July 21, 2014

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By Alameda County Environmental Health at 2:41 pm, Jul 21, 2014

Ms. Karel Detterman
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

I, Stephanie Kochan, hereby authorize ERAS Environmental, Inc. to submit the Workplan for Subsurface Investigation for 729 45th Ave., Oakland in Oakland, California, dated June 26, 2014 to the Alameda County Health Care Services Agency.

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.

Signature: Stephanie Kochan

Printed Name: Stephanie Kochan

Ms. Stephanie Kochan
Equipment Fabricating Corporation
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ERAS Environmental, Inc.

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WORK PLAN FOR LIMITED PHASE II SUBSURFACE INVESTIGATION

AT

729 45th AVENUE
OAKLAND, CALIFORNIA

ERAS PROJECT NUMBER: 14-001-02
GLOBAL ID: T0000005808

Prepared for

Ms. Stephanie Kochan
Equipment Fabricating Corporation
729 45th Avenue
Oakland, CA 94601

June 26, 2014

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CERTIFICATION

This **Work Plan for Limited Phase II Subsurface Investigation** at 729 45th Avenue in Oakland, California, has been prepared by ERAS Environmental, Inc. (ERAS) under the professional supervision of the Registered Professional Geologist whose signature appears hereon.

This work plan was prepared in general accordance with the accepted standard of practice that exists in Northern California at the time the investigation was performed. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, can tend to reduce the inherent uncertainties associated with such studies.

Our firm has prepared this work plan for the Client's exclusive use for this particular project and in accordance with generally accepted professional practices within the area at the time of our investigation. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This work plan may be used only by the client and only for the purposes stated within a reasonable time from its issuance. Land use, site conditions (both on-site and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify ERAS of such intended use. Based on the intended use of report, ERAS may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release ERAS from any liability resulting from the use of this report by any unauthorized party.

Sincerely,
ERAS Environmental, Inc.

Curtis Payton
California Registered Professional Geologist 5608

Andrew Savage
Project Geologist

June 26, 2014

1.0 INTRODUCTION

The following is a work plan for the collection of soil and groundwater samples at a commercial site located at 729 45th Avenue in Oakland, California (the "Property"). The Property is an open fuel leak case and a subsurface investigation previously conducted at the site has identified contamination originating from a gasoline underground storage tank (UST). The Alameda County Health Care Services Agency (ACHCSA) requested this work plan in correspondence dated May 28, 2014.

The letter listed 9 items under Technical Documents that are addressed in this workplan.

1.1 BACKGROUND

The location of the Property is shown on **Figure 1**. The locations of the former USTs and AST on the Property are shown on **Figure 2**.

Phase 1 Investigation

A Phase 1 Environmental Site Assessment (ESA) was conducted by Tom Edwards & Associates (TEA) and the results were presented in a report dated August 27, 2013. TEA identified the following potential environmental issues at the Property.

- The former uses of the Property as an oil refining, storage and sales company from 1928-1964.

- Three aboveground storage tanks (ASTs) including a 20,000 gallon and two 15,000 gallon gasoline ASTs were present from at least 1928 to 1949 (actually to at least 1952) which were operated by Norwalk Oil Sales Company. The three ASTs were shown on a 1952 Sanborn Fire Insurance map to be mounted on two concrete pads that were each an estimated 35 feet long. The tanks and pads were located in the area that is now beneath the current rectangular manufacturing building located along the southwest side of the Property.

- The possible former use of hazardous materials on the Property by past occupants United Freight Ways and Arrow Steel Company

- The former use of three 500-gallon underground storage tanks (USTs) on the Property by Equipment Fabrication Company (the current tenant). The USTs were removed in approximately 1991. TEA indicated there were three USTs present in 1986, the two in use at that time were used to store gasoline and paint thinner.

A map from the TEA Phase 1 report showing the locations of the former ASTs and USTs is included in **Appendix A**.

Soil and Groundwater Investigation

TEA performed a Phase 2 soil and groundwater investigation at the Property in October of 2013. Six soil borings were drilled in the yard area and along the southeast edge of the Property. The locations of the borings are shown on the TEA map in **Appendix A**. Soil samples were collected for

laboratory analysis from all six borings. Groundwater was only sampled from two of the borings. The results of this investigation are discussed in **Section 3.2**.

Results of the laboratory analyses are tabulated in the TEA Tables 1 and 2 that are included in **Appendix A**.

File Review Information

On January 28, 2014 ERAS reviewed file information at the City of Oakland Fire Department. The only hazardous materials permit information was issued to the current tenant Equipment Fabricating Corporation dated in 2001. Inspections for the facility for hazardous materials were dated in 1999 and 2003. There were no records that were old enough to have listed or documented the proper permitting or removal of the former USTs.

An ACHCSA hazardous waste inspection report dated June 20, 1986 indicated the presence of three USTs, two of which were in use for gasoline and one for paint thinner dispensing. A certified letter dated September 25, 1989 requested that the USTs be removed or permits be applied for to operate the USTs. A receipt for $855 dated July 31, 1991 appeared to be for payment for oversight for the UST removal/closure.

