EXXON COMPANY, U.S.A.

POST OFFICE BOX 4032 . CONCORD, CA 94524-2032

ENVIRONMENTAL ENGINEERING

MARLA D. GUENSLER
SENIOR ENVIRONMENTAL ENGINEER
(510) 246-8776

February 25, 1993

Ms. Juliet Shin
Alameda County Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

Subject: Exxon RAS #7-0104
1725 Park Street
Alameda, CA

Dear Ms. Shin:

Attached for your review and comment is a Work Plan for Offsite Investigation. This work plan, prepared by RESNA Industries, Inc., of Novato, California, details the proposed installation of three off-site wells to be completed upon your approval.

In your letter dated November 30, 1992, the work plan was requested within 45 days of that date. In December, 1992, Exxon requested an extention until the end of February. On December 22, 1992, you left a voice mail message granting the extention to February 26, 1993.

Harding Construction Services initiated the installation of the bio-remediation system described in the report entitled **Work Plan Groundwater Extraction and Treatment** dated September 10, 1991, in December 1992. Start-up was completed in February 1993.

On January 1, 1993, the project file for this site was transferred to RESNA Industries, Inc., of Novato, California.

The Offsite Groundwater Survey previously submitted to your office indicates that there may be offsite contributions to Exxon's property. Upon further investigation, Exxon may request assistance from your office in holding any offsite contributors responsible for investigation and/or remediation of the offsite sources.

Should you have any questions or comments, or require additional information, please do not hesitate to contact me at the above listed phone number.

Sincerely,

Marla D. Guensler

Marla D. Guensler
Senior Environmental Engineer

MDG/mdg

Attachment

c: w/attachment:
Mr. Richard Hiett, San Francisco RWQCB

w/o attachment:
Mr. Robert La Grone, Alameda Fire Dept.
Mr. Keith Romstad, RESNA Industries, Inc., Novato

0559E/70104.ltr

RESNA
Working To Restore Nature

73 Digital Drive
Novato, CA 94949
Phone: (415) 382-7400
FAX: (415) 382-7415

WORK PLAN:
SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
at
Exxon Service Station No. 7-0104
1725 Park Street
Alameda, California

Prepared for

Exxon Company, U.S.A.
P.O. Box 4032
Concord, California 94524

by
RESNA Industries Inc.

Keith A. Romstad
Project Manager

John B. Bobbitt
R.G. 4313

REGISTERED GEOLOGIST
JOHN BAILEY BOBBITT
No. 4313
STATE OF CALIFORNIA

February 25, 1993

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February 25, 1993

Ms. Marla Guensler
Exxon Company, U.S.A.
P.O. Box 4032
Concord, California 94524

Subject: Executive Summary of Work Plan for Supplemental Environmental Investigation at Exxon Service Station No. 7-0104, 1725 Park Street, Alameda, California.

Ms. Guensler:

At the request of Exxon Company U.S.A. (Exxon), RESNA Industries Inc. (RESNA) has prepared this work plan to delineate the extent of dissolved hydrocarbons in groundwater originating from the subject site. Exxon requested that RESNA perform this investigation after residual hydrocarbons were detected in soil and dissolved hydrocarbons were detected in groundwater during previous environmental work at the site.

Specific tasks associated with the investigation include drilling three soil borings into first encountered ground water; collecting soil samples from the borings; constructing 2-inch-diameter monitoring wells in the borings and collecting groundwater samples; analyzing selected soil and groundwater samples; and preparing a report summarizing our field and laboratory procedures and findings.

We recommend signed copies of this work plan be forwarded to Ms. Juliett Shin, Alameda County Health Agency, Division of Hazardous Materials, 80 Swan Way, Suite 200, Oakland, California, 94621, and to Mr. Richard Hiett of the California Regional Water Quality Control Board, San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, California, 94612.

Please call if you have questions regarding this work plan.

Sincerely,
RESNA Industries Inc.

Keith A. Romstad
Project Manager

Enclosure: Work Plan: Supplemental Environmental Investigation

170077.02W

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WORK PLAN:
SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION
at
Exxon Service Station No. 7-0104
1725 Park Street
Alameda, California

for

Exxon Company, U.S.A.

INTRODUCTION

This work plan describes the tasks to evaluate hydrocarbons detected in soil and groundwater beneath Exxon Service Station No. 7-0104 in Alameda, California. Exxon Company, U.S.A. (Exxon) requested that RESNA Industries, Inc. (RESNA) prepare this work plan to evaluate residual hydrocarbons in soil and delineate the extent of dissolved hydrocarbons in groundwater originating from the subject site.

