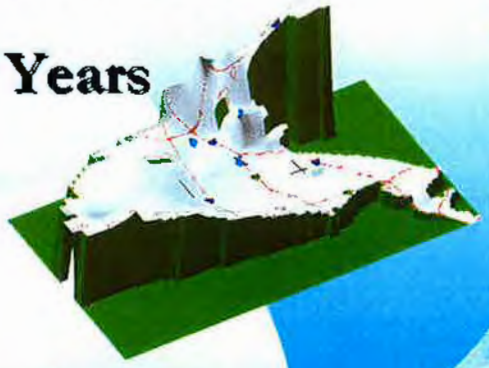
Upper Los Angeles River Area Watermaster

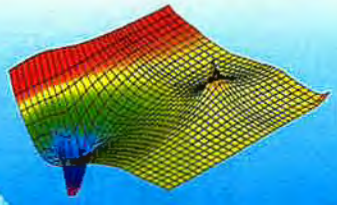
City of Los Angeles VS. City of San Fernando, ET AL

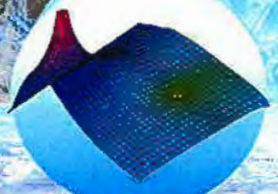
Case No. 650079 - County of Los Angeles

GROUND WATER PUMPING AND SPREADING PLAN

2002-2007 Water Years







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Upper Los Angeles River Area Watermaster

UPPER LOS ANGELES RIVER AREA WATERMASTER

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL
CASE NO. 650079 - COUNTY OF LOS ANGELES

P.O.Box 51111, Room 1450
Los Angeles, CA 90051-0100

GROUNDWATER PUMPING AND SPREADING PLAN FOR THE UPPER LOS ANGELES RIVER AREA LOS ANGELES COUNTY, CALIFORNIA

2002-2007 WATER YEARS

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JULY 2003

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I. EXECUTIVE SUMMARY

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit the 2003 ULARA Pumping and Spreading Plan. This report is prepared in compliance with Section 5.4 of the ULARA Watermaster's Policies and Procedures that established the Watermaster's responsibility for water quality management in the ULARA groundwater basins. The Pumping and Spreading Plan includes the individual plans submitted by the five major water rights holders, which incorporates changes in recharge, spreading, and pumping, or pumping patterns, especially in relation to the present and future plans for groundwater cleanup.

In the Sylmar Basin, the City of San Fernando can pump all its groundwater rights, and the City of Los Angeles plans to pump its full right in this Water Year. Glendale plans to pump its full adjudicated amount in the San Fernando Basin (SFB), but it has limited pumping capacity in the Verdugo Basin. Crescenta Valley Water District (CVWD) may be unable to pump all its assigned water rights from the Verdugo Basin due to a lower water table. CVWD is exploring enhanced conjunctive use of the Verdugo Basin and has applied for a study grant. Both Burbank and Los Angeles are planning to pump their adjudicated amount in the SFB.

Currently, there are five groundwater cleanup plants in operation: the City of Los Angeles' North Hollywood Operable Unit (OU) and the Pollock Wells Treatment Plant, the Burbank OU, CVWD's Glenwood Nitrate Removal Plant, and the Glendale OU. The City of Burbank's Granular Activated Carbon (GAC) Treatment Plant has been temporarily removed from service due to elevated levels of hexavalent chromium.

Within the framework of the Tujunga Task Force the Watermaster will continue to address the capacity limitations for the spreading grounds in the SFB. Projected spreading continues at much lower rates than the 34-year average, contributing to a lower water table. The Watermaster is working with the County and City of Los Angeles to find ways to maximize spreading in the Hansen and Tujunga Spreading Grounds and to explore spreading in new areas, possibly the Boulevard Pit. A methane gas mitigation plan for the Tujunga Spreading Grounds has been developed, and testing is currently underway.

The groundwater model this year simulates the effect on groundwater elevations of projected pumping in the SFB for the next five years. The most significant features continue to be the

pumping cones of depression formed in Layer I (Upper Zone) as a result of pumping at Los Angeles' Tujunga and Rinaldi-Toluca wells and the Burbank OU (Plate 3).

I wish to acknowledge and express appreciation to the parties who have provided information and data that were essential to the completion of this report.

MELVIN L. BLEVINS
ULARA Watermaster

II. INTRODUCTION

As a result of the groundwater contamination that was discovered in the SFB, the ULARA Watermaster and Administrative Committee, jointly with the Regional Water Quality Control Board (RWQCB), revised the ULARA Watermaster's Policies and Procedures in July 1993 to prevent further degradation of groundwater quality and to limit the spread of contamination in the ULARA basins. The Policies and Procedures were revised again in February 1998 to organize the material into a more accessible and complete document.

Section 5.4 of the Policies and Procedures assigns the responsibility for this annual Pumping and Spreading Plan to any party who produces groundwater. Each municipal pumper is required to submit to the ULARA Watermaster annually (on or before May 1 of the current Water Year) a Groundwater Pumping and Spreading Plan. This plan should include projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans. In order to obtain future groundwater contamination levels, a monitoring program should also be included in the plan.

The ULARA Watermaster is required to evaluate and report on the impact of the combined pumping and spreading of each party as it relates to the implementation of the San Fernando Judgment (January 26, 1979) and groundwater management, and make the needed recommendations. The Watermaster's evaluation and recommendations are to be included in a Groundwater Pumping and Spreading Plan for ULARA, and the Administrative Committee is to review and approve the plan by July of the current Water Year.

This is the July 2003 Groundwater Pumping and Spreading Plan for ULARA, prepared according to the Policies and Procedures. This report provides guidance to the Administrative Committee for use in protecting the water quality within ULARA, improving basin management, and providing protection of each party's water right.

III. PLANS FOR THE 2002-2007 WATER YEARS

A. Projected Groundwater Pumping for 2002-07 Water Years

The total 2002-03 ULARA pumping is projected at 125,068 acre-feet (AF) (Table 3-1B), approximately 19,494 AF above the 23-year average (1979-2002). The estimated pumping for 2003-04 is 117,450 AF, a 11,876 AF increase above the historical average (Appendices A-E).

In 2002-03, the City of Burbank plans to pump 9,800 AF (Table 3-1A) from all its groundwater sources, an amount equal to its five-year average, and a 3,850 AF increase from its historical 23-year average. This increase is due to pumping at the Burbank OU. As of October 1, 2002, Burbank has a storage credit of 31,625 AF. Burbank's annual return water credit of 20 percent is approximately 5,000 AF, and its right to purchase Physical Solution water from Los Angeles is 4,200 acre-feet per year (AF/yr). The Consent Decree II for the Burbank OU was entered on June 22, 1998. The plant capacity is 9,000 gpm (14,000 AF/yr). Pumping in excess of Burbank's annual return water credit can come from its banked storage or Physical Solution purchases from Los Angeles. Burbank may also purchase and import water from the Metropolitan Water District (MWD) and store it in the SFB for later extraction, or purchase water rights from other water rights holders in the SFB.

CVWD plans to pump 3,100 AF, which is an increase of about 400 AF compared to its average pumping since 1979, but a reduction of 500 AF from its five-year average. In past years when there was more groundwater available in the Verdugo Basin CVWD had pumped a portion of Glendale's allocation of the Verdugo Basin safe yield, which Glendale was unable to pump. This additional pumping was approved by the Watermaster and the Administrative Committee. The current pumping plan does not include additional pumping beyond the CVWD's adjudicated right of 3,294 AF.

The City of Glendale resumed significant pumping from the SFB when the Glendale North and South OUs began operating in September 2000. In the SFB, Glendale accumulates 20 percent return water credit for water delivered to its entire service area within the SFB. In addition, Glendale has the right to purchase from Los Angeles up to 5,500 AF/yr of Physical Solution water. Glendale had storage credit of 71,761 AF in the SFB as of October 1, 2002. Glendale plans to extract 2,300 AF from the Verdugo Basin in 2002-03, an increase of about 22 AF over its 23-year historical average, and 190 AF less than the average of the past five years.

The City of Los Angeles plans to pump about 95,064 AF this year from the San Fernando Basin, approximately 8,000 AF above its 1979-2002 annual average and about 6,800 AF more than the past five-year average. A total of 3,779 AF of groundwater will be pumped from the Sylmar Basin, about 800 AF more than the 1979-2002 average and 961 AF more than the average of the last five years (1997-2002). As of October 1, 2002, Los Angeles has a storage credit of 254,789 AF in the SFB and 6,375 AF in the Sylmar Basin.

In 2002-03 the City of San Fernando plans to pump 3,400 AF from the Sylmar Basin, approximately equal to its average pumping for the past five years and 400 AF more than the past 23-year average. San Fernando has storage credit of 529 AF as of October 1, 2002.

Estimated capacities of ULARA well fields are provided in Table 3-1. Actual and projected amounts of pumping and spreading by the major parties during 2002-03 are shown in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2002-03

SAN FERNANDO BASIN

City of Burbank - In January 1996, a portion of Burbank's pumping capability was restored when the Lockheed-Burbank Operable Unit (Burbank OU) was activated under Phase I of the Consent Decree with the USEPA. The City assumed the 18-year operation of the facility on March 12, 2001 under provisions of the Second Consent Decree. Although the United States Environmental Protection Agency (USEPA) turned over operating control of the facility to the City of Burbank, negotiations continued with Lockheed Martin (Lockheed) over several issues including the pumping capacity of the eight supply wells.

In June 2000, the Burbank OU went offline due to breakthrough of 1,2,3-Trichloropropane (1,2,3-TCP) in the liquid phase carbon contactors. An investigation revealed inefficient design of the contactor piping and other design flaws. Repair plans include replacing distribution headers and underdrains in the liquid-phase carbon contactors and replacing corroded screens in the vapor-phase contactors. This work is currently underway.

In January 2002, USEPA approved a mode of operation using the existing wells and blending the output with MWD water to keep total chromium levels at 5 parts per billion (ppb) or less, the goal established by the Burbank City Council for the City's delivered water. Part of the pumping plan includes the voluntary shut down of the Lake Street/GAC wells, which could not be blended down to 5 ppb.

With the concurrence of the USEPA the Burbank OU will pump about 9,500 AF of groundwater during 2002-03, a reduction from its design capacity of 14,000 AF/yr. Plate 10 shows the locations of Burbank's, Glendale's and Los Angeles' OUs relative to the hexavalent chromium plumes.

City of Glendale – The Glendale OU is operating from all eight wells. The system has seven shallow wells and one deep well, and a treatment facility designed to treat groundwater contaminated by TCE and PCE at a rate of 5,000 gpm using aeration and granulated activated carbon (GAC). The Grandview Pumping Station blends and conveys the treated water to the Glendale potable water system.

The Glendale OU began operating in September 2000. Subsequently, hexavalent chromium contamination has been detected in the groundwater. However, the Glendale OU was not designed to treat for chromium, so Glendale blends the treated water with imported supplies from MWD to keep hexavalent chromium levels below 6 ppb, a goal set by the Glendale City Council.

Glendale has received more than $1 million from federal appropriations and the American Water Works Research Foundation (AWWARF) to investigate technology capable of large-scale treatment of hexavalent chromium and to develop a pilot study. The project has entered Phase II as of April 2003 which will provide vendors the opportunity to demonstrate the capabilities of their systems to treat hexavalent chromium from the technologies selected in Phase I. During Phase III the pilot study will take place. This study will also benefit other pumpers in the SFB including the cities of Burbank and Los Angeles, as well as water purveyors from other parts of the country.

City of Los Angeles - All of the well fields within the SFB have been impacted because of groundwater contamination, primarily from volatile organic compounds (VOCs) such as TCE and PCE. The Pollock Well Field was partially restored when the Pollock Wells Treatment Plant was placed into service March 17, 1999. The Tujunga and Rinald-Toluca Well Fields have also experienced levels of TCE, PCE, and nitrates above the

maximum contaminant level (MCL) at the wellheads and are being evaluated. Low levels of percholorates have been detected in both the Rinaldi-Toluca and Tujunga Well Fields.

LADWP is planning to add up to eight new 8-cfs wells in the North Hollywood Well Field-West Branch to restore capacity resulting from contamination and obsolescence of some existing wells. Groundbreaking is anticipated in 2004.

The City of Los Angeles has begun a five year project to convert the treatment of all water in the system from chlorine to chloramines. The conversion is necessary to meet the more stringent MCLs for total trihalomethanes (THMs) and Haloacetic Acids (HAA) that have been recently established under the Disinfection Byproduct (DPB) Rule. Reduced supplies from the Los Angeles Aqueduct in the future will require more purchases of water from MWD that is treated with chloramines and would not be compatible with chlorinated water. LADWP will rely more heavily on groundwater from the SFB until the conversion is completed.

SYLMAR BASIN

City of San Fernando - All of San Fernando's groundwater is pumped from the Sylmar Basin, where there are no limitations related to contamination. However, nitrate levels have been rising for several years in San Fernando's wells. Old septic systems, and possibly past agricultural practices, are the likely cause(s) of the high nitrate levels.

City of Los Angeles - The number of active wells at the Mission Well Field has been reduced from six to three because of the age and condition of the wells. The Mission Wells Sand Trap Tank has been repaired and the wells will be pumping the City's full entitlement during 2002-03.

VERDUGO BASIN

Crescenta Valley Water District - All of CVWD's groundwater rights are in the Verdugo Basin. Contamination from VOCs is minimal, however, nitrate contamination is widespread. High nitrate levels are reduced in the supply by treating a portion of the groundwater by ion exchange at the Glenwood Nitrate Removal Plant, and blending untreated groundwater with treated groundwater and/or MWD supplies to meet drinking water standards. In past years CVWD has been given permission on an annual basis by

the Watermaster and Administrative Committee to pump in excess of its right until the City of Glendale is able to pump its entire right. Due to the low water table CVWD has not been able to pump its full entitlement, and in Spring 2002 initiated a Phase I voluntary water conservation program. CVWD's Board of Directors may implement more restrictive measures if it is not successful, or if the water supply becomes less reliable.

CVWD is at the beginning of a ten-year program to construct new wells to replace old wells. Two new wells have been constructed in the past two years, though the well capacity is less than anticipated. A grant-funded Verdugo Basin monitoring well study is underway to investigate the low well capacities. CVWD may suspend the well replacement program until its imported water supply capabilities are expanded through an interconnection with the City of Glendale and pump station upgrade by the Foothill Muncipal Water District (FMWD).

CVWD has also applied for $185,000 under Assembly Bill 303 to study the potential for enhancing the conjunctive use of the basin. The grant application ranked 10th statewide, but actual receipt of the funds is pending resolution of state budget problems.

City of Glendale - The City of Glendale currently does not have the capability of pumping its entire adjudicated right from the Verdugo Basin. Glendale is in the process of studying and evaluating various alternatives to increase its pumping capacity. Limitations in pumping are caused by the lack of wells, rather than contamination problems, as well as the limited availability of groundwater in the basin which is highly variable and based significantly on rainfall. Additional extraction capacity in the Verdugo Basin may be developed.

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number Standby Wells	Number Active Wells	Estimated Capacity (cfs)
	SAN FERNANDO BASIN		
City of Los Angeles			
Aeration	—	7	4
Erwin	3	2	10
North Hollywood	8	21	129
Pollock	1	2	10
Rinaldi-Toluca	—	15	117
Tujunga	—	12	107
Verdugo	2	3	12
Whitnall	1	4	20
City of Burbank	3	10	24
City of Glendale		8	11
TOTAL:	18	84	444
	SYLMAR BASIN		
City of Los Angeles		3	9
City of San Fernando		4	9
TOTAL:		7	18
	VERDUGO BASIN		
CVWD		11	12
City of Glendale		5	15
TOTAL:		16	27

TABLE 3-1A: 2002-03 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS

(acre-feet)

Party/Well Field	Total	2002			2003								
		Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
						SAN FERNANDO BASIN							
City of Los Angeles													
AERATION	2014	126	98	117	186	159	130	196	203	196	203	203	196
ERWIN	883	86	66	52	96	37	0	0	111	107	111	111	107
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	20828	1971	1313	1406	2044	1072	286	0	1845	2678	2768	2768	2678
POLLOCK	1849	0	0	0	96	0	250	226	234	226	431	197	190
RINALDI-TOLUCA	36307	3958	3212	2993	3970	1741	0	0	2522	4404	4551	4551	4404
TUJUNGA	26761	3038	2334	2143	2178	813	0	0	2337	3214	3320	3752	3631
VERDUGO	4640	575	514	286	235	117	0	0	590	571	590	590	571
WHITNALL	1783	261	0	0	2	0	0	0	308	298	308	308	298
TOTAL:	95064	10015	7537	6997	8806	3940	666	422	8150	11694	12282	12479	12076
City of Burbank	300	27	23	10	0	25	14	34	34	34	34	34	34
Burbank OU	9500	974	898	599	884	787	884	838	727	727	727	727	727
City of Glendale	7625	704	628	718	709	615	714	590	590	590	587	590	590
TOTAL:	112489	1705	1549	1327	1593	1427	1612	1462	1351	1351	1348	1351	1351
						SYLMAR BASIN							
City of Los Angeles	3779	0	0	165	310	312	509	387	400	417	431	431	417
City of San Fernando	3400	327	159	0	272	232	408	271	346	346	346	346	346
TOTAL:	7179	327	159	165	582	544	917	658	746	763	777	777	763
						VERDUGO BASIN							
Crescenta Valley Water Dist.	3100	267	234	214	231	172	207	297	297	297	297	296	290
City of Glendale	2300	141	133	132	142	129	136	247	247	247	247	249	250
TOTAL:	5400	408	367	346	373	301	343	544	544	544	544	545	540
ULARA TOTAL:	125067	12456	9612	8834	11354	6212	3538	3086	10791	14352	14950	15152	14730

TABLE 3-1B: HISTORICAL AVERAGE PUMPING
(acre-feet)

Party/Wellfield	Historic Average Pumping		Projected Groundwater Pumping				
			SAN FERNANDO BASIN				
City of Los Angeles	1979-2002 (A)	1997-2002 (B)	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
AERATION (13 yrs)	1279	1389	2014	2390	2390	2390	2390
ERWIN	4509	1251	883	994	994	994	994
HEADWORKS (10 yrs)	3928	0	0	0	0	0	0
No HOLLYWOOD	30494	21128	20828	25276	25276	25276	25276
POLLOCK	2052	1993	1849	2400	2400	2400	2400
RINALDI-TOLUCA (15 yrs)	21646	32714	36307	25900	25900	25900	25900
TUJUNGA (10 yrs)	11120	24107	26761	22179	27179	22179	22179
VERDUGO	5189	3011	4640	5261	5261	5261	5261
WHITNALL	6798	2666	1782	2600	2600	2600	2600
TOTAL City of Los Angeles	**87015**	**88259**	**95064**	**87000**	**92000**	**87000**	**87000**
City of Burbank (C)	1365	1584	300	300	300	300	300
BURBANK OU (9yrs)	4585	8225	9500	10000	10000	10000	10000
City of Glendale (C)	1670	1795	7625	7625	7625	7625	7625
TOTAL San Fernando Basin	**94635**	**99863**	**112489**	**104925**	**109925**	**104925**	**104925**
			SYLMAR BASIN				
City of Los Angeles	2948	2818	3779	3300	3300	3300	3300
City of San Fernando	3019	3455	3400	3800	3900	3900	4000
TOTAL Sylmar Basin	**5967**	**6273**	**7179**	**7100**	**7200**	**7200**	**7300**
			VERDUGO BASIN				
Crescenta Valley County Water Dist.	2694	3632	3100	3125	3150	3200	3250
City of Glendale	2278	2490	2300	2300	2300	2300	2300
TOTAL Verdugo Basin	**4972**	**6122**	**5400**	**5425**	**5450**	**5500**	**5550**
TOTAL ULARA	105574	112258	125068	117450	122575	117625	117775

A. 23 year average or less depending on life of well field indicated in parentheses.

B. 5 year average.

C. Includes Forest Lawn and GOU pumping for Glendale; Valhalla and GAC pumping for Burbank.

IV. GROUNDWATER PUMPING AND TREATMENT FACILITIES

A. Well Fields

There are ten production well fields located in the SFB, two in the Sylmar Basin, and two in the Verdugo Basin. The locations of the well fields are shown on Plate 4, and their estimated capacities are provided in Table 3-1.

B. Active Groundwater Pumping and Treatment Facilities

Glendale OU

The Glendale OU has been producing and treating groundwater for VOCs since September 2000. On April 23, 2001, the City of Glendale assumed operation of the Glendale Water Treatment Plant. Due to concern and confusion about the health risk of hexavalent chromium, nearly 8,000 AF of treated water were discharged to the Los Angeles River between September 2000 and February 2002. In February 2002, the Glendale City Council agreed to stop discharging the treated water and to accept it into the potable system as long as hexavalent chromium was below 6 ppb.

The facility is comprised of a water treatment plant, a facility to blend the treated groundwater with water from the MWD to reduce nitrate levels, a disinfection facility, and associated piping (Appendix C, Figure 4). The treatment plant has the capacity to treat 5,000 gpm from the eight wells in the Glendale North Well Field and the Glendale South Well Field. Currently, the wells are being pumped at 5,000 gpm using an interim pumping plan to maintain the desired low levels of hexavalent chromium while modifications are being designed to use additional water for the power plant and irrigation.

Burbank OU

The remediation of groundwater contamination in the SFB has been significantly enhanced by the startup of the Burbank OU on January 3, 1996. The Burbank OU, consisting of air-stripping towers followed by liquid and gaseous phase GAC polishers, has the capacity to produce 9,000 gpm (14,000 AF) annually. Under the terms of the Second Consent Decree, Burbank assumed operation of the Burbank OU on March 12, 2001 as the long-term primary operator for the next 18 years. Although the USEPA has turned over operation of the facility to the City of Burbank, there have been continuing negotiations with Lockheed over several issues including the

pumping capacity of the eight wells. These issues are being resolved and the design and maintenance problems are being corrected.

GAC Treatment Plant - City of Burbank

This facility has been operated by the City of Burbank since November 1992. Two wells can deliver water at 2,000 gpm to the GAC plant for removal of VOCs. When the plant is in use the treated water supplements production from the Burbank OU and can be delivered to the Burbank distribution system. However, current plans are to keep the plant shut down, except for emergencies, until July 2004 or later because of elevated chromium levels. At that time, the facility may be used to produce water for the Magnolia Power Project.

North Hollywood OU (Aeration Facility) - City of Los Angeles

This facility is designed to treat up to 2,000 gpm of VOC-contaminated groundwater by air-stripping and deliver the treated water to Los Angeles' water distribution system. In February and March 2003 the facility was out of service due to a faulty heater and implementation of security procedures. The facility operates below design capacity because Aeration Well No. 1 is inoperable due to the shallow water table. Aeration Well No. 2, which has been off-line because of unacceptable levels of hexavalent chromium, was returned to operation in January 2003.

Pollock Wells Treatment Plant - City of Los Angeles

Pollock Wells Treatment Plant, treating 3,000 gpm of groundwater, began operating in March 1999. This project is funded by the City of Los Angeles. The Pollock Wells Treatment Plant reduces rising groundwater flowing out of ULARA and enhances the overall groundwater cleanup program in the Los Angeles River Narrows area of the SFB. The groundwater is processed through liquid-phase GAC vessels for VOC removal, followed by chlorination and blending of the treated groundwater to reduce nitrate levels. The processed water is delivered to LADWP's distribution system.

Glenwood Nitrate Removal Plant - CVWD

Groundwater pumped from CVWD's wells is high in nitrates. A portion of the pumped groundwater is treated by ion-exchange and blended with untreated water and/or imported MWD water to reduce nitrate levels below the MCL. In the past year the plant was only in partial operation because overall groundwater production was down due to basin level decline, resulting in more imported water, thereby reducing the need for treatment.

TREATED GROUNDWATER IN THE SAN FERNANDO VALLEY
TABLE 4.1 ACTUAL GROUNDWATER TREATMENT

Water Year	Burbank GAC	Lockheed Aqua Detox	Lockheed BOU	Glendale North/South OU	CVWD Glenwood Nitrate Removal Plant	Los Angeles Aeration Facility	Pollock Wells Treatment Plant	Annual Total AF
1985-86		1						1
1986-87		1						1
1987-88		1						1
1988-89		924						924
1989-90		1,108				1,148		2,256
1990-91		747				1,438		2,185
1991-92		917			847	786		2,550
1992-93	1,205	692			337	1,279		3,513
1993-94	2,395	425	378		1,550	726		5,474
1994-95	2,590		462		1,626	1,626		6,304
1995-96	2,295		5,737		1,419	1,182		10,633
1996-97	1,620		9,280		1,562	1,448		13,910
1997-98	1,384		2,580		1,391	2,166		7,521
1998-99	1,555		9,184		1,281	1,515	1,513	15,048
1999-00	1,096		11,451	979	1,137	1,213	1,851	17,727
2000-01	995		9,133	6,345	989	1,092	1,256	19,810
2001-02	0		10,540	6567	515	998	1,643	20,263
Total AF	**15,135**	**4,815**	**58,745**	**13,891**	**12,654**	**16,617**	**1,513**	**128,120**

TABLE 4.2 PROJECTED GROUNDWATER TREATMENT

	Burbank GAC	Lockheed BOU	Glendale North/South OUs	CVWD Glenwood Nitrate Removal Plant	Los Angeles Aeration Facility	Los Angeles' Pollock Wells Treatment Plant	Annual Total AF
2002-03	0	9,500	7,200	500	2,014	1,849	21,063
2003-04	0	10,000	7,200	500	2,390	2,400	22,490
2004-05	0	10,000	7,200	500	2,390	2,400	22,490
2005-06	0	10,000	7,200	510	2,390	2,400	22,500
2006-07	0	10,000	7,200	520	2,390	2,400	22,510
Total AF	0	**49,500**	**36,000**	**2,530**	**11,574**	**11,449**	**111,053**

C. Projected Groundwater Pumping Facilities

North Hollywood Well Field Restoration Project

LADWP is planning to add up to eight new North Hollywood Wells in the west branch to restore capacity lost due to contamination and age. Construction is expected to begin in 2004.

D. Other Groundwater Remediation Projects

Many privately owned properties in the eastern SFB have been found to have groundwater contamination, and are under Cleanup and Abatement Orders from the Regional Water Quality Control Board (RWQCB). Each site typically has monitoring wells and some have extraction wells and treatment facilities. The RWQCB is also in the process of evaluating and closing a significant number of cases in the underground tank program.

The USEPA began including hexavalent chromium in the quarterly sampling from its monitoring wells to characterize the plume as a step in containment and cleanup of this contaminant. A Total Dissolved Chromium plume map is shown on Plate 10.

E. Dewatering Operations

Metropolitan Transit Authority (MTA)

As part of the planned transportation system in Los Angeles County, the MTA constructed the Universal City Subway Station and the associated tunnels. Construction was completed in June 2000. To ensure the safe and continued operation of facilities constructed below the water table within ULARA, the MTA must continue to collect and dispose of infiltrated groundwater. MTA may construct a pedestrian underpass project at Universal City that would require dewatering.

Northeast Interceptor Sewer (NEIS) Project

The NEIS Project, a portion of which is located northerly of the intersection of the Los Angeles River and the Arroyo Seco, will require dewatering during construction. This project is under the direction of the Los Angeles Department of Public Works Bureau of Engineering.

Eagle Rock Interceptor Sewer (ERIS) Project

The ERIS Project, located in the Eagle Rock Basin along York Boulevard and Eagle Rock Boulevard, will require dewatering during construction. This project is under the direction of the Los Angeles Department of Public Works Bureau of Engineering. Construction is expected to begin in Fall 2003 and last approximately two years.

Temporary Construction Dewatering

Temporary construction excavations, such as building foundations and pipelines, sometimes require dewatering in areas that have a high groundwater table. Water that is discharged is

required to be accounted for by the Watermaster, and may be deducted from the water right holder. The Watermaster Office is developing guidelines to account for these temporary discharges.

Other Permanent Dewatering Operations

Many facilities along the southern and western boundaries of the SFB have deep foundations in areas of high groundwater that require dewatering. The amount of groundwater pumped is required to be reported to the Watermaster on a monthly basis. These activities are subject to approval by the affected Administrative Committee party, and the dewaterer is required to pay for the replacement cost of the extracted groundwater. The pumped groundwater is subtracted from the affected party's water right.

F. Unauthorized Pumping in the County

Unauthorized Pumping

There are a significant number of individuals, primarily within the unincorporated hill and mountain area, who are pumping groundwater without reporting the production to the Watermaster. This groundwater has been adjudicated and is the property of the City of Los Angeles. Although the volume produced by each pumper is probably small, the cumulative effect may be significant. The Watermaster is investigating and conducting negotiations with the City of Los Angeles and Los Angeles County in an attempt to resolve the problem. The Watermaster Office has also begun evaluating pumping by lessees on U.S. Forest Service land within ULARA.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are five active spreading facilities located in the SFB (Plate 2). The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds. The LACDPW, in cooperation with the City of Los Angeles, operates the Tujunga Spreading Grounds. The spreading facilities are used for spreading native water. Plans are being developed to deepen the Hansen Spreading Grounds. An analysis is being made by the County Department of Public Works-Flood Control Section and the LADWP to identify ways to maximize spreading. Estimated capacities are shown in Table 5-2.

B. Other Spreading Operations

East Valley Water Recycling Project

The East Valley Water Recycling Project (EVWRP) was originally designed to deliver tertiary-treated water from the Tillman Water Reclamation Plant for spreading at the Hansen Spreading Grounds. This project has been refocused to maximize non-potable uses for the water, including cooling water for the Valley Steam Plant and landscape irrigation.

