

EXHIBIT 12

PART 5

APPENDIX J

**DELIVERED WATER IN
UPPER LOS ANGELES RIVER AREA**

APPENDIX J

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APPENDIX J

DELIVERED WATER IN UPPER LOS ANGELES RIVER AREA

Delivered water consists of the amount of water utilized in a water supply distribution system. It is comprised of ground water extractions, surface water diversions, water imported into the area and rain and surface runoff which is captured by terminal distribution storage reservoirs. Gross delivered water is defined herein as the total of the foregoing items in contrast to net delivered water, which equals the gross reduced by the amount of water system losses and reservoir evaporation involved in delivering the water to its place of use. Gross and net amounts of delivered water and water system losses for the Upper Los Angeles River area and the valley fill area thereof are evaluated in Chapter V. This appendix deals mainly with determination of delivered water by water service area and contains detailed computations in support of Chapter V.

Water Service Areas

A major portion of the water delivered within the area of investigation is distributed by six agencies. The area served by these agencies includes land within the boundary of the valley fill as well as hill and mountain areas. The location and extent of these water service areas, the names of which appear below, are shown on Plate 19.

1. City of Burbank
2. City of Glendale
3. City of San Fernando

4. City of Los Angeles
 - a. Owens Service Area
 - b. Narrows Service Area
 - c. Mission Wells Service Area
 - d. Sunland-Tujunga Service Area
5. Crescenta Valley County Water District
6. La Canada Irrigation District

The place of use of 77 other entities, including individuals, corporations and small water companies extracting ground water, operating within and outside the major water service areas, is shown on Plate 20.

Available Data

The extent of data available concerning gross and net amounts of delivered water for the foregoing six agencies is shown in Table J-1. The amount of water delivered from private wells and small companies was obtained from field investigations by the Referee as detailed in Appendix I. Amounts of extractions and diversions by parties are described individually in Chapter V.

TABLE J-1

EXTENT OF DATA CONCERNING
GROSS AND NET DELIVERED WATER

Service area	Total gross: 10-1-28 to 9-30-58	Total net: 10-1-28 to 9-30-58	Metered sales			
			Residential	Commercial	Industrial	Irrigation
City of Los Angeles west of Burbank	10-1-28 to 9-30-58	10-1-28 to 9-30-58	10-1-28 to 9-30-58	10-1-28 to 9-30-58	a	10-1-28 to 9-30-58
Owens	10-1-28 to 9-30-58	---	---	---	---	---
Mission Wells	10-1-28 to 9-30-58	---	---	---	---	---
Sunland-Tujunga	1-1-31 to 9-30-58	---	---	---	---	---
Narrows ^b	10-1-28 to 9-30-58	---	---	---	---	---
City of Burbank	10-1-28 to 9-30-58	10-1-28 to 9-30-58	10-1-36 to 9-30-58	10-1-36 to 9-30-58	10-1-36 to 9-30-58	10-1-36 to 9-30-58
City of Glendale	10-1-28 to 9-30-58	10-1-28 to 9-30-58	---	---	---	---
City of San Fernando ^c	10-1-28 to 9-30-58	---	---	---	---	---
Crescenta Valley County Water District	10-1-55 to 9-30-58	1-1-36 to 9-30-58	---	---	---	---
La Canada Irrigation District	---	10-1-28 to 2-28-41	---	---	---	---
	---	1-1-43 to 9-30-58	---	---	---	---

a. Included with commercial.

b. Estimated.

c. Partially estimated.

Gross Delivered Water

The gross delivered water shown in Table 20, page 138 is the sum total of the amounts of ground water extractions, surface water diversions, imported waters that remain in the basin, annual fluctuation in terminal storage, rain on reservoirs and runoff into reservoirs that is available for use. The gross delivered water by service areas was determined for each of the service areas in the area of investigation. Service areas located solely outside the valley fill as delineated on Plate 2 are not included herein; however, extractions and diversions by individuals and companies in these areas are listed in Chapter V.

Within a service area, gross delivered water is defined herein as the water produced from within the service area by pumpage or surface diversion plus water entering the service area derived from imported supplies, less any waters transferred out of the service area. Annual amounts of gross deliveries by service areas, derived from information contained in Appendix M and Chapter V, are listed in Table J-3. The summation of the gross amounts of water for the Owens water service area is equal to the sum of the various supplies less water transferred out of the service area and is itemized as follows:

1. Water extracted by the City of Los Angeles measured at the wells within the Owens service area of the City of Los Angeles.
2. Owens River water imported by the City of Los Angeles measured near its point of entry into the service area.

3. Water extracted by private wells and small water companies in the area.

Less the sum of:

1. Ground water transferred out of the service area by the City of Los Angeles and others.

2. Owens River water transferred out of the service area by the City of Los Angeles.

Gross Available for Distribution

The gross water available for distribution differs from the gross delivered water by the amount of evaporation which takes place at San Fernando, Chatsworth and Encino Reservoirs. The City of Los Angeles water system is the only system which has an appreciable amount of reservoir evaporation. To obtain a uniform delivered water value for each service area and to put the values of each service area on a par with each other, the gross available for distribution was adapted for this purpose. With the exception of the Owens service area of the City of Los Angeles the gross delivered water is equal to the gross available for distribution.

Net Delivered Water

Net delivered water is defined herein as the amount of deliveries which are ultimately applied to the culture within the area. This amount of water is delivered to the consumers or inhabitants and is disposed of through consumptive use, deep percolation, sewage or waste. Net deliveries have been primarily evaluated from the amounts of metered water sales to

individual consumers when water is transported to the consumer through a distribution system, as in a municipal water system. However, where the system is not extensive, such as an individual well or small company, the gross delivered amount is utilized since in these instances the water system losses are minor.

Water System Losses

The difference between the gross available for distribution and the sum of net amounts of delivered water, import spread and operational spills, are defined as water system losses. These losses are made up of meter slippage, leaks and breaks in water mains and unmetered water for municipal uses such as construction, sewer flushing and fire protection.

As noted in Table J-1, only the Cities of Burbank and Glendale water service areas and the City of Los Angeles west of Burbank have records of metered water sales throughout the base period. The remainder of the water service areas have only a limited number of years when the amount of net delivered water is available. For periods in which the net delivered water is not measured, an estimate was made based on the gross delivered and the average water system losses for the period of available records.

The water system loss for the entire City of Los Angeles has been computed by the City of Los Angeles, Department of Water and Power, Water Control Section. These values are available only from 1950 through 1959. The average water system losses so determined during this period were 6.1 percent. The water system losses for the four water service areas of the city in the investigation area were computed utilizing the percent

loss for the entire city for the period of known record and the average percentage loss for period of no record.

The water system losses have been expressed herein as a percent of the gross delivered water. The annual water system losses for the various water service areas varied from 0 to 25 percent. The mean water system losses for these areas with the number of years of data for which the percent losses could be computed are shown on Table J-2.

TABLE J-2
MEAN WATER SYSTEM LOSSES

Service area	Mean percent loss for period of record	Period of data, years	Mean percent loss for period 1949-58
City of Burbank	7.0	30	5.5
City of Glendale	12.5	30	18.6
City of San Fernando	11.5	16	a
City of Los Angeles ^b	6.1	9	6.1
Crescenta Valley County Water District	13.0	3	a
La Canada Irrigation District	12.7	15	a

a. Incomplete data during the period.

b. Includes all service areas within entire City of Los Angeles.

For small or private water systems where the place of use is small and adjacent to the well or point of diversion the water system losses have been considered as negligible.

Delivered Water by Water Service Areas

Tables J-3, J-4 and J-5 are compilations of the gross and net delivered water and the estimated water system losses for nine major water service areas including a breakdown of the City of Los Angeles into its four component service areas within the Upper Los Angeles River area.

Table J-3 shows the amount of water delivered to the water service areas encompassing the combined San Fernando-Eagle Rock Hydrologic Subareas. Tables J-4 and J-5 list similar information for the Sylmar and Verdugo Hydrologic Subareas. The determination of the gross and net delivered water and the water system losses in each water service area was compiled from the available data shown in Table J-1 unless otherwise noted. The general equation for determining the three categories is as follows:

$$\begin{array}{l} \text{gross delivered water or gross available for} \\ \text{distribution} = \text{net delivered} + \text{water system losses} \end{array}$$

The method used to determine the gross and net delivered water and the water system losses for each water service area is tabulated in Table J-6. With the exception of the Owens water service area, the gross delivered water is equal to the sum of the net delivered water plus the water system losses. In the Owens water service area gross delivered water is equal to the sum of net delivered water, spread water, spilled water, water system losses and reservoir evaporation. The various items entering into the delivered water and water system losses in the Owens water service area are discussed in Appendix M.

TABLE J-3
DELIVERED WATER
IN SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS AND TRIBUTARY AREAS
In Acre-Feet

Year	City of Los Angeles													
	Owens Water Service Area									Mission Hills Water Service Area				
	Gross			Net			Spread Owens	Spilled Owens	Water system Losses	Gross				
	Owens	Ground water	Total	Owens	Ground water	Total				Owens	Ground water	Total		
1926-29	101,990	5,990	107,980	89,490	5,990	95,480	590	8,250	2,680	2,160				2,160
29-30	109,800	5,350	115,150	92,820	5,350	98,180	0	11,460	4,550	2,080				2,080
1930-31	115,280	5,160	120,440	89,190	5,160	94,350	7,280	4,680	13,000	1,500				1,500
31-32	122,330	5,950	128,280	68,010	5,950	73,960	31,740	3,250	15,380	1,110				1,170
32-33	115,220	6,500	121,720	71,070	6,500	77,570	33,430	1,920	7,660	560				560
33-34	101,970	6,080	108,050	76,380	6,080	82,460	20,860	2,010	1,020	1,270				1,270
34-35	100,690	6,470	107,160	68,320	6,470	74,790	30,800	490	560	2,040				2,040
1935-36	120,830	6,610	127,440	89,440	6,610	96,050	22,720	560	6,500	2,260				2,260
36-37	95,880	6,260	102,140	80,500	6,260	86,760	9,310	1,920	990	2,010				2,010
37-38	90,680	6,980	97,660	70,680	6,980	77,660	7,320	1,760	4,190	2,380				2,380
38-39	101,270	7,460	108,730	77,480	7,460	84,940	14,910	3,420	3,070	2,270				2,270
39-40	83,250	6,990	90,240	68,740	6,990	75,730	3,410	760	8,690	2,220				2,220
1940-41	75,050	5,410	80,460	63,590	5,410	69,000	3,450	0	1,130	2,700				2,700
41-42	114,840	5,900	120,740	83,270	5,900	89,170	11,290	6,270	12,490	2,430				2,430
42-43	125,620	5,020	130,640	92,200	5,020	97,220	12,130	8,700	8,820	2,230				2,230
43-44	108,340	5,370	113,710	89,690	5,370	95,060	3,190	2,660	9,210	2,500				2,500
44-45	113,150	5,720	118,870	95,470	5,720	101,190	0	1,310	14,860	2,540				2,540
1945-46	123,670	4,990	128,660	103,240	4,990	108,230	0	7,870	11,420	2,900				2,900
46-47	129,180	3,690	132,870	105,210	3,690	108,900	1,690	7,680	13,360	2,990				2,990
47-48	136,620	3,650	140,270	115,230	3,650	118,880	0	2,940	17,880	2,900				2,900
48-49	135,970	3,300	139,270	119,930	3,300	123,230	0	1,460	13,970	2,540				2,540
49-50	134,740	3,210	137,950	115,730	3,210	118,940	760	1,340	15,970	2,460				2,460
1950-51	154,710	2,640	157,350	129,420	2,640	132,060	2,350	3,940	18,220	2,170	430			2,600
51-52	136,580	3,330	140,910	115,570	3,330	118,900	7,880	2,830	8,800	2,320	0			2,320
52-53	152,840	3,400	156,240	129,830	3,400	133,230	0	5,410	16,530	2,440	650			3,090
53-54	148,820	3,710	152,530	126,600	3,710	130,310	0	3,180	17,910	2,160	510			2,670
54-55	147,920	3,810	151,730	122,810	3,810	126,620	0	7,860	16,160	2,190	650			2,840
1955-56	144,720	3,580	148,300	124,520	3,580	128,100	1,610	4,000	13,040	1,930	1,160			3,090
56-57	156,240	3,690	159,930	140,550	3,690	144,240	0	1,570	13,090	2,430	1,230			3,660
57-58	151,620	3,040	154,660	135,610	3,040	138,650	0	0	12,420	1,690	1,880			3,570

DELIVERED WATER
IN SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS AND TRIBUTARY AREAS
(continued)
In Acre-Feet

Year	City of Los Angeles										San Fernando Water Service Area									
	Mission Hills Water Service Area					San Fernando Water Service Area					San Fernando Water Service Area									
	Net		Water system losses		Total	Gross		Net		Total	Gross		Net		Total					
	Groundwater	Owens	Groundwater	Owens		Groundwater	Owens	Groundwater	Owens		Groundwater	Owens								
	Groundwater	Owens	Total	Groundwater	Owens	Total	Groundwater	Owens	Total	Groundwater	Owens	Total	Groundwater	Owens	Total					
1928-29	2,360		2,360	100		100	530		530	510		510	50		560					
29-30	2,000		2,000	80		80	590		590	570		570	50		620					
1930-31	1,440		1,440	60		60	650		650	620		620	50		670					
31-32	1,120		1,120	50		50	720		720	690		690	50		740					
32-33	530		530	30		30	730		730	700		700	50		750					
33-34	1,210		1,210	60		60	770		770	730		730	20		750					
34-35	1,940		1,940	100		100	640		640	610		610	20		630					
1935-36	2,110		2,110	120		120	720		720	680		680	20		700					
36-37	1,910		1,910	100		100	780		780	740		740	20		760					
37-38	2,250		2,250	130		130	950		950	900		900	20		920					
38-39	2,140		2,140	130		130	1,010		1,010	950		950	20		970					
39-40	2,090		2,090	130		130	990		990	930		930	20		950					
1940-41	2,540		2,540	160		160	970		970	910		910	20		930					
41-42	2,280		2,280	150		150	1,140		1,140	1,070		1,070	20		1,090					
42-43	2,100		2,100	130		130	1,120		1,120	1,030		1,030	20		1,050					
43-44	2,350		2,350	150		150	1,170		1,170	1,080		1,080	20		1,100					
44-45	2,360		2,360	180		180	1,550		1,550	1,460		1,460	20		1,480					
1945-46	2,730		2,730	170		170	1,880		1,880	1,770		1,770	20		1,790					
46-47	2,840		2,840	150		150	1,900		1,900	1,800		1,800	20		1,820					
47-48	2,720		2,720	180		180	2,130		2,130	2,030		2,030	20		2,050					
48-49	2,360		2,360	180		180	2,140		2,140	2,040		2,040	20		2,060					
49-50	2,300		2,300	160		160	2,160		2,160	2,060		2,060	20		2,080					
1950-51	2,010	400	2,410	160	30	190	1,950	570	2,520	1,800	530	2,330	150	40	190					
51-52	2,140	0	2,140	180	0	180	1,910	380	2,280	1,790	350	2,140	150	30	180					
52-53	2,240	600	2,840	200	50	250	2,270	1,590	3,860	2,090	1,460	3,550	180	130	310					
53-54	2,000	170	2,170	160	40	200	2,160	1,340	3,500	2,000	1,240	3,240	160	100	260					
54-55	2,030	600	2,630	160	50	210	2,110	1,080	3,220	1,980	1,000	2,980	160	80	240					
1955-56	1,760	1,060	2,820	170	100	270	2,530	1,020	3,550	2,310	930	3,240	220	90	310					
56-57	2,220	1,120	3,340	210	110	320	2,500	1,080	3,580	2,280	990	3,270	220	90	310					
57-58	1,540	1,710	3,250	150	170	320	3,030	630	3,660	2,760	570	3,330	270	60	330					

TABLE J-3

DELIVERED WATER
IN SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS AND TRIBUTARY AREAS
(continued)

In Acre-Feet

Year	CITY OF LOS ANGELES HARBOR WATER SERVICE AREA										Water system losses			
	GROSS					Net					Ground		Other	
	water	M.W.D.	OWNS	water	Total	water	M.W.D.	OWNS	water	Total	water	Total	water	losses
1928-29	8,160			2,430	10,590	7,900			2,430	10,330	260			260
29-30	8,200			2,890	11,090	7,940			2,890	10,830	260			260
1930-31	9,460			2,740	12,200	9,160			2,740	11,900	300			300
31-32	8,870			2,260	11,130	8,580			2,260	10,840	290			290
32-33	8,860			2,360	11,220	8,560			2,360	10,920	300			300
33-34	9,080			2,790	11,870	8,760			2,790	11,550	320			320
34-35	8,120			2,890	11,010	7,820			2,890	10,710	300			300
1935-36	8,600			2,820	11,420	8,290			2,820	11,110	310			310
36-37	9,430			2,780	12,210	9,100			2,780	11,880	330			330
37-38	10,410			2,530	12,940	10,040			2,530	12,570	370			370
38-39	11,580			2,430	14,010	11,160			2,430	13,590	420			420
39-40	11,020			2,670	13,690	10,600			2,670	13,270	420			420
1940-41	10,320			2,670	12,990	9,900			2,670	12,570	420			420
41-42	11,340			2,450	13,790	10,830			2,450	13,280	510			510
42-43	11,590			2,800	14,390	11,080			2,800	13,880	510			510
43-44	11,660			2,790	14,250	10,940			2,790	13,730	520			520
44-45	11,760	150		2,810	14,720	11,130	140		2,810	14,080	630	10		640
1945-46	13,430	870		3,280	17,580	12,890	820		3,280	16,990	590	50		590
46-47	13,860	1,270		3,420	18,510	13,400	1,210		3,420	17,020	460	60		520
47-48	12,400	1,330		3,100	17,130	12,830	1,250		3,100	16,480	570	80		650
48-49	12,650	1,340		3,500	17,490	12,000	1,250		3,500	16,750	650	90		740
49-50	12,300	1,800	1,300	3,440	17,520	11,720	1,450	1,220	3,440	16,830	580	30	80	690
50-51	11,660	660	2,160	3,370	17,850	11,050	610	2,000	3,370	17,030	610	50	160	820
51-52	10,630	890	2,460	3,470	17,430	10,020	820	2,270	3,470	16,580	590	70	190	850
52-53	11,340	1,180	2,170	3,360	18,150	10,660	1,080	2,090	3,360	17,190	680	100	180	960
53-54	8,440	1,500	1,520	3,310	17,770	8,030	1,170	1,410	3,310	16,920	410	330	110	850
54-55	5,740	6,530	1,590	3,260	17,120	5,520	6,050	1,470	3,260	16,300	220	480	120	820
1955-56	6,350	5,190	1,770	3,360	16,670	6,010	4,740	1,620	3,360	15,730	340	450	150	940
56-57	5,600	6,370	2,250	3,580	17,800	5,350	5,820	2,050	3,580	16,800	250	550	200	1,000
57-58	3,170	7,050	2,540	3,010	15,770	3,080	6,420	2,310	3,010	14,820	90	630	230	950

DELIVERED WATER
IN SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS AND TRIBUTARY AREAS
(continued)

