PACIFIC
ENVIRONMENTAL
GROUP, INC.

STID 530

November 18, 1992
Project 305-79.01

Mr. Dan Kirk
Shell Oil Company
P.O. Box 5278
Concord, California 94520

Re: Shell Service Station
285 Hegenberger Road at Leet Drive
Oakland, California
WIC No 204-5508-5504

Dear Mr. Kirk:

This letter was prepared by Pacific Environmental Group, Inc. (PACIFIC) on behalf of Shell Oil Company (Shell) and responds to the September 30, 1992 letter from Barney M. Chan of the Alameda County Health Care Services Agency (ACHCS) regarding the site referenced above (Figures 1 and 2). Mr. Chan has requested submission of a work plan and schedule addressing the on-site subsurface impact of petroleum hydrocarbons. Requests contained in Mr. Chan's letter are discussed below:

1) A comparison of the currently available remedial alternatives:

PACIFIC has evaluated currently available remedial options for the site. Our evaluation considers site specific conditions such as site lithology, distribution of hydrocarbons in the subsurface, and cost effectiveness, among others. Five alternative remedial technologies were evaluated: groundwater extraction and treatment, in-situ bioremediation, excavation and disposal, air sparging and soil vapor extraction. **We conclude that soil vapor extraction is the best available technology for the site based upon the above considerations. The remaining alternatives were eliminated for the following reasons:**

- o Groundwater extraction and treatment - This remedial alternative was not considered feasible as the low flow rates noted during the aquifer testing at the site indicated that the technology would not

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effectively remove hydrocarbons from the groundwater. Additionally, groundwater extraction has been shown to not be effective for source removal, but is primarily initiated for migration control, which does not appear to be warranted at this site based on available site data.

- o In-situ Bioremediation - This option was not considered feasible for remediation at the site due to the low permeability soil at the site, which makes this option not time effective.
- o Excavation and Disposal - This remedial option was previously proposed for the site, but was rejected due to the high cost for excavation and on-site treatment or disposal. Additionally, this option does not address the dissolved hydrocarbons in the groundwater.
- o Air Sparging - The low permeability of the soil at the site, particularly below the existing fill, would potentially inhibit the effectiveness of air sparging at the site.

PACIFIC does not recommend a groundwater based remedial technology at this time, as off-site migration has not occurred along the downgradient property boundary (along Leet Drive). Additionally, preliminary indications from the off-site hydropunch investigation do not indicate hydrocarbons extending off-site across Hegenberger Road. **Details of the hydropunch evaluation are presented later in this letter (page 4).**

2) *The performance of groundwater extraction tests on specific wells. Provide diagrams of areas of expected influence.*

As stated in item number 1 above, groundwater extraction is not being considered as a remedial alternative for the site at this time. Previous slug tests performed by Converse Environmental West (CEW) show the water bearing sediments to be heterogeneous with very low average hydraulic conductivities.

A soil vapor extraction pilot test was conducted by CEW on November 22, 1991 to characterize the vapor permeability of the subsoils. Test results for the 3- to 7-foot depth interval showed a measurable radius of influence for a vapor extraction well to be 30 to 35 feet with variations due to heterogeneity of the soils. It was concluded, however, that soil vapor extraction was a feasible remedial technology for site conditions.

Provide areas of influence when system actually implemented

2 wells SHP-1 & -4 may not be sufficient. 7200' apart. MWs 4 & 8 detect significant TPHg and BTEX. Should consider additional offsite downgradient wells

3) *The receipt of approvals of encroachment permits for the installation of offsite wells.*

PACIFIC will forward copies of all encroachment documentation to Shell and to the ACHCS (Barney Chan) as encroachment activities progress.

4) *Provision of a preliminary engineering design for the proposed treatment system.*

OK

Based on results from the CEW soil vapor extraction pilot test, PACIFIC recommends a remedial system consisting of five soil vapor extraction wells. This system will address petroleum hydrocarbon impacted soils and groundwater beneath the site. **Figure 3 presents locations for the proposed soil vapor extraction wells. A process flow and instrumentation diagram (PF&ID) for the proposed soil vapor extraction and treatment system is presented as Figure 4.**

5) *Obtaining City of Oakland Planning Department, POTW or NPDES and BAAQMD permits.*

Because groundwater extraction is not currently being considered, POTW and NPDES permits are not required. Applications for BAAQMD permits are being prepared at this time. PACIFIC will forward copies of all applicable permit documentation to Shell and to the ACHCS (Barney Chan) as remedial permit activities progress.

