d Budgeted training includes new employee safety orientation, fire extinguisher, confined space entry, forklift, mobile crane, overhead crane, defensive driving, blood borne pathogens, and CPR and first aid. Additional training includes instrument training, PPE, noise, and other types as requested.

Taylor Creek Wins 2008 Safety Award

And the winner of the 2008 George W. Burke Jr. Facility Safety Award is Taylor Creek treatment plant! The award was presented June 24, 2009 at the Ohio Water Environment Associations’ 83rd Annual Conference in Cincinnati.

“What a great win for Taylor Creek,” said Barb Wagner, Treatment Supervisor. The Burke award is given annually to only one treatment plant in Ohio. Award applicants must showcase their safety programs, including training and OSHA recordables. “Taylor Creek didn’t have any OSHA recordables in 2008,” said Barb. “That’s an amazing achievement.”

Employee Training and Development

In response to a changing labor market, MSD established a Core Competency-Based Human Resources (HR) Management System in 2009. By identifying the skills, knowledge, and abilities that our workforce needs, the new system addresses the two primary aspects of maintaining a qualified MSD workforce: staff training and recruitment.

Staff Training

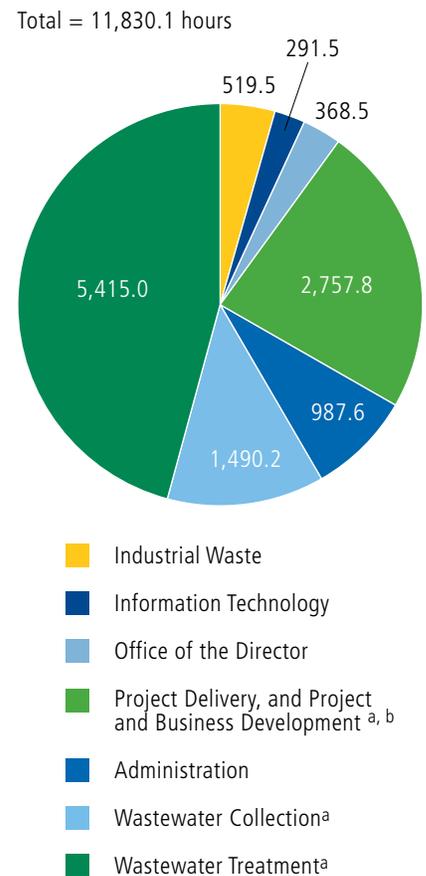
In 2009, MSD employees logged 11,830.1 hours in training courses to maintain or enhance skills needed for job performance, career advancement, or required licensing and certification. The training courses cover a wide range of topics including:

- Technical certifications for wastewater treatment plant operators
- Health and safety courses such as CPR and first aid and forklift handling
- Customer Service skills training
- Standard Operating Procedure (SOP) training
- Diversity and equal opportunity training

Figure 22 shows the breakdown of staff training hours among MSD's divisions.

MSD is currently developing a training plan that identifies gaps and feeds into the career development process for our workforce. The plan will establish training benchmarks for MSD as well as training targets.

Figure 22: MSD Staff Training Hours in 2009



^a These divisions include the greatest number of MSD employees who perform work that requires state licenses and/or job-specific training.
^b In 2008, these two divisions constituted the former Wastewater Engineering Division. To date, training hours are still tracked for these two divisions as if they were one.

MSD Partners with Cincinnati State in Degree Program

MSD and Cincinnati State University have worked together to establish a curriculum in which MSD staff can earn a college degree while enhancing their current skills and capabilities. The program takes advantage of MSD staff expertise by involving them in teaching selected courses. The Water and Wastewater major under the Environmental Engineering Technology (EVET) program focuses on water and wastewater treatment, as well as the operation and design of water and wastewater treatment facilities. Courses focus on biological, physical, and chemical treatment processes; collection and distribution systems; calculations for water and wastewater personnel, safety, and statistics; and quality assurance and control. Graduates of the EVET program go on to work at MSD and other types of facilities, including industrial wastewater treatment facilities; federal, state, and local government agencies; private civil and environmental engineering consulting firms; and water and wastewater analytical labs.