Headworks Spreading Grounds

The Headworks Spreading Grounds is being considered for a joint project among LADWP, Bureau of Sanitation, and City Department of Recreation and Parks as a multi-use site. As proposed, this 41-acre site would provide space for four storage tanks to replace the function of the Silver Lake and Ivanhoe Reservoirs and 28 acres of wetlands and trails. The tanks would be located in the eastern section of the site with the tops of the tanks even with the adjacent road making the entire site available for recreation. The three project partners will continue the feasibility studies.

Boulevard Pit Spreading Facility

Vulcan Materials, CalMat Division, is currently mining sand and gravel from its Boulevard Pit, located between the existing Hansen and Tujunga Spreading Grounds. The LADWP, LACDPW, and the Watermaster are investigating the feasibility of ultimately acquiring the Boulevard Pit for conversion into a new stormwater retention and recharge facility.

C. Actual and Projected Spreading

Table 5-1A shows the actual and projected spread volumes for the 2002-03 Water Year. As shown in Table 5-1A, the 2002-03 Water Year will experience below-average recharge activities. Overall, approximately 11,400 AF will be spread compared to the 34-year historical average of 32,994 AF, and compared to the past five-year average of 21,760 AF. Precipitation on the valley fill is estimated at 20 inches for 2002-03 compared to the long-term average of 18.08 inches per year and the previous five-year average of 16.61 inches per year. This follows the lowest recorded rainfall of 5.95 inches in 2001-02 since record keeping began in 1870.

TABLE 5-1A: 2002-03 SPREADING OPERATIONS

(acre-feet)

	Operated by:						
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga	Total
Oct-02	17	0	0	6	0	0	23
Nov-02	113	27	0	801	0	66	1,007
Dec-02	99	345	0	320	0	47	811
Jan-03	17	199	57	0	0	0	273
Feb-03	151	2,020	68	671	0	173	3,083
Mar-03	325	2,120	171	934	0	44	3,594
Apr-03	0	0	0	0	0	0	0
May-03	0	1,200	0	0	0	1,400	2,600
Jun-03							0
Jul-03							0
Aug-03							0
Sep-03							0
TOTAL	722	5,911	296	2,732	0	1,730	11,391
1968-2002 Average	509	14,532	557	6,679	2,187	8,530	32,994
1997-2002 Average	535	11,520	333	5,781	0	3,591	21,760

Table 5-1B: HISTORICAL PRECIPITATION ON THE VALLEY FILL

(inches per year)

1969-02 Average	1997-02 AV	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03**
18.08	16.61	37.04	9.81	14.84	19.52	5.95	20

Includes native and imported waters.

** - Estimated.

TABLE 5-2: ESTIMATED CAPACITIES OF ULARA SPREADING GROUNDS

Spreading Ground	Type	Total Wetted Area (acres)	Capacity (acre-feet/year)
	Operated by the LACDPW		
Branford	Deep basin	7	1,000
Hansen	Shallow basin	105	36,000
Lopez	Shallow basin	12	5,000
Pacoima	Med. depth basin	107	29,000
	Operated by LADWP		
Headworks (Inactive)	Shallow basin	28	11,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	83	43,000
	TOTAL:	342	125,000

D. Hansen and Tujunga Spreading Grounds Task Force

During the 1997-98 Water Year, precipitation in ULARA was 225 percent of normal. This resulted in an above-average volume of stormwater runoff that could be captured in upstream reservoirs and diverted into spreading grounds. In April 1998, the Watermaster's Office received notice from the LACDPW indicating that spreading at both the Hansen and Tujunga Spreading Grounds would be temporarily suspended. The basis for curtailing spreading was that the groundwater table had risen to a level that threatened to inundate the base of the Bradley-East Landfill near the Hansen Spreading Grounds and methane gas was migrating from the Sheldon-Arleta Landfill adjacent to the Tujunga Spreading Grounds toward a high school. At that time, Los Angeles County's reservoirs were completely full, meaning that thousands of acre-feet of runoff would be spilled and lost to the ocean. The suspended spreading activities spanned over one month.

In response to this undesirable condition, the Watermaster's Office in May 1998 formed the Tujunga and Hansen Spreading Grounds Task Force. The task force was comprised of representatives from the LACDPW, LADWP, Los Angeles Bureau of Sanitation and the Watermaster's Office. After a series of meetings, the task force developed preliminary

mitigation measures to improve the utilization of both spreading grounds, particularly during years of above-normal runoff.

- Hansen Spreading Grounds Mitigation Plan

Above-average recharge at the Hansen Spreading Grounds affects the Bradley-East Landfill, located approximately 3,000 feet downgradient. The RWQCB and the Watermaster's Office prohibit groundwater inundation of the unlined landfill. The groundwater table is allowed to rise to a designated level, and then spreading is temporarily suspended until the groundwater table recedes to a safe level. This occurs only in years when above-average runoff is available. To assure the safety of the landfill, an alert groundwater level, with a 10-foot buffer zone, was established in the late 1980s. The Hansen Spreading Grounds Mitigation Plan established an improved location to record the groundwater levels – 1,000 feet further downgradient from its previous location and adjacent to the existing Bradley-East Landfill. The Watermaster's Office estimated that this change should improve the volume of groundwater recharge by at least 25 percent or approximately 7,000 AF/yr.

- Tujunga Spreading Grounds Mitigation Plan

The Tujunga Spreading Grounds are located adjacent to the Sheldon-Arleta Landfill. Methane gas has been produced by the landfill since the early 1990s, which has been a source of environmental concern.

During the spreading of surface water, water moves through the soil column and displaces the air from voids contained in the soil matrix. A significant migration of air mass has the potential to displace methane gas out of the landfill. In recent years the methane has occasionally migrated and caused elevated levels at a nearby high school, and in at least one instance, forced an evacuation of the school grounds. In order to avoid these episodes, a methane gas monitoring system was constructed. When methane gas is detected at specific concentrations, the spreading activities are suspended, resulting in local storm water runoff being lost to the ocean.

The Tujunga Spreading Grounds Mitigation Plan consists of continuous operation of the perimeter methane gas flare system, situated around the landfill, prior to and during spreading of surface water. This may improve containment of the methane gas within the landfill, and halt its migration out of the landfill. The plan requires close coordination between the Los Angeles Bureau of Sanitation, the operators of the existing perimeter flare system, and the LACDPW.

The goal is to contain methane gas within the landfill and improve the spreading capacity. A test was conducted in May 2003 by the consultant, GeoSyntec. The results were encouraging at a spreading rate of 100 cfs. Additional testing will be conducted during the 2003-04 Water Year.

Meanwhile, the National Baseball League is planning to use 30 acres of the Sheldon-Arleta Landfill surface as a Little League Academy for year-round training of young baseball players. Design and construction of the facility is proceeding through 2003 once analysis of the methane gas migration is completed.

- Big Tujunga Dam/Endangered Species

The USFS and the U.S. Fish and Wildlife Service (USFWS) have raised a concern about several endangered species in the stream channel below the Big Tujunga Dam located in the Angeles National Forest. These agencies of the federal government conducted investigations to determine the amount of water that would be needed to enhance the habitat of the endangered species, particularly the Santa Ana Sucker.

In February 2003, the USFS presented its findings and proposed two flow release strategies, before and after the planned seismic retrofit of the Big Tujunga Dam. The pre-retrofit strategy recommends low-flow pulse releases from the dam beginning when surface flow below Big Tujunga Dam disappears (June/July), and continuing until the first significant rainfall of the storm season (October/November). The post-retrofit plan recommends continuous low-flow releases from the dam to maintain constant surface flow within the Santa Ana Sucker (SAS) Conservation Area during the dry summer months (June through November). However, these low-flow strategies may reduce the amount of water that reaches the SFB, where it can be captured and spread. Because surface flow within Tujunga Wash is tributary to the Los Angeles River and the SFB, the water is clearly part of the City of Los Angeles' pueblo right. The Watermaster Office supports a solution that will safeguard Los Angeles' water rights while protecting the endangered SAS.

VI. BASIN MANAGEMENT ACTIVITIES AND INVESTIGATIONS

A. Groundwater Investigation Programs

Pacoima Area Groundwater Investigation

A significant groundwater VOC contaminant plume exists in the Pacoima area near the intersection of San Fernando Road and the Simi Valley Freeway (118 Freeway). This area is located approximately 2.5 miles north and upgradient of the LADWP's Tujunga Well Field. There are four primary VOCs present in the groundwater beneath the Pacoima area: PCE, TCE, 1,1-TCA and 1,1 DCE. Concentrations of TCE were found to be as high as 24,000 ppb at this site, which is the highest level found in the San Fernando Valley.

To help characterize the extent of contaminant migration, LADWP installed two monitoring wells: PA-01, approximately 0.5 mile downgradient, and PA-02, approximately 1.25 miles downgradient of the site.

The Brenntag/Holchem site is under the jurisdiction of the Department of Toxic Substances Control (DTSC). Holchem is operating a soil vapor extraction system and has installed monitoring wells both on and off site.

The Price-Pfister site is located nearby, and is under the jurisdiction of the RWQCB. Price-Pfister has installed several monitoring wells on site.

Additional wells will be needed to define the contaminant plumes originating from these sites. Due to the close proximity of these sites, DTSC and RWQCB are coordinating their oversight efforts.

Chromium Investigations

The RWQCB, funded in part with a grant from the United States Environmental Protection Agency (USEPA), reviewed 4,040 sites suspected of hexavalent chromium contamination and published its findings in December 2002. After this review, 255 suspected hexavalent chromium sites were identified and inspected. As a result of these inspections, the RWQCB recommended closure for 150 sites and further assessment for 105 sites. In addition, the RWQCB has issued

Cleanup and Abatement orders to Coltec (formerly Menasco Aerospace Division), PRC-Desoto (formerly Courtauld), Drilube, Honeywell (formerly Allied Signal) and plans to issue several more. The Cleanup and Abatement Orders require a responsible party to assess, clean up, and abate the effects of contamination discharged to soil and groundwater.

In January 2003, with funding from the cities of Los Angeles, Burbank, and Glendale, the Watermaster Office published the "Watermaser Special Report Concerning the History and Occurrence of Hexavalent Chromium Contamination in the San Fernando Basin" to preserve the declarations of individuals who witnessed the original events that caused the hexavalent chromium contamination.

The Chrome 6 Task Force has begun meeting again to keep the various parties informed regarding hexavalent chromium issues, including regulations, health studies, and treatment technologies. A new Public Health Goal (PHG) should be established by the Office of Environmental Health Hazard Assessment (OEHHA) in late 2003 to mid 2004. A MCL will subsequently be issued by the California Department of Health Services (DHS).

VII. ULARA WATERMASTER MODELING ACTIVITIES

A. Introduction

The purpose of the groundwater modeling study presented herein is to evaluate the effects of groundwater pumping in the SFB, as projected over a five-year period. The projected pumping values were extracted from the "Year 2002-07 Pumping and Spreading Plans" submitted by each party pursuant to the provisions established in the revised February 1998 Policies and Procedures. The groundwater flow model used for this study is a comprehensive three-dimensional computer model that was developed for the USEPA to incorporate data, characterizations, and findings during the Remedial Investigation Study of the San Fernando Valley (December 1992). The model is a tool to estimate the future response to pumping and spreading in the San Fernando Basin for the next five years. Up-to-date groundwater elevations for specific locations can be obtained by contacting the Watermaster's Office at (213) 367-0921.

The model code, "Modular Three-Dimensional Finite-Difference Groundwater Flow Model," commonly called MODFLOW, was developed by the U.S. Geological Survey (McDonald-Harbaugh) and was used to develop the San Fernando Basin Goundwater Flow Model. This model consists of 64 rows, 86 columns, and four layers to reflect the varying geologic and hydrogeologic characteristics of the SFB in three dimensions. In the deepest portion of the SFB the model is subdivided into four layers, each layer characterizing a specific zone. The model has a variable horizontal grid that ranges from 1,000 by 1,000 feet near the southeastern SFB to 3,000 by 3,000 feet in the northwestern SFB (Figure 7-1) or where less data are available. The model is regularly updated.

B. Model Input

The input data for this model is illustrated in Table 7-1. Table 7-1A is the Basin Recharge, which consists of precipitation, delivered water, hill and mountain runoff, spreading, and sub-surface inflow. Table 7-1B is the Basin Extraction of major producers such as the City of Los Angeles, City of Burbank, City of Glendale, the City of San Fernando, Crescenta Valley Water District, and other individual producers. Both tables represent a projected value for the five-year study, from Fall 2002 to Fall 2007 except for the first half of Water Year 2002-03 where the actual values are known.

In Table 7-1A, the percolation and spreading values were derived from the average or normal rainfall and recharge conditions over the five-year study period except for the first half of Water Year 2002-03 where actual values are known. The LACDPW estimated the spreading values for

the second half of the water year. Anticipated spreading at Pacoima Spreading Grounds by the City of Burbank will help to improve the recovery of the lower water table in the area above the Tujunga Well Field. The values of the sub-surface inflow from the adjacent basins are assumed to be constant throughout the five-year study.

All Table 7-1A values were derived from the "Pumping and Spreading Plans" submitted by producers. Each well field's values were assigned to individual wells, then each well was assigned a percentage of pumping to each model layer based on the percentage of the well's perforations contained within each layer.

The model's initial head values (groundwater elevations) were derived from the actual data of Water Year 2001-2002. The Water Year 2001-02 experienced a coutinuous decline in groundwater elevation as a result of above average extractions combined with low precipitation and low artificial recharge. The valley floor precipitation for the same year was 86 percent of the 100-year mean. At the close of every Water Year, the Watermaster staff updates the model-input files with the actual Basin Recharge and Extraction data. This activity has been performed each year during the period from 1980 to 2002.

C: Simulated Groundwater Elevations and Flow Directions

After running the model for five stress periods (Water Years 2002-2007), each lasting 365 days, the MODFLOW generated numerical data: the head (groundwater elevations), the drawdown (change in groundwater elevations), and the cell-by-cell flow (source of vector or flow directions data). These numerical data were used to develop the following figures or Plates.

- The simulated groundwater contour results for Model Layer 1 (water table) are shown on Plate 1, and for Layer 2 on Plate 2.

- Additionally, the change in groundwater elevation contours were generated from the drawdown data from the Fall 2002 to Fall 2007 stress period and is shown on Plate 3 for Layer 1 and Plate 4 for Layer 2.

- The horizontal flow directions of groundwater movement is shown on Plate 5 for Layer 1 and Plate 6 for Layer 2.

- Finally, Plates 7-10 depict the most recent TCE, PCE, NO_3 and Total Dissolved Chromium contaminant plumes that are superimposed onto the Layer 1 horizontal groundwater flow direction.

D. Evaluation of Model Results

Plate 1: Simulated Groundwater Contour Model Layer 1 – Fall 2007

- The most noticeable feature is the cone of depression (pumping cone) that has developed around the Burbank OU. These extractions are derived primarily from Layer 1, although Layer 2 does provide some recharge to Layer 1. The Burbank OU projected pumping for the period from 2002 though 2007 is 10,000 AF/yr. The radius of influence extends as far as 6,800 feet in the downgradient (southeasterly) direction. An upgradient radius of influence is usually larger than the downgradient radius of influence.

- In a more subtle manner, Plate 1 illustrates the pumping influence (pumping cones) of the Glendale OU, North Hollywood OU, North Hollywood West Wells, and Pollock Treatment Plant Wells.

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2007

- The most significant features are the cones of depression near the Rinaldi-Toluca (R-T), Tujunga (TJ), North Hollywood-West (NHW), Burbank OU. Over 75 percent of the R-T, TJ, and NHW, pumping is derived from Layers 2-4.

Plate 3: Change in Groundwater Elevation Model Layer 1 – Fall 2002 to Fall 2007

- As shown in Plate 3, there is a continuous basinwide decline in the groundwater elevations over the five-year study period, with the exception of the immediate areas near the Hansen and Pacoima Spreading Grounds.

- The primary reason for the decline in water levels is that basin extractions are projected to increase over the 5-year study period by about 26,000 AF.

- The water table within the cone of depression at the Rinaldi-Toluca Well Field is lowered by about 10 feet due to pumping and the groundwater level is lowered approximately 12 feet at the lowest point in the pumping cone near the Burbank OU.

- The water table near the Glendale North OU wells will decline between one to two feet. No noticeable decline was observed near the Glendale South OU Wells. Full-scale operation of the OU plant started at the beginning of the 2000-01 Water Year. The North OU Wells will pump 5,184 AF/yr and the South OU Wells 2,016 AF/yr.

- The area upgradient of the Tujunga and Rinaldi-Toluca Well Fields will experience about a four foot recovery in the water table due to the projected recharge by the City of Burbank at the Pacoima Spreading Grounds. The area near the North Hollywood, Erwin, Whitnall, and Verdugo Well Fields will experience a 10 to 20 foot depression in the water table.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 2002 to Fall 2007

- The area near the Rinaldi-Toluca and West North Hollywood well fields will experience a 4 to 16 foot decline in the water table. The area near the North Hollywood East Branch, Erwin, Whitnall and Verdugo Well Fields will experience an 8 to 16 foot depression in the water table. The area upgradient of the Tujunga Well Field will experience about four feet of recovery in the water table.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2007

- This plate consists of superimposed groundwater flow direction arrows to illustrate the general movement of groundwater flow in Layer 1.

- The Rinaldi-Toluca, North Hollywood, Glendale OU, and Burbank OU Well Fields and the Hansen and Pacoima Spreading Grounds cause the most pronounced effect on the direction of groundwater movement. In particular, the Burbank OU creates such a significant pumping cone that groundwater flows toward the well field from all directions (radial flow).

- A groundwater divide apparently develops just north of the Verdugo wells and south of the Whitnall, Erwin, and Burbank OU wells. This is primarily due to the 'pumping trough' formed by the Burbank OU and North Hollywood Well Field extractions.

Plate 6: Simulated Groundwater Flow Direction Model Layer 2 – Fall 2007

- Similar to Plate 5, a groundwater divide forms between the Verdugo wells and the Burbank OU, Erwin and Whitnall wells. The effect of the Rinaldi-Toluca, North Hollywood, and Burbank OU pumping creates the most significant impact to the natural direction of groundwater movement.

Plates 7 – 10: Simulated Groundwater Flow Direction and TCE, PCE and NO_3, and Chromium Contamination Model Layer 1 – Fall 2007

- Plates 7-9 depict the most recent TCE, PCE and NO_3 contaminant plumes that are superimposed onto the interpolated horizontal direction of groundwater movement for Layer 1, Fall 2007. The Burbank OU appears to contain the >5,000 µg/L TCE and PCE plumes and a portion of the 1,000-5,000 µg/L TCE and PCE plumes. The uncaptured portion of these plumes will migrate in the direction of the Los Angeles River Narrows Area (southeasterly) and towards the Glendale OU.

- The Burbank OU pumping (10,000 AF/yr) tends to flatten the horizontal gradient in a southeasterly direction and slows the natural movement of groundwater southeasterly of the Burbank OU area plume.

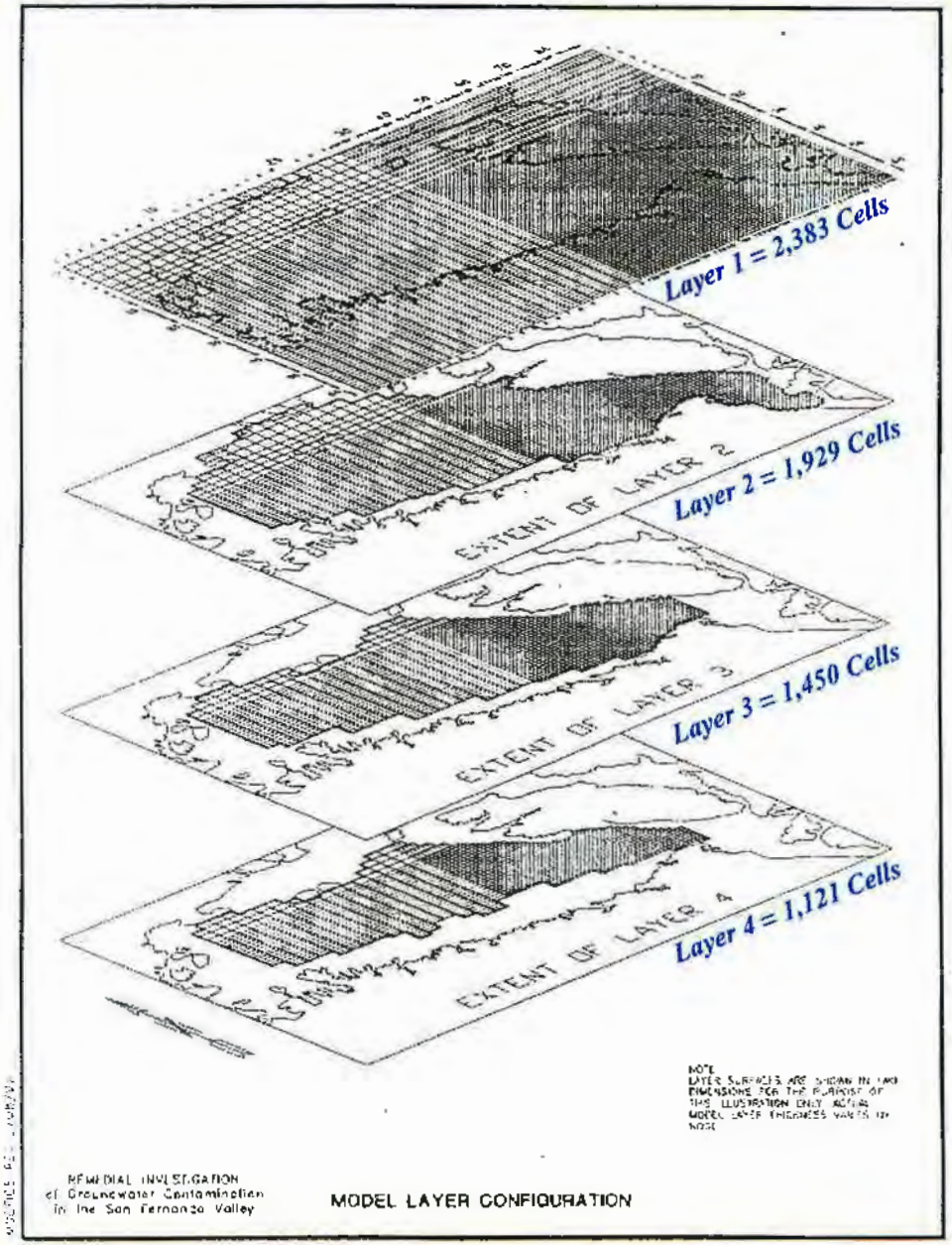
- The Glendale North and South OU Wells pumping tend to capture a portion of the plumes uncaptured by Burbank OU wells.

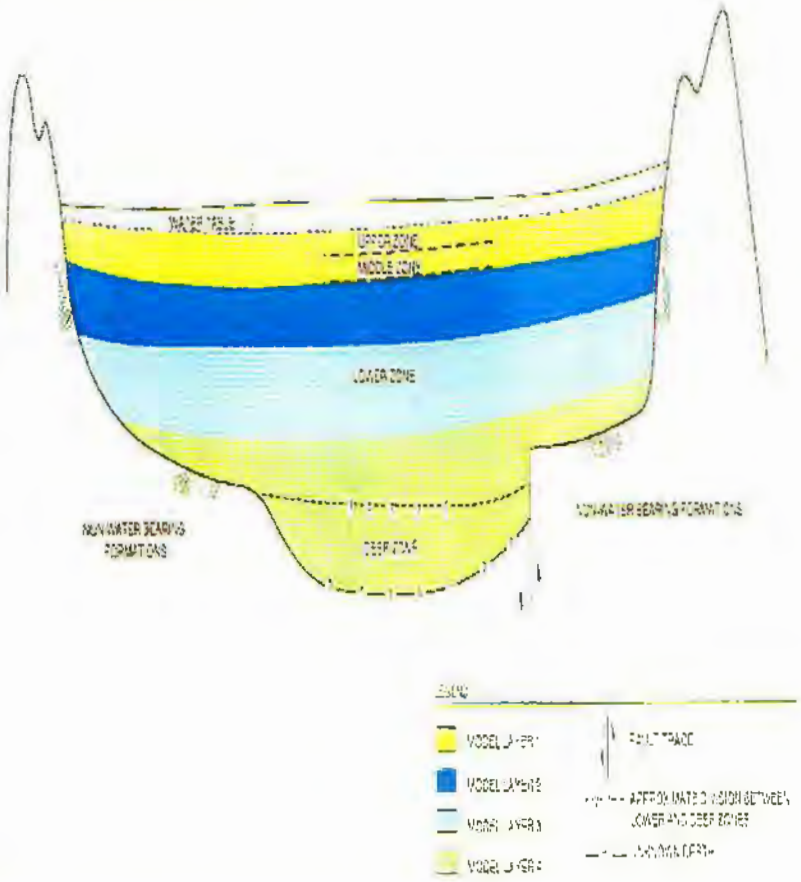
- The Pollock Wells (2,400 AF/yr) have a less pronounced effect on Layer 1 because 75 percent of the Pollock pumping originates from Layer 2.

- Plate 9 (NO_3 contamination) indicates that Layer 1 extractions by the Burbank and Glendale OU facilities may be impacted by NO_3 contamination above 45 mg/L.

- Plate 10 (Total Dissolved Chromium) indicates that Layer 1 extractions by North Hollywood OU, Burbank OU, and Glendale OU facilities may be impacted by chromium contamination.

Figure 7.1
Model Layers and Cell Configurations





Source: Remedial Investigation Report of Groundwater Contamination in the San Fernando Valley, December 1992

TABLE 7-1
MODEL INPUT
Pumping and Spreading Scenario
Water Years 2002 - 2007

Table 7-1A

	BASIN RECHARGE (AF/Y)																	
	RAINFALL (IN/Y)		PERCOLATION (A)			H&M (B)	SPREADING GROUNDS (B)							SUB-SURFACE INFLOW (B)				
WATER YEAR	VALLEY	HILL & MTN	VALLEY FILL	RETURN WATER	SUB TOTAL	HILL & MTN	BRANFORD	HANSEN	HW	LOPEZ	PACOIMA	TUJUNGA	SUB - TOTAL	PACOIMA	SYLMAR	VERDUGO	SUB - TOTAL	TOTAL RECHARGE
2002-03	20.00	26.00	13,894	56,000	69,894	4,440	722	5,911	-	296	2,832	1,730	11,491	350	400	70	820	86,645
2003-04	18.57	23.06	12,874	61,525	74,399	3,939	438	12,973	-	579	7,327	6,696	28,013	350	400	70	820	107,171
2004-05	18.57	23.06	12,874	61,525	74,399	3,939	438	12,973	-	579	8,527	6,696	29,213	350	400	70	820	108,371
2005-06	18.57	23.06	12,874	61,525	74,399	3,939	438	12,973	-	579	9,977	6,696	30,663	350	400	70	820	109,821
2006-07	18.57	23.06	12,874	61,525	74,399	3,939	438	12,973	-	579	11,177	6,696	31,863	350	400	70	820	111,021

Table 7-1B

	BASIN EXTRACTION (AF/Y)																		
	LADWP (C)										BURBANK (C)			GLENDALE (C)			OTHERS (C)		
WATER YEAR	AE	EW	HW	NH	PQ	RT	TJ	VD	WH	TOTAL LADWP	BURBANK PSD	LOCKHEED	NON-BURBANK (VMP)	CITY OF GLENDALE	QU-NORTH	QU-SOUTH	TOTAL NON-LADWP	TOTAL NON-GLENDALE (F. LAWN)	TOTAL EXTRACTION
2002-03	-2,014	-883	0	-20,828	-1,849	-36,307	-26,761	-4,640	-1,783	-95,065		-9,500	-300	-25	-5,184	-2,016	-2,430	-400	-114,920
2003-04	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	-87,000	0	-10,000	-300	-25	-5,184	-2,016	-2,430	-400	-107,355
2004-05	-2,390	-994	0	-25,276	-2,400	-25,900	-27,179	-5,261	-2,600	-92,000	0	-10,000	-300	-25	-5,184	-2,016	-2,430	-400	-112,355
2005-06	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	-87,000	0	-10,000	-300	-25	-5,184	-2,016	-2,430	-400	-107,355
2006-07	-2,390	-994	0	-25,276	-2,400	-25,900	-22,179	-5,261	-2,600	-87,000	0	-10,000	-300	-25	-5,184	-2,016	-2,430	-400	-107,355

NOTES: (A) Model Recharge Package (Aerial)
(B) Model Well Package (Source)
(C) Model Well Package (Sink)

PROJECT: *WATERMASTER*
PROJECT NO.: *PS02-07*
DATE: *6/5/03*

VIII. WATERMASTER'S EVALUATION AND RECOMMENDATIONS

The Watermaster is encouraged by the five year projected pumping and spreading plan because of the progress of the groundwater cleanup program which has restored Burbank's and Glendale's groundwater pumping capability in the San Fernando Basin. Unfortunately, during the past several years hexavalent chromium contamination has become an issue that may threaten the ability of the parties to put the water to beneficial use in the short-term. The Watermaster is concerned that chromium contamination near the Glendale OU, Burbank OU, and the North Hollywood OU could eventually overwhelm the cities' abilities to blend the treated groundwater to acceptable levels. If that happens, the cities may be forced to reduce the treatment rate or shut down the facilities, which could be violations of the Consent Decrees established for VOC cleanup.

In order to avoid this potential conflict, the Watermaster recommends an assertive approach by the USEPA to add chromium to the list of contaminants that must be cleaned up by the Responsible Parties, and by the RWQCB to issue and enforce Cleanup and Abatement Orders.

