February 9, 2011

Ms. Donna Drogos
Alameda County Environmental Health
1131 Harbor Parkway, Suite 250
Oakland, CA 94502-6577

Subject: Site Assessment and Pilot Test Workplan
Shore Acres Gas
403 East 12th Street, Oakland, Alameda County, California
RO #0002931
ECG # GHA.19009

Dear Ms. Drogos:

Enclosed please find a copy of the February 9, 2011 Site Assessment and Pilot Test Workplan for the above referenced site prepared by our consultant Environmental Compliance Group, LLC.

I declare, under penalty and perjury, that the information and/or recommendations contained in this report are true and correct to the best of my knowledge.

Respectfully,

Rashid Ghafoor

Environmental Compliance Group, LLC

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Turlock, CA 95382
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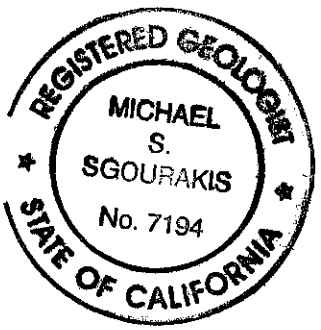
SITE ASSESSMENT AND SOIL VAPOR EXTRACTION PILOT TEST WORKPLAN

SHORE ACRES GAS
403 EAST 12TH STREET
OAKLAND, CALIFORNIA

Prepared for: Rashid Ghafoor

ECG Project Number: GHA.19009
Alameda County Fuel Leak Case No. RO0002931

February 9, 2011



Drew Van Allen
Senior Project Manager

Michael S. Sgourakis
Principal Geologist
CA P.G. No. 7194

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INTRODUCTION

Environmental Compliance Group (ECG) has been authorized by Mr. Rashid Ghafoor to provide this report for the site.

This site assessment and soil vapor extraction workplan was prepared by ECG to evaluate lateral and vertical extent of impacted soil and groundwater and potential methods for the remediation of soil impacted by petroleum hydrocarbons at the site. ECG prepared this workplan in response to Alameda County Environmental Health Department (ACEHD) correspondence dated December 29, 2010 (Appendix A).

Site information is as follows:

Site Location:	403 East 12th Street Oakland, California
Geotracker Global ID:	T0600174667

LIMITATIONS

This report has been prepared for use by Rashid Ghafoor and the relevant regulatory agencies. The conclusions in this report are professional opinions based on the data presented in this report. This report was prepared in general accordance with hydrogeologic and engineering methods and standards. No other warranties are made as to the findings or conclusions presented in this report. The work described in this report was performed under the direct supervision of the professional geologist whose signature and State of California registration are shown above.

SITE DESCRIPTION AND HYDROGEOLOGIC CONDITIONS

SITE DESCRIPTION

The site occupies a parcel on the southeast corner of 4th Avenue and East 12th Street in Oakland, Alameda County, California (Figure 1). The site is situated in a commercial and residential area in central Oakland and is currently vacant. The site was historically used as a gasoline station. The area of interest at the site is the former location of three underground storage tanks (USTs) and fuel dispensers where impacted soil and groundwater was first identified in 2006. A detailed site plan is shown on Figure 2.

HYDROGEOLOGIC CONDITIONS

The site is underlain by Quaternary-age dune sand deposits referred to as the Merritt Sand. The Merritt Sand is typically described as loose, well-sorted fine- to medium-grained sand with a large silt component. The sand is reported to reach a maximum depth of 50-feet bgs in the area.

Based on boring logs from the advancement of 11 soil borings, the stratigraphy of the site and vicinity consists of clays to approximately 30-feet bgs with discontinuous thin intervals of sandy silt and clayey sand present in the area.

Depth to groundwater is shallow, expected from approximately20-feet bgs. The site specific groundwater flow direction has not yet been evaluated, but is anticipated to be southwest based on regional topography.

CLEANUP CRITERIA

It is prudent to establish cleanup goals for soil and groundwater based upon reaching the residential Environmental Screening Levels (ESLs) established by Region II for sites with shallow soil where groundwater is not a current or potential drinking water source. The primary constituents of concern relative to the site appear to be total petroleum hydrocarbons as diesel (TPHd) and gasoline (TPHg) benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), and tertiary butyl alcohol (TBA). Accordingly, the following cleanup goals are proposed:

Constituent	**Soil (mg/kg)**	**Groundwater (ug/L)**
TPHd	100	210
TPHg	100	210
Benzene	0.12	46
Toluene	9.3	130
Ethylbenzene	2.3	43
Xylenes	11	100
MTBE	8.4	1,800
TBA	100	18,000

PROJECT BACKGROUND

INVESTIGATIONS

In July 2006, Geofon Incorporated (Geofon) advanced soil borings GP-1 and GP-2 and collected and analyzed soil samples. Results are detailed in Geofon's report entitled *Summary of Phase II Assessment Activities,* dated July 25, 2006.

In August 2009, Wright Environmental Services, Inc. (Wright) removed three USTs, associated fuel dispensers, and all associated piping. Results are detailed in Wright's *Closure Report for Three Underground Storage Tanks*, dated September 2009.

In April 2010, Apex Envirotech, Inc. (Apex) advanced nine soil borings to evaluate the lateral extent of impacted soil and groundwater. Results are documented in Apex's *Subsurface Investigation Results Report* dated June 23, 2010.

DISTRIBUTION OF MASS CONTAMINANTS

Eleven soil borings have been advanced at the site and the lateral and vertical extent of impacted soil has not been adequately characterized. The boring locations are shown on Figure 2. Soil

analytical results are summarized on Tables 1a and 1b and show reported TPHg, TPHd, and BTEX soil concentrations did exceed ESLs at multiple locations at depths ranging from 2- to 20-feet bgs indicating additional lateral assessment is necessary. During the April, 2010 investigation, a smear zone from 9.5 to 14.5 feet bgs was identified across the study area. No samples were analyzed between 14.5- and 24.5-feet bgs. All soil samples analyzed from 24.5-feet bgs and deeper were reported as non-detect for TPHg and BTEX compounds vertically defining the impacts to soil, but vertical definition is still needed from approximately 15- to 25-feet bgs.

Groundwater concentrations have not been defined vertically or horizontally at the site. Groundwater analytical results are summarized in Tables 2a and 2b. Reported concentrations in groundwater have exceeded ESLs for TPHg, BTEX, and MTBE indicating additional assessment and groundwater gradient definition is necessary.

RISK ASSESSMENTS

A preferential pathway study was completed and is detailed later in this report.

A sensitive receptor survey was completed and is detailed later in this report.

A soil vapor survey has not been completed for the site.

PREFERENTIAL PATHWAY STUDY

ECG conducted a preferential pathway study of the Site to evaluate the potential for subsurface utility trenches to act as conduits for groundwater and contaminant migration. ECG performed a site vicinity reconnaissance and contacted the following agencies/companies:

- Oakland Building Department
- Pacific Gas and Electric Company (PG&E)
- Pacific Bell
- East Bay Municipal Utility District (EBMUD)

On January 26, 2010, ECG reviewed building permits and as-built drawings for the site. Information was available on microfiche. Water, sewer, and underground gas lines were identified west, north, and east of the site. Technical information of the underground utilities including pipe diameter are shown on Figure 3. Locations and depths were based on the site reconnaissance, the Oakland Building Department file review, information and maps provided by PG&E, and maps provided by EBMUD.

An 8-inch diameter water line is present southwest to northeast on 4th Avenue and northwest to southeast on 12th Street. The water line is located approximately 5-feet bgs in both 4th Avenue and 12th Street. A 2-inch diameter water line, set approximately at 2-feet bgs enters the site from 4th Avenue.

A 6-inch diameter vitrified clay pipe sewer line is present southwest to northeast on 4th Avenue and northwest to southeast on 12th Street. The sewer line is located approximately 3-feet bgs in both 4th Avenue and 12th Street.

A 21-inch diameter storm drain line is present southwest to northeast on 4th Avenue and northwest to southeast on 12th Street. The storm drain line is located approximately 5-feet bgs in both 4th Avenue and 12th Street.

A 3-inch diameter soapstone natural gas line is present southwest to northeast on 4th Avenue and northwest to southeast on 12th Street. The natural gas line is located approximately 2- to 3-feet bgs in both 4th Avenue and 12th Street.

A 3-inch diameter soapstone electric line is present northwest to southeast in the sidewalk on 12th Street and 3.5-inch diameter soapstone electric line is present southwest to northeast on 4th Avenue. The electric lines are located approximately 2- to 3-feet bgs in both 4th Avenue and 12th Street.

A shallow PG&E electric and PacBell phone underground utilities are present on the northeast sidewalk. An underground electrical line connects the north corner of the building with the PGE electrical box located at the north end of the site.

Based on the depth to water at the site (approximately 20-feet bgs), the depth of underground utilities adjacent and downgradient from the site (2- to 5- feet bgs), there exists little potential for the subsurface trenches, to act as conduits for impacted groundwater.

SENSITIVE RECEPTOR SURVEY

In January 2011, ECG conducted a sensitive receptor survey for the site. Based on the results of the well search conducted at the Department of Water Resources (DWR), 3 wells were identified within approximately 2,000 feet of the site. Lake Merritt is located approximately 1,600 feet northwest of the site. No other surface water bodies are found within 2,000-feet of the site. All of the located wells were identified as monitoring wells or test holes.

Mr. Harvey Hanoi with East Bay Municipal Utilities District stated that there are no drinking water wells located within 2,000 feet of the site. The sensitive receptors locations are shown on Figure 4 and details are listed in Table 3.

PROPOSED SITE ASSESSMENT SCOPE OF WORK

In correspondence dated December 29th, 2010, ACEHS requested a workplan to further delineate the lateral and vertical extent of impacted soil and groundwater (Appendix A). ECG proposes to install four groundwater monitoring wells (MW-1 through MW-4) to evaluate the lateral and vertical extent of impacted soil and groundwater. The proposed borings will be installed down gradient of the former UST pit and soil borings SB-6, SB-7, and SB-9 and adjacent to soil borings SB-3 and SB-4 to evaluate the lateral extent of impacted groundwater. The proposed well locations are shown on Figure 5.

PROPOSED GROUNDWATER MONITORING WELLS

Prior to conducting any subsurface work at the site, Underground Services Alert (USA) will be contacted to delineate subsurface utilities near the site with surface markings. In addition, the first five feet of every location will be hand cleared as a further precaution against damaging

underground utilities. ECG will obtain the appropriate permits from Alameda County. All work will be done in accordance to ECG standard operating procedures (SOPs) included as Appendix B.

ECG will supervise a California licensed C57 driller, during the advancement of four 8-inch diameter hollow stem auger soil borings (MW-1 through MW-4) at locations proposed on Figure 5.

Based on the April 2010 investigation, groundwater was encountered at approximately 30 feet bgs. However, a review of the neighboring sites shows static groundwater measurements at approximately 10-feet bgs. A review of well logs from the area suggests that perched water zones or semi-confined aquifer conditions may exist. During this investigation, the borings will be advanced in a step-wise manner to insure proper well screen intervals. The first several borings will be advanced to 20-feet bgs and allowed to sit overnight. If water is present the next morning, depth to water measurements and a grab sample will be collected for chemical analysis. DTW information will be communicated to County personnel prior to determining total well depths and proper screened intervals. Currently, it is assumed that monitoring wells will be installed to 30-feet bgs. Wells will be constructed as 2-inch diameter PVC wells with 15-feet of 0.010 screen and #2-/16 sand. A two-foot bentonite seal will separate the filter pack from the neat cement grout installed to the surface. Typical monitoring well construction details are presented on Figure 6.

Soil samples will be collected continuously and lithology and visual and olfactory observations will be recorded in the field. Soil samples will be field screened with a photoionization detector (PID) and at least four soil samples from each boring will be submitted for chemical analyses. Sample depth intervals submitted for analysis will be based on selecting the most impacted location determined by field observations and quantifying vertical definition.

Each new monitoring well will be developed and all onsite monitoring wells will be sampled according to ECG's SOPs contained in Appendix B.

