Appendix 3-3: Supporting Documents

This appendix includes relevant excerpts of supporting documents used in Attachment 3 to provide the technical basis of the projects and their anticipated benefits. Full copies of supporting documents are provided on the included CD, organized by project. Note that some documents are not included in this Appendix because they are websites, personal communication, or general references.

Appendix
3-3

San Diego Integrated Regional Water Management

2014 IRWM Drought Solicitation Implementation Grant Proposal Supporting Documents

Appendix 3-1 contains relevant excerpts of the supporting documentation included in Attachment 3, Technical Justification that form the basis of the benefits claimed by the projects included in this proposal. Documents have been arranged by Author, Year, and Title. For ease of navigation of this appendix and to provide cross-reference with Attachment 3, a table has been provided listing all of the documents that have been included in the Appendix. The table can be understood as follows:

- Row (a): Appendix Entry – This column indicates the order the document is included in the appendix.
- Row (b): Author – This column lists the author or responsible agency for the document. In some cases, abbreviations or acronyms have been used.
- Row (c): Year – This column indicates the year of the source document.
- Row (d): Title – This column contains the full title of the document.
- Row (e): Date – This column contains the date the document was published, a website was accessed, or personal communication occurred, to the best available information for each source.
- Row (f): Location – This column contains the relevant page number, website URLs, or other information to assist in locating the information within the source document cited by the reference in question. For personal communication, contact phone numbers are provided here.
- Row (g): Ref. # - This column contains the footnote number of the relevant citation, and is provided for ease of use.
- Row (h): Project – This column contains an abbreviated name for the project that contains the citation in question, based on Project Sponsor. These abbreviations are as follows:

Project Abbreviation	Project Title
Sweetwater	Reynolds Groundwater Desalination Facility Expansion
Fallbrook	Fallbrook Plant Nurseries Recycled Water Distribution System Expansion
Carlsbad	Carlsbad Recycled Water Plant and Distribution System Expansion
SDCWA	Regional Demand Management Program Expansion
City –Cons.	San Diego Water Use Reduction Program
Rincon	Rincon Customer-Driven Demand Management Program
City – Hodges	Regional Emergency Storage and Conveyance System Intertie Optimization

- Row (i) Benefit – This column indicates which portion of a given project's Technical Justification contains the reference. For example, if a reference is provided citing a value used in a calculation for Benefit A – Avoid Imported Water Supply Purchases, this column would say "A" for that reference.

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(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
1	American Water Works Association	2013	Buried No Longer: Confronting America's Water Infrastructure Challenge	-	Pg. 8	75	Fallbrook	Technical Basis
2	Bender, G	2012	Avocado Farming with High-Priced Water	-	Can It Remain Profitable? Tropics in Subtropics – ANR Blogs	103	Fallbrook	Background
3	CALFED Bay-Delta Program Archived Website		CALFED Objectives	Accessed 28 June 2014	http://calwater.ca.gov/	24	Sweetwater	Background
						94	Fallbrook	
						168	Carlsbad	
						235	SDCWA	
						309	City-Cons.	
						381	Rincon	
						462	City-Hodges	
4	California Building Standards Commission	2014	CCR Title 24, Part 5. 2013 California Plumbing Code	January	§608.2 Excessive Water Pressure	326	City-Cons.	Background
						354	City-Cons.	R
5	California Code of Regulations		Title 22. Article 4. Chapter 3	-	Water Recycling Criteria	128	Fallbrook	J
						201	Carlsbad	
6	California Department of Conservation – Farmland Mapping and Monitoring Program	2013	San Diego County Important Farmland 2010	March	Sheet 1 of 2	104	Fallbrook	Background
7	California Energy Commission	2012	Carlsbad Energy Center Project Commission Decision. CEC-800-2011-004-CMF. Docket No. 07-AFC-06	June	Pg. 1-2	208	Carlsbad	Cost Effectiveness
8	California Public Utilities Commission Energy Division	2011	Embedded Energy in Water Pilot Programs Impact Evaluation	March 9	Pg. iii	274	SDCWA	Cost Effectiveness
					Pg. 118	275	SDCWA	Cost Effectiveness
					-	209	SDCWA	Technical Basis
					Table 57 (Pg. 126)	210	SDCWA	Technical Basis
9	California Regional Water Quality Control Board San Diego Region		Waste Discharge Requirements for the Fallbrook Public Utility District Plant No. 1 and 2 Reclamation Projects, San Diego County (Order No. 91-39), as amended	-	Pp. 20-21 (of original permit)	126	Fallbrook	I
					Pg. 12 (of original permit)	127	Fallbrook	I
					Pg. 5 (of original permit)	129	Fallbrook	J
10	California Regional Water Quality Control Board, San Diego Region	1991	Waste Discharge Requirements for Fallbrook PUD, Plant No. 1 and 2 Reclamation Projects, San Diego County (Order No. 91-39)	-	-	74	Fallbrook	Technical Basis
						83	Fallbrook	Primary
11	California Regional Water Quality Control Board, San Diego Region	2012	Waste Discharge Requirements for the Fallbrook Public Utility District Wastewater Treatment Plant No.1 Discharge to the Pacific Ocean via the Oceanside Ocean Outfall (Order No. R9-2012-0004 [NPDES No. CA0108031])	August 8	Pp. 4-5	71	Fallbrook	Technical Basis
					Pg. 4	105	Fallbrook	Background
					Pp. 4-5	106	Fallbrook	Background
12	CEC	2013	California Electrical Energy Generation Total Production, by Resource Type (Gigawatt hours)	Accessed 24 June 2014	http://energyalmanac.ca.gov/electricity/electricity_generation.html	36	Sweetwater	D
						115	Fallbrook	
						189	Carlsbad	
						258	SDCWA	
						338	City-Cons.	
						402	Rincon	
						481	City-Hodges	
13	City of Chula Vista	2003	Water Conservation Plan Guidelines	May	Pg. 1	281	City-Cons.	Technical Basis
14	City of Escondido	2011	Escondido City Council Meeting Minutes	December 14	-	101	Fallbrook	Background

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	**Author**	**Year**	**Title**	**Date**	**Location**	**Ref. #**	**Project**	**Benefit**
15	City of Escondido	2012	Easterly Recycled Water Main Extension Preliminary Design Report	August 2012	Pg. 2-1	102	Fallbrook	Background
16	City of San Diego	2004	City of San Diego Long-Range Water Resources Plan (2002-2030)		Section 6	447	City-Hodges	Primary
17	City of San Diego	2011	2010 Urban Water Management Plan	-	Pg. 4-1	288	City-Cons.	Primary
					Pg. 4-1	289	City-Cons.	Primary
					Pg. 4-1	296	City-Cons.	Background
					Table 4-15 (Pg. 4-16)	297	City-Cons.	Background
					Pg. 3-8	315	City-Cons.	Background
					Pp. 4-8 to 4-9	318	City-Cons.	Background
					Pg. 4-9	320	City-Cons.	Background
					Pg. 3-10	345	City-Cons.	F
					Table 3-1 (Pg. 3-1)	347	City-Cons.	F
					Pg. 4-1	460	City-Hodges	Background
					Pg. 4-1	466	City-Hodges	Background
					Pg. 3-6	467	City-Hodges	Background
18	City of San Diego	2011	San Diego Municipal Code. Chapter 6: Public Works and Property, Public Improvement and Assessment Proceedings.	-	§67.3805(b)(4)	364	City-Cons.	Cost Effectiveness
					§67.3806(b)	365	City-Cons.	Cost Effectiveness
19	City of San Diego	2012	San Diego Recycled Water Study	July	Pg. 1-1	321	City-Cons.	Background
					Pg. 2-2	351	City-Cons.	H
20	City of San Diego	2013	City of San Diego 2012 Long-Range Water Resources Plan	December	appendix B	448	City-Hodges	Primary
21	City of San Diego	2014	Lake Hodges Reservoir Water Quality Assessment Study: Draft Conceptual Planning Report	March 19	Page vii	429	City-Hodges	Background
					Page vii	440	City-Hodges	Background
					Page vii	471	City-Hodges	Background
					Pg. 4-4	478	City-Hodges	D
					Pg. 6-2	489	City-Hodges	G
					Page viii - ix	500	City-Hodges	NEW FACILITIES
					Page 6-2	501	City-Hodges	Cost Effectiveness
					Pg. 3-2	502	City-Hodges	Cost Effectiveness
					Pg. 3-10	503	City-Hodges	Cost Effectiveness
					Pg. 3-10	504	City-Hodges	Cost Effectiveness
					Pg. 3-5	505	City-Hodges	Cost Effectiveness
					Pg. 3-5	506	City-Hodges	Cost Effectiveness
22	City of San Diego	2014	North City Water Reclamation Plant Recycled Water Filling Station Abstract Business Case Evaluation	June	Pg. 3	292	City-Cons.	Primary
					Pg. 4	293	City-Cons.	Primary
					Pg. 3	294	City-Cons.	Primary
					Pg. 4	355	City-Cons.	Cost Effectiveness
					Pg. 5	356	City-Cons.	Cost Effectiveness
					Pg. 12	357	City-Cons.	Cost Effectiveness
					Pg. 12	358	City-Cons.	Cost Effectiveness
					Pg. 12	359	City-Cons.	Cost Effectiveness
					Pp. 7-8	360	City-Cons.	Cost Effectiveness
					Pp. 9-11	361	City-Cons.	Cost Effectiveness
23	City of San Diego	2014	Permanent Mandatory Water Use Restrictions and Voluntary Level 1 Restrictions	Accessed: July 15	http://www.sandiego.gov/water/conservation/drought/prohibitions.shtml	290	City-Cons.	Primary
24	City of San Diego	2014	Waste No Water Information and Resources	Accessed: July 15	http://www.sandiego.gov/water/conservation/drought/droughtlevels2.shtml	295	City-Cons.	Primary
25	City of San Diego	2014	Water Levels	June 23	http://www.sandiego.gov/water/recreation/levels.shtml	441	City-Hodges	Primary

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
26	City of San Diego		Recycled Water Rate – Future Recycled Water Rate Increase	Accessed July 2, 2014	http://www.sandiego.gov/water/recycled/recycledrates/rateincrease.shtml	317	City-Cons.	Background
27	City of San Diego		Water Rates	Accessed July 2, 2014	http://www.sandiego.gov/water/rates/rates/index.shtml	348	City-Cons.	G
28	City of San Diego, SFID, and SDWD	1998	Lake Hodges Water Agreement	March	-	432	City-Hodges	Background
						439	City-Hodges	Background
						443	City-Hodges	Primary
						498	City-Hodges	NEW FACILITIES
29	CMWD	2005	Ordinance No. 43	June	Pg. 1	154	Carlsbad	Primary
30	CMWD	2011	2010 Urban Water Management Plan	June	Pg. 5-1	149	Carlsbad	Primary
					Pg. 4-1	156	Carlsbad	Background
					Pg. 3-8	176	Carlsbad	Background
					Pg. 3-8	195	Carlsbad	F
					Table 3-1 (Pg. 3-1)	197	Carlsbad	F
31	CMWD	2012	Phase III Recycled Water Project Feasibility Study	June	Pp. 44, 55, and 56	139	Carlsbad	Technical Basis
					Pp. 44, 63, and 64	140	Carlsbad	Technical Basis
					Pg. 44	141	Carlsbad	Technical Basis
					Pp. 71 and 72	142	Carlsbad	Technical Basis
						144	Carlsbad	Primary
					Pg. 71	146	Carlsbad	Primary
					Pg. 71	150	Carlsbad	Primary
					appendix B (Pg. 124)	155	Carlsbad	Primary
					Pg. 58	205	Carlsbad	Cost Effectiveness
					Appendix C – Letters of Interest. Request for Service for Water SuPp.ly & Sewer Interconnection – Proposed new Power Generation Equipment at the Encina Power Station. Pg. 2	206	Carlsbad	Cost Effectiveness
					Pg. 51	207	Carlsbad	Cost Effectiveness
32	CMWD	2012	Recycled Water Master Plan	January	Table 4.2 (Pg. 4-3)	143	Carlsbad	Technical Basis
						145	Carlsbad	Primary
					Pg. 2-1 and Pg. 4-18	147	Carlsbad	Primary
					Pp. 2-1 to 2-2	148	Carlsbad	Primary
					Pg. 3	151	Carlsbad	Primary
					Table 4.2 (Pg. 4-3)	152	Carlsbad	Primary
					Pg. 1	153	Carlsbad	Primary
					Pg. 4-1	173	Carlsbad	Background
					Pg. 4-1	199	Carlsbad	H
					Table 4.3 (Pg. 4-7)	204	Carlsbad	J
33	CMWD	2014	Water Rates	-	Refer to 2014 rates for Irrigation and for Recycled Water	178	Carlsbad	Background
						198	Carlsbad	G
34	County of San Diego	2014	May 2014 San Diego County Wildfires After Action Report	June	Pg. 10	385	Rincon	Background
					Pg. 2	465	City-Hodges	Background

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
35	Delta Stewardship Council	2013	The Delta Plan: Ensuring a Reliable Water Supply for California, a Healthy Delta Ecosystem, and a Place of Enduring Value	-	Pp. 10-11	23	Sweetwater	Background
						93	Fallbrook	
						167	Carlsbad	
						234	SDCWA	
						308	City-Cons.	
						380	Rincon	
						461	City-Hodges	
36	DWR, et al.	2010	20x2020 Water Conservation Plan	February	Pg. ix	97	Fallbrook	Background
					Pg. 3	98	Fallbrook	Background
					Pg. 1	99	Fallbrook	Background
					Pg. ix	174	Carlsbad	Background
					Pg. 3	175	Carlsbad	Background
					Pg. 1	177	Carlsbad	Background
					Pg. 3	196	Carlsbad	F
					Pg. ix	239	SDCWA	Background
					Pg. 3	240	SDCWA	Background
					Pg. 1	241	SDCWA	Background
					Pg. ix	313	City-Cons.	Background
					Pg. 3	314	City-Cons.	Background
					Pg. 1	316	City-Cons.	Background
					Pg. 3	346	City-Cons.	F
					Pg. ix	387	Rincon	Background
					Pg. 3	388	Rincon	Background
					Pg. 1	390	Rincon	Background
					Pg. 3	410	Rincon	F
37	EBMUD	2013	Evaluation of East Bay Municipal Utility District's Pilot of WaterSmart Home Water Reports	December	Pg. 56	373	Rincon	Primary
38	ECO Oxygen Technologies	2014	Success Story: 20 Years of Hypolimnetic Oxygenation of a Reservoir. Presentation at the Oklahoma Clean Lakes and Watersheds 23rd Annual Conference	April 2-3	-	427	City-Hodges	Phasing

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
39	Equinox Center	2010	San Diego's Water Sources: Assessing the Options	July	Pg. 10	19	Sweetwater	Background
					Pg. 8	30	Sweetwater	B
					Table 1a (Pg. 10)	34	Sweetwater	D
					Pg. 10	88	Fallbrook	Background
					Pg. 8	92	Fallbrook	Background
					Pg. 8	111	Fallbrook	B
					Pg. 10	113	Fallbrook	D
					Pg. 10	163	Carlsbad	Background
					Pg. 8	166	Carlsbad	Background
					Pg. 10	169	Carlsbad	Background
					Table 1a (Pg. 10)	186	Carlsbad	D
					Table 1a (Pg. 10)	187	Carlsbad	D
					Pg. 10	228	SDCWA	Background
					Pg. 8	232	SDCWA	Background
					Table 1a (Pg. 10)	236	SDCWA	Background
					Pg. 8	252	SDCWA	B
					Table 1a (Pg. 10)	257	SDCWA	D
					Pg. 10	304	City-Cons.	Background
					Pg. 10	310	City-Cons.	Background
					Pg. 8	331	City-Cons.	B
					Table 1a (Pg. 10)	336	City-Cons.	D
					Table 1a (Pg. 10)	337	City-Cons.	D
					Pg. 8	378	Rincon	Background
					Table 1a (Pg. 10)	382	Rincon	Background
					Pg. 8	395	Rincon	B
					Table 1a (Pg. 10)	400	Rincon	D
					Table 1a (Pg. 10)	401	Rincon	D
					Pg. 10	456	City-Hodges	Background
					Table 1a (Pg. 10)	477	City-Hodges	D
40	ESA	2008	Draft Final Biological Resources Background Report for the Phase II Richard A.Reynolds Desalination Facility Expansion Project.Appendix E to the Sweetwater Authority.Brackish Groundwater Desalination Project Draft EIR	January	Pg. 48	47	Sweetwater	K
					Pg. 35-42	27	Sweetwater	Background
41	Fallbrook Public Utility District	2011	2010 Urban Water Management Plan	-	Pg. 10	109	Fallbrook	A
					Pg. 19	121	Fallbrook	F
					Table 2 (Pg. 5)	122	Fallbrook	F
					Pp. 41 and 42	78	Fallbrook	Primary
42	Fallbrook Public Utility District	2012	Recycled Water Master Plan – Chapter 2 Recycled Water	-	Pg. 2	76	Fallbrook	Primary
					Pg. 2	77		Primary
					Appendix A – Recycled Alternatives Cost Assumptions	130	Fallbrook	Cost Effectiveness
					Pg. 6	131	Fallbrook	Cost Effectiveness
					Pg. 7	132	Fallbrook	Cost Effectiveness
					Pg. 7	133	Fallbrook	Cost Effectiveness
					Pg. 8	134	Fallbrook	Cost Effectiveness
					Pg. 7	135	Fallbrook	Cost Effectiveness
43	Fallbrook Public Utility District	2013	Customer Billing Information	July 1	Refer to Recycled Water and Com Ag (CA) rates	124	Fallbrook	G
44	Fallbrook Public Utility District	2014	Initial Study and Negative Declaration: Recycled Waterline Extension – East	April 22	Pg. 1	79	Fallbrook	Primary
					Pg. 3	81	Fallbrook	Primary

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
45	Fallbrook Public Utility District	2014	Preliminary Assessment Report (Recycled Water System East Expansion Planning) Technical Memorandum	April 15	Pg. 1	69	Fallbrook	Technical Basis
					Pg. 1	70	Fallbrook	Technical Basis
					Pg. 1	72	Fallbrook	Technical Basis
					Pg. 1	73	Fallbrook	Technical Basis
					Pg. 1	80	Fallbrook	Primary
					Pg. 3	82	Fallbrook	Primary
					Pg. 1	107	Fallbrook	Background
					Table 1 (Pg. 2); Table 2 (Pg. 2); and Table 3 (Pg. 3)	110	Fallbrook	A
					Pg. 1	123	Fallbrook	G
					Pg. 1	125	Fallbrook	H
					Pg. 1	136	Fallbrook	Cost Effectiveness
					Pg. 1	137	Fallbrook	Cost Effectiveness
					Pg. 3	138	Fallbrook	Cost Effectiveness
46	Flint et al	2012	A Basin-Scale Approach for Assessing Water Resources in a Semiarid Environment: San Diego Region, California and Mexico	February	Pg. 3825	9	Sweetwater	Primary
47	Geosyntec	2011	Revised Final Engineering Report for Distribution and Use of Reclaimed Water Sunrise Powerlink Project, San Diego County, California	August	Pg. 7	286	City-Cons.	Technical Basis
48	Gloria Penner with Katie Orr	2009	Free Trash Collection Could End for San Diego City Residents	July 31	http://www.kpbs.org/videos/2009/jul/31/4492/	247	SDCWA	Background
49	Interagency Working Group on Social Cost of Carbon, United States Government	2010	Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866	February	Pg. 1	39	Sweetwater	E
					Table 4 (Pg. 28)	40	Sweetwater	E
					Pg. 1	118	Fallbrook	E
					Table 4 (Pg. 28)	119	Fallbrook	E
					Pg. 1	192	Carlsbad	E
					Table 4 (Pg. 28)	193	Carlsbad	E
					Pg. 1	261	SDCWA	E
					Table 4 (Pg. 28)	262	SDCWA	E
					Table 4 (Pg. 28)	263	SDCWA	E
					Pg. 1	341	City-Cons.	E
					Pg. 28	342	City-Cons.	E
					Table 4 (Pg. 28)	343	City-Cons.	E
						386	Rincon	Background
					Pg. 1	405	Rincon	E
					Pg. 28	406	Rincon	E
					Table 4 (Pg. 28)	407	Rincon	E
					Pg. 1	484	City-Hodges	E
					Table 4 (Pg. 28)	485	City-Hodges	E
50	IPCC	2007	Summary for policymakers. In Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of the Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. ML Perry, OF Canziani, JP Palutikof, PJ van der Linden, and CE Hanson (eds.). Cambridge University Press. Cambridge, UK	-	Pg. 17	38	Sweetwater	E
						117	Fallbrook	D
						191	Carlsbad	E
						260	SDCWA	E
						340	City-Cons.	E
						404	Rincon	E
						483	City-Hodges	E
51	Joyce, S	1998	Why the Grass Isn't Always Greener. Environmental Health Perspectives: Volume 106, Number 8	August	Pg. 379 (The Pros and Cons of Lawns)	244	SDCWA	Background

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
52	MWD	2007	Groundwater Assessment Study: A Status Report on the Use of Groundwater in the Service Area of the Metropolitan Water District of Southern California. Report Number 1308. Chapter 4: San Diego County Basins – South San Diego County Basins	September	Pg. iv-23-2	8	Sweetwater	Primary
53	MWD	2013	California Friendly Turf Replacement Incentive Program Southern California Final Project Report	September 30	-	214	SDCWA	Technical Basis
					Pg. 5	215	SDCWA	Technical Basis
54	Otay Water District	2010	From Report to Reality; One Agency's Delayed Success Story. Presented at the WaterSmart Innovations Conference and Exposition. Presented by Rhianna Pensa, Water Conservation Specialist	October 6	Pp. 13-14	211	SDCWA	Technical Basis
					Pp. 19	212	SDCWA	Technical Basis
					Pg. 23	277	SDCWA	Cost Effectiveness
					Pg. 24	278	SDCWA	Cost Effectiveness
					Pg. 7	279	SDCWA	Cost Effectiveness
55	Otay Water District	2012	Customer Agreement Pressure Regulating Valve Rebate Program	February	Pg. 1	362	City-Cons.	Cost Effectiveness
56	Otay Water District	2012	Water Pressure Regulator (video outreach)	March 21 (Accessed July 13, 2014)	https://www.youtube.com/watch?v=Ye0I3V6KCw4	327	City-Cons.	Background
						353	City-Cons.	R
57	Pers. Comm. Goldamer Herbon, Senior Water Resources Specialist, City of San Diego – Public Utilities Department			June 11, 2014	Available: 619-533-4120	426	City-Hodges	Phasing
58	Pers. Comm. Kyrsten Burr-Rosenthal, Senior Management Analyst, City of San Diego Public Utilities Department			2014	Available: 619-533-5380	285	City-Cons.	Technical Basis
						291	City-Cons.	Primary
59	Pers. Comm. Dana Friehauf, SDCWA, Acting Water Resources Manager			June 18, 2014	Available: 858-522-6749	90	Fallbrook	Background
						159	Carlsbad	
						230	SDCWA	
						300	City-Cons.	
60	Pers. Comm. Jeffery Pasek, Watershed Manager, City of San Diego. "Hodges Hydrology through April 2014" excel file			June 2, 2014	Available: 619-533-7599	424	City-Hodges	Technical Basis
						430	City-Hodges	Background
						437	City-Hodges	Background
						438	City-Hodges	Background
						442	City-Hodges	Primary
						449	City-Hodges	Primary
						492	City-Hodges	O
						495	City-Hodges	O
61	Pers. Comm. Joey Jacoby, Conservation Analyst, City of San Diego Public Utilities Department			2014	Available: 619-533-7548	283	City-Cons.	Technical Basis
						284	City-Cons.	
62	Pers. Comm. Julia Escamilla, Public Services Information Officer, Rincon del Diablo MWD			May 28, 2014	Available: 760-745-522x503	368	Rincon	Technical Basis
63	Pers. Comm. Julia Escamilla, Public Services Information Officer, Rincon del Diablo MWD			July 15, 2014	Available: 760-745-522x503	371	Rincon	Phasing
64	Pers. Comm. Mehdi Khalili, Senior Water Resources Engineer, City of San Diego Public Utilities Department			June 6, 2014	Available: 619-533-5356	363	City-Cons.	Cost Effectiveness
65	Pers. Comm. Tim Bombardier, SDCWA, Senior Water Resources Specialist			June 27, 2014	Available: 858-522-6600	31	Sweetwater	B
						112	Fallbrook	B
						183	Carlsbad	B
						233	SDCWA	Background
						253	SDCWA	B
						332	City-Cons.	B
						379	Rincon	Background
						396	Rincon	B
						474	City-Hodges	B

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
66	Rincon	2013	Rincon del Diablo Municipal Water District Budget: Fiscal Years 2013-14 and 2014-15	-	Pg. 4	369	Rincon	Technical Basis
					Pg. 5	370	Rincon	Technical Basis
67	Rincon	2013	Water Rates and System Operations Charges	Effective September 2013	-	414	Rincon	G
						415	Rincon	
						416	Rincon	
68	Rincon	2014	2013 Urban Water Management Plan	February	Appendix C. Pp. C-1; C-3 to C-4; C-6	366	Rincon	Technical Basis
					Pg. 10	372	Rincon	Primary
					Pp. 7-8	374	Rincon	Background
					Pg. 7	375	Rincon	Background
					Pg. 13	389	Rincon	Background
					Pp. 7-8	393	Rincon	A
					Pg. 13	409	Rincon	F
					Table 11 (Pg. 13)	411	Rincon	F
69	Rincon	2014	Memo 3C: Authorized Budget Increase for the Completion of the District's Advanced Metering Infrastructure (AMI) System	March 25	Pg. 2	417	Rincon	Cost Effectiveness
					Pg. 1	418	Rincon	Cost Effectiveness
					Pg. 1	419	Rincon	Cost Effectiveness
					Pg. 2	420	Rincon	Cost Effectiveness
					Pg. 1	421	Rincon	Cost Effectiveness
					Pg. 2	422	Rincon	Cost Effectiveness
70	Rincon		Customer Database	Accessed: June 19, 2014	-	367	Rincon	Technical Basis
71	RMC	2012	North San Diego County Regional Recycled Water Project: Regional Recycled Water Facilities Plan	May (Revised February 2013)	-	108	Fallbrook	Background
						172	Carlsbad	

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
72	RWMG	2013	San Diego Integrated Regional Water Management Plan	September	Pg. 3-26	21	Sweetwater	Background
					Table 7-15 (Pg. 7-38)	25	Sweetwater	Background
					Table 7-16 (Pg. 7-39)	26	Sweetwater	Background
					Pg. 2-9	33	Sweetwater	C
					Pg. 2-9	91	Fallbrook	Background
					Pg. 7-38	95	Fallbrook	Background
					Pg. 7-39	96	Fallbrook	Background
					Pg. 3-26	158	Carlsbad	Background
					Pg. 2-9	165	Carlsbad	Background
					Table 7-15 (Pg. 7-38)	170	Carlsbad	Background
					Table 7-16 (Pg. 7-39)	171	Carlsbad	Background
					Pg. 2-9	185	Carlsbad	Cost Effectiveness
					Pg. 2-9	231	SDCWA	Background
					Pg. 7-38	237	SDCWA	Background
					Pg. 7-39	238	SDCWA	Background
					Pg. 2-9	255	SDCWA	C
					Pg. 3-26	299	City-Cons.	Background
					Pg. 2-9	306	City-Cons.	Background
					Table 7-15 (Pg. 7-38)	311	City-Cons.	Background
					Table 7-16 (Pg. 7-39)	312	City-Cons.	Background
					Pg. 3-18	322	City-Cons.	Background
					Pg. 3-32	323	City-Cons.	Background
					Pg. 3-35	324	City-Cons.	Background
					Pg. 2-9	334	City-Cons.	C
					Table 7-15 (Pg. 7-38)	383	Rincon	Background
					Table 7-16 (Pg. 7-39)	384	Rincon	Background
					Pg. 3-32	391	Rincon	Background
					Pg. 3-35	392	Rincon	Background
					Pg. 2-9	398	Rincon	C
					Pg. 3-26	458	City-Hodges	Background
					Table 7-15 (Pg. 7-38)	463	City-Hodges	Background
					Table 7-16 (Pg. 7-39)	464	City-Hodges	Background
					Pg. 2-9	476	City-Hodges	C
73	RWMG	2013	San Diego Integrated Regional Water Management Plan. Appendix 7-B: Integrated Flood Management Planning Study	April	Pg. 3-5	493	City-Hodges	O
					Pg. 3-4	494	City-Hodges	O
74	San Diego Regional Water Quality Control Board	2009	Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the City of San Diego E. W. Blom Point Loma Metropolitan Wastewater Treatment Plant Discharge to the Pacific Ocean Through the Point Loma Ocean Outfall, San Diego County (Order No. R9-2009-0001 [NPDES No. CA 0107409])	June 10	Pg. 6	319	City-Cons.	Background
75	San Diego Regional Water Quality Control Board	2010	Waste Discharge Requirements for the Sweetwater Authority Richard A. Reynolds Desalination Facility Discharge to the Lower Sweetwater River Basin, San Diego County (Order No. R9-2010-0012 [NPDES No. CA0108952])	-	Pg. 7	4	Sweetwater	Technical Basis
					Pg. 7	14	Sweetwater	Primary
					-	49	Sweetwater	FACILITIES
76	San Diego Regional Water Quality Control Board	2012	Master Reclamation Permit with Waste Discharge Requirements for the Production and Purveyance of Recycled Water for Carlsbad Municipal Water District, Carlsbad Water Recycling Facility, San Diego County (Order No. 2001-352 as amended by Order R9-2012-0027)	-	Pg. 3	180	Carlsbad	Background
					Pg. 26	181	Carlsbad	Background
					Pg. 26	200	Carlsbad	I
					Pg. 2	202	Carlsbad	J
					Pg. 3	203	Carlsbad	J
77	Santa Fe Irrigation District	2013	Enhancing Local Water Supplies in an Era of Uncertainty	October	Slides 12-13	496	City-Hodges	P
78	SDCWA	2007	Lake Hodges and Olivenhain Reservoir Limnology Study	April	Pg. 12	497	City-Hodges	Q

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
79	SDCWA	2008	Strategic Plan	April	Pg. 9	89	Fallbrook	Background
					Pg. 9	164	Carlsbad	Background
					Pg. 9	229	SDCWA	Background
					Pg. 9	305	City-Cons.	Background
					Pp. 9-11	307	City-Cons.	Background
	SDCWA	2008	Lake Hodges Projects Reservoir Regulation Manual	April	Pg. 6-3	423	City-Hodges	Technical Basis
80						425	City-Hodges	Technical Basis
					Page 1-2	433	City-Hodges	Background
					Page 2-5 to 2-6	434	City-Hodges	Background
					Page 2-7 to 2-8	435	City-Hodges	Background
					Page 6-4	436	City-Hodges	Background
					Appendix B-1, page B-3	444	City-Hodges	Primary
					Section 6.4.4 Operational Priorities, page 6-8	445	City-Hodges	Primary
					Section 6.4.4 Operational Priorities, page 6-8	446	City-Hodges	Primary
					Pages C-24 - C-25	450	City-Hodges	Primary
					Definition of pools: page A-2. Minimum levels for pumped storage operations is 290 ft: Figure 6.1, page 6-14	451	City-Hodges	Primary
					Appendix C, Table C	472	City-Hodges	Background
					Pg. 6-7	479	City-Hodges	D
					Pg. D-8	490	City-Hodges	G
					appendix C, Table C.3	499	City-Hodges	NEW FACILITIES
81	SDCWA	2011	2010 Urban Water Management Plan	June	Pp. 1-8 and 3-1	15	Sweetwater	Background
					Pg. 9-2	16	Sweetwater	Background
					Pp. 9-3 to 9-7	17	Sweetwater	Background
					Pg. 2-13	18	Sweetwater	Background
					Pg. 1-8	20	Sweetwater	Background
					Pp. 4-4, 4-6, and 6-1	22	Sweetwater	Background
					Pg. 2-13	29	Sweetwater	A
					Pg. 9-9	32	Sweetwater	C
					Pg. 1-8 and 3-1	84	Fallbrook	Background
					Pg. 9-2	85	Fallbrook	Background
					Pp. 9-3 to 9-7	86	Fallbrook	Background
					Pg. 2-13	87	Fallbrook	Background
					Pg. 1-8	157	Carlsbad	Background
					Pg. 4-4, 4-6, and 6-1	160	Carlsbad	Background
					Pp. 9-3 to 9-7	161	Carlsbad	Background
					Pg. 2-13	162	Carlsbad	Background
					Pg. 2-13	182	Carlsbad	A
					Pg. 9-9	184	Carlsbad	Cost Effectiveness
					Pg. 3-1	216	SDCWA	Primary
					Pg. 3-1	217	SDCWA	Primary
					Pg. 3-5	218	SDCWA	Primary
					Pg. 3-5 and Pg. 3-6	219	SDCWA	Primary
					Pp. 3-6 to 3-8	220	SDCWA	Primary
					Pg. 3-6	221	SDCWA	Primary
					Pg. 1-8 and 3-1	222	SDCWA	Background
					Pg. 9-2	223	SDCWA	Background

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
					Page 4-1, Section 4, San Diego County Water Authority SuPp.lies	224	SDCWA	Background
					Page 6-1, Section 6, Metropolitan Water District of Southern California	225	SDCWA	Background
					Pp. 9-3 to 9-7	226	SDCWA	Background
					Pg. 2-13	227	SDCWA	Background
					Page 6-1, Section 6, Metropolitan Water District of Southern California	249	SDCWA	A
					Page 4-1, Section 4, San Diego County Water Authority SuPp.lies	250	SDCWA	A
					Pg. 2-13	251	SDCWA	A
					Pg. 9-9	254	SDCWA	C
					Pg. 9-9	256	SDCWA	C
					Table 2-6 (Pg. 2-10)	265	SDCWA	F
					Table 1-6 (Pg. 1-19)	266	SDCWA	F
					Pg. 1-8	298	City-Cons.	Background
					Pg. 4-4, 4-6, and 6-1	301	City-Cons.	Background
					Pp. 9-3 to 9-7	302	City-Cons.	Background
					Pg. 2-13	303	City-Cons.	Background
					Page 6-1, Section 6, Metropolitan Water District of Southern California	328	City-Cons.	A
					Page 4-1, Section 4, San Diego County Water Authority SuPp.lies	329	City-Cons.	A
					Pg. 2-13	330	City-Cons.	A
					Pg. 9-9	333	City-Cons.	C
					Pg. 9-9	335	City-Cons.	C
					Page 6-1, Section 6, Metropolitan Water District of Southern California	376	Rincon	Background
					Pg. 2-13	377	Rincon	Background
					Pg. 2-13	394	Rincon	A
					Pg. 9-9	397	Rincon	C
					Pg. 9-9	399	Rincon	C
					Pp. 1-8 and 3-1	452	City-Hodges	Background
					Pg. 9-2	453	City-Hodges	Background
					Pp. 9-3 to 9-7	454	City-Hodges	Background
					Pg. 2-13	455	City-Hodges	Background
					Pg. 1-8	457	City-Hodges	Background
					Pg. 4-4, 4-6, and 6-1	459	City-Hodges	Background
					Pg. 2-13	473	City-Hodges	A
					Pg. 9-9	475	City-Hodges	C

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
82	SDCWA	2013	Capital Improvement Program	April	Water System Planning Schematic. Aqueducts, Flow Control Facilities and Gradient Control Structures	480	City-Hodges	D
83	SDCWA		San Diego County Water Authority Turf Replacement Program	Accessed July 2, 2014	http://turfreplacement.watersmartsd.org	213	SDCWA	Technical Basis
84	SDCWA		San Diego County Water Authority Turf Replacement Program	Accessed July 9, 2014	http://turfreplacement.watersmartsd.org "Available Funds"	280	SDCWA	Cost Effectiveness
85	SDCWA		Turf Replacement Program – Process Guidelines	Accessed July 1, 2014	http://turfreplacement.watersmartsd.org/process_guidelines	243	SDCWA	Background
86	SDG&E	2014	Water/Energy Relationship at SDG&E	-	Pp. 10-12 (http://www.cpuc.ca.gov/NR/rdonlyres/3A4B6FD1-C33E-4A79-92CD-2BEED6906315/0/SanDiegoGEandWaterAuthority.pdf)	273	SDCWA	Cost Effectiveness
					Pg. 16 (http://www.cpuc.ca.gov/NR/rdonlyres/3A4B6FD1-C33E-4A79-92CD-2BEED6906315/0/SanDiegoGEandWaterAuthority.pdf)	276	SDCWA	Cost Effectiveness
87	SFID	2011	2010 Urban Water Management Plan	June	Page 12	428	City-Hodges	Background
					Page 32	431	City-Hodges	Background
88	SFID and SDWD	2012	Joint Facilities Master Plan: R. E. Badger Water Filtration Plant	March	Pg. 1-2	468	City-Hodges	Background
					Page 2-1 and 3-1	469	City-Hodges	Background
					Page 4-7	470	City-Hodges	Background

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
Appendix Entry	Author	Year	Title	Date	Location	Ref. #	Project	Benefit
89	Sweetwater Authority	2010	Richard Reynolds Brackish Groundwater Desalination Facility – Phase II Expansion Final Environmental Impact Report (SCH No. 2007101055)	February	Pg. 1-2 of the Draft EIR, which was not revised in the Final EIR	1	Sweetwater	Technical Basis
					Pp. 1-1 and 1-2 of the Draft EIR, which was not revised in the Final EIR	6	Sweetwater	Primary
					Pg. ES-11 of the Draft EIR, which was not revised in the Final EIR	13	Sweetwater	Primary
					Pp. 1-1 and 1-2 of the Draft EIR, which was not revised in the Final EIR	28	Sweetwater	Background
					Pg. ES-4 through ES-9 of the Draft EIR	50	Sweetwater	Cost Effectiveness
					Pg. 7-1 of the Draft EIR	51	Sweetwater	Cost Effectiveness
					Pp. 7-8 to 7-9 of the Draft EIR	52	Sweetwater	Cost Effectiveness
					Pg. 7-9 of the Draft EIR	53	Sweetwater	Cost Effectiveness
					Pg. 7-11 of the Draft EIR	54	Sweetwater	Cost Effectiveness
					Pp. 7-9 of the Draft EIR	55	Sweetwater	Cost Effectiveness
					Pp. 7-12 to 7-14 of the Draft EIR	56	Sweetwater	Cost Effectiveness
					Pg. 7-15 of the Draft EIR	57	Sweetwater	Cost Effectiveness
					Pg. 7-15 of the Draft EIR	58	Sweetwater	Cost Effectiveness
					Pg. 7-17 of the Draft EIR	59	Sweetwater	Cost Effectiveness
					Pg. 7-20 of the Draft EIR	60	Sweetwater	Cost Effectiveness
					Pg. 7-22 of the Draft EIR	61	Sweetwater	Cost Effectiveness
					Pg. 7-24 of the Draft EIR	62	Sweetwater	Cost Effectiveness
					Pp. 7-24 to 7-26 of the Draft EIR	63	Sweetwater	Cost Effectiveness
					Pg. 7-27 of the Draft EIR	64	Sweetwater	Cost Effectiveness
					Pg. 7-27 of the Draft EIR	65	Sweetwater	Cost Effectiveness
					Pg. 7-29 of the Draft EIR	66	Sweetwater	Cost Effectiveness
					Pg. 7-29 of the Draft EIR	67	Sweetwater	Cost Effectiveness
					Pg. 7-31 of the Draft EIR	68	Sweetwater	Cost Effectiveness
90	Sweetwater Authority	2011	2010 Urban Water Management Plan	June	Pg. 25	7	Sweetwater	Primary
						10	Sweetwater	

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
91	Sweetwater Authority	2014	WaterSMART: Title XVI Water Reclamation and Reuse Program Technical Proposal	January	Pg. 13	2	Sweetwater	Technical Basis
					Pg. 41	5	Sweetwater	Phasing
					Table 3-17 (Pg. 43)	42	Sweetwater	G
					Table 3-17 (Pg. 43)	43	Sweetwater	G
					Table 3-18 (Pg. 44)	44	Sweetwater	G
					Table 3-18 (Pg. 44). Converted from 2012 to 2014 dollars using CPI Inflation Calculator (http://www.bls.gov/data/inflation_calculator.htm)	100	Fallbrook	Background
					Table 3-18 (Pg. 44)	179	Carlsbad	Background
					Table 3-18 (Pg. 44). Converted from 2012 to 2014 dollars using CPI Inflation Calculator (http://www.bls.gov/data/inflation_calculator.htm)	242	SDCWA	Background
					Table 3-18 (Pg. 44)	267	SDCWA	G
					Table 3-18 (Pg. 44)	349	City-Cons.	G
					Table 3-18 (Pg. 44)	412	Rincon	G
					Table 3-18 (Pg. 44)	487	City-Hodges	G
92	Sweetwater Authority and City of San Diego	2013	Settlement Agreement Between Sweetwater Authority and City of San Diego Regarding Joint Expansion of Richard A. Reynolds Desalination Facility	August 28	Pg. 10	3	Sweetwater	Technical Basis
					Pg. 1	11	Sweetwater	Primary
					Pg. 4	12	Sweetwater	Primary
					-	48	Sweetwater	FACILITIES
93	The Sustainable Sites Initiative	2009	The Case for Sustainable Landscapes	-	Pg. 37	245	SDCWA	Background
					Pp. 36-37	269	SDCWA	M
					Pg. 37	270	SDCWA	M
					Pp. 36-37	271	SDCWA	M
					Pg. 37	272	SDCWA	M
94	US Bureau of Labor Statistics		CPI Inflation Calculator	-	http://www.bls.gov/data/inflation_calculator.htm	41	Sweetwater	E
						45	Sweetwater	G
						120	Fallbrook	E
						194	Carlsbad	E
						264	SDCWA	E
						268	SDCWA	G
						344	City-Cons.	E
						350	City-Cons.	G
						408	Rincon	E
						413	Rincon	G
						486	City-Hodges	E
						488	City-Hodges	G
						491	City-Hodges	G

(a) Appendix Entry	(b) Author	(c) Year	(d) Title	(e) Date	(f) Location	(g) Ref. #	(h) Project	(i) Benefit
95	US Environmental Protection Agency (USEPA)	2014	eGRID 9th edition Version 1.0 Year 2010 Summary Tables	February	http://www.epa.gov/cleanenergy/energy-resources/egrid/	37	Sweetwater	D
						114	Fallbrook	
						116	Fallbrook	
						188	Carlsbad	
						190	Carlsbad	
						259	SDCWA	
						339	City-Cons.	
						403	Rincon	
						482	City-Hodges	
96	US EPA	2009	Municipal Solid Waste Generation, Recycled, and Disposal in the United States: Facts and Figures for 2009	-	Pg. 4	246	SDCWA	Background
97	US Fish and Wildlife Service	2014	South San Diego Bay Unit	-	http://fws.gov/refuge/San_Diego_Bay/wildlife_and_habitat/South_San_Diego_Bay_Unit.html	46	Sweetwater	K
98	Waste Management	2013	Phone Call with Waste Management	February 8	Available: 714-558-7761	248	SDCWA	Background
99	WateReuse	2011	Seawater Desalination Power Consumption White Paper	November	Table 2 (Pg. 15)	35	Sweetwater	D
100	Watts	2010	23 Questions and Answers About Water Pressure Reducing Valves	-	Pg. 8	325	City-Cons.	Background
					Pg. 8	352	City-Cons.	I
					Pg. 3	282	City-Cons.	Technical Basis
101	Watts	-	Water Safety & Flow Control Support – Frequently Asked Questions: Water Pressure Regulators	Accessed July 2, 2014	http://www.watts.com/pages/faq.asp?catId=64&faqId=7#73	287	City-Cons.	Phasing

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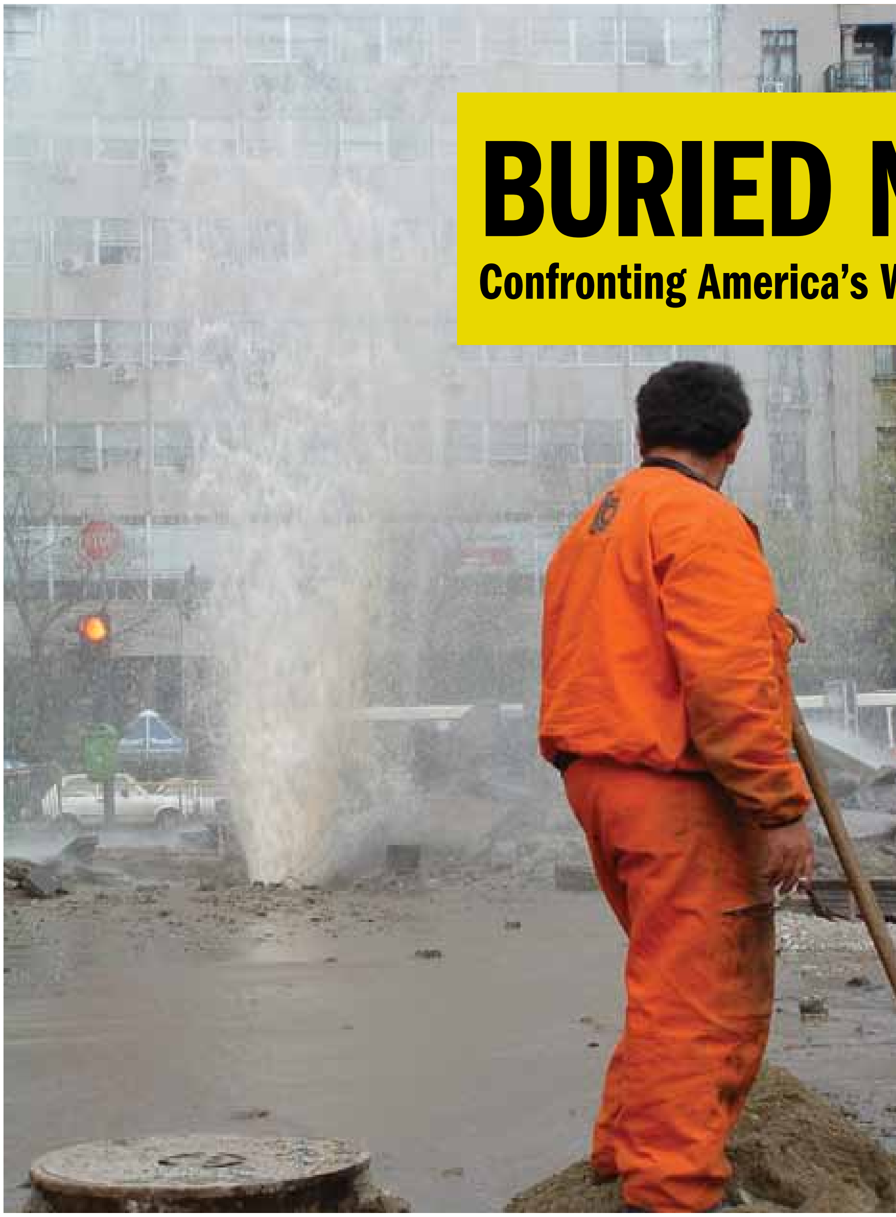

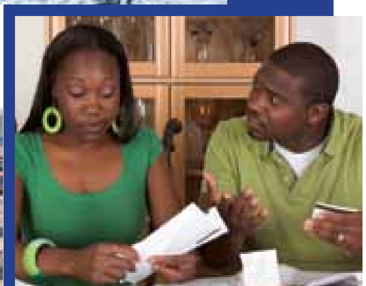

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projections of demographic trends allowed the development of infrastructure need profiles for growth through 2050 in each of the regions and utility size categories (for the latter purpose, city size was used as a proxy for utility size).

The study generally assumes that utilities continue efforts to manage the number of main breaks that occur per mile of pipe rather than absorb increases in pipe failures. That is, the study assumes utilities will strive to maintain current levels of service rather than allow increasing water service outages. We assume that each utility's objective is to make these investments at the optimal time for maintaining current service levels and to avoid replacing pipes while the repairs are still cost-effective. Ideally, pipe replacement occurs at the end of a pipe's "useful life"; that is, the point in time when replacement or rehabilitation becomes less expensive in going forward than the costs of numerous unscheduled breaks and associated emergency repairs.

With this data in hand and using the assumptions above, we projected the "typical" useful service life of the pipes in our inventory using the "Nessie Model"™. The model embodies pipe failure probability distributions based on many utilities' current operating experiences, coupled with insights from extensive research and professional experiences with typical pipe conditions at different ages and sizes, according to pipe material. The analysis used seven different types of pipe in three diameters and addressed pipe inventories dating back to 1870. Estimated typical service lives of pipes are

Figure 5: Average Estimated Service Lives by Pipe Materials (average years of service)

Derived Current Service Lives (Years)	CI	CICL (LSL)	CICL (SSL)	DI (LSL)	DI (SSL)	AC (LSL)	AC (SSL)	PVC	Steel	Conc & PCCP
Northeast Large	130	120	100	110	50	80	80	100	100	100
Midwest Large	125	120	85	110	50	100	85	55	80	105
South Large	110	100	100	105	55	100	80	55	70	105
West Large	115	100	75	110	60	105	75	70	95	75
Northeast Medium & Small	115	120	100	110	55	100	85	100	100	100
Midwest Medium & Small	125	120	85	110	50	70	70	55	80	105
South Medium & Small	105	100	100	105	55	100	80	55	70	105
West Medium & Small	105	100	75	110	60	105	75	70	95	75
Northeast Very Small	115	120	100	120	60	100	85	100	100	100
Midwest Very Small	135	120	85	110	60	80	75	55	80	105
South Very Small	130	110	100	105	55	100	80	55	70	105
West Very Small	130	100	75	110	60	105	65	70	95	75

LSL indicates a relatively long service life for the material resulting from some combination of benign ground conditions and evolved laying practices etc.
SSL indicates a relatively short service life for the material resulting from some combination of harsh ground conditions and early laying practices, etc.

TOPICS IN SUBTROPICS

A collaborative blog by UC farm advisors and specialists in subtropical horticulture in California.

Avocado Farming with High-Priced Water. Can It Remain Profitable?

Author: Gary S. Bender **April 3, 2012**

Water prices in San Diego County continue to increase and there is no end in sight, especially with periodic drought years and California losing some share of its Colorado River water. It is easy to see the response from growers; water is being turned off in many of our districts leaving acres and acres of dying trees. The water districts get nervous because there is not enough money coming in to cover their fixed costs, so they raise the price of water. And, they raise it again.

The math is simple. Some of our water districts are selling water to growers for $1200 - $1300 per acre foot. At a water requirement of about four acre feet per acre for avocados in the inland areas of San Diego County, water will cost $4800 - $5200/acre per year. If you are producing 5000 lbs per acre (the average yield in California for the last five years) and receive $1/lb for your fruit, you get less than your water costs. And that doesn't consider labor costs, fertilizer, taxes, insurance, vehicle costs etc. Profits? Are you kidding?

Are we done? Either prices for our fruit have to increase, or we have to increase the yield per acre. As for prices, we don't have control over market prices; they rise and fall with demand by consumers, on and off years in our groves and interference with Mexican, Chilean and now Peruvian imports.

Can we increase yield per acre? The private consultants and the farm advisors have spent our careers trying to help growers with proper irrigation scheduling and balancing out the pressures and flows, proper fertilization, controlling thrips and persea mites at the right time, and dealing with avocado root rot (which continues to be a huge problem). Despite good farming practices yields per acre have not increased dramatically for most growers. To be fair, some growers are doing quite well with good farming practices, good weather and good soil. but It will probably take a ***dramatic*** increase for most of the growers to stay in business in San Diego County.

I saw a dramatic increase in yield per acre recently in two groves, one in Temecula (owned by John Cornell) and one in the southern area of Escondido (owned by Steve Howerzyl). The Temecula grove produced over 30,000 lbs/ac in the sixth year from planting and the Escondido grove produced 24,195 lbs/ac in the fifth year. Both are high-density groves planted on a 10' x 10' spacing (435 trees/acre). This kind of production is exciting and might bring hope to avocado production for the future in San Diego County. Yield data is supplied in Table 1 and 2.

Table 1. Hass avocado yield data supplied by the grower for a high density planting in Temecula. 384 trees /acre = 0.88 acre. Yield data adjusted to pounds/acre.

2004 planted	0
2005	0
2006	2,727 (est.)
2007	3,636 (est.)
2008	2,727 (est.)
2009	4,545
2010	32,727
2011	4,318

Table 2. Hass avocado yield data supplied by the grower for a high density, non-pruned planting in Escondido. Yield data is supplied in pounds/acre.

2006 planted	0
2007	0
2008	0
2009	5,080
2010	7,656
2011	24,195

However, both groves have problems!

The Temecula grove had a low fruit set in the spring of 2011. (This was the reason I was called out to look at it). Of course a large part of the problem is the inherent on/off cycle in avocados. However, in order to keep these trees in a high density situation without crowding, the grower had to prune the trees. In the late winter/early spring of 2011 every tree was pruned on all sides and topped at 8-9 feet. This effectively removed a lot of the fruiting wood and the trees had a reduced flowering and fruit set as a result. Remember, the Hass avocado flowers and sets fruit primarily on the outside of the tree canopy.

The Escondido grove was not pruned and all of the trees had grown into each other, creating an incredibly crowded grove. It was so crowded that the irrigator was complaining that he couldn't get through the grove to check the sprinklers. The grower commented that his plan was to remove all of the trees in the eighth year and start over again according to the Hofshi idea that was suggested several years ago. (More on this later in this article).

I like the idea of close spacing for increasing yield per acre, but both groves need a good idea for maintaining the spacing and yet produce fruit every year. I proposed pruning in a three year rotation; the southwest side would be pruned the first year, the northeast side pruned in the second year, and the tree would be topped at eight feet in the third year. Then the whole process would start over again. By using this method there would always be fruiting wood on the tree. And it is an easy method to teach grove workers.

The only problem with this pruning idea is that we have never tried this in a trial. This is why I proposed a trial to the California Avocado Commission to set up a high density trial with Hass and Lamb Hass, comparing two pruning methods: complete pruning each year vs. the three year rotation idea. The Commission liked the idea and they funded the trial, along with grower education classes. The trial and the classes will commence in the summer of 2012.

High Density Avocado Plantings. High density plantings were proposed in California in an article in Subtropical Fruit News by Fallbrook grower Reuben Hofshi in 1999. Hofshi stated that the underlying premises for planting on close spacing were:

1. To compete in the international market with low avocado prices will require more efficient farming and a significant increase in productivity.
2. Young trees are vigorous, produce large fruit early, have better canopy to root ratio and reach peak productivity approximately by 7 to 8 years.
3. Smaller trees are easier and less expensive to harvest, particularly when sixe picking is done, and are very amenable to snap harvest.
4. Spraying for different pests may become a way of life; smaller trees are probably the only ones that could be efficiently sprayed by ground rigs in hilly terrain."

In the last few years in California we are seeing a severe reduction in our labor force for harvesting. Pickers are getting picky; they have cell phones and they can call around to find the groves that can be harvested from the ground. Lugging a ladder around on a steep slope is just not desirable, and they can make a lot more money if they don't have to use ladders.

Researchers in other countries have been interested in high density plantings and many of the new plantings in Chile are planted in high density patterns. Ernst and Ernst, growers and nursery owners in South Africa maintain that high density can only be successful if the trees are pruned to a central leader immediately after planting, and maintained in that manner through the life of the tree. They are working with a Hass-like variety known as 'Maluma' which has more of a natural central leader than does 'Hass'.

Pruning. Growers in California have traditionally avoided pruning. Other than stumping periodically if the trees get too tall, not much pruning is done. One of the reasons is the labor to prune. It is difficult to determine from work done in foreign countries how much labor is involved in high density because many of the areas use the growth retardant paclobutrazol, a chemical we are not allowed to use in the U.S. We will keep track of our labor costs in our trial and will report this to growers interested in high density plantings.

Can avocado growers survive in a county with high priced water? Possibly. High density plantings may be one solution to a really serious problem. But growers must continue with good farming practices such as a complete leaf analysis each year along with proper irrigation scheduling.

Literature Cited:

Hofshi, R. 1999. High density avocado planting – an argument for replanting trees. Subtropical Fruit News. Vol. 8 (1).

Ernst, Z.R. and A.A. Ernst. 2011. High density planting: a case study of central leader pruning with Maluma. Proc. VII World Avocado Congress 2011, Cairns, Australia 5-7 Sept. 2011.

Attached Files

Avocado Farming with High Water Costs

Steve Howerzyl in his high density avocado grove.

Tags: avocado (11), high density (1), pruning (1)
Comments: 1

Comments:

by Gary S. Bender
on April 5, 2012 at 2:10 PM
Hey, great article!

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CALFED BAY-DELTA PROGRAM ARCHIVED WEBSITE

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- CALFED Agencies
- Calendar
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- Careers
- Contacts
- Contracts and Grants
- Environmental Justice
- Legislation
- Library
- Program Plans
- Public Record Guidelines
- Tribal

- Bay-Delta Conservation Plan
- Delta Vision

CALFED Bay-Delta Program

What's New

CALFED WEBSITE TRANSITIONED TO ARCHIVE

Posted: 1/12/2012

The CALFED Bay-Delta Program website is now a static archive, marking the tranistion of the organization from the CALFED Bay-Delta Program to the Delta Stewardship council. This site will remain as a historical archive. Please refer to the Delta Stewardship Council website for current information.

- **Request for Qualifications to assist in developing Delta Plan**
  Published: 1/26/2010
- **Ecosystem Restoration Workshop Panel Report Released**
  Published: 1/6/2010
- **National Science Panel to Review Key Delta Issues and Biological Opinions**
  Published: 12/21/2009

MORE

CALFED Objectives

Water Quality | Water Supply | Ecosystem Restoration | Levee Integrity

Approximately two-thirds of all Californians - an estimated 23 million people - obtain at least some of their water from the Delta. This means the Sacramento-San Joaquin Delta is the single largest source of California's water. CALFED's Water Quality Program Objective is to invest in projects that improve the state's water quality from source to tap.

MORE

2013 California Plumbing Code

California Code of Regulations
Title 24, Part 5

California Building
Standards Commission

Based on 2012 Uniform Plumbing Code®

EFFECTIVE
January 1, 2014
(For Errata and Supplements, See History Note Appendix)

cold-water systems to permit servicing or replacement of piping or equipment. Stop valves shall be provided at each fixture.

607.0 Gravity Supply Tanks.

607.1 General. Gravity tanks for potable water shall be tightly covered, and have not less than a 16 square inch (0.01 m^2) overflow screened with copper screen having not less than 14 nor exceeding 18 openings per linear inch (25.4 mm).

607.2 Potable Water Tanks. Potable water tanks, interior tank coatings, or tank liners intended to supply drinking water shall be in accordance with NSF 61.

608.0 Water Pressure, Pressure Regulators, Pressure Relief Valves, and Vacuum Relief Valves.

608.1 Inadequate Water Pressure. Where the water pressure in the main or other source of supply will not provide a residual water pressure of not less than 15 pounds force per square inch (psi) (103 kPa), after allowing for friction and other pressure losses, a tank and a pump or other means that will provide said 15 psi (103 kPa) pressure shall be installed. Where fixtures, fixture fittings, or both are installed that require residual pressure exceeding 15 psi (103 kPa), that minimum residual pressure shall be provided.

608.2 Excessive Water Pressure. Where static water pressure in the water supply piping is exceeding 80 psi (552 kPa), an approved-type pressure regulator preceded by an adequate strainer shall be installed and the static pressure reduced to 80 psi (552 kPa) or less. Pressure regulator(s) equal to or exceeding 1½ inches (38 mm) shall not require a strainer. Such regulator(s) shall control the pressure to water outlets in the building unless otherwise approved by the Authority Having Jurisdiction. Each such regulator and strainer shall be accessibly located aboveground or in a vault equipped with a properly sized and sloped bore-sighted drain to daylight, shall be protected from freezing, and shall have the strainer readily accessible for cleaning without removing the regulator or strainer body or disconnecting the supply piping. Pipe size determinations shall be based on 80 percent of the reduced pressure where using Table 610.4. An approved expansion tank shall be installed in the cold water distribution piping downstream of each such regulator to prevent excessive pressure from developing due to thermal expansion and to maintain the pressure setting of the regulator. Expansion tanks used in potable water systems intended to supply drinking water shall be in accordance with NSF 61. The expansion tank shall be properly sized and installed in accordance with the manufacturer's installation instructions and listing. Systems designed by registered engineers shall be permitted to use approved pressure relief valves in lieu of expansion tanks provided such relief valves have a maximum pressure relief setting of 100 psi (689 kPa) or less.

608.3 Expansion Tanks, Combination Pressure, and Temperature Relief Valves. A water system provided with a check valve, backflow preventer, or other normally closed device that prevents dissipation of building pressure back into the water main shall be provided with an approved, listed, and adequately sized expansion tank or other approved device having a similar function to control thermal expansion. Such expansion tank or other approved device shall be installed on the building side of the check valve, backflow preventer, or other device and shall be sized and installed in accordance with the manufacturer's installation instructions.

A water system containing storage water heating equipment shall be provided with an approved, listed, adequately sized combination pressure and temperature relief valve, except for listed nonstorage instantaneous heaters having an inside diameter of not more than 3 inches (80 mm). Each such approved combination temperature and pressure relief valve shall be installed on the water-heating device in an approved location based on its listing requirements and the manufacturer's installation instructions. Each such combination temperature and pressure relief valve shall be provided with a drain in accordance with Section 608.5.

608.4 Pressure Relief Valves. Each pressure relief valve shall be an approved automatic type with drain, and each such relief valve shall be set at a pressure of not more than 150 psi (1034 kPa). No shutoff valve shall be installed between the relief valve and the system or in the drain line.

608.5 Drains. Relief valves located inside a building shall be provided with a drain, not smaller than the relief valve outlet, of galvanized steel, hard-drawn copper piping and fittings, CPVC, PP, or listed relief valve drain tube with fittings that will not reduce the internal bore of the pipe or tubing (straight lengths as opposed to coils) and shall extend from the valve to the outside of the building, with the end of the pipe not more than 2 feet (610 mm) nor less than 6 inches (152 mm) aboveground or the flood level of the area receiving the discharge and pointing downward. Such drains shall be permitted to terminate at other approved locations. Relief valve drains shall not terminate in a building's crawl space. No part of such drain pipe shall be trapped or subject to freezing. The terminal end of the drain pipe shall not be threaded.

608.6 Water-Heating Devices. A water-heating device connected to a separate storage tank and having valves between said heater and tank shall be provided with an approved water pressure relief valve.

608.7 Vacuum Relief Valves. Where a hot-water storage tank or an indirect water heater is located at an elevation above the fixture outlets in the hot-water system, a vacuum relief valve shall be installed on the storage tank or heater.

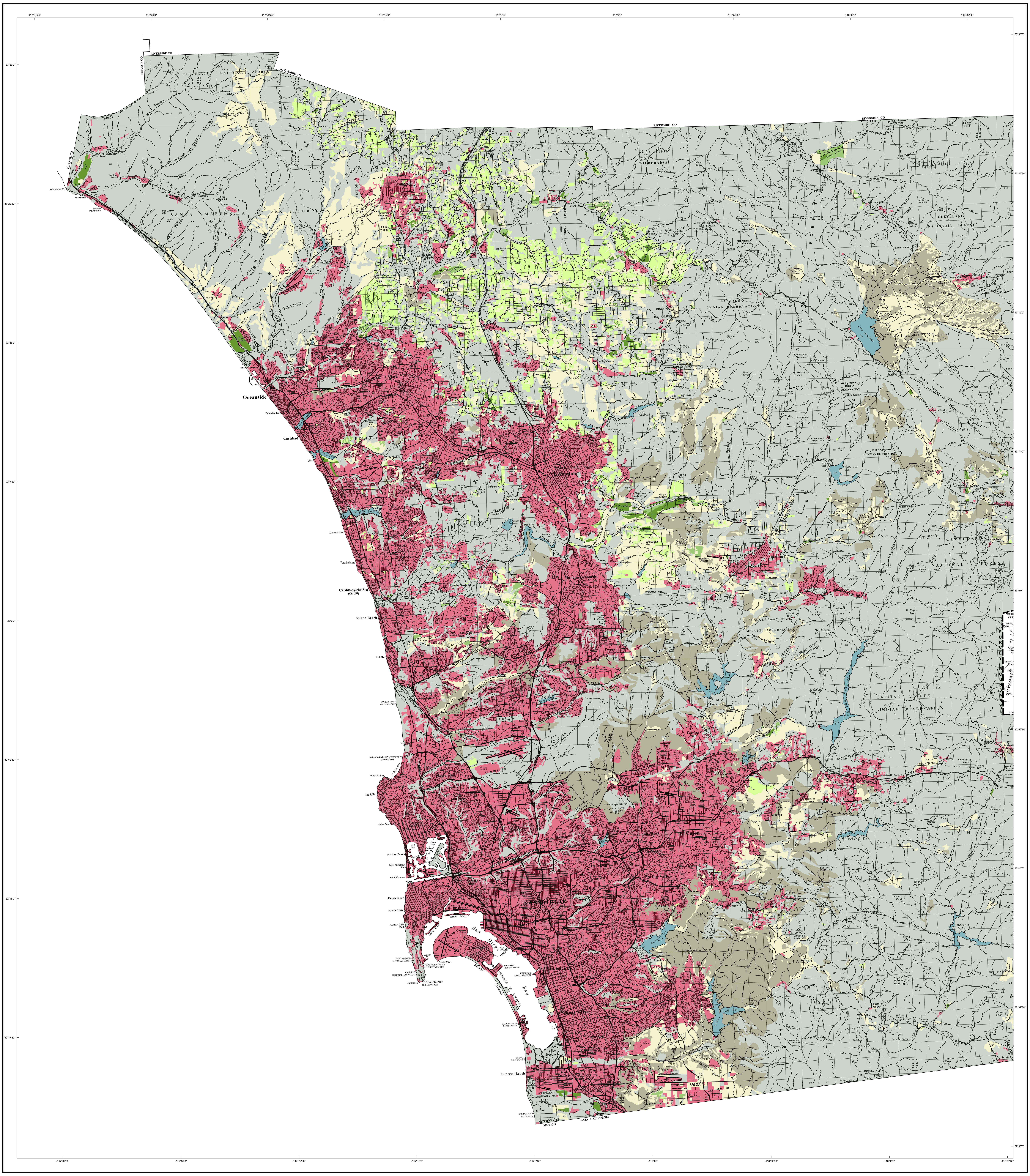
609.0 Installation, Testing, Unions, and Location.

609.1 Installation. Water piping shall be adequately supported in accordance with Table 313.1. Burred ends shall be reamed to the full bore of the pipe or tube. Changes in direction shall be made by the appropriate use of fittings, except that changes in direction in copper tubing shall be permitted to be made with bends, provided that such bends are made with bending equipment that does not deform or create a loss in the cross-sectional area of the tubing. Changes in direction are allowed with flexible pipe and tubing without fittings in accordance with the manufacturer's instructions. Provisions shall be made for expansion in hot-

STATE OF CALIFORNIA
Edmund G. Brown Jr., *Governor*
THE NATURAL RESOURCES AGENCY
John Laird, *Secretary*
DEPARTMENT OF CONSERVATION
Mark Nechodom, *Director*

SAN DIEGO COUNTY IMPORTANT FARMLAND 2010
SHEET 1 0F 2

CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF LAND RESOURCE PROTECTION
FARMLAND MAPPING AND MONITORING PROGRAM



PRIME FARMLAND

PRIME FARMLAND HAS THE BEST COMBINATION OF PHYSICAL AND CHEMICAL FEATURES ABLE TO SUSTAIN LONG-TERM AGRICULTURAL PRODUCTION. THIS LAND HAS THE SOIL QUALITY, GROWING SEASON, AND MOISTURE SUPPLY NEEDED TO PRODUCE SUSTAINED HIGH YIELDS. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

FARMLAND OF STATEWIDE IMPORTANCE

FARMLAND OF STATEWIDE IMPORTANCE IS SIMILAR TO PRIME FARMLAND BUT WITH MINOR SHORTCOMINGS, SUCH AS GREATER SLOPES OR LESS ABILITY TO STORE SOIL MOISTURE. LAND MUST HAVE BEEN USED FOR IRRIGATED AGRICULTURAL PRODUCTION AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

UNIQUE FARMLAND

UNIQUE FARMLAND CONSISTS OF LESSER QUALITY SOILS USED FOR THE PRODUCTION OF THE STATE'S LEADING AGRICULTURAL CROPS. THIS LAND IS USUALLY IRRIGATED, BUT MAY INCLUDE NONIRRIGATED ORCHARDS OR VINEYARDS AS FOUND IN SOME CLIMATIC ZONES IN CALIFORNIA. LAND MUST HAVE BEEN CROPPED AT SOME TIME DURING THE FOUR YEARS PRIOR TO THE MAPPING DATE.

FARMLAND OF LOCAL IMPORTANCE

LAND THAT MEETS ALL THE CHARACTERISTICS OF PRIME AND STATEWIDE, WITH THE EXCEPTION OF IRRIGATION.

FARMLANDS NOT COVERED BY THE ABOVE CATEGORIES BUT ARE OF SIGNIFICANT ECONOMIC IMPORTANCE TO THE COUNTY. THEY HAVE A HISTORY OF GOOD PRODUCTION FOR LOCALLY ADAPTED CROPS. THE SOILS ARE GROUPED IN TYPES THAT ARE SUITED FOR TRUCK CROPS (SUCH AS TOMATOES, STRAWBERRIES, CUCUMBERS, POTATOES, CELERY, SQUASH, ROMAINE LETTUCE, AND CAULIFLOWER) AND SOILS SUITED FOR ORCHARD CROPS (AVOCADOS AND CITRUS).

GRAZING LAND

GRAZING LAND IS LAND ON WHICH THE EXISTING VEGETATION IS SUITED TO THE GRAZING OF LIVESTOCK.

URBAN AND BUILT-UP LAND

URBAN AND BUILT-UP LAND IS OCCUPIED BY STRUCTURES WITH A BUILDING DENSITY OF AT LEAST 1 UNIT TO 1.5 ACRES, OR APPROXIMATELY 6 STRUCTURES TO A 10-ACRE PARCEL. COMMON EXAMPLES INCLUDE RESIDENTIAL, INDUSTRIAL, COMMERCIAL, INSTITUTIONAL FACILITIES, CEMETERIES, AIRPORTS, GOLF COURSES, SANITARY LANDFILLS, SEWAGE TREATMENT, AND WATER CONTROL STRUCTURES.

OTHER LAND

OTHER LAND IS LAND NOT INCLUDED IN ANY OTHER MAPPING CATEGORY. COMMON EXAMPLES INCLUDE LOW DENSITY RURAL DEVELOPMENTS, BRUSH, TIMBER, WETLAND, AND RIPARIAN AREAS NOT SUITABLE FOR LIVESTOCK GRAZING, CONFINED LIVESTOCK, POULTRY, OR AQUACULTURE FACILITIES, STRIP MINES, BORROW PITS, AND WATER BODIES SMALLER THAN 40 ACRES. VACANT AND NONAGRICULTURAL LAND SURROUNDED ON ALL SIDES BY URBAN DEVELOPMENT AND GREATER THAN 40 ACRES IS MAPPED AS OTHER LAND.

WATER

PERENNIAL WATER BODIES WITH AN EXTENT OF AT LEAST 40 ACRES.

SCALE: 1:120,000
1 inch represents approximately 2 miles

1 0 1 2 3 4 5 6 7 8 9 10 Kilometers
1 0 1 2 3 4 5 Miles

10 40 160 1 mile

The minimum land use mapping unit is 10 acres, except Water, which is mapped to a minimum of 40 acres.

1 square mile = 640 acres.

SHEET 1 OF 2

Total County Area - 2,712,200 acres
Mapped Area - 2,166,694 acres

Important Farmland Maps are compiled by the Farmland Mapping and Monitoring Program (FMMP) pursuant to Section 65570 of the California Government Code. To create the maps, FMMP combines current land use information with U.S. Department of Agriculture-Natural Resources Conservation Service (NRCS) soil survey data. Soil units qualifying for Prime Farmland and Farmland of Statewide Importance are determined by the NRCS. Changes to soil profiles subsequent to publication of NRCS soil surveys are not reflected on this map. This map was developed using NRCS digital soil data (SSURGO) and may contain individual soil units as small as one acre.

Land use status is determined using current and historic aerial imagery, supplemental GIS data, and field verification. Imagery sources may include public domain datasets, web-based information, and commercially purchased data, depending on data availability. Supplemental data on land management status is obtained from federal, state, and local governments. Map reviewers at the local level contribute valuable information with their comments and suggestions. Please refer to FMMP field analyst reports for each county to obtain specific citations.

Cultural base information for the Important Farmland Maps was derived from public domain data sets, based upon design of the U.S. Geological Survey, with updates generated by digitizing over current imagery.

This map should be used within the limits of its purpose - as a current inventory of agricultural land resources. This map does not necessarily reflect general plan or zoning designations, city limit lines, changing economic or market conditions, or other factors which may be taken into consideration when land use policies are determined. This map is not designed for parcel-specific planning purposes due to its scale and the ten-acre minimum land use mapping unit. Classification of important farmland and urban areas on this map is based on best available data. The information has been delineated as accurately as possible at 1:24,000-scale, but no claim to meet 1:24,000 National Map Accuracy Standards is made due to variations in the quality of source data.

The Department of Conservation makes no warranties as to the suitability of this product for any particular purpose.

Additional data is available at www.conservation.ca.gov/dlrp/fmmp, including detail on the program, full size PDF maps, map categories, statistics, field summaries, and GIS data for download. Contact the:

Farmland Mapping and Monitoring Program
801 K Street, MS 18-01
Sacramento, CA 95814
Phone: (916) 324-0859
e-mail: fmmp@conservation.ca.gov

Map published March 2013.

CARLSBAD ENERGY CENTER PROJECT

Commission Decision

JUNE 2012
CEC-800-2011-004-CMF

CALIFORNIA
ENERGY COMMISSION
Edmund G. Brown, Jr., Governor

DOCKET NUMBER 07-AFC-06

steam boilers that provided the initial electrical generation) would be permanently retired once the CECP is approved and operational. EPS Units 4 and 5, part of a subsequent EPS expansion that occurred in the late 1970s, would continue generating electricity regardless of this proceeding or its outcome. However the Applicant has committed to planning for the removal and redevelopment of the portion of the EPS complex containing Units 1 through 5 once all of the units are no longer needed for the reliable operation of the electricity system. See conditions of certification **Land-2** and **Land-3** and the related discussion in the Land Use section of this Decision.

The CECP would connect its nominal 540 MWs of electricity to the existing, slightly modified, Encina 138 kilo-volt (kV) switchyard, and to a proposed new Encina 230-kV switchyard (which would be built and located at San Diego Gas & Electric's Cannon Substation, located immediately south of the proposed CECP site). Transmission interconnections to these two switchyards would be comprised of an overhead line from CECP Unit 6 to the existing 138-kV switchyard, and a combined, above and below ground cable from CECP Unit 7 to the proposed new 230-kV substation.

Natural gas would be provided through a new 1,100-foot interconnection to an existing Southern California Gas Company high pressure natural gas line located adjacent to the CECP site. The new CECP units would be natural gas-fired only, with no fuel oil emergency backup capability whatsoever.

The new CECP facility would use evaporative air cooling, eliminating the existing EPS generators' daily need for large quantities of seawater for purposes of once-through cooling. The minimal industrial, wash-down and associated water necessary for CECP's industrial steam and landscape irrigation would be approximately 700,000 gallons per day. This decision permits the use of alternate water supplies for the purpose—recycled water supplied by the City of Carlsbad or another supplier or desalinated water created by an on-site desalination unit drawing ocean water from the adjoining lagoon.

The Energy Commission has exclusive jurisdiction to license this project and is considering the proposal under a review process established by Public Resources Code section 25540.6.

Embedded Energy in Water Pilot Programs Impact Evaluation

Final Report

Prepared for the California Public Utilities Commission Energy Division

March 9, 2011

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conducted proactive leak detection for each agency, and the agencies repaired all of the found leaks.

7. **SDG&E Managed Landscapes** – SDG&E hired a contractor to install proprietary equipment and software that converts conventional irrigation controllers into controllers that utilize daily evapotranspiration (ETo) and weather information to automatically and dynamically control the amount of water used for irrigation. SDG&E paid for the first year equipment and installation costs at each site, after which participants could sign an agreement with the contractor for continued services. Water savings incentives were also available from MWD, although this was not part of the core program design. The program was conducted in the San Diego region and targeted multifamily apartment complexes, condominiums, office parks, commercial properties, homeowner associations, and estate properties with at least four irrigated acres.

8. **SDG&E Recycled Water Retrofits –** This Pilot increased the use of recycled water by providing capital funding for planned retrofit projects that switched from a potable water source to a recycled water source.

9. **SDG&E Large Customer Audits** – For this Pilot, SDG&E provided capital funding to install water conservation measures at sites that had received prior water audits and where the customer had not yet acted to implement any of the identified measures. The second element of the Pilot developed and implemented new, integrated water/energy audits for large commercial, industrial and institutional high water users in San Diego County, expecting that some of these measures would be installed during the program period.

Evaluation Objectives and Methods

The primary purpose of the evaluation was to identify, estimate and quantify the amount of embedded energy savings (kWh, therms) associated with the water savings arising from the water efficiency measures in the programs approved in D. 07-12-050. So that the energy savings impact of various water saving measures deployed under the pilot programs could be understood, the evaluation was to quantify the amount of energy needed to bring water supplies to end-users' facilities.. During the evaluation scoping, the objectives were further refined and are listed below:

1. To learn if the Pilots do or can result in significant *energy* savings;
2. To provide information that the IOUs can use for water program cost-effectiveness and TRC calculations, and to determine if these water programs should become part of future energy efficiency program portfolios;
3. To provide information to enhance the CPUC's E3 Calculator or new program planning tools for water and embedded energy savings; and
4. To develop and test evaluation methods.

The evaluation of the Pilots had two primary components:

1. **End use water savings measurement.** Most of the evaluations utilized direct water metering of individual measures or housing units (e.g., for SCE HETs) for 2 to 4 weeks before and after

10 SDG&E Managed Landscapes Pilot Program

10.1 Program Description

The Managed Landscape Water Pilot Program (MLPP) consisted of converting conventional irrigation controllers into controllers that utilized daily evapotranspiration (ETo) and weather information to control the amount of water used for irrigation. The pilot project focused on efficient use of outdoor potable water used for aesthetic landscapes. A total of thirteen sites in the San Diego area were involved in the pilot program; four of which were selected for evaluation. All four samples were selected after the pilot period had ended. Participants included multifamily apartment complexes, condominiums, office parks, commercial properties, homeowner associations, and estate properties. All sites were owned by third parties. SDG&E issued a competitive bid solicitation to implement this pilot, and a water management service company was selected to install and monitor the systems at each site.

For most of the sites, all metered water was used for irrigation. In only one case, some water was used for irrigation and some was used for other end-uses such as restrooms, drinking water fountains or laundry areas. The former type of project is referred to as having a dedicated end-use meter. The latter type of project is referred to as having a mixed end-use meter. The water savings achieved by the use of the vendor's technology is indifferent to the type of end-use metered project since the water savings are only on the irrigation systems. Due to the substantially greater cost to evaluate a project with a mixed end-use meter, only sites with dedicated irrigation meters were sampled for this evaluation. Any bias introduced by this screening criterion was expected to be negligible.

All of the projects in the MLPP involved the installation of the vendor's irrigation control system on managed landscapes. The specific control schemes used are proprietary to the vendor, were not disclosed to us, and are not discussed in this report. Because all of the projects involved implemented this same water saving measure, the same procedure was used to evaluate each sampled project.

10.2 Methods

10.2.1 Data Collection Methods

Pre-measure water usage data from billing meters (gathered by the vendor from the water utility for each site) were obtained from 2006 up to the month that the measure was implemented. Post-measure data were obtained from the same billing meters from the month that the measure was implemented up to December 2009. Vendor-supplied billing meter data were spot checked with billing meter data obtained directly from the water utilities to ensure the accuracy of the vendor data.

Factors such as recent or planned changes in vegetation, mulching and irrigation area were investigated during pre-measure on-site interviews and by telephone interviews at the end of the post-measure period. Due to budget constraints, site observations could not be made for the post-measure period. No site changes that would affect the amount of irrigation water needed were reported at any of the four sampled sites. Therefore, no adjustments to the amount of water

The evaluation annual savings for each of the nine sites was then calculated by multiplying the vendor annual savings by the average realization rate (1.004). The results are shown in Table 57.

Table 57: Annual Evaluation Savings – All Sites (Including Extrapolation to Non-Sampled Sites)

Site		Meter Type	Vendor YTD Savings (HCF)	Last Meter Read Date	Measure Installation Date	Elapsed Days	Calculated Vendor Annual Savings (HCF)	Calculated Annual Evaluation Savings (HCF)	Savings per Acre (HCF/ Acre)
M1 Residential Development	**Sampled Site**	Dedicated						2,781	404
M2 University	**Sampled Site**	Dedicated						1,076	301
M3 Residential Development	**Sampled Site**	Dedicated						6,582	1,324
M4 Residential Development	**Sampled Site**	Dedicated						6,256	973
M5 Residential Development	Non-Sampled Site	Dedicated	3,152	12/20/2009	11/25/2008	390	2,950	2,962	642
M6 Apartment Complex	Non-Sampled Site	Dedicated	6,478	12/18/2009	11/25/2008	388	6,094	6,118	836
M7 Residential Development	Non-Sampled Site	Dedicated	1,288	12/31/2009	6/4/2009	210	2,239	2,248	502
M8 Apartment Complex	Non-Sampled Site	Dedicated	8,893	12/14/2009	11/25/2008	384	8,453	8,487	908
M9 Residential Development	Non-Sampled Site	Dedicated	7,324	1/15/2010	7/2/2009	197	13,570	13,624	1,243
M10 Residential Development	Non-Sampled Site	Dedicated	6,504	12/14/2009	11/26/2008	383	6,198	6,223	932
M11 Residential Development	Non-Sampled Site	Dedicated	5,949	2/9/2010	4/1/2009	314	6,915	6,943	1,403
M12 Residential Development	Non-Sampled Site	Mixed	1,637	1/4/2010	3/27/2009	283	2,111	2,120	1,009
M13 Residential Development	Non-Sampled Site	Dedicated	2,175	1/11/2010	6/15/2009	210	3,780	3,795	492
Totals								69,215	884[1]

[1] Average HCF/Acre

As shown in Table 57, the total evaluation savings for the pilot project was 69,215 HCF per year. This equates to 141,843 gallons per day. The average savings per acre was 884 HCF/Acre-yr. This was higher than the average savings per acre for the four sampled sites (561 HCF/Acre).

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 3 TO ORDER NO. 91-39

FALLBROOK PUBLIC UTILITY DISTRICT
PLANT NO. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On May 20, 1991, this Regional Board adopted Order No. 91-39, *Waste Discharge Requirements for the Fallbrook Public Utility District Plant No. 1 and 2 Reclamation Projects, San Diego County*. Order No. 91-39 as amended establishes requirements for the disposal of up to 2.7 million gallons per day (MGD) from Plant 1 and 0.4 MGD from Plant 2 of tertiary treated effluent to be used for landscape irrigation.

2. On June 18, 1997, the Fallbrook Public Utility District (FPUD) submitted a report of waste discharge (RWD) requesting modification of the discharge specification for sulfate and chloride for recycled water used at the Good Earth Nursery and the HMS Co. The report of waste discharge contained technical data documenting that an incremental increase of 150 mg/l for sulfate and chloride added to the water supply as a result of domestic use is typical for San Diego County.

3. Discharge Specification B.2 of Order No. 91-39, as amended, specifies discharges of recycled water to the Good Earth Nursery and the HMS Co. shall not contain concentrations of sulfate that exceed a thirty day average concentration of 60 milligrams per liter (mg/l) above potable water supply and a daily maximum concentration of 100 mg/l above potable water supply; and concentration of chloride that exceed a thirty day average concentration of 50 mg/l above potable water supply and a daily maximum concentration of 80 mg/l above potable water supply.

4. The use of undemineralized recycled water meeting the requirements as modified by this addendum will be consistent with water quality standards established in the Basin Plan.

5. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect a modification to the discharge requirements for the Good Earth Nursery and the HMS Co.

6. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

7. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

ADD. 3 TO ORDER NO. 91-39

IT IS HEREBY ORDER THAT ORDER NO. 91-39 BE AMENDED AS FOLLOWS:

Discharge Specification B.2 is modified as follows:

B. DISCHARGE SPECIFICATIONS

2 ~~1.~~ The discharge of effluent to the Mission (903.11) and Bonsall (903.12) Hydrologic Subareas (HSA) of the Bonsall Hydrologic Subunit (903.10) of the San Luis Rey Hydrologic Unit (903.00) and along the I-5 corridor in the Agua Hedionda (904.31), Carlsbad (904.21); Loma Alta (904.10), Mission (903.11), and Ysidora (902.11) HSA containing pollutants in excess of the following effluent limitations is prohibited.

CONSTITUENT	UNITS	30-DAY AVERAGE[1]	DAILY MAXIMUM[2]
Carbonaceous Biological Oxygen Demand ($CBOD_5$ @ 20° C)	mg/l	25	45
Total Suspended Solids	mg/l	30	50
Total Dissolved Solids	mg/l		450[3]
Percent Sodium	%	60	60
Chloride	mg/l		150[4]
Sulfate	mg/l		150[5]
Fluoride	mg/l	1.0	1.2
Boron	mg/l	0.5	0.6
Iron	mg/l	0.85	1.0
Manganese	mg/l	0.15	0.20
Methylene Blue Active Substance	mg/l	0.5	0.6
Turbidity		(6) 2	2 (6)
Coliform		(7)	(7)
pH	pH Units	between 6.0 and 9.0 at all times	

[1,2,3,4,5,6,7] no change to the notes.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, on August 13, 1997.

JOHN ROBERTUS
Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 2 TO ORDER NO. 91-39

FALLBROOK PUBLIC UTILITY DISTRICT
PLANT NO. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On May 20, 1991, this Regional Board adopted Order No. 91-39, *Waste Discharge Requirements for the Fallbrook Public Utility District Plant No. 1 and 2 Reclamation Projects, San Diego County.* Order No. 91-39 as amended establishes requirements for the disposal of up to 2.7 million gallons per day (MGD) from Plant 1 and 0.4 MGD from Plant 2 of tertiary treated effluent to be used for landscape irrigation.

2. On August 28, 1996, the Fallbrook Public Utility District (FPUD) submitted a report of waste discharge (RWD) requesting modification of the discharge specification for total dissolved solids for recycled water used at the Good Earth Nursery and the HMS Co. located within the Upper Ysidora HSA (902.13).

3. Discharge Specification B.1 of Order No. 91-39 specifies discharges of recycled water within the Upper Ysidora HSA (902.13) shall not contain concentrations of total dissolved solids that exceed a thirty day average concentration of 750 milligrams per liter (mg/l) and a daily maximum of concentration 900 mg/l.

4. The discharge of recycled water via drip irrigation of potted plants at Good Earth Nursery and drip irrigation of six acres of cut flowers and cut greens at HMS Co. will result in minimal recharge of recycled water to the ground water aquifer.

5. The use of undeminerialized recycled water meeting the requirements as modified by this addendum will be consistent with water quality standards established in the Basin Plan.

6. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect a modification to the discharge requirements for the Good Earth Nursery and the HMS Co.

7. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

8. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

IT IS HEREBY ORDER THAT ORDER NO. 91-39 BE AMENDED AS FOLLOWS:

1. Discharge Specification B.1 is modified as follows:

    B. DISCHARGE SPECIFICATIONS

    1. The discharge of effluent to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (902.13) except to the Good Earth Nursery and the HMS Co. containing pollutants in excess of the following effluent limitations is prohibited.

    TABLE UNDER THIS SECTION OF ORDER NO. 91-39 REMAINS UNCHANGED.

2. The effluent limitations described in DISCHARGE SPECIFICATION B.2 of Order No. 91-39 shall apply to discharges of recycled water to the Good Earth Nursery and the HMS Co.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, on February 13, 1997.

John H Robertus

JOHN H. ROBERTUS
Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

ADDENDUM NO. 1 TO ORDER NO. 91-39

An Addendum Transferring Responsibility
for Order No. 91-39
from Fallbrook Sanitary District
to Fallbrook Public Utility District
San Diego County

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional board), finds that:

1. On May 20, 1991, this Regional Board Adopted Order No. 91-39, "Waste Discharge Requirements for Fallbook Sanitary District Plant No's. 1 and 2 Reclamation Projects, San Diego County". Order No. 91-39 establishes requirements for the use of reclaimed water for irrigation of approximately 43 acres of the Districts property located next to Plant No. 1 and 15 acres located next to Plant No. 2.

2. By letter dated January 26, 1995, the Fallbrook Public Utility District notified the Regional Board that the ownership of the Fallbrook Wastewater Treatment Plant No's. 1 and 2 and the responsibility for compliance with Order No. 91-39 was transferred from the Fallbrook Sanitary District to the Fallbrook Public Utility District on December 20, 1994.

3. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect the transfer of responsibility for complying with Order No. 91-39.

4. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

5. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

IT IS HEREBY ORDERED THAT ORDER NO. 91-39 IS MODIFIED AS FOLLOWS:

1. Order No. 91-39 shall henceforth be referred to as Waste Discharge Requirements for Fallbrook Public Utility District.

2. The waste discharge requirements contained in Order No. 91-39 shall be applicable to the Fallbrook Public Utility District and shall remain in full force and effect.

3. The word discharger as it appears in Order No. 91-39 shall hereafter be construed to refer to the Fallbrook Public Utility District.

I, Arthur L. Coe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, on August 10, 1995.

ARTHUR L. COE
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ORDER NO. 91-39

WASTE DISCHARGE REQUIREMENTS
FOR
FALLBROOK SANITARY DISTRICT
PLANT NOS. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region, (hereinafter Regional Board) finds that:

1. Fallbrook Sanitary District submitted a Report of Waste Discharge dated January 23, 1986 for the discharge of reclaimed wastewater to be used by the California State Department of Transportation (Caltrans) for landscape irrigation. After receipt of additional materials, the Report of Waste Discharge was accepted as complete on March 25, 1986. On May 5, 1986, the Regional Board adopted Order No. 86-40, **Waste Discharge Requirements for the Fallbrook Sanitary District, Wastewater Reclamation Project with Caltrans, San Diego County.** Order No. 86-40 established requirements for the Fallbrook Sanitary District to supply up to 1.95 million gallons per day (MGD) of secondarily treated domestic wastewater to Caltrans for landscape irrigation along Interstate 5 (I-5). The site of the discharge described in Order No. 86-40 is located along the I-5 corridor from Tamarack Avenue in Carlsbad to Las Pulgas Road north of the City of Oceanside. This section of I-5 is located in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas.

