November 22, 2013

Mr. Keith Nowell
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: **Corrective Action Plan**

Site: **76 Station No. 5191/5043**
449 Hegenberger Road
Oakland, California
Fuel Leak Case No. RO0000219

Dear Mr. Nowell;

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

If you have any questions or need additional information, please call:

Walter T. Sprague
Pacific Convenience & Fuel
7180 Koll Center Parkway, Suite 100
Pleasanton, California 94566
Tel: (925) 931-5714
Fax: (925) 905-2746
WSprague@pcandf.com

Sincerely,

PACIFIC CONVENIENCE & FUEL

WALTER SPRAGUE

Director of Retail Services

Attachment

Work Plan - Monitoring Well Installation

Alameda County Health Care Services Agency
Fuel Leak Case No. RO0000219

California Regional Water Quality Control Board, San Francisco Bay Region (Region 2)
Case No. 01-1601

GeoTracker Global ID No.T0600101476

Antea Group Project No. I42705191

November 21, 2013

Prepared for:
Mr. Keith Nowell
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Prepared by:
Antea™Group
11050 White Rock Road
Suite 110
Rancho Cordova, CA 95670
+1 800 477 7411

Table of Contents

Figures

Tables

Appendices

1.0 INTRODUCTION

Antea Group has prepared this work plan proposing the installation of two monitoring wells, MW-18 and MW-19, down-gradient of the 76 station located at 449 Hegenberger Road in Oakland, California, as requested by the Alameda County Health Care Services Agency (ACHCSA) in a letter dated October 8, 2013. The site location is shown on **Figure 1**. This work is proposed to assess the extent of the petroleum hydrocarbon and methyl tertiary-butyl ether (MTBE) impact to the groundwater, down-gradient of the site. The proposed monitoring well locations are shown on **Figure 2**.

Site summary data has been tabled in the following:

- **Table 1** summarizes the current groundwater analytical results.

A summary of previous investigations and site history is presented as **Appendix A.**

1.1 Site Description

The subject site is an operating 76 station located on the southwestern corner of Hegenberger Road and Edgewater Drive in Oakland, California. Station facilities include three underground storage tanks (USTs), two dispenser islands, a station building, and a carwash. A total of fourteen groundwater monitoring wells are located at or near the site (**Figures 2**).

2.0 SITE GEOLOGY AND HYDROGEOLOGY

The site is underlain by Holocene-age bay mud. The bay mud typically consists of unconsolidated, saturated clay and sandy clay that is rich in organic material. The bay mud locally contains lenses and stringers of silt, well-sorted sand and gravel, and beds of peat. Based on the boring log from monitoring well MW-12A the bay mud continues to a depth of approximately 32 feet below ground surface (bgs). From 32 feet bgs to a depth of approximately 37 feet bgs the bay mud is mixed with well graded sand (transition zone). Below this transition zone is well graded sand to a depth of 43 feet bgs, the maximum depth explored at this site.

The most recent monitoring and sampling event was conducted at the site on September 10, 2013 (Antea Group, 2013). The measured depth to groundwater ranged from 2.63 feet to 6.54 feet below top of casing (TOC). Historic groundwater flow directions are shown on **Figure 3**.

3.0 PROPOSED ACTIVITIES

3.1 Permitting, Utility Notification, and Borehole Clearance

Before commencing field activities, Antea Group will update the Health and Safety Plan in accordance with state and federal requirements. Antea Group will obtain drilling permits, for the installation of two (2) monitoring wells from the Alameda County Public Works Agency. In addition, Antea Group will attempt to obtain an access agreement from the off-site property owner. If an access agree cannot be obtained from the property owner, options will be discussed with the ACHCSA. Prior to drilling, Underground Service Alert (USA) will be notified, as required by law, and a private utility locator will be employed to clear each monitoring well location for underground utilities. In addition, an air-knife will be used to clear each monitoring well location to a depth of 5 feet bgs prior to borehole advancement.

3.2 Monitoring Well Installation

The borings for monitoring wells MW-18 and MW-19 will be advanced to a maximum depth of 15 feet bgs using a drill-rig equipped with 8-inch, outside diameter, hollow stem augers (HSAs). The proposed monitoring well locations are shown on **Figure 2**.

The groundwater monitoring well casing will be installed in the well boring while the augers are in place. The monitoring wells will consist of 2-inch diameter schedule 40 poly vinyl chloride (PVC) well casing with a screen interval to be determined in the field, based on the encountered lithology. The screen interval is anticipated to be ten feet in length from approximately 5 to 15 feet bgs. The perforation size in the screen interval will be 0.020-inch. A sand pack consisting of RMC Lonestar Sand #3 or equivalent will be installed into the annular space and extend approximately one (1) foot above the top of the screen interval.