MSD's Transformational Leadership Program

The Transformational Leadership Program (TLP), was developed in late 2009 by MSD's leadership team and Xavier University's Leadership Center. For high-performing employees with strong career development potential, the program offers collegiate-level education in leadership, communications,

systems analysis, customer service design and delivery, critical analysis, and business systems. MSD employees were invited to apply for the program on a competitive basis. Out of 60 applicants, 19 individuals were accepted into the 8-week program. The first class graduated June 2010.

Recruitment

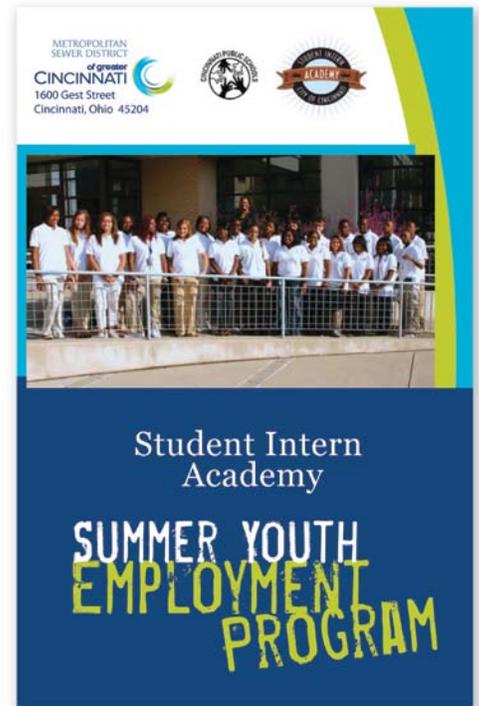
From 2006-2009, 101 of MSD's staff retired. MSD's challenge is not unique – all over the U.S., the wastewater industry faces a shortage of workers who have engineering and operations expertise.

In 2006, MSD chartered a succession planning team to identify critical positions and/or people who would be retiring within this timeframe. The plan included many strategies, such as showcasing employment opportunities at various college career fairs, advertising the positions with professional firms at conferences, automating the application process, and hiring interested professors who are on sabbatical.

The two strategies described below provide a "pipeline" to MSD's future staff and augment the current capabilities of MSD personnel.

Student Intern Academy for High School Students

In 2008, with support from City of Cincinnati administrators and local school districts, MSD became the host site of the Student Intern Academy. The Academy is a paid program for high school juniors and seniors that provides skill-based employment and professional development training during the summer break. MSD professionals lead students on various projects, and the training curriculum is facilitated by leaders experienced in youth development. MSD student interns gain hands-on experience, job readiness training, professional development, and the opportunity to explore careers. In 2009, 25 students participated in the program; since 2008 (first year), 96 students have taken part, with a total of 315 applicants.



How will this internship help you in the future?

“This internship has been a valuable experience because I now have a very good idea of the educational direction I want to take after graduation. This internship has taught me how valuable MSD is to the city. It provides so many services to ratepayers, and the sewer system is also one of the best in the country.”

—James Meehan, Clark Montessori High School, Wastewater Collection Intern (Mentor: Jarissa Garcia)

Mission

To expose and educate Greater Cincinnati youth to public sector careers in environmental management and business practices, which benefits our community and develops our future workforce

Goals

- INVEST in the next generation's knowledge of Water Resource Management
- ASSIGN meaningful projects that teach technical and life skills
- OFFER summer employment with competitive wages and opportunities
- PROVIDE professionals as mentors to enhance youth development

While the program is generally successful, we are constantly learning ways to strengthen and streamline it. We need to ensure that time and funding are set aside for succession planning, and that there are enough staff to manage the increased number of resumes that we receive from year to year. In addition, we are working to improve the tracking, monitoring, and reporting system, which will help us evaluate and improve the recruitment program.