2. On May 20, 1974, the Regional Board adopted Order No. 74-43, **Waste Discharge Requirements for Wastewater and Sludge Reclamation by the Fallbrook Sanitary District.** Order No. 74-43 established requirements for the disposal of treated wastewater by spray irrigation and for the disposal of sludge at Fallbrook Sanitary District Plant Nos. 1 and 2. As part of the 1985/86 fiscal year Waste Discharge Order Update program, Order No. 74-43 was reviewed by Regional Board staff. On September 8, 1986, the Regional Board adopted Order No. 86-63, **Waste Discharge Requirements for Wastewater Reclamation at Fallbrook Sanitary District Plants 1 and 2, San Diego County.** Order No. 86-63 superseded Order

No. 74-43 and established requirements for the use of reclaimed wastewater for irrigation of approximately 43 acres of the District's property adjacent to Plant 1 and 15 acres adjacent to Plant 2. The discharge site adjacent to Plant 1 is located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13). The discharge site adjacent to Plant 2 is located in the Bonsall Hydrographic Subarea of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit (3.12). Order No. 86-63 did not establish waste discharge requirements for the processing, use, and/or disposal of sludge from the Fallbrook Sanitary District Plant Nos. 1 and 2. Waste discharge requirements for sludge processing, use, and/or disposal will be adopted (or adoption will be waived, if appropriate) after the discharger submits a Report of Waste Discharge for the sludge operations.

3. Fallbrook Sanitary District submitted a Report of Waste Discharge, dated February 28, 1990, for the use of up to 3.1 MGD of reclaimed wastewater for irrigation of orchards, commercial nurseries and landscape areas. The District submitted amendments to the Report of Waste Discharge dated March 7, April 6, April 18, April 20, and May 4, 1990. The Report of Waste Discharge was accepted as complete by the Regional Board on August 15, 1990. The Report of Waste Discharge indicates that, at the present time, Fallbrook Sanitary District will supply reclaimed water to two users, the Good Earth Nursery and the Silverthorn Ranch. The Good Earth Nursery is located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13) and Silverthorn Ranch is located in the Bonsall Hydrographic Subarea of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit (3.12). The District also indicated that reclaimed water may be discharged at additional reuse sites in the future.

4. Fallbrook Sanitary District provides treatment to the wastewater from its service area by means of two wastewater treatment plants, Plant Nos. 1 and 2. Fallbrook Sanitary District reports that effluent from Plant Nos. 1 and 2 can be treated to comply with all applicable requirements of California Code of Regulations, Title 22, Division 4, Chapter 3, "Reclamation Criteria." Effluent from these plants is collected into a single flow stream and discharged to the Pacific Ocean via the District's land outfall and the City of Oceanside's ocean outfall.

5. Plant No. 1 is located approximately 14 miles northeast of the City of Oceanside, adjacent to the westerly boundary of the Fallbrook Sanitary District, and serves most of the District's service area. It has a design capacity (average

dry weather flow) of 2.7 MGD. Plant No. 1 uses the following treatment processes: prechlorination for odor control, bar screens for coarse solid removal, an aerated grit removal tank, primary sedimentation, interstage pumping, emergency overflow holding, fine bubble aeration activated sludge, secondary sedimentation, secondary effluent equalization, and chlorine disinfection. To provide reclaimed water, the combined effluent from Plant Nos. 1 and 2 is further treated by alum and polymer injection, flocculation tanks, rapid sand filters, and chlorine disinfection. Storage of reclaimed water can be provided at the existing reservoir located at the southeastern corner of the District property. Filter backwash wastes are returned to the headworks of the treatment plant.

6. Plant No. 2 has a design capacity (average dry weather flow) of 0.4 MGD. It consists of a small headworks, two package wastewater treatment and solids processing units operating in parallel, an effluent pumping station and an operations building. The headworks provides the wastewater with preliminary treatment by means of a comminutor and a manually cleaned bar screen. The effluent from the headworks is distributed to the two package treatment units. Treated effluent from these units is collected into the effluent pumping station which pumps it to Plant No. 1. The Plant No. 2 effluent is mixed with the effluent of Plant No. 1 for discharge to the District's outfall or for further treatment in the tertiary treatment facilities located at Plant No. 1.

7. Treated effluent from Plant Nos. 1 and 2 is discharged into the District's land outfall. This outfall starts at the effluent of Plant No. 1 as an 18-inch pipeline, and shortly after leaving the plant, reduces to a 16-inch ductile iron pipe. The pipeline conveys treated wastewater in a southerly direction from the Fallbrook area for approximately 18 miles, joins the City of Oceanside's 36-inch diameter ocean outfall, and ultimately discharges to the Pacific Ocean. The Fallbrook Sanitary District has an agreement with the City of Oceanside to discharge wastewater through the ocean outfall at a flow rate of up to 2.4 MGD on an annual average basis. The discharge of treated effluent to the Pacific Ocean via the City of Oceanside's Ocean Outfall is currently regulated under **Order No. 89-13, NPDES No. CA0108031, Waste Discharge Requirements for the Fallbrook Sanitary District Water Pollution Control Facilities Plant Nos. 1 and 2, Discharge through the Oceanside Ocean Outfall, San Diego County.**

8. As described in Finding No. 1, the Fallbrook Sanitary District has been supplying the California Department of Transportation (Caltrans) with disinfected secondary effluent for irrigation of freeway landscaping since October, 1987. Following completion of new tertiary treatment facilities, the District has provided filtered tertiary effluent since January, 1990. The reclaimed water is withdrawn from the District's land outfall near its down stream end at I-5 and Hill Street within the City of Oceanside. By a cooperative agreement with Caltrans, the District will provide Caltrans with at least 250 acre-feet of reclaimed water per year.

9. Sludge generated by the wastewater treatment facilities is stabilized by aerobic digestion and dewatered prior to disposal. Following aerobic digestion in two rectangular digesters, the sludge is pumped to concrete lined sludge drying beds for dewatering. A small belt filter press is provided for sludge dewatering when weather conditions diminish the capacity of the drying beds. Dewatered solids are treated through two composting processes. All sludge is first treated by aerated static-pile composting for stabilization of the organic materials in the sludge and elimination of pathogenic organisms. A portion is then treated by the vermicomposting process where earthworms utilize the composted sludge as food and produce worm castings. Both the worm castings and static pile compost may be marketed as a soil conditioner. As indicated in Finding No. 2 of this Order, waste discharge requirements for sludge operations by Fallbrook Sanitary District have not yet been developed.

10. In order to supply new reclaimed water from the land outfall to additional reuse sites, the District plans to construct pipelines and other facilities. Additional reclaimed water reuse sites located within the Community of Fallbrook will be served via the reclaimed water reservoir and a new distribution pumping station and pipeline to the south of Plant No. 1. In order to control the concentration of total dissolved solids of the reclaimed wastewater supplied to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13), the Fallbrook Public Utilities District (FPUD) will provide a potable water supply line and air-gap so that potable water can either be supplied and/or mixed with the reclaimed water.

11. Fallbrook Sanitary District plans to wholesale reclaimed wastewater to FPUD. FPUD will, in turn, sell the wastewater at retail to users located in several service areas. The service areas are described in Attachment 4 and shown in Figure 4-1 of the Report of Waste Discharge. A list of all

potential reclaimed water users in each service area is also contained in Attachment 4 to the Report of Waste Discharge. The potential users are located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13), and the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit. This Order is applicable to the discharge of reclaimed water supplied by Fallbrook Sanitary District for use at all future reuse sites located within these hydrographic subareas.

12. Results of analysis of a grab sample of the combined effluent from Fallbrook Sanitary District Plant Nos. 1 and 2 to be used for irrigation at reuse sites are as follows:

Constituent	Unit	Effluent Concentration
Total dissolved solids	mg/l	747
Chloride	mg/l	120
Percent sodium	%	52
Sulfate	mg/l	228
Nitrate	mg/l	55.5
Iron	mg/l	0.21
Manganese	mg/l	0.02
Methylene blue active substances	mg/l	0.32
Boron	mg/l	0.43
Odor		None
Color	Units	25
Fluoride	mg/l	0.30

13. The **Comprehensive Water Quality Control Plan Report, San Diego Basin (9)** (Basin Plan), was adopted by this Regional Board on March 17, 1975 and subsequently approved by the State Water Resources Control Board (State Board). Subsequent revisions to the Basin Plan have also been adopted by the Regional Board and approved by the State Board.

14. The Basin Plan establishes the following beneficial uses of the surface waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

a. Municipal and Domestic Supply
b. Agricultural Supply
c. Industrial Service Supply
d. Industrial Process Supply
e. Water Contact Recreation
f. Non-contact Water Recreation

g. Warm Fresh-Water Habitat
h. Cold Fresh-Water Habitat
i. Wildlife Habitat
j. Preservation of Rare and Endangered Species
k. Fish Spawning

15. The Basin Plan establishes the following beneficial uses of the ground waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

    a. Municipal and Domestic Supply
    b. Agricultural Supply
    c. Industrial Service Supply
    d. Industrial Process Supply
    e. Groundwater Recharge

16. The Basin Plan establishes the following beneficial uses of the surface waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

    a. Agricultural Supply
    b. Industrial Service Supply
    c. Water Contact Recreation
    d. Non-contact Water Recreation
    e. Warm Fresh-Water Habitat
    f. Wildlife Habitat
    g. Preservation of Rare and Endangered Species

17. The Basin Plan establishes the following beneficial uses of the ground waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

    a. Municipal and Domestic Supply
    b. Agricultural Supply
    c. Industrial Service Supply
    d. Groundwater Recharge

18. The Basin Plan establishes the following water quality objectives for surface and ground waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

Constituent	Concentration not to be exceeded more than 10 percent of the time: Surface Water		Ground Water	
Total dissolved solids	750	mg/L	750[a]	mg/L
Chloride	300	mg/L	300[a]	mg/L
Percent sodium	60	%	60	%
Sulfate	300	mg/L	300[a]	mg/L
Nitrate	---		10[a]	mg/L
Nitrogen and phosphorus	*		---	
Iron	0.3	mg/L	0.3[a]	mg/L
Manganese	0.05	mg/L	0.05[a]	mg/L
Methylene blue active substances	0.5	mg/L	0.5	mg/L
Boron	0.5	mg/L	0.5[a]	mg/L
Odor	None		None	
Turbidity	20	NTU	5	NTU
Color	20	Units	15	Units
Fluoride	1.0		1.0	mg/L

* Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/L in any stream at the point where it enters any standing body of water. A desired goal in order to prevent plant nuisances in streams and other flowing waters appears to be 0.1 mg/L total P. These values are not to be exceeded more than 10 percent of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 shall be used.

[a]The recommended plan would allow for measurable degradation of ground water in this basin to permit continued agricultural land use. Point sources, however, would be controlled to achieve effluent quality corresponding to the tabulated numerical values. In future years demineralization may be used to treat ground water to the desired quality prior to use.

Note: mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units

19. The Basin Plan established the following objectives for surface and ground waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

Constituent	Concentration not to be exceeded more than 10 percent of the time			
	Surface Water		Ground Water	
Total dissolved solids	500	mg/L	1500[a,b]	mg/L
Chloride	250	mg/L	500[a,b]	mg/L
Percent sodium	60	%	60	%
Sulfate	250	mg/L	500[a,b]	mg/L
Nitrate	---		45[a,b]	mg/L
Nitrogen and phosphorus	*		---	
Iron	0.3	mg/L	0.85[a,b]	mg/L
Manganese	0.05	mg/L	0.15[a,b]	mg/L
Methylene blue active Substances	0.5	mg/L	0.5[b]	mg/L
Boron	0.5	mg/L	0.5[a,b]	mg/L
Odor	None		None	
Turbidity	20	NTU	5	NTU
Color	20	Units	15[b]	Units
Fluoride	1.0	mg/L	1.0[b]	mg/L

Note: mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units

* Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/L in any stream at the point where it enters any standing body of water. A desired goal in order to prevent plant nuisances in streams and other flowing waters appears to be 0.1 mg/L total P. These values are not to be exceeded more than 10 percent of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 shall be used.

[a]The recommended plan would allow for measurable degradation of ground water in this basin to permit continued agricultural land use. Point sources, however, would be controlled to achieve effluent quality corresponding to the tabulated numerical values. In future years demineralization may be used to treat ground water to the desired quality prior to use.

[b]A portion of the Upper Mission Basin is being considered as an underground potable water storage reservoir for treated imported water. The area is located north of Highway 76 on the boundary of hydrographic subareas 3.11 and 3.12. If this program is adopted, local objectives approaching the quality of the imported water would be set and rigorously pursued.

20. The Basin Plan establishes that water quality objectives and beneficial uses for ground waters do not apply westerly of the easterly boundary of I-5. Ground water quality objectives for these areas were deleted from the Basin Plan by the Regional Board in accord with the requirements of Resolution No. 68-16 and other requirements of the California Water Code, in order to encourage the use of reclaimed water in these areas. Therefore, the discharge of reclaimed wastewater for landscape irrigation by Caltrans along the I-5 corridor in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas, as identified in Finding No. 1 of this Order, will not result in violation of water quality objectives or adversely affect beneficial uses as set forth in the Basin Plan.

21. Because irrigation operations can result in salts in the applied water being concentrated in the fraction of the applied water which percolates to the groundwater, and because Basin Plan groundwater quality objectives are, in most cases, intended to be achieved in the groundwater (i.e. not in the effluent), effluent mineral limits frequently require concentrations of mineral constituents in the effluent to be lower than the corresponding groundwater quality objectives. However, as indicated in the footnotes to the groundwater quality objectives for the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas (Finding Nos. 18 and 19), the groundwater quality objectives for mineral constituents in these subareas are intended to be achieved in the effluent rather than in the groundwater. Consequently, the 30-day average effluent mineral limits in this Order are the same as the applicable groundwater quality objectives. Therefore, the discharge of reclaimed wastewater for irrigation in the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas will not result in violation of water quality

objectives or adversely affect beneficial uses as set forth in the Basin Plan.

22. Potable water is supplied to the Fallbrook area by the Fallbrook Public Utilities District and the Rainbow Municipal Water District. Both districts are members of the San Diego County Water Authority which is in turn a member of the Metropolitan Water District. Both agencies receive water from the Metropolitan Water District Lake Skinner Plants 1 and 2. The District reports that effluent from these two plants contains the following average concentrations:

Constituent	Unit	Average Concentration
Total dissolved solids	mg/l	437
Chloride	mg/l	98
Percent sodium	%	47
Sulfate	mg/l	124
Nitrate	mg/l	1.0
Iron	mg/l	1.3
Manganese	mg/l	0.02
Fluoride	mg/l	0.14

23. The Basin Plan also contains the following prohibitions applicable to the proposed discharge:

"Discharge of treated or untreated sewage or industrial wastes to a natural watercourse upstream of surface storage or diversion facilities used for municipal supply is prohibited."

"Discharge of treated or untreated sewage or industrial wastewater, exclusive of cooling water or other waters which are chemically unchanged, to a watercourse, is prohibited except in cases where the quality of said discharge complies with the receiving body's water quality objectives."

"Discharge of treated or untreated sewage or industrial wastes in such manner or volume as to cause sustained surface flow or ponding on lands not owned or under the control of the discharger is prohibited except in cases defined in the previous paragraph and in cases in which the responsibility for all downstream adverse effects is accepted by the discharger."

24. On January 23, 1986, Fallbrook Sanitary District submitted "Rules and Regulations for Reclaimed Water Service, Fallbrook Sanitary District." These Rules and Regulations for Reclaimed Water Service will be enforced by the discharger for reclaimed water use along the I-5 corridor in

the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas and within the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas.

25. On May 23, 1990, Fallbrook Sanitary District approved a Negative Declaration for the Fallbrook Area Wastewater Reclamation Project. The project as approved by Fallbrook Sanitary District will not have a significant effect on the environment.

26. The discharge of reclaimed water to the areas authorized under this Order is in conformance with Resolution No. 68-16, **Statement of Policy with Respect to Maintaining the High Quality of Waters in California.** The wastewater reclamation and reuse projects that will occur in these areas under the terms and conditions of this Order will:

    a. Have maximum benefit to the people of the State, because in the absence of reclaimed wastewater, imported potable water would be used for irrigation of the reclaimed water use areas described in this Order;

    b. Not unreasonably effect the beneficial uses of ground water in the underlying basins; and

    c. Not cause the ground water objectives of the underlying basins to be exceeded.

27. This Order prescribes waste discharge requirements and reclamation requirements governing the production and use of reclaimed water, which the Regional Board has determined are necessary to protect the public health, safety and welfare pursuant to California Water Code, Division 7, Chapter 7, Sections 13500 - 13550, ("Water Reclamation Law"). This Order, which applies to the producer of reclaimed water, requires that the producer of the reclaimed water establish and enforce rules and regulations which apply to users, including purveyors, of the reclaimed water.

28. The Regional Board considered all environmental factors associated with the discharge of waste.

29. The Regional Board has notified the discharger and all known interested parties of its intent to adopt waste discharge requirements for use of reclaimed water by Fallbrook Sanitary District.

30. The Regional Board in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, That Fallbrook Sanitary District (hereinafter discharger), in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. Discharges of wastes, including windblown spray and runoff of effluent applied for irrigation, to lands which have not been specifically described in the report of waste discharge and for which valid waste discharge requirements are not in force are prohibited.

2. The discharge of any radiological, chemical or biological warfare agent, or high-level radiological waste is prohibited.

3. Storage, use and/or disposal of wastes in a manner that would result in ponding or surfacing of wastes on lands beyond the disposal area, as described in the findings of this Order, is prohibited.

4. The discharge of wastewater shall not:

   (a) Cause the occurrence of coliform or pathogenic organisms in waters pumped from the basin;

   (b) Cause the occurrence of objectionable tastes and odors in water pumped from the basin;

   (c) Cause waters pumped from the basin to foam;

   (d) Cause the presence of toxic materials in waters pumped from the basin;

   (e) Cause the pH of waters pumped from the basin to fall below 6.0 or rise above 9.0;

   (f) Cause this Regional Board's objectives for the surface waters of the Santa Margarita Hydrographic Unit or the San Luis Rey Hydrographic Unit as established in the Basin Plan, to be exceeded;

   (g) Cause odors, septicity, mosquitos or other vectors, weed growth or other nuisance conditions in the San Luis Rey River or the Santa Margarita River or their tributaries;

   (h) Cause a surface flow recognizable as sewage in the San Luis Rey River or the Santa Margarita River or their tributaries; or

(i) Cause a pollution, contamination or nuisance or adversely affect beneficial uses of the ground or surface waters of the Santa Margarita Hydrographic Unit or the San Luis Rey Hydrographic Unit as established in the Basin Plan.

5. The discharge of a waste flow volume in excess of a thirty-day average wastewater flowrate of 2.7 MGD for Plant No. 1 and 0.4 MGD for Plant No. 2 is prohibited unless the discharger obtains revised waste discharge requirements for the proposed increased flow.

6. Odors, vectors, and other nuisances of sewage or sewage sludge origin beyond the limits of the treatment plant site or disposal area are prohibited.

7. The bypassing of wastewater from the Fallbrook Sanitary District which does not meet the effluent limitations established in Discharge Specifications B.1 and B.2 of this Order is prohibited.

8. The discharge of waste in a manner other than as described in the findings of this Order is prohibited unless the discharger obtains revised waste discharge requirements that provide for the proposed change.

9. The discharge of treated or untreated wastewater to the San Luis Rey River or the Santa Margarita River or their tributaries is prohibited.

B. DISCHARGE SPECIFICATIONS

1. The discharge of effluent to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13) containing pollutants in excess of the following effluent limitations is prohibited:

Constituent	30-day[1] Average		Daily[2] Maximum	
Carbonaceous biochemical oxygen demand ($CBOD_5$ @ 20° C)	25	mg/l	45	mg/l
Total suspended solids	30	mg/l	50	mg/l
pH	Within the limits of 6.0 to 9.0 at all times			
Total dissolved solids	750	mg/l	900	mg/l
Chloride	300	mg/l	350	mg/l
Percent sodium	60	%	65	%
Sulfate	300	mg/l	350	mg/l
Iron	0.3	mg/l	0.4	mg/l
Manganese	0.05	mg/l	0.06	mg/l
Methylene blue active substances	0.5	mg/l	0.6	mg/l
Boron	0.5	mg/l	0.6	mg/l
Fluoride	1.0	mg/l	1.2	mg/l
Turbidity	(3)		(3)	
Coliform	(4)		(4)	

[1]The 30-day average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 consecutive calendar day period.

[2]The daily maximum effluent limitation shall apply to the results of a single composite or grab sample

[3]Not to exceed an average operating turbidity of 2 turbidity units. Not to exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

[4]The median number of coliform organisms shall not exceed 2.2 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analysis have been completed, and the number of coliform organisms shall not exceed 23 per 100 milliliters in any sample.

2. The discharge of effluent to the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit and along the I-5 corridor in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas containing pollutants in excess of the following effluent limitations is prohibited:

Constituent	30-day[1] Average		Daily[2] Maximum	
Carbonaceous biochemical oxygen demand ($CBOD_5$ @ 20° C)	25	mg/l	45	mg/l
Total suspended solids	30	mg/l	50	mg/l
pH	Within the limits of 6.0 to 9.0 at all times			
Total dissolved solids	400[3]	mg/l	450[3]	mg/l
Chloride	50[4]	mg/l	80[4]	mg/l
Percent sodium	60	%	60	%
Sulfate	60[5]	mg/l	100[5]	mg/l
Iron	0.85	mg/l	1.0	mg/l
Manganese	0.15	mg/l	0.20	mg/l
Methylene blue active substances	0.5	mg/l	0.6	mg/l
Boron	0.5	mg/l	0.6	mg/l
Fluoride	1.0	mg/l	1.2	mg/l
Turbidity	(6)		(6)	
Coliform	(7)		(7)	

[1]The 30-day average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 consecutive calendar day period.

[2]The daily maximum effluent limitation shall apply to the results of a single composite or grab sample

[3]These are the increments of TDS in effluent over supply water. However, the daily maximum concentration of TDS in effluent shall not exceed 1500 mg/l under any circumstances.

[4]These are the increments of chloride in effluent over supply water. However, the daily maximum concentration of chloride in effluent shall not exceed 500 mg/l under any circumstances.

[5]These are the increments of sulfate in effluent over supply water. However, the daily maximum concentration

of sulfate in effluent shall not exceed 500 mg/l under any circumstances.

[6]Not to exceed an average operating turbidity of 2 turbidity units. Not to exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

[7]The median number of coliform organisms shall not exceed 2.2 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analysis have been completed, and the number of coliform organisms shall not exceed 23 per 100 milliliters in any sample.

3. All waste treatment, containment and disposal facilities shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency.

4. All waste treatment, containment and disposal facilities shall be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency 24-hour storm.

5. Collected screenings, sludges, other solids removed from liquid wastes, and filter backwash shall be discharged as described in the Findings of this Order or disposed of by other means approved by the Executive Officer. Before sludge is disposed of by means other than as described in this Order, or used or supplied for use of others, the discharger shall submit written notification to the Executive Officer of the proposed disposal or use. Such disposal, use, or supply for use of others shall not be initiated until approved by the Executive Officer.

6. Effluent used for irrigation shall conform with all applicable provisions of California Code of Regulations, Title 22, Division 4, Chapter 3 (**Reclamation Criteria**) for irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure (currently Sections 60313. (b) and 60320.5).

7. Fallbrook Sanitary District shall meet the design, operational, and reliability requirements of Articles 7, 8, 9 and 10 of the California Code of Regulations, Title 22, Division 4, Chapter 3. Fallbrook Sanitary District shall develop an engineering report conforming to Section 60323, Article 7 of the California Code of Regulations, Title 22, Division 4, Chapter 3. The engineering report shall be submitted to the State

Department of Health Services, County Department of Health Services, and the Regional Board Executive Officer. Reclaimed water from the Fallbrook Sanitary District shall not be used for irrigation until the engineering report is approved by the Regional Board Executive Officer.

8. Effluent storage ponds and sludge drying beds shall be designed, constructed, operated, and maintained so as to prevent surfacing of wastes on property not owned or controlled by the discharger. Surface runoff of any wastes which surface on property owned or controlled by the discharger onto property not owned or controlled by the discharger shall be prevented.

C. PROVISIONS

1. Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code.

2. The discharger must comply with all conditions of this Order. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for (a) enforcement action; (b) termination, revocation and reissuance, or modification of this Order; or (c) denial of a report of waste discharge in application for new or revised waste discharge requirements.

3. In an enforcement action, it shall not be a defense for the discharger that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies for example, when the primary source of power of the treatment facility fails, is reduced, or is lost.

4. The discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

5. The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment

and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order.

6. This Order may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

   (a) Violation of any terms or conditions of this Order;

   (b) Obtaining this Order by misrepresentation or failure to disclose fully all relevant facts; or

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

   The filing of a request by the discharger for the modification, revocation and reissuance, or termination of this Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

7. This Order is not transferrable to any person except after notice to the Executive Officer. The Regional Board may require modification or revocation and reissuance of this Order to change the name of the discharger and incorporate such other requirements as may be necessary under the California Water Code. The discharger shall submit notice of any proposed transfer of this Order's responsibility and coverage to a new discharger as described under Reporting Requirement D.3.

8. This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from liability under federal, state or local laws, nor create a vested right for the discharger to continue the waste discharge.

9. The discharger shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

   (a) Enter upon the discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

   (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

   (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

   (d) Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

10. The discharger's wastewater treatment facilities shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Chapter 3, Subchapter 14, Title 23 of the California Code of Regulations.

11. A copy of this Order shall be maintained at Fallbrook Sanitary District Plant Nos. 1 and 2 and shall be available to operating personnel at all times.

12. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.

13. The potable water supply shall not be used to supplement the reclaimed water supply except through an approved air gap. In other areas where the potable water supply is piped to premises where sewage is pumped, treated or reclaimed (i.e., sewage treatment plants or pumping stations, golf course, etc.) the potable water supply shall be protected at the property line in accordance with the State Department of Health Services' **Regulations Relating to Cross-Connections.**

14. All waste water treatment and disposal facilities shall be completely constructed and operable prior to the initiation of any landscape irrigation, and the complete facilities shall have adequate capacity for the full design flow of 3.1 MGD. A report from design engineer certifying the adequacy of each component of the treatment and disposal facilities shall be submitted by the discharger prior to commencement of the irrigation. The certification report shall contain a requirement-by-requirement analysis based on acceptable engineering practices, of how the process and physical designs of the facilities will ensure compliance with the waste discharge requirements. The design engineer shall affix his signature and engineering license number to the certification report and should submit it prior to construction of the facilities. The irrigation shall not be initiated until:

    a. The certification report is received by the Regional Board;

    b. The Regional Board has been notified of the completion of facilities by the discharger;

    c. An inspection of the facilities has been made by staff of the Regional Board; and

    d. Staff has notified the discharger by letter that the irrigation can be initiated.

D. RECLAIMED WATER USE PROVISIONS

1. If the Fallbrook Sanitary District (discharger/ producer) is supplying reclaimed water for use by the discharger/producer or other persons, the discharger/producer shall establish **Rules and Regulations for Reclaimed Water Users** governing the design and construction of reclaimed water use facilities and the use of reclaimed water. The rules and regulations shall, at a minimum, contain the following provisions:

    a. Provisions implementing Title 22, Division 4, Chapter 3, Wastewater Reclamation Criteria, of the California Code of Regulations;

    b. Provisions implementing the State Department of Health Services (DOHS) **Guidelines For Use of Reclaimed Water** and **Guidelines for Use of**

Reclaimed Water for Construction Purposes or measures, acceptable to DOHS, providing equivalent protection of public health;

c. Provisions authorizing the Regional Board, the discharger/producer, or an authorized representative of these parties, upon presentation of proper credentials, to inspect the facilities of any reclaimed water user to ascertain whether the user is complying with the discharger/producer's rules and regulations;

d. Provision for written notification, in a timely manner, to the discharger/producer by the reclaimed water user of any material change or proposed change in the character of the use of reclaimed water;

e. Provision for submission of a preconstruction report to the discharger/producer by the reclaimed water user in order to enable the discharger/producer to determine whether the user will be in compliance with the discharger/producer's rules and regulations;

f. Provision requiring reclaimed water users to designate a reclaimed water supervisor responsible for the reclaimed water system at each use area under the user's control. Reclaimed water supervisors should be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of the discharger/producer's reclaimed water user rules and regulations, prevention of potential hazards, and maintenance of the reclaimed water distribution system plans in "as built" form.

g. Provision authorizing the discharger/producer to cease supplying reclaimed water to any person who uses, transports, or stores such water in violation of the discharger/producer's rules and regulations;

h. Provision requiring that, except as authorized by the Regional Board Executive Officer, all reclaimed water storage facilities owned and/or operated by reclaimed water users shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency.

i. Provision requiring that, except as authorized by the Regional Board Executive Officer, all reclaimed water storage facilities owned and/or operated by reclaimed water users shall be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency, 24-hour storm.

j. Provision requiring notification and concurrence of the State Department of Health Services and the County of San Diego Department of Health Services for new reclaimed water users.

k. Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against any reclaimed water user who discharges reclaimed water in violation of any applicable discharge prohibitions prescribed by the Regional Board or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code Section 13050; and

l. Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against the discharger/producer, which may result in the termination of the reclaimed water supply, if any person uses, transports, or stores such water in violation of the discharger/producer's rules and regulations or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code Section 13050.

The rules and regulations shall be subject to the approval of the Regional Board Executive Officer, the State Department of Health Services and the County of San Diego Department of Health Services. The rules and regulations shall be submitted to the Regional Board within 90 days of adoption of this Order by the Regional Board.

2. The discharger/producer shall implement and enforce the approved rules and regulations for reclaimed water users.

3. The discharger/producer shall, within 90 days of the adoption of this Order, develop and submit to the Regional Board Executive Officer a program to conduct compliance inspections of reclaimed water reuse sites to determine the status of compliance with the approved

rules and regulations for reclaimed water users. The discharger/producer shall implement the inspection program upon its approval by the Regional Board Executive Officer.

4. Reclaimed water shall only be supplied to and used in areas as described in the Findings of this Order for which valid waste discharge requirements, as established by this Order and subsequent addenda, are in force. Prior to using reclaimed water or supplying reclaimed water for use by other parties in any manner or in any area other than as described in the findings of this Order, the discharger shall obtain proper authorization from this Regional Board.

5. Reclaimed water shall not be supplied to parties who use, transport, or store such water in a manner which causes a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code."

E. REPORTING REQUIREMENTS

1. The discharger shall file a new Report of Waste Discharge at least 120 days prior to the following:

   (a) Addition of a major industrial waste discharge to a discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the wastes.

   (b) Significant change in the treatment or disposal method (e.g., change in the method of treatment which would significantly alter the nature of the waste.)

   (c) Change in the disposal area from that described in the findings of this Order.

   (d) Increase in flow beyond that specified in this Order.

   (e) Other circumstances which result in a material change in character, amount, or location of the waste discharge.

   (f) Any planned change in the regulated facility or activity which may result in noncompliance with this Order.

2. The discharger shall furnish to the Executive Officer of this Regional Board, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the Executive Officer, upon request, copies of records required to be kept by this Order.

3. The discharger must notify the Executive Officer, in writing at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new discharger. The notice must include a written agreement between the existing and new discharger containing a specific date for the transfer of this Order's responsibility and coverage between the current discharger and the new discharger. This agreement shall include an acknowledgement that the existing discharger is liable for violations up to the transfer date and that the new discharger is liable from the transfer date on.

4. The discharger shall comply with the attached Monitoring and Reporting Program No. 91-39, and future revisions thereto as specified by the Executive Officer. Monitoring results shall be reported at the intervals specified in Monitoring and Reporting Program No. 91-39.

5. If a need for a discharge bypass is known in advance, the discharger shall submit prior notice and, if at all possible, such notice shall be submitted at least 10 days prior to the date of the bypass.

6. Where the discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Board, it shall promptly submit such facts or information.

7. The discharger shall report any noncompliance which may endanger health or the environment. Any such information shall be provided orally to the Executive Officer within 24 hours from the time the discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected;

the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours. The following occurrence(s) must be reported to the Executive Officer within 24 hours:

(a) Any bypass from any portion of the treatment facility.

(b) Any discharge of treated or untreated wastewater resulting from sewer line breaks, obstruction, surcharge or any other circumstances.

(c) Any treatment plant upset which causes the effluent limitations of this Order to be exceeded.

8. All applications, reports, or information submitted to the Executive Officer shall be signed and certified as follows:

(a) The Report of Waste Discharge shall be signed as follows:

(1) For a corporation - by a principal executive officer of at least the level of vice-president.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal or other public agency - by either a principal executive officer or ranking elected official.

(b) All other reports required by this Order and other information required by the Executive officer shall be signed by a person designated in paragraph (a) of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in paragraph (a) of this provision;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity; and

(3) The written authorization is submitted to the Executive Officer.

(c) Any person signing a document under this Section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

9. The discharger shall submit reports required under this Order, or other information required by the Executive Officer, to:

Executive Officer
California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd, Suite B
San Diego, California 92124- 1331

F. NOTIFICATIONS

1. California Water Code Section 13263(g) states:

"No discharge of waste into waters of the state, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the state are privileges, not rights"

2. These requirements have not been officially reviewed by the United States Environmental Protection Agency and are not issued pursuant to Section 402 of the Clean Water Act.

3. The California Water Code provides that any person who intentionally or negligently violates any waste discharge requirements issued, reissued, or amended by this Regional Board is subject to a civil monetary

remedy of up to 20 dollars per gallon of waste discharged or, if a cleanup and abatement order is issued, up to 15,000 dollars per day of violation or some combination thereof.

4. The California Water Code provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or falsifying any information provided in the monitoring reports is guilty of a misdemeanor.

5. This Order becomes effective on the date of adoption by the Regional Board.

6. The requirements prescribed by this Order supersede the requirements prescribed by Order Nos. 86-40 and 86-63. Order Nos. 86-40 and 86-63 are hereby rescinded when this Order becomes effective.

I, Arthur L. Coe, Executive Officer, do hereby certify the forgoing is a full, true, and correct copy of an Order No. 91-39 adopted by the California Regional Water Quality Control Board, San Diego Region, on May 20, 1991.

ARTHUR L. COE
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

MONITORING AND REPORTING PROGRAM NO. 91-39
FOR
FALLBROOK SANITARY DISTRICT
PLANT NOS. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

A. MONITORING PROVISIONS

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this Order and, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Executive Officer.

2. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ± 5 percent from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

   (a) "A Guide to Methods and Standards for the Measurement of Water Flow," U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by SD Catalog No. C13.10:421.)

   (b) "Water Measurement Manual," U. S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U. S. Government Printing Office, Washington D. C. 20402. Order by Catalog No. 127,19/2:W29/2, Stock No. S/N 24003-0027.)

(c) "Flow Measurement in Open Channels and Closed Conduits," U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS) Springfield, VA 22151. Order by NTIS No. PB-273-535/5ST.)

(d) "NPDES Compliance Sampling Manual," U. S. Environmental Protection Agency, Office of Water Enforcement. Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration (8FFS), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, CO 80225.)

3. Monitoring must be conducted according to United States Environmental Protection Agency test procedures approved under Title 40, Code of Federal Regulations (CFR), Part 136, "Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act" as amended, unless other test procedures have been specified in this Order.

4. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Health Services or a laboratory approved by the Executive Officer.

5. Monitoring results must be reported on discharge monitoring report forms approved by the Executive Officer.

6. If the discharger monitors any pollutants more frequently than required by this Order, using test procedures approved under 40 CFR, Part 136, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharger's monitoring report. The increased frequency of monitoring shall also be reported.

7. The discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report or application. This period may be extended during the

course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

8. Records of monitoring information shall include:

   (a) The date, exact place, and time of sampling or measurements;
   (b) The individual(s) who performed the sampling or measurements;
   (c) The date(s) analyses were performed;
   (d) The individual(s) who performed the analyses;
   (e) The analytical techniques or method used; and
   (f) The results of such analyses.

9. All monitoring instruments and devices which are used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

10. The discharger shall report all instances of noncompliance not reported under Reporting Requirement E.7 of this Order at the time monitoring reports are submitted. The reports shall contain the information listed in Reporting Requirement E.7.

11. The monitoring reports shall be signed by an authorized person as required by Reporting Requirement E.9.

12. A composite sample is defined as a combination of at least eight sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24 hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

13. A grab sample is an individual sample of at least 100 milliliters collected at a randomly selected time over a period not exceeding 15 minutes.

14. Sampling and analysis shall, as a minimum, be conducted in accordance with Article 6 of California Code of Regulations, Title 22, Division 4, Chapter 3 **(Reclamation Criteria)**.

B. EFFLUENT MONITORING

The following shall constitute the effluent monitoring program for Fallbrook Sanitary District:

Determination	Unit	Sample Type	Sampling Frequency	Reporting Frequency
Carbonaceous biochemical oxygen demand (5-Day @ 20 C)	mg/l	Composite	Weekly	Monthly
Total suspended solids	mg/l	Composite	Weekly	Monthly
Volatile suspended solids	mg/l	Composite	Weekly	Monthly
pH	Unit	Composite	Monthly	Monthly
Total dissolved solids	mg/l	Composite	Monthly	Monthly
Chloride	mg/l	Composite	Monthly	Monthly
Percent sodium	%	Composite	Monthly	Monthly
Sulfate	mg/l	Composite	Monthly	Monthly
Iron	mg/l	Composite	Monthly	Monthly
Manganese	mg/l	Composite	Monthly	Monthly
Methylene blue active substances	mg/l	Composite	Monthly	Monthly
Boron	mg/l	Composite	Monthly	Monthly
Fluoride	mg/l	Composite	Monthly	Monthly
Aluminum	mg/l	Composite	Semiannual	Semiannual
Arsenic	mg/l	Composite	Semiannual	Semiannual
Barium	mg/l	Composite	Semiannual	Semiannual
Cadmium	mg/l	Composite	Semiannual	Semiannual
Chromium	mg/l	Composite	Semiannual	Semiannual
Copper	mg/l	Composite	Semiannual	Semiannual
Lead	mg/l	Composite	Semiannual	Semiannual
Mercury	mg/l	Composite	Semiannual	Semiannual
Selenium	mg/l	Composite	Semiannual	Semiannual
Silver	mg/l	Composite	Semiannual	Semiannual
Zinc	mg/l	Composite	Semiannual	Semiannual
Coliform	MPN/100 ml	Grab	*	Monthly
Turbidity	NTU	Continuous	**	Monthly

* Samples for coliform bacteria shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities and disinfection procedures.

** Turbidity analysis shall be performed by a continuous recording turbidimeter.

Note: MGD = million gallons per day
mg/l = milligrams per liter
MPN/100 ml = Most Probable Number per 100 milliliters
ml/l = milliliters per liter
NTU = Nephelometric Turbidity Units

C. FLOWRATE MEASUREMENT

Effluent flowrates shall be measured on a continuous basis as indicated below. Daily flowrates and monthly average flowrates for all waste streams shall be reported monthly.

Waste Stream	Unit	Measurement Type	Reporting Frequency
Plant No. 1 effluent	MGD	Continuous	Monthly
Plant No. 2 effluent	MGD	Continuous	Monthly
Tertiary treatment effluent	MGD	Continuous	Monthly

D. POTABLE SUPPLY WATERS

Examination of the potable waters supplied to the service area of the wastewater treatment facilities shall be conducted for the following constituents monthly with the results reported monthly.

Constituent	Unit
Total dissolved solids	mg/l
Chloride	mg/l
Sulfate	mg/l

E. RECLAIMED WATER USERS SUMMARY REPORT

A reclaimed water users summary report shall be submitted quarterly containing the following information:

1. **Reclaimed water use site summary information**

   The following information shall be submitted for each reclaimed water use site.

   a. Name of the reclaimed water reuse site
   b. Owner of the reclaimed water use facility
   c. Address of the reuse site
   d. Name of the reclaimed water user supervisor
   e. Phone number of the on-site water user supervisor
   f. Mailing address, if different from site address
   g. Basin Plan name of ground water basin underlying the reuse site
   h. Volume of reclaimed water delivered to the reuse site on a monthly basis

2. **Reclaimed Water Use Summary Information**

   a. Total gallons of reclaimed water supplied to all reclaimed water users for each month of the reporting period.

   b. Total number of reclaimed water user sites.

3. **Reclaimed water user site inspections**

   Number of reclaimed water reuse site inspections conducted by discharger/producer staff and identification of sites inspected for the reporting period.

4. **Reclaimed water user violations of the discharger/producer's rules and regulations.**

   The discharger/producer shall identify all reclaimed water users known by the discharger/producer to be in violation of the discharger/producer's rules and regulations for reclaimed water users. The report shall include a description of the noncompliance and its cause, including the period of noncompliance, and if the noncompliance has not been corrected; the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

F. SEWAGE SOLIDS

A log of the type, quantity, location, and manner of disposal of solids removed in the course of sewage treatment shall be maintained and submitted monthly.

G. REPORTING

Monitoring reports shall be submitted to the Executive Officer in accordance with the following schedule:

Reporting Frequency	Report Period	Report Due
Monthly	January, February, March, April, May, June, July, August, September, October, November, December	By the end of the following month
Quarterly	January-March	April 30
	April-June	July 31
	July-September	October 31
	October-December	January 31
Semiannual	January-June	July 31
	July-December	January 31

Monitoring reports shall be submitted to:

California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd., Suite B
San Diego, CA 92124-1331

Ordered by ____________________
ARTHUR L. COE
Executive Officer
May 20, 1991

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 3 TO ORDER NO. 91-39

FALLBROOK PUBLIC UTILITY DISTRICT
PLANT NO. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On May 20, 1991, this Regional Board adopted Order No. 91-39,*Waste Discharge Requirements for the Fallbrook Public Utility District Plant No. 1 and 2 Reclamation Projects, San Diego County*. Order No. 91-39 as amended establishes requirements for the disposal of up to 2.7 million gallons per day (MGD) from Plant 1 and 0.4 MGD from Plant 2 of tertiary treated effluent to be used for landscape irrigation.

2. On June 18, 1997, the Fallbrook Public Utility District (FPUD) submitted a report of waste discharge (RWD) requesting modification of the discharge specification for sulfate and chloride for recycled water used at the Good Earth Nursery and the HMS Co. The report of waste discharge contained technical data documenting that an incremental increase of 150 mg/l for sulfate and chloride added to the water supply as a result of domestic use is typical for San Diego County.

3. Discharge Specification B.2 of Order No. 91-39, as amended, specifies discharges of recycled water to the Good Earth Nursery and the HMS Co. shall not contain concentrations of sulfate that exceed a thirty day average concentration of 60 milligrams per liter (mg/l) above potable water supply and a daily maximum concentration of 100 mg/l above potable water supply; and concentration of chloride that exceed a thirty day average concentration of 50 mg/l above potable water supply and a daily maximum concentration of 80 mg/l above potable water supply.

4. The use of undemineralized recycled water meeting the requirements as modified by this addendum will be consistent with water quality standards established in the Basin Plan.

5. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect a modification to the discharge requirements for the Good Earth Nursery and the HMS Co.

6. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

7. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

IT IS HEREBY ORDER THAT ORDER NO. 91-39 BE AMENDED AS FOLLOWS:

Discharge Specification B.2 is modified as follows:

B. DISCHARGE SPECIFICATIONS

2 ~~1.~~ The discharge of effluent to the Mission (903.11) and Bonsall (903.12) Hydrologic Subareas (HSA) of the Bonsall Hydrologic Subunit (903.10) of the San Luis Rey Hydrologic Unit (903.00) and along the I-5 corridor in the Agua Hedionda (904.31), Carlsbad (904.21); Loma Alta (904.10), Mission (903.11), and Ysidora (902.11) HSA containing pollutants in excess of the following effluent limitations is prohibited.

CONSTITUENT	UNITS	30-DAY AVERAGE[1]	DAILY MAXIMUM[2]
Carbonaceous Biological Oxygen Demand ($CBOD_5$ @ 20° C)	mg/l	25	45
Total Suspended Solids	mg/l	30	50
Total Dissolved Solids	mg/l		450[3]
Percent Sodium	%	60	60
Chloride	mg/l		150[4]
Sulfate	mg/l		150[5]
Fluoride	mg/l	1.0	1.2
Boron	mg/l	0.5	0.6
Iron	mg/l	0.85	1.0
Manganese	mg/l	0.15	0.20
Methylene Blue Active Substance	mg/l	0.5	0.6
Turbidity		(6)	(6)
Coliform		(7)	(7)
pH	pH Units	between 6.0 and 9.0 at all times	

[1,2,3,4,5,6,7] no change to the notes.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, on August 13, 1997.

JOHN ROBERTUS
Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 2 TO ORDER NO. 91-39

FALLBROOK PUBLIC UTILITY DISTRICT
PLANT NO. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional Board), finds that:

1. On May 20, 1991, this Regional Board adopted Order No. 91-39, *Waste Discharge Requirements for the Fallbrook Public Utility District Plant No. 1 and 2 Reclamation Projects, San Diego County.* Order No. 91-39 as amended establishes requirements for the disposal of up to 2.7 million gallons per day (MGD) from Plant 1 and 0.4 MGD from Plant 2 of tertiary treated effluent to be used for landscape irrigation.

2. On August 28, 1996, the Fallbrook Public Utility District (FPUD) submitted a report of waste discharge (RWD) requesting modification of the discharge specification for total dissolved solids for recycled water used at the Good Earth Nursery and the HMS Co. located within the Upper Ysidora HSA (902.13).

3. Discharge Specification B.1 of Order No. 91-39 specifies discharges of recycled water within the Upper Ysidora HSA (902.13) shall not contain concentrations of total dissolved solids that exceed a thirty day average concentration of 750 milligrams per liter (mg/l) and a daily maximum of concentration 900 mg/l.

4. The discharge of recycled water via drip irrigation of potted plants at Good Earth Nursery and drip irrigation of six acres of cut flowers and cut greens at HMS Co. will result in minimal recharge of recycled water to the ground water aquifer.

5. The use of undemineralized recycled water meeting the requirements as modified by this addendum will be consistent with water quality standards established in the Basin Plan.

6. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect a modification to the discharge requirements for the Good Earth Nursery and the HMS Co.

7. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

8. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

IT IS HEREBY ORDER THAT ORDER NO. 91-39 BE AMENDED AS FOLLOWS:

1. Discharge Specification B.1 is modified as follows:

   B. DISCHARGE SPECIFICATIONS

   1. The discharge of effluent to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (902.13) except to the Good Earth Nursery and the HMS Co. containing pollutants in excess of the following effluent limitations is prohibited.

   TABLE UNDER THIS SECTION OF ORDER NO. 91-39 REMAINS UNCHANGED.

2. The effluent limitations described in DISCHARGE SPECIFICATION B.2 of Order No. 91-39 shall apply to discharges of recycled water to the Good Earth Nursery and the HMS Co.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, on February 13, 1997.

John H Robertus

JOHN H. ROBERTUS
Executive Officer

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

ADDENDUM NO. 1 TO ORDER NO. 91-39

An Addendum Transferring Responsibility
for Order No. 91-39
from Fallbrook Sanitary District
to Fallbrook Public Utility District
San Diego County

The California Regional Water Quality Control Board, San Diego Region (hereinafter Regional board), finds that:

1. On May 20, 1991, this Regional Board Adopted Order No. 91-39, "Waste Discharge Requirements for Fallbook Sanitary District Plant No's. 1 and 2 Reclamation Projects, San Diego County". Order No. 91-39 establishes requirements for the use of reclaimed water for irrigation of approximately 43 acres of the Districts property located next to Plant No. 1 and 15 acres located next to Plant No. 2.

2. By letter dated January 26, 1995, the Fallbrook Public Utility District notified the Regional Board that the ownership of the Fallbrook Wastewater Treatment Plant No's. 1 and 2 and the responsibility for compliance with Order No. 91-39 was transferred from the Fallbrook Sanitary District to the Fallbrook Public Utility District on December 20, 1994.

3. The Regional Board has notified all known interested parties of its intent to modify Order No. 91-39 to reflect the transfer of responsibility for complying with Order No. 91-39.

4. The Regional Board in a public hearing heard and considered all comments pertaining to the modification of Order No. 91-39.

5. This facility is an existing facility and as such is exempt from the provisions of the California Environmental Quality Act, in accordance with Title 14, California Code of Regulations, Article 19, Section 15301.

IT IS HEREBY ORDERED THAT ORDER NO. 91-39 IS MODIFIED AS FOLLOWS:

1. Order No. 91-39 shall henceforth be referred to as Waste Discharge Requirements for Fallbrook Public Utility District.

2. The waste discharge requirements contained in Order No. 91-39 shall be applicable to the Fallbrook Public Utility District and shall remain in full force and effect.

3. The word discharger as it appears in Order No. 91-39 shall hereafter be construed to refer to the Fallbrook Public Utility District.

I, Arthur L. Coe, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, on August 10, 1995.

ARTHUR L. COE
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ORDER NO. 91-39

WASTE DISCHARGE REQUIREMENTS
FOR
FALLBROOK SANITARY DISTRICT
PLANT NOS. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region, (hereinafter Regional Board) finds that:

1. Fallbrook Sanitary District submitted a Report of Waste Discharge dated January 23, 1986 for the discharge of reclaimed wastewater to be used by the California State Department of Transportation (Caltrans) for landscape irrigation. After receipt of additional materials, the Report of Waste Discharge was accepted as complete on March 25, 1986. On May 5, 1986, the Regional Board adopted Order No. 86-40, **Waste Discharge Requirements for the Fallbrook Sanitary District, Wastewater Reclamation Project with Caltrans, San Diego County.** Order No. 86-40 established requirements for the Fallbrook Sanitary District to supply up to 1.95 million gallons per day (MGD) of secondarily treated domestic wastewater to Caltrans for landscape irrigation along Interstate 5 (I-5). The site of the discharge described in Order No. 86-40 is located along the I-5 corridor from Tamarack Avenue in Carlsbad to Las Pulgas Road north of the City of Oceanside. This section of I-5 is located in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas.

2. On May 20, 1974, the Regional Board adopted Order No. 74-43, **Waste Discharge Requirements for Wastewater and Sludge Reclamation by the Fallbrook Sanitary District.** Order No. 74-43 established requirements for the disposal of treated wastewater by spray irrigation and for the disposal of sludge at Fallbrook Sanitary District Plant Nos. 1 and 2. As part of the 1985/86 fiscal year Waste Discharge Order Update program, Order No. 74-43 was reviewed by Regional Board staff. On September 8, 1986, the Regional Board adopted Order No. 86-63, **Waste Discharge Requirements for Wastewater Reclamation at Fallbrook Sanitary District Plants 1 and 2, San Diego County.** Order No. 86-63 superseded Order

No. 74-43 and established requirements for the use of reclaimed wastewater for irrigation of approximately 43 acres of the District's property adjacent to Plant 1 and 15 acres adjacent to Plant 2. The discharge site adjacent to Plant 1 is located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13). The discharge site adjacent to Plant 2 is located in the Bonsall Hydrographic Subarea of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit (3.12). Order No. 86-63 did not establish waste discharge requirements for the processing, use, and/or disposal of sludge from the Fallbrook Sanitary District Plant Nos. 1 and 2. Waste discharge requirements for sludge processing, use, and/or disposal will be adopted (or adoption will be waived, if appropriate) after the discharger submits a Report of Waste Discharge for the sludge operations.

3. Fallbrook Sanitary District submitted a Report of Waste Discharge, dated February 28, 1990, for the use of up to 3.1 MGD of reclaimed wastewater for irrigation of orchards, commercial nurseries and landscape areas. The District submitted amendments to the Report of Waste Discharge dated March 7, April 6, April 18, April 20, and May 4, 1990. The Report of Waste Discharge was accepted as complete by the Regional Board on August 15, 1990. The Report of Waste Discharge indicates that, at the present time, Fallbrook Sanitary District will supply reclaimed water to two users, the Good Earth Nursery and the Silverthorn Ranch. The Good Earth Nursery is located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13) and Silverthorn Ranch is located in the Bonsall Hydrographic Subarea of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit (3.12). The District also indicated that reclaimed water may be discharged at additional reuse sites in the future.

4. Fallbrook Sanitary District provides treatment to the wastewater from its service area by means of two wastewater treatment plants, Plant Nos. 1 and 2. Fallbrook Sanitary District reports that effluent from Plant Nos. 1 and 2 can be treated to comply with all applicable requirements of California Code of Regulations, Title 22, Division 4, Chapter 3, "Reclamation Criteria." Effluent from these plants is collected into a single flow stream and discharged to the Pacific Ocean via the District's land outfall and the City of Oceanside's ocean outfall.

5. Plant No. 1 is located approximately 14 miles northeast of the City of Oceanside, adjacent to the westerly boundary of the Fallbrook Sanitary District, and serves most of the District's service area. It has a design capacity (average

dry weather flow) of 2.7 MGD. Plant No. 1 uses the following treatment processes: prechlorination for odor control, bar screens for coarse solid removal, an aerated grit removal tank, primary sedimentation, interstage pumping, emergency overflow holding, fine bubble aeration activated sludge, secondary sedimentation, secondary effluent equalization, and chlorine disinfection. To provide reclaimed water, the combined effluent from Plant Nos. 1 and 2 is further treated by alum and polymer injection, flocculation tanks, rapid sand filters, and chlorine disinfection. Storage of reclaimed water can be provided at the existing reservoir located at the southeastern corner of the District property. Filter backwash wastes are returned to the headworks of the treatment plant.

6. Plant No. 2 has a design capacity (average dry weather flow) of 0.4 MGD. It consists of a small headworks, two package wastewater treatment and solids processing units operating in parallel, an effluent pumping station and an operations building. The headworks provides the wastewater with preliminary treatment by means of a comminutor and a manually cleaned bar screen. The effluent from the headworks is distributed to the two package treatment units. Treated effluent from these units is collected into the effluent pumping station which pumps it to Plant No. 1. The Plant No. 2 effluent is mixed with the effluent of Plant No. 1 for discharge to the District's outfall or for further treatment in the tertiary treatment facilities located at Plant No. 1.

7. Treated effluent from Plant Nos. 1 and 2 is discharged into the District's land outfall. This outfall starts at the effluent of Plant No. 1 as an 18-inch pipeline, and shortly after leaving the plant, reduces to a 16-inch ductile iron pipe. The pipeline conveys treated wastewater in a southerly direction from the Fallbrook area for approximately 18 miles, joins the City of Oceanside's 36-inch diameter ocean outfall, and ultimately discharges to the Pacific Ocean. The Fallbrook Sanitary District has an agreement with the City of Oceanside to discharge wastewater through the ocean outfall at a flow rate of up to 2.4 MGD on an annual average basis. The discharge of treated effluent to the Pacific Ocean via the City of Oceanside's Ocean Outfall is currently regulated under **Order No. 89-13, NPDES No. CA0108031, Waste Discharge Requirements for the Fallbrook Sanitary District Water Pollution Control Facilities Plant Nos. 1 and 2, Discharge through the Oceanside Ocean Outfall, San Diego County.**

8. As described in Finding No. 1, the Fallbrook Sanitary District has been supplying the California Department of Transportation (Caltrans) with disinfected secondary effluent for irrigation of freeway landscaping since October, 1987. Following completion of new tertiary treatment facilities, the District has provided filtered tertiary effluent since January, 1990. The reclaimed water is withdrawn from the District's land outfall near its down stream end at I-5 and Hill Street within the City of Oceanside. By a cooperative agreement with Caltrans, the District will provide Caltrans with at least 250 acre-feet of reclaimed water per year.

9. Sludge generated by the wastewater treatment facilities is stabilized by aerobic digestion and dewatered prior to disposal. Following aerobic digestion in two rectangular digesters, the sludge is pumped to concrete lined sludge drying beds for dewatering. A small belt filter press is provided for sludge dewatering when weather conditions diminish the capacity of the drying beds. Dewatered solids are treated through two composting processes. All sludge is first treated by aerated static-pile composting for stabilization of the organic materials in the sludge and elimination of pathogenic organisms. A portion is then treated by the vermicomposting process where earthworms utilize the composted sludge as food and produce worm castings. Both the worm castings and static pile compost may be marketed as a soil conditioner. As indicated in Finding No. 2 of this Order, waste discharge requirements for sludge operations by Fallbrook Sanitary District have not yet been developed.

10. In order to supply new reclaimed water from the land outfall to additional reuse sites, the District plans to construct pipelines and other facilities. Additional reclaimed water reuse sites located within the Community of Fallbrook will be served via the reclaimed water reservoir and a new distribution pumping station and pipeline to the south of Plant No. 1. In order to control the concentration of total dissolved solids of the reclaimed wastewater supplied to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13), the Fallbrook Public Utilities District (FPUD) will provide a potable water supply line and air-gap so that potable water can either be supplied and/or mixed with the reclaimed water.

11. Fallbrook Sanitary District plans to wholesale reclaimed wastewater to FPUD. FPUD will, in turn, sell the wastewater at retail to users located in several service areas. The service areas are described in Attachment 4 and shown in Figure 4-1 of the Report of Waste Discharge. A list of all

potential reclaimed water users in each service area is also contained in Attachment 4 to the Report of Waste Discharge. The potential users are located in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13), and the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit. This Order is applicable to the discharge of reclaimed water supplied by Fallbrook Sanitary District for use at all future reuse sites located within these hydrographic subareas.

12. Results of analysis of a grab sample of the combined effluent from Fallbrook Sanitary District Plant Nos. 1 and 2 to be used for irrigation at reuse sites are as follows:

Constituent	Unit	Effluent Concentration
Total dissolved solids	mg/l	747
Chloride	mg/l	120
Percent sodium	%	52
Sulfate	mg/l	228
Nitrate	mg/l	55.5
Iron	mg/l	0.21
Manganese	mg/l	0.02
Methylene blue active substances	mg/l	0.32
Boron	mg/l	0.43
Odor		None
Color	Units	25
Fluoride	mg/l	0.30

13. The **Comprehensive Water Quality Control Plan Report, San Diego Basin (9)** (Basin Plan), was adopted by this Regional Board on March 17, 1975 and subsequently approved by the State Water Resources Control Board (State Board). Subsequent revisions to the Basin Plan have also been adopted by the Regional Board and approved by the State Board.

14. The Basin Plan establishes the following beneficial uses of the surface waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

    a. Municipal and Domestic Supply
    b. Agricultural Supply
    c. Industrial Service Supply
    d. Industrial Process Supply
    e. Water Contact Recreation
    f. Non-contact Water Recreation

g. Warm Fresh-Water Habitat
h. Cold Fresh-Water Habitat
i. Wildlife Habitat
j. Preservation of Rare and Endangered Species
k. Fish Spawning

15. The Basin Plan establishes the following beneficial uses of the ground waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

    a. Municipal and Domestic Supply
    b. Agricultural Supply
    c. Industrial Service Supply
    d. Industrial Process Supply
    e. Groundwater Recharge

16. The Basin Plan establishes the following beneficial uses of the surface waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

    a. Agricultural Supply
    b. Industrial Service Supply
    c. Water Contact Recreation
    d. Non-contact Water Recreation
    e. Warm Fresh-Water Habitat
    f. Wildlife Habitat
    g. Preservation of Rare and Endangered Species

17. The Basin Plan establishes the following beneficial uses of the ground waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

    a. Municipal and Domestic Supply
    b. Agricultural Supply
    c. Industrial Service Supply
    d. Groundwater Recharge

18. The Basin Plan establishes the following water quality objectives for surface and ground waters in the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13):

Constituent	Concentration not to be exceeded more than 10 percent of the time: Surface Water		Ground Water	
Total dissolved solids	750	mg/L	750[a]	mg/L
Chloride	300	mg/L	300[a]	mg/L
Percent sodium	60	%	60	%
Sulfate	300	mg/L	300[a]	mg/L
Nitrate	---		10[a]	mg/L
Nitrogen and phosphorus	*		---	
Iron	0.3	mg/L	0.3[a]	mg/L
Manganese	0.05	mg/L	0.05[a]	mg/L
Methylene blue active substances	0.5	mg/L	0.5	mg/L
Boron	0.5	mg/L	0.5[a]	mg/L
Odor	None		None	
Turbidity	20	NTU	5	NTU
Color	20	Units	15	Units
Fluoride	1.0		1.0	mg/L

* Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/L in any stream at the point where it enters any standing body of water. A desired goal in order to prevent plant nuisances in streams and other flowing waters appears to be 0.1 mg/L total P. These values are not to be exceeded more than 10 percent of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 shall be used.

[a]The recommended plan would allow for measurable degradation of ground water in this basin to permit continued agricultural land use. Point sources, however, would be controlled to achieve effluent quality corresponding to the tabulated numerical values. In future years demineralization may be used to treat ground water to the desired quality prior to use.

Note: mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units

19. The Basin Plan established the following objectives for surface and ground waters in the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit:

Constituent	Concentration not to be exceeded more than 10 percent of the time: Surface Water		Ground Water	
Total dissolved solids	500	mg/L	1500[a,b]	mg/L
Chloride	250	mg/L	500[a,b]	mg/L
Percent sodium	60	%	60	%
Sulfate	250	mg/L	500[a,b]	mg/L
Nitrate	---		45[a,b]	mg/L
Nitrogen and phosphorus	*		---	
Iron	0.3	mg/L	0.85[a,b]	mg/L
Manganese	0.05	mg/L	0.15[a,b]	mg/L
Methylene blue active Substances	0.5	mg/L	0.5[b]	mg/L
Boron	0.5	mg/L	0.5[a,b]	mg/L
Odor	None		None	
Turbidity	20	NTU	5	NTU
Color	20	Units	15[b]	Units
Fluoride	1.0	mg/L	1.0[b]	mg/L

Note: mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units

* Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/L in any stream at the point where it enters any standing body of water. A desired goal in order to prevent plant nuisances in streams and other flowing waters appears to be 0.1 mg/L total P. These values are not to be exceeded more than 10 percent of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 shall be used.

[a]The recommended plan would allow for measurable degradation of ground water in this basin to permit continued agricultural land use. Point sources, however, would be controlled to achieve effluent quality corresponding to the tabulated numerical values. In future years demineralization may be used to treat ground water to the desired quality prior to use.

[b]A portion of the Upper Mission Basin is being considered as an underground potable water storage reservoir for treated imported water. The area is located north of Highway 76 on the boundary of hydrographic subareas 3.11 and 3.12. If this program is adopted, local objectives approaching the quality of the imported water would be set and rigorously pursued.

20. The Basin Plan establishes that water quality objectives and beneficial uses for ground waters do not apply westerly of the easterly boundary of I-5. Ground water quality objectives for these areas were deleted from the Basin Plan by the Regional Board in accord with the requirements of Resolution No. 68-16 and other requirements of the California Water Code, in order to encourage the use of reclaimed water in these areas. Therefore, the discharge of reclaimed wastewater for landscape irrigation by Caltrans along the I-5 corridor in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas, as identified in Finding No. 1 of this Order, will not result in violation of water quality objectives or adversely affect beneficial uses as set forth in the Basin Plan.

21. Because irrigation operations can result in salts in the applied water being concentrated in the fraction of the applied water which percolates to the groundwater, and because Basin Plan groundwater quality objectives are, in most cases, intended to be achieved in the groundwater (i.e. not in the effluent), effluent mineral limits frequently require concentrations of mineral constituents in the effluent to be lower than the corresponding groundwater quality objectives. However, as indicated in the footnotes to the groundwater quality objectives for the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas (Finding Nos. 18 and 19), the groundwater quality objectives for mineral constituents in these subareas are intended to be achieved in the effluent rather than in the groundwater. Consequently, the 30-day average effluent mineral limits in this Order are the same as the applicable groundwater quality objectives. Therefore, the discharge of reclaimed wastewater for irrigation in the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas will not result in violation of water quality

objectives or adversely affect beneficial uses as set forth in the Basin Plan.

22. Potable water is supplied to the Fallbrook area by the Fallbrook Public Utilities District and the Rainbow Municipal Water District. Both districts are members of the San Diego County Water Authority which is in turn a member of the Metropolitan Water District. Both agencies receive water from the Metropolitan Water District Lake Skinner Plants 1 and 2. The District reports that effluent from these two plants contains the following average concentrations:

Constituent	Unit	Average Concentration
Total dissolved solids	mg/l	437
Chloride	mg/l	98
Percent sodium	%	47
Sulfate	mg/l	124
Nitrate	mg/l	1.0
Iron	mg/l	1.3
Manganese	mg/l	0.02
Fluoride	mg/l	0.14

23. The Basin Plan also contains the following prohibitions applicable to the proposed discharge:

"Discharge of treated or untreated sewage or industrial wastes to a natural watercourse upstream of surface storage or diversion facilities used for municipal supply is prohibited."

"Discharge of treated or untreated sewage or industrial wastewater, exclusive of cooling water or other waters which are chemically unchanged, to a watercourse, is prohibited except in cases where the quality of said discharge complies with the receiving body's water quality objectives."

"Discharge of treated or untreated sewage or industrial wastes in such manner or volume as to cause sustained surface flow or ponding on lands not owned or under the control of the discharger is prohibited except in cases defined in the previous paragraph and in cases in which the responsibility for all downstream adverse effects is accepted by the discharger."

24. On January 23, 1986, Fallbrook Sanitary District submitted "Rules and Regulations for Reclaimed Water Service, Fallbrook Sanitary District." These Rules and Regulations for Reclaimed Water Service will be enforced by the discharger for reclaimed water use along the I-5 corridor in

the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas and within the Upper Ysidora (2.13), Mission (3.11), and Bonsall (3.12) Hydrographic Subareas.

25. On May 23, 1990, Fallbrook Sanitary District approved a Negative Declaration for the Fallbrook Area Wastewater Reclamation Project. The project as approved by Fallbrook Sanitary District will not have a significant effect on the environment.

26. The discharge of reclaimed water to the areas authorized under this Order is in conformance with Resolution No. 68-16, **Statement of Policy with Respect to Maintaining the High Quality of Waters in California.** The wastewater reclamation and reuse projects that will occur in these areas under the terms and conditions of this Order will:

    a. Have maximum benefit to the people of the State, because in the absence of reclaimed wastewater, imported potable water would be used for irrigation of the reclaimed water use areas described in this Order;

    b. Not unreasonably effect the beneficial uses of ground water in the underlying basins; and

    c. Not cause the ground water objectives of the underlying basins to be exceeded.

27. This Order prescribes waste discharge requirements and reclamation requirements governing the production and use of reclaimed water, which the Regional Board has determined are necessary to protect the public health, safety and welfare pursuant to California Water Code, Division 7, Chapter 7, Sections 13500 - 13550, ("Water Reclamation Law"). This Order, which applies to the producer of reclaimed water, requires that the producer of the reclaimed water establish and enforce rules and regulations which apply to users, including purveyors, of the reclaimed water.

28. The Regional Board considered all environmental factors associated with the discharge of waste.

29. The Regional Board has notified the discharger and all known interested parties of its intent to adopt waste discharge requirements for use of reclaimed water by Fallbrook Sanitary District.

30. The Regional Board in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, That Fallbrook Sanitary District (hereinafter discharger), in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. Discharges of wastes, including windblown spray and runoff of effluent applied for irrigation, to lands which have not been specifically described in the report of waste discharge and for which valid waste discharge requirements are not in force are prohibited.

2. The discharge of any radiological, chemical or biological warfare agent, or high-level radiological waste is prohibited.

3. Storage, use and/or disposal of wastes in a manner that would result in ponding or surfacing of wastes on lands beyond the disposal area, as described in the findings of this Order, is prohibited.

4. The discharge of wastewater shall not:

   (a) Cause the occurrence of coliform or pathogenic organisms in waters pumped from the basin;

   (b) Cause the occurrence of objectionable tastes and odors in water pumped from the basin;

   (c) Cause waters pumped from the basin to foam;

   (d) Cause the presence of toxic materials in waters pumped from the basin;

   (e) Cause the pH of waters pumped from the basin to fall below 6.0 or rise above 9.0;

   (f) Cause this Regional Board's objectives for the surface waters of the Santa Margarita Hydrographic Unit or the San Luis Rey Hydrographic Unit as established in the Basin Plan, to be exceeded;

   (g) Cause odors, septicity, mosquitos or other vectors, weed growth or other nuisance conditions in the San Luis Rey River or the Santa Margarita River or their tributaries;

   (h) Cause a surface flow recognizable as sewage in the San Luis Rey River or the Santa Margarita River or their tributaries; or

(i) Cause a pollution, contamination or nuisance or adversely affect beneficial uses of the ground or surface waters of the Santa Margarita Hydrographic Unit or the San Luis Rey Hydrographic Unit as established in the Basin Plan.

5. The discharge of a waste flow volume in excess of a thirty-day average wastewater flowrate of 2.7 MGD for Plant No. 1 and 0.4 MGD for Plant No. 2 is prohibited unless the discharger obtains revised waste discharge requirements for the proposed increased flow.

6. Odors, vectors, and other nuisances of sewage or sewage sludge origin beyond the limits of the treatment plant site or disposal area are prohibited.

7. The bypassing of wastewater from the Fallbrook Sanitary District which does not meet the effluent limitations established in Discharge Specifications B.1 and B.2 of this Order is prohibited.

8. The discharge of waste in a manner other than as described in the findings of this Order is prohibited unless the discharger obtains revised waste discharge requirements that provide for the proposed change.

9. The discharge of treated or untreated wastewater to the San Luis Rey River or the Santa Margarita River or their tributaries is prohibited.

B. DISCHARGE SPECIFICATIONS

1. The discharge of effluent to the Upper Ysidora Hydrographic Subarea of the Ysidora Hydrographic Subunit of the Santa Margarita Hydrographic Unit (2.13) containing pollutants in excess of the following effluent limitations is prohibited:

Constituent	30-day[1] Average		Daily[2] Maximum	
Carbonaceous biochemical oxygen demand ($CBOD_5$ @ 20° C)	25	mg/l	45	mg/l
Total suspended solids	30	mg/l	50	mg/l
pH	Within the limits of 6.0 to 9.0 at all times			
Total dissolved solids	750	mg/l	900	mg/l
Chloride	300	mg/l	350	mg/l
Percent sodium	60	%	65	%
Sulfate	300	mg/l	350	mg/l
Iron	0.3	mg/l	0.4	mg/l
Manganese	0.05	mg/l	0.06	mg/l
Methylene blue active substances	0.5	mg/l	0.6	mg/l
Boron	0.5	mg/l	0.6	mg/l
Fluoride	1.0	mg/l	1.2	mg/l
Turbidity	(3)		(3)	
Coliform	(4)		(4)	

[1]The 30-day average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 consecutive calendar day period.

[2]The daily maximum effluent limitation shall apply to the results of a single composite or grab sample

[3]Not to exceed an average operating turbidity of 2 turbidity units. Not to exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

[4]The median number of coliform organisms shall not exceed 2.2 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analysis have been completed, and the number of coliform organisms shall not exceed 23 per 100 milliliters in any sample.

2. The discharge of effluent to the Mission (3.11) and Bonsall (3.12) Hydrographic Subareas of the Bonsall Hydrographic Subunit of the San Luis Rey Hydrographic Unit and along the I-5 corridor in the Agua Hedionda (4.31), Carlsbad (4.21), Loma Alta (4.10), Mission (3.11), and Ysidora (2.11) Hydrographic Subareas containing pollutants in excess of the following effluent limitations is prohibited:

Constituent	30-day[1] Average		Daily[2] Maximum	
Carbonaceous biochemical oxygen demand ($CBOD_5$ @ 20° C)	25	mg/l	45	mg/l
Total suspended solids	30	mg/l	50	mg/l
pH	Within the limits of 6.0 to 9.0 at all times			
Total dissolved solids	400[3]	mg/l	450[3]	mg/l
Chloride	50[4]	mg/l	80[4]	mg/l
Percent sodium	60	%	60	%
Sulfate	60[5]	mg/l	100[5]	mg/l
Iron	0.85	mg/l	1.0	mg/l
Manganese	0.15	mg/l	0.20	mg/l
Methylene blue active substances	0.5	mg/l	0.6	mg/l
Boron	0.5	mg/l	0.6	mg/l
Fluoride	1.0	mg/l	1.2	mg/l
Turbidity	(6)		(6)	
Coliform	(7)		(7)	

[1]The 30-day average effluent limitation shall apply to the arithmetic mean of the results of all samples collected during any 30 consecutive calendar day period.

[2]The daily maximum effluent limitation shall apply to the results of a single composite or grab sample

[3]These are the increments of TDS in effluent over supply water. However, the daily maximum concentration of TDS in effluent shall not exceed 1500 mg/l under any circumstances.

[4]These are the increments of chloride in effluent over supply water. However, the daily maximum concentration of chloride in effluent shall not exceed 500 mg/l under any circumstances.

[5]These are the increments of sulfate in effluent over supply water. However, the daily maximum concentration

of sulfate in effluent shall not exceed 500 mg/l under any circumstances.

[6]Not to exceed an average operating turbidity of 2 turbidity units. Not to exceed 5 turbidity units more than 5 percent of the time during any 24-hour period.

[7]The median number of coliform organisms shall not exceed 2.2 per 100 milliliters as determined from the bacteriological results of the last 7 days for which analysis have been completed, and the number of coliform organisms shall not exceed 23 per 100 milliliters in any sample.

3. All waste treatment, containment and disposal facilities shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency.

4. All waste treatment, containment and disposal facilities shall be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency 24-hour storm.

5. Collected screenings, sludges, other solids removed from liquid wastes, and filter backwash shall be discharged as described in the Findings of this Order or disposed of by other means approved by the Executive Officer. Before sludge is disposed of by means other than as described in this Order, or used or supplied for use of others, the discharger shall submit written notification to the Executive Officer of the proposed disposal or use. Such disposal, use, or supply for use of others shall not be initiated until approved by the Executive Officer.

6. Effluent used for irrigation shall conform with all applicable provisions of California Code of Regulations, Title 22, Division 4, Chapter 3 (**Reclamation Criteria**) for irrigation of parks, playgrounds, schoolyards, and other areas where the public has similar access or exposure (currently Sections 60313. (b) and 60320.5).

7. Fallbrook Sanitary District shall meet the design, operational, and reliability requirements of Articles 7, 8, 9 and 10 of the California Code of Regulations, Title 22, Division 4, Chapter 3. Fallbrook Sanitary District shall develop an engineering report conforming to Section 60323, Article 7 of the California Code of Regulations, Title 22, Division 4, Chapter 3. The engineering report shall be submitted to the State

Department of Health Services, County Department of Health Services, and the Regional Board Executive Officer. Reclaimed water from the Fallbrook Sanitary District shall not be used for irrigation until the engineering report is approved by the Regional Board Executive Officer.

8. Effluent storage ponds and sludge drying beds shall be designed, constructed, operated, and maintained so as to prevent surfacing of wastes on property not owned or controlled by the discharger. Surface runoff of any wastes which surface on property owned or controlled by the discharger onto property not owned or controlled by the discharger shall be prevented.

C. PROVISIONS

1. Neither the treatment nor the discharge of waste shall create a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code.

2. The discharger must comply with all conditions of this Order. Any noncompliance with this Order constitutes a violation of the California Water Code and is grounds for (a) enforcement action; (b) termination, revocation and reissuance, or modification of this Order; or (c) denial of a report of waste discharge in application for new or revised waste discharge requirements.

3. In an enforcement action, it shall not be a defense for the discharger that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the discharger shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies for example, when the primary source of power of the treatment facility fails, is reduced, or is lost.

4. The discharger shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this Order, including such accelerated or additional monitoring as may be necessary to determine the nature and impact of the noncompliance.

5. The discharger shall, at all times, properly operate and maintain all facilities and systems of treatment

and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Order.

6. This Order may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

   (a) Violation of any terms or conditions of this Order;

   (b) Obtaining this Order by misrepresentation or failure to disclose fully all relevant facts; or

   (c) A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

   The filing of a request by the discharger for the modification, revocation and reissuance, or termination of this Order, or notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

7. This Order is not transferrable to any person except after notice to the Executive Officer. The Regional Board may require modification or revocation and reissuance of this Order to change the name of the discharger and incorporate such other requirements as may be necessary under the California Water Code. The discharger shall submit notice of any proposed transfer of this Order's responsibility and coverage to a new discharger as described under Reporting Requirement D.3.

8. This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from liability under federal, state or local laws, nor create a vested right for the discharger to continue the waste discharge.

9. The discharger shall allow the Regional Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

   (a) Enter upon the discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;

   (b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;

   (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

   (d) Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the California Water Code, any substances or parameters at any location.

10. The discharger's wastewater treatment facilities shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Chapter 3, Subchapter 14, Title 23 of the California Code of Regulations.

11. A copy of this Order shall be maintained at Fallbrook Sanitary District Plant Nos. 1 and 2 and shall be available to operating personnel at all times.

12. The provisions of this Order are severable, and if any provision of this Order, or the application of any provision of this Order to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this Order, shall not be affected thereby.

13. The potable water supply shall not be used to supplement the reclaimed water supply except through an approved air gap. In other areas where the potable water supply is piped to premises where sewage is pumped, treated or reclaimed (i.e., sewage treatment plants or pumping stations, golf course, etc.) the potable water supply shall be protected at the property line in accordance with the State Department of Health Services' **Regulations Relating to Cross-Connections.**

14. All waste water treatment and disposal facilities shall be completely constructed and operable prior to the initiation of any landscape irrigation, and the complete facilities shall have adequate capacity for the full design flow of 3.1 MGD. A report from design engineer certifying the adequacy of each component of the treatment and disposal facilities shall be submitted by the discharger prior to commencement of the irrigation. The certification report shall contain a requirement-by-requirement analysis based on acceptable engineering practices, of how the process and physical designs of the facilities will ensure compliance with the waste discharge requirements. The design engineer shall affix his signature and engineering license number to the certification report and should submit it prior to construction of the facilities. The irrigation shall not be initiated until:

    a. The certification report is received by the Regional Board;

    b. The Regional Board has been notified of the completion of facilities by the discharger;

    c. An inspection of the facilities has been made by staff of the Regional Board; and

    d. Staff has notified the discharger by letter that the irrigation can be initiated.

D. RECLAIMED WATER USE PROVISIONS

1. If the Fallbrook Sanitary District (discharger/ producer) is supplying reclaimed water for use by the discharger/producer or other persons, the discharger/producer shall establish **Rules and Regulations for Reclaimed Water Users** governing the design and construction of reclaimed water use facilities and the use of reclaimed water. The rules and regulations shall, at a minimum, contain the following provisions:

    a. Provisions implementing Title 22, Division 4, Chapter 3, Wastewater Reclamation Criteria, of the California Code of Regulations;

    b. Provisions implementing the State Department of Health Services (DOHS) **Guidelines For Use of Reclaimed Water** and **Guidelines for Use of**

Reclaimed Water for Construction Purposes or measures, acceptable to DOHS, providing equivalent protection of public health;

c. Provisions authorizing the Regional Board, the discharger/producer, or an authorized representative of these parties, upon presentation of proper credentials, to inspect the facilities of any reclaimed water user to ascertain whether the user is complying with the discharger/producer's rules and regulations;

d. Provision for written notification, in a timely manner, to the discharger/producer by the reclaimed water user of any material change or proposed change in the character of the use of reclaimed water;

e. Provision for submission of a preconstruction report to the discharger/producer by the reclaimed water user in order to enable the discharger/producer to determine whether the user will be in compliance with the discharger/producer's rules and regulations;

f. Provision requiring reclaimed water users to designate a reclaimed water supervisor responsible for the reclaimed water system at each use area under the user's control. Reclaimed water supervisors should be responsible for the installation, operation, and maintenance of the irrigation system, enforcement of the discharger/producer's reclaimed water user rules and regulations, prevention of potential hazards, and maintenance of the reclaimed water distribution system plans in "as built" form.

g. Provision authorizing the discharger/producer to cease supplying reclaimed water to any person who uses, transports, or stores such water in violation of the discharger/producer's rules and regulations;

h. Provision requiring that, except as authorized by the Regional Board Executive Officer, all reclaimed water storage facilities owned and/or operated by reclaimed water users shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency.

i. Provision requiring that, except as authorized by the Regional Board Executive Officer, all reclaimed water storage facilities owned and/or operated by reclaimed water users shall be protected against erosion, overland runoff, and other impacts resulting from a 100-year frequency, 24-hour storm.

j. Provision requiring notification and concurrence of the State Department of Health Services and the County of San Diego Department of Health Services for new reclaimed water users.

k. Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against any reclaimed water user who discharges reclaimed water in violation of any applicable discharge prohibitions prescribed by the Regional Board or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code Section 13050; and

l. Provision for notification to reclaimed water users that the Regional Board may initiate enforcement action against the discharger/producer, which may result in the termination of the reclaimed water supply, if any person uses, transports, or stores such water in violation of the discharger/producer's rules and regulations or in a manner which creates, or threatens to create conditions of pollution, contamination, or nuisance, as defined in Water Code Section 13050.

The rules and regulations shall be subject to the approval of the Regional Board Executive Officer, the State Department of Health Services and the County of San Diego Department of Health Services. The rules and regulations shall be submitted to the Regional Board within 90 days of adoption of this Order by the Regional Board.

2. The discharger/producer shall implement and enforce the approved rules and regulations for reclaimed water users.

3. The discharger/producer shall, within 90 days of the adoption of this Order, develop and submit to the Regional Board Executive Officer a program to conduct compliance inspections of reclaimed water reuse sites to determine the status of compliance with the approved

rules and regulations for reclaimed water users. The discharger/producer shall implement the inspection program upon its approval by the Regional Board Executive Officer.

4. Reclaimed water shall only be supplied to and used in areas as described in the Findings of this Order for which valid waste discharge requirements, as established by this Order and subsequent addenda, are in force. Prior to using reclaimed water or supplying reclaimed water for use by other parties in any manner or in any area other than as described in the findings of this Order, the discharger shall obtain proper authorization from this Regional Board.

5. Reclaimed water shall not be supplied to parties who use, transport, or store such water in a manner which causes a pollution, contamination or nuisance, as defined by Section 13050 of the California Water Code."

E. REPORTING REQUIREMENTS

1. The discharger shall file a new Report of Waste Discharge at least 120 days prior to the following:

   (a) Addition of a major industrial waste discharge to a discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the wastes.

   (b) Significant change in the treatment or disposal method (e.g., change in the method of treatment which would significantly alter the nature of the waste.)

   (c) Change in the disposal area from that described in the findings of this Order.

   (d) Increase in flow beyond that specified in this Order.

   (e) Other circumstances which result in a material change in character, amount, or location of the waste discharge.

   (f) Any planned change in the regulated facility or activity which may result in noncompliance with this Order.

2. The discharger shall furnish to the Executive Officer of this Regional Board, within a reasonable time, any information which the Executive Officer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The discharger shall also furnish to the Executive Officer, upon request, copies of records required to be kept by this Order.

3. The discharger must notify the Executive Officer, in writing at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new discharger. The notice must include a written agreement between the existing and new discharger containing a specific date for the transfer of this Order's responsibility and coverage between the current discharger and the new discharger. This agreement shall include an acknowledgement that the existing discharger is liable for violations up to the transfer date and that the new discharger is liable from the transfer date on.

4. The discharger shall comply with the attached Monitoring and Reporting Program No. 91-39, and future revisions thereto as specified by the Executive Officer. Monitoring results shall be reported at the intervals specified in Monitoring and Reporting Program No. 91-39.

5. If a need for a discharge bypass is known in advance, the discharger shall submit prior notice and, if at all possible, such notice shall be submitted at least 10 days prior to the date of the bypass.

6. Where the discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Board, it shall promptly submit such facts or information.

7. The discharger shall report any noncompliance which may endanger health or the environment. Any such information shall be provided orally to the Executive Officer within 24 hours from the time the discharger becomes aware of the circumstances. A written submission shall also be provided within five days of the time the discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected;

the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours. The following occurrence(s) must be reported to the Executive Officer within 24 hours:

(a) Any bypass from any portion of the treatment facility.

(b) Any discharge of treated or untreated wastewater resulting from sewer line breaks, obstruction, surcharge or any other circumstances.

(c) Any treatment plant upset which causes the effluent limitations of this Order to be exceeded.

8. All applications, reports, or information submitted to the Executive Officer shall be signed and certified as follows:

(a) The Report of Waste Discharge shall be signed as follows:

(1) For a corporation - by a principal executive officer of at least the level of vice-president.

(2) For a partnership or sole proprietorship - by a general partner or the proprietor, respectively.

(3) For a municipality, state, federal or other public agency - by either a principal executive officer or ranking elected official.

(b) All other reports required by this Order and other information required by the Executive officer shall be signed by a person designated in paragraph (a) of this provision, or by a duly authorized representative of that person. An individual is a duly authorized representative only if:

(1) The authorization is made in writing by a person described in paragraph (a) of this provision;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity; and

(3) The written authorization is submitted to the Executive Officer.

(c) Any person signing a document under this Section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

9. The discharger shall submit reports required under this Order, or other information required by the Executive Officer, to:

Executive Officer
California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd, Suite B
San Diego, California 92124- 1331

F. NOTIFICATIONS

1. California Water Code Section 13263(g) states:

"No discharge of waste into waters of the state, whether or not such discharge is made pursuant to waste discharge requirements, shall create a vested right to continue such discharge. All discharges of waste into waters of the state are privileges, not rights"

2. These requirements have not been officially reviewed by the United States Environmental Protection Agency and are not issued pursuant to Section 402 of the Clean Water Act.

3. The California Water Code provides that any person who intentionally or negligently violates any waste discharge requirements issued, reissued, or amended by this Regional Board is subject to a civil monetary

remedy of up to 20 dollars per gallon of waste discharged or, if a cleanup and abatement order is issued, up to 15,000 dollars per day of violation or some combination thereof.

4. The California Water Code provides that any person failing or refusing to furnish technical or monitoring program reports, as required under this Order, or falsifying any information provided in the monitoring reports is guilty of a misdemeanor.

5. This Order becomes effective on the date of adoption by the Regional Board.

6. The requirements prescribed by this Order supersede the requirements prescribed by Order Nos. 86-40 and 86-63. Order Nos. 86-40 and 86-63 are hereby rescinded when this Order becomes effective.

I, Arthur L. Coe, Executive Officer, do hereby certify the forgoing is a full, true, and correct copy of an Order No. 91-39 adopted by the California Regional Water Quality Control Board, San Diego Region, on May 20, 1991.

ARTHUR L. COE
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

MONITORING AND REPORTING PROGRAM NO. 91-39
FOR
FALLBROOK SANITARY DISTRICT
PLANT NOS. 1 AND 2
RECLAMATION PROJECTS
SAN DIEGO COUNTY

A. MONITORING PROVISIONS

1. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this Order and, unless otherwise specified, before the effluent joins or is diluted by any other waste stream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Executive Officer.

2. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ± 5 percent from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

   (a) "A Guide to Methods and Standards for the Measurement of Water Flow," U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by SD Catalog No. C13.10:421.)

   (b) "Water Measurement Manual," U. S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U. S. Government Printing Office, Washington D. C. 20402. Order by Catalog No. 127,19/2:W29/2, Stock No. S/N 24003-0027.)

(c) "Flow Measurement in Open Channels and Closed Conduits," U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS) Springfield, VA 22151. Order by NTIS No. PB-273-535/5ST.)

(d) "NPDES Compliance Sampling Manual," U. S. Environmental Protection Agency, Office of Water Enforcement. Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration (8FFS), Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, CO 80225.)

3. Monitoring must be conducted according to United States Environmental Protection Agency test procedures approved under Title 40, Code of Federal Regulations (CFR), Part 136, "Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act" as amended, unless other test procedures have been specified in this Order.

4. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Health Services or a laboratory approved by the Executive Officer.

5. Monitoring results must be reported on discharge monitoring report forms approved by the Executive Officer.

6. If the discharger monitors any pollutants more frequently than required by this Order, using test procedures approved under 40 CFR, Part 136, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the discharger's monitoring report. The increased frequency of monitoring shall also be reported.

7. The discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report or application. This period may be extended during the

course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

8. Records of monitoring information shall include:

   (a) The date, exact place, and time of sampling or measurements;
   (b) The individual(s) who performed the sampling or measurements;
   (c) The date(s) analyses were performed;
   (d) The individual(s) who performed the analyses;
   (e) The analytical techniques or method used; and
   (f) The results of such analyses.

9. All monitoring instruments and devices which are used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

10. The discharger shall report all instances of noncompliance not reported under Reporting Requirement E.7 of this Order at the time monitoring reports are submitted. The reports shall contain the information listed in Reporting Requirement E.7.

11. The monitoring reports shall be signed by an authorized person as required by Reporting Requirement E.9.

12. A composite sample is defined as a combination of at least eight sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24 hour period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

13. A grab sample is an individual sample of at least 100 milliliters collected at a randomly selected time over a period not exceeding 15 minutes.

14. Sampling and analysis shall, as a minimum, be conducted in accordance with Article 6 of California Code of Regulations, Title 22, Division 4, Chapter 3 **(Reclamation Criteria)**.

B. EFFLUENT MONITORING

The following shall constitute the effluent monitoring program for Fallbrook Sanitary District:

Determination	Unit	Sample Type	Sampling Frequency	Reporting Frequency
Carbonaceous biochemical oxygen demand (5-Day @ 20 C)	mg/l	Composite	Weekly	Monthly
Total suspended solids	mg/l	Composite	Weekly	Monthly
Volatile suspended solids	mg/l	Composite	Weekly	Monthly
pH	Unit	Composite	Monthly	Monthly
Total dissolved solids	mg/l	Composite	Monthly	Monthly
Chloride	mg/l	Composite	Monthly	Monthly
Percent sodium	%	Composite	Monthly	Monthly
Sulfate	mg/l	Composite	Monthly	Monthly
Iron	mg/l	Composite	Monthly	Monthly
Manganese	mg/l	Composite	Monthly	Monthly
Methylene blue active substances	mg/l	Composite	Monthly	Monthly
Boron	mg/l	Composite	Monthly	Monthly
Fluoride	mg/l	Composite	Monthly	Monthly
Aluminum	mg/l	Composite	Semiannual	Semiannual
Arsenic	mg/l	Composite	Semiannual	Semiannual
Barium	mg/l	Composite	Semiannual	Semiannual
Cadmium	mg/l	Composite	Semiannual	Semiannual
Chromium	mg/l	Composite	Semiannual	Semiannual
Copper	mg/l	Composite	Semiannual	Semiannual
Lead	mg/l	Composite	Semiannual	Semiannual
Mercury	mg/l	Composite	Semiannual	Semiannual
Selenium	mg/l	Composite	Semiannual	Semiannual
Silver	mg/l	Composite	Semiannual	Semiannual
Zinc	mg/l	Composite	Semiannual	Semiannual
Coliform	MPN/100 ml	Grab	*	Monthly
Turbidity	NTU	Continuous	**	Monthly

* Samples for coliform bacteria shall be collected at least daily and at a time when wastewater characteristics are most demanding on the treatment facilities and disinfection procedures.

** Turbidity analysis shall be performed by a continuous recording turbidimeter.

Note: MGD = million gallons per day
mg/l = milligrams per liter
MPN/100 ml = Most Probable Number per 100 milliliters
ml/l = milliliters per liter
NTU = Nephelometric Turbidity Units

C. FLOWRATE MEASUREMENT

Effluent flowrates shall be measured on a continuous basis as indicated below. Daily flowrates and monthly average flowrates for all waste streams shall be reported monthly.

