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

2006-2011 Water Years

July 2007

UPPER LOS ANGELES RIVER AREA WATERMASTER

CITY OF LOS ANGELES VS. CITY OF SAN FERNANDO, ET AL.
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GROUNDWATER PUMPING AND SPREADING PLAN FOR THE UPPER LOS ANGELES RIVER AREA LOS ANGELES COUNTY, CALIFORNIA

2006-2011 WATER YEARS
October 2006 – September 2011

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I. EXECUTIVE SUMMARY

As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit the 2007 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 management of the ULARA groundwater basins. The Pumping and Spreading Plan includes the individual plans submitted by the five major pumping parties, 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 will pump less than its full groundwater right. The City of Los Angeles also plans to pump less than its full right in this Water Year. In the San Fernando Basin (SFB) Burbank will pump its full adjudication, but Los Angeles is planning to pump less than its adjudicated amount. Glendale plans to pump its full adjudicated amount in the SFB. Glendale has limited pumping capacity in the Verdugo Basin but plans to pump its full water right beginning in 2009. Crescenta Valley Water District (CVWD), with approval from Glendale and the Watermaster, may be able to pump more than its assigned water rights from the Verdugo Basin. In addition, CVWD is conducting a study to evaluate the potential to sustain increased pumping through stormwater recharge and drilling of new wells.

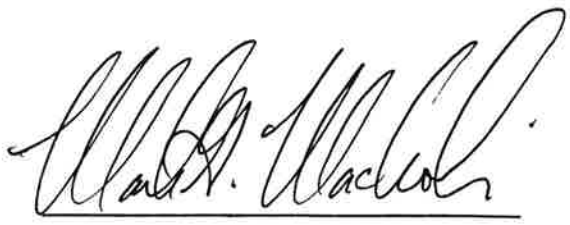
Currently, there are five groundwater cleanup plants in operation: the City of Los Angeles' North Hollywood Operable Unit (OU) and the Pollock Wells Treatment Plant, the Burbank OU, CVWD's Glenwood Nitrate Removal Plant, and the Glendale OU.

The Watermaster will continue to address the declining water table in the SFB. The Watermaster has been 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 stormwater recharge in new areas. A methane gas mitigation plan for the Sheldon-Arleta Landfill near the Tujunga Spreading Grounds is under construction. Thanks to the enormous effort of the Los Angeles County Department of Public Works (LACDPW) a significant amount of native water was captured to recharge the SFB during the 2004-05 and 2005-06 rainfall seasons.

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), and the rebound of

groundwater levels due to reduced pumping and above-normal recharge during the 2004-05 and 2005-06 Water Years.

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.



MARK G. MACKOWSKI
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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 municipal 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 five-year projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans.

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 1 of the current Water Year.

This is the July 2007 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 water quality within ULARA, improving basin management, and providing protection of each party's water right.

III. PLANS FOR THE 2006-2011 WATER YEARS

A. Projected Groundwater Pumping for 2006-07 Water Year

The total 2006-07 ULARA pumping is projected at 103,042 acre-feet (AF) (Table 3-1B), 6,769 AF above the 27-year average (1979-2006). The estimated pumping for 2007-08 is 96,012 AF, a 261 AF increase from the historical average (Appendices A-E).

In 2006-07, the City of Burbank plans to pump 9,627 AF (Table 3-1B) from all its groundwater sources, 78 AF more than its five-year average. As of October 1, 2006, Burbank had a storage credit of 13,999 AF. Burbank's annual return water credit of 20 percent is approximately 5,000 AF/Y, and its right to purchase Physical Solution water from Los Angeles is 4,200 AF/Y. The BOU plant capacity is 9,000 gpm (14,000 AF/Y). Pumping in excess of Burbank's annual import return credit can come from its banked storage or Physical Solution purchases from Los Angeles. Burbank may also purchase and import water from Metropolitan Water District (MWD) and store it in the SFB, or exchange it for LADWP's stored water credits; or obtain stored water credits from Glendale.

CVWD plans to pump 3,294 AF in 2006-07, which is an increase of 481 AF compared to its average pumping since 1979, and an increase of 227 AF from its five-year average. In past years CVWD has pumped a portion of Glendale's allocation of the Verdugo Basin safe yield, which Glendale was unable to pump.

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 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/Y of Physical Solution water. Glendale had storage credit of 61,833 AF in the SFB as of October 1, 2006. Glendale plans to pump 7,725 AF from the SFB in the 2006-07 Water Year. Glendale plans to extract 2,789 AF from the Verdugo Basin in 2006-07, a increase of 512 AF over its 27-year historical average, and 668 AF more than the average of the past five years.

The City of Los Angeles plans to pump 72,924 AF this year from the SFB, 5,105 AF less than its 1979-2006 annual average and 13,734 AF more than the average municipal pumping of the past five years. A total of 3,583 AF of groundwater will be pumped from the Sylmar Basin,

1,962 AF more than the 1979-2006 average. As of October 1, 2006, Los Angeles had a storage credit of 374,091 AF in the SFB and 9,528 AF in the Sylmar Basin.

In 2006-07 the City of San Fernando plans to pump 3,100 AF from the Sylmar Basin, 215 AF less than its average pumping for the past five years and 28 AF more than the past 27 year average. San Fernando has storage credit of 737 AF as of October 1, 2006.

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 2006-07 are shown in Tables 3-1A, 3-1B, and 5-1A.

B. Constraints on Pumping as of 2006-07

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 United States Environmental Protection Agency (USEPA). The City assumed the 18-year operation of the facility on March 12, 2001 under provisions of the Second Consent Decree. Although the USEPA turned over operating control of the facility to the City of Burbank, negotiations continue with Lockheed-Martin (Lockheed) over several issues including the pumping capacity of the eight supply wells.

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. The Lake Street/GAC wells continue to be off-line.

The Burbank OU will pump approximately 9,327 AF of groundwater during the 2006-07 Water Year, a reduction from its design capacity of 14,000 AF/Y. The cause of the reduced pumping was the subject of a study by Burbank. Montgomery Watson Harza conducted the Performance Attainment Study to evaluate the well field and appurtenant facilities in an effort to bring production up to 9,000 gpm. The Well Field Performance

Attainment Study was completed and reviewed by the USEPA and Lockheed-Martin. An operation plan is being developed that may include temporary deflation of existing well packers. The USEPA has temporarily postponed making a decision until work on the air-phase GAC retrofit is complete.

City of Glendale – The Glendale OU began operating in September 2000. Subsequently, hexavalent chromium contamination was 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 Association Research Foundation (AWWARF) to investigate technology capable of large-scale treatment of hexavalent chromium. Phase I and II are completed. Phase II provided vendors the opportunity to demonstrate the capabilities of their systems to treat hexavalent chromium from the technologies selected in Phase I. Glendale is now in Phase III of the chromium studies to test the technology on one well with a 500 gpm flow rate. 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. Glendale has received money to proceed with Phase III and now is seeking additional funding in order to apply the technology to the entire GOU production.

City of Los Angeles - All of the well fields within the SFB have been impacted because of groundwater contamination, primarily from 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 rising levels of TCE, PCE, and nitrates above the Maximum Contaminant Level (MCL) at the wellheads and are being evaluated. Low levels of perchlorates have been detected in both the Rinaldi-Toluca and Tujunga Well Fields.

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, elevated nitrate levels have been observed 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 Mission Wells will be pumping Los Angeles' full entitlement during 2006-07. Los Angeles has undertaken an accelerated rehabilitation of the Mission Well Field including design and installation of a new tank, wells and appurtenant facilities in order to pump both its annual water right and its stored credits. The new tank should be completed by March 2008.

The ULARA Watermaster has performed a safe yield re-evaluation of the Sylmar Basin that recommends a higher safe yield amount with a corresponding increase in the cities' water rights under certain provisions and restrictions. A stipulation agreeing to the safe yield re-evaluation and other matters was signed by the cities of Los Angeles and San Fernando and approved by the Court on December 13, 2006.

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 anion 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 to pump in excess of its right until the City of Glendale is able to pump its entire right. During Water Year 2004-05 and 2005-06 CVWD pumped in excess of its adjudication without obtaining permission from the Watermaster. The Watermaster did not grant CVWD permission to over-pump because Glendale had expressed its intention to increase production in the Verdugo Basin in the near future. CVWD and Glendale reached an agreement to settle past over-pumping.

CVWD has received three AB303 Local Groundwater Assistance grants to study declining groundwater levels in the Verdugo Basin. The first grant funded a monitoring well study to locate new production wells. The results of the study showed that these well sites would produce low-capacity wells. The second grant has been used to investigate the feasibility of recharging the basin with stormwater. The Verdugo Basin Groundwater Recharge, Storage and Conjunctive Use Feasibility Study has demonstrated

that is is possible to capture and store additional stormwater in the Verdugo Basin. The third grant was used to perform a geophysical survey of the Verdugo Basin.

Significant levels of MTBE have been detected in CVWD Well No. 7 requiring a temporary shutdown. A MTBE Task Force has been formed to expedite investigation and cleanup including the RWQCB, oil company representatives, the Watermaster and the impacted pumping parties. Monitoring wells have been installed and characterization is underway. The Task Force has made excellent progress in identifying possible MTBE source sites and developing remedial measures.

City of Glendale - The City of Glendale currently does not have the capability of pumping its entire adjudicated right from the Verdugo Basin. Glendale has been studying and evaluating various alternatives to increase its pumping capacity and will be drilling two new wells in the next few years. 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. Glendale is planning to drill two pilot wells to assess sites for new production wells.

TABLE 3-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number Standby Wells	Number Active Wells	Estimated Capacity (All Wells) (cfs)
SAN FERNANDO BASIN			
City of Los Angeles			
Aeration	---	7	2.4
Erwin	---	2	4.8
North Hollywood	---	14	86.0
Pollock	---	2	5.8
Rinaldi-Toluca	---	15	107.0
Tujunga	---	12	105.9
Verdugo	---	2	7.2
Whitnall	---	4	18.8
City of Burbank	2	8	24.5
City of Glendale	---	8	11.0
TOTAL	2	74	373.4
SYLMAR BASIN			
City of Los Angeles	---	2	6.2
City of San Fernando	---	4	9.1
TOTAL		6	15.3
VERDUGO BASIN			
CVWD	---	12	7.7
City of Glendale	---	5	5.0
TOTAL		17	12.7

TABLE 3-1A: 2006-07 ACTUAL AND PROJECTED GROUNDWATER EXTRACTIONS

(acre-feet)

Party/Well Field	Total	2006			2007								
		Oct.	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
							SAN FERNANDO BASIN						
City of Los Angeles													
AERATION	1,453	62	60	129	141	128	135	131	135	131	135	135	131
ERWIN	2,550	295	0	86	111	100	215	286	295	286	295	295	286
No HOLLYWOOD	24,011	2,780	2,178	2,054	1956	1,739	2,460	1607	984	952	2,460	2,460	2,381
POLLOCK	2,675	357	292	240	203	183	203	196	203	196	203	203	196
RINALDI-TOLUCA	18,870	1,937	1,536	1,267	1,255	1,372	2,067	1,845	1,107	1,071	1,661	1,907	1,845
TUJUNGA	15,702	2,073	131	0	1,199	1,767	492	1786	1230	1548	1,845	1,845	1,786
VERDUGO	3,269	0	0	191	301	272	301	286	308	298	308	510	494
WHITNALL	4,394	406	185	258	406	367	375	393	406	393	406	406	393
TOTAL:	72,924	7,910	4,382	4,225	5,572	5,928	6,248	6,530	4,668	4,875	7,313	7,761	7,512
City of Burbank	300	25	25	25	25	25	25	25	25	25	25	25	25
Burbank OU	9,327	941	737	604	351	677	720	883	883	883	883	883	883
City of Glendale	7,725	965	999	796	826	694	655	465	465	465	465	465	465
TOTAL:	90,276	1,931	1,760	1,426	1,202	1,396	1,400	1,373	1,373	1,373	1,373	1,373	1,373
							SYLMAR BASIN						
City of Los Angeles	3,583	68	0	320	381	183	381	369	381	369	381	381	369
City of San Fernando	3,100	326	301	271	280	31	1	315	315	315	315	315	315
TOTAL:	6,683	394	301	591	661	214	382	684	696	684	696	696	684
							VERDUGO BASIN						
Crescenta Valley Water Dist.	3,294	292	325	293	298	253	254	263	263	263	263	263	263
City of Glendale	2,789	202	248	223	199	201	245	245	245	245	245	245	245
TOTAL:	6,083	494	573	516	497	454	499	508	508	508	508	508	508
ULARA TOTAL:	103,042	10,729	7,016	6,758	7,932	7,992	8,529	9,095	7,245	7,440	9,890	10,338	10,077

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

Party/Wellfield	Historic Average Pumping		Projected Groundwater Pumping				
		SAN FERNANDO BASIN					
City of Los Angeles	1979-2006 (A)	2001-2006 (B)	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
AERATION (17 yrs)	-	1,359	1,453	1,593	1,593	1,593	1,593
ERWIN	-	1,455	2,550	3,488	3,488	3,488	3,488
No HOLLYWOOD	-	15,286	24,011	14,180	16,009	16,009	16,009
POLLOCK (18yrs.)	-	1,739	2,675	2,390	2,390	2,390	2,390
RINALDI-TOLUCA (18yrs.)	-	17,650	18,870	15,057	18,598	18,598	18,598
TUJUNGA (13 yrs)	-	16,952	15,702	16,249	20,439	20,439	20,439
VERDUGO	-	2,775	3,269	4,782	5,181	5,181	5,181
WHITNALL	-	1,974	4,394	4,804	4,804	4,804	4,804
TOTAL City of Los Angeles	**78,029**	**59,190**	**72,924**	**62,543**	**72,502**	**72,502**	**72,502**
City of Burbank (C)	4,501	374	300	300	300	300	0
BURBANK OU (13yrs)	-	9,175	9,327	10,884	10,884	10,884	10,884
City of Glendale (C)	2,724	8,016	7,725	7,725	7,725	7,725	7,725
TOTAL San Fernando Basin	**85,254**	**76,755**	**90,276**	**81,452**	**91,411**	**91,411**	**91,111**
		SYLMAR BASIN					
City of Los Angeles	2,862	1,621	3,583	4,490	4,490	4,490	4,490
City of San Fernando	3,072	3,315	3,100	3,100	3,100	3,100	3,100
TOTAL Sylmar Basin	**5,934**	**4,936**	**6,683**	**7,590**	**7,590**	**7,590**	**7,590**
		VERDUGO BASIN					
Crescenta Valley Water Dist.	2,813	3,067	3,294	3,294	3,294	3,294	3,294
City of Glendale	2,272	2,121	2,789	3,676	3,856	3,856	3,856
TOTAL Verdugo Basin	**5,085**	**5,188**	**6,083**	**6,970**	**7,150**	**7,150**	**7,150**
TOTAL ULARA	96,273	86,879	103,042	96,012	106,151	106,151	105,851

A. 27 year average of municipal well field pumping (Appendix F). 1979-2006 total pumping includes wells that are no longer in service.

B. 5-year average.

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

D. Water Year is from October to September.

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 3, 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. Prior to that time the Glendale Respondents Group had operated the plant through a contract with Camp Dresser & McKee.

The Glendale OU is comprised of a treatment plant, eight groundwater extraction wells, a pumping plant, disinfection facility, and associated piping (Appendix C, Figure 4). The treatment facility is designed to treat groundwater contaminated by trichloroethylene (TCE) and perchloroethylene (PCE) at a rate of 5,000 gpm using aeration and granulated activated carbon (GAC). The treated water is blended with imported supplies to control nitrate levels. Currently, the wells are being pumped in a manner to limit hexavalent chromium to six ppb or less in the treated, blended effluent.

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, has a design capacity of 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 was operated by the City of Burbank from 1992-2001. Two Lake Street Wells can deliver water at 2,000 gpm to the liquid-phase 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 due to elevated chromium levels in the groundwater.

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. The facility operates below design capacity due to a declining water table. The USEPA and the LADWP have been discussing a proposal for the NHOU to increase production by deepening existing wells and drilling new wells in order to remove contaminants at a faster rate and reduce the opportunity for the plume to migrate to other SFB well fields. The decision is complicated by the presence of hexavalent chromium upgradient of the wells. The USEPA, LADWP, and the Watermaster are currently evaluating additional treatment and funding alternatives.

The USEPA five-year review of the NHOU published September 2003 found that the interim remedy of the NHOU "currently protects human health and the environment because the concentration of TCE and PCE in treated groundwater is less than the Record of Decision (ROD) selected cleanup goals and no other Contaminants of Concern (COC) currently exceed health-based standards." The USEPA has a concern about the future ability of the NHOU to control contaminant plume migration for VOCs and COCs, so the USEPA is conducting a Focused Feasibility Study to investigate long-term requirements for continued mass removal. A preliminary study was completed in September 2006. The draft report should be available in August 2007.

Pollock Wells Treatment Plant - City of Los Angeles

Pollock Wells Treatment Plant, with a capacity of 3,000 gpm, began operating in March 1999. This project is funded, owned, and operated 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 treated water is then 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 2003-04 Water Year the plant was operated below design capacity because overall groundwater production was down due to basin level decline, resulting in more imported water, thereby reducing the need for treatment. However, near record rainfall in 2004-05 followed by near-average rainfall in 2005-06 have raised well production and CVWD has increased its use of the nitrate plant.

USEPA Proposed Final Remedy for the San Fernando Basin

The USEPA has begun an analysis of all contamination in the SFB with the stated intention of formulating a final remedial action plan in the next several years for all the operable units in the SFB. The USEPA has been active in the SFB since the mid-1980s. The first operable unit was constructed in 1989 – the North Hollywood Operable Unit - followed by the Burbank Operable Unit and the Glendale North/South Operable Unit. There has been mass removal of VOCs, but the contamination persists and continues to threaten the drinking water supply of all three cities: Los Angeles, Glendale and Burbank. In some areas the contaminants are hexavalent chromium and emerging chemicals that the operable units were not designed to treat.

TREATED GROUNDWATER IN ULARA

TABLE 4-1 ACTUAL GROUNDWATER TREATMENT

Water Year	Burbank GAC	Lockheed Aqua Detox	Burbank OU	Glendale North/South OU	CVWD Glenwood Nitrate Removal Plant	North Hollywood OU	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		5,772		1,419	1,182		10,668
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	6,567	515	998	1,643	20,263
2002-03	0		9,170	7,508	216	1,838	1,720	20,452
2003-04	0		9,660	6,941	164	1,150	1,137	19,052
2004-05	0		6,399	7,541	782	1,042	1,752	17,517
2005-06	0		10,108	6,777	997	1,766	2,442	22,090
Total AF	**15,135**	**4,815**	**94,118**	**42,658**	**14,813**	**22,413**	**13,314**	**207,266**

TABLE 4-2 PROJECTED GROUNDWATER TREATMENT

	Burbank GAC	Burbank OU	Glendale North/South OUs	CVWD Glenwood Nitrate Removal Plant	North Hollywood OU	Los Angeles' Pollock Wells Treatment Plant	Annual Total AF
2006-07	0	9,327	7,300	1,000	1,453	2,675	21,755
2007-08	0	10,884	7,300	1,000	1,593	2,390	23,167
2008-09	0	10,884	7,300	1,000	1,593	2,390	23,167
2009-10	0	10,884	7,300	1,000	1,593	2,390	23,167
2010-11	0	10,884	7,300	1,000	1,593	2,390	23,167
Total AF	0	**52,863**	**36,500**	**4,000**	**6,232**	**9,845**	**109,440**

C. Projected Groundwater Pumping Facilities

Verdugo Basin Wells – Glendale

Glendale is evaluating adding several new extraction wells in the Verdugo Basin to enable it to pump its full groundwater right.

D. Other Groundwater Remediation Projects

Many privately owned properties in the eastern SFB have been found to have groundwater contamination, and some 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 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

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 is deducted from the water right holder.

Permanent Dewatering Operations

Some facilities along the southern and western boundaries of the SFB have deep foundations in areas of high groundwater that require permanent 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. Working in cooperation with the County Department of Health Services and County Planning, the Watermaster and the LADWP have developed a process to identify and monitor water usage through a water license agreement. The Watermaster Office has also identified pumping by lessees on U.S. Forest Service (USFS) land within ULARA. The USFS began conducting an evaluation of water sources for each residence in the area below the Big Tujunga Dam beginning in 2004.

V. GROUNDWATER RECHARGE FACILITIES AND PROGRAMS

A. Existing Spreading Operations

There are five active spreading facilities located in the SFB (Plate 1). 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 and imported water. Plans are being considered to deepen and modernize the Tujunga and Hansen Spreading Grounds. An analysis is being made by the LACDPW, LADWP, and the Watermaster to identify ways to maximize spreading. Estimated capacities are shown in Table 5-2.

B. Other Spreading Operations

Boulevard Pit

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 acquiring the Boulevard Pit for conversion into a new stormwater retention and/or recharge facility.

Sheldon Pit

Vulcan Materials also owns Sheldon Pit, the former site of gravel mining located northeast of Hansen Spreading Grounds. Sheldon Pit is being considered in the Los Angeles County Sun Valley Watershed Management Plan as a potential stormwater retention facility.

Strathern Pit

Strathern Pit is being considered for conversion into a stormwater retention and recharge facility.

C. Actual and Projected Spreading

Table 5-1A shows the actual and projected spread volumes for the 2006-07 Water Year. Approximately 5,755 AF of native runoff will be spread compared to the 38-year historical average of 32,981 AF of native runoff and imported water, and compared to the past five-year average of 29,574 AF. Precipitation on the valley fill is estimated at 3.2 inches for 2006-07 compared to the long-term average of 16.48 inches per year and the previous five-year average of 18.79 inches per year.

TABLE 5-1A SPREADING OPERATIONS
(acre-feet)

Actual and Projected Spreading in ULARA Spreading Grounds 2006-07							
Operated by:							
	LACDPW				LADWP	LACDPW and LADWP	
Month	Branford	Hansen	Lopez	Pacoima	Headworks*	Tujunga**	Total
Oct-06	27	257	0	0		123	407
Nov-06	37	0	0	0		289	326
Dec-06	87	474	44	8		178	791
Jan-07	52	747	0	39		135	973
Feb-07	116	759	0	194		102	1,171
Mar-07	23	1,067	0	0		214	1,304
Apr-07	50	650	0	67		16	783
May-07							-
Jun-07							-
Jul-07							-
Aug-07							-
Sep-07							-
TOTAL	392	3,954	44	308	-	1,057	5,755
1968-2006 Average	545	14,497	551	6,766	1,957	8,665	32,981
2001-2006 Average	772	14,267	512	6,154	-	7,869	29,574

* Out of service since 1981-82.

**Includes native and imported water.

TABLE 5-1B HISTORICAL PRECIPITATION ON THE VALLEY FILL
(inches per year)

1968-06	2001-06	2001-02*	2002-03	2003-04	2004-05	2005-06	2006-07**
18.50	18.79	5.95	19.41	9.52	42.64	16.46	3.2

* Historic Low

** 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	35,000
Lopez	Shallow basin	12	2,000
Pacoima	Med. Depth basin	107	23,000
	Operated by LACDPW and LADWP		
Tujunga	Shallow basin	83	43,000
	TOTAL	314	104,000

D. Stormwater Recharge Committee (former San Fernando Basin Recharge Task Force)

During the 1997-98 Water Year, precipitation in ULARA was 225 percent of normal. This event provided an above-average volume of stormwater runoff that could be captured in upstream reservoirs and diverted into spreading grounds. In April 1998, the Watermaster Office received notice from the LACDPW 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 into the surrounding neighborhood. 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, in May 1998 the Watermaster Office formed the Tujunga and Hansen Spreading Grounds Task Force which later became the San Fernando Basin Recharge Task Force. The task force was comprised of representatives from the LACDPW, LADWP, Los Angeles Bureau of Sanitation and the Watermaster 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.

