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

February 19, 1991

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

Dear Mr. Shahid:

Enclosed is a copy of our Quarterly Technical Report dated September 7, 1990 for our former Texaco Service Station located at 2225 Telegraph Avenue in Oakland, California. This report covers the second quarter of 1990.

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

Very truly yours,

R.R. Zielinski
Field Environmental
Supervisor

RRZ:pap

Enclosure

cc: Mr. Tom Callaghan
Regional Water Quality Control Board
1800 Harrison Street, Suite 700
Oakland, CA 94607

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

December 29, 1989

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

Dear Mr. Shahid:

Enclosed is a copy of our Quarterly Technical Report dated December 18, 1989 for our former Texaco Service Station located at 2225 Telegraph 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:pap

Enclosure

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

RR

9/9/90

Harding Lawson Associates

No new date!

A Report Prepared for

Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608

QUARTERLY TECHNICAL REPORT
FIRST QUARTER OF 1990
FORMER TEXACO STATION
2225 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA 94612

HLA Job No. 2251,111.03
May 8, 1990
1990 Report No. 1

by

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Project Engineer

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Harding Lawson Associates
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415/687-9660

INTRODUCTION

This quarterly technical report (QTR) presents the results of site investigation and remediation activities conducted by Harding Lawson Associates (HLA) at a service station site formerly owned by Texaco Refining and Marketing Inc. The station, at 2225 Telegraph Avenue, Oakland, California (see Plate 1), is currently owned and operated by Exxon Company U.S.A. This QTR summarizes HLA's work at the site, ongoing since May 1988, and presents results of the recent quarter's work.

SITE DESCRIPTION

The site is on the southwest corner of the intersection of Telegraph and West Grand Avenues (Plate 2). The surrounding area contains commercial/retail businesses, including a Chevron service station immediately across Telegraph Avenue and a Beacon service station northeast of the site. Adjacent to the site on the south is the First Baptist Church of Oakland. There is an apartment building, currently occupied, immediately west of the site.

Surface elevation at the site is approximately 20 feet above mean sea level. The land surface slopes gently southeast, toward Lake Merritt and the Oakland/Alameda Inner Harbor, an area of tidal flats that has been filled. This area has been extensively developed, and surfacewater runoff is mainly controlled by the municipal storm sewer system.

As shown on Plate 3, structures at the service station include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks. Leaded and unleaded gasoline are dispensed from these tanks; automotive repair services are also provided.

HYDROGEOLOGIC SETTING

The East Bay Plain has been divided into seven groundwater subareas, defined by the California Department of Water Resources (DWR) on the basis of areal differences (i.e., faults and other geologic conditions). This site lies within the Oakland Upland and Alluvial Plain subarea. Most groundwater used in the East Bay Plain is for irrigation or industrial, rather than domestic, purposes. The majority of domestic water is supplied by the East Bay Municipal Utility District (EBMUD) from surface sources.

The groundwater reservoir is made up of the Alameda and Temescal Formations, along with the Merritt Sand; these have an aggregate thickness of more than 1,100 feet. According to maps for the area, surface materials at the site are from the Temescal Formation, an alluvial fan deposit. Approximately 1,000 feet west of the site is an outcrop of the Merritt Sand. Direction of regional groundwater flow is west-southwest, toward San Francisco Bay.

Subsurface materials at the site, down to the maximum depth explored of 20 feet, generally consist of stiff, silty clay (CL),

underlain by a dense layer of silty sand that ranges from 3 to 8 feet in thickness. According to slug test results, the hydraulic conductivity of the shallow, saturated sand aquifer beneath the site ranges from 1.2 to 5.9 feet per day (Table 1).

Groundwater is currently encountered at approximately 13 feet below grade; well monitoring and survey data are presented in Table 2. **The estimated direction of groundwater flow is to the southwest**, with a gradient of 0.005 foot per foot, as shown on the Groundwater Surface Map, Plate 4.

SUMMARY OF PREVIOUS WORK

Previous Reports

Since May 1988, HLA has investigated soil and groundwater conditions at this site. To date, the investigation and proposed remediation plan have comprised four sequential phases; results and proposed work were presented in the following reports:

1.	Sensitive Receptor Study	May 24, 1988
2.	Subsurface Investigation	July 20, 1988
3.	Environmental Assessment	June 22, 1989
4.	Groundwater Remediation Plan	November 30, 1989

Previous Field Operations

Boring locations are shown on Plate 3. Because of restricted subsurface access on Telegraph and West Grand Avenues, no off-site exploration was conducted north or east of the site. These restrictions were imposed by the City of Oakland and the

Bay Area Rapid Transit District (BART), whose tunnel is in this area (see Plate 2). The investigation process has included the following field operations:

