EAST BAY
MUNICIPAL UTILITY DISTRICT

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September 14, 2017

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

Transmittal
Site Investigation Work Plan
East Bay Municipal Utility District
Anderson Building
1075 West Grand Avenue (formerly 2130 Adeline Street)
Oakland, California
Geotracker Global ID: T000100495

Dear Mr. Nowell:

East Bay Municipal Utility District (EBMUD), is pleased to submit this site investigation work plan for EBMUD's Anderson Building leaking underground storage tank site located at 1075 West Grand Avenue in Oakland, California. This report was prepared by Engineering/Remediation Resources Group, Inc. (ERRG) on behalf of EBMUD in compliance with Alameda County Environmental Health (ACDEH) directives related to Fuel Leak Case No. RO0000449.

> *"I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website."*

If you have any questions, please contact me at (510) 986-7524 or via e-mail at john.walter@ebmud.com.

Sincerely,

John Walter
Environmental Compliance

enc: Site Investigation Work Plan, East Bay Municipal Utility District, Anderson Building, 1075 West Grand Avenue (formerly 2130 Adeline Street), Oakland, California

cc: Dan Lohr, ERRG
ERRG Project File

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East Bay Municipal Utility District
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September 2017

ERRG Project No. 20170126

Prepared for:

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Site Investigation Work Plan
East Bay Municipal Utility District
Anderson Building
1075 West Grand Avenue (formerly 2130 Adeline Street)
Oakland, California

Submitted by:
Engineering/Remediation Resources Group, Inc.

	September 14, 2017
Signature	Date
Erik Oehlschlager	Project Manager
Name	Title
	September 14, 2017
Signature	Date
Dan Lohr	Program Manager
Name	Title

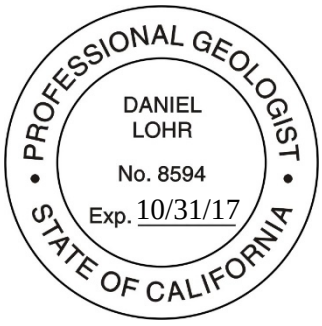

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Table 1. Summary of Historical Soil Sample Analytical Results

Abbreviations and Acronyms

ACEH	Alameda County Environmental Health Department
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
EBMUD	East Bay Municipal Utility District
ERRG	Engineering/Remediation Resources Group, Inc.
ESL	environmental screening level
IDW	investigation-derived waste
LUFT	Leaking Underground Fuel Tank
MDL	method detection limit
mg/kg	milligrams per kilogram
MTBE	methyl tert butyl ether
PID	photoionization detector
PVC	polyvinyl chloride
SCM	site conceptual model
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SRS	sensitive receptor survey
TPH-g	total petroleum hydrocarbons as gasoline
TFH	total fuel hydrocarbons
USA North	Underground Service Alert North
UST	underground storage tank
VHC	volatile halogenated compound

Section 1. Introduction

Engineering/Remediation Resources Group, Inc. (ERRG) has prepared this work plan in response to Alameda County Environmental Health Department's (ACEH) directive to East Bay Municipal Utilities District (EBMUD) dated June 6, 2017. The objective of the work is to collect additional data to further assess the nature and extent of petroleum compounds in soil and groundwater in the vicinity of the former underground storage tank (UST) associated with EBMUD's Anderson Building at 1075 West Grand Avenue in Oakland, California (formerly 2130 Adeline Street) (ACEH, 2017). In accordance with the ACEH directive, this investigation will include a sensitive receptor survey (SRS) and collection of soil and groundwater samples surrounding the former UST adjacent to the Anderson Building, to address data gaps identified in the Site Conceptual Model submitted to ACEH (ERRG, 2016).

The primary elements of the investigation are summarized below.

- Section 2.2. Conduct a geophysical survey to locate and determine the depths of any subsurface utilities at the site to evaluate whether utility corridors are potential preferential pathways for lateral migration of contaminants in the subsurface.
- Section 2.4. Collect soil and groundwater samples from two soil borings on the northern and southern side of the former UST location on Linden Street to evaluate the presence of total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, xylene (BTEX), and methyl tertiary butyl ether (MTBE).

The remainder of this section describes the site's location and description, geology and hydrogeology, and background.