The task force has recently become the Stormwater Recharge Committee. The committee is focusing on specific projects. Watershed groups have been formed within both the Los Angeles County Department of Public Works and Los Angeles Department of Water and Power to focus on the whole cycle of pumping and recharge as an interrelated discipline, and are working in partnership to study and develop solutions to enhance groundwater supply in the San Fernando Basin.

- Hansen Spreading Grounds Plan

Capital improvements are planned for the spreading basins and the intake diversion structure to increase the capacity and efficiency of the facility for flood protection and stormwater conservation. The project lead is the Los Angeles County Flood Control District in partnership with LADWP. Construction is expected to begin in 2008.

- Sheldon-Arleta Methane Gas Mitigation Plan

The Tujunga Spreading Grounds are located adjacent to the Sheldon-Arleta Landfill. Methane gas is produced by the landfill, which is a source of environmental concern.

During the spreading of surface water, water moves through the underlying soil column and displaces the air from voids within the soil matrix. The resulting lateral migration of air mass has the potential to displace methane gas out of the adjacent 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 Sheldon-Arleta Methane Gas 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 improves containment of the methane gas within the landfill, and halts 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 restore the historic spreading capacity of 250 cfs. The contract was awarded on December 22, 2006 and construction has begun.

- Big Tujunga Dam Seismic Retrofit

Big Tujunga Dam was constructed by LACDPW in the 1930s primarily as a flood control facility. In the 1970s a seismic analysis indicated the dam was susceptible to damage from a large earthquake. Since then, the dam has been operated at a reduced capacity for safety reasons. LACDPW has proposed a seismic retrofit of the dam to restore the storage capacity for flood control and water conservation.

This project will make structural improvements to Big Tujunga Dam to increase its storage capacity from 1,500 acre-feet to 6,000 acre-feet. This will greatly enhance the Los Angeles County Flood Control District's (County) ability to retain and manage stormwater for flood protection, water conservation, and environmental restoration. The County bid the project on March 21, 2007 and expects to make an award in June 2007. Construction is expected to take 36 months and the dam is expected to be in full operation by October 2010. The bid that is expected to be awarded is for approximately $88 million. The project will be funded by a variety of sources including the County, LADWP, Proposition 13 Grant funds, FEMA, and possibly Proposition 1E.

- Additional Recharge Projects

LADWP and LACDPW are considering additional projects to enhance water conservation in the SFB. Stormwater recharge projects are being proposed at the Valley Generating Station, and in power transmission line easements.

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.

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 suspected source area.

The Brenntag/Holchem site is under the jurisdiction of the Department of Toxic Substances Control (DTSC). Brenntag is operating a soil vapor extraction system and has installed monitoring wells both on and off site. A test to evaluate the feasibility of a pump and treat system was conducted in Ocober 2005. An additional aquifer test will be conducted to develop the final design of the pump and treat system. The remedial goal is to remove the mass of VOCs and to destroy 1,4-dioxane. The required work will be scheduled after legal approval of a new Consent Decree which is currently in progress.

The Black & Decker (formerly Price-Pfister) site is located nearby, and is under the jurisdiction of the RWQCB. The RWQCB has reviewed and responded to a work plan submitted by Black & Decker in March 2007 for additional groundwater investigation to delineate the extent of the chromium groundwater plume. The work plan proposes ten additional temporary groundwater monitoring wells. The RWQCB has added four wells and recommended the relocation of several of the ten proposed wells. 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 for potential 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 B.F. Goodrich (formerly Menasco Aerospace Division), PRC-Desoto (formerly Courtauld), Drilube, Honeywell (formerly Allied Signal), Lockheed (2), ITT, and Excello Plating, and may 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.

Increasing levels of hexavalent chromium has caused the shutdown or reduced pumping of several wells associated with operable units that were not designed to treat hexavalent chromium or emerging chemicals. These shutdowns allow the vertical and lateral spread of VOCs to other production wells, further complicating management and delivery of potable water.

The USEPA has called several meetings with the cities of Burbank, Glendale, Los Angeles and agencies including DTSC, DHS, RWQCB and the Watermaster to develop a Chromium Action Plan that implements remedial actions for the operable units in the San Fernando Basin and enhanced treatment of VOCs and emerging chemicals.

A new Public Health Goal (PHG) for hexavalent chromium should be established by the Office of Environmental Health Hazard Assessment (OEHHA) in 2007. An 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 and recharge in the SFB, as projected over a five-year period. The projected pumping values were extracted from the "Year 2006-11 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 originally for the USEPA 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 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 up to 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 - the City of Los Angeles, City of Burbank, City of Glendale, and other individual producers. Both tables show projected values for the five-year study, from Fall 2006 to Fall 2011, except for the first half of Water Year 2006-07 where the actual values are known.

In Table 7-1A, the percolation and spreading values were derived by using the long-term average rainfall and recharge conditions projected over the five-year study period except for the first half

of Water Year 2006-07 where actual values are known. The LACDPW estimated the spreading values for the second half of the current water year. Anticipated spreading at PSG by the City of Burbank will help to improve the recovery of the 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 7-1B values were derived from the "Pumping and Spreading Plans" submitted by the municipal producers. Each well field's total extraction was allocated among 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 from Water Year 2005-06, during which the SFB experienced a rebound in groundwater elevation as a result of low pumping and above-normal artificial recharge.

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 since 1981.

C: <u>Simulated Groundwater Elevations and Flow Directions</u>

After running the model for five stress periods (Water Years 2006-2011), each lasting 365 days, MODFLOW generated numerical data: the head (groundwater elevations), the drawdown (change in groundwater elevations), and the cell-by-cell flow (vector or flow direction data). These numerical data were used to develop the following Figures and Plates:

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

- The change in groundwater elevation contours were generated from the drawdown data from the Fall 2006 to Fall 2011 stress period and is shown on Plate 3 for Layer 1 and Plate 4 for Layer 2.

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

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

D. Evaluation of Model Results

Plate 1: Simulated Groundwater Contour Model Layer 1 – Fall 2011

- 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 2006 though 2011 is about 11,000 AF/Y. The radius of influence extends as far as 4,800 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 of the North Hollywood Operable Unit Aeration Wells (AE), North Hollywood West Wells, Glendale OU and Pollock Treatment Plant Wells.

Plate 2: Simulated Groundwater Contour Model Layer 2 – Fall 2011

- The most significant features are the cones of depression near the Rinaldi-Toluca (R-T), Tujunga (TJ), North Hollywood-West (NHW), and 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 2006 to Fall 2011

- As shown in Plate 3, the areas in the vicinity of the pumping well fields of the SFB and downgradient of the Hansen Spreading Grounds (HSG) show decline in the groundwater elevations over the last five years of the study period (Water Year 2006-07 to Water Year 2010-2011). The areas west of the 405 Freeway and in the vicinity of the PSG show a minor increase in groundwater elevations. In general, the basin shows a minor decline mostly in the areas of pumping activities.
- The increase in the water levels in the vicinity of Pacoima Spreading Grounds (PSG) was due to the additional spreading of about 24,600 AF of projected imported water by Burbank to the normal recharge activity by LACDPW of native water.

- The water table within the cone of depression at the Rinaldi-Toluca Well Field declines by about ten feet, and the groundwater level near the Burbank OU declines by about two feet.
- The water table within the cone of depression at the Tujunga Well Field will decline by about 14 feet.
- The water table near the Glendale North and South OU wells will decline about one foot. The North OU Wells will pump 5,234 AF/Y and the South OU Wells 2,066 AF/Y.
- The areas near the North Hollywood, Erwin, and Whitnall Well Fields will experience a four to six foot decrease in the water table.

Plate 4: Change in Groundwater Elevation Model Layer 2 – Fall 2006 to Fall 2011

- The area near the Rinaldi-Toluca and North Hollywood – West well fields will experience a six to ten foot decline in the water table. The area near the North Hollywood East Branch, Erwin, Whitnall and Verdugo Well Fields will experience a four foot decline in the water table. The area upgradient of the Tujunga Well Field will experience about 14 feet of decline in the water table.

Plate 5: Simulated Groundwater Flow Direction Model Layer 1 – Fall 2011

- 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 2011

- 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 2011

- Plates 7-10 depict the most recent TCE, PCE, NO_3 and Cr contaminant plumes that are superimposed onto the horizontal direction of groundwater movement for Layer 1, Fall 2011. The Burbank OU appears to contain most of the 1,000 to 5,000 µg/L TCE and PCE plumes and a large portion of the 0-5, 5-50, 100-500, and 500 – 1,000 µg/L TCE and PCE plumes. The uncaptured portion of these plumes will migrate southeasterly in the direction of the Los Angeles River Narrows area and toward the Glendale OU.

- The Burbank OU pumping (11,000 AF/Y) 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 capture a portion of the plumes uncaptured by Burbank OU Wells.

- The Pollock Wells (2,400 AF/Y) 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.

- 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.

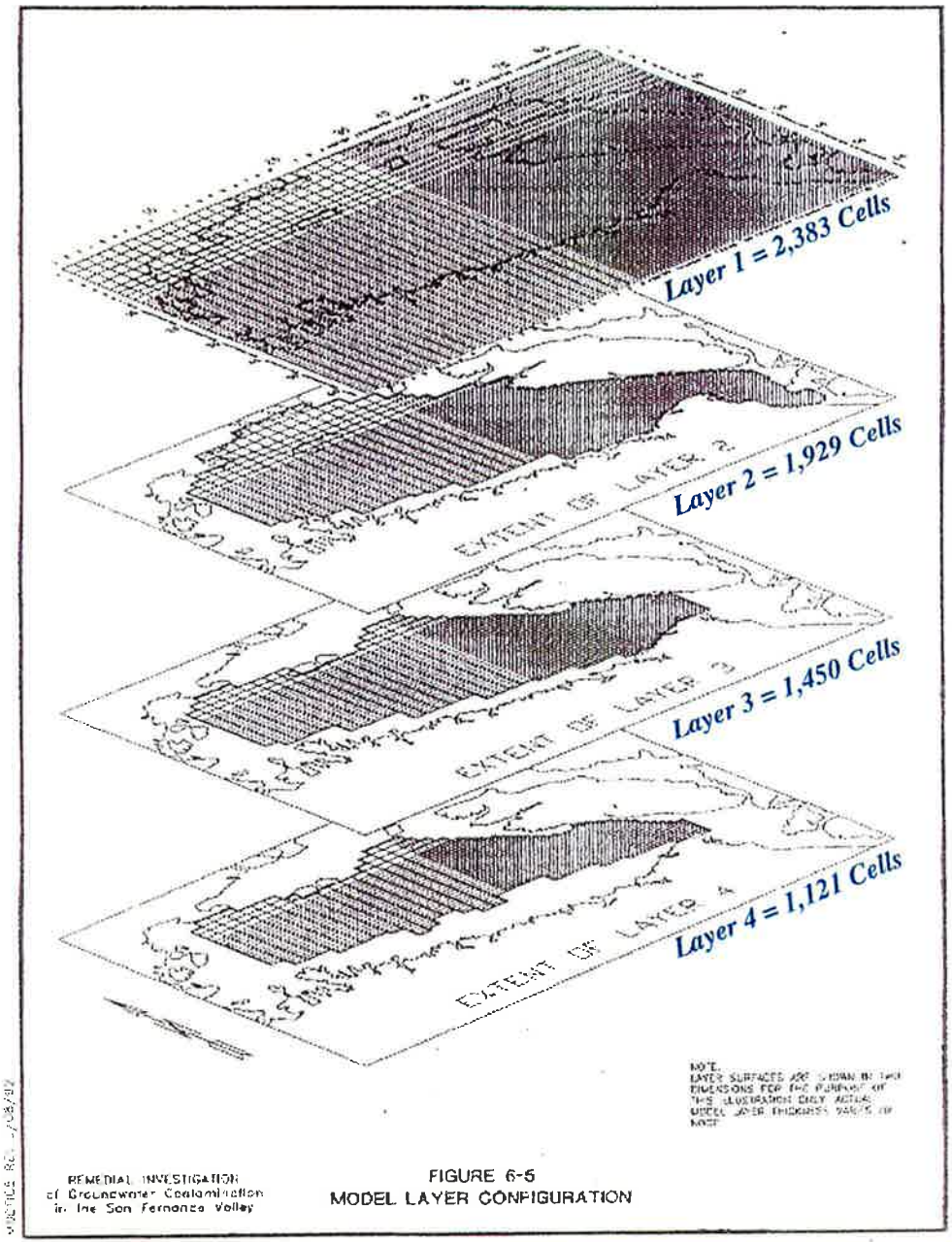
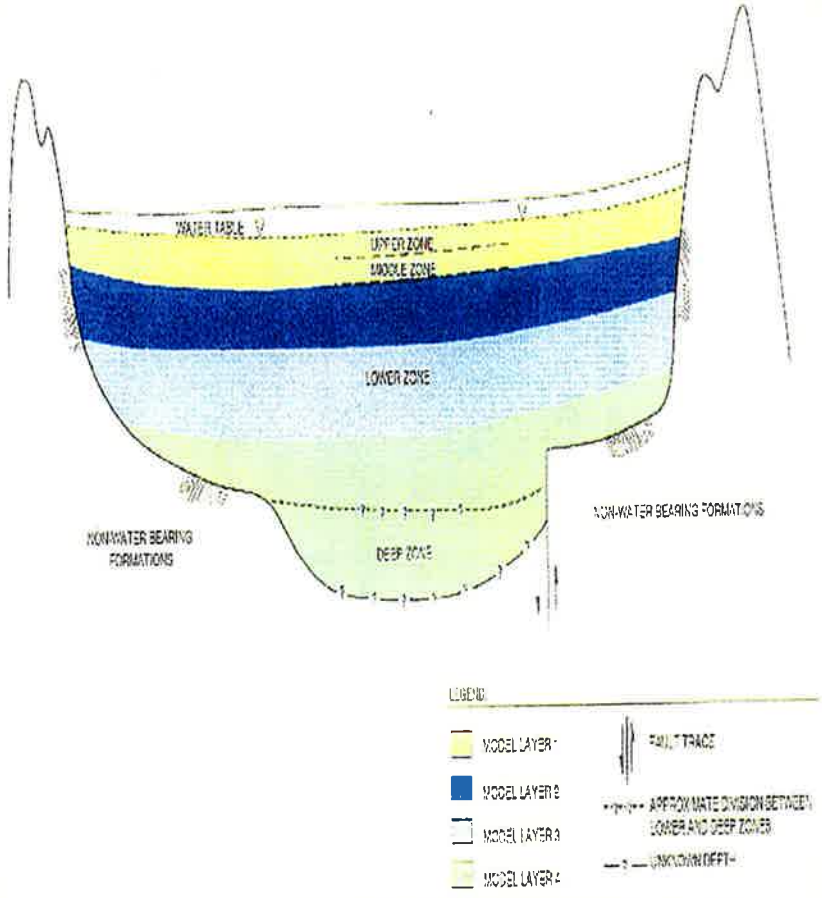


Figure 7.1
Model Layers and Cell Configurations



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 2006 - 2011

Table 7-1A

	SAN FERNANDO 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
2006-07	3.20	4.11	2,223	56,256	58,479	702	342	3,304	-	44	241	1,041	4,972	350	400	70	820	64,973
2007-08	18.57	23.06	12,874	55,085	67,959	3,939	438	12,973	-	579	12,127	6,696	32,813	350	400	70	820	105,531
2008-09	18.57	23.06	12,874	55,085	67,959	3,939	438	12,973	-	579	12,327	6,696	33,013	350	400	70	820	105,731
2009-10	18.57	23.06	12,874	55,085	67,959	3,939	438	12,973	-	579	12,327	6,696	33,013	350	400	70	820	105,731
2010-11	18.57	23.06	12,874	55,085	67,959	3,939	438	12,973	-	579	12,327	6,696	33,013	350	400	70	820	105,731

Table 7-1B

	SAN FERNANDO 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	GAC	BOU	NON-BURBANK (VMP)	CITY OF GLENDALE	OU-NORTH	OU-SOUTH	TOTAL NON-LADWP	TOTAL NON-GLENDALE (F, LAWN)	TOTAL EXTRACTION
2006-07	-1,453	-2,550	0	-24,012	-2,675	-18,869	-15,701	-3,269	-4,394	-72,923		-9,327	-300	-25	-5,234	-2,066	-1,494	-400	-91,769
2007-08	-1,593	-3,498	0	-16,431	-2,390	-18,852	-18,489	-4,799	-4,817	-70,869	0	-10,884	-300	-25	-5,234	-2,066	-1,494	-400	-91,272
2008-09	-1,593	-3,488	0	-14,796	-2,390	-19,804	-20,649	-4,985	-4,804	-72,509	0	-10,884	-300	-25	-5,234	-2,066	-1,494	-400	-92,912
2009-10	-1,593	-3,488	0	-14,796	-2,390	-19,804	-20,649	-4,985	-4,804	-72,509	0	-10,884	-300	-25	-5,234	-2,066	-1,494	-400	-92,912
2010-11	-1,593	-3,488	0	-14,796	-2,390	-19,804	-20,649	-4,985	-4,804	-72,509	0	-10,884	0	-25	-5,234	-2,066	-1,494	-400	-92,612

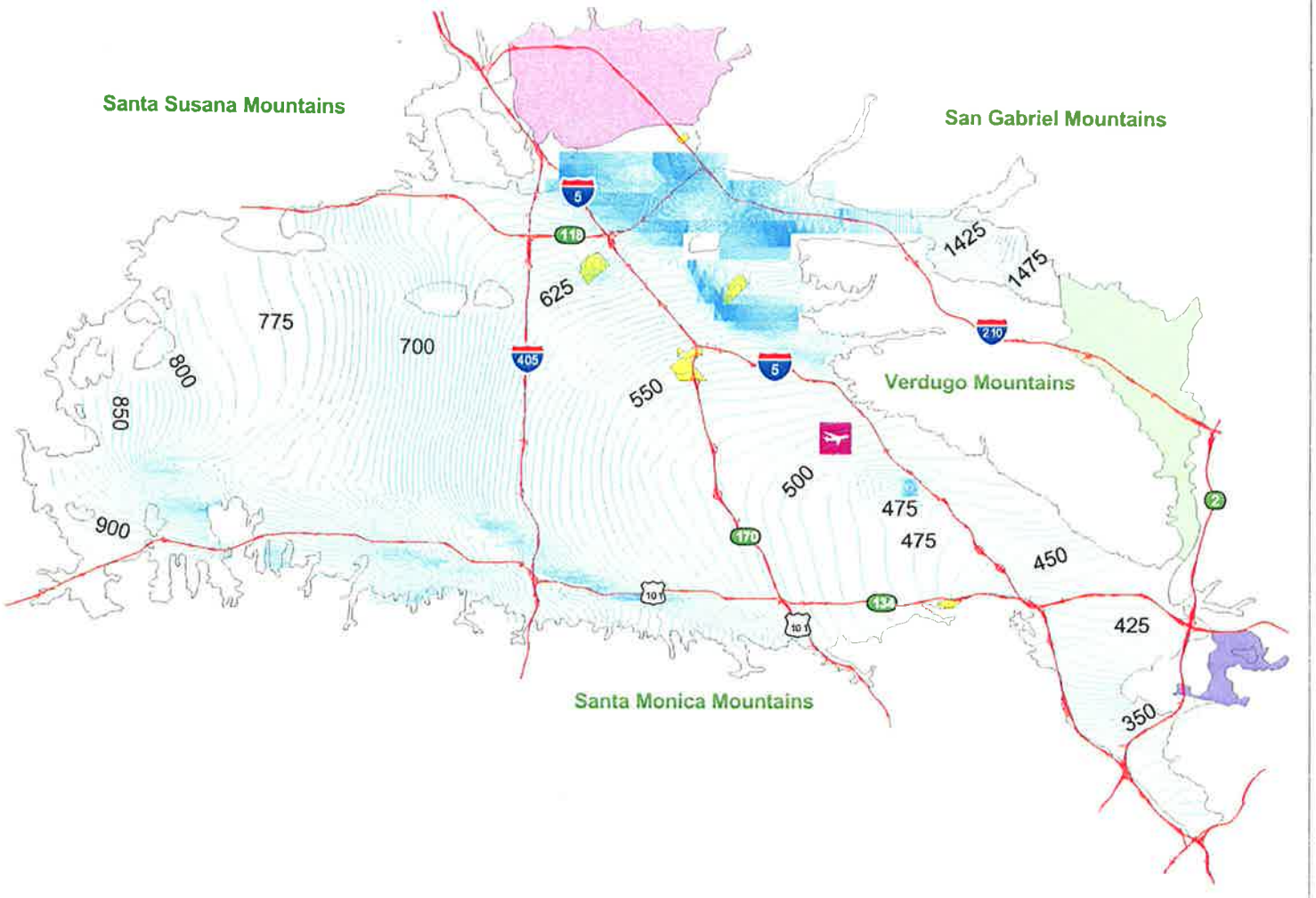
NOTES: (A) Model Recharge Package (Aerial)
(B) Model Well Package (Source)
(C) Model Well Package (Sink)

PROJECT: *WATERMASTER*
PROJECT NO.: *PS06-11*
DATE: 6/13/2007

PLATES

PLATE 1

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years



LEGEND

- Groundwater Contour
- Spreading Grounds
- Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

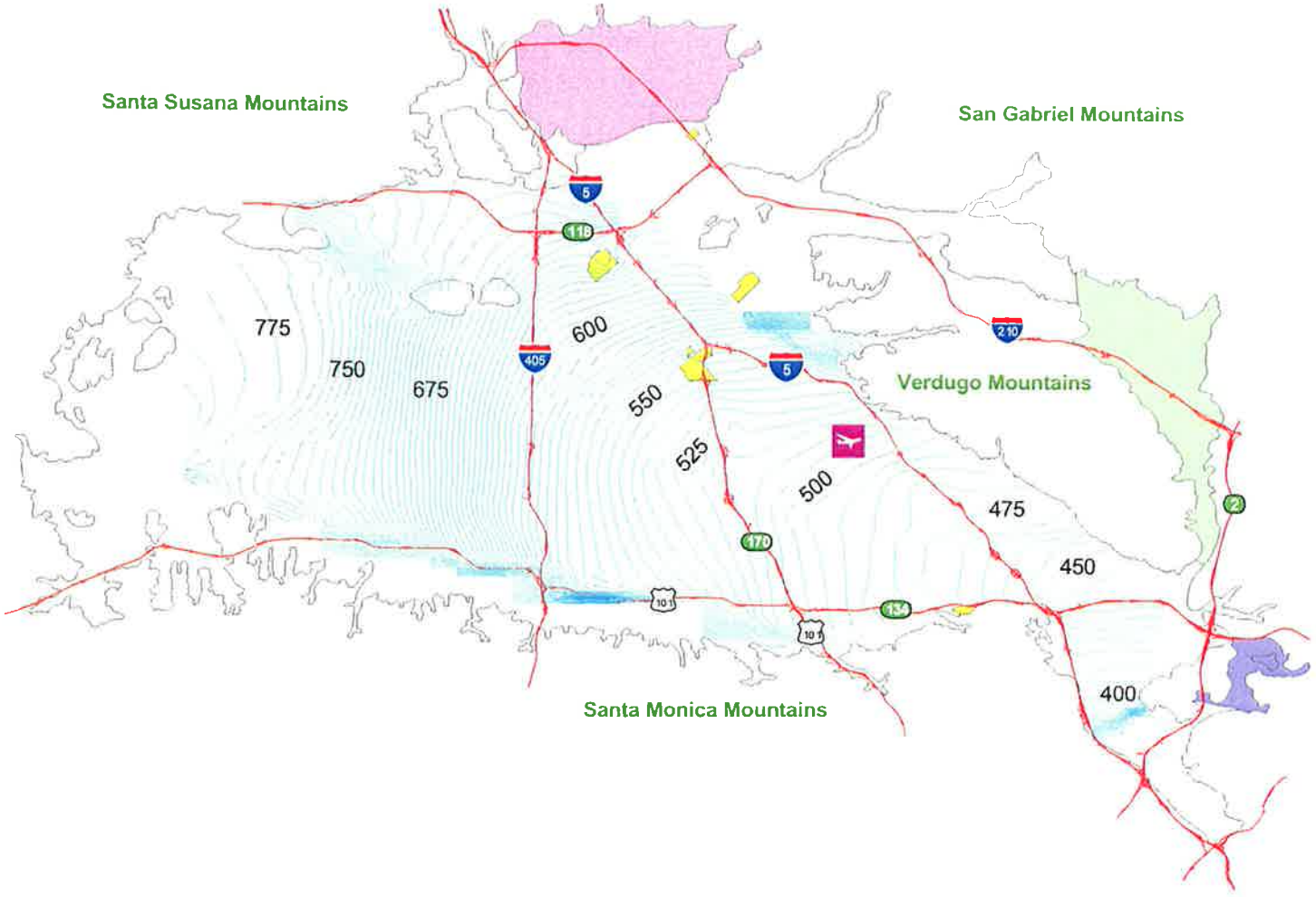
N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 1
FALL 2011

