A Report Prepared for

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

QUARTERLY TECHNICAL REPORT
SECOND QUARTER OF 1990
FORMER TEXACO STATION
2200 EAST 12TH STREET
OAKLAND, CALIFORNIA

HLA Job No. 2251,112.03
August 10, 1990
1990 Report No. 3

by

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January 10, 1991

Mr. Tom Callaghan
California Regional Water Quality Control District
1800 Harrison Rd., Suite 700
Oakland, Ca 94612

Dear Mr. Callaghan:

Enclosed, please find the 1990 Second Quarter Report for the Texaco Station located at **2200 East 12th St., in Oakland,** California.

If you have any questions, please feel free to contact Tony Palagyi at (818) 505-2701.

Sincerely,

Kim Gumbiner
Texaco Environmental Services
Administrative Asst.

KEG:kg

Enclosure

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

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 2200 East 12th Street, 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 southeast corner of the intersection of East 12th Street and 22nd Avenue; the surrounding area consists of commercial/retail businesses, including a Shell Oil Company (Shell) service station immediately across 22nd Avenue (Plate 2). The site is bordered on the west by East 12th Street, on the north by 22nd Avenue, and on the east by a building occupied by a mattress manufacturer. Adjacent to the site on the south is a parcel owned by M.C.B. Industries, which is currently used for automobile storage.

The topography is relatively flat, sloping gently southwest toward East 12th Street and the Brooklyn Basin Tidal Canal. The site's surface is approximately 20 feet above Mean Sea Level, and drainage is toward East 12th Street. This area has been exten-

sively developed, and surface runoff is mainly controlled by the municipal storm sewer system.

At the station, leaded and unleaded gasoline are dispensed and automotive repair services are provided. Structures include a building, three fuel pump islands, one underground waste oil tank, and three underground fuel storage tanks (see Site Plan, Plate 3).

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 geologic conditions). The site lies within the Oakland Upland and Alluvial Plain subarea. The groundwater 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. Regionally, groundwater flows west-southwest, toward San Francisco Bay.

Most uses of groundwater in the East Bay Plain are related to irrigation or industrial needs; the majority of domestic water is supplied by the East Bay Municipal Utility District (EBMUD) from surface sources.

Subsurface conditions at the site to the maximum depth explored (20 feet), indicate that soils generally consist of unconsolidated, stiff, sandy clay (CL), interbedded with occasional silty sand and gravel lenses. During HLA's investigation,

groundwater was initially encountered between 11 and 13 feet below grade, stabilizing in the wells at approximately 6.5 feet below grade.

The tops of well casings were surveyed to a temporary datum located at the western end of the dispenser island nearest the underground storage tanks with an assumed elevation of 100.0 feet (HLA datum, see Plate 3). Well monitoring and survey data are presented in Table 1. The general direction of groundwater flow is to the west-northwest, with a gradient of 0.004 foot per foot, as shown on the Groundwater Surface Map, Plate 4. Estimates of the hydraulic conductivity of the slightly confined shallow soils range from 0.4 to 0.5 foot per day.

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 descriptions of proposed work were presented in the following reports:

1. Sensitive Receptor Study — May 24, 1988
2. Subsurface Investigation — July 20, 1988
3. Environmental Assessment — September 19, 1989
4. Soil and Groundwater Remediation Plan — May 11, 1990

Previous Field Operations

During our investigation, HLA completed the following field operations:

- Conducted a soil-gas survey on site and in city streets near the site. Probe locations are shown on Plate 5 and soil-gas survey results are presented in Table 2.
- Drilled and sampled 20 shallow soil borings (B-1 through B-20); locations are shown on Plate 3.
- Drilled, constructed, developed, and sampled five on-site monitoring wells (MW-9A through MW-9E) and three off-site wells (MW-9F through MW-9H); locations are shown on Plate 3.
- Ordered chemical analyses on soil and water samples to determine concentrations of petroleum hydrocarbons; results of analyses are presented in Tables 3 and 4, respectively.
- Conducted slug tests in MW-9B and MW-9E to estimate hydraulic conductivity and transmissivity values for the shallow aquifer; slug test results are presented in Table 5.

SUMMARY OF PREVIOUS FINDINGS

Vadose-zone Soil Condition

The area where detectable concentrations of petroleum products were found in vadose-zone soils and soil gas is closely associated with the pump islands on the west side of the station. Soil samples were collected from 11 borings (MW-9E, SB-4, and SB-12 through SB-20) to delineate the extent of hydrocarbons in the vadose zone around the pump island. The distribution of hydrocarbons in the vadose zone is illustrated on Plate 6 and results of chemical analyses on soil samples are presented in Table 3.

Only two samples contained total petroleum hydrocarbons (TPH) at concentrations exceeding 100 parts per million (ppm). These samples were from borings MW-9E and SB-4, on the west and east sides, respectively, of the pump island. The soil sample from a depth of 5.5 feet in MW-9E represents the only significant hydrocarbon concentration (1,900 ppm TPH). We concluded that MW-9E and SB-4 are in two isolated occurrences of vadose-zone soil with TPH concentrations above 100 ppm. Correspondingly high concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and TPH were detected in soil-gas samples from Probe Locations SG-01 and SG-03.

