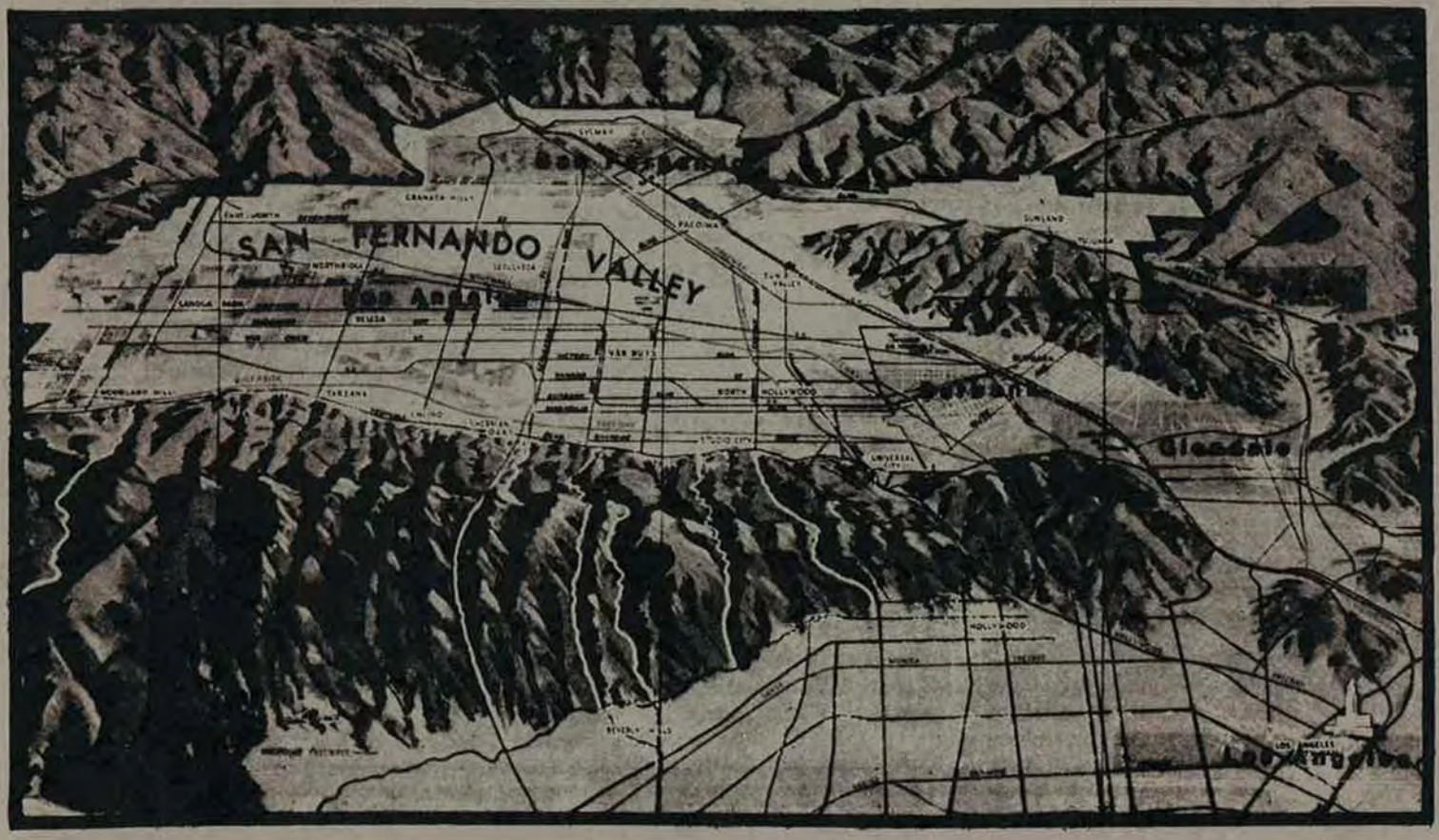
UPPER LOS ANGELES RIVER AREA WATERMASTER

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, 1987 - SEPTEMBER 30, 1988



MAY 1989

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MELVIN L. BLEVINS WATERMASTER
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WATERMASTER SERVICE IN THE UPPER LOS ANGELES RIVER AREA LOS ANGELES COUNTY

OCTOBER 1, 1987 - SEPTEMBER 30, 1988

MAY 1989

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 1987-88 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 1988-89, and indicates the water in storage to the credit of each party as of October 1, 1988. 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 occuring during the water year pursuant to the provisions of the Judgment.

During the 1986-87 Water Year, significant revisions were made to the ULARA Policies and Procedure documents.* This addresses and provides for test pumping and prolonged clean-up pumping by non-parties, who have no right to pump, but who are required to pump and treat contaminated groundwater under a Clean-up and Abatement Order of the Regional Water Qualify Control Board. The Regional Board has included in all Clean-up and Abatement Orders for the ULARA to include a provision requiring the discharger to follow the ULARA Policies and Procedures. Presently, several companies are involved in clean-up pumping and treatment or are drilling extraction wells and designing treatment facilities. These companies include Lockheed, Centralab, Riker-3M, and Rockwell.

Also addressed in the Policies and Procedures dated July 1987 is pumping for dewatering of construction projects. Arrangements have been made with the City of Los Angeles Department of Building and Safety to refer all such dewatering projects in ULARA to the Watermaster's office. If the water pumped for dewatering must be discharged to the storm drains, replacement water must be purchased. At present, seven companies are dewatering and reporting to the Watermaster's office.

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* The purpose and function of the ULARA Policies and Procedures is to set forth in simple terms guidelines regarding decreed rights of parties set forth in the Final Judgment.

Under the Judgement, Disney (Defendant No. 105) operates under a separate stipulation (filed on May 11, 1961, and merged into the San Fernando Judgment, filed January 26, 1979) whereby groundwater extracted for cooling water is discharged into the channel of the Los Angeles River just upstream from the Headworks Spreading Grounds. The original stipulation between Los Angeles and Disney anticipated that the water so discharged would be diverted by the then existing rubber dam into the Headworks Spreading Grounds and returned to the San Fernando Basin as groundwater storage. As the operation of the rubber dam was discontinued because of quality concerns by the California Department of Health Services, the water discharged by Disney is presently considered flowing to the ocean.

The water pumped by Disney will need to be returned to the basin (through injection wells or spreading) or will need to be accounted for as groundwater removed from storage in the San Fernando Basin. Under the guidelines set forth in the Policies and Procedures, this would mean that Disney may need to pay Burbank for the amount pumped under some type of physical solution agreement. If Los Angeles is allowed to spread in the future at its Headwords Spreading Grounds, the Disney's pumping would revert back to non-consumptive use, because the Disney water would then be diverted and returned to groundwater storage through spreading. Los Angeles plans for future spreading is before the L.A. Regional Board presently.

Under the Judgement, several rock companies were assigned rights to pump, with the understanding that their use of water for gravel washing was non-consumptive. As the gravel pits became deeper and reached the water table, permanent ponds were produced, from which evaporation could occur on a continuous basis. The Watermaster has received from the rock companies general proposed plans to take the pumped groundwater to a separate area for recharge. If done properly, such an approach would be acceptable. However, further review is required for final approval. Additional consideration will be needed as to whether an adjustment in the non-consumptive approach is in order. Other Physical Solution pumpers such as Toluca Lake and Sportsmen Lodge are also under review by the Watermaster's office to see if there has been a change in their consumptive use of groundwater.

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 Waterworks Engineer
and ULARA Watermaster
(Reg. C.E. No 12863)

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ULARA WATERMASTER REPORT
FOR WATER YEAR 1987-88

Report Prepared By:

Melvin L. Blevins	Sr. Waterworks Engineer and ULARA Watermaster
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Victor J. Vargas	Hydrologic Engineering Assistant and Staff
Moseis R. Garcia	Office Engineering Technician and Staff
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Other Watermaster Staff:

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Karen K. Murphy	Hydrologic Engineering Assistant
Michael L. Deas	Hydrologic Engineering Assistant
Craig D. Caplinger	Hydrologic Engineering Assistant
Herbert D. Schweiger.	Hydrologic Engineering Assistant
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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 1455, 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 physical solution rights to extract water from Eagle Rock Basin.

Watermaster Service

In preparing the 1987-88 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, 1988, are:

City of Burbank

Fred Lantz (President)
Ross Burke (Alternate)

City of Glendale

Michael Hopkins (Vice-President)
Don Baker (Alternate)

City of Los Angeles

Dennis C. Williams
* Don G. McBride (Alternate)

City of San Fernando

Richard James
Michael Drake (Alternate)

Crescenta Valley County Water District

Robert K. Argenio
Ray Marsden (Alternate)

Private Parties

Charles Meurer
Roger Meurer

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* Appointed as of April 3, 1989.

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 1987-88 water year, the Administrative Committee met on April 28, 1988. The following items were discussed at the April 28 meeting.

1. Amount of Groundwater Stored in San Fernando Basin.
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 - Status
   d) Underground Tank Leakage Problems
   e) San Fernando Groundwater Quality Study - ICC Committee
   f) AB 1803 - Programs on Water Quality Monitoring - Status
   g) SWAT Reports - Status
3. Verdugo Basin Groundwater Development - Status.
4. Update on "Other Pumping by Non-Parties".
5. Approval of the 1986-87 Watermaster Report.

Summary of 1987-88 Operating Conditions

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

Rainfall on the valley fill area was 113 percent of normal as compared to 36 percent of normal the year before. Surface runoff leaving the valley at Gage F-57C-R for 1987-88 was 156,204 acre-feet. The amount conserved by the LACDPW in its spreading basins was 23,161 acre-feet, an increase of over 190 percent over last year. Total precipitation falling on the San Fernando Valley and its tributary hill and mountain areas was estimated to be 599,545 acre-feet for the 1987-88 water year. Of this total, approximately 74,284 acre-feet flowed from the valley as storm runoff and rising ground water, leaving 525,261 acre-feet which was beneficially used within the area (88 percent of the total).

Ground water extractions decreased in the Sylmar and Verdugo Basins and increased in the San Fernando and Eagle Rock Basins during 1987-88. Total ULARA extractions amounted to 120,100 acre-feet as compared to an allowable pumping of 119,176 acre-feet. Of this total, 115,838 acre-feet represents the 1987-88 extraction rights of parties in the San Fernando Basin (see Table 15, 1987-88) plus the safe yield values of Sylmar and Verdugo Basins. The remaining 3,338 acre-feet is non-consumptive use pumping (see Table 13). Extractions used within ULARA decreased by 33 percent (8,534 acre-feet) from last year.

For ULARA, gross imports decreased by 17,101 acre-feet, or 3 percent, while imports used within ULARA increased over 4 percent (14,931 acre-feet). Exports of Owens River water decreased by 32,032 acre-feet, or 9 percent. The total amount delivered to water users within ULARA increased by 6,821 acre-feet, or almost 2 percent.

Sewage export was 177,808 acre-feet in 1987-88, an increase of 6 percent. Total reclaimed water used in ULARA (cooling towers, irrigation, etc.) increased 14 percent (424 acre-feet), while the total water reclaimed increased from 63,605 acre-feet to 76,207 acre-feet, an increase of 20 percent. Most of the reclaimed water is discharged to the Los Angeles River.

A total of 23,161 acre-feet of native water (no Owens River water spread) was spread during the year, which was over a 190 percent increase from last year in spreading of imported and native water.

Ground water storage for the San Fernando and Verdugo Basins decreased by an estimated 5,000 acre-feet and 931 acre-feet, respectively, and increased in the Sylmar Basin by 371 acre-feet during 1987-88.

Summary of Allowable Pumping for 1988-89

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, 1988.

TABLE 1

UPPER LOS ANGELES RIVER AREA
SUMMARY OF OPERATING CONDITIONS
1986-87 AND 1987-88

Item		Water Year 1986-87	Water Year 1987-88
1. Active pumpers		18	19
2. Inactive pumpers (within valley fill)		2	2
3. Valley rainfall, in inches		5.99	18.62
4. Spreading operations, in acre-feet[a/]			
a. LACDPW		7,919	23,161
b. Los Angeles, City of		33	0
5. Extractions, in acre-feet		107,788	120,100
a. Used in ULARA		25,786	17,252
6. Gross imports, in acre-feet			
a. MWD water		75,862	85,114
b. Owens River water[b/]		601,017	574,664
	Total	676,879	659,778
7. Exports in acre-feet			
a. Owens River water		320,754	288,722
b. Groundwater by Los Angeles		81,802	102,643
	Total	402,556	391,365
8. Imports used in ULARA, in acre-feet		356,125	371,056
9. Reclaimed water, in acre-feet		63,605	76,207
a. Used in ULARA		3,020	3,444
10. Total delivered water used in ULARA, in acre-feet		384,931	391,752
11. Sewage export, in acre-feet[c/]		167,514	177,808

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 ULARA. It does not include operational releases, reservoir evaporation, and water spread during the year. A portion of the water (7a) is passed through ULARA and is considered an export.

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 1988-89

(In Acre-Feet)

	Extractions			
	Native	Import Credit	Total	Stored Water Credit*
San Fernando Basin				
Los Angeles	43,660	50,702	94,362	182,650
Burbank	--	4,742	4,742	38,498
Glendale	--	5,185	5,185	23,621
Sylmar Basin				
Los Angeles	--	--	3,058	(47)[a/]
San Fernando	--	--	2,765	0
Verdugo Basin				
Crescenta	--	--	3,294	--
Glendale	--	--	3,856	--

* As of October 1, 1988.

[a/] Parenthesis indicate deficit stored water credit.

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

Σ stored water credit = 244,760 ≈ 245,000

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 1987-88 water year experienced above average rainfall. The valley floor received 18.62 inches of rain, whereas the mountains received approximately 23.06 inches. The weighted average of both valley and mountain areas was 21.36 inches, an increase of 13.59 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	1986-87 Precipitation	1987-88	
				Precipitation	Percent of 100-Year Mean
11D	Upper Franklin Canyon Reservoir	18.50	6.30	17.69	96
13C	Hollywood-Blix[b/]	16.63	5.66	20.28	122
14C	Roscoe-Merrill[b/]	14.98	6.42	20.08[c/]	134
15A	Van Nuys[b/]	15.30	4.31	14.40	94
17	Sepulveda Canyon-Mulholland Highway	19.82	6.76	25.40	128
21B	Woodland Hills[b/]	14.60	5.51	18.04	124
23B-E	Chatsworth Reservoir[b/]	15.19	6.04	18.88	124
25C	Northridge-LADWP[b/]	15.16	5.61	18.07	119
33A-E	Pacoima Dam	19.64	7.63	21.60	110
47D	Clear Creek-City School	33.01	11.45	31.50	95
53D	Colby's Ranch	29.04	12.80	26.30	91
54C	Loomis Ranch-Alder Creek	18.62	10.67	17.55	94
210B	Brand Park	18.13	8.05	18.40[c/]	101
251C	LaCrescenta[b/]	23.31	8.77	21.79	93
259D	Chatsworth-Twin Lakes	18.70	5.98	20.00[c/]	107
293E	Los Angeles Reservoir[b/]	17.32	6.60	19.03	110
1190	Pacoima Canyon-North Park Ranger Station	23.06	11.01	28.98[c/]	126

Weighted average for valley stations - 18.62 inches (1987-88)
Weighted average for mountain stations - 23.06 inches (1987-88)

[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 summarizes the monthly runoff for these gaging stations and compares the 1986-87 water year with the 1987-88 year. The larger runoff in 1987-88 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 which includes 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. 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 1987-88 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 ground water, and industrial and reclaimed wastewater discharges. The Watermaster utilized the procedures outlined in the Report of Referee (Volume II, Appendix O) 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												Total
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	
F-57C-R	1986-87	6475^{E}	10480^{E}	6370^{E}	9860^{E}	8460^{E}	10760^{E}	5300^{E}	5310^{E}	5330^{E}	4690^{E}	4910^{E}	5350^{E}	83,295^{E}
Los Angeles River	1987-88	28408^{E}	14087^{E}	11897^{E}	16568^{E}	21156^{E}	7266^{E}	16889^{E}	8152^{E}	7557^{E}	7176^{E}	7184^{E}	7254^{E}	153,594^{E}
F-252-R	1986-87	210	580	190	480	690	590	170^{E}	180^{E}	170^{E}	180^{E}	180^{E}	170^{E}	3,790^{E}
Verdugo	1987-88	2340	1950	3330	1580	1830	364	878	313	462	300	418	275	14,041
E285-R	1986-87	430	1070	500	1420	600	520	260	450	570	360	450	280	6,910
Burbank Storm Drain	1987-88	2710	1330	1180	1500	1560	765	1520	655	553	761	716	804	6,740
F-300-R	1986-87	4650	6690	4360	6440	4690	6260	3630^{E}	3795^{E}	3700^{E}	3120	3020	3880	54,235^{E}
L.A. River Tujunga Ave.	1987-88	21755	8986	13963	12682	18861	5817	13070	4353	4577	4932	5119	4805	118,920
F-168-R	1986-87	68	177	317	291	443	651	424	170	13	18	185	18	2,775
Big Tujungal Dam	1987-88	169	657	357	821	617	1700	1167.5	614	29.4	30.7	19.8	100	6,282
118B-R	1986-87	+	6	+	+	212	+	+	+	+	4	+	+	222
Pacoima Dam	1987-88	+	0	47.6	1436	0	1094	+	808	+	+	+	3.4	3,389

* 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 Groundwater[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
1987-88	210	81,920	74,074	156,204
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[d]	0	6,270[d]	8,740[d]
1986-87	2,100[d]	0	1,690[d]	3,790[d]
1987-88	3,548	0	10,493	14,041

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 ground water and industrial waste plus reclaimed water. Separation of base flow from surface runoff is based on the following assumptions:

> Rising ground 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. However, the operation of the diversion structure (rubber dam) was discontinued in 1982 because of quality concerns by the State Department of Health Services.

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 are subsequently 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 continues to be a problem because of the sediment 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 summarizes the spreading operations for the 1987-88 water year.

Ground Water Table Elevations

During the 1987-88 water year, the Watermaster collected and processed data to determine prevailing ground water conditions during the spring and fall of 1988. Plates 7 and 8 show ground water contours for these two seasons. Change in water surface elevation from the fall of 1987 to the fall of 1988 are shown on Plate 9. The drop in water levels in the North Hollywood area is related to the increase in pumping in the North Hollywood wells and the start-up of the newly installed Rinaldi-Toluca production wells. The rise in water levels northeast of the Verdugo Fault and southerly of the Hansen Spreading Grounds is related to the heavier spreading in 1987-88 (17,252 acre-feet - Table 6) as compared with 1986-87 (7,311 acre-feet). On Plate 10 is a diagrammatic sketch of flow directions and estimated ground water velocities in the San Fernando Basin. On Figures 1 and 2 are shown fluctuations of water levels in wells whose locations are shown in the inset map on Figure 2.

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. Their locations are shown on Plate 2.

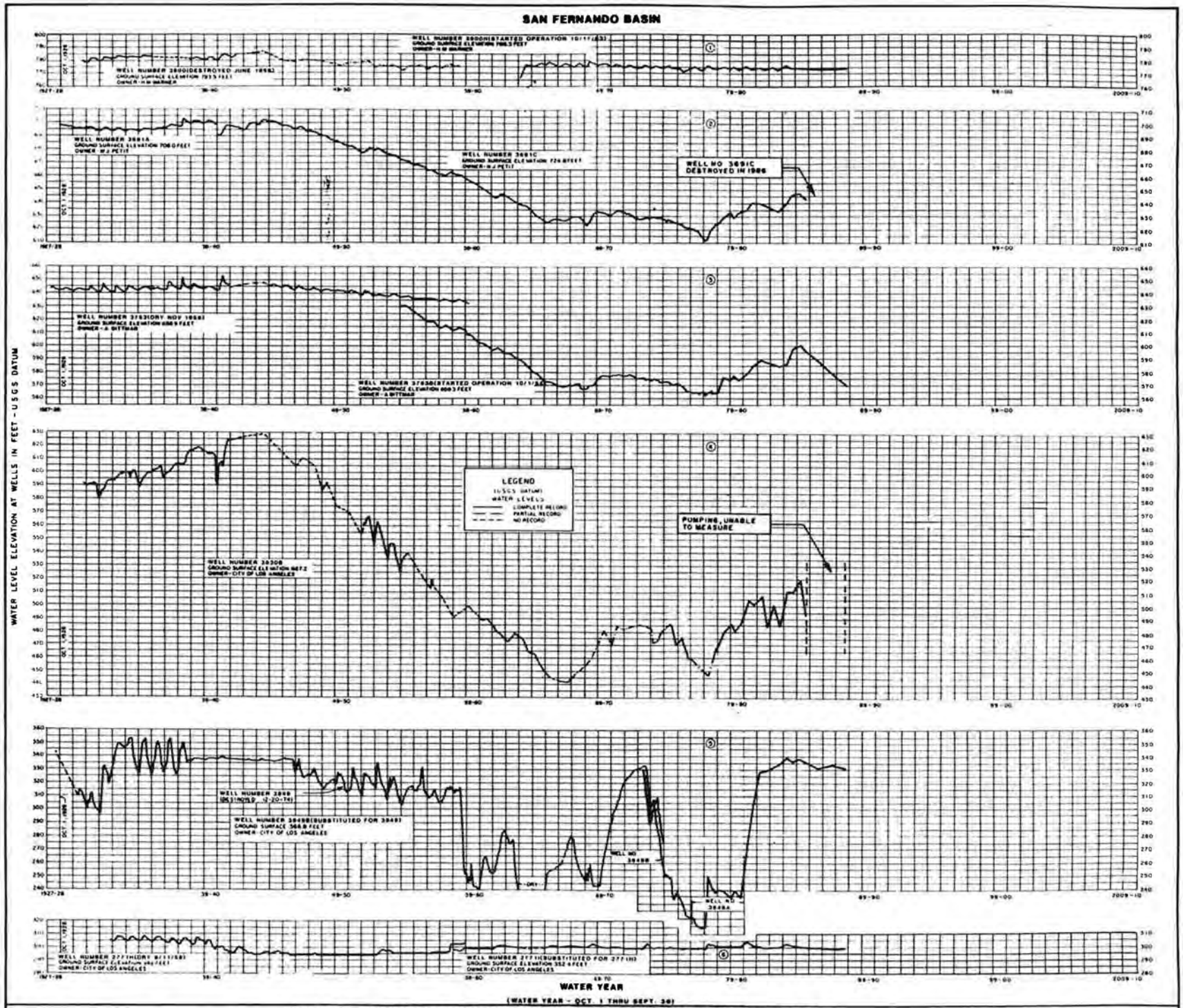
Water Quality

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 1987-88 are contained in Table 8.

