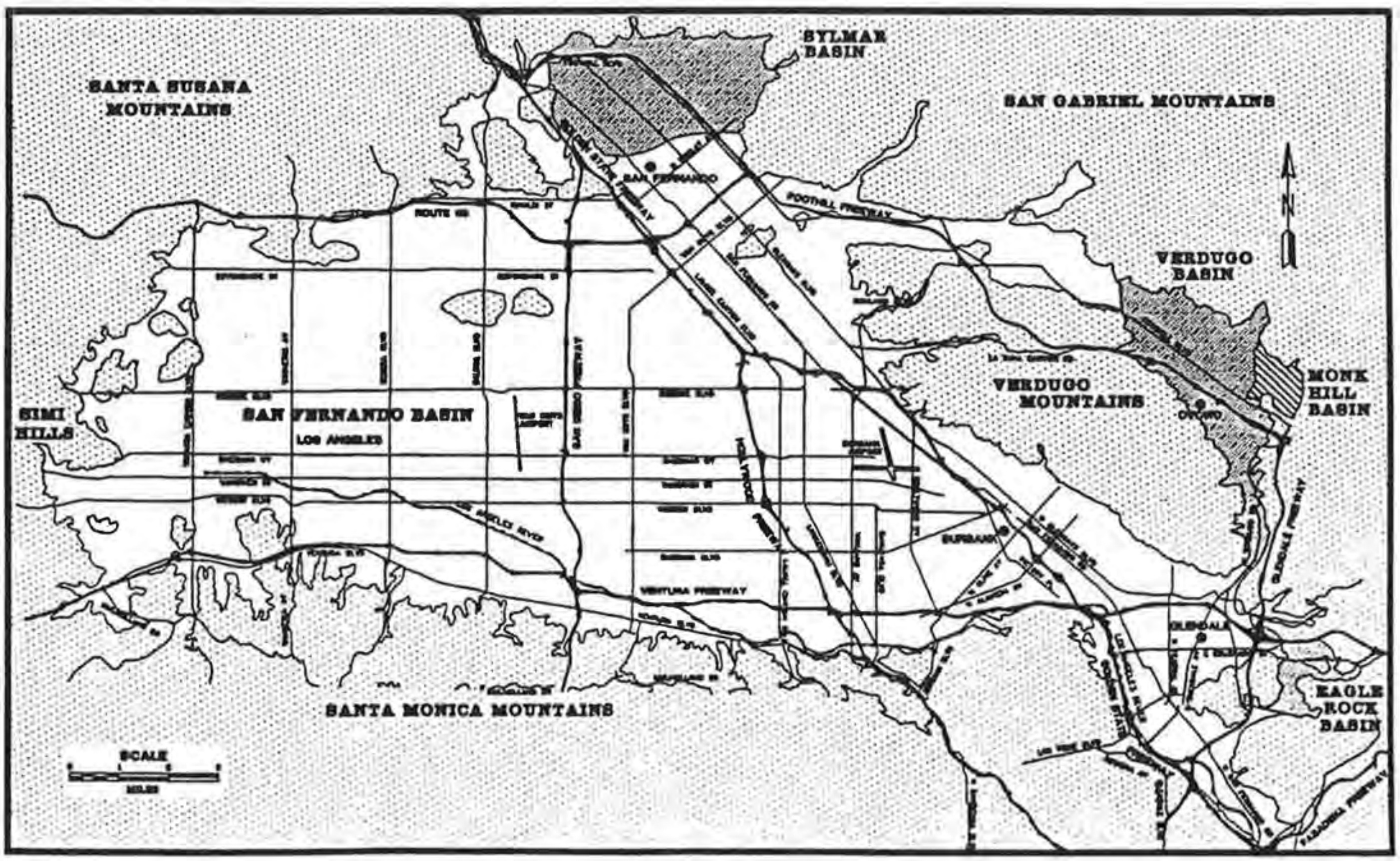
UPPER LOS ANGELES RIVER AREA WATERMASTER

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

GROUND WATER PUMPING AND SPREADING PLAN
FOR THE
UPPER LOS ANGELES RIVER AREA
LOS ANGELES COUNTY

1994-95 WATER YEAR
OCTOBER 1, 1994 - SEPTEMBER 30, 1995



SEPTEMBER 1995

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P.O. Box 111, Room 1304
Los Angeles, CA 90051-0100

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1994-95 WATER YEAR
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SEPTEMBER 1995

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I. EXECUTIVE SUMMARY

This is the first report prepared for compliance with Section 2.9.4. amended July 1993 of the Upper Los Angeles River Area (ULARA) Watermaster's Policies and Procedures. This section establishes the Watermaster's responsibility for water quality management in the ULARA groundwater basins, by independently reviewing and approving all plans or activities that might affect water quality. This involves plans submitted by the five major producers which might incorporate increased recharge such as spreading, increased pumping, or change in pumping patterns, especially in relation to the present and future plans for groundwater clean-up.

This first ULARA Pumping and Spreading report presents a review by the ULARA Watermaster of the 1994-95 pumping and spreading plans prepared by the five major water producers in the ULARA and the impact on water quality in three major basins of ULARA: San Fernando, Verdugo, and Sylmar. The report also includes a review of cleanup reports submitted for the Superfund Operable Units (OUs) and other smaller groundwater cleanup operations and dewatering activities.

None of the plans for pumping and spreading for the 1994-95 Water Year involve significant departures from that which has been experienced historically. In recent years, Los Angeles has shifted a majority of its pumping upgradient of the plumes, where there is adequate well capacity to pump all of its assigned water rights. Glendale is unable to pump its water rights in the San Fernando Basin (SFB), and is taking only a portion of its water rights from the Verdugo Basin. Burbank has reactivated two wells. San Fernando can pump all its groundwater rights from the Sylmar Basin, and Crescenta Valley is now able to pump all its assigned water rights from the Verdugo Basin.

Currently, there are four cleanup plants in operation: the City of Los Angeles' North Hollywood OU and the Advanced Oxidation Process Plant, the City of Burbank's Granular Activated Carbon Treatment Plant, and Crescenta Valley County Water District's Glenwood Nitrate Removal Plant. Three other treatment facilities are either in their final design stages or are completed: Burbank OU at Lockheed (completed), the Glendale North and South OUs, and the Pollock Wells Treatment Plant Project. There is also a fourth cleanup project to be funded by the City of Los Angeles which is planned for the Headworks Well Field.

There is a discussion of dewatering operations at the Universal City Subway Station under construction by the Metropolitan Transportation Authority and at sites along the southwestern boundary of the SFB in areas of deep foundations and high water tables.

The Watermaster recommends that in the plans for groundwater cleanup at any location, the treated water will be delivered for consumptive use, and that the pumping schedules for the wells be adjusted to the demands of the receiving purveyor. The concept of pumping more groundwater than is necessary for plume control is not recommended. Reinjection of surplus water is to be avoided, especially for disposal of unusable high nitrate waters into shallow aquifers already high in nitrates. In the next few years as groundwater pumping for cleanup from the OUs increases and as the spreading of recycled water is started (East Valley Water Recycling Project - Phase I), Watermaster surveillance and testing of results with groundwater flow models will be intensified. Models presently in use represent preferences of many different organizations and involve many different codes. It would be an investment in future efficiency if consensus could be reached on a uniform code to be used, the layers which most adequately represent the physical system, and the horizontal and vertical distribution of parameters such as recharge, specific yield, storage coefficient, and permeability.

II. INTRODUCTION

As a result of the groundwater contamination that was discovered in the SFB (Plates 1, 9, and 10), 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, in order to prevent further degradation of the groundwater quality and to limit the spread of contamination in the ULARA basins.

The thrust of the revisions to the ULARA Watermaster's Policies and Procedures is detailed in Section 2.9.4. (App. L). In Section 2.9.4., any party who produces groundwater is required to submit to the ULARA Watermaster annually (on or before May 1 of the current water year), a Groundwater Pumping and Spreading Plan. This plan should include projected groundwater pumping and spreading amounts, recent water quality data on each well, and facility modification plans. In order to obtain the information needed to project future groundwater contamination levels, a monitoring program should also be included in the plan.

The ULARA Watermaster is required to evaluate and report on the impact of the combined pumping and spreading as it relates to the implementation of the ULARA 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, that the Administrative Committee is to review and approve by September 1 of the current water year.

This is the first Groundwater Pumping and Spreading Plan for ULARA, prepared following the revision of the Policies and Procedures (July 1993). The plan is for the 1994-95 Water Year. This report provides guidance to the Administrative Committee for use in protecting the water quality within ULARA, improve basin management, and provide overall protection for each party's water rights.

III. PLANS FOR THE 1994-95 WATER YEAR

A. Groundwater Pumping - 1993-94 Water Year

Groundwater extractions for the 1993-94 Water Year are given in Appendix A.

B. Projected Groundwater Pumping for 1994-95 Water Year

Individual reports of the major water rights producers are given in the Appendices:

City of Los Angeles	Appendix D
City of Burbank	Appendix E
City of Glendale	Appendix F
City of San Fernando	Appendix G
Crescenta Valley County Water District (CVCWD)	Appendix H

Actual and projected amounts of pumping and spreading by the major parties during 1994-95 are given in Tables 3-1 and 3-2.

The projected groundwater pumping in 1994-95 is strongly affected by the pattern of contamination. This pattern is shown by the maps in the U.S. Environmental Protection Agency (EPA) Fact Sheet No. 13 (Appendix I) and Plates 9 and 10.

C. Constraints on Pumping as of 1994-95

SAN FERNANDO BASIN

Los Angeles - Several of the well fields within the SFB can not be pumped because of excessive levels of volatile organic contaminants. The majority of pumping has been shifted to areas upgradient of the plumes, where there is adequate well capacity to pump all of the water rights assigned in the Judgment.

Glendale - Essentially all of Glendale's SFB wells have been taken out-of-service due to excessive levels of volatile organic contaminants. At present, Glendale is unable to pump its water rights to return waters, physical solution waters, or stored waters from the SFB.

However, Glendale continues to accumulate a 20% storage credit for all return waters to the Hill and Valley area of the SFB.

Burbank - All but two Burbank wells have been inactive because of groundwater contamination. The two wells that have been reactivated pump groundwater through a treatment system and deliver to their distribution system. In the SFB, Burbank continues to accumulate return water storage credits rights which it is unable to pump.

SYLMAR BASIN

San Fernando - All of San Fernando's groundwater rights are pumped from the Sylmar Basin, where there are no limitations related to contamination.

VERDUGO BASIN

Crescenta Valley - Crescenta Valley's groundwater rights in the Verdugo Basin are minimally impacted by volatile organics' contamination. However, excessive nitrate levels are reduced by sending a portion of the pumped groundwater through a nitrate removal plant and blending to acceptability. Crescenta Valley is now able to pump all of its assigned water rights (as of 1993-94).

Glendale - At present, Glendale has facilities for taking only a portion of its water rights from the Verdugo Basin.

TABLE 3-1: 1994-95 PROJECTED GROUNDWATER EXTRACTIONS
(acre-feet)

		1994			1995								
Party/Well Field	Total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
City of Los Angeles*							SAN FERNANDO BASIN						
AERATION	1,648	209	158	107	107	137	155	99	48	187	149	154	138
CRYSTAL SPRINGS	0	0	0	0	0	0	0	0	0	0	0	0	0
ERWIN	2,428	308	77	0	0	247	411	135	0	210	350	350	340
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	17,573	4,345	610	0	0	0	3,403	390	0	0	2,650	3,150	3,025
POLLOCK	0	0	0	0	0	0	0	0	0	0	0	0	0
RINALDI-TOLUCA	25,990	7,260	1,928	1	0	4,631	2,994	276	0	0	0	4,500	4,400
TUJUNGA	8,001	6,062	547	0	0	917	0	475	0	0	0	0	0
VERDUGO	2,932	395	92	0	0	302	492	161	0	255	415	415	405
WHITNALL	1,129	157	37	0	0	122	203	0	0	105	170	170	165
TOTAL:	59,701	18,736	3,449	108	107	6,356	7,658	1,536	48	757	3,734	8,739	8,473
City of Burbank	2,589	270	205	159	214	192	266	190	268	172	249	268	136
City of Glendale	144	14	4	3	2	2	2	8	1	1	5	49	53
Lockheed	462	0	3	63	41	85	89	24	6	33	1	48	69
TOTAL:	62,896	19,020	3,661	333	364	6,635	8,015	1,758	323	963	3,989	9,104	8,731
							SYLMAR BASIN						
City of Los Angeles*	2,776	475	480	13	0	0	0	0	0	370	416	527	495
City of San Fernando	3,421	294	256	250	219	206	225	268	289	301	366	393	354
TOTAL:	6,197	769	736	263	219	206	225	268	289	671	782	920	849
							VERDUGO BASIN						
Crescenta Valley County Water Dist.	3,708	268	271	247	265	243	240	289	295	347	439	473	331
City of Glendale	1,633	158	139	150	138	108	137	113	138	70	182	154	146
TOTAL:	5,341	426	410	397	403	351	377	402	433	417	621	627	477
ULARA TOTAL:	74,434	20,215	4,807	993	986	7,192	8,617	2,428	1,045	2,051	5,392	10,651	10,057

D. Actual and Projected Spreading

Table 3-2 shows the volumes projected or actually spread during the 1994-95 Water Year, and Plate 3 shows the locations of the spreading facilities. Spreading operations for the 1993-94 Water Year are included in Appendix B.

TABLE 3-2: 1994-95 ACTUAL SPREADING OPERATIONS
(acre-feet)

Spreading in ULARA Spreading Grounds in 1994-95						
	Operated by:					
	LACDPW				LADWP	LACDPW and LADWP
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga
Oct-94	34	425	0.4	0	0	0
Nov-94	56	387	0	34	0	6
Dec-94	70	466	0	109	0	70
Jan-95	105	5,950	3.3	3,280	0	4,558
Feb-95	60	4,560	217	2,190	0	2,675
Mar-95	60	9,930	100	3,740	0	3,120
Apr-95	81	6,950	472	3,080	0	2,914
May-95	21	1,640	199	876	0	4,030
Jun-95	47	2,100	90	480	0	787
Jul-95	22	1,480	1	101	0	0
Aug-95	17	868	3	46	0	0
Sep-95	12	381	0	128	0	76
TOTAL	585	35,137	1,086	14,064	0	18,236

IV. FACILITY MODIFICATION PLANS

A. Well Fields

There are 13 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 in Plate 3, and their estimated capacities are given on Table 4-1. One well, Pollock No. 5, was abandoned during the 1994-95 Water Year.

B. Active Groundwater Pump and Treat Facilities

The remediation of groundwater contamination in the SFB is at a very early stage. Only four small capacity plants are in operation. However, facilities for the Burbank OU have been built, and designs for the Glendale North and South OUs and Pollock Wells Treatment Plant are nearing completion.

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

This facility is designed to treat by air-stripping up to 2,000 gpm of groundwater. The treated water is delivered to the Los Angeles water distribution system. This treatment facility is discussed in Appendix I. During 1994-95, the plant was operating at a capacity of 1,750 gpm.

Advanced Oxidation Plant (AOP) - City of Los Angeles

This plant is operated by the City of Los Angeles. It is testing the removal of volatile organic compounds (VOCs) from pumped groundwater by the use of ozone and hydrogen peroxide. Treated water is delivered to the Los Angeles distribution system. The system was inoperable from November 1993 through June 1994 because of construction at the North Hollywood Pumping Plant. Operation was resumed in October 1994. Because the TCE concentrations in the well waters are less than expected, DWP undertook a study to spike the influent water with TCE and PCE and evaluate the effectiveness of the plant at the higher contaminant levels. Preliminary test results indicate the facility is effective in removing TCE and PCE contaminants. Complete dissemination of the results is forthcoming.

Granular Activated Carbon (GAC) Treatment Plant - City of Burbank

This facility is operated by the City of Burbank. Two wells (Nos. 7 and 15) have been reactivated to deliver water to a GAC plant for removal of VOCs. The treated water is delivered to the

Burbank distribution system. The amounts of water treated in 1993-94 are given in Appendix B. Actual and projected amounts for 1994-95 are given in Table 3-1.

Glenwood Nitrate Removal Plant - CVCWD

Groundwater in the wells of the CVCWD is excessively high in nitrate. A portion of the pumped groundwater is treated in an ion-exchange process and blended with untreated water to meet drinking water standards.

TABLE 4-1: ESTIMATED CAPACITIES OF ULARA WELL FIELDS

Party/Well Field	Number of Wells	Estimated Capacity (cfs)
SAN FERNANDO BASIN		
City of Los Angeles		
Aeration	8	5
Crystal Springs	5	60
Erwin	6	25
Headworks	6	25
North Hollywood	35	168
Pollock	4	11
Rinaldi-Toluca	15	134
Tujunga	12	120
Verdugo	7	22
Whitnall	7	36
City of Burbank	7	5*
City of Glendale	3	15*
Lockheed	6	30**
TOTAL:	121	656
SYLMAR BASIN		
City of Los Angeles	6	10
City of San Fernando	4	9
TOTAL:	10	19
VERDUGO BASIN		
CVCWD	11	18
City of Glendale	5	15**
TOTAL:	16	33

Notes:

(*) - Only two wells capable of pumping.

(**) - Values estimated by ULARA Watermaster.

C. Projected Groundwater Pump and Treat Facilities

Burbank OU - Lockheed

The wells for Phase I of this facility have been drilled and tested. The general location of the Burbank OU is shown on page D-4. The treatment plant has been completed and plan view is shown on page I-1 (Figure 1), along with a discussion of the Burbank OU. Test pumping by Lockheed in 1993-94 is shown in Appendix B. Amounts of additional test pumping for the Burbank OU in 1994-95 are shown in Table 3-1. Most of the treated water is to be delivered to the Burbank municipal system where there will be blending for nitrate reduction. The system is expected to start operation in 1995-96. There is still no agreement between Lockheed and the EPA as to the amounts to be pumped annually.

Glendale OU

This is discussed in EPA Fact Sheet 13 (Appendix I). The Remedial Design being prepared by the Consultant for the Potentially Responsible Parties is essentially complete. There will be some delay because the site intended for the treatment plant is being considered for other uses, and the treatment plant will probably be relocated. Operation of this facility may start in 1996.

Pollock Wells Treatment Plant

This is discussed in EPA Fact Sheet 13 (Appendix I). The National Pollutant Discharge Elimination system (NPDES) permit for the Pollock Project has been approved, and the design is underway. Construction will begin in 1996.

Headworks Well Field Remediation Project

This is not a Superfund project and will be funded by the City of Los Angeles. The object is to rehabilitate the Headworks Well Field by pumping and treating the water for VOCs. The first step will be the test pumping of Headworks Well No. 29 (HW-29) at 600 gpm for a period of 90 days. The extracted groundwater will be conveyed about 200 feet to a portable GAC contactor, which will remove the TCE and PCE contaminants. The treated water will be discharged to a nearby storm channel which flows to the Los Angeles River. The discharges will be covered by an NPDES permit. The preliminary pumping will allow the evaluation of the effectiveness of other AOP treatment technologies such as Ultra-Violet-Hydrogen Peroxide.

D. Groundwater Remediation Projects

Many privately owned facilities in the SFB have been found to have groundwater contamination, and are under Cleanup and Abatement Orders issued by the RWQCB. Each facility has numerous monitoring wells and most have pumping wells and treatment plants. Locations are shown on Plate 5. Descriptions are given in Appendix J.

E. Dewatering Operations

Metropolitan Transit Authority (MTA)

Discussions are being held for dewatering of the Universal City Subway Station being constructed by the MTA as part of its planned public transportation system in Los Angeles County. It is estimated that about 1,200 acre-feet (AF) will be removed over a two-year period under an existing NPDES permit. The water will be discharged to storm drains which flow into the Los Angeles River.

Other Dewatering Operations

Many facilities along the south-western boundary of the SFB have deep foundations and are in areas of a high groundwater table condition. These facilities are generally subject to continuous dewatering activities. The approval for the discharges must come from the Watermaster's office. The Watermaster requires submission of reports on the volume of water pumped for dewatering purposes. Locations are shown on Plate 5.

F. Existing and Projected Spreading Operations

Existing Spreading Operations

There are six spreading facilities located in the SFB. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima Spreading Grounds; the City of Los Angeles operates the Headworks Spreading Grounds. The LACDPW in cooperation with the City of Los Angeles operates the Tujunga Spreading Grounds. The spreading facilities are used primarily for spreading native water and imported water under party agreements. There are no plans for modifications of existing spreading grounds, or for the construction of new facilities in the 1994-95 Water Year. Estimated capacities for these are shown in Table 4-2, and their locations are shown on Plate 3.

Projected Spreading Operations

In 1998, the East Valley Water Recycling Project (EVWRP) will take tertiary-treated water from the Tillman Water Reclamation Plant and spread the water at the Hansen Spreading Grounds. The RWQCB, the California Department of Health Services, and the ULARA Watermaster have approved a Phase IA Demonstration Project which contemplates the spreading of 10,000 acre-feet per year (AF/yr) for three years. Monitoring wells are currently being installed in the Hansen Spreading Grounds. A full scale monitoring program will be implemented in 1996. The monitoring program will provide an evaluation of the impact of the vadose zone on the concentrations of Total Organic Compounds and total nitrogen, as well as the rate reclaimed water flows towards the nearest supply wells, the Tujunga Well Field under the expected groundwater gradients. If the results of the Demonstration Project are favorable, the amounts of recycled water delivered for spreading may be increased up to 35,000 AF/yr.

TABLE 4-2: ESTIMATED CAPACITIES OF ULARA SPREADING GROUNDS

Spreading Ground	Type	Total Wetted Area (acre-feet)	Capacity (acre-feet/year)
Operated by the LACDPW			
Branford	Deep basin	8	720
Hansen	Shallow basin	110	29,000
Lopez	Shallow basin	13	5,100
Pacoima	Med. depth basin	111	29,000
Operated by LADWP			
Headworks	Shallow basin	28	22,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basin	130	72,000
TOTAL:		400	157,820

V. ULARA WATERMASTER MODELING ACTIVITIES

A. Existing Models

The ULARA Watermaster is committed to the use of groundwater models as a means of evaluating the impacts of any significant changes of the locations or amounts of pumping or spreading. An objective of particular interest is to evaluate and assure that these changes do not interfere with groundwater cleanup activities and at the same time allow the parties to pump their water rights.

Many groundwater flow models have already been used in the SFB over the last 30 years, starting with analog models in the 1960s. In the modern era (since 1980) all flow models have been of the digital type. Improved but relatively simple flow and mass transport models were used for the EPA's Remedial Investigation and Feasibility Studies for the Burbank and Glendale Operable Units in 1989 and 1992, respectively.

The San Fernando Basin Groundwater Flow Model (Flow Model) that was developed for the EPA's "Remedial Investigation of Groundwater Contamination in the San Fernando Valley", dated December 1992, is the most rigorous model to date. The Flow Model is a three-dimensional model that incorporated the geologic, hydrologic and hydrogeologic characterizations of the SFB that were derived in the RI and that was calibrated against ten years of historical operations and water level data. In 1994, the Los Angeles Department of Water and Power developed a mass transport model (MT Model), a three-dimensional model that operates in conjunction with the Flow Model.

The Department, in close cooperation with the ULARA Watermaster's Office, has performed extensive SFB simulations using these models. Flow Model simulations were performed to evaluate the effectiveness of the Pollock Wells Treatment Plant Project and the Headworks Well Field Remediation Project, and both Flow Model and MT Model simulations were developed to evaluate the East Valley Water Recycling Project.

Of particular interest were the Flow Model simulations that were produced for the report on "The Effects of Above-Average Pumping in the San Fernando Valley" (Appendix K). Based on the analysis presented in that report, up to 150,000 AF of groundwater (200 percent of the historical average) could be extracted in 1994-95 with the City of Los Angeles' Water System current facilities. The recharge conditions in 1994-95 were assumed to be above average, similar to those experienced during the 1992-93 Water Year. Following this assumed year of very heavy pumping, a second year of pumping at 100,000 AF was simulated assuming below-average recharge conditions. Monthly water level data from seven monitoring wells that cover the north end of the SFB (Tujunga Well Field) to the southeastern end in the Los Angeles Narrows (Pollock Well Field) support the model simulations and provide benchmark conditions for groundwater level response under both high and low recharge conditions. These simulations demonstrate that even under the assumed two-year scenario of very heavy pumping, the groundwater gradients produced as a result of the above-average pumping, would not significantly enhance the migration of the groundwater plume towards the cleaner areas of the SFB.

The hydrographs in Appendix K are of particular interest in that they show actual water level responses resulting from periods of very low and very high pumping periods under conditions of both low and high recharge.

EPA is currently working on a Basin-wide Groundwater Feasibility Study which includes a recalibration of the RI model (Appendix I).

B. Future Models

The ULARA Watermaster believes that the key to the effective use of groundwater models is "flexibility" and that it is necessary to refine the existing models as new data, and new modeling techniques become available. Models presently in use represent preferences of many different organizations and involve many different codes. It would be an investment in future efficiency if agreement could be reached on a uniform code to be used, the layers which most adequately represent the physical system, and the horizontal and vertical distribution of such parameters as recharge, specific yield and storage coefficient, and permeability.

VI. WATERMASTER'S EVALUATION AND RECOMMENDATIONS

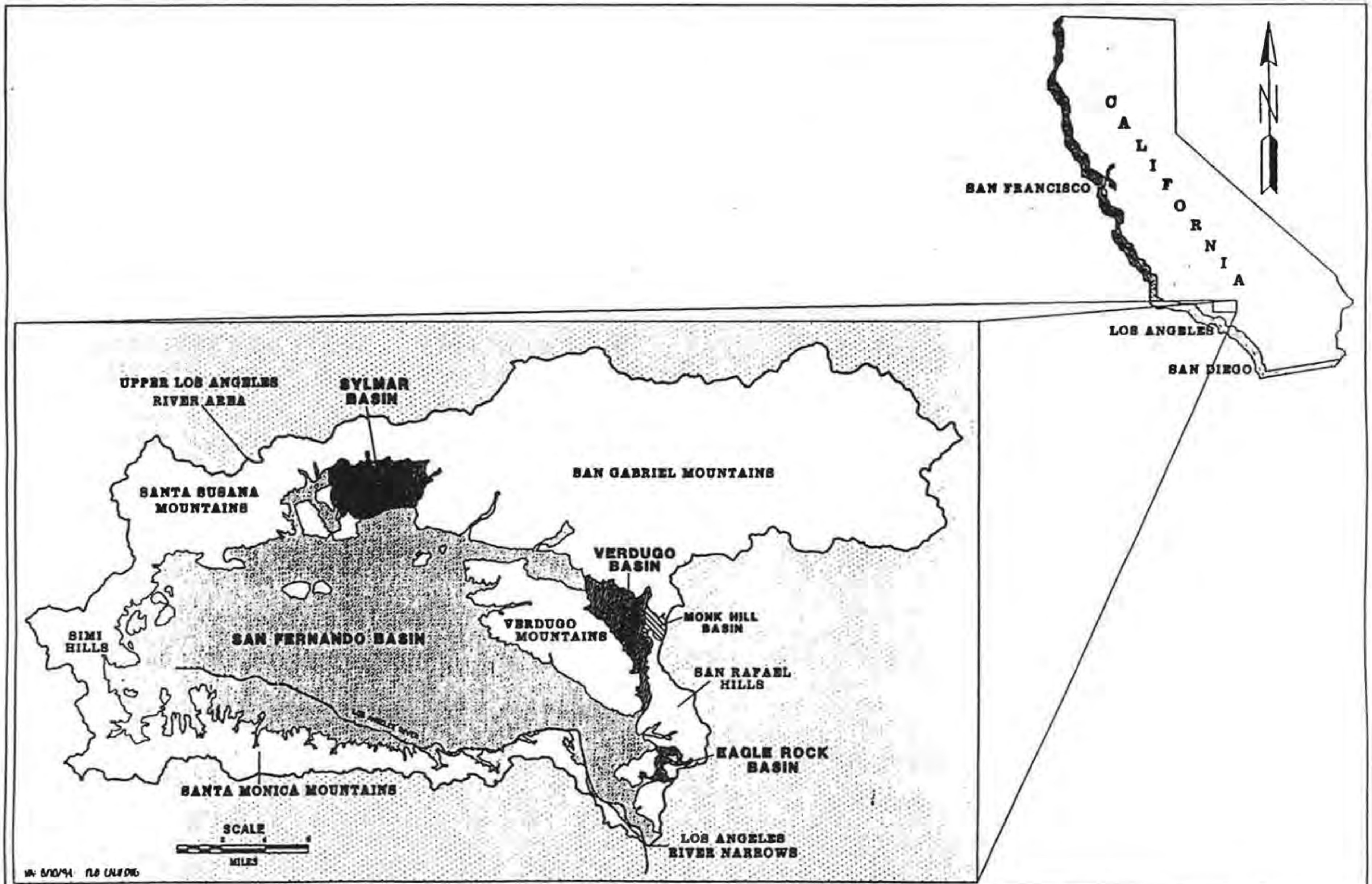
It is apparent that the changes in groundwater pumping and spreading for the 1994-95 Water Year are minor and will produce no significant impact beyond that which has been experienced historically.

It is recommended that in the plans for groundwater cleanup at any location, the treated water will be delivered for consumptive use, and that the pumping schedules for the wells be adjusted to the demands of the receiving purveyor. The concept of pumping more groundwater (or pumping more continuously) than is necessary for plume control is not recommended. Reinjection of surplus water is to be avoided, especially for disposal of unusable high nitrate waters into shallow aquifers already high in nitrates.

The groundwater pumping and spreading plans submitted each year will be evaluated by groundwater modeling. Simulations such as were conducted for Appendix K offer a basis for confidence that even under conditions of unprecedented drought and extremely heavy pumping, there will not be significant interference with present plans for groundwater cleanup.

The impact and applications of groundwater pumping and recharge programs could be more effectively evaluated if uniform modeling codes were used as well as uniform/standard keys for the distribution and representation of the groundwater system.

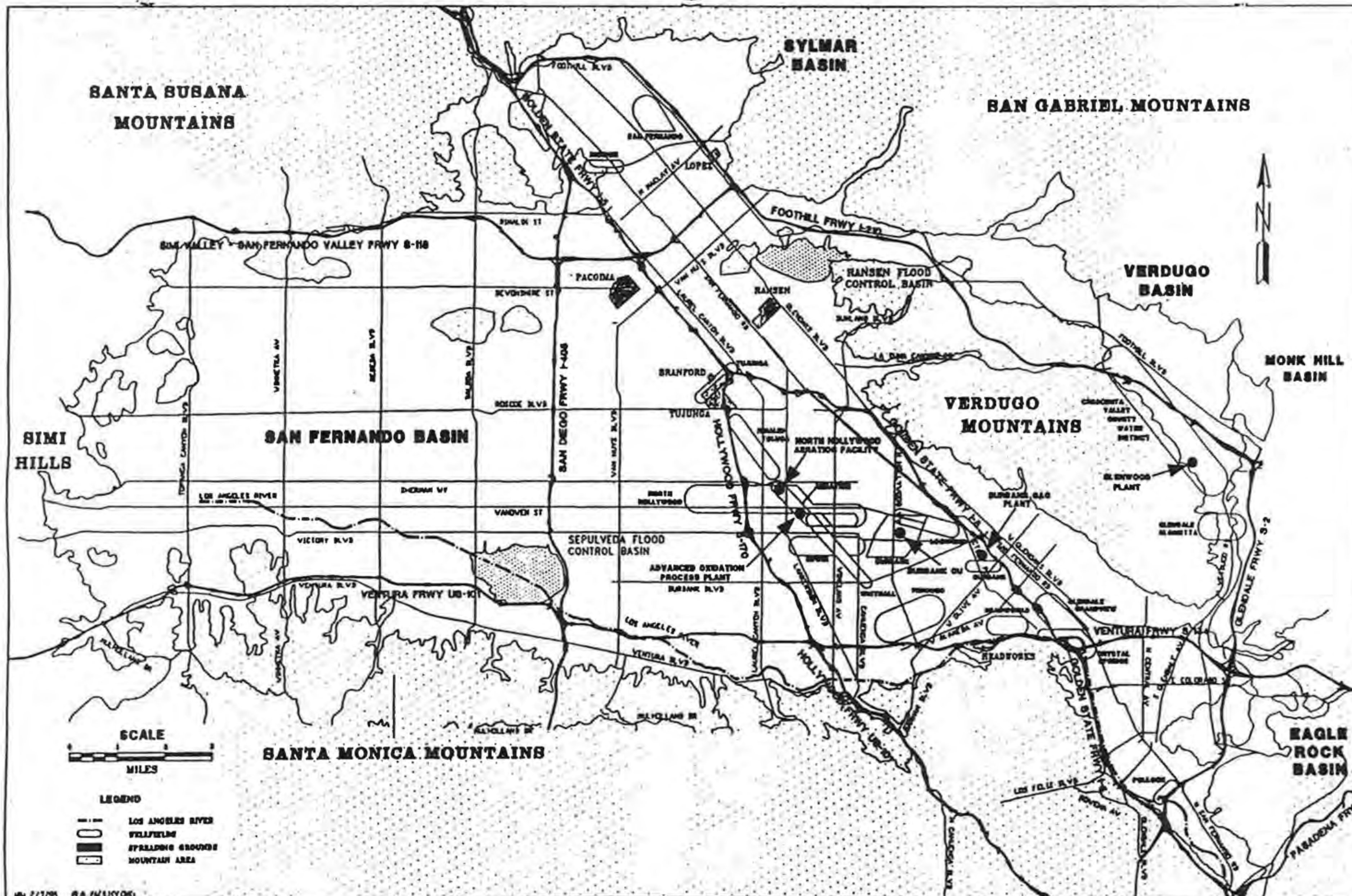
PLATES



1994-95 Water Year
ULARA Pumping & Spreading Plan

UPPER LOS ANGELES RIVER AREA

PLATE 1



1994-95 Water Year

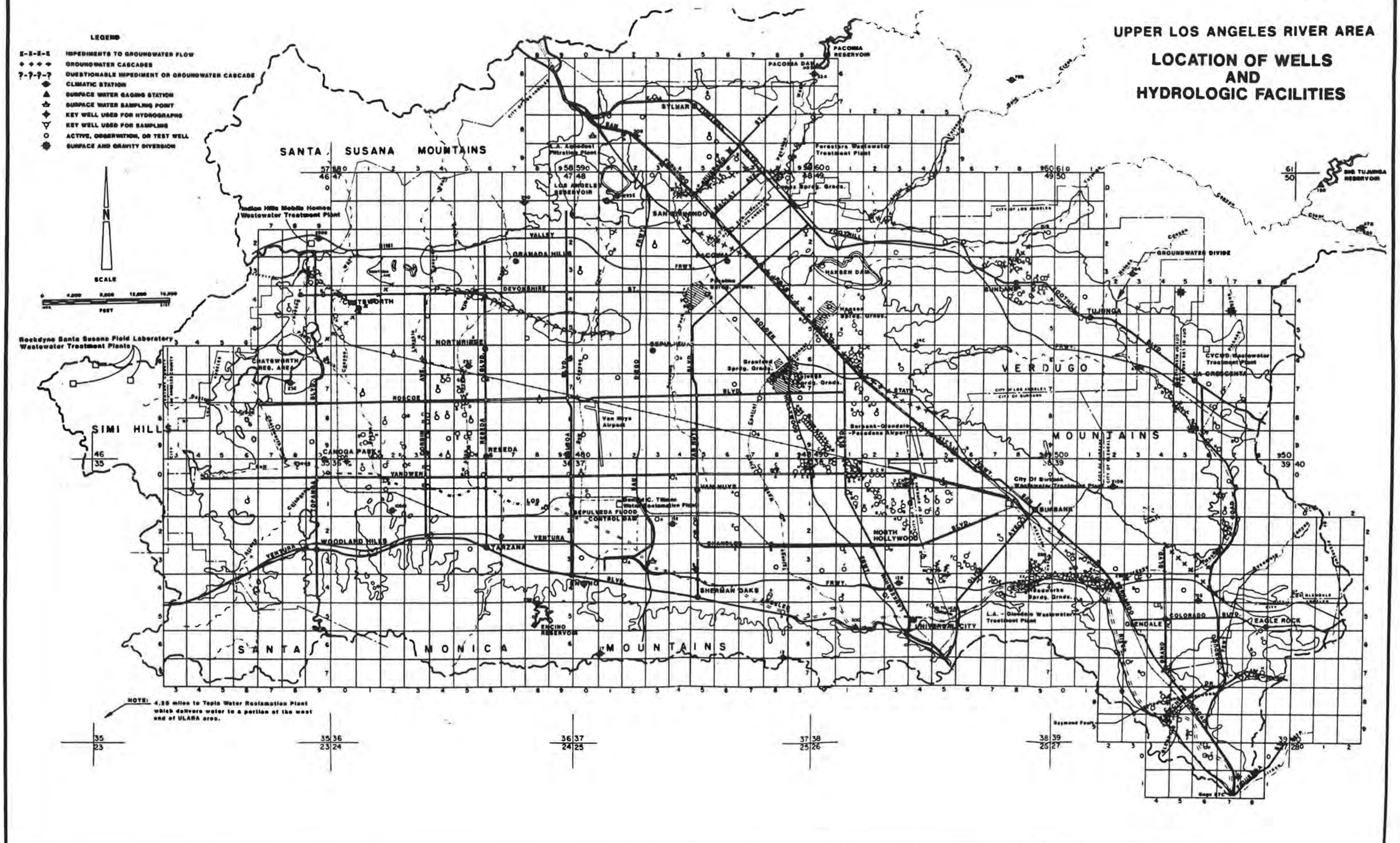
ULARA Pumping & Spreading Plan

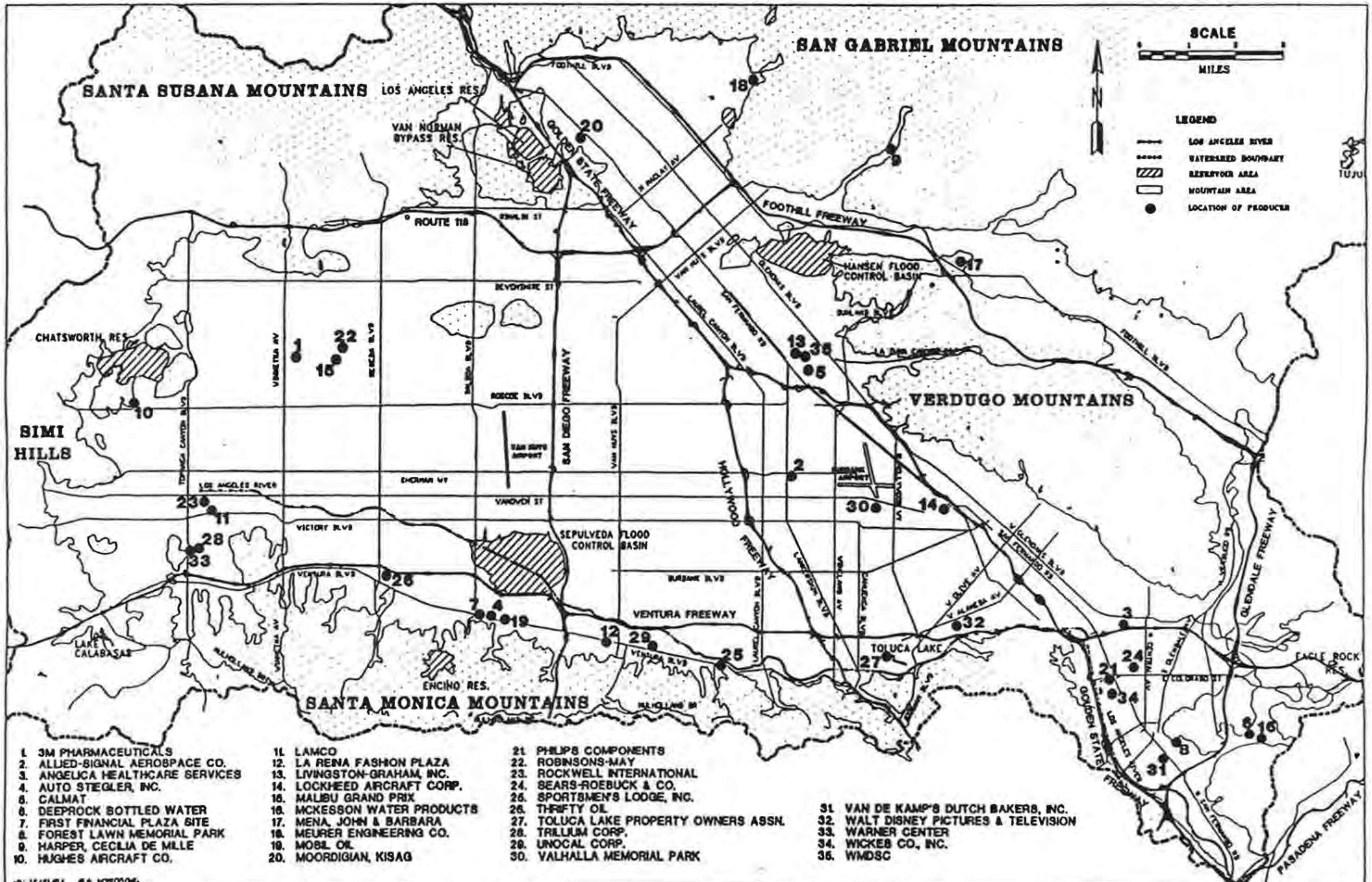
Spreading Grounds, Well Fields, and Ground Water Treatment Facilities