1.1. SITE LOCATION AND DESCRIPTION

The Anderson Building is located at 1075 West Grand Avenue in Oakland, California (Figure 1). EBMUD owns the property which is a portion of EBMUD's large multi-block Adeline Maintenance Center. The Anderson Building is situated in the northeast corner of the property and is bounded by West Grand Avenue to the north, Linden Street to the east, and an EBMUD employee parking lot to the south and west. The former UST location associated with the Anderson Building is located adjacent to the building in the sidewalk area along Linden Street (Figure 2).

1.2. GEOLOGY AND HYDROGEOLOGY

The hills along the East Bay area of Oakland and along the San Francisco Peninsula, as well as the down-warped Bay plain in between, are part of the central California Coast Range Province. The rock exposed in the hills and underlying the sedimentary deposits of the Bay plain consists of Tertiary-aged sediments

and volcanic rock. The uplift of the hills resulted in erosion and deposition of thick alluvial fan deposits on the Bay plain, known as the Alameda formation.

Approximately 540 feet of tertiary to early quaternary sediments overlies bedrock beneath the East Bay. The unconsolidated sedimentary deposits include artificial fill, estuarine deposits known as Bay mud, the Merritt sand, Yerba Buena mud, and the Alameda formation.

The closest major fault, the Hayward Fault, is located about 3.5 miles northeast of the property. While the site is located in a seismically active area, it is not within an Alquist-Priolo Special Studies active fault zone, the legislatively defined zone of restricted land use 200 feet around an active fault due to the high probability of ground rupture.

Based on boring logs completed during a 1995 site investigation, the uppermost soil 1 to 2 feet below ground surface (bgs) is composed of a gravelly sand base material. Below the base material are silty clays down to approximately 11 feet bgs where the soil transitions to a clayey sand with gravel extending down to at least 14 feet bgs. No site data exists below 14 feet bgs.

A freshwater aquifer beneath Oakland includes most of the porous sands and gravels of the Alameda and Temescal alluvial deposits and the Merritt sand. The aquifers are recharged by rainfall on exposed areas of the porous formations, primarily between the Southern Pacific Railroad right-of-way to the west and the Oakland Hills to the east. The water flows downgradient toward the bay. The fresh water contacts higher-density salt water in the vicinity of the bay margin. The regional groundwater flow direction is westward toward the bay, although local variations may occur due to variations in topography and subsurface lithology.

Shallow groundwater was not reported to have been encountered during the 1995 site investigation. However, a 2009 investigation approximately 600 feet west at an adjacent EBMUD site (located at 1200 21st Street) showed the depth to first saturated sediments ranges from 10 to 13 feet bgs. In May 2007, the groundwater gradient approximately 1,300 feet northwest of the site (2221 Union Street) was reported to be northwesterly at 0.041 feet per foot. Static depth-to-water measurements at Union Street in 2007 ranged from 5.86 to 9.42 feet bgs (ERRG, 2016).

1.3. SITE BACKGROUND

On June 11, 1987, an unauthorized petroleum release associated with an EBMUD UST was discovered near the intersection of Linden Street and West Grand Avenue in Oakland (Figure 2). On June 15, 1987, the release was stopped when a 500-gallon UST was removed from beneath the sidewalk area between Linden Street and EBMUD's Anderson Building. The excavation was 11.75 feet long by 6.5 feet wide. The depth of the 1987 excavation, as well as the backfill material, is unknown. Two composite soil samples were taken during the 1987 excavation and analyzed for total volatile hydrocarbons by EPA Method 8015 and BTEX by EPA Method 8020. One sample contained 170 milligrams per kilogram (mg/kg) volatile

hydrocarbons, 3.6 mg/kg benzene, 15 mg/kg toluene, and 11 mg/kg total xylenes (Table 1). The second sample had no detections or VOCs or BTEX. A third soil sample was collected on July 7, 1987, presumably after further excavation activities at the former tank location, and analyzed. The sample contained total fuel hydrocarbons (TFH) (140 mg/kg), benzene (1.2 mg/kg), toluene (0.5 mg/kg), and total xylenes (1.9 mg/kg) (Table 1) (ERRG, 2016).

An underground storage tank unauthorized release (leak)/contamination site report documenting that the release had been stopped was submitted by EBMUD and received by the ACEH on March 21, 1988.

