SECTION 2

INTRODUCTION

2-1 Purpose

This section provides an overview and outline for the City of Manhattan Beach's Water Master Plan. A brief background description, objectives and scope of work, acknowledgments, and a list of abbreviations used throughout the report are provided.

2-2 History and Background

Included in a land grant from Mexico, the Rancho Sausal Redondo consisted of approximately 22,500 acres, including the present site of the City of Manhattan Beach. Major development began in 1888 when the railroad was constructed between Redondo Beach Wharf and Downtown Los Angeles. By the early 1900's, the northern portion of the site was called Shore Acres and was owned by George Peck. The southern portion was owned by John Merrill who named it after his old home Manhattan in New York City. Ultimately, the fate of the City's name was left to a coin flip, in which "Manhattan" won.

Manhattan Beach was initially regarded as a place to vacation. Visitors often rented beach cottages or pitched tents; however, there were very few houses for permanent residency. When incorporated on December 7, 1912, Manhattan Beach consisted of roughly 600 permanent residents. After World War II, many servicemen settled in the City to take advantage of the warm climate. Rapid growth during this period, can also be contributed to the aerospace and defense industry such as Douglas Aircraft, Hughes Aircraft, Northrop, and North American Aviation, which moved into the nearby area and created many new jobs.

The first municipal water plant and a water system consisting of 23 miles of pipeline were established shortly after the City's incorporation in 1912. The system was later improved to include several elevated tanks. In the 1940's, the Water Department Building and a water well was constructed through a federal Work Progress Administration (WPA) project. Today, the only remaining elevated water tank is located at the City's Block 35 facility on Rowell Avenue and 6th Street. The tower was built in the late 1948 and retrofitted in 1994. It is primarily used for pressure control and not storage. (*City of Manhattan Beach General Plan, 2003*)

Currently the City is comprised of approximately 3.9 square miles of primarily residential land use. Commercial land uses are located along Highland Avenue, Manhattan Beach Boulevard, Sepulveda Boulevard, and in Manhattan Village, which is located south east of Rosecrans Avenue and Sepulveda Boulevard. Industrial land uses primarily consist of the Northrop Grumman and Raleigh Studios, which are located northwest of Aviation Boulevard and Marine Avenue. According to the City's 2007-2008 Comprehensive Annual Financial Report, the largest employers within the City include the Target Corporation, Sketchers USA Inc., Kinecta Federal Credit Union, the City of Manhattan Beach, and Macy's West LLC. The California Department of Finance estimated that the City's population in 2009 was 36,718.

2-3 Past Studies

Water System Master Plan (1994)

The most recent study of the City's water system was completed by Kennedy/Jenks Consultants in 1994. The report, entitled "Final Report, Water System Master Plan," developed design criteria, estimated water demands, developed a computer hydraulic model of the system, and evaluated the then existing and future system under average day, maximum day, and peak hour conditions. Fire flow conditions at the following locations were also analyzed:

1. Westport cul-de-sac, located in the Manhattan Village
2. Tenth Street and Pacific Avenue
3. 38th Street and Manhattan Avenue

The previous water master plan also evaluated the feasibility of providing emergency storage in the case of an imported water supply outage. It analyzed the possibilities of either adding additional storage or constructing additional wells to provide the full maximum day demand.

The following recommendations were made:

1. Replace the three (3) pumps at Peck Avenue Reservoir to increase the discharge pressures to 94 psi. (Improved in 1998)
2. Provide backup diesel or natural gas generators at the Peck Avenue (Installed 1998), Block 35 (Installed 1998), Larsson Street (Installed 1998), and Second Street Pump Station.
3. Provide a backup diesel or natural gas generator at Well No. 15 to increase the system reliability during an emergency or power outage. (Standby generator installed in 1998)
4. Construct new or replacement pipelines.
5. Install three (3) new wells with a total capacity of 4,600 gpm.
6. Obtain an additional groundwater entitlement of 500 af/yr.
7. Replace existing Peck Avenue Reservoir with a new 7.5 million gallon reservoir.
8. Perform a hydrogeologic evaluation of the injection/extraction wells.
9. Perform a siting study for a new Peck Avenue Reservoir.
10. Evaluate additional system control alternatives to the elevated tank.

Fire Hydrant Flow Testing and Fire Flow Analysis Report Technical Memorandum

Kennedy/Jenks Consultants conducted a fire hydrant flow testing analysis in May 1998. The main goals of the analysis were to:

1. Determine low and high pressure areas in the City's water distribution system.
2. Identify locations for new fire hydrants based on the results of the analysis.
3. Verify the Water System Master Plan (1994) model results for the three fire flow simulations.

Seventy three (73) fire hydrant locations were evaluated. The majority of the test locations required multiple hydrants to provide the required fire flow of 2,000 gpm. The Hydrant Flow Testing and Fire Analysis Report Technical Memorandum concluded that there was sufficient capacity to provide the required fire flows throughout the City. Fire flow demands estimated to be greater than 2,000 gpm were recommended to be analyzed on a case-by-case basis.

