

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	EXECUTIVE SUMMARY.....	1-1
	1-1 History and Background.....	1-1
	1-2 Objectives and Scope of Work.....	1-1
	1-3 Study Area.....	1-1
	1-4 Water Use.....	1-2
	1-5 Water Supply.....	1-4
	1-6 Existing Facilities.....	1-5
	1-7 Service Criteria.....	1-8
	1-8 System Analysis.....	1-10
	1-9 Capital Improvement Program.....	1-16
2	INTRODUCTION.....	2-1
	2-1 Purpose.....	2-1
	2-2 History and Background.....	2-1
	2-3 Past Studies.....	2-2
	2-4 Objectives and Scope of Work.....	2-3
	2-5 Organization of Water Master Plan Report.....	2-4
	2-6 Acknowledgments.....	2-5
	2-7 Abbreviations.....	2-5
3	STUDY AREA.....	3-1
	3-1 Purpose.....	3-1
	3-2 Location.....	3-1
	3-3 Topographical Description.....	3-1
	3-4 Geology.....	3-1
	3-5 Climate.....	3-1
	3-6 Land Use.....	3-4
	3-7 Population.....	3-9
4	WATER USE.....	4-1
	4-1 Historic Water Production.....	4-1
	4-2 Water Consumption Versus Water Purchase/Production.....	4-2
	4-3 Water Demand Variations.....	4-4
	4-4 Monthly Demand Variations.....	4-4
	4-5 Hourly Demand Variations.....	4-6
	4-6 System Demands and Peaking Factors.....	4-7
	4-7 High Water Users.....	4-9
	4-8 Unit Flow Factors.....	4-10
	4-9 Recycled Water.....	4-11
	4-10 Water Conservation.....	4-12

5	WATER SUPPLY	5-1
5-1	Source of Supply	5-1
5-2	Imported Water Supply.....	5-1
	5-2.1 Metropolitan Water District and West Basin Municipal Water District	5-1
5-3	Groundwater Supply.....	5-5
	5-3.1 West Coast Basin.....	5-5
	5-3.2 West Coast Basin groundwater Recharge and Protection	5-7
	5-3.3 Administration of the West Coast Basin Judgment.....	5-8
	5-3.4 Groundwater Rights	5-9
	5-3.5 Groundwater Level	5-9
	5-3.6 Groundwater Quality	5-9
6	EXISTING FACILITIES	6-1
6-1	General.....	6-1
6-2	Pressure Zones	6-4
6-3	Transmission and Distribution System.....	6-5
6-4	General Operations	6-10
6-5	Emergency Connections	6-10
6-6	City Wells.....	6-10
6-7	Water Treatment.....	6-13
6-8	Reservoirs	6-14
	6-8.1 Peck Reservoir	6-14
	6-8.2 Block 35 Ground Level Reservoir	6-16
	6-8.3 Block 35 Elevated Tank.....	6-17
6-9	Pump Stations	6-18
	6-9.1 Peck Booster Pump Station	6-19
	6-9.2 Block 35 Booster Pump Station.....	6-20
	6-9.3 Larrison Street Booster Pump Station	6-21
	6-9.4 Second Street Booster Pump Station	6-22
7	SERVICE CRITERIA.....	7-1
7-1	General.....	7-1
7-2	Source of Supply	7-1
7-3	Wells	7-3
7-4	Storage.....	7-3
7-5	Booster Pump Stations.....	7-4
7-6	Pressure Regulating Stations.....	7-4
7-7	System Pressures	7-5
7-8	Transmission and Distribution Pipelines	7-5
7-9	Service Life of Facilities.....	7-6
7-10	Fire Suppression	7-6
7-11	Operational Flexibility	7-8