It appears that the USTs were operated by the current owner of the Property from approximately 1972 until they were removed in 1991.

Note that naphthalene was detected in groundwater samples located down-gradient of the former UST are which may indicate a leak of a non petroleum fuel. It is considered likely that the large ASTs operated by Norwalk Oil Sales Company were used to store oils but may have also been used to store diesel fuel (Item 1 in Technical Comments). Item 1 also provides historical information indicating that certain metals and other constituents of explosives may have been scattered on the Property and nearby area by the 1898 explosive demolition of the Western Fuse and Explosive Company and 40 nearby buildings.

Circumstantial evidence indicates the underground tanks were removed in 1991 with the knowledge of and with permits from the Alameda County Health Care Services Agency. All available sources of historical information including the City of Oakland Fire Department and ACHCSA files were searched and no UST removal report or other additional information could be found (Item 2 in Technical Comments).

Items 3-9 in Technical Comments are addressed in the Site Conceptual Model and Data Gap Summary in **Appendix B**.

2.0 REGIONAL GEOLOGY/HYDROLOGY

The Property is in the southern part of the City of Oakland in the San Francisco Bay area. The San Francisco Bay area occupies a broad alluvial valley that slopes gently northward toward Oakland Bay and is flanked by alluvial fans deposited at the foot of the Diablo Range to the east and the Santa Cruz Mountains to the west. Surface topography in the immediate vicinity of the Property is gently sloping down to the south west towards tidally influenced Brooklyn Basin Tidal Canal.

The Property is at an elevation of approximately 15 feet above Mean Sea Level according to the United States Geological Survey (USGS) Oakland East Quadrangle California 7.5 Minute Series topographic map.

Materials underlying the site are unconsolidated deposits of near shore and beach sediments, deposited in Oakland Bay at higher sea level stands. At shallow depths beneath these sediments are chert, greywacke, serpentine and shale bedrock that are a part of the Cretaceous to Jurassic-aged Franciscan Formation. Bedrock is exposed to the west and north on the upland surfaces.

The subject site is located on the San Francisco Bay Plain in the northernmost part of the Santa Clara Valley Groundwater Basin, (DWR, 1967), the surface of which slopes gently down toward the Brooklyn Basin Tidal Canal.

The regional groundwater flow follows the topography, moving from areas of higher elevation to areas of lower elevation. The regional groundwater flow direction in the area of the Property is estimated to be toward the southwest toward the Brooklyn Basin Tidal Canal. Groundwater monitoring at nearby leak sites (720 High Street, approximately 200 feet west-northwest and 833 47th Avenue, approximately 700 feet east), indicated that the flow direction has been determined to be to the southwest.

3.0 SITE CONCEPTUAL MODEL

A Site Conceptual Model Table and Data Gap Summary are included as **Appendix B**.

3.1 HYDROGEOLOGIC SETTING

Shallow groundwater is at roughly 14-16 feet bgs. No groundwater monitoring has been conducted on the Property but based on nearby leak cases with active groundwater monitoring the groundwater has been determined to flow toward the southwest at a gradient of about 0.015 feet/foot.

The shallow water-bearing zone is found in silty/sandy units (clayey silt, sandy silty gravel, clayey silt with gravel, gravely sand, and sandy gravel) interbedded with clay. Groundwater is generally under water-table conditions, but may be locally confined by clay in the upper portion of the water-bearing zone.

The base of the shallow water bearing zone has not been determined.

3.2 EXTENT OF CONTAMINATION

3.2.1 Results in Soil

High concentrations of petroleum hydrocarbons were detected in soil sampled from boring EFC05 at 1.75 feet. This boring was in a low spot in asphalt at the edge of the roadway and it is possible these hydrocarbons are the result of surface runoff from the outside storage yard or the next door topographically higher lumber storage yard.

A high concentration of zinc was detected in the soil sampled from boring EFC-04 at a depth of 1.5 feet also collected in a low spot adjacent to the edge of the Property. It is postulated that this zinc may be the result of surface runoff from metals released into the air by the galvanizing plant directly across the street from the Property. It is also possible elevated metals are a remnant of the 1989 explosive demolition.

3.2.2 Results in Groundwater

Elevated concentrations of gasoline and diesel hydrocarbons were detected in the groundwater samples from borings EFC-04 and EFC-05, located down-gradient from the former USTs, indicating a possible release from that area. Napthalene was also detected in groundwater from both of those borings, indicating a possible release from the former paint thinner UST.

However concentrations of total petroleum hydrocarbons (TPH) quantified as gasoline range organics (TPH-gro[1]) up to 137,000 micrograms per liter (µg/L) was detected in EFC04, located

[1] TPH-gro, TPH-dro, and TPH-oro are methods that compare analytical results to standards for gasoline, diesel and motor oil, respectively. Therefore analytical results are estimates of quantities based on what would be expected for the range of hydrocarbon results for the standard. Gasoline range organics (gro) are those hydrocarbon compounds that are in the range of C6 to C10, diesel range organics (dro) are those hydrocarbon compounds that are in the range of C10 to C23, and oil range organics (oro) are those hydrocarbon compounds that are in the range of C18 to C36. There can be overlap in reporting methods as well as identification of compounds that fall within the standard that may not necessarily be derived from gasoline, diesel, or oil.

further away from EFC05 which contained TPH quantified as diesel range organics (TPH-dro) at a concentration of 105,000 µg/L. It is possible the TPH-dro is degraded gasoline hydrocarbons. The source of the high concentration of TPH-gro is unknown.

