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July 1, 2008

Mr. Jerry Wickham
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Additional Characterization Work Plan**
Allright Parking
1432 Harrison St., Oakland, California
Fuel Leak Case No. RO0000266
CRA Project No. 540188

Dear Mr. Wickham:

On behalf of the Estate of A. Bacharach / Barbara Jean Borsuk, Conestoga-Rovers & Associates, Inc. (CRA) is pleased to present this *Additional Characterization Work Plan* (Work Plan) in response to the Alameda County Department of Environmental Health (ACEH) letter dated February 22, 2008 and May 7, 2008 meeting with ACEH. This Work Plan supersedes our March 9, 2007 *Soil Gas Characterization Work Plan*.

Please call me at (510) 420-3307 if you have any questions regarding this report or the project.

Sincerely,
Conestoga-Rovers & Associates, Inc.

Mark Jonas, P.G.
Senior Project Manager

Enclosure: *Additional Characterization Work Plan*

cc: Mr. Mark Borsuk, 1626 Vallejo Street, San Francisco, California 94123-5116

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**ADDITIONAL CHARACTERIZATION WORK PLAN
ALLRIGHT PARKING
1432 HARRISON STREET
OAKLAND, CALIFORNIA
Fuel Leak Case No. RO0000266**

July 1, 2008

Prepared for:

Estate of A. Bacharach / Barbara Jean Borsuk
c/o: Mr. Mark Borsuk
1626 Vallejo Street
San Francisco, California

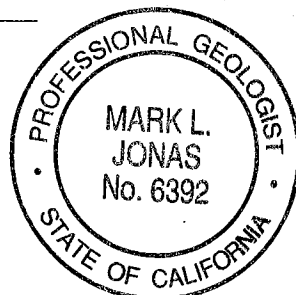
Prepared by:

Conestoga-Rovers & Associates, Inc.
5900 Hollis Street, Suite A
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CRA Project No. 540188

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ALLRIGHT PARKING
1432 HARRISON STREET
OAKLAND, CALIFORNIA
Fuel Leak Case No. RO0000266**

July 1, 2008

1.0 INTRODUCTION

On behalf of Estate of A. Bacharach / Barbara Jean Borsuk, Conestoga-Rovers & Associates, Inc. (CRA) is pleased to present this *Additional Characterization Work Plan* (Work Plan) for the above referenced site. This is in response to the Alameda County Department of Environmental Health (ACEH) letter dated February 22, 2008 and the May 7, 2008 ACEH meeting. ACEH is the lead agency for this site. Presented in this *Work Plan* are site background, site characterization, proposed scope of work, and a quality assurance project plan.

2.0 SITE BACKGROUND

2.1. Site Description

The site is located at 1432 Harrison Street, in Oakland, California, as identified in Figure 1. It currently operates as a ground-level commercial parking facility in downtown Oakland. The general area is mixed commercial and residential, but predominantly commercial.

2.2. Alice Street Property

The Alice Street Property is located at 1439 Alice Street, in Oakland, California, as identified in Figure 5. It currently operates as a multi-level commercial parking facility and Chung's TV Video Sale & Service. The Alice Street Property is bordered by Alice Street to east, a residential apartment building to the north, a parking area to the south and west.

3.0 ENVIRONMENTAL SETTING

The site is located in the Coast Range Physiographic Province, characterized by northwest-southeast trending valleys and ridges. This region lies between the Pacific Ocean to the west and the Great Valley to the east. The oldest known bedrock in the Coast Range Province is marine sedimentary and volcanic rocks that from the Franciscan Assemblage. Geologic formations in the San Francisco Bay Region range in age from Jurassic to recent Holocene.



3.1. Geology

The site is located to the west of the Oakland-Berkeley Hills on the East Bay Plain, which slopes gently to the west, towards San Francisco Bay. The San Francisco Bay is located in a broad depression in the Franciscan bedrock resulting from an east-west expansion between the San Andreas and Hayward fault systems. Unconsolidated sediments in the East Bay Plain vary in thickness, with some areas up to 1,000 feet thick. From oldest to youngest, the unconsolidated sediments are 1/ Santa Clara Formation, 2/ Alameda Formation, 3/ Temescal Formation, and 4/ artificial fill. The Early Pleistocene Santa Clara Formation consists of alluvial fan deposits inter-fingered with lake, swamp, river channel, and flood plain deposits, ranging from 300 to 600 feet thick. The Late Pleistocene Alameda Formation was deposited primarily in an estuarine environment and consists of alluvial fan deposits bound by mud deposits on the top and bottom of the formation. The Alameda Formation ranges from 26 to 245 feet thick and is subdivided into the Yerba Buena Mud, San Antonio, Merritt, and Young Bay Mud Members. The Early Holocene Temescal Formation is an alluvial fan deposit consisting primarily of silts and clays with some gravel layers. The Temescal Formation ranges from 1 to 50 feet thick, thinning toward the bay. Below any sub-base and fill, shallow sand, silt, and clay at the site most likely are Temescal Formation.

The site lithology is heterogeneous consisting of interbedded lenses of silty sand, sand, and sandy silt to the maximum explored depth of 30 feet. Near the surface, fill includes gravel and concrete road base.

3.2. Hydrogeology

The site is located in the East Bay Plain Subbasin, Groundwater Basin No. 2-9.04 (DWR 2003). The East Bay Plain Subbasin is a northwest trending alluvial basin, bounded on the north by San Pablo Bay, on the east by the contact with Franciscan basement rock, and on the south by the Nile Cone Groundwater Basin. The East Bay Plain Subbasin extends beneath the San Francisco Bay to the west. The East Bay Plain Subbasin aquifer system consists of unconsolidated sediments of Quaternary age. These include the Santa Clara Formation, Alameda Formation, Temescal Formation, and artificial fill. In the project area most rainfall occurs between November and March. The average annual rainfall is approximately 23 inches.

Throughout most of the East Bay Plain, regional water level contours show that the direction of groundwater flow is generally east to west, towards San Francisco Bay, with some localized variation. Groundwater flow direction typically correlates to topography.

From 1860 to 1930 groundwater from the East Bay Plain was the major water supply of the East Bay, before Sierra water was imported into the area. By the late 1920's the groundwater supply was too small to meet the growing population and the wells often became contaminated by seepage or saltwater intrusion. By 1929, East Bay Municipal Utility District (EBMUD) provided imported water to East Bay communities via the Mokelumne Aqueduct. This high-quality, reliable supply soon eliminated the need for local groundwater wells. In 1996, the Regional Board reviewed General Plans for Oakland and other



communities. They found that Oakland and most other cities did not have any plans to develop local groundwater resources for drinking water, due to existing or potential saltwater intrusion, contamination, or poor or limited quality (Regional Board 1999).

First water in various borings was typically encountered around 20 feet (ft) below ground surface (bgs). Monitoring well completion data is presented in Table 1. Groundwater levels in these monitoring wells have historically ranged from approximately 18 to 21 ft bgs, as presented in Table 2. Groundwater beneath the site flows primarily towards the north, with some localized flow to the south. Any vertical hydraulic gradient is currently undefined.

3.3. Land Usage

3.3.1. Site Land Usage

Documentation for land usage at the Site from 1889 through 1981 was reported in the September 13, 2007 Environmental Data Resources Inc. (EDR) report. This will be provided to ACEH in a separate transmittal. The Sanborn maps, from 1889 to 1911, apparently reports the Site address as 1220 Harrison Street, Oakland, California (rather than 1432 Harrison Street). The 1920 EDR reports the site address as 1432 Harrison Street, Oakland, California. Following is a summary previous land usage:

- 1889: Residential home
- 1903: Residential home
- 1911: Residential home
- 1925: Motor Vehicle Dept and the State Division of Motor Vehicles
- 1938: Allied Automotive Industries LTD East Bay DIV and Automotive Industries Inc.
- 1943: Broderick Harold C Garage
- 1945: Automotive Industries Inc, Eastbay Motor Co DLRS Inc, Hoyer S Oakland Garage, Allied Automotive Industries LTD East Bay DIV, Hoyer Fred H Hoyer S Oakland Garage, and Oakland Garage
- 1950: Markovits Dave Dave S Service Garage
- 1952: Garage
- 1953: Garage
- 1955: Dave S Service Garage and Markovits Dave Dave S Service Garage
- 1957: Garage
- 1959: Garage
- 1960: Garage
- 1962: Dave S Service Garage and Markovits Dave Dave S Service Garage



- 1964: Garage
- 1965: Garage
- 1967: Dave Service Garage (Automobile Repairing)
- 1969: Garage
- 1970: Dave S Service Garage and Markovits Dave S Service Garage
- 1975: B & H Body Shop and Harrison Street Garage
- 1980: American International Rent A Car & Leasing, Harrison Street Garage, and R E L Lease Co.
- 1981: Two installed UST's, owned by Douglas Parking Co., and contained Unleaded Gasoline. One UST was installed for the purpose of waste, fuel type #1.
- 1986: Roy's Auto Body is reported as a small quantity generator of Oxygenated solvents (acetone, butanol, ethyl acetate, etc.) EPA ID: CAD982039125
- Preceding 1998 To Present: Commercial Parking Facility

As seen by these results, the Site was generally used as a residence, garage, and parking facility. Figure 2 presents uses prior to its current use as a single-level parking facility. Previous uses include a hydraulic lift area, wash rack and sump, gasoline fuel pumps, and underground gasoline storage tanks. These have all been removed. Current the site is surfaced with asphalt and concrete, on ground level.

3.3.2. Alice Street Property Land Usage

To the east of the 1432 Harrison Street Site is the 1439 Alice Street Property (Figure 2). The documentation for the Alice Street property land usage from 1889 through 1981 was reported in the September 13, 2007 Environmental Data Resources Inc. (EDR) report. Sanborn maps, from 1889 to 1911, reports this property as 1253 Alice Street, Oakland, California. The 1920 EDR reports this property's address as 1439 Alice Street, Oakland, California.

Based on the Sanborn maps, the 1439 Alice Street property includes addresses from 1435 Alice Street through 1443 Alice Street. The September 13, 2007 EDR-City Directory identifies the Alice Street property with the street names of Alice Street and Alice Way interchangeably. Following is a summary of land usage for the Alice Street property:

- 1889: Residential home
- 1903: Residential home
- 1911: Residential home
- 1928: Land Division of Motor Vehicles ADA Ford MGR
- 1933: State Government Division of Motor Vehicles L A Alborelli MG, Hughes Cora Beauty Shop



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- 1943: City Club Beauty Shop
- 1943: Cherry Laura Beauty Shop
- 1945: Safeway Stores Inc., City Club Beauty Shop, Ellis John Boardman Ins., Payroll Guarantee Assn Inc.
- 1950: Oakland Garage, Auto Painting, Pac Studio, Franklin Beauty Salon, Payroll Guarantee Assn Inc.
- 1952: Oakland Garage, Auto Painting
- 1953: Oakland Garage, Auto Painting
- 1955: Bay Counties Photo Agcy, Harris & Associates Photographers Albert Kayo Harris & Associates
- 1957: Oakland Garage, Auto Painting
- 1959: Oakland Garage, Auto Painting
- 1960: Oakland Garage, Auto Painting
- 1962: Harris & Associates Photographers Albert Kayo Harris & Associates, Kayo Harris & Associates, Kosmos Chris G & Associates
- 1964: Oakland Garage, Auto Painting
- 1965: Oakland Garage, Auto Painting
- 1967: Oakland Garage, Auto Painting, Harris Photos Photography, Kosmos & Associates Inc. Restr, Sups & Equipment, First Temple of Oakland CH, Monroe Mitzie REV.
- 1969: Oakland Garage, Auto Painting
- 1970: Kosmos & Associates Inc.
- 1975: Leong T S Photo Lab, Kosmos & Associates Inc.
- 1980: Leong T S Photo Lab, Agur Gordon, Rieser & Associates XK The Communicating Group, Rieser Robert E & Associates Audiovisual Production & Graphical Design, Williamson Jack Motion Picture Productions
- 1986: Leong T S Photo Lab, The Communicating Group, XK Photo Services
- 1991 to Present: Chung's TV Video Sale & Service
- ? to Present: Commercial Parking

A more detailed description of land use associated with the former waste oil USTs on the Alice Street property was not available. These waste oil USTs were removed in 1993.



4.0 INVESTIGATIONS AND ACTIVITIES

4.1.1. Site Investigations and Activities

July 1990 through May 1993 - Soil Boring Investigations: In July and September 1990, Subsurface Consultants (SCI) of Oakland, California drilled seven (7) soil borings near the gasoline USTs and between the hydraulic lift area, the wash rack, and the sump. Soil samples were analyzed and petroleum hydrocarbons were detected. Geophysical investigation performed by JR Associates (JRA) was performed in August of 1990. JRA detected anomalies in the subsurface near the hydraulic lift area.

In January and February 1992, RGA Environmental Consulting of Emeryville, California drilled eleven (11) soil borings and analyzed soil samples from various depths near the gasoline USTs, the pump island, and between the hydraulic lift area, the wash rack, and the Sump.

In the RGA Preliminary Site Assessment Report dated April 2, 1992, RGA states the site once was a "Chevron Service Station". During the review of the September 2007 EDR and prior investigation documentation, CRA was unable to verify this statement.

In May 1993, Levine-Fricke, Inc. (Levine-Fricke) of Emeryville, California drilled two (2) soil borings near the gasoline UST area and analyzed soil samples down to a depth of 24.5 feet (ft) below ground surface (bgs).

December 1993 - Removal of USTs: In December 1993, Levine-Fricke removed two (2) underground storage tanks (USTs) from the site. The two (2) 1,000-gallon, single-walled, steel, gasoline USTs were located under the sidewalk on Harrison Street, with gasoline dispensers located about 20 ft east of the USTs. In addition, three hydraulic lifts, one vault, one wash rack sump, and associated piping were reportedly excavated and removed from the site. A total of approximately 240 cubic yards of hydrocarbon-impacted soil was reportedly removed from these areas.

January 1994 - Installation of Monitoring Well: Monitoring well MW-1 was installed by Levine-Fricke at the former gasoline tank area.

July 1994 - Subsurface Investigation: In July 1994, Levine-Fricke conducted a subsurface investigation to assess the extent of hydrocarbons in soil and groundwater. One soil boring in Harrison Street was drilled and sampled and one additional well was installed onsite: MW-2.

July 1995 - Subsurface Investigation: In July 1995, Cambria Environmental Inc. (Cambria) conducted a subsurface investigation to further define the extent of hydrocarbons in soil and groundwater. Cambria drilled nine (9) soil borings to collect soil samples and three (3) boring to collect grab groundwater samples. Petroleum hydrocarbons were detected in both soil and groundwater.

August 1996 - Soil Vapor Extraction Test: In August 1996, Cambria conducted a soil vapor extraction test on existing groundwater monitoring wells MW-1 and MW-2. Results of the test suggested that the subsurface consists of moderate permeability materials such as sands and silty sands, and that soil vapor extraction could effectively remove hydrocarbons from the subsurface soils.



October 1996 Subsurface Investigation: In October 1996, Cambria conducted an additional subsurface investigation to further define the extent of hydrocarbons in soil and groundwater. Five (5) soil borings were drilled and three (3) of the borings were converted to monitoring wells MW-4, MW-5, and MW-6. Two additional angled borings were drilled to assess the impact of hydrocarbons from two closed-in-place tanks located directly up-gradient of the site.

July 1999 – Coaxial Remediation Wells: In July 1999, Cambria installed four (4) coaxial remediation wells near the former gasoline USTs for vapor extraction and air sparging.

December 2001 – April 2005 Soil Vapor Extraction/Air Sparge Remediation: In December 2001, Cambria supervised the installation and initiated active remediation with a site-specific soil vapor extraction (VES) and air sparging (AS) system. The system ran under a Bay Area Air Quality Management District (BAAQMD) permit. System influent, mid-influent, and effluent vapor samples were collected and analyzed. On April 30, 2005 remediation using the VES/AS system ceased due to low influent vapor concentrations and hydrocarbon mass removal rates. During operation of the SVE/AS system, approximately 9,939 pounds of hydrocarbons were extracted from the site. On June 2, 2005, the SVE/AS system was removed from the property.

August 2006 – Risk Assessment: A Tier 1 and 2 risk assessment was performed using existing data. Based on this analysis, it was determined that there is no significant commercial risk for indoor and outdoor vapor inhalation from benzene in soil and/or groundwater. Also, there is no significant residential risk from outdoor vapor inhalation from benzene. Some elevated concentrations of benzene in soil indicated that a potential may exist from indoor residential vapor inhalation. Currently no indoor residential receptors apparently exist in areas with elevated concentrations of benzene associated with the site. Because of this preliminary finding, Cambria presented a March 9, 2007 *Soil Gas Characterization Work Plan*.

March 2007 - Soil Gas Characterization Work Plan: In March 9, 2007, Cambria submitted a *Soil Gas Characterization Work Plan* to ACEH, as recommended in the August 2006 *Risk Assessment*. Cambria proposed six (6) onsite soil gas sampling locations. ACEH did not allow implementation of *Soil Gas Characterization Work Plan*, apparently due to lack of an assigned ACEH project manager. This June 2008 *Additional Characterization Work Plan*, submitted by CRA, supersedes the previous March 9, 2007 *Soil Gas Characterization Work Plan*.

Groundwater Monitoring: Periodic groundwater monitoring and sampling has been performed since May 1994. Monitoring well construction details are presented in Table 1. Historical and recent groundwater analytical data are presented in Table 2.

4.1.2. Alice Street Property Investigations and Activities

July 1990 through May 1993 - Soil Boring Investigations: In July and September 1990, Subsurface Consultants (SCI) of Oakland, California drilled one (1) soil borings near the waste oil tanks. Soil samples were analyzed and petroleum hydrocarbons were detected. Geophysical investigation performed by JR Associates (JRA) was performed in August of 1990. JRA found the waste oil tanks full of unknown liquid. In August 1991, SCS Engineers of Dublin, California sampled the contents of the waste oil tanks. SCS reported the presence of oil and grease, diesel, and volatile hydrocarbons with in the waste oil tank samples. SCS noted the quantities of contaminants to be low.



In January and February 1992, RGA Environmental Consulting of Emeryville, California drilled twelve (12) soil borings and analyzed soil samples from various depths near the waste oil tanks.

December 1993 - Removal of USTs: In December 1993, Levine-Fricke removed and excavated two (2) waste-oil tanks and related piping, located under the sidewalk on Alice Street. It was observed, both waste oil UST's exhibited cracking along the seams. A total of approximately 60 cubic yards of hydrocarbon-impacted soils were reportedly removed from around the waste oil UST's and related piping. The concrete spacer, between the two waste oil tanks, was reportedly closed in place.

July 1994 - Subsurface Investigation: In July 1994, Levine-Fricke conducted a subsurface investigation to assess the extent of hydrocarbons in soil and groundwater. Three soil borings in Alice Street were drilled. Sampling points GW-2, GW-3, and MW-3 were sampled for soil and groundwater. MW-3 was converted into a monitoring well, located to the east, in Alice Street.

Groundwater Monitoring: Quarterly groundwater monitoring and sampling from MW-3 has been performed from May 2004 through March 2005 and December 2000 through June 2002 by Cambria. Annual ground water monitoring and sampling from MW-3 has been performed from December 2000 to present by Cambria and than CRA. Monitoring well construction detail for MW-3 is presented in Table 1. Historical and recent groundwater analytical data are presented in Table 2.

5.0 CHEMICAL DISTRIBUTION

5.1. Hydrocarbon Distribution in Soil

Site

Pre-VES/AS remediation soil concentrations, prior to December 2001, are presented on Figure 3 and Tables 3 and 4. Elevated soil hydrocarbon concentrations existed in the upper 30 feet in the area of the former USTs and gasoline dispensers. This occurred under both vadose (unsaturated) zone and saturated conditions. The vertical extent of hydrocarbons appeared to significantly decrease by 30 ft bgs.

The USTs, fuel dispensers, hydraulic lifts, a vault, a wash rack sump, associated piping, and approximately 240 cubic yards of hydrocarbon-impacted soil were removed in December 1993. VES/AS remediation in the area of site-related former USTs and gasoline dispensers occurred between December 2001 and April 2005. Current concentrations in soil are unknown, but they should have decreased significantly after removal of the USTs and associated soil and active VES/AS remediation in 2001 to 2005 removed approximately 9,939 pounds of hydrocarbons from the former gasoline USTs and dispenser areas.

Significant hydrocarbon concentrations have been found adjacent to existing and apparently closed in-place USTs associated with the neighboring 1424 Harrison Street property. These abandoned USTs, not associated with the Site, may have significantly impacted soil and groundwater with hydrocarbon contamination.



Some slightly elevated hydrocarbons concentrations in soil also existed prior to removal of the hydraulic lifts and wash rack sump in 1993. Current concentrations are unknown.

Alice Street Property

Very low to no detection of petroleum hydrocarbons are present across most of the Alice Street Property, as identified in Figure 6 and in Tables 3 and 4. Some slightly elevated concentration of Total Petroleum Hydrocarbons as gasoline (TPHg), TPH as diesel (TPHd), and Total Oil & Grease (O&G) were detected adjacent to the former waste oil tanks. No benzene was detected. One sample had a very low level of PCB, at 0.009 mg/kg, and all the others were non-detect. All these samples were collected in September 1990 and January 1992. These waste oil tanks and approximately 60 cubic yards of impacted soil were removed in December 1993. Current concentrations are unknown, but they are probably fairly low, if any.

5.2. Metal Distribution in Soil

Site

Apparently slightly elevated concentrations of mercury (Hg) and arsenic (As) appear to exist in vadose zone soil. Samples were collected at the former hydraulic lift and wash rack sump areas. Concentrations are provided on Figure 3 and in Table 4. The maximum detected concentrations of Hg and As were 45.4 mg/kg and 26.6 mg/kg, respectively. Samples were collected from 5 and 15 ft bgs. Analytical results did not show a discernable trend with respect to areal distribution and depth. The origin of these apparently elevated concentrations is unknown.

Alice Street Property

Apparently elevated concentrations of Hg and As also appear to exist in vadose zone soil on the Alice Street property. Samples were collected at 2 ft bgs. Mercury samples were also collected from 5 and 8 ft bgs. The maximum detected concentration of Hg and As were 73.0 mg/kg and 47.3 mg/kg, respectively. There was no discernable trend with respect to areal distribution. Concentration of Hg appeared to slightly decrease with depth. Analytical results are presented on Figure 6 and Table 4.