SAMPLE ANALYSES

Soil and groundwater samples will be labeled and placed in an insulated container for delivery to Argon Labs in Ceres, California under proper chain-of-custody documentation. The soil and groundwater samples will be analyzed for TPHd and TPHg, by EPA Method 8015M and benzene, toluene, ethyl benzene, and xylenes (BTEX), five oxygenates, 1,2-DCA, EDB, and ethanol by EPA Method 8260B.

PROPOSED SOIL VAPOR EXTRACTION PILOT TEST

PROPOSED CORRECTIVE ACTION OVERVIEW

ECG proposes installing two vapor extraction wells, one inside the former UST pit and one between the former dispenser islands. A soil vapor extraction (SVE) test is proposed on the new wells to test the feasibility of soil vapor extraction.

The results of a proposed five-day SVE pilot test will indicate if soil vapor extraction would be effective at remediating the site. If test results show that adequate vapor flow rates and contaminant recovery rates are attainable, then SVE will be evaluated in results report that will be prepared

PROPOSED VAPOR EXTRACTION WELLS

Underground Services Alert will be contacted at least 48 hours before drilling to locate underground utilities in the vicinity and public right of ways. In addition, the first 5 feet of each boring will be hand augured to avoid striking utilities. ECG will obtain the appropriate permits from Contra Costa County.

ECG will supervise a State of California licensed C57 driller during the advancement of two 10-inch diameter hollow stem auger soil borings (VW-1 and VW-2) at the locations shown on Figure 5. The borings will be sampled at 5-foot intervals to provide additional soil column information and to quantify soil contaminant levels. Vapor wells will be installed to 20-feet bgs. Vapor wells will be constructed as 4-inch diameter PVC wells with 15-feet of 0.020 screen and #3 sand. A two-foot bentonite seal will separate the filter pack from the neat cement grout installed to the surface. Typical vapor well construction details are presented on Figure 7.

Soil samples will be collected by driving a 2-inch diameter, 1.5-foot long California type sampler equipped with brass sleeves in advance of the augers. The brass sleeves will be removed from the steel sampler and the bottom sleeve will be logged for lithology and monitored for volatile organic compounds with a PID. Based on soil type and PID readings, the middle sleeve at selected intervals will be chosen for analysis, sealed with Teflon tape and plastic end caps, labeled, and placed in an insulated container for delivery to Argon in Ceres, California under proper COC documentation. The soil samples will be analyzed for TPHd and TPHg by EPA Method 8015M and BTEX, five oxygenates, 1,2-DCA, EDB, and ethanol by EPA Method 8260B.

SVE TREATMENT SYSTEM PILOT TEST

ECG proposes to conduct a SVE pilot test at the site for five days. A portable SVE unit will be rented from Mako Industries Inc. in Anaheim, California and will be operated to discharge vapors to the atmosphere under their blanket air board permit. Any water generated during the test will be stored on-site and properly disposed of after receipt of analysis. The SVE unit will be a Model 250 MakoCAT, catalytic oxidizer capable of extracting and abating soil vapors at a rate of 250 standard cubic feet per minute (SCFM). System specifications are presented in Appendix C.

Two extraction wells will be used as extraction points during the test (VW-1 and VW-2). Both extraction wells will be tested for approximately 48 hours. The well locations are shown on Figure 5. The SVE unit will be connected to an individual well using 1.5-inch diameter above ground flexible tubing. The monitoring wells will be used to monitor vacuum influence during the tests.

Field influent concentrations will be monitored with a PID hourly during daylight hours. In addition to readings for influent concentrations, flow rates, system vacuum, and vacuum influence will be monitored hourly with field instruments. This data will be converted into a contaminant recovery rate in pounds per day. A vapor sample collected for laboratory analysis will be collected three hours into each test and one hour prior to the termination of each test. The vapor samples will be submitted to the analytical laboratory for analysis.

Vapor samples will be collected into one-liter Tedlar bags filled no more than 90 percent to capacity and shipped overnight to Kiff Analytical in Davis, California, a State certified analytical laboratory for analysis. All work will be done in accordance to ECG SOPs included as Appendix B.

SCHEDULE

Pending approval of this workplan, ECG will obtain well permits and install monitoring wells MW-1 through MW-4 and extraction wells VW-1 and VW-2. Soil and water analytical results will be forwarded to ACEHD staff prior to performing the SVE test.

The SVE test will be conducted within two weeks of receiving soil and groundwater analytical data from the installation of wells groundwater and extraction wells. A results report that includes field PID and flow data from the SVE test will be forwarded to ACEHD at the conclusion of the test.

FIGURES

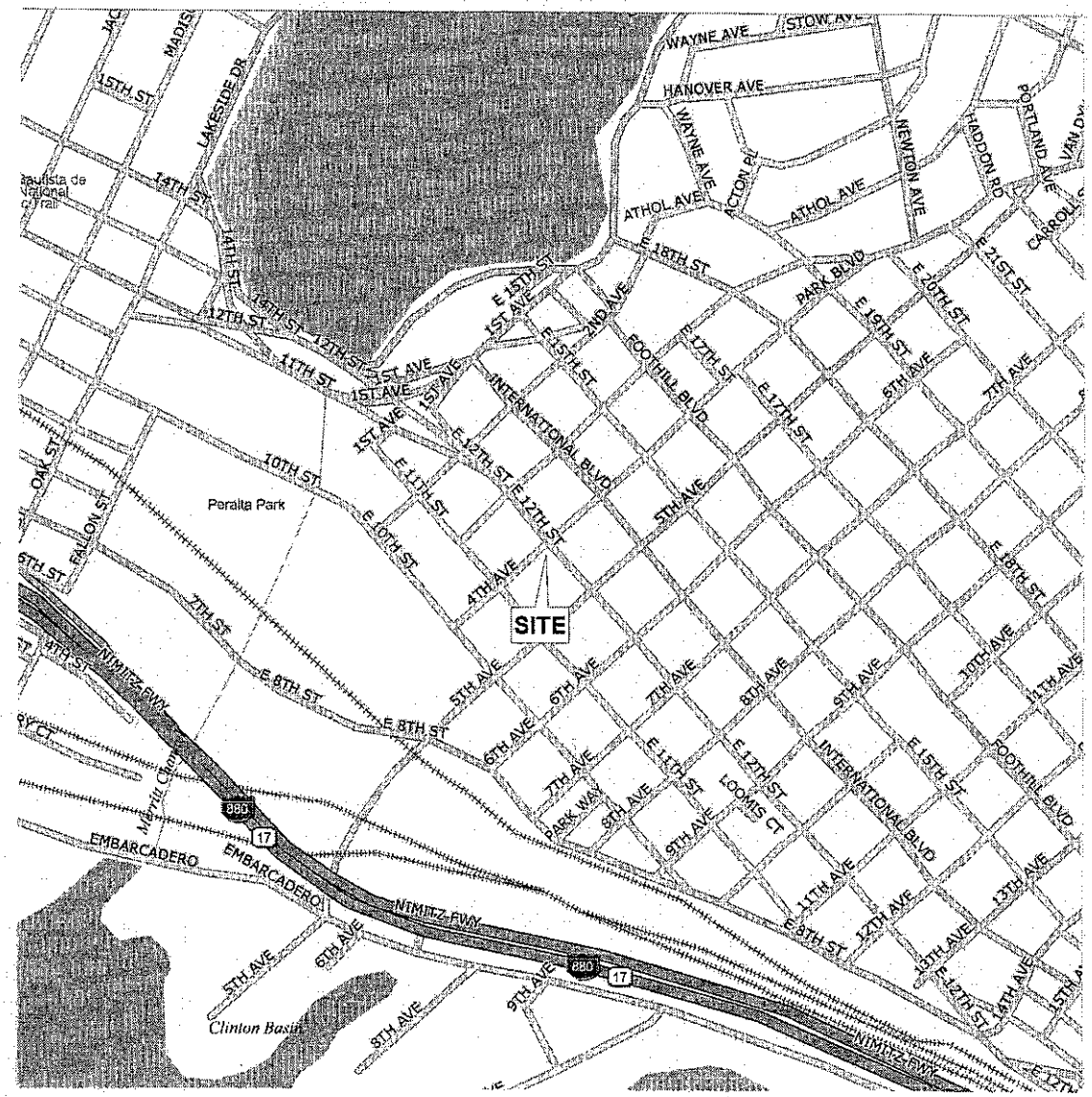


FIGURE 1	**SITE LOCATION MAP**	**Environmental Compliance Group, LLC**
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: February 9, 2011		

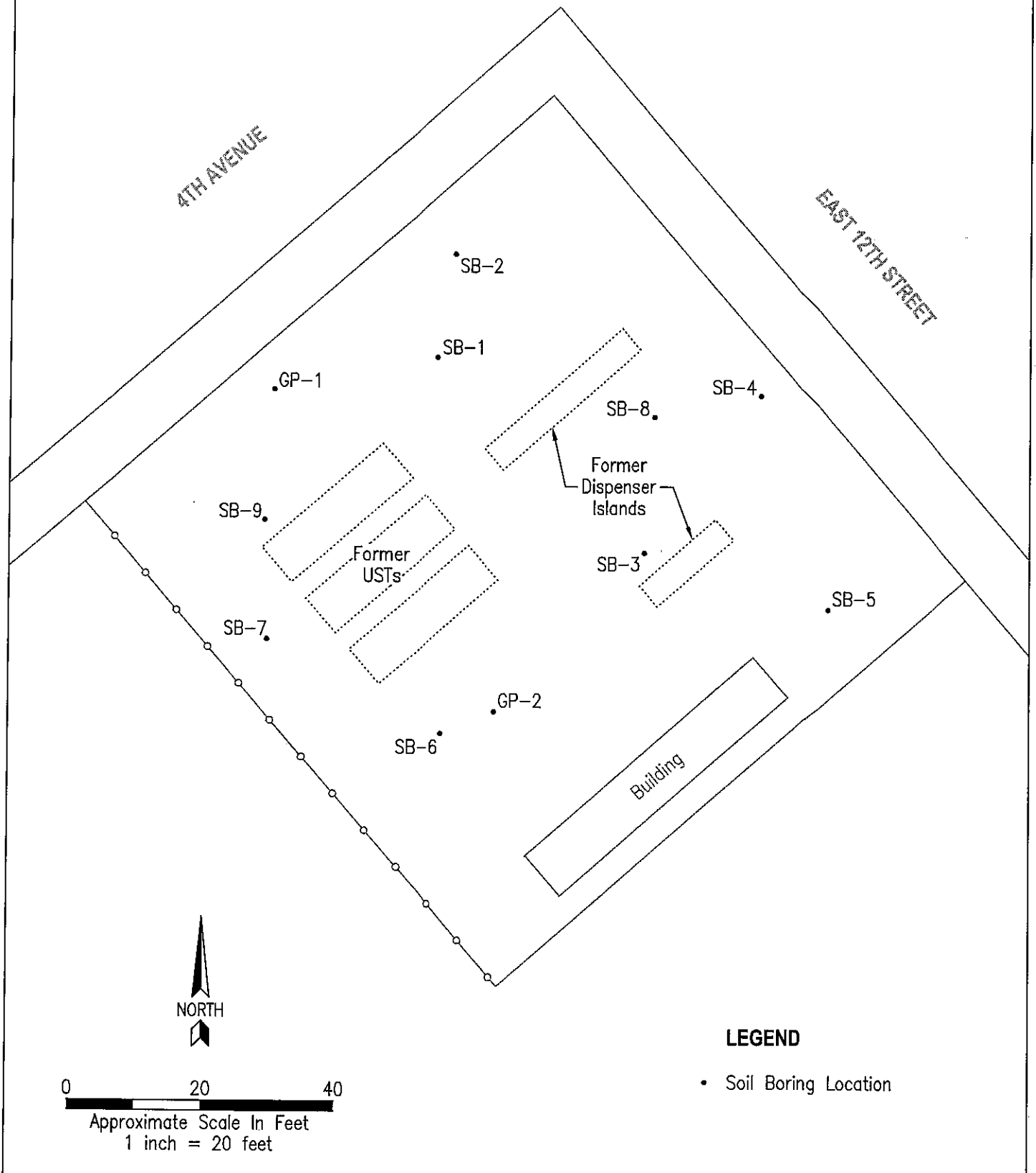


FIGURE 2 **Project Number:** GHA.19009 **Date:** February 9, 2011	**SITE MAP** Shore Acre Gas 403 East 12th Street Oakland, California	**Environmental Compliance Group, LLC** 270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035