A two (2) foot thick bentonite seal will be placed on top of the sand pack. The monitoring wells will be surged prior to the placement of the bentonite seal to promote settling of the sand pack. The remainder of the annular space will be filled with neat cement and the monitoring wells will be fitted with a locking cap and encased in a traffic-rated protective vault placed at existing ground level. Well construction details are shown on **Figure 4**.

3.3 Soil Sampling

During the borehole advancement for each monitoring well, soil samples will be collected beginning at a depth of five feet bgs, or just above first encountered groundwater, whichever comes first. Soils will be classified and logged according to the Unified Soil Classification System (USCS). Soil samples will be screened for volatile organic compounds in the field using a calibrated photoionization detector (PID).

Select soil samples will be collected and retained for laboratory analysis using the following criteria:

- A sample will be collected at any change in lithology (if encountered).
- A sample will be collected from the highest PID measurement in each boring.
- A sample will be collected from the bottom of each boring.
- Additional samples may be submitted based on historical occurrences of hydrocarbons, field observations, and/or PID measurements observed in the field.

Soil samples retained for laboratory analysis will be given a unique sample number, placed in an ice-cooled chest, and recorded on the chain of custody. All soil samples collected during borehole advancement activities will be submitted to Kiff Analytical LLC (Kiff), a state of California Environmental Laboratory Accreditation Program (ELAP) certified laboratory (Certification No. 08263CA), and analyzed for the following constituents:

- Total petroleum hydrocarbons – gasoline range organics (TPHg), carbon chain range C05 – C12, benzene, toluene, ethylbenzene, and total xylenes (collectively BTEX compounds), MTBE, tertiary-butyl alcohol (TBA), and ethanol by Environmental Protection Agency (EPA) Method 8260B; and
- Total petroleum hydrocarbons – diesel range organics (TPHd) [silica gel treated] by EPA Method 8015.

3.4 Well Development, Monitoring, and Sampling

The monitoring wells will be developed, by bailing, surging, and pumping, a minimum of 72 hours after construction. A minimum of 10 casing volumes of groundwater will be removed from each monitoring well, if possible, during the development process.

The monitoring wells will be sampled a minimum of 48 hours after they have been developed, and will be incorporated into a quarterly sampling schedule for the first year.

Groundwater samples collected for analysis from each monitoring well will be analyzed for TPHg, BTEX, MTBE, TBA, and ethanol by EPA Method 8260B, and TPHd [silica gel treated] by EPA Method 8015.

3.5 Wellhead Survey

Following the completion of the new monitoring wells, a California licensed surveyor will survey the northing and easting of the monitoring wells using datum NAD 83. The monitoring well elevation will be surveyed relative to mean sea level, with an accuracy of +/- 0.01 foot. A global positioning system (GPS) will also be used to survey the latitude and longitude of each well and uploaded to California's Geo Tracker database system. The survey of the well locations will be to sub-meter accuracy.

3.6 Disposal of Drill Cuttings and Wastewater

Air-knife cuttings, drill cuttings, decontamination water, and well development water generated during well installation and development activities will be placed into properly labeled 55-gallon Department of Transportation (DOT) approved steel drums. Samples of the drill cuttings will be collected, properly labeled, placed on ice, and submitted to a California-certified laboratory for analysis of TPHg, BTEX, and MTBE by EPA Method 8260B, and CAM 17 Metals. Samples of the decontamination and development water will be collected, properly labeled, placed on ice, and submitted to a California-certified laboratory for analysis of TPHg, BTEX, and MTBE by EPA Method 8260B, and total lead by EPA Method 6010. Chain-of-custody documentation will accompany the samples during transportation to the laboratory. Subsequent to receiving the laboratory analytical results, the generated wastes will be profiled, transported, and disposed of at an approved facility.

4.0 REPORTING

Following completion of the field work and receipt of analytical results, a site investigation report will be prepared and submitted within 60 days. The report will present the details of the site investigation activities, including copies of the drilling permits, boring logs and well construction details, details of disposal activities and copies of disposal documents (if available), and copies of laboratory reports. Required electronic submittals will be uploaded to the State Geotracker database.

5.0 REMARKS

The recommendations contained in this report represent Antea USA, Inc.'s professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Antea USA, Inc. and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Antea USA, Inc.'s client and anyone else specifically identified in writing by Antea USA, Inc. as a user of this report. Antea USA, Inc. will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Antea USA, Inc. makes no express or implied warranty as to the contents of this report.