5.3. Hydrocarbon Distribution in Groundwater

Site

Elevated concentrations of gasoline-range hydrocarbons have been previously detected in groundwater sampled from monitoring well MW-1, located at the former gasoline USTs, and monitoring wells MW-2, MW-4, and MW-5, located downgradient of the USTs. Concentrations in MW-1 decreased significantly, apparently due to active VES/AS remediation between December 2001 and April 2005 at the location of the former USTs, but current concentrations still appear elevated. Concentrations in MW-2, located just downgradient of the former USTs and VES/AS remediation system, decreased significantly in 2002 to



2005, but have recently increased. Both of these wells are downgradient and possibly are impacted by the area around the closed in-place USTs associated with the adjacent property at 1424 Harrison Street. Groundwater concentrations associated with downgradient monitoring well MW-4 appear to have significantly decreased. Groundwater concentrations from monitoring well MW-5 have increased. Currently, the downgradient extent of groundwater contaminated with petroleum hydrocarbons is undefined.

Local and downgradient groundwater concentrations may be impacted by other sources not associated with the Site. Specifically, soils around the apparently closed in-place USTs, at 1424 Harrison Street, may be impacting groundwater. It is also possible that other sites may be impacting groundwater. An April 22, 2008 letter report titled *Neighboring Sites* was submitted to ACEH for consideration of other potential sites impacting local groundwater.

Alice Street Property

Downgradient and possible cross-gradient of the former waste oil USTs associated with the Alice Street property, monitoring well MW-3 did not have detectable concentrations of gasoline-range hydrocarbons, including TPHg and BTEX. A grab groundwater sample was also collected at GW-2. No gasoline-range hydrocarbons were detected. Table 2 presents analytical results for petroleum hydrocarbons in groundwater. Figure 7 presents hydrocarbon results for groundwater collected adjacent to the Alice Street property.

6.0 PROPOSED SCOPE OF WORK

This section presents the scope of work for soil gas investigation, subsurface borings for soil and grab groundwater samples, monitor well installation, and a sensitive receptor survey. Proposal monitoring well and sampling locations are presented on Figure 10.

6.1. Soil Gas Investigation

Site

To evaluate the potential for vapor intrusion, we recommend collecting soil gas samples from five locations. The proposed locations include three along Harrison Street, one in the 1410 Harrison Street parking lot, and one onsite adjacent to the former hydraulic lift, sump, and wash rack area. Soil gas samples will be analyzed for TPHg and BTEX. The sample from the former hydraulic lift, sump, and wash rack area will also be analyzed for Mercury (Hg).



Alice Street Property

Due to reported elevated concentrations of mercury (Hg) in soil, one soil vapor sample from the Alice Street property will be analyzed for Hg. Samples of soil gas will also be analyzed for TPHg and BTEX.

6.1.1. Soil Gas Sampling Procedures and Analyses

After pre-sampling preparations are complete, the field program will be initiated. Assuming the absence of subsurface obstructions, CRA is currently anticipates that six (6) soil gas samples will be collected from approximately 5 feet bgs using soil vapor points. A hand auger will be used to advance a borehole to install each temporary soil gas point (probe). Appendix B presents standard field procedures for installation soil gas (vapor) points and sampling. Appendix B also has the sampling requirements for mercury analysis by Data Chem.

The following Table 6-1 presents soil vapor analysis, sampling containers, preservation, detection limit, and holding time.

**Table 6-1
Soil Gas Analysis, Sampling Containers, Preservatives, Detection Limits, and Holding Times**

Analysis and Method	Sampling Containers	Preservatives	Detection Limit (ug/m ³)	Holding Times
TPHg (Method TO-3)	Summa Canister	None	100	30 days
Benzene, Ethylbenzene, Toluene, Xylenes (Method TO-15)	Summa Canister	None	1.6, 2.2, 1.9, 2.2	30 days
Butane, Isobutane, Propane (Method TO-15, TIC) - For leak detection.	Summa Canister	None	6, 6, 4.5	30 days
Mercury (Method 6009)	Solid Sorbent Tube	None	~10	30 days

6.2. Soil Boring Investigation

Site

To characterize post-remediation soil concentrations, we proposed drilling one borehole to 50 ft bgs, in the area where the former gasoline USTs were located adjacent to Harrison Street. Soil samples will be collected approximately every five feet and analyzed for TPHg and BTEX. Groundwater will not be sampled for analysis.



Alice Street Property

Assuming a limited assess, direct push rig can attain entry into the basement area of the Alice Street property, we propose advancing one soil boring to 30 ft bgs north of the former waste oil tank area adjacent to Alice Street. Soil samples will be collected at two ft bgs, at five ft bgs, and thereafter every five feet down to 30 ft bgs. Soil samples will be analyzed for TPHg, BTEX, TPHd, TPHmo, Total Oil & Grease, and Metals (Ag, As, Be, Cd, Cr, Hg, Pb, Se). One groundwater sample will be collected around 20 ft bgs and analyzed for TPHg, BTEX, TPHd, TPHmo, Total Oil & Grease, and Metals (Ag, As, Be, Cd, Cr, Hg, Pb, Se).

6.2.1. Soil Boring Sampling Procedures and Analyses

After pre-sampling preparations are complete, a field program using a C-57 drilling contractor with a geoprobe (or similar equipment) will be implemented for soil and grab groundwater sampling and analysis. Standard field procedures for drilling and sampling are presented in Appendix B *Standard Field Procedures*. These procedures provide general field guidance.

Soil Sampling

Soil samples will be collected from the boring locations proposed in Figure 10. At the boring at the Site, in the area with the former gasoline USTs, soil samples will be collected approximately every five feet down to a depth of 50 ft bgs. Assuming a limited assess, direct push rig can attain entry into the basement area of the Alice Street property, one boring will be sampled every five feet down to an anticipated depth of 30 ft bgs. If staining or elevated PID reading are identified in either of these borings, additional samples may be collected.

Soil Sample Analysis

For the boring at the Site, soil samples will be analyzed for TPHg and BTEX. For the boring at the Alice Street property, soil samples will be analyzed for TPHg, BTEX, TPHd, TPHmo, Total Oil & Grease, and Metals (Ag, As, Be, Cd, Cr, Hg, Pb, Se). Table 6-2 presents soil sample analysis, sampling containers, preservation, detection limit, and holding time.

**Table 6-2
Soil Sample Analysis, Sampling Containers, Preservatives, Detection Limits, and Holding Times**

Analysis and Method	Sampling Containers	Preservatives	Detection Limit (mg/kg)	Holding Times
TPHg (8015M)	Tube or Glass Containers	Ice	1.0	14 days
BTEX (8021M)	Tube or Glass Containers	Ice	0.005	14 days
TPHd & TPHmo (8015M)	Tube or Glass Containers	Ice	1.0 & 5.0	14 days



Analysis and Method	Sampling Containers	Preservatives	Detection Limit (mg/kg)	Holding Times
Total Oil & Grease (418.1)	Tube or Glass Containers	Ice	50	14 days
Metals: Ag, As, Be, Cd, Cr, Hg, Pb, Se (EPA 6020)	Tube or Glass Containers	Ice	~0.5	28 days

Grab Groundwater Sampling

Assuming a limited assess, direct push rig can attain entry into the basement area, a grab groundwater sample will be collected from the soil boring on the Alice Street property. The groundwater sample will be collected from an approximate depth of 20 ft bgs.

Grab Groundwater Analysis

For the boring at the Alice Street property, the grab groundwater sample will be analyzed for TPHg, BTEX, TPHd, TPHmo, Total Oil & Grease, and Metals (Ag, As, Be, Cd, Cr, Hg, Pb, Se). Table 6-3 presents grab groundwater sample analysis, sampling containers, preservation, detection limit, and holding time.

Table 6-3
Grab Groundwater Analysis, Sampling Containers, Preservatives, Detection Limits, and Holding Times

Analysis and Method	Sampling Containers	Preservatives	Detection Limit (ppb)	Holding Times
TPH g (8015M)	VOA	HCl	~50	14 days
BTEX (8021m or 8260)	VOA	HCl	~0.50	14 days
TPHd & TPHmo (8015M) with silica gel cleanup	Amber	HCl	~50 & ~250	14 days
Total Oil & Grease (418.1) with silica gel cleanup	VOA	HCl	~0.001	14 days
Metals: Ag, As, Be, Cd, Cr, Hg, Pb, Se (EPA200.8)	250 ml Plastic	HNO ³	~0.012 to ~0.5	28 days

6.3. Monitoring Well Installation

The extent of the downgradient plume to the northwest is undefined. We propose installing one downgradient monitoring wells in the vicinity of the 1535 Harrison Street parking area (Figure 10). The standard field procedure for installing this monitoring well is in Appendix B *Standard Field Procedures*.



These procedures provide general field guidance. The well will be screened from approximately 15 to 25 ft bgs.

During boring activities prior to well installation, if soil staining or elevated PID measurements are identified, soil samples will be collected and analyzed for TPHg and BTEX. After the well has been installed, it will be surveyed and included in the periodic groundwater monitoring program with other monitoring wells.

6.4. Sensitive Receptor Survey

A sensitive receptor survey will be performed. This study will include a well survey and identification of potential sensitive receptors.

6.4.1. Well Survey

To identify potential drinking water wells, we will request *Well Driller Completion Reports* from the California Department of Water Resources (DWR) for all wells located within a ½ mile radius of the site. We will also contact Alameda County Public Works Agency to get a map and table of wells located within a ½ mile radius of the site. In addition, we will contact local agencies to determine if any municipal wells are located within a ½ mile radius of the site. Potential drinking water and municipal wells will be provided on a table and figure.

6.4.2. Sensitive Receptors

To identify potential sensitive receptors, we will identify and discuss all surface water bodies within ½ mile radius of the site and discuss any properties with sensitive land usage (i.e. schools, daycare, hospitals, and etc.) within 500 ft of the site.

7.0 PRE-SAMPLING PROCEDURES, DOCUMENTATION, AND WASTE MANAGEMENT

7.1. Pre-Sampling Preparations

Prior to performing on-site sampling activities, the proposed sampling approach will be approved, a site-specific Health and Safety Plan (HSP) will be prepared, utility clearance will be performed, and a boring permit will be submitted and approved.

7.1.1. Approval of Sampling Approach

This *Work Plan* presents the proposed scope of work for the sampling approach. The scope of work shall be approved by the ACEH prior to initiating field activities.



7.1.2. Health and Safety Plan

A site-specific HSP will be prepared for the proposed field activities. The HSP will be maintained on-site during field work

7.1.3. Utility Clearance

Prior to subsurface field activities, proposed boring locations will be marked with white paint and Underground Service Alert (USA) will be notified to perform a utility survey of USA members. Because of the limits of the USA survey, a utility locating service will be subcontracted to also perform an additional utility survey of those areas proposed for borehole sampling. This will help to identify subsurface utilities at boring locations. In addition, initially a hand auger or air knife may be used to clear the borehole to a reasonable depth and to collect soil samples.

7.1.4 Access Agreement

For locations proposed for off-site borings on private property, we will attempt to acquire written authorization with an access agreement. We will present the agreement to selected property owners. We cannot guarantee that property owner will agree to access their property, in a timely and reasonable fashion.

7.1.5 Permit

Based on regulatory requirements of the local agency, a soil boring permit will be obtained from Alameda County Public Works Agency.

7.2 Sample Documentation

Sampling containers will be labeled in the field with the job number, sampling location, date and time of sample, and requested analysis. A chain-of-custody record will be initiated and updated throughout handling of the samples.

7.3 Sampling Locations

Following borehole sampling, sampling locations will be defined based on field measurements from existing structures. Borehole sampling locations will be identified on a scaled figure.

7.4 Investigation Derived Waste

All investigation derived waste (IDW) will be temporarily stored on-site in sealed Department of Transportation-approved drums or other appropriate container(s). The drums will be labeled with the



appropriate boring(s) identification number(s), date of collection, and nature of contents. All drummed IDW will be properly disposed of by the client.

8 REPORT

After receiving analytical results from the laboratory, an *Additional Characterization Report* will be prepared that will include the following:

- A summary of the site background and history,
- Description of drilling and sampling methods,
- Lithologic and well construction logs,
- Tabulated results,
- A site map showing the boring locations,
- Analytical reports and chain-of-custody documentation,
- A discussion of hydrocarbon distribution at the site,
- Our conclusions and recommendations.

9 QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) is intended to define procedures to facilitate the acquisition of accurate and reliable data.

9.1 Project Organization

Mark Borsuk, on behalf of the Sydney & Barbara Borsuk Trust and the Shiela Siegel Trust, is currently responsible for the site. CRA works for this client to provide consulting and sampling services. Subcontractors will be used for drilling, laboratory analysis, and independent utility clearance. Alameda County Health Agency is the lead agency and will provide oversight for sampling activities. Documents will be sent to the client and the lead agency for their consideration. Underground Service Alert (USA) will be contacted prior to performing any subsurface activities. Following are principal contacts for organization currently associated with the project:

Client
Mark Borsuk
1626 Vallejo Street
San Francisco, CA 94123
mark@borsuk.com
415/ 922-4740; 415/ 922-1485fax

Conestoga-Rovers & Associates, Inc.
Mark Jonas, R.G
510/420-3307; 510/420-9170 fax
510/385-0022 mobile
mjonas@crawold.com
5900 Hollis Street, Suite A
Emeryville, CA 94608



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Alameda County Health Agency
Mr. Jerry Wickham
510/567-6700; 510/567-6765
jerry.wickham@acgov.org
1131 Harbor Bay Parkway, 2nd Floor

Alameda County Public Works Agency
James Yoo (for Drilling Permit)
510/670-6633; 510/782-1939 fax
Jamesy@acpwa.org
399 Elmhurst Street, Hayward, CA 94544

Soil Gas Laboratory
Air Toxics Ltd.
180 Blue Ravine Road, Suite B
Folsom, CA 95630
916/985-1000

Soil Gas Laboratory (Hg)
Data Chem
960 W. LeVoy Drive
Salt Lake City, Utah 84123
800/280-8071

Soil & Groundwater Analytical Laboratory
McC Campbell Analytical
1534 Willowpass Road
Pittsburg, California 94565
Angela Rydelius
877/252-9262; 925/252-9269 fax
main@mcccampbell.com

9.2 Quality Assurance Objectives

The overall quality assurance objective is to develop and implement procedures for field sampling; chain-of-custody, laboratory analysis, and reporting that will provide results that are defensible and reliable. Quality assurance objectives for accuracy, precision, and method detection limits are discussed as follows:

Accuracy

The criterion for accuracy is a measurement of bias that exists in a measurement system. It refers to the degree of agreement of a measurement, X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T. Accuracy can also be assessed by using percent bias and percent recovery information. Accuracy is difficult to measure for the entire data collection activity and specifically the sampling component. The criteria for accuracy is best addressed using laboratory matrix spikes.

Precision

The criterion for precision is a measure of the reproducibility of replicate analyses made under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements as compared to their average value. The overall precision of each data collection activity should take into account both field sampling precision and analytical precision. The specific criterion for precision for each parameter is detailed within the individual analytical test method. If groundwater is sampled, a blind



duplicate ground water sample may be collected and assessed as a means of assessing both sampling and analytical reproducibility and as a measure of the data collection activity's precision. The duplicate sample would be analyzed for the same suite of analyses as the original sample. All results will be included in a report.

Method Detection Limits

Anticipated method detection limits are based on a relatively standard sample with a manageable amount of interference. The specific character of a sample with respect to high concentrations of multiple contaminants, can increase the actual detection limit above the anticipated method detection limit

9.3 Sampling Procedures

Sampling procedures are presented in Section 6.0 *Proposed Scope of Work*.

9.4 Sample Custody Procedures and Documentation

Chain-of-custody procedures and documentation are covered in Section 6.0 *Proposed Scope of Work*.

9.5 Field and Laboratory Calibration Procedures

Field Calibration Procedures

If a PID is used, it will be calibrated in the office or at an equipment supplier, prior to use in the field. If necessary, the PID will also be calibrated periodically in the field.

Laboratory Calibration Procedures

The analytical laboratory has calibration procedures as required by the current analytical Standard Methods and their own laboratory Quality Assurance/Quality Control (QA/QC) plan. The details associated with all the specific laboratory calibration procedures are available from the laboratory upon request.

9.6 Analytical Procedures

Analytical methods to be used are presented in Section 6.0 *Proposed Scope of Work*. Specific laboratory procedures associated with each method are available upon request.

9.7 Certified Analytical Laboratory

Pursuant to Health and Safety Code Section 25198, a state-certified laboratory will perform analytical services. For this project it is anticipated that Air Toxics Ltd, a California-certified laboratory with Department of Health Services (DHS) License #02110CA, or Data Chem, also a California-certified laboratory with DHS License #01150CA will perform soil gas analytical services. Data Chem will analyze



the soil gas samples for mercury. McCampbell Analytical, a California-certified laboratory with DHS License #1644, will perform soil and groundwater analytical services.

9.8 Data Assessment and Corrective Actions

Data Assessment

Data assessment within the analytical laboratory is defined by the specific requirements for the standard analytical method and the laboratory's QA/QC program. Procedures for analytical accuracy, precision, and completeness are in laboratory documents, available upon request. Accuracy and precision are also discussed in Section 9.2 "Quality Assurance Objectives." Completeness of analytical data is a measure of the amount of valid data obtained from the measurement system compared with the amount that was expected under normal conditions.

The analytical laboratories will submit QC documentation with the analytical results. QC documentation typically includes a case narrative describing conformance; surrogate recoveries; spike amount(s), control limits, accuracy, and precision; calibration summaries; and a GC/MS internal standard summary.

Field data and analytical results will be evaluated by a Professional Geologist.

Corrective Actions

Unacceptable conditions or data, nonconformance with the QA procedures, or other deficiency may require corrective actions. A corrective action may be necessary if the nonconformance is of program significance. If required, the action to correct the nonconformance will be developed, initiated, and implemented.

Corrective action(s) may include:

- Reanalyzing the samples, if holding time permits.
- Resampling and reanalyzing.
- Evaluating and amending the sampling and analytical procedures.
- Accepting the data and acknowledging its level of uncertainty.

Necessary corrective actions will be documented.

9.9 Reporting Procedures

Reporting procedures for measurement of system performance and data quality are part of the laboratory's operating procedures and documentation is available upon request. Quality control documentation will be presented with analytical results from the laboratory.



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9.10 Data Management

Laboratory data management, data reduction, and reporting requirements are in the laboratory's QA/QC program and operating procedures. Documentation from the laboratory is available upon request. Independent third-party validation will not be performed. Analytical laboratories perform an internal review of analytical and QC results prior to release of a data package signed by a laboratory representative.

Laboratory results and associated QC documentation will be presented in a report following field activities and sample analysis.

9.11 Internal Quality Control

Quality control is defined as the routine application of procedures for obtaining prescribed standards of performance. The procedures used for field work are discussed throughout this report, under Section 6.0 *Proposed Scope of Work*. Standards of performance are discussed in this section of the Work Plan. Laboratory documentation on standard analytical methods and the laboratory's QA/QC program is available upon request.



