May 25, 2007

Mr. Steven Plunkett
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: Zimmerman Property
3442 Adeline Street
Oakland, California
Alameda County Fuel Leak Case No. RO0002936
Clearwater Group Project # AB013G

Dear Mr. Plunkett,

As the legally authorized representative of the above-referenced project location, I have reviewed the *Work Plan Addendum for Additional Subsurface Investigation and Contaminant Migration Control* prepared by my consultant of record, Clearwater Group. I declare, under penalty of perjury, that the information and/or recommendations contained in this report are true and correct to the best of my knowledge.

Sincerely,

Steffi R. Zimmerman

Ms. Steffi R. Zimmerman

CLEARWATER
GROUP
Environmental Services

May 23, 2007

Mr. Steven Plunkett
Hazardous Materials Specialist
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: **Work Plan Addendum for Additional Subsurface Investigation and Contaminant Migration Control**
Zimmerman Property
3442 Adeline Street
Oakland, California
Alameda County Fuel Leak Case No. RO0002936
Clearwater Group Project Number AB013G

Dear Mr. Plunkett:

Clearwater Group (Clearwater), on behalf of our client, Mrs. Steffi Zimmerman, is pleased to present this *Work Plan Addendum for Additional Subsurface Investigation and Contaminant Migration Control* prepared for the subject property (property) located at 3442 Adeline Street, in Oakland, California (**Figure 1**), for review, comments and direction. The property (**Figure 2a**) straddles the block between Adeline Street (to the west) and Chestnut Street (to the east); it is bounded by 34th Street to the north and residential properties followed by 35th Street to the south. The main entrance to the property is on the Adeline Street side; however, one of the roll-up doors to the warehouse complex is located on Chestnut Street and is recorded with the City of Oakland as having the address of 3433 Chestnut Street. The property was improved with an underground fuel tank (UST) and dispensing system (see **Figure 2b**) adjacent (to the south) to the roll-up door.

Purpose of Work Plan Addendum for Additional Subsurface Investigation and Contaminant Migration Control

In response to staff review of the *Work Plan for Additional Subsurface Investigation and Contaminant Migration Control* dated March 28, 2007, prepared by Clearwater, Alameda County Environmental Health Services (ACEH) in their April 23, 2007, letter (**Attachment A**) requested that a revised work plan be prepared to address the following technical comments:

- Contamination plume delineation
- Interim Source Remediation
- Vapor Intrusion and Soil Gas Investigation
- Soil Sampling Analysis
- Groundwater Sampling Analysis

A meeting was held at the offices of the ACEH on May 16, 2007, to discuss the request for the preparation of a revised work plan and the status of the project. In attendance were Mr. Steven Plunkett, of ACEH; Mr. Bill Mouat, representing the property owner; and Mr. Jim Jacobs, Clearwater's Chief Hydrogeologist. The purpose of the meeting was to discuss the technical comments made in ACEH's April 23, 2007, letter and the clean-up goals for the project site. It was determined in the meeting that the revised work plan would focus on the following technical comments:

- Modify the proposed contamination plume delineation (Geoprobe® soil and groundwater sampling locations)
- Incorporate at least 4 soil vapor sample locations into the proposed subsurface investigation
- Delay installation of the groundwater extraction trench pending further review of characterization of subsurface conditions and extent of contamination

Modification to Proposed Contamination Plume Delineation

Clearwater proposed in the *Work Plan for Additional Subsurface Investigation and Contaminant Migration Control* dated March 28, 2007, to complete the installation of 12 soil borings, S5 through S16, to a depth of approximately 16 feet below ground surface (bgs) using direct push technology to define the vertical and horizontal impact of the hydrocarbon plume sourcing from the former UST at the property. **Figure 2c** and **2d** show levels of contamination in soil and groundwater at the property. The proposed soil boring depth was based on observations made during the June 23, 2006, subsurface investigation event at which it appeared that the sorbed phase contamination did not extend below 14 feet bgs.

Mr. Plunkett requested that the soil borings be continuously cored to 20 feet bgs. Soil samples are to be collected every 4 feet for submittal to the project laboratory for analysis of total petroleum hydrocarbons as diesel (TPH-d) by EPA Method 8015 and total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX) tertiary amyl methyl ether (TAME), methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), diisopropyl ether (DIPE), tertiary butyl alcohol (TBA), and lead scavengers 1,2-dichloroethane (1,2-DCA) and 1,2-dibromoethane (EDB) using EPA Method 8260B. The soil samples collected at the termination of the soil boring, 20 feet bgs, will be analyzed if the laboratory reported detectable concentrations of the constituents of concern in the soil samples collected at the 16-foot interval bgs.

During previous subsurface investigation events both soil and groundwater samples have been analyzed for concentrations of MTBE, 1,2-DCA,and 1,2-EDB. The project laboratory did not report detectable concentrations of these compounds above their respective laboratory method reporting limits (**Table 1 and Table 2**). Though the other fuel oxygenates; TAME, TBA, DIPE, and ETBE have not been analyzed for in the past, Clearwater assumes that the age of the tank excludes the possibility of these constituents being found in petroleum hydrocarbon plume sourcing from the former UST excavation

area. Clearwater requests that the analytical suite be re-evaluated and that the five oxygenates (MTBE, TBA, TAME, ETBE, and DIPE) and the 2 lead scavengers (1,2-DCA and EDB) be removed.

Mr. Plunkett also requested that the number of soil borings be reduced from the 12 soil borings previously proposed in the *Work Plan for Additional Subsurface Investigation and Contaminant Migration Control* to 9 soil borings. It is assumed that the 9 soil borings will provide the data necessary to define the orientation of the dissolved plume, the horizontal extent of the hydrocarbon plume and the subsurface characterization needed to strategically place a groundwater extraction trench to implement petroleum hydrocarbon migration control. To minimize confusion in the future with regard to the number of soil borings completed at the site, the proposed locations of the soil borings were renumbered on an updated version of **Figure 3.**

Drilling, Soil Sampling, and Analysis

Prior to conducting field activities, Clearwater will obtain boring, traffic, excavation, and encroachment permits for drilling in the public road right-of-way from the appropriate agencies. Underground Service Alert (USA) will be requested to identify utilities located at these boring locations. Clearwater recommends that a geophysics survey be completed in the vicinity of the proposed soil boring locations along the sidewalk of Chestnut Street to identify any additional utilities that may not have been located during the USA event, especially any residential lateral utility pipelines. All field personnel on-site will review and sign the site Health and Safety plan, prepared in accordance with OSHA 1910.120, at the start of each field day. All fieldwork will be conducted in accordance with Clearwater's *Direct Push Drilling Investigation Procedures* (**Attachment B**).

Under the supervision of a Clearwater Professional Geologist, a C-57 licensed drilling contractor will advance each of the soil borings using a Geoprobe® truck-mounted drilling rig. The soil borings will be 2 inches in diameter and be advanced to sufficient

depth so that water is encountered, although it is expected that the borings will not be drilled deeper than 20 feet because groundwater has previously been located at 12 feet bgs. The soil borings will be continuously cored for lithologic and hydrogeologic classification. Portions of each soil sample will be retained for visual classification according to the Unified Soil Classification System. Soil samples will be screened for the presence of volatile hydrocarbons using a photo-ionization detector (PID). Soil samples will be collected every 4 feet and at the capillary fringe using EPA Method 5035 (see *5035SC™ Soil Core Sampler and Procedures* in **Attachment B**), placed on dry ice, and submitted to Kiff Analytical, LLC for analysis of TPH-g, BTEX, TAME, MTBE MTBE, ETBE, DIPE, TBA, and the lead scavengers 1,2-DCA and EDB using EPA Method 8260B, unless specified otherwise by the ACDEH. The 6-inch section of the soil core directly above the portion of the soil core prepared using EPA Method 5035 will be sealed at both ends, labeled, and placed on ice for transport to Kiff for the analysis of TPH-d by EPA Method 8015 Modified. Additional soil samples will be collected at locations with elevated PID readings or where visual observations suggest the presence of petroleum-related hydrocarbons. All the soil samples will be properly labeled, documented on a chain of custody, and placed in the appropriate cooler for transport to the project laboratory. The remaining portions of the soil cores will be discarded into Department of Transportation (DOT)-approved 55-gallon drums for storage until disposal at the appropriate facility can be arranged.

A grab-groundwater sample will be taken from each of the proposed soil borings within the upper 5 feet of the saturated zone, using a disposable polyethylene bailer, and then decanted into laboratory-supplied containers. Samples will be labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory. Samples will be analyzed for concentrations of TPH-d, TPH-g, BTEX, TAME, MTBE, 1,2-DCA, EDB, ETBE, DIPE, and TBA, again unless specified otherwise. The protocol for setting a temporary well and collecting a grab-groundwater sample, Clearwater's *Grab Groundwater Sample Collection Protocol*, is provided in

Attachment B. When this has been completed, the temporary well screen will be removed, and each borehole will be sealed to the surface with a neat cement grout.

Soil Vapor Sampling

In both the April 23, 2007, letter from ACEH and during the May 16, 2007, project meeting, the possibility of soil vapor intrusion into nearby residences was discussed. A review of the groundwater elevation data for the Thrifty Service Station located at 3400 San Pablo Avenue in Oakland, California, (one block east of the subject property) indicates that the observed groundwater flow direction in the area of the project site (on January 17, 2007) is to the southwest (**Attachment C**). Because the closest occupied residence is located directly southwest of the former UST excavation area, Clearwater recommends that at least 4 soil vapor samples be collected on the subject property (in the warehouse) along the southwest wall of the warehouse which is immediately adjacent to the residence (**Figure 4**) to evaluate possible vapor intrusion pathways of the contaminant, benzene.

Clearwater recommends that the soil vapor samples, V1 through V5, be collected using Direct Push Technology with a Macro-Core® Soil Sampler according to Clearwater's *Soil Vapor Sampling Procedures Where Total Petroleum Hydrocarbons as Diesel is a Suspected Constituent of Concern* (**Attachment B**). Because of the poor recovery rates of TPH-d using EPA Method TO-15 Clearwater recommends that the soil vapor samples be collected at approximately 5 feet bgs and analyzed using EPA Method TO-17 for concentrations of TPH-d, TPH-g, BTEX, MTBE, TBA, TAME, ETBE, DIPE, 1,2-DCA and EDB by Air Toxics, LTD. of Folsom, California. Soil vapor samples will be collected prior to the completion of soil borings S5 through S13. If required, confirmation samples may be collected using Summa canisters and analyzed EPA Method TO-15.