PLATE 3

UPPER LOS ANGELES RIVER AREA

LOCATION OF WELLS AND HYDROLOGIC FACILITIES





1993-94 Water Year
ULARA Watermaster Report

Upper Los Angeles River Area: Locations of Individual Producers

PLATE 5

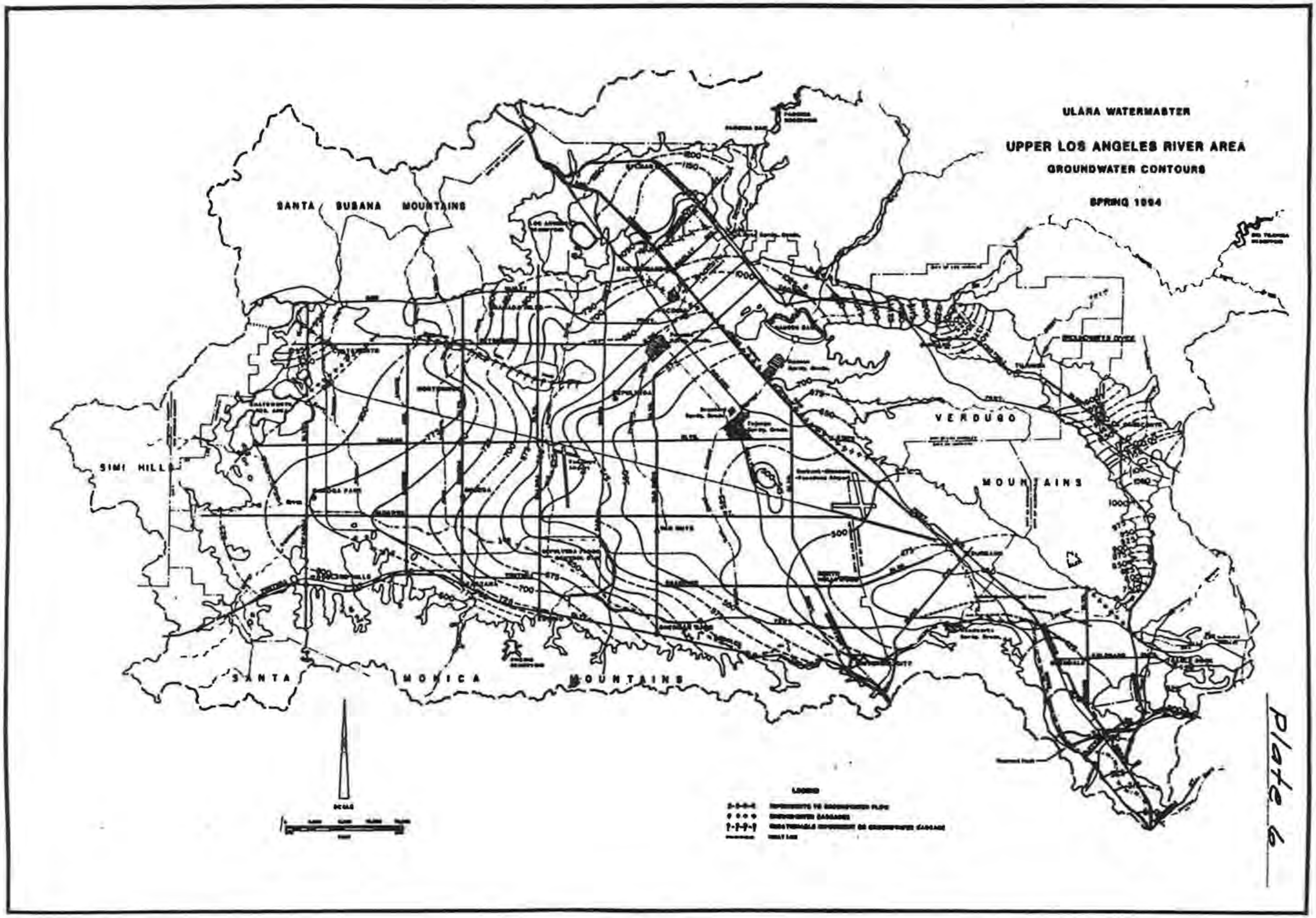
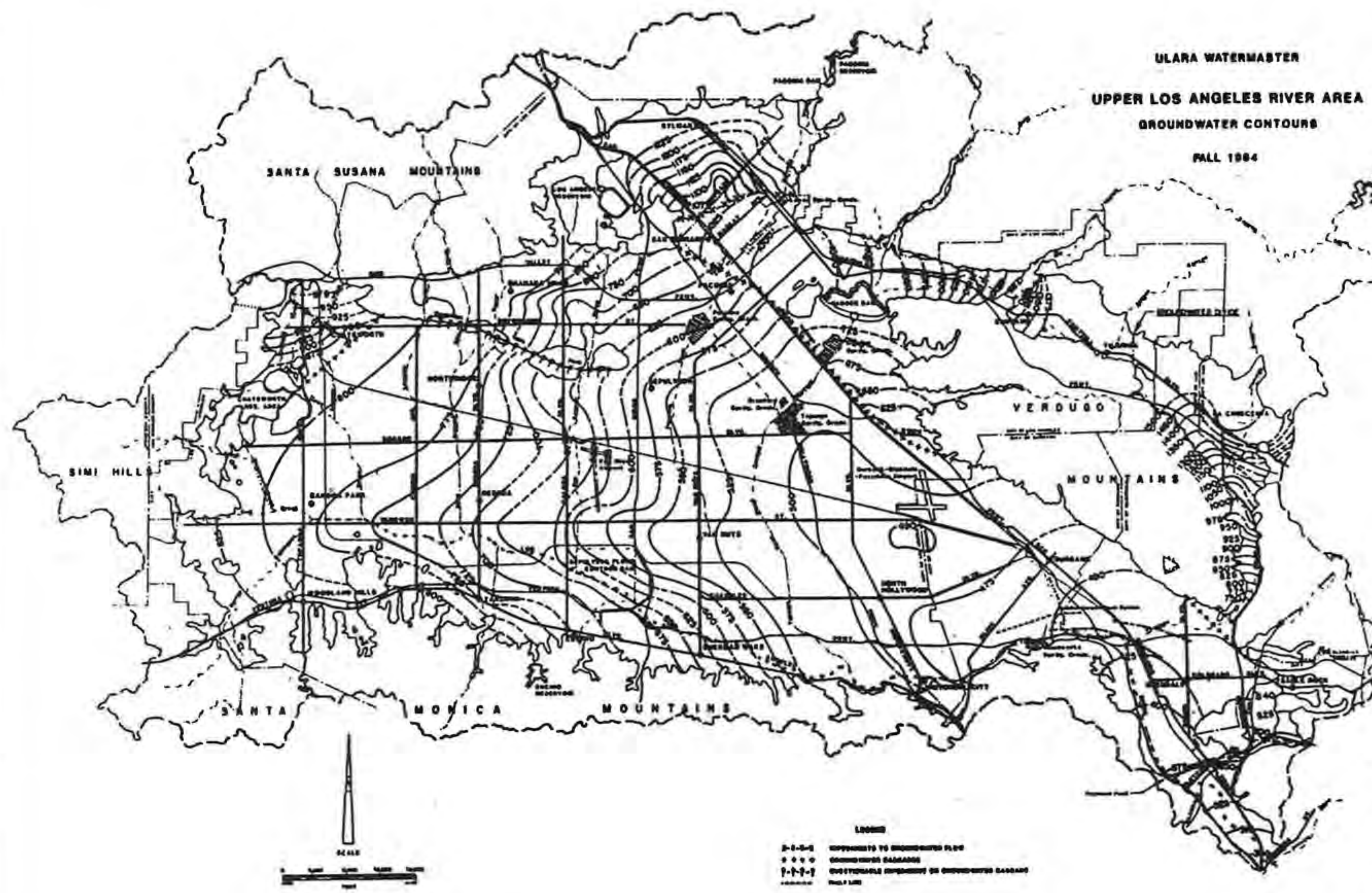

ULARA WATERMASTER
UPPER LOS ANGELES RIVER AREA
GROUNDWATER CONTOURS
SPRING 1994
SANTA SUSANA MOUNTAINS
SIMI HILLS
VERDUGO MOUNTAINS
SANTA MONICA MOUNTAINS
LEGEND

Plate 6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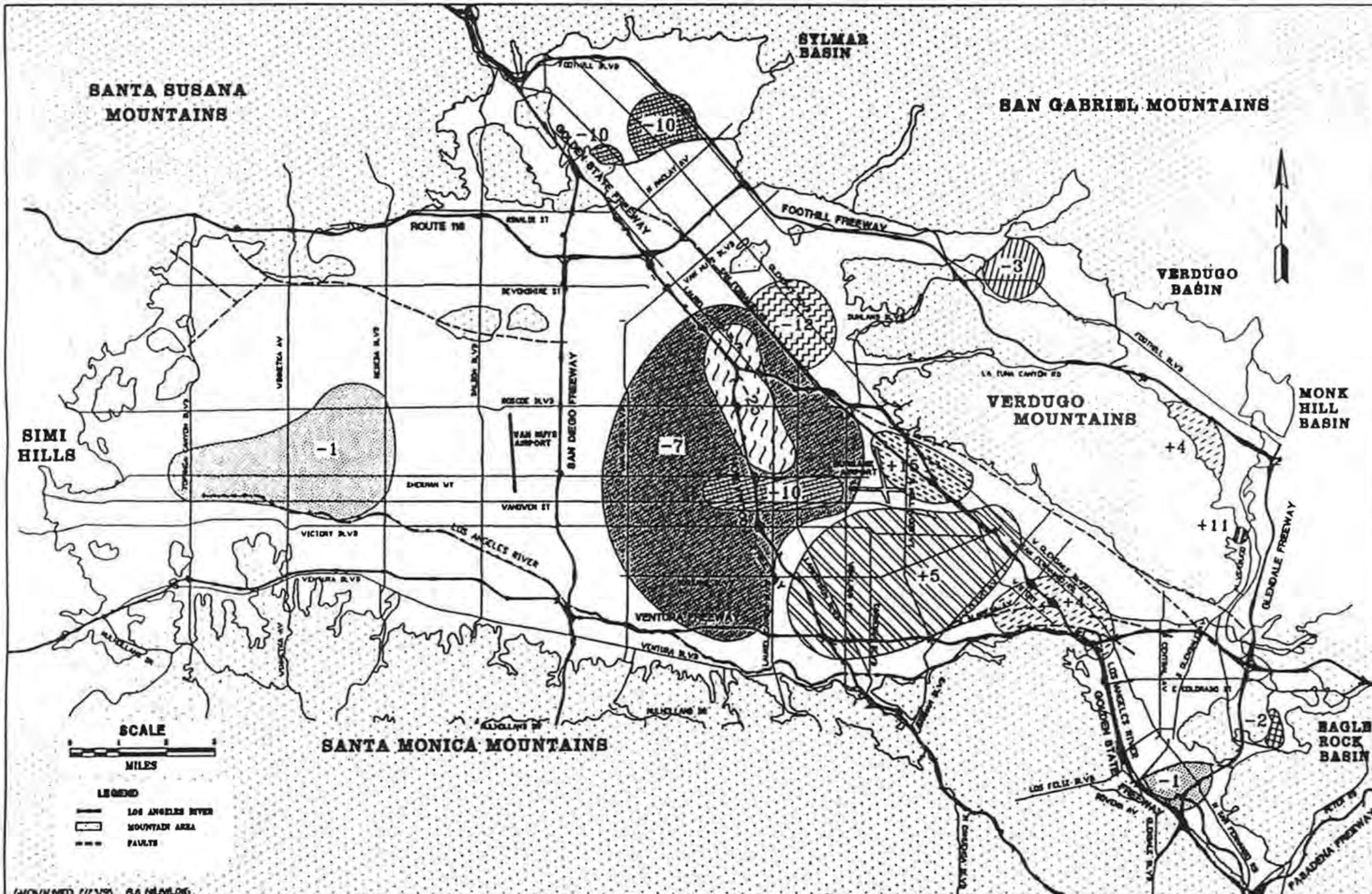
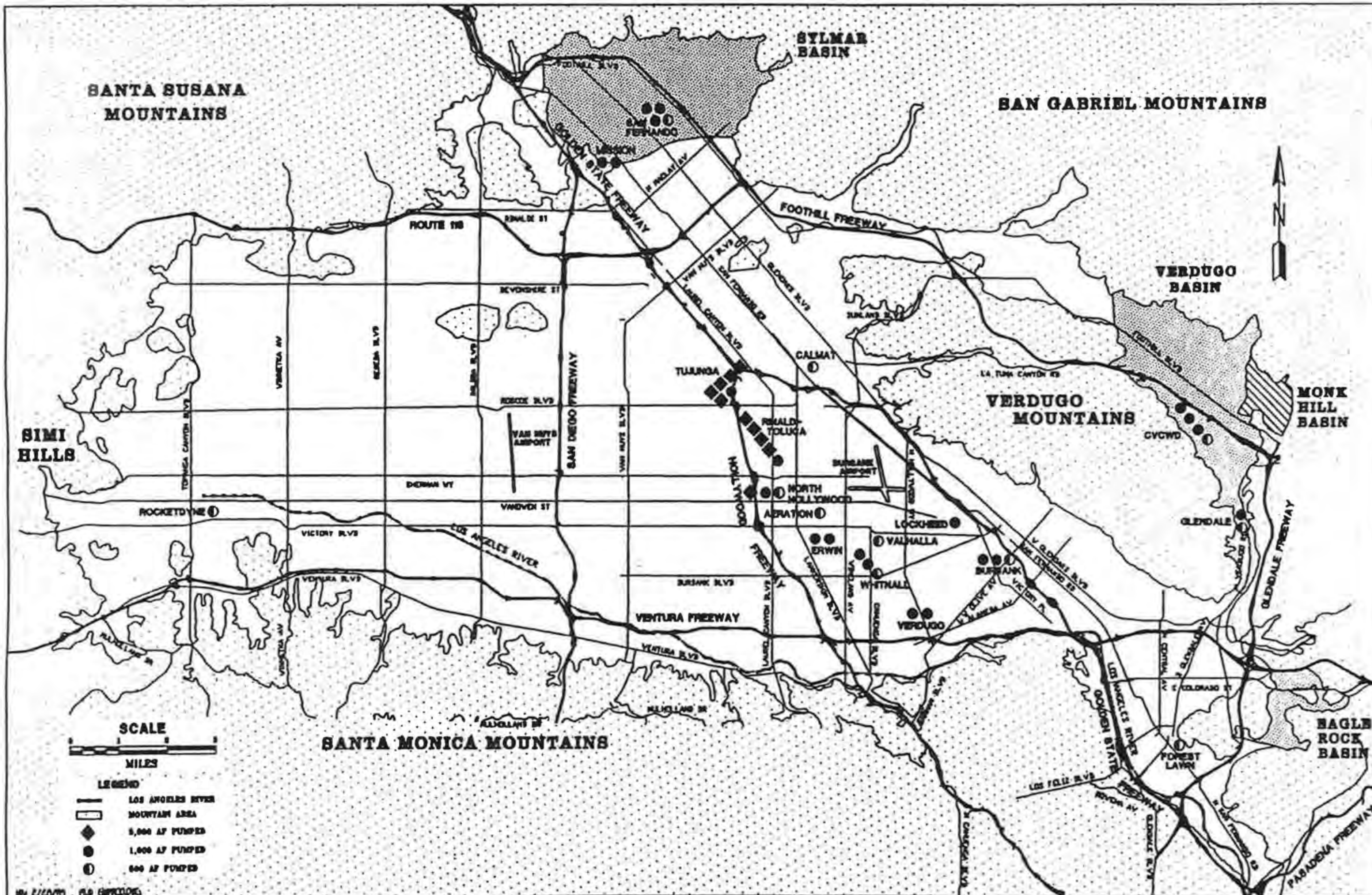
VERDUGO
MOUNTAINS
SANTA MONICA MOUNTAINS

Plate 7



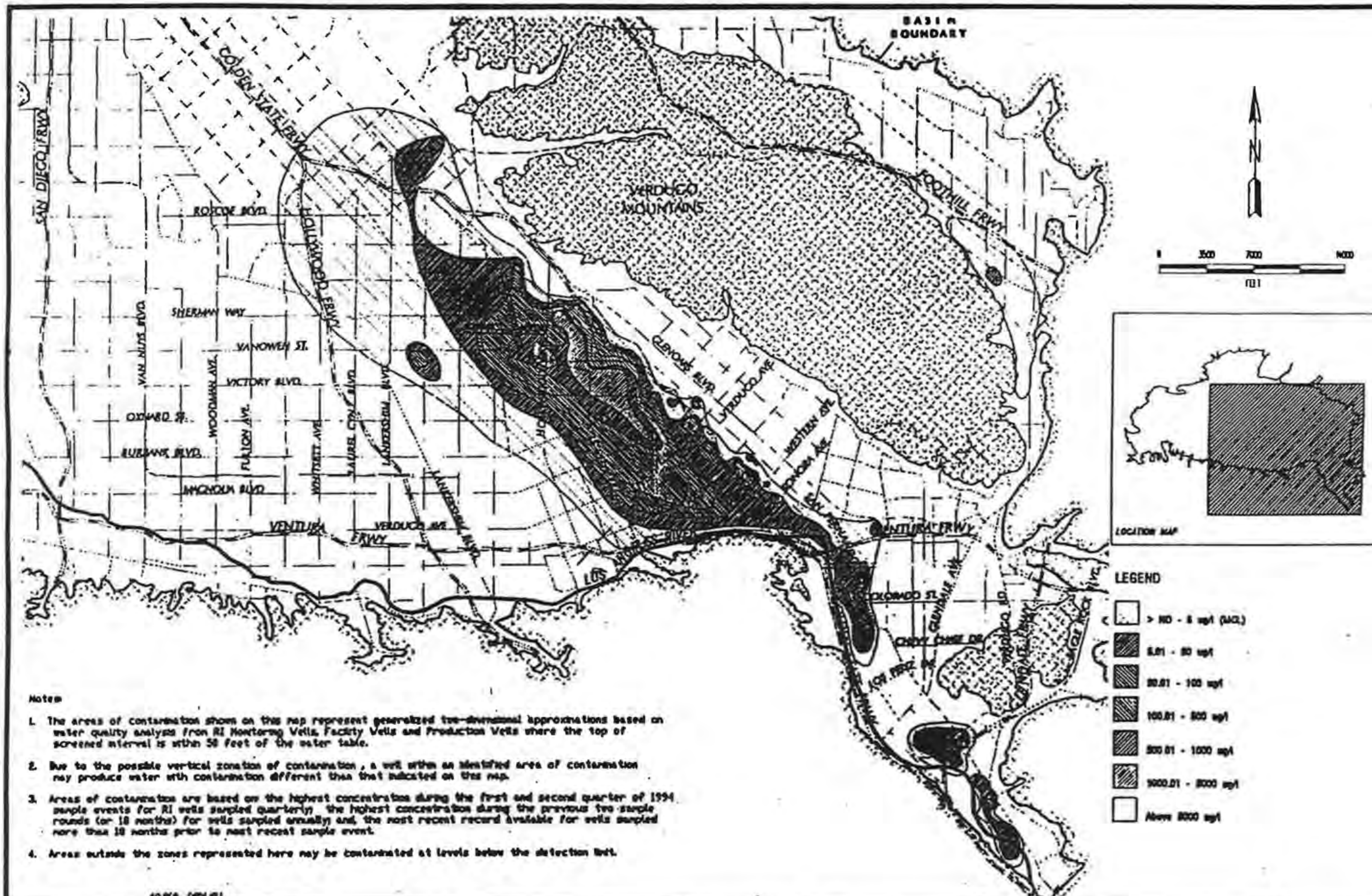
1993-94 Water Year ULARA Watermaster Report	Upper Los Angeles River Area: Average Change in Groundwater Elevations: Fall 1993 - Fall 1994	PLATE 8



1993-94 Water Year
ULARA Watermaster Report

Upper Los Angeles River Area: Pattern of Ground Water Production

PLATE 9



Notes

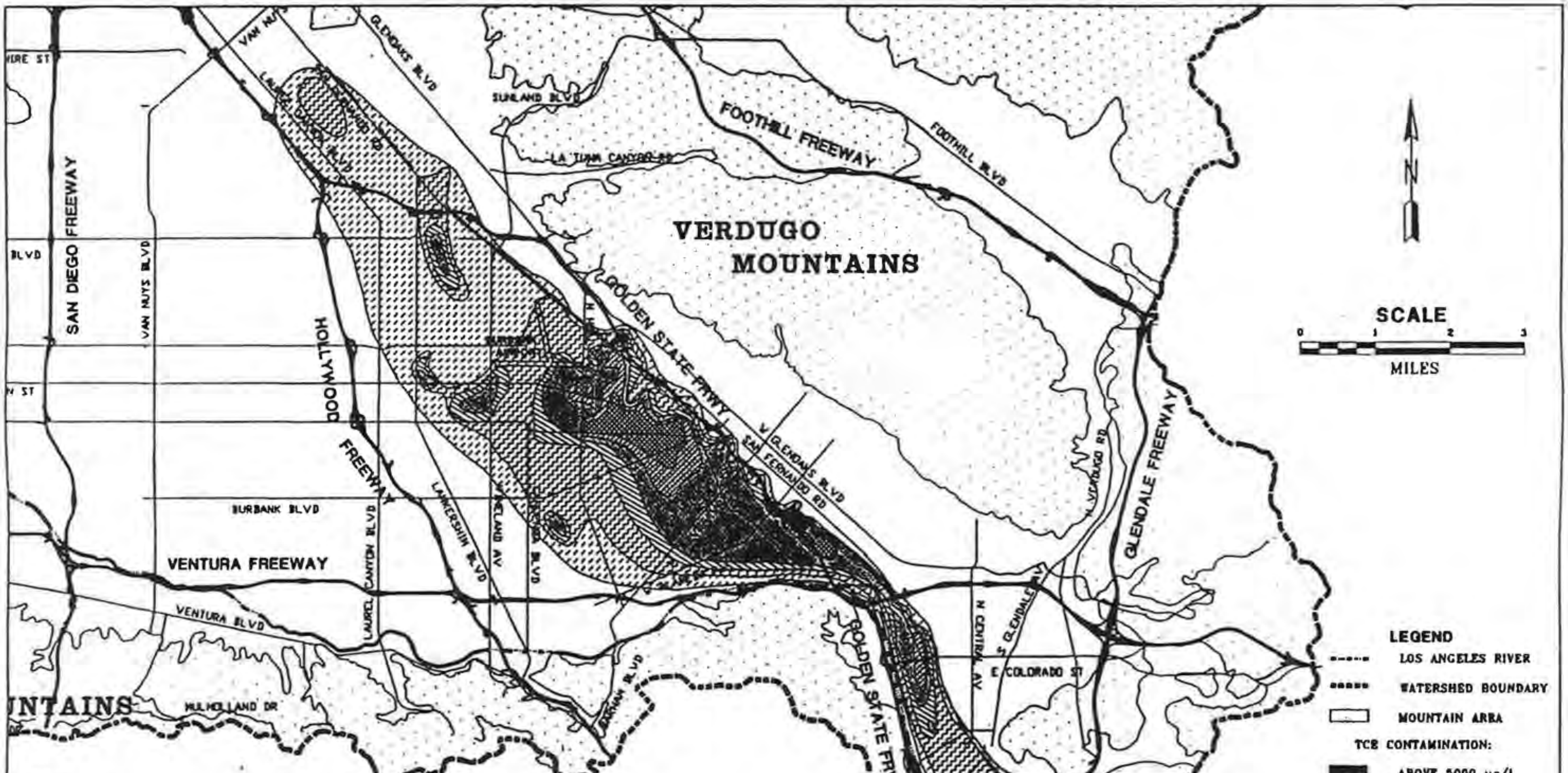
1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells and Production Wells where the top of screened interval is within 50 feet of the water table.

2. Due to the possible vertical zonation of contamination, a well within an identified area of contamination may produce water with contamination different than that indicated on this map.

3. Areas of contamination are based on the highest concentration during the first and second quarter of 1994 sample events for RI wells sampled quarterly; the highest concentration during the previous two sample rounds (or 18 months) for wells sampled annually; and, the most recent record available for wells sampled more than 18 months prior to most recent sample event.

4. Areas outside the zones represented here may be contaminated at levels below the detection limit.

1993-94 Water Year ULARA Watermaster Report	San Fernando Basin: PCE Contamination [ug/l] in the Upper Zone [Spring 1994]	PLATE 10



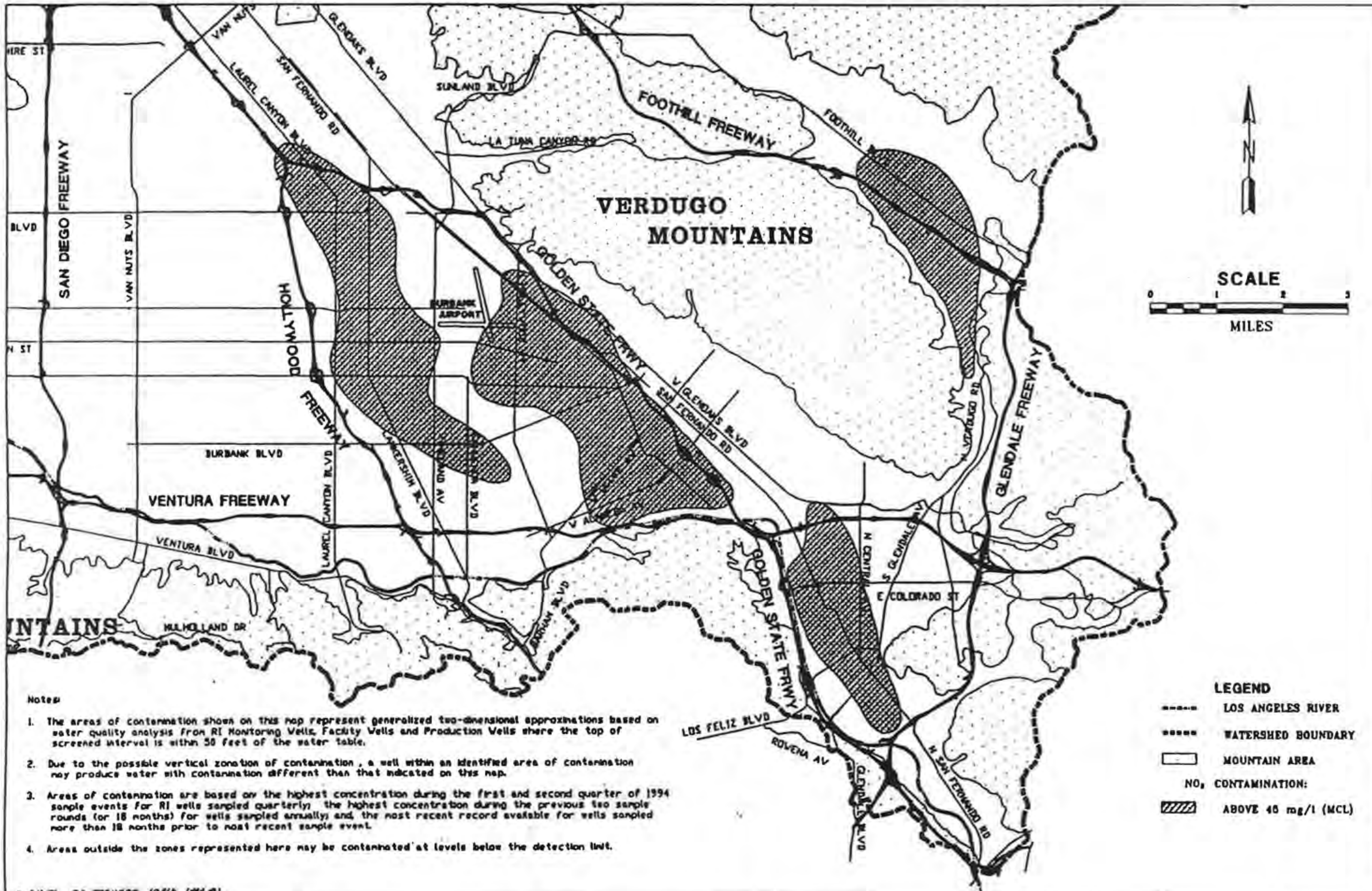
Notes:

1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells and Production Wells where the top of screened interval is within 50 feet of the water table.
2. Due to the possible vertical zonation of contamination, a well within an identified area of contamination may produce water with contamination different than that indicated on this map.
3. Areas of contamination are based on the highest concentration during the first and second quarter of 1994 sample events for RI wells sampled quarterly; the highest concentration during the previous two sample rounds (or 18 months) for wells sampled annually; and, the most recent record available for wells sampled more than 18 months prior to most recent sample event.
4. Areas outside the zones represented here may be contaminated at levels below the detection limit.

1993-94 Water Year
ULARA Watermaster
Report

San Fernando Basin:
TCE Contamination [ug/l] in the Upper Zone [Spring 1994]

PLATE 11



Notes:

1. The areas of contamination shown on this map represent generalized two-dimensional approximations based on water quality analysis from RI Monitoring Wells, Facility Wells and Production Wells where the top of screened interval is within 50 feet of the water table.

2. Due to the possible vertical zonation of contamination, a well within an identified area of contamination may produce water with contamination different than that indicated on this map.

3. Areas of contamination are based on the highest concentration during the first and second quarter of 1994 sample events for RI wells sampled quarterly; the highest concentration during the previous two sample rounds (or 18 months) for wells sampled annually; and the most recent record available for wells sampled more than 18 months prior to most recent sample event.

4. Areas outside the zones represented here may be contaminated at levels below the detection limit.

1993-94 Water Year
ULARA Watermaster
Report

San Fernando and Verdugo Basins:
NO_3 Contamination [mg/l] in the Upper Zone [Spring 1994]

PLATE 12

APPENDIX A

GROUNDWATER EXTRACTIONS

1993-94 Water Year

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	1993 Nov.	1993 Dec.	1994 Jan.	1994 Feb.	1994 Mar.	1994 Apr.	1994 May	1994 June	1994 July	1994 Aug.	1994 Sept.	TOT
							San Fernando Basin							
Angelica Healthcare Services														
3934A	M050A	8.70	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.3
Auto Stiegler														
—	—	0.92	0.36	1.07	0.88	1.30	0.88	0.26	1.15	0.51	1.12	0.92	0.89	10.2
Burbank, City of														
3841C	6A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3882P	7	150.26	145.94	148.93	97.13	0.00	140.69	145.44	60.59	107.65	150.96	60.49	147.87	1,355.
3851E	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3851K	13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3882T	15	118.67	119.00	119.65	73.50	0.00	114.49	120.73	50.58	111.69	112.37	1.07	97.10	1,038.
3841G	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Total:	268.93	264.94	268.58	170.63	0.00	255.18	266.17	111.17	219.34	263.33	61.56	244.97	2,394.
CalMat														
4916A	2	194.48	88.18	0.66	0.24	0.06	0.01	0.03	0.21	0.05	0.03	0.81	7.81	292.
4916	3	0.00	0.12	0.00	5.32	30.19	6.03	29.17	28.24	53.48	23.50	4.58	8.43	189.
	Total:	194.48	88.30	0.66	5.56	30.25	6.04	29.20	28.45	53.53	23.53	5.39	16.24	481.
First Financial Plaza Site														
N/A	F.F.P.S.	1.55	1.38	1.66	3.28	2.72	2.78	1.79	1.72	1.54	1.06	1.11	1.10	21.6
Forest Lawn Memorial Park														
3947A	2	13.75	10.92	7.20	5.81	1.89	3.96	10.05	5.53	19.04	23.29	19.44	25.84	146.
3947B	3	13.36	11.95	7.96	6.45	2.09	4.39	11.29	6.16	21.49	26.43	18.61	26.21	156.
3947C	4	10.86	8.51	3.90	4.55	1.47	3.08	7.89	3.05	13.89	17.86	15.94	9.62	100.
3858K	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Total:	37.97	31.38	19.06	16.81	5.45	11.43	29.23	14.74	54.42	67.58	53.99	61.67	403.
Glendale, City of														
3924N	STPT 1	12.60	9.94	13.69	9.26	7.66	9.86	8.90	5.16	6.40	5.25	9.37	13.37	111.
3924R	STPT 2	0.00	0.10	0.17	0.78	0.00	0.12	0.34	0.03	1.12	0.02	0.60	0.05	3.3
GVENT	GVENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Total:	12.60	10.04	13.86	10.04	7.66	9.98	9.24	5.19	7.52	5.27	9.97	13.42	114.
Harper, Cecelia DeMille														
4940A	NORTH	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	15.0
Lockheed - Burbank Operable Unit														
3871L	VO-1	—	—	—	—	—	—	1.33	0.00	0.00	0.02	0.19	0.00	1.5
3861G	VO-2	—	—	—	—	—	—	0.11	0.00	0.00	0.02	0.17	0.00	0.3
3861K	VO-3	—	—	—	—	—	—	7.39	120.87	6.53	9.36	0.00	2.06	146.
3861L	VO-4	—	—	—	—	—	—	4.16	0.00	9.67	14.19	0.46	36.31	64.
3850X	VO-5	—	—	—	—	—	—	10.14	19.47	19.25	27.31	3.48	0.00	79.
3850Z	VO-6	—	—	—	—	—	—	1.12	0.00	17.20	19.33	4.03	0.00	41.
3850	VO-7	—	—	—	—	—	—	3.65	3.39	14.01	11.51	3.12	8.17	43.
	Total:	—	—	—	—	—	—	27.90	143.73	66.66	81.74	11.45	46.54	378.

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	1993 Nov.	1993 Dec.	1994 Jan.	1994 Feb.	1994 Mar.	1994 Apr.	1994 May	1994 June	1994 July	1994 Aug.	1994 Sept.	TOTAL
San Fernando Basin (cont'd)														
Lockheed - AquaDetox Treatment Plant														
3861C	B175-E1	0.00	19.49	67.24	65.64	86.62	55.55	76.15	50.95	28.76	0.00	0.00	0.00	450.40
Livingston-Graham, Inc.														
4916B	SaVal	0.13	0.13	0.47	0.21	0.42	0.33	0.41	0.02	0.05	0.06	0.07	0.07	2.37
Moss, John & Barbara														
4973J		0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.96
Mobil Oil Corporation														
—	—	0.45	0.80	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93
Philips Components														
—	—	4.62	4.62	4.62	5.40	5.40	5.40	2.09	2.09	2.09	6.07	6.07	6.07	54.54
Robinsons-May/North Ridge Fashion Plaza														
—	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rockwell International														
—	E-1 to E-9	36.67	31.97	38.56	22.66	13.43	32.75	35.93	23.60	25.03	31.89	26.29	24.43	343.21
Sears Roebuck & Co.														
3945	3945	17.85	16.27	16.16	16.02	15.83	16.86	16.69	17.05	18.94	16.14	18.10	18.39	204.30
Sportsmen's Lodge														
3785A	1	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.08
3M-Pharmaceuticals														
—	—	0.80	0.64	0.42	1.17	1.36	2.20	2.00	1.84	1.13	1.16	1.68	1.96	15.56
Toluca Lake Property Owners Association														
3845F	3845F	3.90	3.54	1.54	1.95	1.60	0.30	0.00	7.85	6.28	7.41	8.19	6.49	49.03
Trillium Corporation														
Well #1	—	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	15.0
Well #2	—	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	20.1
	Total:	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	2.93	35.1
Valhalla Memorial Park and Mortuary														
3840K	4	25.81	20.43	18.10	10.80	19.01	14.37	13.22	29.31	58.75	53.68	56.55	71.88	391.1
Waste Management Disposal Services of Calif.														
4916D		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Walt Disney Pictures and Television														
3874E	EAST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3874F	WEST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3874G	NORTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
	Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	1993 Nov.	1993 Dec.	1994 Jan.	1994 Feb.	1994 Mar.	1994 Apr.	1994 May	1994 June	1994 July	1994 Aug.	1994 Sept.	TOTA
						San Fernando Basin (cont'd)								
Los Angeles, City of														
Aeration (A)														
3800E	A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810U	A-2	0.02	0.00	0.00	0.07	0.00	0.00	0.00	0.00	11.55	23.94	15.86	19.35	70.79
3810V	A-3	0.07	0.00	0.00	0.09	0.00	0.00	0.00	0.00	17.45	8.61	43.18	27.34	96.74
3810W	A-4	0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00	21.67	46.88	43.27	35.22	147.1
3820H	A-5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.71	21.86	19.44	23.19	76.22
3821J	A-6	0.05	0.00	0.00	0.28	0.00	0.00	0.00	0.00	19.58	12.51	0.18	24.33	56.93
3830P	A-7	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	22.66	43.18	40.31	31.31	137.5
3831K	A-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	47.59	33.82	34.41	140.8
	A Total:	0.21	0.00	0.00	0.51	0.00	0.00	0.00	0.00	129.62	204.57	196.06	195.15	726.1
Crystal Springs (CS)														
3914L	CS-45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3914M	CS-46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	CS Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Erwin (E)														
3831H	E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821I	E-2A	27.48	0.00	0.00	0.00	0.00	0.09	0.00	0.07	0.00	0.00	0.00	0.16	27.80
3831G	E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821F	E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3831F	E-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821H	E-6	38.61	0.00	0.00	77.39	35.61	53.21	0.00	0.00	7.07	192.66	173.19	182.76	760.5
3811F	E-10	28.17	0.00	0.00	89.33	139.53	62.28	0.00	0.00	8.61	226.75	196.99	207.12	958.7
	E Total:	94.26	0.00	0.00	166.72	175.14	115.58	0.00	0.07	15.68	419.41	370.18	390.04	1,747.
Headworks (H)														
3893L	H-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893K	H-27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893M	H-28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893N	H-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893P	H-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	H Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
North Hollywood (NH)														
3800	NH-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3780A	NH-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810S	NH-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3770	NH-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810	NH-11	76.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.0
3810A	NH-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3810B	NH-14A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3790B	NH-15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
3820D	NH-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	1993 Nov.	1993 Dec.	1994 Jan.	1994 Feb.	1994 Mar.	1994 Apr.	1994 May	1994 June	1994 July	1994 Aug.	1994 Sept.	TOTAL
							San Fernando Basin (cont'd)							
North Hollywood (NH), cont'd														
3820C	NH-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3820B	NH-18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830D	NH-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830C	NH-20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830B	NH-21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790C	NH-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	242.56	89.46	332.02
3790D	NH-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3800C	NH-24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790F	NH-25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790E	NH-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	204.09	215.22	419.31
3820F	NH-27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810K	NH-28	76.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.29
3810L	NH-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3800D	NH-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810T	NH-31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3770C	NH-32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00
3780C	NH-33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790G	NH-34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	326.59	303.88	630.47
3830N	NH-35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	159.34	345.94	505.28
3790H	NH-36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56	5.56
3790J	NH-37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	456.94	447.04	903.98
3810M	NH-38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810N	NH-39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810P	NH-40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	436.41	439.70	876.11
3810Q	NH-41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	349.54	355.56	705.10
3810R	NH-42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	283.68	166.46	450.14
3790K	NH-43A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.77	230.69	296.46
3790L	NH-44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	411.21	261.64	672.85
3790M	NH-45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	186.89	515.06	701.95
	NH Total:	152.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,123.02	3,376.21	6,651.53
Pollock (P)														
3959E	P-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3958H	P-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3958J	P-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	P Total:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rinaldi-Toluca (RT)														
4909E	RT-1	0.00	0.00	0.00	169.90	107.74	29.27	0.00	0.00	0.00	0.09	429.71	439.81	1,176.5
4898A	RT-2	0.00	0.00	0.09	205.05	377.85	150.25	0.00	0.00	0.00	0.09	505.03	512.15	1,750.5
4898B	RT-3	0.00	0.00	0.00	107.58	70.55	150.46	0.00	0.00	0.21	0.00	519.61	525.05	1,373.4
4898C	RT-4	0.00	0.00	0.00	112.83	73.05	158.01	0.00	0.00	0.23	0.00	410.08	558.80	1,313.0
4898D	RT-5	0.00	0.00	0.00	0.00	146.19	165.29	0.00	0.00	0.25	0.00	580.72	585.29	1,477.7
4898E	RT-6	0.00	0.00	0.00	0.00	68.46	165.45	0.00	0.00	0.18	0.00	567.77	574.48	1,376.3

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW	Owner	1993			1994									
Well No.	Well No.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
							San Fernando Basin (cont'd)							
Rinaldi-Toluca (RT), cont'd														
4898F	RT-7	0.00	0.00	0.00	0.00	67.72	161.92	0.00	0.00	0.32	0.00	540.20	536.94	1,307.10
4898G	RT-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	519.70	517.66	1,037.52
4898H	RT-9	0.00	0.00	0.14	0.00	62.42	149.84	0.00	0.00	0.34	0.00	496.42	497.87	1,207.03
4909G	RT-10	0.00	0.00	0.00	210.29	307.72	72.64	0.00	0.00	0.00	0.14	575.51	579.80	1,746.10
4909K	RT-11	0.00	0.00	0.11	199.11	352.11	67.54	0.00	0.00	0.00	0.11	513.66	523.76	1,656.40
4909H	RT-12	0.00	0.00	0.07	203.74	251.45	70.39	0.00	0.00	0.00	0.07	556.55	566.53	1,648.80
4909J	RT-13	0.00	0.00	0.11	54.43	19.49	148.28	0.00	0.00	0.00	0.07	530.83	541.62	1,294.83
4909L	RT-14	0.00	0.00	0.00	211.43	70.02	155.60	0.00	0.00	0.00	0.14	543.23	549.84	1,530.26
4909M	RT-15	0.00	0.00	0.00	9.94	0.00	0.00	0.00	0.00	0.00	0.32	557.24	584.30	1,151.80
	RT Total:	0.00	0.00	0.52	1,484.30	1,974.77	1,644.94	0.00	0.00	1.53	1.19	7,846.26	8,093.90	21,047.41
Tujunga (T)														
4887C	T-1	269.68	0.00	0.00	116.25	0.00	197.82	0.00	0.00	36.59	598.03	507.97	551.01	2,277.35
4887D	T-2	275.67	0.00	0.00	138.06	0.00	203.93	0.00	0.00	37.51	621.38	608.38	577.92	2,462.85
4887E	T-3	73.76	0.00	0.00	135.95	0.00	200.62	0.00	0.00	22.73	379.62	580.38	548.86	1,941.92
4887F	T-4	266.35	0.00	0.00	132.90	0.00	99.56	0.00	0.00	36.66	438.09	583.02	553.91	2,110.49
4887G	T-5	262.58	0.00	0.00	205.86	120.96	80.26	0.00	0.00	36.87	582.21	562.26	512.22	2,363.22
4887H	T-6	277.89	0.00	0.00	218.32	71.53	172.18	0.00	0.00	38.02	614.88	601.27	570.00	2,564.09
4887J	T-7	271.15	0.00	0.00	208.79	124.40	159.41	0.00	0.00	18.78	610.06	432.51	566.21	2,391.31
4887K	T-8	271.15	0.00	0.00	130.90	53.26	181.70	0.00	0.00	37.08	614.90	604.16	573.28	2,465.83
4886B	T-9	270.62	0.00	0.00	126.10	0.00	88.11	0.00	0.00	36.57	612.06	597.87	566.74	2,298.07
4886C	T-10	257.69	0.00	0.00	118.44	0.00	130.76	0.00	0.00	34.92	586.44	554.73	412.84	2,095.82
4886D	T-11	260.93	0.00	0.00	67.63	0.00	121.42	0.00	0.00	30.92	532.19	439.95	354.89	1,807.93
4886E	T-12	211.39	0.00	0.00	21.81	0.00	104.39	0.00	0.00	1.54	138.96	278.58	305.60	1,062.27
	T Total:	2,968.86	0.00	0.00	1,620.41	370.15	1,740.16	0.00	0.00	368.19	6,328.82	6,351.08	6,093.48	25,841.15
Tujunga Gallery														
4992A		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Verdugo (V)														
3863H	V-1	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95
3863P	V-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3863J	V-4	0.00	0.02	0.00	0.00	0.00	57.21	0.00	0.07	0.00	0.00	0.00	0.00	57.30
3863L	V-11	49.56	0.05	0.00	92.93	42.77	62.86	0.00	0.05	8.24	226.59	217.72	231.87	932.64
3853G	V-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3854F	V-22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3844R	V-24	39.69	0.09	0.00	80.69	37.14	54.57	0.00	0.00	7.16	196.74	189.07	199.22	804.37
	V Total:	91.20	0.16	0.00	173.62	79.91	174.64	0.00	0.12	15.40	423.33	406.79	431.09	1,796.26
Whitnall (W)														
3820E	W-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821B	W-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821C	W-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821D	W-4	0.14	0.00	0.00	195.78	358.50	0.00	0.00	0.83	17.77	321.03	0.00	0.41	894.46

