9/22/89

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

September 19, 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 for our former Texaco service station located at 2225 Telegraph Avenue in Oakland, California. 94612

This site has no identified fuel hydrocarbons in vadose zone soils. The shallow ground water on site, however, contains dissolved fuel hydrocarbons that will require remedial action. We are preparing a remedial plan for this site that will include extracting and treatment of ground water.

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

Very truly yours,

R.R. ZIELINSKI
Field Environmental
Supervisor

RRZ:kn

Enclosure

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

RR

~~LARRY~~ -DB

THIS report, purported to be on 2nd qtr. 1989 report, is nonsense. It reiterates the info we already knew in the June 22, 1989 report. This latest report indicates no further sampling has occured since 12/88!!

A Report Prepared For

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

QUARTERLY TECHNICAL REPORT
SECOND QUARTER OF 1989
FORMER TEXACO STATION
2225 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

9/8/89

HLA Job No. 2251.080.03

by

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September 8, 1989

INTRODUCTION

This quarterly technical report (QTR) presents the results of site investigation activities conducted by Harding Lawson Associates (HLA) at a former Texaco service station site (presently operated by Exxon) at 2225 Telegraph Avenue, Oakland, California. The site location is shown on the Vicinity Map, Plate 1. HLA's work at the site, ongoing since June 1988, is summarized in this report; the recent quarter's work included aquifer hydraulic testing, as described below, and preparation of the environmental assessment report for the site. The information in this QTR is presented in the following subsections:

- Site description
- Hydrogeologic setting
- Summary of previous work
- Work performed during the second quarter of 1989
- Discussion of results.

SITE DESCRIPTION

The site is on the southwest corner of the intersection of Telegraph and West Grand Avenues (see the Area Map, Plate 2). The surrounding area consists of commercial/retail businesses, including a Chevron service station immediately across Telegraph Avenue and a Beacon service station northeast of the site. Adjacent south of the site is the 1st Baptist Church of Oakland.

There is an apartment building immediately west of the site which is currently occupied.

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

Structures at the service station include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks. At the station, leaded and unleaded gasoline are dispensed and automotive repair services are provided.

HYDROGEOLOGIC SETTING

The East Bay Plain has been divided into seven ground-water subareas, defined by the California Department of Water Resources (DWR) on the basis of areal differences (i.e., faults and geologic conditions). The site lies within the Oakland Upland and Alluvial Plain subarea. Most ground water 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). The ground-water reservoir is made up of the Alameda and Temescal Formations, along with the Merritt Sand, with an aggregate thickness of more than

1,100 feet. Surface geology at the site is mapped as being within the Temescal Formation, an alluvial fan deposit. Approximately 1,000 feet west of the site is an outcrop of the Merritt Sand. The regional ground-water flow direction is west-southwest, toward San Francisco Bay.

Subsurface conditions at the site, down to the maximum depth explored of 20 feet, indicate that soils generally consist of stiff, silty clay (CL) underlain by a dense silty sand layer of variable thickness. During drilling for our investigation, we initially encountered ground water at approximately 13 feet below grade.

The tops of well casings were surveyed to a temporary datum located at the western end of the dispenser island nearest West Grand Avenue with an assumed elevation of 100.0 feet (HLA datum, see Plate 3). Well monitoring and survey data are presented in Table 1. The estimated direction of ground-water flow is to the southwest, with a gradient of 0.004 feet per foot, as shown on the Ground-Water Surface Map, Plate 4.

SUMMARY OF PREVIOUS WORK

Preliminary Subsurface Investigation

In June 1988, HLA conducted a preliminary subsurface investigation at the site. The work included drilling four borings; constructing a monitoring well (2-inch diameter PVC casing) in each boring (MW-6A through MW-6D); developing and

sampling water from the wells; and analyzing ground-water samples for dissolved benzene, toluene, ethylbenzene, and xylenes (BTEX). The wells are approximately 20 feet deep with slotted well screen (.02-inch slot width) between 10 and 20 feet. Results of the chemical analyses are discussed later in this report.

Soil-gas Survey

On September 19, 1988, a soil-gas survey was conducted on site and in streets near the site by Tracer Research Corporation, under HLA's direction and supervision. Soil-gas probes were driven at 7 locations (Plate 3).