Proposed Migration Control

The installation and placement of the groundwater extraction trench is pending further review and characterization of subsurface conditions and the extent of the petroleum hydrocarbon plume. The results of the additional investigation event will be reviewed and presented to ACEH. The results report will include a discussion regarding the installation details of the groundwater extraction trench, including its proposed location and design.

Proposed Reporting

Clearwater will prepare a report describing the results of the subsurface investigation event and detail the installation of the groundwater extraction trench. The report will summarize investigation/analytical methods and results. The report will provide conclusions and recommendations for additional action such as the installation of groundwater monitoring wells, if warranted. The report will also include supporting tables, figures, and soil boring logs. The report will also include the initial analytic results from the groundwater extraction trench and propose any additional modifications to the extraction system as needed. The report will be reviewed and signed by a California Professional Geologist at Clearwater.

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Certification

This report was prepared under the supervision of a State of California Professional Geologist at Clearwater Group. All statements, conclusions, and recommendations are based solely upon published results from previous consultants, field observations by Clearwater Group, and laboratory analysis performed by a California Deparment of Health Services-certified laboratory related to the work performed by Clearwater Group.

Information and interpretation presented herein are for the sole use of the client and regulating agency. A third party should not rely upon the information and interpretation contained in this document.

The service performed by Clearwater Group has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

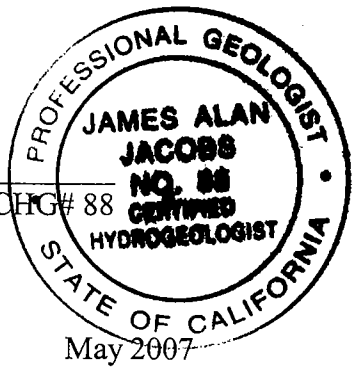
Licensed Professionals

In-house licensed professionals direct all projects. These professionals, including geologists or engineers, shall be guided by the highest standards of ethics, honesty, integrity, fairness, personal honor, and professional conduct. To the fullest extent possible, the licensed professional shall protect the public health and welfare and property in carrying out professional duties. In the course of normal business, recommendations by the in-house professional may include the use of equipment, services, or products in which the Company has an interest. Therefore, the Company is making full disclosure of potential or perceived conflicts of interest to all parties.

Sincerely,
CLEARWATER GROUP

Jessica Moreno
Project Manager

James A. Jacobs, PG# 4815, CHG# 88
Chief Hydrogeologist



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FIGURES

Figure 1: Site Location Map
Figure 2a: Site Vicinity Map
Figure 2b: Site Plan
Figure 2c: Maximum Sorbed Phase Hydrocarbon Concentration Map
Figure 2d: Dissolved Phase Hydrocarbon Concentration Map
Figure 3: Proposed Groundwater Extraction Trench and Soil Boring Locations
Figure 4: Proposed Soil Vapor Sampling Locations

TABLES

Table 1: Cumulative Soil Sample Analytical Results
Table 2: Cumulative Groundwater Sample Analytical Results

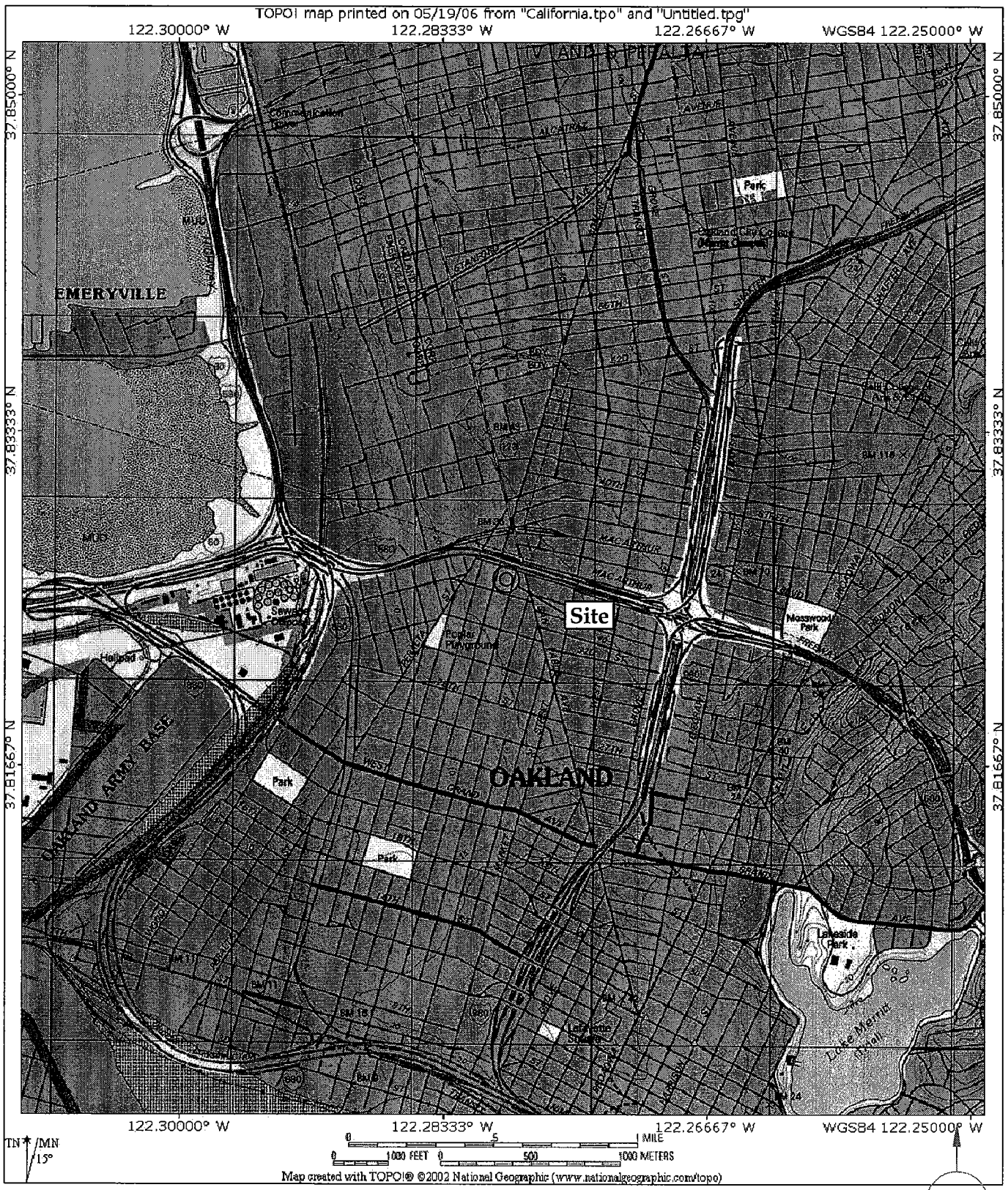
ATTACHMENTS

Attachment A: Alameda County Environmental Health Services letter dated April 23, 2007
Attachment B: Clearwater Field Protocols:
Clearwater Direct-Push Drilling Investigation Procedures
5035SC™ Soil Core Sampler and Procedures
Grab Groundwater Sample Collection Protocol
Clearwater Soil Vapor Sampling Procedures Where Total Petroleum Hydrocarbons as Diesel is a Constituent of Concern
Attachment C: Equipoise Corp. Groundwater Contour Map Figure 2 (03/07)

cc: Mrs. Steffi Zimmerman, 6330 Swainland Road, Oakland, CA 94611

San Francisco Bay Regional Water Quality Control Board, 1515 Clay Street, Suite 1400, Oakland, CA 94612