6) *Provision of a description of the system's operation and maintenance schedule.*

The remedial system operation and maintenance schedule will be followed according to requirements set forth by regulatory permits.

7) *Provision of the date for the installation of the system. Description of verification and effectiveness and provision of a contingency plan.*

PACIFIC anticipates that system installation will commence during the first quarter of 1993, contingent upon obtaining all required permits. Should delays occur in receipt of any necessary permit, system installation will begin within one month of receipt of the permits. PACIFIC will provide the ACHCS with revisions to the proposed schedule, should they occur.

8) Projection of a time for the eventual verification monitoring and system shut-down.

The effectiveness of the system will be evaluated every six months following installation to determine whether continued remedial efforts are required and/or to address appropriate changes to the system, if necessary. PACIFIC anticipates operating the proposed remedial system up to a maximum period of two years.

At such time that it appears that the rate of reduction of hydrocarbons in the subsurface soil and/or groundwater becomes asymptotic, then confirmation soil borings will be recommended. Soil samples from discreet depth intervals will be collected and analyzed for the appropriate parameters, as will groundwater samples from pre-selected, strategically positioned groundwater monitoring wells. Results of the confirmation soil borings and groundwater samples will be evaluated to consider further remedial or closure options, as appropriate. Should the results of the confirmation borings indicate that further remedial action is required, PACIFIC will reevaluate alternatives to achieve further hydrocarbon concentration reductions.

Results of Hydropunch Sampling Program

Eight temporary groundwater sampling location points were drilled September 23 and 24, 1992. Four sampling points were drilled in the median strip along Hegenberger Road on September 23, 1992 (SHP-1 through SHP-4, Figure 5). A hydropunch sampling unit was used initially at these points; however, no water sample was recovered from SHP-1 through SHP-4. Sampling Points SHP-5 through SHP-8 were installed on the east side of Hegenberger Road on September 24, 1992. These holes were drilled with 4-inch diameter augers to a depth of 11 feet. At this time, Sampling Points SHP-1 through SHP-4 were drilled to 11 feet with the 4-inch diameter augers. Two-inch monitoring well casings were installed in Sampling Points SHP-1 through SHP-8 to facilitate sample collection. The holes were covered with steel road plates and allowed to recharge.

Groundwater samples were collected from Sampling Points SHP-5 through SHP-8 on September 25, 1992. The sample collected from SHP-7 was of insufficient volume to analyze for total petroleum hydrocarbons, calculated as diesel (TPH-d). Sampling Points SHP-5 through SHP-8 were backfilled with cement grout. At this time, Sampling Points SHP-1 through SHP-4 were still dry. These sampling points were checked again on September 28, 1992. Sampling Points SHP-2 through SHP-4 were dry. A sample was collected from SHP-1; however, the volume obtained was insufficient to analyze for TPH-d. The holes were backfilled

What about TPHg?

with cement grout. Analytical results from the sampling event are presented in Table 1.

only SHP-1 yielded H_2O not SHP-2-4

The results suggest that TPH-g and BTEX compounds have not migrated off-site, as the groundwater samples from SHP-1 and SHP-5 through SHP-8 did not contain these compounds. The laboratory reported TPH-d in groundwater from SHP-5 and SHP-8 at concentrations of 1.5 and 0.14 parts per million (ppm), respectively. The origin of the TPH-d in these samples is unclear, as the occurrence of TPH-d in SHP-5 and SHP-8, but not in SHP-6, would not be expected if the TPH-d originated on-site.

same location where no H_2O found SHP 4.

To further evaluate the lateral extent of the hydrocarbon plume at the site, PACIFIC proposes installing two monitoring wells along the median of Hegenberger Road, in the vicinity of SHP-1 and SHP-4 (Figure 5). These wells will aid in defining the lateral extent of the hydrocarbon plume and to help establish whether the source of the TPH-d in SHP-5 and SHP-8 originates from the Shell site. Additionally, the laboratory noted that the analytical results reported as TPH-d in Samples SHP-5 and SHP-8 were a "non-diesel mix".

The responses addressed above serve as a Schedule and Interim Remedial Plan fulfilling the requirements of the ACHCS letter of September 30, 1992. If you have any questions regarding the contents of this letter, please call.