Work for the investigation will include drilling three soil borings, constructing 2-inch-diameter monitoring wells in the borings, collecting and analyzing soil samples from the borings and groundwater samples from the wells, interpreting the data to evaluate soil and groundwater conditions, and preparing a report summarizing our field and laboratory procedures and findings.

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BACKGROUND

Site Description

Exxon Station No. 7-0104 is an operating retail gasoline station located at the western corner of Park Street and Eagle Avenue in Alameda, California, as depicted on the Site Vicinity Map (Plate 1). The site is at an elevation of approximately 17 feet above mean sea level and the surrounding topography is relatively flat (U.S.G.S. 1980). Structures at the site include a building with a convenience store, two multi-pump fuel-dispenser islands, and three underground storage tanks. The site is in a commercial district; however, a high school is within 1,000 feet. The approximate locations of the station facilities, existing underground storage tanks and pump islands, and other pertinent site features are shown on the Generalized Site Plan (Plate 2).

Existing or former retail service stations are at each corner of the intersection. Locations are shown on the Map of Area (Plate 3).

Previous Environmental Work

Previous work at the site has included the replacement of three underground storage tanks in 1989. Subsequently, Harding Lawson Associates (Harding Lawson) of Novato, California, performed an initial investigation which included drilling six soil borings and constructing groundwater monitoring wells at the site. Gasoline hydrocarbons were detected in soil and groundwater (Harding Lawson Associates, March 21, 1989). Harding Lawson subsequently drilled five soil borings and constructed five groundwater extraction wells onsite (Harding Lawson Associates, May 1, 1990). The locations of the onsite wells are shown on Plate 2.

In September 1992, Harding Lawson performed an offsite groundwater survey to evaluate the horizontal extent of petroleum hydrocarbons in groundwater that are related to an onsite source and whether potential offsite sources contributed to dissolved hydrocarbons in the vicinity of the site. Harding Lawson concluded that petroleum hydrocarbons from onsite sources appear to be limited to the site and possibly slightly offsite. Harding Lawson further concluded that additional sources

of petroleum hydrocarbons are present to the southeast and southwest of the site. During the field investigation, groundwater monitoring wells were noted at the former service station across Park Street southeast of the site, which is likely the source of petroleum hydrocarbons southeast of the Exxon site. Additionally, a release of petroleum hydrocarbons has also reportedly occurred at a Shell service station on Park Street southwest of the site, which is likely the source of petroleum hydrocarbons to the southwest of the Exxon site (Harding Lawson Associates, October 30, 1992).

In October 1992, Harding Lawson performed a vapor extraction test (VET), which included six individual short-term tests. Results of the VET indicated soil-vapor extraction appears to be a viable technology for removing hydrocarbons from soil; however, existing wells do not have sufficient open length to allow adequate air flow. During the tests, the air flow rates from the wells generally did not increase with applied vacuum, indicating that the air flow paths to the wells do not develop significantly during short-term operation. Air flow rates were generally low (between 1 and 6.5 cfm) except for well MW-7, which achieved a flow rate of 26 cfm. The induced vacuum created a radius of influence generally between 30 and 50 feet (Harding Lawson, December 28, 1992).

In December 1992, Harding Lawson began construction of a groundwater removal and treatment system at the site. The system will remove groundwater from the existing extraction wells to an aboveground bioreactor tank, through activated carbon canisters, and to the sanitary sewer system. Harding-Lawson began operation of the system in February 1993.

Onsite groundwater extraction could potentially alter the migration path of offsite plumes and make differentiation of plume boundaries difficult. Additionally, the potential contribution of petroleum hydrocarbons from offsite sources could impact the duration of remediation unless measures are taken by the respective responsible parties to prevent migration of petroleum hydrocarbons to the Exxon site.

What if the capture zone only encompasses the immediate area of the site?