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EXPLANATION

MW-2 ● Groundwater monitoring well

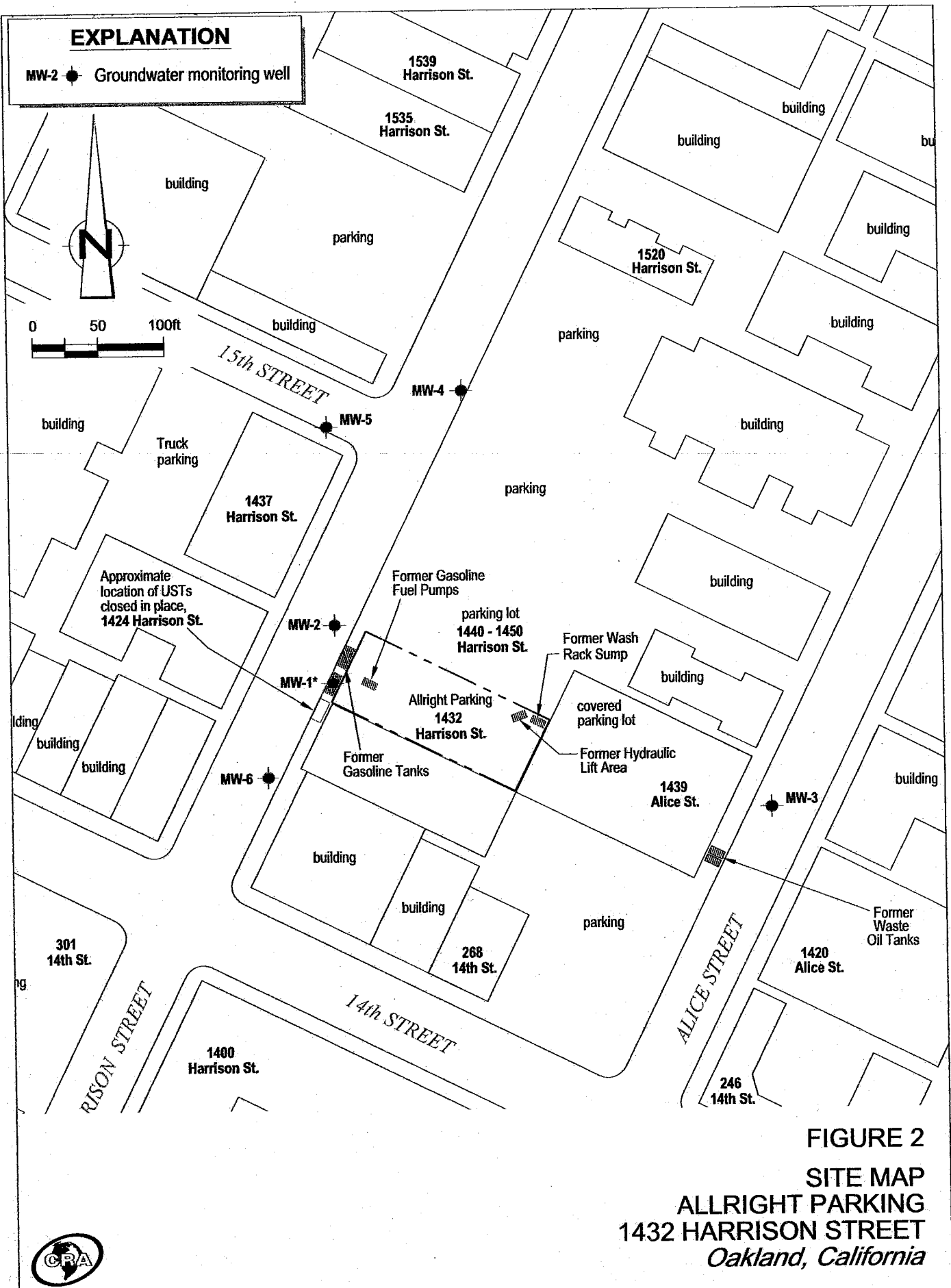
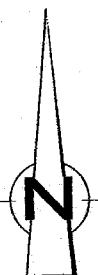
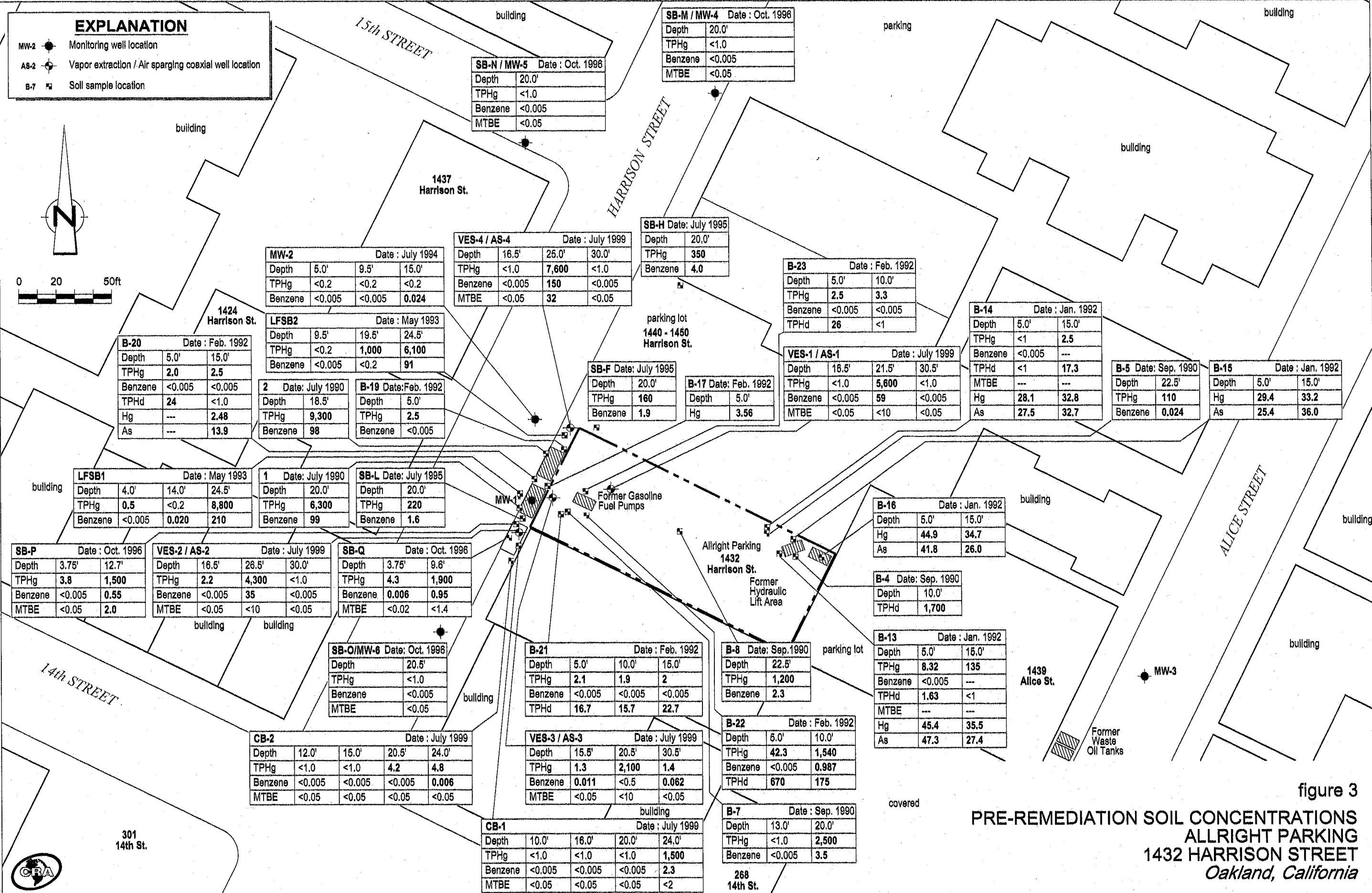


FIGURE 2
SITE MAP
ALLRIGHT PARKING
1432 HARRISON STREET
Oakland, California



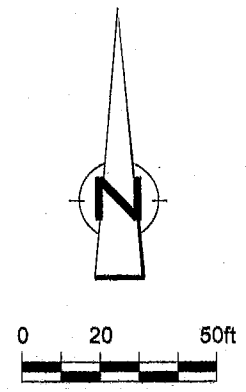


EXPLANATION

MW-2 ● Monitoring well location

AS-2 ○ Vapor extraction / Air sparging coaxial well location

B-7 ■ Soil sample location



Well/Sample ID	Date	Depth	TPHg	Benzene	MTBE	Hg	As
SB-M / MW-4	Oct. 1996	20.0'	<1.0	<0.005	<0.05		
SB-N / MW-5	Oct. 1996	20.0'	<1.0	<0.005	<0.05		
SB-H	July 1995	20.0'	350	4.0			
VES-4 / AS-4	July 1999	16.5', 25.0', 30.0'	<1.0, 7,600, <1.0	<0.005, 150, <0.005	<0.05, 32, <0.05		
MW-2	July 1994	5.0', 9.5', 15.0'	<0.2, <0.2, <0.2	<0.005, <0.005, 0.024			
SB-F	July 1995	20.0'	160	1.9			
B-23	Feb. 1992	5.0', 10.0'	2.5, 3.3	<0.005, <0.005			
B-14	Jan. 1992	5.0', 15.0'	<1, 2.5	<0.005, ---			
VES-1 / AS-1	July 1999	16.5', 21.5', 30.5'	<1.0, 5,600, <1.0	<0.005, 59, <0.005	<0.05, <10, <0.05		
B-5	Sep. 1990	22.5'	110	0.024			
B-15	Jan. 1992	5.0', 15.0'	29.4, 33.2	25.4, 36.0			
B-20	Feb. 1992	5.0', 15.0'	2.0, 2.5	<0.005, <0.005			
LFSB2	May 1993	9.5', 19.5', 24.5'	<0.2, 1,000, 6,100	<0.005, <0.2, 91			
2	July 1990	18.5'	9,300	98			
B-19	Feb. 1992	5.0'	2.5	<0.005			
LFSB1	May 1993	4.0', 14.0', 24.5'	0.5, <0.2, 8,800	<0.005, 0.020, 210			
1	July 1990	20.0'	6,300	99			
SB-L	July 1995	20.0'	220	1.6			
SB-P	Oct. 1996	3.75', 12.7'	3.8, 1,500	<0.005, 0.55	<0.05, 2.0		
VES-2 / AS-2	July 1999	16.5', 26.5', 30.0'	2.2, 4,300, <1.0	<0.005, 35, <0.005	<0.05, <10, <0.05		
SB-Q	Oct. 1996	3.75', 9.8'	4.3, 1,900	0.006, 0.95	<0.02, <1.4		
SB-O / MW-6	Oct. 1996	20.5'	<1.0	<0.005	<0.05		
B-21	Feb. 1992	5.0', 10.0', 15.0'	2.1, 1.9, 2	<0.005, <0.005, <0.005	16.7, 15.7, 22.7		
B-8	Sep. 1990	22.5'	1,200	2.3			
B-4	Sep. 1990	10.0'	1,700				
B-16	Jan. 1992	5.0', 15.0'	44.9, 34.7	41.8, 26.0			
B-13	Jan. 1992	5.0', 15.0'	8.32, 135	<0.005, ---	1.63, <1		
B-22	Feb. 1992	5.0', 10.0'	42.3, 1,540	<0.005, 0.987	670, 175		
CB-2	July 1999	12.0', 15.0', 20.5', 24.0'	<1.0, <1.0, 4.2, 4.8	<0.005, <0.005, <0.005, 0.006	<0.05, <0.05, <0.05, <0.05		
B-7	Sep. 1990	13.0', 20.0'	<1.0, 2,500	<0.005, 3.5			
CB-1	July 1999	10.0', 16.0', 20.0', 24.0'	<1.0, <1.0, <1.0, 1,500	<0.005, <0.005, <0.005, 2.3	<0.05, <0.05, <0.05, <2		

figure 3
PRE-REMEDIATION SOIL CONCENTRATIONS
ALLRIGHT PARKING
1432 HARRISON STREET
Oakland, California

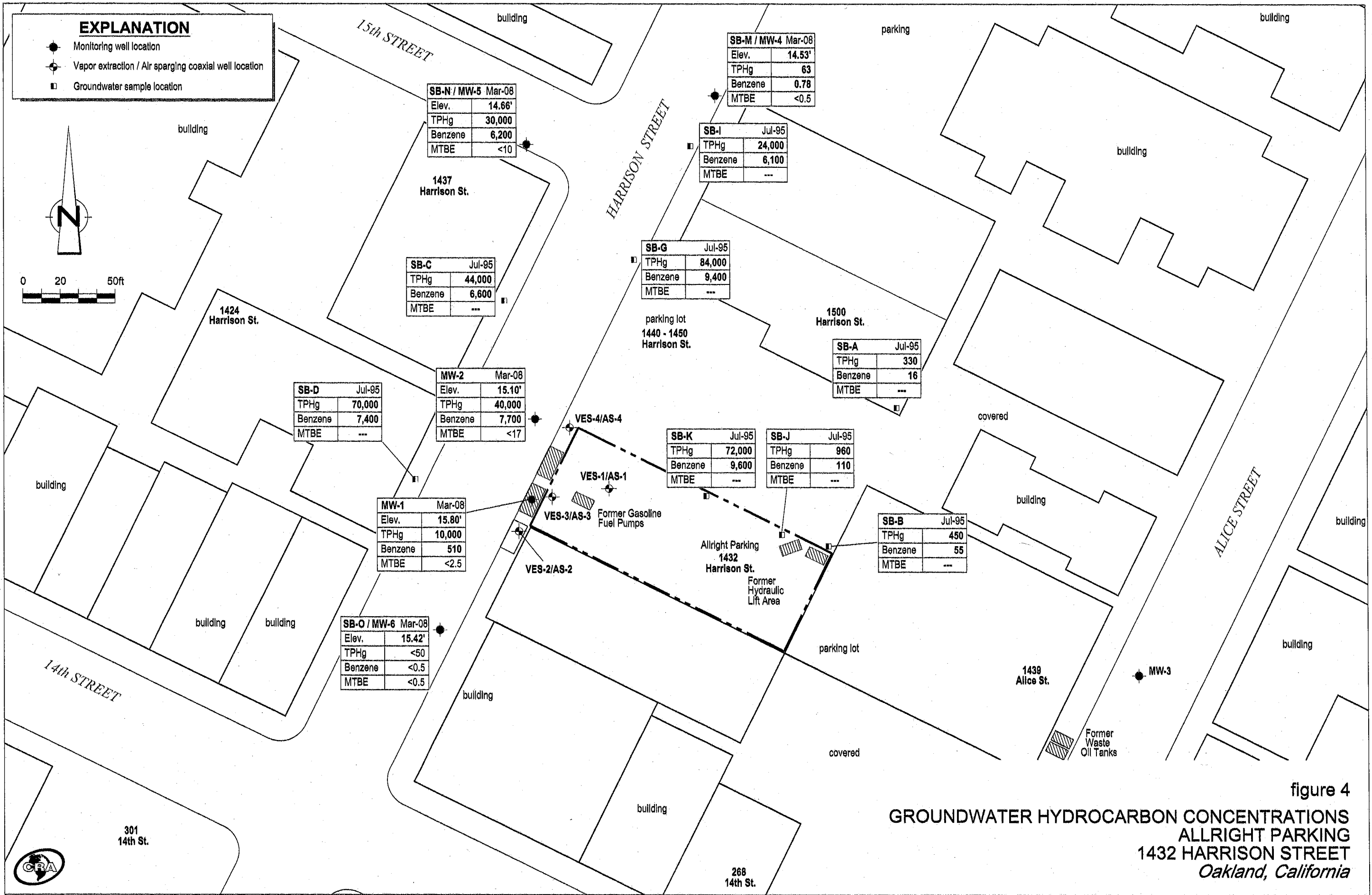
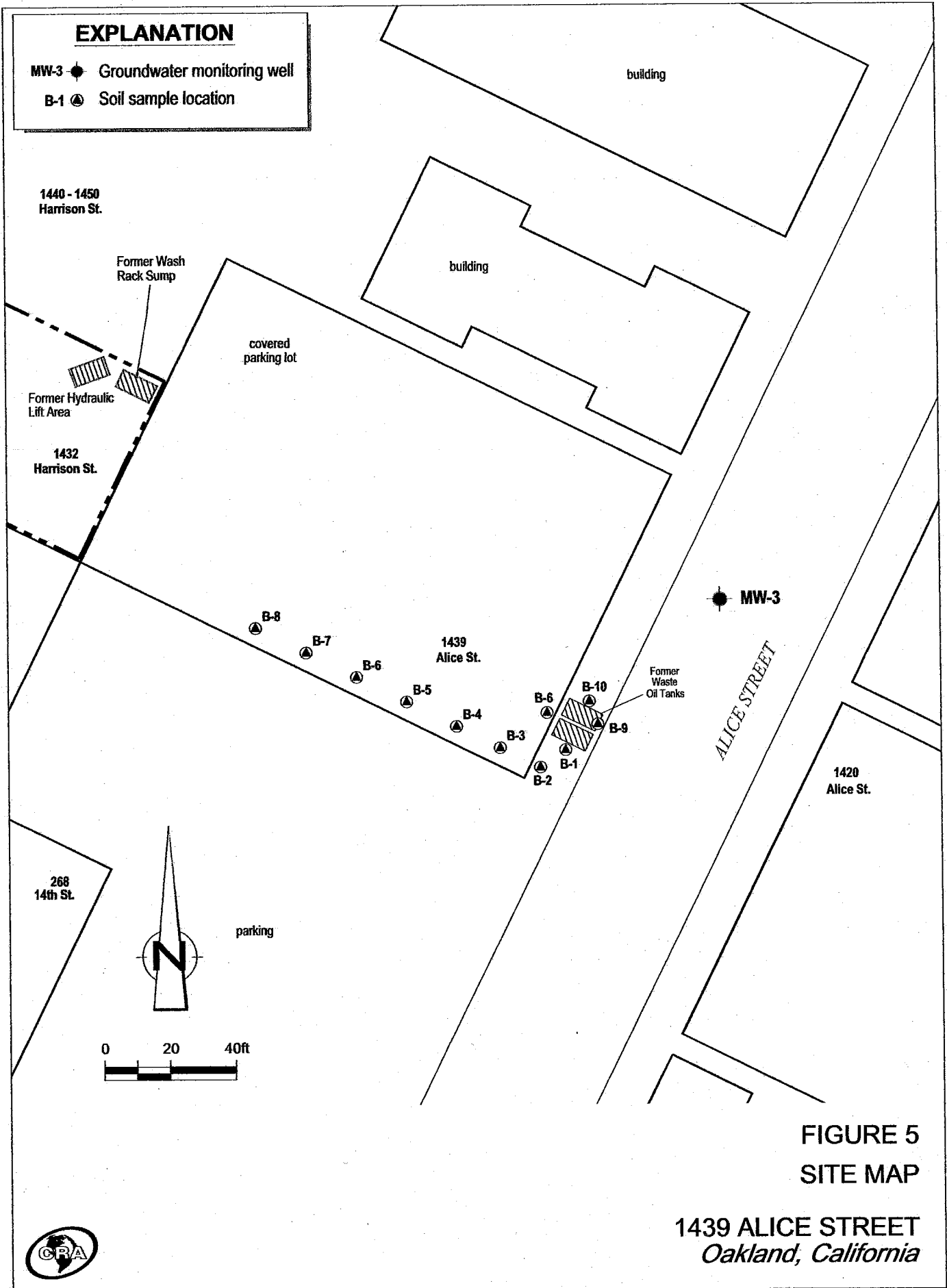


figure 4
 GROUNDWATER HYDROCARBON CONCENTRATIONS
 ALLRIGHT PARKING
 1432 HARRISON STREET
 Oakland, California

EXPLANATION

- MW-3 ● Groundwater monitoring well
- B-1 ▲ Soil sample location



**FIGURE 5
SITE MAP**

**1439 ALICE STREET
Oakland, California**



EXPLANATION

MW-3 ● Groundwater monitoring well

B-1 ● Soil sample location

concentrations in milligram per kilogram (mg/kg)