FIGURES

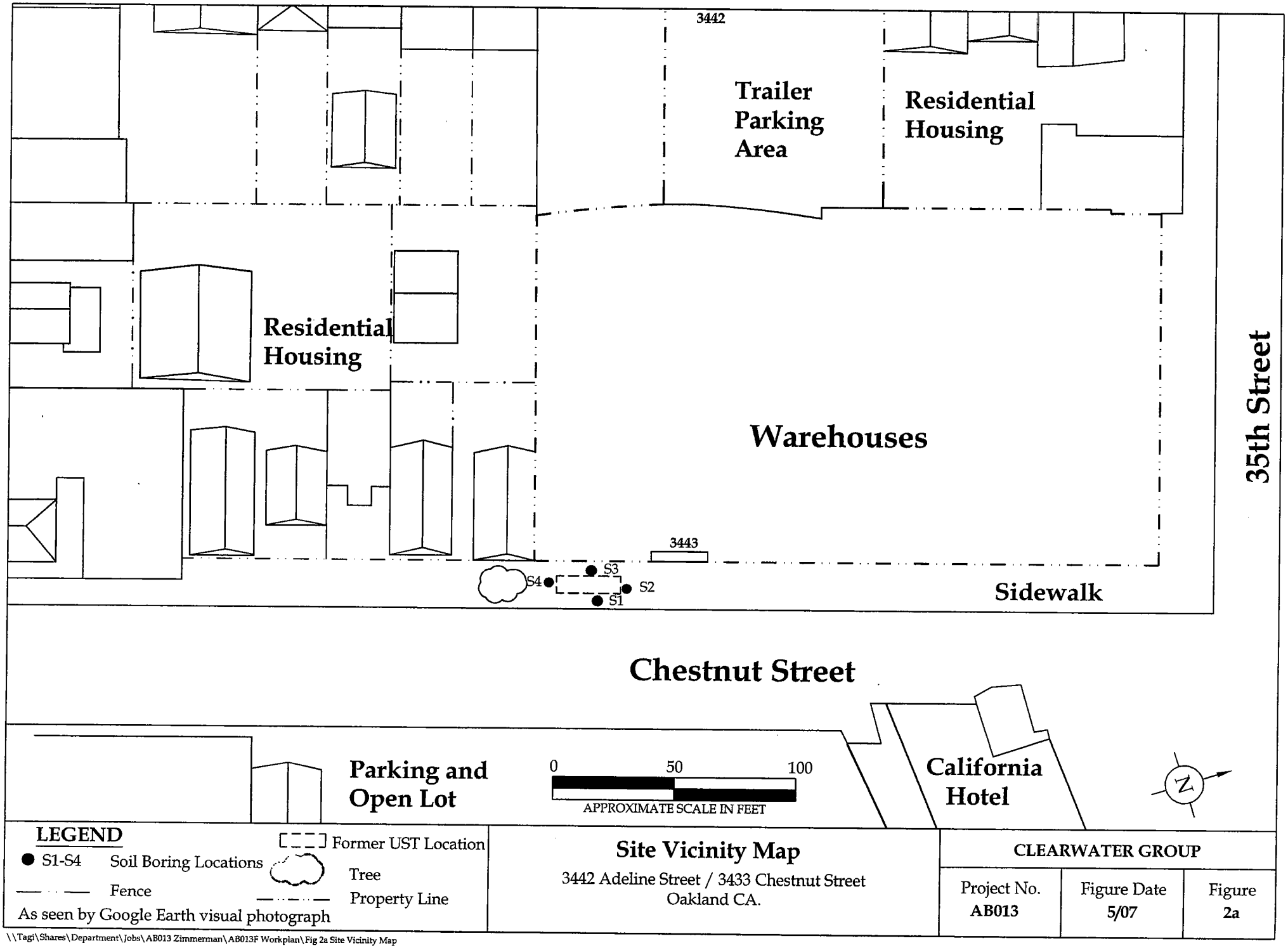


SITE LOCATION MAP

3442 Adeline Street
Oakland, California

CLEARWATER GROUP

Project No.	Figure Date	Figure
AB013	**05/06**	**1**



Site Vicinity Map

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

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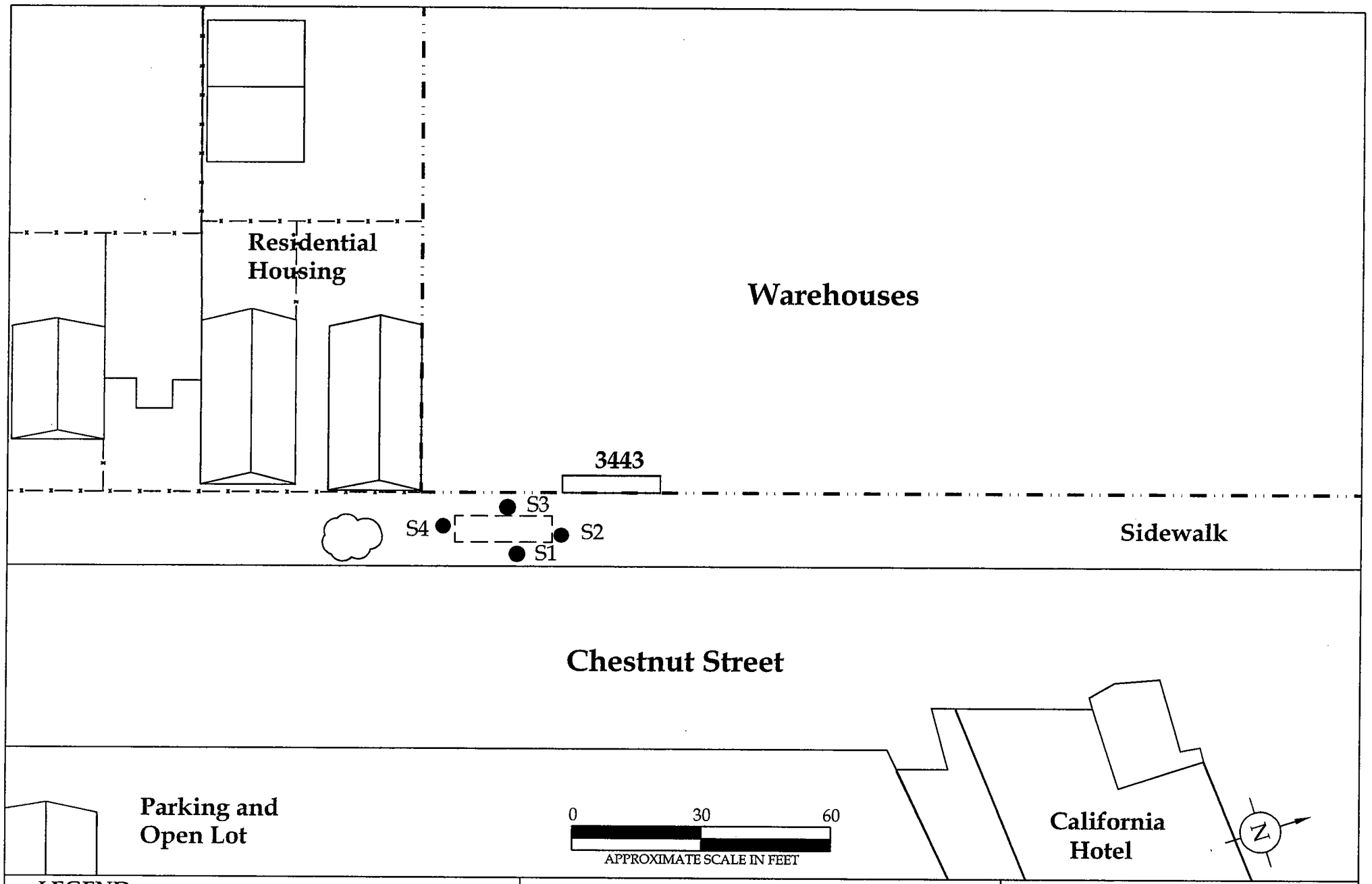
Project No.	Figure Date	Figure
AB013	5/07	2a

\\Tagi\Shares\Department\Jobs\AB013 Zimmerman\AB013F Workplan\Fig 2a Site Vicinity Map

