SSO 700 Integrated Watershed Action Plan

Sanitary Sewer Overflow (SSO) 700 is the largest SSO in the Metropolitan Sewer District of Greater Cincinnati's (MSDGC's) system, discharging approximately 38 million gallons of overflow into Mill Creek annually. Under MSDGC's Consent Decree, MSDGC is required to eliminate SSO 700.

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Key Project Elements

- Performed SWMM modeling of sanitary, combined, and stormwater flow throughout the entire watershed
- Interacted with local political jurisdictions to identify key problem areas and opportunities for joint projects benefiting MSDGC and the local jurisdictions
- Performed alternative analysis of a variety of green, gray, and watershed-based solutions

Overview

Sanitary Sewer Overflow (SSO) 700 is the largest SSO in the Metropolitan Sewer District of Greater Cincinnati's (MSDGC's) system, discharging approximately 38 million gallons of overflow into Mill Creek annually. Under MSDGC's Consent Decree, MSDGC is required to eliminate SSO 700. Addressing this mandate in isolation through the implementation of traditional, end-of-pipe infrastructure is estimated to cost ratepayers $230 million, with no enhancement to local communities. Therefore, Hamilton County and MSDGC have teamed up to comprehensively evaluate the SSO 700 watershed to develop an Integrated Watershed Action Plan (IWAP).

The purpose of the IWAP is to identify and evaluate the spectrum of water quality and water quantity issues and opportunities throughout the watershed and ultimately arrive at solutions that cost-effectively achieve compliance with MSDGC's Consent Decree and the Clean Water Act. These gray, sustainable, and watershed-based solutions will also seek to improve quality of life and economic development within the local communities in the watershed. This project not only address SSO 700, but also addresses 10 other SSOs, 9 combined sewer overflows (CSOs), water quality and habitat impairment in the Mill Creek and its tributaries, and various other stormwater and sanitary sewer issues encountered in the watershed.

The development of the IWAP is a multi-jurisdictional, multi-organizational, and multi-departmental effort to identify and characterize the sources of CSO, SSO, and water quality problems throughout the SSO 700 watershed study area in an integrated manner. The study area covers 35 square miles (12% of MSDGC's service area), and is comprised of all or parts of 16 local communities, including Springdale, Blue Ash, Sharonville, Reading, and Evendale.

IWAP Process

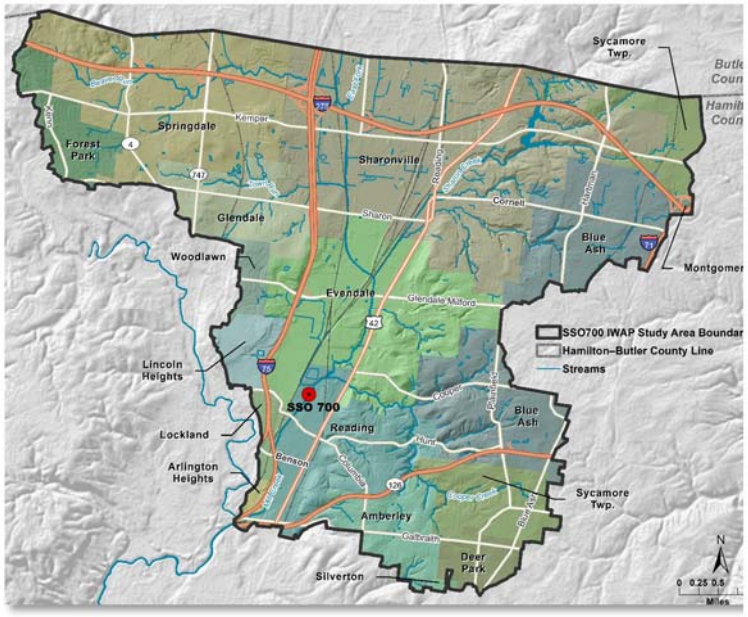
Through the IWAP, sustainable solutions will be developed to comprehensively and economically address the water quality and quantity issues identified. The outcome of the project will be an Integrated Watershed Plan comprised of recommended watershed-based sustainable and gray infrastructure projects that maximize in-stream compliance with water quality standards, address local community priorities, and meet consent decree requirements, while also saving rate-payers money and maximizing the impact of the dollars spent in our communities.