Waste Stream	Unit	Measurement Type	Reporting Frequency
Plant No. 1 effluent	MGD	Continuous	Monthly
Plant No. 2 effluent	MGD	Continuous	Monthly
Tertiary treatment effluent	MGD	Continuous	Monthly

D. POTABLE SUPPLY WATERS

Examination of the potable waters supplied to the service area of the wastewater treatment facilities shall be conducted for the following constituents monthly with the results reported monthly.

Constituent	Unit
Total dissolved solids	mg/l
Chloride	mg/l
Sulfate	mg/l

E. RECLAIMED WATER USERS SUMMARY REPORT

A reclaimed water users summary report shall be submitted quarterly containing the following information:

1. **Reclaimed water use site summary information**

   The following information shall be submitted for each reclaimed water use site.

   a. Name of the reclaimed water reuse site
   b. Owner of the reclaimed water use facility
   c. Address of the reuse site
   d. Name of the reclaimed water user supervisor
   e. Phone number of the on-site water user supervisor
   f. Mailing address, if different from site address
   g. Basin Plan name of ground water basin underlying the reuse site
   h. Volume of reclaimed water delivered to the reuse site on a monthly basis

2. **Reclaimed Water Use Summary Information**

   a. Total gallons of reclaimed water supplied to all reclaimed water users for each month of the reporting period.

   b. Total number of reclaimed water user sites.

3. **Reclaimed water user site inspections**

   Number of reclaimed water reuse site inspections conducted by discharger/producer staff and identification of sites inspected for the reporting period.

4. **Reclaimed water user violations of the discharger/producer's rules and regulations.**

   The discharger/producer shall identify all reclaimed water users known by the discharger/producer to be in violation of the discharger/producer's rules and regulations for reclaimed water users. The report shall include a description of the noncompliance and its cause, including the period of noncompliance, and if the noncompliance has not been corrected; the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

F. SEWAGE SOLIDS

A log of the type, quantity, location, and manner of disposal of solids removed in the course of sewage treatment shall be maintained and submitted monthly.

G. REPORTING

Monitoring reports shall be submitted to the Executive Officer in accordance with the following schedule:

Reporting Frequency	Report Period	Report Due
Monthly	January, February, March, April, May, June, July, August, September, October, November, December	By the end of the following month
Quarterly	January-March April-June July-September October-December	April 30 July 31 October 31 January 31
Semiannual	January-June July-December	July 31 January 31

Monitoring reports shall be submitted to:

California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd., Suite B
San Diego, CA 92124-1331

Ordered by [signature]
ARTHUR L. COE
Executive Officer
May 20, 1991

ORDER NO. R9-2012-0004
NPDES NO. CA0108031

WASTE DISCHARGE REQUIREMENTS FOR THE FALLBROOK PUBLIC UTILITY DISTRICT WASTEWATER TREATMENT PLANT NO. 1 DISCHARGE TO THE PACIFIC OCEAN VIA THE OCEANSIDE OCEAN OUTFALL

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 1. Discharger and Facility Information

Discharger	Fallbrook Public Utility District
Name of Facility	Fallbrook Public Utility District Treatment Plant No. 1
Facility Address	1425 South Alturas Road Fallbrook, CA 92028
The U.S. Environmental Protection Agency (USEPA) and the California Regional Water Quality Control Board, San Diego Region have classified this discharge as a **major** discharge.	

Discharges by the Fallbrook Public Utility District from the Facility listed in Table 1 at the discharge point identified in Table 2 are subject to waste discharge requirements as set forth in this Order:

Table 2. Discharge Location

Discharge Point No.	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	POTW effluent	33º 09' 46" N	117º 23' 29" W	Pacific Ocean

Table 3. Administrative Information

This Order was adopted by the California Regional Water Quality Control Board, San Diego Region on:	**August 8, 2012**
This Order shall become effective on:	**September 28, 2012**
This Order shall expire on:	**September 27, 2017**
The Discharger shall file a Report of Waste Discharge in accordance with Title 23, California Code of Regulations, not later than 180 days in advance of the Order expiration date as application for issuance of new waste discharge requirements.	

I, David W. Gibson, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Diego Region, on August 8, 2012.

David W. Gibson
Executive Officer

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I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 4. Facility Information

Discharger	Fallbrook Public Utility District
Name of Facility	Fallbrook Public Utility District Treatment Plant No. 1
Facility Address	1425 South Alturas Road Fallbrook, CA 92028
Facility Contact, Title, and Phone	Jack Bebee, Engineering and Planning Manager, (760) 728-1125
Mailing Address	990 East Mission Road P.O. Box 2290, Fallbrook, CA 92088
Type of Facility	Publicly Owned Treatment Works (POTW)
Facility Permitted Discharge Flow Rate	2.7 million gallons per day (MGD)

II. FINDINGS

The California Regional Water Quality Control Board, San Diego Region (hereinafter San Diego Water Board), finds:

A. Background. The Fallbrook Public Utility District (hereinafter Discharger or FPUD) is currently discharging pursuant to Order No. R9-2006-002 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0108031. FPUD submitted a Report of Waste Discharge (ROWD), dated September 30, 2010, and applied for a NPDES permit renewal to discharge up to 2.7 MGD of treated wastewater to the Oceanside Ocean Outfall (Oceanside OO) from Treatment Plant No. 1, hereinafter Facility. The application was deemed complete on October 30, 2010.

B. Facility Description. FPUD owns and operates Treatment Plant No. 1, the FPUD land outfall pipeline, and the FPUD sanitary collection system, hereinafter FPUD Facilities. FPUD's Treatment Plant No. 1 is a publicly owned treatment works (POTW) as defined in section 403.3, title 40 of the Code of Federal Regulations (40 CFR 403.3). FPUD provides municipal wastewater treatment services to a population of approximately 25,000 within the boundaries of the FPUD, treating primarily residential and commercial wastewater. There are no significant industrial users within the FPUD service area

Wastewater treatment processes at Treatment Plant No.1 include preliminary treatment by mechanical bar screening, aerated grit removal, primary sedimentation, aeration and secondary clarification (activated sludge treatment process), and chlorination. Sludge from the secondary treatment facilities is thickened, aerobically digested, and dewatered via centrifuge. Dewatered sludge is fed to a thermal dryer system to produce Class A EQ sewage sludge and disposed of via land application. If the dryer system is off-line, sewage sludge is dewatered via drying beds and hauled to a land application site in Yuma, Arizona by a contractor. Grit and screenings collected from preliminary treatment processes are collected and disposed of at a landfill in San Diego County.

Recycled water distributed from the Facility is regulated under a separate order, Order No. 91-39, which is not incorporated by reference into this permit. Treated wastewater from the Facility that is not distributed as recycled water, hereinafter referred to as effluent, is discharged to the

FPUD-owned land outfall pipeline. This pipeline conveys effluent to the Oceanside OO at the site of the City of Oceanside's La Salina Wastewater Treatment Plant. FPUD has a contractual agreement with the City of Oceanside to discharge up to 2.4 MGD on an annual average basis through the Oceanside OO. The Oceanside OO is owned and operated by the City of Oceanside.

The City of Oceanside is regulated under Order No. R9-2011-0016 (NPDES Permit No. CA0107433) and has a total flow limitation of 22.9 MGD. An additional 6.155 MGD of capacity is allocated to FPUD, US Marine Corps Base Camp Pendleton, and Genetech, Inc. Attachment B of this Order provides maps of the area around the Facility, land outfall pipelines, and the Oceanside OO. Attachment C of this Order provides flow schematics of the Facility.

C. Legal Authorities. This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the United States Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this Facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

D. Background and Rationale for Requirements. The San Diego Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through E and G are also incorporated into this Order.

E. California Environmental Quality Act (CEQA). Under CWC section 13389, this action to adopt a NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.

F. Technology-Based Effluent Limitations. Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44, require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. 40 CFR Part 133 establishes the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), and the instantaneous minimum and maximums for pH. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133. TBELs contained in Table A of the 2009 *Water Quality Control Plan for Ocean Waters of California, California Ocean Plan* (hereinafter Ocean Plan), which include grease and oil, TSS, settleable solids, turbidity, and pH, are also applicable to discharges from the Facility. A detailed discussion of the technology-based effluent limitations (TBELs) development is included in the Fact Sheet (Attachment F).

G. Water Quality-Based Effluent Limitations. Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no

numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

H. **Water Quality Control Plans.** The San Diego Water Board adopted a *Water Quality Control Plan for the San Diego Region* (hereinafter Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for the Pacific Ocean and other receiving waters addressed through the plan. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Resources Control Board (State Water Board). Beneficial uses applicable to the Pacific Ocean specified in the Basin Plan are as follows:

Table 5. Basin Plan Beneficial Uses of the Pacific Ocean

Discharge Point No.	Receiving Water Name	Beneficial Use(s)
001	Pacific Ocean	Industrial service supply; navigation; contact water recreation; non-contact water recreation; commercial and sport fishing; preservation of biological habitats of special significance; wildlife habitat; rare, threatened, or endangered species; marine habitat; aquaculture; migration of aquatic organisms; spawning, reproduction, and/or early development; and shellfish harvesting.

Requirements of this Order implement the Basin Plan.

I. **California Ocean Plan.** The State Water Board adopted the Ocean Plan in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, 2005, and 2009. The State Water Board adopted the latest amendment on September 15, 2009 and it became effective on March 10, 2010. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. The Ocean Plan identifies beneficial uses of ocean waters of the State to be protected as summarized below:

Table 6. Ocean Plan Beneficial Uses of the Pacific Ocean

Discharge Point No.	Receiving Water Name	Beneficial Use
001	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.

In order to protect the beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan.

J. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes. (40 CFR 131.21; 65 Fed. Reg. 24641 (April 27, 2000).) Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000 may be used for CWA purposes, whether or not approved by USEPA.

K. **Stringency of Requirements for Individual Pollutants.** This Order contains both TBELs and WQBELs for individual pollutants. The TBELs consist of restrictions on $CBOD_5$, TSS, pH, oil and grease, settleable solids, and turbidity. Restrictions on these pollutants are discussed in section IV.B of the Fact Sheet (Attachment F of this Order). This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. These limitations are not more stringent than required by the CWA.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. The scientific procedures for calculating the individual WQBELs are based on the Ocean Plan, which was approved by USEPA on October 8, 2010. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). This Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

L. **Antidegradation Policy.** 40 CFR 131.12 requires that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The San Diego Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies (San Diego Basin Plan Chapter 3, page 3-2). As discussed in detail in the Fact Sheet (Attachment F of this Order), the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

M. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. Some effluent limitations in this Order are less stringent that those in the previous Order. As discussed in detail in the Fact Sheet (Attachment F of this Order), this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

N. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 USCA sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the State. FPUD is responsible for meeting all requirements of the applicable Endangered Species Act.

O. Monitoring and Reporting. 40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. CWC sections 13267 and 13383 authorize the San Diego Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements to implement federal and State requirements. This MRP is provided in Attachment E of this Order.

P. Standard and Special Provisions. Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D of this Order. The San Diego Water Board has also included in this Order special provisions applicable to FPUD. A rationale for the special provisions contained in this Order is provided in the Fact Sheet (Attachment F of this Order).

Q. Provisions and Requirements Implementing State Law. Some of the provisions/requirements in subsections VI.C of this Order are included to implement State law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations. As described in the fact sheet, the requirements of this Order take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of CWC section 13241.

R. Executive Officer Delegation of Authority. The San Diego Water Board by prior resolution has delegated all matters that may legally be delegated to its Executive Officer to act on its behalf pursuant to CWC section 13223. Therefore, the Executive Officer is authorized to act on the San Diego Water Board's behalf on any matter within this Order unless such delegation is unlawful under CWC section 13223 or this Order explicitly states otherwise

S. Notification of Interested Parties. The San Diego Water Board has notified FPUD and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet (Attachment F of this Order).

T. Consideration of Public Comment. The San Diego Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet (Attachment F of this Order).

THEREFORE, IT IS HEREBY ORDERED, that Order No. R9-2006-002 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the CWC (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, FPUD shall comply with the requirements in this Order.

III. DISCHARGE PROHIBITIONS

A. The discharge of waste from the Facility not treated by a secondary treatment process and not in compliance with the effluent limitations specified in section IV.A of this Order, and/or to a location other than Discharge Point No. 001, unless specifically regulated by this Order or separate waste discharge requirements, is prohibited.

B. The bypassing of untreated wastes is prohibited, except as allowed by Federal Standard Provisions I.G or I.H of this Order. (Attachment D).

C. The discharge of wastes from the Facility during dry-weather months (May to October) in excess of a monthly average effluent flow of 2.7 MGD, and during wet-weather months (November to April) in excess of a monthly average effluent flow of 3.6 MGD is prohibited.

D. The Discharger must comply with Ocean Plan Discharge Prohibitions, summarized in Attachment G, as a condition of this Order.

E. The Discharger must comply with Discharge Prohibitions contained in Chapter 4 of the Basin Plan, summarized in Attachment G, as a condition of this Order

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations and Performance Goals – Discharge Point No. 001

1. Final Effluent Limitations

a. FPUD shall maintain compliance with the following effluent limitations at Monitoring Locations M-001, as described in the attached MRP (Attachment E of this Order).

Table 7. Effluent Limitations at M-001 (Secondary Effluent from Wastewater Treatment Plant No. 1)

Parameter	Units	Effluent Limitations					
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	6-Month Median
Carbonaceous Biochemical Oxygen Demand (5-day @ 20°C) ($CBOD_5$)[1]	mg/L	25	40	--	--	--	--
	lbs/day	560	900	--	--	--	--
TSS[1]	mg/L	30	45	--	--	--	--
	lbs/day	680	1,000	--	--	--	
Oil and Grease	mg/L	25	40	--	--	75	--
	lbs/day	560	900	--	--	1,700	--
Settleable Solids	ml/L	1.0	1.5	--	--	3.0	--
Turbidity	NTU	75	100	--	--	225	--
pH	standard units	--	--	--	6.0	9.0	--

[1] The average monthly percent removal of $CBOD_5$ and TSS shall not be less than 85 percent.

b. FPUD shall maintain compliance with the following effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Locations M-001 or M-002 as described in the attached MRP (Attachment E of this Order):

Table 8. Effluent Limitations at M-001 or M-002

Parameter	Unit	Effluent Limitations[1]			
		6-Month Median	Maximum Daily	Instantaneous Maximum	Average Monthly
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE					
Total Residual Chlorine[2]	µg/L	180	700	5,300	
	lbs/day	4.0	16	120	
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS					
TCDD[3]	µg/L	--	--	--	3.4E-07
	lbs/day	--	--	--	7.7E-09

1 Scientific “E” notation is used to express effluent limitations. In scientific “E” notation, the number following the “E” indicates that position of the decimal point in the value. Negative numbers after the “E” indicate that the value is less than 1, and positive numbers after the “E” indicate that the value is greater than 1. In this notation a value of 6.1E-02 represents 6.1×10^{-2} or 0.061, 6.1E+02 represents 6.1×10^{2} or 610, and 6.1E+00 represents 6.1×10^{0} or 6.1.

2 The water quality objectives for total chlorine residual applicable to intermittent discharges not exceeding two hours shall be determined through use of the following equation:

$$\log y = 0.43(\log x) + 1.8$$

where,

y = the water quality objective (in µg/L) to apply when chlorine is being discharged;

x = the duration of uninterrupted chlorine discharge in minutes.

Actual effluent limitations for total chlorine, when discharging intermittently, shall then be determined according to Implementation Procedures for Table B from the Ocean Plan and using a minimum probably dilution factor of 87 and a flow rate of 2.7 MGD.

3 TCDD equivalents represent the sum of concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors.

2. Performance Goals

a. Constituents that do not have reasonable potential to cause or contribute to an exceedance of water quality objectives, or for which reasonable potential to cause or contribute to an exceedance of water quality objectives cannot be determined, are referred to as performance goal constituents and are assigned the performance goals listed in the following table. Performance goal constituents shall be monitored at M-001 or M-002, but the results will be used for informational purposes only, not compliance determination, because the listed performance goals are not enforceable as effluent limitations.

Table 9. Performance Goals

Parameter	Unit	Performance Goals[1]			
		6-Month Median	Maximum Daily	Instantaneous Maximum	30-Day Average
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE					
Arsenic, Total Recoverable	µg/L	4.4E+02	2.6E+03	6.8E+03	--
Cadmium, Total Recoverable	µg/L	8.8E+01	3.5E+02	8.8E+02	--
Chromium VI, Total Recoverable[2]	µg/L	1.8E+02	7.0E+02	1.8E+03	--
Copper, Total Recoverable	µg/L	9.0E+01	8.8E+02	2.5E+03	--
Lead, Total Recoverable	µg/L	1.8E+02	7.0E+02	1.8E+03	--
Mercury, Total Recoverable	µg/L	3.09E+00	1.4E+01	3.5E+01	--
Nickel, Total Recoverable	µg/L	4.4E+02	1.8E+03	4.4E+03	--
Selenium, Total Recoverable	µg/L	1.3E+03	5.3E+03	1.3E+04	--
Silver, Total Recoverable	µg/L	4.8E+01	2.3E+02	6.0E+02	--
Zinc, Total Recoverable	µg/L	1.1E+03	6.3E+03	1.7E+04	--
Cyanide, Total Recoverable[3]	µg/L	8.8E+01	3.5E+02	8.8E+02	
Ammonia (expressed as nitrogen)	µg/L	5.3E+04	2.1E+05	5.3E+05	--
Acute Toxicity	TUa	--	2.9E+00	--	
Chronic Toxicity[4]	TUc	--	8.8E+01	--	--
Phenolic Compounds (non-chlorinated)[5]	µg/L	2.6E+03	1.1E+04	2.6E+04	--
Chlorinated Phenolics[6]	µg/L	8.8E+01	3.5E+02	8.8E+02	--
Endosulfan[7]	µg/L	7.9E-01	1.6E+00	2.4E+00	--
Endrin	µg/L	1.8E-01	3.5E-01	5.3E-01	--
HCH[8]	µg/L	3.5E-01	7.0E-01	1.1E+00	--
Radioactivity	pCi/L	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations, Reference to Section 30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.			

OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – NONCARCINOGENS					
Acrolein	µg/L	--	--	--	1.9E+04
Antimony	µg/L	--	--	--	1.1E+05
Bis(2-chloroethoxy) Methane	µg/L	--	--	--	3.9E+02
Bis(2-chloroisopropyl) Ether	µg/L	--	--	--	1.1E+05
Chlorobenzene	µg/L	--	--	--	5.0E+04
Chromium (III), Total Recoverable	µg/L	--	--	--	1.7E+07
Di-n-butyl Phthalate	µg/L	--	--	--	3.1E+05
Dichlorobenzenes[9]	µg/L	--	--	--	4.5E+05
Diethyl Phthalate	µg/L	--	--	--	2.9E+06
Dimethyl Phthalate	µg/L	--	--	--	7.2E+07
4,6-dinitro-2-methylphenol	µg/L	--	--	--	1.9E+04
2,4-dinitrophenol	µg/L	--	--	--	3.5E+02
Ethylbenzene	µg/L	--	--	--	3.6E+05
Fluoranthene	µg/L	--	--	--	1.3E+03
Hexachlorocyclopentadiene	µg/L	--	--	--	5.1E+03
Nitrobenzene	µg/L	--	--	--	4.3E+02
Thallium, Total Recoverable	µg/L	--	--	--	1.8E+02
Toluene	µg/L	--	--	--	7.5E+06
Tributyltin	µg/L	--	--	--	1.2E-01
1,1,1-trichloroethane	µg/L	--	--	--	4.8E+07
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS					
Acrylonitrile	µg/L	--	--	--	8.8E+00
Aldrin	µg/L	--	--	--	1.9E-03
Benzene	µg/L	--	--	--	5.2E+02
Benzidine	µg/L	--	--	--	6.1E-03
Beryllium	µg/L	--	--	--	2.9E+00
Bis(2-chloroethyl) Ether	µg/L	--	--	--	4.0E+00
Bis(2-ethlyhexyl) Phthalate	µg/L	--	--	--	3.1E+02
Carbon Tetrachloride	µg/L	--	--	--	7.9E+01
Chlorodane	µg/L	--	--	--	2.0E-03
Chlorodibromomethane	µg/L	--	--	--	7.6E+02
Chloroform	µg/L	--	--	--	1.1E+04
DDT[10]	µg/L	--	--	--	1.5E-02
1,4-dichlorobenzene	µg/L	--	--	--	1.6E+03
3,3'-dichlorobenzidine	µg/L	--	--	--	7.1E-01
1,2-dichloroethane	µg/L	--	--	--	2.5E+03
1,1-dichloroethylene	µg/L	--	--	--	7.9E+01
Dichlorobromomethane	µg/L	--	--	--	5.5E+02
Dichloromethane	µg/L	--	--	--	4.0E+04
1,3-dichloropropene	µg/L	--	--	--	7.8E+02
Dieldrin	µg/L	--	--	--	3.5E-03
2,4-dinitrotoluene	µg/L	--	--	--	2.3E+02
1,2-diphenylhydrazine	µg/L	--	--	--	1.4E+01
Halomethanes[11]	µg/L	--	--	--	1.1E+04

Heptachlor	µg/L	--	--	--	4.4E-03
Heptachlor Epoxide	µg/L	--	--	--	1.8E-03
Hexachlorobenzene	µg/L	--	--	--	1.8E-02
Hexachlorobutadiene	µg/L	--	--	--	1.2E+03
Hexachloroethane	µg/L	--	--	--	2.2E+02
Isophorone	µg/L	--	--	--	6.4E+04
N-nitrosodimethylamine	µg/L	--	--	--	6.4E+02
N-nitrosodi-N-propylamine	µg/L	--	--	--	3.3E+01
N-nitrosodiphenylamine	µg/L	--	--	--	2.2E+02
PAHs[12]	µg/L	--	--	--	7.7E-01
PCBs[13]	µg/L	--	--	--	1.7E-03
1,1,2,2-tetrachloroethane	µg/L	--	--	--	2.0E+02
Tetrachloroethylene	µg/L	--	--	--	1.8E+02
Toxaphene	µg/L	--	--	--	1.8E-02
Trichloroethylene	µg/L	--	--	--	2.4E+03
1,1,2-trichloroethane	µg/L	--	--	--	8.3E+02
2,4,6-trichlorophenol	µg/L	--	--	--	2.6E+01
Vinyl Chloride	µg/L	--	--	--	3.2E+03

1 Scientific “E” notation is used to express certain values. In scientific “E” notation, the number following the “E” indicates that position of the decimal point in the value. Negative numbers after the “E” indicate that the value is less than 1, and positive numbers after the “E” indicate that the value is greater than 1. In this notation a value of 6.1E-02 represents 6.1×10^{-2} or 0.061, 6.1E+02 represents 6.1×10^{2} or 610, and 6.1E+00 represents 6.1×10^{0} or 6.1.

2 Dischargers may, at their option, apply this performance goal as a total chromium performance goal.

3 If FPUD can demonstrate to the satisfaction of the San Diego Water Board (subject to USEPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, performance goals may be evaluated with the combined measurement of free cyanide, simple alkali metals cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by the approved method in 40 CFR Part 136, as revised May 14, 1999.

4 Chronic toxicity expressed as Chronic Toxicity Units (TUc) = 100/NOEL, where NOEL (No Observed Effect Level) is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism.

5 Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-Dinitro-2-methylphenol, 2,4-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-Nitrophenol, 4-nitrophenol, and phenol.

6 Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.

7 Endosulfan represents the sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate.

8 HCH (hexachlorocyclohexane) represents the sum of the alpha, beta, gamma (Lindane), and delta isomers of hexachlorocyclohexane.

9 Dichlorobenzenes represent the sum of 1,2- and 1,3-dichlorobenzene.

10 DDT represents the sum of 4,4’DDT; 2,4’DDT; 4,4’DDE; 2,4’DDE; 4,4’DDD; and 2,4’DDD.

11 Halomethanes represent the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

12 PAHs (polynuclear aromatic hydrocarbons) represent the sum of acenaphthalene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo[k]fluoranthene; 1,12-benzoperylene; benzo[a]pyrene; chrysene; dibenzo[a,h]anthracene; fluorene; indeno[1,2,3-cd]pyrene; phenanthrene; and pyrene.

[13] PCBs (polychlorinated biphenyls) represent the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Arolclor-1254, and Arcolor-1260.

3. Interim Effluent Limitations – Not Applicable

B. Land Discharge Specifications – Not Applicable

C. Reclamation Specifications

FPUD must continue to comply with the separate reclamation requirements established in San Diego Water Board Order No. 91-39 and any applicable future revised or renewal waste discharge requirements, which are not incorporated by reference into this Order.

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

The receiving water limitations set forth below are based on water quality objectives contained in the Basin Plan and Ocean Plan and are a required part of this Order. The FPUD discharge shall not cause or contribute to the following in the Pacific Ocean.

1. Bacterial Characteristics

a. Within a zone bounded by the shoreline and a distance of 3 nautical miles from the shoreline, including all kelp beds, the following bacterial objectives shall be maintained throughout the water column. The zone of initial dilution for ocean outfall is excluded.

30-day Geometric Mean – The following standards are based on the geometric mean of the five most recent samples from each site:

i. Total coliform density shall not exceed 1,000 per 100 ml;

ii. Fecal coliform density shall not exceed 200 per 100 ml; and

iii. Enterococcus density shall not exceed 35 per 100 ml.

Single Sample Maximum:

i. Total coliform density shall not exceed 10,000 per 100 ml;

ii. Fecal coliform density shall not exceed 400 per 100 ml;

iii. Enterococcus density shall not exceed 104 per 100 ml; and

iv. Total coliform density shall not exceed 1,000 per 100 ml when the fecal coliform/total coliform ratio exceeds 0.1.

b. The Initial Dilution Zone for any wastewater outfall shall be excluded from designation as kelp beds for purposes of bacterial standards. Adventitious assemblages of kelp plants on waste discharge structures (e.g., outfall pipes and diffusers) do not constitute kelp beds for purposes of bacterial standards.

c. At all areas where shellfish may be harvested for human consumption, as determined by the San Diego Water Board, the median total coliform density shall not exceed 70 per 100 ml throughout the water column, and not more than 10 percent of the samples shall exceed 230 per 100 ml.

2. Physical Characteristics

a. Floating particulates and grease and oils shall not be visible.

b. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.

c. Natural light shall not be significantly reduced at any point outside the initial dilution zone as a result of the discharge of waste.

d. The rate of deposition of inert solids and the characteristics of inert solids in the ocean sediments shall not be changed such that benthic communities are degraded.

3. Chemical Characteristics

a. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.

b. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.

c. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.

d. The concentration of substances set forth in Chapter II, Table B of the Ocean Plan, shall not be increased in marine sediments to levels that would degrade indigenous biota.

e. The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life.

f. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.

g. Numerical water quality objectives established in Section II, Table B of the California Ocean Plan shall not be exceeded outside of the zone of initial dilution as a result of the discharges from the Facility.

4. Biological Characteristics

a. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.

b. The natural taste, odor, color of fish, shellfish, or other marine resources used for human consumption shall not be altered.

c. The concentration of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

5. Radioactivity

a. Discharge of radioactive waste shall not degrade marine life.

B. Groundwater Limitations – Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. Federal Standard Provisions. FPUD shall comply with all Standard Provisions included in Attachment D of this Order.

2. San Diego Water Board Standard Provisions. FPUD shall comply with the following provisions:

a. FPUD shall comply with all requirements and conditions of this Order. Any permit non-compliance may constitute a violation of the CWA and/or the CWC and may be grounds for enforcement action, permit termination, revocation and reissuance, or modification, or for denial of an application for permit renewal, modification, or reissuance.

b. FPUD shall comply with all applicable federal, State, and local laws and regulations that pertain to sewage sludge handling, treatment, use and disposal, including CWA section 405 and USEPA regulations at 40 CFR Part 257.

c. FPUD's wastewater treatment facilities shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Title 23, Division 3, Chapter 26 of the California Code of Regulations (CCR).

d. All proposed new treatment facilities and expansions of existing treatment facilities shall be completely constructed and operable prior to initiation of the discharge from the new or expanded facilities. FPUD shall submit a certification report for each new treatment facility, expansion of an existing treatment facility, and re-ratings, the certification report shall be prepared by the design engineer. For re-ratings, the certification report shall be prepared by the engineer who evaluated the treatment facility capacity. The certification report shall:

i. Identify the design capacity of the treatment facility, including the daily and 30-day design capacity,

ii. Certify the adequacy of each component of the treatment facility, and

iii. Contain a requirement-by-requirement analysis, based on acceptable engineering practices, of the process and physical design of the facility to ensure compliance with this Order.

iv. Contain the signature and engineering license number of the engineer preparing the certification report affixed to the report. If reasonable, the certification report shall be submitted prior to beginning construction. FPUD shall not initiate a discharge from an existing treatment facility at a daily flow rate in excess of its previously approved design capacity until:

(1) The certification report is received by the San Diego Water Board,

(2) The San Diego Water Board has received written notification of completion of construction (new treatment facilities and expansions only),

(3) An inspection of the facility has been made by the San Diego Water Board or their designated representatives (new treatment facilities and expansions only), and

(4) The San Diego Water Board has provided FPUD with written authorization to discharge at a daily flow rate in excess of its previously approved design capacity.

e. All waste treatment, containment, and disposal facilities shall be protected against 100-year peak stream flows as defined by the San Diego County flood control agency.

f. All waste treatment, containment, and disposal facilities shall be protected against erosion, overland runoff, and other impacts resulting from a 100-year, 24-hour storm event.

g. This Order expires on September 27, 2017, after which, the terms and conditions of this permit are automatically continued pending issuance of a new permit, provided that all requirements of USEPA's NPDES regulations at 40 CFR 122.6 and the State's regulations at CCR Title 23, section 2235.4 regarding the continuation of expired permits and waste discharge requirements are met.

h. FPUD's wastewater treatment facilities shall be operated and maintained in accordance with the operations and maintenance manual prepared by FPUD pursuant to the Clean Water Grant Program. A copy of this manual shall be at or near the treatment and disposal facilities and shall be available to operating personnel at all times.

i. A copy of this Order shall be posted at a prominent location at or near the treatment and disposal facilities and shall be available to operating personnel at all times.

B. Monitoring and Reporting Program (MRP) Requirements

FPUD shall comply with the MRP, and future revisions thereto, in Attachment E of this Order.

C. Special Provisions

1. Reopener Provisions

a. This Order may be reopened for modification to include an effluent limitation if monitoring establishes that the discharge causes, has the reasonable potential to cause, or contributes to an excursion above an Ocean Plan Table B water quality objective.

b. This Order may be reopened for modification of the receiving waters monitoring requirements, as the San Diego Water Board determines. The modification(s) can include, but is (are) not limited to, recommendations from Southern California Coastal Water Research Project (SCCWRP) or creation of a Regional Monitoring Program.

c. This Order may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following;

i. Violation of any terms or conditions of this Order.

ii. Obtaining this Order by misrepresentation or failure to disclose fully all relevant facts.

iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by FPUD for modifications, revocation and reissuance, or termination of this Order does not stay any condition of this Order. Notification by FPUD of planned operational or facility changes, or anticipated noncompliance with this Order does not stay any condition of this Order.

d. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under section 307 (a) of the CWA for a toxic pollutant and that standard or prohibition is more stringent than any limitation on the pollutant in this Order, the San Diego Water Board may institute proceedings under these regulations to modify or revoke and reissue the Order to conform to the toxic effluent standard or prohibition.

e. This Order may be re-opened and modified, to incorporate in accordance with the provisions set forth in 40 CFR Parts 122 and 124, to include requirements for the implementation of the watershed management approach.

f. This Order may be reopened and modified, in accordance with the provisions set forth in 40 CFR Parts 122 and 124, to include new Minimum Levels (MLs).

g. This Order may be re-opened and modified to revise effluent limitations as a result of future Basin Plan Amendments, or the adoption of a total maximum daily load (TMDL) for the receiving water.

h. This Order may be re-opened upon submission by FPUD of adequate information, as determined by this San Diego Water Board, to provide for dilution credits or a mixing zone, as may be appropriate.

i. This Order may be re-opened and modified to revise the toxicity language once that language becomes standardized.

j. This Order may also be re-opened and modified, revoked and reissued, or terminated in accordance with the provisions of 40 CFR 122.44, 122.62 to 122.64, 125.62, and 125.62. Causes for taking such actions include, but are not limited to, failure to comply with any condition of this Order and permit, and endangerment to human health or the environment resulting from the permitted activity.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. Spill Prevention and Response Plans

i. For purposes of this section, a spill is a discharge of treated or untreated wastewater that occurs at or downstream of the Facility headworks in violation of Discharge Prohibition III.A of this Order, or a discharge of other materials related to treatment and operations of the Facility. This section does not include sanitary sewer overflows (SSOs) from the sewage collection system that are reportable under separate waste discharge requirements, not incorporated herein.

ii. FPUD shall maintain and implement a Spill Prevention Plan (SPP) for the facilities owned and/or operated by FPUD in an up-to-date condition and shall amend the SPP whenever there is a change (e.g., in the design, construction, operation, or maintenance of the sewerage system or sewerage facilities) which materially affects the potential for spills. FPUD shall review and amend the SPP as appropriate after each spill from the Facility. The SPP and any amendments thereto shall be subject to the approval of the San Diego Water Board and shall be modified as directed by the San Diego Water Board. FPUD shall submit the SPP and any amendments thereto to the San Diego Water Board upon request of the San Diego Water Board. FPUD shall ensure that the up-to-date SPP is readily available to the sewerage system personnel at all times and that the sewerage system personnel are familiar with it.

iii. FPUD shall maintain and implement a Spill Response Plan (SRP) for the Facility in an up-to-date condition and shall amend the SRP, as necessary. FPUD shall review and amend the SRP as appropriate after each spill from the Facility. The SRP and any amendments thereto shall be subject to the approval of the San Diego Water Board and shall be modified as directed by the San Diego Water Board. FPUD shall submit the SRP and any amendments thereto to the San Diego Water Board upon request of the San Diego Water Board. FPUD shall ensure that the up-to-date SRP is readily available to the sewerage system personnel at all times and that the sewerage system personnel are familiar with it.

b. Spill Reporting Requirements

FPUD shall report treated and untreated wastewater spills downstream of the plant headworks as defined in section VI.C.2.a.i above in accordance with the following procedures:

i. If a spill results in a discharge of treated or untreated wastewater downstream of the plant headworks that is equal to or exceeds 1,000 gallons, and/or results in a discharge to a drainage channel and/or surface water, and/or results in a discharge to a storm drain that was not fully captured and returned to the sanitary sewer system, FPUD shall:

(a) Report the spill to the San Diego Water Board by telephone, by voice mail, or by FAX within 24 hours from the time FPUD becomes aware of the spill. FPUD shall inform the San Diego Water Board of the date of the spill, spill location and its final destination, time the spill began and ended, estimated total spill volume, and type of spill material.

(b) Submit a written report, as well as any additional pertinent information, to the San Diego Water Board no later than five days from the time FPUD becomes aware of the spill.

(c) The San Diego Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours.

ii. If a spill results in a discharge of treated or untreated wastewater under 1,000 gallons and the discharge does not reach a drainage channel, surface waters, or storm drain, or reached a storm drain but was fully captured, FPUD is not required to notify the San Diego Water Board within 24 hours or provide a five-day written report.

iii. For spills of material other than treated or untreated wastewater that cause, may cause, or are caused by significant operational failure, or endangers or may endanger human health or the environment, FPUD shall notify the San Diego Water Board by telephone, by voice mail, or by FAX within 24 hours from the time FPUD becomes aware of the spill. FPUD shall inform the San Diego Water Board of the date of the spill, spill location and its final destination, time the spill began and ended, estimated total spill volume, and type of spill material.

iv. For all spills, FPUD shall include a detailed summary of spills in the monthly self-monitoring report for the month in which the spill occurred.

v. The spill reporting requirements contained in this Order do not relieve FPUD of responsibilities to report to other agencies, such as the California Emergency Management Agency (EMA) and the County of San Diego Department of Environmental Health Services.

c. Toxicity Reduction Requirements

If the performance goal for acute or chronic toxicity is exceeded in any one test, then within 15 days of the exceedance, FPUD shall begin conducting six additional tests, bi-weekly, over a 12 week period.

If either toxicity performance goal is exceeded in any of these six additional tests, then FPUD shall notify the San Diego Water Board. If the San Diego Water Board determines that the discharge consistently exceeds a toxicity performance goal, then FPUD shall initiate a Toxicity Reduction Evaluation (TRE)/Toxicity Identification Evaluation (TIE) in accordance with the TRE workplan, *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants* (USEPA 833-B-99-002, 1999), and USEPA TIE guidance documents (Phase I, EPA/600/6-91/005F, 1992; Phase II, EPA/600/R-92/080, 1993; and Phase III, EPA/600/R-92/081, 1993). Once the source of toxicity is identified, FPUD shall take all reasonable steps to reduce the toxicity to meet the chronic toxicity performance goal identified in section IV.A.2.a of this Order.

Within 30 days of completion of the TRE/TIE, FPUD shall submit the results of the TRE/TIE, including a summary of the findings, data generated, a list of corrective actions necessary to achieve consistent compliance with all the performance goals of this Order and prevent recurrence of exceedances of those performance goals, and a time schedule for implementation of such corrective actions. The corrective actions and time schedule shall be modified at the direction of the San Diego Water Board.

If no toxicity is detected in any of these additional six tests, then FPUD may return to the testing frequency specified in the MRP.

d. Toxicity Reduction Evaluation (TRE)

FPUD shall review and update, as necessary, its TRE workplan in accordance with TRE procedures established by USEPA in the following guidance manuals.

i. *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations* (EPA/600/2-88/070).

ii. *Toxicity Identification Evaluation, Phase I* (EPA/600/6-91/005F).

iii. *Methods for Aquatic Toxicity Identification Evaluations, Phase II* (EPA/600/R-92/080).

iv. *Methods for Aquatic Toxicity Identification Evaluations, Phase III* (EPA/600/R-92/081).

FPUD shall submit any revisions to its TRE workplan to the San Diego Water Board within 180 days of the adoption of this Order. The TRE workplan shall be subject to the approval of the San Diego Water Board and shall be modified as directed by the San Diego Water Board.

3. Best Management Practices and Pollution Prevention – Not Applicable

4. Construction, Operation and Maintenance Specifications – Not Applicable

5. Special Provisions for Wastewater Facilities (POTWs Only)

a. Treatment Plant Capacity

FPUD shall submit a written report to the San Diego Water Board within 90 days after the monthly average influent flow rate equals or exceeds 75 percent of the secondary treatment design capacity of the wastewater treatment and/or disposal facilities. FPUD's senior administrative officer shall sign a letter in accordance with Standard Provision V.B. (Attachment D of this Order) which transmits that report and certifies that that policy-making body is adequately informed of the influent flow rate relative to the Facility's design capacity. The report shall include the following:

i. Average influent daily flow for the calendar month, the date on which the maximum daily flow occurred, and the rate of that maximum flow.

ii. FPUD's best estimate of when the average daily influent flow for a calendar month will equal or exceed the design capacity of the facilities.

iii. FPUD's intended schedule for studies, design, and other steps needed to provide additional treatment for the wastewater from the collection system before the waste flow exceeds the capacity of present units.

b. Pretreatment Program

i. FPUD shall conduct an Industrial Waste Survey (IWS) of all the industrial users (IUs) in the service area of the Facility to determine whether any IUs are subject to pretreatment standards specified in 40 CFR Part 403. FPUD shall also perform a priority pollutant scan of the influent to the Facility. The IWS and priority pollutant monitoring is required during the 12-month period beginning on November 1, 2013. Based on results of the IWS, the priority pollutant scan, and the requirements of 40 CFR Part 403, FPUD shall submit a certification report indicating whether the Facility receives pollutants from any IU that would require FPUD to establish a pretreatment program in accordance with 40 CFR Part 403. The certification report, along with results of the IWS and priority pollutant monitoring, shall be submitted to the San Diego Water Board by December 1, 2014. If FPUD becomes aware of an IU in the service area of the Facility that would require development of a pretreatment program pursuant to 40 CFR Part 403, FPUD shall notify the San Diego Water Board and request a modification of this Order to include pretreatment program requirements. In such circumstances, FPUD shall develop and implement a pretreatment program in accordance with the requirements of CWA sections 307(b) and (c) and 402(b)(8) and 40 CFR Part 403. FPUD shall assure compliance with applicable federal and local pretreatment standards by the IUs within the service area of the Facility.

ii. The San Diego Water Board may amend this Order, at any time, to require FPUD to develop and implement an industrial pretreatment program pursuant to the requirements of 40 CFR Part 403 if the San Diego Water Board finds that the Facility receives pollutants from an IU that is subject to pretreatment standards, or if other circumstances so warrant.

c. Sludge (Biosolids) Disposal Requirements

i. The handling, treatment, use, management, and disposal of sludge and solids derived from wastewater treatment must comply with applicable provisions of CWA section 405 and USEPA regulations at 40 CFR Parts 257, 258, 501, and 503, including all monitoring, record keeping, and reporting requirements.

ii. Sludge and wastewater solids must be disposed of in a municipal solid waste landfill, reused by land application, or disposed of in a sludge-only landfill in accordance with 40 CFR Parts 258 and 503 and Title 23, Chapter 15 of the CCR. If FPUD desires to dispose of solids and/or sludge in a different manner, a request for permit modification must be submitted to the USEPA and the San Diego Water Board at least 180 days prior to beginning the alternative means of disposal.

iii. Sludge that is disposed of in a municipal solid waste landfill must meet the requirements of 40 CFR Part 258 pertaining to providing information to the public. In the annual self-monitoring report, FPUD shall include the amount of sludge placed in the landfill as well as the landfill to which it was sent.

iv. All requirements of 40 CFR Part 503 and 23 CCR Chapter 15 are enforceable whether or not the requirements of those regulations are stated in an NPDES permit or any other permit issued to FPUD.

v. FPUD shall take all reasonable steps to prevent and minimize any sludge use or disposal in violation of this Order that has a likelihood of adversely affecting human health or the environment.

vi. Solids and sludge treatment, storage, and disposal or reuse shall not create a nuisance, such as objectionable odors or flies, and shall not result in groundwater contamination.

vii. The solids and sludge treatment and storage site shall have adequate facilities to divert surface water runoff from adjacent areas to protect the boundaries of the site from erosion, and to prevent drainage from the treatment and storage site. Adequate protection is defined as protection, at the minimum, from a 100-year storm and protection from the highest possible tidal stage that may occur.

viii. The discharge of sewage sludge and solids shall not cause waste material to be in position where it is, or can be, conveyed from the treatment and storage sites and deposited in waters of the State.

ix. FPUD shall submit an annual report to the USEPA and the San Diego Water Board containing monitoring results and pathogen and vector attraction reduction requirements, as specified by 40 CFR Part 503. FPUD shall also report the quantity of sludge removed from the Facility and the disposal method. This self-monitoring report shall be postmarked by February 19 of each year and report for the period of the previous calendar year.

d. Collection System

On May 2, 2006, the State Water Board adopted State Water Board Order No. 2006-0003, a Statewide General WDR for Sanitary Sewer Systems. Order No. 2006-0003 requires that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the General WDR. FPUD shall be subject to all applicable requirements of Order No. 2006-0003 and any future revisions thereto, the requirements of which are not incorporated herein.

Regardless of the coverage obtained under Order No. 2006-0003, FPUD's collection system is part of the treatment system that is subject to this Order. As such, pursuant to federal regulations, FPUD must properly operate and maintain its collection system [40 CFR 122.41(e)], report any non-compliance [40 CFR 122.41(l)(6) and (7)], and mitigate or prevent any discharge from the collection system in violation of this Order [40 CFR 122.41(d)].

6. Other Special Provisions – Not Applicable

7. Compliance Schedules

Prior to terminating disinfection of the Facility effluent, FPUD must submit a plan and time schedule that outlines the tasks and approaches to achieve full compliance with bacteria receiving water limitations, contained within the Ocean Plan, outside of the initial dilution zone of the Oceanside OO. The time schedule shall include timelines for design, construction and implementation of any new or improved facilities needed for compliance.

VII. COMPLIANCE DETERMINATION

Unless otherwise provided for by this Order, such as Standard Provisions I.G and I.H of Attachment D, or for just cause to decide otherwise, compliance with the effluent limitations contained in section IV of this Order will be determined as specified below:

A. Compliance with Average Monthly Effluent Limitation (AMEL)

If the average of daily discharges over a calendar month exceeds the AMEL for a given parameter, an alleged violation will be flagged and FPUD will be considered out of compliance for each day of that month for that parameter (e.g., resulting in 31 days of noncompliance in a 31-day month). The average of daily discharges over the calendar month that exceeds the AMEL for a parameter will be considered out of compliance for the month only. If only a single sample is taken during the calendar month and the analytical result for that sample exceeds the AMEL, FPUD will be considered out of compliance for that calendar month. For any one calendar month during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar month.

B. Compliance with Average Weekly Effluent Limitation (AWEL)

If the average of daily discharges over a calendar week (Sunday through Saturday) exceeds the AWEL for a given parameter, an alleged violation will be flagged and FPUD will be considered out of compliance for each day of that week for that parameter, resulting in 7 days of noncompliance. The average of daily discharges over the calendar week that exceeds the AWEL for a parameter will be considered out of compliance for that week only. If only a single sample is taken during the calendar week and the analytical result for that sample exceeds the AWEL, FPUD will be considered out of compliance for that calendar week. For any one calendar week during which no sample (daily discharge) is taken, no compliance determination can be made for that calendar week.

C. Compliance with Maximum Daily Effluent Limitation (MDEL)

The MDEL shall apply to flow weighted 24-hour composite samples, or grab, as specified in the MRP (Attachment E of this Order). If a daily discharge exceeds the MDEL for a given parameter, an alleged violation will be flagged and FPUD will be considered out of compliance for that parameter for that one day only within the reporting period. For any one day during which no sample is taken, no compliance determination can be made for that day.

D. Compliance with Instantaneous Minimum Effluent Limitation

The instantaneous minimum effluent concentration limitation shall apply to grab sample determinations. If the analytical result of a single grab sample is lower than the instantaneous minimum effluent limitation for a parameter, a violation will be flagged and FPUD will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of noncompliance with the instantaneous minimum effluent limitation.)

E. Compliance with Instantaneous Maximum Effluent Limitation

The instantaneous maximum effluent concentration limitation shall apply to grab sample determinations. If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for a parameter, a violation will be flagged and FPUD will be considered out of compliance for that parameter for that single sample. Non-compliance for each sample will be considered separately (e.g., the results of two grab samples taken within a calendar day that both are lower than the instantaneous minimum effluent limitation would result in two instances of noncompliance with the instantaneous minimum effluent limitation.)

F. Compliance with 6-Month Median Effluent Limitation

If the median of daily discharges over any 180-day period exceeds the 6-month median effluent limitation for a given parameter, an alleged violation will be flagged and FPUD will be considered out of compliance for each day of that 180-day period for that parameter. The next assessment of compliance will occur after the next sample is taken. If only a single sample is taken during a given 180-day period and the analytical result for that sample exceeds the 6-month median, FPUD will be considered out of compliance for the 180-day period. For any 180-day period during which no sample is taken, no compliance determination can be made for the 6-month median limitation.

G. Mass and Concentration Limitations

Compliance with mass and concentration effluent limitations for the same parameter shall be determined separately with their respective limitations. When the concentration of a constituent in an effluent sample is determined to be “Not Detected” (ND) or “Detectable but not quantifiable” (DNQ), the corresponding mass emission rate (MER) determined from that sample concentration shall also be reported as “ND” or “DNQ”.

H. Percent Removal

Compliance with percent removal requirements for monthly average percent removal of carbonaceous biochemical oxygen demand and total suspended solids shall be determined separately for each wastewater treatment facility discharging through an outfall. For each wastewater treatment facility, the monthly average percent removal is the average of the calculated daily discharge percent removals only for days on which the constituent concentration is monitored in both the influent and effluent of the wastewater treatment facility at location specified in the MRP (Attachment E of this Order) within a calendar month.

The percent removal for each day shall be calculated according to the following equation:

$$\text{Daily discharge percent removal} = \frac{\text{Influent concentration} - \text{Effluent concentration}}{\text{Influent concentration}} \times 100\%$$

I. Ocean Plan Provisions for Table B Constituents

1. Sampling Reporting Protocols

a. FPUD must report with each sample result the reported Minimum Level (ML) and the laboratory’s current Method Detection Limit (MDL).

b. FPUD must also report results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

i. Sample results greater than or equal to the reported ML must be reported "as measured" by the laboratory (i.e., the measured chemical concentration in the sample).

ii. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, must be reported as "Detected, but Not Quantified", or DNQ. The laboratory must write the estimated chemical concentration of the sample next to DNQ as well as the words "Estimated Concentration" (may be shorted to "Est. Conc.").

iii. Sample results less than the laboratory's MDL must be reported as "Not Detected", or ND.

2. Compliance Determination

Sufficient sampling and analysis shall be required to determine compliance with the effluent limitation.

a. Compliance with Single-constituent Effluent Limitations

FPUD shall be deemed out of compliance with an effluent limitation or discharge specification if the concentration of the constituent in the monitoring sample is greater than the effluent limitation or discharge specification and greater than or equal to the ML.

b. Compliance with Effluent Limitations Expressed as a Sum of Several Constituents

FPUD is out of compliance with an effluent limitation that applies to the sum of a group of chemicals (e.g., PCBs) if the sum of the individual pollutant concentrations is greater than the effluent limitation. Individual pollutants of the group will be considered to have a concentration of zero if the constituent is reported as ND or DNQ.

c. Multiple Sample Data Reduction

The concentration of the pollutant in the effluent may be estimated from the result of a single sample analysis or by a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses when all sample results are quantifiable (i.e., greater than or equal to the reported ML). When one or more sample results are reported as ND or DNQ, the central tendency concentration of the pollutant shall be the median (middle) value of the multiple samples. If, in an even number of samples, one or both of the middle values is ND or DNQ, the median will be the lower of the two middle values.

d. Mass Emission Rate

The mass emission rate (MER), in pounds per day, shall be obtained from the following calculation for any calendar day:

Mass Emission Rate (lb/day) = 8.34 x Q x C

In which Q and C are the flow rate in million gallons per day and the constituent concentration in mg/L, respectively, and 8.34 is a conversion factor (lb/gallon of water). If a composite sample is taken, then C is the concentration measured in the composite sample and Q is the average flow rate occurring during the period over which the samples are composited.

e. Bacterial Standards and Analysis

i. The geometric mean used for determining compliance with bacterial standards is calculated with the following equation:

Geometric Mean = $(C_1 \times C_2 \times \ldots \times C_n)^{1/n}$

Where n is the number of days samples were collected during the period and C is the concentration of bacteria (CFU/100 mL) found on each day of sampling.

ii. For all bacterial analyses, sample dilutions should be performed so the range of values extends from 2 to 16,000 CFU (colony-forming units). The detection methods used for each analysis shall be reported with the results of the analysis. Detection methods used for coliforms (total and fecal) shall be those listed in 40 CFR Part 136 or any improved method determined by the San Diego Water Board (and approved by USEPA) to be appropriate. Detection methods used for enterococcus shall be those presented in USEPA publication USEPA 600/4-85/076, *Test Methods for Escherichia coli and Enterococci in Water by Membrane Filter Procedure*, listed under 40 CFR Part 136, or any other method approved by the San Diego Water Board.

f. Single Operational Upset

A single operational upset (SOU) that leads to simultaneous violations or more than one pollutant parameter shall be treated as a single violation and limits FPUD's liability in accordance with the following conditions:

i. A SOU is broadly defined as a single unusual event that temporarily disrupts the usually satisfactory operation of a system in such a way that it results in violation of multiple pollutant parameters.

ii. A Discharger may assert SOU to limit liability only for those violations which FPUD submitted notice of the upset as required in Section I.H of Attachment D of this Order.

iii. For purposes outside of CWC section 13385(h) and (i), determination of compliance and civil liability (including any more specific definition of SOU), the requirements for Dischargers to assert the SOU limitation of liability, and the manner of counting violations, shall be in accordance with the USEPA Memorandum "Issuance of Guidance Interpreting Single Operational Upset" (September 27, 1989).

iv. For purposes of CWC section 13385(h) and (i), determination of compliance and civil liability (including any more specific definition of SOU, the requirements for Dischargers to assert the SOU) limitation of liability, and the manner of counting violations shall be in accordance with CWC section 13385(f)(2).

J. Chronic Toxicity

Chronic toxicity is used to measure the acceptability of waters for supporting a healthy marine biota until approved methods are developed to evaluate biological response. Evaluation of the chronic toxicity performance goal established in section IV.A.2 of this Order for Discharge Point No. 001 shall be determined using critical life stage toxicity tests in accordance with procedures prescribed by the Ocean Plan and restated in the MRP (Attachment E of this Order). Chronic toxicity shall be expressed as Toxic Units Chronic (TUc), where:

TUc = 100 / NOEL

where NOEL is the No Observed Effect Level and is expressed as the maximum percent of effluent that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test.

ATTACHMENT A – DEFINITIONS

Acute Toxicity

a. Acute Toxicity (TUa)
Expressed in Toxic Units Acute (TUa)

$$TUa = \frac{100}{96\text{-hr } LC_{50}}$$

b. Lethal Concentration 50% (LC_{50})

LC_{50} (percent waste giving 50% survival of test organisms) shall be determined by static or continuous flow bioassay techniques using standard marine test species as specified in 2009 California Ocean Plan (hereinafter Ocean Plan) Appendix III. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC_{50} may be determined after the test samples are adjusted to remove the influence of those substances.

When it is not possible to measure the 96-hour LC_{50} due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \frac{\log(100 - S)}{1.7}$$

where:

S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

Anti-Backsliding
Provisions in the Clean Water Act (CWA) and USEPA regulations [CWA 303 (d) (4); CWA 402 (o); Code of Federal Regulations (CFR) 122.44 (l)] require a reissued permit to be as stringent as the previous permit with some exceptions.

Antidegradation
Policies which ensure protection of water quality for a particular body where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Antidegradation plans are adopted by the State to minimize adverse effects on water.

Applicable Standards and Limitations
All State, interstate, and federal water quality standards and limitations to which a discharge, a sewage sludge use or disposal practice, or a related activity is subject under the CWA, including effluent limitations, water quality standards, standards of performance, toxic effluent standards or prohibitions, best management practices, pretreatment standards, and standards for sewage sludge use or disposal under sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of CWA.

Areas of Special Biological Significance (ASBS)
Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of

Special Biological Significance are also classified as a subset of STATE WATER QUALITY PROTECTION AREAS.

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Beneficial Uses of waters of the State may be protected against quality degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

Best Management Practices (BMPs)
Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ)
The method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data.

Bioaccumulative Pollutants
Those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Bioassay
A test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism.

Biosolids
Sewage sludge that is used or disposed through land application, surface disposal, incineration, or disposal in a municipal solid waste landfill.

Carbonaceous Biochemical Oxygen Demand (CBOD)
The measurement of oxygen required for carbonaceous oxidation of a nonspecific mixture of organic compounds. Interference caused by nitrifying bacteria in the standard 5-day BOD test is eliminated by suppressing the nitrification reaction.

Certifying Official
All applications, including notices of intent (NOIs), must be signed as follows:

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. A principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

Chemical Oxygen Demand (COD)
A measure of the oxygen-consuming capacity of inorganic and organic matter present in wastewater. COD is expressed as the amount of oxygen consumed in mg/L. Results do not necessarily correlate to the biochemical oxygen demand (BOD) because the chemical oxidant may react with substances that bacteria do not stabilize.

Chlordane
Shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane.

Chronic Toxicity
This parameter shall be used to measure the acceptability of waters for supporting a healthy marine biota until improved methods are developed to evaluate biological response.

a. Chronic Toxicity (TUc)

Expressed as Toxic Units Chronic (TUc)

$$TUc = \frac{100}{NOEL}$$

b. No Observed Effect Level (NOEL)

The NOEL is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test listed in Ocean Plan Appendix III.

Composite Sample
Sample composed of two or more discrete samples of at least 100 milliliters collected at periodic intervals during the operating hours of a facility over a 24-hour period. The aggregate sample will reflect the average water quality covering the compositing or sample period. For volatile pollutants, aliquots must be combined in the laboratory immediately before analysis. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically.

Conventional Pollutants
Pollutants typical of municipal sewage, and for which municipal secondary treatment plants are typically designed; defined at 40 CFR 401.16 as BOD, Total Suspended Solids (TSS), fecal coliform bacteria, oil and grease, and pH.

Daily Discharge
Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

Daily Maximum Limit
The maximum allowable daily discharge of pollutant. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the 24-hour period. Where daily maximum limitations are expressed in terms of a concentration, the daily discharge is the arithmetic average measurement of the pollutant concentration derived from all measurements taken that 24-hour period.

DDT
Shall mean the sum of 4,4'DDT, 2,4'DDT, 4,4'DDE, 2,4'DDE, 4,4'DDD, and 2,4'DDD.

Degrade (Degradation)
Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

Detected, but Not Quantified (DNQ)
Sample results that are less than the reported Minimum Level, but greater than or equal to the laboratory's method detection limit (MDL).

Dilution Credit
The amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Dichlorobenzenes
Shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Discharge when used without qualification means the discharge of a pollutant. Discharge of a pollutant means:

1. Any addition of any pollutant or combination of pollutants to waters of the United States from any point source, or

2. Any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation.

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a state, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. This term does not include an addition of pollutants by any indirect Discharger.

Discharge Monitoring Report (DMR) means the USEPA uniform form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by approved states as well as by USEPA. The USEPA will supply DMRs to any approved state upon request. The USEPA national forms may be modified to substitute the state agency name, address, logo, and other similar information, as appropriate, in place of USEPA's.

Downstream Ocean Waters
Waters downstream or down current with respect to ocean currents.

Dredged Material
Any material excavated or dredged from the navigable waters of the United States, including material otherwise referred to as "spoil".

Effluent Limitation
Any restriction imposed by an Order on quantities, discharge rates, and concentrations of pollutants that are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean, except performance goals.

Endosulfan
The sum of endosulfan-alpha and -beta and endosulfan sulfate.

Grab Sample
An individual sample of at least 100 milliliters collected at a randomly selected time over a period not exceeding 15 minutes. The sample is taken from a waste stream on a one-time basis without consideration of the flow rate of the waste stream and without consideration of time of day.

Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

HCH shall mean the sum of the alpha, beta, gamma (Lindane), and delta isomers of hexachlorocyclohexane.

Initial Dilution
The process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.

For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and non-buoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the San Diego Water Board, whichever results in the lower estimate for initial dilution.

Instantaneous Maximum Effluent Limitation
The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Kelp Beds
For purposes of the bacteriological standards of the Ocean Plan, are significant aggregations of marine algae of the genera Macrocystis and Nereocystis. Kelp beds include the total foliage canopy of Macrocystis and Nereocystis plants throughout the water column.

Maximum Daily Effluent Limitation (MDEL)
The highest allowable daily discharge of a pollutant.

Method Detection Limit (MDL)
The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in Title 40 of the Code of Federal Regulations (CFR), Part 136, Attachment B.

Minimum Level (ML)
The concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Natural Light
Reduction of natural light may be determined by the San Diego Water Board by measurement of light transmissivity or total irradiance, or both, according to the monitoring needs of the San Diego Water Board.

Not Detected (ND)
Those sample results less than the laboratory's MDL.

Nuisance
CWC section 13050, subdivision (m), defines nuisance as anything which meets all of the following requirements:

1. Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.
2. Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.
3. Occurs during, or as a result of, the treatment or disposal of wastes.

Ocean Waters
The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.

PAHs (polynuclear aromatic hydrocarbons)
The sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene, and pyrene.

PCBs (polychlorinated biphenyls)
The sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260.

Pollutant Minimization Program (PMP)
PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of Ocean Plan Table B pollutants through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The San Diego Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to CWC section 13263.3(d), shall be considered to fulfill the PMP requirements.

Publicly Owned Treatment Works (POTW)
The term Publicly Owned Treatment Works or POTW means a treatment works as defined by section 212 of the Clean Water Act, which is owned by a State or municipality [as defined by section 502(4) of the Act]. This definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW Treatment Plant. The term also means the municipality as defined in section 502(4) of the Act, which has jurisdiction over the Indirect Discharges to and the discharges from such a treatment works.

POTW Treatment Plant
The term POTW Treatment Plant means that portion of the POTW which is designed to provide treatment (including recycling and reclamation) of municipal sewage and industrial waste.

Reported Minimum Level
The ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the San Diego Water Board either from Appendix II of the Ocean Plan in accordance with section III.C.5.a of the Ocean Plan or established in accordance with section III.C.5.b of the Ocean Plan. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the reported ML.

Sanitary Sewer Overflow (SSO)
Any overflow, spill, release, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer system. SSOs include:

1. Overflows or releases of untreated or partially treated wastewater that reach waters of the United States;
2. Overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and
3. Wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publicly/federally-owned portion of a sanitary sewer system.

Sanitary Sewer System
Any system of pipes, pump stations, sewer lines, or other conveyances, upstream of a wastewater treatment plant headworks used to collect and convey wastewater to the wastewater treatment facility. Temporary storage and conveyance facilities (such as vaults, temporary piping, construction trenches, wet wells, impoundments, tanks, etc.) are considered to be part of the sanitary sewer system, and discharges into these temporary storage facilities are not considered to be SSOs

Secondary Treatment Standards
Technology-based requirements for direct discharging municipal sewage treatment facilities. Standards are based on a combination of physical and biological processes typical for the treatment of pollutants in municipal sewage. Standards are expressed as a minimum level of effluent quality in terms of: BOD_5, TSS, and pH (except as provided for special considerations and treatment equivalent to secondary treatment).

Sewage Sludge
Sewage sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal waste water or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced waste water treatment, scum, septage, portable toilet pumpings, type III marine sanitation device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge. [40 CFR 122.2]

Shellfish
Organisms identified by the State of California Department of Public Health as shellfish for public health purposes (i.e., mussels, clams, and oysters).

Significant Difference
Defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level.

Six-month Median Effluent Limitation
The highest allowable moving median of all daily discharges for any 180-day period.

State Water Quality Protection Areas (SWQPAs)
Non-terrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) that were previously designated by the State Water Board in Resolution Nos. 74-28, 74-32, and 75-61 are now also classified as a subset of State Water Quality Protection Areas and require special protections afforded by the Ocean Plan.

Technology-Based Effluent Limit
A permit limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration.

Toxic Pollutant
Pollutants or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of USEPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, (including malfunctions in reproduction), or physical deformations, in such organisms or their offspring. Toxic pollutants also include those pollutants listed by the Administrator under CWA section 307(a)(1) and 40 CFR §401.15 or any pollutant listed under section 405(d) which relates to sludge management.

Toxicity Identification Evaluation (TIE)
A TIE is a set of procedures that seek to identify the specific chemical(s) responsible for toxicity. These procedures are generally performed in three phases (characterization, identification, and confirmation using aquatic organism toxicity tests).

Toxicity Reduction Evaluation (TRE)
A study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A TIE may be required as part of the TRE, if appropriate.

Treatment Plant Capacity
For purposes of this Order, an average dry weather monthly effluent flow (May to October) of 2.7 MGD, and an average wet weather monthly effluent flow (November to April) of 3.6 mgd.

Untreated or Partially Treated Wastewater
Any volume of waste discharged from the sanitary sewer system upstream of a wastewater treatment plant headworks.

Waste
As used in the Ocean Plan, waste includes a Discharger's total discharge, of whatever origin (i.e., gross, not net, discharge).

Water Quality Control Plan
consists of a designation or establishment for the waters within a specified area of all of the following:

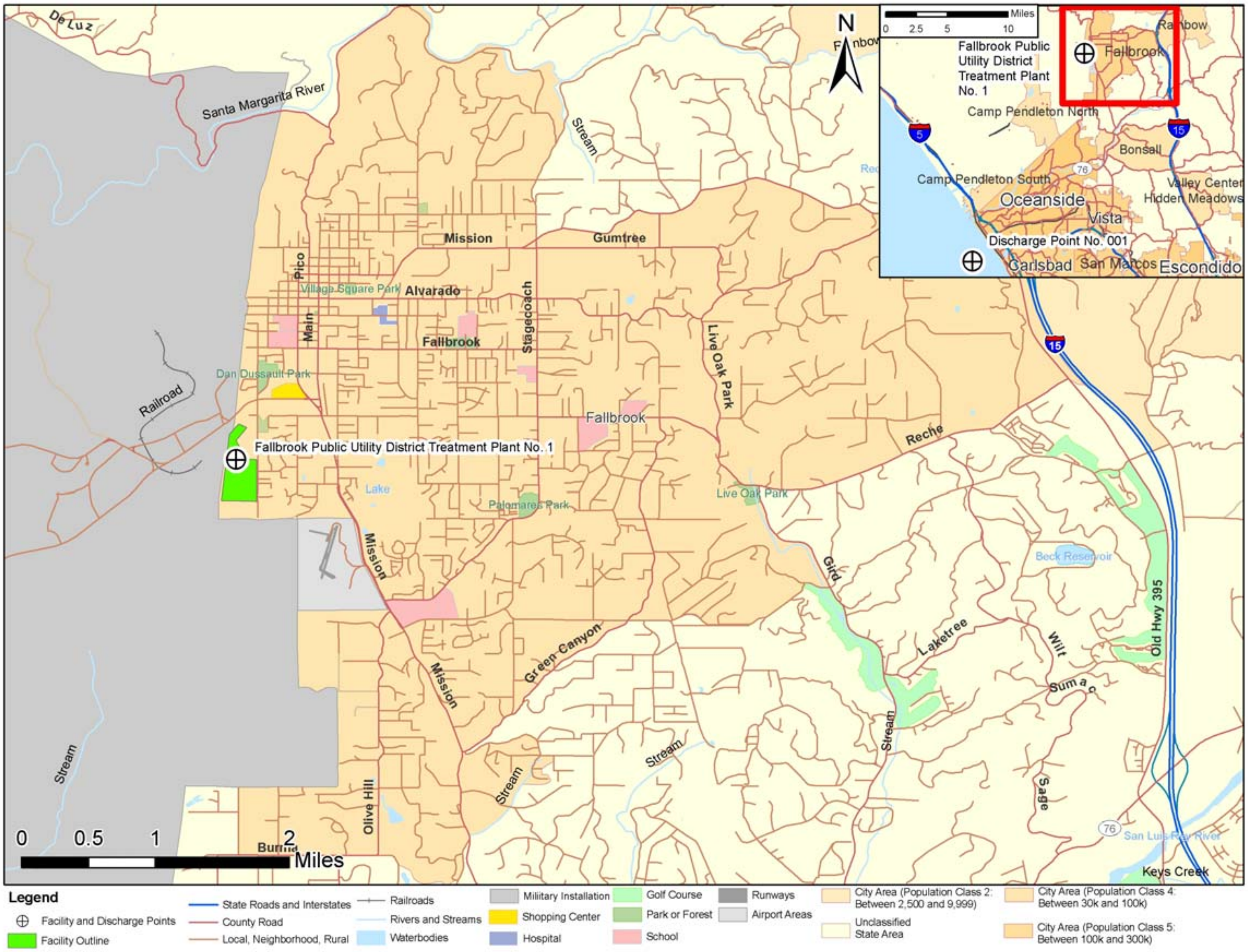
1. Beneficial uses to be protected.
2. Water quality objectives.
3. A program of implementation needed for achieving water quality objectives.

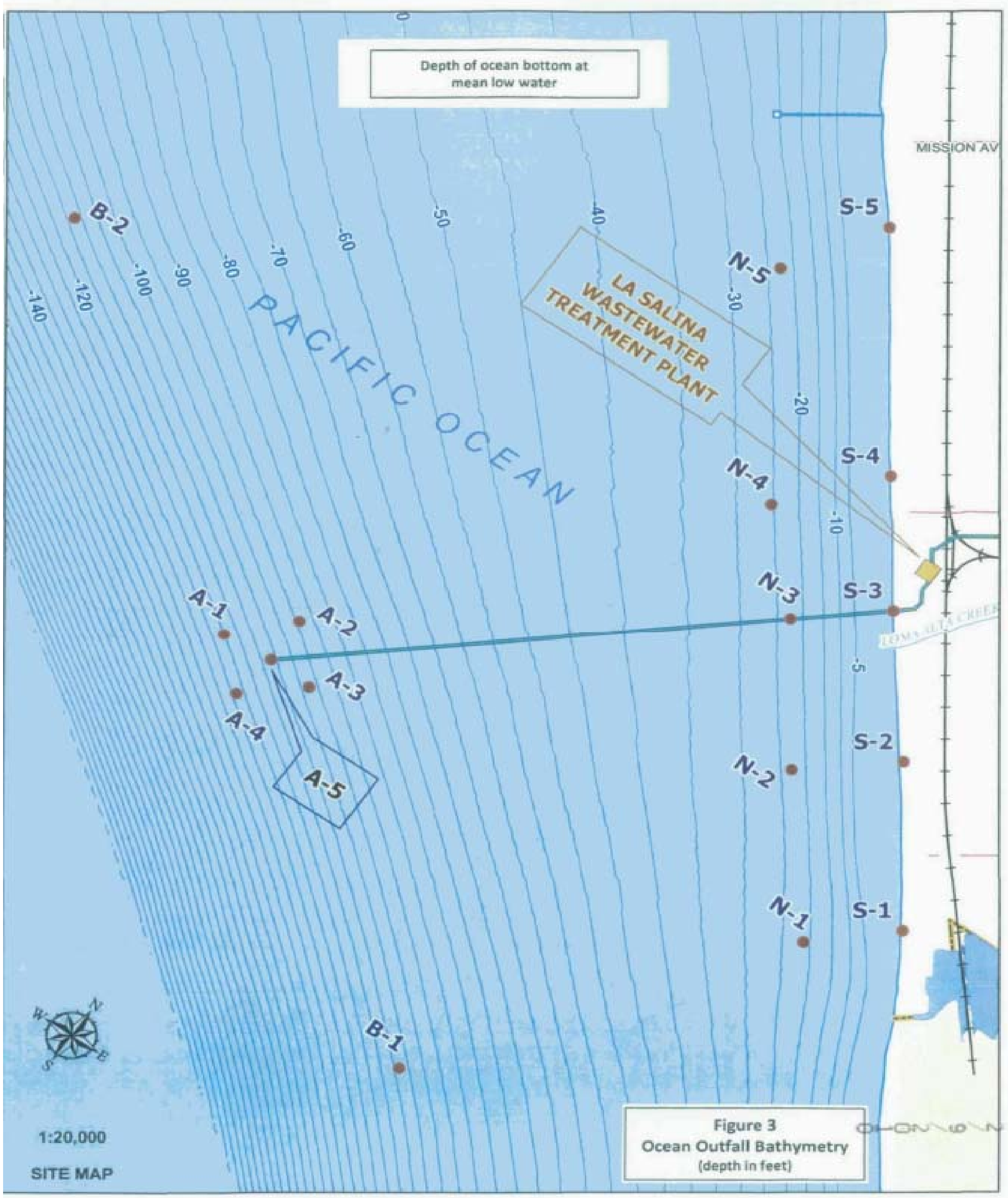
Water Quality Objectives means the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

Water Reclamation
The treatment of wastewater to render it suitable for reuse, the transportation of treated wastewater to the place of use, and the actual use of treated wastewater for a direct beneficial use or controlled use that would not otherwise occur.

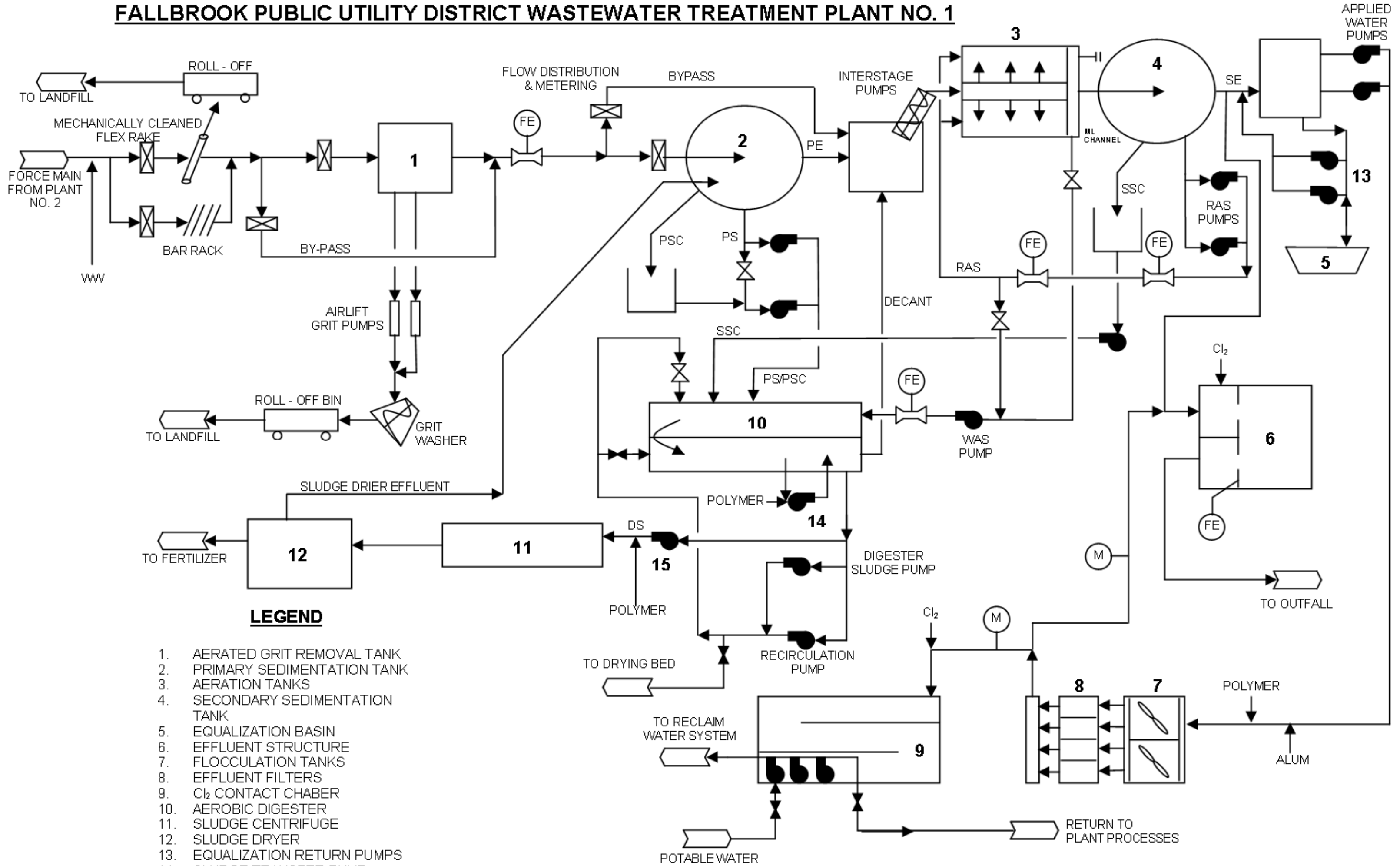
Whole Effluent Toxicity (WET)
The total toxic effect of an effluent measured directly with a toxicity test.

Attachment B – Map




Depth of ocean bottom at mean low water
MISSION AV
PACIFIC OCEAN
LA SALINA WASTEWATER TREATMENT PLANT
B-2
S-5
N-5
S-4
N-4
N-3
S-3
A-1
A-2
A-3
A-4
A-5
S-2
N-2
N-1
S-1
B-1
-140
-120
-100
-90
-80
-70
-60
-50
-40
-30
-20
-10
-5
0
1:20,000
SITE MAP
Figure 3
Ocean Outfall Bathymetry
(depth in feet)

Attachment C – Flow Schematic



LEGEND

1. AERATED GRIT REMOVAL TANK
2. PRIMARY SEDIMENTATION TANK
3. AERATION TANKS
4. SECONDARY SEDIMENTATION TANK
5. EQUALIZATION BASIN
6. EFFLUENT STRUCTURE
7. FLOCCULATION TANKS
8. EFFLUENT FILTERS
9. Cl_2 CONTACT CHABER
10. AEROBIC DIGESTER
11. SLUDGE CENTRIFUGE
12. SLUDGE DRYER
13. EQUALIZATION RETURN PUMPS
14. SLUDGE TRANSFER PUMP
15. CENTRIFUGE PUMP

ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR 122.41(a))

2. The Discharger shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR 122.41(a)(1))

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR 122.41(c))

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR 122.41(d))

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR 122.41(e))

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR 122.41(g))

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of State or local law or regulations. (40 CFR 122.5(c))

F. Inspection and Entry

The Discharger shall allow the San Diego Water Board, State Water Board, U.S. Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR 122.41(i); CWC, § 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR 122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR 122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location. (40 CFR 122.41(i)(4))

G. Bypass

1. Definitions

a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR 122.41(m)(1)(i))

b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR 122.41(m)(1)(ii))

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR 122.41(m)(2))

3. Prohibition of bypass. Bypass is prohibited, and the San Diego Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR 122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR 122.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR 122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the San Diego Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR 122.41(m)(4)(i)(C))

4. The San Diego Water Board may approve an anticipated bypass, after considering its adverse effects, if the San Diego Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR 122.41(m)(4)(ii))

5. Notice

a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 CFR 122.41(m)(3)(i))

b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR 122.41(m)(3)(ii))

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR 122.41(n)(1))

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR 122.41(n)(2))

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR 122.41(n)(3)):

a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR 122.41(n)(3)(i));

b. The permitted facility was, at the time, being properly operated (40 CFR 22.41(n)(3)(ii));

c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR 122.41(n)(3)(iii)); and

d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR 122.41(n)(3)(iv))

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR 122.41(n)(4))

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR 122.41(f))

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 CFR 122.41(b))

C. Transfers

This Order is not transferable to any person except after notice to the San Diego Water Board. The San Diego Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC. (40 CFR 122.41(l)(3); 122.61)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR 122.41(j)(1))

B. Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order. (40 CFR 122.41(j)(4); 122.44(i)(1)(iv))

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the San Diego Water Board at any time. (40 CFR 122.41(j)(2))

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR 122.41(j)(3)(i));

2. The individual(s) who performed the sampling or measurements (40 CFR 122.41(j)(3)(ii));

3. The date(s) analyses were performed (40 CFR 122.41(j)(3)(iii));

4. The individual(s) who performed the analyses (40 CFR 122.41(j)(3)(iv));

5. The analytical techniques or methods used (40 CFR 122.41(j)(3)(v)); and

6. The results of such analyses. (40 CFR 122.41(j)(3)(vi))

C. Claims of confidentiality for the following information will be denied (40 CFR 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR 122.7(b)(1)); and

2. Permit applications and attachments, permits and effluent data. (40 CFR 122.7(b)(2))

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the San Diego Water Board, State Water Board, or USEPA within a reasonable time, any information which the San Diego Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the San Diego Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR 122.41(h); CWC, § 13267)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the San Diego Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR 122.41(k))

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR 122.22(a)(3)).

3. All reports required by this Order and other information requested by the San Diego Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR 122.22(b)(1));

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR 122.22(b)(2)); and

c. The written authorization is submitted to the San Diego Water Board and State Water Board. (40 CFR 122.22(b)(3))

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the San Diego Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR 122.22(c))

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification[1]:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 CFR 122.22(d))

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E of this Order). (40 CFR 122.41(l)(4))

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the San Diego Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 CFR 122.41(l)(4)(i))

[1] On March 3, 2000, USEPA issued a memorandum stating that a certification of "accuracy" in information submissions is a certification that the information provided is "accurate" as the layperson uses the term, rather than "accurate" as that term is used to describe the quantifiable performance of a measurement system. In USEPA documents associated with testing procedures for measuring whole effluent toxicity, the Agency stated that the "accuracy" of toxicity tests cannot be determined in a meaningful way. When a person certifies that the submission of WET testing information is "accurate" to the best of their knowledge and belief, the person certifies that the results obtained using the WET testing procedures are faithfully and truthfully transcribed on the information submission, and that the results were, in fact, results that were obtained using the specified testing procedures.

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the San Diego Water Board. (40 CFR 122.41(l)(4)(ii))

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR 122.41(l)(4)(iii))

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR 122.41(l)(5))

E. Twenty Four-Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR 122.41(l)(6)(i))

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR 122.41(l)(6)(ii)):

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(A))

b. Any upset that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(B))

3. The San Diego Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR 122.41(l)(6)(iii))

F. Planned Changes

The Discharger shall give notice to the San Diego Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b) (40 CFR 122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 CFR 122.41(l)(1)(ii))

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR 122.41(l)(1)(iii))

G. Anticipated Noncompliance

The Discharger shall give advance notice to the San Diego Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 CFR 122.41(l)(2))

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR 122.41(l)(7))

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the San Diego Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR 122.41(l)(8))

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The San Diego Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the San Diego Water Board of the following (40 CFR 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR 122.42(b)(1)); and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR 122.42(b)(2))

3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 CFR 122.42(b)(3)).

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Table of Contents

List of Tables

ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations (40 CFR §122.48) require that all National Pollutant Discharge Elimination System (NPDES) permits specify monitoring and reporting requirements. California Water Code (CWC) sections 13267 and 13383 also authorize the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and State regulations.

I. GENERAL MONITORING PROVISIONS

A. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitoring discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of the San Diego Water Board. Samples shall be collected at times representative of "worst case" conditions with respect to compliance with the requirement of this Order.

B. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurement is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ±5 percent from true discharge rates throughout the range of expected discharge volumes.

C. Monitoring must be conducted according to U.S. Environmental Protection Agency (USEPA) test procedures approved at 40 CFR Part 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act* as amended, or unless other test procedures are specified in this Order and/or in this MRP and/or by the San Diego Water Board.

D. All analyses shall be performed in a laboratory certified to perform such analyses by the California Department of Public Health (DPH) or a laboratory approved by the San Diego Water Board.

E. Records of monitoring information shall include information required under Standard Provision, Attachment D of this Order, section IV.

F. All monitoring instruments and devices used by FPUD to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year, or more frequently, to ensure continued accuracy of the devices.

G. FPUD shall have, and implement, an acceptable written quality assurance (QA) plan for laboratory analyses. Duplicate chemical analyses must be conducted on a minimum of 10 percent of the samples or at least one sample per month, whichever is greater. A similar frequency shall be maintained for analyzing spiked samples. When requested by USEPA or the San Diego Water Board, FPUD will participate in the NPDES discharge monitoring report QA performance study. FPUD should have a success rate equal or greater than 80 percent.

H. Analysis for toxic pollutants, including chronic toxicity, with performance goals based on water quality objectives of the 2005 California Ocean Plan (hereinafter Ocean Plan) shall be conducted in accordance with procedures described in the Ocean Plan and restated in this MRP.

I. This permit may be modified in accordance with the requirements set forth at 40 CFR Parts 122 and 124, to include appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information, or to implement any USEPA approved, new, State water quality standards applicable to effluent toxicity.

II. MONITORING LOCATIONS

FPUD shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	M-INF	At a location where all influent flows to Treatment Plant No. 1 are accounted for in monitoring events; upstream of any in-plant return flows; and where representative samples of influent can be collected.
--	M-001	Downstream of any in-plant return flows and chlorine disinfection where representative samples of effluent treated solely at Treatment Plant No. 1 can be collected.
001	M-002	At a location other than M-001 where representative samples of effluent from Treatment Plant No. 1 can be collected before combining with wastewater from the City of Oceanside, US Marine Corps Base Camp Pendleton, and Genetech, Inc. Current location is near terminus of the Fallbrook Land Outfall and prior to connecting to the Oceanside Ocean Outfall
SURF ZONE STATONS		
--	S1	Surf zone, 5,500 feet south of the outfall.
--	S2	Surf zone, 2,500 feet south of the outfall.
--	S3	Surf zone; at the outfall
--	S4	Surf zone, 2,000 feet north of the outfall.
--	S5	Surf zone, 5,800 feet north of the outfall.
NEAR SHORE STATIONS		
--	N1	Opposite S1, at the 30 foot depth contour, MLLW.
--	N2	Opposite S2, at the 30 foot depth contour, MLLW.
--	N3	Opposite S3, at the 30 foot depth contour, MLLW.
--	N4	Opposite S4, at the 30 foot depth contour, MLLW.
--	N5	Opposite S5, at the 30 foot depth contour, MLLW.
OFFSHORE STATIONS		
--	A1-A4	At the corners of a 1,000 ft x 1,000 ft square having one side parallel to shore and the intersection of its diagonals at the seaward end of the outfall.
--	A5	At the seaward end of the outfall.
--	B1	One mile downcoast from the outfall, and over the same depth contour as Station A5.
--	B2	One mile upcoast from the outfall and over the same depth contour as Station A5.

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
BIOLOGICAL TRANSECTS		
--	T0	At the 20, 40, 60, and 80 foot depth contours along the transect located 50 feet downcoast of and parallel to the outfall.
--	T1	At the 20, 40, 60, and 80 foot depth contours along the transect located 1 mile downcoast of and parallel to the outfall.
--	T2	At the 20, 40, 60, and 80 foot depth contours along the transect located 1.5 miles downcoast of and parallel to the outfall.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location M-INF

1. FPUD shall monitor the influent at M-INF, as follows.

Table E-2. Influent Monitoring at M-INF

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MGD	Recorder/Totalizer	Continuous	--
Carbonaceous Biochemical Oxygen Demand (5-day @ 20°C) ($CBOD_5$)	mg/L	24-hr Composite	1/Week	[1]
Total Suspended Solids (TSS)	mg/L	24-hr Composite	1/Week	[1]

[1] As required under 40 CFR Part 136.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location M-001

1. FPUD shall monitor the effluent at M-001 as follows.

Table E-3. Effluent Monitoring at M-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
TSS	mg/L	24-hr Composite	1/Day[2]	[1,3,4]
$CBOD_5$	mg/L	24-hr composite	1/Day[2]	[1,3,4]
Oil and Grease	mg/L	Grab	1/Month[5]	[1,3]
Settleable Solids	mL/L	Grab	1/Day[2]	[1]
Turbidity	NTU	24hr Composite	1/Week[5]	[1]
pH	pH Units	Grab	1/Day[2]	[1]

[1] As required under 40 CFR Part 136.

[2] Applies 5 days per week, except 7 days per week for at least 1 week in July or August of each year.
[3] FPUD shall calculate and report the mass emission rate (MER) of the constituent for each sample taken. The MER shall be calculated in accordance with section VII.I.2.d of this Order.
[4] FPUD shall calculate the monthly average percent removal for these constituents.
[5] The minimum frequency of monitoring for this constituent is automatically increased to twice the minimum frequency specified, if any analysis for this constituent yields a result higher than the applicable effluent limitation or performance goal specified in this Order. The increased minimum frequency of monitoring shall remain in effect until the results of a minimum of four consecutive analyses for this constituent are below all applicable effluent limitations or performance goals specified in this Order.

2. FPUD shall monitor the effluent from M-001 or M-002 (Discharge Point No. 001) as follows.

Table E-4. Effluent Monitoring at M-001 or M-002

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Temperature	°F	Grab	1/Week	1
Dissolved Oxygen	mg/L	Grab	1/Week	1
Flow	MGD	Recorder/Totalizer	Continuous	--
TABLE B PARAMETERS FOR PROTECTION OF MARINE AQUATIC LIFE				
Arsenic, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Cadmium, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Chromium (VI), Total Recoverable[4]	µg/L	24-hr Composite	2/Year[2,3,4]	1
Copper, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Lead, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Mercury, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Nickel, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Selenium, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Silver, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Zinc, Total Recoverable	µg/L	24-hr Composite	2/Year[2,3]	1
Cyanide, Total Recoverable[5]	µg/L	24-hr Composite	2/Year[2,3]	1,6
Chlorine, Total Residual	µg/L	Grab	1/Week[2,6]	1
Ammonia Nitrogen, Total (as N)	mg/L	24-hr Composite	1/Month[2,3]	1
Phenolic Compounds (nonchlorinated)[7]	µg/L	24-hr Composite	2/Year[2,3]	1
Phenolic Compounds (chlorinated)[8]	µg/L	24-hr Composite	2/Year[2,3]	1
Endosulfan[9]	µg/L	24-hr Composite	2/Year[2,3]	1
Endrin	µg/L	24-hr Composite	2/Year[2,3]	1
HCH[10]	µg/L	24-hr Composite	2/Year[2,3]	1
Radioactivity	pCi/L	24-hr Composite	2/Year[2,3]	1
TABLE B PARAMETERS FOR PROTECTION OF HUMAN HEALTH – NONCARCINOGENS				
Acrolein	µg/L	Grab	1/Year[2,3]	1
Antimony, Total Recoverable	µg/L	24-hr Composite	1/Year[2,3]	1
Bis (2-chloroethoxy) Methane	µg/L	Grab	1/Year[2,3]	1
Bis (2-chloroisopropyl) Ether	µg/L	Grab	1/Year[2,3]	1
Chlorobenzene	µg/L	Grab	1/Year[2,3]	1
Chromium (III), Total Recoverable	µg/L	24-hr Composite	1/Year[2,3]	1

Di-n-butyl Phthalate	µg/L	Grab	1/Year[2,3]	[1]
Dichlorobenzenes[11]	µg/L	Grab	1/Year[2,3]	[1]
Diethyl Phthalate	µg/L	Grab	1/Year[2,3]	[1]
Dimethyl Phthalate	µg/L	Grab	1/Year[2,3]	[1]
4,6-dinitro-2-methylphenol	µg/L	Grab	1/Year[2,3]	[1]
2,4-dinitrophenol	µg/L	Grab	1/Year[2,3]	[1]
Ethylbenzene	µg/L	Grab	1/Year[2,3]	[1]
Fluoranthene	µg/L	Grab	1/Year[2,3]	[1]
Hexachlorocyclopentadiene	µg/L	Grab	1/Year[2,3]	[1]
Nitrobenzene	µg/L	Grab	1/Year[2,3]	[1]
Thallium, Total Recoverable	µg/L	24-hr Composite	1/Year[2,3]	[1]
Toluene	µg/L	Grab	1/Year[2,3]	[1]
Tributyltin	µg/L	24-hr Composite	1/Year[2,3]	[1]
1,1,1-trichloroethane	µg/L	Grab	1/Year[2,3]	[1]
TABLE B PARAMETERS FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS				
Acrylonitrile	µg/L	Grab	1/Year[2,3]	[1]
Aldrin	µg/L	Grab	1/Year[2,3]	[1]
Benzene	µg/L	Grab	1/Year[2,3]	[1]
Benzidine	µg/L	Grab	1/Year[2,3]	[1]
Beryllium, Total Recoverable	µg/L	24-hr composite	1/Year[2,3]	[1]
Bis (2-chloroethyl) Ether	µg/L	Grab	1/Year[2,3]	[1]
Bis (2-ethlyhexyl) Phthalate	µg/L	Grab	1/Year[2,3]	[1]
Carbon Tetrachloride	µg/L	Grab	1/Year[2,3]	[1]
Chlordane	µg/L	Grab	1/Year[2,3]	[1]
Chlorodibromomethane	µg/L	Grab	1/Year[2,3]	[1]
Chloroform	µg/L	Grab	1/Year[2,3]	[1]
DDT[12]	µg/L	Grab	1/Year[2,3]	[1]
1,4-dichlorobenzene	µg/L	Grab	1/Year[2,3]	[1]
3,3'-dichlorobenzidine	µg/L	Grab	1/Year[2,3]	[1]
1,2-dichloroethane	µg/L	Grab	1/Year[2,3]	[1]
1,1-dichloroethylene	µg/L	Grab	1/Year[2,3]	[1]
Dichlorobromomethane	µg/L	Grab	1/Year[2,3]	[1]
Dichloromethane	µg/L	Grab	1/Year[2,3]	[1]
1,3-dichloropropene	µg/L	Grab	1/Year[2,3]	[1]
Dieldrin	µg/L	Grab	1/Year[2,3]	[1]
2,4-dinitrotoluene	µg/L	Grab	1/Year[2,3]	[1]
1,2-diphenylhydrazine	µg/L	Grab	1/Year[2,3]	[1]
Halomethanes[13]	µg/L	Grab	1/Year[2,3]	[1]
Heptachlor	µg/L	Grab	1/Year[2,3]	[1]
Heptachlor Epoxide	µg/L	Grab	1/Year[2,3]	[1]
Hexachlorobenzene	µg/L	Grab	1/Year[2,3]	[1]
Hexachlorobutadiene	µg/L	Grab	1/Year[2,3]	[1]
Hexachloroethane	µg/L	Grab	1/Year[2,3]	[1]
Isophorone	µg/L	Grab	1/Year[2,3]	[1]
N-nitrosodimethylamine	µg/L	Grab	1/Year[2,3]	[1]

N-nitrosodi-N-propylamine	μg/L	Grab	1/Year[2,3]	[1]
N-nitrosodiphenylamine	μg/L	Grab	1/Year[2,3]	[1]
PAHs[14]	μg/L	Grab	1/Year[2,3]	[1]
PCBs[15]	μg/L	Grab	1/Year[2,3]	[1]
TCDD equivalents[16]	μg/L	Grab	2/Year[2,3]	[1]
1,1,2,2-tetrachloroethane	μg/L	Grab	1/Year[2,3]	[1]
Tetrachloroethylene	μg/L	Grab	1/Year[2,3]	[1]
Toxaphene	μg/L	Grab	1/Year[2,3]	[1]
Trichloroethylene	μg/L	Grab	1/Year[2,3]	[1]
1,1,2-trichloroethane	μg/L	Grab	1/Year[2,3]	[1]
2,4,6-trichlorophenol	μg/L	Grab	1/Year[2,3]	[1]
Vinyl Chloride	μg/L	Grab	1/Year[2,3]	[1]

1 As required under 40 CFR Part 136.

2 FPUD shall calculate and report the mass emission rate (MER) of the constituent for each sample taken. The MER shall be calculated in accordance with section VII.I.2.d of this Order.