- Conducted a soil-gas survey on site and in city streets near the site. Probe locations are shown on Plate 3 and soil-gas survey results are presented in Table 3
- Drilled and sampled seven shallow soil borings (B-1 through B-7); locations are shown on Plate 3
- Drilled, constructed, developed, and sampled six on-site monitoring wells (MW-6A through MW-6F) and three off-site wells (MW-6G through MW-6I); locations are shown on Plate 5
- Ordered chemical analyses on soil and water samples to determine concentrations of petroleum hydrocarbons; results of analyses are presented in Tables 4 and 5, respectively
- Conducted slug tests in MW-6D, MW-6E, and MW-6H to estimate hydraulic conductivity and transmissivity values for the shallow aquifer; slug test results are presented in Table 1.

SUMMARY OF PREVIOUS FINDINGS

Vadose-zone Soil Condition

No significant concentrations of petroleum hydrocarbons have been found in vadose-zone soils. The fuel constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) have been detected in concentrations exceeding 100 parts per million (ppm) exclusively in soils at 12 to 13.5 feet below the ground surface (Table 4); this depth is within the zone of fluctuation of the groundwater table.

Groundwater Conditions

No free product has been observed in any of the monitoring wells. As shown on Plate 5, hydrocarbons dissolved in the groundwater are generally limited to the vicinity of the tanks and pump islands, extending southwest.

Water from five on-site wells near the tanks and pump islands contains detectable levels of TPH as gasoline. As of September 1989, the lateral limits of the plume are delineated by MW-6G, MW-6A, MW-6F, and MW-6I; samples from these wells show no detectable hydrocarbons (detection limit for TPH = <50 parts per billion [ppb]). Upgradient plume definition is incomplete because of restricted subsurface access imposed by the City of Oakland and BART.

Hydrocarbon contaminants may be migrating to the site from an upgradient source. In water from upgradient well MW-6B, combined concentrations of BTEX have increased from 7 to 298 ppb (samplings of October 20, 1988, and September 7, 1989, respectively). Water samples from every monitoring well besides MW-6B have not exhibited a substantial increase in BTEX over the same time period.

WORK PERFORMED DURING THE FOURTH QUARTER OF 1989

HLA performed the following activities during the first quarter of 1990:

1. Received an EBMUD wastewater discharge permit

2. Met with an Exxon representative on site to discuss logistics of implementing the proposed remedial action

3. Prepared design specifications for the following components of the groundwater treatment system and groundwater collection system:

   - Air displacement pumps
   - Well head detail
   - Well head cover detail
   - Manhole detail
   - Well piping detail
   - Trench and line layout
   - Concrete pad
   - Treatment unit flow schematic
   - Treatment unit isometric
   - Treatment unit plan
   - Retention tank
   - Carbon canisters
   - Control panel

4. Prepared a materials acquisition cost estimate for the groundwater treatment system and received approval from Texaco Refining and Marketing Inc. to begin procurement of the equipment

5. Solicited quotations to fabricate the groundwater treatment system. Chose vendor to fabricate the system. Authorization to initiate the preparation of detailed shop drawings of the system is pending the clarification of air compressor requirements

6. Solicited quotations for and ordered the following components of the groundwater treatment system:

   - One 1,000-gallon retention tank to be supplied by William M. Ryan Company of Danville, California

   - One control panel to be supplied by Superior Controls of Odessa, Texas

7. Prepared bid package for installation of groundwater treatment system and groundwater collection system.

LIST OF TABLES

LIST OF ILLUSTRATIONS

Table 1. Slug Test Results

Well Number	Most Permeable Stratum Adjacent to Well Screen			
	Lithology	Classification	Thickness (feet)	Estimated Hydraulic Conductivity (feet/day)
MW-6D	sand	confined	2	5.9
MW-6E	sand, fine-grained	confined	2.5	1.2
MW-6H	sand, medium-grained	unconfined	6	4.8

Table 2. Well Monitoring and Survey Data

Well No.	Top of Casing Elevation* (feet)	Depth to Groundwater** (feet)	Groundwater Surface Elevation+ (feet)
MW-6A	98.99	13.77	85.22
MW-6B	98.81	13.01	85.80
MW-6C	99.89	14.41	85.48
MW-6D	98.78	13.53	85.25
MW-6E	98.99	13.84	85.15
MW-6F	99.91	14.73	85.18
MW-6G	99.16	12.39	86.77
MW-6H	97.93	12.39	85.54
MW-6I	97.60	12.82	84.78

Notes:

* Elevation relative to HLA temporary benchmark located at the western end of the dispenser island nearest West Grand Avenue, with an arbitrary elevation of 100.0 feet (see Plate 3).