The Watermaster is also concerned about a general decline in San Fernando Basin groundwater levels during the past several years. Probable causes include increased pumping and reduced recharge of the groundwater aquifer. We address this issue in more detail in the May 2003 Watermaster Report. The Watermaster will monitor the situation closely and will seek the advice and guidance of the Parties to the Judgment in reversing this decline.

City of Los Angeles

The Watermaster approves of Los Angeles' projected average annual pumping from the SFB of approximately 89,612 AF/yr for Water Years 2002-03 to 2006-07. This is approximately 2,600 AF/yr more than the 1979-2002 average but only 1,300 AF/yr more than average over the last five years (1997-2002). As of October 1, 2002 Los Angeles' accumulated stored water credit was 254,789 AF in the SFB.

The loss of Los Angeles' Headworks, Crystal Springs, and Pollock Well Fields due to VOC contamination has caused rising groundwater levels in the Los Angeles River Narrows area. The Watermaster is pleased by the partial restoration of pumping in this area by the Pollock Wells Treatment Plant, and encourages Los Angeles to operate this facility at least 2,000 AF/yr to minimize the loss of water from ULARA due to excess rising groundwater.

In the Sylmar Basin, Los Angeles plans to pump an average of 3,396 AF/yr for Water Years 2002-03 through 2006-07. This represents an increase over the long-term average (1979-2002) of 2,948 AF/yr, and is also higher than the average of 2,818 AF/yr during the past five years (1997-2002). As of October 1, 2002 Los Angeles' stored water credits were 6,375 AF in the Sylmar Basin.

City of Burbank

The Watermaster is pleased that Burbank's pumping capability has been restored through the construction of the Burbank OU. However, Burbank's stored water credit is showing the impact of this pumping, dropping from 50,771 AF on October 1, 1999 to 31,625 AF on October 1, 2002. At current pumping rates Burbank's stored water will be depleted in few years, eventually requiring arrangements to purchase or replace extractions that are in excess of Burbank's return flow credits and physical solution purchase rights. The Watermaster encourages a cooperative spirit between parties to promote the continued operation of the Burbank OU.

City of Glendale

Since its start-up on September 26, 2000, the Glendale OU has pumped and treated approximately 13,891 AF from the SFB as of May 1, 2003. Glendale has taken a lead role in investigating treatment technology for hexavalent chromium with funds provided by AWWARF and the federal government. The results will have widespread application. Glendale's stored water credits are 71,761 AF as of October 1, 2002. It is estimated that the facility can be operated for approximately 35 years before exhausting Glendale's stored water credits.

In the Verdugo Basin, Glendale expects to pump an average of 2,300 AF/yr for the next five years. The long-term average (1979-2002) is 2,278 AF/yr, and the five-year average (1997-2002) is 2,490 AF/yr.

City of San Fernando

San Fernando expects to pump an average of 3,800 AF/yr over the next five years from the Sylmar Basin. The long-term average (1979-2002) is 3,019 AF/yr, and the five year average (1997-2002) is 3,455 AF/yr. As of October 1, 2002 San Fernando's stored water credit was 529 AF in the Sylmar Basin.

Crescenta Valley Water District (CVWD)

The Watermaster supports CVWD's increased pumping in the Verdugo Basin until Glendale has the ability to pump its full right, although the lower water table may limit pumping by both parties. CVWD expects to pump an average of 3,165 AF/yr during the next five years. The long-term average (1979-2002) is 2,694 AF/yr, and the five-year average (1997-2002) is 3,632 AF/yr.

Model Simulation

The model simulations indicate that a significant portion of the TCE and PCE contamination plumes in the Burbank area will be captured by the Burbank OU wells. The remaining uncaptured portion will migrate toward the Los Angeles River Narrows area. The Glendale OU and the Pollock Wells Treatment Plant will capture much of this remaining contamination.

The change in groundwater elevation contours illustrates that over the next five years, there is an overall basinwide decline in groundwater levels, with the exception of the areas in the immediate vicinity of the Hansen and Pacoima Spreading Grounds. Specifically, the water table declines about 10 feet near the Tujunga and Rinaldi-Toluca Well Fields; up to 12 feet near the Burbank OU; one to two feet near the Glendale OU; and 10 to 20 feet near the North Hollywood, Whitnall, Erwin, Verdugo, and Headworks Well Fields.

Proposed recharge by the City of Burbank at the Pacoima Spreading Grounds will help basin water levels recover upgradient of the Tujunga and Rinaldi-Toluca Well Fields.

The model also demonstrates that the radius of influence of the Burbank OU extends to approximately 6,800 feet downgradient, and that the combined pumping of the Burbank OU, Rinaldi-Toluca, and North Hollywood Well Fields tends to flatten the horizontal gradient and slows the movement of the contaminant plumes south of the Burbank OU.

Nitrate contamination in excess of the 45 mg/L MCL will continue to affect the Burbank and Glendale OUs.

Pacoima Area Contamination

The Pacoima area groundwater contamination concerns the Watermaster because it is only 2.5 miles upgradient of the Tujunga Well Field. The Watermaster continues to urge the DTSC and RWQCB to expedite the investigation and cleanup of these VOC plumes.

Tujunga Spreading Grounds

The Watermaster continues to take an active role in addressing the landfill gas migration problem at the Tujunga Spreading Grounds. The goal is to restore the full operation of the spreading grounds by preventing off-site methane gas migration during heavy spreading. Los Angeles has retained a consultant to help resolve this problem.

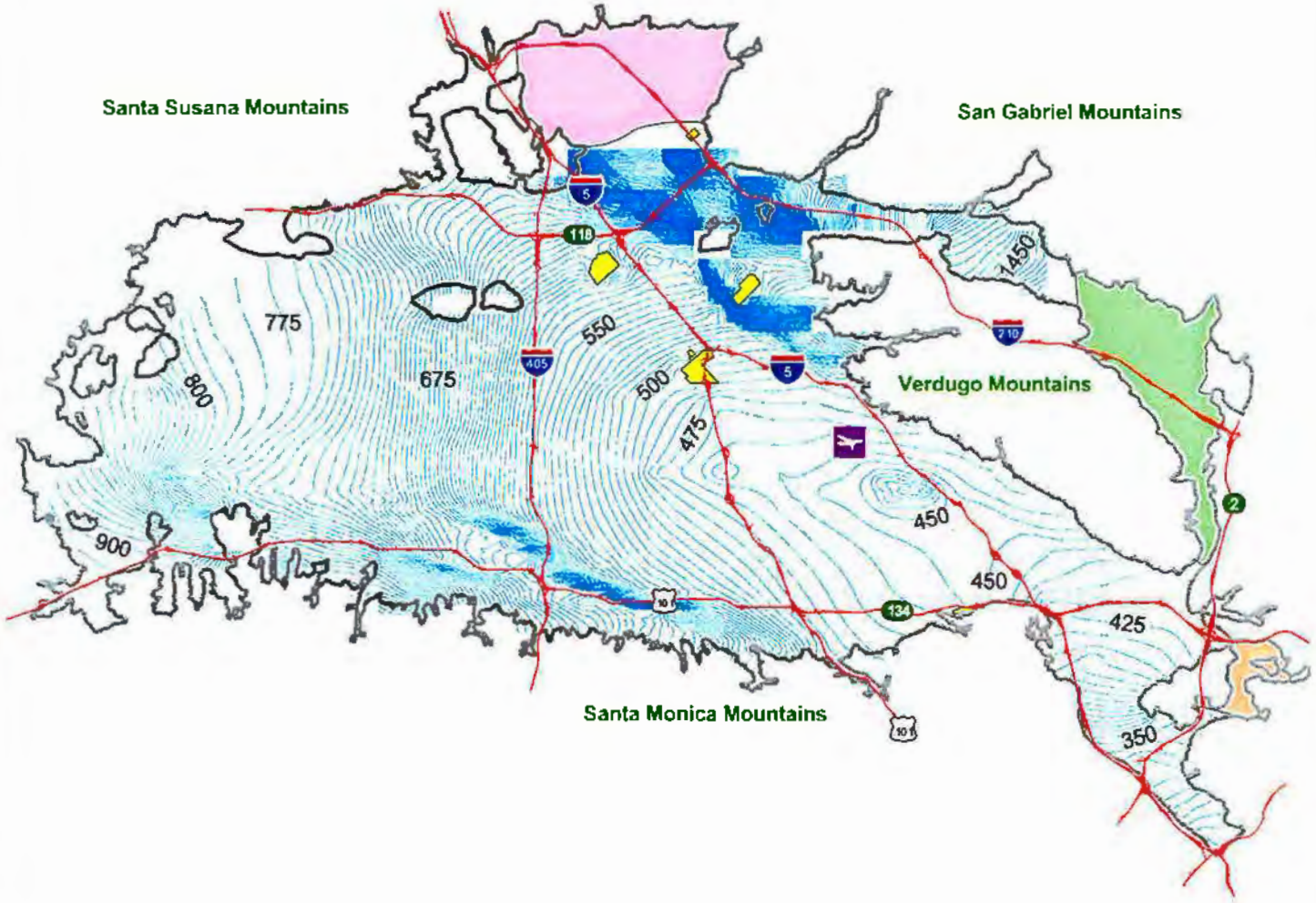
Boulevard Pit

The Boulevard Pit is owned by Vulcan Materials and is currently being mined for sand and gravel. The Watermaster has partnered with the City of Los Angeles and the Los Angeles County Department of Public Works to investigate the potential for obtaining this property and converting it into a spreading and/or storage facility for native runoff. This facility could provide a significant new opportunity to enhance basin recharge for the City and provide additional flood control for the County.

PLATES

PLATE 1

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year



LEGEND

- Groundwater Contour
- Spreading Grounds
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

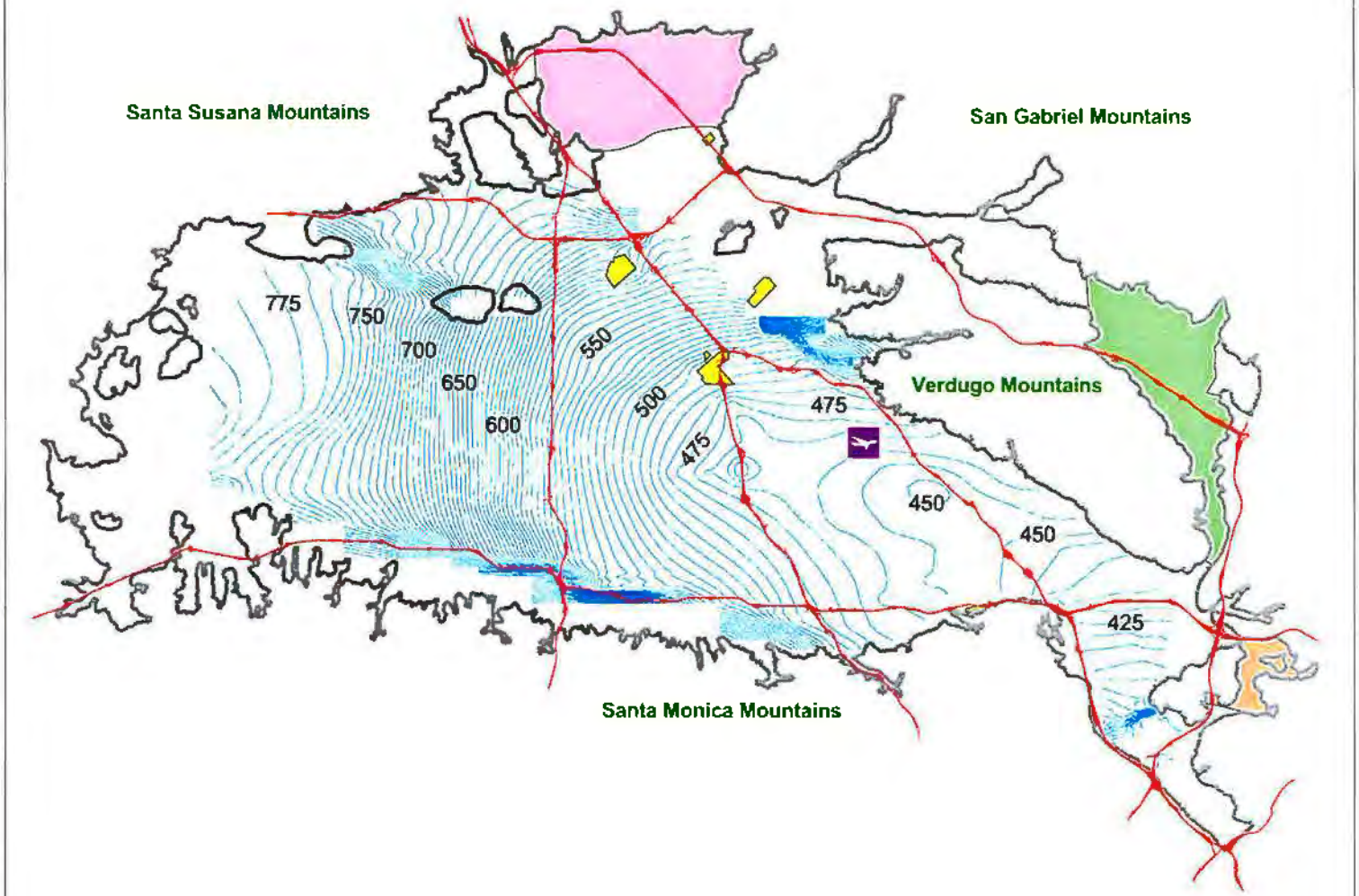
N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 1
FALL 2007

PLATE 2

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year



LEGEND

- Groundwater Contour
- Spreading Grounds
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

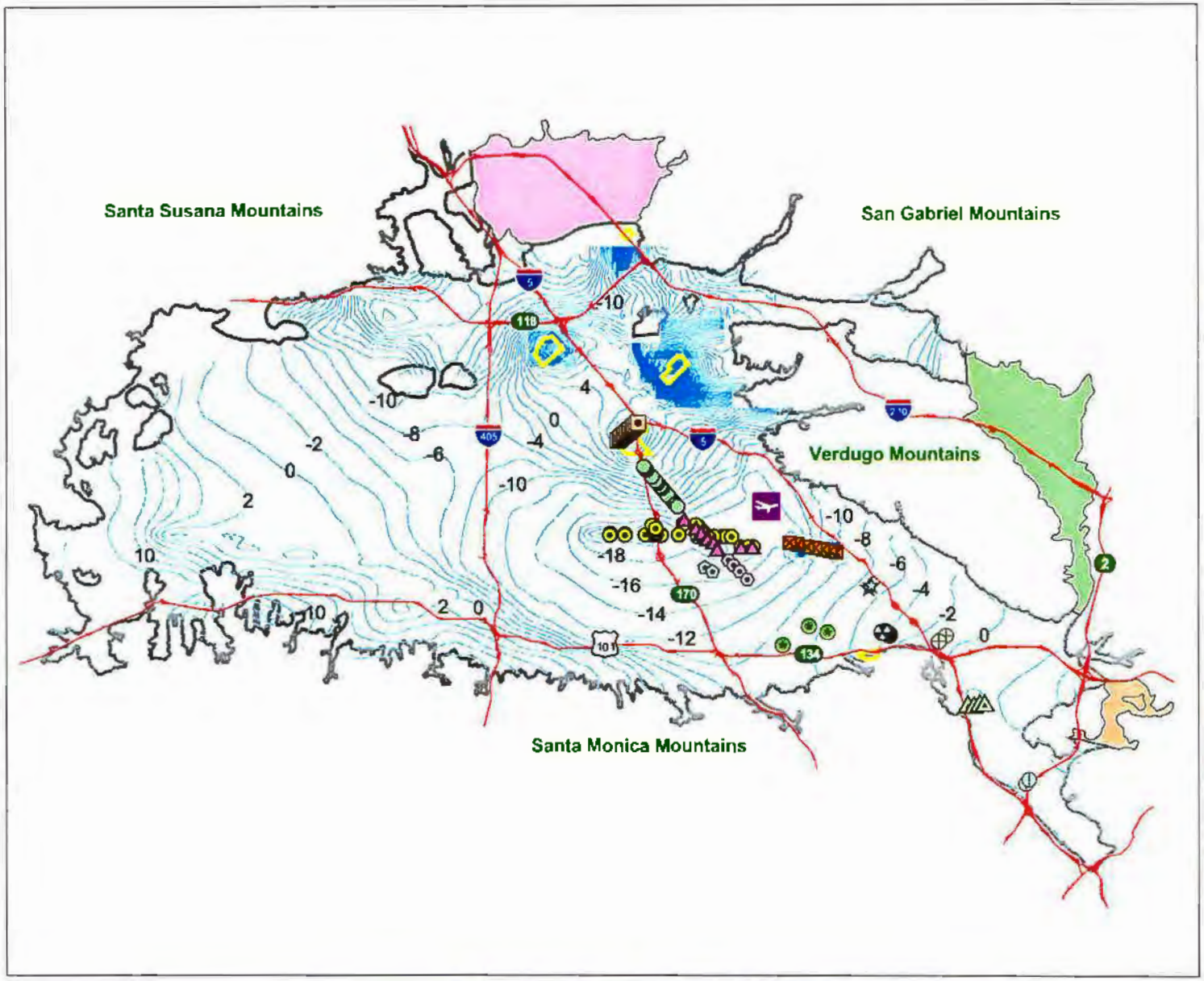
N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 2
FALL 2007

PLATE 3

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year



LEGEND

Well Fields

- Burbank OU (Lockheed)
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Change in GW Elev.
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

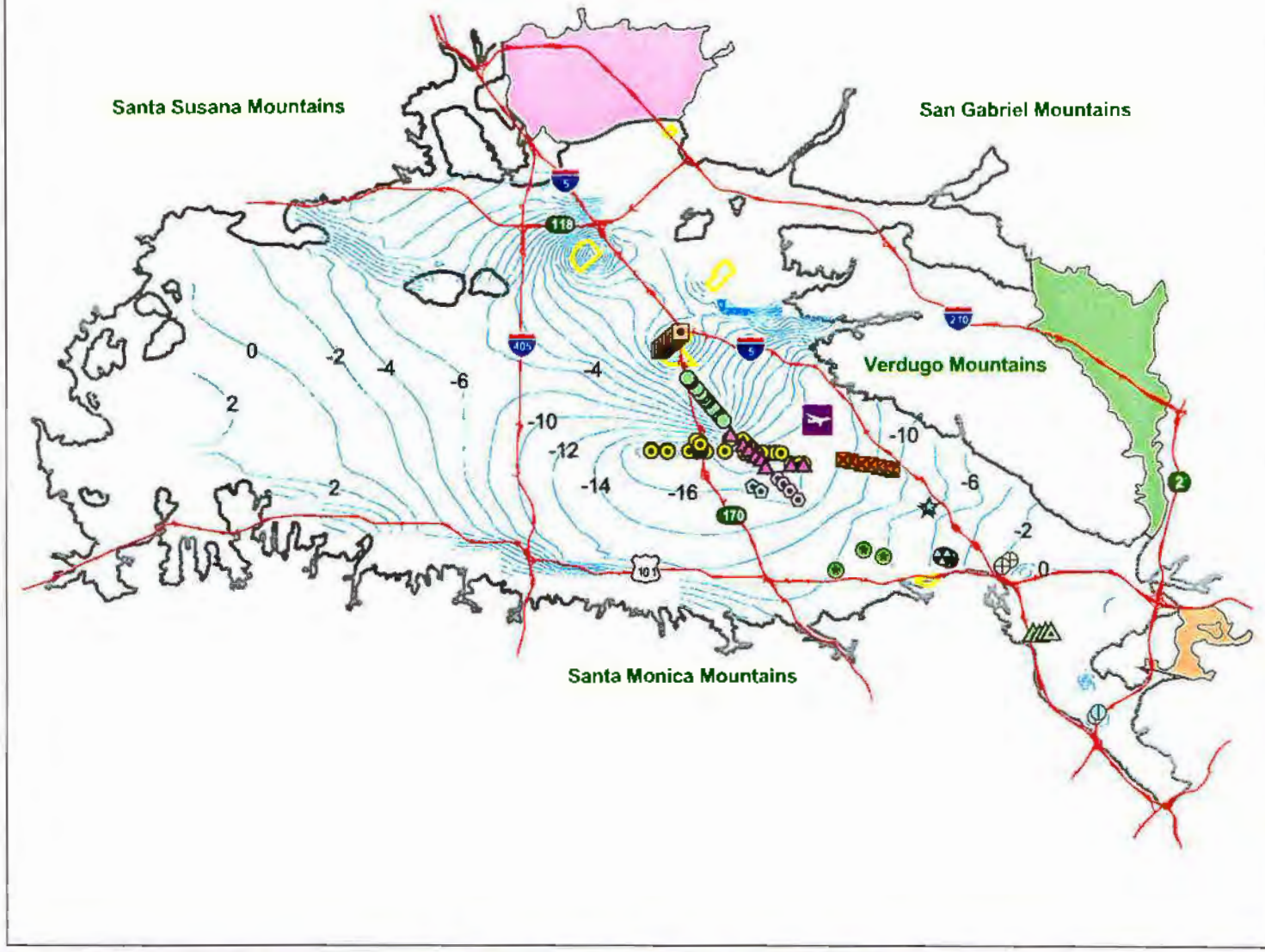
N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 1
Fall 2002 - Fall 2007

PLATE 4

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year



LEGEND

Well Fields

- Burbank OU (Lockheed)
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Change in GW Elev.
- Burbank Airport

Groundwater Basins

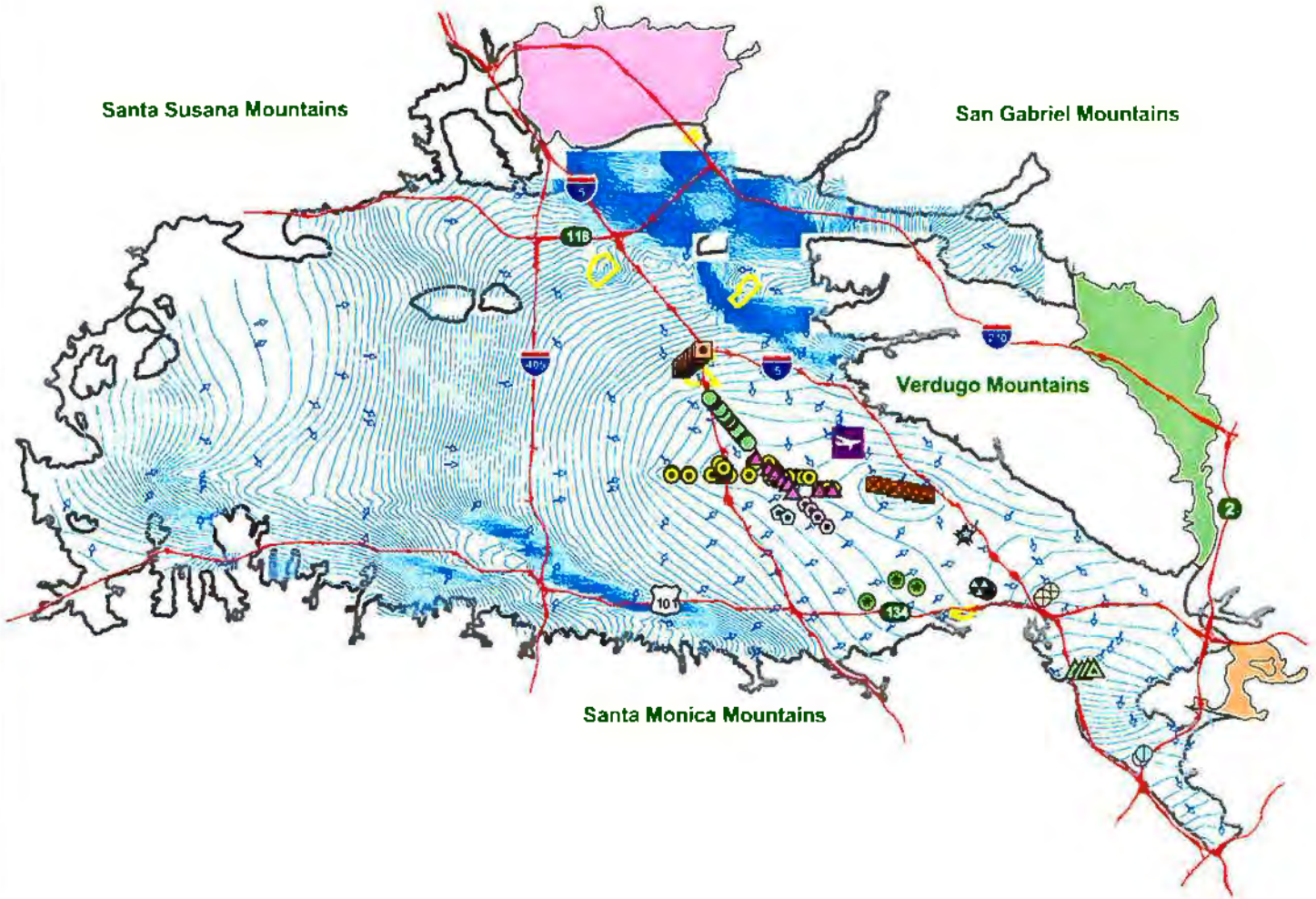
- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 2
Fall 2002 - Fall 2007

PLATE 5



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year

LEGEND

Well Fields

- Burbank OU (Lockheed)
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Groundwater Contour
- Groundwater Flow Direction
- Burbank Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

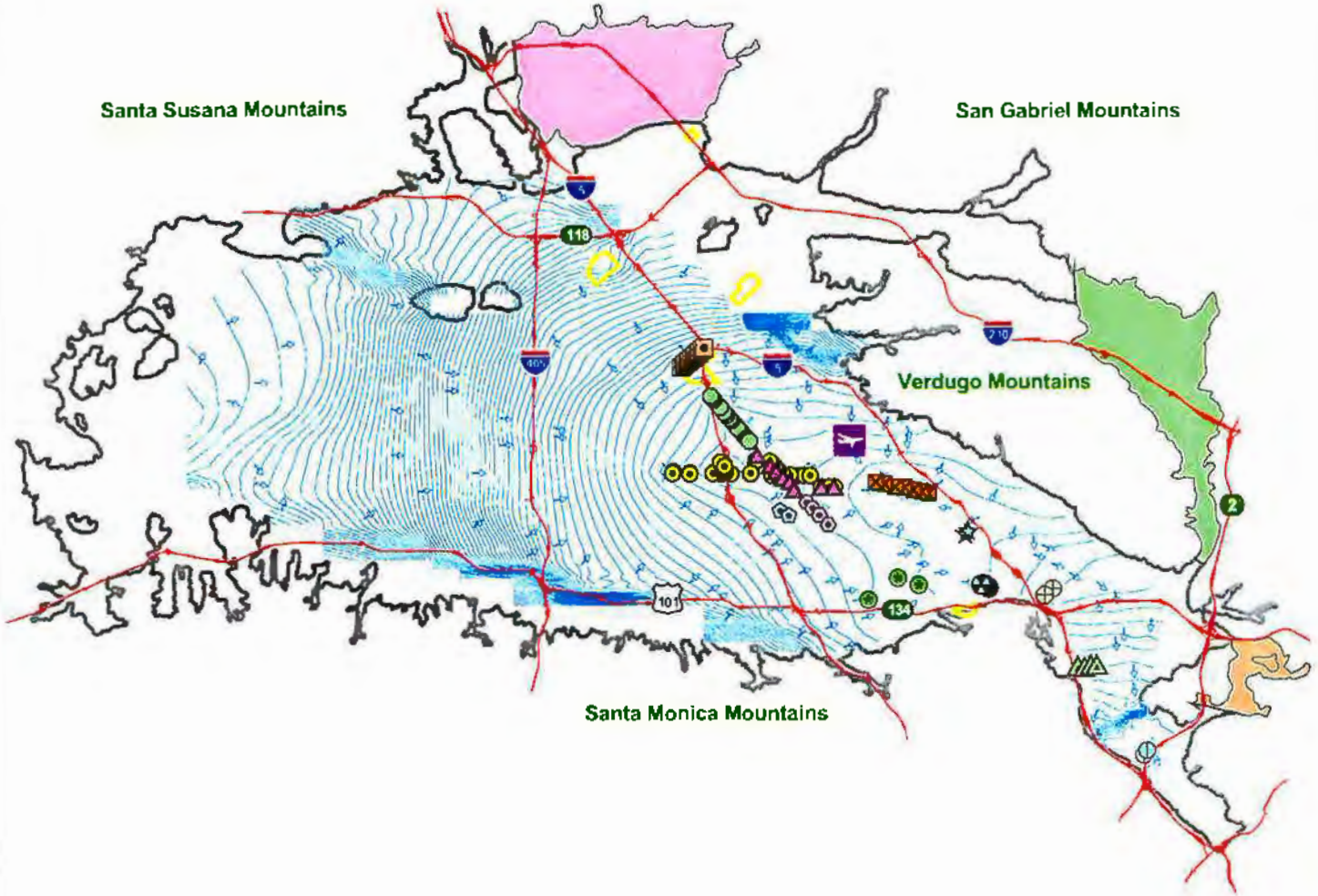
N

2 0 2 Miles

Simulated Groundwater Flow Direction - Model Layer 1
FALL 2007

PLATE 6

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year



LEGEND

Well Fields

- Burbank OU (Lockheed)
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headwork
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

- Freeway
- Spreading Grounds
- Groundwater Contour
- Groundwater Flow Direction
- Burbank Airport

