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
IN THE
UPPER LOS ANGELES RIVER AREA
LOS ANGELES COUNTY

OCTOBER 1, 1986 - SEPTEMBER 30, 1987

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MAY 1988

CONVERSION FACTORS

English to Metric System of Measurement

Quantity	English unit	Multiply by	To get metric equivalent
Length	feet (ft)	.3048	metres (m)
	miles (mi)	1.6093	kilometres (km)
Area	square feet (ft^2)	.092903	square metres (m^2)
	acres	4046.9	square metres (m^2)
		.40469	hectares (ha)
		.40469	square hectometres (hm^2)
		.0040469	square kilometres (km^2)
	square miles (mi^2)	2.590	square kilometres (km^2)
Volume	gallons (gal)	3.7854	litres (l)
		.0037854	cubic metres (m^3)
	million gallons (10^6 gal)	3785.4	cubic metres (m^3)
	cubic feet (ft^3)	.028317	cubic metres (m^3)
	cubic yards (yd^3)	.76455	cubic metres (m^3)
	acre-feet (ac-ft)	1233.5	cubic metres (m^3)
		.0012335	cubic hectometres (hm^3)
		1.233×10^{-6}	cubic kilometres (km^3)
Volume/Time (Flow)	cubic feet per second (ft^3/s)	28.317	litres per second (l/s)
		.028317	cubic metres per second (m^3/s)
	gallons per minute (gal/min)	.06309	litres per second (l/s)
		6.309×10^{-5}	cubic metres per second (m^3/s)
	million gallons per day (mgd)	.043813	cubic metres per second (m^3/s)
	miners inch*	.70792 (.56634)	litres per second (l/s)
Temperature	Degrees Fahrenheit (°F)	$\frac{tF - 32}{1.8} = tC$	Degrees Celsius (°C)

* Section 24 of Water Code = 1/40 ft^3/s

( ) 1/50 ft^3/s commonly used in Southern California

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FOREWORD

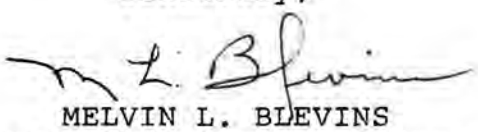
As Watermaster for the Upper Los Angeles River Area (ULARA), I am pleased to submit this report of the water supply conditions in ULARA during the 1986-87 Water Year. It was prepared in accordance with the provisions of the Final Judgment, signed by the Honorable Harry L. Hupp of the Los Angeles Superior Court on January 26, 1979. On April 30, 1985, Judge Vernon G. Foster replaced Judge Hupp as Judge of Record for the San Fernando Judgment.

This report describes the water rights in each basin, lists the allowable pumping for the water year 1987-88, and indicates the water in storage to the credit of each party as of October 1, 1987. In addition, this report includes background information on the history of the San Fernando Case; information as to each basin and the ULARA in total on water supply, ground water extractions, ground water levels, quantities of imported water use, recharge operations including amounts thereof, water quality conditions; and other pertinent information occurring during the water year pursuant to the provisions of the Judgment.

During the past Water Year, a significant revision was made to the ULARA Policies and Procedures. The revision addressed and provided for pumping by non-parties for well development, testing, cleanup, and long term dewatering. Prior to this there was no specific guideline for such pumping, but with increasing aquifer contamination problems and deeper excavations associated with new construction within the western portion of the basin, such a provision became necessary. The revision will maintain water rights in ULARA while making subsurface construction and cleanup of the aquifer possible.

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

Sincerely,



MELVIN L. BLEVINS
Senior Hydrologic Engineer
and ULARA Watermaster
(Reg. C.E. No. 12863)

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ULARA WATERMASTER REPORT
FOR WATER YEAR 1986-87

Report Prepared By:

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Mark Aldrian	Hydrologic Engineering Associate
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Consultant

John F. Mann, Jr., Ph.D.	Consulting Geologist and Hydrologist

I. INTRODUCTION

Upper Los Angeles River Area (ULARA) encompasses all the watershed of the Los Angeles River and its tributaries above a point in the river designated as Los Angeles County Department of Public Works (LACDPW) Gaging Station F-57C-R, near the junction of the Los Angeles River and the Arroyo Seco (Plates 1 and 2). ULARA encompases 328,500 acres, composed of 122,800 acres of valley fill, referred to as the ground water basins, and 205,700 acres of hills and mountains. ULARA is bounded on the north and northwest by the Santa Susana Mountains; on the north and northeast by the San Gabriel Mountains; on the east by the San Rafael Hills, which separate it from the San Gabriel Basin; on the south by the Santa Monica Mountains, which separate it from the Los Angeles Coastal Plain; and on the west by the Simi Hills.

ULARA has four distinct ground water basins. The water supplies of these basins are separate and are replenished by deep percolation from rainfall and from a portion of the water that is delivered for use within these basins. The four ground water basins in ULARA are the San Fernando, Sylmar, Verdugo, and Eagle Rock Basins (Plate 2).

The San Fernando Basin, the largest of the four basins, consists of 112,000 acres and comprises 91.2 percent of the total valley fill. It is bounded on the east and northeast by the San Rafael Hills, Verdugo Mountains, and San Gabriel Mountains; on the north by the San Gabriel Mountains and the eroded south limb of the Little Tujunga Syncline which separates it from the Sylmar Basin; on the northwest and west by the Santa Susana Mountains and Simi Hills; and on the south by the Santa Monica Mountains.

The Sylmar Basin, in the northerly part of ULARA, consists of 5,600 acres and comprises 4.6 percent of the total valley fill. It is bounded on the north and east by the San Gabriel Mountains; on the west by a topographic divide in the valley fill between the Mission Hills and the San Gabriel Mountains; on the southwest by the Mission Hills; on the east by the Upper Lopez Canyon Saugus formation along the east bank of the Pacoima Wash; and on the south by the eroded south limb of the Little Tujunga syncline, which separates it from the San Fernando Basin.

The Verdugo Basin, north and east of the Verdugo Mountains in ULARA, consists of 4,400 acres and comprises 3.6 percent of the total valley fill. It is bounded on the north by the San Gabriel Mountains, on the east by a ground water divide separating it from the Monk Hill Subarea of the Raymond Basin, on the southeast by the San Rafael Hills, and on the south and southwest by the Verdugo Mountains.

The Eagle Rock Basin, the smallest of the four basins, is in the extreme southeast corner of ULARA. It comprises 800 acres and consists of 0.6 percent of the total valley fill.

History of Adjudication

The water rights in ULARA were established by the JUDGMENT AFTER TRIAL BY COURT in Superior Court Case No. 650079, entitled The City of Los Angeles, a Municipal Corporation, Plaintiff, vs. City of San Fernando, et al., Defendants, signed March 14, 1968 by the Honorable Edmund M. Moor, Judge of the Superior Court. Prior to the judgment, numerous pretrials were held subsequent to the filing of the action by the City of Los Angeles in 1955 and before the trial commenced on March 1, 1966.

On March 19, 1958, an Interim Order of Reference was entered by the Court directing the State Water Rights Board, now known as the State Water Resources Control Board (SWRCB), to study the availability of all public and private records, documents, reports, and data relating to a proposed order of reference in the case. The Court subsequently entered on June 11, 1958 an "Order of Reference to State Water Rights Board to Investigate and Report upon the Physical Facts (Section 2001, Water Code)."

A final Report of Referee was approved on July 27, 1962 and filed with the Court. The Report of Referee made a complete study of the geology, insofar as it affects the occurrence and movement of ground water and the surface and ground water hydrology of the area. In addition, investigations were made of the history of channels of the Los Angeles River and its tributaries; the areas, limits, and directions of flow of all groundwater within the area; the historic extractions of ground water in the basin and their quality; and all sources of water, whether they be diverted, extracted, or imported, etc. Said Report of Referee served as the principal basis for geological and hydrological facts for the original Trial Court Judgment in 1968 and Decision of the Supreme Court in 1975 (14 Cal 3d 199, 123 Cal Rept 1) and the Trial Court Judgment on remand on January 26, 1979.

The City of Los Angeles filed an appeal from the Judgment of the Trial Court with the Court of Appeal, which held a hearing on November 9, 1972, and issued its opinion on November 22, 1972. The opinion, prepared by Judge Compton and concurred in by Judges Roth and Fleming, reversed, with direction, the original judgment handed down by Judge Moor. In essence, the City of Los Angeles was given rights to all water in ULARA including the use of the underground basins. The defendants, however, were given the right to capture "return water", which is water purchased from the Metropolitan Water District of Southern California (MWD) that percolates into the basin.

A petition for rehearing was filed on December 7, 1972, but was denied by the Court of Appeal. On January 2, 1973, the defendants filed a petition for hearing with the State Supreme Court. The Court on March 2, 1973 advised the parties it would hear the case. The hearing was held on January 14, 1975.

On May 12, 1975, the California Supreme Court filed its opinion on the 20-year San Fernando Valley water litigation. This opinion, which became final on August 1, 1975, upheld the Pueblo Water Rights of the City of Los Angeles to all ground water in the San Fernando Basin derived from precipitation within ULARA. The City of Los Angeles' Pueblo Water Rights were not allowed to extend to the ground waters of the Sylmar and Verdugo Basins.

The City of Los Angeles was also given rights to all San Fernando Basin ground water derived from water imported by it from outside ULARA and either spread or delivered within ULARA. The Cities of Glendale and Burbank each were given rights to all San Fernando Basin ground water derived from water that each imports from outside ULARA and delivered within ULARA. San Fernando was not a member of MWD until the end of 1971, and had never prior thereto imported any water from outside ULARA.

The Supreme Court reversed the principal judgment of the Trial Court and remanded the case back to the Superior Court for further proceedings consistent with the Supreme Court's opinion. On remand the case was assigned to the Honorable Harry L. Hupp, Judge of the Superior Court of Los Angeles County.

The Final Judgment, signed by the Honorable Harry L. Hupp, was entered on January 26, 1979. Copies of the Final Judgment are available from the ULARA Watermaster, Post Office Box 111, Room 1466, Los Angeles, California 90051. The water rights set forth in the judgment are consistent with the opinion of the Supreme Court described above. In addition, the Final Judgment includes provisions and stipulations regarding water rights, the calculation of imported return water credit, storage of water, stored water credit, and arrangements for a physical solution for certain parties as suggested by the Supreme Court.

On August 26, 1983, the Watermaster reported to the Court pursuant to Section 10.2 of the Judgment that the Sylmar Basin was in a condition of overdraft. In response to the Watermaster's letter and a Minute Order of this Court, the Cities of Los Angeles and San Fernando responded by letters to the Court, agreeing with the Watermaster's report on overdraft. On March 22, 1984, Judge Harry L. Hupp signed a stipulation ordering, effective October 1, 1984, that the Cities of Los Angeles and San Fernando shall be limited in their pumping to bring the total pumping within the safe yield of the basin, less any rights exercised by the private parties.

On April 30, 1985, Judge Vernon G. Foster replaced Judge Hupp as Judge of Record for the San Fernando Judgment. Judge Foster retains the authority to oversee and implement the Judgment.

Extraction Rights

The extraction rights under the Judgment and Sylmar Basin Stipulation are as follows:

San Fernando Basin

Native Water. Los Angeles has an exclusive right to extract and utilize all the native water which, under the judgment, is evaluated to be 43,660 acre-feet per year.

Imported Return Water. Los Angeles, Glendale, and Burbank each have a right to extract from the San Fernando Basin the following amounts:

Los Angeles:	20.8 percent of all delivered water (including reclaimed water) to valley fill lands of San Fernando Basin.
Burbank:	20.0 percent of all delivered water (including reclaimed water) to San Fernando Basin and its tributary hill and mountain areas.
Glendale:	20.0 percent of all delivered water (including reclaimed water) to San Fernando Basin and its tributary hill and mountain areas (i.e., total delivered water [including reclaimed water] less 105 percent of total sales by Glendale in Verdugo Basin and its tributary hills).

Physical Solution Water. Several parties are granted limited rights to extract water chargeable to the rights of others upon payment of specified charges. The parties and their maximum physical solution quantities are as follows:

As to Los Angeles' Water:

Glendale	5,500 acre-feet per year
Burbank	4,200 acre-feet per year
Van de Kamp	120 acre-feet per year
Toluca Lake	100 acre-feet per year
Sportsmen's Lodge	25 acre-feet per year

As to Glendale's Water:

Forest Lawn	400 acre-feet per year
Environmentals Inc.	75 acre-feet per year

As to Burbank's Water:

Valhalla	300 acre-feet per year
Lockheed	25 acre-feet per year

Stored Water. Los Angeles, Glendale, and Burbank each have rights to store water in the San Fernando Basin and the right to extract equivalent amounts.

Sylmar Basin

Native and Imported Return Water. San Fernando and Los Angeles have equal rights to pump the safe yield of the basin (6,210 acre-feet), less private party pumping, with each party allowed to pump approximately 3,105 acre-feet per year. Private parties Meurer Engineering and Kisag Moordigian have overlying rights to extract and use on their lands overlying the Sylmar Basin all native water reasonably necessary for the acreage owned by them to meet beneficial uses.

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

Verdugo Basin

Glendale and Crescenta Valley own mutually prescriptive rights to extract 3,856 acre-feet and 3,294 acre-feet per year, respectively.

Eagle Rock Basin

Native Water. The Eagle Rock Basin has no significant native safe yield.

Imported Return Water. Los Angeles has the right to extract or cause to be extracted the recharge to the basin.

Physical Solution Water. Sparkletts and Deep Rock have rights to extract water chargeable to Los Angeles.

Watermaster Service

In preparing the 1986-87 annual report, the Watermaster collected and reported all information affecting and relating to the water supply and disposal within ULARA. Such information includes the following items:

1. Water supply

    a. Precipitation and runoff
    b. Imports and exports

2. Water use and disposal

    a. Extractions
        (1) Used in valley fill area
        (2) Exported from each basin

b. Water outflow
   (1) Surface
   (2) Subsurface
   (3) Sewers

3. Water levels

4. Water quality

5. Ownership and location of new wells

Administrative Committee .

Section 8, Paragraph 8.3 of the ULARA judgment established an Administrative Committee for the purpose of advising the Watermaster in the administration of his duties. The duly appointed members of the Committee, as of September 30, 1987, are:

City of Burbank

Fred Lantz
Thomas H. McCauley (Alternate)

City of Glendale

Michael Hopkins (President)
Don Baker (Alternate)

City of Los Angeles

Le Val Lund
Dennis C. Williams (Alternate)

City of San Fernando

Arthur Kidman
Rick Navarro (Alternate)

Crescenta Valley County Water District

Robert K. Argenio (Vice-President)
Ray Marsden (Alternate)

Private Parties

Charles Meurer
Roger Meurer

The Administrative Committee may be convened by the Watermaster at any time in order to seek its advice. In addition, the Committee is responsible for reviewing with the Watermaster the proposed annual report.

During the 1986-87 water year, the Administrative Committee met on April 28 and August 11, 1987. The following items were discussed at the April 28 meeting.

1. Amount of Groundwater Stored in San Fernando Basin by Parties.
2. Status of Groundwater Quality Studies in the San Fernando Valley.
   a) North Hollywood/Burbank Aeration Tower Facility
   b) Well Packer Project
   c) Superfund Study
   d) Underground Tank Leakage Problems
   e) San Fernando Groundwater Quality Study - ICC Committee
   f) AB 1803 - Programs on Water Quality Monitoring - Status
3. Verdugo Basin Groundwater Development - Status.
4. State-Mandated Solid Waste Assessment Tests (SWAT).
   a) Sheldon-Arleta Landfill
   b) Branford Landfill
   c) Lopez Landfill
   d) Toyon Landfill
5. Judgment Amendment for Groundwater Pumping in Dealing with Pollutant Evaluation and Cleanup.
6. Review of Draft 1985-86 Watermaster Report.

The following items were discussed at the August 11 meeting:

1. ULARA Policies and Procedures - July 1987.
2. Status of Groundwater Pumping for Cleanup - Watermaster Policy.
3. Underground Tank Leak Site Investigations.
4. Pumping for Dewatering - Watermaster Policy.

Summary of 1986-87 Operating Conditions

Table 1 compares statistics for this period of record and the prior water year.

Rainfall on the valley fill area was 36 percent of normal as compared to 128 percent of normal the year before. Surface runoff leaving the valley at Gage F-57C-R for 1986-87 was 83,295 acre-feet. The amount conserved by the LACDPW in its spreading basins was 7,919 acre-feet, a decrease of 71 percent over last year. Total precipitation falling on the San Fernando Valley and its tributary hill and mountain areas was estimated to be 213,175 acre-feet for the 1986-87 water year. Of this total, approximately 19,170 acre-feet flowed from the valley as storm runoff and rising water, leaving 194,005 acre-feet which was beneficially used within the area (91 percent of the total).

Ground water extractions decreased in the Eagle Rock, Sylmar, and Verdugo Basins and increased in the San Fernando Basin during 1986-87. Total ULARA extractions amounted to 107,788 acre-feet as compared to an allowable pumping of 118,514 acre-feet. Of this total, 114,368 acre-feet represents the 1986-87 extraction rights of parties in the San Fernando Basin (see 1986-87 Table 15) plus the safe yield values of Sylmar and Verdugo Basins. The remaining 4,146 acre-feet is non-consumptive use pumping (see Table 13). Extractions used within ULARA increased by 1 percent (177 acre-feet) from last year.

For ULARA, gross imports increased by 9,811 acre-feet, or 1 percent, while imports used within ULARA increased less than 4 percent (13,566 acre-feet). Exports of Owens River water decreased by 3,755 acre-feet, or 1 percent. The total amount delivered to water users within ULARA increased by 14,126 acre-feet, or about 4 percent.

Sewage export was 167,514 acre-feet in 1986-87, an increase of 9 percent. Total reclaimed water used in ULARA (cooling towers, irrigation, etc.) increased 15 percent (383 acre-feet), while the total water reclaimed increased from 44,350 acre-feet to 63,605 acre-feet, an increase of 43 percent. Most of the reclaimed water is discharged to the Los Angeles River.

A total of 7,952 acre-feet of water, 7,919 native and 33 Owens River, was spread during the year, which was a 72 percent decrease from last year in spreading of imported and native water.

Ground water storage for the San Fernando Basin decreased by 31,940 acre-feet and increased in the Verdugo and Sylmar Basins by 14,230 acre-feet and 5,440 acre-feet, respectively, during 1986-87.

Summary of Allowable Pumping for 1987-88

Table 2 gives a summary of allowable pumping for the Cities of Los Angeles, Burbank, Glendale, San Fernando and Crescenta Valley County Water District. Stored water is also shown as a credit for these parties as of October 1, 1987.

TABLE I

UPPER LOS ANGELES RIVER AREA
SUMMARY OF OPERATING CONDITIONS
1985-86 AND 1986-87

Item		Water Year 1985-86	Water Year 1986-87
1. Active pumpers		19	18
2. Inactive pumpers (within valley fill)		0	2
3. Valley rainfall, in inches		20.27	5.99
4. Spreading operations, in acre-feet[a/]			
a. LACDPW		26,917	7,919
b. Los Angeles, City of		1,433	33
5. Extractions, in acre-feet		102,752	107,788
a. Used in ULARA		25,609	25,786
6. Gross imports, in acre-feet			
a. MWD water		72,568	75,862
b. Owens River water[b/]		594,500	601,017
	Total	667,068	676,879
7. Exports in acre-feet			
a. Owens River water		324,509	320,754
b. Groundwater by Los Angeles		76,956	81,802
	Total	401,465	402,556
8. Imports used in ULARA, in acre-feet		342,559	356,125
9. Reclaimed water, in acre-feet		44,350	63,605
a. Used in ULARA		2,637	3,020
10. Total delivered water used in ULARA, in acre-feet		370,805	384,931
11. Sewage export, in acre-feet[c/]		153,131	167,514

a/ Breakdown of spreading operations as to sources of water is shown in Table 6. Values include native and imported water.

b/ This value represents the summation of the gross amount of water delivered to and exported from ULARA. It does not include operational releases, reservoir evaporation, and water spread during the year.

c/ Total of sewage outflow from all four basins, including reclaimed water which is discharged into flood control channel and flows out of basin.

TABLE 2

SUMMARY OF ALLOWABLE PUMPING FOR ENSUING YEAR 1987-88

(In Acre-Feet)

	Extractions			Stored Water Credit*
	Native	Import Credit	Total	
San Fernando Basin				
Los Angeles	43,660	48,833	92,493	194,668
Burbank	--	4,730	4,730	34,022
Glendale	--	5,256	5,256	19,841
Sylmar Basin				
Los Angeles	--	--	3,087	(18)[a/]
San Fernando	--	--	2,784	6
Verdugo Basin				
Crescenta	--	--	3,294	--
Glendale	--	--	3,856	--

* As of October 1, 1987.

[a/] Parenthesis indicate deficit stored water credit.

Note: Calculation of these values shown in more detail in Tables 14, 15, and 16.

II. WATER SUPPLY CONDITIONS

The present water supply of ULARA consists of ground water recharge from imported water, hill and mountain runoff, and direct precipitation on the valley floor area. This includes runoff from precipitation falling on portions of the San Gabriel, Verdugo, Santa Monica, and Santa Susana Mountains; imports from the Mono Basin-Owens River system; imports from the Colorado River; imports from Northern California made available by the State Water Project; and reclaimed water.

Precipitation

ULARA has the climate of an interior valley and is hotter in summer and wetter in the winter than the coastal areas.

Precipitation varies considerably throughout ULARA, depending on topography and elevation. Mean seasonal precipitation ranges from about 14 inches at the western end of the San Fernando Valley to 35 inches in the San Gabriel Mountains. Approximately 80 percent of the annual rainfall occurs from December through March.

The 1986-87 water year experienced below average rainfall. The Valley floor received 5.99 inches of rain, whereas the mountains received approximately 8.86 inches. The weighted average of both valley and mountain areas was 7.77 inches, a decrease of 15.50 inches from last year. The 100-year (1881-1981) average precipitation for the valley and mountains is 16.48 inches and 21.91 inches, respectively. Table 3 presents a record of rainfall at 17 key precipitation stations which were used to develop the 100-year average rainfall and are described in the Report of Referee.

In the safe yield evaluation, precipitation on the valley is determined separately from that on the hills and mountains. The valley is made up of the four ground water basins, whereas the hills and mountains comprise the remaining areas in ULARA. Precipitation in the hills and mountains is evaluated to relate the runoff from the watersheds of Big Tujunga, Pacoima Creek, and Sycamore Canyon to the runoff records which are included in this report and also to calculate the ground water recharge. See Plate 5 for location of precipitation stations.

Runoff and Outflow from ULARA

The drainage area of ULARA contains 328,500 acres, of which 205,700 acres are hills and mountains. The drainage system, in turn, is made up of the Los Angeles River and its tributaries. Surface flow originates as storm runoff from the hills and mountains; storm runoff from the impervious areas of the valley; operational spills of imported water; industrial and sanitary waste discharges; and rising water.

TABLE 3

PRECIPITATION[a/]
(Inches)

LACDPW Number	Name	100-Year-Mean	1985-86 Precipitation	1986-87	
				Precipitation	Percent of 100-Year Mean
11D	Upper Franklin Canyon Reservoir	18.50	24.17	6.30	34
13C	Hollywood-Blix[b/]	16.63	22.21	5.66	34
14C	Roscow-Merrill[b/]	14.98	15.31	6.42[c/]	43
15A	Van Nuys[b/]	15.30	18.07	4.31	28
17	Sepulveda Canyon-Mulholland Highway	19.82	27.42	6.76	34
21B	Woodland Hills[b/]	14.60	20.61	5.51	38
23B-E	Chatsworth Reservoir[b/]	15.19	21.55	6.04	40
25C	Northridge-LADWP[b/]	15.16	18.83	5.61	37
33A-E	Pacoima Dam	19.64	21.64	7.63	39
47D	Clear Creek-City School	33.01	35.72	11.45[c/]	35
53D	Colby's Ranch	29.04	23.80	12.80[c/]	44
54C	Loomis Ranch-Alder Creek	18.62	21.24	10.67[c/]	57
210B	Brand Park	18.13	23.90	8.05[c/]	44
251C	LaCrescenta[b/]	23.31	26.71	8.77	38
259D	Chatsworth-Twin Lakes	18.70	16.68	5.98[c/]	32
293E	Los Angeles Reservoir[b/]	17.32	22.01	6.60	38
1190	Pacoima Canyon-North Park Ranger Station	23.06	30.92	11.01	48

Weighted average for valley stations - 5.99 inches (1986-87)
Weighted average for mountain stations - 8.86 inches (1986-87)

[a/] Data furnished by Los Angeles County Department of Public Works (LACDPW)
[b/] Valley Station
[c/] Estimated

A number of stream-gaging stations are maintained throughout ULARA, either by LACDPW or United States Geological Survey (USGS). The Watermaster has selected six key gaging stations which, in effect, record runoff from hydrologic areas in ULARA.

Table 4 summarized the monthly runoff for these gaging stations and compares the 1985-86 water year with the 1986-87 year. The larger runoff in 1985-86 reflects higher rainfall than 1986-87 in the valley and in the mountains.

Station F-57C-R registers all surface outflow from ULARA.

Station F-252-R registers flow from Verdugo Canyon plus flows from Dunsmore and Pickens Canyons.

Station E-285-R registers flow from the westerly slopes of the Verdugo Mountains and some flow east of Lankershim Boulevard. It also records any releases of reclaimed wastewater discharged by the City of Burbank.

Station F-300-R registers all flow east of Lankershim Boulevard plus outflow from Hansen Dam that is not spread. These records also include releases from Sepulveda Dam, which may include extractions from Reseda wells.

Station F-168-R registers all releases from Big Tujunga Dam, which collects runoff from Tujunga Canyon northeast of the dam. Runoff below this point flows to Hansen Dam.