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PROPOSED WORK

This investigation is designed to delineate the extent of dissolved hydrocarbons in groundwater originating from the subject site. The locations were selected using the results of the Offsite Groundwater Survey performed in September 1992 by Harding Lawson Associates. The specific tasks are summarized below and discussed in the sections that follow. We will perform the following tasks:

- Prepare a site safety plan and obtain appropriate encroachment permits and monitoring well permits.
- Drill three soil borings to approximately 15 feet below ground surface. We expect to encounter groundwater at approximately 5 feet to 8 feet below grade. The locations of the proposed soil borings are shown on Plate 3.
- Collect and classify relatively undisturbed soil samples at 5-foot intervals; and at obvious changes in soil type.
- Construct 2-inch-inner-diameter monitoring wells (MW-8 through MW-10) in the three soil borings, respectively.
- Develop, purge and sample wells MW-8 through MW-10.
- Submit selected soil samples to a laboratory certified by the state of California for analyses for TPHg using U.S. Environmental Protection Agency (EPA) Method 8015 (modified), for total petroleum hydrocarbons as diesel fuel (TPHd) using EPA Method 8015 (modified), and for benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) using EPA Method 8020. Groundwater samples will be submitted to a laboratory for analyses for TPHg and TPHd using EPA Method 8015 (modified), and for BTEX using EPA Method 602.
- Contract a licensed land surveyor to survey the locations and elevations of the tops of the well casings relative to mean sea level.
- Interpret field and laboratory data to evaluate hydrocarbons in soil and evaluate the extent of dissolved hydrocarbons in groundwater originating from the subject site.
- Prepare a report summarizing our field and laboratory procedures and findings.

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Site Safety Plan and Permits

Field work will be performed by RESNA personnel in accordance with a site safety plan prepared for the site. This plan will describe the basic safety requirements for the subsurface investigation and the drilling of soil borings at the work site. The site safety plan is applicable to personnel and subcontractors of RESNA. Personnel at the site will be informed of the contents of the site safety plan before work begins. A copy of the site safety plan will be kept at the work site and will be available for reference by appropriate parties during the work. The RESNA geologist will act as the Site Safety Officer.

RESNA will obtain applicable state and local permits related to the work to be performed at the site. This will include monitoring well permits and encroachment permits for offsite wells.

Soil Borings and Sampling

RESNA will contact Underground Services Alert before drilling to help locate public utility lines at the site. RESNA will hand auger boring locations to a depth of approximately 3 feet to 5 feet before drilling to reduce the risk of damaging underground structures. Locations of the proposed soil borings and monitoring wells are shown on Plate 3. These locations were chosen to delineate the extent of dissolved hydrocarbons in groundwater offsite in the downgradient and crossgradient directions of groundwater flow from the site.

Soil borings will be drilled by a licensed C-57 well driller with a CME-55 (or similar) drill rig equipped with 8-inch-diameter, hollow-stem augers. Augers and sampling equipment will be steam cleaned before use to minimize the possibility of crosshole contamination. The rinseate will be containerized and stored onsite. Drilling will be performed under the observation of a geologist, and the earth materials in the borings will be classified while drilling using the visual and manual methods according to the Unified Soil Classification System.

We expect to drill the soil borings to approximately 17 feet below grade. Soil borings will be drilled to approximately 10 feet below the first-encountered groundwater or at least 5 feet into any

confining layer encountered beneath the uppermost water-bearing zone. If a confining layer is encountered, the boring will be terminated and backfilled with bentonite to the top of the confining layer before installing a groundwater monitoring well. During drilling soil samples will be collected every 5 feet, at obvious changes in soil stratigraphy, or at obvious signs of hydrocarbons. Samples will be collected with a California-modified, split-spoon sampler equipped with laboratory-cleaned brass sleeves. Samples will be collected by advancing the auger to a point just above the sampling depth and driving the sampler into the soil. The sampler will be driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows required to drive the sampler each successive 6-inch interval will be counted and recorded to give an indication of soil consistency. Soil samples will be monitored with a photoionization detector (PID), which measures hydrocarbon concentrations in the ambient air or headspace above the soil sample. Field instruments such as the PID are useful for indicating relative levels of volatile hydrocarbons, but do not detect concentrations of hydrocarbons with the same precision as laboratory analyses. Soil samples selected for possible chemical analysis will be sealed promptly with aluminum foil, plastic caps, and duct tape. The samples will be labeled and placed in iced storage for transport to the laboratory. Chain of Custody Records will be initiated by the geologist in the field, updated throughout handling of the samples, and sent with the samples to the laboratory. Copies of these records will be included in the final report. Cuttings generated during drilling will be segregated on the basis of field evidence of hydrocarbons and sampled. The cuttings will then either be treated onsite or hauled to an appropriate disposal facility.