Groundwater Condition

Shallow groundwater in the site vicinity contains detectable quantities of BTEX, as shown in Table 4. As illustrated on Plate 7, the extent of BTEX in the groundwater is well delineated and the plume appears to be extending downgradient, toward utility lines in East 12th Street and 22nd Avenue. The bottom of the storm drain in East 12th Street is approximately 8.5 feet below grade, approximately 2 feet below the water table.

The lateral limits of the plume are delineated by MW-9A, MW-9C, MW-9D, MW-9F, MW-9G and MW-9H; samples from these wells show no detectable hydrocarbon concentrations. Samples from MW-9B and MW-9E exhibited benzene concentrations in groundwater (4 and 15 parts per billion [ppb], respectively) that exceed Maximum

Contaminant Levels (MCLs). No other constituent exceeds the MCLs or Drinking Water Action Levels (DWALs).*

WORK PERFORMED DURING THE SECOND QUARTER OF 1990

HLA issued a soil and groundwater remediation plan, which proposes excavating soil with hydrocarbon concentrations above 100 ppm from an area between the sidewalk and the canopy covering the western pump islands (Plate 3) and monitoring groundwater conditions quarterly for one year. Texaco Refining and Marketing Inc. approved the work plan, but implementation of the plan is pending review and approval by Alameda County Health Services.

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* The California Department of Health Services issued an action list for chemical contaminants of drinking water. Acceptable drinking water concentrations are specified for four gasoline constituents: benzene, toluene, ethylbenzene, and xylenes (BTEX). MCLs are drinking water standards enforced by law under California Code of Regulations, Title 22. DWALs are recommended levels, but are not enforced by law.

LIST OF TABLES

LIST OF ILLUSTRATIONS

Table 1. Well Monitoring and Survey Data

Well No.	Top of Casing Elevation* (feet)	Depth to Groundwater** (feet)	Groundwater Surface Elevation+ (feet)
MW-9A	100.07	7.25	92.82
MW-9B	98.41	6.14	92.27
MW-9C	99.73	6.99	92.74
MW-9D	101.46	8.40	93.06
MW-9E	98.41	5.70	92.71
MW-9F	96.96	6.07	90.89
MW-9G	98.51	6.01	92.50
MW-9H	97.14	8.35	88.79

Notes:

* Elevation relative to HLA temporary benchmark located at the western corner of the dispenser island nearest the underground storage tanks, with an arbitrary elevation of 100.0 feet (see Plate 3).

** Depth to groundwater on October 12, 1989.

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

Table 2. Results of Soil-gas Survey
Conducted on September 20, 1988
Concentrations in micrograms per liter (μg/L)

Sample	Depth (ft)	Benzene	Ethyl-benzene	Toluene	Xylenes	Total Petroleum Hydrocarbons
Air	N/A	<0.8	<0.8	<0.7	<0.8	<0.8
SG-01	5.0	320,000	620	1	2,200	700,000
WS-02	5.0	12,000	<80	<73	<80	25,000
SG-03	4.0	32,000	<8	<28,000	800	96,000
SG-04	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
MW-9A	6.0	<76	<80	<73	<80	<76
SG-05	2.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-06	--	--	--	--	--	--
SG-07	--	--	--	--	--	--
SG-08	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-09	6.0	<0.8	<0.8	<0.7	<0.8	<0.8
WS-10	6.0	<76	<80	<73	<80	<76
SG-11	4.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-12	5.0	<0.8	<0.8	<0.7	<0.8	<0.8
SG-13	5.0	<0.8	<0.8	<0.7	<0.8	23
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

Table 3. Results of Soil Analyses
Concentrations in milligrams per kilogram (mg/kg)

Sample Number	Depth (ft)	Benzene [1]	Ethyl- benzene [2]	Toluene [3]	Xylenes [3]	TPH as Gasoline [4]
SB-1	4.8	0.30	ND	0.2	ND	ND
B-9-1	5.0	ND	ND	ND	ND	ND
B-9-1	9.0	ND	ND	ND	ND	ND
B-9-1	12.0	ND	ND	ND	ND	ND
B-9-2	5.0	ND	ND	ND	ND	ND
B-9-2	9.0	ND	ND	ND	ND	ND
B-9-2	10.5	ND	ND	ND	ND	ND
B-9-2	13.0	ND	ND	ND	ND	ND
SB-4	4.0	1.0	2.3	0.9	5.8	160
SB-4	9.0	ND	ND	ND	ND	ND
SB-5	4.0	0.33	ND	ND	ND	ND
SB-5	9.0	ND	ND	ND	ND	ND
SB-6	5.0	ND	ND	ND	ND	ND
SB-6	5.5	ND	ND	ND	ND	ND
SB-7	4.0	ND	ND	ND	ND	ND
SB-7	8.5	ND	ND	ND	ND	ND
SB-8	5.5	0.43	ND	ND	ND	ND
SB-8	9.0	ND	ND	ND	ND	ND
SB-9	4.0	ND	ND	ND	ND	ND
SB-9	9.0	ND	0.4	ND	1.1	39
SB10-1	5.0	ND	ND	ND	ND	ND
SB10-2	10.0	ND	ND	ND	ND	ND
SB11-1	5.0	ND	ND	0.1	ND	ND
SB11-2	10.0	ND	ND	ND	ND	ND
SB-12	3.5	0.09	0.07	0.2	0.09	11 (1)
SB-13	4.0	ND	ND	0.1	ND	1.7 (1)
SB-14	4.5	ND	ND	ND	ND	3.5 (1)
SB-15	3.5	0.07	ND	ND	ND	6.3 (1)
SB-16	4.5	0.21	0.08	ND	ND	9.0 (1)
SB-17	5.0	0.093 (.01)	0.139 (.01)	0.043 (.01)	ND (.01)	42 (2)
SB-18	5.0	ND (.01)	0.021 (.01)	0.245 (.01)	0.015 (.01)	5 (2)
SB-19	5.0	ND (.01)	0.022 (.01)	0.078 (.01)	ND (.01)	6 (2)
SB-20	5.0	0.035 (.01)	0.017 (.01)	0.038 (.01)	ND (.01)	7 (2)
MW-9D	6.0	ND	ND	ND	ND	ND
MW-9D	10.5	ND	ND	ND	ND	ND
MW-9E	5.5	ND	18	ND	ND	1,900
MW-9E	9.0	ND	ND	ND	ND	ND
MW-9G	4.0	ND	ND	0.2	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 4. Results of Groundwater Analyses
Concentrations in micrograms per liter (μg/L)