Sincerely,

Pacific Environmental Group, Inc.

for

Tina Berry
Project Geologist

Michael Hurd
Project Geologist
RG 5319

REGISTERED GEOLOGIST
MICHAEL HURD
No. 5319
EXP. 6/99
STATE OF CALIFORNIA

3057901/ACHDLTR2

Attachments: Table 1 - Groundwater Analytical Data
Temporary Groundwater Sampling Points -
Total Petroleum Hydrocarbons
(TPH-g, BTEX Compounds, and TPH-d)
Figure 1- Site Location Map
Figure 2- Site Map
Figure 3- Proposed Soil Vapor Extraction Well Location Map
Figure 4- Process Flow and Diagram - Proposed Soil Vapor Extraction System
Figure 5 Site Map Showing Hydropunch Sampling Location and Designation

cc: **Mr. Barney Chan, Alameda County Health Care Services Agency**
Mr. Rich Hiett, Regional Water Quality Control Board, S.F. Bay Region

Table 1
Groundwater Analytical Data
Temporary Groundwater Sampling Points
Total Petroleum Hydrocarbons
(TPH-g, BTEX Compounds, and TPH-d)

Shell Service Station
285 Hegenberger Road at Leet Drive
Oakland, California

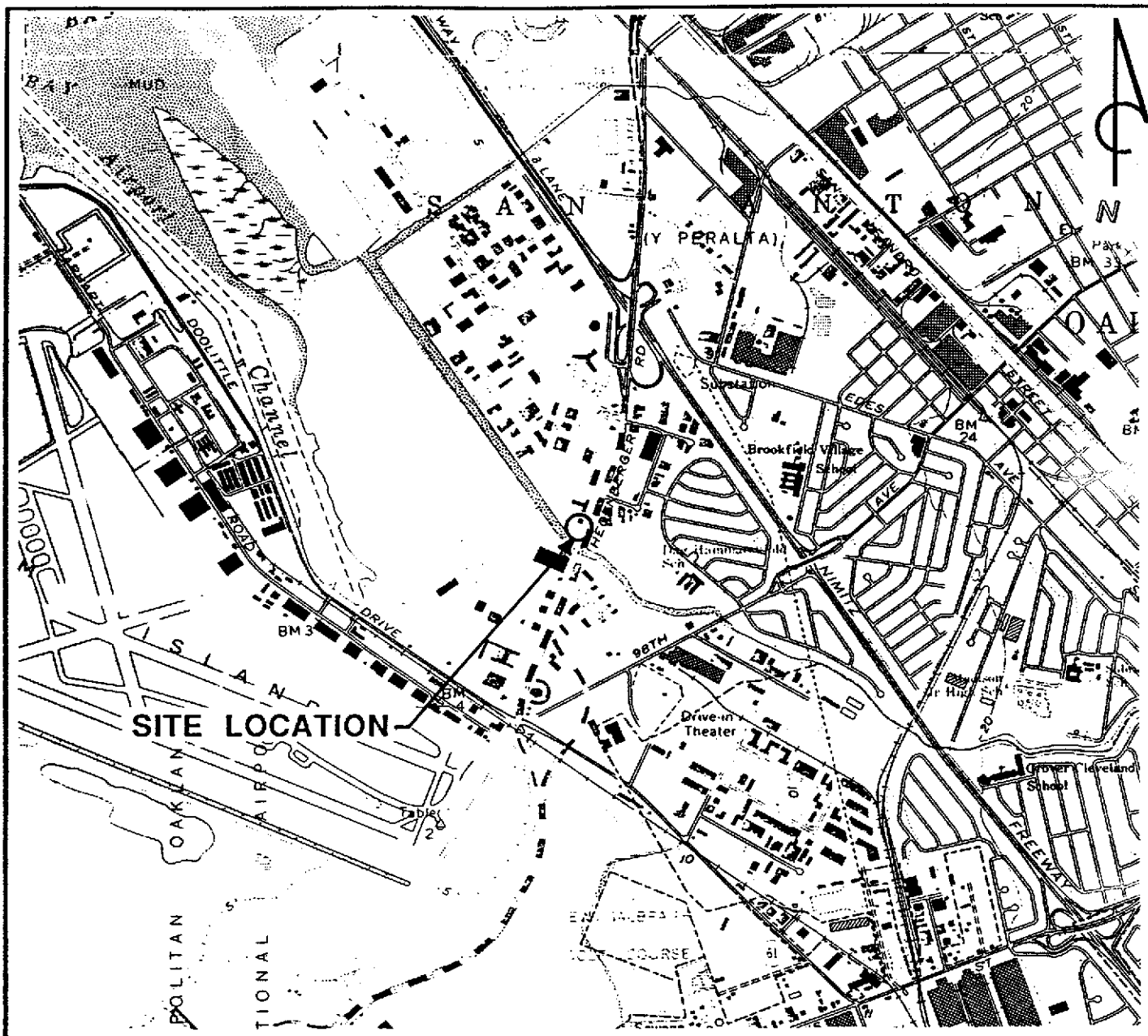
Sample Number	Sample Date	TPH-g (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	TPH-d (ppm)
SHP-1	09/28/92	ND	ND	ND	ND	ND	NA
SHP-2	09/28/92	NS	NS	NS	NS	NS	NS
SHP-3	09/28/92	NS	NS	NS	NS	NS	NS
SHP-4	09/28/92	NS	NS	NS	NS	NS	NS
SHP-5	09/25/92	ND	ND	ND	ND	ND	1,500
SHP-6	09/25/92	ND	ND	ND	ND	ND	ND
SHP-7	09/25/92	ND	ND	ND	ND	ND	NA
SHP-8	09/25/92	ND	ND	ND	ND	ND	140