3 The minimum frequency of monitoring for this constituent is automatically increased to twice the minimum frequency specified, if any analysis for this constituent yields a result higher than the applicable effluent limitation or performance goal specified in this Order. The increased minimum frequency of monitoring shall remain in effect until the results of a minimum of four consecutive analyses for this constituent are below all applicable effluent limitations or performance goals specified in this Order.

4 Dischargers may, at their option, apply this performance goal as a total chromium performance goal.

5 If a Discharger can demonstrate to the satisfaction of the San Diego Water Board (subject to USEPA approval) that an analytical method is available to reliably distinguish between strongly and weakly complexed cyanide, performance goals for cyanide may be met by the combined measurement of free cyanide, simple alkali metals cyanides, and weakly complexed organometallic cyanide complexes. In order for the analytical method to be acceptable, the recovery of free cyanide from metal complexes must be comparable to that achieved by the approved method in 40 CFR Part 136, as revised May 14, 1999.

6 Monitoring of total chlorine residual is not required on days when none of the treatment units that are subject to this Order use chlorine for disinfection. If only one sample is collected for total chlorine residual analysis on a particular day, that sample must be collected at the time when the concentration of total chlorine residual in the discharge would be expected to be greatest. The times of chlorine discharges on the days that samples are collected, and the time at which samples are collected, shall be reported.

7 Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-Dinitro-2-methylphenol, 2,4-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-Nitrophenol, 4-nitrophenol, and phenol.

8 Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.

9 Endosulfan represents the sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate.

10 HCH (hexachlorocyclohexane) represents the sum of the alpha, beta, gamma (Lindane), and delta isomers of hexachlorocyclohexane.

11 Dichlorobenzenes represent the sum of 1,2- and 1,3-dichlorobenzene.

12 DDT represents the sum of 4,4'DDT; 2,4'DDT; 4,4'DDE; 2,4'DDE; 4,4'DDD; and 2,4'DDD.

13 Halomethanes represent the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

14 PAHs (polynuclear aromatic hydrocarbons) represent the sum of acenaphthalene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo[k]fluoranthene; 1,12-benzoperylene; benzo[a]pyrene; chrysene; dibenzo[a,h]anthracene; fluorene; indeno[1,2,3-cd]pyrene; phenanthrene; and pyrene.

15 PCBs (polychlorinated biphenyls) represent the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Arolclor-1254, and Arcolor-1260.

16 TCDD equivalents represent the sum of concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown by the table below. USEPA Method 8280 may be used to analyze TCDD equivalents.

Isomer Group	Toxicity Equivalence Factor
2,3,7,8 – tetra CDD	1.0
2,3,7,8 – penta CDD	0.5
2,3,7,8 – hexa CDD	0.1
2,3,7,8 – hepta CDD	0.01
octa CDD	0.001
2,3,7,8 – tetra CDF	0.1
1,2,3,7,8 – penta CDF	0.05
2,3,4,7,8 – penta CDF	0.5
2,3,7,8 – hexa CDFs	0.1
2,3,7,8 – hepta CDFs	0.01
Octa CDF	0.001

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

FPUD shall conduct chronic toxicity testing on effluent samples collected at Effluent Monitoring Station M-002 in accordance with the following schedule and requirements:

Table E-5. Whole Effluent Toxicity Testing

Test	Unit	Sample Type	Minimum Test Frequency
Screening period for chronic toxicity	TU_c	24-hr Composite	Every other year for 3 consecutive months, beginning with the calendar year 2011
Chronic Toxicity	TU_c	24-hr Composite	1/Quarter

Marine Organisms, 5th Edition, October 2002 (EPA-821-R-02-012).

Critical life stage toxicity tests shall be performed to measure chronic toxicity (TUc). Testing shall be performed using methods outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine Estuarine Organisms (*Chapman, G.A., D.L. Denton, and J.M. Lazorchak, 1995) or *Procedures Manual for Conducting Toxicity Tests Developed by the Marine Bioassay Project* (State Water Board, 1996).

A screening period for chronic toxicity shall be conducted every other year beginning with the calendar year 2011. Each screening period shall consist of 3 consecutive months of WET tests, using a minimum of three test species with approved test protocols, from the following list (from the Ocean Plan). Repeat screening periods may be terminated after the first month if the most sensitive species is the same as the species previously found to be most sensitive. Other tests may be used, if they have been approved for such testing by the State Water Board. The test species shall include a fish, an invertebrate, and an aquatic plant. After the screening period, the most sensitive test species shall be used for the quarterly testing. Control and dilution water should be obtained from an unaffected area of the receiving water or should use lab water as appropriate. If the dilution water is different from the culture water, then culture water should be used in a second control. The sensitivity of the test organisms to a reference toxicant shall be determined concurrently with each bioassay test and reported with test results.

Table E-6. Approved Test for Chronic Toxicity

Species	Test	Tier [1]	Reference [2]
giant kelp, *Macrocystis pyrifera*	percent germination; germ tube length	1	a, c
red abalone, *Haliotis rufescens*	abnormal shell development	1	a, c
oyster, *Crassostrea gigas*; mussels, *Mytilus spp*.	abnormal shell development; percent survival	1	a, c
urchin, *Strongylocentrotus purpuratus*; sand dollar, *Dendraster excentricus*	percent normal development	1	a, c
urchin, *Strongylocentrotus purpuratus*; sand dollar, *Dendraster excentricus*	percent fertilization	1	a, c
shrimp, *Homesimysis costata*	percent survival; growth	1	a, c
shrimp, *Mysidopsis bahia*	percent survival; fecundity	2	b, d
topsmelt, *Atherinops affinis*	larval growth rate; percent survival	1	a, c
Silversides, *Menidia beryllina*	larval growth rate; percent survival	2	b, d

[1] First tier methods are preferred for compliance monitoring. If first tier organisms are not available, FPUD can use a second tier test method following approval by the San Diego Water Board.

[2] Protocol References:

a. Chapman, G.A., D.L. Denton, and J.M. Lazorchak. 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. USEPA Report No. EPA/600/R-95/136.
b. Klemm, D.J., G.E. Morrison, T.J. Norberg-King, W.J. Peltier, and M.A. Heber. 1994. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Marine and Estuarine Organisms. USEPA Report No. EPA-600-4-91-003.
c. SWRCB 1996. Procedures Manual for Conducting Toxicity Tests Developed by the Marine Bioassay Project. 96-1WQ.
d. Weber, C.I., W.B. Horning, I.I., D.J. Klemm, T.W. Nieheisel, P.A. Lewis, E.L. Robinson, J. Menkedick and F. Kessler 9eds). 1998. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA/600/4-87/028. National Information Service, Springfield, VA.

If the performance goal for chronic toxicity is exceeded in any one test, then within 15 days of the exceedance, FPUD shall begin conducting six additional tests, bi-weekly, over a 12 week period. If the toxicity effluent limitation is exceeded in any of these six additional tests, then FPUD shall notify the San Diego Water Board. If the San Diego Water Board determines that the discharge consistently exceeds a toxicity performance goal, then FPUD shall initiate a TRE/TIE in accordance with the TRE workplan, Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants (USEPA 833-B-99-002, 1999), and USEPA TIE guidance documents (Phase I, EPA/600/6-91/005F, 1992; Phase II, EPA/600/R-92/080, 1993; and Phase III, EPA/600/R-92/081, 1993). Once the source of toxicity is identified, FPUD shall take all reasonable steps to reduce the toxicity to meet the chronic toxicity performance goal identified in section IV.A.2 of this Order.

Within 30 days of completion of the TRE/TIE, FPUD shall submit the results of the TRE/TIE, including a summary of the findings, data generated, a list of corrective actions necessary to achieve consistent compliance with all the toxicity limitations/performance goals of this Order and prevent recurrence of exceedances of those limitations/performance goals, and a time schedule for implementation of such corrective actions. The corrective actions and time schedule shall be modified at the direction of the San Diego Water Board.

If no toxicity is detected in any of these additional six tests, then FPUD may return to the testing frequency specified in the MRP.

VI. LAND DISCHARGE MONITORING REQUIREMENTS – NOT APPLICABLE

VII. RECLAMATION MONITORING REQUIREMENTS – NOT APPLICABLE

VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER

The receiving water monitoring program required herein is also required by San Diego Water Board Order No. R9-2011-0016, which establishes limitations and conditions for discharges from the City of Oceanside, Oceansdie OO. FPUD may conduct the required receiving water monitoring together with the City of Oceanside, US Marine Corps Base Camp Pendleton, and Genentech, as these entities discharge through the Oceanside OO.

Receiving water and sediment monitoring in the vicinity of the Oceanside OO shall be conducted as specified below. Station location, sampling, sampling preservation and analyses, when not specified, shall be by methods approved by the San Diego Water Board. The monitoring program may be modified by the San Diego Water Board at any time.

The receiving water and sediment monitoring program for the Oceanside OO may be conducted jointly with other dischargers to the Oceanside OO.

During monitoring events, if possible, sample stations shall be located using a land-based microwave positioning system or a satellite positioning system such as GPS. If an alternate navigation system is proposed, its accuracy should be compared to that of microwave and satellite based systems, and any compromises in accuracy shall be justified.

A. Surf Zone Water Quality Monitoring

All surf zone stations shall be monitored as follows.

1. Grab samples shall be collected and analyzed for total and fecal coliform and enterococcus bacteria at a minimum frequency of one time per week. As required by implementation procedures at section III.D of the Ocean Plan, measurement of enterococcus density shall be conducted at all stations where measurement of total and fecal coliform bacteria is required.

   If a single sample exceeds any of the single sample bacterial standards, repeat sampling at that location shall be conducted to determine the extent and persistence of the exceedance. Repeat sampling shall be conducted within 24 hours of receiving analytical results and continued until the sample result is less than the single sample bacterial standards or until a sanitary survey is conducted to determine the source of the high bacterial densities.

   Single sample bacterial standards include:

   i. Total coliform density will not exceed 10,000 per 100 ml; or

   ii. Fecal coliform density will not exceed 400 per 100 ml; or

iii. Total coliform density will not exceed 1,000 per 100 ml when the ratio of fecal/total coliform exceeds 0.1;

iv. Enterococcus density will not exceed 104 per 100 ml.

2. At the same time Samples are collected from surf zone stations, the following information shall be recorded: observation of wind direction and speed; weather (cloudy, sunny, or rainy); current direction; tidal conditions; and observations of water color, discoloration, oil and grease; turbidity, odor, and materials of sewage origin in the water or on the beach; water temperature (°F); and status of the mouth of the Buena Vista Lagoon (open, closed, flow, etc.).

B. Near Shore Water Quality Monitoring

All near shore stations shall be monitored as follows.

1. Reduced Monitoring

If the San Diego Water Board determines that the effluent complies with the effluent limitations and performance goals at section IV.A of this Order and the receiving water limitations at section V.A of this Order at all times, only reduced near shore water quality monitoring specified below is required.

Table E-7. Near Shore Water Quality Reduced Monitoring Requirements

Determination	Units	Type of Sample	Minimum Frequency
Visual Observations	--	--	1/Month
Total Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Fecal Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Enterococcus	Number / 100 mL	Grab[1]	1/Month

[1] At the surface.

2. Intensive Monitoring

The intensive near shore water quality monitoring specified below is required during the 12-month period beginning November 1, 2013 through October 31, 2014, and must be submitted by December 1, 2014. This monitoring data will assist the San Diego Water Board in the evaluation of the Report of Waste Discharge. The intensive near shore water quality monitoring specified below may also be required if the San Diego Water Board determines that 1) the effluent does not at all times comply with the effluent limitations and performance goals of this Order; or 2) FPUD's discharge is causing or contributing to the receiving water limitations of this Order not being consistently achieved.

Table E-8. Near Shore Water Quality Intensive Monitoring Requirements

Determination	Units	Type of Sample	Minimum Frequency
Visual Observations	--	--	1/Month
Total Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Fecal Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Enterococcus	Number / 100 mL	Grab[1]	1/Month

[1] At the surface and mid-depth.

C. Off Shore Water Quality Monitoring

All off shore stations shall be monitored as follows.

1. Reduced Monitoring

If the San Diego Water Board determines that the effluent at all times complies with the effluent limitations and performance goals at section IV.A of this Order and the receiving water limitations at section V.A of this Order, only reduced off shore water quality monitoring specified below is required.

Table E-9. Off Shore Water Quality Reduced Monitoring Requirements

Determination	Units	Type of Sample	Minimum Frequency
Visual Observations	--	--	1/Month
Total Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Fecal Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Enterococcus	Number / 100 mL	Grab[1]	1/Month

1 At surface and mid-depth.

2. Intensive Monitoring

The intensive off shore water quality monitoring specified below is required during the 12-month period beginning November 1, 2013 through October 31, 2014, and must be submitted by December 1, 2014. This monitoring data will assist the San Diego Water Board in the evaluation of the Report of Waste Discharge. The intensive off shore water quality monitoring specified below may also be required if the San Diego Water Board determines that 1) the effluent does not at all times comply with the effluent limitations and performance goals of this Order, or 2) the receiving water limitations of this Order are not being consistently achieved.

Table E-10. Off Shore Water Quality Intensive Monitoring Requirements

Determination	Units	Type of Sample	Minimum Frequency
Visual Observations	--	--	1/Month
Total Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Fecal Coliform Organisms	Number / 100 mL	Grab[1]	1/Month
Enterococcus	Number / 100 mL	Grab[1]	1/Month
Conductivity, Temperature, and Depth	Practical Salinity Units,°F, feet	Grab[2]	1/Month
Dissolved Oxygen	mg/L	Grab[2]	1/Month
Light Transmittance	percent	Instrument[2]	1/Month
pH	standard units	Grab[3]	1/Month

1 At the surface and mid-depth.
2 At the surface, mid-depth, and bottom.
3 At the surface.

D. Benthic Monitoring

The intensive monitoring specified below is required during the 12-month period beginning November 1, 2013 through October 31, 2014, and must be submitted by December 1, 2014. This monitoring data will assist the San Diego Water Board in the evaluation of the Report of Waste Discharge. The sediment monitoring specified below may also be required if the San Diego Water Board determines that 1) the effluent does not at all times comply with Effluent Limitations and Performance Goals of this Order or 2) FPUD's discharge is causing or contributing to the receiving water limitations of this Order not being consistently achieved. Benthic monitoring shall be conducted at all off shore monitoring stations.

1. **Sediment Characteristics**. Analyses shall be performed on the upper 2 inches of core.

Table E-11.Sediment Monitoring Requirements

Determination	Units	Type of Sample	Minimum Frequency
Sulfides	mg/kg	Core	2/Year
Total Chlorinated Hydrocarbons	mg/kg	Core	2/Year
Biochemical Oxygen Demand (5-day @ 20°C)	mg/kg	Core	2/Year
Chemical Oxygen Demand	mg/kg	Core	2/Year
Particle Size Distribution	mg/kg	Core	2/Year
Arsenic	mg/kg	Core	1/Year
Cadmium	mg/kg	Core	1/Year
Total Chromium	mg/kg	Core	1/Year
Copper	mg/kg	Core	1/Year
Lead	mg/kg	Core	1/Year
Mercury	mg/kg	Core	1/Year
Nickel	mg/kg	Core	1/Year
Silver	mg/kg	Core	1/Year
Zinc	mg/kg	Core	1/Year
Cyanide	mg/kg	Core	1/Year
Phenolic Compounds	mg/kg	Core	1/Year
Radioactivity	pCi/kg	Core	1/Year

2. **Infauna.** Samples shall be collected with a Paterson, Smith-McIntyre, or orange-peel type dredge, having an open sampling area of not less than 124 square inches and a sediment capacity of not less than 210 cubic inches. The sediment shall be sifted through a 1-millimeter mesh screen and all organisms shall be identified to as low a taxon as possible.

Table E-12. Infauna Monitoring Requirements

Determination	Units	Sample Type	Minimum Frequency
Benthic Biota	Identification and enumeration	3 Grabs	2/Year

E. Additional Biological Monitoring – Demersal Fish and Macroinvertebrates

The intensive monitoring specified below is required during the 12-month period beginning November 1, 2013 through October 31, 2014, and must be submitted by December 1, 2014. This monitoring data will assist the San Diego Water Board in the evaluation of the Report of Waste Discharge, which is required to be submitted by FPUD within 180 days prior to the Order's expiration date of September 27, 2017.

Table E-13. Demersal Fish and Macroinvertebrates Monitoring Requirements

Determination	Units	Minimum Frequency
Biological Transects	Identification and enumeration	Year 4

In rocky or cobble areas, a 30-meter band transect, 1 meter wide, shall be established on the ocean bottom. Operations at each underwater station shall include: (1) recording of water temperature (may be measured from a boat) and estimated visibility and pelagic macrobiota at each 10-foot depth increment throughout the water column and at the bottom; (2) recording of general bottom description; (3) enumeration by estimate of the larger plants and animals in the band transect area; (4) development of a representative photographic record of the sample area; and (5) within each band, three ¼-meter square areas shall be randomly selected, and all macroscopic plant and animal life shall be identified within each square to as low a taxon as possible, and measured. Sampling techniques will follow those employed by biologist divers of the California State Department of Fish and Game.

In sandy areas, a 30-meter band transect, 1 meter wide, shall be established on the ocean bottom. Operations at each underwater station shall include: (1) recording of water temperature (may be measured from a boat), and estimated visibility and pelagic macrobiota at each 10-foot depth increment throughout the water column and at the bottom; (2) recording of general bottom description; (3) recording of height, period, and crest direction of ripple marks; (4) recording of amount, description, and location of detritus on bottom; (5) creation of a representative photographic record of the area sampled; and (6) within each band, three cores of at least 42.5 cm^2 in area shall be randomly taken to a depth of 15 cm where possible, (the three cores may be taken from a boat) and the material removed sifted through at least a 1 mm mesh screen, and all organisms identified to as low a taxon as possible, enumerated, measured, and reproductive conditions assessed where feasible. Sampling techniques will follow those employed by biologist divers of the California State Department of Fish and Game.

For each epifauna and infauna, size frequency and distribution shall be shown for at least the three numerically largest populations identified to the lowest possible taxon and appropriate graphs showing the relationship between species frequency and population shall be plotted from each sample.

IX. OTHER MONITORING REQUIREMENTS

A. Kelp Bed Canopy

FPUD shall participate with other ocean dischargers in the San Diego Region in an annual regional kelp bed photographic survey. Kelp beds shall be monitored annually by means of vertical aerial infrared photography to determine the maximum aerial extent of the region's coastal kelp beds within the calendar year. Surveys shall be conducted as close as possible to the time when kelp bed canopies cover the greatest area. The entire San Diego Region coastline, from the international boundary to the San Diego Region/Santa Ana Region boundary shall be photographed on the same day.

The images produced by the surveys shall be presented in the form of 1:24,000 scale photo-mosaic of the entire San Diego Region coastline. Onshore reference points, locations of all ocean outfalls and diffusers, and the 30-foot mean lower low water (MLLW) and 60-foot (MLLW) depth contours shall be shown.

The aerial extent of the various kelp beds photographed in each survey shall be compared to that noted in surveys of previous years. Any significant losses which persist for more than one year shall be investigated by divers to determine the probable reason for the loss.

B. Regional Monitoring

The Discharger shall, as directed by the San Diego Water Board, participate with other regulated entities, other interested parties, and the San Diego Water Board in development, refinement, implementation, and coordination of regional monitoring and assessment programs to:

1. Determine the status and trends of conditions in ocean waters with regard to beneficial uses, e.g.
   a. Are fish and shellfish safe to eat?
   b. Is water quality safe for swimming?
   c. Are ecosystems healthy?
2. Identify the stressors causing / contributing to conditions of concern;
3. Identify the sources of the stressors causing / contributing to conditions of concern; and
4. Evaluate the effectiveness (i.e., environmental outcomes) of actions taken to address such stressors and sources.

C. Solids Monitoring

FPUD shall report, annually, the volume of screenings, sludge [biosolids], grit, and other solids generated and/or removed during wastewater treatment and the locations where these waste materials are placed for disposal. Copies of all annual reports required by 40 CFR Part 503 shall be submitted to the San Diego Water Board at the same time they are submitted to the USEPA.

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. FPUD shall comply with all Standard Provisions (Attachment D of this Order) related to monitoring, reporting, and recordkeeping.

2. Reports of marine monitoring surveys conducted to meet receiving water monitoring requirements of this MRP shall include, as a minimum, the following information:

a. A description of climatic and receiving water characteristics at the time of sampling (weather observations, floating debris, discoloration, wind speed and direction, swell or wave action, time of sampling, tide height, etc.).

b. A description of sampling stations, including differences unique to each station (e.g., station location, sediment grain size, distribution of bottom sediments, rocks, shell litter, calcareous worm tubes, etc.).

c. A description of the sample collection and preservation procedures used in the survey.

d. A description of the specific method used for laboratory analysis.

e. An in-depth discussion of the results of the survey. All tabulations and computations shall be explained.

f. Annual reports will include detailed statistical analyses of all data. Methods may include, but are not limited to, various multivariate analyses such as cluster analysis, ordination, and regression. FPUD should also conduct additional analyses, as appropriate, to elucidate temporal and spatial trends in the data.

3. By March 1 of each year, FPUD shall submit an annual report to the San Diego Water Board and USEPA Region 9 that contains tabular and graphical summaries of the monitoring data obtained during the previous year. FPUD shall discuss the compliance record and corrective actions taken, or which may be taken, or which may be needed to bring the discharge into full compliance with the requirements of this Order and this MRP.

B. Self Monitoring Reports (SMRs)

1. The State Water Board and San Diego Water Board has notified FPUD to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html). FPUD shall also submit hard copy SMRs, until notified otherwise. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. FPUD shall report in the SMR the results for all monitoring specified in this MRP under sections III through IX. FPUD shall submit monthly SMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If FPUD monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.

3. Unless otherwise noted in the MRP, monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

Table E-14. Monitoring Periods and Reporting Schedule

Sampling Frequency/ Report Type	Monitoring Period Begins	Monitoring Period	SMR Due Date
Continuous	First day of the calendar month following the permit effective date or on permit effective date if that date is first day of the month.	All	First day of second calendar month following month of sampling.
1/Day	First day of the calendar month following the permit effective date or on permit effective date if that date is first day of the month.	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	First day of second calendar month following month of sampling.

Sampling Frequency/ Report Type	Monitoring Period Begins	Monitoring Period	SMR Due Date
1/Week	First Sunday of the calendar month following the permit effective date or on permit effective date if on a Sunday.	Sunday through Saturday	First day of second calendar month following month of sampling.
1/Month	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month.	First day of calendar month through last day of calendar month	First day of second calendar month following month of sampling.
1/Quarter	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date.	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31	May 1 August 1 November 1 February 1
2/Year	Closest of January 1 or July 1 following (or on) permit effective date.	January 1 through June 30 July 1 through December 31	August 1 March 1
Significant Industrial User Compliance Status Report	Closest of January 1 or July 1 following (or on) permit effective date.	January 1 through June 30 July 1 through December 31	September 1 March 1
1/Year Pretreatment Program Compliance Schedule – progress report	January 1 following (or on) permit effective date.	January 1 through December 31	March 1
Biosolids Report	January 1 following (or on) permit effective date.	January 1 through December 31	February 19
Intensive Monitoring	November 1, 2013	November 1, 2013 through October 31, 2014	December 1, 2014

4. **Reporting Protocols.** FPUD shall report with each sample result the applicable reported Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136. For each numeric effluent limitation or performance goal for a parameter identified in Table B of the Ocean Plan, FPUD shall not use a ML greater than that specified in Appendix II of the Ocean Plan.

   FPUD shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

   a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

b. Sample results less than the minimum level (ML), but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

   For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+ a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is FPUD to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. **Compliance Determination.** Compliance with effluent limitations for reportable pollutants shall be determined using sample reporting protocols defined above and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, FPUD shall be deemed out of compliance with effluent limitations if the concentration of the reportable pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported ML.

6. **Multiple Sample Data.** When determining compliance with a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses and the data set contains one or more reported determinations of DNQ or ND, FPUD shall compute the median in place of the arithmetic mean in accordance with the following procedure:

   a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

   b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

7. FPUD shall submit SMRs in accordance with the following requirements:

   a. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, FPUD shall electronically submit the data in a tabular format as an attachment.

   b. Clearly identify violations of the waste discharge requirements; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions.

Identified violations must include a description of the requirement that was violated and a description of the violation.

c. When hard copies are required, SMRs must be submitted to the San Diego Water Board, signed and certified as required by the Standard Provisions (Attachment D of this Order), to the address listed below:

9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

C. Discharge Monitoring Reports (DMRs)

1. At any time during the term of this permit, the State or San Diego Water Board may notify FPUD to electronically submit SMRs that will satisfy federal requirements for submittal of Discharge Monitoring Reports (DMRs). Until such notification is given, FPUD shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D of this Order). FPUD shall submit the original DMR and one copy of the DMR to the address listed below:

STANDARD MAIL	FEDEX/UPS/ OTHER PRIVATE CARRIERS
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15th Floor Sacramento, CA 95814

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated will not be accepted unless they follow the exact same format of USEPA Form 3320-1.

D. Other Reports

1. FPUD shall report the results of any chronic toxicity testing, TRE/TIE, FPUD Treatment Plant No. 1 Capacity Study, Sludge Disposal Report, and Pretreatment Report, as required by Special Provisions – VI.C. of this Order. FPUD shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date.

Attachment F – Fact Sheet

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ATTACHMENT F – FACT SHEET

As described in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as "not applicable" are fully applicable to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the Facility.

Table F-1. Facility Information

WDID	9 000000115
Discharger	Fallbrook Public Utility District
Name of Facility	Fallbrook Public Utility District Treatment Plant No. 1
Facility Address	1425 South Alturas Road Fallbrook, CA 92028
Facility Contact, Title and Phone	Jack Bebee, Engineering and Planning Manager, (760) 728-1125
Authorized Person to Sign and Submit Reports	Jack Bebee, Engineering and Planning Manager, (760) 728-1125
Mailing Address	P.O. Box 2290, Fallbrook, CA 92028
Billing Address	Same as Mailing Address
Type of Facility	Municipal Publicly Owned Treatment Works (POTW)
Major or Minor Facility	Major
Threat to Water Quality	1
Complexity	A
Pretreatment Program	No
Reclamation Requirements	Producer and Distributor (regulated under separate waste discharge requirements (WDRs))
Facility Permitted Flow Rate	2.7 million gallons per day (MGD)
Facility Design Flow	2.7 MGD
Watershed	Pacific Ocean
Receiving Water	Pacific Ocean
Receiving Water Type	Ocean

A. The Fallbrook Public Utility District (hereinafter Discharger or FPUD) is the owner and operator of the Fallbrook Public Utility District Treatment Plant No. 1 (hereinafter Facility), a municipal POTW.

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to FPUD herein.

B. The Facility discharges treated secondary effluent through the Oceanside OO, which is owned and operated by the City of Oceanside, to the Pacific Ocean, a water of the United States, and currently regulated under Order No. R9-2006-002, which was adopted on April 12, 2006 and expires on June 1, 2011. The terms and conditions of the current Order have been automatically continued and remain in effect until new Waste Discharge Requirements and an NPDES permit are adopted and effective pursuant to this Order.

C. FPUD filed a Report of Waste Discharge (ROWD) and submitted an application for renewal of its WDRs and National Pollutant Discharge Elimination System (NPDES) permit on September 30, 2010.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

FPUD owns and operates the Facility, FPUD land outfall pipe, and FPUD sanitary sewer system. These facilities are collectively referred to as FPUD's Facilities in this Order. This Order establishes discharge prohibitions, limitations, and conditions to regulate discharges of effluent consisting of treated wastewater from FPUD's Facilities to the Pacific Ocean; these discharges were regulated by Order No. R9-2006-002 (NPDES permit No. CA0108031) that expired on June 1, 2011, but was administratively continued until the effective date of this Order.

FPUD provides wastewater collection, treatment, and disposal services for approximately 25,000 people utilizing residential service connections within the FPUD service area. Additionally, the Facility provides treatment and disposal services for approximately 10,000 gallons of wastewater generated by the Fallbrook US Naval Weapons Station. Currently, FPUD is not required to have an industrial pretreatment program since the Facility does not accept contributions from any industrial dischargers or sources subject to pretreatment standards.

The Facility is located at 1425 South Alturas Road, Fallbrook CA 92028 in San Diego County, adjacent to Fallbrook Creek. Wastewater treatment unit operations and processes at the Facility consist of mechanical bar screening, aerated grit removal, primary sedimentation, aeration and secondary clarification (activated sludge treatment process), chlorination, and filtration. Treated wastewater is discharged to the Pacific Ocean through the Oceanside OO. Secondary treatment design capacity is currently 2.70 MGD average daily flow. The annual average daily flow in 2008 was 1.75 MGD, and in 2009 was 1.71 MGD.

Screenings from the headworks and solids from grit removal at the Facility are collected on-site and trucked to a landfill in San Diego County, California. Sludge from the secondary treatment facilities is thickened aerobically, digested, and dewatered via centrifuge. Dewatered sludge are fed to a thermal dryer system to produce Class A EQ sewage sludge and disposed of via land application. If the dryer system is off-line, sewage sludge is dewatered via drying beds and hauled to a land application site in Yuma, Arizona by a contractor.

B. Discharge Points and Receiving Waters

The Facility discharges secondary effluent to the Oceanside OO via pump stations and a land outfall system. FPUD has a contractual agreement with the City of Oceanside to discharge up to 2.4 MGD of treated effluent through the Oceanside OO on an annual average basis.

The City of Oceanside owns and operates the Oceanside OO which begins at the City of Oceanside La Salina Wastewater Treatment Plant site just north of the mouth of the Loma Alta Creek and extends southwesterly approximately 8,850 feet offshore to a depth of approximately 100 feet. The Oceanside OO contains a 38-inch internal diameter steel pipe with a 1-inch thick cement mortar interior lining and 2.75-inch thick cement mortar outer jacket. The Oceanside OO has a 35.75-inch internal diameter. The Oceanside OO terminates with a 230-foot diffuser collinear with the rest of the outfall and extends to a depth of approximately 108 feet. The diffuser has fourteen 5-inch diameter ports and ten 4-inch diameter ports. The terminus of the diffuser is located at Latitude 33^{o} 09' 46" North, Longitude 117^{o} 23' 29" West.

The City of Oceanside has a contract with FPUD for the discharge of an average annual flowrate of 2.4 MGD of treated wastewater through the Oceanside OO, subject to waste discharge requirements contained in this Order. The City of Oceanside also has a contract with the United States Marine Corp Base Camp Pendleton (USMCBCP) for the discharge of up to 3.6 MGD of undisinfected secondary effluent through the Oceanside OO, subject to waste discharge requirements contained in Order No. R9-2008-0096 (NPDES Permit No. CA0109347). The City of Oceanside also has a contract with the industrial discharger Genentech to discharge brine flow up to 0.85 MGD through the Oceanside OO, subject to waste discharge requirements contained in Order No. R9-2008-0082 (NPDES Permit No. CA0109193). The combined permitted flow rate from all parties discharging through the Oceanside OO was 29.055 MGD.

Section II.B of the Fact Sheet for Order No. R9-2006-002 stated that the design capacity of the Oceanside OO is an average daily flow of 30 MGD, with a maximum rated peak-day capacity of 45 MGD. However, during an inspection of the Oceanside OO in 2009, the City of Oceanside determined that the outfall interior diameter is 35.75-inches, not 36-inches as shown in construction drawings. The City of Oceanside 2009 inspection also determined that a coating of soft muck is currently coating the entire interior circumference of the outfall pipe, reducing outfall capacity. Further, a sediment survey of the diffuser confirmed a sediment buildup, particularly near the end of the diffuser, also contributing to a loss of outfall capacity. The City of Oceanside submitted these findings to the San Diego Water Board in a 2010 Ocean Outfall Capacity Report. The report concludes that the current available capacity of the Oceanside OO is 22.6 MGD, significantly less than the previously reported 30 MGD. However, the City of Oceanside reported that this capacity is sufficient until 2015, when wet weather flows may result in an exceedance of the Oceanside OO capacity.

Below is a table displaying projected peak flows to the Oceanside OO.

Table F-2. Facility Information

Source	Peak Day Flow (MGD)	Projected Peak Flow (MGD) Under Wet Weather Conditions[1]		
		Current	Projected 2015	Projected 2020
City of Oceanside	15.75[2]	18.22[7]	19.93[7]	20.70[7]
Mission Basin Desalination Facility	1.3[3]	1.26	1.26[3]	1.26[3]
Genentech, Inc.	0.11[2]	0.11[4]	0.2[4]	0.2[4]
Camp Pendleton	2.8[5]	2.8[5]	2.8[5]	2.8[5]
FPUD	2.5[6]	2.5[6]	2.5[6]	2.5[6]
Total	21.18	24.89[7]	26.69[7]	27.46[7]

1 From Ocean Outfall Capacity Evaluation Report (Carrollo Engineers, 2010). Assumes a 30 million gallon effluent storage pond at the City of Oceanside San Luis Rey Water Reclamation Facility (SLRWF) is not utilized.
2 Observed maximum day flow during 2009.
3 Based on typical peak day brine flow observed in 2009.
4 Based on flow projections from Genentech, Inc.
5 Historic Camp Pendleton peak wet weather discharge to the Oceanside OO, which occurred during wet weather period in winter of 2005.
6 Historic FPUD peak wet weather discharge to the Oceanside OO, which occurred during wet weather period in winter 2005.
7 Combined projected peak inflow to the La Salina Wastewater Treatment Plant and SLRWRF. Actual wet weather discharge flows from the two plants to the Oceanside OO will be lower than these projected values through the use of effluent storage capacity at the SLRWRF.

Prior to 2016, the City of Oceanside plans to clean muck and debris from the interior of the outfall which will serve to increase the outfall capacity to 23.4 MGD and provide sufficient capacity until approximately 2025.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in Order No. R9-2006-002 for discharges from the Facility and representative monitoring data obtained at Monitoring Location M-001 and M-002 (Discharge Point No. 001) are as follows:

Table F-3. Historic Effluent Limitations and Monitoring Data at M-001

Parameter	Units	Effluent Limitation			Monitoring Data (July 2005 – February 2010)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Carbonaceous Biochemical Oxygen Demand (5-day @ 20°C) ($CBOD_5$)	mg/L	25	40	--	16	32	--
	% Removal	85	--	--	93[2]	--	--
Total Suspended Solids (TSS)	mg/L	30	45	--	7.9	19	--
	% Removal	85	--	--	97[2]	--	--
pH	standard units	--	--	6.0 – 9.0[1]	--	--	6.2[2]/7.6

1 Between 6.0 and 9.0 at all times.
2 Minimum.

Table F-4. Historic Effluent Limitations and Monitoring Data at Discharge Point No. 001 (M-002)

Parameter	Units	Effluent Limitation			Monitoring Data (July 2005 – February 2010)		
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Oil and Grease	mg/L	25	40	75[1]	ND	ND	ND
Settleable Solids	mL/L	1.0	1.5	3.0[1]	1.0	0.26	5.0
Turbidity	NTU	75	100	225[1]	4.7	16	53
Chronic Toxicity	TUc[2]	--	--	88[1]	--	--	25[2]

ND – Not detected
NR – Not Reported
[1] Applied as an instantaneous maximum effluent limitation.
[2] Chronic toxicity expressed as Chronic Toxicity Units (TUc) = 100/NOEL, where NOEL (No Observed Effect Level) is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism.

D. Compliance Summary

1. Compliance Evaluation Inspections (CEI) of Treatment Plant No. 1 were conducted on October 22, 2007, January 15, 2009, and on April 8, 2010. Compliance issues noted by the inspectors were as follows:

   a. On October 22, 2007, FPUD failed to properly report mass emission loadings for CBOD, TSS, and BOD between June 1, 2006 and the date of the inspection. Additionally, the inspector noted that oil and grease grab samples had not been collected according to the procedures under 40 CFR Part 136.

   b. On February 28, 2008, FPUD did not report a value in the self-monitoring report for total suspended solids (TSS); however, the TSS value did not exceed the permit limitation.

   c. On January 15, 2009, FPUD failed to properly report mass emission loadings for CBOD, TSS, and BOD between June 1, 2006 and the date of the inspection.

   d. In the January 15, 2009 and April 8, 2010 CEI Reports, the inspector noted that FPUD's sampling methods for oil and grease were not in accordance with 40 CFR Part 136, as required in Order No. R9-20069-0002, Attachment E, Monitoring and Reporting Program.

2. From June 2006 to June 2010, according to the Discharger's reports, there were nine deficient monitoring violations and three effluent limitations violations. A notice of violation was issued for all of these violations on July 17, 2012.

E. Planned Changes

FPUD plans to upgrade existing process facilities without capacity increase.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the United States Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the California Water Code (CWC) (commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as WDRs pursuant to article 4, chapter 4, division 7 of the CWC (commencing with section 13260).

B. California Environmental Quality Act (CEQA)

Under CWC section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100 through 21177.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Regional Water Quality Control Board (San Diego Water Board) adopted a *Water Quality Control Plan for the San Diego Basin* (hereinafter Basin Plan) on September 8, 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives. The Basin Plan was subsequently approved by the State Water Board on December 13, 1994. Subsequent revisions to the Basin Plan have also been adopted by the San Diego Water Board and approved by the State Water Board. The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan.

Table F-5. Basin Plan Beneficial Uses

Discharge Point No.	Receiving Water Name	Beneficial Use(s)
001	Pacific Ocean	Industrial service supply; navigation; contact water recreation; non-contact water recreation; commercial and sport fishing; preservation of biological habitats of special significance; wildlife habitat; rare, threatened, or endangered species; marine habitat; aquaculture; migration of aquatic organisms; spawning, reproduction, and/or early development; and shellfish harvesting.

Requirements of this Order implement the Basin Plan.

2. **California Ocean Plan.** The State Water Board adopted the *Water Quality Control Plan for Ocean Waters of California, California Ocean Plan* (hereinafter Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, 2005, and 2009. The State Water Board adopted the latest amendment on September 15, 2009 and it became effective on March 10, 2010. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. The Ocean Plan identifies beneficial uses of ocean waters of the State to be protected as summarized below:

Table F-6. Ocean Plan Beneficial Uses

Discharge Point No.	Receiving Water	Beneficial Uses
001	Pacific Ocean	Industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning and shellfish harvesting.

In order to protect beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation. Requirements of this Order implement the Ocean Plan.

3. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes (40 CFR 131.21, 65 Fed. Reg. 24641 (April 27, 2000)). Under the revised regulation (also known as the Alaska Rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

4. **Antidegradation Policy.** 40 CFR 131.12 requires that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The San Diego Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies (San Diego Basin Plan Chapter 3, pages 3-2 & 3-3). The permitted discharge must be consistent with the antidegradation provision of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

5. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require that effluent limitations in a reissued permit must be as stringent as those in the previous permit, with some exceptions in which limitations may be relaxed.

D. Impaired Water Bodies on CWA 303(d) List

On June 28, 2007, USEPA approved the list of impaired water bodies, prepared by the State Water Board pursuant to section 303(d) of the CWA, which are not expected to meet applicable water quality standards after implementation of technology-based effluent limitations for point sources. The 303(d) list for waters in the vicinity of the Oceanside OO include:

1. 0.5 miles of the Pacific Ocean at the mouth of the San Luis Rey River for indicator bacteria;

2. 1.1 miles of the Pacific Ocean shoreline at the mouth of Loma Alta Creek for indicator bacteria;

3. 1.2 miles of the Pacific Ocean shoreline at Buena Vista Creek for indicator bacteria.

Impairment has been detected in the above waters. Some of the receiving water monitoring locations required by this permit may be within the current 303(d) listed waterbodies. The San Diego Water Board will take these considerations into account the fact when determining compliance. An applicable Total Maximum Daily Load has not been adopted for this pollutant/waterbody combination and a waste load allocation has not been assigned for FPUD's discharge under this Order.

E. Other Plans, Policies and Regulations

1. **Secondary Treatment Regulations.** 40 CFR Part 133 establishes the minimum levels of effluent quality to be achieved by secondary treatment. These limitations, established by the USEPA, are incorporated into this Order, except where more stringent limitations are required by other applicable plans, policies, or regulations.

2. **Storm Water.** Sewage treatment works with a design flow of 1.0 MGD or greater are required to comply with Water Quality Order No. 97-03-DWQ (NPDES General Permit No. CAS000001), WDRs for Dischargers of Storm Water Associated with Industrial Activity, Excluding Construction Activities. FPUD is currently regulated under the General Permit, which is not incorporated into this Permit by reference.

F. Provisions and Requirements Implementing State Law

Pursuant to CWC section 13263, the provisions and requirements contained in this Order that implement State law shall take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of CWC section 13241.

The beneficial uses (CWC section 13241 (a)) and water quality objectives (CWC section 13241 (c)) serve as the basis for the development of the water quality based effluent limitations as described in section IV. Of the Fact Sheet. Other waste discharges are described in paragraph II.B of this fact sheet. There is a clear need to prevent potential nuisance conditions resulting from the inadequate treatment of sewage.

In addition to the above, CWC section 13241 requires consideration of:

Section 13241(b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto. As noted in paragraph III.D, some of the receiving water monitoring locations required by this permit may be within the current 303(d) listed waterbodies.

Section 13241(d) Economic considerations. No party has submitted current or future cost information on the facility. Based upon the State Water Board's Wastewater User Charge Survey Report, dated May 2008, the monthly rates for agencies with both collection and treatment systems ranged from $25 to $82.50, with an average rate of $44.22 as compared to FPUD's reported monthly rate of $42.78.

Section 13241(e) The need to develop housing within the region. FPUD has not indicated that development in the area requires expansion of the capacity of the treatment facility.

Section 13241(f) The need to develop and use recycled water. The San Diego Water Board supports FPUD's efforts to develop and to supply recycle water to users. The need to supply recycled water is the reason that the San Diego Water Board is prescribing a time schedule for FPUD to comply Ocean Plan total residual chlorine standards.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the CFR: 40 CFR 122.44(a) requires that permits include applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water.

A. Discharge Prohibitions

This Order retains the discharge prohibitions from Order No. R9-2006-002, as described below. Compliance determination language is included in section VII of this Order to accurately describe how violations of these prohibitions are determined. Discharges from the Facility to surface waters in violation of prohibitions contained in this Order are violations of the CWA and therefore are subject to third party lawsuits. Discharges from the Facility to land in violation of prohibitions contained in this Order are violations of the CWC and are not subject to third party lawsuits under the CWA because the CWC does not contain provisions allowing third party lawsuits.

1. Prohibitions III.A, III.B, and III.C of this Order are based on Order No. R9-2006-002 and are included in order to clearly define what types of discharges are prohibited.

2. This Order prohibits the discharge of wastes in excess of the design criteria for Treatment Plant No. 1. As such, Prohibitions III.C prohibit the discharge of wastes in excess of the design criteria for the Facility.

3. CWC section 13243 provides that the San Diego Water Board, in a water quality control plan, may specify certain conditions where the discharge of wastes, or certain types of wastes, that could affect the quality of waters in the State is prohibited. This Order includes the Basin Plan and Ocean Plan prohibitions as Discharge Prohibitions, section III.D and E.

   Order No. R9-2006-002 prohibited discharges of waste to Areas of Special Biological Significance and the discharge of sludge to the ocean. Because these prohibitions are expressly included in the Ocean Plan prohibitions, which are included in this Order as prohibition section III.D and for convenience listed in Attachment G of this Order, these requirements are not retained in the prohibitions of this Order.

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. Discharges authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133. Discharges must also meet technology-based effluent limitations (TBELs) based on Ocean Plan Table A.

Regulations promulgated in 40 CFR 125.3(a)(1) require TBELs for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in 40 CFR 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of biochemical oxygen demand (BOD_5), TSS, and pH.

2. Applicable Technology-Based Effluent Limitations

a. **Federal Regulations.** 40 CFR Part 133 establishes the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD_5 and TSS. 40 CFR 133.102(a)(4) allows for effluent limitations for carbonaceous biological oxygen demand ($CBOD_5$) to be applied in lieu of effluent limitations for BOD_5 where BOD_5 may not provide a reliable measure of the oxygen demand of the effluent. USEPA has determined that a 30-day average effluent limitation of 25 mg/L and a 7-day average effluent limitation of 40 mg/L are effectively equivalent to the secondary treatment standards for BOD_5.

b. 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal of BOD_5 and TSS shall not be less than 85 percent. This Order contains a limitation requiring an average of 85 percent removal of $CBOD_5$ and TSS over each calendar month.

The secondary treatment regulations at 40 CFR Part 133 also require that pH be maintained between 6.0 and 9.0 standard units.

These TBELs are applicable to each of the POTWs prior to the commingling of their respective effluents with any other wastewater. Thus, compliance with these effluent limitations must be determined at internal outfall locations upstream of the location where these wastewaters commingle with other wastewaters.

TBELs based on secondary treatment standards for $CBOD_5$, TSS, and pH are summarized in the following table.

Table F-7. Summary of Technology-Based Effluent Limitations Based on Secondary Treatment Standards

Parameter	Units	Effluent Limitations				
		Average Monthly	**Average Weekly**	**Maximum Daily**	**Instantaneous Minimum**	**Instantaneous Maximum**
$CBOD_5$	mg/L	25	40	--	--	--
	Lbs/day	560	900			
	% Removal	85	--	--	--	--
TSS	mg/L	30	45	--	--	--
	Lbs/day	680	1,000			
	% Removal	85	--	--	--	--
pH	standard units	--	--	--	6.0	9.0

c. Ocean Plan. The Ocean Plan is applicable, in its entirety, to point source discharges to the ocean. Therefore, the discharge of wastewater to the Pacific Ocean at Discharge Point No. 001 is subject to the Ocean Plan.

The Ocean Plan establishes water quality objectives, general requirements for management of waste discharged to the ocean, effluent quality requirements for waste discharges, discharge prohibitions, and general provisions. Further, Table A of the Ocean Plan establishes TBELs for POTWs and industrial discharges for which effluent limitation guidelines have not been established. Order No. R9-2006-002 established numeric effluent limitations based on Table A of the Ocean

Plan at Monitoring Location M-001 or M-002. Because the Table A effluent limitations are technology-based, the San Diego Water Board finds that the Table A effluent limitations are applicable to Treatment Plant No. 1 and FPUD shall be responsible for achieving compliance with the effluent limitations prior to the contributing wastewaters commingling with effluent from other facilities discharging effluent at the Oceanside OO.

Because secondary treatment standards contain effluent limitations for TSS that are more stringent than Table A of the Ocean Plan, the more stringent effluent limitations for TSS will be applied to discharges from Treatment Plant No. 1. The TBELs from the Ocean Plan are summarized below:

Table F-8. Summary of Technology-Based Effluent Limitations Based on Table A of the Ocean Plan

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Oil and Grease	mg/L	25	40	--	--	75
	Lbs/day	560	900			1700
Settleable Solids	mL/L	1.0	1.5	--	--	3.0
Turbidity	NTU	75	100	--	--	225
pH	standard units	--	--	--	6.0	9.0

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan and Ocean Plan, and achieve applicable water quality objectives and criteria that are contained in the Ocean Plan.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan and Ocean Plan designate beneficial uses, establishes water quality objectives, and contain implementation programs and policies to achieve those objectives for all waters.

a. Basin Plan. The beneficial uses specified in the Basin Plan applicable to the Pacific Ocean are summarized in section III.C.1 of this Fact Sheet. The Basin Plan includes water quality objectives for pH applicable to the receiving water.

The Basin Plan states, "*The terms and conditions of the State Board's "Water Quality Control Plan for Ocean Waters of California" (Ocean Plan), "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California" (Thermal Plan), and any revisions thereto are incorporated into this Basin Plan by reference. The terms and conditions of the Ocean Plan and Thermal Plan apply to the ocean waters within this Region.*"

b. Ocean Plan. The beneficial uses specified in the Ocean Plan for the Pacific Ocean are summarized in section III.C.2 of this Fact Sheet. The Ocean Plan also includes water quality objectives for the ocean receiving water for bacterial characteristics, physical characteristics, chemical characteristics, biological characteristics, and radioactivity.

Table B of the Ocean Plan includes the following water quality objectives for toxic pollutants and whole effluent toxicity:

i. 6-month median, daily maximum, and instantaneous maximum objectives for 21 chemicals and chemical characteristics, including total residual chlorine and chronic toxicity, for the protection of marine aquatic life.

ii. 30-day average objectives for 20 non-carcinogenic chemicals for the protection of human health.

iii. 30-day average objectives for 42 carcinogenic chemicals for the protection of human health.

iv. Daily maximum objectives for acute and chronic toxicity.

3. Determining the need for WQBELs

Order No. R9-2006-002 contained effluent limitations for non-conventional and toxic pollutant parameters in Table B of the California Ocean Plan. For this Order, the need for effluent limitations based on water quality objectives in Table B of the Ocean Plan was re-evaluated in accordance with 40 CFR 122.44(d) and guidance for statistically determining the "reasonable potential" for a discharged pollutant to exceed an objective, as outlined in the revised *Technical Support Document for Water Quality-based Toxics Control* (TSD; EPA/505/2-90-001, 1991) and the Ocean Plan Reasonable Potential Analysis (RPA) Appendix VI that was adopted by the State Water Board on September 15, 2009. The statistical approach combines knowledge of effluent variability (as estimated by a coefficient of variation) with the uncertainty due to a limited amount of effluent data to estimate a maximum effluent value at a high level of confidence. This estimated maximum effluent value is based on a lognormal distribution of daily effluent values. Projected receiving water values (based on the estimated maximum effluent value or the reported maximum effluent value and minimum probable initial dilution) can then be compared to the appropriate objective to determine potential for an exceedance of that objective and the need for an effluent limitation. According to the Ocean Plan amendment, the RPA can yield three endpoints: 1) Endpoint 1, an effluent limitation is required and monitoring is required; 2) Endpoint 2, an effluent limitation is not required and the San Diego Water Board may require monitoring; 3) Endpoint 3, the RPA is inconclusive, monitoring is required, and an existing effluent limitation may be retained or a permit reopener clause may be included to allow inclusion of an effluent limitation if future monitoring warrants the inclusion. Endpoint 3 is typically the result when there are fewer than 16 data points and all are censored data (i.e., below quantitation or method detection levels for an analytical procedure).

The implementation provisions for Table B in section III.C of the Ocean Plan specify that the minimum initial dilution is the lowest average initial dilution within any single month of the year. Dilution estimates are to be based on observed waste flow characteristics, observed receiving water density structure, and the assumption that no currents of sufficient strength to influence the initial dilution process flow across the discharge structure. Before establishing a dilution credit for a discharge, it must first be determined if, and how much, receiving water is available to dilute the discharge. Prior to issuance of Order No. R9-2006-002, the State Water Board had determined the minimum initial dilution factor (Dm), for the Oceanside OO to be 87 to 1. This determination was based on flow from the Facility and additional discharges from the City of Oceanside's La Salina and San Luis Rey wastewater treatment plants, the Mission Basin Desalting Facility, USMC Camp Pendleton, and Genentech, yielding a total flow rate of 29.055 MGD. No additions or modifications to the Facility or the Oceanside OO have been proposed that would alter the previously determined dilution characteristics. Therefore, the previous Dm of 87 to 1 will be retained in the current Order and applied to WQBELs established herein.

Conventional pollutants were not considered as part of the RPA. TBELs for these pollutants are included in this Order as described in section IV.B of this Fact Sheet.

Using the RPcalc 2.0 software tool developed by the State Water Board for conducting reasonable potential analyses, the San Diego Water Board has conducted the RPA for the constituents in Table F-9. For parameters without reasonable potential a narrative limit statement to comply with all Ocean Plan objectives requirements is provided. This Order includes desirable maximum effluent concentrations for constituents that do not have reasonable potential which were derived using the effluent limitation determination procedure described above and are referred to in this Order as “performance goals”, not as enforceable “numeric effluent limitations”. FPUD is required to monitor for these constituents as stated in the MRP (Attachment E of this Order) to gather data for use in reasonable potential analyses for future permit renewals.

Effluent data provided in FPUD's monitoring reports for the Facility from July 2006 through July 2009 were used in the RPA. A minimum probable initial dilution of 87 to 1 was considered in this evaluation.

A summary of the RPA results is provided below:

Table F-9. RPA Results Summary

Parameter	Units	n[1]	MEC[2,4]	Most Stringent Criteria	Background	RPA Endpoint[3]
Arsenic	μg/L	7	<0.0044	8[5]	3[6]	3
Cadmium	μg/L	7	<0.002	1[5]	0	3
Chromium (VI)	μg/L	7	2.3	2[5]	0	3
Copper	μg/L	7	26	3[5]	2[6]	2
Lead	μg/L	7	<0.003	2[5]	0	3
Mercury	μg/L	7	0.12	0.04[5]	0.0005[6]	3
Nickel	μg/L	7	3.3	5[5]	0	2
Selenium	μg/L	7	<0.008	15[5]	0	3
Silver	μg/L	7	<0.006	0.7[5]	0.16[6]	3
Zinc	μg/L	7	51	20[5]	8[6]	2
Cyanide	μg/L	7	20	1[5]	0	3
Total Residual Chlorine	μg/L	1617	6600	2[5]	0	1
Ammonia	μg/L	68	26,000	600[5]	0	2
Acute Toxicity	TUa	12	0.41	0.3[7]	0	2
Chronic Toxicity[8]	TUc	20	25	1[7]	0	2
Phenolic Compounds[9]	μg/L	7	0.730	30[5]	0	2
Chlorinated Phenolics[10]	μg/L	7	<0.096	1[5]	0	3
Endosulfan[11]	μg/L	7	0.049	0.009[5]	0	3
Endrin	μg/L	7	<0.0019	0.002[5]	0	3
HCH[12]	μg/L	7	0.014	0.004[5]	0	3
Radioactivity	pCi/L			[13]	0	
Acrolein	μg/L	4	<1.3	220[14]	0	3
Antimony	μg/L	4	<0.006	1,200[14]	0	3
Bis(2-chloroethoxyl)methane	μg/L	4	<0.096	4.4[14]	0	3
Bis(2-chloroisopropyl)ether	μg/L	4	<0.096	1,200[14]	0	3
Chlorobenzene	μg/L	4	<0.36	570[14]	0	3
Chromium (III)[15]	μg/L	4	2.3	190,000[14]	0	3
Di-n-butyl phthalate	μg/L	4	0.21	3,500[14]	0	3
Dichlorobenzenes[16]	μg/L	4	<0.096	5,100[14]	0	3
Diethyl phthalate	μg/L	4	0.89	33,000[14]	0	2
Dimethyl phthalate	μg/L	4	0.87	820,000[14]	0	2
4,6-Dinitro-2-methylphenol	μg/L	4	<0.19	220[14]	0	3
2,4-Dinitrophenol	μg/L	NA	NA	4.0[14]	0	--
Ethylbenzene	μg/L	4	<0.25	4,100[14]	0	3
Fluoranthene	μg/L	4	<0.096	15[14]	0	3
Hexachlorocyclopentadiene	μg/L	4	<0.096	58[14]	0	3
Nitrobenzene	μg/L	4	<0.096	4.9[14]	0	3
Thallium	μg/L	4	<0.007	2[14]	0	3
Toluene	μg/L	4	0.69	85,000[14]	0	3
Tributyltin	μg/L	4	0.028	0.0014[14]	0	3
1,1,1-Trichloroethane	μg/L	4	<0.3	540,000[14]	0	3
Acrylonitrile	μg/L	4	<0.7	0.10[14]	0	3
Aldrin	μg/L	4	<0.0014	0.000022[14]	0	3

Parameter	Units	n[1]	MEC[2,4]	Most Stringent Criteria	Background	RPA Endpoint[3]
Benzene	μg/L	4	<0.28	5.9[14]	0	3
Benzidine	μg/L	4	<0.96	0.000069[14]	0	3
Beryllium	μg/L	4	<0.0009	0.033[14]	0	3
Bis(2-chloroethyl) ether	μg/L	4	<0.096	0.045[14]	0	3
Bis(2-ethylhexyl) phthalate	μg/L	4	9.7	3.5[14]	0	2
Carbon tetrachloride	μg/L	4	<0.28	0.90[14]	0	3
Chlordane	μg/L	4	<0.019	0.000023[14]	0	3
Chlorodibromomethane	μg/L	4	1.1	8.6[14]	0	2
Chloroform	μg/L	4	9.2	130[14]	0	2
DDT[17]	μg/L	2	<0.002	0.00017[14]	0	3
1,4-Dichlorobenzene	μg/L	4	0.46	18[14]	0	3
3,3-Dichlorobenzidine	μg/L	4	<0.38	0.0081[14]	0	3
1,2-Dichloroethane	μg/L	4	<0.28	28[14]	0	3
1,1-Dichloroethylene	μg/L	4	<0.32	0.9[14]	0	3
Dichlorobromomethane	μg/L	4	2.8	6.2[14]	0	2
Dichloromethane	μg/L	4	<0.7	450[14]	0	3
1,3-Dichloropropene	μg/L	4	<0.32	8.9[14]	0	3
Dieldrin	μg/L	4	<0.0019	0.00004[14]	0	3
2,4-Dinitrotoluene	μg/L	4	1.3	2.6[14]	0	3
1,2-Diphenylhydrazine	μg/L	4	<0.096	0.16[14]	0	3
Halomethanes[18]	μg/L	4	5.3	130[14]	0	3
Heptachlor	μg/L	4	<0.0028	0.00005[14]	0	3
Heptachlor Epoxide	μg/L	4	<0.0024	0.00002[14]	0	3
Hexachlorobenzene	μg/L	4	<0.096	0.00021[14]	0	3
Hexachlorobutadiene	μg/L	4	<0.1	14[14]	0	3
Hexachloroethane	μg/L	4	<0.19	2.5[14]	0	3
Isophorone	μg/L	4	<0.096	730[14]	0	3
N-nitrosodimethylamine	μg/L	4	0.095	7.3[14]	0	3
N-nitrosodi-N-propylamine	μg/L	4	<0.096	0.38[14]	0	3
N-nitrosodiphenylamine	μg/L	4	<0.096	2.5[14]	0	3
PAHs[19]	μg/L	4	<0.096	0.0088[14]	0	3
PCBs[20]	μg/L	4	<0.1	0.000019[14]	0	3
TCDD equivalents[21]	pg/L	4	0.0009	0.0000039[14]	0	1
1,1,2,2-Tetrachoroethane	μg/L	4	<0.24	2.3[14]	0	3
Tetrachloroethylene	μg/L	4	<0.26	2.0[14]	0	3
Toxaphene	μg/L	3	<0.069	0.00021[14]	0	3
Trichloroethylene	μg/L	4	<0.26	27[14]	0	3
1,1,2-Trichloroethane	μg/L	4	<0.3	9.4[14]	0	3
2,4,6-Trichlorophenol	μg/L	4	0.23	0.29[14]	0	3
Vinyl Chloride	μg/L	4	<0.26	36[14]	0	3

Parameter	Units	n[1]	MEC[2,4]	Most Stringent Criteria	Background	RPA Endpoint[3]

NA = Not Available
1 Number of data points available for the RPA.
2 If there is a detected value, the highest reported value is summarized in the table. If there are no detected values, the lowest MDL is summarized in the table.
3 End Point 1 – RP determined, limit required, monitoring required.
End Point 2 – Discharger determined not to have RP, monitoring may be established.
End Point 3 – RPA was inconclusive, carry over previous limits if applicable, and establish monitoring.
4 Note that the reported MEC does not account for dilution. The RPA does account for dilution; therefore it is possible for a parameter with an MEC in exceedance of the most stringent criteria not to present a RP (i.e. Endpoint 1).
5 Based on the 6-Month Median in the Table B of the Ocean Plan.
6 Background concentrations contained in Table C of the Ocean Plan.
7 Based on the Daily Maximum in Table B of the Ocean Plan.
8 Chronic toxicity expressed as Chronic Toxicity Units (TUc) = 100/NOEL, where NOEL (No Observed Effect Level) is express as the maximum percent effluent of receiving water that causes no observable effect on a test organism.
9 Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-Dinitro-2-methylphenol, 2,3-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-nitropheneol, 4-nitrophenol, and phenol.
10 Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.
11 Endosulfan represents the sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate.
12 HCH (hexachlorocyclohexane) represents the sum of the alpha, beta, gamma (Lindane), and delta isomers of hexachlorocyclohexane.
13 Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations. Radioactivity at levels that exceed the applicable criteria are not expected in the discharge.
14 Based on 30-Day Average in Table B of the Ocean Plan.
15 Chromium data was reported as Total Chromium and is summarized under Chromium (VI).
16 Dichlorobenzenes represent the sum of 1,2- and 1,3-dichlorobenzene.
17 DDT represents the sum of 4,4'DDT; 2,4'DDT; 4,4'DDE; 2,4'DDE; 4,4'DDD; and 2,4'DDD.
18 Halomethanes represent the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).
19 PAHs (polynuclear aromatic hydrocarbons) represent the sum of acenaphthalene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo[k]fluoranthene; 1,12-benzoperylene; benzo[a]pyrene; chrysene; dibenzo[a,h]anthracene; fluorene; indeno[1,2,3-cd]pyrene; phenanthrene; and pyrene.
20 PCBs (polychlorinated biphenyls) represent the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Arolclor-1254, and Arcolor-1260.
21 TCDD equivalents represent the sum of concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors, as shown by the table below. USEPA Method 8280 may be used to analyze TCDD equivalents.

Isomer Group	Toxicity Equivalence Factor
2,3,7,8 – tetra CDD	1.0
2,3,7,8 – penta CDD	0.5
2,3,7,8 – hexa CDD	0.1
2,3,7,8 – hepta CDD	0.01
octa CDD	0.001
2,3,7,8 – tetra CDF	0.1
1,2,3,7,8 – penta CDF	0.05
2,3,4,7,8 – penta CDF	0.5
2,3,7,8 – hexa CDFs	0.1
2,3,7,8 – hepta CDFs	0.01
Octa CDF	0.001

Consistent with 40 CFR 122.44(l)(2)(i)(B), effluent limitations from Order No. R9-2006-002 are not retained for constituents for which the RPA results indicated Endpoint 2. Instead performance goals have been assigned for these constituents. Parameters for which Endpoint 2 was concluded are determined not to have reasonable potential, thus it is inappropriate to establish or retain effluent limitations for these parameters.

For parameters for which Endpoint 3 was concluded, the reasonable potential analysis was inconclusive. For parameters for which Endpoint 3 was concluded and previous effluent limitations had not been established, reasonable potential was not determined. For parameters for which new data is available, and the reasonable potential analysis results are inconclusive, effluent limitations have been retained. During the current permit reissuance, none of the parameters for which effluent limitations had been established in the previous Order were determined to be Endpoint 3.

Reasonable potential to cause or contribute to an exceedance of water quality objectives contained within the Ocean Plan (i.e. Endpoint 1) was determined for TCDD equivalents and total residual chlorine, thus effluent limitations for TCDD equivalents and total residual chlorine have been established in this Order based on the initial dilution of 87 to 1, as discussed below.

The monitoring and reporting program (MRP) in Attachment E of this Order is designed to obtain additional information for these constituents to determine if reasonable potential exists for these constituents in future permit renewals and/or updates.

4. WQBEL Calculations

a. From the Table B water quality objectives of the Ocean Plan, effluent limitations and performance goals are calculated according to the following equation for all pollutants, except for acute toxicity (if applicable) and radioactivity:

$$Ce = Co + Dm\ (Co - Cs) \text{ where,}$$

- Ce = the effluent limitation (µg/L)
- Co = the water quality objective to be met at the completion of initial dilution (µg/L)
- Cs = background seawater concentration
- Dm = minimum probable initial dilution expressed as parts seawater per part wastewater

b. Initial dilution (Dm) has been determined to be 87 to 1 by the San Diego Water Board through the application of USEPA's dilution model, Visual Plumes.

c. Table C of the Ocean Plan establishes background concentrations for some pollutants to be used when determining reasonable potential (represented as "Cs"). In accordance with Table B implementing procedures, Cs equals zero for all pollutants not established in Table C. The background concentrations provided in Table C are summarized below:

Table F-10. Pollutants Having Background Concentrations

Pollutant	Background Seawater Concentration
Arsenic	3 μg/L
Copper	2 μg/L
Mercury	0.0005 μg/L
Silver	0.16 μg/L
Zinc	8 μg/L

d. As an example of how effluent limitations and performance goals have been calculated, the performance goals for cyanide are determined as follows:

Water quality objectives from the Ocean Plan for cyanide are:

Table F-11. Example Parameter Water Quality Objectives

Parameter	Units	6-Month Median	Daily Maximum	Instantaneous Maximum
Cyanide	μg/L	1	4	10

Using the equation, Ce = Co + Dm (Co – Cs), effluent limitations/performance goals are calculated as follows.

Cyanide

Ce = 1 + 87 (1 – 0) = 88 (6-Month Median)
Ce = 4 + 87 (4 – 0) = 352 (Daily Maximum)
Ce = 10 + 87 (10 – 0) = 880 (Instantaneous Maximum)

Based on the implementing procedures described above, effluent limitations and performance goals have been calculated for all Table B pollutants from the Ocean Plan and incorporated into this Order.

e. 40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCLs) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations were calculated using the following equation:

lbs/day = permitted flow (MGD) x pollutant concentration (mg/L) x 8.34

f. A summary of the WQBELs established in this Order are provided below:

Table F-12. Summary of Water Quality-based Effluent Limitations – Discharge Point No. 001

Parameter	Unit	Effluent Limitations[1]			
		6-Month Median	Maximum Daily	Instantaneous Maximum	Average Monthly
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE					
Total Residual Chlorine[2]	µg/L	180	700	5,300	--
	lbs/day	4.0	16	120	--
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS					
TCDD[3]	µg/L	--	--	--	3.4E-07
	lbs/day	--	--	--	7.7E-09

1 Scientific "E" notation is used to express effluent limitations. In scientific "E" notation, the number following the "E" indicates that position of the decimal point in the value. Negative numbers after the "E" indicate that the value is less than 1, and positive numbers after the "E" indicate that the value is greater than 1. In this notation a value of 6.1E-02 represents 6.1×10^{-2} or 0.061, 6.1E+02 represents 6.1×10^{2} or 610, and 6.1E+00 represents 6.1×10^{0} or 6.1.

2 The water quality objectives for total chlorine residual applicable to intermittent discharges not exceeding two hours shall be determined through use of the following equation:

$$\log y = 0.43(\log x) + 1.8$$

where,

y = the water quality objective (in µg/L) to apply when chlorine is being discharged;
x = the duration of uninterrupted chlorine discharge in minutes.

Actual effluent limitations for total chlorine, when discharging intermittently, shall then be determined according to Implementation Procedures for Table B from the Ocean Plan and using a minimum probably dilution factor of 87 and a flow rate of 2.7 MGD.

3 TCDD equivalents represent the sum of concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors.

g. A summary of the performance goals is provided in Table F-14 of this Fact Sheet.

5. Whole Effluent Toxicity (WET)

a. Implementing provisions at section III.C.4.c.(4) of the Ocean Plan require chronic toxicity monitoring for ocean waste discharges with minimum initial dilution factors that fall below 100:1 at the edge of the mixing zone. Using quarterly chronic WET testing conducted between January 2005 and November 2006 to conduct the RPA, resulted in Endpoint 2, and an effluent limitation for chronic toxicity is not required. However, consistent with Order No. R9-2006-002, this Order contains a performance goal and quarterly monitoring for chronic toxicity. Based on the methods established by the Ocean Plan, a maximum daily performance goal of 88 TUc is established in this Order.

b. Implementing provisions at section III.C.4.c.(3) of the Ocean Plan states that the San Diego Water Board may require acute toxicity testing in addition to chronic toxicity monitoring for ocean waste discharges with minimum initial dilution factors ranging from 100:1 to 350:1 as necessary for the protection of beneficial uses of ocean waters. The Oceanside OO has been granted a dilution ratio of 87:1 and the results of the RPA do not indicate reasonable potential for acute toxicity, thus monitoring for acute toxicity is not necessary and has been discontinued.

D. Final Effluent Limitations

1. Final Effluent Limitations

The following tables list the effluent limitations established by this Order. Where this Order establishes mass emission limitations, these limitations have been derived based on a flow of 2.7 MGD.

Table F-13.a. Technology Based Effluent Limitations at M-001

Parameter	Units	Effluent Limitations					
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum	6-Month Median
Carbonaceous Biochemical Oxygen Demand (5-day @ 20°C)[1]	mg/L	25	40	--	--	--	--
	lbs/day	560	900	--	--	--	--
Total Suspended Solids[1]	mg/L	30	45	--	--	--	--
	lbs/day	680	1,000	--	--	--	--
Oil and Grease	mg/L	25	40	--	--	75	--
	lbs/day	560	900	--	--	1,700	--
Settleable Solids	ml/L	1.0	1.5	--	--	3.0	--
Turbidity	NTU	75	100	--	--	225	--
pH	standard units	--	--	--	6.0	9.0	--

[1] The average monthly percent removal of $CBOD_5$ and TSS shall not be less than 85 percent.

Table F-13.b. Effluent Limitations Based on Table B of the Ocean Plan at M-001 or M-002 (Discharge Point No. 001)

Parameter	Unit	Effluent Limitations[1]			
		6-Month Median	Maximum Daily	Instantaneous Maximum	Average Monthly
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE					
Total Residual Chlorine[2]	µg/L	180	700	5,300	--
	lbs/day	4.0	16	120	--
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS					
TCDD[3]	µg/L	--	--	--	3.4E-07
	lbs/day	--	--	--	7.7E-09

1 Scientific "E" notation is used to express effluent limitations. In scientific "E" notation, the number following the "E" indicates that position of the decimal point in the value. Negative numbers after the "E" indicate that the value is less than 1, and positive numbers after the "E" indicate that the value is greater than 1. In this notation a value of 6.1E-02 represents 6.1×10^{-2} or 0.061, 6.1E+02 represents 6.1×10^{2} or 610, and 6.1E+00 represents 6.1×10^{0} or 6.1.

2 The water quality objectives for total chlorine residual applicable to intermittent discharges not exceeding two hours shall be determined through use of the following equation:

$$\log y = 0.43(\log x) + 1.8$$

where,

y = the water quality objective (in µg/L) to apply when chlorine is being discharged;

x = the duration of uninterrupted chlorine discharge in minutes.

Actual effluent limitations for total chlorine, when discharging intermittently, shall then be determined according to Implementation Procedures for Table B from the Ocean Plan and using a minimum probably dilution factor of 87 and a flow rate of 2.7 MGD.

3 TCDD equivalents represent the sum of concentrations of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) multiplied by their respective toxicity factors.

2. Satisfaction of Anti-Backsliding Requirements

The technology based effluent limitations in this Order are at least as stringent as the effluent limitations in the previous Order.

Effluent limitations from Order No. R9-2006-002 are not retained for constituents for which RPA results indicated Endpoint 2, or Endpoint 3 when previous effluent limitations had not been established; instead performance goals have been assigned for these constituents. Parameters for which Endpoint 2 was concluded are determined not to have reasonable potential, thus it is inappropriate to establish effluent limitations for these parameters. For parameters for which Endpoint 3 was concluded and previous effluent limitations had not been established, reasonable potential was not determined. For parameters for which new data is available, and a reasonable potential analysis determined that reasonable potential does not exist, effluent limitations have been removed as allowed under 40 CFR 122(l)(2)(i)(B), and performance goals have been established in their place. The MRP for this Order is designed to obtain additional information for these constituents to determine if reasonable potential exists for these constituents in future permit renewals and/or updates.

This permit complies with all applicable federal and State anti-backsliding regulations.

3. Satisfaction of Antidegradation Policy

WDRs for FPUD must conform with federal and State antidegradation policies provided at 40 CFR 131.12 and in State Water Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California*. The antidegradation policies require that beneficial uses and the water quality necessary to maintain those beneficial uses in the receiving waters of the discharge shall be maintained and protected, and, if existing water quality is better than the quality required to maintain beneficial uses, the existing water quality shall be maintained and protected unless allowing a lowering of water quality is necessary to accommodate important economic and social development or consistent with maximum benefit to the people of California. When a significant lowering of water quality is allowed by the San Diego Water Board, an antidegradation analysis is required in accordance with the State Water Board's Administrative Procedures Update (July 2, 1990), *Antidegradation Policy Implementation for NPDES Permitting*.

a. Technology-based Effluent Limitations

The TBELs are at least as stringent as the previous effluent limitations, and no degradation of the receiving water is expected.

b. Water Quality-based Effluent Limitations

The WQBELs contained in this Order have been modified from previous NPDES permits for FPUD, including Order No. R9-2006-002, to remove effluent limitations for some parameters after an RPA was conducted. In accordance with the State Water Board's Administrative Procedures Update (APU) No. 90-004, the San Diego Water Board assessed the potential impact of the modified effluent limitations on existing water quality and the need for an antidegradation analysis.

Effluent limitations were not included in this Order for constituents which reasonable potential to exceed the water quality objectives was not indicated following an RPA although the previous permit included effluent limitations for those constituents. The procedures for conducting the RPA are explained in section IV.C.3 of this Fact Sheet. For constituents for which effluent limitations were not included, performance goals were included which will indicate the level of discharge at which possible water quality impacts may be significant. The removal of effluent limitations by itself is not expected to cause a change in the physical nature of the effluent discharged and is not expected to impact beneficial uses nor cause a reduction of the water quality of the receiving water. Coupled with the inclusion of performance goals and retention of the monitoring program for constituents without effluent limitations, the existing water quality is expected to be maintained. For these reasons, the San Diego Water Board has determined that an antidegradation analysis is not required to consider the possible impacts resulting from the removal of effluent limitations following a RPA.

4. Stringency of Requirements for Individual Pollutants

This Order contains both TBELs and WQBELs for individual pollutants. The TBELs consist of restrictions on $CBOD_5$, TSS, oil and grease, settleable solids, turbidity, and pH. Restrictions on these constituents are discussed in section IV.B of this Fact Sheet. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. These limitations are not more stringent than required by the CWA.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. The scientific procedures for calculating the individual WQBELs are based on the Ocean Plan, which was approved by USEPA on February 14, 2006. All beneficial uses and water quality objectives contained in the Basin Plan were approved under State law and submitted to and approved by USEPA prior to May 30, 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to May 30, 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

E. Performance Goals

Constituents that do not have reasonable potential are listed as performance goals in this Order. Performance goals serve to maintain existing treatment levels and effluent quality and supports State and federal antidegradation policies. Additionally, performance goals provide all interested parties with information regarding the expected levels of pollutants in the discharge that should not be exceeded in order to maintain the water quality objectives established in the Ocean Plan. Performance goals are not effluent limitations or standards as defined by the Clean Water Act for the regulation of the discharge. Effluent concentrations above the performance goals will not be considered as violations of the permit but serve as red flags that indicate the potential for water quality concerns. Repeated red flags may prompt the San Diego Water Board to reopen and amend the permit to replace performance goals for constituents of concern with effluent limitations or the San Diego Water Board may coordinate such actions with the next permit renewal.

The following table lists the performance goals established by this Order. A minimum probable initial dilution factor of 87:1 was used in establishing the performance goals.

Table F-14. Performance Goals Based on the Ocean Plan

Parameter	Unit	Performance Goals[1]			
		6-Month Median	Maximum Daily	Instantaneous Maximum	30-Day Average
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE					
Arsenic, Total Recoverable	µg/L	4.4E+02	2.6E+03	6.8E+03	--
Cadmium, Total Recoverable	µg/L	8.8E+01	3.5E+02	8.8E+02	--
Chromium VI, Total Recoverable[2]	µg/L	1.8E+02	7.0E+02	1.8E+03	--
Copper, Total Recoverable	µg/L	9.0E+01	8.8E+02	2.5E+03	--
Lead, Total Recoverable	µg/L	1.8E+02	7.0E+02	1.8E+03	--
Mercury, Total Recoverable	µg/L	3.09E+00	1.4E+01	3.5E+01	--
Nickel, Total Recoverable	µg/L	4.4E+02	1.8E+03	4.4E+03	--
Selenium, Total Recoverable	µg/L	1.3E+03	5.3E+03	1.3E+04	--
Silver, Total Recoverable	µg/L	4.8E+01	2.3E+02	6.0E+02	--
Zinc, Total Recoverable	µg/L	1.1E+03	6.3E+03	1.7E+04	--
Cyanide, Total Recoverable	µg/L	8.8E+01	3.5E+02	8.8E+02	
Ammonia (expressed as nitrogen)	µg/L	5.3E+04	2.1E+05	5.3E+05	--
Acute Toxicity	TUa	--	2.9E+00	--	
Chronic Toxicity[3]	TUc	--	8.8E+01	--	--
Phenolic Compounds (non-chlorinated)[4]	µg/L	2.6E+03	1.1E+04	2.6E+04	--
Chlorinated Phenolics[5]	µg/L	8.8E+01	3.5E+02	8.8E+02	--
Endosulfan[6]	µg/L	7.9E-01	1.6E+00	2.4E+00	--
Endrin	µg/L	1.8E-01	3.5E-01	5.3E-01	--
HCH[7]	µg/L	3.5E-01	7.0E-01	1.1E+00	--
Radioactivity	pCi/L	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations, Reference to Section 30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.			

OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – NONCARCINOGENS					
Acrolein	µg/L	--	--	--	1.9E+04
Antimony	µg/L	--	--	--	1.1E+05
Bis(2-chloroethoxy) Methane	µg/L	--	--	--	3.9E+02
Bis(2-chloroisopropyl) Ether	µg/L	--	--	--	1.1E+05
Chlorobenzene	µg/L	--	--	--	5.0E+04
Chromium (III), Total Recoverable	µg/L	--	--	--	1.7E+07
Di-n-butyl Phthalate	µg/L	--	--	--	3.1E+05
Dichlorobenzenes[8]	µg/L	--	--	--	4.5E+05
Diethyl Phthalate	µg/L	--	--	--	2.9E+06
Dimethyl Phthalate	µg/L	--	--	--	7.2E+07
4,6-dinitro-2-methylphenol	µg/L	--	--	--	1.9E+04
2,4-dinitrophenol	µg/L	--	--	--	3.5E+02
Ethylbenzene	µg/L	--	--	--	3.6E+05
Fluoranthene	µg/L	--	--	--	1.3E+03
Hexachlorocyclopentadiene	µg/L	--	--	--	5.1E+03
Nitrobenzene	µg/L	--	--	--	4.3E+02
Thallium, Total Recoverable	µg/L	--	--	--	1.8E+02
Toluene	µg/L	--	--	--	7.5E+06
Tributyltin	µg/L	--	--	--	1.2E-01
1,1,1-trichloroethane	µg/L	--	--	--	4.8E+07
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS					
Acrylonitrile	µg/L	--	--	--	8.8E+00
Aldrin	µg/L	--	--	--	1.9E-03
Benzene	µg/L	--	--	--	5.2E+02
Benzidine	µg/L	--	--	--	6.1E-03
Beryllium	µg/L	--	--	--	2.9E+00
Bis(2-chloroethyl) Ether	µg/L	--	--	--	4.0E+00
Bis(2-ethlyhexyl) Phthalate	µg/L	--	--	--	3.1E+02
Carbon Tetrachloride	µg/L	--	--	--	7.9E+01
Chlorodane	µg/L	--	--	--	2.0E-03
Chlorodibromomethane	µg/L	--	--	--	7.6E+02
Chloroform	µg/L	--	--	--	1.1E+04
DDT[9]	µg/L	--	--	--	1.5E-02
1,4-dichlorobenzene	µg/L	--	--	--	1.6E+03
3,3'-dichlorobenzidine	µg/L	--	--	--	7.1E-01
1,2-dichloroethane	µg/L	--	--	--	2.5E+03
1,1-dichloroethylene	µg/L	--	--	--	7.9E+01
Dichlorobromomethane	µg/L	--	--	--	5.5E+02
Dichloromethane	µg/L	--	--	--	4.0E+04
1,3-dichloropropene	µg/L	--	--	--	7.8E+02
Dieldrin	µg/L	--	--	--	3.5E-03
2,4-dinitrotoluene	µg/L	--	--	--	2.3E+02

1,2-diphenylhydrazine	µg/L	--	--	--	1.4E+01
Halomethanes[10]	µg/L	--	--	--	1.1E+04
Heptachlor	µg/L	--	--	--	4.4E-03
Heptachlor Epoxide	µg/L	--	--	--	1.8E-03
Hexachlorobenzene	µg/L	--	--	--	1.8E-02
Hexachlorobutadiene	µg/L	--	--	--	1.2E+03
Hexachloroethane	µg/L	--	--	--	2.2E+02
Isophorone	µg/L	--	--	--	6.4E+04
N-nitrosodimethylamine	µg/L	--	--	--	6.4E+02
N-nitrosodi-N-propylamine	µg/L	--	--	--	3.3E+01
N-nitrosodiphenylamine	µg/L	--	--	--	2.2E+02
PAHs[11]	µg/L	--	--	--	7.7E-01
PCBs[12]	µg/L	--	--	--	1.7E-03
1,1,2,2-tetrachloroethane	µg/L	--	--	--	2.0E+02
Tetrachloroethylene	µg/L	--	--	--	1.8E+02
Toxaphene	µg/L	--	--	--	1.8E-02
Trichloroethylene	µg/L	--	--	--	2.4E+03
1,1,2-trichloroethane	µg/L	--	--	--	8.3E+02
2,4,6-trichlorophenol	µg/L	--	--	--	2.6E+01
Vinyl Chloride	µg/L	--	--	--	3.2E+03

1 Scientific “E” notation is used to express certain values. In scientific “E” notation, the number following the “E” indicates that position of the decimal point in the value. Negative numbers after the “E” indicate that the value is less than 1, and positive numbers after the “E” indicate that the value is greater than 1. In this notation a value of 6.1E-02 represents 6.1 x 10^{-2} or 0.061, 6.1E+02 represents 6.1 x 10^{2} or 610, and 6.1E+00 represents 6.1 x 10^{0} or 6.1.

2 Dischargers may, at their option, apply this performance goal as a total chromium performance goal.

3 Chronic toxicity expressed as Chronic Toxicity Units (TUc) = 100/NOEL, where NOEL (No Observed Effect Level) is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism.

4 Non-chlorinated phenolic compounds represent the sum of 2,4-dimethylphenol, 4,6-Dinitro-2-methylphenol, 2,4-dinitrophenol, 2-methylphenol, 4-methylphenol, 2-Nitrophenol, 4-nitrophenol, and phenol.

5 Chlorinated phenolic compounds represent the sum of 4-chloro-3-methylphenol, 2-chlorophenol, pentachlorophenol, 2,4,5-trichlorophenol, and 2,4,6-trichlorophenol.

6 Endosulfan represents the sum of alpha-endosulfan, beta-endosulfan, and endosulfan sulfate.

7 HCH (hexachlorocyclohexane) represents the sum of the alpha, beta, gamma (Lindane), and delta isomers of hexachlorocyclohexane.

8 Dichlorobenzenes represent the sum of 1,2- and 1,3-dichlorobenzene.

9 DDT represents the sum of 4,4’DDT; 2,4’DDT; 4,4’DDE; 2,4’DDE; 4,4’DDD; and 2,4’DDD.

10 Halomethanes represent the sum of bromoform, bromomethane (methyl bromide), and chloromethane (methyl chloride).

11 PAHs (polynuclear aromatic hydrocarbons) represent the sum of acenaphthalene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo[k]fluoranthene; 1,12-benzoperylene; benzo[a]pyrene; chrysene; dibenzo[a,h]anthracene; fluorene; indeno[1,2,3-cd]pyrene; phenanthrene; and pyrene.

12 PCBs (polychlorinated biphenyls) represent the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Arolclor-1254, and Arcolor-1260.

F. Interim Effluent Limitations

Order No. R9-2012-0005 supplements the requirements of Order No. R9-2012-0004 and establishes a Time Schedule for FPUD to comply with the final total residual chlorine effluent limitations prescribed in Order No. R9-2012-0004 (NPDES Permit NO. CA0108031). Order No. R9-2012-0005 includes the following interim effluent limitation[1] for total residual chlorine at Monitoring Location M-001 or M-002, as described in Order No. R9-2012-0004, to be effective until **March 31, 2016** or when the Discharger achieves compliance, whichever is earlier:

Table 2: Interim Total Residual Chlorine Effluent Limitations

Parameter	Unit	Effluent Limitations			
		6-Month Median	Maximum Daily	Instantaneous Maximum	Average Monthly
Total Residual Chlorine	mg/L	5.4	11.12	11.12	
	lbs/day	122	252	252	

G. Land Discharge Specifications – Not Applicable

H. Reclamation Specifications

FPUD must continue to comply with the separate reclamation requirements established in San Diego Water Board Order No. 91-39 and any applicable future revised or renewal waste discharge requirements, which are not incorporated by reference into this Permit.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Receiving water limitations of this Order are derived from the water quality objectives for ocean waters established by the Basin Plan and the Ocean Plan.

The water contact bacterial standards in the previous Order No. R9-2006-002, which were based on the language in the 2001 Ocean Plan, have changed. The language in the 2009 Ocean Plan now specifies that the Water-Contact Standards apply to ocean waters within California's jurisdiction designated by the San Diego Water Board as having REC-1 beneficial uses. Because the San Diego Water Board has not completed a process to designate specific areas where the water-contact standards apply, Ocean Plan Bacterial Standards apply throughout all ocean waters in the San Diego Region. Thus, the applicable standards are included in this Order. See section VII.B.7 of this Fact Sheet for additional information on compliance with the 2009 Ocean Plan bacterial standards.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. CWC sections 13267 and 13383 authorize the San Diego

[1] The interim effluent limitations are based on effluent performance data from July 1, 2012 through July 31, 2011 for the Discharger where 99.9% of the data points lie within 3.3 standard deviations of the mean.

Water Board to require technical and monitoring reports. The MRP (Attachment E of this Order), establishes monitoring and reporting requirements to implement federal and State requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this Facility.

A. Influent Monitoring

Influent monitoring is required to determine the effectiveness of the source control program, to assess the performance of treatment facilities, and to evaluate compliance with effluent limitations. Influent monitoring frequencies and sample types for flow, $CBOD_5$, and TSS have been retained from Order No. R9-2006-002. Refer to section III.A of Attachment E of this Order for a summary of influent monitoring requirements.

B. Effluent Monitoring

Effluent monitoring is required to determine compliance with the permit conditions and to identify operational problems and improve plant performance. Effluent monitoring also provides information on wastewater characteristics and flows for use in interpreting water quality and biological data. Effluent monitoring requirements for most of the parameters have been retained from Order No. R9-2006-002. Effluent monitoring for TCDD equivalents have been increased from annually to semiannually based on the results of the RPA and to determine compliance with the newly established effluent limitations. Order No. R9-2006-002 gave FPUD the option of sampling for parameters contained in Table B of the Ocean Plan at either Monitoring Location M-001 (located at the end of the Facility treatment train) or at Monitoring Location M-002 (located near the terminus of the Fallbrook Land Outfall prior to joining the Oceanside OO). This option permits FPUD reasonable flexibility in their sampling regimen (i.e., sampling for whole effluent toxicity and total residual chlorine may be conducted at M-002) and has been retained.

C. Whole Effluent Toxicity Testing Requirements

As described in section IV.C.5 of this Fact Sheet, quarterly chronic WET testing is required by this Order to evaluate compliance with Table B water quality objective and evaluate any potential synergistic effects associated with pollutants in the effluent.

D. Receiving Water Monitoring

1. Surface Water

a. Microbiological (Near Shore and Off Shore)

The near shore and off shore water quality sampling program is designed to help evaluate the fate of the wastewater plume under various conditions and to determine if the Ocean Plan standards are being negatively impacted by the discharge. Further, bacterial sampling is required to provide data to help track the wastewater plume in the offshore waters, to evaluate compliance with recreational water standards in the kelp beds, and to address issues of beach water quality at the shoreline stations. Monitoring requirements for total coliform organisms, fecal coliform organisms, and enterococcus bacteria have been established in this Order, consistent with Order No. R9-2006-002 and consistent with the City of Oceanside's Order No. R9-2011-0016.

b. Benthic Monitoring

Sediment and infauna monitoring is required to help evaluate the potential effects of the discharge on the physical and chemical properties of the sediment and biological communities in the vicinity of the discharge, consistent with Order No. R9-2006-002.

c. Fish and Invertebrate

Fish and invertebrate monitoring is required to assess the effects of the discharge on local fish and megabenthic invertebrate communities in the surrounding area of the discharge location, consistent with Order No. R9-2006-002.

E. Other Monitoring Requirements

1. **Kelp Bed Monitoring.** Kelp bed monitoring is intended to assess the extent to which the discharge of wastes may affect the aerial extent and health of coastal kelp beds. The aerial extent of the various kelp beds photographed in each survey will provide a baseline for future monitoring to help evaluate any significant and persistent losses to the kelp beds.