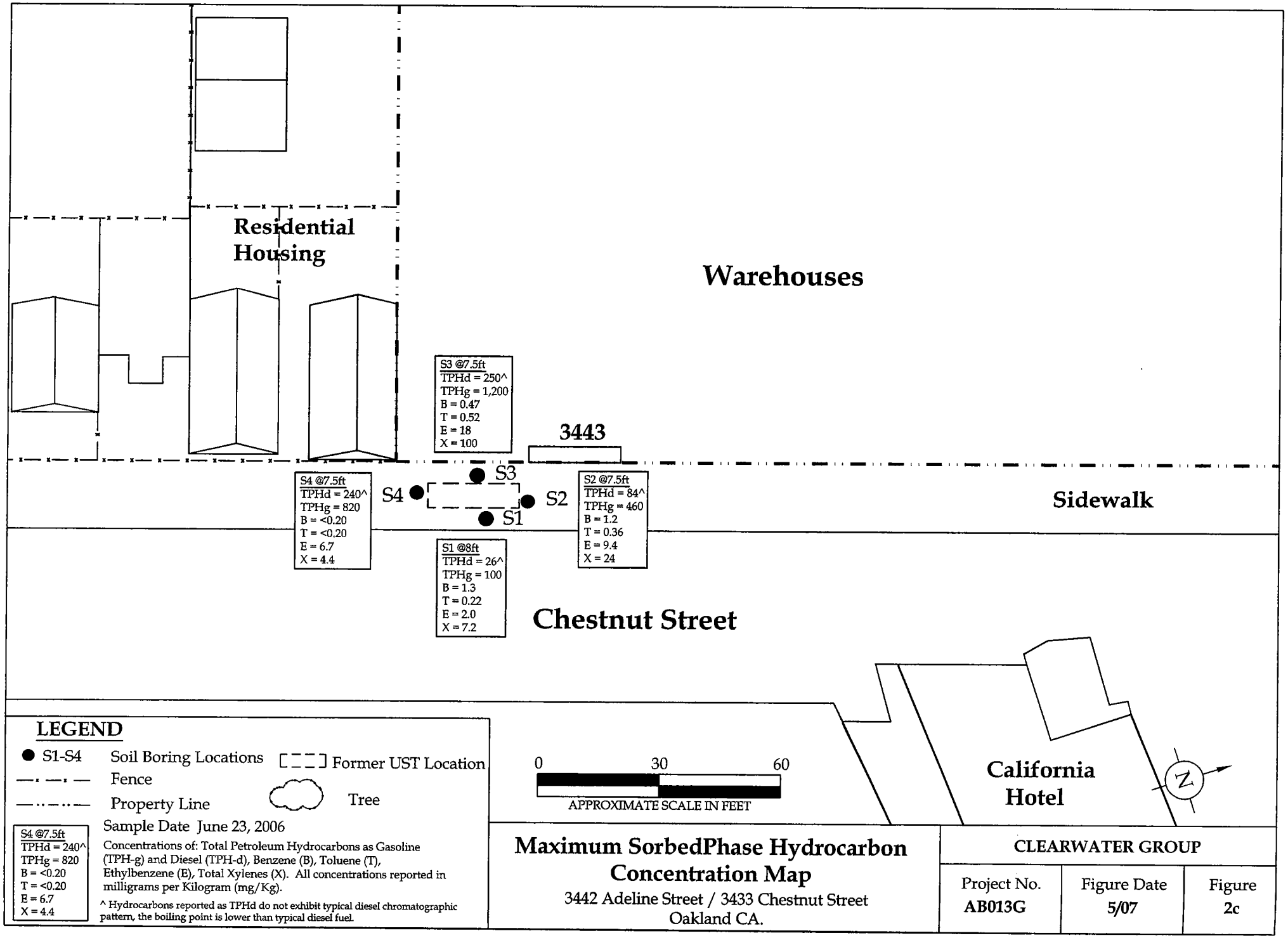


Site Plan

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

CLEARWATER GROUP

Project No.	Figure Date	Figure
AB013	3/07	2b



S4 @7.5ft
TPHd = 240^
TPHg = 820
B = <0.20
T = <0.20
E = 6.7
X = 4.4

Maximum SorbedPhase Hydrocarbon Concentration Map

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

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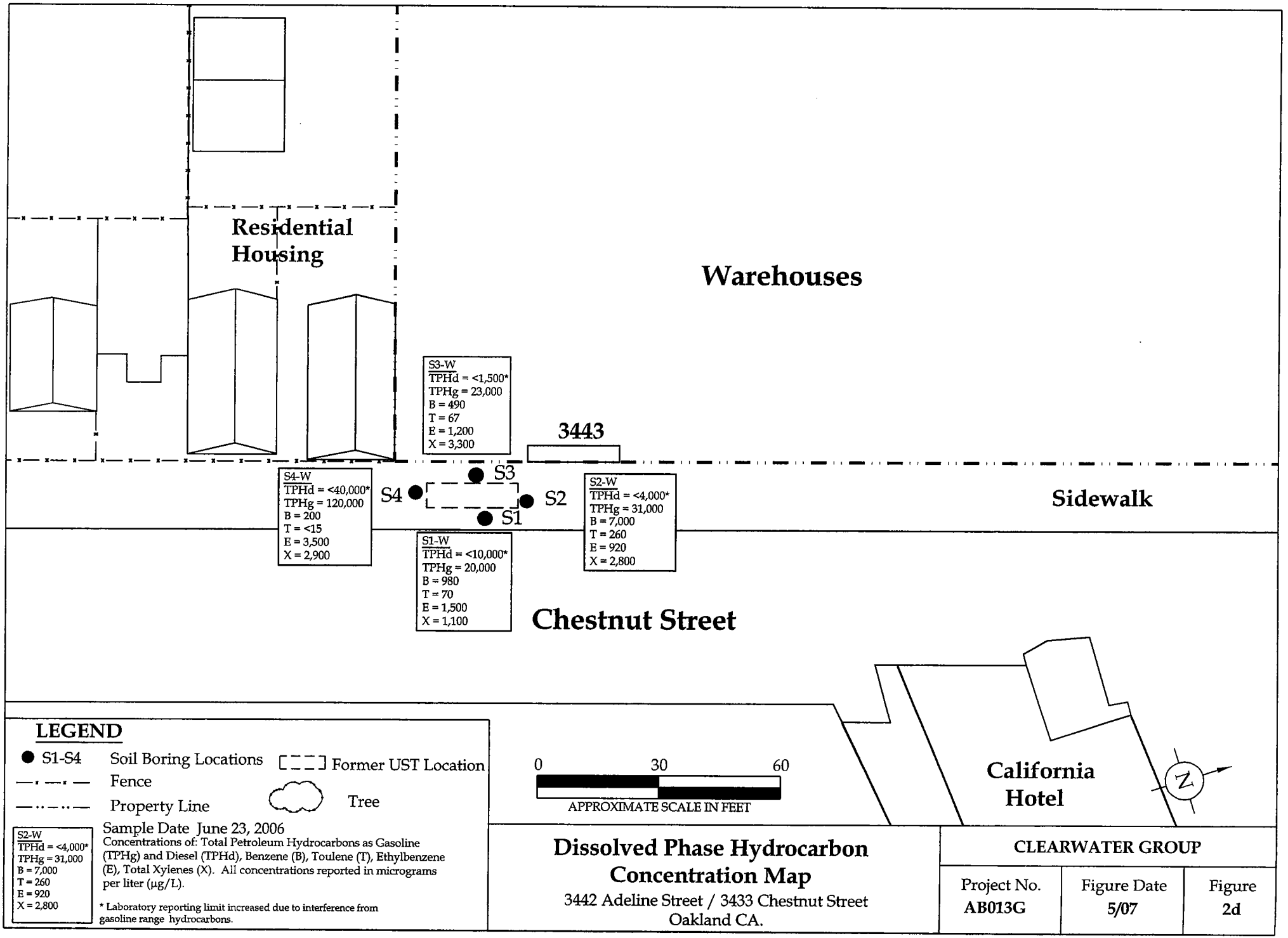
Project No.	Figure Date	Figure
AB013G	5/07	2c



Sample Date June 23, 2006

Concentrations of: Total Petroleum Hydrocarbons as Gasoline (TPHg) and Diesel (TPHd), Benzene (B), Toulene (T), Ethylbenzene (E), Total Xylenes (X). All concentrations reported in micrograms per liter (µg/L).

* Laboratory reporting limit increased due to interference from gasoline range hydrocarbons.

Dissolved Phase Hydrocarbon Concentration Map

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

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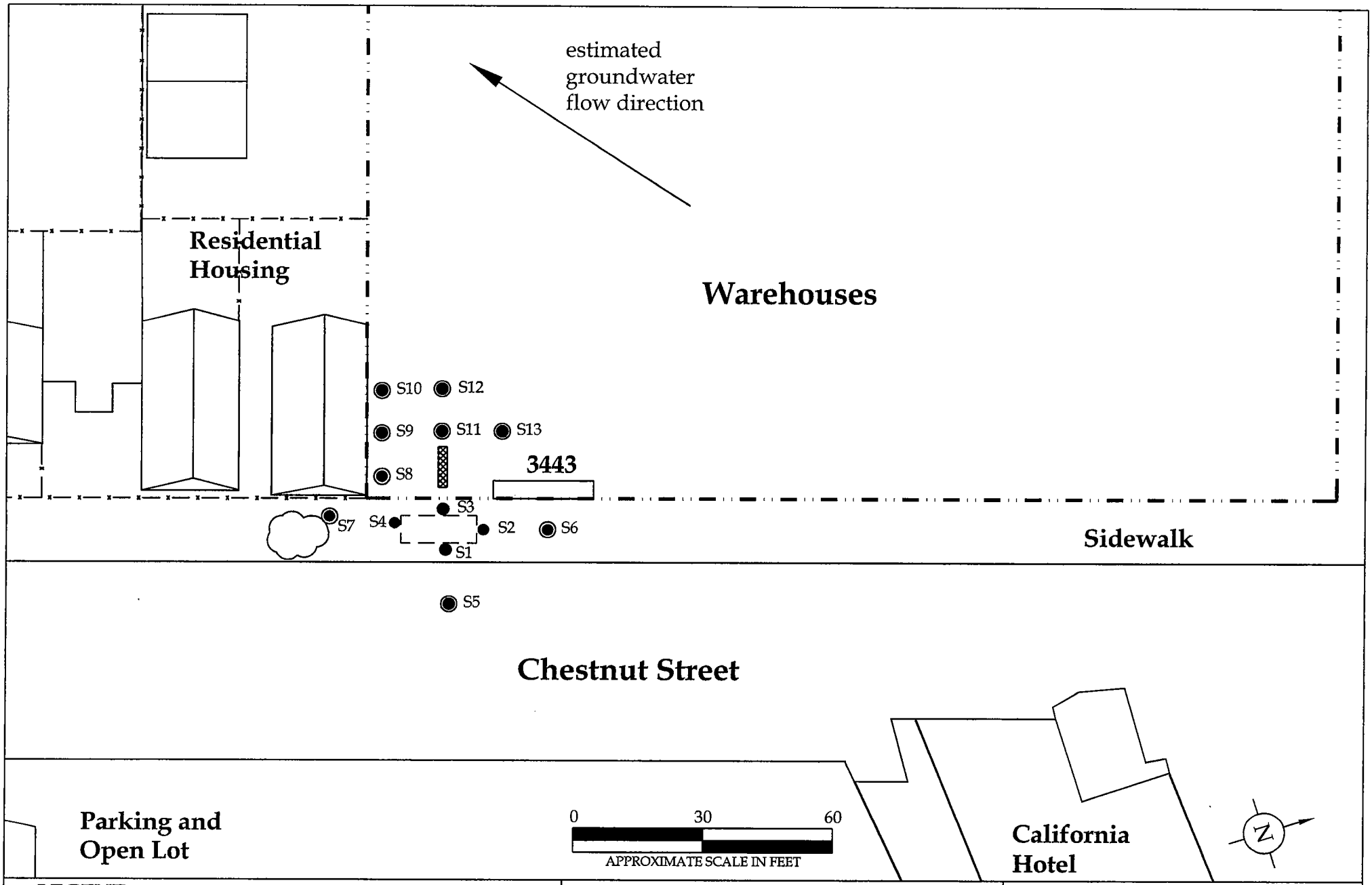
Project No.	Figure Date	Figure
AB013G	5/07	2d



LEGEND

- S1-S4 Soil Boring Locations
- S5-S15 Proposed Soil Boring Location
- Groundwater Extraction Tench
- Former UST Location
- Property Line
- Fence
- Tree

Proposed Groundwater Extraction Trench and Soil Boring Locations

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

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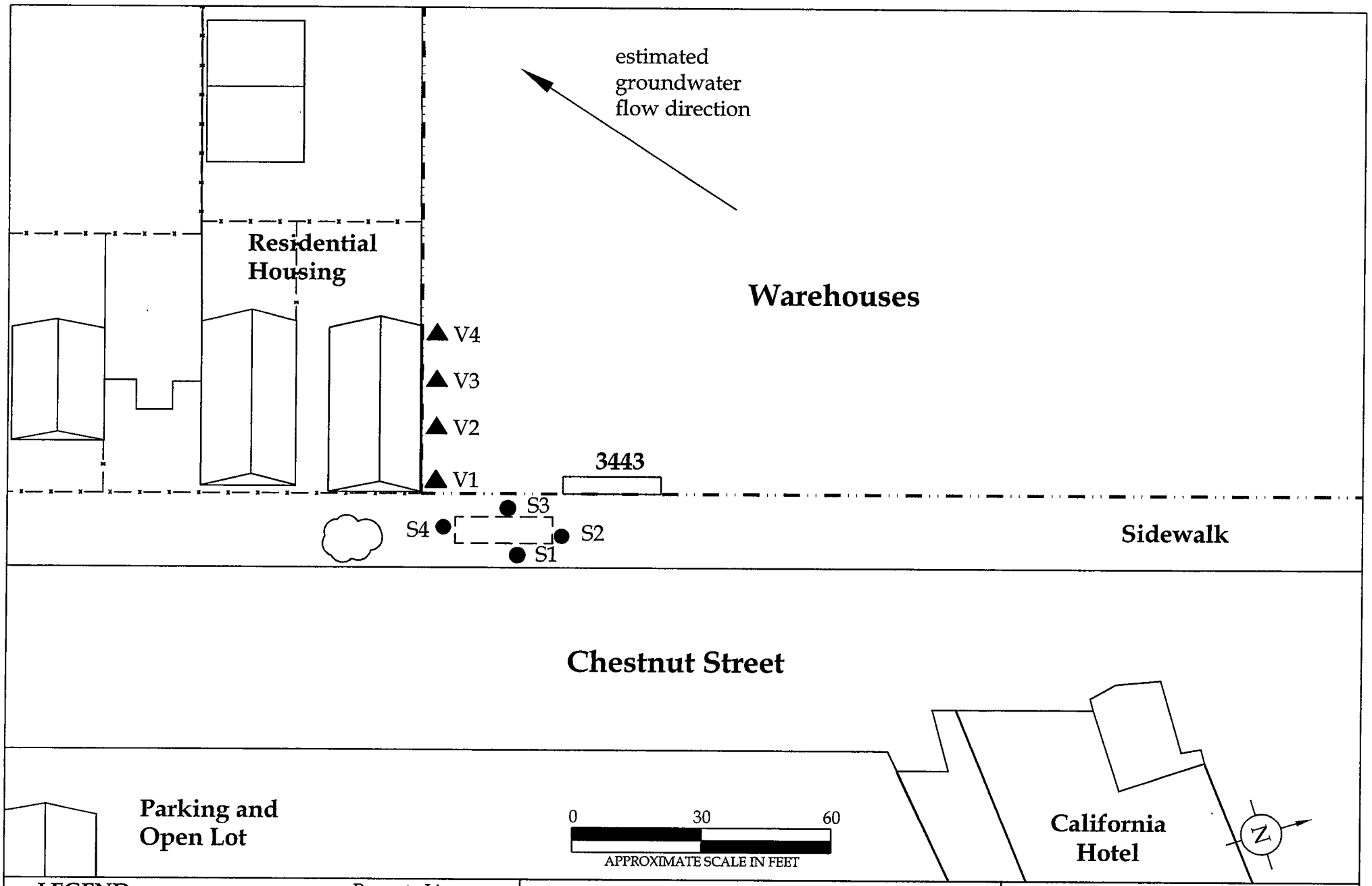
Project No.	Figure Date	Figure
AB013G	5/07	3