Station 118B-R registers all releases from Pacoima Dam that originate in Pacoima Canyon. Runoff below this point flows to the Lopez and Pacoima spreading grounds and on down to the Los Angeles River through lined channels.

The locations of these key gaging stations are shown on Plate 5. The mean daily discharge rates for these six gaging stations during 1986-87 are summarized in Appendix B.

The Watermaster has computed the surface flow of the Los Angeles River at Gaging Station F-57C-R as to the sources, i.e. storm runoff from precipitation, Owens River water, rising water, and industrial and reclaimed wastewater discharges. The Watermaster utilized the procedures outlined in the Report of Referee for estimating the approximate flow rates and sources of water passing Gaging Station F-57C-R. A similar calculation was made for Station F-252-R. A summary of the procedures used follows, and a tabulation of the computed flows is shown in Table 5.

TABLE 4

MONTHLY RUNOFF AT SELECTED GAGING STATIONS*
(In Acre-Feet)

Station	Water Year	Month												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Total
F-57C-R	1985-86	4360	19810	6340	22180	33970	29250	8510	5540	5370	5530	5530$_E$	8690$_E$	155,090
Los Angeles River	1986-87	6475	10480	6370	9860	8460	10760	5300	5310	5330	4690	4910^E	5350^E	83,295
F-252-R	1985-86	192	1120	118	1680	1910	1920	297$_E$	220$_E$	299$_E$	315$_E$	195$_E$	473$_E$	8,739
Verdugo	1986-87	210	580	190	480	690	590	170^E	180^E	170^E	180^E	180^E	170^E	3,790
E285-R	1985-86	600	1190	421	1670	1780	1760	795	394	303	340	233	619	10,105
Burbank Storm Drain	1986-87	430	1070	500	1420	600	520	260	450	570	360	450	280	6,910
F-300-R	1985-86	2610	11100	3530	13260	21740	17210	4780$_E$	3140$_E$	2970$_E$	2940	3180	4780	91,240
L.A. River Tujunga Ave.	1986-87	4650	6690	4360	6440	4690	6260	3630^E	3795^E	3700^E	3120	3020	3880	54,235
F-168-R	1985-86	18	593	503	1230	4100	3260	1210	358	90	387	24	19	11,792
Big Tujunga Dam	1986-87	68	177	317	291	443	651	424	170	13	18	185	18	2,775
118B-R	1985-86	+	+	+	+	1967	2410	1668	317	359	362	+	+	7,083
Pacoima Dam	1986-87	+	6	+	+	212	+	+	+	+	4	+	+	222

* See Plate 5 for gaging station location.

+ - No measurable flow.

E - Estimated.

TABLE 5

SEPARATION OF SURFACE FLOW AT STATIONS F-57C-R AND F-252-R
(In Acre-Feet)

Period	Base Low Flow		Storm Runoff	Total Measured Outflow
	Rising Water[a]	Waste Discharge		
Station F57C-R				
1971-72	3,602	8,219	35,049	46,870
1972-73	4,596	8,776	100,587	113,959
1973-74	2,694	6,366	79,818	88,878
1974-75	427	7,318	56,396	64,141
1975-76	261	6,741	32,723	39,725
1976-77	839	7,128	58,046	66,013
1977-78	1,331	7,449	357,883	366,663
1978-79	2,840[d]	16,450[d]	119,810	139,100
1979-80	5,500[d]	16,500[d]	[b]	[b]
1980-81	4,710	19,580	51,940	76,230
1981-82	1,280	18,180	80,000	99,460
1982-83	3,460[d]	17,610	384,620	405,690
1983-84	3,000[d]	17,780	49,090	69,870
1984-85	3,260	21,600	46,300	71,160
1985-86	3,880	48,370	102,840	155,090
1986-87	110	64,125	19,060	83,295
29-year average 1929-57	6,810	770	30,790	39,950
Station F252 R				
1971-72	2,050	0	2,513	4,563
1972-73	1,706	0	7,702	9,408
1973-74	1,772	0	5,613	7,385
1974-75	1,333	0	4,255	5,588
1975-76	2,170	0	2,380	4,550
1976-77	1,683	0	2,635	4,318
1977-78	1,168	0	23,571	24,739
1978-79	2,470	0	[b]	[b]
1979-80	5,150[c]	0	7,752	12,902
1980-81	5,780	0	2,917	8,697
1981-82	3,710	0	5,367	9,077
1982-83	5,330[d]	0	21,384	26,714
1983-84	4,000[d]	0	[b]	[b]
1984-85	2,710	0	3,970	6,680
1985-86	2,470	0	6,270[d]	8,740[d]
1986-87	2,100[d]	0	1,690[d]	3,790[d]

a/ Includes rising water past rubber dam at Headworks Spreading Grounds, Verdugo Channel, and Los Angeles River Narrows.

b/ Data not available.

c/ Verdugo Basin. Large increase in 1979-80 is probably due to a change in the method of measurement.

d/ Estimated.

The base low flows were separated from the surface runoff by the use of the hydrographs of Station F-57C-R. Base flows consist of rising water and industrial waste plus reclaimed water. Separation of base flow from surface runoff is based on the following assumptions:

> Rising water equals base low flow minus the sum of industrial discharge water and reclaimed water. Industrial discharge waters are estimated from City of Los Angeles waste permits, Los Angeles-Glendale and Tillman reclamation plant discharges, and low flows in the Burbank-Western storm drain which include wastewater from the Burbank reclamation plant.
>
> When the City of Los Angeles diverts water at the Headworks spreading grounds, most of the rising water is diverted. When there is no diversion, a portion of the rising water may percolate upstream from Station F-57C-R.

Historically, the surface runoff obtained from the hydrographs of Station F-57C-R consisted primarily of storm runoff and Owens River water. The last releases of Owens River water into the Los Angeles River occurred in February 1971 due to the San Fernando earthquake. Releases in the future are expected to be minimal, but if they do occur, separation of surface runoff will be based on the following assumptions:

> Net storm runoff equals surface runoff minus Owens River water.
>
> If the Headworks diversion structure is used, all releases of Owens River waters are diverted to the Headworks spreading grounds. If the Headworks diversion structure does not divert water, all releases of Owens River waters are considered as passing Station F-57C-R.

Ground Water Recharge

Local precipitation can have a marked influence on the ground water supply and water in storage. However, there is a wide variation in the annual amount of runoff as a result of changes in both precipitation and retentive characteristics of the watershed.

Urban development during the past years in ULARA has resulted in much of the rainfall being collected and routed into paved channels, which discharge into the Los Angeles River, and subsequently being carried out of the basin.

To somewhat overcome the increased runoff due to urbanization, Pacoima and Hansen Dams, originally built for flood protection,

were utilized to regulate storm flows to recapture the flow in downstream spreading basins operated by LACDPW, as well as the City of Los Angeles. Operation of Hansen Dam for the purpose of spreading water for recharge has become increasingly more difficult due to the sand and gravel that has accumulated within the forebay of the dam.

LACDPW operates the Branford, Hansen, Lopez, and Pacoima spreading grounds. The City of Los Angeles, in turn, operates the Tujunga and Headworks spreading grounds. Plate 2 shows the locations of these spreading basins. The spreading grounds operated by LACDPW are utilized for spreading native water and imported water under contract. The spreading grounds operated by the City of Los Angeles are utilized to spread Owens River and native waters, ground water, and the discharge from the Reseda wells. Table 6 summarized the spreading operations for the 1986-87 water year.

Ground Water Table Elevations

During the 1986-87 water year, the Watermaster collected and processed data to determine prevailing ground water conditions in ULARA during the spring and fall of 1987. Plates 7 and 8 show these conditions. Change in ground water surface elevation from fall of 1986 to fall of 1987 as presented in Plate 9 reflects the effects of variations in spreading, ground water extractions, and replenishment from rainfall. Plate 10 provides a diagrammatic sketch of the direction travel time for ground water flow in the San Fernando and Verdugo Basins in 1980.

TABLE 6

1986-87
SPREADING OPERATIONS
(In Acre-Feet)

Month	Native Water Spread by Los Angeles County Department of Public Works					Water Spread by City of Los Angeles			Total San Fernando Basin Spreading
	Spreading Basins					Tujunga Spreading Grounds		Headworks Spreading Grounds	
	Branford	Hansen	Lopez	Pacoima Native	Pacoima Owens River	Native Water	Owens River Water		
Oct.	0	25	0	0	0	0	0	0	25
Nov.	0	418	0	0	0	0	0	0	418
Dec.	0	587	0	21	0	0	0	0	608
Jan.	0	1,010	0	96	0	0	0	0	1,106
Feb.	0	854	141	177	0	0	21	0	1,193
Mar.	0	1,220	0	173	0	0	0	0	1,393
Apr.	0	695	0	0	0	0	0	0	695
May	0	700	0	0	0	0	0	0	700
June	0	578	0	0	0	0	0	0	578
July	0	439	0	0	0	0	0	0	439
Aug.	0	416	0	0	0	0	0	0	416
Sept.	0	369	0	0	0	0	12	0	381
Totals	0	7,311	141	467	0	0	33	0	7,952

Figures 1 and 2 depict water levels at key wells with their approximate locations indicated by numbers shown on Figure 2 map.

Water Reclamation

Water reclamation presently provides a source of water for irrigation, industrial and recreational uses, and ground water recharge which occurs in the unlined section of the Los Angeles River. Six wastewater reclamation plants are in operation in ULARA. A tabulation of operating water reclamation plants is shown on Table 7.

Water Quality

Water resources management must take into account water quality as well as water supply. The total dissolved solids (TDS) concentration in water is the quality indicator that is generally used. A comparison of the TDS content in the various water sources is shown in Figure 3. Representative mineral analyses of imported, surface, and ground waters for 1986-87 are contained in Table 8.

An Interagency Coordinating Committee has been formed to coordinate the implementation of the Groundwater Quality Management Plan - San Fernando Valley Basin - in order to deal with the organic contaminants TCE and PCE found in the groundwater. Table 9 shows the total number of wells for 1986-87 exceeding the California DOHS action levels for these contaminants.

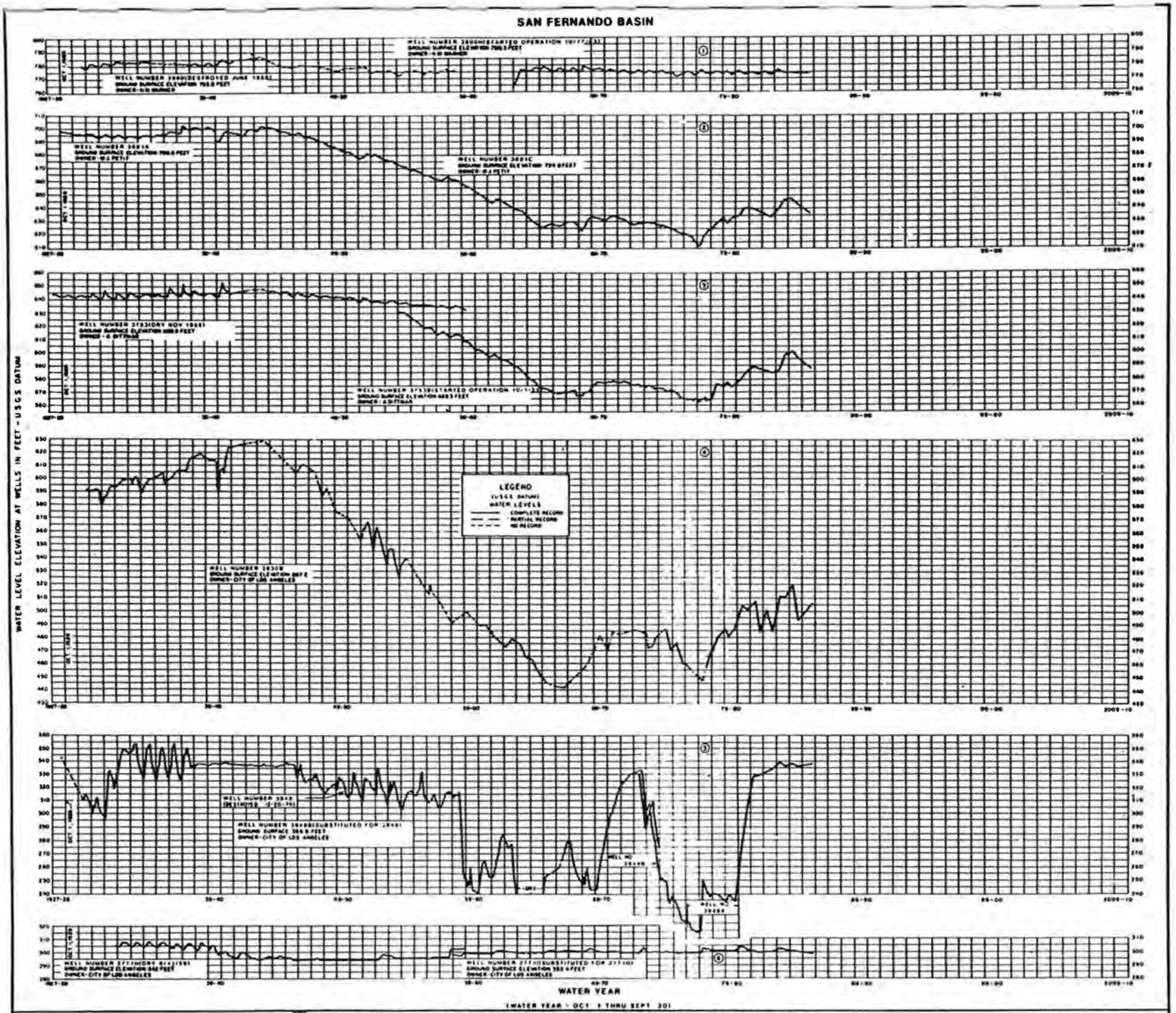

FIGURE 1 - FLUCTUATION OF WATER LEVEL ELEVATION AT WELLS IN THE SAN FERNANDO BASIN

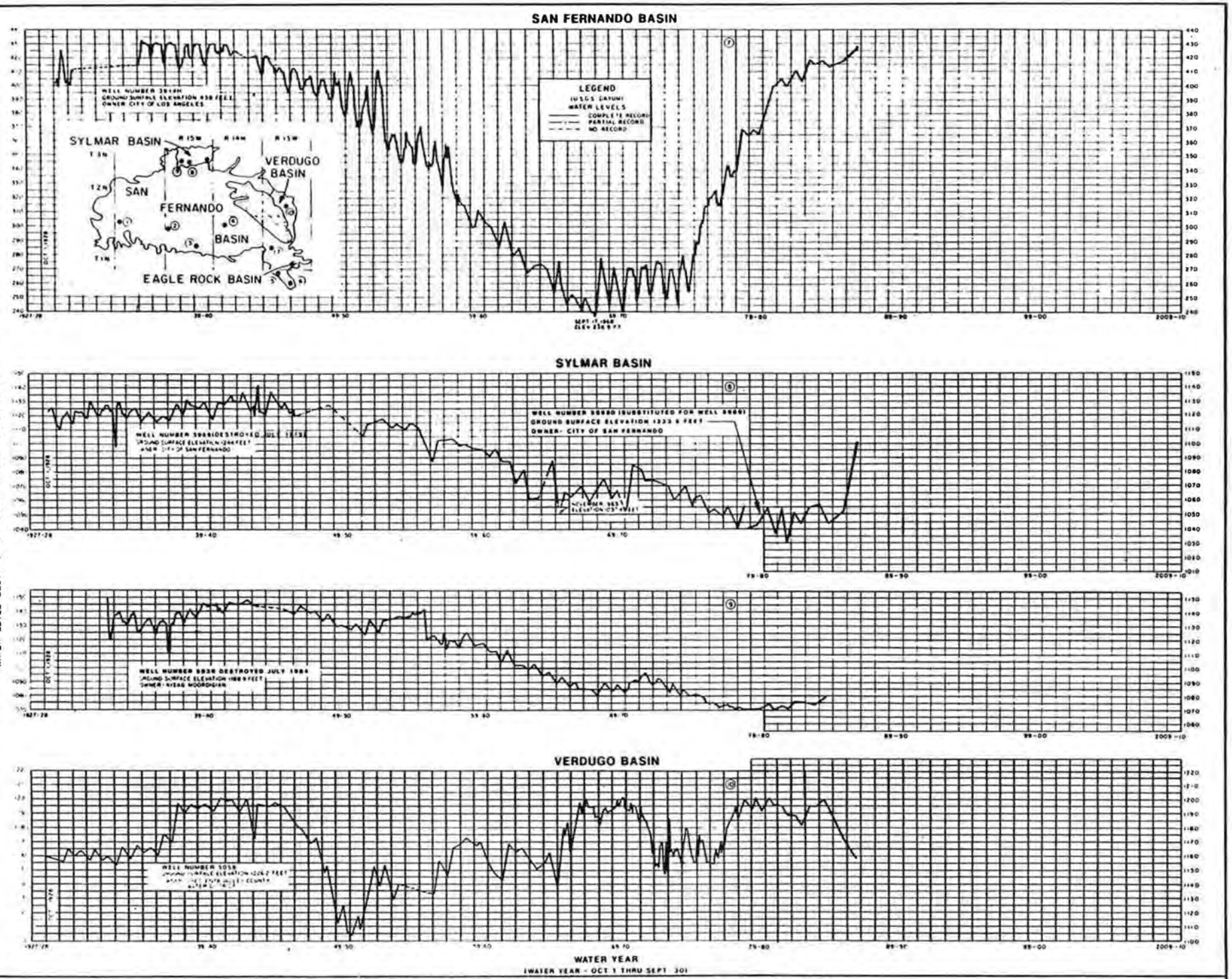

FIGURE 2 - **FLUCTUATION OF WATER LEVEL ELEVATION AT WELLS IN THE SAN FERNANDO, SYLMAR AND VERDUGO BASINS**

TABLE 7

WATER RECLAMATION PLANTS, 1986-87
(In Acre-Feet)

Plant	Treated	Used in ULARA	Discharged to Los Angeles River
San Fernando Basin			
City of Burbank	3,750	560	3,470
Los Angeles-Glendale	23,065	1,718[a/]	20,638
Donald C. Tillman	36,664	616[e/]	35,095
Indian Hills Mobile Homes[c/]	20	20[b/]	0
Rocketdyne (Santa Susana Field Laboratory)	89	89	0
The Independent Order of Foresters[d/]	17	17[b/]	0
Total	63,605	3,020	59,203

a/ Total water delivered (267 AF) to the phosphate plant in Glendale for cooling water includes 50 percent evaporation and the rest to Los Angeles River; 1,449 AF delivered to Griffith Park by City of Los Angeles for irrigation and to Los Angeles-Glendale plant for wash down, cooling, and irrigation; 2 AF used by Cal/Trans for freeway landscape irrigation.

b/ Land irrigation.

c/ Water supply from nearby well.

d/ Water supply from pipeline from LADWP.

e/ Water used for in plant use.