In Acre-Feet

Year	CITY OF GLENDALE WATER SERVICE AREA										City of San Fernando Water Service Area			
	GROSS					Net					Ground		Other	
	water	M.W.D.	OWNS	water	Total	water	M.W.D.	OWNS	water	Total	water	Total	water	losses
1928-29	8,110		220	8,360	7,560	220	7,780	580		580	1,000	1,000	880	120
29-30	9,140		260	9,400	8,140	260	8,400	1,000		1,000	1,030	1,030	910	120
1930-31	9,660		280	9,940	8,460	280	8,740	1,200		1,200	1,070	1,070	940	130
31-32	8,850		280	9,130	7,480	280	7,760	1,370		1,370	1,080	1,080	950	130
32-33	8,660		280	8,940	7,400	280	7,680	1,260		1,260	1,160	1,160	1,010	150
33-34	9,100		250	9,350	7,830	250	8,080	1,270		1,270	1,200	1,200	1,030	170
34-35	7,940		210	8,150	7,000	210	7,210	940		940	1,100	1,100	950	150
1935-36	9,280		260	9,540	8,120	260	8,380	1,160		1,160	1,300	1,300	1,150	150
36-37	9,130		230	9,360	8,310	230	8,540	820		820	1,310	1,310	1,130	180
37-38	9,730		260	9,990	8,740	260	9,000	990		990	1,280	1,280	1,110	170
38-39	10,790		270	11,060	9,770	270	10,040	1,020		1,020	1,400	1,400	1,200	200
39-40	10,740		260	11,000	9,770	260	10,030	970		970	1,390	1,390	1,240	150
1940-41	10,640		270	10,910	9,760	270	10,030	880		880	1,380	1,380	1,210	170
41-42	11,550		280	11,830	10,590	280	10,870	960		960	1,590	1,590	1,350	240
42-43	12,520		310	12,830	11,640	310	11,950	880		880	1,700	1,700	1,470	230
43-44	12,810		280	13,090	12,110	280	12,390	700		700	1,630	1,630	1,440	190
44-45	13,360		300	13,660	12,350	300	12,650	1,010		1,010	1,700	1,700	1,570	130
1945-46	15,170	270	330	15,770	13,670	240	13,240	1,500	30	1,530	1,790	1,790	1,640	150
46-47	16,300	1,000	420	17,720	15,940	870	15,230	2,160	130	2,290	1,880	1,880	1,660	220
47-48	17,800	510	420	18,730	16,900	420	15,740	2,900	80	2,980	2,160	2,160	1,910	250
48-49	18,590	60	470	19,120	15,240	50	15,760	2,350	10	3,360	2,290	2,290	2,140	150
49-50	16,030	270	450	16,750	13,770	230	14,450	2,260	40	2,300	2,240	2,240	2,010	230
1950-51	16,460	920	400	17,780	14,010	780	15,190	2,470	140	2,610	2,230	2,230	2,010	220
51-52	15,400	1,230	370	17,000	13,240	1,060	14,700	2,120	170	2,290	2,110	2,110	1,950	160
52-53	17,680	1,080	330	19,030	14,540	890	15,760	3,080	190	3,270	1,800	1,800	1,590	210
53-54	17,590	1,550	310	19,450	14,340	1,270	15,920	2,250	280	3,530	1,760	1,760	1,560	200
54-55	19,630	780	300	20,710	14,700	580	15,580	4,970	200	5,170	2,160	2,160	1,910	250
1955-56	17,790	1,960	330	20,080	13,550	1,500	15,380	4,240	460	4,700	2,730	2,730	2,410	320
56-57	19,910	2,050	390	22,350	15,010	1,550	16,950	4,900	500	5,400	2,320	2,320	2,060	260
57-58	15,390	1,260	320	16,970	13,160	1,080	14,560	2,230	180	2,410	2,580	2,580	2,280	300

TABLE I-5

DELIVERED WATER
IN SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS AND TRIBUTARY AREAS
(continued)

In Acre-Feet

Year	City of Burbank Service Area				City of Glendale Service Area				Water Section 100000			
	Ground water ^a	M.W.D. ^b	Ground water ^c	Total	Ground water ^d	M.W.D. ^e	Ground water ^f	Total	Ground water ^g	M.W.D. ^h	Ground water ⁱ	Total
1928-29	2,560		790	3,350	2,380		790	3,170	180			180
29-30	2,900		810	3,710	2,540		810	3,350	360			360
1930-31	2,810		820	3,630	2,550		810	3,360	260			260
31-32	2,460		810	3,270	2,280		810	3,090	180			180
32-33	2,510		810	3,320	2,310		810	3,120	200			200
33-34	2,820		950	3,770	2,580		950	3,530	240			240
34-35	2,740		790	3,530	2,490		790	3,280	250			250
1935-36	3,030		750	3,780	2,730		750	3,480	300			300
36-37	3,140		980	4,120	2,940		980	3,920	200			200
37-38	3,840		1,250	5,090	3,520		1,250	4,770	320			320
38-39	5,380		1,280	6,660	4,800		1,280	6,080	580			580
39-40	6,250	70	1,560	7,880	5,710	60	1,560	7,330	540	10		550
1940-41	7,420	250	1,480	9,150	7,040	240	1,480	8,760	380	10		390
41-42	10,220	420	1,370	12,010	9,590	390	1,370	11,350	630	30		660
42-43	11,570	1,200	1,520	14,290	10,890	1,150	1,520	13,560	680	50		730
43-44	12,710	710	1,470	14,890	12,140	680	1,470	14,290	570	30		600
44-45	13,740	610	1,560	15,910	12,930	570	1,560	15,060	810	40		850
1945-46	13,590	1,070	1,680	16,340	12,710	1,000	1,680	15,390	880	70		950
46-47	13,220	2,200	1,680	17,100	12,590	2,090	1,680	16,360	630	110		740
47-48	15,730	700	1,690	18,120	13,860	620	1,690	16,170	1,870	80		1,950
48-49	16,050	330	1,840	18,220	15,130	320	1,840	17,290	720	10		730
49-50	16,340	210	1,950	18,500	15,650	200	1,950	17,800	690	10		700
1950-51	17,760	840	1,920	20,520	16,680	790	1,920	19,390	1,080	50		1,130
51-52	18,020	1,660	2,250	21,930	17,080	1,570	2,250	20,900	940	90		1,030
52-53	19,900	2,570	2,530	25,000	18,010	2,330	2,530	22,870	1,890	240		2,130
53-54	20,780	2,430	2,660	25,870	19,930	2,330	2,660	24,920	850	100		950
54-55	21,520	1,430	2,630	25,580	20,290	1,350	2,630	24,270	1,230	80		1,310
1955-56	20,760	1,700	2,370	24,830	19,800	1,620	2,370	23,790	960	80		1,040
56-57	20,670	3,070	2,090	25,830	19,780	2,940	2,090	24,810	890	130		1,020
57-58	19,050	3,320	2,470	24,840	18,040	3,140	2,470	23,650	1,010	180		1,190

- a. Extracted by City of Los Angeles.
b. Extracted by other than City of Los Angeles.
c. Extracted by City of Burbank.
d. Extracted by other than City of Burbank.
e. Extracted by City of Glendale.
f. Extracted by other than City of Glendale.
g. Extracted by City of San Fernando.

Note: Minor amounts of surface water diversions are included under the columns entitled ground water.

Year	Outside major service area	
	Ground water	Wet
1928-29	300	300
29-30	300	300
1930-31	300	300
31-32	300	300
32-33	300	300
33-34	450	450
34-35	390	390
1935-36	350	350
36-37	330	330
37-38	370	370
38-39	400	400
39-40	510	510
1940-41	430	430
41-42	570	570
42-43	490	490
43-44	580	580
44-45	940	940
1945-46	1,010	1,010
46-47	980	980
47-48	960	960
48-49	980	980
49-50	990	990
1950-51	1,070	1,070
51-52	1,080	1,080
52-53	1,130	1,130
53-54	1,130	1,130
54-55	420	420
1955-56	640	640
56-57	880	880
57-58	1,050	1,050

TABLE J-4
DELIVERED WATER
IN SYLMAR HYDROLOGIC SUBAREA AND TRIBUTARY AREAS

In Acre-Feet

Year	Owens Water Service Area						Water system losses	City of San Fernando Water Service Area						Water system losses
	Gross			Net				Gross			Net			
	Owens	Ground water ^a	Total	Owens	Ground water ^a	Total		Owens	Ground water ^a	Total	Owens	Ground water ^a	Total	
1928-29	3,760	1,270	5,030	3,610	1,270	4,880	150	100	70	170	90	70	160	10
29-30	3,210	1,270	4,480	3,080	1,270	4,350	130	110	70	180	100	70	170	10
1930-31	3,010	1,270	4,280	2,880	1,270	4,150	130	110	70	180	100	70	170	10
31-32	2,490	1,270	3,760	2,380	1,270	3,650	110	110	70	180	100	70	170	10
32-33	3,390	1,140	4,530	3,230	1,140	4,370	160	120	70	190	110	70	180	10
33-34	2,980	1,350	4,330	2,840	1,350	4,190	140	120	70	190	100	70	170	20
34-35	2,960	1,100	4,060	2,810	1,100	3,910	150	110	70	180	90	70	160	20
1935-36	4,080	960	5,040	3,870	960	4,830	210	140	70	210	120	70	190	20
36-37	3,390	1,130	4,520	3,210	1,130	4,340	180	140	80	220	120	80	200	20
37-38	2,570	1,670	4,240	2,430	1,670	4,100	140	130	80	210	110	80	190	20
38-39	3,680	1,640	5,320	3,510	1,640	5,150	170	150	80	230	130	80	210	20
39-40	2,680	1,590	4,270	2,520	1,590	4,110	160	140	80	220	120	80	200	20
1940-41	2,800	1,710	4,510	2,630	1,710	4,340	170	140	50	190	120	50	170	20
41-42	3,590	1,800	5,390	3,370	1,800	5,170	220	160	50	210	140	50	190	20
42-43	4,380	1,730	6,110	4,120	1,730	5,850	160	180	50	230	160	50	210	20
43-44	4,530	1,720	6,250	4,260	1,720	5,980	270	170	50	220	150	50	200	20
44-45	4,790	1,690	6,480	4,450	1,690	6,140	340	180	50	230	170	50	220	10
1945-46	5,290	1,710	7,000	4,980	1,710	6,690	310	190	50	240	170	50	220	20
46-47	6,160	1,650	7,810	5,850	1,650	7,500	310	200	50	250	180	50	230	20
47-48	6,500	1,650	8,150	6,100	1,650	7,750	100	220	50	270	200	50	250	20
48-49	6,110	1,690	7,800	5,960	1,690	7,650	450	240	50	290	220	50	270	20
49-50	5,750	1,590	7,340	5,380	1,590	6,970	370	230	50	280	210	50	260	20
1950-51	5,990	1,610	7,600	5,540	1,610	7,150	450	230	0	230	210	0	210	20
51-52	5,120	1,310	6,430	4,730	1,310	6,040	390	220	0	220	200	0	200	20
52-53	6,150	1,060	7,210	5,650	1,060	6,710	500	190	0	190	170	0	170	20
53-54	5,350	1,060	6,410	4,950	1,060	6,010	400	180	0	180	160	0	160	20
54-55	5,650	1,060	6,710	5,230	1,060	6,290	420	220	0	220	200	0	200	20
1955-56	5,160	1,040	6,200	5,000	1,040	6,040	480	280	0	280	250	0	250	30
56-57	6,530	1,030	7,560	5,960	1,030	6,990	570	240	0	240	210	0	210	30
57-58	5,620	930	6,550	5,120	930	6,050	500	270	0	270	240	0	240	30

Notes: Minor amounts of surface water diversions are included under the columns entitled "ground water".

- a. Extracted by Defendants and nonparties. Includes total amounts extracted by Defendants Numbers 141 and 181 who are partially outside the service area.
- b. Extracted by City of San Fernando.
- c. Extracted by other than City of San Fernando.

TABLE J-5
DELIVERED WATER
IN VERDUGO HYDROLOGIC SUBAREA AND TRIBUTARY AREAS
In Acre-Feet

Year	Crescenta Valley Water District Service Area						Water system losses					
	Gross			Net			Gross			Net		
	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total
1928-29	750		750	650		650	650	100	100			
29-30	750		750	650		650	650	100	100			
1930-31	750		750	650		650	650	100	100			
31-32	710		710	620		620	620	90	90			
32-33	730		730	640		640	640	90	90			
33-34	890		890	770		770	770	120	120			
34-35	660		660	570		570	570	90	90			
1935-36	640		640	560		560	560	80	80			
36-37	690		690	600		600	600	90	90			
37-38	750		750	650		650	650	100	100			
38-39	800		800	700		700	700	100	100			
39-40	850		850	740		740	740	110	110			
1940-41	790		790	690		690	690	100	100			
41-42	1,020		1,020	890		890	890	130	130			
42-43	940		940	820		820	820	120	120			
43-44	1,110		1,110	970		970	1,000	140	140			
44-45	1,040		1,040	900		900	920	140	140			
1945-46	1,360		1,360	1,180		1,180	1,200	180	180			
46-47	1,640		1,640	1,430		1,430	1,450	210	210			
47-48	2,210		2,210	1,920		1,920	1,940	290	290			
48-49	1,900		1,900	1,650		1,650	1,670	250	250			
49-50	2,000		2,000	1,740		1,740	1,760	260	260			
1950-51	2,210		2,210	1,920		1,920	1,940	290	290			
51-52	2,400		2,400	2,090		2,090	2,110	310	310			
52-53	2,760		2,760	2,400		2,400	2,420	360	360			
53-54	2,960		2,960	2,580		2,580	2,600	380	380			
54-55	2,340	490	2,830	2,030	430	2,460	2,480	310	60	370		
1955-56	2,250	890	3,140	1,940	770	2,710	2,720	310	120	1,30		
56-57	2,290	1,010	3,300	2,020	890	2,910	2,930	270	120	390		
57-58	2,670	620	3,290	2,310	540	2,850	2,860	360	80	440		

DELIVERED WATER
IN VERDUGO HYDROLOGIC SUBAREA AND TRIBUTARY AREAS
(continued)

In Acre-Feet

Year	City of Glendale Water Service Area						La Canada Irrigation District Water Service Area					
	Gross			Net			Gross			Net		
	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total	Ground waters	N.W.D. waters	Total
1928-29	500		500	460	40	500	460	120	120	20		20
29-30	570		570	510	60	570	510	130	130	20		20
1930-31	630		630	550	80	630	550	130	130	20		20
31-32	640		640	540	100	640	540	120	120	20		20
32-33	710		710	610	100	710	610	130	130	20		20
33-34	940		940	810	130	940	810	130	130	20		20
34-35	930		930	820	110	930	820	110	110	10		10
1935-36	990		990	870	120	990	870	160	160	20		20
36-37	1,130		1,130	1,030	100	1,130	1,030	160	160	20		20
37-38	1,180		1,180	1,060	120	1,180	1,060	180	180	30		30
38-39	1,250		1,250	1,130	120	1,250	1,130	210	210	20		20
39-40	1,430		1,430	1,300	130	1,430	1,300	200	200	170		170
1940-41	1,350		1,350	1,240	110	1,350	1,240	210	210	180		180
41-42	1,560		1,560	1,430	130	1,560	1,430	240	240	210		210
42-43	1,700		1,700	1,580	120	1,700	1,580	280	280	240		240
43-44	1,700		1,700	1,610	90	1,700	1,610	290	290	250		250
44-45	1,800		1,800	1,660	140	1,800	1,660	270	270	230		230
1945-46	2,070		2,070	1,870	200	2,070	1,870	350	350	300		300
46-47	2,180		2,180	1,890	290	2,180	1,890	380	380	330		330
47-48	2,160		2,160	1,810	350	2,160	1,810	430	430	370		370
48-49	2,190		2,190	1,800	390	2,190	1,800	470	470	410		410
49-50	2,300		2,300	1,980	320	2,300	1,980	500	500	440		440
1950-51	2,490	70	2,560	2,140	60	2,200	370	10	380	470	80 ^f	550
51-52	2,090	80	2,170	2,030	70	2,100	330	10	340	540	30	570
52-53	2,810	80	2,890	2,410	60	2,470	510	20	530	610	110	720
53-54	3,340	150	3,490	2,810	120	2,930	640	30	670	640	120	790
54-55	3,460	60	3,520	2,690	40	2,730	910	20	930	450	280	730
1955-56	4,080	310	4,390	3,130	240	3,370	970	70	1,040	280	510	790
56-57	4,430	350	4,780	3,340	270	3,610	1,090	80	1,170	440	1,000	840
57-58	5,060	350	5,410	4,330	300	4,630	730	50	780	350	450	800

TABLE J-1

DELIVERED WATER
IN VERMILION HYDROLOGIC SUBAREA AND TRIBUTARY AREAS
(continued)

In Acre-Feet

Year	Sunland-Tulumba Water Service Area						Water system losses		
	GROSS			NET					
	Ground waters	Owens	Total	Ground waters	Owens	Total	Ground waters	Owens	Total
1928-29	70		70	70		70			
29-30	80		80	80		80			
1930-31	90		90	90		90			
31-32	100		100	100		100			
32-33	100		100	100		100			
33-34	110		110	100		100	10		10
34-35	90		90	90		90	0		0
1935-36	100		100	90		90	10		10
36-37	110		110	100		100	10		10
37-38	130		130	120		120	10		10
38-39	140		140	130		130	10		10
39-40	140		140	130		130	10		10
1940-41	130		130	120		120	10		10
41-42	160		160	150		150	10		10
42-43	190		190	180		180	10		10
43-44	200		200	190		190	10		10
44-45	210		210	200		200	10		10
1945-46	260		260	240		240	20		20
46-47	260		260	250		250	10		10
47-48	320		320	300		300	20		20
48-49	330		330	310		310	20		20
49-50	330		330	310		310	20		20
1950-51	270	80	350	250	70	320	20	10	30
51-52	270	50	320	250	50	300	20	0	20
52-53	310	220	530	280	200	480	30	20	50
53-54	290	180	470	270	170	440	20	10	30
54-55	290	150	440	270	140	410	20	10	30
1955-56	350	140	490	320	130	450	30	10	40
56-57	340	150	490	310	140	450	30	10	40
57-58	410	90	500	370	80	450	40	10	50

- a. Extracted by Crescenta Valley County Water District.
 b. Extracted by other than Crescenta Valley County Water District.
 c. Extracted by City of Glendale.
 d. Extracted by La Canada Irrigation District.
 e. Extracted by City of Los Angeles.
 f. Imported from Monk Hill Basin.

Note: Minor amounts of surface water diversions are included under the columns entitled ground water.

TABLE J-6
METHOD OF DETERMINING GROSS,
NET DELIVERED WATER AND WATER SYSTEM LOSSES

<u>Service area</u>	<u>Gross</u>	<u>Net</u>	<u>Water system losses</u>
Mission Wells	Extractions and measured Owens River water entering the service area.	Estimated by subtraction of water system losses.	Percent of the average annual water system losses for the City of Los Angeles
Sunland-Tujunga	Extractions, surface diversions and measured Owens River water entering the service area.	Estimated by subtraction of water system losses.	Percent of the average annual water system losses for the City of Los Angeles.
Owens	Owens River water remaining in service area plus change in reservoir storage, rain and surface runoff into reservoirs.	Measured metered sales for City of Los Angeles west of Burbank plus spilled and spread Owens River water less the net delivered to the Mission Wells and Sunland-Tujunga service areas.	Difference between gross available for distribution and net delivered plus spread and spilled Owens River water.
Harrows	Measured amounts of water entering the area from various City of Los Angeles reservoirs plus extractions from private wells.	Estimated as discussed in Appendix H.	Percent of the average annual water system losses for the City of Los Angeles.
Burbank	Ground water extractions by the city and private wells plus imports.	Measured metered sales.	Difference between gross and net delivered water.
Glendale	Ground water extractions by the city and private wells plus imports.	Measured metered sales	Difference between gross and net delivered water.
San Fernando	Ground water extractions by the city and private wells plus imports.	Partially measured and partially estimated.	Average percentage water system losses for years when the net delivered water is not measured.
Crescenta Valley County Water District	Ground water extractions by the District and private wells plus imports.	Partially measured and partially estimated.	Average percentage water system losses for years when the net delivered water is not measured.
La Canada Irrigation District	Ground water extractions by the District and private wells plus imports.	Partially measured and partially estimated.	Average percentage water system losses for years when the net delivered water is not measured.

