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Marina Coast Water District

WATER SYSTEMS MASTER PLAN

FINAL
November 2006

carollo engineers

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Marina Coast Water District

WATER SYSTEMS MASTER PLAN

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This executive summary presents a brief background of the Marina Coast Water District's (MCWD or District) current water distribution and supply system, the need for this water system master plan, a description of the methodology employed in this study, proposed improvements to mitigate existing capacity deficiencies, and proposed expansion improvements. A summary of the capital improvement program costs through the planning horizon year of 2025 is listed at the end of this chapter.

ES.1 STUDY OBJECTIVE

Recognizing the importance of planning, developing, and financing water system facilities to provide reliable and enhanced service for existing customers and to serve anticipated growth, the District initiated the preparation of this water system master planning study. The Marina Water Systems Master Plan study is an update to the 2004 Ord Community Water Distribution System Master Plan.

The objectives of the study included the following tasks:

- Establish water system design and planning criteria.
- Evaluate the existing water distribution system using computer hydraulic modeling.
- Identify potential water quality issues.
- Perform a demand analysis and review supply capacity.
- Perform a system-wide storage analysis.
- Evaluate the potential to implement operational strategies to reduce energy use.
- Summarize existing system deficiencies and propose improvements to enhance system reliability.
- Recommend improvements needed to service anticipated future growth.
- Develop a Capital Improvement Program with a planning horizon year of 2025.

ES.2 WATER SYSTEM OVERVIEW

The District provides potable water service to its residential, commercial, industrial, and institutional customers within its service area. The service area includes the City of Marina, City of Seaside, Monterey County, City of Del Rey Oaks, and City of Monterey, and the former Fort Ord, as shown in Figure ES.1. Water service in the Ord Community is provided under agreement with the Ford Ord Reuse Authority (FORA). FORA is the public agency created to manage the conversion of the former Fort Ord Army Base to civilian use.

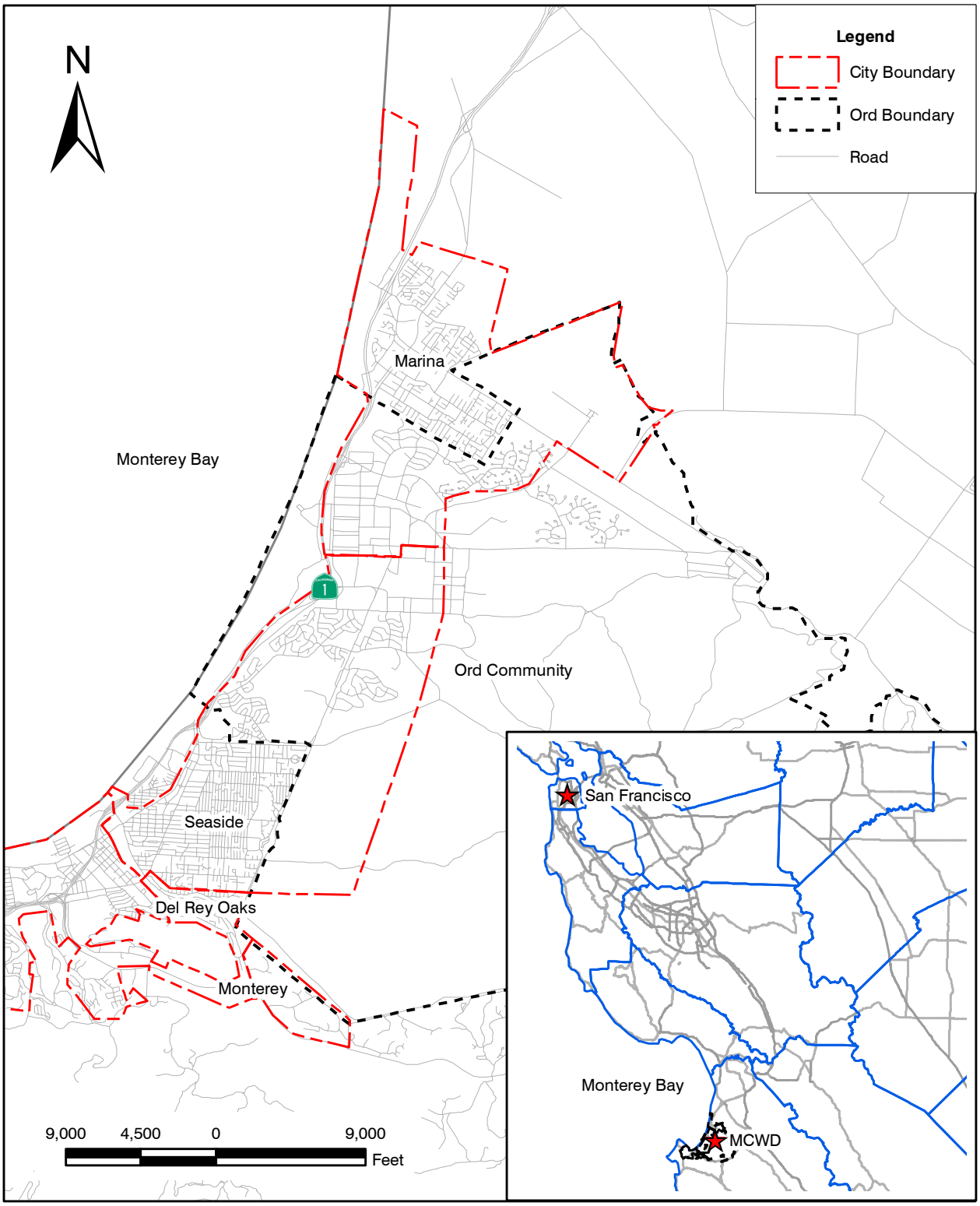

Figure ES.1
STUDY AREA
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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The District's municipal water system extracts water from the underground aquifers via a series of groundwater wells distributed along the valley floor and supplying five major pressure zones. Water is then pumped up to service the higher pressure zones via booster stations. The District's water system facilities include six groundwater wells, eight potable water storage tanks, five booster stations, and over 280 miles of pressured pipes ranging from 2 to 24-inches in diameter. Gates and pressure reducing valves are used to isolate or regulate flow between pressure zones.

Most of the District is on relatively flat land, with elevation increasing to the southeast, away from Monterey Bay and the Salinas River. Serviced elevations range from approximately sea level at the coast to approximately 500 feet. Maintaining appropriate operating pressures within the service area dictates the creation of multiple pressures zones, each operating between a desired range from 40 to 100 pounds per square inch (psi).

Historically, the District has operated their distribution and supply facilities as two independent systems. One system served users in Central Marina. The second system served the Ord community (former Ford Ord Army Base). In 2005, the District completed a project that connected the two systems, maintaining the ability to preserve a zero net balance of flows between the two systems through Supervisory Control and Automated Data Acquisition (SCADA) controls.

ES.3 WATER REQUIREMENTS

Water demands are anticipated to substantially increase due to the redevelopment of the former Fort Ord. In 2005, the District updated its Urban Water Management Plan (UWMP) that will be used as the basis for water demands in this study. The UWMP included detailed land use surveys of jurisdictions within the District through the planning horizon of Year 2025. In 2005, the UWMP estimated District-wide demands of 4,869 AFY (acre-feet per year) or 3,018 gpm (gallons per minute). By Year 2010, demands will more than double to 10,855 AFY (6,730 gpm) District-wide. By the end of the planning horizon in Year 2025, water demands are estimated at 15,404 AFY (9,550 gpm), more than triple current demands. This study will help guide the District in planning for this unprecedented growth. Tables ES.1, ES.2 and Figure ES.2 present the projected water demands based on the UWMP.

Water is a precious commodity in the Monterey area. Seawater intrusion affecting water quality in the Salinas Valley groundwater basin has been documented and monitored since the 1940s. Groundwater production in the District's service area is under the jurisdiction of the Monterey County Water Resources Agency (MCWRA) and the Monterey Peninsula Water Management District (MPWMD). MCWD fully cooperates with each of these agencies to manage water issues in the region.

Table ES.1 Water Demands Based on Land Use (AFY)
Water Systems Master Plan
Marina Coast Water District

Jurisdiction	2004 (AFY)[(2)]	2005 (AFY)	2010 (AFY)	2015 (AFY)	2020 (AFY)	2025 (AFY)
Former Fort Ord						
CSUMB	602	677	920	1,081	1,150	1,192
Del Rey Oaks	0	0	472	762	837	838
City of Monterey	0	53	78	94	110	126
Co. of Monterey	1	1	569	682	1,209	1,209
UCMBEST	4	4	561	735	942	1,187
City of Seaside	525	525	1,221	1,238	1,984	1,984
U.S. Army	529	529	1,102	1,659	1,659	1,659
St. Parks and Rec.	0	0	0	0	45	45
Marina Ord Comm.	302	302	2,309	2,773	2,773	2,773
Marina Sphere	0	0	0	0	0	0
FOR A Strat. Res.	0	0	0	0	0	0
Assumed line loss	457	578	578	578	578	578
Subtotal	**2,420**	**2,669**	**7,809**	**9,602**	**11,287**	**11,592**
Marina						
Armstrong Ranch	0	0	680	680	680	680
RMC Lonestar	0	0	0	0	500	500
Marina - Central	2,266	2,200	2,366	2,534	2,617	2,632
Subtotal	**2,266**	**2,200**	**3,046**	**3,214**	**3,797**	**3,812**
Total	**4,686**	**4,869**	**10,855**	**12,816**	**15,084**	**15,404**

Notes:
(1) Adapted from Table 3.4 of UWMP for average day demands.
(2) AFY = Acre-feet per year.

Table ES.2 Water Demands Based on Land Use (gpm)
Water Systems Master Plan
Marina Coast Water District

Jurisdiction	2004 (gpm)[2]	2005 (gpm)	2010 (gpm)	2015 (gpm)	2020 (gpm)	2025 (gpm)
Former Fort Ord						
CSUMB	373.2	419.7	570.4	670.2	713.0	739.0
Del Rey Oaks	0.0	0.0	292.6	472.2	518.7	519.5
City of Monterey	0.0	32.5	48.4	58.3	68.2	78.2
Co. of Monterey	0.6	0.6	352.4	422.5	749.5	749.5
UCMBEST	2.5	2.5	347.6	456.0	583.7	736.1
City of Seaside	325.5	325.5	757.2	767.8	1,230.3	1,230.3
U.S. Army	328.0	328.0	682.9	1,028.2	1,028.2	1,028.2
St. Parks and Rec.	0.0	0.0	0.0	0.0	27.9	27.9
Marina Ord Comm.	187.2	187.2	1,431.6	1,719.2	1,719.2	1,719.2
Marina Sphere	0.0	0.0	0.0	0.0	0.0	0.0
FOR A Strat. Res.	0.0	0.0	0.0	0.0	0.0	0.0
Assumed line loss	283.3	358.3	358.3	358.3	358.3	358.3
Subtotal	**1,500.3**	**1,654.4**	**4,841.5**	**5,952.7**	**6,997.2**	**7,186.3**
Marina						
Armstrong Ranch	0.0	0.0	421.6	421.6	421.6	421.6
RMC Lonestar	0.0	0.0	0.0	0.0	310.0	310.0
Marina - Central	1,404.8	1,364.0	1,466.7	1,571.2	1,622.5	1,631.8
Subtotal	**1,404.8**	**1,364.0**	**1,888.3**	**1,992.8**	**2,354.1**	**2,363.4**
Total	**2,905.1**	**3,018.4**	**6,729.8**	**7,945.5**	**9,351.3**	**9,549.7**

Notes:
(1) Adapted from Table 3.4 of UWMP for average day demands.
(2) gpm = Gallons per minute.

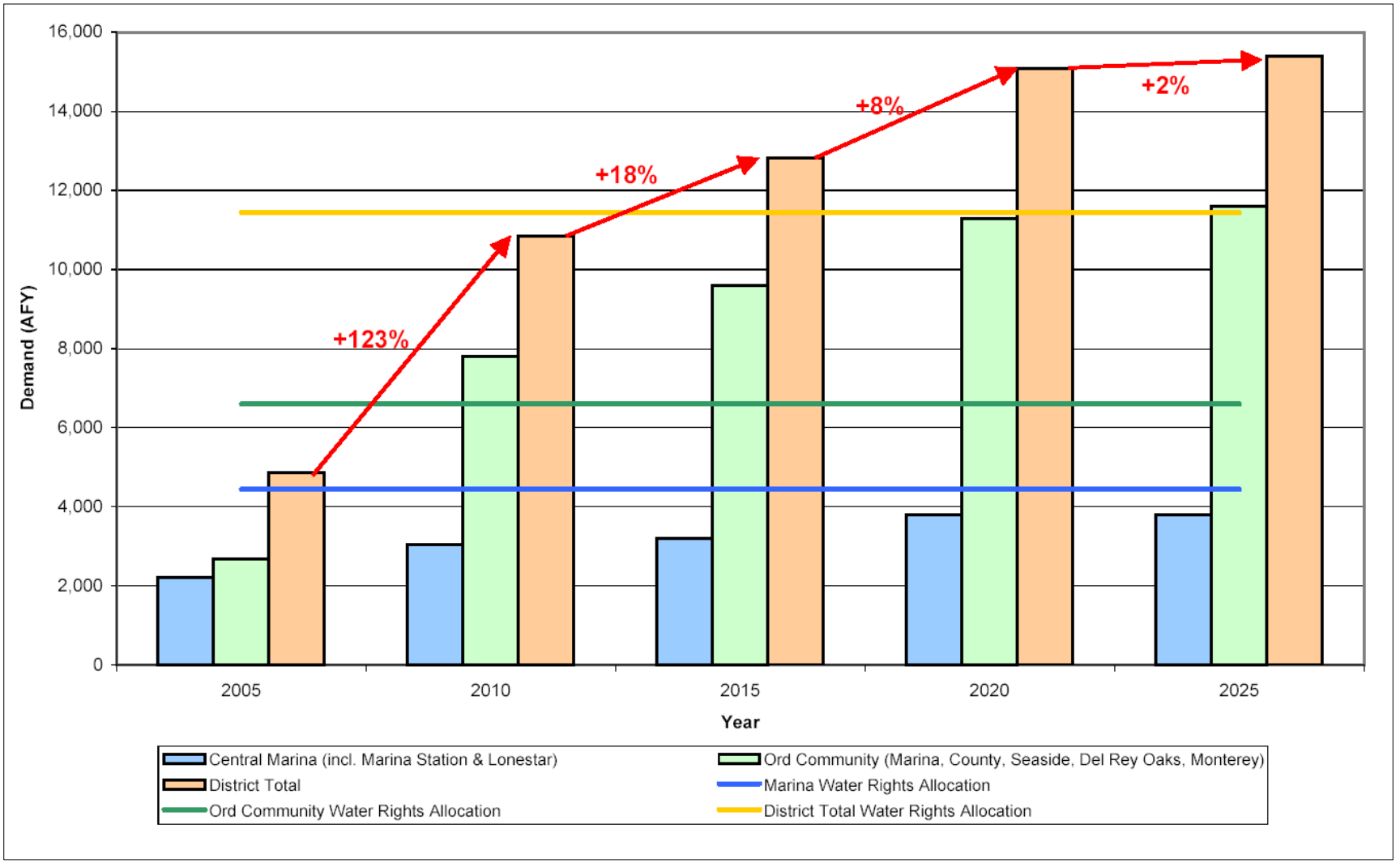

Figure ES.2
WATER DEMAND PROJECTIONS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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By agreement, MCWD limits groundwater pumping to 11,040 AFY (including 3,020 AFY in Central Marina, 6,600 AFY in Ord Community, 920 AFY for Armstrong Ranch, and 500 AFY for the Lonestar Property). As indicated in Figure ES.2, water demands for the District's service area will exceed this allocation between 2010 and 2015. The District is aggressively pursuing water augmentation strategies that include desalination and recycled water use to meet these demands.

ES.4 WATER SYSTEM EVALUATION

The District's water supply, storage, and distribution facilities were evaluated based on the analysis and design criteria defined in this study. The developed criteria address the water supply capacity, storage capacity, acceptable service pressures, distribution main performance, and daily and hourly peaking factors.

ES.4.1 Computer Hydraulic Model

Hydraulic network analysis is a powerful tool used in all aspects of water distribution planning, design, operation, management, emergency response, system reliability analysis, fire flow capacity evaluation, as well as water quality simulations. The District's hydraulic model combines information on the physical and operational characteristics of the water system, and performs calculations to solve a series of mathematical equations to simulate flows in pipes and pressures at nodes in a dynamic fashion. The model was based on separate models for the Marina and Ord communities systems developed previously. As part of this study, the separate models were combined, converted to a more sophisticated dynamic model, and updated to reflect recent system modifications, to evaluate the adequacy of the existing distribution system and in planning future facilities.

ES.4.2 Supply Capacity

The District's total supply capacity from the existing six groundwater wells is estimated at 18,630 AFY or 11,550 gpm. The District-wide supply analysis indicates that at the end of the planning horizon of Year 2025 maximum day demands will total 23,106 AFY or 14,325 gpm. This will result in a supply deficiency of 4,476 AFY or 2,775 gpm. Furthermore, as indicated previously, the District's water allocation limit is 11,040 AFY.

A new well, Well No. 33 is already in the planning phases and is estimated to have a capacity of 350 gpm. Well No. 33 will be drilled approximately 1 mile southeast of East Garrison on Reservation Road. Future water supplies will need to be developed to accommodate future growth and to mitigate existing well contamination, primarily from seawater intrusion.

Assuming the existing wells will remain in service at their current capacities, a total of 4 new wells of approximately 1,500 gpm are recommended in addition to Well No. 33. The additional wells will give the District excess capacity and be able to meet customer demand

with the largest well out of the service. Furthermore, if any existing well is taken out of service or placed into a backup mode, due to contamination or other causes, a well or wells of equal capacity should be drilled in the new well field. Figure ES.3 illustrates the timing of the new wells.

The District has plans to provide water supply from sources other than groundwater. These plans include desalination and the use of recycled water.

ES.4.3 Storage Capacity

The District's current storage reservoirs provide a total of 10.3 million gallons (MG) for servicing the District's operational, fire, and emergency needs. A District-wide analysis of the District's needs, using the storage criteria discussed in this report, indicates a total of 19.7 MG will be needed through the planning horizon of Year 2025 resulting in a 9.4 MG deficiency. Table ES.3 lists this study's recommended storage facilities to meet the District's needs through the planning horizon of Year of 2025. Additional storage facilities have been recommended as some reservoirs are nearing the end of their service life and are in need of replacement. A total of 14.4 MG of storage is recommended, including those reservoirs in need of replacement.

Table ES.3 Recommended Storage Reservoirs
Water Systems Master Plan
Marina Coast Water District

Reservoir	Diameter per Reservoir (Feet)	Height per Reservoir (Feet)	Volume per Reservoir (MG)[1]	Total Volume (MG)
A1/A2	133	20	2.08	4.16
A3	116	20	1.58	1.58
B2[2]	97	20	1.11	1.11
B4/B5	116	20	1.58	3.16
D1/D2[3]	137	20	2.21	4.42
Total				**14.43**

Notes:
(1) MG = million gallons.
(2) Does not include storage for the portion of Zone B to be served by the Coe Avenue PRV.
(3) Includes storage for Zones D, E, and a portion of Zone B to be served by the Coe Avenue PRV.

ES.4.4 Distribution System

Based on the evaluation criteria discussed in this report, the hydraulic model was used to further evaluate the capacity of the existing distribution system. The hydraulic model evaluation consisted of 24-hour simulations during normal operations of a maximum day

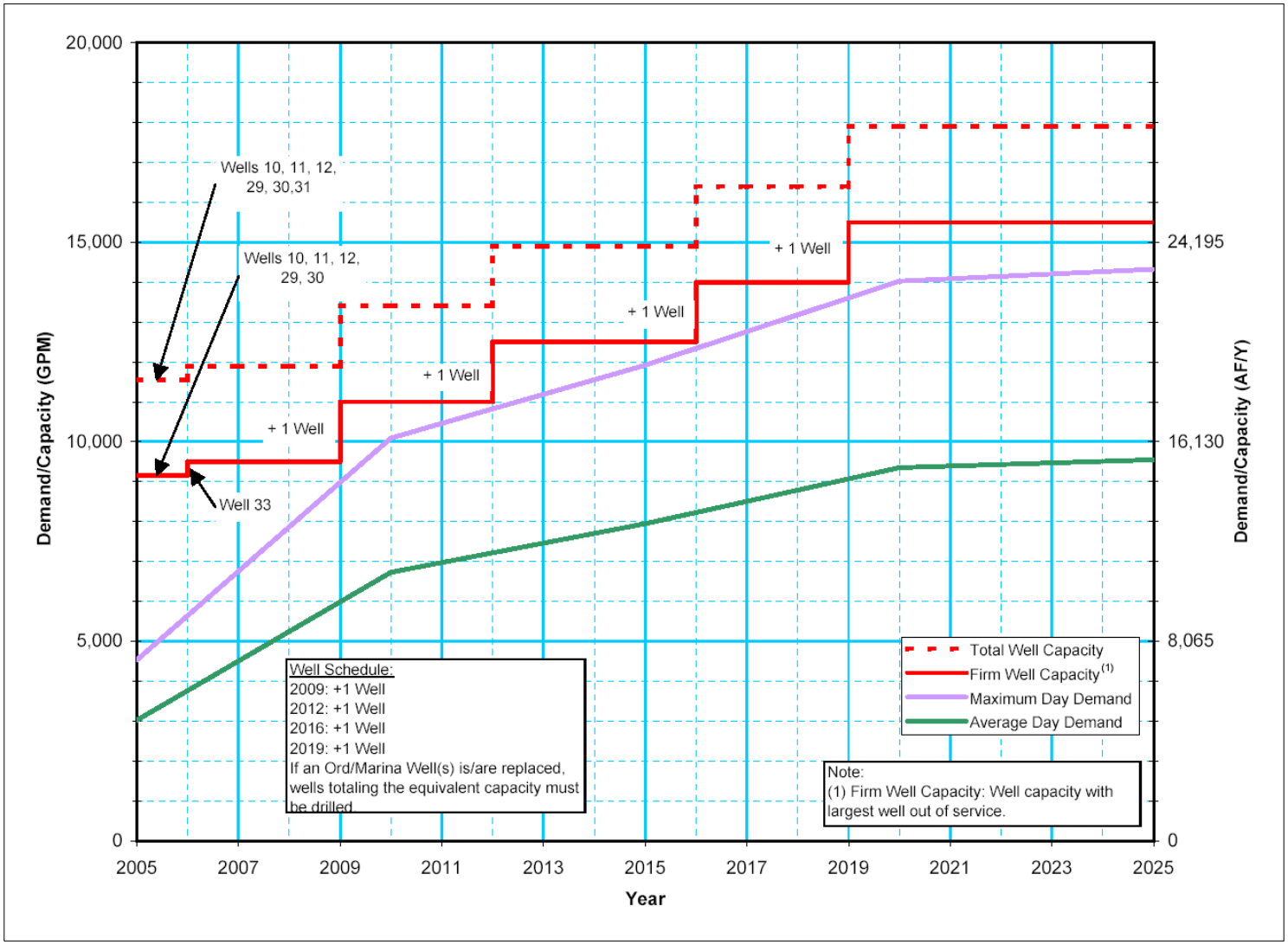

Figure ES.3
WELL TIMING
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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demand condition. The proposed distribution, supply and storage system improvements, are listed in detail in the study.

ES.5 CAPITAL IMPROVEMENT PROGRAM

Based on the identified system deficiencies and the projected water demand patterns, a Capital Improvement Program (CIP) was developed. An implementation schedule was devised that would enable improvements to be completed in time to serve the affected users, based on the projected demands. The CIP included a secondary phasing criteria based on the number of Equivalent Dwelling Units (EDUs) that would trigger the need for improvements.

The cost estimates presented in the CIP have been prepared for general master planning purposes and for guidance in project evaluation and implementation. Final costs of projects will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors such as: preliminary alignments generation, investigation of alternative routings, and detailed utility and topography surveys.

Knowledge about site-specific conditions for each proposed project is limited at the master planning stage, therefore the Estimated Construction Costs include a 20 percent contingency to account for unforeseen events and unknown field conditions and for Contractor's Overhead and Profit, General Conditions, and Sales Tax totaling 28.5 percent. The Capital Improvement Costs also include an additional 25 percent (applied to the Estimated Construction costs) for project-related costs, comprising of engineering, administration, construction management, and legal costs. The District's CIP is estimated to cost $193.5M and is summarized in Tables ES.4 through ES.6 by water system, project need, and component.

Table ES.4 CIP Summary by Water System
Water Systems Master Plan
Marina Coast Water District

Water System	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Marina	$2,622,000	$ -	$ -	$ -	$776,000	$520,000	$1,309,000	$ -	**$5,227,000**
Ord Community	$3,315,000	$13,175,000	$6,811,000	$2,013,000	$5,888,000	$6,552,000	$ -	$565,000	**$38,319,000**
- Well 33 Project	*$ -*	*$6,327,600*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$6,327,600***
- Eastern Well Field	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$32,794,000*	*$20,238,000*	*$ -*	***$53,032,000***
RUWAP[(1)] (Recycled Water)	$ -	$44,372,000	$ -	$ -	$ -	$ -	$ -	$ -	**$44,372,000**
RUWAP (Desal)	$ -	$ -	$46,250,000	$ -	$ -	$ -	$ -	$ -	**$46,250,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Table ES.5 CIP Summary by Project Need
Water Systems Master Plan
Marina Coast Water District

Project Need	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Capacity	$4,812,000	$12,867,000	$6,427,000	$2,013,000	$571,000	$2,301,000	*$ -*	*$ -*	**$28,991,000**
- Well 33 Project	*$ -*	*$6,327,600*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$6,327,600***
- Eastern Well Field	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$32,794,000*	*$20,238,000*	*$ -*	***$53,032,000***
- RUWAP[(1)] (Recycled Water)	*$ -*	*$44,372,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$44,372,000***
- RUWAP (Desal)	*$ -*	*$ -*	*$46,250,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$46,250,000***
Demolish	*$ -*	$205,000	$288,000	*$ -*	*$ -*	$464,000	*$ -*	*$ -*	**$957,000**
Fire Flow	$1,125,000	*$ -*	$96,000	*$ -*	$796,000	$1,491,000	*$ -*	*$ -*	**$3,508,000**
Operations	*$ -*	$103,000	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	**$103,000**
Service	*$ -*	*$ -*	*$ -*	*$ -*	$5,297,000	$1,923,000	$1,309,000	$565,000	**$9,094,000**
Standby	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	$893,000	*$ -*	*$ -*	**$893,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Table ES.6 CIP Summary by Component
Water Systems Master Plan
Marina Coast Water District

Project Component	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Pipeline	$5,937,000	$1,178,000	$1,744,000	$ -	$5,913,000	$3,414,000	$1,309,000	$565,000	**$20,060,000**
PRV	$ -	$225,000	$112,000	$ -	$206,000	$ -	$ -	$ -	**$543,000**
Pump Station	$ -	$1,784,000	$93,000	$ -	$545,000	$ -	$ -	$ -	**$2,422,000**
Reservoir	$ -	$9,988,000	$4,862,000	$2,013,000	$ -	$2,765,000	$ -	$ -	**$19,628,000**
Well	$ -	$ -	$ -	$ -	$ -	$893,000	$ -	$ -	**$893,000**
Well 33 Project	$ -	$6,327,600	$ -	$ -	$ -	$ -	$ -	$ -	**$6,327,600**
Eastern Well Field	$ -	$ -	$ -	$ -	$ -	$32,794,000	$20,238,000	$ -	**$53,032,000**
RUWAP[(1)] (Recycled Water)	$ -	$44,372,000	$ -	$ -	$ -	$ -	$ -	$ -	**$44,372,000**
RUWAP (Desal)	$ -	$ -	$46,250,000	$ -	$ -	$ -	$ -	$ -	**$46,250,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Chapter 1

INTRODUCTION

This chapter describes the need for this water system master plan and details the report organization.

1.1 BACKGROUND

The Marina Coast Water District (MCWD or District) operates six groundwater wells and associated infrastructure facilities within two water systems, Marina and Ord Community. The District is located in Monterey County, approximately 9 miles north of the City of Monterey and 110 miles south of the City of San Francisco. The District is situated on Monterey Bay and currently serves customers in Marina, Seaside, and unincorporated Monterey County. Future service to the jurisdictions of the City of Del Rey Oaks and portions of the City of Monterey is anticipated. Figure 1.1 presents a map showing the study area. Previous water master plans were completed in 1987 for the Marina water system and 2004 for the Ord Community water system. Both previous plans were based on planning assumptions and operational conditions that have since changed.

In 1991, the former Fort Ord was recommended for closure as part of the second round of Base Realignment and Closures (BRAC) with actual base closure occurring in 1995. The closure of Fort Ord significantly increased the District's service area with the District assuming responsibility of Fort Ord's entire water system and associated facilities. As a result of Fort Ord's closure, the area has the potential to realize significant growth with the reuse and redevelopment of the former base. As part of the base closure, the Fort Ord Reuse Authority (FORA) was formed to facilitate the redevelopment process. The Fort Ord Reuse Plan which was adopted in June 1997, was developed to guide the conversion of the Army Base to civilian use.

MCWD has provided water service for the City of Marina since 1966. In 1997, MCWD was selected by FORA to operate and maintain the water supply and distribution system for the Ord Community. Ownership of the Ord Community water system was transferred to MCWD in 2001, but the Ord Community lands have not been formally annexed to the District. Annexation is one reason that the District continues to operate the Central Marina and the Ord Community as two separate systems.

In 2005, the District completed a project that allows water to be transferred between the two water systems. This inter-connection allows the district to leverage all of their available resources to meet the needs of their service area. To maintain the independence of the two systems, the District maintains a "net zero balance" between the systems.

The Monterey County Water Resources Agency (MCWRA) and the Monterey Peninsula Water Management District (MPWMD) have jurisdiction over the groundwater production in

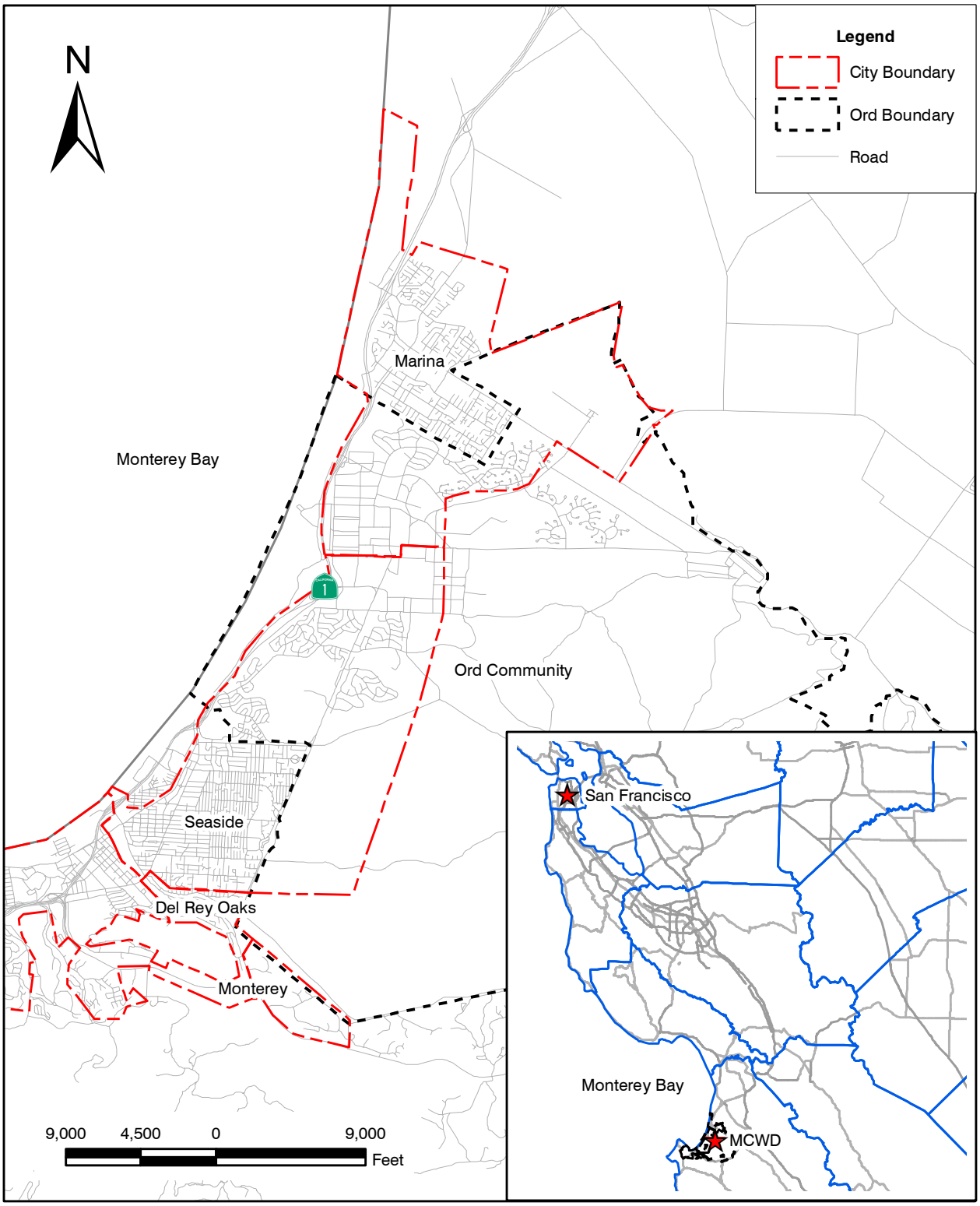

Figure 1.1
STUDY AREA
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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the region. By a 1993 agreement, FORA is authorized to allocate groundwater supplies through June 30, 2014. Currently, groundwater allocations for the MCWD area as follows:

- Central Marina - 3,020 acre-feet per year (AFY)
- Ord Community - 6,600 AFY

In the future, additional groundwater allocations will be available when the following properties are developed and become District customers.

- Armstrong Ranch - 920 AFY
- Lonestar Property - 500 AFY

Additional water supplies available to the District for meeting the demands of the Ord Community include 1,200 AFY or recycled water and 1,200 AFY of desalinated water.

1.2 SCOPE AND AUTHORIZATION

Recognizing the importance of planning, developing, and financing water system facilities to provide reliable and enhanced service for existing customers and to serve anticipated growth, the District initiated the preparation of this water system master planning study.

On June 22, 2005, the District authorized Carollo Engineers to prepare this water system master plan study which included the following tasks:

- Establish water system design and planning criteria.
- Evaluate the existing water distribution system using computer hydraulic modeling.
- Perform a demand analysis and review supply capacity.
- Perform a system-wide storage analysis.
- Summarize existing system deficiencies and propose improvements to enhance system reliability.
- Recommend improvements needed to service anticipated future growth.
- Develop a Capital Improvement Program (CIP) with a planning horizon year of 2025.

The study includes several planning assumptions that are documented in this report. Should future planning conditions deviate from the assumptions stated in this master plan (i.e., accelerated growth, more intense developments, supply source modifications, etc.), revisions and adjustments to the master plan recommendations would be necessary. Secondary information has been included in this report to assist in determining the impacts of changes in the projected rate of development.

1.3 REPORT ORGANIZATION

The water system master plan report contains seven chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 - Introduction. This chapter presents the need for this water system master plan.

Chapter 2 - System Description. This chapter presents an overview of the City's water supply, distribution, and storage facilities.

Chapter 3 - Planning and Design Criteria. The District's water supply, storage, and distribution facilities were evaluated based on the analysis and design criteria defined in this chapter. Historical water consumption and production records were reviewed to determine both the daily and seasonal fluctuations experienced by the water system. The developed criteria address the water supply capacity, storage capacity, acceptable service pressures, distribution main performance, and daily and hourly peaking factors.

Chapter 4 - Water Demand Projections. This chapter describes the land use and Urban Water Management Plan data available for this study. This chapter also includes water demand projections through the planning horizon in Year 2025.

Chapter 5 - Supply and Storage Evaluation. This chapter describes the District's water supply sources and allocation limits. Recommendations to meet storage requirements are also provided.

Chapter 6 - Hydraulic Analysis. This chapter describes the development and calibration of the District's Water Distribution Hydraulic Model. This model was used for identifying existing system deficiencies and for recommending enhancements. The results of the capacity evaluation of the water supply, distribution, and storage facilities is presented with improvements to mitigate existing system deficiencies and for servicing future growth. These improvements are recommended based on the system's technical requirements, cost effectiveness, and operational reliability.

Chapter 7 - Capital Improvement Program. This chapter presents the recommended Capital Improvement Program (CIP) for the Marina Coast Water District water distribution systems. The CIP is based on the evaluation of the District's water distribution system and on the recommended projects described in the previous chapters. The CIP has been staged to the planning horizon year of 2025.

Chapter 8 - Time of Use for Pumping. This chapter describes the time of use pumping analysis performed on the District's system. Included are impacts on the recommended facility improvements and a life cycle cost analysis.

Chapter 9 - Water Augmentation. This chapter describes alternative water supply sources (recycled water and desalination), and the impacts on the recommended facility improvements due to reduced flows in the distribution system (offset by recycled water for irrigation purposes) and specific changes to system load points (desalination).

Chapter 2

SYSTEM DESCRIPTION

This chapter presents an overview of the District's water supply, distribution, and storage facilities.

2.1 SYSTEM OVERVIEW

The District operates and maintains two distinct systems, Marina and Ord Community. The two the two separate systems have been intertied at five locations on the Marina and Ord Community systems. This allows water to be shared between the two systems. However, all intertie points are metered and much achieve a zero balance at the end of each month. The potable water supply for the District comes from six wells, three located in Marina (Wells 10, 11, and 12) and three in the Ord Community (Wells 29, 30, and 31). Well water from the Ord Community wells are pumped through the Intermediate Reservoir and then are conveyed to Sand Tank or are diverted to meet Central Marina demands. Marina well water meets Central Marina demands or is also pumped to the Sand Tank. From the Sand Tank water is boosted to consecutively higher pressure zones and reservoirs through a series of booster pump stations located throughout the District.

2.2 PRESSURE ZONES

The District is divided into five pressure zones ranging from sea level to 505 feet. Elevation increases from the coast to the hills in the southeast. The breakdown of pressure zone elevations is described below.

- Zone A: Elevation of 0 feet to 130 feet.
- Zone B: Elevation of 130 feet to 220 feet.
- Zone C: Elevation of 220 feet to 305 feet.
- Zone D: Elevation of 305 feet to 405 feet.
- Zone E: Elevation of 405 feet to 505 feet.

The above pressure zone ranges are general guidelines and may differ based on local topographical variations. Figure 2.1 shows the distribution pipelines and other facilities of the District's pressure zones.

2.3 WELLS

The District draws water from the Salinas Valley groundwater basin (managed by the Monterey County Water Resources Agency (MCWRA) through wells to supply water to its customers. While the District is also located above the Seaside groundwater basin (managed by the Monterey Peninsula Water Management District (MPWMD), it currently

N

Monterey Bay

Marina

Monterey County

Seaside

Res 2 & Well 12 & BPS

Well 11

Well 10

Sand Tank & B/C BPS

Well 30

Well 31

Well 29

Int Res

Res B1

Res C1

Res C2

D BPS

Res D & E

E BPS

NEPONSET RD
MONTE RD
RAMP
NASHUA RD
HWY 183
LAPIS RD
MRWMD
DEL MONTE BLVD
HWY 1
DUNES DR
LAKEWOOD DR
DREW ST
ABDY WAY
MARINA DR
MICHAEL DR
SEASIDE CT
BEGONIA CIR
BEACH RD
ROBIN DR
SUSAN AVE
MELANIE RD
DE FOREST RD
CRESCENT AVE
LAKE DR
LAKE CT
MORTIMER LN
PALM AVE
ZANETTA DR
HILLCREST AVE
REINDOLLAR AVE
GRANT ST
NICKLAS LN
EXETER PL
CARMEL AVE
BAYER ST
ELLEN CT
KING CIR
EDDY ST
SUNRISE AVE
BOSTICK AVE
BAYER DR
WAHL CT
PRESTON DR
CHOSIN CT
BARTH CT
BROSTROM DR
BUNKER HILL DR
OLD COUNTY RD
RESERVATION RD
COMES CT
EDDIE CT
ABRAMS DR
SCHOONOVER DR
PATCH CT
MANASSAS DR
INJUN RD
NEESON RD
MC FADDEN RD
COOPER RD
BLANCO RD
CARSWELL ST
HAYES CIR
LINDSEY ST
3RD AVE
WALKER ST
DX DR
4TH AVE
2ND AVE
MONTEREY RD
13TH ST
12TH AVE
12TH ST
11TH ST
10TH ST
9TH ST
8TH ST
6TH ST
5TH ST
4TH ST
3RD ST
2ND ST
1ST ST
1ST AVE
5TH AVE
ENGINEERING EQUIPMENT RD
INTERGARRISON RD
PANZIERA RD
ENGINEER RD
A ST
B ST
C ST
6TH AVE
7TH AVE
8TH AVE
LIGHT FIGHTER DR
OWEN DURHAM ST
JOE LLOYD WAY
GIGLING RD
7TH DIVISION PL
6TH ARMY AVE
ATTU RD
LUZON RD
NORMANDY RD
NORMANDY
NOUMEA RD
MALMEDY RD
PARKER FLATS
BEACH RANGE
CORREGIDOR RD
MONTEREY RD
BUNA RD
LEINBACH AVE
NAPIER ST
VELASCO ST
GENERAL JIM MOORE BLVD
METZ RD
TUNISIA RD
ARDENNES CIR
HATTEN RD
MC CLURE RD
EUCALYPTUS RD
PARKER FLATS RD
8TH AVE
CAMP ST
WATKINS GATE RD
CHAPEL HILL
ORD AVE
SHERMAN ST
CRESCENT BLUFF RD
HENNEKENS RANCH RD
BARLOY CANYON RD
PICNIC CANYON RD
IMPOSSIBLE CANYON RD
WILDCAT RIDGE RD
JACKS RD
OIL WELL RD
TORO CREEK RD
BENANCIO RD
PASEO TORCIDO
HWY 68 HWY
RAMP
CALIFORNIA AVE
ORD
MILITARY AVE
COE AVE
PORK CHOP HILL PL
METZ AVE
ORD GROVE AVE
PARALTA AVE
PARK CT
TIOGA AVE
PLAYA AVE
FIR AVE
FREMONT BLVD
BAKER ST
LUXTON ST
LA SALLE AVE
SAN PABLO AVE
MINGO AVE
LINCOLN ST
HAVANA ST
MARIETTA ST
NOCHE BUENA ST
SOTO ST
BROADWAY AVE
ELM AVE
SONOMA AVE
TRINITY AVE
HILBY AVE
ROUSCH AVE
KIMBALL AVE
PLUMAS AVE
WORK AVE
ANGELUS WAY
PALOMA RD
ROSITA RD
WHEELER ST
BUENA ST
MESCAL ST
ANCON ST
LUZERN ST
HARDING ST
WARING ST
LOWELL ST
WANDA AVE
CARLTON DR
PHEASANT RIDGE RD
CANYON DEL REY BLVD
RYAN RANCH RD
VIA MALPASO
UPPER RAGSDALE DR
LOWER RAGSDALE DR
TRAIL
YORK RD
SOUTH BOUNDARY RD
DETERMINE LN
ESTRELLA AVE
ALLEY
PASADERA
PASADERA DR
A RD
B RD
B CAMP
A CAMP
RAC
DIRECTORS RD
PERIMETER RD
POPE RD

4,000 2,000 0 4,000
Feet

Legend

- Reservoir
- Well
- Pump Station
- Disinfection
- Zone A Pipe
- Zone B Pipe
- Zone C Pipe
- Zone D Pipe
- Zone E Pipe

Elevation

- Zone E (0 - 130 Feet)
- Zone D (130 - 220 Feet)
- Zone C (220 - 305 Feet)
- Zone B (305 - 405 Feet)
- Zone A (405 - 505 Feet)
- Basemap
- City Boundary
- Ord Boundary

MARINA COAST WATER DISTRICT

carollo engineers

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November 5, 2006

Figure 2.1
EXISTING DISTRIBUTION SYSTEM FACILITIES
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

has no operational wells or plans for withdrawing from this basin. The water from the wells is pumped directly into the distribution system with no treatment except for disinfection by chlorination. Three of the wells, Well Nos. 10, 11, and 12, are deep aquifer (900-foot) wells located in the Marina water system and the other three wells, Well Nos. 29, 30, and 31, are located in the shallow (180-foot) and middle (400-foot) aquifers and serve the Ord water system. Table 2.1 presents a summary of District's wells.