Groundwater Basins
- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

2 0 2 Miles

Simulated Groundwater Flow Direction - Model Layer 2
FALL 2007

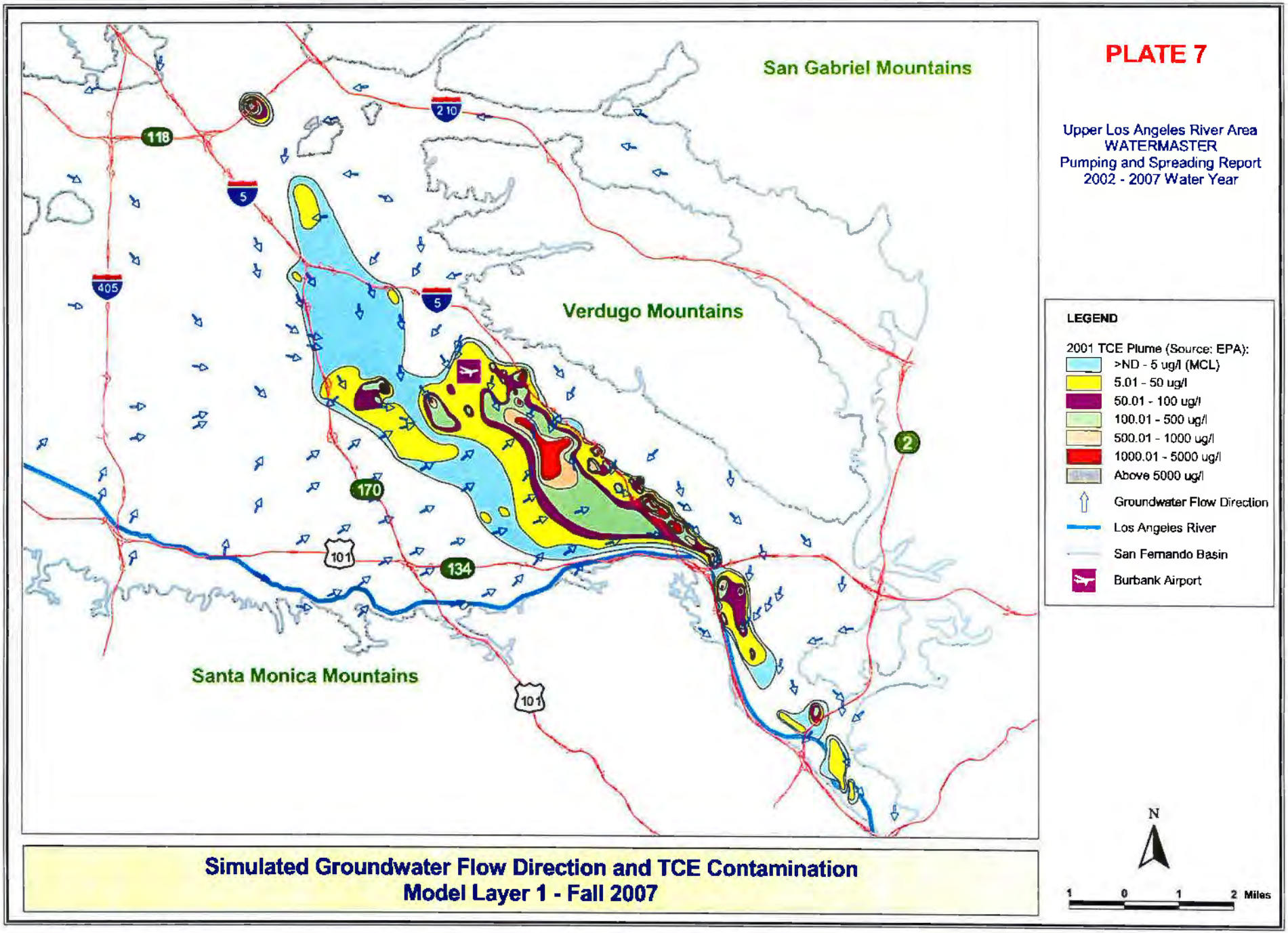
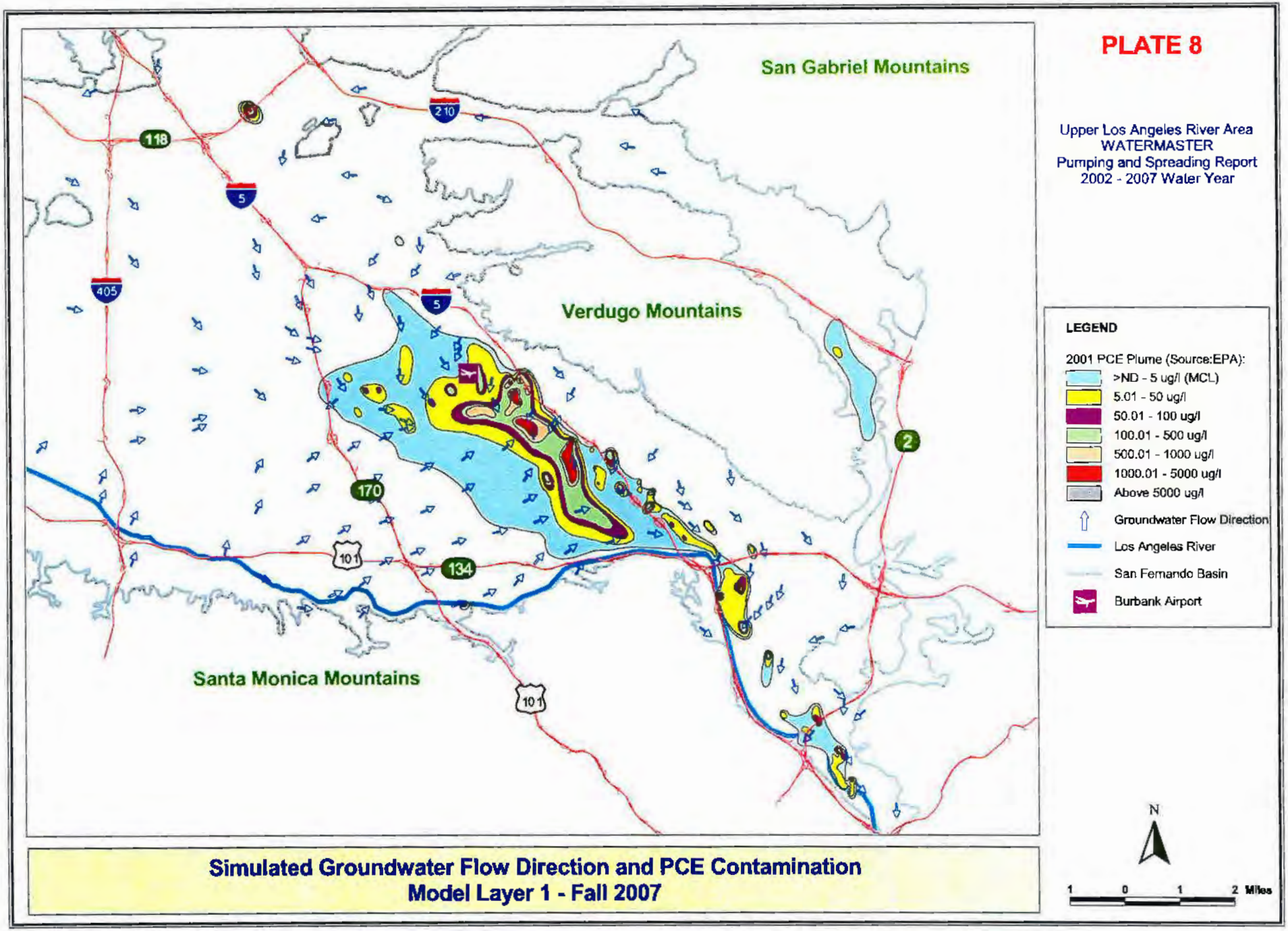


PLATE 7
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
5
170
101
134
101
2
LEGEND
2001 TCE Plume (Source: EPA):
>ND - 5 ug/l (MCL)
5.01 - 50 ug/l
50.01 - 100 ug/l
100.01 - 500 ug/l
500.01 - 1000 ug/l
1000.01 - 5000 ug/l
Above 5000 ug/l
Groundwater Flow Direction
Los Angeles River
San Fernando Basin
Burbank Airport
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and TCE Contamination
Model Layer 1 - Fall 2007

PLATE 8



Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year

Simulated Groundwater Flow Direction and PCE Contamination
Model Layer 1 - Fall 2007

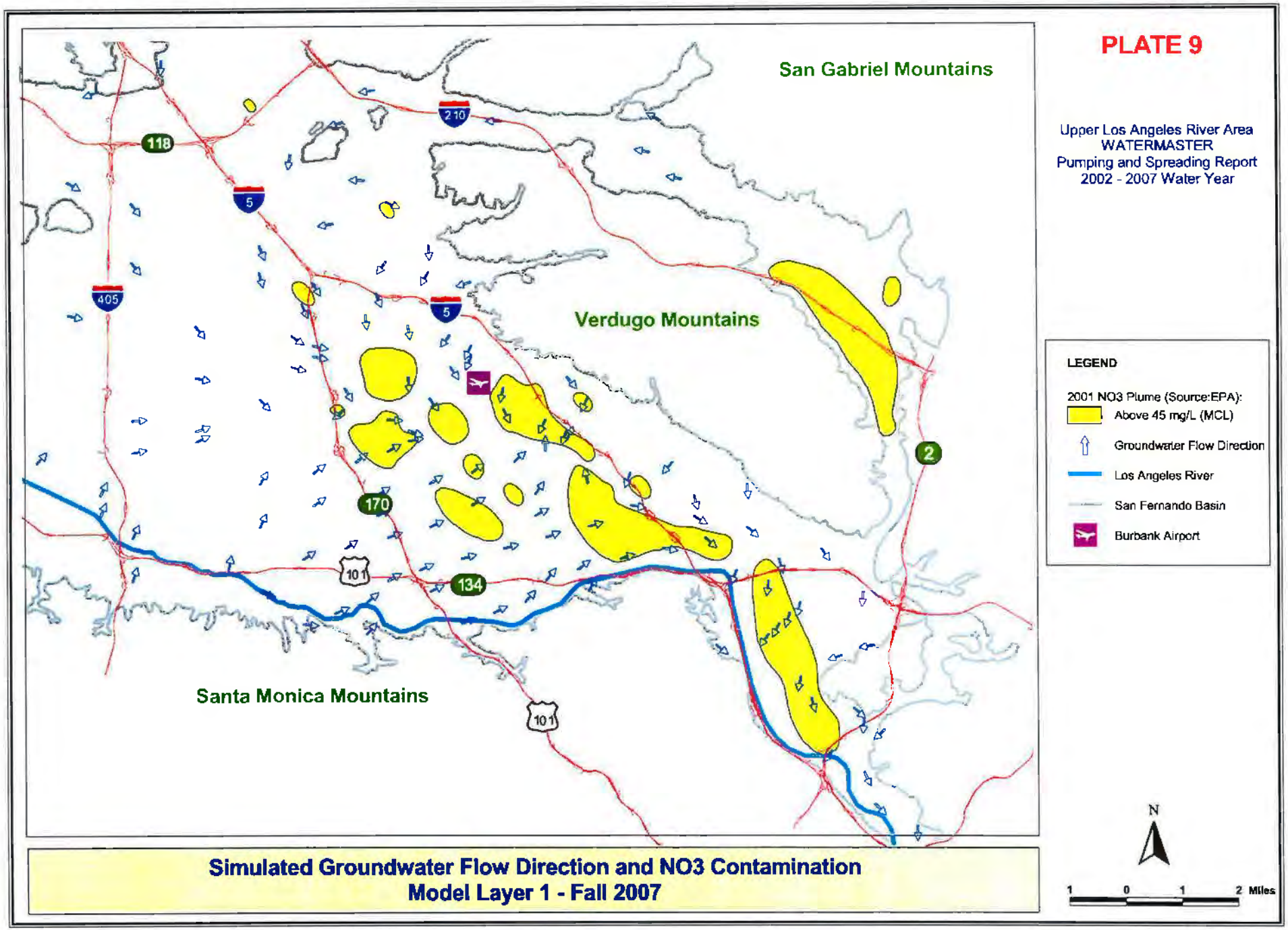


PLATE 9
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
5
170
101
134
2
101
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year
LEGEND
2001 NO3 Plume (Source:EPA):
Above 45 mg/L (MCL)
Groundwater Flow Direction
Los Angeles River
San Fernando Basin
Burbank Airport
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and NO3 Contamination
Model Layer 1 - Fall 2007

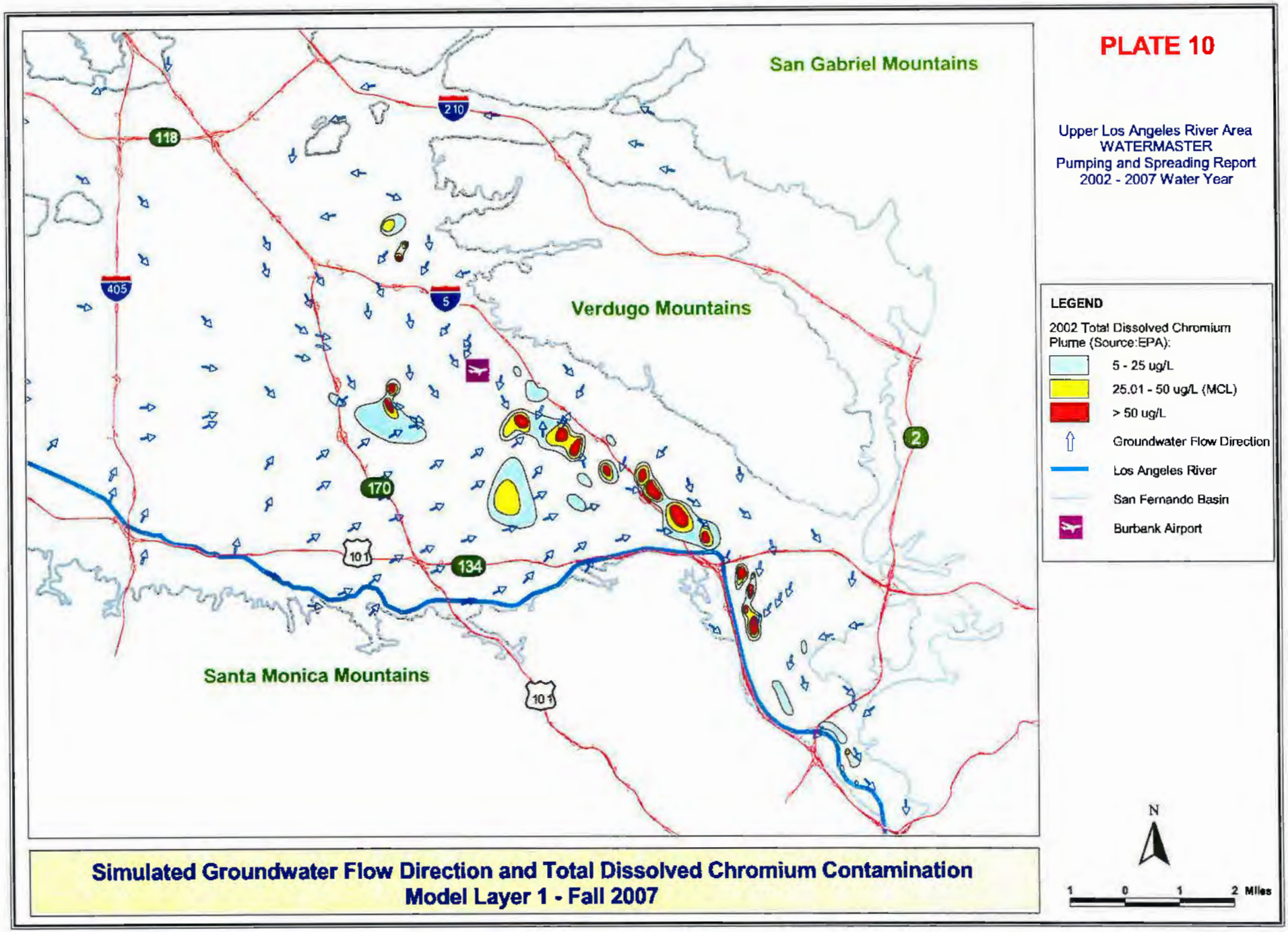


PLATE 10
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2002 - 2007 Water Year
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
405
5
170
101
134
2
LEGEND
2002 Total Dissolved Chromium Plume (Source:EPA):
5 - 25 ug/L
25.01 - 50 ug/L (MCL)
> 50 ug/L
Groundwater Flow Direction
Los Angeles River
San Fernando Basin
Burbank Airport
N
1 0 1 2 Miles
Simulated Groundwater Flow Direction and Total Dissolved Chromium Contamination
Model Layer 1 - Fall 2007

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2002-2007 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 2002-2007 WATER YEARS

APRIL 2003

Prepared by:
City Groundwater Group
Water Resources Section
WATER RESOURCES BUSINESS UNIT
Los Angeles Department of Water and Power

TABLE OF CONTENTS

Introduction

The water rights in the Upper Los Angeles River Area (ULARA) were set forth in a Final Judgment, entered on January 26, 1979, ending litigation that lasted over 20 years. The ULARA Watermaster's Policies and Procedures give a summary of the decreed extraction rights within ULARA, together with a detailed statement describing the ULARA Administrative Committee operations, reports to and by the Watermaster and necessary measuring tests and inspection programs. The ULARA Policies and Procedures have been revised several times since the original issuance, to reflect current groundwater management thinking.

In Section 5.4 of the ULARA Policies and Procedures as amended in February 1998, it is stated that:

> *"...all parties or non-parties who pump groundwater are required to submit annual reports by May 1 to the Watermaster that include the following:*
>
> - *A 5-year projection of annual groundwater pumping rates and volumes.*
> - *A 5-year projection annual spreading rates and volumes.*
> - *The most recent water quality data for each well."*

This report constitutes Los Angeles' 2003 Groundwater Pumping and Spreading Plan for the Water Years 2002 - 2007.

Section 1: Facilities Description

This section describes facilities that influence groundwater conditions in ULARA and relate to Los Angeles.

a. Spreading Grounds: There are six spreading ground facilities that can be used for groundwater recharge of native water in ULARA. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima spreading grounds; the City of Los Angeles Department of Water and Power (LADWP) operates the Headworks Spreading Grounds. LACDPW and LADWP operate the Tujunga Spreading Grounds cooperatively. Estimated capacities for these are shown in Table 1-1 and their locations are shown in Figure 1-1.

Table 1-1

Estimates Capacities of ULARA Spreading Grounds			
Spreading Ground	Type	Total wetted area [ac]	Capacity [ac-ft/yr.]
Operated by LACDPW			
Branford	Deep basin	7	1,000
Hansen	Shallow basins	105	36,000
Lopez	Shallow basins	12	5,000
Pacoima	Med. depth basins	107	29,000
Operated by LADWP			
Headworks	Shallow basins	28	11,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basins	83	43,000
TOTAL:			125,000

b. Extraction Wells: The LADWP has nine well fields in the San Fernando Basin, and one in the Sylmar Basin. The well fields are shown in Figure 1-1, and their rated capacities are shown in Table 1-2. The rated capacities are approximate as operating capacities vary depending on the water levels. Actual groundwater pumping is dependent on maintenance schedules and water quality for each well.

Table 1-2

Rated Capacities of LADWP Well Fields in ULARA				
Well Field	Number of Wells			Rated Capacity of All Wells (cfs)
San Fernando Basin	Active	Stand-by	Total	cfs
Aeration	7	—	7	4
Crystal Springs (A)	—	—	—	—
Erwin	2	3	5	10
Headworks			—	—
North Hollywood	21	8	29	129
Pollock	2	1	3	10
Rinaldi-Toluca	15	—	15	117
Tujunga	12	—	12	107
Verdugo	3	2	5	12
Whitnall	4	1	5	20
Sylmar Basin				
Mission	3	—	3	9
TOTALS	69	15	84	418

(A) Wellfield has been abandoned pursuant to sale of property to DreamWorks, Inc.

c. Groundwater Treatment Facilities: The LADWP operates two groundwater treatment facilities. Water treated at these facilities is delivered to the water distribution system for consumption

North Hollywood Groundwater Treatment Facility: This plant was placed into service in December 1989 to treat up to 2,000 gpm of groundwater to remove VOCs by using aeration with granular activated carbon (GAC) for off-gas treatment. This facility is a part of the North Hollywood Operable Unit (NHOU) that also includes a system of shallow wells. The NHOU is financed, in part, by the U.S. Environmental Protection Agency.

Pollock Wells Treatment Plant: This plant was placed into service in March 1999 to remove VOCs from the groundwater at a rate up to 3,000 gpm from the Pollock Well Field. The facility features the use of liquid-phase GAC, restores the use of Pollock Wells, and addresses the excessive rising groundwater discharges from the San Fernando Basin into the Los Angeles River.

In addition, the LADWP has the North Hollywood Advanced Oxidation process (AOP) Demonstration Project that features the use of ozone and hydrogen peroxide to remove VOCs

from the groundwater at a rate of upto 4,000 gpm. This demonstration facility is not currently in operation.

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 2002-2007 Water Year: The City of Los Angeles has the following three sources of water supply: 1. Los Angeles Aqueduct supply imported from the Owens Valley/Mono Basin area, 2. Local groundwater supply from the Central, San Fernando, and Sylmar Basins, 3. Purchased water from the Metropolitan Water District of Southern California (MWD). The MWD sources of supply are the State Water Project and the Colorado River Aqueduct. Use of San Fernando Basin groundwater can fluctuate annually depending on the availability of imported water which varies due to climatic and operational constraints.

The San Fernando Basin and Sylmar Basin provide most of the City's local groundwater supply. The City of Los Angeles has the following average annual water rights which comprise approximately 15% of the City's supply:

San Fernando Basin	87,000 AF
Sylmar Basin	3,600 AF

Table 2-1 shows the amount of groundwater extractions that are expected during the 2002-03 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 2002 to 2007. These projections are based upon assumed demand and Los Angeles Aqueduct flows and are subject to yearly adjustments.

Table 2-1

CITY OF LOS ANGELES PUMPING PROJECTION FOR WY 02-03 (Acre-Feet) **San Fernando Basin**													
		Actual Extractions						Projected Extraction					
	TOTAL	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
AERATION	2,014	126	98	117	186	159	130	196	203	196	203	203	196
ERWIN	883	86	66	52	96	37	0	0	111	107	111	111	107
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	20,828	1971	1313	1406	2043	1072	286	0	1845	2678	2768	2768	2678
POLLOCK	1,849	0	0	0	96	0	250	226	234	226	431	197	190
RINALDI-TOLUCA	36,307	3958	3212	2993	3970	1741	0	0	2522	4404	4551	4551	4404
TUJUNGA	26,761	3038	2334	2143	2178	813	0	0	2337	3214	3321	3752	3631
VERDUGO	4,640	575	514	286	235	117	0	0	590	571	590	590	571
WHITNALL	1,782	261	0	0	2	0	0	0	308	298	308	308	298
TOTAL:	95,064	10,015	7,537	6,997	8,805	3,940	666	422	8,150	11,694	12,283	12,480	12,075
Sylmar Basin													
MISSION	3,779	0	0	165	310	312	509	387	400	417	431	431	417
ULARA TOTAL:	98,843	10,015	7,537	7,162	9,116	4,252	1,175	809	8,550	12,111	12,714	12,911	12,492

b. Spreading Projections for the 2002-03 Water Year: Native groundwater recharge from captured storm runoff occurs primarily as a result of the use of man-made spreading grounds. Spreading grounds operations are primarily controlled by the LACDPW. Table 2-2 represents the anticipated spreading volumes for 2002-03.

Table 2-2

Actual and Projected Spreading in ULARA Spreading Grounds in 2002-03 (in acre-feet)							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-02	17	0	0	6		0	23
Nov-02	113	27	0	801		66	1007
Dec-02	99	345	0	320		47	811
Jan-03	17	199	57	0		0	273
Feb-03	151	2020	68	671		173	3083
Mar-03	325	2120	171	934		44	3594
Projected							
Apr-03							0
May-03							0
Jun-03							0
Jul-03							0
Aug-03							0
Sep-03							0

(A) The Headworks Spreading Grounds has not been operated since the early 1980s due to DHS water quality constraints.

Section 3: Water Quality Monitoring Program Description

All of LADWP's 69 active wells in ULARA are monitored in conformance with the requirements set forth in Title 22, California Code of Regulations. For all active wells, monitoring is required whether the well is in production or not. State regulations require the following types of monitoring regimens:

1. Inorganic compounds
2. Organic compounds
3. Phase II and V Initial monitoring
4. Radiological compounds
5. Quarterly organics compounds

Each well, whether on active or standby status, is monitored every three years for a full range of inorganic and organic compounds. Phase II and V Initial monitoring involves analysis for newly regulated organic compounds at all wells. Each well must be sampled for four consecutive quarters within a three-year period. Quarterly organics compounds analysis monitoring are performed four times a year for each well where organic compounds have been detected. A complete list of the parameters that must be tested for is contained in Title 22 of the California Code of Regulations. Appendix A provides a recent report for TCE, PCE, and nitrates in Los Angeles' San Fernando and Sylmar Basins wells.

Section 4: Groundwater Treatment Facilities Operations Summary

North Hollywood Operable Unit (NHOU): In February and March 2003 the Aeration Facility was shut down to repair the heater. Well No. 2 was shut off late in July 2001 due to chromium levels above 20 ppb and was returned to service in January 2003.

	Aeration Well No.							Average Flow to Facility	Influent to Facility TCE/PCE	Effluent from Facility TCE/PCE
Mon/Yr	2	3	4	5	6	7	8	(gpm)	(ug/L)	(ug/L)
4/02	217	231	258	70	258	---	296	926	28.4/14	<0.5/<0.5
5/02	---	227	258	71	296	---	296	528	NS	NS
6/02	---	261	258	97	323	---	297	1269	NS	NS
7/02	109	179	176	90	226	349	299	897	31/11.5	<0.5/<0.5
8/02	---	264	258	68	229	327	294	824	30.4/14.2	<0.5/<0.5
9/02	---	264	258	31	262	329	293	803	28.1/11.9	<0.5/<0.5
10/02	109	264	254	47	263	---	291	801	24.0/11.0	<0.5/<0.5
11/02	109	264	257	48	261	325	288	1058	74.8/14.3	<0.9/<0.5
12/02	---	264	---	41	256	---	286	907	82.6/11.7	<0.5/<0.5
1/03	126	264	258	35	254	323	281	936	88.1/10.9	1.0/<0.5
2/03	129	264	258	33	247	324	276	962	77.7/9.72	0.8/<0.5
3/03	134	264	258	30	95	320	272	1199	49.2/11.4	ND/<0.5

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 2002-2003 Water Year, as of the printing of this report (April 2003).

a. Spreading Grounds:. LADWP plans to restore the full groundwater recharge capacity of the Tujunga Spreading Grounds by developing and implementing a mitigation action plan to control the methane gas migration from Sheldon-Arleta Landfill to the local neighborhood as a result of recharge. LADWP is investigating the possibility of developing a multi-objective project to restore the recharge activity of the Headworks Spreading Grounds while incorporating other compatible uses including passive recreation.

b. Extraction Wells: LADWP is planning to add up to four new North Hollywood Wells in the west branch to restore diminished capacity resulting from contamination and obsolescence of some existing wells.

c. Groundwater Treatment Facilities:

North Hollywood Operable Unit. A draft feasibility study to enhance the NHOU is being reviewed by the USEPA. This plan includes the development of two or three new wells northwesterly of the NHOU. The discovery of hexavalent chromium above 5,000 ppb upgradient of the proposed well locations has temporarily halted implementation of the plan. The USEPA, the City of Los Angeles, and the RWQCB are investigating the source of the hexavalent chromium contamination.

Headworks Well Field Remediation. The Headworks Well Field was taken out of service in the mid 1980s due to contamination by TCE and PCE. LADWP submitted to the California Department of Health Services (DHS) the Source Water Assessment and the Raw Water Characterization elements of DHS Policy 97-005 for the Headworks Well Field Remediation Project. In reviewing the submittals, DHS indicated that the recently established State Action level for 1,2,3 trichloropropane of 5 parts-per-trillion and the presence of this compound within the ten-year capture zone of the Headworks Project would require additional treatment than that already planned As a result, LADPW has suspended activity on the Headworks Project to

evaluate other options to ensure that maximum inflows can be restored to the Silver Lake Reservoir service area.

East Valley Water Recycling Project. The LADWP has stopped work on the groundwater recharge portion of this project to focus on direct non-potable (irrigation, industrial, commercial) use of the recycled water supply. Tertiary treated recycled water from the Donald C. Tillman Water Reclamation Plant will be used, but only for non-potable projects. The Hansen Area Water Recycling Project Phase I, scheduled to be on line by early 2004, will use some of the recycled water for cooling towers at the Valley Generating Station. The Hansen Area Water Recycling Project Phase II that is being planned to deliver recycled water to the proposed Canyon Trails Golf Club and the Hansen Dam Recreation Area. Other areas that will benefit from recycled water include irrigation projects in the West Valley and the Sepulveda Basin.