Consumer's Use of Water

The net delivered water to the consumer may be divided into three groups:

1. Irrigation.
2. Domestic (including water used for irrigation of lawns and gardens in residential areas).
3. Commercial and industrial.

The City of Los Angeles tabulates its billings according to irrigation, domestic, commercial and industrial; however, the billings are based more on the type of electrical service supplied rather than on land use classifications utilized by the Referee.

Commercial billings include multiple dwellings where the water service is measured on a master meter and paid for by the landlord or proprietor. Such dwellings would be classified in the residential category in the Referee's culture survey and should be considered as such from a water use viewpoint.

The City of Los Angeles' industrial classification includes services supplying water to industrial plants which manufacture products from raw materials. The definition for industrial classification by the City of Los Angeles is more restrictive than the definition used by the Referee. Because of these differences in definition no distinction is made herein between commercial and industrial delivered water.

The City of Los Angeles west of Burbank is the only area where the records of the monthly amounts of water delivered for domestic,

irrigation and commercial classifications, compiled from billings, are available and complete throughout the base period.

Irrigation

The use of water for irrigation at the beginning of the base period constituted a major portion of the total net delivered water. With the increase in urbanization the use of water for irrigation diminished until today it represents only a small part of the net delivered water.

In 1928-29, the City of Los Angeles west of Burbank contained approximately 97 percent of the total irrigated crop acreage in the San Fernando and Sylmar Hydrologic Subareas. In 1957-58, it still contained 94 percent of the total acreage in irrigated crops even though the total acreage was greatly reduced. Water is supplied for irrigation in the area by the City of Los Angeles and by pumpage from private wells.

The total amount of irrigation water used in the San Fernando and Sylmar Hydrologic Subareas was determined as the sum of three parts. The first of these parts is the metered irrigation water delivered in the City of Burbank and in the portion of the City of Los Angeles west of Burbank. Second is the amounts of extractions from private wells used for the purpose of irrigation. The third part is irrigation water used in service areas in which irrigation water is not separately metered. In these areas the amounts were estimated based on the adjusted duty of water for each crop in the service area (see Table J-9, page J-27).

The adjusted duty of water for irrigated crops was derived from data compiled by Frank Carr, an employee of the Los Angeles Department of Water and Power. From 1925 through 1942, the acreage and amount of water delivered to the farmer's headgates were recorded by Mr. Carr for the City

of Los Angeles west of Burbank. His records, extending from 1927 through 1942, were utilized to obtain an average duty of water for various crops. The period from 1927 through 1942 was selected because the precipitation cycle during this period represented a more normal rainfall than the 1928 through 1942 period. The average monthly depth of application of irrigation water on crops determined by the use of the Frank Carr's data is shown below in Table J-7.

TABLE J-7
AVERAGE MONTHLY DEPTH OF APPLICATION
OF IRRIGATION WATER*

In Feet

Crop	Month								Total
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	
								through Sept.	
Deciduous	0.24	0.18	0.19	0.11	0.12	0.17	0.25	1.55	2.81
Citrus	0.32	0.29	0.22	0.18	0.17	0.19	0.24	1.81	3.42
Walnuts	0.24	0.30	0.26	0.16	0.14	0.19	0.24	1.58	3.11
Truck	0.34	0.26	0.20	0.21	0.22	0.25	0.31	2.09	3.88
Alfalfa and pasture	0.30	0.25	0.20	0.20	0.22	0.25	0.31	2.02	3.75
Vineyard	0.17	0.11	0.06	0.03	0.03	0.11	0.22	1.38	2.11

* Based on Frank Carr's monthly records of water delivered and acreage served.

The average monthly depths of irrigation water shown in Table J-7 were utilized to prorate the total available water used for irrigation to each crop irrigated in the San Fernando and Sylmar Hydrologic Subareas. The amount of water applied to each crop was then adjusted to an annual depth of irrigation water. The annual adjusted depth of irrigation water for each crop was further proportioned to the percentage of the total annual irrigation water delivered during each month from October through April and during the summer season from May through September.

The amount of irrigation water for each crop and each year in the base period was adjusted by the above method. Sample Calculation A for the year 1928-29 illustrates the method of distributing the available water between the various crops.

SAMPLE CALCULATION A

Adjustment of Delivered Irrigation Water
(Based on Frank Carr's Average Monthly Depth of
Application for San Fernando and Sylmar Hydrologic Subareas)
Year 1928-29

<u>Crop</u>	<u>Deciduous</u>	<u>Citrus</u>	<u>Walnuts</u>	<u>Truck</u>	<u>Alfalfa and pasture</u>	<u>Vineyard</u>	<u>Total</u>
Acreage, in acres	4,470	9,960	8,480	23,920	8,050	1,490	
Average annual depth of irrigation, in feet (from Table J-7)	2.81	3.42	3.11	3.88	3.75	2.11	
Calculated irrigation water, in acre-feet = (1) x (2)	12,560	34,060	26,370	92,810	30,190	3,140	199,130
Adjusted duty,* in feet	1.26	1.54	1.40	1.75	1.69	0.95	
Adjusted duty, in inches	15.1	18.5	16.8	21.0	20.3	11.4	

* Total irrigation water delivered to Owens Service Area by City
of Los Angeles = 89,090 acre-feet.

Adjustment factor = $\frac{89,090}{199,130} = 0.45$

$0.45 \times 2.81 = 1.26$ feet for deciduous

The adjusted monthly depths of applied irrigation water were computed as shown in Sample Calculation B and are compiled in Table J-8 for each crop and each year in the base period and 1957-58.

SAMPLE CALCULATION B

Monthly Distribution of Delivered Irrigation Water
City of Los Angeles West of Burbank

<u>Year 1928-29</u>	<u>Metered sales, in acre-feet</u>	<u>Percentage of^a annual delivery</u>	<u>Depth of irrigation^b for deciduous, in inches</u>	
October	5,662	6.8	1.0	
November	2,530	3.0	0.5	
December	601	0.7	0.1	
January	1,110	1.3	0.2	
February	168	0.2	0.1	
March	1,050	1.3	0.2	
April	3,540	4.3	0.6	
May	9,513	11.4)	82.4	12.4
June	11,925	14.3)		
July	19,015	22.9)		
August	18,137	21.8)		
September	<u>9,977</u>	<u>12.0)</u>		
TOTAL	83,228	100.0	15.1	

a. Monthly delivered water divided by annual delivered water.

b. Annual duty times percent of water delivered,
(i.e. $15.1 \times 6.8\% = 1.0$).

TABLE J-8
MONTHLY DEPTHS OF DELIVERED IRRIGATION WATER FOR IRRIGATED CROPS
In Acre-Inches per Gross Acre

Year	Deciduous										Citrus									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total
1928-29	1.0	0.5	0.1	0.2	0.1	0.2	0.6	2.6	12.4	15.1	1.3	0.6	0.1	0.2	0	0.2	0.8	3.2	15.2	18.4
29-30	1.1	0.8	0.6	0.2	0.1	0.1	0.5	3.4	11.4	14.8	1.4	1.1	0.7	0.3	0.1	0.1	0.6	4.3	13.7	18.0
1930-31	1.1	0.8	0.2	0.1	0	0.3	1.7	4.2	10.9	15.1	1.4	1.0	0.3	0.1	0	0.4	2.1	5.3	13.2	18.5
31-32	1.2	0.7	0	0	0	0.2	1.0	3.1	10.1	13.2	1.4	0.8	0	0	0	0.3	1.2	3.7	12.4	16.1
32-33	1.0	1.0	0.3	0.1	0	0.3	0.9	3.6	10.2	13.8	1.2	1.2	0.4	0.1	0.1	0.4	1.1	4.5	12.4	16.9
33-34	1.1	0.8	0.3	0	0.1	0.2	1.1	3.6	10.6	14.2	1.4	0.8	0.3	0.1	0.1	0.2	1.3	4.2	13.1	17.3
34-35	1.1	0.4	0	0	0.1	0.1	0.1	1.8	10.7	12.5	1.3	0.5	0	0	0.1	0.1	0.1	2.1	13.1	15.2
1935-36	1.0	0.5	0.4	0.3	0.2	0.7	0.3	3.4	12.0	15.4	1.2	0.6	0.5	0.3	0.2	1.0	0.4	4.2	14.6	18.8
36-37	1.0	0.7	0.4	0	0	0.1	0.3	2.5	11.3	13.8	1.2	0.8	0.5	0	0	0.1	0.4	3.0	13.7	16.7
37-38	1.2	0.8	0.3	0.1	0	0	0.4	2.8	10.6	13.4	1.4	1.0	0.4	0.1	0	0	0.5	3.4	13.0	16.4
38-39	1.1	0.8	0.5	0	0	0.1	0.6	3.1	11.9	15.0	1.4	1.1	0.6	0	0.1	0.2	0.8	4.2	14.3	18.5
39-40	0.4	0.7	0.5	0.1	0	0.2	0.3	2.2	11.1	13.3	0.5	1.0	0.7	0.1	0	0.2	0.3	2.8	13.5	16.3
1940-41	1.2	0.5	0.5	0	0	0	0.1	2.3	9.8	12.1	1.5	0.6	0.6	0	0	0	0.1	2.8	11.9	14.7
41-42	0.8	0.4	0.2	0.1	0.3	0.5	0.8	3.1	11.6	14.7	1.1	0.5	0.3	0.1	0.3	0.6	1.1	4.0	14.0	18.0
42-43	1.1	0.4	0.8	0.4	0.1	0	0.5	3.3	12.2	16.5	1.7	0.7	0.9	0.7	0.1	0	0.5	4.6	15.2	19.8
43-44	1.5	0.8	0.3	0.1	0	0.3	1.4	4.4	12.2	16.6	2.2	1.3	0.4	0.1	0.1	0.3	1.3	5.7	14.1	19.8
44-45	1.1	0.1	0.3	0.3	0	0	0.9	2.7	14.2	16.9	1.5	0.3	0.3	0.5	0.1	0	0.9	3.6	16.6	20.2
1945-46	0.9	0.8	0.5	0.1	0.3	0.9	0.7	4.2	13.9	18.1	1.3	1.0	0.7	0.3	0.3	1.0	0.7	5.3	16.4	21.7
46-47	1.3	0.4	0	0.1	0.3	0.9	2.5	5.5	14.8	20.3	1.8	0.8	0	0.1	0.4	1.0	2.3	6.4	17.4	23.8
47-48	1.4	0.8	0.3	0.9	0.5	0.9	1.1	5.9	14.6	20.5	1.9	1.1	0.4	1.3	0.8	1.0	1.0	7.5	17.4	24.9
48-49	1.7	1.0	0.7	0	0.1	0.3	2.7	6.5	15.2	22.7	2.3	1.7	0.8	0.1	0.1	0.4	2.7	8.1	17.7	25.8
49-50	1.8	0.8	0.5	0.7	0	0.8	1.9	6.5	7.2	13.7	2.5	1.4	0.5	0.9	0.1	0.8	1.9	8.1	13.3	21.4
1950-51	1.8	0.7	0.7	0.4	0	0.8	2.7	7.1	16.2	23.3	2.5	0.9	0.8	0.5	0	1.0	2.6	8.3	18.8	27.1
51-52	1.9	0.8	0	0	0.1	0.8	0.4	4.0	13.4	17.4	2.7	1.1	0	0	0.3	0.8	0.4	5.3	15.6	20.9
52-53	2.7	0.5	0	0	0.4	1.3	1.7	6.6	13.4	20.0	2.6	0.8	0	0.1	0.7	1.5	1.7	7.4	15.8	23.2
53-54	1.9	0.7	0.9	0.4	0.1	0.3	0.4	4.7	11.5	16.2	2.6	1.0	1.1	0.5	0.3	0.3	0.4	6.2	13.5	19.7
54-55	1.8	0.5	0.3	0	0.1	0.4	1.9	5.0	11.7	16.7	2.5	0.8	0.4	0	0.1	0.4	1.9	6.1	13.7	19.8
1955-56	1.8	0.8	0.1	0.1	0.1	0.7	0.8	4.4	10.9	15.3	2.5	1.0	0.1	0.1	0.1	0.7	0.8	5.3	12.9	18.2
56-57	1.9	1.3	1.5	0.1	0	0.1	0.8	5.7	14.8	20.5	2.6	2.2	1.8	0.3	0.1	0.1	0.8	7.9	17.4	25.3
57-58	0.9	0.4	0.5	0.3	0	0.4	0.4	2.9	14.4	17.3	1.1	0.7	0.7	0.4	0	0.4	0.4	3.7	16.8	20.5

MONTHLY DEPTHS OF DELIVERED IRRIGATION WATER FOR IRRIGATED CROPS
(continued)

Year	Walnuts										Truck									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total
1928-29	1.1	0.5	0.1	0.2	0	0.2	0.7	2.8	13.9	16.7	1.4	0.6	0.1	0.3	0	0.3	0.8	3.5	17.4	20.9
29-30	1.3	1.0	0.7	0.3	0.1	0.1	0.6	4.1	12.3	16.4	1.6	1.2	0.7	0.3	0.2	0.1	0.7	4.8	15.6	20.4
1930-31	1.2	0.8	0.2	0.1	0	0.4	1.9	4.6	12.1	16.7	1.6	1.2	0.3	0.1	0	0.5	2.3	6.0	15.0	21.0
31-32	1.3	0.7	0	0	0	0.3	1.1	3.4	11.1	14.5	1.6	0.9	0	0	0	0.3	1.4	4.2	13.9	18.1
32-33	1.1	1.1	0.3	0.1	0	0.4	1.0	4.0	11.5	15.5	1.4	1.4	0.4	0.1	0.1	0.5	1.2	5.1	14.0	19.1
33-34	1.2	0.8	0.3	0	0.1	0.2	1.2	3.8	11.9	15.7	1.5	1.1	0.4	0.1	0.1	0.3	1.5	5.0	14.6	19.6
34-35	1.2	0.4	0	0	0.1	0.1	0.1	1.9	11.9	13.8	1.5	0.5	0.1	0	0.1	0.1	0.1	2.4	14.9	17.3
1935-36	1.1	0.6	0.5	0.3	0.2	0.8	0.3	3.8	13.3	17.1	1.3	0.7	0.6	0.4	0.3	1.1	0.4	4.8	16.6	21.4
36-37	1.1	0.8	0.4	0	0	0.1	0.3	2.7	12.7	15.4	1.4	1.0	0.5	0	0	0.1	0.4	3.4	15.7	19.1
37-38	1.3	0.8	0.4	0.1	0	0	0.5	3.1	11.7	14.8	1.6	1.1	0.5	0.1	0	0	0.6	3.9	14.7	18.6
38-39	1.3	1.0	0.6	0	0.1	0.2	0.7	3.9	12.9	16.8	1.6	1.3	0.7	0	0.1	0.2	0.9	4.8	16.2	21.0
39-40	0.4	0.8	0.6	0.1	0	0.2	0.3	2.4	12.4	14.8	0.5	1.1	0.6	0.1	0	0.3	0.4	3.0	15.5	18.5
1940-41	1.4	0.5	0.5	0	0	0	0.1	2.5	10.9	13.4	1.7	0.6	0.7	0.1	0	0	0.1	3.2	13.5	16.7
41-42	1.0	0.4	0.2	0.1	0.3	0.6	1.0	3.6	12.8	16.4	1.2	0.6	0.3	0.1	0.4	0.7	1.2	4.5	15.9	20.4
42-43	1.1	0.8	1.1	0.5	0.1	0	0.5	4.1	13.3	17.4	1.7	0.7	0.8	0.7	0.1	0	0.7	4.7	17.6	22.3
43-44	1.5	1.3	0.4	0.1	0.1	0.3	1.3	5.0	12.4	17.4	2.3	1.1	0.3	0.1	0.1	0.4	1.7	6.0	16.3	22.3
44-45	1.1	0.3	0.4	0.5	0.1	0	0.9	3.3	14.5	17.8	1.7	0.3	0.3	0.7	0.1	0	1.3	4.4	19.1	23.5
1945-46	0.9	1.0	0.8	0.3	0.3	1.0	0.7	5.0	14.2	19.2	1.3	0.9	0.5	0.4	0.4	1.4	0.8	5.7	18.8	24.5
46-47	1.3	0.8	0.1	0.1	0.3	1.0	2.3	5.9	15.2	21.1	1.9	0.7	0	0.1	0.5	1.3	2.9	7.4	20.1	27.5
47-48	1.4	1.3	0.4	1.1	0.7	1.0	1.0	6.9	15.1	22.0	2.1	1.0	0.3	1.6	0.8	1.4	0.6	8.6	19.9	28.5
48-49	1.7	1.8	0.8	0	0.1	0.4	2.7	7.5	15.6	23.1	2.5	1.7	0.7	0.1	0.1	0.5	3.5	9.1	20.6	29.7
49-50	1.8	1.4	0.7	0.8	0	0.8	1.9	7.4	7.6	15.0	2.6	1.1	0.5	1.0	0.1	1.0	2.5	8.8	9.9	18.7
1950-51	1.8	0.9	0.8	0.5	0	0.9	2.6	7.5	16.6	24.1	2.5	0.8	0.7	0.7	0	1.1	3.3	9.1	21.9	31.0
51-52	1.9	1.1	0	0	0.3	0.8	0.4	4.5	13.7	18.2	2.8	1.0	0	0	0.4	1.0	0.4	5.6	18.1	23.7
52-53	1.9	0.8	0.1	0	0.5	1.5	1.7	6.5	13.8	20.3	2.6	0.8	0	0.1	0.8	2.1	2.2	8.6	18.3	26.9
53-54	1.9	1.0	1.4	0.5	0.3	0.3	0.4	5.8	11.8	17.6	2.6	0.9	1.0	0.7	0.3	0.4	0.5	6.4	15.6	22.0
54-55	1.8	0.8	0.4	0	0.1	0.4	1.9	5.4	12.0	17.4	2.5	0.8	0.3	0	0.1	0.5	2.5	6.7	15.8	22.5
1955-56	1.8	1.0	0.1	0.1	0.1	0.7	0.8	4.6	11.3	15.9	2.6	0.9	0.1	0.1	0.1	0.9	1.0	5.7	14.8	20.5
56-57	1.9	2.2	2.1	0.3	0.1	0.1	0.8	7.5	15.1	22.6	2.7	1.9	1.5	0.3	0.1	0.3	0.9	7.7	20.1	27.8
57-58	0.9	0.7	0.8	0.3	0	0.4	0.4	3.5	14.7	18.2	1.3	0.5	0.5	0.4	0	0.5	0.5	3.7	19.4	23.1

MONTHLY DEPTHS OF DELIVERED IRRIGATION WATER FOR IRRIGATED CROPS
(continued)

