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By Alameda County Environmental Health at 9:24 am, Apr 10, 2013

April 8, 2013

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

Subject: Path to Closure Plan and Workplan Report
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 April 8, 2013 *Path to Closure Plan and Workplan Report* 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

270 Vintage Drive
Turlock, CA 95382
P: 209.664.1035
F: 209.664.1040

PATH TO CLOSURE PLAN AND WORKPLAN REPORT

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

April 8, 2013

REGISTERED GEOLOGIST MICHAEL S. SGOURAKIS No. 7194 STATE OF CALIFORNIA

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 Path to Closure Plan and Workplan Report for the site. This report was requested by the Alameda County Health Care Services (ACHCS) Agency in their directive letter dated February 7, 2013 (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 Mr. 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 and the installation of six monitoring wells and two extraction wells, the stratigraphy of the site and vicinity consists of silt to approximately 30-feet bgs with discontinuous thin intervals of sandy silt and clayey sand present in the area.

Groundwater monitoring has been ongoing for two years. Depth to groundwater is shallow, ranging between 10- to 13-feet bgs. The groundwater flow direction appears to be toward the southwest. The latest groundwater gradient map is provided on Figure 3.

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

PATH TO CLOSURE PLAN

A complete narrative describing the task completed and those not completed is detailed below. A critical path schedule with timelines is included in Figure 4.

PREFERENTIAL PATHWAY STUDY

This task was completed on April 14, 2011 in the report entitled *Workplan Addendum* prepared by ECG.

A preferential pathway with utility depths is included as Figure 5 and a downgradient preferential pathway map is included as Figure 6. The underground utilities listed on Figure 5 were extended to include the utility drawings listed in the *Phase I Environmental Site Assessment* for the Downtown Educational Complex prepared by Ninyo and Moore Geotechnical and Environmental Sciences Consultants located down gradient of the site (Figure 6).

All subsurface utilities found were very shallow, less than 5-feet bgs, and are unlikely groundwater conduits based on their depths. However, a proposed monitoring well has been included in the workplan section of this report to address the potential for offsite migration along potential conduits along the south side of 4th Avenue in the downgradient direction from the site.

SOIL, GROUNDWATER, AND SOIL VAPOR INVESTIGATIONS

This task is incomplete. To date, no soil vapor analysis has been completed. ECG has included a workplan section in this report to address this detail.

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. The City of Oakland Fire Department was onsite during UST removal activities and ordered the UST basin backfilled due to strong gasoline odors outside of the excavation.

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.

In June 2011, ECG supervised the installation of six groundwater monitoring wells (MW-1 through MW-6) and two extraction wells (VW-1 and VW-2). Results are documented in ECG's *Interim Results and Second Quarter 2011 Monitoring Report,* dated August 17, 2011.

In December 2011, ECG supervised the advancement of twelve soil borings (SB-10 through SB-21) for the collection of grab groundwater samples. Results are documented in ECG's *Off-Site Investigation and Dual Phase Pilot Test Results with Fourth Quarter 2011 Monitoring Report,* dated January 26, 2012.

Well construction details are provided on Table 1.

SITE CONCEPTUAL MODEL

This task is complete although it is a constant work in progress. Updates will be made to the SCM as additional investigation and remediation activities provide new data for the site.

Six monitoring wells, two extraction wells, and 22 soil borings have been advanced at the site and the lateral extent of impacted soil has been adequately characterized as shown on Figures 7 through 11. The boring and well locations are shown on Figure 2 and cross sections are shown on Figures 12 through 18. Soil analytical results are summarized on Tables 2a and 2b and they show reported soil concentrations did exceed ESLs for TPHg at locations GP-1, GP-2, SB-1, SB-4, SB-5, SB-6, SB-7, SB-8, SB-9, MW-3, MW-4, MW-5, VW-1, and VW-2 and did exceed ESLs for benzene at locations GP-1, GP-2, SB-1, SB-2, SB-4, SB-6, SB-7, SB-8, SB-9, MW-1, MW-3, MW-4, MW-5, VW-1, and VW-2 at depths of approximately 10- feet (below ground surface) bgs or greater. In addition, soil concentrations did exceed ESLs for toluene, ethyl benzene, and xylenes at multiple locations. The TPHg and BTEX soil concentrations do appear to be vertically defined and the lithology at the site would discourage vertical migration. All soil results above ESLs are located in or just adjacent to the more transmissive zones located between approximately 10- to 20-feet bgs

Groundwater concentrations have not been defined vertically or horizontally to the northwest or southeast of the site. Reported concentrations in groundwater have exceeded ESLs for TPHg, BTEX, and MTBE. Groundwater samples were collected from 21 direct-push borings, six monitoring wells, and two extraction wells and the analytical results (Tables 3a, 3b, 4a, and 4b) showed ESLs were exceeded for TPHg in SB-4, SB-6, SB-7, SB-11, SB-12, SB-13, SB-15 through SB-19, MW-1 through MW-6, VW-1, and VW-2. ESLs for benzene were exceeded in SB-4, SB-11, SB-12, SB-13, SB-16, and SB-17, MW-1 through MW-6, VW-1, and VW-2. ESLs for MTBE were exceeded in SB-6, SB-7, and

SB-19, MW-1, MW-3, MW-5, MW-6, and VW-2. Groundwater isoconcentration maps using the offsite grab sample data are provided as Figures 19 through 21.

In January 2011, ECG conducted a sensitive receptor survey for the site. The results are shown on Figure 22. 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 22 and details are listed in Table 5.

INTERIM REMEDIAL ACTIONS

This task has been completed.

In 2006, when the release was first identified, interim remedial actions were performed. A very limited over excavation and brief aeration of exposed soil was performed. During tank removal activities the odor from the excavated soil was creating a nuisance for nearby residences and the Oakland Fire Department directed Mr. Ghafoor to put the material back in the pit and resurface the area.

FEASIBILITY STUDY AND CORRECTIVE ACTION PLAN

This task has been completed. ECG submitted a report entitled Revised Corrective Action Plan (CAP) on October 25, 2012 which included a feasibility study. ACEHD approved the CAP on February 7, 2013.

Based on the results of site assessment and pilot testing activities, three remedial options were evaluated for the treatment of petroleum hydrocarbon impacted soil and groundwater at the site: soil vapor extraction (SVE) with air sparging, soil excavation, and DPE. DPE was chosen as the most feasible remedial option for the site.

PILOT TESTS

This task has been completed.

In June 2011, ECG supervised the installation of two extraction wells (VW-1 and VW-2). ECG performed a 5-day dual phase extraction (DPE) test in June 2011. Results are documented in ECG's *Off-Site Investigation and Dual Phase Pilot Test Results with Fourth Quarter 2011 Monitoring Report,* dated January 26, 2012.

SOIL VAPOR AND GROUNDWATER MONITORING WELL INSTALLATION AND MONITORING

This task has been partially completed.
EG will install two additional DPE wells that were proposed in the CAP and approved by ACEHD, in April 2013. Based on the critical path schedule (Figure 4), the remediation system has the longest timeframe for completing site closure activities, and should be started as soon as feasibly possible. Anticipated startup is in the summer of 2013. A workplan section of this report details additional well installation activities.

CASE CLOSURE TASKS

This task will be completed when site conditions warrant. ECG estimates the system should operate for approximately one year and an additional year of post closure monitoring. This puts closure activities into the schedule in the summer of 2015.

WORKPLAN

In correspondence dated February 7, 2013, ACEHS requested a workplan to further delineate the lateral extent of impacted groundwater downgradient of boring SB-16 (Appendix A). ECG disagrees with this directive based on the evidence that the groundwater impacts at boring SB-16 are not associated with the subject site. ECG proposes to install three groundwater monitoring wells (MW-7 through MW-9) to evaluate the lateral extent of impacted soil and groundwater associated with the site. The proposed wells will be installed to evaluate the lateral extent of impacted groundwater at location SB-14, northwest of boring SB-12, and southeast of well MW-3. The proposed well locations are shown on Figure 23. ECG also proposes installing soil vapor sample points in six locations on and near the site (Figure 23).

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 three 8-inch diameter hollow stem auger soil borings (MW-7 through 9)) at locations proposed on Figure23.

Based on the wells currently at the site, the wells will be installed to a depth of 18-feet bgs utilizing a 10-foot screened interval. Wells will be constructed as 2-inch diameter PVC wells with 10-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 24.

Soil samples will be collected at 5-foot intervals 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.

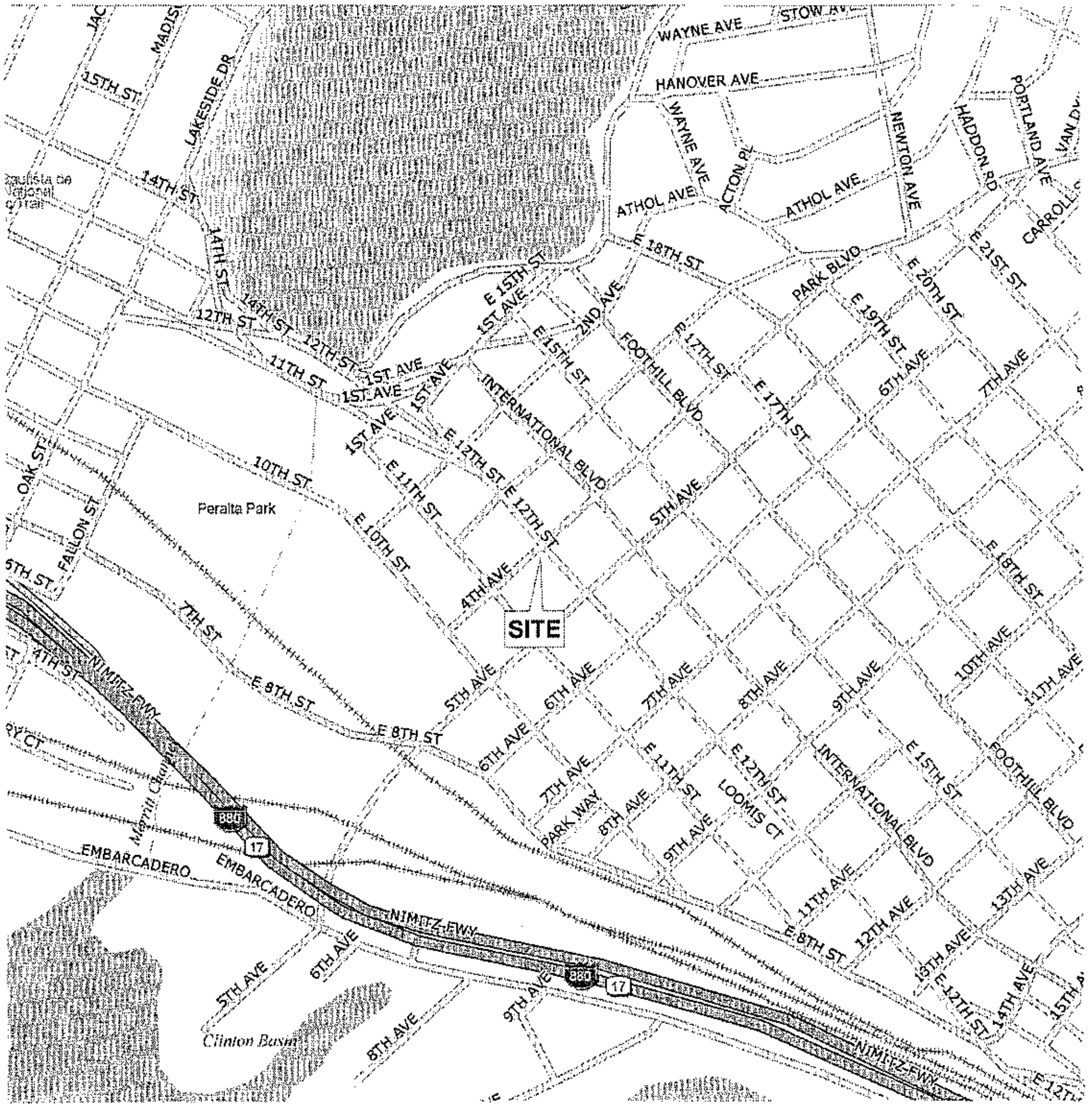
SOIL VAPOR PROBE INSTALLATION

ECG will supervise a California licensed C57 driller during the installation of two soil vapor probes (SVP-1 and SVP-2) at locations shown on Figure 23 to evaluate the risk to indoor air of nearby structures. The soil vapor probes will be installed with a hand auger and consist of a stainless steel vapor implant made of 316 stainless steel. One end of the soil vapor probe will be fitted with a PVC barb connected to ¼-inch diameter Teflon tubing. The tubing will be capped at the surface with a gas tight valve and secured in a traffic rated vault box. Proposed soil vapor probe construction details are shown on Figure 25.

Soil Vapor Probe Sampling

ECG will purge three volumes of vapor at a rate less than 200 milliliters per minute (ml/min.), including sand pack pore volume, from each soil vapor probe. A Summa sample canister with a flow regulator will be attached to the gas tight valve on each soil vapor probe and a plastic shroud will be placed over the sample canister and gas tight valve. Difluoroethane will be used as a tracer gas and will be sprayed into a small bowl under the plastic shroud during sample collection. The vapor samples will be submitted under chain of custody documentation to Air Toxics, Ltd. in Folsom, California for analyses of a full list EPA Method TO-15 analyses.

FIGURES



0 1,000 2,000

Approximate Scale In Feet
1 inch = 1,000 Feet

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		

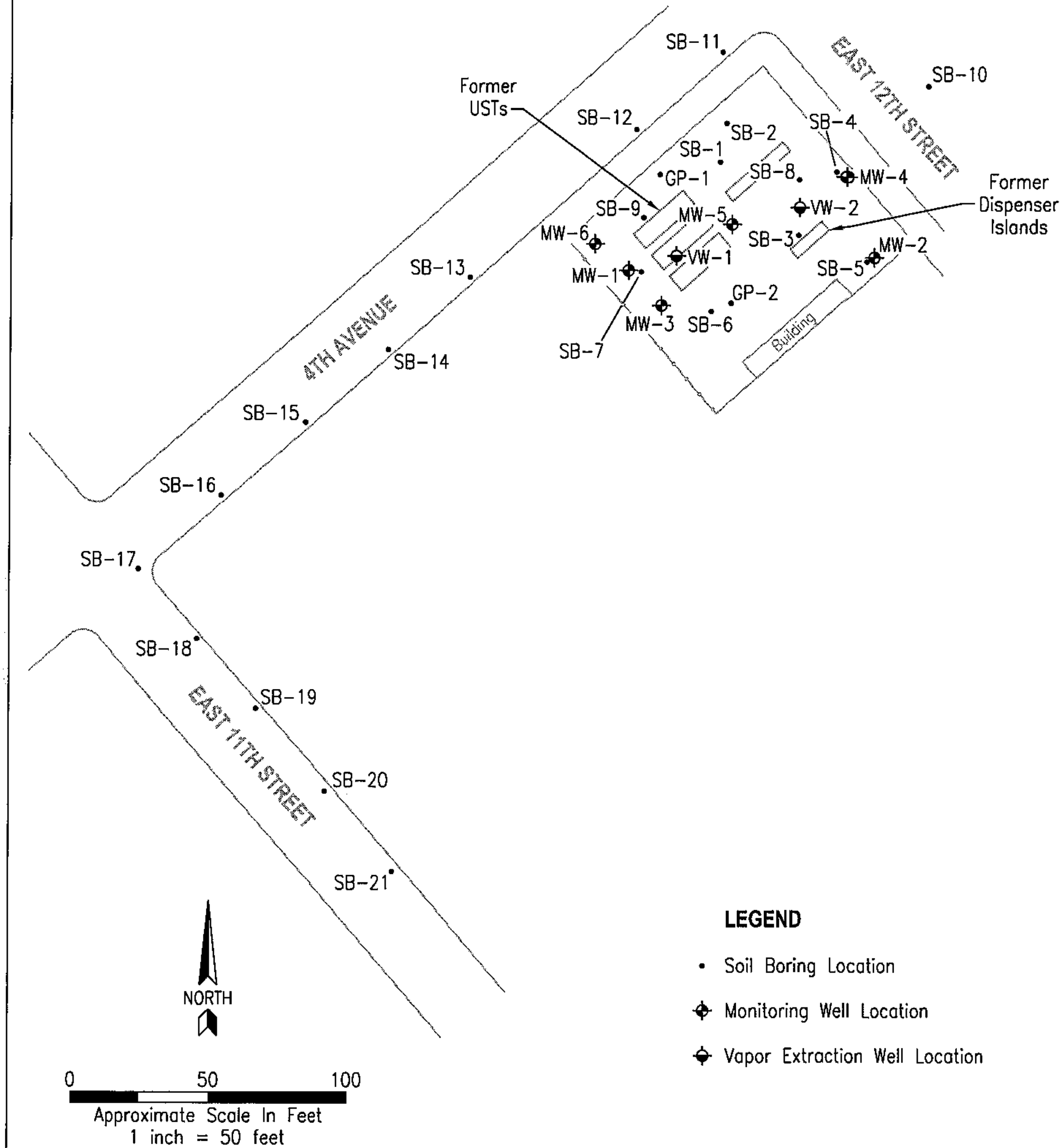


FIGURE 2	SITE MAP	Environmental Compliance Group, LLC
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: January 4, 2012		