PLATE 2

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years



LEGEND

- Groundwater Contour
- Spreading Grounds
- Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

N

2 0 2 Miles

Simulated Groundwater Contours - Model Layer 2
FALL 2011

PLATE 3

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years

LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headworks
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo
- Change in GW Elev.
- Spreading Grounds
- Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

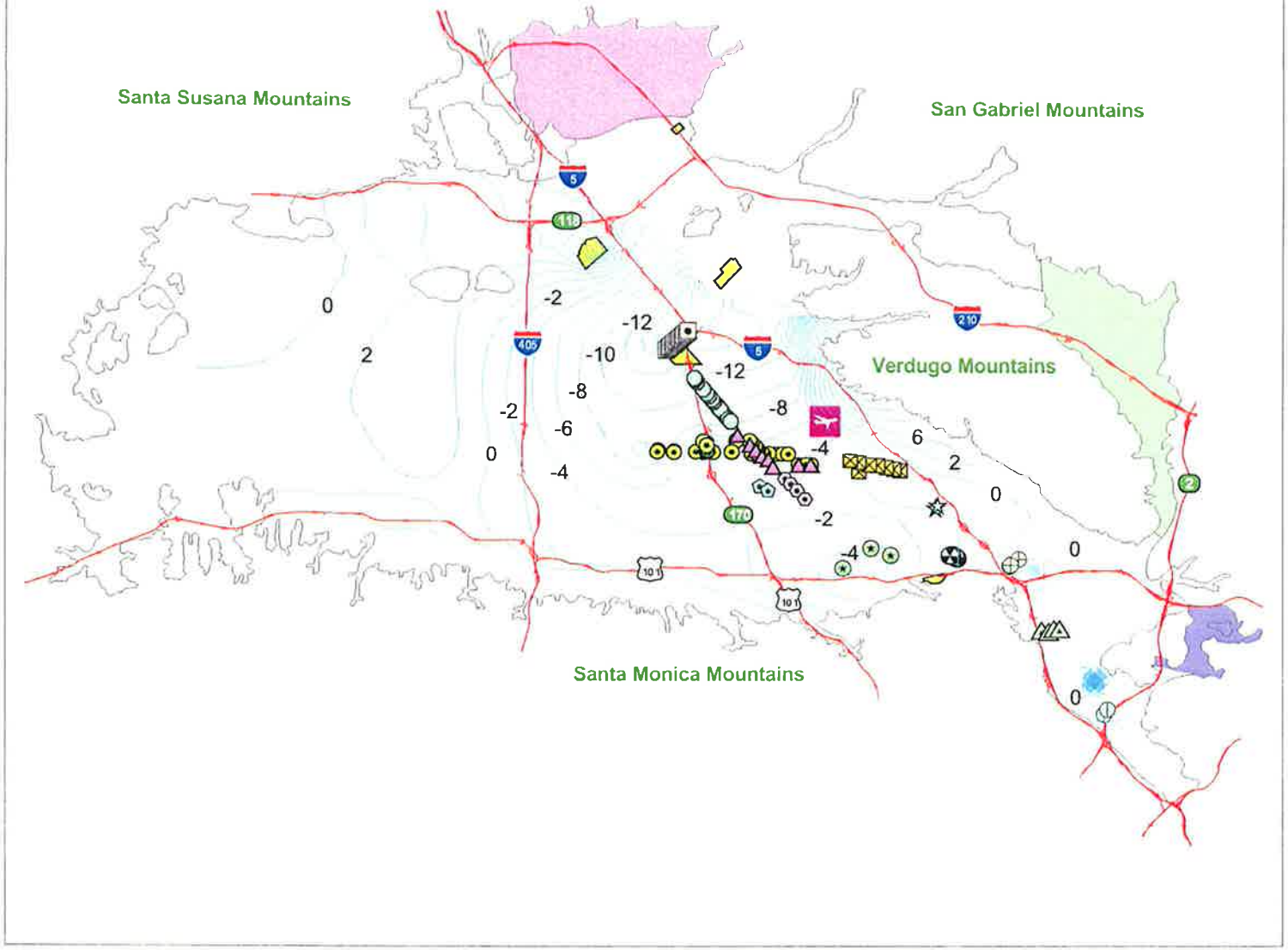
N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 1
Fall 2006 - Fall 2011

PLATE 4

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years



LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headworks
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo
- Change in GW Elev.
- Spreading Grounds
- Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

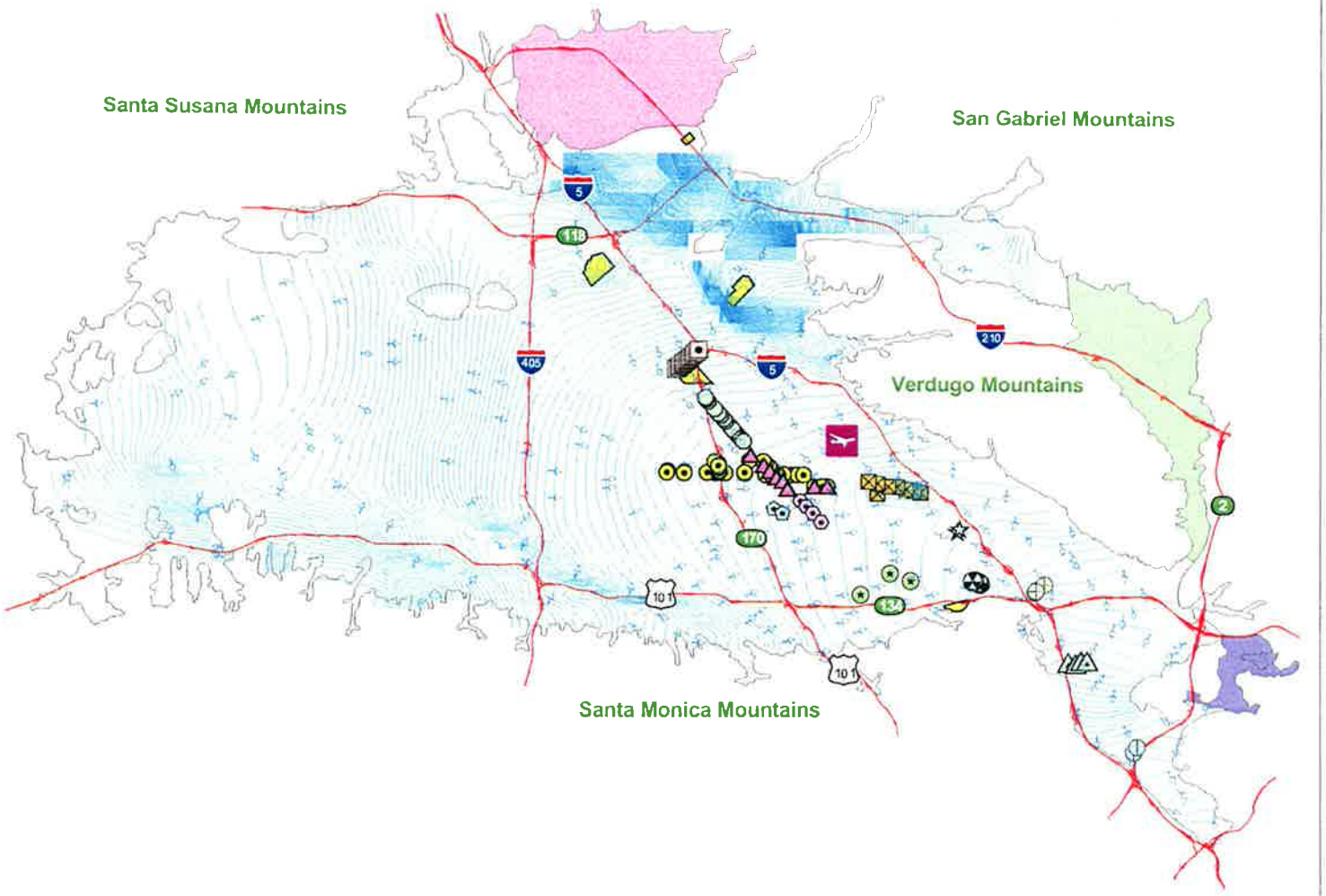
N

2 0 2 Miles

Change in Groundwater Elevation - Model Layer 2
Fall 2006 - Fall 2011

PLATE 5

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006- 2011 Water Years



LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headworks
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

Groundwater Flow Direction

Groundwater Contour

Spreading Grounds

Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

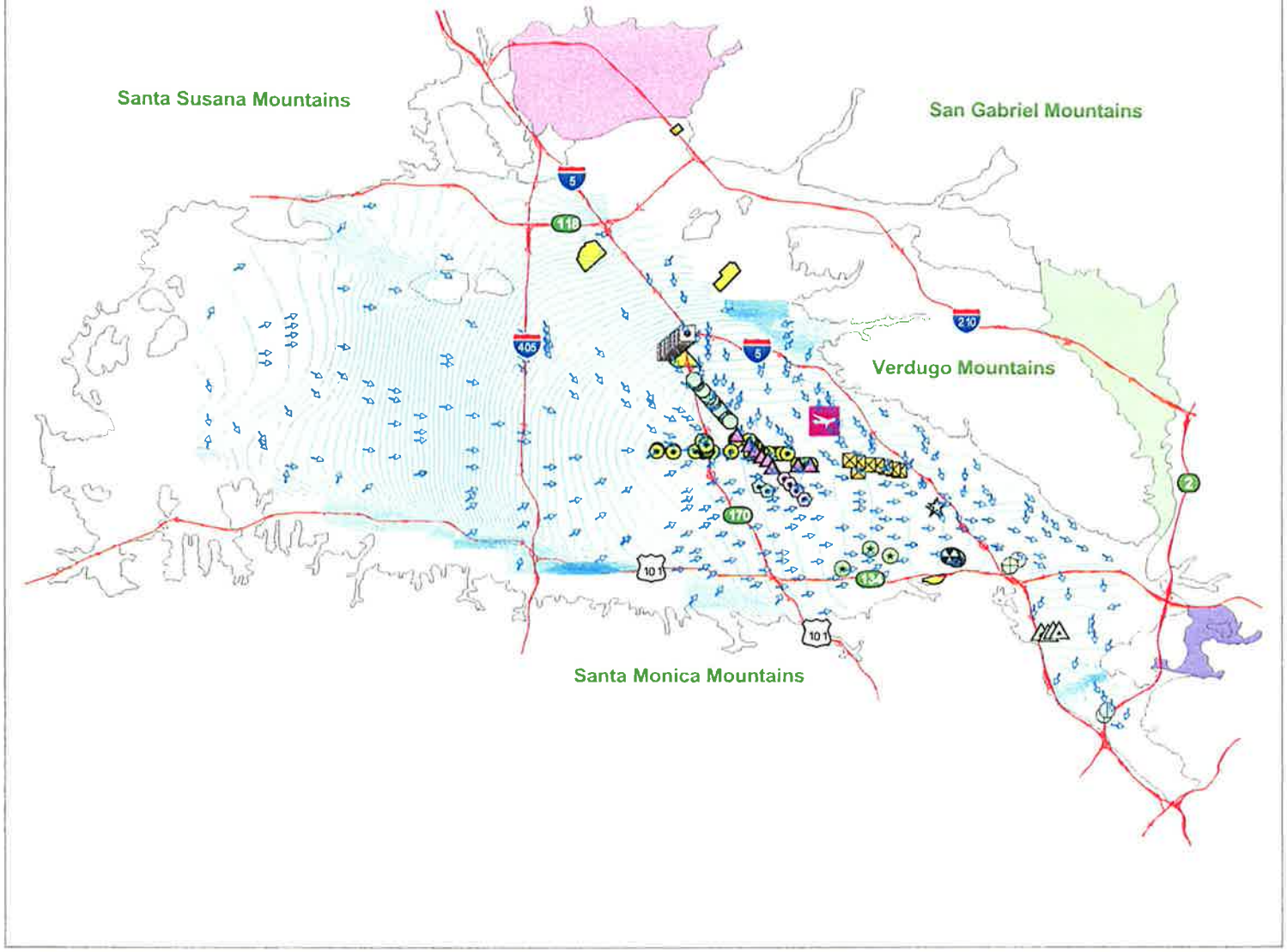
N

2 0 2 Miles

Simulated Groundwater Flow Direction - Model Layer 1
FALL 2011

PLATE 6

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years



LEGEND

Well Fields

- Burbank OU
- Glendale North OU
- Glendale South OU
- Burbank GAC
- Headworks
- North Hollywood OU
- Pollock
- Tujunga
- Rinaldi - Toluca
- North Hollywood
- Whitnall
- Erwin
- Verdugo

Groundwater Flow Direction

Groundwater Contour

Spreading Grounds

Bob Hope Airport

Groundwater Basins

- San Fernando
- Sylmar
- Verdugo
- Eagle Rock

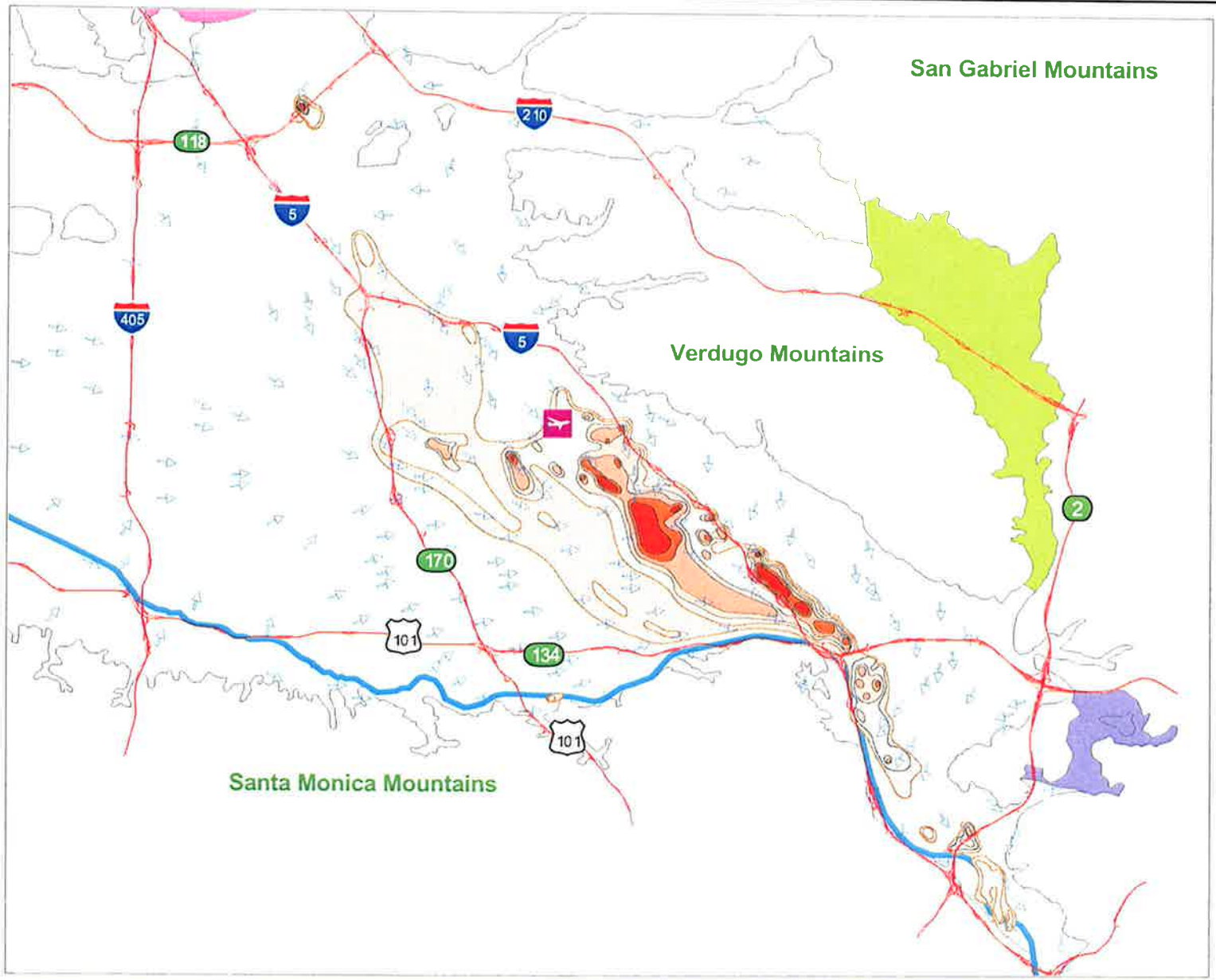
N

2 0 2 Miles

Simulated Groundwater Flow Direction - Model Layer 2
FALL 2011

PLATE 7

Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years



LEGEND

2005 TCE Plume (Source: EPA)
- > DL - 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

Groundwater Flow Direction
Los Angeles River
Bob Hope Airport

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

N

1 0 1 2 Miles

2005 TCE Contamination and 2011 Simulated Groundwater Flow Direction
Model Layer 1

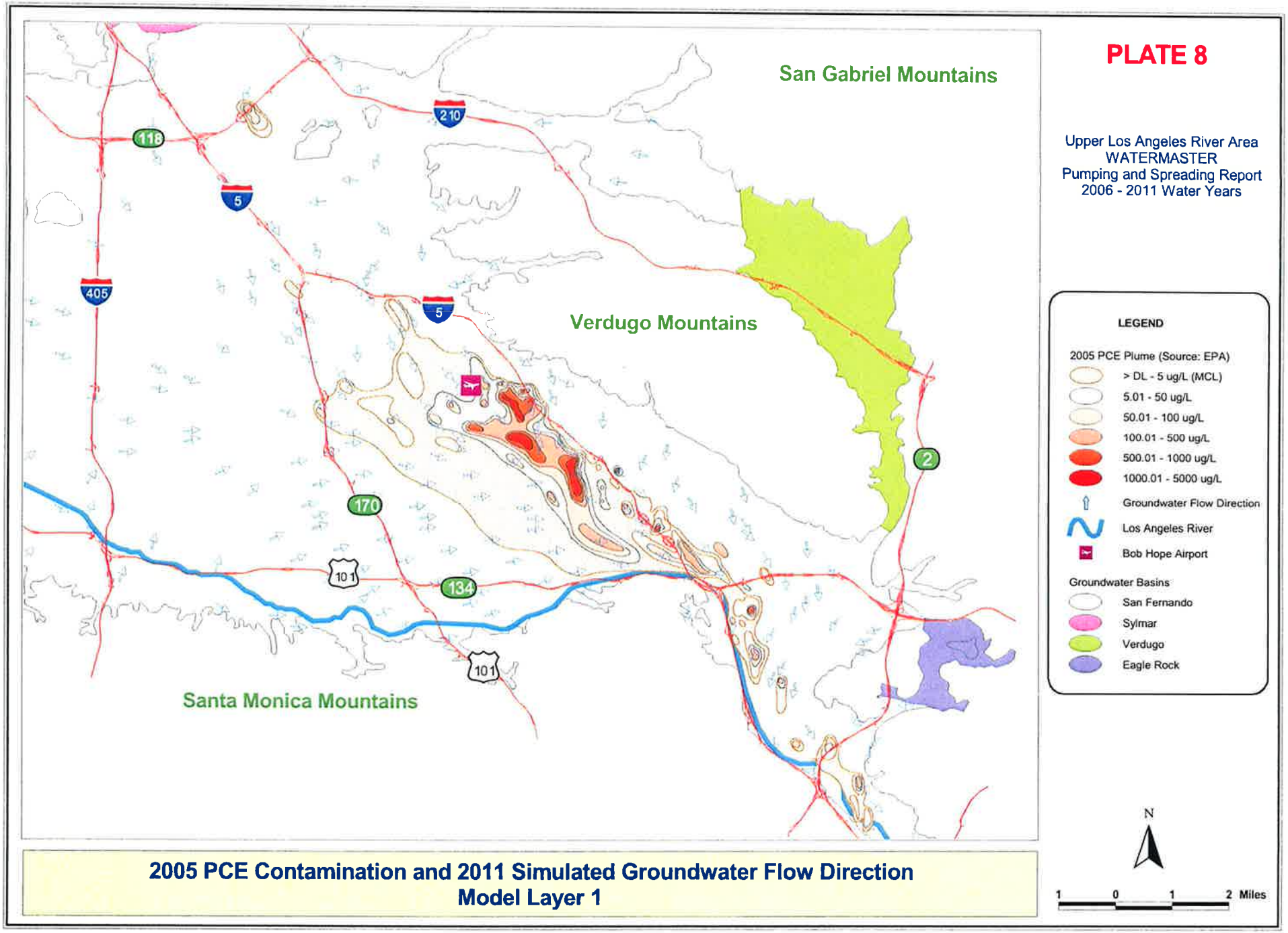


PLATE 8
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
5
170
101
134
101
2
LEGEND
2005 PCE Plume (Source: EPA)
> DL - 5 ug/L (MCL)
5.01 - 50 ug/L
50.01 - 100 ug/L
100.01 - 500 ug/L
500.01 - 1000 ug/L
1000.01 - 5000 ug/L
Groundwater Flow Direction
Los Angeles River
Bob Hope Airport
Groundwater Basins
San Fernando
Sylmar
Verdugo
Eagle Rock
N
1 0 1 2 Miles
2005 PCE Contamination and 2011 Simulated Groundwater Flow Direction
Model Layer 1

