ASSET MANAGEMENT MASTER PLAN

for the

SANTA FE IRRIGATION DISTRICT

Submitted by

Dexter Wilson Engineering, Inc.

SANTA FE IRRIGATION DISTRICT
Est. 1923

March 19, 2009

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EXECUTIVE SUMMARY

PURPOSE

As summarized on Table ES-1, the estimated asset value of the Santa Fe Irrigation District's (District) distribution system and the District's share of jointly owned facilities (water treatment and associated facilities) exceeds $288,000,000. This value does not include property, buildings, and fleet assets. The purpose of the Asset Management Master Plan is to evaluate the ability of the District's assets to perform according to an established set of criteria, and identify recommended capital improvement projects and associated costs.

TABLE ES-1
SFID ASSET VALUATION SUMMARY

Asset	Count or Length in feet	Total Value
SFID Assets		
Larrick Reservoir	--	$ 7,500,000
Larrick Pump Station	--	$ 750,000
Pipelines	866,866	$ 121,521,231
Valves	2,855	$ 23,936,250
Pressure Reducing Stations	38	$ 6,650,000
Fire Hydrants	2,200	$ 11,000,000
Water Services	7,130	$ 18,726,750
Water Meters	7,130	$ 2,949,225
Corporate Yard	--	$ 20,000,000
Subtotal		*$ 213,033,456*
Joint Facility Assets, SFID Share		
Cielo Pump Station	--	$ 2,293,200
SDR Dam	--	$ 8,599,500
SDR Pump Station	--	$ 2,365,000
REB Hydro Plant	--	$ 1,650,000
REB Plant	--	$ 30,250,000
Pipelines	86,169	$ 29,668,061
Meters	4	$ 550,000
Subtotal		*$ 75,375,761*
TOTAL SFID ASSET VALUE		***$ 288,409,217***

A traditional Asset Management Plan focuses on a system in its "as-is" configuration, recommends replacement requirements based on a projected useful life, and provides a plan for constructing the improvements. In the case of this report, the goal was to take the asset evaluation process a step further to evaluate how modifications to the existing system as a whole may result in improved conditions. In doing so, some elements of this report resemble

more of a master plan, hence the title of an Asset Management Master Plan (AMMP). The AMMP includes a detailed assessment of the District's distribution system assets. The assessment of the R.E. Badger Water Filtration Plant (REB Plant), and other facilities jointly owned with San Dieguito Water District (SDWD), was conducted at a lower conceptual level of analysis. One of the projects recommended in the AMMP is a more detailed master plan update for the REB Plant.

DISTRICT SERVICE AREA

The Santa Fe Irrigation District supplies water to approximately 21,300 customers on 10,200 acres of land in northern San Diego County. Over the last five years, the District has delivered an annual average of 13,500 acre-feet of potable water and 430 acre-feet of recycled water. The climate within the District service area is temperate with an average annual rainfall of approximately 12 inches occurring primarily in the months of December to April. East to west across the 6.5 miles of the District, elevations range from sea level in coastal Solana Beach to 400 feet above sea level in eastern Rancho Santa Fe.

HISTORY

The Santa Fe Irrigation District was established in 1923. It was originally established as an irrigation district to provide Lake Hodges water to agricultural users in the Rancho Santa Fe and Solana Beach areas. The District water was initially delivered to customers directly from the San Dieguito Reservoir with chlorination as the only treatment. Over time the District has transitioned from an agricultural district to a municipal district. This transition has caused major pressure and piping changes to the water delivery system. As shown on Figure ES-1, at one time the District had 20 open reservoirs within the service area to provide water to their agricultural customers. These reservoirs did not meet standards for potable water storage and all of them have been eliminated from the system. Figure ES-2 presents the existing facilities. As shown on Figure ES-2, many of these reservoirs were replaced with pressure reducing stations to regulate pressure to existing customers.

LEGEND

- Initial Boundary
- Present Boundary
- Reservoir - SFID 1957 Master Plan

Pressure Reducing Station

- Current PRS
- Abandoned PRS

ENCINITAS BL
N RANCHO SANTA FE RD
LA BAJADA
LA GRANADA
DEL DIOS HWY
SAN DIEGUITO RESERVOIR
LOMAS SANTA FE DR
I-5 NB
I-5 SB

#1 #2 #3 #4 #5 #6 #11 #12 #13 #14 #15 #16 #17 #18 #21 #23 #24 #25 #26 #27

PRS313-3 PRS313-2 PRS313-1 PRS343-2 PRS288-2 PRS360-3 PRS360-2 PRS376-1 PRS406-A4 PRS406-A2 PRS310-3 PRS338-1 PRS288-1 PRS343-1 PRS360-1 PRS406-A3 PRS406-A1 PRS406-B1 PRS310-5 PRS348-2 PRS348-1 PRS310-2 PRS310-1 PRS310-4 PRS358-1 PRS376-CMWD PRS340-1 PRS440-4 PRS340-2 PRS440-2 PRS440-3 PRS340-5 PRS340-3 PRS340-4 PRS520-1 PRS202-1 PRS202-3 PRS202-2

0 1,500 3,000 6,000 Feet

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DEXTER WILSON ENGINEERING, INC.

CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE ES–1

SFID INITIAL AND PRESENT BOUNDARIES

LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir
- Pressure Reducing Station
- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

ENCINITAS BL
N RANCHO SANTA FE RD
SAN DIEGUITO RESERVOIR
DEL DIOS HY
LA GRANADA
CIELO DE LIMAS
LINEA DEL CIELO
LOMAS SANTA FE DR
HSSE
PRS313-3
PRS313-2
PRS343-2
PRS288-2
PRS360-3
PRS360-2
PRS406-A4
PRS376-1
PRS406-A2
PRS313-1
PRS310-3
PRS338-1
PRS343-1
PRS288-1
PRS360-1
PRS406-A3
PRS406-A1
PRS340-1
PRS440-4
PRS340-7
PRS440-2
PRS440-3
PRS406-B1
PRS348-2
PRS310-5
PRS520-1
PRS340-5
PRS376-OMWD
PRS348-1
PRS340-3
PRS310-1
PRS310-2
PRS310-4
PRS202-1
PRS340-4
PRS358-1
PRS202-2
PRS202-3

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE ES–2

SFID EXISTING DISTRIBUTION SYSTEM

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CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

FINDINGS AND RECOMMENDATIONS

Identification of Capital Projects. Detailed technical criteria for distribution and storage facilities was established based upon the San Diego Water Agency Standard Specifications and Design Guidelines (WAS), the California Waterworks Standards, other industry standards, and/or specific District performance objectives. Distribution system assets were assessed relative to the performance criteria to determine if they could achieve current and projected requirements. The District's hydraulic model and GIS systems were key tools used in the assessment of existing assets. The integrity of distribution system assets, as well as the assets projected useful life, was also considered in the evaluation process.

A less detailed evaluation of REB Plant and other joint facility assets was then conducted to identify potential capital project needs. In addition to the assessment of existing assets, the planning process included identification of new facilities required to meet redundancy requirements or achieve other objectives.

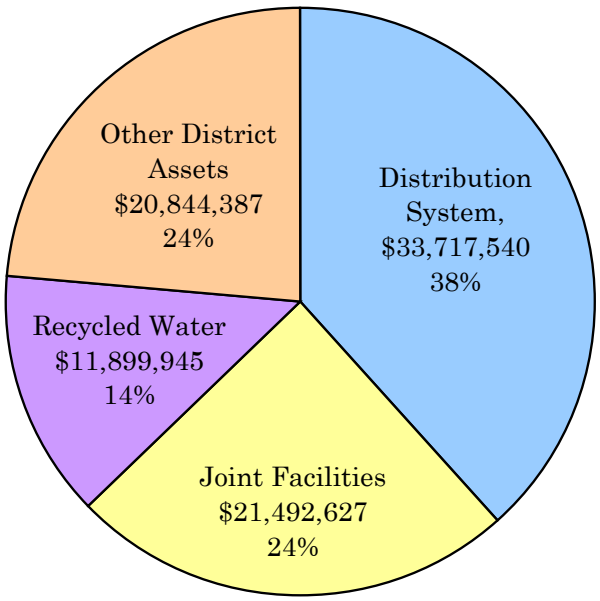


Figure ES-3. CIP Projects by Asset Category

As shown on Table ES-2, the asset evaluation and master planning process identified 60 capital projects. The recommended projects are listed by asset category. Figure ES-3 provides a breakdown of capital costs by potable water distribution system, joint treatment facilities, recycled water distribution, and other assets (corporate yard and integrated technology improvements).

In addition, the AMMP identified general asset replacement programs with a recommended replacement fund accumulation schedule. These general programs are listed in Table ES-3.

TABLE ES-2
AMMP SFID CIP PROJECTS
(All Numbers in Thousands of Dollars)

Project #	Description	Total, $1,000
CIP - District		
	Distribution System	
	Valve Replacement	
J-703	Phase 1 Valve Replacement	933.8
J-902	Phase 2A Valve Replacement	448.3
J-902	Phase 2B Valve Replacement	614.5
N-1 Project	Phase 3 Valve Replacement	1,810.4
N-2 Project	Phase 4 Valve Replacement	3,915.7
N-3 Project	Phase 5 Valve Replacement	3,005.1
	Pressure Stations	
N-5 Project	PRS Project 1	1,251.3
N-6 Project	PRS Project 2	1,251.3
N-7 Project	PRS Project 3	1,251.3
N-8 Project	PRS Project 4	1,251.3
N-9 Project	PRS Project 5	1,001.0
N-10 Project	PRS Project 6	1,001.0
N-11 Project	PRS 7, Removal	475.2
	Pipeline Projects	
N-4 Project	Calle Mayor Interconnect Repair	284.6
N-13 Project	Fairbanks Ranch Redundancy	2,843.6
N-12 Project	Fireflow Enhancement Pipeline	514.8
N-14 Project	East of I-5 Replacement	3,699.7
N-15 Project	I-5 Crossing Redundancy	1,818.0
J-904	Via de Fortuna Pipeline	1,300.0
N-16 Project	Government Road Pipeline	1,450.0
N-17 Project	Lago Lindo Pipeline	2,800.0
N-18 Project	Marview, Canyon, Glencrest Pipeline	561.3
	Storage and Pumping	
J-602	Larrick PS - Pump 3/4 Install	235.5
	Subtotal Distribution System	***33,717.5***
	Other District Assets	
	Technical Programs	
J-805	Asset Management Plan	45.6
J-706	Integrated Technology Program	2,020.3
N-45 Project	Automatic Flowmeter Reading	2,660.5
	Buildings and Property	
J-704	Corporate Yard Phase 1	209.0
J-901	Corporate Yard Phase 2	409.0
N-20 Project	Corporate Yard, Phase 3	1,300.0
N-21 Project	Corporate Yard, Phase 4	700.0
N-22 Project	Corporate Yard, Phase 5	8,000.0
N-23 Project	Corporate Yard, Phase 6	5,500.0
	Subtotal Other District Assets	***20,844.4***
	Joint Facilities (SFID Share)	
	Technical Programs	
J-206	Integrated Technology Program	58.3
J-212	Asset Management Plan	34.9
N-30 Project	REB Plant Master Plan Update	151.3
	REB Plant Improvements	
J-301	Chemical Tank Improvement	309.1
N-24 Project	Hydroelectric Facility Upgrade	4,991.8
N-25 Project	Plant Electrical Improvements	589.9
N-26 Project	Solids Management Project	1,887.6
N-27 Project	Improved Disinfection	545.2
N-42 Project	Improved Local Water Aesthetics	1,966.3
N-29 Project	Utility Upgrade Project	286.3
N-46 Project	Sedimentation Basin Addition	1,573.0
N-28 Project	Relocate and Improve SDR Pump Station	2,359.5
N-33 Project	SDR Dam Seepage Recovery	882.6
	Pipeline Improvements	
J-208	Cathodic Protection	167.5
N-31 Project	15-inch REB Plant Drain Line	1,750.3
N-32 Project	Rehabilitation of 30" line b/w SDR & REB Plant	1,377.3
N-43 Project	Upgrade 18-inch HDPE to SD Reservoir	2,561.8
	Subtotal Joint Facilities	***21,492.6***
	Recycled Water	
N-34 Project	Recycled Water - West Project 1	14.0
N-35 Project	Recycled Water - West Project 2	535.9
N-36 Project	Recycled Water - West Project 3	86.4
N-37 Project	Recycled Water - West Project 4	103.6
N-38 Project	Recycled Water - West Project 5	2,070.6
N-47 Project	Recycled Water - West Project 6	1,435.0
N-48 Project	Recycled Water - West Project 7	42.9
N-49 Project	Recycled Water - West Project 8	593.5
N-50 Project	Recycled Water - West Project 9	900.9
N-39 Project	Recycled Water - East Project 1, SEJPA Option	2,226.8
N-40 Project	Recycled Water - East Project 2, SEJPA Option	3,890.3
	Subtotal Recycled Water	***11,899.9***
TOTAL ALL PROJECTS		**87,954.5**

TABLE ES-3
PROGRAMMATIC RESERVES

Description	Yearly Cost	Number of Years	Year Start
District Only			
Office Equipment	50.0	Ongoing	FY09
Vehicle/Equipment Replacement	111.0	Ongoing	FY09
Temporary Meters	2.0	Ongoing	FY09
Pipelines	1,215.2	Ongoing	FY23
Valves	478.7	Ongoing	FY26
Corporate Yard	400.0	Ongoing	--
Water Services	374.5	Ongoing	FY09
Orangeburg Lateral Pipeline	195.0	10	FY20
Larrick Reservoir	150.0	Ongoing	FY14
Hydrants	220.0	Ongoing	FY14
Meters	121.0	Ongoing	FY14
Larrick PS	15.0	Ongoing	FY14
Joint Facilities, SFID Share			
Office Equipment	10.0	Ongoing	FY09
Laboratory and Portable Equipment	75.0	Ongoing	FY09
Vehicle/Equipment Replacement	50.0	Ongoing	FY09
Pipelines	296.7	Ongoing	FY13
Meters	118.0	Ongoing	FY13
REB Plant	605.0	Ongoing	FY26
Cielo Pump Station	45.9	Ongoing	FY13
SDR Pump Station	47.0	Ongoing	--
SDR Reservoir and Dam	86.0	Ongoing	FY32
TOTAL	**3,735.3**		

Construction cost estimates were developed for each project. In addition, multipliers were consistently applied to the construction cost of each project to establish total capital cost. The total capital cost estimate for each project is included in Table ES-2. The total cost for these projects is approximately $87,954,500 in 2009 dollars. This is the capital cost for the District only, and does not include San Dieguito Water District's share of joint facility project costs. Project descriptions and total capital cost breakdowns for each project are included in Appendix A.

Project Prioritization. A project prioritization process was established to help define the relative importance of each project. The process included the following steps:

- Evaluation categories were developed that reflect attributes that are critical to overall system performance.

- The evaluation categories were weighted in order to establish the relative importance of each category to overall system performance.

- Priority rating factors were developed that reflect a project's anticipated impact on each evaluation category.

- Each project was scored by multiplying the project's priority rating factor by the evaluation category weighting for each category.

Evaluation categories, category weightings, and priority rating factors were developed collaboratively by managers representing all District departments, the District's General Manager, and the District's Consultant. This information was also presented to the Water Resources Committee for review and concurrence. Table ES-4 provides an example of how the process was used to assign a prioritization score to each project. Though the prioritization scoring was as an important factor in the determination of relative project importance, some subjectivity was required in the interpretation of data and the establishment of the implementation plan.

TABLE ES-4
PRIORITIZATION RATING FACTOR DESCRIPTIONS AND EXAMPLE

Capital Improvement Project Evaluation Categories and Weights		Prioritization Rating Factors and Definitions				J-902 Phase 2B Valve Replacement	
Evaluation Criteria	Category Weight	Prioritization Rating Factor	Prioritization Rating Factor	Prioritization Rating Factor	Prioritization Rating Factor	PRF	Score
		3	2	1	0		
Regulatory compliance and/or flow-pressure objectives	10	Project is critical to achieving compliance, or is a prerequisite project to a project critical to achieving compliance.	Project will moderately improve ability to achieve compliance.	Project may have a low level of impact on the ability to achieve compliance.	Project has no impact on ability to achieve compliance.	1	10
Staff safety and working environment	10	Project could significantly reduce the risk of an accident, or would improve the work environment to the point where the protection of the employee's health would be significantly improved.	Project could have a moderate impact on the reduction accident risk or moderate improvement of the work environment.	Project may have a low level of impact on the ability to reduce accidents or improve the work environment.	Project has no impact on ability to improve staff safety and work environment.	3	30
Reliability - remaining useful life, condition, accessibility	9	Project would substantially improve reliability of a currently unreliable asset.	Project would improve the reliability of a moderately reliable asset, or the project would enable better access to the existing asset to facilitate regular monitoring and/or maintenance.	Project may further improve the reliability of an asset that is currently considered reliable.	Project has no impact on improving the reliability of an existing asset.	3	27
Redundancy - distribution system or treatment	8	Project provides redundant improvements that are critical to the distribution or treatment of water should the primary system component fail to operate. Effected system users would be unreasonably burdened by the loss of the primary system component.	Project provides redundant system improvements that may not be critical to the distribution or treatment of water but would reduce a potentially unreasonable burden on the effected system users.	Project provides redundant system improvements that would reduce the impact on system users. However, the impact to users could most probably be reasonable.	Project has no impact on redundancy.	0	0
O&M Cost Efficiency	8	Provides significant O&M savings.	Provides moderate O&M savings.	Project may result in a low level of O&M savings.	Project will provide no O&M savings.	1	8
Increased local water usage	7	Project substantially improves our ability to increase local water use.	Project moderately improves our ability to increase local water use.	Project may have a lower level impact on our ability to increase local water use.	Project has no impact on local water usage.	0	0
Water quality enhancement (Taste and Odor)	7	Project would substantially improve product water aesthetics and significantly reduce taste and odor complaints.	Project would result in moderate aesthetic improvements and potentially reduce certain taste and odor complaints.	Project may have a limited impact on product water aesthetics and a relatively low impact on taste and odor complaints.	Project has no impact on water quality aesthetics.	0	0
Enhanced operational control	6	Project substantially increases system flexibility and/or operational control.	Project moderately increases system flexibility and/or operational control.	Project may result in some increase in system flexibility and/or operational control.	Project has no impact on system flexibility and/or operational control.	3	18
Expansion of water supply portfolio	6	Project would result in a significant increase in alternative water supply.	Project would result in a moderate increase in alternative water supply.	Project may have an impact on the development of new water supplies in the future.	Project has no impact on the development of new water supplies.	0	0
Availability of outside funding support	5	Project can be fully funded by outside grant funding, and the grant funding has reasonable terms and conditions.	Project can be at least 50% funded by outside grant funding, and the grant funding has reasonable terms and conditions.	Low interest loans can be obtained for the project, and the loans have reasonable terms and conditions.	Project has no potential for outside funding.	0	0
TOTAL SCORE						93	

Recommended Baseline 10 Year Capital Improvement Program (CIP). Based upon workshops held with District Staff, the Water Resources Committee, and the Consultant, a recommended "baseline" 10 year Capital Improvement Program (CIP) was established that achieves the following key objectives:

- Projects that are critical to system performance must be implemented in a timely manner.

- Implementation of the CIP shall enable "Pay-As-You-Go" funding.

- Available reserve funds shall be effectively utilized to expedite the implementation of critical near-term projects.

- CIP implementation should be accelerated over the next 3 years to realize the value of the current construction market.

- Outside funding support (grants) shall be aggressively pursued to accelerate the implementation of alternative water supply projects.

Table ES-5 presents the recommended baseline 10 year CIP in 2009 dollars. The baseline 10 year CIP provides a breakdown of expenditures per asset category per year. Figure ES-4 graphically presents the annual cost per year for assets associated with the distribution system, joint facilities, recycled water program, and other assets (Corporate Yard, IT program, etc.). The baseline CIP balances the priority and timing of each project with the anticipated availability of income (at current rates) and reserve funds. The baseline CIP will enable pay-as-you-go financing. In order to achieve this objective, implementation of certain projects that are not essential to the reliable delivery of potable water were assumed to be delayed for several years unless outside funding support becomes available.

As shown on the bottom of Table ES-5, in order to implement the proposed baseline CIP, the District's currently established Reserve Fund Balance requirement of maintaining a reserve of 40% of the running 5 year total of projects and acquisitions would need to be modified.

It is anticipated that the baseline CIP will serve as a key tool for the District in the development of the District's Long Range Financial Plan and Rate Model update. The baseline CIP could be modified as appropriate during the financial planning process and the final CIP would become a part of the Long Range Financial Plan.

TABLE ES-5
SFID BASELINE 10 YEAR CAPITAL IMPROVEMENT PROJECT PROGRAM

All Numbers in Thousands of Dollars

Project #	Description	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	TOTAL
CIP - District													
	Distribution System												
	Valve Replacement												
	Phase 1 Valve Replacement	933.8	-	-	-	-	-	-	-	-	-	-	933.8
J-902	Phase 2A Valve Replacement	448.3	-	-	-	-	-	-	-	-	-	-	448.3
J-902	Phase 2B Valve Replacement	80.0	534.5	-	-	-	-	-	-	-	-	-	614.5
N-1 Project	Phase 3 Valve Replacement	-	1,810.4	-	-	-	-	-	-	-	-	-	1,810.4
N-2 Project	Phase 4 Valve Replacement	-	-	-	-	-	1,957.8	1,957.8	-	-	-	-	3,915.7
N-3 Project	Phase 5 Valve Replacement	-	-	-	-	-	-	-	-	1,502.6	1,502.6	-	3,005.1
	Pressure Stations												
N-5 Project	PRS Project 1	140.0	1,111.3	-	-	-	-	-	-	-	-	-	1,251.3
N-6 Project	PRS Project 2	-	1,251.3		-	-	-	-	-	-	-	-	1,251.3
N-7 Project	PRS Project 3	-	-	1,251.3		-	-	-	-	-	-	-	1,251.3
N-8 Project	PRS Project 4	-	-	-	1,251.3		-	-	-	-	-	-	1,251.3
N-9 Project	PRS Project 5	-	-	-	-	1,001.0	-	-	-	-	-	-	1,001.0
N-10 Project	PRS Project 6	-	-	-	-	-	1,001.0	-	-	-	-	-	1,001.0
N-11 Project	PRS 7, Removal	-	-	-	-	-	-	475.2	-	-	-	-	475.2
	Pipeline Projects												
N-4 Project	Calle Mayor Interconnect Repair	284.6	-	-	-	-	-	-	-	-	-	-	284.6
N-13 Project	Fairbanks Ranch Redundancy	-	-	-	-	-	-	-	-	-	350.0	2,493.6	2,843.6
N-12 Project	Fireflow Enhancement Pipeline	-	514.8	-	-	-	-	-	-	-	-	-	514.8
N-14 Project	East of I-5 Replacement	-	-	400.0	3,299.7	-	-	-	-	-	-	-	3,699.7
N-15 Project	I-5 Crossing Redundancy	-	-	-	-	1,818.0	-	-	-	-	-	-	1,818.0
J-904	Via de Fortuna Pipeline	1,300.0	-	-	-	-	-	-	-	-	-	-	1,300.0
N-16 Project	Government Road Pipeline	-	-	-	-	-	-	-	-	1,450.0	-	-	1,450.0
N-17 Project	Lago Lindo Pipeline	-	-	-	-	-	-	-	2,800.0	-	-	-	2,800.0
N-18 Project	Marview, Canyon, Glencrest Pipeline	-	561.3	-	-	-	-	-	-	-	-	-	561.3
	Storage and Pumping												
J-602	Larrick PS - Pump 3/4 Install	235.5	-	-	-	-	-	-	-	-	-	-	235.5
	Subtotal Distribution System	***3,422.2***	***5,783.6***	***1,651.3***	***4,550.9***	***2,819.0***	***2,958.8***	***2,433.0***	***2,800.0***	***2,952.6***	***1,852.6***	***2,493.6***	***33,717.5***
	Other District Assets												
	Technical Programs												
J-805	Asset Management Plan	45.6	-	-	-	-	-	-	-	-	-	-	45.6
J-706	Integrated Technology Program	130.0	460.0	585.0	585.0	150.0	110.0	-	-	-	-	-	2,020.0
	Automatic Flow Meter Project	-	-	-	-	-	1,330.2	1,330.2	-	-	-	-	2,660.5
	Buildings and Property												
	Corporate Yard Phase 1	209.0	-	-	-	-	-	-	-	-	-	-	209.0
J-901	Corporate Yard Phase 2	409.0	-	-	-	-	-	-	-	-	-	-	409.0
N-20 Project	Corporate Yard, Phase 3	-	150	150	-	-	1,000.0	-	-	-	-	-	1,300.0
N-21 Project	Corporate Yard, Phase 4	-	-	-	-	-	-	-	-	-	-	-	-
N-22 Project	Corporate Yard, Phase 5	-	-	-	-	-	-	-	-	-	-	-	-
N-23 Project	Corporate Yard, Phase 6	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Other District Assets	***748.0***	***610.0***	***735.0***	***585.0***	***150.0***	***2,440.2***	***1,330.2***	***-***	***-***	***-***	***-***	***6,644.1***
	Joint Facilities (SFID Share)												
	Technical Programs												
J-206	Integrated Technology Program	58.3	-	-	-	-	-	-	-	-	-	-	58.3
J-212	Asset Management Plan	34.9	-	-	-	-	-	-	-	-	-	-	34.9
N-30 Project	REB Plant Master Plan Update	-	-	151.3	-	-	-	-	-	-	-	-	151.3
	REB Plant Improvements												
J-301	Chemical Tank Improvement	309.1	-	-	-	-	-	-	-	-	-	-	309.1
N-24 Project	Hydroelectric Facility Upgrade	-	-	-	-	-	-	-	-	-	-		-
N-25 Project	Plant Electrical Improvements	-	-	589.9	-	-	-	-	-	-	-	-	589.9
N-26 Project	Solids Management Project	-	-	-	-	943.8	943.8	-	-	-	-	-	1,887.6
N-27 Project	Improved Disinfection	-	545.2	-	-	-	-	-	-	-	-	-	545.2
N-42 Project	Improved Local Water Aesthetics	-	-	-	-	-	-	-	-	983.1	983.1	-	1,966.3
N-29 Project	Utility Upgrade Project	-	286.3	-	-	-	-	-	-	-	-	-	286.3
N-46 Project	Sedimentation Basin Addition	-	-	-	-	-	-	-	-	-	-	-	-
N-28 Project	Relocate and Improve SDR Pump Static	-	-	1,179.8	1,179.8	-	-	-	-	-	-	-	2,359.5
N-33 Project	*SDR Dam Seepage Recovery*	30.0	-	852.6	-	-	-	-	-	-	-	-	882.6
	Pipeline Improvements												
J-208	Cathodic Protection	167.5	-	-	-	-	-	-	-	-	-	-	167.5
N-31 Project	15-inch REB Plant Drain Line	-	-	-	-	-	-	1,750.3	-	-	-	-	1,750.3
N-32 Project	Rehabilitation of 30" line b/w SDR & REI	-	-	-	-	-	-	-	1,377.3	-	-	-	1,377.3
N-43 Project	Upgrade 18-inch HDPE to SD Reservoir	-	-	-	-	-	-	-	-	-	-	2,561.8	2,561.8
	Subtotal Joint Facilities	***599.8***	***831.5***	***2,773.5***	***1,179.8***	***943.8***	***943.8***	***1,750.3***	***1,377.3***	***983.1***	***983.1***	***2,561.8***	***14,927.8***
	Recycled Water												
N-34 Project	Recycled Water - West Project 1	-	14.0	-	-	-	-	-	-	-	-	-	14.0
N-35 Project	Recycled Water - West Project 2	-	535.9	-	-	-	-	-	-	-	-	-	535.9
N-36 Project	Recycled Water - West Project 3	-	-	-	-	-	-	-	-	-	-	-	-
N-37 Project	Recycled Water - West Project 4	-	-	-	-	-	-	-	-	-	-	-	-
N-38 Project	Recycled Water - West Project 5	-	-	-	-	-	-	-	-	-	-	-	-
N-47 Project	Recycled Water - West Project 6	-	-	-	-	-	-	-	-	-	-	-	-
N-48 Project	Recycled Water - West Project 7	-	-	-	-	-	-	-	-	-	-	-	-
N-49 Project	Recycled Water - West Project 8	-	-	-	-	-	-	-	-	-	-	-	-
N-50 Project	Recycled Water - West Project 9	-	-	-	-	-	-	-	-	-	-	-	-
N-39 Project	Recycled Water - East Project 1, SEJPA	-	-	-	-	-	-	-	-	-	-	-	-
N-40 Project	Recycled Water - East Project 2, SEJPA	-	-	-	-	-	-	-	-	-			
	Subtotal Recycled Water	***-***	***549.9***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***549.9***
TOTAL ALL PROJECTS		***4,770.0***	***7,775.0***	***5,159.7***	***6,315.7***	***3,912.8***	***6,342.9***	***5,513.5***	***4,177.3***	***3,935.7***	***2,835.7***	***5,055.3***	***55,839.3***
	Capital Acquisition	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	4,180.0
TOTAL ALL PROJECTS AND ACQUISITIONS		***5,150.0***	***8,155.0***	***5,539.7***	***6,695.7***	***4,292.8***	***6,722.9***	***5,893.5***	***4,557.3***	***4,315.7***	***3,215.7***	***5,435.3***	***60,019.3***
Reserve Fund Balance ($17,000 at FY08 end)		***15,650.0***	***11,295.0***	***9,555.3***	***6,659.6***	***6,166.7***	***3,243.9***	***1,150.3***	***393.0***	***(122.7)***	***461.6***	***(1,173.7)***	
Running 5-year total of projects and acquisitions		*29,833.3*	*31,406.1*	*29,144.7*	*28,162.2*	*25,782.2*	*24,705.1*	*23,417.6*	-	-	-	-	
40 % of 5-year		*11,933.3*	*12,562.5*	*11,657.9*	*11,264.9*	*10,312.9*	*9,882.0*	*9,367.0*	-	-	-	-	

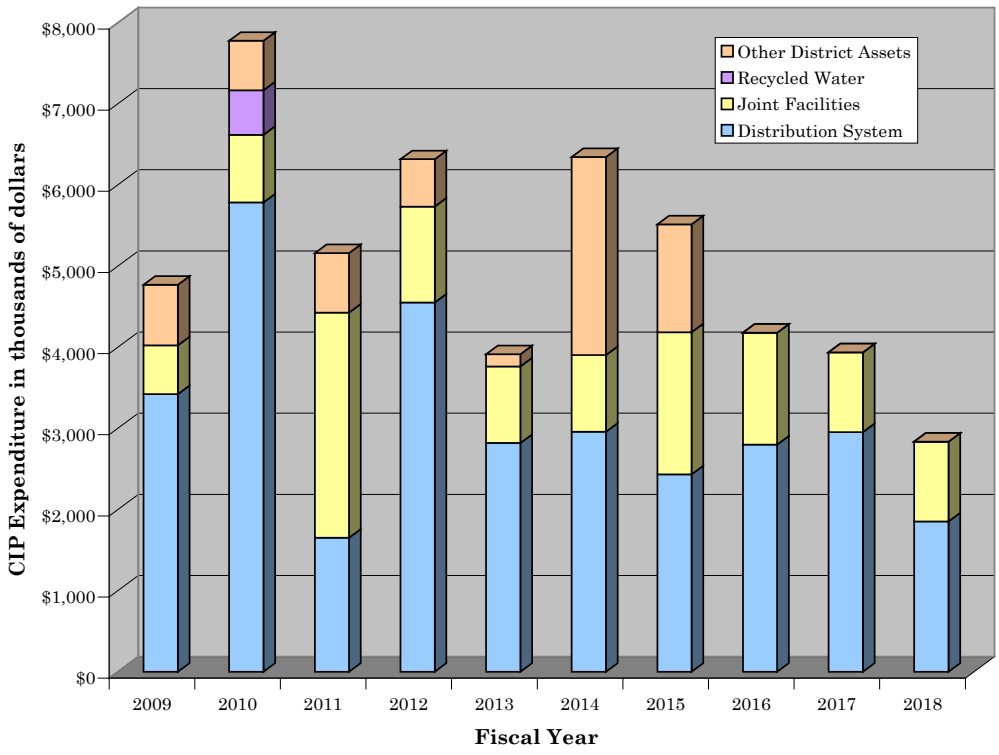


FIGURE ES-4. Baseline CIP Expenditure Breakdown

The following summarizes the basis of the recommended baseline 10 year CIP from the perspective of each major asset category.

Distribution System

Pressure reducing stations and valve replacement projects. The prioritization process confirmed that upgrading the pressure reducing stations is a top distribution system priority. The pressure reducing stations are the primary point of control for the system. In addition, the stations protect downstream piping and appurtenances from failure due to excess pressure. Several of the existing stations are also difficult to maintain due to their constrained configuration and/or location. Therefore, it is recommended that all pressure reducing stations be upgraded within the next five fiscal years.

Before the pressure reducing station projects can occur, currently inoperable valves must be replaced to enable isolation of the pressure reducing stations. The Phase 2B valve replacement project must be completed prior to the Phase 1 pressure reducing station project. Completion of

the Phase 3 valve replacement project will enable isolation of the remaining pressure reducing stations and will also replace any failed isolation valves along the backbone distribution system. The project cost assumes 25% of these valves are failed and need to be replaced. This assumption will be confirmed through field activities planned by the District prior to design of the Phase 3 valve replacement project.

Though the proposed 10 year CIP shows the pressure reducing station and valve replacement projects as separate projects for planning purposes, there are multiple advantages to combining certain valve and pressure reducing station projects. For example, the Phase 2B valve replacement and Phase 1 pressure reducing station project could be combined. Another logical combination is the Phase 3 valve replacement and Phase 2 pressure reducing station project. The pre-design stage of these projects will confirm whether the pressure reducing stations, and thus the isolation valves, should be rebuilt in their existing location or would be better served installed elsewhere.

The remaining valve replacement projects involve the replacement of isolation valves throughout the system. Over the next few years, the valve exercising activities conducted by District maintenance staff will determine the extent of failed valves throughout the District. The Phase 4 and 5 valve replacement projects assume that 25% of the valves are not operable. This assumption will be modified as new information becomes available. These phases were projected to be initiated in year FY2014 of the 10 year CIP.

Pipelines. The ability to provide a redundant source of water to the Fairbanks Ranch area is a high priority. Implementation of the Calle Mayor interconnection repair project will enable delivery of a redundant source of water from the Olivenhain Municipal Water District's distribution system. This connection would only be used in the case of emergency or planned system shut downs. Implementation of this interconnect project would enable the delay of the more costly Fairbanks Ranch Redundancy Project until the end of the 10 year CIP planning period. The East of I-5 redundancy project was also considered a critical project and is scheduled to be initiated in the third year of the program. The East of I-5 project satisfies both redundancy and capacity issues.

System modeling conducted as part of the AMMP identified pipeline improvements that enhance fire flow capabilities in various locations. In order to achieve a consistent fire flow standard throughout the service area, these improvements were considered to be a high priority and included in year FY2010.

System modeling also identified the need to upsize the existing Marview Lane and Canyon Drive pipelines in order to consistently achieve normal operating pressure objectives. This was also considered a high priority project and included in year FY2010. In order to create a larger pipeline project, combining this project with the fireflow enhancement project is a practical option.

Regarding other pipeline projects, the 10 year CIP includes the I-5 Redundancy crossing beginning in year FY2013 of the program. Due to funding limitations and priority considerations, all other pipeline projects were delayed until the later years of the planning period. This includes all pipeline projects planned to be relocated from difficult to access areas.

Storage and pumping. Following the FY2009 completion of on-going improvements to the Larrick Pump Station, it is assumed that no new improvements will be required in the 10 year planning period. Replacement planning funds should consider the remaining useful life of existing pumping equipment as described later in this chapter.

Joint Facilities

Water treatment. Projects required to achieve regulatory compliance, or employee health and safety requirements, were considered to be the highest priority. Therefore, the REB chemical tank replacement project and the REB improved disinfection project are schedule to be initiated in FY2009 and FY2010, respectively. The utility upgrade project and electrical evaluation projects are scheduled to be initiated early in the planning period. The District recently received approval of matching funds from the SDCWA to study the extraction of groundwater that may be present due to seepage from the San Dieguito reservoir. Assuming the study will identify a cost effective source of new supply, the costs to design and construct the extraction facilities is included in the year FY2011 of the program. The cost for the study is included in FY2009.

Relocation of the San Dieguito Pump Station is planned to be initiated in year FY2011 of the program. This is primarily due to the age and condition of the existing facilities and the critical nature of this pump station. Improvements to solids handling facilities are also planned to be initiated in year FY2011.

Other projects related to enhancement of aesthetic qualities (taste and odor), or the ability to utilize more local water, were delayed until the later years in the planning period. The decision to delay these projects is based upon the assumption that the SDCWA's Emergency Storage Program (ESP) will result in improved water quality in Lake Hodges, and the desire to delay expenditure of limited funds until the actual impacts of the ESP are better defined. Unknowns associated with the ESP are also why the cost of potential demineralization facilities was not included in the 10 year CIP.

Joint Facility Pipelines. Joint facility pipeline projects would not be initiated until years FY2015 and FY2016 of the proposed CIP. These include the 15-inch drain line replacement project and the 30-inch line rehabilitation from San Dieguito Reservoir to the REB Plant.

Recycled Water

Western service area. For the purpose of developing the 10 year CIP projects and costs, it was assumed that new recycled water projects in the western portion of the service area will be District owned capital projects. It is probable that extensions to the existing distribution system in the western service area would be implemented by the San Elijo Joint Powers Authority (SEJPA), and the costs would become part of the District's rate structure for recycled water. An updated agreement between the District and SEJPA would need to be developed in order to define the preferred implementation approach.

The initiation of the first two recycled water projects in the western portion of the service area is included in FY2010 of the planning period. These projects will serve customers in relatively close proximity to the existing recycled water distribution system. Project costs do not include the cost for on-site customer improvements. Other efforts are ongoing to define the required improvement and identify funding support for on-site improvements.

Eastern service area. Projects considered essential to provide potable water service received first consideration for available funding. Due to the limit of available funds, only the first two western service area recycled water projects can be funded in the 10 year CIP. All other western and eastern area recycled water projects are not included in the 10 year CIP. Outside funding support (grants) shall be aggressively pursued to enable implementation of the remaining recycled water supply projects. Studies are being conducted to confirm the best recycled water supply and delivery approach to the eastern service area. The information included in these studies should aid in development of future funding applications.

Other District Assets

Corporate yard. Phase 1 of the Corporate Yard Improvement Program is complete and included the installation of modular offices. Phase 2 will include the demolition of various structures and will be complete in early 2009. Phase 3 of the Corporate Yard Improvement Program will complete the building of a warehouse and processing of a new major use permit. Phases 1 though 3 were assumed to be completed within the 10 year CIP. Due to funding limitations, the remaining phases, including the construction of a new maintenance and administration building, have been delayed beyond the 10 year planning period.