Proposed Soil Vapor Sample Locations

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

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Project No.	Figure Date	Figure
AB013G	5/07	4

TABLES

Table 1
CUMULATIVE SOIL SAMPLE ANALYTICAL RESULTS
Zimmerman Property
3442 Adeline Street, Oakland CA
Clearwater Group Project Number AB013

Sample I.D	Date	Depth (ft bgs)	TPH-d mg/Kg	TPH-g mg/Kg	B mg/Kg	T mg/Kg	E mg/Kg	X mg/Kg	MTBE mg/Kg	1,2-DCA/EDB mg/Kg
NW-6.5	2/22/2000	6.5	130	130	0.16	0.26	0.73	6.3	<0.5	****
SE-6.5	2/22/2000	6.5	850	920	0.3	0.37	5.3	22	<2.5	****
S1-5.0	6/23/2006	5.0	5.6*	<1.0	0.011	<0.0050	<0.0050	<0.0050	****	<0.0050
S1-8.0	6/23/2006	8.0	26^	100	1.3	0.22	2.0	7.2	****	<0.0050
S1-12.0	6/23/2006	12.0	45^	67	0.098	<0.025	0.73	0.39	****	<0.025
S1-14.5	6/23/2006	14.5	1.2*	<1.0	<0.0050	<0.0050	<0.0050	0.010	****	<0.0050
S2-4.0	6/23/2006	4.0	4.7*	<1.0	0.016	<0.0050	<0.0050	<0.0050	****	<0.0050
S2-7.5	6/23/2006	7.5	84^	460	1.2	0.36	9.4	24	****	<0.050
S2-12.0	6/23/2006	12.0	49^	61	0.33	0.055	0.84	2.4	****	<0.025
S2-14.0	6/23/2006	14.0	<1.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	****	<0.0050
S3-3.5	6/23/2006	3.5	3.1*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	****	<0.0050
S3-7.5	6/23/2006	7.5	250^	1,200	0.47	0.52	18	100	****	<0.090
S3-10.0	6/23/2006	10.0	76^	220	0.26	<0.040	6.2	7.2	****	<0.040
S3-14.5	6/23/2006	14.5	1.3*	<1.0	<0.0050	<0.0050	0.0056	0.016	****	<0.0050
S4-3.5	6/23/2006	3.5	3.6*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	****	<0.0050
S4-7.5	6/23/2006	7.5	240^	820	<0.20	<0.20	6.7	4.4	****	<0.20
S4-11.5	6/23/2006	11.5	120^	500	0.079	<0.040	3.5	4.8	****	<0.040
S4-14.5	6/23/2006	14.5	1.3*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	****	<0.0050

Notes	
NW-6.5	Soil sample collected during tank pull on the northwest sidewall just above groundwater level.
SE-6.5	Soil sample collected during tank pull on the southeast sidewall just above groundwater level.
S3-7.5	Soil boring number and corresponding depth at which soil sample was collected.
ft bgs	Feet below ground surface that soil sample was collected.
TPH-d	Total petroleum hydrocarbons reported as diesel by EPA Method 3550/8015M in 2000 and 8015M in 2006.
TPH-g	Total petroleum hydrocarbons reported as gasoline by EPA Method 5030/8015M in 2000 and 8260B in 2006.
BTEX	Benzene, Toluene, Ethylbenzene, Total Xylenes by EPA Method 8020 in 2000 and 8260B in 2006.
MTBE	Methyl tertiary butyl ether by EPA Method 8020 in 2000 and 8260B in 2006.
1,2-DCA	1,2-Dichloroethane by EPA Method 8260B.
EDB	1,2-Dibromoethane by EPA Method 8260B.
mg/Kg	milligrams per Kilogram or parts per million
<	Not detected in concentrations exceeding indicated laboratory reporting limit.
*	Hydrocarbons reported as TPHd do not exhibit a typical diesel chromatographic pattern, these hydrocarbons are higher boiling than typical diesel fuel.
^	Hydrocarbons reported as TPHd do not exhibit a typical diesel chromatographic pattern, these hydrocarbons are lower boiling than typical diesel fuel.
*****	Compound not analyzed.

Table 2
CUMULATIVE GROUNDWATER SAMPLE ANALYTICAL RESULTS
Zimmerman Property
3442 Adeline Street, Oakland CA
Clearwater Group Project Number AB013

Sample I.D	Date	DTW feet	TPH-d µg/L	TPH-g µg/L	B µg/L	T µg/L	E µg/L	X µg/L	MTBE µg/L	1,2-DCA/EDB µg/L
Pit Water	2/22/2000	7	7,400	34,000	3,300	930	400	6,200	<250	****
S1-W	6/23/2006	^^^^^	<10,000*	20,000	980	70	1,500	1,100	****	<5.0
S2-W	6/23/2006	^^^^^	<4,000*	31,000	7,000	260	920	2,800	****	<15
S3-W	6/23/2006	^^^^^	<1,500*	23,000	490	67	1,200	3,300	****	<5.0
S4-W	6/23/2006	12.5	<40,000*	120,000	200	<15	3,500	2,900	****	<15

Notes

Pit Water	Grab water sample collected from tank pit during UST removal activities, groundwater seeped into tank pit.
S1-W	The number of the soil boring from which the water sample was collected.
DTW	Observed depth to water measured in feet below ground surface.
^^^^^	Groundwater not encountered during drilling of soil boring and not measured due to slow rate of recharge.
TPH-d	Total petroleum hydrocarbons reported as diesel by EPA Method 3550/8015M in 2000 and 8015M in 2006.
TPH-g	Total petroleum hydrocarbons reported as gasoline by EPA Method 5030/8015M in 2000 and 8260B in 2006.
BTEX	Benzene, Toluene, Ethylbenzene, Total Xylenes by EPA Method 8020 in 2000 and 8260B in 2006.
MTBE	Methyl tertiary butyl ether by EPA Method 8020 in 2000 and 8260B in 2006.
1,2-DCA	1,2-Dichloroethane by EPA Method 8260B.
EDB	1,2-Dibromoethane by EPA Method 8260B.
µg/L	Micrograms per Liter or parts per billion.
<	Not detected in concentrations exceeding indicated laboratory reporting limit.
*****	Compound not analyzed.
*	Laboratory reporting limit increased due to interference from Gasoline-Range Hydrocarbons.

ATTACHMENT A

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

April 23, 2007

Ms. Steffi Zimmerman
Ronald S. Zimmerman Estate
6330 Swainland Road
Oakland, CA 94611

Subject: Fuel Leak Case No. RO0002936, 3442 Adeline Street, Oakland, CA 94608

Dear Ms. Zimmerman:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file and the recently submitted report entitled, "Work Plan for Additional Subsurface Investigation and Migration Control," dated March 28, 2007 and prepared by the Clearwater Group Inc (Clearwater). The scope of work in the Work Plan recommends the installation of 12 soil borings either adjacent to or downgradiet of the former UST location. In addition, the Work Plans suggests the installation of a groundwater excavation trench, which could be used to mitigate potential dissolved phase contamination from moving offsite beneath the adjacent residences.

ACEH has reviewed the soil boring locations as proposed in the Work Plan and determined several soil boring location are not necessary at this time. Furthermore, ACEH does not agree with the proposed remedial alternative selected by Clearwater -the installation of a groundwater extraction trench. In addition, considering the proximity of residences to the former UST location and the presence of benzene in groundwater, the vapor intrusion pathway must be evaluated in connection with the soil and groundwater investigation.

We request that you prepare a revised Work Plan that responds to the technical comments discussed below and send us the Work Plan according to the schedule below. Please provide 72-hour advance written notification to this office (e-mail preferred to steven.plunkett@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Contamination Plume Delineation.** The lateral extent of the dissolved petroleum hydrocarbon contamination has not been determined at the subject site. Results from the preliminary site assessment conducted in June 2006 indicate that residual TPH and TPH constituents in groundwater beneath your site may be migrating off site. There has been no soil or groundwater analytical data collected downgradient of soil boring S4 to determine the lateral extent of hydrocarbon contamination.

   Clearwater recommends the installation of twelve soil borings to evaluate the horizontal and vertical extent of petroleum hydrocarbon impacts to soil and to define the extent of dissolved phase petroleum hydrocarbon contamination downgradient of the site. Groundwater elevation data at nearby sites demonstrates a hydraulic gradient toward the southwest. After review of

the proposed soil boring locations, ACEH has determined the soil borings in their current configuration are unusually close spacing; in particular, the outlying soil borings S12, S14 and S16 may not be useful for dissolved phase plume characterization. While these soil-boring locations may provide additional data, more importantly, the proposed soil borings S12, S14 through S16 are unlikely to define the orientation of the dissolved plume. Furthermore, if soil and groundwater contamination is detected in soil borings S8, S10 or S11 an additional offsite investigation will be required. In addition, soil borings S7 and S9 are not necessary at this time. Therefore, ACEH has determined six soil borings are sufficient during this phase of investigation. Please present the results of the Soil and Groundwater Investigation Work Plan (SWI) requested below

2. **Interim Source Area Remediation**. The purpose of interim cleanup is to immediately remove the ongoing source(s) that may be continuing to add mass to the dissolved plume and immediately begin removal of dissolved contaminant mass in the source area.

