PACIFIC
ENVIRONMENTAL
GROUP INC.

Revised
4/27/95
OK

#113

ENVIRONMENTAL
PROTECTION
95 APR 26 PM 2:05

April 25, 1995
Project 305-131.1B

Mr. Dan T. Kirk
Shell Oil Company
P.O. Box 4023
Concord, California 94524

1) add TPHd + TPH mo.
2) Run water sple for benzene also.

Re: Technical Response and Site Assessment Work Plan
Shell Service Station
4411 Foothill Boulevard at High Street
Oakland, California
WIC No 204-5506-3400

Dear Mr. Kirk:

This letter, prepared by Pacific Environmental Group, Inc. (PACIFIC), presents a response and a site assessment work plan for the site referenced above (Figures 1 and 2). This work plan has been prepared on behalf of Shell Oil Company (Shell), and is in response to the March 14, 1995 letter from the Alameda County Health Care Services Agency (ACHCSA).

TECHNICAL RESPONSE

The letter to Shell from ACHCSA requests that "*a Remedial Action Plan (RAP) inclusive of a feasibility study for the petroleum contamination on and off site... be provided by April 28, 1995.*" The letter also states that "*Certainly, the extent of Shell's groundwater plume must be determined. Currently, insufficient information exists to state that Chevron is or is not being impacted by the Shell Station's release.*"

Prior to completion of a RAP, it is prudent to complete the soil investigation around the underground storage tank (UST) complex and pump islands. In addition, the petroleum hydrocarbons identified by off site Chevron groundwater monitoring wells (Wells C-6 and C-7) require further definition to determine the extent of petroleum hydrocarbons in groundwater, and the source for petroleum hydrocarbons. Upon completion of the additional investigation, it may be possible to establish if the Chevron site is, or is not

being impacted by the Shell site, and to complete, if necessary a RAP to mitigate or eliminate petroleum hydrocarbons in soil and groundwater. The following presents a work plan to delineate existing petroleum hydrocarbons in soil on the Shell site, and to investigate petroleum hydrocarbons in the uppermost water bearing zone off-site, downgradient of the Shell and Chevron service stations.

BACKGROUND

Geology/Hydrogeology

Beneath the Shell site (Figure 2), the borings for Wells S-1 through S-3 encountered sandy clay and clayey sand to 10 to 12 feet below ground surface (bgs). From approximately 12 to 14 feet bgs interbedded clayey sand, clayey gravel, sandy gravel, and silty sand was encountered. From approximately 14 feet bgs to the total depth explored of 26 feet bgs, minor clayey sand, silty clay and fat, high plasticity clays were encountered beneath the Shell site. Geologic cross-sections are shown on Figures 3 and 4 which shows the stratigraphy to the southwest and to the northwest (including the Chevron site), respectively.

Groundwater elevations for the June 16, 1994 cooperative sampling date are shown on Figures 4 and 5. The groundwater elevation data combined with the stratigraphy, first encountered groundwater elevations, and photo-ionization detector (PID) concentrations all indicate that at a minimum two and possibly three discrete water-bearing zones are represented by the groundwater elevation data from the adjacent Chevron, British Petroleum, and Shell sites.

It is not conclusive whether the upper water-bearing zone screened on the Shell site extends across the entire Chevron site and toward the southwest, however PID concentrations in Wells C-5 and C-7 at 10 to 15 feet bgs indicate that at least groundwater has been present. Also it is not likely that Wells C-2 through C-5 on the Chevron site monitor the same water-bearing zone as Wells C-6 through C-8 to the southwest.

Previous Investigations

In February 1992, one waste oil tank located west of the station building was removed (*Waste Oil Tank Removal Observation Report,* GeoStategies Inc., March 26, 1992).

In November 1992, one exploratory boring to a depth of 26 feet was drilled and converted to a 4-inch diameter groundwater monitoring well (S-1) to a depth of 24-1/2 feet. Well S-1 is located southwest of the former waste oil tank (*Well Installation Report,* GeoStrategies Inc., January 19, 1993). In May 1993, two 4-inch

diameter groundwater monitoring wells (Wells S-2 and S-3) were completed to a depth of 20 and 22 feet bgs, respectively (Hydro-Environmental Technologies, Inc., July 22, 1993).