At the request of ACEH, EBMUD re-excavated the former UST area on April 25, 1988, until undisturbed clay-sand material was encountered at a depth of 12 feet bgs (Figure 2). The re-excavated hole was reported to have a slight fuel odor and preliminary results indicated that some residual fuel-contaminated soil remained in the excavation. Additional soil was removed from the re-excavation until there was no longer a fuel odor and a soil sample was taken for laboratory analysis of TFH (EPA Method 602) and BTEX. TFH were reported as non-detect, less than 10 mg/kg (Table 1). The BTEX sample was lost by the laboratory. Clean fill was used to backfill the re-excavation and the area was capped with concrete.

The final report issued to EBMUD documenting the Anderson Building 500-gallon UST removal makes no mention of free product being found within the excavation. Similarly, the final report documenting the 1988 re-excavation at the former UST location did not indicate the presence of free product. Furthermore, TFH were not detected in the soil sample that was collected following the 1988 re-excavation (Table 1).

Laboratory results from soil samples collected following the 1987 UST excavation indicated that detectable concentrations of TFH and BTEX remained in soil; benzene (1.2 mg/kg) exceed its February 2016 San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) soil environmental screening level (ESL) under the Leaching to Groundwater as Drinking Water resource (0.044 mg/kg) (Table 1). Laboratory results from a soil sample collected following the 1988 re-excavation of the former UST location indicates that additional soil removal successfully reduced the TFH concentration in soil to less than 10 mg/kg at the former UST location (Table 1). Reduction in BTEX concentrations following the 1988 re-excavation at the former UST location cannot be evaluated because the soil sample submitted for BTEX analysis was lost by the laboratory.

During January 1995, soil borings M-1 and M-2 (Figure 2) were advanced in the vicinity of the former UST location to characterize soil for future redevelopment activities at the site. Although these two field points were in relatively close proximity to the former UST location, their exact locations are uncertain. At boring location M-1, a strong gasoline odor was reported at 5 to 6 feet bgs and a questionable solvent odor was reported at 9 to 10 feet bgs. A moderate gasoline odor was reported at 10 to 11 feet bgs in boring M-2. Soil samples were collected from all three of these depth intervals for laboratory analysis of TPH-g, BTEX, and volatile halogenated compounds (VHC).

None of the samples that had detectable concentrations exceeded current February 2016 SFBRWQCB soil ESL under the Leaching to Groundwater as Drinking Water resource scenario for TPH-g (770 mg/kg), benzene (0.044 mg/kg), toluene (2.9 mg/kg), ethylbenzene (1.4 mg/kg), and xylenes (2.3 mg/kg) (Table 1). For analytes with reported non-detectable concentrations, all laboratory method detection limits (MDLs) were below the current leaching to drinking water ESLs, except for benzene, where the shallow M-1 sample and the M-2 sample had MDLs of 0.05 and 0.2 mg/kg, respectively. VHCs were not detected at or above the laboratory MDLs of 10 µg/kg in any of the M-1 and M-2 soil samples. The lowest leaching to drinking water ESL value for laboratory report listed VHCs was 4.5 µg/kg and is associated with 1,2-dichloroethane (ERRG, 2016).

This summary of findings was presented to ACEH by ERRG in a Site Conceptual Model (SCM) dated August 10, 2016 (ERRG, 2016). Following ACEH review of the SCM, an ACEH directive to EBMUD dated June 6, 2017, requested the preparation and submittal of a work plan to:

- Perform a search of Alameda County Public Works Agency and Department of Water Resources databases for wells in the vicinity of the site;
- Advance soil bore(s) in the vicinity of the former UST location for the collection of soil and grab groundwater samples; and
- Conduct a geophysical survey to identify locations of subsurface utilities which may provide preferential pathways (ACEH, 2017).

Section 2. Site Investigation Activities

The section describes the specific activities and procedures associated with the planned investigation at the site, including the following:

- Permitting
- Utility location and geophysical survey
- Drilling borings
- Collecting soil and groundwater samples
- Managing investigation-derived waste (IDW)
- Reporting procedures

To ensure safe working practices, during all field activities, ERRG will adhere to requirements in the EBMUD Health and Safety Program Plan (ERRG, 2015), which will be available on site, and task-specific Activity Hazard Analyses that will be developed for work in the field.