   Interim cleanup is necessary to prevent dissolved phase petroleum hydrocarbon pollution from impacting or continuing to impact drinking water supply aquifers, reduce the ultimate impact of the unauthorized release on the resource, limit continued migration and growth of the petroleum hydrocarbon plume, and reduce overall cleanup costs.

   ACEH agrees with the need for source area remediation to limit offsite pollution migration. However, the proposed remedial alternative, a groundwater extraction trench in not acceptable. Groundwater elevation data at nearby UST sites demonstrate a hydraulic gradient toward the southwest. It is unlikely the extraction trench in its current location, which is cross-gradient of the source area, will be effective for the intended purpose of plume migration control. In addition, the recommendation of a "mini drawdown test" in a soil borings is not a valid or acceptable approach to determine aquifer properties. Therefore, ACEH request that you evaluate several remedial alternatives that could be used to limit offsite groundwater contamination migration. Plans for interim remediation are to be proposed following site characterization.

3. **Vapor Intrusion and Soil Gas Investigation**. Review of groundwater elevation data at nearby UST sites confirms the current groundwater flow direction for your site is toward the southwest, directly in line with nearby residences. In addition, analytical data collected during the preliminary site assessment indicate residual petroleum hydrocarbon contamination in soil may be continuing to add mass to the dissolved petroleum hydrocarbon plume. Of particular concern is the presence of benzene in groundwater at concentrations of up to 7,000 ppb, approximately 25 feet from the closest residence. ACEH requires that the vapor intrusion pathway must be evaluated in conjunction with the proposed soil and groundwater investigation. Please prepare a revised Work Plan and discuss your proposal to perform a soil vapor survey, and thus evaluate the vapor intrusion pathway. The revised work plan is to include soil vapor sampling locations and recommendations for soil vapor sample analysis.

4. **Soil Sampling and Analysis**. Previous soil sampling conducted at the site detected adsorbed petroleum hydrocarbon contamination at approximately seven feet bgs. Clearwater recommends soil sampling every four feet. ACEH generally agrees with the recommended soil sample depths as proposed by Clearwater. Additionally, ACEH recommends a soil sample be collected at the capillary fringe, and the total depth of the soil borings must be extended to 20 feet bgs. Then a soil sample shall be collected at approximately 20 feet bgs.

and placed on laboratory hold pending results from the sample interval collected immediately above (approximately 16 feet bgs). ACEH generally agrees with the soil sample analysis as recommended by Clearwater with the addition of TAME, MtBE, EDB, EDC, ETBE, DIPE, and TBA. Please present the results from soil sampling in the SWI report requested below.

5. **Groundwater Sampling and Analysis**. ACEH generally agrees with the groundwater sample analysis as recommended by Clearwater with the addition of TAME, MtBE, EDB, EDC, ETBE, DIPE, and TBA. Please present the results from soil sampling in the SWI report requested below.

Please submit a work plan detailing your proposal to define the extent of soil and groundwater contamination **by March 30, 2007**.

TECHNICAL REPORT REQUEST

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

- **May 15, 2007** – Revised Work Plan for Soil and Groundwater Investigation

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

ELECTRONIC SUBMITTAL OF REPORTS

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

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

PERJURY STATEMENT

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

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

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

LANDOWNER NOTIFICATION REQUIREMENTS

Pursuant to California Health & Safety Code Section 25297.15, the active or primary responsible party for a fuel leak case must inform all current property owners of the site of cleanup actions or requests for closure. Furthermore, ACEH may not consider any cleanup proposals or requests for case closure without assurance that this notification requirement has been met. Additionally, the active or primary responsible party is required to forward to ACEH a complete mailing list of all record fee title holders to the site.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please be aware that you may be eligible for reimbursement of the costs of investigation from the California Underground Storage Tank Cleanup Fund (Fund). In some cases, a deductible amount may apply. If you believe you meet the eligibility requirements, we strongly encourage you to call the Fund for an application.

AGENCY OVERSIGHT

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

If you have any questions, please call me at (510) 383-1767.

Sincerely,

Steven Plunkett
Hazardous Materials Specialist

cc: Robert Nelson
Clearwater Group
229 Tewksbury Avenue
Point Richmond, CA 94801

Donna Drogos, ACEH
Steven Plunkett, ACEH
File

ATTACHMENT B

CLEARWATER GROUP

Direct-Push Drilling Investigation Procedures

The direct-push method of drilling soil borings has several advantages over hollow-stem auger drilling. The direct-push method produces no drill cuttings and is capable of 150 to 200 feet of soil boring or well installation work per day. Direct-push drilling can be used for soil gas surveys, soil sampling, groundwater sampling, and installation of small-diameter monitoring well and remediation system components such as air sparge points. The equipment required to perform direct-push work is varied, ranging from a roto-hammer and operator to a pickup truck-mounted rig capable of substantial static downward force combined with percussive force. This method allows subsurface investigation work to be performed in areas inaccessible to conventional drill rigs such as basements, beneath canopies, or below power lines. Direct-push equipment is ideal at sites with unconsolidated soil or overburden, and for sampling depths less than 30 feet. This method is not appropriate for boring through bedrock or gravelly soils.

Permitting and Site Preparation

Prior to direct-push drilling, Clearwater Group will obtain all necessary permits and locate all underground and above-ground utilities through Underground Service Alert and a thorough site inspection. All drilling equipment will be inspected daily and will be maintained in safe operating condition. All down-hole drilling equipment will be cleaned prior to arriving on-site. Working components of the rig near the borehole, as well as casing and sampling equipment, will be thoroughly decontaminated between each boring location by either steam cleaning or washing with an Alconox® solution. All drilling and sampling methods will be consistent with ASTM Method D-1452-80 and county, state, and federal regulations.

Boring Installation and Soil Sampling

Direct-push drilling uses a 1.5-inch outer barrel with an inner rod held in place during pushing. Soil samples are collected by penetrating to the desired depth, retracting the inner rod, and

attaching a soil sampler. The sampler is then thrust beyond the outer barrel into native soil. Soil samples are recovered in brass, stainless steel, or acetate sample tubes held inside the sampler.

Soil removed from the upper tube section is used for lithologic descriptions, according to the Unified Soil Classification System. If organic vapors will be analyzed in the field, a portion of each soil sample will be placed in a plastic zip-lock bag. The bag will be sealed and warmed for approximately 10 minutes to allow soil vapors to be released from the sample and diffused into the head space of the bag. The bag is then pierced with the probe of a calibrated organic vapor detector and the detector readings recorded with the lithologic descriptions on the soil boring log. Soil samples selected for laboratory analysis will be covered on both ends with Teflon™ tape and plastic end caps. The samples will then be labeled, recorded on a chain-of-custody document, stored on ice in a cooler, and transported to a state-certified analytical laboratory.

Temporary Well Installation and Groundwater Sampling

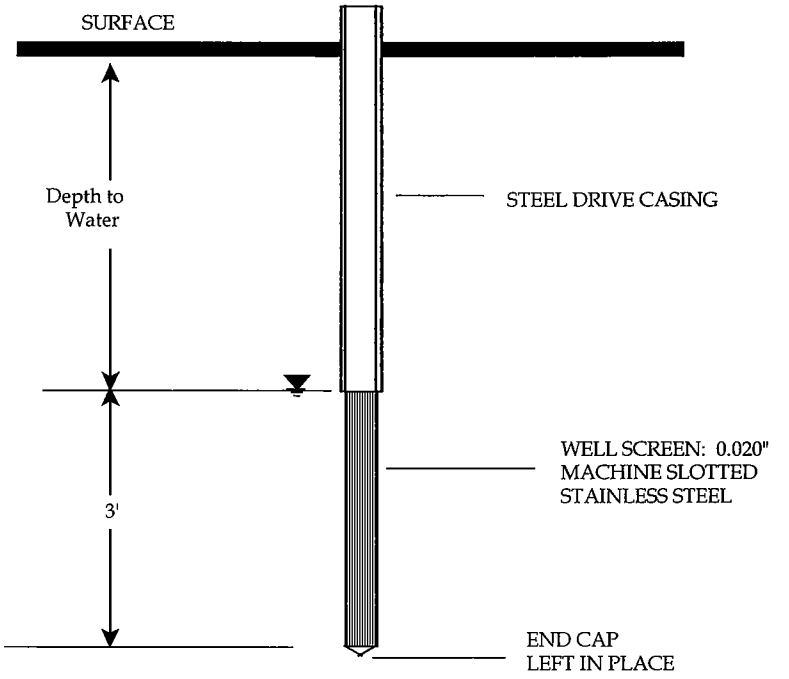

Figure 1

Grab Groundwater Sample Collection

Groundwater samples are collected by removing the inner rod and attaching a 4-foot stainless steel screen with a drive point at the end (**Figure 1**). The screen and rod are then inserted inside

the outer barrel and driven to the desired depth, where the outer rod is retracted to expose the screen. If enough water for sampling is not produced through the stainless well screen, a 1-inch PVC screen can be installed in the boring and the outer rod retracted to leave a temporary well point for collecting groundwater samples, water level, or other parameters.

Monitoring Well Installation and Development

Permanent small-diameter monitoring wells are installed by driving a 2-inch diameter outer barrel and inner rod as described above. Upon reaching the desired depth, the system is removed, and 1-inch outside diameter (OD) (1/2-inch inside diameter [ID]) pre-packed PVC piping is installed. The well plug is created using granular bentonite. The well seal is constructed of cement and sealed at the surface with a conventional "Christy® Box" or similar vault. Monitoring wells are developed by surging the well with a small-diameter bailer and removing approximately 10 casing volumes of water, until the water is clear.

Groundwater Sample Collection and Water Level Measurement from Monitoring Wells

Before groundwater is collected from the wells, the water levels are measured in all wells using an electronic water-level gauge. Monitoring wells are prepared for sampling by purging three or more well volumes of water. Water is removed using small-diameter bailers, a peristaltic pump, or by manually pumping using tubing with a check valve at the bottom. During removal of each well volume of water, the temperature, pH, and conductivity are measured and recorded on the field sampling form. Successive well volumes are removed until the parameters have stabilized or the well has gone dry. Prior to sampling, the well is allowed to recover to within 90% of the stabilized water levels. The groundwater samples[1] are collected using small-diameter bailers.