LEGEND

NORTH

Monitoring Well Location

Vapor Extraction Well Location

(23.40) Elevation Of Groundwater Measured In Feet Above Mean Sea Level

(23.25) Lines Of Equipotential Measured In Feet Above Mean Sea Level (Dashed Where Inferred)

Flow Lines

i = 0.014 General Gradient

(NM) Not Measured

0 50 100

Approximate Scale In Feet
1 inch = 50 feet

FIGURE 3

Project Number: GHA.19009

Date: June 8, 2012

POTENTIOMETRIC SURFACE MAP
MARCH 30, 2012

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

Figure 4
Critical Path Schedule
Shore Acres Gas
403 East 12th Street
Oakland, California

Task	4/1/2013	5/1/2013	6/1/2013	7/1/2013	8/1/2013	9/1/2013	10/1/2013	11/1/2013	12/1/2013	1/1/2014	2/1/2014	3/1/2014	4/1/2014	5/1/2014	6/1/2014	7/1/2014	8/1/2014	9/1/2014	10/1/2014	11/1/2014	12/1/2014	1/1/2015	2/1/2015	3/1/2015	4/1/2015	5/1/2015	6/1/2015	7/1/2015	8/1/2015	9/1/2015	9/2/2015	9/3/2015	9/4/2015
Preferential Pathway Study	Complete																																
Soil, Groundwater, Soil Vapor Investigations																																	
Offsite Access Permission	■	■																															
Permit	■																																
Encroachment Permits	■	■																															
Drill			■																														
Initial Site Conceptual Model	Complete																																
Interim Site Conceptual Model	Complete																																
Final Site Conceptual Model				■	■																												
Interim Remedial Actions	Complete																																
Feasibility Study/Corrective Action Plan	Complete																																
Pilot Tests	Complete																																
Remedial Actions																																	
Well Installations	■																																
Trenching and Piping	■																																
Air Permit	■	■	■																														
Sewer Discharge Permit	■	■																															
System Inslallation		■																															
Electrical Power Application	■																																
Electrical Power Installation		■																															
Natural Gas Application	■																																
Natural Gas Installation		■																															
System Operation				■	■	■	■	■	■	■	■	■	■	■	■																		
Soil Vapor and Groundwater Monitoring Well Installation																																	
Monitoring Wells			■																														
Extraction Wells	■																																
Monitoring	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Soil Vapor Probes			■																														
Public Participation	Complete																																
Closure Tasks																															■	■	■

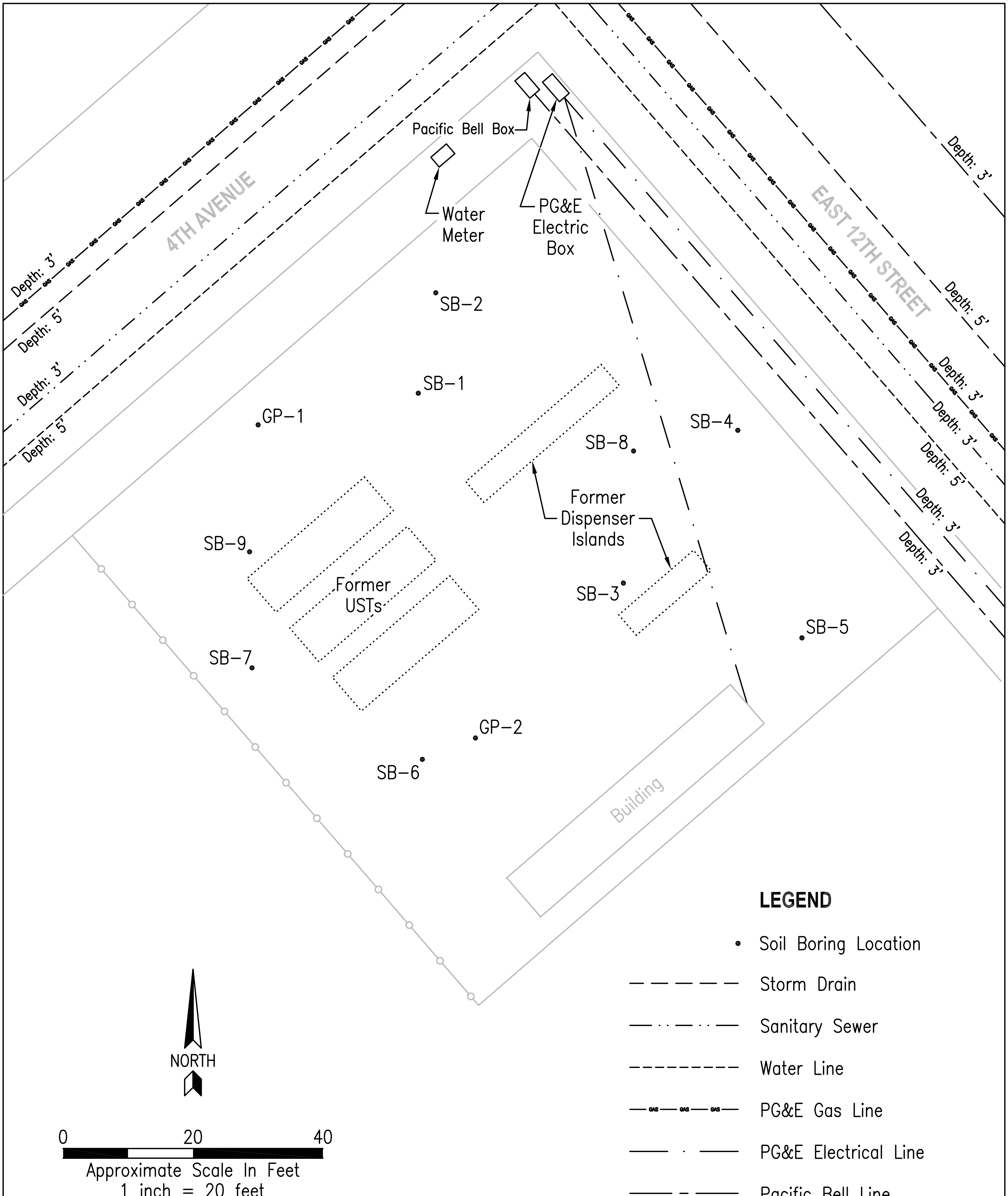


FIGURE 5

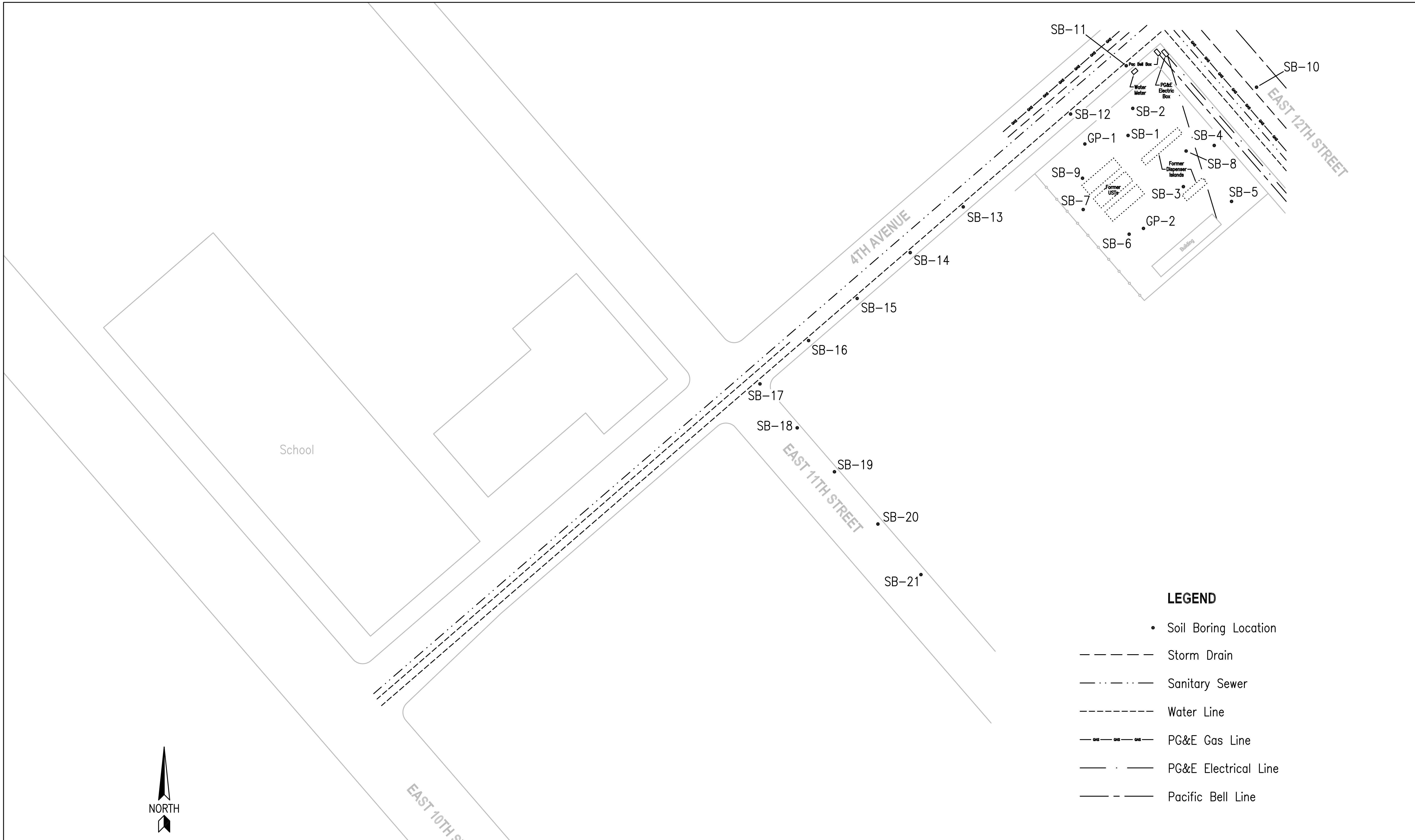
Project Number: GHA.19009

Date: April 14, 2011

PREFERENTIAL PATHWAY MAP

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035



Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

DOWNGRADIENT PREFERENTIAL PATHWAY MAP

Shore Acre Gas
403 East 12th Street
Oakland, California

FIGURE 6

Project Number: GHA.19009

Date: April 8, 2013

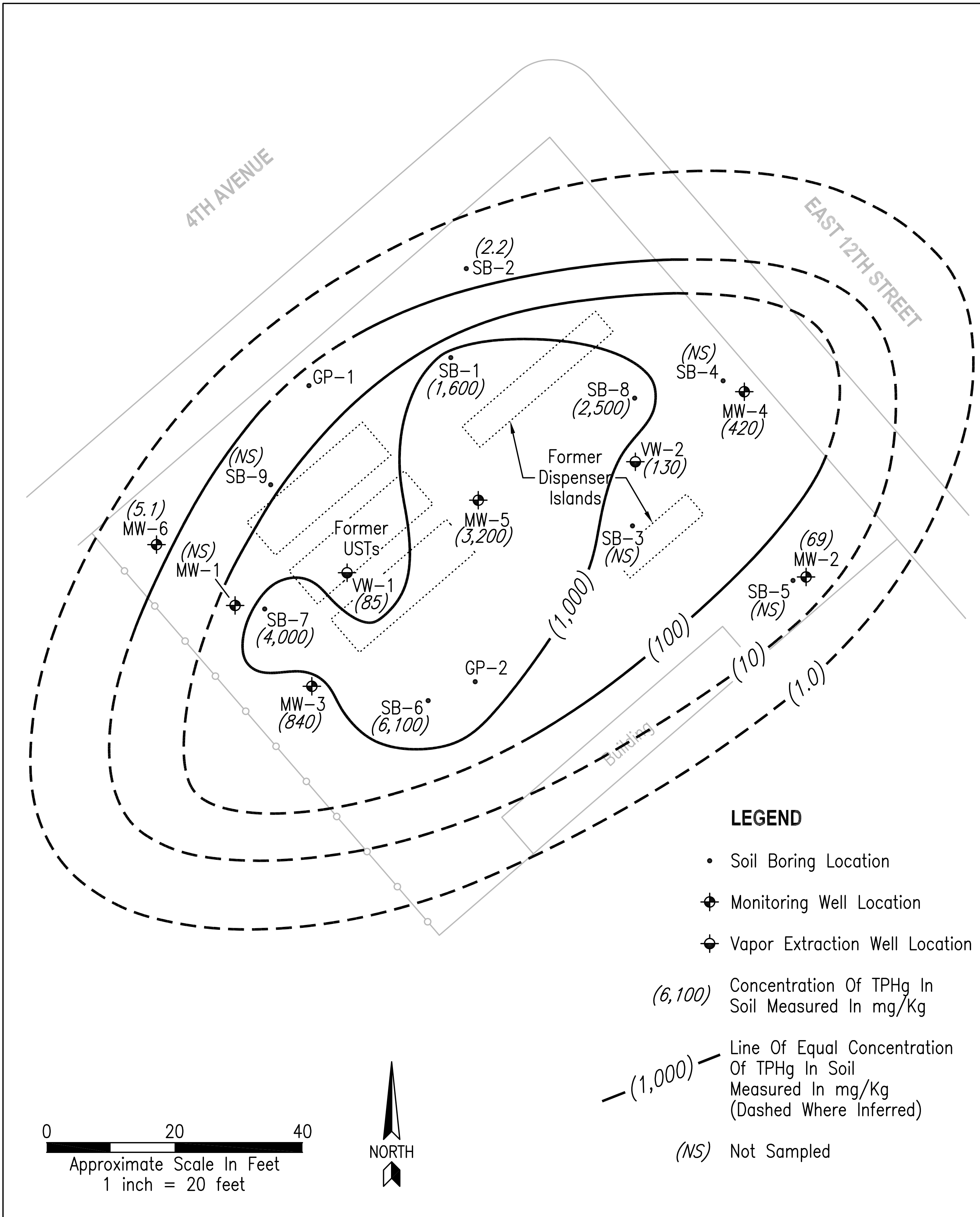


FIGURE 7

Project Number:
GHA.19009

Date:
August 16, 2011

TPHg IN SOIL AT 10 FEET bgs ISOCONCENTRATION MAP

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

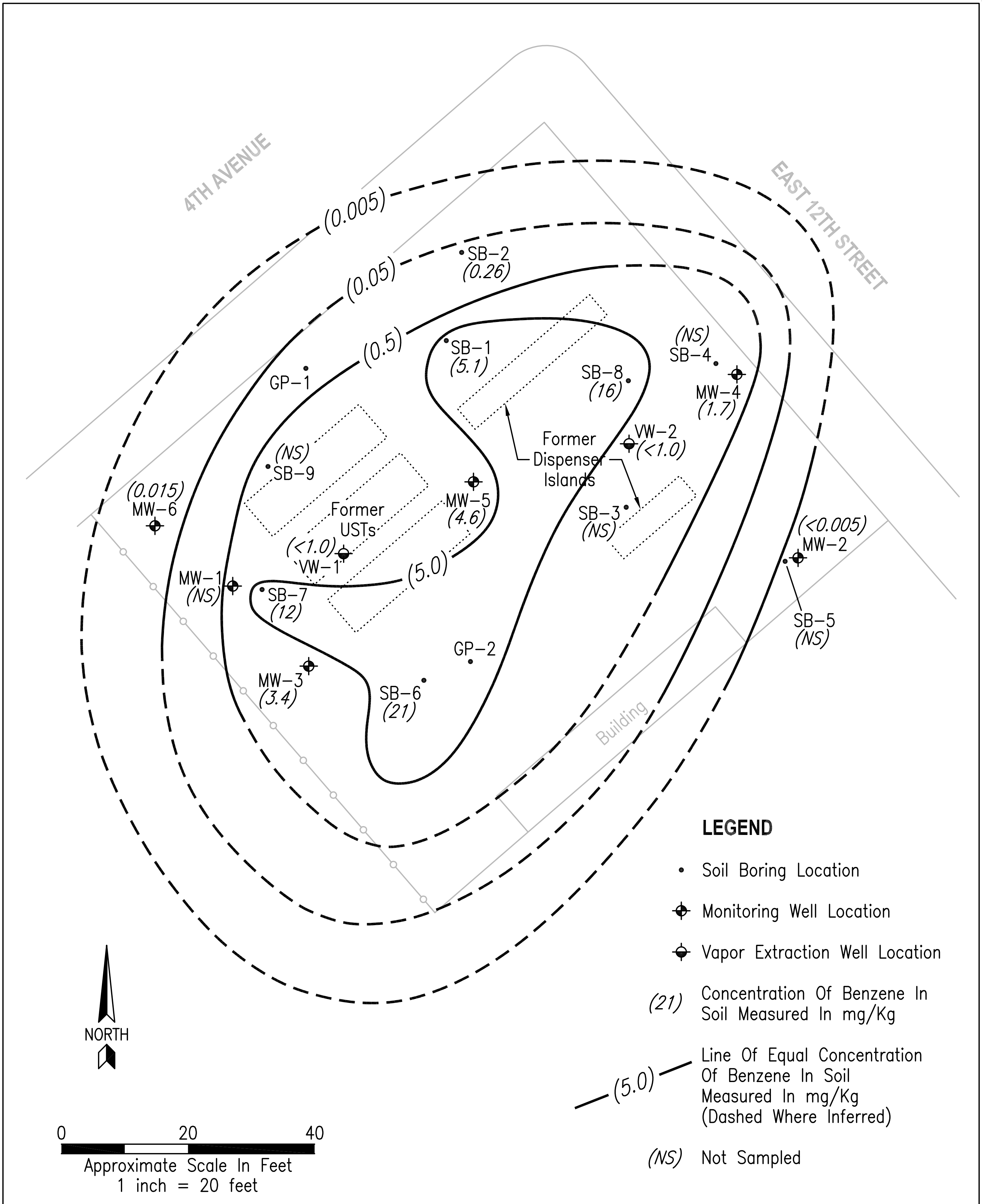


FIGURE 8	BENZENE IN SOIL AT 10 FEET bgs ISOCONCENTRATION MAP	Environmental Compliance Group, LLC
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: August 16, 2011		