ND = Not detected
NA = Not analyzed
NS = Not sampled

ppb

typo?

Pls send copies of analytical results w/ chain of custody



QUADRANGLE LOCATION

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

SCALE
2000 0 2000 FEET

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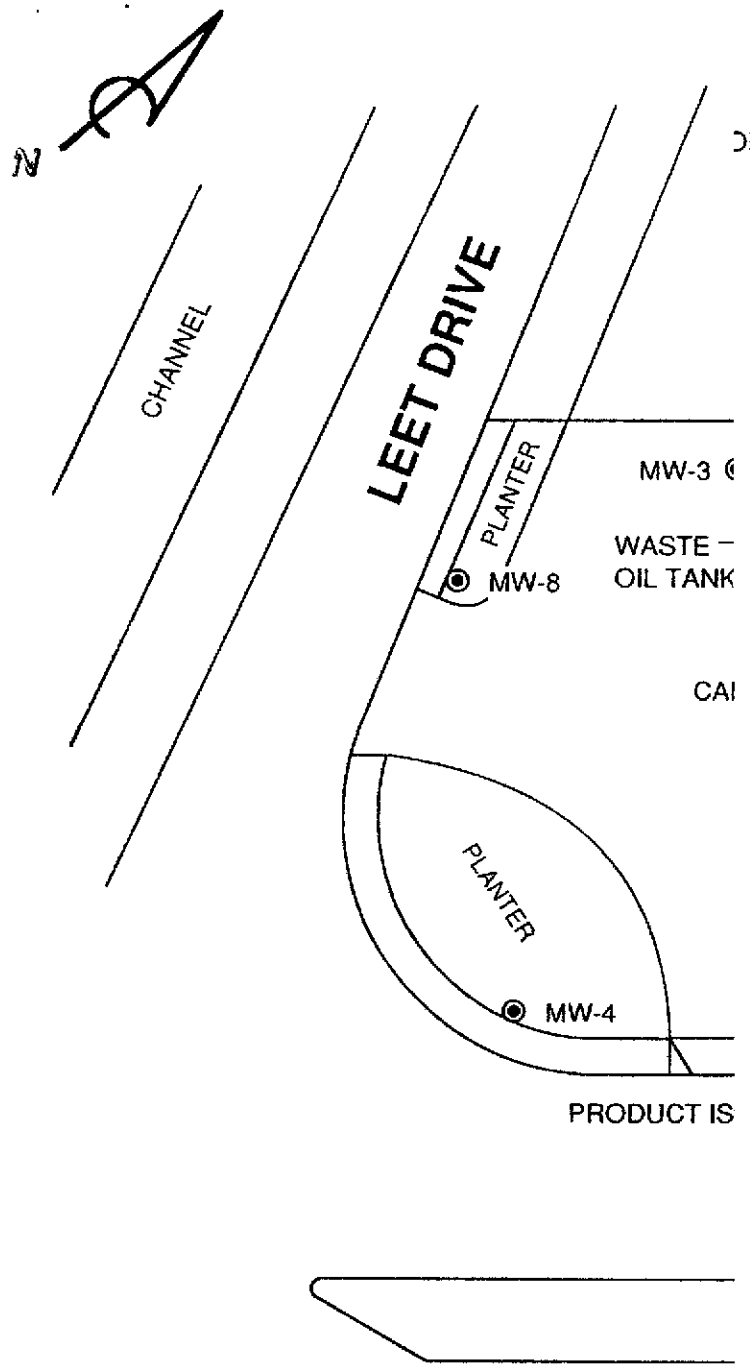
SHELL SERVICE STATION
285 Hegenberger Road at Leet Drive
Oakland, California