Co-op Program for Students from Local Universities and Colleges

In support of the recruitment program, MSD also provides a co-op internship program, in which college students are able to take temporary positions at MSD to learn more about the types of positions available to those students who pursue careers in water resource management. In 2009, MSD's recruitment strategy included visits to several universities and colleges. As a result, MSD received approximately 155 resumes from college students who applied for summer co-op positions. MSD's goal was to hire 12 students; however, 20 were hired because of their excellent qualifications. Four of the co-op students had participated in the MSD Student Intern Academy program as high school students and were returning as college apprentices. Three of the four declared a major in the area of water resource management operations, saying that their choice was influenced by their experiences at MSD. In total, 31 students participated in MSD's program throughout 2009.



MSD's co-op students added value by working on the following projects in 2009:

- NPDES mapping
- Investigation of property account errors
- Preparing permits
- Providing sewer information to the public
- Assisted with the sewer plant maintenance
- Compiling a spreadsheet of all pressure release valves at the plants
- Making maps of priority areas

MSD's 2009 Recruitment Locations

- University of Cincinnati (Cincinnati)
- DeVry University (Cincinnati)
- Xavier University (Cincinnati)
- Kaplan e-college
- Northern Kentucky University (Kentucky)
- Central State University (Wilberforce, Ohio)
- Cincinnati State and Community College (Cincinnati)
- Dayton University (Dayton, Ohio)
- Ohio State University (Columbus, Ohio)

Important elements of the SBE program:

- Focus on customer service areas
- Diversity of SBE participation
- Opportunity for first-time contractors
- Elements for capacity building
- Partnering with community resources



Small Business and Local Workforce Development

Our contractors and professional services vendors are an extension of MSD’s employee base in that they provide a range of skills that augment MSD’s staff capabilities on an as-needed basis. In all aspects of contracting, the participation of small business enterprises (SBEs) is of particular interest to MSD. Hamilton County Commissioners approved a resolution accepting the SBE program in August 2009 and authorized MSD to be the first entity to implement it. In 2010, MSD worked with officials from the Hamilton County Office of Small Business Development to establish the SBE Program Rules and Guidelines.

Since 2008, MSD has tracked its performance against the SBE Program aspiration goals. Figure 23 summarizes our performance in the first half of 2010.

Figure 23: **MSD Performance Against SBE Program Goals**

SBE Participation In:	SBE Program Goal	MSD Performance ^a
Construction Contracts	30 percent	7.6 percent
Commodities and General Services Contracts	15 percent	7.1 percent
Professional Services Contracts	10 percent	19.6 percent

^a These data represent performance in the first half of 2010, when MSD began formally tracking SBE participation.

In addition, knowing that Project Groundwork would require many contracting and professional-service resources, MSD commissioned a study to look at local contractor and professional capacity and how it might be impacted by upcoming infrastructure projects. The scope of the study included a review of regional resource needs, since other Consent Decree programs and other large projects within a 250-mile radius would be competing for the same resources. The study concluded with several findings that describe a significant shortage in resource capacity:

- The experience of local contractors and consultants does not typically include larger scale projects, such as the infrastructure projects that Project Groundwork will include.
- Resource shortages are estimated to reach 8 to 12 percent by 2018.
- MSD will see the greatest challenge in meeting the 30 percent SBE participation goal in construction, due to lack of SBE representation in specialty trades.

Because MSD’s wet weather program is anticipated to require a large percentage of the available regional resources, we have begun to work with a variety of local educational institutions and agencies to ensure that our workforce is ready to meet the demand. For example, in October 2009, MSD hosted a workshop to present “best practices” to help mentor and develop small local engineering and architectural design firms. Through the program, MSD hopes to develop a strong base of local businesses while supporting economic development in Hamilton County. Key future efforts include economic inclusion initiatives with professional service providers while also expanding to construction providers. To monitor the effectiveness of our SBE program, we are developing a system to track, monitor and report our progress.

