Atlantic Richfield Company

Shannon Couch
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June 19, 2013

Re: Site Model and Case Closure Request
Atlantic Richfield Company Station #472
6415 International Boulevard, Oakland, California
ACEH Case #RO00002982

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct."

Submitted by,

Shannon Couch
Operations Project Manager

Attachment:

CONCEPTUAL SITE MODEL AND CASE CLOSURE REQUEST
Former Richfield Oil Company Station No.472
aka Pluckey's Liquors
6415 International Boulevard
Oakland, California
ACEH Case No. RO0002982

Prepared for

Ms. Shannon Couch
Operations Project Manager
Atlantic Richfield Company
P.O. Box 1257
San Ramon, California 94583

Prepared by

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June 19, 2013

Project No. 09-88-601

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June 19, 2013

Project No. 09-88-601

Atlantic Richfield Company
P.O. Box 1257
San Ramon, CA 94583
Submitted via ENFOS

Attn.: Ms. Shannon Couch

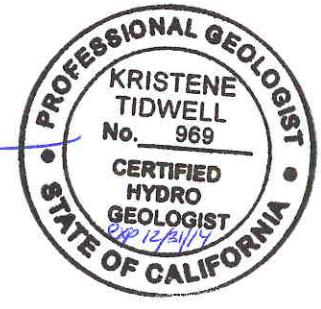
Re: Conceptual Site Model and Case Closure Request, Former Richfield Oil Company Station No.472, 6415 International Boulevard, Oakland, California; ACEH Case No. RO0002982

Dear Ms. Couch:

Broadbent & Associates, Inc. (Broadbent) is pleased to submit this *Conceptual Site Model and Case Closure Request* for Former Richfield Oil Company Station No.472 (also known as Pluckey's Liquors) located at 6415 International Boulevard, Oakland, California (Site). This document was prepared in order to evaluate this Site for case closure under the recently-approved *Low Threat Underground Storage Tank Case Closure Policy* (Low Threat UST Closure Policy; CSWRCB, 2012). After completion of the Conceptual Site Model and comparing the current Site conditions to the Low Threat UST Closure Policy, case closure is recommended.

Should you have questions or require additional information, please do not hesitate to contact us at (530) 566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.



Kristene Tidwell, P.G., C.Hg.
Senior Geologist

Attachment

cc: Ms. Dilan Roe, PE, Alameda County Environmental Health (Submitted via ACEH ftp site)
Mr. Mahmud Ghanem, 6207 International Boulevard, Oakland, CA 94621
Electronic copy uploaded to GeoTracker

CONCEPTUAL SITE MODEL AND CASE CLOSURE REQUEST
Former Richfield Company Station No. 472
6415 International Boulevard, Oakland, California
Fuel Leak Case No. RO0002982

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CONCEPTUAL SITE MODEL AND CASE CLOSURE REQUEST
Former Richfield Company Station No. 472
6415 International Boulevard, Oakland, California
Fuel Leak Case No. RO0002982

1.0 INTRODUCTION

On behalf of the Atlantic Richfield Company– (ARC, a BP affiliated company) Broadbent & Associates, Inc. (Broadbent) has prepared this *Conceptual Site Model and Case Closure Request (CSM and CCR)* for the Former Richfield Oil Company (ROC) Station No.472 (also known as Pluckey's Liquors but herein referred to as Station No.472), located at 6415 International Boulevard, Oakland, California (Site). This CSM and CCR were prepared in order to evaluate the Site's eligibility to be closed under the California State Water Resources Control Board's (CSWRCB) *Low Threat Underground Storage Tank Case Closure Policy* (Low Threat UST Closure Policy; CSWRCB, 2012). This CSM and CCR includes discussions on the Site background and previous environmental activities, regional and Site geology and hydrogeology, and justification for Case Closure.

1.1 Site Setting

The Site is currently being used as a storage lot for used cars for an adjacent operating lot. Previously, a liquor store was operated onsite, and the building from this operation is still present. The Site is generally asphalt or concrete. Alameda County Assessors records indicate the Site is located on an approximately 0.27 acre parcel of property. The Site is located in Section 16, Township 2 South, Range 3 West, relative to the Mount Diablo Baseline and Meridian of Northern California, and The Site can be located on the Oakland East, California 7½-minute topographic quadrangle map of the United States Geological Survey (USGS). A Site Location Map is presented as Drawing 1.

The Site is located in a mixed residential and commercial land-use area. The property across 64th Avenue to the west is a car wash. The property to the east is a Little Caesars restaurant. Across International Blvd. to the north of the Site is a McDonald's restaurant. To the south, and adjacent to the Site, are single-family residences.

1.2 Site Background

The Site operated as a gasoline fueling station between 1947 to at least 1971. The fueling station features including the USTs and dispensers were removed in 1976. A detailed Site history and summary of previous investigations is included in Appendix A.

1.3 Document Purpose and Organization

The purpose of this document is to summarize and present current Site conditions in the form of a CSM and evaluate these conditions and data gathered for Site closure based on the Low Threat UST Closure Policy. The following section presents justification for case closure based on the CSM. The CSM is presented as Table 1. Table 2 and Table 3 present historical and current groundwater analytical data. Table 4 summarizes historical and current potentiometric groundwater gradient magnitude and direction.

In order to evaluate Site condition against the Low Threat UST Closure Policy, each category in the policy has been individually evaluated using the data presented in the CSM (Table 1). These evaluations are presented in the following section.

2.0 JUSTIFICATION FOR SITE CLOSURE – LOW THREAT UST CLOSURE POLICY

As indicated in Section 1.3 above, the Site was evaluated for Closure based on comparing data presented in the CSM (Table 1) against the Low Threat UST Closure Policy. Closure Criteria in the Low Threat UST Closure Policy are organized into the following categories:

- General Criteria
- Media Specific Criteria-Groundwater
- Media Specific Criteria – Petroleum Vapor Intrusion to Indoor Air
- Media Specific Criteria – Direct Contact and Outdoor Air Exposure
- Additional Criteria

The following sections present the details of the evaluation.

2.1 General Criteria

The general criteria relate to the Site use, presence of free product, sources, and completeness of the Site understanding. As evidenced in the data presented in the CSM, a sufficiently good understanding of Site conditions, on- and offsite receptors, and Site history has been established. These general criteria and a discussion as to how the Site is consistent with these criteria are presented below.

The unauthorized release is located within the service area of a public water system
The Site is located within the East Bay Municipal Utilities District Service Area.

The unauthorized release consists only of petroleum
The release at the Site is believed to have occurred in the area of the original USTs and dispensers located in front of the former station building, nearest boring SB-4 and groundwater well MW-1. This has been the location of the highest concentrations of petroleum hydrocarbons (Tables 2 and 3, and Appendix C). The Site was a retail service station between 1949 and 1971. In addition, there is no knowledge or evidence that other activities occurred at the Site which may have caused non-petroleum releases.

The unauthorized release has been stopped
The USTs where the release occurred have been removed, thereby removing the leak sources (Table 1).

Free product has been removed to the extent possible
No free product has been measured at the Site since environmental investigations began in 2008.

A conceptual site model (CSM) that assesses the nature, extent, and mobility of the release has been developed
A conceptual site model has been prepared for this Site and is summarized in Table 1.

Secondary source has been removed to the extent practical
Soils around the former UST complex and have been over-excavated. Approximately 588 cubic yards of petroleum impacted soil was removed and disposed of offsite in 1990. Further soil excavation was reportedly not possible due to existing Site structures.

Soil and groundwater have been tested for MTBE and results reported in accordance with Health and Safety Code 25296.15

The original Phase II investigation (GEOCON, 2008) and soil and water investigation wherein monitoring wells were installed (Broadbent, 2009) were focused on investigating a former retail gasoline station closed down decades before Methyl Tert-Butyl Ether (MTBE) was added to gasoline as a fuel oxygenate. Since installation, groundwater samples collected from the monitoring wells have been routinely analyzed for MTBE. MTBE has been detected just once in groundwater on August 25, 2009 from MW-1 at a concentration of 0.54 micrograms per liter (µg/L), barely above the laboratory method reporting limit of 0.50 µg/L. No MTBE, nor any of the other typical fuel oxygenates have been detected in groundwater samples collected from the Site. Historical MTBE analytical data are included in Table 2 and Table 3.

Nuisance as defined by the Water Code section 13050 does not exist at this site
A nuisance as defined by the Water Code does not exist at this Site.

2.2 Media-Specific Criteria - Groundwater

The Low Threat UST Closure Policy lists four scenarios for groundwater plumes. Conditions at the Site pertain to the first scenario listed in the Low Threat Closure Policy because not petroleum compounds above water quality objectives are currently present in groundwater. This first scenario states that the plume size is not over 100 feet in length, no free product is present at the Site and the closest water supply well or surface water body is greater than 250 in distance. As noted in the CSM (Table 1), free product has never been observed at the Site, the nearest surface water body is over one mile away, and there are no water supply wells located within ½ mile of thie Site.

2.3 Media Specific Criteria – Petroleum Vapor Intrusion to Indoor Air

The Site is not an active service station, and it does not apply to the active fueling station exemption in the Low Threat UST Closure Policy, which considers that petroleum vapors from onsite fueling activities are a far greater risk than those associated with exposure to vapors from historic petroleum releases. However, this Site passes scenarios 1 through 3 of the Low Threat Closure Policy which require a bioattenuation zone for the following:

- provides a separation of at least 30 feet vertically between the light non-aqueous phase liquids (LNAPL) in groundwater and the foundation of existing or potential buildings
- provides a separation of at least 30 feet both laterally and vertically between the LNAPL in soil and the foundation of existing or potential buildings
- provides a separation of at least 5 feet vertically between the dissolved phase benzene and the foundation of existing or potential buildings
- Contain total petroleum hydrocarbons (TPH; as gasoline and diesel combined) less than 100 milligrams per kilogram (mg/kg) throughout the entire depth of the bioattenuation zone

No LNAPL in soil or groundwater is present at the Site. Additionally, benzene has never been reported in historical soil or groundwater samples. Shallow soil samples collected at the site within the bioattenuation zone (area of soil between land surface and shallow groundwater located approximately 7 feet bls) have not detected TPH as gasoline or diesel. Therefore, it was concluded that the vapor intrusion pathway was not complete.