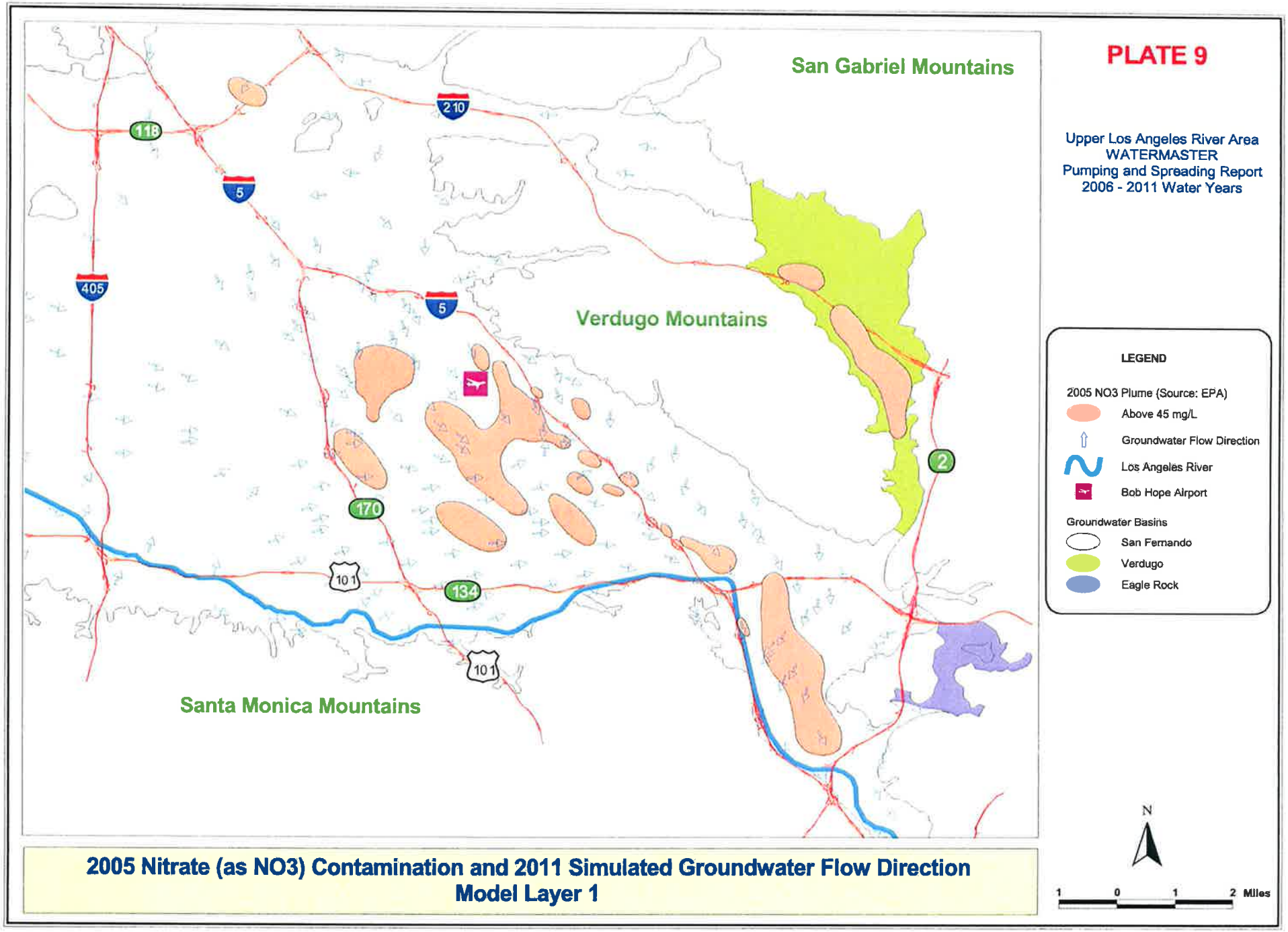
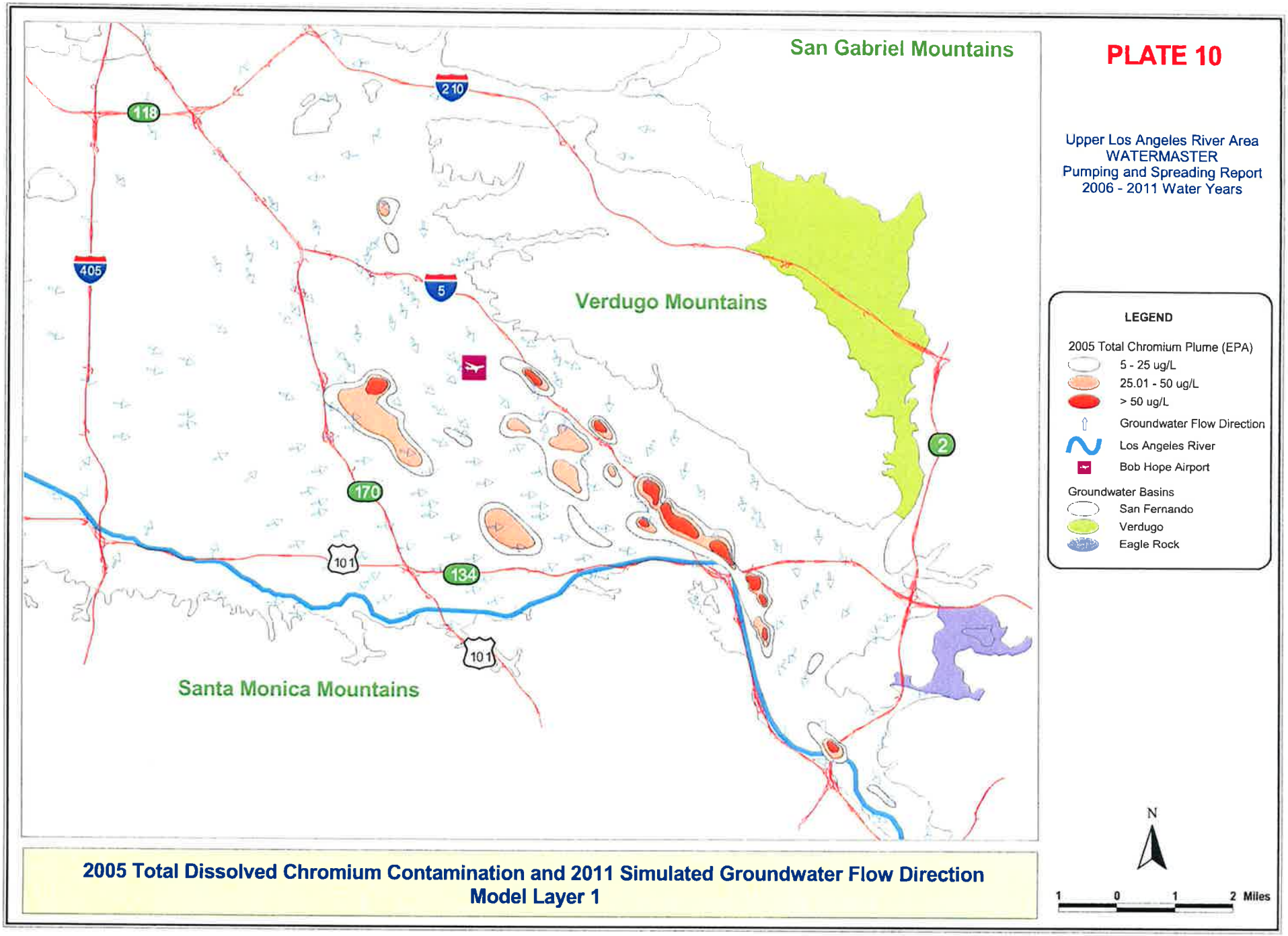


PLATE 9
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years
San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
118
210
5
405
5
170
101
134
101
2
LEGEND
2005 NO3 Plume (Source: EPA)
Above 45 mg/L
Groundwater Flow Direction
Los Angeles River
Bob Hope Airport
Groundwater Basins
San Fernando
Verdugo
Eagle Rock
N
1 0 1 2 Miles
2005 Nitrate (as NO3) Contamination and 2011 Simulated Groundwater Flow Direction
Model Layer 1


San Gabriel Mountains
Verdugo Mountains
Santa Monica Mountains
210
118
405
5
170
101
134
101
2
PLATE 10
Upper Los Angeles River Area
WATERMASTER
Pumping and Spreading Report
2006 - 2011 Water Years
LEGEND
2005 Total Chromium Plume (EPA)
5 - 25 ug/L
25.01 - 50 ug/L
> 50 ug/L
Groundwater Flow Direction
Los Angeles River
Bob Hope Airport
Groundwater Basins
San Fernando
Verdugo
Eagle Rock
N
1 0 1 2 Miles
2005 Total Dissolved Chromium Contamination and 2011 Simulated Groundwater Flow Direction
Model Layer 1

APPENDIX A

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

2006-2011 Water Years

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 2006-2011 WATER YEARS

APRIL 2007

Prepared by:
Groundwater and Watershed Management Group
WATER RESOURCES DIVISION
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 of annual spreading rates and volumes.*
> - *The most recent water quality data for each well."*

This report constitutes Los Angeles' 2007 Groundwater Pumping and Spreading Plan for the Water Years 2006 - 2011.

Section 1: Facilities Description

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

a.) Spreading Grounds: There are five 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. 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

Estimated 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	35,000
Lopez	Shallow basins	12	2,000
Pacoima	Med. Depth basins	107	23,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basins	83	43,000
TOTAL:			104,000

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 (cfs)
San Fernando Basin	Active	Stand-by	Total	cfs
Aeration	7	---	7	2.6
Crystal Springs (A)	---	---	---	---
Erwin	2	0	2	5.8
Headworks			---	---
North Hollywood	17	0	17	86
Pollock	2	0	2	6.3
Rinaldi-Toluca	15	---	15	107
Tujunga	12	---	12	105.9
Verdugo	2	---	2	7.2
Whitnall	4	---	4	18.8
Sylmar Basin				
Mission	2	---	2	6.2
TOTAL	63	0	63	345.8

(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.

Section 2: Annual Pumping And Spreading Projections

2.) Pumping Projections for the Water Years 2006-2011: 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 increasing levels of hexavalent chromium and other emerging chemicals; and the migration of volatile organic compounds that have spread beyond the sphere of influence created by the small capacity of the NHOU.

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	3,405 AF

Table 2-1 shows the amount of groundwater extractions that are expected during the 2006-07 Water Year from the San Fernando and Sylmar Basins. Appendix B provides groundwater extraction projections from 2006 to 2011. 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
ACTUAL AND PROJECTED PUMPING FOR WY 06-07

San Fernando Basin		Actual Extraction (Acre-Feet)						Projected Extraction (Acre-Feet)					
	TOTAL	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07
AERATION	1,453	62	60	129	141	128	135	131	135	131	135	135	131
ERWIN	2,550	295	0	86	111	100	215	286	295	286	295	295	286
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
NORTH HOLLYWOOD	24,011	2,780	2,178	2,054	1,956	1,739	2,460	1,607	984	952	2,460	2,460	2,381
POLLOCK	2,675	357	292	240	203	183	203	196	203	196	203	203	196
RINALDI-TOLUCA	18,870	1,937	1,536	1,267	1,255	1,372	2,067	1,845	1,107	1,071	1,661	1,907	1,845
TUJUNGA	15,702	2,073	131	0	1,199	1,767	492	1,786	1,230	1,548	1,845	1,845	1,786
VERDUGO	3,269	0	0	191	301	272	301	286	308	298	308	510	494
WHITNALL	4,394	406	185	258	406	367	375	393	406	393	406	406	393
SAN FERNANDO BASIN TOTAL:	72,924	7,910	4,382	4,225	5,572	5,928	6,248	6,530	4,668	4,875	7,313	7,761	7,512
Sylmar Basin													
MISSION	3,583	68	0	320	381	183	381	369	381	369	381	381	369
ULARA TOTAL:	76,507	7,978	4,382	4,545	5,953	6,111	6,629	6,899	5,049	5,244	7,694	8,142	7,881

b.) Spreading Projections for the 2006-07 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 2006-07.

Table 2-2

Actual and Projected Spreading in ULARA Spreading Grounds in 2006-07 (in acre-feet)							
	Operated by:						
	LACDPW				LADWP	LACDPW and LADWP	Monthly Total
Month	Branford	Hansen	Lopez	Pacoima	Headworks (A)	Tujunga	
Oct-06	27	257	0	0	0	123	407
Nov-06	37		0	0	0	289	326
Dec-06	87	474	44	8	0	178	791
Jan-07	52	747	0	39	0	135	973
Feb-07	116	759	0	194	0	102	1171
Mar-07	23	1067	0	0	0	214	1304
Projected							
Apr-07	0	0	0	0	0	0	0
May-07	0	0	0	0	0	0	0
Jun-07	0	0	0	0	0	0	0
Jul-07	0	0	0	0	0	0	0
Aug-07	0	0	0	0	0	0	0
Sep-07	0	0	0	0	0	0	0
Total	342	3304	44	241	0	1041	4972

(A) 1992-93 Water Year was the last year of spreading.

Section 3: Water Quality Monitoring Program Description

All of LADWP's 63 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 organic 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): Throughout the 2006-2007 Water Year Well No. 5 was out of service due to pump failure. Other wells had problems due to reduced water table impacting suction at the wells so that the system could not operate at design capacity. In February 2007 Well No. 2 was shut down due to high levels of hexavalent chromium. Treatment of the contaminant is under investigation.

	Aeration Well No. (gpm)							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)
4/06	140	232	188	---	---	---	125	685	96.2/8.1	ND/ND
5/06	141	239	200	---	313	305	---	1039	54.0/6.5	ND/ND
6/06	138	245	211	---	311	307	271	1049	81.2/ND	ND/ND
7/06	140	239	201	---	346	298	267	1221	64.2/7.5	ND/ND
8/06	141	239	200	---	313	305	---	1266	66.2/7.6	ND/ND
9/06	138	225	151	---	306	292	265	1326	75.0/7.6	ND/ND
10/06	138	224	96	---	303	292	263	1282	65.6/8.9	ND/ND
11/06	138	233	---	---	310	---	276	903	95.3/8.6	ND/ND
12/06	138	235	---	---	308	336	200	1089	90.1/8.0	ND/ND
1/07	140	234	70	---	306	337	270	898	108.0/7.8	ND/ND
2/07	137	233	47	---	304	352	229	729	40.8/6.8	ND/ND
3/07	137	231	16	---	305	325	180	1051	33.3/7.0	ND/ND

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 2006-2007 Water Year, as of the printing of this report (April 2007).

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. The contract was awarded in December 2006 by the City of Los Angeles Bureau of Engineering.

The Headworks Spreading Grounds is the site of multi-objective projects to improve water quality and storage, and to provide the community with an opportunity for passive recreation. The project includes a buried 110-million gallon reservoir for potable water storage. The other Headworks component is the proposed wetlands project that is a joint effort between LADWP and the Army Corps of Engineers. This project is currently undergoing a feasibility analysis.

b.) Groundwater Treatment Facilities:

North Hollywood Operable Unit. A feasibility study is being developed by the USEPA to improve the sustained production capacity of the NHOU well system to 2,000 gpm; to enhance the NHOU capture zone; and to improve the reliability of the NHOU. This plan possibly includes the improving of existing wells to the construction of additional new wells in the NHOU area. The USEPA, the City of Los Angeles, and the RWQCB are also investigating the source of the hexavalent chromium contamination in the area.

Water Recycling Projects in the San Fernando Valley. The LADWP has plans to connect large recycled water customers over the next decade including the Hansen Dam Recreation Area, Valley Generating Station, and the Sepulveda Basin in the southern portion of the Valley. Irrigation with recycled water of a small area of the Woodley Golf Course began in April 2007 with plans to bring the entire golf course onto recycled water along with the Valley Generating Station by this July. LADWP plans to begin a stakeholder process to study the feasibility of using advanced treated recycled water for groundwater replenishment in the SFB. The "Water

Reuse Feasibility Planning Study" will seek stakeholder input for deciding if LADWP should pursue groundwater replenishment or focus only on non-potable uses.

APPENDIX A:
2006-2007 Water Quality Sampling Results

ULARA WELLS

	Owner Name	Well Name	Well	Date	PCE 5 ppb	TCE 5 ppb	NO3 45 ppm	C6+ 5 ppb
1	NHE-1	3800E	NH AERATION WELL-001	6/17/98	3.66	240.00		
2	NHE-2	3810U	NH AERATION WELL-002	3/27/07	37.10	915.00	40.60	423.00
3	NHE-3	3810V	NH AERATION WELL-003	3/22/07	4.51	23.20	26.10	8.26
4	NHE-4	3810W	NH AERATION WELL-004	3/22/07	14.10	25.50	37.10	1.00
5	NHE-5	3820H	NH AERATION WELL-005	11/29/05	11.30	18.00		
6	NHE-6	3821J	NH AERATION WELL-006	3/22/07	8.63	13.80	21.70	3.62
7	NHE-7	3830P	NH AERATION WELL-007	3/22/07	5.42	86.30	33.50	1.27
8	NHE-8	3831K	NH AERATION WELL-008	3/22/07	8.25	18.30	30.40	1.03
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	6.10	4.43	
13	EW-6	3821H	ERWIN-006	5/16/06	-99.00	2.96	22.90	
14	EW-10	3811F	ERWIN-010	2/20/07	-99.00	-99.00	12.70	
15	M-5	4840J	MISSION-005		-99.00	5.15	27.60	
16	M-6	4840K	MISSION-006	2/9/07	-99.00	-99.00	10.10	
17	M-7	4840S	MISSION-007	2/9/07	-99.00	3.36	23.80	
18	NH-02	3800	NORTH HOLLYWOOD-002	9/28/99	6.06	38.50	32.40	
19	NH-04	3780A	NORTH HOLLYWOOD-004	2/16/07	-99.00	-99.00	8.55	1.00
20	NH-07	3770	NORTH HOLLYWOOD-007	2/28/07	-99.00	-99.00	21.10	1.00
21	NH-11	3810	NORTH HOLLYWOOD-011	5/4/04	17.70	16.80	25.50	
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	6.16	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	2/22/07	0.72	1.54	25.40	2.30
29	NH-23	3790D	NORTH HOLLYWOOD-023	5/25/06	5.26	9.93	30.50	
30	NH-25	3790F	NORTH HOLLYWOOD-025	2/16/07	-99.00	-99.00	20.10	1.48
31	NH-26	3790E	NORTH HOLLYWOOD-026	2/16/07	2.75	6.15	28.90	3.50
32	NH-27	3820F	NORTH HOLLYWOOD-027	4/23/02	-99.00	-99.00	10.40	
33	NH-28	3810K	NORTH HOLLYWOOD-028	5/4/04	18.00	17.00	25.70	
34	NH-30	3800D	NORTH HOLLYWOOD-030	6/18/03	1.12	8.08	25.00	
35	NH-32	3770C	NORTH HOLLYWOOD-032	5/25/06	-99.00	-99.00	2.00	
36	NH-33	3780C	NORTH HOLLYWOOD-033	2/16/07	-99.00	-99.00	4.25	1.01
37	NH-34	3790G	NORTH HOLLYWOOD-034	2/22/07	0.71	1.39	21.30	
38	NH-35	3830N	NORTH HOLLYWOOD-035	11/15/01	2.81	1.22	10.40	
39	NH-36	3790H	NORTH HOLLYWOOD-036	2/16/07	-99.00	1.17	16.00	3.62
40	NH-37	3790J	NORTH HOLLYWOOD-037	2/22/07	0.73	1.21	12.30	3.10
41	NH-38	3810M	NORTH HOLLYWOOD-038					
42	NH-39	3810N	NORTH HOLLYWOOD-039					
43	NH-40	3810P	NORTH HOLLYWOOD-040	5/4/04	1.85	1.63	9.30	
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	2/22/07	4.40	10.30	17.00	1.00
47	NH-44	3790L	NORTH HOLLYWOOD-044	2/22/07	-99.00	2.86	10.50	2.03
48	NH-45	3790M	NORTH HOLLYWOOD-045	5/5/06	-99.00	-99.00	9.66	
49	P-4	3959E	POLLOCK-004	2/2/07	3.97	4.32	31.90	
50	P-6	3958H	POLLOCK-006	5/15/06	9.88	7.79	38.00	

NOTE: -99 = non-detect

- - - = not tested (prior results)

= above MCL

	Owner Name	Well Name	Well	Date	PCE 5 ppb	TCE 5 ppb	NO3 45 ppm	C6+ 5 ppb
51	P-7	3958J	POLLOCK-007	6/2/03	-99.00	-99.00	13.50	
52	RT-1	4909E	RINALDI-TOLUCA-001	2/13/07	-99.00	2.44	9.92	
53	RT-2	4898A	RINALDI-TOLUCA-002	2/13/07	-99.00	-99.00	12.90	
54	RT-3	4898B	RINALDI-TOLUCA-003	2/14/07	-99.00	-99.00	14.00	
55	RT-4	4898C	RINALDI-TOLUCA-004	2/14/07	-99.00	-99.00	14.30	
56	RT-5	4898D	RINALDI-TOLUCA-005	2/14/07	-99.00	-99.00	14.00	
57	RT-6	4898E	RINALDI-TOLUCA-006	2/14/07	-99.00	-99.00	14.40	
58	RT-7	4898F	RINALDI-TOLUCA-007	2/14/07	-99.00	0.68	17.80	
59	RT-8	4898G	RINALDI-TOLUCA-008	2/14/07	-99.00	-99.00	9.30	
60	RT-9	4898H	RINALDI-TOLUCA-009	2/14/07	-99.00	-99.00	12.20	
61	RT-10	4909G	RINALDI-TOLUCA-010	2/13/07	-99.00	5.25	14.80	
62	RT-11	4909K	RINALDI-TOLUCA-011	2/13/07	-99.00	2.50	9.57	
63	RT-12	4909H	RINALDI-TOLUCA-012	2/13/07	-99.00	-99.00	10.10	
64	RT-13	4909J	RINALDI-TOLUCA-013	2/13/07	-99.00	-99.00	9.52	
65	RT-14	4909L	RINALDI-TOLUCA-014	5/23/06	-99.00	0.75	10.30	
66	RT-15	4909M	RINALDI-TOLUCA-015	2/13/07	-99.00	0.78	8.46	
67	TJ-01	4887C	TUJUNGA-001	2/15/07	-99.00	-99.00	18.80	
68	TJ-02	4887D	TUJUNGA-002	2/15/07	2.75	4.86	17.60	
69	TJ-03	4887E	TUJUNGA-003	2/27/07	-99.00	0.70	16.50	
70	TJ-04	4887F	TUJUNGA-004	2/27/07	14.30	22.40	30.70	
71	TJ-05	4887G	TUJUNGA-005	2/15/07	0.78	4.43	18.70	
72	TJ-06	4887H	TUJUNGA-006	2/15/07	1.05	4.55	14.60	
73	TJ-07	4887J	TUJUNGA-007	2/15/07	0.93	5.15	19.80	
74	TJ-08	4887K	TUJUNGA-008	2/15/07	7.87	12.20	37.90	
75	TJ-09	4886B	TUJUNGA-009	2/15/07	1.28	5.73	35.30	
76	TJ-10	4886C	TUJUNGA-010	2/27/07	-99.00	5.70	17.40	
77	TJ-11	4886D	TUJUNGA-011	2/27/07	-99.00	3.74	11.50	
78	TJ-12	4886E	TUJUNGA-012	2/27/07	0.56	2.40	11.00	
79	V-1	3863H	VERDUGO-001	8/3/05	0.54	0.95	3.65	
80	V-2	3863P	VERDUGO-002	2/26/03	0.78	18.30	38.70	
80	V-2	3853F	VERDUGO-002	3/21/03	-99.00	3.60	36.10	
81	V-4	3863J	VERDUGO-004	1/13/98	6.47	17.90	1.92	
82	V-11	3863L	VERDUGO-011	5/12/05	-99.00	-99.00	9.13	
83	V-13	3853G	VERDUGO-013					
84	V-24	3844R	VERDUGO-024	2/20/07	-99.00	-99.00	7.31	
85	WH-4	3821D	WHITNALL-004	2/20/07	4.49	3.14	15.80	
86	WH-5	3821E	WHITNALL-005	2/20/07	1.84	4.24	20.70	
87	WH-6A	3831J	WHITNALL-006A	2/20/07	0.85	2.20	6.60	
88	WH-7	3832K	WHITNALL-007	2/20/07	0.59	2.68	7.35	
89	WH-8	3832L	WHITNALL-008		4.60	10.20		
90	WH-9	3832M	WHITNALL-009					

NOTE: -99 = non-detect

--- = not tested (prior results)

= above MCL

APPENDIX B:
Groundwater Extraction Projections 2006-2011

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

WELL FIELD	WATER YEAR				
	2006-07	2007-08	2008-09	2009-10	2010-11
AERATION	1,453	1,593	1,593	1,593	1,593
ERWIN	2,550	3,498	3,488	3,488	3,488
HEADWORKS	0	0	0	0	0
NO HOLLYWOOD	24,012	16,431	14,796	14,796	14,796
POLLOCK	2,676	2,390	2,390	2,390	2,390
RINALDI-TOLUCA	18,869	18,852	19,804	19,804	19,804
TUJUNGA	15,701	18,489	20,649	20,649	20,649
VERDUGO	3,269	4,799	4,985	4,985	4,985
WHITNAL	4,394	4,817	4,804	4,804	4,804
TOTAL ACRE-FEET	72,924	70,869	72,509	72,509	72,509

Sylmar Basin	3,583	4,490	4,490	4,490	4,490

APPENDIX B

CITY OF BURBANK

PUMPING AND SPREADING PLAN

2006-2011 Water Years

GROUNDWATER PUMPING
AND
SPREADING PLAN

FIVE WATER YEARS
OCTOBER 1, 2006 TO SEPTEMBER 30, 2011

Prepared by

BURBANK WATER AND POWER
WATER DIVISION

May 2007

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TABLES

FIGURES

APPENDICES

I. INTRODUCTION

The groundwater rights of the City of Burbank are 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.