Both these concentrations are above the Environmental Screening Limits of 100 µg/L set forth by the California Regional Water Quality Control Board (RWQCB) for a commercial site where shallow groundwater is considered a potential source of drinking water. TEA does not appear to have had the laboratory run silica gel cleanup on the samples prior to analysis to remove biogenic hydrocarbon interferences.

4.0 WORK PLAN

4.1 SCOPE OF PROPOSED INVESTIGATION

ERAS proposes a scope of work for this investigation as follows.

- Obtain a permit for drilling from the Alameda County Public Works Department (ACPWD).

- Clear the boring location for the presence of utilities by notifying Underground Service Alert and employing a private underground locating/clearance service.

- Advance three borings using a direct push sample rig to about 20 feet in the vicinity of the former AST's. Advance one boring to a depth of approximately 20 feet in the vicinity of the oil warehouse. Advance two borings to a depth of 20 feet in the vicinity of the former gas/paint thinner USTs. Six borings in total. These borings will be continuously logged.

- Collect soil samples from the borings for laboratory analysis.

- Groundwater samples will be collected from each boring. If contamination is observed in the vadose zone a soil sample will be collected in addition. Evidence of contamination will consist of discoloration, odor, or elevated detections on the organic vapor meter (OVM).

- Analyze the groundwater samples from the vicinity of the former USTs and ASTs for TPH-gro and TPH-dro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, SVOCs by EPA Method 8270, and total lead by EPA Method E200.8.

- Analyze the groundwater samples collected from the vicinity of the oil warehouse for TPH-dro by EPA Method 8015C, total petroleum hydrocarbons quantified as oil and grease range organics (TPH-oro) by EPA Method 5520B, TPH-gro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, polychlorinated biphenyls (PCBs) by EPA Method 8082, semi-volatile organic compounds (SVOCs) by EPA Method 8270, and CAM 17 metals.

- Prepare a report detailing the field procedures and results of the investigation.

4.2 FIELD WORK COORDINATION

ERAS will procure a drilling permit from the ACPWD prior to drilling activities.

The boring locations will be painted and Underground Service Alert notified at least 48 hours in advance to give owners of underground utilities an opportunity to mark their lines. Prior to drilling, each boring location will be cleared using a private underground utility locator.

4.3 BORING LOCATIONS AND SAMPLING

The locations of the borings are shown on **Figure 2**. The Standard Operating Procedures for direct-push sampling is included in **Appendix C**.

Three borings will be advanced using a direct push sample rig to about 16 feet inside the current manufacturing building in the vicinity of the former AST's. One boring will be advanced near the down-gradient corner of the former oil warehouse to a depth of approximately 16 feet bgs. Two borings will be advanced adjacent to the down-gradient side of the gas/paint thinner USTs to a depth of approximately 16 feet bgs. These borings will be continuously logged.

A groundwater sample will be collected from each boring. If evidence of contamination is discovered in the vadose zone a soil sample will be collected for analysis from the highest impacted area. Evidence to warrant the selection of the soil sample shall include discoloration of soil, odor, or elevated reading on the photoionization detector (PID).

The groundwater samples will be kept refrigerated pending transport under chain-of-custody procedures to a California certified environmental analytical laboratory.

The groundwater samples from the vicinity of the former USTs and ASTs will be analyzed for TPH-gro and TPH-dro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, SVOCs by EPA Method 8270, and total lead by EPA Method E200.8.

The groundwater samples collected from the vicinity of the oil warehouse will be analyzed for TPH-dro by EPA Method 8015C, TPH-oro by EPA Method 5520B, TPH-gro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, PCB by EPA Method 8082, SVOCs by EPA Method 8270, and CAM 17 metals.

4.4 FIELD AND REPORT SCHEDULE

The field work will be scheduled as soon as possible following approval of this work plan by the ACEHD. A report will be submitted within 30 working days of the completion of field activities.