2.4 Media Specific Criteria – Direct Contact and Outdoor Air Exposure

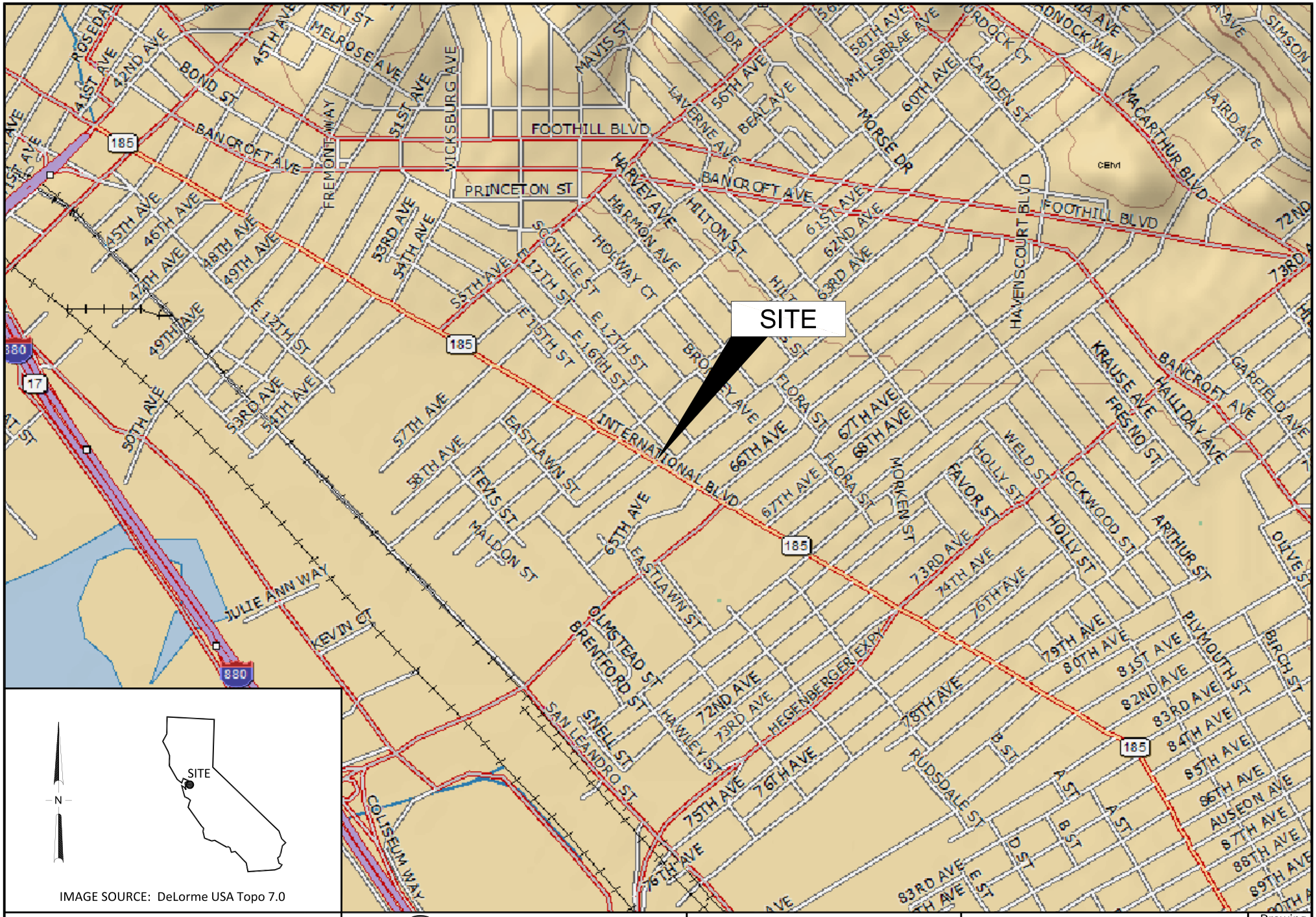
For the direct contact and outdoor air exposure, all soil data was considered. Based on extensive soil data collected during the well installation activities in 2009, no benzene or ethylbenze are present above 10 feet bgs. Napthalene was not analyased during this investigation, however concentrations of gasoline range organics (GRO) were not detected above the laboratory reporting limit of 5 mg/kg, which is lower than the the most conservative level (residential) for napthalene as specified in the Low Threat Closure Policy. Since napthalene is included in the GRO range, it is by default below the maximum allowable level listed in the Low Threat UST Closure Policy. No soil samples above 6.5 feet bgs were collected, however due to the lack hydrocarbon concentrations slightly below 5 feet bgs, and the length of time since USTs or dispensers were present onsite, it is very unlikely petroleum compounds are present between 0 and 5 feet bgs.

2.5 Recommendation for Case Closure

As presented above and in the attached CSM table (Table 1), this Site appears to meet all applicable criteria for case closure under the Low Threat Closure Policy. No BTEX has ever been detected in soil or groundwater samples at the Site with the exception of one minor detection of toluene in 2009. In addition, with the exception of one low MTBE concentration detected in MW-1 and believed to be anomalous, MTBE and other fuel oxygenates are not present. Primarily GRO and DRO have been detected in groundwater at the site with concentration from the most recent sampling event conducted on February 21, 2013 all below 200 ug/L. Adequate Site characterization , evaluation of receptors, historical descriptions, and technical analysis have been performed at the Site and in this document to support a recommendation for case closure. The Site does pose a reasonable risk to the environmental or public health. We hereby recommend that a determination of No Further Action be made for this Site. Upon concurrence of this recommendation from the ACEH, closure activities including well decommissioning should be carried.

3.0 REFERENCES

State Water Resources Control Board, 2012. Low-Threat Underground Storage Tank Case Closure Policy, August 17.



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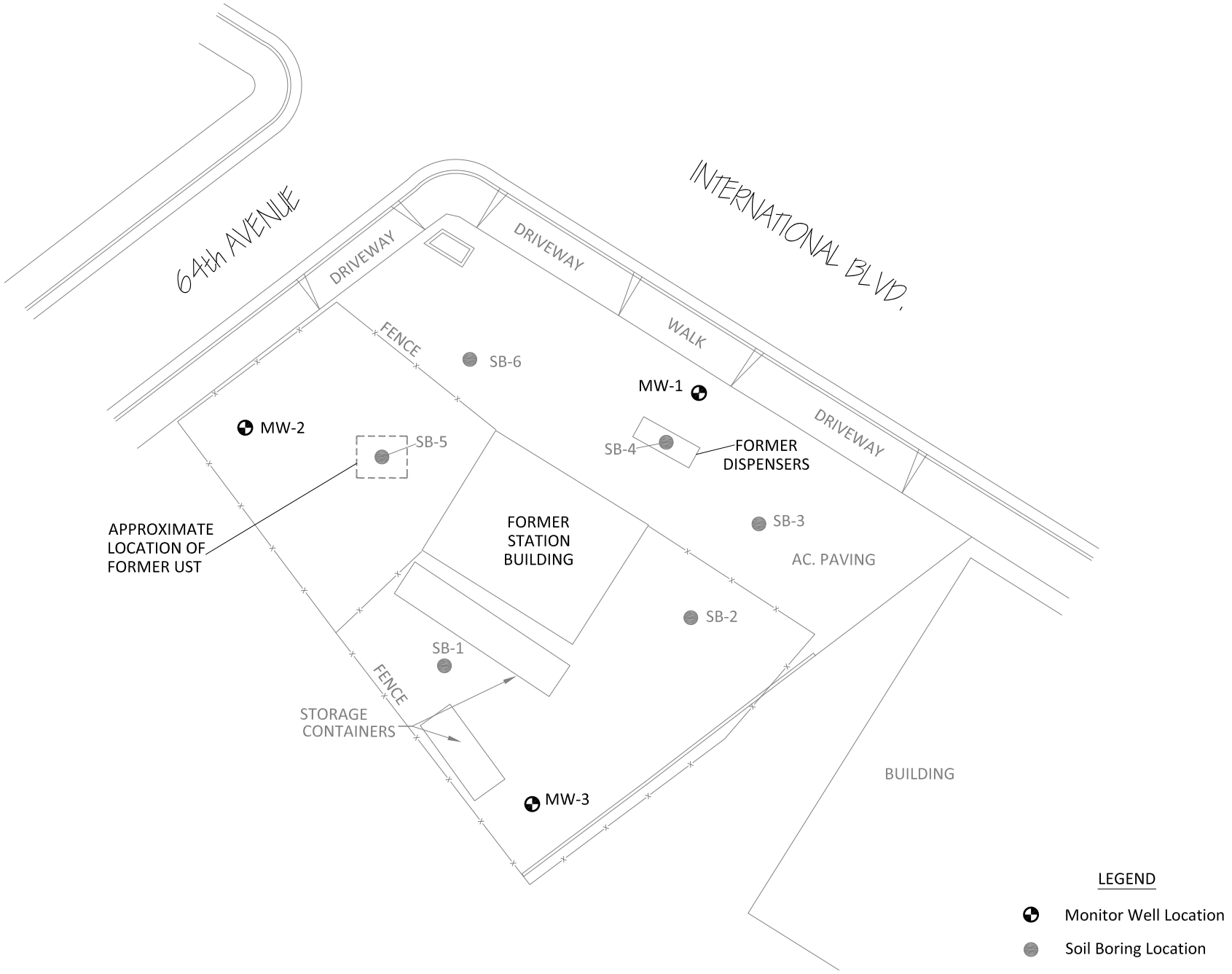
Chico, California 95973
Project No.: 09-88-601 Date: 4/2/2013