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.

Potable water demand is expected to increase only one-half percent per year for the next five years. The increase is mostly from multifamily residential and commercial redevelopment with increased density. 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. Recycled water use increased when the Magnolia Power Project began operation in September 2005.

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 recycled 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 projected production from this plant is shown in Table 3.2. The GAC Treatment Plant would normally be operated during the summer season from May to October. However, current plans are to keep the plant shut down, except for emergencies, because of hexavalent chromium in the well water. The GAC treatment process does not remove chromium, and blending facilities are not available. Total chromium in the plant effluent would exceed the limit of five parts per billion (ppb) set by Burbank City Council policy for water delivered to the distribution system. New chromium regulations (MCL and PHG) due in 2007 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 (Figure 3.1). The plant capacity is 2,000 gpm.

Additionally, 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 (Figure 3.1). 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. Historic and projected water production from the Burbank Operable Unit (BOU) is shown in Table 3.3.

D. RECYCLED WATER

The City has used reclaimed water for its power plant cooling since 1967. An expansion of the recycled water system to DeBell Golf Course was completed in 1996. Incremental expansion of the recycled water system has been ongoing since 2001 and is projected to continue for the next 20 years. Historic and proposed use of recycled water is shown in Table 3.4.

E. PRODUCTION WELLS

The City has four wells that are mechanically and electrically operable, plus the eight wells of the BOU. Two wells are on "Active" status and two are on "Inactive" status with the California Department of Health Services (DHS). Two others have had equipment pulled. We do not plan to operate the inactive wells unless an emergency develops in the 2006-2007 water year. Wells 17 and 18 were destroyed in accordance with County standards in September 2006.

Active Wells	Inactive Wells	Well Casings
No. 7 No. 15	No. 6A No. 13A	No. 11A No. 12

IV. JUDGMENT 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. Depending on availability of MWD replenishment water, a decision must be made each year on the purchase of physical solution 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.

B. STORED WATER CREDIT

The City has a stored water credit of 13,999 acre-feet as of October 1, 2006. Continued BOU operation has drawn down the stored water credits. The objective is to maintain a reserve of 10,000 acre-feet. (See Appendix C.) Some combination of physical solution and spreading water purchases is necessary to avoid depleting the stored water credits.

C. ALLOWANCE FOR PUMPING

The import return water extraction right (20 percent of water delivered the prior year) for the 2006-2007 water year is 4,817 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 AND TRANSFERS OF CREDITS

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. In lieu replenishment water purchases and transfers of pumping rights, including physical solution purchases, are shown in Table 4.3.

Burbank is currently preparing to construct an MWD connection at the end of the Foothill Feeder Tunnel. (See Figure 4.1.) The connection will be capable of delivering 50 cubic feet per second (cfs). This will allow spreading of 6,000 to 8,000 acre-feet per year of purchased untreated replenishment water at the Pacoima Spreading Grounds. MWD drained the tunnel for inspection in June 2006. The connection could be in operation by 2008. However, MWD notified the City on April 26, 2007 that replenishment service will be curtailed effective May 1, 2007 because of dry conditions and high projected demands.

V. CAPITAL IMPROVEMENTS

A. WELLS

Burbank: Burbank has retained the services of a consultant to conduct an efficiency study of the BOU wells and well water transmission system. Proposed capital improvements may result from the Well Field Performance Attainment Study now underway.

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

Maintenance Activity- Destruction of Wells 14A, 17 and 18: These wells have been destroyed in accordance with County standards. Well 14A was destroyed in July 2003, and Wells 17 and 18 were destroyed in September 2006.

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. During the outage, water was pumped and treated only for production testing. 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 VC-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 vapor 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. The results of the Well Field Performance Attainment Study will guide the next step in optimizing the BOU well field to reliably produce 9,000 gpm.

Replacement of distribution headers and underdrains in the liquid phase carbon contactors was completed in December of 2003. Design of replacement screens for the vapor phase carbon contactors is in progress. Construction is projected for July 2007.

The City has had responsibility for full operation of the BOU since March 12, 2001. United Water Services was the contract operator of the BOU from March 12, 2001 through November 20, 2005. Eco Resources became the contract operator on December 1, 2005.

GAC Treatment Plant: Burbank does not plan to use the production and treatment facilities of the GAC Treatment Plant during the 2006-2007 water year. The plant will remain on an active status, but will not be operated except for emergencies.

TABLE 2.1
ACTUAL AND PROJECTED WATER DEMAND

Water Year	Acre-Feet
96-97	24,888
97-98	22,447
98-99	22,672
99-00	26,313
00-01	25,619
01-02	24,937
02-03	23,129
03-04	24,357
04-05	21,790
05-06	24,110
06-07*	25,790
07-08*	25,964
08-09*	26,131
09-10*	26,298
10-11*	26,466

* Projected

NOTES:

(1) Water demand equals the total of MWD, extractions (GAC & Valley/BOU), Valhalla, and recycled.

(2) The last five year average water demand was 23,665 acre-feet.

TABLE 3.1
ACTUAL AND PROJECTED MWD TREATED WATER DELIVERIES

Water Year	Acre-Feet
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	13,158
03-04	13,751
04-05	14,415
05-06	11,879
06-07*	14,007
07-08*	12,413
08-09*	12,530
09-10*	12,647
10-11*	12,765

*Projected

NOTES:

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

TABLE 3.2
ACTUAL AND PROJECTED LAKE STREET GAC TREATMENT PLANT PRODUCTION

Water Year	Acre-Feet
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
07-08*	0
08-09*	0
09-10*	0
10-11*	0

*Projected

NOTES:

(1) The Lake Street 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.

(4) The GAC Treatment Plant has been shut down since March 2001 because of chromium 6 concerns.

TABLE 3.3
ACTUAL AND PROJECTED VALLEY/ BOU TREATED GROUNDWATER PRODUCTION

Water Year	Acre-Feet
96-97	9,280 (3)
97-98	2,102
98-99	9,042
99-00	11,345
00-01	9,046
01-02	10,402
02-03	9,100
03-04	9,660
04-05	6,399
05-06	10,108
06-07*	9,327
07-08*	10,884
08-09*	10,884
09-10*	10,884
10-11*	10,884

*Projected

NOTES:

(1) Burbank includes BOU extractions in its pumping rights.
(2) Lockheed Martin has a physical solution right of 25 AF/year.
(3) Table 3.3 shows extractions charged to Burbank. Production for municipal use began in January 1996. GAC flushing and treatment bypass were accounted for separately and charged to a 'basin account' (following table), but beginning June 2003, most such losses are charged to Burbank as "non-municipal use" and included above. Non-municipal use is not included in deliveries used to calculate the 20% return water credit.

Water Year	AF	Water Year	AF	Water Year	AF	Water Year	AF
1996-97	320	1999-2000	107	2002-03	70	2005-06	0
1997-98	478	2000-01	88	2003-04	0		
1998-99	142	2001-02	138	2004-05	0		

(4) 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
ACTUAL AND PROJECTED RECYCLED WATER DELIVERIES

Water Year	Acre-Feet
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	488
03-04	549
04-05	681
05-06	1,692
06-07*	2,156
07-08*	2,367
08-09*	2,417
09-10*	2,467
10-11*	2,817

*Projected

NOTES:

1) The source of recycled water is the Burbank Water Reclamation Plant.
2) The Magnolia Power Project began using recycled water in September 2005.

TABLE 4.1
ACTUAL AND PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

Water Year	Acre- Feet
96-97	343
97-98	281
98-99	342
99-00	432
00-01	407
01-02	362
02-03	383
03-04	397
04-05	295
05-06	431
06-07*	300
07-08*	300
08-09*	300
09-10*	300
10-11*	0

*Projected

NOTES:

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

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

(3) Valhalla is expected to be using recycled water instead of groundwater by Water Year 2010-11.

TABLE 4.2
ACTUAL AND PROJECTED BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET
96-97	0
97-98	0
98-99	0
99-00	0
00-01	0
01-02	0
02-03	0
03-04	0
04-05	0
05-06	0
06-07*	0
07-08*	6,000
08-09*	6,200
09-10*	6,200
10-11*	6,200

*Projected

NOTES:

1) The Maclay pipeline was damaged in the 1994 Northridge earthquake. Deliveries to the Pacoima Spreading Grounds are precluded until repaired by the LADWP.
2) A new connection to MWD is planned to allow the necessary spreading at Pacoima Spreading Grounds (Figure 4.1). If MWD replenishment service is not available, some of the spreading will be replaced by Physical Solution purchases or other transfers of groundwater credits.

TABLE 4.3
BURBANK PHYSICAL SOLUTION PURCHASES AND OTHER CREDITS

WATER YEAR	ACRE-FEET	
96-97	1,500	(1)
97-98	0	
98-99	2,000	(1)
99-00	0	
00-01	0	
01-02	0	
02-03	300	(1)
03-04	44	(2)
04-05	0	
05-06	0	
06-07*	4,000	(3)
07-08*	0	
08-09*	0	
09-10*	0	
10-11*	0	

*Projected

NOTES:

1) The City exercised its physical solution right in water years 1994-95, 1995-96, 1996-97, 1998-99, and 2002-03.
2) In WY 2003-04, 44 AF of stored water credit was transferred from Glendale to Burbank to compensate for April 2004 water transfer via system interconnection.
3) In-lieu transfer or replenishment is being arranged with LADWP for WY 2006-07. If MWD replenishment service for speading water is unavailable in future years, Physical Solution purchases or other such transfers will be used if they are less expensive than purchasing spreading water at the full MWD untreated volumetric rate.

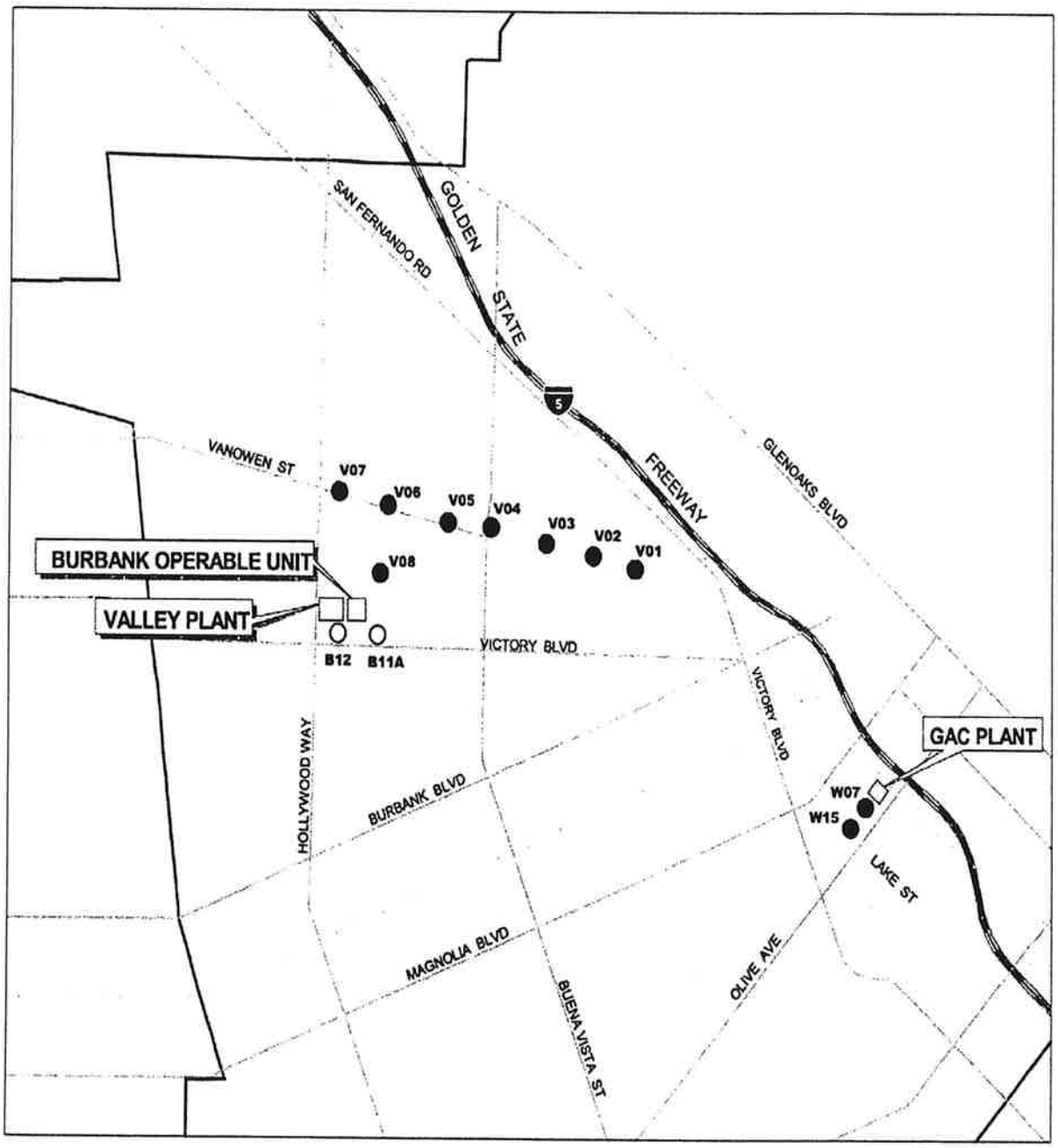


FIGURE 3.1
WELLS AND GROUNDWATER TREATMENT PLANTS

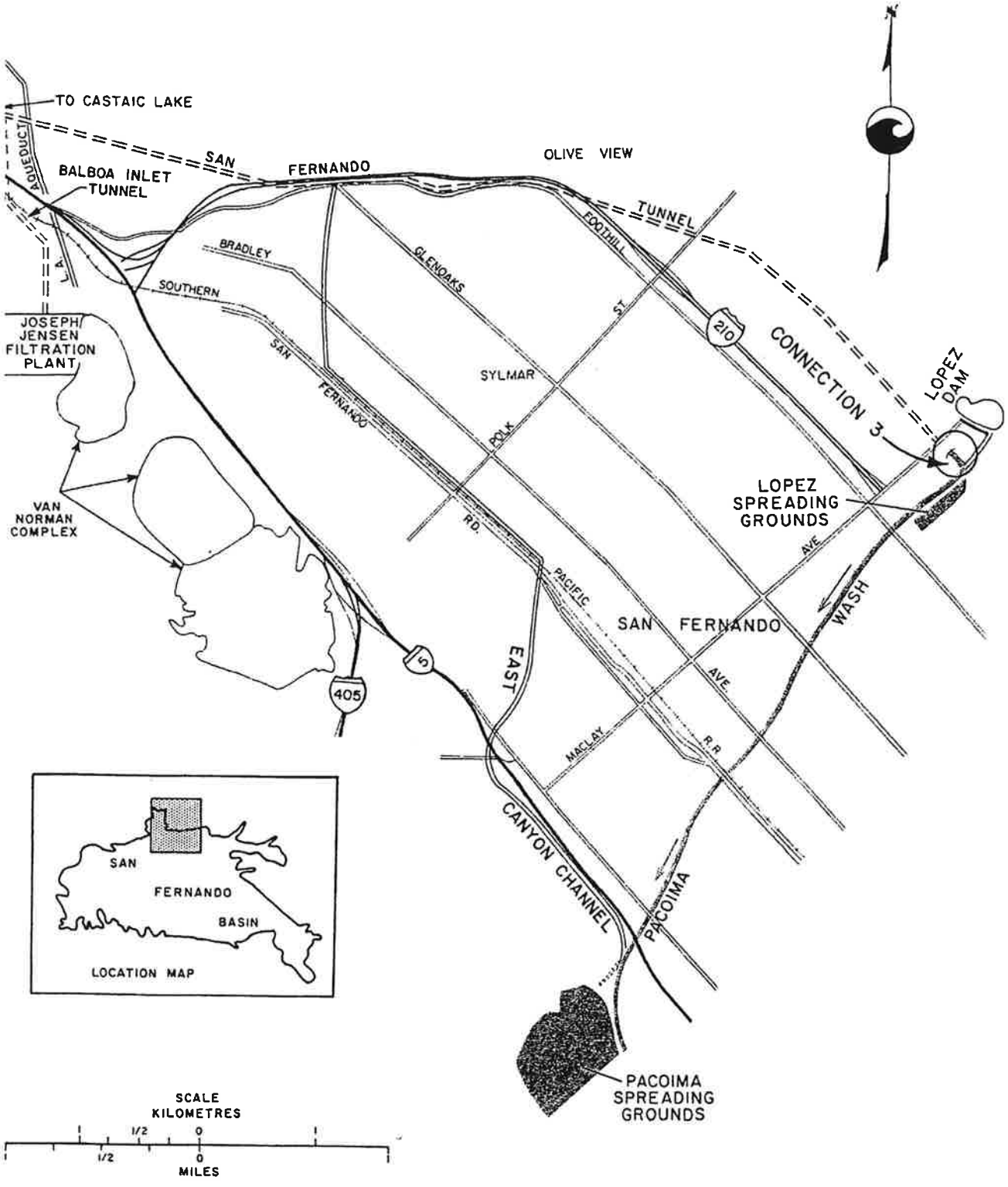


FIGURE 4.1
LOCATION OF PROPOSED MWD UNTREATED WATER CONNECTION

APPENDIX A

WATER QUALITY DATA

The 2006 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 (10/1/05 through 10/1/06):

None—plant remained on standby

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 (10/1/05 through 10/1/06):

10,081 Acre-Feet for domestic use

WATER QUALITY:

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

DISPOSITION:

(1) Test Water- Waste

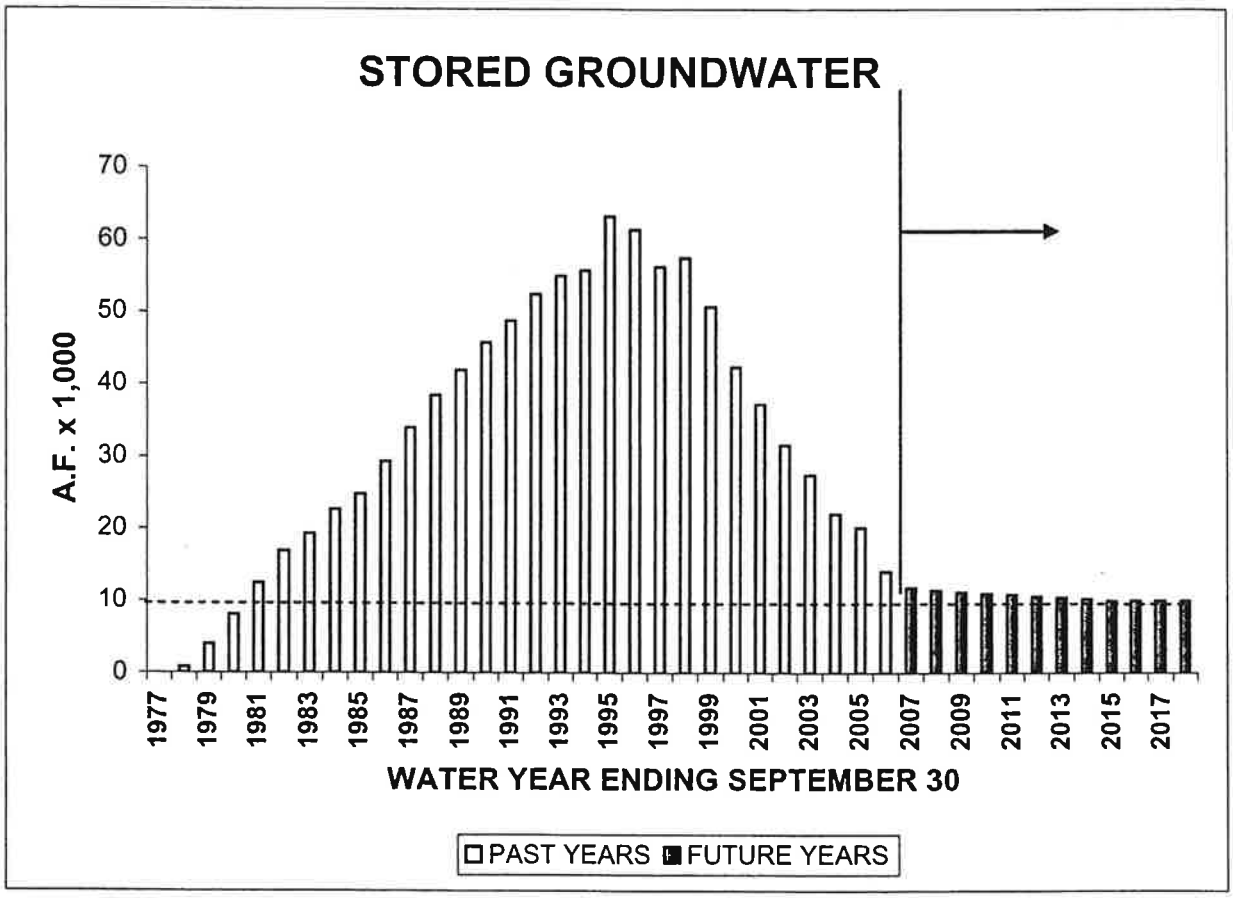
(2) Operation Water (backwash, etc.) - Waste

(3) Burbank Water System-
Potable water after blending

APPENDIX C

STORED GROUNDWATER

BURBANK WATER AND POWER
WATER DIVISION
WY 2005/06



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).
- SPREADING WATER PURCHASES BEGINNING WATER YEAR 2007-08 TO MAINTAIN BASIN BALANCE.