APPENDIX A:
2002-2003 Water Quality Sampling Results

ULARA WELLS

	Owner Name	Well Name	Well	Date	PCE	TCE	NO3
1	NHE-1	3800E	NH AERATION WELL-001	6/17/98	3.66	240.00	
2	NHE-2	3810U	NH AERATION WELL-002	2/12/03	5.58	192.00	47.80
3	NHE-3	3810V	NH AERATION WELL-003	2/12/03	6.45	34.80	44.30
4	NHE-4	3810W	NH AERATION WELL-004	2/12/03	18.30	42.90	48.30
5	NHE-5	3820H	NH AERATION WELL-005	2/12/03	27.10	29.70	48.30
6	NHE-6	3821J	NH AERATION WELL-006	2/12/03	9.00	19.10	27.70
7	NHE-7	3830P	NH AERATION WELL-007	2/12/03	9.82	208.00	43.40
8	NHE-8	3831K	NH AERATION WELL-008	2/12/03	12.40	29.50	51.40
9	EW-1	3831H	ERWIN-001	10/22/97	0.72	-99.00	
10	EW-2	3821G	ERWIN-002	5/4/95	4.30	13.20	
11	EW-3	3831G	ERWIN-003	7/30/96	1.40	24.00	14.66
12	EW-4	3821F	ERWIN-004	4/7/97	0.60	8.10	4.43
13	EW-6	3821H	ERWIN-006	11/7/00	-99.00	-99.00	27.00
14	EW-10	3811F	ERWIN-010	1/10/03	-99.00	-99.00	10.20
15	M-5	4840J	MISSION-005	2/20/03	-99.00	6.51	29.80
16	M-6	4840K	MISSION-006	2/19/03	-99.00	-99.00	9.70
17	M-7	4840S	MISSION-007	2/19/03	-99.00	2.90	21.40
18	NH-02	3800	NORTH HOLLYWOOD-002	9/28/99	75.06	38.50	32.40
19	NH-04	3780A	NORTH HOLLYWOOD-004	9/25/02	4.52	0.92	8.15
20	NH-07	3770	NORTH HOLLYWOOD-007	2/3/03	-99.00	-99.00	13.40
21	NH-11	3810	NORTH HOLLYWOOD-011	10/23/02	7.39	9.60	22.70
22	NH-15	3790B	NORTH HOLLYWOOD-015				
23	NH-16	3820D	NORTH HOLLYWOOD-016	5/23/96	12.60	2.70	16.30
24	NH-17	3820C	NORTH HOLLYWOOD-017	12/9/97	16.16	1.65	11.92
25	NH-18	3820B	NORTH HOLLYWOOD-018	11/10/99	8.18	83.70	36.90
26	NH-20	3830C	NORTH HOLLYWOOD-020	7/21/99	3.00	9.58	39.50
27	NH-21	3830B	NORTH HOLLYWOOD-021	3/23/01			10.94
28	NH-22	3790C	NORTH HOLLYWOOD-022	3/21/02	22.20	-99.00	20.42
29	NH-23	3790D	NORTH HOLLYWOOD-023	12/6/00	-99.00	-99.00	28.85
30	NH-25	3790F	NORTH HOLLYWOOD-025	2/6/01	-99.00	-99.00	10.94
31	NH-26	3790E	NORTH HOLLYWOOD-026	2/3/03	-99.00	-99.00	25.00
32	NH-27	3820F	NORTH HOLLYWOOD-027	4/23/02	-99.00	-99.00	10.40
33	NH-28	3810K	NORTH HOLLYWOOD-028	10/23/02	8.11	20.10	24.80
34	NH-30	3800D	NORTH HOLLYWOOD-030	10/23/02	1.12	8.52	30.30
35	NH-32	3770C	NORTH HOLLYWOOD-032	2/3/03	-99.00	-99.00	4.56
36	NH-33	3780C	NORTH HOLLYWOOD-033	7/9/02	-99.00	-99.00	4.92
37	NH-34	3790G	NORTH HOLLYWOOD-034	1/24/03	1.02	5.72	32.40
38	NH-35	3830N	NORTH HOLLYWOOD-035	11/15/01	2.81	1.22	10.40
39	NH-36	3790H	NORTH HOLLYWOOD-036	2/3/03	-99.00	0.62	17.10
40	NH-37	3790J	NORTH HOLLYWOOD-037	9/25/02	5.88	7.76	31.40
41	NH-38	3810M	NORTH HOLLYWOOD-038				
42	NH-39	3810N	NORTH HOLLYWOOD-039				
43	NH-40	3810P	NORTH HOLLYWOOD-040	1/24/03	4.53	4.81	6.38
44	NH-41	3810Q	NORTH HOLLYWOOD-041	5/8/01	5.63	47.20	14.13
45	NH-42	3810R	NORTH HOLLYWOOD-042	5/12/99	5.73	88.50	24.50
46	NH-43A	3790K	NORTH HOLLYWOOD-043A	5/11/00	-99.00	-99.00	4.55
47	NH-44	3790L	NORTH HOLLYWOOD-044	2/3/03	-99.00	-99.00	12.90
48	NH-45	3790M	NORTH HOLLYWOOD-045	2/3/03	0.84	1.01	15.10
49	P-4	3959E	POLLOCK-004	2/27/03	3.86	6.40	38.90
50	P-6	3958H	POLLOCK-006	9/10/02	21.70	13.30	37.00

NOTE: -99 = non-detect

--- = not tested (refer to p.8)

= above MCL

ULARA WELLS

	Owner Name	Well Name	Well	Date	PCE	TCE	NO3
51	P-7	3958J	POLLOCK-007	7/12/03	-99.00	-99.00	28.00
52	RT-1	4909E	RINALDI-TOLUCA-001	7/6/00	-99.00	-99.00	9.90
53	RT-2	4898A	RINALDI-TOLUCA-002	2/3/03	2.34	8.70	21.60
54	RT-3	4898B	RINALDI-TOLUCA-003	1/16/03	1.37	1.48	23.10
55	RT-4	4898C	RINALDI-TOLUCA-004	2/26/03	-99.00	-99.00	17.20
56	RT-5	4898D	RINALDI-TOLUCA-005	2/26/03	-99.00	-99.00	23.30
57	RT-6	4898E	RINALDI-TOLUCA-006	2/26/03	-99.00	0.68	18.90
58	RT-7	4898F	RINALDI-TOLUCA-007	2/26/03	-99.00	0.68	18.90
59	RT-8	4898G	RINALDI-TOLUCA-008	2/26/03	-99.00	0.66	21.40
60	RT-9	4898H	RINALDI-TOLUCA-009	2/26/03	-99.00	-99.00	19.80
61	RT-10	4909G	RINALDI-TOLUCA-010	1/15/03	0.64	7.34	19.50
62	RT-11	4909K	RINALDI-TOLUCA-011	6/7/01	-99.00	2.40	
63	RT-12	4909H	RINALDI-TOLUCA-012	2/21/03	-99.00	-99.00	8.82
64	RT-13	4909J	RINALDI-TOLUCA-013	2/21/03	-99.00	1.11	12.00
65	RT-14	4909L	RINALDI-TOLUCA-014	2/26/03	0.70	3.15	18.60
66	RT-15	4909M	RINALDI-TOLUCA-015	2/26/03	-99.00	1.26	17.40
67	TJ-01	4887C	TUJUNGA-001	5/17/02	-99.00	-99.00	24.80
68	TJ-02	4887D	TUJUNGA-002	2/18/03	-99.00	-99.00	17.90
69	TJ-03	4887E	TUJUNGA-003	2/5/03	-99.00	-99.00	22.20
70	TJ-04	4887F	TUJUNGA-004	1/17/03	0.51	1.30	20.80
71	TJ-05	4887G	TUJUNGA-005	2/18/03	0.82	3.07	30.40
72	TJ-06	4887H	TUJUNGA-006	2/5/03	7.57	23.50	46.60
73	TJ-07	4887J	TUJUNGA-007	2/18/03	3.53	19.40	43.60
74	TJ-08	4887K	TUJUNGA-008	2/18/03	2.49	15.50	45.20
75	TJ-09	4886B	TUJUNGA-009	2/18/03	3.57	17.70	45.20
76	TJ-10	4886C	TUJUNGA-010	2/5/03	7.42	12.60	40.80
77	TJ-11	4886D	TUJUNGA-011	6/7/02	-99.00	2.40	32.10
78	TJ-12	4886E	TUJUNGA-012	2/18/03	0.79	5.88	18.50
79	V-1	3863H	VERDUGO-001	2/26/03	0.76	4.74	33.30
80	V-2	3863P	VERDUGO-002	2/26/03	0.78	18.30	38.70
80	V-2	3853F	VERDUGO-002	2/26/03	-99.00	3.60	
81	V-4	3863J	VERDUGO-004	1/13/98	6.47	17.90	1.92
82	V-11	3863L	VERDUGO-011	2/26/03	-99.00	3.60	14.10
83	V-13	3853G	VERDUGO-013				
84	V-24	3844R	VERDUGO-024	11/13/02	-99.00	-99.00	6.78
85	WH-4	3821D	WHITNALL-004	5/18/00	4.22	15.10	
86	WH-5	3821E	WHITNALL-005	1/29/03	3.58	12.20	28.30
87	WH-6A	3831J	WHITNALL-006A	9/20/02	0.87	3.32	7.31
88	WH-7	3832K	WHITNALL-007	1/29/03	1.84	8.43	26.10
89	WH-8	3832L	WHITNALL-008	10/22/96	4.60	10.20	
90	WH-9	3832M	WHITNALL-009				

NOTE: -99 = non-detect
--- = not tested (refer to p.8)
= above MCL

APPENDIX B:
Groundwater Extraction Projections 2002-2007

PROJECTED PUMPING BY THE CITY OF LOS ANGELES FROM THE SAN FERNANDO AND SYLMAR BASINS FOR THE NEXT 5 YEARS (IN ACRE-FEET)

SAN FERNANDO BASIN (SFB) WELL FIELDS	WATER YEAR				
	2002-03	2003-04	2004-05	2005-06	2006-07
AERATION	2,014	2,390	2,390	2,390	2,390
ERWIN	883	994	994	994	994
HEADWORKS	0	0	0	0	0
NO HOLLYWOOD	20,828	25,276	25,276	25,276	25,276
POLLOCK	1,849	2,400	2,400	2,400	2,400
RINALDI-TOLUCA	36,307	25,900	25,900	25,900	25,900
TUJUNGA	26,761	22,179	27,179	22,179	22,179
VERDUGO	4,640	5,261	5,261	5,261	5,261
WHITNALL	1,782	2,600	2,600	2,600	2,600
TOTAL SFB ACRE-FEET	95,064	87,000	92,000	87,000	87,000

Sylmar Basin	3,779	3,300	3,300	3,300	3,300

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2002-2007 Water Years

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS
OCTOBER 1, 2002 TO SEPTEMBER 30, 2007

Prepared by

BURBANK WATER AND POWER
WATER DIVISION

May 2003

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FIGURE

APPENDICES

I. INTRODUCTION

The groundwater rights of the City of Burbank are defined by the JUDGEMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgement was signed on January 26, 1979.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 2.9.4, Groundwater Pumping and Spreading Plan.

The Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30. The Draft Plan for Burbank will be submitted in May to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last ten years and the projected annual water demand for the next five years are shown in Table 2.1.

Water demand during 1990 to 1993 was affected by drought conditions in California. The City of Burbank imposed mandatory conservation from April 1991 to April 1992. Voluntary conservation was in effect prior to, and since, this period. Significant "hard conservation" in the form of retrofit showerheads and ultra-low flush toilet installations has been made.

Projected water demands for the next five years are expected to increase only slightly from the 1989-90 base year. The increase is not from residential growth, but as a rebound from the drought conditions and re-establishment of commercial-industrial demand. The projected water demand may vary significantly due to weather and/or economic conditions in the Burbank area. A variance of ±5% may be expected.

III. WATER SUPPLY

The water supply for the City of Burbank is composed of purchased water from the Metropolitan Water District of Southern California (MWD), locally produced and treated groundwater, and reclaimed water from the Burbank Water Reclamation Plant.

A. MWD

The amount of treated water purchased from the MWD has been reduced as the result of bringing several water resource projects on-line. Burbank may purchase additional quantities of untreated water for basin replenishment. See Section IV. Historic and projected use of MWD water is shown in Table 3.1.

B. GAC TREATMENT PLANT

The City placed a granular activated carbon (GAC) Treatment Plant in service in November 1992. Historic and proposed production from this plant is shown in Table 3.2. The GAC Treatment Plant will normally be operated during the summer season from May to October. However, current plans are to keep the plant shut down, except for emergencies, until July 2004 or later because of chromium concerns. At that time, the system may be used to produce water for the Magnolia Power Project. New chromium regulations due in 2004-05 will lead to decisions on the future use of the water. When the plant is operated, shutdowns for carbon change-out can be expected every two months. Mechanical maintenance will be performed when the plant is out of service during the winter season. The GAC Treatment Plant uses the groundwater produced from Well No. 7 and Well No. 15. The plant capacity is 2,000 gpm. Lockheed Martin has arranged to utilize the capacity of the GAC Treatment Plant to augment the production of the Burbank Operable Unit (BOU) to reach the required annual average of 9,000 gpm. Lockheed Martin will pay a share of the operation and maintenance cost of the GAC in proportion with the volume of water which is credited toward the 9,000 gpm.

C. EPA CONSENT DECREE

The EPA Consent Decree Project became operational January 3, 1996. The source of water is wells VO-1 through VO-8. The Second Consent Decree was entered on June 22, 1998. The plant was out of service from December 15, 1997 to December 13, 1998. The plant capacity is 9,000 gpm. Projected use of EPA Consent Decree water produced by the BOU is shown in Table 3.3.

D. RECLAIMED WATER

The City has used reclaimed water for its power plant cooling since 1967. An expansion of the reclaimed water system was completed in 1996. Historic and proposed use of reclaimed water is shown in Table 3.4.

E. PRODUCTION WELLS

The City has five wells that are mechanically and electrically operable, plus the eight wells of the BOU. Two wells are on "Active" status and three are on "Inactive" status with the Department of Health Services (DHS). Four others have had equipment pulled. We do not plan to operate the inactive wells unless an emergency develops in the 2002-2003 water year. In 2000, the City had proposed using Wells 11A and 12 for the BOU (see Section V.A below).

Active Wells	Inactive Wells	Well Casings
No. 7 No. 15	No. 6A No. 13A No. 18*	No. 11A No. 12 No. 14A No. 17

*No transformer; cannot be operated.

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

The City has a physical solution right of 4,200 acre-feet per year in addition to its import return water extraction rights and use of stored water credits. The City will charge the following physical solution right holders for water used and claim the extractions against the City's rights:

Physical Solution Producers	
Valhalla	300 acre-feet
Lockheed Martin	25 acre-feet

Table 3.3 lists the extractions by Lockheed Martin. Table 4.1 lists the extractions by Valhalla.

Walt Disney Imagineering pumped groundwater for dewatering during construction of their Riverside office building. Extractions of 2,336 acre-feet were charged to Burbank's water for water year 1998-99.

B. STORED WATER CREDIT

The City has a stored water credit of 31,625 acre-feet as of October 1, 2002.

C. ALLOWANCE FOR PUMPING

The import return water extraction right (20 percent of water delivered the prior year) for the 2002-2003 water year is 4,987 acre-feet. This amount is exclusive of additional extractions allowed due to the City's stored water credits, physical solution right or pumping for groundwater clean-up.

Estimated allowable future pumping, based on 23,000 acre-feet of delivered water, will be 4,600 acre-feet per year.

D. SPREADING OPERATIONS

The City has purchased water for basin replenishment since 1989. The water has been typically spread at the Pacoima Spreading Grounds by L.A. County Public Works Department with the assistance of the Los Angeles Department of Water and Power (LADWP). The LADWP water pipelines to the Pacoima Spreading Ground were damaged during the 1994 Northridge earthquake. Replenishment water, beginning in water year 1994-95, has been taken "in lieu" through MWD service connection LA-35 at the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.2.

Burbank is currently preparing a Proposition 13 grant application for assistance in constructing an MWD connection at the end of the Foothill Feeder Tunnel. If successful, this will allow spreading of purchased water at the Pacoima Spreading Grounds.

V. CAPITAL IMPROVEMENTS

A. WELLS

Burbank: Burbank Water and Power (BWP) made a formal proposal to EPA on November 6, 2000 to substitute production from City Wells No. 11A and No. 12 for production from Well VO-1 in the BOU. The proposed substitution was intended to reduce the overall level of chromium in the Burbank water system as Well VO-1 has singularly high chromium levels among the BOU wells. The proposal has since been withdrawn. In January 2002, EPA approved a mode of operation using the existing BOU wells and blending the output with MWD water to keep total chromium levels at 5 parts per billion.

We plan to continue the use of Wells No. 7 and No. 15 for the GAC Treatment Plant when it is operated.

Maintenance Activity- Wells 14A, 17 and 18: These wells are planned to be destroyed in accordance with County standards, Well 14A during Fiscal Year 2002-03 and Wells 17 and 18 during Fiscal Year 2003-04.

Burbank Operable Unit: Eight wells (VO-1 through VO-8) provide the production capability of the EPA Consent Decree Project. See Figure 5.1. The well field will normally produce 9,000 gpm.

B. GROUNDWATER TREATMENT FACILITIES

EPA Project: The EPA Consent Decree Project became fully operational on January 3, 1996. Production and treatment of 3,000 gpm to 8,000 gpm was performed through mid-September 1996.

The EPA Consent Decree Project was removed from production on December 15, 1997 for plant modifications required under the Second Consent Decree.

Due to problems in obtaining a new operating permit from DHS, the treatment plant did not resume operations until December 12, 1998. Only testing water was produced during the outage. Production from December 1998 through September 1999 increased from 5,000 gpm to 9,000 gpm as the plant came fully on-line.

In late June 2000, the treatment plant went off-line due to a breakthrough of 1,2,3- trichloropropane (TCP) in the plant effluent. The plant did not return to service until DHS had approved an operation and sampling plan and the carbon was changed out in the wet phase contactors. Well VO-6 was removed from service at that time because it had high concentrations of 1,2,3-TCP. The overall production of the BOU was also reduced at this time due to general mechanical problems in the BOU, including the air phase GAC screens, the wearing of well

pumps/motors and the failure of well level sensors. While these problems were being analyzed, Lockheed Martin invoked a "*force majeure*" provision of the Second Consent Decree in October 2001. EPA has ruled against the *force majeure* claim. Discussions continue between EPA and Lockheed Martin. Plans for 2002-03 include replacing distribution headers and underdrains in the liquid phase carbon contactors. Replacing screens in the vapor phase contactors will happen in 2003-04.

The City has taken responsibility, through its contractor, United Water Services, for full operation of the BOU as of March 12, 2001.

GAC Treatment Plant: Burbank does not plan to use the production and treatment facilities of the GAC Treatment Plant during the 2002-2003 water year. The plant will remain on an active status, but will not be operated except for emergencies.

TABLE 2.1
FIVE-YEAR PROJECTED WATER DEMAND

Water Year	Acre – Feet
92-93	22,230
93-94	25,369
94-95	23,003
95-96	23,188
96-97	24,845
97-98	22,447
98-99	22,672
99-00	26,313
00-01	25,619
01-02	24,937
02-03*	24,000
03-04*	25,910
04-05*	26,166
05-06*	27,523
06-07*	28,080

* Projected

NOTES:

(1) Water demand equals the total delivered water. [Extractions (GAC & EPA), MWD, Reclaimed, Valhalla].

(2) The last five year average water demand was 24,397 acre-feet.

TABLE 3.1
FIVE-YEAR PROJECTED USE OF MWD TREATED WATER

Water Year	Acre-Feet
92-93	18,005
93-94	18,074
94-95	17,173
95-96	12,937
96-97	10,525
97-98	16,972
98-99	10,536
99-00	10,471
00-01	12,447
01-02	12,086
02-03*	12,700
03-04*	12,910
04-05*	13,066
05-06*	13,223
06-07*	13,380

*Projected

NOTES:

(1) All values shown above are for treated water.

TABLE 3.2
FIVE-YEAR PROJECTED USE OF GAC TREATED GROUNDWATER

Water Year	Acre-Feet
92-93	1,205
93-94	2,395
94-95	2,590
95-96	2,295
96-97	1,620
97-98	1,348
98-99	1,542
99-00	1,086
00-01	987
01-02	0
02-03*	0
03-04*	0
04-05*	0
05-06*	0
06-07*	0

*Projected

NOTES:

(1) The GAC Treatment Plant has a treatment capacity of 2,000 gpm.

(2) Wells No. 7 and No. 15 supply water for the GAC Treatment Plant. Proposed production rates (if the plant is used) are as follows:

Well No. 7	1,050 gpm
Well No. 15	850 gpm

(3) GAC Treatment Plant production was reduced beginning in water year 1996-97 to accept the required flows from the EPA Consent Decree Project.

TABLE 3.3
FIVE-YEAR PROJECTED USE OF VALLEY/ BOU TREATED GROUNDWATER

Water Year	Acre-Feet
93-94	803 (3) (5)
94-95	462 (5)
95-96	5,737 (5)
96-97	9,280
97-98	2,102
98-99	9,042
99-00	11,345
00-01	9,046
01-02	10,402
02-03*	9,500
03-04*	10,000
04-05*	10,000
05-06*	10,000
06-07*	10,000

*Projected

NOTES:

(1) Burbank includes BOU extractions in its pumping rights.
(2) Lockheed Martin has physical solution right of 25 AF/year.
(3) Lockheed Martin stopped its operation of the Aqua Detox Treatment System in June 1994. (BOU378 + AD450 - 25) = 803
(4) Re-injected water has been excluded from the above values.
(5) During the water years 1993-94, 1994-95 and 1995-96, Lockheed-Martin produced water for testing of the EPA Consent Decree Project. The Watermaster did not charge Burbank for these amounts included in Table 3.3. Beginning January of water year 1995-96, all extractions shown in Table 3.3 are treated for VOC removal and beneficially used by Burbank. GAC flushing and treatment bypass are accounted for separately and charged to a 'basin account'.

Water Year	AF	Water Year	AF	Water Year	AF
1993-94	378	1996-97	320	1999-2000	107
1994-95	462	1997-98	478	2000-2001	88
1995-96	34	1998-99	142	2001-2002	138

(6) The City of Burbank is currently using water from the BOU under an Operation Permit, issued in October 2000, from the California Department of Health Services.

TABLE 3.4
FIVE-YEAR PROJECTED USE OF RECLAIMED WATER

Water Year	Acre-Feet
92-93	2,629
93-94	3,706
94-95	2,480
95-96	1,880
96-97	3,120
97-98	1,744
98-99	1,210
99-00	2,979
00-01	2,732
01-02	2,087
02-03*	1,500
03-04*	2,700
04-05*	2,800
05-06*	4,000
06-07*	4,400

*Projected

NOTES:

1) The source of reclaimed water is the Burbank Water Reclamation Plant.
2) The Upper and Lower Landfill areas were provided reclaimed water service in water year 1994-95.
3) The DeBell Golf Course and Par-3 Course were provided reclaimed water service in water year 1995-96. McCambridge Park landscaping was added to the reclaimed water system in 1996-97.
4) The Burbank Nature Center was provided reclaimed water service in water year 1998-99.
5) The BWP Power Plant reduced its reclaimed water use beginning water year 1996-97 due to decreased local power generation. Beginning water year 2000-01, power production and reclaimed water use were increased again.
6) Beginning May 2002, the Power Plant began to use reclaimed water as its source for demineralized water production using the Puretec treatment system.

TABLE 4.1
FIVE-YEAR PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

Water Year	Acre- Feet
92-93	391
93-94	391
94-95	298
95-96	339
96-97	300
97-98	281
98-99	342
99-00	432
00-01	407
01-02	362
02-03*	300
03-04*	300
04-05*	300
05-06*	300
06-07*	300

*Projected

NOTES:

(1) Burbank includes extractions by Valhalla in its pumping rights.

(2) Valhalla has physical solution right of 300 AF/year.

TABLE 4.2
FIVE-YEAR PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET	
92-93	500	(1)
93-94	0	(2)
94-95	5,380	(3)
95-96	2,000	(3)
96-97	1,500	(3)
97-98	0	
98-99	2,000	(3)
99-00	0	(4)
00-01	0	
01-02	0	
02-03*	100	(5)
03-04*	1,200	
04-05*	2,400	
05-06*	3,850	
06-07*	5,050	

*Projected

NOTES:

1) MWD water taken at the Los Angeles Treatment Plant (LA-35). In-lieu credit to Burbank by the LADWP.
2) The Maclay pipeline was damaged in the 1994 Northridge earthquake. Deliveries to the Pacoima Spreading Grounds are precluded until repaired by the LADWP.
3) The City exercised its physical solution right in water years 1994-95, 1995-96, 1996-97, and 1998-99 for basin replenishment.
4) Starting 1999-2000, combination of physical solution purchases and MWD water delivered to Los Angeles.
5) Beginning in FY 2002-03, Burbank will begin to ramp into its long-term basin replenishment obligation.

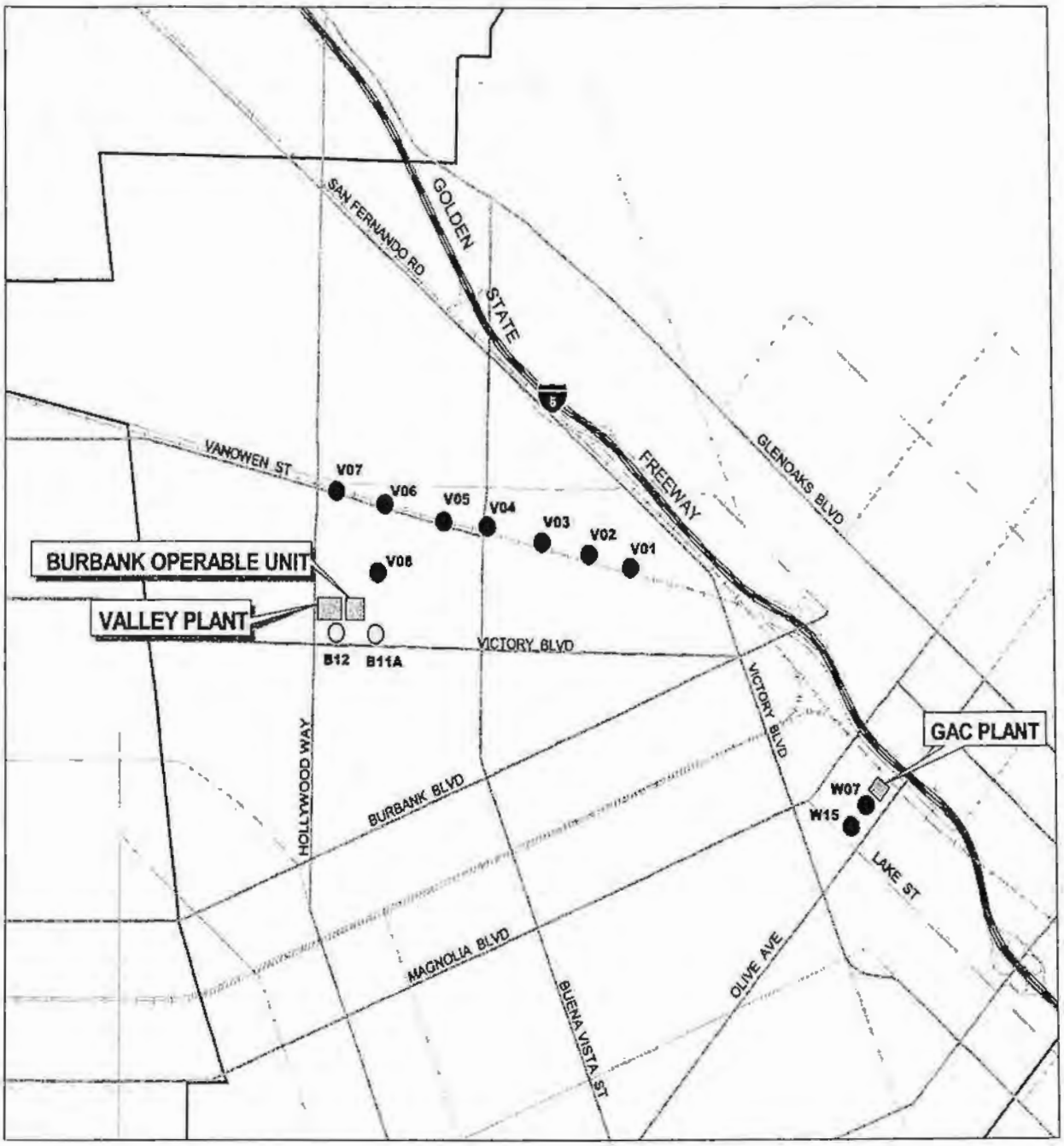


FIGURE 5.1
EPA PHASE II EXTRACTION WELLS

APPENDIX A

WATER QUALITY DATA

The 2002 Annual Water Quality Report is not yet available. Water Quality monitoring and testing of supply sources is not included with this report.