EPA TEST METHOD 602

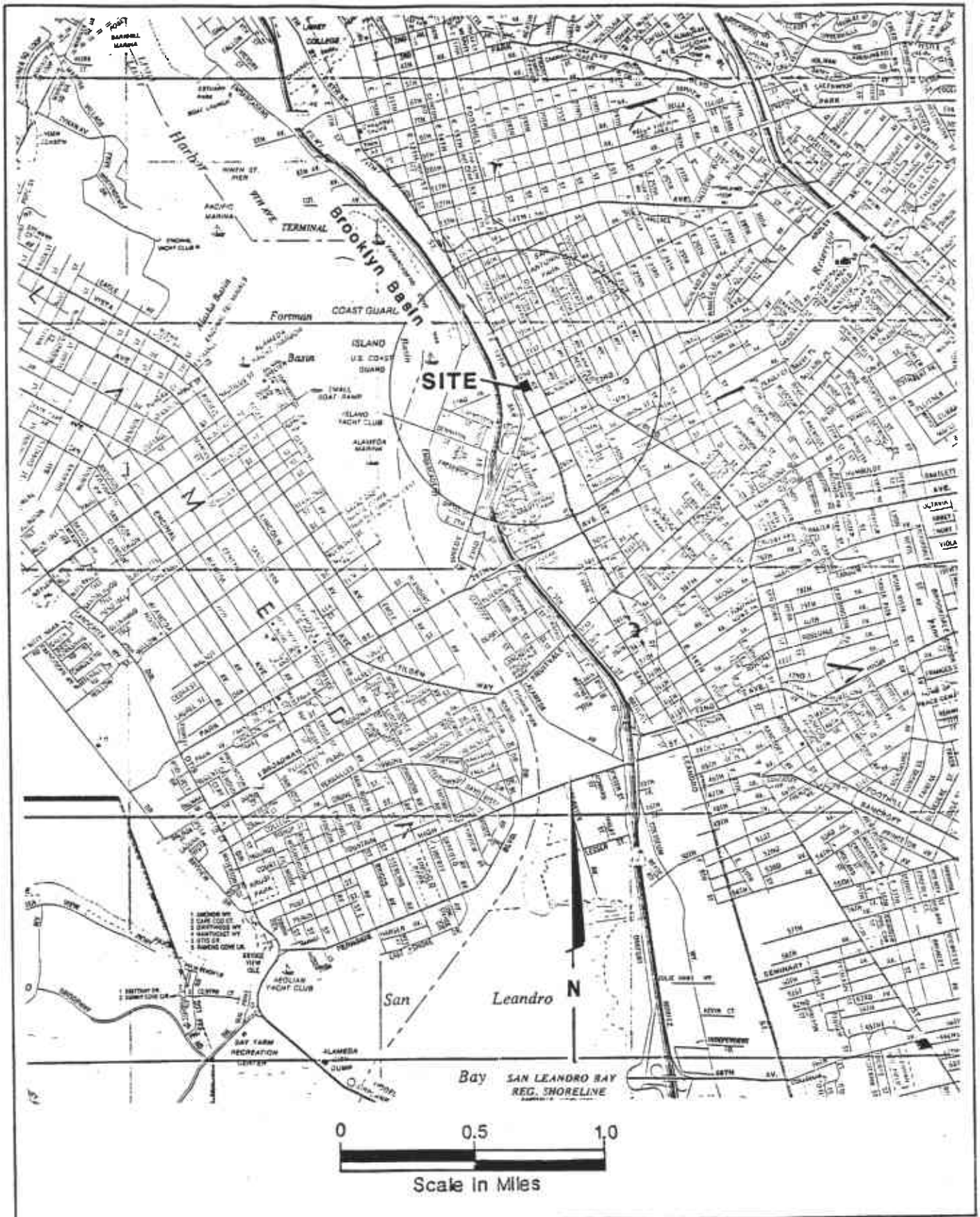
Well Number	Date Sampled	Benzene	Ethylbenzene	Toluene	Xylenes
MW-9A	06/13/88	ND	ND	ND	ND
MW-9A	10/24/88	ND	ND	ND	ND
MW-9A	10/13/89	ND	ND[1]	ND[1]	ND[2]
MW-9B	06/13/88	350	66	7.8	160
MW-9B	10/24/88	84	3.1	ND	3.2
MW-9B	10/13/89	4.1	ND[1]	ND[1]	ND[2]
MW-9C	06/13/88	ND	ND	ND	ND
MW-9C	10/28/88	ND	ND	ND	ND
MW-9C	10/13/89	ND	ND[1]	ND[1]	ND[2]
MW-9D	10/24/88	ND	ND	ND	ND
MW-9D	10/13/89	ND	ND[1]	ND[1]	ND[2]
MW-9E	10/24/88	1.3	ND	ND	ND
MW-9E	10/13/89	15	2.1[1]	ND[1]	ND[2]
MW-9F	12/06/88	ND	ND	ND	ND
MW-9F	10/13/89	ND	ND[1]	ND[1]	ND[2]
MW-9G	12/06/88	0.8	ND	ND	ND
MW-9G	10/13/89	ND	ND[1]	ND[1]	ND[2]
MW-9H	12/06/88	ND	ND	ND	ND
MW-9H	10/13/89	ND	ND[1]	ND[1]	ND[2]
Detection limits		0.5	2.0	1.0	1.0