5.0 REFERENCES

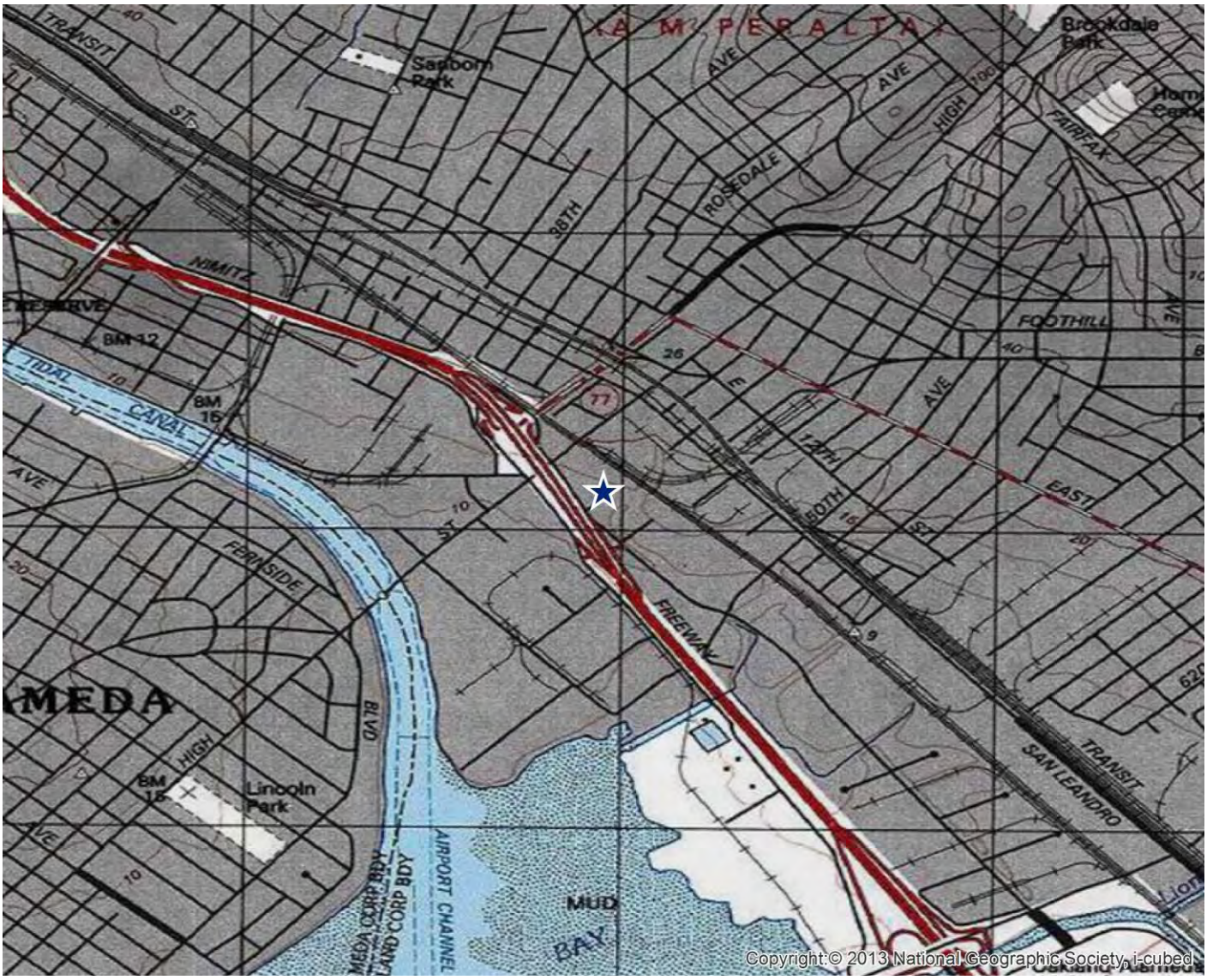
California Department of Water Resources, Evaluation of Ground Water Resources South Bay, Appendix A: Geology, Bulletin 118-1, August 1967.

California Regional Water Quality Control Board, Water Quality Control Plan, San Francisco Bay Basin Region (2), December 1986.

Goldman, Harold B., Geology of San Francisco Bay prepared for San Francisco Bay Conservation and Development Commission, February 1967.

Helley, E.J., La Joie, K.R., Spangle, W.E., and Blair, M.L., Flatland Deposits of the San Francisco Bay Region, California - their geology and engineering properties and their importance to comprehensive planning, U.S. Geological Survey Professional Paper 943, 1974.

FIGURES



SITE LOCATION TOPOGRAPHIC MAP

U.S. Geological Survey. Oakland East Quadrangle, 7.5 Minute Series

N

	729 45Th Ave, Oakland, CA	FIGURE: 1

LEGEND

- BOREHOLES BY TEA
- BUILDINGS (FORMER) - APPROXIMATE BASED ON OLD FIRE INSURANCE MAP AND AERIAL PHOTOGRAPHS
- PROPOSED BORING LOCATIONS

