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TEXACO REFINING AND MARKETING INC.
100 CUTTING BOULEVARD
RICHMOND CA 94804

December 12, 1989

Ms. Dyan Whyte
San Francisco Regional Water Quality Control Board
1111 Jackson Street, Room 6000
Oakland, CA 94607

Dear Ms. Whyte:

Enclosed is a copy of our Quarterly Technical Report dated December 1, 1989 for our former Texaco service station located at 500 Grand Avenue in Oakland, California. This report covers the third quarter of 1989.

Please call me at (415)236-1770 if you have any questions.

Very truly yours,

R.R. ZIELINSKI
Field Environmental
Supervisor

RRZ:cz

Enclosure

cc: Mr. Rafat Shahid
Alameda County Environmental Health Department
80 Swan Way, Room 200
Oakland, CA 94621

RR

A Report Prepared for

Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804

QUARTERLY TECHNICAL REPORT
THIRD QUARTER OF 1989
FORMER TEXACO STATION NO. 6248800235
500 GRAND AVENUE
OAKLAND, CALIFORNIA

HLA Job No. 2251,081.03

by

Jeanna S. Hudson
Senior Geologist

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December 1, 1989

INTRODUCTION

Harding Lawson Associates (HLA) submits this Quarterly Technical Report (QTR) of the site investigation activities at former Texaco service station No. 6248800235, located at 500 Grand Avenue in Oakland, California (Plate 1). This report summarizes the previous work at the site and the accomplishments of the third quarter 1989. Planned activities for the fourth quarter 1989 are presented.

SUMMARY OF PREVIOUS WORK

Texaco Refining and Marketing Inc. retained HLA to conduct a sensitive receptor survey at the subject location in May 1988. In June 1988 Texaco requested that HLA proceed with a subsurface investigation to evaluate whether hydrocarbons had affected shallow soil or ground water. The following tasks were performed during that investigation:

- Obtained permits, drilled, and developed four 2-inch-diameter ground-water monitoring wells (MW-8A, MW-8B, MW-8C, and MW-8D, see Plate 2)
- Gauged water levels and estimated the direction of ground-water flow
- Obtained one ground-water sample from each well and analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX).

Results of the ground-water analyses (as documented in a report issued to Texaco Refining and Marketing Inc. on July 20, 1988) indicate low concentrations of hydrocarbons in MW-8A and

MW-8C (Table 1). Water from MW-8D was not sampled nor was its water level measured because of insufficient water. Water level data from MW-8A, MW-8B, and MW-8C, indicated that the direction of ground-water flow is south.

Table 1. Results of Ground-water Analyses
Concentrations in µg/l (ppb)

Well	Depth (feet)	Date Sampled	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH as Gasoline
MW-8A	32	06/14/88	<0.5*	1.5	<2	6.6	
		10/28/88	<0.5	<1	<2	<1	
		09/28/89	<0.5	<0.5	<0.5	<3	<50
MW-8B	20	06/14/88	<0.5	<1	<2	<1	
		10/21/88	<0.5	<1	<2	3.1	
		09/28/89	<0.5	<0.5	<0.5	<3	<50
MW-8C	24.5	06/14/88	5.3	3.5	2.6	[illegible]	
		10/21/88	<0.5	<1	<2	<1	
		09/28/89	<0.5	<0.5	<0.5	<3.0	<50
MW-8E	20	10/25/88	1,400	510	2.9	420	
		[illegible]	[illegible]	[illegible]	[illegible]	<3,000	[illegible]
MW-8F	16.5	04/14/89	<0.5	<1	<2	<1	
		09/28/89	<0.5	<0.5	<0.5	<3	<50
MW-8G	16.5	04/14/89	<0.5	<1	<2	<1	
		09/28/89	<0.5	<0.5	<0.5	<3	<50
DWAL			1.0	680	100	1,750	

DWAL = Drinking water action levels, State of California Health Services (April, 1989).

* <0.5 indicates that concentrations are below the reporting limit of 0.5 µg/l.

With authorization from Texaco Refining and Marketing Inc., a soil-gas survey was conducted at the site in September 1988. The survey was performed by Tracer Research Corporation under the

direction and supervision of HLA personnel. The survey entailed the following:

- Analysis of soil gas for BTEX and total hydrocarbons at 18 locations, using gas chromatography
- Analysis of hydrocarbons in ground water from each of the four observation wells adjacent to the underground tanks.