SITE LOCATION MAP

FIGURE: 1
PROJECT: 305-79.01

REORDER NO. A54081



ONITORING WELL LOCATION AND DESIGNATION

MW-3 (

WASTE –
OIL TANK

CAI

PRODUCT IS

PACIFIC
ENVIRONMENTAL
GROUP, INC.

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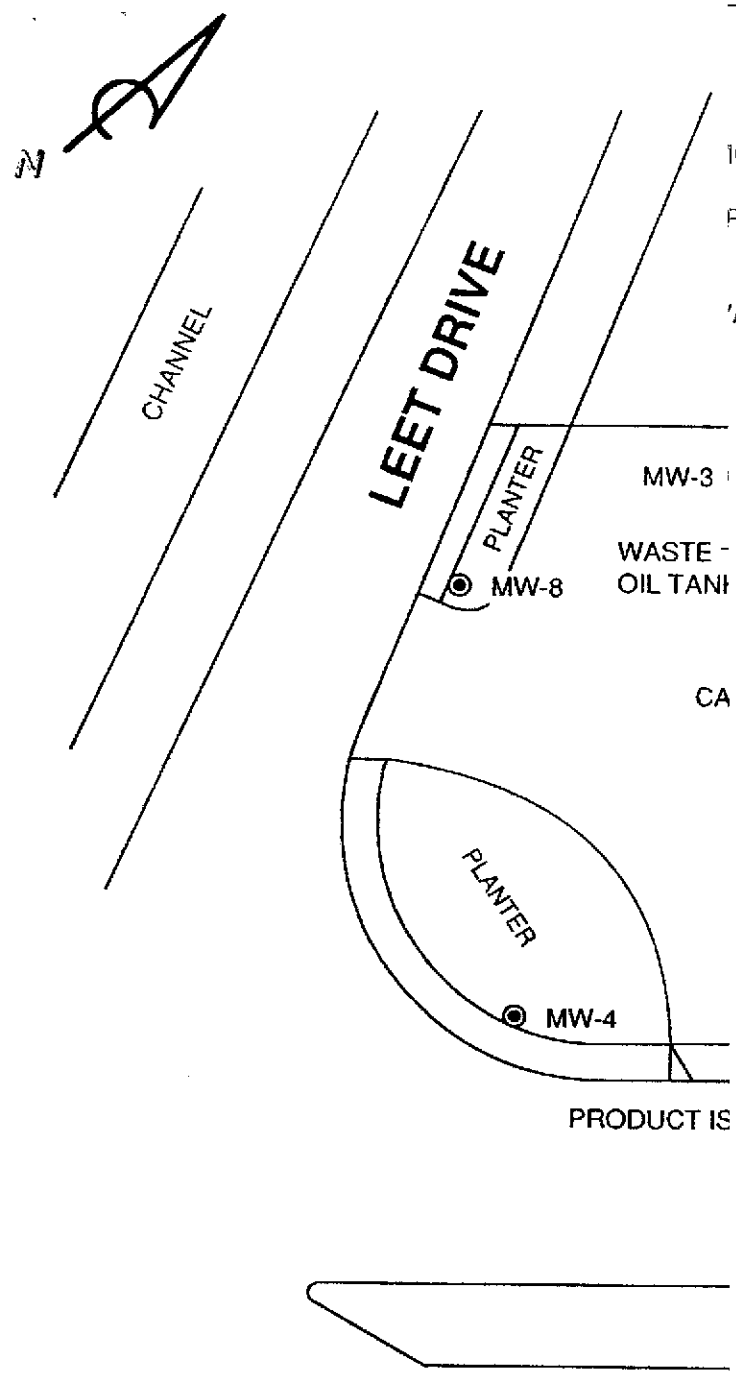
FIGURE:
2