TABLE 6

1987-88
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.	118	527	1	606	0	0	0	0	1,252
Nov.	0	1,614	0	362	0	0	0	0	1,976
Dec.	91	1,407	1	306	0	0	0	0	1,805
Jan.	25	2,512	273	1,310	0	0	0	0	4,120
Feb.	36	1,742	1	531	0	0	0	0	2,310
Mar.	67	3,363	428	566	0	0	0	0	4,424
Apr.	15	2,737	15	523	0	0	0	0	3,290
May	0	1,561	318	316	0	0	0	0	2,195
June	0	768	0	0	0	0	0	0	768
July	0	661	0	0	0	0	0	0	661
Aug.	0	88	0	0	0	0	0	0	88
Sept.	0	272	0	0	0	0	0	0	272
Totals	352	17,252	1,037	4,520	0	0	0	0	23,161



3600H
3691C
3753B
3830B
3949B
3949A
2771H
2771I

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

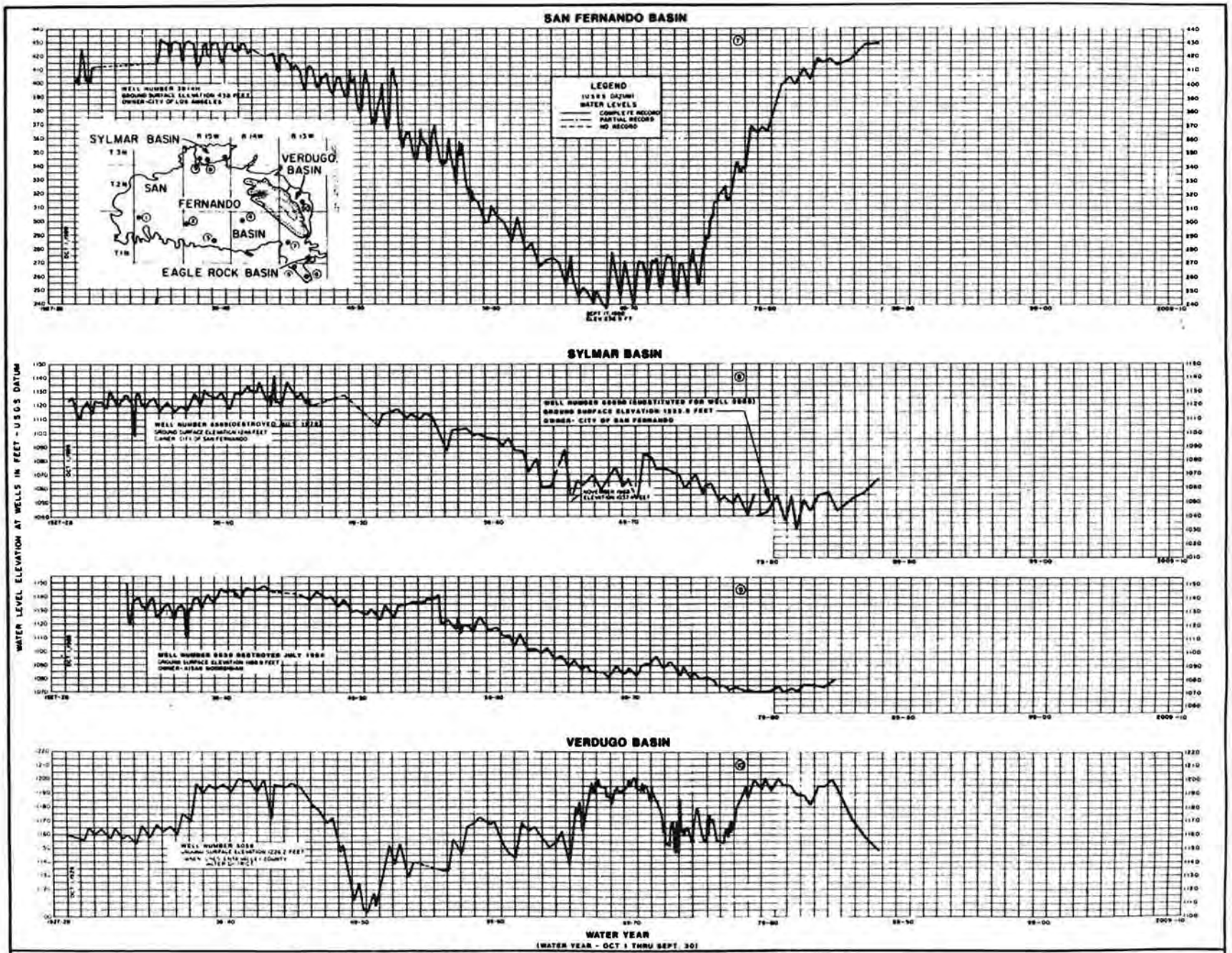


FIGURE 2 - **FLUCTUATION OF WATER LEVEL ELEVATION AT WELLS IN THE SAN FERNANDO, SYLMAR AND VERDUGO BASINS**

TABLE 7

WATER RECLAMATION PLANTS, 1987-88
(In Acre-Feet)

Plant	Treated	Used in ULARA	Discharged to Los Angeles River
San Fernando Basin			
City of Burbank	5,717	885[a/]	5,258
Los Angeles-Glendale	21,847	1,877[b/]	20,095
Donald C. Tillman	48,576	615[c/]	46,535
Indian Hills Mobile Homes[d/]	20	20[e/]	0
Rocketdyne (Santa Susana Field Laboratory)	31	31	0
The Independent Order of Foresters[f/]	16	16[e/]	0
Total	76,207	3,444	71,888

a/ Total water delivered (851 AF) to the power plant in Burbank for cooling water includes 50 percent evaporation and the rest is discharged to the Burbank western channel at the power plant; 34 AF used by Cal/Trans for freeway landscape irrigation.

b/ Total water delivered (344 AF) to the phosphate plant in Glendale for cooling water includes 50 percent evaporation and the rest to Los Angeles River; 1,530 AF delivered to Griffith Park by City of Los Angeles for irrigation and to Los Angeles-Glendale plant for wash down, cooling, and irrigation; 3 AF used by Cal/Trans for freeway landscape irrigation.

c/ Water used for in plant use.

d/ Water supply from nearby well.

e/ Land irrigation.

f/ Water supply from pipeline from LADWP.

TABLE 8
REPRESENTATIVE MINERAL ANALYSIS OF WATER

Well Number or Source	Date Sampled	MINERAL CONSTITUENTS IN Milligrams per liter (mg/l)													TDS Total Dissolved Solids mg/l	TH Total Hardness as $CaCO_3$ mg/l
		EC x 10^6 at 25°C	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	87-88	799	7.6	56	23	78	3.8	-	126	171	68	1.4	0.26	-	569	236
Owens River Water Upper Van Norman Reservoir Inlet	87-88	339	8.1	24	6.7	38	4.0	-	127	23	17	0.2	0.57	0.37	232	88
State Project Water at Joseph Jensen Filtration Plant (Influent)	4/5/88	578	7.9	28	16	66	3.5	-	92	60	84	1.3	0.12	-	384	134
Surface Water																
Los Angeles River at Sepulveda Blvd.	87-88	840	7.1	43	15	91	10	0	128	108	68	16	-	0.59	510	168
Los Angeles River at Colorado Blvd.	87-88	893	8.7	56	20	98	9.2	42	130	147	93	18	-	0.49	589	224
Burbank Western Wash at Los Angeles River	87-88	1163	7.9	46	21	152	13	3	162	171	146	20	-	0.54	757	202
Los Angeles-Glendale Reclamation Plant Discharge to Los Angeles River	87-88	983	7.5	47	20	130	11	0	159	140	119	18	-	0.53	629	200
Groundwater																
(San Fernando Basin - Western Portion)																
4757C (Reseda No. 6)	10/13/83	944	7.8	115	31	43	2.1	-	301	200	33	2.6	0.31	0.24	595	416
(San Fernando Basin - Eastern Portion)																
3800D**** (No. Hollywood No. 30)	10/28/87	746	7.2	98	22	32	4.0	-	330	56	17	0.8	0.45	0.21	-	335
3841C (Burbank No. 6)	02/09/88	475	7.9	55	10.5	32	3.6	1.05	211	45	15	1.2	0.30	-	280	181
3913H (Grandview No. 16)	06/18/87	520	7.9	57	12	36	3.4	1.08	211	50	21	2.3	0.52	-	310	193
(San Fernando Basin - L.A. Narrows)																
3959E (Pollock No.4*)	10/28/87	1180	7.3	108	43	86	3.9	-	250	215	101	23.5	-	0.98	743	445
(Sylmar Basin)																
4840K (Mission No. 6**)	06/09/88	584	7.7	59	14	34	4.5	-	176	70	27	1.8	0.23	0.10	365	206
5959 (San Fernando No. 3)	02/13/85	850	7.6	100	17	30	3.1	-	-	65	32	21	0.31	-	400	319
(Verdugo Basin)																
3971 (Glorietta No. 3)	06/09/87	845	7.2	89	32	36	3.0	0.23	207	108	76	75	0.21	-	500	356
5058 (CVCWD No. 6***)	11/15/88	760	6.8	72	28	35	3.2	0.08	177	92	63	66.4	0.18	-	490	298

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

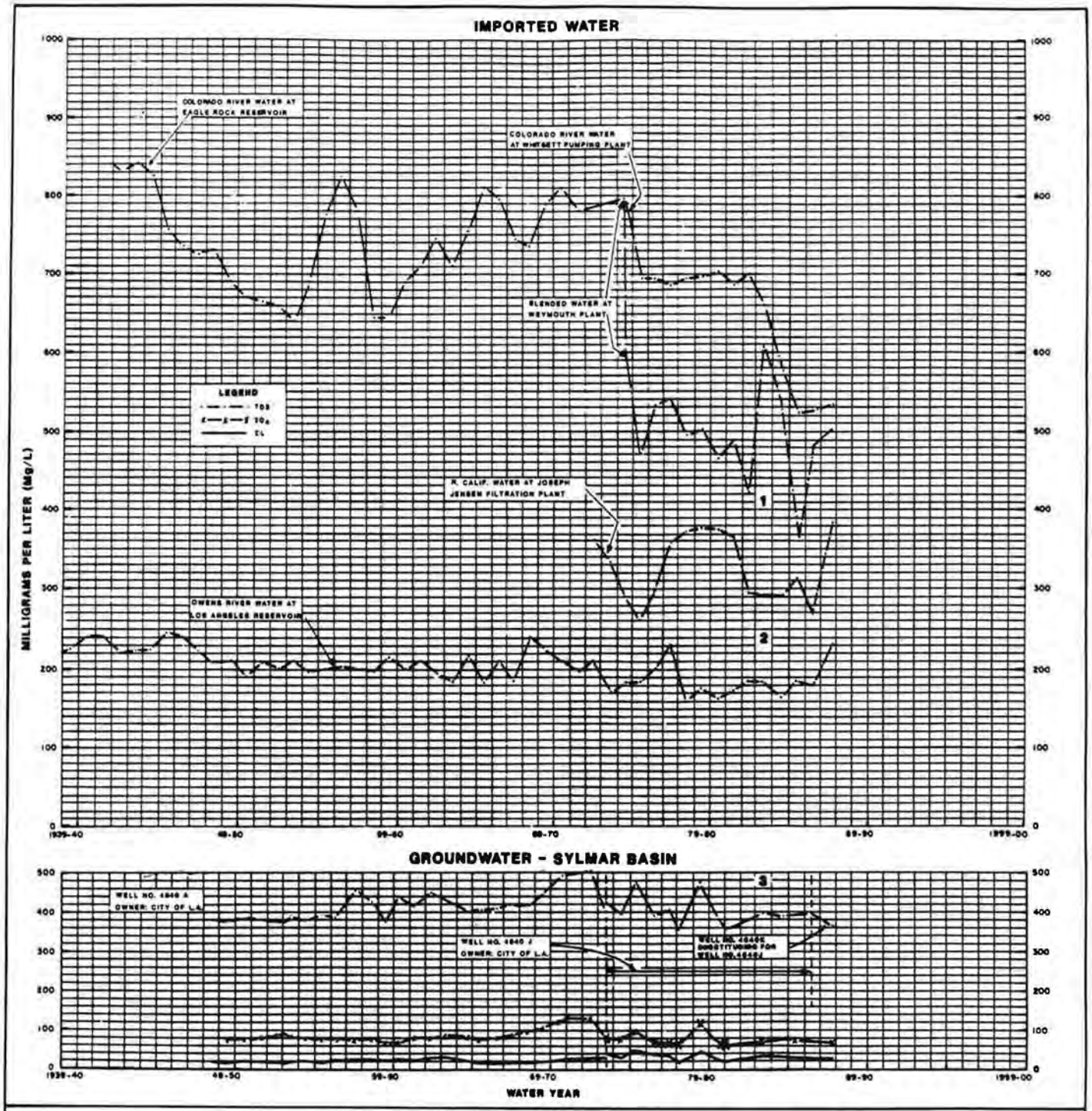


Figure 3 - MINERAL CONSTITUENTS OF WATER SOURCES IN THE ULARA

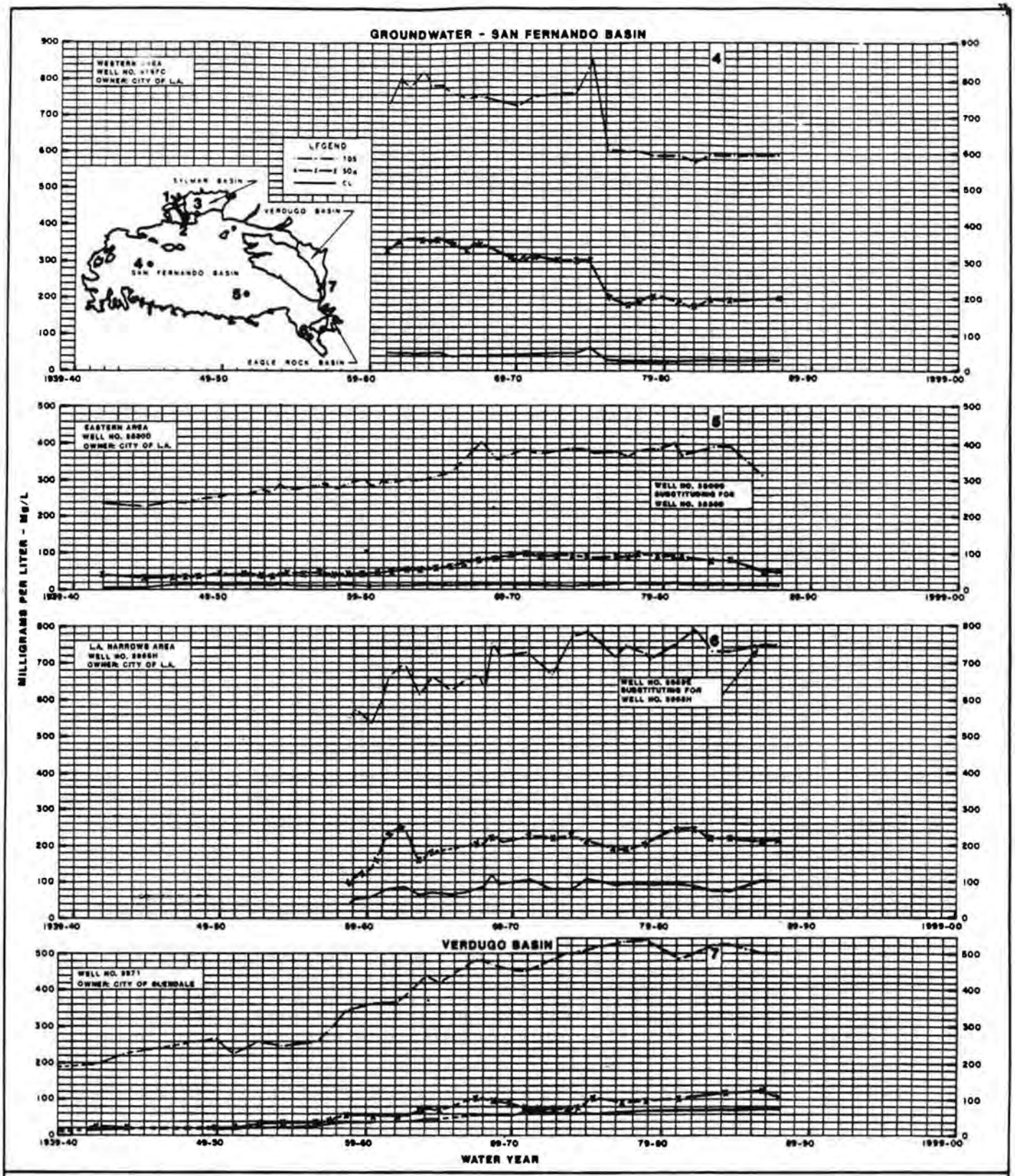


Figure 3(cont.) - MINERAL CONSTITUENTS OF WATER SOURES IN THE ULARA

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 1987-88 was 232 mg/1, which was 29 percent greater than the 180 mg/1 for 1986-87.

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 Lake Matthews showed an average TDS of 539 mg/1 for 1987-88, an increase of 1 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 1987-88 was 384 mg/1, an increase of 43 percent over last year due to changes in the quality of MWD source waters.

D. Colorado River and Northern California water were first blended at the Weymouth Plant in May 1975. In the 1987-88 period, TDS had an average value of 503 mg/1 which was a 4 percent increase from 1986-87. 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 1987-88, low flows in the Los Angeles River at Colorado Boulevard had an average TDS content of 589 mg/1 and a total hardness of 224 mg/1, an increase over last year of 3 and 4 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 in character.

TABLE 9

1987-88
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	11	0	1	0	2	2	1	17	0	4	0	21
20-100	3	2	1	6	1	3	0	16	5	4	0	25
> 100	6	0	0	0	0	0	0	6	2	0	0	8
Total	20	2	2	6	3	5	1	39	7	8	0	54
PCE Levels (ppb)												
4-20	10	0	2	3	0	1	0	16	0	3	3	22
20-100	0	0	0	1	0	0	0	1	5	0	0	6
> 100	0	0	0	0	0	0	0	0	2	0	0	2
Total	10	0	2	4	0	1	0	17	7	3	3	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

* Wells are categorized based upon annual averages. Where data was not available for 1987-88, data from the most recent water year was used to compile this table.

Groundwater is generally within the recommended limits of the California Title 22 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 delivered is either being treated or blended in order to meet State Drinking Water Standards.

Groundwater Quality Management Plan

During 1987-88, the Interagency Coordinating Committee (ICC) continued to implement the recommendations of the Groundwater Quality Management Plan - San Fernando Valley Basin (GWQMP) which were formulated to protect the groundwater basin. Particular attention was directed toward the organic contaminants TCE and PCE found in the groundwater. Table 9 shows the total number of wells for 1987-88 exceeding the California DOHS action levels for these contaminants.

There were five active subcommittees of the ICC operating during 1987-88 to implement the GWQMP recommendations. More than 20 state and local agencies and private organizations are participating in the subcommittees. Several noteworthy accomplishments, described below, resulted from subcommittee activities.

Underground Tanks, Sumps, and Pipelines - The City of Los Angeles Fire Department activated its new Underground Tank Unit during the 1987-88 year. This unit has the responsibility of enforcing the State-mandated Underground Tank Program for the City of Los Angeles. As of July 1, 1988, every underground tank located within the City must be tested for leaks and retrofitted with an alarm system that will indicate the existence of any future leaks. In addition to investigation of existing underground tanks, the Underground Tank Unit has the responsibility for plan checks, issuance of permits for new installations, and regulatory authority over the removal and repair of underground tanks or tank systems.

Private Sewage Disposal System - The City of Los Angeles Bureau of Sanitation is implementing an ordinance adopted in 1985, requiring the proper abandonment of commercial and industrial Private Sewage Disposal Systems (PSDS) and connection to the public sewer system where and when it is available. Initially, a total of 752 Notices to Connect to available sewers was issued to property owners. The City continues to implement an enforcement program which includes issuance of Notices to Connect, the initiation of judicial actions for noncompliance, and monitoring of PSDS for contaminants where sewers are not available.

As part of the sewer connection efforts, the Bureau of Engineering is continuing its work on the planning, design, and construction of 18 sewer projects in unsewered areas of the City in the San Fernando Valley. The first project was completed in 1988, and Notices to Connect were subsequently issued. The remainder of the work is moving ahead as scheduled. The projects are scheduled to be completed in 1991. As each sewer project is completed, existing PSDSs will be properly abandoned and commercial wastewater discharges will be routed to the public sewer system.

Landfills - Legislation passed in 1984 (AB 3525) requires 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 a Solid Waste Assessment Test (SWAT) Report to the Regional Water Quality Control Board (RWQCB) 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, has, to date, submitted the required SWAT Reports for these facilities. In addition, the Los Angeles Department of Water and Power (LADWP) has submitted SWAT Report proposals to the RWQCB for its active Pendleton landfill in the San Fernando Basin. The City is awaiting approval of the RWQCB on the SWAT proposals for each of these facilities. SWAT programs are also being implemented by the City of Glendale at its Scholl Canyon landfill, and by the City of Burbank at its Burbank City landfill. Additionally, the following privately-owned landfills are also being processed through the SWAT Program:

Bradley West
BFI Sunshine Canyon
Bradley East
Bran Park
Gregg Pit
Hewitt Pit
L.A. By-Products
Penrose Pit No. 7
L.A. By-Products
Penrose Pit No. 8
L.A. By-Products
Penrose Pit No. 9
MCA Development
Stough Park
Sun Valley No. 3
Tuxford
Valley Reclamation
Bentz
Bishop's Canyon
Calmat
L.A. By-Products
Newberry

Water Quality Monitoring - Cities and agencies in the ULARA 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 (DHS) action levels of 5 ppb for TCE and 4 ppb for PCE.

Water Treatment - The LADWP continues its research of advanced technologies for the removal of organic chemicals from groundwater sources. James M. Montgomery, Consulting Engineers, Inc. (JMM), in cooperation with Dr. William Glaze of UCLA, is currently conducting this research under a cooperative agreement between LADWP and the U.S. Environmental Protection Agency. JMM has been selected by LADWP as design consultant for a 2,000 gpm Ozone/Hydrogen Peroxide Demonstration Plant. This method of treatment would remove organic contaminants by means of an effective oxidation process which converts the contaminants into harmless by-products. An initial environmental study of the project was completed in August 1988. Based on this study, it was determined that the project would not have a significant effect on the environment, and that a Negative Declaration should be prepared.

The Crescenta Valley County Water District's Glenwood Nitrate Water Reclamation Plant is under construction for removal of nitrate from the District's groundwater. Plant completion is scheduled for April 1989.

U.S. EPA Superfund Program - The North Hollywood Aeration Facility is designed to upgrade the quality of North Hollywood area groundwater by aeration treatment on a continuous basis. During 1987-88, construction was completed on the eight wells which were installed to extract 2,000 gpm of contaminated water containing trichloroethylene (TCE) and perchloroethylene (PCE). Fabrication and installation of the 45-foot high aeration tower and the two carbon filters for the air emitted from the tower were also completed. The LADWP has coordinated the design and construction of the North Hollywood Aeration Facility and is currently implementing the start-up phase of the project. Construction of the wells and aeration facility is being financed by the U.S. Environmental Protection Agency and State Department of Health Services (90% and 10%, respectively). An Operable Unit Feasibility Study is also being prepared for the Burbank well field to evaluate remedial alternatives for cleaning up groundwater contaminated by TCE and PCE.