Prepared by:

Date: 11-21-13

Ed Weyrens, G.I.T.
Project Professional

Information, conclusions, and recommendations provided by Antea Group in this document regarding the site have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

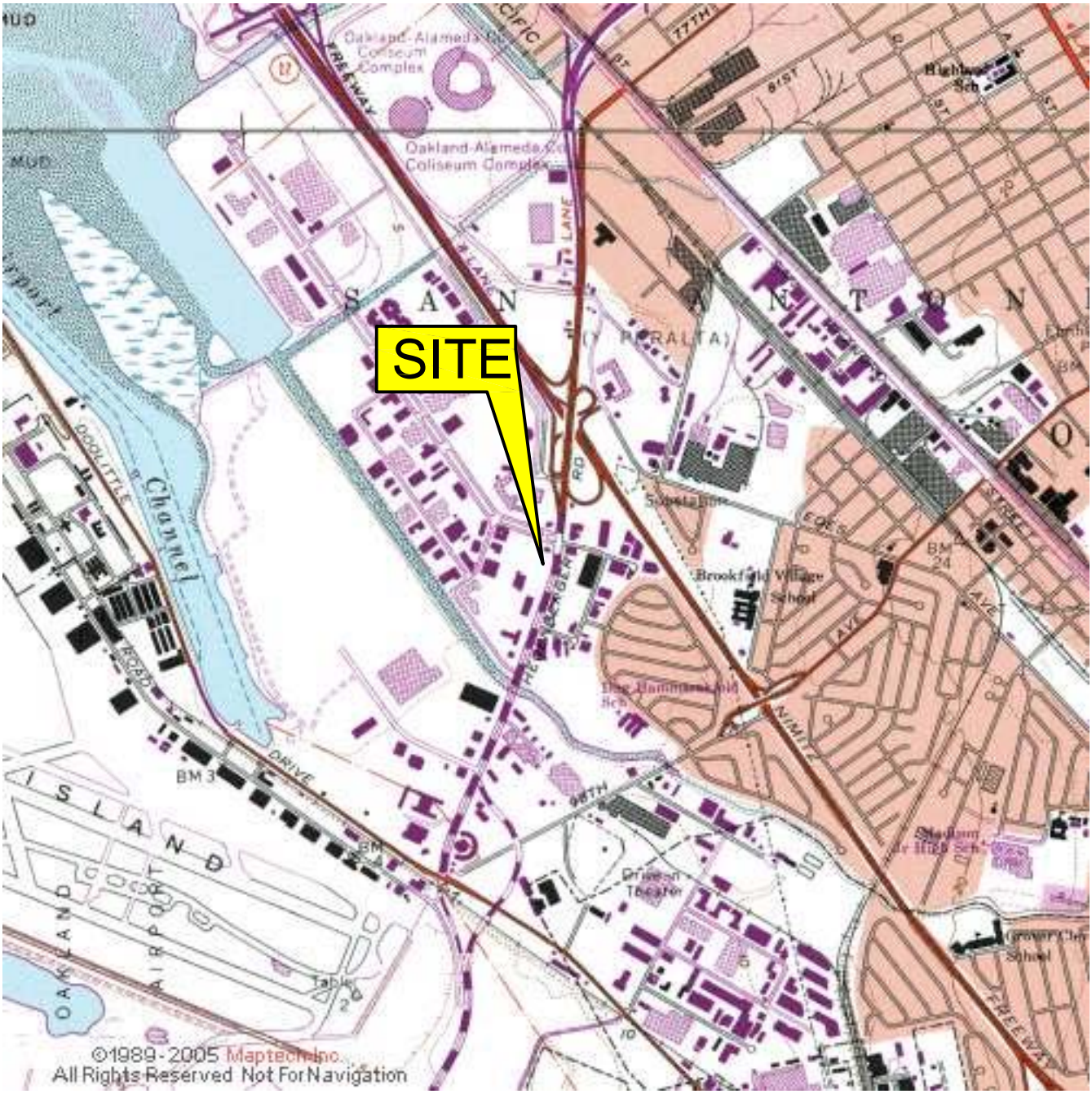
Licensed Approver:

PROFESSIONAL GEOLOGIST
DENNIS SHANNON DETTLOFF
No. 7480
STATE OF CALIFORNIA

Date: 11/21/13

Dennis S. Dettloff, P.G.
Senior Project Manager
California Registered Professional Geologist No. 7480