Former Station #472
6415 International Boulevard
Oakland, California

Site Location Map

Drawing
1



0 30 60

SCALE (ft)

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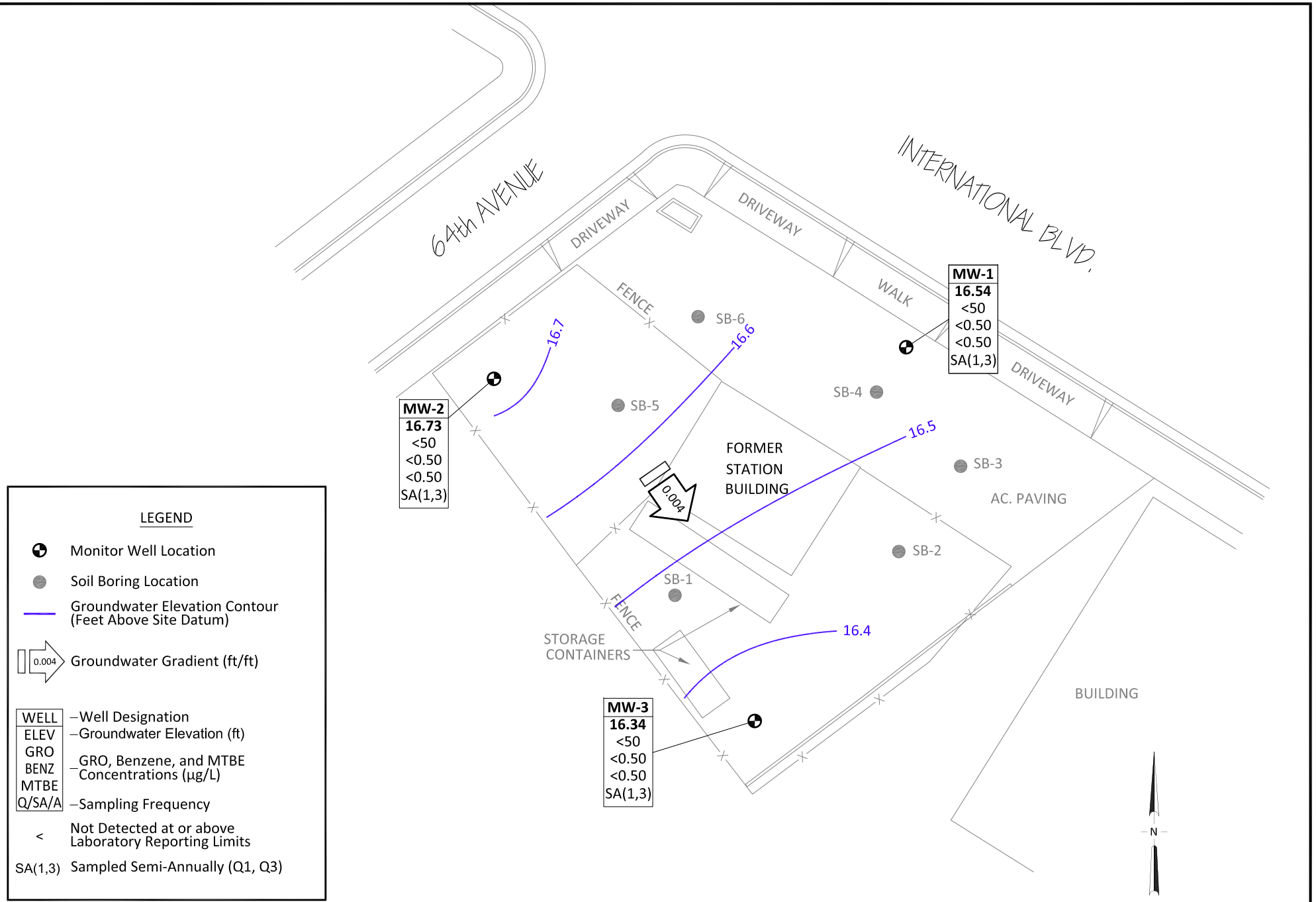
Former Station #472
6415 International Boulevard
Oakland, California

Site Map with Monitoring Well
and Historic Boring Locations

Drawing
2



0 30 60

SCALE (ft)

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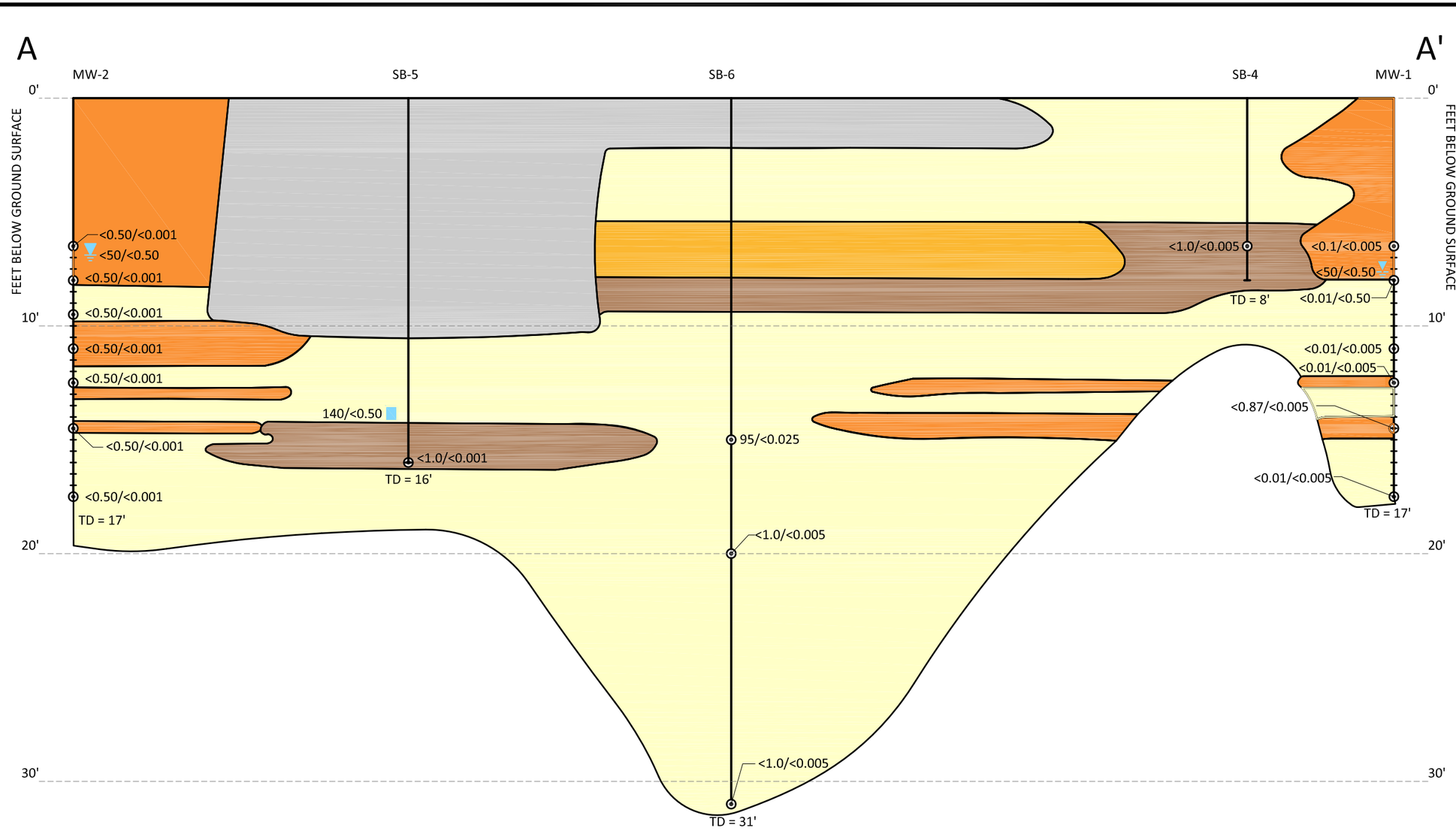
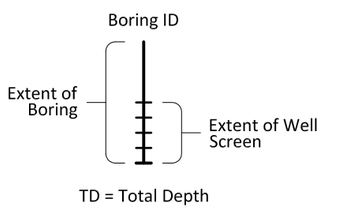
Former Station #472
6415 International Boulevard
Oakland, California

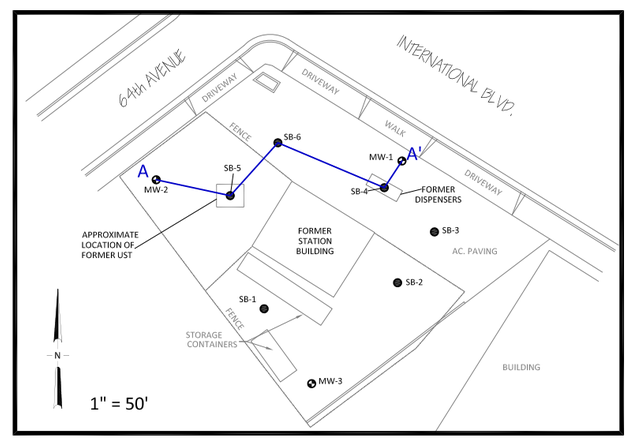
Groundwater Elevation and Analytical Summary Map
February 21, 2013

Drawing
3



- Backfill/Asphalt
- Gravelly Clay, Sandy Clay, Silty Clay, Silt, and Clayey Silt
- Clayey Sand
- Well Graded Sands and Gravelly Sands
- Clayey Gravels
- Groundwater Elevation (2/21/13)
  <50<0.001 = Groundwater GRO/Benzene Concentration in µg/L (2/21/13)
- 140/<0.50 = Grab Groundwater GRO/Benzene Concentration in µg/L (2009)
- <1.0/<0.005 = Soil GRO/Benzene Concentration in mg/Kg (2008/2009)