In Acre-Inches per Gross Acre

Year	Alfalfa										Vineyard									
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Sub- total	May- Sept.	Total
1928-29	1.4	0.6	0.1	0.3	0	0.3	0.8	3.5	16.7	20.2	0.8	0.3	0.1	0.1	0	0.1	0.5	1.9	9.4	11.3
29-30	1.5	1.2	0.8	0.3	0.2	0.1	0.7	4.8	15.0	19.8	0.8	0.7	0.5	0.2	0.1	0	0.4	2.7	8.3	11.0
1930-31	1.5	1.1	0.3	0.2	0	0.5	2.3	5.8	14.4	20.2	0.8	0.6	0.2	0.1	0	0.3	1.3	3.3	8.0	11.3
31-32	1.6	0.8	0	0	0	0.3	1.3	4.0	13.5	17.5	0.8	0.5	0	0	0	0.2	0.8	2.3	7.4	9.7
32-33	1.3	1.3	0.4	0.1	0.1	0.5	1.2	4.9	13.6	18.5	0.7	0.7	0.2	0.1	0	0.3	0.7	2.7	7.6	10.3
33-34	1.5	1.0	0.4	0.2	0.1	0.3	1.4	4.8	14.3	19.1	0.8	0.6	0.2	0	0.1	0.1	0.8	2.6	7.9	10.5
34-35	1.4	0.5	0.1	0	0.1	0.1	0.2	2.3	14.4	16.7	0.8	0.3	0	0	0	0	0.1	1.2	8.1	9.3
1935-36	1.3	0.7	0.6	0.4	0.3	1.1	0.4	4.8	15.9	20.7	0.7	0.4	0.3	0.2	0.2	0.6	0.2	2.6	8.9	11.5
36-37	1.3	1.0	0.5	0	0	0.1	0.4	3.3	15.2	18.5	0.7	0.6	0.3	0	0	0	0.2	1.8	8.6	10.4
37-38	1.6	1.1	0.5	0.2	0	0	0.6	3.9	14.1	18.0	0.8	0.6	0.3	0.1	0	0	0.3	2.1	7.9	10.0
38-39	1.5	1.2	0.7	0	0.1	0.2	0.8	4.5	15.7	20.2	0.8	0.7	0.4	0	0	0.1	0.5	2.5	8.8	11.3
39-40	0.5	1.0	0.7	0.2	0	0.3	0.4	3.0	15.0	18.0	0.3	0.6	0.4	0.1	0	0.1	0.2	1.7	8.3	10.0
1940-41	1.7	0.6	0.6	0	0	0	0.1	3.0	13.2	16.2	0.8	0.4	0.4	0	0	0	0.1	1.7	7.3	9.0
41-42	1.2	0.5	0.3	0.1	0.4	0.7	1.2	4.4	15.4	19.8	0.7	0.3	0.2	0.1	0.2	0.4	0.7	2.6	8.5	11.1
42-43	1.5	0.7	0.8	0.7	0.1	0.1	0.8	4.7	17.1	21.8	0.8	0.3	0.3	0.1	0	0	0.4	1.9	11.2	13.1
43-44	2.1	1.0	0.3	0.1	0.1	0.4	2.1	6.1	25.8	31.9	1.1	0.5	0.1	0	0	0.1	1.1	2.9	10.9	13.8
44-45	1.4	0.3	0.3	0.5	0.1	0.1	1.5	4.2	18.5	22.7	0.8	0.1	0.1	0.1	0	0	0.9	2.0	12.6	14.6
1945-46	1.1	0.9	0.5	0.4	0.4	1.7	0.9	5.9	18.2	24.1	0.8	0.4	0.1	0	0	0.7	0.7	2.7	11.8	14.5
46-47	1.7	0.7	0	0.1	0.5	2.7	3.6	8.3	19.4	27.7	0.9	0.3	0	0	0.1	0.7	2.2	4.2	12.7	16.9
47-48	1.8	1.0	0.3	1.5	0.8	1.7	1.7	8.8	19.3	28.1	0.9	0.5	0.1	0.3	0.1	0.7	0.9	3.5	12.7	16.2
48-49	2.1	1.4	0.8	0.1	0.1	0.5	4.1	9.1	19.9	29.0	1.1	0.8	0.3	0	0	0.3	2.5	5.0	13.6	18.6
49-50	2.2	1.1	0.5	0.9	0.1	1.3	2.8	8.9	9.6	18.5	1.1	0.5	0.1	0.1	0	0.5	1.8	4.1	6.4	10.5
1950-51	2.2	0.8	0.7	0.7	0	1.5	4.1	10.0	21.1	31.1	1.1	0.4	0.3	0.1	0	0.7	2.5	5.1	14.3	19.4
51-52	2.5	1.0	0	0	0.4	1.3	0.5	5.7	17.5	23.2	1.4	0.5	0	0	0	0.5	0.3	2.7	11.8	14.5
52-53	2.5	0.8	0	0.1	0.8	2.6	2.6	9.4	17.3	26.7	1.3	0.4	0	0	0.1	0.8	1.5	4.1	12.0	16.1
53-54	2.5	0.9	1.0	0.7	0.3	0.4	0.7	6.5	15.0	21.5	1.3	0.4	0.4	0.1	0	0.1	0.4	2.7	10.3	13.0
54-55	2.2	0.8	0.3	0	0.1	0.7	2.8	6.9	15.2	22.1	1.1	0.4	0.1	0	0	0.3	1.7	3.6	10.5	14.1
1955-56	2.3	0.9	0.1	0.1	0.1	1.0	1.1	5.6	14.4	20.0	1.3	0.4	0	0	0	0.4	0.8	2.9	9.7	12.6
56-57	2.5	1.8	1.5	0.3	0.1	0.3	1.1	7.6	19.5	27.1	1.3	0.8	0.5	0.3	0	0.1	0.8	3.8	13.2	17.0
57-58	1.1	0.5	0.5	0.4	0	0.7	0.7	3.9	18.9	22.8	0.8	0.3	0.1	0	0	0.3	0.4	1.9	12.8	14.7

The adjusted duty was computed for each crop for each year in the period 1928-29 through 1957-58 by the method shown in Sample Calculation A. The mean annual adjusted duty for the base period thus derived is shown in Table J-9. These values on the average are slightly higher than those reported in Table 24 of Bulletin No. 51, "Irrigation Requirements of California Crops", California State Division of Water Resources, 1945. Bulletin 51 notes that certain duties such as deciduous appear extremely low and that the values for shallow rooted crops appear more consistent with other crops in California.

TABLE J-9
MEAN ANNUAL ADJUSTED DUTY FOR IRRIGATED CROPS

In Feet		
Crop	Adjusted duty	San Fernando Valley Bulletin 51 (1930-37)
Deciduous	1.35	0.54-1.07
Citrus	1.63	1.81
Walnuts	1.20	0.84
Truck	1.85	1.03-2.07
Alfalfa and pasture	1.81	1.86
Vineyards	1.05	0.50

Delivered Water Available for
Residential Lawns and Gardens

The portion of water delivered to residential meters for use on lawns and gardens was estimated to determine the consumptive use and deep percolation on residential areas. From 1936-37 through 1957-58, the total sales to residential meters were not tabulated separately except for the City of Los Angeles west of Burbank and the City of Burbank. The amount of water used on residential lawns and gardens was therefore estimated by taking the total net delivered water and deducting the delivered water applied to irrigated crops and commercial and industrial classifications and the net sewage (sewage export plus cesspool recharge minus sewer infiltration). The residual amount was assumed to be applied to the residential lawn and garden areas.

The depths of applied irrigation water for irrigated crops in Table J-8 and the acreage for each crop, as discussed in Appendix K, were utilized to determine the total use on irrigated crops. The amounts of delivered water required by commercial and industrial areas and the portions consumed or percolating are discussed in Appendix L. It is assumed that no deep percolation of delivered water occurred in this classification except in particular instances where it could be evaluated, (i.e. City of Los Angeles Valley Steam Plant and industrial waste discharges to the Los Angeles River) since this classification is primarily impervious.

The available data did not permit the evaluation of sewage contributed from residential, commercial and industrial areas to be separated. The amount of water available for residential lawns and gardens

was estimated by subtracting the total sewage and waste, consumptive use and deep percolation of commercial and industrial from the water delivered to residential, commercial and industrial areas.

The annual amount of water estimated as being delivered to residential lawn and garden areas and the estimated component amounts of delivered water are shown in Table J-10. The monthly depth of water applied to lawns and gardens was based on the monthly percentage distribution of the domestic metered sales in the City of Los Angeles west of Burbank. These calculations were made in the same manner as shown in Sample Calculation B for the monthly depth of irrigation water. The monthly percentage of water delivered to domestic meters and the monthly depth of water applied to residential lawns and gardens are shown in Tables J-11 and J-12, respectively. The annual depth of water delivered to residential lawn and garden areas was utilized for the determination of consumptive use and deep percolation on residential areas as discussed in Appendix L.

TABLE J-10
DISPOSITION OF NET DELIVERED WATER BY TYPE OF USE^a

Year	San Fernando Hydrologic Subarea					Valencia Hydrologic Subarea					Verde Hydrologic Subarea				
	Residential	Commercial and Industrial	Irrigation	Sewage	Total	Residential	Commercial and Industrial	Irrigation	Sewage	Total	Residential	Commercial and Industrial	Irrigation	Sewage	Total
	In	In	In	In	In	In	In	In	In	In	In	In	In	In	In
1928-29	16,810	2,490	89,670	10,420	119,390	100	30	4,790	180	5,100	350	30	600	320	1,300
29-30	20,410	2,890	89,940	11,290	124,530	150	30	4,210	190	4,580	420	30	550	370	1,370
1930-31	20,080	3,270	85,920	12,370	121,640	170	30	3,970	210	4,380	450	40	520	410	1,420
31-32	14,110	3,670	68,060	12,990	98,830	120	30	3,530	200	3,880	440	40	510	390	1,380
32-33	13,890	4,070	70,910	13,040	101,910	120	30	4,240	220	4,610	500	40	500	440	1,480
33-34	15,800	4,470	75,530	13,260	109,060	150	30	4,040	200	4,420	590	40	480	600	1,610
34-35	12,500	4,860	69,170	13,380	99,910	130	30	3,760	210	4,130	580	40	460	510	1,590
1935-36	15,610	5,250	88,340	14,190	123,390	170	30	4,680	200	5,080	590	50	500	520	1,660
36-37	16,090	5,650	78,580	15,110	115,430	170	30	4,190	210	4,600	710	50	490	620	1,870
37-38	17,690	6,040	68,730	16,350	108,810	190	30	3,910	220	4,350	780	60	460	680	1,980
38-39	22,460	6,430	73,120	17,950	119,960	290	30	4,240	260	4,820	870	60	450	770	2,150
39-40	22,270	6,830	62,600	19,550	111,250	280	30	3,800	260	4,370	990	70	420	860	2,340
1940-41	19,350	8,190	56,240	21,600	105,480	240	30	4,060	240	4,570	900	70	470	790	2,230
41-42	24,920	10,290	73,300	22,810	131,320	330	30	4,760	300	5,120	1,130	80	480	990	2,680
42-43	29,940	10,820	78,300	23,340	142,400	450	30	5,250	390	6,120	1,200	90	490	1,060	2,840
43-44	31,790	11,360	74,890	23,780	141,760	490	30	5,290	430	6,240	1,330	90	470	1,160	3,050
44-45	34,340	11,880	78,160	25,250	149,630	550	30	5,360	480	6,420	1,310	90	470	1,140	3,020
1945-46	43,120	10,790	81,170	27,060	162,140	710	30	5,620	610	6,970	1,610	100	500	1,400	3,610
46-47	46,000	9,560	78,050	30,360	163,970	850	30	6,190	720	7,790	1,770	110	500	1,540	3,920
47-48	48,300	9,950	81,040	33,500	172,790	960	30	6,260	800	8,030	2,040	120	500	1,760	4,120
48-49	52,670	10,360	79,120	36,620	178,750	1,150	30	5,900	880	7,960	1,920	130	460	1,880	4,190
49-50	56,840	10,490	68,840	39,430	175,600	1,130	40	5,160	950	7,280	2,070	140	440	1,840	4,190
1950-51	60,470	10,650	75,530	44,890	191,540	1,280	50	5,000	1,080	7,410	2,330	140	450	2,020	4,940
51-52	58,210	12,710	58,270	49,300	178,490	1,320	60	3,780	1,120	6,280	2,340	150	480	2,040	5,010
52-53	70,550	12,910	62,540	52,180	198,180	1,640	70	3,830	1,390	6,930	2,870	160	490	2,180	6,000
53-54	72,420	13,640	51,920	58,490	196,470	1,770	80	2,870	1,500	6,220	3,210	180	470	2,770	6,630
54-55	71,020	16,980	41,090	61,700	190,780	1,940	90	2,870	1,640	6,540	3,010	190	450	2,620	6,270
1955-56	71,550	18,160	34,340	68,490	192,540	2,050	110	2,460	1,740	6,360	3,530	200	460	3,050	7,240
56-57	84,740	19,130	35,970	72,140	211,980	2,390	130	2,690	2,030	7,240	3,720	200	610	3,210	7,740
57-58	75,520	19,220	30,230	76,610	201,580	2,110	140	2,290	1,800	6,340	4,210	210	630	3,610	8,660

a. Includes tributary drainage area within major service areas.
b. Includes Eagle Rock Subarea.

TABLE J-11

MONTHLY DISTRIBUTION OF WATER DELIVERED TO
DOMESTIC SERVICES IN LOS ANGELES WEST OF BURBANK*

In Percent

Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May through Sept.
1928-29	9.6	5.5	3.1	2.7	1.5	2.9	4.7	70.0
29-30	9.3	8.6	5.8	4.0	2.3	2.9	6.0	61.1
1930-31	9.3	7.6	4.2	1.7	1.4	4.9	8.8	62.1
31-32	11.5	7.0	3.5	0.6	0.5	2.0	7.5	67.4
32-33	8.8	6.9	4.9	1.4	0.9	2.9	6.6	67.6
33-34	9.1	6.5	4.8	1.1	1.7	2.3	6.1	68.4
34-35	12.2	5.6	3.5	0.8	0.8	0.0	2.2	74.9
1935-36	7.3	5.2	2.6	2.8	5.1	1.9	4.8	70.3
36-37	10.1	4.1	4.4	1.1	0.2	0.9	2.9	76.3
37-38	11.1	6.4	4.4	1.7	1.0	0.6	4.8	70.0
38-39	9.9	6.0	5.9	1.4	0.2	2.6	4.1	69.9
39-40	8.7	5.2	4.2	2.3	0.2	2.0	4.6	72.8
1940-41	11.9	6.1	4.6	1.6	0.2	0.9	1.6	73.1
41-42	8.9	3.2	2.8	0.6	1.6	3.6	4.1	75.2
42-43	6.0	5.6	3.4	3.0	1.3	1.1	2.9	76.7
43-44	11.1	6.9	3.5	1.7	1.0	2.3	6.1	67.4
44-45	9.1	4.8	2.0	1.4	1.5	2.0	5.0	74.2
1945-46	8.9	5.3	3.2	2.4	2.9	3.8	4.9	68.6
46-47	8.7	4.5	1.7	1.2	2.1	3.5	6.6	71.7
47-48	8.3	5.5	3.8	3.5	3.8	4.0	4.9	66.2
48-49	9.6	6.3	3.7	1.5	0.4	1.7	5.6	71.7
49-50	10.0	6.6	3.3	1.3	1.1	3.2	6.0	68.5
1950-51	8.0	5.2	2.7	1.6	1.4	3.1	5.8	72.2
51-52	11.0	6.5	2.0	0.1	0.3	1.3	3.6	75.2
52-53	9.5	4.9	1.1	0.5	2.6	5.0	6.8	69.6
53-54	10.5	6.8	4.1	3.1	2.4	2.5	3.8	66.8
54-55	10.7	6.4	2.4	0.6	0.5	2.7	5.4	71.3
1955-56	11.9	5.9	1.6	0.0	0.7	3.3	5.2	71.4
56-57	10.3	7.2	5.5	3.2	0.4	0.8	3.4	69.2
57-58	9.1	3.7	2.0	1.5	0.1	0.0	2.4	81.2

* Includes combination services and excludes sewage.

TABLE J-12

DEPTH OF WATER APPLIED TO
RESIDENTIAL LAWNS AND GARDENS*

In Inches

Year	San Fernando and Sylmar Subarea								Total
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May through Sept.	
1928-29	2.2	1.3	0.7	0.6	0.3	0.7	1.1	16.0	22.9
29-30	2.3	2.1	1.4	1.0	0.6	0.7	1.5	15.2	24.8
1930-31	2.1	1.7	1.0	0.4	0.3	1.1	2.0	14.1	22.7
31-32	1.5	0.9	0.5	0.1	0.1	0.3	1.0	9.0	13.4
32-33	1.1	0.8	0.6	0.2	0.1	0.4	0.8	8.2	12.2
33-34	1.2	0.9	0.7	0.2	0.2	0.3	0.8	9.4	13.7
34-35	1.2	0.5	0.3	0.1	0.1	0	0.2	7.3	9.7
1935-36	0.9	0.6	0.3	0.3	0.6	0.2	0.6	8.4	11.9
36-37	1.1	0.5	0.5	0.1	0	0.1	0.3	8.4	11.0
37-38	1.3	0.8	0.5	0.2	0.1	0.1	0.6	8.3	11.9
38-39	1.6	1.0	1.0	0.2	0	0.4	0.7	11.4	16.3
39-40	1.3	0.8	0.6	0.3	0	0.3	0.7	10.6	14.6
1940-41	1.4	0.7	0.5	0.2	0	0.1	0.2	8.7	11.8
41-42	1.4	0.5	0.4	0.1	0.2	0.5	0.6	11.4	15.1
42-43	1.2	1.1	0.7	0.6	0.2	0.2	0.6	14.7	19.3
43-44	2.2	1.4	0.7	0.3	0.2	0.5	1.2	13.5	20.0
44-45	2.0	1.0	0.4	0.3	0.3	0.4	1.1	16.0	21.5
1945-46	2.3	1.4	0.8	0.6	0.8	1.0	1.3	18.0	26.2
46-47	2.6	1.3	0.5	0.4	0.6	1.0	2.0	21.4	29.8
47-48	2.6	1.7	1.2	1.1	1.2	1.3	1.6	21.1	31.8
48-49	3.2	2.1	1.3	0.5	0.1	0.6	1.9	24.1	33.8
49-50	3.3	2.2	1.1	0.4	0.4	1.1	2.0	22.7	33.2
1950-51	2.7	1.8	0.9	0.5	0.5	1.1	2.0	24.7	34.2
51-52	3.6	2.1	0.7	0	0.1	0.4	1.2	24.5	32.6
52-53	3.6	1.8	0.4	0.2	1.0	1.9	2.5	26.0	37.4
53-54	4.0	2.6	1.5	1.2	0.9	0.9	1.4	25.3	37.8
54-55	3.7	2.2	0.8	0.2	0.2	0.9	1.9	24.5	34.4
1955-56	4.1	2.1	0.5	0	0.2	1.1	1.8	24.9	34.7
56-57	4.0	2.8	2.2	1.2	0.2	0.3	1.3	26.9	38.9
57-58	2.9	1.2	0.6	0.5	0	0	0.7	26.4	32.3

* Based on percentages in Table J-11.

TABLE J-12

DEPTH OF WATER APPLIED TO
RESIDENTIAL LAWNS AND GARDENS*
(continued)

In Inches

Year	Verdugo Subarea								Total
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May through Sept.	
1928-29	1.7	1.0	0.6	0.5	0.3	0.5	0.9	12.7	18.2
29-30	1.9	1.8	1.2	0.8	0.5	0.6	1.2	12.8	20.8
1930-31	2.0	1.6	0.9	0.4	0.3	1.0	1.8	13.0	21.0
31-32	2.3	1.4	0.7	0.1	0.1	0.4	1.5	13.3	19.8
32-33	1.9	1.5	1.1	0.3	0.2	0.6	1.4	14.5	21.5
33-34	2.6	1.8	1.4	0.3	0.5	0.6	1.7	19.3	28.2
34-35	2.8	1.3	0.8	0.2	0.2	0	0.5	17.0	22.8
1935-36	1.6	1.2	0.6	0.6	1.1	0.4	1.1	15.8	22.4
36-37	2.5	1.0	1.1	0.3	0.1	0.2	0.7	19.1	25.0
37-38	2.9	1.6	1.1	0.4	0.3	0.2	1.2	18.0	25.7
38-39	2.7	1.6	1.6	0.4	0.1	0.7	1.1	18.8	27.0
39-40	2.5	1.5	1.2	0.7	0.1	0.6	1.3	20.8	28.7
1940-41	2.8	1.4	1.1	0.4	0	0.2	0.4	17.0	23.3
41-42	2.5	0.9	0.8	0.2	0.4	1.0	1.1	21.1	28.0
42-43	1.6	1.5	0.9	0.8	0.3	0.3	0.8	20.7	26.9
43-44	3.0	1.9	1.0	0.5	0.3	0.6	1.7	18.2	27.2
44-45	2.3	1.2	0.5	0.4	0.4	0.5	1.3	18.4	25.0
1945-46	2.5	1.5	0.9	0.7	0.8	1.1	1.4	19.5	28.4
46-47	2.5	1.3	0.5	0.3	0.6	1.0	1.9	20.5	28.6
47-48	2.5	1.7	1.2	1.1	1.2	1.2	1.5	20.2	30.6
48-49	2.6	1.7	1.0	0.4	0.1	0.5	1.5	19.3	27.1
49-50	2.7	1.8	0.9	0.4	0.3	0.9	1.6	18.5	27.1
1950-51	2.3	1.5	0.8	0.5	0.4	0.9	1.7	20.7	28.8
51-52	3.0	1.7	0.5	0	0.1	0.3	1.0	20.3	26.9
52-53	3.0	1.5	0.3	0.2	0.8	1.6	2.1	21.9	31.4
53-54	3.5	2.2	1.4	1.0	0.8	0.8	1.3	22.0	33.0
54-55	3.1	1.9	0.7	0.2	0.1	0.8	1.6	20.8	29.2
1955-56	3.9	1.9	0.5	0	0.2	1.1	1.7	23.6	32.9
56-57	3.4	2.4	1.8	1.1	0.1	0.3	1.1	22.7	32.9
57-58	3.2	1.3	0.7	0.5	0	0	0.8	28.5	35.0

* Based on percentages in Table J-11.