CITY OF BURBANK WATER AND POWER
WATER DIVISION

BURBANK'S STORED GROUNDWATER

75% EPA - With B-6 Spreading

WATER YEAR	DELIVERED WATER AF	RETURN FLOW CREDIT AF	SPREAD WATER AF	OTHER CREDITS 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	0	5,380	2,888	63,215
1995-96	23,124	4,625	0	2,000	8,308	61,415
1996-97	24,888	4,977	0	1,500	11,243	56,297
1997-98	22,447	4,489	0	0	3,731	57,543
1998-99	22,671	4,534	0	2,000	13,262	50,770
1999-2000	26,312	5,262	0	0	12,862	42,442
2000-01	25,619	5,124	0	0	10,440	37,264
2001-02	24,937	4,987	0	0	10,764	31,624
2002-03	23,108	4,622	0	300	9,483	27,428
2003-04	24,235	4,847	0	44	10,057	22,037
2004-05	21,749	4,350	0	0	6,694	20,190
2005-06	24,084	4,817	0	0	10,543	13,997
2006-07	23,000	4,600	0	4,000	11,000	11,814
2007-08	23,000	4,600	6,000		11,000	11,414
2008-09	23,000	4,600	6,200		11,000	11,214
2009-10	23,000	4,600	6,200		11,000	11,014
2010-11	23,000	4,600	6,200		11,000	10,814
2011-12	23,000	4,600	6,200		11,000	10,614
2012-13	23,000	4,600	6,200		11,000	10,414
2013-14	23,000	4,600	6,200		11,000	10,214
2014-15	23,000	4,600	6,200		11,000	10,014
2015-16	23,000	4,600	6,400		11,000	10,014
2016-17	23,000	4,600	6,400		11,000	10,014
2017-18	23,000	4,600	6,400		11,000	10,014

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.
OTHER CREDITS INCLUDE PHYSICAL SOLUTION PURCHASES, IN-LIEU STORAGE, AND OTHER TRANSFERS OF GROUNDWATER CREDITS
COLUMNS (1) THROUGH (5) - FROM ULARA WATERMASTER REPORTS
COLUMN (2) = 20% OF COL. (1)
COLUMN (5) = COL.(2) PREV. YR. - COL.(4) CUR. YR. + COL.(5) PREV. YR. + COL.(3) CUR. YR.
PUMPED GROUNDWATER INCLUDES CITY, VALHALLA, LOCKHEED, & DISNEY.
SHADED AREAS OF TABLE ARE PROJECTED VALUES .

APPENDIX C

CITY OF GLENDALE

PUMPING AND SPREADING PLAN

2006-2011 Water Years

CITY OF GLENDALE

GROUNDWATER PUMPING AND SPREADING PLAN

WATER YEARS 2006-2011

City of Glendale Water & Power

Reliable • Competitive • Trusted

Prepared By

GLENDALE WATER & POWER

JUNE 2007

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Introduction

This report discusses water supplies to Glendale, future water demands, and projections in local water resource available to meet demands and to 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.

Executive Summary

Glendale receives its groundwater supply from San Fernando Basin and Verdugo Basin. The following table illustrates the projected pumping activities in the two basins between 2006 and 2011. Glendale currently does not have any spreading facility.

PROJECTED PUMPING ACTIVITIES IN WY 2006 - 2011 (AFY)

Source	2006	2007	2008	2009	2010	2011
San Fernando Basin						
Glendale OU	6,777	7,300	7,300	7,300	7,300	7,300
Forest Lawn	338	400	400	400	400	400
Steam Plant	25	25	25	25	25	25
Total	7,140	7,725	7,725	7,725	7,725	7,725
Verdugo Basin	2,648	2,789	3,676	3,856	3,856	3,856

Existing Water Sources and Supplies

The City of Glendale (refer as "City") currently has four sources of water available to meet demands: San Fernando Basin, Verdugo Basin, Metropolitan Water District (imported water) and recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP). Each of these sources is described below. The entry points in the Glendale water system for the various supplies are shown in Figure 1. Over the past 40 years, there has been changes in the mix of supplies used to meet water demands in the City. In the future, we project minor changes in water supplies. These changes and sources are discussed below.

1. San Fernando Basin

The City's water right to San Fernando Basin supplies is defined by the judgment entitled "The City of Los Angeles vs. the City of San Fernando, et al." (1979) (the "Judgement"). It consists of a return flow credit, a type of water right based on the assumption that a percentage of water used in the City is returned to the groundwater

basin. Additionally, the City has a right to accumulate its credits annually if its water rights are not used. In the water years of 2004-05 and 2005-06, the City had a storage credit of 64,103 AF and 61,833 AF, respectively, within the basin. Also, there is a right to produce excess water subject to a payment obligation to the City of Los Angeles based primarily on the cost of MWD alternative supplies. This option to produce additional water in excess of the return flow credit and the accumulated credits is a significant factor in relation to the water production at the Glendale Water Treatment Plant (GWTP), which is part of a U.S. Environmental Protection Agency (EPA) Superfund clean-up project in Glendale. The project consists of a 5,000 gallon-per-minute (gpm) facility and eight wells that supply the plant. Further discussion of this can be found later in this report. The various San Fernando Basin supplies are:

Return Flow Credit – Glendale is entitled to a return flow credit of 20 percent of all delivered water (including recycled water) in the San Fernando Basin and its tributary hill and mountain area. A location map is shown in Figure 2. This credit ranges from about 5,000 AFY to 5,400 AFY depending on actual water use. This is the City's primary water right in the San Fernando Basin.

Physical Solution Water – Glendale has an agreement to extract excess water chargeable against the rights of the City of Los Angeles upon payment of specified charges generally tied to MWD's water rates. Glendale's physical solution right is 5,500 AFY.

Pumping for Groundwater Cleanup – Section 2.5 of the Upper Los Angeles River Area's Policies and Procedures, dated July, 1993, provides for the extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right became a significant factor with the completion of the Glendale Water Treatment Plant (GWTP) in 2000.

Carry-over extractions – In addition to current extractions of return flow water and stored water, Glendale may, in any one year, extract from the San Fernando Basin an amount not to exceed 10 percent 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 important year-to-year flexibility in meeting water demands.

San Fernando Basin production has been limited over the past 20 years and was eventually eliminated for a time because of the volatile organic compounds (VOCs) in the groundwater. The entire San Fernando Valley is part of a U. S. Environmental Protection Agency (EPA) Superfund cleanup program. Over the past ten years, many water treatment plants had been constructed in the San Fernando Valley to remove VOCs from the groundwater. EPA had focused on the construction of cleanup facilities in Glendale. The Glendale Water Treatment Plant and eight extraction wells had been constructed to pump, treat and deliver the water to Glendale via its Grandview Pumping Station. Significant production from the basin and delivery to Glendale started in January 2002.

The cleanup facilities consist of seven shallow extraction wells and one deep well; the 5,000 gpm Glendale Water Treatment Plant to remove the VOCs; piping to convey the untreated water from the wells to the water treatment plant; a system to convey water from the treatment plant to the Glendale potable distribution system; a facility to blend the treated groundwater with water from Metropolitan, and a disinfection facility. A general layout of these facilities is shown on Figure 3.

The major agreements between City of Glendale and Glendale Respondents Group (GRG), which represents forty plus industries identified by the EPA as potentially responsible for the groundwater contamination, and the EPA were signed in the year 2000. GRG retained CDM Consulting Engineers, Inc. to design, construct and operate the required facilities. The State Department of Health Services issued a permit for Glendale to operate the facilities in July 2000. Glendale started taking small quantities of water from this facility on July 23, 2001. The delivery of the water to Glendale was initially limited because of Glendale's concerns with taking water with higher chromium 6 levels than in the current water supply, even though such water met all water quality standards. In January 2002, the Council authorized Glendale to start delivering 5,000 gpm from the treatment facility into Glendale's potable water system with a target to minimize the concentration of chromium 6 in the water. This source is expected to provide about 7,300 AFY to Glendale, which 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 about 25 AFY for use on the cooling tower and gas turbine at the Glendale Power Plant, for a total of approximately 7,715 AFY.

Additionally, Glendale can pump and treat more groundwater in times of imported water shortages based on accumulated pumping credits discussed earlier in this section. As discussed previously, Glendale as of October 2006 has 61,833 AF in accumulated pumping credits in the San Fernando Basin. In order to achieve 7,715 AF of San Fernando Basin production per year, Glendale must utilize its return flow credit of 5,500 AF per year as well as 2,215 AF per year of its accumulated pumping credits. Additional usage of accumulated groundwater credits could be used to meet unexpected demands or in cases of emergency. The usage of additional amounts of accumulated groundwater pumping credits was not considered in the supply-demand analysis of this Water Supply Evaluation, but rather would be in addition to the amounts of available water supplies detailed in that analysis. That these additional amounts of groundwater were not included in the supply-demand analysis further ensures that there are sufficient supplies to meet Plan demands.

2. Verdugo Basin

Historically, groundwater supplies from the Verdugo Basin contributed a small portion to the City's water supplies via five wells and an underground water infiltration system. The Judgment gives Glendale the right to extract 3,856 AFY from the Verdugo Basin. Crescenta Valley Water District also has water rights and is the only other entity allowed to extract water from the Verdugo Basin.

Use of these supplies has been limited in the past due to water quality problems, groundwater levels, and limited extraction capacity. In order to increase the use of these supplies, the City completed construction of the Verdugo Park Water Treatment Plant (VPWTP) in 1996. This facility has a capacity of 1,150 gpm and treats water from the two low capacity wells (referred to as Verdugo Wells A & B) and from the water supplies in the Verdugo Pickup System, a subsurface horizontal infiltration system. Actual flows from these sources range between 500-550 gpm. The three existing wells referred to as Glorietta Wells 3, 4 and 6 and VPWTP produce about 2,600 AFY and account for about eight percent of Glendale's total demand. This alone will not fully utilize the City's entire water rights to the Verdugo Basin supplies. The City has immediate plans to increase its extraction capacity so that it can utilize its full adjudicated water right from the Verdugo Basin, to the extent possible given the basin's hydrology. Detail is further discussed later in the report. The location of the VPWTP and existing wells are shown on Figure 1.

3. Metropolitan Water District

The Metropolitan Water District of Southern California (MWD or "Metropolitan") is a public agency organized in 1928 by a vote of the electorates of 13 Southern California cities which included Glendale. The first function of MWD was building the Colorado River Aqueduct to import water from the Colorado River. Water deliveries through the aqueduct began in the early 1940's. This imported water supplemented the local water supplies of the original 13 Southern California member cities. In 1972, to meet growing water demands in its service area, MWD started receiving additional water supplies from the State Water Project. The State Water Project is owned and operated by the State of California Department of Water Resources (DWR). MWD currently imports water from these two sources: (1) the Colorado River via the Colorado River Aqueduct and (2) the State Water Project via the California Aqueduct.

The locations of the above facilities are shown in Figure 4. MWD's service area includes the Southern California coastal plain. It extends about 200 miles along the Pacific Ocean from the city of Oxnard on the north to the international boundary with Mexico border on the south, and it reaches 70 miles inland from the coast. MWD is currently composed of 26 member agencies, including 14 cities, 11 municipal water districts, and one county water authority. Glendale is one of the 11 municipal water districts served by MWD.

Glendale receives MWD water through three service connections as shown on Figure 1. The service connection number and capacity are summarized in Table 1 below. In total, MWD has a total delivery capacity of 78 cubic feet-per-second (cfs). During hot summer days, it is common for Glendale to utilize the full capacity of the facilities. Any significant increase in demands on MWD could require another service connection.

TABLE 1
METROPOLITAN CONNECTIONS AND CAPACITY

Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	20

Over the years, MWD has provided high level of reliability in meeting Glendale's supplemental water supply needs. It is believed that the reliability of water supply to the City will continue in the future as a result of the many water resource programs under way and the proposed future programs now being considered based on MWD's Water Surplus and Drought Management (WSDM) Plan and Integrated Resources Plan (IRP). This source will always be a major factor in meeting the water needs of the City. The City closely follows the planning activities at MWD to assure that it has adequate supplies to meet the needs of its member agencies.

4. Recycled Water

The City of Glendale has been delivering recycled water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP) since the late 1970's. This is a 20 million gallon-per-day (MGD) facility owned by the Cities of Los Angeles and Glendale. Based on a 1970 contract between the Cities of Los Angeles and Glendale, Glendale is entitled to 50% of any effluent produced at the plant, which is more than sufficient to for all recycled water use within City of Glendale. Treated wastewater that is not used in either the Glendale or Los Angeles system is discharged to the Los Angeles River and eventually reaches the ocean.

Currently, Glendale has fifty seven (57) recycled water users. These include two golf courses, a landfill, ten recreation parks, two cemeteries, one high school, one junior high school, three elementary schools, and other irrigation areas. Also, three high-rise buildings, Glendale's new Police Headquarters and the new buildings at Glendale Community College are dual-plumbed to use recycled water for sanitary flushing purposes when facilities are in place to provide the water (Figure 6). In 2006 and 2007, five new users were added to the recycled water system. Among them were Cerritos Elementary School, Edison Elementary School and Disney Animation Complex. In the next five years, seven (7) more new recycled water users will be added for irrigation and dual-plumbing, some of which have already been completed. Figure 7 provides a general idea of the scope of the expansion program. The amount of potable water purchased from Metropolitan is expected to have a corresponding reduction.

In the 1990's Glendale Water Department began to require all new high-rise buildings (5-story or higher) to install dual-plumbing system within the Glendale Downtown area. Recycled water customers are solely responsible for funding and installing the connectors from the recycled water pipeline in the public streets to the customer's

property, and for all on-site facilities to distribute recycled water to the ultimate use. The main recycled water distribution pipelines and existing recycled water facilities are shown in more detail in Figure 5. The expected deliveries from the various projects are shown in Table 2.

TABLE 2
RECYCLED WATER USE (AFY)

PROJECTS	2006	2010	2015	2020	2025
Brand Park Pipeline	69	170	170	170	170
Forest Lawn Pipeline	241	350	350	350	350
Power Plant Pipeline	237	450	450	450	450
Verdugo-Scholl Pipeline	621	1,040	1060	1,080	1,080
TOTAL	**1,168**	**2,010**	**2030**	**2,050**	**2,050**

5. Summary of Local Supplies

The current use of local resources available to the City is substantially less than rights because of water quality and extraction problems. A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 3.

TABLE 3
LOCAL WATER PROJECTS AND USE (AFY)

Potential Source	Right	Current Use	Future Use
San Fernando Basin	5,000 - 5,400	6,800 AFY	7,300
Verdugo Basin	3,856	3,000 AFY	3,856
Recycled Water	10,000	1,200 AFY	2,050

Note : Glendale Physical Solution Water Right and Use is not included

Past Water Use and Trends

In the past, the water quality problems in the San Fernando Basin and groundwater levels in the Verdugo Basin have impacted the ability of Glendale to produce water from these Basins. Glendale has only recently been able to better utilize its rights to the San

Fernando Basin water supplies accumulated for many years. The EPA has designated several locations in the San Fernando Basin as Superfund sites and required construction of cleanup treatment facilities by the industry group responsible for the contamination. The Glendale cleanup project is the last in a series of EPA-required cleanup facilities and is now complete. The project consists of eight (8) production wells and a water treatment facility.

The Glendale water treatment facility was built to treat VOCs (volatile organic compounds). In December 2000, Glendale started operating the treatment plant. But because of the chromium 6 issue, only a small quantity was initially pumped and delivered. Full operation started on January 6, 2002. A study is being made regarding removal of chromium 6.

Glendale currently has five (5) active production wells and a pick-up system (infiltration galleries) in the Verdugo Basin, along with the VPWTP. The lower water levels have reduced supplies for this source, and accordingly, Glendale has reduced its projections of supply from this source as well.

Historically, Glendale used groundwater to meet a varying portion of its water demand. In the 1940s and 1950s essentially all of Glendale'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 17,000 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 Glendale's potable water system.

In the mid-1970s, Glendale limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a Water Rights lawsuit by the City of Los Angeles. In 1975, the California Supreme Court judgment in City of Los Angeles vs. City of San Fernando further limited Glendale's production right. The current right is about 5,500 AFY based on a Return Flow Credit right from water use in Glendale, with certain additional rights as described above.

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

In late 1979, Assembly Bill 1803 required that all water agencies using groundwater must conduct tests for the presence of certain industrial solvents. The tests indicated that VOCs such as trichlorethylene (TCE) and perchloroethylene (PCE) were present in the San Fernando Basin groundwater supplies in concentrations exceeding State Department of Health Services' maximum contaminant levels (MCL). Both chemicals were used extensively in the past as degreasers in manufacturing industries.

At that time, the presence and hazards to the water supplies were identified. As a result, Glendale had to further limit its use of San Fernando Basin supplies. From 1980 to 1992,

Glendale reduced production; and from 1992 to 2000, Glendale totally suspended production from the basin because of the presence of VOCs. During this 20-year period of reduced production, Glendale continued to accumulate the groundwater storage credits that could be used in the future. Glendale's storage account balance is 61,594 AF, as of Water Year 2005-06 Upper Los Angeles River Area Watermaster Annual Report.

Glendale's Ability To Meet Demands

Reliability of water supplies is a key item in the operation of Glendale's water distribution system. Glendale is currently importing approximately seventy percent of its water supply from Metropolitan. Consequently, the reliability of Metropolitan water supplies to meet Glendale water needs as well as the needs of its other twenty-five member agencies becomes exceptionally crucial. The MWD's RUWMP provides significant information on providing a reliable supply of water to its member agencies such as Glendale. MWD's 2003 Integrated Water Resources Plan (IRP) and the Water Surplus and Drought Management (WSDM) Plan adopted in 1999 are the key documents in their effort to do so. For Glendale, MWD is the supplier of "last resort" in meeting the needs of our citizens.

Glendale Water System Improvements

To assure the reliability and quality of water served to our water users, Glendale Water Department has been dedicated in improving the water system, which includes components such as water treatment plant, reservoirs, tanks, pump stations, communication system and pipelines. The major improvements are discussed below.

1. Glendale Water Treatment Plant

The City has continued to expand the use of its local water supplies with the addition of the Glendale Water Treatment Plant (GWTP). The GWTP, which began delivering water to the community in the middle of 2001, started operating at full capacity in February 2002 despite issues related to chromium 6 and has yielded an average production rate of 7 MGD.

2. Chevy Chase 968 Reservoir Project

In 1997 during a routine inspection of the reservoir, City staff observed cracks in the column foundation which were believed to be the result of the 1994 Northridge earthquake. Temporary repairs have been done and, if continued, will be costly. It became apparent the most cost-effective solution is to replace the entire reservoir in a relatively short time.

The proposed project is divided into three major tasks:

(1) Developing potential alternative sites (2004-2005) – Alternatives were presented to the community and golf course owner. A proposed site was identified in Spring of 2005.

(2) Environmental impact analysis, engineering design, and soil analyses (2005-2006) – After the site selection, preliminary design, detailed soil analysis, structural engineering, hydraulic analysis and cost estimate would be performed and presented to the community.

(3) Engineering Design (2006-2007) – design the new Chevy Chase reservoir and to provide the construction estimate.

(4) Construction of the reservoir (2008-2010) – Construction of the new 15-million gallon reservoir is projected to begin in early 2008 and be completed by 2010.

3. Water Main Replacement Program

Another program to improve the water system is the Water Main Replacement. The Department has a standing policy that the minimum size of distribution lines in the system is 8 inches. Smaller sizes have been replaced to increase capacity to meet the increasing demand for water. All 4" water main pipes were replaced with 8" ductile iron pipes in the improvement program. Work completed in the last two years is listed below:

Rossmoyne (FY 2004-05 Project I) – Installation of 1.6 miles of new 8" water main.

Moncado (FY 2004-05 Project II) – Installation of 1.7 miles of new 8" water main.

Irving (FY 2004-05 Project III) – Installation of 0.8 miles of new 8" water main.

Brand (FY 2005-06) – Installation of 0.9 miles of new 8" water main including

Howard (FY 2005-06 Project I) – Installation of 1.6 miles of new 8" water main.

4. Water Main Cleaning and Lining Program

Water main cleaning and lining has been an on-going effort for more than ten years. Water mains are scrapped-clean and re-line with cement inside the pipe to improve water flow and quality in the distribution system. Works completed in the last 4 years are:

1. Doran Street – Completed in May 2005
2. Chevy Chase Canyon Drive – Completed in June 2004
3. Sunset Road (and nearby streets) – Completed in January 2004

5. Pumping Stations Improvement Program

The Department has continuously rehabilitated or replaced inefficient pumps and motors at all our pumping stations. The priority needs have been established and the following works completed have been the most recent:

1. Old Glorietta Pump Station – New transformer, MCC unit and switchgear
2. Western Pumping Station – Installation of new motors
3. Park Manor Pumping Stations – New boosters, electric motors and starter installed
4. Glorietta Park Pump Station – Completed the design of new switchgear and motor control starters, installed new pumps and motor
5. Melwood Pumping Station – New motor
6. Emerald Isle 1666 PS – New end suction pump
7. Glorietta Well No. 3 – New motor and pump
8. Glenoaks 968 PS – New pump installed
9. Grandview Pumping Station – Large compressor, rebuilt pump and motor, new clay valve installed
10. Markridge PS – New pump and two motors
11. Verdugo 1&2 – Rebuilt pump and motor
12. Metro 1 – Rebuilt pump and motor
13. Metro 2 – Repair turbine meter and installed new butterfly valve

6. Installation of Pressure Reducing Stations

In an effort to enhance reliability, the Water Department had installed several Pressure Reducing Valve (PRV) Stations throughout the distribution system. These new stations offer the system a much greater degree of redundancy during high demand periods and also make it easier to take reservoirs out of service for maintenance purposes.

7. Groundwater Extraction Improvement

Glendale *Water & Power* (GWP) is currently utilizing about sixty percent of its adjudicated water right from the Verdugo Basin. To fully utilize the adjudicated water right, the City has hired Geomatrix Consultants, Inc. (Geomatrix) to determine possible sites for additional water extraction from the Verdugo Basin. GWP is currently in process of siting and drilling pilot wells in the Basin. Evaluations of the pilot wells will help determine the optimal locations for new production wells. By the end of 2008, the City is expected to have two additional production wells in the Verdugo Basin.

In parallel effort with the pilot well drilling, the City also has plan to restore a previously abandoned well (Well 5036) located on Foothill Boulevard. Water samples were taken from Well 5036 on May 3, 2007 and are being tested in a laboratory. If the laboratory results are to the satisfaction level, Well 5036 will be rehabilitated and serve the northern portion of Glendale's water distribution system. Well 5036 is expected to yield 200-250 gpm after rehabilitation. Upon completion of the new well development project and the rehabilitation of Well 5036, the City is expecting to utilize its full rights to these supplies. About 12 percent of the City's total water demand can be obtained from this Basin. If the laboratory results on the water samples are satisfactory, the existing

Foothill well will contribute potable water to the northern portion of Glendale's water system. The existing wells are not producing the expected production in spite of rehabilitation work which was completed in 2004-05. A decrease in the groundwater production has been noted in recent years and multiple new wells will be the best alternative. Maximizing its ability to extract water from the Verdugo Basin is a priority for Glendale. The new well will reduce the City's dependency on MWD water.

8. Water System Analysis (Hydraulic Modeling)

In May of 2005, the City of Glendale employed the services of Carollo Engineers to begin Phase I of the City's Water Hydraulic Model Development Program. The model was completed in August 2006. The Hydraulic Model provides a better understanding of the system and optimized operation. It helps to determine areas with water quality problem, assess causes of service interruptions, and assist in meeting new regulations such as the Disinfection By-product Rule.

9. Water Supervisory Control & Data Acquisition System (SCADA) Upgrade

In October of 2003, the City began a program to upgrade its Supervisory Control And Data Acquisition System (SCADA). The work included the replacement of 16 Programmable Logic Controllers (PLC's) as well as Radio Transmission System upgrades for many of the City's Water Pumping Facilities. In July of 2005, the City began Phase II of the SCADA System upgrade. In Phase II, the communication of the remaining 14 pump stations were upgrade from copper wire-type connection to the 900 MHz spread-spectrum radio system. The project was completed in August 2006.

10. Metropolitan Water District G-03 Service Connection Upgrade

A contract between the City and MWD has been signed to increase the delivery capacity from 12 cfs to 20 cfs of the MWD G-03 service connection to the Glendale's water system. The objective of the project was to improve the blending capability and reliability of the MWD supply. The connection upgrade was completed in November of 2006.

11. Future Los Angeles Interconnections

Glendale is working with City of Los Angeles, Department of Water and Power to establish two (2) interconnections between the two systems. These will increase Glendale's reliability by providing an emergency source of supply.