** Depth to groundwater on October 3, 1989.

\+ Groundwater surface elevation = top of casing elevation - depth to water.

Table 3. Results of Soil-gas Survey
Conducted on September 19, 1988

Concentrations in micrograms per liter (µg/L)

Sample	Depth (feet)	Benzene	Ethyl-benzene	Toluene	Xylenes	Total Petroleum Hydrocarbons
Air	N/A	<0.7	<0.8	<0.8	<0.8	<0.7
SG-01	--	--	--	--	--	--
SG-02	5.0	<0.7	<0.8	<0.8	<0.8	<0.7
SG-03	12.0	10	4	<0.8	2,800	6,100
SG-04	13.0	<0.7	<0.8	<0.8	140	780
WS-05*	12.0	<75	<76	<77	<77	<75
SG-06	13.0	<0.7	<0.8	<0.8	<0.8	<0.7
SG-07	--	--	--	--	--	--
Air	N/A	<0.7	<0.8	<0.8	<0.8	<0.7

-- - Not able to obtain sample
N/A - Not applicable
Air - Ambient air sample
* - WS-05 was a sample of groundwater

Table 4. Results of Soil Chemical Analyses
Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (feet)	Benzene [1]	Ethyl-benzene [2]	Toluene [3]	Xylenes [3]	TPH as Gasoline [4]
B-1	8.0	0.05	ND	ND	ND	ND
B-1	13.0	ND (5)	10 (10)	16 (10)	41 (10)	2,000 (1,000)
B-2	7.0	ND	ND	ND	ND	ND
B-2	13.5	ND	ND	ND	ND	ND
B-3	7.0	0.06	ND	ND	ND	ND
B-3	13.5	40 (25)	84 (50)	390 (50)	370 (50)	11,000 (5,000)
B-4	13.5	ND	ND	ND	ND	ND
B-5	5.5	ND	ND	ND	ND	ND
B-5	9.5	ND	ND	ND	ND	ND
B-5	12.5	ND	ND	ND	ND	ND
B-6	6.0	ND	ND	ND	ND	ND
B-6	9.5	ND	ND	ND	ND	ND
B-6	12.0	40 (5)	40 (20)	110 (10)	450 (10)	3,000 (1,000)
B-7	6.0	0.64	0.4	0.9	3.4	24
B-7	9.5	0.5	ND	0.7	1.0	ND
B-7	12.0	20 (5)	20 (20)	72 (10)	190 (10)	1,400 (1,000)
MW-6E	13.0	ND	ND	ND	ND	ND
MW-6F	13.0	ND	ND	ND	ND	ND
MW-6G	13.5	ND	ND	ND	ND	5.2
MW-6H	13.5	11 (0.5)	8.8 (2)	3.2 (1)	19 (1)	1,000 (495)
MW-6I	13.5	ND	ND	ND	ND	ND

ND = Not detected.

1 Detection limit 0.05 mg/kg except as noted in parentheses.
2 Detection limit 0.2 mg/kg except as noted in parentheses.
3 Detection limit 0.1 mg/kg except as noted in parentheses.
4 Detection limit 10 mg/kg except as noted in parentheses.

Table 5. Results of Groundwater Chemical Analyses
Concentrations in micrograms per liter (µg/L)

EPA TEST METHOD 602

Well Number	Date Sampled	Benzene[1]	Ethylbenzene[2]	Toluene[3]	Xylenes[3]	TPH[4] (as gasoline)
MW-6A	06/24/88	ND	ND	ND	ND	-
MW-6A	10/20/88	1	ND	ND	ND	
MW-6A	09/07/89	2	ND	ND	ND	ND
MW-6B	06/24/88	ND	ND	ND	5	-
MW-6B	10/20/88	4	ND	3	ND	-
MW-6B	09/07/89	70 (2.5)	60 (3)	8 (3)	160 (4)	2,700 (25)
MW-6C	06/24/88	7,400	170	7	2,300	-
MW-6C	10/20/88	9,500 (50)	170 (2)	65 (100)	850 (1)	-
MW-6C	09/07/89	7,900 (25)	350 (25)	430 (25)	1,100 (38)	18,000 (2,500)
MW-6D	07/11/88	220 (5)	ND (20)	27 (10)	ND (10)	-
MW-6D	10/20/88	710 (5)	22 (20)	74 (10)	110 (10)	-
MW-6D	09/07/89	600 (12.5)	58 (13)	26 (13)	31 (19)	2,200 (1,250)
MW-6E	10/20/88	1	ND	ND	3	
MW-6E	09/07/89	3	ND	ND	ND	220
MW-6F	10/25/88	ND	ND	ND	2	
MW-6F	09/07/89	ND	ND	ND	ND	ND
MW-6G	12/07/88	ND	ND	ND	ND	-
MW-6G	09/07/89	ND	ND	ND	ND	ND
MW-6H	12/07/88	1,200 (25)	110 (20)	320 (10)	220 (10)	-
MW-6H	09/07/89	480 (10)	16 (10)	ND (10)	ND (15)	660 (500)
MW-6I	12/07/88	ND	ND	ND	ND	-
MW-6I	09/07/89	ND	ND	ND	ND	ND

ND = Not detected.