The soil-gas testing was conducted using a mobile van equipped with two Varian 3300 gas chromatographs and two Spectra Physics SP4270 computing integrators. A hydraulic mechanism was used to drive and withdraw seven-foot lengths of 3/4 inch-diameter steel tubing with detachable drive points. Soil-gas and/or water samples were obtained through the tubing at depths ranging from two to six feet; these were tested for the following constituents:

- Total hydrocarbons
- Benzene
- Toluene
- Ethylbenzene
- Xylenes

Detectable concentrations of petroleum products in soil-gas samples were limited to probe locations SG-3 and SG-4 (Plate 3).

At these locations relatively high concentrations of xylenes and TPH were detected in soil-gas samples obtained from depths of 12 and 13 feet at probe locations SG-3 and SG-4, respectively. Both SG-3 and SG-4 were located along the edge of Telegraph Avenue which possesses underground sewer and storm drain lines. The chromatograph resulting from these samples did not match that of gasoline. The on-site chemist informed us that it more closely resembled the pattern that a paint or varnish would produce.

Concentrations of petroleum products were less than the detection limit at probe locations SG-2, WS-5 and SG-6. Because of tight clays encountered at probe locations SG-1 and SG-7, we were not able to obtain soil-gas samples. A summary of the analytical results of the soil-gas survey is presented in Table 2.

Soil Borings

HLA explored subsurface conditions on and off site by drilling and sampling nine soil borings during October and November, 1988. Five of the borings were completed as monitoring wells (MW-6E through MW-6I). Boring locations are shown on Plate 3. Off-site exploration was not conducted to the north and east of the site because of restricted access into Telegraph and West Grand Avenues imposed by the City of Oakland and the existing underground Bay Area Rapid Transit (BART) tunnel (see Plate 2).

The borings were advanced using truck-mounted, 8-inch (borings), and 12-inch (wells) diameter hollow-stem auger drilling equipment and sampled using a 2.5-inch-diameter (I.D.)

Sprague and Henwood (S&H) split-barrel sampler lined with three, 6-inch-long, brass tubes. Drilling was performed under the direction of an HLA field geologist who logged the borings. Soil samples were screened in the field with either a Photovac TIP-I photoionization detector (PID) or a Johnson Gas Detector (Gastech), Model 1314.

All drill cuttings were placed in 55-gallon drums for subsequent disposal. Sampling equipment was washed with a phosphate-free detergent solution and rinsed with a clean water between sampling intervals. All drilling equipment was cleaned using a high-pressure, hot-water wash (steam-cleaned) before and after each boring.

Water Quality Sampling

On October 19, 1988, the recently installed Monitoring Wells MW-6E and MW-6F were developed, sampled, and surveyed by an HLA technician. All other existing on-site wells were also sampled at this time. On December 7, 1988, Monitoring Wells MW-6G through MW-6I were developed, sampled, and surveyed by an HLA technician.

Ground-water samples were collected from each well with a clean, stainless steel bailer. A representative sample was decanted into laboratory-prepared, 40 milliliter, volatile organic analysis (VOA) vials. The vials were immediately sealed, labeled, and placed in a cooler with blue ice until delivery for chemical testing.

All soil and ground-water samples were delivered to ChemWest Analytical Laboratories, Inc., in Sacramento, California. Soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and for BTEX; water samples were tested for BTEX content. Results are presented in Tables 3 (for soil) and 4 (for water).

WORK PERFORMED DURING THE SECOND QUARTER OF 1989

Aquifer Hydraulic Testing

Aquifer tests were performed on MW-6D, MW-6E, and MW-6H on April 4, 1989. A volume (slug) of water was removed from MW-6H using a suction pump and from MW-6E using a submersible turbine pump; a slug of water was injected into MW-6D. A pressure transducer, placed near the bottom of the wells, was used to measure water level recovery following slug withdrawal or injection. The output of the transducer was interpreted and recorded by a data logger for subsequent analysis. Table 5 summarizes the conditions of the slug tests at this site. The hydraulic conductivity of the shallow saturated sand aquifer beneath the site is estimated to range from 1.2 to 5.9 feet per day (Table 6).