Drawing 4

Geologic Cross Section A - A'

Former Station #472
6415 International Boulevard
Oakland, California

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B

B'

SB-6 SB-5 SB-1 MW-3

FEET BELOW GROUND SURFACE

0'
10'
20'
30'

95/<0.025
<1.0/<0.005
TD = 16'
<1.0/<0.005
7.3/<0.005
80/<0.50
TD = 24'
<0.1/<0.005
<0.01/<0.50
<50/<0.50
<0.01/<0.005
<0.01/<0.005
<0.87/<0.005
<0.01/<0.005
TD = 17'
<1.0/<0.005
TD = 31'

Backfill/Asphalt

Gravelly Clay, Sandy Clay, Silty Clay, Silt, and Clayey Silt

Clayey Sand

Well Graded Sands and Gravelly Sands

Clayey Gravels

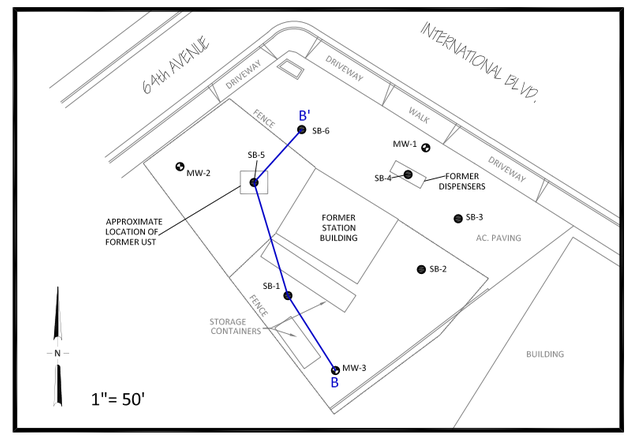
Groundwater Elevation (2/21/13)
<50<0.001 = Groundwater GRO/Benzene Concentration in µg/L (2/21/13)

80/<0.50 = Grab Groundwater GRO/Benzene Concentration in µg/L (2009)

<1.0/<0.005 = Soil GRO/Benzene Concentration in mg/Kg (2008/2009)

Boring ID
Extent of Boring
Extent of Well Screen
TD = Total Depth

0 10 20
HORIZONTAL SCALE (ft)
VERTICAL EXAGGERATION 2:1



Drawing 5

Geologic Cross Section B - B'

Former Station #472
6415 International Boulevard
Oakland, California

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1370 Ridgewood Dr., Suite 5
Chico, California 95973
Project No.: 09-88-601 Date: 5/2/2013

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	The Site is located within the San Leandro Sub-Area of the East Bay Plain of the San Francisco Basin. The San Leandro Sub-Area is primarily filled with alluvial fans, but unlike the Sub-Areas to the north, the Yerba-Buena Mid extends west into the San Leandro Sub-Area. It has been proposed that a clay layer forms an extensive east-west aquitard across the basin. Historically there were municipal supply wells in this Sub-Area that produced from the upper level Alameda gravels. The San Leandro Sub-Area is distinct from the Niles Cone basin to the south, in that the alluvial fans are much smaller and produce much less groundwater. The groundwater flow direction in most of the East Bay Plain is from the east to the west, from the Hayward Fault to the San Francisco Bay, which generally correlates to topography. Flow-direction and velocity are influenced by subsurface stream channels general oriented from east to west. However, near the San Leandro Sub-Area, limited regional data indicates that groundwater in the upper water-bearing zone flows to the south, with deeper groundwater flowing to the north. According to the *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report* (California Regional Water Quality Control Board – San Francisco Bay Region/SFRWQCB, June 1999), the Site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet deep. There are no well-defined aquitards such as estuarine muds. The largest and deepest wells in this sub-area historically pumped one to two million gallons per day at depths greater than 200 feet. Overall, sustainable yields are low due in part to low recharge potential. The Merrit Sand in West Oakland was an important part of the early water supply for the City of Oakland. It is shallow (up to 60 feet), but before the turn of the last century, septic systems contaminated the water supply wells.	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology (continued)	Site	The Site elevation is approximately 24 feet above mean sea level. Based on data collected during the Phase II investigation, static ground-water onsite was encountered at approximately nine feet bgs. Groundwater monitoring has been conducted at the Site since August 2009. Depth-to-groundwater levels at the Site have varied from 6.80 feet bgs to 11.07 feet bgs. The prevailing groundwater flow direction during that time has been south-southwest, at an average gradient of 0.006 feet/foot. One north-northwest flow direction was noted in 2010, but no other significant variations in groundwater flow direction or gradient have occurred during the Site's monitoring history. According to soil boring logs from the Phase II and monitoring well installation investigation, soils encountered at the Site generally consisted of sand and clay with clayey gravel being encountered in some borings. Gravelly sand was observed at depths between approximately 6 and 12 feet bgs. In soil boring SB-5, 10 feet of fill was observed. Due to the presence of the fill, SB-5 is within the assumed location of a former UST(s). Ground water was initially encountered during drilling activities at approximately 21 feet bgs and rose to approximately 9 feet bgs within the borings. Geologic cross-sections are included as Drawings 4 and 5.	None	NA
Surface Water Bodies		The closest downgradient surface water body is San Leandro Bay located approximately 1.1 miles southwest. Due to the distance of this water body from the Site, it is not reasonably anticipated that migration of contaminants from the Site would impact this receptor. The details of this Sensitive Receptor Survey are included in *Broadbent's Case Evaluation and Justification for No Further Action* dated(Broadbent, 2011).	None	NA
Nearby Wells		According to data provided by DWR, one irrigation well is located within one-half mile to the north-northeast (upgradient) from the Site. There are no public water supply wells within ½ mile of the Site. No domestic wells were identified in the files reviewed (Broadbent, 2011).	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Constituents of Concern	Light-Non Aqueous Phase Liquids (LNAPL)	No LNAPL have been reported at the Site since environmental investigations began in 2008.	None	NA
Constituents of Concern	Gasoline Range Organics (GRO)	Grab-groundwater samples were initially collected in 2008. Monitoring wells were installed in 2009 and have been sampled regularly since installation. These data indicated that highest concentrations of GRO have historically been detected in the northeast portion of the Site near the former USTs and dispenser, specifically in well MW-1. Concentrations of GRO in this well have ranged from not detected (<50 µg/L) to 1,100 µg/L. GRO in downgradient well MW-3 have not been detected since the third quarter of 2010. The highest concentration of GRO in well MW-3 historically was 1,000 µg/L. No GRO has been detected during any sampling event in crossgradient well MW-2. Trend graphs show that residual GRO is present in the lower part of the smear-zone. When groundwater levels decrease to approximately 15.2 ft-msl, the GRO concentrations increase modestly. However, the highest concentration historically reported was only approximately 200 µg/L. Based on these data, the extent of GRO detected at the Site is small and well defined, and appears to be stable-to decreasing. Graphs of concentration trends are presented in Appendix B.	None	NA
Constituents of Concern	Diesel Range Organics (DRO)	Historical sampling data indicated that highest concentrations of DRO have historically been detected in the northeast portion of the Site near the former USTs and dispenser, specifically in well MW-1. Concentrations of DRO in this well has ranged from 53 µg/L to 220 µg/L. DRO in downgradient well MW-3 have historically been detected from not detected (<50 µg/L) to 600 µg/L. Results from the first quarter 2013 event indicate that DRO is present within the historical range. No DRO has been detected during any sampling event in crossgradient well MW-3, with the exception of one detection slightly above reporting limits during the Second Quarter 2010 groundwater monitoring event. Trend graphs show that residual GRO is present in the lower part of the smear-zone. When groundwater levels decrease to approximately 15.2 ft-msl, the DRO concentrations	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Constituents of Concern (continued)	Diesel Range Organics (DRO) (continued)	increase modestly. However, the highest concentration historically reported was only 600 µg/L. Based on these data, the extent of DRO detected at the Site is small and well defined, and appears to be stable. Graphs of concentration trends are presented in Appendix B.		
Constituents of Concern	Benzene	No benzene has been detected at the Site in any grab-groundwater or monitoring well sample collected to date.	None	NA
Constituents of Concern	MTBE	Site features including USTs were removed in 1976, prior to the general use of MTBE as a gasoline additive. No MTBE has been detected in any grab-groundwater or monitoring well sample collected to date, with the exception of one anomalous detection slightly above reporting limits.	None	NA
Potential Sources	Onsite	The exact release source and volume released at the Site is unknown. However, it is assumed that the source was the former USTs and dispensers at the Site, based on soil and groundwater data collected to date. Site USTs and other Site features including product lines and dispensers were removed during station demolition in 1976. No other onsite sources have been identified.	None	NA
Potential Sources	Offsite	No offsite sources have been identified.	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Nature and Extent of Environmental Impacts	Extent in Soil	No BTEX has been detected during any subsurface investigation conducted to date. GRO, DRO, and motor oil range organics (ORO) were historically detected during the initial Phase II investigation carried out in 2008. Maximum concentration detected were 95 mg/kg GRO, 20 mg/kg DRO, and 51 mg/kg ORO. However, all of the these samples were collected below the static water levels at the Site, so these samples were likely submerged and indicative of groundwater conditions. Soil collected during well installations in 2009 included sampling intervals at 6.5, 8, 9, 11, 12.5, 14.5, and 17.0 feet bgs (with the exception of well MW-1 not having a 17.0 ft bgs sample collected). No GRO, DRO, and ORO were detected in any sample collected with the exception of MW-1 at 14.5 feet bgs at a concentration of 0.87 mg/kg, slightly above the reporting limit of 0.50 mg/kg. These data indicate that while historical releases continue to impact groundwater at the Site to a small degree, concentrations of petroleum hydrocarbons in soil are not present. The extent of petroleum hydrocarbons in soil is well defined as minimal to none.	None	NA
Nature and Extent of Environmental Impacts	Extent in Shallow Groundwater	As discussed previously, no significant or consistent BTEX or fuel oxygenates have been reported in any groundwater samples collected at the Site. Current GRO and DRO concentrations indicate a small dissolved-phase hydrocarbon plume centered around well MW-1, with GRO concentrations not currently detected in monitoring well MW-3 located approximately 100 feet downgradient of well MW-1. DRO is typically detected in downgradient well MW-3 at concentrations lessr than those in MW-1. Due to the overall low concentrations of GRO and DRO, the extent of hydrocarbon impacts is small and well defined, with the exception of DRO in well MW-3. However, the DRO and GRO concentrations currently present are not detected above Environmental Screening Levels (ESLs; CRWQCB, 2013) in any well.	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Nature and Extent of Environmental Impacts	Extent in Deeper Groundwater	During the initial 2008 Phase II investigation, soil borings were completed to a total depth of 31 feet bgs. No BTEX was detected in any sample. Concentrations of BTEX are therefore defined vertically. GRO, DRO, and MRO were detected during this investigation at depths up to 14 feet bgs, with deeper soil containing lesser concentrations. Groundwater samples during this investigation were collected in the open boreholes, and specific intervals were not targeted. However, based on the soil data, it appears that the GRO, DRO, and ORO impacts at the Site are present largely at approximately 14 to 20 feet bgs, with the sample at 31 feet bgs containing little to trace amount of petroleum hydrocarbons. Therefore, the vertical extent of hydrocarbons at the Site is considered defined.	None	NA
Nature and Extent of Environmental Impacts	Extent in Soil Vapor	Soil vapor has not been evaluated due to the current Site concentrations. No BTEX or MTBE is present in groundwater, and concentrations of GRO currently detected do not indicate a potential soil vapor risk. DRO is not volatile, and therefore is not a vapor intrusion risk because no benzene is present, and no petroleum in soil samples above 14.5 feet bgs has been reported.	None	NA
Migration Pathways	Potential Conduits	A formal preferential pathway study has not been performed at the Site. However, due to the low concentrations of contaminants currently detected, the lack of BTEX or fuel oxygenates, and the depth of impacts (depth to water is approximately 9 to 10 feet bgs), the risk of offsite migration through utility conduits is very unlikely. Additionally, groundwater flows to the southwest at the Site, away from International Boulevard where any potential deeper, offsite utility lines would likely be present (i.e. sewer mains). Therefore, offsite migration of contaminants through utility trenches/conduits is not considered a risk at this Site.	None	NA