Delivered Water to Hydrologic Subareas

The amounts of gross delivered water for each subarea are shown in Table 21, page 139 and are obtained by the summation of the amounts shown in Tables J-3, J-4 and J-5. Many water service areas cross over subarea boundaries, thus necessitating a split of the water served in the area.

The southerly boundary of Sylmar Hydrologic Subarea divides the Owens River and the City of San Fernando water service areas into two parts. Although the gross deliveries to both of these water service areas is known (see Table J-1). Gross delivered water within the boundary of the Sylmar Subarea is not measured. Estimates of the amount of the net delivered water to this subarea were based on the historic acreages of areal culture and the adjusted depth of delivered water for each land use classification. The annual amounts of water were then adjusted to include water system losses to obtain the gross delivered water.

Approximately nine percent of the areal extent of the City of San Fernando is in Sylmar Subarea and the remainder in the San Fernando Subarea. The gross delivered water for the City of San Fernando was thus proportioned according to the areal extent within each subarea.

Verdugo Hydrologic Subarea contains all of the Crescenta Valley County Water District service area and portions of the City of Glendale, La Canada Irrigation District and the City of Los Angeles Sunland-Tujunga service areas. The gross delivered water to the service areas, which are partially in Verdugo Subarea, was estimated.

The Crescenta Valley County Water District serves a small portion of the City of Glendale in the La Crescenta area, as shown on Plate 19. The gross delivered water to this area was included with the delivered water for Crescenta Valley County Water District.

The City of Glendale in Verdugo Subarea delivers water from four water service levels or pressure levels because of the large differences in

the surface elevation in its service area. A large portion of the two higher levels and a small portion of the next lower pressure level are in Verdugo Hydrologic Subarea. The gross delivered water to the City of Glendale in the Verdugo Hydrologic Subarea is based primarily on the amount of water raised to each service level.

During the earlier part of the base period the two higher pressure levels obtained their water supply from the Glorietta Wells and had to be pumped to a higher elevation through booster pumps. The meter readings of the flow through these booster pumps represented the amount of water delivered to these levels. The gross delivered water to the lower pressure level was estimated by determining the number of meters in this pressure level and multiplying the number of meters by the amount of water delivered per meter based on the gross annual delivery per meter in the City of Glendale. The sum of these quantities represented the total water delivered by the City of Glendale in Verdugo Hydrologic Subarea.

The amount metered by the City of Glendale booster pumps includes water sold to the Crescenta Valley County Water District and the La Canada Irrigation District during periods of drought. These amounts were deducted from the total delivered water to the City of Glendale's service area in Verdugo Subarea and added to the respective districts.

Delivered Water to the Hill Areas

During the latter half of the base period an increasing number of homes were built along the hillsides above the valley floor. In the

1958 Land Use Survey made by the Referee, there were 8,700 acres in the residential classifications in the hill and mountain areas. A large part of this acreage was in the Narrows and the Owens River service areas (see Appendix K).

Due to the limited amount of usable land on which a house can be constructed, the area of lawns and gardens is considerably less than the area of residential lots on the valley floor. It did not appear reasonable to apply a duty of water per acre of residential for the valley floor to the residential acreage in the hill and mountain area.

An estimate of the amount of water delivered to residential areas in the hills was compiled from "Read Books" in the Owens River and Narrows service areas. In the selections of the "Read Books" only areas completely developed and in the hills were utilized, thus eliminating the necessity of any correction. The data from these "Read Books" were compiled for 1956-57 and 1957-58. Data prior to 1956-57 were incomplete since the area covered by each "Read Book" changes from time to time.

The average amount of water delivered to each lot for 1956-57 and 1957-58 was 0.50 acre-foot per lot or approximately 1.5 acre-feet per gross acre. This is 23 percent less than the delivered water per meter in the Owens River service area for the corresponding period, which contains a larger area of lawns and gardens. It was therefore apparent that a large percentage of the residential delivered water was for inside use and the value for delivered water when applied to the hills during the earlier period could be higher than that actually delivered. It was therefore

assumed that the values found in the 1956 through 1958 period are more representative of the gross delivered water and were thus utilized in this way to determine the delivered water to the hills over the base period.

The Owens River service area constitutes another area in which residential development in the hill and mountain area occurred. "Read Book" areas in the Santa Monica Mountains were selected to obtain the gross delivered water per acre of residential. The average depth of water delivered to these areas was 1.57 feet per acre for 1956-57 and 1957-58. This value compared favorably with the value found in the Narrows service area and was applied to the area of residential acreage in each of the service areas with the exception of the Narrows service area where additional data were available.

In the Narrows service area, the acreage of residential in the hill and mountain areas varied from approximately 1,400 acres in 1929 to 2,250 acres in 1958. The density of the number of lots per acre has increased from 2.4 to 3.5 lots per acre during the base period, with an average of 3.0 lots per acre. The density of the number of lots per acre was determined by enumerating the number of sewer house connections for every five years from 1930 to 1955 for the Narrows service area and dividing the number of sewer connections into the acreage in the hill area for the corresponding years. The number of lots per acre determined above are plotted on Figure J-1 showing an increase in density throughout the base period. This increase is in accordance with the increase in population and popularity of hillside homes.

The annual net delivered water to the hill area in the Narrows service area was calculated by multiplying the density by the delivered water per lot and the product multiplied by the acreage of residential in the hills.

The estimated amounts of water delivered to each service area in the hill and mountain areas are shown in Table J-13. Also included in the table are the totals of water delivered to the hill and mountain areas from the valley floor for the remaining land use classifications and extractions from wells outside the major water service areas.

FIGURE J-1

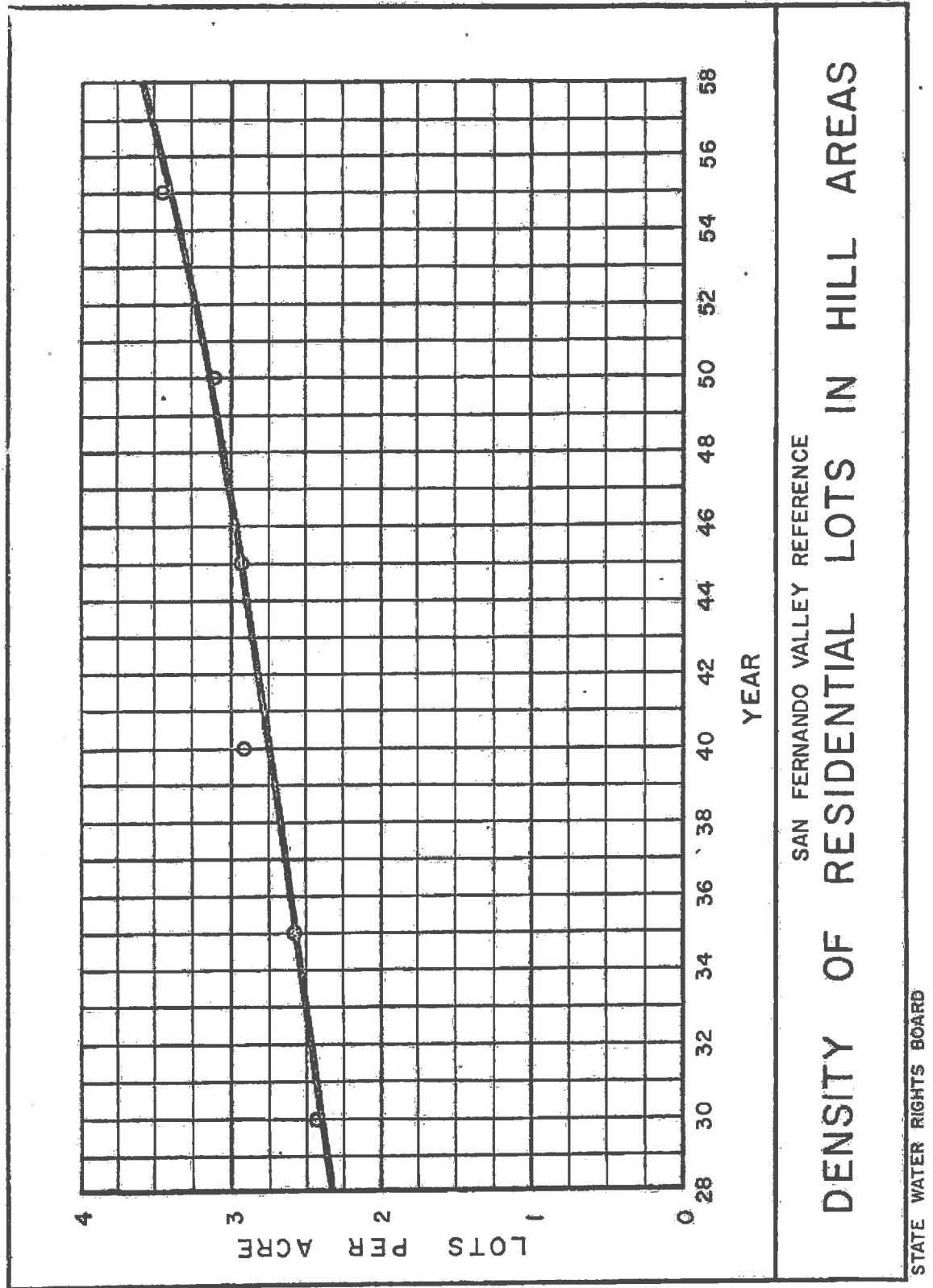


TABLE J-13

GROSS DELIVERED WATER TO HILL AREAS BY WATER SERVICE AREAS

In Acre-Feet

Year	Residential areas																Others ^a		Total	
	Narcovus		Glendale		Burbank		Sunland-Tujunga		Owens		C.V.C.M.D.S.		La Canada		Ground water		Ground water		Total	
	Ground	Import ^a	Ground	Import ^a	Ground	Import ^a	Ground	Import ^a	Ground	Import ^a	Ground	Import ^a	Ground	Import ^a	water	Import ^a	water	Import ^a	water	Import ^a
1928-29	1,800	0	0	0	0	0	0	0	0	0	0	0	0	0	500	2,300	0	2,300	0	2,300
29-30	1,850	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	3,650	0	3,650	0	3,650
1930-31	1,890	0	0	0	0	0	0	0	0	0	0	0	0	0	2,460	4,350	20	4,370	20	4,370
31-32	1,960	0	0	0	0	0	0	0	0	0	0	0	0	0	2,580	4,540	30	4,570	30	4,570
32-33	2,020	0	0	0	0	0	0	0	0	0	0	0	0	0	2,650	4,670	50	4,720	50	4,720
33-34	2,090	0	0	0	0	0	0	0	0	0	0	0	0	0	2,560	4,650	60	4,710	60	4,710
34-35	2,160	0	0	0	0	0	0	0	0	0	0	0	0	0	2,270	4,430	80	4,510	80	4,510
1935-36	2,200	0	0	0	0	0	0	0	0	0	0	0	0	0	2,710	4,910	90	5,000	90	5,000
36-37	2,270	0	0	0	0	0	0	0	0	0	0	0	0	0	3,180	5,450	110	5,560	110	5,560
37-38	2,340	0	0	0	0	0	0	0	0	0	0	0	0	0	3,860	6,200	130	6,330	130	6,330
38-39	2,390	0	0	0	0	0	0	0	0	0	0	0	0	0	4,450	6,840	140	6,980	140	6,980
39-40	2,470	0	0	0	0	0	0	0	0	0	0	0	0	0	4,510	6,980	160	7,140	160	7,140
1940-41	2,530	0	0	0	0	0	0	0	0	0	0	0	0	0	4,000	6,530	190	6,720	190	6,720
41-42	2,590	0	0	0	0	0	0	0	0	0	0	0	0	0	4,890	7,480	220	7,700	220	7,700
42-43	2,660	0	0	0	0	0	0	0	0	0	0	0	0	0	4,000	6,660	280	6,940	280	6,940
43-44	2,740	0	10	0	0	0	0	0	0	0	0	0	0	0	3,970	6,720	320	7,040	320	7,040
44-45	2,750	50	30	0	0	0	0	0	0	0	0	0	0	0	3,940	6,720	440	7,160	440	7,160
1945-46	2,600	250	50	0	0	0	0	0	0	0	0	0	0	0	5,470	8,130	750	8,880	750	8,880
46-47	2,670	300	90	0	0	0	0	0	0	0	0	0	0	0	3,690	6,470	910	7,380	910	7,380
47-48	2,640	380	160	0	0	0	0	0	0	0	0	0	0	0	1,770	4,610	1,160	5,770	1,160	5,770
48-49	2,720	390	240	0	0	0	0	0	0	0	0	0	0	0	2,060	5,080	1,350	6,430	1,350	6,430
49-50	2,670	530	340	0	0	0	0	0	0	0	0	0	0	0	4,480	7,570	1,820	9,390	1,820	9,390
1950-51	2,450	840	440	20	0	0	0	10	1,660	10	0	0	0	0	4,230	7,220	2,530	9,750	2,530	9,750
51-52	2,350	1,030	560	40	0	0	0	60	2,090	20	0	0	0	0	4,300	7,350	3,170	10,520	3,170	10,520
52-53	2,470	1,010	730	40	10	0	0	90	2,650	40	0	0	0	0	4,420	7,750	3,750	11,500	3,750	11,500
53-54	1,730	1,840	880	70	60	0	0	70	3,350	20	0	0	0	0	4,270	7,050	5,310	12,360	5,310	12,360
54-55	940	2,770	1,120	40	70	0	0	90	4,080	20	10	0	0	0	4,620	6,880	6,960	13,840	6,960	13,840
1955-56	1,360	2,420	1,230	130	70	10	110	50	4,980	30	10	10	10	10	4,230	7,040	7,630	14,670	7,630	14,670
56-57	980	2,940	1,440	140	80	10	130	50	5,970	30	10	30	30	30	4,760	7,450	9,140	16,590	9,140	16,590
57-58	390	3,640	1,700	130	90	20	170	40	7,150	40	10	30	30	30	4,460	6,900	11,020	17,920	11,020	17,920

a. Estimate of import based on the annual percentages of imported waters supplied by the cities and districts to their service areas.

b. Crescenta Valley County Water District.

c. Includes areas outside the major water service areas and deliveries to other land use classes in the hill and mountain areas.

Note: Gross delivered water to hill areas by the service areas of Crescenta Valley County Water District, La Canada and 26.3% of Glendale are tributary to Verdugo Subarea. The remaining amounts of gross delivered water to the hill areas are tributary to San Fernando Subarea.

APPENDIX K

LAND DEVELOPMENT AND USE

APPENDIX K

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APPENDIX K

LAND DEVELOPMENT AND USE

The area of investigation has undergone rapid changes in land use and population during the past 30 years. To determine the variation of culture historically, the Referee has collected data on culture and population from various sources.

Source and Extent of Data

Historical data utilized in the determination of areal culture include:

Land Use Surveys. Land use surveys by the State Department of Public Works, Division of Water Resources, were available for the years 1932 and 1942. The 1932 Land Use Survey was part of the South Coastal Basin Investigation.^{1/} In that survey data were obtained as summaries of land use contained within the area covered by the 6 minute series U.S.G.S. quadrangle sheets. The 1942 survey determined the changes that had occurred between the 1932 survey and 1942, and the data were obtained in the form of a map.

The Los Angeles Department of Water and Power conducted a land use survey for the years 1949 and 1954. The 1949 survey was made on overlays of 7-1/2 minute series U.S.G.S. quadrangle sheets while the 1954 survey was made on Los Angeles County index maps at a scale of 1" = 600'. The data collected by these surveys were utilized in State Water Resources

Board Bulletin No. 24.^{2/} Both the original survey work sheets for 1949 and 1954 and the tabulations in Bulletin No. 24 were utilized by the Referee.

The types of culture surveyed in 1932, 1942, 1949 and 1954 are tabulated in Table K-1.

Agricultural Crop Survey. Records of the acreage and water applied to various crops in the City of Los Angeles west of Burbank were maintained by the Los Angeles Department of Water and Power for the period 1925 through 1942 on a monthly basis. These records are referred to as Carr's records and also include the same data for lands in the area served by private pumpers. These records are available only on summary sheets, the original field notes no longer being in existence. Representatives of the Referee interviewed Mr. Carr in 1959 to determine the methods he used to obtain the data and as a result concluded that the aforementioned records were representative of Mr. Carr's observations.

Annual crop reports compiled by the Los Angeles County Agricultural Commissioner for the period 1944 through 1958 were utilized to supplement the various land use surveys. The original purpose of these reports was to determine the value of the various crops grown in the San Fernando Valley and Saugus-Newhall area and contained the number of bearing acres in each area. The acreages reported therein were found to agree with the observations made in the land use surveys of 1949, 1954 and 1958 and were considered representative of the full period reported.

TABLE K-1
LAND USE GROUPINGS USED BY
OTHER AGENCIES

Year	Agency conducting survey	Garden and field	Citrus	Walnuts	Deciduous	Alfalfa	Irrigated grass	Domestic, commercial and industrial	Fallow	Truck	Vacant	Residential	Commercial	Roads	River wash	Water surface	Other crops	Native vegetation	Miscellaneous
1932	State Department of Public Works, Division of Water Resources	x	x	x	x	x	x	x	x										
1942	State Department of Public Works, Division of Water Resources		x		x	x	x	x		x	x								
1949	Los Angeles Department of Water and Power*		x	x	x	x				x		x	x	x	x	x	x	x	x
1954	Los Angeles Department of Water and Power*		x	x	x	x				x		x	x	x	x	x	x	x	x

* Reported by State Water Resources Board, Bulletin 24.

Census. The United States Bureau of the Census conducted its general census for the years 1930, 1940 and 1950. Special censuses were made for the City of Los Angeles in 1946, 1953 and 1956 and the Cities of Burbank and Glendale in 1957. An estimate of the population in water service areas, shown in Table K-2, was made from combinations of records of the various census tracts covering the area.

TABLE K-2
POPULATION BY WATER SERVICE AREAS

Year : of : census:	City of : Burbank:	City of : Glendale:	City of Los Angeles : Narrows :	City of : West of : Burbank :	City of : San : Fernando:	La : Crescenta:	Total
1930	16,662	62,736	67,495	54,217	7,567	6,971	215,648
1940	34,337	82,582	77,136	112,001	9,094	10,686	325,836
1946	--	--	Incomplete	176,008	--	--	--
1950	78,577	95,702	91,560	311,116	12,922	37,009	626,886
1953	--	--	89,254	455,872	--	--	--
1956	--	--	83,749	571,563	--	--	--
1957	86,775	114,460	--	--	--	--	--

Aerial Photographs. Aerial photographs of the Upper Los Angeles River area, taken by Fairchild Aerial Surveys, Incorporated, in 1928, 1949 and 1956, were also utilized to determine the acreage of various culture classifications in the area.