2.1. PERMITTING

Prior to mobilization, ERRG will obtain soil boring permits from Alameda County Public Works Agency. Encroachment/obstruction permits will be obtained from the City of Oakland for the drilling of soil borings on the Linden Street sidewalk and to conduct a geophysical survey in the Linden Street sidewalk and parking shoulder area adjacent to the Anderson Building (Figure 2).

2.2. UTILITY LOCATING AND GEOPHYSICAL SURVEY

ERRG will mark the proposed boring locations (Figure 2) in white paint and notify Underground Service Alert North (USA North) a minimum of 5 working days prior to the drilling. USA North will notify public and private utility companies to mark the locations of underground utilities owned and maintained by each company. ERRG will also contract with a private utility locator to mark and clear the proposed boring locations within the work area.

The private utility locator will also perform a geophysical survey of the Linden Street sidewalk and parking shoulder area adjacent to the Anderson Building (Figure 2) to determine the location and depths of the utilities to evaluate whether the utility corridors are potential preferential pathways for lateral migration of contamination to subsurface soil and groundwater. The utility lines will be electrically energized or a transmitter will be inserted to locate the utility and identify its depth.

2.3. DRILL BORINGS

ERRG will subcontract a California-licensed driller to advance two soil borings using direct-push drilling techniques. An ERRG field geologist, under the supervision of a California-registered geologist, will oversee all drilling activities and log the lithology of each boring using the Unified Soil Classification System. ERRG's field geologist will also field screen each boring for hydrocarbon vapors using a portable photoionization detector (PID). Figure 2 shows the locations of the proposed borings.

Borings S1 and S2 will be advanced 8 feet below the observed water table (anticipated to be 5 to 10 feet bgs) to an approximate total depth of 13 to 18 feet bgs. Borings S1 and S2 will be located immediately adjacent to the former UST location on the north and south sides (Figure 2). Soil and groundwater samples will be collected from both borings. Upon completion, the borings will be tremie grouted from the bottom up with neat cement.

The locations of the proposed borings may be adjusted in the field based on the presence of utilities or other unforeseen physical obstacles.

2.4. COLLECT SOIL AND GROUNDWATER SAMPLES

One soil sample from each boring will be collected from a depth that is 6 inched above the depth where groundwater is first encountered. Two additional soil samples may be collected from the vadose zone in each boring if PID field screening results indicates the presence of volatile organic compounds. If no volatile organic compounds are detected by the PID, then no additional soil samples will be collected. Soil samples will be transferred directly from the soil core liner into laboratory supplied glass jars with Teflon® lids, given unique sample identification numbers (i.e., S1-MMDDYY), placed in zip-top bags, and immediately stored in an ice-filled cooler.

After each boring is advanced to its prescribed depth below the water table, 0.75-inch-diameter prepacked polyvinyl chloride (PVC) pipe well screen will be inserted into each borehole. The screen interval will be sufficiently long to ensure that the top of the screened interval is located above the water table. Prior to groundwater sample collection, the liquid level in the well will be gauged with an oil/water interface meter, accurate to 0.01 feet, to determine if light non-aqueous phase liquid is present in the borings. After the well is gauged, grab groundwater samples will be retrieved with new disposable Teflon® bailers, collected in laboratory supplied bottles, given unique sample identification numbers (i.e., S1-GW-MMDDYY), placed in zip-top bags, and immediately placed in an ice-filled cooler.

Soil and groundwater samples will be submitted to EBMUD's Laboratory Services Division for analysis of the following analytes:

- TPH-g
- BTEX

- MTBE
- Total Dissolved Solids (groundwater only)

In addition, one four-point waste soil composite sample and one wastewater sample will be analyzed for Leaking Underground Fuel Tank (LUFT) 5 metals (cadmium, chromium, nickel, lead, and zinc) for waste disposal characterization purposes.