TABLE 1

CONCEPTUAL SITE MODEL
Former Richfield Oil Company Service Station No. 472
6415 International Boulevard, Oakland, California

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Potential Receptors	Onsite	No onsite water supply wells or surface water exists. The only potential onsite receptor would be onsite workers exposed to gasoline vapors. However, current concentrations of contaminants in soil and groundwater indicate that vapor intrusion to indoor air is not a risk to onsite workers because no benzene is present, and no petroleum in soil samples above 14.5 feet bgs has been reported.	None	NA
Potential Receptors	Offsite	As noted above, the closest downgradient surface water body is San Leandro Bay located approximately 1.1 miles southwest and is not considered a potential receptor. One irrigation well is located within one-half mile to the north-northeast (upgradient) from the Site. There are no public water supply wells within ½ mile of the Site. No domestic wells have been identified. Additionally, the East Bay Municipal Utilities District provides water service in the area, so it is unlikely any private unidentified private wells are being used for human consumption. Vapor intrusion to indoor air for offsite workers and/or residents is not a concern at this Site due to the fact that no volatile constituents are travelling offsite. Only DRO is present in downgradient well MW-3. DRO is not a compound with vapor intrusion concerns.	None	NA

Notes:
ft = feet
bgs = below ground surface
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
MTBE = Methyl tert-butyl Ether
BTEX = benzene, toluene, ethylbenzene, xylenes
µg/L = micrograms per liter
mg/Kg = milligrams per kilogram
DWR = California Department of Water Resources

All report references are included in Section 3 of the preceding report

Table 2. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L							DO (mg/L)	pH	Footnote
							DRO/ TPHd	GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
MW-1																
8/25/2009	P	24.17	7.00	17.00	9.29	14.88	190	530	<0.50	<0.50	<0.50	<0.50	0.54	--	7.21	LX (DRO)
11/11/2009	NP		7.00	17.00	8.22	15.95	--	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	
2/17/2010	NP		7.00	17.00	7.36	16.81	70	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.69	7.03	LX (DRO)
6/2/2010	NP		7.00	17.00	7.61	16.56	120	110	<0.50	<0.50	<0.50	<0.50	<0.50	1.21	7.0	LW (GRO), LX (DRO)
9/3/2010	NP		7.00	17.00	8.99	15.18	190	1,000	<0.50	<0.50	<0.50	<0.50	<0.50	0.74	7.30	LW (GRO), LX (DRO)
2/8/2011	NP		7.00	17.00	7.69	16.48	53	<50	<0.50	<0.50	<0.50	<0.50	<0.50	0.64	6.8	LX (DRO)
7/18/2011	NP		7.00	17.00	7.99	16.18	110	<50	<0.50	<0.50	<0.50	<0.50	<0.50	0.70	7.2	LX (DRO)
3/1/2012	P		7.00	17.00	8.20	15.97	140	500	<0.50	<0.50	<0.50	<0.50	<0.50	0.71	7.01	
8/15/2012	P		7.00	17.00	8.89	15.28	220	490	<0.50	<0.50	<0.50	<1.0	<0.50	8.90	7.53	
2/21/2013	**P**		**7.00**	**17.00**	**7.63**	**16.54**	**<51**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**1.78**	**7.54**	
MW-2																
8/25/2009	P	23.62	7.00	17.00	9.65	13.97	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	7.30	
11/11/2009	NP		7.00	17.00	8.09	15.53	--	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	
2/17/2010	P		7.00	17.00	6.80	16.82	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.62	7.15	
6/2/2010	NP		7.00	17.00	7.11	16.51	65	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.85	7.3	LX (DRO)
9/3/2010	NP		7.00	17.00	8.79	14.83	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.19	7.90	
2/8/2011	NP		7.00	17.00	7.21	16.41	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.15	7.0	
7/18/2011	--		7.00	17.00	--	--	--	--	--	--	--	--	--	--	--	Inaccessible
3/1/2012	P		7.00	17.00	7.41	16.21	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.89	7.34	
8/15/2012	P		7.00	17.00	8.79	14.83	<47	<50	<0.50	<0.50	<0.50	<1.0	<0.50	3.3	7.48	
2/21/2013	**P**		**7.00**	**17.00**	**6.89**	**16.73**	**<52**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**1.35**	**7.73**	
MW-3																
8/25/2009	P	24.73	7.00	17.00	11.07	13.66	85	63	<0.50	1.2	<0.50	<0.50	<0.50	--	7.09	
11/11/2009	NP		7.00	17.00	9.56	15.17	--	88	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	LW (GRO)
2/17/2010	NP		7.00	17.00	8.52	16.21	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.04	7.09	
6/2/2010	NP		7.00	17.00	8.64	16.09	130	100	<0.50	<0.50	<0.50	<0.50	<0.50	1.22	7.1	LW (GRO), LX (DRO)

Table 2. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L							DO (mg/L)	pH	Footnote
							DRO/ TPHd	GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
MW-3 Cont.																
9/3/2010	NP	24.73	7.00	17.00	8.41	16.32	140	200	<0.50	<0.50	<0.50	<0.50	<0.50	0.87	6.9	LW (GRO), LX (DRO)
2/8/2011	NP		7.00	17.00	8.82	15.91	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	0.88	7.0	
7/18/2011	NP		7.00	17.00	9.20	15.53	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	0.93	6.9	
3/1/2012	P		7.00	17.00	9.13	15.60	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	0.63	6.91	
8/15/2012	P		7.00	17.00	10.45	14.28	600	<50	<0.50	<0.50	<0.50	<1.0	<0.50	2.99	7.38	*(DRO)
2/21/2013	**P**		**7.00**	**17.00**	**8.39**	**16.34**	**95**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<1.0**	**<0.50**	**1.30**	**7.76**	

Symbols & Abbreviations:
--- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
DO = Dissolved oxygen
DRO = Diesel range organics
DTW = Depth to water in ft bgs
GRO = Gasoline range organics
GWE = Groundwater elevation measured in ft
HVOC = Halogenated volatile organic compounds
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Well not purged prior to sampling
P = Well purged prior to sampling
TOC = Top of casing measured in ft
TOG = Total oil and grease
TPH-d = Total petroleum hydrocarbons as diesel
TPH-g = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
CEL = CalScience Environmental Laboratories, Inc.
* = Hydrocarbon result partly due to individual peak(s) in the quantitation range

Footnotes:
LW = Quantitation of unknown hydrocarbon(s) in sample based on gasoline
LX = Quantitation of unknown hydrocarbon(s) in sample based on diesel

Table 3. Summary of Fuel Additives Analytical Data

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-1									
8/25/2009	<300	<10	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72 µg/L sec-Butylbenzene, 1.4 µg/L tert-Butylben
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	LW (GRO), LX (DRO)
8/15/2012	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/21/2013	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	
MW-2									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	--	--	--	--	--	--	--	--	Inaccessible
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
8/15/2012	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/21/2013	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	
MW-3									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
3/1/2012	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	

Table 3. Summary of Fuel Additives Analytical Data

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-3 Cont.									
8/15/2012	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/21/2013	**<150**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	

Symbols & Abbreviations:
-- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
1,2-DCA = 1,2-Dichloroethane
DIPE = Diisopropyl ether
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
TAME = tert-Amyl methyl ether
TBA = tert-Butyl alcohol
µg/L = Micrograms per Liter

Notes:
All volatile organic compounds were analyzed using EPA Method 8260B

Table 4. Historical Groundwater Gradient - Direction and Magnitude

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
8/25/2009	Southwest	0.01
11/11/2009	South-Southwest	0.008
2/17/2010	South	0.006
6/2/2010	South	0.003
9/3/2010	North-Northwest	0.015
2/8/2011	South	0.006
7/18/2011	(a)	(a)
3/1/2012	South-Southeast	0.006
8/15/2012	South-Southwest	0.011
2/21/2013	**South-Southeast**	**0.004**

Footnotes:

a = Groundwater gradient unable to be calculated due to MW-2 being inaccessible

APPENDIX A

Summary of Previous Investigations

Summary of Previous Investigations

In 1947, Richfield Oil Company purchased the property for the construction of a service station with completion taking place in 1949. The service station was operated by various Richfield Oil Company dealers from 1949 to 1970. In 1966, two 4,000 gallon and one 6,000 gallon replacement underground storage tanks (USTs) were installed on the property. Richfield Oil Company sold the property in 1971 to the Nattrass Corporation.