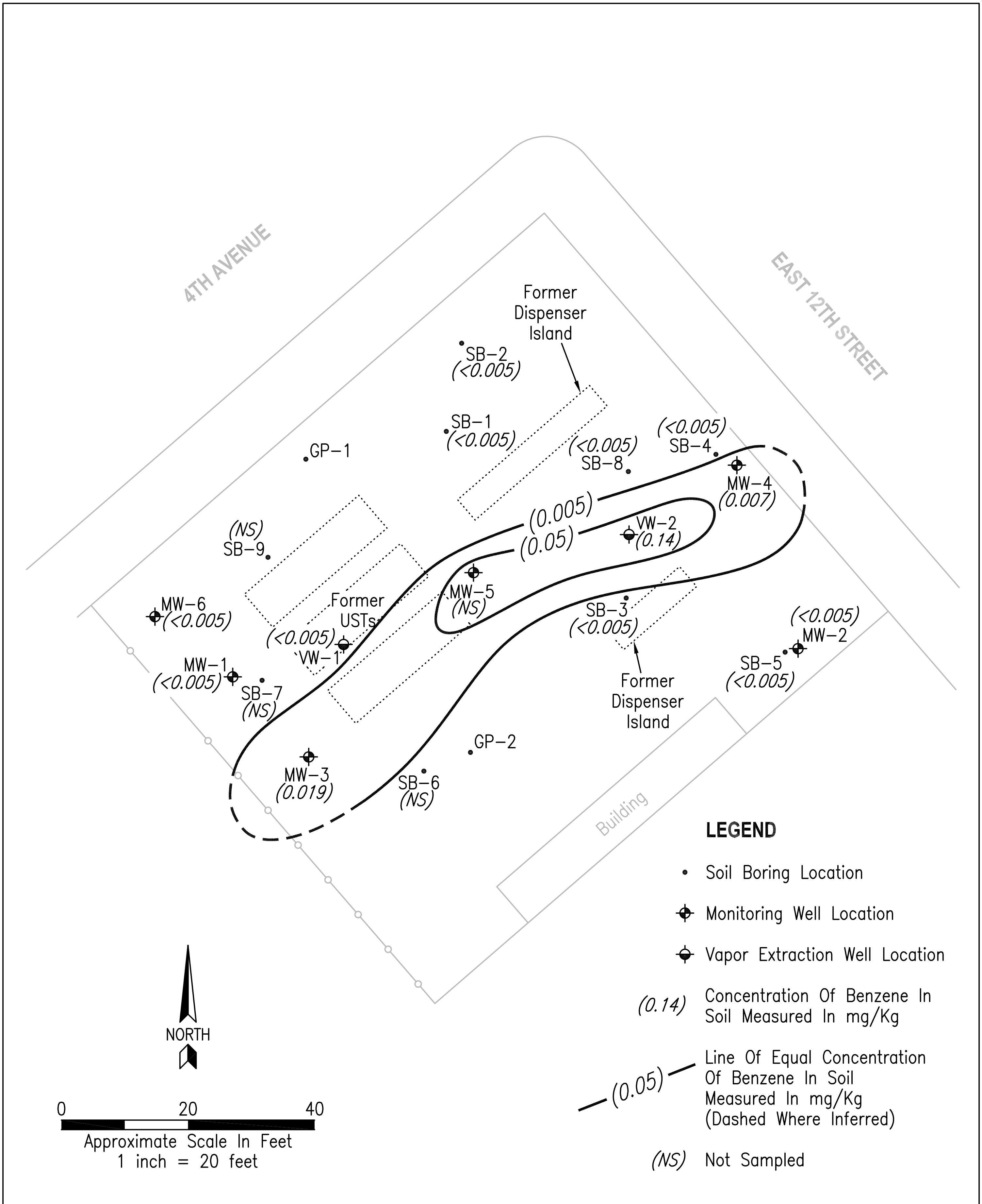


FIGURE 9

Project Number: GHA.19009

Date: August 16, 2011

BENZENE IN SOIL AT 20-25 FEET bgs ISOCONCENTRATION MAP

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664–1035

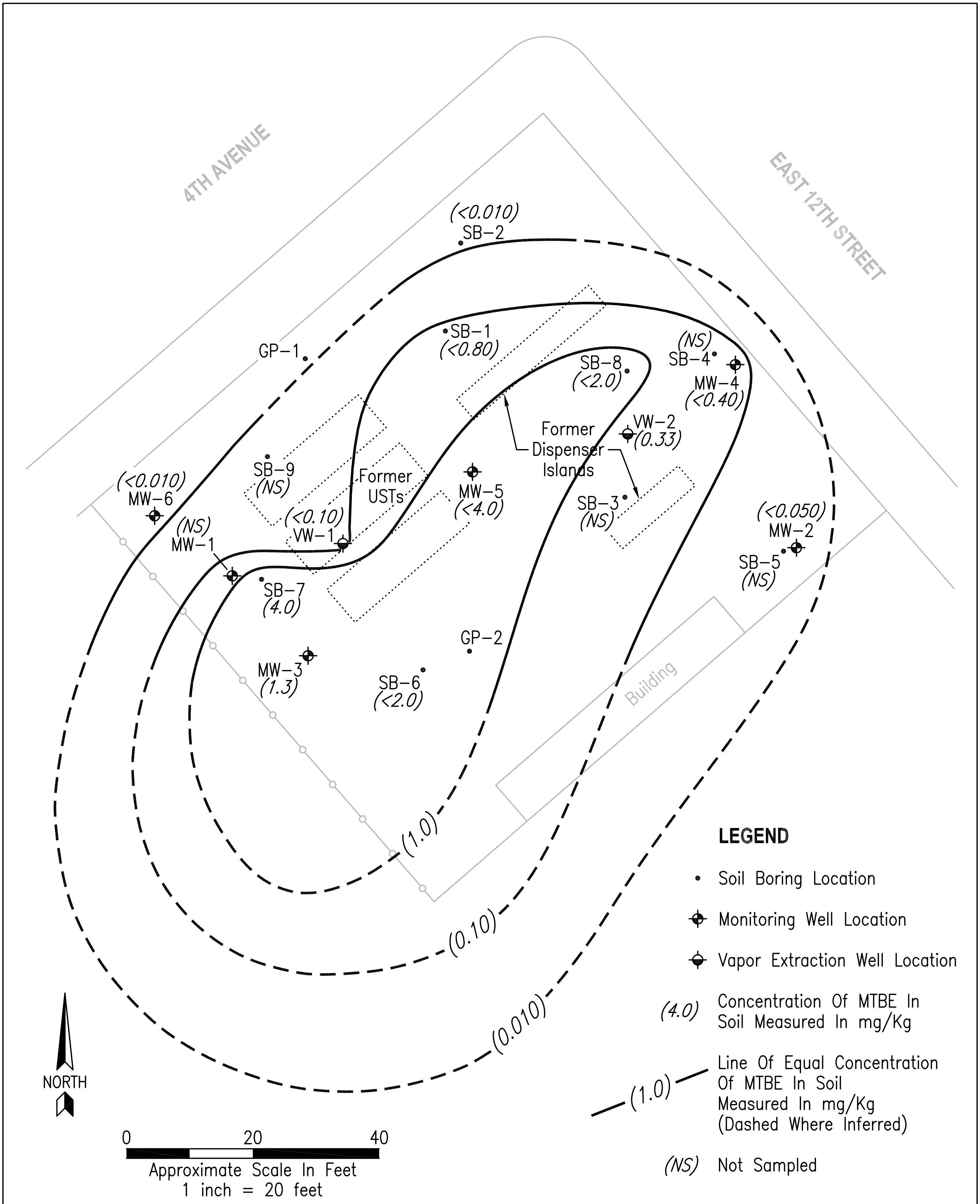


FIGURE 10

MTBE IN SOIL AT 10 FEET bgs ISOCONCENTRATION MAP

Shore Acre Gas
403 East 12th Street
Oakland, California

Project Number: GHA.19009

Date: August 16, 2011

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

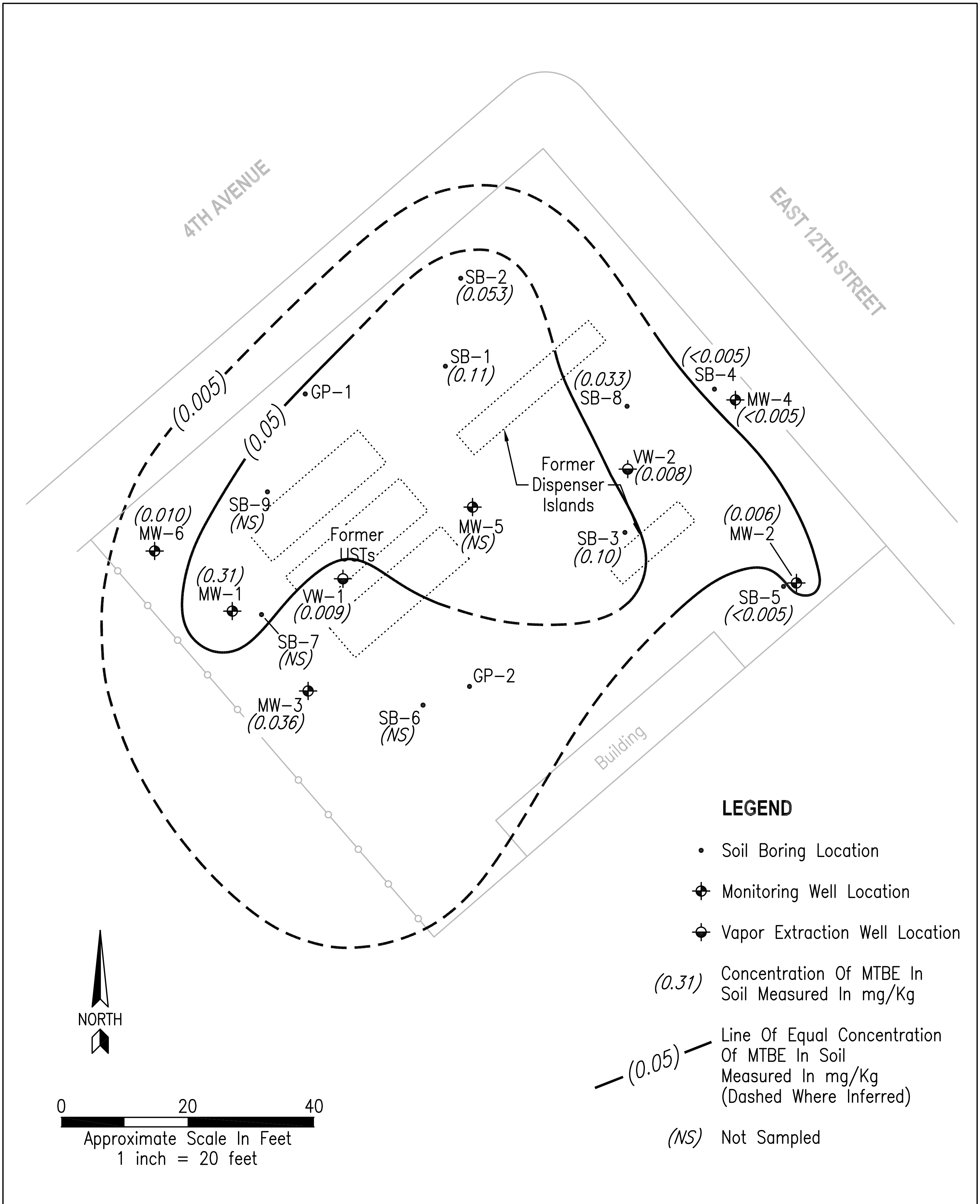


FIGURE 11	**MTBE IN SOIL AT 20-25 FEET bgs ISOCONCENTRATION MAP**	**Environmental Compliance Group, LLC**
Project Number: GHA.19009	Shore Acre Gas 403 East 12th Street Oakland, California	270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Date: August 16, 2011		