[1] Small-diameter wells often produce small sample quantities and are appropriate for analysis of volatile and aromatic compounds and dissolved metals analysis using VOA vials. Obtaining liter-size samples can be difficult and time consuming. Monitoring wells installed by the direct-push method are most effective at sites where the subsurface soils are more coarse than silt, gasoline components are the key contaminants of concern, and water levels are not more than 25 feet below ground surface.

The samples are decanted into laboratory-supplied containers, labeled, recorded on a chain-of-custody document, stored on ice in a cooler, and transported to a certified analytical laboratory for analysis.

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5035SC ™ Soil Core Sampler and Procedures

The purpose of EPA Method 5035 is to reduce volatilization of soil sample contaminants prior to laboratory analyses. The 5035SC ™ Soil Core Sampler is a zero-headspace, multi-functional sampling device designed to meet the requirements of EPA Method 5035 and Florida Department of Environmental Protection FS 3000 approved methods.

5035SC ™ SOIL CORE SAMPLER

The 5035SC ™ Soil Core Sampler is a pre-cleaned syringe soil core sampler and storage device. The U.S. Environmental Protection Agency (U.S. EPA) approved, in 2003, the use of disposable plastic syringes that have been converted into soil sampling devices. The syringe's "needle end" has been cut off, creating a blunt, even coring end. The 5035SC ™ Soil Core Sampler was designed to be disposable and inexpensive, and to have zero headspace. It requires no in-field weighing. Each sampler comes with an airtight plastic cap. Each disposable sampler should be used only once (not reused). The sampler acts as both the coring tool and an airtight storage container.

APPROVAL FOR USE

The California Regional Water Quality Control Board, Region 1 (North Coast), has approved the 5035SC ™ Soil Core Sampler for fuel-related sites as both a soil-coring and transportation device. The Department of Toxic Substances Control (DTSC) and EPA Region 9 have approved the 5035SC ™ Soil Core Sampler for soil coring and preservation, in the field, at DTSC and EPA sites, respectively. Use of the 5035SC ™ Soil Core Sampler as a transportation device for DTSC or EPA sites has not yet been approved.

SOIL COLLECTION

Method 5035 requires three sample syringes for each soil sample. All sampling activities are performed wearing clean, chemical-resistant gloves. The soil sample is collected by

removing the pre-cleaned plastic cap, holding the syringe wingtips on either side of the sampler body, and then pushing the sampler into the soil. (The plunger is shipped in the forward position.) Approximately 5 grams of dry to semi-dry soil will pack tightly into the sampler, pushing the plunger back to its rear position. The filled soil sampler is then removed from the soil, and the airtight plastic cap is pushed over the open end of the sampler.

FIELD PRESERVATION BY FREEZING

The 5035SC ™ Soil Core Sampler can be field frozen with dry ice as a preservation method. There must be adequate dry ice to chill the samples to below –7 °C and maintain the sample temperature during transport to the laboratory. The 5035SC ™ Soil Core Samplers should not be frozen below –20 °C. Samplers preserved with dry ice can be held at below –7 °C for up to 7 days, provided the laboratory places the samples in a refrigerated environment or uses a chemical preservation method. In one study, sample integrity was maintained with less than a 5% loss of analyte concentrations after a 14-day holding time.

Alternatively, bags of water ice mixed with table salt may be used to achieve temperatures between –12 °C and –4 °C (Hewitt, 1999). Dry ice is recommended as the easiest method of field freezing and preservation. The disadvantage of using ice (4 °C ± 2 °C) is that the samples are required to be analyzed within 48 hours.

SAMPLE DOCUMENTATION PROCEDURES

The samples are affixed with a waterproof label indicating date, time, sampler's name, sample number, site location, compounds of interest, chemical preservation techniques (if any), and laboratory equipment specifications or laboratory methods. A temperature blank should be included with the samples so that the laboratory can verify the sample temperature upon sample receipt. An infrared thermometer should be used to measure the temperature blank when the samples arrive at the laboratory, and the temperature of

the samples at arrival should be noted on the chain-of-custody document. A visual inspection of the seals is required by the receiving person at the laboratory to verify that the 5035SC ™ Soil Core Samplers are intact and that sample volatilization has not occurred. The condition of the sample upon receipt at the laboratory shall be noted on the chain-of-custody form by the receiving person.

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Siegrist, R. L., Jenssen, P. D., 1990, "Evaluation of Sampling Method Effects on Volatile Organic Compound Measurements in Contaminated Soils," *Environmental Science Technology*; 24: 1387-92.

United States Environmental Protection Agency (US EPA), 2003, Guidance Document for the Implementation of United States Environmental Protection Agency Method 5035: Methodologies for Collection, Preservation, Storage, and Preparation of Soils to Be Analyzed for Volatile Organic Compounds, Final Interim (Version 4,0), October; 35 p.

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PHOTOS SHOWING THE 5035SC ™ SAMPLER

1) The soil sample is collected using the 5035SC ™ Soil Core Sampler by removing the pre-cleaned plastic cap. The plunger will be in the forward position.

2) Holding the wingtips on either side of the sampler body, push the 5035SC ™ Soil Core Sampler into the soil to be sampled. The soil will pack tightly into the body of the 5035SC ™ Soil Core Sampler, pushing the plunger back to its rear position. The patented plunger stop of the 5035SC ™ Soil Core Sampler sleeve prevents the plunger from exiting the body of the sampler.

3) Remove the filled soil sampler from the soil, and press the airtight plastic cap over the open end of the sampler. The soil sample is placed into a hermetically sealed, reclosable polyethylene shipping bag.

4) Once the 5035SC ™ Soil Core Sampler is placed in the sampler shipping bag and is tagged with the waterproof label, it is ready to be placed into the cooler with the dry ice to be kept at below –7 °C (7 days) or ice cooled to 4 °C (48-hour preservation).

Questions: James A. Jacobs, R.G.#4815, C.H.G.#88; 415-381-5195 or augerpro@sbcglobal.net

CLEARWATER GROUP

Grab Groundwater Sample Collection Protocol

Permits, Site Safety Plan, Utility Clearance

Clearwater Group will obtain all the required permits, unless contracted by a permitting party. Clearwater prepares a site-specific Site Safety Plan detailing site hazards, site safety and control, decontamination procedures, and emergency response procedures to be employed throughout the work. Usually seven, and at least two, working days prior to drilling, Underground Service Alert (USA) will be notified of the planned work. Clearwater attempts to locate all underground and above-ground utilities by site inspection and with hand-held magnetic line locating equipment, in conjunction with its subcontractors and knowledgeable site managers, and review the site as-built drawings. Clearwater may employ a private, professional utility locator or a subcontractor who performs ground penetrating radar surveys, to refine the site utility inspection. Clearwater provides notification to those agencies which require notification prior to drilling in order to schedule a grouting inspection.

Drilling Equipment

All soil borings are drilled using a truck-mounted, direct-push, Geoprobe® drill rig, unless site conditions warrant a different drilling method. Subsurface conditions permitting, the first five feet of each boring is advanced using a hand-auger or post-hole digger. All drilling equipment will be inspected daily and maintained in safe working condition by the operator. All down-hole drilling equipment will be steam cleaned prior to arriving on site. Working components of the drill rig near the borehole, as well as probe rods, will be thoroughly steam cleaned between each boring location. All drilling and sampling methods will be consistent with local, state, and federal regulations.

Grab Groundwater Sample Collection

- Drive the soil boring to the depth zone(s) of interest. For petroleum hydrocarbons and floating compounds, the primary zone of interest is the top of static groundwater. For

dense non-aqueous-phase liquid compounds, the zone of interest will be below the top of static groundwater and above an aquitard.

- Remove the Geoprobe® rods from the boring, and insert a short (5-foot-long or less), 1-inch diameter PVC temporary well screen. Attach enough blank well casing above the well screen to reach the target depth.
- If the boring was drilled with a hollow-stem auger, it may be possible to collect the sample from within the augers without setting temporary well casing.
- Lower a clean disposable bailer down the temporary well casing to collect the grab groundwater sample.
- Decant the sample into laboratory-provided containers.
- Seal and label the containers, and record the sample information on a Chain-of-Custody document.
- Place the labeled containers in watertight plastic bags (zip-lock opening).
- Store the sample in a cooler containing ice.
- Block the bags of samples with bubblewrap to prevent container breakage.
- Remove the temporary well casing.
- Grout the boring with bentonite chips or cement grout according to agency regulations.
- Hydrate the bentonite chips with clean water.
- Patch the ground surface with concrete, asphalt cold patch, or other material to match the ground surface.
- Measure the sample location from known landmarks using a tape measure and/or use a global positioning system (GPS) to locate the sample. If a GPS is used, located nearby landmarks with the GPS, and confirm the locations with a tape measure.
- Sketch the sample location in the field notes with dimensions.
- Photograph the sample location with nearby landmarks visible in the photograph's background.

Recordkeeping

Proper record keeping consists of recording the following information, at a minimum:

- Sample identification information (location, depth, sample identifiers, data, and time)

- Chain-of-custody document
- Field personnel
- Weather conditions (temperature, wind speed, precipitation, etc.)
- Sampling method, devices, and equipment used
- Shipment information, including a copy of the FedEx, or other transporter, shipping label and tracking number.

Quality Assurance Procedures

To prevent contamination of the samples, Clearwater personnel adhere to the following procedures in the field:

- Put on a new, clean pair of latex gloves prior to collecting each sample.
- Collect samples in the expected order of increasing degree of contamination based on historical analytical results.
- All sampling equipment will be thoroughly decontaminated between each boring.

Soil Waste Management

Soil cuttings will be stockpiled onsite and covered with plastic sheeting to control runoff, or contained in labeled 55-gallon D.O.T.-approved drums, pending disposal. Wastes will be sampled, to profile them for disposal, and, once profiled and accepted, hauled by a licensed waste hauler to an appropriate landfill. All waste stored on site will be properly labeled at the time of production.