Table 2.1 Well Summary
Water Systems Master Plan
Marina Coast Water District

Well Number	Water System	Aquifer	Estimated Capacity[(1)] (AFY)[(2)]	Estimated Capacity[(1)] (GPM)[(3)]
10	Marina	Deep	2,180	1,350
11	Marina	Deep	3,230	2,000
12	Marina	Deep	3,060	1,900
29	Ord	400-foot	2,420	1,500
30	Ord	400-foot	3,870	2,400
31	Ord	400-foot	3,870	2,400

Notes:
(1) Estimated well capacity based on well pump curve.
(2) AFY = acre feet per year.
(3) GPM = gallons per minute.

Some wells are experiencing deteriorating water quality due to seawater intrusion, trichloroethylene (TCE), manganese, and elevated water temperatures. Seawater intrusion is due to the overdraft condition that currently exists in the Salinas groundwater basin and has been steadily increasing inland. As of 2005, the plume of seawater intrusion (>500 mg/L of chloride) has extended east of Blanco Road in the 180-foot aquifer and east of Salinas Avenue in the 400-foot aquifer. Figures 2.2 and 2.3 illustrate the seawater plume in the 180 and 400-foot aquifers, respectively. The Marina wells (Wells 10, 11, and 12) are already within the seawater intrusion plume. If the overdraft condition continues, it is only a matter of time before the Ord wells will also be included.

A current TCE plume exists north of Reservation Road between the Marina Airport and the Central Marina boundary on Tallmon Street. TCE contamination is due to past Army activities on the former Fort Ord. TCE concentrations near Tallmon Street have measured 20 parts per billion (ppb) based on sampling done in September 2005. The State of California drinking water standard is 5.0 ppb. The TCE contamination is located in the shallow 180-foot groundwater aquifer and so far has not spread to the 900-foot aquifer where District's Marina wells are located. The well most likely to see TCE contamination first would be Well 12 but it is unlikely due to the clay layers separating the aquifers.

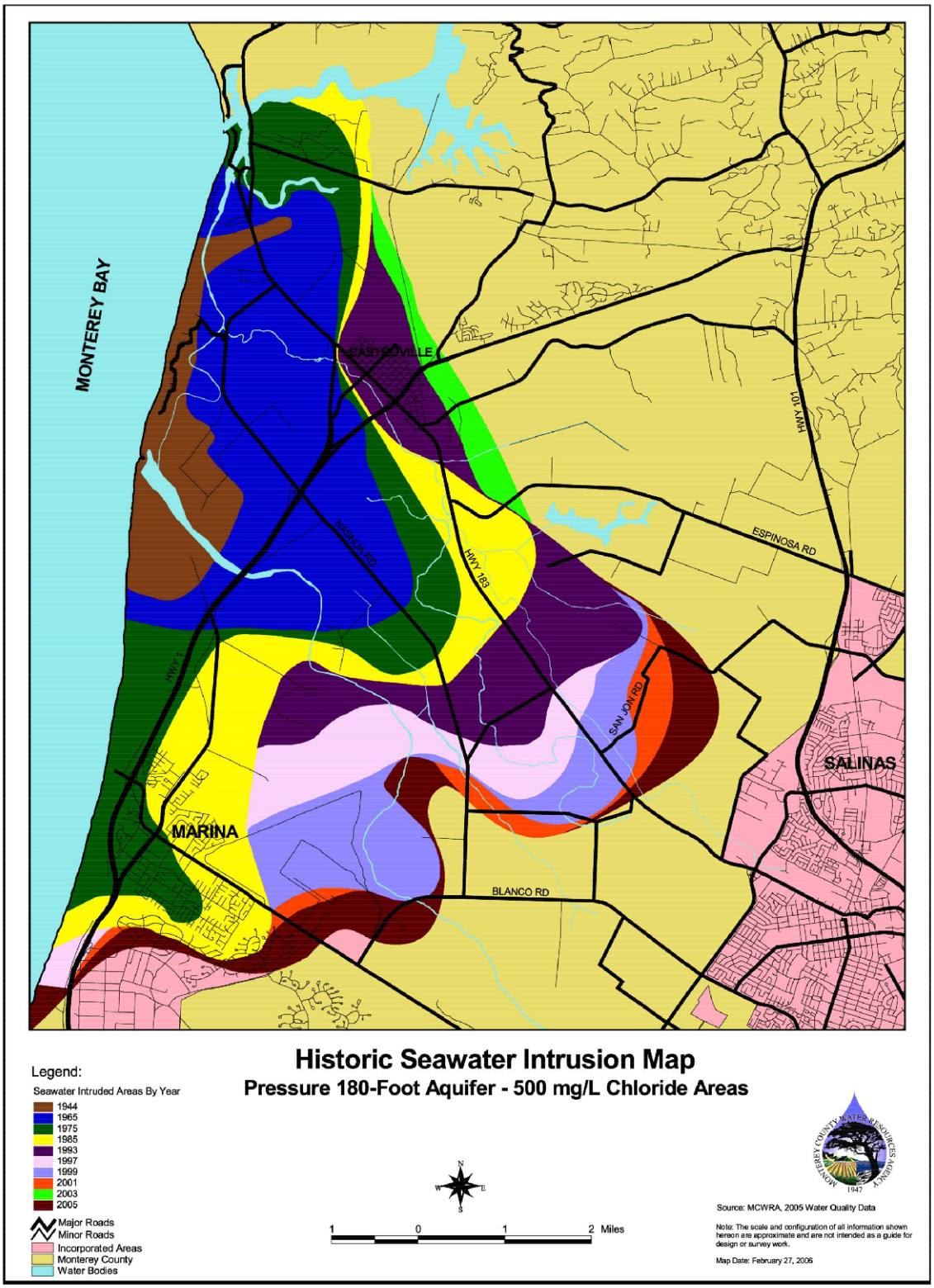

Figure 2.2
180-FOOT AQUIFER SEAWATER INTRUSION
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

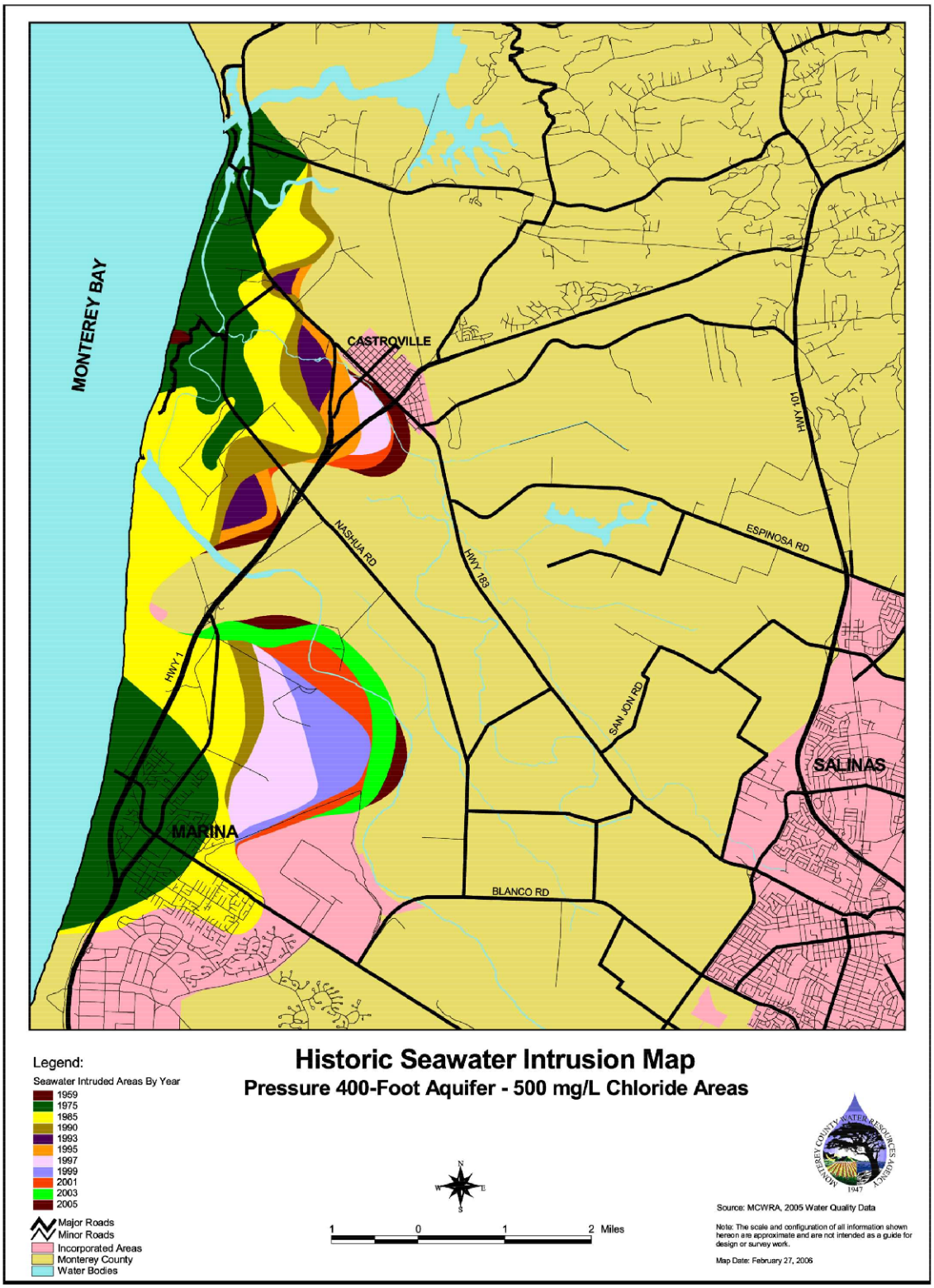

Figure 2.3
400-FOOT AQUIFER SEAWATER INTRUSION
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

The District performs wellhead sampling to detect the presence of potential contaminants in the groundwater. In addition, monitoring wells are maintained at strategic locations and sampling performed to provide early warning of water quality issues that could jeopardize the District's wells, In order to prepare for the possible loss of one or more of the wells, the District is studying the feasibility of installing new wells. Possible options for new wells include establishing a new well field located east of the District's current service area and constructing new wells that would reach the deep aquifer. A detailed discussion of the water quality issues facing the District can be found in the Urban Water Management Plan (December 2005).

Individual systems for on-site generation of sodium hypochlorite are provided for each of the Marina wells to disinfect the groundwater. Disinfection facilities for the Ord Community wells are located near the Intermediate Reservoir.

2.4 PUMP STATIONS

The District currently operates five pump stations that are used to fill reservoirs and transfer water across the service area. Well water produced in Zone A is pumped to the Main Booster Station located at the Sand Tank. From there water is pumped systematically to higher pressure zones, Zones B through E. Table 2.2 presents a summary of the District's pump stations.

2.5 RESERVOIRS

The District currently operates eight reservoirs in the system. The reservoirs are used for various purposes including flow equalization, fire flow, emergency conditions, and peak demand attenuation. Table 2.3 presents a summary the District's reservoirs.

The intermediate reservoir and the sand tank do not have specific service areas. Water passes through the storage facilities and is distributed throughout the system.

2.6 DISTRIBUTION SYSTEM

The existing distribution system consists of approximately 280 miles of 2-inch to 24-inch diameter pipes made predominantly of ductile iron but also including asbestos-cement, steel, and C-900 (PVC). Approximately 106 miles of the distribution is included in the hydraulic model. Most of the pipes in the Ord Community are old, having been built by the Army decades ago. Table 2.4 presents a summary of the District's distribution system pipelines that were included in the computer hydraulic model.

Table 2.2 Pump Station Summary
Water Systems Master Plan
Marina Coast Water District

Pump Station	Pump	Power (HP)[1]	Elevation (Feet)	Capacity (GPM)[2]	Comment
Reservoir 2	1	100	150	1,500	Reservoir 2 to Zone A
	2	100	150	1,500	
	3	100	150	1,500	
B[3]	1	125	110	2,800	Sand Tank to Zone B
	2	125	110	2,800	
C[3]	1	125	110	2,000	Sand Tank to Zone C
	2	125	110	1,800	
	3	125	110	1,800	
	4	125	110	1,800	
	5	125	110	1,800	
D	1	100	300	4,800	Zone C to Zone D
	2	50	300	2,000	
E	1	30	475	600	Zone D to Zone E
	2	30	475	600	
Intermediate Reservoir[4]	1	N/A	190	1,500	Intermediate Res. to Zone C
	2	N/A	190	1,500	

Notes:
(1) HP = Horsepower.
(2) GPM = Gallons per minute.
(3) Main Booster Pump Station located at Sand Tank.
(4) Not included in hydraulic model.

Table 2.3 Reservoir Summary
Water Systems Master Plan
Marina Coast Water District

Reservoir	Zone	Material	Volume (Gallons)
Reservoir 2	Marina Zone A	Steel	2,000,000
Intermediate Reservoir	Marina Zone A	Steel	169,000
Sand Tank	None	Concrete	2,000,000
B	B	Concrete	2,000,000
C1	C	Concrete	2,000,000
C2	C	Concrete	2,000,000
D	D	Concrete	2,000,000
E	E	Steel	250,000

Table 2.4 Modeled Pipeline Summary Water Systems Master Plan Marina Coast Water District	
Diameter (Inches)	**Length[(1)] (Feet)**
4.00	1,643
6.00	127,984
8.00	199,077
10.00	18,992
12.00	120,865
14.00	4,431
16.00	17,204
16.72	6,665
18.00	22,546
20.00	12,190
24.00	15,772
24.94	10,593
Total	**557,963**

Note:
(1) Includes modeled pipes only.

2.7 PRESSURE REDUCING VALVES (PRV)

The District currently operates 19 pressure reducing valves (PRVs) in its system. PRVs are used to reduce pressure when transferring water from a higher pressure zone to a lower pressure zone. PRVs are typically used to supplement pressure to lower zones during situations such as fire flow, emergencies, or peak demand periods. However, in some situations PRVs may provide the only source of water to certain areas due to topographical restrictions. Table 2.5 and Figure 2.4 present a summary of the District's PRVs.

Table 2.5 Pressure Reducing Valve Summary
Water Systems Master Plan
Marina Coast Water District

PRV	Location	Elevation (Feet)	Inlet Pressure (psi)[1]	Outlet Pressure (psi)	Transfer Mode
Bermad Valve	Sand Tank	141	20	10.8	Zone A to Sand Tank
PRV-2	Carmel Ave. at Crumpton Ln.	126	63	32.5	Zone B to A
PRV-22	8th St. at 4th Ave.	179	51	13	Zone B to A
PRV-24	12th St. near DX Dr.	167	56	23	Zone B to A
PRV-28	8th St. at 2nd Ave.	110	82	41.6	Zone B to A
PRV-20	Monterey Rd. at Normandy Rd.	190	90	47	Zone C to B
PRV-50	8-inch pipeline south of Sand Tank	110	170	70	Zone C to B
PRV-25	Old County Rd. near Well 29	175	88	30	Zone C to B
PRV-26	Gigling Rd. at 6th Division Cir.	228	72	29	Zone C to B
PRV-10	Abrams Dr. at Bunker Hill Dr.	190	67	43	Schoonover Park to Zone B
PRV-11	Inter-Garrison Rd. near Spotsylvania Ct.	250	67	46	Zone C to Schoonover Park
PRV-12	Inter-Garrison Rd. at Abrams Dr.	241	70	46	Zone C to Schoonover Park
PRV-13	Inter-Garrison Rd. at Schoonover Dr.	237	71	48	Zone C to Schoonover Park
PRV-6	Inter-Garrison Rd. to East Garrison Development	216	70	48	Zone C to B
PRV-17	Kiska Rd. at Buna Rd.	178	60	50	Zone C to Seaside Highlands
PRV-18	Penninsula Point Dr. at Bay Crest Cir. (End of maintenance Rd)	161	67	45	Zone C to Seaside Highlands
PRV-419	Coe Ave. to Upper Seaside Highlands	233	110	14	Zone C to Seaside Highlands
PRV-27	General Jim Moore Blvd. at Normandy Dr.	310	72	23	Zone D to C
PRV-SUNBAY	Coe Ave. to Sunbay Apartments	233	110	45	Zone D to Sunbay

Note:
(1) psi = Pounds per square inch.

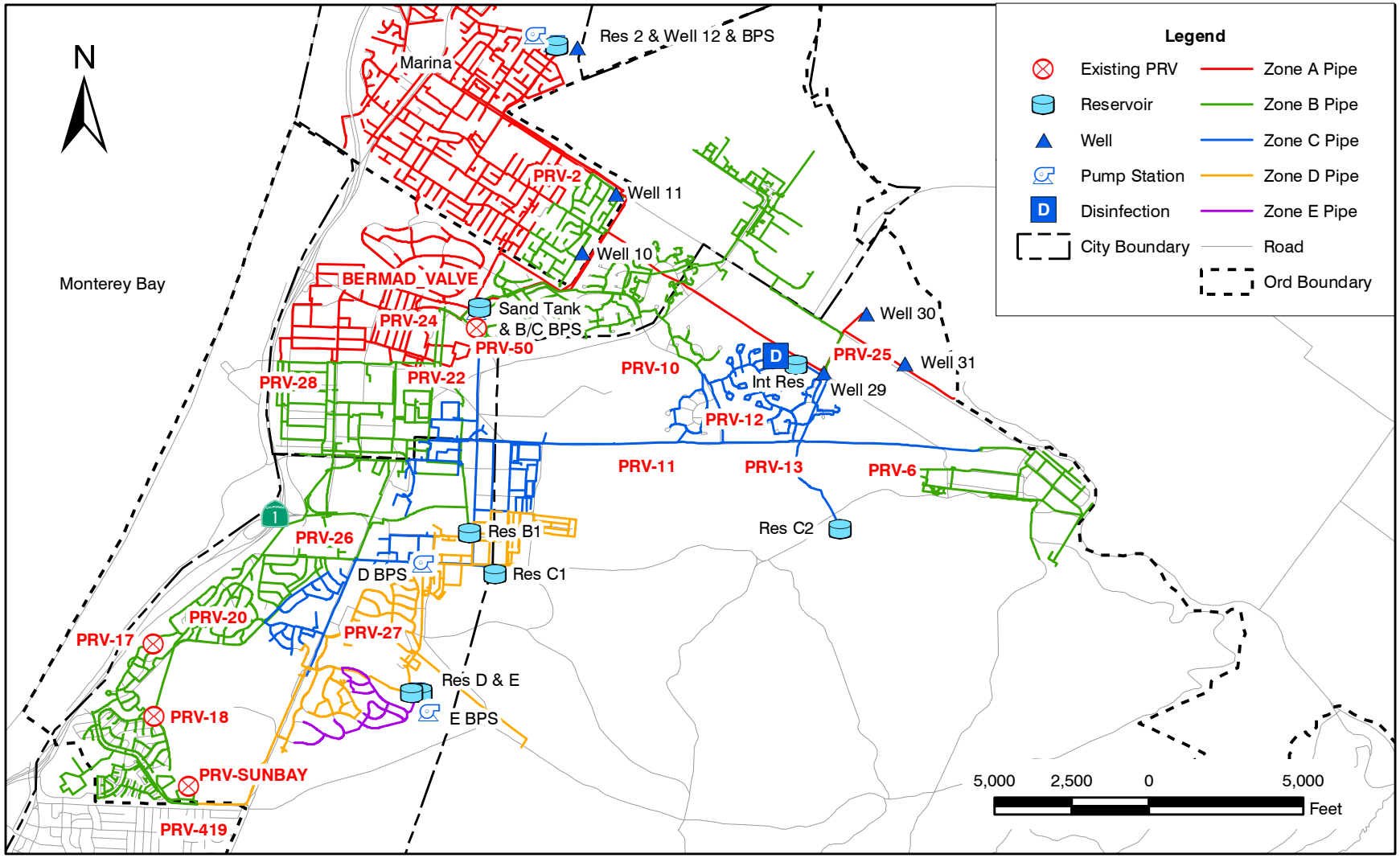

Figure 2.4
PRESSURE REDUCING VALVE LOCATIONS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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November 5, 2006

Chapter 3

PLANNING AND DESIGN CRITERIA

The District's water supply, storage, and distribution facilities were evaluated based on the analysis and design criteria defined in this chapter. Historical water consumption and production records were reviewed to determine the daily and seasonal fluctuations experienced by the water system. The developed criteria address the water supply capacity, storage capacity, acceptable service pressures, distribution main performance, and daily and hourly peaking factors.

3.1 WATER SUPPLY CAPACITY

In determining the adequacy of the water supply facilities, the source must be large enough to meet the varying water demand conditions, as well as provide sufficient water during potential emergencies such as power outages and natural or created disasters. Since this study does not include an analysis of the groundwater aquifer yield, which should be performed by a hydrogeologic consultant, it is assumed that future water supply capacity will continue to be extracted from groundwater wells, recycled water, or desalination.

3.1.1 Normal Production Capacity

In accordance with industry standard practices and the California Department of Health Services (DHS) criteria for "Adequate Source Capacity" on water supply, the source should be sized to serve the maximum day demand. On the day of maximum demand, it is desirable to maintain a water supply rate equal to the maximum day demand rate. Water required for peak hour demands or for fire flows would come from storage. The District's total supply capacity is currently equal to the production capability of all its wells. To account for unanticipated reductions in supply, the District's firm supply capacity is equal to the production capacity with the largest well out of service. This criterion will give the District supply reliability and allow demands to be met under all but the most extreme conditions.

3.1.2 Additional Production Capacity

An additional source of supply could potentially come from a desalination plant and recycled water. Participation in a regional desalination plant is one possible way to supplement the District's supply capacity. The District could also construct a desalination plant of their own, or recommission the idle desalination plant they already own. Recycled water is another potential method for augmenting the District's water supply. An additional 1,200 acre-feet per year (AFY) of recycled water and 1,200 AFY of desalinated water may be produced to augment the water supplies for Ord Community. Both of these options could be used to supplement the District's groundwater production and increase system reliability.

3.2 STORAGE REQUIREMENTS

The primary function of potable water storage is to provide a reserve supply to satisfy the needs of the following:

- Operational or equalization supply.
- Fire fighting.
- Emergency supply.

Operational storage is directly related to the amount of water necessary to meet peak demands. The intent of operational storage is to provide the difference in quantity between the customer's peak demands and the system's reliable available supply. The volume of water allocated for emergency uses is decided based on the historical record of emergencies experienced, and on the amount of time which is expected to lapse before a hypothetical emergency can be corrected. Having too little storage requires that pipelines and pumps must be larger to meet the system's operational, emergency, and fire demands. Too much storage results in higher capital costs, underutilized facilities, and/or water quality issues.

3.2.1 Operational Storage

This storage is the amount of desirable stored water in a system to regulate fluctuations in demand so that extreme variations will not be imposed on the source of supply. With operational storage, system pressures are improved and stabilized to better serve customers throughout the service area. Operational storage is commonly estimated between 25 percent and 50 percent of the maximum day demand. This study recommends an operational storage equal to 25 percent of the District's maximum day demand.

3.2.2 Fire Storage

Fire storage is the amount of water that is required to provide an adequate water supply in the event of a fire in the service area. The minimum volume of fire storage is set by the jurisdictional fire chief(s). Fire storage volumes are usually calculated using guidelines from the California Fire Code (CFC). Fire flows are typically based on the type of building construction, square footage of the building floor space, presence or absence of fire suppression measures, and the spacing of adjacent structures. The Insurance Service Organization (ISO) uses a similar method for determining fire flow. Table 3.1 presents a comparison of base fire flows for one building type for the CFC and ISO methods. The base fire flows and associated fire areas are similar. However, the fire durations are more conservative under CFC guidelines.

For master planning purposes, fire flows are typically generalized based on land use since calculating fire flows for individual buildings can be incorrect without knowledge of the building's characteristics. For residential land use, a fire flow of 1,500 gallons per

Table 3.1 System Design Criteria Water Systems Master Plan Marina Coast Water District	
Condition	**Criteria**
Minimum Pressure	
Maximum Day	40 psi
Peak Hour	40 psi
Maximum Day Plus Fire Flow	20 psi
Maximum Pressure at Service Connection	100 psi
Distribution Pipeline Velocity	
Peak Hour	8 fps(1)
Maximum Day Plus Fire Flow	15 fps
Distribution Pipeline Headloss	
Pipeline Diameter < 16 inches	10 feet per 1,000 feet
Pipeline Diameter > 16 inches	3 feet per 1,000 feet
Roughness Coefficient	
New Pipelines	130
Existing Pipelines	120

Note:
(1) fps - feet per second.

minute (gpm) for 2 hours is assumed and results in a fire storage volume of 0.18 million gallons (MG). For light/neighborhood commercial land uses, a fire flow of 3,000 gpm for 3 hours is commonly assumed and is equivalent to 0.54 MG of storage. For commercial and industrial land uses, a fire flow of 4,000 gpm for 4 hours is assumed and is equivalent to 0.96 MG of storage.

At the airport, a deluge system has been provided in the hangers to deliver a large amount of water released in a short period of time to essentially flood the building. It is estimated that the fire flow needed for this operation is 6,000 gpm for one hour (personal communication with the City of Marina Fire Chief). Previously, there was a 300,000-gallon storage tank located near the airport to support the deluge system. Due to seismic vulnerability, the storage tank has since been abandoned. Thus, fire flows will need to come from other reservoirs and piping must be appropriately size following an investigation by the Marina Fire Chief. The airport fire flow has been reduced to 4,000 gpm for four hours.

The fire fighting storage volume is based on the land use in each pressure zone. For Zones A, B, and C, 0.96 MG (4,000 gpm for 4 hours, commercial/industrial) is recommended. For Zone D, 0.54 MG (3,000 gpm for 3 hours, light neighborhood/commercial) is recommended.

For Zone E which only has residential structures, 0.18 MG (1,500 gpm for 2 hours) is recommended.

3.2.3 Emergency Storage

Emergency storage is the volume of water held in reserve at all times to meet demands in the event of a system failure. The emergency storage volume is often based on an analysis of possible events that could create a supply failure, and the estimated amount of time needed to return the supply back to service. A risk assessment is sometimes performed to determine the desired degree of system reliability.

Emergency events can include, but are not limited to:

- Well failures.
- Treatment plant failures (a future consideration).
- Distribution system pipeline failures.
- Major transmission main failures.
- Pump station failures.
- Electrical power outages.
- Natural disasters.

Emergency storage volume is typically expressed as a percentage of the maximum day demand for the service area. The District currently has no emergency storage criterion. This study recommends an emergency storage equal to 50 percent of the District's maximum day demand.

3.2.4 Total Storage

In summary, the following storage criteria is proposed.

- Operational Storage: 25 percent of Maximum Day Demand (MDD).
- Fire Fighting Storage: Maximum of:
  - 1,500 gpm for 2 hours (residential).
  - 3,000 gpm for 3 hours, (neighborhood commercial).
  - 4,000 gpm for 4 hours (commercial/industrial).
  - 4,000 gpm for 4 hour (airport).
- Emergency Storage: 50 percent of MDD.

The total storage volume can be represented by the following equation:

Storage Volume = 0.25 x MDD + Fire Flow (Varies) + 0.5 x MDD

The above recommended storage criteria will give the District the flexibility to meet demands under normal operational situations, fire events, and emergency situations without compromising service levels that customers currently expect and receive.

3.3 SERVICE PRESSURES

Pressures maintained within distribution systems vary depending on District criteria and pressure zone topography. It is essential that the water pressure in a consumer's residence or place of business be neither too high nor too low. Low pressures, below 30 pounds per square inch (psi), cause annoying flow reductions when more than one water-using appliance is used. High pressures may cause faucets to leak and valve seats to wear out quickly. Additionally, high service pressures usually result in wasted water and high water utility bills and may require pressure reducing valves to be installed.

It is recommended that the minimum pressure criteria during maximum day conditions be no less than 40 psi, while the minimum acceptable service pressure criteria during peak hour conditions be no less than 40 psi. A lower minimum service pressure of 35 psi is applicable to certain pressure zones with restrictive elevations. Another service pressure criteria is related to fire flows and was devised to ensure adequate positive pressure head for the booster pumps in fire trucks. The fire pressure criteria requires a minimum acceptable residual pressure of 20 psi at the main connected to the hydrant used for fighting the fire.

3.4 DISTRIBUTION MAINS

Transmission grid mains are generally sized to carry the greater of: 1) the peak hour demand, or 2) the maximum day demand plus fire flow. Other criteria related to the distribution piping include the maximum and minimum velocities and the maximum allowable friction losses.

High velocities may cause damage to the pipes and their appurtenances. Normally, velocities of 10 feet per second (fps), or higher, do not cause ill effects if they occur for a limited duration. It is normally good practice to become concerned when pipe velocities exceed 8 fps on a continuous basis.

As long as the maximum velocity criteria and the pressure criteria are not violated, high head loss by itself is not an important factor. However, it may be a warning that the pipe is nearing the limit of its carrying capacity, and may not have sufficient capacity to perform under stringent conditions. It is normally good practice to monitor pipes that have a head loss in excess of 10 feet per 1,000 feet of pipe length. The recommended roughness coefficients for calculating head loss in pipes will be 120 for existing pipes and 130 for new pipes.

3.5 PEAKING FACTORS

Peaking factors represent the seasonal and daily demand water use variations, above or below the average annual water demand. The various peaking conditions are either statistical concepts or numerical values established through a review of historical data and are, at times, adjusted to reflect a level of conservatism.

3.5.1.1 Maximum Day Demand

The maximum day demand (MDD) is the highest water demand during a 24-hour period of the year. The MDD peaking factor is expressed as a multiplier applied to the average day demand. Water system sources are typically sized to meet the anticipated maximum day demands of a water system.

Maximum day plus fire flows stress the water system in the specific area of the fire and often show existing deficiencies, if any, within the general area of the simulated fire. To evaluate the effect of maximum day plus fire flow throughout a system, the fire flow is simulated at selected critical areas of the distribution system. Simulating maximum day plus fire flows also demonstrates the performance of supply sources, booster pumps, and storage tanks operating under stressful conditions.

In general, the maximum day demand is 2.0 to 2.5 times greater than the average annual demand. A maximum to average day demand ratio of 1.5 was determined using production data from the District's Department of Water Resources (DWR) reports. A lower ratio than 2.0 is acceptable due to the mild climate observed throughout the District. The 1987 Water Master plan also used a maximum to average day demand ratio of 1.5. Irrigation demands represent are large component of the maximum day demand. Using recycled water to serve irrigation needs is one factor in a lower peaking factor. Increased recycled water use could potentially reduce the peaking factor in the future as well.

Maximum Day Demand = 1.5 x Average Day Demand

3.5.1.2 Peak Hour Demand

The peak hour demand (PHD) is the highest water demand during any one-hour period of the year. The PHD is expressed as a multiplier applied to the average annual demand. Peak hour demands simulate high water use throughout the system during peak demands and identifies areas of the distribution system that experience low pressures.

This condition is similar to applying maximum day plus fire flow, only in this case, the entire system is exposed to stressful conditions.

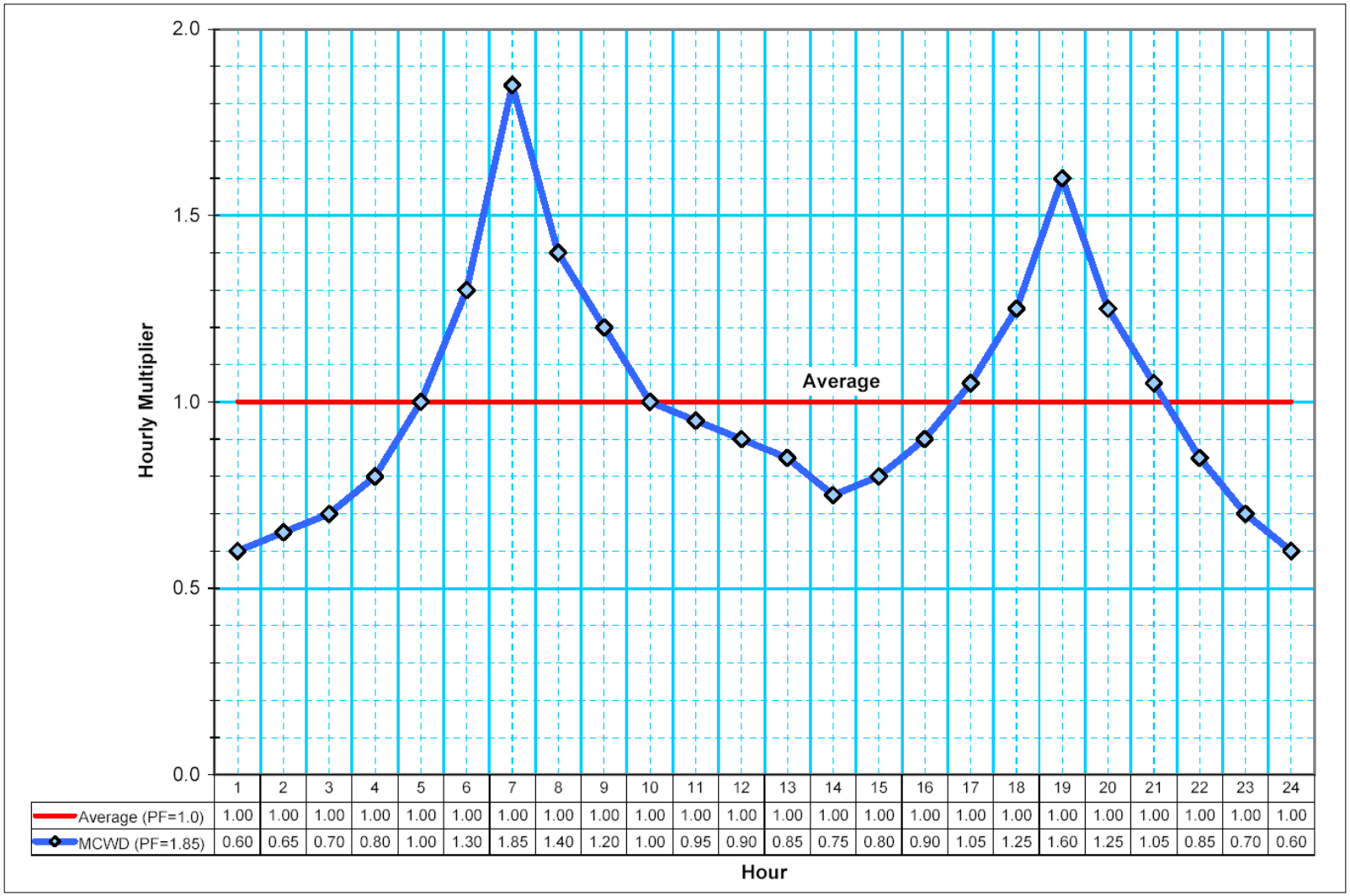
In general, the peak hour demand ranges between 2.5 and 3.5 times greater than the average annual demand. Supervisory Control and Automated Data Acquisition (SCADA) data for the summer of 2005 was used to determine the peak hour demand ratio. The data included flow from the District's wells and levels in its reservoirs. A peak hour to maximum

day demand ratio of 1.85 was calculated using this data. The 1987 Water Master Plan used a similar ratio of 1.8.

Peak Hour Demand = 2.8 x Average Day Demand = 1.85 x Maximum Day Demand

3.5.1.3 Daily Diurnal Pattern

In the absence of hourly production records, an hourly diurnal pattern was developed for this study using the recommended peaking factors and diurnal patterns used for other water agencies. Figure 3.1 presents the diurnal pattern developed for this study and includes values for hourly demand multipliers. The diurnal pattern was used in the computer hydraulic model to perform 24-hour simulations for evaluating the capacity of the District's existing distribution system and for designing the future expansions. Based on the evaluation of the well production records, and future land use projections, it was determined appropriate to use the same diurnal curve for both the Central Marina and Ord Community systems.



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Average (PF=1.0)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MCWD (PF=1.85)	0.60	0.65	0.70	0.80	1.00	1.30	1.85	1.40	1.20	1.00	0.95	0.90	0.85	0.75	0.80	0.90	1.05	1.25	1.60	1.25	1.05	0.85	0.70	0.60

Figure 3.1
DAILY DIURNAL WATER DEMAND PATTERN
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

Chapter 4

WATER DEMAND PROJECTIONS

This chapter presents an overview of the data used in developing existing and future water demands for the distribution system hydraulic model.

4.1 LAND USE

Land use inventory and projections are used to distribute existing and future water demands. The methodology and assumptions made in their development for each planning period will be described below. Land use data were obtained from the City of Marina, City of Seaside, and Monterey County for existing and build-out conditions. The land use layers for these jurisdictions was then compiled into a single combined layer with common land use categories. Tables 4.1 and 4.2 summarize the land use for existing and build-out conditions.

Table 4.1 Existing Land Use
Water Systems Master Plan
Marina Coast Water District

Land Use Category	Area (Acres)
Low Density Residential	1,285
Medium Density Residential	3,145
High Density Residential	34
Multi-Family Residential	149
Commercial	262
Office	381
Retail	164
Hotel	64
Light Industrial	100
Government	18,323
Education	1,251
Landscaping	1,104
Open Space	7,120
Total	33,383

Note:
(1) Land use based on data from City of Marina, City of Seaside, and Monterey County.

Table 4.2 Water Demand Factors Water Systems Master Plan Marina Coast Water District				
Land Use	**Unit**	**Use Factor (AFY)[2]**	**Use Factor (GPD)[3]**	**Use Factor (GPM)[4]**
SF Residential - < 5 units/acre	Unit	0.5	446.37	0.31
SF Residential - 5-8 units/acre	Unit	0.33	294.61	0.20
Residential - 8-15 units/acre	Unit	0.25	223.19	0.15
Multi family > 15 units/acre	Unit	0.25	223.19	0.15
Hotel/Motel and Timeshares/unit	Unit	0.17	151.77	0.11
Retail	SF	0.00021	0.19	0.000130
Restaurant (@ 9 sqft/seat * 7 gsf)	Seat	0.029	25.89	0.0020
Office/R&D	SF	0.000135	0.12	0.000084
Other Commercial	SF	0.0003	0.27	0.000186
Light Industrial	SF	0.00015	0.13	0.000093
Governmental (corp yard 0.25 af/acre)	SF	0.0003	0.27	0.000186
Institutional	SF	0.0003	0.27	0.000186
Schools (K-12)	SF	0.0003	0.27	0.000186
Higher Education	SF	0.0003	0.27	0.000186
Improved Landscaping	Acre	2.1	1,874.76	1.30
Turf	Acre	2.5	2,231.86	1.55

Notes:
(1) Adapted from Table 3.3 of UWMP.
(2) AFY = Acre-feet per year.
(3) GPD = Gallons per day.
(4) GPM = Gallons per minute.