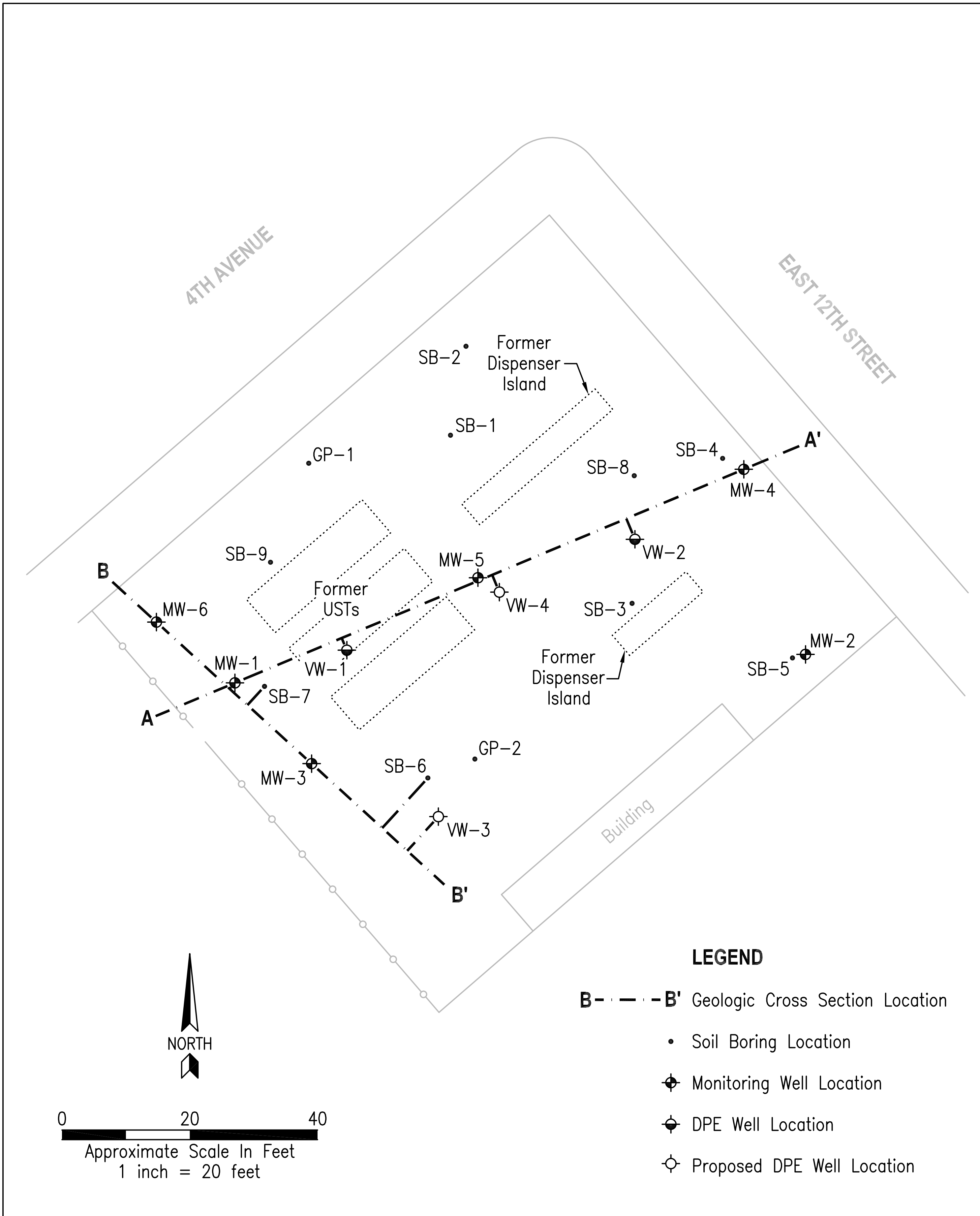


FIGURE 12

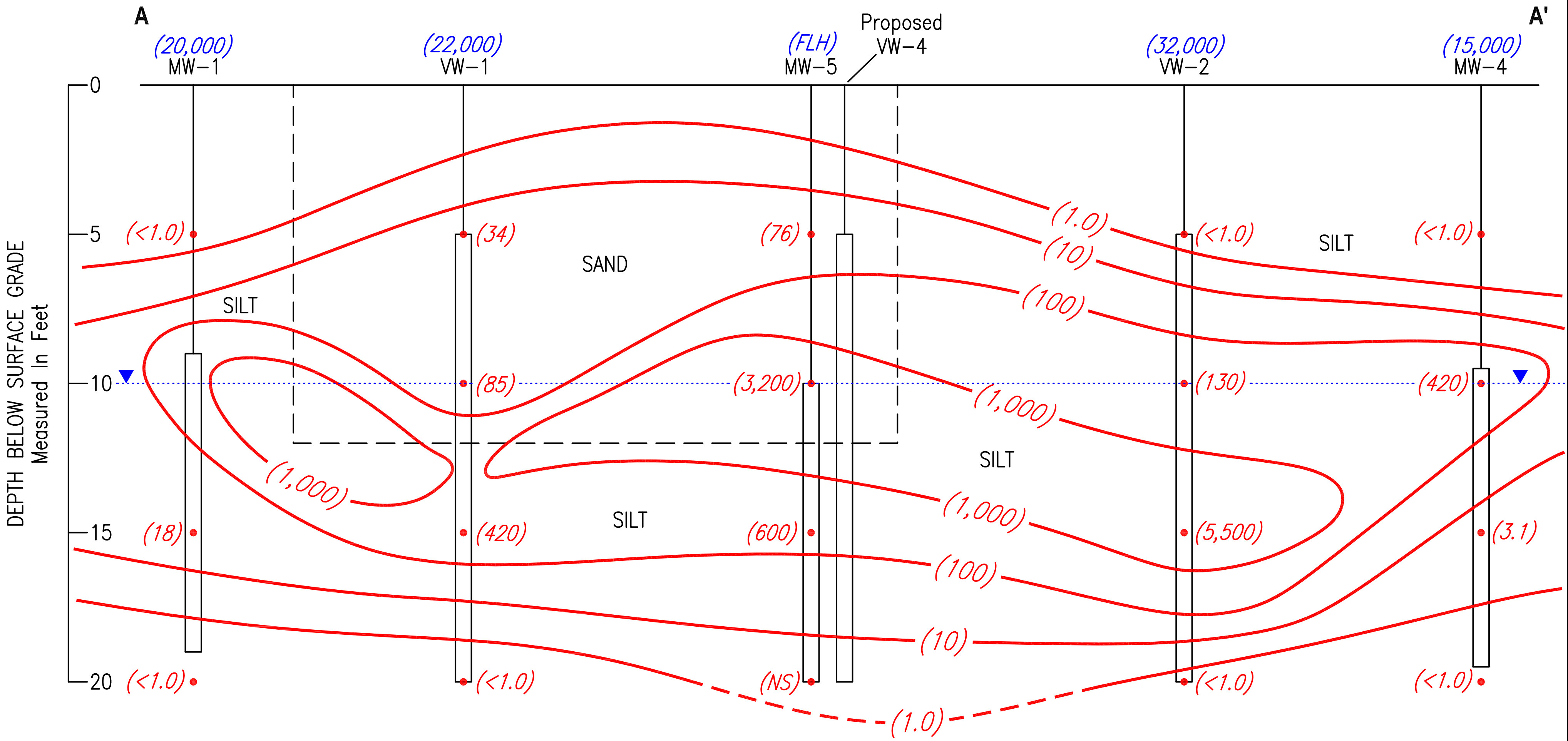
Project Number: GHA.19009

Date: October 22, 2012

CROSS SECTION 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



LEGEND

Soil Sample Location

Screened Interval

Approximate Lithologic Contact

(NS) Not Sampled

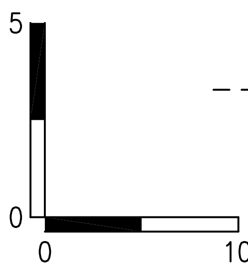
(5,500) Concentration Of TPHg In Soil Measured In mg/Kg

(1,000) Line Of Equal Concentration Of TPHg In Soil Measured In mg/Kg (Dashed Where Inferred)

(32,000) Concentration Of Benzene In Groundwater Measured In ug/L Sampled September 14, 2012

(FLH) Floating Liquid Hydrocarbons

Groundwater Level



Approximate Scale In Feet
(Vertical Exaggeration = 2X)

FIGURE 13	**TPHg IN SOIL ISOCONCENTRATION MAP CROSS SECTION A-A'** Shore Acre Gas 403 East 12th Street Oakland, California	**Environmental Compliance Group, LLC** 270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Project Number: GHA.19009		
Date: October 22, 2012		

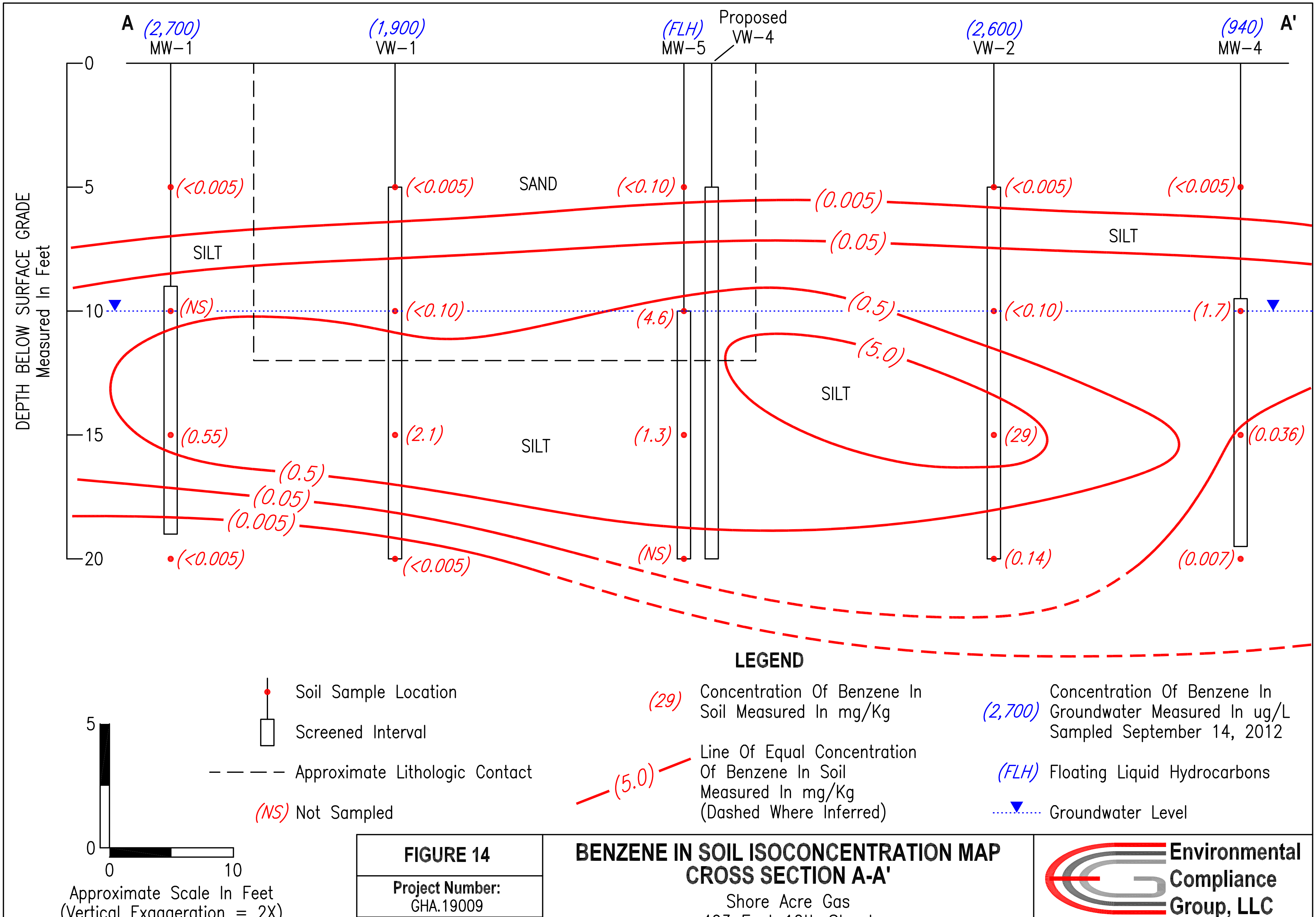


FIGURE 14

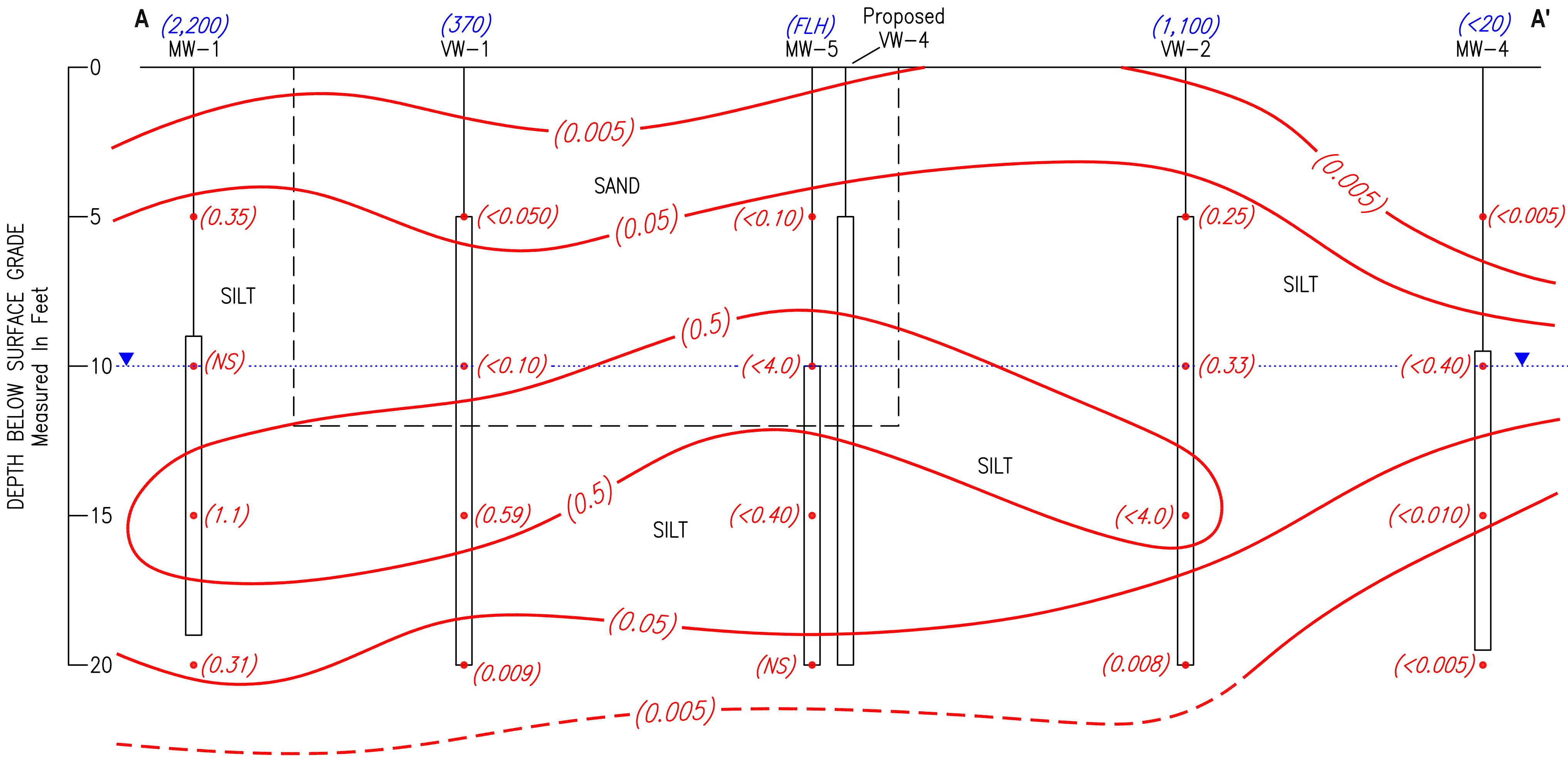
Project Number: GHA.19009

Date: October 22, 2012

BENZENE IN SOIL ISOCONCENTRATION MAP CROSS SECTION A-A'

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664−1035



LEGEND

Soil Sample Location

Screened Interval

Approximate Lithologic Contact

(NS) Not Sampled

(1.1) Concentration Of MTBE In Soil Measured In mg/Kg

(0.5) Line Of Equal Concentration Of MTBE In Soil Measured In mg/Kg (Dashed Where Inferred)

(2,200) Concentration Of Benzene In Groundwater Measured In ug/L Sampled September 14, 2012

(FLH) Floating Liquid Hydrocarbons

Groundwater Level

5
0
0 10
Approximate Scale In Feet
(Vertical Exaggeration = 2X)

FIGURE 15

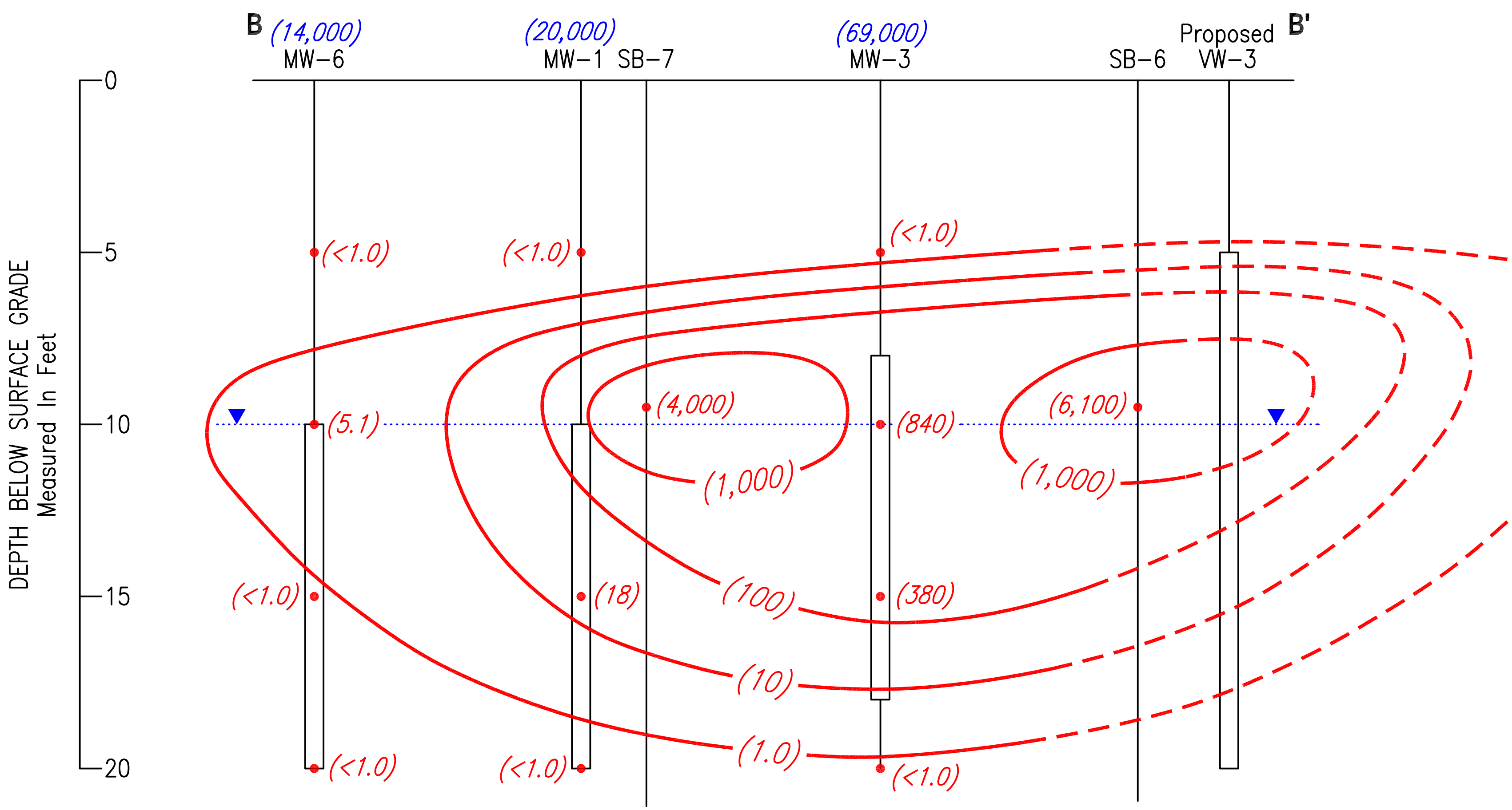
Project Number: GHA.19009

Date: October 22, 2012

MTBE IN SOIL ISOCONCENTRATION MAP
CROSS SECTION A-A'