2.5. MANAGEMENT OF INVESTIGATION-DERIVED WASTE

IDW is anticipated to consist of soil cuttings, decontamination water, and groundwater. IDW will be stored in properly labeled U.S. Department of Transportation-approved 55-gallon drums, pending analysis and waste characterization. One four-point soil composite sample and one wastewater sample will be analyzed for LUFT 5 metals (cadmium, chromium, nickel, lead, and zinc) for waste disposal characterization purposes. ERRG will temporarily store the drums in a secure location at the site. Any personal protective equipment will be disposed of as nonhazardous waste in the municipal trash. Waste soil and water generated during investigation activities is anticipated to be non-hazardous. Waste drums will be transported to EBMUD's Corporation Yard for disposal by EBMUD.

2.6. REPORTING

ERRG will prepare a summary report for submittal to ACEH following ACEH's approval of this work plan and ERRG's completion of field investigations outlined in this work plan. The report will include a refined SCM based on the investigation results, a description of field procedures and methods, figures indicating boring and sample locations and site features, tabulated analytical results, soil boring logs, conclusions, and recommendations for additional investigation or remedial action, if necessary. Sampling analytical results will be compared with appropriate SFBRWQCB ESLs.

Section 3. References

Alameda County Environmental Health Services (ACEH), 2016a. "Letter regarding Fuel Leak Case No. RO0000030 and Geotracker Global ID T0600102115, EBMUD, 1200 21st Street, Oakland, CA 94607. From Keith Nowell, Hazardous Materials Specialist, ACEH. To John Walter, East Bay Municipal Utility District (EBMUD)." June 24.

ACEH, 2017. "Work Plan Request, Fuel Leak Case No. R0000449 and Geotracker Global ID T0600100495, EBMUD, 1075 W Grand Ave, (the Anderson Building – formerly 2130 Adeline Street), Oakland, CA 94607. From Keith Nowell, Hazardous Materials Specialist, ACEH. To John Walter, East Bay Municipal Utility District (EBMUD)." June 6.

Engineering Remediation/Resources Group, Inc. (ERRG), 2015. "Health and Safety Program Plan for General Environmental Services, Various Locations in California, East Bay Municipal Utilities District." June.

ERRG, 2016. "Anderson Building LUFT/SLIC Case, Site Conceptual Model, Fuel Case No. RO0000449, Geotracker ID: T0600100495, 1075 West Grand Avenue, Oakland, CA." August 10.