2. **Regional Monitoring.** The purpose of regional monitoring programs (such as the Southern California Bight Regional Monitoring Program, which is coordinated by the Southern California Coastal Water Research Project) is to address questions about conditions in and influences on water bodies with regard to beneficial uses. This is done using scientifically sound and cost-effective monitoring designs and coordinating the efforts of various parties involved in monitoring. The Discharger is required to participate in regional monitoring programs pursuant to 40 CFR 122.48 and CWC sections 13225, 13267, and 13383.

   FPUD may request to reduce the level of effort devoted to other monitoring so that resources can be reallocated to regional monitoring by submitting a proposal to the San Diego Water Board and USEPA for such changes (including sampling, analytical, and/or reporting work).

3. **Solids Monitoring.** FPUD is required to monitor solids generated at the Facility pursuant to 40 CFR Part 503. FPUD shall report, annually, the volume of screenings, sludges, grit, and other solids generated and/or removed during wastewater treatment and the locations where these waste materials are placed for disposal.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D to the Order.

40 CFR 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR 123.25(a)(12) allows the State to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

B. Special Provisions

1. Reopener Provisions

This Order may be re-opened and modified, revoked, and reissued or terminated in accordance with the provisions of 40 CFR Parts 122, 123, 124, and 125. The San Diego Water Board may reopen the permit to modify permit conditions and requirements [including, but not limited to, increased/ modified receiving water requirements and participation in the Southern California Coastal Water Research Project (SCCWRP) model monitoring program]. Causes for modifications include the promulgation of new regulations, modification in sludge use or disposal practices, or adoption of new regulations by the State Water Board or San Diego Water Board, including revisions to the Basin Plan.

2. Special Studies and Additional Monitoring Requirements

a. Spill Prevention and Response Plans

The CWA largely prohibits any discharge of pollutants from point sources to waters of the United States except as authorized under an NPDES permit. In general, any point source discharge of sewage effluent to waters of the United States must comply with technology-based, secondary treatment standards, at a minimum, and any more stringent requirements necessary to meet applicable water quality standards and other requirements. The unpermitted discharge of wastewater to waters of the United States is illegal under the CWA. Further, the Basin Plan prohibitions discharges of waste to land, except as authorized by WDRs of the terms described in CWC section 13264. The Basin Plan also prohibits the unauthorized discharge of treated or untreated sewage to waters of the State or to a storm water conveyance system. Further, Discharge Prohibition III.A of the Order prohibits the discharge of waste from the Facility not treated by secondary treatment process and not in compliance with the effluent limitations of the Order and/or to a location other than Discharge Point No. 001.

Sanitary collection and treatment systems experience periodic failures resulting in discharges that may affect waters of the State. There are many factors which may affect the likelihood of a spill. To ensure appropriate funding, management and planning to reduce the likelihood of a spill, and increase the spill preparedness, this Order requires FPUD to maintain and implement Spill Prevention and Response Plans.

b. Spill Reporting Requirements.

To determine compliance with Discharge Prohibition III.A and provide appropriate notification to the general public for the protection of public health, spill reporting requirements have been established in section VI.C.2.b of this Order.

c. Whole Effluent Toxicity (WET)

Implementing provisions at section III.C.4.c.(4) of the Ocean Plan require chronic toxicity monitoring for ocean waste discharges with minimum initial dilution of less than 100:1. Based on methods of the Ocean Plan, a maximum daily performance goal of 88 TUc is established in this Order and quarterly monitoring is retained from Order No. R9-2006-002.

As described further in section IV.C.5.b of this Fact Sheet, this Order does not require acute toxicity testing.

This Order requires FPUD to update, as necessary, its Toxicity Reduction Evaluation (TRE) workplan, and submit any revisions of the TRE workplan within 180 days of the effective date of this Order. The workplan shall describe steps FPUD intends to follow if the performance goal for chronic toxicity (88 TUc) is exceeded.

If the performance goal for chronic toxicity is exceeded in any one test, then within 15 days of the exceedance, FPUD shall begin conducting six additional tests, bi-weekly, over a 12 week period. If the toxicity performance goal is exceeded in any of these six additional tests, then FPUD shall notify the San Diego Water Board and Director. If the San Diego Water Board and Director determine that the discharge consistently exceeds a toxicity performance goal, then FPUD shall initiate a TRE/TIE in accordance with the TRE workplan, *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants* (USEPA 833-B-99-002, 1999), and USEPA Toxicity Identification Evaluation (TIE) guidance documents (Phase I, EPA/600/6-91/005F, 1992; Phase II, EPA/600/R-92/080, 1993; and Phase III, EPA/600/R-92/081, 1993). Once the source of toxicity is identified, FPUD shall take all reasonable steps to reduce the toxicity to meet the chronic toxicity performance goal identified in section IV.A.2 of this Order.

Within 30 days of completion of the TRE/TIE, FPUD shall submit the results of the TRE/TIE, including a summary of the findings, data generated, a list of corrective actions necessary to achieve consistent compliance with all the toxicity limitations/performance goals of this Order and prevent recurrence of exceedances of those limitations/performance goals, and a time schedule for implementation of such corrective actions. The corrective actions and time schedule shall be modified at the direction of the San Diego Water Board.

If no toxicity is detected in any of these additional six tests, then FPUD may return to the testing frequency specified in the MRP.

3. Best Management Practices and Pollution Prevention – Not Applicable

4. Construction, Operation, and Maintenance Specifications – Not Applicable

5. Special Provisions for Wastewater Facilities

a. Treatment Plant Capacity

Consistent with Order No. R9-2006-002, this Order requires FPUD to perform a treatment plant capacity study to serve as an indicator for the San Diego Water Board of the Facility's increasing hydraulic capacity and growth in the service area.

FPUD shall submit a written report to the San Diego Water Board within 90 days after the monthly average influent flow rate equals or exceeds 75 percent of the secondary treatment design capacity of the wastewater treatment and/or disposal facilities. FPUD's senior administrative officer shall sign a letter in accordance with Standard Provision V.B. (Attachment D of this Order) which transmits that report and certifies that that policy-making body is adequately informed of the influent flow rate relative to the Facility's design capacity. The report shall include the following:

- Average influent daily flow for the calendar month, the date on which the maximum daily flow occurred, and the rate of that maximum flow.
- FPUD's best estimate of when the average daily influent flow for a calendar month will equal or exceed the design capacity of the facilities.
- FPUD's intended schedule for studies, design, and other steps needed to provide additional treatment for the wastewater from the collection system and/or control the flow rate before the waste flow exceeds the capacity of present units.

b. Pretreatment Program

Because the Facility does not currently receive discharges from industries that are subject to USEPA's pretreatment standards, FPUD is not currently required to develop and implement an industrial pretreatment program. Consistent with Order No. R9-2006-002, this Order requires FPUD to perform an Industrial Waste Survey (IWS) and influent priority pollutant monitoring to determine whether a pretreatment program is required pursuant to 40 CFR Part 403.

c. Biosolids

The use and disposal of biosolids is regulated under federal and State laws and regulations, including permitting requirements and technical standards included in 40 CFR Part 503. FPUD is required to comply with the standards and time schedules contained in 40 CFR Part 503.

Title 27, CCR, Division 2, Subdivision 1, section 20005 establishes approved methods for the disposal of collected screenings, residual sludge, biosolids, and other solids removed from liquid wastes. Requirements to ensure FPUD disposes of solids in compliance with State and federal regulations have been included in this Order.

d. Collection System

The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on May 2, 2006, which is not incorporated herein by reference. The General Order requires public agencies that own or operate sanitary sewer systems with greater than 1 mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating SSOs. Public agencies that are discharging wastewater into the Facility were required to obtain enrollment for regulation under the General Order by December 1, 2006.

6. Other Special Provisions – Not Applicable

7. Compliance Schedules

FPUD currently disinfects Facility effluent with chlorine to meet State Health requirements for recycled water. Prior to terminating disinfection of their effluent, FPUD must submit a plan and time schedule that outlines the tasks and approaches to achieve full compliance with bacteria receiving water limitations, contained within the Ocean Plan, outside of the initial dilution zone of the Oceanside OO. The time schedule shall include timelines for design, construction and implementation of any new or improved facilities needed for compliance.

VIII. PUBLIC PARTICIPATION

The San Diego Water Board is considering the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the San Diego Water Board has developed tentative WDRs. The San Diego Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The San Diego Water Board has notified FPUD and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was published in the San Diego Union-Tribune and the North County Times on June 15, 2012and posted on the San Diego Water Board web site on June 15, 2012.

B. Written Comments

Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail to the Executive Office at the San Diego Water Board at the address above on the cover page of this Order.

To be fully responded and considered by the San Diego Water Board, written comments must be received at the San Diego Water Board offices by 5:00 p.m. on July 16, 2012.

C. Public Hearing

The San Diego Water Board will hold a public hearing on the tentative WDRs during its regular board meeting on the following date and time and at the following location:

Date:	August 8, 2012
Time:	9:00 AM
Location:	Regional Water Quality Control Board Regional Board Meeting Room 9174 Sky Park Court, Suite 100 San Diego, CA 92123

Interested persons are invited to attend. At the public hearing, the San Diego Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our Web address is http://www.waterboards.ca.gov/sandiego/board_info/agendas/, where you can access the current agenda for changes in dates and locations.

D. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the San Diego Water Board regarding the final WDRs. The petition must be submitted within 30 days of the San Diego Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The Report of Waste Discharge (RWD), related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the San Diego Water Board by calling (858) 467-2952.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the San Diego Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this Order should be directed to Mr. Ben Neill at (858) 467-2983 or via email at bneill@waterboards.ca.gov.

ATTACHMENT G – DISCHARGE PROHIBITIONS CONTAINED IN THE 2005 CALIFORNIA OCEAN PLAN AND BASIN PLAN

I. Ocean Plan Discharge Prohibitions

1. The Discharge of any radiological chemical, or biological warfare agent or high-level radioactive waste into the ocean is prohibited.

2. Waste shall not be discharged to designated Areas of Special Biological Significance except as provided in Chapter III.E. of the Ocean Plan.

3. Pipeline discharge of sludge to the ocean is prohibited by federal law; the discharge of municipal and industrial waste sludge directly to the ocean, or into a waste stream that discharges to the ocean, is prohibited. The discharge of sludge digester supernatant directly to the ocean, or to a waste stream that discharges to the ocean without further treatment, is prohibited.

4. The by-passing of untreated wastes containing concentrations of pollutants in excess of those of Table A or Table B [of the Ocean Plan] is prohibited.

II. Basin Plan Discharge Prohibitions

1. The discharge of waste to waters of the State in a manner causing, or threatening to cause a condition of pollution, contamination or nuisance as defined in CWC section 13050, is prohibited.

2. The discharge of waste to land, except as authorized by WDRs of the terms described in CWC section 13264 is prohibited.

3. The discharge of pollutants or dredged or fill material to waters of the United States except as authorized by an NPDES permit or a dredged or fill material permit (subject to the exemption described in CWC section 13376) is prohibited.

4. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues an NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State of California Department of Public Health and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.

5. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.

6. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

7. The dumping, deposition, or discharge of waste directly into waters of the State, or adjacent to such waters in any manner which may permit its being transported into the waters, is prohibited unless authorized by the San Diego Water Board.

8. Any discharge to a storm water conveyance system that is not composed entirely of storm water is prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to an NPDES permit and discharges resulting from fire fighting activities.] [Section 122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].

9. The unauthorized discharge of treated or untreated sewage to waters of the State or to a storm water conveyance system is prohibited.

10. The discharge of industrial wastes to conventional septic tank/ subsurface disposal systems, except as authorized by the terms described in CWC section 13264, is prohibited.

11. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the State is prohibited.

12. The discharge of any radiological, chemical, or biological warfare agent into waters of the State is prohibited.

13. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.

14. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the State or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

15. The discharge of treated or untreated sewage from vessels to Mission Bay, Oceanside Harbor, Dana Point Harbor, or other small boat harbors is prohibited.

16. The discharge of untreated sewage from vessels to San Diego Bay is prohibited.

17. The discharge of treated sewage from vessels to portions of San Diego Bay that are less than 30 feet deep at MLLW is prohibited.

18. The discharge of treated sewage from vessels, which do not have a properly functioning USCG certified Type 1 or Type II marine sanitation device, to portions of San Diego Bay that are greater than 30 feet deep at MLLW is prohibited.

California Electrical Energy Generation

California Electrical Energy Generation* Total Production, by Resource Type (Gigawatt Hours)

For years 1983 - 1999

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
California Generation plus Net Imports *	246,876	267,399	274,444	280,026	290,211	289,177	298,454	304,823	307,448	299,101	291,310	293,875	302,113	296,569
Total Hydroelectric	42,053	24,988	31,359	36,341	34,490	40,263	48,559	27,105	24,460	29,220	34,327	42,731	27,459	24,098
Large Hydroelectric	N/A	20,691	26,647	30,931	29,589	34,228	41,861	23,071	20,352	24,699	29,145	36,355	23,133	20,754
Small Hydroeletric	N/A	4,297	4,712	5,410	4,901	6,034	6,698	4,034	4,108	4,522	5,182	6,376	4,326	3,343
Nuclear	43,533	33,294	34,353	35,594	30,241	36,155	32,036	35,698	32,482	31,509	32,214	36,666	18,491	17,860
In-State Coal	3,183	4,041	4,275	4,269	4,086	4,283	4,190	4,217	3,977	3,735	3,406	3,120	1,580	1,018
Oil	449	379	87	103	127	148	134	103	92	67	52	36	90	38
Natural Gas **	106,878	116,369	92,752	94,715	105,358	97,110	109,316	120,459	123,036	117,277	109,916	91,276	121,761	120,896
Geothermal	13,456	13,525	13,396	13,329	13,494	13,292	13,093	13,029	12,907	12,907	12,740	12,685	12,733	12,485
Biomass	6,086	5,761	6,196	6,092	6,080	6,076	5,861	5,743	5,927	6,096	5,960	5,986	6,121	6,466
Wind	3,604	3,242	3,546	3,316	4,258	4,084	4,902	5,570	5,724	6,249	6,172	7,598	9,242	12,694
Solar	860	836	851	759	741	660	616	668	733	851	912	1,097	1,834	4,154
Other	0	38	35	108	48	24	34	15	39	20	12	13	14	14
Direct Coal Imports***	23,877	23,699	23,653	23,148	24,504	24,114	14,452	14,417	14,463	13,556	13,119	13,032	9,716	11,824
Other Imports****	2,897	41,227	63,941	62,253	66,785	62,967	65,263	77,799	83,608	77,615	72,481	79,633	93,071	85,022
Total In-State Generation	220,102	202,473	186,851	194,625	198,922	202,096	218,740	212,606	209,377	207,931	205,711	201,210	199,326	199,723
Governmental and Utility-Owned In-State Generation	99,733	67,208	70,484	76,406	71,246	83,213	91,801	83,085	79,345	81,897	86,369	94,169	71,162	68,941
Total Hydroelectric	41,001	21,449	26,395	29,984	28,992	33,210	39,979	23,203	20,676	24,367	28,271	34,437	22,693	20,506
Large Hydroelectric	N/A	18,322	23,198	26,411	25,807	29,301	35,731	20,553	17,991	21,431	24,998	30,432	19,902	18,341
Small Hydroeletric	N/A	3,127	3,197	3,574	3,185	3,910	4,248	2,649	2,684	2,935	3,272	4,006	2,791	2,164
Nuclear	43,533	33,294	34,353	35,594	30,241	36,155	32,036	35,698	32,482	31,509	32,214	36,666	18,491	17,860
In-state Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oil	157	123	43	41	51	58	51	53	53	45	35	30	29	28
Natural Gas	13,747	11,344	8,537	9,591	10,814	12,788	18,743	23,142	25,157	25,050	24,954	22,066	28,763	29,394
Geothermal	1,252	996	1,150	1,190	1,140	997	970	975	947	903	846	858	875	817
Biomass	34	0	4	4	6	2	20	12	28	18	38	37	39	20
Wind	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar	3	3	2	2	2	2	2	2	3	5	11	73	273	317
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial In-State Generation	120,369	135,265	116,367	118,220	127,676	118,883	126,938	129,521	130,031	126,034	119,341	107,041	128,164	130,782

Total Hydroelectric	1,052	3,539	4,965	6,357	5,498	7,052	8,579	3,902	3,784	4,854	6,057	8,294	4,767	3,592
Large Hydroelectric	N/A	2,369	3,450	4,520	3,782	4,928	6,130	2,517	2,361	3,267	4,147	5,924	3,231	2,413
Small Hydroeletric	N/A	1,170	1,515	1,837	1,716	2,125	2,449	1,384	1,423	1,586	1,910	2,370	1,535	1,179
Nuclear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
In-state Coal	3,183	4,041	4,275	4,269	4,086	4,283	4,190	4,217	3,977	3,735	3,406	3,120	1,580	1,018
Oil	293	256	44	62	76	90	83	51	39	22	17	6	61	11
Natural Gas	93,130	105,025	84,215	85,124	94,544	84,322	90,573	97,317	97,880	92,227	84,962	69,210	92,999	91,502
Geothermal	12,204	12,528	12,246	12,139	12,354	12,295	12,123	12,054	11,960	12,004	11,894	11,826	11,858	11,668
Biomass	6,052	5,761	6,192	6,088	6,074	6,074	5,841	5,731	5,899	6,078	5,922	5,949	6,081	6,446
Wind	3,597	3,242	3,546	3,316	4,258	4,084	4,902	5,570	5,724	6,249	6,172	7,598	9,242	12,694
Solar	857	834	848	757	739	658	614	666	730	846	901	1,024	1,561	3,837
Other	0	38	35	108	48	24	34	15	39	20	12	13	14	14
Energy Exports	N/A	14,854	6,534	6,026	4,825	5,685	5,056	5,586	5,064	4,629	5,054	5,146	4,974	3,281
Pacific Northwest	N/A	5,846	1,020	1,471	1,532	2,061	2,518	2,620	2,242	1,871	1,809	1,133	761	809
Pacific Southwest	N/A	9,007	5,514	4,555	3,292	3,623	2,539	2,966	2,822	2,759	3,245	4,013	4,213	2,472
Energy Imports	N/A	79,780	94,128	91,427	96,113	92,766	84,771	97,802	103,136	95,800	90,653	97,811	107,760	100,127
Pacific Northwest	N/A	12,672	28,206	23,775	22,363	22,347	22,321	27,289	26,201	21,800	26,486	36,352	40,231	35,897
Pacific Southwest	N/A	67,107	65,921	67,652	73,750	70,419	62,450	70,514	76,935	74,000	64,168	61,459	67,529	64,230
Net Energy Imports	26,774	64,926	87,594	85,401	91,289	87,081	79,714	92,217	98,072	91,171	85,599	92,665	102,786	96,846
Pacific Northwest	18,777	6,826	27,186	22,303	20,831	20,286	19,803	24,669	23,959	19,929	24,677	35,219	39,470	35,088
Pacific Southwest	7,997	58,100	60,408	63,097	70,458	66,795	59,911	67,547	74,113	71,241	60,922	57,446	63,317	61,758

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
California Generation plus Net Imports *	199,609	211,900	210,172	211,028	220,371	232,926	238,567	252,355	242,343	245,535	242,026	256,719	256,367	253,621	230,243	244,577	243,077
Total Hydroelectric	59,351	46,880	33,898	44,478	27,140	26,692	32,742	26,092	23,244	22,373	41,595	25,626	51,665	47,883	41,400	48,757	41,627
Large Hydroelectric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Small Hydroeletric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear	6,738	13,467	18,911	28,000	32,995	35,481	33,803	36,586	37,167	38,622	36,579	38,828	36,186	39,753	37,267	41,715	40,419
In-State Coal	563	731	865	1,033	1,163	1,791	2,479	3,692	3,050	3,629	2,549	2,655	1,136	2,870	2,276	2,701	3,602
Oil	6,535	2,632	2,790	3,126	2,143	8,158	9,275	4,449	523	107	2,085	1,954	489	693	143	123	55
Natural Gas **	45,486	58,248	69,771	49,260	75,437	74,221	78,916	76,082	75,828	87,032	70,715	95,025	78,378	66,711	74,341	82,052	84,703
Geothermal	7,020	9,272	10,957	13,094	14,083	14,194	15,247	16,038	15,566	16,491	15,770	15,573	14,267	13,539	11,950	12,554	13,251
Biomass	731	1,099	1,171	2,063	2,461	4,092	5,204	6,644	7,312	7,362	5,760	7,173	5,969	5,557	5,701	5,266	5,663
Wind	52	192	655	1,221	1,713	1,824	2,139	2,418	2,669	2,707	2,867	3,293	3,182	3,154	2,739	2,776	3,433
Solar	2	11	33	64	188	315	471	681	719	700	857	798	793	832	810	839	838
Other	0	0	0	6	5	4	4	4	0	2	0	0	0	343	896	230	0
Direct Coal Imports***	17,001	18,080	14,112	17,588	17,544	19,243	17,223	17,710	20,392	28,806	20,358	22,440	16,788	22,590	22,411	22,570	22,802
Other	56,130	61,288	57,009	51,095	45,499	46,911	41,064	61,959	55,873	37,704	42,892	43,354	47,514	49,696	30,310	24,993	26,685

Imports****																	
Governmental and Utility-Owned In-State Generation	121,602	125,533	129,124	127,612	136,518	134,770	137,858	121,599	111,474	124,544	134,280	135,149	132,147	124,573	119,961	121,955	97,688
Total Hydroelectric	59,244	46,687	33,639	44,117	26,727	26,259	32,096	25,612	22,728	22,033	40,440	25,024	50,089	46,660	40,122	47,326	40,593
Large Hydroelectric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Small Hydroeletric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear	6,738	13,467	18,911	28,000	32,995	35,481	33,803	36,586	37,167	38,622	36,579	38,828	36,186	39,753	37,267	41,715	40,419
In-state Coal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oil	6,535	2,632	2,790	3,126	2,143	8,158	9,275	4,449	523	107	2,085	1,954	489	693	143	123	55
Natural Gas	42,742	54,168	63,654	40,517	62,222	53,040	52,249	45,262	42,353	54,338	46,738	61,474	39,448	31,856	37,048	27,699	14,995
Geothermal	6,341	8,576	10,122	11,831	12,421	11,827	10,429	9,684	8,700	9,441	8,435	7,842	5,855	5,540	5,302	5,009	1,543
Biomass	0	0	6	8	0	0	0	0	0	0	0	0	65	59	71	80	73
Wind	2	3	0	3	3	0	0	0	0	0	1	26	13	10	6	3	7
Solar	0	0	2	4	2	1	2	2	3	1	3	1	3	2	2	2	3
Other	0	0	0	6	5	4	4	4	0	2	0	0	0	0	0	0	0
Commercial In-State Generation	4,876	6,999	9,927	14,733	20,810	32,002	42,422	51,087	54,604	54,481	44,496	55,776	59,917	56,763	57,561	75,058	95,903
Total Hydroelectric	107	193	259	361	413	433	646	480	516	340	1,155	602	1,576	1,223	1,277	1,430	1,035
Large Hydroelectric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Small Hydroeletric	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nuclear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
In-state Coal	563	731	865	1,033	1,163	1,791	2,479	3,692	3,050	3,629	2,549	2,655	1,136	2,870	2,276	2,701	3,602
Oil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Natural Gas	2,744	4,080	6,117	8,743	13,215	21,181	26,667	30,820	33,475	32,694	23,977	33,550	38,930	34,854	37,292	54,354	69,708
Geothermal	679	696	835	1,263	1,662	2,367	4,818	6,354	6,866	7,050	7,334	7,731	8,412	7,999	6,648	7,546	11,708
Biomass	731	1,099	1,165	2,055	2,461	4,092	5,204	6,644	7,312	7,362	5,760	7,173	5,904	5,498	5,630	5,186	5,590
Wind	50	189	655	1,218	1,710	1,824	2,139	2,418	2,669	2,707	2,867	3,268	3,169	3,144	2,733	2,773	3,426
Solar	2	11	31	60	186	314	469	679	716	699	854	797	790	831	808	837	835
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	343	896	230	0
Energy Exports	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Northwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Southwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Energy Imports	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Northwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pacific Southwest	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Net Energy Imports	73,131	79,368	71,121	51,095	63,043	66,154	58,287	79,669	76,265	66,510	63,250	65,794	64,303	72,285	52,721	47,563	49,487
Pacific Northwest	38,375	41,027	37,146	31,632	24,977	19,893	17,739	31,665	28,819	19,600	15,466	15,315	19,890	29,529	25,204	19,428	26,051
Pacific Southwest	34,756	38,341	33,975	19,463	38,066	46,261	40,548	48,004	47,446	46,910	47,784	50,480	44,412	42,757	27,517	28,136	23,436

*** Note:** Note: The data in this table is based on corrections and updates as of April 2014.

**** Note:** Electric generation categories, such as natural gas, are attributed based on the primary fuel of the plant. With the recent addition of biogas contracts being applied to existing natural gas plant supply contracts, the Total System Power table is not intended to be used as a measure of the state's progress toward the large variety of renewable generation and greenhouse gas emission goals. It is intended to be used as a guide only.

***** Note:** The Direct Coal Imports category is based on reported ownership shares and contractual arrangements for power purchases by California utilities. Due to legislative changes required by Assembly Bill 162 (2009) and to simplify the characterization of coal power generation, only Utah's Intermountain Power Project and Nevada's Mohave Generation Station (closed as of 2006) are included in the reported Direct Coal Imports for 1983 through 2012 on this table. A more detailed analysis of the role of coal-based power generation within California is outside the scope of this table. The California Air Resources Board is currently undertaking the task of identifying the fuel source of all imported power into California. When comparing coal and other power imports over time, the best approach is to compare the combined value of Net Energy Imports.

****** Note:** In this tabulation, generation located physically out-of-state is included in the energy imports category. The energy imports and exports include all electricity flows in and out of the state as reported by four California Balancing Authorities: California Independent System Operator, Los Angeles Department of Water and Power, Imperial Irrigation District, and Balancing Area of Northern California plus generation at six out-of-state power plants that are within one or more of these Balancing Authorities' control areas but are physically located outside California. These plants include Intermountain Power Plant (coal) in Utah, Mohave Generation Station (coal) in Nevada (now closed), Terra-Gen Dixie Valley plant (geothermal) and Desert Star Plant (natural gas) in Nevada, Termoelectrica de Mexicali Plant and InterGen's La Rosita Plant (natural gas) both of which are in Mexico. Power generated by these plants is not reported by Balancing Authorities as imports, hence their inclusion in this methodology. Finally, imports reported by Balancing Authorities do not include associated fuel source information. Fuel sources for out-of-state power are only reported by load serving entities under Power Source Disclosure and Power Content Label reporting requirements. As presented here, imports are only known for their geographic origin and not their fuel source origin. For a more detailed view of annual imported fuel sources, please refer to Total System Power

Water Conservation Plan Guidelines

Part One – General City Requirements

The City of Chula Vista Growth Management Ordinance, Municipal Code Section 19.09.050C, requires a Water Conservation Plan (WCP) to be submitted with all Sectional Planning Area (SPA) Plans. If a SPA Plan is not required, a WCP is required to be submitted with Tentative Subdivision Maps. The Growth Management Program further requires that a Water Conservation Plan be submitted for major development projects, defined as residential projects consisting of 50 dwelling units or greater, or commercial and industrial projects with 50 Equivalent Dwelling Units (EDU's) of water demand or greater. (See Part Six for an explanation of EDU's.)

The WCP shall provide an analysis of water usage requirements of the proposed project, as well as a detailed plan of proposed measures for water conservation, use of reclaimed water, and other means of reducing per capita water consumption from the proposed project, as well as defining a program to monitor compliance.

Part Two – Water Conservation Plan Outline

Water Conservation Plans shall be consistent with the format and content identified in the Water Conservation Plan Outline, Attachment A.

Part Three – Residential Water Conservation Measures

All residential projects subject to the WCP requirements shall provide the following conservation measures in all dwelling units as more particularly described in Attachment B:

a. Hot-Water Pipe Insulation.
b. Pressure Reducing Valves.
c. Water Efficient Dishwashers.
d. At least one outdoor water conservation measure from the Residential Water Conservation Measures list.
e. At least one additional water conservation measure from either the indoor or outdoor categories identified on the Residential Water Conservation Measures list.
f. Water conservation measures not found on the Residential Water Conservation Measures list may be proposed consistent with the provisions of Part Five below.

Part Four – Non-Residential Water Conservation Measures

All non-residential projects subject to the WCP requirements shall provide the following conservation measures as more particularly described in Attachment C:

a. Hot-Water Pipe Insulation.
b. Pressure Reducing Valves.
c. At least one outdoor water conservation measure from the Non-Residential Water Conservation Measures list.
d. At least one additional water conservation measure from either the indoor or outdoor categories identified on the Non-Residential Water Conservation Measures list.
e. Water conservation measures not found on the Non-Residential Water Conservation Measures list may be proposed consistent with the provisions of Part Five below.

Indoor Water Conservation Measures (Cont.)

3. **Pre-Rinse Sprayer on Sinks**
   Install automatic shut-off sprayer for pre-rinsing dishes with a maximum flow rate of 1.6 gpm in all restaurant and fast-food units.

4. **High-Efficiency Dishwashers**
   Install high-efficiency dishwashers in restaurant buildings.

5. **Air-Cooled Ice Machines**
   Install air-cooled ice machines instead of water-cooled machines in restaurants.

6. **Conductivity Meters**
   Install conductivity meters on cooling towers to regulate cycling of cooling water and chemicals.

Optional Water Conservation Measures

- Submeter all individual tenants in buildings.
- Provide educational materials and guidance to tenants.

Adopted May 27, 2003

CITY OF ESCONDIDO

December 14, 2011
3:00 p.m. Special Meeting Minutes

Escondido City Council
Community Development Commission

CALL TO ORDER

The Special Meeting of the Escondido City Council and Community Development Commission was called to order at 3:00 p.m. on Wednesday, December 14, 2011 in the Council Chambers at City Hall with Mayor Abed presiding.

ATTENDANCE

The following members were present: Councilmember Olga Diaz, Councilmember Ed Gallo, Councilmember Michael Morasco, Deputy Mayor Marie Waldron, and Mayor Sam Abed. Quorum present.

ORAL COMMUNICATIONS

CLOSED SESSION: (COUNCIL/CDC/RRB)

MOTION: Moved by Councilmember Morasco and seconded by Councilmember Gallo to recess to Closed Session. Motion carried unanimously.

I. CONFERENCE WITH REAL PROPERTY NEGOTIATOR (Government Code §54956.8)

a. Property: 150 East Valley Parkway
Agency Negotiator: Debra Lundy
Negotiating Parties: City and San Diego County Credit Union
Under Negotiation: FMV Rent Adjustment and Lease Terms

b. Property: 272 Via Rancho Parkway, Escondido
Agency Negotiators: Clay Phillips
Negotiating parties: City and Westfield Shopping Town, Inc.
Under negotiation: Price and terms of payment

II. CONFERENCE WITH LABOR NEGOTIATOR (Government Code §54957.6)

a. Agency negotiator: Sheryl Bennett, Clay Phillips
Employee organization: Police Officers' Association

b. Agency negotiator: Sheryl Bennett, Clay Phillips
Employee organization: Escondido Firefighters' Association

III. CONFERENCE WITH LEGAL COUNSEL--EXISTING LITIGATION (Government Code §54956.9(a) Two cases:

a. Name of case: Cirolia v. City of Escondido, Case No.:37-2010-00062036-CU-PO-NC
b. Name of case: Arriola v. City of Escondido, Case No.:37-2010-00062685-CU-PO-NC

IV. CONFERENCE WITH LEGAL COUNSEL-ANTICIPATED LITIGATION: Significant exposure to litigation pursuant to subdivision (b) of Government Code §54956.9(b): **one case**

ADJOURNMENT

Mayor Abed adjourned the meeting at 4:35 p.m.

MAYOR

CITY CLERK

MINUTES CLERK

CITY OF ESCONDIDO

December 14, 2011
4:30 p.m. Meeting Minutes

Escondido City Council
Community Development Commission

CALL TO ORDER

The Regular Meeting of the Escondido City Council and Community Development Commission was called to order at 4:30 p.m. on Wednesday, December 14, 2011 in the Council Chambers at City Hall with Mayor Abed presiding.

MOMENT OF REFLECTION

FLAG SALUTE

Mayor Abed led the flag salute.

ATTENDANCE

The following members were present: Councilmember Olga Diaz, Councilmember Ed Gallo, Councilmember Michael Morasco, Deputy Mayor Marie Waldron, and Mayor Sam Abed. Quorum present.

Also present were: Clay Phillips, City Manager; Jeffrey Epp, City Attorney; Barbara Redlitz, Community Development Director; Robb Zaino, Engineering Services Deputy Director; Diane Halverson, Deputy City Clerk; and Liane Uhl, Minutes Clerk.

ORAL COMMUNICATIONS

Maria Sandoval, Escondido, asked for a year-long shelter and a crisis shelter for the homeless.

Andrea Seavey, Escondido, asked for election districts.

Demetrio Gomez, Escondido, stated he wanted district elections.

Chris Nava, Escondido, voiced support for district elections.

Victor Torres, San Diego, urged Council to set up district elections.

Tooney Pierce, Escondido, indicated it was her first amendment right to clap in the Council Chambers.

Mauro Figueroa, Escondido, asked Council to move to district elections.

Roy Garrett, Escondido, indicated he supported district elections.

Linda Fluewelling, Escondido, urged Council to help the homeless.

Rabbi Laurie Coskey, San Diego, requested that Council set election districts.

Reverend Beth Johnson, Vista, asked the Council to form election districts.

Dashin Ansley, Escondido, urged Council to help the homeless.

Elizabeth Maldonado, La Mesa, asked Council to allow election districts.

Ivan Briggs, Newhall, CA, distributed information and listed the positive aspects of prevailing wages.

Estella del los Rios, San Diego, requested Council have election districts.

Carmen Miranda, Escondido, asked for election districts.

Daniel Perez, Escondido, urged Council to create election districts.

M.A. Mareck, Escondido, requested Council set up election districts.

CONSENT CALENDAR

Councilmember Waldron removed item 9, Councilmember Diaz removed item 5 and Councilmember Gallo removed item 6 from the Consent Calendar for discussion.

MOTION: Moved by Councilmember Waldron and seconded by Councilmember Diaz that the following Consent Calendar items be approved with the exception of items 5, 6 and 9. Motion carried unanimously.

1. **AFFIDAVITS OF PUBLICATION, MAILING AND POSTING (COUNCIL/CDC/RRB)**
2. **APPROVAL OF WARRANT REGISTER (Council/CDC)**
3. **APPROVAL OF MINUTES: None Scheduled**

4. **CALPERS INDUSTRIAL DISABILITY RETIREMENT OF TIMOTHY KELLY** – Request Council approve the Industrial Disability Retirement of Timothy Kelly. (File No. 0170-57)

   Staff Recommendation: Approval **(Human Resources Department: Sheryl Bennett)**

RESOLUTION NO. 2011-158

5. **FISCAL YEAR 2012 OFFICE OF TRAFFIC SAFETY SOBRIETY CHECKPOINT MINI-GRANT AND BUDGET ADJUSTMENT –** Request Council authorize the Escondido Police Department to accept a Fiscal Year 2012 Sobriety Checkpoint Mini-grant from the Office of Traffic Safety in the amount of $75,530; and authorize the Chief of Police to execute contract documents on behalf of the City; and approve budget adjustments needed to spend grant funds. (File No. 0480-70)

   Staff Recommendation: Approval **(Police Department: Jim Maher)**

Councilmember Diaz asked if the checkpoints would be in concurrence with the new law.

Police Lieutenant Tom Albergo answered that the new law would be implemented.

MOTION: Moved by Councilmember Diaz and seconded by Councilmember Morasco to authorize the Escondido Police Department to accept a Fiscal Year 2012 Sobriety Checkpoint Mini-grant from the Office of Traffic Safety in the amount of $75,530; and authorize the Chief of Police to execute contract documents on behalf of the City; and approve budget adjustments needed to spend grant funds. Motion carried unanimously.

6. **FISCAL YEAR 2009 BUFFER ZONE PROTECTION PLAN (BZPP) GRANT AND BUDGET ADJUSTMENT** – Request Council authorize the Escondido Police Department to accept Fiscal Year 2009 Buffer Zone Protection Plan funds in the amount of $194,000 from the United States Department of Homeland Security. (File No. 0480-70)

   Staff Recommendation: Approval **(Police Department: Jim Maher)**

Councilmember Gallo asked for clarification of the grant.

Police Captain Bob Benton answered the grant was from Homeland Security.

MOTION: Moved by Councilmember Gallo and seconded by Councilmember Diaz to authorize the Escondido Police Department to accept Fiscal Year 2009 Buffer Zone Protection Plan funds in the amount of $194,000 from the United States Department of Homeland Security. Motion carried unanimously.

7. **ASSET FORFEITURE FUND BUDGET ADJUSTMENT** – Request Council authorize staff to establish a budget in the amount of $121,980 with Asset Forfeiture Funds to purchase equipment, services and training for front-line law enforcement operations. (File No. 0430-80)

   Staff Recommendation: Approval **(Police Department: Jim Maher)**

8. **DESTRUCTION OF POLICE RECORDS –** Request Council approve the destruction of the Police Department files and recordings listed in Exhibit A. (File No. 0160-35)

   Staff Recommendation: Approval **(City Clerk's Office: Robert Zornado)**

RESOLUTION NO. 2011-160

9. **MODIFICATION TO FUND BALANCE POLICY, CONSULTING AGREEMENT FOR ECONOMIC DEVELOPMENT MASTER PLAN AND COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY AND BUDGET ADJUSTMENT** – Request Council approve the modification to the Fund Balance Policy; and authorize a budget adjustment in the amount of $96,300 from the General Fund Economic Development Commitment Fund to the City Manager's Professional Services account for the completion of an Economic Development Master Plan and Comprehensive Economic Development Strategy (CEDS); and authorize the Mayor and City Clerk to execute a consulting agreement with Natelson-Dale Group, Inc., to complete the project. (File No. 0600-10 [A-3038])

   Staff Recommendation: Approval **(City Manager's Office: Joyce Masterson)**

RESOLUTION NO. 2011-151

Councilmember Waldron stated this was a positive move for the City.

Joyce Masterson, Assistant to the City Manager, introduced Roger Dale and Paul Hendershot, Natelson-Dale Group, Inc. who presented a series of slides.

Lisa Prazeau, Escondido, voiced concern that the Economic Development Master Plan would not be successful.

MOTION: Moved by Councilmember Waldron and seconded by Councilmember Gallo to approve the modification to the Fund Balance Policy; and authorize a budget adjustment in the amount of $96,300 from the General Fund Economic Development Commitment Fund to the City Manager's Professional Services account for the completion of an Economic Development Master Plan and Comprehensive Economic Development Strategy (CEDS); and authorize the Mayor and City Clerk to execute a consulting agreement with Natelson-Dale Group, Inc., to complete the project and adopt Resolution No. 2011-151. Motion carried unanimously.

CONSENT - RESOLUTIONS AND ORDINANCES (COUNCIL/CDC/RRB)

10. REVISED CITY'S LOCAL LIMITS AND MUNICIPAL CODE CHAPTER 22, ARTICLE 1 AND 3 THROUGH 9 – Approved on December 7, 2011 with a vote of 4/0/1, Morasco absent. (File No. 0680-10)

ORDINANCE NO. 2011-18 – Second Reading and Adoption

PUBLIC HEARINGS

11. BID AWARD, BUDGET ADJUSTMENT AND AMENDMENT TO FISCAL YEAR 2012-2016 TRANSNET PROGRAM OF PROJECTS FOR MAPLE STREET PEDESTRIAN PLAZA - Request Council authorize the Mayor and City Clerk to execute an agreement with LB Civil Construction, Inc., in the amount of $2,369,812 for the Maple Street Pedestrian Plaza project; and approve a budget adjustment in the amount of $1,637,000 to fund the contract award and construction support costs; and amend the City's Fiscal Year 2012-2016 Local Streets and Roads Program of Projects adding $813,970 of Local Transnet funding to the Maple Pedestrian Plaza project (ESC27). **CONTINUED FROM DECEMBER 7, 2011** (File No. 0600-10 [A-3030])

Staff Recommendation: Approval **(Engineering Services: Robert Zaino)**

a. RESOLUTION NO. 2011-142R
b. RESOLUTION NO. 2011-149

Charles Grimm, Assistant City Manager, gave the staff report and presented a series of slides. Robert Zaino, Engineering Services Deputy Director, presented a history of the Master Plan concept.

Mayor Abed opened the public hearing and asked if anyone would like to speak on this issue in any way.

Lisa Prazeau, Escondido, voiced concern with the expense of the project.

Carol Rea, Escondido, expressed concern that the alley entrances to businesses would be closed.

Demetrio Gomez, Escondido, asked if the project could be rebid.

Claire Plotner., Escondido, voiced concern that her driveway would be closed.

Mayor Abed asked if anyone else wanted to speak on this issue in any way. No one asked to be heard. Therefore, he closed the public hearing.

MOTION: Moved by Councilmember Morasco and seconded by Councilmember Diaz to authorize the Mayor and City Clerk to execute an agreement with LB Civil Construction, Inc., in the amount of $2,369,812 for the Maple Street Pedestrian Plaza project excluding the kiosks and using the art fees to fund the water feature; approve a budget adjustment in the amount of $1,637,000 to fund the contract award and construction support costs; amend the City's Fiscal Year 2012-2016 Local Streets and Roads Program of Projects adding $813,970 of Local Transnet funding to the Maple Pedestrian Plaza project (ESC27); adopt Resolution No. 2011-142R and Resolution No. 2011-149. Ayes: Abed, Diaz, Gallo and Morasco. Noes: Waldron. Absent: None. Motion carried.

12. WATER RATE ADJUSTMENTS for 2012 – Request Council approve a water rate adjustment to increase revenue to the Water Fund by 12% in Calendar Year 2012. (File No. 1320-65)

Staff Recommendation: Approval **(Utilities Department: Chris McKinney)**

RESOLUTION NO. 2011-159R

Chris McKinney, Utilities Director, gave the staff report and presented a series of slides.

Mayor Abed opened the public hearing and asked if anyone would like to speak on this issue in any way.

Jan Wylie Compton, Escondido, urged Council to not raise agriculture water fees and to provide reclaimed water for agriculture watering use.

Edward Grangetto, Escondido, asked that Council not raise agriculture water rates and suggested plans for reclaimed water use.

Eric Larsen, San Diego County Farm Bureau Executive Director, asked Council to not raise agriculture water rates.

Phil Henry, Escondido, indicated he did not want a water rate increase for agriculture.

Ken Melban, Avocado Commission, stated he was opposed to water rate increases for agriculture.

Burnet Wohlford, Escondido, urged Council to not raise agriculture water fees.

Gary Bender, Fallbrook, indicated avocado farmers would turn off water to their groves if their rates were increased.

Kevin Grangetto, Escondido, read a letter from Harvey Mitchell and requested Council to not raise agriculture water rates.

Dennis Shepherd, Escondido, asked Council to keep the current agricultural water rates.

Ben Cueva, Escondido, urged to Council to not raise agricultural water rates.

Dennis Snyder, Escondido, requested Council keep the agriculture water rates as they are.

Karen Archey, Escondido, asked Council to not raise agriculture water rates.

Brian Malone, Escondido, urged Council to keep the current agriculture water rates.

Bob Shuster, Escondido, indicated agriculture should not have a rate increase until they could use reclaimed water.

Bill Snapp, Escondido, urged Council to keep the agriculture water rates as they are.

Lisa Prazeau, Escondido, presented a slide and asked Council to not raise agriculture water rates.

Ed Smith, Escondido, requested Council not raise water rates.

Sandy Candelario, Escondido, indicated a 12% increase was excessive and asked Council to keep water rates as they are.

Mike Sutherland, Fallbrook, requested that agriculture water rates not be raised.

Olaf Walter, Escondido, asked that water rates not be raised.

Mike Davis, Escondido, indicated the groves were beautiful and urged Council to not raise agriculture water rates.

Richard Carey, Escondido, asked that water rates not be raised.

Carol Rea, Escondido, stated the groves were used as fire breaks and requested Council not raise agriculture water rates.

Mayor Abed asked if anyone else wanted to speak on this issue in any way. No one asked to be heard. Therefore, he closed the public hearing.

MOTION: Moved by Councilmember Diaz and seconded by Councilmember Morasco to approve Option 2; a water rate adjustment to increase revenue to the Water Fund by 12% in Calendar Year 2012, with no rate increase to agriculture and adopt Resolution No. 2011-159R. Motion carried unanimously.

13. RECOMMENDATIONS FOR ALLOCATION OF FEDERAL HOME INVESTMENT PARTNERSHIPS (HOME) PROGRAM FUNDS – Request Council authorize encumbrance of FY 2010-11 and FY 2011-12 HOME funds in an amount not to exceed $1,000,000 as leveraged financing to Community HousingWorks (CHW) for its multi-family development located at Broadway and El Norte Parkway; and authorize the Mayor and City Clerk to execute the necessary loan documents, security and supporting agreements with CHW. (File No. 0875-55)

Staff Recommendation: Approval **(Community Services/Housing: Jerry VanLeeuwen)**

RESOLUTION NO. 2011-154

Karen Youel, Housing Division, gave the staff report and presented a series of slides.

Mayor Abed opened the public hearing and asked if anyone would like to speak on this issue in any way. No one asked to be heard. Therefore, he closed the public hearing.

MOTION: Moved by Councilmember Waldron and seconded by Councilmember Gallo to authorize encumbrance of FY 2010-11 and FY 2011-12 HOME funds in an amount not to exceed $1,000,000 as leveraged financing to Community HousingWorks (CHW) for its multi-family development located at Broadway and El Norte Parkway; and authorize the Mayor and City Clerk to execute the necessary loan documents, security and supporting agreements with CHW and adopt Resolution No. 2011-154. Motion carried unanimously.

14. MUNICIPAL AND ZONING CODE AMENDMENTS AZ 11-0002 – Request Council amend the Escondido Municipal Code and the Escondido Zoning Code to consolidate the Design Review Board with the Planning Commission and revise the qualifications for planning commissioners. (File No. 0680-10)

Staff Recommendation: Approval **(Community Development/Planning: Barbara Redlitz)**

ORDINANCE NO. 2011-19 Introduction and First Reading

Rozanne Cherry, Planning Department, gave the staff report and presented a series of slides.

Mayor Abed opened the public hearing and asked if anyone would like to speak on this issue in any way.

Carol Rea, Escondido, expressed concern of the negative effects on Historic Preservation status.

Mayor Abed asked if anyone else wanted to speak on this issue in any way. No one asked to be heard. Therefore, he closed the public hearing.

Mayor Abed re-opened the public hearing.

Carol Rea, Escondido, explained why a Historic Preservation authority was on the Design Review Board.

Mayor Abed closed the public hearing.

MOTION: Moved by Councilmember Gallo and seconded by Councilmember Morasco to amend the Escondido Municipal Code and the Escondido Zoning Code to consolidate the Design Review Board with the Planning Commission and revise the qualifications for planning commissioners and introduce Ordinance No. 2011-19. Ayes: Abed, Gallo, Morasco and Waldron. Noes: Diaz. Absent: None. Motion carried.

CURRENT BUSINESS

15. BUILDING MAINTENANCE FUND BALANCE – Request Council authorize the expenditure of $500,000 for building improvements at East Valley Community Center, Fire Station #2, Jim Stone Pool, Escondido Public Library and various other improvements. (File No. 0430-80)

Staff Recommendation: Approval **(Community Services: Jerry VanLeeuwen)**

Jerry Van Leeuwen, Community Services Director, gave the staff report and corrected the expenditure amount to $740,000.

M.A. Mareck, Escondido, indicated the branch library at the Community Center should not have been closed.

MOTION: Moved by Councilmember Gallo and seconded by Councilmember Diaz to authorize the expenditure of $740,000 for building improvements at East Valley Community Center, Fire Station #2, Jim Stone Pool, Escondido Public Library and various other improvements. Motion carried unanimously.

16. CONSIDERATION OF ADJUSTMENT TO CITY COUNCIL COMPENSATION AS REQUIRED BY CITY COUNCIL RULES AND PROCEDURES, SECTION (B)(9) (File No. 0720-20)

Staff Recommendation: None **(Mayor Sam Abed and Council Member Michael Morasco)**

Mayor Abed and Councilmember Morasco led the discussion.

COUNCIL ACTION: Directed staff to prepare appropriate paperwork and place the item on a future agenda

FUTURE AGENDA

17. FUTURE AGENDA ITEMS - The purpose of this item is to identify issues presently known to staff or which members of the Council wish to place on an upcoming City Council agenda. Council comment on these future agenda items is limited by California Government Code Section 54954.2 to clarifying questions, brief announcements, or requests for factual information in connection with an item when it is discussed.

Staff Recommendation: None **(City Clerk's Office: Marsha Whalen)**

ORAL COMMUNICATIONS

Lisa Prazeau, Escondido, presented slides and indicated the public works yard should not be moved for a ballpark/technology park.

COUNCIL MEMBERS' COMMITTEE REPORTS/COMMENTS/BRIEFING

Councilmember Gallo wished everyone a Merry Christmas, Happy New Year and played a Christmas Carol on his tie.

Councilmember Morasco reported on his humanitarian mission to Turkey.

Councilmember Waldron met with the City lobbyists in Sacramento and wished everyone Merry Christmas and Happy Hanukah.

Councilmember Diaz reported the River Park met and she would be the Chair next year. She also mentioned the passing of John Van Doren of the North County Times.

Mayor Abed indicated the Mayors' meetings on Prosperity On Purpose was moving forward.

ADJOURNMENT

Mayor Abed adjourned the meeting at 10:50 p.m.

MAYOR

CITY CLERK

MINUTES CLERK

City of Escondido
Easterly Recycled Water Main Extension

Preliminary Design Report

Prepared by:

RMC
Water and Environment

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. BICHETTE
No. C70228
EXP. 9-30-12
CIVIL
STATE OF CALIFORNIA

August 2012

Chapter 2 System Demands and Hydraulic Evaluation

This chapter presents the Project irrigation demands, hydraulic evaluation criteria, hydraulic analysis results, and recommendations for facility sizing.

2.1 Project Demands

Recycled water demand is defined several ways. Average Annual Demand (AAD) is an estimate of customer demand over a typical year and is expressed in acre-feet per year (afy). AAD is converted to Average Day Demand (ADD) by dividing by 365 days per year and is expressed in million gallons per day (mgd).

Two important peak demand scenarios are defined to evaluate system hydraulics: maximum day demand (MDD) and peak hour demand (PHD). For the purpose of this Report, MDD is defined as the average daily demand during the peak usage month and is expressed in mgd. The peak usage month is typically July, August or September, when irrigation demand is highest. PHD is defined as the maximum demand in gallons per minute (gpm) under MDD conditions and is based on typical usage patterns of customers on the system. MDD is estimated for each customer by applying a peaking factor to ADD based on usage patterns. PHD is estimated based on MDD delivered over a typical irrigation period for each customer (the number of hours per day over which the water is delivered).

2.1.1 Agriculture Demands

The agricultural parcels to be served have different growers, and it would be difficult at this stage of the project to contact each individual grower separately for information. For this Report, RMC and the City met with representatives of the agricultural community to gather information on irrigation water use and practices and associated user requirements.

For the purpose of this Report, agriculture demands east of downtown Escondido are divided into two distinct groups or "blocks" based on geography. The blocks are referred to as the Eastern Block and the Northern Block and are shown in Figure 1-1. As discussed above, the primary goal of this report is to develop a preliminary design of facilities to deliver recycled water to the Eastern Block; however, some of the project facilities will be sized to deliver recycled water to the Northern Block in the future.

Agricultural demand primarily consists of irrigation water to serve avocado groves and small patches of citrus trees. Growers have indicated that avocado trees require more water than citrus trees and estimates of demand should assume that all agriculture areas could be converted to avocado groves. Agricultural irrigation demands were developed using an average annual irrigation demand of 5 acre-feet (af) per acre, which was provided by the avocado growers. This usage estimate applies to overall parcel acreage, and therefore accounts for portions of agriculture parcels that are not plant-able. The acreage of agriculture parcels was estimated using geographic information system (GIS) data for parcels identified as one of the following using the San Diego County Assessor Land Use Codes:

- 50 – Vacant
- 51 – Citrus
- 52 – Avocado

The Eastern Block irrigation demand area is estimated at 870 acres, and the Northern Block irrigation demand area is estimated at 450 acres. These acreages reflect total (gross) parcel acreage, not currently planted or plant-able acreage. As stated above, the demand factor of 5 af per acre includes areas that are not plant-able.

MDD was calculated by applying a peaking factor of 1.7 to the calculated ADD based on usage patterns for agricultural demand based on meter measurements from 2000 to 2005. This period predated mandatory water cutbacks. Average annual agriculture demand during this period was 6,368 AF. The

City of San Diego Long-Range Water Resources Plan

(2002-2030)

The City of San Diego
Water Department

Section 6
Developing Evaluation Approach and Systems Model

Section 6
Developing Evaluation Approach and Systems Model

6.1 General Approach

Section 4 summarized the City's planning objectives and corresponding performance measures. Together they represent the "why are we doing this" aspect of the planning process. Section 3 and Section 5 presented water supply options that were then combined to form water resource portfolios. These supply options and alternative portfolios represent the "how will we accomplish this" aspect of the planning process. Where these two aspects converge, a model is needed to facilitate the evaluation and decision-making process (see Figure 6-1).

Models help decision makers compare and contrast alternatives in a systematic and reproducible manner. Because of the dynamic and complex nature of the City's water supply system, evaluating alternatives without a model would be very difficult. It is important however, to recognize that models are only tools that help in the decision-making process. It is also important to recognize that there are different types of models, and choosing the correct model depends on the answers to a number of important questions:

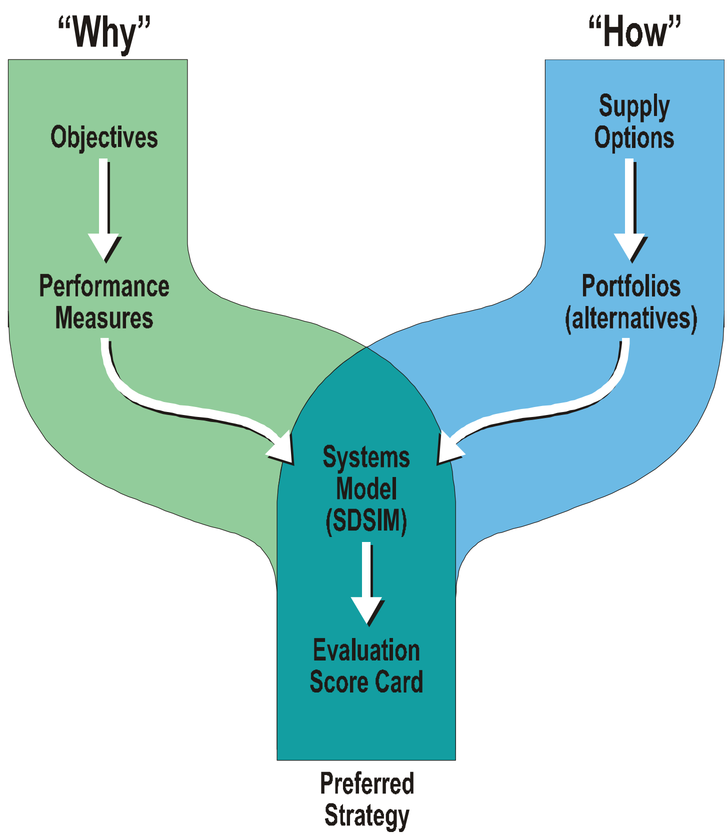

Figure 6-1
Evaluation Approach Road Map

- Is the problem long-term or short-term?
- Is the problem policy related or operational?
- Is the problem dynamic in nature?
- Are stakeholders involved in the process for solving the problem?

6.2 Developing a Systems Model for San Diego

6.2.1 Selecting from Different Types of Models

Models can be classified in several ways, depending on their characteristics: static or dynamic, stochastic or deterministic, physical or conceptual. One of the most useful classifications, however, divides models into optimization and simulation.

Optimization models are prescriptive. Optimization delineates the actions needed in order to obtain the best results or outcome according to a specific objective or set of objectives. They do not describe how the system will respond after making a particular set of decisions. The outcome of the optimization model prescribes the best way to accomplish a goal by using three main elements: an objective function that specifies the goal to accomplish, a set of decision variables, and a set of constraints. Optimization works best for a specific and well-defined problem, such as: what is the best way to operate a surface reservoir, given the objective of providing the maximum water supply and the constraints of local runoff and dedicated storage for emergency purposes?

Simulation models are descriptive. Their outcome is a description of the system's response to a set actions or decisions. They represent the physical system and the decision-making process, and are good tools for analyzing "what if" scenarios.

While optimization models are very useful for situations in which the maximum or minimum values of an objective can be well determined (i.e., when the "best" outcome can be easily defined), they are less useful in foresight and policy formation, where understanding the response of the system is more important than knowing the optimum outcome. Simulation models, on the other hand, are better suited for systems that are relatively more dynamic, and present feedback relationships.

Based on the nature of the City's water supplies, the need to explore other supply options, and the desire of the City's Water Department to expand its role in securing additional supplies, a simulation model was determined to be best suited for evaluating alternatives. In addition, it was determined that dynamic simulation (components vary over time) was preferred over static simulation (only represents a snapshot in time).

The City hired Camp Dresser & McKee (CDM) to develop a systems model that would be best suited for simulating alternative water resources portfolios for the next 30 years. CDM reviewed several modeling environments, including Microsoft Excel. In consultation with the City, CDM selected the generic systems simulator STELLA, developed by High Performance Systems, Inc, as the modeling platform for the City's systems model. This modeling platform was selected because of its flexible and relatively simple programming environment. In addition, the STELLA software was selected because it provides graphical interfaces that create an engaging virtual environment, increasing the ability of technical staff to share their understating of the system with decision-makers and stakeholders. CDM customized STELLA to create the San Diego Simulation (SDSIM) Model.

6.2.2 Modeling Objectives

The SDSIM Model was developed to: (1) represent the physical water delivery system for the City; (2) simulate the operations of existing and future water supplies under different hydrological conditions in order to meet current and projected demands; and (3) provide the performance measurements for the stated planning objectives as identified in Section 4.

The model development process included: (1) depicting the City's water supply system, including reservoirs, major conveyance, and treatment capacity; (2) defining the water supply options to include in the model; (3) defining the outputs required; (4) identifying the general relationships between the water supply options and the components within a each option; (5) developing a conceptual model; (5) collecting data and defining the response functions; (6) programming, and (7) performing a testing protocol.

The planning horizon for the systems model is the year 2030, and the simulation time step is specified as one year. Therefore, all of the variables are annualized and in units of acre-feet per year.

6.2.3 Physical System

City of San Diego Water Supply System – Service Area Scale

The City of San Diego Water Department divides its overall service area into three service areas: Miramar Service Area (MSA), including all the north area of the City; the Alvarado Service Area (ASA), from approximately the Mission Bay and Mission Valley area and Interstate 8, south to the limits with National City; and the Otay Service Area (OSA) serving the area south of Chula Vista to the U.S.-Mexico border (see Figure 6-2).

Each service area is relatively independent from the others in terms of the treated water distribution systems, although some interconnectivity exists. Raw imported water and treated imported water can be delivered to each of the service areas, through the CWA aqueducts. Each service area has a water treatment plant: the Miramar Treatment Plant (MTP), the Otay Treatment Plant (OTP), and the Alvarado Treatment Plant (ATP), which treat raw imported water and local runoff from the City's reservoirs.

Local reservoirs include Sutherland, San Vicente and El Capitan supplying raw water to the Alvarado Treatment Plant; Morena, Barret and Lower Otay, supplying raw water to the Otay Treatment Plant; and two small lakes, Miramar Lake and Lake Murray, located next to the Miramar Treatment Plant and Alvarado Treatment Plant, respectively. Lake Hodges is also a reservoir the City could use in the future, but it is currently not connected to the City's system.

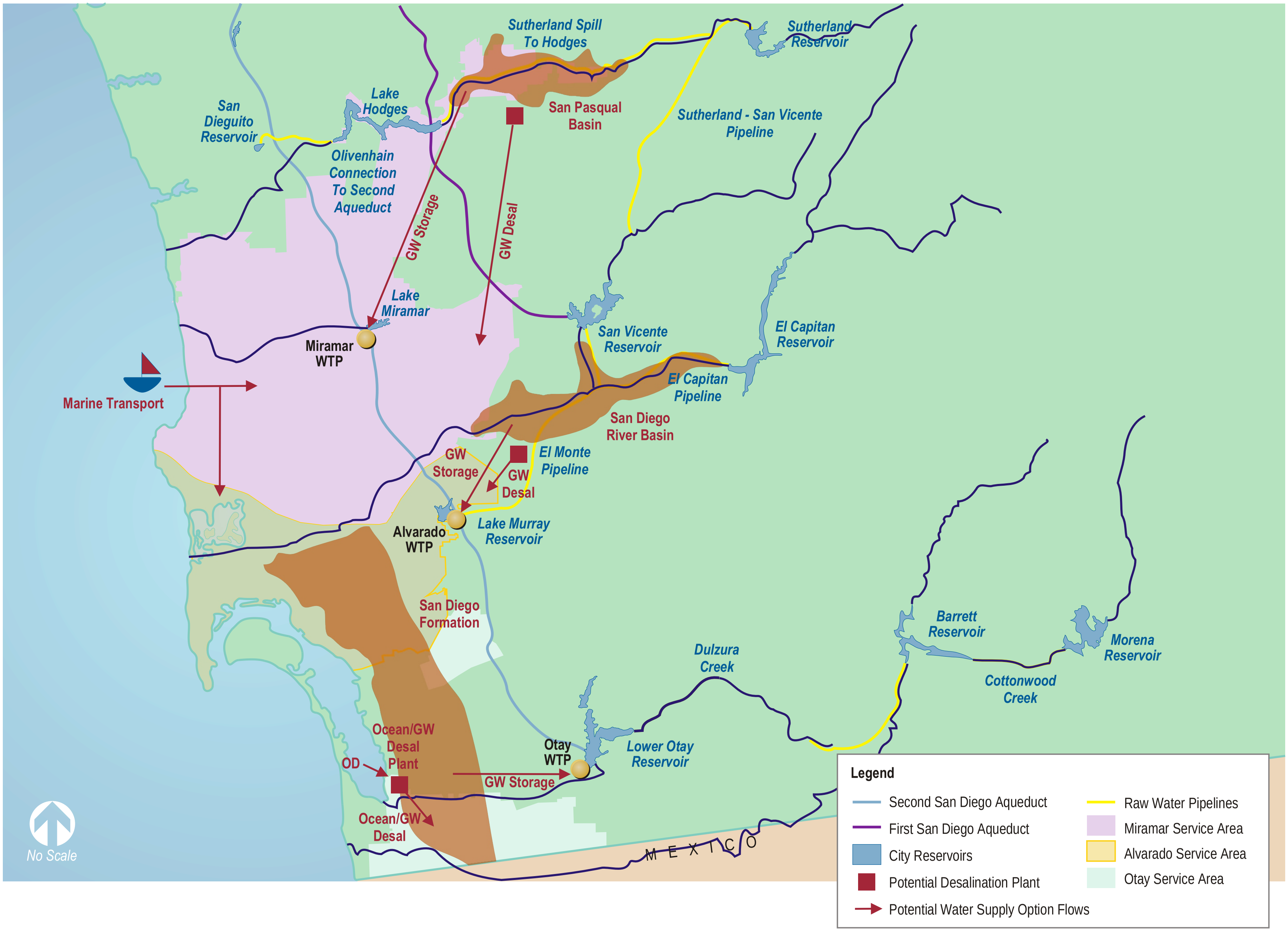

Figure 6-2
Existing Water Supply System and Potential New Water Supply Options

The City's reservoirs are connected through a series of pipelines and streams. Sutherland is upstream of San Vicente, and the reservoirs are connected through a pipeline. Similarly, the El Monte pipeline connects San Vicente to the Alvarado Treatment Plant, and the El Capital pipeline connects the El Capitan Reservoir to the El Monte Pipeline, upstream of the Alvarado Treatment Plant. In the Otay system, the Morena Reservoir feeds the Barret Reservoir through the Cottonwood Creek, and Barret is connected to Lower Otay through the Dulzura Conduit.

To accomplish the geographic representation of the City's sources and facilities in the SDSIM Model, the system was divided into the City's three service areas. The model did not go beyond the service area scale (i.e., the distribution system was not included in the SDSIM Model). Demands and supply were analyzed at the service-area scale, and the imported water system, the CWA aqueducts, were represented as sources of raw and treated water to each one of the service areas, to mimic the actual system operation.

Reservoirs, pipelines, creeks and treatment plants were represented in the model using the elements of the systems dynamics software:

- Stocks: used to represent elements that can accumulate over time
- Flows: used to represent elements that feed or drain stocks, and elements that can be represented as rates
- Converters: used to establish more detailed mathematical relationships between stocks and flows, introducing constants or exogenous variables (variables that are not affected by the model and serve as inputs)

In general, the SDSIM Model used stocks to represent the City's reservoirs and groundwater basins, as they are essentially (or could be) used for storing water and releasing water to satisfy demand. Flows were used to represent pipelines, streams, wells and treatment plants (including desalination plants), because these elements are relevant to the system in terms of the volumes of water that they handle per unit of time (i.e., millions of gallons treated per day, cubic feet of water conveyed per second, etc.). Flows, however, were needed in the model to represent a great variety of water flows intrinsic to the system, not related to the City's facilities. Examples of such flows are the water losses in conveying water from one reservoir to another through a creek, and the evaporative losses at a reservoir.

Figure 6-3 shows a screen capture of the SDSIM Model, with the representation of the El Capitan Reservoir system.

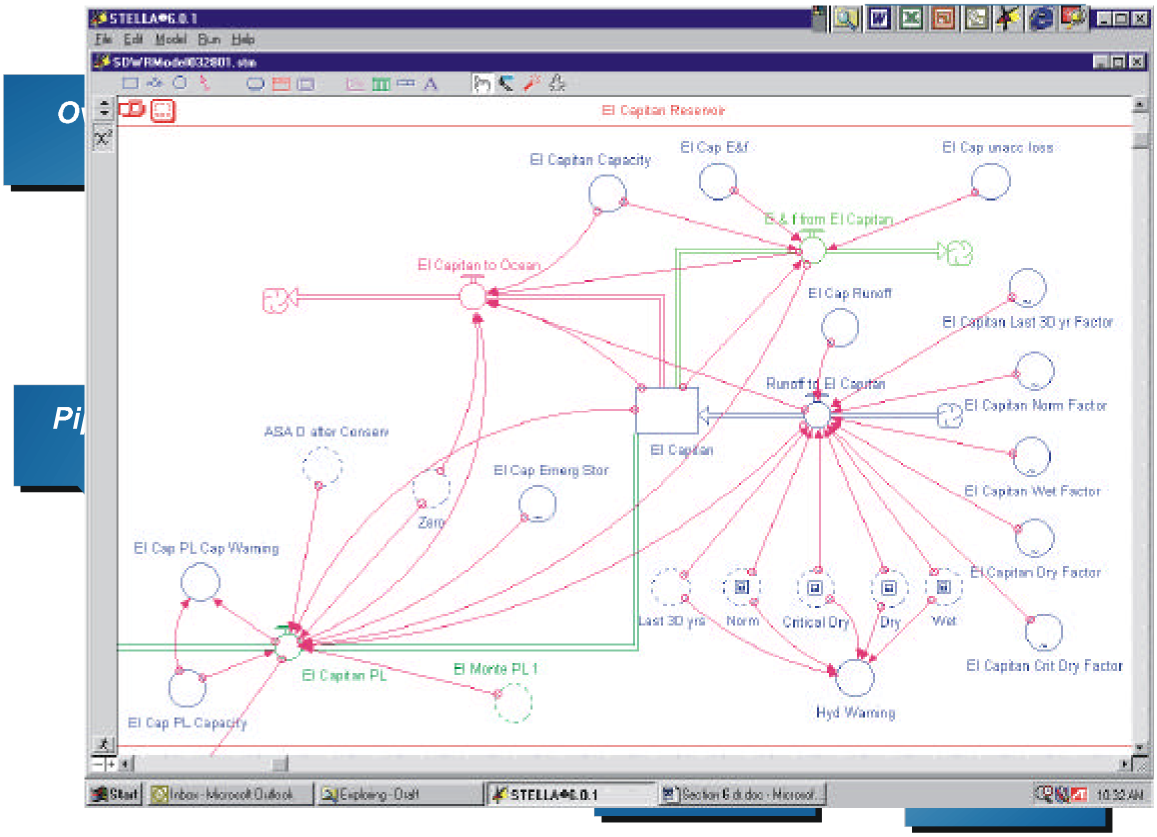

Figure 6-3
Model Representation of a Reservoir

As Figure 6-3 shows, stocks are elements with several inflows and outflows, that in some cases represent actual facilities (such as El Capitan Pipeline), natural flows (runoff or overflows to a stream), or water losses that exist in the real system, but are "invisible" flows in the sense that they are not conveyed in a natural stream or pipeline.

Surface Reservoir Operations

The SDSIM Model assumes that the City will continue to maximize the supply yield from its surface reservoirs, as it is one of the lowest-cost supply options available. The water entering the reservoir by natural runoff was modeled as a function of the type of hydrology year (wet, normal, dry, or critically dry). Each year in a simulation has a given amount of runoff, depending on the hydrology (see Section 6.2.5 for a further discussion on the hydrology and weather aspects of the model).

Reservoir capacity was determined from City records, and the total capacity was divided into dead storage, emergency storage, and available storage for supply yield. Dead storage was also obtained from City's records for each reservoir. Emergency storage is required to meet the City's emergency storage policy. The emergency storage City Council Policy 400-4 establishes that enough water must remain in storage for emergency conditions, to be able to meet a demand equal to six tenths of a year. The City's water demand projections were used to estimate the required emergency storage for every year from 2001 to 2030. Available storage for supply, therefore, represents the difference between total capacity (constant), dead storage (constant) and emergency storage (variable over time).

In addition to emergency storage and dead storage, the available storage was corrected for losses due to evaporation and infiltration. These losses were specific for each reservoir and based on the City's historical records. A function was estimated that allowed the model to calculate evaporative losses every year, as a function of the water level in the reservoir.

The model calculated reservoir storage for every year during the simulation, and used a mass balance to determine spillover based on inflows, outflows, and the capacity of the reservoir. The main outflow for the City's reservoirs was the actual draft as a function of demand in a given service area. Given the annual nature of the model, reservoir optimization routines were not needed. However, the City does have rule curves for monthly reservoir operations that do reflect optimization goals and take into consideration seasonal variability in demands, runoff, and recreational needs.

Another constraint for the use of water from city reservoirs was the capacity of the pipeline conveying the surface water to the treatment plant. The model established the capacity of the conveyance as a constraint, and kept track of the times that the capacity of the pipe was the limiting factor for local runoff use. An analysis for the optimization of the pipe capacity was not performed, however, because all of the flows in the model were annualized, and no seasonal or peak demands and drafts were incorporated into the model.

Miramar Reservoir and Lake Hodges were assumed to be in-line with the Miramar Water Treatment Plant. Because Lake Hodges in not currently connected to the treatment plant, a management decision variable was included to turn the option "on" or "off, " which allows the analyst to incorporate water from Lake Hodges into the resource mix, however account for the costs of connecting the reservoir into the system, and estimate the salinity impacts. Sutherland, San Vicente, Murray and El Capitan reservoirs were assumed to be in-line with the Alvarado Treatment Plant, Morena, Barret, and Lower Otay reservoirs were assumed to be in-line with the Otay Treatment Plant.

6.2.4 Water Supply Options

The overall operational assumption for the model is that local supply options meet only local demand in the specific service area of the City. Remaining supply needs

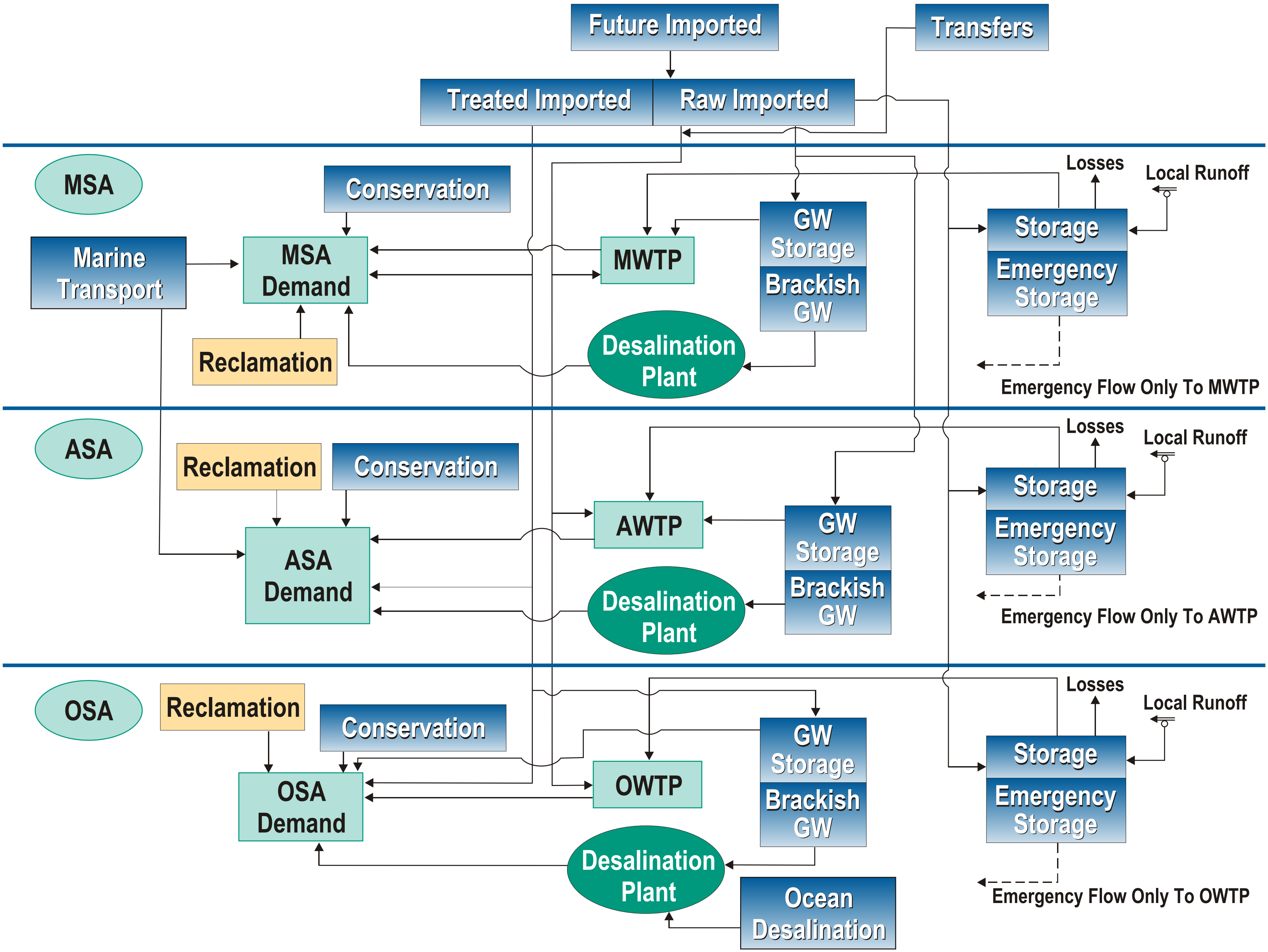

Figure 6-4 Model Flow Chart

after local supplies are utilized are met by imported water, distributed to minimize remaining supply deficits. Figure 6-2 illustrates the location of the water supply options in the City's system. Water supply flows in the model followed the conceptual representation depicted in Figure 6-4.

Priorities for the Use of Water Supply Options

In order to supply each service area demand with a sufficient, and not excessive, demand, priorities were set to establish an order in which each supply is utilized. The following is the priority order in which the supplies are developed:

- Conservation
- Local reservoir
- Reclamation
- Groundwater desalination
- Ocean desalination
- Marine transport
- Firm/existing imported water
- Groundwater storage
- Water transfers
- Future imported water

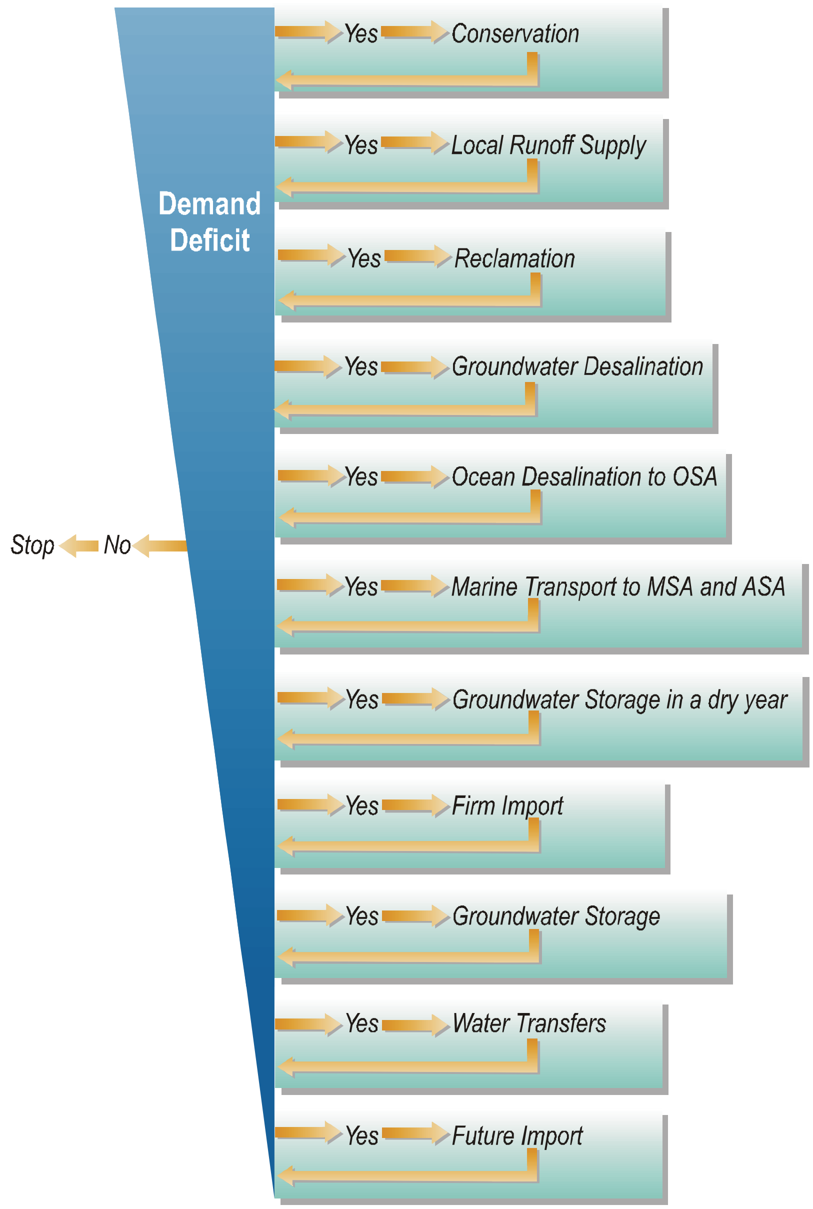

Figure 6-5
Water Supply Priorities Used in the Model

The priorities for the use of water supply options were mainly based on the marginal operating cost of water, with the assumption that once all the options are in place (i.e., capital investments have been made to establish a water supply option), the marginal operating cost of water dictates the decision on whether or not the supply is used in a specific year. In addition to the marginal cost rule, the type of supply was a factor for prioritization. Supplies can be categorized generally as core and dry year. Core supplies are basically used each and every year, whereas dry year supplies are used only during dry years. Figure 6-5 illustrates the water supply priorities programmed in the model.

6.2.5 Hydrology and Weather

Modeling hydrology requires addressing several difficulties. One of the most common problems in modeling a water supply and delivery system is the use of averages for the representation of inherently probabilistic variables, such as precipitation. Another hurdle to be overcome is that what typically drives water demands upward (warm, dry weather), also drives supply downward. Finally, hydrology in northern California and Colorado River basin (where the City's imported supplies originates) is not always correlated to hydrology in San Diego County (where local runoff originates). To avoid these problems, simulations of water demand and various supplies were modeled using historical hydrology records from 1922 to 1998, indexed sequentially for all points of origin of the City's water supply. These records were used to generate demand and supply factors that were applied to long-term averages in order to estimate the variability in demand and supply under different hydrological conditions.

Weather factors for water demand were obtained from the MWD, which developed them statistically for their long-term planning efforts. These demand factors were shared with and reviewed by the CWA in previous studies. These factors were applied to "normal" weather water demand projections developed for the City by PMCL (see Section 2). These same factors were also applied to water conservation, as dry weather not only affects demand, but also how much conservation occurs.

Imported water from the CWA and MWD is one of the most variable supplies. This variation is mainly due to hydrology in northern California. The imported water from the Colorado River is tempered by the massive storage of the system, which is over 10 times the storage on the SWP. Again, weather factors for imported water were obtained by MWD.

In addition to demand and imported water, local runoff was also modeled using historical hydrology. Local runoff records to each reservoir were used as input to the model, based on the year sequence corresponding to each hydrology. A runoff factor was applied to the average runoff for the period 1922 to 1998, resulting in the actual runoff observed in a given year. Thus, if a simulation included hydrology conditions for the years 1947, 1948, and 1949, all reservoirs were applied factors that resulted in a runoff equal to the recorded runoff for those specific years. Figure 6-6 shows actual runoff records from Morena Reservoir from 1922 to 1998, as an example of the data used for every reservoir in the SDSIM Model.

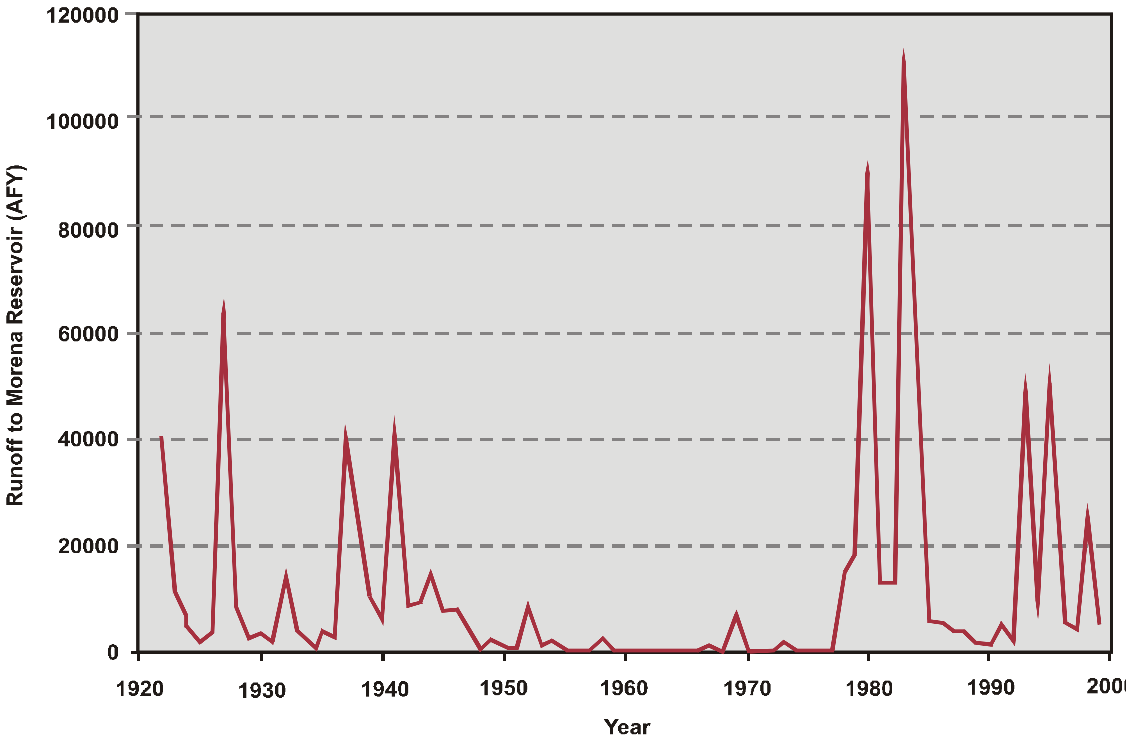

Figure 6-6
Actual Runoff Records for Morena Reservoir

For the purposes of modeling and evaluation, four 30-year hydrologic traces were developed: (1) critically dry; (2) dry; (3) normal; and (4) wet. These four traces represented the most likely weather scenarios that the City could face. To determine the specific hydrologic years that went into each of these 30-year traces, cumulative water shortage/surplus were generated. The cumulative shortage/surplus was generated by comparing the water demand, with existing conservation and reclamation, to local runoff and imported supplies for each hydrological year from 1922 to 1998. Those 30-year sequences with the highest cumulative supply shortage represented the critically dry hydrologies. It should be noted that not all the years included in the critically dry hydrology trace were dry, just that the cumulative sequence produced the greatest overall shortage. It should also be noted that a critically dry year does not necessarily mean water demands were at an all time high or that all sources of supply were at an all time low. However, it does imply that the overall supply deficit was greatest.

Hydrological sequences that produced cumulative shortages not as great as the critically dry trace were used to represent the dry hydrologies. The normal year hydrologies were developed using the statistical mean, while the wet sequence was developed by selecting the traces that had the greatest cumulative surplus. Table 6-1 presents the selection of the representative hydrologies used in the SDSIM Model.

Table 6-1
Selected Traces for Four Represented Hydrologic Scenarios

Hydrologic Scenario	Hydrologic Years Included in Trace	30-Year Cumulative Shortage/Surplus	Probability of Occurrence
Critically Dry	1948-1977	-690,000 AF	8%
Dry	1939-1968	-165,000 AF	19%
Normal	1923-1952	+239,000 AF	44%
Wet	1992-1998/ 1922-1944[1]	+690,000 AF	29%

[1] Trace starts with 1992-1998, then wraps around and begins again using 1922-1944 data.

6.2.6 Performance Measures

As a result of stakeholder and water department staff interviews, the following seven broad objectives were developed to analyze each portfolio.

- Supply Reliability
- Flexibility
- Salinity
- Catastrophe Protection
- Environmental Impact
- Risk
- Minimize Costs

From these objectives, performance measures were developed. The performance measures are numerical values needed for the decision-making process; therefore, the model was programmed to provide output for these performance measures.

Supply Reliability

Supply reliability was measured by taking the total usable supply in a given year under a given hydrological scenario and comparing it to the total demand. The ratio of percent of supply to demand became the output for measuring how well an alternative portfolio did in terms of meeting the Supply Reliability Objective.

Cost

Capital costs and O&M costs for each supply option were included in the model. Both capital and O&M costs were escalated by an inflation rate of 3 percent per year. In addition, the present values (PV) of the costs were calculated for the 30-year period at a discount rate of 6 percent. For the capital costs, the assumption was made that the capital investment would be financed at 6 percent interest rate, equal to the discount rate used for the PV estimates. O&M costs were separated into fixed and variable O&M costs. Fixed O&M costs were considered unavoidable and included maintenance, repair, and labor costs; and, variable O&M costs included mainly power costs and chemicals, which were considered avoidable. Water conservation costs were modeled as variable costs, and the costs of CWA water purchases were also variable. The percent of variable costs to the total costs became the output for measuring how accommodating an alternative portfolio was in terms of avoiding costs if the supply was not needed, and how well the portfolio met the Flexibility Objective.

Flexibility

The quantification of flexibility was based on the costs of the portfolio. The ratio of PV of variable costs (which could be avoided if conditions change) to the total PV of the portfolio was estimated, and that was assumed to be an indication of how easily a portfolio could avoid costs if conditions changed in the future. A high ratio indicated high flexibility. The rationale for this performance measure that investments in infrastructure requiring very high fixed costs may preclude taking advantage of new opportunities in the future.

Salinity

The water quality assessment is based on the concentration of total dissolved solids (TDS) estimated for each water supply source. TDS concentrations for each option, excluding water conservation, were determined based on historic records and/or projected water quality of options currently not in place (i.e., desalination, marine transport, etc.). A mass-balance of supplies was programmed into the model in order to track the total salinity for each alternative portfolio. By multiplying the water supply's TDS concentration by the water supply yield, a TDS load is calculated and totaled for the entire San Diego supply. The total TDS load is then divided by the total San Diego supply yield to obtain an overall TDS concentration for the each simulation. The following equation represents the formula used to convert TDS concentration to TDS load, including unit conversions:

*TDS Load (mg/year) = Supply Yield (AFY) * 1,233,246 (L/AF) * TDS Conc. (mg/L)* [1]

Catastrophe Protection

A separate analysis was performed for emergency conditions representing a major earthquake in the region. This PM essentially evaluated the same aspect as the supply reliability PM, doing it in this case for a simulated period equal to six tenths of a year (based on the City's emergency supply policy, see Section 6.3.3). The general approach to quantify this performance measure was to identify the sources that would not be available during an earthquake scenario, eliminate those sources from the simulation, make the emergency storage available for supply, and determine the reliability of the portfolio, measured over six tenths of a year. For a detailed discussion on the emergency simulation see Section 6.3.3.

Environmental Impact

The assessment of the negative environmental impact caused by the development and use of each water supply option was quantitatively analyzed by means of qualitative

[1] mg/year = milligram per year; L/AF = liter per acre-foot; mg/L = milligram per liter

factors developed by expert judgment. Table 6-2 indicates the factors assigned to each water supply option.

Table 6-2
Environmental Impact Factors

Water Supply Option	**Environmental Impact Factor (5: no impact) (1: highest impact)**
Existing Conservation	5
Additional Conservation	5
Local Runoff	4
Existing Reclamation	5
Level 1 Reclamation	5
Level 2 Reclamation	5
Option 1 GW Storage	4
Option 2 GW Storage	4
Option 3 GW Storage	4
Option 1 GW Desalination	3
Option 2 GW Desalination	3
Option 3 GW Desalination	3
Ocean Desalination	2
Marine Transport	3
Level 1 Water Transfers	4
Level 2 Water Transfers	4
Level 3 Water Transfers	3
Firm Imported Water	3
Future Imported Water	1

A total score for each portfolio was generated based on multiplying each supply option's water yield (acre-feet per year) by the numeric factor.

Risk

There are three components of the risk evaluation: level of ownership, level of consumer acceptance, and level of implementation risk. The level of ownership is the assessment of City ownership of the water supply option. The level of consumer acceptance is the assessment of how well consumers will accept and/or implement the supply option. The level of implementation risk is the assessment of the difficulty in developing the supply option. Similar to environmental impact, risk is quantitatively analyzed by means of qualitative factors developed by expert judgment. In the case of level of ownership, experts used as a guideline, three basic situations: (1) options for which the City would have direct control, such as reclamation; (2) options for which a contract exists but the actual deliveries depend on other parties, such as water transfers; and (3) options for which no control or contract exists, such as imported supply. Table 6-3 indicates the factors assigned to each water supply option. A total score for each component was generated by multiplying each supply's water yield by the numeric factor. A weighted average of the three components became the output for measuring how uncertain an alternative portfolio was in terms of the overall Risk Objective.