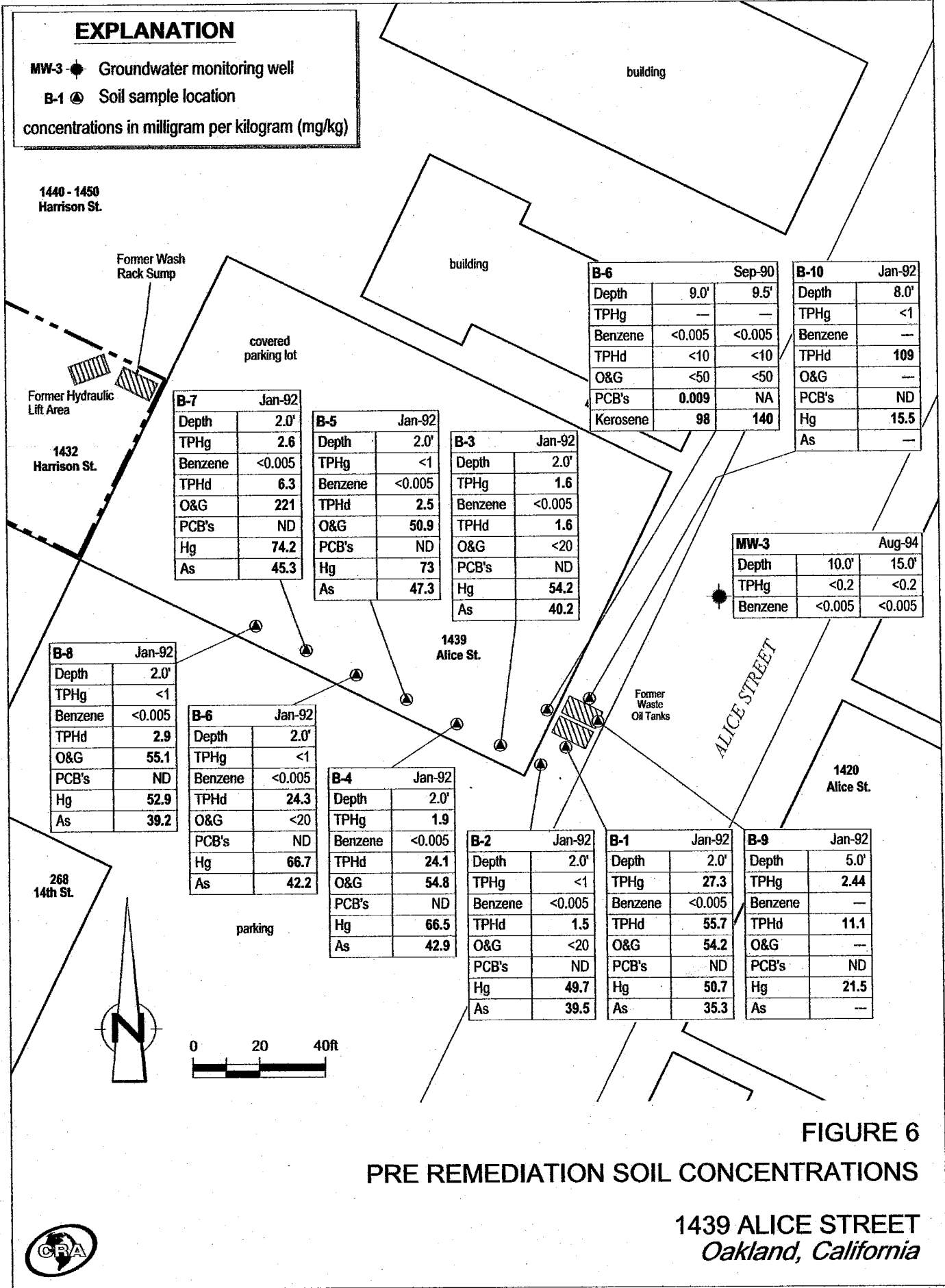


FIGURE 6

PRE REMEDIATION SOIL CONCENTRATIONS

1439 ALICE STREET
Oakland, California



EXPLANATION

- MW-3 ● Groundwater monitoring well
- GW-2 ▲ Grab groundwater sample location

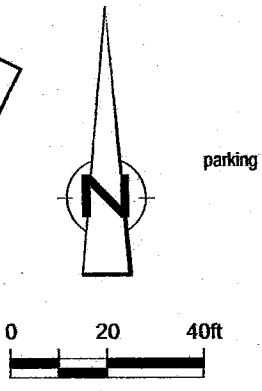
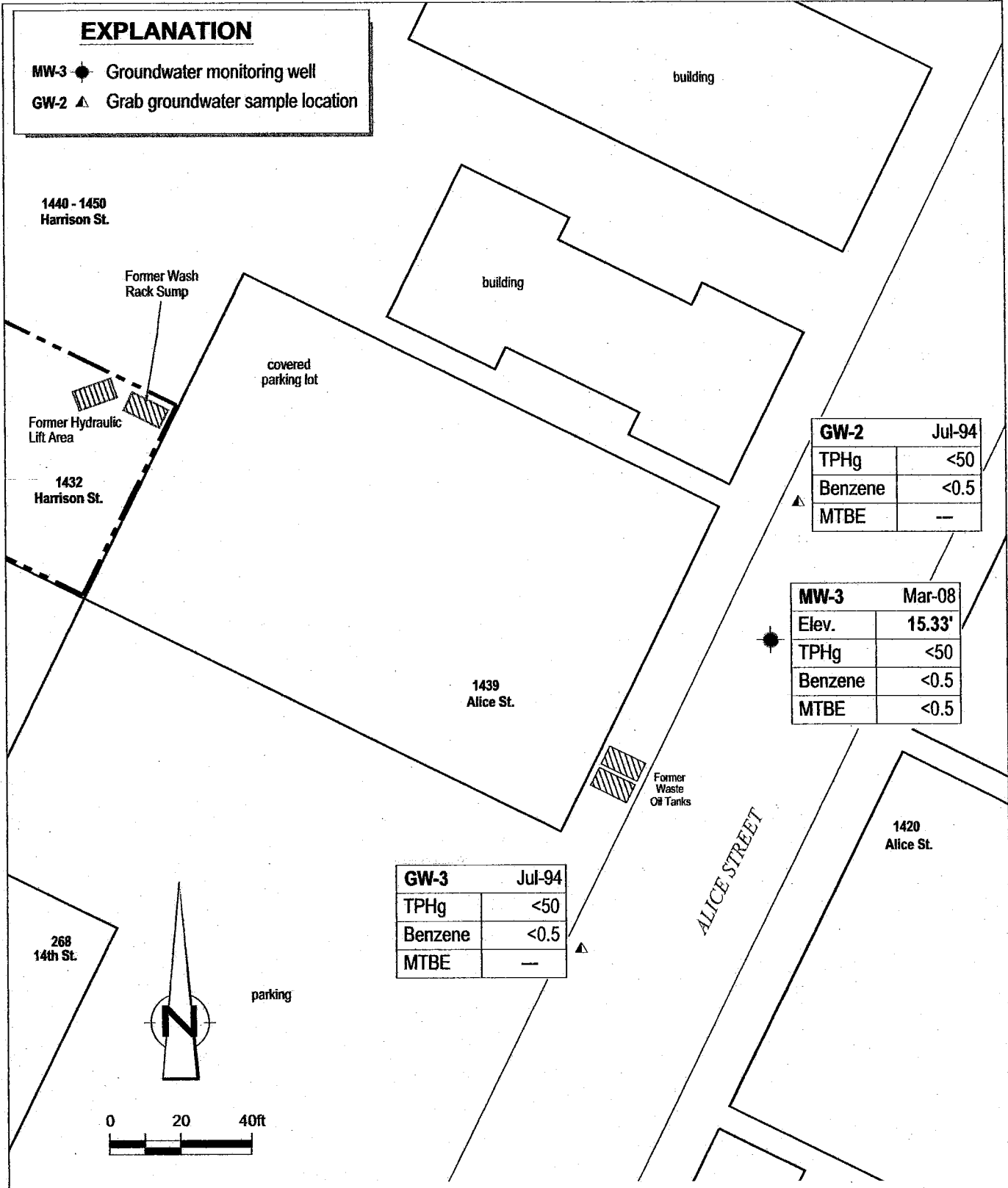
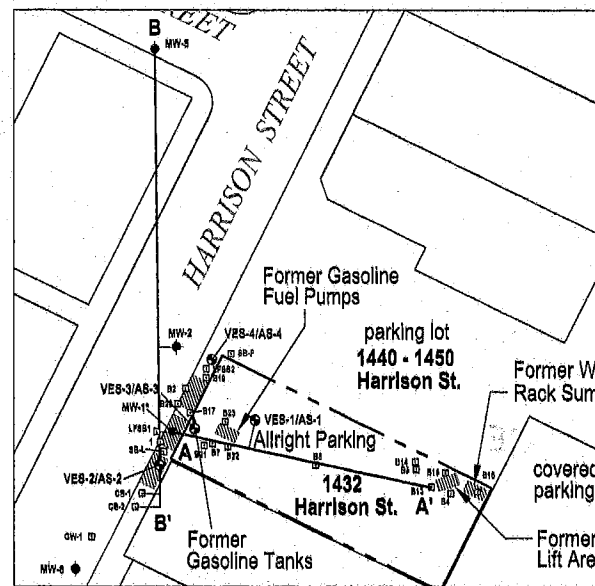
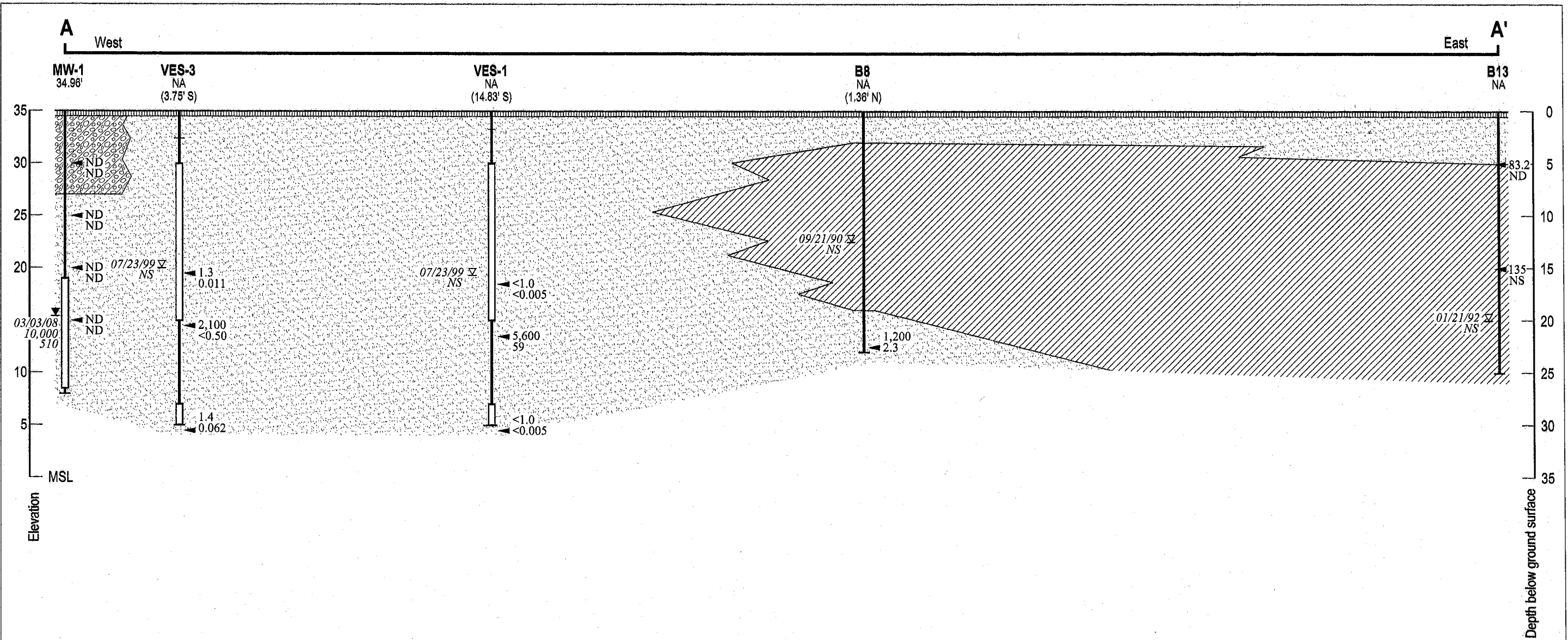


FIGURE 7
GROUNDWATER HYDROCARBON CONCENTRATIONS

1439 ALICE STREET
Oakland, California





EXPLANATION

- = Clayey Sands and Clays
- = Silty Sands and Sands
- = Fill
- = Concrete / Asphalt
- ◀ = Approximate sample location
- TPHg Benzene = Hydrocarbon concentrations in Soil, in parts per million
- TPHg Benzene = Hydrocarbon concentrations in Groundwater, in parts per billion
- Well ID — Well Designation
- Elev. (offset) — Top of Casing Elevation
- Groundwater Monitoring Well
- Well Screen Interval
- Bottom of boring
- ∇ = Depth of First Encountered Groundwater - Date
- ▼ = Depth of Groundwater - Date

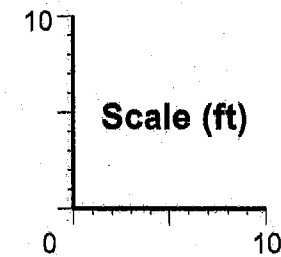
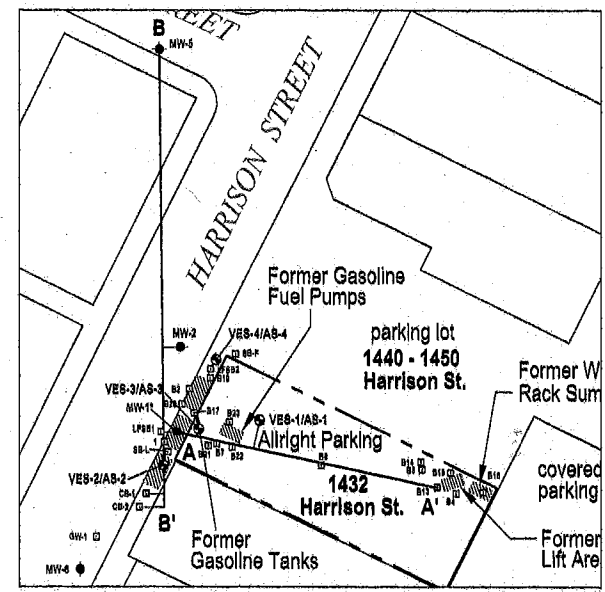
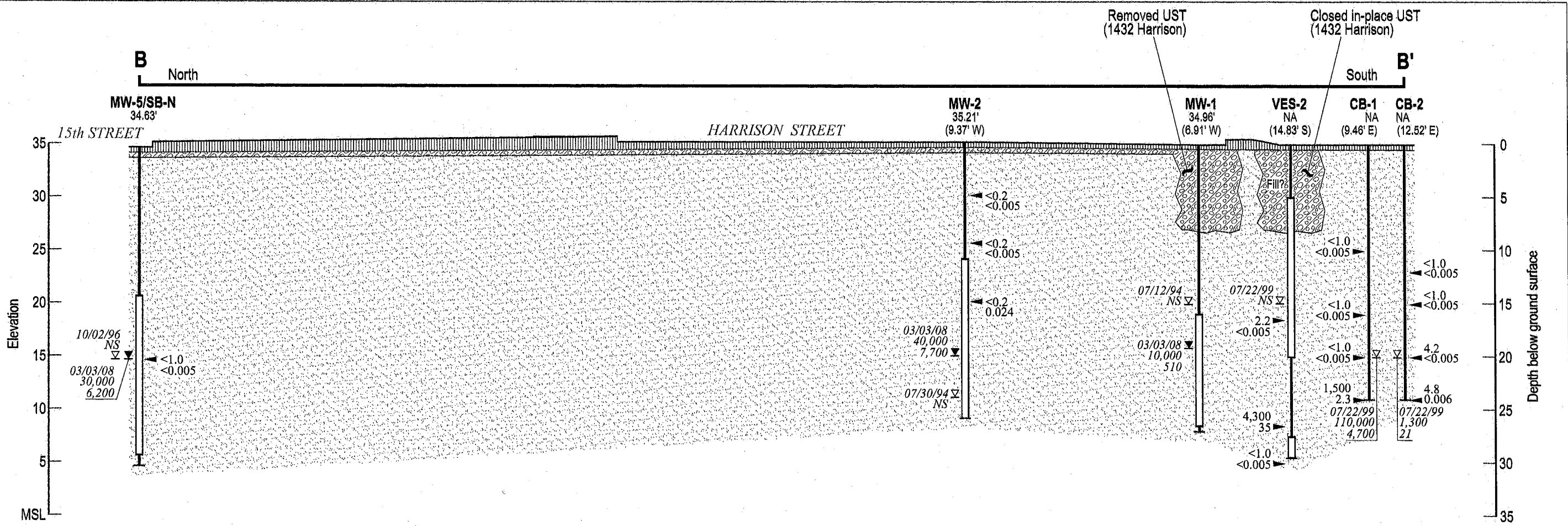


figure 8
GEOLOGIC CROSS SECTION A-A'
ALLRIGHT PARKING
1432 HARRISON STREET
Oakland, California



EXPLANATION

	= Clayey Sands and Clays	Well ID — Well Designation	
	= Silty Sands and Sands	Elev. (offset) — Top of Casing Elevation	
	= Fill	— Groundwater Monitoring Well	
	= Concrete / Asphalt	— Well Screen Interval	
◀	Approximate sample location	— Bottom of boring	
TPHg Benzene	Hydrocarbon concentrations in Soil, in parts per million	∇	Depth of First Encountered Groundwater - Date
TPHg Benzene	Hydrocarbon concentrations in Groundwater, in parts per billion	▼	Depth of Groundwater - Date

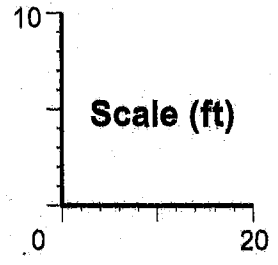
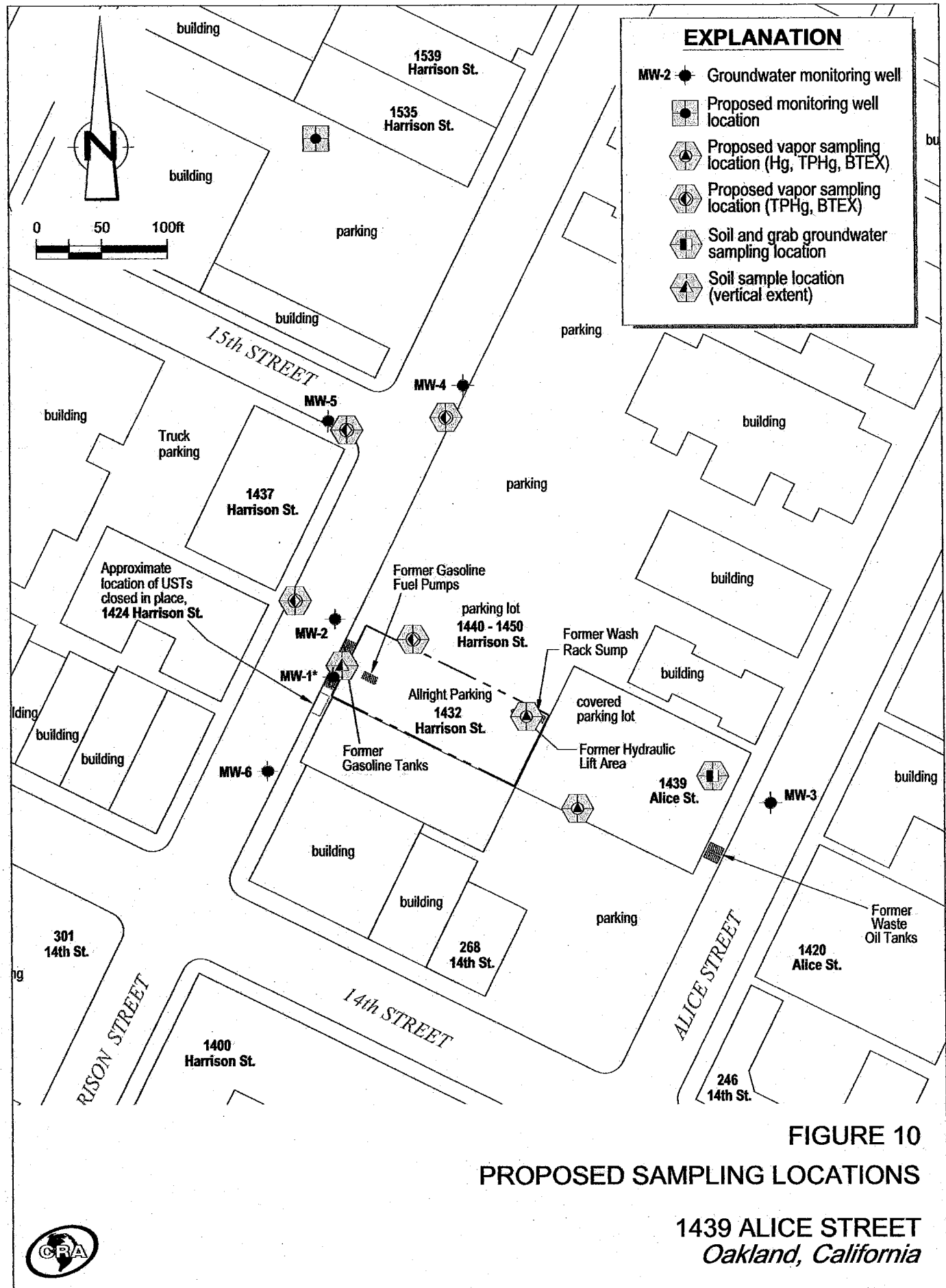


figure 9
GEOLOGIC CROSS SECTION B-B'
ALLRIGHT PARKING
1432 HARRISON STREET
Oakland, California



Conestoga-Rovers & Associates

Table 1. Well Construction Details - Allright Parking, 1432 Harrison Street, Oakland, California

Well No.	Installation Date	Total Depth (ft-bgs)	Boring Diameter (inch)	Well Diameter (inch)	Screen Size (inch)	Screened Interval (ft-bgs)	Sand Pack Interval (ft-bgs)	Surface Seal (ft-bgs)	TOC Elevation (ft-msl)
MW-1	1/12/1994	27	12	4	0.020	16-26.5	14.5-27	0-14.5	35.37*
MW-2	7/30/1994	26		2	0.010	11-26	9-26	0-9	35.21
MW-3	7/30/1994	25		2	0.010	15-25	13-25	0-13	34.01
MW-4	10/2/1996	25	8	2	0.010	15-25	13-25	0-13	33.75
MW-5	10/2/1996	30	8	2	0.010	14-29	12-30	0-12	34.63
MW-6	10/2/1996	30.5	8	2	0.010	14-29	30-Dec	0-12	35.89
VES-1 (VE)	7/23/1999	30	8	3	0.020	5-20	4.5-20	0-5	-
VES-1 (AS)				1	0.020	28-30	27.5-30	0-27.5	-
VES-2 (VE)	7/22/1999	29.5	8	3	0.020	5-20	4-20	0-4	-
VES-2 (AS)				1	0.020	27.5-29.5	27-29.5	0-27	-
VES-3 (VE)	7/23/1999	30	8	3	0.020	5-20	4-20	0-4	-
VES-3 (AS)				1	0.020	28-30	25-30	0-25	-
VES-4 (VE)	7/23/1999	29	8	3	0.020	5-20	4-20	0-4	-
VES-4 (AS)				1	0.020	27-29	26.5-28.5	0-26.5	-