APPENDIX B

WATER TREATMENT FACILITIES

LAKE STREET GAC TREATMENT PLANT

320 North Lake Street
Burbank CA 91502

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/01 through 10/1/02):

None—plant remained out of service

WATER QUALITY:

Contaminant VOC'S: TCE, PCE, 1,2-DCE, 1,2-DCA

DISPOSITION:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT – BURBANK OPERABLE UNIT

2030 North Hollywood Way
Burbank CA 91505

OPERATOR:

City of Burbank
Burbank Water and Power, Water Division

Albert Lopez, Water Production/ Operations Superintendent

QUANTITY TREATED (10/1/01 through 10/1/02):

10,402 Acre-Feet for domestic use

WATER QUALITY:

Contaminants: VOCs, Nitrate, Chromium, 1,2,3-TCP

DISPOSITION:

(1) Test Water- Waste

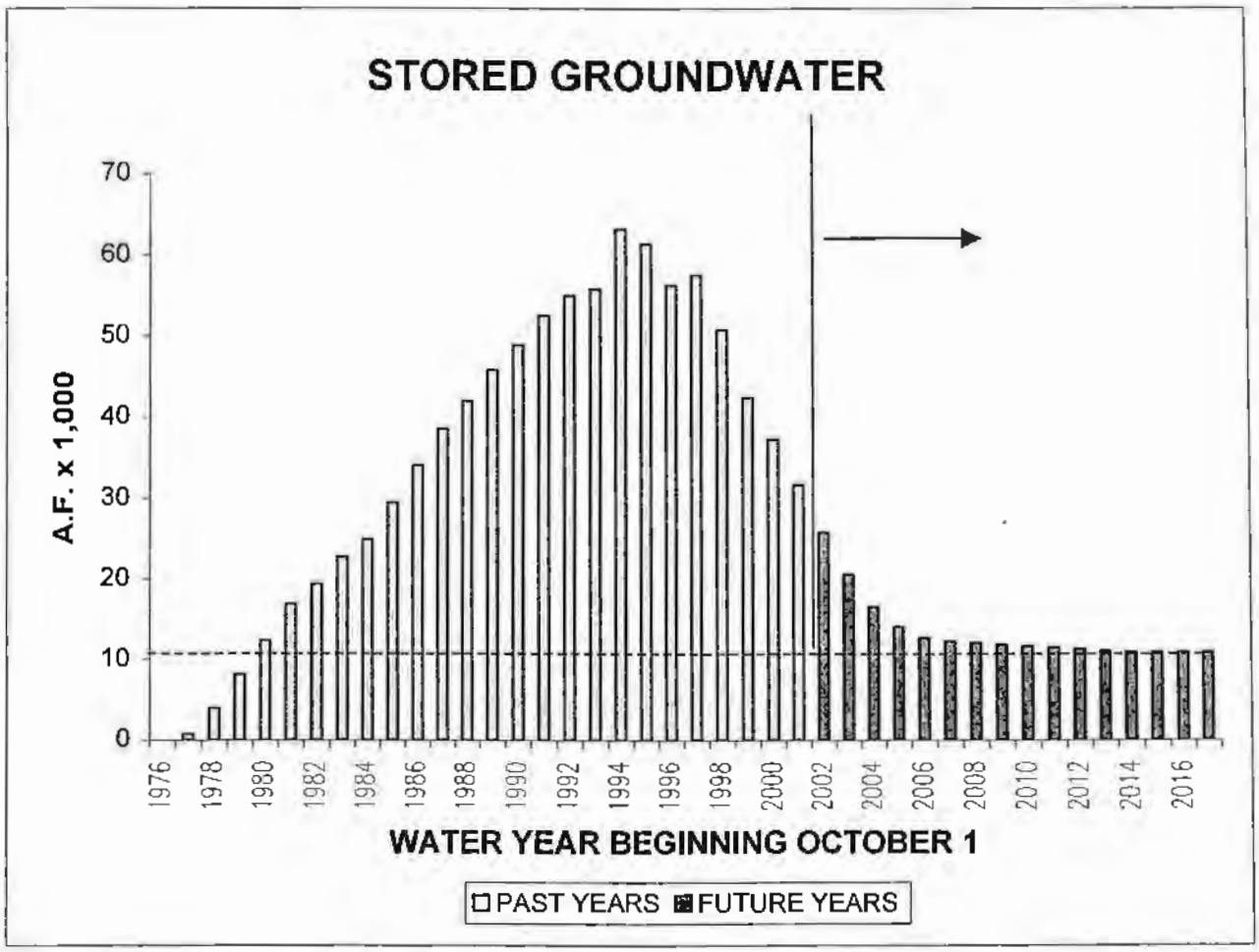
(2) Operation Water (backwash, etc.) - Waste

(3) Burbank Water System-
Potable water after blending

APPENDIX C

STORED GROUNDWATER

BURBANK WATER AND POWER
WATER DIVISION
FY 2003/04



NOTES:

- 10,000 AF RECOMMENDED AS BASIN BALANCE. THIS EQUATES TO ABOUT ONE YEAR OF DOMESTIC SYSTEM PRODUCTION IF REPLENISHMENT NOT AVAILABLE FROM MWD.
- DRAW DOWN STORED WATER BY PRODUCTION EXCEEDING THE RETURN FLOW CREDIT (~4,600 AF) PLUS SPREAD WATER OR PHYSICAL SOLUTION CREDITS.
- GROUNDWATER PRODUCTION EQUALS EPA (10,700 AF) AND VALHALLA (300 AF).
- RAMP UP SPREADING WATER PURCHASES BEGINNING WATER YEAR 2002-03 TO MAINTAIN BASIN BALANCE.

CITY OF BURBANK WATER AND POWER

WATER DIVISION

BURBANK'S STORED GROUNDWATER

70% EPA - With Ramp

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	PUMPED GROUNDWATER AF	STORED WATER CREDIT AF
1976-77	22,743	4,549			
1977-78	22,513	4,503		3,767	(1) 782
1978-79	24,234	4,847		1,358	(2) 3,947
1979-80	24,184	4,837		677	8,117
1980-81	25,202	5,040		595	12,359
1981-82	22,120	4,424		523	16,876
1982-83	22,118	4,424		2,002	19,298
1983-84	24,927	4,985		1,063	22,659
1984-85	23,641	4,728		2,863	24,781
1985-86	23,180	4,636		123	29,386
1986-87	23,649	4,730		0	34,022
1987-88	23,712	4,742		253	38,498
1988-89	23,863	4,773		1,213	42,027
1989-90	23,053	4,611	378	1,401	45,777
1990-91	20,270	4,054	504	2,032	48,860
1991-92	20,930	4,186	503	938	52,479
1992-93	21,839	4,368	500	(3) 2,184	54,981
1993-94	24,566	4,913	0	(3) 3,539	55,810
1994-95	22,541	4,508	5,380	2,888	63,215
1995-96	23,124	4,625	2,000	8,308	61,415
1996-97	24,888	4,977	1,500	11,243	56,297
1997-98	22,447	4,489	0	3,731	57,543
1998-99	22,671	4,534	2,000	13,262	50,770
1999-2000	26,312	5,262	0	12,862	42,442
2000-01	25,619	5,124	0	10,440	37,264
2001-02	24,937	4,987	0	10,764	31,624
2002-03	23,000	4,600	100	11,000	25,711
2003-04	23,000	4,600	1,200	11,000	20,511
2004-05	23,000	4,600	2,400	11,000	16,511
2005-06	23,000	4,600	3,850	11,000	13,961
2006-07	23,000	4,600	5,050	11,000	12,611
2007-08	23,000	4,600	6,000	11,000	12,211
2008-09	23,000	4,600	6,200	11,000	12,011
2009-10	23,000	4,600	6,200	11,000	11,811
2010-11	23,000	4,600	6,200	11,000	11,611
2011-12	23,000	4,600	6,200	11,000	11,411
2012-13	23,000	4,600	6,200	11,000	11,211
2013-14	23,000	4,600	6,200	11,000	11,011
2014-15	23,000	4,600	6,200	11,000	10,811
2015-16	23,000	4,600	6,400	11,000	10,811
2016-17	23,000	4,600	6,400	11,000	10,811
2017-18	23,000	4,600	6,400	11,000	10,811

NOTES:

(1) STORED WATER AS OF OCTOBER 1, 1978

(2) STORED WATER AS OF OCTOBER 1, 1979

(3) EXCLUDES 150 A.F. OF PUMPING FOR TESTING.

COLUMNS (1) THROUGH (5) - FROM ULARA WATERMASTER REPORTS - SFB EXTRACTION RIGHTS AND STORED WATER TABLES

COLUMN (2) = 20% OF COL. (1)

COLUMN (5) = COL.(2) PREV. YR. - COL.(4) CUR. YR. + COL.(5) PREV. YR. + COL.(3) CUR. YR.

COLUMN (5) = EXTRACTIONS OF NEXT YEAR

PUMPED GROUNDWATER INCLUDES CITY, VALHALLA, LOCKHEED, & DISNEY.

SHADED AREAS OF TABLE ARE PROJECTED VALUES .

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

2002-2007 Water Years

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

Prepared By

GLENDALE WATER & POWER

APRIL 2003

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INTRODUCTION

The City of Glendale has recently developed many facilities to reduce the City's dependence on imported water supplies from northern California and the Colorado River via the Metropolitan Water District (Metropolitan) by using more local resources. This trend in local water resource development is occurring throughout the southern California water community.

Fundamentally, it is imprudent for a city of 200,000 people to be almost totally dependent on water supplies originating hundreds of miles away that Glendale has little control over. This document discusses the City's program to develop more local water resources to reduce our dependency on imported water supplies and improve the overall reliability of our system, and the ability of the City to meet projected water demands associated with new developments. These local water facilities have been completed over the past ten years at a cost about $50 million. Of this amount, the City has spent $25 million with another $25 million by the industry group responsible for contaminating Glendale's San Fernando Basin water supplies.

This report discusses historic water supplies available to Glendale, future water demands in Glendale, and new sources of local water available to meet demands and reduce dependency on imported water. This information is needed by a wide group of individuals and organizations including Glendale's City Manager and Council Members, regulatory agencies, others interested in Glendale's water resource future and, more recently, to demonstrate adequate water supplies for the future development in the City.

EXISTING WATER SOURCES AND SUPPLIES

The City has four sources of water available to meet its long-term water demands. Each of these sources and available supplies are described below, as well as the quantity of water available. The location of these sources is shown in Figure 1. Over the past 40 years, there has been a significant change in the mix of supplies available to meet water demands in the City, and this is expected to continue into the future. These supplies and changes are discussed below.

SAN FERNANDO BASIN

Water Rights and Supplies - The City's right to San Fernando Basin groundwater supplies is defined in "The City of Los Angeles vs. The City of San Fernando, et. al. (1979) (Judgement). This decision culminated decades of water rights litigation over water supplies in the San Fernando Basin. The location of the San Fernando Basin is shown in Figure 2. The California Supreme Court found that under "Pueblo" Water Rights, Los Angeles owns all San Fernando surface and groundwater supplies, and that the cities of Burbank and Glendale are entitled to only an annual Return Flow credit. Additionally, Glendale has a secondary right to produce additional water subject to a payment obligation to the City of Los Angeles generally equivalent to the cost of Metropolitan supplies. The right to produce water in excess of the annual Return Flow credit is a significant factor in relation to the recently completed Glendale Water Treatment Plant located on Flower Street. The various categories of San Fernando Basin water supplies are:

Return Flow Credit Water Right - Glendale is entitled to a groundwater return flow credit of 20 percent of all delivered water in the San Fernando Basin and its tributary hill and mountain area. The 20 percent return flow credit is based on the assumption that 20 percent of the water used is percolated into the groundwater, and the City has the right to pump this water and deliver it to its customers. This credit is about 5,500 acre-feet per year (AFY). Essentially, this is the City's primary water right in the San Fernando Basin. For planning purposes this should be viewed as an assured source of water, as groundwater treatment facilities have been constructed to remove certain chemical constituents so the water is usable.

Accumulated Groundwater Rights - Because Glendale has not been able to fully utilize its right to the groundwater supply and Return Flow Credit Water Right Project since 1979 due to contamination, the annual unused return flow credit has accumulated to about 72,000 AF of pumping rights. This provides the City with great flexibility to pump more water from the basin than its annual Return Flow Credit.

Physical Solution Water Right - Glendale has limited water rights to extract additional groundwater. Payment for the use of this water is generally charged at a rate similar to Metropolitan's water costs.

Pumping for Groundwater Cleanup - Section 2.5 of the Upper Los Angeles River Area's Policies and Procedures, dated July, 1993, provides for the unlimited extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right will be a significant factor with the recently completed EPA treatment facility. This facility is expected to deliver about 7,200 AFY to the City.

Carry-Over Extractions - In addition to current extractions of return flow water and stored water (discussed later), Glendale may, in any one year, extract from the San Fernando Basin an amount not to exceed ten percent (10%) of its last annual credit for import return water, subject to an obligation to replace such over-extraction by reduced extraction during the next water year. This provides an important year-to-year flexibility in meeting water demands.

Water Quality - San Fernando Basin production was limited and eventually eliminated between 1980 and 2000 because of the volatile organic compounds in the groundwater. The entire San Fernando Valley is part of a U. S. Environmental Protection Agency (EPA) SUPERFUND clean-up program and many water treatment plants have been constructed, over the past ten years, to treat the groundwater. Recently, EPA has focused on the construction of clean-up facilities in Glendale. The Glendale Water Treatment Plant and eight extraction wells have been constructed to pump, treat and deliver the water to the City via the Grandview Pumping Station.

The cleanup facilities consist of seven shallow extraction wells and one deep well, a 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the Glendale Water Treatment Plant to remove the "volatile organic compounds" (VOC), a conveyance system to bring water from the treatment plant to Glendale potable distribution system, a facility to blend the treated groundwater with water from the Metropolitan Water District, and a disinfection facility. A general layout of these facilities is shown on Figure 4.

The major agreements between Glendale, Glendale Respondents Group (GRG), and the EPA have been signed. The GRG retained CDM Consulting Engineers Inc. to design and construct the required facilities. Construction has been completed and the

State-DOHS issued a permit to operate the facilities in July 2000. The City started receiving small quantities of water from this facility on July 23, 2001. The delivery of the water to the City was initially limited because of the City's reservations to take water of higher chromium 6 levels than in the current water supply even though it meets water quality standards. In January 2002, the Council authorized the City to take delivery of water of the full flow from the treatment facility. This source will provide about 7,200 AFY to the City and will meet about 22 percent of projected near-term water demands. There is additional groundwater production of 400 AFY by Forest Lawn Memorial Park for irrigation purposes, and 25 AFY for use of the cooling towers at the Glendale Power Plant for a total of 7,625 AFY.

Summary - The water rights in the judgement described above gives the City the right to extract from a practical point of view, subject to certain conditions and payment in some cases, any quantity of water anticipated to be needed from this source for the City's future water resource program. The only practical limitation is the cost of producing and treating this water compared to the cost of purchasing Metropolitan Water District (MWD) water supplies. For the next ten years, the industry group responsible for the contamination pays essentially all operation and maintenance costs. From a planning perspective, the City has a reliable and firm supply in the amount of 7,200 AFY from the Glendale Water Treatment Plant, 400 AFY produced by Forest Lawn Memorial Park used for irrigation purposes, and 25 AFY for use of the cooling towers at the Glendale Power Plant for a San Fernando Valley supply total of 7,625 AFY. This represents about 20 percent of the year 2025 water demands as shown in Table 6.

VERDUGO BASIN

Water Rights and Supplies – The San Fernando Judgement described above also gave Glendale the right to extract 3,856 AFY from the Verdugo Basin, which is shown on Figure 2. Glendale has a long history of pumping water from this basin and it was the primary source of water going back to the formation of the City in the early 1900s. The production of water is highly variable based significantly on rainfall conditions. Recently, the City operated three extraction wells to increase its use of this resource. In the early 1990's, Glendale constructed the Verdugo Park Water Treatment Plant (VPWTP) to treat extracted groundwater from two new shallow wells and the underground water infiltration pick-up system in the Verdugo Basin constructed a century ago. This water is delivered to the water system. This same judgement gave the Crescenta Valley Water District water rights and is the only other entity allowed to extract water from the Verdugo Basin.

The City's use of these water sources has been limited because of lower groundwater levels and extraction capacity. The VPWTP has a capacity of 1,150 gpm to treat water from the two low capacity wells (referred to as Verdugo Wells A and B) and from the water supplies in the old Verdugo Pickup horizontal infiltration system. Experience indicates that flows closer to 550 gpm can be expected from these sources on a firm basis. The three existing Glorietta wells and the VPWTP alone will not utilize the City's entire water rights to the basin supplies. Additional extraction capacity in the Verdugo Basin needs to be developed to utilize the City's full rights. The existing wells and VPWTP will produce, on a reliable basis, about 2,300 AFY with the remaining 1,500 AF coming from other basin sources not currently identified and not included in planning studies. It is anticipated that the City will be looking at other sources of supply in the Verdugo Basin.

Water Quality – Historically, the only water quantity parameter of concern in the Verdugo Basin is the high nitrates from past septic tanks in the La Crescenta area. Now that the areas are sewered, the nitrate levels are expected to decrease in the future. Even so, the groundwater is blended with large quantities of MWD supplies so that nitrate levels do not impact the usability of the groundwater supplies.

Summary – If the City were able to fully utilize its rights to these supplies, about ten percent of demands could be met from this supply. Realistically, based on historical pumping records, only 2,300 AFY will be available from this source on a reliable basis, and will provide 6 percent of the City's water needs. The location of the VPWTP and wells are shown on Figure 3.

METROPOLITAN WATER DISTRICT

Metropolitan provides supplemental water from Northern California via the State Water Project and the Colorado River via the Colorado River Aqueduct to the coastal area of Southern California. The location of these aqueducts is shown on Figure 5. Within its service area, it has 26 member agencies that provide water to 16 million people. Glendale is one of the member agencies. All member agencies use and develop as much of their local water supplies as possible, and purchase Metropolitan supplies to meet the remainder of their demands. This plan is used because local water supplies are generally cheaper. Glendale's need for Metropolitan water is highly variable and will be discussed below.

As a member agency of the Metropolitan, Glendale has the right to purchase any amount of water, without limitation, but subject to supply availability and cost factors. The Metropolitan delivers water to Glendale through three service connections. The service connection number and capacity are summarized in Table 1. The capacity of the MWD connection is more than adequate to meet future water demands. Now that the City is using more local water and less Metropolitan Water supplies, there is even greater excess capacity in these connections. Glendale recently signed a ten-year purchase agreement with Metropolitan for water supplies designed to meet Glendale's long-term need for MWD water supplies. The agreement also contains a renewal provision to assure the long-term availability of Metropolitan water supplies.

Metropolitan has many water supply initiatives to meet the increasing water needs of its member agencies as outlined in a brief report called "An Update – Certainty of Southern California's Water Supply". This report was prepared to identify Metropolitan's plans to meet the water needs of its member agencies. Metropolitan is also updating its Integrated Resources Plan that will more specifically identify water supplies to meet water demands through 2025 for its member agencies.

The Colorado River has been a major source of MWD water supplies for decades. As a whole, California has been using more than its apportionment of Colorado River water and because of the failure to complete an agreement with the Imperial Irrigation District, the Secretary of Interior reduced California's water supplies to its legal apportionment with most of this reduction from Metropolitan supplies. Even so, Metropolitan is confident that it can continue to meet the supplemental water demands to its Southern California member agencies as evidence by its many water supply initiatives.

Metropolitan has many initiatives to assure adequate water supplies to the region. A good explanation of these sources was presented in a statement made by MWD's Chief Executive Officer to the State legislature on January 21, 2003. The combination of the many documents and the fact that Glendale will use even less Metropolitan supplies in the future gives us great assurance of adequate water supplies from Metropolitan long into the future.

TABLE 1
METROPOLITAN CONNECTIONS AND CAPACITY

Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	12

Recycled Water

Since the late 1970's, the City of Glendale has been delivering recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP). This is a 20 million gallon-per-day (MGD) facility that is owned by the Cities of Los Angeles and Glendale. Each City is entitled to one-half of the treated flows from the plant for recycled water deliveries. Effluent not used in the recycled water systems for Los Angeles and Glendale is discharged to the Los Angeles River and eventually reaches the ocean.

The City of Glendale has many recycled water projects designed to serve different parts of the City. Each is reviewed below.

Power Plant Project - Recycled water deliveries were first made to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation along the 134 Freeway near the 5 Freeway in the late 1970's. A pipeline was constructed from the LAGWRP to the Glendale Power Plant.

Forest Lawn Project – This project, completed in 1992, was a joint project with the City of Los Angeles. This facility, a 30-inch diameter pipeline project, was constructed to deliver recycled water for irrigation to Forest Lawn Memorial Park in south Glendale. Later, the City began deliveries to an irrigated street median on Brand Boulevard from Colorado Boulevard and Los Feliz Boulevard.

Los Angeles proposes to extend the system from its south Glendale terminus into Elysian Park and into the downtown Los Angeles area.

Expansion Project - In the late 1980's, planning was initiated on expanding the recycled water system to other areas in the City, and construction initiated in the early 1990's for the $16 million project. The system was composed of three phases in different part of the City to complete the backbone of the distribution system. The significance of this program was the regional involvement of the City of Pasadena in the project. Each segment is discussed below:

The Verdugo – Scholl Project was designed to deliver recycled water to the Oakmont Country Club for irrigation with another section in Glenoaks Canyon to deliver recycled water to the Scholl Canyon Golf Course for irrigation, and to the Scholl Canyon Landfill for dust control and irrigation. Another major user of this water is Caltrans for irrigation along the 134 and 2 Freeways. Additional users include schools, parks, and roadway media strips.

The portion of the project up to Scholl Canyon was a joint effort with the City of Pasadena. Pasadena provided funds for Glendale to increase the size of the facilities so deliveries could be made to Pasadena from the Scholl Canyon area. Pasadena continues to review the possibility to extend the system.

The Brand Park Project consists of a pumping plant, storage tanks, and pipeline from the Glendale Power Plant to a tank above Brand Park. This section delivers recycled water for irrigation to Brand Park, Grandview Cemetery and along the street medians on Glenoaks Boulevard.

Delivery System - The recycled water delivery system is now comprised of 20 miles of mains, 5 storage tanks, pumping plants and 42 customers currently using about 1,700 AFY. The specific features of this recycled water program are shown in more detail on Figure . The users from the various recycled water projects are shown on Figure 6 and schematic diagram of the recycled water system is shown on Figure 7. This will give the reader a general idea of the scope of the expansion program. Recycled water use

has increased from 551 AF in 1991-92 to 1,500 AF in 2001-2002. The expected deliveries from the various projects are shown on Table 2. The objective is to increase the use of recycled water to meet 10 percent of demands. This will require a significant increase in users and expansion of the system. The recycled water user sites are shown in detail on Figure 8.

TABLE 2

RECYCLED WATER USE (AFY)

PROJECTS	2000	2005	2010	2020
Brand Park	111	170	170	170
Forest Lawn Pipeline	242	350	350	350
Power Plant Pipeline	472	450	450	450
Verdugo-Scholl Pipeline	839	1,020	1,040	1,080
Other Potential Projects	0	0	0	0
TOTAL	**1,664**	**1,990**	**2,010**	**2,050**

High-Rise Office Building - The City requires dual plumbing system in new high-rise office buildings so when recycled water becomes available, recycled water can be used for sanitary flushing purposes in the buildings without retrofitting. Developers of new buildings have accepted this requirement and it is routine to require this installation. A listing of office building dual plumbed is provided on Table 3.

TABLE 3

Office Buildings Dual Plumbed to Use Recycled Water for Sanitary Programs

Location	Stories
655 N Central Avenue	24
400 N Brand Boulevard	15
450 N Brand Boulevard	15
Glendale Community College Classroom and Library	4
Glendale Police Building	4

Summary of Supplies

The current use of local resources available to the City is substantially less than its water-rights primarily because of water quality problems. A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 4.

TABLE 4

LOCAL WATER USE (AFY)

Potential Source	Right	Current Use	Future Use
San Fernando Basin[1]	About 5,400	7,600 AFY	7,625
Verdugo Basin	3,856	2,100 AFY	2,300
Recycled Water	10,000	1,600 AFY	2,050

(1) Return flow credit only.

PAST WATER USE, CURRENT AND TRENDS

The water quality problems in the San Fernando and Verdugo Basins and reduced ground water levels in the Verdugo Basin have severely impacted the ability of the City to produce water from the Basins. Glendale has not been able to fully utilize its rights to these water supplies for many years. The U. S. Environmental Protection Agency (EPA) has designated several locations in the San Fernando Basin as Superfund sites and required construction of clean-up treatment facilities. The Glendale clean-up project consist of the Glendale Water Treatment Plant and 8 wells is the last in a series of EPA required clean-up facilities in the San Fernando Basin was complete in the late 2000. Because of the chromium issues in the treated water supplies, the City deferred taking this water until January 2002.

The City currently has five active production wells and a pick-up system (infiltration galleries) in the Verdugo Basin. The old Grandview Wells in the San Fernando Basin have been abandoned because some wells are 80 years old, need replacement, and its groundwater contains water quality issues.

Historically, the City used ground water to meet a varying portion of its water demand. In the 1940's and 1950's essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from Metropolitan. In the 1960's, production from the San Fernando Basin reached a peak of about 18,000 acre-feet per year (AFY). The Grandview well water collection system in the San Fernando Basin and the Grandview Pumping Plant originally pumped a peak capacity of about 24,000 gpm (34.6 million gallons per day-MGD) from San Fernando Basin directly into the City's potable water system.

In the mid-1970's, the City limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a lawsuit by the City of Los Angeles. In 1975, the California Supreme Court judgement in the City of Los Angeles vs. the City of San Fernando further limited the City's production right. The current right is about 5,000 to 5,500 AFY based on a Return Flow credit right from water use in the City.

Other limitations to ground water use occurred in the late 1970's, when production from the Verdugo Pick-up System in the Verdugo Basin was discontinued because of possible water quality problems.

In late 1979, Assembly Bill 1803 required that all water agencies using ground water must conduct tests for the presence of certain industrial solvents. The tests indicated that "volatile organic compounds" (VOC's) such as trichlorethylene (TCE) and perchloroethylene (PCE) were present in the San Fernando Basin groundwater supplies in concentrations exceeding State Department of Health Service maximum contaminant levels (MCL). Both chemicals were used extensively in the past as degreasers in manufacturing. At that time, the hazards to the water supplies were not known. As a result, Glendale with other communities in the San Fernando Valley, had to further limit its use of San Fernando Basin supplies. The City almost totally suspended production from the basin because of the difficulty of producing supplies meeting the MCL's for the VOC's. Except for a small quantity (about 400 ac-ft per year) used at the Glendale Power Plant for cooling tower make-up water and irrigation at Forest Lawn Memorial Park, no San Fernando Valley water was used in Glendale till the middle of 2001.

The water quality and water rights problems in the San Fernando area severely impacted the ability of the City to produce water from the Basin and made the City even more dependent of MWD water supplies. In the 1980's, the U. S. Environmental Protection Agency designated the San Fernando Basin as a Superfund site. After a decade of studies, and facility design and construction, a water treatment plant, eight extraction wells, piping to convey the untreated water from the wells to the treatment plant, a conveyance system to bring water from the treatment plant to Glendale potable distribution system, a facility to blend the treated groundwater with water from the Metropolitan Water District to reduce nitrate levels, and a disinfection facility, were completed in the summer of 2000 to begin the use of San Fernando Basin water supplies. This plant is called the Glendale Water Treatment Plant (GWTP). A general layout of the plant facilities is shown on Figure 4.

Other limitations to ground water use occurred in the late 1970's, when production from the Verdugo Pick-up System in the Verdugo Basin was discontinued because of possible water quality problems.

Due to the increase in population, economic growth, decrease in availability of local water supply, water quality problems and diminished of water rights, Glendale's dependency on imported water from MWD increased to more than 90 percent of the total potable water need. This has been reduced to less than 70% with the operation of the GWTP.

The City has been about 95% of the designed capacity of the treatment facility since January 2002. The supplies from one of the wells because of its high chromium 6 levels will be delivered into the City's recycled water supply system. The construction of the Goodwin Treatment facility was completed on December 2002 to remove the VOC's from the said well before delivering to RW system.

The City's expected annual delivery of the treated water is about 7,200 AFY and will meet about 20 percent of projected near-term water demands. This will be available in all types of years because of the large supply of water in the San Fernando Groundwater Basin.

The historic and projected water use from the various sources is plotted on Figure 9 and shows the significant reduction in production from the San Fernando Basin and corresponding increase in imported water supplies from Metropolitan. The annual water use in Glendale `for fiscal year 2000-01 was 33,475 AFY. In 1991-92, the use was about 25,782 AFY because of mandatory conservation. Water use in FY 1997-98 was below normal because of the very heavy rain (El Nino) during the first half of 1998. However, with the below normal rainfall in FY 1998-99, water use was up significantly as shown on Table 5. In the fiscal year 2001-02, the use was 33,897 AFY and is equivalent to an average daily use of 30 million gallons per day (MGD).

TABLE 5

TOTAL ANNUAL WATER DEMAND

Fiscal Year	Demand	Comments
1991-92	25,780 AF	
1997-98	29,680 AF	Heavy Rainfall (El Nino)
1998-99	31,230 AF	Below Normal Rainfall
1999-00	33,435 AF	
2000-01	33,475 AF	
2001-02	33,897 AF	
2005	32,554 AF	Projected
2010	33,824 AF	
2020	36,821 AF	
2025	38,295 AF	

PROJECTED WATER DEMANDS AND SOURCES

Projection Methodology - Metropolitan uses the U.S. Army Corps of Engineers IWR-MAIN (Municipal and Industrial Needs) water demand forecasting system modified for 51 of the larger cities in Metropolitan's service area including Glendale. The model (MWD-MAIN) is used to project water demands incorporating a wide range of economic, demographic, and climatic factors. The specific date includes projected population, housing mix, household occupancy, housing values, weather conditions, and conservation measures. The forecasts generate expected demands during a year of normal weather conditions. This modeling is considered the state-of-the-art approach in projecting demands and is being used by an increasing number of major cities in the country for water demand forecasting.

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows the overall water demand for year 2005 of 32,554 AFY, for year 2020 a demand of 36,800 AFY and 38,300 for the year 2025. These figures were based on incorporating projected population, housing, and employment data into the MWD-MAIN water demand forecasting model for Glendale along with a weather variable. The year 2020 demand reflects a modest increase over current use even though Glendale is essentially "built-out". These projections incorporate the 1981 and 1992 California plumbing codes changes requiring ultra-low flush toilets beginning in 1992, along with a continuation of current drought oriented public education and information programs. As additional conservation measures are carried out, there could be still more reductions in projected use.