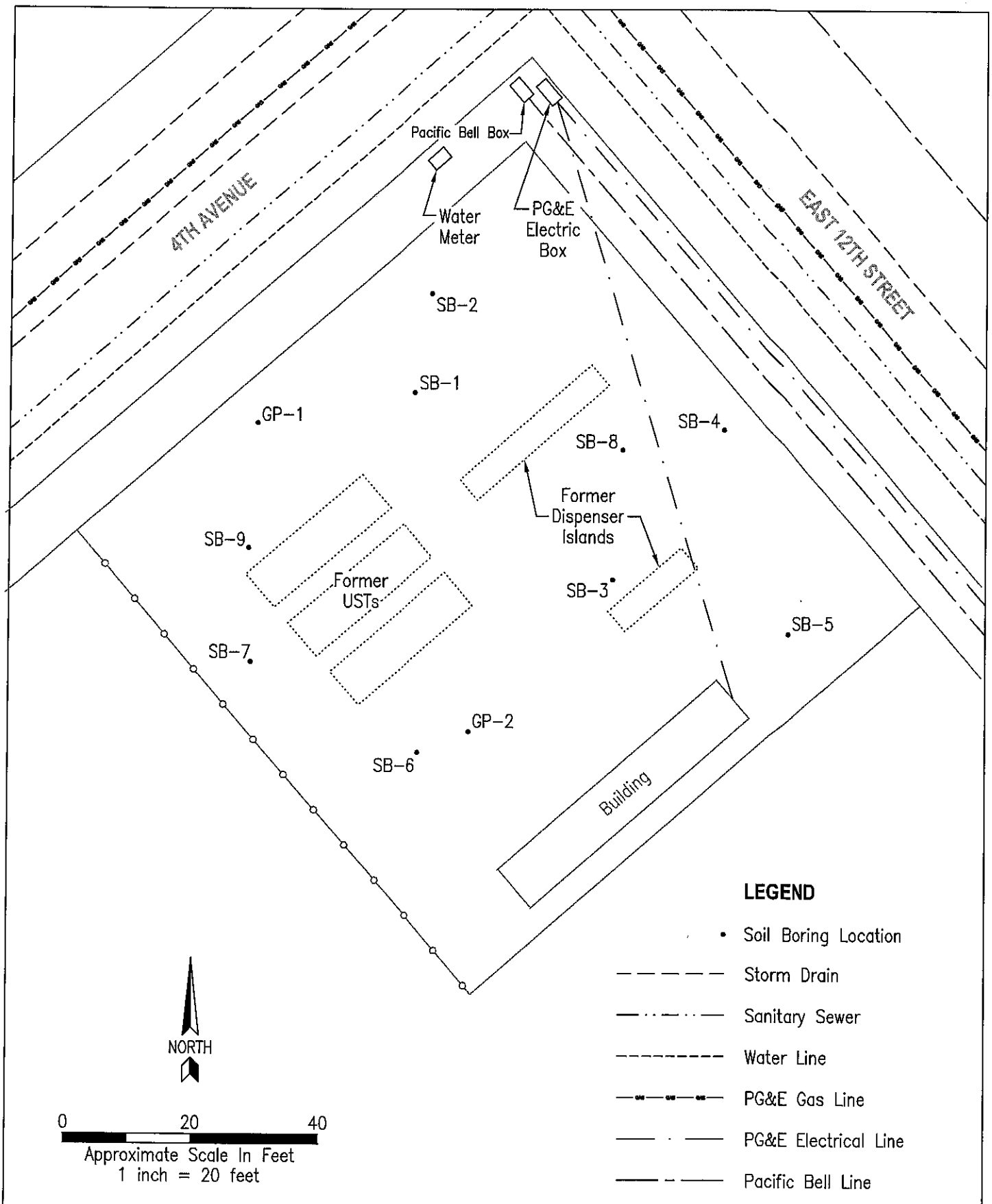
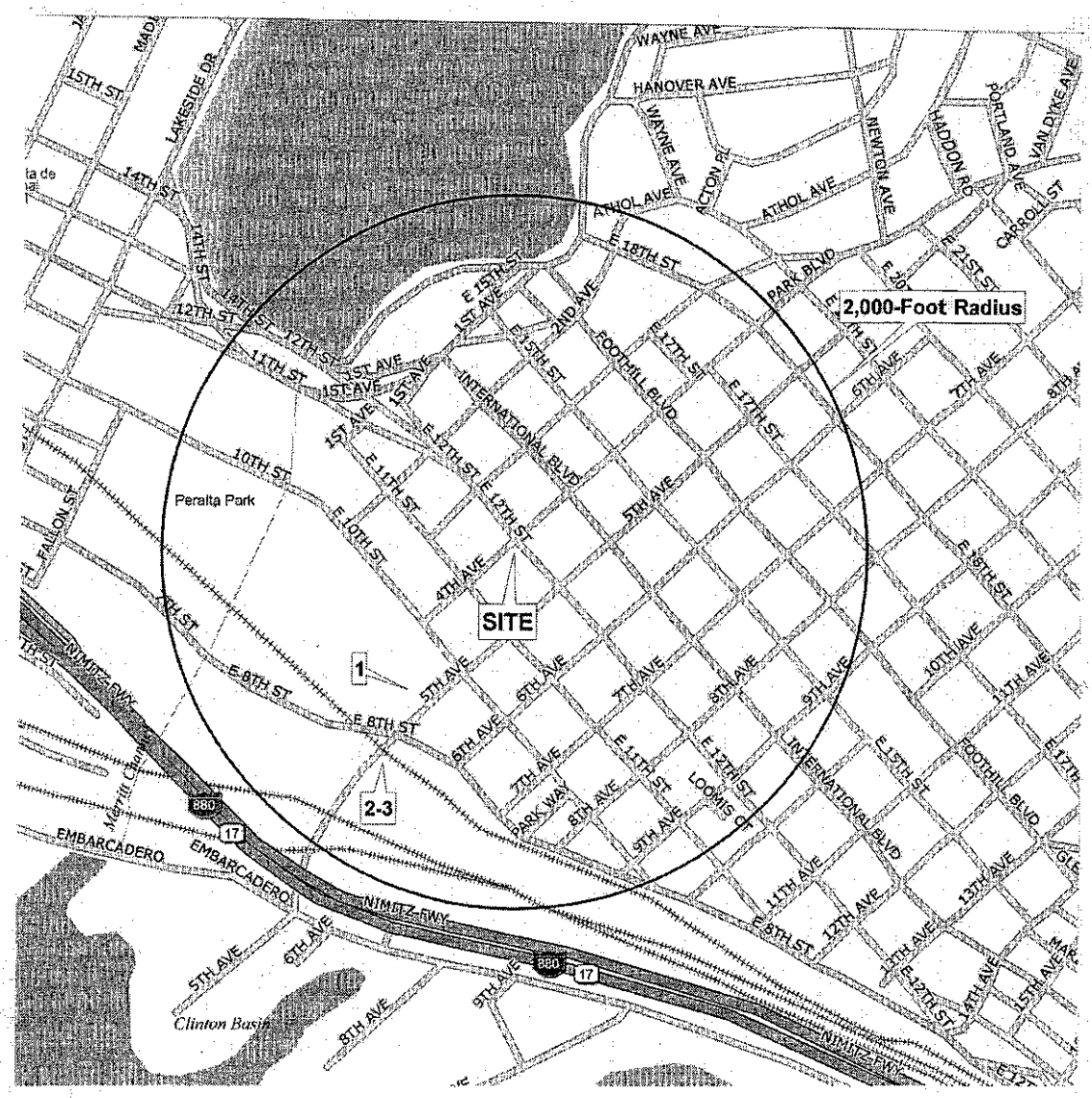


FIGURE 3	**PREFERENTIAL PATHWAY MAP**	Environmental Compliance Group, LLC
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: February 9, 2011		



NORTH

0 1,000 2,000

Approximate Scale In Feet
1 inch = 1,000 Feet

FIGURE 4	**SENSITIVE RECEPTOR LOCATION MAP**	**Environmental Compliance Group, LLC**
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: February 9, 2011		

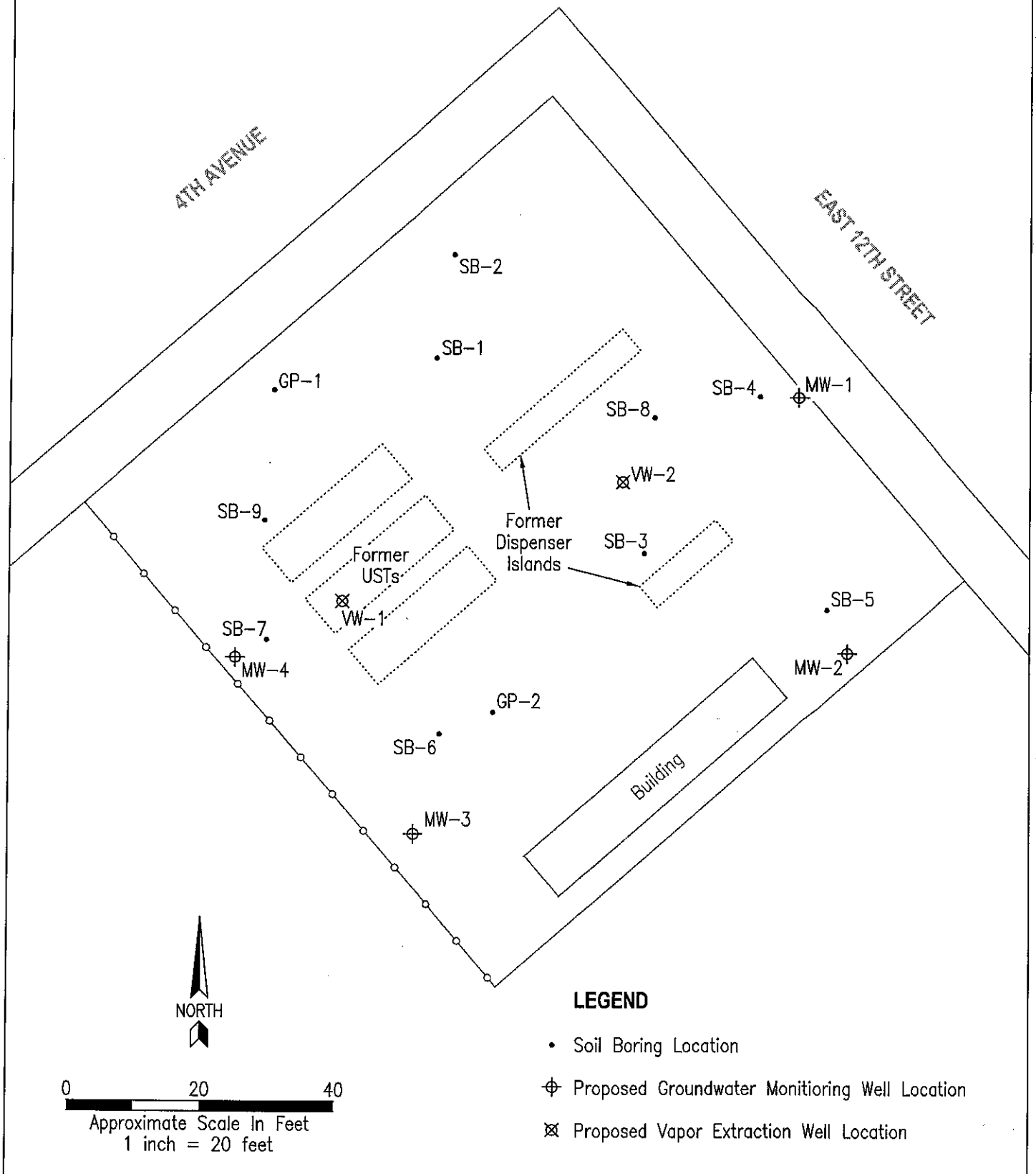
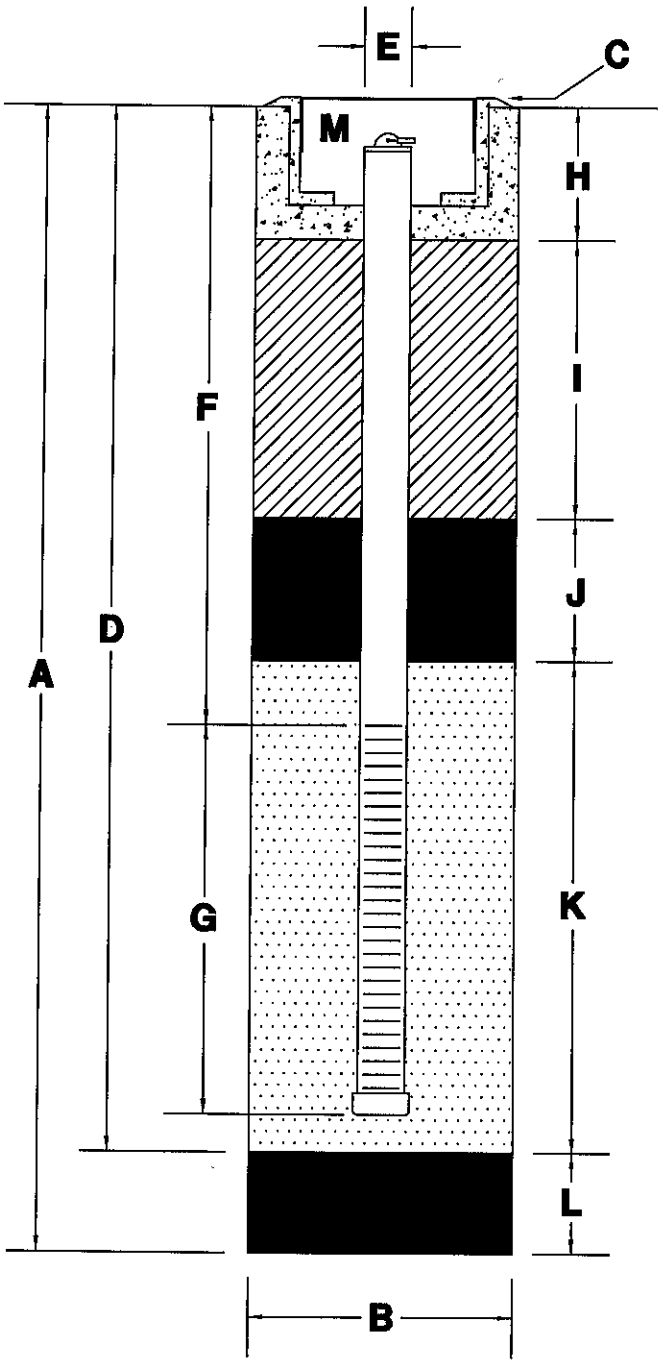