7-12 Distribution System Maintenance Program..... 7-8

7-13 Storage Tank and Reservoir Maintenance..... 7-9

7-14 Water Quality..... 7-9

7-15 Future Regulations 7-17

8 SYSTEM ANALYSIS..... 8-1

8-1 Introduction..... 8-1

8-2 Source of Supply 8-1

8-3 Storage 8-2

8-4 Pump Stations 8-3

8-5 Supervisory Control and Data Acquisition (SCADA) System..... 8-4

8-6 Model Calibration..... 8-8

8-7 Model Runs and System Pressures 8-15

8-8 Transmission and Distribution System..... 8-21

8-9 Water Age Analysis 8-22

9 CAPITAL IMPROVEMENT PROGRAM 9-1

9-1 Introduction..... 9-1

9-2 Cost Estimates 9-1

9-3 Project Priorities 9-1

9-4 Capital Improvement Projects 9-3

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1-1	Water Consumption Versus Water Purchase/Production 1-3
1-2	Water System Demands and Peaking Factors 1-4
1-3	Existing Booster Pump Data 1-8
1-4	Service Criteria 1-9
1-5	Booster Pump Station Analysis by Zone 1-12
1-6	Existing SCADA..... 1-13
1-7	Capital Improvement Program 1-18
1-8	Recommended Pipeline Replacements 1-19
2-1	Abbreviations 2-5
3-1	Existing Study Area Land Uses 3-5
3-2	Residential Density Requirements by District 3-8
4-1	Historic Water Production (Annual) 4-1
4-2	Water Consumption Versus Water Purchase/Production 4-4
4-3	Monthly Water Demands (AF) 4-5
4-4	Water System Demands and Peaking Factors 4-7
4-5	Water System Demands by Zone 4-9
4-6	High Water Users 4-9
4-7	Unit Flow Factors..... 4-11
4-8	Existing Manhattan Beach Recycled Water Users..... 4-11
6-1	Existing Potable Water Meters 6-1
6-2	Existing Storage Capacity 6-14
6-3	Existing Booster Pump Data 6-18
6-4	Peck Pump Efficiency Results..... 6-19
6-5	Peck Pump Controls..... 6-20
6-6	Block 35 Pump Efficiency Results..... 6-20
6-7	Larsson Street Pump Efficiency Results 6-21
7-1	Service Criteria 7-2
7-2	Planning Criteria for Facility Useful Life 7-6
7-3	Minimum Required Fire Flow and Flow Duration for Buildings 7-7
7-4	Fire Flow and Fire Hydrant Location Criteria 7-8
7-5	Primary Drinking Water Standards..... 7-13
7-6	Secondary Drinking Water Standards..... 7-16
7-7	Future Regulations Proposed by the USEPA and CDHS 7-17
8-1	Estimated Existing Storage Capacity 8-3
8-2	Existing Reservoir and Storage Capacity Analysis 8-3
8-3	Booster Pump Station Analysis by Zone 8-3
8-4	Existing SCADA..... 8-5
8-5	Peck Pump Control..... 8-6
8-6	Larsson Pump Controls..... 8-7
8-7	Friction Coefficients 8-8
8-8	Water System Model Calibration Comparison of Nodal Pressure Readings..... 8-10
8-9	Fire Flow Hydrant Test Results 8-13

9-1	Capital Improvement Program	9-7
9-2	Recommended Pipeline Replacements	9-8

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1-1	Capital Improvement Projects	1-27
3-1	Regional Location Map	3-2
3-2	Soils Map	3-3
3-3	Seasonal Rainfall 1990-2008	3-4
3-4	Land Use Map	3-6
3-5	Residential District Boundary Map	3-7
3-6	Population History	3-9
4-1	Historical Water Production (Annual)	4-2
4-2	Historical Water Purchase/Production (Monthly)	4-3
4-3	Monthly Demand Factors	4-6
4-4	Diurnal Curves	4-7
4-5	Water Demand Peaking Factors	4-8
5-1	Metropolitan Water District Service Area	5-2
5-2	West Basin Municipal Water District Service Area	5-3
5-3	MWD Common Pool Service Area	5-4
5-4	West Coast and Central Groundwater Basin	5-6
6-1	Existing Water System	6-2
6-2	System Hydraulic Schematic	6-3
6-3	Length of Pipe by Size	6-5
6-4	Pipe Size	6-6
6-5	Length of Pipe by Decade of Construction	6-7
6-6	Pipe Length by Material	6-7
6-7	Pipe by Decade	6-8
6-8	Pipe Material	6-9
6-9	Groundwater Production History	6-11
8-1	Data Logger Locations	8-9
8-2	Fire Flow Test Hydrant Locations	8-12
8-3	Average Day Pressure Contours	8-16
8-4	Maximum Day Pressure Contours	8-17
8-5	Maximum Day Peak Hour Pressure Contours	8-19
8-6	Existing System Available Fire Flow Contours	8-20
8-7	Ultimate Pipe Size	8-23
8-8	Ultimate System Available Fire Flow Contours	8-24
8-9	Peck Reservoir Influence Area	8-25
9-1	Capital Improvement Projects	9-2

LIST OF PHOTOGRAPHS

<u>Photo No.</u>		<u>Page</u>
6-1	Well 15.....	6-12
6-2	Well 11A	6-12
6-3	Peck Reservoir	6-14
6-4	Existing Aluminum Roof and Steel Truss Support	6-14
6-5	Peck Reservoir Leaks	6-15
6-6	Peck Reservoir Outlet with Chlorine.....	6-15
6-7	Block 35 Ground Level Reservoir.....	6-16
6-8	Block 35 Ground Level Reservoir Control Box.....	6-16
6-9	Block 35 Elevated Tank.....	6-17
6-10	Block 35 Elevated Tank Inlet.....	6-18
6-11	Peck Booster Pump Station	6-19
6-12	Block 35 Booster Pump Station.....	6-20
6-13	Larrison Street Booster Pump Station.....	6-21
6-14	Second Street Booster Pump Station.....	6-22