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	1993 Nov.	1993 Dec.	1994 Jan.	1994 Feb.	1994 Mar.	1994 Apr.	1994 May	1994 June	1994 July	1994 Aug.	1994 Sept.	TOTAL
San Fernando Basin (cont'd)														
Whitnall (W), cont'd														
3821E	W-5	0.00	0.00	0.00	124.66	0.00	0.00	0.00	0.09	10.40	203.05	0.00	0.16	338.36
3831J	W-6A	0.00	0.00	0.00	132.62	89.37	91.97	0.00	0.44	12.14	267.72	174.43	53.17	821.86
3832K	W-7	0.00	0.00	0.00	0.00	51.54	0.00	0.00	0.34	7.00	155.17	217.33	184.73	616.11
3832L	W-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3832M	W-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3842E	W-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	W Total:	0.14	0.00	0.00	453.06	499.41	91.97	0.00	1.70	47.31	946.97	391.76	238.47	2,670.79
Los Angeles, City of Total:		3,306.97	0.16	0.52	3,898.62	3,099.38	3,767.29	0.00	1.89	577.73	8,324.29	18,685.15	18,818.34	60,480.34
San Fernando Basin Total:		3,925.01	499.37	457.47	4,233.91	3,294.69	4,185.60	514.55	445.01	1,126.54	8,888.60	18,950.77	19,336.74	65,858.26
Sylmar Basin														
Los Angeles, City of														
Plant	Mission	0.00	0.00	0.00	0.00	0.00	0.00	0.00	346.05	340.34	380.19	521.49	464.42	2,052.49
Meurer Engineering														
5998	3	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.60
San Fernando, City of														
5969D	2A	208.38	172.46	37.15	0.00	99.02	93.93	195.95	160.41	222.98	250.18	250.95	272.57	1,963.98
5959	3	50.70	63.53	155.29	172.40	88.54	116.42	42.64	79.61	87.35	66.23	95.31	42.39	1,060.41
5969	4	23.96	22.80	40.98	40.98	20.80	38.28	25.28	30.88	32.77	35.76	35.96	25.49	373.94
5968	7A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	283.04	258.79	233.42	213.38	208.36	248.63	263.87	270.90	343.10	352.17	382.22	340.45	3,398.33
Sylmar Basin Total:		283.09	258.84	233.47	213.43	208.41	248.68	263.92	617.00	683.49	732.41	903.76	804.92	5,451.42
Verdugo Basin														
Crescenta Valley County Water District														
5058B	1	9.68	3.23	2.77	9.33	1.25	0.68	3.35	5.60	7.70	13.38	40.48	28.33	125.78
5036A	2	3.46	1.22	2.63	1.88	0.76	1.69	0.52	0.00	0.00	0.00	0.00	0.00	12.16
5058H	5	20.50	31.51	29.84	39.14	29.59	63.59	60.22	24.79	71.54	78.38	85.12	69.24	603.46
5058	6	11.13	8.82	19.07	13.91	3.84	19.87	12.56	8.70	1.16	9.92	16.19	6.31	131.48
5047B	7	15.61	1.71	6.82	16.60	2.66	10.48	7.22	6.54	11.18	20.26	49.41	38.11	186.60
5069J	8	53.77	58.65	61.15	58.98	37.90	58.76	57.64	62.17	57.91	57.05	49.15	62.35	675.48

GROUND WATER EXTRACTIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993 Oct.	Nov.	Dec.	1994 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	TOTAL
							Verdugo Basin (cont'd)							
Crescenta Valley County Water District, cont'd														
5047D	9	13.88	1.83	4.15	14.83	2.42	3.99	13.70	5.52	7.73	6.67	0.00	0.00	74.72
5058D	10	17.98	43.20	32.59	32.55	27.08	21.54	16.22	30.91	55.58	42.83	53.10	68.47	442.05
5058E	11	46.73	46.14	47.93	43.28	30.06	30.16	39.86	31.16	20.10	33.31	2.29	12.52	383.54
5058J	12	56.72	25.86	36.42	39.01	39.26	69.63	65.09	70.59	71.03	67.95	53.81	55.28	650.65
5069F	14	43.55	39.47	38.12	35.58	16.46	12.01	24.12	23.94	16.24	10.25	17.38	3.43	280.55
	PICK	5.48	5.34	5.45	6.09	5.91	6.31	5.85	5.82	5.53	5.51	5.37	5.00	67.66
	Total:	298.49	266.98	286.94	311.18	197.19	298.71	306.35	275.74	325.70	345.51	372.30	349.04	3,634.13
Glendale, City of														
3961-3971	GL3-5	49.10	49.10	53.03	53.08	53.03	53.03	53.03	66.29	53.03	70.71	75.13	65.50	694.01
3970	GL-6	31.67	31.67	31.67	23.90	56.66	76.18	64.09	81.14	64.81	94.57	76.41	75.60	708.37
—	MM-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total:	80.77	80.77	84.70	76.93	109.69	129.21	117.12	147.43	117.84	165.28	151.54	141.10	1,402.38
Verdugo Basin Total:		379.26	347.75	371.64	388.11	306.88	427.92	423.47	423.17	443.54	510.79	523.84	490.14	5,036.51
							Eagle Rock Basin							
McKesson Water Products														
3987A	1	5.13	6.75	2.73	6.68	5.63	3.16	4.79	6.54	7.45	7.25	5.66	5.84	67.61
3987B	2	4.35	4.06	6.34	5.31	4.03	6.74	5.35	3.19	4.68	2.95	7.36	9.01	63.37
3987F	3	5.63	5.21	6.41	5.63	5.07	2.94	4.00	4.10	7.96	2.46	3.13	5.75	58.29
	Total:	15.11	16.02	15.48	17.62	14.73	12.84	14.14	13.83	20.09	12.66	16.15	20.60	189.27
Eagle Rock Basin Total:		15.11	16.02	15.48	17.62	14.73	12.84	14.14	13.83	20.09	12.66	16.15	20.60	189.27
ULARA Total:		4,602.47	1,121.98	1,078.06	4,853.07	3,824.71	4,875.04	1,216.08	1,499.01	2,273.66	10,144.46	20,394.52	20,652.40	76,535.46

APPENDIX B

TREATMENT OPERATIONS

1993-94 Water Year

TREATMENT OPERATIONS
1993-94 WATER YEAR
(acre-feet)

LACDPW Well No.	Owner Well No.	1993			1994									TOTAL
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	
SAN FERNANDO BASIN														
City of Burbank														
Granular Activated Carbon Treatment Plant														
3882P	7	150.26	145.94	148.93	97.13	0.00	140.69	145.44	60.59	107.65	150.96	60.49	147.87	1,355.95
3882T	15	118.67	119.00	119.65	73.50	0.00	114.49	120.73	50.58	111.69	112.37	1.07	97.10	1,038.85
	Total:	268.93	264.94	268.58	170.63	0.00	255.18	266.17	111.17	219.34	263.33	61.56	244.97	2,394.80
Los Angeles, City of														
Aeration (A)														
3800E	A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810U	A-2	0.02	0.00	0.00	0.07	0.00	0.00	0.00	0.00	11.55	23.94	15.86	19.35	70.79
3810V	A-3	0.07	0.00	0.00	0.09	0.00	0.00	0.00	0.00	17.45	8.61	43.18	27.34	96.74
3810W	A-4	0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00	21.67	46.88	43.27	35.22	147.11
3820H	A-5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.71	21.86	19.44	23.19	76.22
3821J	A-6	0.05	0.00	0.00	0.28	0.00	0.00	0.00	0.00	19.58	12.51	0.18	24.33	56.93
3830P	A-7	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	22.66	43.18	40.31	31.31	137.51
3831K	A-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	47.59	33.82	34.41	140.82
	A Total:	0.21	0.00	0.00	0.51	0.00	0.00	0.00	0.00	129.62	204.57	196.06	195.15	726.12
Advanced Oxidation process Plant														
3810	NH-11	76.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.01
3810K	NH-28	76.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.29
	NH Total:	152.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	152.30
VERDUGO BASIN														
Crescenta Valley County Water District														
Glenwood Nitrate Removal Plant														
	TOTAL:	129.00	129.00	129.00	129.00	129.00	129.00	129.00	129.00	129.00	129.00	129.00	129.00	1,548.00

APPENDIX C

SPREADING OPERATIONS

1993-94 Water Year

1993-94 SPREADING OPERATIONS IN THE SAN FERNANDO BASIN
(acre-feet)

	Spreading	1993			1994								
Agency	Facility	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total
LACDPW														
	Branford	21	32	69	22	178	109	22	9	0	0	0	0	462
	Hansen	1,300	842	1,130	1,210	2,480	1,560	1,380	1,690	264	196	0	0	12,052
	Lopez	0	0	0	0	0	0	0	0	153	10	12	6	182
	Pacoima	143	33	432	230	1,120	472	257	158	311	0	0	0	3,156
	Tujunga	0	321	634	672	634	702	565	160	439	2	0	0	4,129
	Total	1,464	1,228	2,265	2,134	4,412	2,843	2,224	2,017	1,167	208	12	6	19,980
City of Los Angeles														
	Tujunga	0	0	0	0	0	0	0	0	0	0	0	0	0
	Headworks	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0
City of Burbank*														
	Pacoima	0	0	0	0	0	0	0	0	0	0	0	0	0
Basin Total		1,464	1,228	2,265	2,134	4,412	2,843	2,224	2,017	1,167	208	12	6	19,980

APPENDIX D

CITY OF LOS ANGELES

PUMPING AND SPREADING PLAN

1994-95 Water Year

WATER EXECUTIVE OFFICE

SEP 01 1995

Department of Water and Power the City of Los Angeles

August 31, 1995

Mr. Melvin L. Blevins
ULARA Watermaster
111 North Hope Street, Room 1455
Los Angeles, California 90012

Dear Mr. Blevins:

Annual Pumping and Spreading Plan

We are hereby transmitting to you the Los Angeles's Pumping and Spreading Plan for the 1994-95 Water Year. This plan satisfies the requirements set forth in the Upper Los Angeles River Area (ULARA) Watermaster Policies and Procedures Section 2.9.4.

We look forward to your plan evaluation and recommendations that will result in the most appropriate management of the ULARA service area.

Sincerely,

Robert Yoshimura

ROBERT Y. YOSHIMURA
Assistant Director
Water Engineering Design Division

Enclosure

CITY OF LOS ANGELES
GROUNDWATER PUMPING AND SPREADING PLAN
IN THE UPPER LOS ANGELES RIVER AREA
FOR THE 1994-1995 WATER YEAR

AUGUST 1995

Prepared by:
Groundwater Group
Water Resources Section
WATER ENGINEERING DESIGN DIVISION
Los Angeles Department of Water and Power

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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 ground water management thinking.

In Section 2.9.4 of the ULARA Policies and Procedures as amended in July 1993, it is stated that:

> *"...each party or non-party who produces ground water will submit to the ULARA Watermaster annually (on or before May 1 of the current water year), a Ground Water Pumping and Spreading Plan. This will include information on projected pumping and spreading rates and volumes, and recent water quality information on each well. In order to obtain the information needed to project future contamination levels, a monitoring program should be included."*

This report constitutes Los Angeles's Ground Water Pumping and Spreading Plan for the 1994-95 Water Year.

Section 1: Facilities Description

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

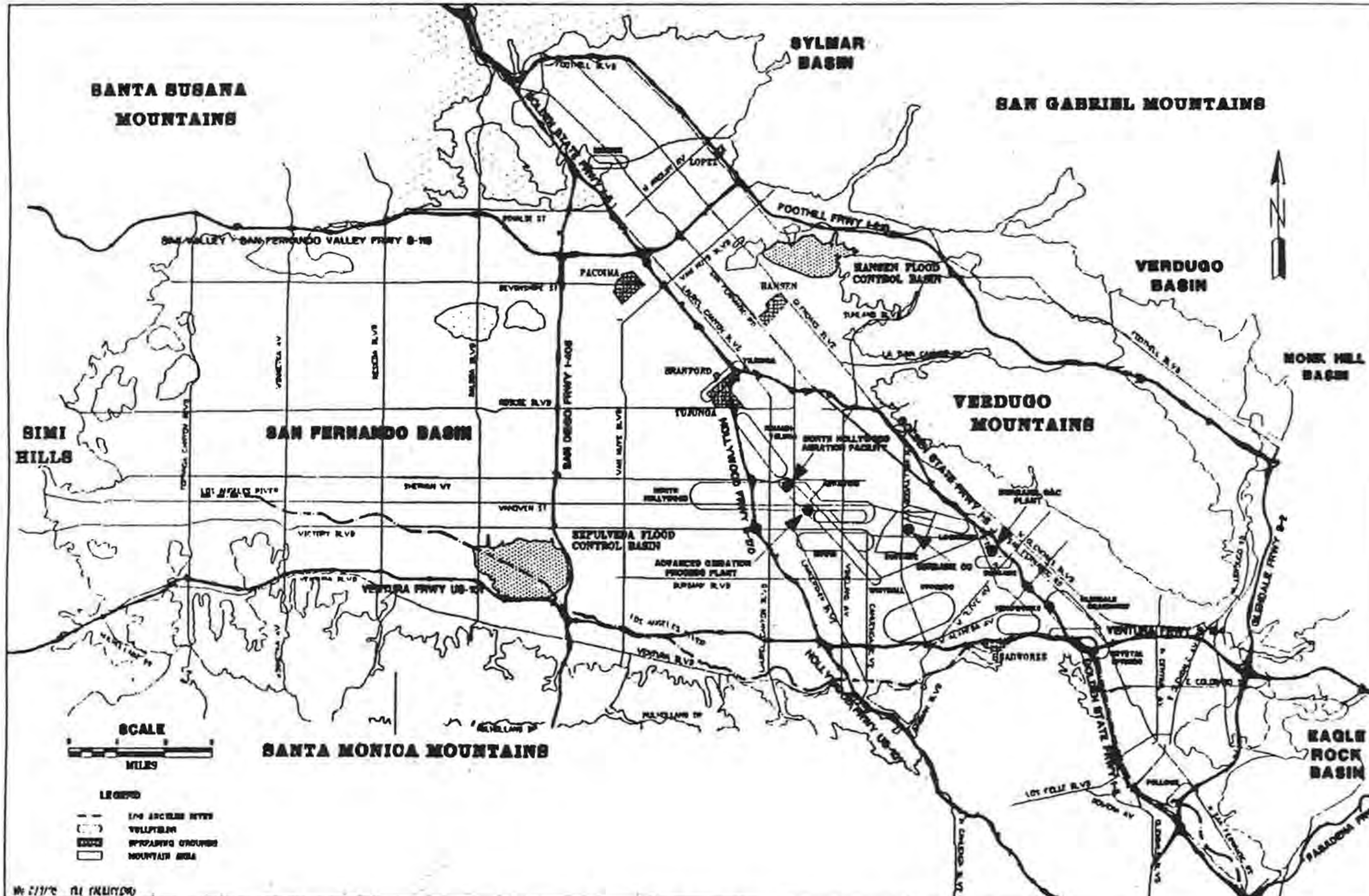
a. Spreading Grounds: There are six spreading ground facilities that are used for groundwater recharge of native water in ULARA. The Los Angeles County Department of Public Works (LACDPW) operates the Branford, Hansen, Lopez, and Pacoima spreading grounds; the City of Los Angeles Department of Water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

Table 1-1

Estimates Capacities of ULARA Spreading Grounds			
Spreading Ground	Type	Total wetted area [ac]	Capacity [ac-ft/yr.]
Operated by LACDPW			
Branford	Deep basin	8	720
Hansen	Shallow basins	110	29,000
Lopez	Shallow basins	13	5,100
Pacoima	Med. depth basins	111	29,000
Operated by LADWP			
Headworks	Shallow basins	28	22,000
Operated by LACDPW and LADWP			
Tujunga	Shallow basins	130	72,000
TOTAL:			157,820

b. Extraction Wells: The LADWP has ten well fields in the San Fernando Basin, and one in the Sylmar Basin. The well fields are shown in Figure 1-1, and their estimated capacities are shown in Table 1-2. The listed capacities are approximate and may vary depending on the water levels and maintenance schedule of the available pumping equipment.

9-0



1994-95 Water Year Pumping & Spreading Plan City of Los Angeles	Upper Los Angeles River Area: Spreading Grounds, LADWP Well Fields, and Ground Water Treatment Facilities	FIGURE 1-1

Table 1-2

Estimated Capacities of LADWP Well Fields in ULARA		
Well field	Number of wells	Estimated Initial Capacity [cfs]
San Fernando Basin		
Aeration	8	5
Crystal Springs	5	60
Erwin	6	25
Headworks	6	25
North Hollywood	35	168
Pollock	4	11
Rinaldi-Toluca	15	134
Tujunga	12	120
Verdugo	7	22
Whitnall	7	36
Sylmar Basin		
Mission	6	10
TOTAL:		676

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. The locations of these facilities are shown in Figure 1-1.

Advanced Oxidation Process Plant: This plant is designed to process up to 4,000 gallons per minute (gpm) of groundwater by employing an ozone and hydrogen peroxide treatment method to remove volatile organic compounds (VOCs) from the water.

North Hollywood Operable Unit: This plant is designed to process up to 2,000 gpm of groundwater containing VOCs by using aeration for the liquid phase and granular activated carbon for off-gas treatment.

Section 2: Annual Pumping And Spreading Projections

a. Pumping Projections for the 1994-95 Water Year: The supply to the City of Los Angeles has three components. Water is either imported from the Owens Valley/Mono Basin area, purchased from the Metropolitan Water District of Southern California (MWD), or extracted from local ground water basins. The MWD sources of supply are the State Water Project and the Colorado River Aqueduct. Local supplies originate from the Central, San Fernando and Sylmar Groundwater Basins. Groundwater extractions fluctuate to meet demands as the imported water amount varies due to climatic and operational constraints.

Table 2-1 shows the amount of ground water extractions that is expected during the 1994-95 Water Year from the San Fernando and Sylmar Basins. Actual quantities are given from October 1994 through May 1995 and are estimated for June through September 1995.

Table 2-1

CITY OF LOS ANGELES PUMPING PROJECTION FOR WY 94-95
(Acre-Feet)

San Fernando Basin	TOTAL	Oct-94	Nov-94	Dec-94	Jan-95	Feb-95	Mar-95	Apr-95	May-95	Jun-95	Jul-95	Aug-95	Sep-95
AERATION	1,859	209	158	107	107	137	171	220	140	150	155	155	150
CRYSTAL SPRINGS	0	0	0	0	0	0	0	0	0	0	0	0	0
ERWIN	2,298	308	77	0	0	247	411	0	0	215	350	350	340
HEADWORKS	0	0	0	0	0	0	0	0	0	0	0	0	0
No HOLLYWOOD	17,573	4,345	610	0	0	0	3,403	390	0	0	2,650	3,150	3,025
POLLOCK	0	0	0	0	0	0	0	0	0	0	0	0	0
RINALDI-TOLUCA	26,603	7,260	1,928	1	0	4,631	2,994	890	0	0	0	4,500	4,400
TUJUNGA	8,001	6,062	547	0	0	917	0	475	0	0	0	0	0
VERDUGO	2,771	395	92	0	0	302	492	0	0	255	415	415	405
WHITNALL	1,129	157	37	0	0	122	203	0	0	105	170	170	165
TOTAL:	60,235	18,736	3,449	108	107	6,356	7,674	1,975	140	725	3,740	8,740	8,485
Sylmar Basin													
MISSION	2,993	475	480	13	0	0	0	0	0	385	430	615	595
ULARA TOTAL:	63,228	19,211	3,929	121	107	6,356	7,674	1,975	140	1,110	4,170	9,355	9,080
									Actual	Est'd			

b. Spreading Projections for the 1994-95 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 1994-95.

Table 2-2

Projected Spreading in ULARA Spreading Grounds in 1994-95						
	Operated by:					
	LACDPW				LADWP	LACDPW and LADWP
Month	Branford	Hansen	Lopez	Pacoima	Headworks	Tujunga
Oct 94	34	425	0.4	0.1	0	0
Nov 94	56	387	0	34	0	5
Dec 94	105	561	0	109	0	70
Jan 95	0	5,170	3.3	3,280	0	4,558
Feb 95	0	4,560	217	2,190	0	2,675
Mar 95	0	9,930	100	3,740	0	3,120
Apr 95	0	6,950	472	3,080	0	2,914.
May 95	0	1,640	199	876	0	4,030
Jun 95	0	2,100	0	480	0	0
Jul 95	0	0	0	0	0	0
Aug 95	0	0	0	0	0	0
Sep 95	0	0	0	0	0	0
TOTAL:	195	31,723	991.7	13,789.1	0	17,372

Section 3: Water Quality Monitoring Program Description

All of LADWP's 89 active wells in ULARA are sampled at least once every three years. State regulations require the following types of sampling regimens:

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

Every three years, each well is monitored for a full range of inorganic and organic compounds. Phase II and V Initial monitoring involves analysis for newly regulated organic compounds at all wells. Each well must be sampled for four consecutive quarters within a three-year period. Quarterly organics monitoring involves organic compound analysis 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.

The 89 wells are divided into clusters each consisting of three to six wells. The clusters are organized in three sampling groups to allow for efficient sample collection. Appendix A contains the 1994-95 TCE, PCE, and nitrate data that are representative of each cluster.

Section 5: Plans For Facilities Modifications

This section describes any plans for modifications to existing facilities, or plans to construct new facilities in the 1994-95 Water Year, as of the printing of this report (August 1995).

a. Spreading Grounds: There are no plans for modifications that would change the capacity of existing spreading grounds, or for the construction of new facilities in the 1994-95 Water Year.

b. Extraction Wells: There are no plans for modifications that would change the capacity or zone of extraction of any existing wells, or for the construction of new wells in the 1994-95 Water Year. Pollock Well No. 5 was abandoned in accordance with State guidelines.

c. Groundwater Treatment Facilities: There are no plans for modifications to any existing groundwater treatment facilities, or the construction of new facilities in the 1994-95 Water Year.

The LADWP is planning to construct the Pollock Well Field Remediation Project to provide groundwater treatment and distribution facilities required to restore two existing Pollock wells to operation. The well field was removed from service due to VOC contamination. The scope of project includes four 750 gpm liquid phase GAC units to remove VOCs from the water. Design of the project is slated to be completed by October 1995, with an anticipated construction start date of February 1996.

Reactivation of the Headworks well field is currently being studied. The well field has been out of service due to TCE and PCE contamination since the early 1980s and consists of six wells that produce approximately 2,500 gpm each. Conceptual design, preferred alternative analysis and environmental documentation is slated to be completed by early 1997.

APPENDIX A:
1994-95 Water Quality Sampling Results

ULARA WELLS

Number	Cluster	Well	Date	PCE (ug/L)	TCE (ug/L)	NO^3 (mg/L)
1	11	AERATION #2	---			
2	11	AERATION #3	3/1/95	3.60	67.80	
3	10	AERATION #4	3/16/95	3.00	73.60	
4	9	AERATION #5	6/21/94	2.60	64.20	
5	9	AERATION #6	3/16/95	5.20	54.20	27.86
6	8	AERATION #7	6/21/94	1.50	2.60	
7	8	AERATION #8	6/21/94	23.50	13.00	
8	6	ERWIN #1	---			
9	7	ERWIN #2	5/4/95	4.30	13.20	
10	6	ERWIN #3	---			
11	7	ERWIN #4	---			
12	7	ERWIN #6	---			
13	7	ERWIN #10	---			
14	20	MISSION #5*	*6/7/95	ND	ND	
15	21	MISSION #6	11/30/94	ND	ND	9.04
16	21	MISSION #7	11/30/94	ND	ND	14.09
17	12	NORTH HOLLYWOOD #2	---			
18	14	NORTH HOLLYWOOD #4	---			
19	15	NORTH HOLLYWOOD #7	---			
20	10	NORTH HOLLYWOOD #11	---			
21	14	NORTH HOLLYWOOD #15	11/1/94	2.00	15.20	
22	9	NORTH HOLLYWOOD #16	---			
23	9	NORTH HOLLYWOOD #17	11/1/94	18.80	5.60	
24	8	NORTH HOLLYWOOD #18	10/18/94	4.40	12.60	
25	8	NORTH HOLLYWOOD #20	---			
26	7	NORTH HOLLYWOOD #21	---			
27	12	NORTH HOLLYWOOD #22	---			
28	12	NORTH HOLLYWOOD #23	2/22/95	ND	ND	
29	14	NORTH HOLLYWOOD #25	2/22/95	ND	ND	
30	12	NORTH HOLLYWOOD #26	2/22/95	ND	ND	
31	9	NORTH HOLLYWOOD #27	---			
32	10	NORTH HOLLYWOOD #28	5/9/95	ND	1.00	6.38
33	12	NORTH HOLLYWOOD #30	---			
34	15	NORTH HOLLYWOOD #32	---			
35	14	NORTH HOLLYWOOD #33	---			
36	13	NORTH HOLLYWOOD #34	2/22/95	ND	0.90	
37	8	NORTH HOLLYWOOD #35	---			
38	14	NORTH HOLLYWOOD #36	---			
39	13	NORTH HOLLYWOOD #37	2/22/95	ND	0.90	
40	10	NORTH HOLLYWOOD #38	---			
41	10	NORTH HOLLYWOOD #39	---			
42	11	NORTH HOLLYWOOD #40	5/10/95	ND	1.00	4.70
43	11	NORTH HOLLYWOOD #41	10/18/94	0.60	25.20	
44	11	NORTH HOLLYWOOD #42	---			
45	13	NORTH HOLLYWOOD #43A	2/22/95	ND	ND	
46	13	NORTH HOLLYWOOD #44	2/22/95	ND	ND	
47	13	NORTH HOLLYWOOD #45	2/22/95	ND	ND	

NOTE: ND = non-detect
— not tested (refer to p.8)

ULARA WELLS

Number	Cluster	Well	Date	PCE (ug/L)	TCE (ug/L)	NO³ (mg/L)
48	3	POLLOCK #4	---			
49	3	POLLOCK #6	---			
50	3	POLLOCK #7	---			
51	15	RINALDI-TOLUCA #1	8/2/94	ND	ND	
52	16	RINALDI-TOLUCA #2	6/20/95	ND	0.60	
53	17	RINALDI-TOLUCA #3	---			
54	17	RINALDI-TOLUCA #4	6/21/95	ND	1.60	
55	17	RINALDI-TOLUCA #5	10/18/94	ND	0.90	
56	17	RINALDI-TOLUCA #6	6/21/95	ND	0.70	
57	17	RINALDI-TOLUCA #7	6/21/95	ND	ND	
58	18	RINALDI-TOLUCA #8	6/22/95	ND	0.50	
59	18	RINALDI-TOLUCA #9	6/22/95	ND	ND	
60	16	RINALDI-TOLUCA #10	6/22/95	ND	ND	
61	16	RINALDI-TOLUCA #11	10/28/94	1.60	ND	
62	16	RINALDI-TOLUCA #12	6/20/95	ND	ND	
63	16	RINALDI-TOLUCA #13	6/20/95	ND	ND	
64	15	RINALDI-TOLUCA #14	8/10/94	ND	ND	
65	15	RINALDI-TOLUCA #15	8/10/94	ND	ND	
66	18	TUJUNGA #1	4/7/95	ND	ND	29.46
67	18	TUJUNGA #2	4/27/95	ND	ND	31.50
68	18	TUJUNGA #3	4/21/95	ND	ND	30.70
69	19	TUJUNGA #4	4/21/95	ND	0.60	24.99
70	19	TUJUNGA #5	3/31/95	ND	1.20	
71	19	TUJUNGA #6	4/21/95	ND	2.20	36.95
72	19	TUJUNGA #7	4/27/95	ND	1.30	34.02
73	19	TUJUNGA #8	4/27/95	ND	0.80	30.61
74	20	TUJUNGA #9	4/21/95	ND	2.20	27.95
75	20	TUJUNGA #10	4/21/95	0.80	4.70	14.40
76	20	TUJUNGA #11	4/25/95	ND	1.40	10.37
77	20	TUJUNGA #12	4/27/95	ND	0.60	8.99
78	4	VERDUGO #1	---			
79	4	VERDUGO #2	---			
80	4	VERDUGO #4	5/4/95	8.70	15.90	
81	4	VERDUGO #11	4/12/95	ND	3.60	
82	5	VERDUGO #13	---			
83	5	VERDUGO #24	---			
84	6	WHITNALL #4	5/4/95	3.30	21.40	
85	6	WHITNALL #5	5/4/95	2.00	8.20	
86	6	WHITNALL #6A	6/1/95	ND	ND	
87	5	WHITNALL #7	---			
88	5	WHITNALL #8	---			
89	5	WHITNALL #9	---			
	*	*MISSION #5*	*11/30/94*	*ND*	*2.20*	*27.33*

NOTE: ND = non-detect
--- not tested (refer to p.8)

APPENDIX E

CITY OF BURBANK

PUMPING AND SPREADING PLAN

1994-95 Water Year

CITY OF BURBANK
164 WEST MAGNOLIA BOULEVARD, P.O.BOX 631, BURBANK, CALIFORNIA 91503-063

BLIC SERVICE DEPARTMENT

May 14, 1995

ULARA Watermaster
Melvin L. Blevins, Watermaster
P.O. Box 111, Room 1455
Los Angeles, CA 90051

SUBJECT: GROUNDWATER PUMPING AND SPREADING PLAN
WATER YEAR 1994-1995

Dear Mel:

I am pleased to provide you with the City of Burbank Groundwater Pumping and Spreading Plan for the Water Year 1994-1995. If you have any questions, please call me at 818/953-9640.

Yours truly,

Fred Lantz

FRED LANTZ, P.E.
Water System Manager
City of Burbank
Public Service Department

JWL:ret
jwl\pumpsprd.pln

cc: R. Burke
B. Smith
B. Doxsee
Watermaster File

GROUNDWATER PUMPING

AND

SPREADING PLAN

WATER YEAR
OCTOBER 1, 1994 TO SEPTEMBER 30, 1995

Prepared by

PUBLIC SERVICE DEPARTMENT
WATER DIVISION
CITY OF BURBANK

MAY, 1995

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TABLES

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APPENDIX

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I. INTRODUCTION

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

In 1993, 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, Draft 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 five years and the projected annual water demand for the next five years is shown in Table 2.1.

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

Projected water demands for the next five years is expected to increase only slightly from the 1992-93 base year. The increase is not from residential growth, but as a rebound from the drought conditions and re-establishment of commercial-industrial demand.

The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the Burbank area. A variance of ±10% can be expected.

III. WATER SUPPLY

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

A. MWD

The amount of treated water purchased from the MWD is expected to be reduced over the next five years as the result of bringing several water resource projects on line. Burbank will be purchasing 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. EPA CONSENT DECREE

The EPA Consent Decree project was expected to become operational on March 25, 1994. Due to delays by the Administrative Order Parties, the operation date is now expected to be September 1, 1995. The source of water will be from wells operated by Lockheed. The City of Burbank will account for the production beneficially used by Burbank. Projected use of EPA Consent Decree water produced by Lockheed is shown in Table 3.3.

C. GAC TREATMENT PLANT

The City placed a granular activated carbon (GAC) Treatment Plant in service in November, 1992. Historic and proposed production from this plant is shown in Table 3.2. The GAC Treatment Plant will be taken out of service periodically for carbon change-out of the contactors. Mechanical maintenance will be performed during the change-out period. The GAC Treatment Plant uses the groundwater production of Well No. 7 and Well No. 15.

D. RECLAIMED WATER

The City has used reclaimed water for its power plant cooling for more than 20 years. An expansion of the reclaimed water system is in progress. The next element is expected to be in service June, 1995. Historic and proposed use of reclaimed water is shown in Table 3.4.

E. PRODUCTION WELLS

The City has seven wells that are mechanically and electrically operable. The wells are on "Inactive" status with the DHS. We do not plan to operate these wells unless an emergency develops in the 1994-95 water year.

IV. JUDGEMENT CONSIDERATIONS

A. PHYSICAL SOLUTION

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

Physical Solution Producers

Valhalla	300 Acre-feet
Lockheed	25 Acre-feet

Table 3.3 lists the past and projected extractions by Valhalla. Table 3.4 lists the past and projected extractions by Lockheed. This Table includes both the Aqua Detox System and the EPA Consent Decree extractions.

B. STORED WATER CREDIT

The City has a stored water credit of 54,981 acre-feet as of October 1, 1993.

C. ALLOWANCE FOR PUMPING

The allowable pumping for the 1993-94 water year is 4,368 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 20,000 acre-feet of delivered water, will be 4,000 acre-feet per year.

D. SPREADING OPERATIONS

The City has purchased water for basin replenishment since 1989. The water has been typically spread at the Pacoima Spreading Grounds by L.A. County Public Works Department with the assistance of the L.A.D.W.P. The L.A.D.W.P. water pipelines to the Pacoima Spreading Ground were damaged during the 1994 Northridge earthquake. Replenishment water, beginning in water year 1994-95, will be taken "in-lieu" through the L.A. Treatment Plant. The historic and projected spreading water is shown in Table 4.1.

V. CAPITAL IMPROVEMENTS

A. WELLS

No capital improvements or modifications are planned for the Burbank water wells. We plan to continue the use of Well No. 7 and No. 15 for the GAC Treatment Plant.

Burbank will allow Lockheed to use Well No. 10, No.11A, and No. 12 for aquifer testing. See Figure 5.1. Lockheed may use these wells for Phase II EPA Consent Decree production. Testing will be conducted during the year.

B. GROUNDWATER TREATMENT FACILITIES

Burbank completed construction and testing of its EPA Consent Decree facilities. Coordinated testing with the Blending Facilities is expected in May-June, 1995.

Coordinated testing of the combined facilities (City, Blending, Lockheed) is expected in July-August, 1995.

The EPA Consent Decree Project is expected to be fully operational in September, 1995.

Lockheed stopped its operation of the Aqua Detox Treatment System in June, 1994.

Lockheed will continue limited production and treatment for start-up and testing of the EPA Consent Decree Project until June, 1995. Production and treatment of up to 9,000 gpm is expected June through September, 1995.

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TABLE 2.1
FIVE-YEAR HISTORIC AND PROJECTED WATER DEMAND

WATER YEAR	ACRE-FEET
88-89	23,863
89-90	23,053
90-91	20,269
91-92	20,930
92-93	21,839
93-94	24,175
94-95*	22,900
95-96*	22,700
96-97*	22,700
97-98*	22,700
98-99*	22,700

* Projected

NOTES:

(1) Water demand equals the net delivered water. (Extractions (GAC & EPA), MWD, reclaimed)

(2) Values above do not include Valhalla extractions or replenishment.

TABLE 3.1
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

WATER YEAR	ACRE-FEET
88-89	22,936
89-90	22,397
90-91	17,773
91-92	18,830
92-93	18,005
93-94	18,074
94-95*	15,000
95-96*	9,000
96-97*	9,000
97-98*	9,000
98-99*	9,000

* Projected

NOTES:

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

TABLE 3.2
HISTORIC AND PROJECTED USE OF GAC TREATED WATER

WATER YEAR	ACRE-FEET
92-93	1,205
93-94	2,395
94-95*	2,400
95-96*	2,000
96-97*	2,000
97-98*	2,000
98-99*	2,000

* Projected

NOTES:

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

(2) Wells No. 7 and No. 15 are the source of supply for the GAC Treatment Plant. Proposed production rates are as follows:

Well No. 7	1250 GPM
Well No. 15	750 GPM

(3) Treatment Plant production will be reduced beginning in water year 95-96 in order to meet monthly minimums required by the EPA Consent Decree project.

TABLE 3.3
HISTORIC & PROJECTED EXTRACTIONS OF GROUNDWATER BY LOCKHEED

WATER YEAR	ACRE-FEET
93-94	803 (4)
94-95*	2,200
95-96*	8,200
96-97*	8,200
97-98*	8,200
98-99*	8,200

* Projected

NOTES:

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

(2) Lockheed has Physical Solution right of 25 AF/year.

(3) Extractions include the Aqua Detox Facility and the EPA Consent Decree Project.

(4) The "Policies and Procedures" allow a 50 acre-foot reduction for well development and testing.

(5) Re-injected water has been excluded from the above values.

(6) Beginning in June of water year 1994-95, all extractions will be treated for VOC removal and beneficial use by Burbank.

TABLE 3.4
HISTORIC & PROJECTED EXTRACTIONS OF GROUNDWATER BY VALHALLA

WATER YEAR	ACRE-FEET
89-90	293
90-91	239
91-92	376
92-93	391
93-94	391
94-95*	300
95-96*	300
96-97*	300
97-98*	300
98-99*	300

* Projected

NOTES:

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

(2) Valhalla has Physical Solution right of 300 AF/year.

TABLE 3.5
HISTORIC AND PROJECTED USE OF RECLAIMED WATER

WATER YEAR	ACRE-FEET
88-89	927
89-90	656
90-91	1,234
91-92	2,100
92-93	2,629
93-94	3,706
94-95*	3,500
95-96*	3,500
96-97*	3,500
97-98*	3,500
98-99*	3,500

* Projected

NOTES:

(1) The source of reclaimed water is the Burbank Waste Water Treatment Plant.

TABLE 4.1
BURBANK SPREADING OPERATIONS

WATER YEAR	ACRE-FEET
88-89	0
89-90	378
90-91	504
91-92	503
92-93	500 (2)
93-94	0 (3)
94-95*	2,000 (2)
95-96*	4,000
96-97*	6,000
97-98*	6,000
98-99*	6,000

* Projected

NOTES:

(1) MWD water spread at the Pacoima Spreading Grounds.

(2) MWD water taken at the Los Angeles Treatment Plant (LA-35). In-lieu credit to Burbank by the L.A.D.W.P.

(3) The Maclay pipeline was damaged in the 1994 Northridge earthquake. Deliveries to the Pacoima Spreading Grounds are precluded until repaired by the L.A.D.W.P.

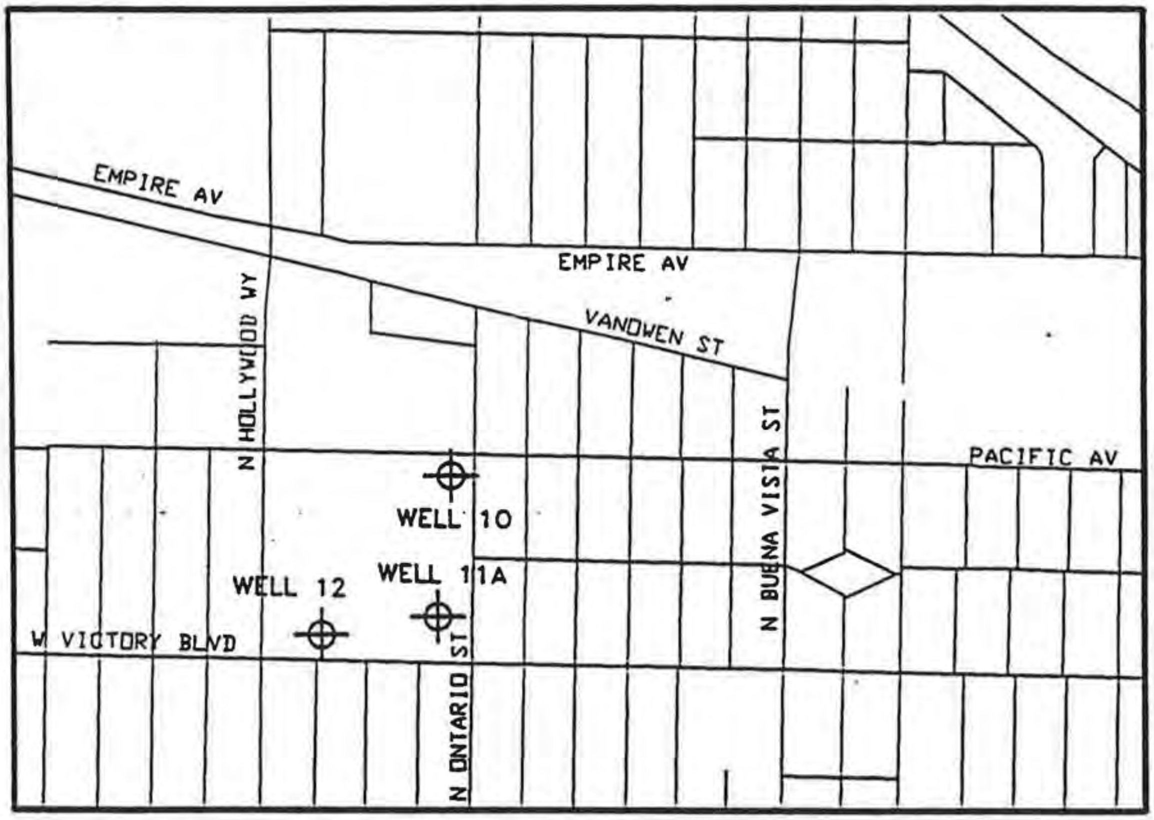


FIGURE 5.1
EPA PHASE II EXTRACTION WELLS

APPENDIX A

WATER QUALITY DATA

BURBANK WELLS

- WELL NO. 7
- WELL NO. 15

LOCKHEED WELLS

- NO. 1
- NO. 2
- NO. 3
- NO. 4
- NO. 5
- NO. 6
- NO. 7

NOTE: WATER QUALITY TEST DATA WILL BE PROVIDED ON SPECIFIC REQUEST, AND IS NOT INCLUDED WITH THIS REPORT

LAKE STREET GAC TREATMENT PLANT

320 LAKE STREET
BURBANK, CA 91503

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

BILL SMITH, PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/93 THROUGH 9/30/94):

2,400 Acre-Feet

WATER QUALITY:

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

DISPOSAL:

Burbank Water System
Potable Water

EPA CONSENT DECREE PROJECT

2030 N. Hollywood Way
Burbank, CA 91505

OPERATOR:

CITY OF BURBANK
PUBLIC SERVICE DEPARTMENT, WATER DIVISION

BILL SMITH, WATER PRODUCTION/OPERATIONS SUPERINTENDENT

QUANTITY TREATED (10/1/94 THROUGH 9/30/95):

2,200 ACRE-FEET

WATER QUALITY:

N/A

DISPOSAL:

(1) TEST WATER - WASTE

(2) BURBANK WATER SYSTEM
Potable water after blending

APPENDIX B

WATER TREATMENT FACILITIES

APPENDIX F

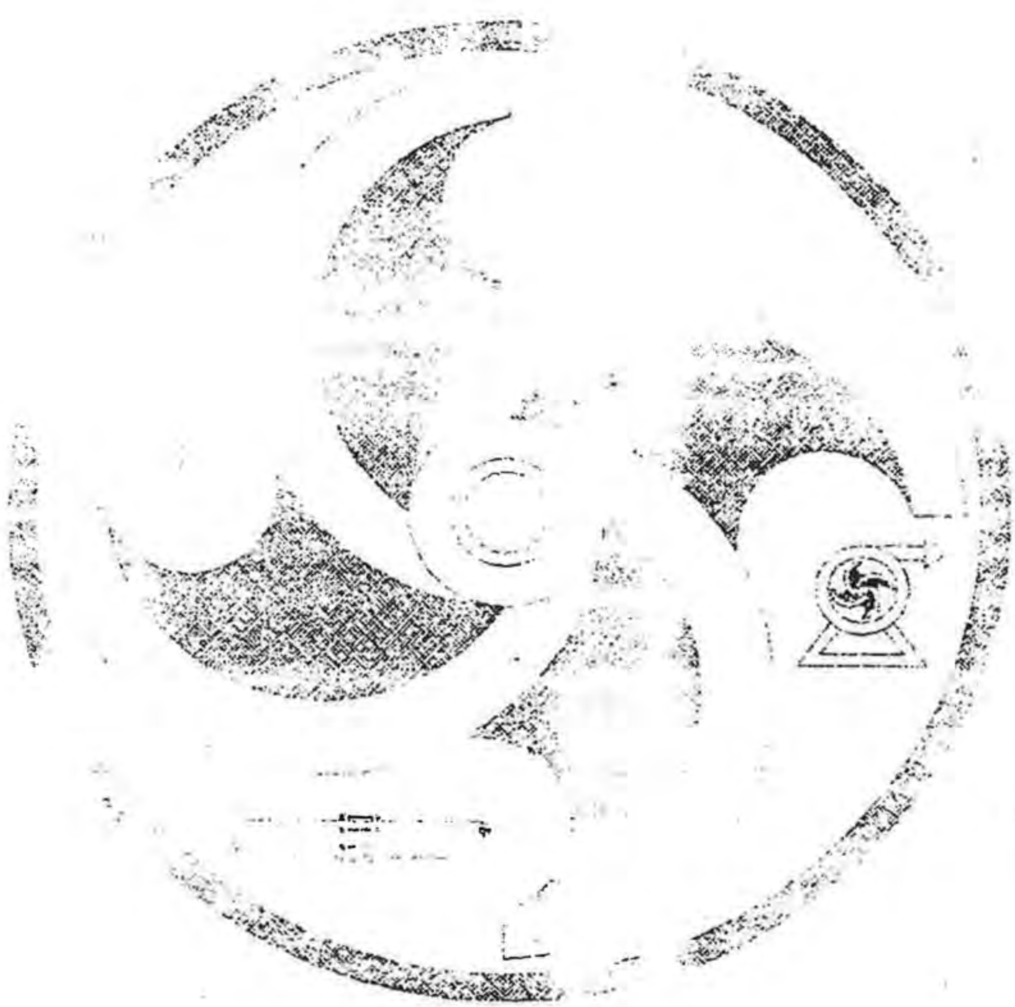
CITY OF GLENDALE

PUMPING AND SPREADING PLAN

1994-95 Water Year

CITY OF GLENDALE

WATER RESOURCE PLAN



PUBLIC SERVICE DEPARTMENT

WATER SECTION

JUNE, 1995

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INTRODUCTION

The City of Glendale has developed a plan to reduce the City's dependence on imported water supplies from northern California and the Colorado River via the Metropolitan Water District (Metropolitan) by using more local resources. By using more local resources, Glendale residents will realize some relief in future retail water rate increases due to Metropolitan water rate increases needed to support Metropolitan's capital improvement program. This trend in local water resource development is occurring throughout the southern California water community. Also, the cost of imported water provides economic justification to develop local resources that were uneconomical to develop in the past.