Figures



North

0 900 1800 FT

SCALE

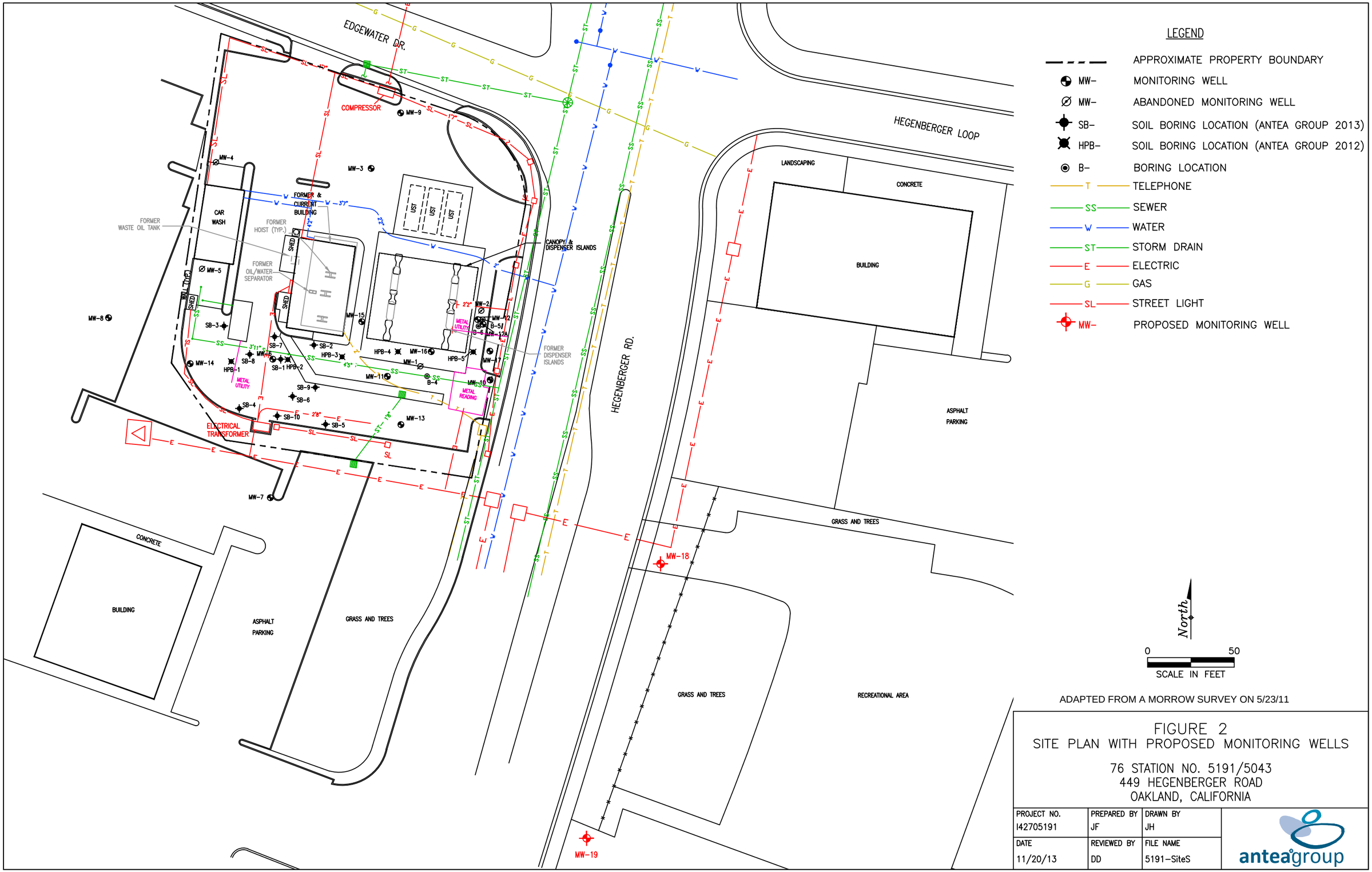
SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP, OAKLAND EAST QUADRANGLE (1973)

FIGURE 1
SITE LOCATION MAP

76 STATION NO. 5191/5043
449 HEGENBERGER ROAD
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
142705191	EW	DR/JH
DATE	REVIEWED BY	FILE NAME
1/31/11	DD	5043-SiteLocator

antea group



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- MW– MONITORING WELL
- MW– ABANDONED MONITORING WELL
- SB– SOIL BORING LOCATION (ANTEA GROUP 2013)
- HPB– SOIL BORING LOCATION (ANTEA GROUP 2012)
- B– BORING LOCATION
- T TELEPHONE
- SS SEWER
- W WATER
- ST STORM DRAIN
- E ELECTRIC
- G GAS
- SL STREET LIGHT
- MW– PROPOSED MONITORING WELL