4.1.1 Existing Land Use

Table 4.1 summarizes and Figure 4.1 illustrates the existing land use distribution. The largest land use category is government (18,323 acres) from the former Fort Ord. Much of this land is anticipated to become habitat management space. Other large areas include residential (4,613 acres) and open space (7,120 acres). All land from the former Fort Ord will be transferred via the Fort Ord Reuse Authority (FORA), the organization responsible for the redevelopment of the former army base.

4.2 URBAN WATER MANAGEMENT PLAN

The basis for the projection of water demands used in the hydraulic model is the District's 2005 Urban Water Management Plan (UWMP). The UWMP was completed by Byron Buck and Associates and adopted by the District's Board of Directors on December 14, 2005

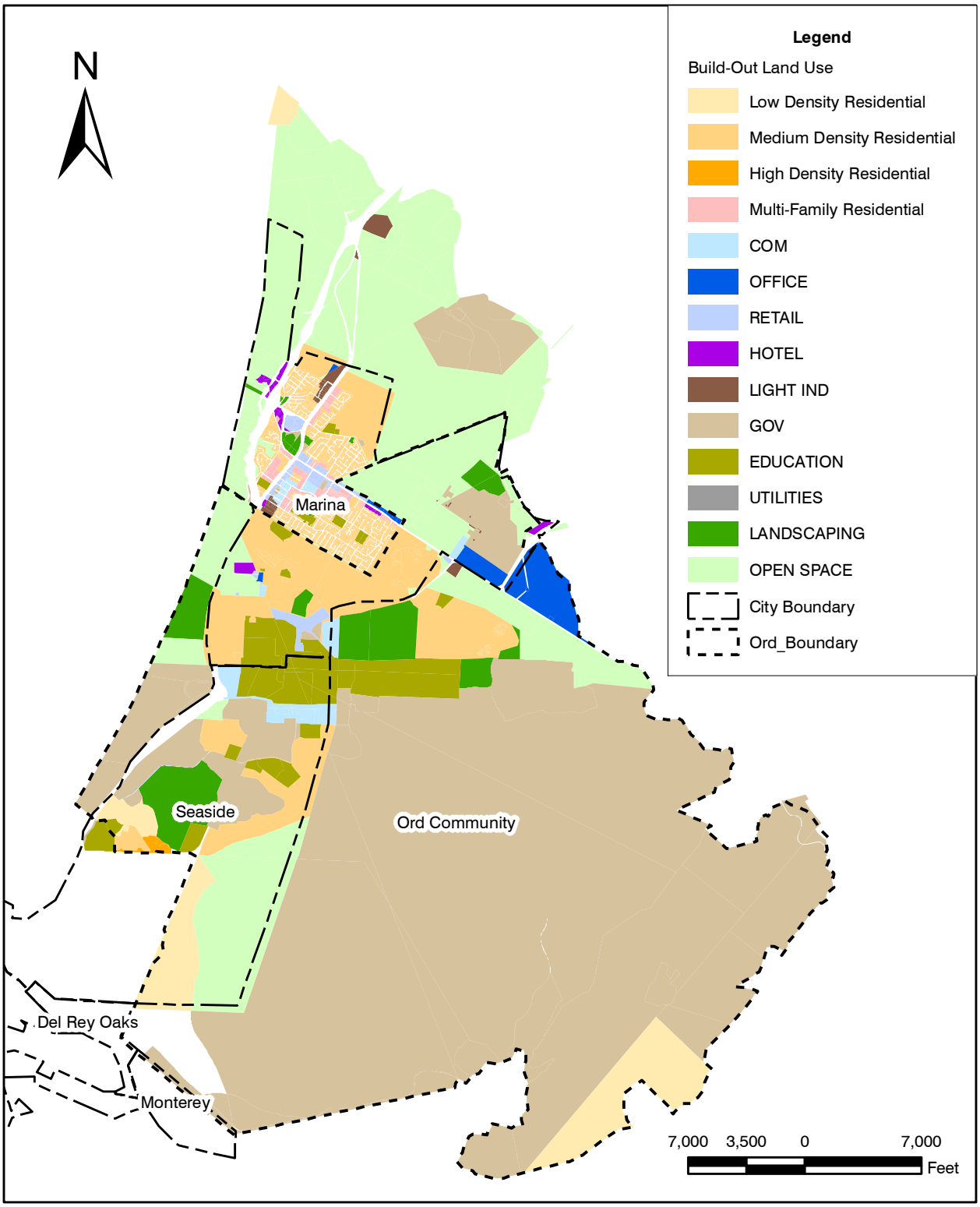

Figure 4.1
EXISTING LAND USE
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

(Resolution 2005-64). Demands in the UWMP are the result of a comprehensive land use survey of the various jurisdictions within the District. The UWMP presents demands in five-year increments with a planning horizon in Year 2025.

4.2.1 Water Demand Factors

Once land use units have been tallied for each category, water demands can be calculated using demand factors. Table 4.2 presents the water demand factors used in the UWMP.

4.2.2 Water Demand Projections

Based on the land use totals obtained from the jurisdictional survey and the water demand factors for each land use category, water demands were calculated. District-wide average day demands are anticipated to nearly double by Year 2010 and triple in Year 2025 (see Figure 4.2). Most of the District's growth is expected to occur in the Ord Community due to the redevelopment of the former Fort Ord military base. Table 4.3 presents the water demands in acre-feet per year and Table 4.4 in gallons per minute. For greater detail on the development of the water demands, see the District's 2005 Urban Water Management Plan.

Much of the water demands can be attributed to specific developments within the District. Figure 4.3 illustrates existing and proposed developments and their location within the District. The largest of these developments are the City of Del Rey Oaks, CSUMB, UCMBEST, University Villages, and the Marina Airport.

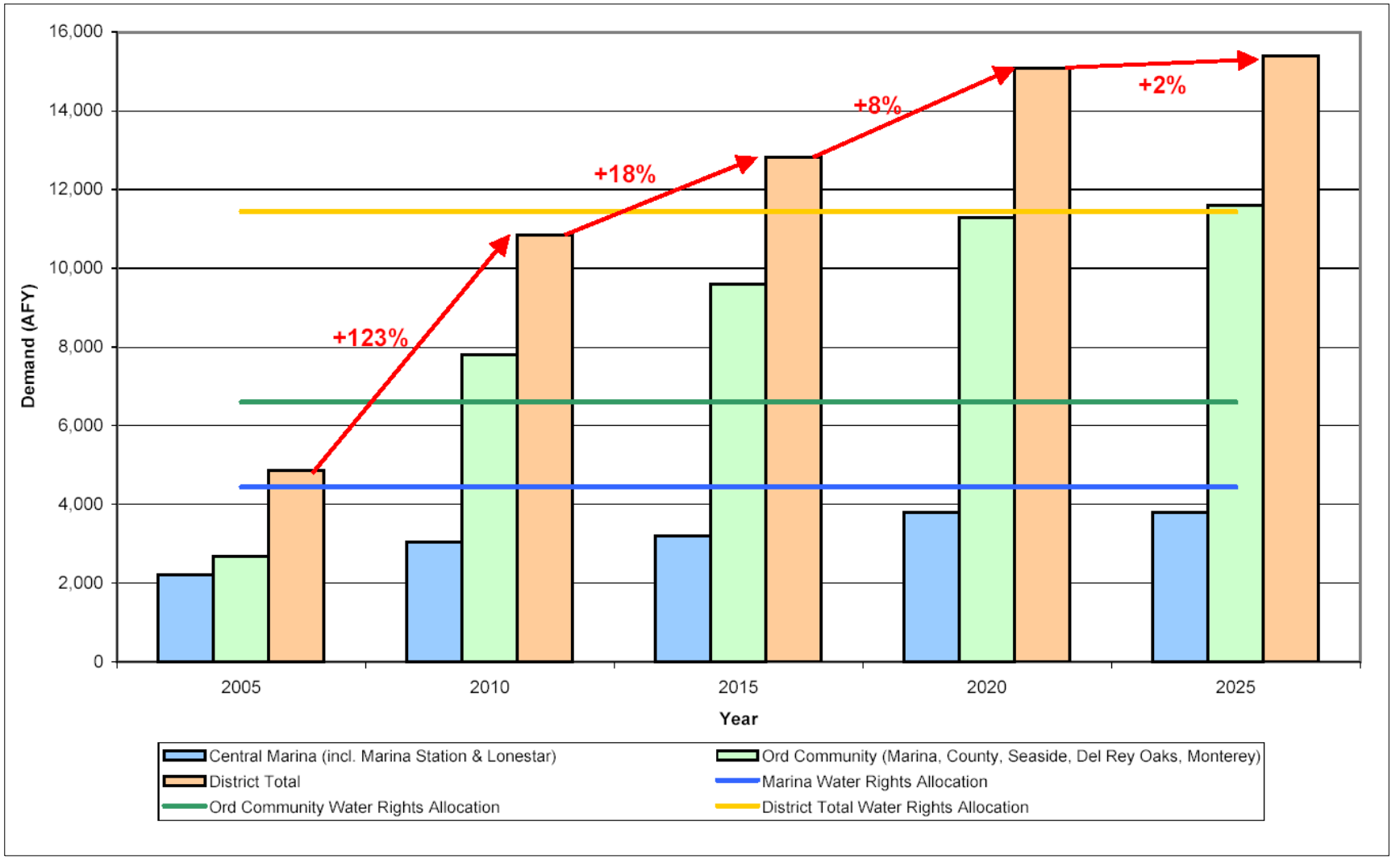

Figure 4.2
WATER DEMAND PROJECTIONS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

Table 4.3 Water Demands Based on Land Use (AFY)
Water Systems Master Plan
Marina Coast Water District

Jurisdiction	2004 (AFY)[2]	2005 (AFY)	2010 (AFY)	2015 (AFY)	2020 (AFY)	2025 (AFY)
Former Fort Ord						
CSUMB	602	677	920	1,081	1,150	1,192
Del Rey Oaks	0	0	472	762	837	838
City of Monterey	0	53	78	94	110	126
Co. of Monterey	1	1	569	682	1,209	1,209
UCMBEST	4	4	561	735	942	1,187
City of Seaside	525	525	1,221	1,238	1,984	1,984
U.S. Army	529	529	1,102	1,659	1,659	1,659
St. Parks and Rec.	0	0	0	0	45	45
Marina Ord Comm.	302	302	2,309	2,773	2,773	2,773
Marina Sphere	0	0	0	0	0	0
FORA Strat. Res.	0	0	0	0	0	0
Assumed line loss	457	578	578	578	578	578
Subtotal	**2,420**	**2,669**	**7,809**	**9,602**	**11,287**	**11,592**
Marina						
Armstrong Ranch	0	0	680	680	680	680
RMC Lonestar	0	0	0	0	500	500
Marina - Central	2,266	2,200	2,366	2,534	2,617	2,632
Subtotal	**2,266**	**2,200**	**3,046**	**3,214**	**3,797**	**3,812**
Total	**4,686**	**4,869**	**10,855**	**12,816**	**15,084**	**15,404**

Notes:
(1) Adapted from Table 3.4 of UWMP for average day demands.
(2) AFY = Acre-feet per year

Table 4.4 Water Demands Based on Land Use (gpm)
Water Systems Master Plan
Marina Coast Water District

Jurisdiction	2004 (GPM)[2]	2005 (GPM)	2010 (GPM)	2015 (GPM)	2020 (GPM)	2025 (GPM)
Former Fort Ord						
CSUMB	373.2	419.7	570.4	670.2	713.0	739.0
Del Rey Oaks	0.0	0.0	292.6	472.2	518.7	519.5
City of Monterey	0.0	32.5	48.4	58.3	68.2	78.2
Co. of Monterey	0.6	0.6	352.4	422.5	749.5	749.5
UCMBEST	2.5	2.5	347.6	456.0	583.7	736.1
City of Seaside	325.5	325.5	757.2	767.8	1,230.3	1,230.3
U.S. Army	328.0	328.0	682.9	1,028.2	1,028.2	1,028.2
St. Parks and Rec.	0.0	0.0	0.0	0.0	27.9	27.9
Marina Ord Comm.	187.2	187.2	1,431.6	1,719.2	1,719.2	1,719.2
Marina Sphere	0.0	0.0	0.0	0.0	0.0	0.0
FORA Strat. Res.	0.0	0.0	0.0	0.0	0.0	0.0
Assumed line loss	283.3	358.3	358.3	358.3	358.3	358.3
Subtotal	**1,500.3**	**1,654.4**	**4,841.5**	**5,952.7**	**6,997.2**	**7,186.3**
Marina						
Armstrong Ranch	0.0	0.0	421.6	421.6	421.6	421.6
RMC Lonestar	0.0	0.0	0.0	0.0	310.0	310.0
Marina - Central	1,404.8	1,364.0	1,466.7	1,571.2	1,622.5	1,631.8
Subtotal	**1,404.8**	**1,364.0**	**1,888.3**	**1,992.8**	**2,354.1**	**2,363.4**
Total	**2,905.1**	**3,018.4**	**6,729.8**	**7,945.5**	**9,351.3**	**9,549.7**

Notes:
(1) Adapted from Table 3.4 of UWMP for average day demands.
(2) GPM = Gallons per minute

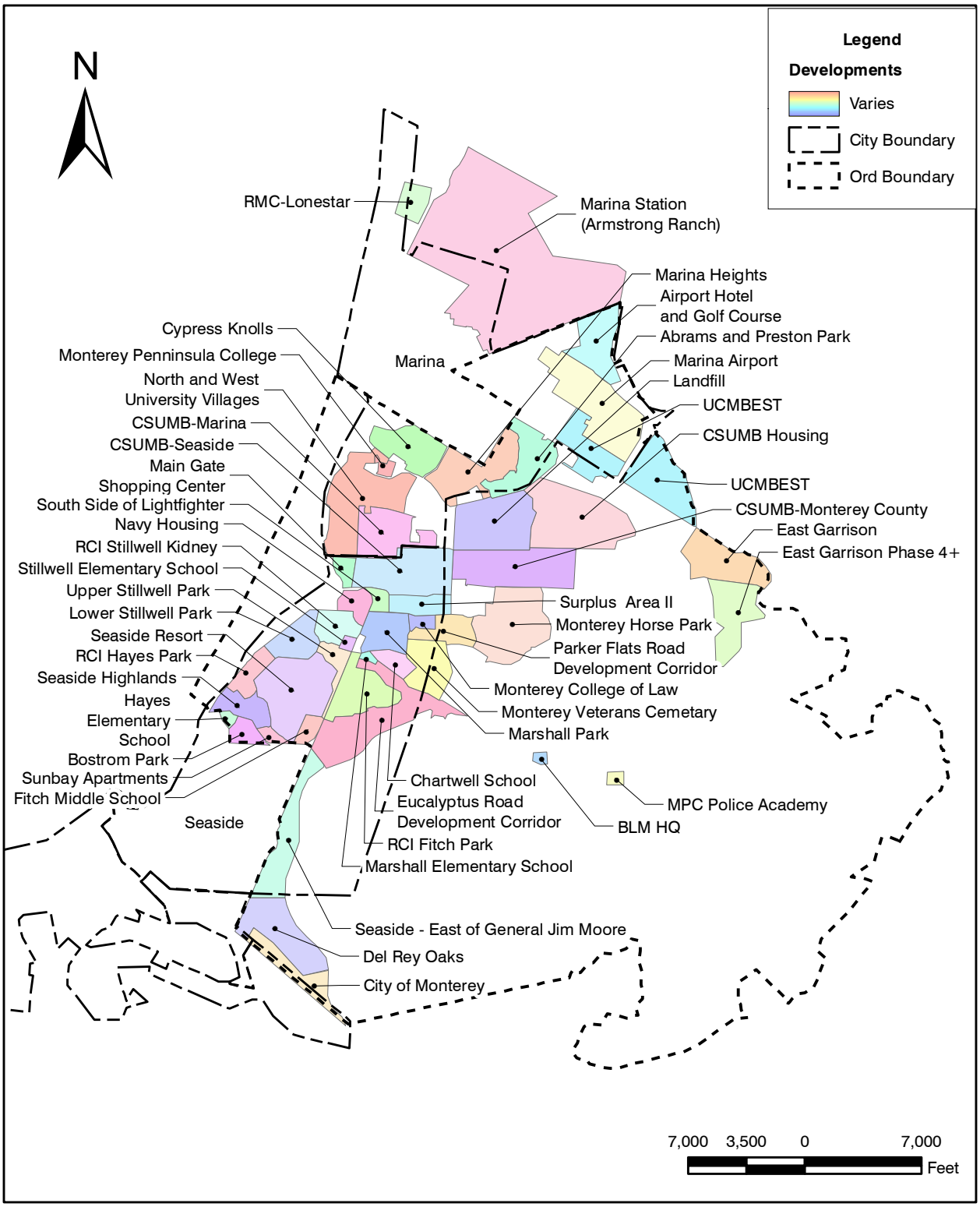

Figure 4.3
DEVELOPMENTS WITHIN THE DISTRICT
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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November 5, 2006

Chapter 5

SUPPLY AND STORAGE EVALUATION

This chapter presents the results of the capacity evaluation of the water supply, distribution, and storage facilities. The chapter also presents improvements to mitigate existing system deficiencies and for servicing future growth. These improvements are recommended based on the system's technical requirements, cost effectiveness, and operational reliability. In this chapter, and in the Hydraulic Analysis (Chapter 6), and Capital Improvement Program (CIP) that follow, it is assumed that all water demands will be met through groundwater sources. To meet these demands in this manner, the District would need to obtain additional water allocations. Alternative water supply sources (recycled water and desalination) and the impacts of water augmentation, are discussed in Chapter 9.

5.1 SUPPLY CAPACITY

The District's total supply capacity from the existing six groundwater wells is estimated at 11,550 gallons per minute (gpm). The District also has a firm supply capacity of 9,150 gpm with the largest well out of service. The District-wide supply analysis, summarized in Table 5.1, indicates that the current maximum day demand is 4,528 gpm. The District is not anticipated to experience a supply deficiency until Year 2009. However, a 5,175 gpm deficiency is anticipated by the end of the planning horizon if the District's currently supply capacity does not change.

Table 5.1 Storage Requirements Year 2025 Water Systems Master Plan Marina Coast Water District

Year	MDD[(1)] (gpm)[(2)]	Cumulative Deficiency (-) / Surplus (+)[(3)] (gpm)	Cumulative No. of New Wells[(4)]	Cumulative Increased Firm Capacity (gpm)	Cumulative New Firm Capacity (gpm)
2005	4,528	+4,622	0	0	9,150
2010	10,095	-945	2	1,850	11,000
2015	11,918	-2,768	3	3,350	12,500
2020	14,027	-4,877	5	6,350	15,500
2025	14,325	-5,175	5	6,350	15,500

Notes:
(1) MDD = Maximum day demand.
(2) gpm = Gallons per minute.
(3) Based on existing capacity of 9,150 gpm.
(4) A new well is assumed to have the capacity of 1,500 gpm except for Well No. 33 (350 gpm).

Assuming the existing wells will remain in service at their current capacities, and will not be impacted by seawater intrusion or contamination, the total recommended increase in the source of supply through the planning horizon of Year 2025 is 6,150 gpm. This increase in capacity will give the District a total supply capacity of 17,900 gpm and a firm supply capacity of 15,500 gpm. Figure 5.1 illustrates the relationship between supply and demand throughout the planning horizon. It is recommended that the District construct a total of five new wells, with an approximate individual average capacity of 1,500 gpm (except for Well 33 with a 350 gpm capacity). However, if the existing wells become contaminated beyond wellhead treatment facilities will have to be constructed in order to maintain continuing service.

5.1.1 Water Rights

Water rights ensure that all users of a basin receive are supplied with water. Users can include municipalities such as Marina Coast Water District (MCWD), agricultural users, commercial/industrial users, and typically include a base supply that remains unallocated. Water rights are adjudicated by a governing agency so as not to irreparably harm the environment through overdraft conditions. Overdraft conditions can increase seawater intrusion, reduce flow in waterways, and increase the spread of contamination. Groundwater production in the regional area is managed by the Monterey County Water Resources Agency (MCWRA) in the Salinas basin and the Monterey Peninsula Water Management District (MPWMD) in the Seaside basin. Water allocations in the Salinas Valley groundwater basin in the Ord Community are assigned by the Fort Ord Reuse Authority (FORA).

The District currently has approximately 9,620 acre-feet per year (AFY) in water rights through its member jurisdictions in the Salinas groundwater basin. In addition, the District has 300 AFY in water rights for its idle desalination plant and will acquire an additional 1,420 AFY in groundwater rights from Marina Station (Armstrong Ranch) and Lonestar developments. These allocations will be added to the District when the developments are annexed into the District. At that time the District will have a total water allotment of 11,040 AFY that includes groundwater and the idle desalination plant. Table 5.2 summarizes the District's water rights. Furthermore, water allocations are restricted to designated service areas. For example, by agreement, the water provided to the Ord Community cannot exceed 6,600 AFY. Water designated for one service area cannot be used to satisfy demands in another. This is important because the water allocation for Central Marina exceeds projected demands, but projected demands in Ord Community will exceed the allocation. The District plans to mitigate the Ord Community deficiency through its water augmentation project, which includes recycled water and increased desalination supplies. Another method to mitigate part of the Ord Community deficiency is to formally annex the Ord service area into the District through the Local Agency Formation Commission (LAFCO) process. Further discussion of the District's water rights can be found in the 2005 Urban Water Management Plan (December 2005).

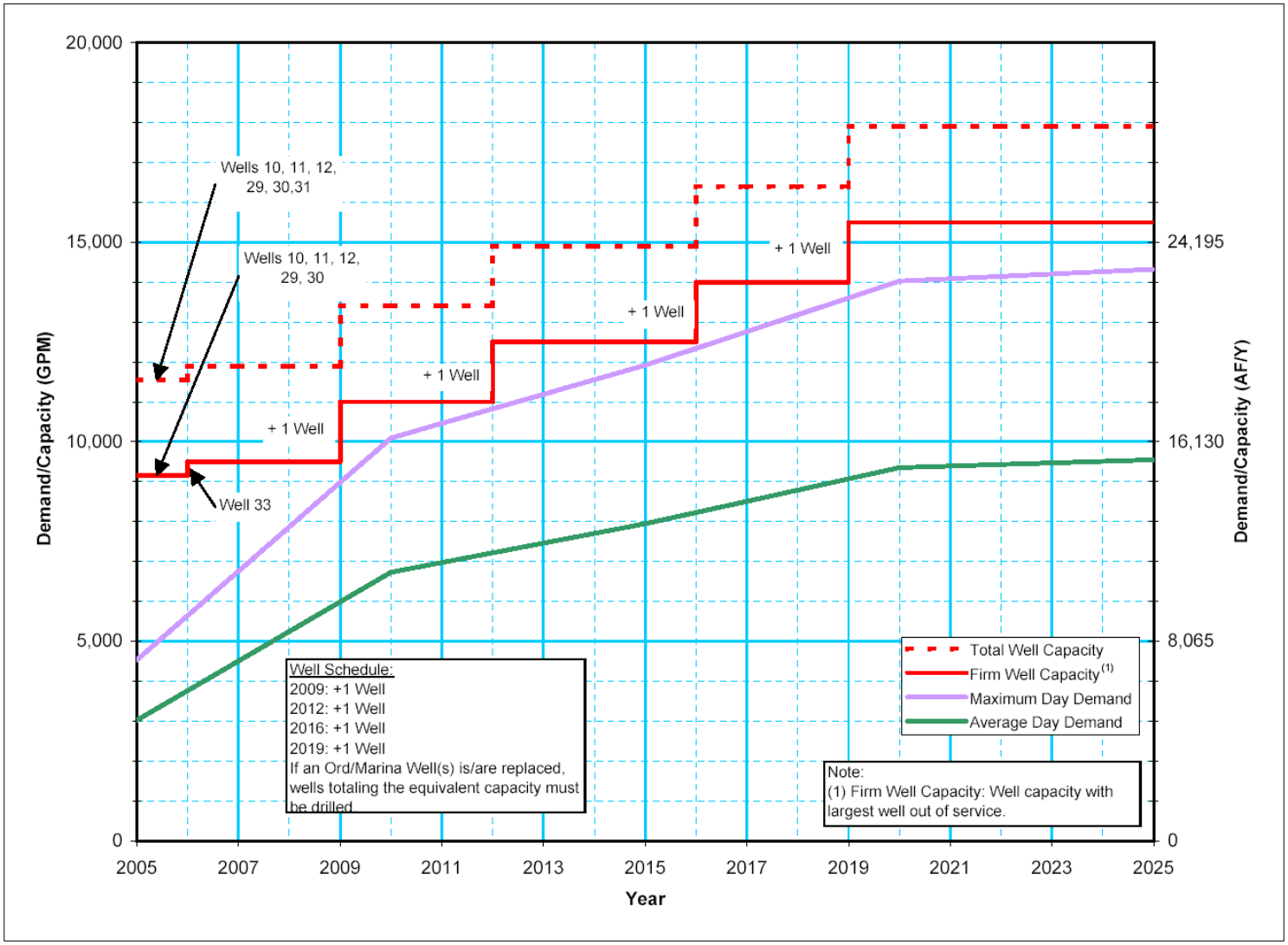

Figure 5.1
WELL TIMING
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

Table 5.2 Water Rights Summary Water Systems Master Plan Marina Coast Water District		
Jurisdiction	**Allotment (AFY)[3]**	**Allotment (gpm)[4]**
Groundwater		
Marina		
Central Marina by Agreement with MCWRA	3,020	1,872
Armstrong Ranch	920	570
Lonestar Property	500	310
Marina Subtotal	*4,440*	*2,752*
Ord Community		
City of Marina	1,175	729
City of Seaside	862	534
CSUMB	1,035	642
UCMBEST	230	143
City of Del Rey Oaks	92.5	57
City of Monterey	65	40
Monterey County	560	347
US Army	1,577	978
County/State Parks	45	28
City of Marina (Sphere)	10	6.2
Allowance for line losses (10%)	535	332
FORA Strategic Reserve	413.5	256
Ord Community Subtotal (rounded)	*6,600*	*4,092*
Groundwater Total	***11,040***	***6,844***
Desalination		
MCWD Desalination Plant (idle)[5]	300	186
Total	**11,340**	**7,030**

Notes:
(1) Adapted from Table 2.1 of the UWMP.
(2) Not including 150 AFY in loans from FORA Strategic Reserve for Del Rey Oaks, Marina, Monterey County, and Seaside.
(3) AFY = Acre-feet per year.
(4) GPM = Gallons per minute.
(5) Permitted supply that could be restored.

The Blackhorse Golf Course operates a well to irrigate the golf course. This well is located in the Seaside basin and is not part of the District's allocation. However, the golf course is planning to use recycled water for irrigation making the well unnecessary. It is unknown

what plans the City of Seaside has for this well but by agreement with the MPWMD, the District is unable to supply water from this well to the Ord Community.

5.1.2 Water Augmentation

As described above, the District plans on accumulating water rights of approximately 11,340 AFY. This amount is insufficient for build-out demand as projected in the Urban Water Management Plan (UWMP). At build-out in Year 2025, it is projected that the District needs 15,404 AFY of water. The shortage of 4,064 AFY would be made up by water augmentation. The current 3,000 AFY water augmentation project for the District includes the following:

- 300 AFY of desalinated water by activating the District's currently idle desalination plant.
- 1,200 AFY of recycled water use in the Ord Community.
- 1,200 AFY of desalinated water for the Ord Community from a regional desalination plant.
- 300 AFY of recycled water for MCWRA customers on the Monterey Peninsula.

The project will add 300 AFY to Marina supplies in the short term and result in a net 2,400 AFY for the Ord Community. Following the construction of the regional desalination plant the District's plant will be retired. The project has been endorsed by both the MCWD and FORA board of directors. Should the water augmentation project be implemented, the water rights shortage will be reduced significantly to 1,364 AFY, at which time other projects (e.g. increased conservation, increased recycled water usage) could eliminate the shortage all together. A hydraulic analysis of the proposed water augmentation project is discussed in more detail in Chapter 9 of this Master Plan Report.

5.2 STORAGE CAPACITY

The District's current storage reservoirs provide a total of 10.3 million gallons (MG) for servicing the District's operational, fire, and emergency needs. Using the storage criteria discussed previously in Chapter 3 and the water demands presented in the UWMP, storage requirements were calculated for each pressure zone. Table 5.3 presents the storage requirements through the planning horizon of Year 2025. A total of 19.7 MG is required, indicating a deficiency of approximately 9.4 MG. Table 5.4 presents a comparison of available storage to required storage. Only Zone C has a surplus of storage. The large increase in storage required is expected due to the significant development of the former Fort Ord.

Table 5.3 Storage Requirements Year 2025 Water Systems Master Plan Marina Coast Water District					
Zone	MDD[1] (mgd)	Operational Storage[2] (MG)	Emergency Storage[3] (MG)	Fire Flow Storage[4] (MG)	Total Storage (MG)
A	6.3	1.6	3.2	1.0	5.7
B	7.6	1.9	3.8	1.0	6.6
C	3.2	0.8	1.6	1.0	3.4
D	3.7	0.9	1.8	0.5	3.3
E	0.7	0.2	0.4	0.2	0.7
Total	**21.5**	**5.4**	**10.7**	**3.6**	**19.7**

Notes:
(1) MDD = Maximum day demand.
(2) Operational Storage = 0.25 x MDD.
(3) Emergency Storage = 0.5 x MDD.
(4) Fire flow = one 4,000 gpm (4 hour) event in Zone B, one 3,000 gpm (3 hour) event in Zones A, C, and D, and one 1,500 gpm (2 hour) event in Zone E.

Table 5.4 Available vs. Required Storage Water Systems Master Plan Marina Coast Water District			
Zone	Available Storage (MG)	Storage Required (MG)	Deficiency (-) / Surplus (+) (MG)
A	2.0	5.7	-3.7
B	2.0	6.6	-4.6
C	4.0	3.4	+0.6
D	2.0	3.3	-1.3
E	0.25	0.7	-0.45
Total	**10.3**	**19.7**	**-9.4**

Note:
(1) MDD = Maximum day demand.

5.2.1 Proposed Storage Reservoirs

It is anticipated that 14.4 MG of storage will be constructed through the planning horizon. This is greater than the deficiency of 9.4 MG due to the need to replace Reservoir 2 and Reservoir D. A condition assessment of Reservoir 2 in Zone A led to the recommendation of removal of the existing tank coating and application of a new tank coating. This coating Project would have a relatively high cost and the reservoir will have a limited service life. Reservoir D is in poor structural condition and has been limited to operating at half its capacity. A replacement for Reservoir D has already been designed and will be constructed in the near future. Table 5.5 presents the recommended reservoir sizing. A description of the proposed reservoirs is as follows:

- Reservoirs A1/A2 are projected to be 2 – 2.1 MG reservoirs (each). The reservoirs are likely to be located near the intersection of 3rd Street and the 8th Street Cut-Off on property transferred from CSUMB to the District.
- Reservoir A3 is projected to be a single 1.6 MG reservoir. The location of Reservoir A3 is not known at this time.

Table 5.5 Projected Reservoir Sizing Water Systems Master Plan Marina Coast Water District

Reservoir	Diameter per Reservoir (Feet)	Height per Reservoir (Feet)	Volume per Reservoir (MG)[1]	Total Volume (MG)	Max WSE[4] (Feet)
A1/A2	133	20	2.08	4.16	230
A3	116	20	1.58	1.58	230
B2[2]	97	20	1.11	1.11	314
B4/B5	116	20	1.58	3.16	315
D1/D2[3]	137	20	2.21	4.42	501
Total				**14.43**	

Notes:
(1) MG = million gallons.
(2) Does not include storage for the portion of Zone B to be served by the Coe Avenue PRV.
(3) Includes storage for Zones D, E, and a portion of Zone B to be served by the Coe Avenue PRV.
(4) WSE = water surface elevation.

- Reservoir B2 is proposed to be a single 1.1 MG reservoir, located adjacent to Reservoir B1.
- Reservoirs B4/B5 are proposed to be 2 – 1.6 MG reservoirs, located west of the East Garrison development and south of Inter-Garrison Road. Reservoirs B4/B5 are currently in design.
- Reservoirs D1/D2 are proposed to be 2 – 2.2 MG reservoirs to be located at the existing Reservoir D location. Reservoirs D and E will be demolished and replaced with the new reservoirs. Reservoir D1/D2 are currently in design and will have a service area that includes Zones D, E, and small portion of Zone B served by the Coe Avenue PRV.

Chapter 6

HYDRAULIC ANALYSIS

This chapter presents the results of the capacity evaluation of the water supply, distribution, and storage facilities. The chapter also presents improvements to mitigate existing system deficiencies and for servicing future growth. These improvements are recommended based on the system's technical requirements, cost effectiveness, and operational reliability.

6.1 HYDRAULIC ANALYSIS

The role of a hydraulic model is to identify hydraulic deficiencies in the District's distribution system and simulate the effect of future growth and new water sources. This section will discuss the development and calibration of the hydraulic model and will identify system deficiencies under existing and future demand conditions.

6.1.1 Model Development and Calibration

The distribution system model was developed using H2OMapWater by MWH Soft. The District gave Carollo two preliminary models set-up in WaterCAD by Bentley. These two models were updated to reflect recent improvement projects, combined into one model, and then converted to H2OMapWater. Other data necessary for model development including manufacturer pump curves, Supervisory Control and Automated Data Acquisition (SCADA) data, pump control data, and hydrant test results was obtained from the District. Carollo completed development of the model as described herein. A hydraulic profile of the existing system is illustrated in Figure 6.1.

6.1.1.1 Model Inconsistency

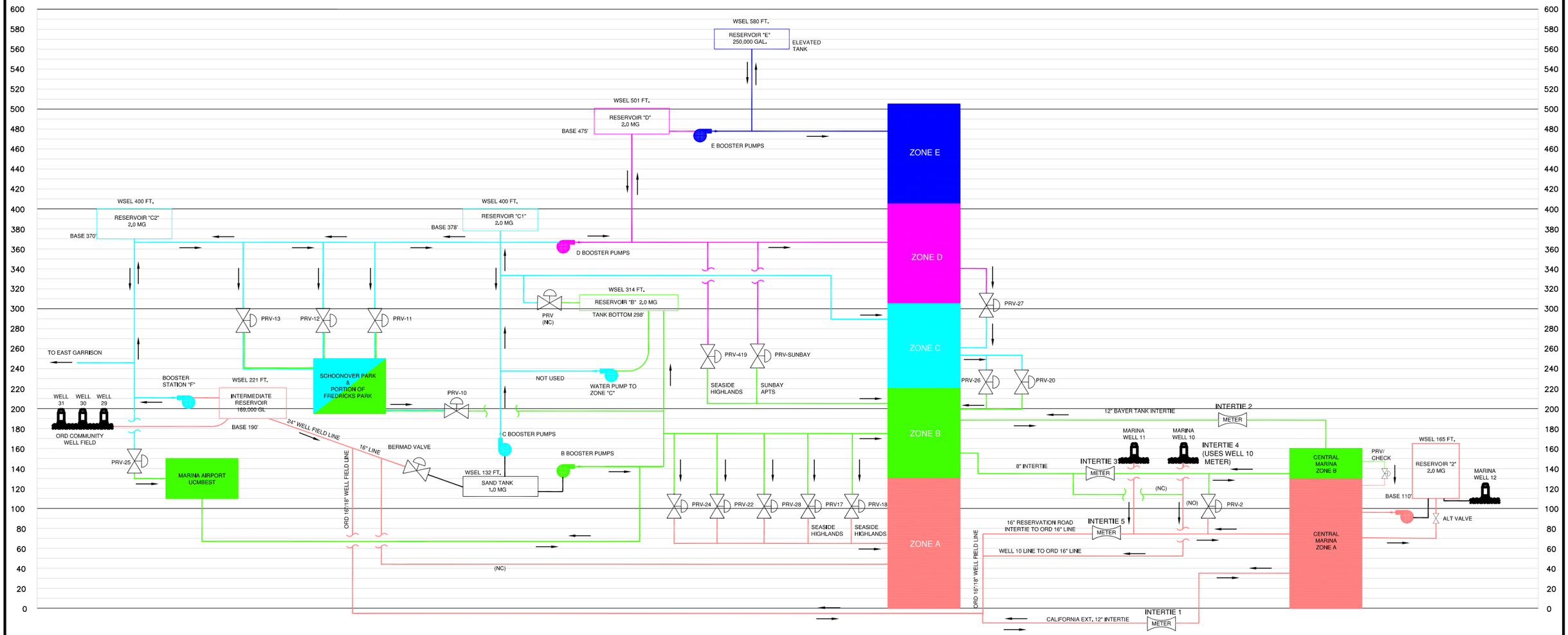
Model inconsistencies were checked and corrected with District-provided AutoCAD and Geographic Information Systems (GIS) data (i.e., system maps, development maps). In addition, recently constructed pipes and appurtenances were incorporated into the model. When possible, manufacturer pump curves were used in the model. In the event that no manufacturer pump curve was available, the pump curve from the previous hydraulic model was used.

6.1.1.2 Distribution of Water Demands

The water demands projected in Chapter 4 were distributed and input into the model using GIS techniques. Distribution of demands was performed using land use and development information from the Urban Water Management Plan (UWMP). Where possible, the jurisdictional survey from the UWMP was used to distribute the demands since it provided a convenient and accurate link between demands and location. Some of the jurisdictions and developments found in the UWMP were illustrated earlier in Figure 4.3. If jurisdictional

ORD COMMUNITY WATER SYSTEM

MARINA WATER SYSTEM



LEGEND

PRESSURE ZONE	MAX HGL	SERVICE ELEVATION
ZONE-A	221'	0'-130'
ZONE-B	314'	130'-220'
ZONE-C	400'	220'-305'
ZONE-D	501'	305'-405'
ZONE-E	580'	405'-505'

⚠ REVISED 8/8/05 BY MJW TO CONSTRUCTION PLANS

REV	DATE	BY	DESCRIPTION

DESIGNED JN
DRAWN ALG
CHECKED
DATE NOVEMBER 2006

DISCIPLINE ENGINEER
PROJECT ENGINEER
PARTNER

carollo engineers

MARINA COAST WATER DISTRICT

MARINA COAST WATER DISTRICT

WATER SYSTEMS MASTER PLAN

EXISTING SYSTEM HYDRAULIC PROFILE

NOT TO SCALE

JOB NO. 7259A.00

FIGURE NO. 6.1

SHEET NO. OF

survey information was not available (e.g., Central Marina), land use on a parcel level was used in the demand distribution process.

6.1.1.3 Calibration

The model was calibrated using SCADA data as well as residual and static hydrant test data from September 2005. Residual hydrant testing results in stressing the water system and allows for a potentially more accurate model. Hydrant testing involves measuring the pressure drop across two nearby hydrants when one is opened. The hydrant flow, static and residual pressures, and SCADA data were then used to calibrate the model. SCADA data used include well production, reservoir level, and booster pump operation. Figure 6.1 illustrates the locations of static and residual hydrant testing. Table 6.1 summarizes the calibration using the residual hydrant testing.

This calibration process resulted in a hydraulic model that should be considered adequately calibrated. Six of the seven residual hydrant testing locations have a static pressure differential of less than 5 percent. In addition, five of the seven locations have a residual pressure differential of less than 5 percent. Hydrant No. 33 in Zone E observed a calibration greater than 5 percent and can be explained by small differences in the pump curves. Hydrant No. 40 in Zone C observed a measured residual pressure differential of 10.1 percent below modeled. This can be explained by the fact that the testing and modeled pipeline are different diameters. The testing occurred on a 6-inch pipeline but this pipe is not included in the hydraulic model. The closest pipeline in the model is a 24-inch pipeline. Since more headloss is expected through a 6-inch pipeline, there should be a lower measured residual pressure.

6.1.2 Results of Hydraulic Analysis

The hydraulic network model was used to evaluate whether the existing distribution system, without improvements, was adequate to meet the pressure, headloss, and velocity criteria presented in Chapter 3. Components that did not meet the criteria were noted as deficiencies. Deficiencies include:

- Extremely low or high pressures at nodes.
- High velocity or high headloss in pipelines.

The hydraulic network model was run under the following existing (2005) conditions to evaluate the distribution system performance:

- Maximum day demand.
- Peak hour demand.
- Maximum day demand plus fire flow.

Table 6.1 Model Calibration
Water Master Plan
Marina Coast Water District

Hydrant No.	Zone	Cross Streets	Location	Modeled Junction	Hydrant Testing										
					Operational Information		Static Pressure				Residual Pressure				
					Pumps On/Off	Measured Reservoir Level	Measured Pressure (psi)	Modeled Pressure (psi)	Pressure Difference (psi)	% Diff (%)	Measured Discharge (gpm)	Measured (psi)	Modeled (psi)	Difference (psi)	% Diff (%)
3	A	Beach Rd. & Fitzgerald Cir.	Approximately 170 feet SE of intersection	J-78	Pumps Off	Int Res. @ 19 ft	65	63	-2	-3.1%	1,045	40	39	-1	-2.5%
10	A	Carmel Ave. & Bradley Cir.	NE corner of T-intersection	J-1244	Well #11 On	Int Res. @ 21 ft	49	47	-2	-4.1%	823	37	38	+1	+2.7%
14	B	Reservation Rd. & Imjin Rd.	Approximately 820 feet NE of intersection	J-285	Pumps Off	Res. B1 @ 11 ft	71	69	-2	-2.8%	1,007	51	49	-2	-3.9%
28	B	Coe Rd. & Leinbach Ave.	Approximately 625 feet E of intersection	J-9500	Pumps Off	Res. B1 @ 11 ft	85	84	-1	-1.2%	1,113	70	73	+3	+4.3%
33	E	Remagen Rd. & Tunisia Rd.	Approximately 230 feet NE of intersection	J-506	E-1 On	Res. E @ 24 ft	80	85	+5	+6.3%	1,210	24	22	-2	-8.3%
36	D	Normandy Rd. & Brittany Rd.	S side of intersection	J-408	Pumps Off	Res. D @ 10 ft	80	77	-3	-3.8%	1,910	61	63	+2	+3.3%
40[(1)]	C	6th Ave. & 8th St.	Approximately 250 feet S of intersection	J-343	C-4 On	Res. C1 @ ft	89	89	0	0.0%	1,350	79	87	+8	+10.1%

Note:
(1) Hydrant test performed on 6-inch pipe whereas model reflects a 24-inch pipe. Additional headloss would be expected in 6-inch pipe resulting in a lower residual pressure.