ft-bgs feet below ground surface
ft-msl feet above mean sea level

Conestoga-Rovers & Associates

Table 2. Groundwater Elevations and Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Well ID Sample ID TOC (ft amsl)	Date	Depth to Groundwater (ft below TOC)	SPH Thickness (feet)	TOC Groundwater		TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
				Elevation (ft amsl)								
Monitoring Well Sample Results:												
MW-1	8/1/1994	--	--	--	--	170,000	35,000	51,000	2,400	13,000	--	--
34.95	12/21/1994	19.53	--	15.42	180,000	180,000	41,000	64,000	3,100	100,000	--	--
	3/13/1995	18.66	--	16.29	150,000	150,000	31,000	45,000	2,500	17,000	--	--
	6/27/1995	18.20	--	16.75	71,000	71,000	17,000	18,000	1,600	7,700	--	--
	7/7/1995	18.35	--	16.60	71,000	71,000	17,000	18,000	1,600	7,700	--	--
	9/28/1995	18.20	--	16.75	110,000	110,000	27,000	34,000	1,700	14,000	--	--
	12/20/1995	19.96	--	14.99	120,000	120,000	33,000	43,000	2,300	15,000	--	--
	3/26/1996	19.27	--	15.68	140,000	140,000	29,000	36,000	1,900	13,000	<200*	d
	6/20/1996	18.64	--	16.31	110,000	110,000	30,000	38,000	2,200	13,000	<200*	--
	9/26/1996	19.35	--	15.60	170,000	170,000	28,000	40,000	2,200	15,000	ND**	--
	10/28/1996	19.58	--	15.37	--	--	--	--	--	--	--	--
	12/12/1996	19.68	--	15.27	110,000	110,000	36,000	47,000	2,500	16,000	ND*	--
	3/31/1997	18.80	--	16.15	160,000	160,000	24,000	39,000	1,900	13,000	ND*	--
	6/27/1997	19.26	--	15.69	130,000	130,000	25,000	36,000	2,000	14,000	ND*	--
	9/9/1997	19.70	--	15.25	99,000	99,000	22,000	27,000	1,600	13,000	270*	--
	12/18/1997	19.25	--	15.70	160,000	160,000	30,000	44,000	2,200	15,000	ND***	--
	3/12/1998	17.52	--	17.43	190,000	190,000	20,000	49,000	2,500	18,000	ND***	--
	6/22/1998	18.63	--	16.32	90,000	90,000	19,000	40,000	2,100	16,000	--	--
	9/18/1998	18.60	--	16.35	190,000	190,000	29,000	48,000	2,400	17,000	--	--
	12/23/1998	19.18	--	15.77	140,000	140,000	24,000	44,000	2,000	8,200	--	--
	3/29/1999	18.52	--	16.43	181,000	181,000	22,200	40,100	1,844	12,200	--	--
	6/23/1999	18.60	--	16.35	80,000	80,000	20,000	33,000	1,600	11,000	--	--
	9/24/1999	19.05	--	15.90	117,000	117,000	15,100	20,700	1,550	11,800	--	--
	12/23/1999	19.95	--	15.00	186,000	186,000	25,900	39,000	1,990	12,400	--	--
	7/3/2000	18.48	--	16.47	210,000	210,000	35,000	42,000	2,200	13,000	<3,000	a
	7/3/2000	18.95	--	16.00	200,000	200,000	33,000	46,000	2,200	15,000	<200*	a
	9/7/2000	19.45	Sheen ^{Field}	15.50	--	--	--	--	--	--	--	--
	12/5/2000	19.90	--	15.05	220,000	220,000	42,000	57,000	2,700	17,000	<200	a
	3/6/2001	18.20	--	16.75	180,000	180,000	27,000	39,000	2,000	13,000	<1200*/<20***	a,l
	6/8/2001	20.14	--	14.81	170,000	170,000	28,000	40,000	1,900	13,000	<200	a
	8/27/2001	21.19	--	13.76	130,000	130,000	24,000	33,000	1,600	11,000	<350	a
	10/25/2001	21.74	--	13.21	160,000	160,000	22,000	28,000	1,500	10,000	<350	a
	3/1/2002	21.39	0.41	13.84*	--	--	--	--	--	--	--	--
	6/10/2002	22.30	--	12.65	210,000	210,000	30,000	51,000	3,100	22,000	<1,000*	a
34.96	9/3/2002	21.40	--	13.56	2,500,000	2,500,000	31,000	170,000	29,000	170,000	2,500,000*	a
	12/22/2002	20.50	--	14.46	89,000	89,000	2,600	9,300	530	28,000	<1,700	a,m
	1/23/2003	18.57	Sheen ^{Lab}	16.39	130,000	130,000	600	1,600	<100	41,000	<50***	a,b,l
	6/12/2003	19.10	0.07	15.91*	--	--	--	--	--	--	--	--
	7/23/2003	19.42	0.07	15.59*	--	--	--	--	--	--	--	--
35.37#	12/22/2003	17.09	0.01	18.29*	--	--	--	--	--	--	--	--
	3/10/2004	13.82	--	21.55	22,000	22,000	190	250	<10	5,100	<100	a,c
	6/16/2004	14.75	--	20.62	2,700	2,700	23	160	13	520	<25	a
	9/27/2004	18.02	Sheen ^{Field}	17.35	27,000	27,000	580	2,000	56	6,800	<10***	a,m
	12/22/2004	11.25	--	24.12	250	250	3.5	18	<0.5	47	<0.5***	a,m
	3/3/2005	14.42	--	20.95	320	320	5.2	13	3.2	46	<5.0	a
34.96##	6/9/2005	17.80	--	17.16	--	--	--	--	--	--	--	+
	9/9/2005	18.26	--	16.70	--	--	--	--	--	--	--	+
	12/20/2005	18.68	--	16.28	--	--	--	--	--	--	--	+
	3/26/2006	16.96	--	18.00	23,000	23,000	270	400	65	4,400	<50	a
	6/23/2006	17.55	--	17.41	30,000	30,000	340	680	170	6,900	<500	a,m
	9/7/2006	18.53	--	16.43	34,000	34,000	540	630	190	7,000	<500	a
	12/29/2006	19.43	Sheen ^{Field}	15.53	20,000	20,000	550	55	130	4,700	<100*/<0.5***	a,m
	3/21/2007	18.92	Sheen ^{Field}	16.04	23,000	23,000	910	210	140	5,900	<250*	a
	6/7/2007	19.22	Sheen ^{Field}	15.74	24,000	24,000	680	61	190	4,300	<100*	a,b
	9/28/2007	20.19	--	14.77	--	--	--	--	--	--	--	+
	12/9/2007	20.40	--	14.56	--	--	--	--	--	--	--	+
	3/3/2008	19.16	Sheen ^{Lab}	15.80	10,000	10,000	510	28	<10	1,700	<2.5***	a,b,m,l
	6/4/2008	20.05	--	14.91	--	--	--	--	--	--	--	--
MW-2	8/1/1994	--	--	--	--	130,000	28,000	35,000	3,000	12,000	--	--
35.18	12/21/1994	19.91	--	15.27	200	200	140,000	200,000	3,500	22,000	--	--
	3/13/1995	19.15	--	16.03	500	500	9,200	23,000	7,000	36,000	--	--
	6/27/1995	18.74	--	16.44	120,000	120,000	23,000	30,000	2,700	13,000	--	--
	7/7/1995	18.80	--	16.38	120,000	120,000	23,000	30,000	2,700	13,000	--	--
	9/28/1995	19.30	--	15.88	110,000	110,000	23,000	29,000	2,500	11,000	--	--
	12/20/1995	20.24	--	14.94	83,000	83,000	980	1,800	2,200	10,000	--	--
	3/26/1996	19.69	--	15.49	150,000	150,000	23,000	32,000	2,800	12,000	<200*	d
	6/20/1996	19.20	--	15.98	94,000	94,000	15,000	23,000	2,400	12,000	<200*	--
	9/26/1996	19.80	--	15.38	150,000	150,000	20,000	29,000	2,800	12,000	ND**	--
	10/28/1996	20.18	--	15.00	--	--	--	--	--	--	--	--
	12/12/1996	20.17	--	15.01	58,000	58,000	3,100	11,000	1,700	8,100	220*	--
	3/31/1997	19.67	--	15.51	38,000	38,000	6,000	7,900	690	3,300	ND*	--
	6/27/1997	19.68	--	15.50	62,000	62,000	13,000	16,000	1,300	6,000	ND*	--
	9/9/1997	20.20	--	14.98	81,000	81,000	16,000	18,000	1,800	8,600	ND***	--
	12/18/1997	19.80	--	15.38	110,000	110,000	18,000	26,000	2,200	9,500	ND***	--
	3/12/1998	18.07	--	17.11	120,000	120,000	16,000	26,000	2,200	9,400	ND***	--
	6/22/1998	18.29	--	16.89	38,000	38,000	9,800	9,500	1,500	6,000	--	--

Conestoga-Rovers & Associates

Table 2. Groundwater Elevations and Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Well ID Sample ID TOC (ft amsl)	Date	Depth to Groundwater (ft below TOC)	SPH Thickness (feet)	TOC Groundwater		TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
				Elevation (ft amsl)								
MW-2 (cont.) 35.21	9/18/1998	19.09	--	16.09	68,000	12,000	16,000	1,400	5,900	--	--	
	12/23/1998	19.67	--	15.51	180,000	16,000	22,000	2,200	8,300	--	--	
	3/29/1999	18.97	--	16.21	16,600	1,380	1,920	373	1,840	--	--	
	6/23/1999	18.25	--	16.93	41,000	10,000	9,400	1,100	5,000	--	--	
	9/24/1999	19.60	--	15.58	40,600	4,880	3,490	1,090	4,560	--	--	
	12/23/1999	20.21	--	14.97	61,900	6,710	9,320	1,150	5,360	--	--	
	3/21/2000	18.93	--	16.25	98,000	14,000	21,000	1,600	6,900	<1600	a	
	7/3/2000	19.38	--	15.80	140,000	18,000	33,000	2,600	11,000	<200*	a	
	9/7/2000	19.83	--	15.35	110,000	17,000	21,000	2,200	9,700	<100***	a,l	
	12/5/2000	20.30	--	14.88	130,000	19,000	28,000	2,500	11,000	<200	a	
	3/6/2001	19.57	--	15.61	32,000	3,400	3,400	580	2,500	<200	a	
	6/8/2001	20.59	--	14.59	72,000	9,400	9,200	1,300	5,800	<200	a	
	8/27/2001	21.79	--	13.39	110,000	17,000	28,000	2,600	11,000	<950	a	
	10/25/2001	22.05	--	13.13	110,000	15,000	18,000	2,000	8,700	<350	a	
	3/1/2002	21.80	--	13.38	3,100	370	180	62	330	<5.0*	a	
	6/10/2002	22.83	--	12.35	7,800	2,000	1,100	76	570	<100*	a	
	9/3/2002	22.03	--	13.18	21,000	2,400	2,900	320	1,400	<500	a	
	12/22/2002	22.70	--	12.51	630	48	56	19	82	<5.0	a	
	1/23/2003	20.49	--	14.72	1,100	27	32	19	150	<25	a	
	6/12/2003	21.03	--	14.18	10,000	2,100	1,600	150	660	<250	a	
	7/23/2003	21.40	--	13.81	28,000	4,800	4,800	380	1,700	<500	a	
	12/22/2003	19.33	--	15.88	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	3/10/2004	19.33	--	15.88	3,100	460	290	38	240	<50	a	
	6/16/2004	19.90	--	15.31	9,100	1,600	1,200	220	830	<400	a	
	9/27/2004	22.08	--	13.13	14,000	2,800	490	340	1,600	<350	a	
	12/22/2004	21.74	--	13.47	1,100	300	28	22	71	<15	a	
	3/3/2005	19.60	--	15.61	340	12	4.4	9.1	28	<10	a	
	6/9/2005	18.65	--	16.56	240	22	2.7	6.4	27	<10	a	
	9/9/2005	19.27	--	15.94	7,800	1,100	170	380	690	<160	a	
	12/20/2005	19.70	--	15.51	150	10	1.9	2.8	10	<5.0	a	
	3/26/2006	18.51	--	16.70	2,200	93	19	66	130	<50	a	
	6/23/2006	18.47	--	16.74	8,800	1,600	110	500	480	<500	a,m	
	9/7/2006	18.97	--	16.24	29,000	4,800	280	940	1,000	<500	a	
	12/29/2006	19.76	--	15.45	4,500	720	54	250	480	75*/<0.5***	a	
	3/21/2007	19.59	--	15.62	34,000	9,100	500	890	2,500	<1,100*	a	
6/7/2007	19.74	Sheen Lab	15.47	46,000	7,100	410	870	2,400	<800*	a,b		
9/28/2007	20.23	--	14.98	44,000	9,400	630	1,400	3,600	<0.5***	a		
12/9/2007	20.68	--	14.53	37,000	8,400	550	1,400	4,500	<17***	a,l		
3/3/2008	20.11	--	15.10	40,000	7,700	490	1,400	4,400	<17***	a,l		
6/4/2008	20.40	--	14.81	56,000	7,400	600	1,500	4,100	<25***	a,j		
MW-3 33.97	8/1/1994	--	--	--	<50	<0.5	<0.5	<0.5	<2.0	--	--	
	12/21/1994	18.82	--	15.15	<50	<0.5	<0.5	<0.5	<0.5	--	--	
	3/13/1995	17.86	--	16.11	<50	<0.5	<0.5	<0.5	<0.5	--	--	
	7/7/1995	18.25	--	15.72	--	--	--	--	--	--	--	f,g
	9/28/1995	18.00	--	15.97	--	--	--	--	--	--	--	h
	12/20/1995	18.74	--	15.23	--	--	--	--	--	--	--	
	3/26/1996	18.25	--	15.72	--	--	--	--	--	--	--	
	6/20/1996	18.35	--	15.62	--	--	--	--	--	--	--	
	9/26/1996	19.12	--	14.85	--	--	--	--	--	--	--	
	10/28/1996	19.11	--	14.86	--	--	--	--	--	--	--	
	12/12/1996	18.61	--	15.36	--	--	--	--	--	--	--	
	3/31/1997	18.35	--	15.62	--	--	--	--	--	--	--	
	6/27/1997	18.81	--	15.16	--	--	--	--	--	--	--	
	9/9/1997	19.18	--	14.79	--	--	--	--	--	--	--	
	12/18/1997	18.64	--	15.33	--	--	--	--	--	--	--	
	3/12/1998	17.56	--	16.41	--	--	--	--	--	--	--	
	6/22/1998	18.64	--	15.33	--	--	--	--	--	--	--	
	9/18/1998	18.33	--	15.64	--	--	--	--	--	--	--	
	12/23/1998	18.60	--	15.37	--	--	--	--	--	--	--	
	3/29/1999	17.85	--	16.12	--	--	--	--	--	--	--	
	6/23/1999	18.67	--	15.30	--	--	--	--	--	--	--	
	9/24/1999	18.64	--	15.33	--	--	--	--	--	--	--	
	12/23/1999	19.32	--	14.65	--	--	--	--	--	--	--	
	3/21/2000	17.89	--	16.08	--	--	--	--	--	--	--	
	7/3/2000	18.40	--	15.57	--	--	--	--	--	--	--	
	9/7/2000	18.75	--	15.22	--	--	--	--	--	--	--	
34.01	12/5/2000	19.03	--	14.94	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	3/6/2001	18.12	--	15.85	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	6/8/2001	20.02	--	13.95	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	8/27/2001	21.09	--	12.88	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	10/25/2001	21.29	--	12.68	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	3/1/2002	21.14	--	12.83	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	--	
	6/10/2002	21.99	--	11.98	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	--	
	9/3/2002	21.17	--	12.84	--	--	--	--	--	--	--	
	12/22/2002	21.94	--	12.07	--	--	--	--	--	--	--	
	1/23/2003	20.08	--	13.93	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	
	6/12/2003	20.95	--	13.06	--	--	--	--	--	--	--	

Conestoga-Rovers & Associates

Table 2. Groundwater Elevations and Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Well ID Sample ID TOC (ft amsl)	Date	Depth to Groundwater (ft below TOC)	SPH Thickness (feet)	TOC Groundwater		TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
				Elevation (ft amsl)								
MW-3 (cont.)	7/23/2003	21.28	--	12.73	--	--	--	--	--	--	--	--
	12/22/2003	19.05	--	14.96	--	--	--	--	--	--	--	--
	3/10/2004	18.22	--	15.79	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	6/16/2004	18.82	--	15.19	--	--	--	--	--	--	--	--
	9/27/2004	21.03	--	12.98	--	--	--	--	--	--	--	--
	12/22/2004	20.69	--	13.32	--	--	--	--	--	--	--	--
	3/3/2005	17.94	--	16.07	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	6/9/2005	18.00	--	16.01	--	--	--	--	--	--	--	--
	9/9/2005	18.43	--	15.58	--	--	--	--	--	--	--	--
	12/20/2005	18.18	--	15.83	--	--	--	--	--	--	--	--
	3/26/2006	17.42	--	16.59	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	6/23/2006	17.77	--	16.24	--	--	--	--	--	--	--	--
	9/7/2006	18.20	--	15.81	--	--	--	--	--	--	--	--
	12/29/2006	18.49	--	15.52	--	--	--	--	--	--	--	--
	3/21/2007	18.44	--	15.57	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	--	--
	6/7/2007	18.68	--	15.33	--	--	--	--	--	--	--	--
	9/28/2007	19.19	--	14.82	--	--	--	--	--	--	--	--
	12/9/2007	19.31	--	14.70	--	--	--	--	--	--	--	--
	3/3/2008	18.68	--	15.33	<50	<0.5	<0.5	<0.5	<0.5	<5.0***	--	--
	6/4/2008	19.11	--	14.90	--	--	--	--	--	--	--	--
MW-4 33.75	10/28/1996	19.32	--	14.43	10,000	3,900	420	400	360	<200*	n	
	12/12/1996	19.42	--	14.33	11,000	4,200	410	420	260	32*	--	
	3/31/1997	18.67	--	15.08	ND	ND	ND	ND	ND	ND*	--	
	6/27/1997	19.08	--	14.67	160	49	1.2	ND	5.9	ND*	--	
	9/9/1997	19.33	--	14.42	7,400	5,000	410	230	470	33*	--	
	12/18/1997	19.17	--	14.58	710	170	8.0	ND	39	ND***	--	
	3/12/1998	17.68	--	16.07	1,300	410	21	ND	57	ND***	--	
	6/22/1998	17.63	--	16.12	ND	ND	ND	ND	ND	--	--	
	9/18/1998	18.58	--	15.17	ND	42	1.6	ND	4.8	--	--	
	12/23/1998	19.01	--	14.74	1,900	1,000	76	50	120	--	--	
	3/29/1999	18.35	--	15.40	ND	ND	ND	ND	ND	--	--	
	6/23/1999	17.58	--	16.17	ND	ND	ND	ND	ND	--	--	
	9/24/1999	19.05	--	14.70	9,150	3,270	131	34	537	--	--	
	12/23/1999	19.41	--	14.34	12,200	5,360	275	424	592	--	--	
	3/21/2000	18.42	--	15.33	45,000	16,000	1,100	1,400	1,900	1400*/<35***	a,l	
	7/3/2000	18.82	--	14.93	33,000	10,000	720	840	1,800	<200*	a	
	9/7/2000	19.21	--	14.54	26,000	8,800	800	740	1,500	<50***	a,c,l	
	12/5/2000	19.60	--	14.15	41,000	11,000	840	930	1,900	<200	a	
	3/6/2001	18.24	--	15.51	1,100	400	5.7	<0.5	20	<5.0	a	
	6/8/2001	20.91	--	12.84	92	19	<0.5	1	<5.0	<5.0	a	
	8/27/2001	21.63	--	12.12	49,000	17,000	1700	1,700	3,200	<260	a	
	10/25/2001	21.70	--	12.05	57,000	16,000	1,500	1,600	2,600	<300	a	
	3/1/2002	21.53	--	12.22	400	140	2.3	<0.5	12	<5.0*	a	
	6/10/2002	22.23	--	11.52	<50	2.5	<0.5	<0.5	<0.5	<5.0*	--	
	9/3/2002	21.85	--	11.90	31,000	9,700	300	650	1,100	<1,000	a	
	12/22/2002	22.39	--	11.36	35,000	13,000	310	1,100	1,800	<1,500	a	
	1/23/2003	20.61	--	13.14	51,000	18,000	430	1,500	2,200	<5.0***	a,l	
	6/12/2003	21.20	--	12.55	80	12	<0.5	<0.5	1.0	<10	a	
	7/23/2003	21.51	--	12.24	20,000	7,600	100	65	660	<250	a	
	12/22/2003	19.60	--	14.15	26,000	9,500	200	380	1,100	<150	a	
	3/10/2004	18.81	--	14.94	14,000	4,800	150	320	530	<400	a	
	6/16/2004	19.32	--	14.43	2,800	1,100	24	17	100	<50	a	
	9/27/2004	21.45	--	12.30	45,000	16,000	260	1,700	2,000	<25***	a	
12/22/2004	21.15	--	12.60	29,000	10,000	160	890	1,200	<5.0***	aj		
3/3/2005	18.60	--	15.15	18,000	6,400	98	500	610	<600	a		
6/9/2005	18.11	--	15.64	20,000	6,100	110	460	580	<500	a		
9/9/2005	18.65	--	15.10	17,000	6,400	100	470	730	<250	a		
12/20/2005	19.01	--	14.74	26,000	8,500	160	640	800	<120	a		
3/26/2006	17.84	--	15.91	1,900	700	22	49	85	<50	a		
6/23/2006	17.96	--	15.79	12,000	3,400	130	370	510	260	a		
9/7/2006	18.29	--	15.46	8,600	1,800	100	170	220	<210	a,i		
12/29/2006	18.93	--	14.82	4,200	1,100	120	150	280	<150*/<0.5***	a		
3/21/2007	18.76	--	14.99	550	30	2.0	4.5	5.1	<30*	a		
6/7/2007	18.92	--	14.83	85	4.4	<0.5	0.77	0.82	<5.0*	a		
9/28/2007	19.41	--	14.34	140	7.0	<0.5	1.2	<0.5	<0.5***	a		
12/9/2007	19.86	--	13.89	120	4.5	<0.5	0.62	<0.5	<0.5	a		
3/3/2008	19.22	--	14.53	63	0.78	<0.5	<0.5	<0.5	<0.5***	i		
6/4/2008	19.58	--	14.17	86	2.2	<0.5	<0.5	0.58	<0.5***	a		
MW-5 34.63	10/28/1996	19.88	--	14.75	90	4.0	0.6	<0.50	<0.50	16*	--	
	12/12/1996	20.09	--	14.54	230	5.6	0.9	ND	0.9	3.6*	n	
	3/31/1997	19.24	--	15.39	90	3.1	ND	ND	ND	ND*	--	
	6/27/1997	19.16	--	15.47	ND	ND	ND	ND	ND	ND*	--	
	9/9/1997	19.93	--	14.70	ND	ND	ND	ND	ND	ND*	--	
	12/18/1997	19.77	--	14.86	ND	ND	ND	ND	ND	ND***	--	
	3/12/1998	19.77	--	14.86	79	2.3	ND	0.8	ND	ND*	--	
6/22/1998	18.08	--	16.55	ND	ND	ND	ND	ND	--	--		