SCOPE OF WORK

PACIFIC proposes to evaluate petroleum hydrocarbons present in soil on the Shell site, and to investigate petroleum hydrocarbons in the uppermost water bearing zone off-site. Soil and groundwater samples will be collected through the use of a geoprobe hydraulic "push" system. Soil probes on site will be advanced to first encountered groundwater. PACIFIC proposes soil probes be advanced near the product islands and UST complex as shown on Figure 2. Off site to the northwest and southeast, the probes will be advanced into first encountered groundwater to collect "grab" groundwater samples. Information obtained from the off-site probe locations will be used to more accurately pinpoint the location for any additional groundwater monitoring wells as necessary. PAC[illegible] probe locations will be completed, however the location and number of probes necessary to evaluate each area of concern may be altered based on field evidence.

If you have any questions regarding the contents of this letter, please call.

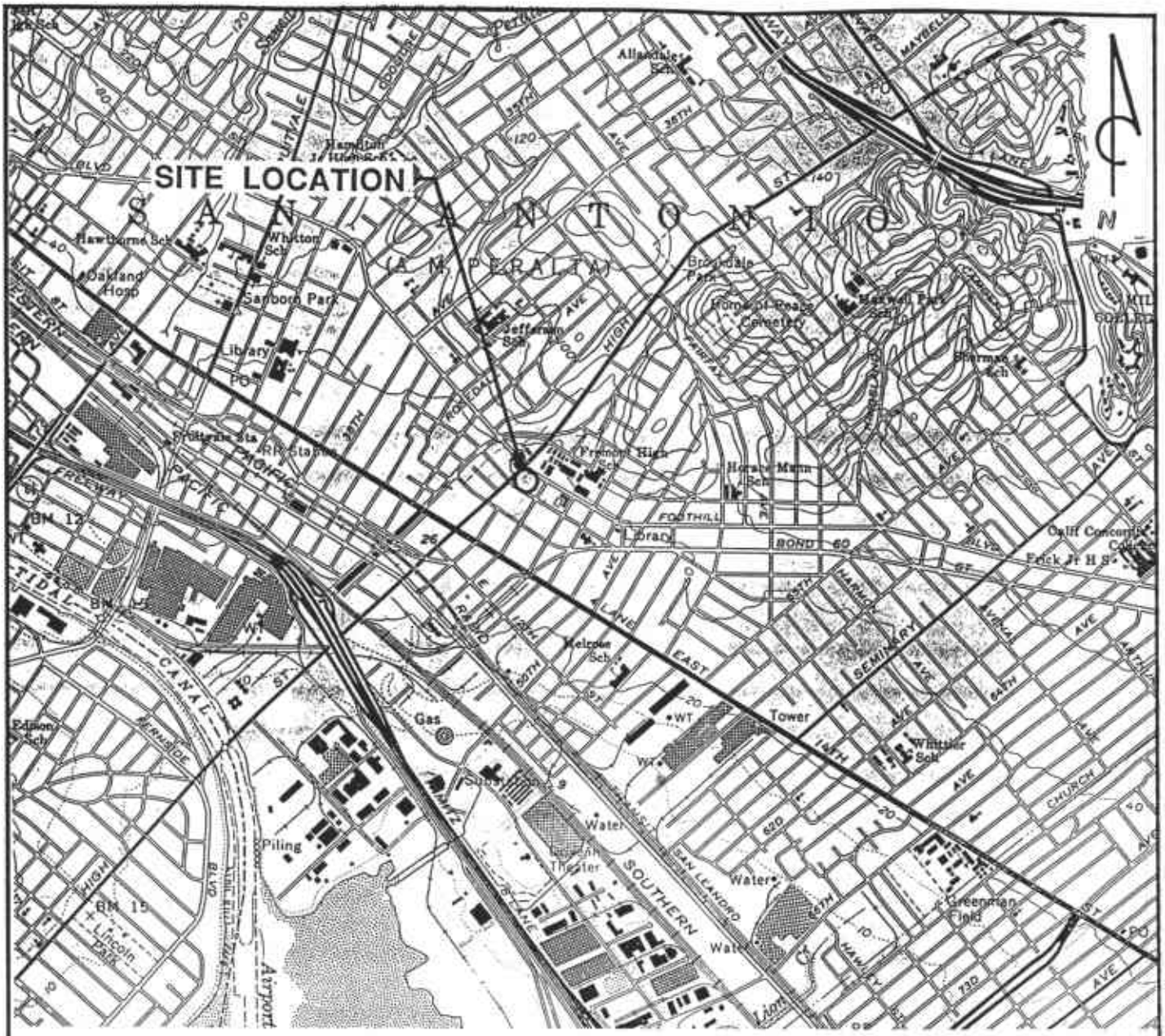
Sincerely,

Pacific Environmental Group, Inc.

Ross W.N. Tinline
Project Geologist
RG 5860

Attachments:
Figure 1 - Site Location Map
Figure 2 - Proposed Geoprobe Location Map
Figure 3 - Geologic Cross-Section A-A'
Figure 4 - Geologic Cross-Section B-B'
Attachment A - Field and Laboratory Procedures