Table 6-3
Risk Evaluation Factors

Water Supply Option	Level of Ownership (5: completely owned) (1: no ownership)	Level of Consumer Acceptance (5: highest degree of acceptance) (1: lowest degree)	Level of Implementation Risk (5: lowest risk) (1: highest risk)
Existing Conservation	4	4	4
Additional Conservation	4	4	4
Local Runoff	5	5	5
Existing Reclamation	5	3	4
Level 1 Reclamation	5	3	4
Level 2 Reclamation	5	3	4
Option 1 GW Storage	4	4	4
Option 2 GW Storage	4	4	4
Option 3 GW Storage	4	4	4
Option 1 GW Desal	5	4	3
Option 2 GW Desal	5	4	3
Option 3 GW Desal	5	4	3
Ocean Desalination	5	3	3
Marine Transport	3	2	1
Level 1 Water Transfers	3	4	2
Level 2 Water Transfers	3	4	2
Level 3 Water Transfers	3	3	1
Firm Imported Water	1	3	4
Future Imported Water	1	2	1

6.2.7 Quality Control

Model development was subject to quality control process. All data used in the model was obtained from information developed or compiled by technical staff, and was reviewed by senior staff. The overall model structure and the modeling approach were discussed with the City in various work sessions and reviewed by an internal technical committee.

The model was subject to a detailed review for flow and stock magnitudes and dynamics, mass conservation, dimensionality, and response under extreme input conditions. The model used explicit representation of units in every equation, forcing unit consistency. In addition, the hydrology record for the past 30 years was used to validate the output for the use of local reservoir water, obtaining a mean error (mean over the 30-year simulation) on the order of ±3 percent of supply.

Frequent and effective communication with City staff was established to guarantee that any model reprogramming and all of the assumptions for developing the most important response functions were consistent with existing information about the system and congruent with the modeling objectives. The conceptual nature of the model provided opportunity for validating most of the response functions using simple spreadsheets.

6.3 Simulation Process

6.3.1 Management Decisions and Options

The input process for the SDSIM Model is facilitated by the use of a graphical interface based on switches that set the hydrology and turn options on and off. Figure 6-7 shows the graphical management panel developed for the systems model.

Figure 6-7
SDSIM Model Management Panel

As Figure 6-7 shows, the following options were included in the model in addition to local reservoir water, which was used in the model by default with no associated management decisions:

- Conservation: existing conservation (included in all simulations by default) and additional conservation efforts
- Reclamation: existing levels, and two additional levels that can be implemented independently
- Groundwater desalination: as three independent options

- Ocean desalination: only one level of ocean desalination
- Marine transport: only one level of marine transport
- Firm/existing imported water: on by default for every simulation, but allowing the model allows for the evaluation of scenarios without imported supply
- Groundwater storage: as three independent options
- Water transfers: three options that can be added to the simulation independently
- Future imported water: increasing the levels of imported water that can be purchased (at higher costs and risks)

To run the model, the user switches on desired water supply options for the portfolio by clicking on the appropriate buttons (the green square in the middle of the switch indicates that the option is on). The desired hydrology must be selected before running the simulation because results can vary significantly depending on the hydrologic conditions.

Each project alternative or "portfolio" was represented by a unique set of inputs to the model, which were entered in to the model through the management panel. The Dynamic Data Exchange features of the STELLA software were used to develop a spreadsheet-based output file that could be updated automatically at the end of each simulation. The output file was then used to develop the alternative scorecards for analysis of the impacts of each portfolio comparatively. The output file was designed in close communication with the developers of the decision-making model (score card analysis), and it served as the primary and direct input file for that model, with no intermediate steps for data conversion involved.

In addition to the main inputs included in the management panel, the model was programmed to provide easy manipulation of certain variables for sensitivity analysis. Input variables were programmed for: (1) reducing costs of groundwater storage, reclamation and groundwater desalination to account for potential cost-sharing opportunities; (2) increasing energy costs; (3) reducing the availability of imported supplies and transfers; and, (4) reducing the capital costs of groundwater and ocean desalination to account for improvements in desalination technology.

6.3.2 Model Operation

Once the water supply options, levels of implementation and hydrology are selected, the model computes demands, supplies, storage operations, costs, TDS mass balance, and the other performance measures for every annual time-step. Data from the model database is used for inputs to the model. The yields from the different sources in the database (described in Section 3), however, are used as maximum yields, allowing the model to calculate the actual annual yield based on the combination of factors involved in each simulation. Table 6-4 shows an example of some of the model outputs for a part (5 years) of a simulation.

Table 6-4
Example of Some of the Model Outputs for a Part (5 Years) of a Simulation

Parameter (AFY)	2018	2019	2020	2021	2022
Type of Year (model input)	**Dry**	**Normal**	**Wet**	**Dry**	**Wet**
Demand	297,572	299,475	299,029	322,615	300,897
Conservation	12,576	13,666	14,851	17,222	17,167
Local Runoff	9,126	21,286	30,988	9,452	48,952
Reclamation	14,600	14,600	14,600	14,600	14,600
Ocean Desalination	10,000	10,000	10,000	10,000	10,000
Imported Supply	228,982	218,208	207,728	232,386	190,968
Groundwater Storage	53,863	43,513	68,445	96,445	84,831
Flow out of Groundwater Storage to Demand	10,350	0	0	11,614	0
Total Supply	297,572	299,475	299,029	322,615	300,897

As shown in Table 6-4, the model computes each one of the variables at each time step, and uses the end-of-year values as inputs to the following year (as seen in the groundwater storage row, where the flow out of groundwater storage is subtracted from the storage of the next year. Table 6-4 shows a very simplified version of the model output, with only very few elements included. The SDSIM Model provides output both by service area and aggregated, and includes values for each one of the possible yields under each portfolio as well as performance measures, costs, and variables used as intermediate steps for the calculation of performance measures.

6.3.3 Emergency Scenario Simulation Process

Under City Council Policy 400-4, the City of San Diego is required to have available at all times a substantial emergency storage reserve, equal to a six-tenths of the annual demand for the entire city. The purpose of the emergency storage reserve is to maintain water service in the event of a prolonged outage of the imported water system due to an earthquake, flood, or other catastrophe.

In order to evaluate the performance of each portfolio of options in the event of a catastrophe, an emergency scenario was developed to determine the supply reliability. The emergency scenario, representing a major earthquake, was simulated by eliminating the imported supply and water transfers options. This emergency scenario represents a case in which the CWA aqueducts are off-line for a period equal to six-tenths of a year, during peak months.

The dry hydrology condition was used in the emergency simulation to represent conservative conditions. Thus, the simulation of each portfolio was run without imported supply or water transfers under the dry hydrology in order to obtain the following output:

- Reservoir Storage
- Groundwater Basin Storage
- Total San Diego Demand
- Total San Diego Conservation

More than these four variables are needed for the calculation of the reliability under emergency conditions. However, other variables required (such as desalination yields, reclamation yields, marine transport yields) are exogenous variables (i.e., not affected by the model), whereas the reservoir and groundwater storage are calculated by the model for each simulation year. Demand and conservation are also calculated by the model depending on projected averages and the hydrology selected.

Beginning-of-year storage for every year was obtained from the model runs and the reservoir supply was computed based on available water and capacity constraints. The supply availability is limited by the pipeline capacities conveying the water to the treatment plants for six-tenths of the year; therefore, the reservoir storage was compared to the six-tenths of the year pipeline capacity in order to determine the reservoir supply. Similarly, the groundwater basin supply is limited by the production well capacities pumping the water from the basins for six-tenths of the year; therefore the groundwater basin storage was compared to the six-tenths of the year production well capacity in order to determine the groundwater basin supply.

The total supply available for the emergency storage reserve includes the reservoir supply, the groundwater basin supply, and six-tenths of the annual supply options included in the portfolio (desalination, marine transport, etc.). Demand and supply was computed in this way for every year from 2001 to 2030, and the performance of a portfolio was evaluated based on the ratio of the total supply to the total San Diego demand for an emergency period occurring in any given year. An average performance measure was calculated for each portfolio.

6.4 Use of Score Card to Evaluate Alternatives

Often the most difficult aspect of the evaluation process is how to compare alternatives using a standardized approach. For example, how does one compare two portfolios when the criteria are costs and supply reliability? Reliability, as measured by the percent of demand met by supply, is a totally different metric than present value cost. Comparing alternatives is further complicated when both quantitative and qualitative measurements are introduced.

In an attempt to standardize all of the performance measures, a scorecard approach was used. For each planning objective, a score of 0 to 100 was generated, with 100 being the best. Both quantitative and qualitative measurements were converted into these standardized scores. Once standardized, scores for each objective could then be weighted, according to the stakeholder preferences summarized in Section 4.

Two quantitative measurements, Supply Reliability (measured as the percent of demand met by supply) and Flexibility (measured as the percent of variable cost to total costs) did not have to be converted because their raw model output was already in the form of a percentage. All other measures were first calculated in raw form, then converted using the minimum/maximum alternative technique.

The minimum/maximum alternative technique involves looking at the raw model output for all alternatives, then identifying the minimum and maximum values, and comparing those values to the alternative in question. For example:

Assume that there are 5 alternatives and their raw model output (the larger the number the better) is as follows:

Alternative 1 = 50
Alternative 2 = 10
Alternative 3 = 140
Alternative 4 = 35
Alternative 5 = 70

To put these on a standard score from 1-100, the following formula would be used:

$$\left[(AlternativeScore - MinScore) \div (MaxScore - MinScore)\right] \text{ x } 100$$

Where:

AlternativeScore = the raw model output for the alternative in question

MaxScore = the maximum raw model output for all alternatives

MinScore = the minimum raw model output for all alternatives

So, for this example, the standardized score for Alternative 5 would be:

$$[(70-10) \div (140-10)] \text{ x } 100 = 46$$

Section 7 summarizes the evaluation results of the alternatives and the development of standardized scores for each portfolio.

The City of San Diego

2010 Urban Water Management Plan

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City of San Diego
PUBLIC UTILITIES
Water & Wastewater

Section 3

Historical and Projected Water Use

Water demand projections provide the basis for evaluating the adequacy of future water supplies. This section presents the population and water needs projections for the City.

3.1 Population

Demographic factors such as population, housing, and employment are taken into account when associating water use within the City. With more than 1.3 million people, San Diego is the eighth largest city in the United States and the second largest in California. More than 100 languages are spoken by San Diego residents who have come from all parts of the world to live here. San Diego also has a young population, with approximately 70 percent of its residents under 45 years old.

The City's population is expected to increase from its current 1.3 million to over 1.7 million in 2035. This represents a 27 percent increase in 25 years. The City's population presented in Table 3-1 is from SANDAG's latest projections developed for the Series 12: 2050 Regional Growth Forecast, which used a 2008 estimate produced by the California Department of Finance. The SANDAG forecast is based on regional projections and local inputs gathered from the region's 18 incorporated cities and the County. The inputs included current adopted general and community plans, the County's Referral Map draft land use plan of 2009 with adjustments to reflect habitat constraints, and draft general plan updates. SANDAG staff developed the regionwide projections to reflect current economic conditions.

Table 3-1. City of San Diego Population Current and Projected

	2010	2015	2020	2025	2030	2035
City of San Diego population	1,376,173	1,459,351	1,542,528	1,615,891	1,689,254	1,756,621
City population not served by the water system [(a)]	51,868	53,811	58,542	61,105	63,501	68,667
Service area population	1,324,305	1,405,540	1,483,986	1,554,786	1,625,753	1,687,954

DWR Table 2
Source: SANDAG Series 12: 2050 Regional Growth Forecast, City of San Diego, February 2010, and City of San Diego Public Utilities Update of Long-term Water Demand Forecast, June 2010.

Notes:

[(a)] Some City of San Diego residents in the South Bay and in the northern part of the City are served by other water agencies.

3.2 Water Use

Water use consists of potable and recycled water used by the City, water sold to others, and additional water uses and losses. Tables 3-2 to 3-6 present the past and projected water sales to City customers and number of connections by customer sector. The information is based on the calendar year, unless noted as fiscal year (FY).

The projected water demands were developed utilizing an econometric model that incorporated SANDAG data to supply some of the demographic inputs (CDM, 2010). The demand model is a

One issue with the term “unaccounted-for water” which the IWA format clarifies is the differentiation of real water loss and unbilled consumption. As shown in Figure 3-1, apparent water loss includes revenue loss due to leaks, breaks and storage overflows. Water use for firefighting, line flushing and other authorized, but unbilled, use is classified as neither real nor apparent loss, but is included in the computation of NRW as unbilled consumption.

Using metered demand and total City delivered values, NRW was computed as 9.0 percent in 2008. City staff deemed it reasonable to assume this percent system loss could be maintained in future years given the City’s aggressive program of leak detection and repair. The City is going forward with an automated meter reading system that could improve billing accuracy, better quantify real versus apparent losses and identify customer leaks. Thus, NRW is held constant in the projections at 9.0 percent for forecast years. Table 3-9 presents the City’s additional water uses (recycled water) and losses.

Table 3-9. Additional Water Uses and Losses (AFY)

Water Use	2005	2010	2015	2020	2025	2030	2035
Recycled water	4,294	7,656	9,253	9,253	9,253	9,253	9,253
Non-revenue water	10,404	21,909	20,810	22,586	24,041	25,131	26,065
Total	14,698	29,565	30,063	31,839	33,294	34,384	35,318

DWR Table 10

Notes:

1. *Source for recycled water: 2005 from Table 2-8 of the City’s 2005 Urban Water Management Plan. 2010 from NCWRP and SBWRP beneficial reuse summary tables with wholesale deliveries excluded provided by the City on March 2, 2011. 2015 and later from table entitled, ”NCWRP and SBWRP Summary of Baseline Demands”, provided by the City on April 22, 2011.*
2. *Recycled water is City use only and excludes recycled water sold to other agencies.*
3. *Source for non-revenue water: For 2005, Table 2-8 of the City’s 2005 Urban Water Management Plan with 4.3% assumption. For 2010 to 2035, City of San Diego Public Utilities, Update of Long-Term Water Demand Forecast, Table 6-5, Water Demand Forecast with Normal Weather, June 2010.*

The total amount of water used in 2005 and 2010 and projected to be used by the City in the future is presented in Table 3-10.

Table 3-10. Total Water Use

Water Distributed	Total Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (from Tables 3-2 through 3-6)	199,178	162,291	195,688	213,409	228,061	238,772	247,986
Sales to Other Water Agencies (from Table 3-8)	14,515	13,030	14,721	14,963	15,020	15,325	15,556
Additional Water Uses and Losses (from Table 3-9)	14,698	29,565	30,063	31,839	33,294	34,384	35,318
Total	228,391	204,886	240,472	260,211	276,375	288,481	298,860

DWR Table 11

Table 3-12. Base Daily per Capita Water Use - 10- to 15-year Range				
Base Period Year		Distribution System Population[a]	Daily System Gross Water Use (AFY)[b]	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Fiscal Year Ending June 30			
Year 1	1996	1,099,989	216,066	175
Year 2	1997	1,111,440	222,977	179
Year 3	1998	1,128,491	206,495	163
Year 4	1999	1,151,642	215,400	167
Year 5	2000	1,173,293	230,973	176
Year 6	2001	1,191,357	216,312	162
Year 7	2002	1,206,026	219,610	163
Year 8	2003	1,228,055	211,059	153
Year 9	2004	1,243,152	229,162	165
Year 10	2005	1,244,554	217,780	156
Year 11	2006	1,253,497	224,197	160
Year 12	2007	1,265,120	229,940	162
Year 13	2008	1,285,692	226,150	157
Year 14	2009	1,302,470	213,258	146
Year 15	2010	1,324,226	188,981	127
Base Daily Per Capita Water Use				1996-2005: 166
Target				0.8*166=133

DWR Table 14
Notes:
[a] *Population consists of population served by the Public Utilities Department.*
[b] *Gross water use consists of water produced by the Public Utilities Department and purchased SDCWA treated water minus water sold to other agencies, and includes system losses.*

Table 3-13. Base Daily per Capita Water Use - 5-year Range				
Base Period Year		Distribution System Population	Daily System Gross Water Use (AFY)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	Fiscal Year Ending June 30			
Year 1	2004	1,243,152	229,162	165
Year 2	2005	1,244,554	217,780	156
Year 3	2006	1,253,497	224,197	160
Year 4	2007	1,265,120	229,940	162
Year 5	2008	1,285,692	226,150	157
Base Daily Per Capita Water Use				160
Target				0.95*160=152

DWR Table 15

An urban water supplier must select one of the methods to set their per capita water use target. Water suppliers may choose to change the selected method until 2015. The City has selected Method 3 for establishing the 2020 per capita water use target of 142 gpcd. Based on an evaluation of the four methods, the City has determined that Method 3 provides the best target.

Since 2007, the City's per capita water use has been experiencing a decline. As shown in Table 3-12, the City's per capita water use in 2010 was already below the 2020 target. However, this 2010 level of water use is likely to be somewhat temporary due to the water use impacts of the recent economic conditions and the Level 2 Drought Alert with mandatory restrictions that have been in effect since June 2009. A partial rebound to prior per capita water use levels may occur.

The City's approach to meeting the 2020 per capita water use target has several elements consisting of increased saturation into the customer base of low flow plumbing devices and fixtures, continued implementation of demand management measures, the water use reductions that occur with the increased costs of water and the increased use of recycled water. Recycled water is excluded from gross water use in determining per capita water use according to the DWR guidance. The City's water conservation efforts are described in Section 5.

Section 4
Water Supply

In 1997, the City developed the Strategic Plan for Water Supply. This plan focused mainly on engaging the City in the planning and development of its own water supply in order to become less reliant on imported water. Subsequently, over a two-year period beginning in 2000, the City's Water Department worked closely to develop a long-range water supply plan with a twelve member Citizen's Advisory Board (CAB). The CAB members, representing a variety of community interests and groups, were an integral part of the planning process. The result of this effort was the creation of the Long-Range Water Resources Plan (LRWRP) that was unanimously adopted by the City Council on December 9, 2002.

The LRWRP identified water conservation, water recycling, groundwater desalination, groundwater storage, ocean desalination, marine transport, water transfers, and imported supply from SDCWA and MWD as potential near-term and long-term supplies. Based on the recommendations of the LRWRP, the City has been increasing conservation and recycled water use and exploring new alternative sources of water, including groundwater. The City recently initiated an update of the LRWRP that is expected to be completed in 2012.

The City currently uses imported water, local surface water, recycled water, and a small amount of groundwater as its supply sources. This section describes the water supplies and their quantities, reliability, and water quality.

4.1 Imported Water

The City currently purchases most of its water from the SDCWA. The City has been receiving water from the SDCWA since 1947 and during the last 20 years the City has purchased between 100,000 and 228,000 AF of water per year. This section presents the City's amounts needed from imported water, the wholesaler planned sources of water, supply reliability, and factors resulting in inconsistency of the imported supply.

In order to help the SDCWA plan for their customers' future demands, the Act requires that each agency who receives wholesale water provide their demand projections to the wholesaler. The demand projections for imported water for the City were developed in coordination with SDCWA and are presented in Table 4-1.

Table 4-1. Retail Agency Demand Projection Provided to Wholesaler (AFY)

Wholesaler	Contracted Volume	2015	2020	2025	2030	2035
San Diego County Water Authority	(a)	201,719	221,458	237,622	249,728	260,107

DWR Table 12

(a) The SDCWA does not define contract volumes.

The SDCWA's water supplies consist of a variety of supply sources. This water resources mix allows the SDCWA to provide supply reliability to its customers. The SDCWA's supply sources consist of the following components:

Table 4-7. Transfer and Exchange Opportunities (AFY)			
Transfer agency	Transfer or exchange	Short term or Long Term	Proposed Volume, AFY
MWD	Transfer of Colorado River water from PVID from fallowing. Miscellaneous spot transfers from Central Valley agriculture.	See MWD's 2010 Regional Urban Water Management Plan.	See MWD's 2010 Regional Urban Water Management Plan.
SDCWA	Transfer of conserved water from IID. Miscellaneous spot transfers from Central Valley suppliers.	See SDCWA's 2010 Urban Water Management Plan.	See SDCWA's 2010 Urban Water Management Plan.

DWR Table 20

4.6 Recycled Water

Water recycling, a component of the City's local water supply portfolio, is the treatment of municipal wastewater for beneficial reuse purposes, thereby reducing demands for potable water. "Recycled water" is defined in the California Water Code as "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur." CDPH sets the water quality criteria for specific uses of recycled water in Title 22 of the California Code of Regulations. The City's recycled water is treated to a Title 22 disinfected tertiary level quality suitable for irrigation, industrial processes including cooling water, construction uses, ornamental fountains, flushing toilets and urinals and groundwater recharge.

This section provides information on the amount of generated wastewater, existing disposal of wastewater, the existing and projected uses of recycled water as well as the quantity of recycled water potentially available.

4.6.1 Agency Participation

The City has agreements with a number of local agencies that define the terms of the City providing recycled water supply. Table 4-8 identifies the agencies with whom the City coordinates with to supply recycled water.

Table 4-8. Recycled Water Coordination	
Agencies	Role in Plan Development
Otay Water District	Wholesale recycled water customer
City of Poway	Wholesale recycled water customer
Olivenhain Municipal Water District	Wholesale recycled water customer

4.6.2 Wastewater Quantity and Disposal

This section provides information on the wastewater collected and treated within the City's service area. The City collects and treats wastewater from the City and surrounding municipalities and sewer districts. The City is responsible for transporting the San Diego region's wastewater to the Point Loma Wastewater Treatment Plant (PLWTP) or one of the two water reclamation plants. The City treats approximately 180 MGD of wastewater, generated in a 450 square mile area by more than 2.2 million residents within the City and 15 other cities and districts (called Participating Agencies). The Participating Agencies are the Cites of Chula Vista, Coronado, Del Mar, El Cajon, Imperial Beach, La Mesa, National City, and Poway, Lemon Grove Sanitation District, Otay Water District, Padre Dam Municipal Water District, and Lakeside/Alpine, Spring Valley, Wintergardens, and East Otay Mesa located in the unincorporated portions of County of San Diego.

The City's collection system consists of 61,717 sewer manholes, over 3,000 miles of sewer mains, 83 sewer pump stations, and 54 storm water interceptor stations, with approximately 10 percent of the sewer lines located in canyons and open space. The sewer main diameters range from 4 inches to 114 inches.

The wastewater is treated at the PLWTP, the North City Water Reclamation Plant (NCWRP), and the South Bay Water Reclamation Plant (SBWRP). The current and projected volume of collected wastewater and the amount that meets recycled water standards from the City's service area is presented in Table 4-9. The current and projected annual volume of disposed wastewater is presented in Table 4-10.

Table 4-9. Recycled Water-Wastewater Collection And Treatment (AFY)

Type of Wastewater	2010	2015	2020	2025	2030	2035
Wastewater collected and treated in service area[a]	120,080[b]	121,205	124,188	127,313	131,450	136,192
Volume that meets recycled water standard [c]	8,906[b]	16,950	16,950	16,950	16,950	16,950

DWR Table 21

Notes:

[a] The SANDAG Series 12 Forecast was used to project City's sewage flow within the City's Water Service Areas. The projected annual flow volume includes the wet weather component contributed by the 2-year storm. The flow projection based on this return period represents the median value.

[b] Actual flow.

[c] Includes City's recycled water supply and recycled water sold to other agencies.

Table 4-10. Recycled Water-Non-Recycled Wastewater Disposal (AFY)

Method of Disposal	Treatment Level	2010	2015	2020	2025	2030	2035
Point Loma Ocean Outfall	Advanced Primary or better	108,952[a]	102,744	106,497	109,622	113,759	118,500
South Bay Ocean Outfall[b]	Secondary or better	2,222[a]	1,481	741	741	741	741
Total		111,174[a]	104,255	107,238	110,363	114,500	119,242

DWR Table 22

Notes:

[a] Actual ocean discharge flow.

[b] South Bay currently discharges about 3 MGD to the ocean. Assumes that it will discharge 2 MGD in 2015 and 1 MGD in other years. The City's flow is approximately 66% of the Metro flow.

Table 4-15. Water Supplies - Projected (AF)						
Water Supply Sources	Wholesaler Supplied Volume (yes/no)	2015	2020	2025	2030	2035
San Diego County Water Authority	**Yes**	**201,719**	**221,458**	**237,622**	**249,728**	**260,107**
Supplier produced surface water [(a)]		**29,000**	**29,000**	**29,000**	**29,000**	**29,000**
Supplier produced groundwater		**500**	**500**	**500**	**500**	**500**
Transfers In		**0**	**0**	**0**	**0**	**0**
Exchanges In		**0**	**0**	**0**	**0**	**0**
Recycled Water [(b)]		**9,253**	**9,253**	**9,253**	**9,253**	**9,253**
Desalinated Water		**0**	**0**	**0**	**0**	**0**
Other		**0**	**0**	**0**	**0**	**0**
Total		**240,472**	**260,211**	**276,375**	**288,481**	**298,860**

DWR Table 16

Notes:

[(a)] Local surface water estimates provided by City, 2011.

[(b)] Recycled water excludes recycled water sold to other agencies and is from table entitled, "NCWRP and SBWRP Summary of Baseline Demands", provided by the City on April 22, 2011.

Table 4-15 shows a decrease in the recycled water projections versus the 2005 Plan. In the 2005 Plan, the projected recycled water use was based on the expansion of the non-potable system, which did not proceed as planned, but is moving forward in 2011.

However, the RWS will provide recommendations for future water reuse projects, and will likely include a blend of indirect potable reuse (IPR) and non-potable reuse projects. Until the WPDP is complete in 2012, the City's ability to implement IPR projects will not be known. Also, the 2010 Master Plan will include information about potential areas to expand the City's existing recycled water system. As the implementation of future non-potable reuse beyond already planned system expansions through 2015 are pending the findings of the WPDP, the 2010 Plan recycled water projections are held constant.

4.8 Water Supply Reliability

Providing reliable and sufficient water supplies upon demand has been a constant challenge for the City. The City has addressed the water supply challenge with a variety of strategies including:

- Conservation and peak management programs
- Storage
- Water transfers
- Local surface water
- Recycled water

The City presently relies upon imported water to supply a majority of its annual water supply (higher during times of drought). Each of the imported and local water supply sources that the City depends on to meet water demands could be vulnerable to legal, environmental, water quality, or climatic uncertainties (inconsistency of supply).

§67.3805 Drought Response Level 1 – Drought Watch Condition

(a) A Drought Response Level 1 condition is also referred to as a “Drought Watch” condition. The City Manager may recommend, and upon resolution of the City Council, declare a Drought Response Level 1 when there is a reasonable probability, due to *drought*, that there will be a supply shortage and that a consumer demand reduction of up to 10 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon such declaration, the City Manager shall take action to implement the voluntary Level 1 conservation practices identified in this Division.

(b) During a Level 1 Drought Watch condition, City of San Diego will increase its public education and outreach efforts to increase public awareness of the need to implement the following *water conservation* practices.

(1) Limit all landscape irrigation to no more than three assigned *days* per week on a schedule established and posted by the City Manager. This provision does not apply to commercial *growers* or nurseries, nor to the irrigation of golf course greens and tees.

(2) Use a hand-held hose equipped with a positive shut-off nozzle or hand held container or a garden hose sprinkler system on a timer to water landscaped areas, including trees and shrubs located on residential and commercial properties that are not irrigated by a landscape irrigation system.

(3) The washing of automobiles, trucks, trailers, airplanes and other types of mobile equipment is permitted only before 10:00 a.m. or after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May, with a hand-held container or a hand-held hose equipped with a positive shut-off nozzle for quick rinses. Boats and boat engines are permitted to be washed down after use. Washing is permitted at any time on the immediate premises of a commercial car wash. The use of water by all types of commercial car washes which do not use partially recirculated water will be reduced in volume by an amount determined by resolution of the City Council. Mobile equipment washings are exempt from these regulations where the health, safety and welfare of the public are contingent upon frequent vehicle cleanings, such as garbage trucks and vehicles to transport food products, livestock and perishables.

(4) Use recycled or non-potable water for construction purposes when available.

(5) Use of water from fire hydrants will be limited to fire fighting, meter installation by the Water Department as part of its Fire Hydrant Meter Program, and related activities or other activities necessary to maintain the health, safety and welfare of the citizens of San Diego.

(6) Construction operations receiving water from a fire hydrant meter or water truck will not use water beyond normal construction activities, consistent with Section 67.3803 and that required by regulatory agencies. Construction projects requiring watering for new landscaping materials shall adhere to the designated irrigation hours of only before 10:00 a.m. and after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May.

(7) Irrigation is not permitted during a rain event.

(Renumbered from Sec. 67.38.4 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3805 repealed and added "Drought Response Level 1 – Drought Watch Condition " 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)
(Amended 12-7-2010 by O-20008 N.S.; effective 1-6-2011.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)

§67.3806 Drought Response Level 2 – Drought Alert Condition

(a) A Drought Response Level 2 condition is also referred to as a "Drought Alert" condition. The City Manager may recommend and, upon resolution of the City Council, declare a Drought Response Level 2 when, due to *drought*, a consumer demand reduction of up to 20 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon declaration of Drought Response Level 2, the City Manager shall take action to implement the mandatory Level 2 conservation practices identified in this Division.

(b) All City of San Diego water *customers* shall comply with all Level 1 Drought Watch *water conservation* practices during a Level 2 Drought Alert, and shall also comply with the following conservation measures:

(1) Limit lawn watering and landscape irrigation using sprinklers to no more than ten minutes maximum per watering station per assigned *Day* during the months of June through October and no more than seven minutes maximum per watering station per assigned *Day* during the months of November through May. This provision does not apply to landscape irrigation systems using water efficient devices, including drip/micro-irrigation systems and stream rotor sprinklers.

(2) Landscaped areas, including trees and shrubs not irrigated by a landscape irrigation system governed by Section 67.3806(b)(2) shall be watered no more than three assigned days per week by using a hand held container, hand-held hose with positive shut-off nozzle, or low volume non-spray irrigation (soaker hose.)

(3) Stop operating ornamental fountains except to the extent needed for maintenance.

(4) *Potted plants*, non-commercial vegetable gardens and fruit trees may be irrigated on any *day*, but must be irrigated only before 10:00 a.m. or after 6:00 p.m. during the months of June through October and only before 10:00 a.m. and after 4:00 p.m. during the months of November through May.

(5) Irrigation is permitted any *day* at any time, as follows:

(A) as required by a landscape permit;

(B) for erosion control;

(C) for establishment, repair or renovation of public use fields for schools and parks; or

(D) for landscape establishment following a *disaster*. Such irrigation is permitted for a period of up to two months, which a hardship variance is required in accordance with Section 67.3810.

(c) The City Manager may recommend and, upon resolution of the City Council, implement a water allocation per *customer* account served by the City of San Diego, and a schedule of surcharges or penalties for exceeding the water allocation. If the City Council adopts or modifies water allocations, the City Manager will post notice of the water allocation prior to the effective date(s). Following the effective date(s) of the water allocation as established by the City Council, any *customer* that uses water in excess of the allocation will be subject to a surcharge or penalty for each billing unit of water in excess of the allocation. The surcharge or penalty for excess water usage will be in addition to any other remedy or penalty that may be imposed for violation of this Division. The *water conservation* measures required under Level 1 Drought Watch and Level 2 Drought Alert conditions, shall be suspended during the period a water allocation is in effect.

(Renumbered from Sec. 67.38.5 and amended 10-19-1998 by O-18596 N.S.)
(Former Section 67.3806 repealed and added "Drought Response Level 2 – Drought Alert Condition" 12-15-08 by O-19812 N.S; effective 1-14-2009.)
(Amended 10-28-2009 by O-19904 N.S; effective 11-27-2009.)
(Amended 12-7-2010 by O-20008 N.S.; effective 1-6-2011.)
(Amended 10-3-2011 by O-20093 N.S.; effective 11-2-2011.)

§67.3807 Drought Response Level 3 – Drought Critical Condition

(a) A Drought Response Level 3 condition is also referred to as a "Drought Critical" condition. The City Manager may recommend and, upon resolution of the City Council, declare a Drought Response Level 3 when, due to *drought*, there will be a supply shortage and that a consumer demand reduction of up to 40 percent is required in order to ensure that sufficient supplies will be available to meet anticipated demands. Upon declaration of Drought Response Level 3, the City Manager shall take action to implement the mandatory Level 3 conservation practices identified in this Division.

(b) All City of San Diego water *customers* shall comply with all Level 1 Drought Watch and Level 2 Drought Alert *water conservation* practices during a Level 3 Drought Critical condition and shall also comply with the following additional mandatory conservation measures:

(1) Limit all landscape irrigation to no more than two assigned days per week on a schedule established and posted by the City Manager. During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established and posted by the City Manager. This provision will not apply to commercial *growers* or nurseries, nor to the irrigation of golf course greens.

Recycled Water Study

Prepared for

City of San Diego

July 2012

SAN DIEGO RECYCLED WATER STUDY

Prepared for
City of San Diego, Public Utilities Department
July 2012

Project No. 137921

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CA C63566, EXP 9/30/2012

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CA C56943, EXP 6/30/2013

1. STUDY OVERVIEW

In August 2009, the City of San Diego (City), along with key stakeholders, initiated the Recycled Water Study (Study). This Study summarizes the technical evaluations performed, stakeholder participation, and the integrated reuse alternatives developed. This document is intended to serve as a guidance document to help inform policy leaders about the important decisions ahead regarding water reuse and our water and wastewater infrastructure.

1.1 Study Background

On June 16, 2010, the San Diego Regional Water Quality Control Board and United States (U.S.) Environmental Protection Agency (EPA) adopted Order No. R9-2009-0001 (National Pollutant Discharge Elimination System (NPDES) Permit No. CA0107409) allowing the City to continue to operate the Point Loma Wastewater Treatment Plant (Point Loma Plant) as a chemically enhanced primary treatment (CEPT) facility. The Permit, which became effective on August 1, 2010, allows the City to continue operating the Point Loma Plant in this fashion for five years until July 31, 2015, when the permit must be renewed. During the 2008 to 2010 permit modification process the San Diego Coastkeeper and Surfrider Foundation entered into a Cooperative Agreement (see Appendix A) with the City to conduct a Recycled Water Study. In accordance with the Cooperative Agreement, the environmental community did not oppose the U.S. EPA's decision to grant the modification. The City's responsibility per the Cooperative Agreement is to execute this Study, which is also consistent with the City's long-term goals and objectives.

This Study, based on the Cooperative Agreement, focuses on the Metropolitan Sewerage System (Metro System) which serves the City of San Diego and the Metropolitan Wastewater Joint Power Authority (Metro JPA), as shown on Figure 1-1. The area served by the Metro System is referred to as the Metro Service Area.

1.2 Study Objective and Approach

The Cooperative Agreement sets forth the primary Study goal of maximizing reuse in the Metro Service Area in order to minimize flows to the Point Loma Wastewater Treatment Plant (Point Loma Plant). To achieve this goal, the Study develops and presents Integrated Reuse Alternatives that the public and policy makers can review and select from to guide the future of the Metropolitan Sewer System's service area reuse program. The central focus of the alternatives is non-potable and indirect potable reuse opportunities. Non-potable reuse is simply defined as recycled water generally used for irrigation and industry – not for drinking water. Indirect potable reuse is simply defined as the blending of advanced treated recycled water into a surface water reservoir or groundwater basin that could be used for drinking (potable) water after further treatment. The opportunities were evaluated to meet City, Participating Agency and project Stakeholder reuse goals through a 2035 planning horizon. The integrated reuse alternatives and the overall plan were based on two fundamental principles: 1) providing detailed non-potable recycled water and indirect potable reuse opportunities and 2) relating the opportunities to avoided cost benefits and water quality improvements. These considerations are described further in Chapter 3, Study Process and Evaluation Approach.

conditions, the Point Loma Plant is limited to 15,000 metric tons per year for discharges through December 31, 2013 (see Appendix B for wastewater mass emission details and Appendix C, Section C.1.1, for further details on the permit). From January 1, 2014, however, the permit requires that the annual mass emission for total suspended solids be 13,598 metric tons or lower. Additional details on the permit and wastewater regulations are located in Appendix C.

The September 2011 Draft Wastewater Master Plan assumed that the Point Loma Plant would continue to operate as a CEPT plant and a series of large-scale projects would be built to divert solids and high flows away from it to prevent potential overflows during peak wet weather events. The diversion included redirecting the flow of wastewater from Point Loma to South Bay, adding a wastewater treatment plant in the Mission Valley area, expanding the North City Plant, and constructing a Point Loma Parallel Outfall to allow flows to bypass the Point Loma Plant and flow directly to the Point Loma Ocean Outfall. Although the September 2011 Draft Wastewater Master Plan would have expanded the Metro System's capacity to produce recycled water at new or expanded existing plants, it was not the primary objective. More importantly, the prospect of indirect potable reuse was not included in the September 2011 Draft Wastewater Master Plan. The cost of the September 2011 Draft Wastewater Master Plan improvements could be reduced by implementing water reuse projects to offload flows from the Point Loma Plant. In later chapters, the financial considerations associated with the reuse alternatives developed under the Recycled Water Study are compared to those included in the September 2011 Draft Wastewater Master Plan.

2.3 Key Studies and Activities

Several studies and activities provide an important basis for the work performed in this Study. The following summarizes these studies and activities and their relevance to this Report.

2.3.1 2005 Water Reuse Study

The City has long recognized the importance of developing a local water supply and has conducted several studies in an effort to create a system that provides that supply. In 2005, the City completed the Water Reuse Study which included a 35-member American Assembly panel comprised of a cross section of San Diego stakeholders. Public viewpoints were solicited through community meetings, focus groups, and telephone/online surveys. The Study included an evaluation of six strategies integrating non-potable reuse and indirect potable reuse opportunities for the North, Central, and South Service Areas. Option NC-3 was preferred by the Stakeholders, which included infilling non-potable demands served by the North City Water Reclamation Plant (North City Plant), followed by an indirect potable reuse project utilizing San Vicente Reservoir. For the South Bay, SB-1 (a non-potable approach serving a majority of non-potable water to the Otay Water District [Otay]) and SB-3 (an indirect potable reuse project utilizing Lower Otay Reservoir) were supported. This study was completed in conjunction with the *City of San Diego Recycled Water Master Plan Update 2005* (additional details on this study are included below).

The concluding American Assembly statement included:

> *"The Assembly unanimously agrees that current technology and scientific studies support the safe implementation of non-potable and indirect potable use projects. The Assembly considers advanced treated (purified) water to be superior in quality to other sources (e.g., Colorado River, State Project Water)."*
>
> *"The Assembly believes that properly designed and operated advanced water treatment processes, coupled with a diligent and publicly accessible water quality monitoring program, produce water of exceptional quality that is protective of public health."*
>
> *"The Assembly believes that the costs of the strategies are affordable and equitable, and considers the strategies to be a necessary investment in our future."*

City of San Diego • Public Utilities Department

2012 Long-Range Water Resources Plan

December 2013

Appendix B Simulation Model Overview

Appendix B
Simulation Model Overview

The City of San Diego Public Utilities Department (SDPUD) water system consists of complex and dynamic sources of supply and interdependence among the sources. To simulate the use of existing sources of supply and facilitate decisions on future supply options, the SDPUD's water resources systems model was used as the main tool for evaluating system performance. The systems model is programmed using STELLA, developed by Isee Systems, Inc.. This modeling platform was selected because of its flexible and relatively simple programming environment. In addition, the STELLA software was selected because it provides graphical interfaces that create an engaging virtual environment, increasing the ability of technical staff to share their understanding of the system with decision-makers and stakeholders. CDM Smith customized STELLA to create the San Diego Simulation (SDSIM) model.

This tool is appropriate for strategic level decision-making, with the ability to look at comprehensive systems in an integrated manner. Systems models combine natural, physical, and social systems to help decision-makers understand impacts and trade-offs. Systems simulation models are also dynamic, meaning they can evaluate parameters through time. Such dynamic evaluation is crucial for long-term water resources planning.

SDSIM was developed for the 2002 Long-Range Water Resources Plan (LRWRP) and has been updated several times to incorporate new parameters. Major updates to the SDSIM model (Version 4) for the 2012 LRWRP include:

- Updated demand projections
- Updated imported water availability and costs
- Updated existing system components to reflect recent and planned near-term improvements (use of Lake Hodges, emergency storage requirements, raw water conveyance capacity, treatment capacity, costs)
- Updated supply option information (costs, yields, etc.) and added new supply options not previously evaluated, including indirect potable reuse, graywater, and rainwater harvesting
- Updated performance measures calculated by the model; this included addition of several new performance measures including greenhouse gas emissions, potential for job creation, reduction in stormwater and wastewater discharges, etc.
- Added functionality to evaluate climate change impacts

This appendix describes the modeling objectives, model components of the physical water system, performance measures calculated by the model, and the simulation process.

B.1 SDSIM Model Purpose

The systems model was developed to (1) represent the physical water delivery system for the SDPUD; (2) simulate the operations of existing and future water supplies under different hydrological conditions in order to meet current and projected demands; and (3) provide “raw” performance scores for each portfolio in achieving the stated planning objectives.

The model development process included: (1) depicting the SDPUD’s water supply system, including reservoirs, major conveyance, and treatment capacity; (2) defining the water supply options to include in the model; (3) defining the outputs required; (4) identifying the general relationships between the water supply options and the components within each option; (5) developing a conceptual model; (6) collecting data and defining the response functions; (7) programming, and (8) performing a testing protocol.

The planning horizon for the systems model is the year 2035, and the simulation time step is specified as one month. Therefore, all units of water flows are in acre-feet per month. The model operates as a sequential time series with increasing demands over time from 2010 to 2035.

B.2 Physical System

The City of San Diego (City) divides its overall service area into three service areas: Miramar Service Area (MSA), including all the north area of the City; the Alvarado Service Area (ASA), from approximately the Mission Bay and Mission Valley area and Interstate 8, south to the limits with National City; and the Otay Service Area (OSA) serving the area south of Chula Vista to the U.S.-Mexico border.

Each service area is relatively independent from the others in terms of the treated water distribution systems, although some interconnectivity exists. Raw imported water and treated imported water can be delivered to each of the service areas, through the San Diego County Water Authority (SDCWA) aqueducts. Each service area has a water treatment plant: the Miramar Treatment Plant (MTP), the Otay Treatment Plant (OTP), and the Alvarado Treatment Plant (ATP), which treat raw imported water and local runoff from the City’s reservoirs.

Local reservoirs include Sutherland, San Vicente and El Capitan supplying raw water to the Alvarado Treatment Plant; Morena, Barrett and Lower Otay, supplying raw water to the Otay Treatment Plant; Miramar Lake and Lake Hodges supplying raw water to the Miramar Treatment Plant; and Lake Murray supplying water to the Alvarado Treatment Plant. Refer to Section 3 of the 2012 LRWRP for locations of reservoirs and treatment plants.

The City’s reservoirs are connected through a series of pipelines and streams. Sutherland is upstream of San Vicente, and the reservoirs are connected through a pipeline. Similarly, the El Monte pipeline connects San Vicente to the Alvarado Treatment Plant, and the El Capital pipeline connects the El Capitan Reservoir to the El Monte Pipeline, upstream of the Alvarado Treatment Plant. In the Otay system, Morena Reservoir feeds Barrett Reservoir through the Cottonwood Creek, and Barrett is connected to Lower Otay through the Dulzura Conduit.

To accomplish the geographic representation of the City’s sources and facilities in the SDSIM model, the system was divided into the City’s three service areas. The model did not go beyond the service area scale (i.e., the distribution system was not included in the SDSIM model). Demands and supply were analyzed at the service-area scale, and the imported water system, and SDCWA aqueduct, were represented as sources of raw and treated water to each one of the service areas, to mimic the actual system operation.

Reservoirs, pipelines, creeks and treatment plants were represented in the model using the elements of the systems dynamics software:

- Stocks: Used to represent elements that can accumulate over time
- Flows: Used to represent elements that feed or drain stocks, and elements that can be represented as rates
- Converters: Used to establish more detailed mathematical relationships between stocks and flows, introducing constants or exogenous variables (variables that are not affected by the model and serve as inputs)

In general, the SDSIM model used stocks to represent the City's reservoirs and groundwater basins, as they are essentially (or could be) used for storing water and releasing water to satisfy demand. Flows were used to represent pipelines, streams, wells and treatment plants (including desalination plants), because these elements are relevant to the system in terms of the volumes of water that they handle per unit of time (i.e., millions of gallons treated per day, cubic feet of water conveyed per second, etc.). Flows, however, were needed in the model to represent a great variety of water flows intrinsic to the system, not related to the City's facilities. Examples of such flows are the water losses in conveying water from one reservoir to another through a creek, and the evaporative losses at a reservoir.

Figure B-1 shows a screen capture of the SDSIM model, with the representation of the El Capitan Reservoir system. As Figure B-1 shows, stocks are storage elements with several inflows and outflows, that in some cases represent actual facilities (such as El Capitan Pipeline), natural flows (runoff or overflows to a stream), or water losses.

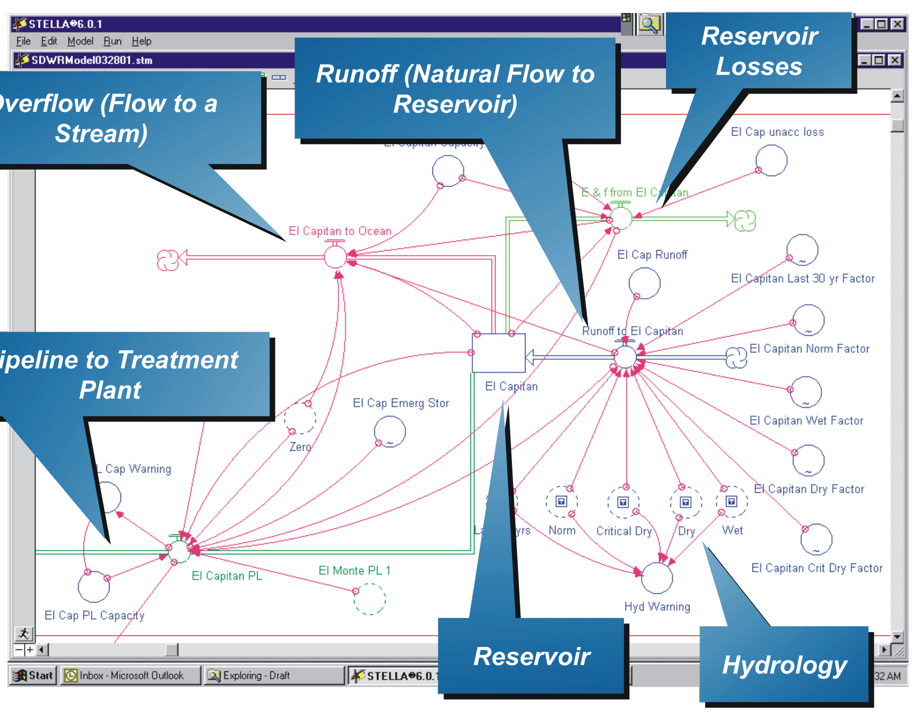


Figure B-1
Model Representation of a Reservoir

B.2.1 Surface Reservoir Operations

The SDSIM model assumes that the City will continue to maximize the supply yield from its surface reservoirs, as it is one of the lowest-cost supply options available. The water entering the reservoir by natural runoff was modeled as a function of the type of hydrology year (wet, normal, dry, or critically dry). Each year in a simulation has a given amount of runoff, depending on the hydrology.

Reservoir capacity was determined from City records, and the total capacity was divided into dead storage, emergency storage, and available storage for supply yield. Dead storage was also obtained from City's records for each reservoir. Emergency storage is required to meet the City's emergency storage policy. The emergency storage City Council Policy 400-4 establishes that enough water must remain in storage for emergency conditions, to be able to meet a demand equal to six tenths of a year. Available storage for supply represents the difference between total capacity (constant), dead storage (constant) and emergency storage (variable over time).

In addition to emergency storage and dead storage, the available storage was corrected for losses due to evaporation and infiltration. These losses were specific for each reservoir and based on the City's historical records. A function was estimated that allowed the model to calculate evaporative losses every year, as a function of the water level in the reservoir.

The model calculated reservoir storage for every year during the simulation, and used a mass balance to determine spillover based on inflows, outflows, and the capacity of the reservoir. The main outflow for the City's reservoirs was the actual draft as a function of demand in a given service area. Another constraint for the use of water from city reservoirs was the capacity of the pipeline conveying the surface water to the treatment plant. The model established the capacity of the conveyance as a constraint, and kept track of the times that the capacity of the pipe was the limiting factor for local runoff use.

Lake Miramar and Lake Hodges were assumed to be in-line with the Miramar Water Treatment Plant. Sutherland, San Vicente, Murray and El Capitan reservoirs were assumed to be in-line with the Alvarado Treatment Plant, Morena, Barrett, and Lower Otay reservoirs were assumed to be in-line with the Otay Treatment Plant.

B.2.2 Water Supply Options

The overall operational assumption for the model is that local supply options meet demands first, and remaining supply needs are met by imported water. Imported water is the default supply source after all other resources have been utilized. The following categories of options (existing and new) are included in the SDSIM model for the 2012 LRWRP:

- Conservation
- Local Reservoir Supply
- Groundwater
- Recycled Water for Non-potable Use
- Recycled Water for Indirect Potable Use
- Graywater

- Rainwater Harvesting
- Ocean Desalination
- Imported Water Purchases from SDCWA

These options are further described in Section 4 and Appendix A. Water supplies flows in the model followed the conceptual representation depicted in Figure B-2.

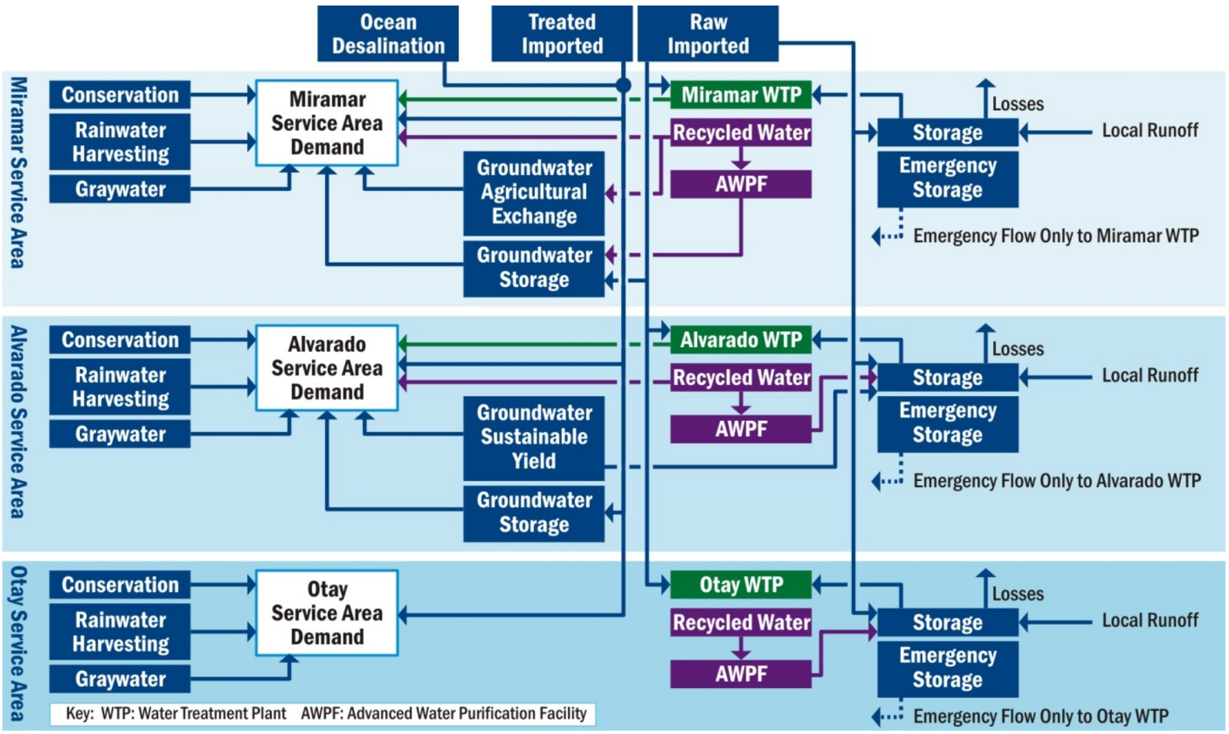


Figure B-2
Conceptual Model Flow Chart

B.2.3 Hydrology and Weather

Modeling hydrology requires addressing several difficulties. One of the most common problems in modeling a water supply and delivery system is the use of averages for the representation of inherently probabilistic variables, such as precipitation. Another hurdle to be overcome is that what typically drives water demands upward (warm, dry weather), also drives supply downward. Finally, hydrology in northern California and Colorado River basin (where the City's imported supplies originates) is not always correlated to hydrology in San Diego County (where local runoff originates). To avoid these problems, simulations of water demand and various supplies were modeled using available historical hydrology records from 1922 to 1998, indexed sequentially for all points of origin of the City's water supply. These records were used to generate demand and supply factors that were applied to long-term averages in order to estimate the variability in demand and supply under different hydrological conditions.

Weather factors for water demand were obtained from the Metropolitan Water District of Southern California (MWD), which developed them statistically for their long-term planning efforts. These demand factors were shared with and reviewed by the SDCWA in previous studies. These factors (shown in Figure B-3) were applied to "normal" weather water demand projections in the City of San Diego's *2010 Update to the Long-term Water Demand Forecast*. These same factors were also applied to water conservation, as dry weather not only affects demand, but also how much conservation occurs. Demands are typically higher in a dry, hot year (represented by a factor greater than 1.0 in Figure B-2) and lower in wet, cool year (represented by a factor less than 1.0 in Figure B-2).

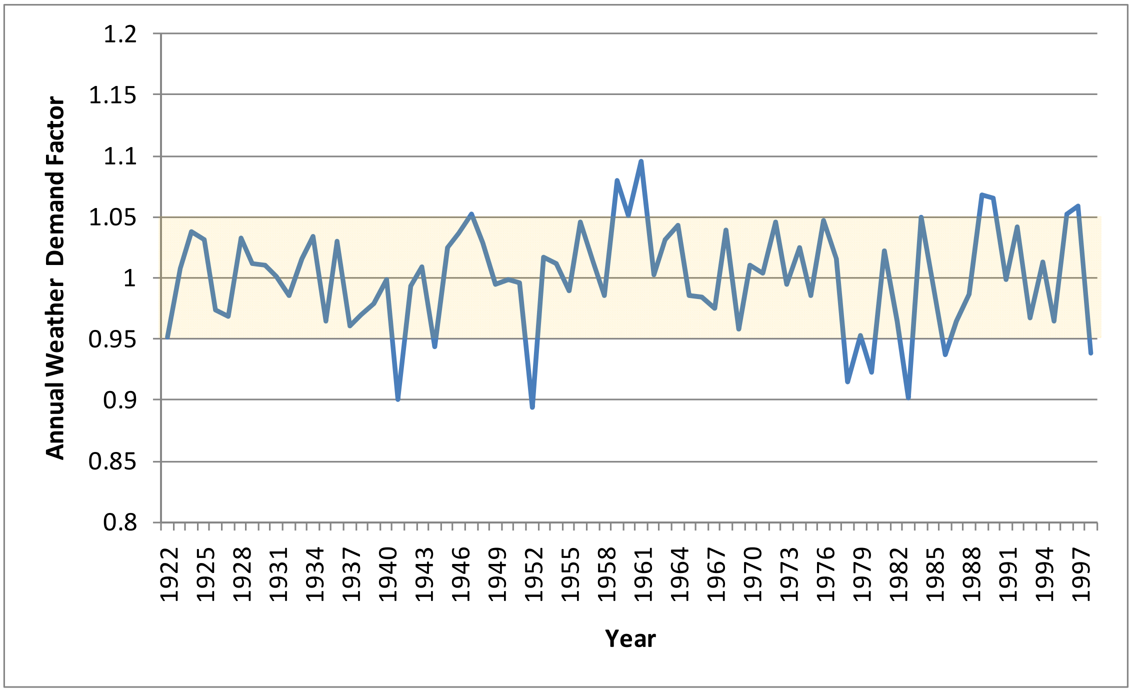


Figure B-3
Annual Weather Demand Factors

Imported water from the SDCWA and MWD is one of the most variable supplies. This variation is mainly due to hydrology in northern California. The imported water from the Colorado River is tempered by the massive storage of the system, which is over 10 times the storage on the State Water Project. Projected annual imported water shortages under varying hydrologic conditions from 1922-2004 (which extends beyond the SDSIM model hydrologic period of 1922-1998) were provided by MWD for the forecast period from 2010 to 2035[1]. These projected shortages were used to determine the amount of imported water supply available to the City, by applying the MWD percent shortage to the City's baseline imported water demand. Note that the SDCWA is pursuing additional sources of water that would help to offset these shortages (refer to Section 3 of the 2012 LRWRP report for assumed SDCWA supplies).

[1] Provided to the City by Grace Chan (MWD) on August 10, 2012. Data is based on IRPSIM model output developed for MWD's 2010 Integrated Resources Plan.

In addition to demand and imported water, local runoff was also modeled using historical hydrology. Local runoff records to each reservoir were used as input to the model, based on the year sequence corresponding to each hydrology. A monthly runoff factor was applied to the average runoff for the period 1922 to 1998, resulting in the actual runoff observed in a given month. Thus, if a simulation included hydrology conditions for the years 1947, 1948, and 1949, all reservoirs were applied factors that resulted in a runoff equal to the recorded runoff for those specific years. Figure B-4 shows actual runoff records from Morena Reservoir from 1922 to 1998, as an example of the data used for every reservoir in the SDSIM model.

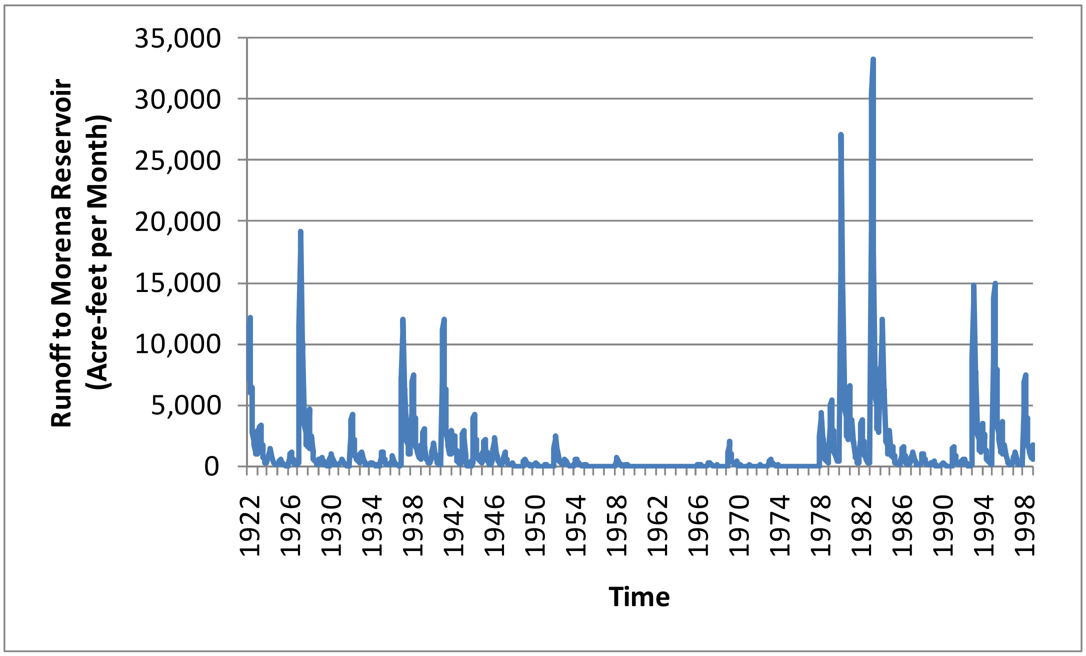


Figure B-4
Actual Runoff Records for Morena Reservoir

For the purposes of modeling and evaluation, four 30-year hydrologic traces were developed: (1) critically dry; (2) dry; (3) normal; and (4) wet. These four traces represented the most likely weather scenarios that the City could face. To determine the specific hydrologic years that went into each of these 26-year traces (from 2010 to 2035), cumulative hydrologic water supplies were generated. The cumulative supplies were generated by comparing local runoff and imported supplies for each hydrological year from 1922 to 1998. Those 26-year sequences with the lowest cumulative supply represented the critically dry hydrologies. It should be noted that not all the years included in the critically dry hydrology trace were dry, just that the cumulative sequence produced the lowest overall supply. Table B-1 presents the selection of the representative hydrologies used in the SDSIM model.

Table B-1 Selected Traces for Four Represented Hydrologic Scenarios			
Hydrologic Scenario	**Hydrologic Years Included in Trace**	**30-Year Cumulative Supply**	**Cumulative Probability**
Critically Dry	1986-1998/ 1922-1934[1]	7,736,386 AF	3%
Dry	1966-1991	7,800,511 AF	21%
Normal	1957-1982	8,028,701 AF	51%
Wet	1937-1962	8,141,005 AF	84%

[1] Trace starts with 1986-1998, then wraps around and begins again using 1922-1934 data.

B.2.4 Water Demands

Projected average annual demands were included in the model for the planning horizon between 2010 and 2035. The demands are based on the City of San Diego 2010 Update to the Long-term Water Demand Forecast (2010 Demand Forecast) , which categorizes demands based on each of the three major service areas tracked in the systems model: Miramar, Alvarado, and Otay. The demand forecast also includes crossover areas served by more than one treatment plant: Miramar/Alvarado and Alvarado/Otay. Demands within the crossover area are assumed to be split 50/50 to estimate total demand for each of the three major service areas as input to the systems model. For example, the total Miramar service area demand is equal to Miramar demand plus half of the Miramar/Alvarado crossover demand.

Water demands fluctuate not only from year to year but also from month to month. To account annual and seasonal fluctuations in projected average demands, annual weather demand factors (from Figure B-3) and monthly seasonal factors (provided in the 2010 Demand Forecast) are applied in the systems model. The monthly simulated demand is equal to:

Average annual demand		**Weather Factor**		**Seasonal Factor**
Tracked for each service area Divided by 12, to convert to average monthly demand	**X**	Varies from year to year (refer to Figure 3-2) Factor multiplied to every month within a given year	**X**	Varies from month to month

Demand management options such as additional conservation may be tested with the model. These options would decrease the average annual demand from the baseline projections.

B.3 Performance Measures

The systems model is a single model representing several systems (surface water, recycled water, groundwater, and imported water), and evaluates overall system performance of water supply portfolios (or combinations of options) against multiple planning objectives.

The 2012 LRWRP Stakeholder Committee defined the following eleven objectives, which formed the basis for evaluating performance of each portfolio:

- Provide Reliability and Robustness
- Manage Cost and Provide Affordability
- Maximize Efficiency of Water Use
- Provide for Scalability of Implementation
- Maintain Current & Future Assets
- Provide Local Control/Independence
- Maximize Project Readiness
- Protect Quality of Life
- Protect Habitats and Wildlife
- Reduce Energy Footprint
- Protect Quality of Receiving Waters

From these objectives, performance measures were developed. The performance measures are numerical values needed for the decision-making process; therefore, the model was programmed to provide output for these performance measures. Only quantitative performance measures were simulated in the model. Qualitative performance measures for each of the objectives are described in Appendix C.

Objective: Provide Reliability and Robustness

Supply reliability was measured in the model through two quantitative metrics:

<u>Cumulative Water Shortages Over Planning Horizon (Averaged Under Various Hydrologic Conditions)</u>
This performance measure calculates the cumulative water shortages over the planning horizon from 2010 through 2035 for a given portfolio, with water shortages classified as when the total demand for a given service area cannot be met by the available supply. The performance measure is based on the average cumulative water shortage of all four hydrologic conditions (critically dry, dry, normal, wet).

<u>Ratio of Emergency Supply to Six Tenths of Annual Demand</u>

Under City Council Policy 400-4, the City of San Diego is required to have available at all times a substantial emergency storage reserve equal to six-tenths of the annual demand for the entire city. The purpose of emergency storage reserve is to maintain water service in the event of a prolonged outage of the imported water system due to an earthquake, flood, or other catastrophe.

In order to evaluate this performance measure, the emergency storage requirements are calculated based on six-tenths of average annual demand, which increases over time. The emergency storage requirement is compared with the total supply available for the emergency condition. During an emergency condition, any local supplies would be available including conservation, reclamation (non-potable and indirect potable reuse), ocean desalination, groundwater, graywater and rainwater harvesting, and local reservoir supply.

The local reservoir supply available is limited by the pipeline capacities conveying water to the treatment plants for six-tenths of the year; therefore, the reservoir storage was compared to six-tenths of the year pipeline capacity in order to determine the reservoir supply available. Similarly, for groundwater storage options, supply is limited to production well capacities pumping water from the basin for six-tenths of the year; therefore the groundwater basin storage is compared to six-tenths of the year production well capacity in order to determine the groundwater basin supply available. For all other local supply options, the supply available is equal to the production over six-tenths of the year.

The performance measure is based on the ratio of supply available compared with demand for six tenths of the year. The average ratio over of the simulation period is calculated, and then the average is calculated for all four hydrologic conditions (critically dry, dry, normal, wet).

Objective: Manage Cost and Provide Affordability

Two quantitative performance measures are used to evaluate cost and affordability:

<u>Total Present Value Costs to The City PUD and Customers/Developers</u>

This performance measure accounts not only for the cost to the City which could affect water rates, but also the cost to customers/developers. Costs include operation of existing supplies and development of new options. The model calculates annual portfolio costs over the entire planning horizon (from 2010 to 2035) and discounts the total cost back to present value (PV). Annual portfolio costs over time include amortized capital payments, operation and maintenance costs, and costs to purchase imported water from SDCWA.

Model inputs include economic assumptions such as inflation rates, operation and maintenance (O&M) costs for existing supplies, capital and O&M costs for each option, projected SDCWA imported water rates, and water distribution and wastewater system costs.

Economic Assumptions

The following basic economic assumptions were used in the model:

- Inflation rate: 3% annually
- Capital Loan Interest rate: 5% annually
- Capital Loan Payment Period: 30 years
- Discount Rate: 5% annually
- Discount Period: 25 years (from 2010 to 2035)

The assumptions above apply to all new and existing options except for SDCWA imported water rates, which are expected to increase faster than inflation (as discussed subsequently).

Existing Local Supply Costs

The intent of the model is to compare relative costs of potential new options. Therefore, sunk costs such as existing capital payments were not included, nor were fixed costs to maintain the existing system. Variable operation and maintenance cost for local surface water supply, existing groundwater supply, and existing recycled water supply were included and inflated over time. However, since these existing supplies are included in all water resource portfolios, the variable O&M costs of existing supplies are the same among portfolios and the costs do not contribute to comparative cost differences during portfolio evaluations.

Table B-2 presents the assumed unit cost of existing supply in current dollars. For local surface treatment and groundwater pumping that produce potable water supplies, water distribution and wastewater system costs are also included.

Table B-2
Variable O&M Unit Cost of Existing Supply

Existing Supply	Water Supply Costs		Wastewater System Costs		Total Unit Cost[4], $/AF
	Supply O&M Cost (Current Dollars), $/AF	Distribution O&M Cost (Current Dollars), $/AF	Wastewater System Capital Costs[2], $/AF	Wastewater System O&M Cost[3], $/AF	
Local Surface Water Treatment	71 overall for current supply from all three treatment plants[1]	88	385	377	695
Groundwater Pumping	100	88	385	377	707
Recycled Water from North City WRP	662 (treatment and distribution)	Included in Supply O&M	0	0	662

[1] Ranges from $55/AF to $206/AF at individual treatment plants.
[2] The construction cost to upgrade Point Loma WWTP is currently estimated to be $1.2 billion. During the time of 2012 LRWRP analyses, it was assumed that the cost would be $1.052 billion and expressed in volumetric terms of wastewater treated. This is used as a proxy to illustrate that these supplies produce wastewater flows and costs at Point Loma WWTP. This does not represent the actual cost to upgrade Point Loma, which varies depending on total system-wide wastewater flows that are generated.
[3] Based on current average volumetric cost of wastewater collection, treatment, and solids handling. Assume 40 percent of supply yield is used for indoor applications. Note that treatment O&M costs would increase with upgrades to Point Loma Wastewater Treatment Plant (WWTP).
[4] Total unit cost is weighted average assuming 100 percent of supply and wastewater system capital unit costs, and 40 percent of wastewater system O&M unit costs (assuming 40 percent of supply yield is used for indoor applications and requires wastewater treatment).

Options Costs

Planning level estimates of total capital costs and O&M were developed for individual options. Costs for new options represent the incremental new capital, operational, or program costs. Traditionally, cost comparison of water supply options has only included the capital and operating costs to produce the water supply. However, in order to fully compare options, the major costs of distributing the water supply and costs associated with wastewater collection, treatment and discharge were added to this analysis. This is important because not all water supply options require water distribution or wastewater costs. In fact, some options actually reduce wastewater costs for the City. For example, increased recycling can help offload wastewater treated at Point Loma WWTP and help avoid some costs associated with infrastructure improvements at Point Loma WWTP for secondary treatment upgrades. The level of avoided costs depends on the magnitude of wastewater that could be recycled.

Table A-2 (in Appendix A) and Figure B-5 provide a summary of capital, supply and distribution O&M cost, imported water costs, and wastewater (WW) system costs in current dollars.

For on-site rainwater harvesting options (cisterns and rain barrels) and graywater options, it is assumed that the capital costs are phased in over time as implementation grows and more devices are installed. As such, the annual capital costs (a function of the number of devices installed in a given year) will increase with inflation. For all other options, it is assumed that capital costs would be paid through a bond or loan. The model calculates capital payments by inflating to the assumed implementation year, then amortizing the payment based on the interest rate and payment period.

Annual O&M and purchases costs ($/AF) are inflated over time, starting in the assumed implementation year. Note that the only option with a purchase cost is ocean desalination (purchased from the project proprietor). In addition, annual conservation costs are expected to vary over time depending on the best management practices that are being implemented in a given year.

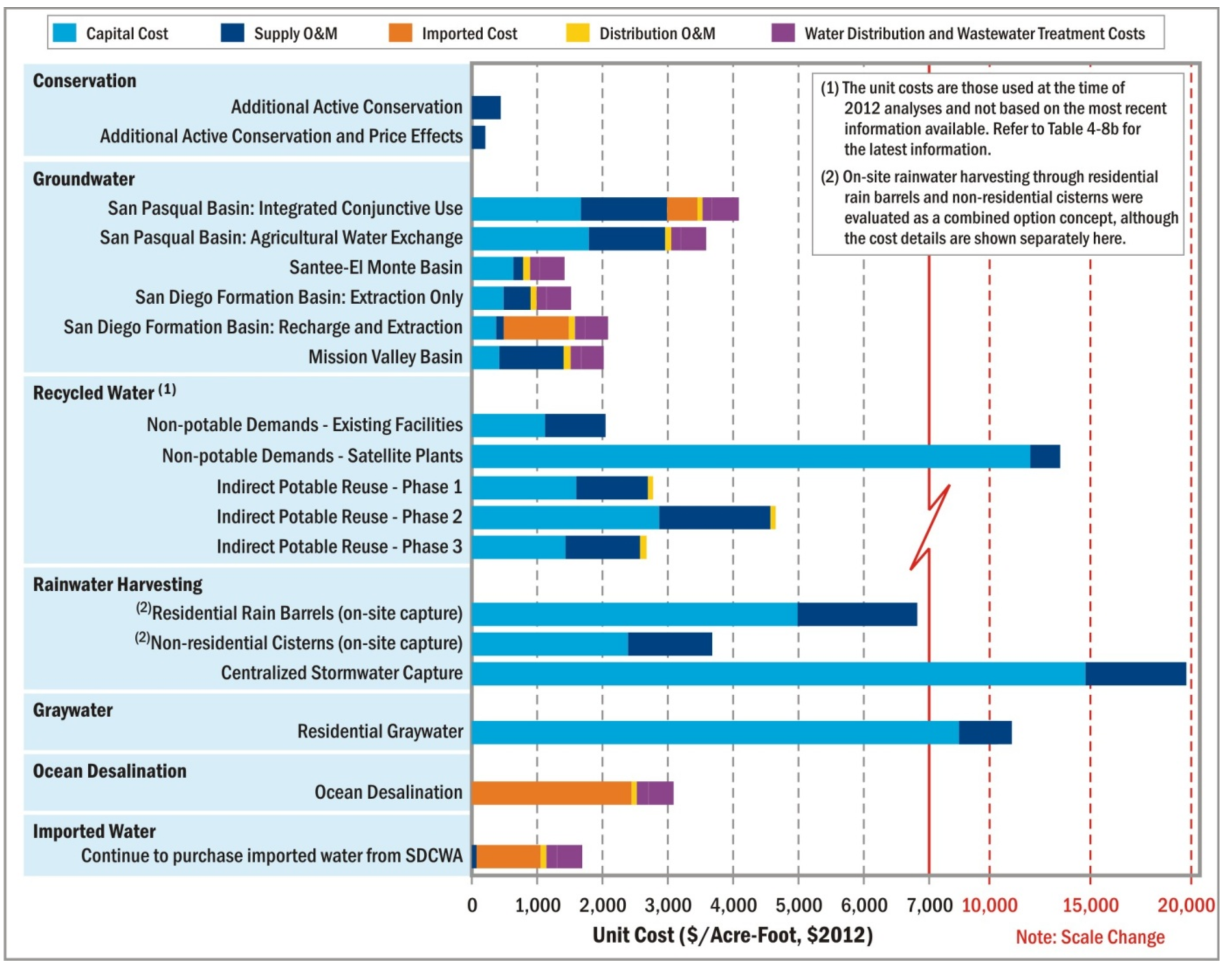


Figure B-5
Unit Cost Breakdown of New Options

SDCWA Imported Water Purchases

The City purchases imported water from the SDCWA. Projected water rates for imported supply are expected to increase faster than inflation, primarily due to rising energy costs, future MWD and SDCWA capital improvements, and the enormous cost of implementing a comprehensive solution in the Delta. Figure B-6 shows projected SDCWA fixed and total volumetric rates for untreated water. The volumetric rate (cost per unit volume of water used) includes the purchase cost plus the cost of transportation. The fixed costs do not vary and cannot be reduced based on the volume of water purchased per year.

The SDCWA volumetric imported water rate (untreated purchase rate plus transportation) is assumed to escalate at 6 percent annually through 2016, 4.5 percent annually from 2017 to 2020, and 3 percent annually from 2021 to 2035. Fixed annual costs for SDCWA imported water are assumed to escalate at 3 percent annually throughout the planning horizon.

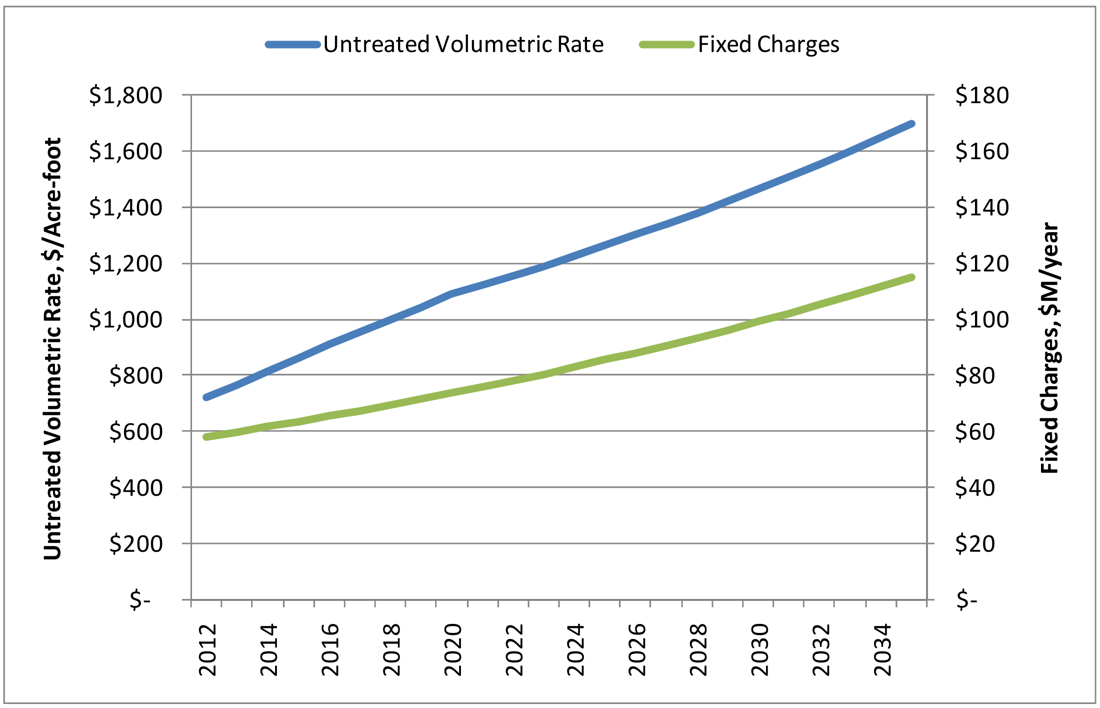


Figure B-6
Projected SDCWA Water Rates

Wastewater System Costs

In order to illustrate the total cost of each individual option (existing and new), the wastewater costs were expressed in volumetric terms in Tables B-2 and A-2 (in Appendix A). However, the SDSIM model evaluates wastewater system costs based on system-wide wastewater flows that are generated and treated at Point Loma Wastewater Treatment Plant (WWTP). Currently, system-wide dry weather wastewater flows are approximately 160 million gallons per day (mgd), and are expected to grow to about 195 mgd by 2035[2]. New options such as recycling, graywater, and indoor conservation can help

[2] City of San Diego Recycled Water Study, Table 4-3, July 2012.

offload wastewater treated at Point Loma WWTP and help avoid some costs associated with infrastructure improvements at Point Loma WWTP for secondary treatment upgrades. The overall wastewater system costs depend on the amount of wastewater flows that can be offloaded from Point Loma WWTP and are presented in Table B-3; however, it is important to note that these estimates were used for modeling purposes in SDSIM only and do not reflect the most recent cost estimates resulting from other studies conducted in parallel with the 2012 LRWRP. The SDSIM model calculates wastewater system costs based on projected status quo wastewater flows and the total level of wastewater flows that are offloaded by new options included in each portfolio.

Table B-3
Estimated Point Loma Wastewater Treatment Plant Costs
(Source: City of San Diego Recycled Water Study TM 8, Figure B-2 and B-3, August 2011)

Wastewater Flow, MGD	Construction Cost (Millions)	Annual O&M Cost (Millions)
0	---	---
10	---	---
20	---	---
30	267.266	3.5155
40	283.138	4.6875
50	299.010	5.8595
60	343.566	9.347
70	358.432	10.905
80	373.298	12.463
90	388.164	14.021
100	403.030	15.579
110	684.289	14.877
120	706.358	16.117
130	728.427	17.357
140	750.496	18.597
150	772.565	19.837
160	794.634	21.077
170	816.703	22.317
180	838.772	23.557
190	1024.804	29.865
200	1052.080	31.393

NOTE: The 2012 LRWRP was conducted in parallel with the City's Recycled Water Study that was recently completed in July 2012. The values in this table do not reflect the final numbers resulting from the Recycled Water Study. The estimates in this table were used for SDSIM modeling purposes as a proxy for wastewater system costs during the time of 2012 LRWRP evaluations.

Calculation of Performance Measure

For each portfolio, the total costs are calculated on a monthly basis over the planning horizon (2010 to 2035). Portfolio cost calculations are divided into four general steps:

1) Calculate total supply O&M costs of existing sources, escalated over the planning horizon

2) Calculate the total supply cost of new options (capital and O&M), escalated over the planning horizon

3) Calculate imported water purchase costs, escalated over the planning horizon

4) Calculate the distribution O&M costs for existing and new options that require distribution, escalated over the planning horizon

5) Calculate the wastewater system costs (capital and O&M), escalated over the planning horizon

6) Sum the annual escalated costs (from Steps 1 through 5 above) and discount back to present value costs

The total PV cost over the planning horizon was calculated, and then averaged for the four hydrologic conditions (critically dry, dry, normal, and wet).

It is important to note that potential grant funding is not reflected in the cost analysis.

Amount of City PUD annual capital costs relative to total annual costs to City PUD

This performance measure considers only the costs to the City, and does not include costs to customers/developers for options that involve on-site costs. For this performance measure, both annual capital and total costs to the City are tracked for each portfolio in escalated dollars (costs are escalated similar the previous performance for total present value cost). For each year, the ratio of annual capital cost to total cost to the City is calculated on a annual basis. The ratio is averaged over the planning horizon, and then averaged for the four hydrologic conditions (critically dry, dry, normal, and wet).

It is important to note that potential grant funding is not reflected in the cost analysis.

Objective: Maximize Project Readiness

Evaluation of this objective is based on qualitative performance measures described in Appendix C.

Objective: Protect Quality of Life

One quantitative performance measure was used to evaluate the quality of life objective:

Potential for local job creation

In order to compare the potential for job creation among portfolios in SDSIM, a formula was developed based on information from the IMPLAN (Impact analysis for PLANning) system for the San Diego region. The IMPLAN system is a complete economic impact modeling and database system, with unique data across 440 sectors for each specific region (data is available for approximately 3,000 counties in the United States).

In order to estimate the potential for job creation from development of water supply options, 2009 data was used from IMPLAN system for the San Diego county region under Sector 33 (Water, sewage and other treatment and delivery systems) and Sector 36 (Construction of other new nonresidential structures). The 2009 data was available at the time of the LRWRP analyses, and updates are not expected to significantly change the comparative analysis among portfolios.

The following is the proxy formula used to calculate potential for job creation for each portfolio:

Potential for temporary construction jobs = (Total Capital Cost)/(Output per worker for IMPLAN Sector 36) = (Total Capital Cost)/$136,885

Potential for long-term jobs = (Average annual operation and maintenance cost)/(Output per worker for IMPLAN sector 33) = (Average annual operation and maintenance cost)/$241,788

For each month of the simulation, the overall potential for job creation is calculated as the combination of the potential for temporary construction jobs and potential for long-term jobs. Note that the temporary construction jobs are assumed to last for 3 years from the time of project implementation (when capital costs are assumed to be incurred). The overall average potential for job creation is calculated over the simulation period, and then the average is calculated for all four hydrologic conditions (critically dry, dry, normal, wet).

It is important to note that these formulas were used to develop a gross potential job creation index for high-level planning comparisons of water resource portfolios, and do not represent refined estimates of number of jobs created for specific projects.

Objective: Protect Habitats and Wildlife

Evaluation of this objective is based on qualitative performance measures described in Appendix C.

Objective: Maximize Efficiency of Water Use

One quantitative performance measure was used to evaluate quality of life:

<u>Cumulative Level of Water Conservation and Reclamation Over the Planning Horizon</u>

The objective of maximizing efficiency of water use means efficiency in how water is used and how waste is recovered or minimized. This performance measure calculates on a monthly basis the 1) total water conservation including existing conservation and additional conservation options, and 2) total reclamation through non-potable and indirect potable reuse. The cumulative water conservation and reclamation is summed over the planning horizon, and then the average is calculated for all four hydrologic conditions (critically dry, dry, normal, wet).

Objective: Provide for Scalability of Implementation

Evaluation of this objective is based on qualitative performance measures described in Appendix C.

Objective: Maintain Current & Future Assets

One quantitative performance measure was used for the objective to maintain current and future assets:

<u>Cumulative amount of water supplied from existing drinking water treatment plants, recycled water plants, and groundwater sources</u>

This objective aims to utilize the City's existing assets which include facilities and rights to water supply. On a monthly basis, the model calculates the total water supplied from 1) existing drinking water treatment plants, 2) existing recycled water plants, and 3) local groundwater sources originating from natural replenishment. For existing treatment plants, the utilization of the plants is accounted for regardless of the origin of the source water or the end use of the product water. For example, existing treatment plants currently treat local surface supply but could also treat advanced treated recycled water though indirect potable reuse with reservoir augmentation. In addition, existing recycled water plants could provide water for non-potable reuse, or treated effluent water could undergo additional advanced treatment for indirect potable reuse.

The cumulative amount of water supplied from existing drinking water treatment plants, recycled water plants, and groundwater sources is calculated over the planning horizon, and then averaged for all four hydrologic conditions (critically dry, dry, normal, wet).

Objective: Provide Local Control/Independence

One quantitative performance measure was used for the objective to provide local control/independence:

Total Local Resources

The majority of the City's current water supply is imported water purchased from the SDCWA, which in turn purchases imported water from MWD. The future reliability of imported water is uncertain with increased concern over shortages due to drought, environmental restrictions, climate change, and seismic catastrophes. In addition, the cost of imported water is expected to increase significantly and prices are not controlled by the City. This objective aims to reduce dependence on imported water by developing local resources. Local resources include any non-imported supply, such as conservation, groundwater, recycled water, stormwater, and ocean desalination.

For this performance measures, the total supply from local resources is calculated on a monthly basis. The total cumulative supply from local resources is calculated over the planning horizon, and then averaged for all four hydrologic conditions (critically dry, dry, normal, wet).

Objective: Reduce Energy Footprint

One quantitative performance measure was used for the objective to reduce the energy footprint of the City's water sources:

Cumulative carbon dioxide (CO_2) emissions from water sources

Greenhouse gas emissions are calculated based on typical per unit energy requirements for each source of water supply, including energy requirements for distribution and wastewater treatment if applicable. The energy required was converted to carbon dioxide equivalents. While imported water sources have different sources of energy than local water resources, it is assumed that all water resources use the same energy resource for simplicity. Therefore, portfolio variations in carbon dioxide emission for this analysis are a reflection of the energy required to produce water; not the type of energy used for each water resource.

Figure B-7 presents the approximate carbon dioxide emissions per acre-foot (AF) assumed for each type of water source. Greenhouse gas emissions from energy used to produce water supply (treatment and major conveyance) are accounted for, as well as energy required for wastewater treatment where applicable (options that produce potable water can be used indoors and generate wastewater that must be treated). In this analysis, it is assumed that 40 percent of potable water produced is used indoors. The emissions per AF in Figure B-6 are estimated based on information regarding unit emissions provided in a report prepared by the Equinox Center titled *San Diego's Water Sources: Assessing the Options* dated July 2010 and other similar analyses performed by CDM Smith.

Note that the analysis does not account for potential energy generation from water supplies that may offset greenhouse gas emissions. For example, the San Pasqual Integrated Conjunctive Use and

Groundwater Desalination Project could potentially generate hydropower which may offset some of the greenhouse gas emissions from this water source.

The total carbon dioxide emissions from water supplies are calculated in each month of the simulation based on 1) the CO2 emissions per AF of each source, and 2) the use in AF per month of each water source as a supply to meet demands. The cumulative carbon dioxide emissions over the planning horizon are calculated, and then averaged for all four hydrologic conditions (critically dry, dry, normal, wet).

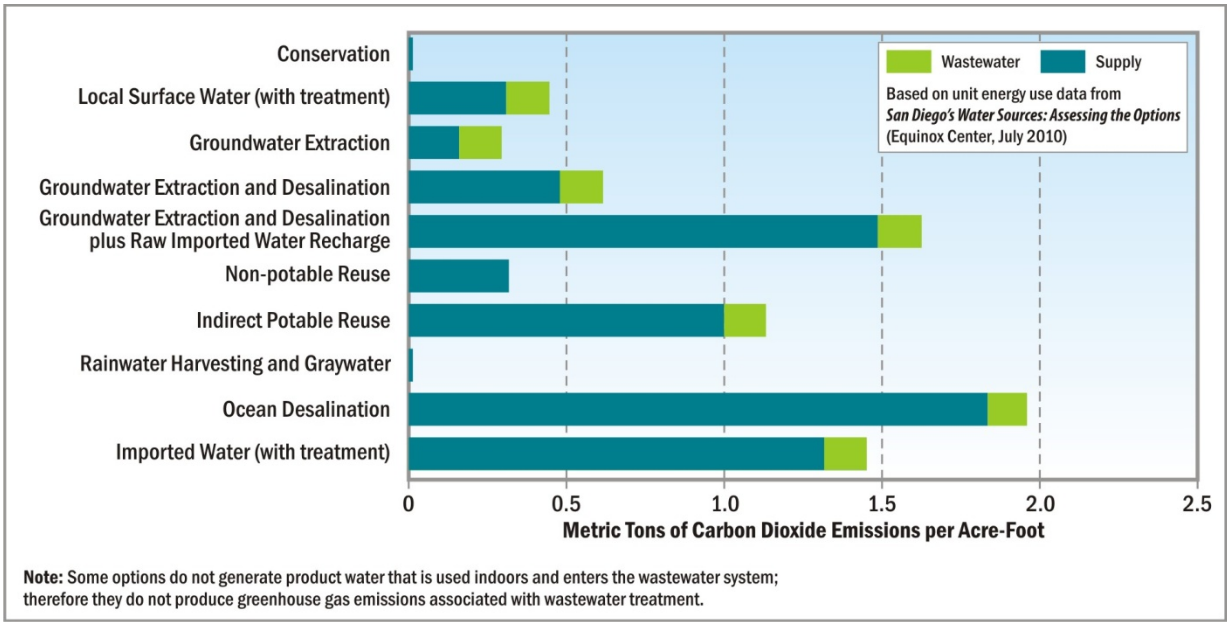


Figure B-7
Carbon Dioxide Emissions per Unit Volume of Water Source
(Note: the emissions for imported water are based on pumping from the Bay-Delta, as this represents MWD's marginal water supply)

Objective: Protect Quality of Receiving Waters

Two quantitative performance measures were used for the objective to protect the quality of receiving waters:

Cumulative Reduction in Stormwater And Wastewater Discharges to Rivers and Ocean

Reducing discharges of stormwater and wastewater to rivers and the ocean can help improve water quality conditions. This performance measure accounts for 1) reduced stormwater discharges through implementation of urban stormwater capture options (both centralized capture as well as onsite capture with cisterns or rain barrels), and 2) reduced wastewater discharges through implementation of conservation and reclamation. It is assumed that 40 percent of new conservation savings are through reduced indoor consumption, thereby reducing wastewater generated. Other options that reduce wastewater discharges include graywater, non-potable reuse, and indirect potable reuse.

The reduction in stormwater and wastewater discharges is calculated on a monthly basis in the model. For this performance measure, the cumulative reduction in stormwater and wastewater discharges over the planning horizon is calculated, and then averaged for all four hydrologic conditions (critically dry, dry, normal, wet).

Concentration of Total Dissolved Solids (Salts) in Water Supply

Total dissolved solids (TDS) concentrations for each potable water supply option, excluding water conservation, were determined based on historic records and/or projected water quality of options currently not in place (i.e., indirect potable reuse, ocean desalination, etc.). A mass-balance of supplies was programmed into the model in order to track the total salinity for each portfolio. By multiplying the water supply's TDS concentration by the water supply yield, a TDS load is calculated and totaled for the entire San Diego supply. The total TDS load is then divided by the total San Diego supply yield to obtain an overall TDS concentration for each simulation. The following formula was used to calculate the TDS of the potable supply in the portfolio:

$$PortfolioTDS = \frac{(TDS)_{Option(1)} * (Flow)_{Option(1)} + \ldots + (TDS)_{Option(N)} * (Flow)_{Option(N)}}{\sum_{i=1}^{N} (Flow)_{Option(i)}}$$

The portfolio TDS values are calculated on a monthly basis in the model. For this performance measure, the average potable TDS values over the planning horizon is calculated, and then averaged for all four hydrologic conditions (critically dry, dry, normal, wet).