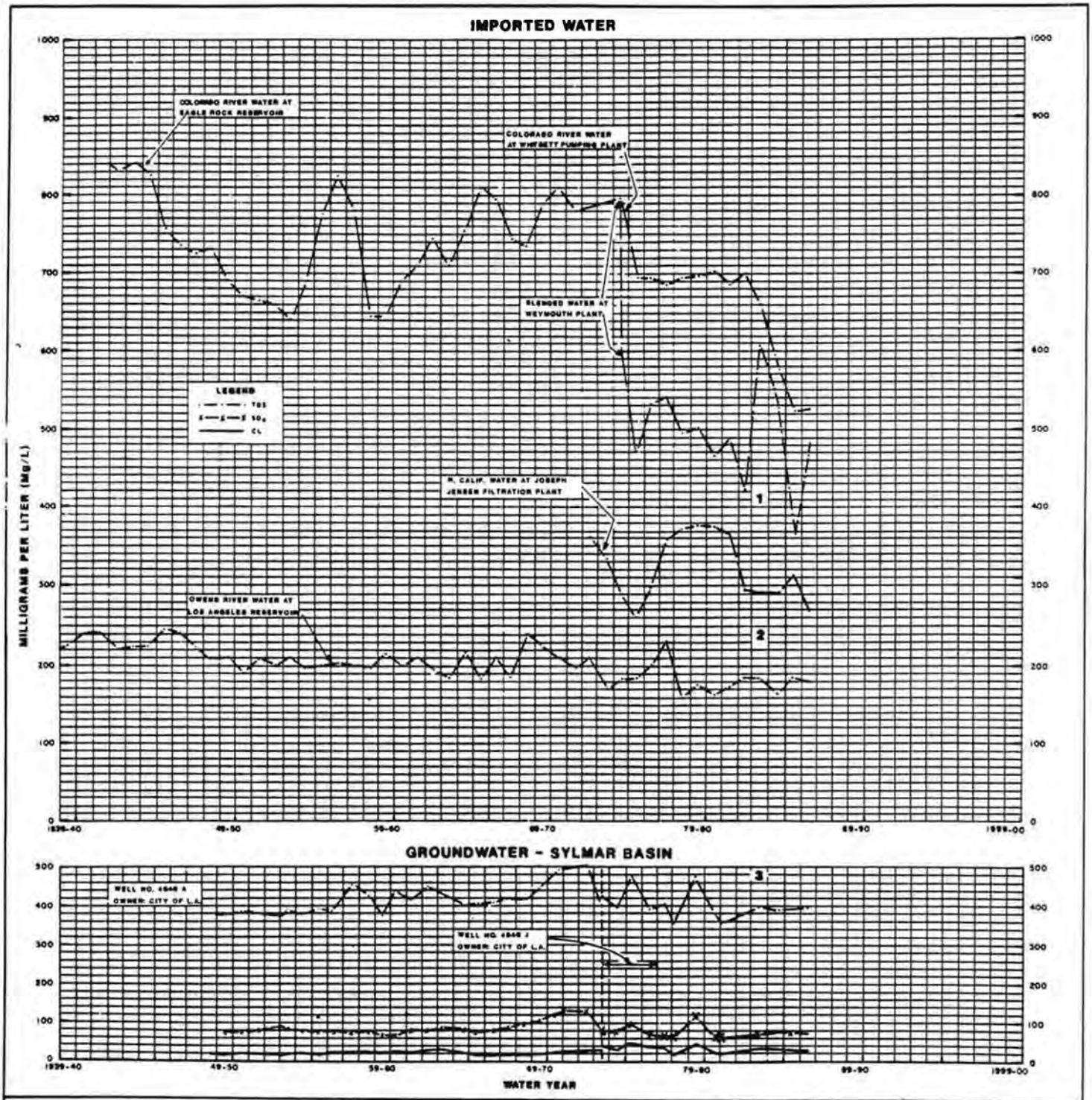

Figure 3 - MINERAL CONSTITUENTS OF WATER SOURCES IN THE ULARA

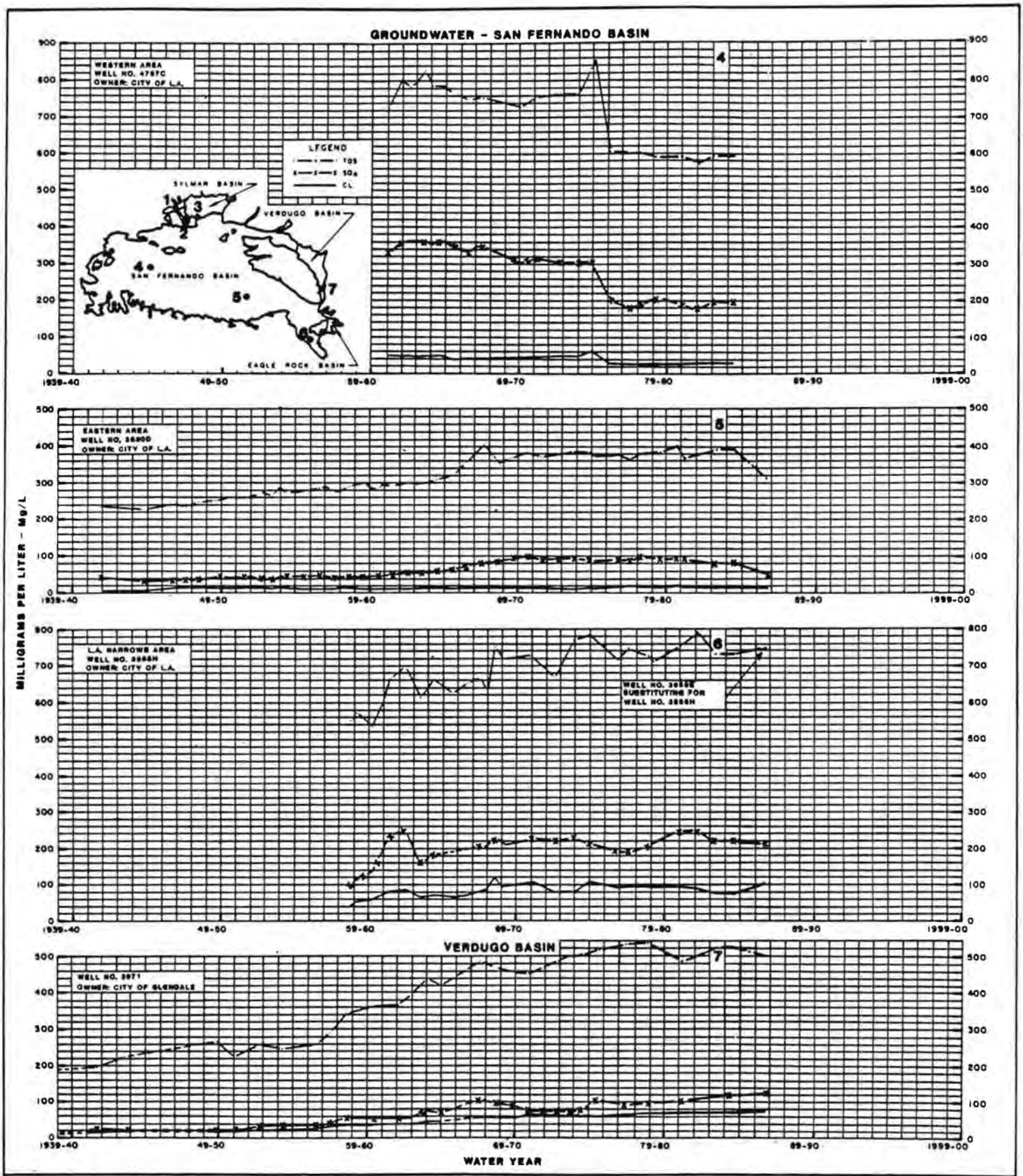

Figure 3(cont.) - MINERAL CONSTITUENTS OF WATER SOURES IN THE ULARA

TABLE 8

REPRESENTATIVE MINERAL ANALYSIS OF WATER

Well Number or Source	Date Sampled	EC x 10^6 at 25°C	MINERAL CONSTITUENTS IN Milligrams per liter (mg/l) / Milliequivalents per liter (me/l)												TDS Total Dissolved Solids mg/l	Total Hardness as $CaCO_3$ mg/l
			pH	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	NO_3	F	B		
Imported Water																
Blended State Project and Colorado River Water at Eagle Rock Reservoir	86-87	728	7.98	57 2.9	22 1.8	60 2.6	3.4 0.1	-- --	131 2.6	158 3.3	54 1.5	2.7 0.04	0.29 0.02	0.17 0.02	435	234
Owens River Water Upper Van Norman Reservoir Inlet	86-87	286	8.11	20 1.00	5.8 0.5	29 1.3	3.5 0.1	-- --	104 2.1	19 0.4	14 0.4	0.13 0.0	0.46 0.02	0.33 0.03	180	74
State Project Water at Joseph Jensen Filtration Plant (Influent)	86-87	481	7.85	27 1.35	13 1.08	47 2.0	2.8 0.07	0 0	98 2.0	57 1.2	58 1.6	2.25 0.04	0.18 0.01	-- --	269	123
Surface Water																
Los Angeles River at Sepulveda Blvd.	86-87	864	7.3	43 2.1	17 1.4	92 4.0	9.8 0.3	0.0 0.0	154 3.1	125 2.6	75 2.1	11.5 0.2	-- --	0.60 0.17	433	176
Los Angeles River at Colorado Blvd.	86-87	875	8.74	56 2.8	21 1.7	87 3.8	9.5 0.2	32 0.6	115 2.3	138 2.8	89 2.5	10.2 0.16	-- --	0.51 0.14	573	216
Burbank Western Wash at Los Angeles River	86-87	1011	8.2	41 2.0	20 1.6	110 4.8	12 0.3	8 0.2	147 2.9	140 2.9	108 3.0	13.3 0.21	-- --	0.53 0.15	642	183
Los Angeles-Glendale Reclamation Plant Discharge to Los Angeles River	86-87	960	7.5	43 2.2	18 1.5	119 5.2	11 0.3	0.0 0.0	0.0 0.0	134 2.8	118 3.3	19.0 0.31	-- --	0.61 0.17	612	179
Groundwater																
(San Fernando Basin - Western Portion)																
4757C (Reseda No. 6)	10/13/83	944	7.80	115 5.75	31 2.54	43 1.87	2.1 0.05	-- --	301 4.94	200 4.17	33 0.93	2.6 0.19	0.31 0.02	0.24 0.07	595	416
(San Fernando Basin - Eastern Portion)																
3790G**** (No. Hollywood No. 34)	02/12/87	502	7.7	58 2.9	16 1.33	24 1.04	2.6 0.07	-- --	185 3.7	54 1.13	16 0.45	8.9 0.14	0.20 0.01	0.21 0.02	316	208
3841C (Burbank No. 6)	02/09/88	475	7.9	55 2.75	10.5 0.88	32 1.4	3.6 0.09	1.0 0.02	211 4.22	45 0.94	15 0.42	1.24 0.02	0.30 0.02	-- --	280	180
3913H (Grandview No. 16)	06/18/87	520	7.90	57 2.85	12 1.00	36 1.58	3.4 0.09	1.08 0.02	211 4.22	50 1.04	21 0.59	2.3 0.04	0.52 0.03	-- --	310	193
(San Fernando Basin - L.A. Narrows)																
1959E (Pollock No. 4*)	10/28/87	1180	7.3	108 5.4	43 3.58	86 3.75	3.9 0.1	-- --	250 5.0	215 4.48	101 2.85	23.5 0.34	-- --	0.98 0.09	743	445
(Sylmar Basin)																
4840J (Mission No. 7**)	09/30/87	627	7.7	64 3.20	20 1.67	30 1.30	3.8 0.1	-- --	190 3.8	74 1.54	27 0.76	13.3 0.21	0.3 0.02	0.17 0.02	395	240
5959 (San Fernando No. 1)	02/13/85	850	7.60	100 5.0	17 1.39	30 1.30	3.1 0.08	-- --	-- --	65 1.35	32 0.90	21 1.75	0.31 0.02	-- --	400	319
(Verdugo Basin)																
3971 (Glorietta No. 1)	06/09/87	845	7.2	89 4.45	32 7.67	36 1.57	3.0 0.08	0.23 0.01	207 4.14	108 2.25	76 2.14	75 1.21	0.21 0.01	-- --	500	356
5069F (CVCWD No. 12***)	11/26/85	860	6.50	83.4 4.17	32.0 2.67	34.3 1.49	3.3 0.08	0.04 0.00	183 3.00	99.0 2.06	70.0 1.97	101 7.21	0.16 0.01	-- --	550	342

* Substituted for Pollock No. 6
** " " Mission No. 5
*** " " CVCWD No. 14
**** " " No. Hollywood No. 19

Imported Water

A. Owens River-Mono Basin water is sodium bicarbonate in character and is the highest quality water available to ULARA. Its TDS concentration averaged about 210 milligrams per liter (mg/1) for 30 years before 1969. The highest on record was 320 mg/1 on April 1, 1946, and the lowest 150 mg/1 on September 17, 1941. Average TDS concentration for 1986-87 was 180 mg/1, which was 3 percent lower than the 185 mg/1 for 1985-86.

B. Colorado River water is predominantly sodium-calcium sulfate in character, changing to sodium sulfate after treatment to reduce total hardness. Samples taken at the Burbank turnout between 1941 and 1975 indicated a TDS concentration high of 875 mg/1 in August 1955 and a low of 625 mg/1 in April 1959. The average TDS over the 34-year period was approximately 740 mg/1. Tests conducted at the Lake Matthews showed an average TDS of 534 mg/1 for 1986-87, an increase of 2 percent from last year.

C. Northern California water (State Water Project water) is sodium bicarbonate-sulfate in character. It generally contains less TDS and is softer than local and Colorado River water. Since its arrival in Southern California in April 1972, the water had a high TDS concentration of 390 mg/1 and a low of 247 mg/1. Tests of Northern California water are taken at the Joseph Jensen Filtration Plant. Average TDS concentration during 1986-87 was 269 mg/1, a decrease of 14 percent over last year.

D. Colorado River and Northern California water were first blended at the Weymouth Plant in May 1975. In the 1986-87 period, TDS had an average value of 484 mg/1 which was a 32 percent increase from 1985-86. Blending ratios vary at the Weymouth Plant and tests are taken from the effluent.

Surface Water

Surface runoff contains salts dissolved from rocks in the tributary areas. Surface water is sodium-calcium, sulfate-bicarbonate in character. In 1986-87, low flows in the Los Angeles River at Colorado Boulevard had an average TDS content of 573 mg/1 and a total hardness of 216 mg/1, a decrease over last year of 14 and 27 percent, respectively.

Ground Water

Ground water in ULARA is moderately hard to very hard. The character of groundwater from the major water-bearing formations is of two general types, each reflecting the composition of the surface runoff in the area. In the western part of ULARA, it is calcium sulfate-bicarbonate in character, while in the eastern part, including Sylmar and Verdugo Basins, it is calcium bicarbonate.

Groundwater is generally within the recommended limits of the United States Public Health Service Drinking Water Standards, except for: 1) areas of the eastern San Fernando Valley and part of the Verdugo Basin where high concentrations of TCE and PCE are present; 2) wells in the western end of the San Fernando Basin having excess concentrations of sulfate; and 3) those in the lower part of the Verdugo Basin having abnormally high concentrations of nitrate. In each area the groundwater is either being water quality treated, blended or not pumped in order to meet DOHS Drinking Water Standards.

Groundwater Quality Management Plan

During 1986-87, the Interagency Coordinating Committee (ICC) continued to implement the recommendations of the Groundwater Quality Management Plan - San Fernando Valley Basin (GWQMP) which are to protect the groundwater basin and to reduce concentrations of trichloroethylene (TCE) and tetrachloroethylene (PCE). There were seven active subcommittees operating during 1986-87 to implement the GWQMP recommendations. More than 20 state and local agencies are participating in the subcommittees. Several noteworthy accomplishments, described below, resulted from subcommittee activities.

Underground Tanks, Sumps, and Pipelines

The Fire Department of the City of Los Angeles has funded nine additional staff positions to handle underground tank programs.

Measures necessary for Los Angeles area environmental protection in connection with the proposed Angeles Pipeline Project were investigated during the year.

The number of Los Angeles area underground tank leak cases handled by the California Regional Water Quality Control Board - Los Angeles has grown from 88 cases in 1983 to 393 cases by November 1986.

Private Sewage Disposal System

The City of Los Angeles Bureau of Sanitation is implementing the ordinance adopted in 1985, requiring the proper abandonment of commercial and industrial Private Sewage Disposal Systems (PSDS) and connection to the public sewer system. A survey of the number of PSDSs that require abandonment was performed. A total of 752 Notices to Connect to available sewers were issued to property owners.

As part of the above effort, the Bureau of Engineering is continuing work on 18 sewer construction projects in unsewered areas of the City in the San Fernando Valley. The project locations are shown on Plate 11. These projects are on schedule, with completion planned for 1991. The first project began construction in January 1988. Once the sewer construction projects are completed, existing PSDSs can be abandoned, and commercial building waste-water discharges can be routed to the public sewer system.

Landfills - Recent legislation, A.B. 3525 (1984), has required the State Water Resources Control Board (SWRCB) to conduct an evaluation of the impact of solid waste disposal sites upon air and water quality within the state. Under this program, each year a designated number of owners of disposal sites are required to prepare and submit Solid Waste Assessment Test (SWAT) Reports indicating the extent to which their site impacts groundwater and air quality. The City of Los Angeles as owner of the Sheldon-Arleta, Toyon, Lopez, and Branford landfills must submit SWAT Reports for these facilities to the Regional Water Quality Control Board. DWP has assisted in the selection of the contractors to prepare these reports and has provided technical information. The final SWAT Report for Sheldon-Arleta Landfill was submitted to the RWQCB on July 1, 1987. The DWP has provided water quality, Tujunga Spreading Grounds data, and water level information to assist the Los Angeles City Bureau of Sanitation in performing the SWAT. The SWAT Report for Sheldon-Arleta Landfill was completed July 1, 1987; and for Toyon, Lopez, and Branford Landfills due July 1, 1988.

Water Quality Monitoring - Cities and agencies in the Upper Los Angeles River Area continued to monitor the volatile organic contamination in their production well fields. Table 9 shows the results of this monitoring and the scope of the contamination by summarizing the number of ULARA wells that are contaminated at various levels above the California State Department of Health Services action levels of 5 ppb for TCE and 4 ppb for PCE.

Water Treatment - The LADWP has proceeded with the development of the North Hollywood-Burbank Aeration Facility. DWP is proceeding with the construction phase of the project. The supply wells and the well collector line are under construction.

The DWP continues its research of technologies for the removal of organic chemicals from groundwater sources. James M. Montgomery, Consulting Engineers, Inc., in cooperation with Dr. William Glaze of UCLA, is currently conducting this research under a cooperative agreement between DWP and the U.S. EPA. A contract for a 2,000 gpm pilot unit utilizing ozonation and hydrogen peroxide is being prepared.

The LADWP completed a contract for installation of 14 well packers in the San Fernando Valley on September 1, 1987. The purpose of the project was to seal off the contaminated upper zone of the aquifer by inflating a packer in the well casing opposite a low permeable zone and pumping cleaner water from the lower portion of the aquifer.

The results of the well packer project were summarized in a report entitled "Use of Well Packers to Control TCE and PCE Contaminants". The report was presented at the National Water Well Association Conference on Southwest Groundwater Issues on March 23-25, 1988.

U.S. EPA Superfund Program - On October 17, 1986, the Federal Superfund Program was reauthorized by Congress for an expenditure of $8.5 billion over the next five years. LADWP and EPA entered into cooperative agreements to conduct Remedial Investigations (RI) on four Superfund sites in the SFVB at a funding level of $7.6 million. The four sites officially designated as cleanup sites are the North Hollywood, Crystal Springs, Pollock, and Verdugo Well Field areas. Additionally, a cooperative agreement has been entered into between EPA and LADWP for the construction of an aeration facility to treat groundwater in the North Hollywood area for $2.2 million. Contracts have been awarded to J. M. Montgomery Engineers to perform the RI in the SFVB and to design the Aeration Facility. Completion of the construction at the Aeration Facility is planned for June, 1988.

A Community Work Group for the SFVB Superfund Program was formed and held four meetings during the year to obtain community input to the overall program. A SFVB Superfund Management Committee was also formed and met twice during the year to direct implementation of the Program.

Leaking Underground Tank Investigations - During 1986-87, major underground tank leak investigations with the potential for impacting ground water were active at numerous sites. The sites being investigated include Centralab, Lockheed, Riker Lab-3M, Bendix, and Rockwell-Rocketdyne. As part of these investigations, that are being conducted under the direction of the Regional Water Quality Control Board - Los Angeles Region, wells have been drilled and ground water has been extracted for the purpose of well development and testing. Design work to implement remedial measures is in progress. Following is the amount of water pumped by these non-parties during 1986-87:

Party	Amount of Water Pumped (Acre-Feet)
Lockheed[a/]	0.74
Riker Labs	0.05
Rockwell	1.09
Total	1.88

a/ Lockheed is a party to the Judgment entered on January 26, 1979. However, they have not pumped since the Judgment was entered, except for their groundwater quality investigation.

On July 1, 1987 the ULARA Policies and Procedures were revised to include the 1984 Sylmar Basin Stipulation and two new sections: Section 2.5, "Pumping by Non-Parties for Cleanup"; and Section 2.6, "Other Pumping by Non-Parties". These two new sections address pumping by non-parties for well development, testing, cleanup, and long-term dewatering. The revised ULARA Policies and Procedures were approved at the August 11, 1987 ULARA Administrative Committee meeting. First Financial Plaza Site was the first non-party to reach an agreement with the City of Los Angeles regarding long-term dewatering. From the period July 1, 1987 to September 30, 1987, First Financial Plaza Site pumped a total of 6.43 AF, this amount was subtracted from Los Angeles' water rights.

Other Activities - The DWP continued construction of a new production well field in the Sun Valley area of the San Fernando Valley to provide a safe and adequate water supply to its customers. Rinaldi-Toluca Well Nos. 1 through 7 and Nos. 10 through 13 have been completed, and drilling of Rinaldi-Toluca Well Nos. 8, 9, 14, and 15 is scheduled for the upcoming year. The southern portion of the string of wells is expected to be on-line in June of 1988.

TABLE 9

1986-87
ULARA WELL FIELDS* -
WELLS EXCEEDING CALIFORNIA DOHS ACTION LEVELS
FOR TCE AND PCE

	Number of Wells											
	City of Los Angeles								Others			Total
	NH	CS	P	HW	E	W	V	Total	B	G	CVCWD	
TCE Levels (ppb)												
5-20	10	0	1	0	2	2**	1	16	5	5	0	26
20-100	1	4	1	6**	1	3	0	16	2**	3	0	21
100	7**	0	0	0	0	0	0	7	1	2	0	10
Total	18	4	2	6	3	5	1	39	8	10	0	57
PCE Levels (ppb)												
4-20	8**	0	2	3**	0	1	0	14	3**	2	4	23
20-100	0	0	0	2	0	0	0	2	2**	0	0	4
100	0	0	0	0	0	0	0	0	3**	0	0	3
Total	8	0	2	5	0	1	0	16	8	2	4	30

Well Fields:
NH - North Hollywood
CS - Crystal Springs
P - Pollock
HW - Headworks
E - Erwin
W - Whitnall
V - Verdugo
B - City of Burbank
G - City of Glendale
CVCWD - Crescenta Valley County Water District

* Values in table represent an average for the year.

** Where data was not available for 1986-87, most recent data was used to compile this table.

III. WATER USE AND DISPOSAL

Water delivered for use in ULARA is either imported water, local ground water, local surface diversions, reclaimed, or a mixture of local and imported water, depending on the area and water system operation. During the 1986-87 water year, the total amount delivered to water users in ULARA was 384,931 acre-feet. Of this total, 25,786 acre-feet was ground water, 356,125 acre-feet was imported, and 3,020 acre-feet was reclaimed water. Refer to Figure 5 for a monthly breakdown. The basin contains 546 wells, of which 136 are active and 410 are inactive, observation, test, capped, etc.

The original trial court adjudication of ground water rights in ULARA (no longer in effect) restricted all ground water extractions, effective October 1, 1968. On that date, extractions were restricted to approximately 104,000 acre-feet per water year. This amounted to a reduction of approximately 50,000 acre-feet below the previous six-year average. The State Supreme Court's opinion, as implemented on remand in the Final Judgment entered on January 26, 1979, provides a similar restriction in ground water pumping. Refer to the previous section entitled "History of Adjudication" for details of allowed pumping.

Sparkletts Drinking Water Corporation and Deep Rock Water Company are the only parties that extract water from the Eagle Rock Basin.

Figure 4 illustrates the annual ground water extractions and total water imported in ULARA, beginning with the 1944-45 water year. Note the change from 1968-69 through the present.

It can also be noted that for 10 years before pumping was restricted, imports exceeded extractions from 50,000 to 90,000 acre-feet per year and that, for the water years 1968-69 to 1986-87, the difference has increased to between 110,000 and 270,000 acre-feet.

Figure 5 provides an analysis of the monthly relationship between rainfall, ground water extractions, and imported supply. Data relates to all ULARA and not to any one specified ground water basin. The precipitation values were obtained from stations on the valley floor (Table 3).

Ground Water Extractions

Appendix A is the record of groundwater extractions for the 1986-87 water year, and Plate 6 shows the approximate location of the well fields which pumped this water. A total of 96,604 acre-feet was pumped from the San Fernando Basin compared to an allowable pumping of 105,237 acre-feet. Of this total, 101,091 acre-feet is extraction rights by parties in the San Fernando Basin (see 1986-87 Table 15), with its remaining 4,146 acre-feet

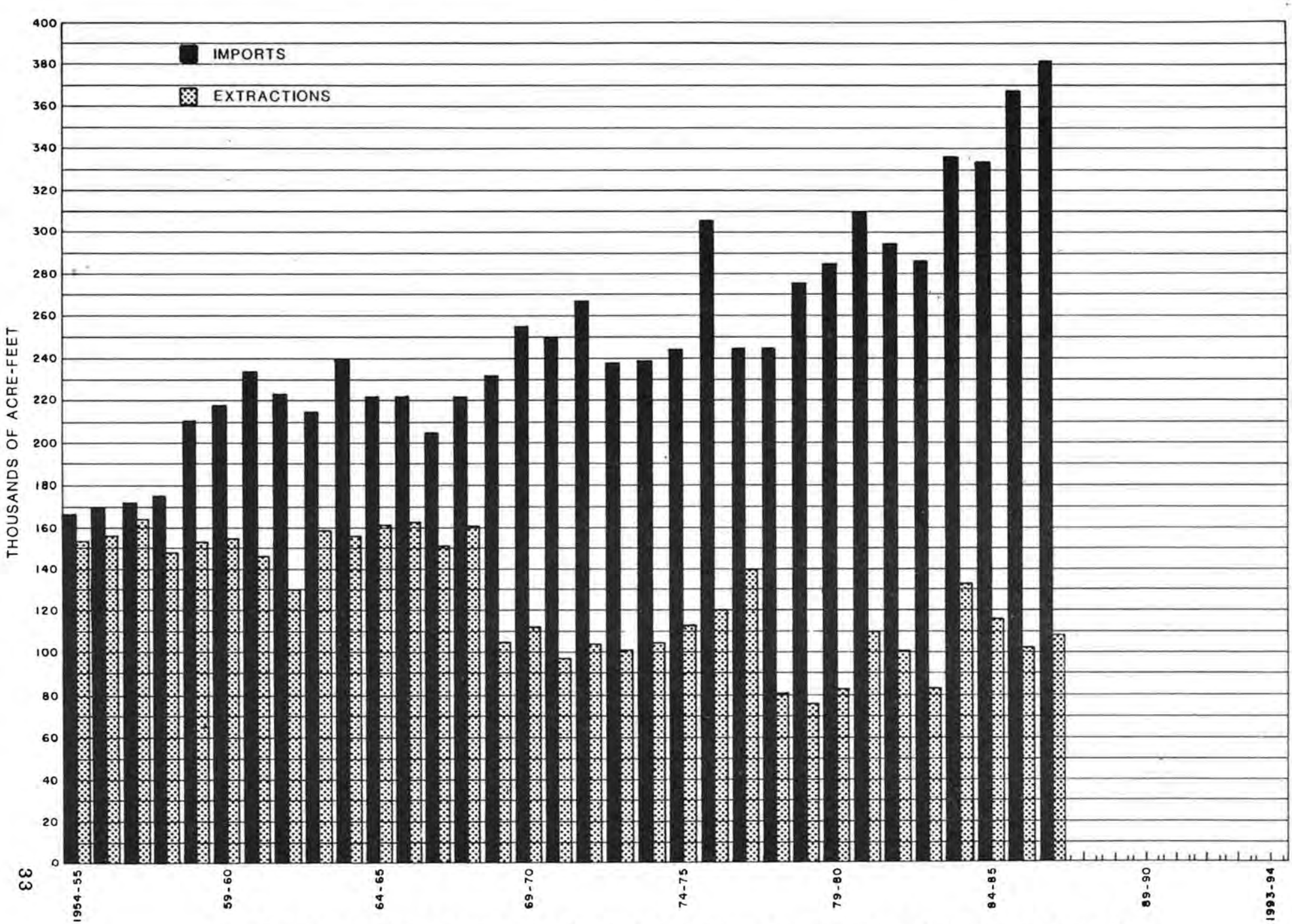

Figure 4 – GROUNDWATER EXTRACTIONS AND USE OF IMPORTED WATER IN UPPER LOS ANGELES RIVER AREA

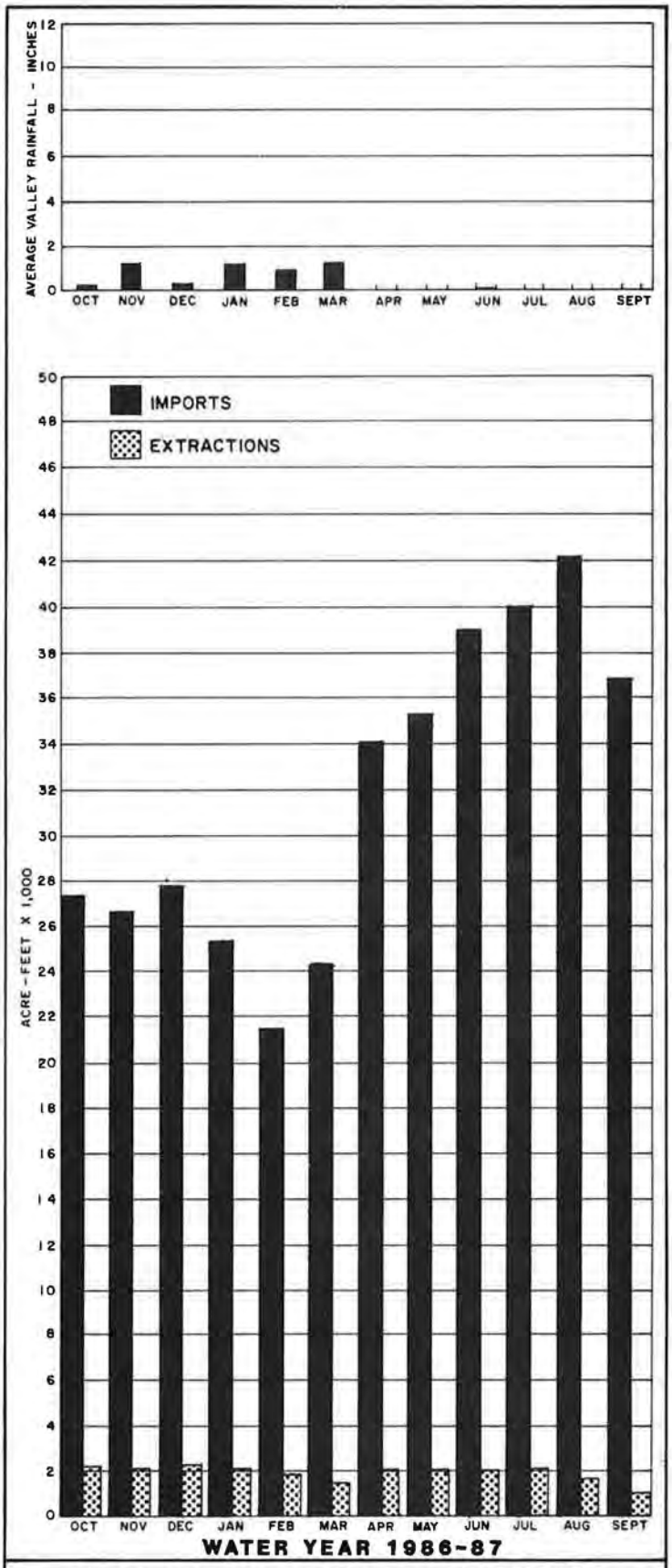

Figure 5 – MONTHLY WATER DEMAND AND AVERAGE RAINFALL IN UPPER LOS ANGELES RIVER AREA

being nonconsumptive use pumping (see Table 13). A total of 6,139 acre-feet was pumped from the Sylmar Basin and 4,874 acre-feet from the Verdugo Basin. The respective safe yield values for these three basins are 90,680, 6,210, and 7,150 acre-feet. Pumping in the Verdugo Basin is less than safe yield due to water quality problems. Construction of water blending facilities in the Verdugo Basin by the City of Glendale was completed in September 1981. This allows poorer quality Verdugo Basin ground water to be blended with MWD water and now enables Glendale to approach pumping its prescriptive right in the Verdugo Basin.