The IWAP is accomplished through a series of key tasks, each building on previous tasks in order to build a comprehensive IWAP. The key steps of the IWAP are:

- **Watershed Selection and Delineation:** The SSO 700 IWAP study boundary is defined as the combination of MSDGC's East Branch Mill Creek sewershed and the Hamilton County component of two USGS HUC-12 boundaries (East Fork Mill Creek and Sharon Creek). Under this task, the watershed and sewershed boundaries were reviewed and refined, and the study area boundary finalized as the union of the two.
- **Data Collection:** A list of requested background data that support the development of the IWAP was developed. Each item on that list is then collected from various sources. These data include but are not limited to 305(b) and 303(d) listings, watershed studies, community plans, infrastructure as-built documents, existing surface water or point discharge source water quality data, compilation of existing pollution sources, and existing water quality problem areas.
- **Site Visits:** Site visits were conducted as necessary to visually identify, characterize and document the physical, chemical and biological integrity impairments in the watershed, the pollution sources and discharges, and assess the technical feasibility of water quality-based strategies for the existing site conditions, as well as current and planned land use.
- **Inventory and Gap Analysis:** Under this task, the data collected were analyzed and summarized and a gap analysis performed. The resulting data inventory and gap analysis also provided recommendations and a plan to fill data gaps as needed. Meetings with political jurisdictions throughout the watershed were held to collect data on their infrastructure and understand their priorities and how they could be accomplished as part of the IWAP
- **Water Quality Data Collection Program:** Water quality data were collected through an extensive six-month dry weather and wet weather sampling program to support the updating and/or development of existing and new watershed and surface water quality models.
- **Watershed Water Quality Models Update & Development:** A watershed model and surface water quality models are required for the development of the IWAP. The available surface water quality model and watershed models were reviewed to identify their representation of the SSO 700 watershed, their applicability to supporting the development of an IWAP, any calibration and validation deficiencies, shortfalls in existing source data used, and other potential gaps in the existing models. Recommendations were developed for using and updating the surface water quality model and watershed models or developing new models as necessary to meet industry best practices for calibration and validation and to accomplish the IWAP. This task involves building, refining, and/or calibrating the surface water quality models and watershed models to industry standards for use in the IWAP.
- **Hydraulic Model Update & Development:** A validated and calibrated hydraulic model of MSDGC's collection system is required for the development of the IWAP. The existing SWMM collection system (both combined and sanitary systems) hydraulic model was reviewed to identify its representation of the SSO 700 watershed, its applicability to supporting the development of an IWAP, any calibration and validation deficiencies as compared to MSDGC modeling standards,

shortfalls in existing flow monitoring and source data used, and other potential gaps in the existing models. This task includes development, recalibration and validation of the collection system hydraulic model.

- **Identify Pollution Sources & Use Tools to Evaluate Collection System Response & Waterway Response:** Once the various models are developed, the pollutant source contributions to the watershed will be characterized and the pollutant mass balance pie charts will be prepared for pollutants and pollution sources found to be impairing the waterways. The pollutant source categories to be characterized and evaluated in this task (bacteria, BOD/DO, nutrients, etc.) shall be defined based on the outcomes of previous tasks and the capabilities of the watershed and surface water quality models approved by MSDGC and the County.
- **Select Optimal Levels of Control:** Based on the determination of the key pollutants impairing the watershed waterways, and their respective sources, the optimized level of control for each pollutant will be determined to achieve water quality standards. The optimal level of control for each pollutant source will be calculated to determine the target reductions to obtain in-stream water quality benefit before reaching diminishing returns.
- **Identify Cost-Effective Green, Gray & Watershed Controls:** Green and gray infrastructure and watershed control projects that achieve the pollutant levels of control identified in the previous step will be identified and evaluate for the watershed. This step involves cost estimation and modeling to assess the cost effectiveness of these potential projects.
- **Select Final Projects:** Projects identified in the previous task will be prioritized and ranked through a comprehensive comparison of relevant metrics such as volumetric control of overflows, water quality impacts, costs, other environmental benefits, feasibility, and reliability. A list of recommended SSO 700 IWAP projects will be developed. The Integrated Watershed Action Plan projects will be programmed in an implementation schedule. The results of the IWAP will be submitted to Regulators to support MSDGC's ongoing Consent Decree compliance.



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The IWAP is currently in the model development phase.