Active Soil Gas (ASG) testing is continuing to be researched for the Crystal Springs, Pollock, and Verdugo National Priority List (NPL) sites to assess its effectiveness in determining the areal extent of groundwater contamination in these areas. ASG testing was found to be ineffective at the North Hollywood NPL site. Computer models of contaminant flow are under development to assist in determining the extent and pathways of groundwater contamination.

A Community Work Group for the San Fernando Valley Basin (SFVB) Superfund Program held seven meetings during the year to provide community input to the overall remedial investigation (RI) of groundwater contamination in the SFVB. In addition, the Superfund Management Committee met ten times during the year to direct implementation of the RI.

Leaking Underground Tank Investigations - During 1987-88, major underground tank leak investigations with the potential for impacting ground water were active at various sites. The sites being investigated include Centralab, Lockheed, Riker Lab-3M, Bendix, and Rockwell-Rocketdyne. As part of these investigations, which 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 1987-88:

Party	Amount of Water Pumped (Acre-Feet)	Method of Disposal
Centralab	11.20	Recharge
Lockheed[a/]	1.19	Storm Drain
Riker Labs	2.03	Storm Drain
Rockwell	0	Storm Drain
Total	14.42	

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. 8, 9, 14, and 15 were drilled during the year.

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.

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 1987-88 water year, the total amount delivered to water users in ULARA was 391,752 acre-feet. Of this total, 17,252 acre-feet was ground water, 371,056 acre-feet was imported, and 3,444 acre-feet was reclaimed water. Refer to Figure 5 for a monthly breakdown. The basin contains 557 wells, of which 148 are active and 409 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 by 50,000 to 90,000 acre-feet per year and that, for the water years 1968-69 to 1987-88, the difference between imports and extractions has increased to between 110,000 and 250,000 acre-feet.

Figure 5 provides an analysis of the monthly relationship between rainfall, ground water extractions, and imported supply. Data relates to all of 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 1987-88 water year, and Plate 6 shows the approximate location of the well fields which pumped this water. A total of 109,625 acre-feet was pumped from the San Fernando Basin compared to an allowable pumping of 105,816 acre-feet. Of this total, 102,478 acre-feet constitutes extraction rights by parties in the San Fernando Basin (see Table 15, 1987-88), and the remaining 3,338 acre-feet is pumping for nonconsumptive use (see Table 13).

A total of 5,938 acre-feet was pumped from the Sylmar Basin and 4,364 acre-feet from the Verdugo Basin. The respective safe yield values for these three basins are 104,289 (native safe yield of 43,660 and an import return of 60,629), 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 soley by the City of Los Angeles, and include both imported (pass through) Owens River water and ground water. Table 10 summarizes the nontributary imports and exports from ULARA. Ground water imports and exports in and out of ULARA are listed in Tables 12A, 12B, 12C, and 12D.

Physical Data by Basins

The Watermaster has collected and summarized data in Tables 12A, 12B, 12C, and 12D, which show the water supply and disposal in each of the basins.

The information for Tables 12A, 12B, 12C, and 12D 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 1988-89. Table 15 shows San Fernando Basin stored water as of October 1, 1987 and October 1, 1988. All rights are based on the City of Los Angeles vs. City of San Fernando, et al., judgment, dated January 26, 1979.

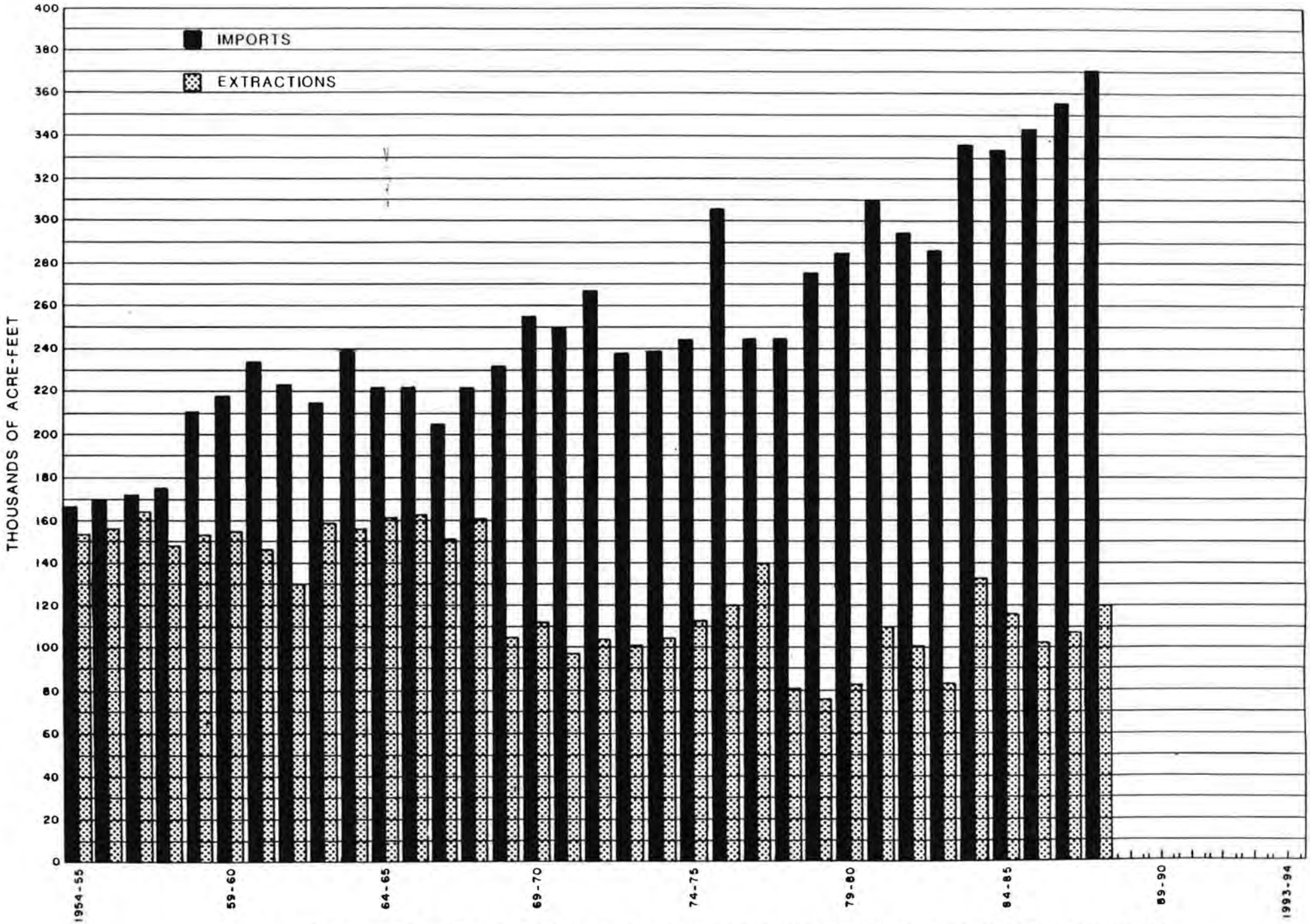


Figure 4 – GROUNDWATER EXTRACTIONS AND USE OF IMPORTED WATER IN UPPER LOS ANGELES RIVER AREA

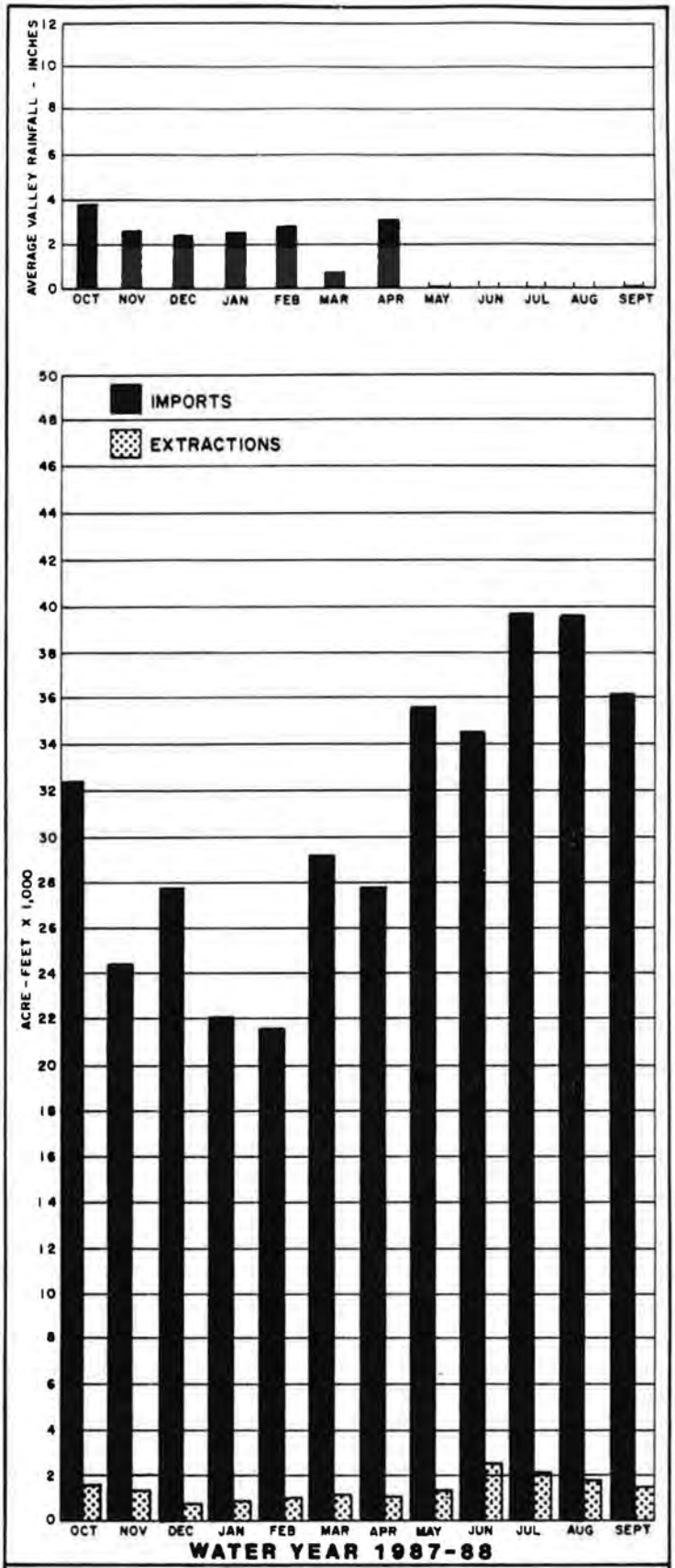


Figure 5 – MONTHLY WATER DEMAND AND AVERAGE RAINFALL IN UPPER LOS ANGELES RIVER AREA

TABLE 10

ULARA - NONTRIBUTARY WATERS,
IMPORTS AND EXPORTS

(In Acre-Feet)

Source and Agency	1986-87	1987-88
Imports		
MWD water[a/]		
Burbank, City of	23,089	22,827
Crescenta Valley County Water District	2,696	2,650
Glendale, City of	22,637	27,506
Los Angeles, City of	8,638	13,816
La Canada Irrigation District	1,023	1,038
Las Virgenes Municipal Water District (nonparty)	16,522	16,175
San Fernando, City of	1,257	1,102
	75,862	85,114
Owens River water		
Los Angeles, City of	601,017[b/]	574,664[b/]
Total	676,879	659,778
Exports		
Owens River water		
Los Angeles, City of	320,754	288,722
Net Import	356,125	371,056

a/ Colorado River and Northern California waters combined.

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

Sylmar Basin Allowable Extractions

Table 16 shows Sylmar Basin stored water as of October 1, 1987 and October 1, 1988. All rights are based on the March 22, 1984 stipulation between the City of San Fernando and the City of Los Angeles (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, of which a regulatory storage capacity of 350,000 acre-feet is 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 stored ground water 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 1987-88 was estimated as -5,000 acre-feet, and the cumulative change in storage from 1954-55 through 1987-88 was -223,720 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 1987-88 was 17.98 inches, compared to a long-term average of 16.48 inches of rainfall. From 1968-69 to 1987-88, the basin gained approximately 222,200 acre-feet of stored water. Through spreading and in-lieu replenishment** activities, 244,800 acre-feet were stored. Thus, the net storage has decreased 22,600 acre-feet. Refer to Table 11 for the annual precipitation and change in storage.

Sylmar Basin. The change in storage for 1987-88 was +371 acre-feet, and the cumulative change in storage from 1954-55 through 1987-88 was -21,575 acre-feet.

Verdugo Basin. The change in storage for 1987-88 was -931 acre-feet, and the cumulative change in storage from 1954-55 through 1987-88 was +15,665 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.

** In-lieu recharge involves an increase in stored ground water related to an intentional reduction of pumping.

see p. 36 & See Table 2 also

storage space available = 520,000 AF but have stored water credit of ~ 244,760 ∴ native water + spreading water available storage space is ≈ 276,000 AF at this time. Native water has priority.

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
1987-88	18.62	-5000[E]	+222200[E]
20 ~~19~~-yr. average	17.98		

Notes:

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

(2) Stored water through spreading and in-lieu pumping = 244,760 AF. (see Table 2)

(3) Change in storage = +222,200 AF - 244,760 AF = -22,573 AF.

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

E - Estimate.

TABLE 12A

1987-88
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	30[h]	1,020	104,452	0	4,122	109,624
Used in valley fill	0	[d]	1,809	[d]	[d]	[d]
Imports						
MWD water	22,827	27,506	9,362[f]	1,102	16,175[i]	76,972
Owens River water	--	--	562,644[f]	--	--	562,644
Ground water from Sylmar Basin	--	--	3,134	2,551	0	5,685
Ground water from Verdugo Basin	--	1,350	--	--	--	1,350
Reclaimed water	885[g]	344[e]	2,148[c]	--	67	3,444
Exports						
Ground water:						
to Verdugo Basin	--	0	0	--	0	0
out of ULARA	--	--	102,643	--	0	102,643
Owens River water:						
to Eagle Rock Basin	--	--	0	--	--	0
to Sylmar Basin	--	--	140	--	--	140
out of ULARA	--	--	288,722	--	0	288,722
MWD:						
to Verdugo Basin	--	4,293	0	--	--	4,293
Total net delivered water	23,712	25,927[a]	290,235	3,653	20,364	363,891
Water delivered to hill and mountain areas						
Ground water	[d]	[d]	0	0	0	[d]
Owens River water	--	--	43,243	--	--	43,243
MWD water	[d]	[d]	3,230	0	16,175	[d]
Verdugo Basin water	--	[d]	--	--	--	[d]
Water outflow						
Surface	--	--	--	--	--	153,594
Subsurface	--	--	--	--	--	413
Sewers	9,564	17,931	70,942	1,544	--	99,981
Reclaimed	5,258	10,048	56,582	--	--	71,888

* See Table 13 for parties included.

a/ Total delivered water to the City of Glendale was 30,966 AF. Verdugo Basin metered sales times 105 percent equaled 5,040 AF. Therefore, the San Fernando Basin delivered water was 25,927 AF (30,966 AF minus 5,040 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.

i/ Las Virgenes Municipal Water District (see Table 10).

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

TABLE 12B

1987-88
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	3,134	2,804	0	5,937
Used in valley fill	0	252	0	252
Imports				
Owens River water	11,141	140 i/	--	11,281
MWD water	--	0	--	0
Exports				
Groundwater:				
to San Fernando Basin	3,134	2,551	0	5,685
Water delivered to hill and mountain area				
Owens River	428	--	--	428
Water outflow				
Surface	--	--	--	5,000 i/
Subsurface:				
to San Fernando Basin h/	--	--	--	--
Sewers	827	152	0	979

h/ Computation not possible, well destroyed.

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

j/ Temporary connection.

TABLE 12 C

1987-88
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	2,268	2,096	0	0	4,364
Used in valley fill	2,209	1/	0	0	1/
Imports					
MWD water	2,650	4,293	1,038	0	7,9
Owens River water	--	--	--	879	87
Groundwater from:					
San Fernando Basin	--	--	--	--	--
Reclaimed water	--	--	--	--	--
Exports					
Groundwater to:					
San Fernando Basin	--	1,350	--	--	1,350
Water delivered to hill and mountain areas					
MWD water	70	1/	0	0	1/
Owens River water	--	--	--	107	107
Groundwater from:					
Verdugo Basin	59	1/	--	0	1/
San Fernando Basin	--	0	--	0	0
Water outflow					
Surface	--	--	--	--	14,041 i/
Subsurface:					
to Monk Hill Basin	--	--	--	--	300 k/
to San Fernando Basin	--	--	--	--	70
Sewage	1,723	1,120	0	182	3,025

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

TABLE 12D

1987-88
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	173	173
Used in valley fill	0	0	0	0
Imports				
Owens River water	0	--	--	0
MWD water	4,454	--	--	4,454
Groundwater	0	0	0	0
Exports				
Groundwater	0	0	173	173
Water delivered to hill and mountain areas				
MWD water	2,465	--	--	2,465
Owens River water	0	--	--	0
Water outflow				
Surface[m/]	--	--	--	--
Subsurface[n/]	--	--	--	--
Sewers	1,935	0	0	1,935

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

1987-88
PUMPING BY NONCONSUMPTIVE USE, PHYSICAL SOLUTION,
AND PARTIES WITHOUT RIGHTS
SAN FERNANDO BASIN

(In Acre-Feet)

I.	**Nonconsumptive Use Parties**	
1.	Conrock Co.	1,973
2.	Livingston-Graham, Inc.	5
3.	Sears, Roebuck and Company	50
4.	Sportsmen's Lodge, Inc.	0
5.	Toluca Lake Property Owners Assn.	0
6.	Walt Disney Productions	1,310
7.	Total	3,338
II.	**Physical Solution Parties**	
1.	Environmentals Inc.	56
2.	First Financial Plaza Site	33
3.	Forest Lawn Cemetery Assn.	400
4.	Sportsmen's Lodge, Inc.	1
5.	Toluca Lake Property Owners Assn.	4
6.	Valhalla Memorial Park	253
7.	Valley Reclamation Company	21
8.	Total	768
III.	**Parties Without Rights**	
1.	Harper, Cecelia De Mille	15*
2.	Mena, John and Barbara	1
3.	Total	16
IV.	**Total Pumping by Private Parties**	4,122

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

* Presently under investigation.

TABLE 14

1988-89
SAN FERNANDO BASIN EXTRACTION RIGHTS
(In Acre-Feet)

Item		Cities of		
		Burbank (1)	Glendale (2)	Los Angeles (3)
1.	Delivered water 1987-88	23,712	25,927	290,235
2.	Import delivered 1987-88	--	--	--
3.	Delivered to hill & mountain 1987-88	--	--	46,473
4.	Delivered to valley fill 1987-88	--	--	243,762
5.	Percent recharge	20%	20%	20.8%
6.	Return water extraction right 1988-89	4,742	5,185	50,702
7.	Native safe yield	0	0	43,660
8.	Total extraction right 1988-89	4,742	5,185	94,362

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)
1986-87			
1. Stored water as of Oct. 1, 1986	29,386	20,574	189,873
2. Delivered water 1985-86	23,180	25,125	229,663
3. Return water extraction right 1986-87	4,636	5,025	47,770
4. Native safe yield	0	0	43,660
5. Total extraction right for 1986-87	4,636	5,025	91,430
6. Extractions for year	29[a/]	5,758	85,886
7. Physical solution extractions	(319)**	(436)**	27
8. Spread water	0	0	33
9. Stored water as of Oct. 1, 1987	34,022	19,841	194,668
1987-88			
10. Delivered water 1986-87	23,649	26,282	234,773
11. Return water extraction right 1987-88	4,729	5,256	48,833
12. Native safe yield	0	0	43,660
13. Total extraction right for 1987-88	4,729	5,256	92,493
14. Extractions for year	30[a/]	1,020	104,452
15. Physical solution extractions	253	456	59
16. Spread water	0	0	0
17. Stored water as of Oct. 1, 1988*	38,498	23,621	182,650

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
**Item 7 = 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 10
col. (1) = Table 14 Item 1 of previous year
col. (2) = " " Item 1 " "
col. (3) = " " Item 4 " "

Item 17 = Items 9 + 13 - 14 - 15 + 16
* = Does not include return flow occurring during water year 1987-88.