Imports and Exports of Water

Residential, commercial, and industrial expansions in ULARA require the importation of additional water supplies to supplement that provided by the ground water basins.

The imported supplies to ULARA are from the City of Los Angeles' Owens-Mono Basin aqueduct and through the MWD distribution system, which consists of California and Colorado River Aqueduct waters.

Exports from ULARA, exclusive of sewage, are limited to the City of Los Angeles, which exports imported and ground water. Table 10 summarized the nontributary imports and exports from ULARA. Ground water imports and exports in and out of ULARA are listed in Table 12.

Physical Data by Basins

The Watermaster has collected and summarized data in Table 12 which show the water supply and disposal in each of the basins.

The information for Table 12 was submitted by the parties. In instances where estimates were made by the parties, such as water delivered to hill and mountain areas, sewage exported, etc., these were based upon methods consistent with previous estimates computed by SWRCB for the San Fernando Valley reference. The Watermaster also made computations of subsurface outflows based on similar computations made by SWRCB.

Pumping by private parties is summarized in Table 13.

San Fernando Basin Allowable Extractions

Table 14 lists San Fernando Basin extraction rights for the Cities of Burbank, Glendale, Los Angeles, and San Fernando for the water year 1987-88. Table 15 shows San Fernando Basin stored water as of October 1, 1986 and October 1, 1987. All rights are based on the City of Los Angeles vs. City of San Fernando, et al., judgment, dated January 26, 1979.

Sylmar Basin Allowable Extractions

Table 16 shows Sylmar Basin stored water as of October 1, 1986 and October 1, 1987. All rights are based on the March 22, 1984 stipulation between the City of San Fernando and the City of Los Angeles and filed with the Superior Court.

Facts Relevant to Ground Water Storage Capacity*

San Fernando Basin. The total ground water storage capacity of San Fernando Basin is approximately 3,200,000 acre-feet, with a regulatory storage capacity of 350,000 acre-feet required by the judgment. As of 1954-55, the temporary surplus in the basin had been exhausted by the overextraction of approximately 520,000 acre-feet.

Sylmar Basin. Sylmar Basin consists of confined aquifers with ground water storage space of approximately 310,000 acre-feet.

Verdugo Basin. The ground water storage capacity of Verdugo Basin is approximately 160,000 acre-feet.

Change in Ground Water Storage

San Fernando Basin. The change in storage for 1986-87 was -31,940 acre-feet, and the cumulative change in storage from 1954-55 through 1986-87 was -218,720 acre-feet. A comparison is made between the annual precipitation and the cumulative change in storage since the commencement of Watermaster activities for the San Fernando Basin. The average precipitation for the period 1968-69 through 1986-87 was 17.94 inches, compared to a long-term average of 16.48 inches of rainfall. During that time, the basin gained approximately 230,000 acre-feet of stored water. Through spreading and in-lieu recharge activities 250,000 acre-feet were stored. Thus, the natural change in storage has decreased 20,000 acre-feet. Refer to Table 11 for the annual precipitation and change in storage.

Sylmar Basin. The change in storage for 1986-87 was +5,440 acre-feet, and the cumulative change in storage from 1954-55 through 1986-87 was -17,860 acre-feet.

Verdugo Basin. The change in storage for 1986-87 was +14,230 acre-feet, and the cumulative change in storage from 1954-55 through 1986-87 was +33,850 acre-feet.

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* Information obtained from the City of Los Angeles vs. City of San Fernando, et al., Findings of Fact and Conclusions of Law dated January 26, 1979.

TABLE 10

ULARA - NONTRIBUTARY WATERS,
IMPORTS AND EXPORTS

(In Acre-Feet)

Source and Agency	1985-86	1986-87
Imports		
MWD water[a/]		
Burbank, City of	22,498	23,089
Crescenta Valley County Water District	2,662	2,696
Glendale, City of	20,672	22,637
Los Angeles, City of	9,971	8,638
La Canada Irrigation District	1,020	1,023
Las Virgenes Municipal Water District (nonparty)	15,227	16,522
San Fernando, City of	518	1,257
	72,568	75,862
Owens River water		
Los Angeles, City of	594,500[b/]	601,017[b/]
Total	667,068	676,879
Exports		
Owens River water		
Los Angeles, City of	-324,509	-320,754
Net Import	342,559	356,125

a/ Colorado River and Northern California waters combined.

b/ This value represents the summation of the gross amount of water delivered to and exported from ULARA. It does not include operational releases, reservoir evaporation, and water spread during the year.

TABLE 11

SAN FERNANDO BASIN
PRECIPITATION COMPARED TO
CHANGE IN STORAGE

Water Year	Valley Floor Precipitation (Inches)	Change in Storage (AF)	Cumulative Change in Storage (AF)
1968-69	29.00	+79240	+79240
1969-70	10.50	-9740	+69500
1970-71	15.57	+15340	+84840
1971-72	8.10	-17090	+67750
1972-73	20.65	+17020	+84770
1973-74	15.75	-21820	+62950
1974-75	14.74	-22580	+40370
1975-76	9.90	-30090	+10280
1976-77	14.19	-50490	-40210
1977-78	35.43	+136150	+95940
1978-79	21.76	+78080	+174020
1979-80	30.25	+99970	+273990
1980-81	11.04	-32560	+241430
1981-82	17.18	-530	+240900
1982-83	39.64	+121090	+361990
1983-84	9.97	-63180	+298810
1984-85	11.00	-31690	+267120
1985-86	20.27	-7980	+259140
1986-87	5.99	-31940	+227200
19-yr. average	17.94		

Note

(1) 100-year mean precipitation = 16.48 inches.

(2) Stored water through spreading and in-lieu pumping = 239,830 AF.

(3) Natural change in storage = +227,200 AF - 248,531 AF = -21,331 AF.

(4) The change in storage is based on the methodology used in the Report of Referee filed with the court in July 1962.

TABLE 12

1986-87
SUMMARY OF WATER SUPPLY AND DISPOSAL
SAN FERNANDO BASIN
(In Acre-Feet)

Water Source and Use	City of Burbank	City of Glendale	City of Los Angeles	City of San Fernando	All Others	Total
Extractions						
Total quantity extracted	29[h]	5,758	85,886	0	4,931	96,604
Used in valley fill	0	[d]	4,084	[d]	[d]	[d]
Imports						
MWD water	23,089	22,637	5,383	1,257	16,522	68,888
Owens River water	--	--	589,945[f]	--	--	589,945
Ground water from Sylmar Basin	--	--	3,114	2,754	0	5,868
Ground water from Verdugo Basin	--	1,440	--	--	--	1,440
Reclaimed water	560[g]	267[e]	2,067[c]	--	126	3,020
Exports						
Ground water:						
to Verdugo Basin	--	0	0	--	0	0
out of ULARA	--	--	81,802	--	0	81,802
Owens River water:						
to Eagle Rock Basin	--	--	1,176	--	--	1,176
out of ULARA	--	--	320,754	--	0	320,754
MWD:						
to Verdugo Basin	--	3,820	0	--	--	3,820
Total net delivered water	23,649	26,282[a]	282,663	4,011	21,579	358,184
Water delivered to hill and mountain areas						
Ground water	[d]	[d]	0	0	0	[d]
Owens River water	--	--	45,845	--	--	45,845
MWD water	[d]	[d]	2,045	0	16,522	[d]
Verdugo Basin water	--	[d]	--	--	--	[d]
Water outflow						
Surface	--	--	--	--	--	83,295
Subsurface	--	--	--	--	--	425
Sewers	11,255	18,740	70,185	1,907	--	102,087
Reclaimed	3,470	10,319	45,414	--	--	59,203

* See Table 13 for parties included.

a/ Total delivered water to the City of Glendale was 31,281 AF. Verdugo Basin metered sales times 105 percent equaled 4,999 AF. Therefore, the San Fernando Basin delivered water was 26,282 AF (31,281 AF minus 4,999 AF). Refer to Section 5.2.1.3 of Judgment.

b/ At Station F-57C-R where 29-year mean (1929-57) base low flow is 7,580 acre-feet.

c/ Used for irrigation at the Harding and Wilson Golf Courses, Crystal Springs picnic area, and freeway landscaping. Also used for wash down, cooling, and irrigation at the Los Angeles-Glendale plant and Tillman Water Reclamation Plant.

d/ These values are no longer calculated as per Judgment.

e/ Delivered to cooling towers of the phosphate plant in Glendale. Assumed 50 percent evaporation and 50 percent to Los Angeles River. Refer to Table 7 for all others.

f/ Includes Owens River water exported to Eagle Rock Basin and exported out of ULARA.

g/ This value is no longer estimated. Actual amount of reclaimed water is being metered by the City of Burbank.

h/ Water pumped for water quality testing only.

Note: Colorado River and Northern California waters combined and listed as MWD water.

TABLE 12

1986-87
SUMMARY OF WATER SUPPLY AND DISPOSAL
SYLMAR BASIN
(In Acre-Feet)

Water Source and Use	City of Los Angeles	City of San Fernando	All Others	Total
Extractions				
Total quantity	3,113	3,026	0	6,139
Used in valley fill	0	272	0	272
Imports				
Owens River water	10,308	--	--	10,308
MWD water	--	1,257	--	1,257
Exports				
Groundwater: to San Fernando Basin	3,113	2,754	0	5,867
Water delivered to hill and mountain area				
Owens River	447	--	--	447
Water outflow				
Surface	--	--	--	5,000[i/]
Subsurface: to San Fernando Basin[h/]	--	--	--	--
Sewers	820	189	0	1,009

h/ Computation not possible, well destroyed.

i/ Surface outflow is not measured. Calculated average surface outflow by Mr. Laverty - SF Exhibit 57.

TABLE 12

1986-87
SUMMARY OF WATER SUPPLY AND DISPOSAL
VERDUGO BASIN
(In Acre-Feet)

Water Source and Use	Crescenta Valley County Water District	City of Glendale	La Canada Irrigation District	City of Los Angeles	Total
Extractions					
Total quantity	2,255	2,619	0	0	4,874
Used in valley fill	2,196	1/	0	0	1/
Imports					
MWD water	2,696	3,820	1,023	0	7,539
Owens River water	--	--	--	764	764
Groundwater from:					
San Fernando Basin	--	--	--	--	--
Reclaimed water	--	--	--	--	--
Exports					
Groundwater to:					
San Fernando Basin	--	1,440	--	--	1,440
Water delivered to hill and mountain areas					
MWD water	71	1/	0	0	1/
Owens River water	--	--	--	115	115
Groundwater from:					
Verdugo Basin	59	1/	--	0	1/
San Fernando Basin	--	0	--	0	0
Water outflow					
Surface	--	--	--	--	8,740 j/
Subsurface:					
to Monk Hill Basin	--	--	--	--	300 k/
to San Fernando Basin	--	--	--	--	70
Sewage	1,600	1,535	0	160	3,295

j/ Information obtained from Station F-252C-R.
k/ Based on 29-year average (1929-57).
l/ These values are no longer required.

TABLE 12

1986-87
SUMMARY OF WATER SUPPLY AND DISPOSAL
EAGLE ROCK BASIN
(In Acre-Feet)

Water Source and Use	City of Los Angeles	Deep Rock[o/] Water Company	Sparkletts Drinking[o/] Water Corporation	Total
Extractions				
Total quantity	0	0	171	171
Used in valley fill	0	0	0	0
Imports				
Owens River water	1,176	--	--	1,176
MWD water	3,255	--	--	3,255
Groundwater	0	0	0	0
Exports				
Groundwater	0	0	171	171
Water delivered to hill and mountain areas				
MWD water	1,865	--	--	1,865
Owens River water	1,176	--	--	1,176
Water outflow				
Surface[m/]	--	--	--	--
Subsurface[n/]	--	--	--	--
Sewers	1,920	0	0	1,920

m/ Information not available

n/ Estimated in Supplement No. 2 to Report of Referee for dry years 1960-61. Currently, data not available for direct evaluation.

o/ Deep Rock Water Company and Sparkletts Drinking Water Corporation under a stipulated agreement with the City of Los Angeles; extract limited to 500 AF/year, and export given amount.

TABLE 13

1986-87
PUMPING BY NONCONSUMPTIVE USE, PHYSICAL SOLUTION,
AND PARTIES WITHOUT RIGHTS
SAN FERNANDO BASIN

(In Acre-Feet)

I.	Nonconsumptive Use Parties	
1.	Conrock Co.	2,608
2.	Livingston-Graham, Inc.	10
3.	Sears, Roebuck and Company	39
4.	Sportsmen's Lodge, Inc.	0
5.	Toluca Lake Property Owners Assn.	0
6.	Walt Disney Productions	1,489
7.	Total	4,146
II.	Physical Solution Parties	
1.	Environmentals Inc.	36
2.	First Financial Plaza Site	6
3.	Forest Lawn Cemetery Assn.	400
4.	Sportsmen's Lodge, Inc.	1
5.	Toluca Lake Property Owners Assn.	20
6.	Valhalla Memorial Park	319
7.	Total	782
III.	Parties Without Rights	
1.	Harper, Cecelia De Mille	1
2.	Mena, John and Barbara	1
3.	Total	2
IV.	Total Pumping by Private Parties	4,930

Note: Sportsmen's Lodge and Toluca Lake pumping is part nonconsumptive and part physical solution.

TABLE 14

1987-88
SAN FERNANDO BASIN EXTRACTION RIGHTS
(In Acre-Feet)

Item		Cities of		
		Burbank (1)	Glendale (2)	Los Angeles (3)
1.	Delivered water 1986-87	23,649	26,282	282,663
2.	Import delivered 1986-87	--	--	--
3.	Delivered to hill & mountain 1986-87	--	--	47,890
4.	Delivered to valley fill 1986-87	--	--	234,773
5.	Percent recharge	20%	20%	20.8%
6.	Return water extraction right 1987-88	4,730	5,256	48,833
7.	Native safe yield	0	0	43,660
8.	Total extraction right 1987-88	4,730	5,256	92,493

Items 1, 2 & 3 = Table 12
Item 4 = Item 1 minus Item 3
Item 5 = Article 5.2.1.3, page 17 of Judgment
Item 6, cols. (1) & (2) = Item 1 x Item 5
col. (3) = Item 4 x Item 5
Item 7 = Article 4.2.4, page 11 of Judgment
Item 8 = Item 6 + Item 7
-- = Data not required

TABLE 15

STORED WATER
SAN FERNANDO BASIN
(In Acre-Feet)

	Cities of		
	Burbank (1)	Glendale (2)	Los Angeles (3)
1985-86			
1. Stored water as of Oct. 1, 1985	24,781	21,245	180,370
2. Delivered water 1984-85	23,641	25,742	221,705
3. Return water extraction right 1985-86	4,728	5,148	46,115
4. Native safe yield	0	0	43,660
5. Total extraction right for 1985-86	4,728	5,148	89,775
6. Extractions for year	123	5,819	81,019
7. Physical solution extractions	(226)**	(429)**	31
8. Spread water	0	0	1,433
9. Stored water as of Oct. 1, 1986	29,386	20,574	189,873
1986-87			
10. Delivered water 1985-86	23,180	25,125	229,663
11. Return water extraction right 1986-87	4,636	5,025	47,770
12. Native safe yield	0	0	43,660
13. Total extraction right for 1986-87	4,636	5,025	91,430
14. Extractions for year	29[a/]	5,758	85,886
15. Physical solution extractions	(319)**	(436)**	27
16. Spread water	0	0	33
17. Stored water as of Oct. 1, 1987*	34,022	19,841	194,668

Items 3 & 11 = Items 2 & 10 x percent recharge
Items 5 & 13 = Items 3 + 4 & 11 + 12, respectively
Item 9 = Items 1 + 5 - 6 - 7 + 8
** Items 7 & 15 = All subtracted from Los Angeles
col. (1) = Valhalla pumping
col. (2) = Forest Lawn & Environmentals Inc. pumping
col. (3) = Toluca Lake, Sportsmens Lodge, and First Financial Plaza Site pumping. Only consumptive use portion charged to Los Angeles.
Item 17 = Items 9 + 13 - 14 - 15 + 16
* = Does not include return flow occurring during water year 1986-87.

[a/] Water pumped for water quality testing only.

TABLE 16

STORED WATER AND
1987-88 EXTRACTION RIGHTS
SYLMAR BASIN
(In Acre-Feet)

	Cities of		All Others (3)
	San Fernando (1)	Los Angeles (2)	
1985-86			
1. Stored water as of Oct. 1, 1985	(11)[c]	(40)[c]	--[b]
2. Native safe yield	3,105	3,105	[b]
3. Total extraction right for 1985-86	3,094[a]	3,065[a]	[b]
4. Extractions for year	3,166	3,075	1
5. Stored water as of Oct. 1, 1986	(73)[c]	(10)[c]	--
1986-87			
6. Stored water as of Oct. 1, 1986	(73)[c]	(10)[c]	--
7. Native safe yield	3,105	3,105	--[b]
8. Total extraction right 1986-87	3,032[a]	3,095[a]	[b]
9. Extractions for year	3,026	3,113	0
10. Stored water as of Oct. 1, 1987	6	(18)[c]	--
1987-88			
11. Stored water as of Oct. 1, 1987	6	(18)[c]	--
12. Native safe yield	3,105	3,105	--[b]
13. Total extraction right 1987-88	2,784[d]	3,087	[b]

a/ The safe yield of the Sylmar Basin is 6,210 acre-feet. Effective October 1, 1984, the safe yield less pumping by others is equally shared by Los Angeles and San Fernando. The extraction right also takes into account deficit stored water.

b/ Entitled to reasonable overlying landowner pumping amount.

c/ Parenthesis indicate deficit stored water.

d/ An audit performed on San Fernando's pumping records discovered over-pumping of 980 AF during a two-year period. The City of San Fernando requested to reduce extractions by 327 AF/year for a three-year period beginning 1987-88. The Watermaster has agreed to this.

Item 3 = Items 2 + 1
Item 5 = Items 3 - 4 - others divided by 2
Item 8 = Items 7 + 6
Item 10 = Items 8 - 9 - others divided by 2
Item 13 = Items 12 + 11

APPENDIX A

GROUNDWATER EXTRACTIONS

1986-1987 WATER YEAR

GROUND WATER EXTRACTIONS

(Acre-Feet)

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
							San Fernando Basin							
City of Burbank														
3841C	6A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.11	3.44	9.55
3882P	7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.44	0.91
3851K	13A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.34	3.08	6.42
3882T	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.72	0.24	2.96
3841G	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05	6.25	9.30
Party Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.69	13.45	29.14
Conrock Co.														
4916A	2	194.27	215.25	52.26	40.78	101.53	104.89	131.65	130.66	133.99	112.34	108.99	163.30	1489.91
4916	3	0.28	104.28	104.41	84.35	83.23	77.11	89.06	126.93	82.70	116.55	106.07	142.87	1117.84
Party Total		194.55	319.53	156.67	125.13	184.76	182.00	220.71	257.59	216.69	228.89	215.06	306.07	2607.75
Environmentals Inc.														
3934A	M050A	3.64	4.99	4.35	4.20	2.50	0.53	2.06	3.35	2.25	3.70	2.28	2.49	36.34
First Financial Plaza Site														
N/A	F.F.P.S.	-	-	-	-	-	-	-	-	-	2.25	2.09	2.09	6.43

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
Forest Lawn Cemetery Assn.														
3947B	3	1.63	10.29	14.56	6.79	11.46	7.87	14.06	5.27	12.64	18.45	22.62	14.39	140.03
3947C	4	0.00	0.00	0.00	0.00	0.00	5.71	21.11	32.20	31.44	31.59	5.34	26.15	153.54
3958K	7	4.50	6.44	6.94	6.66	5.49	4.06	10.22	14.43	14.27	8.36	11.76	13.31	106.44
Party Total		6.13	16.73	21.50	13.45	16.95	17.64	45.39	51.90	58.35	58.40	39.72	53.85	400.01
City of Glendale														
3924N	STPT 1	17.98	12.22	6.28	6.24	0.06	4.43	5.34	9.04	8.14	1.58	17.27	31.09	119.67
3924R	STPT 2	0.19	0.35	0.37	0.45	0.04	0.00	1.66	1.51	0.23	0.02	0.53	0.70	6.05
GVENT	GVENT	500.86	517.13	447.77	517.43	298.31	163.88	281.43	615.03	893.39	1005.40	391.91	0.00	5632.54
Party Total		519.03	529.70	454.42	524.12	298.41	168.31	288.43	625.58	901.76	1007.00	409.71	31.79	5758.26
Harper, Cecelia DeMille														
4940A	North	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	0.10[E]	1.20
Livingston-Graham, Inc.														
4916B	SnVal	1.33	0.73	1.16	0.28	0.19	1.72	0.77	0.69	0.00	0.86	1.04	1.34	10.11
City of Los Angeles														
3914L	CS-45	220.04	215.54	218.25	155.67	0.00	54.82	0.00	0.00	192.98	0.57	0.00	0.00	1057.87
3914M	CS-46	0.00	123.03	163.78	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	287.25
CS Total		220.04	338.57	382.03	155.67	0.00	54.82	0.00	0.00	192.98	1.01	0.00	0.00	1345.12

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
3831H	E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	168.27	286.80	271.95	727.02
3821I	E-2A	110.02	66.69	50.02	48.37	55.23	68.83	61.32	65.75	72.61	69.61	37.90	0.00	706.35
3831G	E-3	124.45	41.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.98	174.55
3921F	E-4	103.40	90.38	87.03	82.23	70.02	69.96	67.06	67.13	59.62	57.78	54.55	52.00	861.15
3831F	E-5	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.18	1.77	0.00	0.02	0.00	2.59
3821H	E-6	0.00	26.15	161.50	159.14	144.86	154.64	142.49	142.49	132.39	129.20	122.54	112.24	1427.64
E Total		337.87	224.34	299.17	289.74	270.11	293.42	270.87	275.55	266.39	424.86	501.81	445.17	3899.30
3894BB	H-25	0.00	0.14	0.00	1.54	0.00	0.00	293.46	344.61	0.00	0.00	0.00	0.00	639.75
3893L	H-26	0.00	0.05	0.00	0.00	0.00	0.00	0.00	1.45	0.00	0.00	0.00	0.00	1.50
3893K	H-27	0.00	0.00	2.30	2.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.39
3893M	H-28	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.83
3893N	H-29	0.00	0.11	0.00	0.00	0.00	0.00	2.73	0.00	0.00	0.00	0.00	0.00	2.84
3893P	H-30	0.00	0.14	0.00	0.00	0.00	0.00	0.00	2.69	0.00	0.00	0.00	0.00	2.83
H Total		0.00	0.58	2.30	3.63	0.00	0.00	296.19	349.44	0.00	0.00	0.00	0.00	652.14
3800	NH-2	181.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	181.20
3780A	NH-4	0.00	47.41	147.96	150.05	133.08	40.17	148.21	147.06	133.45	33.52	0.00	105.81	1086.72
3810S	NH-5	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.14
3770	NH-7	0.00	49.43	154.43	157.55	140.34	43.04	149.84	153.56	143.30	147.75	148.97	140.36	1428.57
3810	NH-11	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.28

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
3810A	NH-13	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
3810B	NH-14A	0.37	0.60	0.85	0.00	0.55	0.37	0.30	0.73	0.00	0.00	0.00	0.00	3.77
3790B	NH-15	126.86	121.95	120.78	124.93	98.78	0.00	0.00	0.00	132.00	132.76	131.61	117.91	1107.58
3820D	NH-16	45.64	27.32	0.00	85.24	269.15	291.60	282.74	290.98	257.72	282.23	281.15	268.76	2382.53
3820C	NH-17	183.24	212.21	228.01	236.94	210.22	220.59	43.34	0.00	119.17	285.38	285.17	272.66	2296.93
3820B	NH-18	0.00	0.00	0.00	0.00	32.85	344.01	347.96	359.16	337.03	350.53	350.55	335.75	2457.84
3830D	NH-19	0.00	0.00	0.00	0.00	0.00	0.00	4.41	0.00	0.00	0.00	0.00	0.00	4.41
3830C	NH-20	0.00	2.11	0.00	1.77	0.00	201.54	295.92	302.80	278.65	57.46	196.03	280.49	1616.77
3830B	NH-21	0.00	1.01	0.00	0.94	25.16	158.68	0.00	192.36	217.36	44.81	113.48	165.06	918.86
3790C	NH-22	287.28	275.67	277.25	280.28	252.96	79.32	236.96	0.00	0.00	100.48	281.98	267.79	2339.97
3790D	NH-23	0.00	40.47	209.14	195.78	180.35	49.43	159.09	204.89	192.70	199.73	195.69	186.96	1814.23
3800C	NH-24	0.00	0.00	2.25	0.00	2.04	49.72	115.68	363.25	313.55	354.43	260.61	212.90	1674.43
3790F	NH-25	0.00	90.27	282.55	286.76	251.65	77.66	281.38	284.90	261.66	262.44	253.95	229.75	2562.97
3790E	NH-26	0.00	0.00	0.00	0.00	47.41	71.79	253.77	261.37	240.11	247.84	243.25	232.94	1598.48
3820F	NH-27	0.00	0.16	1.56	0.00	134.32	264.49	249.89	250.44	229.55	231.09	220.62	201.31	1783.43
3810K	NH-28	0.00	0.48	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.00	3.25
3810L	NH-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.15	0.00	0.00	0.00	0.00	10.15
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	57.16	57.16
3810T	NH-31	0.00	0.00	0.00	0.00	4.98	0.00	0.00	1.95	201.49	292.13	274.54	246.83	1021.92
3770C	NH-32	0.00	0.00	0.00	0.00	0.00	52.43	268.46	276.40	259.99	263.94	268.11	258.93	1648.26
3780C	NH-33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	92.03	65.24	12.05	169.32
3790G	NH-34	263.16	249.86	246.26	254.52	230.67	73.30	268.90	274.43	244.22	243.80	243.69	231.25	2824.06