cc: Mr. Barney Chan, Alameda County Health Care Services Agency



QUADRANGLE LOCATION

REFERENCES:
USGS 7.5 MIN. TOPOGRAPHIC MAP
TITLED: OAKLAND EAST, CALIFORNIA
DATED: 1959 REVISED: 1980

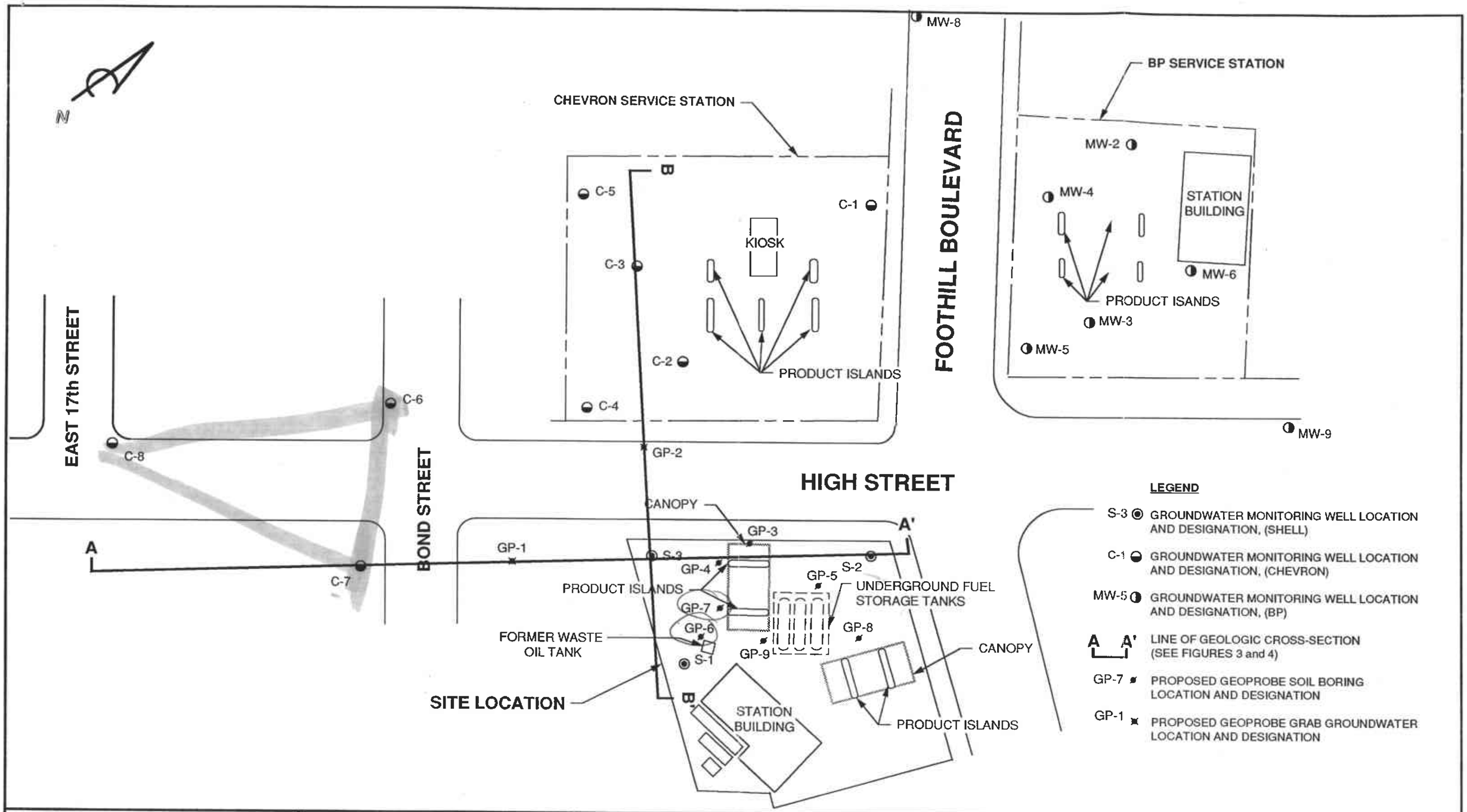
SCALE IN FEET
2000 0 2000