Future Water Sources - The basic objective of the City's Water Resource Plan has been to develop more local supplies. Currently, about 77 % of the potable water used in the City comes from Metropolitan. This compares to 90% just a few years ago by building new facilities and the use of the San Fernando Basin water supplies. The change in source of water to be used in the City between now and year 2025 is presented on Figure 10, with one "pie-chart" showing the current sources and the year 2025 mix. As one can see, the City has become less dependent on MWD over time. This will contribute to increased reliability in meeting future water demands in the City.

RELATED INFORMATION ON WATER USE

Detailed information on historic and projected water use in Glendale is shown on Figure 9. From a practical sense, water use in the water year is equivalent to water use in a fiscal year. Table 6 is a tabular version of Figure 9.

TABLE 6
HISTORIC AND PROJECTED WATER USE IN GLENDALE (AF)

Fiscal Year	San Fernando Basin	Verdugo Basin	Recycled Water	MWD Water	Total
1980-81	761	3,488	300	22,647	27,196
1985-86	6,089	2,733	300	22,080	31,202
1990-91	2,932	1,132	432	25,354	29,850
1991-92	1,577	732	551	23,316	25,176
1992-93	447	904	770	25,935	28,056
1993-94	554	1,226	625	26,977	29,382
1994-95	441	1,667	574	26,199	28,881
1995-96	496	2,059	886	27,905	31,346
1996-97	467	2,569	1,112	28,122	32,270
1997-98	267	2,696	1,087	25,626	29,678
1998-99	409	2,720	1,458	26,642	31,229
1999-00	515	2,451	1,738	28,731	33,435
2000-01	673	2,105	1,664	29,033	33,475
2001-02	4,013	2,120	1,500	26,264	33,897
2005	7,625	2,300	1,990	20,639	32,554
2010	7,625	2,300	2,010	21,889	33,824
2015	7,625	2,300	2,030	23,136	35,091
2020	7,625	2,300	2,050	24,846	36,821
2025	7,625	2,300	2,050	26,320	38,295

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APRIL 28, 2003

FIGURES

FIGURE 1

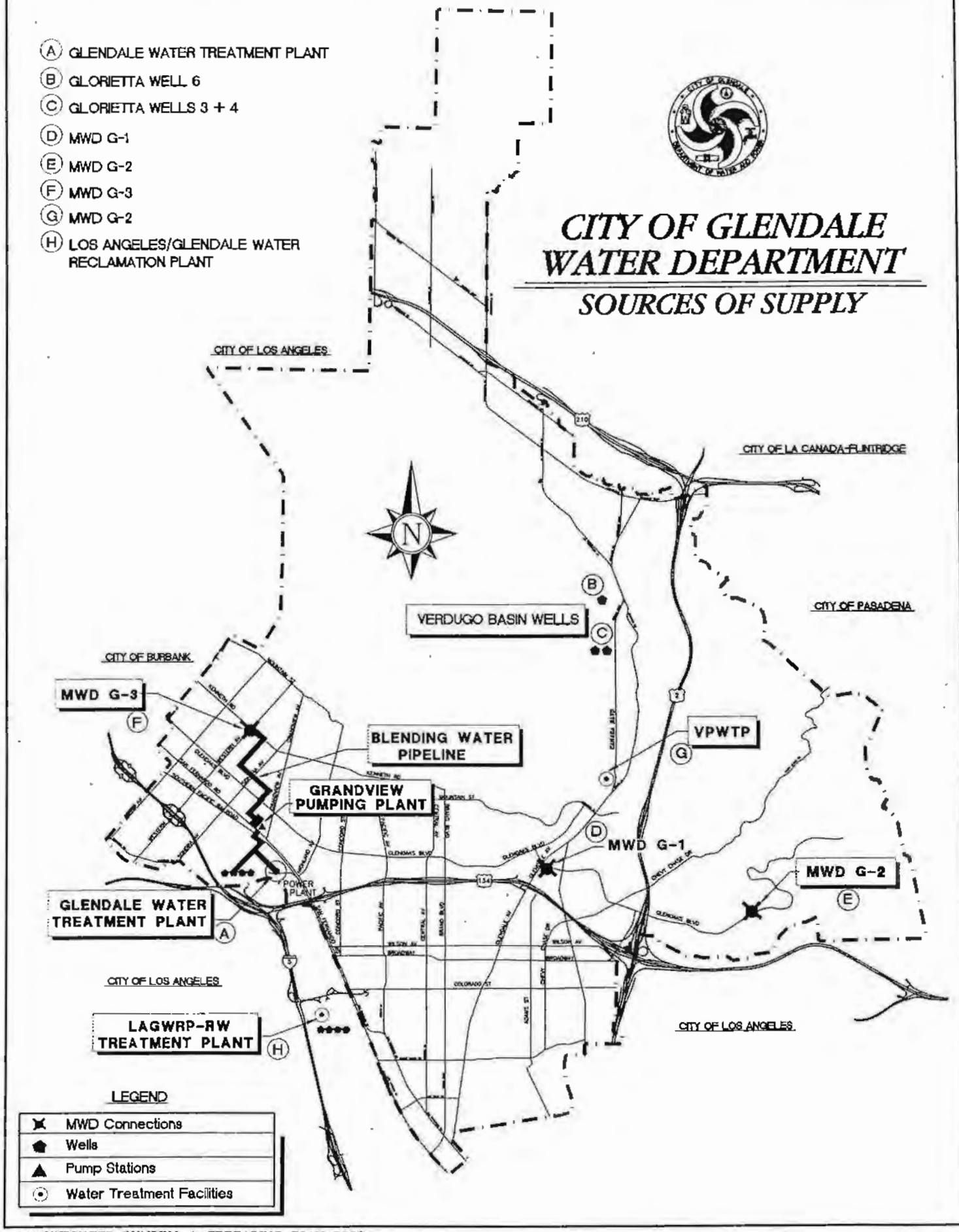

(A) GLENDALE WATER TREATMENT PLANT
(B) GLORIETTA WELL 6
(C) GLORIETTA WELLS 3 + 4
(D) MWD G-1
(E) MWD G-2
(F) MWD G-3
(G) MWD G-2
(H) LOS ANGELES/GLENDALE WATER RECLAMATION PLANT
CITY OF GLENDALE WATER DEPARTMENT
SOURCES OF SUPPLY
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
CITY OF LOS ANGELES
CITY OF LOS ANGELES
VERDUGO BASIN WELLS
MWD G-3
BLENDING WATER PIPELINE
VPWTP
GRANDVIEW PUMPING PLANT
MWD G-1
MWD G-2
POWER PLANT
GLENDALE WATER TREATMENT PLANT
LAGWRP-RW TREATMENT PLANT
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities

FIGURE 2

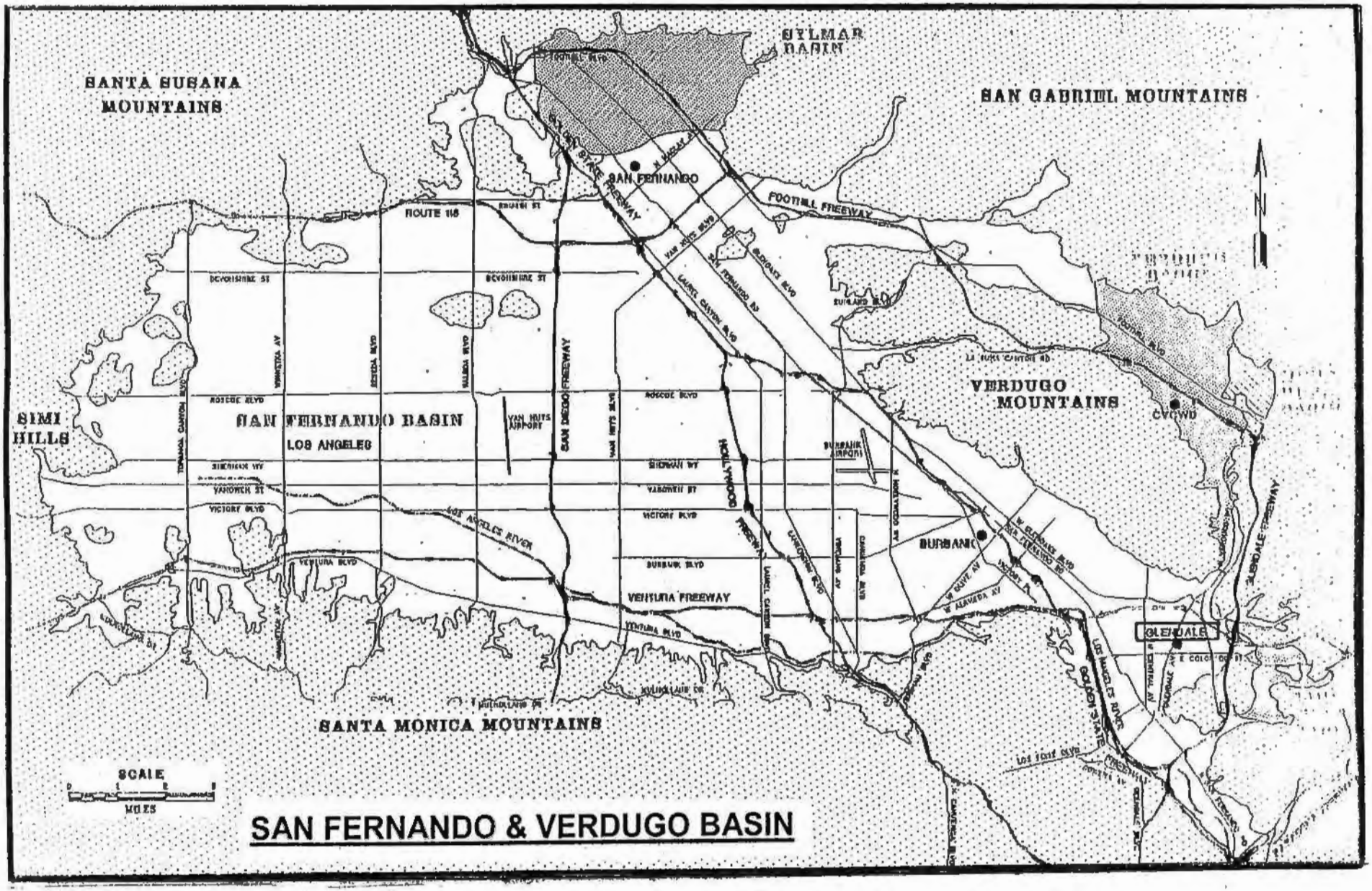
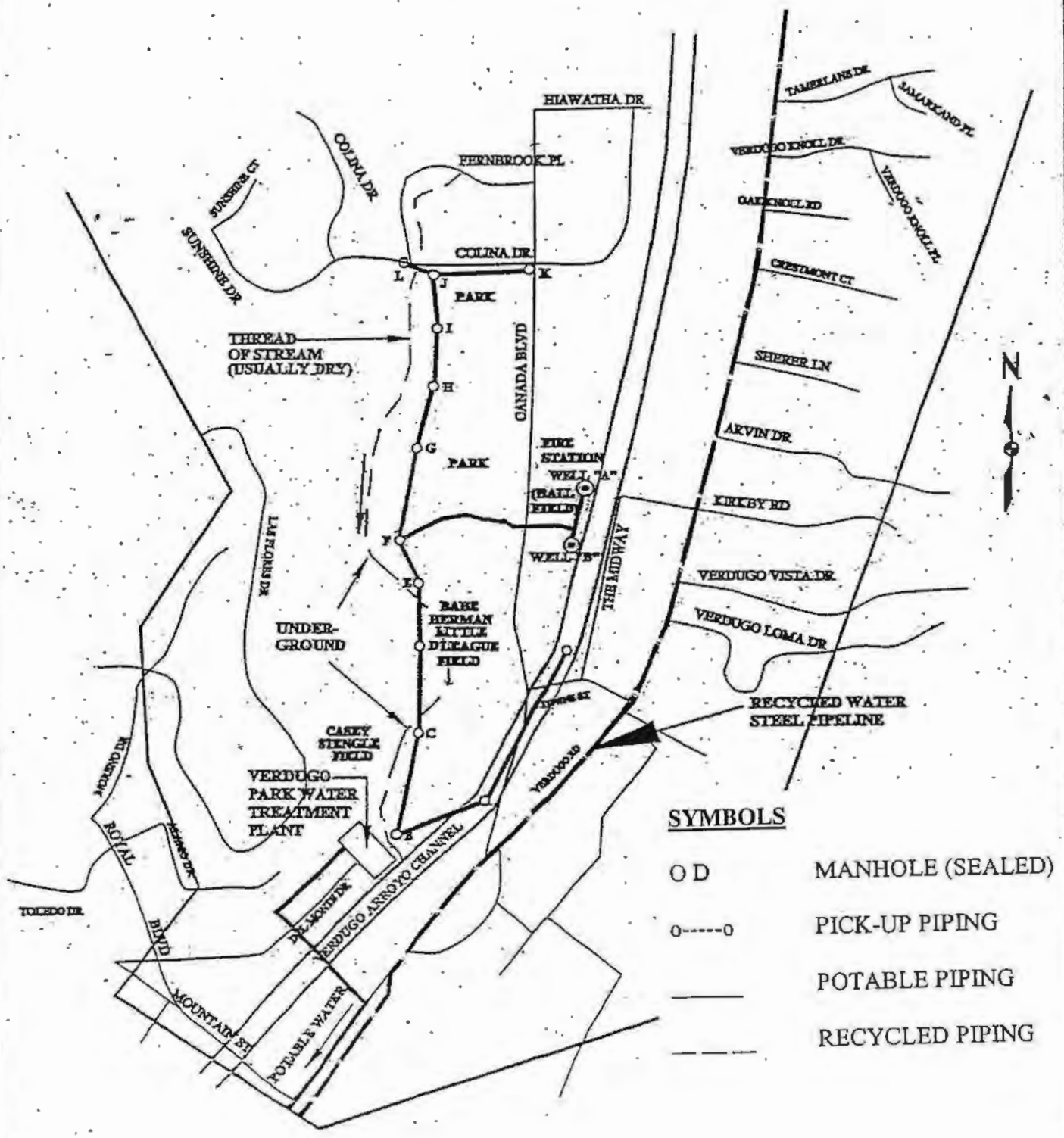

SYLMAR BASIN
SANTA SUSANA MOUNTAINS
SAN GABRIEL MOUNTAINS
SAN FERNANDO
FOOTHILL FREEWAY
ROUTE 118
SAN DIEGO FREEWAY
VERDUGO MOUNTAINS
SIMI HILLS
SAN FERNANDO BASIN
LOS ANGELES
VAN NUYS AIRPORT
BURBANK AIRPORT
HOLLYWOOD FREEWAY
BURBANK
VENTURA FREEWAY
GLENDALE
GLENDALE FREEWAY
SANTA MONICA MOUNTAINS
SCALE
MILES
SAN FERNANDO & VERDUGO BASIN

FIGURE 3

VERDUGO PARK WATER TREATMENT PLANT
PICK-UP AND WELL SYSTEM



GLENDALE WATER TREATMENT PLANT AND WELL LOCATIONS

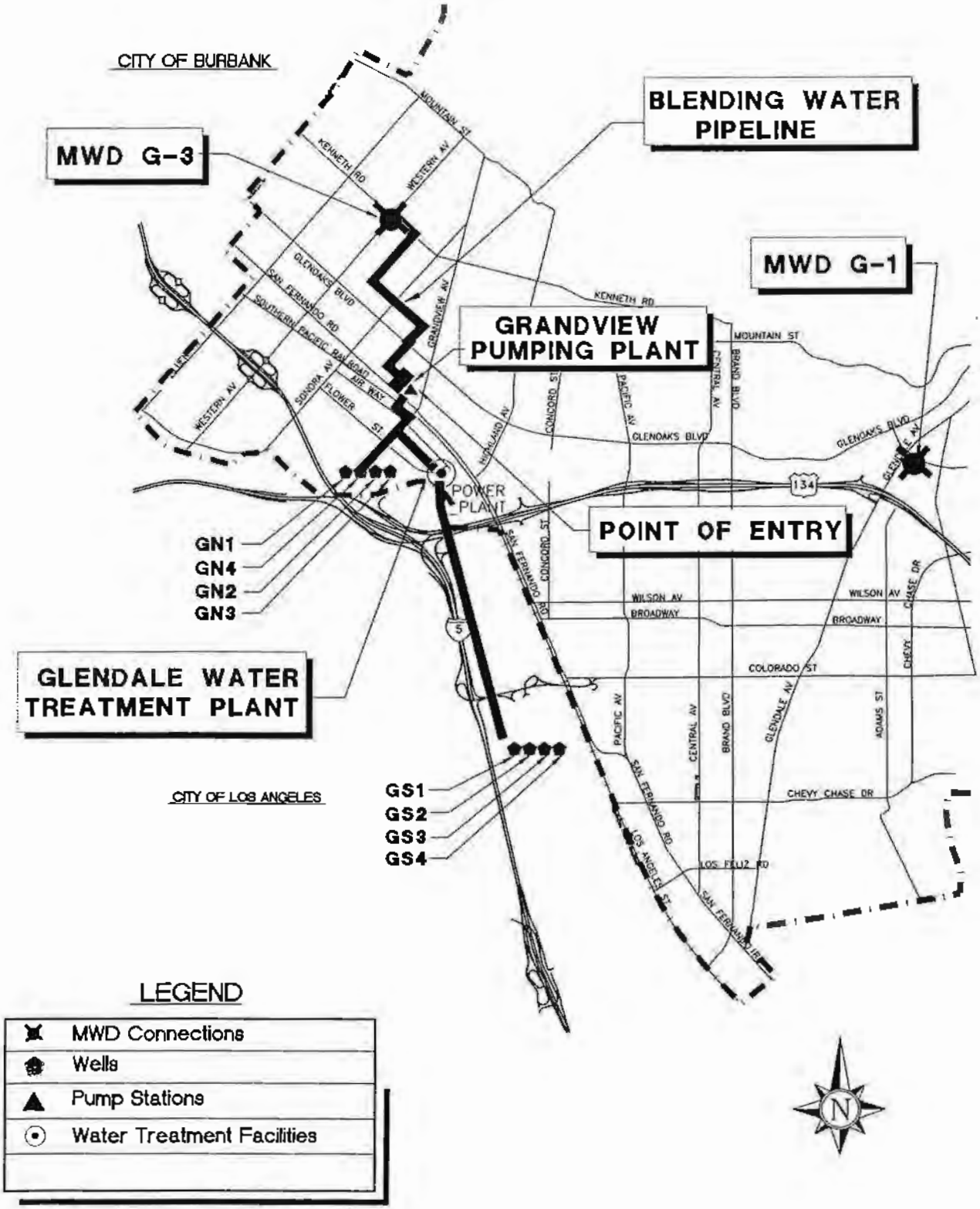
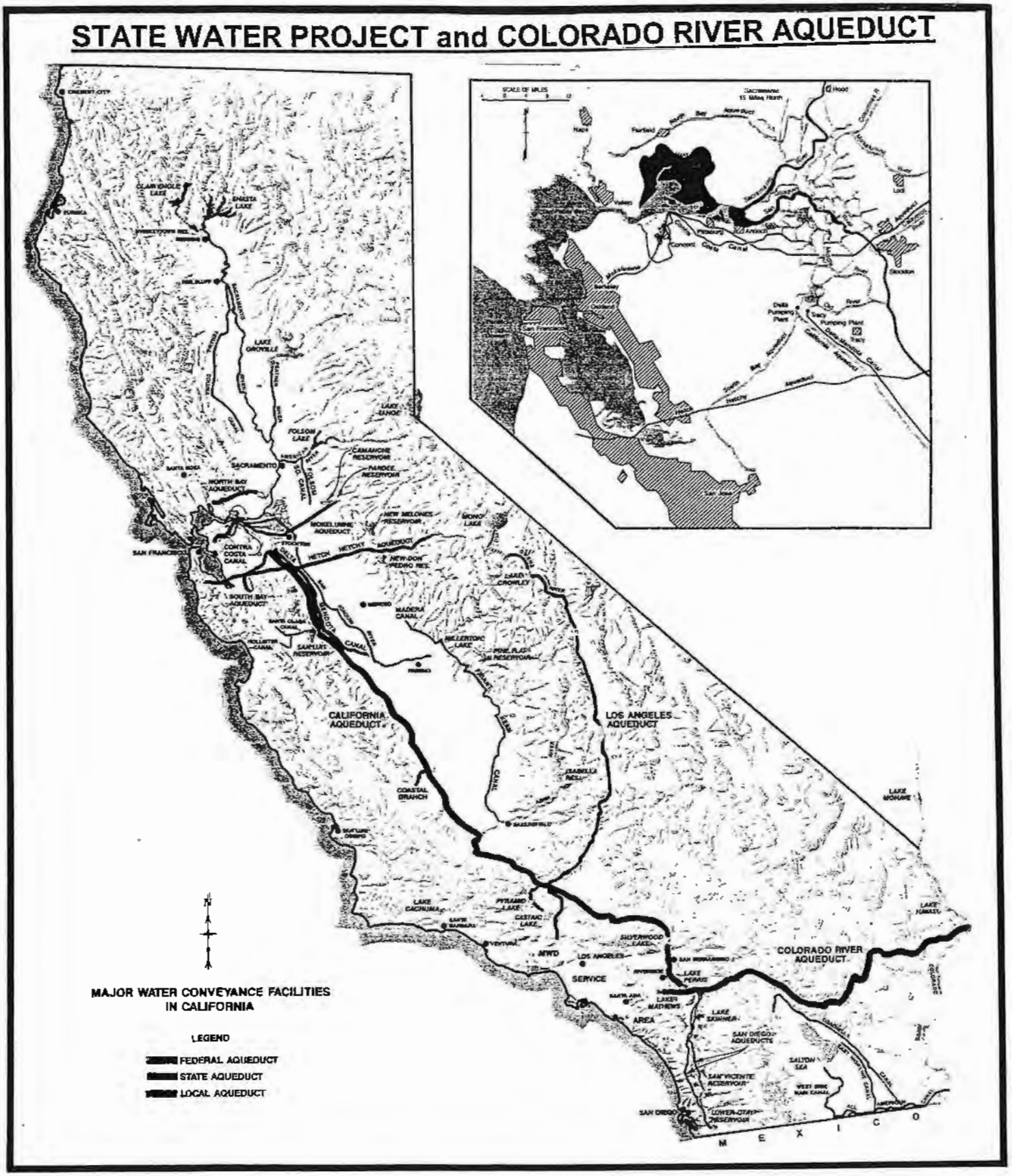
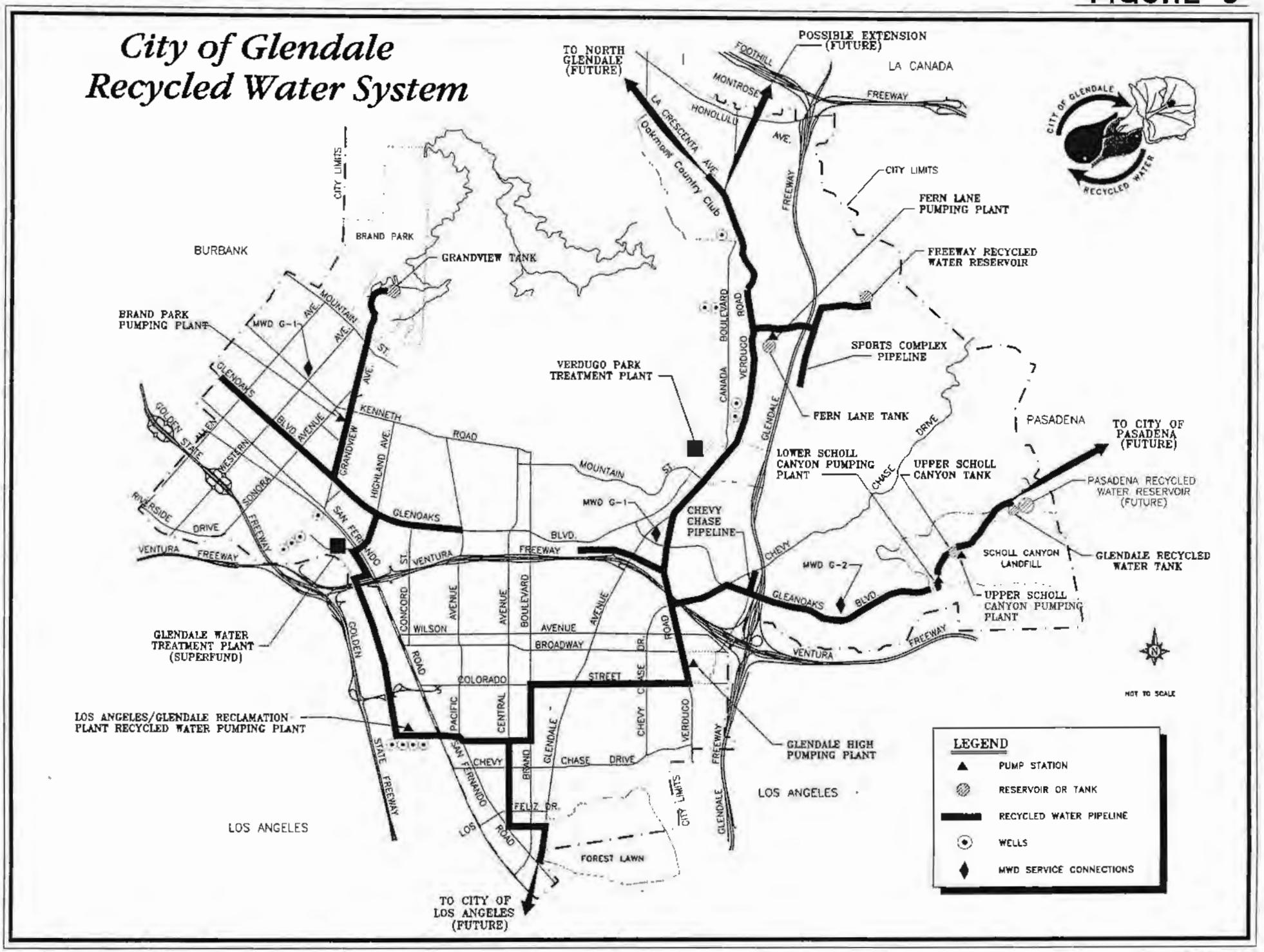