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
							San Fernando Basin							
3830N	NH-35	216.83	209.85	213.71	216.03	192.79	204.94	197.43	201.06	78.95	0.00	0.00	0.00	1731.59
3790H	NH-36	265.87	257.21	258.52	260.54	234.74	76.06	264.07	271.72	251.91	257.05	260.06	245.75	2903.50
3790J	NH-37	405.63	390.96	298.05	299.20	369.63	117.91	402.73	415.04	388.16	396.42	403.45	387.93	4475.11
3810M	NH-38	0.00	3.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.67	211.82	249.06	468.22
3810N	NH-39	457.16	345.37	462.01	472.13	436.50	486.16	447.50	463.13	454.36	455.38	442.68	425.44	5347.82
3810P	NH-40	0.00	0.00	2.85	0.00	0.00	0.00	339.86	441.42	427.53	421.26	415.27	389.24	2437.43
3810Q	NH-41	0.00	0.00	0.00	0.00	1.97	0.00	0.00	15.45	100.18	349.06	134.37	316.81	917.84
3810R	NH-42	410.56	400.35	401.13	38.50	0.00	0.00	0.00	0.00	86.27	432.19	419.19	394.52	2582.71
3790K	NH-43A	470.37	449.41	456.82	459.90	414.90	136.20	455.56	470.25	440.61	450.29	457.90	441.55	5103.76
3790L	NH-44	423.72	405.15	406.13	413.91	372.80	116.83	421.86	434.53	399.93	402.02	403.58	382.67	4583.13
3790M	NH-45	342.20	328.81	332.49	86.52	0.00	0.00	0.00	0.00	295.27	429.18	423.24	406.32	2644.03
NH Total		4080.09	3909.89	4604.95	4121.49	4037.84	3156.24	5636.00	6087.26	6485.12	7218.87	7386.77	7463.96	64188.48
3904J	CS-52(#1)	2.57	1.42	2.89	2.11	1.86	1.97	1.26	0.53	2.02	2.48	2.02	0.34	21.47
3904J	CS-52(#2)	2.38	1.29	2.64	1.93	1.70	1.81	1.15	0.53	1.86	2.27	1.84	0.32	19.72
CS Total		4.95	2.71	5.53	4.04	3.56	3.78	2.41	1.06	3.88	4.75	3.86	0.66	41.19
3959E	P-4	176.19	167.59	169.54	171.72	66.58	0.00	0.00	0.00	0.00	0.00	28.28	108.08	887.98
3958H	P-6	185.15	177.00	179.18	179.41	160.47	177.46	170.73	176.03	143.09	175.51	34.37	0.00	1758.40
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	0.28	0.28
P Total		361.34	344.59	348.72	351.13	227.05	177.46	170.73	176.03	143.09	175.51	62.65	108.36	2646.66

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
4992A	Tujunga Gallery	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57
3863H	V-1	108.31	102.04	100.69	93.80	80.03	85.88	81.34	80.26	79.45	78.01	79.11	66.12	1035.04
3863J	V-4	114.67	109.21	109.92	110.42	92.38	97.64	91.41	90.13	88.66	87.88	86.75	83.84	1162.91
3863L	V-11	0.00	0.00	0.00	0.00	0.00	116.60	230.03	234.00	225.09	229.52	224.15	215.54	1474.93
3853G	V-13	31.66	31.93	34.16	33.24	27.20	29.04	29.55	27.59	28.76	26.01	29.22	27.23	355.59
3854F	V-22	45.29	42.33	45.80	40.91	34.99	38.54	36.85	38.84	42.95	45.27	43.78	41.94	497.49
V Total		299.93	285.51	290.57	278.37	234.60	367.70	469.18	470.82	464.91	466.69	463.01	434.67	4525.96
3820E	W-1	0.00	0.30	1.95	1.91	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.00	4.67
3821B	W-2	0.00	2.41	0.0	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.34
3821C	W-3	288.45	124.01	0.00	42.84	204.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	660.03
3821D	W-4	369.92	345.32	331.75	306.71	272.25	276.49	242.61	232.55	216.21	211.80	202.94	187.81	3196.36
3831J	W-6A	212.56	202.62	208.91	206.48	189.74	207.28	197.43	202.60	187.56	191.09	187.60	168.99	2362.86
3832K	W-7	118.80	19.10	0.00	0.00	0.00	0.00	0.00	0.39	198.35	202.66	199.73	191.12	930.15
3832L	W-8	0.00	0.00	0.00	0.00	0.00	0.00	186.98	359.19	341.12	221.33	41.53	249.20	1399.35
3832M	W-9	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.47	28.52
3842E	W-10	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
W Total		989.73	693.83	542.61	559.87	666.72	483.77	627.02	794.73	943.24	827.39	631.80	825.59	8586.30
City of Los Angeles Total		6293.95	5800.59	6475.88	5763.94	5439.88	4537.19	7472.40	8154.89	8499.61	9119.08	9049.90	9278.41	85885.72

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
Mena, John & Barbara														
4973J	4973J	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.08[E]	0.96
Sears Roebuck & Co.														
3945	3945	2.37	0.77	1.27	1.06	13.32	2.49	1.20	1.18	1.21	6.56	4.84	2.89	39.10
Sportmen's Lodge, Inc.														
3785A	1	0.08	0.05	0.04	0.04	0.04	0.04	0.04	0.06	0.06	0.07	0.05	0.05	0.62
Toluca Lake Property Owners Assn.														
3845F	3845F	0.00	0.00	0.00	2.03	4.03	2.50	3.68	1.68	1.03	1.39	1.56	2.09	19.99
Valhalla Memorial Park														
3840K	4	20.26	14.30	17.78	11.92	4.37	13.05	31.89	38.64	42.26	50.21	42.28	32.16	319.12
Walt Disney Productions														
3874E	East	0.00	0.00	0.00	0.00	0.00	20.15	0.00	0.00	3.78	0.53	0.00	0.00	24.46
3874F	West	156.59	104.08	118.32	89.74	99.61	82.93	165.98	104.07	112.94	119.39	184.43	126.62	1464.70
Party Total		156.59	104.08	118.32	89.74	99.61	103.08	165.98	104.07	116.72	119.92	184.43	126.62	1489.16
Basin Total		7198.11	6791.65	7251.57	6536.09	6064.24	5028.73	8232.73	9239.81	9840.12	10598.51	9968.83	9853.52	96603.91

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
Sylmar Basin														
City of Los Angeles														
Plant	Mission	394.98	364.67	348.56	0.00	0.00	0.00	0.00	421.81	411.18	405.79	393.00	373.44	3113.43
Meurer Engineering Co.														
5998	3	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.01[E]	0.12
City of San Fernando														
5969D	2A	214.45	201.60	206.37	208.94	173.66	197.83	217.02	215.58	48.20	27.38	130.83	14.50	1856.36
5959	3	86.05	78.70	81.32	62.77	78.33	86.82	99.90	90.55	31.21	9.58	115.59	8.40	829.22
5969	4	14.03	17.22	8.71	13.11	7.44	11.53	18.86	21.57	3.12	0.00	0.01	0.00	115.60
5968	7A	20.73	24.71	12.02	19.16	11.38	15.73	37.17	24.43	3.93	7.23	42.01	5.90	224.40
Party Total		335.26	322.23	308.42	303.98	270.81	311.91	372.95	352.13	86.46	44.19	288.44	28.80	3025.58
Basin Total		730.25	686.91	656.99	303.99	270.82	311.92	372.96	773.95	497.65	449.99	681.45	402.25	6139.13
Verdugo Basin														
Crescenta Valley County														
5058B	1	0.76	0.00	0.35	0.00	1.03	0.13	0.56	12.36	38.77	8.66	0.56	1.21	64.39
5058H	5	5.91	0.00	0.00	0.00	0.00	0.00	3.60	3.09	0.00	0.00	9.05	6.12	27.77
5058	6	10.91	10.72	9.30	14.58	15.50	18.07	20.57	13.87	13.88	22.28	25.86	23.83	199.37
5047B	7	0.37	0.00	0.10	0.00	0.73	0.41	3.77	2.58	1.87	18.15	30.49	21.98	80.45

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
Verdugo Basin														
5069J	8	37.36	41.63	42.47	32.15	32.82	37.32	41.48	41.65	40.91	18.55	0.00	0.00	366.34
5047D	9	0.97	0.00	0.26	0.00	1.12	0.35	0.61	0.00	0.00	1.15	0.00	0.00	4.46
5058D	10	65.53	69.59	52.98	47.15	30.82	30.57	56.47	73.74	74.53	92.22	91.62	86.33	771.55
5058J	12	0.01	0.01	0.37	1.42	0.01	2.60	11.65	7.45	4.62	18.68	39.94	43.05	129.81
5069F	14	46.24	44.32	47.83	49.37	37.70	47.73	44.42	42.47	44.53	50.37	51.58	47.84	554.40
	Pick	4.80	4.54	4.76	4.80	4.29	4.76	4.60	4.90	4.97	4.83	4.80	4.64	56.69
Party Total		172.86	170.81	158.42	149.47	124.02	141.94	187.73	202.11	224.08	234.89	253.90	235.00	2255.23
City of Glendale														
3961-3971	GL3-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.78	23.11	18.94	11.54	7.46	81.83
3970	GL-6	123.68	119.69	123.68	23.94	111.71	0.00	27.93	123.68	119.69	123.68	107.11	92.07	1096.86
-	MM-1	113.95	110.48	111.59	212.10	210.17	223.82	167.84	83.77	74.04	54.47	36.83	41.16	1440.22
Party Total		237.63	230.17	235.27	236.04	321.88	223.82	195.77	228.23	216.84	197.09	155.48	140.69	2618.91
Basin Total		410.49	400.98	393.69	385.51	445.90	365.76	383.50	430.34	440.92	431.98	409.38	375.69	4874.14
Eagle Rock Basin														
Sparkletts Drinking Water														
3987A	1	1.86	2.83	0.35	2.69	2.16	3.37	3.06	1.97	2.54	1.44	2.73	3.00	28.00
3987B	2	5.27	3.34	5.30	4.07	3.62	4.16	3.72	3.55	4.20	3.99	3.76	4.22	49.20
3987F	3	8.05	6.46	8.85	7.23	6.01	7.88	8.04	7.98	7.73	8.75	8.39	7.99	93.36
Party Total		15.18	12.63	14.50	13.99	11.79	15.41	14.82	13.50	14.47	14.18	14.88	15.21	170.56
Basin Total		15.18	12.63	14.50	13.99	11.79	15.41	14.82	13.50	14.47	14.18	14.88	15.21	170.56
ULARA Total		8354.03	7892.17	8316.75	7239.58	6792.75	5721.82	9004.01	10457.60	10793.16	11494.66	11074.54	10646.67	107787.74

APPENDIX B

KEY GAGING STATIONS SURFACE RUNOFF

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description: LOS ANGELES RIVER ABOVE ARROYO SECO — for Water-Year 19 86 19 87 — Station No. F 57 CR

Drainage Area: 511 Square Miles — H. ELDEEB (Observer) — Gage Read: EVERY 15 MINUTES — Rating Table No.: 69 I

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH		
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge
1	0.91		84.2	0.87		77.2	0.97		94.7	0.91		84.2	0.95		91.2	0.96		93.
2	1.49		522.	0.85		73.7	0.97		94.7	0.92		85.9	0.95		91.2	0.98		96.5
3	1.05		119.	0.86		75.4	0.98		96.5	0.92		85.9	0.95		91.2	0.97		94.7
4	0.93		87.7	0.86		75.4	0.99		98.2	2.09		1530	0.96		93.0	0.97		94.7
5	0.93		87.7	0.88		78.9	1.02		108.	1.32		317.	0.96		93.0	1.52		562.
6	0.93		87.7	0.89		80.7	1.49		524.	1.50		544.	0.95		91.2	1.81		1010.
7	0.96		93.	0.89		80.7	0.99		98.2	1.25		244.	0.96		93.0	1.09		134.
8	0.96		93.	0.89		80.7	0.97		94.7	0.94		89.4	0.96		93.0	0.90		82.4
9	0.99		98.2	0.89		80.7	0.98		96.5	0.93		87.7	1.07		128.	0.89		80.7
10	1.00		100.	0.90		82.4	0.97		94.7	0.93		87.7	1.12		149.	0.91		84.2
11	1.01		104.	0.90		82.4	0.96		93.	0.92		85.9	0.98		96.5	0.91		84.2
12	0.99		98.2	0.92		85.9	0.95		91.2	0.93		87.7	0.96		93.0	0.91		84.2
13	0.99		98.2	0.92		85.9	0.94		89.4	0.93		87.7	1.81		1020.	0.97		94.7
14	1.00		100.	0.91		84.2	0.93		87.7	0.92		85.9	1.19		196.	0.99		98.2
15	0.99		98.2	1.00		100.	0.92		85.9	0.91		84.2	1.00		100.	1.33		332
16	0.98		96.5	0.92		85.9	0.92		85.9	0.92		85.9	0.96		93.0	0.96		93.
17	0.97		94.7	1.67		790.	0.91		84.2	0.91		84.2	0.98		96.5	0.96		93.
18	0.96		93.	2.36		2090.	0.90		82.4	0.91		84.2	0.96		93.0	0.93		87.7
19	0.96		93.	1.02		108.	0.92		85.9	0.92		85.9	0.93		87.7	0.93		87.7
20	0.95		91.2	0.97		94.7	0.99		98.2	0.91		84.2	0.95		91.2	0.93		87.7
21	0.95		91.2	0.96		93.	0.92		85.9	0.90		82.4	0.95		91.2	1.76		931
22	0.94		89.4	0.93		87.7	0.92		85.9	0.92		85.9	1.03		111.	1.01		104.
23	0.93		87.7	0.93		87.7	0.91		84.2	0.93		87.7	0.99		98.2	0.92		85.9
24	0.92		85.9	0.93		87.7	0.90		82.4	0.92		85.9	1.37		371.	0.92		85.9
25	0.91		84.2	0.93		87.7	0.91		84.2	0.93		87.7	1.33		326.	1.22		222.
26	0.91		84.2	0.94		89.4	0.92		85.9	0.93		87.7	1.05		119.	0.93		87.7
27	0.91		84.2	0.94		89.4	0.91		84.2	0.94		89.4	0.92		85.9	0.93		87.7
28	0.91		84.2	0.95		91.2	0.91		84.2	0.94		89.4	0.95		91.2	0.94		89.4
29	0.90		82.4	0.96		93.	0.90		82.4	0.95		91.2				0.93		87.7
30	0.89		80.7	0.96		93.	0.92		85.9	0.95		91.2				0.93		87.7
31	0.86		75.4				0.92		85.9	0.94		89.1				0.94		89.0
1	3269.			5292.6			3215.1			4979.5			4274.2			5434.7		
2	105.			176.			104.			161.			153.			175.		
3	6480.			10500.			6380.			9880.			8480.			10780.		
4	522.			2090.			524.			1530.			1020.			1010.		
5	75.4			73.7			82.4			82.4			85.9			80.7		

DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1	0.96		93.	0.91		84.2	0.90		82.4	0.89		80.7			*ROF			*ROF	1
2	0.97		94.7	0.91		84.2	0.93		87.7	0.90		82.4							2
3	1.11		144.	0.91		84.2	0.94		89.4	0.89		80.7							3
4	0.96		93.	0.91		84.2	0.95		91.2	0.89		80.7							4
5	0.93		89.4	0.92		85.9	0.95		91.2	0.89		80.7							5
6	0.94		89.4	0.92		85.9	1.25		242.	0.89		80.7							6
7	0.92		85.9	0.93		87.7	0.89		80.7	0.90		82.4							7
8	0.94		89.4	0.93		87.7	0.95		91.2	0.90		82.4							8
9	0.93		87.7	0.92		85.9	0.91		84.2	0.90		82.4							9
10	0.96		93.	0.92		85.9	0.91		84.2	0.89		80.7							10
11	0.96		93.	0.93		87.7	0.91		89.2	0.87		77.2							11
12	0.94		89.4	0.94		89.4	0.91		84.2	0.87		77.2							12
13	0.92		85.9	0.93		87.7	0.91		84.2	0.87		77.2							13
14	0.92		85.9	0.93		87.7	0.91		84.2	0.87		77.2							14
15	0.92		85.9	0.93		87.7	0.91		84.2	0.87		77.2							15
16	0.93		87.7	0.93		87.7	0.91		84.2	0.86		75.4							16
17	0.94		89.4	0.93		87.7	0.92		85.9	0.89		80.7							17
18	0.93		87.7	0.93		87.7	0.93		85.9	0.83		70.2							18
19	0.92		85.9	0.94		89.4	0.92		85.9	0.81		66.7							19
20	0.91		84.2	0.94		89.4	0.92		85.9	0.81		66.7							20
21	0.91		84.2	0.94		89.4	0.90		82.4	0.82		68.5							21
22	0.90		82.4	0.93		87.7	0.90		82.4	0.82		68.5							22
23	0.91		84.2	0.92		85.9	0.90		82.9	0.82		68.6							23
24	0.91		84.2	0.91		84.2	0.91		84.2	0.82		68.5							24
25	0.91		84.2	0.94		89.4	0.90		82.4	0.84		72.0							25
26	0.90		82.4	0.92		85.9	0.90		82.4	0.86		75.4							26
27	0.91		84.2	0.92		85.9	0.89		80.7	0.87		77.2							27
28	0.91		84.2	0.92		85.9	0.89		80.7	0.87		77.2							28
29	0.91		84.2	0.92		85.9	0.89		80.7	0.87		77.2							29
30	0.92		85.9	0.92		85.9	0.89		80.7	0.87		77.2							30
31				0.91		84.2				0.87		77.2							31
1	2671.6			2611.1			2692.			2366.9									1
2	89.4			86.5			89.7			76.4									2
3	5300.			5320			5340.			4690.									3
4	144.			89.4			242.			82.4									4
5	82.4			22.4			80.7			66.7									5

Maximum stage ____ feet at ____ hr. — Discharge ____ second-feet
Minimum stage ____ feet at ____ hr. — Discharge ____ second-feet

*RECORDER REMOVED ON 08-04-87

REMARKS

1 - Peak(s)
2 - Average Daily Flow in C.F.S.
3 - Total Quantity Flow in A.F.
4 - Maximum Average Daily Flow in C.F.S.
5 - Minimum Average Daily Flow in C.F.S.

YEARLY TOTALS

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description: PACOIMA CREEK FLUME
BELOW PACOIMA DAM
for Water Year 19 86 - 19 87

Station No.: F 118 BR

Drainage Area: 28.2 Square Miles (...) Observed

Gage Read: CONTINUOUSLY

Rating Table No.: 44.1

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge		Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1			+			+			0			0			0			E 0.1	1			0			0			e 0			0			0			0	1
2																			2																		2
3																			3																		3
4																			4																		4
5																			5																		5
6																			6			0															6
7																			7			+															7
8																			8																		8
9																			9																		9
10																		E 0.1	10																		10
11																		+	11																		11
12																			12																		12
13																			13																		13
14																			14																		14
15																			15												0						15
16																			16										H		2.0						16
17																			17												0						17
18			+																18																		18
19			H			2.9													19																		19
20						0												+	20																		20
21																		0	21			+															21
22																			22			0															22
23															0				23																		23
24													H		20.6				24																		24
25													0.44	+ 0.2	33.6				25																		25
26													0.15	+ 0.2	33.6				26																		26
27													H		19.1				27																		27
28															E .1				28																		28
29																			29																		29
30						0													30			0						e 0									30
31			+						0			0						0	31					0						0			0			0	31
1	+			2.9			0			0			107.0			0			1	0			0			e	0		2.0			0			0		1	111.3
2	+			0.1			0			0			3.8			0			2	0			0			e	0		0.1			0			0		2	4.0
3	+			5.8			0			0			21.2			0			3	0			0			e	0		4.0			0			0		3	221.8
4	+			2.9			0			0			33.6			0			4	0			0			e	0		1.0			0			0		4	38.5
5	+			0			0			0			0			0			5	0			0			e	0		0			0			0		5	0

Maximum stage	feet at	on	Discharge	Second-feet	
Minimum stage	feet at	on	Discharge	Second-feet	

REMARKS:

1. Total CFS
2. Average Daily Flow in CFS
3. Total Monthly Flow in A.F.
4. Maximum Average Daily Flow in CFS
5. Minimum Average Daily Flow in CFS

YEARLY TOTALS

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description BIG TUJUNGA CREEK BELOW BIG TUJUNGA DAM for Water-Year 1986 - 1987

Station No. F168-R

Drainage Area 82.3 Square Miles (Armando Rodriguez Observer)

Gage Read EVERY 15 MINUTES

Rating Table No. 78-01

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH		
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge
1	2.07		0.4	2.27		3.0	2.06		0.3	2.09		0.5	2.57		10.0	2.07		0.4
2	2.07		↑	2.27		↑	2.34		1.2	2.07		0.4	2.57		↑	2.06		0.3
3	2.07			2.27			2.09		0.5	2.07		0.4	2.57			2.06		0.3
4	2.07			2.27			2.08		0.4	2.11		0.6	2.57			2.06		0.3
5	2.07			2.27			2.08		0.4	2.11		0.6	2.57			2.59		10.5
6	2.07			2.27			2.08		0.4	2.38		4.9	2.57			2.59		10.5
7	2.07			2.27			2.08		0.4	2.76		16.4	2.57			2.57		10.0
8	2.07			2.27			2.08		0.4	2.76		16.4	2.57		↓	2.57		10.0
9	2.07			2.27			2.07		0.4	2.76		16.4	2.57		10.0	2.66		12.7
10	2.07			2.27			2.07		0.4	2.76		16.4	2.56		9.7	2.72		14.9
11	2.07			2.27			2.07		0.4	2.76		16.4	2.56		↓	2.72		↑
12	2.07			2.27			2.07		0.4	2.49		7.7	2.56			2.72		
13	2.07			2.27			2.06		0.3	2.10		0.5	2.56			2.72		
14	2.07			2.27			2.06		0.3	2.07		0.4	2.56			2.72		
15	2.07			2.27		↓	2.06		0.3	2.05		0.3	2.56			2.72		
16	2.07			2.27		3.0	2.41		5.5	2.04		↑	2.56			2.72		
17	2.08			2.28		3.2	2.57		10.0	2.04			2.56			2.72		
18	2.09			2.35		4.3	2.57		↑	2.04			2.56			2.72		
19	2.08			2.35		4.3	2.57			2.04			2.56			2.72		
20	2.08			2.35		4.3	2.67			2.04			2.56			2.72		↑
21	2.08		↓	2.35		4.3	2.57			2.04			2.56		↓	2.72		14.8
22	2.08		0.4	2.35		4.3	2.57			2.04			2.56		9.7	2.71		14.4
23	2.18		1.5	2.35		4.3	2.57			2.04			2.40		5.2	2.71		↑
24	2.27		3.0	2.35		4.3	2.57			2.04			2.11		0.6	2.71		
25	2.27		↑	2.35		4.3	2.57			2.04		↑	2.10		0.5	2.71		
26	2.27			2.22		2.1	2.57			2.04		0.3	2.10		0.5	2.71		↑
27	2.27			2.09		0.5	2.57			2.41		5.5	2.08		0.4	2.71		14.4
28	2.27			2.08		0.4	2.57			2.57		10.0	2.07		0.4	2.46		7.0
29	2.27			2.07		0.4	2.57		↑	2.57		10.0				2.15		1.1
30	2.27		↓	2.06		0.3	2.57		10.0	2.57		10.0				2.13		0.9
31	2.27		3.0				2.39		5.0	2.57		10.0				2.11		0.6
1	34.3			89.3			160			147.1			223.7			328.6		
2	1.1			3.0			5.2			4.7			8.0			10.6		
3	68			177			317			292			444			652		
4	3			4.3			10			16.4			10			14.8		
5	.4			0.3			0.3			.3			0.4			.3		

DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj	Discharge	Gage Height	Adj	Discharge	
1	2.11		0.6	2.59		10.5	2.06		0.3	2.06		0.3	2.06		0.3	2.06		0.3	1
2	2.11		0.6	2.59		↑	2.07		0.4	2.06		↑	2.06		↑	2.06		↑	2
3	2.10		0.5	2.59			2.07		0.4	2.06			2.06			2.06			3
4	2.10		0.5	2.59			2.07		0.4	2.06			2.06			2.06			4
5	2.10		0.5	2.59			2.06		0.3	2.06			2.06			2.06			5
6	2.10		0.5	2.59		↓	2.05		0.3	2.06			2.06			2.06			6
7	2.10		0.5	2.59		10.5	2.06		0.3	2.06			2.06			2.06			7
8	2.10		0.5	2.41		5.6	2.06		0.3	2.06			2.06			2.06			8
9	2.10		0.5	2.13		0.9	2.07		0.4	2.06			2.06			2.06			9
10	2.42		5.8	2.09		0.5	2.06		0.3	2.06			2.06			2.06			10
11	2.57		10.0	2.07		0.4	2.01		0.1	2.06			2.06		0.3	2.06			11
12	2.57		↑	2.06		0.3	1.98		0.1	2.06			2.33		4.0	2.06			12
13	2.57			2.05		0.3	1.99		0.1	2.06			2.45		6.6	2.06			13
14	2.57			2.04		0.3	2.01		0.1	2.06			2.46		6.9	2.06			14
15	2.57			2.03		0.2	1.99		0.1	2.06			2.46		6.9	2.06			15
16	2.57			2.03		↑	1.97		0.1	2.06			2.46		6.9	2.06			16
17	2.57			2.03			1.97		0.1	2.06			2.46		6.9	2.06			17
18	2.57			2.03			1.99		0.1	2.06			2.47		7.2	2.06			18
19	2.57			2.03			2.00		0.1	2.06			2.47		7.2	2.06			19
20	2.57			2.03			2.01		0.1	2.06			2.47		7.2	2.06			20
21	2.57		↓	2.03			2.02		0.2	2.06			2.47		7.2	2.06			21
22	2.57		10.0	2.03		↓	2.01		0.1	2.06			2.47		7.2	2.06			22
23	2.58		10.2	2.03		0.2	2.00		0.1	2.06			2.47		7.2	2.06			23
24	2.59		10.5	2.04		0.3	2.01		0.1	2.06			2.36		4.5	2.06			24
25	2.59		10.5	2.05		0.3	2.02		0.2	2.06			2.16		1.3	2.06			25
26	2.59		10.5	2.06		0.3	2.02		0.2	2.06			2.12		0.9	2.06			26
27	2.59		10.5	2.06		↑	2.03		0.2	2.06			2.11		0.6	2.06			27
28	2.59		10.5	2.06			2.04		0.3	2.06			2.10		0.5	2.06			28
29	2.59		10.5	2.06			2.05		0.3	2.06			2.09		0.5	2.06		↓	29
30	2.59		10.5	2.06		↓	2.06		0.3	2.06		↓	2.07		0.4	2.06		0.3	30
31				2.06		0.3						0.3	2.06		0.3				31
1	214.2			86.			6.4			9.3			93.6			9			1
2	7.1			2.8			0.2			.3			3			.3			2
3	425			171			12.7			18.4			186			17.9			3
4	10.5			10.5			0.4			.3			7.2			.3			4
5	.5			.2			0.1			.3			.3			.3			5

Maximum stage ____ feet at ____ on ____ Discharge ____ Second-feet.