Fundamentally, it is imprudent for a city of 187,000 people to be almost totally dependent on water supplies (93 percent of demands) originating hundreds of miles away that Glendale has little control over. The purpose of this document is to discuss the City's Water Resource Plan designed to develop more local water resources. The implementation of this plan will cost about $50 million.

This report discusses existing water supplies available to Glendale, future water demands in Glendale, and alternative sources of local water available to reduce dependance 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, and others interested in Glendale's water resource future.

EXISTING WATER SOURCES

The City has four sources of water available to meet demands. Each of these sources are described below, as well as the quantity of water available. The location of these sources is shown in Figure 1. Over the past 10-years, there has been a significant change in the mix of supplies used to meet water demands in the City. These changes are discussed in the next section of this report.

San Fernando Basin - The City's right to San Fernando Basin supplies is defined in "The City of Los Angeles vs. The City of San Fernando, et. al. (1979) (Judgement) and consists of a return flow credit, which is a water right. Additionally, there is a secondary right to produce additional water subject to a payment obligation to the City of Los Angeles based primarily on the cost of Metropolitan supplies. This right to produce water in excess of the return flow credit is a significant factor in relation to the proposed U. S. Environmental Protection Agency (EPA) Superfund treatment facility in Glendale, discussed 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 reclaimed water) in the San Fernando Basin and its tributary hill and mountain area. It is calculated by determining the amount of total water used in the City less 105 percent of total sales by Glendale to Verdugo Basin and its tributary hills. This credit ranges from about 5,000 acre-feet per year (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 limited rights to extract water chargeable to the rights of the City of Los Angeles upon the payment of specified charges generally tied to Metropolitan'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 unlimited extraction of basin water for SUPERFUND activities, subject to payment of specified charges similar to physical solution water. This right will be a significant factor with the proposed EPA treatment facility.

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

For the San Fernando Basin, the rights describe above give the City the right to extract from a practical point of view, subject to certain conditions and payment in some cases, any quantity of water anticipated to be needed for the City's future water resource program. Each water right used to produce from the San Fernando Basin has its own costs and availability.

Verdugo Basin - The Judgement described above gave Glendale the right to extract 3,856 AFY from the Verdugo Basin. Crescenta Valley County Water District also has rights and is the only other entity allowed to extract water from the Verdugo Basin.

Metropolitan Water District - As a member agency of the Metropolitan Water District, Glendale has the right to purchase, without limitation, but subject to supply availability and cost factors, any amount of water. The Metropolitan water delivered to Glendale is delivered through three service connections. The service connection number and capacity is summarized in Table 1.

TABLE 1 METROPOLITAN CONNECTIONS AND CAPACITY	
Service Connection Number	Capacity (cfs)
G-1	48
G-2	10
G-3	12

Reclaimed Water - The City has been delivering reclaimed water from the Los Angeles/Glendale Water Reclamation Plant (LAGWRP) since the late 1970's. The first deliveries of reclaimed water were to the Glendale Power Plant for use in the cooling towers and to Caltrans for irrigation of a portion of Route 134 Freeway. In 1992, the City began delivering reclaimed water for irrigation purposes to Forest Lawn Memorial Park. The total deliveries to these existing users is about 800 AFY. To the extent reclaimed water is used, there is a corresponding reduction in the amount of water purchased from Metropolitan. The capacity of LAGWRP is 20 MGD with indefinite plans for expansion to 50 MGD, and Glendale is entitled to 50 percent of any effluent produced at the plant.

Summary of Supplies - The current use of local resources available to the City is substantially less than rights primarily because of water quality problems (discussed later herein). A general summary of the City's rights to local water resources compared to the amount currently being used is shown on Table 2.

TABLE 2 LOCAL WATER USE (AFY)			
Potential Source	Right	Current Use	Future Use
San Fernando Basin[1]	5,000-5,400	100 AFY	5,000
Verdugo Basin	3,856	1,200 AFY	3,856
Reclaimed Water	10,000	800 AFY	3,000

In order to develop the "Potential Future Use," significant capital expenditures are required primarily for water treatment, extraction, and distribution facilities.

(1) Return flow credit only.

PAST WATER USE TRENDS

The water quality problems in the San Fernando and Verdugo Basins and ground water levels in the Verdugo Basin have severely impacted the ability of the City to produce water from the Basins. Glendale has not been able to fully utilize its rights to these water supplies for many years. The U. S. Environmental Protection Agency (EPA) has designated the basin as a Superfund site and will begin clean-up operations within the next two years.

The City currently has three active production wells in each of the San Fernando (Grandview Wells) and Verdugo Basins (Glorietta Wells) plus standby wells in the San Fernando Basin. Some of the wells were installed prior to 1920 and need replacement.

Historically, the City used ground water to meet a varying portion of its water demands. In the 1940's and 1950's essentially all of the City's water needs were obtained from the San Fernando and the Verdugo Basins with limited supplies from Metropolitan. In the 1960's, production from the San Fernando Basin reached a peak of about 17,000 acre-feet per year (AFY). The Grandview well water collection system in the San Fernando Basin and the Grandview Pumping Plant has a peak capacity of about 24,000 gpm (34.6 million gallons per day-MGD) to pump San Fernando Basin water supplies into the potable water system.

In the mid-1970's, the City limited production from the San Fernando Basin to about 12,000 AFY as part of a court decree arising from a lawsuit by the City of Los Angeles. In 1975, the California Supreme Court judgement in the City of Los Angles vs. the City of San Fernando further limited the City's production right. The current right is about 5,000 to 5,400 AFY based on a return flow credit right and water use.

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

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

The historic and projected water use from the various sources is plotted on Figure 2 and shows the significant reduction in production from the San Fernando Basin and corresponding increase in imported water supplies from Metropolitan. The annual water use in Glendale for fiscal year 1993-94 was 29,448 AFY. In 1989-90, the use was about 32,600 AFY. The recent drought and many water conservation measures have resulted in reduced water use in Glendale. The 29,448 AFY is equivalent to an average daily use of 26 million gallons per day (MGD).

PROJECTED WATER DEMANDS

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

Projected Water Use - The projected water demand using MWD-MAIN calibrated for Glendale shows a year 2000 demand of 32,080 AFY and a year 2010 demand of 33,000 AFY. These figures were based on incorporating projected population, housing, and employment data into the MWD-MAIN water demand forecasting model for Glendale along with a weather variable. The year 2010 demand reflects a 7 percent increase over current use, or a modest annual increase of 0.4 percent. These projections incorporate the 1981 and 1992 California plumbing codes changes requiring ultra-low flush toilets beginning in 1992, along with a continuation of current drought oriented public education and information programs. As additional conservation measures are implemented, there could be still more reductions in projected use.

Future Water Sources - The basic objective of the plan is to develop more local supplies and the facilities required to increase the use of local resources thereby reducing the need for imported water. The cost of these new facilities is estimated to be $50 million. Currently, about 93 percent of the potable water used in the City comes from Metropolitan. With the proposed supplies and facilities, the goal is to reduce dependence on Metropolitan to 60 percent of demand. This will be accomplished by building new facilities for expanding production from the San Fernando and Verdugo Basins, and increased reclaimed water use.

PROPOSED WATER FACILITIES

The various features to be constructed as part of this water resource plan are shown on Figure 3 and described below.

San Fernando Basin/EPA Treatment Facility - San Fernando Basin production is currently limited because of the volitle organic compounds in the groundwater. The entire San Fernando Valley is part of a federal SUPERFUND clean-up program with many proposed water treatment plants constructed or to be constructed in the basin. Now the Environmental Protection Agency (EPA) is focusing on the construction of cleanup facilities in Glendale. The treated water from these facilities will be conveyed to the Glendale potable water system.

Under the Record of Decision (ROD) for the South Glendale and North Glendale Operable Units, many new facilities will be constructed consisting of: shallow extraction wells, a combined 5,000 gpm water treatment plant, piping to convey the untreated water from the wells to the treatment plant, a conveyance system from the treatment plant to Glendale potable distribution system, a facility to blend the treated groundwater with water from the Metropolitan Water District to reduce nitrate levels, and a disinfection facility. A general layout of facilities being proposed is shown on Figure 4. Also, shown on the figure is an assumed new connection to the Metropolitan water system to blend with the treated groundwater to reduce the nitrate levels in the groundwater to acceptable limits.

The major agreements between Glendale, the Responsible Parties (PRP's), and the EPA have been signed. The PRPs have retained CDM Consulting Engineers to design the required facilities. Construction should be completed in the 1997-98 time frame.

In addition, the City proposes to construct wells to provide water from the lower San Fernando Aquifer. It is anticipated that these wells would be constructed in the 1996-97 time frame. The City's basic water right of 5,400 AFY will meet about 18 percent of projected near-term water demands based on an annual use in the City of 30,000 AFY.

Verdugo Basin - Historically, the City's use of these supplies has been limited because of water quality problems, water levels, and extraction capacity. The City has completed construction of the Verdugo Park Water Treatment Plant (VPWTP). This facility is expected to be operational in the summer of 1995. This facility will have a capacity of 1,150 gpm and will treat water from the two new low capacity wells (referred to as Glorietta Wells A & B) and the water supplies in the old Verdugo Pickup horizontal infiltration system. The three existing wells and the Verdugo Park Water Treatment Plant alone will not permit the use of the City's rights to the basin supplies. Additional extraction capacity in the Verdugo Basin will be required. The existing wells and VPWTP will produce about 2,200 AFY with the remaining 1,600 AF coming from other basin sources not currently identified. It is anticipated that the City will be looking at other sources of supply in the Verdugo Basin. If the City were able to utilize its full rights to these supplies, about 12 percent of demands could be met from this Basin.

Reclaimed Water - The City has been using reclaimed water from the Los Angeles/Glendale Water Reclamation Plant for the past 10 years at the Glendale Power Plant for make-up water use in the cooling towers and along the Route 134 Freeway in the City for irrigation. In 1992, the City began delivering reclaimed water to Forest Lawn Memorial Park in Glendale for irrigation.

The City is now constructing a "backbone" distribution system consisting of pipelines, pumping plants, and storage tanks to deliver reclaimed water to many new users in and outside of the City. The objective is to increase the use of reclaimed water to meet 10 percent of demands.

The specific features of this program are shown in more detail on Figure 5. The users from the various reclaimed water projects are tabulated on Figure 6. This will give the reader a general idea of the scope of the expansion program. The expected deliveries from the various projects are shown on Table 3.

TABLE 3
RECLAIMED WATER USE (AFY)

PROJECTS	1995	2000	2005	2010
Brand Park	0	160	170	170
Forest Lawn Pipeline	350	350	350	350
Power Plant Pipeline	450	450	450	450
Verdugo-Scholl Pipeline	674	832	935	1054
Other Potential Projects	0	0	0	0
TOTAL	1474	1792	1905	2024

Metropolitan Water District - The City currently has three treated water connections to the Metropolitan water system in the City. The cities of Los Angles, Burbank and Glendale have looked at a 150 cfs, equally divided, untreated water connection on the San Fernando Tunnel to percolate water into the San Fernando Basin. With this additional water delivered into groundwater storage, the City would be entitled to produce more water from the San Fernando Basin. Also, the water could be delivered at a lower cost because it is untreated compared to the current sources. Also, it may be possible to purchase this water under a different pricing program by taking advantage of special pricing for Metropolitan supplies that are periodically available (seasonal storage). The replenishment water would be taken generally during the wetter years for a storage credit in the basin and extracted in later years during drought conditions when treated Metropolitan supplies are limited. It is anticipated that about 3,000 AFY will be replenished from this source on the average.

TABLE 4					
HISTORIC AND PROJECTED WATER USE IN GLENDALE (AF)					
Water Year	San Fernando Basin	Verdugo Basin	Reclaimed Water	MWD Water	Total
1989-90	2,041	1,635	333	28,848	32,857
1990-91	2,932	1,132	432	25,354	29,850
1991-92	1,577	732	551	23,003	25,863
1992-93	447	904	770	25,905	28,026
1993-94	554	1,226	625	27,043	29,448
1994-95	500	1,700	1,100	28,274	31,574
1995-96	500	2,700	1,474	27,000	31,674
1996-97	500	2,700	1,664	26,910	31,774
1997-98	7,700	2,700	1,709	19,765	31,874
1998-99	7,700	3,000	1,749	19,527	31,976
1999-00	7,700	3,300	1,792	19,288	32,080

SUMMARY OF WATER SUPPLIES

The above information describes the many projects proposed for construction in the City at a cost of $50 million. The money will come from City sources, others benefitting from these facilities, and the parties responsible for groundwater contamination in the San Fernando Basin through the SUPERFUND Clean-Up Program.

RELATED INFORMATION ON WATER USE

Detailed information on historic and projected water use in Glendale is shown on Table B-1. From a practical sense, water use in the water year is equivalent to water use in a fiscal year. Table 4 is a tabular version of Table B-1.

C:/Misc/WtrRes.Pln-DOS

Figure B

ATER SUPPLY AND DEMAN AF/YR)

Deliveries for Blending)

Date: 31-May-95

92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	2000	2005	2010
,863	28,026	29,448	31,574	31,674	31,774	31,874	32,080	32,680	32,966
,373	4,805	5,090	5,515	5,535	5,555	5,575	5,616	5,736	5,793
						2,125	2,084	1,964	1,907
,080	78	140	100	100	100	100	100	100	100
						7,200	7,200	7,200	7,200
497	369	414	400	400	400	400	400	400	400
,577	447	554	500	500	500	7,700	7,700	7,700	7,700
732	904	1,226	1,700	1,700	1,700	1,700	1,700	1,700	1,700
				1,000	1,000	1,000	1,000	1,000	1,000
							600	356	356
732	904	1,226	1,700	2,700	2,700	2,700	3,300	3,056	3,056
					150	155	160	170	170
	348	299	350	350	350	350	350	350	350
551	422	326	450	450	450	450	450	450	450
			300	674	714	754	832	935	1,054
551	770	625	1,100	1,474	1,664	1,709	1,792	1,905	2,024
,003	25,905	27,043	28,274	27,000	26,910	19,765	19,288	20,019	20,186
,003	25,905	27,043	28,274	27,000	26,910	19,765	19,288	20,019	20,186
863	28,026	29,448	31,574	31,674	31,774	31,874	32,080	32,680	32,966

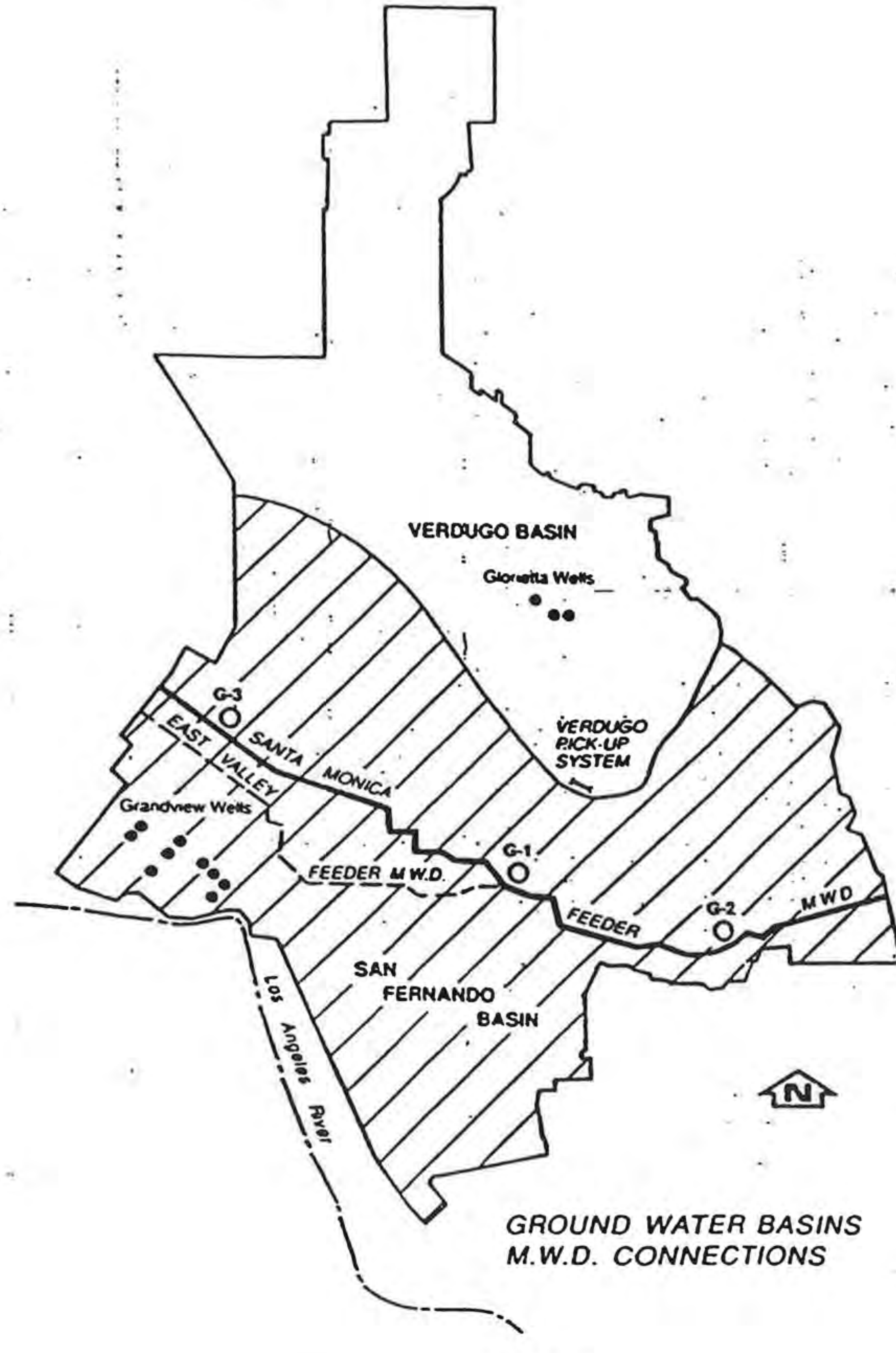
7) - (3) - (15)

l) - (7) - (11) - (12)

(a) Projected demands from MWD

F-11

SOURCES OF SUPPLY



GROUND WATER BASINS
M.W.D. CONNECTIONS

F-13

CITY OF GLENDALE

SOURCES OF WATER SUPPLY

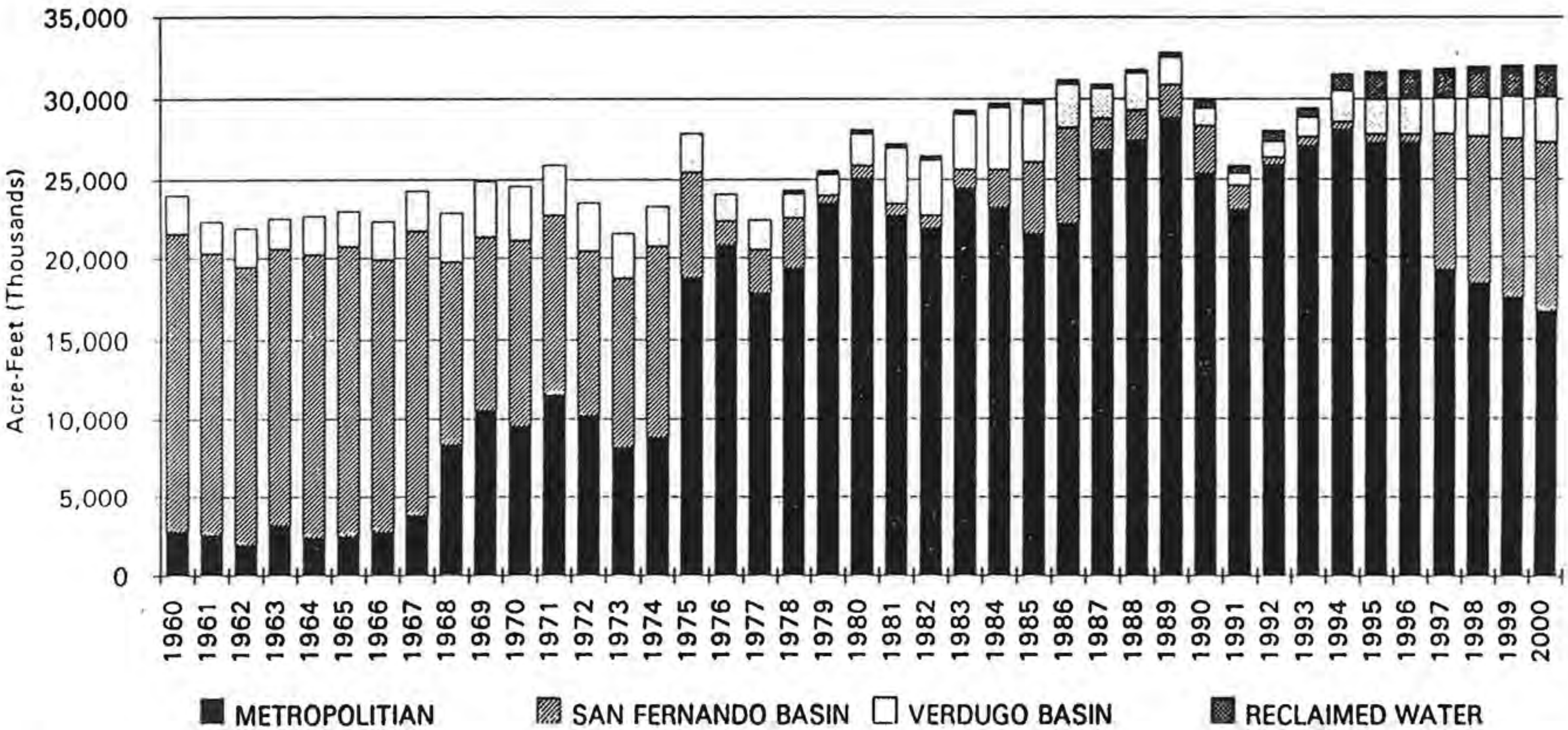


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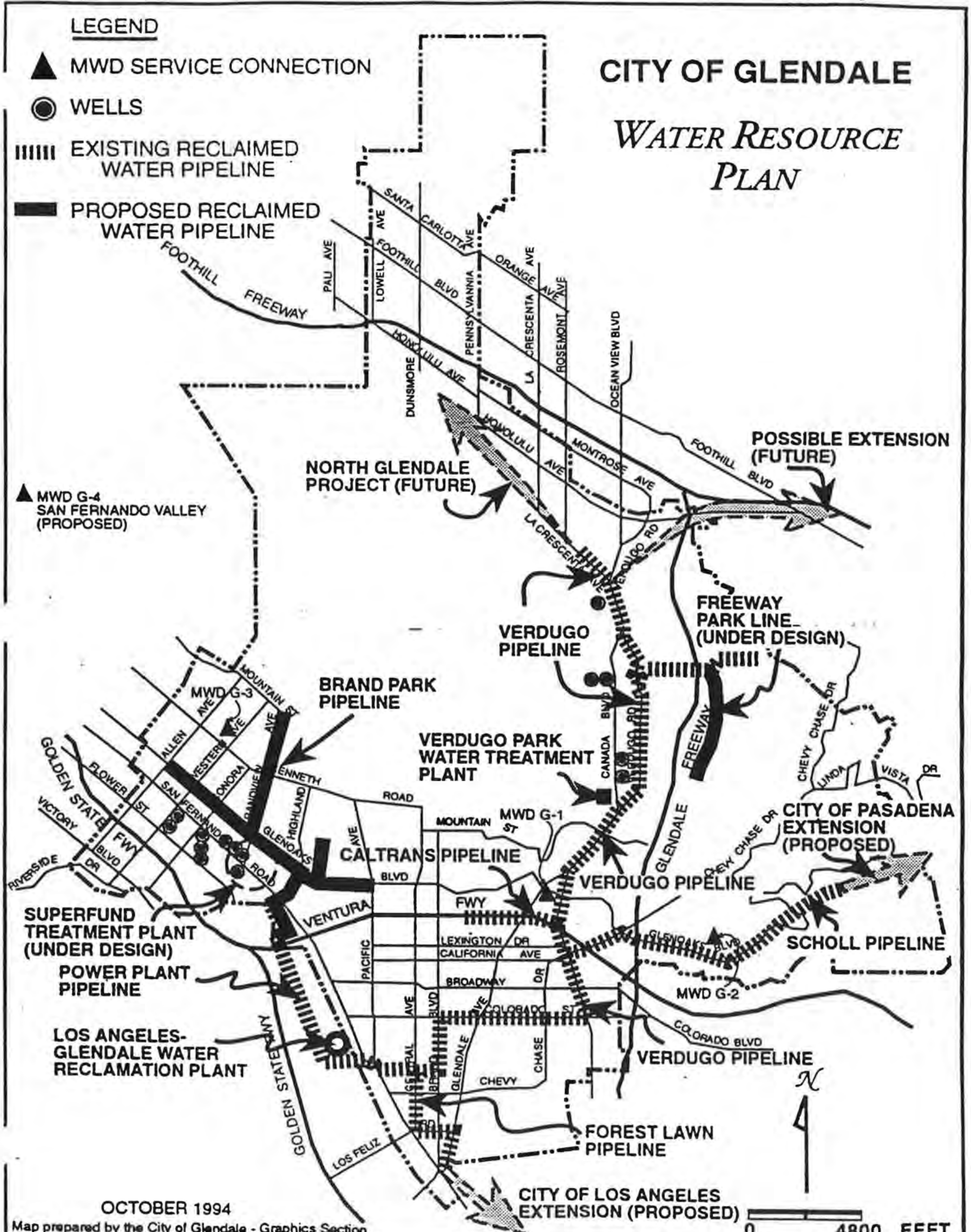
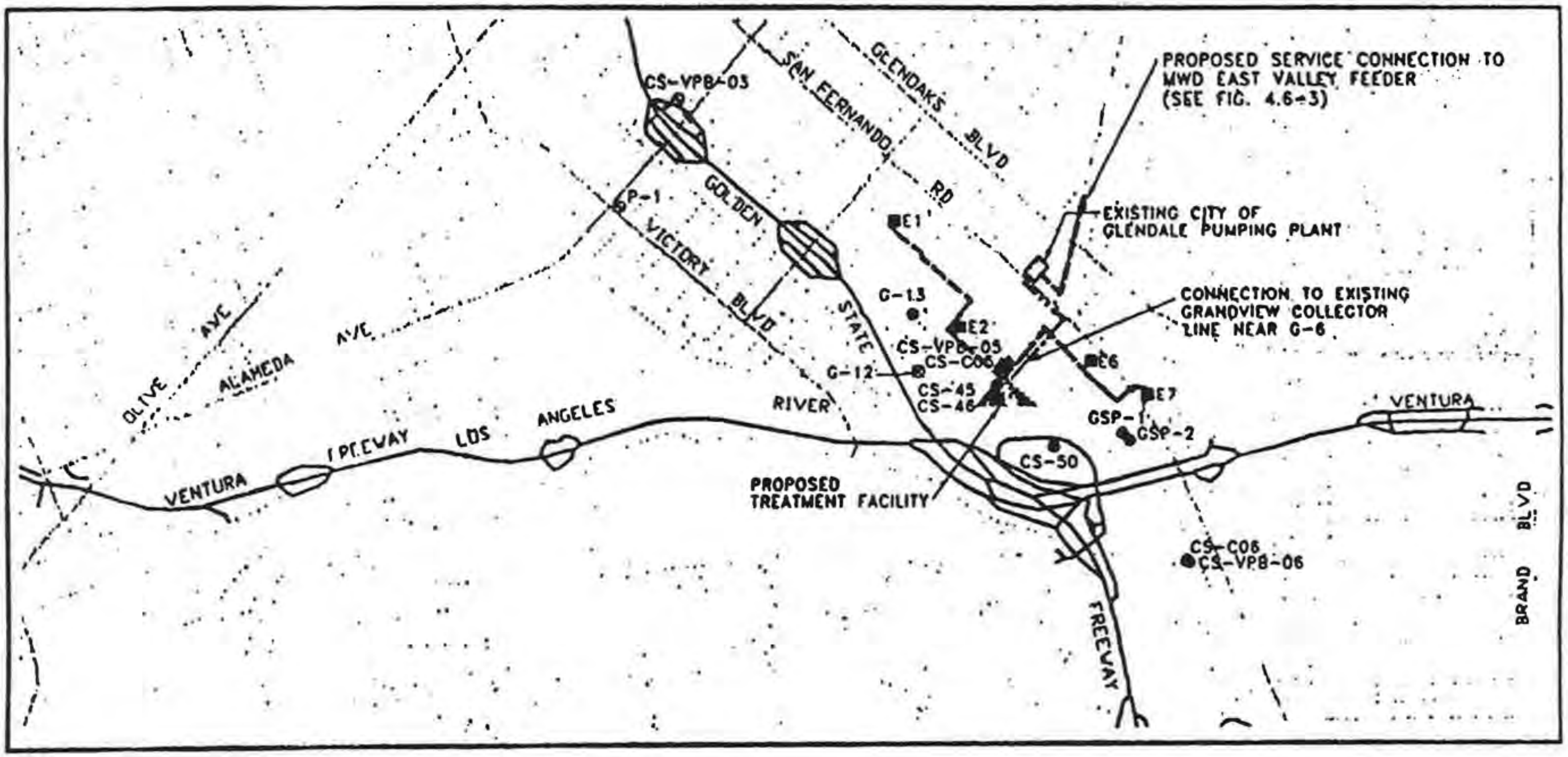
FIGURE 2


LEGEND
MWD SERVICE CONNECTION
WELLS
EXISTING RECLAIMED WATER PIPELINE
PROPOSED RECLAIMED WATER PIPELINE
CITY OF GLENDALE
WATER RESOURCE PLAN
NORTH GLENDALE PROJECT (FUTURE)
POSSIBLE EXTENSION (FUTURE)
MWD G-4 SAN FERNANDO VALLEY (PROPOSED)
VERDUGO PIPELINE
FREEWAY PARK LINE (UNDER DESIGN)
BRAND PARK PIPELINE
MWD G-3
VERDUGO PARK WATER TREATMENT PLANT
MWD G-1
CALTRANS PIPELINE
CITY OF PASADENA EXTENSION (PROPOSED)
VERDUGO PIPELINE
SUPERFUND TREATMENT PLANT (UNDER DESIGN)
SCHOLL PIPELINE
POWER PLANT PIPELINE
MWD G-2
LOS ANGELES-GLENDALE WATER RECLAMATION PLANT
VERDUGO PIPELINE
FOREST LAWN PIPELINE
CITY OF LOS ANGELES EXTENSION (PROPOSED)
OCTOBER 1994
Map prepared by the City of Glendale - Graphics Section
0
4800 FEET
N



LEGEND

- MONITORING WELL
- ABANDONED WELL
- REHABILITATED WELL
- EXTRACTION SITE
- 12" PIPELINE
- 16" PIPELINE
- 30" PIPELINE (existing)

ALTERNATIVE 2

- 3,000 gpm Extraction (Scenario 4)
- Dual-Stage AS with Vapor-Phase GAC
- Blending
- Use as Potable Supply

0 2000 4000
FEET

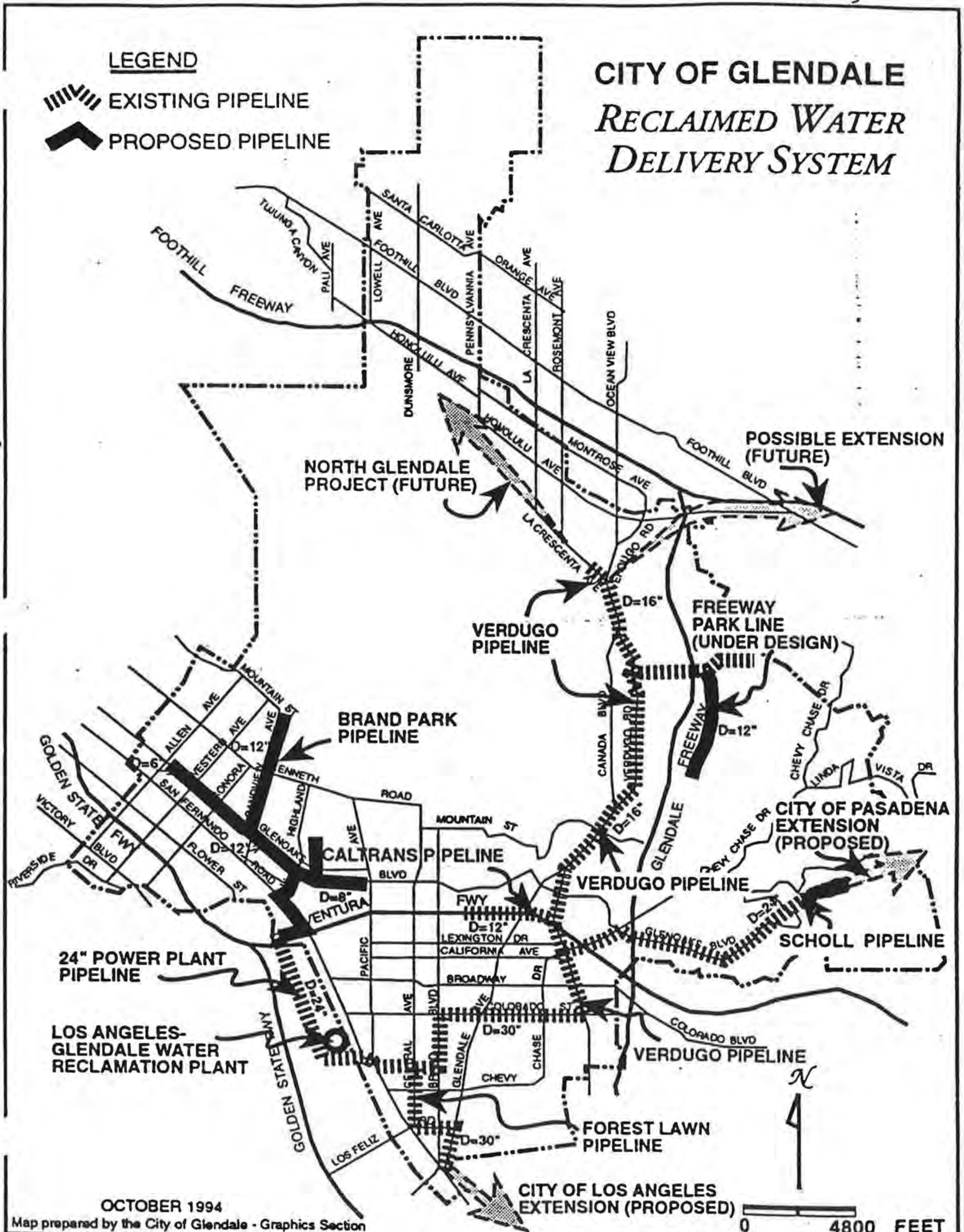
FIGURE 6.2-2
LOCATION OF EXTRACTION, TREATMENT, DISPOSAL
AND MONITORING FACILITIES-ALTERNATIVE 2

NORTH PLUME OPERABLE UNIT
FEASIBILITY STUDY

GOUALTS6 FIG6.2-2 REV. 04/09/92

45

FIGURE 4


LEGEND
EXISTING PIPELINE
PROPOSED PIPELINE
CITY OF GLENDALE
RECLAIMED WATER DELIVERY SYSTEM
NORTH GLENDALE PROJECT (FUTURE)
POSSIBLE EXTENSION (FUTURE)
VERDUGO PIPELINE
FREEWAY PARK LINE (UNDER DESIGN)
D=16"
D=12"
BRAND PARK PIPELINE
CALTRANS PIPELINE
CITY OF PASADENA EXTENSION (PROPOSED)
SCHOLL PIPELINE
D=24"
D=30"
24" POWER PLANT PIPELINE
LOS ANGELES-GLENDALE WATER RECLAMATION PLANT
FOREST LAWN PIPELINE
CITY OF LOS ANGELES EXTENSION (PROPOSED)
FOOTHILL FREEWAY
FOOTHILL BLVD
HONOLULU AVE
MONTROSE AVE
LA CRESCENTA AVE
VERDUGO RD
CANADA BLVD
GLENDALE FREEWAY
GLENOAKS BLVD
COLORADO BLVD
GOLDEN STATE FWY
VENTURA FWY
MOUNTAIN ST
SAN FERNANDO ROAD
LOS FELIZ
N
0 4800 FEET
OCTOBER 1994
Map prepared by the City of Glendale - Graphics Section

RECLAIMED WATER USER STATUS

User	Anticipated/Actual Delivery Date	User Agreement	Quantity AF/YR[1]
City of Glendale Facilities:			
Glendale Power Plant	1978	N/A	400
Parks:			
Glendale Median (Highland)	1995	N/A	12
Glenoaks Median	1995	N/A	4
Verdugo Road Median	1995	N/A	10
Civic Auditorium	1995	N/A	15
Lower Scholl Canyon Park	1995	N/A	12
Scholl Canyon Ball Fields	1995	N/A	17
Scholl Canyon Golf Course (Proposed)	1995	Yes	100
Mayor's Park		N/A	6
Park Site A (Proposed)		N/A	69
Park Site B (Proposed)	1995	N/A	99
Park Site C (Proposed)		N/A	54
Adult Recreation Center	1994	N/A	5
South Brand Median	1994	N/A	2
Central Library	1994	N/A	4
Brand Park	1995	N/A	60
Pelanconi Park	1995	N/A	8
Public Works	1978	No	
Glendale Unified School District			
Glendale High	1995	Yes	15
Wilson Jr. High	1995	Yes	7
Hoover High	1995	N/A	12
Toll Jr. High	1995	N/A	6
Kepple School	1995	N/A	2
Glendale Community College	1995	Yes	25
Cal-Trans			
5/134 Interchange Area	1978	N/A	60
Route 134, 134/2 Interchange	1995	Yes	100
Others:			
Forest Lawn Memorial Park	1992	Yes	300-600
Glendale Adventist Medical Center	1995	Yes	8
Scholl Canyon Landfill (LACSD)	1995	Yes	100
Oakmont Country Club	1995	Yes	200
Pasadena	1996	Yes	4,000-6,000
Grand View Memorial Park	1995	No	50

[1] Acre-feet per year.

APPENDIX G

CITY OF SAN FERNANDO

PUMPING AND SPREADING PLAN

1994-95 Water Year

CITY OF SAN FERNANDO
117 Macneil Street
San Fernando, CA 91340-2993
(818) 898-1200

April 28, 1995

Mr. Melvin Blevins
ULARA WATERMASTER
P.O. Box 111, Room 1466
Los Angeles, California 90051

Subject: City of San Fernando Groundwater Pumping Plant and Spreading Plan

Dear Mr. Blevins:

Herewith is the draft Groundwater Pumping and Spreading Plan for the City of San Fernando as required.

Should you have any questions or need more information, please give me a call at 818/898-1222.

Sincerely,

Michael S. Drake

MICHAEL S. DRAKE
Public Works Director

LTR-879-2.PW

DRAFT

CITY OF SAN FERNANDO

GROUNDWATER PUMPING
AND
SPREADING PLAN

WATER YEAR
OCTOBER 1, 1993 TO SEPTEMBER 30, 1994

Prepared by

PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION
117 Macneil Street
San Fernando, California 91340

APRIL 1995

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GROUNDWATER PUMPING AND SPREADING PLAN

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. As of October 1, 1984, San Fernando and Los Angeles were assigned equal rights to pump the safe yield of the Basin (6,120 acre-feet) thus, San Fernando and Los Angeles are each allowed to pump approximately 3,105 acre-feet per year.

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

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

II. WATER DEMAND

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

Water demand during the last five years has been affected by drought conditions in California. The City of San Fernando imposed voluntary conservation since 1977.

Projected water demands for the next five years is expected to increase only slightly from the 1992-93 base year. The increase is not from residential growth, but as a rebound from the drought conditions and re-establishment of commercial-industrial demand.