Financial and Risk Performance

MSD operates, maintains, and upgrades the sewer infrastructure in order to meet the expectations of stakeholders, ratepayers, and environmental regulators, as well as to protect water quality and public health. It costs millions of dollars each year to accomplish these goals. Financial stability is, therefore, critical to our sustainability performance.

As with any household or business, we must manage our expenses with respect to income and accept some levels of debt to accomplish our goals. We must also understand and mitigate the various risks inherent to the work that we do.

This section presents MSD's 2009 performance with respect to each of our key performance indicators for financial sustainability and risk management.

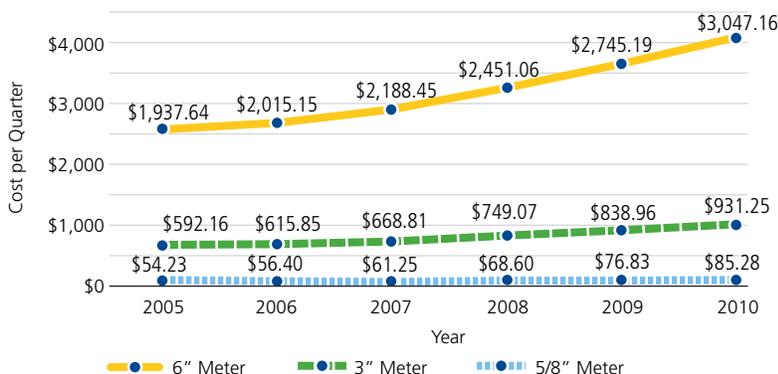
Sewer Rates

Every year, MSD evaluates spending needs to maintain levels of service and adjusts sewer rates to cover costs. The recent federal Consent Decree requires MSD to make significant investments in sewer infrastructure over the next 10 years and beyond. As a result, sewer rates will rise significantly to cover the investment costs.

Figure 24 shows the average residential and commercial sewer rates for the past 10 years and the anticipated rate increases for the next 3 years, as described in MSD's approved rate plan. Our goal is to make necessary improvements to the system while remaining affordable to our customers. Prudent operational process improvements and strategic capital borrowing will help keep rate increases as low as possible.

Due to the initial ramp-up projects for the Project Groundwork capital program, sewer rates rose 12 percent in both 2008 and 2009, and 11 percent in 2010. This means that the average residential customer is paying about \$5.07 a month more in 2010, compared to 2009. Figure 24 shows the trend in minimum quarterly bills for three different meter sizes.

Figure 24: **Minimum Quarterly Sewer Bill^a, by Meter Size**



Note:

^a The minimum quarterly bill is a charge that includes an allowance for the first 900 cubic feet of water used, designated by meter diameter.

Strategic Plan Goals

- Provide financial stewardship for the utility that achieves and sustains community service level expectations
- Align business strategies with best practice methodologies to optimize organizational performance



Sustainability Goals

- Maintain financial solvency and liquidity for short- and long-term funding needs
- Maintain a high credit rating
- Maintain affordable sewer rates
- Manage risks proactively



Key Performance Indicators for Sustainability

- Sewer Rates
- Revenue Sources and Uses
 - Revenues
 - Cash contributed to capital expenditures
 - Operating expenditures
 - Debt service
- Capital Sources and Uses
 - Borrowed capital
 - Annual capital expenditures
- Risk Management

Figure 25: **2009 Revenues** (\$ millions)