DISCUSSION OF RESULTS

Concentrations of petroleum products in soil-gas/water samples were detected at Probe Locations SG-3, and SG-4 (Plate

3). The chromatograph resulting from these samples did not match that of gasoline. The on-site chemist informed us that it more closely resembled the pattern that a paint or varnish would produce.

BTEX and TPH have been detected exclusively in soils at 12 to 13 feet below the ground surface. This interval is within the zone of fluctuation of the ground-water table.

The investigations suggest that gasoline handling operations on site have resulted in the BTEX components found in ground water both on and off site. We understand that line and tank testing in 1988 showed that the fuel storage and dispensing systems were tight. It is therefore likely that the fuel hydrocarbons encountered have resulted either from surface spillage, overfilling during product delivery, or line or tank leakage from the previous storage and dispensing systems.

As shown on Plate 5, shallow ground water beneath the site contains detectable quantities of BTEX. BTEX has also been detected in off-site ground water in the cross-gradient direction in MW-6H. Laterally, the extent of BTEX in the ground water has not been well defined. The lateral extent of BTEX in the ground water is not known at this time because of restricted access into Telegraph and West Grand Avenues imposed by the City of Oakland. Subsurface exploration north of the site, into West Grand Avenue, was also restricted because of the existing Bay Area Rapid Transit (BART) tunnel.

The highest concentrations of BTEX in the ground water from on-site wells is found in MW-6C and MW-6D, which are very near the underground fuel tanks or directly downgradient of them. The underground tank complex most likely represented an on-site source. The relatively high concentrations of BTEX found in MW-6H, and at lower concentrations in MW-6B, may represent an unidentified off-site source; MW-6B is upgradient of the tanks and MW-6H is cross-gradient.

LIST OF TABLES

LIST OF ILLUSTRATIONS

Table 1. Well Monitoring and Survey Data

Well No.	Top of Casing Elevation* (feet)	Depth to Ground Water** (feet)	Ground-Water Surface Elevation+ (feet)	Comments
MW-6A	98.99	13.40	85.59	no odor
MW-6B	98.81	12.94	85.87	no odor
MW-6C	99.89	14.10	85.79	hydrocarbon odor and sheen
MW-6D	98.78	13.44	85.34	hydrocarbon odor and sheen
MW-6E	98.99	13.70	85.29	no odor
MW-6F	99.91	14.48	85.43	no odor
MW-6G	99.16	12.22	86.94	no odor
MW-6H	97.93	12.36	85.57	hydrocarbon odor
MW-6I	97.60	12.83	84.77	no odor

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 ground water on December 15, 1988.

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

Table 2. Analytical Results of Soil-gas Survey
Conducted on September 19, 1988

Concentrations in micrograms per liter (ug/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 ground water

Table 3. Laboratory Results of Soil 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
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 notes in parentheses.
4 Detection limit 10 mg/kg except as noted in parentheses.

Table 4. Laboratory Results of Ground-water Analyses
Concentrations in micrograms per liter (ug/L)

EPA TEST METHOD 602

Well Number	Date Sampled	Benzene	Ethylbenzene	Toluene	Xylenes
MW-6A	10/20/88	0.6 (0.5)	ND (2)	ND (1)	ND (1)
MW-6B	10/20/88	4.1 (0.5)	ND (2)	2.5 (1)	ND (1)
MW-6C	10/20/88	9,500 (50)	170 (2)	65 (100)	850 (1)
MW-6D	10/20/88	710 (5)	22 (20)	74 (10)	110 (10)
MW-6E	10/20/88	1.1 (0.5)	ND (2)	ND (1)	3.4 (1)
MW-6F	10/25/88	ND (0.5)	ND (2)	ND (1)	2.4 (1)
MW-6G	12/07/88	ND (0.5)	ND (2)	ND (1)	ND (1)
MW-6H	12/07/88	1,200 (25)	110 (20)	320 (10)	220 (10)
MW-6I	12/07/88	ND (0.5)	ND (2)	ND (1)	ND (1)

ND = Not detected.
Detection limits given in parentheses.