ND = Not detected
1 Detection limit = 0.5
2 Detection limit = 3.0

Table 5. Slug Test Results

Well Number	Lithology of Tested Zone	Thickness of Zone (feet)	Estimated Hydraulic Conductivity of Zone (feet/day)
MW-9B	Clayey sand	2.5	0.42
MW-9E	Sandy clay with gravel	13.0	0.52

105649



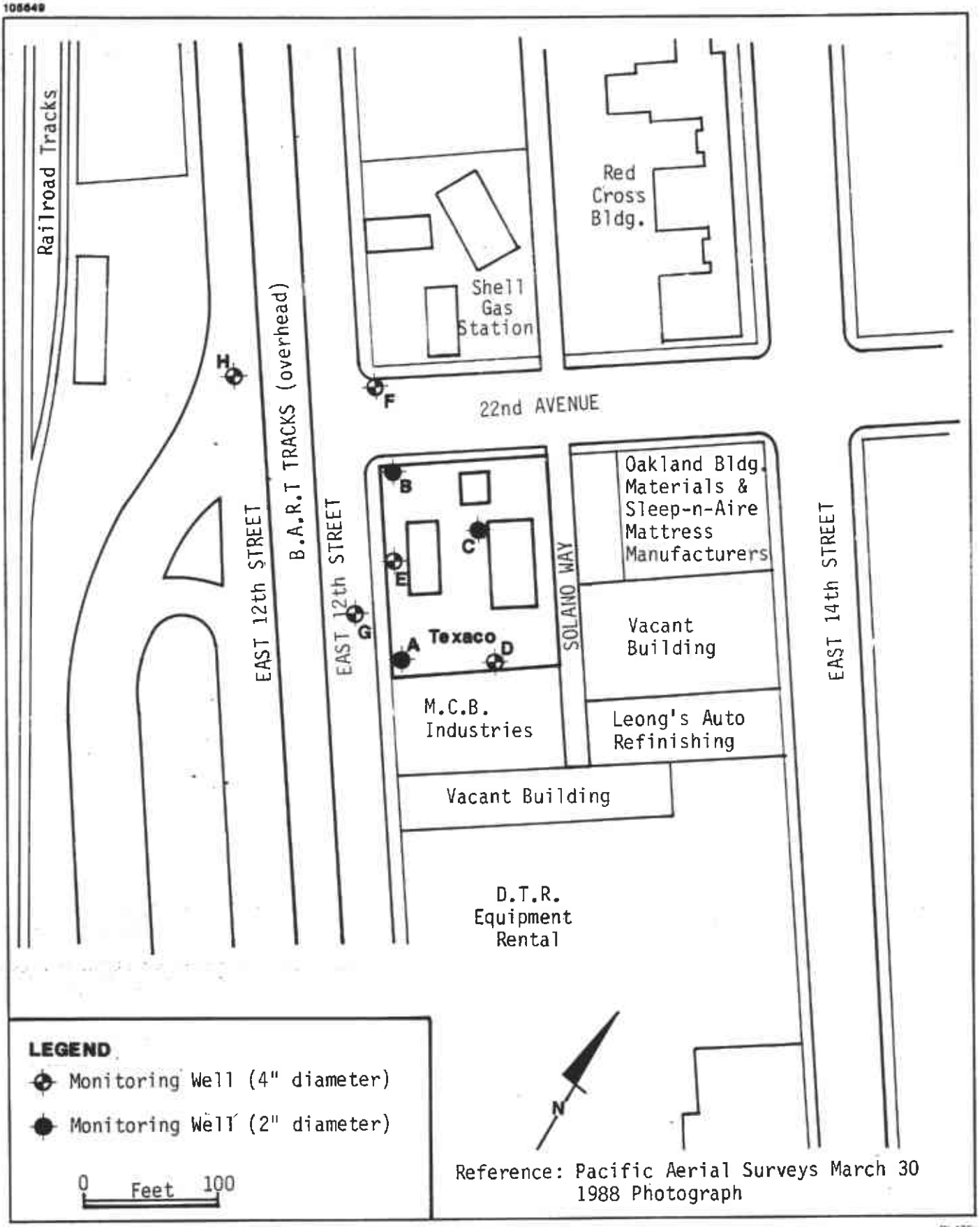
Harding Lawson Associates
Engineers and Geoscientists