PROJECT:
305-79.01



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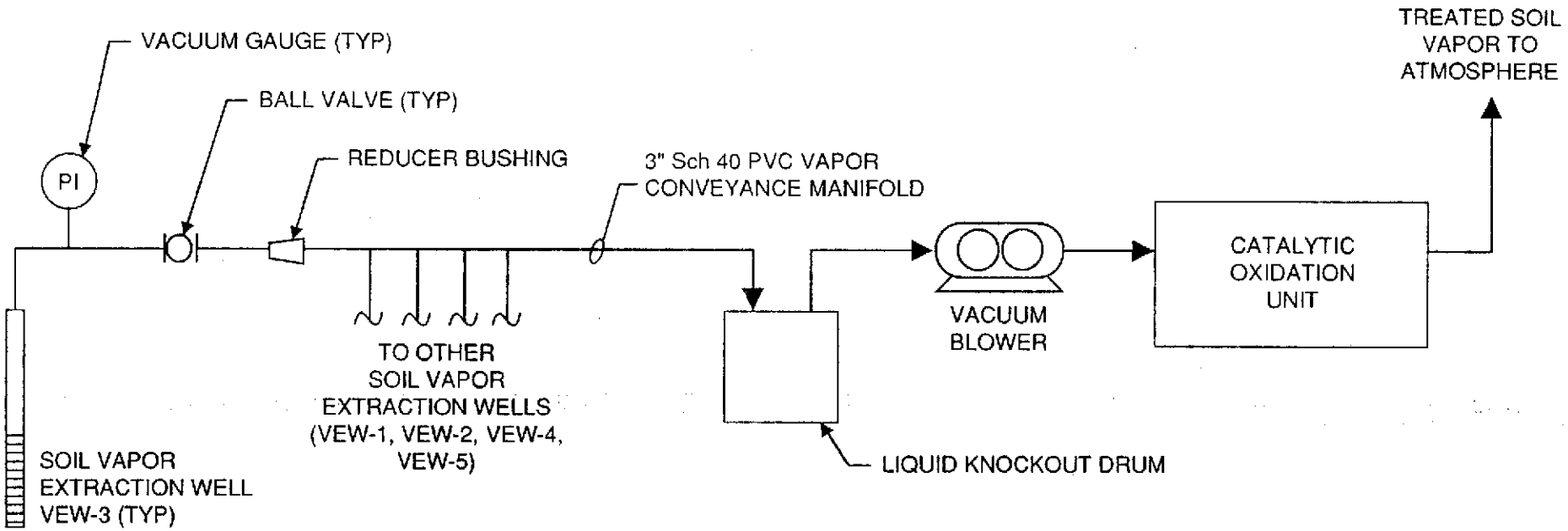
N MAP

FIGURE:
3
PROJECT:
305-79.01



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SHELL SERVICE STATION
285 Hegenberger Road at Leet Drive
Oakland, California

PROCESS FLOW DIAGRAM - PROPOSED SOILVAPOR EXTRACTION SYSTEM

FIGURE:
4
PROJECT:
305-79.01

N

CHANNEL

LEET DRIVE

PLANTER

TRUCK STORAGE AREA

MW-3

MW-5

MW-2

WASTE OIL TANK

STATION BUILDING

MW-8

UNDERGROUND FUEL STORAGE TANKS

CANOPY

MW-10

MW-1

MW-6

PLANTER

PARKING

PLANTER

MW-4

PLANTER

MW-7

SIDEWALK

PLANTER

MW-9

PRODUCT ISLANDS

LEGEND

MW-7 ◉ GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

SHP-1 ● HYDROPUNCH SAMPLE LOCATION AND DESIGNATION

ND/ND/1.5 TPH-g/BENZENE/TPH-d CONCENTRATION IN GROUNDWATER, IN PARTS PER MILLION, 9-24-92 and 9-28-92

ND NOT DETECTED

NA NOT ANALYZED

NS NO SAMPLE COLLECTED (HYDROPUNCH WELL DRY)

⊕ PROPOSED GROUNDWATER MONITORING WELL LOCATION

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

HEGENBERGER ROAD

> 200' apart

SHP-1 **ND/ND/NA** run for BTEX

SHP-2 **NS**

SHP-3 **NS**

SHP-4 **NS**

SHP-5 **ND/ND/1.5**

SHP-6 **ND/ND/ND**

SHP-7 **ND/ND/NA**

SHP-8 **ND/ND/0.140** also run for BTEX

SIDEWALK

PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE

0 40 80 FEET

SHELL SERVICE STATION
285 Hegenberger Road at Leet Drive
Oakland, California

SITE MAP SHOWING HYDROPUNCH SAMPLING LOCATION AND DESIGNATION

FIGURE: **5**

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