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

III. WATER SUPPLY

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

A. MWD

The amount of treated water purchased from the MWD is expected to remain the same over the next five years. Historic and projected use of MWD water is shown in Table 3.1.

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: 2000 GPM

2. Well 3
   Location: 13003 Borden Avenue, Sylmar
   Capacity: 1280 GPM

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

4. Well 7A
   Location: 13180 Dronfield Avenue, Sylmar
   Capacity: 480 GPM

C. Quantity (Acre-Feet) of Water Pumped From Each Well (1993-94)

1. Well 2A -	1963.98
2. Well 3 -	1060.41
3. Well 4A -	373.94
4. Well 7A -	00.00

D. Wells Groundwater Level Data

1. Well 2A -	1047.50'	Taken 4/95
2. Well 3 -	1108.20	Taken 4/95
3. Well 4A -	1071.01'	Taken 4/95
4. Well 7A -	1090.69'	Taken 4/95

IV JUDGMENT CONSIDERATIONS

A. Native and Imported Return Water

The cities of San Fernando and Los Angeles have equal rights to pump the safe yield of the Sylmar Basin (6,210 acre-feet) after subtracting the overlaying pumping of two private parties. San Fernando and Los Angeles are each allowed to pump approximately 3,105 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.

- San Fernando has a stored water credit of 2,652 acre-feet as of October 1, 1993.

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

(Acre-Feet)

89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
3,823	3,387	3,394	3,430	3,491	3,500	3,500	3,500	3,500	3,500
ACTUAL					PROJECTED				

NOTES:
(1) Water demand equals the pumped and imported water.

TABLE 3.1
FIVE-YEAR HISTORIC AND PROJECTED USE OF MWD TREATED WATER
CITY OF SAN FERNANDO

(Acre-Feet)

89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
1,008	1,122	568	1,285	93	900	900	900	900	900
ACTUAL					PROJECTED				

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

APPENDIX A

WATER QUALITY DATA

CITY OF SAN FERNANDO

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

CON-136.PW

117 MACNEIL STREET • SAN FERNANDO, CALIFORNIA 91340-2993

CITY OF SAN FERNANDO

Water Quality Report 1994

6-10

ANNUAL WATER QUALITY REPORT 1994

	DISTRIBUTION SYSTEM		Range	
CLARITY				
Tubidity	5.0	NTU	ND - 2.50	NTU
MICROBIOLOGICAL				
Coliform Bacteria (a)	State MCL	Average		
PA (% Samples Positive)	<5.0%		0 -0	
Number of Acute Violations	None			
ORGANIC CHEMICALS				
Total Trihalomethanes (mg/L) (b)	0.100	0.050	.028 - .072	

Please see below for key to abbreviations

	PARAMETER	STATE MCL	UNITS	2A	3A	4A	7A		RANGE
				CITY WELLS					
	PRIMARY STANDARDS - Mandatory Health - Related Standards								
	ORGAINIC CHEMICALS (mg/L)								
	Pesticides								
***	Aldicarb (Temik)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Aldicarb sulfone	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Aldicarb sulfoxide	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Aldrin	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Alachlor	0.002	mg/L	ND	ND	ND	NA	ug/L	ND
	Atrazine	0.003	mg/L	ND	ND	ND	NA	ug/L	ND
***	Butachlor	NS	mg/L	NA	NA	NA	NA	ug/L	ND
***	Bentazon	0.018	mg/L	ND	ND	ND	NA	ug/L	ND
	Carbaryl (Sevin)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Carbofuran	0.018	mg/L	ND	ND	ND	NA	ug/L	ND
	Chlordane	0.0001	mg/L	ND	ND	ND	NA	ug/L	ND
***	Chlorothalonil	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	2,4-D	0.07	mg/L	ND	ND	ND	NA	ug/L	ND
***	Bromacil	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Dalapon	0.2	mg/L	ND	ND	ND	NA	ug/L	ND
	Dibromochloropropane (DBCP)	0.0002	mg/L	ND	ND	ND	NA	ug/L	ND
***	Dicamba	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Dinoseb	0.007	mg/L	ND	ND	ND	NA	ug/L	ND
***	Dieldrin	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Diquat	0.02	mg/L	ND	ND	ND	NA	ug/L	ND
***	Dimethoate	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Diuron	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Endothall	0.1	mg/L	NA	NA	NA	NA	ug/L	ND
	Diazinon	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Endrin	0.0002	mg/L	ND	ND	ND	NA	ug/L	ND
	Ethylene dibromide (EDB)	0.00002	mg/L	ND	ND	ND	NA	ug/L	ND
***	Glyphosate	0.7	mg/L	ND	ND	ND	NA	ug/L	ND
***	Heptachlor	0.00001	mg/L	ND	ND	ND	NA	ug/L	ND
***	Heptachlor epoxide	0.00001	mg/L	ND	ND	ND	NA	ug/L	ND
***	Lindane	0.0002	mg/L	ND	ND	ND	NA	ug/L	ND
***	Methoxychlor	0.04	mg/L	ND	ND	ND	NA	ug/L	ND
***	Molinate	0.02	mg/L	ND	ND	ND	NA	ug/L	ND
***	Oxamyl (Vydate)	0.2	mg/L	ND	ND	ND	NA	ug/L	ND
***	Pentachlorophenol	0.001	mg/L	ND	ND	ND	NA	ug/L	ND
***	Prometryn	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Picloram	0.5	mg/L	ND	ND	ND	NA	ug/L	ND
	Polychlorinated Biphenyls (PCBs)	0.0005	mg/L	ND	ND	ND	NA	ug/L	ND
	Simazine	0.004	mg/L	ND	ND	ND	NA	ug/L	ND
***	2,4,5-TP (Silvex)	0.05	mg/L	ND	ND	ND	NA	ug/L	ND
***	Thiobencarb	0.07	mg/L	ND	ND	ND	NA	ug/L	ND
	Toxaphene	0.003	mg/L	ND	ND	ND	NA	ug/L	ND

	Semi-Volatile Organic Compounds	STATE MCL	UNITS	2A	3A	4A	7A		RANGE
***	Benzo(a)-pyrene	0.0002	mg/L	NA	NA	NA	NA	ug/L	ND
***	Di(2-ethylhexyl)adipate	0.4	mg/L	NA	NA	NA	NA	ug/L	ND
***	Di(2-ethylhexyl) phthlate (DEHP)	0.004	mg/L	NA	NA	NA	NA	ug/L	ND
***	Hexachlorobenzene	0.001	mg/L	NA	NA	NA	NA	ug/L	ND
***	Hexachlorocyclopentadiene	0.05	mg/L	NA	NA	NA	NA	ug/L	NA
***	3-Hydroxycarbofuran	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Methomyl	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Metolachlor	NS	mg/L	NA	NA	NA	NA	ug/L	ND
***	Propachlor	NS	mg/L	NA	NA	NA	NA	ug/L	ND
***	2,3,7,8 - TCDD (Dioxin)	3X10-8	mg/L	NA	NA	NA	NA	ug/L	ND

Volatile Organic Compounds	STATE MCL	UNITS	2A	3A	4A	7A		RANGE
Benzene	0.001	mg/L	ND	ND	ND	NA	ug/L	ND
Carbn Tetrachloride	0.0005	mg/L	ND	ND	ND	NA	ug/L	ND
1,2-Dichlorobenzene	0.6	mg/L	ND	ND	ND	NA	ug/L	ND
1,4-Dichlorobenzene (P-DCB)	0.005	mg/L	ND	ND	ND	NA	ug/L	ND
1,1-Dichloroethane	0.005	mg/L	ND	ND	ND	NA	ug/L	ND
1,2-Dichloroethane	0.0005	mg/L	ND	ND	ND	NA	ug/L	ND
cis-1,2-Dichloroethylene	0.006	mg/L	ND	ND	ND	NA	ug/L	ND
trans-1,2-Dichloroethylene	0.01	mg/L	ND	ND	ND	NA	ug/L	ND
1,1-Dichloroethylene	0.007	mg/L	ND	ND	ND	NA	ug/L	ND
1,2-Dichloropropane	0.005	mg/L	ND	ND	ND	NA	ug/L	ND
1,3-Dichloropropene	0.0005	mg/L	ND	ND	ND	NA	ug/L	ND
Ethylbenzene	0.7	mg/L	ND	ND	ND	NA	ug/L	ND
Monochlorobenzene	0.070	mg/L	ND	ND	ND	NA	ug/L	ND
Styrene	0.1	mg/L	ND	ND	ND	NA	ug/L	ND
1,1,2,2-Tetrachloroethane	0.001	mg/L	ND	ND	ND	NA	ug/L	ND
Tetrachloroethylene	0.005	mg/L	ND	ND	1.1	NA	ug/L	ND - 1.1
1,2,4-Trichlorobenzene	0.07	mg/L	ND	ND	ND	NA	ug/L	ND
1,1,1-Trichloroethane	0.200	mg/L	ND	ND	ND	NA	ug/L	ND
1,1,2-Trichloroethane	0.005	mg/L	ND	ND	ND	NA	ug/L	ND
Trichloroethylene	0.005	mg/L	ND	ND	ND	NA	ug/L	ND
Trichlorofluoromethane (Freon 11)	0.15	mg/L	ND	ND	ND	NA	ug/L	ND
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon 113)	1.2	mg/L	ND	ND	ND	NA	ug/L	ND
Toluene	0.15	mg/L	ND	ND	ND	NA	ug/L	ND
Total Trihalomethanes	0.10	mg/L	ND	ND	50	NA	ug/L	ND - 50
Vinyl chloride	0.0005	mg/L	ND	ND	ND	NA	ug/L	ND
Total Xylenes	1.750	mg/L	ND	ND	ND	NA	ug/L	ND

	PARAMETER	STATE MCL	UNITS	2A	3A	4A	7A		RANGE
	INORGANIC CHEMICALS (mg/L)								
	Aluminum	1	mg/L	ND	ND	ND	NA	ug/L	ND
	Antimony	006	mg/L	ND	ND	ND	NA	ug/L	ND
	Arsenic	0 05	mg/L	ND	ND	ND	NA	ug/L	ND
****	Asbestos	7	MFL	NA	ND	ND	NA	MFL	ND
	Barium	1	mg/L	130	160	ND	NA	ug/L	ND - 130
	Beryllium	004	mg/L	ND	ND	ND	NA	ug/L	ND
	Cadmium	005	mg/L	ND	ND	ND	NA	ug/L	ND
	Chromium	0 05	mg/L	ND	ND	ND	NA	ug/L	ND
	Copper	1 0	mg/L	ND	ND	ND	NA	ug/L	ND
***	Cyanide	0 2	mg/L	NA	ND	008	NA	ug/L	ND - 006
**	Fluoride	1 4 - 2 4	mg/L	0 33	0 39	0 23	NA	ug/L	0 23 - 0 39
	Lead		mg/L	ND	ND	5	NA	ug/L	ND-5
	Mercury	0 002	mg/L	ND	ND	ND	NA	ug/L	ND
	Nickel	0 1	mg/L	ND	ND	ND	NA	ug/L	ND
	Nitrate (as NO3)	45	mg/L	22	21	15	NA	mg/L	15 - 22
	Nitrite (as N)	1.0	mg/L	ND	ND	ND	NA	ug/L	ND
	Total Nitrate plus Nitrite (as N)	NS	mg/L	4800	4800	3100	NA	ug/L	3100 - 4800
	Selenium	0 05	mg/L	ND	ND	ND	NA	ug/L	ND
	Silver	0 1	mg/L	ND	ND	ND	NA	ug/L	ND
	Thallium	0 002	mg/L	ND	ND	ND	NA	ug/L	ND

	Radionuclides (pCi/L) (analyzed every four years, for four consecutive quarters)								
	Gross Alpha	15	pCi/L	5 75	5 95	5.20	NA	pCi/L	5.20 - 5.95
	Gross Beta	50	pCi/L	6 40	6 24	8 90	NA	pCi/L	6.25 - 8 90
	Radium 226 (c)	5	pCi/L	1	1 1	1 90	NA	pCi/L	1.00 - 1 90
	Radium 228 (c)	5	pCi/L	2 06	2 02	4 09	NA	pCi/L	2 02 - 4 09
	Radon 222	NS	pCi/L	NA	NA	NA	NA	pCi/L	NA
	Strontium-90	8	pCi/L	NA	NA	NA	NA	pCi/L	NA
	Tritium	20,000	pCi/L	NA	NA	NA	NA	pCi/L	NA
	Uranium	20	pCi/L	1	1	1.20	NA	pCi/L	1 - 1 20

SECONDARY STANDARDS - Aesthetic Standards

	Chemical Parameters								
	Chloride (mg/L)	250 - 500	mg/L	17	25	18	NA	mg/L	17 - 25
	Corrosivity	non corrosive		0 4	0 3	0 3	NA		0.30 - 0 40
	Color (units)	15	Units	ND	ND	ND	NA	Units	ND
	Foaming Agents-MBAS (mg/L)	0 5	mg/L	ND	ND	ND	NA	mg/L	ND
	Iron (mg/L)	0 3	mg/L	ND	ND	ND	NA	mg/L	ND
	Manganese (mg/L)	0.05	mg/L	ND	ND	ND	NA	mg/L	ND
	Odor Threshold (units)	3	Units	1 00	1 00	1 00	NA	Units	1 00
	pH (units)	6.5 - 8.5	Units	7 7	7 6	7 8	NA	Units	7.6 - 7.8
	Specific Conductance	900 - 1600	uhmo/cm	490	555	450	NA	umho/cm	450 - 555
	Sulfate (mg/L)	250 - 500	mg/L	42	67	48	NA	mg/L	42 - 67
	Total Dissolved Solids (mg/L)	500 - 1,000	mg/L	310	380	290	NA	mg/L	290 - 380
	Turbidity	5	NTU	ND	ND	ND	NA	NTU	ND
	Zinc (mg/L)	5 0	mg/L	ND	ND	ND	NA	mg/L	ND

ADDITIONAL PARAMETERS

	Alkalinity (as Ca CO3)	NS	mg/L	185	185	156	NA	mg/L	156 - 185
	Bicarbonate	NS	mg/L	225	225	189	NA	mg/L	189 - 225
	Calcium (mg/L)	NS	mg/L	50	59	48	NA	mg/L	48 - 59
	Carbonate	NS	mg/L	0 73	0 58	78	NA	mg/L	0.58 - 0.78
	Hardness as CaCO3 (mg/L)	NS	mg/L	201	238	158	NA	mg/L	158 - 238
	Hydroxide	NS	mg/L	0 01	0 01	0 01	NA	mg/L	0 01
	Magnesium (mg/L)	NS	mg/L	13	22	9 3	NA	mg/L	9.3 - 22
	Potassium (mg/L)	NS	mg/L	3 9	2 7	4 4	NA	mg/L	2 7 - 4 4
	Sodium (mg/L)	NS	mg/L	23	27	33	NA	mg/L	23 - 33
****	Asbestos (d)	NS	MFL					0.10 ug/L	
	Bromobenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Bromochloromethane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Bromomethane (Methyl Bromide)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	n-Butylbenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	sec-Butylbenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	tert-Butylbenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Chloroethane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Chloromethane (methyl choride)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	2-Chlorotoluene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	4-Chlorotoluene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Dibromomethane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	1,3-Dichlorobenzene (m-DCB)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Dichlorodifluromethane	NS	mg/L	NA	ND	ND	NA	ug/L	ND
	Dichloromethane	0.005	mg/L	ND	ND	ND	NA	· ug/L	ND
	1,3-Dichloropropane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	2,2-Dichloropropane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	1,1-Dichloropropene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Hexachlorobutadiene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	Isopropylbenzene (Cumene)	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	P=isopropyltoluene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
***	Naphthalene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	n-Propylbenzene	NS	mg/L	NA	ND	ND	NA	ug/L	ND
	1,2,3-Trichlorobenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	1,2,3-Trichloropropane	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	1,2,4-Trimethylbenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND
	1,3,5-Trimethylebenzene	NS	mg/L	ND	ND	ND	NA	ug/L	ND

KEY TO ABBREVIATIONS

MCL	Maximum Contaminant Level	*	Microbiological percentages are based on amonthly average This also reflects both surface and ground water
(a) PA	Presence/Absence test used after 8/31/92	**	Fluoride Standard depends on temperature
NA	Not Anaylyzed	***	Waived by State Department of Health Services
ND	Not Detected	****	Measured in million fibers per liter (longer than 10 microns)
NS	No Standard	(b)	Samples collected quarterly from distribution system
NTU	Nephelometric Turbidity Units a measure of the suspended material in water	(c)	Standards are for Radium 226 and 228 combined
mg/L	Milligrams per liter (parts per million)	(d)	Taken from Distribution System
pCi/L	pico Curies per liter		
ug/L	Micrograms per liter (parts per billion)		*Please Note:* Test results of some parameters are stated in ug/L or micrograms per liter, 1000 Micrograms per liter equal - 1 milligram per liter or parts per million
umho /cm	Micromhos per centimeter		

DEAR WATER USER:

Every year there is increasing concern over the environment and especially the Water that is served to you, the Public.

The City of San Fernando is proud to present to you this year's annual "Water Quality Report 1994." The City has met and/or exceeds all State and Federal standards for drinking water.

As in the past, for ease of comparing the range of concentrations, we have arranged all constituents on this form showing maximum levels that exist in our water at this time.

For a comparison of our water and purchased water please see the report from Metropolitan Water District of Southern California (MWD) which is included for your review.

Under the State Health Department and Environmental Protection Agency's (EPA) mandated Lead and Copper Sampling Program, the City of San Fernando for its first monitoring period of December 1993 through June 1994, did not exceed the action levels set forth by the EPA.

The City of San Fernando supplements its water supply with water purchased from MWD. For disinfection purposes, MWD water is treated with chloramines, whereas City of San Fernando water is treated with chlorine.

This information and all water related data is open to the public and copies of earlier reports or any additional water quality can be obtained by calling:

Mr. Harold Tighe or Mr. Jose (Tony) Salazar
(818) 898-1293 or (818) 898-1294
Se Habla Español

WATER SAVING TIPS

Check your faucets. Be sure to inspect all of your faucets for leaks. A dripping faucet can significantly increase your water use and your bill.

Don't water the concrete. Make sure your sprinklers are set to water the lawn...and only the lawn.

Pick up the broom. Use a broom, not the hose, to clean driveways, patios and sidewalks.

Pack up your washing machine and fill your dishwasher. Always wash full loads of clothes and use the water-saver cycle if you have one. Your dishwasher uses more water than any other kitchen appliance, so always wash full loads.

Take shorter showers. If you shorten your shower by 2-3 minutes, you'll save 9-12 gallons of water per shower.

Install low-flow shower heads. Installing water saving shower heads, which use less than 3 gallons per minute, can greatly reduce the amount of water used during your shower.

It's a toilet, not a trash can. Don't use your toilet to dispose of facial tissue and the like that can be tossed in the trash more conservatively.

Water at the right time. To keep water from evaporating, water only when it's cool. Early morning is better than dusk, since it helps prevent the growth of fungus.

Water when necessary. Only water your lawn or garden when necessary. Try this simple test. Step on the grass before watering. If it springs back, you can wait another day.

PLEASE BE WATER WISE!

WELL 2A PRODUCES 2200 GPM TO THE CITY OF SAN FERNANDO

APPENDIX H

CRESCENTA VALLEY COUNTY WATER DISTRICT

PUMPING AND SPREADING PLAN

1994-95 Water Year

GROUNDWATER PUMPING

PLAN

WATER YEAR
OCTOBER 1, 1994 TO SEPTEMBER 30, 1995

Prepared by
CRESCENTA VALLEY COUNTY
WATER DISTRICT

MAY 1995

TABLE OF CONTENTS

TABLES

I. INTRODUCTION

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

In 1993, 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 2.4, Draft Groundwater Pumping and Spreading Plan. Since no groundwater spreading has been performed or is planned at this time by the CVCWD, only plans/projections for groundwater pumping and treatment are discussed in this report.

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

II. WATER DEMAND

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

Water demand during the last five years has been affected by drought conditions in California. The CVCWD enacted voluntary water conservation in 1990, and this resolution is still in effect. Also, an emergency water shortage ordinance is on file and the District's Board of Directors can enact its provisions at any time deemed necessary. Moderate "hard conservation" in the form of a limited number of retrofit showerheads and ultra-low flush toilet installations is currently being provided.

Projected water demands for the next five years is expected to increase only slightly (0.5%) from the 1992-93 base year. The increase is expected mainly from residential growth.

The projected water demand may vary significantly due to weather conditions, economic conditions and/or social conditions in the CVCWD service area. A variance of ±10% can be expected.

III. WATER SUPPLY

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

A. PRODUCTION WELLS

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

B. GLENWOOD NITRATE REMOVAL PLANT

The Glenwood ion exchange nitrate removal plant began operation in January 1990. The plant remained in operation until August 1992 when repairs were necessary. In May 1993 the plant was put back in operation. 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 CVCWD demand is supplied by the Pickens Gravity Tunnel. Historic and projected production from Pickens Tunnel is shown in Table 3.3.

D. MWD

The amount of treated water purchased from the MWD via FMWD is expected to decrease slightly over the next five years. Historic and projected use of MWD water is shown in Table 3.4.

IV. JUDGEMENT CONSIDERATIONS

The allowable pumping for the 1992-93 water year is 3,294 acre-feet. Estimated future pumping is expected to realize this adjudicated quantity assuming continued full operation of the Nitrate Removal Plant and relatively stable levels of Verdugo Basin Groundwater.

TABLE 2.1
HISTORIC AND PROJECTED WATER DEMAND

(Acre-Feet)

89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
4708	3968	4232	4249	4806	4422	4444	4460	4483	4511
ACTUAL					PROJECTED				

TABLE 3.1
HISTORIC AND PROJECTED COMBINED WELL
AND TUNNEL GROUNDWATER PRODUCTION

(Acre-Feet)

89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
2901	2615	2630	2555	3631	3100	3200	3294	3294	3294
ACTUAL					PROJECTED				

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

(Acre-Feet)

88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
0	604	960	847	337	1550	1320	1320	1320	1320	1320
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)

89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
47	46	49	60	67	57	57	57	57	57
ACTUAL					PROJECTED				

TABLE 3.4
HISTORIC AND PROJECTED USE OF MWD TREATED WATER

(Acre-Feet)

88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99
2618	1807	1353	1602	1694	1175	1322	1244	1166	1189	1211
ACTUAL						PROJECTED				

NOTES:

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

CRESCENTA VALLEY COUNTY WATER DISTRICT
ANNUAL WATER QUALITY REPORT 1994

PARAMETER	STATE MCL	IMPORTED (a) SURFACE WATER		LOCAL(b) GROUND WATER		COMBINED(c) DELIVERED WATER	
		Range	Average	Range	Average	Range	Average
INORGANIC CHEMICALS (mg/L) (cont'd)							
Nitrate (as N) (i)	10	0.10 - 0.43	.0.25	7.2 - 17.9	13.5	4.8 - 9.9	7.1
Nitrite (as N)	1	ND	ND	NA	NA	-	-
Total Nitrate plus Nitrite (as N)	10	0.10 - 0.43	.0.25	NA	NA	-	-
Selenium	0.05	ND - 0.002	0.001	ND	ND	ND - 0.004	0.004
Thallium	0.002	ND	ND	NA	NA	-	-
RADIONUCLIDES (pCi/L) (analyzed every four years, for four consecutive quarters)							
Gross Alpha Activity (j)	15	0.3 - 2.9	2.2	0.5 - 4.9	2.8	0.5 - 4.4	2.7
Gross Beta Activity	50	0.3 - 6.2	3.2	3.0 - 5.2	4.4	2.3 - 5.5	4.1
Radium 226 & 228 combined	5	ND	ND	NA	NA	-	-
Radon 222	NS	ND	ND	NA	NA	-	-
Strontium-90	8	ND	ND	NA	NA	-	-
Tritium	20,000	ND	ND	NA	NA	-	-
Uranium	20	ND - 5	3	NA	NA	-	-
SECONDARY STANDARDS-Aesthetic Standards							
Color (Units)	15	1 - 3	2	<3 - 15	3.7	<5	<5
Corrosivity	noncorrosive	(k)	(k)	NA	NA	-	-
Odor-Threshold (Units)	3	(l)	(l)	1 - 4	1.9	1 - 4	1.9
Groundwater Turbidity (NTU)	5	NA		0.05 - 18	3.6	0.05 - 2.5	0.38
CHEMICAL PARAMETERS (mg/L)							
Chloride (m)	250	87 - 103	95	42 - 78	65	53 - 84	73
Foaming Agents (MBAS) (n)	0.5	ND - 0.06	ND	ND	ND	ND	ND
Iron	0.3	ND	ND	ND - 4.1	0.3	ND - 3.10	0.25
Manganese	0.05	ND	ND	ND - 0.11	0.02	ND - 0.09	0.02
Silver	0.1	ND	ND	ND	ND	ND	ND
Specific Conductance (umho/cm) (m)	1600	919 - 1115	1025	540 - 800	729	635 - 879	803
Sulfate (m)	250	206 - 298	260	9 - 110	78	58 - 157	124
Total Dissolved Solids (m)	500	554 - 707	643	320 - 490	430	379 - 544	483
Zinc	5.0	ND	ND	ND - 0.24	0.07	ND - 0.19	0.07
ADDITIONAL PARAMETERS							
Alkalinity as CaCo3 (mg/L)	NS	108 - 128	118	NA	NA	-	-
Calcium (mg/L)	NS	60 - 80	70	41 - 79	66	46 - 79	67
Hardness (CaCO3) (mg/L)	NS	251 - 329	292	27 - 305	253	83 - 311	263
Heterotrophic Plate Count (CFU/mL)	NS	<1 - 1	<1	NA	NA	-	-
Magnesium (mg/L)	NS	24.5 - 31.5	28	21 - 31	28	22 - 31	28
pH (units)	6.5-8.5	8.02 - 8.11	8.06	7.6 8.2	7.9	7.7 - 8.2	7.9
Potassium (mg/L)	NS	4.2 - 6.1	4.9	2.3 - 4	3.1	3 - 5	4
Sodium (mg/L)	NS	90 - 114	102	25 - 40	33	41 - 59	50
Total Organic Carbon (mg/L)	NS	2.10 - 2.87	2.55	NA	NA	-	-
AMOUNT OF WATER DELIVERED			25%		75%		100%

KEY TO ABBREVIATIONS

MCL = Maximum Contaminant Level
NA = Not Analyzed
NS = No Standard
mg/L = milligrams per liter (parts per million)
umho/cm = micromhos per centimeter

ND = Monitored for but Not Detected
NTU = Nephelometric Turbidity Units. This is a measure of the suspended material in water
pCi/L = picoCuries per liter
< = less than

(a) = Imported water from Metropolitan Water District's F.E. Weymouth Treatment Plant. For averaging purposes, ND is considered the minimum detectable limit.
(b) = Data shown are either yearly averages or are results of latest analyses performed on groundwater source (12 wells).
(c) = Data shown are based on either actual blended analyses performed, where applicable, or are calculated results based on proportion of imported/ground water delivered.
(d) = Total coliform MCLS: No more than 5.0% of the monthly samples may be total coliform-positive. Fecal coliform/E. coli MCLS: The occurrence of 2 consecutive total coliform-positive samples, one of which contains fecal coliform/E. coli, constitutes an acute MCL violation.
(e) = Calculated on a running annual average. Compliance is based on a running annual average.
(f) = Measured in million fibers per liter (longer than 10 microns).
(g) = The State standard for lead and copper is treatment techniques requiring agencies to optimize corrosion control treatment.
(h) = State level is dependent upon temperature.
(i) = To convert the data from N to NO3 multiply by 4.43.
(j) = Negative values occur when the background count, as part of the analytical method, exceeds the count in the actual sample.
(k) = Corrosivity is measured by the Langlier Stability Index. A positive index, indicating non-corrosivity, was maintained at the plant effluents.
(l) = Metropolitan has developed a flavor-profile analysis method that can more accurately detect odor occurrences. For more information, contact Metropolitan.
(m) = Recommended level.
(n) = Data only collected on influents for imported water.
(o) =Samples collected from raw, undisinfected water

If you have any questions regarding this Report, please contact Mr. Phil McCleaf of our office at 248-3925 or write to him at the Cresecenta Valley County Water District, 2700 Foothill Boulevard, La Crescenta, CA 91214

BULK RATE
U.S. POSTAGE
PAID

This is a copy of Crescenta Valley County Water District's "Annual Water Quality Report" for 1994, prepared in accordance with State Health Department Regulations. As you will note, average concentrations of pollutants in water delivered by Crescenta Valley County Water District are below Primary Standard concentrations levels set by the State Health Department and the U.S. Environmental Protection Agency.

CRESCENTA VALLEY COUNTY WATER DISTRICT
ANNUAL WATER QUALITY REPORT 1994

PARAMETER	STATE MCL	IMPORTED (a) SURFACE WATER		LOCAL(b) GROUND WATER		COMBINED(c) DELIVERED WATER	
		Range	Average	Range	Average	Range	Average
PRIMARY STANDARDS - Mandatory Health-Related Standards							
CLARITY							
Surface Water Turbidity (NTU)	0.5	0.05 - 0.09	0.07	NA	NA	NA	NA
MICROBIOLOGICAL (d)							
Coliform Bacteria-PA (% Positive)	5.0	0.0 - 5.3	0.44	0 - 21.4 (o)	5.81 (o)	0 - 8.2	1.3
Fecal Coliform/E. coli (% Positive)	0	0	0	0	0	0	0
ORGANIC CHEMICALS (mg/L)							
Pesticides/PCBs							
Alachor	0.002	ND	ND	NA	NA	-	-
Atrazine	0.003	ND	ND	ND	ND	ND	ND
Bentazon	0.018	ND	ND	ND	ND	ND	ND
Carbofuran	0.018	ND	ND	ND	ND	ND	ND
Chlordane	0.0001	ND	ND	ND	ND	ND	ND
2,4-D	0.07	ND	ND	ND	ND	ND	ND
Dalapon	0.2	ND	ND	ND	ND	ND	ND
Dibromochloropropane (DBCP)	0.0002	ND	ND	ND	ND	ND	ND
Dinoseb	0.007	ND	ND	ND	ND	ND	ND
Diquat	0.02	ND	ND	NA	NA	-	-
Endothall	0.1	ND	ND	NA	NA	-	-
Endrin	0.002	ND	ND	ND	ND	ND	ND
Ethylene Dibromide (EDB)	0.00005	ND	ND	ND	ND	ND	ND
Glyphosate	0.7	ND	ND	ND	ND	ND	ND
Heptachlor	0.00001	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	0.00001	ND	ND	ND	ND	ND	ND
Lindane	0.0002	ND	ND	ND	ND	ND	ND
Methoxychlor	0.04	ND	ND	ND	ND	ND	ND
Molinate	0.02	ND	ND	ND	ND	ND	ND
Oxamyl	0.2	ND	ND	NA	NA	-	-
Pentachlorophenol	0.001	ND	ND	NA	NA	-	-
Picloram	0.5	ND	ND	ND	ND	ND	ND
Polychorinated Biphenyls (PCBs)	0.0005	ND	ND	ND	ND	ND	ND
Simazine	0.004	ND	ND	ND	ND	ND	ND
2,4,5-TP (Silvex)	0.05	ND	ND	ND	ND	ND	ND
Thiobencarb	0.07	ND	ND	ND	ND	ND	ND
Toxaphene	0.003	ND	ND	ND	ND	ND	ND
Semi-Volatile Organic Compounds							
Benzo(a)-pyrene	0.0002	ND	ND	ND	ND	ND	ND
Di(2-ethylhexyl) adipate	0.4	ND	ND	ND	ND	ND	ND
Di(2-ethylhexyl) phthlate	0.004	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.001	ND	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene	0.05	ND	ND	ND	ND	ND	ND
2,3,7,8-TCDD (Dioxin)	3X10-8	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds							
Benzene	0.001	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.0005	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	0.6	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	0.005	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.005	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.0005	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	0.006	ND	ND	ND - 0.001	ND	ND	ND
trans-1,2-Dichloroethylene	0.01	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.006	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.005	ND	ND	ND	ND	ND	ND
1,3-Dichloropropene	0.0005	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.7	ND	ND	ND	ND	ND	ND
Dichloromethane (methylene chloride)	.005	ND	ND	ND	ND	ND	ND
Monochlorobenzene	0.07	ND	ND	ND	ND	ND	ND
Styrene	0.1	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	0.001	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	0.005	ND	ND	ND - 0.010	0.002	ND - 0.002	0.001
1,2,4-Trichlorobenzene	0.07	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.200	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.005	ND	ND	ND	ND	ND	ND
Trichloroethylene	0.005	ND	ND	ND - 0.001	ND	ND	ND
Trichlorofluoromethane	0.15	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro - 1,2,2-trichloroethane	1.2	ND	ND	ND	ND	ND	ND
Toluene	0.15	ND	ND	ND	ND	ND	ND
Total trihalomethanes (e)	0.10	0.039 - 0.056	.049	ND - 0.009	0.002	0.025 - 0.056	0.036
Vinyl chloride	0.0005	ND	ND	ND	ND	ND	ND
Xylenes	1.750	ND	ND	ND	ND	ND	ND
INORGANIC CHEMICALS (mg/L)							
Aluminum	1	0.142 - 0.487	0.226	ND - 0.14	ND	0.11 - 0.23	0.13
Antimony	0.006	ND	ND	NA	NA	-	-
Arsenic	0.05	0.002 - 0.003	0.003	<.005	<.005	- 0.004	0.005
Asbestos (f)	7	ND	ND	NA	NA	-	-
Barium	1	0.113 - 0.137	0.125	.077 - 0.13	0.110	0.088 - 0.132	0.114
Beryllium	0.004	ND	ND	NA	NA	-	-
Cadmium	0.005	ND	ND	ND	ND	ND	ND
Copper (g)	1.0	ND - 0.016	ND	ND - 0.17	0.02	ND - 0.132	0.015
Cyanide	0.2	ND	ND	NA	NA	-	-
Fluoride(h)	1.4-2.4	0.12 - 0.31	0.22	0.13 - 0.33	0.19	0.13 - 0.33	0.20
Chromium	0.05	ND	ND	ND	ND	ND	ND
Lead (g)	0.05	ND	ND	ND - 0.008	0.004	ND - 0.006	0.003
Mercury	0.002	ND	ND	ND	ND	ND	ND
Nickel	0.1	ND	ND	NA	NA	-	-

APPENDIX I

USEPA FACT SHEET NO. 13

EPA San Fernando Valley Superfund Sites

Region IX, San Francisco, CA September 1994 Fact Sheet Number 13

EPA Continues Its Investigation And Cleanup Efforts In The San Fernando Valley

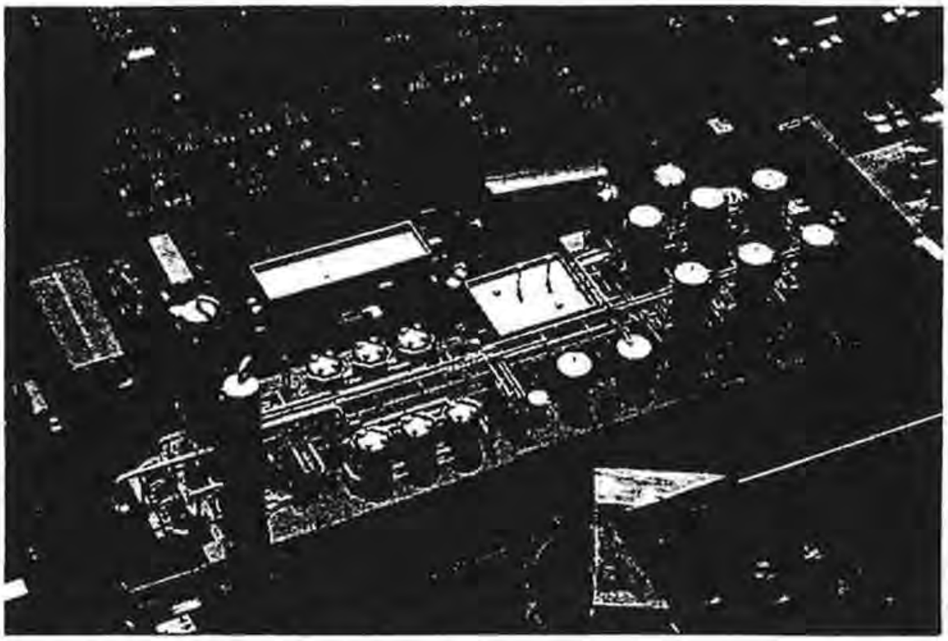


Figure 1. Burbank OU Groundwater Treatment Plant

The U.S. Environmental Protection Agency (EPA), under the Superfund program, is continuing to develop and construct individual cleanup projects addressing the most significant contamination problems in the San Fernando Valley. Through its Superfund program mandate, EPA has developed four ground water cleanup projects, called operable units (OUs), for the North Hollywood, Burbank, Glendale North and Glendale South areas. Additionally, EPA is continuing to investigate and evaluate areawide contamination of the San Fernando Valley Superfund sites. This annual update fact sheet describes the status of each of the OUs as well as progress in the overall investigation.

BURBANK OPERABLE UNIT

Background

In June 1989, EPA selected a cleanup remedy for the Burbank OU involving the extraction and cleanup of 12,000 gallons per minute (gpm) of groundwater contaminated with volatile organic compounds (VOCs). VOCs are organic compounds that evaporate readily at room temperature. In 1991, EPA reached agreement with three parties, Lockheed Corporation, Weber Aircraft and the City of Burbank to implement part of this remedy. These parties signed a Consent Decree to design and construct a treatment system and operate it for two years. Treated water will be delivered to the City of Burbank public water distribution system.

Current Status

The Burbank OU involves three phases. Lockheed Corporation, Weber Aircraft and the City of Burbank, with EPA oversight, have completed Phase I construction of the extraction and treatment facility, which employs air stripping, liquid phase granular activated carbon and vapor phase activated carbon to remove VOCs. Operation will begin upon completion of a pipeline and blending facility to be constructed under an EPA Administrative Order issued to the Aeroquip, Crane, Janco, Sargent Industries, and Ocean Technology companies, and the Antonini Family Trust. EPA projects the two facilities will be fully operational in spring 1995. Phase I involves extracting and treating 6,000 gallons per minute (gpm) of contaminated water to remove VOCs and blending the treated water with Metropolitan Water District water to meet drinking water standards for nitrate.

Burbank OU (continued)

Next Steps

The Lockheed Corporation, with EPA oversight, is designing Phase II of the project. Phase II will add 3,000 gpm of groundwater extraction and treatment capacity. When Phase II is complete, Lockheed will begin designing Phase III of the selected remedy, which involves extracting and treating another 3,000 gpm. Starting from the date when all three phases of the project are complete, the treatment facilities will operate for a period of 20 years. EPA is currently negotiating for the long term operation and maintenance of these facilities with a group of 50 potentially responsible parties (PRPs) designated by EPA in May 1994. PRPs are owners or operators of facilities determined by EPA to be potentially responsible for the contamination.

GLENDALE OPERABLE UNIT

Background

In 1989, EPA found elevated concentrations of VOCs in the groundwater of the Glendale area of the San Fernando Valley. In the spring of 1990, EPA commenced a Remedial Investigation (RI) of the Glendale area and discovered two distinct plumes of VOC contamination in the area's groundwater. These plumes are referred to as the Glendale North Plume and Glendale South Plume. EPA conducted separate feasibility studies and developed two OUs to address contamination associated with each plume.

The final remedial investigation report for both OUs was completed in January 1992. Feasability Study (FS) reports for the Glendale North and South OUs were issued in April 1992 and August 1992, respectively. On June 18, 1993, after receiving and considering public comments, EPA signed Records of Decision (RODs) for both the Glendale North and South OUs, describing EPA's selected remedies for a combined cleanup project to address the groundwater contamination in the Glendale Study Area.

Under the combined OU remedy, groundwater is to be extracted at a rate of 3,000 gpm from Glendale North and 2,000

SITE HISTORY

The San Fernando Valley Superfund site is located in the eastern portion of the San Fernando Valley, between the San Gabriel and Santa Monica Mountains. The San Fernando Valley Basin is an important source of drinking water for the Los Angeles metropolitan area, the Cities of Glendale, Burbank, and San Fernando, La Cañada- Flintridge, and the unincorporated area of La Crescenta.

In 1980, after finding organic chemical contamination in the groundwater of the San Gabriel Valley, the California Department of Health Services (DHS) requested all major groundwater users to conduct tests for the presence of certain industrial chemicals in the water they were serving. The results of testing revealed volatile organic compound (VOC) contamination in the groundwater beneath large areas of the San Fernando Valley. The primary contaminants of concern are the solvents trichloroethylene (TCE) and perchloroethylene (PCE), widely used in a variety of industries including metal plating, machinery degreasing, and dry cleaning.

TCE and PCE have been detected in a large number of production wells at levels that are above the Federal Maximum Contaminant Level (MCL), which is 5 parts per billion (ppb) for each of these VOCs. The State of California MCL is also 5 ppb for TCE and PCE. MCLs are drinking water standards. Other VOC contaminants in the San Fernando Valley have also been detected above Federal and/or State MCLs. As a result of the groundwater contamination, many production wells have been taken out of service. The water agencies of the San Fernando Valley closely monitor the quality of drinking water delivered to residents. **The water meets all federal and state requirements and is safe to drink.** Due to groundwater contamination, much of the drinking water delivered to residents is purchased from the Metropolitan Water District (MWD) of Southern California.

Nitrate, an inorganic contaminant, has also been detected in the groundwater in the San Fernando Valley, consistently at levels in excess of the MCL of 45 ppm. Nitrate contamination may be the result of past agricultural practices and/or septic system or ammonia releases.

State and local agencies acted to provide alternative water supplies and to investigate and clean up potential sources. EPA and other agencies became involved in coordinating efforts to address the large-scale contamination. In 1984, EPA proposed four sites for inclusion on the National Priorities List (NPL): North Hollywood, Crystal Springs, Pollock, and Verdugo. The original boundaries of these sites were based on drinking water wellfields that were known to be contaminated by VOCs in 1984. In 1986, the four sites were included on the NPL. EPA manages the four sites and adjacent areas where contamination has (or may have) migrated as one large site called the San Fernando Valley Superfund Site. EPA uses the perimeter of the groundwater contamination plume as the boundary for the San Fernando Valley Superfund site. This has allowed the agency to pursue a more comprehensive approach for the investigation and cleanup of the contamination. Figures 2 and 3 (pages 4-5) show the TCE and PCE groundwater contamination plumes in the San Fernando Valley.

In 1987, EPA and the Los Angeles Department of Water and Power (LADWP) signed a Cooperative Agreement providing federal funds to perform a remedial investigation (RI) of groundwater contamination in the San Fernando Valley. EPA is coordinating the large-scale effort for subsequent groundwater monitoring and the basinwide groundwater Feasibility Study (FS).