Total = \$201,273,000

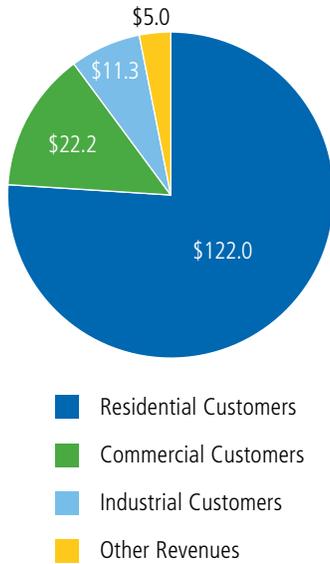
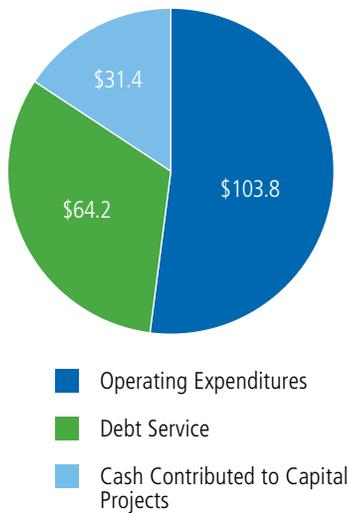


Figure 26: **2009 Total Expenditures** (\$ millions)

Total = \$199,426,000



Note:
MSD strives to contribute cash to capital projects in the range of 20 and 30 percent of annual capital expenditures. In 2009, MSD met this goal by achieving a 25.25 percent contribution.

Revenue Sources and Uses

Customer payments for sewer services comprise MSD’s primary source of income to fund day-to-day operations and the capital program. Other revenues include surcharges collected from industrial customers whose sewage exceeds defined concentration limits, and miscellaneous connection fees, septic hauler charges, and interest on deposits. These revenue-based funds are used to cover MSD operating expenses and debt service on borrowed capital needed to pay for infrastructure projects (the capital program). After these spending needs are met, remaining revenues are used to help fund capital programs.

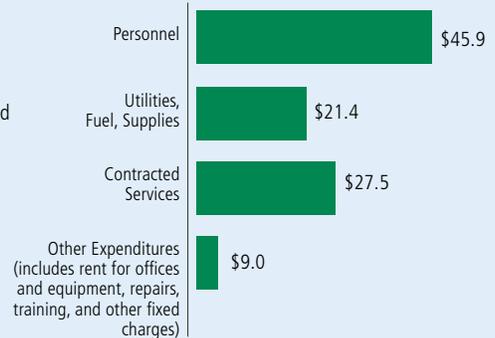
Figure 25 shows that sewer service charges constitute the bulk of our revenue-derived income. Figure 26 shows that the largest proportion of total expenditures is used to cover operating expenditures. Figure 27 shows how operating expenditures are allocated among personnel, contracted services, and utilities, fuel, and supplies.

Operating Expenditures

Operating expenditures include utilities (such as electricity, natural gas, and water), employee salaries and benefits, maintenance of our facilities, fleet-related costs, professional services/contracted services, and materials and supplies. As new technologies and improvements are implemented, MSD strives to hold the operating budget constant.

Figure 27: **2009 Operating Expenditures** (\$ millions)

Total = \$103,825,000 (less depreciation)
= \$1,707.65 per million gallons treated



Debt Service

The majority of annual capital expenditures are covered by funds borrowed through the bond market or low-interest loan programs. The annual interest, or debt service, is paid for by sewer service revenues. MSD is required to show funders that there is enough revenue to cover all operating expenses and the debt service through a performance indicator known as “debt service coverage.” MSD chooses to maintain at least a 1.5 coverage ratio; this means that net revenue is 1.5 times higher than the projected debt payment. The higher the ratio, the more comfortable funders will be in loaning funds, and the lower the interest rate they will offer. That is why we place so much importance on maintaining or improving our bond rating.

In 2009, our debt service coverage was 1.9, somewhat better than our policy target of 1.5. Our debt service as a percentage of total operating expenses was 38.2 percent, well below the maximum of 50 percent set by MSD financial policy.