Plate 3 summarizes the results of the soil-gas survey. The data indicate hydrocarbons in the soil gas in the vicinity of the underground storage tanks, as well as near the dispenser islands. Water analyses from the four observation wells show the presence of dissolved petroleum hydrocarbons adjacent to the underground tanks.

During the fourth quarter 1988 and the first quarter 1989, HLA continued to explore subsurface conditions at the site by drilling and sampling soil borings and installing additional monitoring wells. The following objectives were met:

- Drilled and sampled six soil borings to identify and delineate hydrocarbon content of the vadose zone (Plate 2)
- Analyzed soil samples for BTEX and total petroleum hydrocarbons (TPH) as gasoline
- Obtained permits, drilled, and developed two 4-inch-diameter off-site monitoring wells (MW-8F and MW-8G) to examine the downgradient distribution of hydrocarbons in the ground water (Plate 2)
- Converted one of the above-mentioned soil borings to 4-inch-diameter monitoring well MW-8E (Plate 2)
- Sampled water from all monitoring wells (MW-8A, MW-8B, MW-8C, MW-8E, MW-8F, and MW-8G) and analyzed water for BTEX

- Submitted soil samples from MW-8F and MW-8G to analyze for BTEX and TPH as gasoline.

Soil samples and drill cuttings indicate that the substrate consists predominantly of clays, with thin beds of clay-rich sand. Chemical analyses of the soils indicate the presence of gasoline hydrocarbons in the vadose zone (from 1 to 7 feet below grade) in B-1, B-3, B-4, and MW-8D (Table 2).

Table 2. Results of Soil Sample Analyses
(concentrations in mg/kg [ppm])

Boring/ Well Number	Depth (feet)	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH (gasoline)
B-1	6.5	<0.05*	<0.1	<0.2	<0.1	12
B-3	4.5	<1	<2	<4	5	520
B-4	1.5	<0.5	1	3.5	13	510
B-5	5.5	<0.05	<0.1	<0.2	<0.1	<10
B-5	10.5	<0.05	<0.1	<0.2	<0.1	<10
B-5	16	<0.05	<0.1	<0.2	<0.1	<10
MW-8D	1.3	<0.05	0.40	<0.20	0.50	10
MW-8E	5.5	0.82	6.5	5.5	26	750
MW-8F	11	<0.5	<0.1	<0.2	<0.1	<10
MW-8G	6	<0.5	<0.1	<0.2	<0.1	<10

* <0.05 indicates that concentrations are below the reporting limit of 0.05 mg/kg.

Notable concentrations of benzene (1,400 parts per billion [ppb]) were found in water from MW-8E (Table 1). Analyses of ground water from resampled wells MW-8A, MW-8B, and MW-8C indicate nondetectable hydrocarbons or concentrations well below

acceptable limits. Water from both off-site wells (MW-8F and MW-8G) had non-detectable concentrations of petroleum hydrocarbons.

During the first quarter 1989, MW-8D was abandoned because of insufficient water for development or sampling. The casing was removed and the remaining borehole was fully grouted, in accordance with a permit from the Alameda County Flood Control District, Zone 7.

The following site assessment tasks were accomplished during the second quarter 1989:

- Measured water levels in all monitoring wells and refined estimates of ground-water flow direction (Plate 4)
- Performed slug tests on MW-8C and MW-8E to estimate hydraulic conductivity
- Began work on the environmental assessment report.

Slug tests on MW-8C and MW-8E indicate relatively low permeabilities (Table 3) and unconfined aquifer conditions. Ground water would be expected to move through these soils relatively slowly.

Table 3. Slug Test Results

Well Number	Lithology of Tested Soils	Thickness of Tested Soils (feet)	Estimated Hydraulic Conductivity of Tested Soils (feet/day)
MW-8C	Silty clay	13	0.03
MW-8E	Sandy clay, clayey sand	11.5	0.02

ACCOMPLISHMENTS DURING THIRD QUARTER 1989

During the third quarter 1989, HLA completed an Environmental Assessment Report for the former Texaco station and submitted it to Texaco Refining and Marketing Inc.

Ground-water samples were collected from six monitoring wells at the site. Each well was purged while monitoring temperature, conductivity, and pH of the water. The samples were collected using a stainless steel bailer, then decanted into 40-ml volatile organic analysis vials containing HCl as a preservative. The samples were transported under chain-of-custody to ChemWest Analytical Laboratories, Inc., in Sacramento, California, where they were analyzed for BTEX and TPH as gasoline.