EPA is administering four operable units (OUs) within the San Fernando Valley Superfund Site to accelerate the investigation and cleanup of the study area. Each OU represents a discrete, interim containment remedy currently in progress throughout the eastern portion of the San Fernando Valley. EPA has signed Record of Decision (ROD) documents for four OUs in the San Fernando Valley: North Hollywood OU (1987), Burbank OU (1989), and Glendale North and South OUs (1993). The North Hollywood OU Interim Remedy is currently operating. The Burbank OU is in the construction phase and Glendale North and South OUs are currently in the remedial design phase. All remedial actions established by EPA in the Records of Decision issued to date are interim measures but are intended to be consistent with the overall long-term remediation of the San Fernando Valley. EPA has not yet selected a final remedy for the entire San Fernando Valley.

Glendale OU (continued)

gpm from Glendale South for 12 years. The total 5,000 gpm extracted water will be treated for VOCs using either air stripping or liquid-phase granular activated carbon. The nitrate standard will be met by blending. The treated and blended water will meet all drinking water standards and be conveyed to the City of Glendale for distribution through its public water supply system.

Current Status

In October 1993, EPA sent Special Notice letters to 34 potentially responsible parties (PRPs) in the Glendale area. Many of these PRPs responded to EPA's special notice and subsequently began negotiations to conduct the remedial design for the two Glendale OUs. EPA eventually reached agreements with 25 of the PRPs to conduct the remedial design.

Concurrently, EPA entered into discussions with the City of Glendale on a Memorandum of Agreement (MOA) which requires the city to work cooperatively with the PRPs in their remedial design efforts. The MOA is of particular importance because both Glendale OU remedies call for the city to accept the treated water.

On March 30, 1994, EPA signed an Administrative Order on Consent (AOC) with the 25 PRPs who responded to EPA's Special Notice letter. An AOC is a legal and enforceable agreement in which the PRPs agree to perform or pay the cost of site cleanup. Unlike a consent decree, an AOC does not have to be approved by a federal judge in a court of law. Under the Glendale OU AOC, the 25 parties agreed to conduct the remedial design for the two Glendale OUs and to pay for EPA's oversight of the work. EPA also signed the MOA with Glendale on March 30, 1994.

Since these documents were signed, the PRPs have started designing the combined Glendale OU remedy. The remedial design is scheduled to be completed in October 1995.

Next Steps

EPA is continuing to work on its future enforcement actions. EPA intends to issue Special Notice letters to initiate negotiations for the Remedial Action in the fall of 1994. Remedial Action is the actual construction, implementation, and operation and maintenance of the selected cleanup remedy. Construction is expected to begin in winter 1996 and will take at least one year. At the end of construction, the remedies will be operated for 12 years. Prior to the conclusion of the 12 year period, EPA will evaluate the cleanup projects and determine whether additional pumping in the Glendale North and/or Glendale South OUs will be necessary.

NORTH HOLLYWOOD OU

Background

The Los Angeles Department of Water and Power (LADWP), with EPA funding and oversight, has been operating a groundwater extraction and treatment facility to remove VOCs and inhibit migration of contamination within the North Hollywood site. An average of 1,750 gpm of groundwater is treated by the North Hollywood OU using air stripping and vapor phase activated carbon. The treated water is distributed to the public through LADWP's North Hollywood Pumping Station.

Current Status

EPA has been working to recover costs for the investigation, construction and operation of the North Hollywood OU. EPA is negotiating a consent decree for this purpose with four PRPs that have offered to settle. EPA has filed suit against six non-settling PRPs to recover the additional costs.

Next Steps

EPA anticipates reaching agreement on the consent decree by fall 1994. EPA will continue in its attempts to settle with other PRPs pending litigation.

POLLOCK STUDY AREA

Background

The Pollock Study Area is located at the southern portion of the San Fernando Valley Basin in the vicinity of LADWP's Pollock Wellfield. On April 30, 1994, EPA completed a site assessment of the Pollock Study Area. The site assessment was conducted to assist EPA in making determinations about the need and scope for future RI/FS work including the need for an OU in this area. As a result of the site assessment work, EPA determined that establishing an OU in the Pollock area is not necessary at this time because LADWP intends to conduct a pump and treat project in the Pollock Wellfield. This reactivation of the Pollock Wellfield will inhibit the migration of the contamination.

Current Status

As a result of the site assessment, EPA has decided to suspend its RI/FS activities in the Pollock Study Area for the present. Under the LADWP proposal, they will reactivate two wells in the Pollock Wellfield to extract 3,000 gpm starting in 1997. The water will be treated and conveyed to LADWP's public water supply. Preliminary groundwater modeling suggests that if pumping by LADWP from the Pollock Wellfield starts in 1997 as planned, it will capture nearly all of the contamination upgradient of the wellfield and inhibit migration of VOC-contaminated groundwater into the Los Angeles River. EPA will monitor LADWP's reactivation of the Pollock Wellfield to determine its effects on the groundwater contaminant plume, and will determine what additional actions are necessary.

Next Steps

Although EPA has determined that establishing an OU for the Pollock Study Area is not necessary at this time, EPA will continue to monitor the groundwater and will revisit the possibility of creating a Pollock OU if contamination warrants such action.

VERDUGO STUDY AREA

Background

The Verdugo NPL site includes the contaminated groundwater in and around several wellfields located in the Verdugo Basin. In April 1993, EPA completed a site assessment for the Verdugo Basin. As stated in the report entitled, *Site Assessment and Monitoring Plan for the Verdugo Basin*, perchloroethylene (PCE) continues to be the only VOC detected at or above its maximum contaminant level (MCL) of 5 ppb and in only a small number of the total wells sampled.

Current Status

In the past year, EPA has been sampling more wells in the Verdugo Basin because additional municipal and EPA monitoring wells have become accessible. As is the case with most of the wells sampled in the Verdugo Basin, VOC concentrations in these newer wells are equal to or slightly above MCLs.

Next Steps

EPA will continue to sample groundwater monitoring wells in the Verdugo Basin on a quarterly basis to monitor the quality of the groundwater and to observe any changes in the extent or level of contamination.

BASINWIDE ACTIVITIES

EPA completed a Basinwide Remedial Investigation in 1992. EPA is continuing work on its Basinwide Feasibility Study (FS), to identify, screen and analyze methods to clean up both the vadose zone (the layers of soil above the water table) and the groundwater. EPA intends to complete its Basinwide FS activities sometime in 1996.

Vadose Zone

EPA continues to work on a vadose zone FS to examine ways to protect the groundwater from contaminants in the soil that could reach the groundwater in the future. EPA has been collecting soil data from facilities overseen by the Regional Water Quality Control Board. This information is being used by EPA to estimate the quantity and extent of VOC contamination in the vadose zone. In addition, EPA is currently developing a model of VOC transport in the vadose zone as an aid in determining the fate of the VOC contaminants. As part of the vadose zone FS, EPA will review and evaluate potential cleanup alternatives for the VOC contamination in the vadose zone. Within EPA, vadose zone studies are being coordinated with work conducted on the San Gabriel Valley Superfund project in order to develop consistent cleanup standards.

Groundwater

EPA completed a Remedial Investigation (RI) report on groundwater contamination in the San Fernando Valley in December 1992. This RI work provided EPA with a better understanding of the nature and extent of VOC contamination in the groundwater of the San Fernando Valley. The figures to the right show the most current understanding of the TCE and PCE contamination. Since the RI report was completed, EPA has

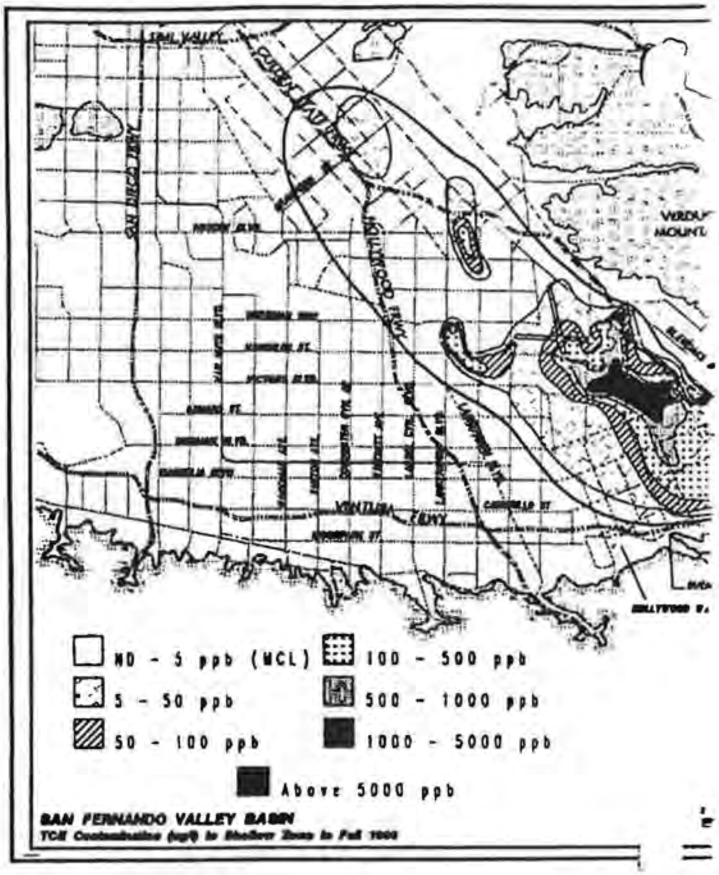
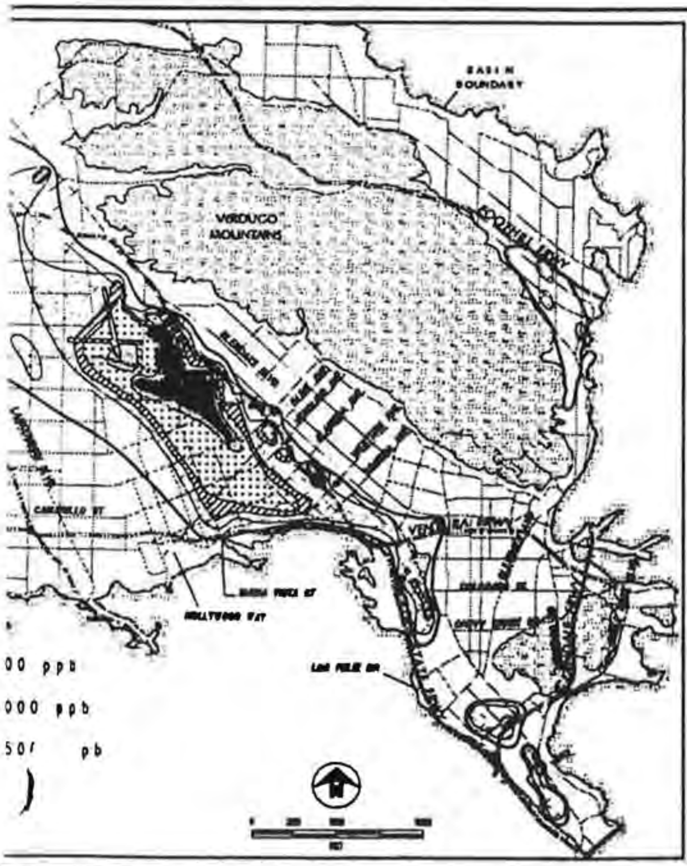


Figure 3. PCE Plume Map

Figure 2. TCE Plume Map



Basinwide Groundwater (Continued)

continued to conduct a large quarterly groundwater monitoring program for the San Fernando Valley Superfund project. This program includes sampling of approximately 500 wells, 87 of which were installed by EPA as part of the Basinwide Groundwater RI. Monitoring reports and contamination plume maps are produced semi-annually.

EPA continues to work on its Basinwide Groundwater Feasibility Study, including preparation of technical memoranda on water rights and water management in the San Fernando Valley and recalibration and verification of the basinwide groundwater flow model. EPA's newly recalibrated groundwater flow model provides a more realistic representation of the hydrogeology and changing groundwater conditions of the San Fernando Valley than was achieved by previous models.

Currently, EPA is conducting an evaluation of the effectiveness of the OU projects. These evaluations should be completed by fall 1994. EPA is also reviewing and evaluating additional potential groundwater remediation options for the basin including regional pump and treat, well-head treatment and innovative technologies. EPA will then make a determination as to whether or not additional OUs are necessary.

WHAT IS SUPERFUND?

Superfund is the commonly-used name for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a federal law enacted in 1980 and amended in 1986. CERCLA enables EPA to respond to hazardous sites that threaten public health and the environment where owners or operators are either unwilling or unable to address the contamination themselves.

Two major steps in the Superfund process are to conduct an in-depth investigation of a site (called a Remedial Investigation) and evaluate possible cleanup alternatives (the Feasibility Study). During the Remedial Investigation, information is gathered to determine the general nature, extent, and sources of contamination at a site. Using the alternatives developed during the Feasibility Study, EPA selects a preferred cleanup alternative considering the following criteria: (1) overall protection of human health and the environment; (2) compliance with federal and more stringent state laws; (3) long-term effectiveness; (4) reduction of potency of the contamination (toxicity), ability of the contaminants to move through the environment (mobility), and the amount of contamination (volume); (5) cost; (6) short-term effectiveness; (7) how easily an alternative can be applied (implementability); (8) state acceptance; and (9) community acceptance.

Once the final cleanup plan has been selected, EPA formalizes this decision by signing a Record of Decision (ROD). The ROD also contains a Responsiveness Summary, EPA's response to public comments. Design and actual cleanup activities (Remedial Design and Remedial Action) can then proceed.

OU or Study Area	Site Discovery	NPL Ranking and Listing	Remedial Investigation (RI)	Feasibility Study (FS)	Public Comment Period	Record of Decision (ROD)	Remedial Design (RD)	Remedial Action (RA)
North Hollywood OU	In 1980, contaminated groundwater was discovered by San Fernando Valley Water purveyors through testing mandated by the State of California Department of Health Services.	In 1984, four sites within the San Fernando groundwater basin were proposed for inclusion on the National Priorities List (NPL), because of VOC contamination in municipal wellfields. EPA added the four sites to the NPL in 1986.	LADWP completed RI/FS activities for the North Hollywood OU in November, 1986.			EPA signed the Record of Decision in September 1987.	The RD phase lasted from 1987 to 1989.	Construction of the extraction and treatment facility was completed in early 1989. 24-hour operation began in December 1989.
Burbank OU			EPA issued this RI report as part of the October 1988 OU Feasibility Study.	EPA released the FS for the Burbank OU in October 1988. The cleanup remedy involved extracting and treating the contaminated groundwater.	EPA had a public comment period from October to December 1988 for its Proposed Plan for the Burbank OU.	EPA signed a ROD in June 1989 for extraction and treatment of 12,000 gpm of contaminated water. EPA issued an Explanation of Significant Differences in December 1990 for blending to reduce nitrate contamination.	The RD is being conducted by PRPs under a Consent Decree and an EPA order signed in 1991. The Phase I RD was completed in November 1993 and the Phase II RD is currently underway.	The Phase I extraction well field and treatment facility were completed in March 1994. Phase I will not be fully operational until [illegible] expected by spring 1995.
Glendale North OU			EPA issued the RI report for the Glendale Study Area in January 1992.	EPA issued this Feasibility Study in April 1992. The selected remedy involves treating groundwater in the shallow aquifer in the Glendale North OU.	A public comment period on EPA's preferred alternative was held from July to September 1992. A public hearing was held on July 23, 1992.	EPA signed Records of Decision for both Glendale North and South OUs on June 18, 1993. The treatment facilities for both OUs will be combined at a single location in the Glendale North OU area. Extraction rates will be 3,000 gpm for Glendale North and 2,000 for Glendale South.	EPA signed an Administrative Order on Consent in March 1994 with 25 PRPs to conduct the remedial design for the Glendale OUs.	EPA intends to issue Special Notice letters for the Remedial Action in the fall of 1994 to conduct negotiations with PRPs to construct, operate, and maintain the combined remedies for the two Glendale OUs.
Glendale South OU				EPA issued this Feasibility Study in August 1992. The selected remedy involves groundwater extraction and treatment.	EPA held a public comment period from October 1992 to January 1993 on the preferred alternative for this OU. A public hearing was held on October 21, 1992.			
Pollock Study			EPA completed its site assessment in April 1994 and determined that an OU is not necessary for the Pollock Study Area at this time. LADWP intends to reactivate pumping at the Pollock Wellfield in 1997 at an [illegible] rate of 3,000 gpm.					
Basinwide Study			EPA issued the Basinwide Groundwater RI Report in December 1992.	EPA is continuing to work on the Basinwide Groundwater and Vadose Zone Feasibility Studies.				

Completed — Current or To Be Completed

Where the OUs Are Within the Superfund Process

WHO'S INVOLVED

The San Fernando Superfund project is large and complex, requiring many agencies to work together. EPA is coordinating efforts to address groundwater contamination in the San Fernando Valley Basin. Representatives from the agencies listed below meet quarterly as the Management Committee for the San Fernando Valley Superfund Sites to address water supply management and RI/FS-related technical issues on both an OU and Basinwide scale.

[illegible]

The U.S. Environmental Protection Agency has overall responsibility for cleanup and enforcement efforts at the San Fernando Valley Superfund Sites. EPA is responsible for groundwater and vadose zone feasibility studies, community relations activities and enforcement efforts. EPA is also responsible for the quarterly groundwater monitoring program.

[illegible]

The California EPA (formerly called the Department of Health Services) is the state agency responsible for protecting the health and welfare of California residents. It requires regular testing of drinking water and has established state standards for more than 50 potential contaminants. Through its Department of Toxic Subtances Control, Cal-EPA also enforces state hazardous waste cleanup requirements and oversees potential source sites. Cal-EPA also reviews EPA documents and provides input to ensure compliance with state regulations. Cal-EPA is the coordinating agency for the state and is also involved in cleanup of sites around and within the San Fernando Valley.

Regional Board

The Regional Water Quality Control Board, Los Angeles Region, is responsible for the protection of surface and groundwater for the State of California. The Regional Board investigates facilities which use, store, or handle chemicals. When contamination is found, the Regional Board requires and oversees site cleanup. Through a cooperative agreement, EPA provides the Regional Board with funds to investigate potential sources of groundwater contamination in the San Fernando Valley.

LADWP

The Los Angeles Department of Water and Power has overall responsibility for water supply in the City of Los Angeles. It is required to provide water to its customers which meets state and federal drinking water standards. LADWP was responsible for a number of tasks under a cooperative agreement with EPA originally signed in 1987. LADWP completed the Phase 1 Basinwide Groundwater RI (December 1992) and feasibility studies for the North Hollywood OU (1986), Burbank OU (1989), Glendale North OU (April 1992) and Glendale South OU (August 1992).

Now that the basinwide groundwater RI report is final, LADWP's direct role in the overall project has decreased significantly. LADWP's continuing involvement includes preparation of cost documentation to support EPA enforcement/cost recovery actions, and coordination and consultation with EPA about the Pollock Study Area, and basinwide water management issues pertinent to remedial actions. In addition, LADWP continues to operate and maintain the North Hollywood OU treatment facility.

Burbank and Glendale

The Cities of Burbank and Glendale each provide drinking water to their residents through local municipal utilities. As water providers, each city must test water regularly and ensure that water supplies meet federal and state standards. Both cities have been closely involved in the Superfund studies. The City of Burbank is a signatory to the Consent Decree for the Burbank OU and the City of Glendale may be a signatory to a Consent Decree or Memorandum of Agreement for the Glendale OUs.

ULARA Watermaster

The Upper Los Angeles River Area (ULARA) Watermaster, appointed by the Los Angeles Superior Court, oversees and documents all actions that affect groundwater supply in the basin such as annual rainfall, import and export of water to other areas, and pumping of groundwater for both water supply and remediation purposes. The Watermaster is working with EPA, the Regional Board, and water purveyors to address groundwater management issues in the San Fernando Valley.

MAILING LIST COUPON

If you did not receive this fact sheet by mail and would like to be included on the mailing list for the San Fernando Valley Superfund project, please fill out this coupon and return it to the EPA Office of Community Relations.

Name: ____________________

Address: ____________________

____

Telephone: ____________________

Affiliation (if any):

Return to: Office of Community Relations, U.S. EPA, 75 Hawthorne Street (H-1-1), San Francisco, CA 94105

San Fernando Valley Information Repositories

EPA maintains information repositories at the following locations containing fact sheets, technical documents, the Remedial Investigation/Feasibility Study documents, the Community Relations Plan, the Records of Decision, and other reference materials. Many of the documents are available on microfilm instead of, or as well as, on hardcopy. If documents are not available, contact Fraser Felter, Community Relations Coordinator, at (415) 744-2181.

City of Burbank Public Library
110 North Glenoaks Boulevard
Burbank, CA 91502
(818) 953-9741
Contact: Andrea Anzalone
Hours: M–Th 9:30 am–9:00 pm
F 9:30 am–6:00 pm
Sat 10:00 am–6:00 pm

California State University Northridge Library
18111 Nordhoff Street
Northridge, CA 91330
(818) 885-2285
Contact: Mary Finley
Hours: M–Th 8:00 am–10:00 pm
F 8:00 am–5:00 pm
Sat 9:00 am–5:00 pm

City of Glendale Public Library
222 East Harvard Street
Glendale, CA 91205
(818) 548-2021
Contact: Lois Brown
Hours: M–Th10:00 am–8:55 pm
F–Sat 10:00 am–5:55 pm

Los Angeles Department of Water and Power
(LADWP) Library
111 North Hope Street, Room 518
Los Angeles, CA 90012
(213) 481-4612
Contact: Joyce Purcell
Hours: M–F 7:30 am–5:30 pm

The University Research Library/U.C.L.A.
Public Affairs Service
405 Hilgard Avenue
Los Angeles, CA 90024
(310) 825-3135
Contact: Barbara Silvernail
Hours: M–F 10:00 am–7:00 pm
Sat 1:00 pm–5:00 pm

For Further Information

about the Basinwide investigation and specific cleanup efforts, contact:

Ned Black/Project Manager
U.S. EPA, Region IX
75 Hawthorne Street (H-6-4)
San Francisco, CA 94105
(415) 744-2253
FAX: (415) 744-2180

Fraser Felter/Community Relations Coordinator
U.S. EPA, Region IX
75 Hawthorne Street (H-1-1)
San Francisco, CA 94105
(415) 744-2181 or
(800) 231-3075

United States Environmental Protection Agency
Region 9
75 Hawthorne Street (H-1-1)
San Francisco, CA 94105
Attn: Fraser Felter

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INSIDE: STATUS OF ACTIVITIES AT THE SAN FERNANDO VALLEY SUPERFUND SITES

APPENDIX J

GROUNDWATER REMEDIATION PROJECTS

Ground Water Remediation Projects

During the 1993-94 Water Year, several ground water contamination investigations were performed at various sites. As part of these investigations ground water monitoring wells have been drilled and ground water has been extracted for the purpose of well development, testing or cleanup. Some of the major sites and their activities through March 1995 are summarized below:

Philips Components

Groundwater remediation, which involves extraction, air-stripping, and reinjection through a trench was started in July 1988. The main contaminant in Methylene Chloride (MEC) which has been found only in Extraction Well (EW-1), and in a nearby monitoring well (MW-19). Concentrations of MEC have decreased by two orders of magnitude since July 1988. During 1993-94, 55 acre-feet were pumped, treated and reinjected. The TCE and PCE present in most of the monitoring wells is believed to originate off-site, to the north. A soil-vapor extraction system was started in 1994 but has since been shut down due to the absence of MEC in the air stream. Five soil samples showed similar results. Phillips has petitioned the Regional Board for removal of the system.

Rockwell-Rocketdyne (Canoga Park)

Contaminants include chloroform TCE, PCE, 1,1-DCE, TCA and Freon 113. There are also free-floating hydrocarbons derived from several upgradient service stations. There are 85 monitor wells-65 in the shallow zone, 14 in the upper zone, and 6 in the lower zone. Additionally there are another 31 monitoring wells near the four upgradient service stations. Nine extraction wells feed a treatment facility in the southeast portion of the property. During the 1993-94 Water Year, about 343 acre-feet were pumped. An interim liquid phase granular activated carbon system was replaced by an air-stripping system with vapor phase GAC, which commenced operation during February 1994, following delays caused by the Northridge earthquake (January 1994). The treated water is discharged under an NPDES permit to a storm drain, and thence to the Los Angeles River, which is monitored both upstream and downstream from the storm drain confluence. During September 1994 two additional monitoring wells were installed-one in the upper zone (U-16) and one in the lower zone (L-7).

3M (Formerly Riker Lab)

The main pollutant is chloroform. There ~~as~~ has been a groundwater extraction and treatment system since 1988. REW-1 and REW-2 pump from the shallow zone and RMW-1 from the lower water-bearing zone. There are numerous monitor wells on the property, and off-site to the south.

Treatment is by three GAC columns in series, thence to an on-site holding tank, Water is used on-site for cooling towers as make-up water. The demand for this purpose determines ~~drives~~ the amount pumped. During 1993-94 Water Year the amount pumped was 16 acre-feet Treated water not used on-site was to be discharged to the Los Angeles River under an NPDES permit, but high nitrates created a problem with this proposal. The problem has now been resolved and start-up is expected in late 1995. A soil vapor extraction system has been installed and start-up is scheduled for the second quarter 1995.

Allied-Signal (Formerly Bendix Corp.)

The only VOC that was detected above 5µg/l was TCE in three of the ten monitor wells. Nitrates are in the range of 27-76mg/l. There is no remediation system. Allied-Signal was named a potentially responsible party (PRP) by the EPA in the Burbank OU. Allied-Signal is currently investigating the possibility of Los Angeles' pumping in the North Hollywood wellfield drawing additional contamination under their property.

Hughes (Canoga Park)

The most prominent contaminant is 1,1-DCE with lesser amounts of TCE, PCE, TCA, and 1,1-DCA. Petroleum compounds (BTEX) are found in the northwest area (buildings 269 and 270). Thirty-five monitor wells were sampled on March 7-8 ~~195~~ 1995. Final testing of the air-sparging/vapor extraction system was delayed due to the Northridge earthquake but full system operation is expected in May 1995. An application was made to the Regional Board on May 24, 1995, to discharge the effluent from the treatment system, but the TDS is in excess of the Basin Plan objectives, even though the origin of the high TDS is related to the naturally occurring groundwaters. Instead of being discharged to the Los Angeles River, the treatment plant effluent will be stored in holding tanks, and used for on-site irrigation. The treated water will supply about half the water required for landscaping.

Greeff Fabrics (Formerly Wickes)

The main contaminant from an on-site source is chlorotoluene. Other plumes from off-site sources are mostly TCE, PCE, and PCA. There are three extraction wells. The pumped water is treated by chemical oxidation and returned to the groundwater via a percolation trench. There is also a vapor extraction system which has been operating satisfactorily. Twenty test holes have been proposed to evaluate plume migration.

Taylor Yard (Narrows Area)

The remediation of the Taylor Yard of the Southern Pacific Transportation Company is under the jurisdiction of the Department of Toxic Substances Control (DTSC) of the California Environmental Protection Agency (Cal-EPA). To expedite the remediation the Taylor Yard has been divided in two parts-active yard and sale parcel. Remediation activities to the present time have involved mainly soils on the sale parcel. Many shallow soils have been found to be contaminated with petroleum hydrocarbons and with lead. These have been handled in two ways. Some have been stockpiled; others have been treated in-situ. The stockpiled soils have been rendered non-hazardous by chemical fixation technology and to reduce the potential for leaching so that these treated soils can meet the Regional Board requirements for use as a daily cover on class III landfills. Similar chemical fixation procedures were used in-situ to accomplish similar objectives without excavation of the soils. Remediation of the sale parcel has been completed. The groundwater investigation is in its early stages. Its primary focus is to assess the lateral distribution of VOC s and petroleum hydrocarbons from possible off-site and on-site sources at specific areas where sufficient data were not previously available. Nineteen monitoring wells were installed previously, and four additional wells were installed recently. The first quarterly monitoring report for these wells was for the fourth quarter of 1994. This monitoring is done in conjunction with monitoring of wells drilled for the Pollock Superfund site. Two areas of contamination have been recognized. In the northern part of the Taylor yard is a plume of VOC s coming from the north. LADWP's Pollock well project will be controlling this plume and removing VOC s (primarily TCE and PCE). Along the northeastern part of Taylor Yard are areas that show high VOC s (mainly TCE and PCE) in the groundwater. The sources of these VOC s appear to be two industries immediately adjacent to the northeast boundary, along San Fernando Road. Along this northeast boundary a vapor extraction system was operated continuously from August 25 to November 15, 1994 in the area close to the Weiand Automotive property. A portion of the vapor extraction system close to the Profile Plastics property was taken out of service because soil samples taken in August indicated that soil remediation in that area had been completed. However, one monitor well in that area shows high PCE.

The field investigation report will consist of four phases:
Phase 1: Initiation of groundwater monitoring
Phase 2: Vapor probe survey
Phase 3: Hydro punch and soil boring
Phase 4: Focused groundwater investigation

The aquitard inferred to exist by earlier investigators was not found during this investigation. The entire thickness of alluvium in this portion of the Narrows has free hydraulic communication.

APPENDIX K

EFFECTS OF ABOVE-AVERAGE PUMPING IN THE SAN FERNANDO BASIN

8701141
1/95

MEMORANDUM

ORIGINAL SIGNED BY
DUANE D. BUCHHOLZ

WATER ENGINEERING DESIGN DIVISION

MEMO BY Duane D. Buchholz TO Laurent McReynolds DATE July 20, 1995

FILE TITLE Effects of Above-Average Pumping in the San Fernando Basin (SFB)

The Groundwater Group of the Water Engineering Design Division has completed its analysis of the effects of above-average pumping in the SFB and is presenting the findings in the attached report entitled, "The Effects of Above-Average Pumping in the San Fernando Basin".

The analysis was prompted by discussion held during the annual water supply symposium meeting. An issue was raised whether the Water System's facilities are capable of pumping Los Angeles's annual adjudicated groundwater rights plus its SFB stored water credits. As of October 1, 1994, 265,983 acre-feet (AF) of water has been cumulatively stored in the SFB and credited to the City of Los Angeles.

In summary, the analysis shows that the current Water System facilities can physically pump 250,000 AF over a two-year period without a major loss in well field productivity due to reduced water levels in the SFB. This amount of pumping is approximately 64 percent more than the historical average. Groundwater model simulations and field data are presented to support the findings. The Upper Los Angeles River Area Watermaster (Watermaster) has also reviewed the analysis and concurs with the findings.

RAN:ww

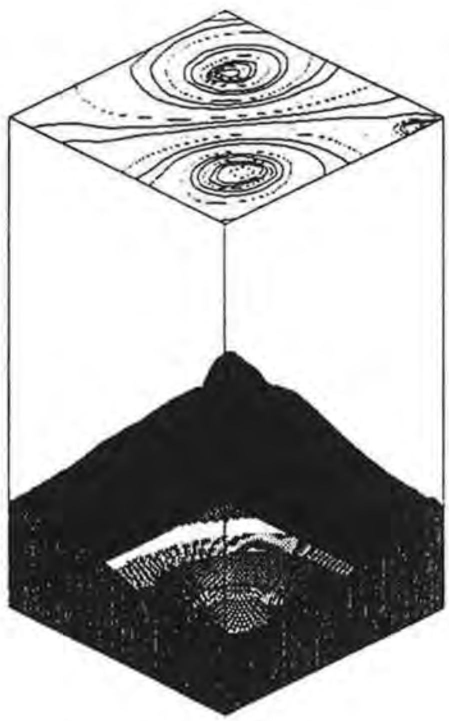
Attachment

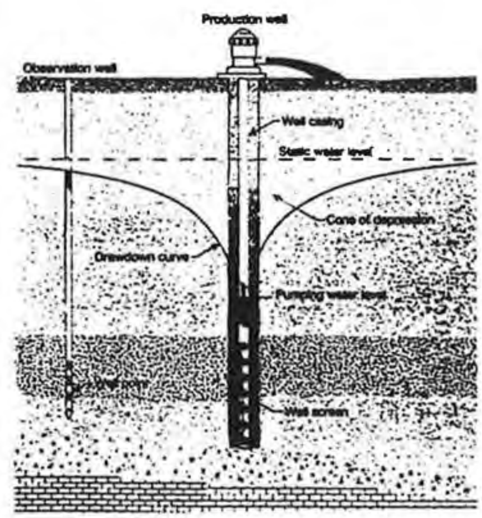
c: Melvin L. Blevins
Watermaster w/encl.(2)
Dr. John Mann w/encl.
James F. Wickser/
Norman L. Buehring w/encl.
Gerald A. Gewe w/encl.
Hoover H. Ng
Scott F. Munson w/encl.
Martin L. Adams
Henry R. Venegas w/encl.
Peter Kavounas w/encl.
Bruce W. Kuebler w/encl.
John D. Miller
Gary F. Stolarik
Duane D. Buchholz/
Robert Y. Yoshimura
Ernest F. Wong
Hadi S. Jonny
Tina C. Wilson
Andy J. V. Agra
Richard A. Nagel

Groundwater Quality
Water Operating Division

702-EFFECTS.DOC

The Effects of Above-Average Pumping in the San Fernando Basin





JULY 1995

PREPARED BY:
Groundwater Group
Water Engineering Design Division
Los Angeles Deparment of Water and Power

K-2

Effects of Above-Average Pumping in the San Fernando Basin

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FIGURES AND TABLES LIST

FIGURE NO. & NAME **FOLLOWED BY**

TABLE NO. & NAME **FOLLOWED BY**

Effects of Above-Average Pumping in the San Fernando Basin

EXECUTIVE SUMMARY

Based on the analysis presented in this report, up to 150,000 AF of groundwater from the San Fernando Basin (SFB) (200 percent of the historical average) could be extracted this year with the Water System's current facilities. This statement is based on 100,000 AF of pumping from the Tujunga (TJ) and Rinaldi-Toluca (R-T) Well Fields, 33,000 AF from the North Hollywood (NH) Well Field and the remainder from the River Supply Conduit (RSC) and other SFB wells. The recharge conditions for the 1994-95 water year were assumed to be above-average, similar to the conditions experienced during the 1992-93 water year. Annual groundwater pumping in the SFB has averaged approximately 76,000 AF.

The analysis also shows that in a second year following the heavy pumping, it is possible to extract approximately 100,000 AF even with the assumption that the second year would experience below-average recharge conditions. Approximately 61,000 AF of extractions would originate from the TJ and R-T Well Fields, 24,000 AF from NH, and the remainder from the RSC and other wells.

Monthly water level data from seven monitoring wells that cover the north end of the SFB (TJ Well Field) to the southeastern end, the Los Angeles Narrows (Pollock Well Field), support the model simulations and provide benchmark conditions for groundwater level response under both high and low recharge and discharge conditions. Simulations also show that under the assumed two-year scenario, horizontal contaminant plume migration would not significantly affect the cleaner areas of the SFB.

I. Introduction

The Groundwater Remediation Group was requested to analyze the effects on the SFB in response to pumping groundwater in excess of Los Angeles's annual adjudicated groundwater rights. This analysis is to address the concern of possible limitations to the Water System's ability to physically pump its stored water credits with its existing well facilities. The analysis was accomplished by producing computer simulations of specified pumping conditions in the SFB using the SFB Groundwater Flow Model. Existing groundwater level data were also analyzed to assess the groundwater level response from actual discharge and recharge events. The three areas of analysis were the effects of above-average groundwater pumping in a single year, the effect of above-average pumping in consecutive years, and groundwater level responses to basin recharge and discharge activities.

II. Background

1. SFB Recharge and Discharge

Recharge in the SFB is derived from by precipitation falling on the hill and mountain areas, and valley floor areas, native and imported water spread in local spreading basins, and return flow (recharge) from water delivered to the SFB which is used for domestic, industrial, and agricultural uses.

Groundwater discharges from the SFB occur through well pumping activities (including groundwater cleanup), rising groundwater discharging into unlined portions of the Los Angeles River, dewatering projects, and groundwater discharging at the outlet of the basin (both rising groundwater and underflow).

2. *Groundwater Pumping Rights*

Los Angeles's annual adjudicated groundwater pumping rights were established in 1979 by the California Superior Court (referred to as the San Fernando Judgment). The Court ruled that Los Angeles's water rights consists of the following elements: the native safe yield of the SFB of 43,660 acre-feet/year (AF/yr) (Los Angeles's Pueblo Water Right), plus 20.8 percent credit of all imported water delivered to the valley fill within the SFB, and, credit for any imported or reclaimed water spread and stored within the SFB. Historically, since the water year 1978-79, the sum of these has averaged about 90,000 AF/yr, while groundwater pumping over this same period of time (17 years) has averaged about 76,000 AF/yr. The difference between the actual pumping and the adjudicated rights accounts for Los Angeles's current stored water credit of 265,943 AF (as of October 1, 1994).

III. Groundwater Level Responses

The groundwater levels rise and fall in response to the SFB's recharge and discharge conditions, and the magnitude, timing, and location of those events.

Recharge from precipitation falling on the valley floor and runoff captured and spread in local spreading basins usually occurs during the rainfall season - November through April.

Since the water year 1968-69, rainfall on the valley floor has averaged 18.32 inches/year. During the past five years (1990-91 through 1994-95), rainfall has been approximately 9 percent above this average at 19.95 inches/year. SFB recharge from spreading activities has averaged 34,600 AF/yr with 9,400 AF/yr coming from imported water supplies. The water year 1982-83 constituted the highest spreading year, 102,925 AF (70,678 native and 32,247 imported) and 1989-90 the lowest, 4,154 AF (100 percent native water).

Los Angeles SFB groundwater extractions (discharges) have averaged 76,000 AF/yr since 1968. The highest extractions on record occurred in 1988-89, 126,630 AF, and the least amount of pumping occurred in 1992-93, 34,973 AF.

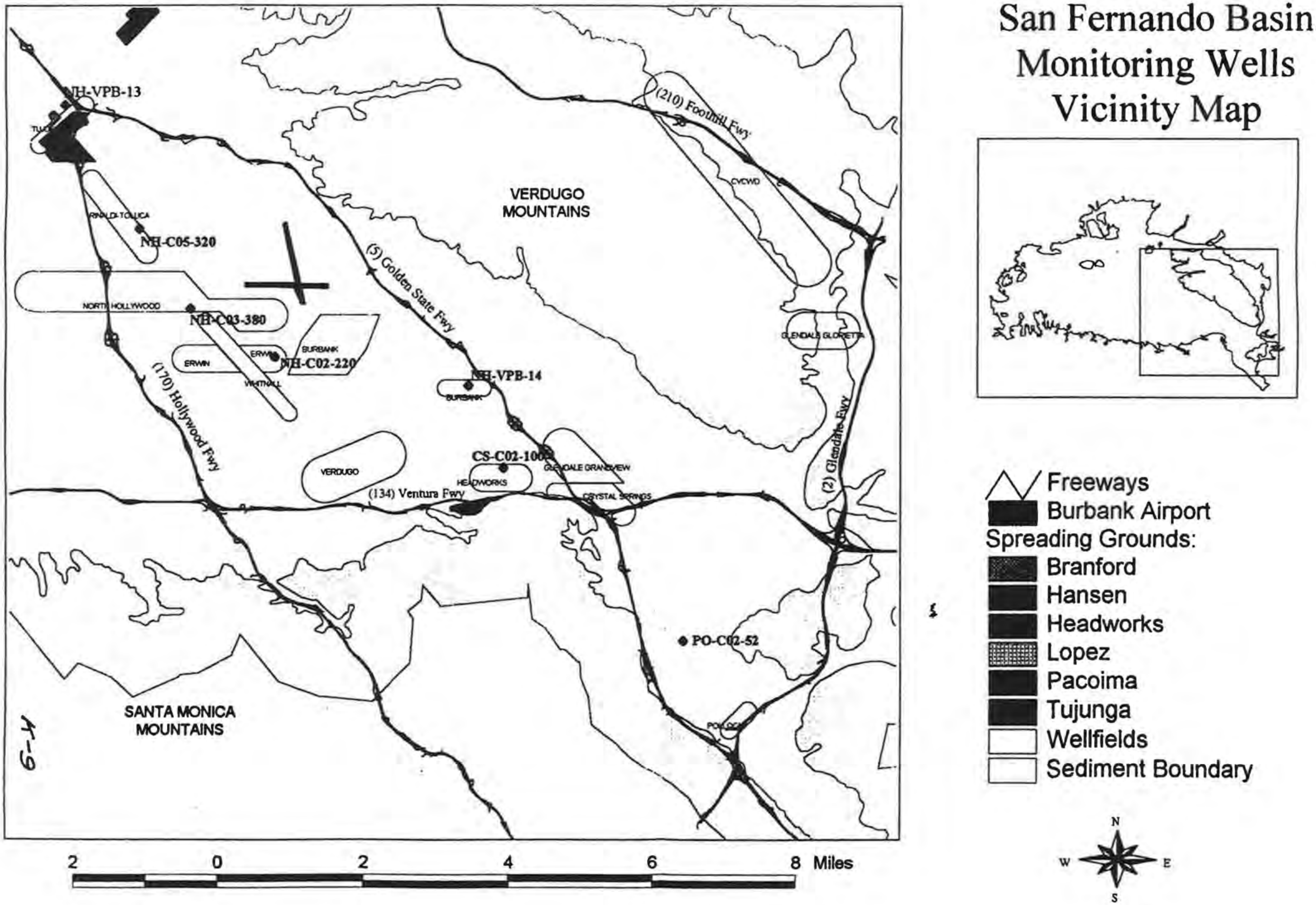
Monthly groundwater level data have been collected from numerous monitoring wells since their construction for the SFB Remedial Investigation (RI) in the early 1990s. Selected monitoring wells in the SFB provide representative groundwater elevation (GWE) data for the Water System's well fields (Figure 1). Figures 2-8 represent hydrographs of each well. The hydrographs contain monthly groundwater elevation and pumping data. The NH area extractions include the Burbank, Erwin, NH, R-T, TJ, and Whitnall Well Fields. The total SFB pumping includes the above pumping plus the Crystal Springs (CS), Headworks (HW), Pollock (PO), and Verdugo Well Field extractions.