Capital Sources and Uses

Borrowed Capital

MSD utilizes a variety of financial instruments to pay for the capital program. They are:

- Bond sale proceeds
- Low-interest loan programs
- Grant programs that do not need to be repaid

Figure 28 shows the proportion of funds received from each of these three sources. They include:

- \$149.8 million in bond sale proceeds.
- \$5 million from the American Recovery and Reinvestment Act of 2009 (ARRA). These federal stimulus funds are considered “principal forgiveness loans” (grants) that do not need to be repaid.
- \$5.8 million in a low-interest loan from the State of Ohio’s existing Water Pollution Control Loan Fund (WPCLF) for the Little Miami Treatment Plant improvements. MSD has 20 years to repay the loan, at interest rates ranging between 0 and 3.7 percent.
- Figure 28 does not include a \$78 million low-interest loan from WPCLF (at an interest rate of 3.25 percent), for two large improvement projects at the Mill Creek Wastewater Treatment Plant, which treats the majority of the utility’s wastewater. This loan was issued in 2009, but was not officially awarded until January 2010.

Compared to commercial bank loans, these instruments offer lower interest rates, thereby lowering the “cost of capital” and ultimately reducing costs for MSD’s ratepayers. For example, the WPCLF loans carry interest rates that are lower than current bond market rates.

For 2010 and 2011, MSD is in the process of requesting loans from the State of Ohio and the federal government for planning, design, and construction activities for approximately 22 projects and for overall wet weather program management and support services, for a total of \$200 million. MSD will continue to utilize these state and federal programs in the coming years.

Annual Capital Expenditures

Borrowed capital is used to fund MSD’s annual capital expenditures, which include costs associated with the planning, design, and construction of the wet weather projects, the asset management program, and building new sewers where requested by customers (assessment projects). In addition, MSD spends capital on supplemental environmental projects required by the federal Consent Decree. Figure 29 shows the breakdown of capital expenditures by category.

Figure 28: **2009 Borrowed Capital** (\$ millions)

Total = \$160,600,000

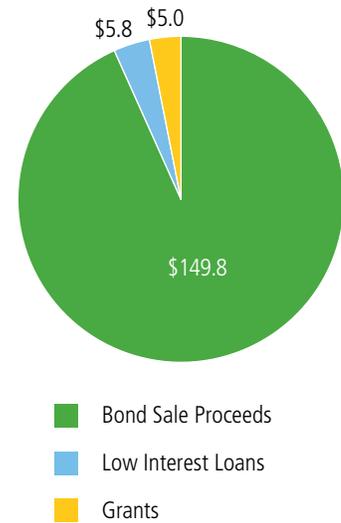
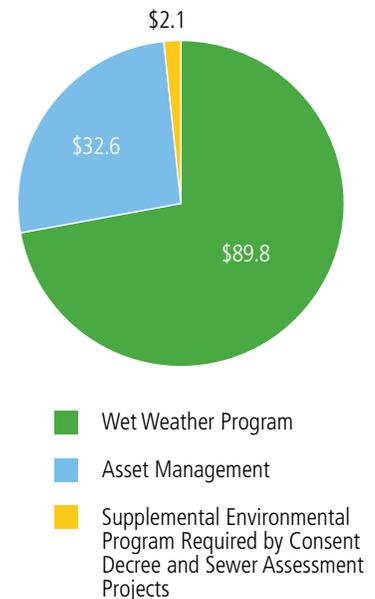


Figure 29: **2009 Capital Expenditures** (\$ millions)

Total = \$124,500,000



MSD’s Bond Rating Improves

In the past, the bulk of borrowed funds has come from revenue bonds that are sold on the bond market. The cost of these borrowed funds depends in part on MSD’s bond rating, which is similar to a consumer credit rating.

In 2009, MSD’s bond rating was upgraded from AA to AA+ by Standard & Poor’s, on the strength of our financial statement and sound management practices. As a result, MSD will be able to borrow capital funds at a lower interest rate, saving ratepayers millions of dollars in debt service costs over the next 20 to 25 years.