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

TABLE 16

STORED WATER AND
1988-89 EXTRACTION RIGHTS
SYLMAR BASIN
(In Acre-Feet)

	Cities of		All Others (3)
	San Fernando (1)	Los Angeles (2)	
1986-87			
1. Stored water as of Oct. 1, 1986	(73)[c]	(10)[c]	--
2. Native safe yield	3,105	3,105	--[b]
3. Total extraction right 1986-87	3,032[a]	3,095[a]	
4. Extractions for year	3,026	3,113	0
5. Stored water as of Oct. 1, 1987	6	(18)[c]	--
1987-88			
6. Stored water as of Oct. 1, 1987	6	(18)[c]	--
7. Native safe yield	3,105	3,105	--[b]
8. Total extraction right 1987-88	2,804[d]	3,087	
9. Extractions for year	2,804	3,134	0
10. Stored water as of Oct. 1, 1988	0	(47)[c]	--
1988-89			
11. Stored water as of Oct. 1, 1988	0	(47)[c]	--
12. Native safe yield	3,105	3,105	--[b]
13. Total extraction right 1988-89	2,765[d]	3,058	

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 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

1987-1988 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	1.06	0.00	1.86	0.55	0.80	0.80	0.44	0.46	0.57	0.44	0.64	0.48	8.10
3882P	7	0.19	0.00	0.98	0.23	0.30	0.34	0.08	0.61	0.25	0.07	0.19	0.05	3.29
3851C	10	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.00	0.62
3851E	12	0.48	0.00	1.11	0.51	0.56	0.64	0.33	0.39	0.50	0.35	0.58	0.28	5.73
3851K	13A	0.44	0.00	1.61	0.60	0.69	0.66	0.38	0.39	0.51	0.37	0.56	0.42	6.63
3882T	15	0.11	0.00	0.71	0.13	0.19	0.20	0.12	0.19	0.28	0.17	0.26	0.15	2.51
3841G	18	0.27	0.00	0.65	0.42	0.28	0.26	0.24	0.26	0.33	0.23	0.37	0.25	3.56
Party Total		2.55	0.00	6.92	2.44	2.82	2.90	2.21	2.30	2.44	1.63	2.60	1.63	30.44
Conrock Co.														
4916A	2	114.30	17.26	41.61	37.47	42.44	6.64	75.48	105.95	100.90	45.48	0.41	0.01	587.95
4916	3	93.77	103.91	81.46	94.47	98.48	163.80	112.15	100.70	133.19	153.76	147.29	102.54	1385.52
Party Total		208.07	121.17	123.07	131.94	140.92	170.44	187.63	206.65	234.09	199.24	147.70	102.55	1973.47
Environmentals Inc.														
3934A	M050A	2.58	2.41	4.21	2.88	2.77	0.00	2.82	4.00	7.41	8.29	9.64	9.33	56.34

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
First Financial Plaza Site														
N/A	F.F.P.S.	3.09	2.92	2.91	2.95	3.19	3.54	2.89	2.70	2.63	2.17	1.99	2.05	33.03
Forest Lawn Cemetery Assn.														
3947A	2	11.77	4.16	0.76	3.36	6.67	14.40	9.13	4.11	19.55	0.00	8.60	16.41	98.92
3947B	3	10.06	0.00	0.67	2.97	5.99	12.96	8.50	3.76	26.64	14.84	24.48	12.60	123.47
3947C	4	15.72	0.00	0.75	3.34	6.80	12.62	7.95	3.55	25.13	9.93	25.07	12.50	123.36
3958K	7	2.41	0.00	0.32	1.38	2.87	7.03	4.52	1.98	13.74	5.88	10.81	3.30	54.24
Party Total		39.96	4.16	2.50	11.05	22.33	47.01	30.10	13.40	85.06	30.65	68.96	44.81	399.99
City of Glendale														
3924N	STPT 1	3.93	4.86	1.05	7.64	0.73	2.50	2.06	8.83	10.12	10.48	7.52	1.23	60.95
3924R	STPT 2	1.22	0.03	0.07	0.12	0.48	0.04	0.29	0.28	0.36	0.65	1.71	0.04	5.29
GVENT	GVENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	533.09	420.76	0.00	0.00	953.85
Party Total		5.15	4.89	1.12	7.76	1.21	2.54	2.35	9.11	543.57	431.89	9.23	1.27	1020.09
Harper, Cecelia DeMille														
4940A	North	1.25[E]	1.25[E]	1.25[E]	1.25[E*]	1.25[E]	1.25[E]	1.25[E]	1.25[E]	1.25[E]	1.25[E]	1.25[E]	1.25[E]	15.00
Livingston-Graham, Inc.														
4916B	SnVal	0.58	0.30	0.48	0.55	0.29	0.30	0.44	0.58	0.53	0.42	0.44	0.47	5.38

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
City of Los Angeles														
3914L	CS-45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3914M	CS-46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CS Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3831H	E-1	272.22	263.25	274.43	221.67	0.00	16.97	246.05	250.51	234.05	235.47	224.50	208.50	2447.62
3821I	E-2A	0.00	21.26	0.00	0.00	65.43	77.02	279.80	286.50	274.45	274.59	278.26	265.02	1822.33
3831G	E-3	280.37	53.93	0.00	234.60	272.13	39.65	272.71	277.73	259.53	254.85	238.04	213.57	2397.11
3921F	E-4	53.65	0.00	54.55	52.66	48.35	53.35	48.51	50.53	47.91	48.53	48.26	45.59	551.89
3831F	E-5	0.00	63.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.02
3821H	E-6	112.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.17
E Total		718.41	401.46	328.98	508.93	385.91	186.99	847.07	865.27	815.94	813.44	789.06	732.68	7394.14
3894BB	H-25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893L	H-26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893K	H-27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893M	H-28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893N	H-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3893P	H-30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
3800	NH-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3780A	NH-4	144.88	130.76	118.73	183.11	168.23	121.86	169.49	175.28	170.78	165.27	141.71	136.55	1826.65
3810S	NH-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3770	NH-7	138.04	130.65	104.52	140.80	129.68	94.12	131.38	137.24	131.87	135.65	135.10	129.22	1583.27
3810	NH-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810A	NH-13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3810B	NH-14A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790B	NH-15	125.00	109.44	90.77	131.73	117.31	37.24	0.00	0.00	0.00	0.00	95.80	126.10	883.39
3820D	NH-16	276.45	258.86	205.19	276.91	257.99	71.97	271.15	281.09	269.19	275.64	275.09	264.58	2984.11
3820C	NH-17	281.22	262.72	208.20	281.09	262.08	35.68	264.12	273.12	262.83	243.02	36.39	0.00	2410.47
3820B	NH-18	341.44	318.55	254.32	340.61	298.00	0.00	0.00	0.00	354.39	375.69	374.80	357.07	3014.87
3830D	NH-19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3830C	NH-20	286.55	270.57	213.29	286.20	266.55	20.75	276.15	103.19	0.00	0.00	0.00	0.00	1723.25
3830B	NH-21	158.36	138.94	108.68	143.64	132.00	10.35	136.23	142.15	135.86	138.06	139.30	134.11	1517.68
3790C	NH-22	272.66	251.70	192.38	267.15	245.32	180.12	250.76	252.76	252.09	258.15	256.04	243.11	2922.24
3790D	NH-23	192.84	176.63	145.18	192.29	175.32	130.26	177.89	170.98	0.00	0.00	0.00	0.00	1361.39
3800C	NH-24	0.00	0.00	0.00	0.00	296.93	221.03	186.73	0.00	0.00	0.00	0.00	0.00	704.69
3790F	NH-25	219.54	193.11	162.03	211.98	187.83	144.33	189.88	196.47	179.71	177.04	173.44	156.89	2192.25
3790E	NH-26	238.78	221.76	175.37	231.43	213.57	156.11	217.88	225.69	218.83	224.70	222.09	210.56	2556.77
3820F	NH-27	196.70	176.36	144.74	194.47	178.79	50.67	190.06	193.48	182.14	185.42	181.20	166.81	2040.84
3810K	NH-28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
3810L	NH-29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3800D	NH-30	217.86	201.08	162.51	205.74	200.14	134.87	190.02	163.82	0.00	0.00	0.00	0.00	1476.04
3810T	NH-31	239.97	214.28	183.66	224.15	213.48	151.88	199.22	221.67	214.69	207.23	196.24	175.21	2441.68
3770C	NH-32	298.44	291.69	229.50	309.09	286.09	207.46	291.81	303.17	293.34	300.55	297.91	284.97	3394.02
3780C	NH-33	196.12	181.66	141.07	187.03	175.23	128.74	178.22	186.43	181.31	185.79	184.02	174.63	2100.25
3790G	NH-34	235.91	218.78	174.82	232.19	217.59	164.00	226.95	233.95	226.82	232.78	230.72	218.69	2613.20
3830N	NH-35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3790H	NH-36	254.34	235.19	189.67	245.46	223.23	167.38	235.88	240.61	231.34	234.32	41.07	0.00	2298.49
3790J	NH-37	400.60	372.45	294.47	397.84	368.12	268.85	382.19	393.35	378.54	388.46	383.77	369.13	4397.77
3810M	NH-38	374.36	369.86	274.82	355.47	334.30	249.13	163.11	0.00	0.00	0.00	0.00	0.00	2121.05
3810N	NH-39	212.65	0.00	0.00	0.00	0.00	29.34	149.54	0.00	0.00	0.00	0.00	0.00	391.53
3810P	NH-40	415.25	121.67	0.00	0.00	0.00	0.00	167.45	229.48	0.00	0.00	0.00	0.00	933.85
3810Q	NH-41	341.81	324.02	256.18	176.91	1.84	0.00	0.00	0.00	0.00	0.00	0.00	2.02	1102.78
3810R	NH-42	409.55	373.76	297.82	395.66	361.69	266.88	368.32	55.42	228.33	304.71	290.75	268.37	3621.26
3790K	NH-43A	449.54	415.13	328.72	443.48	408.27	269.79	331.66	436.07	427.83	439.95	436.09	416.69	4803.22
3790L	NH-44	394.42	368.83	289.33	394.26	374.27	280.03	384.41	388.36	374.68	383.38	381.52	364.26	4377.75
3790M	NH-45	415.09	385.24	305.21	409.25	119.35	35.95	408.84	450.81	437.58	450.90	448.24	431.18	4297.64
NH Total		7728.37	6713.69	5251.18	6857.94	6213.20	3628.79	6139.34	5454.59	5152.15	5306.71	4921.29	4630.15	67997.40
3904J	CS-52(#1)	1.29	1.40	1.03	0.73	0.92	1.84	1.01	2.66	2.82	1.31	0.73	1.52	17.26
3904J	CS-52(#2)	1.19	1.29	0.94	0.67	0.85	1.68	0.92	2.46	2.59	1.22	0.67	1.40	15.88
CS Total		2.48	2.69	1.97	1.40	1.77	3.52	1.93	5.12	5.41	2.53	1.40	2.92	33.14

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
3959E	P-4	95.39	231.93	61.92	199.27	223.95	230.03	230.37	238.64	226.93	234.39	231.50	221.08	2425.40
3958H	P-6	0.00	5.46	116.55	145.09	39.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	306.36
3958J	P-7	0.00	6.01	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	6.29
P Total		95.39	243.40	178.75	344.36	263.21	230.03	230.37	238.64	226.93	234.39	231.50	221.08	2738.05
4909E	RT-1	-	-	-	-	-	-	-	-	-	-	463.64	550.51	1014.15
4898A	RT-2	-	-	-	-	-	-	-	-	-	-	471.35	525.12	996.47
4909G	RT-10	-	-	-	-	-	-	-	-	-	-	461.09	510.01	971.56
4909K	RT-11	-	-	-	-	-	-	-	-	-	-	397.55	509.00	906.55
4909H	RT-12	-	-	-	-	-	-	-	-	-	-	416.21	548.99	965.20
4909J	RT-13	-	-	-	-	-	-	-	-	-	-	458.77	529.09	987.86
RT Total		-	-	-	-	-	-	-	-	-	-	2668.61	3172.72	5841.33
4992A	Tujunga Gallery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3863H	V-1	33.91	31.75	41.60	47.75	42.61	42.72	39.10	44.12	44.93	44.51	41.74	39.00	493.74
3853F	V-2	0.00	0.00	0.00	0.00	0.00	106.43	221.49	227.66	220.55	223.56	212.38	638.16	1350.23
3863J	V-4	83.38	76.35	80.51	90.45	82.53	13.41	101.68	101.38	96.67	96.56	12.40	0.00	835.32
3863L	V-11	225.35	216.28	227.41	228.77	210.29	222.27	210.61	216.67	208.61	214.42	215.98	212.70	2609.36

NOTE: Dash line indicates wells not on line.

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
							San Fernando Basin							
3853G	V-13	26.81	25.41	28.56	15.36	28.47	27.53	25.00	27.30	25.18	28.03	28.86	24.15	310.66
3854F	V-22	43.62	42.03	45.48	41.37	39.95	40.77	38.02	37.67	40.84	42.22	42.26	40.47	494.70
3844R	V-24	182.78	208.75	217.27	214.03	197.09	212.31	201.45	207.88	200.97	204.43	201.95	195.59	2444.50
V Total		595.85	600.57	640.83	637.73	600.94	665.44	837.35	862.68	837.75	853.73	755.57	650.07	8538.51
3820E	W-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821B	W-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821C	W-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3821D	W-4	192.20	180.46	168.46	163.22	153.83	95.75	171.31	178.38	168.76	170.87	168.94	161.04	1973.22
3821E	W-5	0.00	0.25	158.33	44.10	0.00	0.00	0.00	0.00	205.33	300.87	299.45	282.85	1291.18
3831J	W-6A	153.22	146.33	149.54	147.93	139.39	148.35	137.54	142.68	147.80	148.39	145.57	142.38	1749.12
3832K	W-7	195.25	186.98	193.05	189.46	175.28	188.18	175.00	180.56	171.14	172.71	168.55	159.32	2155.48
3832L	W-8	247.57	237.95	246.10	237.40	218.39	244.91	218.67	223.05	207.55	207.46	200.80	185.06	2674.91
3832M	W-9	159.41	201.54	208.17	204.16	188.71	27.62	193.60	193.39	182.78	180.24	171.08	155.12	2065.82
3842E	W-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W Total		947.65	953.51	1123.65	986.27	875.60	704.81	896.12	918.06	1083.36	1180.54	1154.39	1085.77	11909.73
City of Los Angeles														
Total		10088.15	8915.32	7525.36	9336.63	8340.63	5419.58	8952.18	8344.36	8121.54	8391.34	10521.82	10495.39	104452.30
Mena, John & Barbara														
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

59 wells

L.A. 9394
67,997
33
2738
CA 41
8539
11,916

104,452

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
						San Fernando Basin								
Sears Roebuck & Co.														
3945	3945	3.41	2.78	0.81	2.18	4.12	3.25	5.01	2.69	5.04	4.67	5.18	10.40	49.54
Sportmen's Lodge, Inc.														
3785A	1	0.06	0.06	0.05	0.05	0.06	0.06	0.06	0.07	0.06	0.05	0.09	0.07	0.74
Toluca Lake Property Owners Assn.														
3845F	3845F	2.23	0.00	0.00	0.00	0.00	0.58	0.46	0.03	0.29	0.31	0.01	0.00	3.91
Valhalla Memorial Park														
3840K	4	18.18	3.41	0.46	0.79	3.33	15.89	11.55	31.00	57.24	32.42	41.01	37.30	252.58
Valley Reclamation Co.														
916D		0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58	4.31	5.41	4.28	3.78	21.36
Walt Disney Productions														
3874E	East	28.45	35.61	33.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	97.57
3874F	West	137.76	88.55	58.02	91.43	60.21	97.84	105.30	137.15	94.83	94.48	150.63	95.96	1212.16
Party Total		166.21	124.16	91.53	91.43	60.21	97.84	105.30	137.15	94.83	94.48	150.63	95.96	1309.73
Basin Total		10541.55	9182.91	7760.75	9591	8583.21	5765.26	9304.33	8758.95	9160.37	9204.30	10964.91	10806.34	109624.86

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	380.21	320.30	241.81	0.00	0.00	0.00	146.67	443.78	428.72	363.02	418.09	390.89	3133.49
Meurer Engineering Co.														
5998	3	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.05[E]	0.60
City of San Fernando														
5969D	2A	98.97	26.50	18.21	126.10	140.80	188.51	79.01	10.43	201.72	184.60	211.89	187.95	1474.69
5959	3	75.35	3.15	18.44	91.39	84.47	92.87	48.44	9.33	129.19	147.02	151.19	126.22	977.06
5969	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.65	20.65
5968	7A	44.39	13.86	8.68	25.88	0.00	55.01	22.55	0.58	43.04	61.47	30.39	25.48	331.33
Party Total		218.71	43.51	45.33	243.37	225.27	336.39	150.00	20.34	373.95	393.09	393.47	360.30	2803.73
Basin Total		598.97	363.86	287.19	243.42	225.32	336.44	296.72	464.17	802.72	756.16	811.61	751.24	5937.82
Verdugo Basin														
Crescenta Valley County														
5058B	1	8.20	0.00	0.00	0.00	0.02	0.00	0.01	0.13	18.04	21.14	18.60	16.48	82.62
5058H	5	6.69	0.00	0.00	0.00	1.22	2.35	4.27	11.72	7.29	12.80	3.72	3.72	53.78
5058	6	6.40	25.49	26.34	25.39	16.17	16.87	15.27	22.71	12.67	23.36	23.67	20.36	234.70
5047B	7	2.52	0.00	0.00	0.00	0.05	0.00	0.08	3.30	3.56	0.00	0.00	0.00	9.51
5069J	8	0.00	0.00	0.00	0.00	18.23	0.00	0.00	0.00	65.13	67.78	18.40	53.54	223.08

LACDPW Well No.	Owners Designation	Extractions												
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Total
Verdugo Basin														
5047D	9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.01	0.00	0.30
5058D	10	74.26	51.14	50.95	51.34	58.70	80.58	71.07	76.55	82.24	86.95	82.59	56.19	822.56
5058J	12	47.00	15.19	14.28	18.17	13.79	32.36	30.66	46.92	9.73	18.98	48.72	22.83	318.63
5069F	14	47.42	45.06	47.58	46.69	40.46	48.75	45.37	39.81	36.42	4.79	31.62	34.33	468.30
	Pick	5.07	4.81	4.84	4.73	4.37	4.65	4.44	4.56	4.36	4.49	4.43	3.72	54.47
Party Total		197.56	141.69	143.99	146.32	153.01	185.56	171.17	205.70	239.73	240.29	231.76	211.17	2267.95
City of Glendale														
3961-3971	GL3-4	21.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.08
3970	GL-6	116.01	41.43	15.35	0.00	0.00	0.00	0.00	39.60	131.35	133.50	128.59	119.69	725.52
-	MM-1	67.27	168.82	116.93	124.60	93.11	118.53	115.03	108.31	117.57	112.72	107.45	99.53	1349.87
Party Total		204.36	210.25	132.28	124.60	93.11	118.53	115.03	147.91	248.92	246.22	236.04	219.22	2096.47
Basin Total		401.92	351.94	276.27	270.92	246.12	304.09	286.20	353.61	488.65	486.51	467.80	430.39	4364.42
Eagle Rock Basin														
Sparkletts Drinking Water														
3987A	1	2.72	0.00	1.85	5.32	5.68	6.05	5.22	5.10	4.97	5.13	6.11	5.45	53.60
3987B	2	4.58	3.73	0.33	0.00	1.21	3.75	4.17	3.66	4.04	3.88	4.83	3.93	38.11
3987F	3	9.01	8.41	7.39	7.41	7.79	6.28	4.96	5.88	6.11	5.95	5.28	6.62	81.09
Party Total		16.31	12.14	9.57	12.73	14.68	16.08	14.35	14.64	15.12	14.96	16.22	16.00	172.80
Basin Total		16.31	12.14	9.57	12.73	14.68	16.08	14.35	14.64	15.12	14.96	16.22	16.00	172.80
ULARA Total		11558.75	9910.85	8333.78	10119.05	9069.33	6421.87	9901.60	9591.37	10466.86	10461.93	12260.54	12003.97	120099.90

APPENDIX B

KEY GAGING STATIONS SURFACE RUNOFF

STATION NO. F57C-R (ALERT STATION NO. 365)

DAILY DISCHARGE IN SECOND-FEET OF LOS ANGELES RIVER AVOVE ARROYO SECO FOR THE WATER YEAR ENDING SEPTEMBER 30,1988

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
01	73	374	77	86	140	639	95	127	127	127	95	77
02	90	229	77	95	943	181	95	127	127	127	111	90
03	82	127	77	95	95	127	95	127	127	127	127	90
04	86	2387	1354	95	86	127	95	127	127	127	106	95
05	86	2001	237	95	86	119	95	154	127	127	111	90
06	90	154	127	95	95	95	95	181	127	127	103	95
07	95	82	103	95	95	95	95	154	127	119	95	73
08	90	69	95	95	95	95	95	140	127	127	95	77
09	95	77	95	95	95	95	95	127	127	127	95	86
10	90	73	95	95	95	95	95	127	127	127	95	86
11	90	77	95	95	95	95	95	127	127	127	90	86
12	119	69	95	111	95	95	95	127	127	127	95	95
13	90	61	95	127	95	95	95	127	127	127	95	95
14	90	61	111	119	103	95	954	127	127	127	95	106
15	94	61	111	119	119	95	145	127	127	127	95	95
16	86	61	1062	161	127	95	127	140	127	127	98	95
17	90	61	367	5084	127	95	119	140	127	127	77	90
18	90	69	111	229	127	95	119	127	127	127	77	90
19	90	90	90	127	119	95	1178	127	127	119	95	90
20	137	95	82	127	127	95	2414	127	127	95	95	186
21	82	95	77	103	127	95	496	127	127	95	95	90
22	5380	95	77	95	127	95	161	140	127	95	95	82
23	741	95	77	95	119	95	597	140	127	95	90	95
24	308	77	77	95	127	95	181	127	127	95	145	90
25	77	77	77	95	127	95	154	127	127	106	86	90
26	69	77	86	95	127	95	127	127	127	114	90	95
27	77	77	95	95	636	95	127	127	127	119	86	90
28	77	77	90	95	2808	95	127	127	127	119	82	90
29	375	77	596	111	3509	95	127	127	127	98	95	95
30	73	77	95	127	-----	95	127	127	127	95	86	90
31	5210	-----	95	127	-----	95	-----	127	-----	95	82	-----
MEAN	462	237	193	269	368	118	284	133	127	117	96	93
AC-F	28410	14090	11900	16570	21160	7270	16890	8150	7560	7180	5900	5540

NOTE: All flows below 300 cfs are estimated due to construction in the channel during the period of record. Estimates are based on relative changes in gage height at the stattion and upstream flow readings.

