

Gravity Sewer Asset Management Systems

Throughout 2016, MSD has continued to expand, develop, refine and integrate its usage of GIS-centric tools to better identify, plan and manage projects associated with the various asset classes that comprise the wastewater collection system – with a focus on Main Public Sewers. Since no single software or turn-key solution meets all business needs, MSD has developed processes to use multiple standardized industry-best solutions together in a complex integration framework with the goal of bridging the traditional organizational gaps between Long-term Planning, Short-term Projects, and Daily Operations. This goal has led to the development of MSD's Gravity Sewer Asset Management Layer, or GSAM.

In its simplest form, the GSAM is a GIS layer with one feature for each gravity sewer asset in the MSD wastewater collection system. Unlike traditional GIS sewer layers, the GSAM is exceptionally dynamic in its attribution and related tables, and is designed to be continuously and seamlessly updated to provide current information on asset activities and costs, standardized recommendations for risk-based structural and maintenance activities, risk-based scheduling information, construction coordination support, and activity conflict exception reporting. The GSAM currently relies upon information managed and gathered in multiple systems and platforms including Cityworks, Flowfinity, Pipetech, the MSD Gravity Sewer Risk Model, InfoMaster, and custom GIS applications designed to optimize spatial cost-estimating of discrete point-repair projects and asset replacement costs. Integration efforts are planned to include additional information from the Countywide Construction Coordination System, and Electroscan's Critical Sewers cloud platform.

While significant work remains to be done to optimize performance and maximize utility, this framework of tools is now functional in supporting MSD's long term goal of dynamically and consistently identifying prioritized collection system improvements based upon industry standard Asset Management principles. As projects are appropriately categorized, prioritized, estimated, funded, and issued, progress on these improvements can be readily tracked in Cityworks, the Wastewater Collection Division's Centralized Maintenance Management Software (CMMS) – which will then update the GSAM. Assets with structural defects that clearly lack theoretical adequate hydraulic capacity, or may require a higher level of analysis and planning can be readily identified through the standardized spatially enabled decision processes, and can be dynamically prioritized by structural risk to support the ongoing generation of Business Case Evaluations within MSD's Planning Group. Specific tools are designed to integrate the status of individual assets within MSD's CIP and Planning activities along with maintenance activities and external Construction Coordination opportunities to improve communication, enable exception reporting, and ultimately reduce asset life-cycle cost. A high level workflow of the process, systems and tools used to identify, prioritize, update and manage work on main sewer assets in the MSD wastewater collection system is diagramed below.

It is important to note and understand that the output of this system (the lists of prioritized projects by renewal method) is inherently dynamic. The relative priority of unassigned individual projects within a proposed renewal method may be dynamically adjusted based upon the standardized analysis of completed Initial Condition Assessments of main sewers that have not been previously inspected, the planned reassessment of main sewers using schedules derived from assets' Risk Bins, and external factors driving scheduling review – such as Construction Coordination opportunities. The dynamic,

prioritized output of this entire system will continue to drive the body of work that is assigned and completed in both the Main Sewer Renewal Program and the Prioritized WWC System Improvements allowances for 2017.

MSDGC Gravity Sewers – Structural Renewal Processes and Applications