Integrated technology program implementation. The 10 year CIP assumes staged implementation of the integrated technology program between years FY2009 and FY2014 of the planning period. Specific integrated technology project scopes and associated costs are currently being developed by District staff.

Capital Acquisition Budget

The baseline CIP also includes a capital acquisition budget of $380,000 per year based upon prior District financial planning assumptions.

Long Term (50 Year) Replacement Cost Forecasting

Considering the age of the District's existing infrastructure, planning for significant replacement costs beyond the 10 year CIP horizon is essential. As part of the AMMP, a conceptual level 50 year expenditure forecast was prepared to provide a general awareness of long term replacement cost requirements. Table ES-6 presents the forecasted replacement cost values. The 50 Year expenditure forecast was originally developed by the District in 2007. The updated forecast includes the recommended 10 year CIP and provides a modified forecast of expenditures for the remaining 40 years.

Over the next several years, the District should implement condition assessment programs and maintenance management programs to confirm the life expectancy assumptions used in this AMMP, extend the life of existing facilities, and to protect the investment of proposed new facilities.

TABLE ES-6
50 YEAR EXPENDITURE FORECAST
(All Numbers in Thousands of Dollars)

	Average $	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Fund Sources																					
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses																					
Loan Payments																					
Debt Service Payment		1,452.8	1,449.5	1,448.3	1,448.7	1,446.3	1,445.9	1,442.0	1,443.8	1,441.5	1,435.1	1,434.4	1,434.1	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**1,452.8**	**1,449.5**	**1,448.3**	**1,448.7**	**1,446.3**	**1,445.9**	**1,442.0**	**1,443.8**	**1,441.5**	**1,435.1**	**1,434.4**	**1,434.1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions																					
SFID																					
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0 [17]	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)																					
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	127.0 [18]	-	23.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	212.0	85.0	108.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**375.0**	**248.0**	**271.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement																					
SFID																					
Technical Programs	-	176	460	585	585	150	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs																					
Valves	479	1,462	2,345	-	-	-	1,958	1,958	-	1,503	1,503	-	-	-	-	-	-	-	-	-	-
Corporate Yard	400	618	150	150	-	-	1,000	-	200	-	-	-	700	100	-	-	8,000	-	-	5,500	-
Water Services	375	-	-	-	375	375	375	375	375	375	375	375	195	195	195	195	195	195	195	195	195
Pressure Stations	133	140	2,363	1,251	1,251	1,001	1,001	475	-	-	-	-	-	-	-	-	-	-	-	-	-
Reservoir	150	-	-	-	-	-	10	10	10	10	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	-	-	-	-	-	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	-	-	-	-	-	1,330	1,330	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Programs	1,878	2,220	4,858	1,401	1,626	1,376	5,894	4,368	805	2,108	2,248	745	1,265	665	565	565	8,565	565	565	6,065	565
Larrick Pump Station	15	236	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	15	15	15	15
Pipelines	1,115	1,585	1,076	400	3,300	1,818	-	-	2,800	1,450	350	2,494	-	-	254	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**4,216**	**6,394**	**2,386**	**5,511**	**3,344**	**6,004**	**4,368**	**3,605**	**3,558**	**2,598**	**3,239**	**1,265**	**665**	**819**	**1,680**	**9,684**	**1,695**	**1,695**	**7,195**	**1,695**
Non-SFID																					
Pipelines	100	-	-	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)																					
Studies and Reports	-	93	-	151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	168	-	-	-	-	-	1,750	1,377	-	-	2,562	-	-	-	-	-	-	-	-	-
Meters	11	-	-	-	-	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	309	832	590	-	944	944	-	532	983	983	-	454	605	605	605	605	605	605	605	605
Cielo Pump Station	46	-	-	-	-	3	3	3	3	3	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	1,180	1,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	30	-	853	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Joint Facilities (SFID Share)	**1,092**	**600**	**832**	**2,774**	**1,180**	**958**	**958**	**1,764**	**1,923**	**997**	**1,040**	**2,619**	**511**	**662**	**662**	**662**	**662**	**662**	**662**	**662**	**662**
Recycled Water																					
Recycled Water		-	550	-	-	-	-	-	-	-	-	-	-	2,071	1,435	43	594	901	2,227	-	2,890
Subtotal, Recycled Water		**-**	**550**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,071**	**1,435**	**43**	**594**	**901**	**2,227**	**-**	**2,890**
Subtotal, CRP & CIP	**4,200**	**4,816**	**7,775**	**5,160**	**6,691**	**4,302**	**6,962**	**6,133**	**5,528**	**4,555**	**3,638**	**5,857**	**1,876**	**3,498**	**3,016**	**2,485**	**11,040**	**3,358**	**4,684**	**7,957**	**5,347**
Total, Fund Uses	**4,498**	**6,643**	**9,472**	**6,880**	**8,438**	**6,046**	**8,706**	**7,872**	**7,270**	**6,294**	**5,371**	**7,590**	**3,608**	**3,796**	**3,314**	**2,783**	**11,338**	**3,656**	**4,982**	**8,255**	**5,645**
Net Yearly Cash		**(1,325)**	**(4,154)**	**(1,561)**	**(3,119)**	**(728)**	**(3,387)**	**(2,554)**	**(1,952)**	**(976)**	**(52)**	**(2,271)**	**1,710**	**1,523**	**2,005**	**2,536**	**(6,019)**	**1,663**	**337**	**(2,936)**	**(326)**
Fund Balance	***17,000***	***16,695***	***13,543***	***12,794***	***10,443***	***10,342***	***7,575***	***5,476***	***3,853***	***3,108***	***3,243***	***1,166***	***2,946***	***4,646***	***6,929***	***9,880***	***4,454***	***6,383***	***7,103***	***4,593***	***4,542***

[17] Operator Vehicle Replacement
[18] Skiploader/Forklift Replacement

Annual Replacement Cost
Capital Project Spending
Capital Project Recovery
Capital Project Fiscal Overlap

	Average $	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Fund Sources																			
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses																			
Loan Payments																			
Debt Service Payment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions																			
SFID																			
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)																			
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement																			
SFID																			
Technical Programs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs																			
Valves	479	-	-	289	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
Corporate Yard	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Services	375	195	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Pressure Stations	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reservoir	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	-	-	-	-	-	-	2	121	121	121	121	121	121	121	121	121	121	121
Subtotal Programs	1,878	565	745	1,034	1,224	1,224	1,224	1,226	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345
Larrick Pump Station	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Pipelines	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**1,695**	**1,875**	**2,164**	**2,354**	**2,354**	**2,354**	**2,356**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**
Non-SFID																			
Pipelines	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)																			
Studies and Reports	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	-	-	-	-	-	251	297	297	297	297	297	297	297	297	297	297	297	297
Meters	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605
Cielo Pump Station	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	-	-	64	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal, Joint Facilities (SFID Share)	**1,092**	**662**	**662**	**726**	**748**	**748**	**999**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
Recycled Water																			
Recycled Water		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Recycled Water		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Subtotal, CRP & CIP	**4,200**	**2,457**	**2,637**	**2,990**	**3,202**	**3,202**	**3,453**	**3,501**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**
Total, Fund Uses	**4,498**	**2,755**	**2,935**	**3,288**	**3,500**	**3,500**	**3,751**	**3,799**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**
Net Yearly Cash		**2,564**	**2,384**	**2,031**	**1,819**	**1,819**	**1,568**	**1,520**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**
Fund Balance	***17,000***	***7,378***	***10,204***	***12,847***	***15,436***	***18,181***	***20,839***	***23,609***	***26,426***	***29,412***	***32,578***	***35,933***	***39,489***	***43,259***	***47,255***	***51,491***	***55,981***	***60,740***	***65,785***

	Average $	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Fund Sources													
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses													
Loan Payments													
Debt Service Payment		-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions													
SFID													
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)													
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement													
SFID													
Technical Programs	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs													
Valves	479	479	479	479	479	479	479	479	479	479	479	479	479
Corporate Yard	400	-	-	-	-	-	-	-	-	-	-	-	100
Water Services	375	375	375	375	375	375	375	375	375	375	375	375	375
Pressure Stations	133												
Reservoir	150	150	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	121	121	121	121	121	121	121	121	121	121	121	121
Subtotal Programs	1,878	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,445
Larrick Pump Station	15	15	15	15	15	15	15	15	15	15	15	15	15
Pipelines	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,575**
Non-SFID													
Pipelines	100	100	100	100	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)													
Studies and Reports	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	297	297	297	297	297	297	297	297	297	297	297	297
Meters	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	605	605	605	605	605	605	605	605	605	605	605	605
Cielo Pump Station	46	46	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal, Joint Facilities (SFID Share)	**1,092**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
Recycled Water													
Recycled Water		-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Recycled Water		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Subtotal, CRP & CIP	**4,200**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,720**
Total, Fund Uses	**4,498**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**4,018**
Net Yearly Cash		**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,301**
Fund Balance	***17,000***	***71,133***	***76,802***	***82,810***	***89,179***	***95,931***	***103,087***	***110,673***	***118,714***	***127,237***	***136,272***	***145,849***	***155,900***

CHAPTER 1

INTRODUCTION

The Santa Fe Irrigation District was originally established as an irrigation district to provide Lake Hodges water to agricultural users in the Rancho Santa Fe and Solana Beach areas. At the time, the District's system assets to supply the customers consisted of the San Dieguito Reservoir, of which chlorination was the only treatment, the piping system, and twenty (20) open reservoirs. As the transition from an agricultural irrigation district to a potable water district occurred, new assets such as pressure reducing stations and the R.E. Badger Filtration Plant were acquired and merged with the original agricultural distribution system pipeline assets.

PURPOSE

The purpose of this report is to evaluate the ability of the District's assets to perform according to an established set of criteria, and identify recommended capital improvements and associated costs. The focus of a traditional asset management plan is to evaluate the system in its current configuration "as-is", recommend replacement based on a projected useful life, and provide a plan for constructing the improvements. In the case of this report, the goal was to take the asset evaluation process a step further to evaluate how modifications to the existing system as a whole may result in improved conditions. In doing so, some elements of this report resemble more of a master plan, hence the title of an Asset Management Master Plan.

The Asset Management Master Plan (AMMP) evaluates the District's distribution system assets (e.g., pipelines, valves) in depth and the water supply and treatment assets (Joint Facilities) at lower, conceptual level. The asset evaluation did not include assets such as buildings, vehicles, land, or spare parts.

REPORT OVERVIEW

It is important that the criteria used to assess District assets are clearly defined. Chapter 2 provides a detailed description of the evaluation criteria used to assess the water and recycled water distribution and storage facilities. The regulatory issues and other drivers considered in the evaluation of the water treatment facilities jointly owned with San Dieguito Water District are provided in Chapter 8.

In order to understand the basis of the District's existing facilities, Chapter 3 highlights the historical development of the District, how it was established, and how it has grown.

An understanding of demand and supply issues is critical to the evaluation of the District's current assets and the determination of facilities required to serve projected demand needs and imported water supply shortfalls. Historical and projected water uses are discussed in Chapter 4. Chapter 5 identifies goals and issues with respect to water supply for the District.

In light of the information presented in prior chapters, Chapter 6 provides a detailed inventory of the existing distribution system components, summarizing the District's pipelines, valves, pressure reducing stations, and other assets. Chapter 7 then provides a detailed evaluation of these assets and provides recommended capital improvements and associated costs.

Chapter 8 evaluates the R.E. Badger Water Filtration Plant, and other facilities that are jointly owned with San Deiguito Water District. The conceptual level evaluation of these facilities was conducted in order to identify recommended capital improvements and associated costs.

The role of recycled water for the District is discussed in Chapter 9. The chapter provides options for the District to expand its current recycled water service.

The Asset Management Master Plan identifies 60 capital improvement projects. Chapter 10 describes the process used to prioritize the capital improvement projects and presents the recommended baseline 10 year Capital Improvement Project Program. A conceptual 50 year replacement cost forecast is also provided to assist the District in future financial planning efforts.

CHAPTER 2

PERFORMANCE AND EVALUATION CRITERIA, COST ESTIMATING ASSUMPTIONS, AND EVALUATION TOOLS

This chapter presents the technical criteria used to evaluate the District's distribution and storage facilities. The criteria are based upon the San Diego Water Agency Standard Specifications and Design Guidelines (WAS), the California Waterworks Standards, other industry standards, and/or specific District performance objectives.

This chapter also presents the cost estimating assumptions used to develop construction costs and total capital improvement cost estimates for projects identified throughout the Asset Management Master Plan. In addition, this chapter describes the evaluation tools used to determine an asset's ability to achieve the established performance criteria.

Criteria used in the conceptual evaluation of the jointly owned water treatment facilities, including a discussion of regulatory issues, are presented in Chapter 8. The evaluation of the REB Plant and other joint facilities was conducted at a lower level than the distribution system.

DISTRIBUTION SYSTEM PERFORMANCE CRITERIA

Table 2-1 summarizes the technical criteria used to evaluate the potable and recycled water distribution systems, storage facility performance, and presents the basis for each parameter. Additional descriptive information for selected categories is provided in the following paragraphs.

TABLE 2-1
DISTRIBUTION AND STORAGE TECHNICAL PERFORMANCE CRITERIA

POTABLE WATER SYSTEM				
Category	**Value**	**Unit**	**Related Assumptions**	**Basis for Criteria**
Minimum Residual Pressures • Average and maximum day * • Peak Hour	 65 40	 psi psi	* Water Agency Standards set the minimum static pressure at 65 psi. This analysis considers 65 psi desirable during average and maximum day demands.	- Department of Public Health - Exceeds Water Agency Standards - California Waterworks Standards
Maximum Static Pressure • Backbone Pipelines • Distribution Pipelines	 215 150	 psi psi		Water Agency Standards
Residential Demand Peaking Factors * • Max Day • Peak Hour	 2.16 3.17		Multiplied by average day demand. * These factors were increased for the Fairbanks Ranch area by 42%.	District demand data
Irrigation • Cycle Time • Peaking Factor *	 8 6.0	 hours	* This factor was increased for the Fairbanks Ranch area by 42%.	
Fire Flow Requirements • Fire Flow at Hydrants • Minimum Pressure at Fire Hydrant *	 1000 20	 gpm psi	- Occurs during the maximum day demand. * From the RSFFPD code. In this AMMP the minimum pressure in the vicinity of the hydrant was also considered.	- California Fire Code (utilized by Solana Beach Fire Department) - RSF Fire Protection District Ordinance 2008-02 (which supplements the 2007 California Fire Code and the 2006 International Fire Code). - California Waterworks Standards

TABLE 2-1
DISTRIBUTION AND STORAGE TECHNICAL PERFORMANCE CRITERIA

Fire Flow Utilized	2,500	gpm	- Occurs during the maximum day demand. - Used to conduct hydraulic analysis for pressure reducing station recommendations.	Represents common fire flow requirement within the District.
WATER STORAGE AND AVAILABILITY				
Category	**Value**	**Unit**	**Related Assumptions**	**Basis for Criteria**
Emergency Water Storage: Untreated Water	10 134 411	days mg acre-feet	- Based on average day demand volume. - Stored in San Dieguito Reservoir.	SDCWA recommendation to account for imported treated water supply interruptions.
Emergency Treated Water Availability Achieved by: • SDCWA Aqueduct Connection • Storage in REB Plant clearwell • Storage in Larrick Reservoir	 14.85 5.2 1.1	 mgd mg mg	Based on 1.35 maximum days of demand 55% SFID ownership in connection - Interconnections supply additional support	- Specific District performance objective considering availability of supply. - Industry standard of 1 maximum day increased to allow adequate time for supply transition.
Operational/Equalization Potable Water Storage: • Storage in REB Plant clearwell	2.7	mg	- Based upon the 2007 max day, August 13, 2007.	- Specific District performance objective - Required to accommodate peak demands above the maximum day demand.

TABLE 2-1 DISTRIBUTION AND STORAGE TECHNICAL PERFORMANCE CRITERIA				
Fire Flow Potable Water Storage: • Storage in REB Plant clearwell Storage in Larrick Reservoir	 540,000 540,000	 gallons gallons	Provides storage for fire event duration of 3 hours at a flow rate of 3,000 gpm in all zones.	- California Fire Code (utilized by Solana Beach Fire Department) - RSF Fire Protection District Ordinance 2008-02, Section 508.3 which allows the Chief to increase fire flow requirement as necessary.
RECYCLED WATER SYSTEM				
Category	**Value**	**Unit**	**Related Assumptions**	**Basis for Criteria**
Minimum Pressure	60	psi	Pressure at the user property line during max day demand.	Industry standard
Peaking Factors: • Max. month • Max. day • Peak hour	 2.5 4.0 9.0		- Multiplied by the average day demand. - Assumes nine hour irrigation cycle.	Industry standard
Minimum pipe diameter	8	inch		SEJPA requirement
RECYCLED WATER SYSTEM				
Category	**Value**	**Unit**	**Related Assumptions**	**Basis for Criteria**
Pumping Facilities	---	---	Sized to pump the maximum day demand for the area served.	Industry standard

Potable Water System Fire Flow Requirements and Storage

Within the District, all buildings were constructed in accordance with the fire code in place at that time. Effective January 15, 2008, the Rancho Santa Fe Fire Protection District (RSFFPD) adopted Ordinance 2008-02 which adopts the 2007 California Fire Code (also used by the City of Solana Beach Fire Department) and the 2006 International Fire Code with certain amendments, additions, and deletions. Within the amendments, Section 1908.16.1 was added which states, "… Fire flow at the hydrant(s) shall be at least 1000 gallons per minute at 20 psi." In addition to the established criteria, the evaluation of the District's distribution system conservatively considered the residual pressures in the vicinity of the hydrant rather than just at the hydrant itself.

To test and confirm the pressure reducing station recommendations, in Chapter 7, a fire flow of 2,500 gpm during the maximum day demand was assumed. This allows for a more conservative analysis, as the demand will be the furthest distance possible from the pressure reducing station.

Regarding fire flow storage, a fire flow requirement of 2,500 gpm for a duration of 2 hours, is a typical requirement under the California Fire Code for properties within the District. The Rancho Santa Fe Fire Protection District states in Ordinance 2008-02, Section 508.3, that this fire flow requirement could be increased for a several reasons. For this purpose, the storage requirement was based on a 3,000 gpm fire flow requirement and the code duration of 3 hours and should be available to all pressure zones.

COST ESTIMATING ASSUMPTIONS

Potable and recycled water distribution system cost estimates are generally based upon the RSMeans Construction Cost Index for 2009 (utilizing the San Diego City Cost Index of 106.0). The unit costs from the Construction Cost Index were used primarily for piping materials. Meter and valve costs were based on manufacturer's prices. Pressure reducing station costs are based on manufacturer's prices. For all of these components, the unit cost was increased by 50 percent for installation to arrive at a construction cost, based on the Consultant's experience. Pump stations and reservoirs are lump sum estimates based on the Consultant's experience with facilities of a similar size. A 10% contingency was added to the initial construction cost estimate to account for the conceptual level of evaluation used to define the estimate.

Estimated construction costs for water treatment facilities are based upon the Consultant's recent experience with the pricing of these facilities. As with the distribution project construction estimates, a 10% contingency was added to the initial construction cost estimate to account for the conceptual level of evaluation used to define the estimate.

In order to establish total capital cost estimates, the estimated construction costs were multiplied by factors that account for design, construction management, district labor, and other related project costs. The total multiplier is approximately 30% of the estimated total construction cost. This includes a 5% "non-construction" contingency to account for the conceptual level of evaluation used to define the estimate.

Table 2-2 provides a breakdown of each multiplier and a sample project cost calculation. For each of the projects identified in the AMMP, a project description sheet was created which includes the project cost breakdown. These sheets can be found in Appendix A.

TABLE 2-2
CAPITAL IMPROVEMENT PROJECT COST COMPONENTS

Component	Cost Basis	Cost Example
Construction Cost	Based on Unit Costs	$100,000
Construction Contingency	10% of Construction Cost	$10,000
Total Construction Cost	Sum of Construction Cost and Contingency	$110,000
Project Definition	1% of Total Construction Cost	$1,100
Pre-Design	3% of Total Construction Cost	$3,300
Design	8% of Total Construction Cost	$8,800
Construction Management (CM)	7% of Total Construction Cost	$7,700
District Labor	4% of Total Construction Cost	$4,400
Commissioning and Closeout	2% of Total Construction Cost	$2,200
Non-Construction Contingency	5% of Total Construction Cost	$5,500
Total Project Cost	**--**	**$143,000**

TECHNICAL EVALUATION TOOLS

Database Development

The primary tool utilized in the Asset Management Master Plan is the geographic information system (GIS) database that the District has been developing over the last few years. The GIS database is a key component to asset management as a repository of information which pertains to the District's distribution system assets. The GIS database itself is a key asset of the District. The database is utilized as the source data of the hydraulic modeling program, InfoWater. The GIS in its present form is a compilation of the District's MicroStation files, PBS&J's hydraulic model developed for the 2001 Water Master Plan, As-Built drawings obtained from the District, and valve detail sheets from some of the District staff.

The GIS database currently includes a large amount of information regarding system attributes. However, for many pipeline segments (especially for the older segments of the system) the database for certain attributes is not complete. Where data was not available, assumptions were made that were considered reasonable based upon other available information. The District is in the process of identifying missing attribute information and is developing a program for field-verifying key attribute data for more critical areas of the system. As more accurate data becomes available and incorporated into the GIS database, the assumptions used in this AMMP should be validated and modifications to the findings made where appropriate.

Hydraulic Model

The District's hydraulic modeling program, InfoWater, developed by MWH Soft, Inc. integrates with GIS to evaluate how water moves throughout the distribution system. The model was originally developed by PBS&J for the District. The InfoWater model was used in this report to evaluate the capacity of the distribution system and confirm recommended distribution system improvements.

The hydraulic model evaluation utilizes average day demand data placed at nodes throughout the system and District-wide peaking curves, developed by PBS&J, to model demands. Figure 2-1 provides a graph of the residential demand hourly peaking factors, where the maximum day demand occurs at 11 am and the peak hour at 7 am. The reservoir, pump station, and pressure reducing station field operational parameters, provided by District staff, are also incorporated into the hydraulic model. The peak hour demand is considered to be 7 am, rather than at the highest residential peaking factor at 8 am, because it is at this time the demands on the system are the greatest when considering the irrigation demands (potable water irrigation) and the reservoir operational scheme in combination with the residential demands.

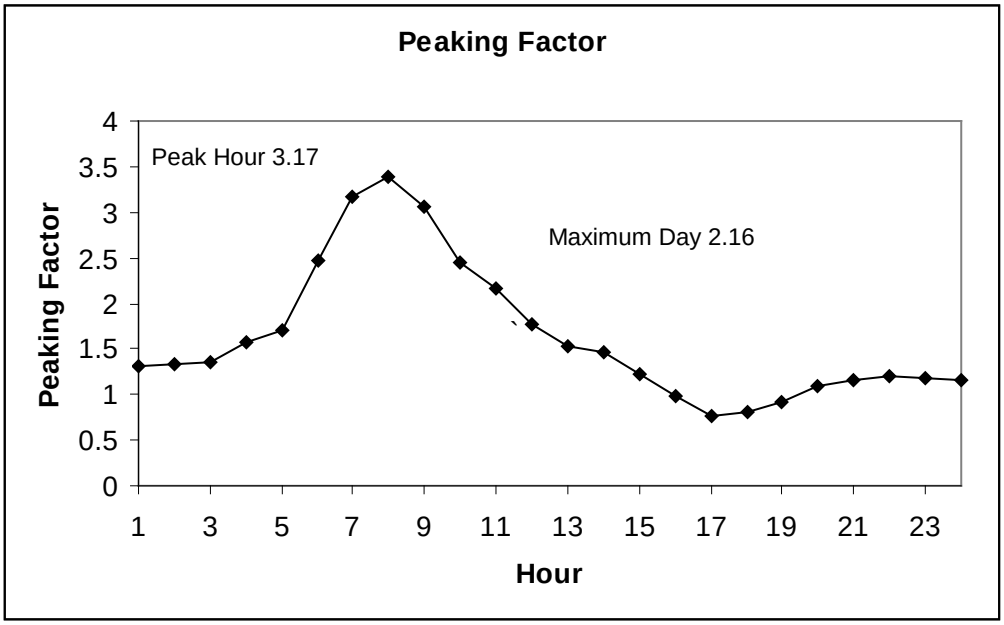


FIGURE 2-1. District Residential Daily Peaking Curve

After the District reviewed the peaking utilized in the model, the residential peaking factors, as shown in Figure 2-1 above, and the intensity of the irrigation cycle were both increased for the Fairbanks Ranch area by approximately 42%. This was based on the District experiencing greater peaks in this area than what the model was projecting. The improvements for the Fairbanks Ranch area discussed later in this report are based on this intensified peaking.

CHAPTER 3

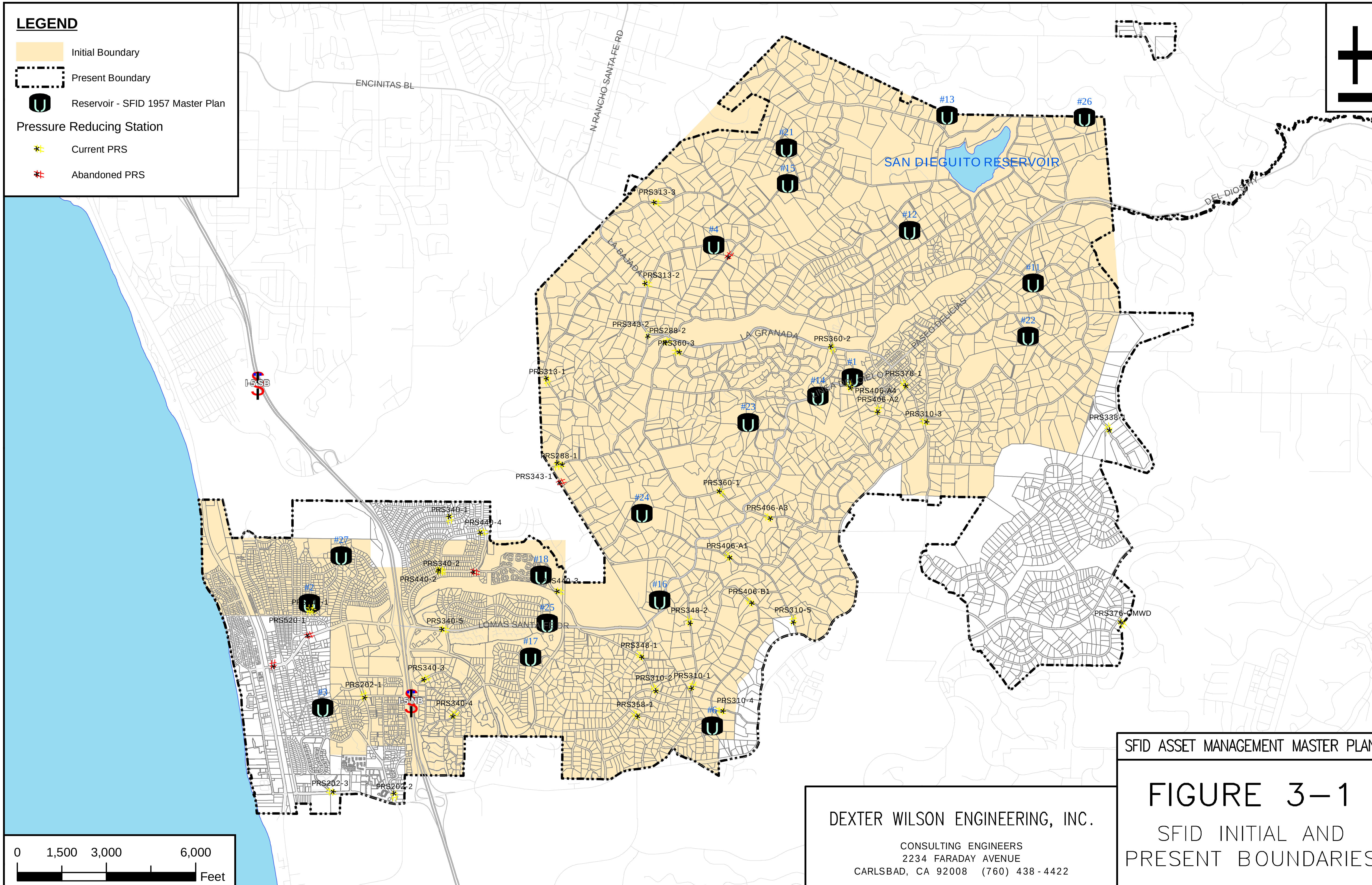
HISTORY OF DISTRICT AND FACILITIES

The District was formed January 26, 1923 under the California Irrigation District Act to provide water to the communities of Rancho Santa Fe, Solana Beach, and Fairbanks Ranch. Initially all water came from local supplies and limited the ability of the District to expand and serve other communities. The District primarily supplied irrigation water for agricultural uses when it was formed. Currently, approximately 25 percent of the District's potable supply comes from Lake Hodges and approximately 75 percent comes from the San Diego County Water Authority.

HISTORY OF DISTRICT

The District was formed by a petition of the property owners. The initial and current boundary is shown in Figure 3-1. The current District boundary encompasses approximately 10,200 acres. The District became a founding member of the San Diego County Water Authority (SDCWA) in 1948 and was included in the boundaries of the Metropolitan Water District of Southern California. In 1967, the District entered into a Joint Construction and Operations Agreement with the San Dieguito Water District (formerly the San Dieguito Irrigation District) for construction of a water filtration plant, filtered water reservoir, and joint transmission line.

In 1969, the District and San Dieguito Water District (SDWD) reached an agreement with the City of San Diego for the purchase of the San Dieguito Reservoir and San Dieguito Dam. This purchase included the conduit from the weir at Lake Hodges to the San Dieguito Reservoir and the 30-inch transmission main originating at the SDCWA First Aqueduct. The District entered into agreements with the SDWD and City of San Diego in 1977 and 1998 to memorialize water supply allocations from Lake Hodges.



SFID ASSET MANAGEMENT MASTER PLAN

DEXTER WILSON ENGINEERING, INC.

CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

FIGURE 3-1

SFID INITIAL AND PRESENT BOUNDARIES

HISTORY OF MAJOR FACILITIES

The history of the major facilities serving the District is important because it provides background as to why some of the District facilities are located where they are today. Many of the District facilities predate current road alignments such as the construction of Interstate 5. A brief history of the major District facilities is provided below. Figure 3-1 shows the location of the major facilities described in this section and Figure 3-2 schematically shows the raw water supply system for the District.

Raw Water Facilities

The raw water supply system consists of the Hodges Pipeline, the Cielo Pump Station and force main, the San Dieguito Reservoir supply line, the San Dieguito Dam, the San Dieguito Reservoir, and the San Dieguito Pump Station and force main.

Lake Hodges. The Lake Hodges Dam was constructed in 1918 by the San Dieguito Mutual Water Company/Santa Fe Land Improvement Company and was financed by the Santa Fe Railroad. The lake was named after William Hodges, then vice president of the railroad company. The Lake Hodges Dam consists of a 23-cylinder concrete arch structure that reaches a height of 130 feet above the streambed. The City of San Diego purchased Lake Hodges/and the Lake Hodges Dam in 1925 and still owns them. The Lake Hodges Dam has a crest length of 729 feet. The watershed for Lake Hodges is 303 square miles; this includes 54 square miles which drains into Sutherland Reservoir. The original capacity of Lake Hodges was 37,530 acre-feet. Its current capacity is about 30,250 acre-feet.

In accordance with the current agreement with the City of San Diego, the District is entitled to 3,268 acre-feet of Lake Hodges water (57.3 percent of the 5,700 acre-feet SFID/SDWD total allocation) for the portion of the total lake yield below 11,400 acre-feet, and an additional 28.66 percent of the yield exceeding 11,400 acre-feet.

San Dieguito Reservoir and Dam. The San Dieguito Dam also was constructed in 1918 by the San Dieguito Mutual Water Company/Santa Fe Land Improvement Company, creating the 883 acre-feet San Dieguito Reservoir. San Dieguito Dam is a concrete multiple-arch structure. It is 650 feet long and consists of twelve 50-foot arches supported on buttresses which range

RAW WATER SYSTEM

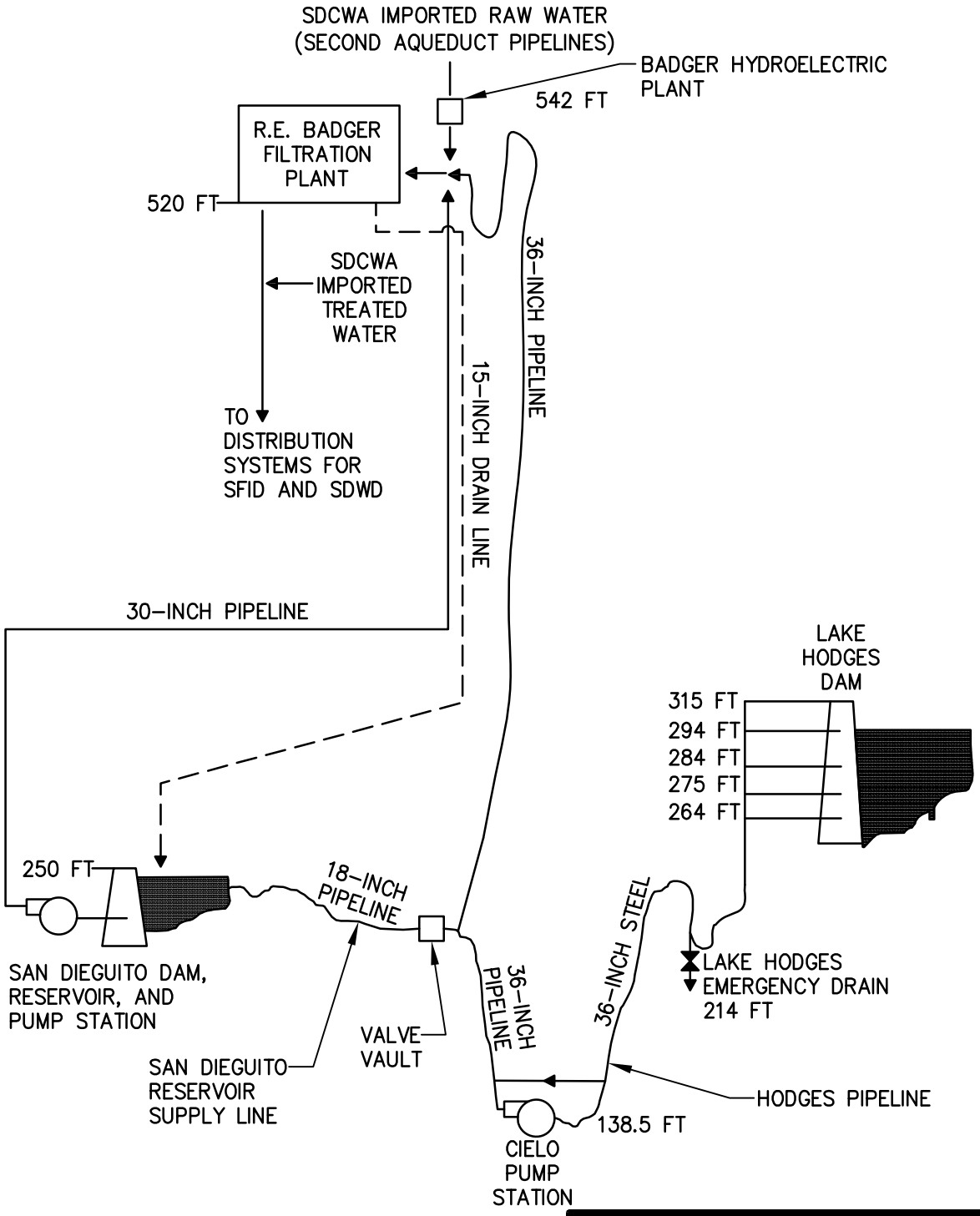


FIGURE 3-2

RAW WATER SUPPLY SCHEMATIC

\\PACIFIC\DWG\134001\ASSET MGMT PLAN\FOURTH SUBMITTAL\FIGURE_3-2.DWG 03-03-09 10:37:27 LAYOUT: 3-2

from 5 to 50 feet in height. A short straight wall shores the dam on each end. The slope of the upstream face is about 56 degrees with the horizontal, except for the top 17 feet which is vertical.

The original thickness of the arch walls was 12 inches at the top, increasing to a thickness of 22 inches (approximately) at the bottom. Due to excessive seepage and cracks in various arches, the dam was strengthened. The strengthening of San Dieguito Dam, completed in 1948, consisted of applying 12 inches of reinforced gunite to the upstream face of the vertical arches and 8 inches to the inclined arches. Reinforcement consisted of 3/8 inch round bars spaced at 6 inches both ways.

The reservoir also, prior to the early 1940s, served the City of Del Mar through a concrete weir box. Since then, the box on the south side of the dam was concreted in and most of the gravity piping removed.

Hodges Flume and New Piping System. A flume was constructed in 1918 to convey water from Lake Hodges to the San Dieguito Reservoir. This flume was 4 miles long and was originally called the Carroll Conduit, but later became known as the Hodges Flume. The flume was constructed as a primarily open concrete lined canal with sections of steel flume and siphons made of concrete pipe. The eastern portion of the flume from Lake Hodges to the Cielo Pump Station was replaced in 2003 with a 36-inch diameter steel line. The western portion of the flume was replaced with an 18-inch HDPE pipeline. A new 36-inch pipe was constructed from the Cielo Pump Station to the REB Plant to allow direct delivery of raw water to the REB Plant without passing through the San Dieguito Reservoir.

San Dieguito Reservoir Pump Station and Force Main. The San Dieguito Reservoir Pump Station was originally constructed to supply water directly to customers from the reservoir. In 1967, the facility was upgraded, concurrent with the REB Plant, to transfer water to the plant for treatment. The pump station has five pumps: four with a capacity of 500 gpm and one with a capacity of 250 gpm.

R. E. Badger Filtration Plant. The District and the San Dieguito Water District jointly own and operate the R.E. Badger Filtration Plant (REB Plant). The plant was built in 1967 and has capacity to treat up to 40 mgd. The plant treats local runoff from Lake Hodges and imported raw water from SDCWA.

The District has the ability to pump water from Lake Hodges directly to the REB Plant or to deliver it to San Dieguito Reservoir prior to pumping to the REB Plant. The Cielo Pump Station was completed in 2004 to give the District the ability to convey water directly from Lake Hodges to the REB Plant.

Imported raw water from SDCWA Raw Water Pipeline 5 that is conveyed to the REB Plant is used to generate power at the Badger Hydroelectric Facility. The plant contains a 13 million gallon clearwell that can also be filled with treated imported water from SDCWA Pipeline 4.