Minimum stage ____ feet at ____ on ____ Discharge ____ second-feet.

REMARKS:

1. Total CFS
2. Average Daily Flow in CFS
3. Total Monthly Flow in A.F.
4. Maximum Average Daily Flow in CFS
5. Minimum Average Daily Flow in CFS

YEARLY TOTALS	
1	1401.5
2	3.806
3	2781.0
4	7.31
5	0.31

09

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description VERDUGO WASH
6 ESTELLE AVE. for Water-Year 1986 to 1987
Station No. F 252 R
Drainage Area 26.8 Square Miles Observer H. ELDEEB Gage Read
Rating Table No. 47 I

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1	0.18		2.3	0.20		2.8	0.17		2.0	0.19		2.5	0.20		2.8	0.18		2.3	1
2	0.20		2.8	0.19		2.5	0.17		2.0	0.19		2.5				0.19		2.5	2
3	0.20		2.8	0.20		2.8	0.17		2.0	0.19		2.5				0.19		2.5	3
4	0.18		2.3	0.22		5.0	0.17		2.0	b		158				0.19		2.5	4
5	0.18		2.3	0.20		2.8	0.17		2.0	b		9.5				0.38		32.3	5
6	0.18		2.3	0.20		2.8	0.39		36.4	b		3.9				0.45		56.5	6
7	0.18		2.3	0.20		2.8	0.17		2.0	b		5.0				0.19		2.5	7
8	0.19		2.5	0.19		2.5	0.16		1.8	0.19		2.5	0.20		2.8	0.18		2.3	8
9	0.19		2.5	0.19		2.5	0.17		2.0	0.18		2.3	0.45		59	0.19		2.5	9
10	0.20		2.8	0.20		2.8	0.17		2.0	0.19		2.5	0.28		12.3	0.19		2.5	10
11	0.21		3.9	0.20		2.8	0.17		2.0	0.18		2.3	0.19		2.5	0.18		2.3	11
12	0.21		3.9	0.20		2.8	0.16		1.8	0.19		2.5	0.19		2.5	0.18		2.3	12
13	0.21		3.9	0.20		2.8	0.16		1.8	0.18		2.3	0.58		129	0.18		2.3	13
14	0.21		3.9	0.20		2.8	0.16		1.8	0.18		2.3	0.22		5.0	0.28		11.8	14
15	0.19		2.5	0.21		3.9	0.16		1.8	0.18		2.3	0.19		2.5	0.42		47.3	15
16	0.20		2.8	0.18		2.3	0.17		2.0	0.17		2.0	0.19		2.5	0.19		2.5	16
17	0.20		2.8	0.49		75.4	0.17		2.0	0.18		2.3	0.19		2.5	0.18		2.3	17
18	0.20		2.8	0.60		143.	0.17		2.0	0.18		2.3	0.20		2.8	0.18		2.3	18
19	0.22		5.0	0.19		2.5	0.18		2.3	0.18		2.3	0.22		5.0	0.17		2.0	19
20	0.20		2.8	0.18		2.3	0.18		2.3	0.17		2.0	0.21		3.9	0.17		2.0	20
21				0.18		2.3	0.17		2.0	0.17		2.0	0.22		5.0	0.52		88.3	21
22				0.17		2.0	0.17		2.0	0.17		2.0	0.23		6.2	0.20		2.8	22
23				0.18		2.3	0.17		2.0	0.17		2.0	0.21		3.9	0.19		2.5	23
24				0.18		2.3	0.18		2.3	0.17		2.0	0.40		38.2	0.18		2.3	24
25	0.20		2.8	0.17		2.0	0.18		2.3	0.18		2.3	0.39		35.	0.18		2.3	25
26	0.21		3.9	0.17		2.0	0.18		2.3	0.18		2.3	0.19		2.5	0.18		2.3	26
27	0.23		6.2	0.17		2.0	0.18		2.3	0.20		2.8	0.17		2.0	0.17		2.0	27
28	0.25		8.4	0.18		2.3	0.18		2.3	0.20		2.8	0.18		2.3	0.17		2.0	28
29	0.23		6.2	0.18		2.3	0.18		2.3	0.20		2.8				0.17		2.0	29
30	0.20		2.8	0.18		2.3	0.18		2.3	0.20		2.8				0.19		2.5	30
31	0.21		3.9				0.18		2.3	0.20		2.8				0.18		2.3	31
1	104.6			291.7			98.4			240.4			347.			296.8			1
2	3.4			9.7			3.2			7.8			12.4			9.6			2
3	207.			579			195.			477.			688.			589.			3
4	8.4			143.			36.4			158.			129.			88.3			4
5	2.3			2.			1.8			2.			2.			2.			5

DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1	0.17		2.0	b															1
2	0.17		2.0																2
3	0.24		7.3																3
4	0.17		2.0																4
5	0.17		2.0																5
6																			6
7																			7
8																			8
9																			9
10																			10
11				b															11
12																			12
13																			13
14																			14
15				b															15
16																			16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28				b															28
29	b																		29
30	b																		30
31																			31
1																			1
2																			2
3																			3
4																			4
5																			5

REMARKS

1. Total CFS
2. Average Daily Flow in CFS
3. Total Monthly Flow in A.F.
4. Maximum Average Daily Flow in CFS
5. Minimum Average Daily Flow in CFS

YEARLY TOTALS

Maximum stage	feet at	on	Discharge	Second-feet.
Minimum stage	feet at	on	Discharge	Second-feet.

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description: BURBANK WESTERN STORM DRAIN @ RIVERSIDE DRIVE

Station No.: F 285 R

for Water-Year 19 86 19 87

Drainage Area: 25.0 Square Miles

H. EL-DEEB (Observer)

Gage Read: EVERY 15 MINUTES

Rating Table No.: 59 I

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1	b		5.0	0.09		6.7	b		9.1	0.09		6.7	0.12		10.6	b		5.0	1
2			41.6	0.09		6.7			34.9	0.10		7.9	0.11		9.1			5.0	2
3			21.2	0.08		5.6			28.0	0.09		6.7	0.11		9.1			5.0	3
4			14.6	0.10		7.9			11.9	b		26.0	0.11		9.1			5.0	4
5			10.6	0.08		5.6			6.7			11.5	0.09		6.7			9.1	5
6	b		6.7	0.08		5.6			6.7			5.6	0.09		6.7			32.6	6
7	0.05		3.9	0.09		6.7			6.7			5.6	0.09		6.7			14.6	7
8	0.06		4.5	0.08		5.6	b		6.7			5.6	0.09		6.7			6.7	8
9	0.06		4.5	0.08		5.6	0.09		6.7			5.6	0.13		12.4			5.0	9
10	0.06		4.5	0.21		30.8	0.11		9.7			6.7	0.07		5.0			5.0	10
11	0.07		5.0	0.48		112.	0.09		6.7			6.7	0.07		5.0			5.0	11
12	0.06		4.5	0.16		15.7	0.09		6.7			7.9	0.07		5.0			5.6	12
13	0.06		4.5	0.10		7.9	0.09		6.7			9.1	0.40		79			6.7	13
14	0.07		5.0	0.08		5.6	0.09		6.7			10.6	b		7.9			9.6	14
15	0.08		5.6	0.08		5.6	0.09		6.7			11.9			4.5			8.2	15
16	0.08		5.6	0.08		5.6	0.08		5.6			11.9			3.9			5.0	16
17	0.08		5.6	0.08		5.6	0.08		5.6			11.9			3.9			5.0	17
18	0.07		5.0	b		6.7	0.08		5.6			10.6			3.9			5.0	18
19	0.08		5.6			9.1	0.08		5.6			11.9			3.4			5.0	19
20	0.07		5.0			9.1	0.09		6.7			9.1			3.4			5.0	20
21	0.07		5.0			9.1	0.08		5.6			9.1			3.4			65.7	21
22	0.07		5.0			9.1						9.1			5.0			4.5	22
23	0.07		5.0			9.1						9.1			5.6			3.9	23
24	0.07		5.0			29.4						10.6			57.1			3.9	24
25	0.05		3.9			45.4						9.1			13.2			3.4	25
26	0.04		3.4			9.1				b		9.1			5.6			3.9	26
27	0.05		3.9			9.1				0.11		9.1			5.0			5.0	27
28	0.04		3.4			9.1				0.09		6.7	b		5.0			4.5	28
29	0.05		3.9			118.				0.22		26.1						3.9	29
30	0.04		3.4	b		25.8				0.75		29.8						4.5	30
31	0.06		4.5				0.08		5.6	0.53		14.1				b		5.0	31
1	214.9			542.9			251.3			716.5			301.9			261.3			1
2	6.9			18.1			8.1			23.1			10.8			8.4			2
3	426			1080.			498.			1420.			599.			518.			3
4	41.6			118.			34.9			28.8			79.			65.7			4
5	3.4			5.6			5.6			5.6			3.4			3.4			5

DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj	Discharge	Gage Height	Adj.	Discharge	
1	b		5.0	0.08		5.6	0.09		6.7	0.08		5.6	0.08		5.6	0.08		5.6	1
2			5.0	0.10		7.9	0.08		5.6			5.6	0.09		6.7	0.07		5.0	2
3			6.7	0.09		6.7	0.09		6.7			5.6	0.08		5.6	0.07		5.0	3
4			5.0	0.10		7.9	0.09		6.7			5.6	0.08		5.6	0.07		5.0	4
5			5.0	0.10		7.9	0.09		6.7			5.6	0.08		5.6	0.07		5.0	5
6			5.0	0.10		7.9	0.44		38.4			5.6	0.08		5.6	0.06		4.5	6
7			5.0	0.10		7.9	0.13		13.7			5.6	0.08		5.6	0.04		3.4	7
8			4.5	0.10		7.9	0.12		10.6			6.7	0.08		5.6	0.05		3.9	8
9	b		4.5	0.10		7.9	0.10		7.9			5.6	0.08		5.6	0.05		3.9	9
10	0.06		4.5	0.09		6.7	0.09		6.7			5.6	0.08		5.6	0.04		3.4	10
11	0.06		4.5	0.10		7.9	0.09		6.7			5.6	0.08		5.6	0.04		3.4	11
12	0.06		4.5	0.10		7.9	0.08		5.6			5.6	0.09		6.7	0.04		3.4	12
13	0.05		3.9	0.10		7.9	0.08		5.6			5.6	0.09		6.7	0.03		2.8	13
14	0.06		4.5	0.11		9.1	0.08		5.6			5.6	0.10		7.9	0.03		2.8	14
15	0.06		4.5	0.11		9.1	0.08		5.6			5.6	0.08		5.6	0.02		2.2	15
16	0.07		5.0	0.11		9.1	0.08		5.6			5.6	0.08		5.6	0.02		2.2	16
17	0.07		5.0	0.11		9.1	0.09		6.7			5.6	0.08		5.6	0.02		2.2	17
18	0.06		4.5	0.12		10.6	0.09		6.7	0.08		5.6	0.08		5.6	0.01		1.7	18
19	0.06		4.5	0.10		7.9	0.08		5.6	0.07		5.0	0.13		11.9	0.01		1.7	19
20	0.06		4.5	0.10		7.9	0.08		5.6	0.07		5.0	0.15		14.6	0.01		1.7	20
21	0.04		3.4	0.09		6.7	0.08		5.6	0.08		5.6	0.15		14.6	0.01		1.7	21
22	0.04		3.4	0.08		5.6	0.08		5.6	0.09		6.7	0.13		11.9	0.04		3.4	22
23	0.05		3.9	0.08		5.6	0.08		5.6			6.7	0.13		11.9	0.12		10.6	23
24	0.04		3.4	0.08		5.6	0.08		5.6			6.7	0.12		10.6	0.11		9.1	24
25	0.04		3.4	0.09		6.7	0.08		5.6			6.7	0.11		9.1	0.11		9.1	25
26	0.03		2.8	0.08		5.6	0.08		5.6			6.7	0.10		7.9	0.11		9.1	26
27	0.06		4.5	0.08		5.6	0.08		5.6			6.7	0.09		6.7	0.10		7.9	27
28	0.06		4.5	0.08		5.6	0.07		5.0			6.7	0.09		6.7	0.10		7.9	28
29	0.07		5.0	0.08		5.6	0.07		5.0	0.09		6.7	0.08		5.6	0.10		7.9	29
30	0.04		3.4	0.08		5.6	0.07		5.0	0.08		5.6	0.08		5.6	0.10		7.9	30
31				0.09		6.7						5.6	0.08		5.6				31
1	133.3			225.7			289.2			182.3			229.1			143.4			1
2	4.4			7.3			9.6			5.9			7.4			4.8			2
3	264.			448.0			574.0			362.			454.			284.			3
4	6.7			10.6			38.4			6.7			14.6			10.6			4
5	2.8			5.6			5.0			5.0			5.6			1.7			5

Maximum stage	feet at	on	Discharge	Second-feet	
Minimum stage	feet at	on	Discharge	Second-feet	

REMARKS:

1. Total CFS
2. Average Daily Flow in CFS
3. Total Monthly Flow in A.F.
4. Maximum Average Daily Flow in CFS
5. Minimum Average Daily Flow in CFS

YEARLY TOTALS	
1	3491.8
2	114.8
3	6927.0
4	774.8
5	52.7

GAGING STATION SUMMARY

LOS ANGELES COUNTY
FLOOD CONTROL DISTRICT
HYDRAULIC DIVISION

Station Location and Description: LOS ANGELES RIVER @ TUJUNGA AVE. for Water-Year 19 86 – 19 87

Station No.: F 300 R

Drainage Area: 401 Square Miles (H. ELDEEB Observer)

Gage Read: EVERY 15 MINUTES

Rating Table No.: 62.1

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY			FEBRUARY			MARCH			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	
1	1.82		52.6	b		50.4	b		51.4	1.87		52.6	1.99		61.9	1.61		42.3	1
2	3.67		692.			49.9			50.9	1.88		55.9	2.01		63.3	1.62		42.7	2
3	2.06		66.6			50.4			49.4	1.95		59.7	2.00		62.7	1.63		43.2	3
4	1.74		48.4			50.4			49.9	3.82		911.	2.01		63.3	1.65		44.1	4
5	1.74		48.3			50.4			51.9	3.08		170.	2.01		63.3	3.49		447.	5
6	1.73		48.1	b		55.8			417.	3.47		425.	1.94		59.2	b		409.	6
7	1.79		50.7	1.90		56.8			62.0	3.23		214.	1.99		62.1			46.4	7
8	1.81		51.7	1.89		56.3	b		68.2	1.87		55.	1.92		58.1			42.7	8
9	1.86		54.9	1.93		58.4	2.01		63.5	1.87		55.1	2.35		86.6			42.3	9
10	1.85		54.2	1.98		61.3	1.99		62.1	1.87		553	2.76		124.			42.3	10
11	1.84		53.8	1.92		57.9	2.00		62.7	1.79		51.1	1.99		62.1	b		46.1	11
12	1.83		53.3	2.09		68.4	2.02		64.1	1.89		56.4	1.83		53.	1.74		48.3	12
13	1.84		53.5	2.04		64.9	1.99		62.2	1.93		58.7	3.62		627.	1.96		60.2	13
14	1.87		55.5	2.03		64.4	1.97		61.1	1.79		50.7	3.04		165.	2.05		65.5	14
15	1.88		55.7	2.38		88.8	1.96		60.3	1.74		48.3	2.19		74.5	3.23		216.	15
16	1.90		57.0	1.96		60.1	2.03		64.6	1.78		50.6	1.95		60.0	2.06		66.4	16
17	1.85		54.4	3.78		853	1.97		61.1	1.84		53.5	1.92		58.1	1.87		55.3	17
18	1.86		54.7	b		946	1.97		60.8	1.83		52.8	1.84		53.6	1.86		54.8	18
19	1.84		53.8			56.3	1.97		60.8	1.91		57.3	1.56		40.	1.78		50.2	19
20	1.88		55.8			54.1	2.27		80.6	1.83		54.3	1.59		41.4	1.85		54.	20
21	1.91		57.6			53.0	1.93		58.7	1.83		53.	1.60		41.8	3.51		516.	21
22	1.90		56.7			51.9	1.99		62.0	1.93		58.6	1.71		46.9	1.99		62.1	22
23	2.04		65.0			51.4	1.76		49.6	1.94		59.2	1.70		46.4	1.95		60.0	23
24	1.98		61.5			52.5	1.97		61.1	1.94		59.5	1.92		58.3	1.90		56.7	24
25	1.89		56.1			53.0	1.83		52.8	1.98		61.5	2.54		102.	1.87		55.2	25
26	1.99		62.4			53.0	1.96		60.5	1.96		60.4	1.89		56.4	1.89		56.6	26
27	2.01		63.2			52.5	1.93		58.9	2.01		63.4	1.44		34.9	1.87		55.2	27
28	b		58.8			52.5	1.90		56.8	2.03		64.5	1.61		42.3	1.89		56.6	28
29			50.4			52.5	1.96		60.2	2.01		63.3				1.84		53.7	29
30			50.4	b		51.9	1.95		60.0	1.98		61.5				1.82		52.5	30
31	b		50.4				1.86		54.7	1.98		61.6				1.84		53.8	31
1	2347.5			3378.2			2199.9			3253.8			2366.2			3161.4			1
2	75.7			113.			71.			105.			84.5			102.			2
3	4660.			6700.			4360.			6450.			4690.			6270.			3
4	692.			946.			417.			911.			627.			516.			4
5	48.1			49.9			49.4			48.3			34.9			42.3			5

DAY	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			DAY
	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj.	Discharge	Gage Height	Adj	Discharge	Gage Height	Adj.	Discharge	
1	e		50.	E		50	e		50	2.05		65.8	1.63		45.9	1.72		47.4	1
2										2.03		64.5	1.68		45.3	1.73		51.1	2
3										2.02		64.1	1.68		45.5	1.78		50.6	3
4										2.01		63.4	1.69		46.1	1.79		50.7	4
5										1.74		53.1	1.72		46.3	1.73		48.1	5
6										1.98		61.5	1.67		45.2	1.77		50.1	6
7										2.04		66.6	1.75		43.0	1.84		52.3	7
8										2.10		68.5	1.74		47.4	1.83		58.3	8
9										2.04		65.1	1.68		45.5	1.93		58.4	9
10										1.84		53.6	1.80		51.6	1.95		53.9	10
11										1.85		54.1	1.72		50.8	1.99		62.0	11
12										1.60		41.9	1.78		50.4	2.05		65.6	12
13										1.62		42.6	1.72		51.0	2.16		72.8	13
14										1.82		52.3	1.89		56.1	2.20		75.6	14
15										1.74		48.4	1.75		48.8	2.17		73.5	15
16										1.73		48.0	1.72		47.5	2.17		73.8	16
17										2.05		65.7	1.73		53.9	2.15		72.1	17
18										1.60		41.8	1.78		50.2	2.16		72.9	18
19										1.57		40.5	1.76		49.5	2.17		73.6	19
20										1.59		41.4	1.65	–	44.0	2.13		70.5	20
21										1.53		38.7	1.78		47.8	2.19		75.1	21
22										1.47		36.2	1.76		49.5	2.19		74.6	22
23										1.53		41.4	1.75		48.7	2.16		73.0	23
24							e		50	1.58		39.7	1.73		51.1	2.10		69.1	24
25										1.67		43.2	1.80		51.2	2.18		73.3	25
26										1.68		45.6	1.80		51.5	2.11		69.3	26
27										1.68		45.4	1.73		50.7	2.04		67.3	27
28										1.70		46.6	1.73		50.7	2.12		70.1	28
29										1.71		46.9	1.73		51.1	2.17		73.3	29
30	e		50.							1.70		46.4	1.73		51.1	2.13		74.5	30
31				e		50				1.70		46.6	1.84		52.6				31
1	1500.			1550.			1200.			1577.6			1523.0			1357.5			1
2										50.9			49.1			65.2			2
3	← Estimated →									3130.0			3020.0			3880.0			3
4										48.5			56.1			75.6			4
5										31.7			44.0			47.4			5

Maximum stage	feet at	on	Discharge	Second-feet.
Minimum stage	feet at	on	Discharge	Second-feet.

REMARKS:

1. Total CFS
2. Average Daily Flow in CFS
3. Total Monthly Flow in A.F.
4. Maximum Average Daily Flow in CFS
5. Minimum Average Daily Flow in CFS

YEARLY TOTALS

83

APPENDIX C

WELLS DRILLED AND DESTROYED

WELLS DESTROYED 1986-87

Party	LACDPW Well No.	Owner No.	Purpose
LADWP	4993C	Woodward-2	Production
Magnolia Water Co.	3852D	--	Drinking Water

WELLS DRILLED 1986-87

Party	LACDPW Well No.	Owner No.	Purpose
LADWP	*	RT-7	Production
LADWP	*	RT-10	"
LADWP	*	RT-11	"
LADWP	*	RT-12	"
LADWP	*	RT-13	"

WELLS DRILLED 1986-87 FOR MAJOR GROUNDWATER POLLUTION INVESTIGATIONS

Party

Bendix - drilled one well for site evaluation, testing, and monitoring.

Centralab - no new wells drilled - have a total of 15 wells for site evaluation, testing, and monitoring.

Lockheed - drilled four additional wells (for a total of 16) for site evaluation, testing, and monitoring.

Riker Labs - no new wells drilled - have a total of 24 wells for site evaluation, testing, and monitoring.

Rocketdyne - drilled 11 additional wells (for a total of 89) for site evaluation, testing, and monitoring - 11 wells are capable of being used as extraction wells.

WELLS DRILLED 1986-87 FOR SWAT REPORTS

Branford Landfill - 2 wells were drilled for site evaluation, testing, and monitoring.