N

SCALE

0 50 100 FEET

Project Number: 14-001-02

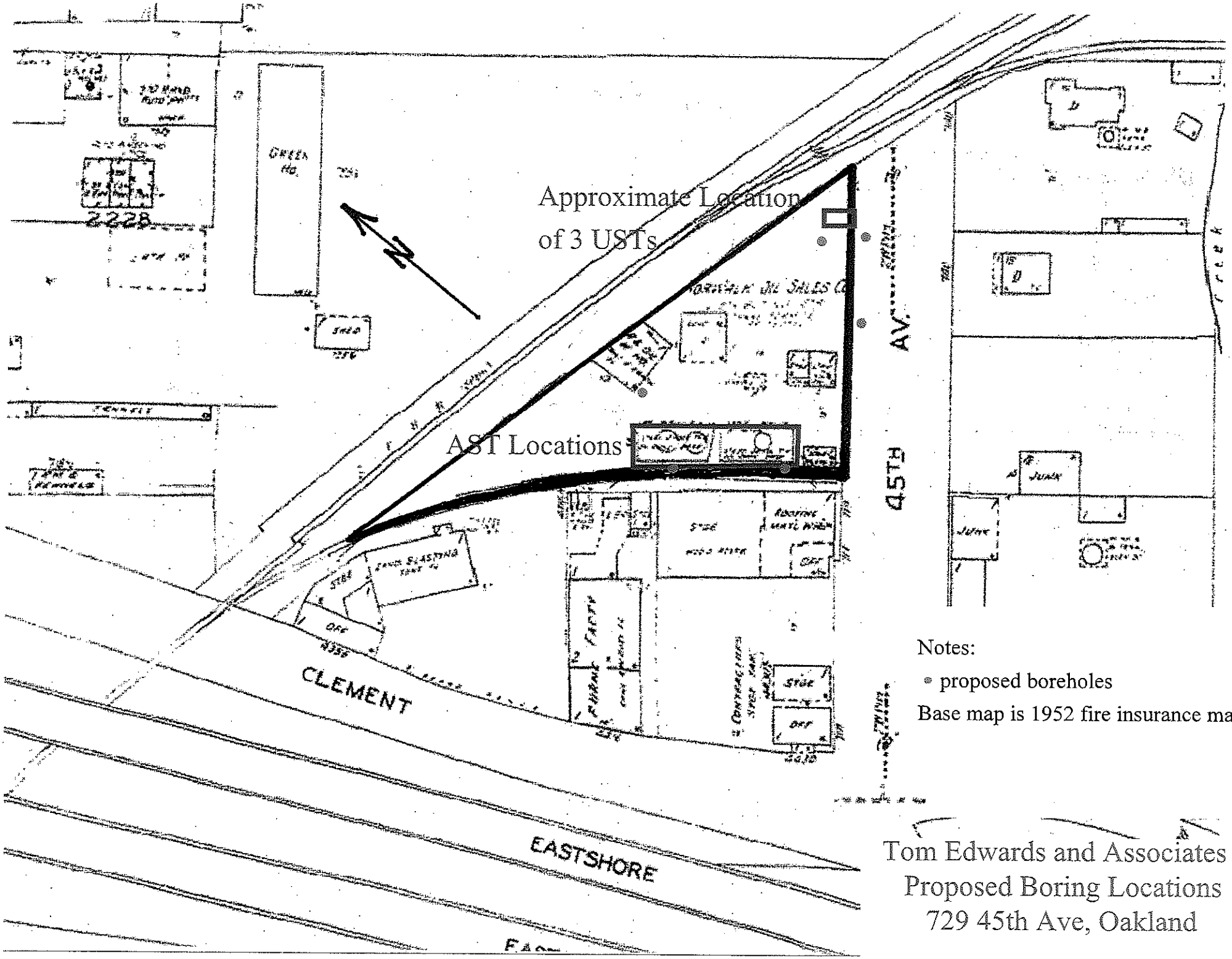
Project Address: 729 45th Avenue, Oakland, CA

Figure 2

Proposed Boring Location Map

APPENDIX A

Previous Investigation Maps and Tables



Notes:

- proposed boreholes

Base map is 1952 fire insurance map

Tom Edwards and Associates
Proposed Boring Locations
729 45th Ave, Oakland

LEGEND

BOREHOLES

BUILDINGS (FORMER) - APPROXIMATE BASED ON OLD FIRE INSURANCE MAP AND AERIAL PHOTOGRAPHS

N

SCALE

0 50 100 FEET

Tom Edwards and Associates Environmental Consulting	Project Number: 13-3793 Project Address: 729 45th Avenue, Oakland, CA	Figure 1 Boring Location Map

Table 1

Analytical Results for Soil Samples with Detections and Environmental Screening Levels[1]