ADAPTED FROM A MORROW SURVEY ON 5/23/11

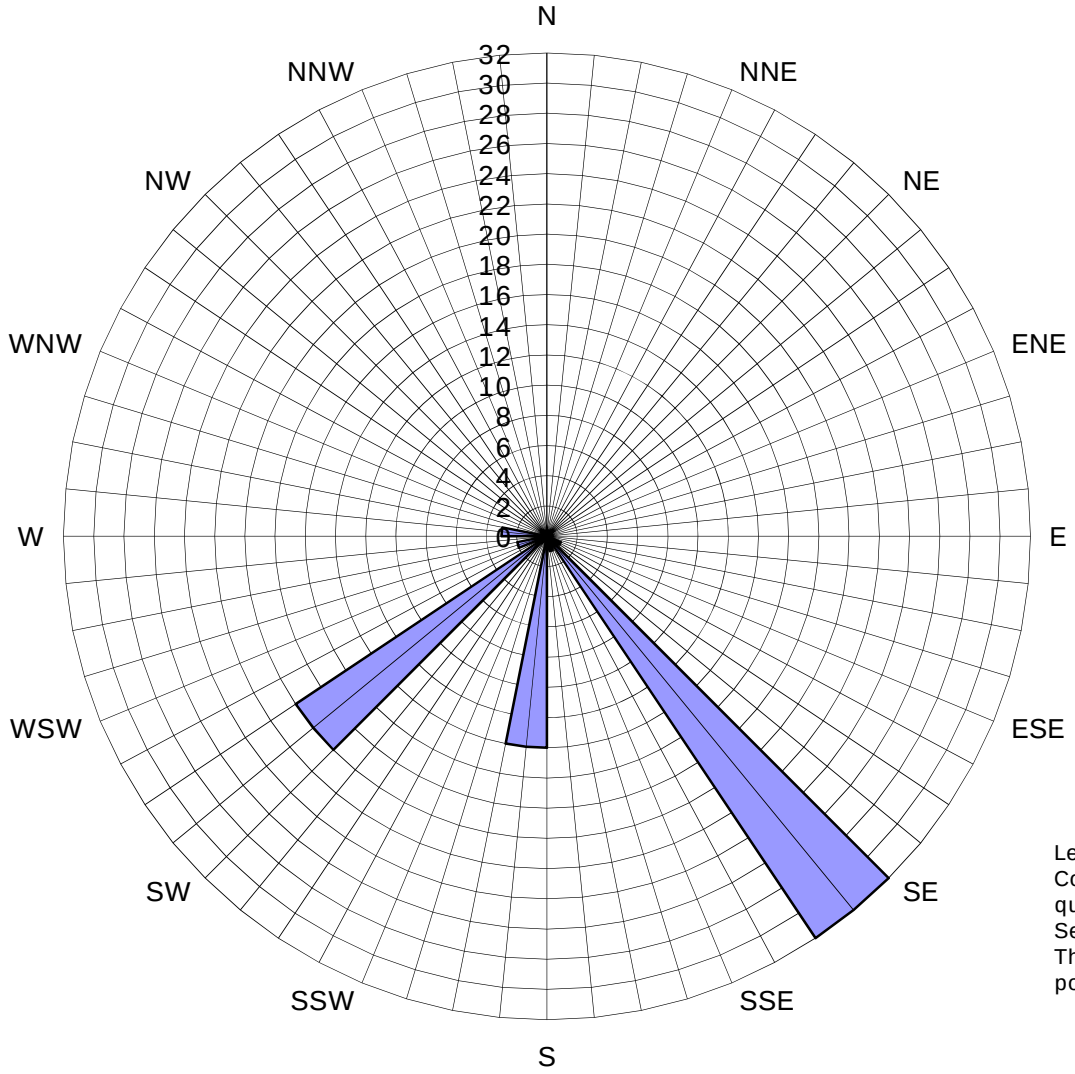
FIGURE 2
SITE PLAN WITH PROPOSED MONITORING WELLS

76 STATION NO. 5191/5043
449 HEGENBERGER ROAD
OAKLAND, CALIFORNIA

PROJECT NO.	PREPARED BY	DRAWN BY
142705191	JF	JH
DATE	REVIEWED BY	FILE NAME
11/20/13	DD	5191-SiteS

antea group

Figure 3
Historical Groundwater Flow Directions
76 Station No. 5191/5043
449 Hegenberger Road
Oakland, California