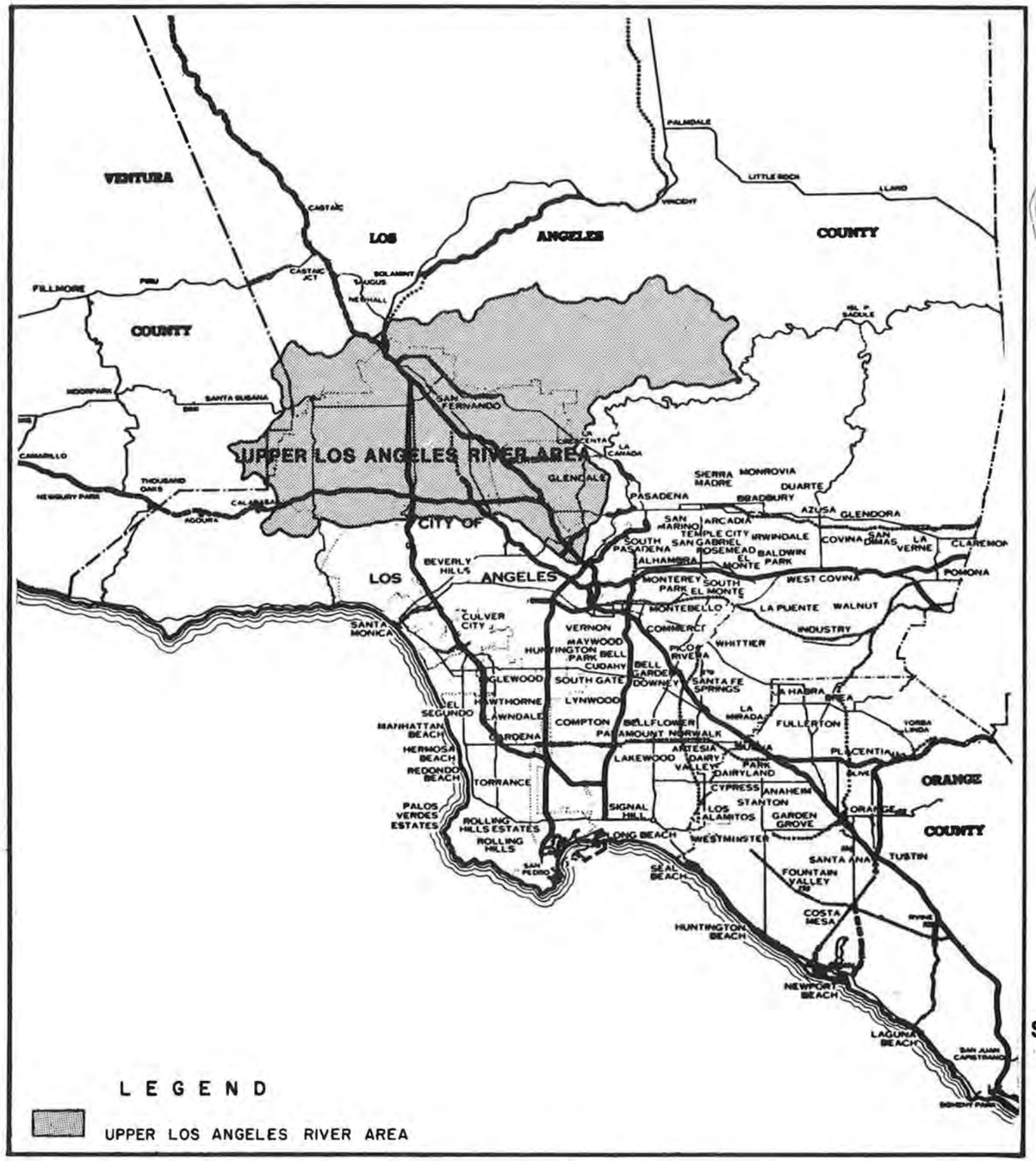
Sheldon-Arleta - 5 wells were drilled for site evaluation, testing, and monitoring.

* - Have not been assigned Los Angeles County Department of Public Works well no.s.

APPENDIX D

PLATES

UPPER LOS ANGELES RIVER AREA WATERMASTER



VICINITY MAP
SCALE
0 5 10 15 Miles

LOCATION MAP

PLATE 2

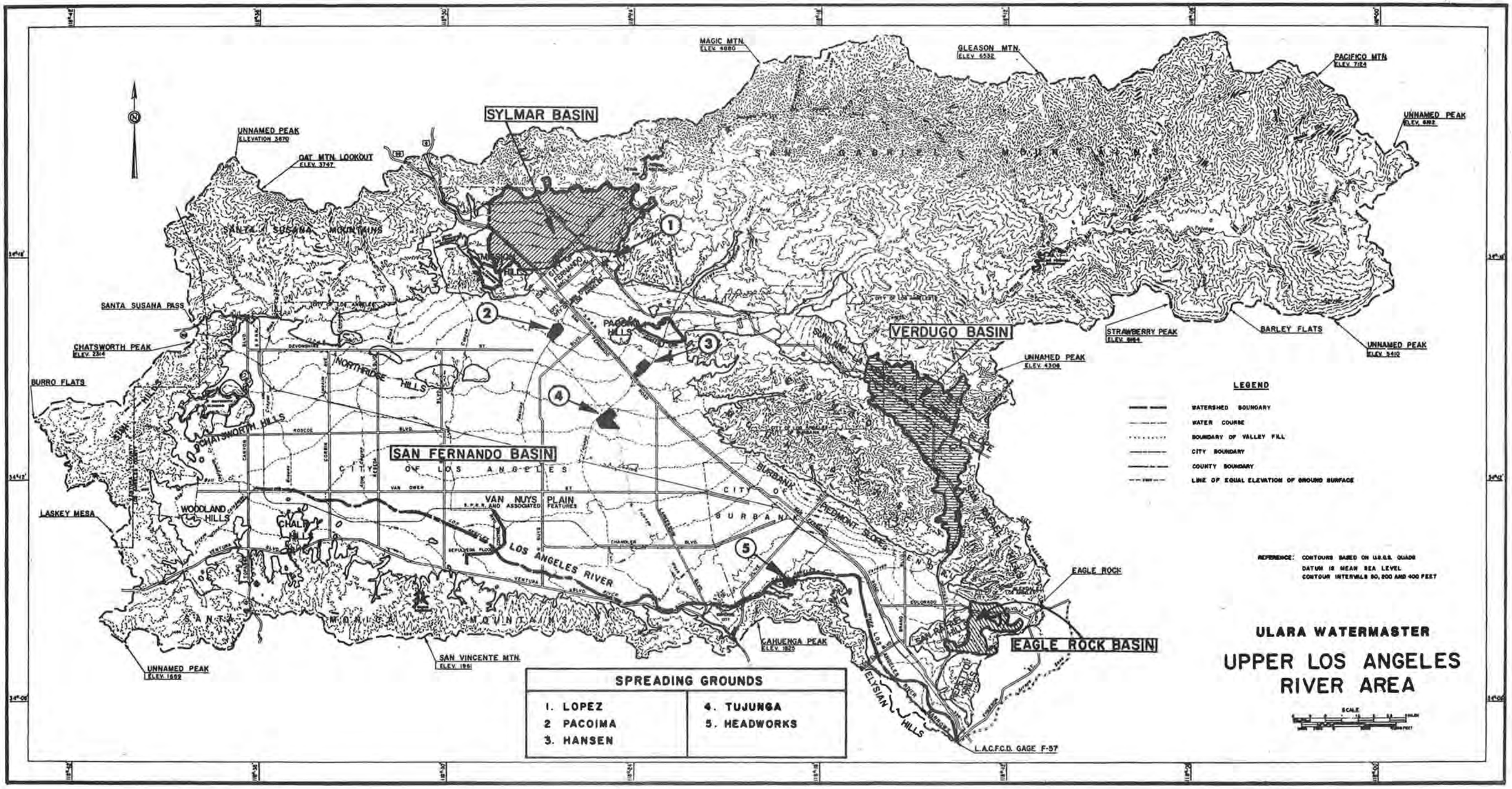
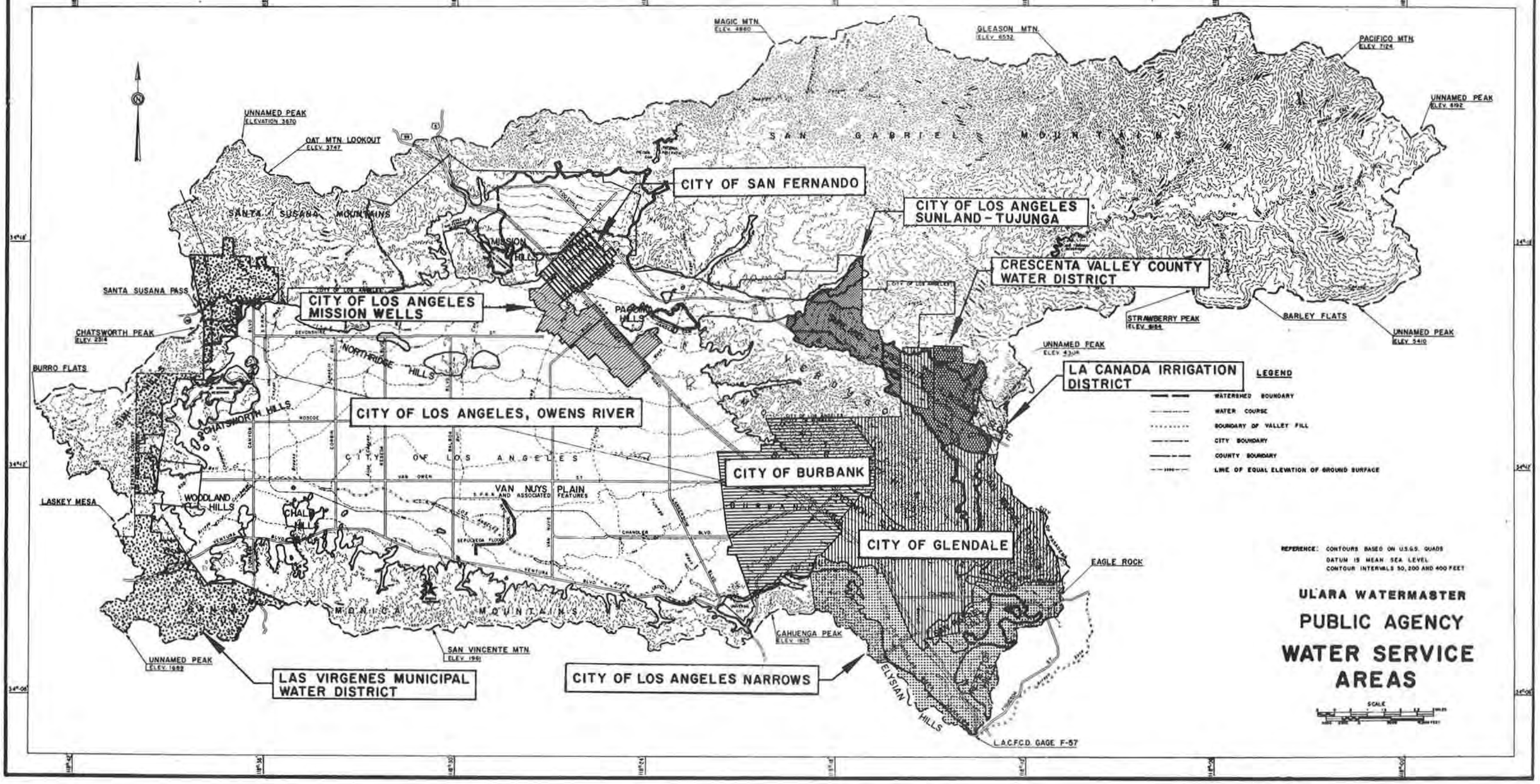
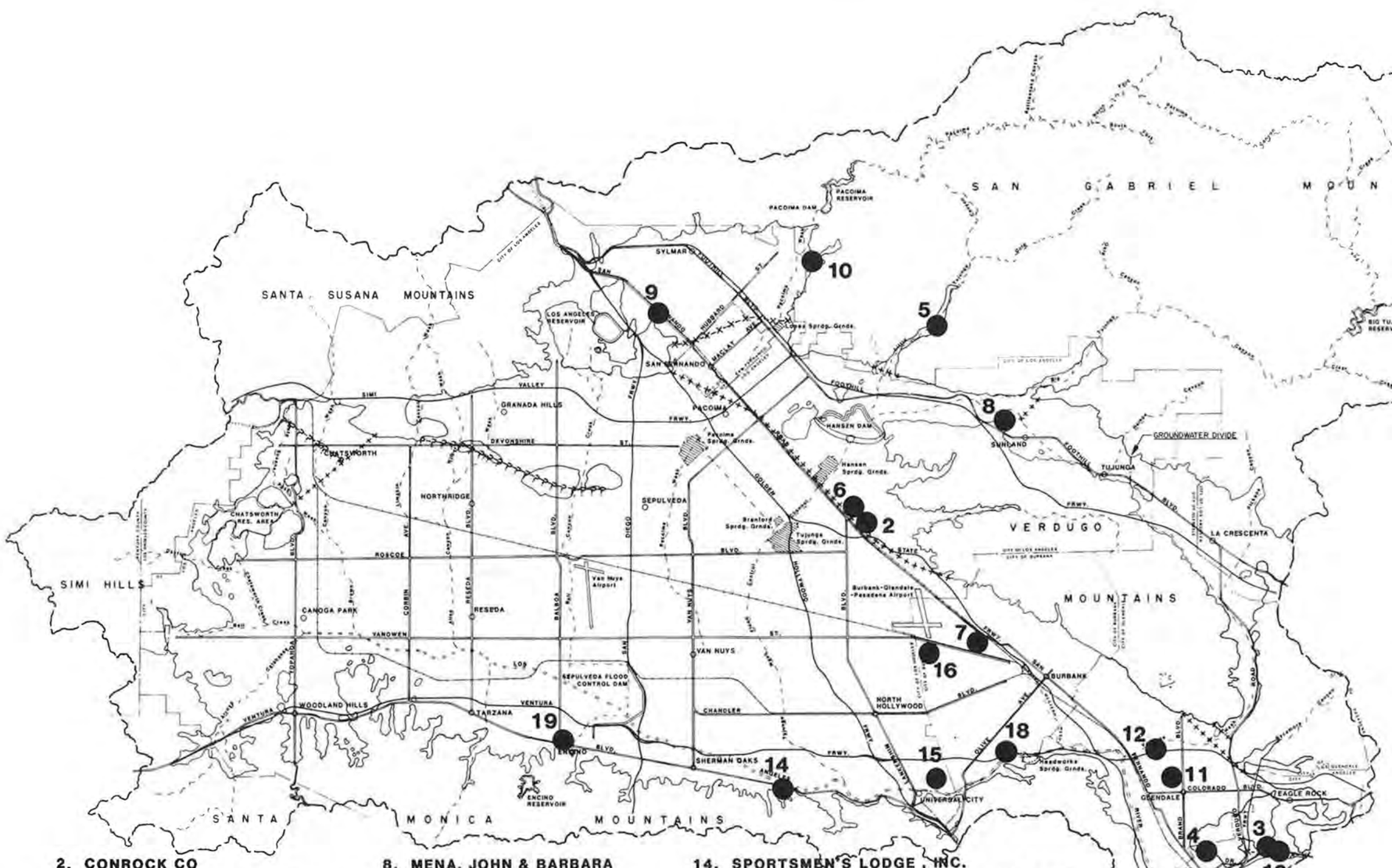

MAGIC MTN.
ELEV. 4880
GLEASON MTN.
ELEV. 6532
PACIFICO MTN.
ELEV. 7124
UNNAMED PEAK
ELEV. 6902
SYLMAR BASIN
UNNAMED PEAK
ELEVATION 3670
OAT MTN. LOOKOUT
ELEV. 3747
SANTA SUSANA MOUNTAINS
SAN GABRIEL MOUNTAINS
SANTA SUSANA PASS
CHATSWORTH PEAK
ELEV. 2344
VERDUGO BASIN
STRAWBERRY PEAK
ELEV. 6164
BARLEY FLATS
UNNAMED PEAK
ELEV. 5410
UNNAMED PEAK
ELEV. 4306
BURRO FLATS
NORTHRIDGE HILLS
CHATSWORTH HILLS
SAN FERNANDO BASIN
OF LOS ANGELES
VAN NUYS PLAIN
AND ASSOCIATED FEATURES
WOODLAND HILLS
LASKEY MESA
LOS ANGELES RIVER
SANTA MONICA MOUNTAINS
SAN VINCENTE MTN.
ELEV. 1961
UNNAMED PEAK
ELEV. 1692
CAHUENGA PEAK
ELEV. 1820
PIEDMONT SLOPES
EAGLE ROCK
EAGLE ROCK BASIN
ELYSIAN HILLS
L.A.C.F.C.D. GAGE F-57
LEGEND
WATERSHED BOUNDARY
WATER COURSE
BOUNDARY OF VALLEY FILL
CITY BOUNDARY
COUNTY BOUNDARY
LINE OF EQUAL ELEVATION OF GROUND SURFACE
REFERENCE: CONTOURS BASED ON U.S.G.S. QUADS
DATUM IS MEAN SEA LEVEL
CONTOUR INTERVALS 80, 200 AND 400 FEET
SPREADING GROUNDS
1. LOPEZ
2 PACOIMA
3. HANSEN
4. TUJUNGA
5. HEADWORKS
ULARA WATERMASTER
UPPER LOS ANGELES RIVER AREA
SCALE

PLATE 3


MAGIC MTN
ELEV. 4860
GLEASON MTN.
ELEV 6532
PACIFICO MTN
ELEV 7124
UNNAMED PEAK
ELEV 6192
UNNAMED PEAK
ELEVATION 3670
OAT MTN LOOKOUT
ELEV. 3747
SAN GABRIEL MOUNTAINS
CITY OF SAN FERNANDO
CITY OF LOS ANGELES
SUNLAND - TUJUNGA
CRESCENTA VALLEY COUNTY
WATER DISTRICT
SANTA SUSANA MOUNTAINS
MISSION HILLS
PACOIMA HILLS
SANTA SUSANA PASS
CITY OF LOS ANGELES
MISSION WELLS
CHATSWORTH PEAK
ELEV. 2264
STRAWBERRY PEAK
ELEV. 6164
BARLEY FLATS
UNNAMED PEAK
ELEV. 5410
UNNAMED PEAK
ELEV. 4306
BURRO FLATS
NORTHRIDGE HILLS
LA CANADA IRRIGATION
DISTRICT
CHATSWORTH HILLS
CITY OF LOS ANGELES, OWENS RIVER
CITY OF LOS ANGELES
VAN NUYS PLAIN
AND ASSOCIATED FEATURES
CITY OF BURBANK
WOODLAND HILLS
LASKEY MESA
CHAL HILL
CITY OF GLENDALE
EAGLE ROCK
SANTA MONICA MOUNTAINS
CAHUENGA PEAK
ELEV. 1625
SAN VINCENTE MTN
ELEV. 1961
UNNAMED PEAK
ELEV. 1982
LAS VIRGENES MUNICIPAL
WATER DISTRICT
CITY OF LOS ANGELES NARROWS
ELYSIAN HILLS
L.A.C.F.C.D. GAGE F-57
LEGEND
WATERSHED BOUNDARY
WATER COURSE
BOUNDARY OF VALLEY FILL
CITY BOUNDARY
COUNTY BOUNDARY
LINE OF EQUAL ELEVATION OF GROUND SURFACE
REFERENCE: CONTOURS BASED ON U.S.G.S. QUADS
DATUM IS MEAN SEA LEVEL
CONTOUR INTERVALS 50, 200 AND 400 FEET
ULARA WATERMASTER
PUBLIC AGENCY
WATER SERVICE
AREAS
SCALE



2. CONROCK CO
3. DEEP ROCK BOTTLED WATER
4. FOREST LAWN MEMORIAL PARK
5. HARPER, CECELLIA DEMILLE
6. LIVINGSTON-GRAHAM, INC.
7. LOCKHEED AIRCRAFT CORP.
8. MENA, JOHN & BARBARA
9. MOORDIGIAN, KISAG
10. MEURER ENGINEERING CO.
11. SEARS, ROEBUCK & CO.
12. ENVIRONMENTALS INC.
13. SPARKLETTS DRINKING WATER CORP.
14. SPORTSMEN'S LODGE, INC.
15. TOLUCA LAKE PROPERTY OWNERS ASSN.
16. VALHALLA MEMORIAL PARK
17. VAN DE KAMP'S DUTCH BAKERS, INC.
18. WALT DISNEY PRODUCTIONS
19. FIRST FINANCIAL PLAZA SITE

ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

WATER SERVICE AREAS OF INDIVIDUAL PRODUCERS

SEPTEMBER 1987

SCALE

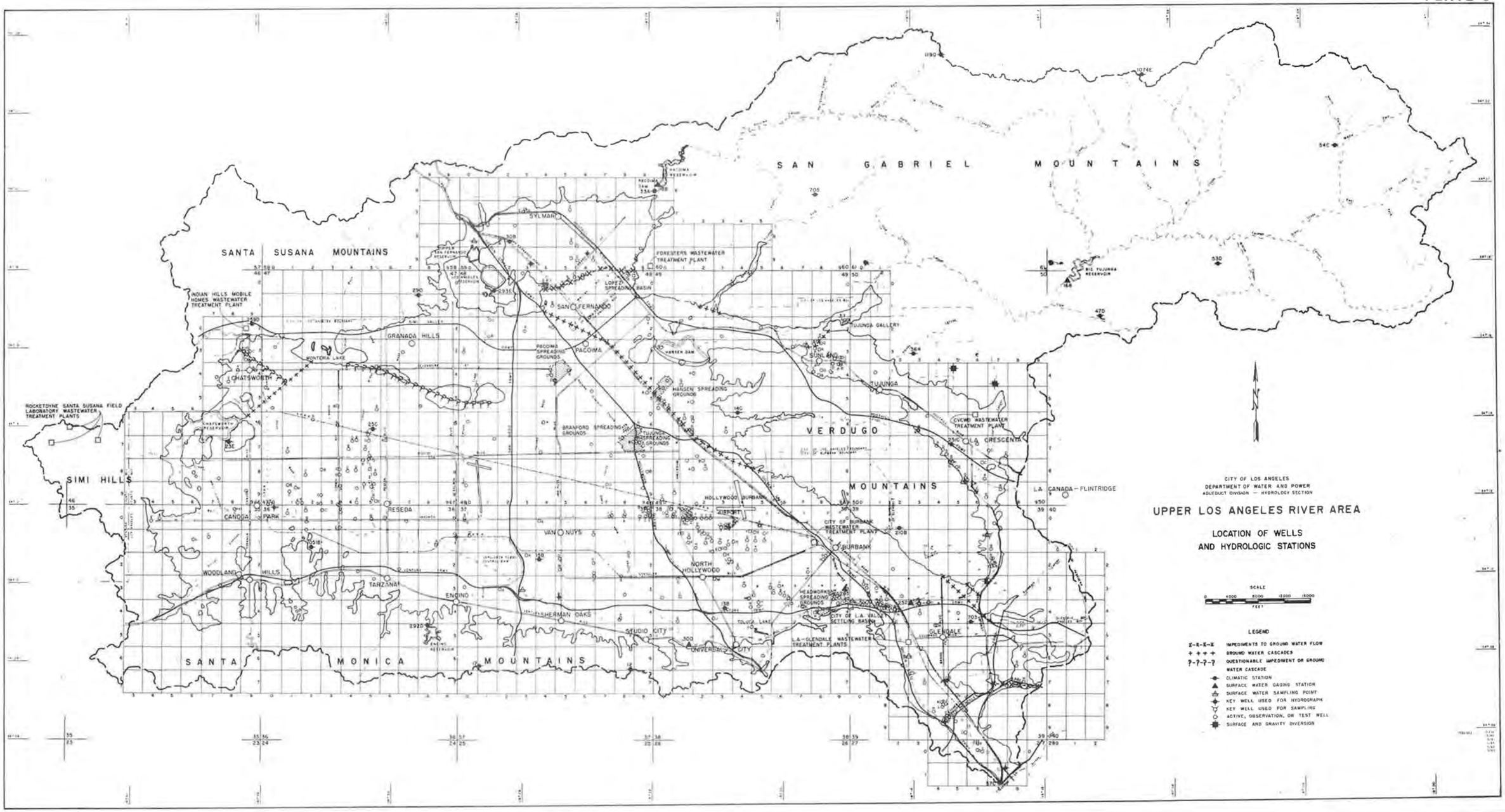
0 4,000 8,000 12,000 16,000

FEET

LEGEND

- X-X-X-X IMPEDIMENTS TO GROUNDWATER FLOW
- + + + + GROUNDWATER CASCADES
- ?-?-?-? QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE

PLATE 5



CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
AQUEDUCT DIVISION — HYDROLOGY SECTION

UPPER LOS ANGELES RIVER AREA

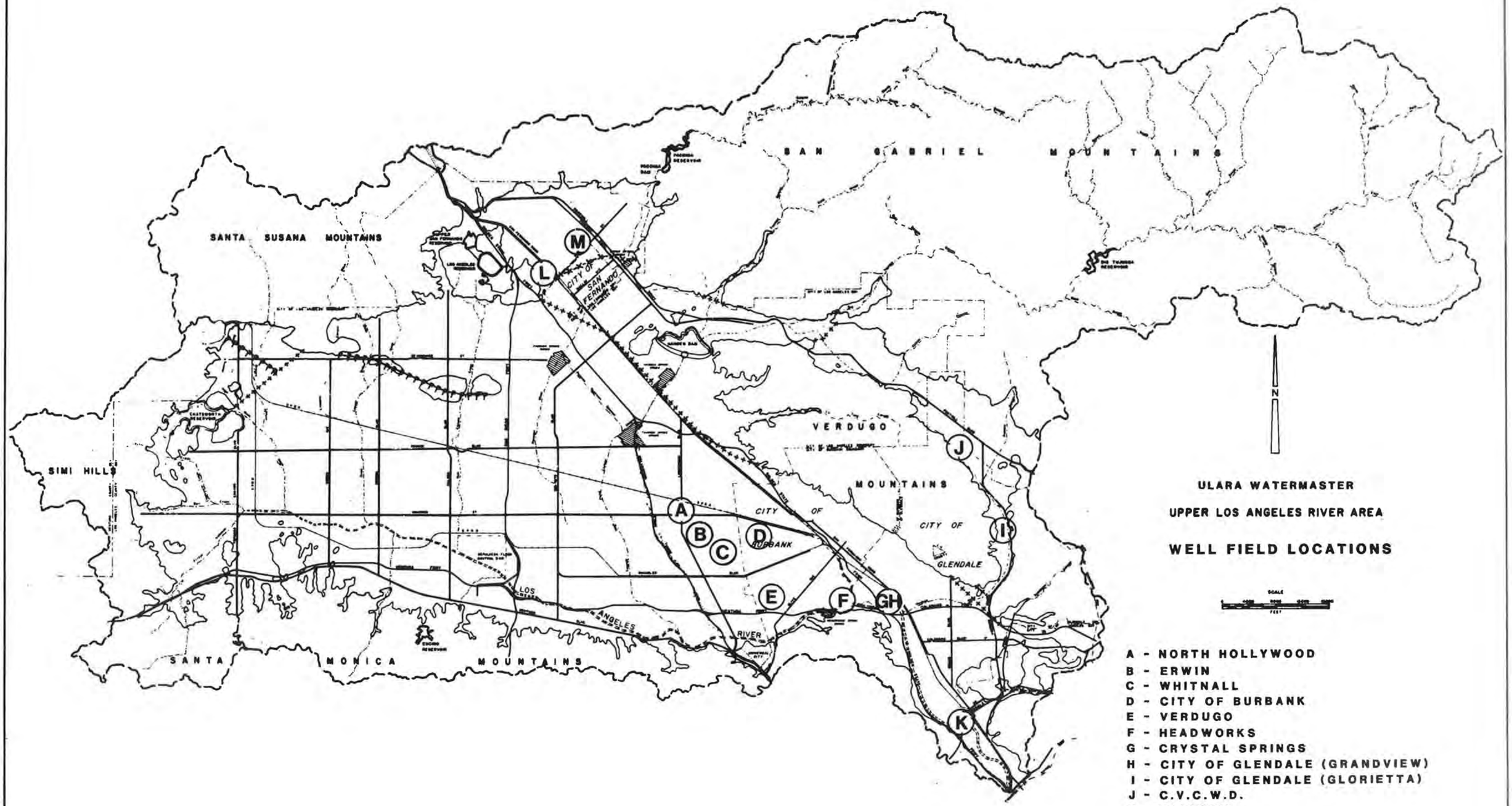
LOCATION OF WELLS AND HYDROLOGIC STATIONS