Well Construction

Monitoring wells MW-8 through MW-10 will be constructed in respective borings using thread-jointed, 2-inch-inner-diameter, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents will be used in well construction. The screened portion of each well will consist of factory-perforated casing with 0.020-inch-wide slots. We expect that the well screen will be installed from the total depth of each well to approximately 5 feet below grade. The well screen for each well will be installed approximately one to two feet above and ten feet below the current water table to permit entry of separate-phase hydrocarbons, if present, and to allow for fluctuations in the groundwater elevation. Unperforated casing will be installed from the top of each screen to the ground surface. The annular space in the well will be packed with sand to

approximately 1 foot above the slotted interval. A bentonite plug will be constructed above the sand pack to prevent cement from entering the filter pack. The remaining annulus will be backfilled to grade with a slurry of cement and bentonite powder.

The monitoring wells will be protected with traffic-rated, cast-aluminum utility boxes equipped with PVC skirts. Each box has a seal to minimize surface-water infiltration and must be opened with a special wrench. The design of this box reduces the possibility of accidental disturbance of the well.

Monitoring Well Development and Sampling

RESNA will wait a minimum of 24 hours before development of the monitoring wells to allow the grout to harden. Initially, a water sample will be collected for subjective analysis before development of the monitoring wells. This sample will be collected from near the water surface in the well with a Teflon bailer cleaned with a laboratory-grade detergent and deionized water. If separate-phase product is not present in the wells, the wells will be developed with a surge block and pump. Well development will continue until the discharge water is clear of silt and sand. Clay-size sediments derived from the screened portion of the formation cannot be eliminated by well development. After the water level has been allowed to stabilize, the well will be checked for separate-phase hydrocarbons using an interface probe. If separate-phase hydrocarbons are detected, the thickness of product detected in the well will be recorded. If separate-phase hydrocarbons are encountered in the well, the well will not be purged, and the water will not be sampled for chemical analysis. If detected, separate-phase hydrocarbons will be bailed from the well and stored in appropriately labeled drums onsite. RESNA will apprise Exxon of appropriate disposal options for separate-phase hydrocarbons bailed from the well.

If separate-phase hydrocarbons are not detected after development, the well will be purged of approximately 4 to 5 casing volumes of water with a submersible pump, or until pH, conductivity, and temperature of the purged water have stabilized. Water purged from the wells will be directed to 55-gallon drums for appropriate disposal. RESNA will apprise Exxon of appropriate disposal options.

The wells will be allowed to recover to at least 80 percent of static conditions, and a sample of the groundwater will be collected with a bailer cleaned with a laboratory-grade detergent and deionized water. The water will be transferred slowly from the bailer to laboratory-cleaned, 1-liter amber bottles and 40-milliliter glass vials for analyses by the laboratory. The glass vials will contain hydrochloric acid as a preservative. Our geologist will check to see if headspace is present. If headspace is present, we will collect more samples until none is present. Chain of Custody Records will be initiated in the field by the geologist, updated throughout handling of the samples, and sent along with the samples to the laboratory. Copies of Chain of Custody Records will be included in our final report.

Evaluation of Potentiometric Surface

The groundwater gradient and direction of groundwater flow at the site will be evaluated. The elevation of the top of each well casing will be measured relative to mean sea level by a licensed land surveyor. Water-depth measurements will be made from the top of the casing in the well to the nearest 0.01 foot with an electronic water-level indicator. The well will be vented to the atmosphere for a minimum of 1 hour before obtaining depth-to-water measurements. Venting is conducted to allow the ground water to equilibrate with barometric pressure. These data will be combined to evaluate the relative elevation of the groundwater surface in each well and the slope of the groundwater surface across the site.

Laboratory Analyses

Soil samples selected for analyses from each boring will generally include the sample collected from just above the first encountered water. Analysis of soil and groundwater samples will be performed for TPHg and TPHd using modified EPA Method 8015 and for BTEX using EPA Methods 8020 and 602, respectively. Detection limits for the tests requested and concentrations present will be stated on the laboratory reports. Analytical methods and detection limits will conform to guidelines specified in the latest edition of the Tri-Regional Recommendations. Laboratory analyses will be performed by a laboratory certified by the State of California.

Report Preparation

RESNA will prepare a report summarizing the extent of dissolved hydrocarbons originating from the subject site and our field and laboratory procedures.