PACIFIC ENVIRONMENTAL GROUP, INC.

SHELL SERVICE STATION
4411 Foothill Boulevard at High Street
Oakland, California

SITE LOCATION MAP

FIGURE: 1
PROJECT: 305-131.1B



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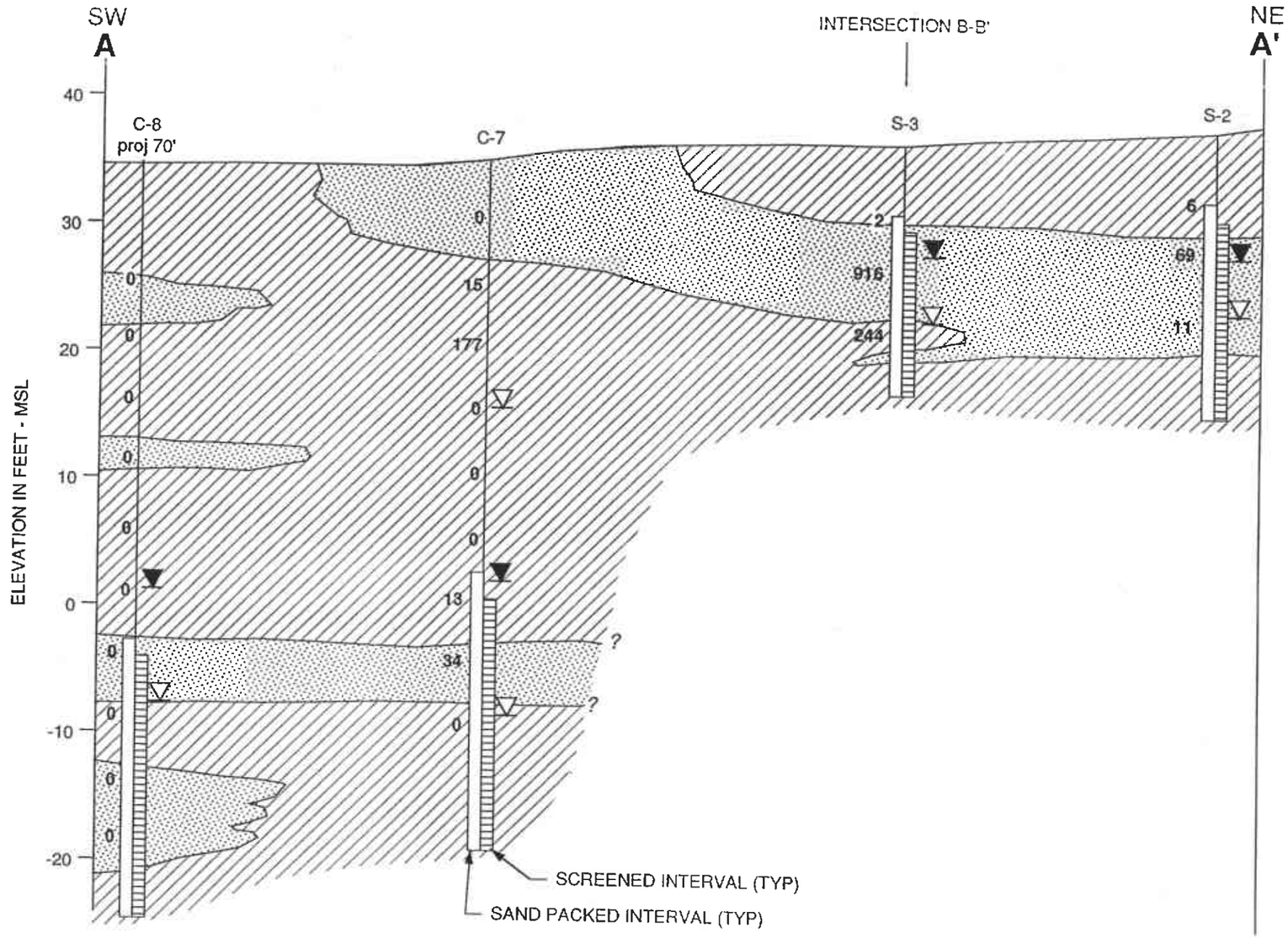
SCALE
0 50 100 FEET