In May 2007, AAI Environmental Corporation (AAI) conducted a Phase I Environmental Site Assessment (ESA) on the property. Work included review of environmental and regulatory databases and site reconnaissance prior to selling the property. AAI reported that one or two USTs were previously removed from the northeast corner of the property prior to 1976, but no soil sampling data or removal report were found to confirm the information given. Sampling and reporting information was likely not required at that time. The AAI site reconnaissance reportedly did not identify potential concerns. However, AAI recommended a limited Phase II Environmental Site Assessment on the property to assess the former presence of the USTs and/or legacy environmental contamination (AAI, 2007).

In April 2008, GEOCON conducted a Limited Phase II Environmental Site investigation on the Site. Work included the advancement of six soil borings (SB-1 through SB-6) down to 31 feet below ground surface (ft bgs) at the locations shown on Drawing 2. Soil samples were collected from each boring and ground-water samples were collected from borings SB-1, SB-2, SB-3 and SB-5. Soil boring SB-1 was drilled on the backside of the property to assess the potential for off-site contaminant migration. Borings SB-2, SB-3, SB-5 and SB-6 were advanced in the area suspected of containing the former USTs. SB-4 was advanced to assess a former pump island. Soil samples from borings SB-1 through SB-6 contained Total Petroleum Hydrocarbons in the Gasoline Range (TPHg) at concentrations up to 95 milligrams per kilogram (mg/kg) (SB-6 at 14 ft bgs), Total Petroleum Hydrocarbons in the Diesel Range (TPHd) at concentrations up to 20 mg/kg (SB-2 at 20 ft bgs), and Total Petroleum Hydrocarbons in the Motor Oil Range (TPHmo) at concentrations up to 51 mg/kg (SB-2 at 20 ft bgs). Grab groundwater samples from borings SB-1, SB-2, SB-3 and SB-5 contained TPHg at concentrations up to 8.1 milligrams per liter (mg/L) (SB-3), TPHd at concentrations up to 7.2 mg/L (SB-3), and TPHmo at concentrations up to 0.18 mg/L (SB-5). No concentrations of Benzene, Toluene, Ethylbenzene, or Xylenes (BTEX) were detected above the laboratory reporting limits in the soil or groundwater samples collected (GEOCON, 2008).

In a letter dated January 29, 2009, ACEH requested completion of an Unauthorized Release Report (URR), and soil and groundwater investigation work plan. A URR was submitted to ACEH on February 20, 2009. A work plan for a soil and groundwater investigation was submitted to ACEH on March 30, 2009. In a letter dated April 16, 2009, ACEH requested an addendum work plan. An addendum work plan for a soil and groundwater investigation was submitted to ACEH on May 28, 2009. In a letter dated June 11, 2009, ACEH approved the addendum work plan. Broadbent and Associates, inc. (Broadbent) submitted the *Revised Soil & Ground-Water Investigation with Third Quarter 2009 Ground-Water Monitoring Report* detailing the installation of three groundwater monitoring wells on November 17, 2009. No petroleum hydrocarbons were detected in the 20 soil samples collected during monitoring well installation activities with the exception of one sample containing Gasoline Range Organics (GRO), which was detected at a concentration of 0.87 mg/kg in boring MW-1 at 14.5 ft bgs.

Broadbent conducted quarterly groundwater monitoring and sampling from the Third Quarter of 2009 to the Second Quarter of 2010. With the concurrence of ACEH, Broadbent switched to semi-annual

monitoring and sampling in the First Quarter of 2011. Low concentrations of Diesel Range Organics (DRO) and GRO have been generally stable or decreasing in wells since initial sampling. The highest GRO concentration was found in well MW-1 at 1,000 micrograms per liter (µg/L, parts per billion, ppb) during the Third Quarter 2010 sampling event. The highest DRO concentration was found in well MW-1 during the First Quarter 2013 sampling event at 95 µg/L. BTEX and MTBE have not been detected in any of the groundwater samples with the exception of a concentration of 1.2 µg/L of Toluene in well MW-3 (third quarter 2009) and 0.54 µg/L of MTBE in well MW-1 (Third Quarter 2009).

References

AAI, May 9, 2007. *Phase I Environmental Site Assessment Report, Former Gasoline Station Pluckey's Liquors, 6415 International Boulevard, Oakland, California.* Prepared for Mr. Marcelo Bermudez, Freeman.

Broadbent & Associates, Inc., February 20, 2009. *Underground Storage Tank Unauthorized Release (Leak)/ Contamination Site Report, Atlantic Richfield Company Station No. 472, 6415 International Boulevard, Oakland, CA, ACEH Case No. RO0002982.*

Broadbent & Associates, Inc., November 17, 2009. *Revised Soil & Ground-Water Investigation and Third Quarter 2009 Ground-Water Monitoring Report, For Former Atlantic Richfield Company Station No. 472, 6415 International Boulevard, Oakland, CA, ACEH Case No. RO0002982.*

Broadbent & Associates, Inc., November 28, 2011. *Case Evaluation and Justification for No Further Action, Former Atlantic Richfield Company Station No. 472, 6415 International Boulevard, Oakland, CA, ACEH Case No. RO0002982.*

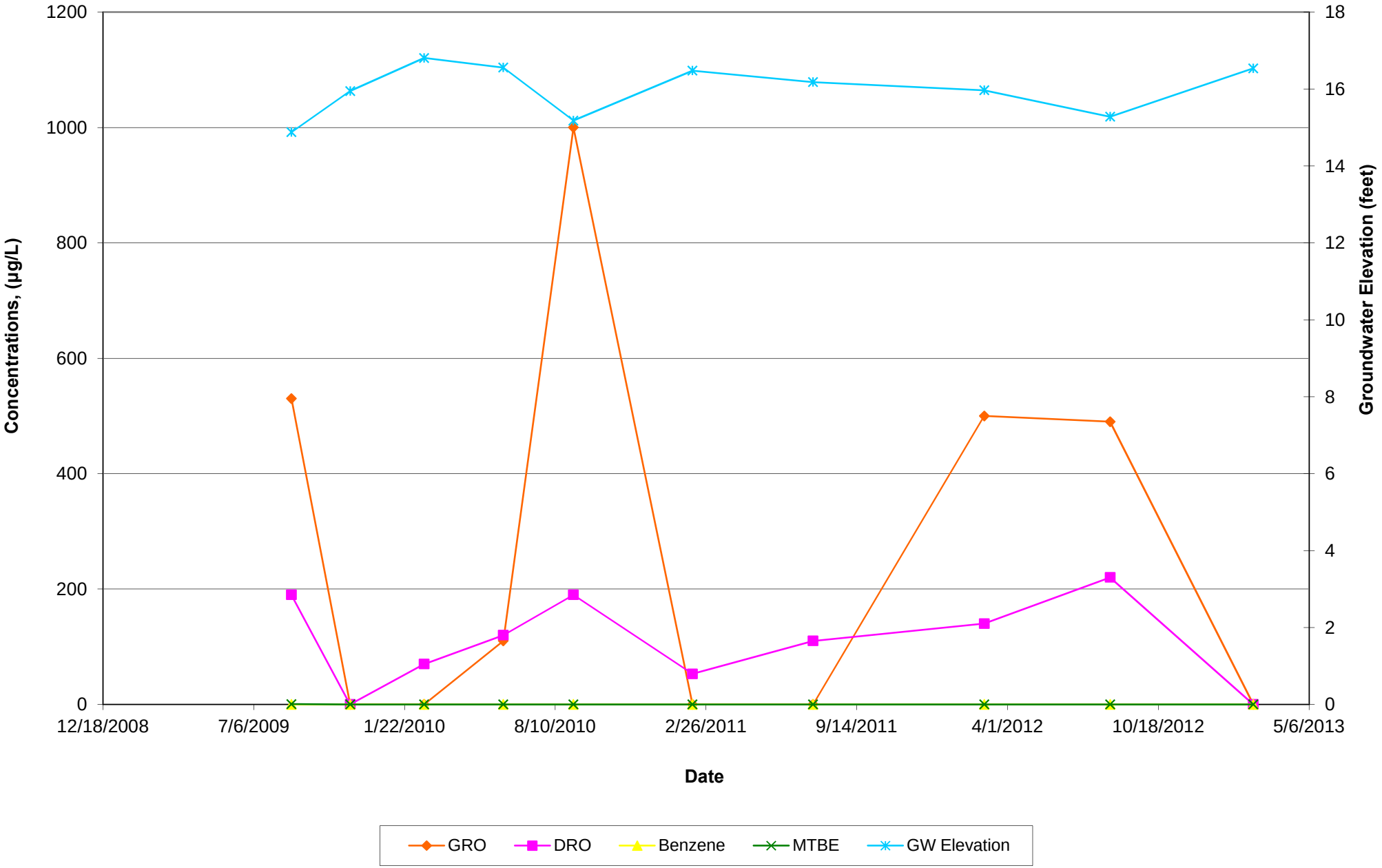
Broadbent & Associates, Inc., April 26, 2013. *First Quarter 2013 Monitoring Report, Former Richfield Oil Company Station #472, 6415 International Boulevard, Oakland; ACEH Case #RO0002982.*

GEOCON, May 7, 2008. *Limited Soil and Grab Groundwater Sampling Report, Plucky's Liquors/ Former Gasoline Station, 6415 International Boulevard, Oakland, California.* Prepared for Ms. Holly Moore, DGC Associates.