2-4 Objectives and Scope of Work

The objective of this master plan is to evaluate the City's water system and provide a framework for undertaking the construction of new and replacement facilities for serving the water supply and distribution needs in an efficient manner. As a planning document, it is general in nature and is predicated upon the best information available at this time. The primary sources of information used during the course of this study are as follows:

- GIS database information (parcels, land use, zoning, street centerlines, water facilities)
- Water as-built drawings
- Water Atlas Maps and Intersection Drawings
- Final Report Water System Master Plan dated April 1994.
- Fire Hydrant Flow Testing and Fire Flow Analysis Report Technical Memorandum dated May 22, 1998
- General Plan (dated 2003), zoning map and regional planning documents
- Draft Housing Element for the City of Manhattan Beach dated October 2008
- Aerial photographs
- Water production and purchase history from 1995 to 2009
- Water meter records
- Southern California Edison pump efficiency tests
- SCADA data of water system facilities
- Turnout flow and pressure records from the Metropolitan Water District of Southern California
- Facility visits
- City staff interviews
- 1-foot ground contour elevation data
- Basic Operations Plan of Water System
- Water system maintenance records
- Pressure data collected in field via data loggers (performed by AKM in conjunction with City staff)
- Fire flow data collected in field via hydrant tests (performed by AKM in conjunction with City staff)
- Report: Evaluation of Elevated Steel Tank and Ground Supported Reservoir, dated July 8, 1994 by Boyle Engineering Corporation
- Report: Seismic Evaluation of Manhattan Beach Reservoirs, dated June 28, 1994 by Geomatrix Consultants, Inc.

The scope of work for the Water Master Plan consists of the following tasks:

1. Data Collection and Review
2. Development Patterns
3. Fire Hydrant Flow Testing
4. System Modeling and Evaluation – model geometry, diurnal curves, demands, operational controls, model calibration, interview City staff, facility site investigations
5. Engineering Evaluation – criteria, system hydraulic analyses, additional analyses
6. Operational Evaluation
7. GIS Update
8. Capital Improvement Program
9. Water Master Plan Document

2-5 Organization of Water Master Plan Report

This Water Master Plan report presents the methodology, analyses, findings, and recommendations of a comprehensive study of the City of Manhattan Beach's potable water system, and describes the water system supplied by the West Basin Municipal Water District. A brief outline of the report follows:

- **Section 1: Executive Summary** provides a summary of the Water Master Plan report.
- **Section 2: Introduction** provides an overview and outline for the Water Master Plan report.
- **Section 3: Study Area** describes the physical features, current and future land use characteristics and population of the study area.
- **Section 4: Water Use** describes the potable water demands within the service area
- **Section 5: Water Supply** describes the sources of potable water, including the West Basin Municipal District/Metropolitan Water District of Southern California systems and groundwater from the West Coast Basin.
- **Section 6: Existing Facilities** describes the facilities that provide water service to the service area.
- **Section 7: Service Criteria** discusses the standards and procedures utilized in estimating the water demands, assessing the system, and selecting the recommended improvements.
- **Section 8: System Analysis** describes the development of the hydraulic model; model calibration; hydraulic analysis of the system under average, maximum day, and maximum day plus fire flow conditions; condition of the system; and the recommended improvements for eliminating the identified deficiencies.
- **Section 8: Prioritization and Capital Improvement/Facility Replacement Program** presents a prioritized capital improvement program for the recommended projects.

2-6 Acknowledgments

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2-7 Abbreviations

To conserve space and improve readability, abbreviations have been used in this report. Each term abbreviated has been spelled out in the text the first time it is used. Subsequent usage of the term is usually by its abbreviation. The abbreviations utilized in this report are contained in Table 2-1.

Table 2-1
Abbreviations

Abbreviation	Explanation
ac, AC	Acre
ACP	Asbestos cement pipe
AF	Acre-foot or acre feet
af/yr or afy	Acre feet per year
AL	Action Level
amsl	Above mean sea level
cfs	Cubic feet per second
cip	Cast iron pipe
CIP	Capital Improvement Program
City	City of Manhattan Beach
D/DBPR	Disinfectants/Disinfection By-Products Rule
DHS	Department of Health Services
DIP	Ductile iron pipe
du, DU	Dwelling unit
DWR	State of California, Department of Water Resources
DW	Domestic water
el	Elevation
ENR	Engineering News Record
EPA	Environmental Protection Agency
ESWTR	Enhanced Surface Water Treatment Rule
F	Fahrenheit
FAF	Floor Area Factor
FAR	Floor Area Ratio

Abbreviation	Explanation
FCV	Flow control valve
fps	Feet per second
ft	Feet
GIS	Geographic information system
gpcd	Gallons per capita per day
gpd	Gallons per day
gpm	Gallons per minute
HGE	Hydraulic grade elevation
hp	Horsepower
LACDPW	Los Angeles County Department of Public Works
LF	Lineal feet
mg	Million gallons
mgd	Million gallons per day
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MWD	Metropolitan Water District of Southern California
O&M	Operations and maintenance
OSHA	Occupational Safety & Health Administration
PCC	Pre-cast concrete
PHG	Public Health Goal
PRS	Pressure regulating station
PRV	Pressure reducing valve
psi	Pounds per square inch
PVC	Polyvinyl chloride
RPM	Revolutions per minute
SCADA	Supervisory control and data acquisition
SDWA	Safe Drinking Water Act
SF	Square feet
stl	Steel
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
THAAS	Total halo acetic acids
TOC	Total organic carbons
TTHMS	Total trihalomethanes
mg/l.	Micrograms per Liter
USGS	United States Geological Survey
VFD	Variable Frequency Drive
WBMWD	West Basin Municipal Water District
WRD	Water Replenishment District of Southern California