Site Location
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	2251,112,03		6/89		

105649



Reference: Pacific Aerial Surveys March 30 1988 Photograph

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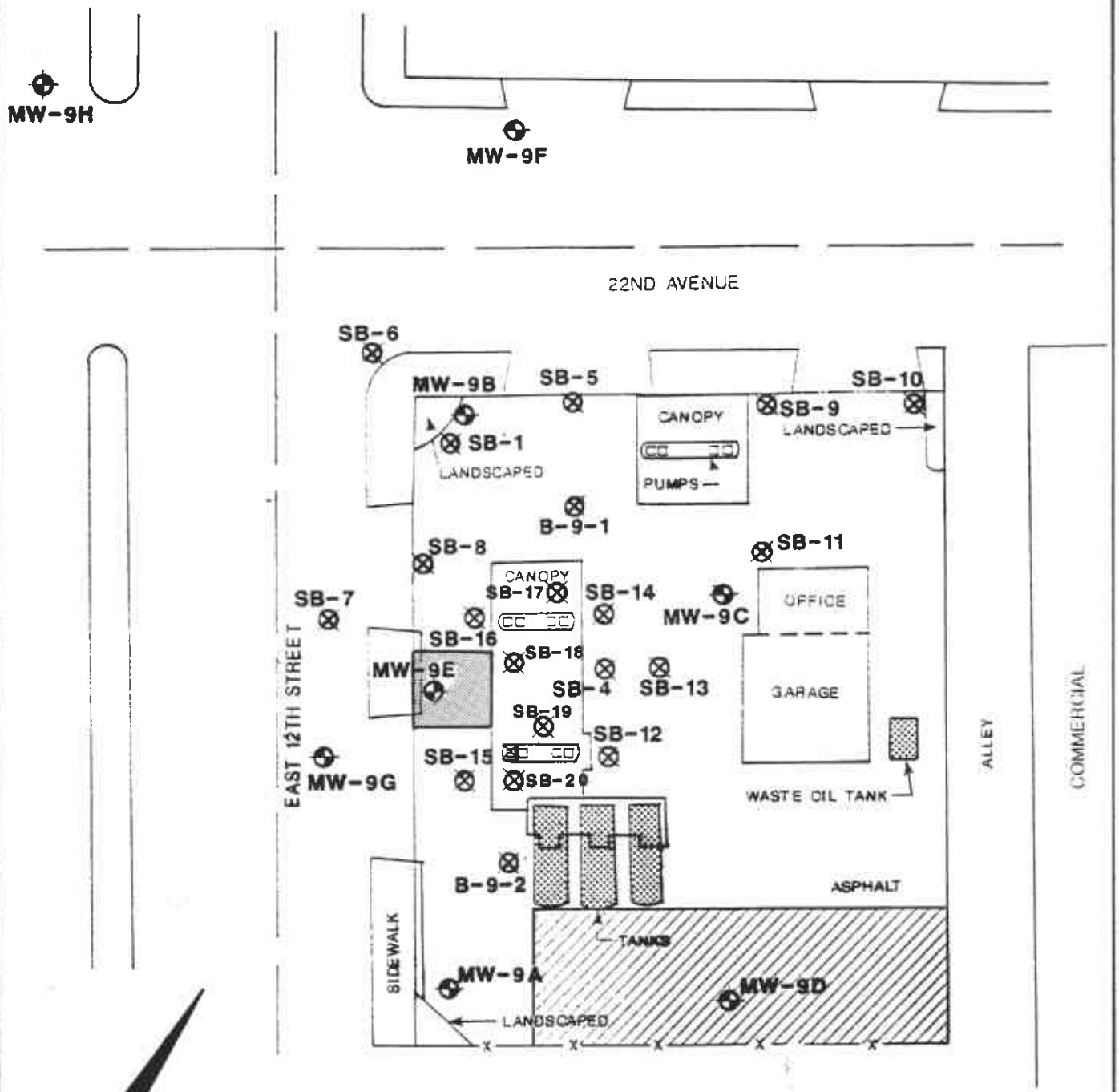
Vicinity Plan
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,112.03	G	1/89		



EXPLANATION

- Proposed treatment area
- Proposed excavation area
- MW-9A — Monitoring well location and number
- B-2 — Boring location and number
- Bench mark (HLA datum El.=100 feet)