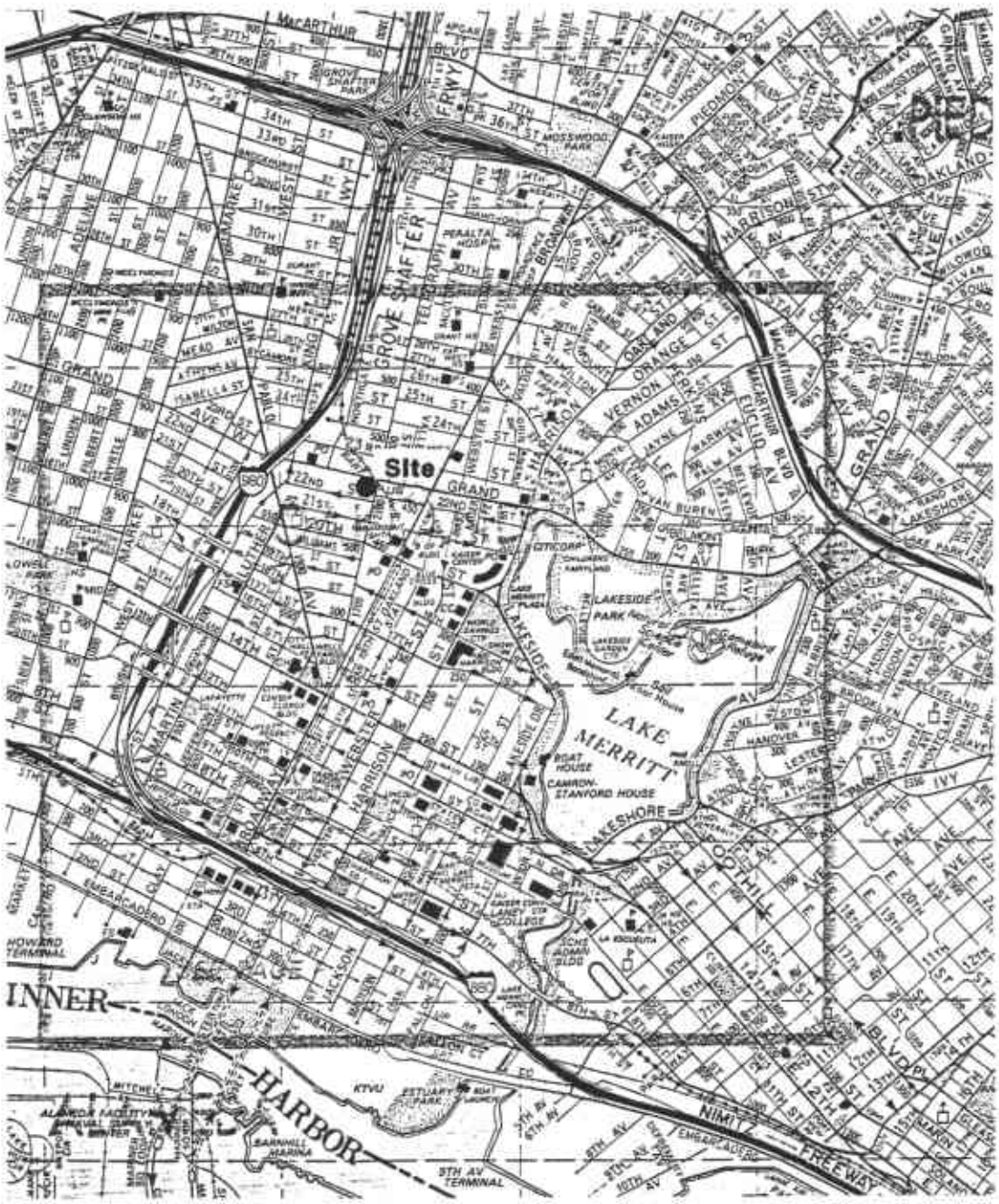
Table 5. Slug Test Conditions

Well Number	Test Type	Slug Pump Type	Approximate Volume (gallons)	Initial Water Level (feet)	Classification of Stratum
MW-6D	Injection	--	2	12.59	Confined
MW-6E	Withdrawal	Submersible	3	12.58	Confined
MW-6H	Withdrawal	Suction	1.5	11.88	Unconfined