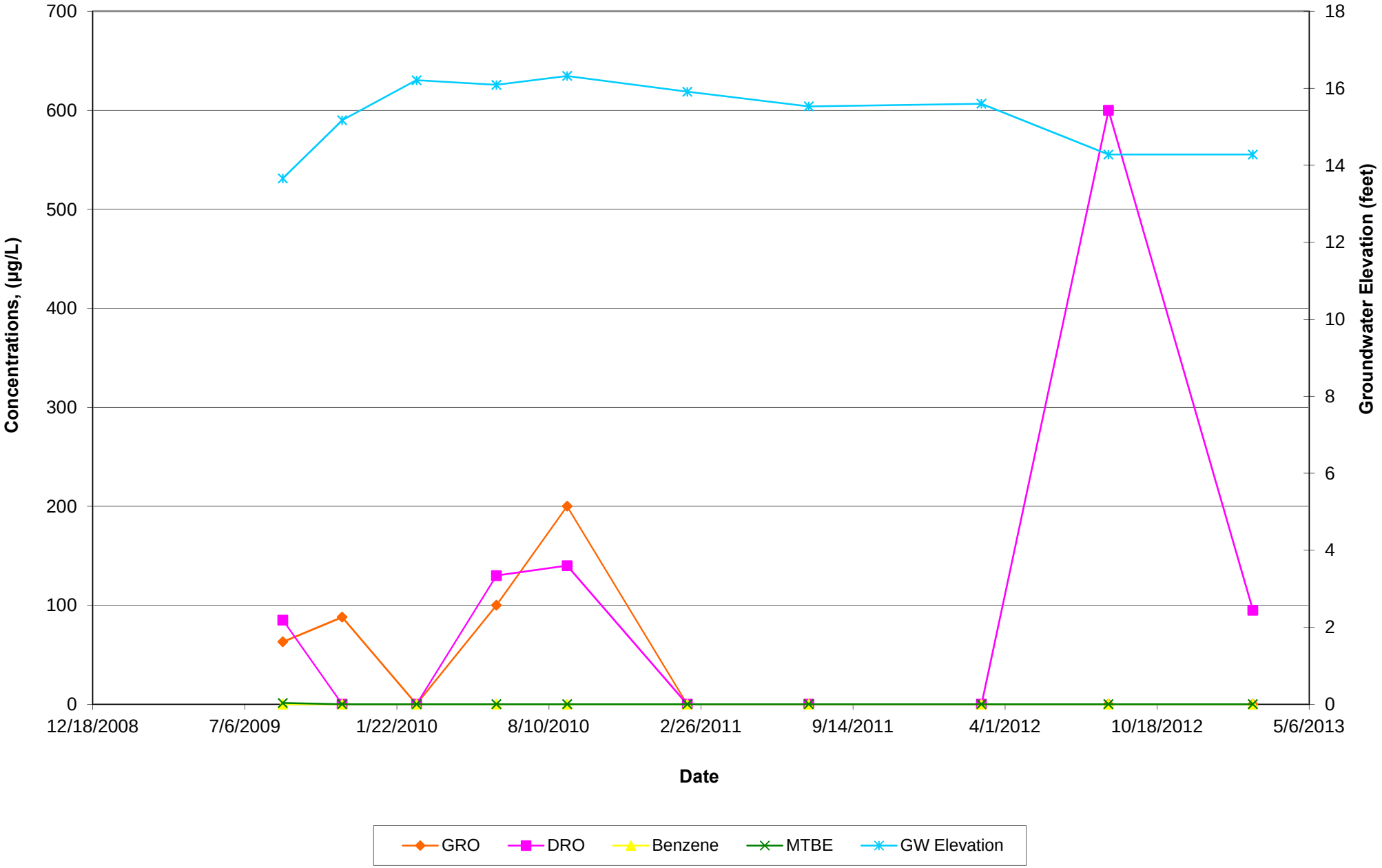
APPENDIX B

DRO, GRO, Benzene, and MTBE Concentration Trend Graphs

MW-1 Concentrations and Groundwater Elevation vs Time
Former Richfield Oil Company Station #472
6415 International Boulevard, Oakland, CA



MW-3 Concentrations and Groundwater Elevation vs Time
Former Richfield Oil Company Station #472
6415 International Boulevard, Oakland, CA



APPENDIX C

Historic Site Data

Table 1
Summary of Soil Sample Results
Plucky's Liquors / Former Gasoline Station
6415 International Blvd.
Oakland, California

Borehole Location	Collection Date	Depth (feet bgs)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Total Xylenes (ug/kg)
SB-1	4/22/2008	15	7.3	6.3	5.5	<5.0	<5.0	<5.0	<15
SB-2	4/22/2008	16	21	2.6	3.5	<5.0	<5.0	<5.0	<15
SB-2	4/22/2008	20	<1.0	20	51	<5.0	<5.0	<5.0	<15
SB-3	4/22/2008	13	<1.0	5.8	5.8	<5.0	<5.0	<5.0	<15
SB-3	4/22/2008	20	<1.0	<1.0	1.6	<5.0	<5.0	<5.0	<15
SB-4	4/22/2008	8	<1.0	4.6	6.2	<5.0	<5.0	<5.0	<15
SB-5	4/22/2008	16	<1.0	7.6	6.3	<5.0	<5.0	<5.0	<15
SB-6	4/22/2008	14	95	7.8	4.4	<25	<25	<25	<75
SB-6	4/22/2008	20	<1.0	1.5	4.0	<5.0	<5.0	<5.0	<15
SB-6	4/22/2008	31	<1.0	3.2	2.7	<5.0	<5.0	<5.0	<15

Table 2
Summary of Grab Groundwater Sample Results
Plucky's Liquors / Former Gasoline Station
6415 International Blvd.
Oakland, California

Borehole Location	Collection Date	Depth (feet bgs)	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Total Xylenes (ug/l)
SB-1	4/22/2008	21	0.080	0.076	0.11	<0.50	<0.50	<0.50	<1.5
SB-2	4/22/2008	21	1.5	0.71	0.13	<0.50	<0.50	<0.50	<1.5
SB-3	4/22/2008	26	8.1	7.2	0.15	<5.0	<5.0	<5.0	<15
SB-5	4/22/2008	14	0.14	0.11	0.18	<0.50	<0.50	<0.50	<1.5

NOTES:
TPHg- Total Petroleum Hydrocarbons as Gasoline
TPHd - Total Petroleum Hydrocarbons as Diesel
TPHmo - Total Petroleum Hydrocarbons as Motor Oil
mg/kg- Milligrams per kilogram
ug/kg- Micrograms per kilogram
mg/l - Milligrams per liter
ug/l - Micrograms per liter

Table 1. Summary of Soil Sampling Analytical Data
Station #472, 6415 International Boulevard, Oakland, CA

Sample ID	Sample Depth (ft)	Date Sampled	DRO/ TPHd	ORO/ TPHo	GRO/ TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
			Concentrations in (mg/kg)						
MW-1 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 14.5'	14.5	7/14/2009	ND <5.0	ND <25	**0.87**	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 14.5'	14.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 17'	17.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 14.5'	14.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 17'	17.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010

ND = Not Detected above the laboratory detection limit
DRO/TPHd = Diesel Range Organics/Total Petroleum Hydrocarbons in the diesel range (C10-C28)
ORO/TPHo = Oil Range Organics/Total Petroleum Hydrocarbons in the oil range (C17-C44)
GRO/TPHg = Gasoline Range Organics/Total Petroleum Hydrocarbons in the gasoline range (C6-C12)
mg/kg = milligrams per killogram

PROJECT NO. E8448-06-01

BORING NO. SB-1

DATE DRILLED 4/22/08 WATER LEVEL (ATD) _____

EQUIPMENT GEOPROBE DRILLER En Prob

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**ASPHALT AND BASE ROCK**		
2				Stiff, moist, black, fine Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5						
6						
7				Stiff, moist, olive, medium Sandy CLAY, low plasticity, no odor	CL	
8				Dense, moist to very moist, olive, Clayey coarse angular	GC	
9				▽ GRAVEL, no odor		
10						
11						
12				Stiff, moist, yellowish red with light green, Sandy CLAY, low to medium plasticity, no odor	CL	
13						
14				Dense, moist, pale green, Clayey GRAVEL, with coarse angular sand, slight plasticity, slight odor	GC	
15				Firm to soft, moist, brown, Silty CLAY, low to medium plasticity, no odor	CL	
16						
17						
18						
19						
20						
21				▼ Soft, very moist, brown, Silty CLAY, with interbedded clayey fine sand, low to medium plasticity, no odor	CL	
22						
23						
24				BORING TERMINATED AT 24 FEET		

Figure 1, Log of Boring SB-1, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-2 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				ASPHALT		
2				Stiff, moist, black, fine Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5						
6						
7				Stiff, moist, olive, medium Sandy CLAY, low plasticity, no odor	CL	
8				Dense, moist to very moist, olive, Clayey coarse angular	GC	
9				▽ GRAVEL, no odor		
10						
11						
12				Stiff, moist, yellowish red with light green, Sandy CLAY, low to medium plasticity, no odor	CL	
13						
14				Dense, moist, pale green, Clayey GRAVEL with coarse angular sand, slight plasticity, petroleum odor	GC	
15				Firm to soft, moist, brown, Silty CLAY, low to medium plasticity, petroleum odor	CL	
16						
17						
18						
19						
20						
21				▼ Soft, very moist, brown, Silty CLAY with interbedded clayey fine sand, petroleum odor	CL	
22						
23						
24				BORING TERMINATED AT 24 FEET		