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664−1035



LEGEND

Soil Sample Location

Screened Interval

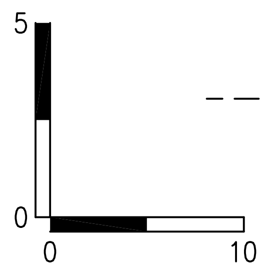
Approximate Lithologic Contact

(6,100) Concentration Of TPHg In Soil Measured In mg/Kg

(1,000) Line Of Equal Concentration Of TPHg In Soil Measured In mg/Kg (Dashed Where Inferred)

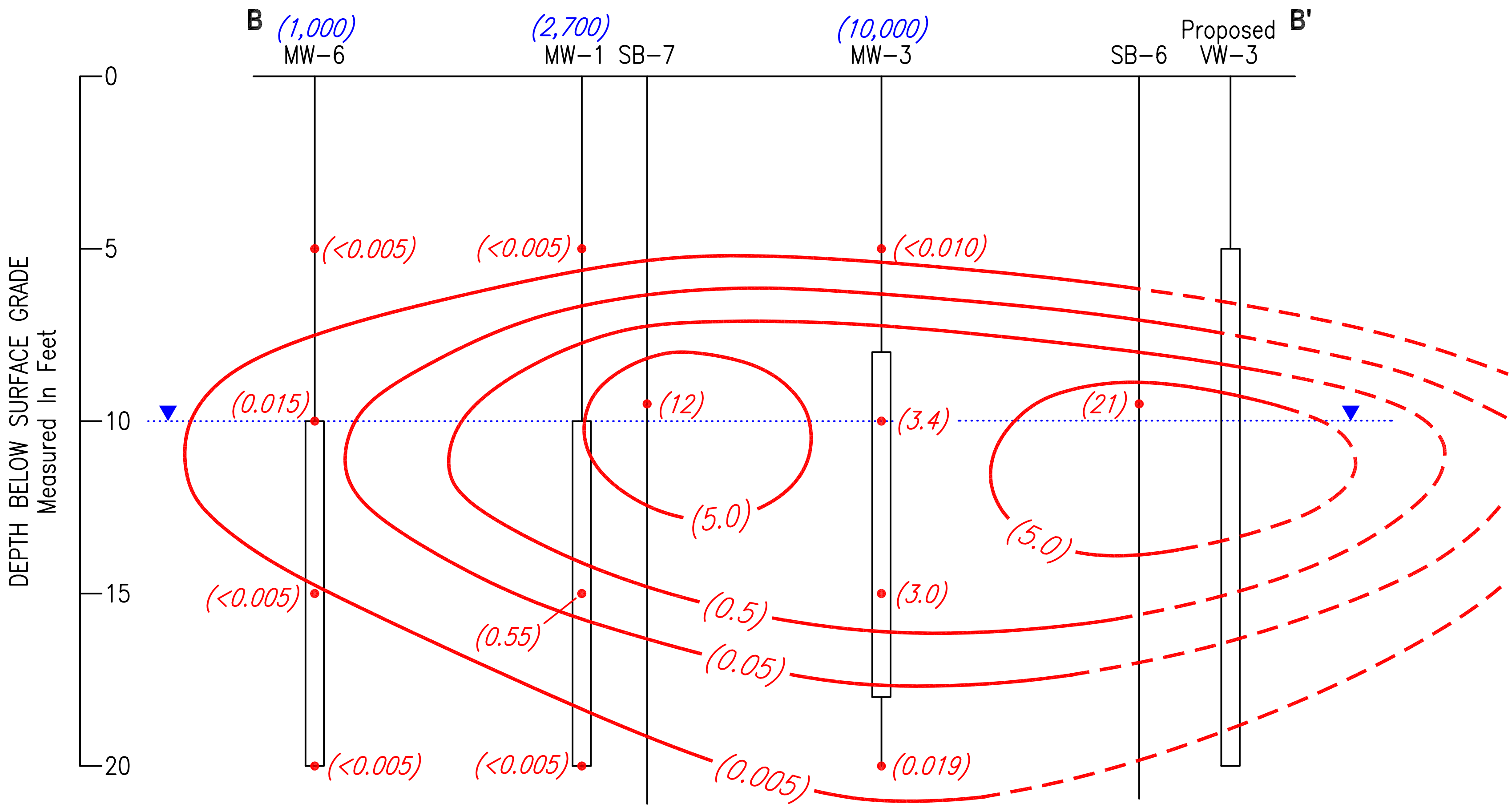
(69,000) Concentration Of TPHg In Groundwater Measured In ug/L Sampled September 14, 2012

Groundwater Level



Approximate Scale In Feet
(Vertical Exaggeration = 2X)

FIGURE 16	**TPHg IN SOIL ISOCONCENTRATION MAP CROSS SECTION B-B'**	**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: October 22, 2012		



LEGEND

Soil Sample Location

Screened Interval

Approximate Lithologic Contact

(21) Concentration Of Benzene In Soil Measured In mg/Kg

(5.0) Line Of Equal Concentration Of Benzene In Soil Measured In mg/Kg (Dashed Where Inferred)

(10,000) Concentration Of Benzene In Groundwater Measured In ug/L Sampled September 14, 2012

Groundwater Level

5
0
0 10
Approximate Scale In Feet
(Vertical Exaggeration = 2X)

FIGURE 17

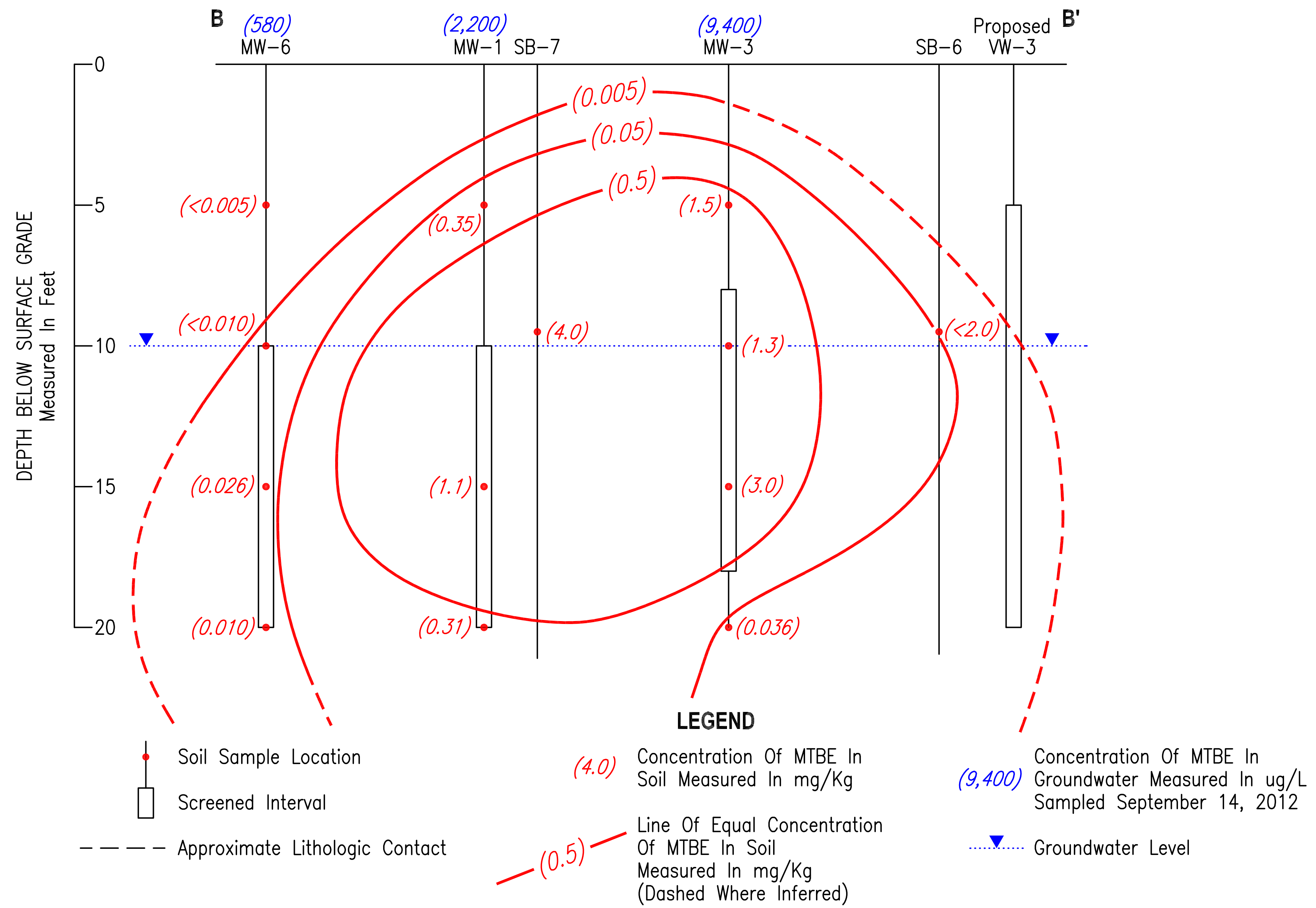
Project Number: GHA.19009

Date: October 22, 2012

BENZENE IN SOIL ISOCONCENTRATION MAP CROSS SECTION B-B'

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035



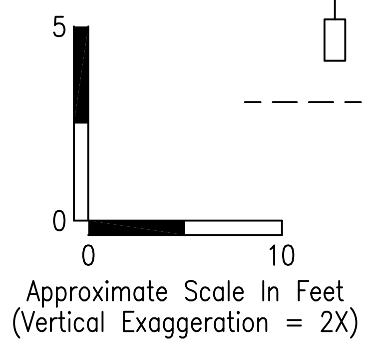


FIGURE 18

Project Number: GHA.19009

Date: October 22, 2012

MTBE IN SOIL ISOCONCENTRATION MAP
CROSS SECTION B-B'