REFERENCES

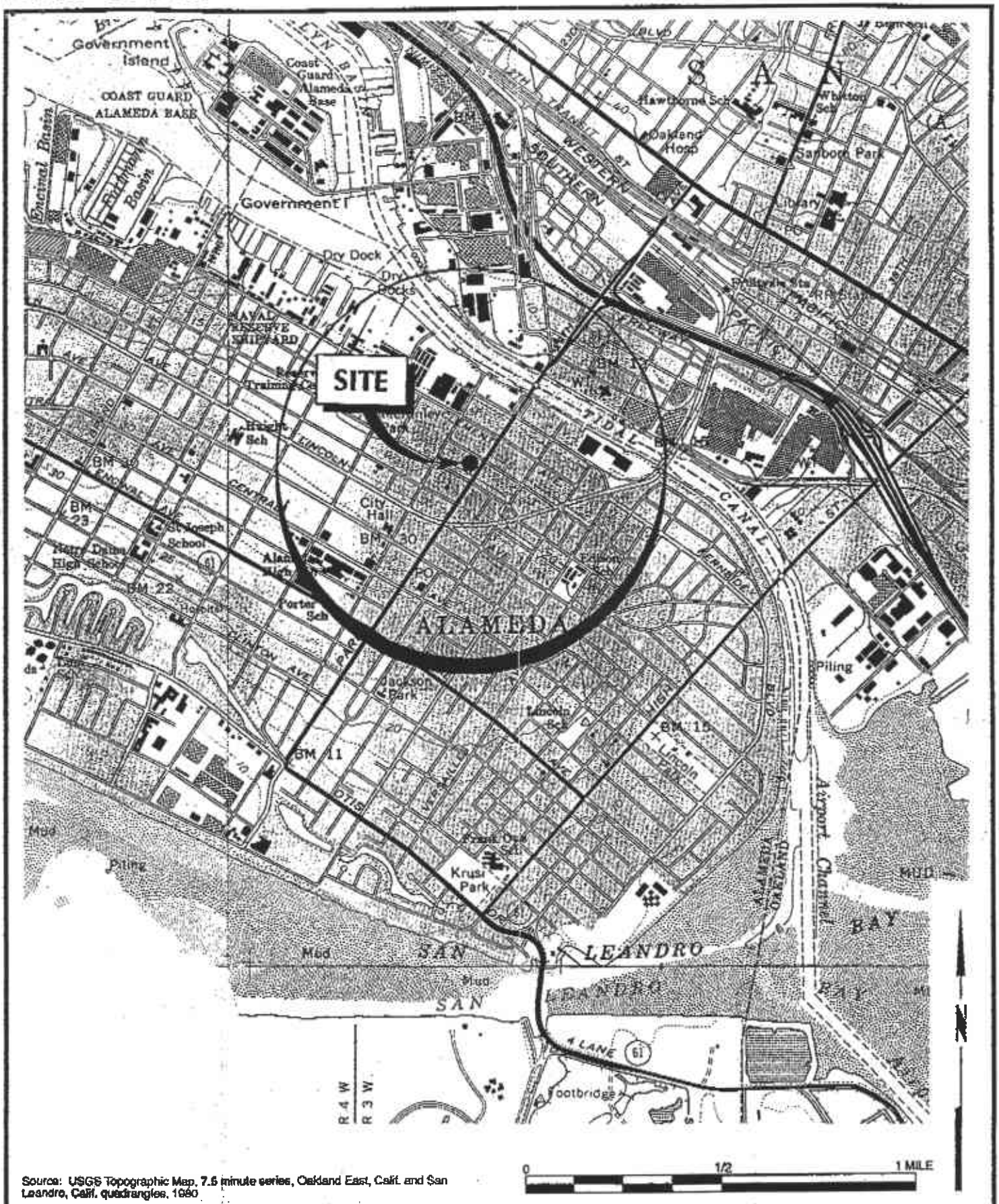
Harding Lawson Associates, March 21, 1989. Phase II Evaluation of Petroleum Hydrocarbons, Exxon Service Station R/S 7-0104, 1725 Park Street, Alameda, California.

Harding Lawson Associates, May 1, 1990. Phase III Evaluation of Petroleum Hydrocarbons, Exxon Service Station R/S 7-0104, 1725 Park Street, Alameda, California.