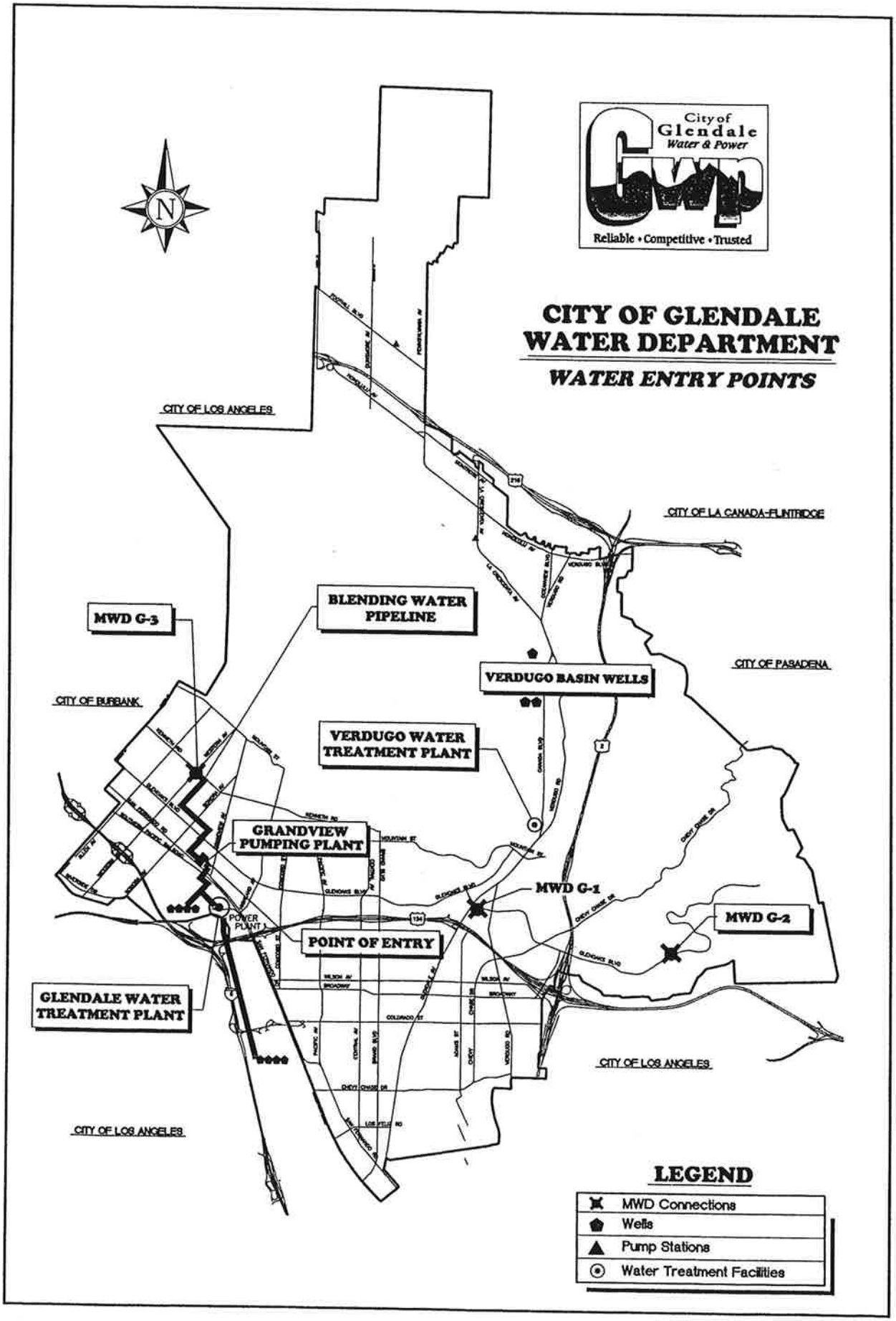
Future Goals

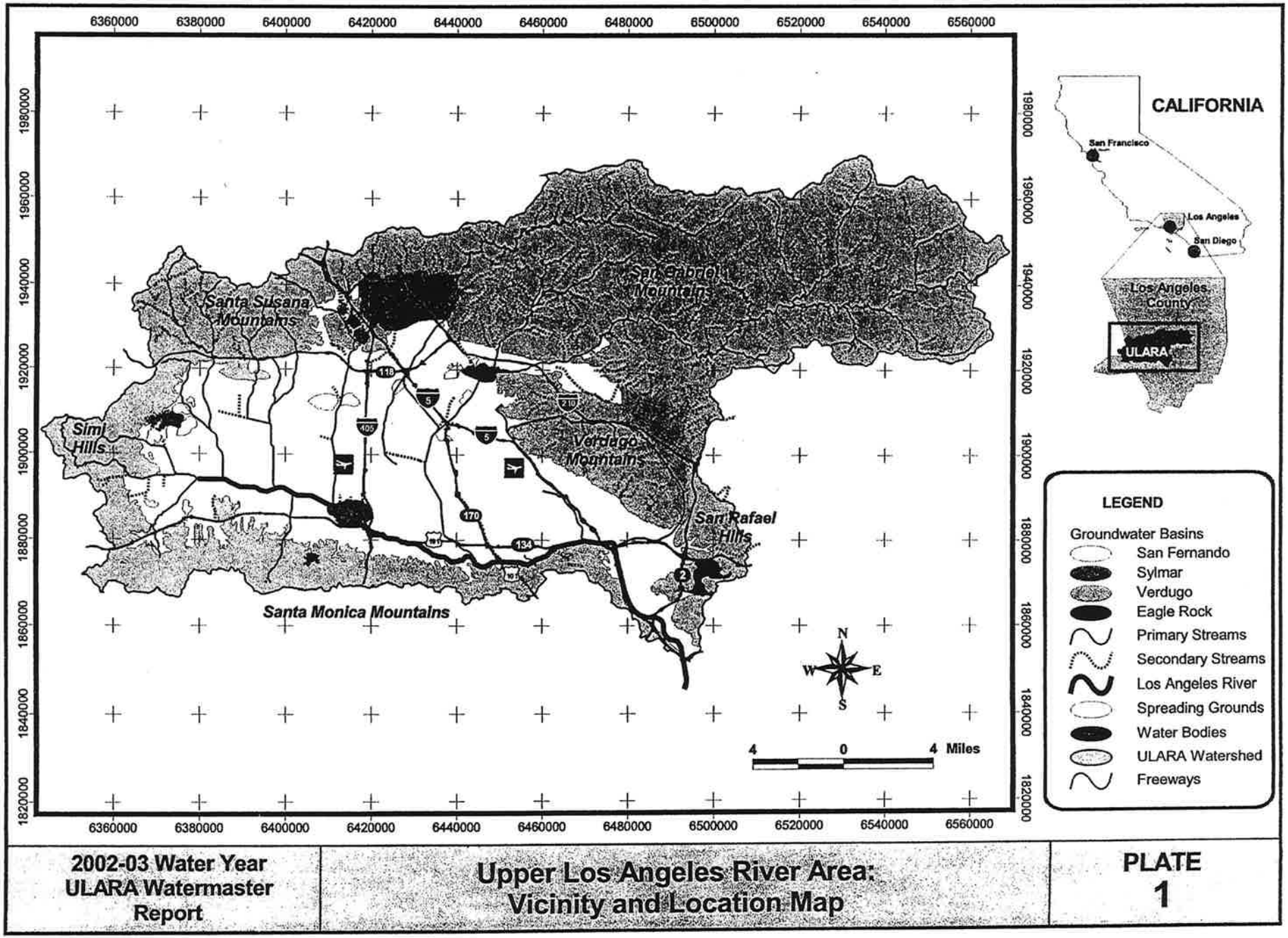
The City has been expanding the use of its local water supplies with operation of the Glendale Water Treatment Plant (GWTP) and increase groundwater extraction of Verdugo Basin. However, because of the chromium 6 related issues, the reliability of the GWTP water supply cannot be guaranteed into the future until a chromium-removal treatment is put into operation. Glendale is working with the Cities of Los Angeles and Burbank, with the help of EPA and American Water Works Research Foundation

(AwwaRF), to develop a new treatment technology for chromium 6. The plan is to have a complete treatment facility in place by the year 2008. Currently, seventy percent of the water used in the City is provided by MWD. The Water Department has immediate plans to increase groundwater production in the Verdugo Basin by constructing two new wells within the basin by 2008 and increase the recycled water use by adding new users and expand the marketing effort to neighboring agencies. Also, Glendale is committed to aggressively advocate the use of recycled water for irrigation & toilet flushing, which will help increased the conservation of potable water and reduced the dependency on imported supplies. The Glendale Water Department goal is to reduce the City's water purchase from MWD to sixty-five percent of total water use by the year 2010.

FIGURES

FIGURE 1


City of Glendale Water & Power
Reliable • Competitive • Trusted
CITY OF GLENDALE WATER DEPARTMENT
WATER ENTRY POINTS
CITY OF LOS ANGELES
CITY OF LA CANADA-FLINTRIDGE
CITY OF PASADENA
CITY OF BURBANK
CITY OF LOS ANGELES
CITY OF LOS ANGELES
MWD G-3
BLENDING WATER PIPELINE
VERDUGO BASIN WELLS
VERDUGO WATER TREATMENT PLANT
GRANDVIEW PUMPING PLANT
POWER PLANT 1
POINT OF ENTRY
MWD G-1
MWD G-2
GLENDALE WATER TREATMENT PLANT
LEGEND
MWD Connections
Wells
Pump Stations
Water Treatment Facilities



2002-03 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Vicinity and Location Map	PLATE 1

FIGURE 2

FIGURE 3

GLENDALE WATER TREATMENT PLANT
SYSTEM LAYOUT

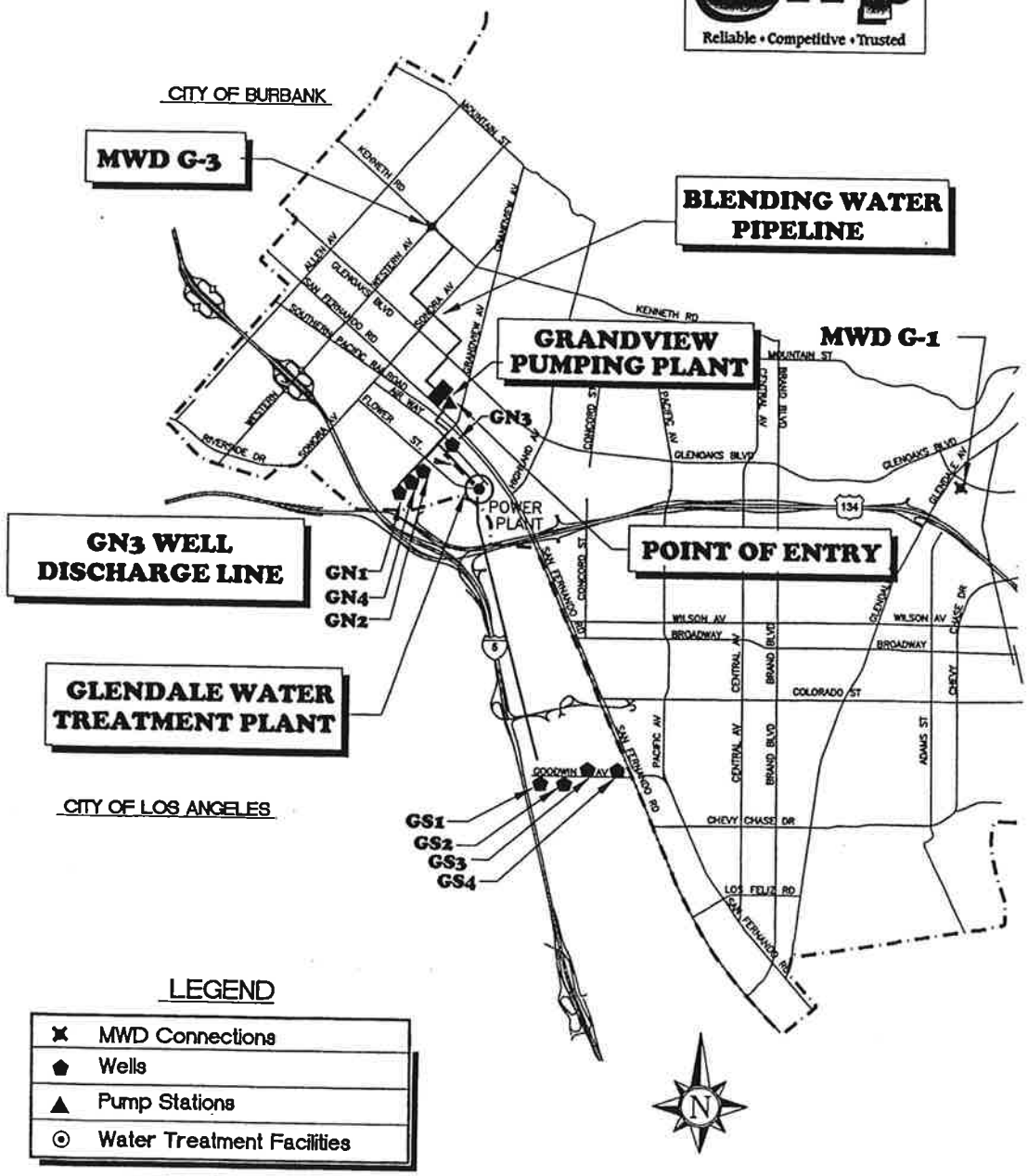
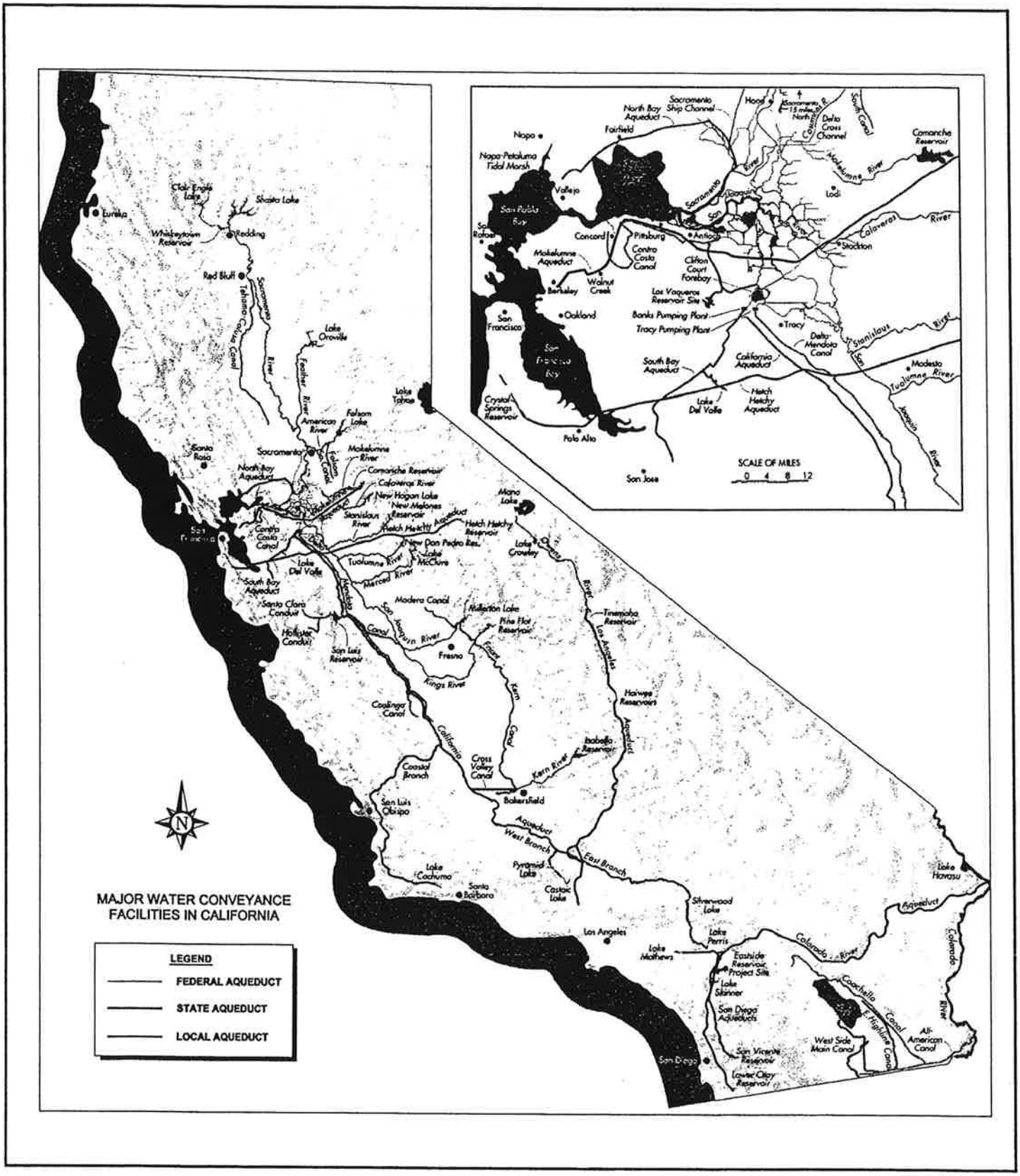


FIGURE 4


MAJOR WATER CONVEYANCE FACILITIES IN CALIFORNIA
LEGEND
FEDERAL AQUEDUCT
STATE AQUEDUCT
LOCAL AQUEDUCT
SCALE OF MILES
0 4 8 12
Eureka
Clair Engle Lake
Shasta Lake
Whiskeytown Reservoir
Redding
Red Bluff
Tehama Colusa Canal
Sacramento River
Lake Oroville
Feather River
Lake Tahoe
American River
Folsom Lake
Santa Rosa
Sacramento
Folsom South Canal
Mokelumne River
North Bay Aqueduct
Cosumnes River
Calaveras River
New Hogan Lake
New Melones Reservoir
Stanislaus River
Hetch Hetchy Aqueduct
Hetch Hetchy Reservoir
Lake Eleanor
New Don Pedro Res.
Lake McClure
Tuolumne River
Merced River
Lake Del Valle
South Bay Aqueduct
Santa Clara Conduit
Hollister Conduit
Madera Canal
Millerton Lake
Friant-Kern Canal
San Joaquin River
San Luis Reservoir
Fresno
Kings River
Coalinga Canal
California Aqueduct
Coastal Branch
Cross Valley Canal
Kern River
Bakersfield
San Luis Obispo
Lake Cachuma
Santa Barbara
Pyramid Lake
Castaic Lake
West Branch
East Branch
Los Angeles
Lake Mathews
Silverwood Lake
Lake Perris
Lake Havasu
Colorado River Aqueduct
Eastside Reservoir Project Site
Lake Skinner
San Diego Aqueducts
Coachella Canal
All-American Canal
West Side Main Canal
San Vicente Reservoir
Lower Otay Reservoir
San Diego
Sacramento River Ship Channel
North Bay Aqueduct
Fairfield
Napa
Napa-Petaluma Tidal Marsh
Vallejo
Hood
Sacramento R. 15 miles North
Delta Cross Channel
South Canal
Comanche Reservoir
Mokelumne River
Lodi
Calaveras River
Stockton
Concord
Pittsburg
Antioch
Contra Costa Canal
Clifton Court Forebay
Mokelumne Aqueduct
Walnut Creek
Berkeley
Las Vaqueros Reservoir Site
Oakland
San Francisco
Banks Pumping Plant
Tracy Pumping Plant
Tracy
Delta-Mendota Canal
Stanislaus River
Modesto
Tuolumne River
San Joaquin River
South Bay Aqueduct
California Aqueduct
Lake Del Valle
Hetch Hetchy Aqueduct
Crystal Springs Reservoir
Palo Alto
San Jose

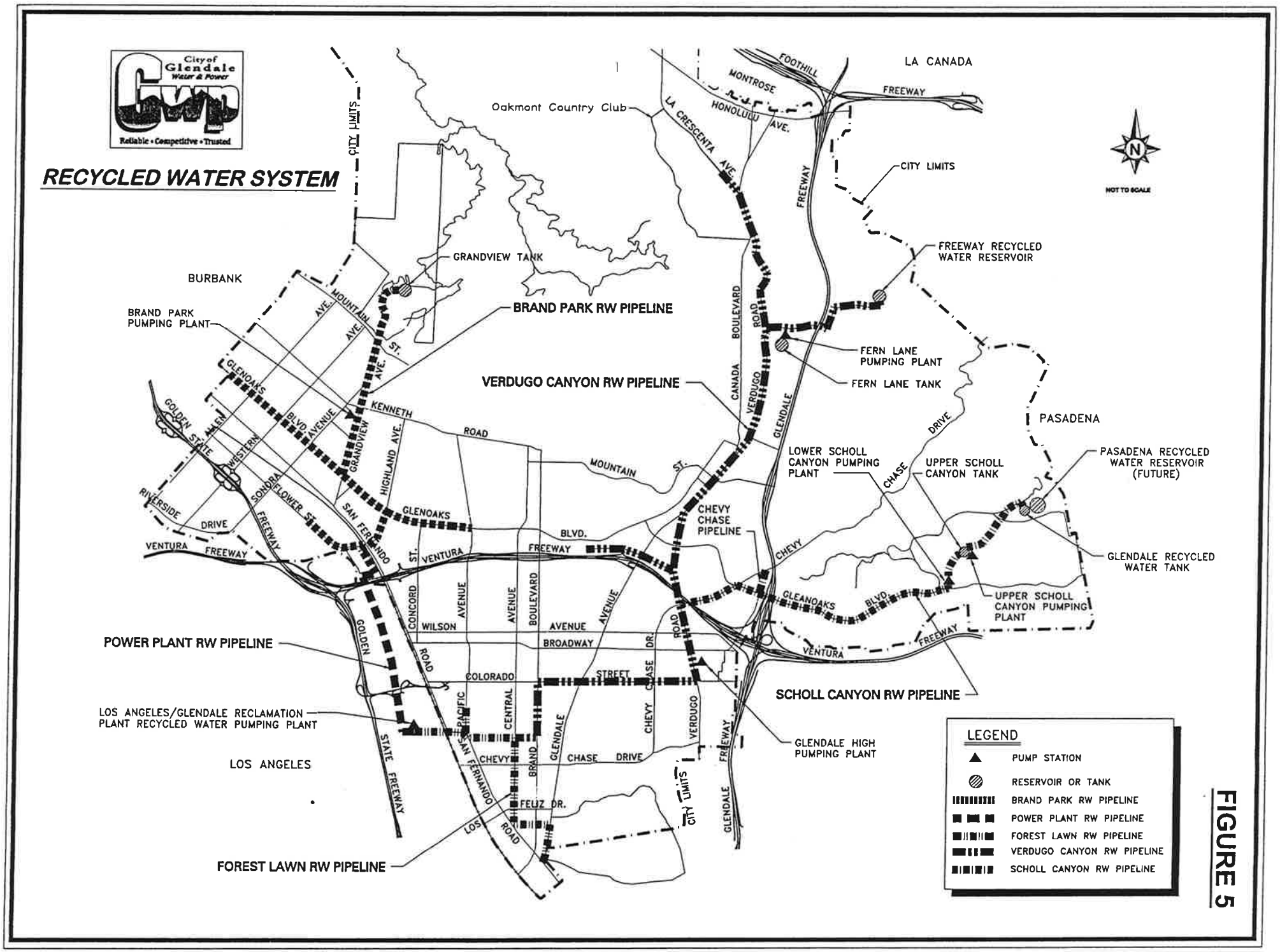

City of Glendale Water & Power
Reliable • Competitive • Trusted
RECYCLED WATER SYSTEM
LA CANADA
FOOTHILL
FREEWAY
MONTROSE
HONOLULU AVE.
Oakmont Country Club
LA CRESCENTA AVE.
CITY LIMITS
NOT TO SCALE
FREEWAY RECYCLED WATER RESERVOIR
GRANDVIEW TANK
BURBANK
BRAND PARK RW PIPELINE
BRAND PARK PUMPING PLANT
FERN LANE PUMPING PLANT
FERN LANE TANK
VERDUGO CANYON RW PIPELINE
PASADENA
LOWER SCHOLL CANYON PUMPING PLANT
UPPER SCHOLL CANYON TANK
PASADENA RECYCLED WATER RESERVOIR (FUTURE)
CHEVY CHASE PIPELINE
GLENDALE RECYCLED WATER TANK
UPPER SCHOLL CANYON PUMPING PLANT
POWER PLANT RW PIPELINE
SCHOLL CANYON RW PIPELINE
LOS ANGELES/GLENDALE RECLAMATION PLANT RECYCLED WATER PUMPING PLANT
GLENDALE HIGH PUMPING PLANT
LOS ANGELES
FOREST LAWN RW PIPELINE
LEGEND
PUMP STATION
RESERVOIR OR TANK
BRAND PARK RW PIPELINE
POWER PLANT RW PIPELINE
FOREST LAWN RW PIPELINE
VERDUGO CANYON RW PIPELINE
SCHOLL CANYON RW PIPELINE
FIGURE 5