SCALE
0 4000 8000 12000 16000
FEET

LEGEND

- IMPEDIMENTS TO GROUND WATER FLOW
- GROUND WATER CASCADES
- QUESTIONABLE IMPEDIMENT OR GROUND WATER CASCADE
- CLIMATIC STATION
- SURFACE WATER GAGING STATION
- SURFACE WATER SAMPLING POINT
- KEY WELL USED FOR HYDROGRAPH
- KEY WELL USED FOR SAMPLING
- ACTIVE, OBSERVATION, OR TEST WELL
- SURFACE AND GRAVITY DIVERSION

PLATE 6



ULARA WATERMASTER

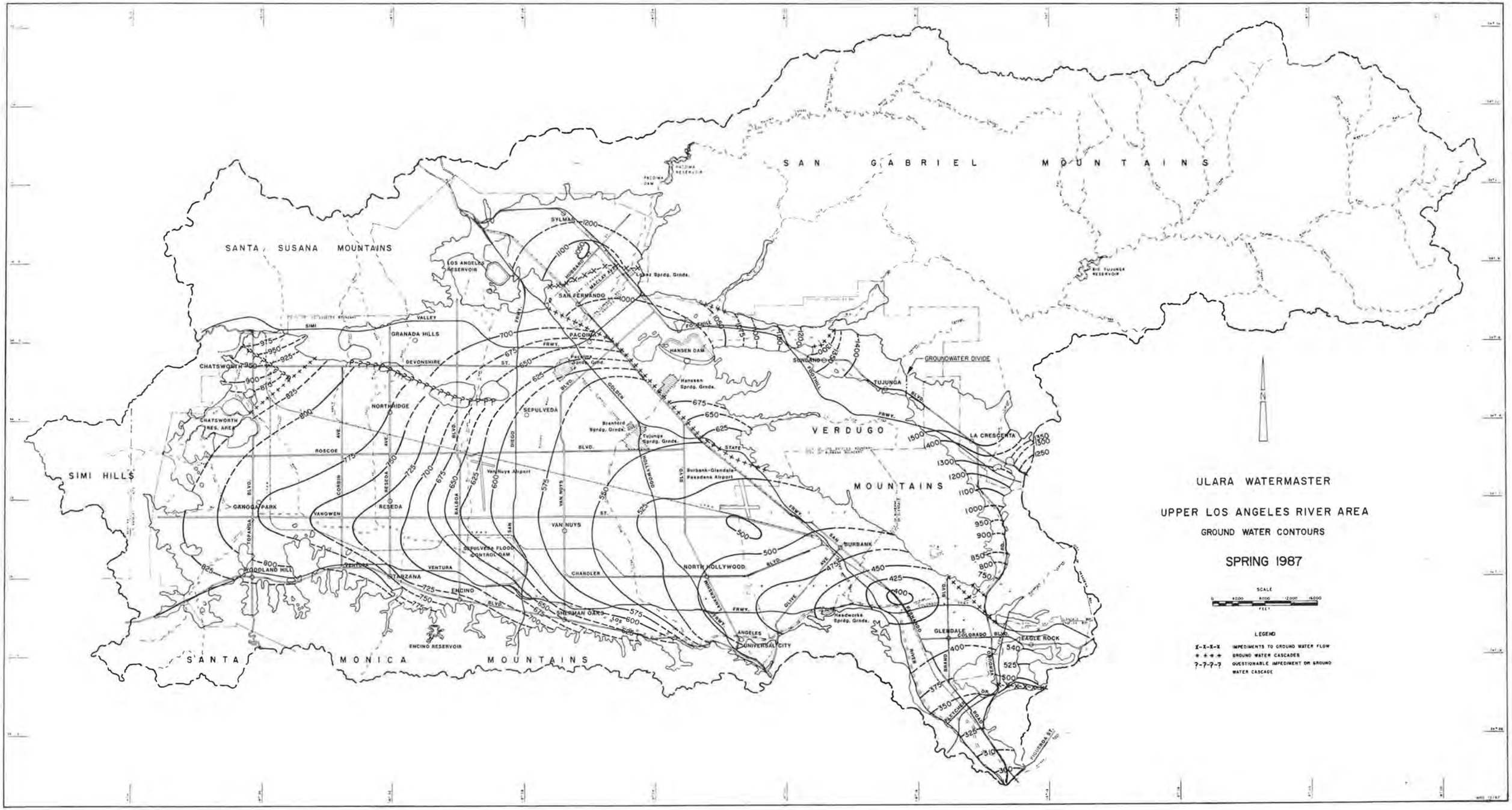
UPPER LOS ANGELES RIVER AREA

WELL FIELD LOCATIONS

SCALE
FEET

A - NORTH HOLLYWOOD
B - ERWIN
C - WHITNALL
D - CITY OF BURBANK
E - VERDUGO
F - HEADWORKS
G - CRYSTAL SPRINGS
H - CITY OF GLENDALE (GRANDVIEW)
I - CITY OF GLENDALE (GLORIETTA)
J - C.V.C.W.D.
K - POLLOCK
L - MISSION
M - CITY OF SAN FERNANDO

PLATE 7



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

GROUND WATER CONTOURS

SPRING 1987

SCALE

0 4000 8000 12000 16000

FEET

LEGEND

X-X-X-X IMPEDIMENTS TO GROUND WATER FLOW

+ + + + GROUND WATER CASCADES

?-?-?-? QUESTIONABLE IMPEDIMENT OR GROUND WATER CASCADE

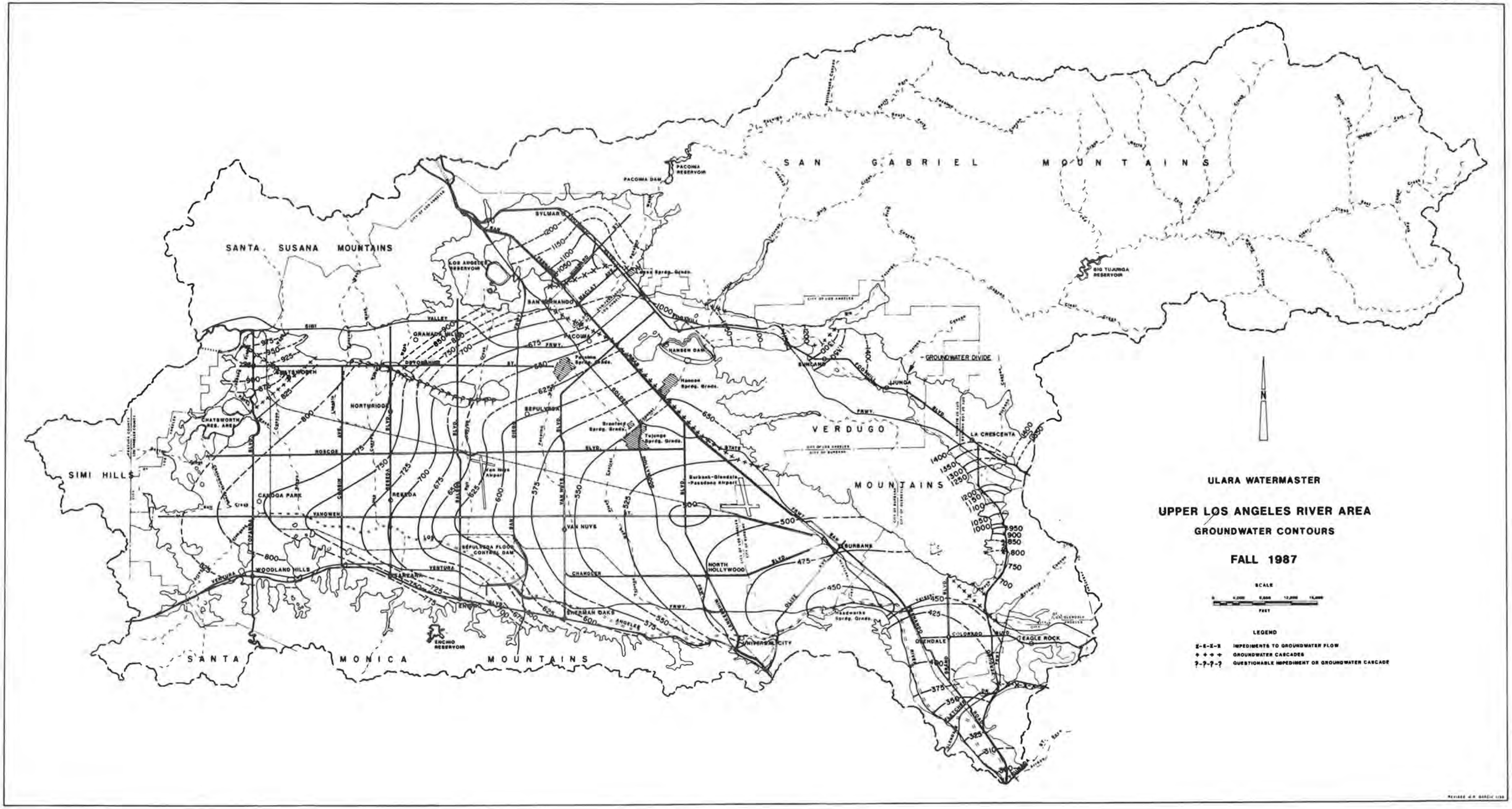
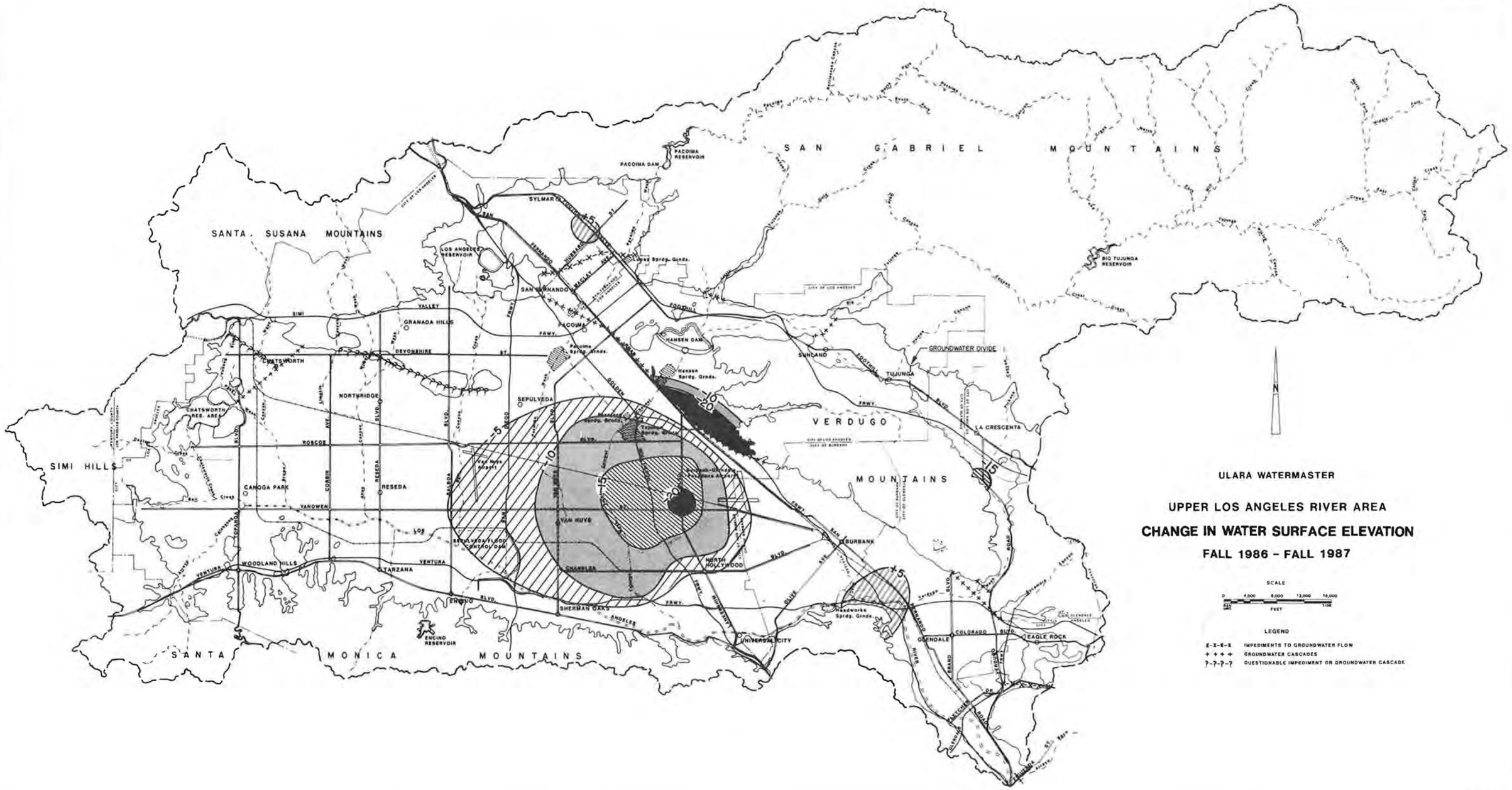

ULARA WATERMASTER
UPPER LOS ANGELES RIVER AREA
GROUNDWATER CONTOURS
FALL 1987
SCALE
FEET
LEGEND
IMPEDIMENTS TO GROUNDWATER FLOW
GROUNDWATER CASCADES
QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE
SAN GABRIEL MOUNTAINS
SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
VERDUGO MOUNTAINS
GROUNDWATER DIVIDE
PACOIMA DAM
PACOIMA RESERVOIR
BIG TUJUNGA RESERVOIR
LOS ANGELES RESERVOIR
HANSEN DAM
ENCINO RESERVOIR
SEPULVEDA FLOOD CONTROL DAM
SYLMAR
SAN FERNANDO
PACOIMA
CHATSWORTH
NORTHRIDGE
CANOGA PARK
RESEDA
VAN NUYS
NORTH HOLLYWOOD
BURBANK
GLENDALE
EAGLE ROCK
LA CRESCENTA
TUJUNGA
SUNLAND
SEPULVEDA
WOODLAND HILLS
ENCINO
SHERMAN OAKS
UNIVERSAL CITY
Burbank-Glendale-Pasadena Airport
VERDUGO
MOUNTAINS
ROSCOE
VANOWEN
CHANDLER
VENTURA
DEVONSHIRE
FRWY.
BLVD.

PLATE 9



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

CHANGE IN WATER SURFACE ELEVATION

FALL 1986 - FALL 1987

SCALE

0 4,000 8,000 12,000 16,000

FEET

LEGEND

- IMPEDIMENTS TO GROUNDWATER FLOW
- GROUNDWATER CASCADES
- QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE

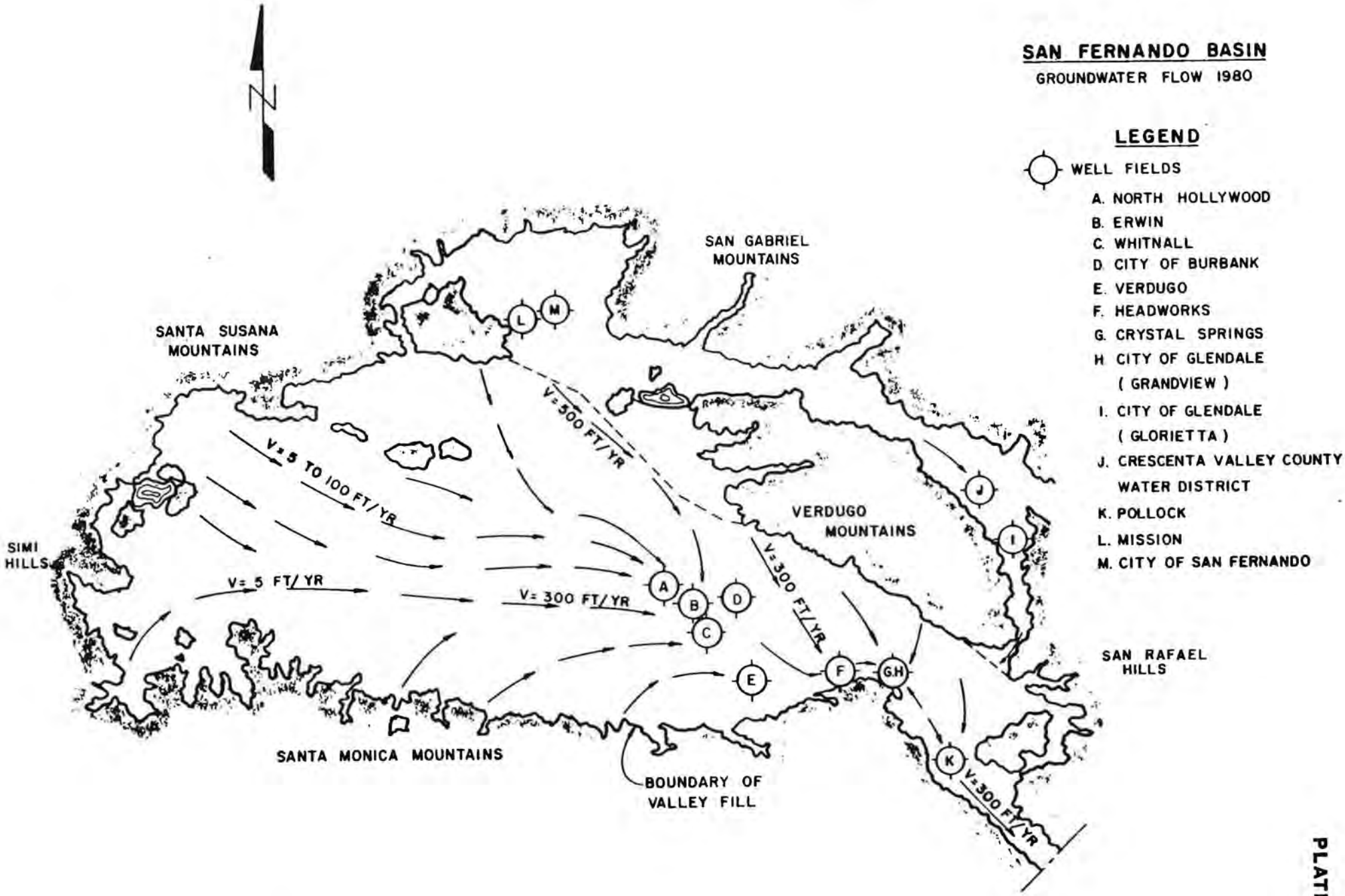
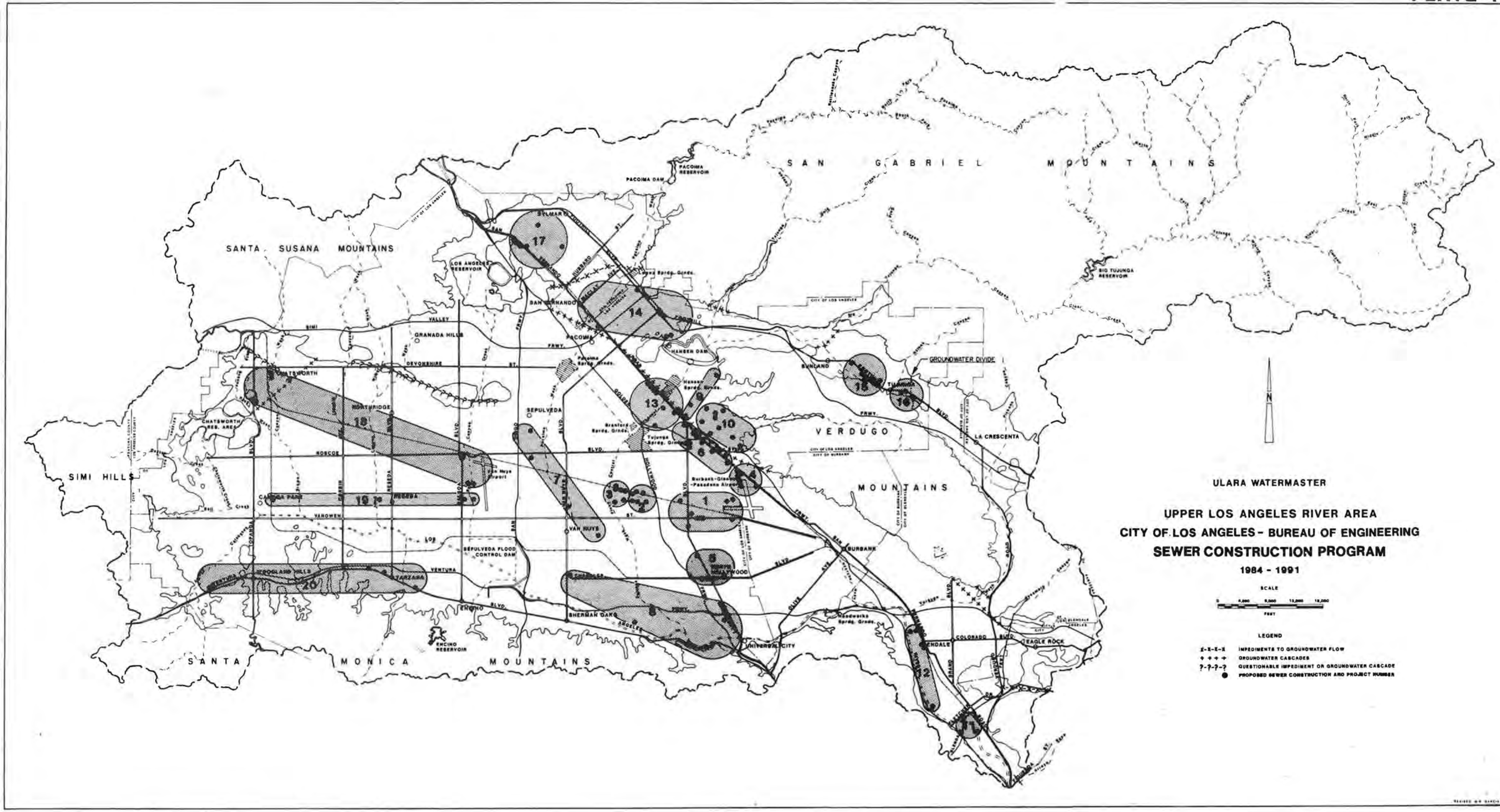

N
SAN FERNANDO BASIN
GROUNDWATER FLOW 1980
LEGEND
WELL FIELDS
A. NORTH HOLLYWOOD
B. ERWIN
C. WHITNALL
D. CITY OF BURBANK
E. VERDUGO
F. HEADWORKS
G. CRYSTAL SPRINGS
H CITY OF GLENDALE (GRANDVIEW)
I. CITY OF GLENDALE (GLORIETTA)
J. CRESCENTA VALLEY COUNTY WATER DISTRICT
K. POLLOCK
L. MISSION
M. CITY OF SAN FERNANDO
SAN GABRIEL MOUNTAINS
SANTA SUSANA MOUNTAINS
SIMI HILLS
V= 5 TO 100 FT/YR
V= 300 FT/YR
V= 5 FT/YR
V= 300 FT/YR
V= 300 FT/YR
VERDUGO MOUNTAINS
SAN RAFAEL HILLS
SANTA MONICA MOUNTAINS
BOUNDARY OF VALLEY FILL
V= 300 FT/YR
PLATE 10

PLATE 11



ULARA WATERMASTER
UPPER LOS ANGELES RIVER AREA
CITY OF LOS ANGELES - BUREAU OF ENGINEERING
SEWER CONSTRUCTION PROGRAM
1984 - 1991
SCALE
FEET
LEGEND
IMPEDIMENTS TO GROUNDWATER FLOW
GROUNDWATER CASCADES
QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE
PROPOSED SEWER CONSTRUCTION AND PROJECT NUMBER
N
SAN GABRIEL MOUNTAINS
SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
VERDUGO MOUNTAINS
GROUNDWATER DIVIDE
PACOIMA DAM
PACOIMA RESERVOIR
BIG TUJUNGA RESERVOIR
LOS ANGELES RESERVOIR
HANSEN DAM
SEPULVEDA FLOOD CONTROL DAM
ENCINO RESERVOIR
CHATSWORTH RES. AREA
SYLMAR
SAN FERNANDO
PACOIMA
GRANADA HILLS
CHATSWORTH
NORTHRIDGE
SEPULVEDA
SUNLAND
TUJUNGA
LA CRESCENTA
CANOGA PARK
RESEDA
VAN NUYS
WOODLAND HILLS
TARZANA
SHERMAN OAKS
NORTH HOLLYWOOD
UNIVERSAL CITY
BURBANK
GLENDALE
EAGLE ROCK
VENTURA
DEVONSHIRE
ROSCOE
VANOWEN
COLORADO
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