0 30
Scale in feet

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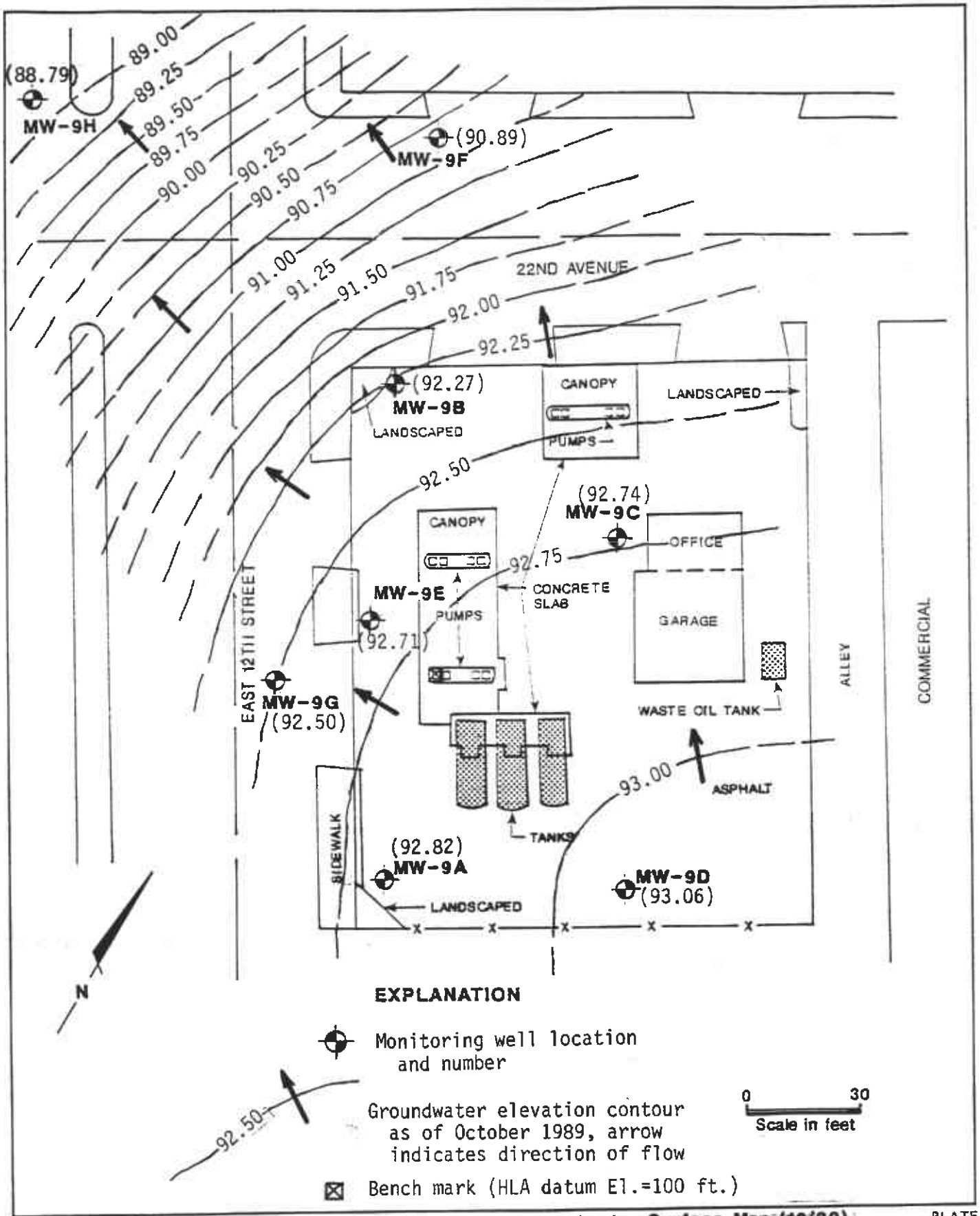
Engineers and Geoscientists

Site Plan
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,112.03	G	6/89	1/90	



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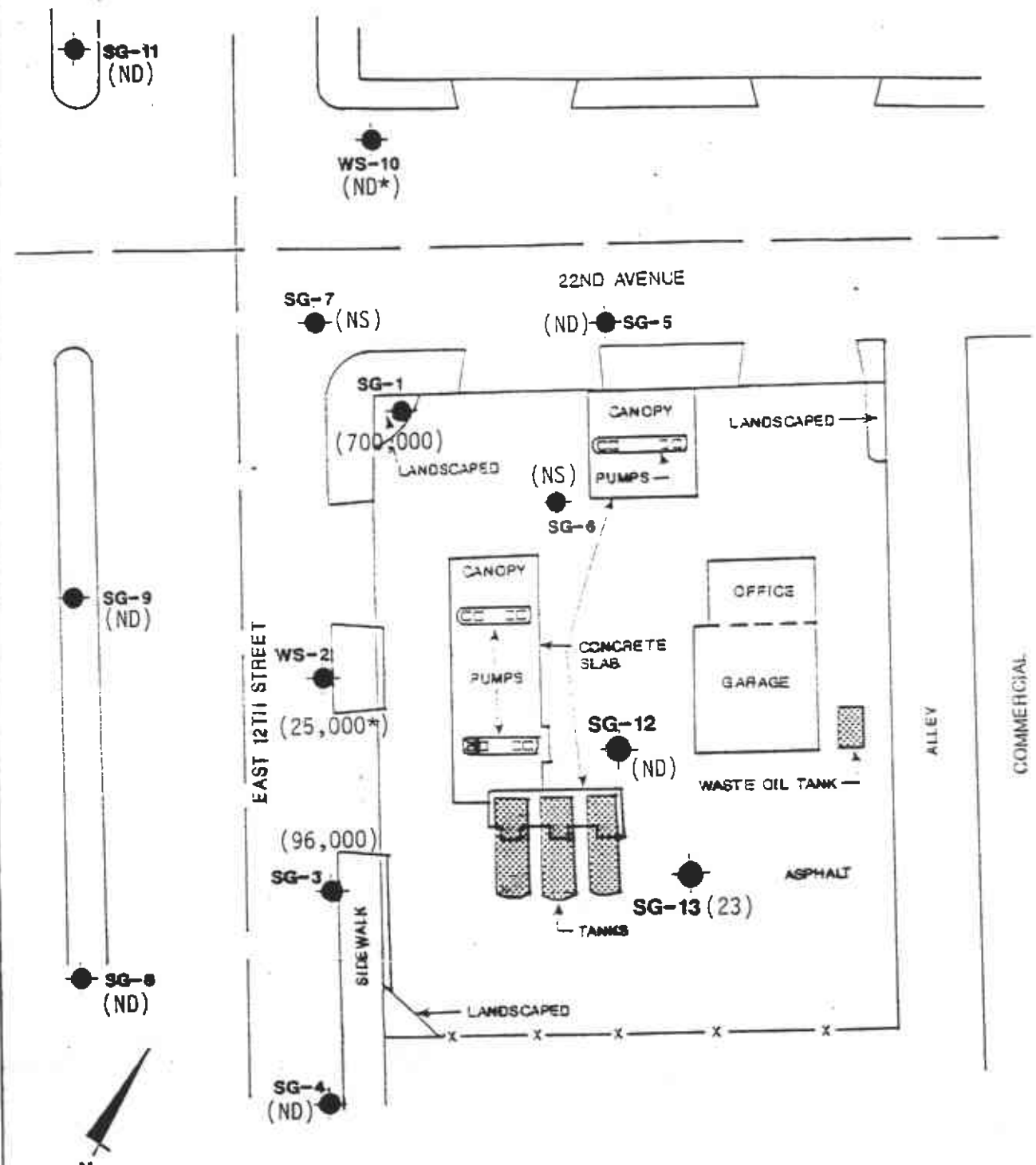
Groundwater Surface Map (10/89)
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251.112.03		11/89	