Detection limits given in parentheses, where applicable. If not:

1. Detection limit = 0.5
2. Detection limit = 2
3. Detection limit = 1
4. Detection limit = 50

Table 1. Schedule for Sampling, Measurement, and Analysis
Ground-water Treatment System
2225 Telegraph Avenue
Oakland, California

	Sampling Station		
Measurement/Analysis	Influent	Effluent	Intermediate
Type of Sample	G	G	G
Flow Rate*	D/W/M	D/W/M	--
pH	D/W/M	D/W/M	--
Temperature	D/W/M	D/W/M	--
Electrical Conductivity	D/W/M	D/W/M	--
EPA 8020 for: Benzene, Toluene, Total xylenes, Ethylbenzene	D/W/M	D/W/M	W/M
EPA 8015 for: total petroleum hydrocarbons (as gasoline)	D/W/M	D/W/M	W/M
SMWWA 2450D for: Total Suspended Solids	D/W/M	D/W/M	--
SMWWA 5220A for: Chemical Oxygen Demand Filtered	D/W/M	D/W/M	--
EPA 524.2 for: Volatile organics; Drinking water quality	--	S	--
EPA 200 Series for: Priority Pollutant Metals	--	S	--

NOTES

G	=	Grab sample.
W/M	=	weekly for first 3 weeks, monthly thereafter.
D/W/M	=	2 hours after system startup; every 24 hours thereafter for 4 days; weekly thereafter for 3 weeks, and monthly thereafter.
S	=	2 hours after system start up
SMWWA	=	Standard Method Water and Wastewater Analyses, 17th edition.
*	==	A flow totalizer will record cumulative effluent discharge volume.

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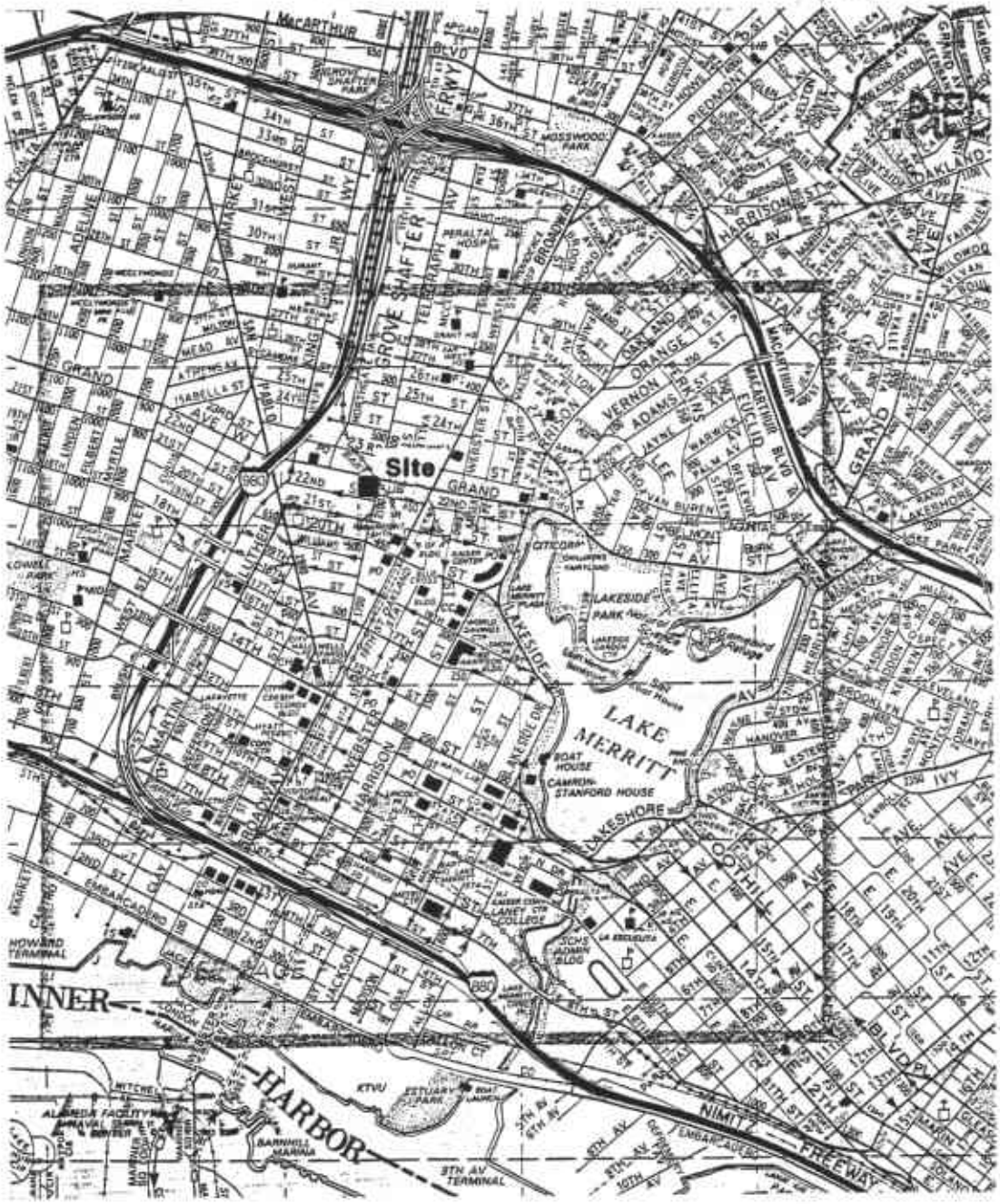