FIGURE 5 **Project Number:** GHA.19009 **Date:** February 9, 2011	**PROPOSED WELL LOCATION MAP** Shore Acre Gas 403 East 12th Street Oakland, California	**Environmental Compliance Group, LLC** 270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035

PROPOSED WELL CONSTRUCTION DETAIL



A Total Depth Of Boring 30 ft.

B Diameter Of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top Of Box Elevation _____ ft.
☒ Referenced To Mean Sea Level
☐ Referenced To Project Datum

D Casing Length 30 ft.
Material Sch 40 PVC

E Casing Diameter 2 in.

F Depth To Top Perforations 15 ft.

G Perforated Length 15 ft.
Perforated Interval From 15 to 30 ft.
Perforation Type Machine Slotted
Perforation Size 0.010 in.

H Surface Seal From 0 to 2 ft.
Seal Material Concrete

I Sanitary Seal From 2 to 11 ft.
Seal Material Grout – Neat Cement

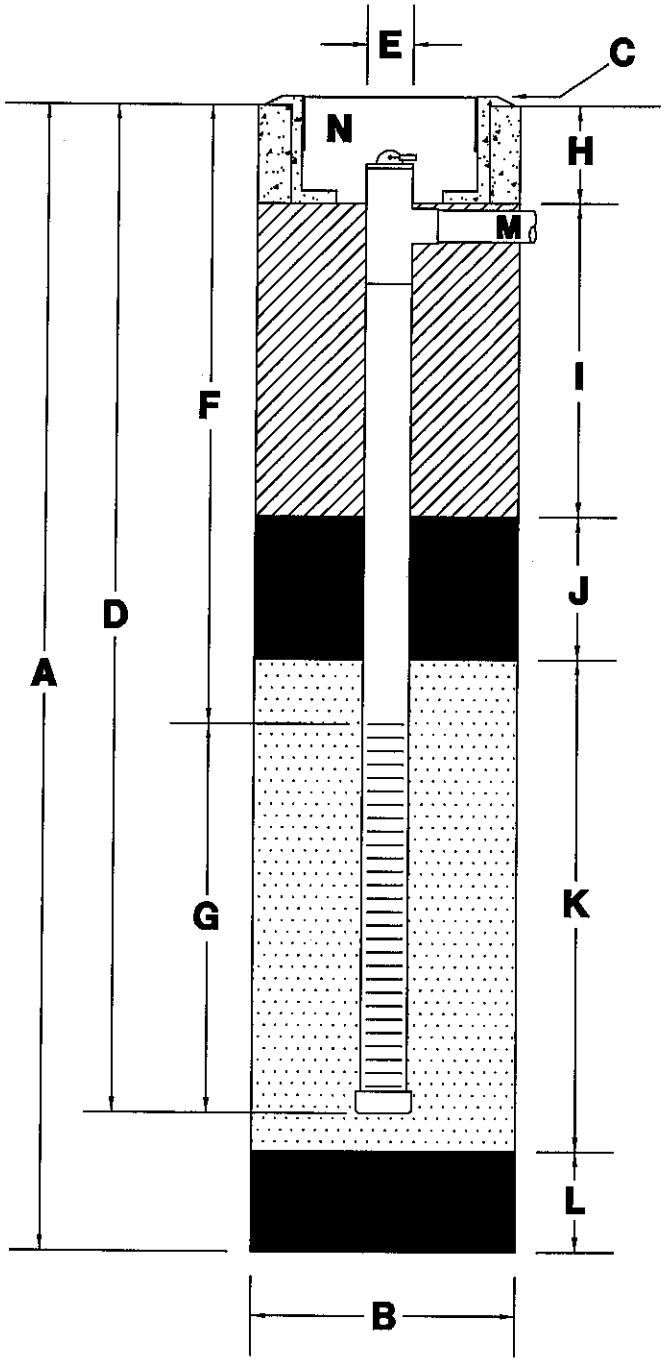
J Seal From 11 to 13 ft.
Seal Material Bentonite

K Filter Pack From 13 to 30 ft.
Pack Material No. 2–/16 Sand

L Bottom Seal N/A ft.
Seal Material N/A

M 8–inch Diameter Traffic Rated Christy Box

FIGURE 6	**PROPOSED MONITORING WELL CONSTRUCTION DETAIL**	Environmental Compliance Group, LLC
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664–1035
Date: February 9, 2011		



A Total Depth Of Boring 20 ft.

B Diameter Of Boring 10 in.
Drilling Method Hollow Stem Auger

C Top Of Box Elevation _____ ft.
☒ Referenced To Mean Sea Level
☐ Referenced To Project Datum

D Casing Length 20 ft.
Material Sch 40 PVC

E Casing Diameter 4 in.

F Depth To Top Perforations 8 ft.

G Perforated Length 12 ft.
Perforated Interval From 8 to 20 ft.
Perforation Type Machine Slotted
Perforation Size 0.020 in.

H Surface Seal From 0 to 2 ft.
Seal Material Concrete

I Sanitary Seal From 2 to 4 ft.
Seal Material Neat Cement Grout

J Seal From 4 to 6 ft.
Seal Material Bentonite

K Filter Pack From 6 to 20 ft.
Pack Material No. 3 Lonestar Sand

L Bottom Seal N/A ft.
Seal Material N/A

M Vapor Extraction Piping

N 12-inch Diameter Traffic Rated Christy Box And Locking Well Cap

FIGURE 7	**PROPOSED VAPOR EXTRACTION WELL CONSTRUCTION DETAIL**	Environmental Compliance Group, LLC
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: February 9, 2011		

TABLES

Table 1a
Historical Soil Analytical Data
TPH and BTEX
Shore Acres Gas
403 East 12th Street
Oakland, California

Boring ID	Sample Depth (feet)	Collection Date	TPHd (mg/kg)	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total xylenes (mg/kg)
UST Removal Samples								
SS-D1	2.0	August 2009	1,800*	3,000	<0.25	0.34	39	180
SS-D2	2.0		900*	2,400	<0.25	<0.25	36	120
SS-D3	2.0		460*	1,000	<0.15	<0.15	12	14
SS-D4	2.0		540*	640	<0.090	1.0	6.1	51
SS-D5	2.0		320	140	<0.025	<0.025	1.3	3.2
SS-D6	2.0		320*	260	<0.025	0.054	1.0	8.0
SS-J1	2.0		39*	160	<0.025	<0.025	0.71	0.94
SS-Isle	4.0		560*	100	<0.025	<0.025	0.30	0.084
SS-7	18.0		310*	1,600	6.9	76	39	200
Tank 1-SS-1	14.0		830*	2,500	4.2	100	69	360
Tank 1-SS-2	14.0		62*	480	1.8	5.3	14	62
Tank 2-SS-1	14.0		120*	290	0.37	2.4	6.3	31
Tank 2-SS-2	14.0		330*	80	0.074	0.051	1.2	5.8
Tank 3-SS-1	14.0		480*	2,100	2.4	41	62	320
Tank 3-SS-2	14.0		75*	130	0.23	0.26	3.1	15
Soil Borings								
GP-1-15.5	15.5	July 2006	13.0	18.0	0.63	0.052	0.69	0.13
GP-1-18.0	18.0		<1.0	<1.0	0.0056	0.0082	<0.005	0.019
GP-2-12.0	12.0		600	3,600	17	180	98	440
GP-2-20.0	20.0		79	1,100	3.2	41	25	130
SB-1-9.5	9.5	April 2010	---	1,600	5.1	43	30	180
SB-1-24.5	24.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-1-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-2-9.5	9.5		---	2.2	0.26	<0.010	0.066	<0.020
SB-2-24.5	24.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-2-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-3-14.5	14.5		---	17	17	100	42	240
SB-3-24.5	24.5		---	<1.0	<0.005	0.005	<0.005	0.013
SB-3-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-4-14.5	14.5		---	1,700	13	79	28	170
SB-4-19.5	19.5		---	<1.0	<0.005	0.009	<0.005	0.026
SB-4-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-5-14.5	14.5		---	470	<0.20	0.45	6.2	37
SB-5-24.5	24.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-5-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-6-9.5	9.5		---	6,100	21	170	95	580
SB-6-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-6-32	32.0		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-7-9.5	9.5		---	4,000	12	46	55	360
SB-7-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-7-32	32.0		---	<1.0	<0.005	<0.005	<0.005	<0.010

Table 1a
Historical Soil Analytical Data
TPH and BTEX
Shore Acres Gas
403 East 12th Street
Oakland, California

Boring ID	Sample Depth (feet)	Collection Date	TPHd (mg/kg)	TPHg (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Total xylenes (mg/kg)
SB-8-9.5	9.5	April 2010	---	**2,500**	**16**	**110**	**63**	**370**
SB-8-24.5	24.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-8-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-9-14.5	14.5		---	**390**	**3.0**	**3.0**	**9.1**	**41**
SB-9-29.5	29.5		---	<1.0	<0.005	<0.005	<0.005	<0.010
SB-9-32	32.0		---	<1.0	<0.005	<0.005	<0.005	<0.010

Notes:

TPHd - denotes total petroleum hydrocarbons as diesel
TPHg - denotes total petroleum hydrocarbons as gasoline
mg/kg - denotes milligrams per kilogram
< - denotes less than the detection limit
--- denotes no data