SHELL SERVICE STATION
4411 Foothill Boulevard at High Street
Oakland, California

PROPOSED GEOPROBE LOCATION MAP

FIGURE: 2
PROJECT: 305-131.1B



LEGEND

- PRIMARILY FINE-GRAINED DEPOSITS - CL and SM
- PRIMARILY COARSE-GRAINED DEPOSITS - SC, SW, SP, GC, GW and GP
- S-2 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (SHELL)
- C-7 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (CHEVRON)
- proj PROJECTED ONTO LINE OF SECTION IN FEET
- ▽ FIRST ENCOUNTERED WATER LEVEL AT TIME OF DRILLING
- ▼ STATIC WATER LEVEL, 6-16-94
- 916 PHOTO IONIZATION DETECTOR LEVEL IN PARTS PER MILLION

PACIFIC ENVIRONMENTAL GROUP, INC.

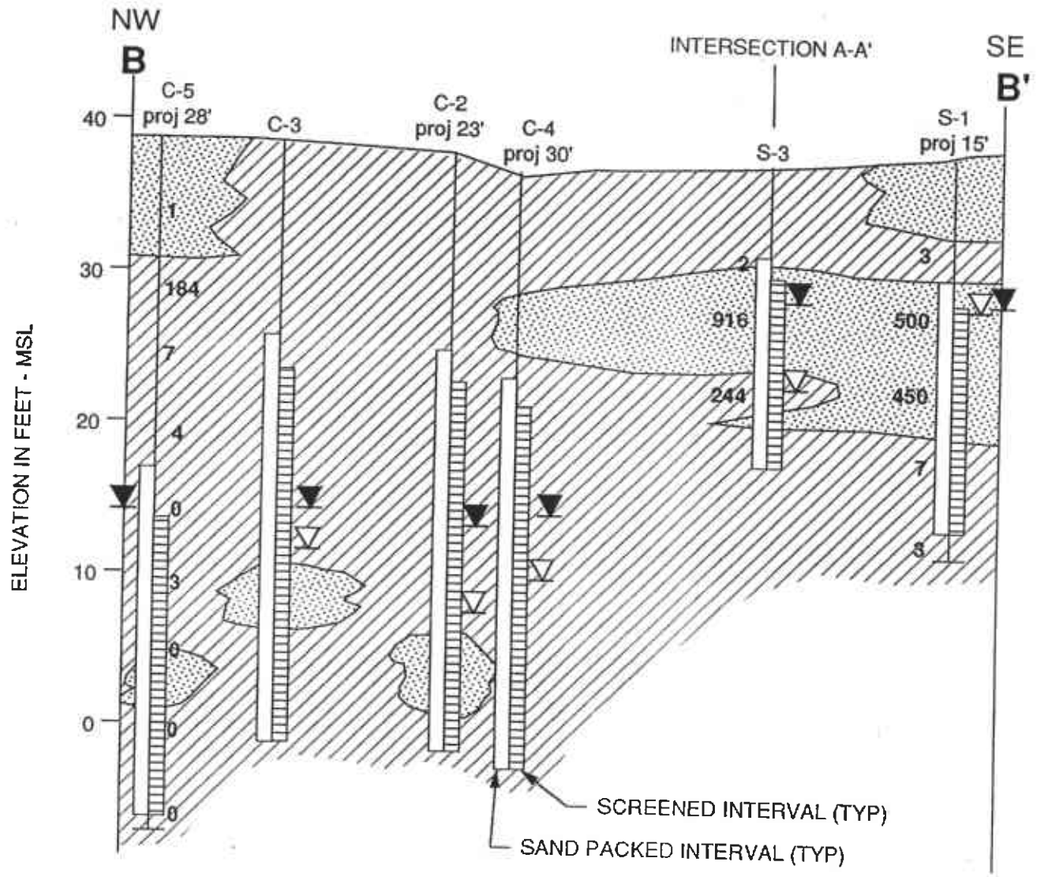
SCALE

HORIZONTAL : 1" = 50'
VERTICAL : 1" = 10'

SHELL SERVICE STATION
4411 Foothill Boulevard at High Street
Oakland, California

GEOLOGIC CROSS-SECTION A-A'

FIGURE: 3
PROJECT: 305-131.1B



LEGEND

PRIMARILY FINE-GRAINED DEPOSITS - CL and SM

PRIMARILY COARSE-GRAINED DEPOSITS - SC, SW, SP, GC and GM

S-3 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (SHELL)

C-2 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION (CHEVRON)

proj PROJECTED ONTO LINE OF SECTION IN FEET

FIRST ENCOUNTERED WATER LEVEL AT TIME OF DRILLING

STATIC WATER LEVEL, 6-16-94

916 PHOTO IONIZATION DETECTOR LEVEL IN PARTS PER MILLION

PACIFIC ENVIRONMENTAL GROUP, INC.

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SHELL SERVICE STATION
4411 Foothill Boulevard at High Street
Oakland, California

GEOLOGIC CROSS-SECTION B-B'

FIGURE:
4
PROJECT:
305-131.1B

ATTACHMENT A

FIELD AND LABORATORY PROCEDURES

ATTACHMENT A
FIELD AND LABORATORY PROCEDURES

Geoprobe Procedures

Soil Sampling

The borings for the Geoprobe borings will be advanced using 2-inch diameter hollow-stem rods. The borings will be logged by a Pacific Environmental Group, Inc. geologist using the Unified Soil Classification System and standard geologic techniques. Soil samples for logging and laboratory analysis will be collected at minimum 5-foot depth intervals by advancing the brass-lined sampler into undisturbed soil. The sampler will be driven a minimum of 2 