Badger Hydroelectric Facility. Located on the REB Plant site and adjacent to the SDCWA Second Aqueduct, the Badger Hydroelectric Facility was designed in 1984, began operation in 1985, and was modified in 1994. The facility consists of two hydraulic turbines and generators. Imported water from SDCWA Raw Water Pipeline 5 flows to the hydroelectric facility, which is controlled by District staff, via the SCDWA-controlled SDWD/SFID No. 4 and 5 Flow Control Facility connections. The Badger Hydroelectric Facility is jointly owned with SDWD.

Treated Water Distribution Facilities

The treated water distribution facilities include the piping system, pressure reducing stations, Larrick Pump Station and Larrick Reservoir. Much of the piping system was constructed before the REB Plant and originally carried non-filtered water. When the District first began delivering water in the 1920s, the District was primarily an agricultural district. Most of the water was used for crop irrigation and chlorination was the only treatment. By the 1960s, the District included 20 storage reservoirs in the distribution system that served as head boxes to reduce pressure to various areas of the District. All of these reservoirs were taken out of service and many were replaced with pressure reducing stations. The system is now set up for domestic treated water delivery, but the location of many facilities is based on the old agricultural delivery system.

Piping. The piping system has been expanded and rebuilt for the last 80 years. Figure 3-1 shows old reservoir sites of the system as it was in 1957, prior to conversion to filtered water.

Pressure Reducing Stations. Figure 3-1 also shows the current location of the District's 38 pressure stations. Additionally, there are five stations that no longer function as pressure reducing stations, but have not been removed. Most of the pressure reducing stations are underground in concrete vaults.

Larrick Reservoir. The Larrick Reservoir was constructed in 1968 and is located in Solana Beach. The reservoir is an above ground concrete structure that provides storage and supply primarily for the District's 202 Zone water system, but can also supply the 340 Zone via the adjacent pump station. Larrick Reservoir is supplied with treated water from the REB Plant through the 520 Pressure Zone. The Larrick Reservoir has a capacity of 6 million gallons. The Larrick Pump Station is located on the Larrick Reservoir site. A 520 to 440 Zone pressure reducing valve is also located on the reservoir site.

Larrick Pump Station. The Larrick Pump Station was constructed in 1982 and currently houses three centrifugal pumps and a pressure reducing valve. A fourth pump is scheduled to be added in early 2009. This pump station is located adjacent to and takes suction from the Larrick Reservoir. Two pumps, each rated at 1,667 gpm, pump to the 340 Zone and the third and fourth, newest, pumps rated at 750 gpm, will pump to the 520 Zone. The pressure reducing valve has also been installed at the station to feed water from the 520 Zone to the 340 Zone in an emergency. The Larrick Pump Station is used to supply water to the western side of the District during high flow periods. The station supplies water directly to the 340 Zone.

CHAPTER 4

PAST, PRESENT, AND FUTURE WATER USE

The District has a very high percentage of outdoor water use as compared to indoor water use. Minimal additional growth is expected within the District and the District boundary is constrained on all sides by other water districts. This chapter presents the past, present, and anticipated future water use by the District.

HISTORIC WATER USE

Table 4-1 shows the yearly total water use in the District from 1998 to the present. The table shows both potable and recycled water use. The District is near buildout and continued development in the District will be limited to isolated empty lots and re-development. Table 4-1 does not show a steady increase in water use. It shows a sporadic increase with yearly fluctuations both up and down. This is due to climate conditions and water conservation measures especially during drought years.

TABLE 4-1
SDCWA WATER USE DATA FOR SFID

Year	ANNUAL TOTALS, acre-feet				
	Imported	Local Surface	Subtotal	Recycled Water Use [1]	Total
1998	6,357	5,265	11,622	0	11,622
1999	7,135	6,357	13,492	0	13,492
2000	8,103	5,657	13,759	0	13,759
2001	7,246	4,759	12,005	140	12,145
2002	10,152	3,656	13,809	361	14,170
2003	10,416	2,498	12,914	403	13,317
2004	12,138	1,555	13,693	509	14,202
2005	10,095	3,319	13,413	420	13,833
2006	10,801	3,280	14,081	453	14,534
TOTAL	**82,443**	**36,346**	**118,788**	**2,286**	**121,074**
AVERAGE	**9,160**	**4,038**	**13,199**	**254**	**13,453**

[1] Data for recycled water use from SFID.

CURRENT WATER USE

This section discusses current water use in the District by community, pressure zone, and also addresses District surplus users and interconnections.

Water Use by Community

Santa Fe Irrigation District serves three distinct communities. These communities are Fairbanks Ranch, Rancho Santa Fe, and Solana Beach. Solana Beach is a typical community with smaller residential lots and much of the District's commercial properties. Fairbanks Ranch and Rancho Santa Fe have large lots many of which are greater than one acre. As can be seen in Table 4-2, both Fairbanks Ranch and Rancho Santa Fe have relatively high water use per meter. Both of these communities are in excess of 3,000 gallons per day per meter. In comparison, Solana Beach has a consumption of 666 gallons per day per meter. The communities of Fairbanks Ranch and Rancho Santa Fe have large lots and extensive landscaping.

TABLE 4-2
2006-2007 RESIDENTIAL WATER USE

Area	Acres	Number of Meters	Water Use			
			ac-ft/yr	mgd	gpd/ meter	gpd/ acre
Fairbanks Ranch	880	419	1,430.1	1.28	3,047	1,451
Rancho Santa Fe	7,087	2,080	7,442.3	6.65	3,195	938
Solana Beach	2,212	3,189	2,378.8	2.12	666	960
DISTRICT TOTAL	**10,179**	**5,688**	**11,251.2**	**10.05**	**1,766**	**987**

Water Use by Pressure Zone

Table 4-3 provides a summary of the water use by zone for the District. As can be seen in the table, the three major zones from a water use standpoint are the 520 Zone, the 376 Zone, and the 340 Zone. The source of this data is the District's InfoWater hydraulic modeling program. In comparison to metered data, the District's 2006-2007 demand was 14,033 acre-feet. Both of

these values include the potable water supplement to the recycled water system from the 520 Zone. For San Dieguito Water District, an average demand of 9,179 acre-feet per year (AFY) (8.2 mgd) is included in the InfoWater hydraulic modeling program, but is not included in Table 4-3.

TABLE 4-3
DISTRICT DEMAND BY PRESSURE ZONE

Zone	Annual Use, acre-feet	Percent of Total
202	827	5
288	99	1
310	466	3
313	293	2
338	49	0
340	1,537	10
343	198	1
348	155	1
358	30	0
360	87	1
376	1,894	13
406	840	6
440	382	3
520	8,254	55
TOTAL, acre-feet	**15,112**	**100**
TOTAL, mgd	**13.5**	

Out of District Customers

The District supplies customers which are outside the District boundaries. The total water use by these customers in 2006-2007 was 27.48 acre-feet (0.2 % of the demand). Table 4-4 provides an account summary of these customers.

TABLE 4-4
OUT-OF-DISTRICT CUSTOMER USE 2002-2007

SFID Account #	Water Use, acre-feet				
	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
50535304	0.48	0.37	0.38	0.39	0.06
30502801	0.03	0.04	0.03	0.04	0.04
10104201	0.95	1.32	1.24	1.49	1.05
70322800	0.56	0.39	0.97	0.53	0.35
50456601	1.14	0.96	0.03	0.31	3.95
50329300	0.65	1.75	3.97	2.99	0.38
50329401	1.08	1.15	1.74	1.73	1.24
50329503	2.80	1.33	1.46	3.13	3.26
10100300	1.08	0.65	0.65	0.70	0.77
10100400	1.83	1.63	1.50	1.85	1.94
10645400	6.71	5.87	6.91	6.24	6.02
70301600	0.23	0.14	0.95	0.46	0.62
40101800	0.75	0.74	1.13	1.10	1.43
40101900	0.79	1.04	0.82	0.69	0.72
40108000	3.28	2.94	2.53	2.75	3.54
40101400	0.75	0.74	0.75	1.10	0.69
40101600	0.64	0.54	0.55	0.58	0.58
40102000	0.37	0.44	0.53	0.60	0.53
40101700	0.57	0.43	0.60	0.60	0.32
TOTAL	**24.67**	**22.47**	**26.74**	**27.28**	**27.48**

Interconnections

The District has 17 interconnections with the Olivenhain Municipal Water District, the San Dieguito Water District, the City of Del Mar, and the City of San Diego. These do not include the normal delivery of water to the San Dieguito Water District. In 2007-2008, the District delivered 58.31 acre-feet to other districts. Table 4-5 provides a summary by account of the use from these interconnections.

TABLE 4-5
WATER DELIVERED VIA INTERCONNECTIONS, 2002 - 2008

SFID Account #	User Code	Water Use, acre-feet					
		2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
40103200	--	0	0	0	0	0	0
40102800	--	0	0	0	0	0	0
40106800	--	0	0	0	0	0	0
40102400	SP	0	0	0	0	0	0
40104000	SP	0.3	0.21	0.17	0.03	0.68	0.81
40103600	--	0	0	0	0	0	0
40104400	SP	12.81	13.89	9.19	10.2	11.53	12
40105600	SP	32.23	29.74	26.74	38.45	36.65	41
40101000	SP	0	0	0	0	2.27	0
40106000	SP	0	0	11.23	0	0	0
40101200	SP	0	0	0	0	0.19	0
40106400	--	0	0	0	0	0	0
40104800	--	0	0	0	0	0	0
TOTAL		**45.34**	**43.84**	**47.33**	**48.68**	**51.33**	**53.81**

In 2007-2008, the District received 210.8 acre-feet from Olivenhain Municipal Water District to maintain pressures in the Fairbanks Ranch area. Table 4-6 provides a summary by account of the water received from the Fairbanks Ranch area interconnections.

TABLE 4-6
WATER RECEIVED VIA INTERCONNECTIONS, 2002 - 2008

SFID Account #	User Code	Water Use, acre-feet					
		2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008
40107200	MI	0.00	2.65	0.29	0.00	0.00	0
40107600	MI	0.00	0.00	0.00	0.00	0.00	0
40107700	MI	49.98	79.64	58.14	145.06	5.04	185.5
40107800	MI	92.21	38.43	0.06	0.15	0.70	25.3
TOTAL		**142.19**	**120.71**	**58.48**	**145.22**	**5.74**	**210.8**

PROJECTED WATER USE

Table 4-7 shows the projected water use for the District as determined by the 2005 Urban Water Management Plan. As discussed further in Chapter 5, the District has plans to increase recycled water use and acquire local desalinated water supply. The District also has a water conservation program. All of these programs lead to reduced dependence on imported supply.

TABLE 4-7
PROJECTED WATER DELIVERIES
(all figures in acre-feet/year)

Year	Single Family	Multi-Family	Comm.	Indust.	Land-scape *	Ag	Other	Recycled Water	System Losses	Total
2000	10,080	947	865	146	931	195	122	0	324	13,610
2005	9,554	817	518	105	637	182	137	494	162	12,606
2010	11,851	1,000	900	150	330	170	140	800	200	15,541
2015	12,025	1,020	900	150	100	170	140	1,000	200	15,705
2020	12,304	1,040	900	150	75	162	140	1,025	200	15,996
2025	12,581	1,060	900	150	75	162	140	1,040	200	16,308
2030	12,668	1,080	900	150	75	158	140	1,100	200	16,471

* Landscape includes irrigation using potable water through dedicated irrigation meters (excludes residential landscaping).

CHAPTER 5

EVALUATION OF WATER SUPPLY

Table 5-1 provides a summary of the approved 2005 Urban Water Management Supply Plan for the District. In this chapter we will evaluate various supply options available to the District and set 2030 supply goals from the sources of water available to the District. The intent of these goals is to reduce the SDCWA supply requirement to the District and provide greater reliability to the District. The June 2007 Integrated Water Resources Plan (prepared by CDM) provided a list of possible supply options. The plan also ranked these options. In this chapter, we will quantify target goals for local supply, desalination, and recycled water. Also briefly discussed is the potential recovery of water that may be seeping under the San Dieguito Reservoir Dam.

TABLE 5-1
CURRENT URBAN WATER MANAGEMENT
SUPPLY PLAN FOR SFID
(all figures in acre-feet/year)

Water Supply Sources	2005	2010	2015	2020	2025	2030
San Diego County Water Authority	8,844	11,473	11,437	11,703	12,000	12,103
Local Surface Water	3,268	3,268	3,268	3,268	3,268	3,268
Recycled Water	494	800	1,000	1,025	1,040	1,100
TOTAL	**12,606**	**15,541**	**15,705**	**15,996**	**16,308**	**16,471**

WATER SOURCES

The District originally relied solely on local water supply to meet its customer needs. The majority of the District's current water deliveries are obtained from imported water. The District began serving recycled water in 2001 and by 2006 recycled water had become approximately 3 percent of the District supply. In 2007 the District signed a water purchase contract with Poseidon Resources for 2,000 acre-feet per year (AFY) of desalinated water from the proposed Carlsbad Desalination Project. This water is not scheduled to be available until late 2012. Each of these sources of water will be discussed below.

San Diego County Water Authority

The District currently has connections to the SDCWA Aqueducts to provide both raw and treated water. The SDCWA is planning for the deliveries to the District as shown in Table 5-1, as confirmed in their 2005 Urban Water Management Plan (April 2007). The current facilities would allow deliveries of these quantities of water with no new facilities required.

Due to changing conditions within the State of California, the imported water supply available from the SDCWA is less reliable than the past. Due to the recent drought and conditions in the Delta, projected supplies are continually being evaluated and may be reduced pending future cutbacks. The SDCWA also has planned for local agencies to develop recycled water, surface water, and desalinated water sources. Thus, the District's pursuit of other sources is in step with the goals of the SDCWA.

Local Surface Supply

Under the current 1997 agreement with the City of San Diego, the District (SFID) and San Dieguito Water District (SDWD) have water supply rights from Lake Hodges Reservoir. Lake Hodges Reservoir and Lake Hodges dam are currently owned by the City of San Diego. The District's water rights under the 1997 Agreement are outlined in the 1997 Agreement for the period of time prior to the Lake Hodges Improvement Project (the re-operation of Lake Hodges) and after the commencement of the Lake Hodges re-operation.

Prior to the re-operation of Lake Hodges (before completion of the LH Improvement Project), the Districts (SFID and SDWD) are entitled to all local water collected in Lake Hodges. The District's share of the first 7,500 AFY of local water supply is 4,300 AFY (57 1/3% of the total). Amounts of local water in excess of 7,500 AFY are divided one-half to SDWD and one-half to SFID.

The 1997 Agreement contemplates the re-operation of Lake Hodges in 2011. The City of San Diego has an agreement with the SDCWA as part of the Emergency Storage Project, to allow the SDCWA to store and remove imported water from Lake Hodges after the re-operation. The City of San Diego has estimated the average annual yield of local water in Lake Hodges, based on the design and intended operation of the Lake Hodges Improvement Project, to be 11,400 AFY. Following the re-operation of Lake Hodges, if the average annual yield is 11,400 AFY, all

local water will be divided one-half to the City of San Diego and one-half to the Districts (SFID and SDWD). In the event the average annual yield is less than 11,400 AFY, the Districts are entitled to an average annual yield of 5,700 AFY. For water supply planning purposes, the District has identified its 57 1/3% portion of the 5,700 AFY average annual yield, or 3,268 AFY, as local water supply.

In review of available data, the average annual total yield including SFID and San Dieguito Water District shares from Lake Hodges from 1976 to 2006 has been 7,043 AFY. The average annual surface water use for the District over this time period is 4,038 acre feet per year. This represents 57.33 percent of the water taken out of the Lake Hodges Reservoir. Thus, the actual historic use has been over 750 AFY greater than the amount planned for in previous planning studies.

Table 5-2 provides an analysis of the Lake Hodges Dam overflows from 1980 to the present, with detailed data found in Appendix B. As can be seen in this table, approximately 953,000 acre-feet have spilled over the dam since 1980. This represents an average of 34,053 AFY. This is far in excess of the amount of water that has been used by both districts from the reservoir. Table 5-2 also provides an estimated recapture computation of the spilled water. This recapture is based on the full capacity of the Olivenhain Pump Station to the SDCWA aqueduct. This represents an average of 19,648 AFY.

If we add the historic yield of 6,813 AFY to the recapture of 19,648 AFY, this yields a total of 26,461 AFY. The District's share of the yield goal of 26,461 AFY is 28.66 percent or 7,584 AFY. The District should establish this amount as a long term yield goal. Coordination with the SDCWA, the City of San Diego, and surrounding water agencies will be necessary to determine the delivery and accounting method for this water.

TABLE 5-2
LAKE HODGES SPILL ANALYSIS

Year	Spill		Estimate of Recapture [1]	
	million gallons	acre-feet	million gallons	acre-feet
1980	81,014	248,586	27,207	83,484
1981	10,011	30,717	10,011	30,717
1982	12,344	37,876	12,344	37,876
1983	60,892	186,844	31,908	97,907
1984	6,040	18,534	6,040	18,534
1985	0	0	0	0
1986	4,588	14,077	4,588	14,077
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	42,150	129,333	21,553	66,135
1994	0	0	0	0
1995	44,506	136,562	27,693	84,975
1996	0	0	0	0
1997	0	0	0	0
1998	27,019	82,905	23,897	73,325
1999	0	0	0	0
2000	0	0	0	0
2001	0	0	0	0
2002	0	0	0	0
2003	0	0	0	0
2004	0	0	0	0
2005	22,183	68,067	14,048	43,105
2006	0	0	0	0
2007	0	0	0	0
TOTAL	**310,746**	**953,500**	**179,289**	**550,135**
AVERAGE	**11,098**	**34,054**	**6,403**	**19,648**

[1] Based on capacity of Olivenhain Pump Station of 314 cfs to pump to the aqueduct.

Carlsbad Desalination Project

The District has signed a contract with Poseidon Resources for the delivery of 2,000 acre-feet (1.79 mgd) of desalinated water per year. This contract provides for a period of time to workout the delivery regime between Poseidon Resources and the District. In the worst case scenario, the terms of the delivery contract may be on a near constant flow on a daily basis. Thus the District will need to accommodate an average of approximately 1.79 million gallons per day of desalinated water. During the winter months, this quantity approaches the District's entire water demand. Thus any future contracts for desalination should be structured to allow for a summer peaking period. Construction of the Carlsbad Desalination Project is scheduled to be completed in late 2012.

Recycled Water

Chapter 9 provides a summary of the Recycled Water projects recommended for the District. The goal for future recycled water use for the District has been established as 1,100 AFY by 2030.

Estimated Future Supply Summary

Table 5-3 provides a summary of the goals to meet the projected 2030 District demand of 16,471 AFY. As can be seen in the chart the goals for recycled water and desalinated water are established. The goal for local surface water is based on information provided in earlier parts of the chapter. In order to reach this goal the SDCWA, the City of San Diego, and the District would have to work toward a mutual goal of maximizing yield from local water.

TABLE 5-3 2030 WATER SUPPLY GOALS	
Source	**Water Supply, ac-ft/yr**
Potable	
Imported Water	5,787
Poseidon (desalination)	2,000
Local Surface Supply [1]	7,584
Other Supplies	-
Subtotal	**15,371**
Non-Potable	
Recycled	1,100
TOTAL	**16,471**

[1] Based on Lake Hodges overflow capture

San Dieguito Dam Seepage Recovery Project

The District is presently preparing to conduct a study of recovering water which is seeping under the San Dieguito Dam. District staff has estimated that 100-200 AFY is seeping beneath the dam and is pursuing the study to determine what impact, if any, utilizing this water would have on downstream groundwater users. Should the results of the study be favorable, the District would pursue the installation of groundwater wells to extract the seepage. The groundwater could be utilized as a raw water supply and treated at the REB Plant or utilized as a non-potable source for irrigation. The location of the groundwater wells would be in the vicinity of the existing San Dieguito Reservoir raw water pumps, which could be utilized if the groundwater is to be treated at the REB Plant. No supply figures have been included in the Water Supply Goals of Table 5-3 above as it has not yet been confirmed if this is a viable source for the District.

CHAPTER 6

EXISTING POTABLE WATER DISTRIBUTION SYSTEM

The District potable water distribution system consists of the Larrick Reservoir and Pump Station, distribution system piping, 38 pressure reducing stations, and appurtenances (e.g., gate valves, air/vacuum valves). From the REB Plant, water is distributed to 14 pressure zones through 38 pressure reducing stations scattered throughout the District. Figure 6-1 schematically shows how water is delivered to the pressure zones. The majority of the pressure stations are served directly from the 520 Pressure Zone. Figure 6-2 shows a map of the District pressure zones.

LARRICK RESERVOIR AND LARRICK PUMP STATION

Larrick Reservoir is a 6.0 million gallon concrete tank located in the Solana Beach area of the District. The reservoir is filled by the 520 Pressure Zone and primarily supplies the District's lowest pressure zone, the 202 Zone. The pump station at the reservoir site, Larrick Pump Station, houses three pumps, with a fourth scheduled to be installed in early 2009. Two of the pumps supply the 340 Zone during times of high water use in the District. When the 340 Zone supply pumps turn on they provide water to the 340 Zone from Larrick Reservoir reducing the demand on the 520 Zone. This increases pressure in the western portion of the 520 Zone which keeps the hydraulic grade line in the 520 Zone above 440 feet and prevents pressure drops in the 440 Zone. The pumps are controlled by total District flow and time of day. The station currently has a third, emergency pump to allow pumping from Larrick Reservoir to the 520 Zone. The new fourth pump will also supply the 520 Zone. The Larrick Reservoir fill is also controlled by time and the pump station. The reservoir is not allowed to fill during periods of high water use or when the pump station is on.

PIPELINES

To supply the District's customers, over 170 miles of pipelines are owned and operated by the District. Appendix C provides a list of all the pipe reaches in the District. This list contains the size, length, age and other attributes for each pipe reach within the District. The pipelines are split into two categories, the backbone distribution system and the remainder.

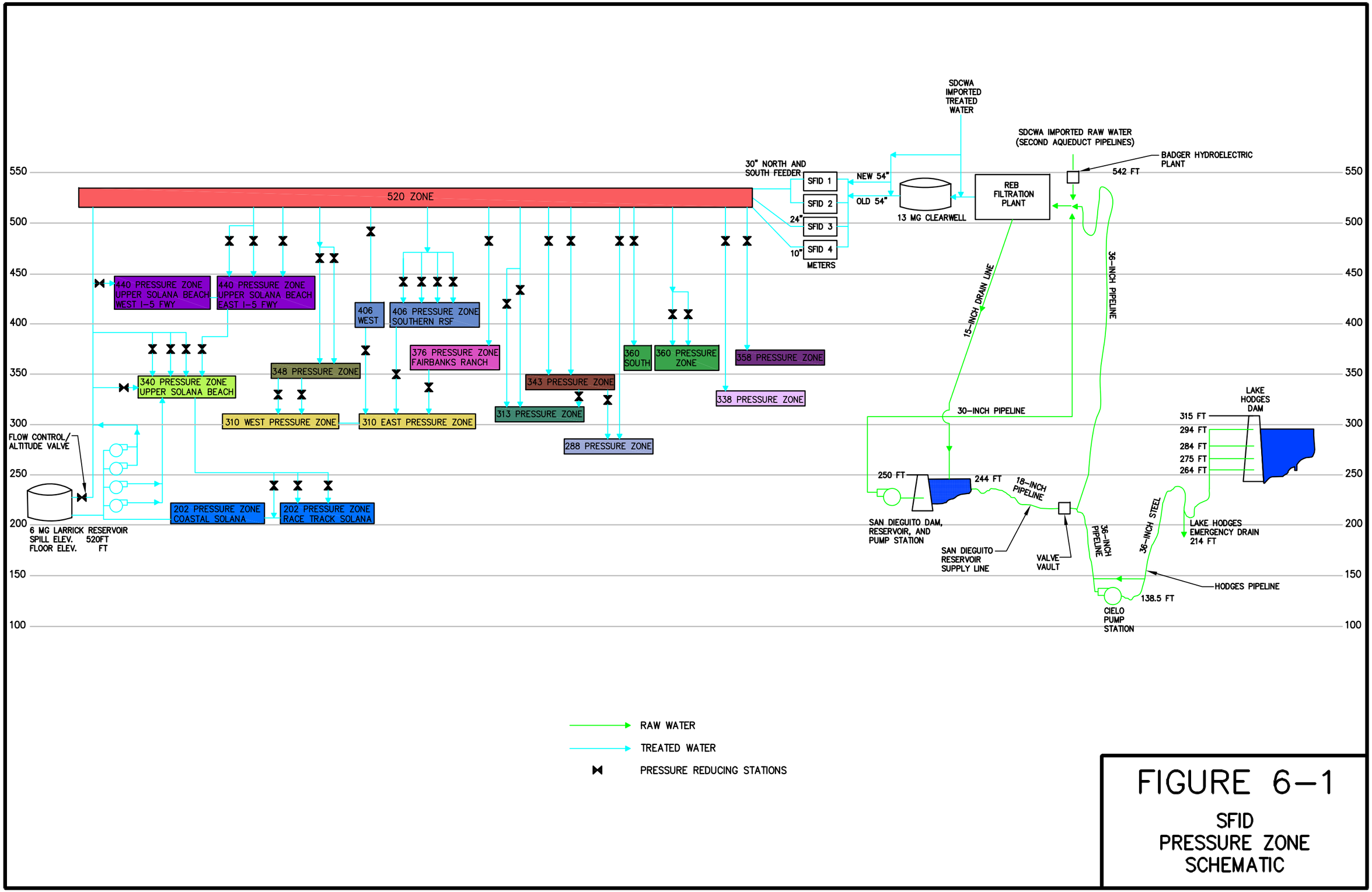


FIGURE 6-1

SFID PRESSURE ZONE SCHEMATIC

LEGEND

- SFID Boundary
- Adjacent Water District Boundary

SFID Pressure Zone

- 202
- 288
- 310
- 313
- 338
- 340
- 343
- 348
- 358
- 360
- 376
- 406
- 440
- 520

RE BADGER FILTRATION PLANT SITE

OLIVENHAIN MUNICIPAL WATER DISTRICT

SAN DIEGUITO RESERVOIR

SAN DIEGUITO WATER DISTRICT

ENCINITAS BL

RANCHO SANTA FE RD

DEL DIOS HWY

LA GRANADA

PASO DE LAS DELICIAS

LINEA DEL CIELO

LOMAS SANTA FE DR

I-5 SB

I-5 NB

CITY OF DEL MAR

CITY OF SAN DIEGO

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–2

SFID POTABLE WATER PRESSURE ZONES

\\Pacific\gis\13401-8\AMMP\Fourth Submittal Figures\FIGURE_6-2.mxd

Backbone Distribution System Piping

In working with District staff, an effort was made to define the backbone distribution system within the District. Transmission systems within potable water systems typically connect major elements such as treatment plants, reservoirs, and large pumps stations and typically have few service connections. In the case of the District, there are two main pipelines that move water through the District and connect the REB Plant and Larrick Reservoir. These are 27-inch and 20-inch pipelines and are often referred to as the northern and southern feeders, respectively. These two main pipelines do have service connections to them and so rather than referring to them as "transmission" pipes, the term "backbone distribution" is used to define these critical pipes. Figure 6-3 highlights the backbone distribution system. Tables 6-1 and 6-2 summarize the District's distribution system pipelines based on size and material, respectively. The backbone distribution system includes all major District pipes including pipelines feeding pressure reducing stations which are the lead station for their zone. Figure 6-4 illustrates the District piping by the most common materials. The ductile iron (DI) and the welded steel (WSP) piping are not shown on this figure as they occur in such small quantities. The ductile iron piping can be found immediately upstream and downstream of the pressure reducing stations. There is only one stretch of welded steel piping and it is into Larrick Reservoir.

Lead pressure reducing stations (PRS) are the primary station for the zone to provide water. They are set as the lead based on the available hydraulic grade line, location, and whether it feeds an additional reduced zone. Some zones have more than one lead station. Secondary PRSs are those which open during peak hour demand scenarios. Emergency PRSs operate only when an extreme drop in hydraulic grade line occurs, such as during a fire flow scenario.

VALVES

The District has isolation valves, pressure reducing valves, air release valves and blow off assemblies. Each of these valve types will be discussed below.

Isolation Valves

The District's piping system has three main types of valves for isolation. These valve types are gate valves, butterfly valves, and plug valves. Isolation valves include fire hydrant isolation valves, distribution isolation valves, and pressure reducing station isolation valves.

LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir
- Lead Pressure Reducing Station
- Backbone Distribution System

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

DEL DIOS HY

LA BAJADA

PASO DE LOS LIBROS

LA GRANADA

HSSB

PRS288-2

PRS360-2

PRS313-1

PRS376-1

PRS406-A2

PRS310-3

PRS343-1

PRS440-4

PRS406-B1

PRS348-2

PRS340-5

PRS310-2

PRS202-1

PRS340-4

PRS358-1

0 1,500 3,000 6,000 Feet

\\Pacificogis\13401-8\AMP\Fourth Submittal Figures\FIGURE_6-3.mxd

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–3

SFID BACKBONE DISTRIBUTION SYSTEM

LEGEND

MATERIAL

- Asbestos Cement Pipeline
- CMLC
- Concrete Cylinder Pipeline
- PVC
- PVC C-900
- PVC C-905
- Unknown Material

N

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

DEL DIOS HY

LA BAJADA

LA GRANADA

PASEO DELICIAS

LINEA DEL CIELO

I-5 SB

I-5 NB

LOMAS SANTA FE DR

0 1,500 3,000 6,000 Feet

\\Pacificogis\13401-8\AMP\Fourth Submittal Figures\FIGURE_6-4.mxd

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–4

DISTRIBUTION SYSTEM PIPING MATERIAL

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TABLE 6-1
BACKBONE DISTRIBUTION SYSTEM PIPING BY MATERIAL AND DIAMETER

Material	Diameter, inch															
	4	6	8	10	12	14	16	18	20	24	17	30	36	42	54	TOTAL
AC	-	3,766	13,577	19,243	12,319	6,393	19,126	6,042	19,369	6,232	-	970	-	-	-	107,038
C-900 PVC	-	-	209	4,417	-	-	-	-	-	3,610	-	-	-	-	-	8,236
CCP	-	-	9	-	34	-	31	85	11,513	15,762	6,727	13,114	204	149	18,477	66,106
DI	5	317	266	245	92	-	70	-	19	-	-	-	-	-	-	1,015
UNKNOWN	-	-	4	38	-	-	31	-	45	39	-	-	-	-	-	157
WSP	-	-	-	-	147	-	-	-	-	-	-	-	-	-	-	147
TOTAL	**5**	**4,083**	**14,065**	**23,944**	**12,592**	**6,393**	**19,258**	**6,127**	**30,947**	**25,642**	**6,727**	**14,084**	**204**	**149**	**18,477**	**182,698**

TABLE 6-2
OTHER DISTRIBUTION SYSTEM PIPING BY MATERIAL AND DIAMETER

Material	Diameter, inch												
	2	3	4	6	8	10	12	14	16	20	24	30	TOTAL
AC	1,649	1,546	31,289	115,486	317,330	78,033	31,565	2,527	8,823	148	71	-	588,467
PVC	-	365	1,588	6,736	53,754	11,733	8,288	196	-	-	2,969	-	85,629
CCP	-	-	-	23	80	15	-	-	-	70	46	63	297
CMLC	-	-	-	-	-	-	-	-	266	-	-	-	266
DI	-	-	39	569	294	95	26	-	-	60	-	-	1,082
UNKNOWN	455	33	476	34,492	1,405	-	82	-	9	-	-	-	36,953
TOTAL	**2,105**	**1,945**	**33,392**	**157,306**	**372,862**	**89,875**	**39,961**	**2,723**	**9,098**	**278**	**3,086**	**63**	**712,694**

Fire Hydrant Isolation Valves. These valves (gate or butterfly) allow flow to a fire hydrant to be shut off without affecting any customers. Figure 6-5 shows the location of the 1,152 fire hydrant isolation valves in the District. Information on these valves can be found in Appendix D.

Distribution System Isolation Valves. These valves (gate, butterfly, or plug) are part of the distribution pipeline system and range in size from 4-inch to 54-inch. These valves allow sections of the District's distribution system to be shut off in the case of an emergency or repair. Table 6-3 summarizes these valves by size while Table 6-4 summarizes these valves by type. Appendix E provides the detail about each of these valves. Figure 6-6 illustrates the location of the backbone distribution system isolation valves.

TABLE 6-3
DISTRIBUTION SYSTEM ISOLATION VALVES BY SIZE

Size, inches	Count		
	Backbone Distribution System	Other System Piping	Total
2	0	5	5
3	0	6	6
4	2	55	57
6	29	1,506	1,535
8	44	785	829
10	58	155	213
12	17	74	91
14	3	3	6
16	27	12	39
18	6	1	7
20	5	0	5
24	26	3	29
30	4	0	4
54	1	0	1
TOTAL	**222**	**2,605**	**2,827**

TABLE 6-4
DISTRIBUTION SYSTEM ISOLATION VALVES BY TYPE

Valve Type	Count		
	Backbone Distribution System	Other System Piping	Total
Butterfly	65	374	439
Double Gate Wedge	9	3	12
Gate	142	2,221	2,363
Plug	6	7	13
TOTAL	**222**	**2,605**	**2,827**

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Pressure Reducing Valve
- Flow Control Valve
- Butterfly Valve
- Gate Valve

Pressure Zone

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

PRS288-1
PRS343-1
PRS360-1
PRS406-A3
PRS406-A1
PRS406-B1
PRS348-2
PRS348-1
PRS310-1
PRS310-2
PRS310-4
PRS358-1
PRS340-1
PRS340-2
PRS340-3
PRS340-4
PRS340-5
PRS440-1
PRS440-2
PRS440-3
PRS440-4
PRS202-1
PRS202-2
PRS202-3
PCV520-1
PRS520-1
TOMAS SANTA FE DR

0 600 1,200 2,400 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6-5A

SFID FIRE HYDRANT ISOLATION VALVES

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Pressure Reducing Valve
- Flow Control Valve
- Butterfly Valve
- Gate Valve

Pressure Zone

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

SAN DIEGUITO RESERVOIR

N RANCHO SANTA FE RD

RANCHO SANTA FE RD

LA GRANADA

CIELITO

PRS313-3
PRS313-2
PRS343-2
PRS288-2
PRS360-3
PRS360-2
PRS313-1
PRS406-A4
PRS406-A2
PRS376-1
PRS310-3
PRS336-1
PRS343-1
PRS288-1
PRS360-1
PRS406-A3
PRS406-A1
PRS340-1
PRS440-4
PRS340-4
PRS340-3
PRS340-5
PRS406-B1
PRS310-5
PRS348-2
PRS348-1
PRS310-1
PRS310-2
PRS358-1
PRS310-4
PRS376-OMWD

0 1,000 2,000 4,000 Feet

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6-5B

SFID FIRE HYDRANT ISOLATION VALVES

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–6

SFID BACKBONE DISTRIBUTION SYSTEM ISOLATION VALVES

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Pressure Reducing Station Isolation Valves. These valves, located upstream and downstream of the District's pressure reducing stations, allow water to be shut off through the station for repair or maintenance.

Water Service Isolation Valves. The number, size, and type of water service isolation valves can be estimated based on the size and number of water services in the District. Typically, buried corporation stops are utilized on water services 2-inch and smaller. The estimated number of corporation stops is therefore 7,095. For valves larger than 2-inch, typically buried isolation valves, such as gate valves, are utilized. From District water service information it is estimated that there would be 24 valves at 4-inches in size, 8 valves at 6-inch in size, 2 valves at 8-inch in size, and 1 valve at 10-inch in size.

Dead End Pipeline Valves

Most District pipes are looped. When a valve on a dead end pipeline is closed, customers downstream of this valve will not receive water. These valves were identified by District staff, 181 in all, and are shown on the maps provided in Appendix F.

Air Valves

There are 421 air valves in the District, 18 of which are automatic according to District staff. These are not presently differentiated between air release, air and vacuum, or combination valves. Additionally, it has not been differentiated which are manual and which are automatic. Figure 6-7 illustrates the location of the air valves in the District and the valves are listed in Appendix G. Many of the existing air release valves were installed several years ago and do not meet the preferred current standards. The District intends to evaluate individual air release valves as part of the Computerized Maintenance Management System (CMMS) implementation element of the Integrated Technology Program. Required upgrades would be included in future operation and maintenance programs. Should it be determined that the number of required air release valve replacements is large enough, the replacement of air release valves may be incorporated into other defined distribution CIP projects. When future manual air release valves are replaced, it is recommended that they be replaced with automatic air release valves if more appropriate for the application.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Air Valve
- Pipelines

ENCINITAS BL
N RANCHO SANTA FE RD
SAN DIEGUITO RESERVOIR
DEL DIOS HWY
LA BAJADA
LA GRANADA
LINEA DEL CIELO
LINEA DEL CIELO
LOMAS SANTA FE DR
I5SB
I5NB

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–7

AIR VALVES

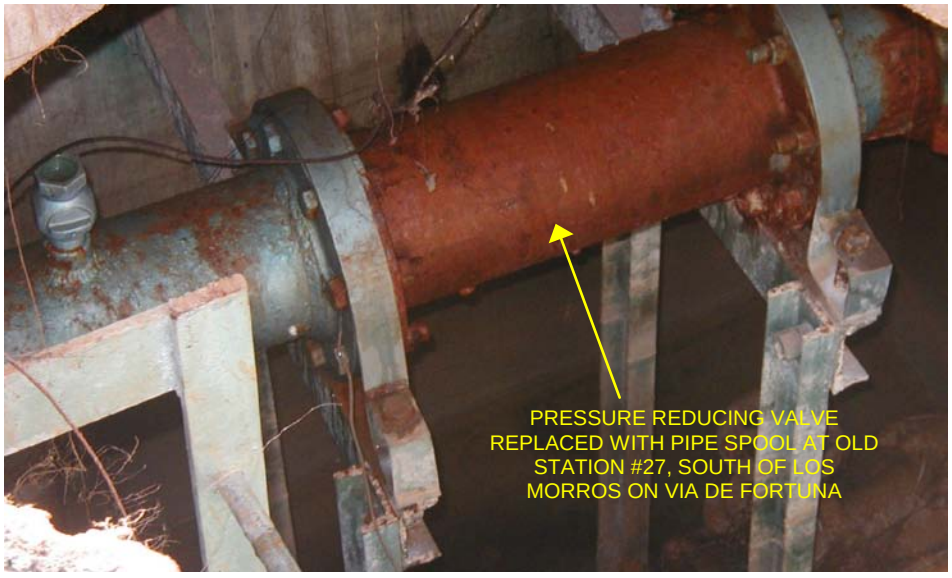
\\Pacific\gis\13400\81AMMP\Fourth Submittal Figures\FIGURE_6-7.mxd

Blow-offs

There are 230 blow-off assemblies in the District. Figure 6-8 illustrates the location of the blow-off in the District and the valves are listed in Appendix H.