CLEARWATER GROUP

Soil Vapor Sampling Procedures Where Total Petroleum Hydrocarbons as Diesel are a Constituent of Concern

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To confirm the presence of shallow soil contamination where total petroleum hydrocarbons as diesel (TPH-d) are suspected, a soil vapor sampling event may be conducted using Direct Push Technology with a Macro-Core® Soil Sampler or similar drilling equipment. The soil vapor sample would be collected and analyzed using EPA Method TO-17 for concentrations of TPH-d. Air Toxics, LTD. of Folsom, California (Air Toxics), has developed a protocol for the analysis of TPH-d using EPA Method TO-17 which provides a laboratory reporting limit of 100 nanograms. Air Toxics is continuing their efforts to develop laboratory methods that would increase the number of constituents that can be analyzed using this method. Currently there are a number of soil vapor sampling methods that may be employed for the analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons as gasoline (TPH-g), or methyl tertiary butyl ether (MTBE) tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE), diisopropyl ether (DIPE), tertiary butyl alcohol (TBA), and lead scavengers 1,2-dichloroethane (1,2-DCA) and 1,2-dibromoethane (1,2-EDB); however, the sampling methods provide poor recovery levels for the analysis of TPH-d.

Discussion of TO-17 Multi-Bed Carbotrap 300 Tubes

TO-17 Multi-Bed Carbotrap 300 tubes are generally constructed of stainless steel and are packed with more than one absorbent in order of increasing absorbent strength. The Multi-Bed Carbotrap 300 tubes are packed with hydrophobic absorbents such as Carbopack C (a weak absorbent), Carbopack B (a medium absorbent) and Carbosieve SIII (a strong absorbent). According to the *Compendium Method TO-17, Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes*, higher weight molecular compounds are retained in the front (least retentive) absorbent, while the more volatile compounds are retained further into the packing, on the stronger absorbent. The

higher molecular weight compounds never encounter the (front end) stronger absorbents, thereby improving the efficiency of analysis.

The TO-17 Multi-Bed Carbotrap 300 tubes come pre-conditioned and ready for vapor sample collection. According to Air Toxics, because the composition of the vapor sample is often unknown, it is best to collect a series of samples using 2 or 3 different sample volumes, often referred to as distributive volume sampling. The EPA requires the use of distributive volume pairs for monitoring to ensure high quality data. The TO-17 method recommends that the distributive volume sampling be completed using 1-liter and 4-liter total sample volumes.

Field Application of TO-17 Multi-Bed Carbotrap 300 Tubes

Soil vapor samples may be collected at various depths using the direct soil gas sampling system provided by Geoprobe® Systems. The direct soil gas sampling system allows the driller (a C-57 licensed drilling contractor) to drive probe rods to the desired depth, connect the gas sampling cap to the top of the drive rod and pull up on the drive rod to expose the soil vapor screen located below ground. A sample pump capable of flow rates ranging from 10 to 200 milliliters per minute (mL/min), such as the Gilair-5 Active Air Pump™, is then connected to the nipple port on the gas sampling cap. The Gilair-5 Active Air Pump™ can be rented from Clean Air Engineering, Palatine, Illinois.

The Geoprobe® gas sampling caps are designed to receive 0.25-inch inner diameter tubing which will then be connected to the Gilair-5 Active Air Pump™ (or equivalent equipment) using a 0.25-inch inner diameter connector. Clean Air Engineering recommends using tygon tubing. Tubing is then connected from the air pump to the TO-17 Multi-Bed Carbotrap 300 tube, which has an outer diameter of 0.25 inch and comes pre-conditioned for field sampling. Before the TO-17 Multi-Bed Carbotrap 300 tube is connected to the sample pump, the line will be purged with source soil vapor, allowing ample time to set the sample flow rate on the sample pump using an air flow calibrator (also rented, pre-calibrated from Clean Air Engineering). To satisfy the distributive volume sampling requirement, at least 2 volumes of

vapor samples, such as 1 liter and 4 liters, are collected at each sampling point. To collect a 1-liter sample, the sample pump flow rate will be set at 66.7 mL/min for approximately 15 minutes. The 4-liter sample requires a flow rate of 133.3 mL/min for approximately 30 minutes. With sampling equipment set up and sample time taken into consideration, it is expected that sampling at each TO-17 Multi-Bed Carbotrap 300 tube location will take at least 1 hour to complete.

Each sample volume will be labeled according to the soil vapor boring location, corresponding sample depth, and sample volume collected. For example, a 1-liter sample collected at 2 feet bgs in soil vapor boring location V-1 would be labeled as V-1-2-1. The samples will then be recorded on a chain-of-custody form supplied by Air Toxics, placed in their respective shipping sleeves, and placed on wet ice for transport to the project laboratory. The samples have a hold time of up to 30 days; however, transport to the project laboratory will occur no later than 72 hours from the date of collection. At the project laboratory, the soil vapor samples will be analyzed for the specified constituents under the standard 10-day turnaround time using EPA Method TO-17.

Confirmation Soil Vapor Sampling Using SUMMA Canisters

Confirmation soil vapor sampling may be required by some oversight agencies. To satisfy this requirement, soil vapor samples are collected using SUMMA canisters at the soil vapor sample depths corresponding with TO-17 soil vapor sampling locations. The confirmation samples will be collected after the vapor samples have been collected using the TO-17 Multi-Bed Carbotrap 300 tubes.

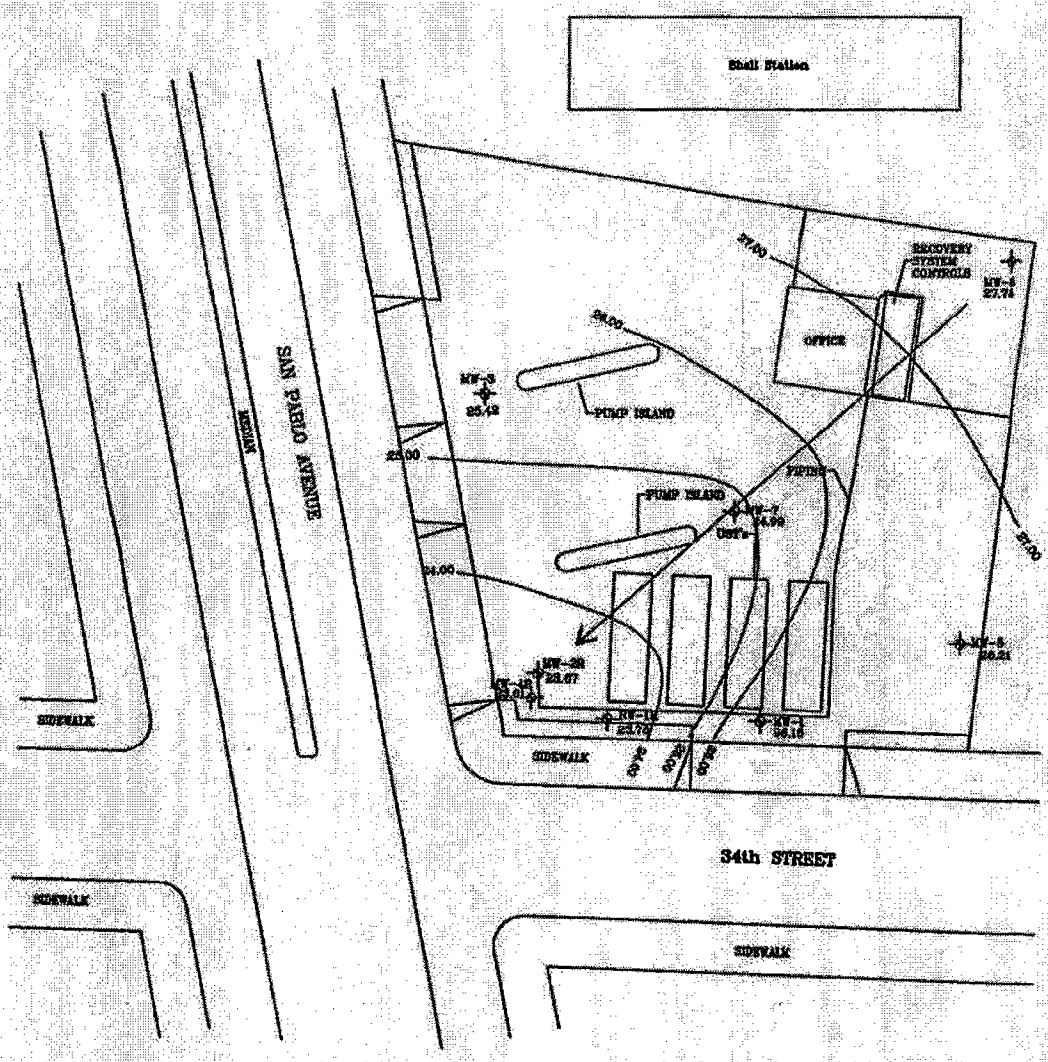
To accomplish the confirmation sampling using SUMMA canisters, it is recommended that a 6-liter sub-atmospheric pressure canister be used. The 6-liter canister will be assembled in series using Teflon tubing attached to the Geoprobe® gas sampling cap which is connected to an air flow controller capable of regulating air flow to 200 mL/min. The SUMMA canister is then connected to the air flow regulator. Since the sub-atmospheric pressure canister is an

evacuated canister (final canister pressure is below atmospheric pressure), the soil vapor sample can be collected without the use of a sample pump. The recommended sample duration is approximately 30 minutes. After 30 minutes, the sample valve is closed, and the canister is labeled and documented on a chain-of-custody form and transported to the project laboratory for analysis of BTEX and TPH-d using EPA Method TO-15. The sample hold-time is up to 30 days; however, Air Toxics recommends that the samples be analyzed within 14 days of collection.

Standard Operating Procedure for Drilling, Soil Sampling, and Analysis

Before field activities are conducted, a soil boring permit for drilling will be obtained from the appropriate permitting agency. The site-specific Health and Safety Plan will be updated as needed. All field personnel on-site will review and sign the site-specific Health and Safety plan, prepared in accordance with OSHA 1910.120, at the start of the field day.

ATTACHMENT C



LEGEND

RECOVERY SYSTEM PIPING

MW-4R RECOVERY WELL LOCATION

MW-1 MONITORING WELL LOCATION

Groundwater elevation data measured on January 17, 2007.

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FEET

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GROUNDWATER CONTOUR MAP
Thrifty Service Station #049
3400 San Pablo Avenue
Oakland, California

FIGURE: 2

REVISION NO: 0

DATE: 03/07