B.4 Quality Control

The SDSIM model was subject to quality control process. All data used in the model was obtained from information developed or compiled by CDM Smith technical staff, and was reviewed by senior CDM Smith staff. The modeling approach was discussed with the City in various work sessions.

The model was subject to a detailed review for flow and stock magnitudes and dynamics, mass conservation, dimensionality, and response under extreme input conditions. The model used explicit representation of units in every equation, forcing unit consistency. In addition, a 30-year historical hydrology record was used to validate the output for the use of local reservoir water, obtaining a mean error (mean over the 30-year simulation) on the order of ±3 percent of supply.

Frequent and effective communication with City staff was established to guarantee that any model reprogramming, and all of the assumptions for development of the most important response functions, were consistent with existing information about the system and congruent with modeling objectives. The conceptual nature of the model provided opportunity for validating most of the response functions using simple spreadsheets.

B.5 Simulation Process

The simulation setup process for the SDSIM model is facilitated by the use of a graphical interface based on switches that set the hydrology and turn options on and off. Figure B-8 shows the graphical management panel developed for the systems model.

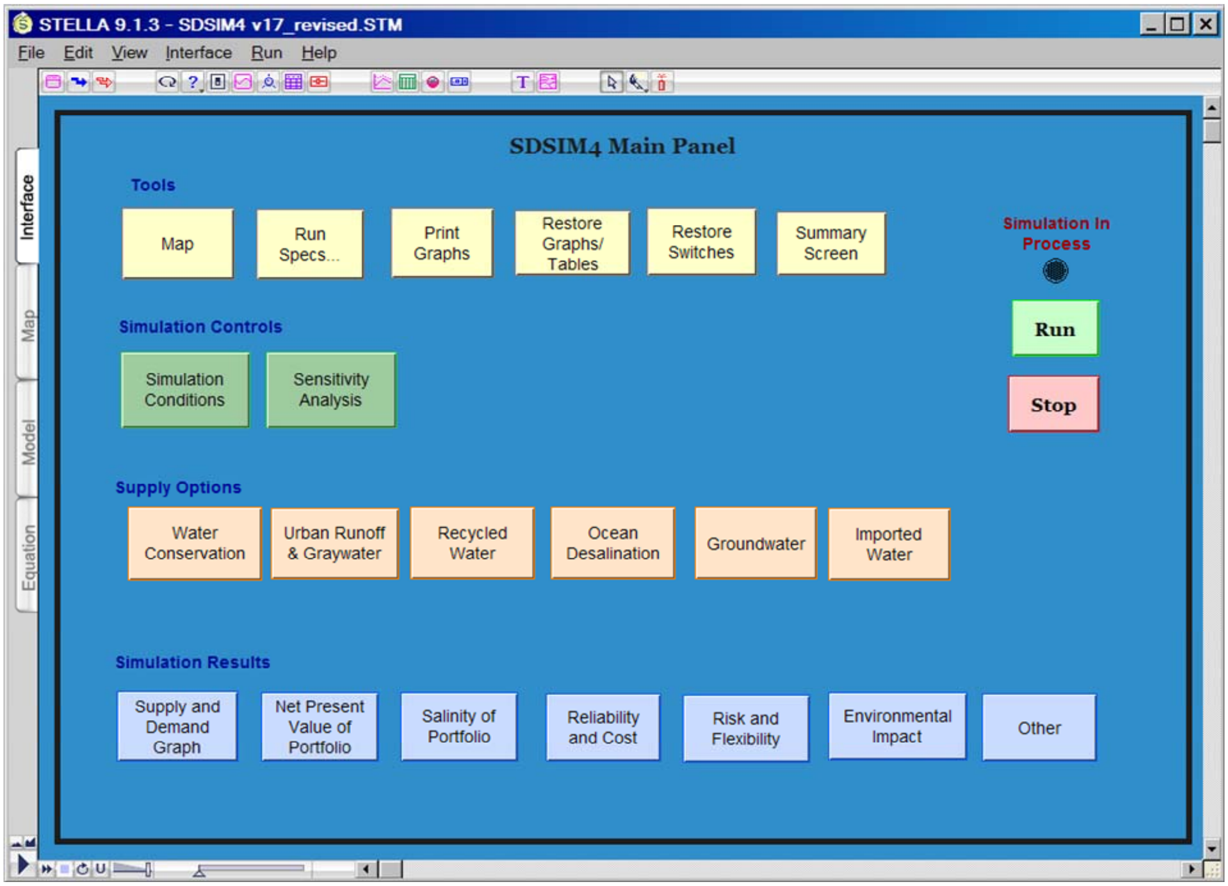


Figure B-8
SDSIM Model Management Panel

As Figure B-8 shows, the following options were included in the model in addition to local reservoir water, which was used in the model by default with no associated management decisions:

- Conservation: existing conservation (included in all simulations by default) and additional conservation efforts
- Rainwater Harvesting (or Urban Runoff): cisterns & rain barrels, as well as centralized stormwater
- Graywater
- Water reclamation: Includes the existing water reuse, new non-potable demand from satellite plants, new non-potable demand from existing reclamation plants, and/or varying phases of indirect potable reuse.
- Ocean desalination
- Groundwater: the existing groundwater supply, the Mission Valley Basin option, the San Pasqual options, the San Diego Formation Basin options, and the Santee – El Monte Basin option

Other supply options (Other Groundwater, Water Transfers, Marine Transport, and New Non-Storage Supply) are from the previous version of the model and were not updated as part of the 2012 LRWRP. It is not recommended to run these options as they may no longer be correctly represented in the model.

To run the model, the user switches on desired water supply options for the portfolio by clicking on the appropriate buttons (refer to Section 5 of the 2012 LRWRP report for definitions of portfolios). Each project alternative or "portfolio" was represented by a unique set of inputs to the model, which were entered into the model through the management panel.

The desired hydrology condition must be selected before running the simulation, because results can vary significantly depending on the hydrologic conditions. For the LRWRP portfolio analysis, all four hydrologic conditions were simulated (Critical Dry, Dry, Normal, and Wet).

In addition to the main inputs included in the management panel, the model was programmed to provide easy manipulation of certain variables for sensitivity analysis. Input variables were programmed for the following sensitivity analyses:

1. **Delta Fix:** No imported water shortages, although this assumes higher imported costs where SDCWA volumetric rates increase at 6 percent through 2020, 4.5 percent through 2025, and 3 percent through 2035 (compared with assumed base rates in Figure B-6).

2. **Higher Energy Costs:** Higher energy costs, which affect cost of operations. Energy cost factors are applied to all existing and new supplies.

3. **Lower Treatment Technology Costs:** Lower operation cost for advanced treatment technologies used for indirect potable reuse and brackish groundwater treatment.

4. **Climate Change:** Potential climate change impacts to water supplies based two global circulation model scenarios (refer to Appendix E for details).

The default simulation setup (under 'Run Specs') is a monthly timestep for26 years (312 months) to represent the 2012 LRWRP planning horizon through 2035. If the climate change sensitivity is selected, however, the simulation setup should be changed to run on a monthly basis for a total of 924 months. This is because the climate change sensitivity simulations represent the 2035 planning year over 77 years (or 924 months) of varying hydrologic conditions.

Results from the model are exported from a STELLA table (Export Table 2012) to an Excel portfolio output file. The Excel output file was then used for post-processing of data to develop scorecards for comparison of portfolio performance in each objective (refer to Appendix D for portfolio performance results from the SDSIM model).

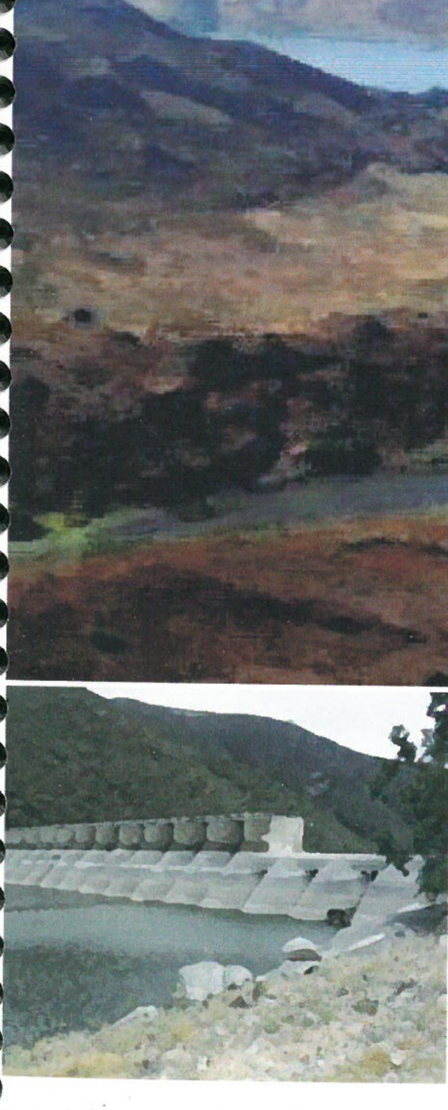
Brown AND Caldwell

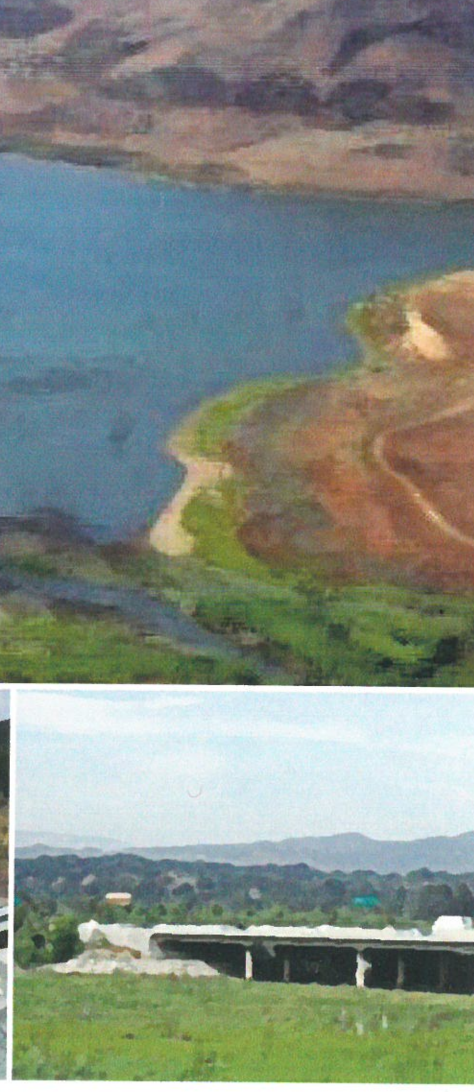
City of San Diego PUBLIC UTILITIES Water & Wastewater

City of San Diego Public Utilities

Lake Hodges Reservoir Water Quality Assessment Study
Draft Conceptual Planning Report

March 19, 2014





Executive Summary

Project Overview

Owned and operated by the City of San Diego (City) Public Utilities Department, Lake Hodges Reservoir (Lake Hodges or reservoir) is located in the San Dieguito Hydrologic Unit in San Diego County, California, and has a maximum capacity of 30,251 acre-feet with 303 square miles of upstream catchment area. It is an important part of the San Diego County Water Authority (SDCWA) Emergency Storage Projects and is needed to increase the ability to deliver water within San Diego County during significant water supply shortage. Currently, the dominant and overarching beneficial use of Lake Hodges is as a source of drinking water supply to the San Dieguito Water District/Santa Fe Irrigation District. Construction of the Hodges Pump Station and Lake Hodges-to-Olivenhain pipeline will allow Lake Hodges to be used for storage and supply to the regional water supply system operated by the SDCWA and, thus, additional usable resource of local water for the City to deliver to its treatment plants.

Lake Hodges has several water quality challenges addressed in this report. Major water quality issues include algal productivity and eutrophication. Water quality impairments include exceedances in pH, manganese, turbidity, nitrogen and phosphorous, as well as elevated mercury and methylmercury in reservoir fish.

Objectives

The project has two main objectives:

1. Develop in-lake management actions to manage and control excessive algal productivity; and
2. Perform actions to address the 303(d) listings of water quality impairments.

Description of Water Quality Issues

Algal Production and Eutrophication

The fundamental water quality issue that needs to be addressed at the Lake Hodges Reservoir is excessive algal production or eutrophication. High algal productivity impairs the usability of the reservoir as a drinking water source because of taste and odor events, high levels of disinfection by-product precursors, filter clogging, high turbidity, and contribution to anoxic conditions in the reservoir's deeper water. Thus, managing odor and taste producing algal is key to restoring and sustaining Lake Hodges' dominant and overarching beneficial use as a source of drinking water supply. Excessive loading of nutrients (in forms of nitrogen and phosphorous) and organic carbon—both external nutrient loading from the catchment and internal nutrient cycling within the reservoir—fuel high algae productivity.

Water Quality Impairments

The Regional Water Quality Control Board, San Diego Region (RWQCB) 2008 Clean Water Act Sections 305(b) and 303(d) Integrated Report states that Lake Hodges currently does not meet water quality objectives for the following five parameters: pH, manganese, turbidity, nitrogen and phosphorous. This assessment means that current Lake Hodges conditions no longer fully support one or more of its beneficial uses. In addition, in the *Statewide 2010 Integrated Report (Clean Water Act Section 303(d) List)*, the State Water Resources Control Board included mercury to the list of pollutants causing impairment in Lake Hodges. The mercury listing is based on findings in the 2009 Surface Water Ambient Monitoring Program report entitled *Contaminants in Fish from the California Lakes and Reservoirs*.

Reservoir Site and Lake Management Objectives

The Lake Hodges Reservoir Water Quality Assessment Project is limited to identifying potential in-reservoir improvements and seeks to accomplish the following objectives:

1. Evaluate existing data and records of algal (taste and odor producers) productivity, nutrients, organic carbon and contaminants in Lake Hodges. In addition, determine if trends exist and how any trends will affect the future use of Lake Hodges water in the local and regional water supply systems.
2. Review ongoing/proposed studies and determine possible impacts they may have on the Lake Hodges Reservoir Water Quality Assessment Study.
3. Evaluate methods to improve Lake Hodges water quality using the Dynamic Reservoir Simulation Model–Water Quality (DYRESM-WQ) model.
4. Produce a plan to reduce levels of pollutants in Lake Hodges that contributes to its 303(d) listed water body status.
5. Evaluate how water quality changes in Lake Hodges will impact the growth or death of Quagga Mussels. If proposed remediation methods to improve water quality stimulate Quagga growth, Consultant shall develop methods to eliminate Quagga mussels generated as a result of proposed remediation methods.

Recommended Plan

Working closely with agency staff, the Brown and Caldwell (BC) team identified and evaluated several potential alternatives to improve Lake Hodges water by decreasing algae production while addressing non-attainment issues. Details of the recommended alternatives are provided in Section 4 and Appendix A.

BC combined the alternatives into an overall plan with several key components, presented in order of implementation priority:

- **Speece Cone hypolimnetic oxygenation system (HOS).** The HOS would add dissolved oxygen to the reservoir's bottom water, to prevent anaerobic conditions from occurring. Anaerobic conditions occur because algae grown near the surface eventually die and sink where bacteria breakdown the algae and similar detritus and use up available oxygen. Ending anaerobic conditions stops internal nutrient cycling. It also greatly decreases or ends methylmercury generation. The City would implement HOS by installing a Speece Cone oxygenation system in the reservoir's deepest water near Hodges Dam. Shoreline equipment would generate about 1 to 3 tons per day (tpd) of higher purity oxygen gas (about 93 percent oxygen by volume) for transfer into the submerged Speece Cone and pump system for dissolution and discharge horizontally across the bottom. An alternative of increasing the oxygen input to up to 6 tpd is also included.

  Since modeling results from Water Quality Solutions point to considerable uncertainty in the sediment and hypolimnion oxygen demands, BC recommends that the City undertake sediment oxygen demand testing using sediment cores and bench-top reaction chambers from five to ten locations around the reservoir. Such testing will help quantify oxygen demand more definitely.
- **Vigorous epilimnetic mixing (VEM) with algae scum corralling.** VEM would mix shallow reservoir areas to discourage the growth of potentially toxic blue green algae. VEM would use three shallow water diffuser lines each about 3,000 feet long, supplied by an air compressor system installed near the recreation area boat ramp. VEM also concentrates the algae so that it could be pumped off to a wetland for removal. VEM would add oxygen to the reservoir's shallower water.

- **Wetland filters for algae and other pollutants.** A floating pump station located along the south shoreline would pump water skimmed from the reservoir's top half meter through a pipeline laid on the reservoir bottom, to the eastern, upstream end of a constructed wetland. A constructed wetland of about 25 surface acres located just west of the Interstate 15 bridge would receive water skimmed from the reservoir surface. Wetland depth would be about 2 feet; it would provide about two days of residence time. The wetland plants, likely bulrushes, would filter out the algae. Smaller organisms living together with the plants would decompose the algae and filtered water would discharge back into the reservoir.
- **Biomanipulation.** For Lake Hodges, biomanipulation would focus on harvesting carp that stir up the bottom sediments and hence recycle nutrients and netting out small fish that feed on zooplankton (good organisms that feed on algae).
- **Algaecides/molluscicides.** If Quagga mussels (or other deleterious organisms) establish themselves in Lake Hodges, the City could apply molluscicides for control.

The agencies should note that they could implement biomanipulation through fish removal in parallel with HOS. That approach could show rapid implementation if required to encourage the public about overall progress while helping to achieve overall project objectives.

Preliminary Cost Estimate

Table ES-1 summarizes the estimated order-of-magnitude capital costs for implementing the Reservoir HOS, Mid-Lake VEM, and Upper Wetland filters. These costs are current to the San Diego Area Winter 2014 and include a contingency allowance of 40 percent and an allowance of 25 percent for engineering, legal, and administrative costs. For project Alternatives that require more significant environmental planning and permitting efforts, such as Alternative 3, the Engineering and Administrative costs are estimated at 30 percent. Details of the preliminary cost estimate are provided in Appendix B.

Table ES-1. Estimated Order-of-Magnitude Capital Costs for Lake Hodges Reservoir Algae Control Alternatives

Alternative		Capital Cost (million dollars)	Engineering and Administrative Cost*	Total Project Cost (million dollars)	Comments
Number	Description				
1	Reservoir Hypolimnetic Oxygenation System	2.3	0.5	2.8	Based on a system production rate of 3 tpd. Larger systems would affect the capital cost of this alternative, e.g., a 6-tpd system would add about $0.6 Million.
2	Mid-Lake Vigorous Epilimnetic Mixing	1.1	0.3	1.4	The VEM system is being implemented to enhance surface mixing and considered a demonstration system.
3	Upper Wetlands Filtering	7.5	2.3	9.8	Upper Wetlands for algae filtering is based on an estimated 30-acre site with a net 25-acre area for water treatment.

Table 3-2. Seventeen Methods for Lake/Reservoir Water Quality Management			
Method		Applicability for Lake Hodges	Use
1	Dredging	Not applicable except in limited areas. Has high cost and likely results in limited benefit (?) – may be benefit with new water source	No
2	Water level fluctuation	Occurs already. Lake Hodges shows no edge weed problems.	No
3	Mixing and/or destratification	High applicability for VEM in shallower, mid-reservoir regions, de-stratification near dam not advisable (see Item 11)	Yes
4	Macrophyte harvesting	None present, weeds not a current problem	No
5	Wetland filters (off-line)	High applicability, locate above reservoir's upper end of reservoir; can also be used for treatment of summer and some winter urban contaminated runoff.	Yes
6	Algae harvesting	Possible for blue-green algae scums, but only in conjunction with Method 5 in algae corralling device. Attached green algae in shallow areas could be harvested but do not appear to present a future problem.	Yes
7	Selective withdrawal of hypolimnion	Occurs already via deep drinking water outlets. Deep water quality will improve considerably with HOS installation and operation.	Yes
8	Dilution/flushing	Will occur with new pump storage but is not factored in eutrophication concepts. Volumes exchanged from deeper water probably not large enough to cause large algal reduction	TBD
9	Sediment sealing (fabrics)	Not applicable, no rooted weed growths around docks or beaches	No
10	Algaecides/herbicides or molluscicides	Emergency use only; high cost and regulatory problems downstream after WWTP (e.g., aquatic biota sensitive to copper [Cu]). Molluscides might be appropriate if future conditions warrant their consideration. Improved products apparently are becoming commercially viable.	Rare
11	Oxygenation/aeration	Oxygenation in lower stratified reservoir (added using the HOS) would reduce internal nutrient loading & eliminate much taste and odor	Yes
12	Shading/dyes	Not applicable; reservoir too large so cost high and benefits would have limited duration, only for month or two	No
13	Sediment sealing (chemical, alum, etc.)	Possible application but large storm water P-loads and exchange with upper P-rich shallow waters make cost of regular applications high. Not needed if other methods work	No
14	Pathogens/diseases of algae	Not recommended; method still in research, immunity buildup in BGA and cost high for larger reservoirs	No
15	Grazers (on algae or macrophytes)	Not needed since Lake Hodges has no macrophyte problem. Algae grazing by zooplankton will be enhanced using Method 11 and Method 17	No
16	Nutrient harvesting from fish/weeds	Not recommended as standalone; only few percent annually can be removed at best but some removal will occur as part of Method 17	No
17	Biomanipulation	Recommended: remove carp and excess tiny fish that eat large zooplankton (Method11) and consider a new design floating or static wetland refuges for zooplankton to compensate for the lack of shoreline submerged plants.	Yes

TBD = To Be Determined when modeling results are available; WWTP = wastewater treatment plant wastewater treatment, has not overcome bottom water heating as it passes through the shore-based system. In contrast, the Speece Cone system is all located in the deepest water and causes no temperature increase. The low temperature ensures that the oxygenated plume "hugs" the bottom sediments where oxygenation is most needed.

If the HOS purpose is a general improvement in fish habitat and some improvement in water quality, then a pure oxygen bubble plume is often appropriate. Long reaches of pipe with hose with small holes prods the bubble plumes. Bubble plumes move upwards and, with reducing density (oxygen transfers out of bubble as it is absorbed in surrounding water), the bubbles' diameter decreases and they rise much more slowly, tending to hover somewhat above the bottom. Although oxygen does reach the bottom, it is not as efficiently supplied as in a horizontal plume where the oxygen has dissolved so does not decrease the plume density plume and cause it to lift off the bottom. Commercial firms who offer such HOS bubble plumes (as installed in several San Francisco Area East Bay reservoirs) include Mobley Engineering.

For Lake Hodges, where water quality and reducing anoxia on the reservoir bed are paramount, a horizontal highly oxygenated plume is most desirable. Therefore, a HOS using a Speece Cone or similar device is preferable. It should be located in the reservoir's deepest part near the dam and be designed to produce a horizontal highly oxygenated plume with a small manifold or larger jet pipes that would discharge close to the bottom. The plume height and its original depth should take into account the reservoirs bathymetry so that the plume minimizes low oxygen areas. See Figure 3-1 for a schematic diagram of the Speece Cone system.

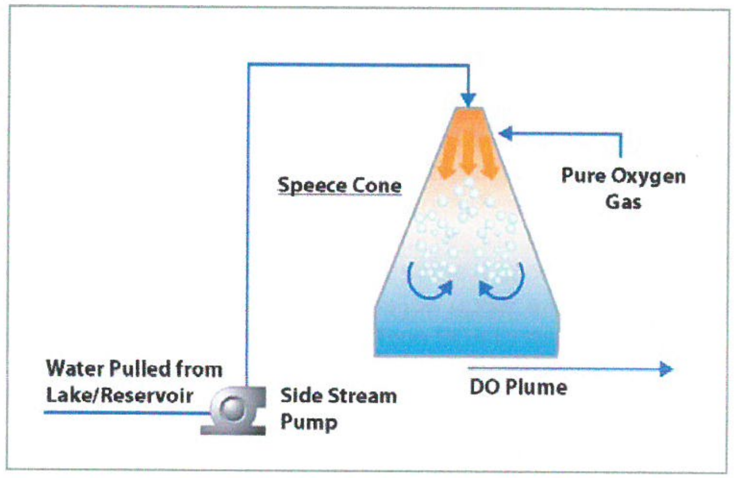


Figure 3-1. Schematic Diagram of Speece Cone

3.4.2 VEM with Algae Scum Corralling

Although formulated as a new concept, VEM has been used for more limited needs for many years. Originally designed to reduce scums of BGA in shallow ornamental lakes in cities, including the royal lakes in Buckingham Palace, London, the concept was expanded in 2009 to the 850-acre Cherry Creek Reservoir near Denver, Colorado. The method is suitable to reduce the nuisance scums of BGA but may not reduce algae overall or even the percent of non-scumming (single filament) BGA. However, from the recreationist or lake user viewpoint, the difference is large and desirable. In addition, the toxicity risk to people or dogs from BGA by ingesting scums is much reduced.

Although described as vigorous, that is only from the algae's viewpoint; lake users would barely perceive a difference. BGA are very successful in warm stratified lakes since they can regulate their buoyancy daily and thus move from high to optimum light levels and even migrate down to deeper water at night where nutrients are more abundant. Buoyancy regulation for BGA, whose largest colonies are the size of a small pea, is ineffective when the water is mixing vertically faster than they can rise or sink, about 0.1 centimeters per second at best. Thus heavy diatoms dominate cool windy waters and can grow faster than blue-greens. Only when the water is warm and calm (diatoms sink out), do blue-greens prosper. Thus, artificial mixing of the upper waters (epilimnion layer) tips the balance away from scumming BGA.

3.6 Summary

This section has presented, developed and evaluated available, commonly applied approaches and technologies for improving reservoir water quality, especially control of algae. Through the initial workshop and subsequent analyses, BC developed a combination of approaches that the agencies could implement in phases, both to manage available funding and to assess the effectiveness of successive phases as presented (in order of priority) as follows:

1. HOS using a Speece Cone
2. VEM
3. Wetland filters for Algae corralling
4. Biomanipulation
5. Algaecides/herbicides/molluscicides (and other Quagga mussel controls)

HOS. For the HOS to work most effectively, the Speece Cone must be located at or near to the reservoir's deepest water. The team explored Sites 1, 2, 3 and 4 to determine which location would be best for the HOS. Review of all potential sites, as well as a review of adjacent roadways and neighborhoods, showed that truck delivery of liquid oxygen would be neither feasible nor accepted to neighbors. Therefore, we discarded liquid oxygen delivery and adopted on-site oxygen generation as part of any alternative. The team determined that Site 1 at the dam area provides adequate power supply and vicinity to the lowest elevation of the reservoir. Although the access road is limited, grading improvements would be required.

VEM. The VEM would help prevent BGA scumming in the reservoirs shallower water. It would produce the most benefit located along the north shoreline, especially near the recreation area boat ramp and swimming beach. The facility would require an onshore building with power service for the air compressor equipment. Dr. Horne recommended locating the offshore area for the test VEM system in the area shown in Figure 4-7. The team identified Site 5 as a good location for the onshore equipment because of easy site access and electric power availability. During subsequent review with agencies representatives, the City suggested that the sewage lift station located northwest from the boat launch area would be a better location.

Algae Corralling and Wetlands. Based on a preliminary review of data presented in the Blue Water Satellite report, it appears that a good location for a surface skimming intake would be at the mouth of the large cove west and slightly north of the tennis courts located west of West Bernardo Drive (see Site 6 on Figure 4-6). Road access would be over trails that split off from West Bernardo Drive. The power supply for the skimming pumps would come along the same route through buried high voltage conduit. The most attractive wetland site would be in shallow water along the north shoreline, west of the Interstate 15 bridge.

4.2 Lake Hodges Reservoir Project Concept

Working closely with agency staff, the BC team identified and evaluated several potential alternatives to improve Lake Hodges water by decreasing algae production while addressing non-attainment issues. BC has combined the alternatives into an overall plan with several key components, as follows.

4.2.1 Reservoir HOS

The HOS adds pure or nearly pure oxygen gas into deep hypolimnion of lakes and reservoirs. To estimate potential oxygen demands, the project team reviewed and used oxygen profile data. Such estimates are difficult now for Lake Hodges since its operational regime will change as the pump-storage facilities is brought to full capacity and regular operation. For data covering a 2-year period ending in the fall of 2013, the only profile data that showed marked hypolimnion oxygen decrease was for a period from mid-February through mid-March 2013. The water surface elevation over that period was at about elevation 294, with the hypolimnion starting about 26 feet below the surface and a hypolimnion volume of about 2,500 aft. The calculated hypolimnion water column demand was about 0.2 grams per cubic meter per day (g/cm-d). This value is a relatively high value for reservoir water and probably reflects high algae productivity during a relatively warm winter with little rainfall or cloud cover. BC did not carry out any sediment oxygen demand (SOD) measurements since these require extensive laboratory work that was beyond this preliminary evaluation. Based on literature information, the SOD was set at 0.2 g/sm-d, a conservatively high value.

The oxygen demand for two conditions was then projected; lake surface at elevation 290 (typical operation with pump-storage facility operating) and elevation 315 (reservoir full every 5 to 10 years, with short duration for full operation). For the former case, a HOD of 0.2 g/cm-d was used with an SOD of 0.2 g/sm-d, arriving at a daily demand of about 1.0 tons per day (tpd). For the later case, a HOD of 0.12 g/cm-d and a SOD of 0.2 g/sm-d was used, arriving at a daily demand of about 3.1 tpd. The lower HOD was used since the condition would occur infrequent and would have a short duration. This approach avoids installing a larger

Table 6-1. Estimated Order-of-Magnitude Capital Costs for Lake Hodges Reservoir Algae Control Alternatives						
Alternative	Description	Engineering and Administration Cost[1]	Environmental Planning and Permitting[2]	Capital Cost	Total Project Cost	Comments
1	Hypolimnetic Oxygenation System	$522,000	$50,000	$2,269,000	$2,841,000	Based on a system production rate of 3 tpd. Larger systems would affect the capital cost of this alternative; e.g., a 6-tpd system would add about $0.6 million.
2	Vigorous Epilimnetic Mixing	$233,000	$50,000	$1,111,000	$1,394,000	The VEM system is being implemented to enhance surface mixing and considered a demonstration system.
3	Wetlands Filtering	$1,885,000	$377,000	$7,538,000	$9,800,000	Upper Wetlands for algae filtering is based on an estimated 30-acre site with a net 25-acre area for water treatment.

[1] *Assumes Engineering and Administration costs are estimated at 20% of the Capital Cost*

[2] *Estimated Environmental Planning and Permitting Cost*

6.2.2 Preliminary Operation and Maintenance Cost

The annual operation and maintenance costs were estimated for the each of the alternatives below. The operation of the VEM and the HOS were estimated at 10 percent. The wetlands will require initial establishment time for the planting and replanting for the first few years. The wetlands may also require reconstruction after a large storm event that results in flows on the spillway (elevation 315). As a result, the annual operation and maintenance cost for the wetlands were estimated at 12.5 percent of the capital construction cost.

Table 6-2. Estimated Annual Operating and Maintenance Costs		
Alternative	Description	Operation and Maintenance Cost
1	Hypolimnetic Oxygenation System	$277,000
2	Vigorous Epilimnetic Mixing	$111,000
3	Wetlands Filtering	$942,000

6.3 Preliminary Implementation Schedule

BC recommends that the City consider implementing the projects in phases, starting with the Reservoir HOS, Mid-Lake VEM, and then the Upper Wetlands. An initial Environmental Assessment would be conduct to determine the appropriate documentation required under CEQA and an identification of the required regulatory permits. BC estimates the schedule for the Reservoir HOS and the Mid-Lake VEM to each require 9 to 12 months for design and permitting, 3 months for bidding and award, and 9 to 12 months for

North City Water Reclamation Plant Recycled Water Filling Station

Business Case Evaluation

June 16, 2014

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3 Problem Summary

3.1 Need

Up to 85% of the water used in San Diego is imported from the Colorado River and Northern California through aqueducts and pipelines. Those sources of water are limited which is why reducing our dependence on them is important.

The North City Water Reclamation Plant has the capacity to treat up to 30 million gallons of wastewater daily and produce up to 30,000 acre-feet of recycled water (RW) annually. Currently, the distribution system is not large enough to match the plant's capacity. Some of the potential customers without the benefit of having RW pipes adjacent to their property are interested in using RW. For example, in areas of new construction there is significant demand for RW for dust suppression and soil compaction before there is a distribution system or development in the area.

On April 23, 2014, Mayor Faulconer called for voluntary water conservation measures in support of declaration of Drought Response Level 1 (See Appendix A – Mayor Faulconer's Call for Voluntary Water Conservation Measures). His announcement included "Using recycled water for construction purposes, when available" as one of the voluntary measures. This project expands availability range of RW for construction purposes throughout the City of San Diego.

3.2 Opportunity

Large customers, such as Caltrans and master developers, have used water tanker trucks to truck RW to construction sites in order to minimize impacts to local potable water supply and become a more environmentally conscious company. The purpose is to make RW more accessible to customers in order to free up more potable water that is currently being used for non-potable uses.

Benefits of using RW from a filling station include:

- Distribution pipelines are costly and therefore not available or feasible in all areas; in comparison RW from a filling station can be used without any distribution pipelines in place with little capital cost to the City.
- In the areas of new construction, where no infrastructure has been built, there is a high potential demand for RW for construction purposes.

- RW cost per HCF is currently lower than that of potable water. Even with a potential RW rate increase, the cost to the consumer will most likely remain lower than potable.
- RW is not subject to mandatory drought restrictions, so when there are limitations placed on potable water use the consumer demand for trucked-in RW will increase.
- This increased demand for RW will also decrease wastewater flows to the ocean outfall.
- This project will increase the City's RW use and reduce the amount of raw and potable water supply needed. This can become important in the next water supply shortage crisis since it frees up critical water supplies.

Disadvantages of using trucked RW include:

- Many streets and roads are not designed to bear the heavy loads of water tanker trucks. The heavy loads can wear out streets and roads, shorten their lifespan and impose maintenance costs on the City.
- Many communities do not like the passing of large water tanker trucks in their neighborhoods.
- Using trucked-in RW can impose undesirable increased traffic.

3.3 Related Projects

SDG&E built an automated recycled water filling station (RWFS) at the City's South Bay Water Reclamation Plant at their cost and transferred ownership of the facility to the Public Utilities Department.

Figure 1 – Recycled Water Filling Station at South Bay Water Reclamation Plant

4 Alternatives

This BCE looked at 20 different alternatives. The first two alternatives are:

I. Do Nothing (Status Quo).
II. Use the existing above ground meter on Meanley Drive near Hoyt Park Drive, close to 9 million gallon (MG) Meanley Tank.
III. Construct a new recycled water filling station.

Alternative IIIIII is divided into two categories:

- New filling station 'location' alternatives: Six potential construction locations are considered for the proposed filling station.
- New filling station 'type' alternatives: Three different types of filling stations are compared.

The proposed filling station may be of any of the three types and located at any of the six locations. The two categories of alternatives are independent from each other. Therefore six locations and three types result in 18 different alternatives.

The following is a list of three type alternatives for the proposed RWFS:

- FST1: Manual single-user
- FST2: Manual multi-user
- FST3: Automated multi-user

The following is a list of six potential location alternatives for the proposed RWFS:

- FSL1: Black Mountain Rd and Carmel Valley Rd, 3 MG Black Mtn. Ranch Recycled Water Reservoir.
- FSL2: Point of Connection to Olivenhain, San Dieguito Rd by the regulator, 12" pipe.
- FSL3: Intersection of Camino Del Sur and Torrey Santa Fe Rd, South of Hwy 56 by the temporary meter.
- FSL4: Park Village Rd and Camino Del Sur, End of 24" pipe.
- FSL5: North City Water Reclamation Plant.
- FSL6: MBC, North of Hwy 52, Convoy St.

Appendix B shows maps of all the location alternatives.

Appendix C shows the overall map of all the location alternatives.

4.1 Do nothing (Status Quo) Alternative (I)

The City can keep the Status Quo – Do Nothing. There will be no immediate additional cost to the City with this alternative. Instead of building a new filling station, the City can encourage potential customers to use the existing RWFS. There is only one other operational RWFS within San Diego; it's located adjacent to the 'South Bay Water Reclamation Plant' (SBWRP) at 2411 Dairy Mart Road, San Diego, CA 92154. This location is at the southern edge of the City near the Mexico border, which is not a convenient location for many potential customers.

- ***Advantage(s)***
  - No initial capital cost.
  - The City does not need to do anything.
- ***Disadvantage(s)***
  - Does not free up potable water that is currently being used for non-potable purposes.
  - Does not meet City's goal of water conservation and imported water reduction efforts.
  - Will not decrease the flow to the wastewater treatment plants and the ocean outfall.
  - The City will still have to seek methods of managing potential drought conditions.
- ***Financial Impact***

The 'Do Nothing' alternative will involve no initial capital cost.

4.2 Use Existing above Ground Meter (II)

There is an above ground meter located on Meanley Drive near Hoyt Park Drive, Close to 9 MG Meanley Tank that may be used as a filling station.

- ***Advantage(s)***
  - RW is available from the 9 MG Meanley Tank.
  - The meter is already in-place.
- ***Disadvantage(s)***
  - This site has poor access.
  - Traffic situation near this site, due to its proximity to a high school, is unfavorable.
  - This site is far from potential RW use sites (areas of new construction).

- Security personnel are not available at this site and must be hired by the City or customers.

- ***Financial Impact*** [1]

This alternative requires no capital investment since the meter is already built. The annual operation and maintenance cost will be $1,000. This location requires hiring on-site security personnel which is estimated to cost $80,000 annually. It is estimated that it will generate $1,947 of revenue annually from selling recycled water. Net present value of this alternative is (-$712,269). The following is a summary of financial impact information for Manual Single-User (FST1) alternative:

- Initial capital cost: None
- Annual O&M cost: $1,000
- Annual on-site personnel wages: $80,000
- Annual benefit: $1,947
- Net Present Value: -$712,269

4.3 Construct New RWFS (III)

The proposed new filling station may be of any of the three types and located at any of the six locations. The two categories of alternatives are independent from each other. Therefore three types and six locations result in 18 different alternatives.

4.3.1 Type Alternatives

4.3.1.1 Manual Single-User (FST1)

In this case, one meter will be installed which during any period of time can be used by one customer only. If RW is to be provided to a new customer, the previous customer must stop using the meter.

- ***Advantage(s)***

[1] Assumptions for all financial impact calculations in this BCE are as follows: The project is implemented by the end of 2014 and generates revenue from 2015 until 2024 (ten-year life cycle). Calculations are performed using escalation rate of 3% and discount rate of 5%.

- This type of filling station requires the least amount of capital investment.

- ***Disadvantage(s)***
  - Provides RW to only one customer at a time.
- ***Financial Impact***

This alternative requires initial capital of $75,000 and annual operation and maintenance cost of $1,000. It is estimated that it will generate $1,947 of revenue annually from selling recycled water. Using escalation rate of 3%, discount rate of 5% and ten years of project life cycle it yields in net present value of (-$66,468). The following is a summary of financial impact information for the Manual Single-User (FST1) alternative:

- Initial capital cost: $75,000
- Annual O&M cost: $1,000
- Annual benefit: $1,947
- Net Present Value: -$66,468

4.3.1.2 Automated Multi-User (FST2)

An automated meter allows for multiple customers to purchase RW from the filling station at any time. Electronic meter identifies each customer and tracks their usage for billing purposes.

- ***Advantage(s)***
  - It provides RW to unlimited number of customers.
- ***Disadvantage(s)***
  - It requires expensive electronic equipment and design.
- ***Financial Impact***

The following is a summary of financial impact information for Automated Multi-User (FST2) alternative:

- Initial capital cost: $175,000
- Annual O&M cost: $3,000
- Annual benefit: $11,680
- Net Present Value: -$96,793

4.3.1.3 Manual Multi-User (FST3)

Multiple risers may be installed each equipped with their own separate meters. Each meter then would be assigned to a unique customer for billing purposes. This alternative combines the low cost of FST1 and advantage of FST2, which is providing RW to more than one customer at any time. It does not require expensive electronic equipment.

- ***Advantage(s)***
  - It does not require expensive electronic equipment and design.
- ***Disadvantage(s)***
  - The number of customers that can purchase RW at any time is limited to the number of meters installed.
- ***Financial Impact***

The following is a summary of financial impact information for the Manual Multi-User (FST3) alternative:

- Initial capital cost: $80,000
- Annual O&M cost: $1,100
- Annual benefit: $11,680
- Net Present Value: +$15,326

4.3.2 Location Alternatives

Key elements to consider when choosing a location and type for RW filling stations include:

- Availability of RW at proposed location of filling station.
- Availability of RW distribution pipelines in the target use area nearby.
- Distance between target potential filling station locations and customer use sites.
- Traffic conditions on surrounding roads and routes between proposed RWFS and target customer sites.
- Environmental impacts.
- Social and community impacts.
- Availability of security personnel on-site.

Considering these criteria, seven potential locations were identified throughout the City for the proposed RWFS. RWFS financial impacts on the City are mostly dictated by the FS type and not FS location so they all have approximately the same financial impact.

4.3.2.1 Black Mountain Rd. and Carmel Valley Rd., 3 MG Black Mtn. Ranch RW Reservoir (FSL1)

- ***Advantage(s)***
    - This site is close to many new construction sites which are potential customers.
- ***Disadvantage(s)***
    - Poor access
    - Drop tank close-by
- ***Financial Impact***

This alternative requires initial capital of $80,000 and annual operation and maintenance cost of $1,100. This location requires hiring on-site security personnel which is estimated to cost $80,000 annually. It is estimated that it will generate $1,947 of revenue annually from selling recycled water. Using escalation rate of 3%, discount rate of 5% and ten years of project life cycle it yields in net present value of (-$774,896).

The following is a summary of financial impact information for FSL1 alternative:

- Initial capital cost: $80,000
- Annual O&M cost: $1,100
- Annual on-site personnel wages: $80,000
- Annual benefit: $11,680
- Net Present Value: -$705,476

4.3.2.2 Point of Connection to Olivenhain, San Dieguito Rd. by the regulator, 12” pipe (FSL2)

- ***Advantage(s)***
    - RW is available from the 12” pipe.
- ***Disadvantage(s)***

- It is located at the edge of the City, which means purveying RW to a smaller area within the City limits.
- Traffic conditions: San Dieguito Road is a relatively narrow road with a speed limit of 45 MPH. It is a two lane roadway with no convenient off-street filling station locations in the vicinity.

- ***Financial Impact***

This alternative has the same financial impact as FSL1. The following is a summary:

- Initial capital cost: $80,000
- Annual O&M cost: $1,100
- Annual on-site personnel wages: $80,000
- Annual benefit: $11,680
- Net Present Value: -$705,476

4.3.2.3 Intersection of Camino Del Sur and Torrey Santa Fe Rd., South of Hwy 56 by the temporary meter (FSL3)

- ***Advantage(s)***
  - It is close to many potential RW use sites (areas of new construction).
  - It is close to California State Route 56.
- ***Disadvantage(s)***
  - Currently RW is not available. There is a separate RW distribution pipeline, that is being fed with potable water at the time this BCE was prepared.
  - Security personnel are not available at this location.
- ***Financial Impact***

This alternative has the same financial impact as FSL1. The following is a summary:

- Initial capital cost: $80,000
- Annual O&M cost: $1,100
- Annual on-site personnel wages: $80,000
- Annual benefit: $11,680
- Net Present Value: -$705,476

4.3.2.4 Park Village Rd. and Camino Del Sur, End of 24” pipe (FSL4)

- ***Advantage(s)***
  - There is a dead-end pipe here that can easily be used.
- ***Disadvantage(s)***
  - This is a residential area which makes it less desirable. Residents would oppose building a RWFS in the neighborhood due to increased truck traffic.
  - Park Village Elementary School is nearby which dictates that the RWFS be operational only during certain hours so as not to impede school traffic.
- ***Financial Impact***

This alternative has the same financial impact as FSL1. The following is a summary:

  - Initial capital cost: $80,000
  - Annual O&M cost: $1,100
  - Annual on-site personnel wages: $80,000
  - Annual benefit: $11,680
  - Net Present Value: -$705,476

4.3.2.5 North City Water Reclamation Plant (FSL5)

- ***Advantage(s)***
  - Security personnel are available within the plant.
  - It is close to the I-805 freeway.
  - It is located in a commercial/ industrial area.
- ***Disadvantage(s)***
  - High traffic conditions on the access road to this site (Eastgate Mall) are not favorable.
- ***Financial Impact***

This alternative requires initial capital of $80,000 and annual operation and maintenance cost of $1,100. This location has on-site security personnel available so there is no additional security personnel cost. It is estimated that it will generate $11,680 of revenue annually from selling recycled water. Using escalation rate of 3%, discount rate of 5% and ten years of project life cycle it yields in net present value of (+$25,906).

The following is a summary of financial impact information for FSL1 alternative:

- Initial capital cost: $80,000
- Annual O&M cost: $1,100
- Annual benefit: $11,680
- Net Present Value: +$15,326

4.3.2.6 Metro Biosolids Center, Convoy St., North of Hwy 52 (FSL6)

- ***Advantage(s)***
  - Security personnel are available within the plant.
  - It is close to the I-805 freeway.
- ***Disadvantage(s)***
  - It is fatally flawed.
- ***Fatal Flaw(s)***
  - Per Environmental Services Department, the permit with the Navy will not allow additional truck trips to accommodate a new filling station.

5 Summary and Conclusions

Two decisions need be made about the proposed RWFS: location and type of RWFS. Accordingly two categories of alternatives were investigated: six location alternatives, i.e., FSL1 through FSL6, and three type alternatives, i.e., FST1 through FST3. The two categories are independent from each other; which results in 18 alternatives (six times three). 'Status Quo' and 'use of above-ground meter' provide two additional alternatives. Therefore overall there are 20 different alternatives.

The following table compares the net present value of the alternatives:

Table 1 – NPV Comparison – Filling Station Type

Alternative	*Name*	*Capital Cost*	*30-yr NPV*
1	Staus Quo	$0	$0
2	FST1 (Manual Single User)	$75,000	($66,468)
3	FST2 (Automated Multi-User)	$175,000	($96,793)
4	FST3 (Manual Multi-User)	$80,000	$15,326

According to Table 1, the best "type" alternative is Manual Multi-User (FST3).

Table 2 – NPV Comparison – Filling Station Location

Alternative	*Name*	*Capital Cost*	*30-yr NPV*
1	Status Quo	$0	$0
2	FSL1 thru. FSL4	$80,000	($705,476)
3	FSL5 (NCWRP)	$80,000	$15,326

Based on Table 2, the best location alternative is North City Water Reclamation Plant (FSL5), due to presence of security personnel and no limit on the number of trips that customers can make.

Table 3 – NPV Comparison

Alternative	*Name*	*Capital Cost*	*30-yr NPV*
1	"Do Nothing" Alternative	$0	$0
2	Use Existing Above Ground Meter	$0	($712,269)
3	FST1 (Manual Single User)	$75,000	($66,468)
4	FST2 (Automated Multi-User)	$175,000	($96,793)
5	FST3 (Manual Multi-User)	$80,000	$15,326
6	FSL1 thru. FSL4	$80,000	($705,476)
7	FSL5 (NCWRP)	$80,000	$15,326

Table 3 compares the net present value for all type, location and existing alternatives. This BCE recommends that the City builds a manual multi-user recycled water filling station at the North City Water Reclamation Plant.

The NCWRP Recycled Water Filling Station Project will consist of the following:

- A 12” lateral from pipe the existing 30” pipe
- An 8” riser
- Six 2” above ground connections and backflows for 2” meters and hose connections
- 12’ x 6’ Concrete Pad
- RW Signage.

Table 4 shows a break-down of the estimated capital cost.

Table 4 – Cost Estimate

PRELIMINARY COST ESTIMATE					**Prepared by:**	**Nelson L. Sellona, P.E.**	
Project:	**Recycled Water 8" Fire Hydrant Connection Project**				**Date:**	**11/19/2008**	
Purpose:	**To provide recycled water filling station for truck for construction and grad**				**Revised:**	**8/28/2013**	
ITEM #	**DESCRIPTION OF WORK**	**QTY**	**UNIT**	**UNIT COST**	**TOTAL**	**# of DAYS**	**REMARKS**
A	**To be Installed at NCWRP site**						
1	8" Gate Valve	1	EA	$2,000.00	$2,000.00	1	
2	8" Fire Hydrant Assembly per W-10 (2-way)	1	EA	$4,000.00	$4,000.00	2	
3	6' x 6' x 5" Thick Concrete Apron	1	LS	$1,000.00	$1,000.00	1	
4	Protection Post per W-16	2	EA	$500.00	$1,000.00	1	
5	Shutdown 36" Transmission main	1	LS	$1,500.00	$1,500.00	1	
6	Excavation	1	LS	$5,000.00	$5,000.00	2	
7	Clean Pipe Outside Surface	1	LS	$2,500.00	$2,500.00	1	
8	**Chip existing 36" CMLC Pipe**	1	EA	$2,500.00	$2,500.00	**2**	**Shutdown Required**
9	**Install 8" Stub-out**	1	EA	$20,000.00	$20,000.00	**2**	**Shutdown Required**
10	Energize 36" Transmission main	1	LS	$1,500.00	$1,500.00	1	
11	Backfill	1	LS	$5,000.00	$5,000.00	1	
	Contingency				$4,000.00		
	Soft Cost				$25,000.00		
	Total Construction cost				**$75,000.00**	**15**	

6 Vicinity Map

Figure 2 shows the vicinity map of the recommended location for the proposed RWFS.

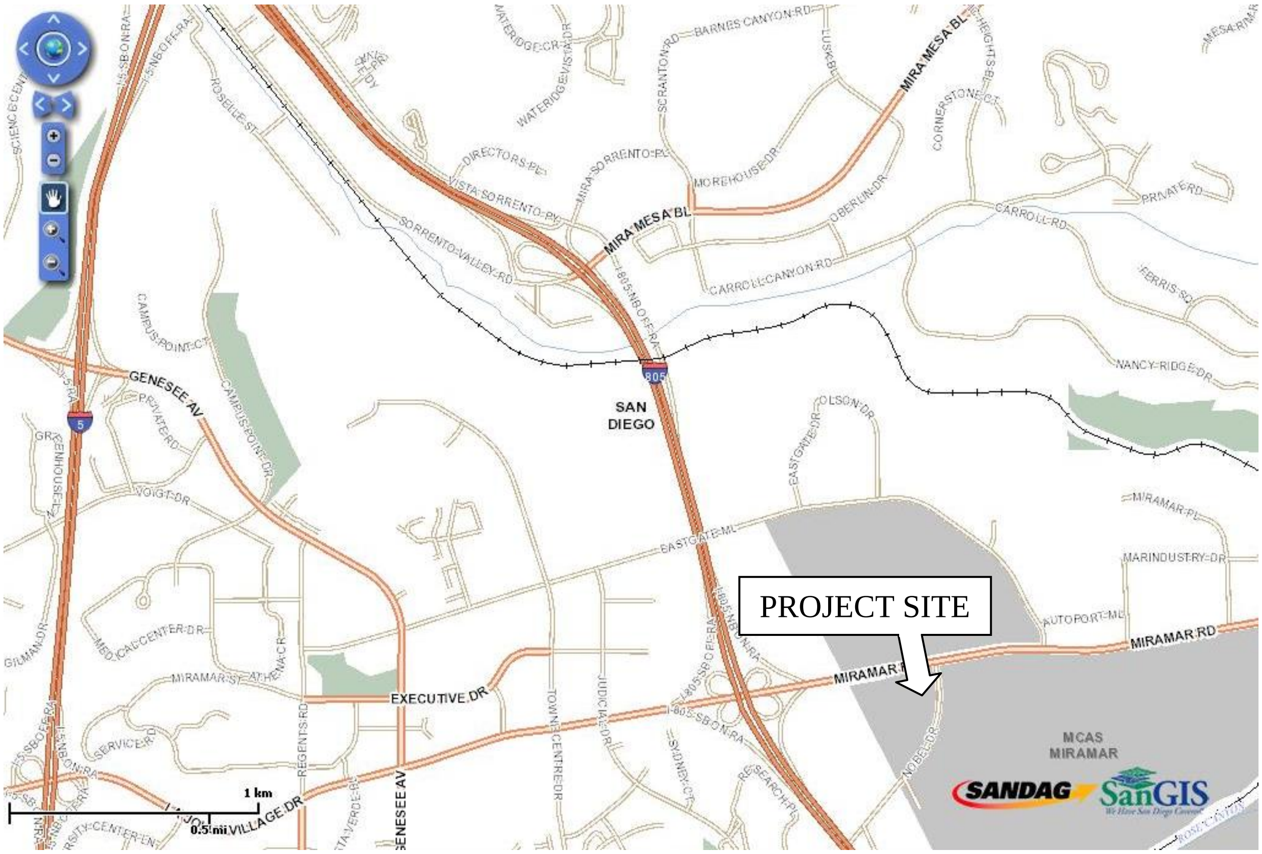

Figure 2 – Project Vicinity Map

Water Conservation

- Water Conservation Home
- Waste No Water Information and Resources
  - Permanent and Level 1 Water Waste Restrictions
  - Enforcement and Penalties
  - Improving Our Long-Range Water Supply
  - News & Events
  - Help Spread the Word
  - Related Links
- Plumbing Retrofit Upon Re-Sale Ordinance
- Water Survey Programs
- Rebates & Incentives
- Kids Water Conservation Corner
- Contests

Water Hotline

Report water waste by calling:

(619) 533-5271

waterwaste@sandiego.gov

PROGRAMS AND REBATES
SPEAKERS BUREAU

Waste No Water Information and Resources

Permanent Mandatory Water Use Restrictions and Voluntary Level 1 Restrictions

On July 1, 2014, the City of San Diego will enter a Level 1 Drought Alert condition - a heightened set of voluntary but very important practices, in addition to the permanent, mandatory restrictions already in place.

Please first review the permanent mandatory restrictions already in place, plus the Level 1 restrictions effective July 1, 2014. San Diego residents are also encouraged to report water waste by calling the Water Waste Hotline at (619) 533-5271.

Permanent Mandatory Restrictions

In recent years the San Diego City Council approved permanent restrictions on wasteful water use. These restrictions are now in place year around. The following prohibitions are in effect at all times.

- *Customers* shall repair or stop all water leaks upon discovery or within 72 hours of notification by the City of San Diego.
- The time of day when watering is allowed (before 10 a.m. and after 6 p.m. from June to October, and before 10 a.m. and after 4 p.m. from November to May) is a permanent restriction. This does not apply to irrigation as required by a landscape permit; for erosion control; for establishment, repair or renovation of public use fields; for landscape establishment following a disaster; for renovation or repair of an irrigation system; and for nursery and commercial growers using hand held containers, positive shut off nozzles, or drip/micro-spray systems. The City will review variance applications from customers who feel they cannot abide by this watering schedule.
- City of San Diego water customers must prohibit excessive irrigation and must immediately correct leaks in their private water systems. The City's regulations now state that customers "shall not allow water to leave their property due to drainage onto adjacent properties or public or private roadways or streets or gutters due to excessive irrigation and/or uncorrected leaks."
- Customers cannot use a running hose to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate safety or sanitation hazards, unless that hose is connected to a water efficient device such as a commercial water broom.
- Overfilling of swimming pools and spas is strictly prohibited.
- All decorative water fountains must use a recirculating pump.
- Vehicles may only be washed at a commercial car wash or by using a hose with an automatic shutoff nozzle or with a hand-held water container.
- The City will not provide new water service connections for customers using single pass-through cooling systems.
- All new conveyer car wash and commercial laundry systems connections will be required to employ a recirculating water system.
- Restaurants and other food establishments shall only serve and refill water for patrons upon request.
- Guests in hotels, motels, and other commercial lodging establishments will be provided the option of not laundering towels and linens daily.

Level 1 Restrictions, effective July 1, 2014

On July 1, 2014, the City of San Diego entered a Level 1 Drought Condition Alert. Below are the recommendations set forth by the City for Level 1, **in addition to the permanent restrictions above**:

- Limit watering of landscapes to no more than 3 days per week.
- When watering without an irrigation system, use either a hand-held hose with a shutoff valve or a garden hose sprinkler system on a timer.
- Washing of vehicles is limited to the same seasonal schedule as irrigation, as explained in permanent restrictions (except for: boats, which may be washed after use; vehicles with health/safety issues; or when washing at a commercial carwash that recycles water).
- Do not water/irrigate during rain events.
- Use recycled water for construction purposes, when available.
- Construction operations may only use water for normal construction activities, consistent with Section 67.3803 and that required by regulatory agencies.
- Limit the use of fire hydrants to fire fighting, construction, health and safety.

Water Conservation

- Water Conservation Home
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Water Hotline

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(619) 533-5271

waterwaste@sandiego.gov

PROGRAMS AND REBATES
SPEAKERS BUREAU
WATER CONSERVATION
REPORT WATER WASTE
SPEAKERS BUREAU

Waste No Water Information and Resources

NO TIME TO WASTE
NO WATER TO WASTE

ALERT LEVEL 2: DROUGHT CONDITION

- Espanol (PDF)
- Vietnamese (PDF)
- Tagalog (PDF)
- Somali (PDF)

Effective June 1, 2009, San Diego declared a Level 2 Drought Alert. Level 2 includes many mandatory water restrictions. In addition, all voluntary Level 1 conservation practices became mandatory. The Level 2 restrictions include:

- Landscape irrigation is limited to no more than three assigned days per week. Those days are:
  - **Homes with odd-numbered addresses can water: Sunday, Tuesday & Thursday**
  - **Homes with even-numbered addresses can water: Saturday, Monday & Wednesday**
  - **Apartments, Condos and Businesses can water: Monday, Wednesday & Friday**
- Between June 1 and October 31, on your watering days, you may only water before 10 a.m. or after 6 p.m. Landscape irrigation using sprinklers is limited to no more than ten minutes maximum per watering station per assigned day (does not apply to drip, micro-irrigation, stream rotor, rotary heads, hose end sprinklers with timers or valves operated by a weather-based irrigation controller).
- Between November 1 and May 31, you may only water before 10 a.m. or after 4 p.m. Landscape irrigation using sprinklers is limited to no more than seven minutes maximum per watering station per assigned day (does not apply to drip, micro-irrigation, stream rotor, rotary heads, hose end sprinklers with timers or valves operated by a weather-based irrigation controller).
- Trees and shrubs not irrigated by a landscape irrigation system may be watered no more than three assigned days per week by using a hand-held container, hand-held hose with positive shut-off nozzle, or low-volume soaker hose.
- Irrigation of nursery and commercial growers' products is permitted in the hours between 6 p.m. and 10 a.m. from June 1 to October 31, and between 4 p.m. and 10 a.m. from November 1 to May 31. Watering may be done at any time when using a hand-held hose with a positive shut-off nozzle, hand-held container, or drip, micro-irrigation.
- Irrigation of nursery propagation beds is permitted at any time.
- Non-commercial vegetable gardens, fruit trees and potted plants are exempt from days of the week restrictions. But, between June 1 and October 31 irrigating is permitted only before 10 a.m. and after 6 p.m. From November 1 to May 31 it is permitted only before 10 a.m. and after 4 p.m.
- All irrigation is banned while it is raining.
- Vehicle washing between June 1 and October 31 is permitted only before 10 a.m. and after 6 p.m. From November 1 to May 31 it is permitted only before 10 a.m. and after 4 p.m. Vehicle washing is only allowed with a hand-held container or a hand-held hose with a positive shut-off nozzle for quick rinses, or at any time on the immediate premises of a commercial car wash. Vehicle washing required for public health and safety is exempt.
- Boats and boat engines are permitted to be washed down immediately after use.
- Water use by commercial car washes which do not use partially re-circulated water will be reduced in volume by an amount determined by the City Council.
- All leaks must be stopped or repaired upon discovery or within 72 hours of notification by the City of San Diego.
- Bird baths, koi ponds and any ornamental water feature using a re-circulating pump and which does not shoot water into the air are allowed under Level 2. Water fountains which discharge into the air a jet or stream of water are banned under Level 2 restrictions. However, these fountains may be operated for maintenance purposes. Any water feature that does not re-circulate water is banned.

- Landscape establishment is allowed if required for landscape permits, erosion control, disasters or establishment, repair or renovation of public use fields for schools and parks. Landscape establishment under these conditions authorizes watering any day, and any hour of the day, as necessary, for up to two months. All other landscape establishment that requires more irrigation than the established irrigation restrictions requires an approved variance.
- Use of recycled or non-potable water is required for construction purposes when available.
- Water use from fire hydrants is limited to fire fighting, City meter installation as part of the Fire Hydrant Meter Program, and for public health and safety reasons.
- Construction operations will not use water obtained by a fire hydrant meter for uses other than normal construction activity.

In addition to these Level 2 requirements, all Level 1 voluntary restrictions are now mandatory. These include:

- City of San Diego water customers must prohibit excessive irrigation and must immediately correct leaks in their private water systems. The City's regulations now state that customers "shall not allow water to leave their property due to drainage onto adjacent properties or public or private roadways or streets or gutters due to excessive irrigation and/or uncorrected leaks."
- Customers cannot use a running hose to wash down sidewalks, driveways, parking areas, tennis courts, patios or other paved areas, except to alleviate immediate safety or sanitation hazards unless that hose is connected to a water efficient device such as a commercial water broom. City storm water regulations require containment and capture of any runoff.
- Overfilling of swimming pools and spas is strictly prohibited.
- The City will not provide new water service connections for customers using single pass-through cooling systems.
- All new conveyer car wash and commercial laundry systems connections will be required to employ a recirculation water system.
- Restaurants and other food establishments shall only serve and refill water for patrons upon request.
- Guests in hotels, motels, and other commercial lodging establishments will be provided the option of not laundering towels and linens daily.

San Diego residents are encouraged to report water waste by calling the Water Hotline at (619) 515-3500.

Recycled Water Rate

Future Recycled Water Rate Increase

The Public Utilities Department began selling recycled water in October 1997, at an initial rate of $1.34 per HCF (an HCF is equal to 748 gallons). The San Diego City Council lowered the recycled rate to $0.80 per HCF on July 1, 2001, to encourage businesses, including homeowner associations, to use recycled water. The Council adopted rate for recycled water has not been increased since then.

Under the direction of City Council, the Public Utilities Department commissioned a rate study to review all financial aspects related to the production, sale, and distribution of recycled water. Moreover, the study will recommend a pricing structure that covers the actual cost of producing recycled water.

Recycled Water Rate

If you are interested in learning more about recycled water, please e-mail us at water@sandiego.gov.

Recycled Water Rate

The cost for recycled water is $0.80 per hundred cubic feet (HCF) of water, which is equal to 748 gallons. By comparison, as of December 1, 2011, the potable water rate is $4.014 per HCF, the current rate charged to irrigation customers.

Future Recycled Water Rate Increase

If you are interested in learning more about recycled water, please e-mail us at water@sandiego.gov

COPY

AGREEMENT

THIS AGREEMENT is executed by and between THE CITY OF SAN DIEGO, a municipal corporation, hereinafter referred to as "San Diego", SANTA FE IRRIGATION DISTRICT, a California irrigation district, hereinafter referred to as "SANTA FE", and SAN DIEGUITO WATER DISTRICT, a California irrigation district, hereinafter referred to as "SAN DIEGUITO". Santa Fe and San Dieguito are referred to collectively as "Districts".

RECITALS

A. Santa Fe and San Dieguito, and their predecessors in interest have acquired rights to local water collected in Lake Hodges pursuant to contracts with the owners of Lake Hodges since the Hodges Dam was constructed.

B. San Diego, Santa Fe and San Dieguito entered into an agreement on December 20, 1956 relating to the settlement of certain disputes then existing among them and providing, among other matters, for a fixed quantity of water to be provided to the Districts at local water costs.

C. As a result of changed circumstances, San Diego, Santa Fe and San Dieguito entered into an agreement effective April 1, 1969 a copy of which is on file in the Office of the City Clerk as Document Number 728946 (the "1969 Agreement") pursuant to which the Districts purchased from San Diego the San Dieguito Reservoir and Dam including the conduit (flume) from the weir at Lake Hodges to the Reservoir, the 30" water transmission line originating at the San Diego County Water Authority Aqueduct and all appurtenances necessary for the operation of those facilities. The April 1, 1969 Agreement also established rights and duties of the parties with respect to the sale and purchase of Local Water collected in Lake Hodges for a contract term expiring on September 30, 2019.

D. The April 1, 1969 Agreement memorialized a property right owned by the Districts to Local Water collected in Lake Hodges. It rescinded and superseded all prior agreements, and is the document which currently establishes the rights of the parties.

E. San Diego, the San Diego County Water Authority, and the Olivenhain Municipal Water District now contemplate the development of an Emergency Storage Project which will result in the reoperation of Lake Hodges in combination with a newly developed reservoir called the Mt. Israel Reservoir. This project is estimated to increase the local yield of Lake Hodges from an average of approximately 5,769 acre feet per year to approximately 11,400 acre feet per year. Given this contemplated reoperation of Lake Hodges, San Diego, San Dieguito and Santa Fe desire to restate and redefine their rights and obligations concerning Local Water in Lake Hodges.

DOCUMENT NO. 00-18474

FILED MAR 17 1998

OFFICE OF THE CITY CLERK
SAN DIEGO, CALIFORNIA

F. Whether the Emergency Storage Project is constructed or not, in order for San Diego to use Local Water from Lake Hodges, San Diego must construct a project to transport said Local Water.

G. This Agreement is intended to rescind all previous agreements among the parties and restate their respective rights with respect to Lake Hodges.

AGREEMENT

NOW, THEREFORE, in consideration of the recitals and the terms and conditions set forth below and other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, San Diego, San Dieguito and Santa Fe agree as follows:

1. Unless otherwise defined herein, the following words shall have the meanings indicated:

A. "Local Water" means all water collected in Lake Hodges from any source other than water transported through the San Diego County Water Authority Aqueducts, provided that Local Water shall include "Evaporative Make Up Water".

B. "Imported Water" means water transported through the San Diego County Water Authority Aqueducts but excludes "Evaporative Make Up Water."

C. "Water Contract Year " means the period from October 1 of any given year through September 30 of the Following Year.

D. "Evaporative Make Up Water" means all water credited by the San Diego County Water Authority as Local Water under Lake Hodges Improvement Project.

E. "Lake Hodges Improvement Project" means a project to transfer and/or store Local Water which involves the construction of infrastructure necessary to pipe and transport water to reservoirs, and which is projected to increase the average annual yield of Lake Hodges. Lake Hodges Improvement Project may be the Emergency Storage Project described in Recital E above or another project constructed to enable San Diego to use Local Water.

F. "Local Water Credit" means an amount of water to which the Districts are entitled to purchase but which they did not purchase in any Water Contract Year pursuant to paragraph 4 below.

G. "Local Water Credit Balance" means the cumulative amount of water which the Districts or San Diego were entitled to purchase but which they did not purchase.

H. "1969 Agreement" shall have the meaning assigned thereto in Recital C above.

I. "Districts" means the Santa Fe Irrigation District and the San Dieguito Water District.

J. "Weir" means the Lake Hodges Flume Weir as described on Exhibit "A" attached hereto and made a part hereof.

K. "Flume" means the Lake Hodges Canal commencing at the Weir and ending at the San Dieguito Reservoir.

L. "Control Facility at Badger Filtration Plant" means that flow control facility described on Exhibit "A" attached hereto and made a part hereof by reference.

2. The parties hereby rescind all previous agreements among them with respect to Lake Hodges, and specifically abrogate, set aside and nullify all their respective rights under such agreements, including, but not limited to, the 1969 Agreement among the three parties.

3. Until such time as the operation of the Lake Hodges Improvement Project commences, the Parties agree as follows:

A. San Diego will sell to Districts all of the Local Water collected in Lake Hodges if the water is requested by Districts, provided that Local Water in Lake Hodges may be sold by San Diego to any other person, firm, corporation or agency if the following conditions exist:

i. There is contained in Lake Hodges at the time water is delivered to such other entity a quantity of Local Water in excess of the quantities San Diego is required to furnish Districts for the remainder of the Water Contract Year during which such sale is to be made; and

ii. There will be in storage in Lake Hodges available for the exclusive use of Districts at the end of said Water Contract Year not less than 8,300 acre feet of usable water; and

iii. The water is put to beneficial use by the purchaser.

San Diego may also release water from Lake Hodges in emergency to prevent or reduce flood or threat of flood damage.

B. Districts shall pay San Diego for all Local Water delivered at the rate of $31.00 per acre foot, which represents the current cost per acre foot to San Diego of operating and maintaining Lake Hodges, excluding the cost of recreation, including depreciation calculated on the straight line method. This price shall remain effective through September 30, 1999, which period coincides with the end of the Water Contract Year. On or prior to the end of each succeeding two year period the amount payable by Districts to San Diego per acre foot for Local Water during the succeeding two (2) year period, shall be calculated. The cost per acre foot payable during each particular succeeding two (2) year period shall be determined as follows:

i. Calculate the total cost of operating and maintaining Lake Hodges during the immediately preceding two year period, plus the cost of capital improvements and repairs to Lake Hodges and Lake Hodges Dam during such two year period amortized over the useful life of the improvement, plus depreciation calculated on the straight line method, divided by the total number of acre feet of Local Water sold by San Diego during the immediately preceding two year period.

ii. For purposes of calculating depreciation, the present depreciated value of Lake Hodges is agreed to be $307,093.

iii. San Diego shall keep accurate records of all costs which it incurs related to Lake Hodges and of all Local Water sold to others than Districts, which records shall be available at all reasonable times for inspection by authorized representatives of the Districts.

C. Districts shall determine the rates of delivery of water to the Districts pursuant to this Agreement in order to meet their respective requirements, and to discharge their obligation to provide potable water to their respective customers.

D. Measurement and delivery of water by San Diego to Districts shall be as follows:

i. At the head of an open conduit immediately downstream from Lake Hodges Dam as shown on Exhibit "A," hereinafter referred to as "the Weir."

ii. San Diego shall at its expense maintain the Weir in as good condition and repair at all times as is possible by the exercise of ordinary care. Districts shall have the right to inspect the Weir and test it for accuracy with a representative of San Diego at reasonable times during business hours with reasonable notice, and the right, if it shall be so desired, to have a representative present at any test or reading of said meter by San Diego.

E. Santa Fe shall be entitled to receive 57 1/3% and San Dieguito shall be entitled to receive 42 2/3% of the first 7,500 acre feet of water supplied in any given Water Contract Year pursuant to this Agreement. If an amount in excess of 7,500 acre feet of water is supplied to Districts within any given year, each District shall be entitled to receive 50% of such excess. San Diego shall have no responsibility or obligation as between the Districts to meter or allocate water supplied to Districts or to otherwise ensure that there has been compliance with the provisions contained in this paragraph.

F. San Diego shall bill each District monthly for water supplied by San Diego through the Weir during the preceding calendar month. Each District shall pay to San Diego the amount due San Diego for water so furnished each District within thirty (30) calendar days after receipt of such bill.

G. San Diego will operate Lake Hodges and all of its facilities, and such operation shall conform to the requirements of all local, state and federal laws and regulations concerning the quality of local water collected in water storage reservoirs. San Diego will use its best efforts to ensure that polluted water from any source is not collected in Lake Hodges. Except as provided in this paragraph, San Diego does not make any assurances concerning water quality.

H. The Districts' right to the delivery and purchase of Local Water collected in Lake Hodges as provided in paragraph 3 above is a property right which was purchased by the Districts for valuable consideration. The extent of such property right is defined and limited by the terms of this Agreement.

4. Upon commencement of the operation of Lake Hodges Improvement Project the Parties agree as follows:

A. Prior to commencing construction of Lake Hodges Improvement Project San Diego shall project an average annual yield of Local Water in Lake Hodges. Said projected average annual yield shall be based upon the construction and design operation of Lake Hodges Improvement Project. Said projection shall be performed by the City and approved by Districts. Subject to the processes and procedures specified herein, in the event the Lake Hodges Improvement Project's average annual yield of Local Water is projected to be 11,400 acre feet or more, all Local Water shall be divided one-half to San Diego and one-half to Districts. In the event the projected average annual yield of Local Water is less than 11,400 acre feet the Local Water shall be divided so as to allocate an average annual yield to Districts of 5,700 acre feet per year.

B. During the first Water Contract Year after commencement of the operation of Lake Hodges Improvement Project, San Diego will deliver and sell to Districts all of the Local Water requested by Districts up to 5,700 acre feet, including all water delivered pursuant to paragraph 3 above. All remaining Local Water in that Water Contract Year shall belong to San Diego.

C. Beginning with the first Water Contract Year after commencement of the operation of Lake Hodges Improvement Project, if such Project's average annual yield of Local Water is projected to be 11,400 acre feet or more, all Local Water shall be divided one-half to San Diego and one-half to Districts. San Diego shall deliver and sell to the Districts their one-half of the amount of Local Water collected in Lake Hodges during the preceding Water Contract Year if said Local Water is requested by Districts. If a portion of said Local Water is not requested by Districts, it shall become a Local Water Credit as described in and subject to the provisions of paragraph 4H hereof. Whatever the actual amount of Local Water in any given Water Contract Year, except as otherwise provided in paragraph D below, it shall be shared as provided above, without any cap or floor.

D. In the event Lake Hodges Improvement Project is constructed or operated so that the projected average yield of Local Water is less than 11,400 acre feet per year, the percentage of water which San Diego shall deliver and sell to Districts shall be adjusted to allow for an average annual yield to Districts of 5,700 acre feet per year. The percentage splits will be determined by a calculation of anticipated average yield to be performed by San Diego and approved by Districts. For example, if the design and operation of Lake Hodges Improvement Project has a projected average annual yield of 10,000 acre feet per year, the percentages would be 57% to Districts and 43% to San Diego.

E. Notwithstanding paragraph 4C, if the average annual yield of Local Water becomes less than 11,400 acre feet due to operational constraints required by any regulatory authority having jurisdiction, or due to the siltation of the reservoir, then all Local Water shall continue to be divided one-half to San Diego and one-half to Districts.

F. The point of delivery and measurement for Local Water purchased after commencement of the operation of Lake Hodges Improvement Project shall be the Weir as described in paragraph 3D if wheeled through the Flume. For all water delivered through Lake Hodges Improvement Project the point of delivery and measurement shall be the Control Facility located at the Badger Filtration Plant as described on Exhibit "A" attached hereto, and by this reference incorporated herein. For all water delivered through Lake Hodges

Improvement Project, the Districts shall pay San Diego a delivery charge equal to San Diego's cost.

G. Districts shall pay San Diego for all water purchased in accordance with the provisions of Paragraph 3B, provided that the calculation of the costs of operating and maintaining Lake Hodges shall not include any costs incurred as part of the operation of Lake Hodges Improvement Project. The provisions of paragraphs 3C, 3D as to measurement of deliveries, 3E, 3F and 3G shall also apply to deliveries of Local Water after commencement of the operation of Lake Hodges Improvement Project.

H. Credits for Local Water to which Districts own an entitlement but which is not purchased in any given Water Contract Year shall be the subject of a Local Water Credit Balance. The Districts' Local Water Credit Balance is that water which the Districts were entitled to purchase but which they did not purchase in any Water Contract Year. The Districts' Local Water Credit shall be reduced to account for evaporative and other losses in the amount of nine percent (9%) per year. Districts may draw on that Local Water Credit Balance by purchasing water represented by that Local Water Credit Balance from San Diego at Local Water prices at any time. Districts shall not receive credit for water which overflows Lake Hodges Dam or water which San Diego is otherwise unable to use or store in a facility other than Lake Hodges. In the event water overflows the Lake Hodges Dam it shall not be considered Local Water. In the event Districts purchase Local Water in any given Water Contract Year which is in excess of its Local Water Credit Balance, San Diego shall have a Local Water Credit Balance. In that event San Diego may draw on that Local Water Credit Balance by purchasing water represented by that Local Water Credit Balance from Districts at Local Water prices at any time. An example of the application of this Local Water Credit Balance is attached hereto as Exhibit C and by this reference incorporated herein.

I. On or before October 1 of each year Districts shall provide San Diego with an estimate of projected Local Water use by the Districts for the forthcoming Water Year.

J. In the event San Diego or any party acting on San Diego's behalf seeks to deposit reused water in Lake Hodges or in wells near Lake Hodges said water shall not be considered Local Water for purposes of this Agreement and the parties shall agree upon a formula to enable San Diego to receive credit for said reused water.

5. Upon commencement of the operation of Lake Hodges Improvement Project the right described in Paragraph 3H above shall terminate and be replaced with the Districts' right to delivery and purchase of all Local Water collected in Lake Hodges as provided in Paragraph 4 above as a

property right which was purchased by the Districts for a valuable consideration. In the event Lake Hodges Improvement Project is not constructed, Districts' property right shall be that right described in Paragraph 3H above. The extent of such property right is defined and limited by the terms of this Agreement.

6. If any provision of this Agreement shall for any reason be held illegal or ultra vires as to San Diego, the remaining portions of this Agreement shall at the option of either District remain in full force and effect as to San Diego and such Districts; if any provision of this Agreement shall for any reason be held illegal or ultra vires as to either District, the remaining portions of this Agreement shall at the option of San Diego remain in full force and effect as to such District and San Diego. If this Agreement shall be held illegal or ultra vires in its entirety as to any party, then the contracts heretofore existing between the Parties hereto shall continue in full force and effect as if this Agreement had never been executed, and none of the rights of any party hereto shall be in any manner affected by the execution of this Agreement.

7. San Diego shall operate and maintain Lake Hodges and Lake Hodges Dam in strict accordance with all state, federal and local laws and regulations and will make all reasonable efforts to maintain and repair Lake Hodges and Lake Hodges Dam to continue operations in order to maintain the maximum projected annual average yield of Local Water.

8. In the event San Diego elects to terminate or substantially change operations of Lake Hodges so as to eliminate the ability of Districts to obtain Local Water, Districts shall have and are hereby conveyed an option to purchase Lake Hodges and Hodges Dam. Upon exercise of said option, Districts shall pay San Diego just compensation in accordance with laws, principles and definitions used in eminent domain proceedings conducted for the purpose of public acquisition of private property for public use.

9. This Agreement shall be binding on and inure to the benefit of the successors and assigns of the respective parties.

10. This Agreement shall be in full force and effect for so long as Lake Hodges is operated.

11. In the event qualified engineers and/or the state or federal government determine or order that the Lake Hodges Dam must be rebuilt or replaced in order for Lake Hodges operations to continue, San Diego shall have the right to rebuild and replace the Dam, or terminate Lake Hodges operations. In the event San Diego determines to rebuild or replace Lake Hodges Dam, Districts shall have an option to terminate this Agreement or extend this Agreement for so long as Lake Hodges is operated. In the event Districts exercise their option to extend the Agreement the price which Districts pay San Diego for Local Water as provided in Paragraph 3B, or 4E shall be recalculated so as to reflect the full capital costs of rebuilding or replacing the Lake Hodges Dam by increasing the present depreciated value of Lake Hodges to include the full price of rebuilding or replacing Lake Hodges Dam. In the event San Diego exercises its right to terminate Lake Hodges operations Districts shall have and are hereby conveyed an option to purchase Lake Hodges property and rebuild or replace Lake Hodges Dam themselves. Upon exercise of said option, Districts shall

pay San Diego just compensation in accordance with laws, principles and definitions used in eminent domain proceedings conducted for the purpose of public acquisition of private property for public use.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the day and year first above written.

THE CITY OF SAN DIEGO

Dated: MAR 17 1998

By:
Its:

I hereby approved the form and legality of this Agreement this 19th day of March, 1998.

CASEY GWINN, CITY ATTORNEY

By:
Kelly J. Salt, Deputy City Attorney

SANTA FE IRRIGATION DISTRICT

Dated: Sept 29, 1997

By:
Its:

I hereby approved the form and legality of this Agreement this 29th day of Sept, 1997.

By:
C. Michael Cowett, General Counsel for
Santa Fe Irrigation District

SDPUB\CMC\2878

O- 18474

SAN DIEGUITO WATER DISTRICT

Dated: 10/08/97

By: John Davis
Its: Board President

I hereby approved the form and legality of this Agreement this 8th day of October, 1997.

By:
Roger W. Krauel, Attorney for
San Dieguito Water District

SDPUB\CMC\2878

O- 18474

EXHIBIT "A"

1. Lake Hodges Flume Weir

The Weir is located within a small block structure constructed at the easterly end of the "Lake Hodges Canal" commencing in the Southeast Quarter (SE 1/4) of the Northwest Quarter of Section 18, Township 13 South, Range 2 West of the subdivision of Rancho Santa Fe as per map thereof filed in the office of the County Recorder of San Diego County, California, on December 28, 1922, and numbered 1742.

2. Flow Control Facility

The Flow Control Facility known as San Diego County Water Authority's SD/SF 3 & 4 is located on property described as follows:

ALL THAT PORTION OF THE SOUTHEAST QUARTER OF SECTION 10, TOWNSHIP 13 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY APPROVED NOVEMBER 19, 1880, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTH QUARTER CORNER OF SAID SECTION 10, THENCE SOUTH 89°24' 44" EAST 965.84 FEET ALONG THE SOUTH LINE OF SAID SECTION 10, (RECORD S89°49'57" E 936.97') TO THE CENTERLINE OF THE FIRST PIPELINE OF THE SECOND SAN DIEGO AQUEDUCT, THENCE CONTINUING ALONG THE SOUTH LINE OF SAID SECTION 10, SOUTH 89°24'44" EAST 16.27' TO THE EASTERLY LINE OF THE SAN DIEGO COUNTY WATER AUTHORITY RIGHT OF WAY AS GRANTED IN FILE/PAGE NO. 25440, RECORDED FEBRUARY 8, 1960 IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, THENCE NORTH 22°10'50" WEST (RECORD N22°10'37" W) 344.32 FEET ALONG SAID EASTERLY SAN DIEGO COUNTY WATER AUTHORITY RIGHT OF WAY LINE TO THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID EASTERLY SAN DIEGO COUNTY WATER AUTHORITY RIGHT OF WAY LINE, NORTH 67°49' 10" EAST, 65.00 FEET; THENCE SOUTH 22° 10' 50" EAST, 78.00 FEET; THENCE SOUTH 00°04°16" EAST 34.54 FEET; THENCE SOUTH 67°49'10" WEST, 52.00 FEET TO SAID EASTERLY SAN DIEGO COUNTY WATER AUTHORITY RIGHT OF WAY LINE; THENCE ALONG SAID SAN DIEGO COUNTY WATER AUTHORITY RIGHT OF WAY LINE, NORTH 22°10'50" WEST, 110.00 FEET TO THE TRUE POINT OF BEGINNING.

(O-98-84)

ORDINANCE NUMBER O-18474 (NEW SERIES)

ADOPTED ON MAR 17 1998

AN ORDINANCE OF THE COUNCIL OF THE CITY OF SAN DIEGO AUTHORIZING THE CITY MANAGER TO EXECUTE AN AGREEMENT WITH SANTA FE IRRIGATION DISTRICT AND SAN DIEGUITO WATER DISTRICT RESTATING RIGHTS CONCERNING LOCAL WATER IN LAKE HODGES.

BE IT ORDAINED, by the Council of The City of San Diego, as follows:

Section 1. That the City Manager is hereby authorized to execute, for and on behalf of The City of San Diego, an agreement with the Santa Fe Irrigation District and San Dieguito Water District restating rights concerning local water in Lake Hodges.

Section 2. That this ordinance shall take effect and be in force on the thirtieth day from and after its passage.

APPROVED: CASEY GWINN, City Attorney

By Kelly J. Salt
Kelly J. Salt
Deputy City Attorney

KJS:pev
2/5/98
Or.Dept:Wtr.
Aud.Cert:N/A
O-98-84
Form=o&t.frm

Passed and adopted by the Council of The City of San Diego on MAR 17 1998 by the following vote:

YEAS: MATHIS, WEAR, KEHOE, STEVENS, WARDEN, STALLINGS, McCARTY, VARGAS, MAYOR GOLDING

NAYS: NONE

NOT PRESENT: NONE

AUTHENTICATED BY:

SUSAN GOLDING
Mayor of The City of San Diego, California

CHARLES G. ABDELNOUR
City Clerk of The City of San Diego, California

(Seal)

By: Lori A. Witzel, Deputy

I HEREBY CERTIFY that the above and foregoing is a full, true and correct copy of ORDINANCE NO. O-18474 (New Series) of The City of San Diego, California.

I FURTHER CERTIFY that said ordinance was not finally passed until twelve calendar days had elapsed between the day of its introduction and the day of its final passage, to wit, on FEB 17 1998 and on MAR 17 1998.

I FURTHER CERTIFY that the reading of said ordinance in full was dispensed with by a vote of not less than a majority of the members elected to the Council, and that there was available for the consideration of each member of the Council and the public prior to the day of its passage a written or printed copy of said ordinance.

CHARLES G. ABDELNOUR
City Clerk of The City of San Diego, California

(Seal)

By: Lori A. Witzel, Deputy

ORDINANCE NO. 43

AN ORDINANCE OF THE BOARD OF DIRECTORS OF CARLSBAD MUNICIPAL WATER DISTRICT (CMWD), CARLSBAD, CALIFORNIA, MANDATING USE OF RECYCLED WATER AND RESCINDING ORDINANCE NO. 31

WHEREAS, the people of the State of California have a primary interest in the development of facilities to reclaim water containing waste to supplement existing surface and underground water supplies and to assist in meeting the future water requirements of the state; and (California Water Code Section 13510); and

WHEREAS, conservation of all available water resources requires the maximum reuse of wastewater for beneficial uses of water (California Water Code Section 461); and

WHEREAS, continued use of potable water for irrigation of greenbelt areas may be an unreasonable use of such water where recycled water is available (California Water Code Section 13550);

NOW, THEREFORE, the Board of Directors of the Carlsbad Municipal Water District (CMWD) of the City of Carlsbad, California, hereby ordains as follows:

SECTION 1: FINDINGS

The state policies described above are in the best interest of the District. The majority of jurisdictions in San Diego County have adopted measures to promote water reclamation. This ordinance is necessary to protect the common water supply of the region which is vital to public health and safety, and to prevent endangerment of public and private property. San Diego County is highly dependent on limited imported water for domestic, agricultural, and industrial uses. The reliability of the supply of imported water is uncertain. By developing and utilizing recycled water, the need for additional imported water can be reduced. In light of these circumstances, certain uses of potable water may be considered unreasonable or to constitute a nuisance where recycled water is available or production of recycled water is unduly impaired. Recycled water would be more readily available in seasons of drought when the supply of potable water for nonessential uses may be uncertain.

SECTION 2:WATER RECLAMATION POLICY

It is the policy of the District that recycled water shall be used within the jurisdiction wherever it has determined that its use is economically justified, financially and technically feasible, and consistent with legal requirements, preservation of public health, safety and welfare, and the environment.

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SECTION 3: DEFINITIONS

The following terms are defined for purposes of this ordinance:

3.1 AGRICULTURAL PURPOSES: Agricultural purposes include the growing of field and nursery crops, row crops, trees, and vines and the feeding of fowl and livestock.

3.2 ARTIFICIAL LAKES: A human-made lake, pond, lagoon, or other body of water that is used wholly or partly for landscape, scenic or noncontact recreational purposes.

3.3 COMMERCIAL OFFICE BUILDINGS: Any building for office or commercial uses with water requirements which include, but are not limited to, landscape irrigation, toilets, urinals and decorative fountains.

3.4 COVERAGE TEST: The coverage test means a field investigation by a cross-connection control specialist to verify that there is no overspray, misting, ponding, and runoff occurring when the irrigation system is in operation, and that proper color coding and signage is in place for the on-site facilities.

3.5 CROSS-CONNECTION TEST: A cross-connection test means to verify that the potable and recycled water supplies are not connected to each other by shutting down the recycled water supply to the on-site facilities for 24 hours and determining that the on-site facilities do not become pressurized by the potable water supply at any location. The purpose for the test is to demonstrate that at the time of the test there are no discoverable cross-connections between the site's potable and recycled systems.

3.6 GREENBELT AREAS: A greenbelt area includes, but is not limited to, golf courses, cemeteries, parks and landscaping.

3.7 INDUSTRIAL PROCESS WATER: Water used by any industrial facility with process water requirements which include, but are not limited to, rinsing, washing, cooling and circulation, or construction, including any facility regulated by the Industrial Waste Discharge Ordinance regulated by Chapter 13.16 of the Carlsbad Municipal Code.

3.8 OFF-SITE FACILITIES: Water facilities from the source of supply to the point of connection with the on-site facilities, normally up to and including the water meter.

3.9 ON-SITE FACILITIES: Water facilities under the control of the owner, normally downstream from the water meter.

3.10 POTABLE WATER: Water which conforms to the federal, state and local standards for human consumption.

3.11 RECYCLED WATER: Recycled water means water which, as a result of treatment of wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource. (See California Water Code Section 13050(n).)

3.12 RECYCLED WATER DISTRIBUTION SYSTEMS: A piping system intended for the delivery of recycled water separate from and in addition to the potable water distribution system.

3.13 WASTE DISCHARGE: Waste discharge means water deposited, released or discharged into a sewer system from any commercial, industrial or residential source which contains levels of any substance or substances which may cause substantial harm to any water treatment or reclamation facility or which may prevent any use of recycled water authorized by law.

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SECTION 4:WATER RECLAMATION MASTER PLAN

4.1 GENERAL: Upon adoption of this ordinance, the District shall prepare and adopt by resolution a Water Reclamation Master Plan to define, encourage, and develop the use of recycled water within its boundaries. The Master Plan shall be updated not less often than every five years.

4.2 CONTENTS OF THE WATER RECLAMATION MASTER PLAN: The Water Reclamation Master Plan (Master Plan) will include the following:

4.2.1 PLANTS AND FACILITIES. Evaluation of the location and size of present and future reclamation treatment plants, distribution pipelines, pump stations, reservoirs, and other related facilities, including cost estimates and potential financing methods.

4.2.2 RECYCLED WATER SERVICE AREAS. A designation of the lands within the District service area that can or may in the future use recycled water in lieu of potable water. Recycled water uses may include, but are not limited to, the irrigation of greenbelt and agricultural areas, filling of artificial lakes, and appropriate industrial and commercial uses.

4.2.3 QUALITY OF WATER TO BE RECLAIMED. For each water reclamation treatment facility, an evaluation of water quality with respect to the effect on anticipated uses of recycled water to be served by each treatment facility.

4.2.4 WATER QUALITY PROTECTION MEASURES. Recommend control measures and management practices to maintain or improve the quality of recycled water.

4.2.5 MANDATORY RECYCLED WATER USE. Within the recycled water service area, a description shall be prepared of where greenbelt irrigation, agricultural irrigation, commercial office buildings, filling of artificial lakes, or industrial processes can be limited to the use of recycled water. This information shall be used by District officials to mandate construction of recycled water distribution systems or other facilities in new and existing developments for current or future recycled water use as a condition of any development approval or continued water service if future reclamation facilities are proposed in the Master Plan that could adequately serve the development.