PRESSURE REDUCING STATIONS

The District presently operates 38 pressure reducing stations (PRS), including the OMWD interconnection at Circa Oriente, and supplying 13 pressure zones. There are an additional five pressure reducing stations which are no longer operational and are either empty valve boxes or the valve has been replaced with a pipe spool as shown in the photo below.



All of these pressure reducing stations are identified on Figure 6-9. Table 6-5 provides information on each of the stations including the hydraulic grade line settings of the valves. Those pressure reducing stations set to operate as the lead station for the zone are considered part of the backbone distribution system. These stations are set as the main, or lead, station into the zone based on their location in the zone, proximity to the backbone distribution system, and other factors such as ease of access.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Blow Off
- Pipelines

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

DEL DIOS HWY

LA BAJADA

LA GRANADA

PASEO DELICIAS

LINEA DELCIELO

LOMAS SANTA FE DR

I-5 SB

I-5 NB

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6-8

BLOW OFF ASSEMBLIES

\\Pacificogis\134001-8\AMP\Fourth Submittal Figures\FIGURE_6-8.mxd

LEGEND

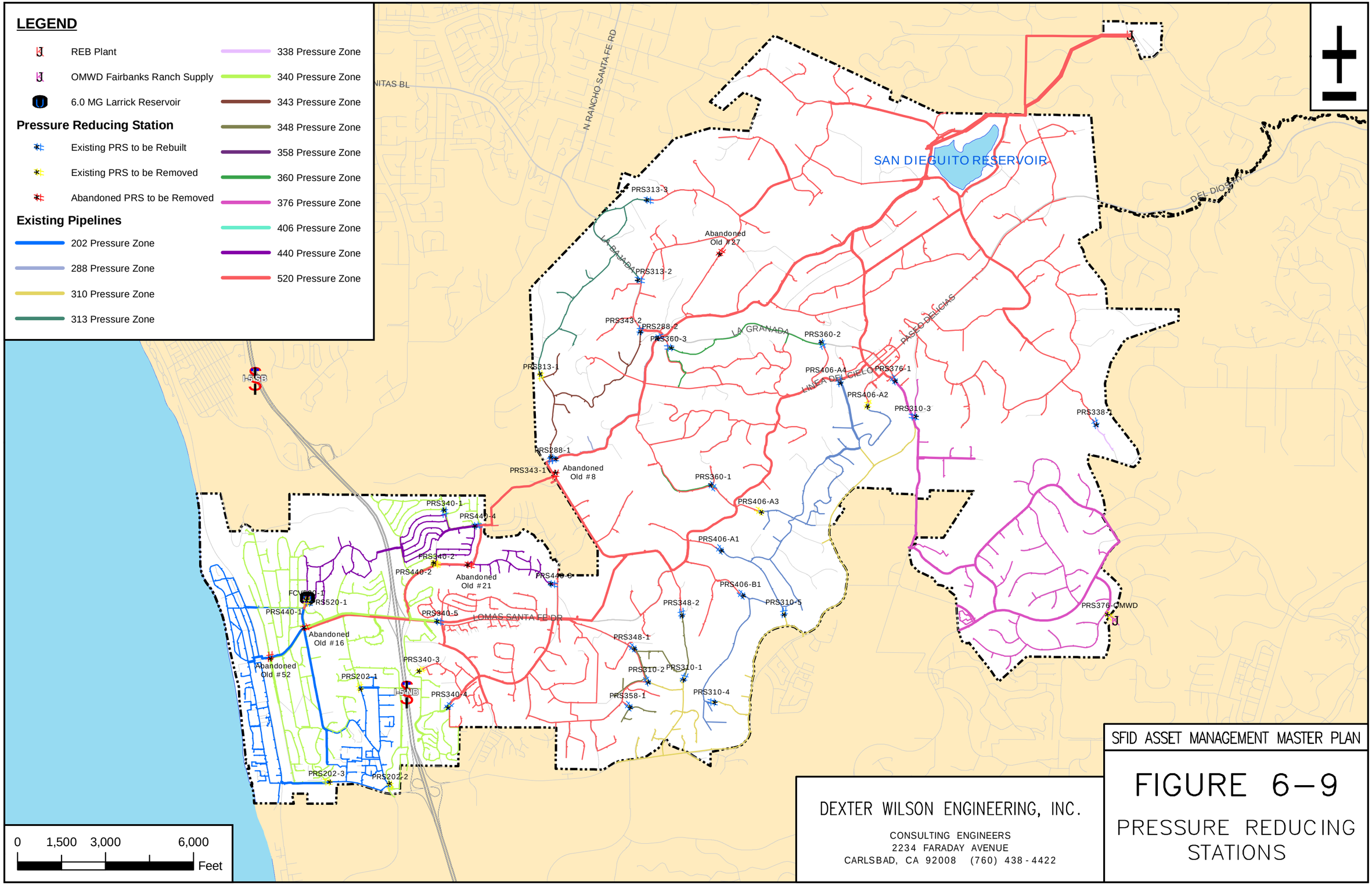
- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir

Pressure Reducing Station

- Existing PRS to be Rebuilt
- Existing PRS to be Removed
- Abandoned PRS to be Removed

Existing Pipelines

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone



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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–9

PRESSURE REDUCING STATIONS

\\Pacific\gis\13400\1-8AMP\Fourth Submittal Figures\FIGURE_6-9.mxd

TABLE 6-5
SFID PRESSURE REDUCING STATIONS

Station	Zone From-To	Year	Valve Size	Valve Elevation, feet	HGL, feet	Back-bone PRV	Comments
PRS202-1	340-202	1998	8" Primary & 4" Bypass	39.5	194	Y	OLD STATION #63
PRS202-2	340-202	0	6" Primary	10.8	188	N	OLD STATION #62
PRS202-3	340-202	1977	8" Primary	46.8	190	N	OLD STATION #59
PRS288-1	343-288	1970	8" Primary & 2" Bypass	17.6	302	N	OLD STATION #49
PRS288-2	520-288	1970	6" Primary	62.6	293	Y	OLD STATION #20
PRS310-1	348-310	1967	6" Primary & 2" Bypass	78.2	324	N	OLD STATION #18
PRS310-2	348-310	1967	6" Primary & 2" Bypass	113.5	318	Y	OLD STATION #14
PRS310-3	376-310	1966	8" Primary & 6" Bypass	118.6	314	Y	OLD STATION #09
PRS310-4	406-310	1966	6" Primary & 2" Bypass	158.5	314	N	OLD STATION #12
PRS310-5	406-310	1966	4" Primary & 2" Bypass	53.6	325	N	OLD STATION #11
PRS313-1	343-313	1970	6" Primary & 2" Bypass	90.4	311	Y	OLD STATION #19
PRS313-2	520-313	1965	6" Primary	178.1	319	N	OLD STATION #02
PRS313-3	520-313	1965	6" Primary & 2" Bypass	110.9	304	N	OLD STATION #01
PRS338-1	520-338	1995	6" Primary & 4" Bypass	193.8	345	N	OLD STATION #15
PRS340-1	440-340	1976	6" Primary	171.0	344	N	OLD STATION #56
PRS340-2	520-340	1976	8" Primary	175.7	344	N	OLD STATION #50
PRS340-3	520-340	1968	6" Primary	174.7	348	N	OLD STATION #37
PRS340-4	520-340	1968	6" Primary	238.1	344	Y	OLD STATION #23
PRS340-5	520-340	1967	10" Primary & 4" Bypass	174.9	348	Y	OLD STATION #22
PRS343-1	520-343	1965	6" Primary & 2" Bypass	17.6	358	Y	OLD STATION #07
PRS343-2	520-343	1965	6" Primary & 2" Bypass	99.9	350	N	OLD STATION #03
PRS348-1	520-348	1966	6" Primary	216.7	353	N	OLD STATION #26
PRS348-2	520-348	1966	6" Primary & 2" Bypass	176.7	374	Y	OLD STATION #13
PRS358-1	520-358	1977	6" Primary	198.3	367	Y	OLD STATION #60
PRS360-1	520-360	1965	6" Primary & 2" Bypass	180.1	357	N	OLD STATION #06
PRS360-2	520-360	0	4" Primary & 2" Bypass	167.9	365	Y	OLD STATION #05
PRS360-3	520-360	1965	6" Primary & 2" Bypass	156.6	371	N	OLD STATION #04
PRS376-1	520-376	1966	10" Primary & 4" Bypass	216.2	382	Y	OLD STATION #45
PRS406-B1	520-406	1961	6" Primary & 2" Bypass	265.2	419	Y	OLD STATION #30
PRS406-A1	520-406	1967	6" Primary & 2" Bypass	213.3	420	N	OLD STATION #33
PRS406-A2	520-406	1967	6" Primary & 2" Bypass	221.9	419	Y	OLD STATION #32
PRS406-A3	520-406	1970	6" Primary	191.3	411	N	OLD STATION #31
PRS406-A4	520-406	1966	10" Primary & 6" Bypass	233.3	414	N	OLD STATION #10
PRS440-1	520-440	1976	6" Primary	193.8	450	N	OLD STATION #58
PRS440-2	520-440	1975	6" Primary	175.7	443	N	OLD STATION #57
PRS440-3	520-440	1974	6" Primary	278.6	454	N	OLD STATION #54
PRS440-4	520-440	1962	12" Primary & 2" Bypass	170.6	457	Y	OLD STATION #51
376-OMWD	OMWD-376	0	8" Primary & 3" Bypass	221.5	365	N	OMWD

WATER SERVICES

Water services from the District's distribution piping are primarily copper. In the past, Orangeburg pipe was also installed as water services. This pipe was manufactured from the 1940s through the 1970s. Figure 6-10 illustrates the general location of the Orangeburg laterals in the District. While specific information is not available, it is estimated that approximately 1,481 parcels in the identified areas are served via Orangeburg laterals.

LEGEND

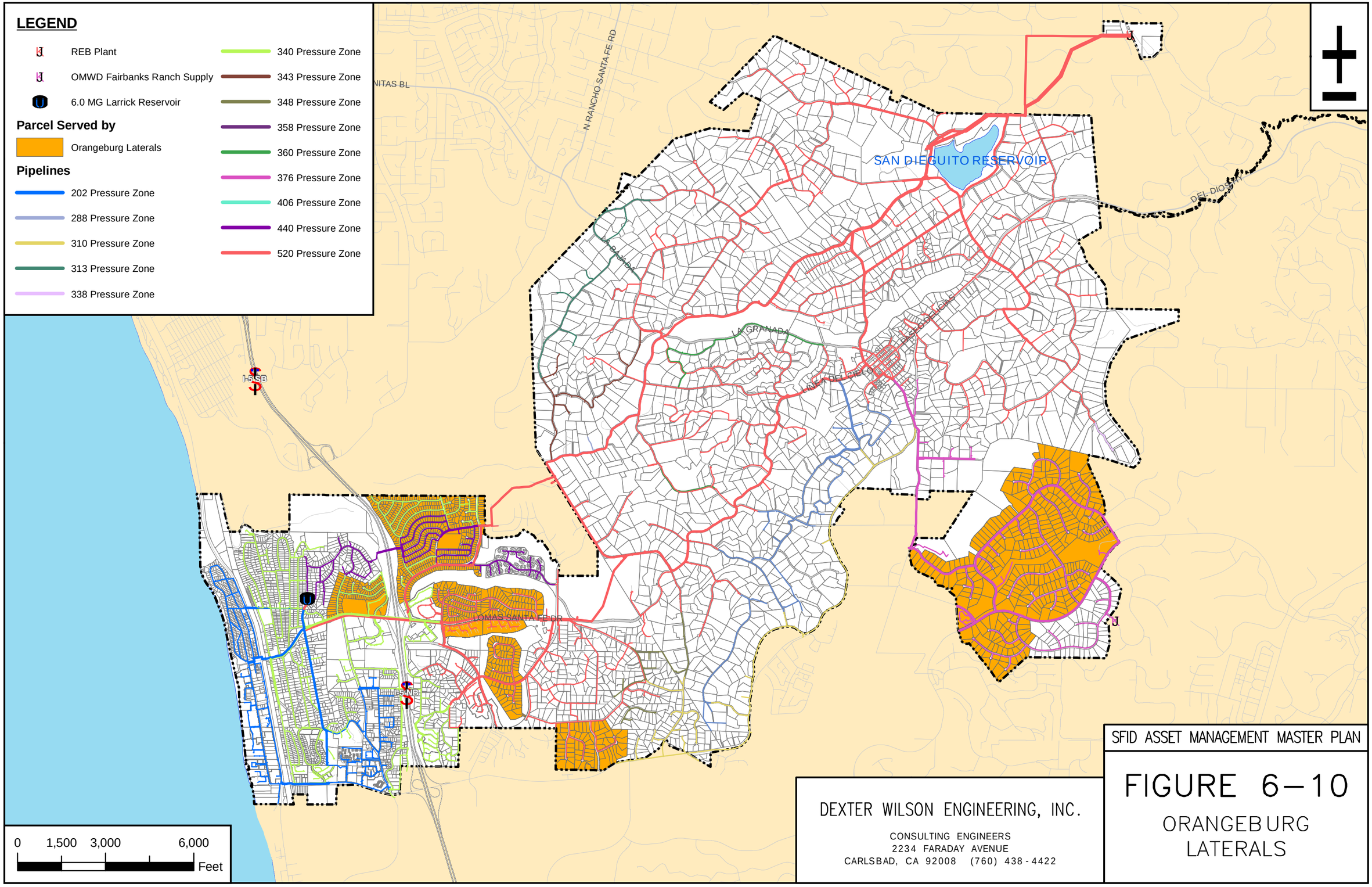
- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir

Parcel Served by

- Orangeburg Laterals

Pipelines

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone



0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–10

ORANGEBURG LATERALS

\\Pacificgis\13400\1-8\AMP\Fourth Submittal Figures\FIGURE_6-10.mxd

METERS

Presently, the District's meter size limitations allow the option to issue dual meters to parcels greater than 6.0 acres in size. For parcels ranging from 6.0 to 8.99 acres with a house, one 1.5-inch meter and one ¾-inch residential meter may be installed. For parcels 9.0 to 15.0 acres, one 2-inch meter and one ¾-inch residential meter may be installed.

FIRE HYDRANTS

The Districts piping system contains 1,188 public fire hydrants and 23 private fire hydrants. The spacing of the hydrants and the distribution system's ability to deliver fire flow are discussed in Chapter 7.

INTERCONNECTIONS

The District presently has 13 interconnections as discussed in Chapter 4 between the City of Del Mar, City of San Diego, Olivenhain Municipal Water District, and San Dieguito Water District. The majority of these connections are typically closed and utilized during emergency scenarios. Two of these are metered and normally open. One is with the OMWD and supplies the 376 Pressure Zone in Fairbanks Ranch along Circa Oriente. The second active interconnection supplies water to the City of San Diego along Via de la Valle east of El Camino Real. This interconnection is with the District's 310 Pressure Zone. Figure 6-11 shows the location of the District's interconnections.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir

SFID Interconnects

- City of Del Mar
- City of San Diego
- OMWD
- SDWD

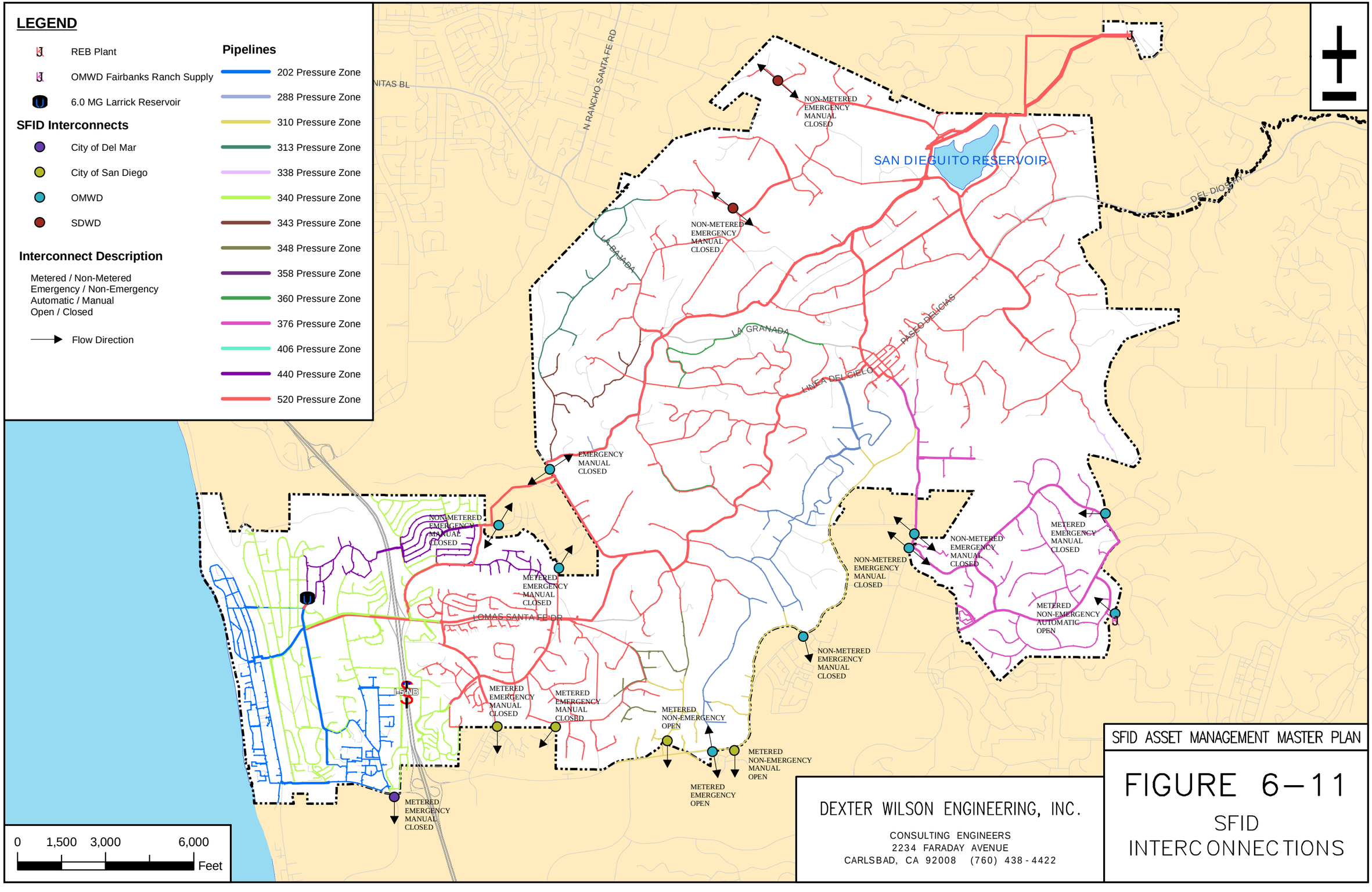
Interconnect Description

Metered / Non-Metered
Emergency / Non-Emergency
Automatic / Manual
Open / Closed

Flow Direction

Pipelines

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone



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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 6–11

SFID INTERCONNECTIONS

\\PacificDgis\134001-8AMP\Fourth Submittal Figures\FIGURE_6-11.mxd

CHAPTER 7

DISTRIBUTION SYSTEM ASSET EVALUATION AND RECOMMENDATIONS

This chapter discusses the recommended distribution system improvements. The chapter will address Larrick Reservoir and pump station, pipelines, valves, pressure reducing stations, and provide a map of the ultimate distribution system based on the recommendations. With the implementation of these improvements, Appendix I presents guidelines for the District to consider in the installation and maintenance of their distribution system assets. Finally, the chapter will also discuss the District's Corporate Yard improvements.

LARRICK RESERVOIR AND PUMP STATION

The Larrick Reservoir was evaluated in 2007 and only minor maintenance and cleaning were needed. The pumps and piping are in good condition and the electrical and instrumentation were upgraded in 2006 and 2008. In early 2009, a fourth 520 Zone pump will be installed at the pump station. Also a portable emergency generator will be installed and telemetry upgrades will be completed. The FY2009 cost for this improvement is expected to be $235,500.

PIPELINES

The District's pipeline assets were evaluated from several different perspectives including:

- capacity and whether or not the system can deliver the required flows based on the criteria identified in Chapter 2;
- redundancy;
- physical condition; and
- location (including ease of access and/or routing within formal easements).

Capacity Evaluation

Utilizing the InfoWater model, the existing distribution system was evaluated to determine whether or not it has the ability to deliver the District's demands during all flow scenarios at

the pressures identified in Chapter 2. During average day and peak hour demands, it was found that the system is able to deliver the appropriate pressures to customers. To evaluate fire flow, each hydrant was evaluated for its ability to deliver 1,000 gpm during the maximum day demand scenario while maintaining 20 psi in the same zone. The results of this evaluation determined that five segments of pipeline, which are 4-inch in diameter, should be replaced. The estimated cost to replace these pipes is $514,800.

Figure 7-1 provides the results of this analysis where each hydrant in the District indicates the number of hydrants surrounding the hydrant of interest which can flow 1,000 gpm simultaneously. For example if a hydrant is listed as a "2", the hydrant of interest and an immediately adjacent hydrant along the same pipeline are able to flow 1,000 gpm simultaneously without causing pressures to drop below 20 psi. The addition of a 3rd hydrant flowing simultaneously would result in a pressure drop at the fire flow location or elsewhere within the same pressure zone to drop below 20 psi. The designation is based on hydrants in the same pressure zone and along a pipeline, not necessarily what is seemingly in closest proximity. For those hydrants which can not meet the 1,000 gpm requirement, the flow which can be pulled from that hydrant is listed (e.g., 750 gpm).

Redundancy Evaluation

In order to maintain adequate service to customers when a pipe breaks or is taken down for service, subareas of the distribution system should have redundant delivery pipelines. The Fairbanks Ranch area, the area west of El Camino Real, and the area west of I-5 have substandard redundancy. Each of these areas is discussed below.

Fairbanks Ranch. This area is primarily served by the pressure reducing station PRS376-1 and an 18-inch pipeline in Via de Santa Fe which runs south over the San Dieguito River as shown in Figure 7-2. There is an operating interconnect with OMWD at Circa Oriente which currently provides a portion of the required water supply to the area. Presently, should the 18-inch line fail, the only redundancy to Fairbanks Ranch area would be this intertie. There are two other interconnections with OMWD in the area, one is an unmetered, emergency, manual connection just south of the bridge, and the other is a non-operating pressure reducing station at Calle Mayor.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Pressure Reducing Valve

Fire Hydrant Supply Analysis

- Less than 1,000 gpm
- One Fire Hydrants
- Two Fire Hydrants
- Three Fire Hydrants

Pressure Zone

- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

ENCINITAS BL
N RANCHO SANTA FE RD
RANCHO SANTA FE RD
LA GRANADA
LOMAS SANTA FE DR
LA GRANADA
CAMINO DEL CIELO
HIGHLAND RIDGE
SAN DIEGUITO RESERVOIR
SAN DIEGUITO HY
I-5 NB

PRS313-3
PRS313-2
PRS343-2
PRS288-2
PRS360-3
PRS360-2
PRS323-1
PRS406-A4
PRS376-1
PRS406-A2
PRS310-3
PRS338-1
PRS343-1
PRS288-1
PRS360-1
PRS406-A3
PRS406-A1
PRS440-1
PRS440-2
PRS340-1
PRS440-4
PRS340-2
PRS440-3
PRS406-B1
PRS310-5
PRS348-2
PRS340-5
PRS348-1
PRS340-3
PRS310-2
PRS310-1
PRS202-1
PRS358-1
PRS340-4
PRS310-4
PRS376-OMWD
PRS202-3
PRS202-2

979gpm
535gpm
446gpm
672gpm
784gpm
772gpm
386gpm
641gpm
926gpm

0 1,200 2,400 4,800 Feet

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-1

SFID EXISTING SYSTEM FIRE HYDRANT ANALYSIS

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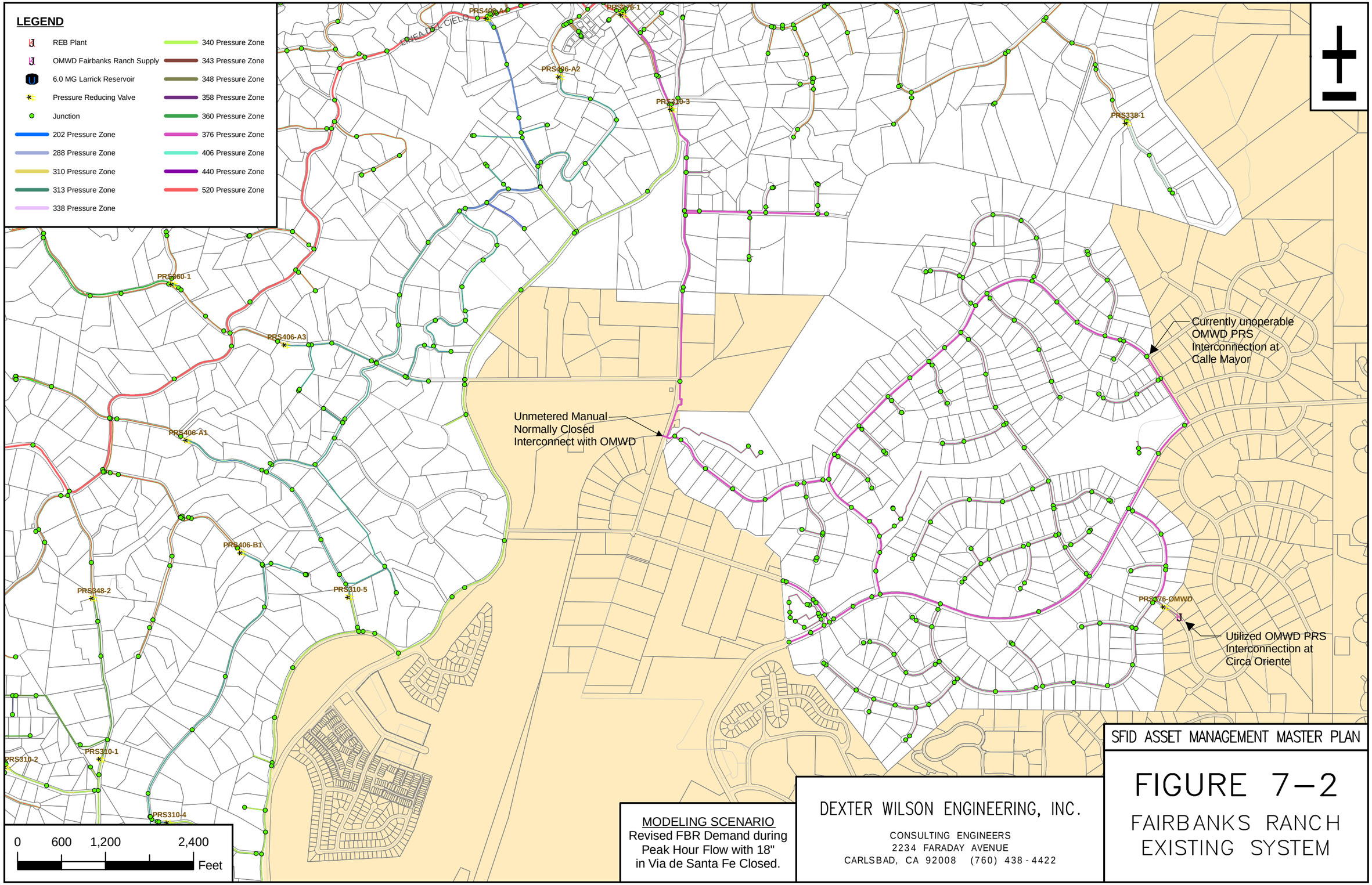
LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Pressure Reducing Valve
- Junction
- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone



MODELING SCENARIO
Revised FBR Demand during Peak Hour Flow with 18" in Via de Santa Fe Closed.

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-2

FAIRBANKS RANCH
EXISTING SYSTEM

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District staff tested the ability of currently-operating Circa Oriente interconnection during a September 2008 test coinciding with a valve replacement. During this test, the interconnection was not able to provide suitable pressures at higher elevations in the Fairbanks area. The hydraulic model confirmed this finding as pressures in higher elevations drop below 40 psi at flow rates higher than 3,100 gpm. The PRS376-1 valve is 8-inch as well as 250-feet of piping immediately downstream of the station. Given the modeling results and field findings indicating that the Circa Oriente interconnection alone is not suitable to serve the Fairbanks Ranch area, redundancy should be provided.

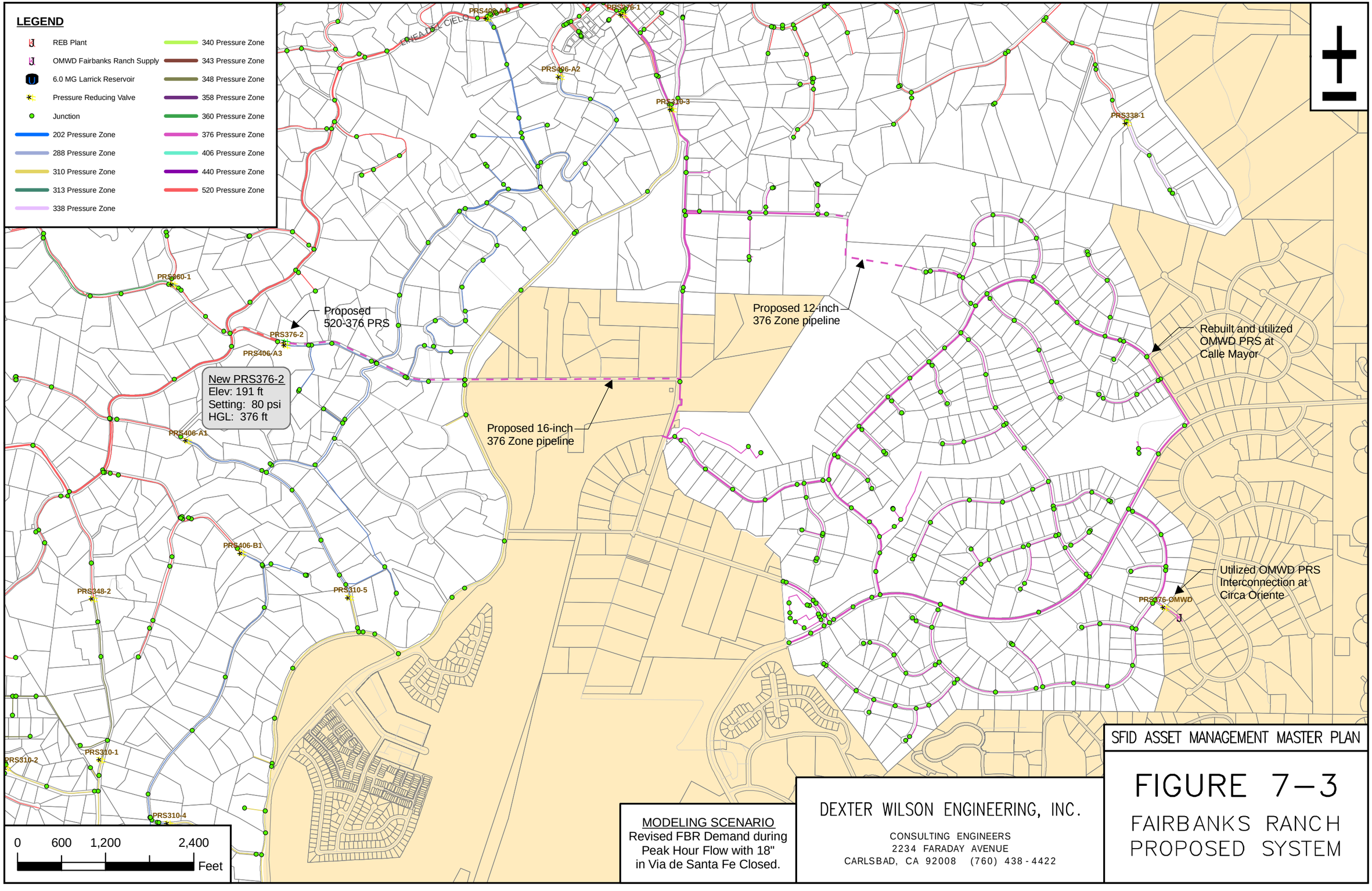
The lowest cost redundancy option would require rebuilding the OMWD interconnection at Calle Mayor. From conversations with District staff, the valve vault is frequently filled with water due to irrigation of the resident's lawn in which the station is located. Staff also indicated that there is a leak in the pipeline upstream of the valve vault. In addition to relocating the valve vault, the upstream and downstream piping segments should be inspected and potentially replaced. The estimated cost for this improvement would be approximately $284,570. In the event the District would have to rely on the two OMWD interconnections alone to serve Fairbanks Ranch, they could provide demands up to 5,200 gpm while maintaining a minimum pressure of 40 psi throughout the area. Note that delivery of the flow rates discussed in this section does not consider the impact on OMWD's system and assumes that their HGL of 469 feet upstream of the PRSs can be maintained.

Discussions between the District and OMWD staff have indicated that OMWD does not foresee any problems with the proposed Calle Mayor interconnection improvements and flow expectations. OMWD has recently completed a hydraulic model of their system and has suggested that the proposed operational approach be confirmed by running a performance scenario through their new system model. District staff will coordinate this confirmation activity prior to implementing the Calle Mayor Improvement project.

The District could also provide redundancy to the area via construction of additional District pipelines. In considering alignments and the need to cross the San Dieguito River at a location other than the existing 18-inch, the alignment shown on Figure 7-3 which extends east from El Sicomoro is preferred. While this provides a redundant river crossing, it does not provide a redundant feed to the area as the source of water would still be the PRS376-1 and the pipeline in Via de Santa Fe. To provide the redundant source, it is recommended to extend a 16-inch feed east from the 520 Zone pipeline in Linea del Cielo to a new PRS 376-2 in Calzada del Bosque and continue a new 16-inch 376 Zone pipeline to the existing 18-inch in Via de Santa Fe on the north side of the river crossing.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- Pressure Reducing Valve
- Junction
- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone



MODELING SCENARIO
Revised FBR Demand during Peak Hour Flow with 18" in Via de Santa Fe Closed.

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-3

FAIRBANKS RANCH
PROPOSED SYSTEM

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The cost for these improvements is estimated to be $2.984 million. This option would provide direct control of pipelines into the Fairbanks area.

West of I-5. Figure 7-4 shows the piping systems crossing the Interstate 5 Freeway. At the start of 2007, the District had five pipelines crossing I-5. Three of these crossings were in the 340 Zone, one was in the 520 Zone and one was in the 440 Zone. The freeway widening program mistakenly took the southerly 340 Zone crossing out of service in 2007. The 440 Zone crossing will be eliminated due to future retaining walls constructed to widen the freeway.

This led to an evaluation of future freeway projects. If only three crossings remained, redundancy could be provided directly to the 340 Zone and indirectly to the 202 Zone; however no redundancy would exist for the 440 Zone as only the one 520 Zone crossing could supply it. Based on this evaluation, the District should ultimately have four pipelines crossing I-5, where the fourth crossing provides redundancy to the 440 Zone. Three of these pipelines, currently exist and provide redundancy to the 340 Zone.

Three options were considered to replace the existing fourth crossing and continue to provide redundancy to the 440 Zone. The first option is to replace the 440 Zone crossing "as-is" when the future freeway widening occurs. The vertical retaining walls that would be utilized would require 150 foot shafts on either side of the freeway to install and maintain the 440 Zone pipe which would run under the freeway. The second option would be to install new 440 Zone piping down Santa Rosita and Santa Helena, crossing I-5 at Lomas Santa Fe, and up Glencrest Drive to connect to the existing 440 Zone piping. With this option in terms of redundancy, three of the four I-5 crossings would be in Lomas Santa Fe. Due to the reasons identified above, the third option shown on Figure 9-6 is preferred where a 520 Zone crossing is installed south of Lomas Santa Fe. This then provides two crossings in the 520 Zone and two in the 340 Zone. These crossings would be in two level corridors: one along Lomas Santa Fe and one along an easterly extension of Genevieve Street. This option provides the best overall system redundancy as having a 520 Zone pipe in each crossing allows service to continue to all zones west of I-5 in the event that one of the crossings is lost.

With the 440 Zone crossing eliminated in the future I-5 expansion, the zone will be separated into two zones, the 440 East Zone and the 440 West Zone. A new pressure reducing station, 440-5, will be the primary source for the 440 West Zone with 440-1 serving as a secondary station operating during peak hour and greater demand scenarios. The future pipeline system is shown in Figure 7-5. The total estimated cost for these improvements is $2.32 million.

LEGEND

REB Plant	310 Pressure Zone	358 Pressure Zone
6.0 MG Larrick Reservoir	313 Pressure Zone	360 Pressure Zone
Larrick Pump Station	338 Pressure Zone	376 Pressure Zone
Pressure Reducing Valve	340 Pressure Zone	406 Pressure Zone
202 Pressure Zone	343 Pressure Zone	440 Pressure Zone
288 Pressure Zone	348 Pressure Zone	520 Pressure Zone

PRS343-1
PRS288-1
PRS340-1
PRS440-4
PRS440-2
PRS340-2
PRS440-3
PRS340-5
PRS348-2
PRS348-1
PRS340-3
PRS310-1
PRS310-2
PRS202-1
PRS340-4
PRS358-1
PRS340-1
PRCV520-1
PRS440-1
PRS202-3
PRS202-2
H5NB
H5SB

Existing 440 Zone Crossing

Existing 340 & 520 Zone Crossing

Existing 340 Zone Crossing

Old 340 Zone Crossing (Removed 2007)

LOMAS SANTA FE DR

LINEA DEL CIELO

0 600 1,200 2,400 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-4

WEST OF I-5 EXISTING SYSTEM

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LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir
- Larrick Pump Station
- Pressure Reducing Valve
- New Pressure Reducing Valve
- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

New PRS440-5
Elev: 216 ft
Setting: 101 psi
HGL: 450 ft

Pipe to be Removed

Upgraded 8-inch 440 Zone

Proposed 8-inch 520 Zone

Proposed 14-inch 520 Zone

Old 340 Zone Crossing

I-5 NB

I-5 SB

PRS343-1
PRS288-1
PRS340-1
PRS440-4
PRS440-2
PRS440-2
PRS440-5
PRS440-3
PRS440-1
PRS520-1
PRS340-5
PRS348-2
PRS348-1
PRS340-3
PRS310-1
PRS310-2
PRS202-1
PRS340-4
PRS358-1
PRS202-3
PRS202-2

LOMAS SANTA FE DR

LINEA DEL CIELO

LINEA DEL CIELO

0 600 1,200 2,400 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7–5

WEST OF I–5
RECOMMENDED
SYSTEM

East of I-5. Figure 7-6 shows the piping system east of I-5 and west of El Camino Real. The District has a northern 520 Zone transmission, or feed, pipe 24-inch in size and a southern 520 Zone transmission pipe 20-inch in size. If either of these pipes is closed, pressures in the 520 and 440 Zones in the area drop below the established criteria. In addition to the redundancy needs, the 24-inch northern feed is presently not located within a road right-of-way and is difficult to access. Table 7-1 shows the pressure at selected points west of El Camino at peak hour flows with both pipes in service, with the northern feeder out of service, and with the southern feeder out of service. As can be seen, both of these pipes are needed to maintain adequate pressure west of El Camino Real.