As indicated in Table 1, only water from MW-8E has detectable concentrations of BTEX and TPH, with 5,600 ppb benzene, 3,100 ppb toluene, and 22,000 ppb TPH as gasoline.

ANTICIPATED ACTIVITIES FOR THE FOURTH QUARTER 1989

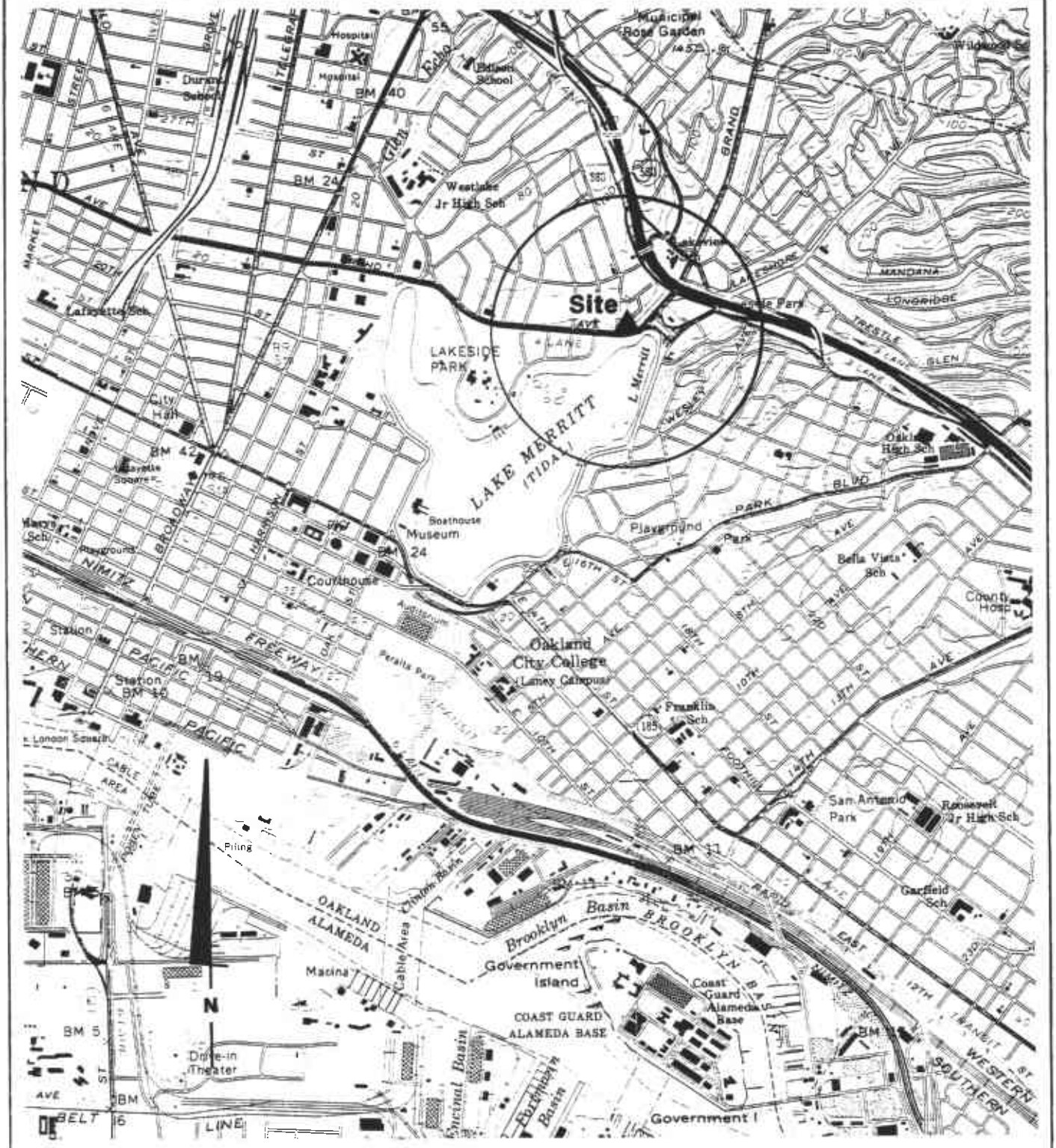
During the fourth quarter 1989, HLA will initiate work on a remediation plan for the former Texaco station. To select the most appropriate method of remediation, additional work is needed to:

- Refine our evaluation of the vertical and lateral extent of hydrocarbons in the vadose zone, providing better estimates of the volume of soil to be remediated
- Better delineate plume boundaries of hydrocarbon-bearing ground water.