6.1.2.1 Maximum Day Demand Analysis

The existing distribution system performed well under maximum day demand conditions. All deficiencies were located in Zone A. The following areas were deficient under the maximum day demand analysis:

- Marina Zone A - higher elevation areas.
- Ord Marina - 5th Avenue and 9th Street area.
- Ord Marina - 3rd Avenue and 9th Street area.

Low pressures in Marina Zone A are anticipated to be relieved by current projects. The current projects include the California Avenue Pipeline Extension and the Reservation Road Pipeline.

6.1.2.2 Peak Hour Demand Analysis

The existing distribution system performed similarly well under peak hour demand conditions. The locations deficient under the maximum day demand analysis were also deficient under peak hour demand conditions. The following areas were deficient under the peak hour demand analysis:

- Marina Zone A - higher elevation areas.
- Ord Marina - 5th Avenue and 9th Street area.
- Ord Marina - 3rd Avenue and 9th Street area.

6.1.2.3 Maximum Day Demand Plus Fire Flow Analysis

In the event of a fire, the distribution system must be able to provide adequate fire flow throughout the entire District. To evaluate system response to a fire, 66 nodes were selected and individually tested using existing maximum day demands plus fire flow. Fire nodes were selected based on surrounding land use and separated into three categories: residential, neighborhood/light commercial, and commercial/industrial. A fire flow was then applied according to the land use nearby. As described in Chapter 3, residential nodes were tested with a 1,500 gallons per minute (gpm) fire flow, neighborhood/light commercial nodes with 3,000 gpm fire flow, and commercial/industrial nodes with 4,000 gpm fire flow. Figure 6.2 illustrates the location of the fire nodes. The following locations were modeled as deficient under existing maximum day demand plus fire flow conditions:

- Reams Court (Marina) - 1,500 gpm fire flow.
- California State University Monterey Bay (CSUMB) Main Campus - 4,000 gpm fire flow.
- Los Arboles Middle School - 3,000 gpm fire flow.
- Marina Airport - 4,000 gpm fire flow.

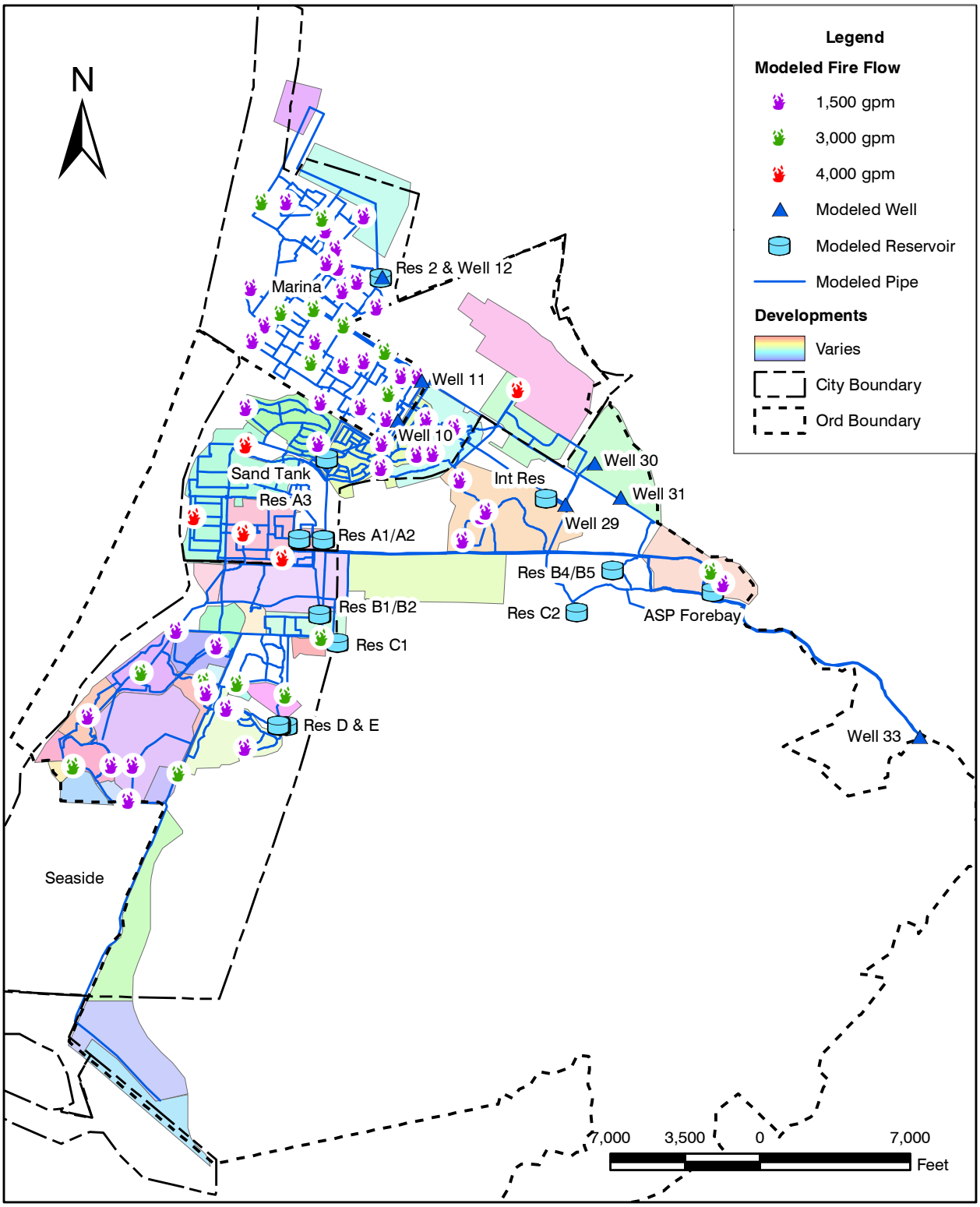


Figure 6.2
FIRE FLOW NODES
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

- Seaside Resort - 1,500 gpm fire flow.
- Reindollar Avenue and Eddy Street (Marina) - 1,500 gpm fire flow.
- Ellen Court (Marina) - 1,500 gpm.

The fire flow deficient areas included four locations in the Marina water system and three locations in the Ord water system. In general, the existing system performed well under fire flow conditions.

6.1.3 Modeling of Future System and Projected Demands

The hydraulic model was then used to evaluate the future system with increased demands and development. Projected demands were based on the UWMP as discussed earlier in Chapter 4. The future system included increased demands, new pipes, new pump stations, and new reservoirs. The new facilities will add service to proposed developments as well as address pump station and reservoir storage capacity deficiencies brought about by increased growth. Facilities were included to accommodate development until the planning horizon of Year 2025. The future system configuration is illustrated in Figure 6.3 and a hydraulic profile is illustrated in Figure 6.4.

6.1.3.1 System Operation

The system is expected to undergo a dramatic shift in operation. Currently, all Ord well water must pass through the Intermediate Reservoir before continuing on to Marina or the Sand Tank and Booster Pump Station where water is boosted to higher pressure zones. Due to a combination of increased well contamination, poor condition of the Main Booster Pump Station, and anticipated development of the Eastern Well Field, major facilities will be demolished and relocated. The Intermediate Reservoir, Sand Tank, and Main Booster Pump Station are envisioned to be replaced by Reservoir A1/A2 and B/C Booster Pump Station, and the Well No. 33 Project. The Well No. 33 Project includes transmission mains from the Eastern Well Field, a forebay and A/B booster pump station at the Ammo Supply Point building (East Garrison), and transmission mains to the A and B Zones. More detail on the Well No. 33 Project can be found in the Well No. 33 and Well Field Project Preliminary Design Report (Carollo, June 2006). The new operation of the system is expected to increase system reliability and redundancy.

6.2 RECOMMENDED IMPROVEMENTS

Based on the evaluation criteria discussed in Chapter 3, the hydraulic model was used to further evaluate the capacity of the existing distribution system. The hydraulic model evaluation consisted of 24-hour simulations during normal operations of a maximum day demand condition. The maximum day demand, the highest daily demand in the year, also includes the maximum anticipated hour demand. Extended period simulations were also used to verify the operational adequacy of the proposed storage tanks.

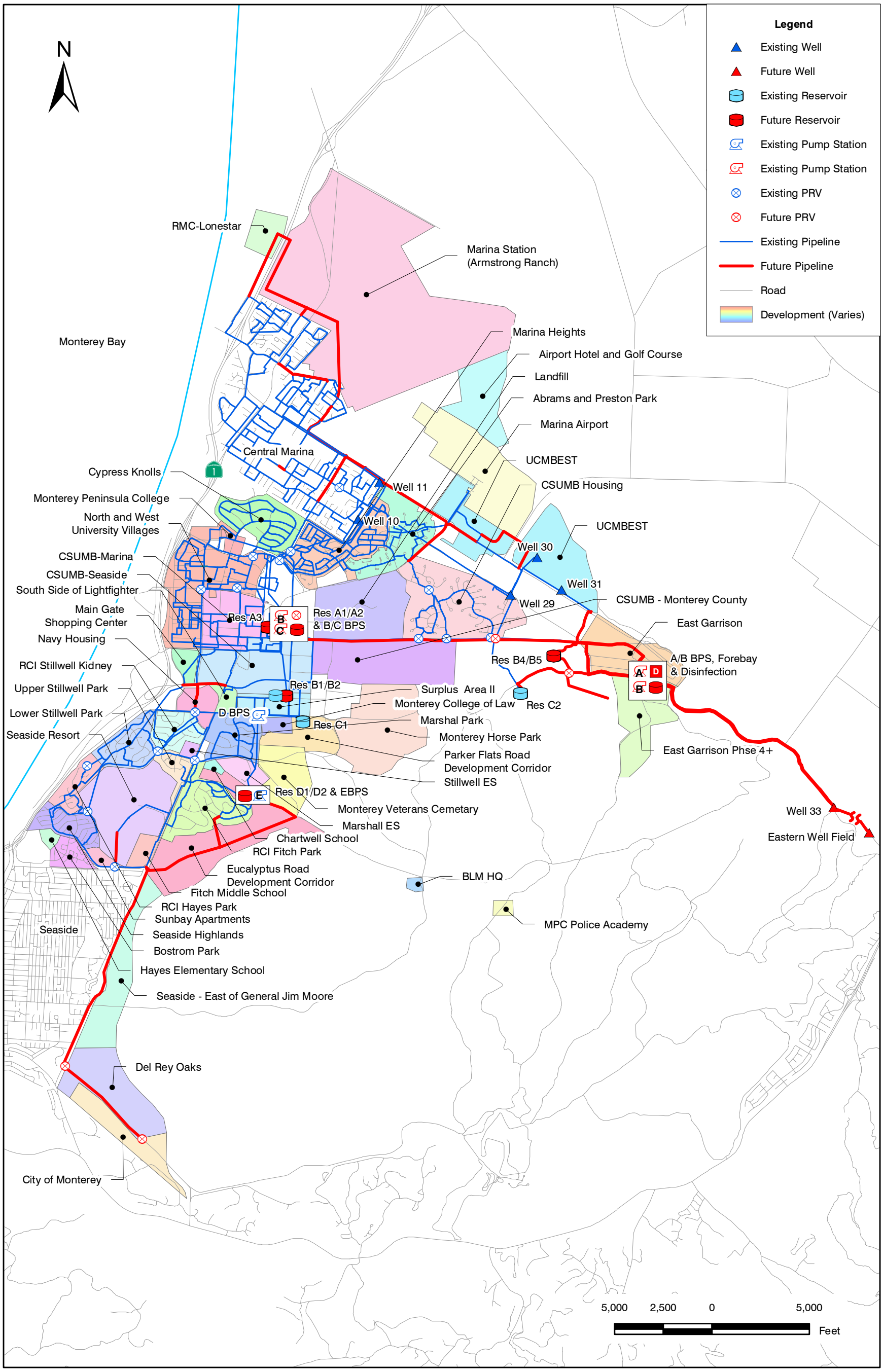

Figure 6.3
FUTURE SYSTEM CONFIGURATION
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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January 31, 2007

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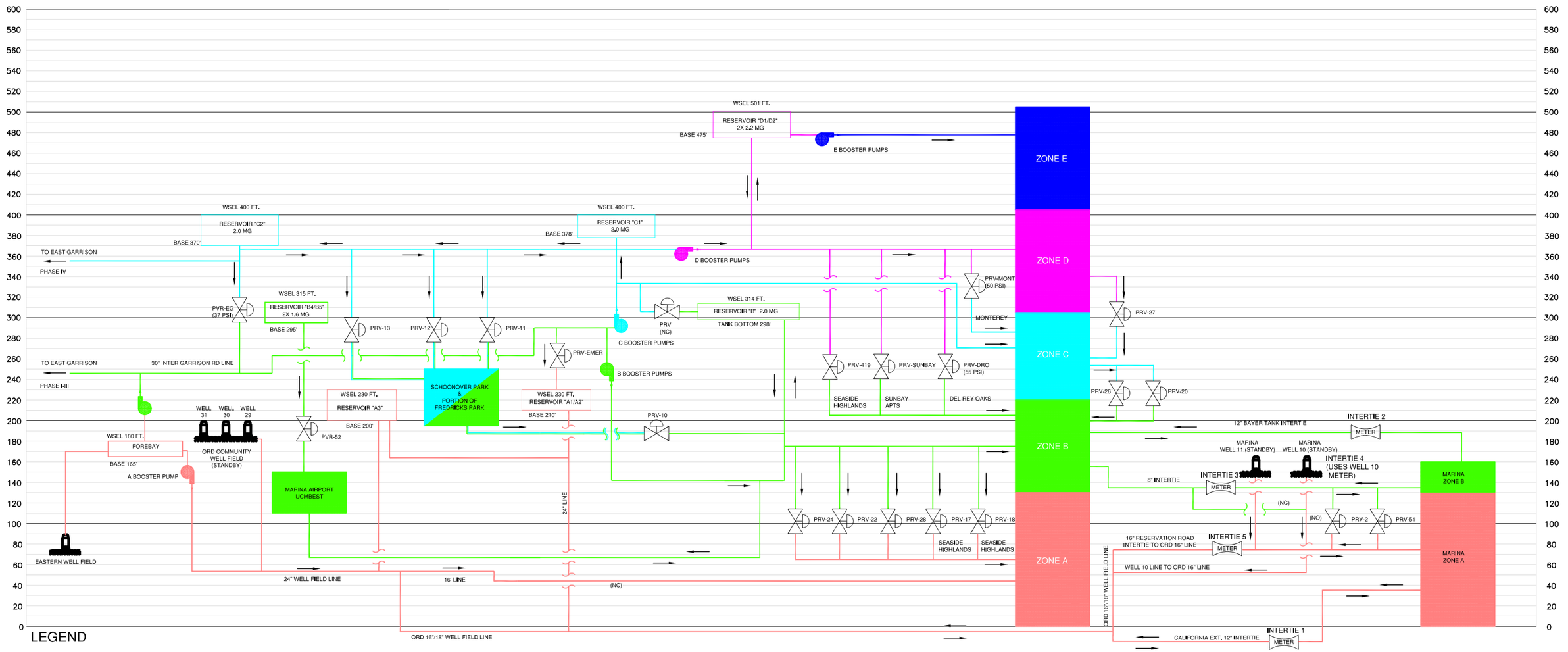
MARINA WATER SYSTEM



LEGEND

PRESSURE ZONE	MAX HGL	SERVICE ELEVATION
ZONE-A	230'	0'-130'
ZONE-B	314'	130'-220'
ZONE-C	400'	220'-305'
ZONE-D	501'	305'-405'
ZONE-E	580'	405'-505'

REV	DATE	BY	DESCRIPTION

DESIGNED JN
DRAWN ALG
CHECKED
DATE NOVEMBER 2006

DISCIPLINE ENGINEER

PROJECT ENGINEER

PARTNER

carollo engineers

MARINA COAST WATER DISTRICT

MARINA COAST WATER DISTRICT

WATER SYSTEMS MASTER PLAN

FUTURE SYSTEM HYDRAULIC PROFILE

NOT TO SCALE

JOB NO. 7259A.00

FIGURE NO. 6.4

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6.2.1 Project Information

Project specific information was developed for each improvement and includes the following:

- Project No.: Number of improvement and name.
- Trigger: Identifies the number of equivalent dwelling units (EDU) that can be built before project is needed. A trigger of zero EDU's indicates an immediate need where as a trigger of 100 EDU's indicates that the existing system has the ability to support 100 EDU's before impairing the system. Where applicable the development where the project is located is indicated.
- Water System: Identifies the water system, Marina or Ord, that the project is located in.
- Benefit: An opinion of benefit to existing and future users. Most projects benefit either existing or future users. Some improvements were assigned a number between 0 and 100 percent indicating that the benefit is shared between existing and future users.

  It should be noted that these opinions are based on preliminary project information. Once estimates for specific projects are completed, a more precise allocation may be performed.
- Environmental Documentation: Identifies the anticipated environmental document the project needs for implementation. Documentation can include but is not limited to categorical exemptions, negative declarations, mitigated negative declarations, environmental impact reports (EIR), or programmatic EIR.
- Completion: Identifies the anticipated District fiscal year for project completion.
- Component: Identifies the project components such as storage tanks, wells, pipelines, booster stations, or pressure reducing valves (PRVs).
- Need: Identifies the need for the project. Needs can include capacity and fire deficiencies as well as providing service to proposed developments.
- Cost Breakdown: Identifies the total project cost.
- Schedule: Identifies an approximate project schedule for design and construction.
- Description: A street description is included as well as component size (i.e. pipeline diameter and length, reservoir size, pump station capacity).

6.2.2 Projects

The project information described in the previous section was placed on a project sheet for each improvement. A project sheet for each improvement can be found in Appendix A.

Figure 6.5 provides a graphical illustration of the improvements recommended to mitigate capacity deficiencies in the existing water system, as identified by the hydraulic analysis. Projects CIP-1, CIP-2 and CIP-5 have been constructed. Projects CIP-7 and CIP-17 are currently under construction. Project CIP-12 has been designed and is going out for bid. The following are project descriptions for the improvements.

6.2.2.1 Project CIP-1: Beach Road Pipeline

Project CIP-1 involves construction of a new 12-inch parallel pipeline in Beach Road from De Forest Road to Marina Drive. The 2,755 foot pipeline is needed for existing fire flow deficiencies in Central Marina.

6.2.2.2 Project CIP-2: Reservation Road Pipeline

Project CIP-2 involves construction of 556 feet of new 12-inch and 6,523 feet of new 18-inch pipelines in Reservation Road and Crescent Avenue in three segments. Segment 1 is a 18-inch pipeline in Reservation Road from Salinas Avenue to Crescent Avenue. Segment 2 is a 18-inch pipeline in Crescent Avenue from Reservation Road to Sirena Del Mar Road. Segment 3 is a new 12-inch pipeline in Crescent Avenue from Quebrada Del Mar Road to Reservoir 2. The pipeline will increase capacity in Central Marina.

6.2.2.3 Project CIP-3: California Avenue Extension

Project CIP-3 involves construction of a new 12-inch pipeline in California Avenue from Reindollar Avenue to Reservation Road. The 2,674 feet pipeline will increase capacity in Central Marina.

6.2.2.4 Project CIP-4: CSUMB Fire Flow Improvements

Project CIP-4 involves replacing 2,376 feet of 6, 8, and 10-inch pipeline with 12-inch pipeline in the main campus area of CSUMB (vicinity of 3rd Street and A Avenue). The pipe replacement is needed to resolve existing fire flow deficiencies.

6.2.2.5 Project CIP-5: Hillcrest Water Pipeline Connection

Project CIP-5 involves construction of a new 8-inch pipeline in Hillcrest Avenue from Crescent Avenue and connecting to the existing 6-inch pipeline to the west. The 335-foot pipeline is needed for existing fire flow deficiencies at Los Arboles Middle School.

6.2.2.6 Project CIP-6: Imjin Road Pipeline

Project CIP-6 involves construction of a new 12-inch pipeline in Imjin Road from Reservation Road to near Abrams Drive. The 2,719-foot pipeline is needed for existing fire flow deficiencies in the Existing Marina area of Ord Community.

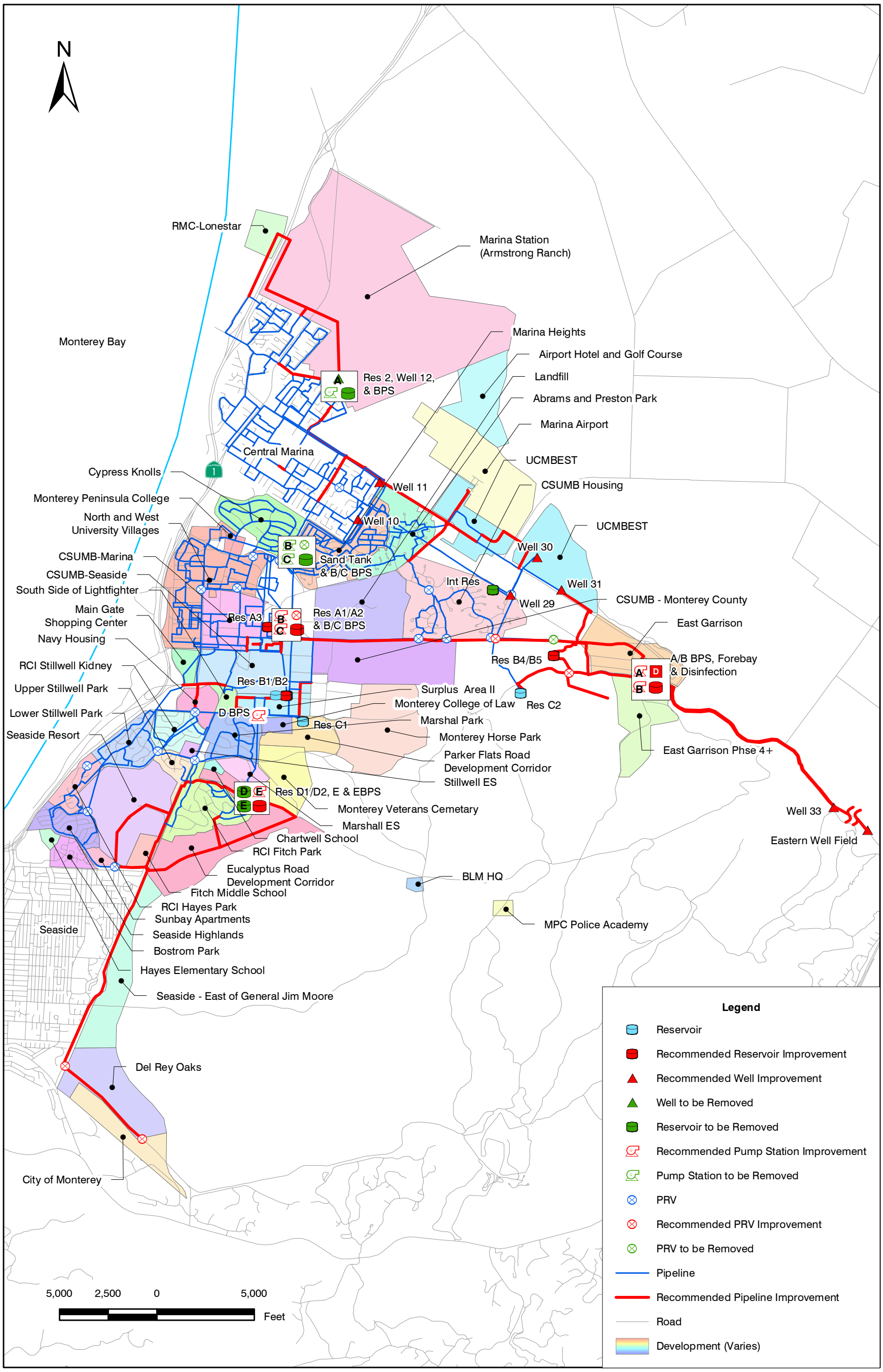

Figure 6.5
RECOMMENDED PROJECTS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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January 31, 2007

6.2.2.7 Project CIP-7: Ardennes Circle and General Jim Moore Boulevard Pipeline

Project CIP-7 involves replacing 8,503 feet of existing 8, 10, and 12-inch pipeline with a 20-inch pipeline in 2 segments. Segment 1 replaces the existing 12-inch pipeline from Reservoir D1/D2 to Ardennes Circle to General Jim Moore Boulevard. Segment 2 replaces the existing 8 and 10-inch pipeline in General Jim Moore Boulevard from Ardennes Circle to Coe Avenue.

6.2.2.8 Project CIP-8: Well 33 Project

Project CIP-8 involves construction of a new 350-gpm well, 13,200 feet of 8-inch pipeline, 24-inch (6,700 feet) and 30-inch (4,800 feet) pipelines through East Garrison, and disinfection and a B Zone Booster Pump Station at the ASP building. The Well 33 Preliminary Design Report contains further details on this project.

6.2.2.9 Project CIP-9: 2nd Avenue Extension

Project CIP-9 involves construction of a new 12-inch pipeline from the 2nd Avenue pipeline and extending south through the Navy Housing development. The 1,435- foot pipeline connecting Light Fighter Drive and Gigling Road will increase capacity to the B Zone area south of Gigling Road (i.e. Hayes Park, Seaside Highlands, Lower Stillwell Park).

6.2.2.10 Project CIP-10: Inter-Garrison Road PRV

Project CIP-10 involves the demolition of an existing PRV along Inter-Garrison Road and replacing it with a new PRV at Inter-Garrison Road and the Reservoir C2 pipeline. This project is needed due to a change in system operations.

6.2.2.11 Project CIP-11: Demolish Intermediate Reservoir

Project CIP-11 involves the demolition of the Intermediate Reservoir and associated disinfection facilities. These facilities will be replaced by the Reservoir A1/A2 project (CIP-13).

6.2.2.12 Project CIP-12: Reservoir D1/D2

Project CIP-12 involves the demolition of the existing Reservoir D, E, and E Zone Booster Pump Station and replacing them with Reservoirs D1/D2 (2.2 million gallons [MG] each) and an E Zone hydro pneumatic pump station. This project was needed due to structural issues with the existing Reservoir D. Construction of Reservoir D2 may be deferred until FY07-08.

6.2.2.13 Project CIP-13: Reservoir A1/A2 and B/C BPS

Project CIP-13 involves construction of Reservoir A1/A2 (2.1 MG each), the B/C Booster Pump Station (B Zone capacity of 2,762 gpm and C Zone capacity of 4,400 gpm), and an emergency PRV (B to A Zone). These facilities are tentatively located on CSUMB property

on 6th Avenue just south of 8th Street pending land acquisition. In addition, 1,365 feet of 16-inch pipeline will be replaced by 20-inch pipeline from the B BPS to 1st Street. This project will replace the Sand Tank and B/C Booster Pump Station. A new 24-inch pipeline (227 feet) will need to be constructed to connect the Sand Tank fill pipe with the 24-inch C Zone pipeline.

6.2.2.14 Project CIP-14: Reservoir B4/B5

Project CIP-14 involves construction of Reservoir B4/B5 (1.6 MG each) and a 20-inch connection pipeline (1,599 feet) to Inter-Garrison Road. The reservoirs will be constructed west of the East Garrison development. Construction of Reservoir B5 may be deferred until FY07-08.

6.2.2.15 Project CIP-15: Demolish Sand Tank

6.2.2.16 Project CIP-15 involves the demolition of Sand Tank facilities including the Bermad Valve, B/C Booster Pump Station, and the Sand Tank itself. The Reservoir A1/A2 and B/C Booster Pump Station Project (CIP-13) will replace these facilities**.**

6.2.2.17 Project CIP-16: Reservoir B4/B5 to East Garrison Backdoor Pipeline

Project CIP-16 involves construction of a 1,348 foot 12-inch pipeline from Reservoir B4/B5 to Watkins Gate Road connecting to East Garrison. The project will provide reliability and additional capacity to East Garrison for fire flow and allows Reservoir B4/B5 to fill at a faster rate.

6.2.2.18 Project CIP-17: Coe Avenue Pipeline

Project CIP-17 involves replacing 1,576 feet of 8-inch pipeline along Coe Avenue from General Jim Moore Boulevard to the Bostrom Park PRV with a 12-inch pipeline. The project will provide additional capacity to the Seaside Highlands area through the Bostrom Park PRV from Reservoir D1/D2.

6.2.2.19 Project CIP-18: Reservoir B2

Project CIP-18 involves construction of a new 1.1 MG reservoir adjacent to Reservoir B1.

6.2.2.20 Project CIP-19: D BPS Upgrade

Project CIP-19 involves upgrading the existing D Zone Booster Pump Station to a capacity of 3,042 gpm.

6.2.2.21 Project CIP-20: Well 10 to Standby

Project CIP-20 involves removing Well 10 from normal operations and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

6.2.2.22 Project CIP-21: Well 11 to Standby

Project CIP-21 involves removing Well 11 from normal operations and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

6.2.2.23 Project CIP-22: Well 29 to Standby

Project CIP-22 involves removing Well 29 from normal operations, adding wellhead disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

6.2.2.24 Project CIP-23: Well 30 to Standby

Project CIP-23 involves removing Well 30 from normal operations, adding wellhead disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

6.2.2.25 Project CIP-24: Well 31 to Standby

Project CIP-24 involves removing Well 31 from normal operations, adding wellhead disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

6.2.2.26 Project CIP-25: Reservoir 2 Demolition

Project CIP-25 involves the demolition of Reservoir 2, Well 12, and the booster pump station. The construction of the Reservation Road Pipeline, California Avenue Extension, and A Zone reservoirs will make the Reservoir 2 facilities hydraulically redundant. However, the District plans on re-coating the interior of the reservoir in the next few years to extend life of the reservoir. Following the useful life of the reservoir, the Reservoir 2 facilities may be taken out of service and demolished.

6.2.2.27 Project CIP-26: Reservoir A3

Project CIP-26 involves construction of a 1.6 MG reservoir north of 3rd Street between 4th and 5th Avenues. The location of Reservoir A3 is preliminary and may change at a later date.

6.2.2.28 Project DS-1: Main Gate Shopping Center

Project DS-1 involves construction of a new 12-inch pipeline in Lightfighter Drive from 1st Avenue to General Jim Moore Boulevard. The 2,200 foot pipeline will increase capacity in the B Zone.

6.2.2.29 Project DS-2: Reservoir C2 East Garrison Backdoor Pipeline

Project DS-2 involves constructing a new 4,580-foot pipeline along Watkins Gate Road from Reservoir C2 to East Garrison in two segments. Segment 1 is a 16-inch pipeline that runs 3,542 feet to the east. Segment 2 is a 12-inch pipeline that runs the remaining 1,038 feet to East Garrison. A PRV is needed near the end of segment 1 to provide B Zone pressure. The project will provide service to East Garrison.

6.2.2.30 Project DS-3: CSUMB Fire Flow Improvements

Project DS-3 involves replacing 689 feet of 8-inch pipeline with 12-inch pipeline in the CSUMB Main Campus area from 1st Street to 3rd Street. This project will alleviate fire flow deficiencies due to CSUMB growth.

6.2.2.31 Project DS-4: Armstrong Ranch Pipeline

Project DS-4 involves construction of a new 12-inch pipeline from the Reservoir 2 vicinity through the Armstrong Ranch development and connecting to the existing 8-inch pipeline in Paul Davis Drive. The 5,577-foot pipeline will provide service to the Armstrong Ranch Development.

6.2.2.32 Project DS-5: City of Monterey Pipeline and PRV

Project DS-54 involves constructing a new PRV and 5,452 foot 16-inch pipeline along South Boundary Road from General Jim Moore Boulevard to the City of Monterey. The project will provide service to the City of Monterey.

6.2.2.33 Project DS-6 Del Rey Oaks Pipeline and PRV

Project DS-6 involves constructing a new PRV and 11,258 foot 16-inch pipeline along General Jim Moore Boulevard from Coe Avenue to South Boundary Road in Del Rey Oaks. The project will provide service to the Del Rey Oaks, Seaside - East of General Jim Moore, and City of Monterey developments.

6.2.2.34 Project DS-7 Airport Hotel and Golf Course Pipeline

Project DS-7 involves replacing 2,118 feet of existing 8-inch pipeline with a 12-inch pipeline and constructing a new 1,861 foot 18-inch pipeline. The replacement pipeline runs from Reservation Road to the Marina Airport along Imjin Road. The new pipeline runs along Reservation Road from the existing 18-inch pipeline fronting UCMBEST to Imjin Road. The project will alleviate fire flow deficiencies from the Airport Hotel and Golf Course development.

6.2.2.35 Project DS-8 UCMBEST Pipeline

Project DS-8 involves construction of 4,259 feet of 12-inch pipeline from Reservation Road north through the UCMBEST development, west crossing Blanco Road, and connecting to existing pipeline. The project will provide service to UCMBEST development.

6.2.2.36 Project DS-9: East Garrison Phase 4 Pipeline

Project DS-9 involves construction of 2,761 feet of 16-inch pipeline from the back door Reservoir C-2 line to the East Garrison Phase 4 development to provide service.

6.2.2.37 Project DS-10: Eucalyptus Road Pipeline

Project DS-13 involves construction of 12,472 feet new 12-inch pipeline to provide service for development along Eucalyptus Road. A 12-inch pipeline will run from the E Zone Pump Station to General Jim Moore Boulevard along Eucalyptus Road. A second 12-inch pipeline will connect Eucalyptus Road and Ardennes Circle located in the Fitch Park development.

6.2.2.38 Project DS-11: Seaside Resort Pipeline

Project DS-11 involves replacing 3,411 feet of 6-inch pipeline with a 12-inch pipeline and constructing a new 1,752 foot 12-inch pipeline. The 5,163 foot pipeline will run from General Jim Moore Boulevard through the development and south to Coe Avenue. The project will alleviate fire flow deficiencies created from new development in Seaside Resorts.

6.2.2.39 Project DS-12: Surplus Area II Pipeline

Project DS-12 involves replacing 5,547 feet of existing 6 and 8-inch pipeline with 12-inch pipelines in three segments. Segment 1 runs from Gigling Road north along Malmedy Road and east along Owen Durham Street to Arnhem Road. Segment 2 runs along Owen Durham Street from Parker Flats Road to 6th Avenue. Segment 3 runs from Gigling Road between 6th and 7th Avenues north to C Street and east to 7th Avenue. The project will alleviate fire flow deficiencies created by development in Surplus Area II.

6.2.2.40 Project DS-13: RMC-Lonestar Pipeline

Project DS-13 involves construction of a new 12-inch pipeline from the existing 12-inch Dunes Drive pipeline to the RMC-Lonestar development, across Highway 1, and connecting to the Armstrong Ranch development. The 9,395-foot pipeline will provide service to the RMC-Lonestar Development.

6.2.2.41 Project DS-14: Reservation Road Pipeline (Imjin Road to Salinas Avenue)

Project DS-14 involves construction of a new 12-inch pipeline in Reservation Road from Imjin Road to Salinas Avenue. The 4,050-foot pipeline will provide service to new development in the area south of Reservation Road.

Chapter 7

CAPITAL IMPROVEMENT PROGRAM

This chapter presents the recommended Capital Improvement Program (CIP) for the District's water distribution system. The improvement projects are based on the evaluation of the District's water distribution system, were developed to mitigate the deficiencies described in the previous chapters, and will accommodate future growth. The CIP has been staged to the planning horizon of Year 2025.

7.1 COST ESTIMATING CRITERIA

The cost estimates presented in this study are opinions developed from bid tabulations, cost curves, information obtained from previous studies, and Carollo Engineers' experience on other projects. The costs estimated for each recommended facility are opinions included in the CIP tables developed with this study. The tables are intended to be used to facilitate revisions to the District's CIP, and ultimately to support determination of the user rates and connection impact fees. Recommendations for cost criteria of pipelines, pump stations, and reservoirs are also presented.

7.1.1 Cost Estimating Accuracy

The cost estimates presented in the CIP have been prepared for general master planning purposes and for guidance in project evaluation and implementation. Final costs of a project will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors such as: preliminary alignments generation, investigation of alternative routings, and detailed utility and topography surveys.

The American Association of Cost Engineers defines three types of cost estimates:

- An Order of Magnitude Estimate for Master Plan Studies. This is an approximate estimate made without detailed engineering data. It is normally expected that an estimate of this type would be accurate within +50 percent to -30 percent.

- A Budget Estimate for Predesign Study. A budget estimate is prepared with the use of flow sheets, layouts, and equipment details. It is normally expected that an estimate of this type would be accurate within +30 percent to -15 percent.

- A Definite Estimate (Engineer's Estimate) for Time of Contract Bidding. This estimate is prepared from very defined engineering data. The data includes fairly complete plot plans and elevations, soil data, and a complete set of specs. It is expected that a definite estimate would be accurate within +15 to -5 percent.

Costs developed for this study should be considered "order of magnitude" and have an expected accuracy range of +50 percent to -30 percent. The purpose of this chapter is to

present the assumptions used in developing order of magnitude cost estimates for facilities recommended with this master plan. Recommended facility improvements, which will address current deficiencies and facilities required to meet future District needs are presented within the body of the report.

7.1.2 Pipelines

Pipeline improvements for the District range in size from approximately 12 to 24 inches in diameter. Costs associated with pipelines ranging in size from 12 to 24 inches are shown on Table 7.1.

Table 7.1 Pipeline Unit Costs
Water Systems Master Plan
Marina Coast Water District

Diameter (Inches)	Base Construction Cost ($/LF)	Contractor's Overhead and Profit[(1)] ($/LF)
12	75	96
14	95	122
16	120	154
18	145	186
20	165	212
24	190	244

Note:
(1) Includes 28.5% for contractor OH&P, GCs, sales tax.

7.1.3 Pump Stations

Costs associated with new pump station facilities include electrical, instrumentation, pumps, piping, pump station building, valves and other appurtenances required for a finished pump station. Costs not included are fencing, landscaping, road work, pile supports, and similar requirements. These items are not known at this time and may be considered a part of the construction contingency. A cost curve for pump station estimating is shown on Figure 7.1. The cost curve is based on generalized cost estimates for three different sizes of pump stations.

7.1.4 Reservoirs

Estimated reservoir costs include foundation, site preparation, inlet and outlet piping, and mechanical controls, and exclude land acquisition and contingency costs. A cost curve for reservoir estimating is shown on Figure 7.2. Three different sized reservoir facilities were considered and cost estimates prepared for each to develop the cost curve.