Table 1b
Historical Soil Analytical Data
Oxygenates and Lead Scavengers
Shore Acres Gas
403 East 12th Street
Oakland, California

Boring ID	Sample Depth (feet)	Collection Date	DIPE (mg/kg)	ETBE (mg/kg)	MTBE (mg/kg)	TAME (mg/kg)	TBA (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)
UST Removal Samples									
SS-D1	2.0	August 2009	<0.25	<0.25	<0.25	<0.25	<1.5	---	---
SS-D2	2.0		<0.25	<0.25	<0.25	<0.25	<1.5	---	---
SS-D3	2.0		<0.15	<0.15	<0.15	<0.15	<0.70	---	---
SS-D4	2.0		<0.090	<0.090	<0.090	<0.090	<0.50	---	---
SS-D5	2.0		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-D6	2.0		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-J1	2.0		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-Isle	4.0		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-7	18.0		<0.25	<0.25	<0.25	<0.25	<1.5	<0.25	<0.25
Tank 1-SS-1	14.0		<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50
Tank 1-SS-2	14.0		<0.040	<0.040	**0.37**	<0.040	**0.51**	<0.040	<0.040
Tank 2-SS-1	14.0		<0.050	<0.050	**0.18**	<0.050	**0.35**	<0.050	<0.050
Tank 2-SS-2	14.0		<0.025	<0.025	**0.090**	<0.025	**0.16**	<0.025	<0.025
Tank 3-SS-1	14.0		<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50
Tank 3-SS-2	14.0		<0.025	<0.025	**0.19**	<0.025	**0.15**	<0.025	<0.025
Soil Borings									
GP-1-15.5	15.5	July 2006	<0.005	<0.005	**0.029**	<0.005	**0.27**	---	---
GP-1-18.0	18.0		<0.005	<0.005	**0.54**	<0.005	**0.33**	---	---
GP-2-12.0	12.0		<0.50	<0.50	<0.50	<0.50	<2.5	---	---
GP-2-20.0	20.0		<0.025	<0.025	**0.041**	<0.025	<0.15	---	---
SB-1-9.5	9.5	April 2010	<0.80	<0.80	<0.80	<0.80	<8.0	<0.80	<0.80
SB-1-24.5	24.5		<0.005	<0.005	**0.11**	<0.005	<0.050	<0.005	<0.005
SB-1-29.5	29.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-2-9.5	9.5		<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
SB-2-24.5	24.5		<0.005	<0.005	**0.053**	<0.005	<0.050	<0.005	<0.005
SB-2-29.5	29.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-3-14.5	14.5		<2.0	<2.0	<2.0	<2.0	<20	<2.0	<2.0
SB-3-24.5	24.5		<0.005	<0.005	**0.10**	<0.005	<0.050	<0.005	<0.005
SB-3-29.5	29.5		<0.005	<0.005	**0.010**	<0.005	<0.050	<0.005	<0.005
SB-4-14.5	14.5		<1.0	<1.0	<1.0	<1.0	<10	<1.0	<1.0
SB-4-19.5	19.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-4-29.5	29.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-5-14.5	14.5		<0.20	<0.20	<0.20	<0.20	<2.0	<0.20	<0.20
SB-5-24.5	24.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-5-29.5	29.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-6-9.5	9.5		<2.0	<2.0	<2.0	<2.0	<20	<2.0	<2.0
SB-6-29.5	29.5		<0.005	<0.005	**0.20**	<0.005	<0.050	<0.005	<0.005
SB-6-32	32.0		<0.005	<0.005	**0.18**	<0.005	<0.050	<0.005	<0.005
SB-7-9.5	9.5		<1.0	<1.0	**4.0**	<1.0	<10	<1.0	<1.0
SB-7-29.5	29.5		<0.005	<0.005	**0.18**	<0.005	<0.050	<0.005	<0.005
SB-7-32	32.0		<0.005	<0.005	**0.11**	<0.005	<0.050	<0.005	<0.005

Table 1b
Historical Soil Analytical Data
Oxygenates and Lead Scavengers
Shore Acres Gas
403 East 12th Street
Oakland, California

Boring ID	Sample Depth (feet)	Collection Date	DIPE (mg/kg)	ETBE (mg/kg)	MTBE (mg/kg)	TAME (mg/kg)	TBA (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)
SB-8-9.5	9.5	April 2010	<2.0	<2.0	<2.0	<2.0	<20	<2.0	<2.0
SB-8-24.5	24.5		<0.005	<0.005	**0.033**	<0.005	<0.050	<0.005	<0.005
SB-8-29.5	29.5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
SB-9-14.5	14.5		<0.20	<0.20	**5.5**	<0.20	<2.0	<0.20	<0.20
SB-9-29.5	29.5		<0.005	<0.005	**0.090**	<0.005	**0.15**	<0.005	<0.005
SB-9-32	32.0		<0.005	<0.005	**0.11**	<0.005	<0.050	<0.005	<0.005

Notes:

mg/kg - denotes milligrams per kilogram
< - denotes less than the detection limi
--- - denotes not analyzed/applicable
DCA - denotes dichloroethane
EDB - denotes ethylene dibromide
MTBE - denotes methyl tertiary butyl ether
DIPE - denotes di-isopropyl ether
ETBE - denotes ethyl tertiary butyl ether
TAME - denotes tertiary amyl ether
TBA - denotes tertiary butyl alcohol

Table 2a
Grab Groundwater Sample Results
TPH and BTEX
Shore Acres Gas
403 East 12th Street
Oakland, California

Sample ID	Collection Date	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)
Excavation							
Pit Sample 1	August 2009	**21,000**	**21,000**	**3,800**	**1,000**	**1,200**	**3,700**
Direct Push Grab Groundwater Samples							
SB-1	April 2010	---	**60**	**2.9**	**6.7**	**2.1**	**9.7**
SB-2		---	<50	<0.5	<0.5	<0.5	<1.0
SB-3		---	**170**	**1.5**	**11**	**4.8**	**27**
SB-4		---	**6,500**	**78**	**440**	**190**	**960**
SB-5		---	<50	<0.5	<0.5	<0.5	<1.0
SB-6		---	**440**	<20	<20	<20	<40
SB-7		---	**270**	<12	<12	<12	<25
SB-8		---	<50	**0.6**	**1.3**	**0.6**	**3.3**
SB-9		---	<50	<10	<10	<10	<20

Notes:

TPHd - denotes total petroleum hydrocarbons as diesel

TPHg - denotes total petroleum hydrocarbons as gasoline

ug/L - denotes micrograms per liter

< - denotes less than the detection limit

--- - denotes not analyzed/applicable

Table 2b
Grab Groundwater Sample Results
Oxygenates and Lead Scavengers
Shore Acres Gas
403 East 12th Street
Oakland, California

Sample ID	Collection Date	DIPE (ug/L)	ETBE (ug/L)	MTBE (ug/L)	TAME (ug/L)	TBA (ug/L)	1,2-DCA (ug/L)	EDB (ug/L)
Excavation								
Water	February 2000	<10	<10	**15,000**	**39**	**17,000**	<10	<10
Direct Push Grab Groundwater Samples								
SB-1	April 2010	<0.5	<0.5	**14**	<0.5	<5.0	<0.5	<0.5
SB-2		<0.5	<0.5	**45**	<0.5	<5.0	<0.5	<0.5
SB-3		<0.5	<0.5	**110**	<0.5	**32**	<0.5	<0.5
SB-4		<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0
SB-5		<0.5	<0.5	**0.6**	<0.5	<5.0	<0.5	<0.5
SB-6		<20	<20	**4,000**	<20	<200	<20	<20
SB-7		<12	<12	**2,500**	<12	<120	<12	<12
SB-8		<0.5	<0.5	**26**	<0.5	**98**	<0.5	<0.5
SB-9		<10	<10	**1,800**	<10	**5,300**	<10	<10

Notes:

ug/L - denotes micrograms per liter
< - denotes less than the detection limit
DCA - denotes dichloroethane
EDB - denotes ethylene dibromide
MTBE - denotes methyl tertiary butyl ether
DIPE - denotes di-isopropyl ether
ETBE - denotes ethyl tertiary butyl ether
TAME - denotes tertiary amyl ether
TBA - denotes tertiary butyl alcohol

Table 3
Sensitive Receptor Survey Data
Shore Acres Gas
403 East 12th Street
Oakland, California

Figure ID	Well Owner	Well Location Description on DWR Log	Well Type	Total Depth (feet bgs.)	Screen Interval (feet bgs.)	Seal Inteval (feet bgs.)	Installation Date	Distance/ Direction (feet)	Notes:
1	Port of Oakland	251 5th Avenue, Oakland	Monitoring	13.0	8-13	0-8	6/14/05	1000/SW	
2-3	Kaiser Paving Company	5th Avenue and S.P. Tracks, Oakland	Test Hole	15.0	None	Unknown	4/20/05	1,200/SW	

Notes:

DWR - denotes Department of Water Resources

— - denotes no data available

bgs - denotes below ground surface

APPENDICES

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Director

ENVIRONMENTAL HEALTH DEPARTMENT
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

December 29, 2010

Rashid Ghafoor and Waseem Iqbal
226 Havenwood Circle
Pittsburg, CA 94567

Subject: Request for Work Plan for Fuel Leak Case No. RO0002931 and GeoTracker Global ID T0600174667, Shore Acres Gas, 403 E 12th St., Oakland, CA 94606

Dear Messrs. Ghafoor and Iqbal:

Thank you for the recently submitted document entitled, *Subsurface Investigation Results Reports* dated June 23, 2010, which was prepared by Apex Envirotech, Inc. for the subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including the above-mentioned report for the above-referenced site. The report details the investigation results for soil and groundwater and recommends additional work including well installation. ACEH requests that you address the following technical comments and send us a work plan as requested below.

TECHNICAL COMMENTS

1. **Off-site Extent of Contamination** – The lateral extent of oxygenates (and hydrocarbons) have not been defined off-site. Groundwater from the adjacent Oakland Unified School District Facility has detectable MTBE concentrations and there is a residence located immediately adjacent to the former USTs that is unevaluated. Please submit a work plan to evaluate the lateral extent of contamination.

2. **Contaminant Preferential Pathway Study** – Preferential Pathway Study - The purpose of the preferential pathway study is to locate potential migration pathways and conduits and determine the probability of the plume encountering preferential pathways and conduits that could spread contamination. We request that you perform a preferential pathway study that details the potential migration pathways and potential conduits (wells, utilities, pipelines, etc.) for vertical and lateral migration that may be present in the vicinity of the site.

   Discuss your analysis and interpretation of the results of the preferential pathway study and report your results in the report requested below. The results of your study shall contain all information required by California Code of Regulations, Title 23, Division 3, Chapter 16, §2654(b).

a. Utility Survey

An evaluation of all utility lines and trenches (including sewers, storm drains, pipelines, trench backfill, etc.) within and near the site and plume area(s) is required as part of your study. Please include maps and cross-sections illustrating the location and depth of all utility lines and trenches within and near the site and plume areas(s) as part of your study.

b. Well Survey

The preferential pathway study shall include a detailed well survey of all wells (monitoring and production wells: active, inactive, standby, decommissioned (sealed with concrete), abandoned (improperly decommissioned or lost); and dewatering, drainage, and cathodic protection wells) within a ¼ mile radius of the subject site. As part of your detailed well survey, please perform a background study of the historical land uses of the site and properties in the vicinity of the site. Use the results of your background study to determine the existence of unrecorded/unknown (abandoned) wells, which can act as contaminant migration pathways at or from your site. Please review and submit copies of historical maps, such as Sanborn maps, aerial photographs, etc., when conducting the background study.

3. **Contaminant Source Area Characterization** – Petroleum hydrocarbons were detected in soil and groundwater samples across the site at maximum concentrations of 6,100 mg/kg total petroleum hydrocarbons as gasoline (TPHg) and 21 mg/kg benzene in soil at 9.5 feet below ground surface (bgs). However, no soil samples were collected from shallower than 9.5 feet below ground surface (bgs) and the next sample was collected between 19 and 29 ft bgs thus leaving the vertical extent of contamination undefined in soil. Please submit a work plan proposing well locations with the screen intervals and sample depths detailed. Ensure that shallow soil samples are collected from the well borings and that samples are collected to evaluate the vertical contamination profile in soil including at a minimum of 5 foot intervals, all elevated PID readings and at lithologic changes.