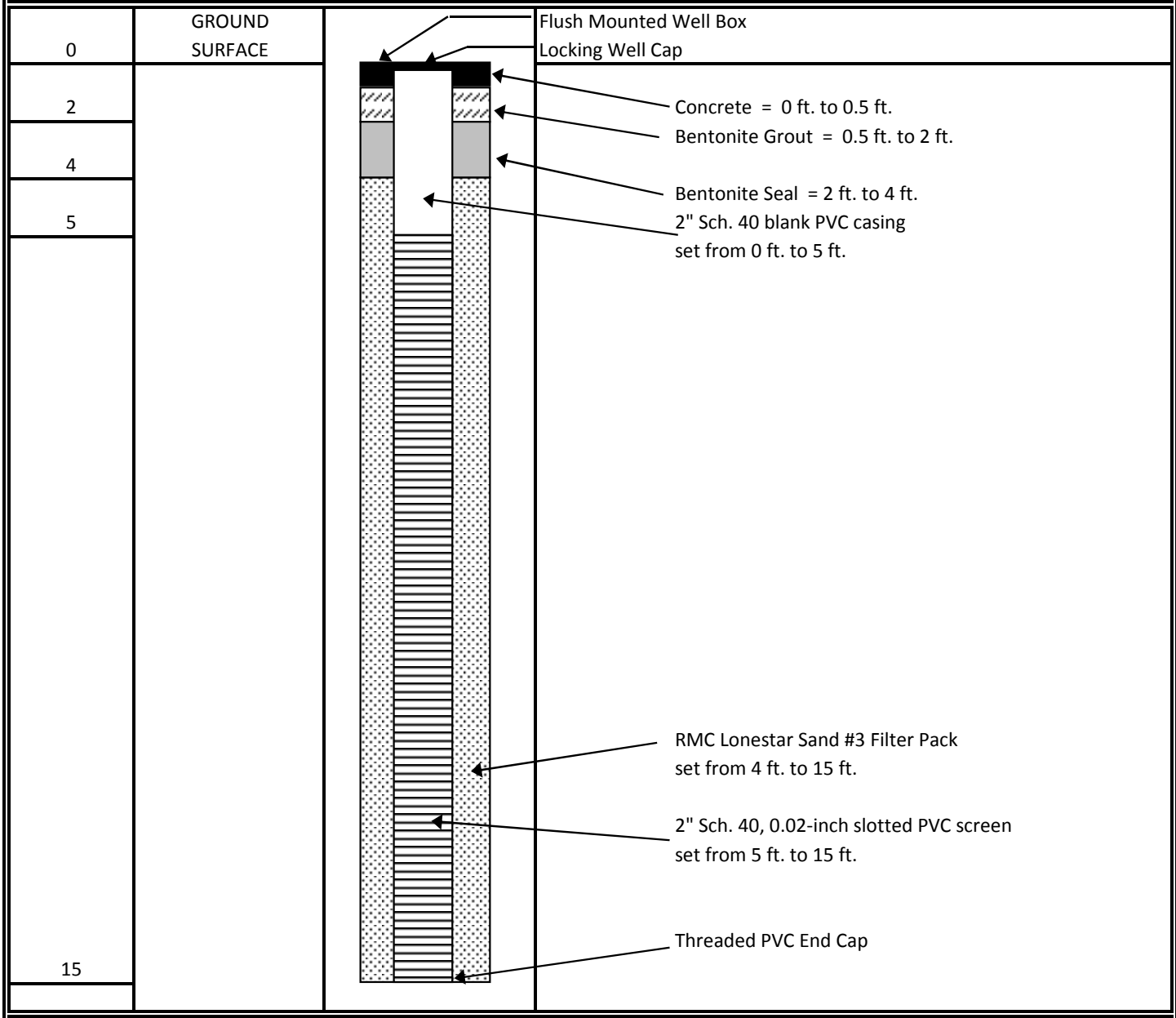


Legend
Concentric circles represent quarterly montoring events Second Quarter 1992 through Third Quarter 2013. 73 data points shown

Groundwater Flow Direction

Project Name and Location:
76 Station No. 5191/5043
Site Address: 449 Hegenberger Road
City, State: Oakland, California

FIGURE 4
WELL CONSTRUCTION DETAIL



Total Depth of boring at 15 feet below ground surface (bgs)

- Concrete
- Bentonite Grout
- Two inch diameter 0.02-inch Slotted PVC Screen
- Two inch diameter PVC well casing grouted in place
- RMC Lonestar Sand #3 Filter Pack
- Bentonite Chip Seal

Tables

TABLE 1
CURRENT GROUNDWATER GAUGING AND ANALYTICAL DATA
76 STATION NO. 5191/5043
449 HEGENBERGER ROAD
OAKLAND, CALIFORNIA