Harding Lawson Associates, October 30, 1992. Offsite Groundwater Survey, Exxon Station 7-0104, Alameda, California. 10495 579

Harding Lawson Associates, December 28, 1992. Pilot Soil Vapor Extraction Test Report, Exxon Service Station 7-0104, 1725 Park Street, Alameda, California.

United States Geological Survey, 1980. Oakland-East, California, 7.5-Minute Topographic Quadrangle Map.



Source: USGS Topographic Map, 7.5 minute series, Oakland East, Calif. and San Leandro, Calif. quadrangles, 1980

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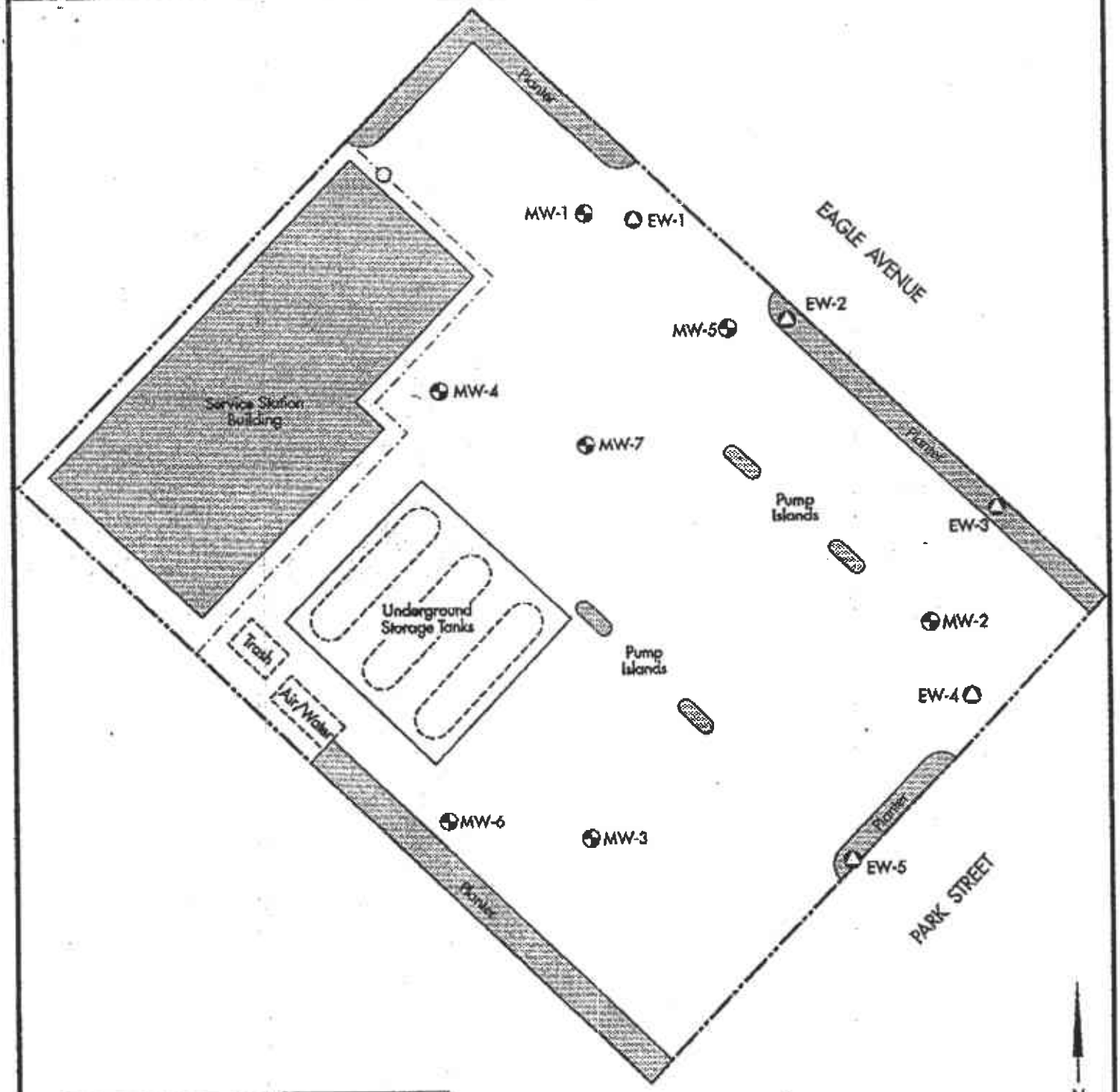
SITE VICINITY MAP