Table 6. Slug Test Results

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

105649



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0 2200 4400

SCALE IN FEET

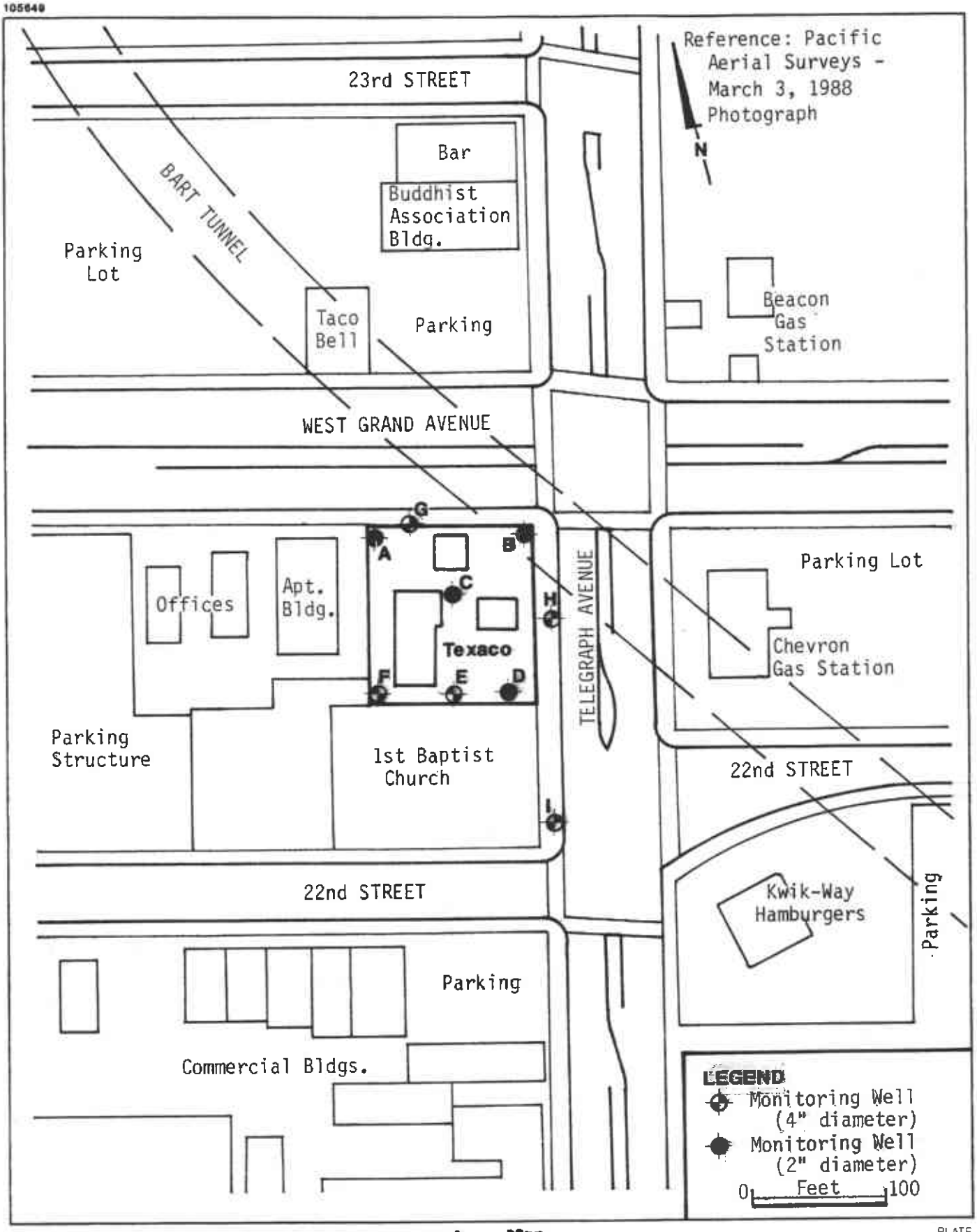
Harding Lawson Associates
Engineers and Geoscientists