Conestoga-Rovers & Associates

Table 2. Groundwater Elevations and Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Well ID Sample ID TOC (ft amsl)	Date	Depth to Groundwater (ft below TOC)	SPH Thickness (feet)	TOC Groundwater		TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes	
				Elevation (ft amsl)									
MW-5 (cont.)	9/18/1998	19.12	--	15.51	ND	ND	ND	ND	ND	ND	--	--	
	12/23/1998	19.60	--	15.03	ND	0.8	0.9	ND	ND	ND	--	--	
	3/29/1999	18.88	--	15.75	ND	ND	ND	ND	ND	ND	--	--	
	6/23/1999	18.05	--	16.58	ND	ND	ND	ND	ND	ND	--	--	
	9/24/1999	19.61	--	15.02	ND	ND	ND	ND	ND	ND	--	--	
	12/23/1999	20.01	--	14.62	ND	ND	ND	ND	ND	ND	--	--	
	3/21/2000	19.05	--	15.58	140	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	7/3/2000	19.40	--	15.23	85	8.1	3.1	1.6	7.8	5.0*	<5.0*	k	--
	9/7/2000	19.62	--	15.01	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0*	a	--
	12/5/2000	20.25	--	14.38	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	3/6/2001	19.07	--	15.56	91	5.5	<0.5	<0.5	<0.5	<0.5	<5.0	--	--
	6/8/2001	20.77	--	13.86	290	22.0	0.8	<0.5	<0.5	<0.5	<5.0	--	--
	8/27/2001	21.33	--	13.30	660	24.0	2.2	1.3	4.0	<2.5	<5.0	a	--
	10/25/2001	21.62	--	13.01	55	3.5	<0.5	<0.5	<0.5	<0.5	<5.0	a	--
	3/1/2002	21.49	--	13.14	200	1.9	0.69	<0.5	<0.5	<5.0*	<5.0*	a	--
	6/10/2002	22.15	--	12.48	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	<5.0*	a	--
	9/3/2002	21.50	--	13.13	60	1.9	<0.5	<0.5	0.77	<5.0	<5.0	--	--
	12/22/2002	22.19	--	12.44	82	0.57	<0.5	0.68	<0.5	<5.0	<5.0	a	--
	1/23/2003	20.27	--	14.36	<50	2.1	<0.5	<0.5	<0.5	<5.0	<5.0	a	--
	6/12/2003	21.10	--	13.53	<50	0.88	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	7/23/2003	21.47	--	13.16	<50	4.0	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	12/22/2003	19.57	--	15.06	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	3/10/2004	19.61	--	15.02	990	200	2.9	4.0	20	<70	<70	--	--
	6/16/2004	20.15	--	14.48	250	42	<0.5	0.88	<0.5	<35	<35	a	--
	9/27/2004	22.14	--	12.49	1,600	140	4.8	45	18	<110	<110	a	--
	12/22/2004	21.81	--	12.82	<50	5.3	<0.5	<0.5	0.66	<5.0	<5.0	--	--
	3/3/2005	19.35	--	15.28	2,000	330	4.4	63	39	<150	<150	a	--
	6/9/2005	18.73	--	15.90	250	42	1.4	14	3.2	<5.0	<5.0	a	--
	9/9/2005	19.30	--	15.33	2,000	390	5.0	71	38	<400	<400	a	--
	12/20/2005	19.65	--	14.98	4,300	760	18	170	150	<35	<35	a	--
3/26/2006	18.58	--	16.05	1,600	460	3.3	35	32	<50	<50	a	--	
6/23/2006	18.57	--	16.06	1,900	500	3.9	81	56	<17	<17	a	--	
9/7/2006	18.98	--	15.65	8,800	1,900	12	350	220	<260	<260	a,i	--	
12/29/2006	19.70	--	14.93	15,000	3,400	69	610	700	<450*/<0.5***	<450*/<0.5***	a	--	
3/21/2007	19.57	--	15.06	9,900	2,300	24	360	410	<240*	<240*	a	--	
6/7/2007	19.70	--	14.93	14,000	3,800	40	790	720	<550*	<550*	a	--	
9/28/2007	20.16	--	14.47	26,000	7,200	84	1,100	1,600	<25***	<25***	a,l	--	
12/9/2007	20.56	--	14.07	25,000	7,000	59	1,100	2,000	<17	<17	a,l	--	
3/3/2008	19.97	--	14.66	30,000	6,200	31	900	1,400	<10***	<10***	a,l	--	
6/4/2008	20.32	--	14.31	7,500	1,600	4.6	25	91	<10***	<10***	a,j	--	
MW-6 35.89 (annual sampling)	10/28/1996	20.02	--	15.87	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<2.0*	--	
	12/12/1996	20.18	--	15.71	ND	ND	ND	ND	ND	ND	ND*	n	
	3/31/1997	19.81	--	16.08	--	--	--	--	--	--	--	--	
	6/27/1997	19.76	--	16.13	--	--	--	--	--	--	--	--	
	9/9/1997	20.06	--	15.83	ND	ND	ND	ND	ND	ND	ND*	--	
	12/18/1997	19.90	--	15.99	ND	ND	ND	ND	ND	ND	--	--	
	3/12/1998	18.00	--	17.89	ND	ND	ND	ND	ND	ND	ND*	--	
	6/22/1998	18.43	--	17.46	ND	ND	ND	ND	ND	ND	--	--	
	9/18/1998	19.10	--	16.79	ND	ND	ND	ND	ND	ND	--	--	
	12/23/1998	19.61	--	16.28	ND	ND	ND	ND	ND	ND	--	--	
	3/29/1999	18.92	--	16.97	ND	ND	ND	ND	ND	ND	--	--	
	6/23/1999	18.41	--	17.48	ND	ND	ND	ND	ND	ND	--	--	
	9/24/1999	19.61	--	16.28	ND	ND	ND	ND	ND	ND	--	--	
	12/23/1999	20.30	--	15.59	ND	ND	ND	ND	ND	ND	--	--	
	3/21/2000	18.97	--	16.92	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	7/3/2000	19.46	--	16.43	59	5.1	2.3	1.1	5.3	<5.0*	<5.0*	--	--
	9/7/2000	19.95	--	15.94	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	<5.0*	a	--
	12/5/2000	20.50	--	15.39	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	3/6/2001	19.54	--	16.35	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	6/8/2001	20.92	--	14.97	<50	<0.5	<0.5	<0.5	<0.5	<5.1	<5.1	--	--
	8/27/2001	21.37	--	14.52	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	10/25/2001	21.59	--	14.30	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--
	3/1/2002	21.33	--	14.56	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	<5.0*	--	--
6/10/2002	21.97	--	13.92	<50	<0.5	<0.5	<0.5	<0.5	<5.0*	<5.0*	--	--	
9/3/2002	21.55	--	14.34	--	--	--	--	--	--	--	--	--	
12/22/2002	22.25	--	13.64	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--	
1/23/2003	20.47	--	15.42	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--	
6/12/2003	21.09	--	14.80	--	--	--	--	--	--	--	--	--	
7/23/2003	21.42	--	14.47	--	--	--	--	--	--	--	--	--	
12/22/2003	19.49	--	16.40	--	--	--	--	--	--	--	--	--	
3/10/2004	20.20	--	15.69	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--	
6/16/2004	20.73	--	15.16	--	--	--	--	--	--	--	--	--	
9/27/2004	22.88	--	13.01	--	--	--	--	--	--	--	--	--	
12/22/2004	22.53	--	13.36	--	--	--	--	--	--	--	--	--	
3/3/2005	19.87	--	16.02	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<5.0	--	--	
6/9/2005	18.95	--	16.94	--	--	--	--	--	--	--	--	--	
9/9/2005	19.45	--	16.44	--	--	--	--	--	--	--	--	--	

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Table 2. Groundwater Elevations and Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Well ID Sample ID TOC (ft amsl)	Date	Depth to Groundwater (ft below TOC)	SPH Thickness (feet)	TOC Groundwater		TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
				Elevation (ft amsl)								
MW-6	12/20/2005	19.90	--	15.99		--	--	--	--	--	--	--
(cont.)	3/26/2006	18.85	--	17.04		<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
	6/23/2006	18.57	--	17.32		--	--	--	--	--	--	--
	9/7/2006	19.13	--	16.76		--	--	--	--	--	--	--
	12/29/2006	19.96	--	15.93		--	--	--	--	--	--	--
	3/21/2007	19.87	--	16.02		<50	<0.5	<0.5	<0.5	<0.5	<5.0*	m
	6/7/2007	20.05	--	15.84		--	--	--	--	--	--	--
	9/28/2007	20.51	--	15.38		--	--	--	--	--	--	--
	12/9/2007	20.90	--	14.99		--	--	--	--	--	--	--
	3/3/2008	20.47	--	15.42		<50	<0.5	<0.5	<0.5	<0.5	<0.5***	--
	6/4/2008	20.70	--	15.19		--	--	--	--	--	--	--
Trip Blank	3/21/2000	--	--	--		<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
	9/7/2000	--	--	--		<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
Grab Groundwater Sample Results:												
SB-A	7/6/1995	~20	--	--		330	16	3.6	1.3	4.9	--	ij
SB-B	7/7/1995	~20	--	--		450	55	3.1	5.1	5.0	--	a
SB-C	7/6/1995	~20	--	--		44,000	6,600	5,900	980	4,400	--	a
SB-D	7/6/1995	~20	--	--		70,000	7,400	10,000	1,600	7,200	--	a
SB-E	7/6/1995	~20	--	--		25,000	1,000	3,000	610	2,700	--	a
SB-G	7/7/1995	~20	--	--		84,000	9,400	16,000	2,200	9,900	--	a,b
SB-I	7/7/1995	~20	--	--		24,000	6,100	1,400	680	1,600	--	a
SB-J	7/7/1995	~20	--	--		960	110	66	8.7	71	--	a
SB-K	7/7/1995	~20	--	--		72,000	9,600	9,600	1,800	7,000	--	a
CB-1-W	7/22/1999	--	--	--		110,000	1,300	16,000	2,700	12,000	<3000*	a,b,c
CB-2-W	7/22/1999	--	--	--		4,700	21	13	170	76	<50*	a,c
GW-1	7/30/1994	--	--	--		<50	<0.5	<0.5	<0.5	<2.0	--	--
GW-2 *	7/29/1994	--	--	--		<50	<0.5	<0.5	<0.5	<2.0	--	--
GW-3 *	7/29/1994	--	--	--		<50	<0.5	<0.5	<0.5	<2.0	--	--

Abbreviations, Methods, & Notes

TOC = Top of casing elevation

ft amsl = feet above mean sea level

SPH = Separate-phase hydrocarbons

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method SW8015C

Benzene, toluene, ethylbenzene, and xylenes by EPA Method SW8021B

MTBE = Methyl tert-butyl ether

* = MTBE by EPA Method SW8021B

** = MTBE by EPA Method SW8240

*** = MTBE by EPA Method SW8260

l = Not confirmed with EPA method 8260B.

µg/L = micrograms per liter, equivalent to parts per billion

-- = Not sampled, not analyzed, not applicable, or no SPH was measured or observed

<n = Not detected in sample above n µg/L

ND = Not detected above laboratory detection limit

x = Groundwater elevation adjusted for SPH by the relation:

Groundwater Elevation = TOC Elevation - Depth to Groundwater + (0.7 x SPH thickness)

= The wellhead elevation was raised by 0.41 feet when well MW-1 was connected to the SVE system on October 31, 2003.

= The wellhead elevation was lowered by 0.41 feet when well MW-1 was disconnected from the SVE system on April 30, 2005.

+ = Well de-watered during purging, no measurable water to sample.

Sheen = A sheen was observed on the water's surface

Field = Observed in the field

Lab = Observed in analytical laboratory

* = Samples associated with 1439 Alice St. Property

a = Unmodified or weakly modified gasoline is significant.

b = Lighter than water immiscible sheen is present.

c = Liquid sample that contains greater than ~2 vol. % sediment.

d = MTBE result confirmed by secondary column or GC/MS analysis.

e = Sample analyzed for purgeable hydrocarbons by EPA Method SW8010, no purgeable hydrocarbons were detected.

f = Sample analyzed for VOCs by EPA Method SW8240, no non-BTEX compounds were detected.

g = Sample analyzed for Total Petroleum Hydrocarbons as motor oil (TPHmo) by Method SW8015,

h = Analytic sampling discontinued. Approved by Alameda County Department of Environmental Health.

i = Lighter gasoline range compounds are significant.

j = Gasoline range compounds having broad chromatographic peaks are significant.

k = No recognizable pattern.

l = Sample diluted due to high organic content.

m = Liquid sample that contains greater than ~1 vol. % sediment.

n = TOC well elevation was increased by 3 ft based on a benchmark discrepancy discovered during a well survey performed on September 11, 2002

Conestoga-Rovers & Associates

Table 3. Petroleum Hydrocarbon Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
1 / 1@20.0'	20	07/25/90	6,300	99	490	110	610	--	
2 / 2@18.5'	18.5	07/25/90	9,300	98	900	190	1,100	--	
B5 / B5@22.5'	22.5	09/17/90	110	0.024	0.21	0.069	1.3	--	
B6 / B6@9'	9	09/17/90	--	<0.005	<0.005	<0.005	<0.005	--	
B6 / B6@9.5'	9.5	09/17/90	--	--	--	--	--	--	*
B7 / B7@13'	13	09/21/90	<1	<0.005	<0.005	<0.005	<0.005	--	*
B7 / B7@20'	20	09/21/90	2,500	3.5	34	33	130	--	
B8 / B8@22.5'	22.5	09/21/90	1,200	2.3	38	18	89	--	
B1 / B1-2'	2	01/16/92	27.3	<0.005	3.0	0.23	<0.005	--	*
B2 / B2-2'	2	01/16/92	<1	<0.005	0.10	<0.005	<0.005	--	*
B3 / B3-2'	2	01/16/92	1.6	<0.005	1.1	<0.005	<0.005	--	*
B4 / B4-2'	2	01/16/92	1.9	<0.005	0.8	<0.005	<0.005	--	*
B5 / B5-2'	2	01/16/92	<1	<0.005	0.4	<0.005	<0.005	--	*
B6 / B6-2'	2	01/16/92	<1	<0.005	0.4	<0.005	<0.005	--	*
B7 / B7-2'	2	01/16/92	2.6	<0.005	1.6	<0.005	<0.005	--	*
B8 / B8-2'	2	01/16/92	<1	<0.005	0.04	<0.005	<0.005	--	*
B9 / B9-5'	2	01/22/92	2.44	<0.005	<0.005	--	--	--	*
B10 / B10-8'	2	01/22/92	<1	--	<0.005	--	--	--	*
B13 / B13-5'	5	01/21/92	8.32	<0.005	0.068	1.23	<0.005	--	
B13 / B13-15'	15	01/21/92	135	--	0.71	--	8.85	--	
B14 / B14-5'	5	01/21/92	<1	<0.005	--	--	--	--	
B14 / B14-15'	15	01/21/92	2.5	--	--	<0.005	--	--	
B17 / B17-5'	5	2/3/1992	--	--	--	--	--	--	
B19 / B19-5'	5	02/03/92	2.5	<0.005	<0.005	<0.005	0.01	--	
B20 / B20-5'	5	02/03/92	2.1	<0.005	0.03	<0.005	0.01	--	
B20 / B20-15'	15	02/03/92	2.5	<0.005	0.034	<0.005	<0.005	--	
B21 / B21-5'	5	02/05/92	2.1	<0.005	0.02	<0.005	0.01	--	
B21 / B21-10'	10	02/05/92	1.9	<0.005	0.021	<0.005	0.026	--	
B21 / B21-15'	15	02/05/92	2	<0.005	0.03	<0.005	<0.005	--	
B22 / B22-5'	5	02/05/92	42.3	<0.005	0.113	<0.005	2.13	--	
B22 / B22-10'	10	02/05/92	1,540	0.987	11.7	1.67	2.88	--	

Conestoga-Rovers & Associates

Table 3. Petroleum Hydrocarbon Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
B23 / B23-5'	5	02/05/92	2.5	<0.005	0.027	<0.005	<0.005	--	
B23 / B23-10'	10	02/05/92	3.3	<0.005	0.034	<0.005	<0.005	--	
LFSB1 / LFSB1-4.0	4	05/22/93	0.5	<0.005	0.01	<0.005	<0.005	--	
LFSB1 / LFSB1-14.0	14	05/22/93	<0.2	0.020	<0.005	<0.005	<0.005	--	
LFSB1 / LFSB1-24.5	24.5	05/22/93	8,800	210	980	160	750	--	
LFSB2 / LFSB2-9.5	9.5	05/22/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
LFSB2 / LFSB2-19.5	19.5	05/22/93	1,000	<0.2	9.4	16	68	--	
LFSB2 / LFSB2-24.5	24.5	05/22/93	6,100	91	320	120	410	--	
Sump 5.5H (3)	5.5	11/29/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
Hoist 1-8H	8	11/29/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
Hoist 2-9.5WH (2)	9.5	11/29/93	0.3	<0.005	<0.005	<0.005	<0.005	--	
Hoist 2-11.5H	11.5	11/29/93	970	2.9	14	4.2	24	--	
Hoist 2-9EH	9	11/29/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
E. Vault-6.5H	6.5	11/29/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
N. Vault-7H (4)	7	11/29/93	4.1	<0.005	<0.005	<0.005	23	--	
Vault-Base-9.5H (5)	9.5	11/29/93	380	0.05	0.69	0.22	2	--	
S. Tank-8FG	8	12/06/93	1,500	0.87	43	34	240	--	
S. Tank-8G	8	12/06/93	43	0.006	0.088	0.25	1.8	--	
N. Tank-7.5G	7.5	12/06/93	3,100	11	190	64	400	--	
N. Tank-8.5FG	8.5	12/06/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
PJ-2G	2	12/07/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
DSP-2G	2	12/07/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
E. Wall-3G	3	12/15/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
S. Wall-3G	3	12/15/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
N. Wall-3G	3	12/16/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
W. Wall-3-N	3	12/29/93	<0.2	<0.005	<0.005	<0.005	<0.005	--	
W. Wall-3-S	3	12/29/93	0.5	<0.005	<0.005	<0.005	<0.005	--	
MW-2 / MW-2-5'	5	07/30/94	<0.2	<0.005	<0.005	<0.005	<0.005	--	
MW-2 / MW-2-9.5'	9.5	07/30/94	<0.2	<0.005	<0.005	<0.005	<0.005	--	
MW-2 / MW-2-15'	15	07/30/94	<0.2	0.024	0.007	<0.005	<0.005	--	
GW-1 / GW-1-10'	10	07/30/94	<0.2	<0.005	<0.005	<0.005	<0.005	--	

Conestoga-Rovers & Associates

Table 3. Petroleum Hydrocarbon Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
GW-1 / GW-1-15'	15	07/30/94	<0.2	<0.005	<0.005	<0.005	<0.005	--	
SB-F / SB-F 20'	20.0	07/07/95	160	1.9	10	2.5	11	--	a
SB-H / SB-H 20'	20.0	07/07/95	350	4.0	16	5.3	25	--	a
SB-L / SB-L 20'	20.0	07/07/95	220	1.6	4.1	4.8	24	--	b,d
(MW-4) / SB-M 20.0'	20.0	10/02/96	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
(MW-5) / SB-N 20.0'	20.0	10/02/96	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
(MW-6) / SB-O 20.5'	20.5	10/03/96	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
SB-P / SB-P 3.75'	3.75	10/03/96	3.8	<0.005	0.016	0.017	0.084	<0.05	
SB-P / SB-P 12.7'	12.7	10/03/96	1,500	0.55	14	25	100	2.0	b,d
SB-Q / SB-Q 3.75'	3.75	10/03/96	4.3	0.006	0.024	0.027	0.11	<0.02	g
SB-Q / SB-Q 9.6'	9.6	10/03/96	1,900	0.95	15	43	200	<1.4	b,d
VES-1 / VES-1-16.5'	16.5	07/22/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
VES-1 / VES-1-21.5'	21.5	07/22/99	5,600	59	400	75	370	<10	a
VES-1 / VES-1-30.5'	30.5	07/22/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
VES-2 / VES-2-16.5'	16.5	07/22/99	2.2	<0.005	0.018	<0.005	0.050	<0.05	g
VES-2 / VES-2-26.5'	26.5	07/22/99	4,300	35	260	74	310	<10	a
VES-2 / VES-2-30.0'	30.0	07/22/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
VES-3 / VES-3-15.5'	15.5	07/23/99	1.3	0.011	<0.005	<0.005	0.010	<0.05	a
VES-3 / VES-3-20.5'	20.5	07/23/99	2,100	<0.50	66	56	280	<10	b,j
VES-3 / VES-3-30.5'	30.5	07/23/99	1.4	0.062	0.25	0.039	0.16	<0.05	a
VES-4 / VES-4-16.5'	16.5	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
VES-4 / VES-4-25.0'	25.0	07/23/99	7,600	150	490	170	640	32*	a
VES-4 / VES-4-30.0'	30.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-1 / CB-1-10.0'	10.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-1 / CB-1-16.0'	16.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-1 / CB-1-20.0'	20.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-1 / CB-1-24.0'	24.0	07/23/99	1,500	2.3	6.8	12	58	<2	a
CB-2 / CB-2-12.0'	12.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-2 / CB-2-15.0'	15.0	07/23/99	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05	
CB-2 / CB-2-20.5'	20.5	07/23/99	4.2	<0.005	0.010	0.007	0.025	<0.05	j
CB-2 / CB-2-24.0'	24.0	07/23/99	4.8	0.006	<0.005	0.026	0.030	<0.05	j

Conestoga-Rovers & Associates

Table 3. Petroleum Hydrocarbon Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Notes
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Notes:

TPHg = Total purgeable petroleum hydrocarbons as gasoline by EPA method Modified 8015.

Benzene, toluene, ethylbenzene, xylenes (BTEX) by EPA method 8020.

MTBE = Methyl tert-butyl ether by modified EPA method 8020.

<n = not detected above n parts per million

a = unmodified or weakly modified gasoline is significant

b = heavier gasoline range compounds significant

d = gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline

g = strongly aged gasoline or diesel range compounds are significant

j = no recognizable pattern

* = MTBE result not confirmed by EPA Method 8260 analysis.

1990 through 1994 data tabulated from Table 1 in Levine Fricke's September 1, 1994, *Soil and Groundwater Investigation Report*, Harrison Street Garage,

1432-1434 Harrison Street, Oakland, California.