1958 Land Use Survey. The land use survey made by the staff of the State Water Rights Board was mapped on overlays of 1956 aerial photographs at a scale of 1" = 400'. In undeveloped hill and mountain areas the mapping was done on U.S.G.S. quadrangles at a scale of 1" = 2,000'.

The field mapping was done in detail utilizing approximately 150 separate classifications. Boundaries of water service areas and hydrologic subareas were added to the overlays as they were determined. Prints of the overlays were made and cut and weighed to determine the area of each classification. In the cutting process, classifications with similar water use characteristics were combined, reducing the number of classifications to 37. Computations of areas within each photograph were controlled by the area computed from the grid coordinates printed on each photograph.

The data on the 37 classifications were coded as to photograph number, water service area, hydrologic subarea, location in valley fill or hill area and type of culture, and punched onto tabulating cards. The areas in acres for each classification within a photograph were computed by machine and the results were then tabulated by water service area and hydrologic subarea. The 37 classifications were then placed into the major groups listed in Table K-3.

Land Use Classifications

The grouping of various land use classes was accomplished by combining on the basis of relative consumptive use the classifications developed by the State Department of Water Resources according to water requirements. Groupings of classes utilized by the Referee are shown in Table K-3. The major groupings do not conform to those utilized in the previous land use surveys referred to in Table K-1; therefore, interpretation of previous surveys was necessary in order to obtain consistent historic culture changes. For example, an area placed in the "fallow" category in the 1932 survey would be placed under "dry farm and native vegetation" in the adopted classification system. Acreages shown herein for each of the land use classes include streets and roads.

Methods of Determining Areal Culture

Table K-4 presents a summary of the methods and data sources utilized in the determination of areal culture on the valley fill. The term areal culture as used herein is synonymous with land use.

Irrigated Crops

Carr's records covered the City of Los Angeles west of Burbank. Since this area contained most of the irrigated crop acreage, the remainder of the valley fill was determined by subtracting Carr's values from the annual values determined by the 1932 and 1942 surveys. Values for the remaining years between 1928 and 1942 were obtained by straight line interpolation and extrapolation of the 1932 and 1942 data.

TABLE K-3
LAND USE CLASSIFICATION

<u>Residential</u>		
Single and duplex	Hotels	Estates
Multiple	Trailer courts	Farmsteads (1/3 of total acreage)
<u>Commercial and Industrial</u>		
Offices	Parking lots	Open storage yards
Hotels	Hard surface earth yards	Substations
Hospitals	Military	Railroad marshaling yards
Prisons	Dairies and feed lots	Truck loading
Reformatories	Manufacturing	Airfields
Asylums	Assembling	Saw mills
Schools	Processing	Oil refineries
Power receiving stations	Oil fields	Paper mills
Kennels	Rock quarries	Meat packing plants
Drive-in theaters	Gravel pits	Steel and aluminum mills
Wineries	Public dumps	Canneries
Brick yards	Rock and gravel plants	Movie studios
Zoo area	Warehouses	Power plants
Auditoriums		
<u>Miscellaneous</u>		
Churches	Spreading grounds	Debris basins
Sanitariums	Dams	Paved channels - paved areas
Circus headquarters	Movie sets	Fronzys
Rock crushers		
<u>Irrigated Crops</u>		
<u>Alfalfa and Irrigated Pasture</u>		
Alfalfa	Mixed pasture	Native pasture
Clover		
<u>Citrus</u>		
Grapefruit	Oranges	Avocados
Lemons	Dates	
<u>Deciduous</u>		
Apples	Peaches	Miscellaneous deciduous
Apricots	Pears	Honey orchards
Olives	Plums	Almonds
Cherries	Prunes	Miscellaneous nuts
Nectarines	Figs	Farmsteads (1/3 of total acreage)
<u>Walnuts</u>		
<u>Truck</u>		
Artichokes	Lettuce and romaine	Spinach
Asparagus	Melons	Tomatoes
Beans (green)	Squash	Flowers and nursery
Broccoli	Cucumbers	Honey gardens
Cabbage	Onions and garlic	Miscellaneous truck
Cauliflower	Pean	Dash berries
Corn, green	Potatoes	Strawberries
Carrots	Brent potatoes	Peppers
Celery		
<u>Vineyard</u>		
Table grapes	Wine grapes	Raisin grapes
<u>Lawn Grass</u>		
Parks	Courtyards	Golf courses
<u>Water Surface</u>		
Lakes	Reservoirs	Rivers
<u>Riparian Vegetation</u>		
Swamps	Meadowland	Brush in stream channels
		Brush and trees in stream channels
<u>Dry Farm and Native Vegetation</u>		
Grass land	Rye	Wash areas
Brush	Grain hay	Honey tailings
Timber forest	Miscellaneous hay	Barren land, rocky
Barley	Vacant lots	Idle (being cleared - being leveled)
Wheat	Railway rights of way	Farmsteads (1/3 of total acreage)
Oats	Utility rights of way	

TABLE K-4

METHODS AND DATA UTILIZED FOR DETERMINATION OF AREAL CULTURE

Year	Irrigated crops	Residential	Commercial and Industrial	Miscellaneous	Riparian vegetation	Water surface	Dry Farm and native vegetation
1928-29	a	i	i	k	m	n	o
29-30	a	j	j	k	m	n	o
1930-31	a	j	j	k	m	n	o
31-32	a and b	j and b	j and b	k	m	n	o
32-33	a	j	j	k	m	n	o
33-34	a	j	j	k	m	n	o
34-35	a	j	j	k	m	n	o
1935-36	a	j	j	k	m	n	o
36-37	a	j	j	k	m	n	o
37-38	a	j	j	k	m	n	o
38-39	a	j	j	k	m	n	o
39-40	a	j	j	k	m	n	o
1940-41	a	j	j	k	m	n	o
41-42	a and c	j and c	j and c	k	m	n	o
42-43	d	j	j	k	m	n	o
43-44	e	j	j	k	m	n	o
44-45	e	j	j	k	m	n	o
1945-46	e	j	j	k	m	n	o
46-47	e	j	j	k	m	n	o
47-48	e	j	j	k	m	n	o
48-49	f	j	j	k	m	n	o
49-50	e	j	j	k	m	n	o
1950-51	e	j	j	k	m	n	o
51-52	e	j	j	k	m	n	o
52-53	e	j	j	k	m	n	o
53-54	g	j	j	k	m	n	o
54-55	e	j	j	k	m	n	o
1955-56	e	j	j	k	m	n	o
56-57	a	j	j	k	m	n	o
57-58	h	h	h	h	h	h	h

- a. Frank Carr's record for the City of Los Angeles.
- b. 1932 Department of Water Resources Land Use Survey. Also used as check on other data.
- c. 1942 Department of Water Resources Land Use Survey. Also used as check on other data.
- d. Average of the year preceeding and following.
- e. Los Angeles County Agricultural Commission's Annual Report.
- f. 1949 Land Use Survey by Los Angeles Department of Water and Power, adjusted to include roads.
- g. 1954 Land Use Survey by Los Angeles Department of Water and Power, adjusted to include roads.
- h. 1958 Land Use Survey by Inferees.
- i. Planimetered area from 1928 Aerial Photo.
- j. Straight line interpolation between years with data.
- k. The annual change in acreage of the Miscellaneous classification was determined by deducting the areas of freeways, paved channels, spreading grounds and dams completed during a given year from the total acreage determined for this class by the 1958 Land Use Survey.
- m. Riparian vegetation was determined only in 1958 Land Use Survey. The annual change in riparian vegetation was estimated by adding to the area of riparian vegetation found in 1958 survey, the acreage occupied annually by channel improvements to the Los Angeles River from 1938 through 1958. The area of riparian vegetation from 1928 through 1937 was then assumed constant.
- n. Based on 1958 survey, except water surface area back of Hansen Dam was subtracted therefrom to determine the acreage existing in the period 1928-1940.
- o. Difference between the sum of the acreage of known culture and the total valley fill area.

Irrigated crops in the Sylmar Subarea were determined from maps prepared by Frank Carr for the Los Angeles Department of Water and Power showing the location and area of the various crops grown in the City of Los Angeles west of Burbank. These maps were available for 1929, 1931, 1934 and 1938. The area of each crop shown on these maps was planimetered to obtain the acreage. Thus, with Carr's data and that from the five land use surveys, including 1958, a total of nine years of record was known. The remaining 21 years were determined by interpolation of the ratio of crop acreage in Sylmar to crop acreage on the valley floor.

To obtain the acreage of irrigated crops in the Verdugo Subarea, the 1932, 1949, 1954 and 1958 land use surveys were utilized and the annual amounts irrigated were obtained by following the annual trend of irrigation for the total valley fill area.

The acreage of irrigated crops in the San Fernando Subarea was taken as the difference between the sum of the acreage in Sylmar and Verdugo Subareas and the total acreage for each crop on the valley floor.

Residential

The rate of growth of residential areas in the Sylmar and Verdugo Hydrologic Subareas has differed throughout the base period. The population data for each subarea indicate that the Verdugo Subarea has increased at a uniform rate while the population of the Sylmar Subarea first grew slowly and then in the late 30's or early 40's had a rapid increase. This relative

difference in the rate of population increase in Sylmar and Verdugo Hydrologic Subareas is indicated on Figure K-1 which contains a plot of the population in these areas versus time throughout the base period.

Utilizing the acreage of residential in 1928, 1949, 1954 and 1958, the annual increase in acreage was interpolated between these years to correspond to the rate of increase in population for each subarea.

Commercial and Industrial

Commercial and industrial acreages were combined to form one classification because of the various interpretations for industrial classifications. Data are available for the years 1928, 1949, 1954 and 1958. The method of interpolating between the years of data for Sylmar and Verdugo Subareas is the same as for residential.

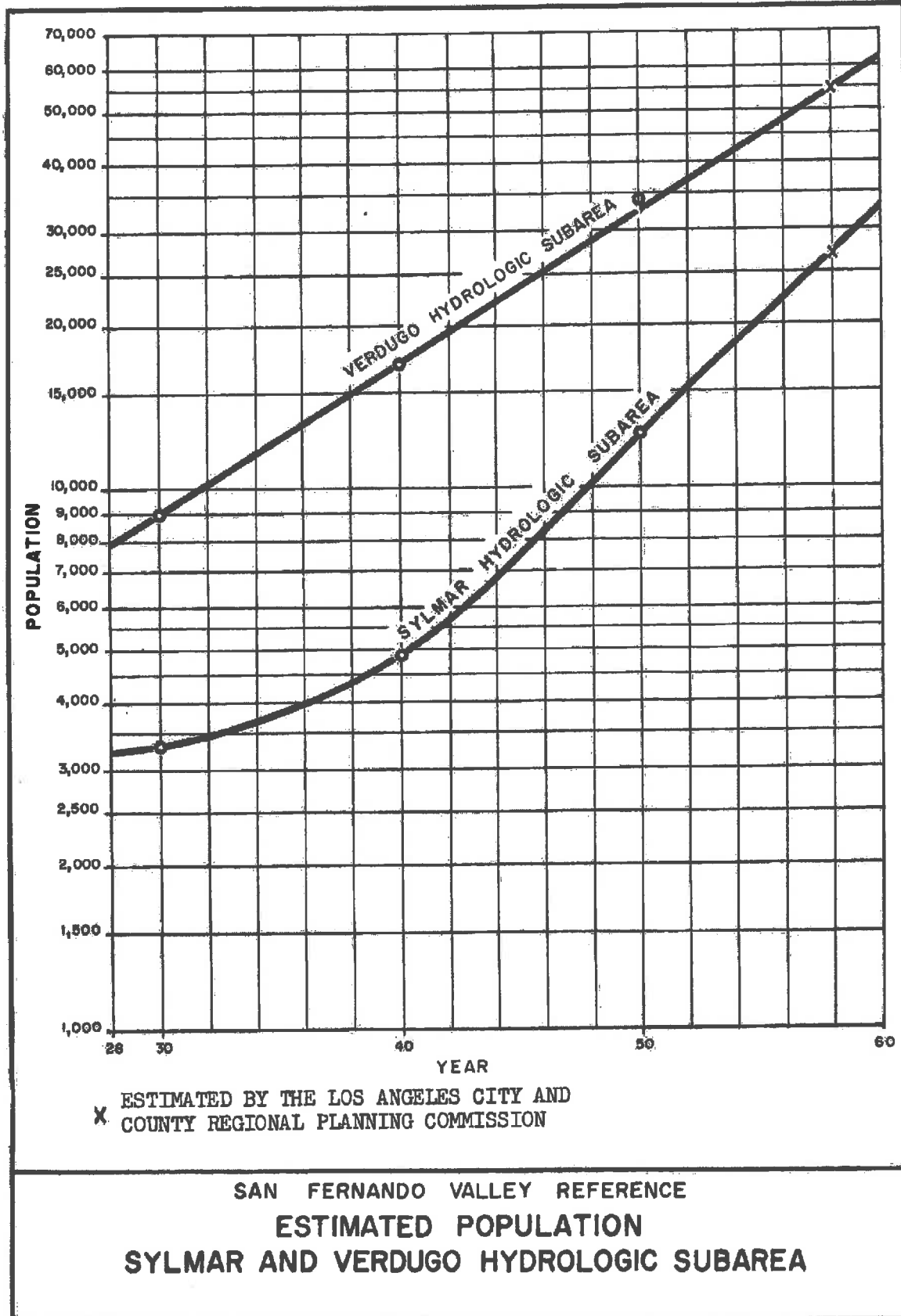
Dry Farm and Native Vegetation

The sum of all acreages in all classifications in the three hydrologic subareas equals the total acreage on the valley floor. The dry farm and native vegetation class was determined as the difference between the sum of the acreages of known culture, evaluated as described heretofore, and the total area in each subarea.

Residential Development in the Hill and Mountain Areas

During the latter part of the base period residential development in the hill and mountain areas has shown a rapid increase. The only land

FIGURE K-1



STATE WATER RIGHTS BOARD

use survey which extended into the hill areas was the one made by the State Water Rights Board staff in 1958. In the 1958 Land Use Survey, the major portion of the 8,740 acres of residential in the hill areas was in the San Fernando Subarea, primarily in the Santa Monica Mountains and the hills in the Los Angeles Narrows. Residential acreage on the hills within each subarea during 1958 was as follows:

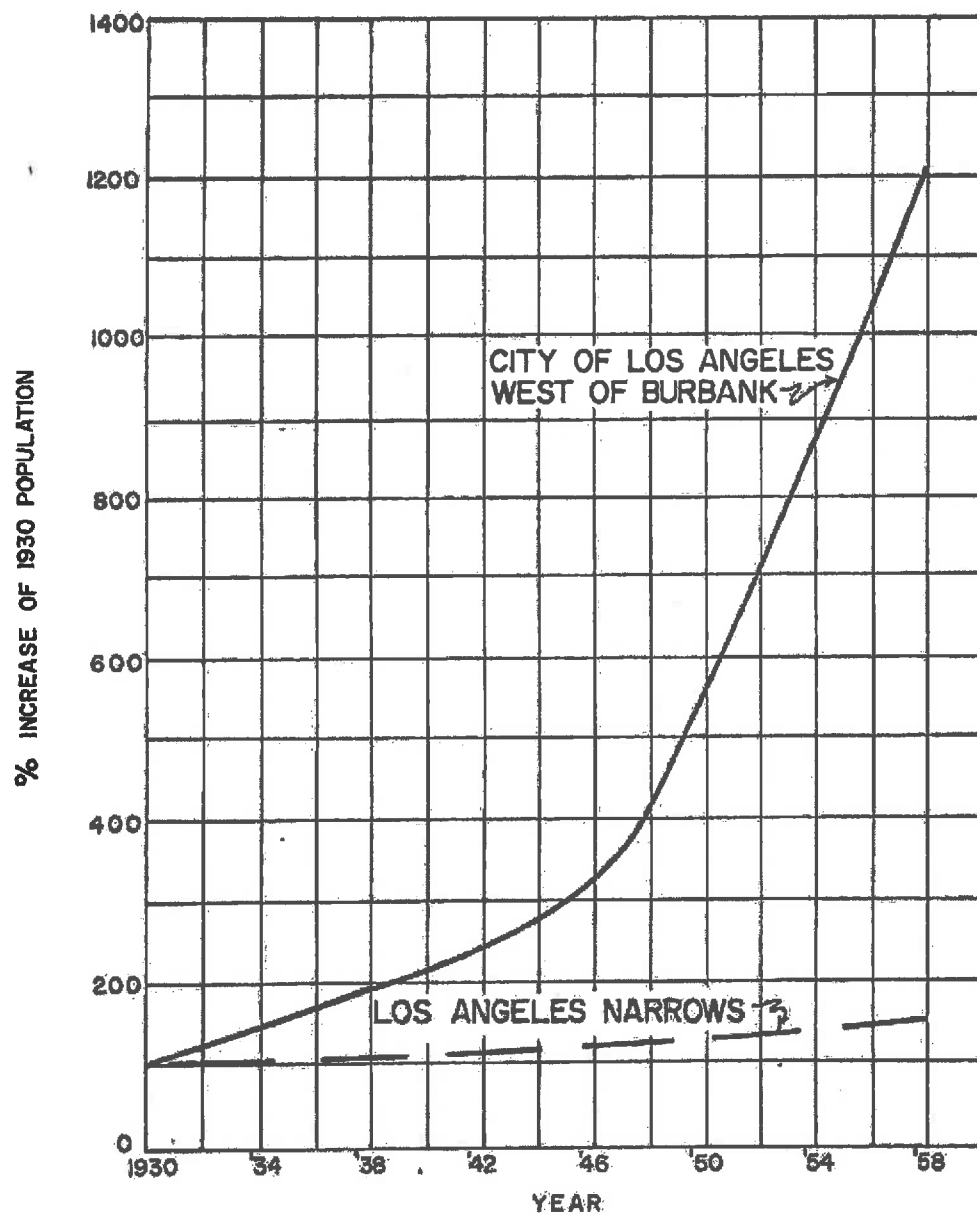
San Fernando	8,274 acres
Sylmar	33 acres
Verdugo	397 acres

Within San Fernando Subarea, 82 percent, or 6,775 acres was in the Owens and Narrows service areas. The latter service area contains one of the oldest residential hill areas in the area of investigation. An estimate of this residential acreage was made by prorating the area surveyed in 1958 on the basis of the population census. The population in the Narrows area has since 1930 increased approximately 40 percent, as shown on Figure K-2. The acreage in residential found in 1958 was thus decreased directly with the percentage change in population, based on the 1930 and recent census values.

In the Owens service area, most of the residential development is in the Santa Monica Mountains. The same method was utilized in this area for estimation of residential acreage in the earlier years as heretofore described for the Narrows service area.

Table K-5 lists values of residential acreage in the hills, estimated in this manner for each year of the base period.