TABLE 7-1
RESIDUAL PRESSURES FOR EAST OF I-5

Junction	Zone	Peak Hour Residual Pressures, psi					
		Existing	North 24" Closed	South 20" Closed	With New 24" & Existing 24" Closed	With New 24" & Both Existing Closed	With New 24" & Both Existing Open
J03812	440	63.8	25.7	58.0	61.4	51.0	64.5
J03702	440	83.6	46.0	77.7	81.1	70.7	84.2
J03578	440	71.7	37.1	65.8	69.3	58.9	72.3
J02272	520	55.1	25.4	32.8	55.7	31.4	57.2
J03358	520	42.9	15.1	19.0	42.5	17.5	43.9
J01402	520	70.8	41.5	47.3	70.4	45.8	71.8
J03314	520	64.0	34.7	40.5	65.3	39.0	65.0

Figure 7-6 shows the piping improvements needed to provide a sufficient redundancy to maintain all pressures above 40 psi with a pipe break. It is recommended that the redundant pipe is 24-inch to allow the future removal of the existing 24-inch which is out of the right-of-way. The estimated cost for these improvements is $3.70 million.

LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir
- Larrick Pump Station
- Pressure Reducing Valve
- Junction
- 202 Pressure Zone
- 288 Pressure Zone
- 310 Pressure Zone
- 313 Pressure Zone
- 338 Pressure Zone
- 340 Pressure Zone
- 343 Pressure Zone
- 348 Pressure Zone
- 358 Pressure Zone
- 360 Pressure Zone
- 376 Pressure Zone
- 406 Pressure Zone
- 440 Pressure Zone
- 520 Pressure Zone

North 24-inch

Proposed 24-inch 520 Zone

South 20-inch

PRS343-1
PRS288-1
PRS340-1
PRS440-4
J03812
J03702
PRS440-2
PRS340-2
J03578
PRS440-3
J02272
J03358
PRS340-5
LOMAS SANTA FE DR
J01402
PRS348-1
PRS310-2
PRS340-3
PRS202-1
PRS340-4
J03314
PRS320-1
PRV520-1
PRS440-5
I-5 NB
I-5 SB

0 500 1,000 2,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-6

EAST OF I-5 EXISTING & RECOMMENDED SYSTEM

Pipeline Integrity and Remaining Useful Life Assumptions

Based upon available information, a low level assessment of apparent pipeline integrity and remaining useful life was conducted. The purpose of the assessment was to determine whether these factors appear to warrant near term replacement projects for impacted pipeline segments. Planning for longer term pipeline replacement programs are discussed in Chapter 10.

Pipeline condition assessment was not conducted as part of this study. The general assessment of integrity and remaining useful life was based upon review of available pipe break data, and the evaluation of available information regarding pipeline age, material of construction, pressure rating, and general soil conditions.

Information regarding material of construction is available for approximately 95% of the distribution system. However, specific information regarding pipe age is limited to approximately 40% of the system. Fortunately, we know that over 90% of the system is comprised on relatively inert materials that have a long life expectancy under the conditions realized within the District. In addition, the history of pipeline breaks indicates that the system as a whole has been generally sound and reliable.

Past Water Main/Pipeline Breaks. From 2002 to 2006 there were 45 pipeline breaks throughout the District's distribution system. Table 7-2 categorizes the breaks based on their cause by year. Details of the breaks can be found in Appendix J. There does not seem to be any pattern to the breaks. Two pipelines, that have experienced localized failures at a relatively high rate, have been identified for replacement due to integrity concerns. These include the Via de Fortuna project that is currently underway and has an estimated cost of $1.6 million, and the Lago Lindo project with an estimated cost of $2.8 million.

TABLE 7-2
SFID PIPELINE BREAK CAUSES 2002-2006

Year	Rubber Ring Blown Out	Leaking Saddle	Construction Damaged	Tree Roots	Settling or Earth Movement	Other or Unknown	Total
2002	3	1	2	0	0	1	7
2003	2	0	3	2	1	1	9
2004	0	1	0	1	3	3	8
2005	2	2	0	2	5	1	12
2006	2	1	3	0	2	1	9
TOTAL	**9**	**5**	**8**	**5**	**11**	**7**	**45**

Remaining Useful Life Assumptions. As determined in Chapter 6 of this report, the combined total length of piping in the District is approximately 895,400 feet (169 miles). The evaluation of remaining useful life described in this section excludes approximately 75,000 feet of public and private fire hydrant laterals, public and private fire lines and services, private water lines, and those pipes that are jointly owned by the District and SDWD. Therefore, the length of pipelines included in the evaluation is approximately 820,485 feet (155 miles).

Though the specific age of the existing pipelines is known for approximately 40% of the system, 95% of the materials of construction are known (due to the availability of past work orders and other records). Based upon available records, approximately 80% of the system is comprised of Asbestos Cement Pipeline (AC) pipeline materials.

Due to the relatively inert nature of AC pipeline materials, and the relatively mild soil conditions and water quality, AC pipeline should have a life expectancy of 75 to 95 years or greater. The District's relatively positive breakage history supports this assumption. Considering a base year of 2009, and a relatively conservative life expectancy of 80 to 85 years, AC pipelines installed after 1939 would have a remaining life of 10 to 15 years. It is assumed that pipelines originally installed between the 1920s and 1930s have been replaced over the years. Therefore, it is assumed that the existing AC pipeline has a remaining life of at least 10 to 15 years. The available records on pipeline age only go back to 1954. The District should conduct a detailed assessment of the remaining useful life of system components suspected to be constructed prior to 1954 to confirm the assumptions used in this AMMP. Should there be components remaining in the system that were constructed before 1939, they could be reaching the end of their useful life, based on the age consideration only.

Approximately 10 percent of the system is known to be constructed of PVC. Estimates of life expectancy for PVC pipeline, under pressure, range from 50 to 100 years. Records available for 70% of the existing PVC pipeline show the oldest segments installed in 1968. Though there may be segments installed prior to 1968, it is assumed that the existing PVC pipeline will provide a useful life well beyond the next 15 years.

Approximately 7.5 miles of the existing system (39,483 feet was confirmed) is constructed of pipelines with ferrous materials (ductile iron/DI, concrete cylinder pipe/CCP, concrete mortar lined cement/CMLC, welded steel pipe/WSP, etc.). The majority of the ferrous pipelines (at least 37,300 feet) are CCP pipe with diameters ranging from 16 to 30 inches and largely make up the backbone distribution system. Depending upon field conditions, and the integrity of the

coating systems, ferrous pipelines could deteriorate rapidly, or last up to a hundred years or more. The AMMP has recommended a redundant pipeline for the 20-inch north feeder (East of I-5 Replacement Project) which has had integrity problems in the past. Based upon the failure history of pipelines in the system, it is assumed that the remaining ferrous pipelines have at least 15 years of remaining useful life. The District should conduct field analysis of the existing ferrous pipelines to confirm the AMMP assumptions.

Existing records do not provide information regarding materials of construction for approximately 5% of the system. Based upon the information above regarding AC, PVC, and Ferrous pipelines, the AMMP assumes that the unknown segments provide at least 10 to 15 years of useful life. The District should conduct field analysis to confirm the material of construction of the unknown segments in the system.

Pressure Rating Considerations. Information regarding pressure classification was available for 60 percent of the pipelines. A hydraulic analysis was conducted to determine the pressures realized throughout the distribution system. Though static pressures exceed pressure classifications for certain segments of the system, all pressures fell within acceptable design limits for the required service. For pipelines that do not have available pressure ratings, it is assumed that they are made of similar materials of construction and have pressure ratings similar to known existing system components. Since the maximum static pressure in the system is approximately 218 feet, it is assumed that the pipelines for which pressure classifications are not available would have acceptable pressure ratings. If possible, the District should confirm the pressure ratings for all pipelines within the system. No pipeline projects were determined necessary for mitigation of rated pressure limitations.

Accessibility. Existing pipelines were also evaluated based upon accessibility. Though this was not determined to be the primary driver for pipeline replacement, multiple projects recommended in the AMMP would also result in improved accessibility and include the Lago Lindo, Via de Fortuna, Government Road, and East of I-5 redundancy projects.

Water Services

The Orangeburg laterals discussed and identified on Figure 6-10 should be replaced programmatically. The estimated cost to replace the Orangeburg laterals over a ten year period is $195,000 per year. Of the estimated 1,481 laterals in the areas identified by the District to contain Orangeburg laterals, it was assumed that 75 percent would be Orangeburg.

VALVE REPLACEMENT PROGRAM

The District has started a comprehensive program to replace all failed valves within the District. The Phase 1 and Phase 2A projects in the Fairbanks Ranch area are complete. The remainder of the program is scheduled to be completed in four phases. In addition to replacing all of the failed valves in the District, the valve replacement program will remove and replace valve types which are either known to be problematic or are critical to the District. The following sections will first describe those valve types that are known to be problematic and recommended for removal. Then the valve replacement phases will be described.

Butterfly Isolation Valves

All of the butterfly isolation valves with a resilient seat on the disc type should be replaced. Figure 7-7 illustrates the location of all butterfly valves according to the GIS database; however, it does not distinguish between the resilient seat on the disc type versus others. Those valves which are failed will be replaced as part of the District-wide Phase 4 and 5 projects.

Double Gate Wedge Valves

Along the District's southern transmission main, there are 10 double gate wedge isolation valves. These valves are easily identified in the District as reducers are found immediately upstream and downstream of the valves. This essentially creates an unnecessary restriction in the line. The valve, reducers, and reduced pipe spools should be removed and replaced with a resilient wedge gate valve in accordance with the WAS (i.e., valve should be the same size as the pipe in which it is installed). Figure 7-7 highlights the location of these valves which are described in Table 7-3. These valves will be replaced as part of the Phase 2B project.

TABLE 7-3 SFID DOUBLE GATE WEDGE VALVES					
ID	**Name - Location**	**Street-Location**	**Size**	**Zone**	**Make**
VLV-00582	VLV-N1943522E6255234	Lomas Santa Fe Drive	12	520	RENS
VLV-00950	VLV-N1943087E6260183	Sun Valley Road	8	520	
VLV-00946	VLV-N1943529E6259652	Lomas Santa Fe Drive	16	520	RENS
VLV-00166	VLV-N1945732E6260873	El Camino Real	16	520	
VLV-00058	VLV-N1946198E6262986	Linea Del Cielo	16	520	
VLV-00076	VLV-N1950156E6265983	Linea Del Cielo	16	520	RENS
VLV-00088	VLV-N1948559E6265751	Linea Del Cielo	16	520	RENS
VLV-00094	VLV-N1947369E6264637	Linea Del Cielo	16	520	RENS
VLV-00410	VLV-N1951185E6266436	Linea Del Cielo	16	520	RENS
VLV-04302	VLV-N1943690E6251180	Lomas Santa Fe Drive	8	340	

Description of Phases

The four remaining valve replacement project phases are described below. Figure 7-7 shows the location of the phases.

Phase 2B. In Phase 2B, the double gate wedge valves, the isolation valves for pressure reducing stations 340-1, 340-4, 340-5, 440-3 and 440-4 and the installation or repair of 10 air valves on the main transmission feeders are to be completed. For the PRS isolation valves, the District should fully evaluate whether these valves should be replaced exactly where they are located or if an alternate location would be preferred given the eventual replacement of the PRS with the District's standard PRS. The estimated cost to complete this project is $614,543.

Phase 3. In Phase 3 the remaining failed pressure reducing station isolation valves and all remaining failed backbone distribution isolation valves will be replaced. As with the Phase 2 replacement of the PRS isolation valves, adequate pre-design should be completed for the PRS isolation valves in this phase to confirm the appropriate placement. This project also includes the installation of 20 air release valves in District determined locations. The estimated cost to complete this project is $1.81 million. This cost assumes all PRS isolation valves have failed and that 25% of the backbone distribution system isolation valves have failed.

Phases 4 and 5. In phases 4 and 5 all remaining failed valves will be replaced. Phase 4 will concentrate on the Solana Beach area. Phase 5 will concentrate on the Rancho Santa Fe area. These projects are expected to cost $3.92 million and $3.00 million, respectively. These costs assume that 25% of the valves are failed and need to be replaced.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir

Valve Replacement Phase 1

- All Butterfly Valves

Valve Replacement Phase 2

- All Butterfly Valves (2A)
- Pressure Reducing Station (2B)
- Air Valves (2B)
- Double Wedge Gate Valve (2B)

Valve Replacement Phase 3

- Butterfly Valve
- Gate Valve
- Plug Valve

Valve Replacement Phase 4

- All Area Valves

Valve Replacement Phase 5

- All Area Valves

ENCINITAS BL
N RANCHO SANTA FE RD
SAN DIEGUITO RESERVOIR
DEL DIOS HWY
LA BAJADA
LA GRANADA
LINEA DEL CIELO
PASEO DELICIAS
I-5 SB
I-5 NB
PRS340-1
PRS440-4
PRS440-3
PRS340-5
LOMAS SANTA FE DR
PRS340-4
N

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7–7
VALVE REPLACEMENT PHASES

PRESSURE REDUCING STATIONS

All of the District's pressure reducing stations (PRS) need to be removed or replaced. Table 7-4 provides a completion schedule for this program. These projects could be conducted concurrently. At the end of the program the number of stations will be reduced from 38 to 28, including the currently operating OMWD-376 PRS at Circa Oriente. The costs presented here are based on rebuilding the PRS above-ground similar to the design found in Appendix K and should include telemetry to monitor flows and optimize pressures.

TABLE 7-4
PRESSURE REDUCING STATION PROJECTS

Project	Description	Estimated Cost, $
PRS Project 1	Rebuild PRS 440-3, 440-4, 340-1, 340-4, and 340-5	1,251,250
PRS Project 2	Rebuild PRS 288-1, 343-1, 313-3, 348-2, and 310-5	1,251,250
PRS Project 3	Rebuild PRS 338-1, 360-1, 406-A4, 310-1, 406-B1	1,251,250
PRS Project 4	Rebuild PRS 360-3, 358-1, 376-1, 406-A1, and 310-2	1,251,250
PRS Project 5	Rebuild PRS 348-1, 310-4, 360-2, and 288-2	1,001,000
PRS Project 6	Rebuild PRS 310-3, 313-2, 343-2, and 440-1	1,001,000
PRS 7, Removal	This project removes the remaining currently operating PRS which are not necessary for future operation of the distribution system and includes stations: 202-1, 202-2. 202-3, 313-1, 340-2, 340-3, 406-A2, 406-A3, and 440-2. There are 5 abandoned stations in the system which should be removed and repiped.	495,189
TOTAL		**7,502,189**

The overarching goal in making these recommendations is to reduce the number of pressure reducing stations in the District, upgrade the existing stations, and remove abandoned and unused stations. Where possible, the number of pressure reducing stations was reduced while confirming through hydraulic modeling that the delivery pressures and flows are similar to existing conditions. Reducing the number of pressure reducing stations per zone reduces the

capital, operational, and maintenance expenses associated with the stations. It is recommended that the pressure stations be replaced in accordance with the proposed new District standard for an above-grade configuration as shown in Appendix K.

Where possible, each zone was assigned a lead station, with a minimum of two valves. As the lead station, this station functions constantly to deliver the flows from the low flow scenario and above. Where necessary hydraulically, a second lead station would be utilized, as in the 340 Zone, to supply the zone demands. Otherwise a secondary station was utilized to meet the peak demands of the zone. As a secondary station, this station would only function during peak hour. Additionally, if necessary, an emergency station was retained to provide fire flows.

In locations where pressure reducing stations are removed, it may be necessary to install a valve with a controlled leak rate; for example, at pressure reducing stations 202-2 and 202-3 between the 340 and 202 Zones. Water age modeling of this area shows no appreciable increase in water age as a result of removing the pressure reducing stations; however, it may be prudent to utilize the periodic flow release valve due to how demands are placed in the model.

Those pressure reducing stations which serve the highest demand zones, 340 and 440, should be replaced first. The priorities in which the remaining pressure reducing stations are to be rebuilt are based on whether the station is lead for the zone and also comments from District staff regarding the degree of difficulty in accessing the stations.

Table 7-5 provides the future ultimate distribution system list of PRSs and their recommended hydraulic grade line (HGL) settings. In addition to the 28 rebuilt stations, this list also includes the new PRS440-5 which will be required for the 440 Zone west of I-5 once the existing 440 Zone freeway crossing is lost. It also includes the new PRS376-2 which will be necessary for the Fairbanks Ranch redundancy project. Prior to the removal of the stations in PRS Project 7, hydraulic modeling of the replaced stations in conjunction with field calibration work should be conducted to confirm their removal.

ULTIMATE DISTRIBUTION SYSTEM

In combining the recommended pipeline and pressure reducing station improvements, Figures 7-8A and 7-8B show the recommended Ultimate Distribution System. Figure 7-8A highlights the pipeline and pressure reducing station improvements. Figure 7-8B highlights the ultimate backbone distribution system based on the pipeline and pressure reducing station improvements.

TABLE 7-5
SFID FUTURE PRESSURE REDUCING STATIONS AND RECOMMENDED SETTINGS

Station	Zone From-To	Year	Valve Size	Valve Elevation, feet	Function	HGL, feet
PRS288-1	343-288	1970	8" Primary & 2" Bypass	17.6	Lead	288
PRS288-2	520-288	1970	6" Primary	62.6	Emergency	280
PRS310-1	348-310	1967	6" Primary & 2" Bypass	78.2	Lead	324
PRS310-5	406-310	1966	4" Primary & 2" Bypass	53.6	Lead	325
PRS310-2	348-310	1967	6" Primary & 2" Bypass	113.5	Secondary	318
PRS310-3	376-310	1966	8" Primary & 6" Bypass	118.6	Emergency	314
PRS310-4	406-310	1966	6" Primary & 2" Bypass	158.5	Emergency	314
PRS313-3	520-313	1965	6" Primary & 2" Bypass	110.9	Lead	320
PRS343-1	520-343	1965	6" Primary & 2" Bypass	17.6	Lead	320
PRS313-2	520-313	1965	6" Primary	178.1	Emergency	306
PRS343-2	520-343	1965	6" Primary & 2" Bypass	99.9	Emergency	306
PRS338-1	520-338	1995	6" Primary & 4" Bypass	193.8	Lead	345
PRS340-4	520-340	1968	6" Primary	238.1	Lead	344
PRS340-5	520-340	1967	10" Primary & 4" Bypass	174.9	Lead	348
PRS340-1	440-340	1976	6" Primary	171.0	Secondary	344
PRS348-2	520-348	1966	6" Primary & 2" Bypass	176.7	Lead	374
PRS348-1	520-348	1966	6" Primary	216.7	Secondary	353
PRS358-1	520-358	1977	6" Primary	198.3	Lead	367
PRS360-1	520-360	1965	6" Primary & 2" Bypass	180.1	Lead	357
PRS360-3	520-360	1965	8" Primary & 2" Bypass	156.6	Lead	371
PRS360-2	520-360	0	4" Primary & 2" Bypass	167.9	Emergency	365
PRS376-2	520-376	NEW	6" Primary & 2" Bypass	--	Lead	376
PRS376-1	520-376	1966	10" Primary & 4" Bypass	216.2	Secondary	340
PRS406-B1	520-406	1961	6" Primary & 2" Bypass	265.2	Lead	419
PRS406-A4	520-406	1966	10" Primary & 6" Bypass	233.3	Lead	414
PRS406-A1	520-406	1967	6" Primary & 2" Bypass	213.3	Secondary	369
PRS440-5.W	520-440	NEW	6" Primary & 2" Bypass	--	Lead	449
PRS440-1.W	520-440	1976	6" Primary	193.8	Emergency	437
PRS440-4	520-440	1962	12" Primary & 2" Bypass	170.6	Lead	457
PRS440-3	520-440	1974	6" Primary	278.6	Secondary	445

LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir

Pressure Reducing Station

- New PRS
- Existing PRS to be Rebuilt

Pipelines

- Existing Pipelines
- New Pipelines

N

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

DEL DIOS HWY

LA BAJADA

LA GRANADA

PASEO DELICIAS

LINEA DEL CIELO

LOMAS SANTA FE DR

I-5 SB

I-5 NB

PRS313-3
PRS313-2
PRS343-2
PRS288-2
PRS360-3
PRS360-2
PRS406-A4
PRS376-1
PRS310-3
PRS338-1
PRS288-1
PRS343-1
PRS360-1
PRS376-2
PRS340-1
PRS440-4
PRS406-A1
PRS440-5
PRS440-3
PRS406-B1
PRS440-1
PRS340-6
PRS340-5
PRS348-2
PRS310-5
PRS348-1
PRS310-2
PRS310-1
PRS340-4
PRS358-1
PRS310-4

0 1,500 3,000 6,000 Feet

\\Pacific\gis\13-001-8\AMMP\Fourth Submittal Figures\FIGURE_7-8A.mxd

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-8A

ULTIMATE DISTRIBUTION SYSTEM

LEGEND

- REB Plant
- 6.0 MG Larrick Reservoir
- Lead Pressure Reducing Station
- Backbone Distribution System

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

DEL DIOS HY

LA BAJADA

LA GRANADA

PASEO DELICIAS

H-SSB

PRS313-3

PRS360-3

PRS406-A4

PRS338-1

PRS343-1

PRS288-1

PRS360-1

PRS376-2

PRS440-4

PRS440-5

PRS406-B1

PRS348-2

PRS310-5

PRS340-5

PRS310-1

PRS340-4

PRS358-1

0 1,500 3,000 6,000 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-8B

SFID ULTIMATE BACKBONE DISTRIBUTION SYSTEM

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METERS

It is recommended that the District allow dual meters to be issued for parcels greater than 1.0 acre in size, where a residential meter up to 1-inch in size would be allowed. Issuing separate meters for irrigation purposes will allow the District to accurately track water demands for irrigation separately from residential use. This change in metering would improve comparisons such as that in Table 4-2 by providing numbers that represent true residential use only.

The District has included in the 10 year CIP a project for the installation of automatic meter readers. The estimated cost for this project is $2.66 million.

FIRE HYDRANTS

As listed in Chapter 5, there are 1,211 fire hydrants in the District. Figure 7-9 has been provided to highlight the hydrant spacing requirements for new construction. The figure provides a 200 foot radius around each existing hydrant, which follows the RSFFPD requirement that fire hydrant spacing should be at 400 foot intervals. The figure also displays a 500 foot radius around each hydrant, based on the International Fire Code's maximum allowable hydrant spacing of 1,000 feet for new water mains where structural protection is not needed.

INTERCONNECTIONS

Presently, the District relies on the OMWD-376 interconnection at Circa Oriente to serve Fairbanks Ranch on a daily basis. For an emergency basis, the District should ensure that those interconnections on which they are interested in relying on remain in operable condition.

LEGEND

- REB Plant
- OMWD Fairbanks Ranch Supply
- 6.0 MG Larrick Reservoir
- FIRE HYDRANT
- PVT - FH
- 200' Radius Buffer
- 500' Radius Buffer

N

ENCINITAS BL

N RANCHO SANTA FE RD

SAN DIEGUITO RESERVOIR

SAN DIEGUITO HY

0 1,200 2,400 4,800 Feet

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SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 7-9

FIRE HYDRANT SPACING

CORPORATE YARD IMPROVEMENTS

This section of the report shall discuss the ongoing Corporate Yard Improvements as well as permitting issues relative to these improvements.

Phasing

The improvements, shown on Figure 7-10 will be completed over six phases, the first of which has been completed. The remaining phases are described below.

Phase 2. In Phase 2, the existing maintenance building will be demolished. The District is presently coordinating these efforts and expects to complete Phase 2 in early 2009.

Phase 3. In Phase 3, the first part of designing and building the warehouse will take place. Additionally, a new major use permit will be processed.

Phase 4. In Phase 4, the warehouse will be finished. The remaining warehouse and maintenance facility will be demolished.

Phase 5. In Phase 5, the new maintenance building will be designed and built, the existing storage structures will be removed, and Modulars 1 and 2 installed during Phase 1 will be removed.

Phase 6. In Phase 6, the new administrative buildings will be designed and constructed. The final modular, Modular 3, installed during Phase 1, will be removed.

Permitting

The District currently has, for the Corporate Yard property, a major use permit (MUP) which was issued to the District in the 1990s. Following this, the District applied for a Minor Deviation to the MUP, which was approved in 2007 and is presently in effect. The Minor Deviation approval allows for the construction of 5,172 square feet of new building after the Phase 2 demolition. Under the current MUP, permits were pulled for the three trailers as construction trailers or modulars (Phase 1 of the Corporate Yard Improvements) with the intent to demolish existing buildings in Phase 2 so as not to exceed the allowable square footage under the MUP.

\\PACIFIC\DWG\134001\ASSET MGMT PLAN\FOURTH SUBMITTAL\FIGURE_7-10.DWG 03-03-09 10:40:47 LAYOUT: MODEL

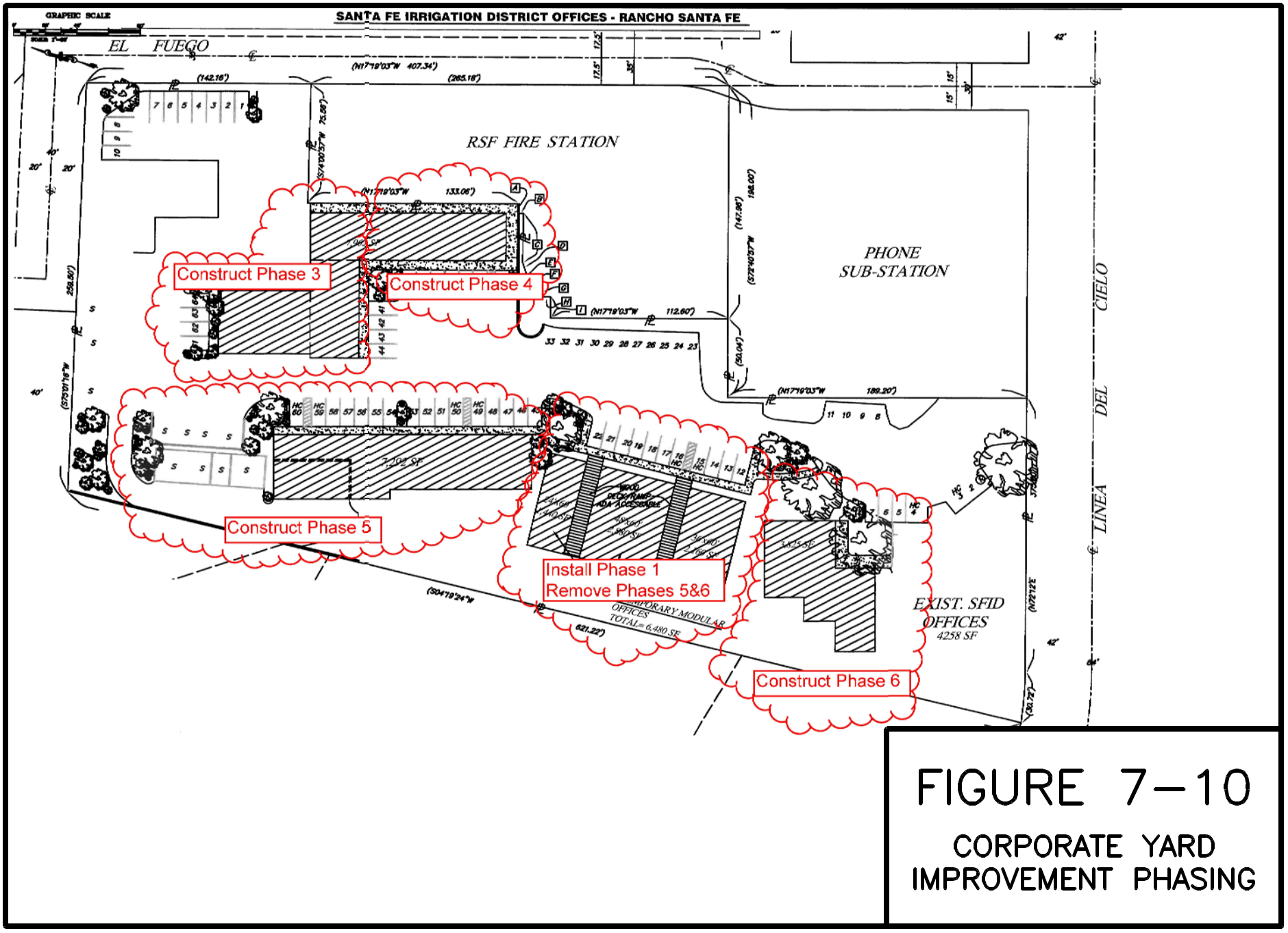

FIGURE 7-10

CORPORATE YARD IMPROVEMENT PHASING

Going forward there are three paths that the District can follow with respect to Corporate Yard construction and the appropriate permitting. To complete all 6 phases as currently outlined above (Option 1), it is possible to proceed with the Phase 3 construction under the existing minor deviation; however, the new MUP must be in place prior to completion of the Phase 3 construction. The new MUP square footage would be based on the completion of Phase 6, without the modulars. Then, as the District constructs Phases 4, 5, and 6, each of the modulars would need to be removed so as not to exceed the allowable square footage of the new MUP. The alternative to this (Option 2) is upon completion of Phase 3, the District decides to do no further construction. At this point, the modulars become permanent structures and would then have to be updated to the fire department's standards for a permanent structure. This would include substantial upgrades to the modulars' roofs, doors and windows.

The other alternative (Option 3) is to not move forward with any further phases of construction and have the modulars be permanent facilities. In this case, after the Phase 2 demolition, additional square footage (storage bins) will have to be demolished to be compliant with the current minor deviation to the existing MUP. At this point, the modulars become permanent structures and would then have to be updated to the fire department's standards for a permanent structure.

With the construction trailers, it should be noted that from the County's perspective, the trailers are installed to permanent building standards so as to not have to inspect further, but again proceeding into Phase 3 construction without the new MUP could be problematic. From the perspective of the Rancho Santa Fe Fire Protection District (RSFFPD), the construction trailers, or modulars, have been approved based on them being temporary. Since their approval, the RSFFPD adopted, in 2007, an ordinance which is more restrictive than the state and federal building requirements for modular facilities. Under these newest regulations, the trailers' roofs, doors, and windows would not be acceptable, so if it is determined that the trailers will remain as permanent buildings on-site, the RSFFPD could require substantial upgrades.

Processing of the new MUP could take approximately 2-3 years from start to finish. Since there is no expiration date on an MUP, it is recommended that the District begin this process as soon as possible. In addition to the detailed planning required for items such as architectural plans for the ultimate facilities, it is in the District's best interest to commence processing to avoid conflicts with the public regarding the historical nature of those buildings which are proposed to be removed. In the mean time, a demolition permit will be necessary on the existing MUP to conduct the Phase 2 demolition.

CHAPTER 8

JOINT FACILITIES ASSETS AND EVALUATION

This chapter will discuss and evaluate the joint facilities assets which the District owns in conjunction with San Dieguito Water District. The level of detail provided in this chapter is not as comprehensive as that conducted on the District's distribution system assets. The intent is to review the asset as a whole and provide a conceptual level needs assessment to identify any potential capital improvement needs. The first portion of the chapter will discuss the raw water facilities with the second portion of the chapter focusing on the R.E. Badger Filtration Plant (REB Plant).

Ownership of Joint Facilities

Table 8-1 provides a summary of the ownership and capacity of the REB Plant and other facilities. All of these facilities are shown schematically in Figure 8-1. These ownership percentages are reflected in the costs for each capital improvement project.

TABLE 8-1
OWNERSHIP AND CAPACITY OF JOINT FACILITIES

Facility	Capacity	Ownership			
		SFID		SDWD	
		%	Capacity	%	Capacity
Cielo Pump Station & Pipelines	22 mgd	57.3	12.6	42.6	9.4
Original San Dieguito Reservoir & Dam	883 ac-ft	57.3	506	42.6	377
Current San Dieguito Reservoir	~383 ac-ft	57.3	219	42.6	164
San Dieguito Pump Station	18 mgd	55	10	45	8
CWA Treated Water Connection	27 mgd	55	14.85 mgd	45	12.15 mgd
CWA Untreated Water Connection	54 mgd	55	29.70 mgd	45	24.30 mgd
Badger Filtration Plant	40 mgd	55	22.00 mgd	45	18.00 mgd
Filtered Water Clearwell	13 mg	69	8.97 mg	31	4.03 mg
Old 54-inch Treated Water Transmission Main	--	61	--	39	--
New 54-inch Treated Water Transmission Main	--	57.3	--	42.6	--

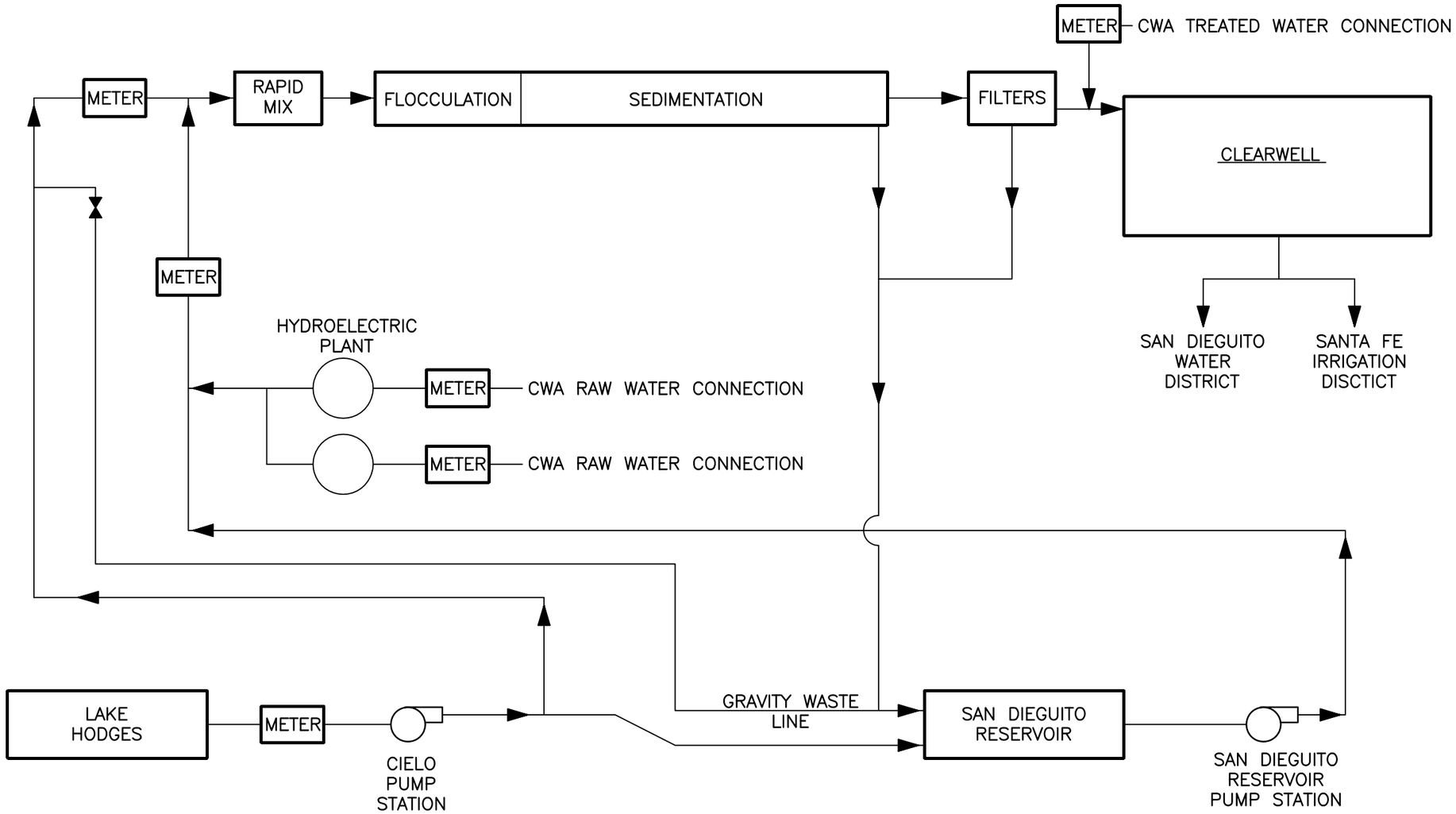

FIGURE 8–1
SCHEMATIC OF REB PLANT SUPPLY AND TREATMENT FACILITIES

\\PACIFIC\DWG\134001\ASSET MGMT PLAN\FOURTH SUBMITTAL\FIGURE_8-1.DWG 03-03-09 10:46:08 LAYOUT: LAYOUT1

RAW WATER FACILITIES

The raw water facilities have recently been rebuilt. The new system allows Lake Hodges water to be directly pumped to the REB Plant through the Cielo Pump Station. The Lake Hodges water can also be delivered to the San Dieguito Reservoir. The evaluation of these assets was based on their remaining useful life and reliability. The recommendations in this section additionally consider evaluations completed by others and the Emergency Storage Project.

Lake Hodges

The City of San Diego intends to re-operate Lake Hodges as an element of the SDCWA Emergency Storage Project (ESP) and the impact of the ESP on water quality and local yield is not yet known. When the quality and yield impacts are known, changes may be necessary to the current raw water deliveries at the REB Plant.

Cielo Pump Station and Piping

The Cielo Pump Station and piping system from Lake Hodges to the REB Plant was replaced in 2003. This system is in very good shape and needs no current improvement. If utilized to capture the maximum potential Lake Hodges yield for both SFID and SDWD, as discussed in Chapter 5, the pump station and piping must be capable of transferring an average of 13,230 AFY (11.8 mgd). The Cielo Pump Station has a capacity of 22 mgd.

San Dieguito Dam, Reservoir, Pump Station, and Piping

The facilities needed to utilize the San Dieguito Reservoir are old and some are nearing the end of their useful life. Each of the facilities is discussed below.

San Dieguito Dam. The February 2008 San Dieguito Dam Study evaluated the dam and determined it should have at least another 50 years of service life. Every ten years the dam should be re-evaluated.

San Dieguito Reservoir. The San Dieguito Reservoir serves two main purposes for the District. Firstly, it provides raw water storage for the District. Secondly, the reservoir over the years has served as pre-treatment of Lake Hodges water during months when it is difficult to treat this water directly at the REB Plant.

