



Helena Wastewater Collection System Master Plan

CHAPTER 2

INTRODUCTION AND BACKGROUND

2.1. INTRODUCTION

The Helena Wastewater Collection System Master Plan is the culmination of an 18-month planning effort undertaken by the City of Helena in 2006. The wastewater planning effort was a continuation of the work the City began in 2003 to update master planning documents for the City's entire infrastructure, including streets, water and wastewater.

This report presents the results of a review of Helena wastewater collection system facilities. It describes the development of the hydraulic model and the results of modeling future conditions. It provides direction for the City's Sewer Capital Program for the next 20 years.

The last Helena Wastewater Facility Plan was completed by the City in 1997. The study included an analysis of inflow and infiltration which included late night flow observations and some flow monitoring. The 1997 report was followed by the Helena Area Wastewater Treatment (HAWT) Facility Plan in 1998, completed by Lewis and Clark County. The purpose of the HAWT plan was to look at regional alternatives for wastewater treatment and did not focus on the collection system.

Since the 1997 Wastewater Facility Plan, the City has maintained an annual program of closed caption TV inspection, slip lining or replacement of aging sewer mains and manhole rehabilitation. This work has resulted in improvement of nearly 10 percent of the City's oldest sewers, resulting in a reduction of per capita flow contribution to the City's Wastewater Treatment Facility (WWTF).

2.2. GOALS OF THE COLLECTION SYSTEM MASTER PLAN

The City of Helena is currently experiencing unprecedented growth within and adjacent to the City limits. There are currently in excess of 7,500 residential lots in various stages of planning that are requesting City services. The City public works staff lacks sufficient tools to document the capacity of the sewer collection system or evaluate the effects of new connections to the system.

The City identified several goals for this project. They included the following:

- Develop a hydraulic model of the existing collection system
- Assess the capacity of the existing collection system
- Assess required improvements in the existing system to accommodate growth
- Project future expansion of the collection system within the planning area
- Provide an effective, interactive planning tool for City staff

2.3. APPROACH TO COLLECTION SYSTEM HYDRAULIC MODELING

One of the most important components of the master planning effort was to provide a planning tool for City staff to evaluate the effect of growth on the existing collection system and determine the needed improvements and new infrastructure needs associated with that growth.

A very systematic approach specific to the City of Helena was used in the development of the hydraulic model. The City's geographical information system (GIS) and their Computerized Maintenance Management System (CMMS) serve as the foundation for the model. Three months of flow monitoring in the City's four main trunk lines was performed and was used to characterize the City's wastewater flow on a 24-hour basis. Finally, field verification including surveying of all manholes on pipes with diameters of 10-inch and larger was performed to improve model accuracy. Figure 2-1 illustrates the components of the study which resulted in a comprehensive hydraulic model of the City's collection system.

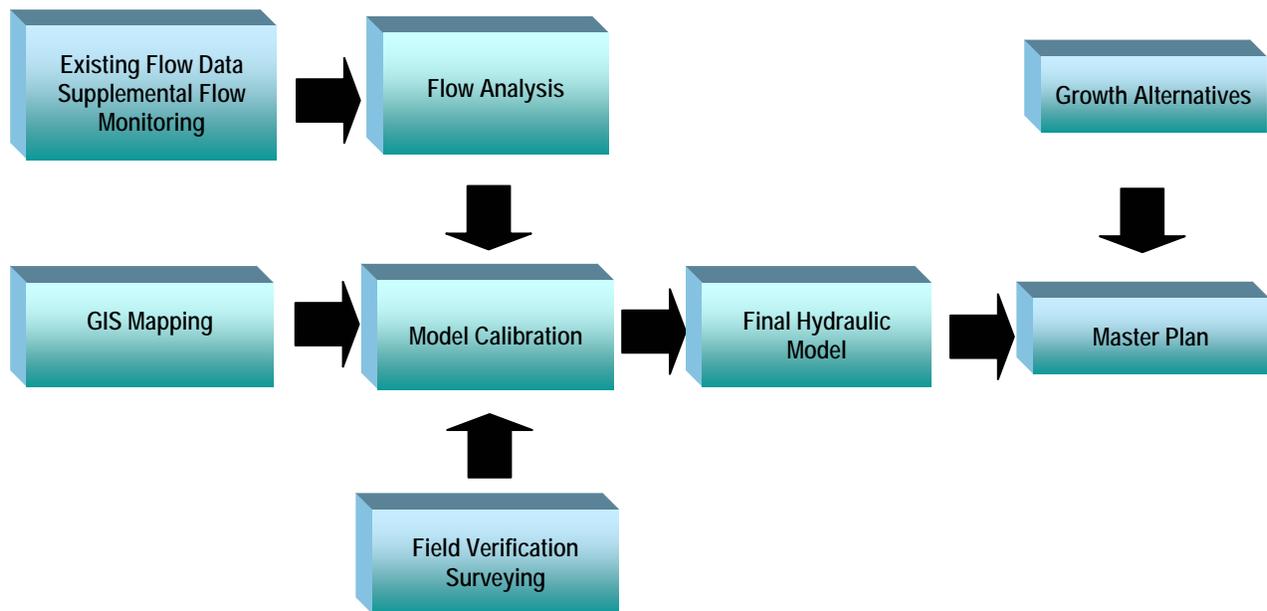


Figure 2-1. Approach to the Sewer Collection System Hydraulic Model

The software used for the hydraulic model was InfoSewer, developed by MWH Soft, Inc. Once modeling of current and future conditions was completed, the software and data were turned over to the City and City personnel were trained on the use of the model.

2.4. ORGANIZATION OF REPORT

The report is organized into seven chapters as follows:

Chapter 1 – Executive Summary

Provides a brief summary of the contents of the master plan.

Chapter 2 – Introduction

Chapter 3 – Basis of Planning

Provides background regarding population projections, the current and future service area, the planning period, development of per capita wastewater flow characteristics, and recommended wastewater flow projections.

Chapter 4 – Wastewater Collection System Geodatabase

Describes the existing data base, the development of the data model used for the foundation of the hydraulic model, and provides recommendations for data base improvements.

Chapter 5 - Existing Collection System Evaluation

This chapter provides a thorough description of the existing wastewater collection system. It describes the data collection performed and provides an analysis of the flow and rainfall data collected. It also describes the physical model development and the modeling results of the existing system.

Chapter 6 – Future Collection System Evaluation

Chapter 6 describes the approach taken in evaluating both the near-term (2015) and future (2025) wastewater system scenarios. The evaluation focuses on improvements required in the existing collection system, lift station improvements and extension of the collection system within the planning area.

Chapter 7 – Summary of Recommendations and Capital Improvements

Presents prioritized improvements and associated costs in 2008 dollars. A summary of the recommendations resulting from the evaluation is also presented.