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664–1035

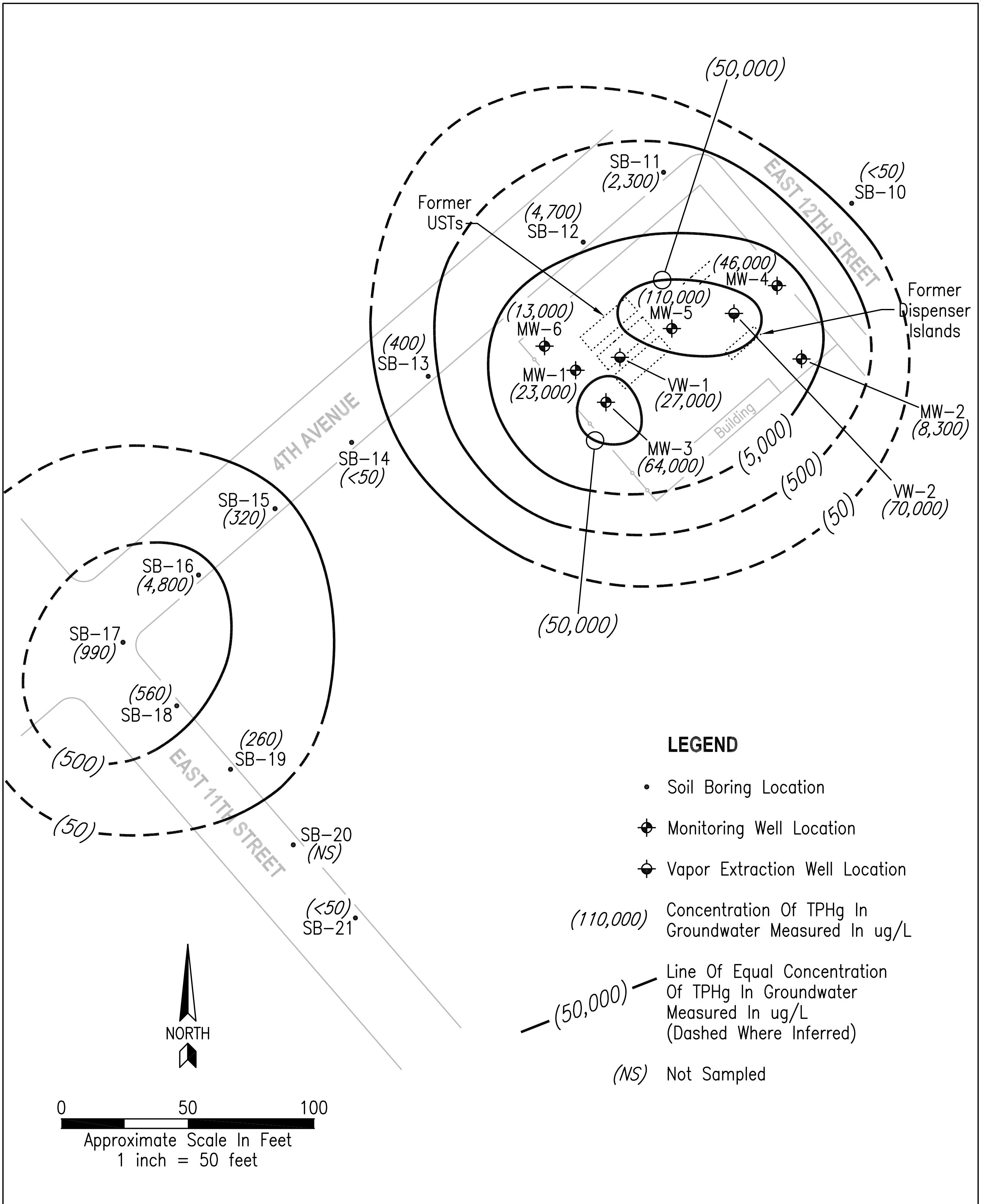


FIGURE 19

Project Number: GHA.19009

Date: January 9, 2012

TPHg IN GROUNDWATER ISOCONCENTRATION MAP
DECEMBER 2011

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664–1035

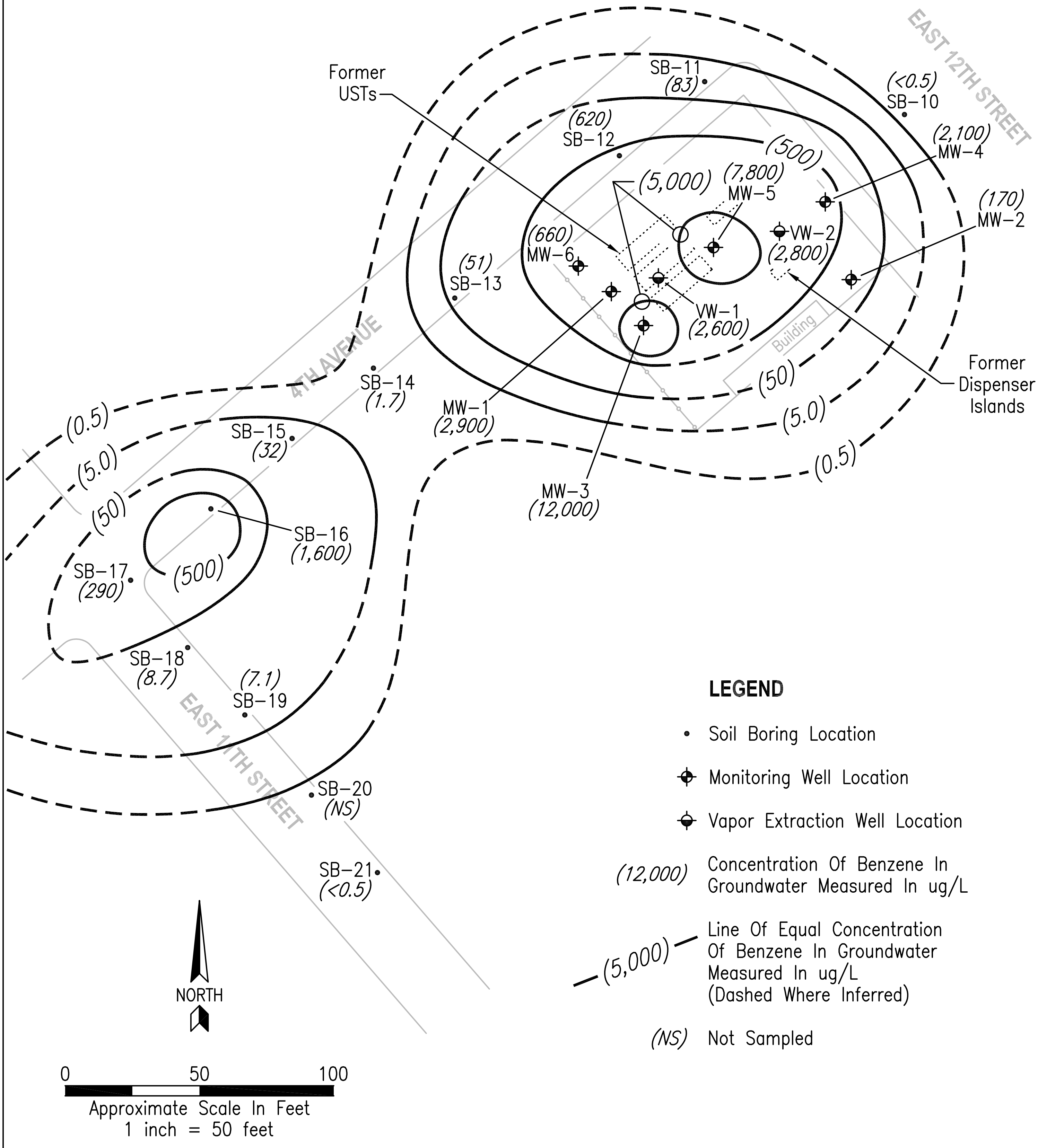


FIGURE 20

Project Number: GHA.19009

Date: January 9, 2012

BENZENE IN GROUNDWATER ISOCONCENTRATION MAP
DECEMBER 2011

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

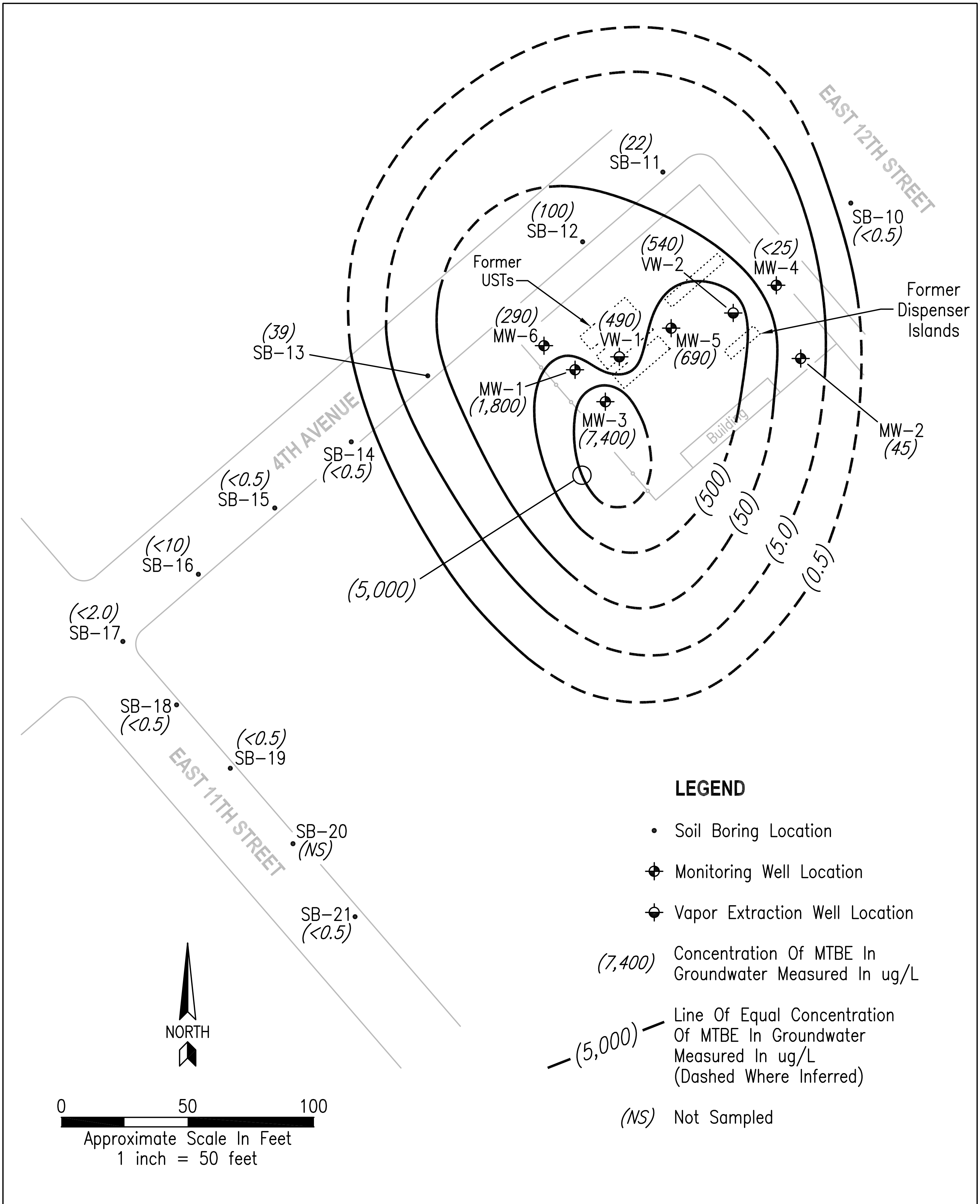
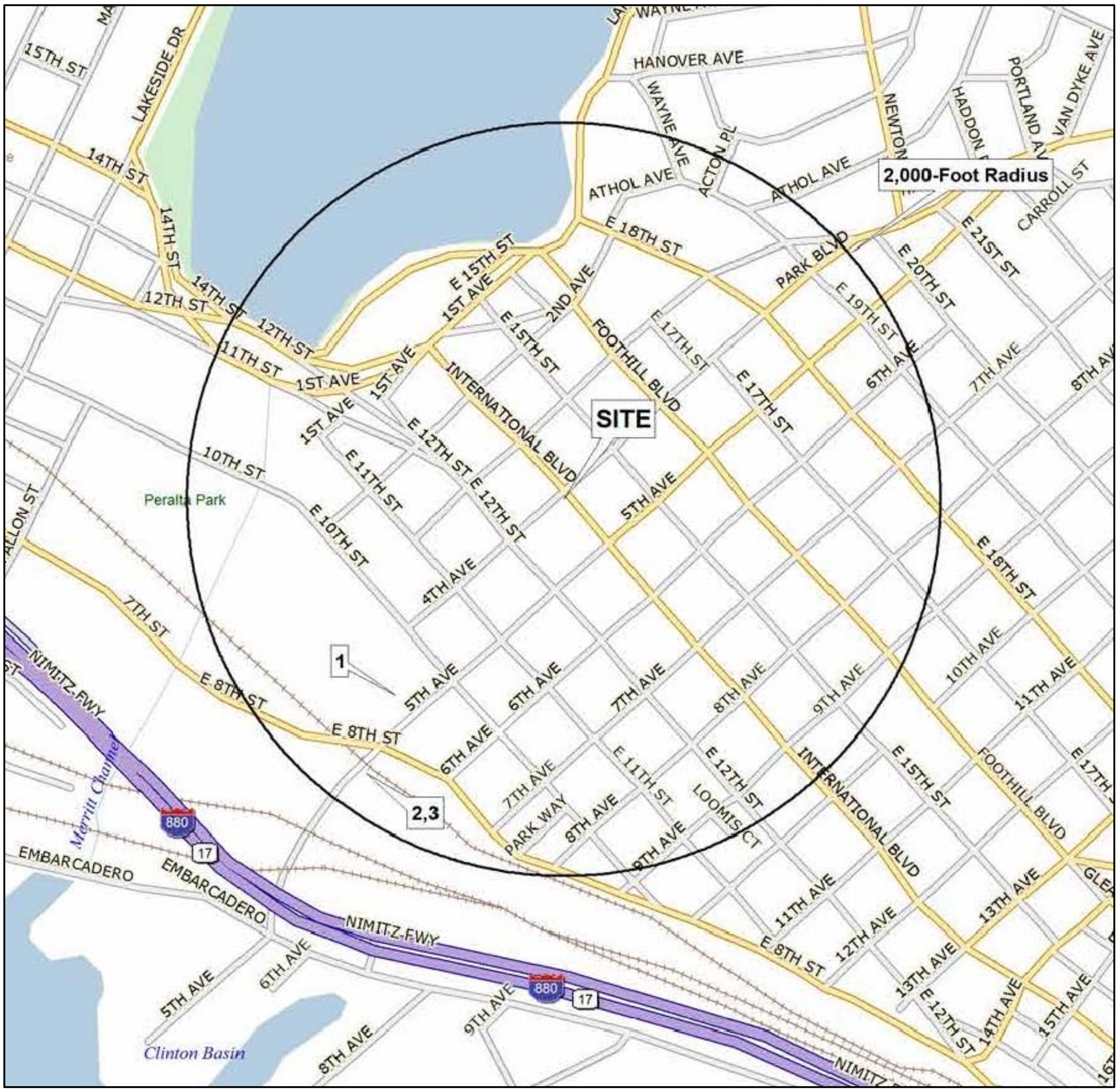


FIGURE 21	MTBE IN GROUNDWATER ISOCONCENTRATION MAP DECEMBER 2011 Shore Acre Gas 403 East 12th Street Oakland, California	Environmental Compliance Group, LLC 270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Project Number: GHA.19009		
Date: January 9, 2012		



NORTH

0 1,000 2,000

Approximate Scale In Feet
1 inch = 1,000 Feet

FIGURE 22

Project Number:
GHA.19009

Date:
February 9, 2011

SENSITIVE RECEPTOR 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

NORTH

0 50 100
Approximate Scale In Feet
1 inch = 50 feet

LEGEND

- Proposed Monitoring Well Location
- Proposed Soil Vapor Probe Location
- Monitoring Well Location
- Vapor Extraction Well Location

FIGURE 23

Project Number: GHA.19009

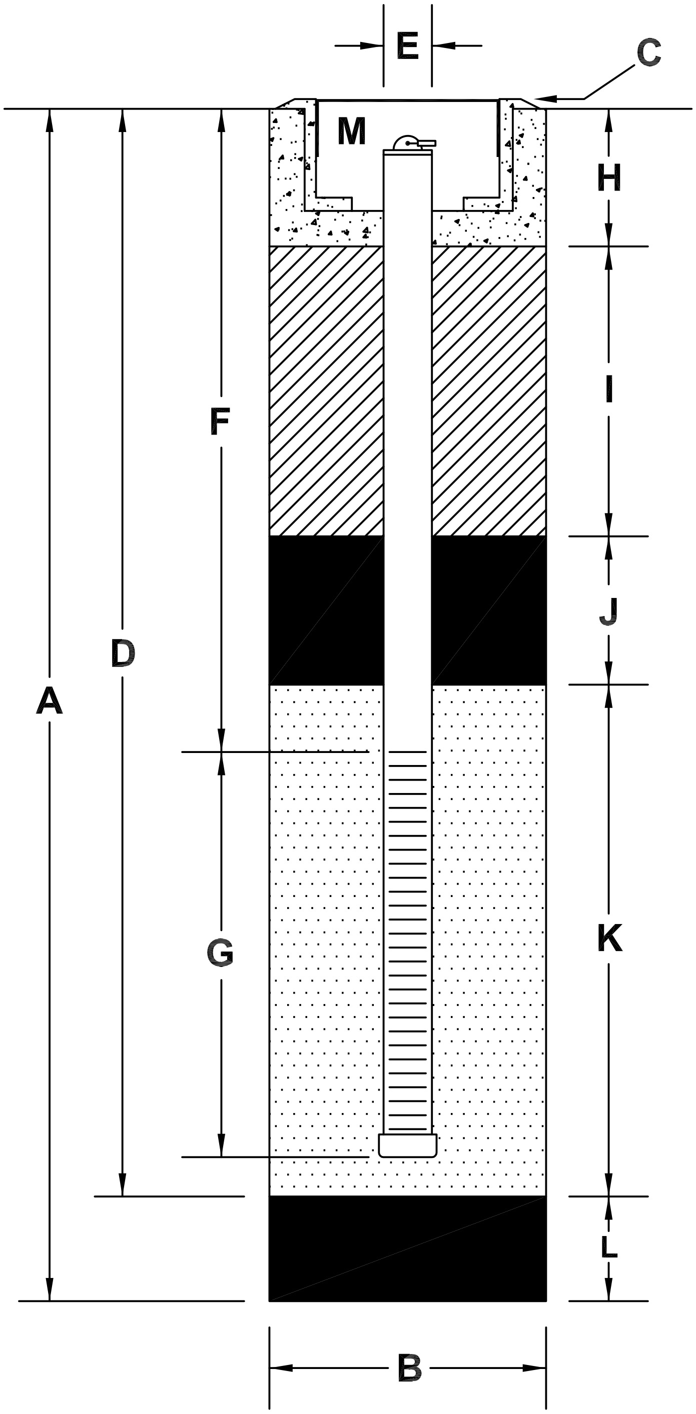
Date: April 8, 2013

PROPOSED MONITORING WELL AND SOIL VAPOR PROBE 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 18 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 18 ft.
Material Sch 40 PVC

E Casing Diameter 2 in.

F Depth To Top Perforations 8 ft.

G Perforated Length 10 ft.
Perforated Interval From 8 to 18 ft.
Perforation Type Machine Slotted
Perforation Size 0.02 in.

H Surface Seal From 0 to 2 ft.
Seal Material Neat Cement

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

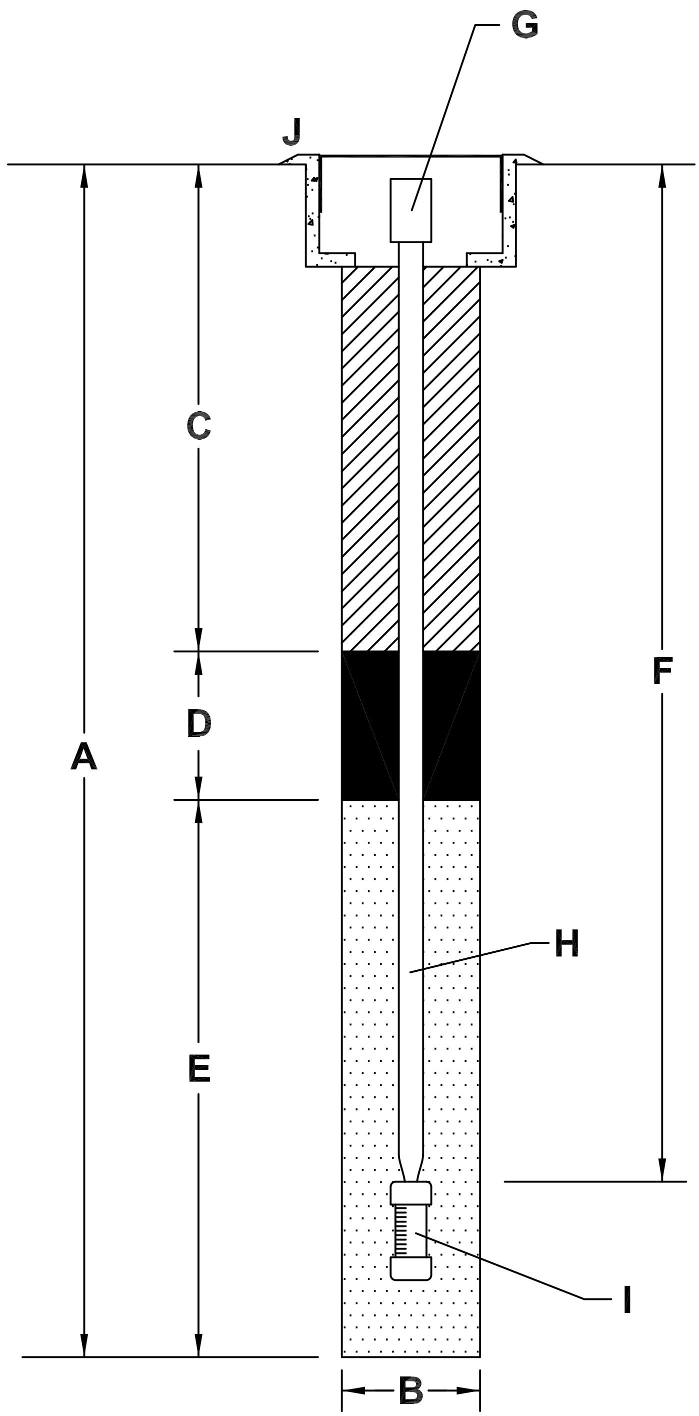
J Seal From 4 to 6 ft.
Seal Material Bentonite

K Filter Pack From 6 to 18 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 24	**PROPOSED MONITORING WELL CONSTRUCTION DETAIL** Shore Acre Gas 403 East 12th Street Oakland, California	Environmental Compliance Group, LLC 270 Vintage Drive, Turlock, CA 95382 Phone: (209) 664-1035
Project Number: GHA.19009		
Date: April 8, 2013		



A Total Depth Of Boring 5 ft.