* = Samples taken from 1439 Alice St. Property

Conestoga-Rovers & Associates

Table 4. Other Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHd	Kerosene	Oil & Grease	PCBs	CL-HCs	VOCs	(mg/kg)							Soluble Pb ¹ (mg/L)	Notes
									As	Pb	Hg	Ni	Se	PCB			
2 / 2@18.5'	18.5	7/25/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	0.21	
B4 / B4@10'	10	9/17/1990	1,700	<100	6,300	--	--	--	--	--	--	--	--	--	--	--	
B6 / B6@9'	9	09/17/90	<10	98	ND	9	--	--	--	0.009	--	--	--	--	--	0.06	*
B6 / B6@9.5'	9.5	09/17/90	<10	140	ND	--	--	--	--	--	--	--	--	--	--	--	*
B7 / B7@20'	20	9/21/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	0.07	
B1 / B1-2'	2	1/16/1992	55.7	--	54.2	ND	ND	ND	35.3	ND	50.7	21.9	15.3	ND	--	--	*
B2 / B2-2'	2	1/16/1992	1.5	--	ND	ND	ND	ND	39.5	ND	49.7	16.9	ND	ND	--	--	*
B3 / B3-2'	2	1/16/1992	1.6	--	ND	ND	ND	ND	40.2	ND	54.2	33.6	17.0	ND	--	--	*
B4 / B4-2'	2	1/16/1992	24.1	--	54.8	ND	ND	ND	42.9	ND	66.5	45.6	19.2	ND	--	--	*
B5 / B5-2'	2	1/16/1992	2.5	--	50.9	ND	ND	ND	47.3	ND	73.0	47.2	19.2	ND	--	--	*
B6 / B6-2'	2	1/16/1992	24.3	--	ND	ND	ND	ND	42.2	ND	66.7	41.4	16.9	ND	--	--	*
B7 / B7-2'	2	1/16/1992	6.3	--	221.0	ND	ND	ND	45.3	ND	74.2	36.3	18.9	ND	--	--	*
B8 / B8-2'	2	1/16/1992	2.9	--	55.1	ND	ND	ND	39.2	ND	52.9	30.8	15.3	ND	--	--	*
B9 / B9-5'	5	1/22/1992	11.10	--	ND	ND	ND	ND	--	7.53	21.5	59.8	11.6	ND	--	--	*
B10 / B10-8'	8	1/22/1992	109.0	--	ND	ND	ND	ND	--	5.63	15.5	34.9	ND	ND	--	--	*
B13 / B13-5'	5	1/21/1992	1.63	--	--	0.245	--	ND	47.3	17.4	45.4	46.1	21.9	245	--	--	
B13 / B13-15'	15	1/21/1992	<1	--	--	ND	--	ND	27.4	13.8	35.5	128.4	15.5	ND	--	--	
B14 / B14-5'	5	1/21/1992	<1	--	--	ND	--	ND	27.5	11.2	28.1	39.4	12.3	ND	--	--	
B14 / B14-15'	15	1/21/1992	17.3	--	--	ND	--	ND	32.7	13.2	32.8	376.2	15.3	ND	--	--	
B15 / B15-5'	5	1/30/1992	--	--	--	--	--	ND	25.4	26.6	29.4	56.6	9.02	ND	--	--	
B15 / B15-15'	15	1/30/1992	--	--	--	--	--	ND	36.0	16.7	33.2	72.3	15.5	ND	--	--	
B16 / B16-5'	5	1/30/1992	--	--	--	--	--	ND	41.8	14.3	44.9	60.3	15.2	ND	--	--	
B16 / B16-15'	15	1/30/1992	--	--	--	--	--	ND	26.0	10.2	34.7	48.4	8.81	ND	--	--	
B17 / B17-5'	5	2/3/1992	--	--	39.1	ND	--	ND	--	10.4	3.56	329.2	6.24 ^a	ND	--	--	
B19 / B19-5'	5	2/3/1992	28	--	--	--	--	--	--	--	--	--	--	--	--	--	
B20 / B20-5'	5	2/3/1992	24	--	--	--	--	--	--	--	--	--	--	--	--	--	
B20 / B20-15'	15	2/3/1992	<1	--	35.2	ND	--	--	--	10.4	2.48	224.8	<7.5	ND	--	--	
B21 / B21-5'	5	2/5/1992	16.7	--	--	--	--	--	--	--	--	--	--	--	--	--	
B21 / B21-10'	10	2/5/1992	15.7	--	--	--	--	--	--	--	--	--	--	--	--	--	
B21 / B21-15'	15	2/5/1992	22.7	--	--	--	--	--	--	--	--	--	--	--	--	--	
B22 / B22-5'	5	2/5/1992	670	--	--	--	--	--	--	--	--	--	--	--	--	--	
B22 / B22-10'	10	2/5/1992	175	--	--	--	--	--	--	--	--	--	--	--	--	--	
B23 / B23-5'	5	2/5/1992	26	--	--	--	--	--	--	--	--	--	--	--	--	--	
B23 / B23-10'	10	2/5/1992	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	

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Table 4. Other Soil Analytical Data - Allright Parking, 1432 Harrison Street, Oakland, California

Boring / Sample ID	Sample Depth (ft)	Sample Date	TPHd	Kerosene	Oil & Grease	PCBs	(mg/kg)							Soluble Pb ¹ (mg/L)	Notes	
							CL-HCs	VOCs	As	Pb	Hg	Ni	Se			
Sump 5.5H (3)	5.5	11/29/1993	--	--	<10	ND	--	--	--	2	<0.06	50	<2	--	--	
Hoist 1-8H	8	11/29/1993	--	--	<10	--	--	--	--	--	--	--	--	--	--	
Hoist 2-9.5WH (2)	9.5	11/29/1993	--	--	17,000	--	--	--	--	--	--	--	--	--	--	
Hoist 2-11.5H	11.5	11/29/1993	--	--	5,100	--	--	--	--	--	--	--	--	--	--	
Hoist 2-9EH	9	11/29/1993	--	--	<10	--	--	--	--	--	--	--	--	--	--	
E. Vault-6.5H	6.5	11/29/1993	--	--	<10	--	--	--	--	--	--	--	--	--	--	
N. Vault-7H (4)	7	11/29/1993	--	--	1,700	--	--	--	--	--	--	--	--	--	--	
Vault-Base-9.5H (5)	9.5	11/29/1993	--	--	14,000	--	--	--	--	--	--	--	--	--	--	
S. Tank-8FG	8	12/6/1993	--	--	--	--	--	--	--	<0.5	--	--	--	--	<0.5 ^b	
S. Tank-8G	8	12/6/1993	--	--	--	--	--	--	--	<0.5	--	--	--	--	<0.5 ^b	
N. Tank-7.5G	7.5	12/6/1993	--	--	--	--	--	--	--	1.9	--	--	--	--	1.9 ^b	
N. Tank-8.5FG	8.5	12/6/1993	--	--	--	--	--	--	--	<0.5	--	--	--	--	<0.5 ^b	

Notes:

1 = Unknown extraction method

a = Report concentration is lower than the detection limit

b = Concentrations reported are Organic Lead by DHS Method

ND - Not detected above laboratory reporting limits

-- = Not analyzed

PCB's = Polychlorinated biphenyls

VOCs = Volatile organic carbons

CL-HCs = Chlorinated hydrocarbons

Pb - Lead

Hg = Mercury

Ni = Nickel

Se = Selenium

All Data tabulated from Table 1 in Levine Fricke's September 1, 1994, *Soil and Groundwater Investigation Report*, Harrison Street Garage, 1432-1434 Harrison Street, Oakland, California.

*= Samples associated with 1439 Alice St. Property



**CONESTOGA-ROVERS
& ASSOCIATES**

**APPENDIX A
Agency Correspondence**

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



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(510) 567-6700
FAX (510) 337-9335

February 22, 2008

Sydney & Barbara Borsuk Trust, Shiela Siegel Trust
C/o Mr. Mark Borsuk
1626 Vallejo Street
San Francisco, CA 94123-5116

Mr. Leland Douglas
Douglas Parking Company
1721 Webster Street
Oakland, CA 94612

Subject: Fuel Leak Case No. RO0000266 and Geotracker Global ID T0600100682, A Bacharach Trust & B Borsuk, 1432 Harrison Street, Oakland, CA 94612

Dear Mr. Borsuk and Mr. Douglas:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site including the documents entitled, "*Risk Assessment, Allright Parking, 1432 Harrison Street, Oakland, California*," dated August 6, 2006, "*Soil Gas Characterization Work Plan*," dated March 9, 2007, and "*Status Report and Recommendations*," dated July 23, 2007. Based upon our review of the case file, we have several comments that require further information and/or revisions to the work plan. Therefore, we request that you prepare a Revised Work Plan that addresses the technical comments below.

TECHNICAL COMMENTS

- 1. Site History and Request for Information.** The site history prior to 1988 is only briefly discussed in the reports currently in ACEH files. Therefore, we request that you submit any other available documents which provide information on site history, such as historic aerial photographs, Sanborn maps, or compilations of information from environmental data bases. Specifically, we request that you submit a copy of a Phase I report which is referenced on page 1 of the RGA Environmental, Inc. report entitled, "*Preliminary Site Assessment Report*," and dated April 2, 1992. In addition, we request that you include a summary of the site history prior to 1988 in the Revised Work Plan requested below. If the review of site history identifies potential sources of soil and groundwater contamination in addition to the former gasoline tanks adjacent to Harrison Street, the waste oil tank adjacent to Alice Street, and the hydraulic lift area, please update the site conceptual model and propose additional site characterization activities accordingly.
- 2. Reference to Former Chevron Service Station.** Page 1 of the RGA Environmental, Inc. report entitled, "*Preliminary Site Assessment Report*," and dated April 2, 1992 refers to a former Chevron service station on site. As part of the expanded review of site history discussed in technical comment 1, please confirm whether a Chevron service station was

located on site and identify on a site plan, the locations of former UST system components associated with the former service station.

3. **Elevated Concentrations of TPH and Benzene East of Former Gasoline Tanks and Dispensers.** We note that elevated concentrations of benzene were detected in boring B-8 (2.3 mg/kg in soil sample from 22.5 feet bgs) and boring SB-K (9,600 µg/L in grab groundwater sample), which are located east (cross gradient) from the identified sources of gasoline contamination at the site. Boring SB-K is approximately 80 feet east (cross gradient) from the former gasoline tanks and 65 feet east of the former dispensers. Boring SB-8 is approximately 70 feet east of the former gasoline tanks and 45 feet east of the former dispensers. Please review these data and the site history to evaluate whether elevated concentrations of benzene in soil and groundwater extend east from the gasoline tanks and dispensers or whether there may be additional sources of gasoline contamination in the eastern portion of the 1432 Harrison Street property. Please update the site conceptual model and propose additional characterization to address data gaps as necessary.
4. **Proposed On-Site Soil Gas Sampling.** We concur conceptually with the proposal to conduct soil vapor sampling to evaluate the potential for vapor intrusion to indoor air. However, upon review of site history and the items discussed in technical comments 1 through 3, revision of the proposed scope of work and sampling locations for soil gas sampling may be necessary in the Revised Work Plan requested below.
5. **Sensitive Receptors and Off-site Soil Gas Sampling.** During the groundwater sampling event on June 23, 2006, benzene was detected in off-site wells MW-2, MW-4, and MW-5 at concentrations ranging from 1,600 to 3,400 µg/L. The Environmental Screening Levels (ESLs) [San Francisco Bay Regional Water Quality Control Board 2007] for potential vapor intrusion of benzene to indoor air for residential and commercial receptors are 540 and 1,800 µg/L, respectively. Based on the potential for vapor intrusion to indoor air within the off-site plume, we request that you conduct a sensitive receptor survey for all areas currently and potentially affected by the plume in the future. We also request that you propose soil gas sampling in the off-site area of the plume to evaluate the potential for vapor intrusion to indoor air due to volatilization from groundwater. Please include these plans in the revised Work Plan requested below.
6. **Elevated Metals in Soil.** Elevated concentrations of mercury, nickel, antimony, arsenic, and selenium were detected in soil samples collected in the hydraulic lift and waste oil tank area (borings B-1 through B-10 and B13 through B-16 advanced in January 1992). Of particular concern are the elevated concentrations of mercury detected in numerous shallow soil samples. As noted in the ESL document (San Francisco Bay Regional Water Quality Control Board 2007), soil vapor sampling is recommended for mercury to evaluate the potential for vapor intrusion to indoor air. The source of the elevated concentrations of metals in soil is currently unknown. We request that you review the metals data for soils, update your site conceptual model, and propose additional characterization activities as necessary to address the elevated concentrations of metals detected in soil.
7. **Waste Oil Tank at 1432 Alice Street.** During sampling of the waste oil tank contents on October 30, 1990, elevated concentrations of tetrachloroethene (PCE), trichloroethene, PCBs, and lead were detected. Monitoring well MW-3 is located in Alice Street approximately 20 feet northeast of the former waste oil tank. Two grab groundwater samples

(GW-1 and GW-2) were also collected in Alice Street but the groundwater samples were only analyzed for TPHg and BTEX (Levine Fricke 1994). These locations are either cross gradient or upgradient from the former waste oil tank. No groundwater samples appear to have been collected downgradient from the former waste oil tank. PCE was detected at a concentration of 2 µg/L and TPH as oil was detected at a concentration of 300 µg/L in a groundwater sample collected from MW-3 on August 7, 1994; no VOCs other than PCE were detected. In order to confirm that groundwater has not been significantly affected in the area of the former waste oil tank, we request that a minimum of one soil boring be advanced downgradient from the former waste oil tank to collect a grab groundwater sample. Please include plans to evaluate water quality downgradient from the waste oil tank.

8. **Risk Assessment Report.** The report entitled, "*Risk Assessment, Allright Parking, 1432 Harrison Street, Oakland, California,*" dated April 4, 2001 includes a Tier 1 assessment of the site and a Tier 2 assessment using risk-based corrective action (RBCA) modeling of the vapor inhalation pathway for benzene. The Tier 1 assessment concludes that the concentrations of TPHg, BTEX, TPHd, and oil & grease exceed ESLs for groundwater protection. The concentration of benzene in soil also exceeds the residential ESL for vapor intrusion. The Tier 2 risk assessment concludes that there is no significant risk from indoor or outdoor vapor inhalation due to benzene in soil and/or groundwater. The Tier 2 risk assessment also concludes that elevated concentrations of benzene in soil may result in risk to a hypothetical residential receptor. Collection of soil gas samples is recommended in the risk assessment to provide a more representative characterization of potential risk from vapor intrusion. We concur with the recommendation to conduct soil vapor sampling to evaluate potential vapor intrusion to indoor air.
9. **Closed in Place USTs at 1424 Harrison Street.** As discussed during our February 6, 2008 meeting, the closed-in-place USTs at 1424 Harrison Street have been identified during previous investigations as a potential source of fuel hydrocarbon contamination in the area of the site. Additional information regarding the closed-in-place USTs was provided in correspondence prepared by Conestoga-Rovers & Associates, entitled, "*Status Report and Recommendations,*" dated July 23, 2007. ACEH is in the process of determining the most appropriate regulatory actions for the closed-in-place USTs at 1424 Harrison Street.
10. **Confirmation Soil Sampling.** The July 23, 2007 correspondence entitled, "*Status Report and Recommendations,*" recommends soil sampling to confirm the effectiveness of remediation through operation of a soil vapor extraction/air sparging system from 2001 to 2005. In general, we do not object to post-remediation confirmation soil sampling. However, we recommend implementing confirmation soil sampling after the items discussed in technical comments 1 through 3 are further evaluated and issues related to the closed-in-place USTs at 1424 Harrison Street are further resolved.
11. **Off-Site Source.** During our meeting on February 26, 2008, a service station at 301 14th Street was discussed as a possible contributor to groundwater contamination in the area of the site. We have reviewed the relevant groundwater monitoring data and find no indications that the service station at 301 14th Street is contributing to the groundwater plume originating from 1432 and possibly 1424 Harrison Street. Although groundwater contamination is present at the 301 14th Street site, the groundwater contamination does not appear to extend to 1432 Harrison Street. Two wells were located in Harrison Street between the service station at 301 14th Street and 1432 Harrison Street. Well MW-6 is on the east side of

Harrison Street and well C-9 was previously located on the west side of Harrison Street. Well C-9 was decommissioned in 2005. The most recent groundwater samples from both wells did not contain detectable fuel hydrocarbons.

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **Revised Work Plan** – April 25, 2008

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

Mr. Mark Borsuk
RO0000266
February 22, 2008
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PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

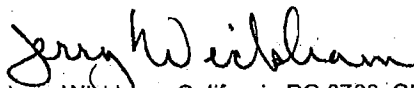
Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to \$10,000 per day for each day of violation.

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at jerry.wickham@acgov.org.

Sincerely,



Jerry Wickham, California PG 3766, CEG 1177, and CHG 297
Senior Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Mark Jonas
Conestoga-Rovers & Associates
5900 Hollis Street, Suite A
Emeryville, CA 94608

Donna Drogos, ACEH
Jerry Wickham, ACEH
File

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	ISSUE DATE: July 5, 2005
	REVISION DATE: December 16, 2005
	PREVIOUS REVISIONS: October 31, 2005
SECTION: Miscellaneous Administrative Topics & Procedures	SUBJECT: Electronic Report Upload (ftp) Instructions

Effective **January 31, 2006**, the Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- Entire report including cover letter must be submitted to the ftp site as a **single portable document format (PDF) with no password protection.** (Please do not submit reports as attachments to electronic mail.)
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- Signature pages and perjury statements **must** be included and have either original or electronic signature.
- **Do not password protect the document.** Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted.**
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:
RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Additional Recommendations

- A separate copy of the tables in the document should be submitted by e-mail to your Caseworker in Excel format. These are for use by assigned Caseworker only.

Submission Instructions

- 1) Obtain User Name and Password:
 - a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
 - i) Send an e-mail to dehloptoxic@acgov.org
 - or
 - ii) Send a fax on company letterhead to (510) 337-9335, to the attention of Alicia Lam-Finneke.
 - b) In the subject line of your request, be sure to include "**ftp PASSWORD REQUEST**" and in the body of your request, include the **Contact Information, Site Addresses, and the Case Numbers (RO# available in Geotracker) you will be posting for.**
- 2) Upload Files to the ftp Site
 - a) Using Internet Explorer (IE4+), go to <ftp://alcoftp1.acgov.org>
 - (i) Note: Netscape and Firefox browsers will not open the FTP site.
 - b) Click on File, then on Login As.
 - c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
 - d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
 - e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.
- 3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
 - a) Send email to dehloptoxic@acgov.org notify us that you have placed a report on our ftp site.
 - b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name at acgov.org. (e.g., firstname.lastname@acgov.org)
 - c) The subject line of the e-mail must start with the RO# followed by **Report Upload.** (e.g., Subject: RO1234 Report Upload)



CONESTOGA-ROVERS
& ASSOCIATES

APPENDIX B

Standard Field Procedure

STANDARD FIELD PROCEDURES VAPOR POINT INSTALLATION AND SAMPLING

This document describes Conestoga-Rovers & Associates' standard field methods for soil vapor sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil vapor samples are collected and analyzed to assess whether vapor-phase subsurface contaminants pose a threat to human health or the environment.

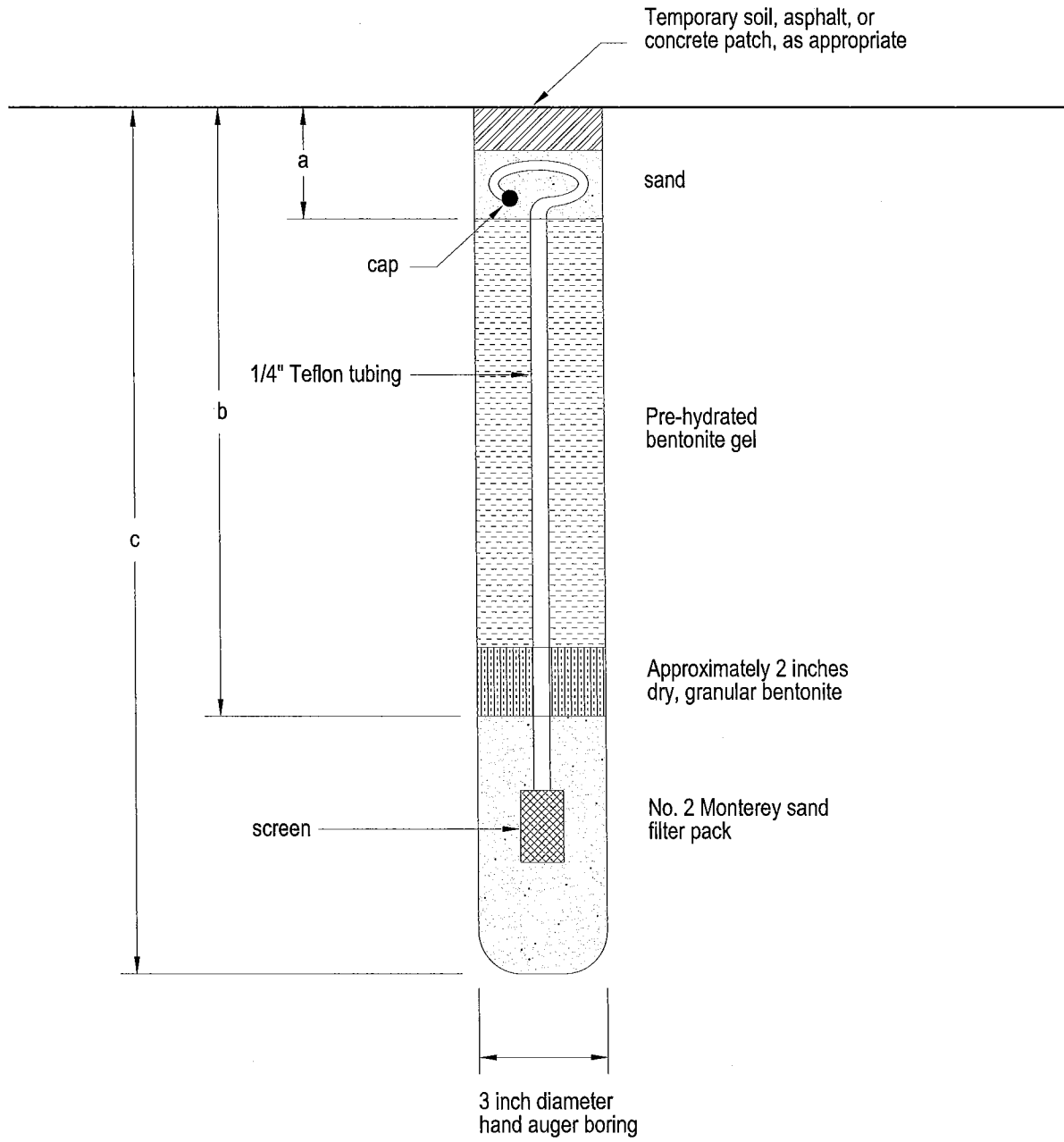
Shallow Soil Vapor Point Method for Soil Vapor Sampling

The shallow soil vapor point method for soil vapor sampling utilizes a hand auger or drill rig to advance a boring for the installation of a soil vapor sampling point. Once the boring is hand augered to the final depth, a 6-inch slotted probe, capped on either end with brass or Swagelok fittings, is placed within 12-inches of number 2/16 filter sand (Figure A). Nylon tubing of ¼-inch outer-diameter of known length is attached to the probe. A 2-inch to 12-inch layer of unhydrated bentonite chips is placed on top of the filter pack. Next pre-hydrated granular bentonite is then poured into the hole to approximately and topped with another 2-inch layer of unhydrated bentonite chips or concrete, depending if the boring will hold one probe or multiple probes. The tube is coiled and placed within a wellbox finished flush to the surface. Soil vapor samples will be collected no sooner than one week after installation of the soil vapor points to allow adequate time for representative soil vapors to accumulate. Soil vapor sample collection will not be scheduled until after a minimum of three consecutive precipitation-free days and irrigation onsite has ceased. Figure B shows the soil vapor sampling apparatus. A measured volume of air will be purged from the tubing using a different Summa purge canister. Immediately after purging, soil vapor samples will be collected using the appropriate size Summa canister with attached flow regulator and sediment filter. The soil vapor points will be preserved until they are no longer needed for risk evaluation purposes. At that time, they will be destroyed by extracting the tubing, hand augering to remove the sand and bentonite, and backfilling the boring with neat cement. The boring will be patched with asphalt or concrete, as appropriate.

Vapor Sample Storage, Handling, and Transport

Samples are stored and transported under chain-of-custody to a state-certified analytic laboratory. Samples should never be cooled due to the possibility of condensation within the canister.