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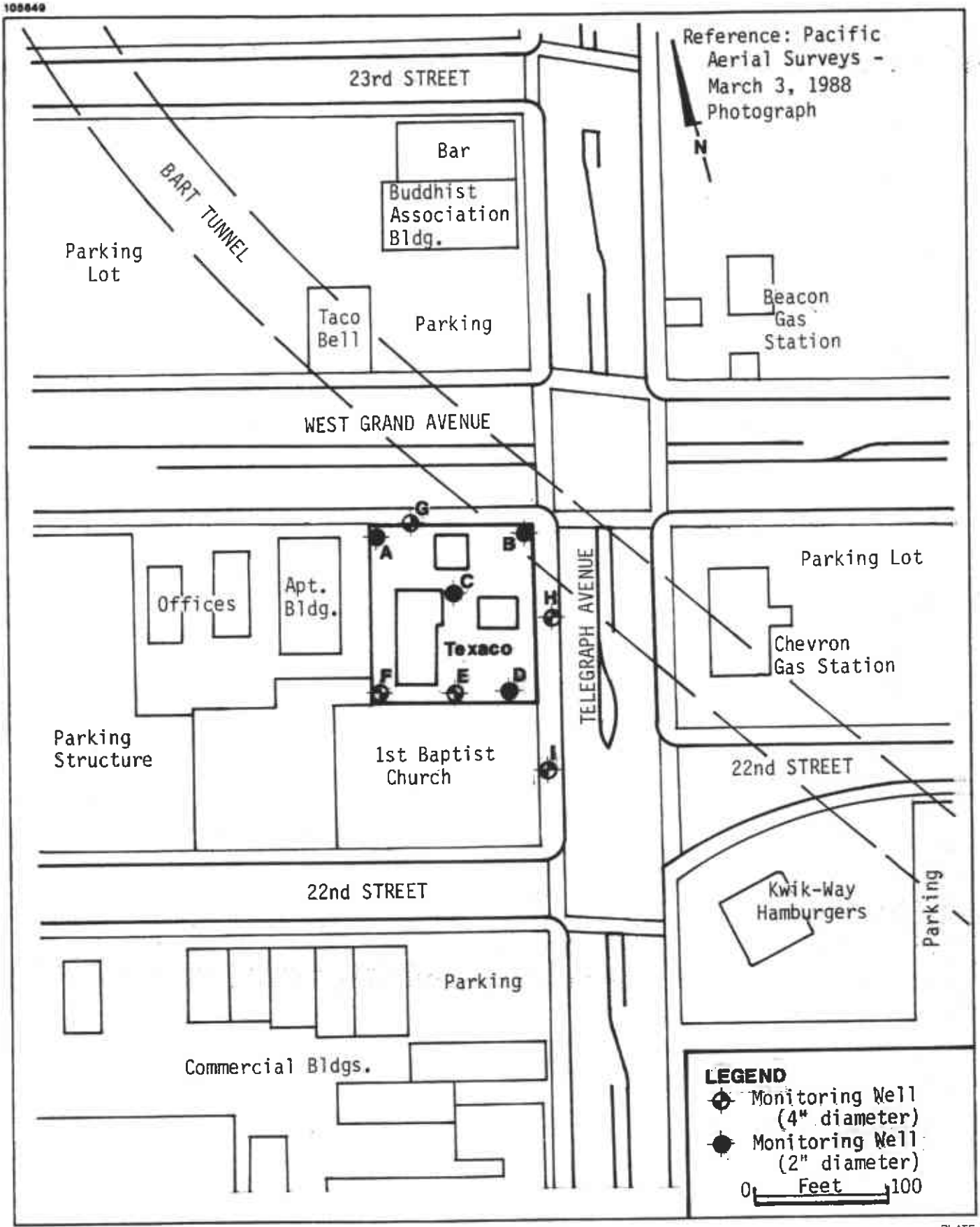
SCALE IN FEET