Well I.D.	Date	GROUNDWATER GAUGING DATA				GROUNDWATER ANALYTICAL DATA								
		TOC Elevation (ft)	Depth to Water (ft)	LNAPL Thickness (ft)	Water Elevation* (ft)	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)	Ethanol (ug/L)
MW-3	9/10/2013	10.81	3.25	NP	7.56	--	--	--	--	--	--	--	--	--
MW-6	9/10/2013	11.55	4.11	NP	7.44	**470**	**28,000**	**440**	**19**	**530**	**1,500**	**10**	**170**	<40
MW-7	9/10/2013	11.64	6.54	NP	5.10	--	--	--	--	--	--	--	--	--
MW-8	9/10/2013	11.32	3.54	NP	7.78	--	--	--	--	--	--	--	--	--
MW-9	9/10/2013	10.94	2.63	NP	8.31	--	--	--	--	--	--	--	--	--
MW-10	9/10/2013	10.97	3.92	NP	7.05	<50	<50	<0.50	<0.50	<0.50	**1.2**	<0.50	<5.0	<5.0
MW-11	9/10/2013	10.53	2.98	NP	7.55	<50	<50	<0.50	<0.50	<0.50	<0.50	**22**	<5.0	<5.0
MW-12	9/10/2013	11.01	3.96	NP	7.05	<50	**340**	**52**	**1.9**	**6.4**	**4.5**	**820**	**17 J**	<15
MW-12A	9/10/2013	11.29	4.40	NP	6.89	<50	<50	<0.50	<0.50	<0.50	<0.50	**6.3**	<5.0	<5.0
MW-13	9/10/2013	11.08	4.20	NP	6.88	<50	<50	<0.50	<0.50	<0.50	**0.62**	**64**	**47**	<5.0
MW-14	9/10/2013	12.00	4.88	NP	7.12	**120**	**31,000**	**1,500**	**39.0**	**2,300**	**5,200**	<1.5	**32**	<15
MW-15	9/10/2013	11.11	3.28	NP	7.83	<50	**68**	<0.50	<0.50	<0.50	<0.50	**120**	**39**	<5.0
MW-16	9/10/2013	10.98	3.44	NP	7.54	<50	<50	<0.50	<0.50	<0.50	**0.67**	**240**	**440**	<5.0
MW-17	9/10/2013	11.52	4.60	NP	6.92	**160**	**36,000**	**8,200**	**510**	**1,200**	**2,400**	<15	**320**	<150

Gauging Notes:

TOS - Top of Screen

ft - Feet

NP - LNAPL not present

LNAPL - Light non-aqueous phase liquid

* - Corrected for LNAPL if present (assumes LNAPL specific gravity = 0.75)

-- - No information available

Analytical Notes:

< - Below laboratory's indicated reporting limit

ug/L - micrograms/liter

TPHd- Total petroleum hydrocarbons as diesel

TPHg- Total petroleum hydrocarbons as gasoline

MTBE- Methyl tertiary-butyl ether

TBA- Tertiary-butyl alcohol

Bold - Above the laboratory's indicated reporting limit

J - TBA result may be biased slightly high due to MTBE converting to TBA during analysis

Appendix A

Previous Investigation and Site History Summary

PREVIOUS INVESTIGATION AND SITE HISTORY SUMMARY

October 1991 - Four soil samples were collected from the product pipe trenches at depths of approximately 3 feet below ground surface (bgs) during a dispenser island modification. The product pipe trenches were subsequently excavated to the groundwater depth at 4 to 4.5 feet bgs.

February 1992 - Three monitoring wells, MW-1 through MW-3, were installed at the site to depths ranging from 13.5 to 15 feet bgs.

August 1992 - Three additional monitoring wells, MW-4 through MW-6, were installed at the site to a depth of 13.5 feet bgs.

September 1994 - One 280-gallon waste-oil UST was removed from the site. The UST was made of steel, and no apparent holes or cracks were observed in the UST. One soil sample was collected from beneath the former UST at a depth of approximately 9 feet bgs. No petroleum hydrocarbons were reported.

January 1995 - Two additional monitoring wells, MW-9 and MW-10, were installed to depths of 13 and 15 feet bgs. In addition, monitoring wells MW-4 and MW-5 were destroyed by over-drilling the wells and backfilling with neat cement.

March 1995 - Two 10,000-gallon gasoline USTs and one 10,000-gallon diesel UST were removed from the site. Groundwater was encountered in the tank cavity at a depth of approximately 8.5 feet bgs. Soil samples contained total petroleum hydrocarbons as diesel (TPHd) and benzene, and TPH as gasoline (TPHg). Approximately 125,000 gallons of groundwater were pumped from the site for remediation and properly disposed off-site. Four fuel dispenser islands and associated product piping were also removed. Based on the results of the confirmation samples, the product dispenser islands were over excavated to approximately 6 feet bgs.