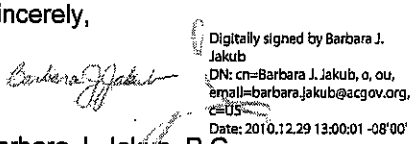
4. **Contaminant Analysis** – Total petroleum hydrocarbons as diesel (TPHD) were detected during the UST removal but no samples were analyzed for this constituent. Please analyze for this constituent in all samples in addition to total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tertiary butyl alcohol (MTBE), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), 1, 2-dicholoroethane (EDC), ethylene dibromide (EDB) and ethanol. Include your proposal for this work by the due date requested below.

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to the following schedule:

- **March 1, 2011** – Work Plan

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,



Barbara J. Jakub, P.G.
Hazardous Materials Specialist

Enclosure: Responsible Party(ies) Legal Requirements/Obligations

ACEH Electronic Report Upload (ftp) Instructions

cc: Brandon Poteet, APEX Envirotech, Inc., 11224 Pyrites Way, Gold River, CA 95670
Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032 (*Sent via E-mail to: lgriffin@oaklandnet.com*)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker, e-file

ENVIRONMENTAL COMPLIANCE GROUP, LLC
STANDARD OPERATING AND SAFETY AND LOSS CONTROL PROCEDURES

1.0 SOIL BORING/DRILLING SAMPLE COLLECTION AND CLASSIFICATION PROCEDURES

ECG will prepare a site-specific Health and Safety Plan as required by the Occupational Health and Safety Administration (OSHA) Standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR.1910.120). The document will be reviewed and signed by all ECG personnel and subcontractors prior to performing work at the site.

Prior to conducting and subsurface work at the site, Underground Services Alert (USA) will be contacted to delineate subsurface utilities near the site with surface markings. In addition, the first five feet of every location will be hand cleared to a diameter larger than the diameter of the auger or probe as a further precaution against damaging underground utilities. Sites that are currently operated as gas stations will be cleared with a private utility locator prior to drilling activities.

Soil samples to be submitted for chemical analyses are collected into brass or stainless steel tubes. The tubes are placed in an 18-inch long split-barrel sampler. The split-barrel sampler is driven its entire length hydraulically or by 140-pound drop hammer. The split-barrel sampler is removed from the borehole and the tubes are removed. When the tubes are removed from the split-barrel sampler, the tubes are trimmed and capped with Teflon sheets and plastic caps or the soil is removed from the tubes and placed in other appropriate sample containers. The samples are sealed, labeled, and placed in ice under chain-of-custody to be delivered to the analytical laboratory. All samples will be kept refrigerated until their delivery to the analytical laboratory.

One soil sample collected from each split-barrel sampler is field screened with a photoionization detector (PID), flame ionization detector (FID), or other equivalent field screening meter. The soil sample is sealed in a plastic bag or other appropriate container to allow volatilization of volatile organic compounds (VOCs). The field meter is used to measure the VOC concentration in the container's headspace and is recorded on the boring logs at the appropriate depth interval.

Other soil samples collected from each split-barrel sampler are inspected and documented to identify the soil stratigraphy beneath the site and classify the soil types according to the United Soil Classification System. The soil types are recorded on boring logs with the appropriate depth interval and any pertinent field observations. Drilling and sampling equipment are steam cleaned or washed in solution and rinsed in deionized water prior to use, between sample collections and boreholes and after use.

2.0 SOIL EXCAVATION SAMPLE COLLECTION AND CLASSIFICATION PROCEDURES

Soil samples to be submitted for chemical analyses are collected into brass or stainless steel tubes or other appropriate containers. The samples are sealed, labeled, and placed in ice under chain-of-custody (COC) to be delivered to the analytical laboratory. All samples will be kept refrigerated until their delivery to the analytical laboratory.

Select soil samples are placed into a sealed plastic bag or other appropriate container and field screened using a PID, FID, or equivalent meter. Other soil samples collected are inspected and documented to identify the soil stratigraphy beneath the site and classify the soil types according to the United Soil Classification System. The soil types are recorded field notes with the appropriate depth interval and any pertinent field observations. Sampling equipment are steam cleaned or washed in solution and rinsed in deionized water prior to use, between sample collections, and after use. Soil cuttings and rinseate water are temporarily stored onsite pending laboratory analytical results and proper transport and disposal.

3.0 SAMPLE IDENTIFICATION AND COC PROCEDURES

Sample containers are labeled with job number, job name, sample collection time and date, sample collection point, and analyses requested. Sampling method, sampler's name, and any pertinent field observations are recorded on boring logs or excavation field notes. COC forms track the possession of the sample from the time of its collection until the time of its delivery to the analytical laboratory. During sample transfers, the person with custody of the samples will relinquish them to the next person by signing the COC and documenting the time and date. The analytical laboratory Quality Control/Quality Assurance (QA/QC) staff will document the receipt of the samples and confirm the analyses requested on the COC matches the sample containers and preservative used, if any. The analytical laboratory will assign unique log numbers for identification during the analyses and reporting. The log numbers will be added to the COC form and maintained in a log book maintained by the analytical laboratory.

4.0 ANALYTICAL LABORATORY QA/QC PROCEDURES

The analytical laboratory analyzes spikes, replicates, blanks, spiked blanks, and certified reference materials to verify analytical methods and results. The analytical laboratory QA/QC also includes:

Routine instrument calibration,
Complying with state and federal laboratory accreditation and certification programs,
Participation in U.S. EPA performance evaluation studies,
Standard operating procedures, and
Multiple review of raw data and client reports

5.0 HOLLOW STEM AUGER WELL INSTALLATION

Boreholes for wells are often drilled with a truck-mounted hollow stem auger drill rig. The borehole diameter is at least 4 inches wider than the outside diameter of the well casing. Soil samples are collected and screened as described in **Section 1.0** and decontamination procedures are also the same as described in **Section 1.0**.

Wells are cased with both blank and factory-perforated Schedule 40 PVC. The factory perforations are typically 0.020 inches wide by 1.5 inch long slots, with 42 slots per foot. A PVC cap is typically installed at the bottom of the casing with stainless steel screws. No solvents or cements are used in the construction of the wells. Well stabilizers or centering devices may be installed around the casing to ensure the filter material and grout in the annulus are evenly distributed. The casing is purchased pre-cleaned or steam cleaned and washed prior to installation in the borehole.

The casing is set inside the augers and sand, gravel, or other filter material is poured into the annulus to fill the borehole from the bottom to approximately 1-2 feet above the perforations. A two foot thick bentonite plug is placed above the filter material to prevent the grout from filling the filter pack. Neat cement or sand-cement grout is poured into the annulus from the top of the bentonite plug to the surface. For wells located in parking lots or driveways, or roads, a traffic rated well box is installed around the well. For wells located in landscaped areas or fields, a stovepipe well protection device is installed around the well. Soil cuttings and rinseate water are temporarily stored onsite pending laboratory analytical results and proper transport and disposal.

6.0 MUD AND AIR ROTARY WELL INSTALLATION

Boreholes for wells can also be drilled with a truck-mounted air rotary or mud rotary drill rig. Air or mud can be used as a drill fluid to fill the borehole and prevent the borehole from caving in and remove drill cuttings. Mud or air can be chosen depending on the subsurface conditions. Soil samples are collected and screened as described in **Section 1.0** and decontamination procedures are also the same as described in **Section 1.0**.

Wells are cased with both blank and factory-perforated Schedule 40 PVC. The factory perforations are typically 0.020 inches wide by 1.5 inch long slots, with 42 slots per foot. A PVC cap is typically installed at the bottom of the casing with stainless steel screws. No solvents or cements are used in the construction of the wells. Well stabilizers or centering devices may be installed around the casing to ensure the filter material and grout in the annulus are evenly distributed. The casing is purchased pre-cleaned or steam cleaned and washed prior to installation in the borehole. Soil cuttings and drilling fluids are temporarily stored onsite pending laboratory analytical results and proper transport and disposal.

The casing is set inside the augers and sand, gravel, or other filter material is poured into the annulus to fill the borehole from the bottom to approximately 1-2 feet above the perforations. A two foot thick bentonite plug is placed above the filter material to prevent the grout from filling the filter pack. Neat cement or sand-cement grout is poured into the annulus from the top of the bentonite plug to the surface. For wells located in parking lots or driveways, or roads, a traffic rated well box is installed around the well. For wells located in landscaped areas or fields, a stovepipe well protection device is installed around the well. Soil cuttings and rinseate water are temporarily stored onsite pending laboratory analytical results and proper transport and disposal.

7.0 WELL DEVELOPMENT

After well installation, the wells are developed to remove residual drilling materials from the annulus and to improve well production by fine materials from the filter pack. Possible well development methods include pumping, surging, bailing, jetting, flushing, and air lifting. Development water is temporarily stored onsite pending laboratory analytical results and proper transport and disposal. Development equipment are steam cleaned or washed in solution and rinsed in deionized water prior to use, between sample collections and after use. After well development the wells are typically allowed to stabilize for at least 24 hours prior to purging and sampling.

8.0 LIQUID LEVEL MEASUREMENTS

Liquid level measurements are made with a water level meter and/or interface probe and disposable bailers. The probe tip attached to a measuring tape is lowered into the well and into the groundwater when a beeping tone indicates the probe is in the groundwater. The probe and measuring tape (graduated to hundredths of a foot) are slowly raised until the beeping stops and the depth to water measurement is recorded. If the meter makes a steady tone, this indicates the presence of floating liquid hydrocarbons (FLH) and the probe and measuring tape are raised until the steady tone stops and the depth to the FLH is measured. Once depth to water and depth to FLH (if present) has been recorded, the probe and measuring tape are lowered to the bottom of the well where the total depth of the well is measured. The depth to water, depth to FLH, and depth to bottom are measured again to confirm the results.

If FLH is encountered in the well, a disposable bailer is lowered into the well and brought back to the surface to confirm the thickness/presence of FLH. To minimize potential for cross contamination between wells, all measurements are done from cleanest to dirtiest well. Prior to beginning liquid level measurements, in between measurements in all wells, and at the completion of liquid level measurements, the water level probe and measuring tape is cleaned with solution (Alconox, Simple Green, or equivalent) and rinsed with deionized water.

9.0 WELL PURGING AND SAMPLING

Each well is typically purged of at least three well casing volumes of groundwater prior to collecting a groundwater sample. Purging can continue beyond three well casing volumes if field parameters including pH, temperature, electrical conductivity are not stabilizing during the purging process. If the well is purged dry before the three well casing volumes has been purged, the well is typically allowed to recharge to 80 percent of its initial water level before a groundwater sample is collected.

Purging equipment can include submersible pumps, PVC purging bailers, disposable bailers, air lift pumps, or pneumatic pumps. Prior to beginning well purging, in between each well purging, and at the completion of purging activities, all non-dedicated purging equipment is cleaned with solution (Alconox, Simple Green, or equivalent) and rinsed with deionized water.

Once the well has been purged, it will be sampled with a disposable bailer, PVC bailer, stainless steel bailer, or through a low flow groundwater pump. The groundwater sample is transferred from the bottom of the bailer to reduce volatilization to the appropriate sample container. The sample containers are specified by the analytical laboratory depending on the analyses requested. Sample containers typically include volatile organic compound (VOA) vials with septa of Teflon like materials. The groundwater sample is collected into the VOAs to minimize air bubbles and once the cap has been placed on the VOA, the VOA is tipped upside down to see if air bubbles are present in the VOA. Typically a duplicate VOA is collected from each well to be analyzed by the analytical laboratory, if warranted, to verify results.

Sample containers are labeled as described in **Section 3.0** and placed immediately in an ice chest and kept refrigerated until its delivery to the analytical laboratory. A trip blank may also be prepared by the analytical laboratory to travel with the ice chest during transport to the laboratory. Field blanks from equipment that has been decontaminated may be collected in between use in different wells to verify the decontamination procedure is effective. To minimize potential for cross contamination between wells, all wells are purged and sampled from cleanest to dirtiest well.