Harding Lawson Associates
Engineers and Geoscientists

Site Location Map
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,111.03		2/89		

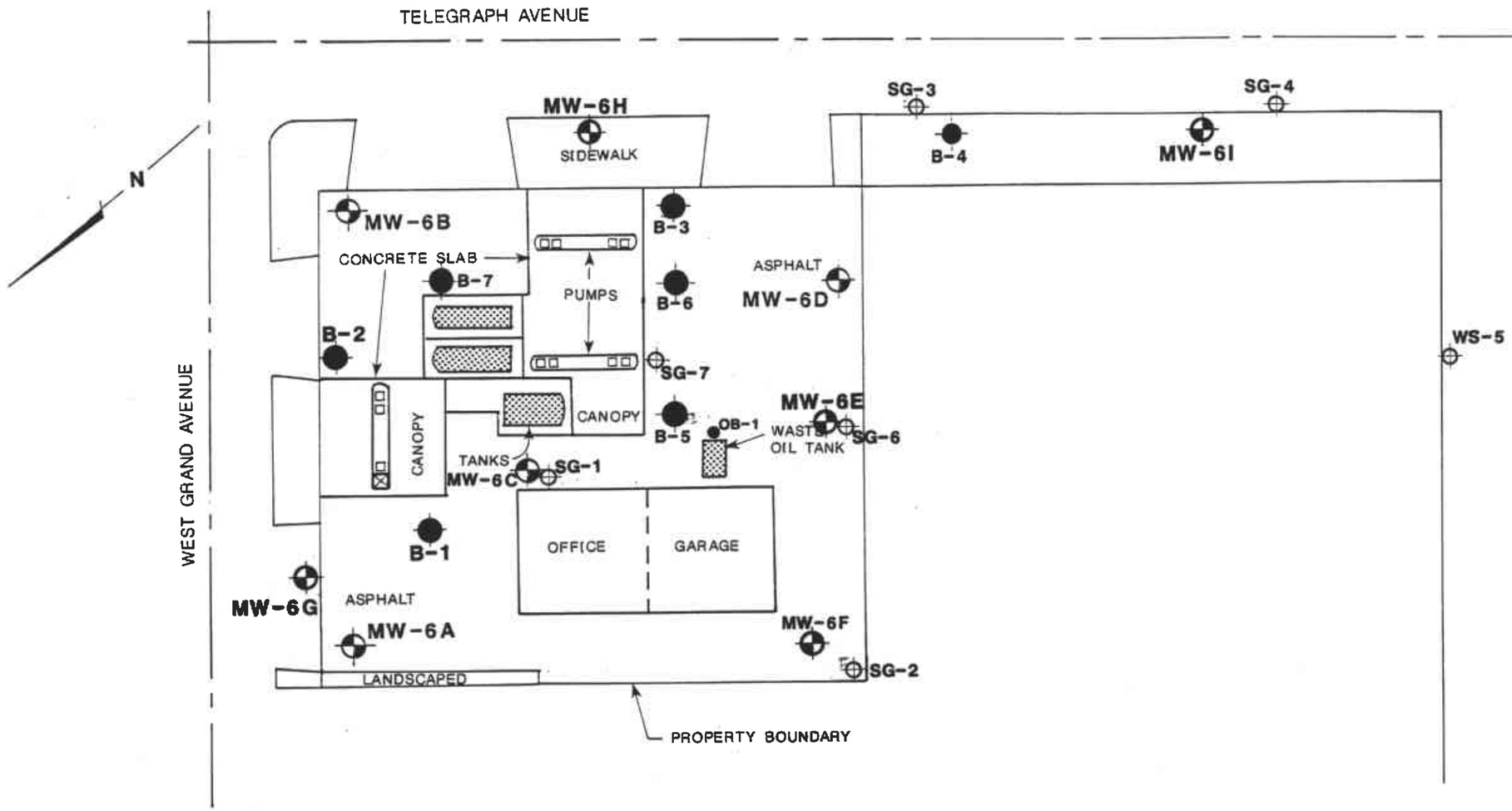


Harding Lawson Associates
Engineers and Geoscientists

Vicinity Plan
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,111.03		12/88		