Over the years, solids from the REB Plant have accumulated in the reservoir, reducing the original reservoir capacity of 883 acre-feet by approximately 500 acre-feet. The District considered removing the solids by lowering the lake level and using excavating equipment; however, due to environmental constraints and the anticipated cost, this option was abandoned. As a solution, projects have been recommended, discussed later in the report, to improve the solids handling equipment at the REB Plant which not only reduce the quantity of solids returned to the reservoir, but may also assist in removing the existing solids in the reservoir over time.

San Dieguito Reservoir Pump Station and Force Main. The San Dieguito Reservoir Pump Station needs to be relocated and rebuilt. The station needs to be relocated to take suction from the lake to avoid new dam penetrations. This will also allow the existing valves for the pump station to be removed. The estimated cost for the replacement of the pump station is $4.29 million ($2.36 million SFID/$1.93 million SDWD).

District staff has also expressed concern regarding the integrity of the 30-inch force main from San Dieguito Reservoir Pump Station to the REB plant. An evaluation of the line should be conducted. If the evaluation reveals that rehabilitation is necessary the estimated cost to do so is $2.4 million ($1.38 million SFID/$1.03 million SDWD). This estimated cost assumes that re-lining of the approximately 10,000 feet of pipe is sufficient and it does not need to be replaced.

Pipeline to the San Dieguito Reservoir. The raw water feed line to San Dieguito Reservoir from the Cielo Pump Station was replaced in 2003 with an 18-inch HDPE pipeline. The Lake Hodges water quality is anticipated to improve with the implementation of the Emergency Storage Project and thus the pipeline should be adequate to accommodate the REB Plant's desired operational flexibility.

If the Emergency Storage Project does not improve the Lake Hodges water quality and it is desired to utilize the reservoir for pre-treatment of the Lake Hodges water, it may be of value to replace the 18-inch line with a larger size pipeline. This will allow the District to maximize use of local water. The estimated cost to replace the pipe is $4.47 million ($2.56 million SFID/$1.91 million SDWD). Pre-design of this project may reveal that parallel piping is more advantageous.

Badger Hydroelectric Plant

The Badger Hydroelectric Plant station was evaluated in 2008 by MWH Engineers. Based on this report, it currently does not appear to be cost effective for the District to rebuild the facility. Additional energy could be derived from a reconstructed facility; however, the capital cost is too great to justify the expense. Limited improvements to the existing facilities are recommended to improve safety and enable the existing facilities to reach their expected life. During the remaining life of the existing facilities (approximately 5 years), the District should continue to track the availability of outside funding support (energy grants, etc.) that may make the construction of a rebuilt hydroelectric plant more cost effective. If the decision were made to rebuild the facility, the estimated cost to do so is $9.33 million ($4.99 million SFID/$4.34 million SDWD).

San Dieguito Reservoir Seepage Recovery Project

If the results of the District's upcoming study regarding the recovery of groundwater seeping under the dam are favorable, facilities will be necessary to pump the groundwater and either convey it to the REB Plant for treatment or distribute to customers as non-potable irrigation water.

The seepage study will estimate the costs of implementing this project. For planning purposes, the cost is estimated to be $1.49 million ($853,000 SFID/$635,000 SDWD).

EVALUATION OF THE R.E. BADGER FILTRATION PLANT

The jointly-owned REB Plant is a conventional water treatment plant utilizing flocculation, sedimentation and filtration to take imported and local surface water sources and treat them for potable use. The plant supplies water to both the Santa Fe Irrigation District and the San Dieguito Water District and can be supplied raw water from Lake Hodges, the San Dieguito Reservoir, or the San Diego County Water Authority. The plant was originally constructed in 1970 and major upgrades were completed in 1993. The plant has a current design flow capacity of 40 mgd. The conceptual level evaluation generally considered the following to determine recommended REB Plant improvements:

- Regulatory Requirements
- Capacity
- Reliability
- Operator Safety
- Aesthetic Water Quality Enhancements

REGULATORY CONSIDERATIONS

The October 2003 *R.E. Badger Water Filtration Plant Master Plan* prepared by McGuire Environmental Consultants, Inc. (2003 McGuire Report) thoroughly evaluated the impact of current, pending, and future regulations on the REB Plant. Building upon the 2003 McGuire Report's extensive analysis of the regulations, this section will discuss current, pending, and future regulations which could have an impact on facility needs.

Current California Title 22 Fluoridation Requirements

The REB Plant will be required to install and operate a fluoridation system if the Department of Public Health secures the required funding. In 2007, the Metropolitan Water District of Southern California began adding fluoride to its treated water which ultimately ends up at the District. Regardless of this, for water that does not originate from Metropolitan, the same holds that no action would be required on the Districts' part unless funding is secured. San Dieguito Water District is currently 24 on the SPH Water System Priority Funding Schedule; SFID is not on the list. Examples of funding sources for DPH include federal block grants and private foundation donations.

Current Secondary Standards

Lake Hodges water has high concentrations of iron and manganese at times and this must be considered in REB operational strategies. Also, due to water quality issues in Lake Hodges, there have been taste and odor complaints from customers. As a result of this, a capital project has been recommended to evaluate the addition of powdered activated carbon and/or oxidation processes to treat taste and odor problems. It should also be noted that the District's TDS level exceeds the state and federal maximum contaminant level of 500 mg/L most of the time as well as the state's recommended level of 1,000 mg/L, but does not exceed the Short Term levels.

Future Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The District has received its initial classification of 1 for the plant's water sources which requires no additional treatment action and assumes the treatment plant is in compliance with the Interim ESWTR and achieves an average 2.0 log removal of cryptosporidium.

Future Stage 2 Disinfection/Disinfection-By-Products (Stage 2 D/DBP) Rule

The District is currently in compliance; however, the REB Plant has limited ability to respond to possible disinfection-by-products issues due to limited contact time. Contact time is achieved by utilizing the volume of plant as well as the treated transmission mains. This leaves little operational flexibility to address any disinfection by product issues. The remainder of this section discusses how this can be improved upon which will ultimately enhance operational flexibility as well as reduce the chemical operational costs.

Table 8-2 provides an analysis of the current disinfection volume for the REB Plant. As can be seen in the chart, due to short circuiting, an effective volume of 5.075 million gallons of the plant is currently available (out of a potential available of 17.517 mg). As the table highlights, the clearwell alone has an available volume of 13 million gallons, but due to short circuit has an effective volume of 1.3 million gallons. This could be greatly increased by baffling the clearwell to increase the percent of volume that can be utilized in the calculation.

TABLE 8-2
CURRENT AVAILABLE DISINFECTION VOLUME

Process	Volume of Each Unit, million gallons	Number of Units in Service	Volume of Units in Service, million gallons	Short circuiting Ratio (T10/T)	Effective Volume, million gallons	Disinfection Retention, %
Plant Influent	0.021	1	0.021	1	0.021	100
Flocculation Basins	0.252	2	0.504	0.66	0.333	95
Sedimentation Basins	0.692	2	1.384	0.66	0.913	90
48-inch Pipeline to Filters	0.021	1	0.021	1	0.021	90
Filters	0.067	5	0.335	0.7	0.235	90
Clearwell	13.000	1	13.000	0.1	1.300	85
TTM 1	1.126	1	1.126	1	1.126	70
TTM 2	1.126	1	1.126	1	1.126	70
TOTAL	**-**	**-**	**17,517**	**-**	**5.075**	**-**

The plant is required to have a 5-log reduction of viruses and a 4-log reduction of giardia. The filtration credit provides a 2.5-log removal of giardia and 2 log removal of viruses. Based on these removals, the regulatory contact time (CT, in units of mg/L*minutes) required for giardia removal is normally between 400 and 500. Currently, the plant needs to dose chloramines at approximately 4 milligrams per liter to meet the CT for giardia removal. In order to significantly reduce chemical usage, maximize the value of the existing clearwell, and to provide operational flexibility to address any disinfection by product issues, it is recommended that sufficient effective volume be provided to meet the CT with a chlorine dose of approximately 2 milligrams per liter.

Table 8-3 shows sample calculations on how this could be provided, assuming a CT of 500, using the existing facilities and an available disinfection volume in the clearwell of 8.6 million gallons. The determination of this 8.6 million gallons is based on the districts other storage requirements within the clearwell and is discussed later in this chapter.

TABLE 8-3
PROPOSED AVAILABLE DISINFECTION VOLUME
AT 40 MGD MAXIMUM DAY

Process	Volume, mg	Number of Units in Service	Volume in Service, mg	Short Circuiting Ratio Needed (T10/T)	Effective Volume, million gallons	Detention Time, minutes	Disinfection Retention, %	Chloramines Residual, mg/L	CT
Plant Influent	0.021	1.0	0.021	1.0	0.021	0.8	100	2.0	1.5
Flocculation Basins	0.252	2.0	0.504	0.66	0.333	12.0	95	1.9	22.8
Sedimentation Basins	0.692	2.0	1.384	0.66	0.913	32.9	90	1.8	59.2
48-inch Pipeline to Filters	0.021	1.0	0.021	1.0	0.021	0.8	90	1.8	1.4
Filters	0.067	5.0	0.335	0.7	0.235	8.4	90	1.8	15.2
Clearwell	8.600	1.0	8.600	0.95	8.170 [1]	191.6	85	1.7	325.7
TTM 1	1.126	1.0	1.126	1.0	1.126 [1]	26.4	70	1.4	37.0
TTM 2	1.126	1.0	1.126	1.0	1.126 [1]	26.4	70	1.4	37.0
TOTAL					**11.945 mg**				**499.7**

[1]Dentention Time based on Peak Hour Flow of 61.4 mgd

In order to reach these detention times, a short-circuiting ratio (T10/T) in the clearwell of 0.95 would be required. If this could be achieved at total plant utilization of 40 mgd and the associated peak hour flow of 61.4 mgd, a CT of 500 could be obtained. To meet this requirement, the total effective disinfection volume would need to be 11.945 million gallons. Therefore, it is recommended that baffles be installed in the clearwell to increase the effective volume. Using the clearwell as a contact tank would avoid the construction of new facilities with an effective volume of 8.17 million gallons. The total estimated cost for this project is $836,500 ($545,246 SFID/$291,254 SDWD). This cost also includes replacement of isolation valves in the clearwell and a structural integrity analysis of the clearwell to confirm the addition of these baffles.

CAPACITY, RELIABILTY, AND OPERATOR SAFETY CONSIDERATIONS

Overall, based upon discussions with District Operations Staff, the evaluation assumed that asset condition, remaining useful life, and redundancy needs of the major unit processes were adequate for near-term planning purposes. For the REB Plant's support facilities, improvements are necessary for some of the components for capacity and reliability reasons. Additionally, there are some components which should be improved for operator safety. These are all discussed in the following sections. As this report presents a conceptual level evaluation of these processes and facilities, the District should pursue the development of a master plan for the REB Plant in the future. For cost planning purposes, $150,000 was assumed for this master plan. The last portion of this section addresses the District's treated water storage capacity as the REB Plant clearwell is utilized by the District as storage.

Description of Unit Processes

The main process flow at the REB Plant consists of rapid mixing, flocculation, sedimentation, filtration and treated water storage in the clearwell. Support facilities include backwash water storage, chemical storage, backwash recovery, and solids dewatering. Each of these processes will be discussed below.

Main Process Flow. Table 8-4 provides a summary of the design criteria for the main flow unit processes. Figure 8-2 provides a flow diagram for the main liquid flow and Figure 8-3 provides a flow diagram for the solids.

TABLE 8-4
DESIGN CRITERIA FOR MAJOR UNIT PROCESSES

Flash Mixing		
Type - Pumped Diffuser	15 hp, 940 gpm	
Number of Pumps	1	
Flocculation Tanks		
Number of Basins	2	
Compartments per Basin	8	
Compartment Size		
Volume	31,400	gallons
Length x Width x Depth	20 x 20 x 10.5	feet
Volume per Basin	251,200	gallons
Total Flocculation Tank Volume	502,400	gallons
Mixers per Compartment	1	
Total Number of Mixers (vertical shaft)	16	
Horsepower per Mixer	1	
Detention Time at Design Flow	18.1	minutes
Sedimentation Basins		
Number of Basins	2	
Basin Size		
Volume	691,600	gallons
Length x Width x Depth	220 x 40 x 10.5	feet
Total Volume (2 basins)	1,383,200	gallons
Detention Time at Design Flow	50	minutes
Surface Loading Rate at Design Flow	2,270	gpd/sf
Horizontal Velocity at Design Flow	1.58	ft/minute
Weir Length Per Basin	450	feet
Weir Overflow Rate	30.86	gpm/ft
Traveling Bridge Motor HP	3/4	HP
rpm	900	rpm
Sludge Collector Motor HP	2	HP
Sludge Pump Capacity HP	7.5	HP
Filter		
Number of Filters	6	
Number of Bays per Filter	2	
Filter Bay Size		
Length	40	feet
Width	16	feet
Media Area Per Filter	1,280	feet
Total Media Area All Filters	7,680	feet
Filtration Rate at Design Flow		
All Filters in Service	3.6	gpm/sq ft
One Filter Out of Service	4.3	gpm/sq ft
Backwash Rate (underdrain)	17.2	gpm/sq ft
Surface Wash Rate	4.8	gpm/sq ft
Volume per Backwash		
Backwash (7 minutes)	154,112	gallons
Surface Wash (4 minutes)	24,576	gallons
Filter Drain	27,000	gallons
TOTAL	205,688	gallons
Filter Media		
Anthracite Depth	21	inches
Sand Depth	10	inches
Gravel Depth	18	inches

OLIVENHAIN
METERED SUPPLY

CLEAN
BACKWASH
WATER
STORAGE
TANK

BACKWASH WATER PUMPS

UTILITY WATER PUMPS

BACKWASH
OUT

DRAIN
GATES

FILTERS
2
4
6

FILTERS
1
3
5

BACKWASH
OUT

RAPID
MIX

FLOCCULATION
BASINS

SEDIMENTATION
BASINS

48"

FILTERED WATER

FILTER INFLUENT CHANNEL

BACKWASH IN

SOLIDS FROM
SEDIMENTATION
BASINS

OVERFLOW FROM
GRAVITY THICKENER
AND CENTRATE
SEE FIGURE 7-3

WEIR

FILTER
CONTROL

13 MILLION
GALLON
CLEARWELL

54"

54"

TO USERS

ACTIFLOW 1

ACTIFLOW 2

OVERFLOW

TO SAN DIEGUITO
RESERVOIR

USED
BACKWASH
PONDS

TO THICKENING AND
DEWATERING,
FIGURE 7-3

LEGEND

FINISHED WATER

UNFINISHED WATER

WASTE STREAM

FIGURE 8-2

REB PLANT
MAIN PROCESS
FLOW DIAGRAM

\\PACIFIC\DWG\134001\ASSET MGMT PLAN\FOURTH SUBMITTAL\FIGURE_8-2.DWG 03-03-09 10:45:05 LAYOUT: LAYOUT1

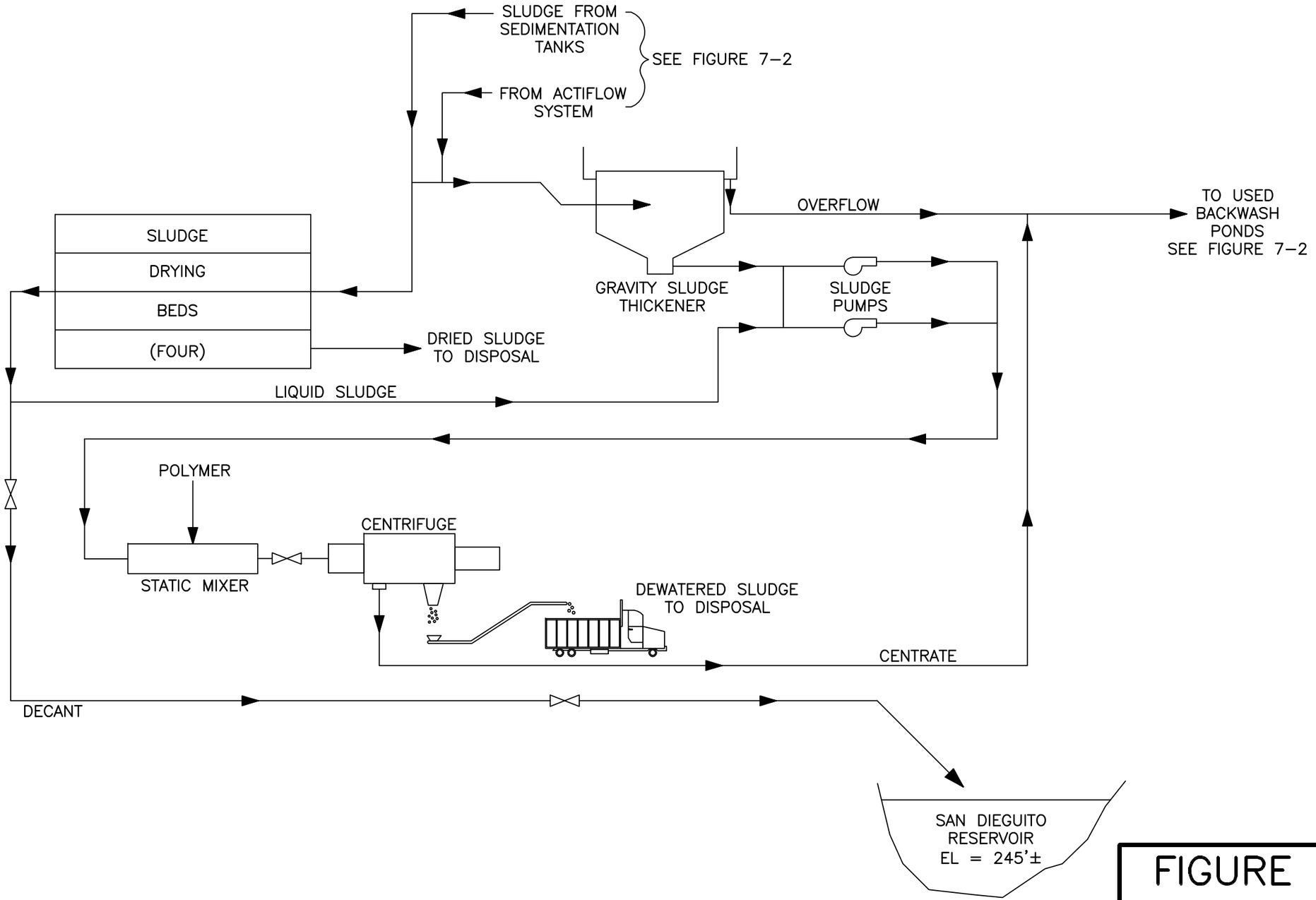

FIGURE 8–3

REB PLANT SOLIDS TREATMENT SCHEMATIC

\\PACIFIC\DWG\134001\ASSET MGMT PLAN\FOURTH SUBMITTAL\FIGURE_8-3.DWG 03-03-09 10:43:48 LAYOUT: LAYOUT1

Rapid Mixing. Rapid mixing and chemical addition are accomplished by injecting a pumped stream into the 54-inch raw water feed. This is accomplished by utilizing a single pump, replaced in 2003. Presently, there is no permanent redundancy in place should this pump need to be replaced. The District should consider installing permanent piping to bring auxiliary water to the downstream side of the pump to ensure that proper chemical mixing can be achieved in the event the rapid mix pump needs to be replaced. This improvement may not require a capital improvement project to complete.

Flocculation Basins. Flocculation basins have a serpentine flow pattern with vertical shaft flocculators. There are two flocculation basins, one feeding each sedimentation basin. Each of the flocculation basins has eight compartments. Each compartment has its own mixer. The approximate capacity of each compartment is 31,400 gallons. The detention time in each flocculation basins for the design flow of 40 mgd is 18.1 minutes.

Sedimentation Basins. The sedimentation basins are rectangular basins with traveling bridge sweepers and cross collection trough sludge collection. There are two basins. Each basin has a volume of 691,600 gallons. The detention time at the 40 mgd design flow is 50 minutes and surface loading rate is 2,270 gallons per day per square foot (1.6 gpm/ft^2).

The sedimentation basins have been rated by the Health Department for the plant's design flow of 40 mgd. The size of the basins result in a surface loading rate higher than the typical 0.5 – 1.0 gpm/ft^2 (MWH Water Treatment: Principles and Design 2nd Edition 2005). Additional chemicals are utilized, enhanced coagulation, to process at these higher loading rates. If with the implementation of the Emergency Storage Project, the Lake Hodges water does not improve and operation of the plant approaches the 40 mgd design flow, an additional sedimentation basin may be necessary to reduce the solids loading rate to typical values. This recommendation is supported by the McGuire report. The estimated cost for the third sedimentation basin is $2.86 million ($1.57 million SFID/$1.29 million SDWD) and includes the flocculation basin as well.

In the near-term, allocation of a portion of the clearwell to operational/equalization storage, as discussed later in this chapter, will reduce the peak surface loading rate as the plant throughput will be more consistent.

Filters. There are six filters at the REB Plant. Each of these filters has two bays. The filters contain anthracite coal, sand, and gravel. The filtration rate at design flow with all filters in service is 3.6 gallons per minute per square foot. With one filter out of service this

increases to 4.3 gallons per minute per square foot. Based on input from District staff, the filters have been rated by the Department of Public Health for a maximum filtration rate of 6 gpm/ft^2. Filters are designed to backwash at a rate of 17.2 gallons per minute per square foot.

Treated Water Clearwell. After filtration, the water is stored in a 13 million gallon treated water clearwell. Additional discussion regarding the clearwell will be provided later in this chapter.

Support Facilities and Utilities. Table 8-5 provides a summary of the capacity of the plant support facilities. Each of the support facilities will be discussed below. Also discussed are the plant's utilities.

TABLE 8-5
DESIGN CRITERIA FOR SUPPORT UNIT PROCESSES

Chemical Storage			
Chlorine			
	One Ton Cylinders	26	
	Days of Storage[1]	39	
Liquid Poly Aluminum Chloride			
	Bulk Tanks	3	
	Volume Each	13,300	gallons
	Days of Storage[1]	46	
Caustic Soda			
	Bulk Tanks	2	
	Volume Each	14,000	gallons
	Days of Storage[1]	37	
Aqua Ammonia			
	Bulk Tanks	1	
	Volume Each	10,000	gallons
	Days of Storage[1]	78	
Cationic Polymer			
	Bulk Tanks	2	
	Volume Each	7,000	gallons
Spare Tanks			
	Bulk Tanks	3	
	Volume Each	660	gallons
Anionic Polymer			
	400 gallon totes		
Potassium Permanganate			
	Number of Drums	275	
	Weight Per Drum	110	lbs.
	Days of Storage[1]	>100	
Backwash Storage Tank			
Capacity		1	million gallons
Diameter		46	feet
Height		80	feet
Used Backwash Ponds			
Number		2	
Capacity Each		228,500	gallons

TABLE 8-5 DESIGN CRITERIA FOR SUPPORT UNIT PROCESSES			
Chemical Storage			
Actiflow System			
Capacity		4	MGD
Sludge Thickener			
68' inside diameter, 11" water depth			
Surface Area		3,630	sq ft
Capacity @ 0.5 gpm per sq ft =		1,815	gpm
	or	108,900	gal/hr

[1] At Design Flow of 40 mgd

Chemical Storage Facilities. Chemical storage and feed equipment is available at the plant for chlorine, liquid alum, caustic soda, ammonia, potassium permanganate, and polymer. Table 8-6 provides a summary of the storage capacity for each chemical.

Currently four chemical storage tanks at the plant are not up to regulations for operating under pressure and should be replaced with ASME code vessels if they continue under the current operational scheme. This project would include replacing the ammonia storage tank with an ASME code pressure vessel. For the remaining three poly aluminum chloride tanks, there are several potential operational methods which impact whether or not an ASME code vessel is required. If the operational strategy chosen is such that the tanks are not pressurized, the air piping which allows the tanks to be pressurized should be removed.

The cost for this project assumes that only the ammonia tank will be replaced with an ASME code vessel. The truck unloading area should also be reconstructed to provide a containment area in case of a pipeline failure during unloading of chemicals into the chemical storage tanks. The total estimated cost for the Chemical Tank Improvement project is $561,990 ($309,095 SFID/$252,896 SDWD).

Clean Backwash Water (Washwater) Storage. A 1.0 million gallon washwater storage tank is on the plant site which stores water to backwash the filters and for start up of the plant process. The washwater storage tank also provides utility water for use around the plant. This tank is normally filled from a pump which takes suction from the line feeding the clearwell. During long periods of time when the plant is shut down and water is being fed directly from the treated water connection, there is no way to refill the washwater storage tank using plant water. In order to restart the plant, it is often necessary to refill the clean backwash water storage tank with potable water from the Olivenhain system. Thus, a secondary fill line connected to the Olivenhain supply line to the plant is utilized to fill the

tank. A permanent metered system should be put in place to allow for this fill or the pump feeding the tank should be moved to the clearwell. A project has been included in the CIP budget for this improvement along with other site utility improvements (discussed in a later section).

Used Backwash Ponds. The plant has two washwater basins, each with a capacity of 228,500 gallons. One basin is intended to hold the water from the backwash of a single filter.

Actiflow System. The Actiflow system is provided at the plant to treat the backwash water and separate the solids from the liquid to allow recycling of the backwash liquid stream into the raw water feed to the plant and the solids stream to dewatering. This facility is not currently in service due to the liquid stream causing unanticipated negative impacts on operations when returned to the plant raw water feed. Additionally, the solids stream can not be processed due to limitations in the dewatering centrifuge. Utilization of this facility would enhance solids handling capabilities. The Actiflow system should be reactivated and all backwash flows should be processed through the Actiflow system. Activation of the Actiflow system will also reduce the discharge of solids to the San Dieguito Reservoir. These improvements shall be made through the REB Plant's operating budget.

Sludge Thickener and Dewatering Equipment. A single gravity sludge thickener takes solids from the sedimentation tanks and the Actiflow system. This thickener has a volume of 312,000 gallons. The estimated capacity of the thickener is 108,900 gph. Downstream of the thickener, a centrifuge dewaters sludge at a maximum rate of approximately 1,560 gph. There are also four sludge drying beds to dewater plant sludge. Table 8-6 provides theoretical calculations of the solids generation at the REB Plant based on varying the plant flow and percent solids from the sedimentation tanks and thickener. This table shows the wide variation possible in liquid and dry solids generation and also that the existing dewatering system should be rebuilt with a higher capacity. For example, based on the processing rate of the centrifuge, if a daily run time is 12 hours, the volume it can process is 18,720 gpd. As the table shows this volume is quickly exceeded at higher plant flows or higher solids production rates.

TABLE 8-6
SOLIDS GENERATION

Plant Flow, mgd	Solids Produced	Sedimentation Basin Sludge [1]		Thickener Sludge Volume at 2.0% [2], gpd
		Volume at 0.25%, gpd	Volume at 0.50%, gpd	
10	10 mg/l	40,000	20,000	5,000
	25 mg/l	100,000	50,000	12,500
	50 mg/l	200,000	100,000	25,000
20	10 mg/l	80,000	40,000	10,000
	25 mg/l	200,000	100,000	25,000
	50 mg/l	400,000	200,000	50,000
30	10 mg/l	120,000	60,000	15,000
	25 mg/l	300,000	150,000	37,500
	50 mg/l	600,000	300,000	75,000
40	10 mg/l	160,000	80,000	20,000
	25 mg/l	400,000	200,000	50,000
	50 mg/l	800,000	400,000	100,000

[1] To thickener
[2] To centrifuge

The centrifuge is not currently in operation as it is undersized to accommodate the solids generated by the enhanced coagulation. In addition, anaerobic conditions in the thickener have created conditions that rapidly deteriorated the equipment. Because of this, the system is not in functional condition and is in need of replacement at a greater capacity. The plant is currently undergoing a one-year study on solids generation to verify the current level of solids production. This information is needed before proceeding with replacement of the existing centrifuge at the plant. As soon as adequate data is available that addresses the peak and average solids productions, the dewatering facilities should be replaced. Until that time, the District will need to rely on its current solids management approach which includes discharge of solids to the San Dieguito Reservoir. Once the appropriate sizing is determined, the new facilities should be designed to survive the environment created by potential anaerobic conditions. The estimated cost for replacement is $2.36 million ($1.30 million SFID/$1.06 million SDWD) and assumes that 2 centrifuge units are installed within a new dewatering building.

Plant Drain Line. The 15-inch drain line from the REB plant to the San Dieguito Reservoir should be evaluated for its capacity. If replacement is necessary, the estimate cost to do so is $3.05 million ($ 1.75 million SFID/$ 1.30 million SDWD).

Site Utilities. This project encompasses the general site utilities of the plant. It includes the permanent metered connection to OMWD for the washwater storage tank discussed previously. It also includes an upgrade to the utility water system to change the location of the utility pumps from the junction manhole to the clearwell. This will allow the utility pumps to operate when the clearwell is being filled with SDCWA treated water and the plant is not in service. Finally, this project includes constructing a permanent sewer connection to the Rancho Santa Fe CSD as currently wastewater generated at the plant is sent to a leach field. The total estimated cost for the Utility Upgrade Project is $520,520 ($286,286 SFID/$234,234 SDWD).

REB Plant Electrical Facilities. An overall evaluation of the electrical operations of the plant should be completed for efficiency. This would evaluate whether or not the plant's electrical components are adequately sized. This evaluation should also review whether the emergency generators and primary feed should be co-located with the hydro electric facility. The estimated cost to relocate facilities is $1.07 million ($589,895 SFID/$482,625 SDWD).

Additionally, $150,000 (construction cost) has been included in the Improved Disinfection project to make minor improvements to the plant's electrical system for health and safety reasons and to the plant site security system.

Emergency Untreated and Treated Water Availability

As reiterated in the 2001 Master Plan, the District is well suited to provide water to customers in an emergency scenario. Unlike many districts, the District not only has the ability to treat water from local sources, it can receive treated water which exceeds its average day demand. The following sections discuss the District's untreated and treated water needs.

Emergency Untreated Water Storage. Following the SDCWA recommendation, 10 average days of untreated water emergency storage should be provided to account for supply interruptions. This storage should be provided in the San Dieguito Reservoir. The California Division of Safety of Dams sets a maximum elevation (46 feet gage) during winter months (October 1- April 30) in San Dieguito Reservoir. This elevation, with the annual fluctuation of the both the District's and SDWD's demands, determine whether adequate storage is available. Also impacting this are the solids present in San Dieguito Reservoir, which reduces the available capacity, and to a greater extent the capacity and intake elevation of the San Dieguito Reservoir Pump Station.

On average, the combined districts demand is approximately 13.4 mgd. Table 8-7 shows the storage requirements, availability, and surplus/deficit based on the water level, or gage. For the winter month's analysis, the table considers the maximum gage set by Dam Safety as well as the REB Plant staff's preferred gage and the minimum gage required for the San Dieguito Reservoir Pump Station intake. The last column highlights the volume of water necessary from Lake Hodges to meet the 10 day storage requirement. For the summer months, all of the storage is assumed to be within San Dieguito Reservoir, and the necessary maximum gage elevation is calculated.

TABLE 8-7
SAN DIEGUITO RESERVOIR AVAILABILITY

SFID & SDWD Demand, mgd	Storage Required, mg	Maximum Gage, feet	Minimum Gage, feet	Storage Available, mg	Surplus/ Deficit	Lake Hodges Water Needs, mg
Winter Months Analysis (Oct. 1 – Apr. 30)						
13.4	134	46 Dam Safety	38	118.7	15.3 mg (1.1 day) Deficit	15.3
		44 Operations preferred	38	82.1	51.9 mg (3.9 day) Deficit	51.9
Summer Month Analysis (May 1 – September 30)						
13.4	134	46.8	38	134.4	0.4 mg Surplus	0

The winter and summer scenarios described above assume that San Dieguito Reservoir has a capacity of 883 acre-feet. As discussed previously, the discharge of solids to the reservoir from the REB Plant has decreased this volume by approximately 500 acre-feet. Additionally, when the San Dieguito Reservoir Pump Station is relocated, consideration should be given to the elevation of the intake piping so as to maximize the usage of the water available in the reservoir. No additional untreated storage capacity is recommended for the districts as it is acceptable to include Lake Hodges water in the emergency untreated water storage analysis; however, the districts should strive to ultimately provide all of the storage in San Dieguito Reservoir. The capital improvement projects relative to the REB Plant solids handling equipment and the replacement of the San Dieguito Pump Station shall provide the means to

achieve this goal. A final item to consider is that if the districts long term plan is to depend on Lake Hodges water to meet the untreated water storage requirement, it should be confirmed that adequate disinfection facilities are in place for this scenario.

Emergency Treated Water Availability. In an emergency scenario where the REB Plant is non-operational, it is desired to have treated water available for the District to supply the demand of 1.35 maximum days. This would be supplied by the Districts' connection to the SDCWA treated water aqueduct and treated water storage. The supply of one maximum day is typical, however the additional 0.35 days is recommended to ensure adequate time to transfer to the SDCWA aqueduct connection. The District's interconnections with surrounding water agencies would provide additional support, but have been left out of the calculations to provide a more conservative analysis.

The SDCWA treated water aqueduct connection can provide 14.85 mgd (based on the District's ownership capacity in the connection). The treated water storage volume required for the District is calculated as the difference between the maximum day demand and the SDCWA treated water connection capacity. Utilizing the 2007 maximum day (August 13), the current treated water storage needed is 3.8 million gallons as calculated in Table 8-8. Extrapolating this to the District's 22 mgd ultimate ownership capacity of the REB Plant (55% of 40 mgd), the storage required is 4.7 million gallons. Multiplying this by 1.35, the treated water storage needed for the District is 6.3 million gallons.

TABLE 8-8
SFID MAXIMUM DAY ANALYSIS (MG) - MONDAY, AUGUST 13, 2007

Time	Flow SFID, mgd	Volume in Excess of 14.85 mgd [1], million gallons
12:00 AM	16.5	1.7
1:00 AM	18.0	3.2
2:00 AM	19.0	4.2
3:00 AM	19.5	4.7
4:00 AM	22.0	7.2
5:00 AM	27.5	12.7
6:00 AM	30.0	15.2
7:00 AM	31.0	16.2
8:00 AM	26.0	11.2
9:00 AM	21.0	6.2
10:00 AM	18.5	3.7
11:00 AM	16.5	1.7
12:00 PM	14.5	0.0
1:00 PM	15.5	0.7

TABLE 8-8 SFID MAXIMUM DAY ANALYSIS (MG) - MONDAY, AUGUST 13, 2007		
2:00 PM	15.0	0.2
3:00 PM	12.0	0.0
4:00 PM	10.5	0.0
5:00 PM	11.0	0.0
6:00 PM	11.5	0.0
7:00 PM	12.5	0.0
8:00 PM	16.0	1.2
9:00 PM	16.0	1.2
10:00 PM	15.0	0.2
11:00 PM	16.5	1.7
AVERAGE FLOW	**18.0**	**--**
TOTAL EXCESS	**--**	**3.8**

[1] From Table 8-1

REB Plant Clearwell and District Treated Water Storage

As discussed in the regulatory section of this chapter, sufficient capacity exists in the REB Plant clearwell to provide adequate disinfection contact time; however, its efficiency or effective volume should be increased to reduce chemical usage, maximize the value of the existing clearwell, and provide operational flexibility to address any disinfection-by-product issues. The calculations in the disinfection section were based on an available volume in the clearwell of 8.6 million gallons. The existing clearwell has the capacity to provide this disinfection storage volume and meet both districts' emergency, operational, and fire flow storage requirements. Table 8-9 shows how the REB Plant clearwell could be allocated and the following sections describe each of the allocation components. This allocation would not require physical improvements to the tank; it would require concurrence between both districts.

TABLE 8-9 REB PLANT CLEARWELL ALLOCATION (in million gallons)				
District	**Clearwell Ownership**	**Allocation of Clearwell**		
		Operational Storage	**Fire Flow Storage**	**Available for Disinfection Contact Time [3]**
SFID	9.0	2.7 [2]	0.54	5.8
SDWD	4.0	0.6	0.63 [1]	2.8
TOTAL	**13.0**	**3.3**	**1.13**	**8.6**

[1] Source: 2003 McGuire Report

[2] Calculated based on SFID 55% ownership of 40 mgd which is 22 mgd.

[3] Calculated based on Operational and Fire Flow needs subtracted from Ownership.

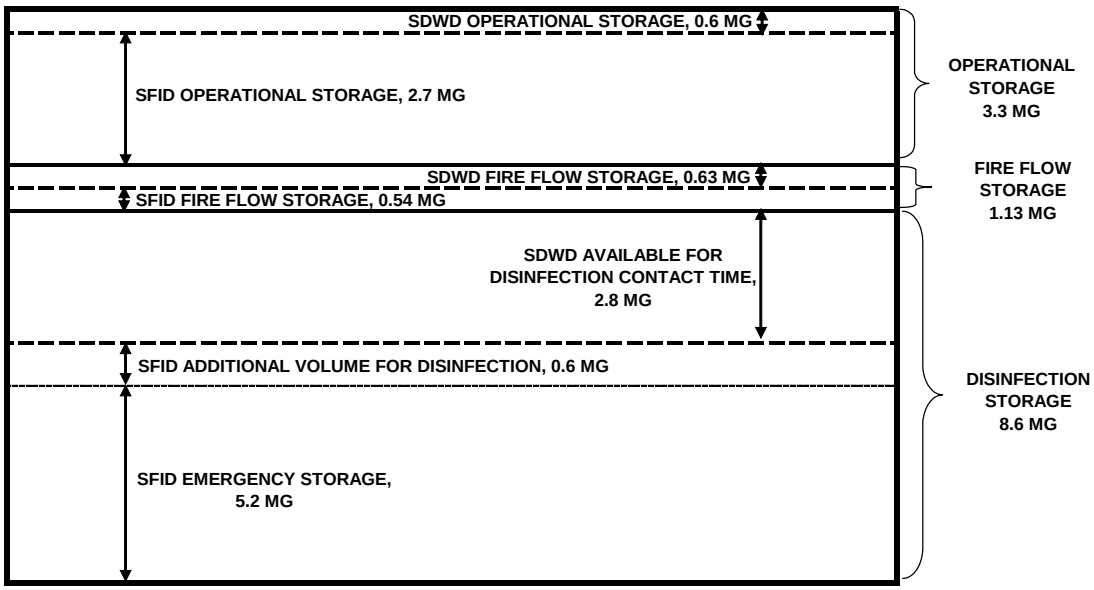

Figure 8-4. REB Plant Clearwell Allocation

Operational/Equalization Storage. Providing operational, or equalization, storage in the clearwell will allow the plant to equalize the daily flows and would not impact disinfection requirements. Table 8-10 provides an analysis of the flows leaving the plant on the 2007 maximum day, Monday, August 13, 2007. Based on the flow pattern from this day, 2.2 million gallons of storage would be required to equalize SFID flows and 2.4 million gallons of storage would be required to equalize the combined flows of both districts. Extrapolating the information to a total plant flow of 40 mgd, SFID's operational storage requirement is 2.7 million gallons (based on 55% ownership capacity) and 3.3 million gallons would be required for both districts. For SFID, all of this storage should be maintained in the clearwell.