FIGURE K-2



SAN FERNANDO VALLEY REFERENCE
INCREASE IN POPULATION FOR CITY OF LOS ANGELES
WEST OF BURBANK AND NARROWS AREA

STATE WATER RIGHTS BOARD

TABLE K-5

ESTIMATED HILL AND MOUNTAIN RESIDENTIAL AREAS

In Acres

Year	Narrows	Santa Monica	Other hill and mountain groups	Total
1928-29	1,500	0	0	1,500
29-30	1,530	0	0	1,530
1930-31	1,550	10	0	1,560
31-32	1,580	20	0	1,600
32-33	1,600	30	0	1,630
33-34	1,630	40	0	1,670
34-35	1,660	50	0	1,710
1935-36	1,680	60	0	1,740
36-37	1,710	70	0	1,780
37-38	1,730	80	0	1,810
38-39	1,760	90	0	1,850
39-40	1,790	100	0	1,890
1940-41	1,810	120	0	1,930
41-42	1,840	140	0	1,980
42-43	1,860	180	0	2,040
43-44	1,890	200	20	2,110
44-45	1,920	240	30	2,190
1945-46	1,940	300	70	2,310
46-47	1,970	360	130	2,460
47-48	1,990	440	220	2,650
48-49	2,020	530	330	2,880
49-50	2,050	700	480	3,230
1950-51	2,070	900	640	3,610
51-52	2,100	1,120	840	4,060
52-53	2,120	1,420	1,070	4,610
53-54	2,150	1,800	1,320	5,270
54-55	2,180	2,200	1,600	5,980
1955-56	2,200	2,700	1,890	6,790
56-57	2,230	3,250	2,190	7,670
57-58	2,250	3,920	2,540	8,710

Chronological Summary of
Areal Culture on the Valley Floor

Table K-6 is a compilation of the acreages for each classification in San Fernando (including Eagle Rock Subarea), Sylmar and Verdugo Subareas and the total valley fill area. Table K-7 gives the acreages of each land use classification on the valley fill area within each of the major water service areas and with respect to its location in each of the subareas. Due to the small area of Eagle Rock Subarea, the acreages of land use have been combined with San Fernando Subarea.

- 1/ California State Department of Public Works, Division of Water Resources. "Value and Cost of Water for Irrigation in Coastal Plain of Southern California". Bulletin No. 43, South Coastal Basin Investigation. 1933.
- 2/ California State Water Resources Board. "Los Angeles County Land and Water Use Survey, 1955". Bulletin No. 24. June, 1956.

TABLE K-6
AREAL CULTURE
WITHIN BOUNDARY OF THE VALLEY FILL
SYLMAR HYDROLOGIC SUBAREA
(5,600 Acres)
In Acres

Year	Irrigated crops							Total	Resi- dential	Commercial and industrial	Miscella- neous	Riparian veg- etation	Water surface	Dry farm and native vegetation
	Deciduous	Citrus	Walnuts	Truck crops	Alfalfa and pasture	Lawn grass	Irrigated vineyard							
1928-29	1,710	1,000	40	330	160	40	80	3,360	120	40	150			1,930
29-30	1,310	1,080	40	300	150	40	40	2,960	160	40	150			2,290
1930-31	1,000	1,160	40	270	140	40	30	2,680	200	40	150			2,530
31-32	1,050	1,200	40	250	120	40	30	2,740	230	40	150			2,660
32-33	1,470	1,230	40	240	110	40	60	3,190	260	40	150			1,960
33-34	1,220	1,260	40	220	100	40	50	2,930	300	40	150			2,180
34-35	1,420	1,290	40	200	90	40	30	3,110	340	40	150			1,960
1935-36	1,540	1,320	40	180	80	40	20	3,220	370	40	150			1,820
36-37	1,430	1,130	40	120	60	40	20	3,140	400	40	150			1,870
37-38	1,260	950	40	650	40	40	20	2,920	440	40	150			2,050
38-39	900	990	40	740	50	40	20	2,780	480	40	150			2,150
39-40	760	1,040	40	820	50	40	20	2,770	510	40	150			2,130
1940-41	1,210	1,080	30	910	40	40	20	3,330	540	40	150			1,540
41-42	920	1,120	30	1,000	40	40	20	3,170	580	40	150			1,660
42-43	980	1,040	30	1,030	40	40	20	3,180	620	40	150			1,610
43-44	1,030	970	30	1,070	30	40	20	3,190	650	40	150			1,570
44-45	1,030	890	30	1,110	30	40	20	3,150	680	40	150			1,580
1945-46	1,030	810	30	1,150	20	40	20	3,100	720	40	150			1,590
46-47	1,030	740	30	1,180	20	40	20	3,050	760	40	150			1,600
47-48	1,010	660	20	1,220	20	40	20	2,990	790	40	150			1,630
48-49	720	580	20	1,260	20	40	20	2,660	820	40	150			1,730
49-50	570	590	20	1,060	30	40	20	2,330	900	50	150			1,170
1950-51	570	600	20	860	50	40	10	2,150	990	60	150			2,250
51-52	760	610	20	660	60	40	10	2,160	1,070	70	150			2,150
52-53	750	620	20	460	80	40	10	1,980	1,150	80	150			2,240
53-54	760	630	10	260	90	40	30	1,820	1,230	90	150			2,310
54-55	780	580	10	260	80	40	30	1,780	1,310	110	130			2,270
1955-56	740	530	10	250	60	40	30	1,660	1,390	130	120			2,300
56-57	480	480	10	240	50	40	30	1,330	1,480	150	100			2,540
57-58	590	430	0	240	40	40	20	1,360	1,560	170	80			2,430

AREAL CULTURE
WITHIN BOUNDARY OF THE VALLEY FILL
(continued)
VERDUGO HYDROLOGIC SUBAREA^b
(5,000 Acres)

Year	Irrigated crops							Total	Resi- dential	Commercial and industrial	Miscella- neous	Riparian veg- etation	Water surface	Dry farm and native vegetation
	Deciduous	Citrus	Walnuts	Truck crops	Alfalfa and pasture	Lawn grass	Irrigated vineyard							
1928-29	140	50		10		100		300	510	40	320	30		3,800
29-30	110	50		10		100		270	540	40	320	30		3,800
1930-31	80	50		10		100		240	570	50	320	30		3,790
31-32	90	50		10		100		250	590	50	320	30		3,760
32-33	80	50		10		100		240	620	50	320	30		3,740
33-34	70	40		10		100		220	650	50	320	30		3,730
34-35	80	40		10		100		230	680	50	320	30		3,690
1935-36	80	40		10		100		230	700	60	320	30		3,660
36-37	80	40		10		100		230	750	60	320	30		3,600
37-38	60	40		10		100		210	810	70	320	30		3,550
38-39	50	30		10		100		190	850	70	320	30		3,530
39-40	40	30		10		100		180	920	80	320	30		3,470
1940-41	70	30		10		110		220	1,030	80	320	30		3,320
41-42	50	30		10		110		200	1,080	90	320	30		3,280
42-43	50	30		10		110		200	1,190	100	320	30		3,160
43-44	50	20		10		110		190	1,300	100	320	30		3,060
44-45	50	20		10		110		190	1,400	110	320	30		2,950
1945-46	60	20		10		110		200	1,510	120	320	30		2,820
46-47	50	20		10		110		190	1,650	130	320	30		2,680
47-48	50	20		10		110		190	1,780	140	320	30		2,540
48-49	40	10		10		110		170	1,890	150	320	30		2,440
49-50	30	10		10		110		160	2,030	160	320	30		2,300
1950-51	30	10		10		110		150	2,140	170	320	30		2,160
51-52	40	10		10		120		180	2,320	180	320	30		1,970
52-53	40	10		10		120		180	2,430	190	320	30		1,850
53-54	40	10		10		120		180	2,590	210	320	30		1,570
54-55	10	10		20		120		160	2,750	220	260	20		1,590
1955-56	10	10		30		120		170	2,860	230	200	20		1,520
56-57	10	10		40		150		210	3,020	240	140	20		1,370
57-58	10	10		60		150		230	3,200	250	80	20		1,220

TABLE K-6
AREAL CULTURE
WITHIN BOUNDARY OF THE VALLEY FILL
(continued)
SAN FERNANDO AND EAGLE ROCK HYDROLOGIC SUBAREAS
(112,800 Acres)

Year	Irrigated crops										Total	Residential	Commercial and industrial	Miscellaneous	Riparian vegetation	Water	Dry farm and native vegetation
	Deciduous	Citrus	Walnuts	Truck	Alfalfa and pasture	Lawn grass	Irrigated cropland										
1928-29	2,760	8,960	8,440	23,590	7,890	1,670	1,410	54,720	18,410	2,930	1,110	1,370	840	33,420			
29-30	2,130	9,220	7,860	23,210	7,590	1,670	810	52,490	19,550	3,400	1,110	1,370	840	34,030			
1930-31	1,610	9,850	7,270	22,970	6,590	1,670	630	50,490	20,710	3,850	1,110	1,370	840	34,230			
31-32	1,720	9,580	7,270	22,760	6,780	1,670	470	46,250	21,860	4,320	1,110	1,370	840	37,030			
32-33	1,080	9,450	6,570	22,900	7,420	1,670	940	44,230	23,040	4,790	1,110	1,370	840	35,420			
33-34	900	9,620	7,260	20,510	6,850	1,670	980	47,790	24,190	5,260	1,470	1,370	840	31,680			
34-35	1,050	9,570	7,250	20,600	7,100	1,670	550	47,790	25,330	5,720	1,470	1,370	840	30,280			
1935-36	1,120	10,040	7,720	21,610	7,450	1,670	490	40,100	26,500	6,180	1,470	1,370	840	26,340			
36-37	1,050	10,640	7,190	21,210	6,520	1,670	400	48,680	27,630	6,650	1,470	1,370	840	26,160			
37-38	870	10,930	6,810	26,340	7,750	1,670	410	44,780	28,750	7,100	1,470	1,370	840	28,480			
38-39	660	10,930	6,890	24,100	7,970	1,670	340	42,540	29,890	7,570	1,500	560	840	29,880			
39-40	590	10,920	6,090	23,530	7,350	1,670	290	40,400	31,020	8,030	1,550	370	840	30,590			
1940-41	890	10,750	5,270	24,620	6,170	1,780	280	39,760	32,100	8,490	1,550	370	960	29,570			
41-42	680	10,720	5,890	17,160	6,950	1,780	320	43,500	33,230	8,950	1,550	370	960	28,240			
42-43	710	11,460	5,700	14,090	7,640	1,780	300	42,080	34,300	9,410	1,550	370	960	26,130			
43-44	750	12,200	5,530	11,810	8,330	1,780	290	40,690	35,380	9,880	1,550	370	960	23,970			
44-45	750	12,330	5,470	11,010	8,330	1,780	270	39,940	36,460	10,330	1,550	370	960	23,190			
1945-46	750	12,400	5,470	8,760	9,990	1,780	260	39,410	37,530	10,790	1,700	370	960	22,040			
46-47	750	11,960	5,480	6,170	8,780	1,780	240	35,160	38,570	11,250	1,700	370	960	24,790			
47-48	740	12,200	5,480	5,520	9,770	1,780	230	35,710	39,630	11,710	1,730	340	960	22,720			
48-49	520	10,510	4,450	5,610	10,430	1,780	210	33,520	40,700	12,160	1,770	300	960	23,400			
49-50	420	10,480	4,230	4,870	8,770	1,780	190	30,740	42,060	12,340	1,770	300	960	24,630			
1950-51	430	20,210	4,240	5,980	8,970	1,780	190	31,780	43,420	12,530	1,780	290	960	22,040			
51-52	550	9,950	3,610	4,980	9,840	1,860	170	30,950	44,760	12,710	1,790	280	960	21,340			
52-53	550	9,280	3,600	5,470	7,840	1,860	150	28,790	46,150	12,900	1,800	270	960	21,970			
53-54	550	8,460	3,210	5,430	7,940	1,860	120	27,570	47,490	13,070	1,800	270	960	21,640			
54-55	510	7,780	2,910	4,350	4,320	1,860	100	21,830	49,840	13,440	1,900	260	960	24,870			
1955-56	480	7,060	2,590	3,810	3,240	1,860	90	19,130	52,240	13,210	2,080	260	960	24,920			
56-57	310	5,000	1,710	3,660	1,990	2,090	70	14,830	54,570	13,280	2,590	230	960	26,340			
57-58	380	4,440	1,160	3,730	2,720	2,090	60	14,580	56,900	13,350	2,720	200	960	24,090			

AREAL CULTURE
WITHIN BOUNDARY OF THE VALLEY FILL
(continued)
TOTAL VALLEY FILL AREA
(123,400 Acres)

Year	Irrigated crops							Total	Residential	Commercial and industrial	Miscellaneous	Riparian vegetation	Water	Dry farm and native
	Deciduous	Citrus	Walnuts	Truck	Alfalfa and pasture	Lawn grass	Irrigated cropland							
1928-29	4,610	10,010	8,480	23,930	8,050	1,810	1,490	58,380	19,040	3,010	1,580	1,400	840	39,150
29-30	3,550	10,350	7,900	23,520	7,740	1,810	850	55,720	20,260	3,480	1,580	1,400	840	40,120
1930-31	2,690	11,060	7,310	23,250	6,830	1,810	660	53,610	21,480	3,940	1,580	1,400	840	40,550
31-32	2,870	10,830	7,310	19,020	6,900	1,810	500	49,240	22,700	4,410	1,580	1,400	840	43,230
32-33	2,630	10,730	6,610	19,150	7,730	1,810	1,000	49,660	23,920	4,880	1,580	1,400	840	41,120
33-34	2,190	10,920	7,300	20,740	6,950	1,810	2,030	50,940	25,140	5,350	1,940	1,400	840	37,790
34-35	2,550	10,900	7,290	20,810	7,190	1,810	580	52,130	26,350	5,810	1,940	1,400	840	35,930
1935-36	2,740	11,400	7,760	21,800	7,530	1,810	510	53,550	27,570	6,280	1,940	1,400	840	31,820
36-37	2,550	11,810	7,230	21,640	6,580	1,810	420	52,050	28,790	6,750	1,940	1,400	840	34,630
37-38	2,110	11,920	6,850	17,000	7,790	1,810	430	47,910	30,010	7,210	1,940	1,400	840	34,090
38-39	1,610	11,950	6,930	14,850	8,020	1,810	360	45,530	31,230	7,680	1,970	590	840	25,560
39-40	1,350	11,990	6,130	14,360	7,400	1,810	310	43,350	32,450	8,150	2,020	400	840	26,190
1940-41	2,170	11,860	5,300	15,540	6,210	1,930	300	43,310	33,670	8,610	2,020	400	960	34,430
41-42	1,650	11,870	5,920	18,170	6,990	1,930	340	46,870	34,890	9,080	2,020	400	960	29,180
42-43	1,740	12,530	5,730	15,530	7,680	1,930	320	45,460	36,110	9,550	2,020	400	960	28,900
43-44	1,830	13,190	5,560	12,890	8,360	1,930	310	44,070	37,330	10,020	2,020	400	960	28,600
44-45	1,830	13,240	5,500	12,130	8,360	1,930	290	43,280	38,540	10,480	2,020	400	960	27,720
1945-46	1,840	13,230	5,500	9,920	10,010	1,930	280	42,710	39,760	10,950	2,170	400	960	26,450
46-47	1,810	12,720	5,500	7,350	8,800	1,930	260	38,400	40,980	11,420	2,170	400	960	29,070
47-48	1,800	12,880	5,500	6,750	9,790	1,930	240	38,890	42,200	11,890	2,200	370	960	26,890
48-49	1,280	11,100	4,470	6,880	10,450	1,930	230	36,340	43,410	12,350	2,240	330	960	27,770
49-50	1,020	11,080	4,250	5,940	8,800	1,930	210	33,230	44,990	12,550	2,240	330	960	29,100
1950-51	1,010	10,820	4,260	6,850	9,020	1,930	200	34,090	46,570	12,760	2,250	320	960	26,450
51-52	1,350	10,570	3,630	5,650	9,900	2,020	180	33,300	48,150	12,960	2,260	310	960	25,450
52-53	1,340	9,910	3,620	5,960	7,920	2,020	160	30,910	49,730	13,170	2,270	300	960	26,060
53-54	1,350	9,160	3,220	5,700	8,030	2,020	150	29,570	51,310	13,270	2,270	300	960	25,620
54-55	1,300	8,370	2,920	4,630	4,400	2,020	130	25,770	53,900	13,470	2,290	280	960	24,730
1955-56	1,230	7,600	2,600	4,090	3,300	2,020	120	20,960	56,490	13,570	2,400	280	960	28,740
56-57	800	5,490	1,720	3,940	2,040	2,280	100	16,370	59,070	13,670	2,830	250	960	30,250
57-58	980	4,880	1,160	4,030	2,760	2,280	80	16,170	61,660	13,770	2,880	220	960	27,740

a. Does not include residential lawn grass areas.

b. Includes the portion of Monk Hill Basin within the Upper Los Angeles River Area.

In Acres

Year	San Fernando and Santa Rosa Hydrologic Subareas															
	City of Burbank Service Area							City of Glendale Service Area								
	Desi- gnation	Urban -residential -and -commercial	Low -lying -areas	Industrial	Commercial -and -industrial	School -and -public -use	Open -land -and -vegetation	Desi- gnation	Urban -residential -and -commercial	Low -lying -areas	Industrial	Commercial -and -industrial	School -and -public -use	Open -land -and -vegetation		
1926-29	320	270	80	2,120	1,000	20	4,150	30	50	30	40	3,170	870	50	20	1,490
29-30	250	270	80	2,110	1,010	20	4,190	30	50	30	40	3,210	900	50	20	1,430
1930-31	190	270	80	2,160	1,020	20	4,220	20	50	30	40	3,240	920	50	20	1,380
31-32	200	270	80	2,160	1,030	20	4,180	20	50	30	40	3,260	950	50	20	1,310
32-33	80	260	80	2,210	1,060	20	4,270	10	50	30	40	3,510	980	50	20	1,240
33-34	70	250	80	2,210	1,050	20	4,250	10	50	30	40	3,350	1,010	50	20	1,190
34-35	80	250	80	2,260	1,070	20	4,200	20	50	30	40	3,380	1,040	50	20	1,130
1935-36	80	240	80	2,290	1,080	20	4,170	20	50	20	40	3,420	1,060	50	20	1,070
36-37	80	230	80	2,320	1,090	20	4,140	20	50	20	40	3,450	1,090	50	20	1,010
37-38	60	230	80	2,350	1,100	20	4,130	10	50	20	40	3,490	1,110	50	20	960
38-39	50	210	80	2,380	1,110	20	4,110	10	50	20	40	3,520	1,140	50	20	900
39-40	40	210	80	2,400	1,130	20	4,080	10	50	10	40	3,560	1,150	50	20	860
1940-41	70	200	130	2,430	1,140	20	3,970	10	50	10	40	3,590	1,160	50	20	820
41-42	50	190	130	2,460	1,150	20	3,960	10	50	10	40	3,630	1,170	50	20	770
42-43	30	220	130	2,620	1,260	20	3,680	20	40	10	40	3,670	1,170	50	20	730
43-44	40	210	130	2,790	1,370	20	3,370	20	30	10	40	3,700	1,180	50	20	700
44-45	40	260	130	2,950	1,480	20	3,080	20	20	10	40	3,740	1,190	50	20	660
1945-46	40	280	130	3,120	1,590	20	2,780	20	10	10	40	3,770	1,200	50	20	630
46-47	40	300	130	3,260	1,700	20	2,490	20	0	10	40	3,800	1,200	50	20	610
47-48	40	320	130	3,450	1,810	50	2,460	20	0	10	40	3,840	1,210	50	20	560
48-49	30	340	130	3,610	1,920	50	1,880	10	0	10	40	3,870	1,220	50	20	530
49-50	20	300	130	3,750	1,940	50	1,770	10	0	10	40	3,910	1,220	50	20	490
1950-51	20	270	130	3,900	1,950	50	1,640	10	0	10	40	3,930	1,230	50	10	470
51-52	30	230	160	4,010	1,970	50	1,480	10	0	10	40	3,940	1,240	50	0	460
52-53	30	200	160	4,190	1,980	50	1,350	10	0	10	40	3,970	1,240	50	0	430
53-54	30	160	160	4,330	2,000	50	1,230	10	0	10	40	3,980	1,240	50	0	420
54-55	30	120	160	4,470	2,010	90	1,080	10	0	20	40	3,990	1,250	90	0	350
1955-56	20	90	160	4,610	2,030	120	930	10	0	20	40	4,020	1,260	110	0	290
56-57	20	50	170	4,750	2,040	160	770	10	0	20	80	4,030	1,260	120	0	220
57-58	20	10	170	4,890	2,060	190	620	10	0	30	80	4,040	1,260	130	0	200