PEAK FLOW = 35890 cfs 10/22/87

= MEAN	208
= AC-FT	150620

GAGING STATION SUMMARY

LOS ANGELES COUNTY
Department of Public Works
Hydraulic/Water Conservation Division

Station Location and Description: Pacoima Creek Flume
Below Pacoima Dam
for Water-Year 1987 1988
Station No. F 118 B-R

Drainage Area: 28.2 Square Miles (C. Sopov Observer)
Gage Read: Continuously
Rating Table No. 44 I

DAY	OCTOBER Gage Height	OCTOBER Adj.	OCTOBER Discharge	NOVEMBER Gage Height	NOVEMBER Adj.	NOVEMBER Discharge	DECEMBER Gage Height	DECEMBER Adj.	DECEMBER Discharge	JANUARY Gage Height	JANUARY Adj.	JANUARY Discharge	FEBRUARY Gage Height	FEBRUARY Adj.	FEBRUARY Discharge	MARCH Gage Height	MARCH Adj.	MARCH Discharge	DAY
1	0		0	0		0	H		0.7	0.52	-.05	33.8	0		0	0		0	1
2							0		0			32.2							2
												33.3						0	
4										0.52	-.05	33.5							4
5			0							0.51	-.05	32.6							5
6										0.46	-.05	29.0							6
7										0.47	-.05	29.4				0		0	7
8										0.46		28.7				0.30	-.05	16.5	8
9										0.45		27.9				0.42		25.6	9
10										0.45		27.8				0.41		24.8	10
11										0.44		27.3				0.41		24.8	11
12										0.44		27.1				0.41		24.6	12
13										0.43		26.5				0.40		24.2	13
14										0.43	-.05	26.7				0.40		24.2	14
15										0.28	-.03	16.5				0.40		24.2	15
16										0		0				0.39		23.5	16
17										0		+				0.40		24.0	17
18										0		0							18
19										0.45	-.03	29.9							19
20										0.82	-.05	58.9							20
21			0				0		0	0.63	-.05	42.5							21
22			+				H		0.6	0.35		20.1							22
23			0				H		0.4	0.35		19.7				0.40		24.0	23
24							0		0	0.35		19.7				0.39		23.3	24
25										0.35		20.0				0.39		23.2	25
26										0.34	-.05	19.6							26
27										0.22	-.03	12.4							27
28										0.0	0	0							28
29							0		0				0		0				29
30				0		0	H		22.3							0.39	-.05	23.2	30
31	0		0				0.57	-.03	36.2	0.0	0	0				0.16	-.02	8.5	31
1	+			0			24.0			724.			0			551.6			1
2	+			0			0.8			23.3			0			17.8			2
3	+			0			47.6			1436.			0			1094			3
4	+			0			22.3			58.9			0			25.6			4
5	0			0			0			0			0			0			5

DAY	APRIL Gage Height	APRIL Adj.	APRIL Discharge	MAY Gage Height	MAY Adj.	MAY Discharge	JUNE Gage Height	JUNE Adj.	JUNE Discharge	JULY Gage Height	JULY Adj.	JULY Discharge	AUGUST Gage Height	AUGUST Adj.	AUGUST Discharge	SEPTEMBER Gage Height	SEPTEMBER Adj.	SEPTEMBER Discharge	DAY
1	0		+	0		+	0		+	0		+	0		+	0		+	1
2				H		11.9													2
3				H		26.4													3
4				H		26.1													4
5				0.47	-.03	29.4													5
6				0.46	-.03	29.2										0		+	6
7				0.46	-.03	29.2										H		1.7	7
8				0.46		29.5										0		+	8
9				0.45		28.9													9
10				0.45		28.4													10
11				0.44		27.7													11
12				0.43		27.2													12
13				0.43		27.0													13
14				0.42		26.7													14
15				0.42		26.4													15
16				0.42	-.03	26.4													16
17				H		6.6													17
18				0		+													18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30	0		+				0		+							0		+	30
31				0		+				C		+	0		+				31
1		+		407.5				+			+			+		1.7			1
2		+		13.1				+			+			+		.06			2
3		+		808.				+			+			+		3.4			3
4		+		29.5				+			+			+		1.7			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	
1	1708.6
2	4.7
3	3389
4	58.9
5	C

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

GAGING STATION SUMMARY

LOS ANGELES COUNTY
Department of Public Works
Hydraulic/Water Conservation Division

Station Location and Description: BIG TUJUNGA CK. BELOW BIG TUJUNGA DAM
for Water-Year 19 87 19 88
Station No. F168-R
Drainage Area ..... Square Miles (..... Observer)
Gage Read .....
Rating Table No. 78-01

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	2.19		.5	H		49.4	H		6.7	2.17		1.4	H		7.7	H		175.0	1
2	↑		↑	3.49		61.2	2.59		10.5	2.15		1.1	2.36		4.5	4.09		130.0	2
3				3.49		61.2	2.59		10.5	2.13		0.9	↑		↑	4.00		124.0	3
4				H		35.9	2.39		10.5	↑		↑				H		74.0	4
5				2.79		17.6	2.56		9.7							2.97		26.2	5
6				2.79		17.6	2.56		9.7						↓	2.96		25.6	6
7				2.79		17.6	H		8.7				2.36		4.5	2.99		24.4	7
8				2.79		17.6	2.54		9.1				2.37		4.7	3.09		32.2	8
9				2.79		17.6	2.54		9.1	↓		↓	↑		↑	3.24		42.4	9
10				H		9.7	2.54		9.1	2.13		.9				H		27.2	10
11				2.19		1.5	H		4.6	H		4.4				2.09		13.7	11
12				2.16		1.3	2.16		1.3	2.65		12.9				2.68		13.4	12
13				2.14		1.0	2.15		1.1	2.65		12.9				2.68		13.4	13
14				2.14		1.0	2.14		1.0	2.65		12.4				2.68		13.4	14
15				2.14		1.0	2.14		1.0	H		9.3				2.57		8.3	15
16				2.14		1.0	2.15		1.1	2.12		0.8				2.48		7.4	16
17				2.15		1.1	2.16		1.3	H		37.7				2.48		7.4	17
18				2.16		1.3	2.16		1.3	3.19		109.0				2.50		8.0	18
19				2.17		1.4	2.16		1.1	H		68.8				2.53		8.8	19
20	↓		↓	2.17		1.4	2.14		1.0	2.62		11.9	↓		↓	↑		↑	20
21	2.10		.5	2.17		1.4	2.14		1.0	↑		↑	2.37		4.7				21
22	H		1.7	2.17		1.4	2.14		1.0				2.38		4.7				22
23	2.23		2.3	2.16		1.3	H		5.5				2.38		4.9	↓		↓	23
24	2.21		2.0	2.15		1.1	2.51		8.3				2.38		4.9	2.53		8.8	24
25	2.19		1.7	2.16		1.3	↑		↑				2.38		4.9	2.48		7.4	25
26	2.19		1.5	2.19		1.5							2.38		4.9	2.40		5.2	26
27	2.19		1.5	2.19		1.5							2.39		5.0	↑		↑	27
28	H		11.2	2.17		1.4							H		53.4				28
29	2.79		17.6	2.17		1.4	↓		↓				4.05		128.0	↓		↓	29
30	2.79		17.6	2.17		1.4	2.51		8.3	↓		↓				2.40		5.2	30
31	2.79		17.6				H		5.9	2.62		11.9				2.41		5.5	31

DAY	APRIL			MAY			JUNE			JULY			ALGUST			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	2.48		4.7	2.86		20.4	2.08		0.4	2.09		0.5	2.10		0.5	2.00		0.1	1
2	2.24		1.6	↑		↑	2.08		0.4	↑		↑	↑		↑	↑		↑	2
3	2.22		1.3				2.09		0.5										3
4	2.21		1.2				↑		↑										4
5	2.21		1.1																5
6	2.22		1.2	↓		↓													6
7	2.64		10.5	2.86		20.4										↓		↓	7
8	2.24		1.7	2.87		20.8										2.00		0.1	8
9	2.23		1.3	H		16.6										2.09		0.9	9
10	2.22		1.3	2.52		8.6							↓		↓	2.08		0.9	10
11	2.22		1.2	↑		↑							2.10		0.5	2.06		0.3	11
12	2.22		1.2										2.09		0.5	2.06		↑	12
13	2.22		1.2										2.09		0.5	2.05			13
14	2.28		2.3										2.06		0.3	2.04			14
15	2.90		20.3										2.05		0.3	2.04		↓	15
16	2.91		20.3										2.06		0.3	2.04		0.3	16
17	2.91		20.3	↓		↓	↓		↓				2.04		0.3	2.03		0.2	17
18	2.91		20.3	2.52		8.6	2.09						2.03		0.2	2.03		0.2	18
19	2.95		22.1	2.42		5.8	2.10						↑		↑	2.03		0.2	19
20	5.90		102	2.40		5.2	2.10									H		1.9	20
21	4.03		114	2.40		5.2	2.10									2.35		4.3	21
22	3.70		76.3	2.40		5.2	2.09						↓		↓	2.35		4.3	22
23	3.33		46.1	2.41		5.5	↑		↑				2.03		↑	2.36		4.5	23
24	3.32		47.5	↑		↑							2.02			↑		↑	24
25	2.93		23.5										2.02		0.2				25
26	2.30		2.5	↓		↓							2.02		0.2				26
27	2.29		2.4	2.41		5.5							2.01		0.1				27
28	2.29		2.4	H		1.7							↑		↑				28
29	2.72		13.9	2.09		0.5	↓		↓	↓		↓				↓		↓	29
30	2.97		22.9	2.08		0.4	2.09		0.5	2.09		0.5	↓		↓	2.36		4.5	30
31				2.09		0.5				2.10		0.5	2.01		0.1				31

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	85.2	331	179.9	413.7	311.2	857.7	588.6	309.6	14.8	15.5	10.0	50.5	3167.7	1
2	2.7	11	5.8	13.3	10.7	27.7	19.6	10.0	0.5	.5	.3	1.7	103.8	2
3	169	657	357.0	821.	617.	1700.	1167.5	614.0	29.4	30.7	19.8	100.0	6282.4	3
4	17.6	61.2	10.5	109.0	128.	175.	109.0	20.8	0.5	0.5	0.5	4.5	637.1	4
5	.5	1.0	1	0.8	4.5	5.2	1.1	0.4	0.4	0.5	0.1	0.1	13.6	5

Maximum stage	feet at	on	Discharge second-feet,
Minimum stage	feet at	on	Discharge second-feet,

GAGING STATION SUMMARY

LOS ANGELES COUNTY
Department of Public Works
Hydraulic/Water Conservation Division

Station Location and Description: Verdugo Wash @ Estelle Ave. for Water-Year 1987 1988

Station No. F257-R

Drainage Area 26.8 Square Miles (C. Soper Observer)

Gage Read ______

Rating Table No. 47 I

DAY	OCTOBER Gage Height	Adj.	Discharge	NOVEMBER Gage Height	Adj.	Discharge	DECEMBER Gage Height	Adj.	Discharge	JANUARY Gage Height	Adj.	Discharge	FEBRUARY Gage Height	Adj.	Discharge	MARCH Gage Height	Adj.	Discharge
1	0.20		2.8	0.75		272.0	0.24		7.3	0.24		7.3	0.26		9.5	0.49		74.0
2				0.35		26.0	0.24		7.3				0.53		97.3	0.34		23.6
3				0.27		10.6	0.23		6.2				0.29		12.9	0.23		6.2
4				0.70		225.0	0.78		305.0	0.24		7.3	0.24		7.3	0.21		3.9
5				0.70		226.0	1.08		688.0	0.34		23.6				0.20		2.8
6				0.46		67.4	0.77		247.0	0.27		10.6						
7				0.30		14.0	0.34		23.6	0.24		7.3						
8				0.26		9.5	0.27		10.6	0.24		7.3						
9				0.25		8.4	0.26		9.5	0.23		6.2	0.24		7.3			
10							0.25		8.4				0.23		6.2			
11							0.23		6.2				0.23		6.2			
12				0.25		8.4	0.23		6.2				0.23		6.2			
13				0.24		7.3	0.25		8.4	0.23		6.2	0.22		5.0			
14				0.24		7.3	0.24		7.3	0.22		5.0						
15				0.24		7.3	0.22		5.0	0.22		5.0						
16				0.23		6.2	0.54		104.0	0.22		5.0						
17				0.23		6.2	0.37		30.8	0.93		478.0	0.22		5.0			
18				0.25		8.4	0.26		9.5	0.45		59.5	0.23		6.2			
19				0.22		5.0	0.32		21.2	0.31		16.4	0.24		7.3			
20							0.24		7.3	0.28		11.8						
21	0.20		2.8				0.23		6.2	0.27		10.6						
22	0.77		294.0				0.23		6.2	0.26		9.5						
23	0.78		266.0	0.22		5.0	0.23		6.2				0.24		7.3			
24	0.29		12.9	0.21		3.9	0.25		8.4				0.21		3.9			
25	0.28		11.8	0.22		5.0	0.27		10.6				0.20		2.8			
26	0.27		10.6	0.22		5.0	0.26		9.5				0.20		2.8			
27	0.26		9.5	0.22		5.0	0.25		8.4				0.47		66.7			
28	0.25		8.4	0.23		6.2	0.24		7.3				0.64		175.0			
29	0.67		206.0	0.23		6.2	0.50		78.7				0.89		4230			
30	0.34		23.6	0.23		6.2	0.25		8.4									
31	0.35		2730				0.25		8.4	0.26		9.5				0.20		2.8
1	1180.6			984.3			1677.1			795.3			924.			183.3		
2	38.1			32.8			54.1			25.7			31.9			5.9		
3	2340.			1950.			3330.			1580.			1830.			364.		
4	294.			272.			688.			478.			423			74.		
5	2.8			3.9			5.0			5.0			2.8			2.8		

DAY	APRIL Gage Height	Adj.	Discharge	MAY Gage Height	Adj.	Discharge	JUNE Gage Height	Adj.	Discharge	JULY Gage Height	Adj.	Discharge	AUGUST Gage Height	Adj.	Discharge	SEPTEMBER Gage Height	Adj.	Discharge	DAY	YEARLY TOTALS
1	0.20		2.8	0.19		2.5	0.25		8.4	0.24		7.3	0.21		3.9	0.20		2.8	1	
2	0.21		3.9	0.20		2.8	0.26		9.5	0.24		7.3	0.20		2.8	0.20		2.8	2	
3				0.20		2.8	0.26		9.5	0.25		8.4				0.23		6.2	3	
4				0.20		2.8	0.27		10.6	0.23		6.2				0.20		2.8	4	
5				0.21		3.9	0.26		9.5	0.20		2.8	0.20		2.8	0.20		2.8	5	
6				0.22		5.0	0.26		9.5	0.21		3.9	0.21		3.9	0.21		3.9	6	
7				0.30		14.6	0.25		8.4	0.23		6.2	0.22		5.0	0.22		5.0	7	
8				0.19		2.5	0.26		9.5	0.22		5.0	0.22		5.0	0.22		5.0	8	
9	0.21		3.9				0.24		7.3	0.22		5.0	0.24		7.3	0.23		6.2	9	
10	0.20		2.8				0.23		6.2	0.21		3.9	0.24		7.3	0.21		3.9	10	
11	0.21		3.9	0.19		2.5				0.20		2.8	0.23		6.2				11	
12	0.22		5.0	0.20		2.8				0.21		3.9	0.23		6.2				12	
13	0.22		5.0	0.20		2.8	0.23		6.2	0.22		5.0	0.25		8.4				13	
14	0.62		163.0	0.21		3.9	0.22		5.0	0.22		5.0	0.23		6.2				14	
15	0.42		45.6	0.22		5.0	0.22		5.0	0.22		5.0	0.24		7.3				15	
16	0.23		6.2				0.24		7.3	0.23		6.2	0.24		7.3				16	
17	0.21		3.9							0.22		5.0	0.23		6.2				17	
18	0.20		2.8							0.23		6.2	0.22		5.0	0.21		3.9	18	
19	0.31		16.7							0.24		7.3	0.21		3.9	0.20		2.8	19	
20	0.48		70.0							0.23		6.2	0.20		2.8	0.37		30.2	20	
21	0.32		16.8							0.21		3.9	0.19		2.5	0.20		2.8	21	
22	0.22		5.0	0.22		5.0	0.24		7.3	0.21		3.9	0.18		2.3	0.19		2.5	22	
23	0.37		30.9	0.23		6.2	0.25		8.4	0.21		3.9	0.20		2.8	0.19		2.5	23	
24	0.30		14.0	0.24		7.3	0.24		7.3	0.20		2.8	0.50		80.6	0.18		2.3	24	
25	0.20		2.8				0.25		8.4	0.20		2.8	0.20		2.8	0.19		2.5	25	
26	0.19		2.5							0.21		3.9				0.21		3.9	26	
27										0.21		3.9							27	
28										0.22		5.0							28	
29				0.24		7.3	0.25		8.4	0.22		5.0				0.21		3.9	29	
30	0.19		2.5	0.23		6.2	0.24		7.3	0.21		3.9				0.22		5.0	30	
31				0.24		7.3				0.21		3.9	0.20		2.8				31	
1	442.9			157.6			233.1			151.5			210.9			138.8			1	7079.4
2	14.8			5.1			7.8			4.9			6.8			4.6			2	19.3
3	878.			313			462			300.			418.			275.			3	14044.
4	163.			14.8			10.6			8.4			80.6			30.2			4	688
5	2.5			2.5			5.			2.8			2.3			2.3			5	2.3

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

Maximum stage 2.78 feet at 1704 on 2-29-88 Discharge 4150 Second-feet.
Minimum stage 0.17 feet at Varies Dates & Times Discharge 2.0 Second-feet.

GAGING STATION SUMMARY

LOS ANGELES COUNTY

Department of Public Works

Hydraulic/Water Conservation Division

Station Location and Description BURBANK WESTERN STORM DRAIN

INERSIDE DR. for Water-Year 1987 1988

Station No. E 285-R

Drainage Area ..... Square Miles (..... Observer)

Gage Read .....

Rating Table No. 59-I

DAY	OCTOBER Gage Height	Adj.	Discharge	NOVEMBER Gage Height	Adj.	Discharge	DECEMBER Gage Height	Adj.	Discharge	JANUARY Gage Height	Adj.	Discharge	FEBRUARY Gage Height	Adj.	Discharge	MARCH Gage Height	Adj.	Discharge	DAY
1	0.14	0	13.1	H	0	66.0	0.12		10.6	0.18		10.6	0.12		10.6	0.18		18.5	1
2	0.13	0	11.9	0.27	0	37.2	0.11		9.1	0.12		10.6	H		90.6	0.15		14.6	2
3	0.13	0	11.9	0.17	0	17.1	0.12		10.6	0.18		11.9	0.12		10.6	0.15		14.6	3
4	0.12	0	10.6	H	0	60.5	H		179.0	0.13		11.9	0.12		10.6	0.15		14.6	4
5	0.12	0	10.6	H	0	104.0	0.12		10.6	0.22		24.9	0.12		10.6	0.15		14.6	5
6	0.13	0	13.1	0.26	0	34.9	0.11		9.1	0.15		14.6	0.12		10.6	0.14		13.1	6
7	0.14	0	13.1	0.17	0	17.1	0.12		10.6	0.14		15.1	0.12		10.6	0.14		13.1	7
8	0.13	0	11.9	0.14	0	13.1	0.12		10.6	0.14		13.1	0.12		10.6	0.12		10.6	8
9	0.13	0	11.9	0.13	0	11.9	0.12		10.6	0.14		13.1	0.12		10.6	0.12		10.6	9
10	0.13	0	11.9	0.12	0	10.6	0.12		10.6	0.14		13.1	0.12		10.6	0.12		10.6	10
11	0.12	0	10.6	0.12	0	10.6	0.12		10.6	0.14		13.1	0.12		10.6	0.12		10.6	11
12	0.13	0	11.9	0.12	0	10.6	0.12		10.6	0.14		13.1	0.12		10.6	0.12		10.6	12
13	0.13	0	11.9	0.12	0	10.6	0.12		10.6	0.15		14.6	0.12		10.6	0.12		10.6	13
14	0.13	0	11.9	0.12	0	10.6	0.11		9.1	0.16		15.7	0.12		10.6	0.15		14.6	14
15	0.13	0	11.9	0.12	0	10.6	0.10		7.9	0.16		15.7	0.12		10.6	0.17		17.1	15
16	0.13	0	11.9	0.12	0	10.6	H		80.3	0.15		14.6	0.12		10.6	0.17		17.1	16
17	0.13	0	11.9	0.12	0	10.6	0.15		14.6	H		363.0	0.12		10.6	0.15		14.6	17
18	0.13	0	11.9	0.12	0	10.6	0.12		10.6	0.21		23.9	0.12		10.6	0.12		10.6	18
19	0.13	0	11.9	0.11	0	9.1	0.13		11.9	0.15		14.6	0.12		10.6	0.11		9.1	19
20	0.13	0	11.9	0.11	0	9.1	0.12		10.6	0.19		13.1	0.12		10.6	0.12		10.6	20
21	0.13	0	11.9	0.11	0	9.1	0.12		10.6	0.22		10.6	0.13		11.9	0.12		10.6	21
22	H	0	60.1	0.11	0	7.9	0.12		10.6	0.12		10.6	0.13		11.9	0.13		11.9	22
23	H	0	66.5	0.12	0	10.6	0.11		9.1	0.13		11.9	0.13		11.9	0.12		10.6	23
24	0.18	0	18.5	0.12	0	10.6	0.11		9.1	0.12		10.6	0.13		11.9	0.12		10.6	24
25	0.14	0	13.1	0.11	0	9.1	0.11		9.1	0.12		10.6	0.13		11.9	0.15		14.6	25
26	0.13	0	11.9	0.11	0	9.1	0.11		9.1	0.12		10.6	0.13		11.9	0.14		13.1	26
27	0.12	0	10.6	0.11	0	9.1	0.11		9.1	0.13		11.9	0.29		32.8	0.13		11.9	27
28	0.12	0	10.6	0.11	0	9.1	0.11		9.1	0.12		10.6	H		159.0	0.12		10.6	28
29	H	0	92.5	0.12	0	10.6	H		49.2	0.12		10.6	H		228.0	0.11		9.1	29
30	0.74	0	30.3	0.12	0	10.6	0.12		10.6	0.11		10.6				0.13		11.9	30
31	H	0	262.0				0.13		11.9	0.11		10.6				0.12		10.6	31
1	1366.6			671.2			596.3			757.1			785.2			385.9			1
2	44.1			22.4			19.2			24.4			27.1			12.4			2
3	2710			1330			1180			1500			1570			765			3
4	6.01			1.66			179			363			22.5			18.5			4
5	10.6			7.9			7.9			10.6			10.6			9.1			5

DAY	APRIL Gage Height	Adj.	Discharge	MAY Gage Height	Adj.	Discharge	JUNE Gage Height	Adj.	Discharge	JULY Gage Height	Adj.	Discharge	AUGUST Gage Height	Adj.	Discharge	SEPTEMBER Gage Height	Adj.	Discharge	DAY
1	0.13		11.9	0.12		10.6	0.11		9.1	0.12		10.6	0.13		11.9	0.13		11.9	1
2	0.13		11.9	0.12		10.6	0.11		9.1	0.12		10.6	0.13		11.9	0.16		15.7	2
3	0.13		11.9	0.12		10.6	0.11		9.1	0.12		10.6	0.13		11.9	0.13		11.9	3
4	0.13		11.9	0.11		9.1	0.11		9.1	0.12		10.6	0.13		11.9	0.12		10.6	4
5	0.12		10.6	0.11		9.1	0.11		9.1	0.12		10.6	0.13		11.9	0.12		10.6	5
6	0.12		10.6	0.11		9.1	0.11		9.1	0.13		11.9	0.13		11.9	0.12		10.6	6
7	0.13		11.9	0.12		10.6	0.11		9.1	0.13		11.9	0.13		11.9	0.12		10.6	7
8	0.12		10.6	0.12		10.6	0.11		9.1	0.14		13.1	0.13		13.1	0.12		10.6	8
9	0.12		10.6	0.12		10.6	0.11		9.1	0.14		13.1	0.13		13.1	0.13		10.6	9
10	0.12		10.6	0.13		11.9	0.11		9.1	0.15		12.1	0.14		13.1	0.12		10.6	10
11	0.12		10.6	0.13		11.9	0.11		9.1	0.15		13.1	0.14		13.1	0.12		11.9	11
12	0.13		11.9	0.13		11.9	0.11		9.1	0.16		13.1	0.13		11.9	0.13		11.9	12
13	0.13		11.9	0.13		11.9	0.11		9.1	0.14		13.1	0.13		11.9	0.12		11.9	13
14	H		64.0	0.13		11.9	0.11		9.1	0.14		13.1	0.13		11.9	0.12		11.9	14
15	0.16		15.7	0.13		11.9	0.12		9.1	0.13		13.1	0.13		11.9	0.13		11.9	15
16	0.19		13.1	0.13		11.9	0.11		9.1	0.14		13.1	0.13		11.9	0.12		11.9	16
17	0.14		13.1	0.12		10.6	0.11		9.1	0.14		13.1	0.12		10.6	0.13		15.7	17
18	0.15		14.6	0.12		10.6	0.11		9.1	0.15		13.1	0.11		9.1	0.13		19.7	18
19	H		146.0	0.12		10.6	0.11		9.1	0.14		13.1	0.13		10.6	0.13		19.7	19
20	H		144.0	0.12		10.6	0.11		9.1	0.14		13.1	0.12		10.6	0.13		21.2	20
21	0.19		19.7	0.13		10.6	0.11		9.1	0.14		13.1	0.12		10.6	0.13		19.7	21
22	0.15		14.6	0.13		10.6	0.11		9.1	0.14		13.1	0.11		9.1	0.13		18.5	22
23	H		78.2	0.12		10.6	0.11		9.1	0.14		13.1	0.11		9.1	0.12		17.1	23
24	0.70		21.2	0.13		10.6	0.11		9.1	0.14		13.1	0.12		11.9	0.13		15.7	24
25	0.14		13.1	0.12		10.6	0.11		9.1	0.10		13.1	0.13		11.9	0.13		14.6	25
26	0.14		13.1	0.12		10.6	0.11		9.1	0.14		13.1	0.13		11.9	0.13		15.1	26
27	0.14		13.1	0.13		10.6	0.12		10.6	0.13		11.9	0.12		10.6	0.13		11.9	27
28	0.13		11.9	0.12		10.6	0.12		10.6	0.13		11.9	0.13		11.9	0.13		11.9	28
29	0.13		11.9	0.11		9.1	0.11		10.6	0.13		11.9	0.13		11.9	0.13		10.6	29
30	0.13		11.9	0.11		9.1	0.12		10.6	0.13		11.9	0.13		13.1	0.13		10.6	30
31						9.1				0.12		11.9	0.14		13.1				31
1	766.1			330.2			279			386.9			361.2			405.1			1
2	25.5			10.7			9.3			12.4			11.7			13.5			2
3	1520			655			553			761			716			804			3
4	146			11.9			10.5			13.1			13.1			21.2			4
5	10.6			9.1			9.1			10.6			9.1			10.6			5