Figures

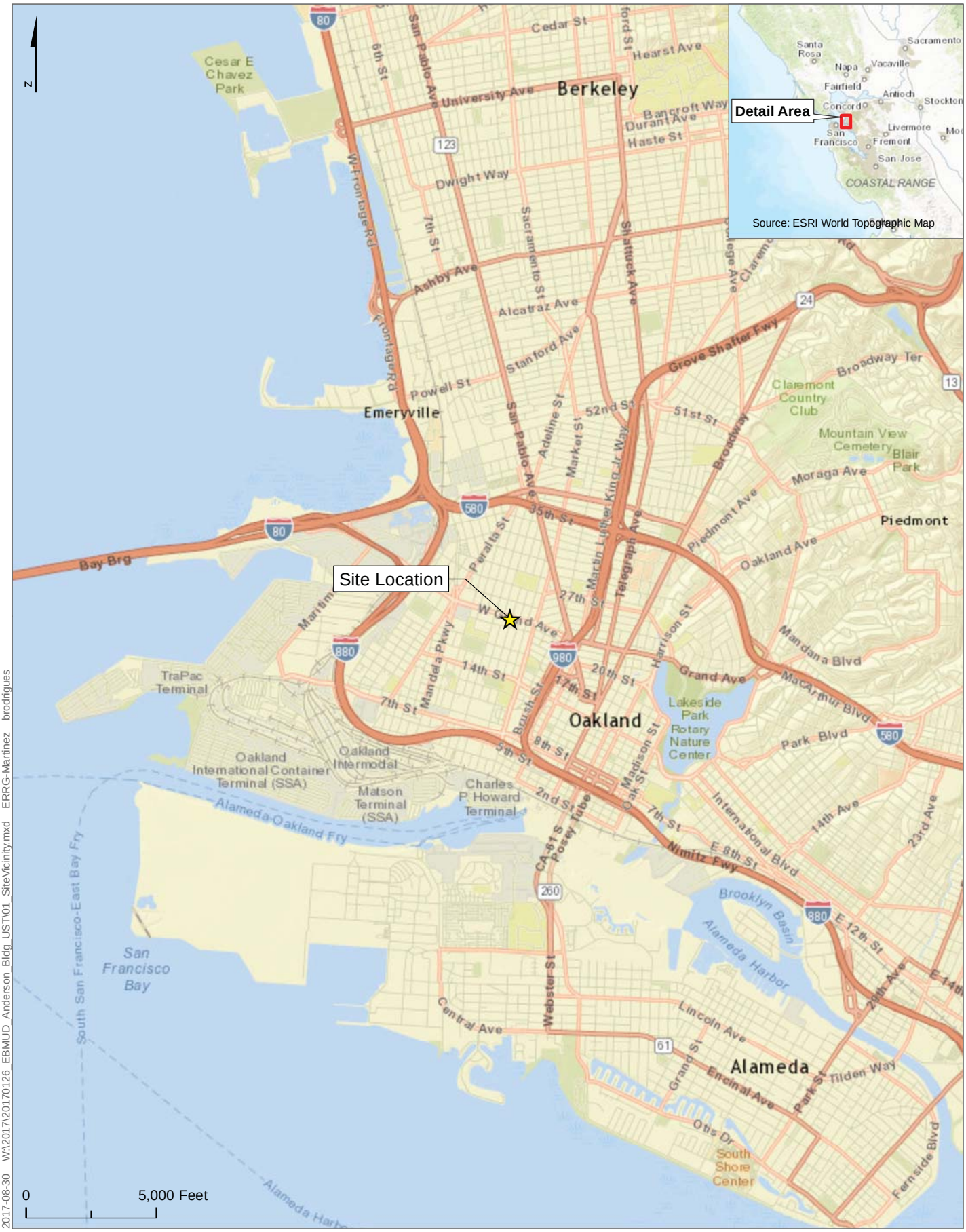

Figure 1. Site Vicinity Map

EBMUD – Anderson Building Site, Oakland, California

ERRG

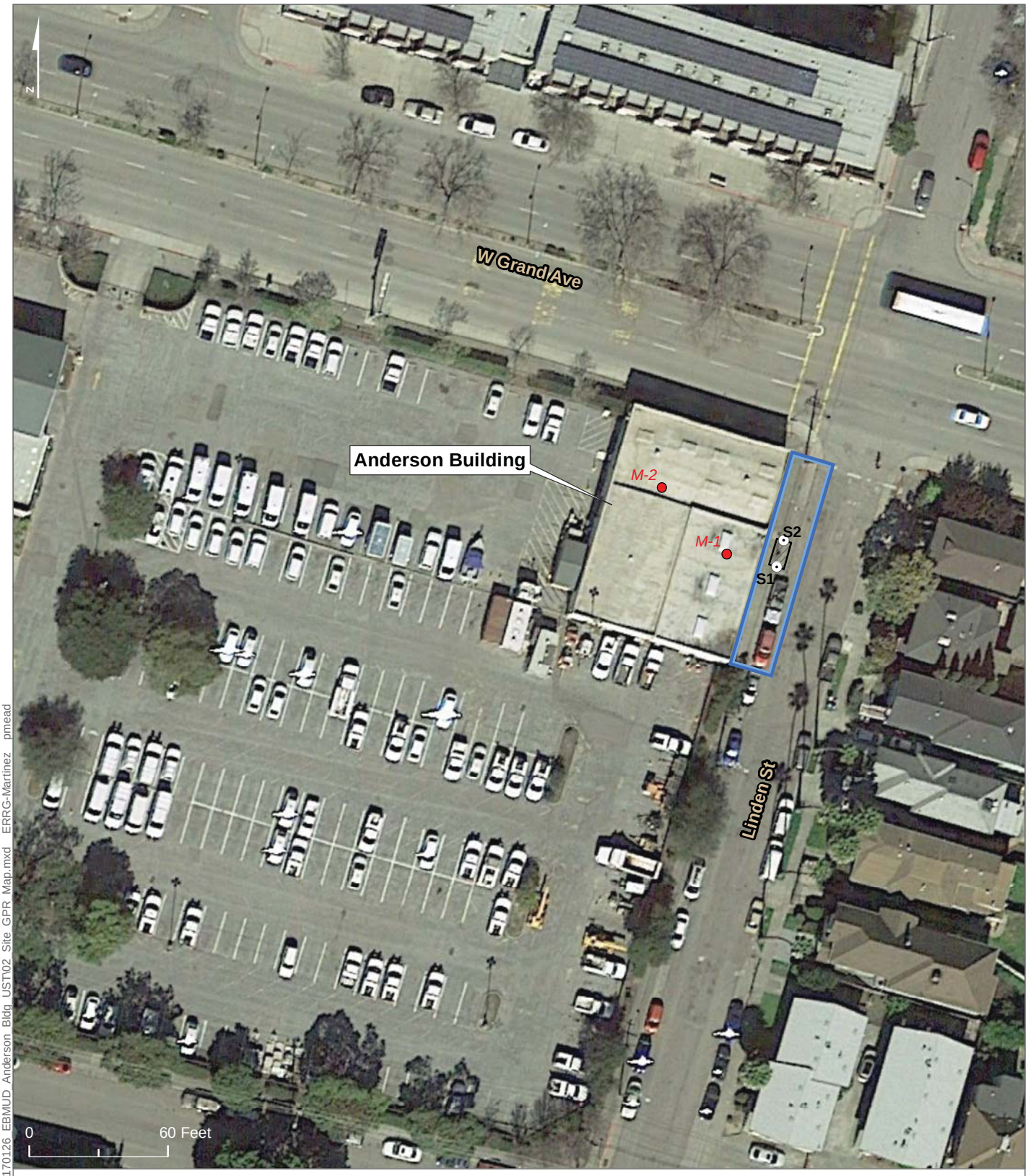

Figure 2. Site Plan

EBMUD – Anderson Building Site, Oakland, California

ERRG

Table

Table 1. Summary of Historical Soil Sample Analytical Results

Sample Name	Sample Description	Date	VHC (µg/kg)	TFH (mg/kg)	TPH-g (mg/kg)	VH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
	ESL [1]		*4.5* [2]	*570* [3]	*770*	*770* [4]	*0.044*	*2.9*	*1.4*	*2.3*
No. 1, Fuel Tank, W. Grand & Linden	Composite	6/15/1987	--	--	--	<3	<0.08	<0.1	--	<0.1
No. 2 Fuel Tank, Grand & Linden	Composite	6/15/1987	--	--	--	**170**	**3.6**	**15**	--	**11**
Soil Linden Tank	Grab	7/7/1987	--	**140**	--	--	**1.2**	**0.5**	--	**1.9**
MISC 880425130	Grab	4/25/1988	--	<10	--	--	--	--	--	--
M-1 S1	Discreet, 5-6 feet bgs	1/20/1995	**<10**	--	**78**	--	**<0.05**	<0.05	**0.063**	**0.32**
M-1 S2	Discreet, 9-10 feet bgs	1/20/1995	**<10**	--	**120**	--	<0.005	**0.014**	<0.005	**0.53**