Enterprise Risk Management Strategy

- Supplement financial reporting
- Define risk tolerance and align with stakeholders and strategy
- Proactively manage leading risks
- Link risk assessment and performance
- Minimize surprises and losses
- Identify and manage cross-enterprise risks
- Seize opportunities
- Enhance communication within MSD
- Enhance external communication

Risk Management

In 2009, MSD began to develop a comprehensive Risk Management Strategy. This ongoing process defines our organizational risk tolerances, identifies MSD’s leading risks, and establishes the framework for planning mitigation measures. Managing our top risks provides a sound basis for driving MSD decisions, such as budgeting and capital project selection. Just as importantly, MSD will use risk management as an effective way to communicate our activities and decisions to key external stakeholders, including the county, city, customers, and media, thus helping us to achieve our overall objectives.

Figure 30 summarizes MSD’s four categories of risks for consideration in the Risk Management Strategy.

Figure 30: MSD Risk Categories

Corporate Risks	Operational Risks	Asset Risks	Capital Project Risks
These are high level, complex challenges that could prevent MSD from meeting its obligations to customers, regulators, and the environment.	Operational risks affect the day-to-day activities of MSD, which include collecting and treating wastewater, as well as constructing capital programs.	Infrastructure failures, such as sewer pipes, pumps, generators, and electrical systems, can have severe consequences to the public and the environment.	Risks that can occur during the construction of a sewer or facility are considered and mitigation strategies are put in place during the planning and design phases.

Quarterly reporting is the key to MSD’s implementation of the comprehensive risk management strategy. This regular review of identified risks and mitigation measures will allow us to reduce risks over the long term as well as the associated costs and liabilities they impose on MSD and our customers.

Financial Policy

In 2009, MSD’s management team presented the updated Financial Policy Manual to the Hamilton County Board of Commissioners. The Manual describes the internal financial controls that are in place, the minimum fund balances, the outline of the Risk Management Strategy, and operating and capital budget development and controls. By following the policy and practices described in the Manual, MSD will manage its financial resources more effectively and consistently.

Managing Assets for Equipment Reliability

Because wastewater treatment is a round-the-clock activity with major consequences in the event of failures, reliability is a key goal for MSD. Accordingly, MSD focuses significant effort on a proactive asset management program, such as being diligent in equipment maintenance. For example, for each piece of equipment, we track its condition using a real-time registry. The registry documents the function and importance of an asset (resulting in a “consequence of failure” score) and its age and overall condition (resulting in an overall probability of failure score). Multiplying these two scores results in a relative risk score.

$$\text{Risk} = \text{Consequence of Failure} \times \text{Probability of Failure}$$

MSD uses the risk scores to establish priorities for spending and to optimize the usable life of equipment. This risk-based approach helps us determine when it is best to repair or replace a piece of equipment and to prevent failures.

From a sustainability perspective, asset management makes efficient use of resources and eliminates waste. Ultimately, this promotes worker and community health and safety, and it protects the environment.

MSD's Leading Risks

In a series of workshops during March 2010, MSD identified the organization's leading risks, listed below. Beginning in 2011, quarterly risk reports will document risk mitigation strategies, progress made, and newly identified risks when necessary.

Figures 31 and 32 show MSD's risk management process and the priority risks in our risk register.