Maximum stage	9.29	feet at 2030	on 10/24/87	Discharge	5,620 second-feet
Minimum stage	0.12	feet at 0730	on 10/31/87	Discharge	1.7 second-feet

REMARKS:

1. Tidal 1/24
2. Average Daily Flow in 1/24
3. Tidal Gauge Daily Flow in A.F.
4. Maximum Average Daily Flow in 1/24
5. Minimum Average Daily Flow in 1/24

YEARLY TOTALS	
1	7087.8
2	19.4
3	6740.3
4	363
5	7.9

1.983487

GAGING STATION SUMMARY

LOS ANGELES COUNTY
Department of Public Works
Hydraulic/Water Conservation Division

Station Location and Description: Los Angeles Riv. @ Tujunga Ave.
Station: F 300-R
Station No.: F300-R
for Water-Year 1987 19 88
Drainage Area ..... Square Miles (C. Soper - R. Velez Observer)
Gage Read: Every 15 minutes
Rating Table No: 62-1

DAY	OCTOBER Gage Height	Adj.	Discharge	NOVEMBER Gage Height	Adj.	Discharge	DECEMBER Gage Height	Adj.	Discharge	JANUARY Gage Height	Adj.	Discharge	FEBRUARY ✓ Gage Height	Adj.	Discharge	MARCH ✓ Gage Height	Adj.	Discharge	DAY
1	2.04		65.3	4.07		1,280.0	2.00		62.5	2.14		71.5	3.12		704	3.53		502 e	1
2	2.19		74.9	3.17		182.0	2.09		68.1	2.10		68.8	3.84		936.0	3.05		164.0	2
3	2.08		67.3	2.29		81.9	2.13		70.5	2.14		71.5	3.85		194.0	2.66		113.0	3
4	2.14		71.8	3.62		633.0	4.50		1,980.0	2.22		76.9	2.30		82.6	2.42		91.6	4
5	2.22		76.6	3.71		755.0	3.35		291.0	3.55		527.0	2.12		70.1	2.25		79.1	5
6	2.22		77.2	2.47		95.6	2.52		89.9	2.85		134.0	2.07		67.0	2.31		76.2	6
7	2.21		76.5	1.36		31.7	3.36		304.0	2.33		84.8	2.09		67.6	2.18		74.2	7
8	2.20		75.4	1.70		46.2	2.29		81.7	2.32		76.9	2.08		67.6	2.20		75.3	8
9	2.23		77.6	2.19		74.8	2.17		73.5	2.21		76.2	2.14		71.5	2.15		72.2	9
10	2.20		75.4	1.91		57.3	2.14		71.5	2.20		75.5	2.11		69.5	2.11		71.5	10
11	2.14	*	71.8	2.13		70.8	2.17		73.7	2.24		78.3	2.03		64.5	2.13		74.8	11
12	2.52		100.0	1.97		61.0	2.13		70.6	(		(	2.00		62.7	2.16		72.8	12
13	2.21		76.4	(		(	2.07		66.7				2.06		66.4	2.19		74.8	13
14	2.23		77.6	1.84		59.5	2.16		73.1				2.05		65.8	2.24		78.3	14
15	2.19		75.0	1.46		35.7	(		(	2.28		81.2	2.12		70.1	2.28		81.2	15
16	2.25		78.8	1.91		57.5	3.99		1,150.0	2.23		77.6	2.15		72.2	2.29		81.9	16
17	2.22		76.9	1.96		60.4	3.69		730.0	5.15		3,240.0	2.16		72.8	2.30		82.6	17
18	2.16		72.7	2.41		90.8	2.85		134.0	3.39		331.0	2.15		72.2	2.29		81.9	18
19	2.27		80.8	2.08		67.4	2.43		92.9	2.84		133.0	2.14		71.5	2.29		81.9	19
20	3.41		350.0	2.11		69.5	2.27		80.5	2.49		97.2	2.14		71.5	2.28		81.2	20
21	2.23		77.8	2.09		68.1	2.21		76.2	2.17		73.5	(		(	2.25		79.1	21
22	5.31		3590.0	2.04		65.3	2.17		73.5	2.13		70.8				2.25		79.1	22
23	3.69		730	2.11		69.5	(		(	2.16		72.8				2.26		79.8	23
24	3.24		219	2.08		67.5	2.16		72.8	2.22		76.9				2.19	r.10	81.9	24
25	2.27		80.5	2.05		66.0	2.11		69.5	2.24		78.3	2.15		72.2	2.05	(	72.2	25
26	2.37		88.0	1.99		62.4	2.05		72.1	2.27		80.5	(		(	2.06		72.8	26
27	2.42		91.6	2.06		66.3	2.18		74.8	2.26		79.8	3.29		245.0	2.06		72.8	27
28	2.33		84.9	2.01		63.5	2.22		76.9	2.30		82.6	5.42		3848	1.95		65.8	28
29	3.33		278.0	2.04		65.1	3.57		563.0	2.31		83.3	4.86		3660	2.07		73.5	29
30	2.27		80.4	1.88		55.6	2.97		150.0	2.27		80.5				2.10		75.5	30
31	5.42		3450.0				2.27		80.5	2.24		78.3				2.07	r.10	73.5	31
1	1096.8			4530.4			7039.6			6393.6			9509.1			2932.7			1
2	35.4			151			227			206			328			94.6			2
3	21,750			8990			13,960			12680			18861.9			5816.9			3
4	3850			1280			1990			3240			3848			502			4
5	65.3			31.7			62.5			68.8			62.7			65.8			5

DAY	APRIL Gage Height	Adj.	Discharge	MAY ✓ Gage Height	Adj.	Discharge	JUNE ✓ Gage Height	Adj.	Discharge	JULY ✓ Gage Height	Adj.	Discharge	AUGUST Gage Height	Adj.	Discharge	SEPTEMBER Gage Height	Adj.	Discharge	DAY
1	2.32		83.8	2.05	+.05	68.8	1.93	+.13	66.4	1.81	+.45	79.8	2.23		77.5	2.25		73.9	1
2	2.30		82.4	2.08	↑	70.8	2.08		69.5	1.83	↑	81.2	2.26		79.9	2.32		84.0	2
3	2.28		80.9	2.11		72.8	2.11		78.3	1.75		75.5	2.37		87.7	2.30		82.9	3
4	2.28		80.9	2.09		71.5	2.09		76.9	1.74		74.8	2.35		86.8	2.31		83.3	4
5	2.26		80.0	2.10		72.2	2.09		76.9	1.72		73.5	2.39		89.5	2.32		83.8	5
6	2.31		83.3	2.07		70.1	2.08		76.2	1.80		79.1	(		(	2.36		86.9	6
7	2.28		81.4	2.06		69.5	2.07		75.5	1.85		82.6	2.35		86.3	2.05		65.6	7
8	2.33		84.1	2.05		68.8	2.14		80.5	1.84		81.9	2.36		87.4	2.30		82.9	8
9	2.28		81.3	2.08		70.8	2.14		80.5	1.83		81.2	2.35		86.4	2.35		86.1	9
10	2.25		79.0	2.12		73.5	2.19		84	(		(	2.28		81.2	2.30		82.5	10
11	2.27		80.6	2.16		76.2	2.19		84.1	1.85		85.5	2.26		80.1	2.26		79.9	11
12	2.29		81.7	2.16		76.2	2.15		81.2	1.87		84.1	2.34		85.8	2.31		83.4	12
13	2.24		78.2	2.12		73.5	2.17		82.6	1.79		78.3	2.38		88.8	2.28		81.4	13
14	3.72		769.0	2.12		73.5	2.16		83.3	1.83		81.2	2.35		86.5	2.27		80.7	14
15	3.16		189.0	2.09		71.5	2.14		80.5	1.76		76.2	2.32		84.0	2.26		79.9	15
16	2.31		83.2	2.09		71.5	2.12		78.3	1.88		84.8	2.01		63.3	2.14		75.1	16
17	2.27		80.8	2.11		72.8	2.11		77.6	1.77		76.9	2.06		66.5	2.17		73.8	17
18	2.22		77.2	2.14		74.8	2.14		80.5	1.79		78.3	2.17		73.7	2.18		74.9	18
19	2.84		940.0	2.13		74.2	2.14		80.5	1.78		77.6	2.39		89.3	2.20		75.7	19
20	4.09		1,310	2.11		72.8	2.13		79.8	1.76		76.2	2.45		93.7	2.78		136.0	20
21	3.56		550.0	2.09		71.5	2.09		76.9	1.86		83.3	2.40		90.2	2.34		78.0	21
22	3.22		211.0	2.09		71.5	2.10		77.6	1.93		88.5	2.31		83.6	2.25		79.1	22
23	3.67		695.0	2.04		68.2	2.06	+.13	74.8	1.87		84.1	2.32		84.3	2.26		80.1	23
24	3.02		159.0	2.01		66.4	1.81	+.35	71.5	1.84		81.9	2.66		113.0	2.24		78.0	24
25	2.44		93.2	2.03		67.6	1.84		74.8	1.91		87.0	2.36		87.3	2.24		78.1	25
26	2.21		76.2	2.04		68.2	1.79		71.5	1.91		79.8	2.32		81.2	2.20		75.3	26
27	2.18		74.2	2.04		68.2	1.80		72.2	1.80	↓	79.1	2.12		70.3	2.19		75.1	27
28	2.20		75.5	2.05		68.2	1.83		72.8	1.87	r.45	84.1	2.19		74.7	2.22		77.2	28
29	2.17		73.5	2.03		67.6	1.78		69.5	2.05	r.25	82.6	2.25		79.4	2.21		76.0	29
30	2.21		76.2	1.98	↓	69.5	1.81	r.35	72.8	2.03	r.15	81.2	2.16		72.5	2.23		77.7	30
31				2.01	+.05	66.4				1.96	r.25	76.2	2.28		81.4				31
1	6589.2			2194.7			2307.6			2486.3			2580.9			2422.7			1
2	220			70.8			76.9			80.2			83.3			80.8			2
3	13070			4353.2			4577.1			4931.5			5120			4810			3
4	1310			74.8			83.3			885			113			126			4
5	735			66.4			66.4			75.5			63.3			65.6			5

REMARKS:

1. Total Flow in AF
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	59,954.8		
2	1972.6		
3	118,920		
4	16,505.6		
5	762.5		

Maximum stage 11.04 feet at 1945 on 10-22-87 Discharge 24300 Second-feet
Minimum stage 0.70 feet at 1921 on 9-07-88 Discharge 11.8 Second-feet

✓ Based on Gage Height adjustment estimates.
* Please see explanation on reverse side of sheet.

* Data was based on gage height adjustment estimates.

APPENDIX C

WELLS DRILLED AND DESTROYED

WELLS DESTROYED 1987-88

Party	LACDPW Well No.	Owner No.	Purpose
-	-	-	-

WELLS DRILLED 1987-88

Party	LACDPW Well No.	Owner No.	Purpose
LADWP	*	RT-8	Production
LADWP	*	RT-9	"
LADWP	*	RT-14	"
LADWP	*	RT-15	"
LADWP	3800E	Aeration 1	Groundwater Cleanup
LADWP	3810U	Aeration 2	"
LADWP	3810V	Aeration 3	"
LADWP	3810W	Aeration 4	"
LADWP	3820H	Aeration 5	"
LADWP	3821J	Aeration 6	"
LADWP	3830P	Aeration 7	"
LADWP	3831K	Aeration 8	"

WELLS DRILLED 1987-88 FOR MAJOR GROUNDWATER POLLUTION INVESTIGATIONS

Party

Bendix - no new wells drilled - have one well for site evaluation, testing, and monitoring.

Centralab - one new well drilled (for a total of 16 wells) for site evaluation, testing, and monitoring.

Lockheed - drilled 25 additional wells (for a total of 41) for site evaluation, testing, and monitoring - one well is capable of being used as an extraction well.

Riker Labs - one new well drilled (for a total of 25 wells) for site evaluation, testing, and monitoring.

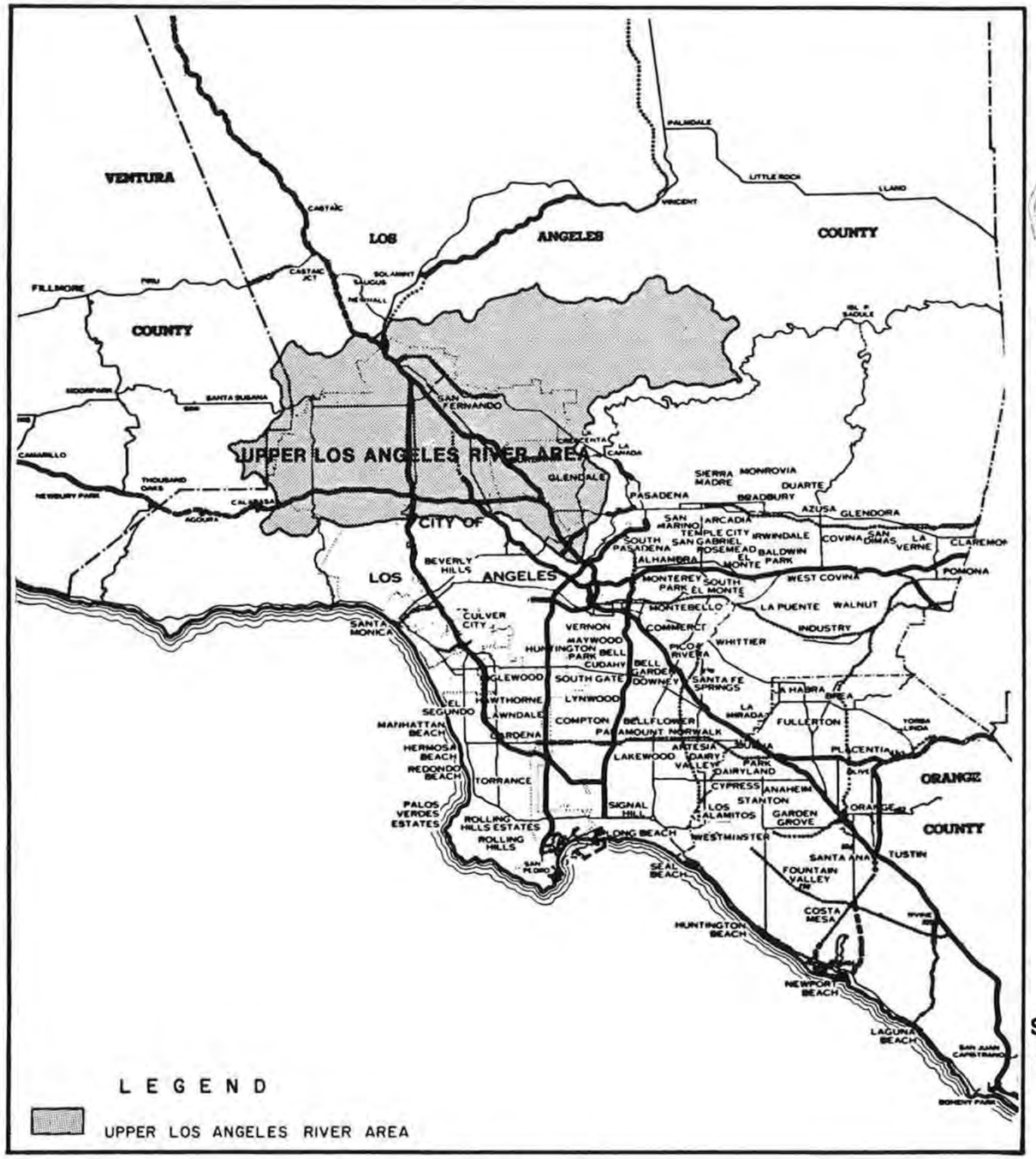
Rocketdyne - drilled 9 additional wells (for a total of 98) for site evaluation, testing, and monitoring - 11 wells are capable of being used as extraction wells.

