

# WEST VALLEY SANITATION DISTRICT SEWER SYSTEM MANAGEMENT PLAN

## SECTION VIII CAPACITY MANAGEMENT

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This SSMP section describes the capacity management element which includes a discussion of capacity assessment, system evaluation, and capacity assurance plan for the District's collection system. The purpose of this element is to document the process used to assess the hydraulic capacity requirements for the District's collection system, discuss the results of the evaluation, and demonstrate that any deficiencies noted will be properly addressed through the District's Capital Improvement Program (CIP).

### **Capacity Assessment**

A critical function of the District's wastewater collection system is to provide adequate capacity to handle current and future wastewater flows. A capacity assessment examines the collection system to determine the adequacy of the collection system to handle these flows.

Since the last capacity assessment was performed in the early 1960's, a contract was issued to RMC Water and Environment to assist the District with development of a new capacity assessment study. In November 2006, RMC was issued a contract to initiate this multiple phase study beginning with the development of a hydraulic model for the District's trunk sewer system. This initial effort required RMC to perform a number of tasks including:

- Review existing sewer system information
- Wet weather flow monitoring
- Developing current and future dry weather flows
- Developing design flow and hydraulic criteria
- Evaluation and selection of hydraulic modeling software
- Developing a hydraulic model of the collection system

The hydraulic modeling software utilized was InfoWorks™. The model was developed and calibrated using collection system and wet weather flow monitoring data. In order to evaluate the collection system, a design storm was developed to represent a future peak wet flow event. The design storm utilized was adapted from the City of San Jose's 10-year design storm at San Jose Airport which is based on the intensity-duration-frequency (IDF) statistical data and guidelines from the County of Santa Clara Storm Design Requirements. The result is the use of a 10-year, 24-hour synthetic rainfall event with a total rainfall of 3.5 inches, which includes a 6-hour rainfall amount of 1.7 inches and a peak intensity of 0.72 inches per hour. The results of these initial studies are documented in separate Technical Memorandums: Dry Weather Flow Data (RMC, February 2008), and Hydraulic Model Documentation (RMC, July 2008).

## System Evaluation

In July 2008, RMC continued the multiple phase study by applying the design storm to the hydraulic model and documenting the performance of the collection system. The system evaluation is made by applying the design storm to the hydraulic model and superimposing the peak intensity of the design storm with the occurrence of the daily peak flow at 8 am. This approach gives a conservative flow response in the collection system and is a typical methodology in determining peak wet weather flow generated by a design storm.

This phase of the project revealed that there were several abnormalities with the system data provided for the model (reversed pipe slope, flow splitting proportions at manholes, etc.) that needed investigation and correction before a final simulation could be done. Once these corrections were made, RMC was able to complete the required tasks including:

- Run hydraulic model simulations
- Evaluate the trunk sewer system's performance
- Document its hydraulic performance
- Summarize hydraulic deficiencies

The two criteria used by RMC to define, or "trigger" a hydraulic deficiency in the system are:

- It is acceptable for sewers to flow full before it is considered to be a capacity deficiency
- A surcharge of up to one foot over the pipe crown is also acceptable under peak flow conditions (given that the surcharge at a manhole allows at least a five foot "freeboard" to the manhole rim)

Once a hydraulic deficiency was found, it was prioritized based upon the flow condition producing the deficiency and ranked according to its corresponding freeboard level. The flow conditions from the highest to lowest priority are:

- Existing peak dry weather flow (existing PDWF)
- Existing peak wet weather flow (existing PWWF)
- Future peak dry weather flow (future PDWF)
- Future peak wet weather flow (future PWWF)

As a result of the system evaluation, RMC determined that the District's entire collection system is capable of handling the existing PDWF, but some portions of the system were hydraulically deficient under more intensive flow conditions produced by existing and future PWWF. A total of 20 hydraulic deficiencies were found in various areas of the system and are tabulated and mapped as provided in Appendix D.1. The District has initiated flow monitoring utilizing Smart Covers and installation of temporary rainfall gages during winter months in an attempt to validate the results of the hydraulic model.

## **Capacity Assurance Plan**

The capacity assessment described above focuses on the use of hydraulic modeling to determine deficiencies in the collection system, however, repair and rehabilitation work identified through CCTV inspection must also be considered. As an ongoing measure to manage the District's collection system, the results of this section along with those of Section IV - Operations and Maintenance Program, Section C. - Rehabilitation and Replacement will be integrated into a comprehensive Capital Improvement Program (CIP) to address both structural and hydraulic deficient elements of the system. The District will prepare and implement a capital improvement plan to correct all significant deficiencies found. The District currently utilizes a 5-year CIP, however, medium and long range plans in the 5-10 year and 10-20 year range, respectively, are also needed to capture future high priority work. The District's 5-year CIP is provided in Appendix D.2.