Figure 31: MSD Risk Management Process

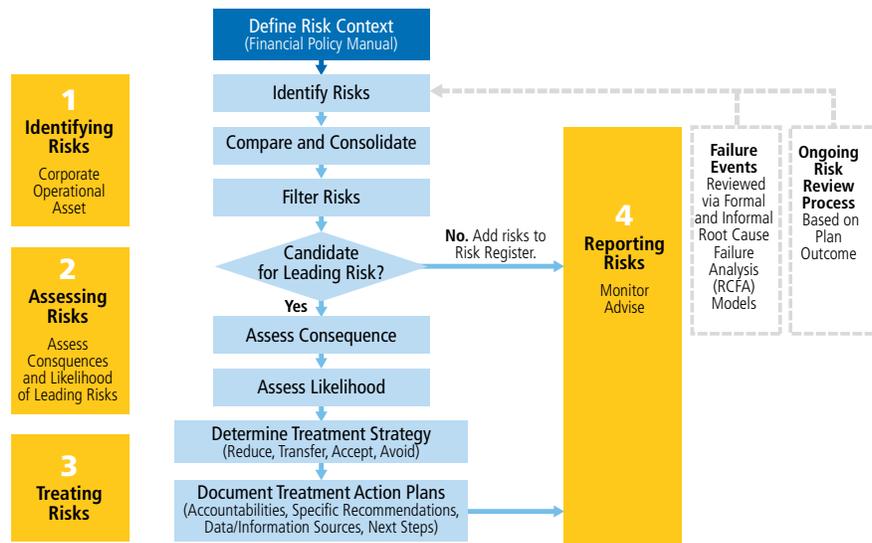


Figure 32: MSD Priority Risk Register

Risk Name	Description	Category
1 Maintaining public trust	Building trust through common understanding of MSD value to the community.	Corporate
2 Maintaining attractive bond rating	Reflects confidence by financial markets and allows borrowing at a reasonable rate.	Corporate
3 Insufficient funding to meet obligations	Increasing obligations due to implementation of Project Groundwork will push bounds of MSD's debt ceiling.	Corporate
4 Sustainable corporate investment	MSD wants today's decisions to be tomorrow's value, not tomorrow's liability.	Corporate
5 Customer base/customer usage	For the past several years, the number of customer accounts, as well as the usage per account, is decreasing.	Corporate
6 Material lawsuits	Could serve to undermine credibility and diminish financial performance.	Corporate
7 Adapting and responding to the general economy	Largely uncontrollable by the utility but can heighten or more likely threaten the financial viability of MSD.	Corporate
8 Conflicting governance structure	MSD is County-governed and City-managed within the 1968 Agreement.	Corporate
9 Limitations of WWIP strictly based on hydraulic model	Wet weather effects are complex and are not completely encompassed by the traditional hydraulic model used commonly in the industry.	Operational
10 Pleasant Run pump station and force main system	Currently this system does not meet current capacity demands during wet weather events.	Asset
11 Performance of WEDECO UV systems	WEDECO brand of UV systems have not performed well at MSD facilities (since the evaluation in March 2010, this risk has been mitigated satisfactorily).	Asset
12 Inadequate real time flow monitoring interface	MSD currently lacks an interface system that collects and presents the data in a useful way for efficient and responsive operations.	Operational
13 Turnover of key staff/Organizational stability	More than 20 percent of the MSD staff is eligible in the next 3 years.	Operational
14 Risk management for construction projects	Risk management at the project level will be incorporated into the process.	Operational
15 Man-made disasters	Severe asset damage and human safety issues can be precipitated by disasters due to vandalism, worker negligence, or lack of proper maintenance.	Corporate
16 New regulatory mandates	New regulatory requirements can be sweeping in scope and extremely costly.	Corporate
17 Sycamore raw pump stations	This pump station is essential to the operation of the Sycamore treatment facility and does not currently meet established levels of service.	Asset
18 Winton Woods aerial sewers	Aerial sewers are at a higher risk, in general, due to their exposure to the elements, excessive vibrations and vulnerability to security hazards.	Asset
19 Power supply to Mill Creek treatment facilities	Parts of the electrical system date back to the 1950s and are in need of upgrading.	Asset
20 Barrier Dam four pack bulkheads and crane system	These primary components are critical to the operation of the Barrier Dam, which prevents the Ohio River from inundating the Mill Creek Valley during flooding events.	Asset
21 Natural disasters	Tornados, floods and earthquakes can have a devastating effect on the operations of the treatment facilities.	Corporate
22 SCADA infrastructure	This system is used to send operational data from remote locations and locations within a facility; older equipment is difficult to operate and maintain.	Asset
23 Four Mile pump station	The current equipment does not provide the reliability needed to protect and maintain the pump station that brings influent wastewater to the Little Miami facility.	Asset

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