This work will require drilling additional soil borings and installing additional monitoring wells.

HLA also plans to monitor existing wells by measuring water levels monthly. Ground water from existing wells will be sampled and analyzed quarterly for BTEX and TPH.

LIST OF ILLUSTRATIONS



Ref: USGS, 7.5 Minute Topographic Map, Oakland West, California, Photo revised 1980.

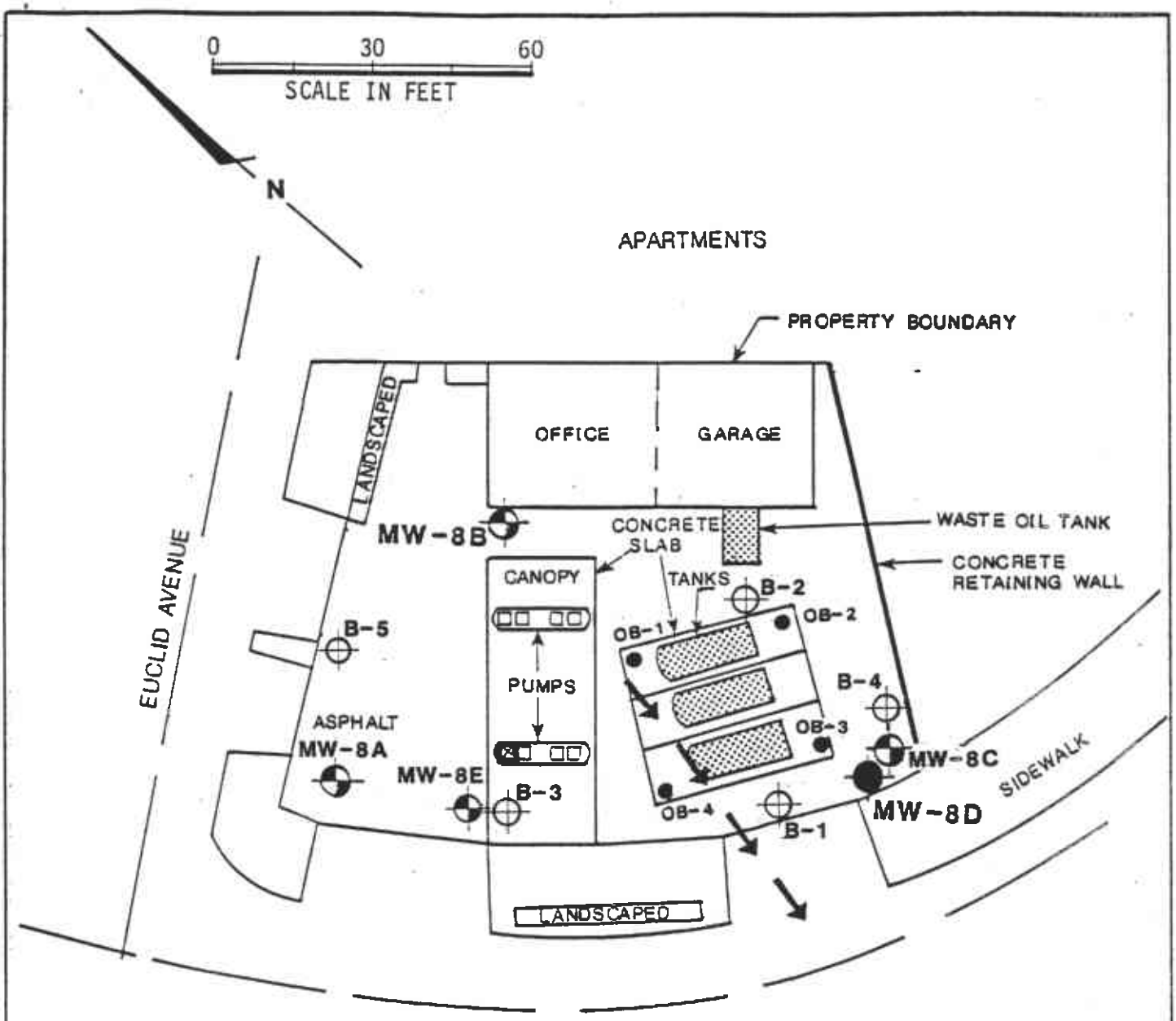
0 2000 4000
SCALE IN FEET

Harding Lawson Associates
Engineers and Geoscientists

Regional Map
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,081.03	AR	5/89		