Attachments: Figure A: Soil Vapor Point
Figure B: Soil Vapor Sampling Apparatus Diagram



S:\0-TEXACO\TEX-SITES\211273\FIGURES\VAPOOR-POINT.DWG

Schematic Not to Scale

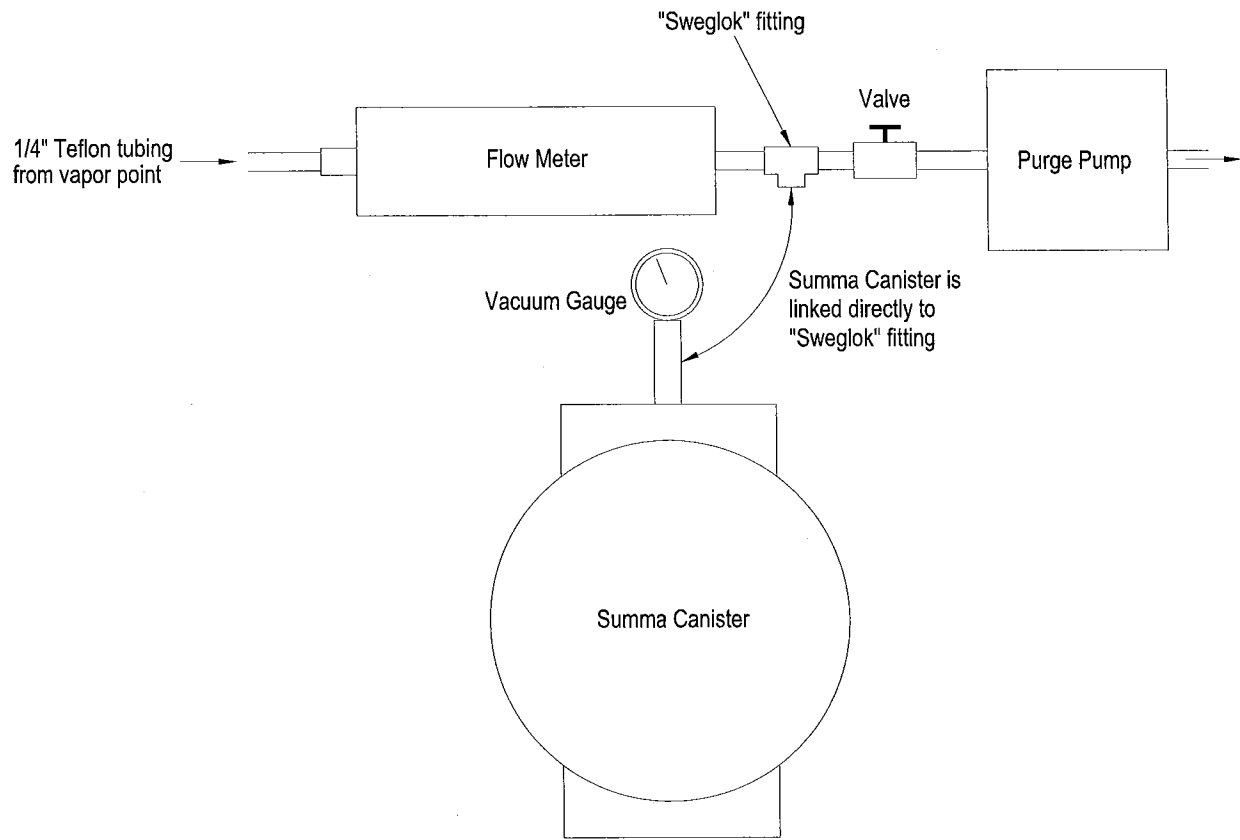
FIGURE

A



**CONESTOGA-ROVERS
& ASSOCIATES**

Soil Vapor Point



S:\C-TEXACO\TEX-SITES\211273\FIGURES\VAPOR-DIAG.DWG

Schematic Not to Scale

FIGURE

B



**CONESTOGA-ROVERS
& ASSOCIATES**

**Soil Vapor Sampling
Apparatus Diagram**

Mercury Sampling Method

Per Communication from Data Chem

Soil gas samples for mercury will be collected from each sampling point using a sampling pump and Solid Sorbent Tube Sampler. A Field Black Solid Sorbent Tube, exposed to ambient air will be used at each sampling location to insure quality control. Using the Solid Sorbent Tube and a laboratory calibrated AirCheck sample pump, purge and sampling rates will be approximately 0.2 millimeters per minute to limit stripping and to prevent ambient air intrusion. With the Solid Sorbent Tube inserted in the AirCheck sample pump, the pump should be set to approximately 0.2 millimeters per minute flow rate for a 10 minute interval to establish a detection limit below a risk value of 19 ug/m^3 . The mercury sample is then analyzed using Method 6009.

MERCURY

6009

Hg

MW: 200.59

CAS: 7439-97-6

RTECS: OV4550000

METHOD: 6009, Issue 2

EVALUATION: PARTIAL

Issue 1: 15 May 1989
Issue 2: 15 August 1994

OSHA : C 0.1 mg/m³ (skin)
NIOSH: 0.05 mg/m³ (skin)
ACGIH: 0.025 mg/m³ (skin)

PROPERTIES: liquid; d 13.55 g/mL @ 20 °C; BP 356 °C;
HP -39 °C; VP 0.16 Pa (0.0012 mmHg);
13.2 mg/m³ @ 20 °C; Vapor Density
(air=1) 7.0

SYNONYMS: quicksilver

SAMPLING		MEASUREMENT	
SAMPLER:	SOLID SORBENT TUBE (Hopcalite in single section, 200 mg)	TECHNIQUE:	ATOMIC ABSORPTION, COLD VAPOR
FLOW RATE:	0.15 to 0.25 L/min	ANALYTE:	elemental mercury
VOL-MIN:	2 L @ 0.5 mg/m ³	DESORPTION:	conc. HNO ₃ /HCl @ 25 °C, dilute to 50 mL
-MAX:	100 L	WAVELENGTH:	253.7 nm
SHIPMENT:	routine	CALIBRATION:	standard solutions of Hg ²⁺ in 1% HNO ₃
SAMPLE STABILITY:	30 days @ 25 °C [1]	RANGE:	0.1 to 1.2 µg per sample
FIELD BLANKS:	2 to 10 field blanks per set	ESTIMATED LOD:	0.03 µg per sample
MEDIA BLANKS:	at least 3 per set	PRECISION (\bar{S}_r):	0.042 @ 0.9 to 3 µg per sample [4]
ACCURACY			
RANGE STUDIED:	0.002 to 0.8 mg/m ³ [2] (10-L samples)		
BIAS:	not significant		
OVERALL PRECISION (\bar{S}_{rT}):	not determined		
ACCURACY:	not determined		

APPLICABILITY: The working range us 0.01 to 0.5 mg/m³ for a 10-L air sample. The sorbent material irreversibly collects elemental mercury. A prefilter can be used to exclude particulate mercury species from the sample. The prefilter can be analyzed by similar methodology. The method has been used in numerous field surveys [3].

INTERFERENCES: Inorganic and organic mercury compounds may cause a positive interference. Oxidizing gases, including chlorine, do not interfere.

OTHER METHODS: This replaces method 6000 and its predecessors, which required a specialized desorption apparatus [4,5,6]. This method is based on the method of Rathje and Marcero [7] and is similar to the OSHA method ID 145H [2].

REAGENTS:

1. Water, organics-free, deionized.
2. Hydrochloric acid (HCl), conc.
3. Nitric acid (HNO₃), conc.
4. Mercuric oxide, reagent grade, dry.
5. Calibration stock solution, Hg²⁺, 1000 µg/mL. Commercially available or dissolve 1.0798 g of dry mercuric oxide (HgO) in 50 mL of 1:1 hydrochloric acid, then dilute to 1 L with deionized water.
6. Intermediate mercury standard, 1 µg/mL. Place 0.1 mL 1000 µg/mL stock into a 100 mL volumetric containing 10 mL deionized water and 1 mL hydrochloric acid. Dilute to volume with deionized water. Prepare fresh daily.
7. Stannous chloride, reagent grade, 10% in 1:1 HCl. Dissolve 20 g stannous chloride in 100 mL conc. HCl. Slowly add this solution to 100 mL deionized water and mix well. Prepare fresh daily.
8. Nitric acid, 1% (w/v). Dilute 14 mL conc. HNO₃ to 1 L with deionized water.

EQUIPMENT:

1. Sampler: glass tube, 7 cm long, 6-mm OD, 4-mm ID, flame sealed ends with plastic caps, containing one section of 200 mg Hopcalite held in place by glass wool plugs (SKC, Inc., Cat. #226-17-1A, or equivalent).
NOTE: A 37-mm, cellulose ester membrane filter in a cassette preceding the sorbent may be used if particulate mercury is to be determined separately.
2. Personal sampling pump, 0.15 to 0.25 L/min, with flexible connecting tubing.
3. Atomic absorption spectrophotometer with cold vapor generation system (see Appendix) or cold vapor mercury analysis system.*
4. Strip chart recorder, or integrator.
5. Flasks, volumetric, 50-mL, and 100-mL.
6. Pipet, 5-mL, 20-mL, others as needed.
7. Micropipet, 10- to 1000-µL.
8. Bottles, biological oxygen demand (BOD), 300-mL.

* See SPECIAL PRECAUTIONS

SPECIAL PRECAUTIONS: Mercury is readily absorbed by inhalation and contact with the skin. Operate the mercury system in a hood, or bubble vented mercury through a mercury scrubber.

SAMPLING:

1. Calibrate each personal sampling pump with a representative sampler in line.
2. Break ends of sampler immediately prior to sampling. Attach sampler to pump with flexible tubing.
3. Sample at an accurately known rate of 0.15 to 0.25 L/min for a total sample size between 2 and 100 L.
NOTE: Include a minimum of three unopened sampling tubes from the same lot as the samples for use as media blanks.
4. Cap sampler and pack securely for shipment.

SAMPLE PREPARATION:

5. Place the Hopcalite sorbent and the front glass wool plug from each sampler in separate 50-mL volumetric flasks.
6. Add 2.5 mL conc. HNO₃ followed by 2.5 mL conc. HCl.
NOTE: The mercury must be in the oxidized state to avoid loss. For this reason, the nitric acid must be added first.
7. Allow the sample to stand for 1 h or until the black Hopcalite sorbent is dissolved. The solution will turn dark brown and may contain undissolved material.
8. Carefully dilute to 50 mL with deionized water. (Final solution is blue to blue-green).
9. Using a volumetric pipet, transfer 20 mL of the sample to a BOD bottle containing 80 mL of deionized water. If the amount of mercury in the sample is expected to exceed the standards, a smaller aliquot may be taken, and the volume of acid adjusted accordingly. The final volume in

the BOD bottle must be 100 mL. To prevent possible loss of mercury during transfer, place the pipet tip below the surface of the liquid in the BOD bottle.

CALIBRATION AND QUALITY CONTROL:

10. Prepare a minimum of two series (six levels each) of working standards covering the range 0.01 to 0.5 µg Hg per aliquot by adding known amounts of the intermediate standard to BOD bottles containing enough 1% nitric acid to bring the final volume to 100 mL.
11. Analyze the working standards together with the samples and blanks (steps 13 through 16). Analyze full set of standards at the beginning of the run, and a second set at the end of the run. Additional standards may be run intermediately during the analysis to confirm instrument response.
12. Prepare calibration graph (peak height vs. solution concentration, µg/sample).

MEASUREMENT:

13. Zero the spectrophotometer by removing the bubbler from the BOD bottle, allowing the baseline on the recorder to stabilize.
14. Place the bubbler in a BOD bottle containing 0.5 µg mercury in 100 mL 1% nitric acid. Adjust the spectrophotometer so that it will give a 75% to full-scale deflection of the recorder.
15. Vent the mercury vapor from the system.
16. Analyze standards, samples and blanks (including media blanks).
 - a. Remove the bubbler from the BOD bottle.
 - b. Rinse the bubbler with deionized water.
 - c. Allow the recorder tracing to establish a stable baseline.
 - d. Remove the stopper from the BOD bottle containing the next sample to be analyzed. Gently swirl the BOD bottle.
 - e. Quickly add 5 mL 10% stannous chloride solution.
 - f. Quickly place the bubbler into the BOD bottle.
 - g. Allow the spectrophotometer to attain maximum absorbance.
 - h. Vent the mercury vapor from the system.
 - i. Place the bubbler into an empty BOD bottle. Continue venting the mercury until a stable baseline is obtained.
 - j. Close the mercury vent.

CALCULATIONS:

17. Calculate the amount of mercury in the sample aliquot (W, µg) from the calibration graph.
18. Calculate the concentration C (mg/m³), of mercury in the air volume sampled, V (L):

$$C = \frac{W \cdot \frac{V_s}{V_a} - B}{V}$$

Where: V_s = original sample volume (step 8; normally 50 mL)
 V_a = aliquot volume (step 9; normally 20 mL)
 B = average amount of mercury present in the media blanks

EVALUATION OF METHOD:

Rathje and Marcerro originally used Hopcalite (MSA, Inc.) as the sorbent material [7]. Later, Hopcalite was shown superior to other methods for the determination of mercury vapor [8]. Atmospheres of mercury vapor for the study were dynamically generated in the range 0.05 to 0.2 mg/m³ and an adsorbent tube loading of 1 to 7 µg was used. The Hydrar material sometimes used is similar to Hopcalite. No significant difference in the laboratory analysis of mercury collected on the two sorbent materials was observed [9]. OSHA also validated a method for mercury using Hydrar [2]. An average 99% recovery, with $\bar{S}_r = 0.042$, was seen for 18 samples with known amounts (0.9 to 3 µg) of mercury added (as Hg(NO₃)₂) [10]. No change in recovery was seen for samples stored up to 3 weeks at room temperature or up to 3 months at -15 °C; longer storage times were not investigated [10].

REFERENCES:

- [1] Evaluation of Mercury Solid Sorbent Passive Dosimeter, Backup Data Report. Inorganic Section, OSHA Analytical Laboratory, Salt Lake City, Utah, 1985.
- [2] Mercury in Workplace Atmospheres (Hydrar Tubes). Method ID 145H, Inorganic Section, OSHA Analytical Laboratory, Salt Lake City, UT, 1987.
- [3] NIOSH/MRSB. Reports for analytical Sequence Nos. 5854, 5900, 6219, and 6311, NIOSH (Unpublished, 1987-1988).
- [4] NIOSH Manual of Analytical Methods, 3rd. ed., Method 6000. (1984).
- [5] NIOSH Manual of Analytical Methods. 2nd. ed., V. 4, S199, U.S. Dept. of Health, Education, and Welfare Publ. (NIOSH) 79-141 (1979).
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METHOD WRITTEN BY:

Keith R. Nicholson and Michael R. Steele, DataChem Laboratories, Inc., Salt Lake City, Utah, under NIOSH contract No. 200-87-2533.

APPENDIX: COLD VAPOR MERCURY ANALYSIS SYSTEM

1. The valve should direct the vented vapors to a hood or to a mercury scrubber system.
2. When the valve is opened to "Vent" the peristaltic pump should draw room air. Place a Hopcalite tube in the air intake to eliminate any mercury that may be present.
3. Adjust the peristaltic pump to a flow that will create a steady stream of bubbles in the BOD bottle, but not so great that solution droplets enter the tubing to the quartz cell.
4. If water vapor condenses in the quartz cell, heat the cell slightly above room temperature by wrapping it with a heating coil and attaching a variable transformer.
5. The bubbler consists of a glass tube with a bulb at the bottom, slightly above the bottom of the BOD bottle. The bulb contains several perforations to allow air to escape into the solution (in a stream of small bubbles). A second tube is provided to allow the exit of the vapor. The open end of the second tube is well above the surface of the liquid in the bottle. The two tubes are fixed into a stoppering device (preferably ground glass) which fits into the top of the bottle. A coarse glass frit can be used in place of the bulb on the first tube. However, it is more difficult to prevent contamination when a frit is used.
6. Replace the flexible tubing (Tygon or equivalent) used to connect the bubbler, cell, and pump periodically to prevent contamination from adsorbed mercury.

STANDARD FIELD PROCEDURES DIRECT PUSH SOIL VAPOR SAMPLING

This document describes Conestoga-Rovers & Associates' standard field methods for soil vapor sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil vapor samples are collected and analyzed to assess whether vapor-phase subsurface contaminants pose a threat to human health or the environment.

Direct Push Method for Soil Vapor Sampling

The direct push method for soil vapor sampling uses a hollow vapor probe, which is pushed into the ground, rather than augured, and the stratigraphy forms a vapor seal between the surface and subsurface environments ensuring that the surface and subsurface gases do not mix. Once the desired soil vapor sampling depth has been reached, the field technician installs disposable polyethylene tubing with a threaded adapter that screw into the bottom of the rods. The screw adapter ensures that the vapor sample comes directly from the bottom of the drill rods and does not mix with other vapor from inside the rod or from the ground surface. In addition, hydrated bentonite is placed around the sampling rod and the annulus of the boring to prevent ambient air from entering the boring. The operator then pulls up on the rods and exposes the desired stratigraphy by leaving an expendable drive point at the maximum depth. The required volume of soil vapor is then purged through the polyethylene tubing using a standard vacuum pump. The soil vapor can be sampled for direct injection into a field gas chromatograph, pumped into inert tedlar bags using a "bell jar" sampling device, or allowed to enter a Summa vacuum canister. Once collected, the vapor sample is transported under chain-of-custody to a state-certified laboratory. The ground surface immediately adjacent to the boring is used as a datum to measure sample depth. The horizontal location of each boring is measured in the field relative to a permanent on-site reference using a measuring wheel or tape measure. Drilling and sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent. Once the sampling is completed, the borings are filled to the ground surface with neat cement.

Vapor Sample Storage, Handling, and Transport

Samples are stored and transported under chain-of-custody to a state-certified analytic laboratory. Samples should never be cooled due to the possibility of condensation within the canister.

STANDARD FIELD PROCEDURES HAND-AUGER SOIL BORINGS AND SAMPLING

This document describes Conestoga-Rovers & Associates standard field methods for drilling and sampling soil borings using a hand-auger. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the modified Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), &
- Estimated permeability.

Soil Boring and Sampling

Hand-auger borings are typically drilled using a hand-held bucket auger to remove soil to the desired sampling depth. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the augered hole. The vertical location of each soil sample is determined using a tape measure. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Augering and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

The borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

STANDARD FIELD PROCEDURES

SOIL BORINGS AND SAMPLING

This document describes Conestoga-Rovers & Associates' standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the modified Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. At least one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

STANDARD FIELD PROCEDURES MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Professional Geologist (P.G.) or Professional Engineer (P.E.).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Upon receipt of analytic results, the water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

STANDARD FIELD PROCEDURES FOR GEOPROBE® / DIRECT PUSH SOIL AND GROUNDWATER SAMPLING

This document describes Conestoga-Rovers & Associates' standard field methods for GeoProbe® or Direct Push soil and groundwater sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the modified Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e., sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or separate-phase hydrocarbon saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e., cementation, presence of marker horizons, mineralogy), &
- Estimated permeability.

Soil Sampling

GeoProbe® or Direct Push soil samples are collected from borings driven using hydraulic push technologies. A minimum of one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples can be collected near the water table and at lithologic changes. Samples are collected using samplers lined with polyethylene or brass tubes driven into undisturbed sediments at the bottom of the borehole. The ground surface immediately adjacent to the boring is used as a datum to measure sample depth. The horizontal location of each boring is measured in the field relative to a permanent on-site reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned or washed prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon® tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

After a soil sample has been collected, soil from the remaining tubing is placed inside a sealed plastic bag and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable GasTech[®] or photoionization detector measures volatile hydrocarbon vapor concentrations in the bag's headspace, extracting the vapor through a slit in the plastic bag. The measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Grab Groundwater Sampling

Groundwater samples are collected from the open borehole using bailers, advancing disposable Tygon[®] tubing into the borehole and extracting ground water using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4° C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory quality assurance/quality control (QA/QC) blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

STANDARD FIELD PROCEDURES
GEOPROBE® / DIRECT PUSH
DISCRETE DEPTH SOIL AND GROUND WATER SAMPLING

This document describes Conestoga-Rovers & Associates standard field methods for GeoProbe® and Direct Push soil and ground water sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the modified Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e., sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or separate-phase hydrocarbon saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e., cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Sampling

GeoProbe® and Direct Push soil samples are collected from borings driven using hydraulic push technologies. A minimum of one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples can be collected near the water table and at lithologic changes. Samples are collected using samplers lined with polyethylene or brass tubes driven into undisturbed sediments at the bottom of the borehole. The ground surface immediately adjacent to the boring is used as a datum to measure sample depth. The horizontal location of each boring is measured in the field relative to a permanent on-site reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned or washed prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon[®] tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

After a soil sample has been collected, soil from the remaining tubing is placed inside a sealed plastic bag and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable GasTech[®] or photoionization detector measures volatile hydrocarbon vapor concentrations in the bag's headspace, extracting the vapor through a slit in the plastic bag. The measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Grab Ground Water Sampling

Ground water samples are collected from the open borehole using bailers, advancing disposable Tygon[®] tubing into the borehole and extracting ground water using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4° C, and transported under chain-of-custody to the laboratory.

Discrete Depth Soil and Ground Water Sampling

Soil and groundwater samples are collected for lithologic and chemical analysis using a direct driven, dual tube soil coring system. A hydraulic hammer drives sampling rods into the ground to collect continuous soil cores. Two nested sampling rods are driven at the same time: a larger diameter outer rod to act as a temporary drive casing and a smaller inner rod to retrieve soil cores. As the rods are advanced the soil is driven into a sample barrel that is attached to the end of the inner rod. The outer rod ensures that the sample is collected from the desired interval by preventing sloughing of the overlying material. After reaching the desired depth the inner rods are removed from the boring and the sleeves containing the soil sample are removed from the inner sample barrel. Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon[®] tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

When collecting groundwater samples, the sample barrel and inner rods are removed from the boring once the targeted water bearing zone has been reached. The drive casing is pulled up from 0.5 to 5 feet to allow groundwater to enter the borehole. Small diameter well casing and screen is then installed in the borehole to facilitate sample collection. The drive casing is then pulled up sufficiently to expose the desired length of screen and samples are collected using a bailer, peristaltic, bladder or inertial pump. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4° C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples

collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory quality assurance/quality control (QA/QC) blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

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