Exxon Service Station No. 7-0104
1725 Park Street
Alameda, California

PLATE 1



Map Source: Site Map by Harding Lawson Associates, 1992

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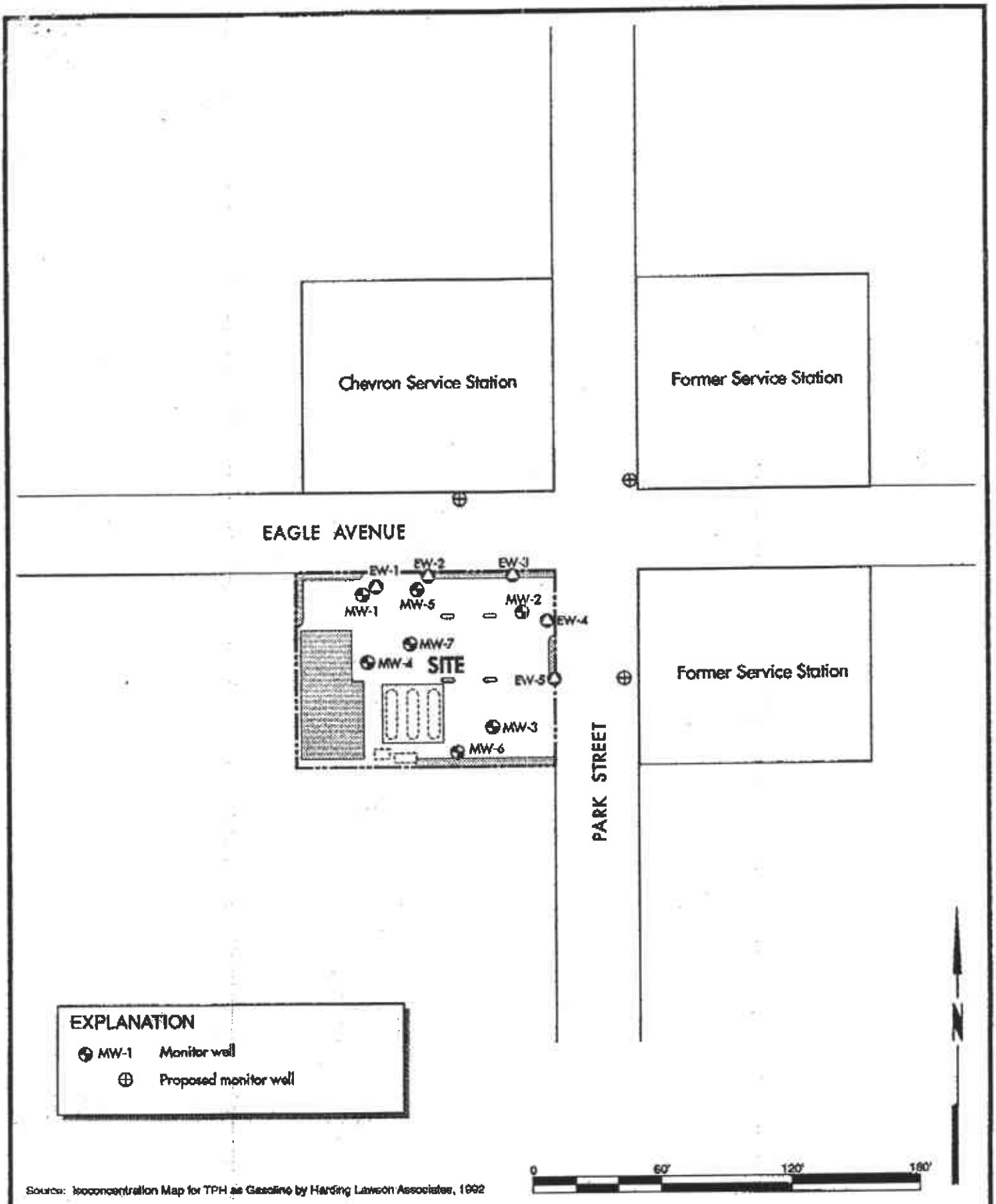
SITE VICINITY MAP

Exxon Service Station No. 7-0104
1725 Park Street
Alameda, California

PLATE
2



Source: Isoconcentration Map for TPH as Gasoline by Harding Lawson Associates, 1992

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MAP OF AREA
Exxon Service Station No. 7-0104
1725 Park Street
Alameda, California

PLATE
3