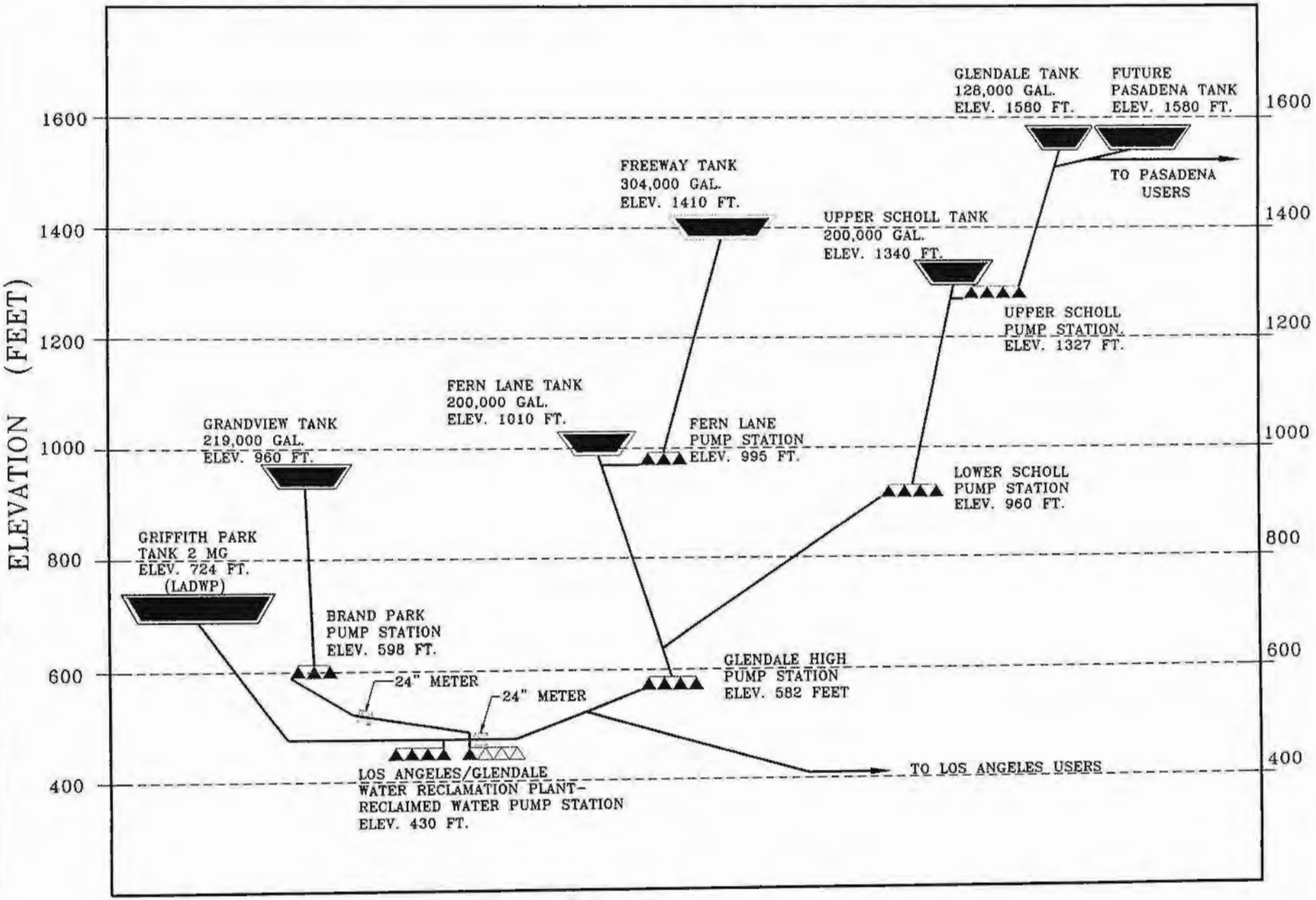
FIGURE 5

STATE WATER PROJECT and COLORADO RIVER AQUEDUCT




City of Glendale
Recycled Water System
TO NORTH GLENDALE (FUTURE)
POSSIBLE EXTENSION (FUTURE)
LA CANADA
FOOTHILL
MONTROSE
HONOLULU
FREEWAY
AVE.
LA CRESCENTA AVE.
Oakmont Country Club
CITY LIMITS
FERN LANE PUMPING PLANT
FREEWAY RECYCLED WATER RESERVOIR
BURBANK
BRAND PARK
GRANDVIEW TANK
BRAND PARK PUMPING PLANT
MWD G-1
MOUNTAIN AVE.
ST.
GLENOAKS BLVD
GOLDEN STATE FREEWAY
WESTERN AVENUE
SONORA
RIVERSIDE DRIVE
VENTURA FREEWAY
SAN FERNANDO
KENNETH ROAD
GRANDVIEW AVE.
HIGHLAND AVE.
VERDUGO PARK TREATMENT PLANT
BOULEVARD
ROAD
CANADA
VERDUGO
GLENDALE
SPORTS COMPLEX PIPELINE
FERN LANE TANK
PASADENA
TO CITY OF PASADENA (FUTURE)
LOWER SCHOLL CANYON PUMPING PLANT
CHASE
DRIVE
UPPER SCHOLL CANYON TANK
PASADENA RECYCLED WATER RESERVOIR (FUTURE)
MOUNTAIN ST
MWD G-1
CHEVY CHASE PIPELINE
GLENOAKS BLVD.
SCHOLL CANYON LANDFILL
GLENDALE RECYCLED WATER TANK
MWD G-2
CHEVY
GLENOAKS BLVD
UPPER SCHOLL CANYON PUMPING PLANT
GLENDALE WATER TREATMENT PLANT (SUPERFUND)
CONCORD
WILSON
AVENUE
BROADWAY
COLORADO
STREET
PACIFIC
CENTRAL
CHEVY CHASE DR.
VENTURA FREEWAY
NOT TO SCALE
LOS ANGELES/GLENDALE RECLAMATION PLANT RECYCLED WATER PUMPING PLANT
GLENDALE HIGH PUMPING PLANT
LOS ANGELES
STATE FREEWAY
SAN FERNANDO ROAD
BISAND
CHEVY CHASE DRIVE
FELIZ DR.
FOREST LAWN
CITY LIMITS
TO CITY OF LOS ANGELES (FUTURE)
LEGEND
PUMP STATION
RESERVOIR OR TANK
RECYCLED WATER PIPELINE
WELLS
MWD SERVICE CONNECTIONS

CITY OF GLENDALE
SCHEMATIC DIAGRAM OF RECYCLED WATER SUPPLY SYSTEM



CITY OF GLENDALE
RECYCLED WATER USERS - SN 1990008
As of DECEMBER 2002

FIGURE 8

LOC. NO.	RECYCLED WATER USER PROJECT	Actual/Anticipated Delivery Date	User	Quantity A.F./year	Type of Use
	FOREST LAWN PROJECT				
1	Forest Lawn Memorial Park	1992	YES	200-400	Irrigation
2	1600 South Brand Median	1995	YES	2	Irrigation
43	323 W Garfield Avenue	2000	YES	2	Irrigation
	GLENDALE POWER PLANT PROJECT				
7	Caltrans - 943 West Doran Street	1978	YES	40-60	Irrigation
8	Glendale Grayson Power Plant	1978	YES	400-600	Cooling Towers
	VERDUGO SCHOLL PROJECT				
	PARKS and RECREATION - City of Glendale				
4	Adult Recreation Center	1995	YES	10	Irrigation
3	Armory	1996	YES	4	Irrigation
35	Carr Park	Planning Stage	NO		Irrigation
5	Central Library	1995	YES	4	Irrigation
34	City of Glendale - Fern Lane	1997	YES	2.5	Irrigation
24	Civic Auditorium	1996	YES	15	Irrigation
37	Colorado Boulevard - Parkway Irrigation	1997	YES	3	Irrigation
31	North Verdugo Road Median/La Cresenta Avenue	1996	YES	10	Irrigation
17	Glenoaks Park	1995	YES	4	Irrigation
28	Glorietta Pump Station	1997	NO		Irrigation
	Mayor's Park (Proposed)	Unknown	NO	6	
29	Montecito Park	1995	YES	1	Irrigation
14	Monterey Road Median - WJH	1996	NO	1	Irrigation
13	701 North Glendale Avenue - Median @ Monterey Road	1995	YES	12	Irrigation
	Park Site C (Proposed)	Unknown	NO	54	
	Park Site A (Proposed)	Unknown	NO	69	
2	741 S Brand Median	1995	YES	4	Irrigation
23	Parque Vaquero	1998	YES	2	Irrigation
20	Scholl Canyon Ballfield	1997	YES	17	Irrigation
18	Scholl Canyon Park	1996	YES	12	Irrigation
27	Sports Complex (Completed)	1998	YES	99	Irrigation
25	Verdugo Rd/Canada (South) Overpass	1995	YES	0.5	Irrigation
30	Verdugo Rd/Canada (North Median)	1996	YES	1.5	Irrigation
	CALTRANS (5 Meters):				
7A	1970 E Glenoaks Boulevard (E/S)	1995	YES	10	Irrigation
7A-1	1970 E Glenoaks Boulevard (W/S I2)	1995	YES	12	Irrigation
7B	406 N Verdugo Road @ Chevy Chase	1995	YES	40	Irrigation
7C	709 Howard Street @ Monterey Road	1995	YES	12	Irrigation
7D	2000 E Chevy Chase Drive @ Harvey	1995	YES	8	Irrigation
	GLENDALE UNIFIED SCHOOL DISTRICT:				
6	Glendale High School	1995	YES	15	Irrigation
36	Glenoaks Elementary School	1998	YES	1	Irrigation
15	Wilson Junior High School	1995	YES	7	Irrigation
	OTHERS:				
16	Glendale Adventist Memorial Hospital	1997	YES(Partially)	20	Irrigation
32	Oakmont Country Club	1996	YES	150-200	Irrigation
21	Scholl Canyon Golf Course	1998	YES	100	Irrigation
22	Scholl Canyon Landfill (LACSD)	1997	YES	100	Dust Control/Soil Compaction
19	Scholl Canyon Landfill (PW)	1996	YES		Irrigation/Soil Compaction
18	Upper Scholl Pump Station	1996	YES		Irrigation
	Dual Plumbing:				
26	Glendale Community College	1996	YES(Partially)	25	Irrigation/Flushing Toilets
38	Glendale Plaza - 655 N Central Avenue	Completed	NO		Flushing Toilets
39	Building - 400 N Brand	Completed	NO		Flushing Toilets
41	Building - 450 N Brand	Completed	NO		Flushing Toilets
42	Police Building - Isabel Street	Const. On-going	NO		Flushing Toilets
40	Building - 611 N Brand	Planning Stage	NO		Flushing Toilets
33	*PUBLIC WORKS - City of Glendale*	1978	YES	1.5	Street Cleaning
	BRAND PARK PROJECT				
12	Brand Park	1997	YES	60	Irrigation
9	Glenoaks Median (9 Meters)	1996	YES	4	Irrigation
11	Grand View Memorial Park	2001	YES(Partially)	50	Irrigation
10	Pelanconi Park	1996	YES	8	Irrigation
	TOTAL **CURRENT METERS**	**42**		**1,599-2,069**	

GROUNDWATER PUMPING SPREADING PLAN 2003

A:\RAYNOTARIO\ZIPC\FIGURE82003

APRIL 2003

GLENDALE WATER SUPPLY AND DEMAND (AF/YR)

(Use MWD Direct Deliveries for Blending)

FIGURE 9

	Fiscal Year	1989-90	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2005	2010	2015	2020	2025
(1)	**Water Demands (a)**	32,551	25,782	28,010	29,439	29,230	31,346	32,298	29,678	31,229	33,435	33,475	33,897	32,333	32,443	32,554	33,824	35,091	36,821	38,295
(2)	San Fernando Basin-Water Rights	5,771	4,373	4,805	5,090	4,979	5,535	5,555	5,575	5,588	5,601	5,626	5,651	5,676	5,701	5,725	5,843	5,843	5,843	5,843
	Water Supplies:																			
	San Fernando Basin																			
(3)	Grandview Wells	1336	950																	
(4)	Power Plant	227	130	78	140	65	35	25	24	32	24	381	337	25	25	25	25	25	25	25
(5)	Glendale Water Treat. Plant (b)												3,223	7,200	7,200	7,200	7,200	7,200	7,200	7,200
(6)	Forest Lawn/Physical Solution	170	396	348	410	376	461	442	243	377	491	292	453	400	400	400	400	400	400	400
(7)	**Total:**	1,733	1,476	426	550	441	496	467	267	409	515	673	4,013	7,625	7,625	7,625	7,625	7,625	7,625	7,625
	Verdugo Basin																			
(8)	Wells 3,4, & 6	1,635	732	909	1,225	1,662	2,059	2,116	1,981	2,080	1,960	1,635	1,663	1,800	1,800	1,800	1,800	1,800	1,800	1,800
(9)	VPWTP						0	453	715	640	491	470	457	500	500	500	500	500	500	500
(10)	Other Production										0	0	0	0	0	0	0	0	0	0
(11)	**Total:**	1,635	732	909	1,225	1,662	2,059	2,569	2,696	2,720	2,451	2,105	2,120	2,300	2,300	2,300	2,300	2,300	2,300	2,300
	Recycled Water																			
	Brand Park Project							32	63	73	106	111	95	100	150	170	170	170	170	170
	Forest Lawn Project			348	295	290	292	344	239	191	200	242	252	300	350	350	350	350	350	350
	Power Plant Project	333	551	422	325	284	377	264	306	698	453	472	318	400	425	450	450	450	450	450
	Verdugo-Scholl Project					340	217	472	479	496	979	838.5	835	900	910	1020	1,040	1,060	1,080	1,080
(12)	**Total:**	333	551	770	620	914	886	1,112	1,087	1,458	1,738	1,664	1,500	1,700	1,835	1,990	2,010	2,030	2,050	2,050
	Metropolitan Water																			
(13)	Direct Deliveries (G1, G2, & G3)	28,850	23,023	25,905	27,044	26,213	27,905	28,150	25,628	26,642	28,731	29,033	26,264	20,708	20,683	20,639	21,889	23,136	24,846	26,320
(14)	**Total:**	28,850	23,023	25,905	27,044	26,213	27,905	28,150	25,628	26,642	28,731	29,033	26,264	20,708	20,683	20,639	21,889	23,136	24,846	26,320
(15)	**Total Water Supplies:**	32,551	25,782	28,010	29,439	29,230	31,346	32,298	29,678	31,229	33,435	33,475	33,897	32,333	32,443	32,554	33,824	35,091	36,821	38,295

2) [(1) - 4,000 AF] * 20% return flow

5) 5,000 gpm @ 90%

6) Forest Lawn, et.al.

13) (1) - (7) - (11) - (12)

(a) Projected demands from MWD

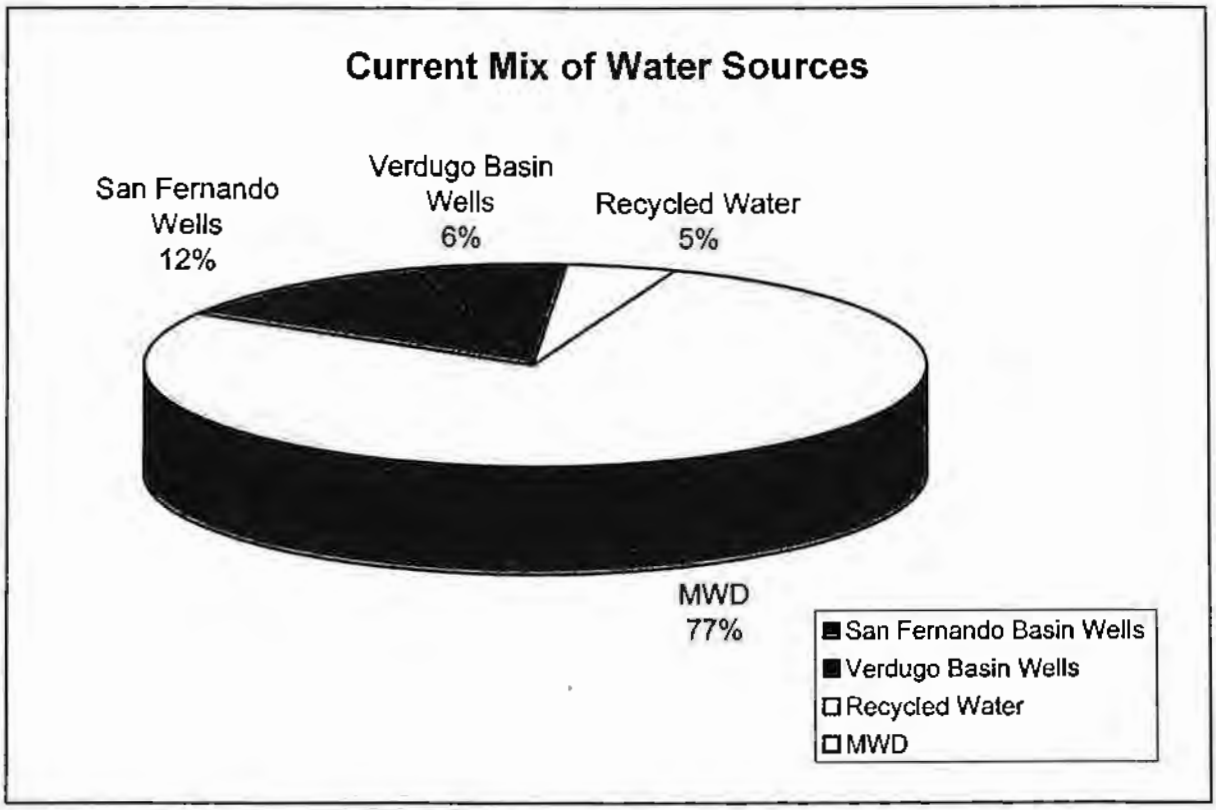
(b) Started operation Dec. 2000, not used by the system
Started delivering water to the system July 2001. 24-hr operation, 1/6/02

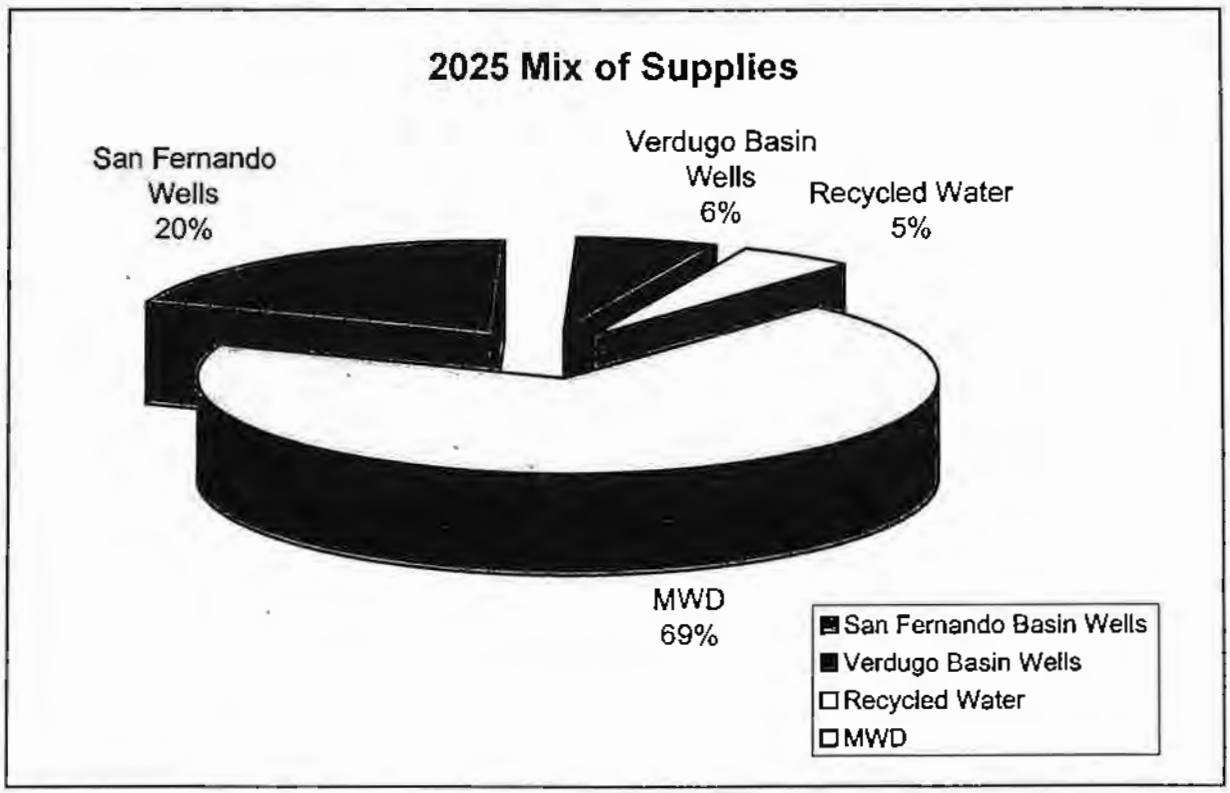
~~GROUNDWATERPUMPING PREADINGPLAN 2003-~~
~~A:\RAYNOTARIO\WRP\FIGUR50~~
~~FEBRUARY 3, 2003]~~

Updated[02/03/03]

FIGURE 10

CURRENT PROJECTED SOURCES OF WATER





APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2002-2007 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2002 TO SEPTEMBER 30, 2007

2002-2003 Water Year

Prepared by:

Public Works Department

Engineering Division

117 Macneil Street

San Fernando, California 91340

APRIL 2003

TABLE OF CONTENTS

I. INTRODUCTION

The ground water rights of the City of San Fernando were defined by the JUDGMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants." The Final Judgment was signed on January 26, 1979.

On August 26, 1983, the Watermaster reported to the court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in condition of overdraft. On October 1, 1984, San Fernando and Los Angeles were assigned equal rights to pump the safe yield of the Basin (6,210 acre-feet) thus, San Fernando and Los Angeles were each allowed to pump approximately 3,105 acre-feet per year. Thereafter, on October 1, 1996, the safe yield of the Basin was determined to be 6,510 acre-feet per year. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,255 acre-feet per year.

In 1993, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Section 2.9, Groundwater Quality Management. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 2.9.4, Groundwater Pumping and Spreading Plan.

The Groundwater Pumping and Spreading Plan is based on the water year, October 1 to September 30. The Draft Plan for San Fernando will be submitted in April to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last five years and the projected annual water demand for the next five years are shown on Table 2.1.

Water demand during the early 1990's was affected by drought conditions in the Southern California region. However, the City of San Fernando did impose voluntary conservation since 1977.

Projected water demands for the next five years is expected to slightly increase from the 1992-93 base year since public opinion is that drought conditions no longer exist and conservation habits will undoubtedly regress. The increase is therefore not from residential growth, but from a rebound of drought conditions and a re-establishment of commercial and industrial demand.

The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the San Fernando area. A variance of $\pm$ 10 percent can be expected.

III. WATER SUPPLY

The water supply for the City of San Fernando is composed of locally produced and treated groundwater. Supplemental water is purchased from the Metropolitan Water District of Southern California (MWD). In case of emergency, there is an existing 6-inch water connection to the City of Los Angeles (DWP) water system at 12900 Dronfield Avenue, in Sylmar.

A. MWD: The amount of treated water purchased from the MWD has been changed beginning in 1997-98 through 2001 as reflected in the Historic and projected use of MWD water as shown in Table 2.1.

B. Production Wells: The City of San Fernando owns and operates four (4) wells that are on "active status" with the Department of Health Services as indicated below:

1. ***Well 2A***
   Location: 14060 Sayre Street, Sylmar
   Capacity: 2100 GPM

2. ***Well 3***
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1100 GPM

3. ***Well 4A***
   Location: 12900 Dronfield Avenue, Sylmar
   Capacity: 400 GPM

4. ***Well 7A***
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 800 GPM

C. Quantity (Acre-Feet) of Water Pumped From Each Well (2000-2001)

1.	Well 2A	2,295.84
2.	Well 3	345.60
3.	Well 4A	252.54
4.	Well 7A	871.72
	Total	3,765.70

D. Wells Groundwater Level Data

1.	Well 2A	1061.5	Taken 4/3/03
2.	Well 3	1078.2	Taken 4/3/03
3.	Well 4A	1110.1	Taken 1/03
4.	Well 7A	1065.3	Taken 4/3/02

E. Well Locations
See next page

IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The safe yield of the Sylmar Basin is 6,510 acre-feet and the cities of San Fernando and Los Angeles have equal rights to pump from this basin. After subtracting the overlaying pumping rights of two private parties, San Fernando and Los Angeles are each allowed to pump approximately 3,255 acre-feet per year.

B. Stored Water Credit

San Fernando and Los Angeles each have the right to store water in the Sylmar Basin and the right to extract equivalent amounts.

As of September 30, 2002 the City of San Fernando has a stored water credit of 1,039.40 acre-feet accumulated during previous years through the 00-01 water year.

TABLE 2.1
FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND
PUMPED AND IMPORTED WATER
CITY OF SAN FERNANDO

(Acre – Feet)

FY	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
DEMAND										
WELLS	3,307.91	3,528.29	3,766.19	3,686.60	3,300	3,400	3,400	3,500	3,500	3,500
MWD	0	0	0	0		380	500	500	500	500
TOTAL	3,307.91	3,528.29	3,766.19	3,686.60	3,300	3,780	3,900	4,000	4,000	4,000
ACTUAL						PROJECTED				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 2002

CITY OF SAN FERNANDO

- WELL NO. 3
- WELL NO. 4A
- WELL NO. 2A
- WELL NO. 7A

(In Progress)

APPENDIX B

POLICIES AND PROCEDURES

(By ULARA)

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

February 1998

APPENDIX E

CRESCENTA VALLEY WATER DISTRICT

PUMPING AND SPREADING PLAN

2002-2007 Water Years

GROUNDWATER PUMPING

PLAN

WATER YEARS

OCTOBER 1, 2002 TO SEPTEMBER 30, 2007

Prepared by
CRESCENTA VALLEY
WATER DISTRICT

APRIL 2003

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TABLES

I. INTRODUCTION

The ground water rights of the Crescenta Valley Water District (CVWD) were defined by the JUDGEMENT in Superior Court Case No. 650079, entitled "The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et. al., Defendants". The Final Judgement was signed on January 26, 1979.

In 1993 and in February 1998, significant revisions were made to the Upper Los Angeles River Area (ULARA) Policies and Procedures with the addition of Sections or Groundwater Quality Management and various new reports and appendices. This addition has been made by the Watermaster and the Administrative Committee to affirm its commitments to participate in the cleanup and limiting the spread of contamination in the San Fernando Valley. This report is in response to Section 5.4, Groundwater Pumping and Spreading Plan. Since no groundwater spreading has been performed or is planned at this time by the CVWD, only plans/projections for groundwater pumping and treatment are discussed in this report.

The Groundwater Pumping Plan is based on the water year, October 1 to September 30. The Draft Plan for CVWD will be submitted in March or April to the Watermaster for the current water year.

II. WATER DEMAND

The annual total water demand for the last five years and the projected annual water demand for the next five years is shown in Table 2.1.

Water demand during the last five years has been affected by the fact that we have had less than normal amounts of rainfall in the Crescenta Valley since 1997-98. The 2001-02 water year was characterized by the second lowest rainfall total in the Crescenta Valley in forty years with only 8.96 inches. The CVWD has implemented a voluntary water conservation program (Phase I) and the District's Board of Directors may implement more restrictive measures if not successful, or if the water supply becomes less reliable. Conservation incentives in the form of rebates for turf replacement, ultra-low flush toilets, and high efficiency clothes washers are currently being provided along with continuous water conservation information.

The 2001-02 base year had slightly more production compared to the prior year (peak year) but it now appears that demand has stabilized in the 5600-5800 AF/yr range. In any case, the water conservation program appears to at least have kept demand from increasing further. However, a fifth consecutive year with less than average precipitation seems likely at the time of this writing.

Projected water demand is expected to decrease slightly in 2002-2003, but then increase only marginally thereafter. The decrease will hopefully be the result of increased water conservation effort by the District and its customers.

Regardless of water conservation programs, the water demand seems to vary significantly due to weather conditions in the CVWD service area. This can be attributed to the residential character of the District and the large percentage of water consumption for outdoor landscaping. A variance of ±10% can be expected.

III. WATER SUPPLY

The water supply for the CVWD is composed of locally produced and treated groundwater and water from the Metropolitan Water District of Southern California (MWD) purchased on a wholesale basis from the Foothill Municipal (FMWD).

A. PRODUCTION WELLS

The CVWD has eleven active wells that are currently in operation. Historic and projected production from these wells is shown in Table 3.1. The CVWD wells produce water which typically contain nitrate concentrations above the 45mg/L maximum contaminant level (MCL) set by the U.S. Environmental Protection Agency (EPA) and State of California Department of Health Services (DHS). As a result, an ion exchange process, the Glenwood Nitrate Removal Plant, is used to treat a portion of the produced water. Untreated water and water treated at the Glenwood Plant are blended to produce water with less than the nitrate MCL. The blended water is distributed by the CVWD system.

The District's active wells range in age from 50 to 75 years and are beyond their useful life. But during 2001-02, construction was completed on the first well in the District's well replacement program with the goal of replacing existing groundwater production capacity with new, modern wells over the next 10 years. However, this first well, is of very low capacity, while a second well, also of very low capacity, will be completed in the summer of 2003. As the capacity of these wells appears to be far less than anticipated and a grant-funded Verdugo Basin monitoring well study (now underway) also indicates low-capacity well sites, the District will probably suspend the well replacement program until its imported water supply capabilities are expanded through an interconnection with the City of Glendale and a pump station upgrade by FMWD.

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant has been out of operation for extended periods in 1992-93 and in 1997 when repairs were necessary. In the past year, the plant was only in marginal operation because overall groundwater production was down due to basin level decline, resulting in more imported water, thereby reducing the need for treatment. This trend should continue in the near term. The historic and projected production from the Glenwood Plant is shown in Table 3.2.

C. PICKENS GRAVITY TUNNEL PRODUCTION

A small portion of the total CVWD demand is supplied by the Pickens Gravity Tunnel. Historic and projected production from Pickens Tunnel is shown in Table 3.3.

D. MWD

The amount of treated water purchased from the MWD via FMWD is expected to remain high over the next five years to make up the difference between decreased groundwater production capacity and customer demand. Historic and projected use of MWD water is shown in Table 3.4.

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for CVWD's share of the Verdugo Basin is 3,294 acre-feet annually. Basin production has been declining and 2001-02 was the first in over ten years to be less than the full adjudication. Estimated future pumping is expected to stay below this adjudicated quantity on an annual basis. A return to normal rainfall conditions is assumed to replenish the groundwater levels and production capacity in the Verdugo Basin but this will probably take a wet cycle of several years. However, this assumption is speculative and optimistic and a more conservative approach is taken in the estimates provided here. In prior years, the Watermaster, with approval from the ULARA Administrative Committee, has allowed CVWD to over-pump their rights in the Basin. This will probably not be an issue again in the near future. In any case, future consideration for excess pumping in the Verdugo Basin is now addressed in the February 1998 "Policies and Procedures", Section 2.3.4. Either party, Glendale or CVWD, may pump in excess of their adjudication as long as total production does not exceed 7150 AF/year, as reviewed on an annual basis by the Watermaster.

TABLE 2.1
HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
4991	5394	5884	5614	5823	5720	5750	5800	5850	5900
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004 2005	2005-2006	2006-2007
3747	3797	3698	3412	3266	3100	3125	3150	3200	3250
ACTUAL					PROJECTED				

TABLE 3.2
HISTORIC AND PROJECTED GLENWOOD NITRATE REMOVAL PLANT PRODUCTION BEFORE BLENDING

(Acre-Feet)

97-98	98-99	99-2000	2000-2001	2001 2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
1391	1281	1137	989	515	500	500	500	510	520
ACTUAL					PROJECTED				

NOTES:

(1) The Glenwood Treatment Plant has a capacity of 2.7 MGD of blended water.

(2) The Glenwood Treatment Plant began operation January 1990.

TABLE 3.3
HISTORIC AND PROJECTED PICKENS TUNNEL WATER PRODUCTION

(Acre-Feet)

97-98	98-99	99-2000	2000 2001	2001 2002	2002-2003	2003-2004	2004-2005	2005 2006	2006 2007
62	65	54	61	59	58	58	59	60	60
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

97-98	98-99	99-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
1244	1597	2186	2202	2556	2620	2625	2650	2650	2650
ACTUAL					PROJECTED				

NOTES:

(1) All values shown above are for treated water.