TABLE 8-10 SFID AND SDWD MAXIMUM DAY ANALYSIS – MONDAY, AUGUST 13, 2007				
Time	**Flow SFID, mgd**	**Total Volume in Excess of 18 mgd Flow, million gallons**	**REB Plant Flow Total, mgd**	**Total Volume in Excess of 29 mgd Flow, million gallons**
12:00 AM	16.5	0.0	25.5	0.0
1:00 AM	18.0	0.0	28.0	0.0
2:00 AM	19.0	1.0	29.5	0.5
3:00 AM	19.5	1.5	30.5	1.5
4:00 AM	22.0	4.0	31.0	2.0
5:00 AM	27.5	9.5	37.5	8.5
6:00 AM	30.0	12.0	42.5	13.5
7:00 AM	31.0	13.0	44.5	15.5
8:00 AM	26.0	8.0	36.5	7.5
9:00 AM	21.0	3.0	33.0	4.0
10:00 AM	18.5	0.5	32.5	3.5
11:00 AM	16.5	0.0	30.0	1.0
12:00 PM	14.5	0.0	28.0	0.0
1:00 PM	15.5	0.0	28.5	0.0
2:00 PM	15.0	0.0	25.5	0.0
3:00 PM	12.0	0.0	21.5	0.0
4:00 PM	10.5	0.0	20.5	0.0
5:00 PM	11.0	0.0	20.5	0.0
6:00 PM	11.5	0.0	21.5	0.0
7:00 PM	12.5	0.0	24.0	0.0
8:00 PM	16.0	0.0	26.0	0.0
9:00 PM	16.0	0.0	26.5	0.0
10:00 PM	15.0	0.0	25.0	0.0
11:00 PM	16.5	0.0	25.5	0.0
24 hours	**18.0**	**2.2**	**29.0**	**2.4**

Fire Flow Storage. Treated water storage for SFID fire flow needs is recommended to be 0.54 million gallons and provided in both the REB Plant Clearwell and Larrick Reservoir. This quantity is sufficient to provide water at the rate of 3,000 gpm for a 3 hour duration in all pressure zones. This rate and duration is consistent with the California Fire Code, the Solana Beach Fire Department fire flow requirements, and maximum (commercial) fire flow requirement for the Rancho Santa Fe Fire Protection District.

Fire flow storage needs for SDWD are 0.63 million gallons, based on the 2003 McGuire Report.

Available Disinfection Volume. The available disinfection volume is based on each districts ownership capacity less their operational and fire flow storage requirements, leaving 8.6 million gallons available for disinfection contact time. It would also be possible to normally utilize the

fire flow volume for contact time, but this has been left out of the calculations as a safety factor. For SFID, it is the District's emergency storage which provides the majority of this volume. As discussed in the previous section, the District's emergency storage requirement is 6.3 million gallons, where 1.1 million gallons is in Larrick Reservoir and 5.2 million gallons are in the REB Plant clearwell.

Table 8-11 summarizes the District's treated water storage requirements, illustrating that sufficient volume is available to meet all of its storage requirements.

TABLE 8-11
SUMMARY OF DISTRICT STORAGE
(in million gallons)

Location	Available Storage	Operational Storage [2]	Fire Flow Storage	Available for Disinfection Contact Time		Additional Available Storage
				Emergency Storage [1]	Additional Contact Time [3]	
REB Plant Clearwell	9	2.7	0.54	5.2	0.6	0
Larrick Reservoir	6	0	0.54	1.1	0	3.9
TOTAL	**15**	**2.7**	**1.08**	**6.3**	**0.6**	**3.9**

[1] Can be used for contact time. Split based on 18% (1.1 mgd) of District usage in 202 and 340 Zones.

[2] Total Oper./Equal. Storage from Table 7-5 and 7-4. Split based on 18% (0.5 mgd) of District usage in 202 & 340 Zones.

[3] Total Contact Time needed is 5.8 mg (includes emergency storage

TREATMENT IMPROVEMENTS FOR WATER QUALITY AESTHETICS AND THE EMERGENCY STORAGE PROJECT

Most of the plant operations are controlled by the blend of Lake Hodges water. This is due to the fact that Lake Hodges water is currently more challenging to treat than imported supplies. The SDCWA's Emergency Storage Project (ESP) will most likely have a significant impact on the quality of Lake Hodges water. The ESP will utilize imported raw water to supplement locally derived water (runoff, etc.) in order to maintain a more consistent storage volume within Lake Hodges. It is probable that the water quality in Lake Hodges could improve due to the ESP. However, it is also possible that constituents included in the imported supply could introduce new treatment challenges. Therefore, the implementation of major improvements

related to water treatment must consider the potential impacts of the ESP. If possible, it is preferred that major treatment improvements be delayed until the ESP is initiated and the impacts are fully understood. The impacts of the ESP will also impact the timing and configuration of projects related to the conveyance of water from Lake Hodges to the San Dieguito Reservoir, as well as projects related to the San Dieguito Pump Station.

Presently, periodically the quality of local water creates treatment challenges that result in taste and odor problems. The addition of chlorine dioxide, activated carbon, and/or oxidation facilities for Lake Hodges water would enhance the District's ability to address constituents that currently cause taste and odor problems. As described previously, the implementation of the SDCWA's ESP could potentially mitigate some of the current problems. The decision to add these facilities will be impacted by the timing of the actual start-up date of the ESP, and the desire to enhance treatment flexibility considering the unknown impact to Lake Hodges water quality. It is recommended that the District evaluate what improvements could be made in the near-term with a more comprehensive evaluation conducted after completion of the ESP. The estimated cost for improvements $3.58 million ($1.97 million SFID/$1.61 million SDWD).

Demineralization Facilities

In addition to the treatment improvements described above, demineralization facilities would provide enhanced water quality aesthetics and improve the District's flexibility to utilize local water supplies throughout the year. A secondary benefit of demineralization may be a reduction in total dissolved solids in the recycled water derived from wastewater originating from the District's service area.

The District is conducting a separate conceptual study to estimate the size and associated cost of potential demineralization facilities. In addition to treatment facilities, demineralization would also require facilities to dispose of brine waste generated from the process. The AMMP does not include improvements required for demineralization. Depending upon the findings of the ongoing study, the District may need to amend the findings of the AMMP. As described previously, the decision to add demineralization facilities will be impacted by the outcome of the SDCWA's ESP.

Cost of Recommended Joint Facilities Improvements

Table 8-12 provides an estimate of costs for the improvements recommended in this chapter.

TABLE 8-12
COST ESTIMATE FOR JOINT FACILITIES IMPROVEMENTS

Project #	Project Name	Estimated Project Cost		
		Total	SFID	SDWD
--	*Technical Programs*			
J-206	Integrated Technology Program	$ 101,676	$ 58,291	$ 43,385
J-212	Asset Management Plan	$ 60,847	$ 34,884	$ 25,963
N-30 Project	REB Plant Master Plan Update	$ 275,000	$ 151,250	$ 123,750
--	*REB Plant Improvements*			
J-301	Chemical Tank Improvement	$ 561,990	$ 309,095	$ 252,896
N-24 Project	Hydroelectric Facility Upgrade	$ 9,330,555	$ 4,991,847	$ 4,338,708
N-25 Project	Plant Electrical Improvements	$ 1,072,500	$ 589,875	$ 482,625
N-26 Project	Solids Management Project	$ 3,432,000	$ 1,887,600	$ 1,544,400
N-27 Project	Improved Disinfection	$ 836,500	$ 545,246	$ 291,254
N-42 Project	Improved Local Water Aesthetics	$ 3,575,000	$ 1,966,250	$ 1,608,750
N-29 Project	Utility Upgrade Project	$ 520,520	$ 286,286	$ 234,234
N-46 Project	Sedimentation Basin Addition	$ 2,860,000	$ 1,573,000	$ 1,287,000
N-28 Project	Relocate and Improve SDR Pump Station	$ 4,290,000	$ 2,359,500	$ 1,930,500
N-33 Project	SDR Dam Seepage Recovery	$ 1,487,200	$ 882,612	$ 604,588
--	*Pipeline Improvements*			
J-208	Cathodic Protection	$ 292,240	$ 167,541	$ 124,699
N-31 Project	15-inch REB Plant Drain Line	$ 3,053,000	$ 1,750,285	$ 1,302,715
N-32 Project	Rehabilitation of 30" line b/w SDR & REB Plant	$ 2,402,400	$ 1,377,296	$ 1,025,104
N-43 Project	Upgrade 18-inch HDPE to SD Reservoir	$ 4,468,464	$ 2,561,770	$ 1,906,694
TOTAL		$ 38,619,892	$ 21,492,627	$ 17,127,265

CHAPTER 9

RECYCLED WATER

The District's mission is "to provide its customers with an adequate and reliable supply of quality water that meets customer needs at a reasonable cost, supported by excellent customer service." Maintaining a diversified and cost effective water supply portfolio is critical to achieving water supply reliability. Recycled water is an important water part of the District's diversified water supply strategy.

Presently the District supplies approximately 500 AFY of recycled water to customers within the District. This equates to approximately 4 percent of the District's water supply volume. The District's 2005 Recycled Water Master Plan stated a goal of distributing 10 percent of the total demand as recycled water. This goal was carried through in the District's Integrated Water Resources Plan (CDM, June 2007) and is the target utilized throughout this Asset Management Master Plan (AMMP).

The District currently has a wholesale purchase agreement with the San Elijo Joint Powers Authority (SEJPA) to provide treatment and conveyance of recycled water for District customers in the western portion of the District's service area. With the exception of recycled water meters, the District does not own any assets associated with recycled water treatment or distribution. This may change in the future as new facilities are implemented to expand the capability to deliver recycled water throughout the District's service area. The purpose of this chapter is to discuss the current recycled water system within the District, and to present options for achieving the District's target of 10 percent, or 1,300 acre-feet, of the demand to be served through recycled water.

BACKGROUND

Though the District does not currently own recycled water related assets, the use of recycled water is still an important component of asset management. The use of recycled water decreases demand from the District's potable system. While the conversion of new individual users has a minimal impact on the overall demand from the system, the combined reduction in potable demand will either reduce or eliminate the projected increase in potable demand since the District is almost fully built out. This effectively delays or eliminates the need to replace components of the potable system solely due to long-term capacity requirements. Additionally,

from an asset perspective, a reduced potable demand may decrease velocities in pipes, minimize the operation of pumps, and reduce large swings in pressures due to irrigation demands within a zone, all of which impact the operation of the District's pressure reducing stations. Recycled water use also reduces peaking demands at the REB Plant. This increases the availability of limited potable water storage capacity. All of these factors impact the capabilities and useful life of the potable system components.

EXISTING RECYCLED WATER SUPPLY AND CUSTOMERS

The District's current recycled water purchase agreement with the SEJPA runs through 2016 with a minimum contract purchase amount of 393 acre-foot per year under a "take-or-pay" agreement. Under this agreement, the SEJPA provides recycled water and operates and maintains the recycled water distribution system within the District, while District staff installs, reads, and maintains the water meters, and bills the recycled water customers on a monthly basis.

The SEJPA's San Elijo Water Reclamation Facility (SEWRF) currently provides the District's recycled water supply. The SEWRF also provides recycled water to the City of Del Mar and the San Dieguito Water District. Figure 9-1 presents the location of the SEWRF, and the components of the SEJPA distribution system currently delivering recycled water to the western portion of the District's service area. The recycled distribution system consists of pipelines ranging in size from 4-inch to 12-inch, a 0.65 million gallon reservoir at San Dieguito Park, and a 3,000 gpm pump station which supplies the park and surrounding golf courses.

Also shown on Figure 9-1 is the location of the District's existing recycled water customers. The District presently supplies recycled water to 14 customers through 43 recycled water meters. Table 9-1 details these customers and their recycled water use for fiscal years 2008. Table 9-2 displays historical recycled water use since service within the District began in 2000.

LEGEND

- Existing RW Reservoir
- Existing RW Pipeline
- Existing RW Customer

RW Service Area

- Eastern Service Area
- Western Service Area

ENCINITAS BL

N RANCHO SANTA FE RD

DEL DIOS HY

LA BAJADA

LA GRANADA

PASEO DELICIAS

LINEA DEL CIELO

I-5 SB

I-5 NB

LOMAS SANTA FE DR

N

0 1,500 3,000 6,000 Feet

DEXTER WILSON ENGINEERING, INC.

CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 9–1

RECYCLED WATER EXISTING SYSTEM AND SERVICE AREAS

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FUTURE RECYCLED WATER DEMANDS

Figure 9-2 shows the location of existing and potential recycled water customers throughout the District. These demands were identified in the 2005 Recycled Water Master Plan. As stated previously, the District's mission is to provide a reliable water supply at a reasonable cost. Due to the proximity of the SEWRF, and the size of existing customer demands, it was possible to implement the facilities needed to serve the existing recycled water costumers at a reasonable cost. To date, the benefits associated with extending the distribution system to serve large volume users in the eastern part of the service area did not justify the cost. In addition, the costs to serve relatively small volume users in the western portion of the service area were not reasonable. However, recent increases in the cost of potable water, coupled with the need to ease demand on imported water supplies, could enable practical expansion of the recycled water system. In addition, the potential availability of funding from outside sources may further improve the financial viability of recycled water projects. The following describes improvements required to serve recycled water customers throughout the service area. The recommended facilities are based upon the conceptual level design criteria presented in Chapter 2 of this AMMP.

EXISTING RECYCLED WATER SYSTEM CAPACITY

Utilizing the PBS&J InfoWater hydraulic model of the existing recycled water system, the capacity of the system was evaluated to determine whether or not the demands proposed in this chapter could be supplied. The analysis addressed the systems existing demands, including the City of Del Mar, and the proposed demands. In conversations with SEJPA staff, it is anticipated that the City of Del Mar will not increase its existing annual demand of approximately 75 ac-ft/yr.

The capacity evaluation assumed that all of the flow is coming from the San Dieguito Park reservoir site during peak hour demands. The model runs have shown that the piping system has the capacity to deliver the proposed demands. It will be necessary, however to utilize booster pumps in certain areas to deliver the design pressures to the users. For example, in the southwest corner of the District, the existing system can deliver 60 psi during maximum day demands up to an elevation of approximately 125 feet. In the case of parcels such as Map ID# 43, no portion of the property is below 125 feet, so the District would likely have to provide the pressure boost. In the case of parcels such as Map ID# 42, a portion of the site fronts a proposed recycled water line below 125 feet, but onsite boosting of pressure may be required by the customer. The District is currently evaluating the onsite improvements required for the proposed for the individual recycled water users.

LEGEND

- Existing RW Reservoir
- Existing Pump Station
- Proposed Pump Station
- Existing RW Pipeline
- Existing RW Customers
- Proposed RW Customers
- Boosted Zone
- Western Service Area

N

I-5 SB

I-5 NB

0 1,500 3,000 6,000 Feet

\\Pacificgis\s134001-8\AMMP\Fourth Submittal Figures\FIGURE_9-2.mxd

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2234 FARADAY AVENUE
CARLSBAD, CA 92008 (760) 438-4422

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 9–2

EXISTING AND POTENTIAL RECYCLED WATER USERS

WESTERN SERVICE AREA RECYCLED WATER SYSTEM IMPROVEMENTS

Figure 9-3 presents the existing and potential recycled water customers in the western service area, as well as new infrastructure required to serve each recycled water customer. Due to its proximity, it is assumed that recycled water supplies for the western service area would be served by the SEWRF.

Proposed recycled water system improvements in the western area can be categorized into four groupings as follows:

Group W1: Improvements needed to serve customers within close proximity to the existing distribution system with no new pumping requirements.

Group W2: Improvements needed to serve customers within close proximity to the existing distribution system requiring new pumping facilities.

Group W3: Improvements needed to extend the distribution system to serve customers in the south central portion of the western service area.

Group W4: Improvements needed to extend the distribution system to serve customers in the far western portions of the service area.

It is important to note that the group designation does not signify a hierarchy. The timing for the implementation of improvements will depend upon available funding and the ability to establish a reasonable cost per acre-foot to serve each grouping. Timing could also be impacted by the availability of outside funds to improve the implementation cost per acre-foot. It is apparent that the lowest cost per acre-foot would be associated with customers adjacent to the existing distribution system that do not require new pumping facilities (Group W1). Therefore, the infrastructure required to connect these users would be implemented first.

The following summarizes the improvements required to serve each grouping of recycled water customers.

TABLE 9-4 IMPROVEMENTS REQUIRED TO SERVE GROUP W1 RECYCLED WATER CUSTOMERS			
Project Name	**Project Description**	**Customers Served by Improvement**	**Approximate Cost to District, $**
Recycled Water - West Project 1	Meter Installations for Users (No District Piping Required)	23, 24,25, 26, 29	$13,957
Recycled Water - West Project 2	Extend SEJPA system for SD Park and Residences	21, 22	$535,950
Recycled Water - West Project 3	Piping for Solana Beach Towne Center	27	$86,444
Recycled Water - West Project 4	Piping for Santa Victoria School	28	$103,604
Total			**$739,954**

The Solana Beach Towne Center (APN 263-421-11) presently has piping onsite available for recycled water with a 1-inch meter. All that is required for conversion to recycled water is an onsite system shut-down. The 1-inch meter would be served by the existing recycled water line in Lomas Santa Fe Drive. The Solana Beach Presbyterian Church requires the installation of a meter and onsite piping.

Western Recycled Water Improvements – Group W2 Customers

Group W2 recycled water customers include the customers identified in Table 9-5. Table 9-6 summarizes the improvements and associated costs required to serve the Group W2 recycled water customers.

To supply the Group W2 customers in the SEJPA service area 7,900 feet of 8-inch pipe and a 750 gpm booster pump will be required.

EASTERN SERVICE AREA RECYCLED WATER SYSTEM IMPROVEMENTS

Figure 9-4 presents the potential recycled water customers in the eastern service area. In addition to being located at a relatively long distance from the SEWRF, the recycled water customers in the eastern portion of the service area are also at a much higher elevation. In order to provide the needed volume for these customers, the SEJPA has indicated that they need to construct operational storage facilities at the SEWRF site. It is highly probable that demineralization facilities would also need to be constructed at the SEWRF to reduce increasing total dissolved solids concentrations in the recycled water supply for SEJPA.

In addition to considering the SEJPA recycled water supply option, the District is evaluating an alternative recycled water supply option that includes the conveyance of secondary effluent from the Escondido outfall to new Title 22 treatment facilities in the vicinity of the REB Plant. The new Title 22 facilities may require demineralization, but would avoid pumping to eastern service area customers. Since the alternative recycled water supply study is ongoing, the following presents the improvements required to serve the eastern service area customers assuming the supply originates from the SEJPA. The findings of the AMMP may need to be amended depending upon the results of the ongoing study.

EASTERN SERVICE AREA IMPROVEMENTS – SEJPA SUPPLY OPTION

Figure 9-5 presents the improvements required to serve the eastern service area recycled water customers assuming the supply originates from the SEJPA. Proposed recycled water system improvements in the eastern service area have been separated into two groupings as follows:

> Group E1: Improvements needed to serve the Rancho Santa Fe Golf Course and customers in close proximity to the E1 facilities.
>
> Group E2: This is an extension of the Group E1 project to serve customers in the northeastern portion of the service area.

Unlike the western area groupings, the E1 project must occur prior to the Group E2 project.

Table 9-11 provides details about Rancho Santa Fe Golf Course and other Group E1 customers. Table 9-12 summarizes the improvements required to serve recycled water to the Group E1 customers.

LEGEND

- Existing RW Reservoir
- Group E1 RSFGC Reservoir
- Group E2 SFID Reservoir
- Existing Pump Station
- Group E1 Pump Station
- Group E2 Pump Station
- Proposed RW East Project 1
- Proposed RW East Project 2
- Group E1 Users
- Group E2 Users
- Boosted Zone
- Eastern Service Area
- Western Service Area

N

I-5 SB

I-5 NB

0 1,500 3,000 6,000 Feet

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CARLSBAD, CA 92008 (760) 438-4422

SFID ASSET MANAGEMENT MASTER PLAN

FIGURE 9-5

EASTERN SERVICE AREA
RECYCLED WATER
IMPROVEMENTS

\\Pacific\gis\134001-8\AMMP\Fourth Submittal Figures\FIGURE_9-5.mxd

assumes the District would own and operate the components of the distribution system serving the eastern service area. The Olivenhain Municipal Water District is also interested in joint use of this potential new recycled water pipeline. Should this option prove viable, there could be a potential to share the cost for the implementation of this portion of the system.

This evaluation assumes delivery of the water at a minimum pressure where the golf course would be responsible for the storage facilities and pumping required.

Table 9-13 provides details about Group E2 customers. Table 9-14 summarizes the improvements required to serve recycled water to the Group E2 customers.

To supply the Group E2 customers in the District service area 8,300 feet of 12-inch pipe, a 675,000 gallon reservoir, and a 2,100 gpm booster station will be required.

TABLE 9-13
GROUP E2 RECYCLED WATER SYSTEM CUSTOMERS

Map ID	User	APN	Est. RW Demand, ac-ft/yr
53	Private Residence	265-161-01 265-160-24 265-161-03	120.2
56	Private Residence	265-160-28 265-160-26	36.5
60	Private Residence	266-371-05	9.2
64	Private Residence	265-102-09	4.1
67	Private Residence	265-101-52	6.9
90	Private Residence	266-120-21	8.3
98	Private Residence	266-371-09	7.9
116	Private Residence	265-130-48	11.1
122	Private Residence	265-130-06	26.2
	Private Residence	265-150-06	
134	Private Residence	265-101-45	9.5
TOTAL GROUP E2 USERS			**397**

TABLE 9-14 IMPROVEMENTS REQUIRED TO SERVE GROUP E2 RECYCLED WATER CUSTOMERS			
Project Name	**Project Description**	**Customers Served by Improvement**	**Approximate Cost to District, $**
Recycled Water - East Project 2	Booster Station, Storage, and Piping north of RSF Golf Course	53, 56, 60, 64, 67, 90, 98, 116, 122, 134	$3,890,315
Total			**$3,890,315**

SUMMARY OF DEMANDS AND COSTS

Table 9-15 below summarizes the demands and costs associated with each of the recycled water user groups. Table 9-16 provides a summary of the recycled water projects.

TABLE 9-15 SUMMARY OF POTENTIAL RECYCLED WATER USERS AND COSTS		
Group	**Total Demand, ac-ft/yr**	**Total Cost, $**
W1	183.3	$739,954
W2	73.7	$2,070,640
W3	31.5	$1,435,019
W4	93.0	$1,537,250
E1	297.4	$2,226,767
E1	396.5	$3,890,315
TOTAL	**1,075.4**	**$11,899,945**

TABLE 9-16 RECYCLED WATER PROJECT SUMMARY	
Project Name	**Total Cost, $**
Recycled Water - West Project 1	13,957
Recycled Water - West Project 2	535,950
Recycled Water - West Project 3	86,444
Recycled Water - West Project 4	103,604
Recycled Water - West Project 5	2,070,640
Recycled Water - West Project 6	1,435,019
Recycled Water - West Project 7	42,900
Recycled Water - West Project 8	593,450
Recycled Water - West Project 9	900,900
Recycled Water - East Project 1	2,226,767
Recycled Water - East Project 2	3,890,315
TOTAL	**11,899,945**

CHAPTER 10

PROJECT PRIORITIZATION AND CAPITAL IMPROVEMENT PROGRAM

A key component of the AMMP is the establishment of a practical implementation program that effectively matches the practical ability to accumulate funds with the timely implementation of the most critical projects.

This chapter describes the process used to prioritize projects identified in the AMMP and presents the recommended "baseline" 10 year Capital Improvement Program. In addition, a 50 year expenditure forecast is provided to facilitate replacement fund planning.

Project Prioritization Process

In order to accommodate a wide range of near and long term potable and recycled water treatment and distribution system needs, the AMMP identified over 60 projects with a total capital cost of approximately $87,954,500 (2009 dollars). This total is for SFID capital costs only and does not include the San Dieguito Water District's (SDWD) share of joint facility capital costs. The recommended projects are listed by asset category in Table 10-1. Summary descriptions for each project are provided in Appendix A. Figure 10-1 provides a breakdown of capital cost by potable water distribution system, joint treatment facilities, recycled water distribution, and other assets (corporate yard and integrated technology improvements). In addition, the AMMP identified general asset replacement programs with a recommended replacement fund accumulation schedule. These general programs are listed in Table 10-2.

A project prioritization process was established to help define the relative importance of each project, and develop an implementation program that spreads the projects over a period of time that enables incremental accumulation of project funding.

TABLE 10-1
AMMP SFID CIP PROJECTS
(All Numbers in Thousands of Dollars)

Project #	Description	Total, $1,000
CIP - District		
	Distribution System	
	Valve Replacement	
J-703	Phase 1 Valve Replacement	933.8
J-902	Phase 2A Valve Replacement	448.3
J-902	Phase 2B Valve Replacement	614.5
N-1 Project	Phase 3 Valve Replacement	1,810.4
N-2 Project	Phase 4 Valve Replacement	3,915.7
N-3 Project	Phase 5 Valve Replacement	3,005.1
	Pressure Stations	
N-5 Project	PRS Project 1	1,251.3
N-6 Project	PRS Project 2	1,251.3
N-7 Project	PRS Project 3	1,251.3
N-8 Project	PRS Project 4	1,251.3
N-9 Project	PRS Project 5	1,001.0
N-10 Project	PRS Project 6	1,001.0
N-11 Project	PRS 7, Removal	475.2
	Pipeline Projects	
N-4 Project	Calle Mayor Interconnect Repair	284.6
N-13 Project	Fairbanks Ranch Redundancy	2,843.6
N-12 Project	Fireflow Enhancement Pipeline	514.8
N-14 Project	East of I-5 Replacement	3,699.7
N-15 Project	I-5 Crossing Redundancy	1,818.0
J-904	Via de Fortuna Pipeline	1,300.0
N-16 Project	Government Road Pipeline	1,450.0
N-17 Project	Lago Lindo Pipeline	2,800.0
N-18 Project	Marview, Canyon, Glencrest Pipeline	561.3
	Storage and Pumping	
J-602	Larrick PS - Pump 3/4 Install	235.5
	Subtotal Distribution System	***33,717.5***
	Other District Assets	
	Technical Programs	
J-805	Asset Management Plan	45.6
J-706	Integrated Technology Program	2,020.3
N-45 Project	Automatic Flowmeter Reading	2,660.5
	Buildings and Property	
J-704	Corporate Yard Phase 1	209.0
J-901	Corporate Yard Phase 2	409.0
N-20 Project	Corporate Yard, Phase 3	1,300.0
N-21 Project	Corporate Yard, Phase 4	700.0
N-22 Project	Corporate Yard, Phase 5	8,000.0
N-23 Project	Corporate Yard, Phase 6	5,500.0
	Subtotal Other District Assets	***20,844.4***
	Joint Facilities (SFID Share)	
	Technical Programs	
J-206	Integrated Technology Program	58.3
J-212	Asset Management Plan	34.9
N-30 Project	REB Plant Master Plan Update	151.3
	REB Plant Improvements	
J-301	Chemical Tank Improvement	309.1
N-24 Project	Hydroelectric Facility Upgrade	4,991.8
N-25 Project	Plant Electrical Improvements	589.9
N-26 Project	Solids Management Project	1,887.6
N-27 Project	Improved Disinfection	545.2
N-42 Project	Improved Local Water Aesthetics	1,966.3
N-29 Project	Utility Upgrade Project	286.3
N-46 Project	Sedimentation Basin Addition	1,573.0
N-28 Project	Relocate and Improve SDR Pump Station	2,359.5
N-33 Project	SDR Dam Seepage Recovery	882.6
	Pipeline Improvements	
J-208	Cathodic Protection	167.5
N-31 Project	15-inch REB Plant Drain Line	1,750.3
N-32 Project	Rehabilitation of 30" line b/w SDR & REB Plant	1,377.3
N-43 Project	Upgrade 18-inch HDPE to SD Reservoir	2,561.8
	Subtotal Joint Facilities	***21,492.6***
	Recycled Water	
N-34 Project	Recycled Water - West Project 1	14.0
N-35 Project	Recycled Water - West Project 2	535.9
N-36 Project	Recycled Water - West Project 3	86.4
N-37 Project	Recycled Water - West Project 4	103.6
N-38 Project	Recycled Water - West Project 5	2,070.6
N-47 Project	Recycled Water - West Project 6	1,435.0
N-48 Project	Recycled Water - West Project 7	42.9
N-49 Project	Recycled Water - West Project 8	593.5
N-50 Project	Recycled Water - West Project 9	900.9
N-39 Project	Recycled Water - East Project 1, SEJPA Option	2,226.8
N-40 Project	Recycled Water - East Project 2, SEJPA Option	3,890.3
	Subtotal Recycled Water	***11,899.9***
TOTAL ALL PROJECTS		**87,954.5**

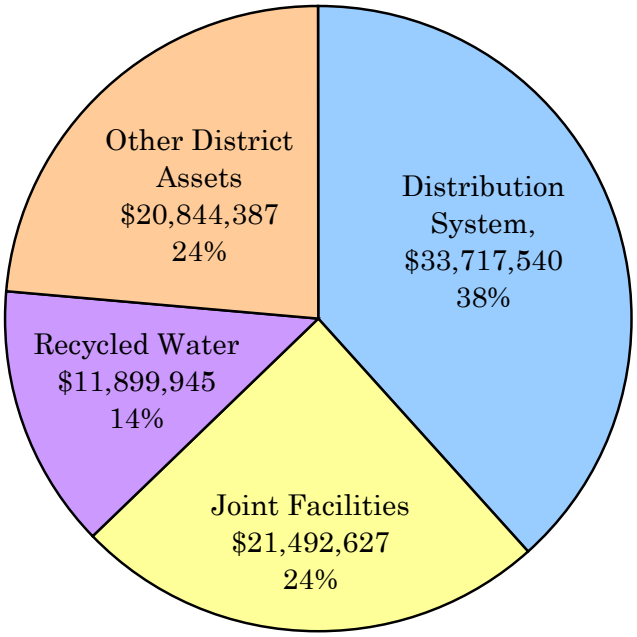

FIGURE 10-1. CIP Projects by Asset Category

TABLE 10-2
PROGRAMMATIC RESERVES

Description	Yearly Cost	Number of Years	Year Start
District Only			
Office Equipment	50.0	Ongoing	FY09
Vehicle/Equipment Replacement	111.0	Ongoing	FY09
Temporary Meters	2.0	Ongoing	FY09
Pipelines	1,215.2	Ongoing	FY23
Valves	478.7	Ongoing	FY26
Corporate Yard	400.0	Ongoing	--
Water Services	374.5	Ongoing	FY09
Orangeburg Lateral Pipeline	195.0	10	FY20
Larrick Reservoir	150.0	Ongoing	FY14
Hydrants	220.0	Ongoing	FY14
Meters	121.0	Ongoing	FY14
Larrick PS	15.0	Ongoing	FY14
Joint Facilities, SFID Share			
Office Equipment	10.0	Ongoing	FY09
Laboratory and Portable Equipment	75.0	Ongoing	FY09
Vehicle/Equipment Replacement	50.0	Ongoing	FY09
Pipelines	296.7	Ongoing	FY13
Meters	118.0	Ongoing	FY13
REB Plant	605.0	Ongoing	FY26
Cielo Pump Station	45.9	Ongoing	FY13
SDR Pump Station	47.0	Ongoing	--
SDR Reservoir and Dam	86.0	Ongoing	FY32
TOTAL	**3,735.3**		

The project prioritization process included the following steps:

- Evaluation categories (described in Table 10-3) were developed that reflect attributes that are critical to overall system performance.
- The evaluation categories were weighted in order to establish the relative importance of each category to overall system performance.
- Priority rating factors were developed that reflect a project's anticipated impact on each evaluation category.
- Each project was scored by multiplying the project's priority rating factor by the evaluation category weighting for each category.

Evaluation categories, category weightings, and priority rating factors were developed collaboratively by managers representing all SFID departments, the District's General Manager, and the District's Consultant. This information was also presented to the Water Resources Committee for review and concurrence.

TABLE 10-3
EVALUATION CATEGORIES

Weight	Category	Description
10	Regulatory compliance and/or flow-pressure objectives for public health and safety (including fire)	This category was used to assess the relative impact a project has on the District's ability to comply with mandatory regulations and/or performance criteria established to protect health and safety. This category includes water treatment quality objectives as well as flow and pressure objectives for the distribution system.
10	Staff safety & working environment	This category was used to assess the improvement in safety and working environment for SFID personnel if the project is implemented.
9	Reliability – remaining useful life/ condition/accessibility	This category relates to the replacement or rehabilitation of existing assets. There must be a high level of confidence that facilities will operate, as intended, when called upon. Reliability concerns could stem from asset age, condition, or the ability to access the asset to determine its status or facilitate repair or maintenance. This evaluation category is used to assess the improvement in reliability if the project were implemented. Note that it is assumed that the critical nature of the asset is captured within the intent of other evaluation categories (such as a projects impact on regulatory and staff health and safety impacts).
8	Redundancy – distribution system or treatment	Redundant components for both the distribution and treatment systems are important to minimize service interruption and relieve the burden on customers during planned and unexpected system shutdowns.

TABLE 10-3
EVALUATION CATEGORIES

Weight	Category	Description
8	Operation & Maintenance (O&M) cost efficiency	This category assesses the impact of the cost effectiveness realized through reduction in labor, energy, chemicals, or other operation and maintenance cost elements. Projects with a relatively short payback period would be considered as cost effective and would receive a higher rating.
7	Increased local water usage	Local water offers the lowest cost supply. In addition, it lessens our reliance on imported water. This category assesses a projects impact on our ability to increase the volume of local water use (relative to current usage values).
7	Water quality enhancement (taste & odor)	In addition to providing water that meets regulatory standards for public health and safety, the aesthetic attributes of the water needs to meet the satisfaction of customer. This category considers a project's potential impact on reduction of taste and odor complaints that periodically arise due to a variety of conditions.
6	Enhanced operational control	Ideally, treatment and distribution systems provide the features needed to enable operational flexibility, and the ability to adjust and optimize system performance. This category considers a project's impact on operational flexibility and control.
6	Expansion of water supply portfolio	One of the District's strategic objectives is to assure a diverse supply of quality water. The purpose is to reduce reliance on imported water. This category is used to assess a project's impact on expanding the District's water supply portfolio.
5	Availability of outside funding	In order to stimulate the implementation of certain types of projects, outside entities may contribute to project funding. Project funding is often limited to certain time-frames depending upon the drivers that cause the monies to be available (drought, etc.). This category considers the fact that the viability of certain projects may depend upon the availability and timing of outside funding.

The project's potential impact on reduced operation and maintenance cost was considered in the prioritization score. The ability to fund the capital project was included in the development of the capital improvement program described later in this Chapter.

Table 10-4 provides an example calculation spreadsheet. The spreadsheet summarizes the prioritization factor weighting descriptions as they relate to each weighted evaluation criteria. A workshop was held with District staff and the consultant to establish a prioritization score for each project. The results of the scoring for each project are presented in Appendix L. The prioritization scoring approach provides a general indication of relative importance of a project and a method for stimulating discussion about the impact and need for various projects. A

TABLE 10-4
PRIORITIZATION RATING FACTOR DESCRIPTIONS AND EXAMPLE

Capital Improvement Project Evaluation Categories and Weights		Prioritization Rating Factors and Definitions				J-902 Phase 2B Valve Replacement	
Evaluation Criteria	Category Weight	Prioritization Rating Factor 3	Prioritization Rating Factor 2	Prioritization Rating Factor 1	Prioritization Rating Factor 0	PRF	Score
Regulatory compliance and/or flow-pressure objectives	10	Project is critical to achieving compliance, or is a prerequisite project to a project critical to achieving compliance.	Project will moderately improve ability to achieve compliance.	Project may have a low level of impact on the ability to achieve compliance.	Project has no impact on ability to achieve compliance.	1	10
Staff safety and working environment	10	Project could significantly reduce the risk of an accident, or would improve the work environment to the point where the protection of the employee's health would be significantly improved.	Project could have a moderate impact on the reduction accident risk or moderate improvement of the work environment.	Project may have a low level of impact on the ability to reduce accidents or improve the work environment.	Project has no impact on ability to improve staff safety and work environment.	3	30
Reliability - remaining useful life, condition, accessibility	9	Project would substantially improve reliability of a currently unreliable asset.	Project would improve the reliability of a moderately reliable asset, or the project would enable better access to the existing asset to facilitate regular monitoring and/or maintenance.	Project may further improve the reliability of an asset that is currently considered reliable.	Project has no impact on improving the reliability of an existing asset.	3	27
Redundancy - distribution system or treatment	8	Project provides redundant improvements that are critical to the distribution or treatment of water should the primary system component fail to operate. Effected system users would be unreasonably burdened by the loss of the primary system component.	Project provides redundant system improvements that may not be critical to the distribution or treatment of water but would reduce a potentially unreasonable burden on the effected system users.	Project provides redundant system improvements that would reduce the impact on system users. However, the impact to users could most probably be reasonable.	Project has no impact on redundancy.	0	0
O&M Cost Efficiency	8	Provides significant O&M savings.	Provides moderate O&M savings.	Project may result in a low level of O&M savings.	Project will provide no O&M savings.	1	8
Increased local water usage	7	Project substantially improves our ability to increase local water use.	Project moderately improves our ability to increase local water use.	Project may have a lower level impact on our ability to increase local water use.	Project has no impact on local water usage.	0	0
Water quality enhancement (Taste and Odor)	7	Project would substantially improve product water aesthetics and significantly reduce taste and odor complaints.	Project would result in moderate aesthetic improvements and potentially reduce certain taste and odor complaints.	Project may have a limited impact on product water aesthetics and a relatively low impact on taste and odor complaints.	Project has no impact on water quality aesthetics.	0	0
Enhanced operational control	6	Project substantially increases system flexibility and/or operational control.	Project moderately increases system flexibility and/or operational control.	Project may result in some increase in system flexibility and/or operational control.	Project has no impact on system flexibility and/or operational control.	3	18
Expansion of water supply portfolio	6	Project would result in a significant increase in alternative water supply.	Project would result in a moderate increase in alternative water supply.	Project may have an impact on the development of new water supplies in the future.	Project has no impact on the development of new water supplies.	0	0
Availability of outside funding support	5	Project can be fully funded by outside grant funding, and the grant funding has reasonable terms and conditions.	Project can be at least 50% funded by outside grant funding, and the grant funding has reasonable terms and conditions.	Low interest loans can be obtained for the project, and the loans have reasonable terms and conditions.	Project has no potential for outside funding.	0	0
TOTAL SCORE						*93*	

slightly higher priority score does not indicate that one project must take precedence over another. *Though the prioritization scoring was as an important factor in the determination of relative project importance, some subjectivity was required in the interpretation of data and the establishment of the implementation plan presented later in this chapter.*

BASELINE 10 YEAR CAPITAL IMPROVEMENT PROGRAM

Based upon workshops held with District Staff, the Water Resources Committee, and the Consultant, a baseline 10 year Capital Improvement Program (CIP) was established that achieves the following key objectives:

- Projects that are critical to system performance must be implemented in a timely manner.
- Implementation of the CIP shall enable "Pay-As-You-Go" funding.
- Available reserve funds shall be effectively utilized to expedite the implementation of critical near-term projects.
- CIP implementation should be accelerated over the next 3 years to realize the value of the current construction market.
- Outside funding support (grants) shall be aggressively pursued to accelerate the implementation of alternative water supply projects.