FIGURE 6

CITY OF GLENDALE
CURRENT RECYCLED WATER USERS - SN 1990008
As of April 2007

LOC. NO.	RECYCLED WATER USER PROJECT	Actual Delivery Date	User	No. Mtrs.	Quantity A.F./year	Type of Use
	FOREST LAWN PROJECT					
1	Forest Lawn Memorial Park	1992	YES	1	200-400	Irrigation
2	1600 South Brand Median	1995	YES	1	6	Irrigation
4	323 W Garfield Avenue	2000	YES	1	2	Irrigation
56	Cerritos Elementary School(6-23-2006)	6 & 11 - 2006	YES	2	10	Irrigation
57	Edison Elementary School & Pacific Park	Mar-07	YES	1	15	Irrigation
	POWER PLANT PROJECT					
5	Caltrans - 943 West Doran Street	1978	YES	1	40-60	Irrigation
6	Glendale Grayson Power Plant	1978	YES	1	400-600	Cooling Towers
	VERDUGO SCHOOL PROJECT					
	PARKS and RECREATION - City of Glendale					
22	Adult Recreation Center(For renovation - 6/2006)	1995	YES	1	10	Irrigation
24	Armory	1996	YES	1	4	Irrigation
30	Central Library	1995	YES	2	4	Irrigation
31	City of Glendale - Fern Lane (Freeway Tank)	1997	YES		60	Irrigation
32	Civic Auditorium	1996	YES	1	15	Irrigation
48	Colorado Boulevard - Parkway Irrigation	1997	YES	3	5	Irrigation
47	North Verdugo Road Median/La Cresenta Avenue	1996	YES	1	10	Irrigation
37	Glenoaks Park	1995	YES	1	5	Irrigation
40	Montecito Park	1995	YES	1	1	Irrigation
44	701 North Glendale Avenue - Median @ Monterey Rd.	1995	YES	1	6	Irrigation
43	741 S Brand Median	1995	YES	1	4	Irrigation
49	Parque Vaquero	1998	YES	1	2	Irrigation
51	Scholl Canyon Ballfield	1997	YES	1	20	Irrigation
50	Scholl Canyon Park	1996	YES	1	12	Irrigation
53	Sports Complex (Completed)	1998	YES	1	99	Irrigation
46	Verdugo Rd/Canada (South) Overpass	1995	YES	1	0.5	Irrigation
45	Verdugo Rd/Canada (North Median)	1996	YES	1	1.5	Irrigation
43	Fern Lane Medians-Irrigation	2003	YES	1	0.5-1.5	Irrigation
	CALTRANS (5 Meters):					
25	1970 E Glenoaks Boulevard (E/S)	1995	YES	1	15	Irrigation
25	1970 E Glenoaks Boulevard (W/S I2)	1995	YES	1	10	Irrigation
26	406 N Verdugo Road @ Chevy Chase	1995	YES	1	35	Irrigation
27	709 Howard Street @ Monterey Road	1995	YES	1	12	Irrigation
28	2000 E Chevy Chase Drive @ Harvey	1995	YES	1	4	Irrigation
	GLENDALE UNIFIED SCHOOL DISTRICT.					
35	Glendale High School	1995	YES	1	30	Irrigation
36	Glenoaks Elementary School	1998	YES	1	2	Irrigation
55	Wilson Junior High School	1995	YES	1	15	Irrigation
	OTHERS:					
33	Glendale Adventist Memorial Hospital (additions - UC)	1997	YES(Partially)	1	20	Irrigation/Coolin
42	Oakmont Country Club	1996	YES	1	250-350	Irrigation
23	Scholl Canyon Golf Course	1998	YES	1	150-250	Irrigation
39	Scholl Canyon Landfill (LACSD)	1997	YES	2	120	Dust Control/Soil Compaction
52	Scholl Canyon Landfill (PW)	1996	YES	1	25	Irrigation/Soil Compaction
54	Public Works	1996	YES	2	10	Irrigation
	Dual Plumbing:					
34	Glendale Community College(onother building under constructi	1996/2004	YES Flush 4-04	2	25-35	Irrigation/Flushing Toilets
3	*PUBLIC WORKS - City of Glendale*	1978	YES		1.5	Street Cleaning
	BRAND PARK PROJECT					
7	Brand Park	1997	YES	1	55-65	Irrigation
8-16	Glenoaks Median (9 Meters)	1996	YES	9	30	Irrigation
17	Grand View Memorial Park	2001	YES(Partially)	2	50	Irrigation
20	Pelanconi Park	1996	YES	2	8	Irrigation
	TOTAL **NUMBER of USERS** **43**			**60**	***1,775 - 2,415***	

A:\RAYNOTARIO\ZIPC\DOHSANNUALREPORT2005\RecycledWaterUsers
05/10/2007

FIGURE 7

CITY OF GLENDALE

RECENT-FUTURE RECYCLED WATER USERS - SN 19990008

As of April 2007

LOC. NO.	RECYCLED WATER USERS PROJECT		Anticipated Delivery Date	User	Quantity A.F./year	Type of Use
	FOREST LAWN PROJECT					
	LOS ANGELES			NO		
61	S Central Avenue*		Completed	NO	5	Irrigation
62	Edison School	Main line to be extended (March 2007)	Completed	YES	15	Irrigation
63	*Cerritos School Park*		*Under Construction*	NO		
	*Dual Plumbing:**					
79	Glendale Plaza - 655 N Central Avenue		Completed	NO		Flushing Toilets
80	Building - 400 N Brand		Completed	NO		Flushing Toilets
58	Building - 450 N Brand		Completed	NO		Flushing Toilets
59	Police Building - Isabel Street		Completed	NO		Flushing Toilets
60	Building - 611 N Brand		Planning Stage	NO		Flushing Toilets
73	Glendale Town Center (Americana at Brand)		*Under Construction*	NO		Irrigation
	POWER PLANT PROJECT					
76	San Fernando Road Landscape Irrigation		Completed	2006-07		
	VERDUGO SCHOOL PROJECT					
	PASADENA			NO		
64	John Marshall School*		Completed	NO	15	Irrigation
77	Polygon Homes Housing Tracks		Planning Stage	NO		Irrigation
65	Fire Station No. 21*		Completed	NO	10	Irrigation
66	Mayor's Park (Proposed)		Unknown	NO	6	Irrigation
67	Park Site C (Proposed)		Unknown	NO	54	Irrigation
68	Park Site A (Proposed)		Unknown	NO	69	Irrigation
29	Carr Park		Planning Stage	NO	5	Irrigation
38	Glorietta Pump Station		Planning Stage	NO	5	Irrigation
41	Monterey Road Median - WJH		Planning Stage	NO	1	Irrigation
	PARKS and RECREATION - City of Glendale					
74	Deukmejian Wilderness Park		*Under Construction*	NO		Irrigation
	BRAND PARK PROJECT					
69	W Glenoaks Boulevard*		Completed	NO	5	Irrigation
70	Toll Jr High		Planning Stage	NO	10	Irrigation
71	Hoover High School		Planning Stage	NO	20	Irrigation
72	Keppel High School		Planning Stage	NO	10	Irrigation
	*Dual Plumbing:**					
78	Disney Animation Complex	Main line to be extended (January 2007)	*Construction completed*	NO Target date - May 2007		Flushing Toilets/Irrigation
	DreamWorks Complex		Planning Stage			
	PARKS and RECREATION - City of Glendale					
75	Pacific Park		Completed	NO		Irrigation
	TOTAL				***100***	
	Grand Total			**	***2,015 - 2,655***	

* *RW main service not yet available.*

** *Pasadena and Los Angeles Demand not included*

*** yellow highlight means recent completion

APPENDIX D

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

2006-2011 Water Years

CITY OF SAN FERNANDO

GROUNDWATER PUMPING AND SPREADING PLAN

OCTOBER 1, 2005 TO SEPTEMBER 30, 2010

2006-2007 Water Year

Prepared by:

Public Works Department

Engineering Division

117 Macneil Street

San Fernando, California 91340

May 2007

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. A stipulation approved by the Court, on December 13, 2006, allows for a temporary increase in the safe yield of the Basin to 6,810 AF/Y beginning October 1, 2006. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,405 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 May 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 has imposed 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: Treated water is purchased from the MWD to supplement ground water supplies. Historic and projected use of MWD water is 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 (2005-2006)

1.	Well 2A	1681.84
2.	Well 3	344.43
3.	Well 4A	224.51
4.	Well 7A	606.18
	Total	2856.96

D. Wells Groundwater Level Data

1.	Well 2A	1084.6	Taken 07/06
2.	Well 3	1072.2	Taken 07/06
3.	Well 4A	1116.1	Taken 07/06
4.	Well 7A	1071.3	Taken 07/06

E. Well Locations

Well 2A - 14060 Sayre Street, Sylmar

Well 3 - 13303 Borden Street, Sylmar

Well 4A - 12900 Dronfield Avenue, Sylmar

Well 7A 13180 Dronfield Avenue, Sylmar

IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The safe yield of the Sylmar Basin was 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 were each allowed to pump approximately 3,255 acre-feet per year.

A stipulation approved by the Court December 13, 2006 allows for a temporary increase in the safe yield of the Basin to 6,810 AF/Y beginning October 1, 2006. Therefore, San Fernando and Los Angeles are now allowed to each pump approximately 3,405 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, 2006 the City of San Fernando has a stored water credit of 737.04 acre-feet accumulated during previous years through the 05-06 water year.

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

(Acre – Feet)

FY	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
DEMAND										
WELLS	3,765.72	3,357.50	3,454	3,143.04	2,856.96	3,100	3,100	3,100	3,100	3,100
MWD	0	382	508	499.9	733.69	900	900	900	900	900
TOTAL	3765.72	3739.50	3,954	3,642.94	3,590.65	4,000	4,000	4,000	4,000	4,000
	ACTUAL					PROJECTED				

APPENDIX A

WATER QUALITY DATA

SEE ATTACHED WATER QUALITY REPORT, 2006

CITY OF SAN FERNANDO

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

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

2006-2011 Water Years

CRESCENTA VALLEY WATER DISTRICT

GROUNDWATER PUMPING & SPREADING PLAN

FOR

WATER YEARS

OCTOBER 1, 2006 TO SEPTEMBER 30, 2011

Prepared by:
David S. Gould, P.E.,
District Engineer

Prepared for:
ULARA Watermaster's Office

May 2007

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 Judgment 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 for 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 as prepared by CVWD is in response to Section 5.4, Groundwater Pumping and Spreading Plan. Since no groundwater spreading has been performed by the CVWD at this time, only plans/projections for groundwater pumping and treatment are discussed in this report. Note that CVWD's Verdugo Basin Groundwater Recharge, Storage and Conjunctive Use Feasibility Study, which was completed in 2005 has recommended methods of stormwater recharge and storage within the basin and this issue will be investigated more in the future.

The Groundwater Pumping Plan is based on the water year, October 1, 2006 to September 30, 2011.

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 in Table 2.1.

Water demands during the last five years (2001/02 – 2005/06) were affected by the amount of annual rainfall within Valley. CVWD observed less than normal amount of rainfall from 1997 to 2004, record rainfall in 2004/05 and average rainfall in 2005/06.

The 2003/04 water year concluded six (6) consecutive years of below average rainfall in the Crescenta Valley, which was an average of 16.4 inches over this period. In 2004/05, the Southern California area saw near record rainfall and the Crescenta Valley rainfall total reached over 50 inches. In 2005/06, rainfall was slightly below the 30 year average at 22.6 inches. However, the rainfall for 2006/07 has seen a dramatic change as the current rainfall is 5.6 inches, which is about 80% below average.

CVWD's Board of Directors elected this year to continue with a voluntary water conservation program utilizing a water conservation alert system. CVWD saw a marginal decrease in water usage (1%-2%) in the summer of 2006, which was attributed to public awareness.

Water conservation incentives in the form of rebates for turf replacement, ultra-low flush toilets, and high efficiency clothes washers are being provided along with continuous water conservation information that is posted on CVWD's website for CVWD's customers. In addition, CVWD has been working with MWD on an ET irrigation controller exchange program.

In 2005/06, we observed a slight increase in water production as compared to 2004-05. CVWD's wells produced 3,353 ac-ft, which was 56 ac-ft over the adjudicated rights of 3,294 AFY. It appears that CVWD's annual water demand has stabilized in the 5200-5600 AFY range, hopefully due to our water conservation and public education efforts.

The localized drought from 1998 – 2004 had serious implications for the Verdugo Basin groundwater supply and CVWD has been looking at additional ways to augment its water supply. The District had increased its ability to obtain more imported water from Foothill Municipal Water District (FMWD) and the City of Glendale. CVWD is finalizing a new emergency water supply interconnection with the City of Los Angeles Department of Water and Power (LADWP) as part of a grant funded under Proposition 50, Chapter 3 for construction of the new facility.

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. An annual increase in water demand of approximately 2% per year can be expected over the next five (5) years.

III. WATER SUPPLY

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

A. PRODUCTION WELLS

The CVWD has twelve (12) 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 contains nitrate concentrations above the 45 mg/L maximum contaminant level (MCL) set by the EPA and DHS. The Glenwood Nitrate Removal Plant, n ion exchange process, 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. In the 2005/06, the ion-exchange plant was in operation for the majority of the year since there was an increase in well levels and well production.

Water production at the Mills Plant is blended with MWD water to decrease the nitrate levels below the MCL.

In September 2006, Well #7 was taken out of service because of the discovery of methyl tertiary-butyl ether (MTBE) above the 13 ug/L MCL. Prior to September 2006, CVWD had detected low levels of MTBE in Well 5 and had been sampling since 2004. The MTBE levels in Well #7 started at 29 ug/L, went as high as 50 ug/L and dropped down to 2.5 ug/L. CVWD requested the Watermaster's office to create the Verdugo Basin MTBE Task Force and have been working with RWQCB, DHS, stakeholders, and PRP's on remediation and clean up of the MTBE.

In addition, CVWD is working on design and installation of a new granulated activated carbon (GAC) water treatment system for removal of MTBE at the Mills Plant. Construction of the GAC plant should be completed by the end of 2007.

The District's active wells range in age from 4 to 75 years and are mostly beyond their useful life. The District' started in 2000 with a well replacement program with the goal of replacing existing groundwater production capacity with new, modern wells over the next 10 years.

However, Well 15 had a very low capacity and a second well drilled (Well 17) did not produce enough during development of the well to be put into production. As the capacity of the new wells appears to be far less than we originally anticipated, CVWD received an AB303 Local Groundwater Assistance Grant from DWR to perform the Verdugo Basin monitoring well study to locate new production wells. The results of the study showed that the monitoring well sites would also produce low-capacity well. The District then received a second AB303 local groundwater assistance grant to perform a groundwater model and look at the feasibility of recharging the basin. This feasibility study was completed in 2005 and the recommendations were that it is possible to store stormwater in the basin to increase groundwater levels and water production. To continue with CVWD's work in the basin, CVWD was awarded a third AB303 local groundwater assistance grant to perform a geophysical survey of the Verdugo Basin. This study began in September 2005 and was completed in June 2006. The results from geophysical survey showed a different configuration of the subsurface and the new data will be inputted into the model to assist CVWD and Glendale with management of the basin.

CVWD has seen the water levels and water production in its groundwater wells remain fairly consistent which is probable due to the record rainfall received in the Crescenta Valley in 2004/05. We have seen an increase in the maximum capacity of the wells of 4.5 MGD in 2005/06. However, we believe that this water year 2006/07, we should start seeing water levels and water production decrease due to the lack of rainfall this year.

In 2005/06, CVWD performed well rehabilitation and an aquifer pump test on Well #2 with plans to equip and activate Well #2. We are completing the design of the new pump and piping system within the next few months. In addition, we are working with DHS on a nitrate blending plan, since the nitrate levels in Well #2 are around 45 ppb. Well #2 is anticipated to be on-line by the end of 2006.

We also have plans to perform well rehabilitation and equipping of Well #17. The goal of activating theses wells is to increase the potential well capacity of the entire system, when lower groundwater levels are experienced and there is also a decrease in well production.

CVWD will continue performing well rehabilitation on its existing wells and will review the findings of the geophysical study to determine possible locations of new wells.

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant was out of operation for extended periods in 1992–93 and in 1997 when repairs were necessary. In the past year, the plant was in operation because overall groundwater production was up due to basin level increase, thereby increasing the need for treatment. This trend will probably continue in 2006/07 as the higher well levels have allowed CWVD to increase usage of the plant, however, water production my decrease in the future. 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

In 2005/06, the amount of treated water purchased from MWD via FMWD was more than previous years due to increased water demands and CVWD's staying within its adjudicated rights. In 2006/07, CVWD is anticipated an increase in the amount of import water it receives from FMWD so as to maintain groundwater production within its adjudicated rights. Historic and projected use of FMWD water is shown in Table 3.4.

E. City of Glendale Interconnection

In 2003/04, CVWD completed the installation of a new water supply interconnection with the City of Glendale. This connection allowed CVWD to increase its water supply capacity by 5.0 cfs or 3.2 mgd. An agreement between City of Glendale, FMWD and CVWD was signed in 2004, where CVWD will pay FMWD for the water and Glendale for the maintenance and operation of bring the water to CVWD. CVWD's usages of the Glendale/CVWD interconnect (GCI) was used only during periods of outages from FMWD. CVWD experienced a planned FMWD outage in December 2006 and is anticipating another major outage in 2009 when MWD does major upgrades to its Weymouth plant in La Verne.

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for CVWD's share of the Verdugo Basin is 3,294 acre-feet annually. In the past six years, basin production was declining and 2001-02 was the first year in over ten years CVWD pumping was less than the full adjudication. However, in 2004/05, CVWD experience an increase in water production and was able to pump its entire adjudication plus 16 ac-ft. In 2005/06 CVWD again experience an increase in water production and was able to pump its entire adjudication plus 56 ac-ft.

During 2005/06 CVWD and Glendale came to a mutual agreement on compensation for the amount of water pumped over the adjudication for water years 04/05 & 05/06. CVWD has adjusted its pumping schedule for 06/07 to maintain well production within the adjudication

TABLE 2.1

HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
5,832	5,710	5,874	5,220	5,432	5,725	5,870	5,990	6,110	6,230
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL AND TUNNEL GROUNDWATER PRODUCTION
(Acre-Feet)

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
3,276	2,842	2,575	3,310	3,353	3,294	3,294	3,294	3,294	3,294
ACTUAL					PROJECTED				

TABLE 3.2
HISTORIC AND PROJECTED GLENWOOD NITRATE REMOVAL PLANT PRODUCTION BEFORE BLENDING
(Acre-Feet)

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
515	216	164	782	997	1,000	1,000	1,000	1,000	1,000
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)

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
59	56	51	69	71	70	70	70	70	70
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER
(Acre-Feet)

2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011
2,556	2,868	3,299	1,909	2,080	2,437	2,572	2,635	2,815	2,939
ACTUAL					PROJECTED				

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

APPENDIX F

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA

1979 - 2006

ANNUAL MUNICIPAL EXTRACTIONS IN ULARA
1979-80 through 2005-06
(acre-feet)

Water Year	San Fernando Basin*				Sylmar Basin			Verdugo Basin			ULARA TOTAL
	Burbank	Glendale	Los Angeles	TOTAL	Los Angeles	San Fernando	TOTAL	CVWD	Glendale	TOTAL	
2005-06	10,108	7,374	38,042	55,523	2,175	2,857	5,032	3,354	2,390	5,744	66,299
2004-05	6,399	7,792	49,085	63,276	1,110	3,143	4,253	3,310	2,358	5,668	73,197
2003-04	9,660	7,282	68,626	85,568	3,033	3,454	6,487	2,568	2,117	4,685	96,740
2002-03	9,170	8,507	73,676	91,353	3,549	3,357	6,906	2,836	1,613	4,449	102,708
2001-02	10,540	6,838	66,823	84,201	1,240	3,766	5,005	3,266	2,129	5,396	94,602
2000-01	12,547	6,886	65,409	84,843	2,606	3,696	6,301	3,422	2,227	5,649	96,793
1999-00	12,547	1,023	98,016	111,586	2,634	3,807	6,441	3,699	2,727	6,426	124,453
1998-99	10,729	31	123,207	133,966	4,536	3,528	8,064	3,797	2,627	6,424	148,455
1997-98	3,964	28	85,292	89,284	3,642	3,308	6,950	3,747	2,820	6,567	102,802
1996-97	11,171	20	89,935	101,126	2,482	3,259	5,741	3,672	2,674	6,346	113,213
1995-96	8,067	26	72,286	80,379	2,766	2,985	5,752	3,705	2,133	5,838	91,969
1994-95	3,052	53	55,478	58,583	2,311	3,421	5,732	3,708	1,633	5,341	69,656
1993-94	2,773	115	60,480	63,368	2,052	3,398	5,451	3,634	1,402	5,037	73,855
1992-93	1,354	91	34,973	36,419	1,369	2,145	3,514	2,557	990	3,547	43,480
1991-92	39	489	75,684	76,213	3,292	2,826	6,118	2,631	633	3,264	85,596
1990-91	1,278	2,755	67,032	71,065	3,281	2,266	5,546	2,615	1,230	3,845	80,456
1989-90	16	1,500	79,949	81,465	2,626	2,763	5,389	2,903	1,329	4,232	91,086
1988-89	29	1,315	126,630	127,974	3,259	2,199	5,459	2,285	2,064	4,349	137,781
1987-88	30	1,020	104,419	105,470	3,133	777	3,911	2,268	2,096	4,364	113,745
1986-87	29	5,758	85,845	91,632	3,113	3,026	6,139	2,255	2,619	4,874	102,645
1985-86	123	5,819	80,963	86,904	3,075	3,166	6,241	2,075	3,418	5,493	98,639
1984-85	2,863	3,086	95,641	101,591	3,130	3,102	6,232	1,997	3,837	5,834	113,657
1983-84	1,063	1,708	112,840	115,611	3,106	3,907	7,013	2,009	3,551	5,560	128,184
1982-83	2,187	1,028	65,178	68,394	3,048	3,133	6,181	1,759	3,427	5,187	79,761
1981-82	523	952	83,207	84,682	3,486	3,290	6,775	1,876	3,732	5,607	97,065
1980-81	595	1,129	91,067	92,791	4,117	3,380	7,497	2,140	2,122	4,262	104,550
1979-80	677	934	57,304	58,915	3,111	2,991	6,102	1,873	1,434	3,307	68,325
Average	4,501	2,724	78,040	85,266	2,862	3,072	5,935	2,813	2,272	5,085	96,286

*Includes municipal pumping only. Does not include any physical solution pumping in the cities of Burbank, Glendale, or Los Angeles.