1. NH-VPB-13 (Figure 2 - Tujunga Well Field)

NH-VPB-13 is located approximately one mile north of the TJ Well Field. This hydrograph illustrates typical water table fluctuations near a major pumping center. Inspection of this graph shows that the greatest rise in the water table occurred between the Fall 1992 and the Winter 1993 when it rose from an elevation of 498.2 to an elevation of 539.6 feet, an increase of 41.4 feet. The year preceding the Fall of 1992 was an average pumping period, followed by a below-average pumping period up until the Winter of 1993. It is of

Figure 1

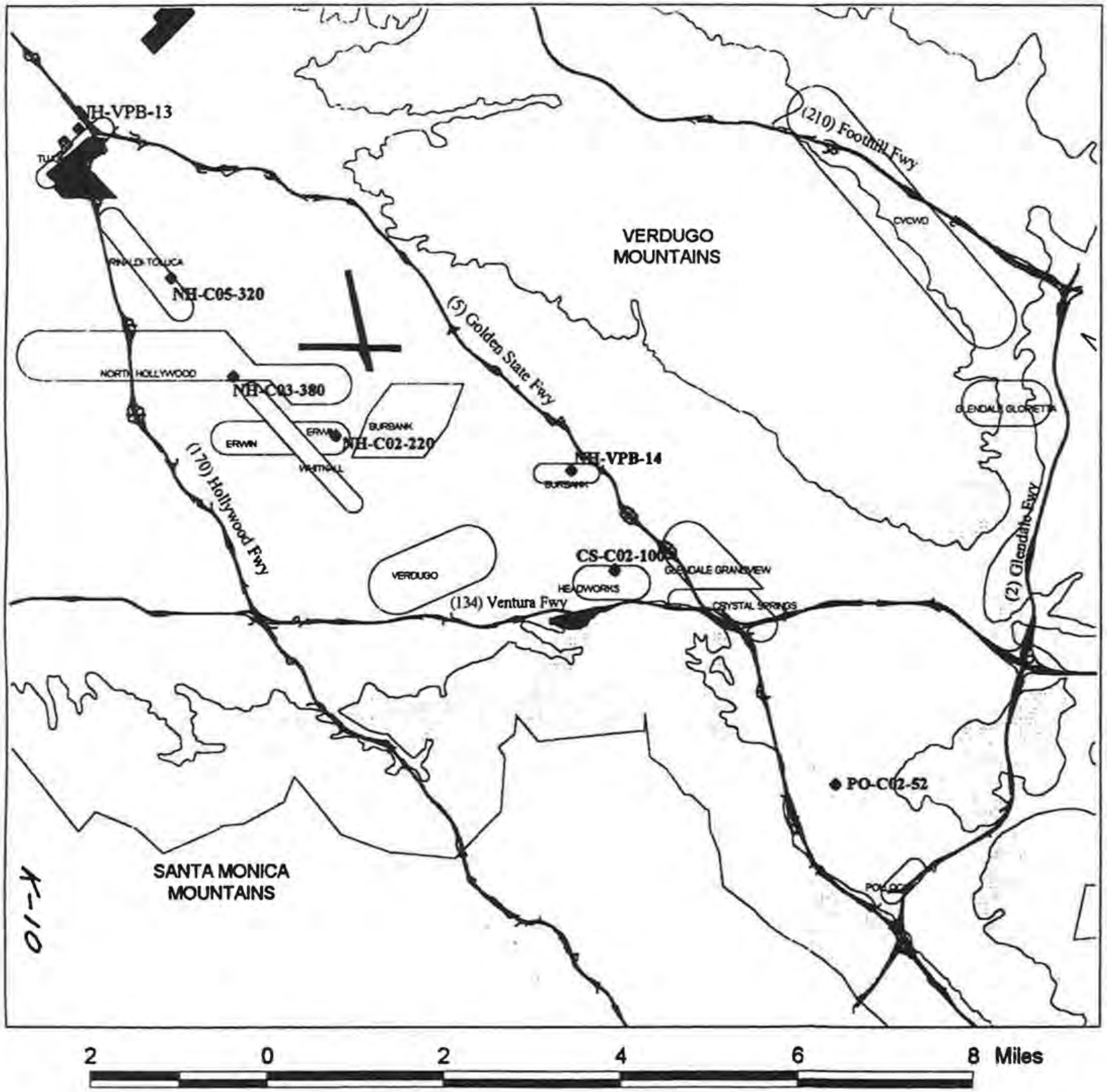
San Fernando Basin Monitoring Wells Vicinity Map



A-9

Figure 1

San Fernando Basin Monitoring Wells Vicinity Map



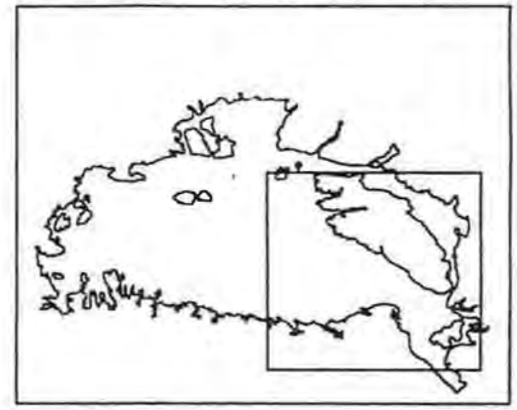


Figure 1

San Fernando Basin Monitoring Wells Vicinity Map

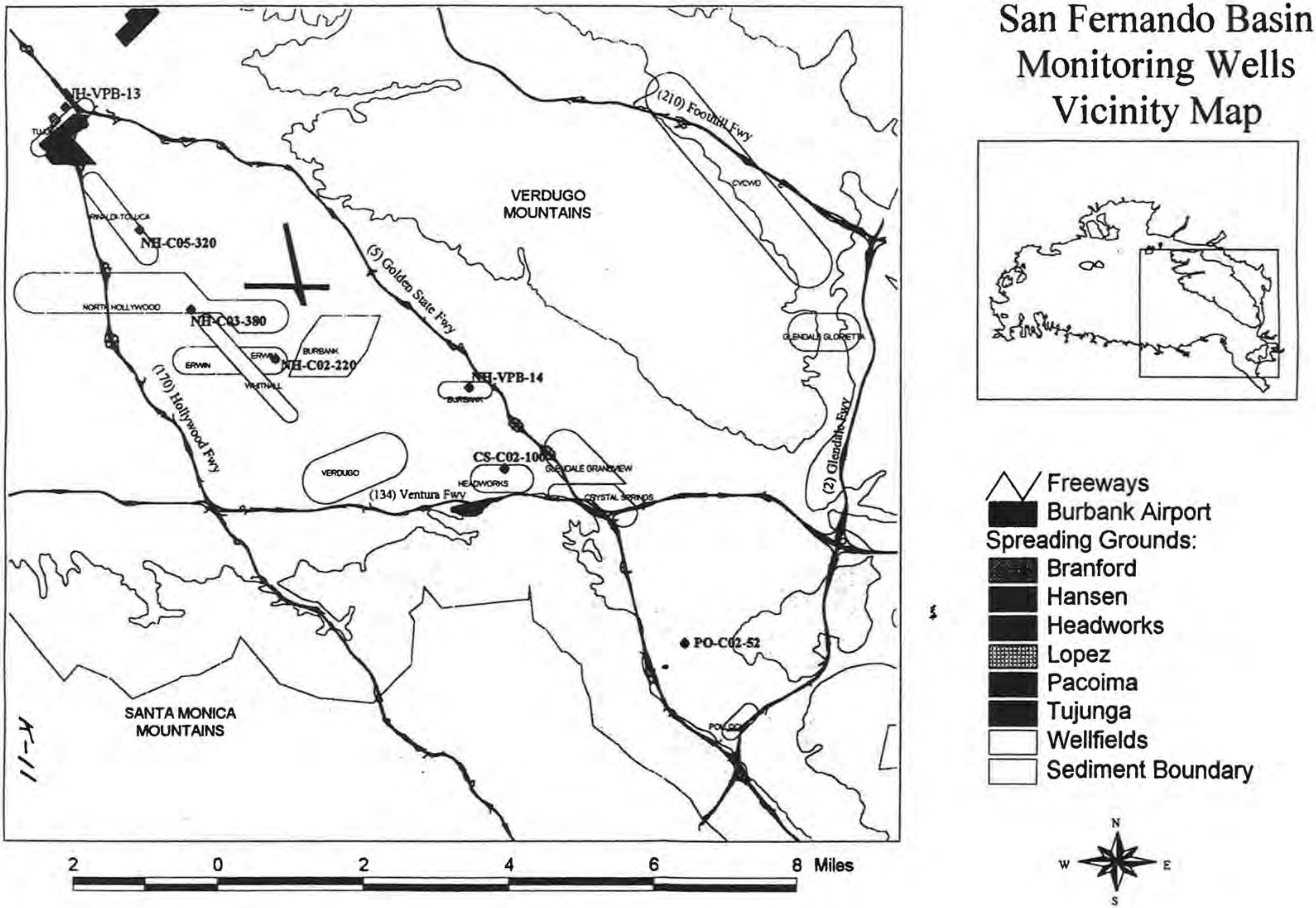
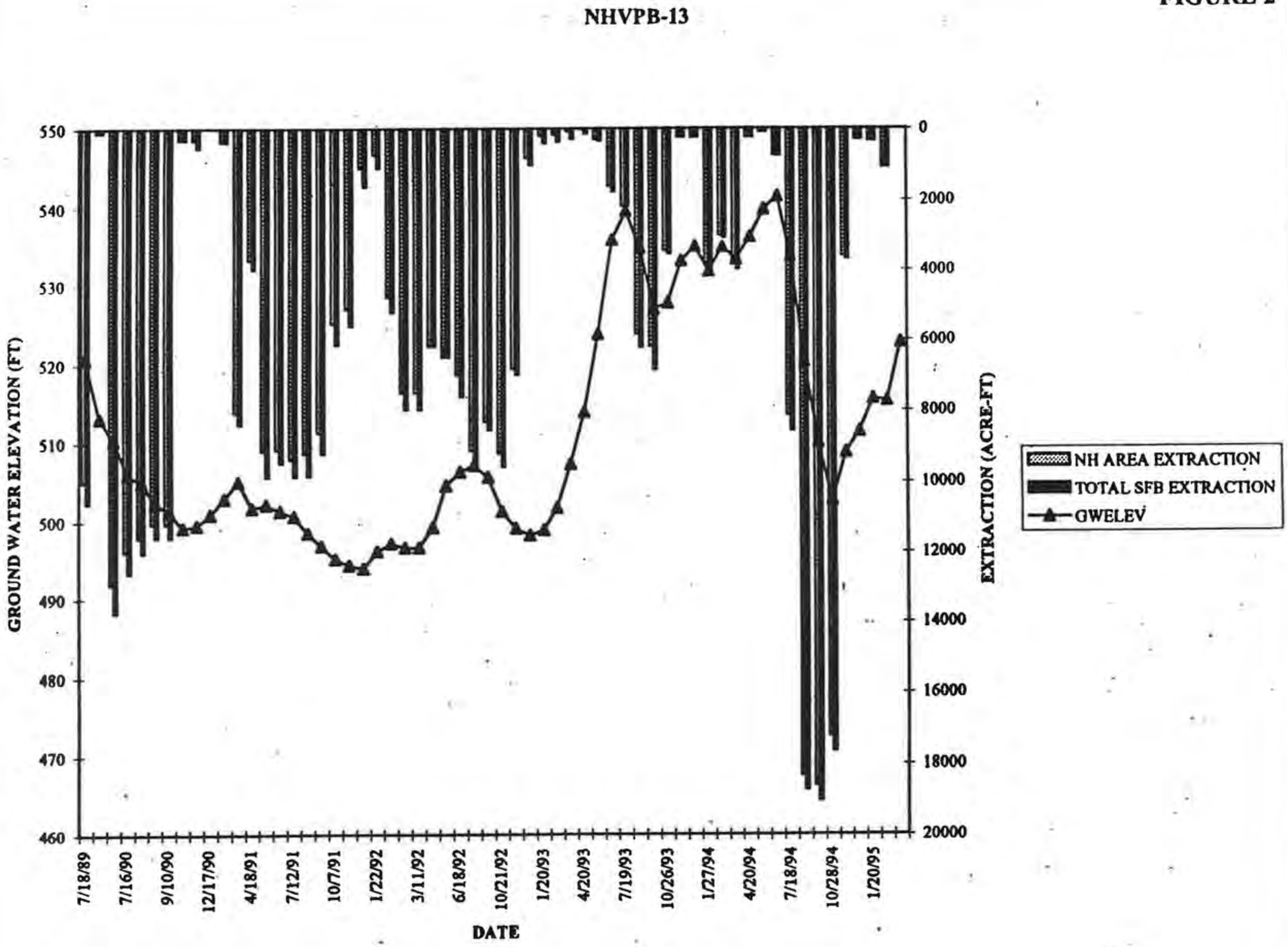


FIGURE 2



K-12

EXT_NH.XLS
NHVPB-13
7/18/95

NH AREA - W,R,N,E,A,T,B
SFB - W,R,N,E,A,T,B,V,U,C,P

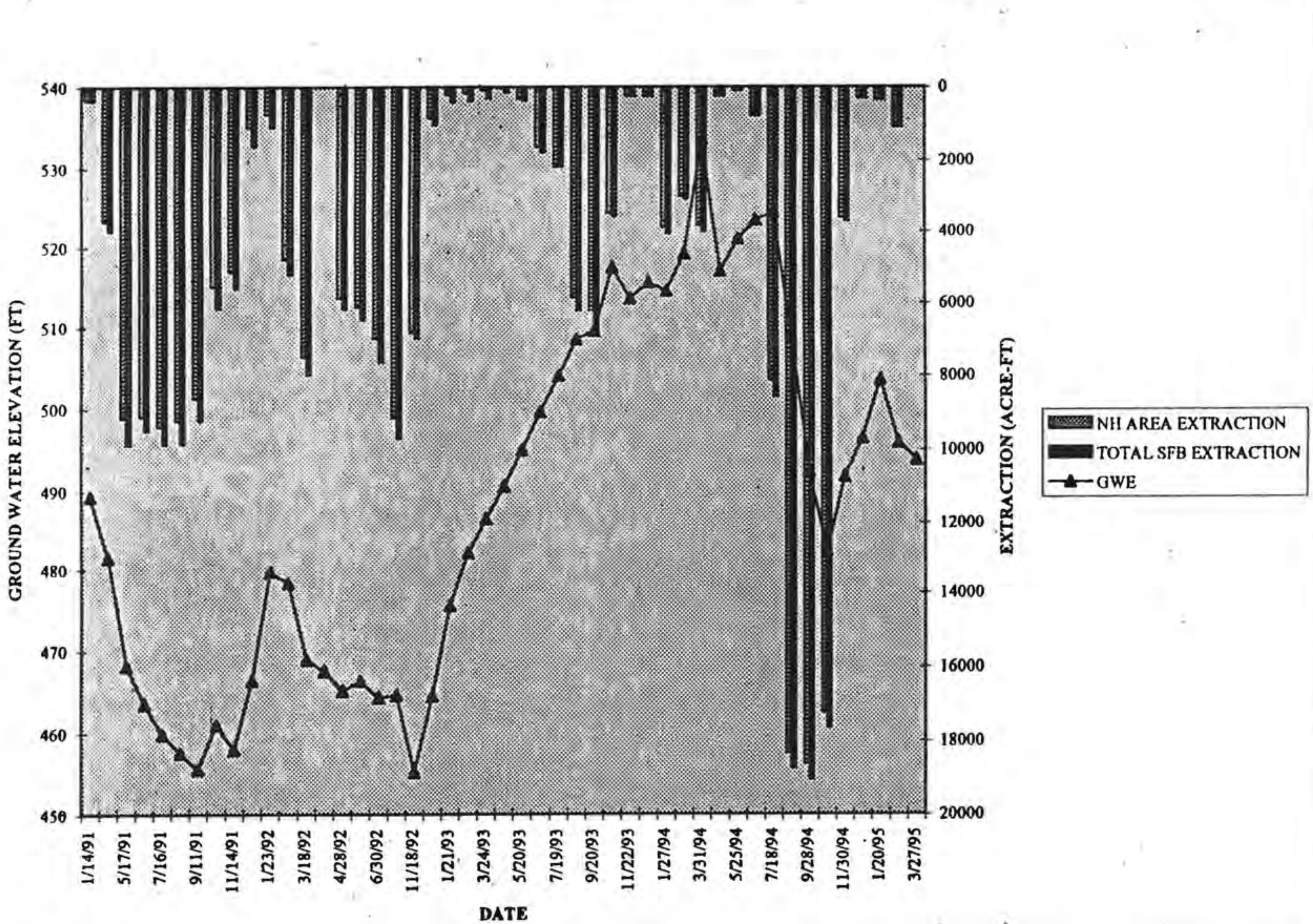
interest that the SFB experienced the second greatest rainfall in the last 25 years during the 1992-93 season, 36.25 inches, or 222 percent of average conditions.

The sharpest drop in the water table occurred between the Spring and Fall 1994. In June 1994, the water table elevation was measured at 541.4 feet; by October it had fallen 38.8 feet to 502.6 feet. This was in response to record pumping from the TJ and R-T Well Fields. The highest monthly pumping on record (18,500 AF/month) occurred during the late summer and early fall months, August through October 1994. By the time groundwater pumping activities were curtailed, the March 1995 water table elevation rose over 20 feet. Today the water table elevation is about 30 feet higher than the lowest measurement taken in the last five years.

2. *NH-C05-320 (Figure 3 - Rinaldi-Toluca Well Field)*

Located near the R-T Well Field, this hydrograph exhibits many of the same patterns as NH-VPB-13. Near a major pumping center, this monitoring well experiences wide fluctuations during peak discharge and recharge events. For example, groundwater level elevations rose over 62 feet from 1992 to the fall of 1993 and then fell 40 feet during the summer of 1994. Both of these events were in response to significant recharge and discharge periods. Since measurements began in 1991, the groundwater level in this area is approximately 40 feet higher than the lowest measurement, which occurred in 1992.

FIGURE 3



EXTRACT.XLS
NHC05-320
7/18/95

NH AREA - W,R,N,E,A,T,B
SFB - W,R,N,E,A,T,B,V,H,C,P

H-14

3. ***NH-C03-380 (Figure 4 - North Hollywood Well Field)***

This well is located near the center of the North Hollywood Well Field and has experienced many of the fluctuations that were observed in the NH-VPB-13 and NH-C05 wells. From October 1992 to May 1994, this hydrograph exhibits a steady climb in the groundwater level from 462 to 518 feet, an increase of 56 feet. Then during the record pumping months in August to October 1994, the groundwater level fell 30 feet. Today's groundwater level stands 30 feet higher than the lowest measurement taken in the last five years.

4. ***NH-C02-220 (Figure 5 - Erwin Well Field)***

Removed from any of the major pumping centers, this hydrograph reflects a less dramatic response and is more representative of the overall change in basin storage. Since 1991, the net change in groundwater levels in this area has increased by approximately 20 feet.

5. ***NH-VPB-14 (Figure 6 - Burbank Well Field)***

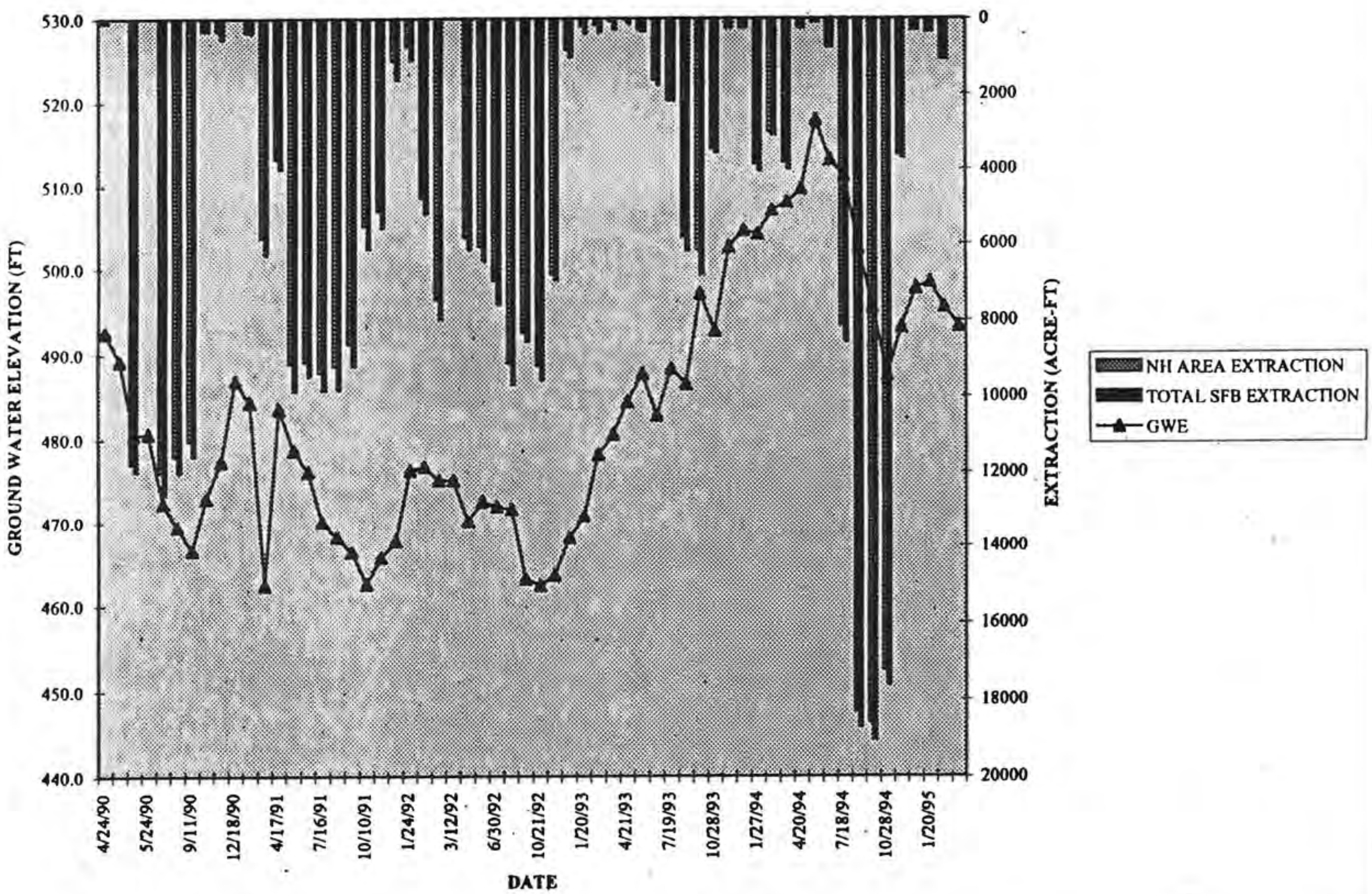
Located in the Burbank area and away from any major pumping center, the trends exhibited by this hydrograph reflect the change in basin storage.

6. ***CS-C02-062 (Figure 7 - Headworks Well Field)***

Located in the HW Well Field, this wells displays subtle changes to groundwater levels, signaling its distance from any major pumping activity and represents a general trend in an increase in basin storage since

FIGURE 4

NHC03-380



H-16

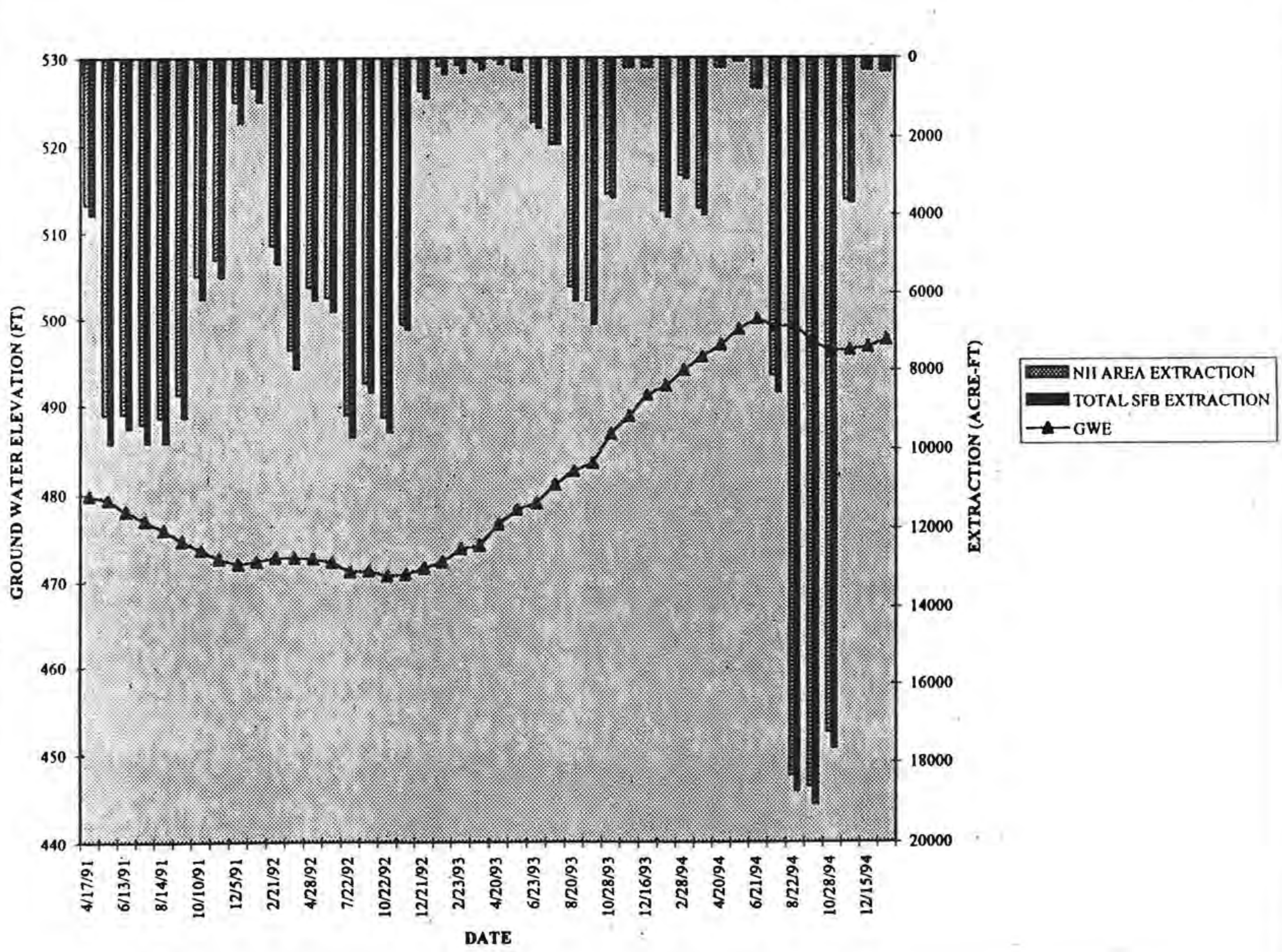
EXTRACT.XLS
NHC03-380
7/18/95

NH AREA - W,R,N,E,A,T,B
SFB - W,R,N,E,A,T,B,V,H,C,P

GSE - 710.28

FIGURE 5

NHC02-220



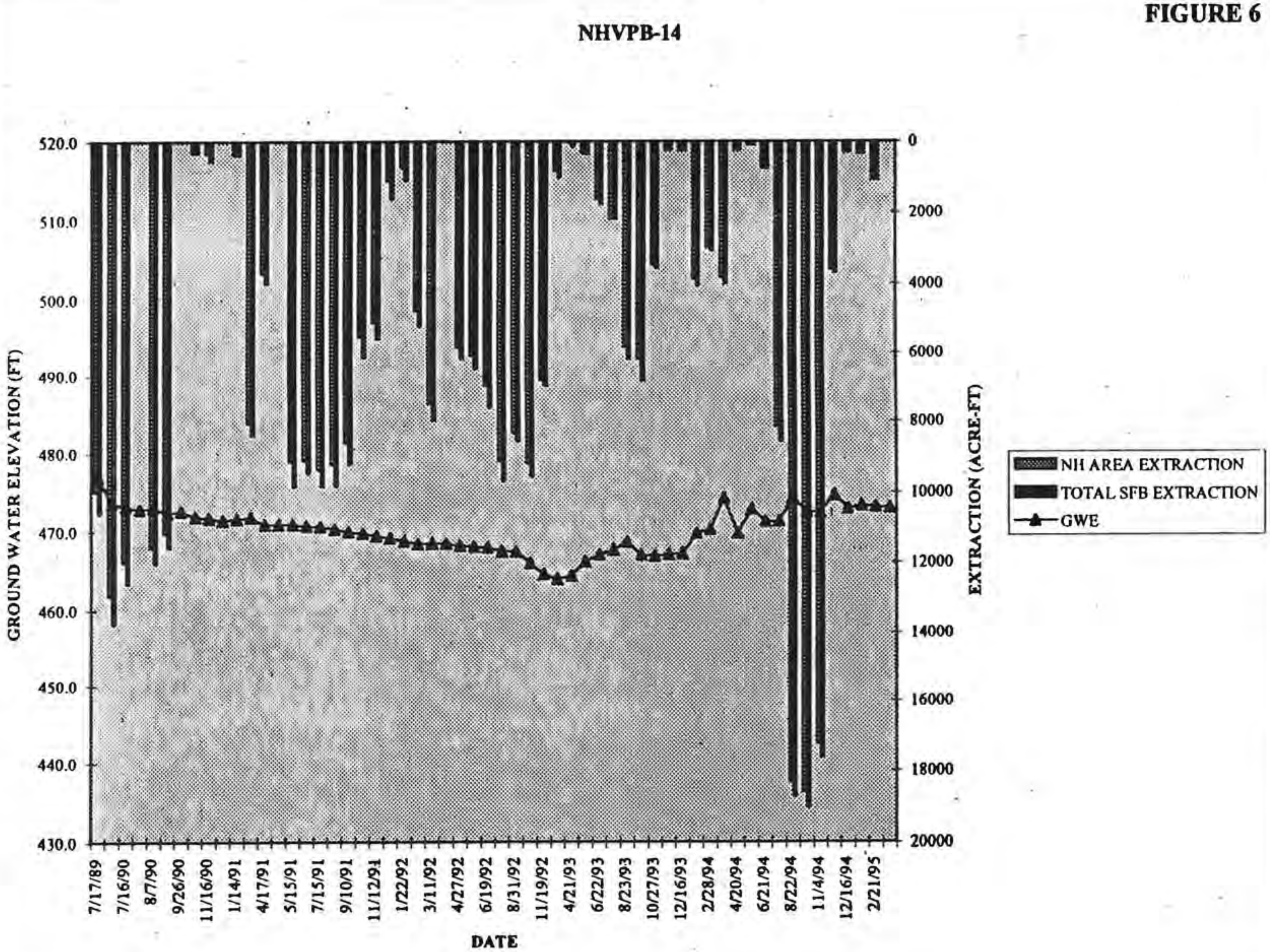
NH AREA - W,R,N,E,A,T,B
SFB - W,R,N,E,A,T,B,V,H,C,P

GSE - 668 62

EXTRACT.XLS
NHC02-220
7/18/95

K-17

FIGURE 6



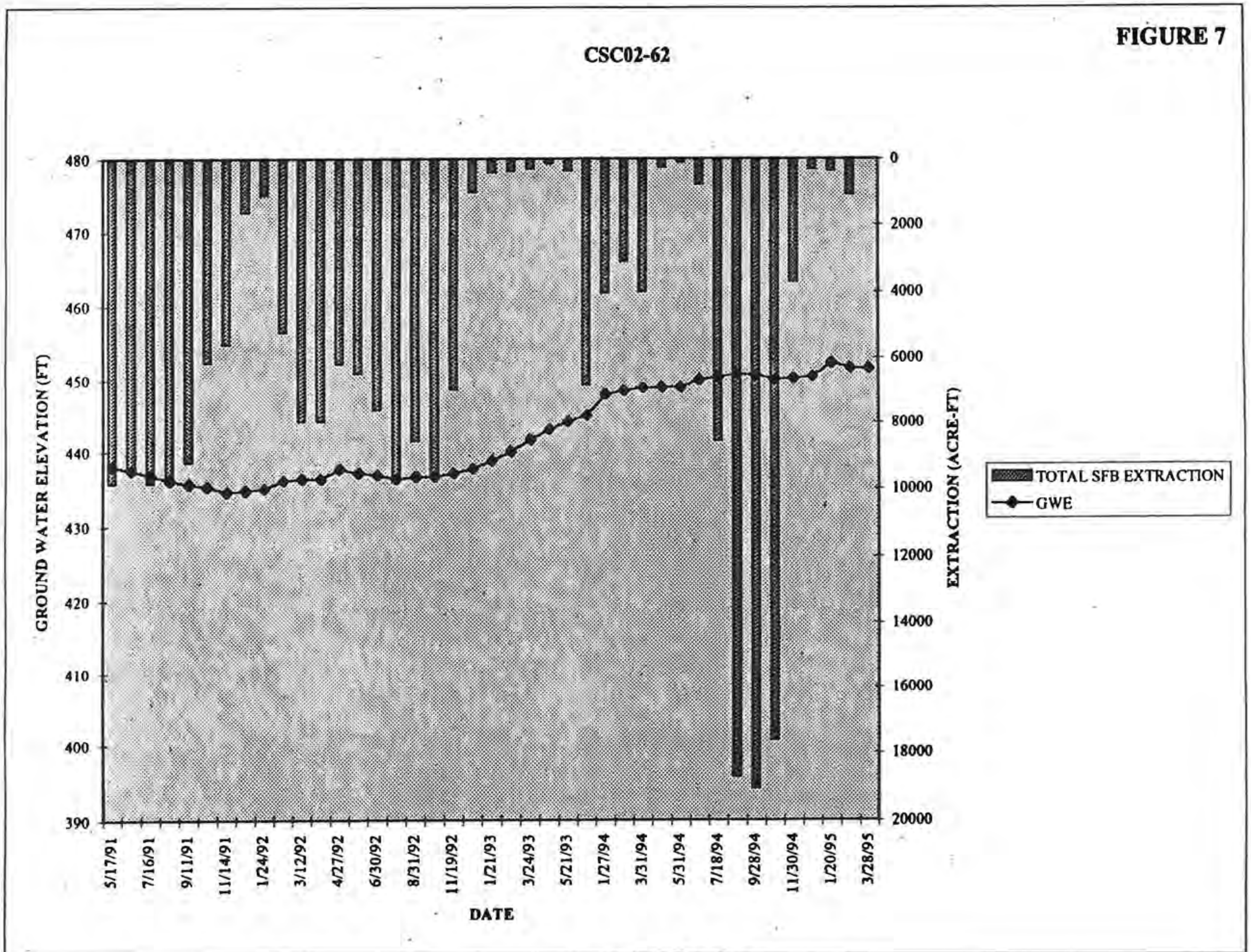
4-18

EXTRACT.XLS
NHVPB-14
7/18/95

NH AREA - W,R,N,E,A,T,B
SFB - W,R,N,E,A,T,B,V,H,C,P

GSE - 565.41

K-19



CS-C02_H.XLS
CSC02-62
7/18/95

SFB - W,R,N,E,A,T,B,V,C,P

1990. Today's water table is 13 feet higher than in 1991.

7. *PO-C02-052 (Figure 8 - Pollock Well Field)*

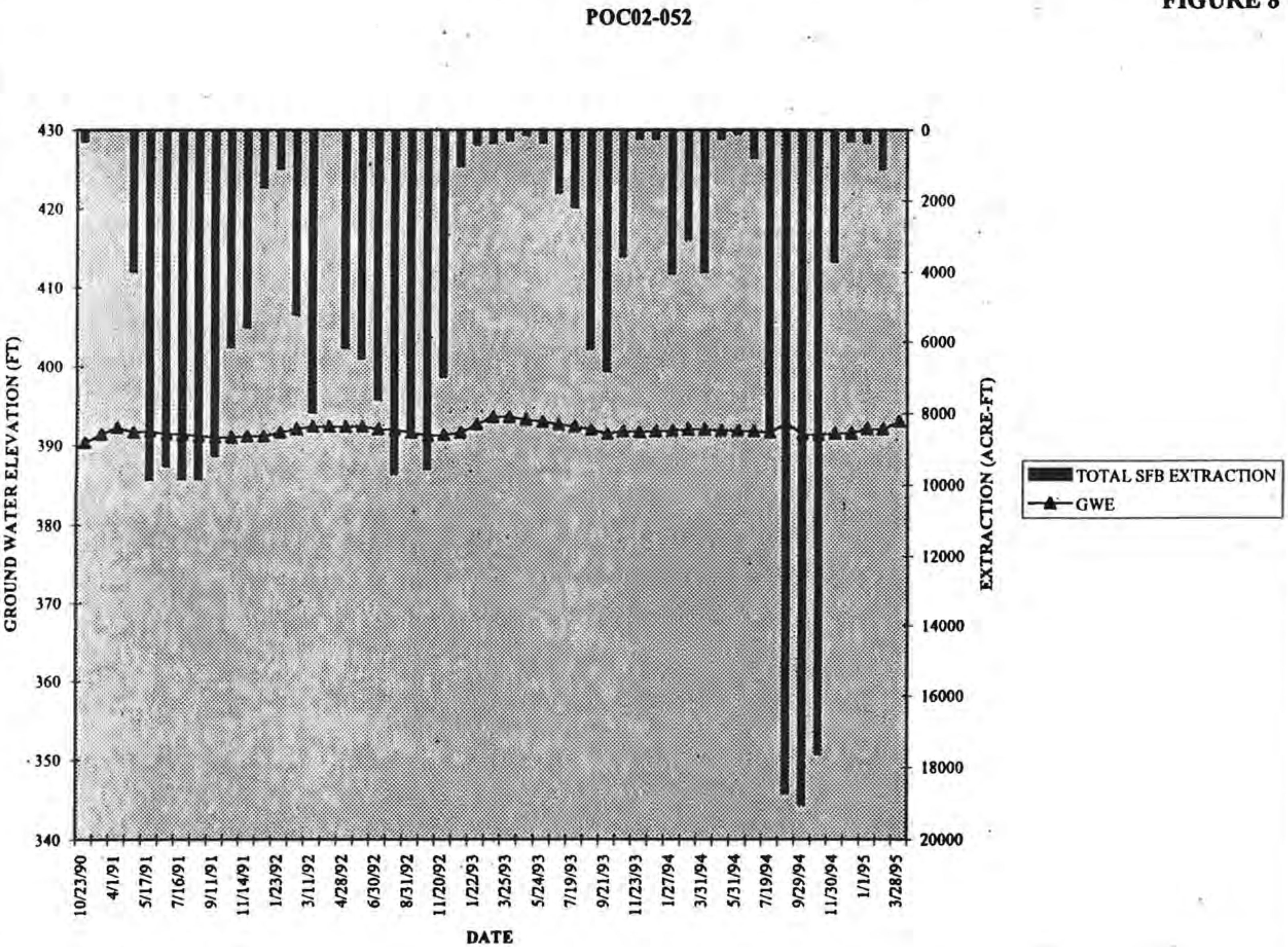
A relatively flat hydrograph, PO-C02-052 shows a slight increase in basin storage since 1990 and represents little effect from the significant recharge and discharge events occurring near the major pumping centers. In this area, rising groundwater conditions can cause discharges into the unlined portions of the Los Angeles River. Since 1991, the change in groundwater levels has increased by three feet.

IV. Groundwater Modeling

During the RI studies performed for the EPA, a groundwater flow model was developed. Its applications have been numerous including modeling projects such as the East Valley Water Recycling Program, the PO Wells Treatment Plant, and Reactivation of the HW Wells and Spreading Grounds Facility. The model simulates groundwater conditions from selected input discharge and recharge values. The model contains up to four layers ranging in depth from 50 to 500 feet with over 5,000 active cells ranging in size from 1,000 by 1,000 feet to 3,000 by 3,000 feet. Each model run computes an average hydraulic head value and assigns it to the representative model cell. The data is then imported to other programs for visual assembly.

Historical rainfall, recharge and discharge data through 1994 were compiled from the Upper Los Angeles River Area (ULARA) Watermaster reports and used as input for model parameters. Discharge and recharge values for the 1995 and 1996 simulations were selected under a chosen set of

FIGURE 8



EXTRACT.XLS
POC02-052
7/18/95

SFB - W.B.N.E.A.T.B.V.H.C.P

12-4

conditions. The intent was to evaluate the effects of above-average pumping in back-to-back years (see Table 1).

1994-95 Input Values

This year's rainfall records exhibit a similar trend to the precipitation conditions of 1992-93 (36.62 inches), and therefore this value was chosen for 1994-95. The groundwater pumping value was chosen to severely stress the aquifer. Approximately 150,000 AF (200 percent of average-pumping) was used as input for 1994-95. This value is 25,000 AF more than any previous groundwater pumping volume.

It was assumed that the combined pumping from the TJ and R-T Well Fields would be approximately 100,000 AF, 33,000 from the NH Well Field and the remainder (17,000 AF) from the RSC and other wells. Other recharge and discharge input values can be found on Table 1.

1995-96 Input Values

Precipitation for the 1995-96 simulation was assumed as 10.50 inches or 67 percent of the average rainfall (18.50 inches); the pumping value was assumed as 101,000 AF (132 percent of average). These back-to-back years represent above-average pumping coupled with a high and low recharge scenario, for 1994-95 and 1995-96, respectively.

V. Modeling Results

After each model simulation, the results were entered into the Geographic Information Systems (GIS) and a graphics software package that facilitated creating groundwater contours, change in groundwater elevation from year-to-year,

Table 1

MODEL INPUT SUMMARY

RUN DATE:

WATER_YEAR	RAINFALL (IN/YR) VALLEY FILL 1 VF	RAINFALL (IN/YR) HILL & MTN 2 HM	BASIN RECHARGE (AF/Y) HILL & MTN 3 HM	VALLEY FILL & RETURN DELIVERED WATER 4 VF&RDW	SPREADING GROUNDS 5 BRANFORD	SPREADING GROUNDS 5 HANSEN	SPREADING GROUNDS 5 HW	SPREADING GROUNDS 5 LOPEZ	SPREADING GROUNDS 5 PACOIMA	SPREADING GROUNDS 5 TUJUNGA	SUB-SURFACE INFLOW 6 PACM	SUB-SURFACE INFLOW 6 SYLMAR	SUB-SURFACE INFLOW 6 VERDUGO	7 TOTAL RECHARGE
1991-92	30.05	33.86	5,783	65,184	653	15,461	230	1,094	12,914	9,272	350	400	70	111,412
1992-93	36.62	44.15	7,541	75,461	389	26,187	114	1,312	17,001	19,657	350	400	70	148,482
1993-94	10.50	14.30	2,442	55,461	462	12,052	0	182	3,156	4,129	350	400	70	78,704
1994-95	36.62	44.15	7,541	75,461	389	26,187	114	1,312	17,001	19,657	350	400	70	148,482
1995-96	10.50	14.30	2,442	55,461	462	12,052	0	182	3,156	4,129	350	400	70	78,704
AVERAGE	25	30	5,150	65,406	471	18,388	92	816	10,646	11,369	350	400	70	113,157

WATER_YEAR	BASIN DISCHARGE (AF/YR) LADWP PRODUCTION WELLS 8 AE	LADWP 9 NH	LADWP 10 PO	LADWP 11 RSC	LADWP 12 RT	LADWP 13 TJ	LADWP 14 TOTAL LADWP	BURBANK 15 BURBANK	BURBANK 16 LOCKHEED	BURBANK 17 TOTAL BURBANK	GLENDALE 18 GLENDALE N&S	OTHERS 19 OTHERS	20 TOTAL EXTRACTION
1991-92	-787	-5,455	0	-16,352	-53,093	0	-75,686	-39	0	-39	-490	-4,574	-80,789
1992-93	-1,281	-4,157	0	-3,595	-14,272	-11,673	-34,978	-1,355	0	-1,355	-91	-3,942	-40,366
1993-94	-726	-6,652	0	-6,325	-21,048	-25,843	-60,594	-2,395	-378	-2,773	-115	-3,084	-65,485
1994-95	-3,000	-32,602	-2,400	-10,781	-64,662	-36,001	-149,446	-2,212	-9,678	-11,890	-8,167	-2,976	-172,479
1995-96	-3,000	-24,001	-2,400	-10,781	-38,261	-23,001	-101,445	-2,212	-9,678	-11,890	-8,167	-2,976	-124,478
AVERAGE	-1,759	-14,573	-960	-9,567	-38,267	-19,303	-84,430	-1,643	-3,947	-5,590	-3,406	-3,294	-96,720

NOTES:

1-2. Rainfall data is based on an hydrologic period of 1991-92 to 1993-94. The recharge data assumed for the year of 1994-95 and 1995-96 is the same as the one assigned for the wet and dry years of 1992-93 and 1993-1994 respectively. The 100 year average precipitation for the valley and mountains is 16.48 inches and 21.91 inches respectively.