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

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,080.03		2/89		

105649

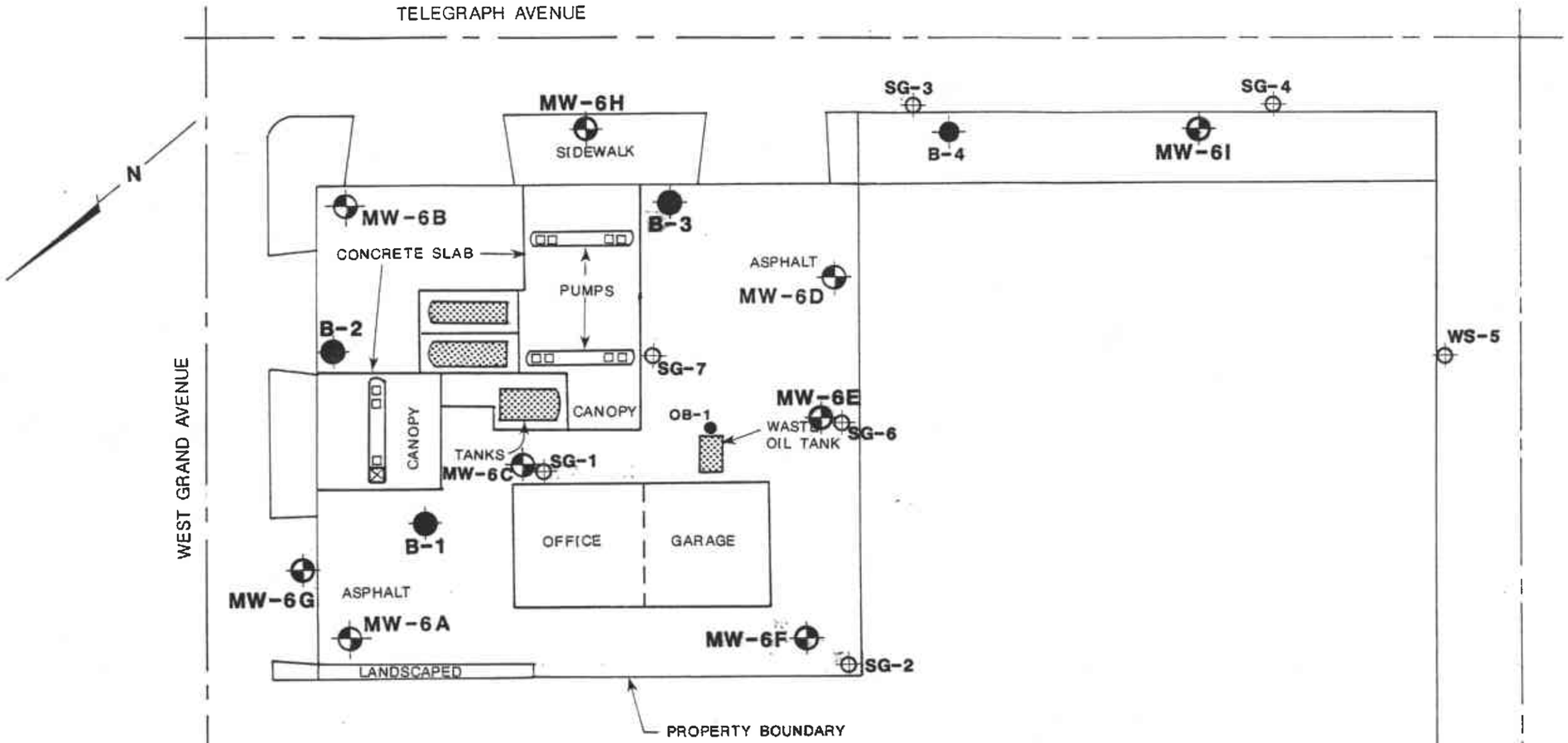


Harding Lawson Associates
Engineers and Geoscientists

Area Map
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,080.03		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