EXPLANATION

MW-6A — Monitoring Well Location and Number

OB-1 — Observation Well Location and Number

B-2 — Boring Locations

SG-1 — Soil-Gas Probe Location

30 60

SCALE IN FEET

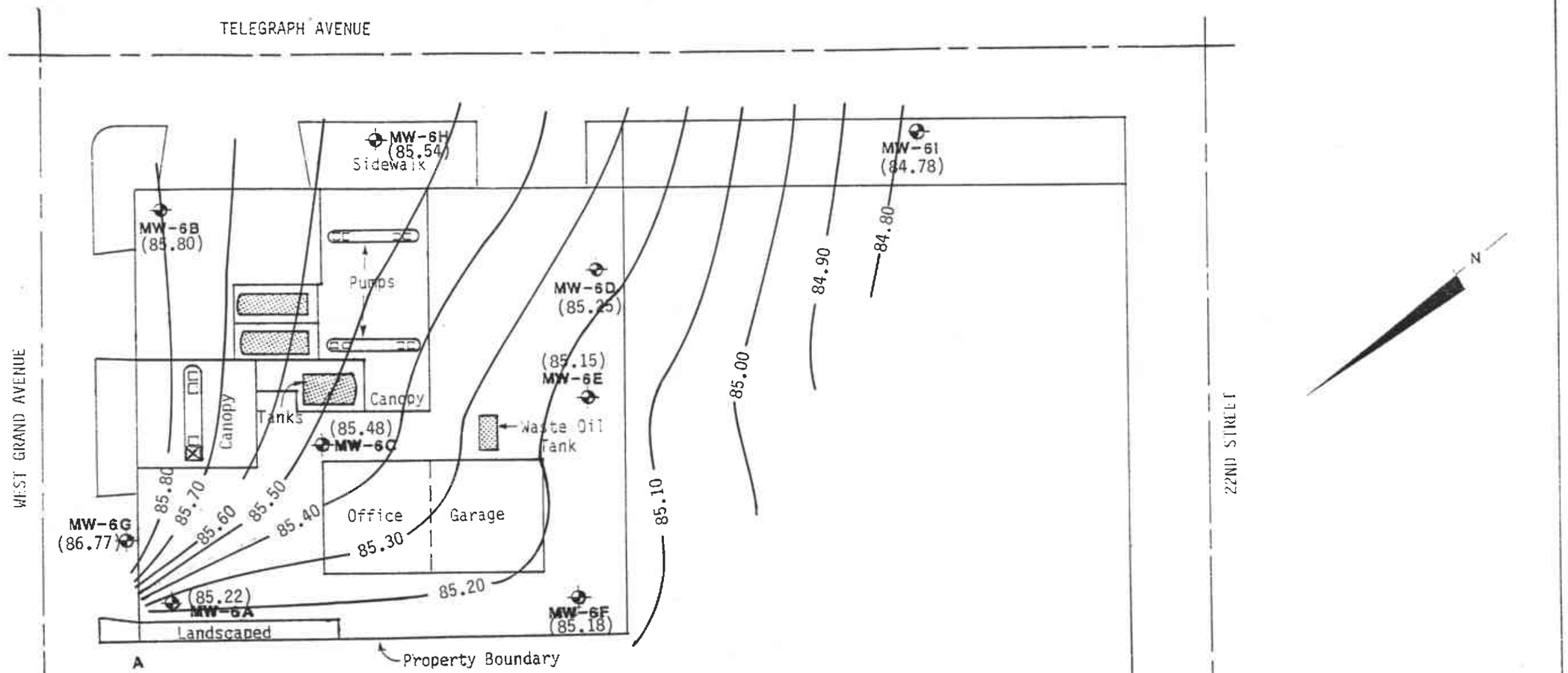
Bench Mark (HLA Datum El. = 100 feet)

Harding Lawson Associates
Engineers and Geoscientists

Site Plan
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE 3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,111.03		2/89		



LEGEND

MW-6J (85.69) ⊕ Monitoring Well Location and Ground-water Surface Elevation on October 4, 1989

⊠ Bench Mark (HLA Datum El.= 100 feet)