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Soil-gas Probe Locations
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
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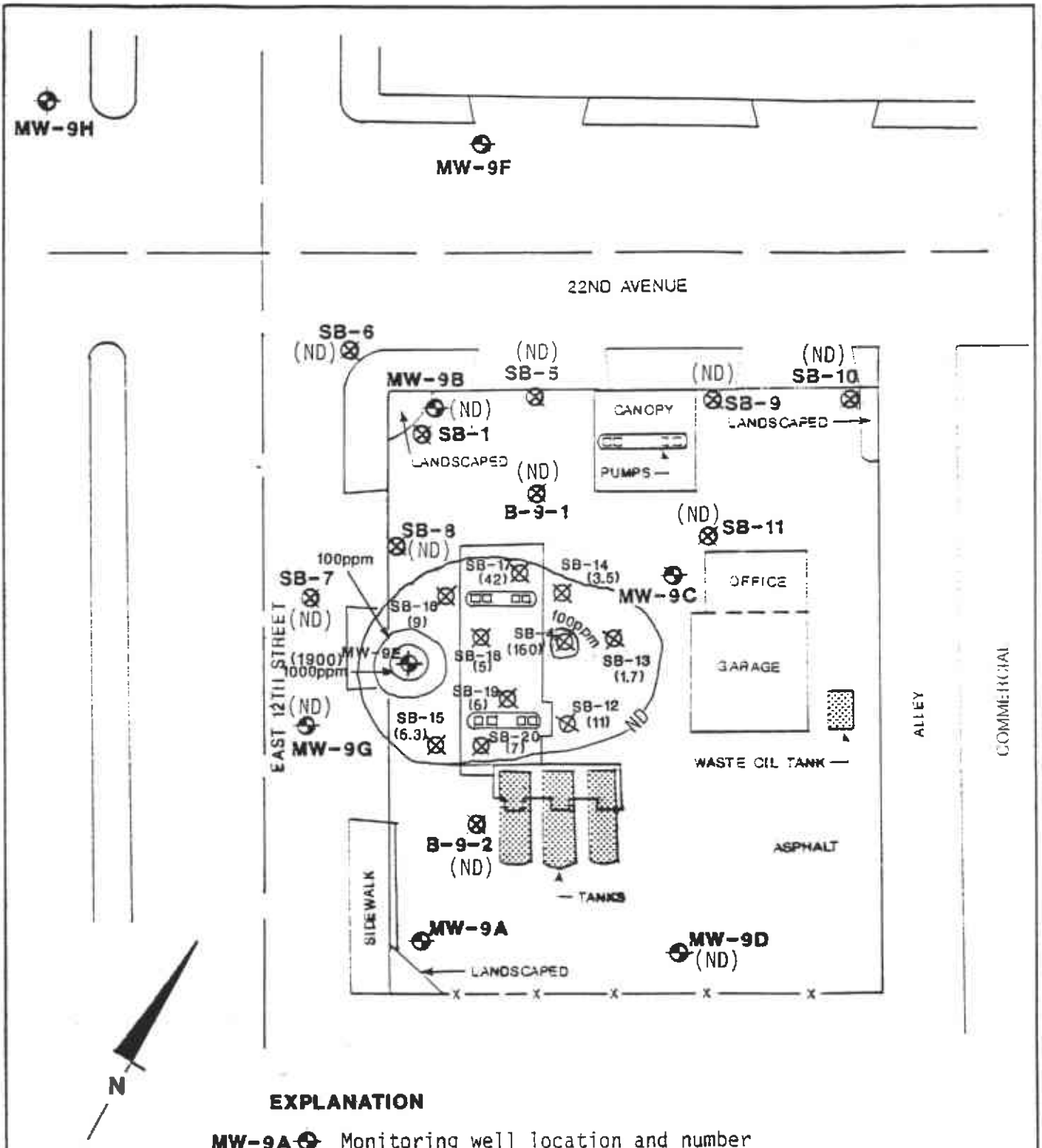