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

30 60

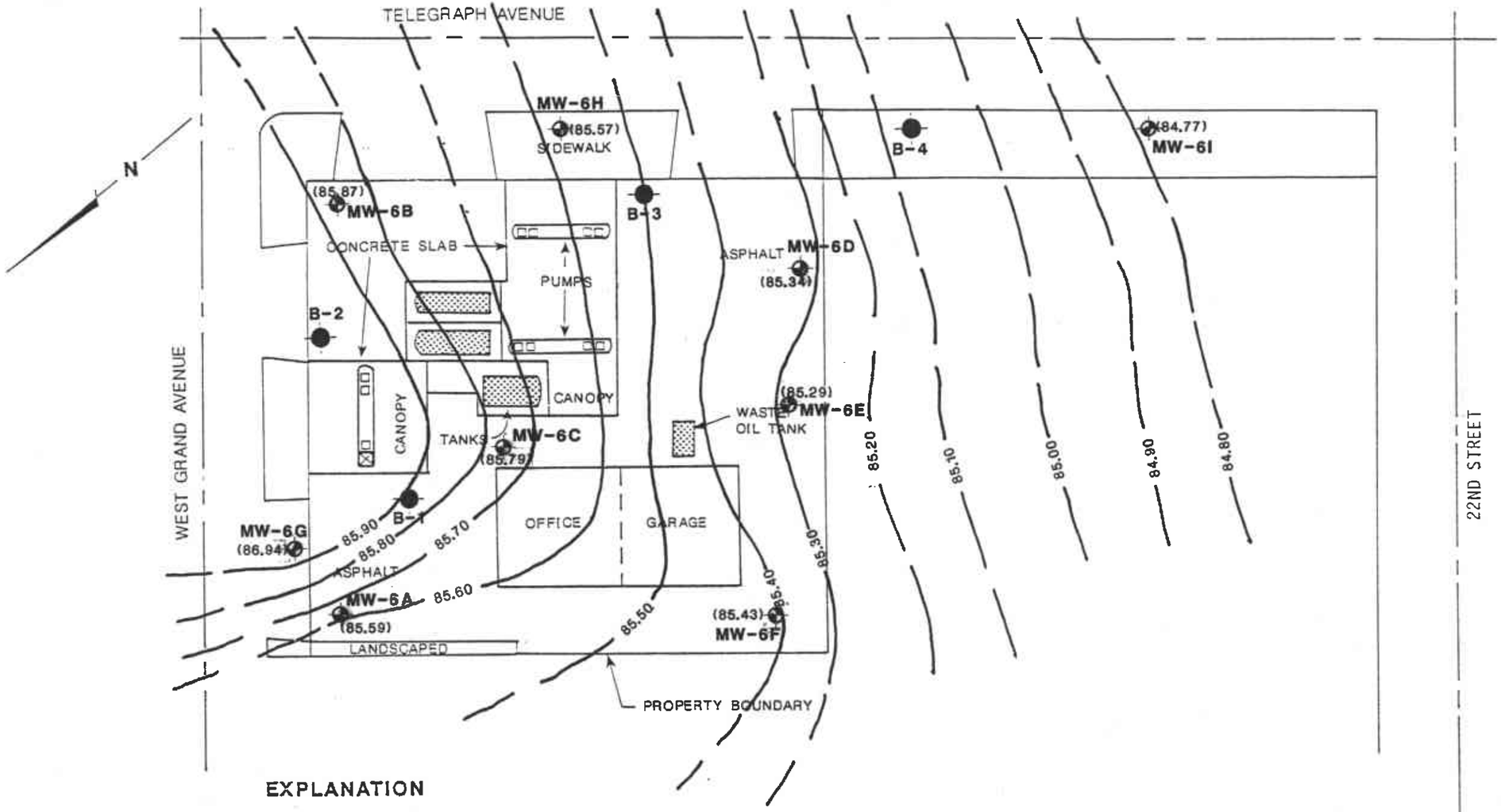
SCALE IN FEET

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	2251,080.03		2/89		



EXPLANATION

B-2 ● Boring Locations

(85.59) ⊕ MW-6J Monitoring Well Location and Groundwater Surface Elevation on December 15, 1988