4.2.6 RULES AND REGULATIONS FOR RECYCLED WATER USE. Establish by resolution, general rules and regulations governing the use and distribution of recycled water.

4.2.7 COORDINATION AMONG AGENCIES FOR RECYCLED WATER USE. An examination shall be made of the potential for initiating a coordinated effort between the Carlsbad Municipal Water District and other regional agencies to share in the production and utilization of recycled water.

SECTION 5: PROCEDURES

5.1 EXISTING POTABLE WATER SERVICE:

5.1.1 PRELIMINARY DETERMINATION. Based upon the Master Plan, and upon the designation of each recycled water service area or the commencement of the design of new recycled water facilities, the District shall make preliminary determinations as to which existing potable water customers shall be converted to the use of recycled water. Each water customer shall be notified of the basis for a determination that conversion to recycled water service will be required, as well as the proposed conditions and of the need for a plan of implementation for such conversion.

5.1.2 NOTICE. The notice of the preliminary determination, including the proposed conditions and time schedule for compliance, shall be sent to the water customer by certified mail.

5.1.3 IMPLEMENTATION. The water customer shall be required to submit a plan of implementation to the Carlsbad Municipal Water District's Executive Manager or his designee within ninety (90) days after receipt of the notice of preliminary determination.

The plan of implementation shall describe in detail how the water customer intends to retrofit his water facilities to use recycled water in accordance with all Federal, State and local laws and public health guidelines. The District shall provide the water customer upon request a copy of its "Rules and Regulations for Recycled Water Use" to be a reference for water customer's in preparing the required plan of implementation for their on-site facilities. All costs for preparation of the plan of implementation are the responsibility of the water customer. Carlsbad Municipal Water District's Executive Manager or his designee shall have the authority to approve the water customer's plan of implementation within thirty (30) days after it is submitted to the District. As an option, the District will prepare the "Plan of Implementation" at the District's cost for the water customer, provided the water customer signs an acknowledgement to install and accept the proposed improvements shown on the District approved Plan of Implementation. Once approved, the plan of implementation must be implemented within six (6) months by the water customer including completion of all coverage and cross connection tests and payment of any plancheck and inspection fees if applicable. All costs for implementation of the improvements on the Plan of Implementation are the responsibility of the water customer. If more than six (6) months is required for the implementation, an appeal may be made for additional time to the Carlsbad Municipal Water District's Board of Directors by submitting such appeal in writing to the Executive Manager of the District.

5.1.4 OBJECTIONS; APPEALS. The water customer may file a notice of objection with the District within thirty (30) days after any notice of determination to comply is delivered or mailed to the customer, and may request reconsideration of the determination or modification of the proposed conditions or schedule for conversion. The objection must be in writing and specify the reasons for the objection. The preliminary determination shall be final if the customer does not file a timely objection. The Executive Manager or his designee, shall review the objection with the objector, and shall confirm, modify or abandon the preliminary determination or submit the objection to the District's Board of Directors. The Board, at its sole discretion may confirm, modify or abandon the preliminary determination or establish an alternative program intended to facilitate the orderly development of the recycled water system.

5.2 NEW DEVELOPMENT AND WATER SERVICE APPROVALS:

5.2.1 CONDITIONS. Upon application by a developer, owner or water customer (herein referred to as "applicant") for a tentative map, subdivision map, land use permit, or other development project as defined by Government Code Section 65928, staff shall review the Master Plan and make a preliminary determination whether the current or proposed use of the subject property is required to be served with recycled water or to include facilities designed to accommodate the use of recycled water in the future. Based upon such determination, use of recycled water and provision of recycled water distribution systems or other facilities for the use of recycled water, and such use may be required as a condition of approval of any such application, in addition to any other conditions of approval.

5.2.2 ALTERATIONS AND REMODELING. On a case by case basis, upon application for a permit for the alteration or remodeling of multi-family, commercial or industrial structures (including, for example, hotels), staff shall review the Master Plan and make a preliminary determination whether the subject property shall be required to be served with recycled water or to include facilities designed to accommodate the use of recycled water in the future. Based upon such determination, use of recycled water and provision of recycled water distribution systems or other facilities for the use of recycled water, and application for a permit for such use, may be required as a condition of approval of the application.

5.2.3 NOTICE OF DETERMINATION. A notice of the basis for the preliminary determination, proposed conditions of approval and schedule for compliance shall be provided to the applicant prior to approval of the development application.

5.2.4 REQUESTED SERVICE. On a case by case basis, to use recycled water on a property not covered by Sections 5.1.1, 5.2.1, or 5.2.2 above, the District shall review the Master Plan and make a determination whether the subject property shall be served with recycled water. Based upon such determination, a written Notice of Determination will be provided to the water customer by the District.

5.2.5 PLAN APPROVAL. Plans for the recycled and non-recycled water distribution systems for the parcel shall be reviewed and approved by the District before on-site facilities are constructed. A recycled water number will be assigned by the District and this number shall be placed on the plans for record purposes.

5.2.6 FIELD INSPECTION. Prior to the use of recycled water, the District will perform a coverage test and cross-connection test of the constructed on-site facilities to verify that they are in compliance with the approved Plan and meet all California State Department of Health Services requirements for use of recycled water. Upon approval of the coverage test, the water customer will be required to fill out a Notice of Appointment of Site Supervisor form, and will be provided Rules & Regulations for Recycled Water Use. The water customer's Site Supervisor will also be required to attend the San Diego County Water Authority's training class on use and handling of recycled water, or other approved training class. The coverage test will take place after the recycled water meter is installed. The District and the City of Carlsbad has no required fees for this work but the water customer is responsible for paying San Diego County Department of Environmental Health applicable fees associated with this work.

5.3 TEMPORARY USE OF POTABLE WATER: At the discretion of the Executive Manager or his designee, potable water may be made available on a temporary basis until recycled water is available. Before the applicant receives temporary potable water, the on-site facilities must be constructed in accordance with the Plan of Implementation and field inspected by the staff for new on-site distribution facilities. Prior to commencement of recycled water service, a coverage and cross-connection test of the on-site facilities will be conducted to verify that the facilities have been maintained and are in compliance with the recycled water irrigation system Plan of Implementation and current requirements for service. Upon verification of compliance, recycled water shall be served to the parcel for the intended use. The District shall provide written notice if the facilities are not in compliance, and the applicant shall be notified of the corrective actions necessary and shall have sixty (60) days to take such actions prior to initiation of enforcement proceedings. The water customer will be required to fill out the form described in Section 5.2.6, and the Site Supervisor will be required to attend the San Diego County Water Authority's class on use and handling of recycled water or other approved training class.

5.4 RECYCLED WATER RATE: The rate charged for reclaimed water shall be established by resolution of the Board of Directors.

SECTION 6: REGULATION OF BRINE DISCHARGE TO SEWAGE SYSTEMS

6.1 INTENT: The Carlsbad Municipal Water District recognizes that to maintain adequate wastewater quality for water reclamation treatment processes, and to protect public and private property, restrictions may be required on certain industrial, commercial, and residential waste discharges to a sewerage system that is located within a designated tributary area of an existing or planned reclamation facility.

6.2 ADOPTED TRIBUTARY PROTECTION MEASURES: Waste discharges to the sewage system from any industrial, commercial, or residential source, may be restricted or prohibited upon a finding, following a noticed public hearing, that the type or class of discharge involved is capable of causing or may cause substantial damage or harm to any sewage treatment or reclamation facility or to any significant user or users or potential user or users of reclaimed water within an area which has been planned for reclaimed water services.

SECTION 7: SANCTIONS

7.1 PUBLIC: Discharge by any person or entity of wastes or the use of recycled water in any manner in violation of this ordinance or of any permit issued hereunder is subject to prosecution for a misdemeanor.

7.2 INJUNCTION: Whenever a discharge of wastes or use of recycled water is in violation or threatens to cause a violation of this ordinance, the District's attorney may seek injunctive relief as may be appropriate to enjoin such discharge or use.

7.3 REVOCATION: In addition to any other statute or rule authorizing termination of water service, the District may revoke the use of recycled water if a violation of any provision of this ordinance is found to exist or if a discharge of wastes or use of recycled water causes or threatens to cause violation of this ordinance.

7.4 PENALTY: Except as provided in Subsection 7.1, any owner and/or operator who violates this ordinance shall be subject to:

A. A fine not exceeding one hundred dollars for the first violation;
B. A fine not exceeding two hundred dollars for the second violation within one year;
C. A fine not exceeding five hundred dollars for the third violation within one year;
D. A fine not exceeding one thousand dollars for the fourth and each additional violation within one year.

Each and every day during any portion of which any violation of this ordinance is committed, continued or permitted shall be a separate offense. In addition, potable water service to the property may be discontinued.

SECTION 8: VALIDITY

If any provision of this ordinance or the application thereof to any person or circumstance is held invalid, the remainder of the ordinance and the application of such provisions to other persons or circumstances shall not be affected thereby.

SECTION 9: The District finds that this Ordinance and actions taken hereafter pursuant to this Ordinance are exempt from the California Environmental Quality Act as actions taken to assure the presentation and enhancement of water resources in accordance with CEQA Guidelines Sections 15307 and 15308. The Executive Manager of the District is authorized and directed to file a Notice of Exemption as soon as possible following adoption of this Ordinance.

SECTION 10: EFFECTIVE DATE

This ordinance shall be effective thirty (30) days after its adoption and the Secretary of the Board of Directors shall certify to the adoption of this ordinance and cause it to be published at least once in a newspaper of general circulation in the City of Carlsbad within fifteen (15) days after its adoption.

SECTION 11: (REPEAL)

That Ordinance No. 31 of the District, relating to mandating the use of reclaimed water, is hereby repealed in its entirety.

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INTRODUCED AND FIRST READ at a regular meeting of said Board of Directors held on the 14th day of JUNE, 2005, and thereafter,

PASSED, APPROVED AND ADOPTED at a special meeting of the Carlsbad Municipal Water District held on the 21st day of JUNE, 2005 by the following vote, to wit:

AYES: Board Members Lewis, Hall, Kulchin, Packard, Sigafoose

NOES: None

ABSENT: None

APPROVED AS TO FORM AND LEGALITY:

RONALD R. BALL, General Counsel
6/22/05.

CLAUDE A. LEWIS, President

ATTEST:

Isabelle Paulsen, Deputy
LORRAINE M. WOOD, Secretary
(SEAL)

2010 Urban Water Management Plan

Prepared for

Carlsbad Municipal Water District

Carlsbad, CA

June 2011

2010 Urban Water Management Plan

Prepared for
Carlsbad Municipal Water District
Carlsbad, CA
June 2011

Brown AND Caldwell
9665 Chesapeake Drive, Suite 201
San Diego, California 92123

Section 3

Historical and Projected Water Use

Water use and production records, combined with projections of population, employment, and urban development, provide the basis for estimating future water supply requirements. This chapter presents CMWD's current and projected population, customer connections, and water use, as well as the lower income household water use and per capita demand target.

3.1 Population

In order to be able to provide for CMWD 's future water demands and water use characteristics, it is important to have reasonable estimates of future population totals and future regional trends. The population projections presented in Table 3-1 were developed for CMWD's Water Master Plan that is currently in the process of being finalized.

Water use in CMWD's service area is closely linked to the local economy, population and weather. Over the last half century, a prosperous local economy has stimulated population growth, which in turn produced a relatively steady increase in water demand. However, fluctuating economic and weather conditions in the 1990s and lingering effects from the 1987-1992 drought resulted in deviations from historic demand patterns. By 1999, a new combination of natural population increases and job creation surfaced as the primary drivers of water consumption increases. The recession that started in 2008 brought an increase in unemployment and decrease in housing prices that has dampened population growth and water use. In addition, CMWD adopted a residential tiered water rate in July 2009 which further dampened demand by the residential population.

Table 3-1. Population-Current and Projected

Year	2010	2015	2020	2025	2030	2035	2040
Service Area Population	84,838	89,470	94,101	96,930	99,759	101,402	103,044

DWR Table 2

Source: SANDAG data provided by CMWD.

3.2 Projected Water Demands

Water use consists of water used by CMWD, water sold to others, and additional water uses and losses. Tables 3-2 to 3-6 present the current and projected potable water sales and number of connections by customer sector for calendar years 2005, 2010, 2015, 2020, 2025, 2030, and 2035. CMWD's demand projections presented in this section meet CMWD's gallons per capita per day (gpcd) demand targets that are described in Section 3.3.

This section describes the categories of water use and presents the projected water demands by customer category, water sales to others, other water uses and losses, low income water use and total water use.

- Method 4: A provisional method that was developed by DWR where the target is based on indoor residential, CII, outdoor, and water loss components. Using the Provisional Method 4 Target Calculator provided by DWR with a CII water use in 1997 of 3,241 ac-ft gives a target of 207.1 gpcd.

An urban water supplier must select one of the methods to set their per capita water use target. Water suppliers may choose to change the selected method until 2015. CMWD has selected Method 4 for establishing the 2020 per capita water use target of 207 gpcd.

Since 2007, CMWD's per capita water use has been experiencing a decline partially due to increased retail water cost, increasing use of water conservation measures by customers responding to drought conditions, and poor economic conditions. As shown in Table 3-13, the CMWD's per capita water use in 2010 was already below the 2020 target. However, this 2010 level of water use may be temporary and a partial rebound to prior per capita water use levels may occur. Recent decisions may increase demand. For example, in Apil 2011 the Governor of California terminated the State's drought proclamation. This was followed by the MWD Board which teminated implementation of their 2010/11 Water Supply Allocation Plan Level 2 allocation and reaffirming Baseline Water Use Efficiency Condition for their region on April 12, 2011.

CMWD's approach to meeting the 2020 per capita water use target has several elements consisting of increased saturation into the customer base of low flow plumbing devices and fixtures, continued implementation of demand management measures, the water use reductions that occur with the increased costs of water, and the increased use of recycled water. Recycled water is excluded from gross water use in determining per capita water use according to the DWR guidance. CMWD's water conservation efforts are described in Section 6.

Section 4

Water Supplies

This chapter discusses CMWD's sources of water supply, the quality of the supply, new supply opportunities, exchanges and transfers of water, and water supply reliability.

4.1 Wholesale Water

CMWD imports all of its potable water from the SDCWA, which, in turn, purchases water from the MWD. The imported water is conveyed into the area via MWD and SDCWA facilities. Upon its formation in 1954, CMWD joined the SDCWA to acquire the right to purchase and distribute imported water throughout its service area. The SDCWA has 24 member agencies, including CMWD, and is the regional wholesaler of imported water in San Diego County.

4.1.1 MWD of Southern California

The MWD was created in 1928 following the passage of the Metropolitan Water District Act by the California Legislature to provide supplemental water for cities and communities on the south coastal plain of California. The MWD has 26 member agencies including the SDCWA, and covers an area which includes all, or portions, of Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties.

MWD serves as a water wholesaler, and provides water to its member agencies from both the Colorado River and the State Water Project. MWD's water supplies and management programs are discussed in their 2010 Regional Urban Water Management Plan.

4.1.2 San Diego County Water Authority

The SDCWA was organized on June 9, 1944 under the County Water Authority Act for the express purpose of importing Colorado River Water into San Diego County. The SDCWA annexed to MWD in 1946 and is now represented on the MWD Board by four directors, as its largest customer. SDCWA purchases water from MWD and other sources for resale to its 24 member agencies.

CMWD is one of 24 member agencies of the SDCWA. Each member agency is autonomous and is represented on the Board of Directors, setting local policies and water pricing structures. The representatives on the Board of Directors are appointed by each member agency and the number of representatives for each agency is based on a ratio of each member's assessed valuation compared to the total of all member agencies. CMWD presently has 2 Board members on the 36-member Board of Directors.

Member agency status entitles CMWD to directly purchase water from SDCWA on a wholesale basis. CMWD also looks to the SDCWA to insure, to the best of its ability, that adequate amounts of imported water will be available to satisfy future potable water requirements.

SDCWA's water supplies and management programs are discussed in their 2010 Urban Water Management Plan. Table 4-1 presents the wholesale water supplies that CMWD projects it needs.

Section 5

Recycled Water

Water recycling, defined as the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-potable reuse, is an important component of Southern California's water resources. Non-potable reuse is the term applied to recycled water used for non-drinking water purposes such as filling lakes, ponds, and ornamental fountains; irrigating parks, campgrounds, golf courses, freeway medians, community green belts, school athletic fields, crops, and nursery stock; controlling dust at construction sites; and recharging groundwater basins.

Recycled water can also be used in certain industrial processes and for flushing toilets and urinals in nonresidential buildings. However, current regulations allow only new buildings to be dual-plumbed for this specific use. Additional uses for recycled water are being identified and approved as local agencies, regulators, and customers become comfortable with its use.

The purpose of this chapter is to provide information on recycled water and its use as a water resource in CMWD. CMWD is currently in the process of preparing an updated recycled water master plan. This chapter presents the quantity of wastewater generated in the service area, a description of the collection, treatment, disposal and reuse of that wastewater, and the projected amount of water recycling in CMWD's service area.

5.1 Wastewater Quantity and Disposal

Wastewater collection and transmission is provided by the City of Carlsbad and Leucadia Wastewater District within the CMWD service area. The Encina Wastewater Authority provides treatment, and effluent disposal through an ocean outfall from their Encina Water Pollution Control Facility (EWPCF). Refer to Figure 5-1 for sewer service area boundaries and location of the EWPCF.

Water recycling is provided by CMWD to developed areas within CMWD's boundaries. The area covered by the CMWD includes the majority of the City of Carlsbad's boundary, with the exception of the southeast corner of the City, which is served by Olivenhain Municipal Water District, and Vallecitos Water District.

The City of Carlsbad is a member of the Encina Wastewater Authority which owns and operates one wastewater treatment facility: the EWPCF. The present capacity of EWPCF is approximately 40.51 mgd. This capacity is owned by six member agencies that make up the Encina Wastewater Authority (EWA), including Vallecitos Water District, City of Vista, Buena Sanitation District, City of Carlsbad, Leucadia Wastewater District, and the City of Encinitas. The City of Carlsbad owns capacity rights for 10.26 mgd. The facility provides for full secondary treatment, sludge handling and disposal through a deep ocean outfall that extends along the ocean floor to a point 1.5 miles off shore, at a depth of over 150 feet. The treatment levels meet all current State and Federal requirements.

Table 5-1 shows the projected amounts of wastewater to be generated and collected in the City of Carlsbad's sewer service area. The wastewater amounts generated within the CMWD boundary are estimated to be approximately five to ten percent greater than the City of Carlsbad's sewer service area because it also includes a portion of the Leucadia Wastewater District.

Final

CARLSBAD
Municipal Water District

Phase III Recycled Water Project Feasibility Study

June 2012

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Phase III Recycled Water Project

Feasibility Study

June 2012

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Table 4.1 Demands by Pipeline Expansion Segment				
Pipeline Expansion Segment	Number of Customers[(2)]	Average Annual Demand (afy)		
		Potable Water Customers	New Demands in Customer Database	Phase III System[(3)]
Adjacent to Existing[(1)]	30	126	472	598
1A	17	99	0	99
2	13	782	0	782
4A	1	554	0	554
5	14	325	129	454
7	3	50	64	114
8	2	420	0	420
9	7	78	13	91
18	1	25	0	25
Total	**88**	**2,459**	**679**	**3,135**

(1) This category consists of potential customers adjacent to the existing recycled water distribution system that do not require a specific project expansion segment and that can directly connect to the system through a customer service lateral. This category is assumed to include 30 service laterals.
(2) The specific pipeline expansion segment to which each customer is assigned can be found in Appendix B. Note that the number of customers does not necessarily correspond to the number of sites or service laterals required for each customer use site. See individual pipeline expansion segment descriptions.
(3) Total of existing potable water customers and demands from new or proposed development projects.

To compare the pipeline expansion segments on a consistent cost basis, the estimated capital cost for each segment were amortized and divided by the total segment demand, resulting in a unit segment cost expressed in dollars per acre-foot ($/af) of demand served.

Each Phase III pipeline expansion segment is described in the next section. Each segment is presented on separate location maps that show the pipeline alignments with the sizing and customer locations labeled with their Customer IDs. Accompanying each map is a table that summarizes the customer information by Customer ID. These tables include:

- Customer ID
- Existing potable water account number (if available)
- Customer Name
- Usage Type
- Project Type
- Existing irrigation meter number (if available)
- Meter size
- Estimated demand
- Customer use site address

If any specific property acquisition and right-of-way needs or water quality requirements were identified, these are discussed for each pipeline expansion segment. One of the goals of the 2012 RWMP was to diversify the City's portfolio to increase daytime demand and flatten the system diurnal curve. However, it was found that the majority of potential users are irrigation with the exception of NRG's proposed power plant (Segment 2) and various cooling towers in a business park (Segment 1A).

4.2.3 Pipeline Expansion Segment 2.

Pipeline Expansion Segment 2 consists of 8,400 LF of 18-inch, 200LF 16-inch, 3,900LF of 12-inch, 3,900 LF of 8-inch pipelines and 18 service laterals to serve a Phase III system demand of 782 afy. This segment would be a part of Pressure Zone 384 and extend the recycled water system north from Carlsbad WRF along Avenida Encinas to the Cannon Road. It is estimated that 18 service laterals will be required to convert or retrofit existing potable irrigation customers in this pipeline expansion project segment to recycled water.

Although previous recycled water studies have placed this pipeline expansion project segment in a lower pressure zone, it was decided to raise the hydraulic grade line (HGL) in order to increase looping in Pressure Zone 384 and eliminate a pressure reducing station. Preliminary analysis showed maximum pressure along this alignment, around 196 psi, at an elevation of 29 ft-msl. Increasing the HGL to Zone 384 will also allow uniform head conditions for all Effluent Pumps at the Carlsbad WRF Pump Station. In addition, this will increase redundancy in the distribution system, as supplies from Carlsbad WRF will be conveyed via transmission mains along Palomar Airport Road and Cannon Road in addition to the transmission main along Poinsettia Lane.

Property Acquisition and Right-of-Way Needs

The majority of Pipeline Expansion Segment 2 falls within existing public streets; however a section of this segment will cross the power plant property. CMWD will need to obtain right-of-way for this section of the pipeline.

User specific Water Quality Requirements

Recycled water can be used in the cooling towers of the existing power plant and the proposed NRG Power Plant west of I-5 and north of Cannon Road. While CDPH water quality requirements for cooling tower applications are limited to the constituents listed in Table 4.3, the use of recycled water may require pretreatment and/or operational adjustment to reduce the cycles of concentration, such that corrosion/scaling problems are minimized and constituent thresholds are not exceeded. Therefore, the customer should determine material compatibility, additional treatment requirements, as well as operational adjustments necessary due to recycled water use.

4.2.4 Pipeline Expansion Segment 4A

Pipeline Expansion Segment 4A is intended to provide recycled water to VID to wholesale Recycled Water service to VID, and also future pipeline extension to City of Oceanside. A letter of interest to purchase from Olivenhain Municipal Water District, VID and City of Oceanside to CMWD is included in Appendix C. Pipeline Expansion Segment 4A consists of a new flow control /metering station at the intersection of Melrose Drive and Faraday Avenue. Pipeline Expansion Segment 4A would make use of the existing City of Vista pipeline located in Melrose Drive and connect it to CMWD's existing recycled water pipeline in Faraday Avenue in the 660-pressure zone. No additional pipelines will be required by CMWD, but improvements to the existing City of Vista pipeline are required by VID, and City of Oceanside would need to extend a new pipeline north from the intersection of Melrose Drive and Green Oak Road. Pipeline Expansion Segment 4A will serve one VID customer listed as (C003), the Shadowridge Golf Course, and several customers in the City of Oceanside with largest being (C103), the

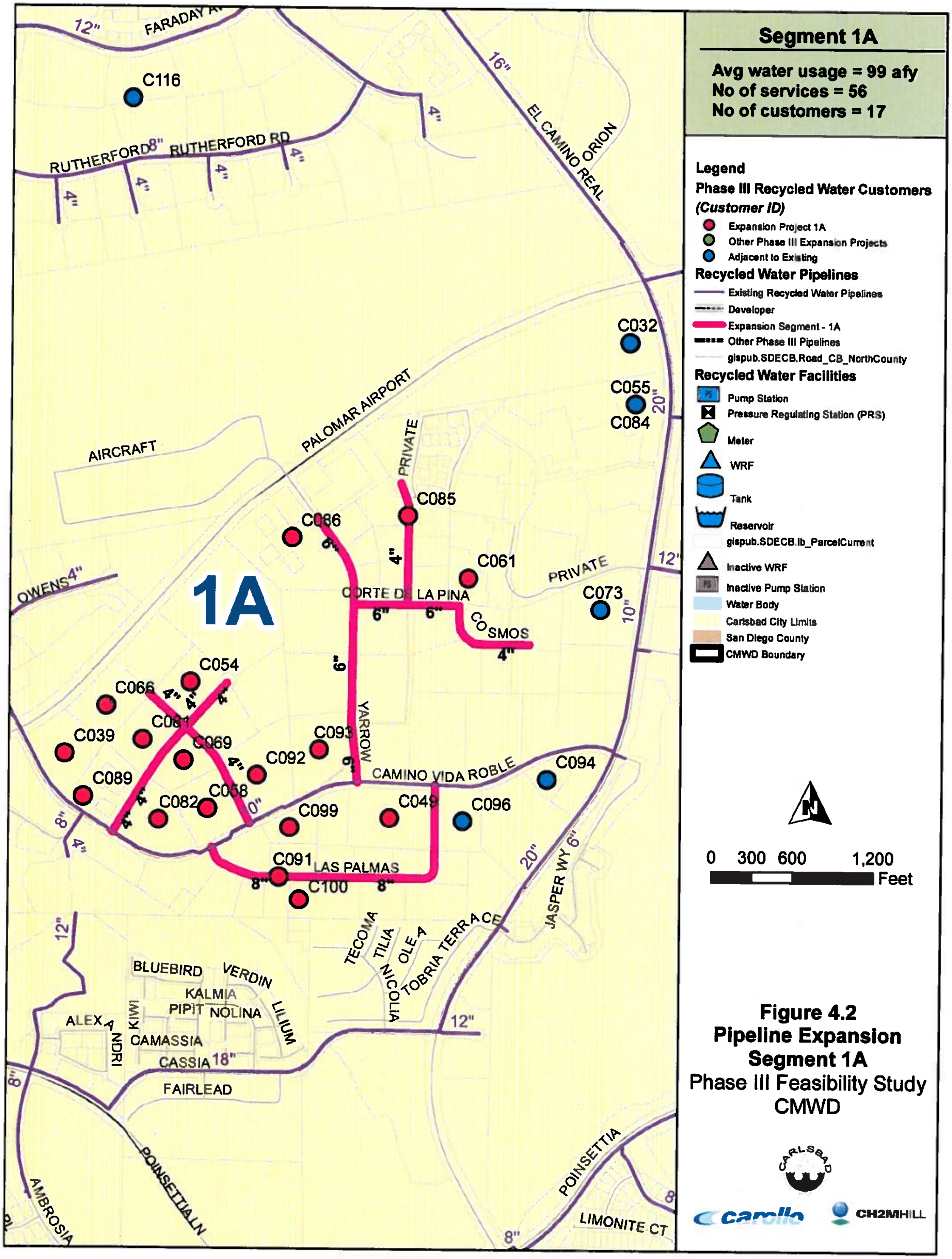


Figure 4.2
Pipeline Expansion
Segment 1A
Phase III Feasibility Study
CMWD

Expansion Project 1A Customers
Phase III Feasibility Study
Carlsbad Municipal Water District

Customer ID [1]	Account	Customer Name	Type	Project Type	Meter Number	Meter Size	Estimated Average Annual Demand [2]			Address		Source
							gpm	afy	mgd			
C039	8510400	Palomar Triad #520	Commercial Property Irrigation	Retrofit	0065562750	2"	8.6	13.9	0.01	2011	Palomar Airport Rd	CMWD
C049	8512700	Equity Growth Invest	Commercial Property Irrigation	Retrofit	0065576124	2"	5.6	9.0	0.01	2225	Camino Vida Roble	CMWD
C054	8509650	2052 CDN LLC	Commercial Property Irrigation	Retrofit	0009912599	1 1/2"	4.9	7.8	0.01	2052	Corte Del Nogal	CMWD
C058	8512250	H G Fenton	Commercial Property Irrigation	Retrofit	0060367019	1 1/2"	4.4	7.1	0.01	6351	Corte Del Abeto	CMWD
C061	8502950	North Pointe HOA	HOA	Conversion	0049370204	1"	4.4	7.1	0.01	6213	El Camino Real	CMWD
C066	8509850	Public Storage Inc	Commercial Property Irrigation	Retrofit	0009482156	1"	4.0	6.4	0.01	6211	Corte Del Abeto	CMWD
C069	8512150	Kilwa Manufacturing Inc	Commercial Property Irrigation	Retrofit	0009913952	1 1/2"	3.9	6.2	0.01	2045	Corte Del Nogal	CMWD
C081	8509950	Bond Ranch	Commercial Property Irrigation	Retrofit	0009912581	1 1/2"	3.3	5.3	< 0.01	2042	Corte Del Nogal	CMWD
C082	8511950	Boi Carlsbad Inc	Commercial Property Irrigation	Retrofit	0009913953	1 1/2"	3.3	5.3	< 0.01	2035	Corte Del Nogal	CMWD
C085	8505100	Palomar Lot 10 BCA	Commercial Property Irrigation	Retrofit	0065562699	2"	3.1	5.0	< 0.01	6050	Corte Del Cedro	CMWD
C086	8507900	Realty Associates Fund VII LP	Commercial Property Irrigation	Retrofit	0065562760	2"	3.1	5.0	< 0.01	2141	Palomar Airport Rd	CMWD
C089	8510010	Carlsbad Corporate Center	Commercial Property Irrigation	Retrofit	0065562690	1 1/2"	2.8	4.6	< 0.01	2032	Corte Del Nogal	CMWD
C091	8513750	Spy Optic Inc	Commercial Property Irrigation	Retrofit	0009912568	1 1/2"	2.8	4.4	< 0.01	2070	Las Palmas Dr	CMWD
C092	8509210	Del Abeto Cntr #260	Commercial Property Irrigation	Retrofit	0009912576	1 1/2"	2.6	4.1	< 0.01	6352	Corte Del Abeto	CMWD
C093	8509050	Palomar 910 Assoc Ltd	Commercial Property Irrigation	Retrofit	0009912566	1 1/2"	2.3	3.6	< 0.01	6351	Yarrow Dr	CMWD
C099	8512300	CBRE - Josepho Family Trust	Commercial Property Irrigation	Retrofit	0009912811	2"	1.4	2.2	< 0.01	2101	Camino Vida Roble	CMWD
C100	8514250	Sierra Land Group Inc	Commercial Property Irrigation	Retrofit	0009912542	1 1/2"	1.2	2.0	< 0.01	2091	Las Palmas Dr	CMWD
		Customer Database Total					**61**	**99**	**0.09**			

Notes:

(1) The customers are displayed by Customer ID in figures

(2) Estimated demand is based on the potable water billing records. If potable records were not available, demand is based on the demand factors developed in Chapter 2.

Expansion Project 2 Customers
Phase III Feasibility Study
Carlsbad Municipal Water District

Customer ID (1)	Account	Customer Name	Type	Project Type	Meter Number	Meter Size	Estimated Average Annual Demand (2)			Address		Source
							gpm	afy	mgd			
C002	8604500	NRC West Coast LLC / Cabrillo Power	Industrial	Retrofit	A031949848	8"	440.8	711.0	0.63	4900	Blk Carlsbad Bl	CMWD
C023	5008815	William L Canepa	Resort Property Irrigation	Retrofit	0009711990	1 1/2"	5.0	8.0	0.01	6450	Carlsbad Bl	CMWD
C050	5008200	Carlsbad Commercial Center	Commercial Property Irrigation	Retrofit	0071394267	2"	4.8	7.8	0.01	5122	Avenida Encinas	CMWD
C052	5002070	Carlsbad Point Corporation	Commercial Property Irrigation	Retrofit	0071394274	2"	4.3	7.0	0.01	5825	Avenida Encinas	CMWD
C053	5001400	Gildred Development	Commercial Property Irrigation	Retrofit	0065576104	2"	4.2	6.8	0.01	5411	Avenida Encinas	CMWD
C057	5002300	Cognac Pacific Corporate LLC	Commercial Property Irrigation	Retrofit	0065576077	2"	4.0	6.4	0.01	5999	Avenida Encinas	CMWD
C059	5003412	Cognac Carlsbad Pac Centr LLC	Commercial Property Irrigation	Retrofit	0009711988	1 1/2"	3.8	6.1	0.01	701	Palomar Airport Rd	CMWD
C065	5002002	Windstar Carlsbad Office LLC / Floral Trade Center	Commercial Property Irrigation	Retrofit	0065576096	2"	3.4	5.5	< 0.01	5600	Avenida Encinas	CMWD
C074	5008510	Inns Of America Suites	Commercial Property Irrigation	Conversion	0065576093	2"	3.1	5.0	< 0.01	5010	Avenida Encinas	CMWD
C075	5008300	Cognac Carlsbad Pacifica LLC	Commercial Property Irrigation	Retrofit	0065576109	2"	3.1	5.0	< 0.01	5050	Avenida Encinas	CMWD
C079	5007600	Palomar And Company	Commercial Property Irrigation	Retrofit	0065576095	2"	2.8	4.4	< 0.01	5952	Avenida Encinas	CMWD
C080	5008550	Inns Of America Suites	Commercial Property Irrigation	Conversion	n/a	1"	2.7	4.4	< 0.01	5010	Avenida Encinas	CMWD
C083	5001300	CBRE Carlsbad Commercial Ctr	Commercial Property Irrigation	Retrofit	0065576101	2"	2.6	4.2	< 0.01	5379	Avenida Encinas	CMWD
			Customer Database Total				**485**	**782**	**0.70**			

Notes:

(1) The customers are displayed by Customer ID in figures

(2) Estimated demand is based on the potable water billing records. If potable records were not available, demand is based on the demand factors developed in Chapter 2.

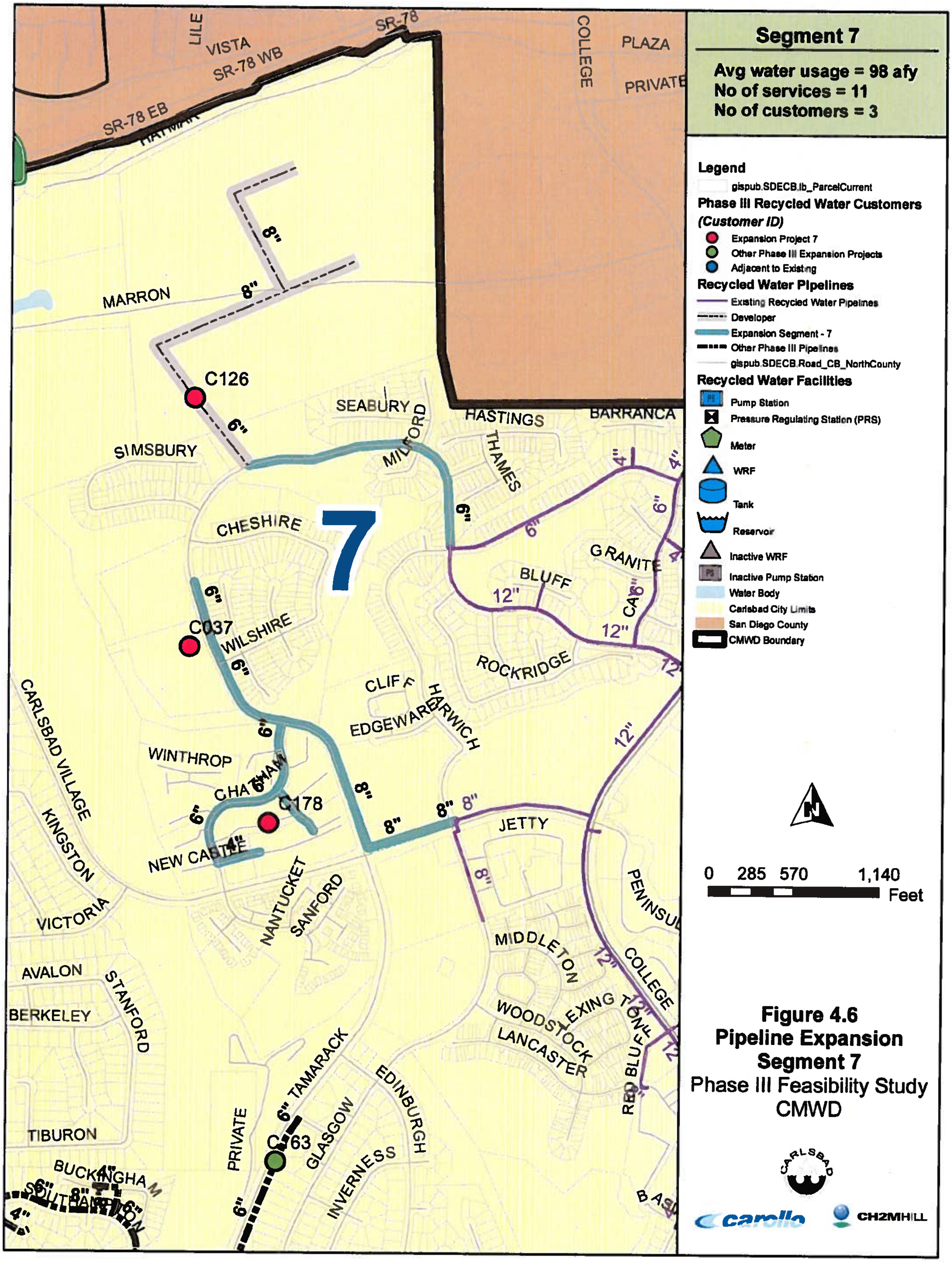


Figure 4.6
Pipeline Expansion
Segment 7
Phase III Feasibility Study
CMWD

Expansion Project 7 Customers
Phase III Feasibility Study
Carlsbad Municipal Water District

Customer ID [1]	Account	Customer Name	Type	Project Type	Meter Number	Meter Size	Estimated Average Annual Demand [2]			Address	Source
							gpm	afy	mgd		
C037	4611900	Hope Elementary School (Group)	Schools	Retrofit	0037128947	2"	8.2	13.3	0.01		CMWD
C126		High-Density Residential Development at Quarry Creek	HOA	New Developmen			40.0	64.5	0.06		Developmen
C178		Existing Landscape Meters at The Villa HOA	HOA	Retrofit			12.4	20.0	0.02	Chatham Road	CMWD
		Customer Database Total					**61**	**98**	**0.09**		

Notes:

(1) The customers are displayed by Customer ID in figures

(2) Estimated demand is based on the potable water billing records. If potable records were not available, demand is based on the demand factors developed in Chapter 2.

4.3 Carlsbad Water Recycling Facility, 4 MGD Expansion

4.3.1 Introduction

The Carlsbad Water Recycling Facility (CWRF) is located on property owned by CMWD. The CWRF is currently operated by the Encina Wastewater Authority through a Memorandum of Understanding with the CMWD.

The CWRF is regulated by the California Regional Water Quality Control Board, San Diego Region under Order No. 2001-352 for treatment and reuse of up to 4.0 million gallons per day (mgd). Order No. 2001-352 also allows the CMWD to purchase and distribute up to:

- 5.0 mgd of recycled water treated by the Vallecitos Water District's Meadowlark Water Reclamation Facility, and
- 2.0 mgd of recycled water treated by the Leucadia Wastewater District's Gafner Water Reclamation Facility.

CMWD requested an amendment to the CWRF discharge order to revise the average annual limit for iron to 0.3 mg/L and 0.1 mg/L for manganese, which was approved by the Regional Board on February 8, 2012.

The CWRF was master planned to be expanded up to a capacity of 16 mgd. The Phase III project will expand the CWRF from its current capacity of 4.0 mgd to a total capacity of 8.0 mgd, and therefore sufficient space and infrastructure is in place to accommodate the expansion. Following is a discussion of the CWRF improvements for the Phase III project.

4.3.2 Recommended Phase III Treatment Plan

Process Flow Schematic. Under the treatment process flow schematic, secondary clarified effluent is pumped from the Encina Water Pollution Control Facility (EWPCF) by the existing Combined Pump Station (CPS) up to the CWRF. The EWPCF combined pump station has two separate pumping systems to deliver secondary treated water to the CWRF. One pumping system pumps flow to the microfiltration (MF) / reverse osmosis (RO) treatment train while the second pumping system pumps to the continuous backwash granular media filtration (GMF) treatment train. Effluent flows from the two treatment trains are blended and then disinfected in the chlorine contact basin, and the treated water stored in the flow equalization basins.

The current filtration process includes either a possible coagulation option followed by granular media filtration (GMF) or passing it through microfiltration (MF) with an option for reverse osmosis (RO) treatment. The disinfection process includes the use of 12.5 percent sodium hypochlorite delivered in bulk which is then applied to the chlorine contact basin.

The MF/RO treatment train is designed to reduce (if required) total dissolved solids (TDS) concentrations. Microfiltration filters (MF) are used to pretreat flows directed to the RO facility. The capacity of the microfiltration treatment facilities are approximately 0.9 mgd. At a recovery rate of approximately 85 percent, the onsite RO facility has a production capacity of approximately 0.7 mgd. The current capacity of the microfiltration/RO treatment train is adequate to ensure that the combined effluent from the two treatment trains will contain concentrations of less than 1000 mg/L, which is CMWD's desired maximum TDS level for its customers. No expansion of the MF/RO treatment train is proposed for the Phase III project because TDS levels in the effluent have been below the desired limit.

Key components of the CWRF expansion for the Phase III project include:

- Granular media filtration feed pumps
- Granular media filtration
- Disinfection through Chlorine Contact Basin
- Plant Controls
- Flow Equalization Storage Basin
- Recycled Water Pump Station

Following is a presentation of the current capacity and proposed improvements for each of the key components as it applies to the Phase III project. Refer to Figure 4.10.

Granular media filtration (GMF) feed pumps. Two pumps are currently located at the EWPCF Combined Pump Station (CPS) which receives secondary treated effluent from the EWPCF Secondary Clarifiers. The GMF feed pumps currently discharges approximately 75 percent of the daily flow for the CWRF from the EWPCF Combined Pump Station (CPS) through a 36-inch diameter influent pipeline to the GMF's. Aluminum sulfate and coagulant polymer can be added before an inline static mixer as coagulant aids.

The GMF feed pumps at the CPS currently includes two vertical turbine pump units with a rated capacity of 2,600 gpm each pump at 65-feet of head. Each pump is driven by a 75 HP motor with variable speed drive. Normally once the pumps startup they operate at a constant speed to match the operator set flow rate to supply water to the granular media filtration.

The CPS was constructed with the provision for four GMF feed pumps ultimately (3 operating and 1 standby) with a total capacity of 5,200 gpm each pump.

The Phase III project will require the following improvements for the CPS feed:

- *Addition of one 2,800 gpm vertical turbine pump.*
- *A 12-inch diameter discharge pipe extension from the vertical turbine pump to the 24-inch diameter manifold pipe with appurtenant check valve and air release valve.*
- *A 24-inch diameter steel manifold pipe extension to the pump discharge pipe.*
- *Variable speed controls will also need to be added to control the new 2,800 gpm vertical turbine pump operation.*

Coagulation and flocculation. GMF influent flow, which is chemically treated by alum or polymer, is coagulated and flocculated in-line prior to the filtration process. A Komax® type static mixer is located approximately 520-feet upstream of the filtration process in the 36-inch diameter filter influent pipeline. The length and diameter of the filter influent pipeline downstream of the static mixer are sized to provide 11 minutes of flocculation time at peak flow.

> **Aluminum Sulfate.** Aluminum sulfate is an option for use as a coagulant in the GMF process to produce a compact settleable floc which can increase turbidity removal. The alum is stored in totes; one tote (350 gallons) provides approximately 15 days of storage based on an average dosage concentration of 10 mg/L at 3.7 mgd. Metering pumps (1-duty, 1 standby) convey the alum to the in-line static mixer located on the filter influent pipeline.

Appendix B

CUSTOMER DATABASE

Customer Database
Phase III Feasibility Study
Carlsbad Municipal Water District

Map ID [1]	Customer Name	Type	Size of Potable Meter	Estimated Average Annual Demand[2]			Account	Address				Multiple Meters	Source	Expansion Alignment
				gpm	afy	mgd		No.	Address	zip	city			
C001	OMWD Customers (Gafner WRP or from Carlsbad WRF via El Camino)	Landscape Irrigation		248.0	400.0	0.36						Discussion with George Briest (OMWD)	Olivenhain Municipal Water District	8
C002	NRC West Coast LLC / Cabrillo Power	Industrial	8"	440.8	711.0	0.63	8604500.0	4900	BLK CARLSBAD BL	92008	CARLSBAD	Email from BP; Potable Water Billing Data LU	Carlsbad Municipal Water District	2
C003	Shadowridge Golf Course	Golf Courses		186.0	300.0	0.27		1980	GATEWAY DR	92081	VISTA	Progress Meeting (9-24-2009)	Vista Irrigation District	4A
C004	KSL Resorts: La Costa Resort (Group)	Resort Property Irrigation	4"	12.4	20.0	0.02	7013300.0	2100	COSTA DEL MAR RD	92009	CARLSBAD	Potable Billing; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	8
C005	Robertson's Ranch - West Village (Phase 2)	HOA		73.3	118.3	0.11						Robertson Ranch Master Plan	Development	5
C009	Robertson's Ranch - East Village (Phase 1)	HOA		40.8	65.8	0.06						Robertson Ranch Master Plan	Development	Near Existing
C010	Tamarack Point HOA	HOA	21	26.0	42.0	0.04			Tamarack Ave & Pontiac Dr			Meeting with EK	Carlsbad Municipal Water District	5
C013	Invitrogen (Life Technologies)	Commercial Cooling	2"	11.2	18.0	0.02	8300030.0	5781	VAN ALLEN WY	92008	CARLSBAD	RW Eng Report; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	Near Existing
C014	San Pacifico HOA	HOA		25.7	41.5	0.04						Customer Workshop	Carlsbad Municipal Water District	9
C017	Alta Mira HOA	HOA		8.1	13.0	0.01						UWMP; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	Near Existing
C021	Pan Pacific Retail Prop Inc	Commercial Property Irrigation	2"	12.1	19.5	0.02	2704440.0	1850	MARRON RD	92008	CARLSBAD	Potable Water Billing Data Large User	Carlsbad Municipal Water District	5
C023	William L Canepa	Resort Property Irrigation	1 1/2"	5.0	8.0	0.01	5008815.0	6450	CARLSBAD BL	92011	CARLSBAD	Potable Billing; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	2
C027	Full Range Prty LLC (Carlsbad Golf Center)	Commercial Property Irrigation	2"	10.8	17.5	0.02	2701120.0	2711	HAYMAR DR	92010	CARLSBAD	Potable Water Billing Data Large User	Carlsbad Municipal Water District	5
C029	Plaza Camino Real	Commercial Property Irrigation	2"	15.9	25.6	0.02	2705600.0	2525	EL CAMINO REAL	92008	CARLSBAD	Potable Water Billing Data Large User	Carlsbad Municipal Water District	5
C032	OVLC Management Co. DBA / KSL (was Olympic Hotel / PAC)	Commercial Property Irrigation		9.3	15.0	0.01	8500100.0					Urban Water Management Plan	Carlsbad Municipal Water District	Near Existing
C033	Motel 6 - Site 000471	Commercial Property Irrigation	2"	9.2	14.9	0.01	5010970.0	750	RAINTREE DR	92011	CARLSBAD	Potable Water Billing Data Large User	Carlsbad Municipal Water District	Near Existing
C037	Hope Elementary School (Group)	Schools	2"	8.2	13.3	0.01	4611900.0					JP Additional Meter Comments	Carlsbad Municipal Water District	7
C038	Ponto Hotel	Resort Property Irrigation		8.0	13.0	0.01						Customer Workshop / Development Projections	Development	9
C039	Palomar Triad #520	Commercial Property Irrigation	2"	8.6	13.9	0.01	8510400.0	2011	PALOMAR AIRPORT RD	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C040	Kelly Elementary School (Group)	Schools	2"	6.5	10.5	0.01	3900000.0					JP Additional Meter Comments	Carlsbad Municipal Water District	5
C044	Existing Landscape Meters near Impala Dr and Palmer Wy	Commercial Property Irrigation		15.2	24.5	0.02						EK Final Review and Additions	Carlsbad Municipal Water District	18
C049	Equity Growth Invest	Commercial Property Irrigation	2"	5.6	9.0	0.01	8512700.0	2225	CAMINO VIDA ROBLE	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C050	Carlsbad Commercial Center	Commercial Property Irrigation	2"	4.8	7.8	0.01	5008200.0	5122	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C052	Carlsbad Point Corporation	Commercial Property Irrigation	2"	4.3	7.0	0.01	5002070.0	5825	AVENIDA ENCINAS	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C053	Gildred Development	Commercial Property Irrigation	2"	4.2	6.8	0.01	5001400.0	5411	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C054	2052 CDN LLC	Commercial Property Irrigation	1 1/2"	4.9	7.8	0.01	8509650.0	2052	CORTE DEL NOGAL	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C055	North Pointe HOA	HOA	1"	0.9	1.5	< 0.01	8500565.0	6155	EL CAMINO REAL	92009	CARLSBAD	Meeting with EK; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	Near Existing
C057	Cognac Pacific Corporate LLC	Commercial Property Irrigation	2"	4.0	6.4	0.01	5002300.0	5999	AVENIDA ENCINAS	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C058	H G Fenton	Commercial Property Irrigation	1 1/2"	4.4	7.1	0.01	8512250.0	6351	CORTE DEL ABETO	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C059	Cognac Carlsbad Pac Centr LLC	Commercial Property Irrigation	1 1/2"	3.8	6.1	0.01	5003412.0	701	PALOMAR AIRPORT RD	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C061	North Pointe HOA	HOA	1"	4.4	7.1	0.01	8502950.0	6213	EL CAMINO REAL	92009	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C064	Future Parcel - Carlsbad Airport Center	Commercial Property Irrigation		1.1	1.8	< 0.01						EK In Progress Map (Future)	Development	Near Existing
C065	Windstar Carlsbad Office LLC / Floral Trade Center	Commercial Property Irrigation	2"	3.4	5.5	< 0.01	5002002.0	5600	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C066	Public Storage Inc	Commercial Property Irrigation	1"	4.0	6.4	0.01	8509850.0	6211	CORTE DEL ABETO	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C069	Kilwa Manufacturing Inc	Commercial Property Irrigation	1 1/2"	3.9	6.2	0.01	8512150.0	2045	CORTE DEL NOGAL	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C072	Lakeshore Gardens MHP (Group)	Pond Evaporation	6"	3.1	5.0	< 0.01	8618800.0	7201	AVENIDA ENCINAS	92011	CARLSBAD	Potable Water Billing Data Large User	Carlsbad Municipal Water District	9
C073	Naturemaker Inc	Commercial Property Irrigation	1 1/2"	3.1	5.0	< 0.01	8500650.0	6225	EL CAMINO REAL	92009	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	Near Existing
C074	Inns Of America Suites	Commercial Property Irrigation	2"	3.1	5.0	< 0.01	5008510.0	5010	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C075	Cognac Carlsbad Pacifica LLC	Commercial Property Irrigation	2"	3.1	5.0	< 0.01	5008300.0	5050	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C076	Future Parcel - Carlsbad Airport Center	Commercial Property Irrigation	0	1.6	2.6	< 0.01			0		0	EK In Progress Map (Future)	Development	Near Existing
C078	City Of Carlsbad Parks	Parks	2"	2.9	4.6	< 0.01	3924500.0					JP Additional Meter Comments	Carlsbad Municipal Water District	5
C079	Palomar And Company	Commercial Property Irrigation	2"	2.8	4.4	< 0.01	5007600.0	5952	AVENIDA ENCINAS	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C080	Inns Of America Suites	Commercial Property Irrigation	1"	2.7	4.4	< 0.01	5008550.0	5010	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C081	Bond Ranch	Commercial Property Irrigation	1 1/2"	3.3	5.3	< 0.01	8509950.0	2042	CORTE DEL NOGAL	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C082	Boi Carlsbad Inc	Commercial Property Irrigation	1 1/2"	3.3	5.3	< 0.01	8511950.0	2035	CORTE DEL NOGAL	92009	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C083	CBRE Carlsbad Commercial Ctr	Commercial Property Irrigation	2"	2.6	4.2	< 0.01	5001300.0	5379	AVENIDA ENCINAS	92008	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	2
C084	North Pointe Owners' Assoc	HOA	1"	1.2	2.0	< 0.01	8500503.0	6155	EL CAMINO REAL	92009	CARLSBAD	Meeting with EK; Dmd per EK Final Edits Rev2	Carlsbad Municipal Water District	Near Existing
C085	Palomar Lot 10 BCA	Commercial Property Irrigation	2"	3.1	5.0	< 0.01	8505100.0	6050	CORTE DEL CEDRO	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C086	Realty Associates Fund VII LP	Commercial Property Irrigation	2"	3.1	5.0	< 0.01	8507900.0	2141	PALOMAR AIRPORT RD	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A

Map ID [1]	Customer Name	Type	Size of Potable Meter	Estimated Average Annual Demand[2]			Account	Address				Multiple Meters	Source	Expansion Alignment
				gpm	afy	mgd		No.	Address	zip	city			
C089	Carlsbad Corporate Center	Commercial Property Irrigation	1 1/2"	2.8	4.6	< 0.01	8510010.0	2032	CORTE DEL NOGAL	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C090	Bressi Ranch Corp Ctr	HOA		2.1	3.4	< 0.01					CARLSBAD	EK	Carlsbad Municipal Water District	Near Existing
C091	Spy Optic Inc	Commercial Property Irrigation	1 1/2"	2.8	4.4	< 0.01	8513750.0	2070	LAS PALMAS DR	92011	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	1A
C092	Del Abeto Cntr #260	Commercial Property Irrigation	1 1/2"	2.6	4.1	< 0.01	8509210.0	6352	CORTE DEL ABETO	92011	CARLSBAD	Meeting with EK	Carlsbad Municipal Water District	1A
C093	Palomar 910 Assoc Ltd	Commercial Property Irrigation	1 1/2"	2.3	3.6	< 0.01	8509050.0	6351	YARROW DR	92011	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	1A
C094	Guy Freeborn	Commercial Property Irrigation	2"	1.6	2.5	< 0.01	8515600.0	2385	CAMINO VIDA ROBLE	92008	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	Near Existing
C096	Micro-Probe Prop LLC	Commercial Property Irrigation	1 1/2"	1.5	2.4	< 0.01	8515200.0	2281	LAS PALMAS DR	92011	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	Near Existing
C099	CBRE - Josepho Family Trust	Commercial Property Irrigation	2"	1.4	2.2	< 0.01	8512300.0	2101	CAMINO VIDA ROBLE	92011	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	1A
C100	Sierra Land Group Inc	Commercial Property Irrigation	1 1/2"	1.2	2.0	< 0.01	8514250.0	2091	LAS PALMAS DR	92011	CARLSBAD	EK In Progress Map (Future)	Carlsbad Municipal Water District	1A
C104	Hosp Grove Park	Parks		1.2	2.0	< 0.01						P Fac Map; Dmd per EK Final Edits Rev2; Nat	Carlsbad Municipal Water District	5
C107	Alga Norte Park (Future)	Parks		44.6	71.9	0.06						Carlsbad Surrounding Public Facilities Map	Development	Near Existing
C109	Future High School Site	Schools		18.6	30.0	0.03						P Fac Map; Dmd per EK Final Edits Rev2; Nat	Development	Near Existing
C110	Business Park Cooling Towers in Carlsbad Airport Center	Commercial Cooling		6.1	9.9	0.01						City Staff Field Investigation / HVAC Factor	Carlsbad Municipal Water District	Near Existing
C116	Business Park Cooling Towers in Carlsbad Research Center	Commercial Cooling		18.6	30.0	0.03						City Staff Field Inv / HVAC Factor / Deduct LT	Carlsbad Municipal Water District	Near Existing
C119	Business Park Cooling Towers in Carlsbad Oaks	Commercial Cooling		2.7	4.4	< 0.01						City Staff Field Investigation / HVAC Factor	Carlsbad Municipal Water District	Near Existing
C126	High-Density Residential Development at Quarry Creek	HOA		40.0	64.5	0.06						Bill Plummer / Developable Areas Shapefile	Development	7
C137	Discovery Isle Child Development	Schools		2.2	3.6	< 0.01						Carlsbad Surrounding Public Facilities Map	Carlsbad Municipal Water District	Near Existing
C140	Irrigation Meters in Palisades and Telescope HOA	HOA		7.3	11.7	0.01						EK Final Review and Additions	Carlsbad Municipal Water District	5
C143	Legoland Inner Park Expansion	Resort Property Irrigation		20.8	33.6	0.03						Development Projections (Planning Department)	Development	Near Existing
C144	Gemological Institute of America Expansion	Commercial Property Irrigation		3.2	5.2	< 0.01						Development Projections (Planning Department)	Development	Near Existing
C145	Carlsbad Ranch Resort	Commercial Property Irrigation		23.5	37.9	0.03						Development Projections (Planning Department)	Development	Near Existing
C146	Dos Colinas (Senior Independent and Assisted Care Living)	HOA		37.0	59.7	0.05						Development Projections (Planning Department)	Development	DEVELOPER
C147	Walmart / Sunny Creek Plaza	Commercial Property Irrigation		7.4	12.0	0.01						Development Projections (Planning Department)	Development	DEVELOPER
C148	Cantarini	HOA		71.3	115.0	0.10						Development Projections (Planning Department)	Development	DEVELOPER
C149	Holly Springs	HOA		57.7	93.1	0.08						Development Projections (Planning Department)	Development	DEVELOPER
C150	Carlsbad Oaks North - Phase I	Commercial Property Irrigation		26.1	42.1	0.04						Development Projections (Planning Department)	Development	Near Existing
C151	Carlsbad Oaks North - Phase II	Commercial Property Irrigation		21.1	34.0	0.03						Development Projections (Planning Department)	Development	Near Existing
C152	Carlsbad Oaks North - Phase III	Commercial Property Irrigation		22.5	36.3	0.03						Development Projections (Planning Department)	Development	Near Existing
C153	Bressi Ranch - Planning Areas 1 through 4	Commercial Property Irrigation		27.0	43.5	0.04						Development Projections (Planning Department)	Development	Near Existing
C154	Bressi Ranch - Planning Area 5	Commercial Property Irrigation		6.1	9.9	0.01						Bressi Ranch Master Plan	Development	Near Existing
C155	Bressi Ranch - Planning Area 15	Commercial Property Irrigation		6.4	10.4	0.01						Bressi Ranch Master Plan	Development	Near Existing
C156	Rancho Carrillo Village H - Palomar Korean Church	Commercial Property Irrigation		1.5	2.4	< 0.01						Development Projections (Planning Department)	Development	Near Existing
C157	Carlsbad Raceway and Palomar Forum - Remaining Vacant Parcels	Commercial Property Irrigation		27.6	44.6	0.04						Development Projections (Planning Department)	Development	Near Existing
C158	HOA	HOA		6.9	11.1	0.01						Bill Plummer / Developable Areas Shapefile	Development	5
C163	Existing Colony at Calavera Irrigation Meters	HOA		4.5	7.2	0.01			Tamarack Avenue			EK Final Review and Additions	Carlsbad Municipal Water District	5
C164	Existing Landscape Meters along El Camino Real	HOA		1.2	2.0	< 0.01			El Camino Real			Pickup Demands	Carlsbad Municipal Water District	5
C165	Existing Landscape Meters at Marbella (Apartment Complex)	HOA		1.2	2.0	< 0.01			Marron Road			EK Final Review and Additions	Carlsbad Municipal Water District	5
C172	Existing Landscape Meters along Navigator Circle	HOA		2.1	3.4	< 0.01			Navigator Circle			EK Final Review and Additions	Carlsbad Municipal Water District	9
C177	Existing Landscape Meter at Avenida Encinas	Commercial Property Irrigation	2"	9.2	14.9	0.01	5010775.0	7190	Avenida Encinas			Pickup Demands	Carlsbad Municipal Water District	9
C178	Existing Landscape Meters at The Villa HOA	HOA		12.4	20.0	0.02			Chatham Road			EK Final Review and Additions	Carlsbad Municipal Water District	7
C200	El Camino Countrylub	Golf Courses		111.6	180.0	0.16					Oceanside			5
C201	Commercial	Commercial Property Irrigation		4.0	6.5	0.01							Carlsbad Municipal Water District	9
C202	Hotel	Commercial Property Irrigation		4.0	6.5	0.01							Carlsbad Municipal Water District	9
		Customer Database Total		1,950	3,145	2.81								

Notes:

(1) Map ID corresponds to the ID in the GIS database. The customers are displayed by Map ID in Chapter 4.

(2) Estimated demand is based on the potable water billing records. If potable records were not available, demand is based on the demand factors developed in Chapter 2. The total demand reflected here includes the four Developer Customers: C146, C147, C148, and C149.

LETTER OF INTEREST

NRG

NRG West Coast LLC
1819 Aston Avenue, Suite 105
Carlsbad, CA 92008

Direct Phone: (760) 710-2144

July 6, 2007

Mr. Bill Plummer
Deputy City Engineer
City of Carlsbad
Engineering Department
1635 Faraday Avenue
Carlsbad, California 92008

RE: Request for Service for Water Supply & Sewer Interconnection – Proposed New Power Generation Equipment at the Encina Power Station

Dear Mr. Plummer:

NRG West Coast LLC (NRG West) is considering development of additional power generation resources for the San Diego Region at the Encina Power Station in the City of Carlsbad. Under the California Energy Commission (CEC) procedures, the evaluation of proposed power generating facilities begins with an "Application for Certification" (AFC). As part of the AFC process, it is necessary, among other things, to identify adequate water and sewer availability and capacity for a proposed new facility.

Recently, we met with you and Mr. Terry Smith of the City of Carlsbad to discuss the utilization of California Code of Regulations (CCR) Title 22 reclaimed water as the primary source of process water for the proposed new power generating equipment at NRG West's Encina Power Station, as well as the source for landscape irrigation water. We also discussed the interconnection of the new power generating equipment for wastewater discharge service (industrial and domestic wastewater) to the City of Carlsbad's existing sewer infrastructure that runs through the existing facility. In addition to the CCR Title 22 reclaimed water, the new power generating project would also require potable water for non-industrial uses such as water taps, toilets, safety showers/emergency eye washes, and fire protection.

Based on the discussion at the meeting, it appears the City of Carlsbad has the supply and infrastructure available to provide service for reclaimed and potable water, and sewer discharge for the new power generating equipment.

During the meeting, it was agreed that the best course of action was for NRG West to request a "Will Serve" letter from the City of Carlsbad to supply the project with reclaimed and potable water, and for the City to provide the interconnection for sewer discharge. Specifically, we are in need of a "Will Serve" letter to meet the power plant site certification regulations of the CEC for the new power generating equipment. The CEC requires a "Will Serve" letter that indicates the willingness and ability of the City to furnish/meet the needs of the project.

The table below provides the project's requirements for CCR Title 22 reclaimed water and its requirement for potable water on a peak daily and yearly average basis.

Peak Daily Water Use

	Gallons/Minute (gpm)	Gallons/Day
Reclaimed	945	1,360,800
Potable (normal)	12	17,200
Potable (Infrequent/fire water storage refill)		
	500 (minimum)	240,000

Yearly Average Water Use

	Gallons/Minute (gpm)	Gallons/Year
Reclaimed	320	168,300,000
Potable	12	6,307,000

To support the use of CCR Title 22 reclaimed water for the project's process water, the reclaimed water will be passed through a reverse osmosis system to treat the water to be used by the proposed power generating equipment. This process will return approximately thirty percent (30%) of the reclaimed water it receives as well as domestic wastewater discharge to the sewer connection. The table below provides the project's requirement for industrial and domestic wastewater sewer discharge on a peak daily and yearly average basis.

Peak Daily Discharge

	Gallons/Minute (gpm)	Gallons/Day
Industrial	290	417,600
Domestic	12	17,200
Combined	**302**	**434,800**

Yearly Average Discharge

	Gallons/Minute (gpm)	Gallons/Year
Industrial	107.2	56,344,320
Domestic	12	6,307,200
Combined	**119.2**	**62,651,520**

Regarding the requested sewer connection, NRG West hereby specifically requests that the project's sewer connection be to the existing sewer line that runs through the Encina Power Station rather than to the planned new sewer line that is to be constructed adjacent to the existing line; with provisions to later connect to the new line.

As discussed at the meeting, an existing reclaimed water line is located at Cannon Road near Avenida Encinas approximately 2,500 feet south of the project site. To serve the project, the existing reclaimed water line will need to be extended to the project site. NRG West hereby specifically requests that the City construct the extension of the reclaimed water line to the project's interconnection, this will include the City obtaining any required easements for extension of the reclaimed water line. NRG West will reimburse the City for the capital cost for construction of the extension of the reclaimed water line on a mutually agreeable reimbursement method.

To meet the requirements of the CEC, the "Will Serve" letter should specifically reference this letter and the project's specific requirements for reclaimed and potable water, and for wastewater discharge so that it is clear that City has and is committing the supply and infrastructure to meet the project's needs as defined in this letter. To meet the filing date of the AFC, NRG West respectively requests receipt of the "Will Serve" letter by August 6, 2007.

Thank you for your time and consideration of this request. If you have any questions or need additional information, please contact Chris Doyle of NRG West at (760) 710-2150.

Sincerely,

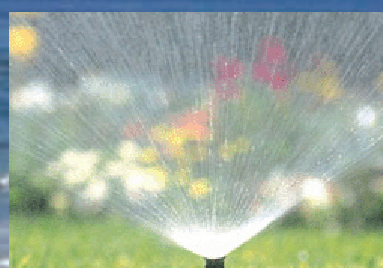
Tim Hemig
Director, Environmental & New Business

cc: David Hauser, Deputy City Engineer
Chris Doyle, NRG West

FINAL REPORT

Carlsbad
Municipal Water District

2012
RECYCLED WATER
Master Plan



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EXECUTIVE SUMMARY

ES.1 PROJECT BACKGROUND

Carlsbad Municipal Water District (CMWD) started its recycled water program in 1990 with the preparation of its first Recycled Water Master Plan (RWMP). Subsequently, CMWD issued a mandatory use ordinance and started implementing the recycled water system facilities of Phase I. CMWD served over 1,000 acre-feet per year (afy) of recycled water by 1995. The implementation of Phase II started in 2000 and included construction of the 4-mgd Carlsbad Water Recycling Facility (CWRF) and expansion of the Meadowlark Water Reclamation Facility (MWRF), improvements to Mahr Reservoir, three new booster pump stations, and 24 miles of additional recycled water pipeline. Construction of Phase II was completed in 2008 and the CMWD currently serves approximately 4,000 afy of recycled water.

With Phase II near completion, CMWD initiated the development of this RWMP update to evaluate the capabilities of the existing recycled water system, define the most cost-effective system expansions through build out conditions, and develop a capital improvement program (CIP). This CIP includes a recommended phasing strategy and defines the Phase III projects. A separate Phase III Project Feasibility Study was also prepared as part of this project but is documented in a separate report.

ES.2 STUDY AREA

The study area of this RWMP is the existing service area of CMWD as well as areas within neighboring districts adjacent to CMWD's service area. As shown in Figure ES.1, CMWD currently provides potable water and recycled water within a portion of the City of Carlsbad (City) located approximately 35 miles north of downtown San Diego. CMWD's existing recycled water system extends to all parts of the City except the northwest quadrant. This RWMP evaluates opportunities to expand recycled water service throughout CMWD's service area as well as to a select number of large potential recycled water customers in neighboring communities.

ES.3 EXISTING RECYCLED WATER SYSTEM

CMWD's primary recycled water distribution system consists of five pressure zones, three storage tanks, three booster pumping stations, two supply sources with pump stations, and three pressure regulating stations. CMWD also supplies recycled water to the south course of the La Costa Resort and Spa from the Gafner Water Reclamation Plant (WRP) through a separate distribution system with dedicated service to the south golf course of the La Costa Resort and Spa. The location of these facilities and supply sources are shown in Figure 2.1 of this RWMP.

ES.4 RECYCLED WATER SUPPLIES

CMWD currently receives recycled water from the Carlsbad Water Recycling Facility (WRF), owned by CMWD but operated by the Encina Wastewater Authority (EWA), the Meadowlark WRF, owned and operated by the Vallecitos Water District (VWD), and the Gafner WRP, owned and operated by the Leucadia Wastewater District (LWWD). Table ES.1 summarizes the existing supply sources of recycled water for CMWD, while the locations of each of these facilities are shown on Figure ES.3.

Table ES.1 Recycled Water Supplies
Recycled Water Master Plan
Carlsbad Municipal Water District

Reclamation Plant Name	Owner	Permitted Capacity[1] (mgd)	Maximum CMWD Allocation (mgd)	Other Allocations (mgd)
CWRF	CMWD	4.0	4.00	0.0
MWRF	VWD	5.0	3.00[1]	1.5[1]
GWRP	LWWD	1.0	0.75[1]	0.0
Total Capacity		**10.0**	**7.75**	**1.5**
Total Usable Capacity[1]			**7.60[1]**	

Notes:
VWD = Vallecitos Water District; LWWD = Leucadia Wastewater District; GWRP = Gafner WRP
(1) Details and assumptions are included in Chapter 4.

To serve the projected recycled water demands, six (6) different supply alternatives were developed. Each alternative has an assumed total build out supply capacity of 14-mgd, which was used to develop comparable alternatives. The six alternatives are:

- Alternative 1 - Maximize use of Carlsbad WRF
- Alternative 2 - Maximize use of Meadowlark WRF
- Alternative 3 - Maximize use of Gafner WRP
- Alternative 4 - Abandon Gafner WRP
- Alternative 5 - Maximize use of Carlsbad WRF and Lake Calavera
- Alternative 6 - Utilize Shadowridge WRP

The breakdown of the distribution of supplies to add up to 14 mgd for each of the six alternatives is summarized in Table ES.2.

EXISTING RECYCLED WATER SYSTEM

2.1 INTRODUCTION

This chapter provides a brief overview of Carlsbad Municipal Water District's (CMWD) existing recycled water system including descriptions of the existing recycled water distribution system/facilities, recycled water supply sources, and recycled water demands.

A more detailed description of the recycled water distribution system pipelines and facilities is included in Chapter 6 (Hydraulic Model Development), while detailed descriptions of the existing and future recycled water demands and supplies are included in Chapter 3 (Recycled Water Demands) and Chapter 4 (Recycled Water Supplies), respectively.

2.2 SERVICE AREA

CMWD's existing recycled water system is shown on Figure 2.1. As shown, CMWD currently provides recycled water to customers inside and outside CMWD's service area, but are nearly within the City of Carlsbad (City).

Most of CMWD's recycled water distribution system is within CMWD's service area. However, two portions of the recycled water distribution system are located outside CMWD's service area. A 12-inch transmission main in Pressure Zone 660 is located within the Vista Irrigation District (VID) to the East of CMWD's service area along Melrose and Faraday Avenue.

A 30-inch transmission main outside CMWD's service area is also located where CMWD's recycled water distribution system is fed from Meadowlark Water Reclamation Facility (MWRF) within the service area of Vallecitos Water District (VWD). This pipeline ends along Rancho Santa Fe Road, located to the southeast of CMWD's service area. CMWD also serves recycled water customers in the VWD within the City per the Mahr Reservoir Use Agreement found in Appendix D.

2.3 EXISTING RECYCLED WATER SUPPLIES

CMWD receives recycled water from reclamation plants within the Encina Wastewater Authority (EWA) service area. EWA is a public agency owned by the City of Carlsbad, City of Vista, City of Encinitas, VWD, Buena Sanitation District (BSD), and Leucadia Wastewater District (LWWD). EWA is operated through a Joint Powers Agreement date April 21, 2005 (see Appendix D). Under the Joint Powers Agreement, these six agencies share the costs and management of wastewater treatment services through a joint outfall system. EWA manages the 36-mgd Encina Water Pollution Control Facility (EWPCF) and the Encina Ocean Outfall (EOO) at the terminus of this joint system. Member agencies are responsible

RECYCLED WATER SUPPLIES

4.1 INTRODUCTION

This chapter identifies the Carlsbad Municipal Water District's (CMWD) supply and related storage needs required to meet the projected water demands identified in Chapter 3. This chapter starts with a description of the existing and future recycled water supply sources. Subsequently, the capacity of these sources are compared with the projected recycled water demands to determine any supply shortfalls. As part of the supply evaluation, six supply scenarios are evaluated based on various combinations of expanding supply sources. This chapter is concluded with a supply strategy that describes the phasing of supply projects to accommodate the recommended system configuration described in Chapter 9 of this recycled water master plan (RWMP).

4.2 SUPPLY SOURCES

This section discusses each of CMWD's existing recycled water supply sources and their associated capacities as well as the historical utilization of each supply source.

4.2.1 Existing Supply Sources

As discussed in Chapter 3, CMWD receives recycled water from three reclamation plants: Carlsbad Water Recycling Facility (WRF), Meadowlark WRF, and Gafner Water Reclamation Plant (WRP).

The **Carlsbad WRF** is owned by CMWD; and the Encina Wastewater Authority (EWA) has been contracted to provide operation and maintenance through a memorandum of understanding (MOU) dated May 1, 2005.

The **Meadowlark WRF** is owned and operated by the Vallecitos Water District and serves both CMWD's recycled water system and a portion of the Olivenhain Municipal Water District's (OMWD) recycled water system within the City of Carlsbad.

The **Gafner WRP** is owned and operated by the Leucadia Wastewater District and serves only the south golf course of the La Costa Resort. The Gafner WRP does not connect to the rest of CMWD's recycled water distribution system.

Carlsbad WRF and Gafner WRP currently operate as tertiary treatment plants, treating secondary effluent from the Encina Water Pollution Control Facility (EWPCF). Meadowlark WRF operates as a "skimming" plant, discharging solids into a 10-inch diameter sludge pipeline for treatment at the EWPCF. The capacities of the Carlsbad WRF, Meadowlark WRF, and Gafner WRP are presented in Table 4.1 along with CMWD's recycled water allocation.

Valve (PSV), which, according to CMWD staff, can convey at least 3,000 gpm. Potable water can also be supplemented in the system feeding the La Costa Resort and Spa south golf course from Gafner WRP. In addition, VWD has a potable water connection at Mahr Reservoir, which can be used to supplement recycled water in the reservoir with potable water through an air gap.

Table 4.2 Utilization of Recycled Water Supplies
Recycled Water Master Plan
Carlsbad Municipal Water District

Source	Average Annual Supply in 2010 (afy)	Average Annual Supply in 2010 (mgd)	Percentage of Average Annual Supply in 2010	Maximum Month Supply(2) in 2010 (mgd)	Percentage of Maximum Month Supply in 2010 (mgd)
CWRF	969	0.9	28%	2.2	38%
MWRF (1)	2,272	2.0	66%	2.9	50%
GWRP	195	0.2	5%	0.6	11%
Potable Water (3)	30	< 0.1	1%	0.1	1%
Total	**3,466**	**3.1**	**100%**	**5.8**	**100%**

Notes:
(1) Portion of MWRF recycled water supplied to CMWD. MWRF also supplies recycled water to OMWD customers.
(2) The month of maximum demand in calendar year 2010 was 5.8 mgd in June 2010. Note that maximum month supply for individual sources varied by supply source (e.g., MWRF produced its maximum monthly flow in May 2010).
(3) Potable makeup water use in 2010 included 4.8 afy at the D Tank supplemental water connection and 25.7 afy at Gafner WRP.

As shown in Table 4.2, in 2010, CMWD obtained the greatest percentage of its supply from the Meadowlark WRF. Under typical operations, CMWD first obtains supply from the Meadowlark WRF and uses the Carlsbad WRF to balance supply with demand because CMWD pays for allocated supplies from Meadowlark WRF even if the supply is not used. In accordance with the inter-agency agreement, CMWD purchases 2 mgd from December through March (4 months) and 3 mgd from April through November (8 months). Note that in 2009, CMWD obtained the largest component of its supplies from Carlsbad WRF because the Meadowlark WRF has at times not provided the contracted 3 mgd due to a lack of influent flow that limited effluent recycled water production. Influent flow at the Meadowlark WRF did not match expected flow projections from the time of the Meadowlark WRF expansion because the housing downturn had slowed development, which would have increased influent flow.

During the maximum month (June 2010) CMWD's demand was 5.8 mgd. During this month, CMWD still obtained the majority of its flow from Meadowlark WRF, with slightly more supply coming from Carlsbad WRF. It should be noted that potable makeup water was primarily supplemented at Gafner WRP when Gafner WRP was offline for several months in 2010. Potable makeup water at the Twin D tanks was primarily used in

Table 4.3 Water Quality Guidelines for Irrigation Use
Recycled Water Master Plan
Carlsbad Municipal Water District

Water Quality Parameter[1]	Unit	Degree of Use Restriction[1,2,3,4] None	Slight to Moderate	Severe	Supply Source MWRF[7]	CWRF[8]	GWRP[9]
Salinity							
EC_w	dS/m	<0.7	**0.7-3.0**	>3.0	1.63	1.70	1.73
TDS	mg/L	<450	**450-2000**	>2000	991	965	1,076
Permeability[5]			EC_w = 0.9				
SAR = 0-3 and EC_w =		>0.7	0.7-0.2	<0.2			
SAR[6] = 3-6 and EC_w =		**>1.2**	1.2-0.3	<0.3	1.6	1.7	1.7
SAR = 6-12 and EC_w =		>1.9	1.9-0.5	<0.5			
SAR = 12-20 and EC_w =		>2.9	2.9-1.3	<1.3			
SAR = 20-40 and EC_w =		>5.0	5.0-2.9	<2.9			
Sodium (Na)							
Surface	SAR	<3	**3-9**	>9	4.0[6]	5.5[6]	5.6[6]
Sprinkler	mg/L	<70	**>70**		152	197	201
Chloride (Cl)							
Surface	mg/L	<140	**140-355**	>355	236	265	278
Sprinkler	mg/L	<100	**>100**		236	265	278
Boron (B)	mg/L	<0.7	**0.7-3.0**	>3.0	0.37	0.40	0.41
Bicarbonate	mg/L	<90	**90-500**	>500	192	219	225
pH	---		**6.5-8.4 (normal range)**		6.7	7.4	7.3
Nitrogen (N)							
Ammonia (NH_4)	mg/L		(see combined N values below)		N/A	N/A	N/A
Nitrate (NO_3)	mg/L		(see combined N values below)		N/A	N/A	N/A
Combined Nitrogen (N)	mg/L	<5	**5-30**	>30	N/A	N/A	16.1
Iron		Recommended maximum concentration of 5 mg/L. Not toxic to plants in aerated soils but can contribute to soil acidification and loss of reduced availability of essential phosphorus and molybdenum.					
Manganese		Recommended maximum concentration of 0.2 mg/L. Toxic to a number of crops at a few tenths to a few mg/L, but usually only in acid soils.					

Notes:
(1) Adapted from University of California Committee of Consultants (1974), and Ayers and Westcot (1994).
(2) Method and Timing of Irrigation: Assumes normal surface and sprinkler irrigation methods are used. Water is applied as needed, and the plants utilize a considerable portion of the available stored soil water (50% or more) before the next irrigation. At least 15 percent of the applied water percolates below the root zone (leaching fraction [LF] > 15%).
(3) Site Conditions: Assumes soil texture ranges from sandy loam to clay with good internal drainage with no uncontrolled shallow water table present.
(4) Bold text indicates where CMWD's Supply Sources from the right columns fall within the range shown. Definitions of "The Degree of Use Restriction" terms:
None = Recycled water can be used similar to the best available irrigation water.
Slight = Some additional management will be required above that with the best available irrigation water in terms of leaching salts from the root zone and/or choice of plants.
Moderate = Increased level of management required and choice of plants limited to those which are tolerant of the specific parameters.
Severe = Typically cannot be used due to limitations imposed by the specific parameters.
(5) Permeability is evaluated based on the combination of adjusted sodium adsorption ratio (SAR) and Electrical Conductivity (EC_w) values.
(6) Adjusted SAR (adj. RNa) includes the effect of bicarbonate/calcium ratio (Cax).
(7) Average of Samples from January 1998 through September 2009. Source: (EJPA, 2009).
(8) Average of Samples from November 2005 through September 2009. Source: (EJPA, 2009).
(9) Average of Quarterly Samples from Oct 2008 through September 2009 (TDS, N, Conductivity, and pH), Annual samples in June 2008 (Cl, B), and intermittent samples from 2002 through 2009 (Na, HCO3). Source: (EJPA, 2009).

The treatment processes and other improvements such as, pipelines and booster pump stations are summarized by supply source in Table 4.7. The capacity and size of the required expanded facilities varies for each alternative as described in the following sections.

Table 4.7 Facilities Required for Expansion
Recycled Water Master Plan
Carlsbad Municipal Water District

Supply Source	Required Facilities(1)	
Carlsbad WRF	Tertiary Filters(2) Chlorine Contact Basins	Effluent Pumping(3)
Meadowlark WRF(5)	-	-
Gafner WRP(4)	Tertiary Filters Chlorine Contact Basins	Influent Force Main Effluent Pumping Transmission Main
Calavera Stormwater Facility	Screenings Sedimentation Flocculation Basins	Filtration Rapid Mix Chamber Chlorine Contact Basins Transmission Main(6)
Shadowridge WRP(7)	Headworks Primary Clarifiers Odor Control Facilities Aeration Basins	Blower Building Secondary Clarifiers Tertiary Filters Chlorine Contact Basins

Notes:
(1) Required facilities include associated yard and electrical work.
(2) Carlsbad WRF's existing MF/RO system and filters treat 20 percent and 80 percent of the flow, respectively. Flow from both processes is blended prior to distribution. Expansions are not anticipated to require MF/RO based on discussions with CMWD staff.
(3) Carlsbad WRF currently has 14.4 mgd of effluent pumping capacity (3 duty - no standby)
(4) The 12-inch diameter transmission main proposed in Chapter 9 would need to be increased to a 16-inch diameter transmission main to connect GWRP effluent to CMWD's distribution system. Pipeline size is based on a 3.4-mgd flow since 0.6 mgd will be delivered to the La Costa golf course, which is adjacent to the GWRP.
(5) Since Meadowlark WRF is limited by wastewater influent flow, no expansion is anticipated.
(6) An 8-inch diameter transmission main is required for connecting the stormwater treatment plant to CMWD's distribution system.
(7) As a part of discussions between CMWD and VID, preliminary cost estimates for three alternatives were developed and are discussed in Section 4.4.6. Details on which facilities are included in the expansion were not available. VID's study on reactivation of Shadowridge WRP also discusses alternatives for delivery of the effluent to CMWD's distribution system. These alternatives are discussed in further detail below.

It should be noted that all three water reclamation treatment plants (Carlsbad WRF, Gafner WRP, and Meadowlark WRF) are part of the Encina Wastewater Authority (EWA) and operate off the EWA's joint collection system. At the end of the collection system is the Encina Water Pollution Control Facility (EWPCF) with a flow capacity of 40.5 mgd, a solids capacity of 43.3 mgd, and an ocean outfall with a flow capacity of 43.3 mgd. The EWPCF treats wastewater to secondary treatment standards. The Carlsbad WRF and the Gafner WRP are tertiary scalping plants. Secondary effluent from the EWPCF is pumped to the

WATER RATES		
Monthly Delivery Charge:	2014	2015
Meter Size:		
5/8"	$ 20.07	$ 21.08
3/4"	27.02	28.38
1"	40.93	42.98
1.5"	75.70	79.49
2"	117.43	123.31
2.5"	166.10	174.41
3"	214.78	225.52
4"	353.86	371.56
6"	701.56	736.64
8"	1,118.80	1,174.74
10"	1,605.58	1,685.86
Single-Family Rates		
Tier 1 (0-10 units)	$ 3.19	$ 3.35
Tier 2 (11-18 units)	4.24	4.45
Tier 3 (19+ units)	6.11	6.42
Multi-Family Rates		
Tier 1 (0-5 units)	3.19	3.35
Tier 2 (6-10 units)	4.24	4.45
Tier 3 (11+ units)	6.11	6.42
Commercial and	3.85	4.05
Non-residential	3.85	4.05
Agricultural Rates	3.95	4.15
Irrigation Rate	4.22	4.44
Recycled Water	3.53	3.53

SEWER RATES		
Groups (I through VI)	2014	2015
Flat monthly charge:		
I - Residential	$ 25.52	$ 26.03
Per unit of water used:		
I - Multi-family	2.94	3.00
II - Commercial	2.40	2.44
III - Commercial	3.63	3.70
IV - Commercial	6.73	6.87
V - Other institutional	2.40	2.44
VI - Bio-Hydration Res.	2.07	2.11
Lab Inc.	-	-
Per student:		
V - Elementary	$ 0.52	$ 0.53
V - Junior high	0.77	0.78
V - High school	1.04	1.06
V - Boarding sch	5.43	5.53

May 2014 San Diego County Wildfires After Action Report

County of San Diego

May 2014 San Diego County Wildfires

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Chief Administrative Officer

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Fourth District	Ron Roberts
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June 2014

California Department of Forestry and Fire Protection (CAL FIRE) had already extended seasonal firefighting forces in Southern California due to dry winter conditions. As early spring temperatures remained unseasonably high and with limited rainfall, CAL FIRE moved to peak staffing in San Diego County on March 31, 2014, a move which came several months earlier than in typical years.

The May 2014 San Diego County Wildfires began at approximately 1100 Pacific Daylight Time on Tuesday, May 13, 2014, southwest of the Rancho Bernardo community in the City of San Diego. Over the event period, there were fourteen separate fires burning in San Diego County, including the Bernardo, Cocos, and Poinsettia fires, which are the primary focus for this report due to their size and impact. The fires, in total, consumed approximately 26,000 acres. Additionally, the fires destroyed an estimated 65 structures, including 46 single-family homes, in the City of Carlsbad, City of San Marcos and unincorporated areas of the county. To date, the costs incurred to contain the fires are estimated at $28.5 million and the total projected private property damage is expected to exceed $29.8 million, not including costs associated with the fires on federal lands.

The San Diego County Operational Area Emergency Operations Center (OA EOC) was initially activated at 1400 PDT on Tuesday, May 13, 2014, at Level 1 in response to the Bernardo Fire. In response to the outbreak of additional incidents in the region, a full Level 3 activation was achieved at approximately 1148 PDT on Wednesday, May 14. Personnel from more than 45 federal, state, and local departments and agencies were present in the OA EOC during the fires. The OA EOC serves as the “nerve center” for disaster response during large-scale regional emergencies.

After the 2003 Firestorms and before 2007, the OAEOC improved its infrastructure through technological enhancements, including the purchase and implementation of WebEOC, a real-time, web-based emergency management system, and AlertSanDiego, the regional mass notification system used throughout the county for emergency and evacuation notifications. In 2006, the OA EOC was upgraded and expanded to assist OA EOC responders with situational awareness and to improve communication and coordination. Additionally, the OA EOC incorporated representatives from CAL FIRE within the OA EOC, which vastly improved situational awareness about the status of fires. OA EOC positions have expanded to include an Access and Functional Needs Unit Leader, a Business Liaison Unit Leader, Volunteer Coordinator, San Diego County Fire Authority representation, and Joint Information Center staff focused on social media.

During the May 2014 fires, AlertSanDiego was used by law enforcement agencies, including the San Diego County Sheriff’s Department and cities, to issue evacuation orders, warnings and repopulation notices. In total, approximately 121,000 individuals were asked to evacuate their

The **Poinsettia Fire** ignited the following morning on Wednesday, May 14, near Poinsettia Lane and Alicante Road in the City of Carlsbad. Burning approximately 600 acres, this fire damaged or destroyed several structures. Over the course of two days, approximately 64,000 contacts were made through AlertSanDiego (emails, phone calls and texts) advising residents to evacuate. Several schools were also evacuated. By approximately 1800 PDT on Thursday, May 15, all evacuation orders were lifted for areas associated with the Poinsettia Fire.

The **Cocos Fire** ignited in the late afternoon on May 14, off Village Drive in the San Marcos area. By the following morning, the Cocos Fire had burned approximately 800 acres, with five percent containment. Numerous structures were reported damaged or destroyed. In total, the Cocos Fire burned 1,995 acres, making it the largest of the May 2014 wildfires burning on state or local land and the last of these wildfires to be contained. Between May 14 and May 15, approximately 51,000 contacts were made via AlertSanDiego (phone calls, emails and text messages) notifying residents threatened by the Cocos Fire to evacuate. During the height of the Cocos Fire, there were approximately 1,300 personnel assigned to just the one fire, including 164 fire engines, 27 hand crews, 11 dozers, and 15 aircraft.

Other wildfires during the same May 2014 event period included the Basilone Complex fires on the Marine Corps Base Camp Pendleton (the Tomahawk Fire, the Freeway Fire, Las Pulgas Fire, and the San Mateo Fire), as well as the Highway Fire near Old Highway 395 and Interstate 15, the Aurora Fire in Lakeside, the Escondido Fire near Bear Valley Parkway, the River Fire off of North River Road in Oceanside, a fire near Sycamore Canyon in Santee, and two additional fires in Spring Valley and Alpine.

On May 14, 2014, the County of San Diego issued a Proclamation of Local Emergency as a result of the fires in multiple locations throughout the county. The Proclamation asked the Governor to proclaim a State of Emergency in San Diego County. On the same day, the Governor responded to the County's request and proclaimed a State of Emergency in San Diego County. After the proclamations, the fires worsened and the scope of devastation widened significantly. Overall, five cities, one university, and the County of San Diego proclaimed local emergencies and numerous agencies from within and outside of San Diego County participated in the response (Appendix A).

The May 2014 fires involved 14 fire events totaling over 26,000 acres, with over 149,000 evacuation orders and warnings generated through AlertSanDiego (emails, phone calls and text messages) the regional emergency mass notification system. Approximately 121,000 people were evacuated, not including those evacuated from federal lands on Camp Pendleton. Additionally, numerous school districts closed schools for one or two days in response to the fires. By Sunday morning, May 18, all evacuation orders related to the wildfires had been lifted.

The fires destroyed 65 structures, including 46 single-family homes, and damaged 19 structures (see Damage Assessment on page 65). The total damage costs to private property owners are estimated at $29.8 million.

During the disaster and immediately following, County officials compiled and submitted the preliminary figures to the State of California as part of the disaster reimbursement process. The estimated cost to local governments of responding to, fighting and recovering from the May 2014 San Diego County Wildfires is approximately $28.5 million (see Table 1). Money received from the State of California, as a result of the locally declared emergency, will help affected governments in the county offset the fire response and recovery costs.

TABLE 1

Estimated Cost to Local Governments of Responding to Fires

Agency	Estimated Cost* (millions)
County of San Diego	$3.9
City of Carlsbad	$12.5
City of San Marcos	$10.4
City of San Diego	$1.3
Other Agencies	$0.4
Total	**$28.5**

*Estimated costs represent revised estimates submitted to the State of California Office of Emergency Services. Initial cost estimates of $27.9 million were later revised to include the County's cost of debris removal.