3. Hill and mountain recharge based on rainfall in the Hill and Mountain area.

4. The areal recharge of valley fill from precipitation equal 8% of the rainfall times 10,420.20 acres, and the areal recharge from delivered water return is based on return water rights of Los Angeles, Burbank, and Glendale equal to 20.8%, 20%, and 20% respectively of delivered water to valley fill area.

5. Native water spreading recharge at the six spreading grounds.

6. Subsurface inflow equal the sum of the steady inflow from the Sylmar notch, 400 AF/Y, the Pacoima notch, 350 AF/Y, and the Verdugo Basin, 70 AF/Y.

7. Total Recharge = (3+4+5+6)

8 - 13. Production from the North Hollywood Aeration Wells, North Hollywood, Pollock, the RSC wells (Whitnall, Erwin, Verdugo), Rinaldi-Toluca, and Tujunga wellfields.

14. Total LADWP Production = (8+9+10+11+12+13)

17. Total Burbank extraction = (15+16)

18. Total Glendale extraction.

19. Other than LADWP, Burbank, and Glendale.

20. Total extraction from the Basin

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4-23

hydrographs of GWE versus pump elevation, and finally, graphs of the vertical water column versus the pump strainer elevation.

Change in Groundwater Elevation Contours

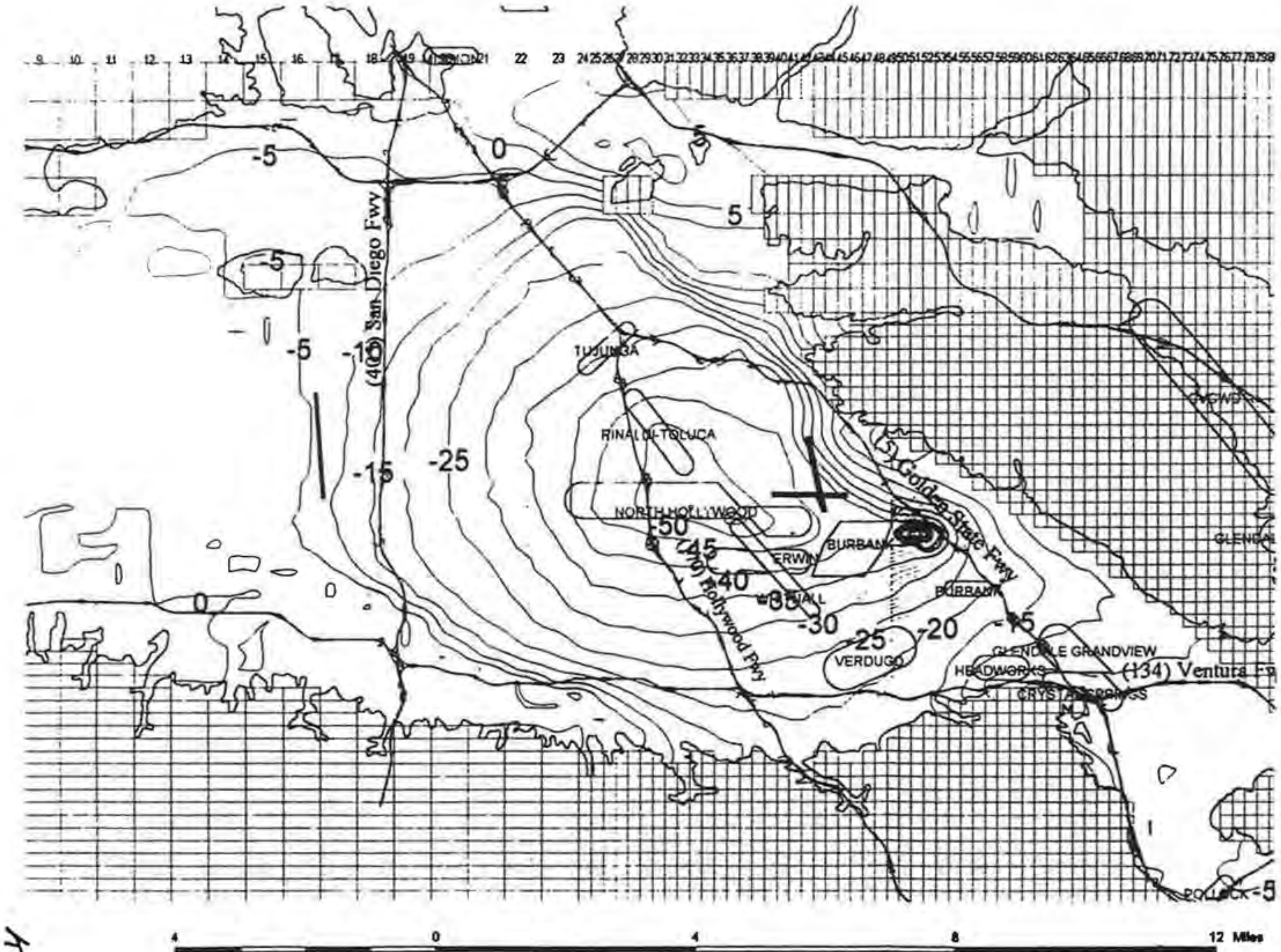
Following the 1994-95 pumping of 150,000 AF, the change in groundwater elevation contours exhibit a 30- to 50-foot depression near the North Hollywood and R-T Well Fields and a 15-25 foot depression near the TJ Well Field (Figure 9). Simulations for 1995-96, while pumping 101,000 AF, increased the drawdown to 45-50 feet near the North Hollywood and R-T Well Fields and 30-35 feet neat the TJ Well Field (Figure 10).

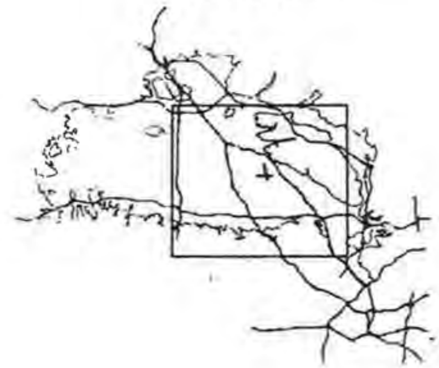
Loss of Pump Suction

Addressing the concern that a well's groundwater level drawdown from above-average pumping may cause a loss in the wells' pump suction, graphs of the vertical distance of the water column above the pump strainer (suction) were constructed for each well (Figures 11-13). The graphs show that after two years of pumping a total of 71,000 AF of stored groundwater and Los Angeles's two-year water right of approximately 180,000 AF (90,000 AF/yr), no well broke pump suction. In the Erwin Well Field, all pumps exhibited at least 130 feet of saturated thickness above the pump's strainer. In the North Hollywood Well Field, all but NH-28 contained at least 60 feet of water column, and the TJ and R-T wells, each maintained at least 150 feet of saturated thickness. It should be noted that the simulated GWE represent an average head value for each model cell containing the represented well. Well casing loss and aquifer head loss would contribute to each well's drawdown by at least an additional 20 to 40 percent or 10 to 20 feet

FIGURE 10

Fall 1994 to Fall 1996
Change in Groundwater Elevations-Model Layer 1





Airports
Wellfields
Minor Contours
Major Contours
Sediment Boundary
Major Freeways
Inactive Nodes

N
W
E
S

PROJECT NO. 95002
PROJECT: Water Operating Division

7-22

A-28

Figure 12

Vertical Distance Between Pump Strainer and Simulated Groundwater Elevations, NH Wells Year 1991-1996 Model Layer 1

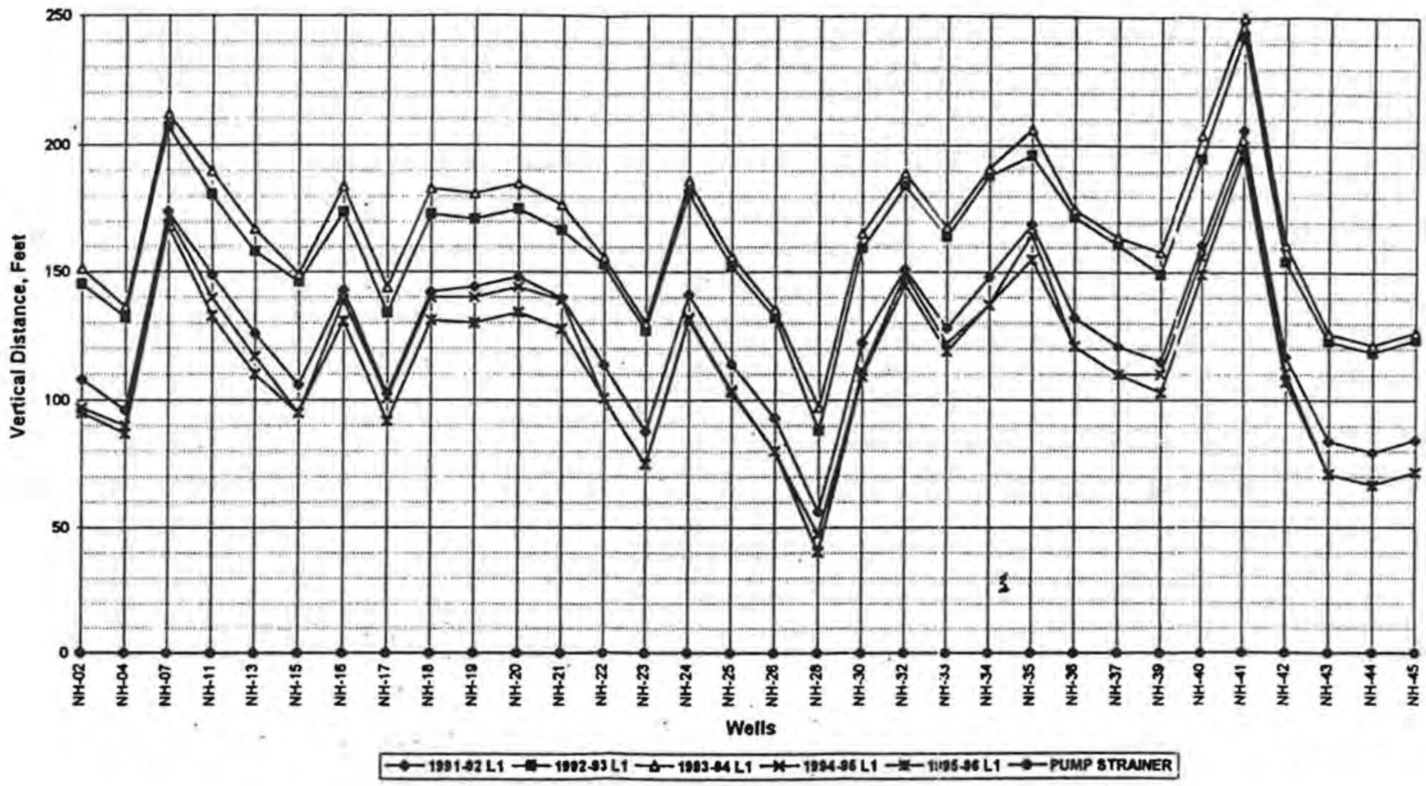
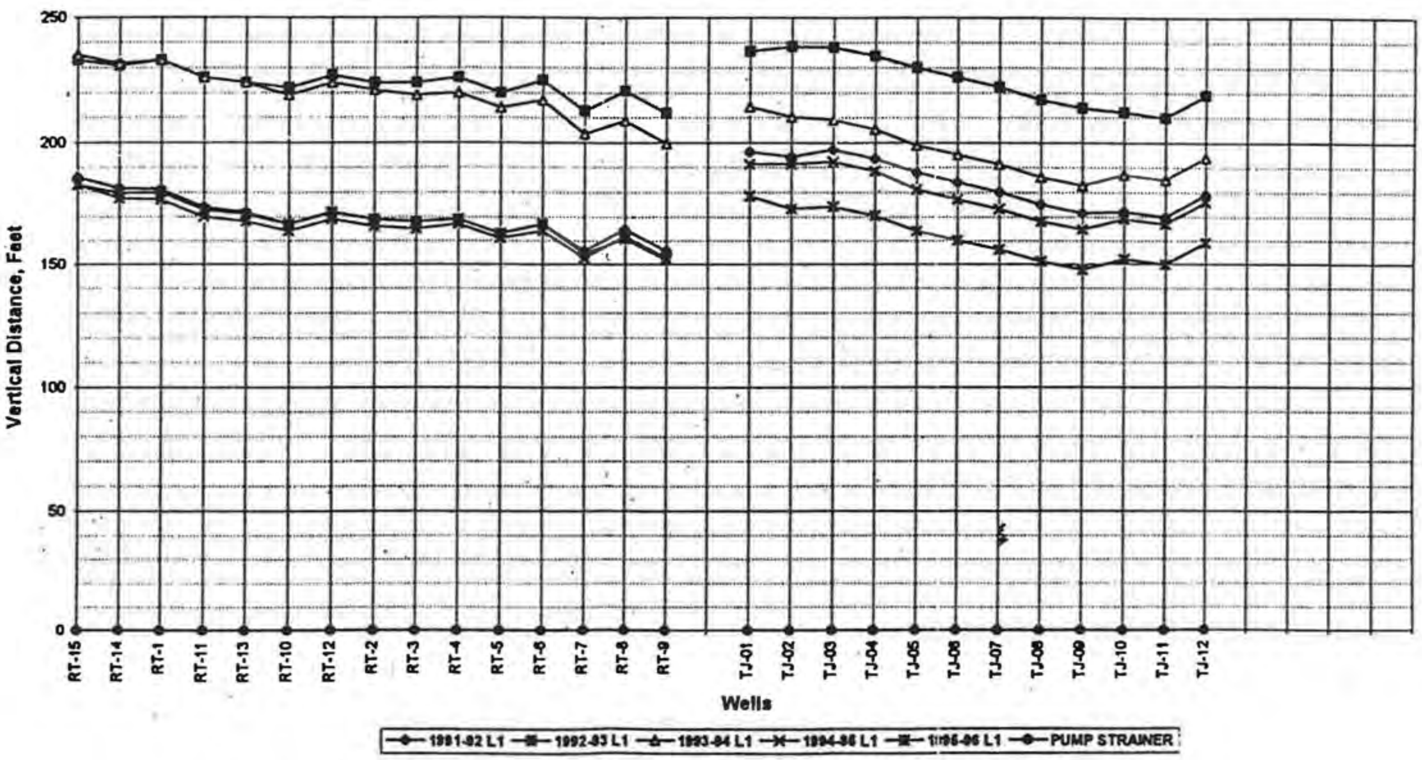


Figure 13

Vertical Distance Between Pump Strainer and Simulated Groundwater Elevations, RT & TJ Wells Year 1991-1996 Model Layer 1



K-129

of drawdown. However, adequate saturation would still be maintained.

VI. Simulated Versus Actual Change in Groundwater Elevations

Figure 14 depicts the simulated change in groundwater elevation from Fall 1992 to Fall 1993 as compared to Figure 15 which contains the actual interpolated values published in the ULARA Watermaster report (dated May 1994 - Plate 12). These figures are similar. For example, the R-T Well Field area is represented by a +60 contour in the Watermaster figure (Figure 15) as compared to +55 contour for the simulated values (Figure 14). Other similarities are apparent such as the areal extent and the general orientation of the change in GWE.

VII. Contaminant Plume Migration

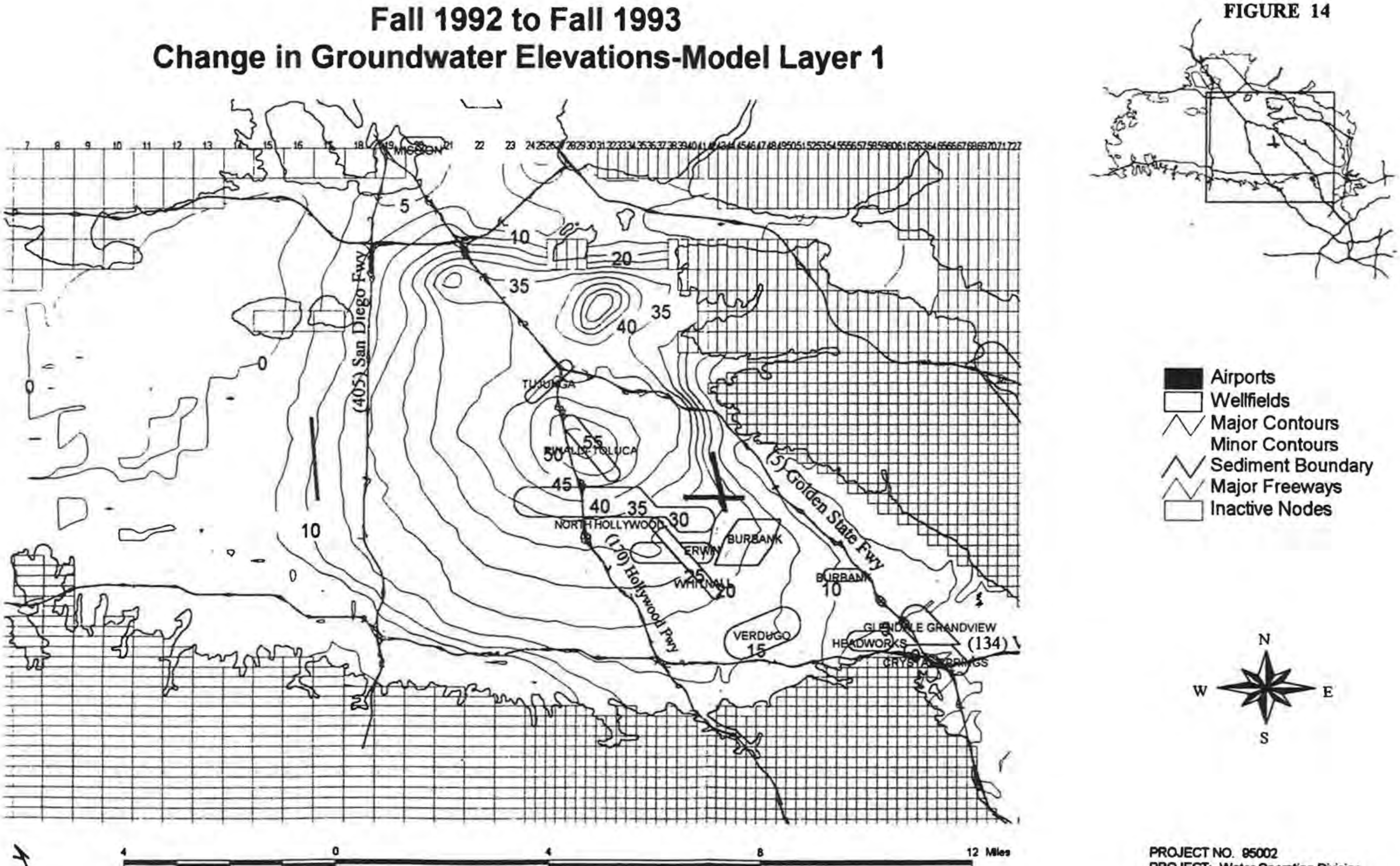
The most recent two-dimensional TCE contaminant plume was super-imposed on the Fall 1995 and Fall 1996 simulated groundwater contours (Figures 16 and 17). Groundwater flow directions are perpendicular to the contour lines. The figures show that the contaminant plume does not horizontally migrate towards the TJ and R-T Well Fields. Contaminant migration is generally in the downgradient direction, or to the south-southeasterly direction, and will be intercepted by the Burbank, Glendale, HW, and PO groundwater clean-up projects.

VIII. Findings

The effect of simulating 250,000 AF of groundwater pumping for a two year period creates a greater than 50 foot depression in the groundwater levels near the R-T Well Field

FIGURE 14

Fall 1992 to Fall 1993
Change in Groundwater Elevations-Model Layer 1

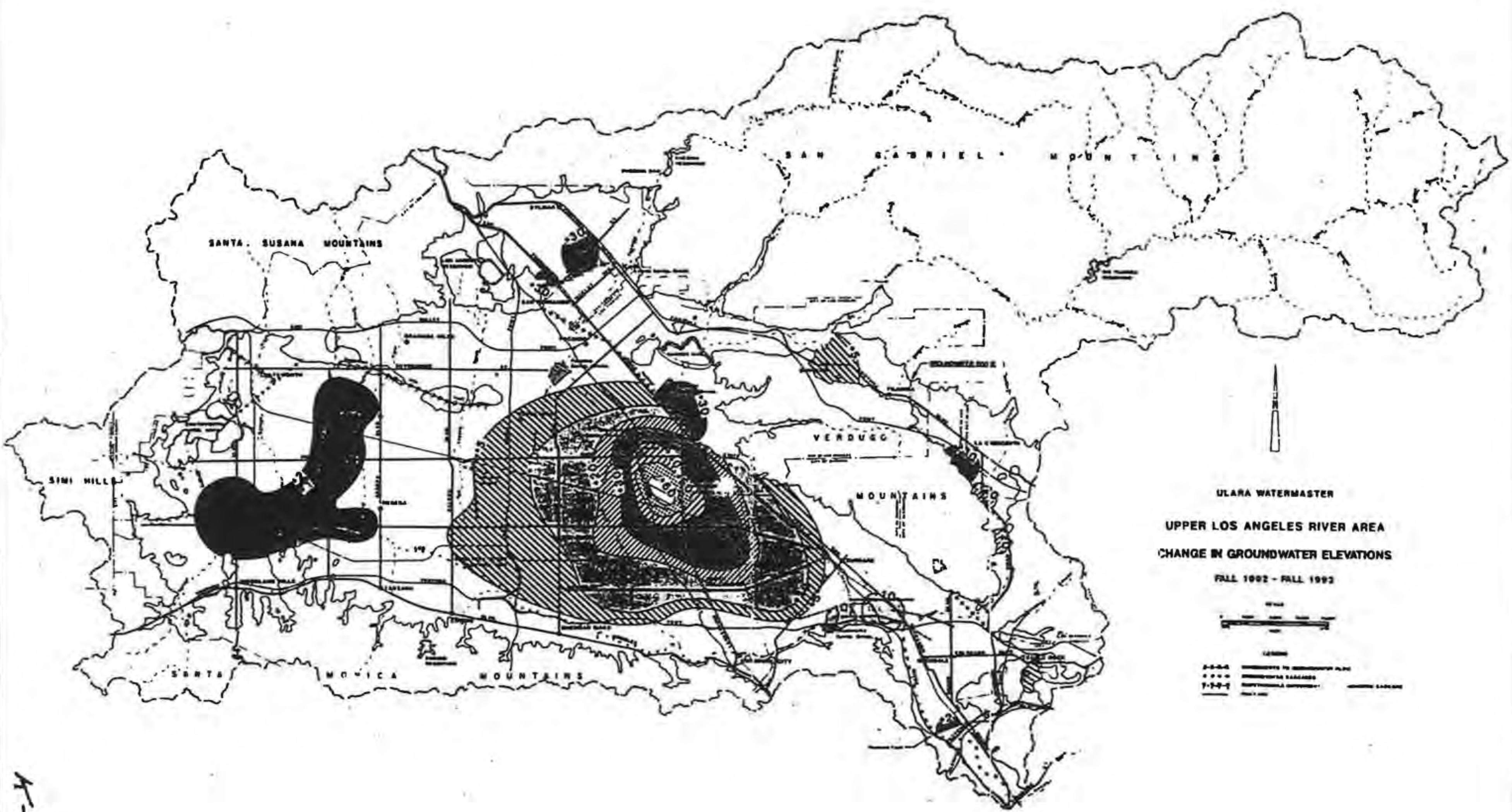


PROJECT NO. 95002
PROJECT: Water Operating Division

K-31

Figure 15

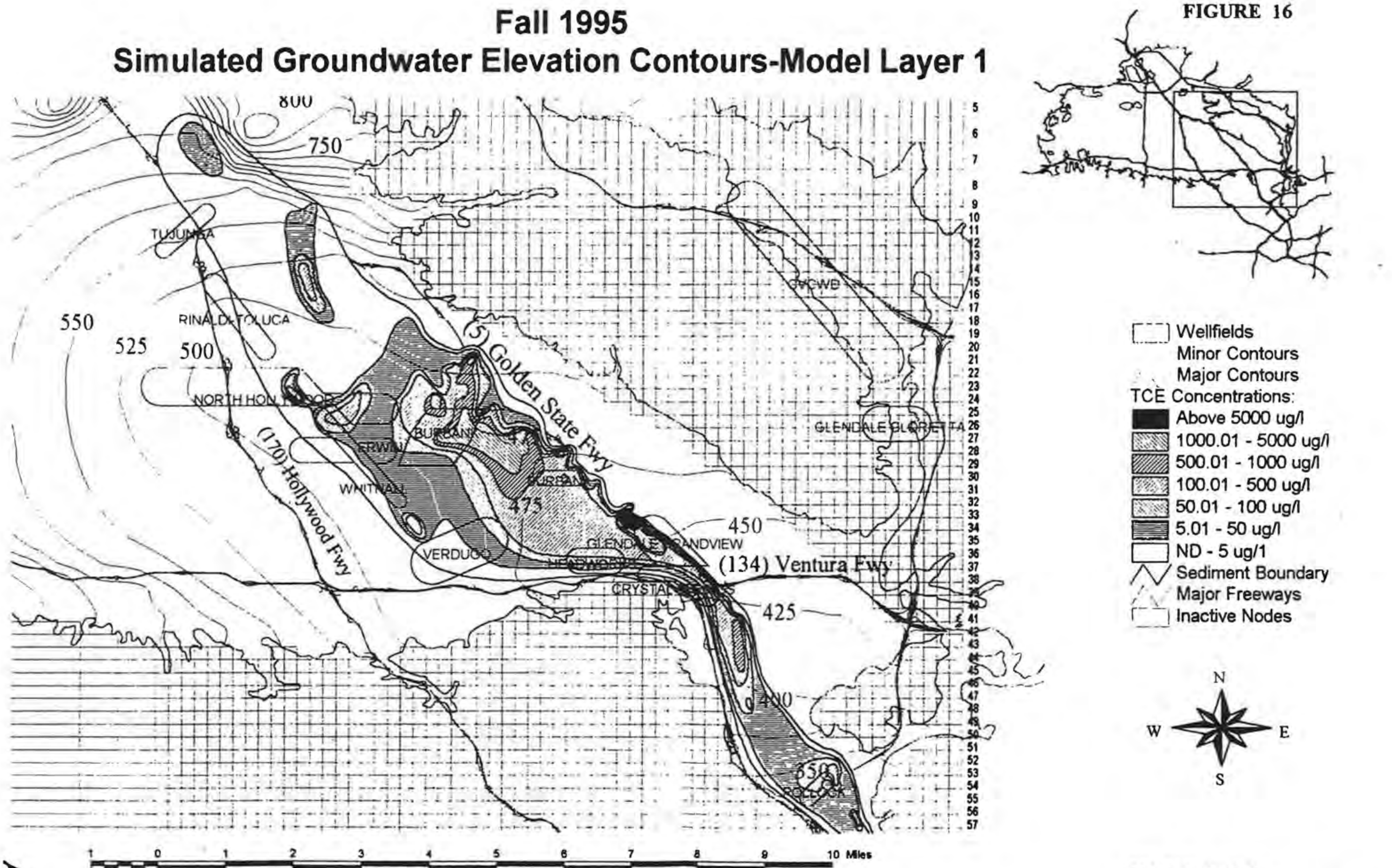
PLATE 12



K-32

FIGURE 16

Fall 1995
Simulated Groundwater Elevation Contours-Model Layer 1

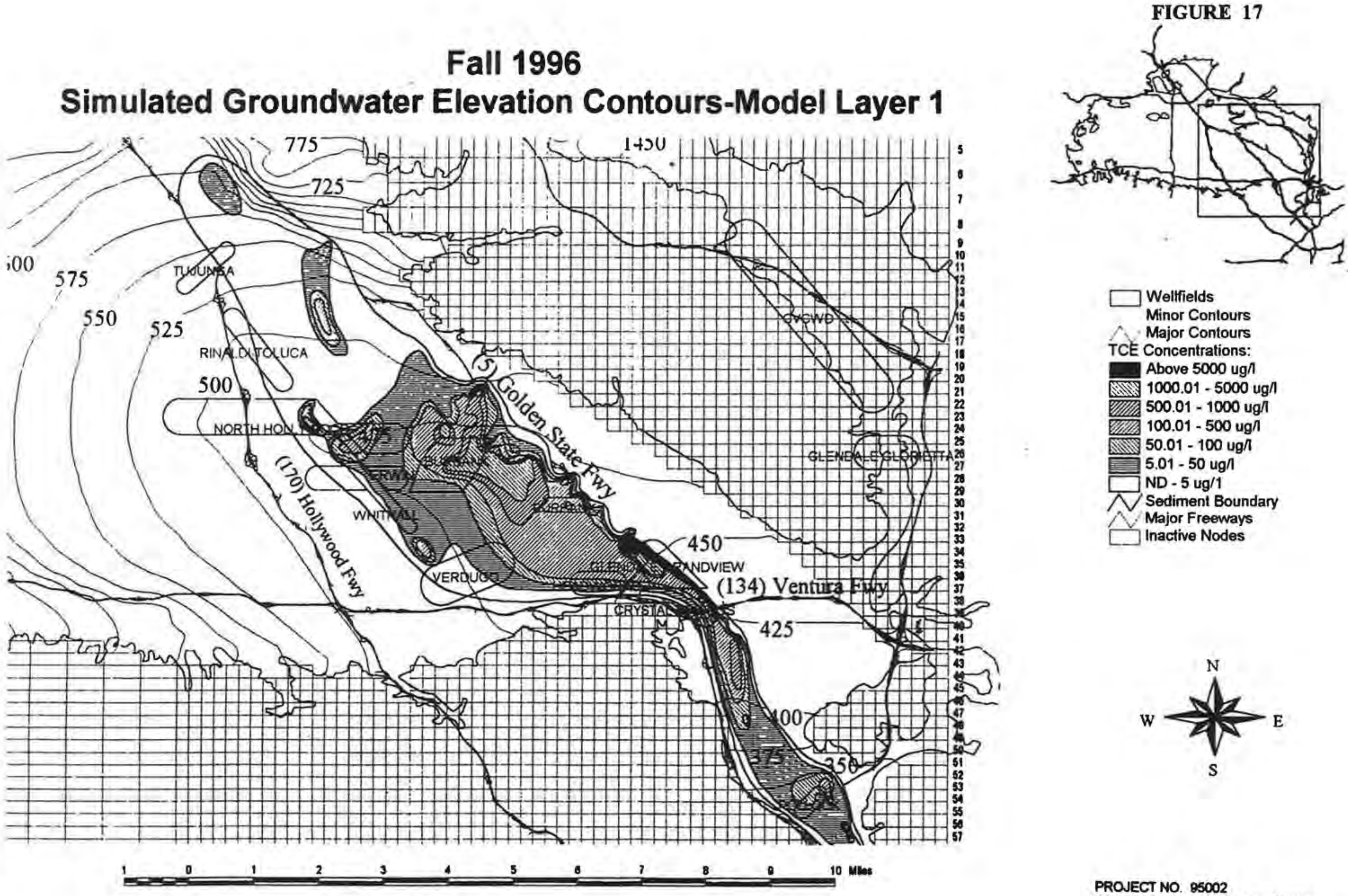


PROJECT NO. 95002
PROJECT: Water Operating Division

K-33

FIGURE 17

Fall 1996
Simulated Groundwater Elevation Contours-Model Layer 1



PROJECT NO. 95002
PROJECT: Water Operating Division

(Figure 10). The simulated data show, however, that the resultant saturated thickness is sufficient to allow continuos operation of the wells (Figures 11-13). Changes to the GWE are greater near the major pumping centers such as the R-T and TJ Well Fields than in other areas such as the inactive CS, HW, and PO Well Fields.

Monthly groundwater level data collected from existing monitoring wells show that basin levels near the major pumping centers of TJ, R-T, and NH have increased about 20 feet since the Fall 1991 (Figures 2-4) and have remained relatively constant in the CS, HW, and PO areas (Figures 7-8). During the same period, strong groundwater level fluctuations, as great as 62 feet, were observed near the major pumping centers while levels remained relatively constant in the CS, HW, and PO areas.
Groundwater is not discharging to the surface except within the seven mile unlined portion of the Los Angeles River. Implementation of the PO and HW Wells Treatment Plants and the Glendale Operable Units will tend to reduce this rising groundwater condition.

Computer simulations show that above-average groundwater pumping does not cause the TCE contaminant plume to flow (migrate) in the direction of the TJ and R-T Well Fields. However, due to the shallow depths of the NH Aeration Wells, the depressed water table may significantly reduce their pumping capacity. Future groundwater clean-up programs such as HW and PO will assist in intercepting the TCE plume as it continues to migrate in the south-southeasterly direction.

702-SFBPUMP.DOC

APPENDIX L

POLICIES AND PROCEDURES -

SECTIONS 2.6 TO 2.9

July 1993

WATERMASTER SERVICE
UPPER LOS ANGELES RIVER AREA

POLICIES AND PROCEDURES

July 1993

UPPER LOS ANGELES RIVER AREA WATERMASTER

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

WATERMASTER SERVICE

UPPER LOS ANGELES RIVER AREA (ULARA)

POLICIES AND PROCEDURES

July 1, 1993

ULARA WATERMASTER

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2.6 PUMPING FOR DEWATERING

In portions of the SFV where high water tables exist, permanent dewatering facilities may be required for certain substructures. As such dewatering removes groundwater from storage, the ULARA Watermaster is required to account for this.

2.6.1 CITY OF LOS ANGELES

If a dewatering facility is part of the building plans, or if there is some reason to believe that such a facility may be necessary, and the project is within the City of Los Angeles, the Department of Building and Safety refers the application for a construction permit to the ULARA Watermaster where a determination is made as to whether or not the pumping may impact water rights. If it is determined that water rights are affected, an agreement for dewatering activities must be signed with the City of Los Angeles Department of Water and Power before a Certificate of Occupancy is granted.

2.6.1.1 Request to Discharge Pumped Groundwater - If there is a request to discharge pumped groundwater to a storm drain or to use the pumped groundwater consumptively, either on site of off site, the pumper would be required to pay Los Angeles for the right to pump its groundwater. The dewatering party is required to report monthly to the ULARA Watermaster the metered amounts of groundwater.

2.6.2 OTHER JURISDICTIONS

Dewatering arrangements in other governmental jurisdictions in the SFV have not yet been developed. As the ULARA Watermaster's primary charge is the accounting for and balancing of water volumes in the safe yield operation, the financial arrangements between parties and nonparties which are used, in part, to accomplish this purpose, are left to the entities involved. However, the ULARA Watermaster must be kept informed of all matters bearing on groundwater storage, such as pumping, recharge, and water rights arrangements.

2.7 PUMPING FOR SPECIAL NEEDS

If a nonparty has a special need to pump groundwater, an application to do so must be filed with the ULARA Watermaster. The application should explain the special need and indicate the amounts desired to be pumped, the location(s) of the well(s), and the method of disposal. Such request will be referred to the party affected for consideration. To the extent that such water is consumptively used or otherwise not returned to groundwater storage, financial arrangements must be made to exercise the right of a party in the same basin wherein the pumping will occur. All water pumped must be metered and reported to the ULARA Watermaster monthly and accounted for as in Section 2.5.5.

2.8 FLEXIBILITY PUMPING - VERDUGO BASIN

The Final ULARA Judgment did not provide for safe yield operation of the Verdugo Basin during unusual circumstances, such as dry years or water system problems. The parties recognize the importance of preserving the Verdugo Basin as a water production and groundwater storage resource. The City of Glendale and the Crescenta Valley County Water District (CVCWD) seek to permit flexibility in the use of this resource without causing damage to the basin. To provide for water shortages due to unusual circumstances, such as weather conditions or water system operational problems, Glendale and CVCWD shall have the right in any year to overextract from the Verdugo Basin an amount not to exceed 10 percent of their allowed pumping, as provided in Section 5.1.3.2 of the 1979 ULARA Judgment. The 10 percent annual overextraction may continue from year to year, accumulatively not to exceed 1,000 AF for each agency, so long as the unusual circumstances persist. When the unusual circumstances cease, the accumulated overextractions shall be replaced by underpumping, and must be done within a six-year period. The amount of such underpumping will not be required to exceed 10 percent of the annual allowed pumping of any party. The party desiring to overextract from the basin shall notify the ULARA Watermaster of the circumstances considered to be unusual and shall justify the need for overextractions. The ULARA Watermaster shall review the existence and cessation of unusual circumstances and shall in his discretion approve the required overextraction and replacement operations.

2.9 GROUNDWATER QUALITY MANAGEMENT

The following sections of the ULARA Watermaster's Policies and Procedures address groundwater quality management activities in the four basins of the SFV and focus on the control of the spread of contaminants through pumping patterns, spreading activities, groundwater modeling, and well-monitoring activities.

2.9.1 COORDINATED RESPONSE FOR GROUNDWATER CLEANUP AND CONTROL

The ULARA Watermaster and the ULARA Administrative Committee (representing all parties within the ULARA) affirm their commitment to participate in a coordinated response to clean up and control the spread of existing contamination of groundwater supplies within the SFV. The ULARA Administrative Committee designates the ULARA Watermaster as the entity to coordinate party and nonparty involvement in the effort to preserve and restore the quality of groundwater within ULARA. This anticipates that new or significantly increased extractions within existing well fields to meet water supply demands may include blending or treatment of groundwaters removed from areas of high-level degradation or contamination. An important part of exercising these additional responsibilities and coordinating responses to contamination of the SFV water supplies is the collection, compilation and evaluation of essential data from producers within ULARA along with the distribution of such data to the proper state and federal agencies for review and comment.

2.9.2 <u>WELLS</u>

Each party or nonparty shall provide to the ULARA Watermaster, for review and comment, plans and drawings for the following:

1) Construction of any new well or well field;
2) Deepening of any existing well;
3) Modification of the perforations of the casing of any existing well;
4) Plans for increasing or decreasing the effective extraction capacity of any existing well;
5) Abandonment of any existing well; and
6) Data and other information that will enable the ULARA Watermaster to assess the potential impacts on pollution containment and cleanup.

These items will be reviewed by the ULARA Watermaster and evaluated as to whether significant adverse contaminant migration would be anticipated and to recommend alternatives as may be needed.

Factors and data included in the evaluation and modeling procedure may include the following:

1) Water quality well data (i.e., historical and present).
2) Water table elevations.
3) Analysis of contaminant migration rates and flow patterns based on changes involving new wells, increased extraction, etc.

2.9.3 OPERATING PRINCIPLES

Any plans for new or significantly increased extraction by a producer in the SFV to meet water supply needs shall be submitted to the ULARA Watermaster for review and comment. The proposed extraction activity will be evaluated against criteria that corresponds to basin management objectives for maintaining and improving water quality to the extent feasible, while operating the basin for water supply purposes. The remedial investigation (RI) groundwater model will be utilized to evaluate that such new or increased extractions will not contribute significantly to the spread of contaminants. The evaluation will be completed using the RI model as fully described in Section 6, Volume 1 of the Remedial Investigation of Groundwater Contamination in the San Fernando Valley report dated December 1992. It is anticipated that the RI model will be updated and improved as new data and new modeling procedures become available. The accuracy of the RI model over time in predicting contaminant migration patterns will be discussed with the LARWQCB and other interested agencies as needed, when requested. Where such extractions are to occur in areas of high-level contamination, blending and treatment facilities would be anticipated and treated groundwater put to beneficial use. These management objectives regarding groundwater quality are expected to be consistent with appropriate federal and state agencies' standards.

2.9.4 GROUNDWATER PUMPING AND SPREADING PLAN

To assure that groundwater pumping and recharge from spreading do not lead to further degradation of water quality in the SFV, each party or nonparty who produces groundwater will submit to the ULARA Watermaster, annually (on or before May 1 of the current water year), a Groundwater Pumping and Spreading Plan. This will include information on projected pumping and spreading rates and volumes, and recent water quality information on each well. In order to obtain the information needed to project future contamination levels, a monitoring program should be included. These annual Groundwater Pumping and Spreading Plans will be sent to the LARWQCB and other interested agencies for review and comment. The ULARA Watermaster will evaluate the impact of the combined pumping and spreading by all ULARA parties as it relates to the implementation of the ULARA Judgment, and make recommendations for inclusion in the Draft Combined Groundwater Pumping and Spreading Plan. The ULARA Administrative Committee will review and approve the final report prior to its release on or before September 1 of the current water year.

The following information and data would be included as a part of the Final Combined Groundwater Pumping and Spreading Plan:

1) Ownership, location and construction details for relevant wells, both active and inactive.
2) Capacity of producing wells, projected pumping volumes and a monitoring program.
3) The name and location of each groundwater producer's wells operated during the previous water year (as reported in the ULARA Watermaster's Annual Report - filed on May 1 in the Los Angeles Superior Court).
4) The quantity data for groundwater pumped from each well.
5) Chemical analysis for all wells tested during the previous water year, including data for volatile organic compounds (VOCs), if available.
6) Groundwater level data for wells monitored during the previous water year.
7) An annual status report on production wells as to pumping during the previous water year.
8) Significant changes in groundwater pumping during the previous water year, including resulting water level changes (as provided in the ULARA Watermaster's Annual Report).
9) A summary of groundwater treatment plant operations and amounts of groundwater treated.
10) Planned construction and a time schedule for new water supply and monitoring wells, if any.

11) Planned modifications and a time schedule for modifications or abandonment of existing wells, if any.
12) Planned groundwater treatment facilities and construction time schedule.
13) Maps showing locations of existing and proposed wells, treatment and water supply distribution systems.

2.9.5 EMERGENCY EXEMPTIONS

Where a producer's water supply or water quality problem is so urgent that the only viable option for maintaining an adequate short-term supply that meets drinking water standards involves objectives different from the operating principles outlined in Section 2.9.3, the ULARA Watermaster will review and comment on the short-term plan with the understanding that the party or nonparty will return to a long-term plan shortly after the emergency is over.

2.9.6 GROUNDWATER TREATMENT FACILITIES

Producers in the SFV will notify the ULARA Watermaster during the initial stages of planning of their intent to construct any facility to remove volatile organic compounds (VOCs) or any other contaminant from water produced from the SFV. Such notice shall include the following information:

1) The intended location and a description of the facility (type of treatment);
2) The capacity in gallons per minute;
3) The expected concentration of all identified contaminants in the groundwater to be treated;