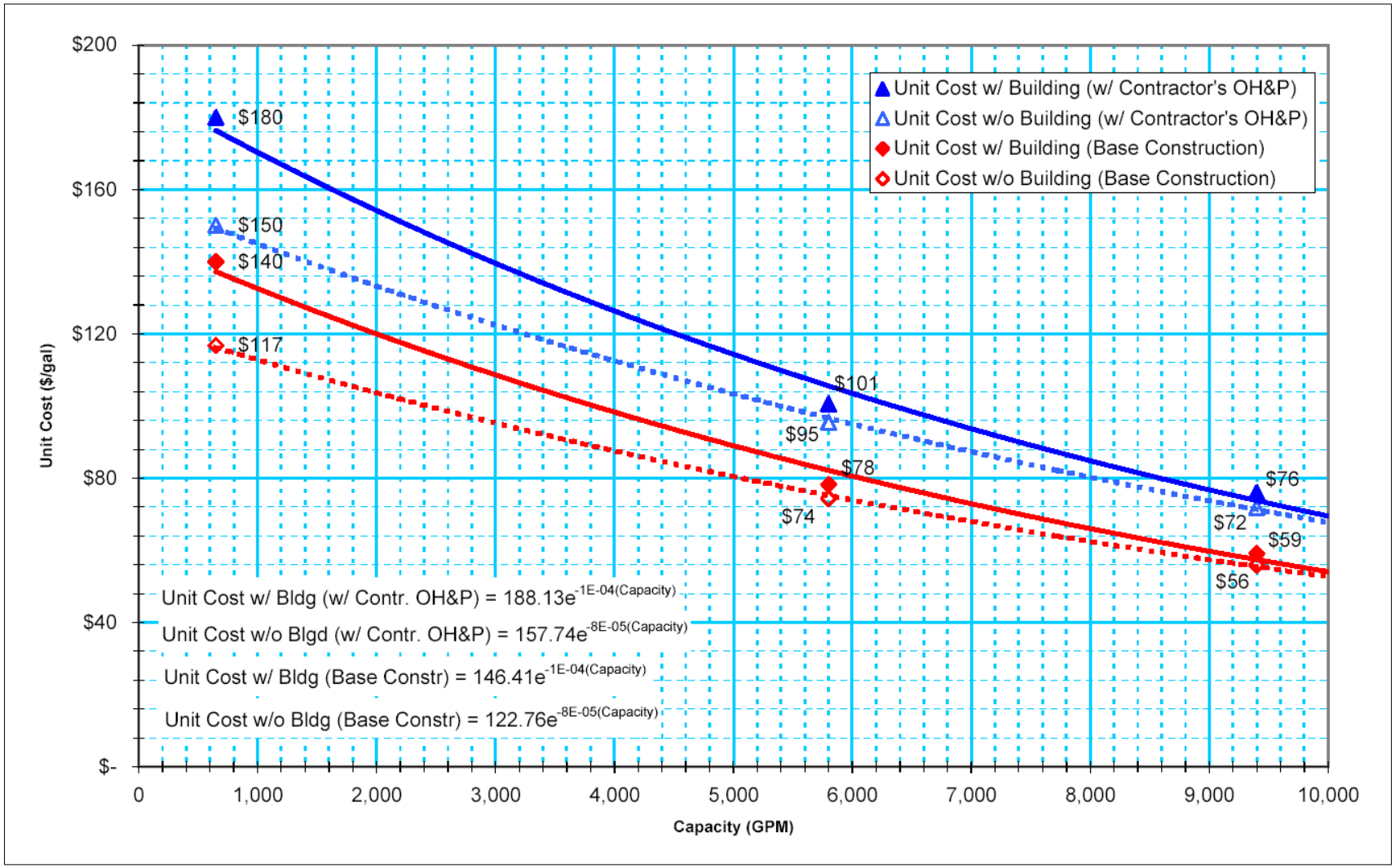

Figure 7.1
PUMP STATION UNIT COST CURVE
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

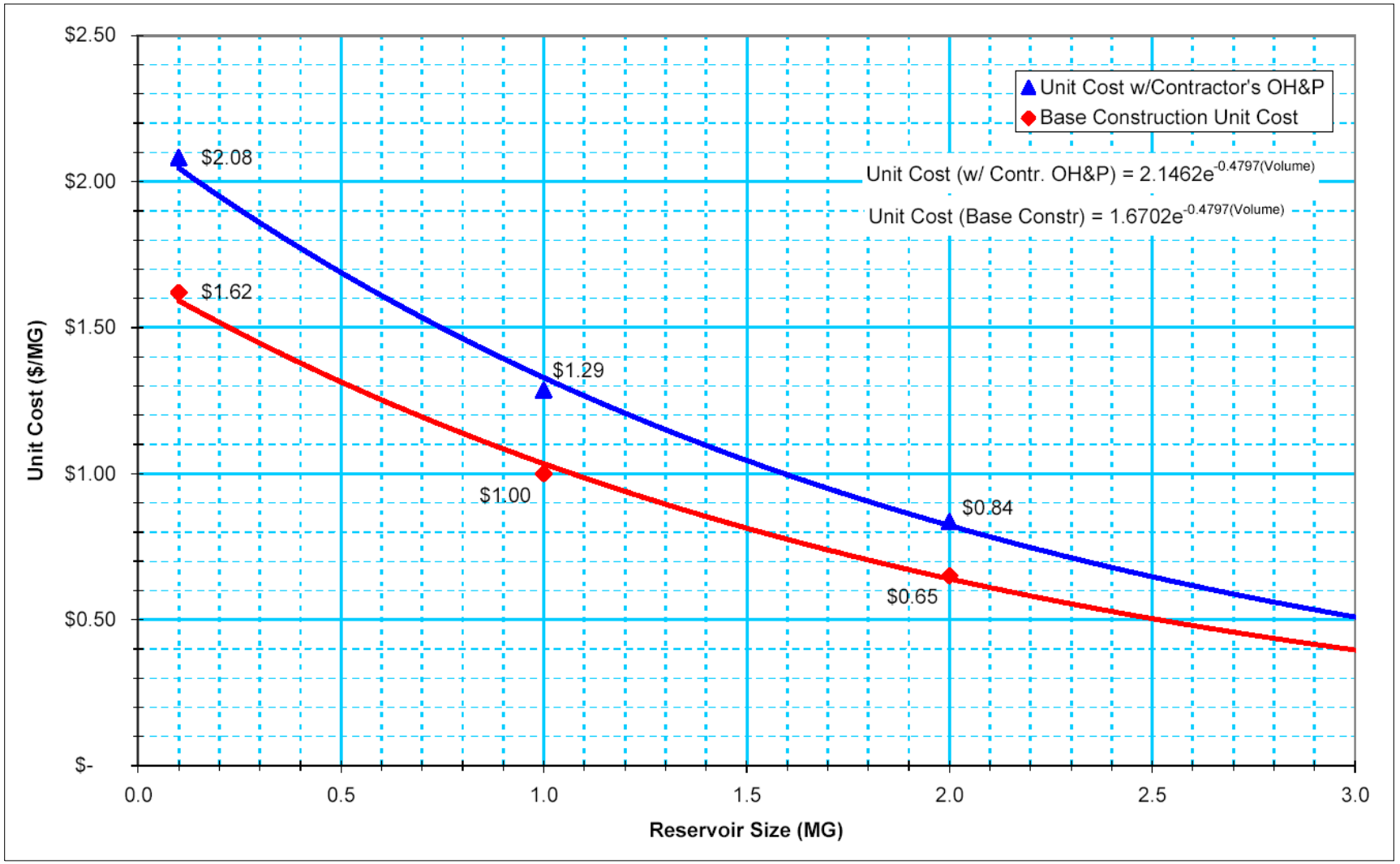

Figure 7.2
CONCRETE RESERVOIR UNIT COST CURVE
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

7.1.5 Land Acquisition

Acquisition of property, easements, and right-of-way (ROW) will be required for some of the recommended projects, particularly new pump stations and reservoir facilities. Additionally, the capital costs do not include pipeline corridor purchases or easement costs because it was assumed that public right-of-way will be utilized wherever possible. Land costs in Monterey County are not easily determined, particularly in the master planning phase, and variables affecting properties can result in widely varying land prices. Since land acquisition costs are not included in this master plan, the final capital costs may vary from the estimates presented herein.

7.1.6 Construction Cost Index Adjustments

Costs estimated with this study should be adjusted utilizing the Engineering News Record (ENR) construction cost index (CCI). The ENR CCI is the primary index utilized by the water planning and engineering community to adjust cost estimates developed in different years. The costs estimated for facilities with this study are in 2006 dollars, based on an ENR CCI for San Francisco of 8441 (June 2006).

7.2 CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program for the improvements identified by this master plan are discussed in this section.

7.2.1 Baseline Construction Cost

This is the total estimated construction cost, in dollars, of the proposed improvement: pipes, wells, tanks, booster stations, PRVs, or emergency generators. Pipe Baseline Construction Costs were developed using the following criteria:

- Pipe Unit Cost: Estimated unit cost of pipeline is based on the pipe's present day cost in addition to installation cost, new pavement or pavement restoration, traffic control, bore- and-jack installation (where applicable), and appurtenances such as valves and fire hydrants, mobilization and demobilization, and contractor's overhead and profit. The cost is expressed in dollars per linear foot ($/LF) of pipe length. In the case of jacked steel casings, the unit cost includes the carrier pipe inside the casing.

- Pipe Cost: Estimated cost of the pipeline, calculated by multiplying the estimated length by the unit cost, in dollars.

- Other Infrastructure Facilities Costs: Estimated lump sum costs, in dollars, for the construction of infrastructure utilities, other than pipes. Wells, storage tanks, booster pump stations, pressure reducing valves, and emergency generators.

7.2.2 Contractor's Overhead and Profit

Other project-related costs have been identified and estimated at 28.5 percent of the Estimated Construction Costs. These costs include contractor's overhead and profit, general conditions, and sales tax.

The Capital Improvement Cost, in dollars, for each proposed improvement is the total of the Estimated Construction Cost (including contingency) plus the other costs discussed in the previous paragraph.

7.2.3 Estimated Construction Cost

Since knowledge about site-specific conditions of each proposed project is limited at the master planning stage, a 20 percent construction contingency was applied to the Baseline Construction Cost to account for unforeseen events and unknown conditions.

The Estimated Construction Cost, in dollars, for the proposed improvement consists of the Baseline Construction Cost plus the construction contingency and contractor's overhead and profit.

7.2.4 Contractor's Overhead and Profit

Other project-related costs have been identified and estimated at 28.5 percent of the Estimated Construction Costs. These costs include contractor's overhead and profit, general conditions, and sales tax.

7.2.5 Capital Improvement Cost

Other project-related costs have been identified and estimated at 25 percent of the Estimated Construction Costs. These costs include engineering, administration, construction management, and legal costs.

The Capital Improvement Cost, in dollars, for each proposed improvement is the total of the Estimated Construction Cost (including contingency) plus the other costs discussed in the previous paragraph.

7.2.6 Capital Improvement Program

The CIP costs were prioritized based on their urgency to mitigate existing deficiencies and for servicing anticipated growth. The deficiencies in the existing system have a significant total capital cost that is best distributed based on the District's ability to construct new infrastructure projects.

The District is capable of allocating larger resources and will perform updated reassessments as needed.

The Program has been divided into the following eight phases based on fiscal year:

- FY05-06: This short-term phase includes improvements that are allocated based on annual fiscal budgets between 2005 and 2006.
- FY06-07: This short-term phase includes improvements that are allocated based on annual fiscal budgets between 2006 and 2007.
- FY07-08: This short-term phase includes improvements that are allocated based on annual fiscal budgets between 2007 and 2008.
- FY08-09: This short-term phase includes improvements that are allocated based on annual fiscal budgets between 2008 and 2009.
- FY09-10: This short-term phase includes improvements that are allocated based on annual fiscal budgets between 2009 and 2010.
- FY10-15: This intermediate phase includes improvements that are allocated based on annual fiscal budgets between 2010 and 2015.
- FY15-20: This long-term phase includes improvements that are allocated based on annual fiscal budgets between 2015 and 2020.
- FY20-25: This long-term phase includes improvements that are allocated based on annual fiscal budgets between 2020 and 2025.

Tables 7.2 to 7.4 present the District's CIP by water system, project need, component, and project, respectively. In addition, Figure 7.3 illustrates the CIP and Table 7.5 presents details of each CIP project.

The District's CIP is estimated to cost approximately $193.5M in 2006 dollars. There are five large projects identified that comprise over half the CIP: the Eastern Well Field project ($53.0M), the Regional Urban Water Augmentation Project (RUWAP) - Recycled Water project ($44.4M), the RUWAP - Desal project ($46.3M), the Well No. 33 Project ($6.3M), and the Reservoir A1/A2 project ($6.7M). In addition, approximately 68 percent of the CIP is anticipated to be constructed by Year 2010 due to development of the former Fort Ord. The CIP has been developed to mitigate existing deficiencies and guide the District for unprecedented growth while providing service its customers have come to expect.

Table 7.2 CIP Summary by Water System
Water Systems Master Plan
Marina Coast Water District

Water System	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Marina	$2,622,000	$ -	$ -	$ -	$776,000	$520,000	$1,309,000	$ -	**$5,227,000**
Ord Community	$3,315,000	$13,175,000	$6,811,000	$2,013,000	$5,888,000	$6,552,000	$ -	$565,000	**$38,319,000**
- Well 33 Project	*$ -*	*$6,327,600*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$6,327,600***
- Eastern Well Field	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$32,794,000*	*$20,238,000*	*$ -*	***$53,032,000***
RUWAP[(1)] (Recycled Water)	$ -	$44,372,000	$ -	$ -	$ -	$ -	$ -	$ -	**$44,372,000**
RUWAP (Desal)	$ -	$ -	$46,250,000	$ -	$ -	$ -	$ -	$ -	**$46,250,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Table 7.3 CIP Summary by Project Need
Water Systems Master Plan
Marina Coast Water District

Project Need	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Capacity	$4,812,000	$12,867,000	$6,427,000	$2,013,000	$571,000	$2,301,000	*$ -*	*$ -*	**$28,991,000**
- Well 33 Project	*$ -*	*$6,327,600*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$6,327,600***
- Eastern Well Field	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$32,794,000*	*$20,238,000*	*$ -*	***$53,032,000***
- RUWAP[(1)] (Recycled Water)	*$ -*	*$44,372,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$44,372,000***
- RUWAP (Desal)	*$ -*	*$ -*	*$46,250,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	***$46,250,000***
Demolish	*$ -*	$205,000	$288,000	*$ -*	*$ -*	$464,000	*$ -*	*$ -*	**$957,000**
Fire Flow	$1,125,000	*$ -*	$96,000	*$ -*	$796,000	$1,491,000	*$ -*	*$ -*	**$3,508,000**
Operations	*$ -*	$103,000	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	**$103,000**
Service	*$ -*	*$ -*	*$ -*	*$ -*	$5,297,000	$1,923,000	$1,309,000	$565,000	**$9,094,000**
Standby	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	$893,000	*$ -*	*$ -*	**$893,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Table 7.4 CIP Summary by Component
Water Systems Master Plan
Marina Coast Water District

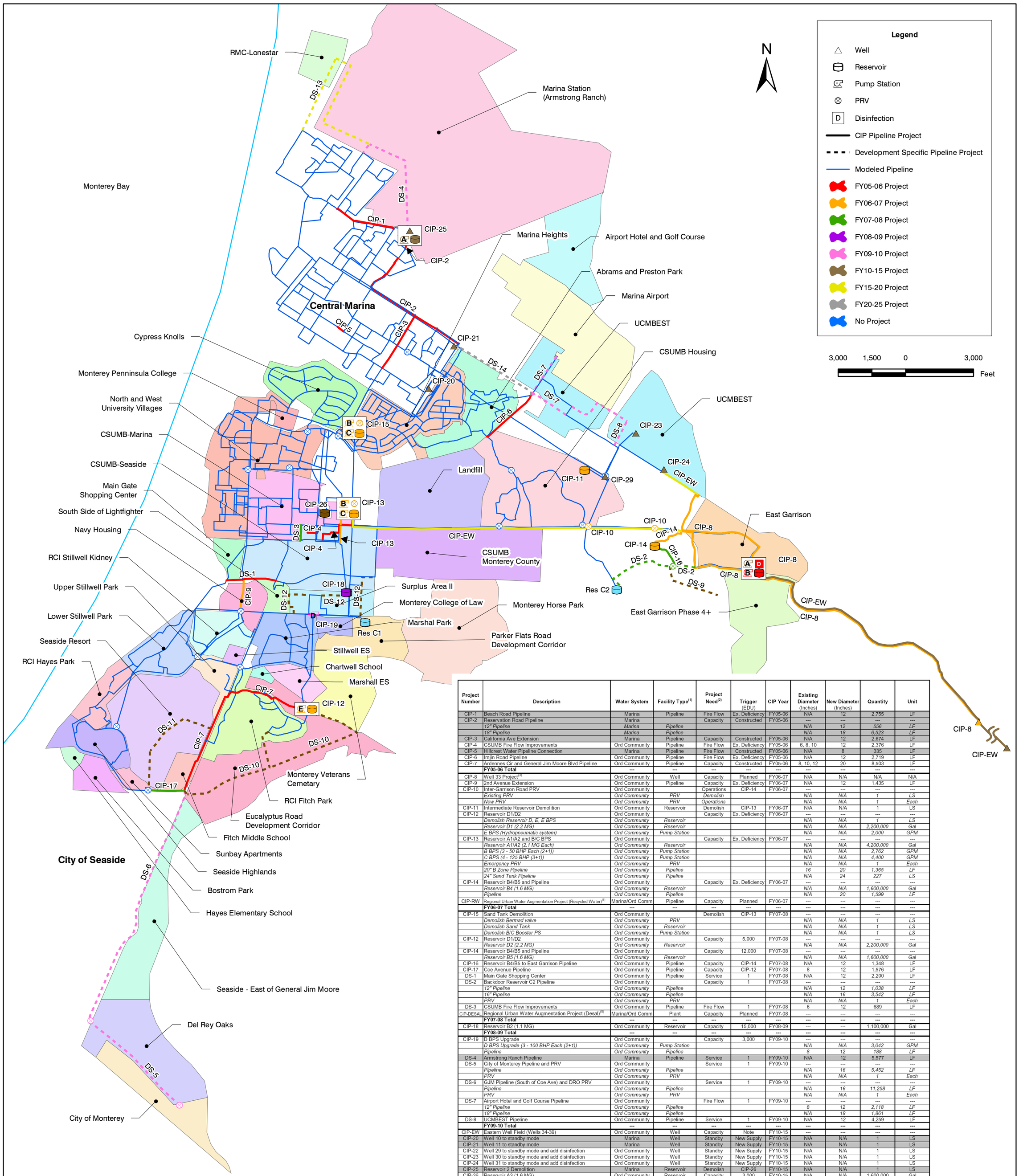
Project Component	CIP Fiscal Year								Total
	FY05-06	FY06-07	FY07-08	FY08-09	FY09-10	FY10-15	FY15-20	FY20-25	
Pipeline	$5,937,000	$1,178,000	$1,744,000	$ -	$5,913,000	$3,414,000	$1,309,000	$565,000	**$20,060,000**
PRV	$ -	$225,000	$112,000	$ -	$206,000	$ -	$ -	$ -	**$543,000**
Pump Station	$ -	$1,784,000	$93,000	$ -	$545,000	$ -	$ -	$ -	**$2,422,000**
Reservoir	$ -	$9,988,000	$4,862,000	$2,013,000	$ -	$2,765,000	$ -	$ -	**$19,628,000**
Well	$ -	$ -	$ -	$ -	$ -	$893,000	$ -	$ -	**$893,000**
Well 33 Project	$ -	$6,327,600	$ -	$ -	$ -	$ -	$ -	$ -	**$6,327,600**
Eastern Well Field	$ -	$ -	$ -	$ -	$ -	$32,794,000	$20,238,000	$ -	**$53,032,000**
RUWAP[(1)] (Recycled Water)	$ -	$44,372,000	$ -	$ -	$ -	$ -	$ -	$ -	**$44,372,000**
RUWAP (Desal)	$ -	$ -	$46,250,000	$ -	$ -	$ -	$ -	$ -	**$46,250,000**
Total	**$5,937,000**	**$63,874,600**	**$53,061,000**	**$2,013,000**	**$6,664,000**	**$39,866,000**	**$21,547,000**	**$565,000**	**$193,527,600**

Note:
(1) RUWAP = Regional Urban Water Augmentation Project

Table 7.5 CIP Summary by Project
Water Master Plan
Marina Coast Water District

Project Number	Description	Water System	Facility Type[1]	Project Need[2]	Trigger (EDU)	CIP Year	Existing Diameter (Inches)	New Diameter (Inches)	Quantity	Unit	Unit Cost ($/Unit)	Estimated Direct Construction Cost ($)	Contractor's Overhead & Profit[3] ($)	Construction Contingency[4] ($)	Estimated Construction Cost ($)	Engr, CM, & Legal/ Admin[5] ($)	Estimated Total Project Cost ($)	Percent Existing Customers	Percent Development	Dollars Existing Customers ($)	Dollars Development ($)
CIP-1	Beach Road Pipeline	Marina	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	N/A	12	2,755	LF	$ 75	$ 207,000	$ 59,000	$ 41,000	$ 307,000	$ 77,000	$ 384,000	100%	0%	$ 384,000	$ -
CIP-2	Reservation Road Pipeline	Marina		Capacity	Constructed	FY05-06	---	---	---	---	---	$ 988,000	$ 282,000	$ 197,000	$ 1,467,000	$ 367,000	$ 1,834,000	---	---	$ 1,266,000	$ 568,000
	12" Pipeline	*Marina*	*Pipeline*				*N/A*	*12*	*556*	*LF*	*$ 75*	*$ 42,000*	*$ 12,000*	*$ 8,000*	$ 62,000	*$ 16,000*	*$ 78,000*	*69%*	*31%*	$ 54,000	$ 24,000
	18" Pipeline	*Marina*	*Pipeline*				*N/A*	*18*	*6,523*	*LF*	*$ 145*	*$ 946,000*	*$ 270,000*	*$ 189,000*	*$ 1,405,000*	*$ 351,000*	*$ 1,756,000*	*69%*	*31%*	$ 1,212,000	$ 544,000
CIP-3	California Ave Extension	Marina	Pipeline	Capacity	Constructed	FY05-06	N/A	12	2,674	LF	$ 75	$ 201,000	$ 57,000	$ 40,000	$ 298,000	$ 75,000	$ 373,000	100%	0%	$ 373,000	$ -
CIP-4	CSUMB Fire Flow Improvements	Ord Community	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	6, 8, 10	12	2,376	LF	$ 75	$ 178,000	$ 51,000	$ 36,000	$ 265,000	$ 66,000	$ 331,000	100%	0%	$ 331,000	$ -
CIP-5	Hillcrest Water Pipeline Connection	Marina	Pipeline	Fire Flow	Constructed	FY05-06	N/A	8	335	LF	$ 50	$ 17,000	$ 5,000	$ 3,000	$ 25,000	$ 6,000	$ 31,000	100%	0%	$ 31,000	$ -
CIP-6	Imjin Road Pipeline	Ord Community	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	N/A	12	2,719	LF	$ 75	$ 204,000	$ 58,000	$ 41,000	$ 303,000	$ 76,000	$ 379,000	100%	0%	$ 379,000	$ -
CIP-7	Ardennes Cir and General Jim Moore Blvd Pipeline	Ord Community	Pipeline	Capacity	Constructed	FY05-06	8, 10, 12	20	8,503	LF	$ 165	$ 1,403,000	$ 400,000	$ 281,000	$ 2,084,000	$ 521,000	$ 2,605,000	100%	0%	$ 2,605,000	$ -
	FY05-06 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 3,198,000**	**$ 912,000**	**$ 639,000**	**$ 4,749,000**	**$ 1,188,000**	**$ 5,937,000**	**---**	**---**	**$ 5,369,000**	**$ 568,000**
CIP-8	Well 33 Project[6]	Ord Community	Well	Capacity	Planned	FY06-07	N/A	N/A	N/A	N/A	N/A	$ 3,551,000	$ 1,012,000	$ 710,100	$ 5,273,100	$ 1,054,500	$ 6,327,600	32%	68%	$ 2,000,000	$ 4,328,000
CIP-9	2nd Avenue Extension	Ord Community	Pipeline	Capacity	Ex. Deficiency	FY06-07	N/A	12	1,435	LF	$ 75	$ 108,000	$ 31,000	$ 22,000	$ 161,000	$ 40,000	$ 201,000	100%	0%	$ 201,000	$ -
CIP-10	Inter-Garrison Road PRV	Ord Community		Operations	CIP-14	FY06-07	---	---	---	---	---	$ 65,000	$ 19,000	$ 13,000	$ 97,000	$ 25,000	$ 122,000	---	---	$ 122,000	$ -
	Existing PRV	*Ord Community*	*PRV*	*Demolish*			*N/A*	*N/A*	*1*	*LS*	*$ 10,000*	*$ 10,000*	*$ 3,000*	*$ 2,000*	*$ 15,000*	*$ 4,000*	*$ 19,000*	*100%*	*0%*	$ 19,000	$ -
	New PRV	*Ord Community*	*PRV*	*Operations*			*N/A*	*N/A*	*1*	*Each*	*$ 55,000*	*$ 55,000*	*$ 16,000*	*$ 11,000*	*$ 82,000*	*$ 21,000*	*$ 103,000*	*100%*	*0%*	$ 103,000	$ -
CIP-11	Intermediate Reservoir Demolition	Ord Community	Reservoir	Demolish	CIP-13	FY06-07	N/A	N/A	1	LS	$ 100,000	$ 100,000	$ 29,000	$ 20,000	$ 149,000	$ 37,000	$ 186,000	100%	0%	$ 186,000	$ -
CIP-12	Reservoir D1/D2	Ord Community		Capacity	Ex. Deficiency	FY06-07	---	---	---	---	---	$ 1,719,000	$ 490,000	$ 344,000	$ 2,553,000	$ 638,000	$ 3,191,000	---	---	$ 948,000	$ 2,243,000
	Demolish Reservoir D, E, E BPS	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1*	*LS*	*$ 200,000*	*$ 200,000*	*$ 57,000*	*$ 40,000*	*$ 297,000*	*$ 74,000*	*$ 371,000*	*100%*	*0%*	$ 371,000	$ -
	Reservoir D1 (2.2 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*2,200,000*	*Gal*	*$ 0.58*	*$ 1,279,000*	*$ 365,000*	*$ 256,000*	*$ 1,900,000*	*$ 475,000*	*$ 2,375,000*	*20%*	*80%*	$ 482,000	$ 1,893,000
	E BPS (Hydropneumatic system)	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*2,000*	*GPM*	*$ 120*	*$ 240,000*	*$ 68,000*	*$ 48,000*	*$ 356,000*	*$ 89,000*	*$ 445,000*	*21%*	*79%*	$ 95,000	$ 350,000
CIP-13	Reservoir A1/A2 and B/C BPS	Ord Community		Capacity	Ex. Deficiency	FY06-07	---	---	---	---	---	$ 3,601,000	$ 1,026,000	$ 719,000	$ 5,346,000	$ 1,338,000	$ 6,684,000	---	---	$ 4,068,000	$ 2,547,000
	Reservoir A1/A2 (2.1 MG Each)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*4,200,000*	*Gal*	*$ 0.61*	*$ 2,562,000*	*$ 730,000*	*$ 512,000*	*$ 3,804,000*	*$ 951,000*	*$ 4,755,000*	*75%*	*25%*	$ 3,570,000	$ 1,185,000
	B BPS (3 - 50 BHP Each (2+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*2,762*	*GPM*	*$ 111*	*$ 307,000*	*$ 87,000*	*$ 61,000*	*$ 455,000*	*$ 114,000*	*$ 569,000*	*30%*	*70%*	$ 171,000	$ 398,000
	C BPS (4 - 125 BHP (3+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*4,400*	*GPM*	*$ 94*	*$ 415,000*	*$ 118,000*	*$ 83,000*	*$ 616,000*	*$ 154,000*	*$ 770,000*	*22%*	*78%*	$ 169,000	$ 601,000
	Emergency PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*	*$ 55,000*	*$ 55,000*	*$ 16,000*	*$ 11,000*	*$ 82,000*	*$ 21,000*	*$ 103,000*	*32%*	*68%*	$ 33,000	$ 70,000
	20" B Zone Pipeline	*Ord Community*	*Pipeline*				*16*	*20*	*1,365*	*LF*	*$ 165*	*$ 225,000*	*$ 64,000*	*$ 45,000*	*$ 334,000*	*$ 84,000*	*$ 418,000*	*30%*	*70%*	$ 125,000	$ 293,000
	24" Sand Tank Pipeline	*Ord Community*	*Pipeline*				*N/A*	*24*	*227*	*LS*	*$ 165*	*$ 37,000*	*$ 11,000*	*$ 7,000*	*$ 55,000*	*$ 14,000*	*$ 69,000*	*100%*	*0%*	$ 69,000	$ -
CIP-14	Reservoir B4/B5 and Pipeline	Ord Community		Capacity	Ex. Deficiency	FY06-07	---	---	---	---	---	$ 1,504,000	$ 428,000	$ 301,000	$ 2,233,000	$ 558,000	$ 2,791,000	---	---	$ 837,000	$ 1,954,000
	Reservoir B4 (1.6 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1,600,000*	*Gal*	*$ 0.78*	*$ 1,240,000*	*$ 353,000*	*$ 248,000*	*$ 1,841,000*	*$ 460,000*	*$ 2,301,000*	*30%*	*70%*	$ 690,000	$ 1,611,000
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*20*	*1,599*	*LF*	*$ 165*	*$ 264,000*	*$ 75,000*	*$ 53,000*	*$ 392,000*	*$ 98,000*	*$ 490,000*	*30%*	*70%*	$ 147,000	$ 343,000
CIP-RW	Regional Urban Water Augmentation Project (Recycled Water)[7]	Marina/Ord Comm	Pipeline	Capacity	Planned	FY06-07	---	---	---	---	---	$ 24,300,000	$ 1,900,000	$ 11,528,000	$ 37,728,000	$ 6,644,000	$ 44,372,000	10%	90%	$ 4,437,000	$ 39,935,000
	FY06-07 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 34,948,000**	**$ 4,935,000**	**$ 13,657,100**	**$ 53,540,100**	**$ 10,334,500**	**$ 63,874,600**	**---**	**---**	**$ 12,799,000**	**$ 51,007,000**
CIP-15	Sand Tank Demolition	Ord Community		Demolish	CIP-13	FY07-08	---	---	---	---	---	$ 155,000	$ 44,000	$ 31,000	$ 230,000	$ 58,000	$ 288,000	---	---	$ 288,000	$ -
	Demolish Bermad valve	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*LS*	*$ 5,000*	*$ 5,000*	*$ 1,000*	*$ 1,000*	*$ 7,000*	*$ 2,000*	*$ 9,000*	*100%*	*0%*	$ 9,000	$ -
	Demolish Sand Tank	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1*	*LS*	*$ 100,000*	*$ 100,000*	*$ 29,000*	*$ 20,000*	*$ 149,000*	*$ 37,000*	*$ 186,000*	*100%*	*0%*	$ 186,000	$ -
	Demolish B/C Booster PS	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*1*	*LS*	*$ 50,000*	*$ 50,000*	*$ 14,000*	*$ 10,000*	*$ 74,000*	*$ 19,000*	*$ 93,000*	*100%*	*0%*	$ 93,000	$ -
CIP-12	Reservoir D1/D2	Ord Community		Capacity	5,000	FY07-08	---	---	---	---	---	$ 1,279,000	$ 365,000	$ 256,000	$ 1,900,000	$ 475,000	$ 2,375,000	---	---	$ 482,000	$ 1,893,000
	Reservoir D2 (2.2 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*2,200,000*	*Gal*	*$ 0.58*	*$ 1,279,000*	*$ 365,000*	*$ 256,000*	*$ 1,900,000*	*$ 475,000*	*$ 2,375,000*	*20%*	*80%*	$ 482,000	$ 1,893,000
CIP-14	Reservoir B4/B5 and Pipeline	Ord Community		Capacity	12,000	FY07-08	---	---	---	---	---	$ 1,240,000	$ 353,000	$ 248,000	$ 1,841,000	$ 460,000	$ 2,301,000	---	---	$ 690,000	$ 1,611,000
	Reservoir B5 (1.6 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1,600,000*	*Gal*	*$ 0.78*	*$ 1,240,000*	*$ 353,000*	*$ 248,000*	*$ 1,841,000*	*$ 460,000*	*$ 2,301,000*	*30%*	*70%*	$ 690,000	$ 1,611,000
CIP-16	Reservoir B4/B5 to East Garrison Pipeline	Ord Community	Pipeline	Capacity	CIP-14	FY07-08	N/A	12	1,348	LF	$ 75	$ 101,000	$ 29,000	$ 20,000	$ 150,000	$ 38,000	$ 188,000	100%	0%	$ 188,000	$ -
CIP-17	Coe Avenue Pipeline	Ord Community	Pipeline	Capacity	CIP-12	FY07-08	8	12	1,576	LF	$ 75	$ 118,000	$ 34,000	$ 24,000	$ 176,000	$ 44,000	$ 220,000	100%	0%	$ 220,000	$ -
DS-1	Main Gate Shopping Center	Ord Community	Pipeline	Service	1	FY07-08	N/A	12	2,200	LF	$ 75	$ 165,000	$ 47,000	$ 33,000	$ 245,000	$ 61,000	$ 306,000	0%	100%	$ -	$ 306,000
DS-2	Backdoor Reservoir C2 Pipeline	Ord Community		Capacity	1	FY07-08	---	---	---	---	---	$ 558,000	$ 159,000	$ 112,000	$ 829,000	$ 208,000	$ 1,037,000	---	---	$ -	$ 1,037,000
	12" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*12*	*1,038*	*LF*	*$ 75*	*$ 78,000*	*$ 22,000*	*$ 16,000*	*$ 116,000*	*$ 29,000*	*$ 145,000*	*0%*	*100%*	$ -	$ 145,000
	16" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*3,542*	*LF*	*$ 120*	*$ 425,000*	*$ 121,000*	*$ 85,000*	*$ 631,000*	*$ 158,000*	*$ 789,000*	*0%*	*100%*	$ -	$ 789,000
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*	*$ 55,000*	*$ 55,000*	*$ 16,000*	*$ 11,000*	*$ 82,000*	*$ 21,000*	*$ 103,000*	*0%*	*100%*	$ -	$ 103,000
DS-3	CSUMB Fire Flow Improvements	Ord Community	Pipeline	Fire Flow	1	FY07-08	6	12	689	LF	$ 75	$ 52,000	$ 15,000	$ 10,000	$ 77,000	$ 19,000	$ 96,000	100%	0%	$ 96,000	$ -
CIP-DESAL	Regional Urban Water Augmentation Project (Desal)[8]	Marina/Ord Comm	Plant	Capacity	Planned	FY07-08	---	---	---	---	---	$ 24,666,667	$ 7,400,000	$ 4,933,000	$ 37,000,000	$ 9,250,000	$ 46,250,000	0%	100%	$ -	$ 46,250,000
	FY07-08 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 28,334,667**	**$ 8,446,000**	**$ 5,667,000**	**$ 42,448,000**	**$ 10,613,000**	**$ 53,061,000**	**---**	**---**	**$ 1,964,000**	**$ 51,097,000**
CIP-18	Reservoir B2 (1.1 MG)	Ord Community	Reservoir	Capacity	15,000	FY08-09	---	---	1,100,000	Gal	*$ 0.99*	$ 1,084,000	$ 309,000	$ 217,000	$ 1,610,000	$ 403,000	$ 2,013,000	30%	70%	$ 604,000	$ 1,409,000
	FY08-09 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 1,084,000**	**$ 309,000**	**$ 217,000**	**$ 1,610,000**	**$ 403,000**	**$ 2,013,000**	**---**	**---**	**$ 604,000**	**$ 1,409,000**
CIP-19	D BPS Upgrade	Ord Community		Capacity	3,000	FY09-10	---	---	---	---	---	$ 307,000	$ 88,000	$ 62,000	$ 457,000	$ 114,000	$ 571,000	---	---	$ 116,000	$ 455,000
	D BPS Upgrade (3 - 100 BHP Each (2+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*3,042*	*GPM*	*$ 96*	*$ 293,000*	*$ 84,000*	*$ 59,000*	*$ 436,000*	*$ 109,000*	*$ 545,000*	*20%*	*80%*	$ 111,000	$ 434,000
	Pipeline	*Ord Community*	*Pipeline*				*8*	*12*	*188*	*LF*	*$ 75*	*$ 14,000*	*$ 4,000*	*$ 3,000*	*$ 21,000*	*$ 5,000*	*$ 26,000*	*20%*	*80%*	$ 5,000	$ 21,000
DS-4	Armstrong Ranch Pipeline	Marina	Pipeline	Service	1	FY09-10	N/A	12	5,577	LF	$ 75	$ 418,000	$ 119,000	$ 84,000	$ 621,000	$ 155,000	$ 776,000	0%	100%	$ -	$ 776,000
DS-5	City of Monterey Pipeline and PRV	Ord Community		Service	1	FY09-10	---	---	---	---	---	$ 709,000	$ 202,000	$ 142,000	$ 1,053,000	$ 264,000	$ 1,317,000	---	---	$ -	$ 1,317,000
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*5,452*	*LF*	*$ 120*	*$ 654,000*	*$ 186,000*	*$ 131,000*	*$ 971,000*	*$ 243,000*	*$ 1,214,000*	*0%*	*100%*	$ -	$ 1,214,000
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*	*$ 55,000*	*$ 55,000*	*$ 16,000*	*$ 11,000*	*$ 82,000*	*$ 21,000*	*$ 103,000*	*0%*	*100%*	$ -	$ 103,000
DS-6	GJM Pipeline (South of Coe Ave) and DRO PRV	Ord Community		Service	1	FY09-10	---	---	---	---	---	$ 1,406,000	$ 401,000	$ 281,000	$ 2,088,000	$ 523,000	$ 2,611,000	---	---	$ -	$ 2,611,000
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*11,258*	*LF*	*$ 120*	$ 1,351,000	*$ 385,000*	*$ 270,000*	*$ 2,006,000*	*$ 502,000*	*$ 2,508,000*	*0%*	*100%*	$ -	$ 2,508,000
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*	*$ 55,000*	$ 55,000	*$ 16,000*	*$ 11,000*	*$ 82,000*	*$ 21,000*	*$ 103,000*	*0%*	*100%*	$ -	$ 103,000
DS-7	Airport Hotel and Golf Course Pipeline	Ord Community		Fire Flow	1	FY09-10	---	---	---	---	---	$ 429,000	$ 122,000	$ 86,000	$ 637,000	$ 159,000	$ 796,000	---	---	$ -	$ 796,000
	12" Pipeline	*Ord Community*	*Pipeline*				*8*	*12*	*2,118*	*LF*	*$ 75*	*$ 159,000*	*$ 45,000*	*$ 32,000*	*$ 236,000*	*$ 59,000*	*$ 295,000*	*0%*	*100%*	$ -	$ 295,000
	18" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*18*	*1,861*	*LF*	*$ 145*	*$ 270,000*	*$ 77,000*	*$ 54,000*	*$ 401,000*	*$ 100,000*	*$ 501,000*	*0%*	*100%*	$ -	$ 501,000
DS-8	UCMBEST Pipeline	Ord Community	Pipeline	Service	1	FY09-10	N/A	12	4,259	LF	$ 75	$ 319,000	$ 91,000	$ 64,000	$ 474,000	$ 119,000	$ 593,000	0%	100%	$ -	$ 593,000
	FY09-10 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 3,588,000**	**$ 1,023,000**	**$ 719,000**	**$ 5,330,000**	**$ 1,334,000**	**$ 6,664,000**	**---**	**---**	**$ 116,000**	**$ 6,548,000**
CIP-EW	Eastern Well Field (Wells 34-39)	Ord Community	Well	Capacity	Note	FY10-15	---	---	---	---	---	$ 17,527,000	$ 4,995,000	$ 3,714,000	$ 26,235,000	$ 6,559,000	$ 32,794,000	32%	68%	$ 10,494,000	$ 22,300,000
CIP-20	Well 10 to standby mode	Marina	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS	$ 15,000	$ 15,000	$ 4,000	$ 3,000	$ 22,000	$ 6,000	$ 28,000	100%	0%	$ 28,000	$ -
CIP-21	Well 11 to standby mode	Marina	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS	$ 15,000	$ 15,000	$ 4,000	$ 3,000	$ 22,000	$ 6,000	$ 28,000	100%	0%	$ 28,000	$ -
CIP-22	Well 29 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS	$ 150,000	$ 150,000	$ 43,000	$ 30,000	$ 223,000	$ 56,000	$ 279,000	100%	0%	$ 279,000	$ -
CIP-23	Well 30 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS	$ 150,000	$ 150,000	$ 43,000	$ 30,000	$ 223,000	$ 56,000	$ 279,000	100%	0%	$ 279,000	$ -
CIP-24	Well 31 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS	$ 150,000	$ 150,000	$ 43,000	$ 30,000	$ 223,000	$ 56,000	$ 279,000	100%	0%	$ 279,000	$ -
CIP-25	Reservoir 2 Demolition	Marina	Reservoir	Demolish	CIP-26	FY10-15	N/A	N/A	1	LS	$ 250,000	$ 250,000	$ 71,000	$ 50,000	$ 371,000	$ 93,000	$ 464,000	100%	0%	$ 464,000	$ -
CIP-26	Reservoir A3 (1.6 MG)	Ord Community	Reservoir	Capacity	3,000	FY10-15	N/A	N/A	1,600,000	Gal	$ 0.78	$ 1,240,000	$ 353,000	$ 248,000	$ 1,841,000	$ 460,000	$ 2,301,000	0%	100%	$ -	$ 2,301,000
DS-9	East Garrison Phase 4 Pipeline	Ord Community	Pipeline	Service	1	FY10-15	N/A	16	2,761	LF	$ 120	$ 331,000	$ 94,000	$ 66,000	$ 491,000	$ 123,000	$ 614,000	0%	100%	$ -	$ 614,000
DS-10	Eucalyptus Road Pipeline	Ord Community	Pipeline	Service	1	FY10-15	N/A	12	9,395	LF	$ 75	$ 705,000	$ 201,000	$ 141,000	$ 1,047,000	$ 262,000	$ 1,309,000	0%	100%	$ -	$ 1,309,000
DS-11	Seaside Resort Pipeline	Ord Community	Pipeline	Fire Flow	1	FY10-15	6	12	5,163	LF	$ 75	$ 387,000	$ 110,000	$ 77,000	$ 574,000	$ 144,000	$ 718,000	0%	100%	$ -	$ 718,000
DS-12	Surplus Area II Pipeline	Ord Community	Pipeline	Fire Flow	1	FY10-15	6, 8	12	5,547	LF	$ 75	$ 416,000	$ 119,000	$ 83,000	$ 618,000	$ 155,000	$ 773,000	0%	100%	$ -	$ 773,000
	FY10-15 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 21,336,000**	**$ 6,080,000**	**$ 4,475,000**	**$ 31,890,000**	**$ 7,976,000**	**$ 39,866,000**	**---**	**---**	**$ 11,851,000**	**$ 28,015,000**
DS-13	RMC-Lonestar Pipeline	Marina	Pipeline	Service	1	FY15-20	N/A	12	9,395	LF	$ 75	$ 705,000	$ 201,000	$ 141,000	$ 1,047,000	$ 262,000	$ 1,309,000	0%	100%	$ -	$ 1,309,000
CIP-EW	Eastern Well Field (Wells 40-42)	Ord Community	Well	Capacity	Note	FY15-20	---	---	---	---	---	$ 10,691,000	$ 3,048,000	$ 2,450,000	$ 16,190,000	$ 4,048,000	$ 20,238,000	32%	68%	$ 6,476,000	$ 13,762,000
	FY15-20 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 11,396,000**	**$ 3,249,000**	**$ 2,591,000**	**$ 17,237,000**	**$ 4,310,000**	**$ 21,547,000**	**---**	**---**	**$ 6,476,000**	**$ 15,071,000**
DS-14	Res Rd Pipeline @ Salinas Ave Development Pipeline	Ord Community	Pipeline	Service	1	FY20-25	N/A	12	4,050	LF	$ 75	$ 304,000	$ 87,000	$ 61,000	$ 452,000	$ 113,000	$ 565,000	0%	100%	$ -	$ 565,000
	FY20-25 Total	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**$ 304,000**	**$ 87,000**	**$ 61,000**	**$ 452,000**	**$ 113,000**	**$ 565,000**	**---**	**---**	**$ -**	**$ 565,000**
												$ 104,188,667	**$ 25,041,000**	**$ 28,026,100**	**$ 157,256,100**	**$ 36,271,500**	**$ 193,527,600**			**$ 39,179,000**	**$ 154,280,000**