In Acres

Year	San Fernando and Eagle Rock Hydrologic Subareas														
	Quinn Service Area														
	Deciduous	Citrus	Walnuts	Truck	Alfalfa	Irrigated pasture	Lawn grass vineyard	Residential	Commercial and industrial	Miscellaneous	Open vineyard	Riparian Vegetation	Water surface	Dry farm and fallow land	
1928-29	2,110	8,300	8,440	24,930	7,880		1,270	1,470	10,160	150	800	480	1,150	840	22,140
29-30	1,790	8,560	7,860	22,550	7,580		1,270	670	11,190	290	800	1,090	1,150	840	22,430
1930-31	1,340	9,190	7,270	22,310	6,680		1,270	520	12,230	680	800	1,270	1,150	840	27,420
31-32	1,440	8,920	7,270	18,100	6,770		1,270	390	13,260	1,100	800	1,420	1,150	840	25,340
32-33	860	8,770	6,570	18,260	7,610		1,270	780	14,220	1,520	800	940	1,150	840	24,110
33-34	730	8,920	7,260	19,880	6,840		1,270	820	15,290	1,910	1,160	920	1,150	840	21,080
34-35	830	8,840	7,250	19,990	7,090		1,270	660	16,310	2,310	1,150	1,350	1,150	840	19,220
1935-36	900	9,290	7,720	21,010	7,440		1,270	440	17,320	2,710	1,150	1,420	1,150	840	15,130
36-37	830	9,670	7,190	20,610	6,520		1,270	330	18,330	3,120	1,150	1,500	500	840	16,010
37-38	720	10,260	6,810	15,760	7,740		1,270	19,310	3,520	1,160	1,490	450	840	18,500	
38-39	530	10,240	6,890	13,530	7,960		1,270	280	20,300	3,930	1,140	1,540	390	840	19,330
39-40	440	10,100	6,090	12,970	7,340		1,270	240	21,300	4,340	1,040	1,580	350	840	20,170
1940-41	720	9,910	5,270	14,080	6,160		1,310	230	22,240	4,750	1,040	1,580	350	960	19,470
41-42	550	9,860	5,890	16,630	6,940		1,310	270	23,220	5,170	1,040	1,540	350	960	18,340
42-43	530	10,660	5,700	13,930	7,630		1,310	250	23,970	5,480	1,040	770	350	960	15,460
43-44	540	11,440	5,530	11,260	8,320		1,310	240	24,730	5,800	1,040	1,530	350	960	15,020
44-45	560	11,630	5,470	10,460	8,320		1,310	220	25,570	6,080	1,040	1,330	350	960	14,850
1945-46	540	11,760	5,470	8,200	9,980		1,310	220	26,260	6,380	1,040	1,040	350	960	11,560
46-47	540	11,380	5,480	5,610	8,770		1,310	200	27,000	6,710	1,040	890	350	960	17,430
47-48	530	11,660	5,480	4,960	9,760		1,310	180	27,740	7,020	1,040	660	320	960	16,580
48-49	370	10,010	4,590	5,050	7,690	2,730	1,310	170	28,490	7,320	1,080	450	280	960	17,710
49-50	310	10,030	4,230	4,360	7,690	1,070	1,310	160	29,560	7,440	1,080	470	280	960	19,120
1950-51	300	9,820	4,240	5,510	7,910	1,040	1,310	160	30,610	7,570	1,090	480	280	960	16,760
51-52	400	9,590	3,610	4,570	8,240	1,580	1,320	140	31,720	7,700	1,100	500	280	960	16,360
52-53	400	8,970	3,600	5,100	4,840	2,870	1,320	120	32,820	7,040	1,110	520	270	960	17,230
53-54	400	8,190	3,210	5,130	5,380	2,520	1,320	100	33,900	7,960	1,110	510	270	960	17,150
54-55	360	7,560	2,910	4,080	2,630	1,640	1,320	80	35,990	7,980	1,130	510	260	960	20,660
1955-56	360	6,890	2,550	3,580	1,640	1,550	1,320	70	38,120	7,990	1,260	480	260	960	21,000
56-57	210	4,870	1,710	3,460	1,480	1,540	1,340	60	40,190	8,080	1,690	50	230	960	23,330
57-58	270	4,360	1,660	3,600	1,330	1,520	1,340	50	42,270	8,060	1,780	60	200	960	21,330

TABLE K-7
AREAL CULTURE ON VALLEY FILL AREA
BY WATER SERVICE AREA WITHIN EACH SUBAREA
(continued)

In Acres

Year	San Fernando and Eagle Rock Hydrologic Subareas													Hawthorne Service Area				
	Decid- uous	Citrus	Truck	Lawn grass	Resi- dential	Commercial and industrial	Miscel- laneous vegetation	Dry farm and native vegetation	Truck	Irrig- ated pasture	Lawn grass	Resi- dential	Commercial and industrial	Miscel- laneous vegetation	Riparian vegetation	Dry farm and native vegetation		
1928-29	20	310	190	10	300	40	20	1,530	60	0	260	1,440	520	160	200	2,460		
29-30	10	310	190	10	320	40	20	1,520	60	0	260	1,450	650	160	200	2,130		
1930-31	10	310	190	10	340	50	20	1,490	60	0	260	1,460	860	160	200	2,110		
31-32	10	310	190	10	360	50	20	1,470	60	0	260	1,490	870	160	200	2,070		
32-33	20	330	190	10	380	50	20	1,420	50	0	260	1,510	880	160	200	2,040		
33-34	10	350	190	10	400	60	20	1,380	50	0	260	1,540	900	160	200	2,000		
34-35	20	370	190	10	420	60	20	1,330	40	0	260	1,560	910	160	200	1,970		
1935-36	20	390	190	10	440	60	20	1,290	40	0	260	1,590	930	160	200	1,920		
36-37	20	410	200	10	460	70	20	1,230	40	0	260	1,610	940	160	200	1,890		
37-38	10	420	200	10	480	70	20	1,210	30	0	260	1,640	960	160	200	1,860		
38-39	10	440	200	10	500	70	20	1,170	30	0	260	1,660	970	210	150	1,830		
39-40	10	460	200	10	520	70	20	1,130	30	0	260	1,690	990	360	0	1,780		
1940-41	10	480	200	20	540	80	20	1,070	20	0	260	1,710	1,000	360	0	1,760		
41-42	10	500	200	20	560	80	20	1,030	20	0	260	1,740	1,020	360	0	1,710		
42-43	70	470	190	20	610	90	20	950	20	0	260	1,770	1,040	360	0	1,640		
43-44	70	490	180	20	670	100	20	910	20	0	260	1,800	1,060	360	0	1,580		
44-45	70	420	170	20	720	110	20	890	10	0	260	1,830	1,080	360	0	1,540		
1945-46	70	390	160	20	780	120	20	860	10	0	260	1,860	1,100	510	0	1,340		
46-47	70	360	150	20	830	120	20	850	10	0	260	1,890	1,120	510	0	1,290		
47-48	70	340	140	20	880	130	20	880	0	0	260	1,920	1,130	510	0	1,260		
48-49	50	310	130	20	940	140	20	810	0	0	260	1,950	1,150	510	0	1,220		
49-50	50	280	120	20	990	150	20	800	0	0	260	1,980	1,160	510	0	1,190		
1950-51	40	250	110	20	1,040	160	20	780	0	10	260	2,010	1,180	510	0	1,130		
51-52	50	230	100	20	1,100	170	20	730	0	10	300	2,030	1,190	510	0	1,050		
52-53	50	200	90	20	1,150	180	20	710	0	20	300	2,060	1,210	510	0	990		
53-54	50	170	80	20	1,210	190	20	680	0	30	300	2,080	1,220	510	0	950		
54-55	50	140	70	20	1,260	190	20	670	0	40	300	2,110	1,240	510	0	890		
1955-56	50	120	60	20	1,310	200	20	640	0	40	300	2,130	1,250	510	0	870		
56-57	30	90	50	20	1,370	210	20	630	0	50	450	2,160	1,270	540	0	630		
57-58	40	60	40	20	1,420	220	20	600	0	60	450	2,180	1,280	540	0	590		

AREAL CULTURE ON VALLEY FILL AREA
BY WATER SERVICE AREA WITHIN EACH SUBAREA
(continued)

In Acres

Year	San Fernando and Eagle Rock Hydrologic Subareas													City of San Fernando Service Area				
	Residential	Commercial and industrial	Miscel- laneous vegetation	Dry farm and native vegetation	Decid- uous	Citrus	Truck	Irrig- ated vineyard	Citrus	Truck	Alfalfa	Lawn grass	Residential	Commercial and industrial	Miscel- laneous vegetation	Dry farm and native vegetation		
1928-29	830	120	30	970	60	20	50	240	280	60	10	10	390	190	30	190		
29-30	860	120	30	1,050	50	20	50	140	280	60	10	10	390	190	30	190		
1930-31	890	130	30	1,050	40	20	50	110	280	60	10	10	390	190	30	190		
31-32	920	130	30	1,050	40	20	50	80	280	60	10	10	390	190	30	190		
32-33	950	130	30	900	80	20	50	160	280	60	10	10	390	190	30	190		
33-34	980	140	30	870	70	20	50	160	280	60	10	10	390	190	30	190		
34-35	1,010	140	30	890	80	30	50	90	280	60	10	10	390	190	30	190		
1935-36	1,050	150	30	850	80	30	50	80	280	60	10	10	390	190	30	190		
36-37	1,070	150	30	850	80	30	50	70	280	70	10	10	390	190	30	180		
37-38	1,100	150	30	840	60	30	40	70	270	70	10	10	390	190	30	190		
38-39	1,110	160	30	810	50	30	40	60	270	70	10	10	390	190	30	190		
39-40	1,160	160	30	800	40	40	40	50	270	70	10	10	390	190	30	190		
1940-41	1,200	170	30	720	70	40	40	50	270	70	10	20	390	190	30	180		
41-42	1,230	170	30	710	50	40	40	50	270	70	10	20	390	190	30	180		
42-43	1,250	170	30	710	30	40	40	50	250	70	10	20	410	200	30	170		
43-44	1,260	170	30	690	40	40	40	50	240	60	10	20	430	200	30	170		
44-45	1,270	180	30	670	40	40	40	50	220	60	10	20	440	210	30	170		
1945-46	1,280	180	30	680	40	30	40	40	210	60	10	20	460	220	30	150		
46-47	1,300	180	30	660	40	30	40	40	190	50	10	20	470	220	30	170		
47-48	1,310	180	30	650	40	30	40	40	170	50	10	20	490	230	30	160		
48-49	1,330	180	30	640	30	30	40	40	160	40	10	20	510	230	30	160		
49-50	1,340	190	30	640	20	30	40	30	140	40	10	20	530	240	30	150		
1950-51	1,360	190	30	630	20	20	40	30	120	40	10	20	540	250	30	150		
51-52	1,370	190	30	610	30	20	40	30	110	30	10	20	560	250	30	150		
52-53	1,380	190	30	600	30	20	40	30	90	30	10	20	580	260	30	140		
53-54	1,390	190	30	600	30	20	40	20	80	30	10	20	600	270	30	120		
54-55	1,410	200	30	570	30	20	40	20	60	20	10	20	610	270	30	110		
1955-56	1,420	200	30	580	20	10	40	20	40	20	10	20	630	280	30	130		
56-57	1,430	200	30	580	20	10	40	10	30	10	10	30	640	280	30	130		
57-58	1,440	200	30	570	20	10	40	10	10	10	10	30	660	290	30	120		

TABLE N-7
AREAL CULTURE ON VALLEY FILL AREA
BY WATER SERVICE AREA WITHIN EACH SUBAREA
(continued)

Year	In Acres														
	Valley Fill Area														
	City of San Fernando Service Area														
	Deciduous	Conifer	Truck	Alfalfa	Irrigated	Lawn	Residential	Commercial	Miscellaneous	Non-irrigated	Dry farm	Native	Residential	Dry farm	Native
1928-29	1,710	1,000	40	330	160	40	80	40	150	30	1,820	40	80		
29-30	1,310	1,080	40	300	150	40	120	40	150	60	2,150	40	80		
1930-31	1,000	1,160	40	270	140	40	30	160	150	70	2,380	40	80		
31-32	1,050	1,200	40	250	120	40	30	190	150	80	2,280	40	80		
32-33	1,470	1,230	40	240	110	40	60	220	150	60	1,820	40	80		
33-34	1,200	1,260	40	220	100	40	50	260	150	50	2,050	40	80		
34-35	1,420	1,290	40	200	90	40	30	300	150	70	1,810	40	80		
1935-36	1,540	1,320	40	180	80	40	20	330	150	70	1,670	40	80		
36-37	1,430	1,130	40	120	60	40	20	360	150	80	1,710	40	80		
37-38	1,180	950	40	650	40	40	20	400	150	80	1,890	40	80		
38-39	900	990	40	740	50	40	20	440	150	100	1,970	40	80		
39-40	760	1,040	40	820	50	40	20	470	150	110	1,940	40	80		
1940-41	1,210	1,080	30	910	40	40	20	500	150	120	1,340	40	80		
41-42	920	1,120	30	1,000	40	40	20	540	150	120	1,460	40	80		
42-43	980	1,040	30	1,030	40	40	20	580	150	60	1,470	40	80		
43-44	1,030	970	30	1,070	30	40	20	610	150	120	1,370	40	80		
44-45	1,030	890	30	1,110	30	40	20	630	150	100	1,410	50	70		
1945-46	1,030	810	30	1,150	20	40	20	670	150	80	1,440	50	70		
46-47	1,030	710	20	1,180	20	40	20	710	150	70	1,460	50	70		
47-48	1,010	660	20	1,220	20	40	20	740	150	50	1,510	50	70		
48-49	720	580	20	1,260	0	20	20	770	150	40	1,820	50	70		
49-50	570	590	20	1,060	0	30	20	850	150	40	2,060	50	70		
1950-51	570	600	20	860	0	50	10	930	60	150	2,150	60	60		
51-52	760	610	20	650	0	60	10	1,010	70	150	2,050	60	60		
52-53	750	620	20	660	0	80	10	1,090	80	150	2,140	60	60		
53-54	760	630	10	660	0	90	10	1,170	90	150	2,210	60	60		
54-55	780	580	10	660	0	80	30	1,250	110	130	2,170	60	60		
1955-56	740	530	10	250	0	60	30	1,330	130	120	2,200	60	60		
56-57	480	480	10	240	0	50	30	1,410	150	100	2,450	70	50		
57-58	590	430	0	240	0	40	20	1,490	170	80	2,340	70	50		

AREAL CULTURE ON VALLEY FILL AREA
BY WATER SERVICE AREA WITHIN EACH SUBAREA
(continued)

Year	In Acres														
	Valley Fill Area														
	City of Glendale Service Area														
	Deciduous	Conifer	Truck	Alfalfa	Irrigated	Lawn	Residential	Commercial	Miscellaneous	Non-irrigated	Dry farm	Native	Residential	Dry farm	Native
1928-29	110	0	10	280	20	120	20	1,640	90	150	10	200	1,220		
29-30	90	0	10	280	20	120	20	1,660	90	160	10	200	1,210		
1930-31	60	0	10	300	20	120	20	1,870	90	170	20	200	1,190		
31-32	70	0	10	310	20	120	20	1,850	90	180	20	200	1,180		
32-33	60	0	10	330	20	120	20	1,840	90	180	20	200	1,180		
33-34	60	0	10	350	20	120	20	1,820	90	190	20	200	1,170		
34-35	60	0	10	360	20	120	20	1,810	90	200	20	200	1,160		
1935-36	60	0	10	370	30	120	20	1,790	90	210	20	20	1,150		
36-37	60	0	10	390	30	120	20	1,770	90	230	20	200	1,130		
37-38	50	0	10	430	30	120	20	1,740	90	240	30	200	1,110		
38-39	40	0	10	450	30	120	20	1,730	90	250	30	200	1,090		
39-40	30	0	10	490	40	120	20	1,690	90	270	30	200	1,080		
1940-41	60	0	10	540	40	120	20	1,610	100	310	30	200	1,030		
41-42	40	0	10	570	50	120	20	1,590	100	320	30	200	1,020		
42-43	30	0	10	630	50	120	20	1,540	100	350	40	200	980		
43-44	30	0	10	690	50	120	20	1,480	100	390	40	200	940		
44-45	30	0	10	730	60	120	20	1,430	100	420	40	200	910		
1945-46	40	0	10	800	70	120	20	1,340	100	450	40	200	880		
46-47	30	0	10	870	70	120	20	1,280	100	490	50	200	830		
47-48	30	0	10	950	80	120	20	1,190	100	530	50	200	790		
48-49	30	0	10	1,000	90	120	20	1,130	100	560	50	200	760		
49-50	20	0	10	1,080	90	120	20	1,060	100	600	60	200	710		
1950-51	20	0	10	1,150	100	120	20	980	100	640	60	200	670		
51-52	30	0	10	1,230	110	120	20	880	110	690	60	200	610		
52-53	30	0	10	1,300	110	120	20	810	110	720	70	200	570		
53-54	30	0	10	1,380	120	120	20	720	110	770	80	200	510		
54-55	10	10	10	1,460	130	100	10	670	110	820	80	160	500		
1955-56	10	20	10	1,520	140	80	10	610	110	850	80	120	510		
56-57	10	30	20	1,600	140	60	10	530	130	900	90	80	470		
57-58	10	50	20	1,700	150	30	10	430	130	950	90	50	450		

TABLE K-7
AREAL CULTURE ON VALLEY FILL AREA
BY WATER SERVICE AREA WITHIN EACH SUBAREA
(continued)

In Acres

Year	Van Nuys Subarea							Sanland-Tulare Service Area	
	Deciduous	Citrus	Trunk	Residential	Commercial and Industrial	Riparian vegetation	Dry farm and native vegetation	Residential	Dry farm and native vegetation
1928-29	10	50	10	60	10	10	140	80	300
29-30	20	50	10	70	10	10	140	30	290
1930-31	20	50	10	70	10	10	140	30	290
31-32	20	50	10	70	10	10	140	30	290
32-33	20	50	10	80	10	10	130	30	290
33-34	10	40	10	80	10	10	150	30	290
34-35	20	40	10	90	10	10	130	30	290
1935-36	20	40	10	90	10	10	130	30	290
36-37	20	40	10	100	10	10	120	40	280
37-38	10	40	10	100	10	10	130	40	280
38-39	10	30	10	110	10	10	130	40	280
39-40	10	30	10	120	10	10	120	40	280
1940-41	10	30	10	130	10	10	110	50	270
41-42	10	30	10	140	10	10	100	50	270
42-43	20	30	10	150	10	10	380	60	260
43-44	20	20	10	160	10	10	380	60	260
44-45	20	20	10	180	10	10	360	70	250
1945-46	20	20	10	190	10	10	350	70	250
46-47	20	20	10	210	10	10	330	80	240
47-48	20	20	10	220	10	10	320	80	240
48-49	10	10	10	240	10	10	320	90	230
49-50	10	10	10	250	10	10	310	100	220
1950-51	10	10	10	270	10	10	290	100	220
51-52	10	10	10	290	10	10	270	110	210
52-53	10	10	10	300	10	10	260	110	210
53-54	10	10	10	320	10	10	240	120	200
54-55	0	10	10	340	10	10	230	130	190
1955-56	0	10	10	360	10	10	210	130	190
56-57	0	10	10	380	10	10	190	140	180
57-58	0	10	10	400	10	10	170	150	170

a. Does not include residential lawn grass areas.

b. Includes the portion of Monk Hill Resin in the Upper Los Angeles River Area.

Note: Areal culture outside of the major water service areas is not included in this tabulation.