Based upon the District's current rate structure, the District is capable of accumulating approximately $3.8 million per year to be earmarked for capital improvements. In addition, the District currently holds approximately $17 million in a capital reserve fund. In order to establish a baseline Pay-As-You-Go funding limitation, it was assumed that the funding available to support CIP activities would be equivalent to the $3.8 million realized annually, plus any funds utilized from the reserve fund.

Figure 10-2 presents the baseline 10 year CIP. The baseline CIP balances the priority and timing of each project with the anticipated availability of income (at current rates) and reserve funds. The approach will enable pay-as-you-go funding. In order to achieve this objective, implementation of certain projects that are not essential to the reliable delivery of potable water were assumed to be delayed for several years unless outside funding support becomes available. Figure 10-3 presents the breakdown of expenditures per asset category per year. The following provides highlights of the baseline 10 year CIP.

FIGURE 10-2
SFID BASELINE 10 YEAR CAPITAL IMPROVEMENT PROJECT PROGRAM

All Numbers in Thousands of Dollars

Project #	Description	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	TOTAL
CIP - District													
	Distribution System												
	Valve Replacement												
	Phase 1 Valve Replacement	933.8	-	-	-	-	-	-	-	-	-	-	933.8
J-902	Phase 2A Valve Replacement	448.3	-	-	-	-	-	-	-	-	-	-	448.3
J-902	Phase 2B Valve Replacement	80.0	534.5	-	-	-	-	-	-	-	-	-	614.5
N-1 Project	Phase 3 Valve Replacement	-	1,810.4	-	-	-	-	-	-	-	-	-	1,810.4
N-2 Project	Phase 4 Valve Replacement	-	-	-	-	-	1,957.8	1,957.8	-	-	-	-	3,915.7
N-3 Project	Phase 5 Valve Replacement	-	-	-	-	-	-	-	-	1,502.6	1,502.6	-	3,005.1
	Pressure Stations												
N-5 Project	PRS Project 1	140.0	1,111.3	-	-	-	-	-	-	-	-	-	1,251.3
N-6 Project	PRS Project 2	-	1,251.3		-	-	-	-	-	-	-	-	1,251.3
N-7 Project	PRS Project 3	-	-	1,251.3		-	-	-	-	-	-	-	1,251.3
N-8 Project	PRS Project 4	-	-	-	1,251.3		-	-	-	-	-	-	1,251.3
N-9 Project	PRS Project 5	-	-	-	-	1,001.0	-	-	-	-	-	-	1,001.0
N-10 Project	PRS Project 6	-	-	-	-	-	1,001.0	-	-	-	-	-	1,001.0
N-11 Project	PRS 7, Removal	-	-	-	-	-	-	475.2	-	-	-	-	475.2
	Pipeline Projects												
N-4 Project	Calle Mayor Interconnect Repair	284.6	-	-	-	-	-	-	-	-	-	-	284.6
N-13 Project	Fairbanks Ranch Redundancy	-	-	-	-	-	-	-	-	-	350.0	2,493.6	2,843.6
N-12 Project	Fireflow Enhancement Pipeline	-	514.8	-	-	-	-	-	-	-	-	-	514.8
N-14 Project	East of I-5 Replacement	-	-	400.0	3,299.7	-	-	-	-	-	-	-	3,699.7
N-15 Project	I-5 Crossing Redundancy	-	-	-	-	1,818.0	-	-	-	-	-	-	1,818.0
J-904	Via de Fortuna Pipeline	1,300.0	-	-	-	-	-	-	-	-	-	-	1,300.0
N-16 Project	Government Road Pipeline	-	-	-	-	-	-	-	-	1,450.0	-	-	1,450.0
N-17 Project	Lago Lindo Pipeline	-	-	-	-	-	-	-	2,800.0	-	-	-	2,800.0
N-18 Project	Marview, Canyon, Glencrest Pipeline	-	561.3	-	-	-	-	-	-	-	-	-	561.3
	Storage and Pumping												
J-602	Larrick PS - Pump 3/4 Install	235.5	-	-	-	-	-	-	-	-	-	-	235.5
	Subtotal Distribution System	***3,422.2***	***5,783.6***	***1,651.3***	***4,550.9***	***2,819.0***	***2,958.8***	***2,433.0***	***2,800.0***	***2,952.6***	***1,852.6***	***2,493.6***	***33,717.5***
	Other District Assets												
	Technical Programs												
J-805	Asset Management Plan	45.6	-	-	-	-	-	-	-	-	-	-	45.6
J-706	Integrated Technology Program	130.0	460.0	585.0	585.0	150.0	110.0	-	-	-	-	-	2,020.0
	Automatic Flow Meter Project	-	-	-	-	-	1,330.2	1,330.2	-	-	-	-	2,660.5
	Buildings and Property												
	Corporate Yard Phase 1	209.0	-	-	-	-	-	-	-	-	-	-	209.0
J-901	Corporate Yard Phase 2	409.0	-	-	-	-	-	-	-	-	-	-	409.0
N-20 Project	Corporate Yard, Phase 3	-	150	150	-	-	1,000.0	-	-	-	-	-	1,300.0
N-21 Project	Corporate Yard, Phase 4	-	-	-	-	-	-	-	-	-	-	-	-
N-22 Project	Corporate Yard, Phase 5	-	-	-	-	-	-	-	-	-	-	-	-
N-23 Project	Corporate Yard, Phase 6	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Other District Assets	***748.0***	***610.0***	***735.0***	***585.0***	***150.0***	***2,440.2***	***1,330.2***	***-***	***-***	***-***	***-***	***6,644.1***
	Joint Facilities (SFID Share)												
	Technical Programs												
J-206	Integrated Technology Program	58.3	-	-	-	-	-	-	-	-	-	-	58.3
J-212	Asset Management Plan	34.9	-	-	-	-	-	-	-	-	-	-	34.9
N-30 Project	REB Plant Master Plan Update	-	-	151.3	-	-	-	-	-	-	-	-	151.3
	REB Plant Improvements												
J-301	Chemical Tank Improvement	309.1	-	-	-	-	-	-	-	-	-	-	309.1
N-24 Project	Hydroelectric Facility Upgrade	-	-	-	-	-	-	-	-	-	-		-
N-25 Project	Plant Electrical Improvements	-	-	589.9	-	-	-	-	-	-	-	-	589.9
N-26 Project	Solids Management Project	-	-	-	-	943.8	943.8	-	-	-	-	-	1,887.6
N-27 Project	Improved Disinfection	-	545.2	-	-	-	-	-	-	-	-	-	545.2
N-42 Project	Improved Local Water Aesthetics	-	-	-	-	-	-	-	-	983.1	983.1	-	1,966.3
N-29 Project	Utility Upgrade Project	-	286.3	-	-	-	-	-	-	-	-	-	286.3
N-46 Project	Sedimentation Basin Addition	-	-	-	-	-	-	-	-	-	-	-	-
N-28 Project	Relocate and Improve SDR Pump Statio	-	-	1,179.8	1,179.8	-	-	-	-	-	-	-	2,359.5
N-33 Project	*SDR Dam Seepage Recovery*	30.0	-	852.6	-	-	-	-	-	-	-	-	882.6
	Pipeline Improvements												
J-208	Cathodic Protection	167.5	-	-	-	-	-	-	-	-	-	-	167.5
N-31 Project	15-inch REB Plant Drain Line	-	-	-	-	-	-	1,750.3	-	-	-	-	1,750.3
N-32 Project	Rehabilitation of 30" line b/w SDR & REE	-	-	-	-	-	-	-	1,377.3	-	-	-	1,377.3
N-43 Project	Upgrade 18-inch HDPE to SD Reservoir	-	-	-	-	-	-	-	-	-	-	2,561.8	2,561.8
	Subtotal Joint Facilities	***599.8***	***831.5***	***2,773.5***	***1,179.8***	***943.8***	***943.8***	***1,750.3***	***1,377.3***	***983.1***	***983.1***	***2,561.8***	***14,927.8***
	Recycled Water												
N-34 Project	Recycled Water - West Project 1	-	14.0	-	-	-	-	-	-	-	-	-	14.0
N-35 Project	Recycled Water - West Project 2	-	535.9	-	-	-	-	-	-	-	-	-	535.9
N-36 Project	Recycled Water - West Project 3	-	-	-	-	-	-	-	-	-	-	-	-
N-37 Project	Recycled Water - West Project 4	-	-	-	-	-	-	-	-	-	-	-	-
N-38 Project	Recycled Water - West Project 5	-	-	-	-	-	-	-	-	-	-	-	-
N-47 Project	Recycled Water - West Project 6	-	-	-	-	-	-	-	-	-	-	-	-
N-48 Project	Recycled Water - West Project 7	-	-	-	-	-	-	-	-	-	-	-	-
N-49 Project	Recycled Water - West Project 8	-	-	-	-	-	-	-	-	-	-	-	-
N-50 Project	Recycled Water - West Project 9	-	-	-	-	-	-	-	-	-	-	-	-
N-39 Project	Recycled Water - East Project 1, SEJPA	-	-	-	-	-	-	-	-	-	-	-	-
N-40 Project	Recycled Water - East Project 2, SEJPA	-	-	-	-	-	-	-	-	-			
	Subtotal Recycled Water	***-***	***549.9***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***549.9***
TOTAL ALL PROJECTS		***4,770.0***	***7,775.0***	***5,159.7***	***6,315.7***	***3,912.8***	***6,342.9***	***5,513.5***	***4,177.3***	***3,935.7***	***2,835.7***	***5,055.3***	***55,839.3***
	Capital Acquisition	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	380.0	4,180.0
TOTAL ALL PROJECTS AND ACQUISITIONS		***5,150.0***	***8,155.0***	***5,539.7***	***6,695.7***	***4,292.8***	***6,722.9***	***5,893.5***	***4,557.3***	***4,315.7***	***3,215.7***	***5,435.3***	***60,019.3***
Reserve Fund Balance ($17,000 at FY08 end)		***15,650.0***	***11,295.0***	***9,555.3***	***6,659.6***	***6,166.7***	***3,243.9***	***1,150.3***	***393.0***	***(122.7)***	***461.6***	***(1,173.7)***	
Running 5-year total of projects and acquisitions		*29,833.3*	*31,406.1*	*29,144.7*	*28,162.2*	*25,782.2*	*24,705.1*	*23,417.6*	-	-	-	-	
40 % of 5-year		*11,933.3*	*12,562.5*	*11,657.9*	*11,264.9*	*10,312.9*	*9,882.0*	*9,367.0*	-	-	-	-	

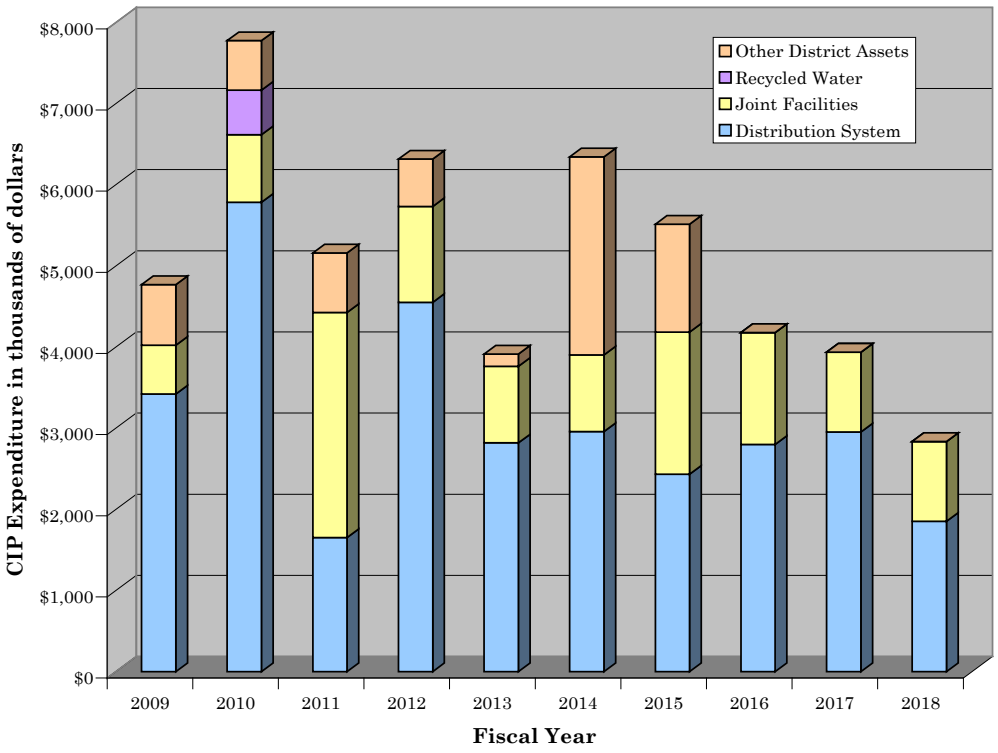

FIGURE 10-3. Baseline CIP Expenditure Breakdown

Distribution System

Pressure reducing stations and valve replacement projects. The prioritization process confirmed that upgrading the pressure reducing stations is a top distribution system priority. The pressure reducing stations are the primary point of control for the system. In addition, the stations protect downstream piping and appurtenances from failure due to excess pressure. Several of the existing stations are also difficult to maintain due to their constrained configuration and/or location. Therefore, it is recommended that all pressure reducing stations be upgraded within the next five fiscal years. The pressure reducing stations have been phased based upon their relative level of criticality. In addition, there are abandoned pressure reducing stations that should be removed. The proposed CIP prioritizes the expenditures for their removal following installation of the new/rehabilitated pressure reducing stations.

Before the pressure reducing station projects can occur, currently inoperable valves must be replaced to enable isolation of the pressure reducing stations. The Phase 2B valve replacement project must be completed prior to the Phase 1 pressure reducing station project. Completion of the Phase 3 valve replacement project will enable isolation of the remaining pressure reducing

stations and will also replace any failed isolation valves along the backbone distribution system. The project cost assumes 25% of these valves are failed and need to be replaced. This assumption will be confirmed through field activities planned by the District prior to design of the Phase 3 Valve project.

Though the baseline 10 year CIP shows the pressure reducing station and valve replacement projects as separate projects for planning purposes, there are multiple advantages to combining certain valve and reducing station projects. For example, the Phase 2B valve replacement and Phase 1 pressure reducing station project could be combined. Another logical combination is the Phase 3 valve replacement and Phase 2 pressure reducing station project. The pre-design stage of these projects will confirm whether the pressure reducing stations, and thus the isolation valves, should be rebuilt in their existing location or would be better served installed elsewhere.

The remaining valve replacement projects involve the replacement of isolation valves throughout the system. Over the next few years, the valve exercising activities conducted by District maintenance staff will determine the extent of failed valves throughout the District. The Phase 4 and 5 valve replacement projects assume that 25% of the valves are not operable. This assumption will be modified as new information becomes available. These phases were projected to be initiated in the FY2014 of the 10 year CIP.

Pipelines. The ability to provide a redundant source of water to the Fairbanks Ranch area is a high priority. Implementation of the Calle Mayor interconnection repair project will enable delivery of a redundant source of water from the Olivenhain Municipal Water District's distribution system. This connection would only be used in the case of emergency or planned system shut downs. Implementation of this interconnect project would enable the delay of the more costly Fairbanks Ranch Redundancy Project until the end of the baseline 10 year CIP planning period. The East of I-5 redundancy project was also considered a critical project and is scheduled to be initiated in the third year of the program. The East of I-5 project satisfies both redundancy and capacity issues.

System modeling conducted as part of the AMMP identified pipeline improvements that enhance fire flow capabilities in various locations. In order to achieve a consistent fire flow standard throughout the service area, these improvements were considered to be a high priority and included in year FY2010. System modeling also identified the need to upsize the existing Marine Lane and Canyon Drive pipelines in order to consistently achieve normal operating pressure objectives. This was also considered a high priority project and included in year FY2010. In order to create a larger pipeline project, combining this project with the fireflow enhancement project is practical option.

Regarding other pipeline projects, the baseline 10-year CIP includes the I-5 redundancy crossing beginning in the FY2013 of the program. Due to funding limitations and priority considerations, all other pipeline projects were delayed until the later years of the planning period. This includes all pipeline projects planned to be relocated from difficult to access areas.

Storage and pumping. Following the completion of on-going improvements to the Larrick Pump Station, it is assumed that no new improvements will be required in the 10 year planning period. Replacement planning funds should consider the remaining useful life of existing pumping equipment as described later in this chapter.

Joint Facilities

Water treatment. Projects required to achieve regulatory compliance, or employee health and safety requirements, were considered to be the highest priority. Therefore, the REB chemical tank replacement project and the REB improved disinfection projects are schedule to be initiated in FY2009 and FY2010, respectively. The utility upgrade project and electrical efficiency projects are scheduled to be initiated early in the planning period.

The District recently received approval of matching funds from the SDCWA to study the extraction of groundwater that may be present due to seepage from the San Dieguito reservoir. Assuming the study will identify a cost effective source of new supply, the costs to design and construct the extraction facilities is included in the year FY2011 of the program. The cost for the study is included in FY2009.

Relocation of the San Dieguito Pump Station is planned to be initiated in year FY2011 of the program. This is primarily due to the age and condition of the existing facilities and the critical nature of this pump station. Improvements to solids handling facilities are also planned to be initiated in year FY2011.

Other projects related to enhancement of aesthetic qualities (taste and odor), or the ability to utilize more local water, were delayed until the later years in the planning period. The decision to delay these projects is based upon the assumption that the SDCWA's Emergency Storage Program (ESP) will result in improved water quality, and the desire to delay expenditure of limited funds until the actual impacts of the ESP are better defined. Unknowns associated with the ESP are also why the cost of potential demineralization facilities was not included in the baseline 10 year CIP.

Joint facility pipelines. Joint facility pipeline projects would not be initiated until years FY2015 and FY2016 the proposed CIP. These include the 15-inch drain line replacement project and the 30-inch Lake Hodges source water feed line rehabilitation.

Recycled Water

Western service area. For the purpose of developing the baseline 10 year CIP projects and cost, it was assumed that new recycled water projects in the western portion of the service area will be District owned capital projects. It is probable that extensions to the existing distribution system in the western service area would be implemented by the San Elijo Joint Powers Authority (SEJPA), and the costs would become part of the District's rate structure for recycled water. An updated agreement between the District and SEJPA would need to be developed in order to define the preferred implementation approach.

The initiation of the first two recycled water projects in the western portion of the service area is included in year FY2010 of the planning period. These projects will serve customers in relatively close proximity to the existing recycled water distribution system. Project costs do not include the cost for on-site customer improvements. Other efforts are ongoing to define the required improvement and identify funding support for on-site improvements.

Eastern service area. Projects considered essential to provide potable water service received first consideration for available funding. Due to the limit of available funds, only the first three western service area recycled water projects can be funded in the 10 year CIP. All other western and eastern area recycled water projects are not included in the 10 year CIP. Outside funding support (grants) shall be aggressively pursued to enable implementation of the remaining recycled water supply projects. Studies are being conducted to confirm the best recycled water supply and delivery approach to the eastern service area. The information included in these studies should aid in the development of future funding applications.

Other District Assets

Corporate yard. Phase 1 of the Corporate Yard Improvement Program included the installation of modular offices. Phase 2, to be complete in early 2009, will include the demolition of various structures. Phase 3 of the Corporate Yard Improvement Program will

complete the building of a warehouse and processing of a new major use permit. Phases 1 though 3 were assumed to be completed within the 10 year CIP. Due to funding limitations, the remaining Phases, including the construction of a new maintenance and administration building, have been delayed beyond the 10 year planning period.

Integrated technology program implementation. The 10 year CIP assumes staged implementation of the integrated technology program between years 2010 and 2014 of the planning period. Specific integrated technology project scopes and associated costs are currently being developed by District staff.

Capital Acquisition Budget

The baseline CIP also includes a capital acquisition budget of $380,000 per year based upon prior District financial planning assumptions.

ASSET VALUATION

Table 10-5 provides an estimate of the value of the District's current assets. This table does not include property assets. As shown, the value of the District's current assets exceeds $288 million.

TABLE 10-5
SFID ASSET VALUATION SUMMARY

Asset	Count or Length in feet	Total Value
SFID Assets		
Larrick Reservoir	--	$ 7,500,000
Larrick Pump Station	--	$ 750,000
Pipelines	866,866	$ 121,521,231
Valves	2,855	$ 23,936,250
Pressure Reducing Stations	38	$ 6,650,000
Fire Hydrants	2,200	$ 11,000,000
Water Services	7,130	$ 18,726,750
Water Meters	7,130	$ 2,949,225
Corporate Yard	--	$ 20,000,000
Subtotal		*$ 213,033,456*
Joint Facility Assets, SFID Share		
Cielo Pump Station	--	$ 2,293,200
SDR Dam	--	$ 8,599,500
SDR Pump Station	--	$ 2,365,000
REB Hydro Plant	--	$ 1,650,000
REB Plant	--	$ 30,250,000
Pipelines	86,169	$ 29,668,061
Meters	4	$ 550,000
Subtotal		*$ 75,375,761*
TOTAL SFID ASSET VALUE		***$ 288,409,217***

Table 10-6 breaks down the total replacement costs and annual capital replacement costs for District assets. The count of water services and water meters was received from the District whereas the pipeline and valve count was generated from the GIS database. Table 10-7 breaks down the replacement and annual capital replacement costs of the District's Joint Facilities. This information was received from the District.

TABLE 10-6
SFID ASSET VALUATION FOR CAPITAL REPLACEMENT AND IMPROVEMENT

Asset	Count	Feet	Cost/Foot or Cost/Unit	Useful Life, years	Total Cost	Annual Capital Replacement, $1,000
Valves						
24"	29		$ 34,500	50	$1,000,500	
20"	5		$ 24,000	50	$120,000	
18"	7		$ 21,000	50	$147,000	
16"	39		$ 16,500	50	$643,500	
14"	6		$ 16,500	50	$99,000	
12"	91		$ 12,750	50	$1,160,250	
10"	215		$ 10,500	50	$2,257,500	
8"	829		$ 10,500	50	$8,704,500	
6"	1,566		$ 6,000	50	$9,396,000	
4"	57		$ 6,000	50	$342,000	
3"	6		$ 6,000	50	$36,000	
2"	5		$ 6,000	50	$30,000	
Total Valves	**2,855**			**50**	**$23,936,250**	**$479**
Corporate Yard	**1**		**$20,000,000**	**50**	**$20,000,000**	**$400**
Larrick Reservoir	**1**		**$7,500,000**	**50**	**$7,500,000**	**$150**
Pressure Stations	**38**		**$175,000**	**50**	**$6,650,000**	**$133**
Fire Hydrants	**2,200**		**$5,000**	**50**	**$11,000,000**	**$220**
Water Services						
Water Service 1"	5,814	82	$ 2,250	50	$13,081,500	
Water Service 1.5"	946	13	$ 3,750	50	$3,547,500	
Water Service 2"	335	5	$ 5,250	50	$1,758,750	
Water Service 3"	12	0	$ 9,000	50	$108,000	
Water Service 4"	12	0	$ 9,000	50	$108,000	
Water Service 6"	8	0	$ 10,500	50	$84,000	
Water Service 8"	2		$ 12,000	50	$24,000	
Water Service 10"	1		$ 15,000	50	$15,000	
Total Water Services	**7,130**				**$18,726,750**	**$375**
Water Meters						
Water Meter 3/4"	3,645		$ 180	25	$656,100	
Water Meter 1"	2,169		$ 450	25	$976,050	
Water Meter 1.5"	946		$ 818	25	$773,355	
Water Meter 2"	335		$ 1,170	25	$391,950	
Water Meter 3"	12		$ 1,980	25	$23,760	
Water Meter 4"	12		$ 3,090	25	$37,080	
Water Meter 6"	8		$ 7,830	25	$62,640	
Water Meter 8"	2		$ 8,430	25	$16,860	
Water Meter 10"	1		$ 11,430	25	$11,430	
Total Water Meter	**7,130**				**$2,949,225**	**$118**
Temporary Meter	**25**		**$3,015**	**25**	**$75,375**	**$3**
Larrick Pump Station	**1**		**$750,000**	**50**	**$750,000**	**$15**
Pipelines						
30"		1,131	$ 336	100	$380,016	

TABLE 10-6
SFID ASSET VALUATION FOR CAPITAL REPLACEMENT AND IMPROVEMENT

Asset	Count	Feet	Cost/Foot or Cost/Unit	Useful Life, years	Total Cost	Annual Capital Replacement, $1,000
27"		6,727	$ 336	100	$2,260,272	
24"		28,728	$ 336	100	$9,652,608	
20"		31,225	$ 288	100	$8,992,800	
18"		6,126	$ 240	100	$1,470,240	
16"		28,356	$ 210	100	$5,954,760	
14"		9,116	$ 150	100	$1,367,400	
12"		52,553	$ 135	100	$7,094,655	
10"		113,459	$ 120	100	$13,615,080	
8"		589,445	$ 120	100	$70,733,400	
Total Pipelines		**866,866**		**100**	**$121,521,231**	**$1,215**

TABLE 10-7
JOINT FACILITIES ASSET VALUATION FOR CAPITAL REPLACEMENT AND IMPROVEMENT

Asset	Count	Feet	Cost/Foot or Cost/Unit	Useful Life, years	Total Cost	SFID Share	SFID Share Cost	Annual Capital Replacement, $1,000
Pipelines								
54" CML&C		19,424	$825	100	$16,024,800	61.00%	$9,775,128	
42" CML&C		91	$713	100	$64,838	61.00%	$39,551	
36" CML&C		37,615	$600	100	$22,569,000	57.33%	$12,938,808	
30" CML&C		13,055	$525	100	$6,853,875	57.33%	$3,929,327	
24" C-905		105	$450	100	$47,250	61.00%	$28,823	
18" HDPE		9,300	$300	100	$2,790,000	57.33%	$1,599,507	
15" Backwash pipeline		6,579	$375	100	$2,467,125	55.00%	$1,356,919	
Total Pipelines		**86,169**		**100**	**$33,877,925**		**$29,668,061**	**$ 297**
Meters								
2- 30" Venturi Meter	2		$300,000	50	$400,000	100.00%	$400,000	
1- 10" Venturi Meter	1		$37,500	50	$25,000	100.00%	$25,000	
1- 24" Venturi Meter	1		$187,500	50	$125,000	100.00%	$125,000	
Total Meters	**4**			**50**	**$550,000**		**$550,000**	**$ 11**
REB Plant	**1**			**50**	**$55,000,000**	**55.00%**	**$30,250,000**	**$ 605**
REB Hydro Plant	**1**			**50**	**$3,000,000**	**55.00%**	**$1,650,000**	**$ 33**
Cielo Pump Station	**1**			**50**	**$4,000,000**	**57.33%**	**$2,293,200**	**$ 46**
SDR Pump Station	**1**			**50**	**$4,300,000**	**55.00%**	**$2,365,000**	**$ 47**
SDR Dam	**1**			**100**	**$15,000,000**	**57.33%**	**$8,599,500**	**$ 86**

50 YEAR EXPENDITURE FORECAST

The baseline 10 year CIP identifies projects required to meet a variety of system needs for the next 10 years. This includes projects with near term integrity and/or end of useful life concerns. Considering the age of the District's existing infrastructure, planning for significant replacement costs beyond the 10 year CIP horizon is essential.

A conceptual level 50 year expenditure forecast was prepared to provide a general awareness of replacement cost requirements beyond the 10 year CIP planning window. Table 10-8 presents the forecast. The 50 year expenditure forecast was originally developed by the District in 2007. The updated forecast includes the baseline 10 year CIP and provides a modified forecast of expenditures for the remaining 40 years.

The asset valuation table presented earlier in this Chapter was used to estimate the amount of money that should be reserved or spent on various assets each year following the initial 10 year CIP planning period. For some assets, such as pump stations, it is likely that the majority of the total replacement cost will occur in one or two projects. An example would be the Cielo Pump Station which likely has a remaining life of 45 or so years. In order to avoid borrowing monies for when this asset reaches the end of its useful life, the District should plan to accumulate $46,000 per year to plan for the eventual replacement. Prolonging the accumulation of these monies is acceptable if it is determined that the estimated useful life is longer than what the annual capital replacement cost is based on.

For the years in which no capital project occurs, the annual replacement cost is utilized to allocate money for the particular program or category. When a capital project occurs in a particular category, the 50 year expenditure forecast highlights the number of years required for cash flow recovery.

The annual replacement costs in the 50 year forecast were provided for future use by the District to determine the preferred replacement funding mechanism. In addition, over the next several years, the District should implement condition assessment programs and maintenance management programs to confirm the life expectancy assumptions used in this AMMP, extend the life of existing facilities, and to protect the investment of proposed new facilities.

TABLE 10-8
50 YEAR EXPENDITURE FORECAST
(All Numbers in Thousands of Dollars)

	Average $	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Fund Sources																					
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses																					
Loan Payments																					
Debt Service Payment		1,452.8	1,449.5	1,448.3	1,448.7	1,446.3	1,445.9	1,442.0	1,443.8	1,441.5	1,435.1	1,434.4	1,434.1	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**1,452.8**	**1,449.5**	**1,448.3**	**1,448.7**	**1,446.3**	**1,445.9**	**1,442.0**	**1,443.8**	**1,441.5**	**1,435.1**	**1,434.4**	**1,434.1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions																					
SFID																					
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0 [17]	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)																					
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	127.0 [18]	-	23.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	212.0	85.0	108.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**375.0**	**248.0**	**271.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement																					
SFID																					
Technical Programs	-	176	460	585	585	150	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs																					
Valves	479	1,462	2,345	-	-	-	1,958	1,958	-	1,503	1,503	-	-	-	-	-	-	-	-	-	-
Corporate Yard	400	618	150	150	-	-	1,000	-	200	-	-	-	700	100	-	-	8,000	-	-	5,500	-
Water Services	375	-	-	-	375	375	375	375	375	375	375	375	195	195	195	195	195	195	195	195	195
Pressure Stations	133	140	2,363	1,251	1,251	1,001	1,001	475	-	-	-	-	-	-	-	-	-	-	-	-	-
Reservoir	150	-	-	-	-	-	10	10	10	10	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	-	-	-	-	-	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	-	-	-	-	-	1,330	1,330	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Programs	1,878	2,220	4,858	1,401	1,626	1,376	5,894	4,368	805	2,108	2,248	745	1,265	665	565	565	8,565	565	565	6,065	565
Larrick Pump Station	15	236	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	15	15	15	15
Pipelines	1,115	1,585	1,076	400	3,300	1,818	-	-	2,800	1,450	350	2,494	-	-	254	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**4,216**	**6,394**	**2,386**	**5,511**	**3,344**	**6,004**	**4,368**	**3,605**	**3,558**	**2,598**	**3,239**	**1,265**	**665**	**819**	**1,680**	**9,684**	**1,695**	**1,695**	**7,195**	**1,695**
Non-SFID																					
Pipelines	100	-	-	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)																					
Studies and Reports	-	93	-	151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	168	-	-	-	-	-	1,750	1,377	-	-	2,562	-	-	-	-	-	-	-	-	-
Meters	11	-	-	-	-	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	309	832	590	-	944	944	-	532	983	983	-	454	605	605	605	605	605	605	605	605
Cielo Pump Station	46	-	-	-	-	3	3	3	3	3	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	1,180	1,180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	30	-	853	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Joint Facilities (SFID Share)	**1,092**	**600**	**832**	**2,774**	**1,180**	**958**	**958**	**1,764**	**1,923**	**997**	**1,040**	**2,619**	**511**	**662**	**662**	**662**	**662**	**662**	**662**	**662**	**662**
Recycled Water																					
Recycled Water		-	550	-	-	-	-	-	-	-	-	-	-	2,071	1,435	43	594	901	2,227	-	2,890
Subtotal, Recycled Water		**-**	**550**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,071**	**1,435**	**43**	**594**	**901**	**2,227**	**-**	**2,890**
Subtotal, CRP & CIP	**4,200**	**4,816**	**7,775**	**5,160**	**6,691**	**4,302**	**6,962**	**6,133**	**5,528**	**4,555**	**3,638**	**5,857**	**1,876**	**3,498**	**3,016**	**2,485**	**11,040**	**3,358**	**4,684**	**7,957**	**5,347**
Total, Fund Uses	**4,498**	**6,643**	**9,472**	**6,880**	**8,438**	**6,046**	**8,706**	**7,872**	**7,270**	**6,294**	**5,371**	**7,590**	**3,608**	**3,796**	**3,314**	**2,783**	**11,338**	**3,656**	**4,982**	**8,255**	**5,645**
Net Yearly Cash		**(1,325)**	**(4,154)**	**(1,561)**	**(3,119)**	**(728)**	**(3,387)**	**(2,554)**	**(1,952)**	**(976)**	**(52)**	**(2,271)**	**1,710**	**1,523**	**2,005**	**2,536**	**(6,019)**	**1,663**	**337**	**(2,936)**	**(326)**
Fund Balance	***17,000***	***16,695***	***13,543***	***12,794***	***10,443***	***10,342***	***7,575***	***5,476***	***3,853***	***3,108***	***3,243***	***1,166***	***2,946***	***4,646***	***6,929***	***9,880***	***4,454***	***6,383***	***7,103***	***4,593***	***4,542***

[17] Operator Vehicle Replacement
[18] Skiploader/Forklift Replacement

Annual Replacement Cost
Capital Project Spending
Capital Project Recovery
Capital Project Fiscal Overlap

	Average $	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Fund Sources																			
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses																			
Loan Payments																			
Debt Service Payment		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions																			
SFID																			
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)																			
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement																			
SFID																			
Technical Programs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs																			
Valves	479	-	-	289	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
Corporate Yard	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Services	375	195	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375	375
Pressure Stations	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reservoir	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	-	-	-	-	-	-	2	121	121	121	121	121	121	121	121	121	121	121
Subtotal Programs	1,878	565	745	1,034	1,224	1,224	1,224	1,226	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345
Larrick Pump Station	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Pipelines	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**1,695**	**1,875**	**2,164**	**2,354**	**2,354**	**2,354**	**2,356**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**
Non-SFID																			
Pipelines	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)																			
Studies and Reports	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	-	-	-	-	-	251	297	297	297	297	297	297	297	297	297	297	297	297
Meters	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605	605
Cielo Pump Station	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	-	-	64	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal, Joint Facilities (SFID Share)	**1,092**	**662**	**662**	**726**	**748**	**748**	**999**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
Recycled Water																			
Recycled Water		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Recycled Water		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Subtotal, CRP & CIP	**4,200**	**2,457**	**2,637**	**2,990**	**3,202**	**3,202**	**3,453**	**3,501**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**
Total, Fund Uses	**4,498**	**2,755**	**2,935**	**3,288**	**3,500**	**3,500**	**3,751**	**3,799**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**
Net Yearly Cash		**2,564**	**2,384**	**2,031**	**1,819**	**1,819**	**1,568**	**1,520**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**
Fund Balance	***17,000***	***7,378***	***10,204***	***12,847***	***15,436***	***18,181***	***20,839***	***23,609***	***26,426***	***29,412***	***32,578***	***35,933***	***39,489***	***43,259***	***47,255***	***51,491***	***55,981***	***60,740***	***65,785***

	Average $	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058
Fund Sources													
Income for Debt		1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5	1,443.5
Replacement Contribution from Operating Account		3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0	3,875.0
Subtotal		5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5	5,318.5
Total, Fund Sources		**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**	**5,318.5**
Fund Uses													
Loan Payments													
Debt Service Payment		-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Loan Payments		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Capital Acquisitions													
SFID													
Office Equipment	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Vehicle/Equipment Replacement	111	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0
Temporary Meters	2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal, SFID	163	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0	163.0
Joint Facilities (SFID Share)													
Office Equipment	10	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Laboratory and Portable Equipment	75	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
Vehicle/Equipment Replacement	50	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Subtotal, Joint Facilities	135	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0	135.0
Subtotal, Capital Acquisitions	**298**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**	**298.0**
Capital Replacements/Improvement													
SFID													
Technical Programs	-	-	-	-	-	-	-	-	-	-	-	-	-
Programs													
Valves	479	479	479	479	479	479	479	479	479	479	479	479	479
Corporate Yard	400	-	-	-	-	-	-	-	-	-	-	-	100
Water Services	375	375	375	375	375	375	375	375	375	375	375	375	375
Pressure Stations	133												
Reservoir	150	150	150	150	150	150	150	150	150	150	150	150	150
Hydrants	220	220	220	220	220	220	220	220	220	220	220	220	220
Meters	121	121	121	121	121	121	121	121	121	121	121	121	121
Subtotal Programs	1,878	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,345	1,445
Larrick Pump Station	15	15	15	15	15	15	15	15	15	15	15	15	15
Pipelines	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115	1,115
Subtotal, SFID	**3,008**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,475**	**2,575**
Non-SFID													
Pipelines	100	100	100	100	100	100	100	100	100	100	100	100	100
Subtotal, Non-SFID	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Joint Facilities (SFID Share)													
Studies and Reports	-	-	-	-	-	-	-	-	-	-	-	-	-
Pipeline	297	297	297	297	297	297	297	297	297	297	297	297	297
Meters	11	11	11	11	11	11	11	11	11	11	11	11	11
REB Plant	605	605	605	605	605	605	605	605	605	605	605	605	605
Cielo Pump Station	46	46	46	46	46	46	46	46	46	46	46	46	46
SDR Pump Station	47	-	-	-	-	-	-	-	-	-	-	-	-
SD Reservoir and Dam	86	86	86	86	86	86	86	86	86	86	86	86	86
Subtotal, Joint Facilities (SFID Share)	**1,092**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**	**1,045**
Recycled Water													
Recycled Water		-	-	-	-	-	-	-	-	-	-	-	-
Subtotal, Recycled Water		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Subtotal, CRP & CIP	**4,200**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,620**	**3,720**
Total, Fund Uses	**4,498**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**3,918**	**4,018**
Net Yearly Cash		**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,401**	**1,301**
Fund Balance	***17,000***	***71,133***	***76,802***	***82,810***	***89,179***	***95,931***	***103,087***	***110,673***	***118,714***	***127,237***	***136,272***	***145,849***	***155,900***