Notes:
(1) Facility Type: Pipeline, PRV, Reservoir, Pump Station
(2) Project Need: Reason for project (e.g. fire flow, service connection, looping, capacity)
(3) Contractor's OH&P, GC's, Sales Tax = 28.5%
(4) Construction Contingency = 20%
(5) Engineering, Construction Management, and Legal/Admin = 25%
(6) Well 33 Project Cost Estimate per Well 33 Preliminary Design Report
(7) Regional Urban Water Augmentation Project - Recycled Water cost estimate per Recycled Water Project Draft Basis of Design Report (RMC, September 2006)
(8) Regional Urban Water Augmentation Project - Desal cost estimate of $37M Estimated Construction Cost per phone conversation between MCWD and RMC (RMC, January 2007)



Project Number	Description	Water System	Facility Type[1]	Project Need[2]	Trigger (EDU)	CIP Year	Existing Diameter (Inches)	New Diameter (Inches)	Quantity	Unit
CIP-1	Beach Road Pipeline	Marina	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	N/A	12	2,755	LF
CIP-2	Reservation Road Pipeline	Marina		Capacity	Constructed	FY05-06	---	---	---	---
	12" Pipeline	*Marina*	*Pipeline*				*N/A*	*12*	*556*	*LF*
	18" Pipeline	*Marina*	*Pipeline*				*N/A*	*18*	*6,523*	*LF*
CIP-3	California Ave Extension	Marina	Pipeline	Capacity	Constructed	FY05-06	N/A	12	2,674	LF
CIP-4	CSUMB Fire Flow Improvements	Ord Community	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	6, 8, 10	12	2,376	LF
CIP-5	Hillcrest Water Pipeline Connection	Marina	Pipeline	Fire Flow	Constructed	FY05-06	N/A	8	335	LF
CIP-6	Imjin Road Pipeline	Ord Community	Pipeline	Fire Flow	Ex. Deficiency	FY05-06	N/A	12	2,719	LF
CIP-7	Ardennes Cir and General Jim Moore Blvd Pipeline	Ord Community	Pipeline	Capacity	Constructed	FY05-06	8, 10, 12	20	8,503	LF
	FY05-06 Total	---	---	---	---	---	---	---	---	---
CIP-8	Well 33 Project[3]	Ord Community	Well	Capacity	Planned	FY06-07	N/A	N/A	N/A	N/A
CIP-9	2nd Avenue Extension	Ord Community	Pipeline	Capacity	Ex. Deficiency	FY06-07	N/A	12	1,435	LF
CIP-10	Inter-Garrison Road PRV	Ord Community		Operations	CIP-14	FY06-07	---	---	---	---
	Existing PRV	*Ord Community*	*PRV*	*Demolish*			*N/A*	*N/A*	*1*	*LS*
	New PRV	*Ord Community*	*PRV*	*Operations*			*N/A*	*N/A*	*1*	*Each*
CIP-11	Intermediate Reservoir Demolition	Ord Community	Reservoir	Demolish	CIP-13	FY06-07	N/A	N/A	1	LS
CIP-12	Reservoir D1/D2	Ord Community		Capacity	Ex. Deficiency	FY06-07	---	---	---	---
	Demolish Reservoir D, E, E BPS	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1*	*LS*
	Reservoir D1 (2.2 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*2,200,000*	*Gal*
	E BPS (Hydropneumatic system)	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*2,000*	*GPM*
CIP-13	Reservoir A1/A2 and B/C BPS	Ord Community		Capacity	Ex. Deficiency	FY06-07				
	Reservoir A1/A2 (2.1 MG Each)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*4,200,000*	*Gal*
	B BPS (3 - 50 BHP Each (2+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*2,762*	*GPM*
	C BPS (4 - 125 BHP (3+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*4,400*	*GPM*
	Emergency PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*
	20" B Zone Pipeline	*Ord Community*	*Pipeline*				*16*	*20*	*1,365*	*LF*
	24" Sand Tank Pipeline	*Ord Community*	*Pipeline*				*N/A*	*24*	*227*	*LS*
CIP-14	Reservoir B4/B5 and Pipeline	Ord Community		Capacity	Ex. Deficiency	FY06-07	---	---	---	---
	Reservoir B4 (1.6 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1,600,000*	*Gal*
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*20*	*1,599*	*LF*
CIP-RW	Regional Urban Water Augmentation Project (Recycled Water)[4]	Marina/Ord Comm	Pipeline	Capacity	Planned	FY06-07	---	---	---	---
	FY06-07 Total	---	---	---	---	---	---	---	---	---
CIP-15	Sand Tank Demolition	Ord Community		Demolish	CIP-13	FY07-08	---	---	---	---
	Demolish Bermad valve	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*LS*
	Demolish Sand Tank	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1*	*LS*
	Demolish B/C Booster PS	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*1*	*LS*
CIP-12	Reservoir D1/D2	Ord Community		Capacity	5,000	FY07-08	---	---	---	---
	Reservoir D2 (2.2 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*2,200,000*	*Gal*
CIP-14	Reservoir B4/B5 and Pipeline	Ord Community		Capacity	12,000	FY07-08	---	---	---	---
	Reservoir B5 (1.6 MG)	*Ord Community*	*Reservoir*				*N/A*	*N/A*	*1,600,000*	*Gal*
CIP-16	Reservoir B4/B5 to East Garrison Pipeline	Ord Community	Pipeline	Capacity	CIP-14	FY07-08	N/A	12	1,348	LF
CIP-17	Coe Avenue Pipeline	Ord Community	Pipeline	Capacity	CIP-12	FY07-08	8	12	1,576	LF
DS-1	Main Gate Shopping Center	Ord Community	Pipeline	Service	1	FY07-08	N/A	12	2,200	LF
DS-2	Backdoor Reservoir C2 Pipeline	Ord Community		Capacity	1	FY07-08	---	---	---	---
	12" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*12*	*1,038*	*LF*
	16" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*3,542*	*LF*
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*
DS-3	CSUMB Fire Flow Improvements	Ord Community	Pipeline	Fire Flow	1	FY07-08	6	12	689	LF
CIP-DESAL	Regional Urban Water Augmentation Project (Desal)[5]	Marina/Ord Comm	Plant	Capacity	Planned	FY07-08	---	---	---	---
	FY07-08 Total	---	---	---	---	---	---	---	---	---
CIP-18	Reservoir B2 (1.1 MG)	Ord Community	Reservoir	Capacity	15,000	FY08-09	---	---	1,100,000	Gal
	FY08-09 Total	---	---	---	---	---	---	---	---	---
CIP-19	D BPS Upgrade	Ord Community		Capacity	3,000	FY09-10	---	---	---	---
	D BPS Upgrade (3 - 100 BHP Each (2+1))	*Ord Community*	*Pump Station*				*N/A*	*N/A*	*3,042*	*GPM*
	Pipeline	*Ord Community*	*Pipeline*				*8*	*12*	*188*	*LF*
DS-4	Armstrong Ranch Pipeline	Marina	Pipeline	Service	1	FY09-10	N/A	12	5,577	LF
DS-5	City of Monterey Pipeline and PRV	Ord Community		Service	1	FY09-10	---	---	---	---
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*5,452*	*LF*
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*
DS-6	GJM Pipeline (South of Coe Ave) and DRO PRV	Ord Community		Service	1	FY09-10	---	---	---	---
	Pipeline	*Ord Community*	*Pipeline*				*N/A*	*16*	*11,258*	*LF*
	PRV	*Ord Community*	*PRV*				*N/A*	*N/A*	*1*	*Each*
DS-7	Airport Hotel and Golf Course Pipeline	Ord Community		Fire Flow	1	FY09-10	---	---	---	---
	12" Pipeline	*Ord Community*	*Pipeline*				*8*	*12*	*2,118*	*LF*
	18" Pipeline	*Ord Community*	*Pipeline*				*N/A*	*18*	*1,861*	*LF*
DS-8	UCMBEST Pipeline	Ord Community	Pipeline	Service	1	FY09-10	N/A	12	4,259	LF
	FY09-10 Total	---	---	---	---	---	---	---	---	---
CIP-EW	Eastern Well Field (Wells 34-39)	Ord Community	Well	Capacity	Note	FY10-15	---	---	---	---
CIP-20	Well 10 to standby mode	Marina	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS
CIP-21	Well 11 to standby mode	Marina	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS
CIP-22	Well 29 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS
CIP-23	Well 30 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS
CIP-24	Well 31 to standby mode and add disinfection	Ord Community	Well	Standby	New Supply	FY10-15	N/A	N/A	1	LS
CIP-25	Reservoir 2 Demolition	Marina	Reservoir	Demolish	CIP-26	FY10-15	N/A	N/A	1	LS
CIP-26	Reservoir A3 (1.6 MG)	Ord Community	Reservoir	Capacity	3,000	FY10-15	N/A	N/A	1,600,000	Gal
DS-9	East Garrison Phase 4 Pipeline	Ord Community	Pipeline	Service	1	FY10-15	N/A	16	2,761	LF
DS-10	Eucalyptus Road Pipeline	Ord Community	Pipeline	Service	1	FY10-15	N/A	12	9,395	LF
DS-11	Seaside Resort Pipeline	Ord Community	Pipeline	Fire Flow	1	FY10-15	6	12	5,163	LF
DS-12	Surplus Area II Pipeline	Ord Community	Pipeline	Fire Flow	1	FY10-15	6, 8	12	5,547	LF
	FY10-15 Total	---	---	---	---	---	---	---	---	---
DS-13	RMC-Lonestar Pipeline	Marina	Pipeline	Service	1	FY15-20	N/A	12	9,395	LF
CIP-EW	Eastern Well Field (Wells 40-42)	Ord Community	Well	Capacity	Note	FY15-20	---	---	---	---
	FY15-20 Total	---	---	---	---	---	---	---	---	---
DS-14	Res Rd Pipeline @ Salinas Ave Development Pipeline	Ord Community	Pipeline	Service	1	FY20-25	N/A	12	4,050	LF
	FY20-25 Total	---	---	---	---	---	---	---	---	---

Notes:
(1) Facility Type: Pipeline, PRV, Reservoir, Pump Station
(2) Project Need: Reason for project (e.g. fire flow, service connection, looping, capacity)
(3) See Well 33 Project Preliminary Design Report for improvements.
(4) See Regional Urban Water Augmentation Project - Recycled Water documents for improvements.
(5) See Regional Urban Water Augmentation Project - Desal documents for improvements.

Figure 7.3
CAPITAL IMPROVMENT PROGRAM
WATER SYSTEM MASTER PLAN
MARINA COAST WATER DISTRICT

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January 31, 2007

Chapter 8

TIME OF USE PUMPING

This chapter presents the results of the time of use pumping analysis performed on the District's future system.

8.1 IMPROVEMENTS

In time of use pumping, energy costs are reduced by not pumping during peak energy rate hours. The same amount of water must now be pumped during an 18-hour day rather than a 24-hour day based on the District's energy rate schedule that shows six peak hours. During the peak energy period the District must rely solely on its reservoirs to supply water to its customers. Figure 8.1 illustrates the time of use pumping concept. While energy costs decrease, capital costs increase due to larger reservoirs, pump stations, and pipelines, Time of use becomes attractive when little or no improvements to the existing system must be made to accommodate the additional flow in a compressed pumping time. The following are general improvements to the system that must be made to accommodate time of use pumping:

- Reservoirs approximately 10 percent larger.
- Pump stations approximately 33 percent larger.
- Larger transmission pipelines.
- Additional projects not previously identified.

Table 8.1 and Figure 8.2 present the additional or incremental improvements necessary to accommodate time of use pumping. All pump stations and future reservoirs have increased in size. One pipeline was identified as being deficient, the Main-C BPS to D BPS pipeline. This pipeline is adequate in the future for non time of use pumping and would only need to be upsized if time of use pumping is implemented. While these improvements are intended to be all inclusive with the existing knowledge of future conditions, additional projects may be necessary due to unknowns in the District's future water supply.

8.2 COST ANALYSIS

The cost analysis involves evaluating the two components of time of use pumping, capital and energy costs. These costs are input into a life cycle cost analysis to determine if time of use pumping will save the District money over a long period of time.

8.2.1 Capital Costs

Capital costs for the improvements identified previously identified were calculated using the same cost estimation methodologies presented in Chapter 7. The capital costs are summarized in Table 8.2.

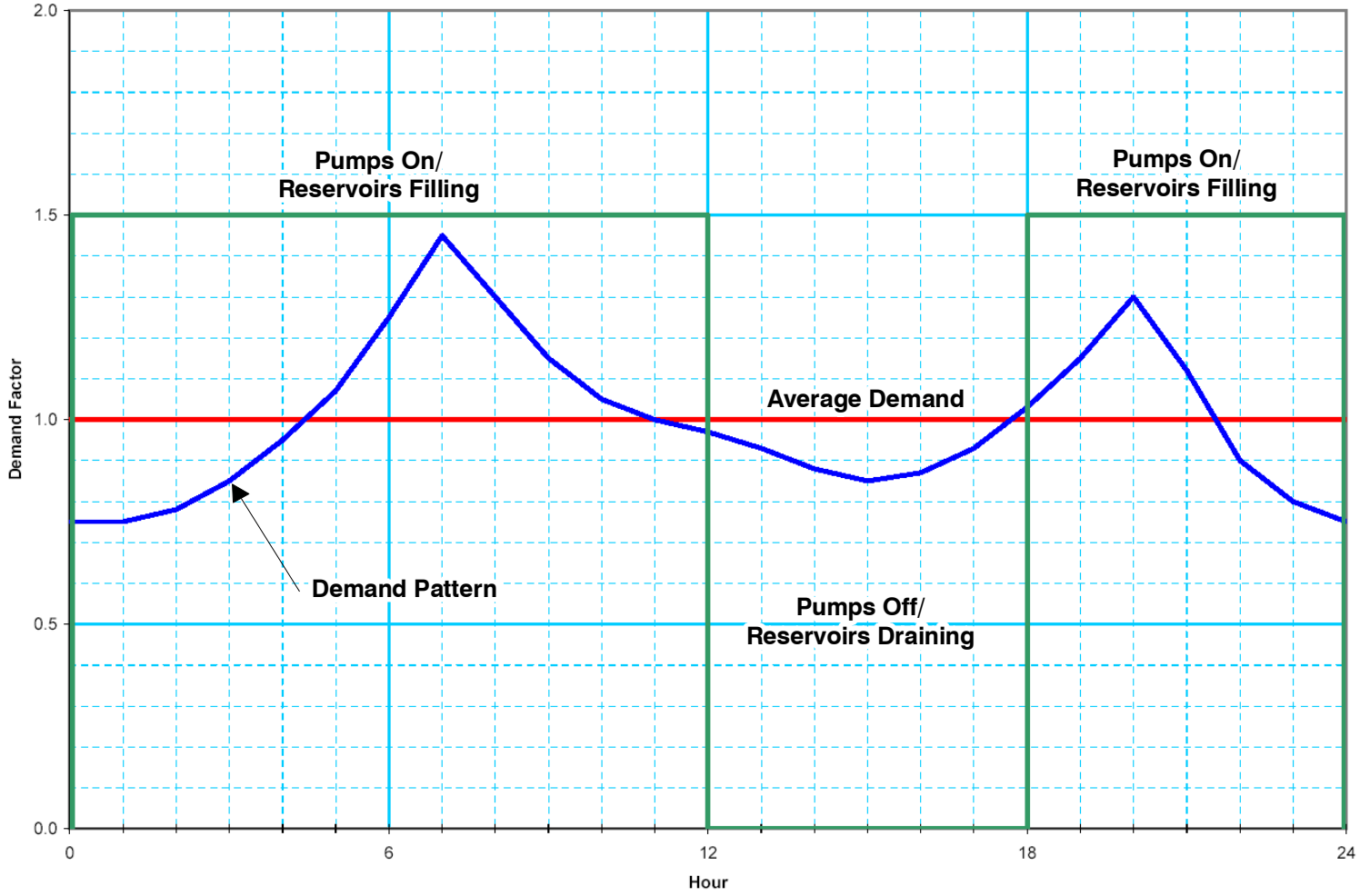

Figure 8.1
TIME OF USE DIURNAL
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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October 18, 2006

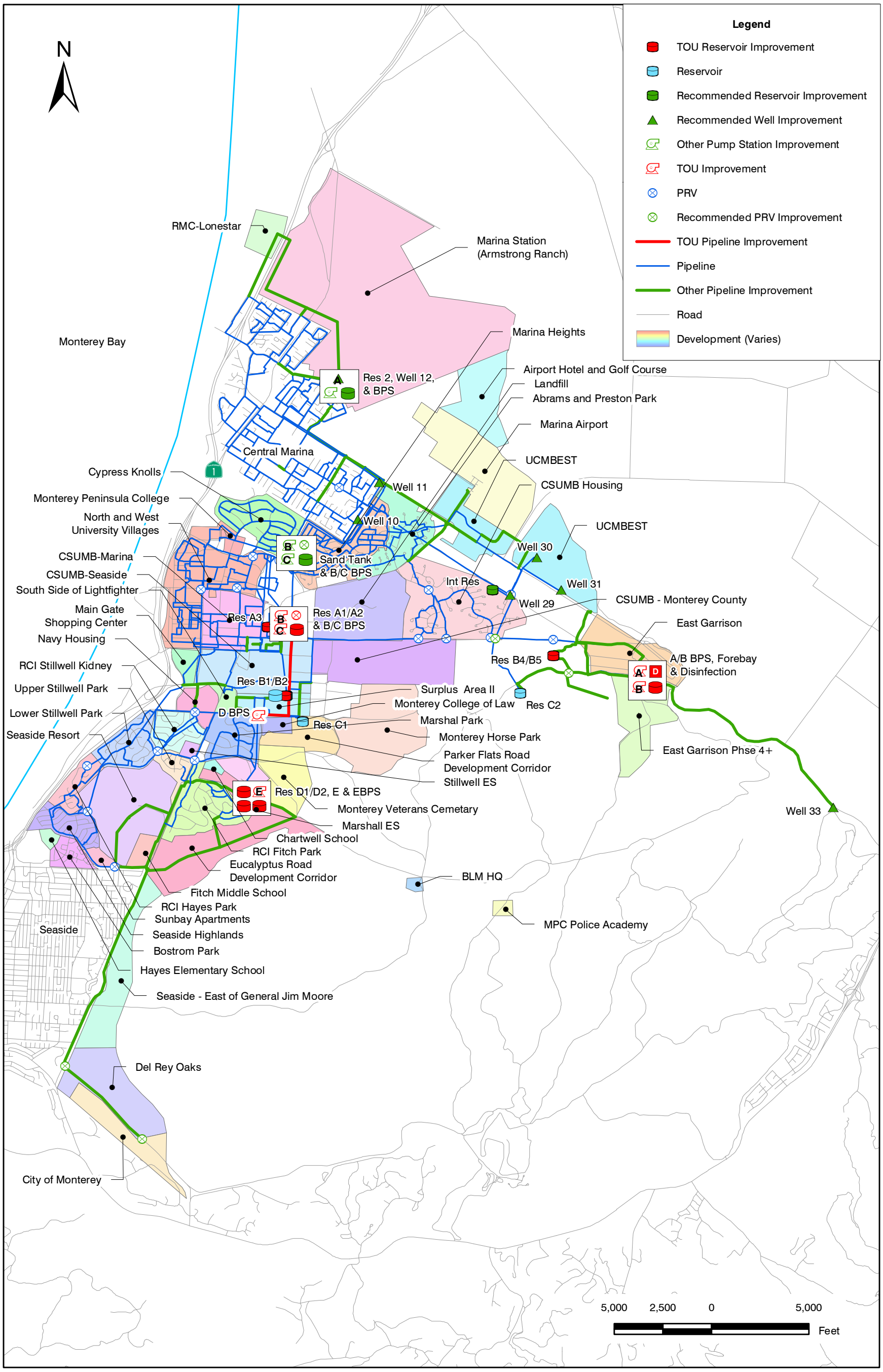

Figure 8.2
TIME OF USE IMPROVEMENTS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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November 6, 2006

Table 8.1 Time of Use Pumping Improvements
Water Master Plan
Marina Coast Water District

Facility	No Time of Use Pumping	Time of Use Pumping	Difference
ASP[1]-A BPS[2]	3,770 gpm	5,010 gpm	+ 1,240 gpm
ASP-B BPS	10,450 gpm	13,900 gpm	+ 3,450 gpm
Main-B BPS	2,760 gpm	3,670 gpm	+ 910 gpm
Main-C BPS	4,400 gpm	5,850 gpm	+ 1,450 gpm
D BPS	3,040 gpm	4,050 gpm	+ 1,010 gpm
E BPS	2,000 gpm	2,660 gpm	+ 660 gpm
Reservoir A1	2.1 MG	2.3 MG	+ 0.2 MG
Reservoir A2	2.1 MG	2.3 MG	+ 0.2 MG
Reservoir A3	1.6 MG	1.8 MG	+ 0.2 MG
Reservoir B2	1.1 MG	1.3 MG	+ 0.2 MG
Reservoir B4	1.6 MG	1.8 MG	+ 0.2 MG
Reservoir B5	1.6 MG	1.8 MG	+ 0.2 MG
Reservoir D1	2.2 MG	2.4 MG	+ 0.2 MG
Reservoir D2	2.2 MG	2.4 MG	+ 0.2 MG
Main-C BPS to D BPS Pipeline (6,200 LF)	24-inches	30-inches	6-inches

Notes:
(1) ASP = Ammo Supply Point.
(2) BPS = Booster Pump Station.

Table 8.2 Capital Costs
Water Master Plan
Marina Coast Water District

Facility Type	No Time of Use Pumping (24-hour)	Time of Use Pumping (18-hour)	Difference
Reservoirs	$19.1M	$19.4M	+ $0.3M
Pump Stations	$4.2M	$4.9M	+ $0.7M
Pipelines	$0M	$1.8M	+ $1.8M
Total	**$23.3M**	**$26.1M**	**+ $2.8M**

Notes:
(1) Costs represent Total Project Cost as described in Chapter 7.

The capital costs for time of use pumping are $2.8 million (M) greater than that of no time of use pumping. The biggest cost difference is in pipeline cost since the pipelines only need to improved with time of use pumping. The differences in reservoir and pump station costs are smaller because they are incremental size improvements and not replacement facilities.

8.2.2 Energy Costs

Energy costs were calculated using the Pacific Gas and Electric (PG&E) rate schedule presented in Table 8.3. The rate schedule is separated by season and time of day with summer peak times having the highest rate. Using the PG&E rate schedule in Table 8.3, the average annual energy costs were calculated using the following equations:

No Time of Use Pumping = [184 days x ($0.25973/KWH x 6 hours/day + $0.12367/KWH x 7 hours/day + $0.07965/KWH x 11 hours/day) + 181 days x ($0.13431/KWH x 6 hours/day + $0.13431/KWH x 7 hours/day + $0.09259/KWH x 11 hours/day) x Total Pump Power in KW / 1.5 (MDD to ADD peaking factor)

Time of Use Pumping = [184 days x ($0.12367/KWH x 7 hours/day + $0.07965/KWH x 11 hours/day) + 181 days x ($0.13431/KWH x 7 hours/day + $0.09259/KWH x 11 hours/day) x Total Pump Power in KW / 1.5 (MDD to ADD peaking factor)

Table 8.3 PG&E Rate Schedule
Water Master Plan
Marina Coast Water District

PG&E Rate	Summer (May 1 - Oct. 31)	Winter (Nov. 1 - Apr. 30)
Peak (Noon - 6:00 PM)	$0.25973	$0.13431
Part-Peak (8:30 AM - Noon, 6:00 PM - 9:30 PM)	$0.12367	$0.13431
Off Peak (9:30 PM - 8:30 AM)	$0.07965	$0.09259

8.2.3 Life Cycle Cost Analysis

The capital and energy costs were then evaluated in a life cycle cost analysis with a 4 percent inflation and 9 percent discount rate over a 75-year period. A 75-year period was chosen because it represents the useful life of a reservoir and pipeline. Pump stations, with a shorter life span, are replaced every 25 years in the analysis. The results of the life cycle cost analysis show that time of use pumping will save the District $6.9M over the 75 year evaluation period.

8.3 RECOMMENDATION

Although the cost analysis shows that time of use pumping is advantageous to the District over a 75 year period, there are many unknowns that could change the outcome of this analysis. The District must find additional supply sources due to continued seawater intrusion and future supply shortage with existing well capacity. If future supplies are located far from the District's existing facilities, the incremental capital costs for new facilities to accommodate time of use pumping may surpass potential energy savings. It is recommended that time of use pumping be re-evaluated once the District's plans for future water supplies is more clearly defined.

Chapter 9

WATER AUGMENTATION

This chapter presents the water augmentation analysis performed on the District's future system. The water augmentation project will both increase supply and reduce demands through the use of desalinated and recycled water. The impacts of the project and improvements necessary to implement the water augmentation are presented.

9.1 SUPPLY AND DEMAND

The District is interested in implementing a water augmentation project that will move the District to use multiple water sources (i.e., well and desalinated water) and reduce demands through the use of recycled water. Water augmentation will also help to reduce the shortage between the District's allocated water rights and projected future demands. Two water augmentation scenarios were evaluated for this study.

9.1.1 3,000 AFY Scenario

The 3,000 acre-feet per year (AFY) Scenario is the District's preferred water augmentation project. The project consists of the following elements:

- 300 AFY of desalinated water from the District's idle desalination plant.
- 1,200 AFY of recycled water for the Ord Community.
- 1,200 AFY of desalinated water from a regional desalination plant with connection point at the District's old wastewater treatment plant.
- 300 AFY of recycled water for other Monterey County Water Resources Agency (MCWRA) customers.

The 3,000 AFY project results in a net 2,400 AFY for the Ord Community. Table 9.1 summarizes the demands for the 3,000 AFY scenario. The reduction in demand is due to recycled water use in the Ord Community. The amount of recycled water use was based on Phase 1 demands of the Recycled Water Project Basis of Design Report (July 2006).

Although average day demand is reduced by 1,352 AFY and supply is increased by 1,200 AFY, a shortage of 1,211 AFY of water rights still exists.

9.1.2 Maximum Water Augmentation Scenario

The maximum water augmentation scenario maximizes the District's use of recycled water based on Phase 1 and 2 demands identified in the Recycled Water Project Basis of Design Report (July 2006). The project consists of the following elements:

Table 9.1 3,000 AFY Scenario Demands (AFY)
Water Systems Master Plan
Marina Coast Water District

Zone	No Water Augmentation ADD[(1)]	No Water Augmentation MDD[(2)]	3,000 AFY Scenario ADD	3,000 AFY Scenario MDD	Difference ADD	Difference MDD
A	4,674	7,011	4,674	7,011	0	0
B	5,605	8,408	5,375	8,063	-230	-345
C	1,890	2,836	1,715	2,573	-175	-263
D	2,689	4,033	1,940	2,910	-749	-1,124
E	545	817	347	520	-198	-297
Total	***15,403***	***23,104***	**14,051**	**21,076**	***-1,352***	***-2,028***

Notes:
(1) ADD = Average Day Demand
(2) MDD = Maximum Day Demand

- 300 AFY of desalinated water from the District's idle desalination plant.
- 2,450 AFY of recycled water District-wide.
- 1,200 AFY of desalinated water from a regional desalination plant with connection point at the District's old wastewater treatment plant.
- 300 AFY of recycled water for other MCWRA customers.

Table 9.2 summarizes the demands for the maximum water augmentation scenario.

Table 9.2 Maximum Water Augmentation Scenario Demands (AFY)
Water Systems Master Plan
Marina Coast Water District

Zone	No Water Augmentation ADD[(1)]	No Water Augmentation MDD[(2)]	Max Aug. Scenario ADD	Max Aug. Scenario MDD	Difference ADD	Difference MDD
A	4,674	7,011	4,442	6,663	-232	-348
B	5,605	8,408	4,812	7,218	-793	-1,190
C	1,890	2,836	1,599	2,399	-291	-437
D	2,689	4,033	1,763	2,644	-926	-1,389
E	545	817	337	505	-208	-312
Total	***15,403***	***23,104***	12,953	19,429	***-2,450***	***-3,675***

Notes:
(1) ADD = Average Day Demand
(2) MDD = Maximum Day Demand

A shortage of water rights still exists when recycled water use is maximized. However, the shortage is small and totals 113 AFY. The maximum water augmentation scenario results in average day demand decreasing by 2,450 AFY and supply increasing by 1,200 AFY.

9.2 IMPROVEMENTS

The new demands and supply were input to the hydraulic model and improvements identified for each water augmentation scenario. Improvements were determined by using the design criteria previously identified in Chapter 3.

9.2.1 3,000 AFY Scenario

Reduction in improvements for the 3,000 AFY scenario were relatively small and impacted only reservoir and booster pump station sizes. The following is summary of the changes in improvements.

- Reduction in storage needed by 1.36 million gallons (MG).
- Reduction in booster pump station size by 352 break horsepower (BHP).
- No reduction pipeline sizes.

A significant reduction in improvements was not expected due to the small decrease in demand (~10 percent). Table 9.3 presents details of the improvements and Figure 9.1 illustrates the location of the improvements.

9.2.2 Maximum Water Augmentation Scenario

Improvements were reduced slightly more under the maximum water augmentation scenario. The following is summary of the changes in improvements.

- Reduction in storage needed by 2.46 MG.
- Reduction in booster pump station size by 352 BHP.
- No reduction pipeline sizes.

Additional water augmentation allowed reservoirs to be decreased further is volume but booster pump stations remained the same size. Table 9.3 presents details of the improvements and Figure 9.1 illustrates the location of the improvements.

Table 9.3 Water Augmentation Improvements Water Systems Master Plan Marina Coast Water District					
Facility	**No Water Augmentation**	**3,000 AFY Scenario**	**Maximum Water Augmentation**	**Difference 3,000 AFY Scenario**	**Difference Max Water Aug.**
ASP(1)-A BPS(2)	545 BHP	482 BHP	482 BHP	- 63 BHP	- 63 BHP
ASP-B BPS	727 BHP	533 BHP	533 BHP	- 194 BHP	- 194 BHP
Main-B BPS	42 BHP	37 BHP	37 BHP	- 5 BHP	- 5 BHP
Main-C BPS	376 BHP	287 BHP	287 BHP	- 89 BHP	- 89 BHP
D BPS	175 BHP	175 BHP	175 BHP	0 BHP	0 BHP
Total	**1,865 BHP**	**1,514 BHP**	**1,514 BHP**	**-352 BHP**	**-352 BHP**
Reservoir A1	2.1 MG	2.1 MG	2.1 MG	0 MG	0 MG
Reservoir A2	2.1 MG	2.1 MG	2.1 MG	0 MG	0 MG
Reservoir A3	1.6 MG	1.6 MG	1.4 MG	0 MG	- 0.2 MG
Reservoir B2	1.1 MG	0.9 MG	1.0 MG	- 0.2 MG	- 0.1 MG
Reservoir B4	1.6 MG	1.6 MG	1.4 MG	0 MG	- 0.2 MG
Reservoir B5	1.6 MG	1.6 MG	1.4 MG	0 MG	- 0.2 MG
Reservoir D1	2.2 MG	1.8 MG	1.7 MG	- 0.4 MG	- 0.5 MG
Reservoir D2	2.2 MG	1.8 MG	1.7 MG	- 0.4 MG	- 0.5 MG
Total	**14.5 MG**	**13.5 MG**	**12.8 MG**	**-1.0 MG`**	**-1.7 MG**

Notes:
(1) ASP = Ammo Supply Point.
(2) BPS = Booster Pump Station.

9.3 COST ANALYSIS

Total project costs for the improvements identified previously identified were calculated using the same cost estimation methodologies presented in Chapter 7. The costs are summarized in Table 9.4.

Table 9.4 Improvement Costs Water Systems Master Plan Marina Coast Water District					
Facility Type	**No Water Augmentation**	**3,000 AFY Scenario**	**Maximum Water Augmentation**	**Difference 3,000 AFY Scenario**	**Difference Max Water Aug.**
Reservoirs	$19.1M	$18.8M	$18.7M	- $0.3M	- $0.4M
Pump Stations	$4.2M	$4.0M	$4.0M	- $0.2M	- $0.2M
Pipelines	$0M	$0M	$0M	$0M	$0M
Total	**$23.3M**	**$22.8M**	**$22.7M**	**- $0.5M**	**- $0.6M**

Notes:
(1) Costs represent Total Project Cost as described in Chapter 7.

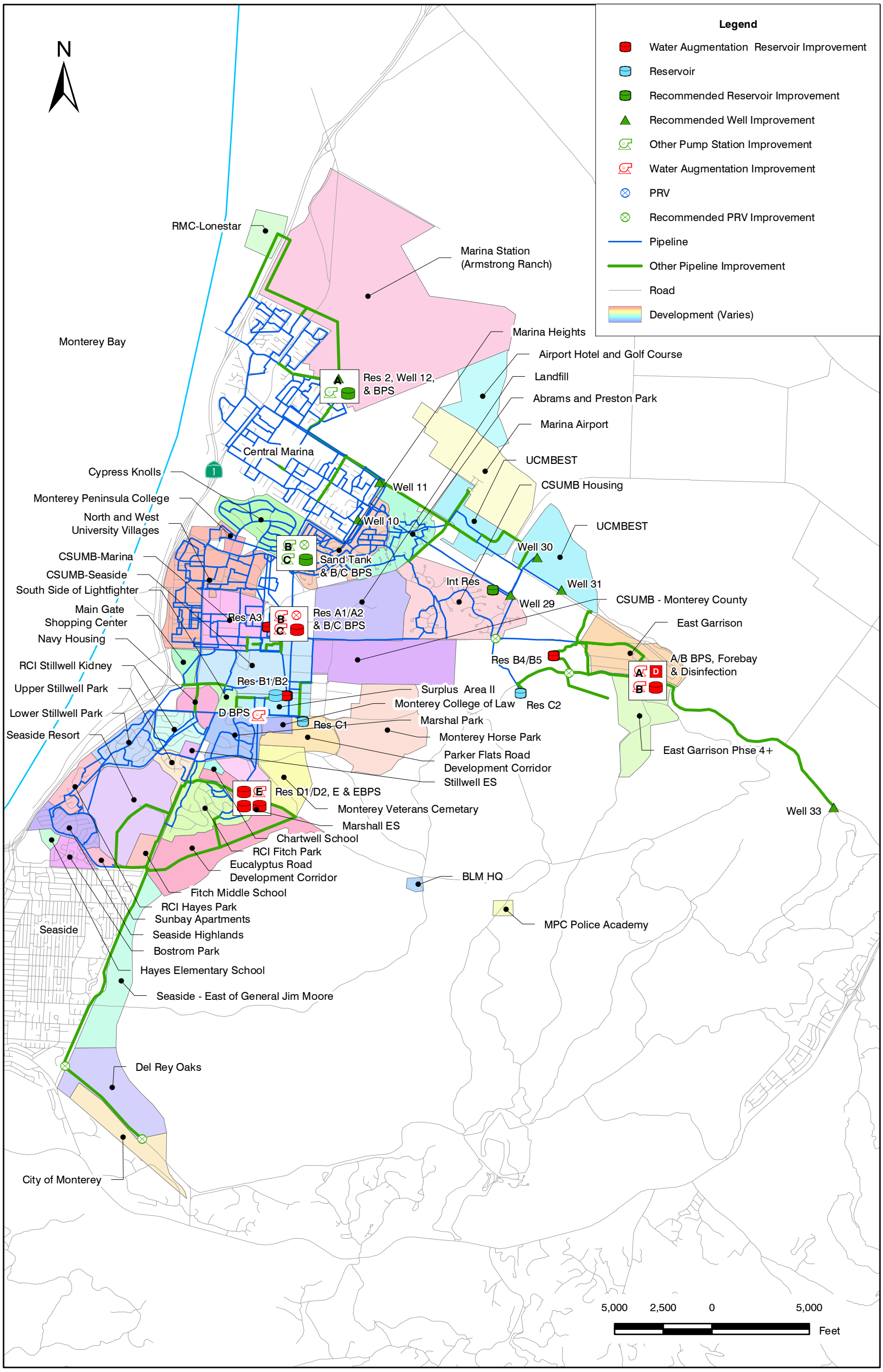

Figure 9.1
WATER AUGMENTATION IMPROVEMENTS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

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November 6, 2006

With water augmentation, the District can save between $0.5 million (M) and $0.6M in improvements. There is a $0.1M difference between the 3,000 AFY scenario and the maximum water augmentation scenario. The cost savings is minimal because the improvements are incremental reductions and not complete project eliminations.

9.4 RECOMMENDATIONS

As expected, water augmentation will reduce the District's Capital Improvement Plan (CIP). However, since the difference between the two scenarios is minimal, it is recommended that the 3,000 AFY project be implemented due to lower capital costs in the construction of a recycled water distribution system. While $0.5M in savings in not substantial, water augmentation also benefits the District by having a variety of dependable water sources, reduces irrigation demands, and lessens the shortage between the District's water rights and demand.