Compound	ESL	EFC02-1'	EFC03-3'	EFC03-8'	EFC04-1.5'	EFC04-5'	EFC05-1.75'	EFC05-10'Grab
EPA Method 8015 (Total Petroleum Hydrocarbons)								
gasoline	500	ND	2.2	ND	ND	ND	4.3	156
diesel	500	ND	110	ND	ND	ND	**1,500**	ND
motor oil	2,500	ND	75	ND	ND	150	**2,700**	165
EPA Method 8260 (Volatile Organic Compounds)								
Benzene	1.2	ND	0.002	ND	ND	ND	**1.6**	ND
Toluene	9.3	ND	ND	ND	ND	ND	0.13	ND
Ethylbenzene	4.7	ND	0.04	ND	ND	ND	0.26	3.8
Total Xylene	110	ND	0.004	ND	ND	ND	1.1	5.2
Naphthalene	4.8	ND	0.13	ND	ND	ND	0.051	0.35
EPA Method 7196A (Hexavalent Chromium)								
Hexavalent Chromium	8	ND	ND	ND	0.21	ND	0.28	0.55
EPA Method 6010B/7471A (CAM 17 Metals)								
Arsenic	0.96	**2.6**	**2.5**	**1.6**	**4.5**	**2.8**	**1.5**	**8.4**
Barium	1,500	139	107	117	151	49.1	55.6	217
Cadmium	12	ND	ND	ND	2.1	ND	ND	4.1
Chromium	750	27.1	18.9	13.1	19.7	10.2	11.5	34.1
Cobalt	80	6.3	6.4	4	7.3	3.9	3.5	9
Copper	230	13.7	9.4	6.7	25.5	12.5	58.3	148
Lead	320	6.8	25.9	4.3	116	5.5	210	**848**
Mercury	10	ND	ND	ND	0.21	ND	0.28	0.35
Nickel	150	41.2	18.8	16.9	35.8	20.7	20	60.6
Vanadium	200	24.8	19.2	18.4	20.5	14.6	9.4	28.4
Zinc	600	46.7	20.4	10.2	**828**	34.5	237	**1,160**
EPA Method 9014 (Total Cyanide)								
Total Cyanide	0.0036	ND	ND	ND	**0.12**	ND	**0.1**	ND

Notes:

All analytical results are in mg/kg (parts per million)

1 Commercial/Industrial Land use ESL from Table B. Environmental Screening Levels (ESLs), Shallow Soils (≤3 m bgs), Groundwater is not a Current or Potential Source of Drinking Water, http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml (California Regional Water Quality Control Board)

848 concentration exceeds the Commercial/Industrial Land use ESL

Table 2
Analytical Results for Water Samples
with Detections and Environmental Screening Levels[1]

Compound	ESL	EFC04	EFC05
EPA Method 8015 (Total Petroleum Hydrocarbons)			
gasoline	500	**137,000**	**4,400**
diesel	640	ND	**105,000**
motor oil	640	ND	ND
EPA Method 8260 (Volatile Organic Compounds)			
Ethylbenzene	43	**2,100**	**2,400**
Total Xylene	100	**2,240**	**2,910**
Naphthalene	24	**878**	**64**
EPA Method 7196A (Hexavalent Chromium)			
Hexavalent Chromium	11	ND	ND
EPA Method 6010B/7471A (CAM 17 Metals)			
Arsenic	36	**40**	ND
Barium	1,000	**3,400**	**3,700**
Chromium	180	**410**	20
Cobalt	3	**150**	**25**
Copper	3.1	**400**	**160**
Lead	2.5	**200**	**110**
Nickel	8.2	**1,300**	**130**
Vanadium	19	**410**	**21**
Zinc	81	**870**	**260**
EPA Method 9014 (Total Cyanide)			
Total Cyanide	1	ND	ND

Notes:

All analytical results are in ug/L (parts per billion)

1 Commercial/Industrial Land use ESL from Table B. Environmental Screening Levels (ESLs), Shallow Soils (≤3 m bgs), Groundwater is not a Current or Potential Source of Drinking Water, http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml (California Regional Water Quality Control Board)

848 concentration exceeds the Commercial/Industrial Land use ESL

APPENDIX B

Site Conceptual Model and Data Gap Summary

Site Conceptual Model

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	The Property is in the southern part of the City of Oakland in the San Francisco Bay area. The San Francisco Bay area occupies a broad alluvial valley that slopes gently northward toward Oakland Bay and is flanked by alluvial fans deposited at the foot of the Diablo Range to the east and the Santa Cruz Mountains to the west. The northern part of the valley is called the Santa Clara Valley. Surface topography in the immediate vicinity of the Property is gently sloping down to the south west towards tidally influenced Brooklyn Basin Tidal Canal. The Property is at an elevation of approximately 15 feet above Mean Sea Level according to the USGS Oakland East Quadrangle California 7.5 Minute Series topographic map. Materials underlying the site are unconsolidated deposits of near shore and beach sediments, deposited in Oakland Bay at higher sea level stands. At shallow depths beneath these sediments are chert, greywacke, serpentine and shale bedrock that are a part of the Cretaceous to Jurassic-aged Franciscan Formation. Bedrock is exposed to the west and north on the upland surfaces. The subject site is located on the San Francisco Bay Plain in the northernmost part of the Santa Clara Valley Groundwater Basin, (DWR, 1967), the surface of which slopes gently down toward the Brooklyn Basin Tidal Canal. The regional groundwater flow follows the topography, moving from areas of higher elevation to areas of lower elevation.	None	NA

Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Site	The regional groundwater flow direction in the area of the Property is estimated to be toward the southwest toward the Brooklyn Basin Tidal Canal. Groundwater monitoring at nearby leak sites (720 High Street, approximately 200 feet west-northwest and 833 47th Avenue, approximately 700 feet east), has reported the groundwater flow direction to be to the southwest. Shallow groundwater beneath the Property has been determined to be roughly 14-16 feet bgs based on lithologic logging conducted by TEA. No groundwater monitoring has been conducted on the Property but based on nearby leak cases with active groundwater monitoring the groundwater has been determined to flow toward the southwest at a gradient of about 0.015 feet/foot. The shallow water-bearing zone is found in silty/sandy units (clayey silt, sandy silty gravel, clayey silt with gravel, gravely sand, and sandy gravel) interbedded with clay. Groundwater is generally under water-table conditions, but may be locally confined by clay in the upper portion of the water-bearing zone. The base of the shallow water bearing zone has not been determined	1. There are no monitoring wells on Property to establish site specific groundwater depth, flow direction, and gradient.	N/A
Surface Water Bodies		The closest surface water body is the Brooklyn Basin Tidal Canal, which is 0.5 miles southwest of the Property.		N/A
Nearby Wells		The RWQCB Geotracker GAMA website provides the locations of water supply wells proximal to the site. No groundwater supply wells were identified within 1 mile of the Property.		N/A
Release Source and Volume		Three ASTs including a 20,000 gallon and two 15,000 gallon gasoline ASTs were present from at least 1928 to 1949. The three ASTs were shown on Sanborn Fire Insurance maps to be mounted on two concrete pads that were each an estimated 35 feet long. The tanks and pads were located in the area that is now beneath the current rectangular manufacturing building located along the southwest side of the Property. Three former 500-gallon USTs were located on the Property and used by Equipment Fabrication Company (the current tenant). The	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.

Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		USTs were removed in approximately 1991. TEA indicated there were three USTs present in 1986, the two in use at that time were used to store gasoline and paint thinner. A third area formerly indicted to have been an oil warehouse was also not addressed and maybe a potential source of impact to the subsurface environmental conditions beneath the Property.	potential impact to the subsurface however it is unknown if silica gel cleanup was performed.	
LNAPL		There are currently no groundwater monitoring wells located on the Property. Although light non-aqueous phase liquids were not observed during grab groundwater sampling activities, concentrations of TPH-gro were detected up to 137,000 µg/L in EFC04, and located further away from EFC05 contained TPH-dro at a concentration of 105,000 µg/L. It is possible the TPH-dro is degraded gasoline hydrocarbons. The source of the high concentration of TPH-gro is unknown.	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to the subsurface however it is unknown if silica gel cleanup was performed.	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.
Source Removal Activities		On January 28, 2014 ERAS reviewed file information at the City of Oakland Fire Department. There were no records that were old enough to have listed or documented the proper permitting or removal of the former USTs. An ACHCSA hazardous waste inspection report dated June 20, 1986 indicated the presence of three USTs, two of which were in use for gasoline and one for paint thinner dispensing. A certified letter dated September 25, 1989 requested that the USTs be removed or permit be applied for to operate the USTs. A receipt for $855 dated July 31, 1991 appeared to be for payment for oversight for the UST removal/closure. It appears that the USTs were operated by the current owner of the Property from approximately 1972 until they were removed in 1991.	3. The extent of impact has not yet been determined and the records for the removal of the former USTs are of a date where records are not available.	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.

Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		The primary sources of contamination (ASTs and USTs) have been removed. The secondary source has not been sufficiently characterized to perform removal		
Contaminants of Concern		Based on the historical investigations and the records reviewed ERAS has determined that the samples need to be analyzed for the following: The groundwater samples from the vicinity of the former USTs and ASTs will be analyzed for TPH-gro and TPH-dro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, SVOCs by EPA Method 8270, and total lead by EPA Method E200.8. The groundwater samples collected from the vicinity of the oil warehouse will be analyzed for TPH-dro by EPA Method 8015C, TPH-oro by EPA Method 5520B, TPH-gro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, PCB by EPA Method 8082, SVOCs by EPA Method 8270, and CAM 17 metals.	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to the subsurface however it is unknown if silica gel cleanup was performed. Additional analysis needs to be conducted to determine the exact contaminants of concern.	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.
Petroleum Hydrocarbons in Soil		High concentrations of petroleum hydrocarbons detected were detected in soil sampled from boring EFC05 at 1.75 feet. This boring was in a low spot in asphalt at the edge of the roadway and it is possible these hydrocarbons are the result of surface runoff from the outside storage yard or the next door topographically higher lumber storage yard.	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.

Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
			the subsurface however it is unknown if silica gel cleanup was performed.	
Petroleum Hydrocarbons in Groundwater		Elevated concentrations of TPH-gro and TPH-dro were detected in the groundwater samples from borings EFC-04 and EFC-05, located down-gradient from the former USTs. Napthalene was also detected in groundwater from both of those borings, indicating a possible release from the former paint thinner UST. However concentrations of TPH-gro were detected up to 137,000 µg/L was detected in EFC04, located further away from EFC05 which contained TPH-dro at a concentration of 105,000 µg/L. It is possible the TPH-dro is degraded gasoline hydrocarbons. The source of the high concentration of TPH-gro is unknown. Both these concentrations are above the Environmental Screening Limits of 100 µg/L set forth by the California RWQCB for a commercial site where shallow groundwater is considered a potential source of drinking water. TEA does not appear to have had the laboratory run silica gel cleanup on the samples prior to analysis to remove biogenic hydrocarbon interferences.	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to the subsurface however it is unknown if silica gel cleanup was performed.	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.
Risk Evaluation		The Property was a former oil refining, storage, and/or sales company from at least 1928 to 1964, United Freight at least in 1967, Arrow Steel Company from 1969 to 1972, followed by Equipment Fabrication Corporation from at least 1972 to the present. The Site is zoned for commercial land use. The data available at this point is not sufficient to prepare a risk evaluation. Further evaluation of direct contact, vapor intrusion and outdoor air exposure risks will be evaluated once sufficient data is obtained.	2. The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to the subsurface however it is unknown if silica	Additional soil borings will be advanced in the source areas including the ASTs, USTs, and oil warehouse for the collection of soil and/or groundwater samples.

Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
			gel cleanup was performed	

Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
1	There are no monitoring wells on Property to establish site specific groundwater depth, flow direction, and gradient.	None at this time	The local groundwater depth, flow direction, and gradient are well known based on nearby leak sites	N/A

Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
2/3	The area of the ASTs and the oil storage warehouse was not addressed in the previous sampling conducted by TEA. The previous samples by the USTs indicated a potential impact to the subsurface however it is unknown if silica gel cleanup was performed.	Advance three borings using a direct push sample rig to about 20 feet in the vicinity of the former AST's. Advance one boring to a depth of approximately 20 feet in the vicinity of the oil warehouse. Advance two borings to a depth of 20 feet in the vicinity of the former gas/paint thinner USTs. Six borings in total. These borings will be continuously logged. Collect soil samples from the borings for laboratory analysis. Groundwater samples will be collected from each boring. If contamination is observed in the vadose zone a soil sample will be collected in addition. Evidence of contamination will consist of discoloration, odor, or elevated detections on the OVM.	These samples are needed to determine potential impact to the subsurface by the AST's, oil storage warehouse, and USTs. The data provided by the previous assessment provided insufficient data,	Analyze the groundwater samples from the vicinity of the former USTs and ASTs for TPH-gro and TPH-dro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, SVOCs by EPA Method 8270, and total lead by EPA Method E200.8. Analyze the groundwater samples collected from the vicinity of the oil warehouse for TPH-dro by EPA Method 8015C, TPH-oro by EPA Method 5520B, TPH-gro by EPA Method 8015C, MTBE and oxygenates by EPA Method 8260, VOCs by EPA 8260, PCB by EPA Method 8082, SVOCs by EPA Method 8270, and CAM 17 metals.

APPENDIX C

Standard Operating Procedures

STANDARD OPERATING PROCEDURE – DIRECT PUSH BORINGS

SOIL CORING AND SAMPLING PROCEDURES

Prior to drilling, all boreholes will be hand dug to a depth of 4-5 feet below ground surface (bgs) to check for underground utilities.

Soil and groundwater samples are collected for lithologic and chemical analyses using a direct driven soil coring system. A hydraulic hammer drives sampling rods into the ground to collect continuous soil cores. As the rods are advanced, soil is driven into an approximately 2.5-inch-diamter sample barrel that is attached to the end of the rods. Soil samples are collected in sleeves inside the sample barrel as the rods are advanced. After being driven 4 to 5 feet into the ground, the rods are removed from the borehole. The sleeve containing the soil core is removed from the sample barrel, and can then be preserved for chemical analyses, or used for lithologic description. This process is repeated until the desired depth or instrument refusal is reached.

A soil core interval selected for analyses is cut from the sleeve using a pre-cleaned hacksaw. The ends of the tube are covered with aluminum foil or Teflon liner and sealed with plastic caps. The soil-filled liner is labeled with the bore number, sample depth, site location, date, and time. The samples are placed in bags and stored in a cooler containing ice. Soil from the core adjacent to the interval selected for analyses is placed in a plastic zip-top bag. The soil is allowed to volatilize for a period of time, depending on the ambient temperature. The soil is scanned with a flame-ionization detector (FID) or photo-ionization detector (PID).

All sample barrels, rods, and tools (e.g. hacksaw) are cleaned with Alconox or equivalent detergent and de-ionized water. All rinsate from the cleaning is contained in 55-gallon drums at the project site.

GROUNDWATER SAMPLING FROM DIRECT PUSH BORINGS

After the targeted water-bearing zone has been penetrated, the soil-sample barrel is removed from the borehole. Small-diameter well casing with 0.010-inch slotted well screen may be installed in the borehole to facilitate the collection of groundwater samples. Threaded sections of PVC are lowered into the borehole. Groundwater samples may then be collected with a bailer, peristaltic pump, submersible or other appropriate pump until adequate sample volume is obtained. Perstaltic pumps are not used in applications requiring a lift of greater than 1 foot of net head.

Groundwater samples are preserved, stored in an ice-filled cooler, and are delivered, under chain-of-custody, to a laboratory certified by the California Department of Health Services (DHS) for hazardous materials analysis.

BOREHOLE GROUTING FOR DIRECT PUSH BORINGS

Upon completion of soil and water sampling, boreholes will be abandoned with neat cement grout to the surface. If the borehole was advanced into groundwater, the grout is pumped through a grouting tube positioned at the bottom of the borehole.