10.0 TEDLAR BAG SOIL VAPOR SAMPLING

Sampling equipment to collect Tedlar bag soil vapor samples includes an air pump, a Tedlar bag which can range in size from 1 to 10 liters, and 3/16-inch diameter polyethylene tubing. The air pump should be equipped with 3/16-inch hose barbs for the polyethylene tubing to attach to. The Tedlar bag must be equipped with a valve for filling and sealing the bag.

When soil vapor samples are collected from remediation equipment, the sample collection port on the remediation equipment is typically fitted with a 3/16-inch hose barb. Prior to collecting soil vapor samples from remediation equipment, air flow, temperature, and pressure or vacuum of the sampling point/remediation equipment are recorded. One end of the polyethylene tubing is connected to the sample collection port and one end is connected to the influent of the air pump, creating an air tight seal. The air pump is turned on and soil vapor from the sample collection port is pumped through the air pump for at least one minute. The air pump is turned off and one end of another piece of polyethylene tubing is connected to the effluent of the air pump and one end is connected to the valve on the Tedlar bag. The valve is opened and the air pump is turned on filling the Tedlar bag with the soil vapor sample until the bag has reached 75% capacity, when the valve on the Tedlar bag is closed and the air pump is turned off.

Tedlar bags are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory. After each soil vapor sample collection, the air pump is turned on for five minutes to allow ambient air to clear the air pump and polyethylene tubing.

11.0 SUMMA CANISTER SOIL VAPOR SAMPLING

Sampling equipment to collect Summa canister soil vapor samples includes a sterilized Summa stainless steel canister under vacuum, ¼-inch diameter polyethylene tubing, and a laboratory calibrated flow meter, if required.

When soil vapor samples are collected from remediation equipment, the sample collection port on the remediation equipment is typically fitted with brass connection with silicone septa that has been threaded into a tapped hole on the piping network. Prior to collecting soil vapor samples from remediation equipment, air flow, temperature, and pressure or vacuum of the sampling point/remediation equipment are recorded. One end of the polyethylene tubing is connected to the brass sample collection port and one end is connected to the canister valve or flow meter, creating an air tight seal. Prior to collecting the soil vapor sample, the valve on the Summa canister is opened to verify the Summa canister has the required vacuum which is recorded. The sample valve or flow meter is opened and the soil vapor sample is collected into the Summa canister and the sample valve is closed and the final vacuum reading (typically greater than 5 inches per square inch) on the Summa canister is recorded.

Summa canisters are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory.

12.0 SYRINGE SOIL VAPOR SAMPLING

Sampling equipment to collect syringe soil vapor samples includes a sterilized, 100 cubic centimeter, gas tight syringe and silicone septa.

When soil vapor samples are collected from remediation equipment, the sample collection port on the remediation equipment is typically fitted with brass connection with silicone septa that has been threaded into a tapped hole on the piping network. Prior to collecting soil vapor samples from remediation equipment, air flow, temperature, and pressure or vacuum of the sampling point/remediation equipment are recorded. The syringe is inserted into the silicone septa and the plunger is purged or pumped at least three times. The sample is collected the fourth time the syringe plunger is extracted and the syringe is removed from the sample collection port and the needle on the syringe is capped with a rubber stopper.

Syringes are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory.

13.0 TEDLAR BAG SOIL VAPOR SURVEY, TEMPORARY SAMPLING POINTS

Sampling equipment to collect Tedlar bag soil vapor survey samples includes an air pump, a Tedlar bag which can range in size from 1 to 10 liters, 3/16-inch diameter polyethylene tubing, and possibly a soil vapor probe. The air pump should be equipped with 3/16-inch hose barbs for the polyethylene tubing to attach to. The Tedlar bag must be equipped with a valve for filling and sealing the bag.

A temporary borehole is advanced using either a slam bar or a direct push drill rig. In the case of the slam bar, once the borehole has been created, a temporary soil vapor probe is inserted into the borehole and advanced with a slide hammer or other physical force two additional feet. A bentonite seal is then placed in the borehole above the soil vapor probe to create an air tight seal and prevent ambient air from entering the sample collection space. In the case of the direct push drill rig, the sampling rod is advanced to the desired depth with a 6-inch retractable vapor screen at the tip. The sample screen on the 6-inch vapor screen is removed and a bentonite seal is then placed in the borehole above the soil vapor probe to create an air tight seal and prevent ambient air from entering the sample collection space.

Once the bentonite seal has set, at least one hour, the soil vapor survey samples are collected into Tedlar bags as described in **Section 10.0.** Tedlar bags are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory. After each soil vapor sample collection, the air pump is turned on for five minutes to allow ambient air to clear the air pump and polyethylene tubing.

13.0 TEDLAR BAG SOIL VAPOR SURVEY, TEMPORARY AND REPEATABLE SAMPLING POINTS

Sampling equipment to collect Tedlar bag soil vapor survey samples includes an air pump, a Tedlar bag which can range in size from 1 to 10 liters, 3/16-inch diameter polyethylene tubing, and possibly a soil vapor probe. The air pump should be equipped with 3/16-inch hose barbs for the polyethylene tubing to attach to. The Tedlar bag must be equipped with a valve for filling and sealing the bag.

13.1 TEMPORARY SAMPLING POINTS

A temporary borehole is advanced using either a slam bar or a direct push drill rig. In the case of the slam bar, once the borehole has been created, a temporary soil vapor probe is inserted into the borehole and advanced with a slide hammer or other physical force two additional feet. A bentonite seal is then placed in the borehole above the soil vapor probe to create an air tight seal and prevent ambient air from entering the sample collection space. In the case of the direct push drill rig, the sampling rod is advanced to the desired depth with a 6-inch retractable vapor screen at the tip. The sample screen on the 6-inch vapor screen is removed and a bentonite seal is then placed in the borehole above the soil vapor probe to create an air tight seal and prevent ambient air from entering the sample collection space.

Once the bentonite seal has set, at least one hour, the soil vapor survey samples are collected into Tedlar bags as described in **Section 10.0.** Tedlar bags are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory. After each soil vapor sample collection, the air pump is turned on for five minutes to allow ambient air to clear the air pump and polyethylene tubing.

13.2 REPEATABLE SAMPLING POINTS

A borehole is advanced using either a hand auger or a drill rig. A 6-inch slotted probe with caps on both ends is placed in the borehole. A Swagelok fitting is attached to one end cap and 3/16-inch diameter Nylon tubing is attached to the Swagelok fitting. A one foot sand pack is placed around the probe and the remainder of the borehole is sealed with a layer of dry bentonite powder, followed by a layer of bentonite chips, and an additional layer of dry bentonite powder. A well box is placed on the surface of the repeatable sampling point and the excess Nylon tubing is placed inside the well box.

Soil vapor survey samples will be collected at least one week after probe installation. In addition, soil vapor survey samples will only be collected after five consecutive precipitation free days and after any onsite irrigation has been suspended.

The soil vapor survey samples are collected into Tedlar bags as described in **Section 10.0** or Summa canisters as described in **Section 11.0.** Tedlar bags or Summa canisters are labeled as described in **Section 3.0** and placed immediately in an empty ice chest and kept dry and unrefrigerated until its delivery to the analytical laboratory. After each soil vapor sample collection, the air pump is turned on for five minutes to allow ambient air to clear the air pump and polyethylene tubing.

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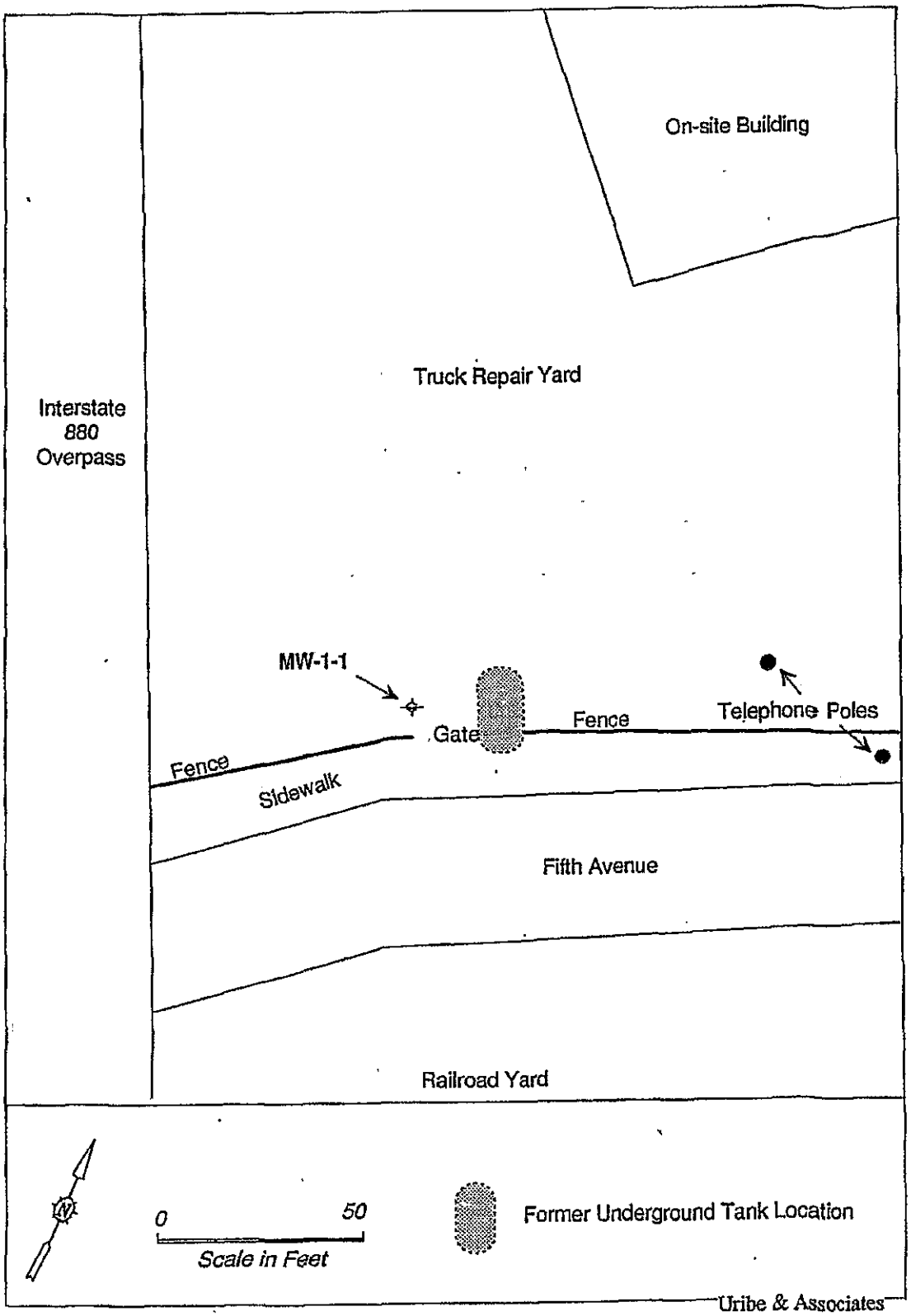