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

APPENDIX D

PLATES

UPPER LOS ANGELES RIVER AREA WATERMASTER



LEGEND

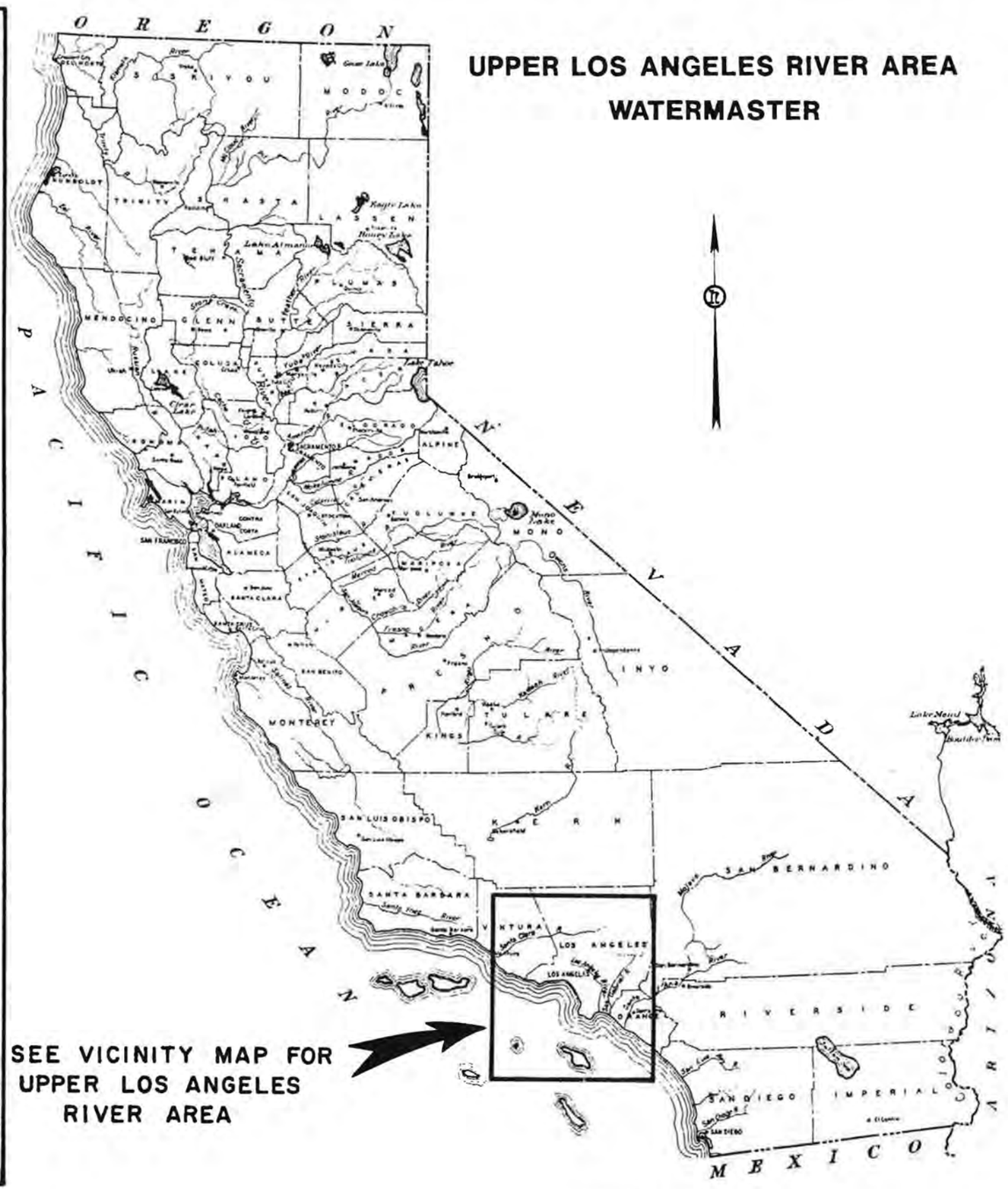
UPPER LOS ANGELES RIVER AREA

VICINITY MAP

SCALE

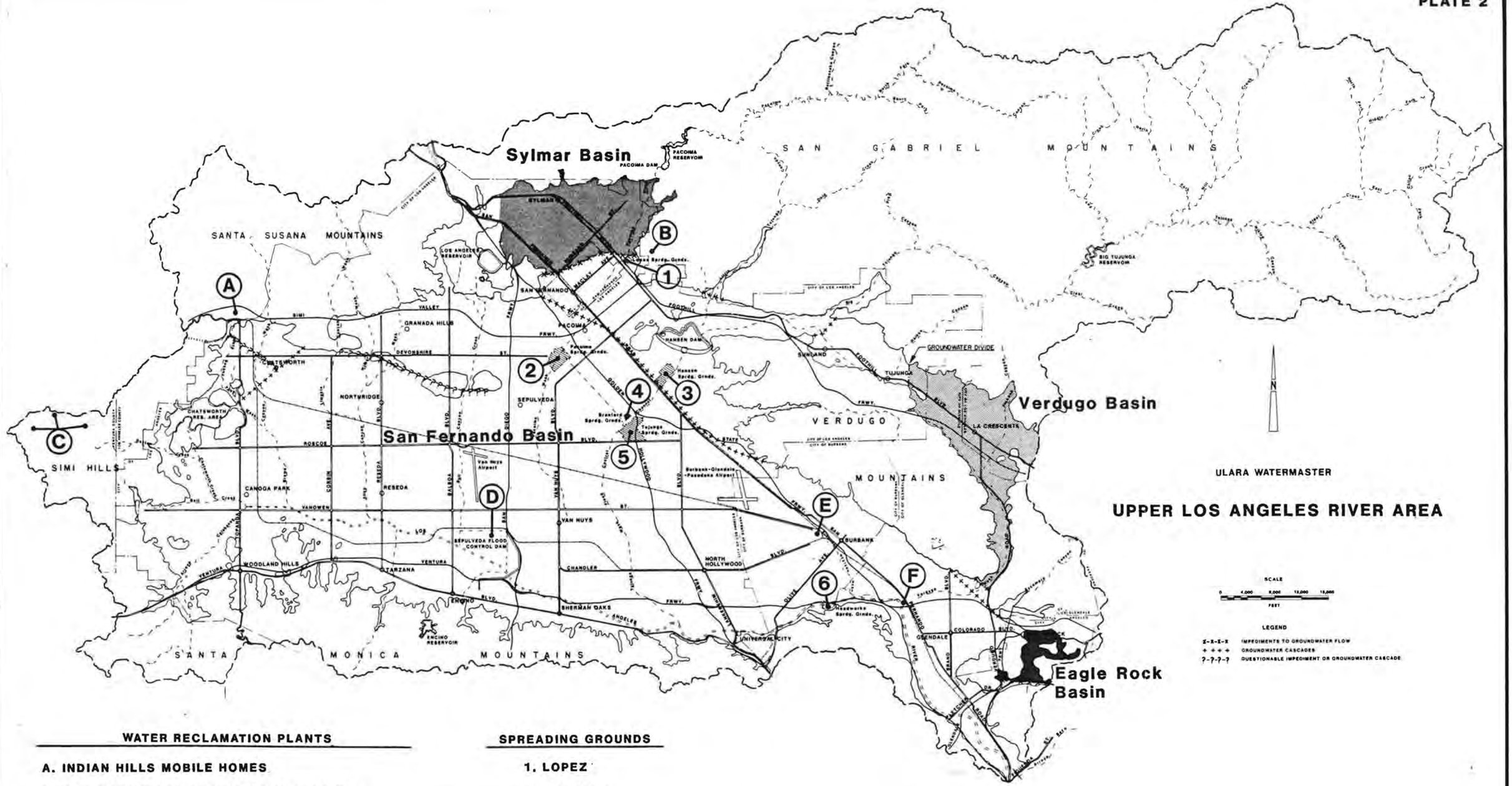
0 5 10 15 Miles

SEE VICINITY MAP FOR UPPER LOS ANGELES RIVER AREA



LOCATION MAP

PLATE 2



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

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

WATER RECLAMATION PLANTS

A. INDIAN HILLS MOBILE HOMES

B. THE INDEPENDENT ORDER OF FORESTERS

C. ROCKETDYNE SANTA SUSANA FIELD LABORATORY

D. DONALD C. TILLMAN

E. CITY OF BURBANK

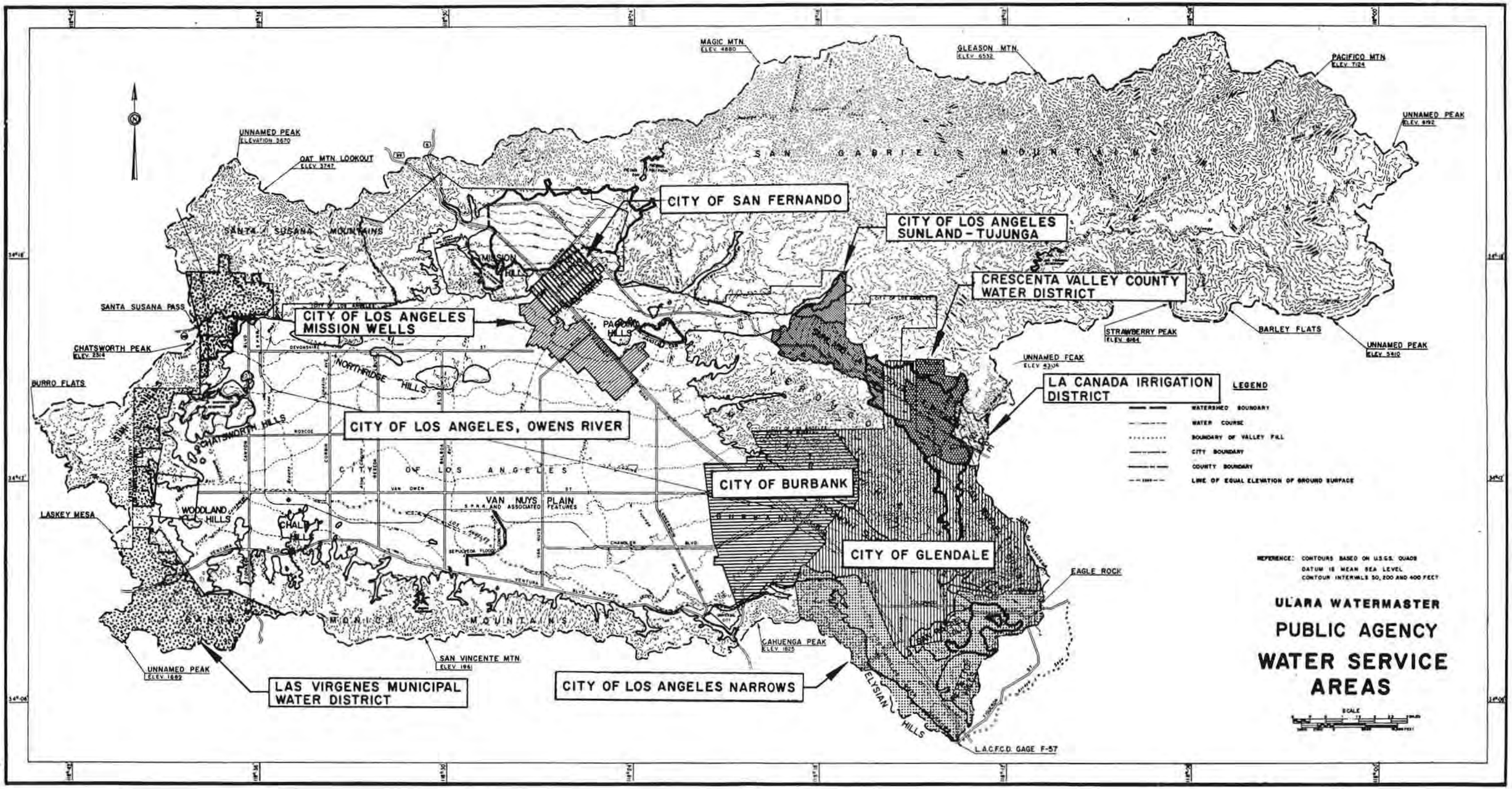
F. LOS ANGELES-GLENDALE

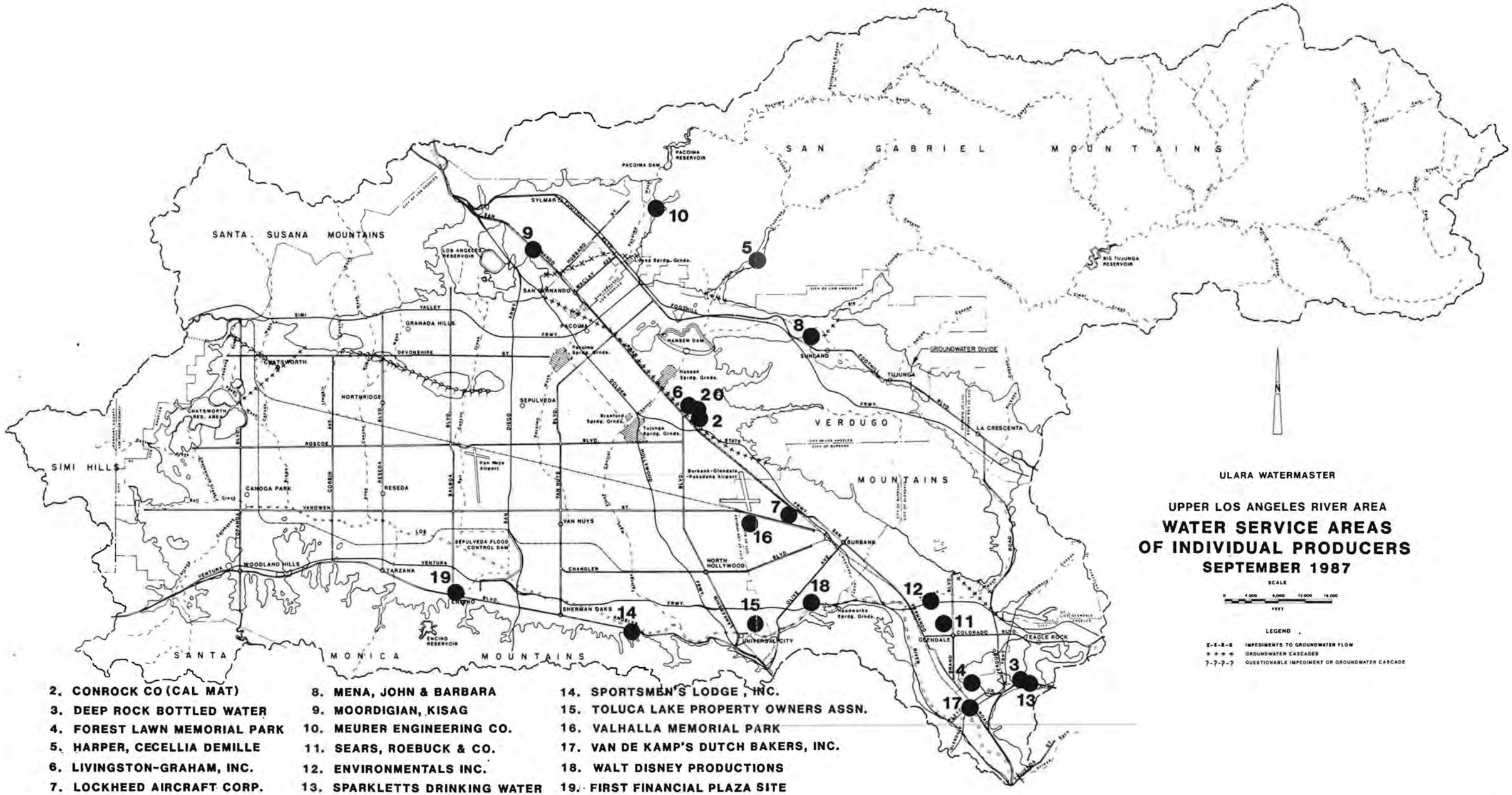
SPREADING GROUNDS

1. LOPEZ
2. PACOIMA
3. HANSEN
4. BRANFORD
5. TUJUNGA
6. HEADWORKS

MRG 3/89

PLATE 3


MAGIC MTN.
ELEV. 4880
GLEASON MTN.
ELEV. 6532
PACIFICO MTN.
ELEV. 7124
UNNAMED PEAK
ELEV. 8192
UNNAMED PEAK
ELEVATION 2670
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
SANTA SUSANA PASS
CITY OF LOS ANGELES
MISSION WELLS
PACOIMA HILLS
STRAWBERRY PEAK
ELEV. 6164
BARLEY FLATS
UNNAMED PEAK
ELEV. 5910
CHATSWORTH PEAK
ELEV. 2514
NORTHRIDGE HILLS
UNNAMED PEAK
ELEV. 4304
LA CANADA IRRIGATION
DISTRICT
BURRO FLATS
CHATSWORTH HILLS
CITY OF LOS ANGELES, OWENS RIVER
CITY OF LOS ANGELES
CITY OF BURBANK
VAN NUYS PLAIN
AND ASSOCIATED FEATURES
WOODLAND HILLS
LASKEY MESA
CHALL
CITY OF GLENDALE
EAGLE ROCK
SANTA MONICA MOUNTAINS
CAHUENGA PEAK
ELEV. 1825
SAN VINCENTE MTN.
ELEV. 1961
UNNAMED PEAK
ELEV. 1689
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 (CAL MAT)
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
20. VALLEY RECLAMATION CO.

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

MRG 3/89

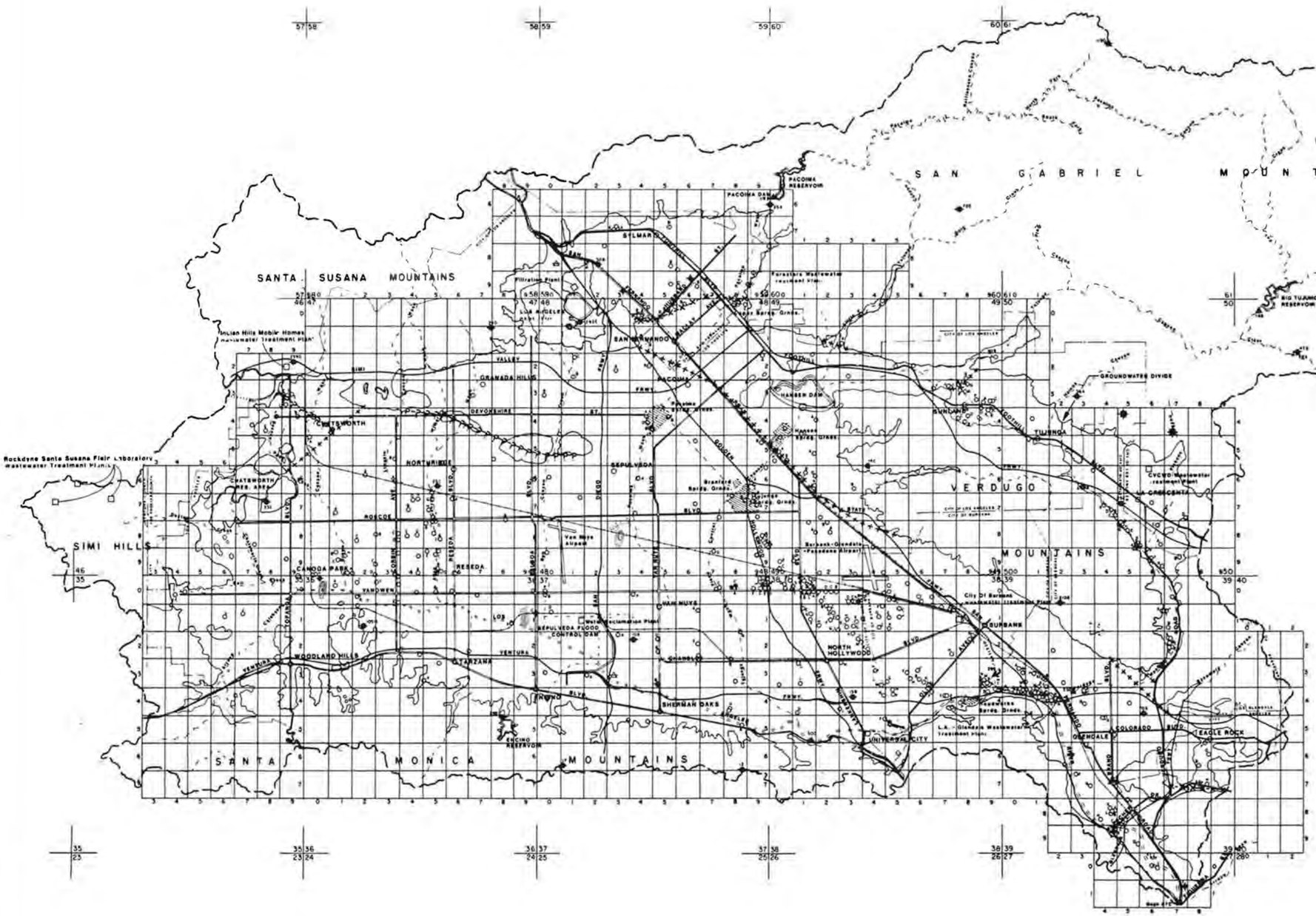


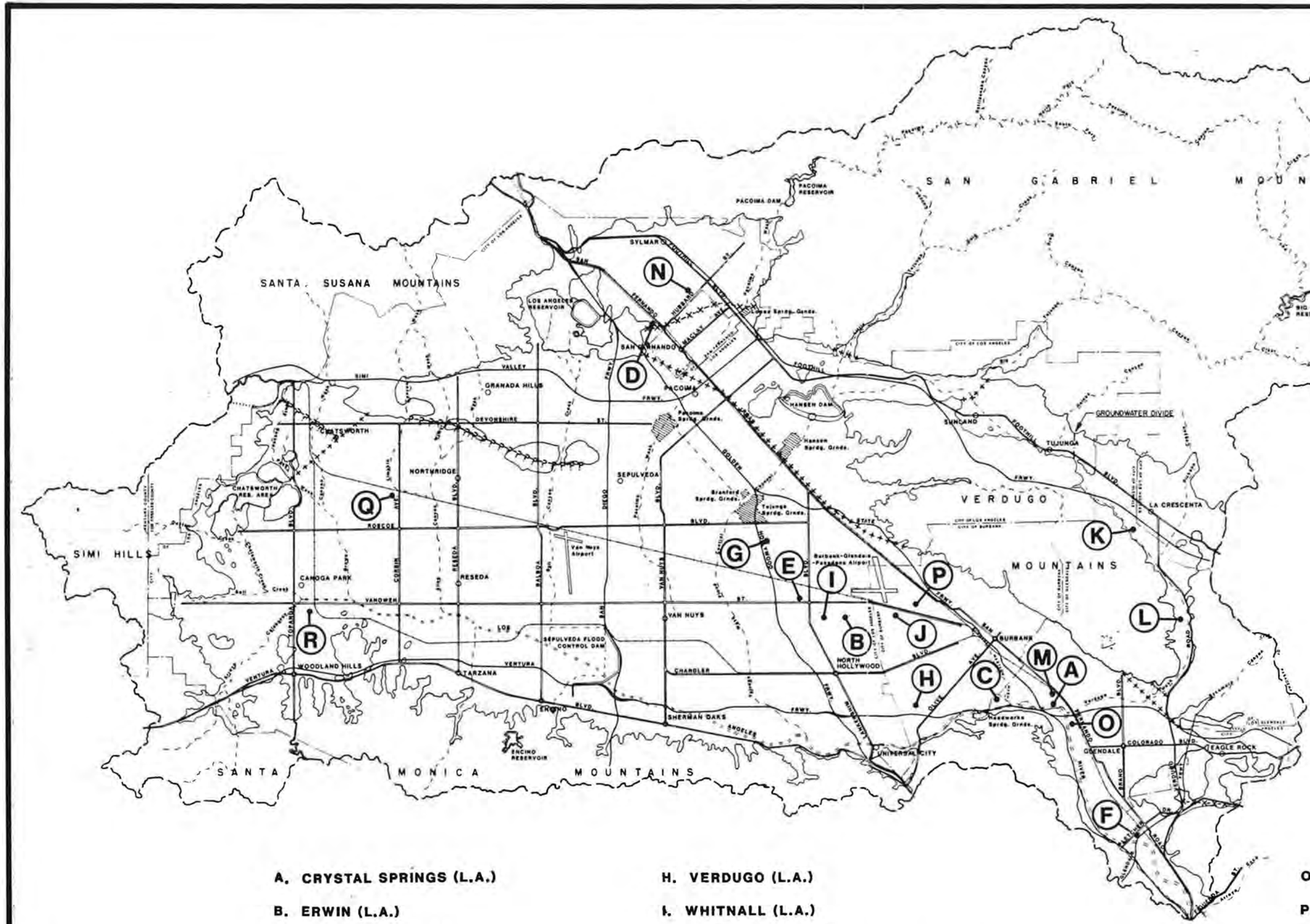
PLATE 5

ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

LOCATION OF WELLS AND HYDROLOGIC FACILITIES

PLATE 6



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

WELL FIELD LOCATIONS

SCALE

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

FEET

LEGEND

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

A. CRYSTAL SPRINGS (L.A.)

B. ERWIN (L.A.)

C. HEADWORKS (L.A.)

D. MISSION (L.A.)

E. NORTH HOLLYWOOD (L.A.)

F. POLLOCK (L.A.)

G. RINALDI-TOLUCA (L.A.)

H. VERDUGO (L.A.)

I. WHITNALL (L.A.)

J. CITY OF BURBANK

K. CRESCENTA VALLEY COUNTY WATER DISTRICT

L. CITY OF GLENDALE (GLORIETTA)

M. CITY OF GLENDALE (GRANDVIEW)

N. CITY OF SAN FERNANDO

O. CENTRALAB

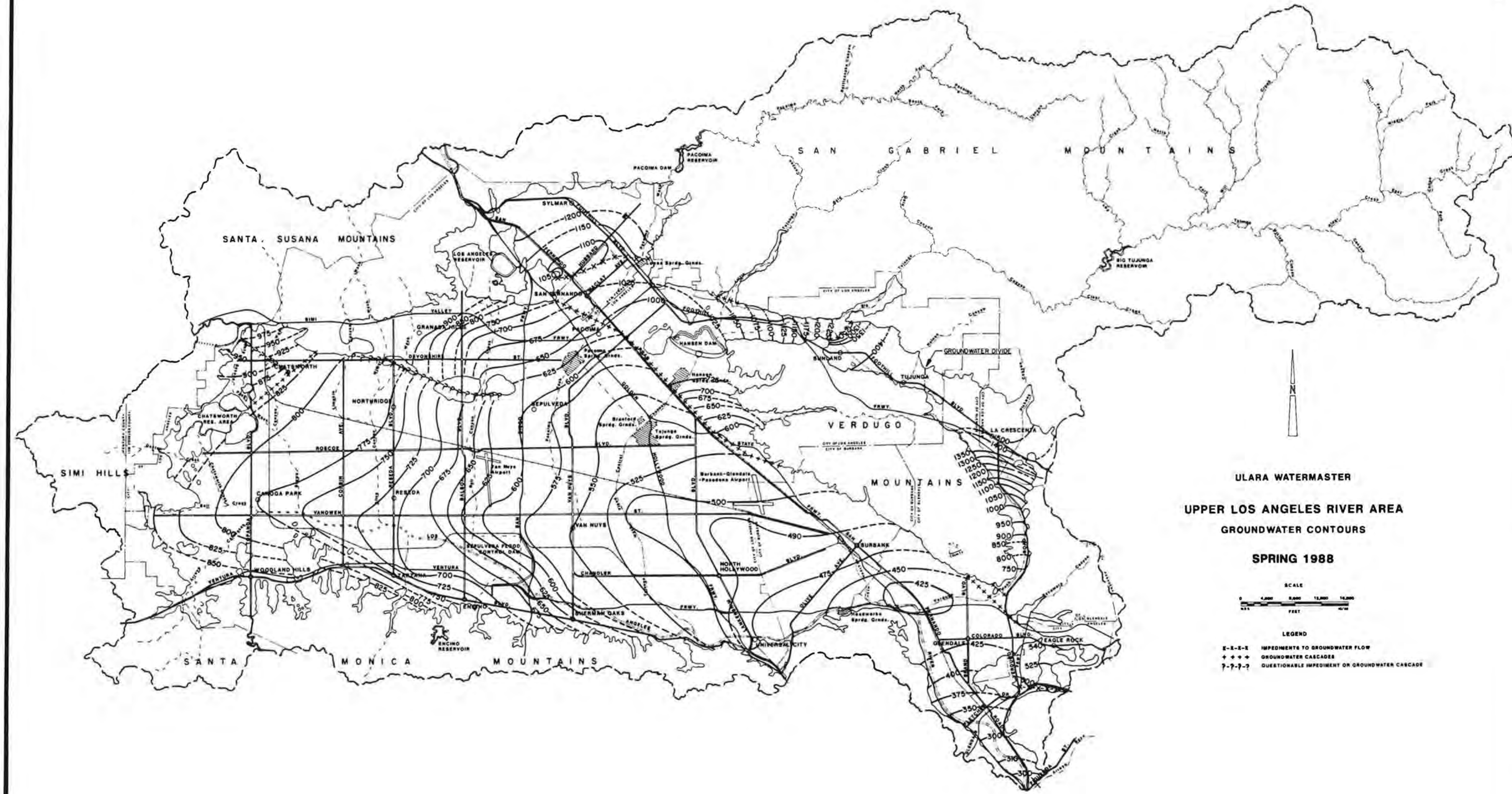
P. LOCKHEED AIRCRAFT CORP.