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

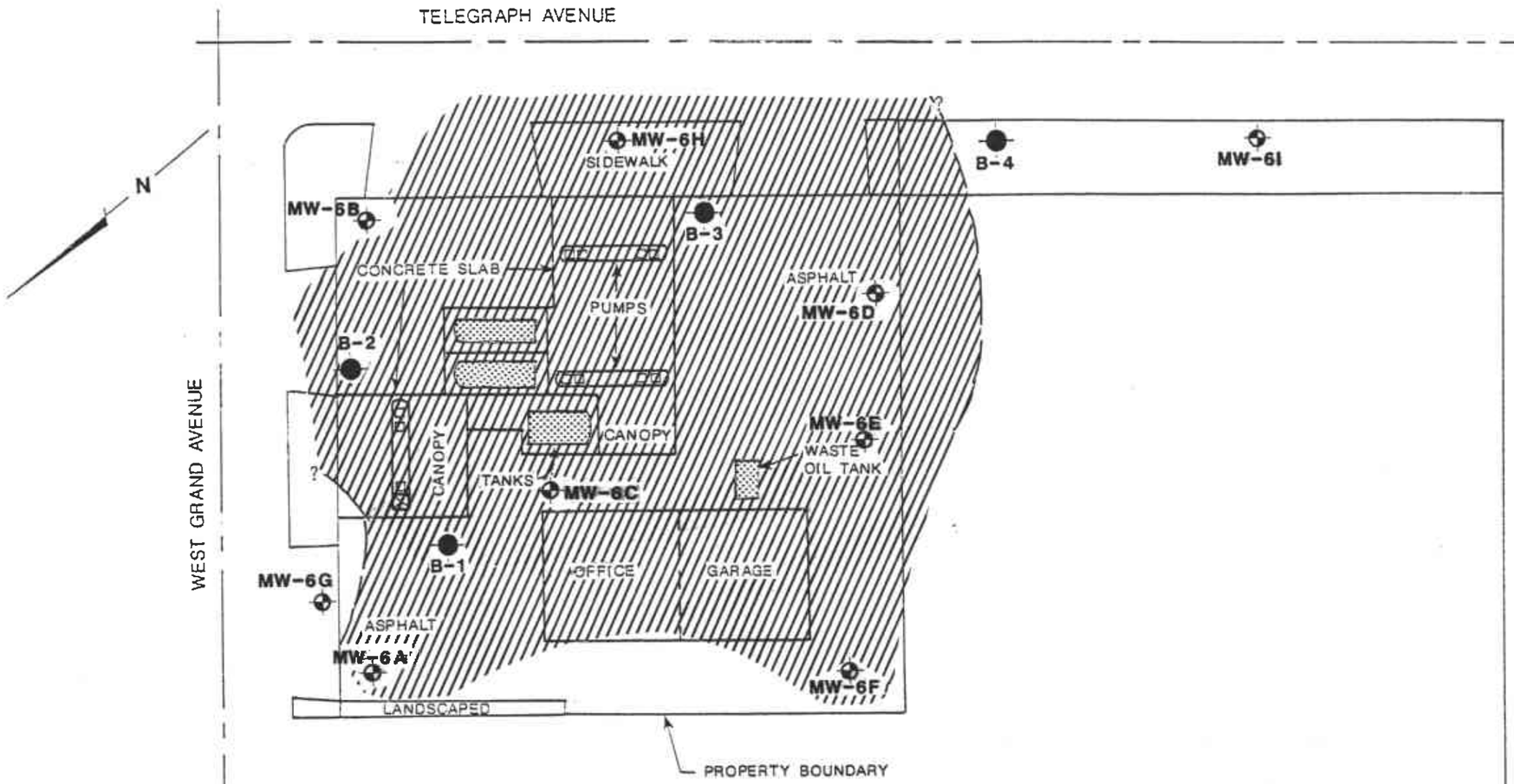
0 30 60
SCALE IN FEET

Harding Lawson Associates
Engineers and Geoscientists

Ground-Water Surface
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,080.03		2/89		



EXPLANATION

B-1 Boring Location

Detectable Dissolved Hydrocarbons in Ground-Water

MW-6J Monitoring Well Location

0 30 60

SCALE IN FEET

Bench Mark (HLA Datum El. = 100 feet)

Harding Lawson Associates
Engineers and Geoscientists

Distributon of Hydrocarbons In Ground-Water
Former Texaco Service Station
2225 Telegraph Avenue
Oakland, California

PLATE 5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,080.03		2/89		

DISTRIBUTION

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

Attention: Mr. R.R. Zielinski

GLF/RS/ly 031175L/R25

QUALITY CONTROL REVIEWER

Stephen J. Osborne
Principal Engineer