APPENDIX - CIP PROJECT SHEETS

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-1
BEACH ROAD PIPELINE

Project Trigger

Trigger: Existing Deficiency

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [x] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

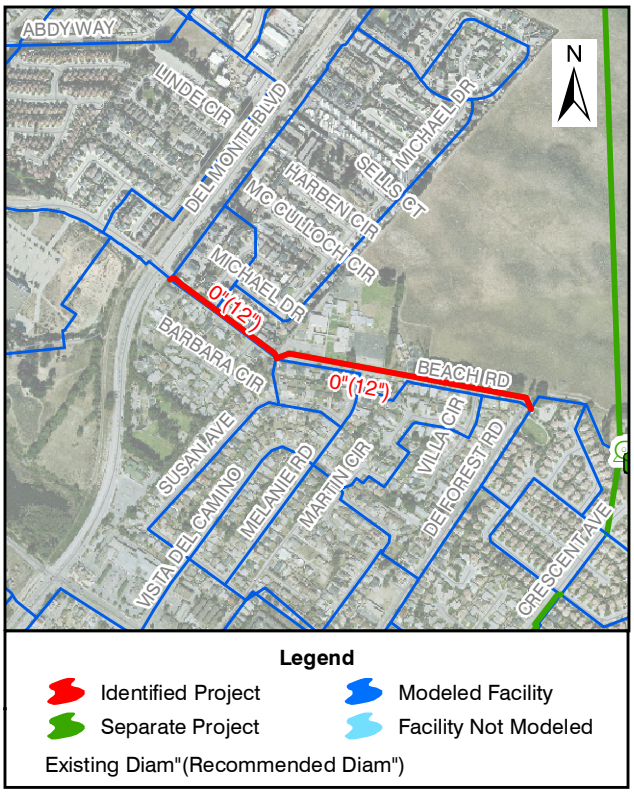
- [x] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [x] Fire Flow
- [ ] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$253,000
Contractor's OHP, GC's, ST (28.5%):	$ 72,000
Constr. Contingency (20%):	$ 51,000
Construction Total:	*$376,000*
Engr., CM, Legal/Admin (25%):	$ 94,000
Total Project Cost:	**$470,000**

Project Schedule

Design | Construction

0 months (July) — 7 (Apr) — 11 (July)

Project Description

Project CIP-1 involves construction of a new 12-inch parallel pipeline in Beach Road from De Forest Road to Del Monte Boulevard. The 2,755 foot pipeline is needed for existing fire flow deficiencies in Central Marina.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-2
RESERVATION ROAD PIPELINE

Project Trigger

Trigger: Constructed

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 69%

New Development: 31%

Environmental Documentation

- [x] CEQA Completed
- [ ] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

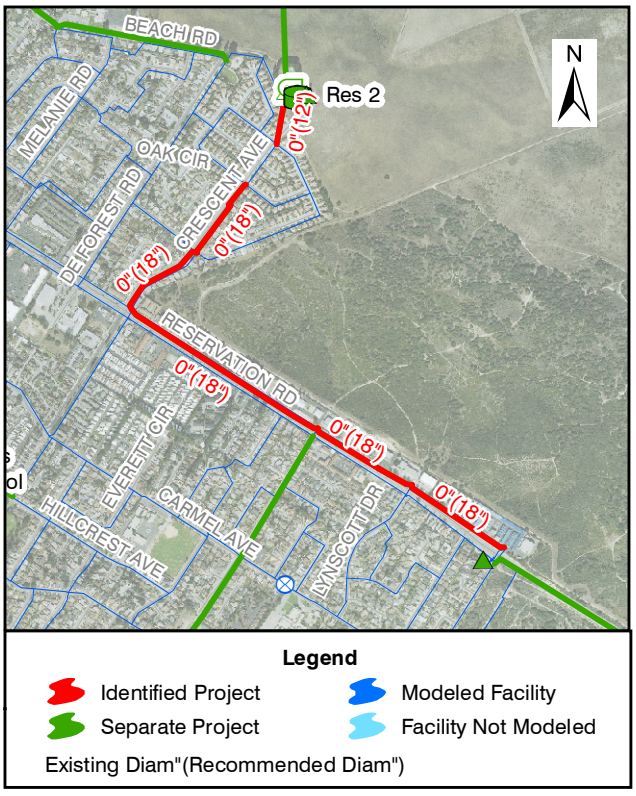
- [x] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [x] Capacity
- [ ] Fire Flow
- [ ] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$1,118,000
Contractor's OHP, GC's, ST (28.5%):	$ 319,000
Constr. Contingency (20%):	$ 223,000
Construction Total:	*$1,660,000*
Engr., CM, Legal/Admin (25%):	$ 416,000
Total Project Cost:	**$2,076,000**

Project Schedule

Design — Construction

0 months (July) — 12 (July) — 18 (Dec)

Project Description

Project CIP-2 involves construction of 556 feet of new 12-inch and 6,523 feet of new 18 inch pipelines in Reservation Road and Crescent Avenue in three segments. Segment 1 is a 18-inch pipeline in Reservation Road from Salinas Avenue to Crescent Avenue. Segment 2 is a 18-inch pipeline in Crescent Avenue from Reservation Road to Sirena Del Mar Road. Segment 3 is a new 12-inch pipeline in Crescent Avenue from Quebrada Del Mar Road to Reservoir 2. The pipeline will increase capacity in Central Marina.

carollo engineers

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-3
CALIFORNIA AVENUE EXTENSION

Project Trigger

Trigger: Constructed

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [x] CEQA Completed
- [ ] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

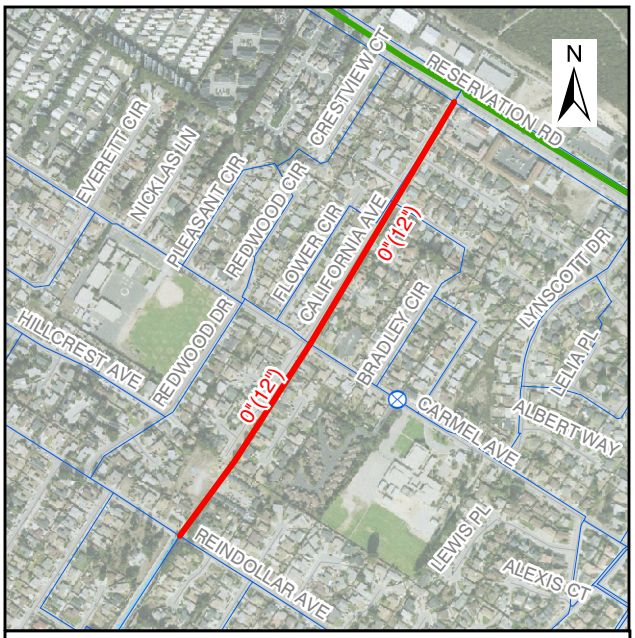
- [x] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [x] Capacity
- [ ] Fire Flow
- [ ] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$201,000
Contractor's OHP, GC's, ST (28.5%):	$ 57,000
Constr. Contingency (20%):	$ 40,000
Construction Total:	*$298,000*
Engr., CM, Legal/Admin (25%):	$ 75,000
Total Project Cost:	**$373,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 9 (June)

Project Description

Project CIP-3 involves construction of a new 12-inch pipeline in California Avenue from Reindollar Avenue to Reservation Road. The 2,674 feet pipeline will increase capacity in Central Marina.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-4
CSUMB FIRE FLOW IMPROVEMENTS

Project Trigger

Trigger: Existing Deficiency

Development: CSUMB

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☒ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

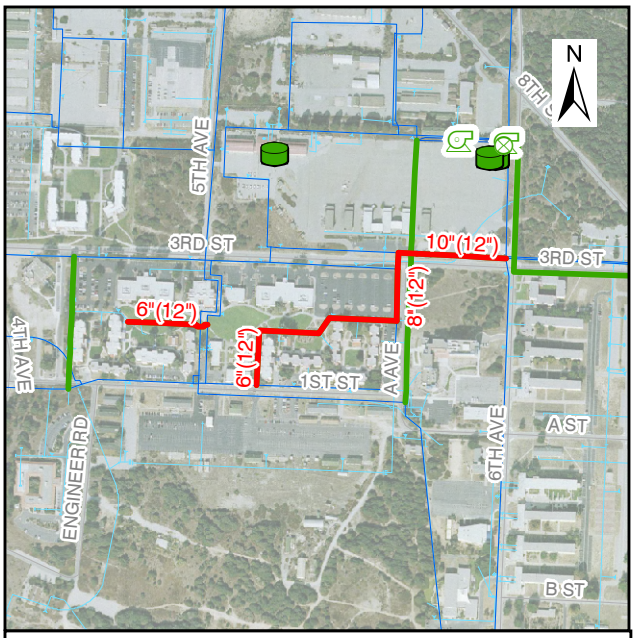
- ☒ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☐ Capacity
- ☒ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$178,000
Contractor's OHP, GC's, ST (28.5%):	$ 51,000
Constr. Contingency (20%):	$ 36,000
Construction Total:	*$265,000*
Engr., CM, Legal/Admin (25%):	$ 66,000
Total Project Cost:	**$331,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 9 (June)

Project Description

Project CIP-4 involves replacing 2,376 feet of 6, 8, and 10-inch pipeline with 12-inch pipeline in the main campus area of CSUMB (vicinity of 3rd Street and A Avenue). The pipe replacement is needed to resolve existing fire flow deficiencies.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-5
HILLCREST WATER PIPELINE CONNECTION

Project Trigger

Trigger: Constructed

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [x] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

- [x] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s) Project Need

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____
- [ ] Capacity
- [x] Fire Flow
- [ ] Service
- [ ] Other: _____

Project Cost Breakdown (2006 Dollars)

Base Construction:	$17,000
Contractor's OHP, GC's, ST (28.5%):	$ 5,000
Constr. Contingency (20%):	$ 3,000
Construction Total:	*$25,000*
Engr., CM, Legal/Admin (25%):	$ 6,000
Total Project Cost:	**$31,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Aug) 7 (Sep)

Project Description

Project CIP-5 involves construction of a new 8-inch pipeline in Hillcrest Avenue from Crescent Avenue and connecting to the existing 6-inch pipeline to the west. The 335 foot pipeline is needed for existing fire flow deficiencies at Los Arboles Middle School.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-6
IMJIN ROAD PIPELINE

Project Trigger

Trigger: Existing Deficiency

Development: Ord Community

Water System

- [ ] Marina Water System
- [x] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [x] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

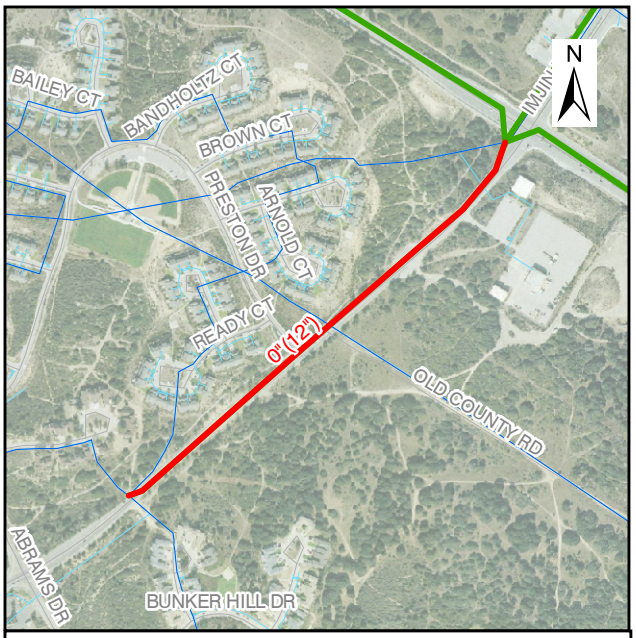
- [x] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [x] Fire Flow
- [ ] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$204,000
Contractor's OHP, GC's, ST (28.5%):	$ 58,000
Constr. Contingency (20%):	$ 41,000
Construction Total:	*$303,000*
Engr., CM, Legal/Admin (25%):	$ 76,000
Total Project Cost:	**$379,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 9 (June)

Project Description

Project CIP-6 involves construction of a new 12-inch pipeline in Imjin Road from Reservation Road to near Abrams Drive. The 2,719 foot pipeline is needed for existing fire flow deficiencies in the Existing Marina area of Ord Community.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-7
ARDENNES CIRCLE AND GENERAL JIM MOORE BOULEVARD PIPELINE

Project Trigger

Trigger: Constructed

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☒ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

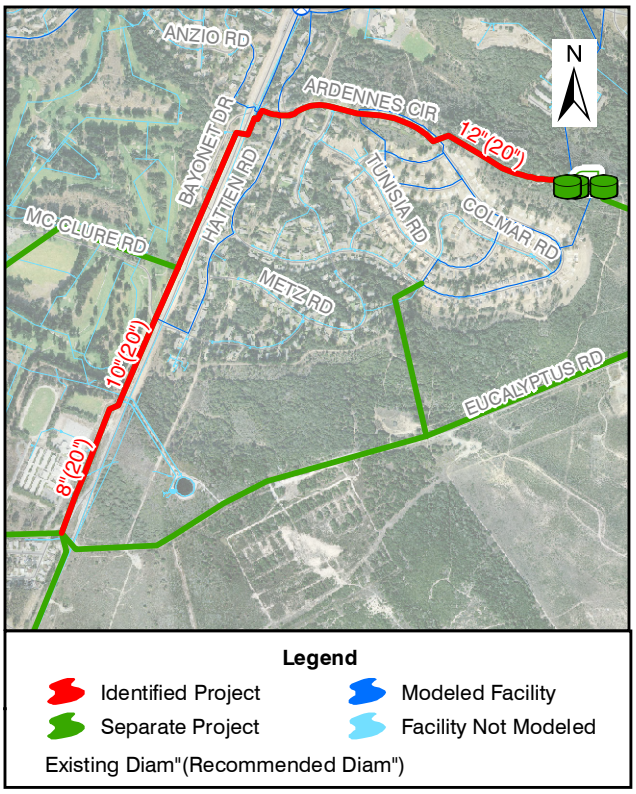
- ☒ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$1,403,000
Contractor's OHP, GC's, ST (28.5%):	$ 400,000
Constr. Contingency (20%):	$ 281,000
Construction Total:	*$2,084,000*
Engr., CM, Legal/Admin (25%):	$ 521,000
Total Project Cost:	**$2,605,000**

Project Schedule

Design | Construction

0 months (July) — 14 (Sep) — 23 (May)

Project Description

Project CIP-7 involves replacing 8,503 feet of existing 8, 10, and 12-inch pipeline with a 20 inch pipeline in 2 segments. Segment 1 replaces the existing 12-inch pipeline from Reservoir D1/D2 to Ardennes Circle to General Jim Moore Boulevard. Segment 2 replaces the existing 8 and 10-inch pipeline in General Jim Moore Boulevard from Ardennes Circle to Coe Avenue.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-8
WELL 33 PROJECT

Project Trigger

Trigger: Planned

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 32%

New Development: 68%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☒ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

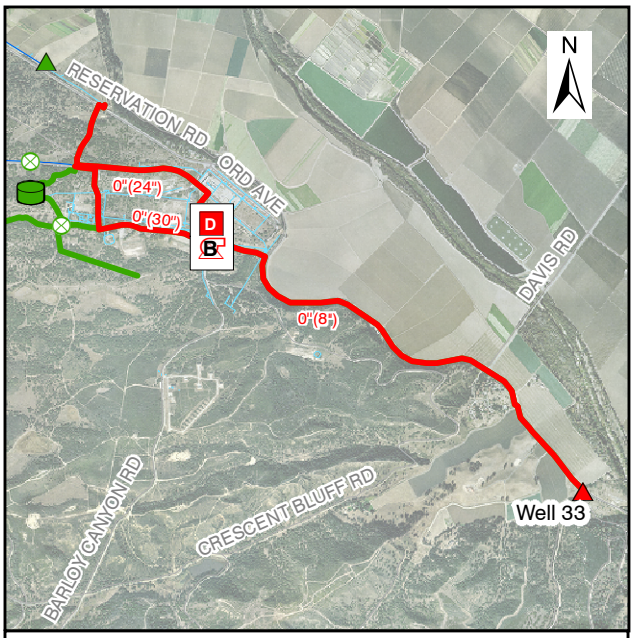
- ☐ FY05-06
- ☒ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☒ Pump Station
- ☐ Reservoir
- ☐ Well
- ☒ Other: Disinfection

Project Need

- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$3,551,000
Contractor's OHP, GC's, ST (28.5%):	$1,012,000
Constr. Contingency (20%):	$ 710,100
Construction Total:	*$5,273,100*
Engr., CM, Legal/Admin (25%):	$1,054,500
Total Project Cost:	**$6,327,600**

Project Schedule

Design | Construction

0 months (Nov) — 9 (Aug) — 21 (July)

Project Description

Project CIP-2 involves construction of a new 350 gpm well, 13,200 feet of 8-inch pipeline, 24-inch (6,700 feet) and 30-inch (4,800 feet) pipelines through East Garrison, and disinfection and a B Zone Booster Pump Station at the ASP building. The Well 33 Preliminary Design Report contains further details on this project.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-9
2ND AVENUE EXTENSION

Project Trigger

Trigger: Existing Deficiency

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

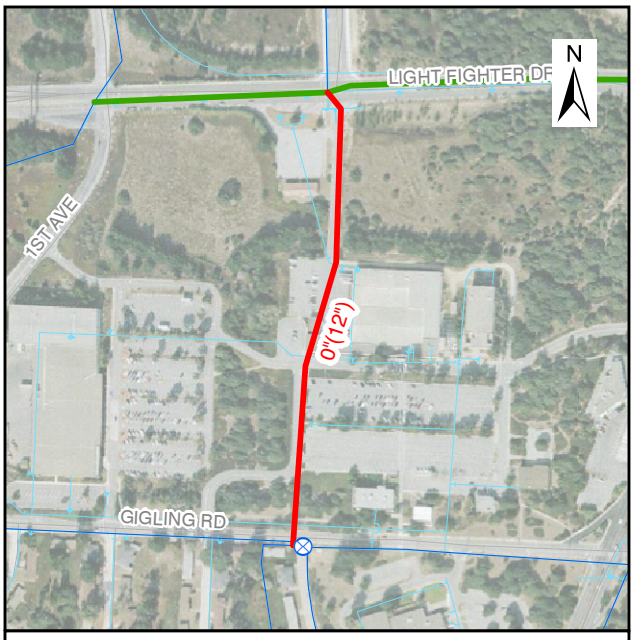
- ☐ FY05-06
- ☒ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$108,000
Contractor's OHP, GC's, ST (28.5%):	$ 31,000
Constr. Contingency (20%):	$ 22,000
Construction Total:	*$161,000*
Engr., CM, Legal/Admin (25%):	$ 40,000
Total Project Cost:	**$201,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 8 (May)

Project Description

Project CIP-9 involves construction of a new 12-inch pipeline from the 2nd Avenue pipeline and extending south through the Navy Housing development. The 1,435- foot pipeline connecting Light Fighter Drive and Gigling Road will increase capacity to the B Zone area south of Gigling Road (i.e. Hayes Park, Seaside Highlands, Lower Stillwell Park).

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October 20, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-10
INTER-GARRISON ROAD PRV

Project Trigger

Trigger: CIP-14

Development: Ord Community

Water System

- [ ] Marina Water System
- [x] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [x] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

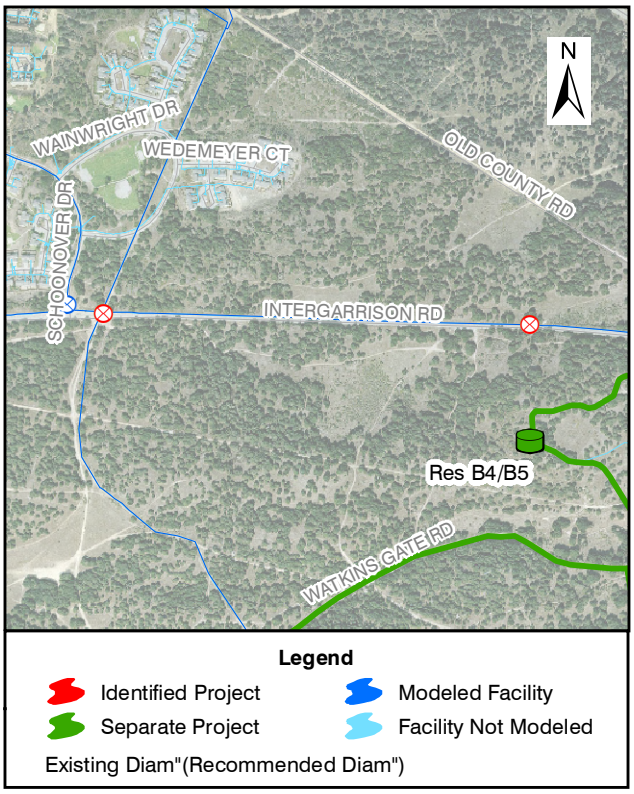
- [ ] FY05-06
- [x] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [ ] Pipeline
- [x] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [ ] Fire Flow
- [ ] Service
- [x] Other: Operations



Project Cost Breakdown (2006 Dollars)

Base Construction:	$ 65,000
Contractor's OHP, GC's, ST (28.5%):	$ 19,000
Constr. Contingency (20%):	$ 13,000
Construction Total:	*$ 97,000*
Engr., CM, Legal/Admin (25%):	$ 25,000
Total Project Cost:	**$122,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Apr) 7 (May)

Project Description

Project CIP-10 involves the demolition of an existing PRV along Inter-Garrison Road and replacing it with a new PRV at Inter-Garrison Road and the Reservoir C2 pipeline. This project is needed due to a change in system operations.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-11
INTERMEDIATE RESERVOIR DEMOLITION

Project Trigger

Trigger: CIP-13

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

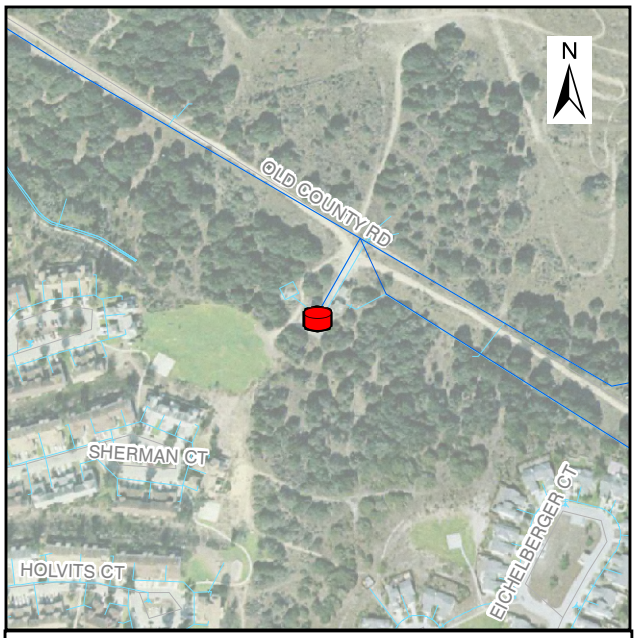
- ☐ CEQA Completed
- ☐ Prev. Environ. Review
- ☐ Notice of Exemption
- ☐ Unknown at this time
- ☒ IS/ND or IS/MND
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY09-10
- ☒ FY06-07
- ☐ FY10-15
- ☐ FY07-08
- ☐ FY15-20
- ☐ FY08-09
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ Capacity
- ☐ PRV
- ☐ Fire Flow
- ☐ Pump Station
- ☐ Service
- ☒ Reservoir
- ☒ Other: Demolition
- ☐ Well
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$100,000
Contractor's OHP, GC's, ST (28.5%):	$ 29,000
Constr. Contingency (20%):	$ 20,000
Construction Total:	*$149,000*
Engr., CM, Legal/Admin (25%):	$ 37,000
Total Project Cost:	**$186,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Apr) 7 (May)

Project Description

Project CIP-11 involves the demolition of the Intermediate Reservoir and associated disinfection facilities. These facilities will be replaced by the Reservoir A1/A2 project (CIP-13).

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-12
RESERVOIR D1/D2

Project Trigger

Trigger: Existing Deficiency

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 25%

New Development: 75%

Environmental Documentation

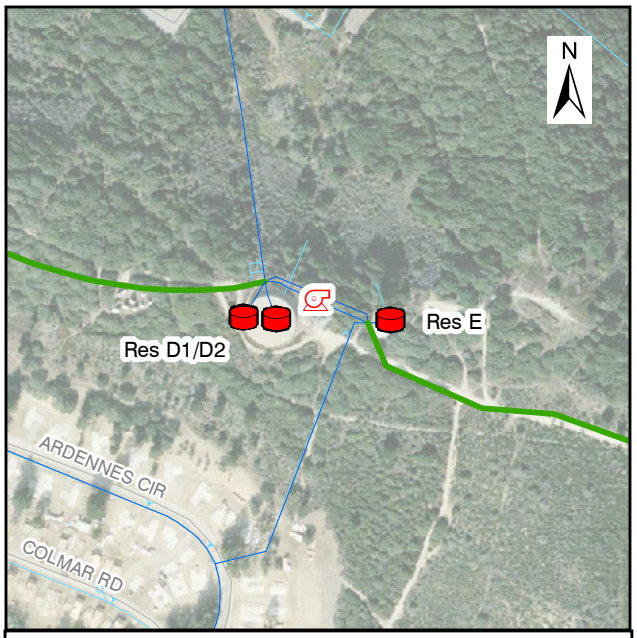
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☒ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☒ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ PRV
- ☒ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☒ Other: Demolition



Project Cost Breakdown (2006 Dollars)

Base Construction:	$2,998,000
Contractor's OHP, GC's, ST (28.5%):	$ 854,000
Constr. Contingency (20%):	$ 600,000
Construction Total:	*$4,542,000*
Engr., CM, Legal/Admin (25%):	$1,113,000
Total Project Cost:	**$5,565,000**

Project Schedule

Design | Construction

0 months (July) | 12 (July '07) | 24 (July '08)

Project Description

Project CIP-12 involves the demolition of the existing Reservoir D, E, and E Zone Booster Pump Station and replacing them with Reservoirs D1/D2 (2.2 million gallons [MG] each) and an E Zone hydro pneumatic pump station. This project was needed due to structural issues with the existing Reservoir D. Construction of Reservoir D2 may be deferred until FY07-08.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-13
RESERVOIR A1/A2 AND B/C BOOSTER PUMP STATION

Project Trigger

Trigger: Existing Deficiency

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 61%

New Development: 39%

Environmental Documentation

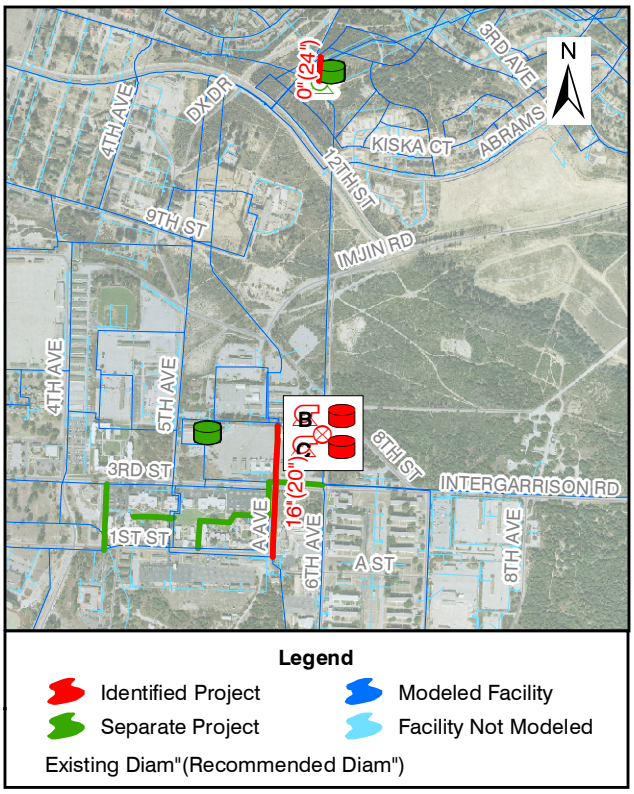
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☒ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☒ PRV
- ☒ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$3,601,000
Contractor's OHP, GC's, ST (28.5%):	$1,026,000
Constr. Contingency (20%):	$ 719,000
Construction Total:	*$5,346,000*
Engr., CM, Legal/Admin (25%):	$1,338,000
Total Project Cost:	**$6,684,000**

Project Schedule

Design | Construction

0 months (July) — 16 (Nov '07) — 28 (Nov '08)

Project Description

Project CIP-13 involves construction of Reservoir A1/A2 (2.1 MG each), the B/C Booster Pump Station (B Zone capacity of 2,762 gpm and C Zone capacity of 4,400 gpm), and an emergency PRV (B to A Zone). These facilities are tentatively located on CSUMB property on 6th Avenue just south of 8th Street pending land acquisition. In addition, 1,365 feet of 16-inch pipeline will be replaced by 20-inch pipeline from the B BPS to 1st Street. This project will replace the Sand Tank and B/C Booster Pump Station. A new 24-inch pipeline (227 feet) will need to be constructed to connect the Sand Tank fill pipe with the 24-inch C Zone pipeline.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-14
RESERVOIR B4/B5 AND PIPELINE

Project Trigger

Trigger: Existing Deficiency

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☒ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

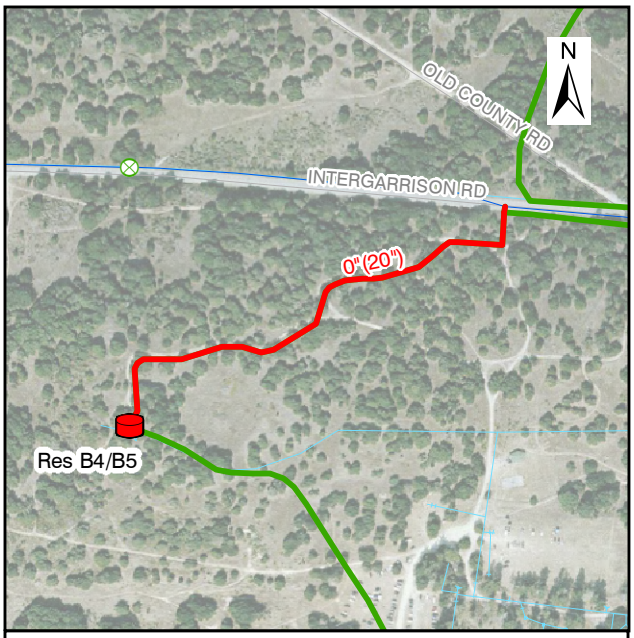
- ☐ FY05-06
- ☒ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$2,745,000
Contractor's OHP, GC's, ST (28.5%):	$ 782,000
Constr. Contingency (20%):	$ 549,000
Construction Total:	*$4,076,000*
Engr., CM, Legal/Admin (25%):	$1,019,000
Total Project Cost:	**$5,095,000**

Project Schedule

Project Description

Project CIP-14 involves construction of Reservoir B4/B5 (1.6 MG each) and a 20-inch connection pipeline (1,599 feet) to Inter-Garrison Road. The reservoirs will be constructed west of the East Garrison development. Construction of Reservoir B5 may be deferred until FY07-08.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-15
SAND TANK DEMOLITION

Project Trigger

Trigger: CIP-13

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

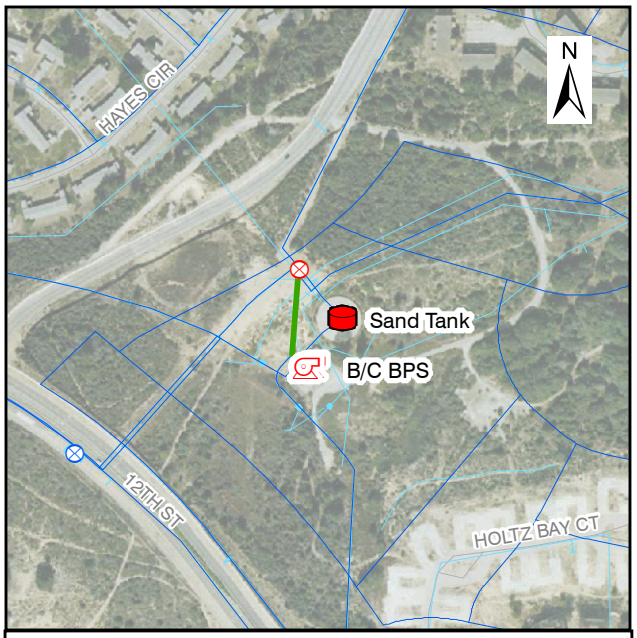
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☒ PRV
- ☒ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☐ Fire Flow
- ☐ Service
- ☒ Other: Demolition



Project Cost Breakdown (2006 Dollars)

Base Construction:	$155,000
Contractor's OHP, GC's, ST (28.5%):	$ 44,000
Constr. Contingency (20%):	$ 31,000
Construction Total:	*$230,000*
Engr., CM, Legal/Admin (25%):	$ 58,000
Total Project Cost:	**$288,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 9 (June)

Project Description

Project CIP-14 involves the demolition of Sand Tank facilities including the Bermad Valve, B/C Booster Pump Station, and the Sand Tank itself. The Reservoir A1/A2 and B/C Booster Pump Station Project (CIP-13) will replace these facilities.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-16
RESERVOIR B4/B5 TO EAST GARRISON PIPELINE

Project Trigger

Trigger: CIP-14

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

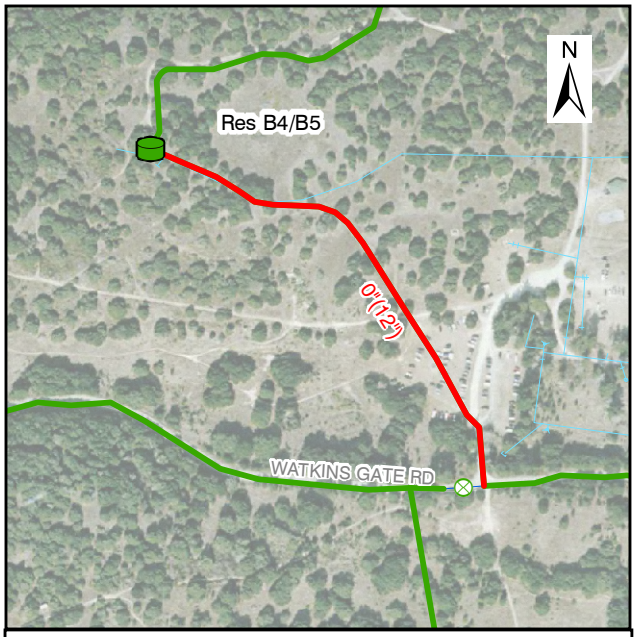
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$101,000
Contractor's OHP, GC's, ST (28.5%):	$ 29,000
Constr. Contingency (20%):	$ 20,000
Construction Total:	*$150,000*
Engr., CM, Legal/Admin (25%):	$ 38,000
Total Project Cost:	**$188,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 8 (May)

Project Description

Project CIP-16 involves construction of a 1,348 foot 12-inch pipeline from Reservoir B4/B5 to Watkins Gate Road connecting to East Garrison. The project will provide reliability and additional capacity to East Garrison for fire flow and allows Reservoir B4/B5 to fill at a faster rate.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-17
COE AVENUE PIPELINE

Project Trigger

Trigger: CIP-12

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

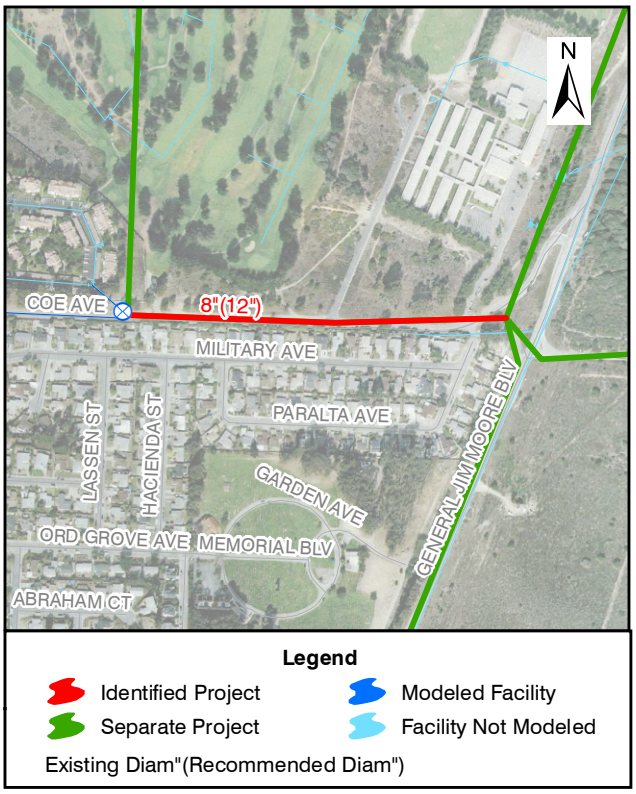
- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$118,000
Contractor's OHP, GC's, ST (28.5%):	$ 34,000
Constr. Contingency (20%):	$ 24,000
Construction Total:	*$176,000*
Engr., CM, Legal/Admin (25%):	$ 44,000
Total Project Cost:	**$220,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Apr) — 8 (May)

Project Description

Project CIP-17 involves replacing 1,576 feet of 8-inch pipeline along Coe Avenue from General Jim Moore Boulevard to the Bostrom Park PRV with a 12-inch pipeline. The project will provide additional capacity to the Seaside Highlands area through the Bostrom Park PRV from Reservoir D1/D2.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-18
RESERVOIR B2

Project Trigger

Trigger: 15,000 EDU

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 30%

New Development: 70%

Environmental Documentation

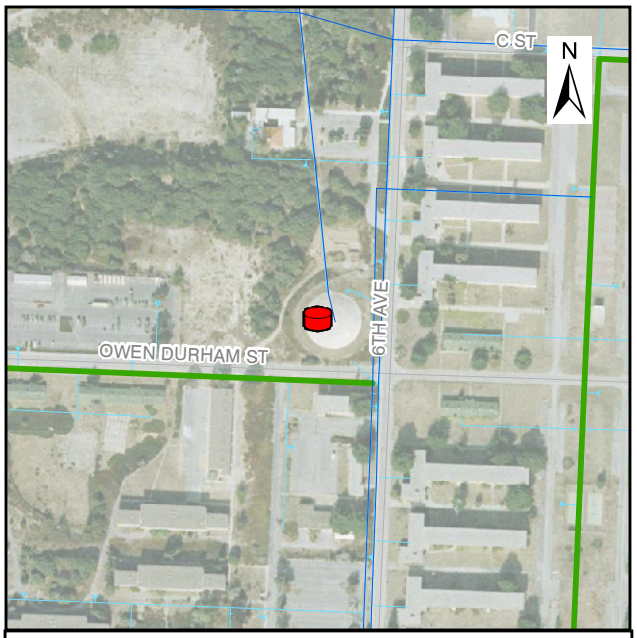
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☒ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

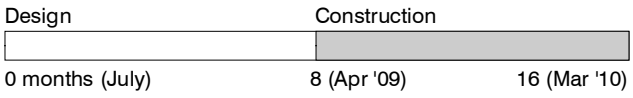
- ☐ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$1,084,000
Contractor's OHP, GC's, ST (28.5%):	$ 309,000
Constr. Contingency (20%):	$ 217,000
Construction Total:	*$1,610,000*
Engr., CM, Legal/Admin (25%):	$ 403,000
Total Project Cost:	**$2,013,000**

Project Schedule



Project Description

Project CIP-18 involves construction of a new 1.1 MG reservoir adjacent to Reservoir B1.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-19
D BOOSTER PUMP STATION UPGRADE

Project Trigger

Trigger: 3,000 EDU

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 20%

New Development: 80%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☒ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☒ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____

Project Cost Breakdown (2006 Dollars)

Base Construction:	$307,000
Contractor's OHP, GC's, ST (28.5%):	$ 88,000
Constr. Contingency (20%):	$ 62,000
Construction Total:	*$457,000*
Engr., CM, Legal/Admin (25%):	$114,000
Total Project Cost:	**$571,000**

Project Schedule

Design | Construction

0 months (July) | 9 (Apr '10) 14 (Aug '10)

Project Description

Project CIP-19 involves upgrading the existing D Zone Booster Pump Station to a capacity of 3,042 gpm. In addition, 188 feet of 8-inch pipeline will be replaced with 12-inch pipeline from the booster station to Arnhem Road along Gigling Road.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-20
WELL 10 TO STANDBY MODE

Project Trigger

Trigger: New Supply

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [x] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

- [ ] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [x] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s) Project Need

- [ ] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [x] Well
- [ ] Other: _____
- [ ] Capacity
- [ ] Fire Flow
- [ ] Service
- [x] Other: Standby

Project Cost Breakdown (2006 Dollars)

Base Construction:	$15,000
Contractor's OHP, GC's, ST (28.5%):	$ 4,000
Constr. Contingency (20%):	$ 3,000
Construction Total:	*$22,000*
Engr., CM, Legal/Admin (25%):	$ 6,000
Total Project Cost:	**$28,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Jan) 7 (Feb)

Project Description

Project CIP-20 involves removing Well 10 from normal operations and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-21
WELL 11 TO STANDBY MODE

Project Trigger

Trigger: New Supply

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [x] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [ ] Unknown at this time
- [ ] Other: _____

Project Completion

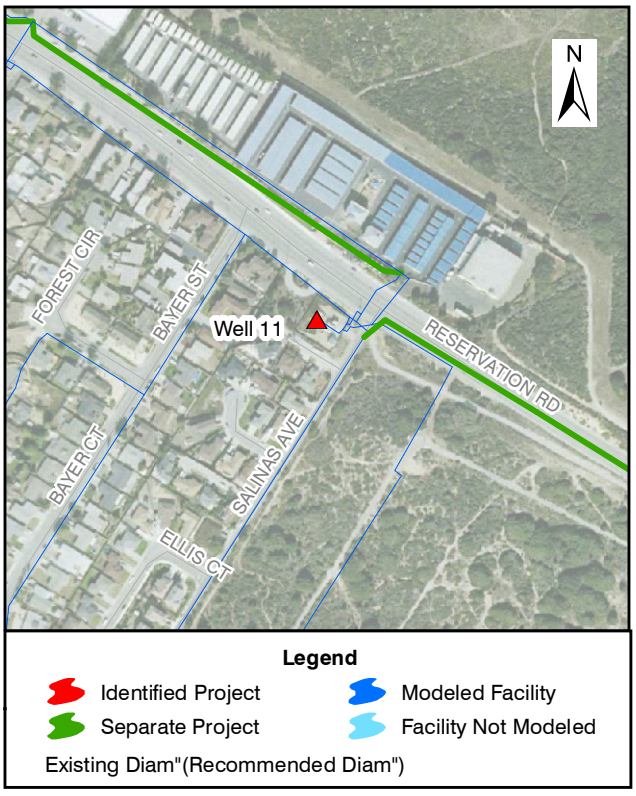
- [ ] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [x] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [ ] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [x] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [ ] Fire Flow
- [ ] Service
- [x] Other: Standby



Project Cost Breakdown (2006 Dollars)

Base Construction:	$15,000
Contractor's OHP, GC's, ST (28.5%):	$ 4,000
Constr. Contingency (20%):	$ 3,000
Construction Total:	*$22,000*
Engr., CM, Legal/Admin (25%):	$ 6,000
Total Project Cost:	**$28,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Jan) 7 (Feb)

Project Description

Project CIP-21 involves removing Well 11 from normal operations and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-22
WELL 29 TO STANDBY MODE AND ADD DISINFECTION

Project Trigger

Trigger: New Supply

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☒ Well
- ☒ Other: Disinfection
- ☐ Capacity
- ☐ Fire Flow
- ☐ Service
- ☒ Other: Standby

Project Cost Breakdown (2006 Dollars)

Base Construction:	$150,000
Contractor's OHP, GC's, ST (28.5%):	$ 43,000
Constr. Contingency (20%):	$ 30,000
Construction Total:	*$223,000*
Engr., CM, Legal/Admin (25%):	$ 56,000
Total Project Cost:	**$279,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Jan) — 8 (Feb)

Project Description

Project CIP-22 involves removing Well 29 from normal operations, adding well head disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-30
WELL 30 TO STANDBY MODE AND ADD DISINFECTION

Project Trigger

Trigger: New Supply

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

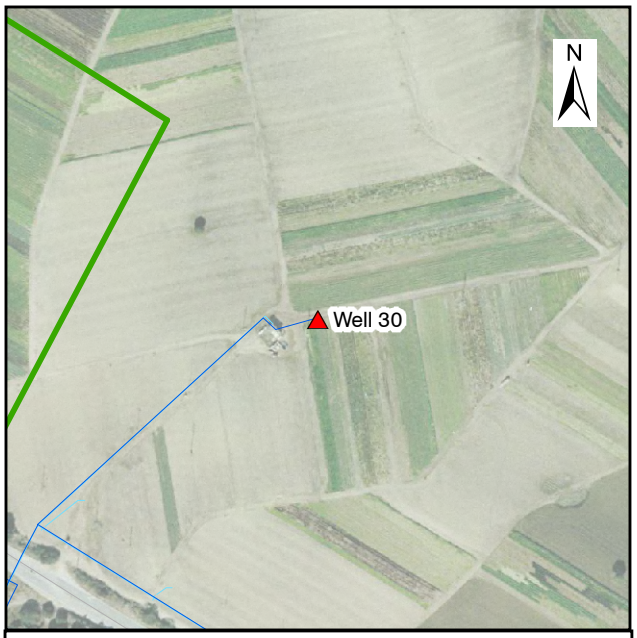
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☒ Well
- ☒ Other: Disinfection
- ☐ Capacity
- ☐ Fire Flow
- ☐ Service
- ☒ Other: Standby



Project Cost Breakdown (2006 Dollars)

Base Construction:	$150,000
Contractor's OHP, GC's, ST (28.5%):	$ 43,000
Constr. Contingency (20%):	$ 30,000
Construction Total:	*$223,000*
Engr., CM, Legal/Admin (25%):	$ 56,000
Total Project Cost:	**$279,000**