Q. RIKER LABS / 3M'S

R. ROCKWELL INTERNATIONAL

MRG 3/89

PLATE 7


SAN GABRIEL MOUNTAINS
SANTA SUSANA MOUNTAINS
SIMI HILLS
SANTA MONICA MOUNTAINS
VERDUGO MOUNTAINS
PACOIMA DAM
PACOIMA RESERVOIR
BIG TUJUNGA RESERVOIR
LOS ANGELES RESERVOIR
HANSEN DAM
GROUNDWATER DIVIDE
SYLMAR
SAN FERNANDO
PACOIMA
CHATSWORTH
CHATSWORTH RES. AREA
NORTHRIDGE
SEPULVEDA
CANOGA PARK
RESEDA
VAN NUYS
WOODLAND HILLS
TARZANA
ENCINO
ENCINO RESERVOIR
SHERMAN OAKS
NORTH HOLLYWOOD
UNIVERSAL CITY
BURBANK
GLENDALE
EAGLE ROCK
SUNLAND
TUJUNGA
LA CRESCENTA
SEPULVEDA FLOOD CONTROL DAM
Van Nuys Airport
Burbank-Glendale-Pasadena Airport
Headworks Sprdg. Grnds.

ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

GROUNDWATER CONTOURS

SPRING 1988

SCALE

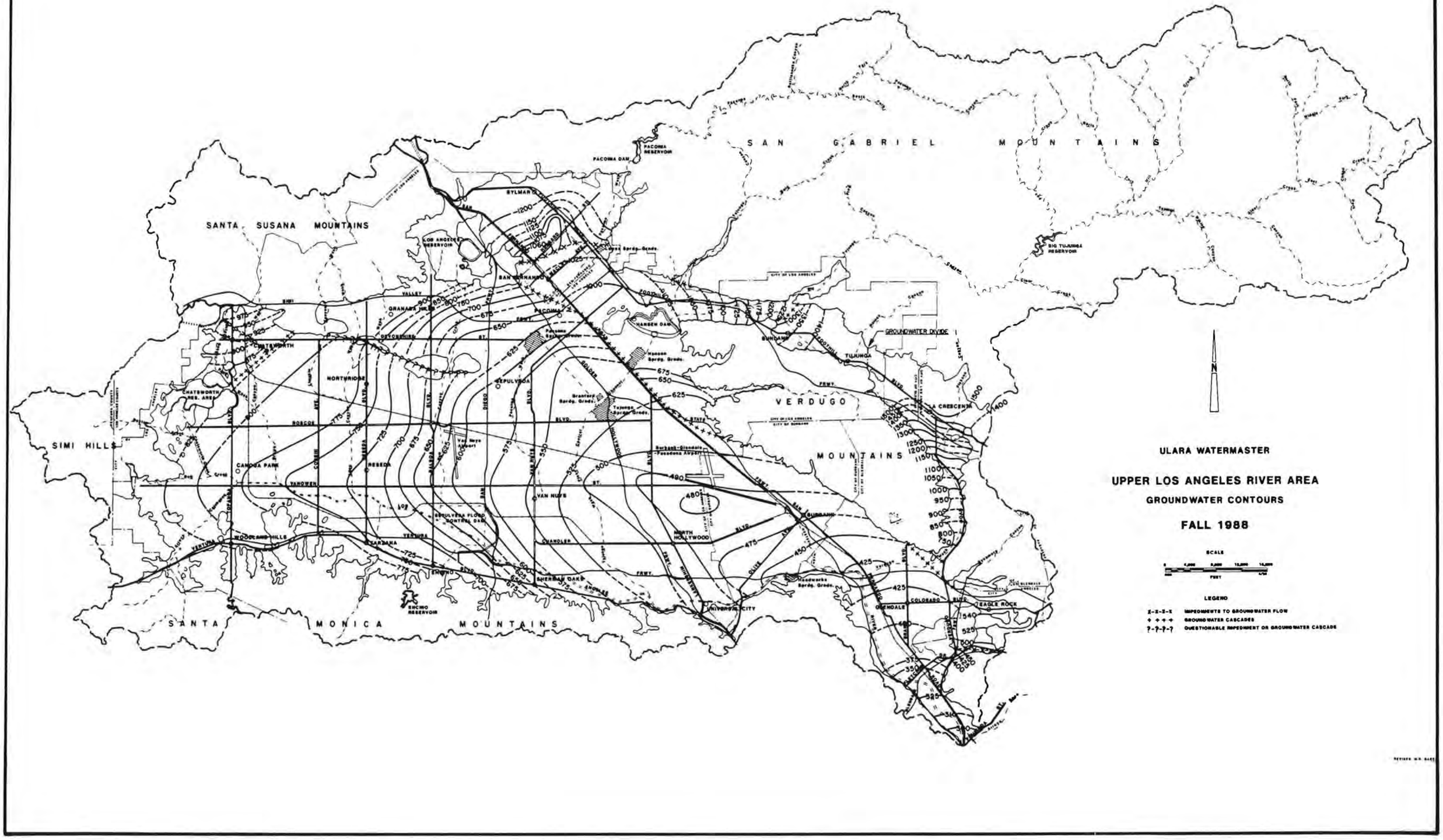
LEGEND

X-X-X-X IMPEDIMENTS TO GROUNDWATER FLOW

+ + + + GROUNDWATER CASCADES

?-?-?-? QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE

PLATE 8



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA
GROUNDWATER CONTOURS
FALL 1988

SCALE

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000

FEET

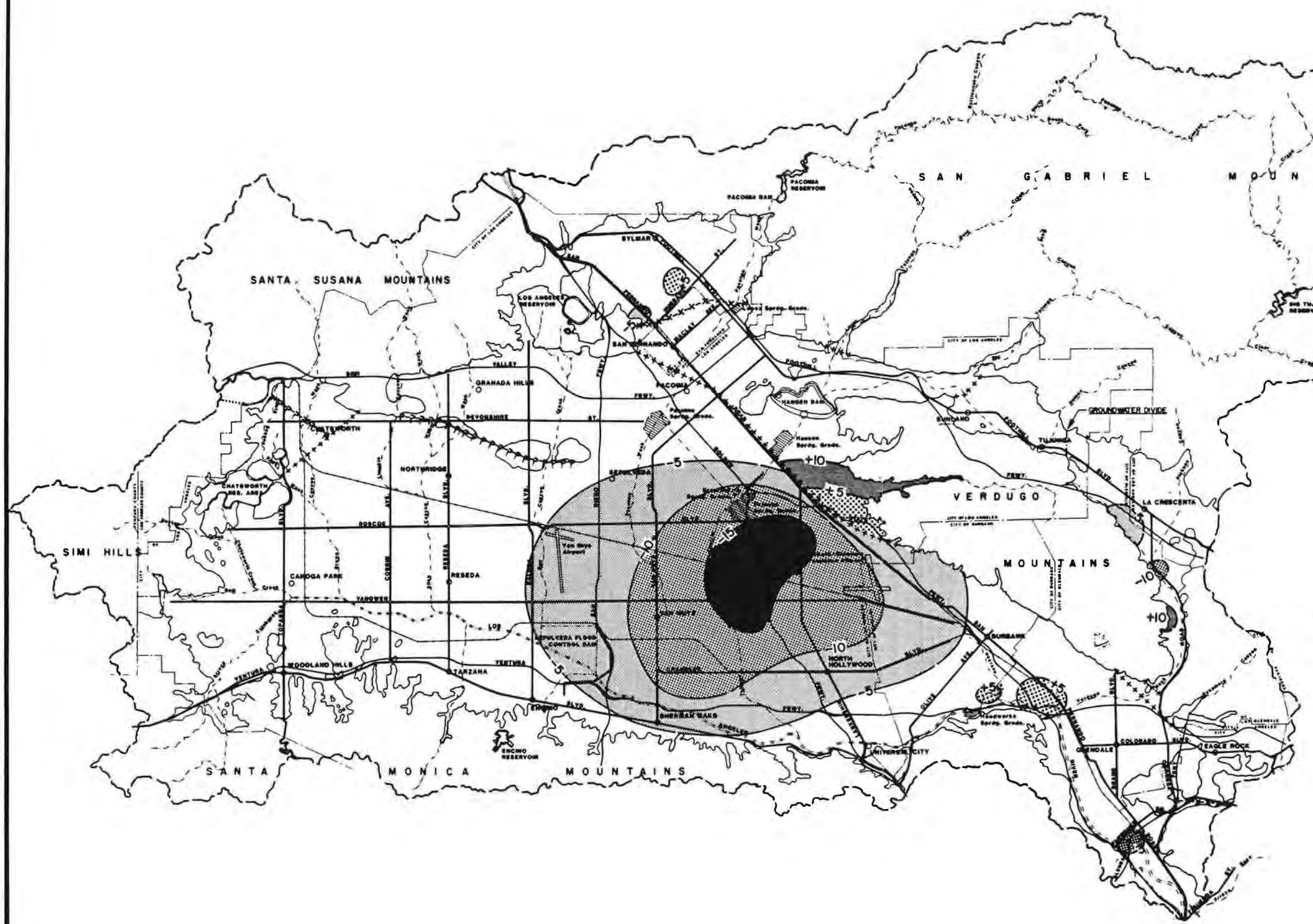
LEGEND

X-X-X-X IMPEDIMENTS TO GROUNDWATER FLOW

+ + + + GROUNDWATER CASCADES

?-?-?-? QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE

PLATE 9



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA

CHANGE IN WATER SURFACE ELEVATION

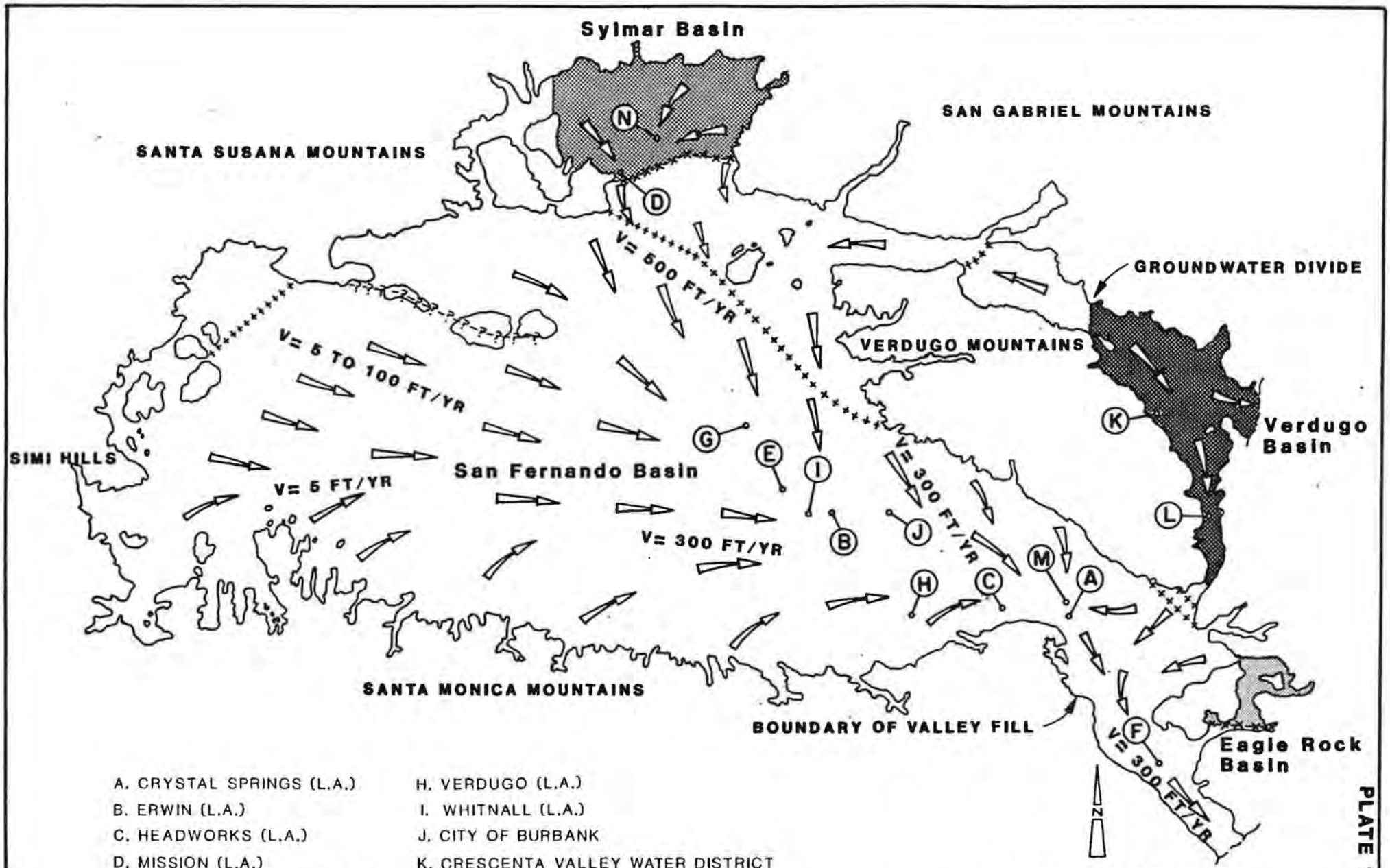
FALL 1987 - FALL 1988

SCALE

FEET

LEGEND

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



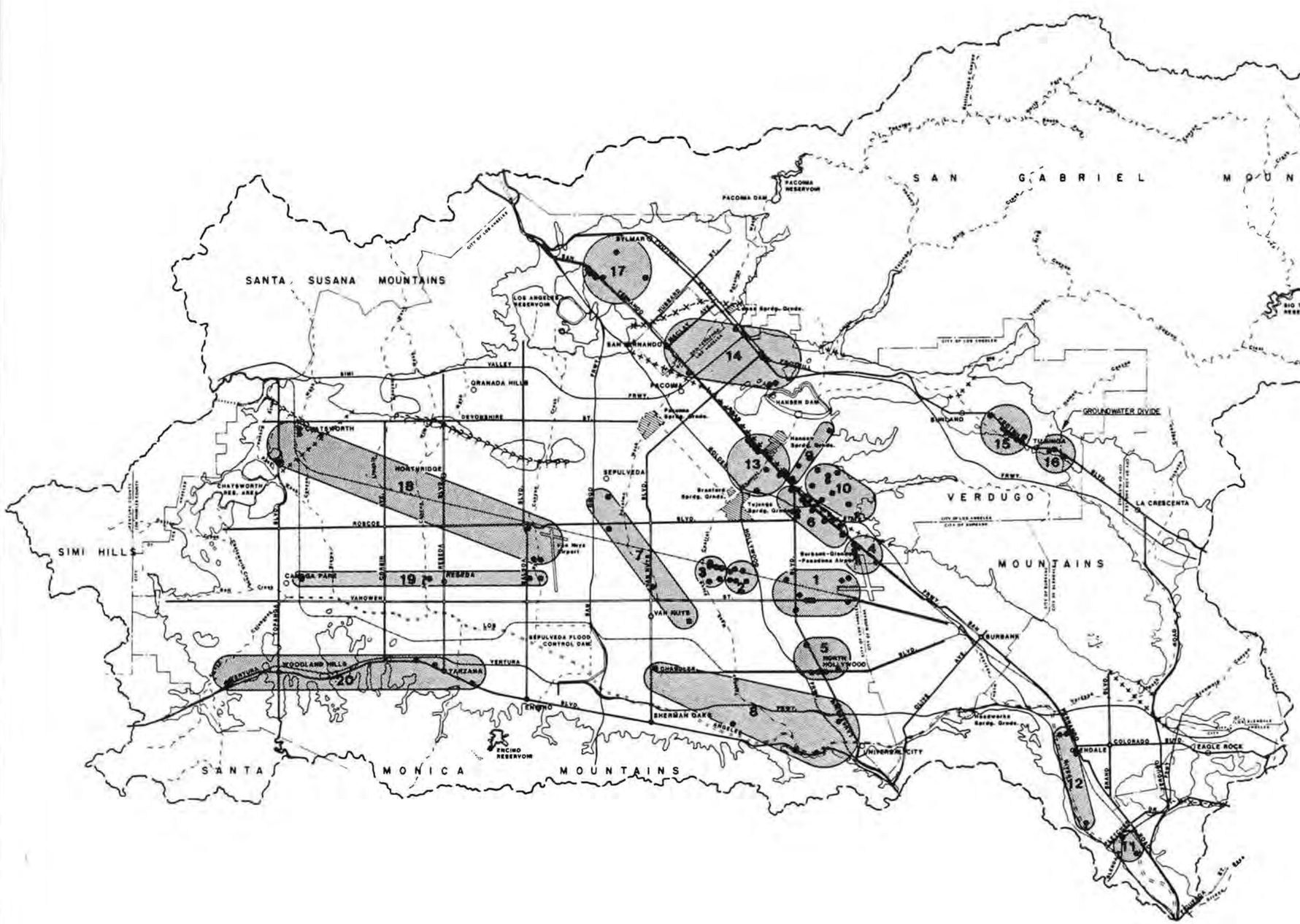
A. CRYSTAL SPRINGS (L.A.)
B. ERWIN (L.A.)
C. HEADWORKS (L.A.)
D. MISSION (L.A.)
E. NORTH HOLLYWOOD (L.A.)
F. POLLOCK (L.A.)
G. RINALDI-TOLUCA (L.A.)
H. VERDUGO (L.A.)
I. WHITNALL (L.A.)
J. CITY OF BURBANK
K. CRESCENTA VALLEY WATER DISTRICT
L. CITY OF GLENDALE (GLORIETTA)
M. CITY OF GLENDALE (GRANDVIEW)
N. CITY OF SAN FERNANDO

ESTIMATED DIRECTIONS AND VELOCITIES OF GROUNDWATER FLOW

PLATE 10

MRG 3/89

PLATE 11



ULARA WATERMASTER

UPPER LOS ANGELES RIVER AREA
CITY OF LOS ANGELES - BUREAU OF ENGINEERING
SEWER CONSTRUCTION PROGRAM
1984 - 1991

SCALE

0 2,000 6,000 12,000 18,000

FEET

LEGEND

- E-E-E-E IMPEDIMENTS TO GROUNDWATER FLOW
- + + + + GROUNDWATER CASCADES
- ?-?-?-? QUESTIONABLE IMPEDIMENT OR GROUNDWATER CASCADE
- ● PROPOSED SEWER CONSTRUCTION AND PROJECT NUMBER

APPENDIX E

POLICIES AND PROCEDURES GUIDELINES

NON-PARTY PUMPING - PHYSICAL SOLUTION

POLICIES AND PROCEDURES GUIDELINES
Non-Party Pumping - Physical Solution

ULARA WATERMASTER

I. Types of Physical Solution Pumping by Non-Parties

A. Dewatering for structure protection

B. Pumping for aquifer cleanup

C. Pumping of groundwater - special needs

II. ULARA Policies and Procedures

A. Section 2.5 - Pumping for clean-up by non-parties

B. Section 2.6 - Other Pumping by non-parties

C Guidelines for groundwater pumping

1. Application letter - (contact person; needs for pumping; location of wells; planned use and disposal) approval by Watermaster required

2. Groundwater pumped must be metered and monthly report made to Watermaster

3. Groundwater consumptively used - agreement needed with the city wherein the pumping occurs

4. California Regional Water Quality Control Board (CRWQCB) - approval by CRWQCB as to the potential occurrence of groundwater contaminants

III. Payment for Pumped Physical Solution Water - Dewatering for structure protection, pumping for aquifer clean-up, and special needs (non-party)

A. Non-consumptive use pumping: (spreading or re-injection); no payment is required.

B. Consumptive use pumping, discharged to the storm drain system: cost for the water is the actual cost to Los Angeles for purchasing replacement water from MWD less the average power cost for extraction of groundwater from the San Fernando Basin.

C. Consumptive use pumping - used on site: cost for the water is what would have been paid had the water been delivered from the Los Angeles distribution system, less the average energy cost for extraction of groundwater by Los Angeles from the San Fernando Basin.

VI. ULARA Watermaster notification of need to pump for clean-up

A. When a clean-up and abatement order has been issued to a non-party by the California Regional Water Quality Control Board, Los Angeles Region, contacting the ULARA Watermaster is included as one of the requirements.

V. ULARA Watermaster notification of permanent dewatering in the San Fernando Valley

A. Application for a Construction Permit from Los Angeles Department of Building and Safety

1. If a dewatering facility is part of the plans, the applicant must contact and receive clearance from the ULARA Watermaster's office before a construction permit is issued. The ULARA Watermaster's office can be contacted at (213) 481-6177 or (213) 481-6194.

2. ULARA Watermaster will provide the applicant (with copy to the Department of Building and Safety) with a written response saying that the project is not a water rights concern or an agreement with the City of Los Angeles Department of Water and Power (LADWP) for pumping is required.

3. The ULARA Watermaster will be sent a copy of the Department of Building and Safety's list of requirements for a permit.

B. Applicant of a project designed to discharge water to the storm drain system is required to apply to the California Regional Water Quality Control Board (CRWQCB) for an NPDES permit. The CRWQCB can be contacted at (213) 620-4460.

C. Issuance of Certificate of Occupancy (C of O)

If an agreement with the City of Los Angeles Department of Water and Power is required, a second letter from the LADWP or the Watermaster must provide to the applicant (with a copy to the Departement of Building and Safety) saying that an agreement has been reached between the parties, or the water rights concern has been removed, and the C of O can be released as it relates to water rights.