feet using a pneumatic hammer and hydraulic pressure. Soil samples will be analyzed in the field for volatile organic compounds using a photo-ionization detector (PID). Results of the PID tests will be used to assist in selection of samples for laboratory analysis. It is anticipated that at minimum two soil samples from each probe location will be submitted for analysis as described below. Soil samples for chemical analysis will be retained in acetate or brass liners, capped with Teflon® and plastic end caps, taped with a non-volatile rubber-based tape, and sealed in zip-lock plastic bags. These samples will be placed in a cooler with ice for transport to the laboratory accompanied by chain-of-custody documentation. The temperature of the cooler will be recorded upon delivery to the laboratory.

ORGANIC VAPOR PROCEDURES

Soil samples collected during drilling will be analyzed in the field for volatile organic compounds using the HNU Model PI 101 PID with a 10.2 eV lamp. The test procedure involves measuring approximately 30 grams from an undisturbed soil sample, placing this subsample in a clean plastic bag. The bag is then warmed for approximately 20 minutes, the bag is then pierced and the head-space within the bag tested for total organic vapor, measured in parts per million as benzene (ppm; volume/volume). The instrument had been previously calibrated using a 100-ppm isobutylene standard (in air) and a sensitivity factor of 0.7, which relates the photo-ionization sensitivity of benzene (7.0 ppm) to that of isobutylene. The results of the field testing will be noted on the exploratory boring logs.

LABORATORY PROCEDURES

The analytical methods for determining the presence of total petroleum hydrocarbons calculated as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes, and TPH calculated as diesel are taken from EPA Methods 8015, 8020, and 5030. The above analytical methods utilize the purge and trap technique, with final detection by gas chromatography using a flame-ionization detector and a PID. All analyses were performed by a California State-certified laboratory.