Project Schedule

Design | Construction

0 months (July) — 6 (Jan) — 8 (Feb)

Project Description

Project CIP-23 involves removing Well 30 from normal operations, adding well head disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-24
WELL 31 TO STANDBY MODE AND ADD DISINFECTION

Project Trigger

Trigger: New Supply

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

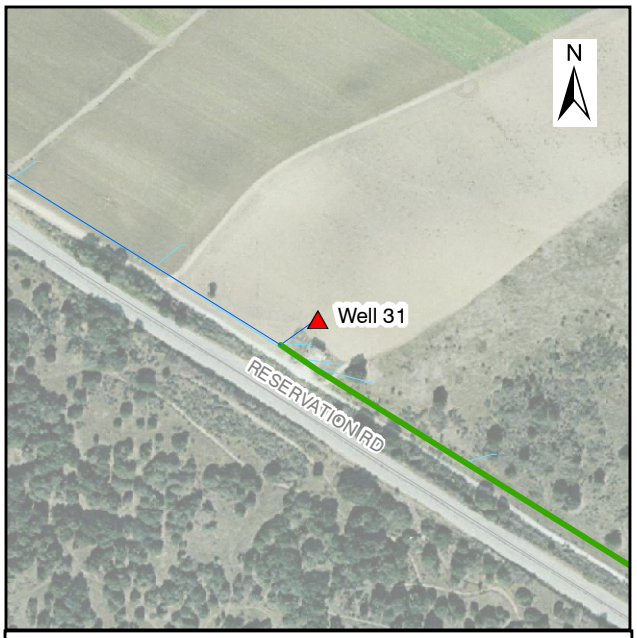
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☒ Well
- ☒ Other: Disinfection
- ☐ Capacity
- ☐ Fire Flow
- ☐ Service
- ☒ Other: Standby



Project Cost Breakdown (2006 Dollars)

Base Construction:	$150,000
Contractor's OHP, GC's, ST (28.5%):	$ 43,000
Constr. Contingency (20%):	$ 30,000
Construction Total:	*$223,000*
Engr., CM, Legal/Admin (25%):	$ 56,000
Total Project Cost:	**$279,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Jan) — 8 (Feb)

Project Description

Project CIP-24 involves removing Well 31 from normal operations, adding well head disinfection, and placing it in a standby mode. The well can be moved to standby when water quality diminishes below acceptable levels and should be replaced with equivalent capacity from a new water source.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-25
RESERVOIR 2 DEMOLITION

Project Trigger

Trigger: CIP-26

Development: Central Marina

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [x] Unknown at this time
- [ ] Other: _____

Project Completion

- [ ] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [x] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s) Project Need

- [ ] Pipeline
- [ ] PRV
- [x] Pump Station
- [x] Reservoir
- [x] Well
- [ ] Other: _____
- [ ] Capacity
- [ ] Fire Flow
- [ ] Service
- [x] Other: Demolition

Project Cost Breakdown (2006 Dollars)

Base Construction:	$250,000
Contractor's OHP, GC's, ST (28.5%):	$ 71,000
Constr. Contingency (20%):	$ 50,000
Construction Total:	*$371,000*
Engr., CM, Legal/Admin (25%):	$ 93,000
Total Project Cost:	**$464,000**

Project Schedule

Design | Construction

0 months (July) — 7 (Feb) — 11 (Jan)

Project Description

Project CIP-25 involves the demolition of Reservoir 2, Well 12, and the booster pump station. The construction of the Reservation Road Pipeline, California Avenue Extension, and A Zone reservoirs will make the Reservoir 2 facilities hydraulically redundant. However, the District plans on re-coating the interior of the reservoir in the next few years to extend life of the reservoir. Following the useful life of the reservoir, the Reservoir 2 facilities may be taken out of service and demolished.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-26
RESERVOIR A3

Project Trigger

Trigger: 3,000 EDU

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

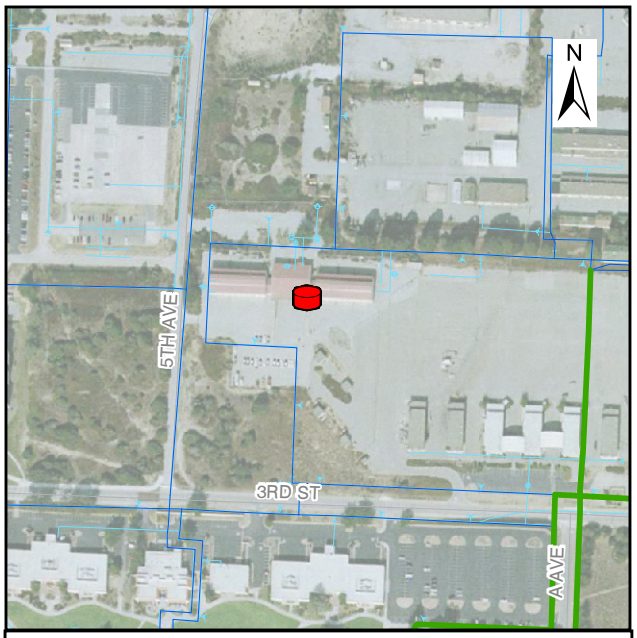
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☐ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☒ Reservoir
- ☐ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$1,240,000
Contractor's OHP, GC's, ST (28.5%):	$ 353,000
Constr. Contingency (20%):	$ 248,000
Construction Total:	*$1,841,000*
Engr., CM, Legal/Admin (25%):	$ 460,000
Total Project Cost:	**$2,301,000**

Project Schedule

Design | Construction

0 months (July) — 10 (June) — 18 (Jan)

Project Description

Project CIP-26 involves construction of a 1.6 MG reservoir north of 3rd Street between 5th and 4th Avenues. The location of Reservoir A3 is preliminary and may change at a later date.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT CIP-EW
EASTERN WELL FIELD DEVELOPMENT

Project Trigger

Trigger: Demand > 11,550 gpm/replace existing well

Development: Ord Community

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 32%

New Development: 68%

Environmental Documentation

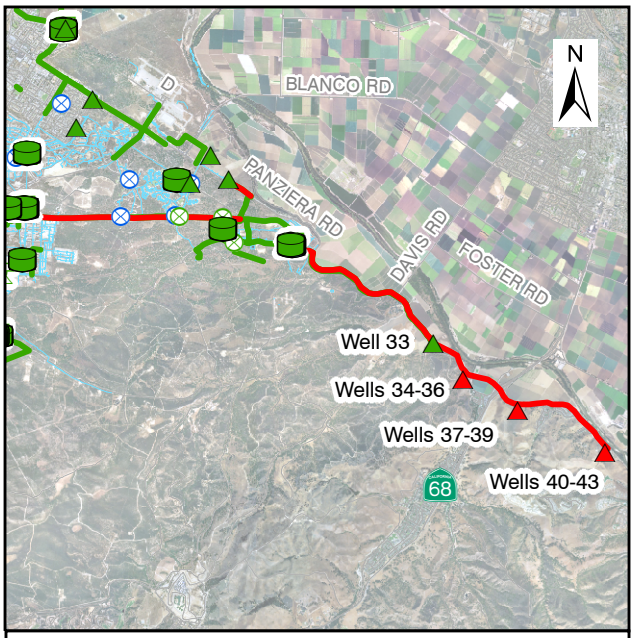
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☒ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☒ Well
- ☐ Other: _____
- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$28,218,000
Contractor's OHP, GC's, ST (28.5%):	$ 8,043,000
Constr. Contingency (20%):	$ 6,164,000
Construction Total:	*$42,425,000*
Engr., CM, Legal/Admin (25%):	$10,607,000
Total Project Cost:	**$53,032,000**

Project Schedule (Per Well)

Design | Construction

0 months | 9 | 17

Project Description

Project CIP-EW involves development of the Eastern Well Field. Nine wells with an average capacity of 1,500 gpm each are anticipated. The wells and associated transmission pipelines will connect to the Well 33 project (CIP-8). The well field location and well sizes are planning estimates only. The feasibility of an eastern well field is unknown at this time and could result in the new wells being constructed in different locations and sizes than indicated. However, the new well field will provide the District with a new water source and allow the existing wells to be placed in standby.

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-1
MAIN GATE SHOPPING CENTER

Project Trigger

Trigger: 1 EDU

Development: Main Gate Shopping Center

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

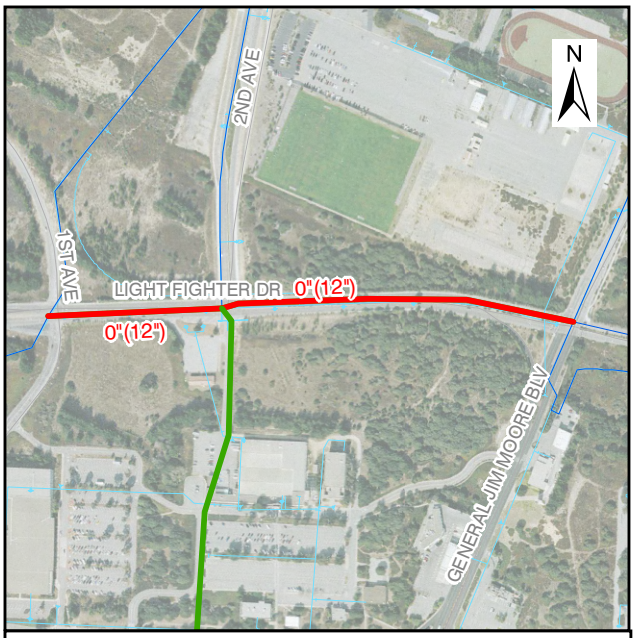
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$165,000
Contractor's OHP, GC's, ST (28.5%):	$ 47,000
Constr. Contingency (20%):	$ 33,000
Construction Total:	*$245,000*
Engr., CM, Legal/Admin (25%):	$ 61,000
Total Project Cost:	**$306,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Apr) 7 (May)

Project Description

Project DS-1 involves construction of a new 12-inch pipeline in Lightfighter Drive from 1st Avenue to General Jim Moore Boulevard. The 2,200 foot pipeline will increase capacity and provide service to the planned Main Gate Shopping Center in the B Zone.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-2
BACKDOOR RESERVOIR C2 PIPELINE

Project Trigger

Trigger: 1 EDU

Development: East Garrison

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☒ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

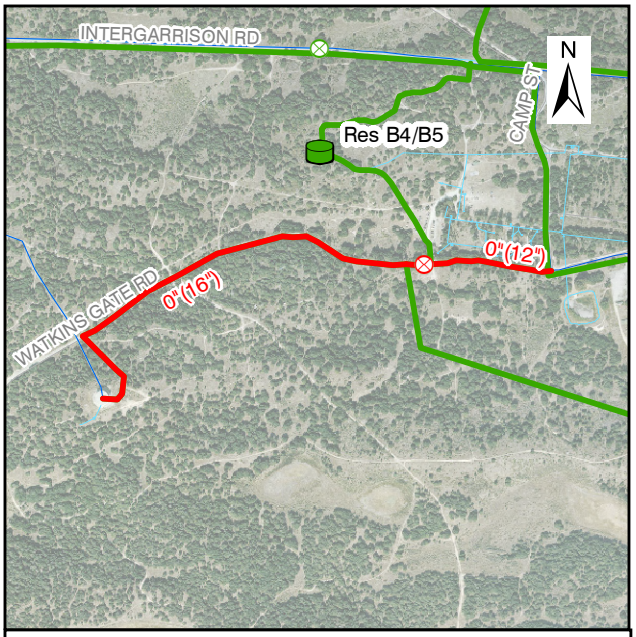
- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☒ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☒ Capacity
- ☐ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$ 558,000
Contractor's OHP, GC's, ST (28.5%):	$ 159,000
Constr. Contingency (20%):	$ 112,000
Construction Total:	*$ 829,000*
Engr., CM, Legal/Admin (25%):	$ 208,000
Total Project Cost:	**$1,037,000**

Project Schedule

Design | Construction

0 months (July) — 10 (May) — 16 (Oct)

Project Description

Project DS-2 involves constructing a new 4,580 foot pipeline along Watkins Gate Road from Reservoir C2 to East Garrison in two segments. Segment 1 is a 16-inch pipeline that runs 3,542 feet to the east. Segment 2 is a 12-inch pipeline that runs the remaining 1,038 feet to East Garrison. A PRV is needed near the end of segment 1 to provide B Zone pressure. The project will provide service to East Garrison.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-3
CSUMB FIRE FLOW IMPROVEMENTS

Project Trigger

Trigger: 1 EDU

Development: CSUMB

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 100%

New Development: 0%

Environmental Documentation

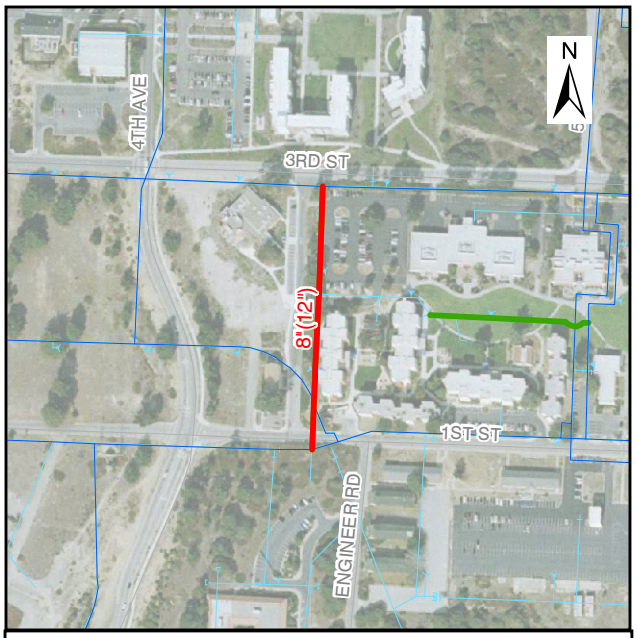
- ☐ CEQA Completed
- ☒ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☐ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☒ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☒ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$52,000
Contractor's OHP, GC's, ST (28.5%):	$15,000
Constr. Contingency (20%):	$10,000
Construction Total:	*$77,000*
Engr., CM, Legal/Admin (25%):	$19,000
Total Project Cost:	**$96,000**

Project Schedule

Design — Construction

0 months (July) — 6 (Apr) 7 (May)

Project Description

Project DS-3 involves replacing 689 feet of 8-inch pipeline with 12-inch pipeline in the CSUMB Main Campus area from 1st Street to 3rd Street. This project will alleviate fire flow deficiencies due to CSUMB growth.

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October 19, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-4
ARMSTRONG RANCH PIPELINE

Project Trigger

Trigger: 1 EDU

Development: Armstrong Ranch

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- [ ] CEQA Completed
- [x] Prev. Environ. Review
- [ ] Notice of Exemption
- [ ] Unknown at this time
- [ ] IS/ND or IS/MND
- [ ] Other: _____

Project Completion

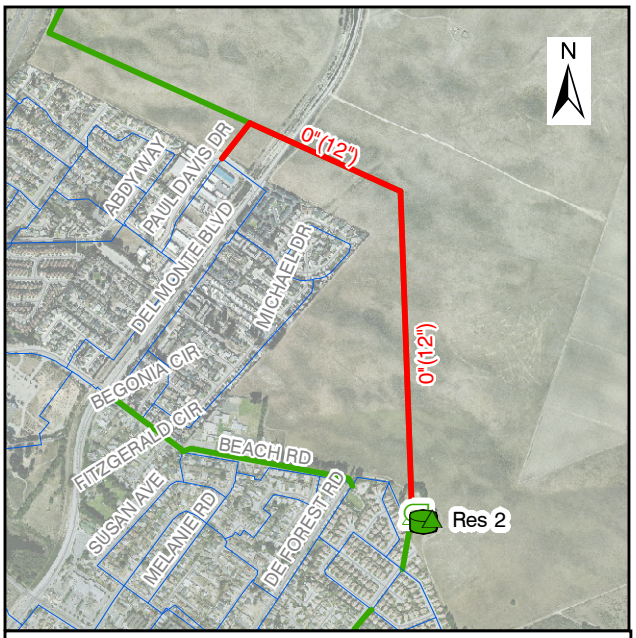
- [ ] FY05-06
- [x] FY09-10
- [ ] FY06-07
- [ ] FY10-15
- [ ] FY07-08
- [ ] FY15-20
- [ ] FY08-09
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [ ] Fire Flow
- [x] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$418,000
Contractor's OHP, GC's, ST (28.5%):	$119,000
Constr. Contingency (20%):	$ 84,000
Construction Total:	*$621,000*
Engr., CM, Legal/Admin (25%):	$155,000
Total Project Cost:	**$776,000**

Project Schedule

Design	Construction	
0 months (July)	9 (Apr)	15 (Sep)

Project Description

Project DS-4 involves construction of a new 12-inch pipeline from the Reservoir 2 vicinity through the Armstrong Ranch development and connecting to the existing 8-inch pipeline in Paul Davis Drive. The 5,577 foot pipeline will provide service to the Armstrong Ranch Development.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-5
CITY OF MONTEREY PIPELINE AND PRV

Project Trigger

Trigger: 1 EDU

Development: City of Monterey

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

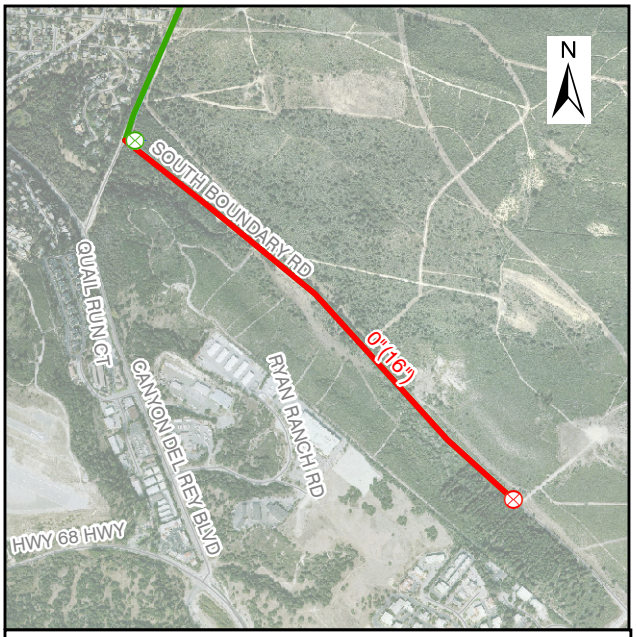
- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☒ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☒ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

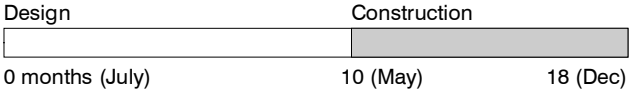
- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$ 709,000
Contractor's OHP, GC's, ST (28.5%):	$ 202,000
Constr. Contingency (20%):	$ 142,000
Construction Total:	*$1,053,000*
Engr., CM, Legal/Admin (25%):	$ 264,000
Total Project Cost:	**$1,317,000**

Project Schedule



Project Description

Project DS-5 involves constructing a new PRV and 5,452 foot 16-inch pipeline along South Boundary Road from General Jim Moore Boulevard to the City of Monterey. The project will provide service to the City of Monterey.

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October 20, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-6
DEL REY OAKS PIPELINE AND PRV

Project Trigger

Trigger: 1 EDU

Development: Seaside - Eat of GJM, DRO, City of Mont.

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

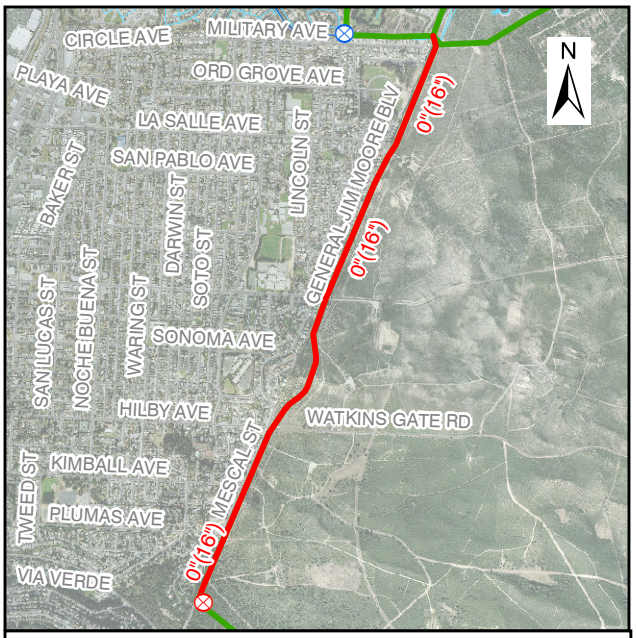
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☒ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

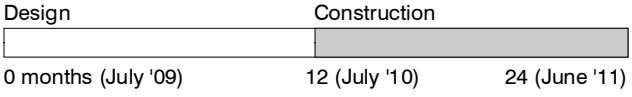
- ☒ Pipeline
- ☒ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$1,406,000
Contractor's OHP, GC's, ST (28.5%):	$ 401,000
Constr. Contingency (20%):	$ 281,000
Construction Total:	*$2,088,000*
Engr., CM, Legal/Admin (25%):	$ 523,000
Total Project Cost:	**$2,611,000**

Project Schedule



Project Description

Project DS-6 involves constructing a new PRV and 11,258 foot 16-inch pipeline along General Jim Moore Boulevard from Coe Avenue to South Boundary Road in Del Rey Oaks. The project will provide service to the Del Rey Oaks, Seaside - East of General Jim Moore, and City of Monterey developments.

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October 20, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-7
AIRPORT HOTEL AND GOLF COURSE PIPELINE

Project Trigger

Trigger: 1 EDU

Development: Airport Hotel and Golf Course

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

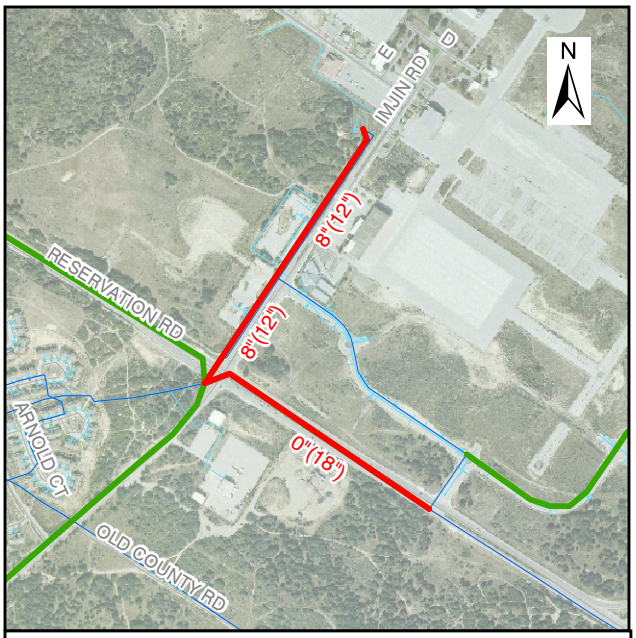
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☒ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☒ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$429,000
Contractor's OHP, GC's, ST (28.5%):	$122,000
Constr. Contingency (20%):	$ 86,000
Construction Total:	*$637,000*
Engr., CM, Legal/Admin (25%):	$159,000
Total Project Cost:	**$796,000**

Project Schedule

Design | Construction

0 months (July) | 9 (Apr) | 15 (Sep)

Project Description

Project DS-6 involves replacing 2,118 feet of existing 8-inch pipeline with a 12-inch pipeline and constructing a new 1,861 foot 18-inch pipeline. The replacement pipeline runs from Reservation Road to the Marina Airport along Imjin Road. The new pipeline runs along Reservation Road from the existing 18-inch pipeline fronting UCMBEST to Imjin Road. The project will alleviate fire flow deficiencies the Airport Hotel and Golf Course development.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-8
UCMBEST PIPELINE

Project Trigger

Trigger: 1 EDU

Development: UCMBEST

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

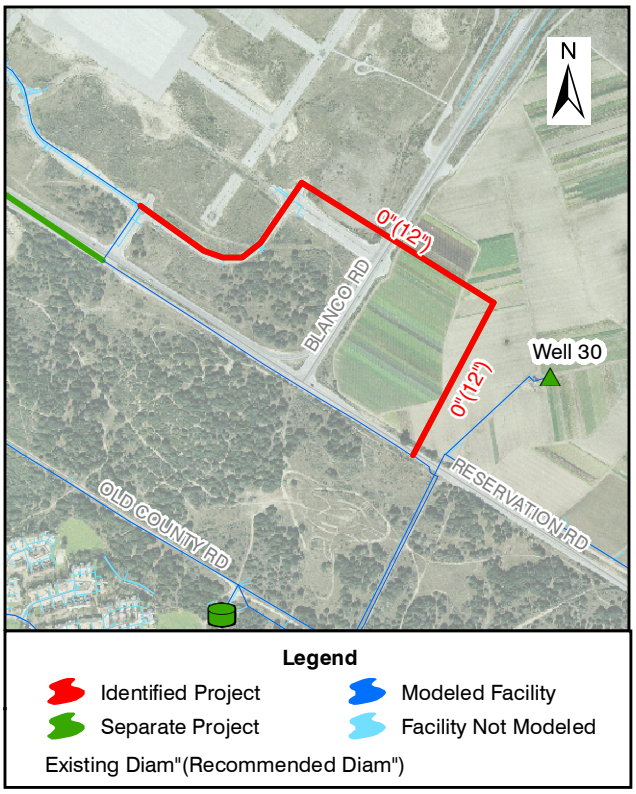
- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☒ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$319,000
Contractor's OHP, GC's, ST (28.5%):	$ 91,000
Constr. Contingency (20%):	$ 64,000
Construction Total:	*$474,000*
Engr., CM, Legal/Admin (25%):	$119,000
Total Project Cost:	**$593,000**

Project Schedule

Design | Construction

0 months (July) | 9 (Apr) | 14 (Aug)

Project Description

Project DS-8 involves construction of 4,259 feet of 12-inch pipeline from Reservation Road north through the UCMBEST development, west crossing Blanco Road, and connecting to existing pipeline. The project will provide service to UCMBEST development.

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October 20, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-9
EAST GARRISON PHASE 4 PIPELINE

Project Trigger

Trigger: 1 EDU

Development: East Garrison

Water System

- [ ] Marina Water System
- [x] Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [x] Unknown at this time
- [ ] Other: _____

Project Completion

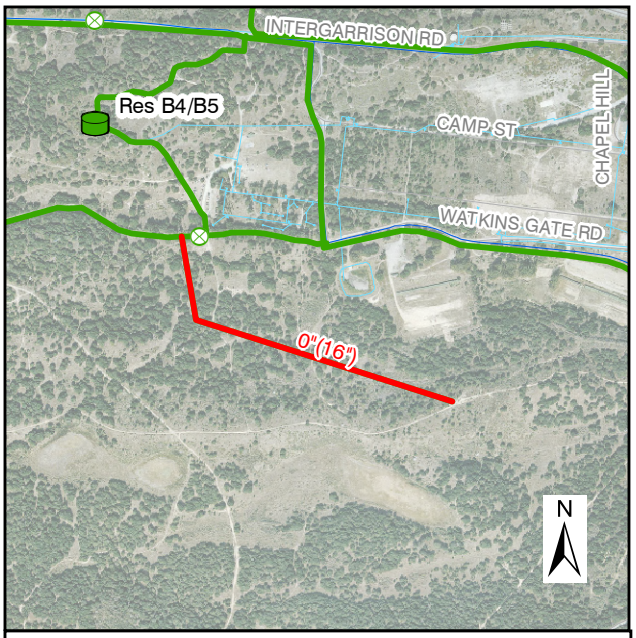
- [ ] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [x] FY10-15
- [ ] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [ ] Fire Flow
- [x] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$331,000
Contractor's OHP, GC's, ST (28.5%):	$ 94,000
Constr. Contingency (20%):	$ 66,000
Construction Total:	*$491,000*
Engr., CM, Legal/Admin (25%):	$123,000
Total Project Cost:	**$614,000**

Project Schedule

Design | Construction

0 months (July) | 9 (Apr) | 14 (Aug)

Project Description

Project DS-9 involves construction of 2,761 feet of 16-inch pipeline from the back door Reservoir C-2 line to the East Garrison Phase 4 development to provide service.

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October 20, 2006

CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-10
EUCALYPTUS ROAD PIPELINE

Project Trigger

Trigger: 1 EDU

Development: Eucalyptus Road Development Corridor

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

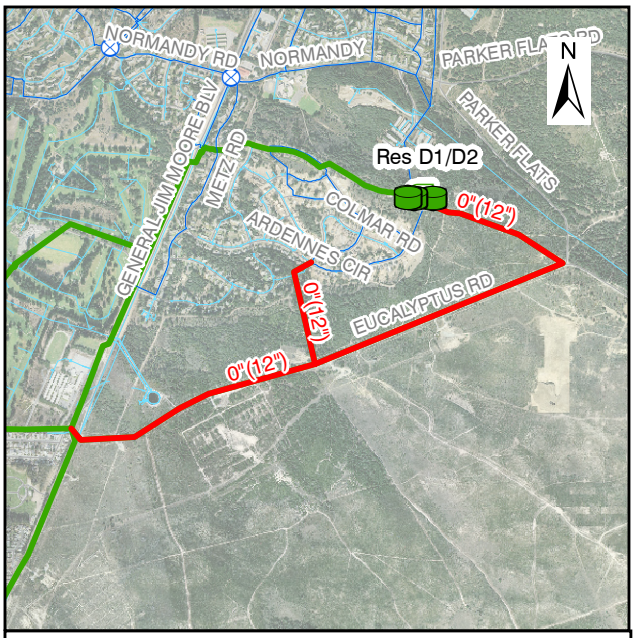
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$ 935,000
Contractor's OHP, GC's, ST (28.5%):	$ 266,000
Constr. Contingency (20%):	$ 187,000
Construction Total:	*$1,388,000*
Engr., CM, Legal/Admin (25%):	$ 347,000
Total Project Cost:	**$1,735,000**

Project Schedule

Design | Construction

0 months (July) | 12 (July) | 24 (June)

Project Description

Project DS-10 involves construction of 12,472 feet new 12-inch pipeline to provide service for development along Eucalyptus Road. A 12-inch pipeline will run from the E Zone Pump Station to General Jim Moore Boulevard along Eucalyptus Road. A second 12-inch pipeline will connect Eucalyptus Road and Ardennes Circle located in the Fitch Park development.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-11
SEASIDE RESORT PIPELINE

Project Trigger

Trigger: 1 EDU

Development: Seaside Resort

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

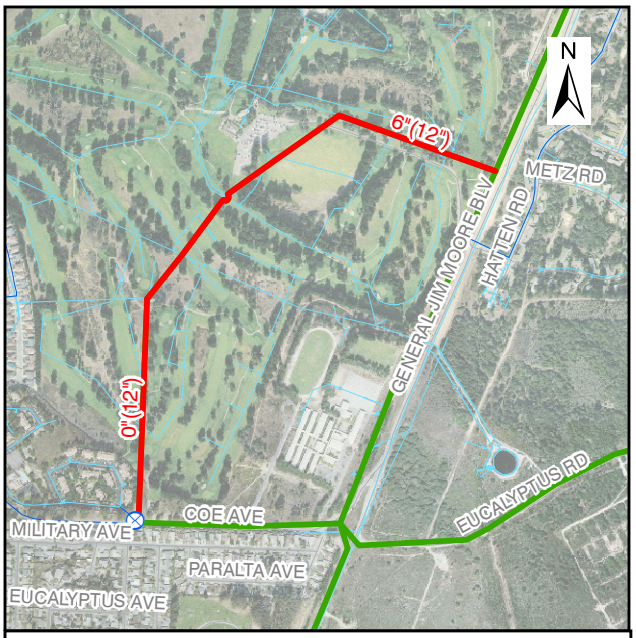
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☒ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$387,000
Contractor's OHP, GC's, ST (28.5%):	$110,000
Constr. Contingency (20%):	$ 77,000
Construction Total:	*$574,000*
Engr., CM, Legal/Admin (25%):	$144,000
Total Project Cost:	**$718,000**

Project Schedule

Design | Construction

0 months (July) — 9 (Apr) — 15 (Sep)

Project Description

Project DS-11 involves replacing 3,411 feet of 6-inch pipeline with a 12-inch pipeline and constructing a new 1,752 foot 12-inch pipeline. The 5,163 foot pipeline will run from General Jim Moore Boulevard through the development and south to Coe Avenue. The project will alleviate fire flow deficiencies created from new development in Seaside Resorts.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-12
SURPLUS AREA II PIPELINE

Project Trigger

Trigger: 1 EDU

Development: Surplus Area II

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

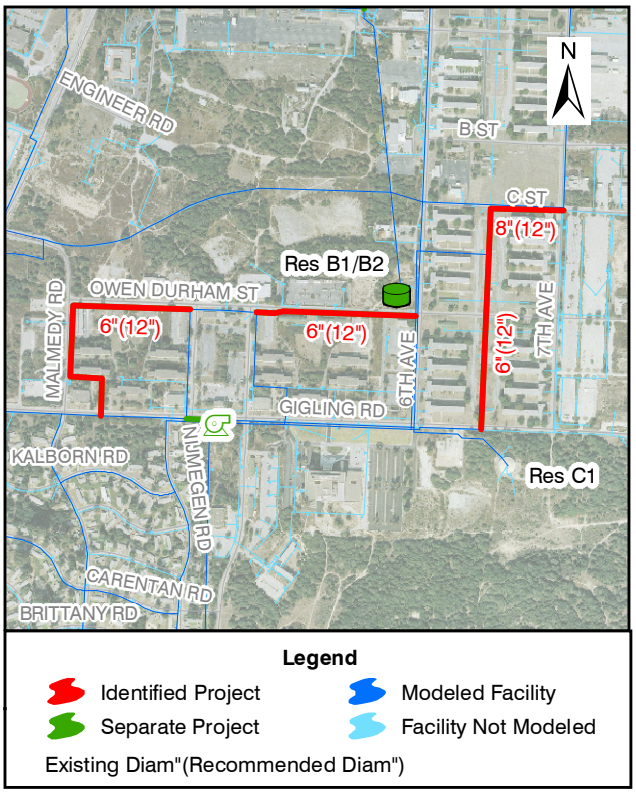
- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☒ FY10-15
- ☐ FY15-20
- ☐ FY20-25

Project Component(s) Project Need

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____
- ☐ Capacity
- ☒ Fire Flow
- ☐ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$416,000
Contractor's OHP, GC's, ST (28.5%):	$119,000
Constr. Contingency (20%):	$ 83,000
Construction Total:	*$618,000*
Engr., CM, Legal/Admin (25%):	$155,000
Total Project Cost:	**$773,000**

Project Schedule

Design | Construction

0 months (July) — 10 (May) — 16 (Oct)

Project Description

Project DS-12 involves replacing 5,547 feet of existing 6 and 8-inch pipeline with 12-inch pipelines in three segments. Segment 1 runs from Gigling Road north along Malmedy Road and east along Owen Durham Street to Arnhem Road. Segment 2 runs along Owen Durham Street from Parker Flats Road to 6th Avenue. Segment 3 runs from Gigling Road between 6th and 7th Avenues north to C Street and east to 7th Avenue. The project will alleviate fire flow deficiencies created by development in Surplus Area II.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-13
RMC-LONESTAR PIPELINE

Project Trigger

Trigger: 1 EDU

Development: RMC-Lonestar

Water System

- [x] Marina Water System
- [ ] Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- [ ] CEQA Completed
- [ ] Notice of Exemption
- [ ] IS/ND or IS/MND
- [ ] Prev. Environ. Review
- [x] Unknown at this time
- [ ] Other: _____

Project Completion

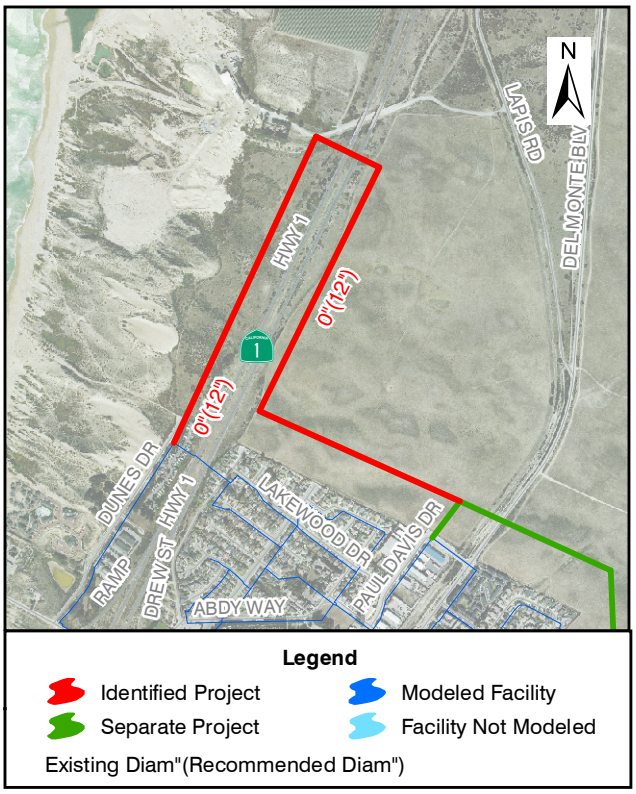
- [ ] FY05-06
- [ ] FY06-07
- [ ] FY07-08
- [ ] FY08-09
- [ ] FY09-10
- [ ] FY10-15
- [x] FY15-20
- [ ] FY20-25

Project Component(s)

- [x] Pipeline
- [ ] PRV
- [ ] Pump Station
- [ ] Reservoir
- [ ] Well
- [ ] Other: _____

Project Need

- [ ] Capacity
- [ ] Fire Flow
- [x] Service
- [ ] Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$ 705,000
Contractor's OHP, GC's, ST (28.5%):	$ 201,000
Constr. Contingency (20%):	$ 141,000
Construction Total:	*$1,047,000*
Engr., CM, Legal/Admin (25%):	$ 262,000
Total Project Cost:	**$1,309,000**

Project Schedule

Design | Construction

0 months (July) | 12 (July) | 24 (June)

Project Description

Project DS-13 involves construction of a new 12-inch pipeline from the existing 12-inch Dunes Drive pipeline to the RMC-Lonestar development, across Highway 1, and connecting to the Armstrong Ranch development. The 9,395 foot pipeline will provide service to the RMC-Lonestar Development.

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CAPITAL IMPROVEMENT PLAN PROJECT SHEETS
WATER SYSTEMS MASTER PLAN
MARINA COAST WATER DISTRICT

PROJECT DS-14
RESERVATION ROAD PIPELINE (IMJIN ROAD TO SALINAS AVENUE)

Project Trigger

Trigger: 1 EDU

Development: Unknown Development

Water System

- ☐ Marina Water System
- ☒ Ord Community Water System

Project Benefit

Existing Customers: 0%

New Development: 100%

Environmental Documentation

- ☐ CEQA Completed
- ☐ Notice of Exemption
- ☐ IS/ND or IS/MND
- ☐ Prev. Environ. Review
- ☒ Unknown at this time
- ☐ Other: _____

Project Completion

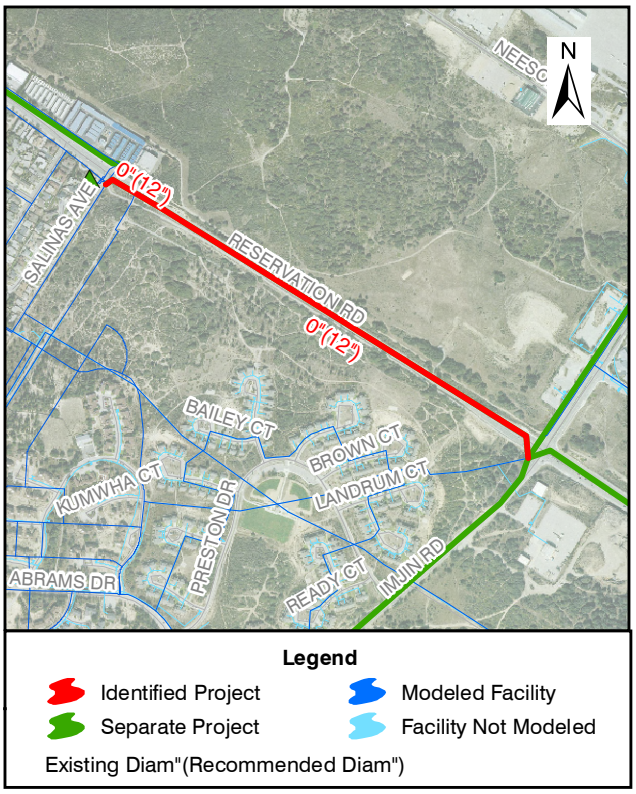
- ☐ FY05-06
- ☐ FY06-07
- ☐ FY07-08
- ☐ FY08-09
- ☐ FY09-10
- ☐ FY10-15
- ☐ FY15-20
- ☒ FY20-25

Project Component(s)

- ☒ Pipeline
- ☐ PRV
- ☐ Pump Station
- ☐ Reservoir
- ☐ Well
- ☐ Other: _____

Project Need

- ☐ Capacity
- ☐ Fire Flow
- ☒ Service
- ☐ Other: _____



Project Cost Breakdown (2006 Dollars)

Base Construction:	$304,000
Contractor's OHP, GC's, ST (28.5%):	$ 87,000
Constr. Contingency (20%):	$ 61,000
Construction Total:	*$452,000*
Engr., CM, Legal/Admin (25%):	$113,000
Total Project Cost:	**$565,000**

Project Schedule

Design | Construction

0 months (July) | 9 (Apr) | 14 (Aug)

Project Description

Project DS-14 involves construction of a new 12-inch pipeline in Reservation Road from Imjin Road to Salinas Avenue. The 4,050 foot pipeline will provide service to new development in the area south of Reservation Road.

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