B Diameter Of Boring 2 in.
Drilling Method Hollow Stem Auger

C Sanitary Seal From 0 to 2.5 ft.
Seal Material Hydrated Granular Bentonite

D Seal From 2.5 to 3.5 ft.
Seal Material Dry Granular Bentonite

E Filter Pack From 3.5 to 5 ft.
Pack Material No. 3 Lonestar Sand

F Depth To Probe 5 ft.

G Gas Tight Valve

H 1/8" To 1/4" Tubing

I Probe Tip (316 Stainless Steel)

J 8-inch Diameter Traffic Rated Christy Box

FIGURE 25

Project Number:
GHA. 19009

Date:
April 8, 2013

PROPOSED SOIL VAPOR PROBE CONSTRUCTION DETAIL

Shore Acre Gas
403 East 12th Street
Oakland, California

Environmental Compliance Group, LLC
270 Vintage Drive, Turlock, CA 95382
Phone: (209) 664-1035

TABLES

Table 1
Well Construction Details
Shore Acres Gas
403 East 12th Street
Oakland, California

Well ID	Date Installed	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Casing Diameter (inches)	Casing Material	Screen/ Filter	Screen Interval (ft bgs)
Monitoring Wells							
MW-1	June 2011	30.81	20	2	PVC	0.020/#3	10-20
MW-2		31.29	20	2	PVC	0.020/#3	10-20
MW-3		31.30	18	2	PVC	0.020/#3	8-18
MW-4		31.21	19	2	PVC	0.020/#3	9-19
MW-5		31.35	20	2	PVC	0.020/#3	10-20
MW-6		30.79	20	2	PVC	0.020/#3	10-20
Dual Phase Extraction Wells							
VW-1	June 2011	31.26	20	4	PVC	0.020/#3	5-20
VW-2		31.40	20	4	PVC	0.020/#3	5-20

Notes:

TOC - denotes top of casing
ft - denotes feet
amsl - denotes above mean sea level
bgs - denotes below ground surface
PVC - denotes polyvinyl chloride

Table 2a
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	August 2009	**1,800***	**3,000**	<0.25	**0.34**	**39**	**180**
SS-D2	2		**900***	**2,400**	<0.25	<0.25	**36**	**120**
SS-D3	2		**460***	**1,000**	<0.15	<0.15	**12**	**14**
SS-D4	2		**540***	**640**	<0.090	**1.0**	**6.1**	**51**
SS-D5	2		**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 2a
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
Groundwater Wells								
MW-1-5	5	June 2011	<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-1-15	15		<5.0	**18**	**0.55**	<0.050	**0.87**	**1.2**
MW-1-20	20		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-2-5	5		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-2-10	10		<5.0	**69**	<0.005	<0.005	<0.005	<0.010
MW-2-15	15		<5.0	**50**	<0.050	**0.48**	**3.1**	**19**
MW-2-20	20		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-3-5	5		<5.0	<1.0	<0.010	<0.010	<0.010	<0.020
MW-3-10	10		<15	**840**	**3.4**	**33**	**20**	**140**
MW-3-15	15		<5.0	**380**	**3.0**	**4.5**	**7.3**	**41**
MW-3-20	20		<5.0	<1.0	**0.019**	<0.005	**0.006**	<0.010
MW-4-5	5		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-4-10	10		<15	**420**	**1.7**	**2.6**	**9.2**	**51**
MW-4-15	15		<5.0	**3.1**	**0.036**	**0.20**	**0.15**	**0.95**
MW-4-20	20		<5.0	<1.0	**0.007**	**0.017**	**0.010**	**0.039**
MW-5-5	5		<5.0	**76**	<0.10	<0.10	**1.3**	**0.76**
MW-5-10	10		<15	**3,200**	**4.6**	**6.5**	**72**	**410**
MW-5-15	15		<5.0	**600**	**1.3**	**13**	**15**	**110**
MW-6-5	5		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-6-10	10		<5.0	**5.1**	**0.015**	<0.010	**3.4**	**1.0**
MW-6-15	15		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
MW-6-20	20		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
VW-1-5	5		<5.0	**34**	<0.005	<0.005	**0.16**	**0.31**
VW-1-10	10		<15	**85**	<0.10	<0.10	**2.2**	**0.89**
VW-1-15	15		<15	**420**	**2.1**	**4.1**	**9.4**	**55**
VW-1-20	20		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
VW-2-5	5		<5.0	<1.0	<0.005	<0.005	<0.005	<0.010
VW-2-10	10		<5.0	**130**	<0.10	<0.10	**2.9**	**15**
VW-2-15	15		<15	**5,500**	**29**	**430**	**120**	**910**
VW-2-20	20		<5.0	<1.0	**0.14**	**0.054**	**0.025**	**0.14**

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 2b
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	August 2009	<0.25	<0.25	<0.25	<0.25	<1.5	---	---
SS-D2	2		<0.25	<0.25	<0.25	<0.25	<1.5	---	---
SS-D3	2		<0.15	<0.15	<0.15	<0.15	<0.70	---	---
SS-D4	2		<0.090	<0.090	<0.090	<0.090	<0.50	---	---
SS-D5	2		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-D6	2		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-J1	2		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-Isle	4		<0.025	<0.025	<0.025	<0.025	<0.15	---	---
SS-7	18		<0.25	<0.25	<0.25	<0.25	<1.5	<0.25	<0.25
Tank 1-SS-1	14		<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50
Tank 1-SS-2	14		<0.040	<0.040	**0.37**	<0.040	**0.51**	<0.040	<0.040
Tank 2-SS-1	14		<0.050	<0.050	**0.18**	<0.050	**0.35**	<0.050	<0.050
Tank 2-SS-2	14		<0.025	<0.025	**0.090**	<0.025	**0.16**	<0.025	<0.025
Tank 3-SS-1	14		<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50
Tank 3-SS-2	14		<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 2b
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
Groundwater Wells									
MW-1-5	5	June 2011	<0.005	<0.005	**0.35**	<0.005	**0.093**	<0.005	<0.005
MW-1-15	15		<0.050	<0.050	**1.1**	<0.050	<0.50	<0.050	<0.050
MW-1-20	20		<0.005	<0.005	**0.31**	<0.005	**0.58**	<0.005	<0.005
MW-2-5	5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
MW-2-10	10		<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.050
MW-2-15	15		<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.050
MW-2-20	20		<0.005	<0.005	**0.006**	<0.005	<0.050	<0.005	<0.005
MW-3-5	5		<0.010	<0.010	**1.5**	<0.010	**0.37**	<0.010	<0.010
MW-3-10	10		<0.80	<0.80	**1.3**	<0.80	<8.0	<0.80	<0.80
MW-3-15	15		<0.20	<0.20	**3.0**	<0.20	<2.0	<0.20	<0.20
MW-3-20	20		<0.005	<0.005	**0.036**	<0.005	**0.16**	<0.005	<0.005
MW-4-5	5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
MW-4-10	10		<0.40	<0.40	<0.40	<0.40	<4.0	<0.40	<0.40
MW-4-15	15		<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
MW-4-20	20		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
MW-5-5	5		<0.10	<0.10	<0.10	<0.10	<1.0	<0.10	<0.10
MW-5-10	10		<4.0	<4.0	<4.0	<4.0	<40	<4.0	<4.0
MW-5-15	15		<0.40	<0.40	<0.40	<0.40	<4.0	<0.40	<0.40
MW-6-5	5		<0.005	<0.005	<0.005	<0.005	<0.050	<0.005	<0.005
MW-6-10	10		<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
MW-6-15	15		<0.005	<0.005	**0.026**	<0.005	**0.088**	<0.005	<0.005
MW-6-20	20		<0.005	<0.005	**0.010**	<0.005	**0.37**	<0.005	<0.005
VW-1-5	5		<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.050
VW-1-10	10		<0.10	<0.10	<0.10	<0.10	<1.0	<0.10	<0.10
VW-1-15	15		<0.40	<0.40	**0.59**	<0.40	<4.0	<0.40	<0.40
VW-1-20	20		<0.005	<0.005	**0.009**	<0.005	**0.16**	<0.005	<0.005
VW-2-5	5		<0.005	<0.005	**0.25**	<0.005	**0.14**	<0.005	<0.005
VW-2-10	10		<0.10	<0.10	**0.33**	<0.10	<1.0	<0.10	<0.10
VW-2-15	15		<4.0	<4.0	<4.0	<4.0	<40	<4.0	<4.0
VW-2-20	20		<0.005	<0.005	**0.008**	<0.005	**0.26**	<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 3a
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
SB-10	December 2011	---	<50	<0.5	<0.5	<0.5	<1.0
SB-11		---	**2,300**	**83**	**1.9**	**140**	**43**
SB-12		---	**4,700**	**620**	**290**	**84**	**400**
SB-13		---	**400**	**51**	**2.4**	**4.2**	**9.7**
SB-14		---	<50	**1.7**	<0.5	**2.1**	<1.0
SB-15		---	**320**	**32**	**0.7**	**33**	**25**
SB-16		---	**4,800**	**1,600**	**10**	**49**	<20
SB-17		---	**990**	**290**	**7.2**	**27**	**4.3**
SB-18		---	**560**	**8.7**	**4.9**	**23**	**83**
SB-19		---	**260**	**7.1**	<0.5	**16**	**7.0**
SB-21		---	<50	<0.5	<0.5	<0.5	<1.0

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 3b
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
SB-10	December 2011	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5
SB-11		<1.0	<1.0	**22**	<1.0	**140**	<1.0	<1.0
SB-12		<5.0	<5.0	**100**	<5.0	**550**	<5.0	<5.0
SB-13		<2.0	<2.0	**39**	<2.0	**3,900**	<2.0	<2.0
SB-14		<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5
SB-15		<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5
SB-16		<10	<10	<10	<10	<100	<10	<10
SB-17		<2.0	<2.0	<2.0	<2.0	<20	<2.0	<2.0
SB-18		<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5
SB-19		<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5
SB-21		<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5

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 4a
Monitoring Well Data
Water Level, TPH, and BTEX
Shore Acres Gas
403 East 12th Street
Oakland, California

Well ID TOC	Date Measured	Depth to Groundwater (ft bgs)	Groundwater Elevation (ft amsl)	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)
Monitoring Wells									
MW-1	6/23/2011	10.46	20.35	<250	23,000	4,500	820	1,700	3,800
	9/22/2011	12.13	18.68	<50	21,000	4,000	1,500	980	3,000
	12/11/2011	11.69	19.12	---	23,000	2,900	1,000	720	3,000
	3/30/2012	Inaccessible							
	6/1/2012	11.04	19.77	---	40,000	4,100	800	2,700	6,100
	9/14/2012	12.96	17.85	<100	**20,000**	**2,700**	**160**	**830**	**2,600**
MW-2	6/23/2011	10.70	20.59	<250	13,000	1,000	160	370	1,600
	9/22/2011	12.42	18.87	<50	12,000	300	130	470	1,400
	12/11/2011	11.98	19.31	---	8,300	170	120	450	1,500
	3/30/2012	8.55	22.74	<250	17,000	850	700	710	2,900
	6/1/2012	11.26	20.03	---	5,300	830	260	630	1,700
	9/14/2012	13.11	18.18	<50	**10,000**	**260**	**190**	**600**	**1,900**
MW-3	6/23/2011	10.79	20.51	<250	55,000	15,000	3,600	2,000	4,300
	9/22/2011	12.60	18.70	<250	77,000	15,000	3,900	1,700	4,900
	12/11/2011	12.13	19.17	---	64,000	12,000	3,100	1,600	4,500
	3/30/2012	7.90	23.40	<120	100,000	17,000	10,000	2,000	8,400
	6/1/2012	11.47	19.83	---	83,000	15,000	6,000	2,900	10,000
	9/14/2012	13.42	17.88	<200	**69,000**	**10,000**	**1,500**	**1,800**	**5,900**
MW-4	6/23/2011	10.62	20.59	<250	47,000	3,500	7,100	2,300	11,000
	9/22/2011	12.25	18.96	<250	46,000	2,000	2,400	1,100	5,300
	12/11/2011	11.89	19.32	---	46,000	2,100	3,400	1,800	7,000
	3/30/2012	8.51	22.70	<250	60,000	6,800	8,200	1,200	5,700
	6/1/2012	11.14	20.07	---	72,000	9,700	8,500	2,300	9,000
	9/14/2012	12.97	18.24	<50	**15,000**	**940**	**880**	**450**	**1,700**
MW-5	6/23/2011	10.12	21.23	<250	130,000	7,100	25,000	13,000	94,000
	9/22/2011	12.53	18.82	<250	120,000	6,900	7,600	3,800	17,000
	12/11/2011	12.09	19.26	---	110,000	7,800	14,000	4,200	20,000
	3/30/2012	8.06	23.29	Sheen - not sampled					
	6/1/2012	11.38	19.97	Sheen - not sampled					
	9/14/2012	13.61	17.74	Free product - not sampled					

Table 4a
Monitoring Well Data
Water Level, TPH, and BTEX
Shore Acres Gas
403 East 12th Street
Oakland, California

Well ID TOC	Date Measured	Depth to Groundwater (ft bgs)	Groundwater Elevation (ft amsl)	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)
MW-6	6/23/2011	10.43	20.36	<250	11,000	2,400	120	480	840
	9/22/2011	12.10	18.69	<50	15,000	1,500	270	880	2,500
	12/11/2011	11.69	19.10	---	13,000	660	190	610	1,500
	3/30/2012	7.50	23.29	<250	9,500	1,200	160	250	520
	6/1/2012	11.04	19.75	---	23,000	2,200	220	1,300	3,000
	9/14/2012	12.96	17.83	<50	**14,000**	**1,000**	**86**	**420**	**1,200**
DPE Wells									
VW-1	6/28/2011	---	---	---	20,000	2,000	490	1,000	2,400
	9/22/2011	12.55	18.71	<120	39,000	3,900	610	1,400	4,600
	12/11/2011	12.09	19.17	---	27,000	2,600	270	1,400	4,400
	3/30/2012	8.06	23.20	<120	21,000	3,100	160	910	2,300
	6/1/2012	11.42	19.84	---	21,000	2,800	100	1,200	3,100
	9/14/2012	13.37	17.89	<50	**22,000**	**1,900**	**50**	**1,000**	**2,600**
VW-2	6/28/2011	---	---	---	33,000	3,100	2,000	790	3,500
	9/22/2011	12.50	18.90	<250	66,000	2,400	4,500	2,000	11,000
	12/11/2011	12.12	19.28	---	70,000	2,800	6,900	2,700	13,000
	3/30/2012	8.48	22.92	<250	57,000	5,800	5,500	1,200	5,400
	6/1/2012	11.40	20.00	---	82,000	8,800	8,600	3,300	13,000
	9/14/2012	13.27	18.13	<100	**32,000**	**2,600**	**2,400**	**1,000**	**4,500**

Notes:

TOC - denotes top of casing elevation
TPHg - denotes total petroleum hydrocarbons as gasoline
TPHd - denotes total petroleum hydrocarbons as diesel
ft bgs - denotes feet below top of casing
ft amsl - denotes feet above mean sea level
ug/L - denotes micrograms per liter
< - denotes less than the detection limit
--- - denotes not available/applicable
FLH - denotes floating liquid hydrocarbons
* - denotes less than six inches of water and considered dry

Table 4b
Monitoring Well Data
Oxygenates and Lead Scavengers
Shore Acres Gas
403 East 12th Street
Oakland, California