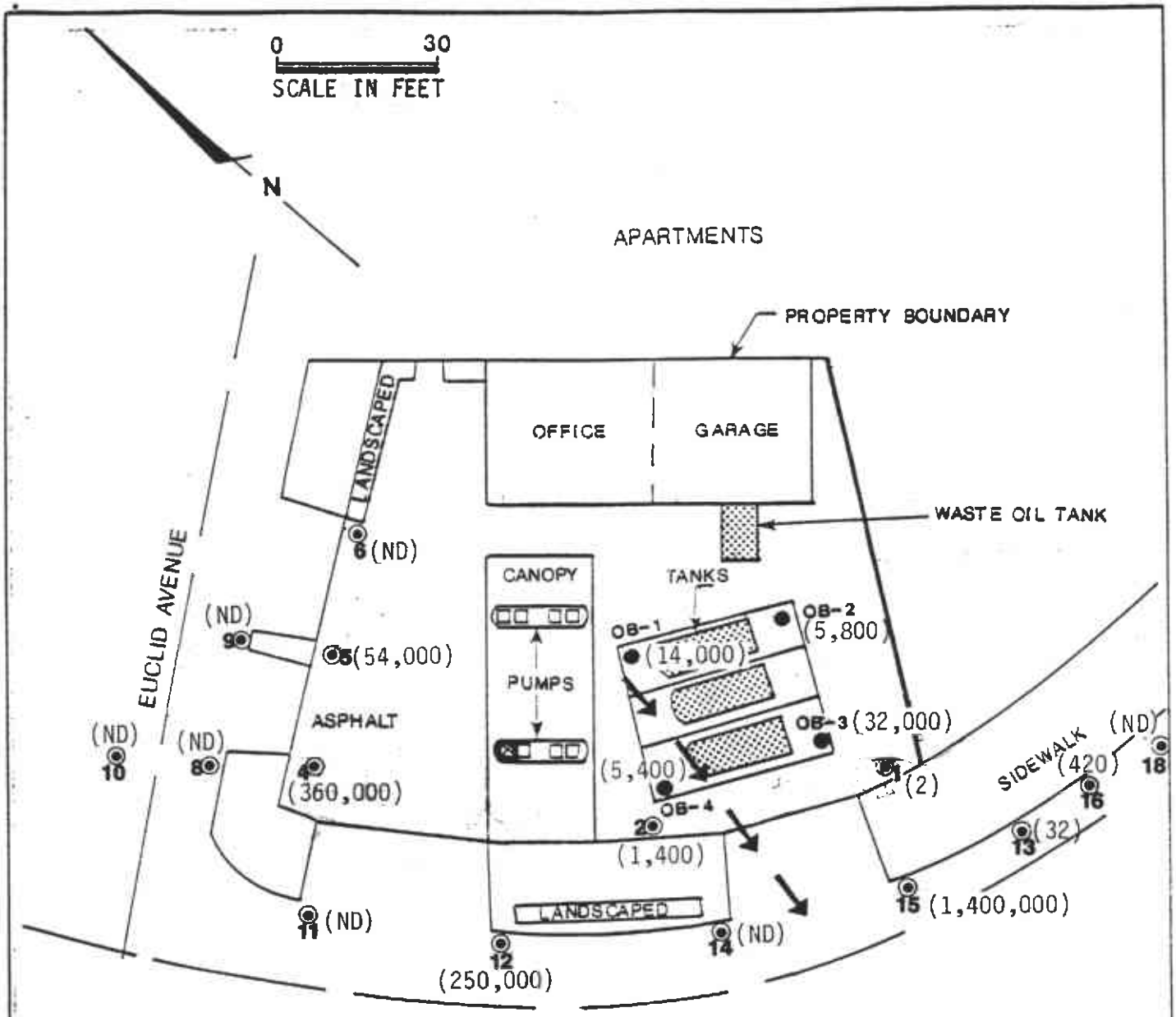


Harding Lawson Associates
Engineers and Geoscientists

Site Plan
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,081.03	JSH	5/89		



LEGEND

OB-1 ● Observation Well and Number

← Ground-water Flow Direction

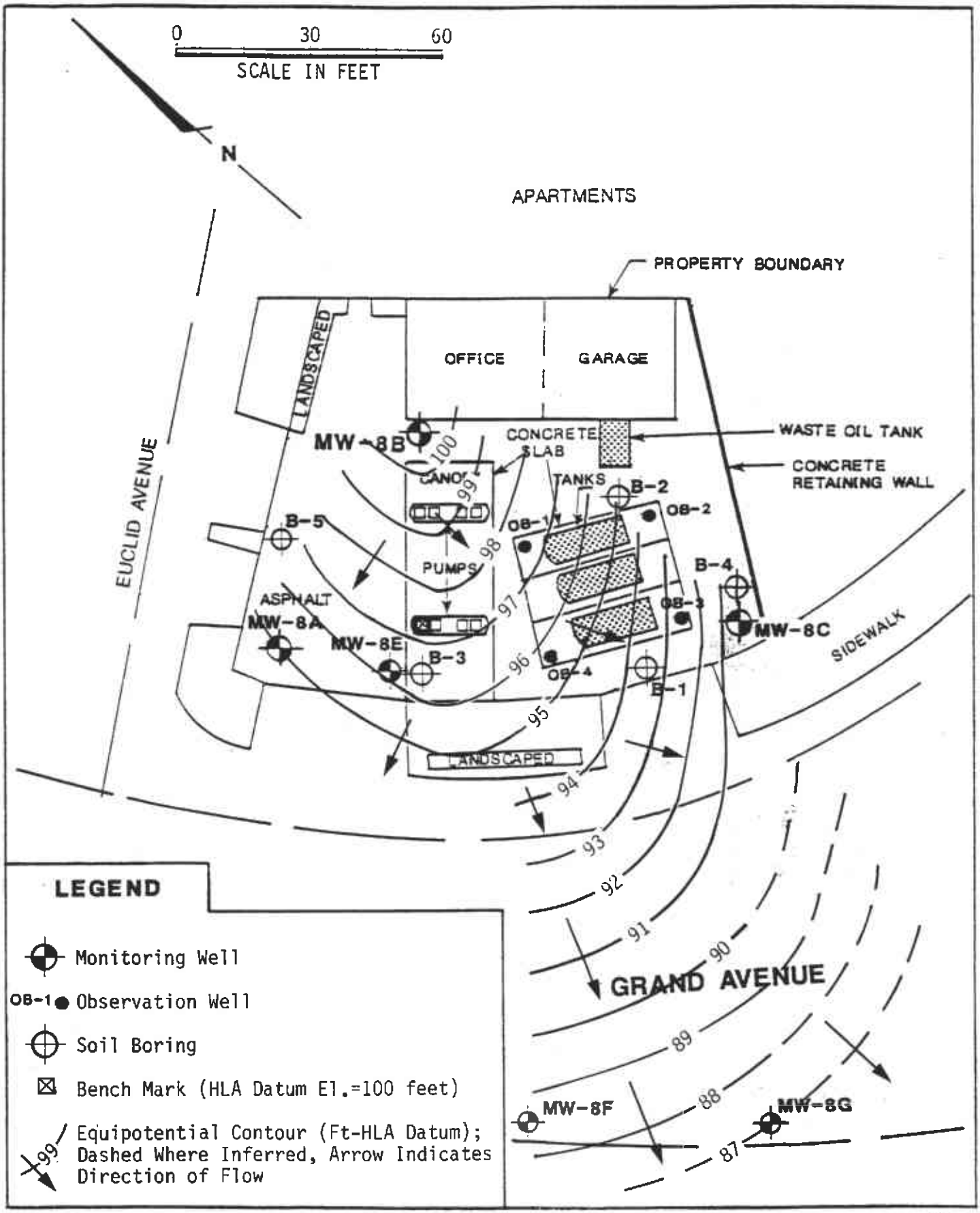
◉12 Soil-gas Probe Location and Number
(250,000) (total hydrocarbon concentration ug/l)

Harding Lawson Associates
Engineers and Geoscientists

Soil-Gas Probe Locations
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,081.03	AK	5/89		



Harding Lawson Associates
Engineers and Geoscientists

Phreatic Surface - May 1989
Former Texaco Service Station
500 Grand Avenue
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,081.03	AK	5/89		

DISTRIBUTION

3 copies: Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804

Attention: Mr. R. R. Zielinski

JSH/RS/ly 031372L/R31

QUALITY CONTROL REVIEWER

Stephen J. Osborne
Civil Engineer