Figure 2, Log of Boring SB-2, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-3 DATE DRILLED 4/22/08 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ASPHALT**		
2				Stiff, moist, black to brown, Sandy CLAY, low plasticity, no odor	CL	
3						
4						
5						
6				Dense, moist, brown, Clayey GRAVEL with angular sand and gravel, no odor	GC	
7						
8				Firm, moist, reddish yellow, Sandy CLAY, low to medium plasticity, no odor	CL	
9						
10						
11				Stiff, moist, pale green, Sandy CLAY, medium plasticity, no odor	CL	
12				Moist, Gravelly SAND with some clay and interbedded brick fragments, petroleum odor	SW	
13						
14						
15						
16				Stiff, moist, brown, Silty CLAY, medium plasticity, no odor	CL	
17						
18						
19						
20						
21						
22						
23						
24						

Figure 3, Log of Boring SB-3, page 1 of 2

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT RESIST BLOWS/FT	SAMPLE NO.	LITHOLOGY	BORING NO. SB-3 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
26				▼ Strong petroleum odor in groundwater		
27						
28				BORING TERMINATED AT 28 FEET		

Figure 4, Log of Boring SB-3, page 2 of 2

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-4 DATE DRILLED 4/22/08 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ASPHALT AND BASE**		
2				Stiff, moist, black, Sandy CLAY, medium plasticity, no odor	CL	
3						
4						
5				Dense, slightly moist, fine Gravelly SAND, variegated, no odor	SW	
6						
7						
8				BORING TERMINATED AT 8 FEET		

Figure 4, Log of Boring SB-4, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-5 DATE DRILLED 4/22/08 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				ASPHALT AND FILL		
2						
3						
4						
5						
6						
7						
8						
9				▽		
10				Soft to stiff,saturated, brown to light green, Silty and Sandy CLAY, low plasticity, slight odor in water, no odor in soil	CL	
11						
12						
13						
14				▽ Dense, moist, variegated Gravelly SAND, fine gravel, well graded sand, no odor	SW	
15						
16				BORING TERMINATED AT 16 FEET		

Figure 5, Log of Boring SB-5, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: JOHN LOVE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-6 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**ASPHALT AND BASE**		
2				Very stiff, moist, black, Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5				Dense, moist, brown, Clayey GRAVEL with angular sand, low plasticity, no odor	GC	
6						
7						
8				Dense, moist, brown, angular Gravelly SAND, no odor	SW	
9				Stiff, moist, brown with olive, Sandy CLAY, medium plasticity, no odor	CL	
10						
11						
12						
13				Soft		
14				Slight petroleum odor		
15				Pale green		
16				Stiff to very stiff, moist, brown, Silty CLAY, medium plasticity, no odor	CL	
17						
18						
19						
20						
21						
22						
23						
24						

Figure 6, Log of Boring SB-6, page 1 of 2

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

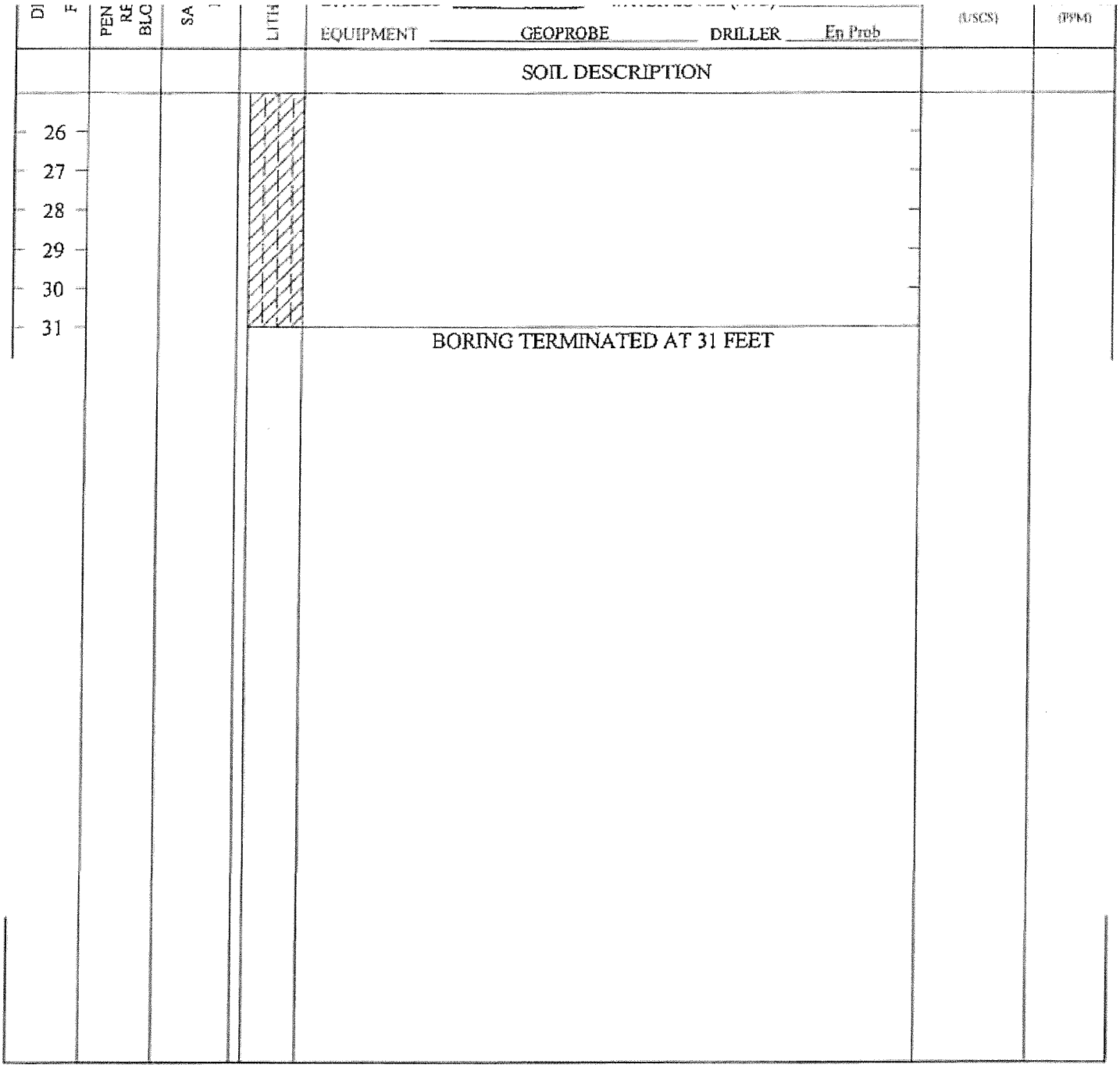


Figure 7, Log of Boring SB-6, page 2 of 2

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

SOIL BORING LOG **Boring No. MW-1** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1			
						2			
						3			
						4	SC	Clayey sand with silt and gravel, SC, (0'-7.5'), grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
						5			
						6			
S	MW-1 6.5'	N/A	1055	100		7			0
S	MW-1 8'	N/A	1058	100		8			0
						9			
S	MW-1 9.5'	N/A	1100	100		10	ML	Clayey silt with sand and gravel, ML, (7.5'-12'), dark yellowish brown moist, low plasticity, 50% silt, 30% clay, 10% fine grained sand	0
S	MW-1 11'	N/A	1102	100		11		10% medium gravel	0
						12			
S	MW-1 12.5'	N/A	1105	100		13	SC	Clayey sand, SC, (12'-12.5'), grayish brown, moist 60% medium grained sand, 40% clay	0
							ML	Clayey silt, ML, (12.5'-13.5'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-1 14.5'	N/A	1107	100		14	SC	Clayey sand, SC, (13.5'-14.5'), dark grayish brown, moist 60% medium grained sand, 40% clay	21
						15			
						16	ML	Clayey silt, ML, (14.5'-17'), grayish brown, moist, medium plasticity 60% silt, 40% clay	
						17			
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. MW-2** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1	SC	Clayey sand with silt and gravel, SC, (0'-8'), grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
						2			
						3			
						4			
						5			
						6			
S	MW-2 6.5'	N/A	1600	100		7			0
S	MW-2 8'	N/A	1602	100		8			0
						9	ML	Clayey silt, ML, (8'-9.5'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 9.5'	N/A	1605	100		10			0
S	MW-2 11'	N/A	1607	100		11	SC	Clayey sand with silt and gravel, SC, (9.5'-11.5'), dark brown, wet 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						12	ML	Clayey silt, ML, (11.5'-12.5'), yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 12.5'	N/A	1610	100		13	SC	Clayey sand with silt and gravel, SC, (12.5'-13'), dark brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						14	ML	Clayey silt, ML, (13'-14'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 14.5'	N/A	1612	100		15	SC	Clayey sand with silt and gravel, SC, (14'-14.5'), yellowish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						16	ML	Clayey silt, ML, (14.5'-17'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 17'	N/A	1615	100		17			0
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. MW-3** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1			
						2			
						3			
						4	CL	Silty clay with sand, CL, (0'-8'), dark brown, moist, medium plasticity	
						5		50% clay, 40% silt, 10% fine grained sand	
						6			
S	MW-3 6.5'	N/A	1405	100		7			0
S	MW-3 8'	N/A	1407	100		8			0
						9		Silty clay with sand and gravel, CL, (8'-9'), dark yellowish brown, moist low plasticity, 40% silt, 30% clay, 20% fine gravel, 10% fine grained sand	
S	MW-3 9.5'	N/A	1410	100		10	SC	Clayey sand with silt and gravel, SC, (9'-10'), dark grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
S	MW-3 11'	N/A	1412	100		11			0
						12			
S	MW-3 12.5'	N/A	1415	100		13	ML	Clayey silt, ML, (10'-15'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	0
						14			
S	MW-3 14.5'	N/A	1417	100		15			0
						16	SC	Clayey sand with silt and gravel, SC, (15'-16.5'), dark grayish brown, wet 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
S	MW-3 17'	N/A	1420	100		17	ML	Clayey silt, ML, (16.5'-17'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	0
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.