0 30 60

SCALE IN FEET

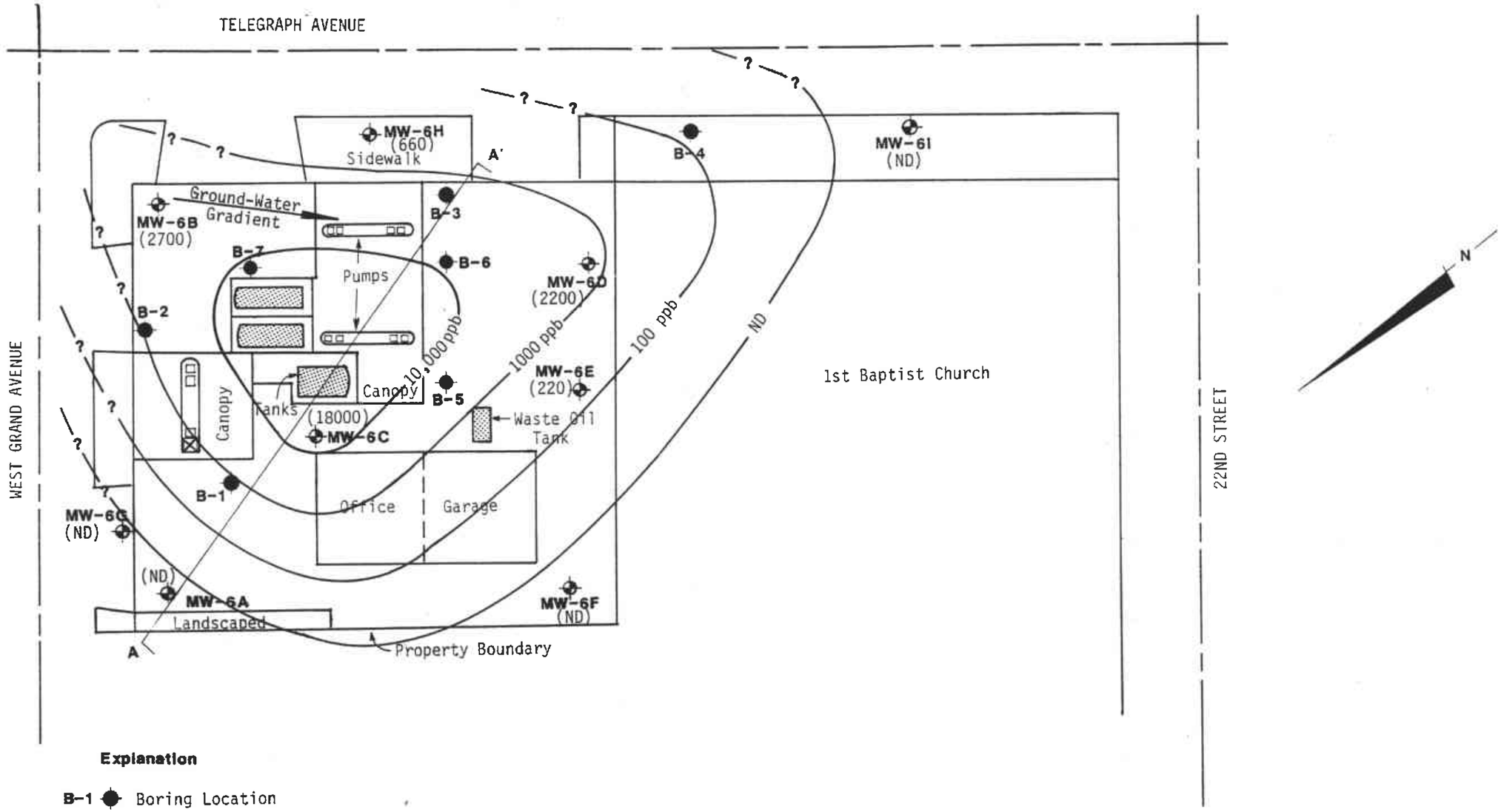
109463

HLA Harding Lawson Associates
Engineers and Geoscientists

Groundwater Surface Map
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
KH	2251.111.03		9/89		



Explanation

B-1 ⊕ Boring Location

MW-6J ⊕ Monitoring Well Location

⊠ Bench Mark (HLA Datum El.= 100 feet)

(2700) Total Petroleum Hydrocarbon (TPH) as Gasoline Concentration on September 7, 1989

——— Contour of Constant TPH Concentration

ND = Not Detectable (<50 ppb)

0 30 60

SCALE IN FEET

109463

HLA **Harding Lawson Associates**
Engineers and Geoscientists

Distribution of Hydrocarbons in Groundwater
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
KH	2251,111.03		9/89		

DISTRIBUTION

3 copies: Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608
Attention: Mr. R. W. Conlon

1 copy: Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804
Attention: Mr. R. R. Zielinski

MAS/RS/ly 031304M/R36

QUALITY CONTROL REVIEWER

Stephen J. Osborne
Principal Engineer