EXPLANATION

MW-9A ⊕ (120) — Monitoring well location and number; TPH as gasoline (mg/kg) in soil above water table

B-2 ⊗ — Boring location and number

ND — Non detectable

0 30
Scale in feet

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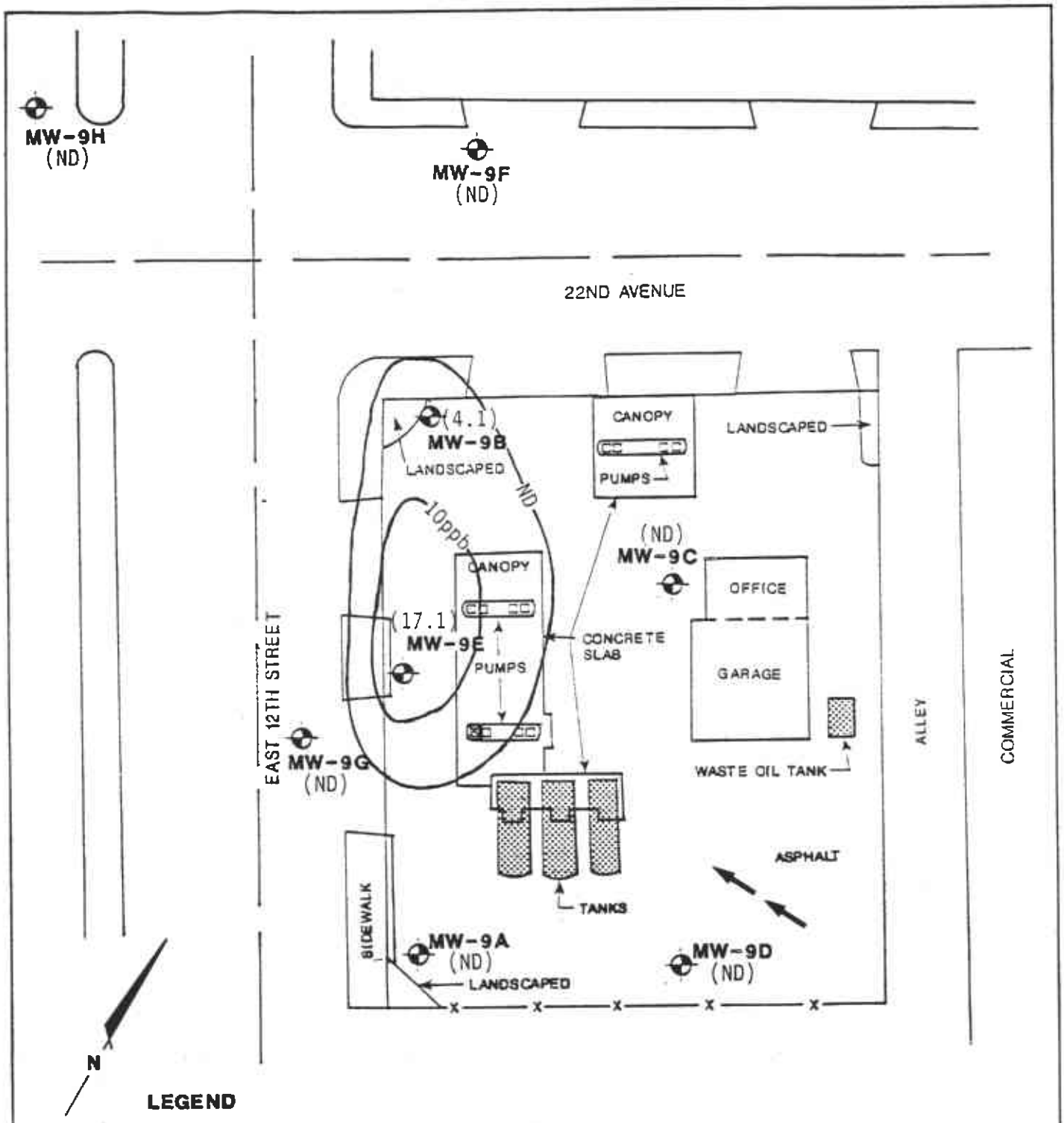
Engineers and Geoscientists

Distribution of TPH in Vadose-zone Soil
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
YC	2251,112.03		6/89	1/90	



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Distribution of Hydrocarbons in Groundwater
Former Texaco Service Station
2200 East 12th Street
Oakland, California

PLATE **7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
YC	2251,112.03		11/89	

DISTRIBUTION

3 copies: Texaco Refining and Marketing Inc.
10 Universal City Plaza
Universal City, California 91608
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1 copy: Texaco Refining and Marketing Inc.
100 Cutting Boulevard
Richmond, California 94804
Attention: Mr. R. R. Zielinski

MAS/RS/pkp 031715L/R38

QUALITY CONTROL REVIEWER

Stephen J. Osborne
Principal Engineer