March-April 1995 - During demolition activities of the former station building, soil samples were collected from two excavations, which were subsequently over excavated. Confirmation samples contained petroleum hydrocarbons. An additional area on the south side of the former station building was excavated based on photo-ionization detector (PID) readings. Two monitoring wells, MW-1 and MW-2, were destroyed in order to allow for over excavation activities to extend to an area adjacent to the dispenser islands in the southeastern quadrant of the site. The excavated areas were subsequently backfilled with clean-engineered fill.

April 1997 - Two additional monitoring wells, MW-7 and MW-8, were installed off-site to the south and east on the neighboring property to a depth of 13 feet bgs. In addition, monitoring well MW-3, which was damaged during site renovation activities, was fully drilled out and reconstructed in the same borehole.

October 2003 - Site environmental consulting responsibilities were transferred to TRC.

April 8-9, 2005 - TRC conducted a 24-hour dual phase extraction (DPE) test at the site using monitoring well MW-6. The 24-hour DPE test was only moderately successful at removing vapor-phase petroleum hydrocarbons from the subsurface; therefore, TRC recommended DPE no longer be considered a viable remedial alternative for the site.

October 2007 - Site environmental consulting responsibilities were transferred to Delta Consultants.

December 2009 - Delta advanced two borings, B-4 and B-5, to depths of 20 feet bgs and 32 feet bgs, respectively. Analytical results from the soil and groundwater samples collected from these two borings indicated that the soil and the groundwater were impacted by petroleum hydrocarbons at these locations.

June 2010 – Delta installed two 4-inch diameter monitoring/extraction wells, MW-11 and MW-12, and two 2-inch diameter monitoring wells, MW-12A and MW-13, at the site. Analytical results from the soil and groundwater samples collected from the MW-12 and MW-12A boring locations indicated that the soil and the groundwater were impacted by petroleum hydrocarbons at these locations.

May 2011 – Antea Group (formally Delta Consultants) installed four 2-inch diameter monitoring wells, MW-14 through MW-17, and advanced one soil boring, B-6, at the site. All four monitoring wells were installed with ten feet of screen from 3 feet bgs to 13 feet bgs. Analytical results of soil samples collected during the monitoring well installation reported TPHg concentrations ranging from 1.0 milligrams per kilogram (mg/kg) (MW-14d13) to 2,490 mg/kg (B-6d9), benzene concentrations ranging from 0.67 mg/kg (B-6d21) to 26.4 mg/kg (B-6d9), toluene concentrations ranging from 0.2 mg/kg (MW-14d10) to 73.9 mg/kg (B-6d9), ethylbenzene concentrations ranging from 0.037 mg/kg (MW-14d13) to 58.1 mg/kg (B-6d9), total xylenes concentrations ranging from 0.066 mg/kg (MW-14d13) to 230 mg/kg (B-6d9), methyl tertiary-butyl ether (MTBE) concentrations ranging from 0.015 mg/kg (MW-15d13) to 0.19 mg/kg (MW-15d8), tertiary-butyl alcohol (TBA) concentrations ranging from 0.014 mg/kg (MW-16d8 and B-6d21) to 0.16 mg/kg (MW-15d8), and lead concentrations ranging from 5.5 mg/kg (MW-16d13) to 16.3 mg/kg (MW-17d9). Diesel range organics (DRO) and DRO with silica gel concentrations were reported; however, all of the results did not match the laboratory standard for diesel. Concentrations of DRO ranged from 2.9 mg/kg (MW-17d13) to 258 mg/kg (B-6d14) and DRO with silica gel concentrations ranged from 2.5 mg/kg (MW-17d13) to 250 mg/kg (B-6d14).

March 2012 – Antea Group advanced five soil borings (HPB-1 through HPB-5) at the site. The borings were advanced using direct push technology. The borings were used to obtain a hydraulic profile of the substrate beneath the site. The data obtained during the investigation will be used to determine the best path forward in terms of remediation.

SENSITIVE RECEPTORS

April 24, 2006, TRC completed a sensitive receptor survey for the site. According to the Department of Water Resources (DWR) records, three water supply wells are located within one-half mile of the site. The closest well is an irrigation well, reported to be, approximately 1,080 feet southeast of the site. In addition, two surface water bodies were observed within a one-half mile radius of the site. San Leandro Creek is located approximately 1,400 feet southwest of the site and flows into the San Leandro Bay. Elmhurst Creek is located approximately 2,220 feet north of the site and also flows into the San Leandro Bay.

Current Consultant: **Antea Group**