M-2 S1	Discreet, 10-11 feet bgs	1/20/1995	**<10**	--	**460**	--	**<0.2**	**0.35**	**0.66**	**2.0**

Note:

1 = Environmental Screening Levels, San Francisco Bay Regional Water Quality Control Board, Feb. 2016 (Rev.3), Table S-2: Soil Leaching to Groundwater Screening Levels (Organic Compounds only) (mg/kg), Final Soil Leaching Screening Levels, Drinking Water Resource

2 = ESL for 1,2-Dichloroethane is the lowest ESL for all volatile halocarbon listed on the laboratory report, ESL of 0.0045 mg/kg converted to 4.5 µg/kg

3 = TPH-d ESL of 570 mg/kg used because it is less than TPH-g ESL of 770 mg/kg

4 = TPH-g ESL

Blue = analyte detected above ESL

-- = not analyzed

Bold = analyte detected at or above laboratory detection limit or laboratory detection limit is above analyte ESL

bgs = below ground surface

ESL = environmental screening level

µg/kg = micrograms per kilogram

mg/kg = milligrams per kilogram

TFH = Total Fuel Hydrocarbons

TPH-g = Total Petroleum Hydrocarbons as Gasoline

VH = Volatile Hydrocarbons

VHC = Volatile Halocarbon Compounds