Well ID TOC	Date Measured	DIPE (ug/L)	ETBE (ug/L)	MTBE (ug/L)	TAME (ug/L)	TBA (ug/L)	1,2-DCA (ug/L)	EDB (ug/L)
Monitoring Wells								
MW-1	6/23/2011	<25	<25	3,000	<25	3,900	<25	<25
	9/22/2011	<50	<50	2,600	<50	2,500	<50	<50
	12/11/2011	<20	<20	1,800	<20	1,600	<20	<20
	3/30/2012	Inaccessible						
	6/1/2012	<20	<20	2,800	<20	1,300	<20	<20
	9/14/2012	<10	<10	**2,200**	<10	**1,600**	<10	<10
MW-2	6/23/2011	<10	<10	240	<10	640	<10	<10
	9/22/2011	<5.0	<5.0	110	<5.0	260	<5.0	<5.0
	12/11/2011	<2.5	<2.5	45	<2.5	110	<2.5	<2.5
	3/30/2012	<5.0	<5.0	140	<5.0	490	<5.0	<5.0
	6/1/2012	<5.0	<5.0	180	<5.0	490	<5.0	<5.0
	9/14/2012	<5.0	<5.0	**65**	<5.0	**190**	<5.0	<5.0
MW-3	6/23/2011	<100	<100	8,200	<100	6,400	<100	<100
	9/22/2011	<100	<100	11,000	<100	2,800	<100	<100
	12/11/2011	<100	<100	7,400	<100	1,800	<100	<100
	3/30/2012	<100	<100	13,000	<100	<1,000	<100	<100
	6/1/2012	<50	<50	12,000	<50	<500	<50	<50
	9/14/2012	<50	<50	**9,400**	<50	<500	<50	<50
MW-4	6/23/2011	<50	<50	<50	<50	<500	<50	<50
	9/22/2011	<25	<25	<25	<25	<250	<25	<25
	12/11/2011	<25	<25	<25	<25	<250	<25	<25
	3/30/2012	<50	<50	56	<50	<500	<50	<50
	6/1/2012	<50	<50	180	<50	<500	<50	<50
	9/14/2012	<20	<20	<20	<20	<200	<20	<20
MW-5	6/23/2011	<120	<120	440	<120	<1,200	<120	<120
	9/22/2011	<50	<50	670	<50	1,500	<50	<50
	12/11/2011	<120	<120	690	<120	1,600	<120	<120
	3/30/2012	Sheen - not sampled						
	6/1/2012	Sheen - not sampled						
	9/14/2012	Free product - not sampled						

Table 4b
Monitoring Well Data
Oxygenates and Lead Scavengers
Shore Acres Gas
403 East 12th Street
Oakland, California

Well ID TOC	Date Measured	DIPE (ug/L)	ETBE (ug/L)	MTBE (ug/L)	TAME (ug/L)	TBA (ug/L)	1,2-DCA (ug/L)	EDB (ug/L)
MW-6	6/23/2011	<25	<25	1,100	<25	4,000	<25	<25
	9/22/2011	<12	<12	600	<12	2,800	<12	<12
	12/11/2011	<10	<10	290	<10	1,300	<10	<10
	3/30/2012	<10	<10	990	<10	3,500	<10	<10
	6/1/2012	<10	<10	1,400	<10	2,200	<10	<10
	9/14/2012	<10	<10	**580**	<10	**2,000**	<10	<10
DPE Wells								
VW-1	6/28/2011	<25	<25	1,500	<25	5,300	<25	<25
	9/22/2011	<50	<50	640	<50	1,800	<50	<50
	12/11/2011	<25	<25	490	<25	1,000	<25	<25
	3/30/2012	<20	<20	370	<20	1,100	<20	<20
	6/1/2012	<25	<25	500	<25	1,700	<25	<25
	9/14/2012	<10	<10	**370**	<10	**1,400**	<10	<10
VW-2	6/28/2011	<25	<25	670	<25	4,100	<25	<25
	9/22/2011	<50	<50	740	<50	1,600	<50	<50
	12/11/2011	<50	<50	540	<50	880	<50	<50
	3/30/2012	<50	<50	1,800	<50	2,800	<50	<50
	6/1/2012	<50	<50	2,600	<50	3,300	<50	<50
	9/14/2012	<20	<20	**1,100**	<20	**2,400**	<20	<20

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
---- - denotes no data available

Table 5
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

Table 6
Dual Phase Extraction Pilot Test
Vapor Analytical Results
Shore Acres Gas
403 East 12th Street
Oakland, California

Sample ID	Date Measured	TPHg (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethyl-benzene (ppmv)	Total Xylenes (ppmv)	MTBE (ppmv)
VW-1-INIT	6/24/2011	190	9.4	1.1	1.3	2.7	1.3
VW-1-DAY 2	6/25/2011	500	15	5.8	4.5	10	2.1
VW-1-END	6/26/2011	1,400	21	13	9.0	23	1.9
VW-2-INIT	6/26/2011	11,000	140	240	84	220	9.2
VW-2-DAY 2	6/27/2011	4,700	68	99	24	64	3.6
VW-2-END	6/28/2011	3,200	44	68	16	43	3.1

Notes:

TPHg - denotes total petroleum hydrocarbons as gasoline
MTBE - denotes methyl tertiary butyl ether
ppmv - parts per million by volume
< - denotes less than the detection limit

Table 7
Dual Phase Extraction Pilot Test
Vapor Extraction Summary
Shore Acres Gas
403 East 12th Street
Oakland, California

Well	Meter (hours)	Influent Flow Rate (scfm)	Influent Sample Results		Extraction Rates (lb/day)		Extraction Mass (lb/day)	
			TPHg (ppmv)	Benzene (ppmv)	TPHg (lb/day)	Benzene (lb/day)	TPHg (lb)	Benzene (lb)
VW-1-INIT	3	150	**190**	**9.4**	10.29	0.44	1.29	0.06
VW-1-DAY 2	15	150	**500**	**15**	27.08	0.00	13.54	0.00
VW-1-END	39	150	**1,400**	**21**	75.81	0.99	75.81	0.99
VW-2-INIT	3.0	50	**11,000**	**140**	198.55	2.19	24.82	0.27
VW-2-DAY 2	18.5	50	**4,700**	**68**	84.84	1.07	54.79	0.69
VW-2-END	42.5	50	**3,200**	**44**	57.76	0.69	57.76	0.69
Total							**228.0**	**2.69**

MW_{TPHg} = Molecular Weight of TPHg = 90

MW_{MTBE} = Molecular Weight of Methyl tert-butyl ether = 88.15

$MW_{Benzene}$ = Molecular Weight of Benzene = 78.11

ft^3 = cubic feet

min = minutes

lb/day = pounds per day

ppmv = parts per million by volume = ft^3 / $1x10^6$ ft^3

scfm = standard cubic feet per minute

NS = not sampled

NA = not analyzed

NC = not calculated

Extraction rate = (flow rate(ft^3/min) x concentration (ft^3 / $1x10^6$ ft^3) x MW_{TPHg}(lb/lb-mol) x 1440 min/day)/(359 ft^3/lb-mol*)

Table 8
Dual Phase Extraction Pilot Test
Groundwater Extraction Summary
Shore Acres Gas
403 East 12th Street
Oakland, California

Sample ID	Date	Water Extracted (gals.)	Influent Concentration TPHg (ug/L)	Influent Concentration Benzene (ug/L)	Extraction Mass TPHg (lb/day) (lb)	Extraction Mass Benzene (lb/day) (lb)
VW-1	6/28/2011	8,200	**20,000**	**2,000**	**1.37**	**0.14**
VW-2	6/28/2011	5,700	**33,000**	**3,100**	**1.57**	**0.15**
Totals					**2.9**	**0.3**

gals. - denotes gallons
ug/L - denotes micrograms per liter
lb- denotes pounds
< - denotes less than the detection limit

Water extracted values are total gallons of water extracted
Averageof the March 11 and 18 concentrations were used to determin mass

Table 9

TPHg, Benzene, and MTBE Masses in Soil

Shore Acres Gas

403 East 12th Street

Oakland, California

TPHg Average[1] Concentration (mg/kg)	Area (ft^2)	Thickness (ft)	Volume (ft^3)	Mass[2] (lbs)
11-20 feet bgs				
3,250	4,900	4	19,600	6,370
550	8,100	12	77,600	4,268
55	12,100	15	84,300	464
5.5	19,600	20	210,500	116
Total TPHg Mass				**11,217**

Benzene Average Concentration (mg/kg)	Area (ft^2)	Thickness (ft)	Volume (ft^3)	Mass (lbs)
11-27 feet bgs				
17	625	5	3,125	5
2.75	4,900	10	45,875	13
0.275	19,600	16	264,600	7
0.0275	19,600	20	78,400	0
Total Benzene Mass				**18.1**

MTBE Average Concentration (mg/kg)	Area (ft^2)	Thickness (ft)	Volume (ft^3)	Mass (lbs)
11-27 feet bgs				
0.8	6,400	5	32,000	2.6
0.275	19,600	15	262,000	7.2
0.0275	28,900	20	284,000	0.8
Total MTBE Mass				**10.5**

Notes

(1) Average of highest area = average of all concentrations plus isoconcentration value / (number of concentrations + 1)

(2) Assumes a soil bulk density of 100 pounds per cubic foot

Table 10

TPHg, Benzene, and MTBE Masses in Groundwater

Shore Acres Gas

403 East 12th Street

Oakland, California

TPHg Average[1] Concentration (ug/L)	Area (ft2)	Depth (ft)	Mass[2] (lbs)
75,000	2,142	20	60.11
27,500	7,900	20	81.29
Total TPHg Mass			**141.40**

Benzene Average Concentration (ug/kg)	Area (ft2)	Depth (ft)	Mass (lbs)
11,000	2,456	20	10.11
2,750	5,177	20	5.33
Total Benzene Mass			**15.44**

MTBE Average Concentration (ug/kg)	Area (ft2)	Depth (ft)	Mass (lbs)
9,000	240	20	0.81
2,750	3,137	20	3.23
275	4,943	20	0.51
Total MTBE Mass			**4.54**

Notes

(1) Average of highest area = $\frac{\text{average of all concentrations plus isoconcentration value}}{\text{(number of concentrations + 1)}}$

(2) Assumes a porosity of 30%

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

February 7, 2013

Rashid Ghafoor and Waseem Iqbal (Sent via e-mail to rashidz1@aol.com)
226 Havenwood Circle
Pittsburg, CA 94567

Subject: Revised Corrective Action 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:

Alameda County Environmental Health (ACEH) staff has reviewed the recently submitted document entitled, *Revised Corrective Action Plan* dated October 25, 2012, which was prepared by Environmental Compliance Group (ECG), LLC for the subject site. The Revised CAP presents an evaluation of three active remediation methods including costs with timeframes to reach clean-up levels. The selected remedial option is dual phase extraction (DPE) based on the time frame and lowest costs of cleanup.

The proposed scope of work to implement DPE is acceptable for public comment at this time. Therefore, we request that you distribute the Fact Sheet (attached) to the attached mailing list. Following distribution of the Fact Sheet, please provide personal verification by e-mail or uploaded letter that the Fact Sheet was distributed by U.S. Mail no later than January 20, 2012.

At the end of the 30-day public comment period, ACEH may request that you address the public comments received. If no public comments are received, ACEH may approve implementation of operation of the DPE provided that technical comment 1 below is incorporated during implementation of DPE. We request that you address the following comments, perform the requested work, and send us the reports described below.

TECHNICAL COMMENTS

1. **Downgradient Extent of Groundwater Contamination** – Groundwater samples collected from off-site boring SB-16 contained 4,800 micrograms per liter (µg/L) total petroleum hydrocarbons as gasoline (TPHg) and 1,600 µg/L benzene, yet no off-site downgradient monitoring wells have been installed. Please present a work plan to install an appropriate groundwater monitoring and performance monitoring network along transects by the due date listed below. We anticipate that the transect(s) of wells be installed concurrently with system installation and sampled prior to system startup.

2. **Groundwater Monitoring** - Please implement quarterly monitoring for all monitoring wells and quarterly reporting once remediation begins.

3. **Soil Vapor Sampling** – An evaluation of vapor intrusion at the site and adjacent residential properties have not been performed. Please submit a work plan to evaluate soil vapor by the due date below.

4. **Landowner Notification** - Pursuant to Section 25297.15 (a), ACEH, the local agency, shall not consider cleanup or site closure proposals from the primary or active responsible party, issue a closure letter, or make a determination that no further action is required with respect to a site upon which there was an unauthorized release of hazardous substances from an underground storage tank subject to this chapter unless all current record owners of fee title to the site of the proposed action have been notified of the proposed action by the primary or active responsible party. ACEH is required to notify the primary or active responsible party of their requirement to certify in writing to the local agency that the notification requirement in the above-mentioned regulation has been satisfied and to provide the local agency with a complete mailing list of all record fee title owners.

   To satisfy the above-mentioned requirement, please complete the enclosed "List of Landowners Form," and mail it back to ACEH within thirty (30) days from the date of this letter.

5. **Baseline Environmental Project Schedule** The State Water Resources Control Board passed Resolution No. 2012-0062 on November 6, 2012 which requires development of a Path to Closure Plan by December 31, 2013 that addresses the impediments to closure for the site. The Path to Closure must have milestone dates to calendar quarter which will achieve site cleanup and case closure in a timely and efficient manner that minimizes the cost of corrective action. The Project Schedule should include, but not be limited to, the following key environmental elements and milestones as appropriate:

   - Preferential Pathway Study
   - Soil, Groundwater, and Soil Vapor Investigations
   - Initial, Updated, and Final/Validated SCMs
   - Interim Remedial Actions
   - Feasibility Study/Corrective Action Plan
   - Pilot Tests
   - Remedial Actions
   - Soil Vapor and Groundwater Monitoring Well Installation and Monitoring
   - Public Participation Program (Fact Sheet Preparation/Distribution/Public Comment Period, Community Meetings, etc.)
   - Case Closure Tasks (Request for closure documents, ACEH Case Closure Summary Preparation and Review, Site Management Plan, Institutional Controls, Public Participation, Landowner Notification, Well Decommissioning, Waste Removal, and Reporting.)

Please include time for regulatory and RP in house review, permitting, off-site access agreements, and utility connections, etc.

Please use a critical path methodology/tool to construct a schedule with sufficient detail to support a realistic and achievable Path to Closure Schedule. The schedule is to include at a minimum:

- Defined work breakdown structure including summary tasks required to accomplish the project objectives and required deliverables
- Summary task decomposition into smaller more manageable components that can be scheduled, monitored, and controlled
- Sequencing of activities to identify and document relationships among the project activities using logical relationships
- Identification of critical paths, linkages, predecessor and successor activities, leads and lags, and key milestones
- Identification of entity responsible for executing work
- Estimated activity durations (60-day ACEH review times are based on calendar days)

Please submit an electronic copy of the Path to Closure Schedule by the date listed below. ACEH will review the schedule to ensure that all key elements are included.

TECHNICAL REPORT REQUEST

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

- **February 19, 2013** – Send out Fact Sheet
- **February 25, 2013** – Verification that Fact Sheet was distributed to the attached mailing list and persons on cc list at the end of this correspondence and Landowner Notification Form
- **March 21, 2013** – Public Comment Period Ends
- **April 8, 2013** – Work Plan
  (File to be named WP_R_yyyy-mm-dd)
- **April 8, 2013** – Path to Closure and Schedule
  (File to be named PROJ_SCH_yyyy-mm-dd)
- **June 20, 2013** – Quarterly Monitoring Report (2nd Quarter 2013)
  (File to be named GWM_R_yyyy-mm-dd)

- **September 20, 2013** – Quarterly Monitoring Report (3rd Quarter 2013)
  (File to be named GWM_R_yyyy-mm-dd)

- **December 20, 2013** – Quarterly Monitoring Report (4th Quarter 2013)
  (File to be named GWM_R_yyyy-mm-dd)

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,

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2013.02.07 16:04:59 -08'00'

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

Enclosure: Public Notification of Site Remediation
Mailing List for Fact Sheet
List of Landowners Form Responsible Party(ies) Legal Requirements/Obligations
ACEH Electronic Report Upload (ftp) Instructions

cc: Michael S. Sgourakis, Environmental Compliance Group, LLC, 270 Vintage Drive, Turlock, CA 95382 *(Sent via E-mail to: ecg.ust@gmail.com)*
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. Three well volumes of vapor will be purged at a rate less than 200 milliliters per minute (ml/min.), including sand pack pore volume from each soil vapor probe prior to sample collection. 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.

Per the DTSC *Advisory Active Soil Gas Investigations*, April 2012, high quality soil gas data collection is driven by project-specific data quality objectives (DQOs) and can be enhanced by using a shroud and a gaseous tracer compound. This method of leak detection ensures that soil gas wells are properly constructed and the sample train components do not leak. Most gaseous tracer compounds do not affect target analyte measurements nor does their detection require sample dilution. Also, gaseous leak tracer compounds allow a quantitative determination of a leak either in the sampling train or from ambient air intrusion down the borehole.

The shroud will be designed to contain the entire sampling train and the soil gas well annulus. The sampling train will be constructed of material that does not react with the sample analytes and will not off gas or adsorb volatile compounds. The sampling equipment will be clean and shut-in tested prior to use. The gaseous leak tracer compound (isobutylene 100 ppm) concentration inside the shroud will be monitored frequently to verify initial concentrations. A photoionization detector will be used to monitor tracer gas concentrations.

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 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** or Suma canisters as described in **Section 11.0**. Samples 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.

14.0 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.