Figure 1: Site Plan of Monitoring Well MW-1-1 at 251 Fifth Avenue, Oakland

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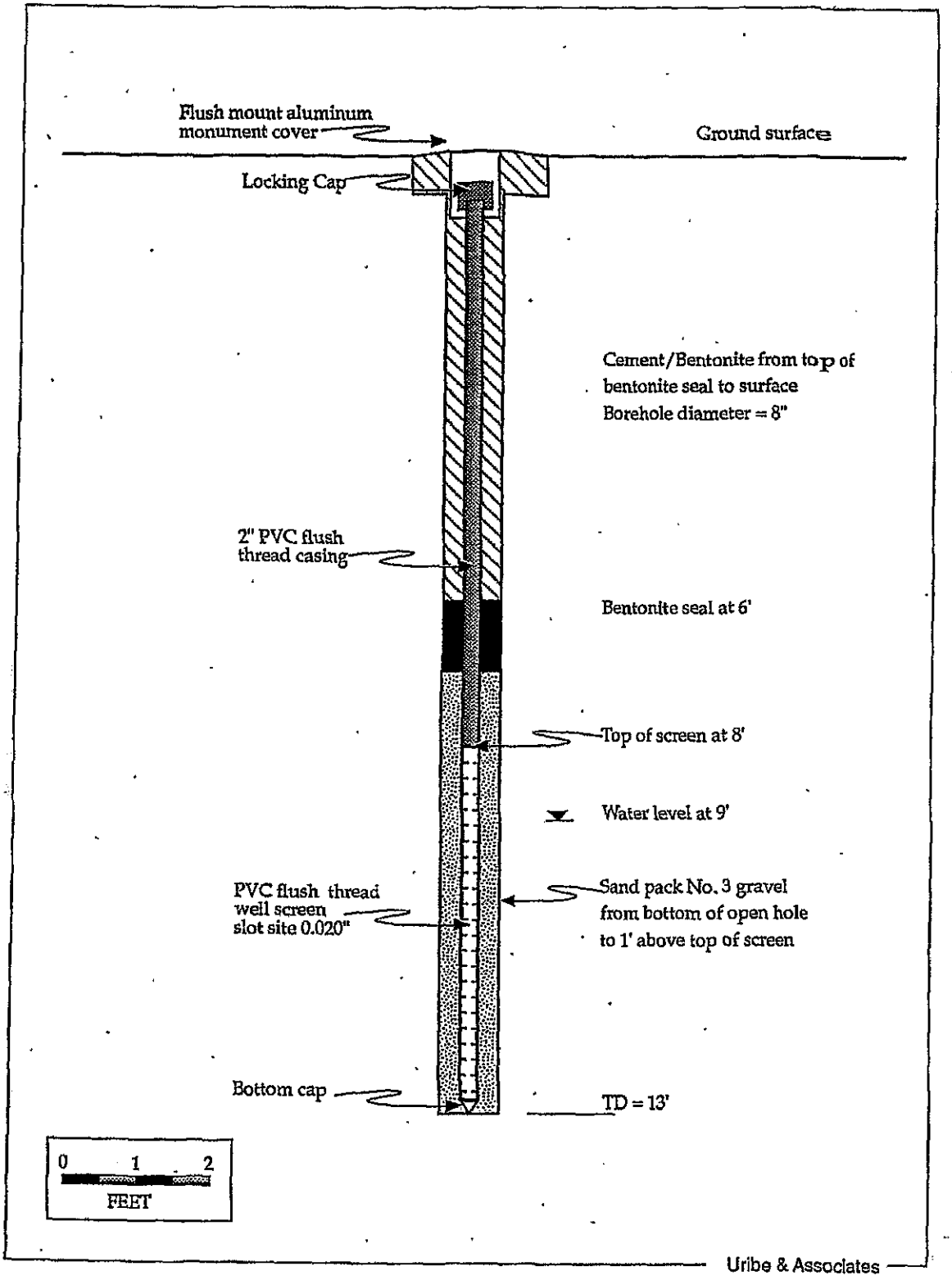


Figure 2: Monitoring Well MW-1-1 Construction Details

URIBE & ASSOCIATES - ENVIRONMENTAL CONSULTING SERVICES

025 04W 02D03 M

BOREHOLE LOG FORM

01 5/13 98

CLIENT: Port of Oakland	JOB NO: 96	BOREHOLE NUMBER: MW-1-1
PROJECT:		LOCATION: 251 5th Avenue
DRILLING CO: Advance Drilling Company		HOLE DIAMETER: 8"
DRILLING METHOD: Hollow-stem Auger		DATE: 5/13/92
SAMPLING METHOD: Split-spoon		RECORDED BY: S. Baehr PROJECT R.G.: K. Koford

DEPTH (Feet)	BLOWS/ 6 INCH	CORE RECOV.	MOISTURE CONTENT	LITHOLOGIC DESCRIPTIONS / REMARKS	SAMPLE I.D.#	SAMPLE TIME
	5	100%	D	Fill material, pebbly, slightly moist, fine-medium grained,		
1	7		↓	brownish green, no odor,		
	10		M	Clay, greenish brown, moist, fine grained		
2	8			pebbly, no odor		
	5			↓		
3	3			↓		
	1			Fine grained mud, very moist, pebbly, high organic content		
4	1			wood chips, no odor		
	1					
5	8					
	2					
6	2					
	2					
7	2			Sandy mud, leaves, organic content		
	2					
8	3					
	2		↓	Sandy, medium grained, blackish brown	MW-1-1-1	9:15
9	2		▼	Pebbly, wet, unconsolidated		
	2		W	↓		
10	2			Sandy clay, fine grained,		
	2			Clayey sand, pebbly, leaves, organic material,		
11	2			black, wet, no odor		
	3			Sandy clay, green/gray, medium grained		
12	3			Wet		
	push			↓		
13	3	↓	↓	Bottom tube - wood chips, mud	MW-1-1-2	9:25
				TD = 13'		
14						
15						
16						
17						
18						
19						
20						

025 04W 01D03 M
01-5130

May 27, 1992

REPORT OF MONITORING WELL INSTALLATION

251 5TH AVENUE, OAKLAND

Summary

This report documents the installation of one monitoring well (MW-1-1) at 251 5th Avenue, Oakland, California. The monitoring well was installed on May 13, 1992 within ten feet down-gradient of a former underground storage tank location. Advance Drilling Company performed all drilling activities. Uribe & Associates (U&A) supervised the drilling activities and completed all borehole logs. A site location map (Figure 1), well bore profile (Figure 2), and the borehole log are included in this report.

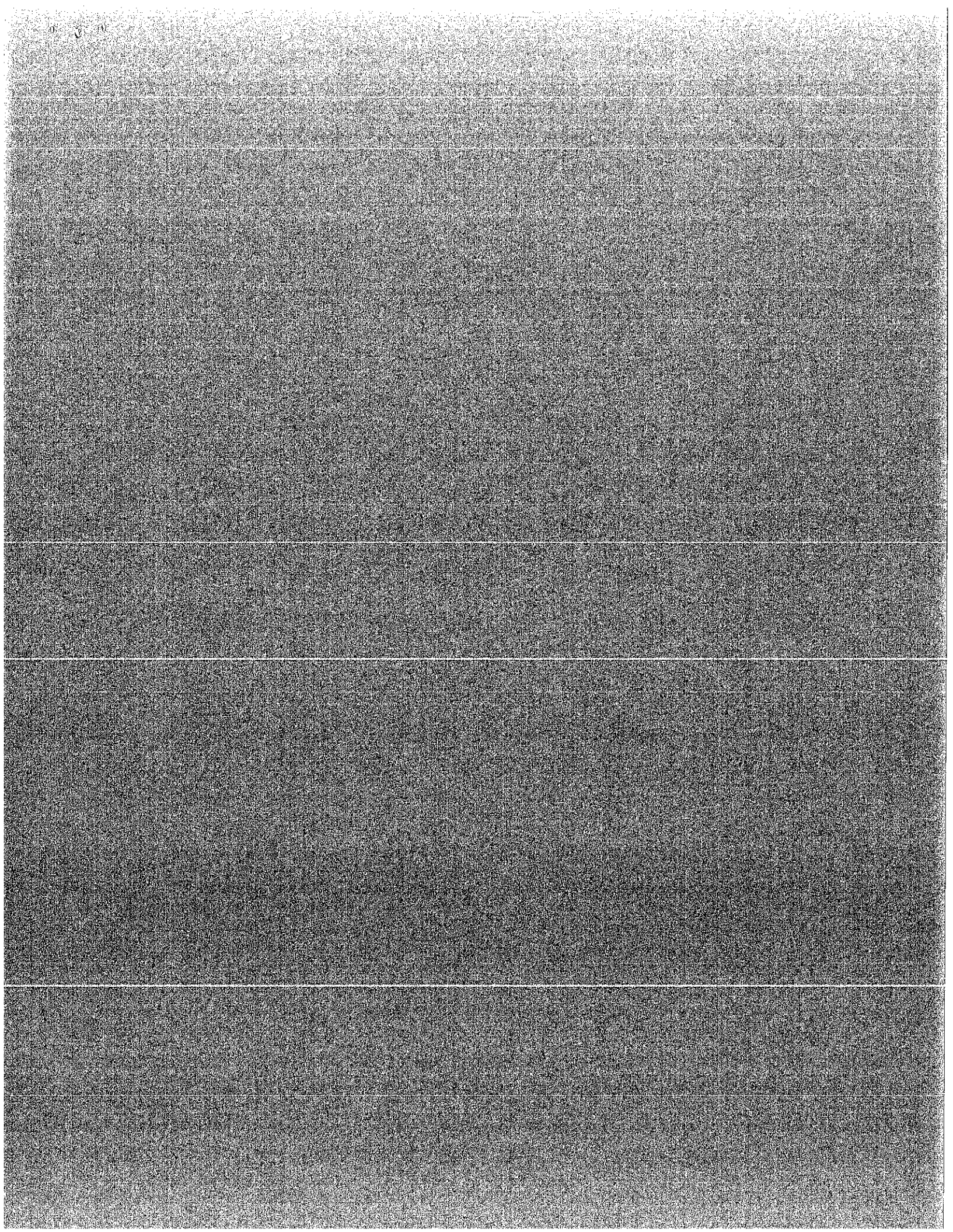
Permits and Licenses

A permit application for the monitoring well was sent to the Alameda County Flood Control and Water Conservation District on April 29, 1992. The project was approved by Wyman Hong and assigned a drilling permit number 92210. Although West HazMat Drilling (license number C57-554979) was listed on the application as the driller, Advance Drilling (license number C57-607458) replaced them as the drilling contractor.

Construction Details

The groundwater monitoring well was completed at a depth of 13 feet using a CME-45B hollow stem auger drill rig equipped with an eight-inch auger. A two-inch diameter screen, five feet in length with a 0.020-inch slot size, was placed in the borehole. A two-inch PVC casing was installed to surface. A sand pack of Number 3 gravel was placed from Total Depth to one foot above the top of the screen. Next, a one-foot bentonite seal was placed in the annulus. Cement with 4% bentonite was placed in the annulus above the bentonite seal to the surface. The individual well profile is attached along with the borehole log.

phone 510-832-2233



01-854

Job #1783. Kaiser Paving Company, Boring 2 Test Holes, 5th. Ave.& S. P. Tracks.

1937.

Mar. 10 - (1)(7)(7)(7) 15.75 Bored two 14 inch Test Holes, one 15 feet, one 15'6" and set 8" x 8" timber loaded with sand.

Log of Test Hole #1.

Soil Black ----------	5 feet
Yellow gray clay, soft	5 to 7 "
Blue clay ----------	7 " 11'6"
Sandy blue clay --	11'6" 14'6"
Yellow gray clay	14'6" 15'6"

Water table 3 feet.

Test Hole #2.

Soil & bricks ----------	2 feet
Yellow clay ---------	2 to 7 "
Rocks, sand blue clay	7 " 14 "
Sandy blue clay ---------	14 " 15 "

Water table 2'8".

11 - (4)(4)(4) 7.50 Cleaned out No. 2 set 8 x 8 loaded with sand. Pulled out 8 x 8 and hauled tools to shop.

Kaiser Paving Co.
5th Ave & S.P. Tracks
01-832

Job # 1783.

Log of Test Hole # 1.

Yellow clay		3½ feet
Broken rock	3½ to	4½ "
Clay	4½ "	5½ "
Clay Blue	5½ "	6½
Clay Blue	6½ "	8 "
Clay Blue	8 "	11½ "
Sandy blue clay	11½ "	14 "
Yellow sandy clay blue	14 "	17½ "
Hard clay, some sand, gray	17½ "	20' 3"

Water table 28 inches.

Log of Test Hole No. 2/

Soil -fill-		4 feet
Clay fill, blue	4 to	6 "
Clay fill, blue	6 "	12 "
Blue clay, sandy	12 "	14 "
Gray sandy clay	14 "	15 "
Gray clay	15 "	17 "

Water table 20 inches.