March 28, 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

RE: **Work Plan for Additional Subsurface Investigation and Migration Control**

Zimmerman Property

3442 Adeline Street

Oakland, California

Alameda County Fuel Leak Case No. RO0002936

Clearwater Group Project Number AB013F

Dear Mr. Plunkett,

As the legally authorized representative of the above-reference project location 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.

Sincerely,

Mrs. Steffi Zimmerman

Owner Steffi R. Zimmerman

Steffi R. Zimmerman,

Executor of the Estate of Ronald Zimmerman

CLEARWATER
GROUP
Environmental Services

March 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 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 AB013F

Dear Mr. Plunkett:

Clearwater Group (Clearwater), on behalf of our client, Mrs. Steffi Zimmerman, is pleased to present this *Work Plan for Additional Subsurface Investigation and 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 and dispensing system (see **Figure 2b**) adjacent (to the south) to the roll-up door.

Purpose of Work Plan for Additional Subsurface Investigation and Migration Control

In response to their review of the case file and the two reports, *Underground Storage Tank Closure Report*, dated March 21, 2000, and the *Phase II Subsurface Investigation Report*, dated August 17, 2006, prepared by Clearwater, Alameda County Environmental Health Services (ACEH) in their February 22, 2007, letter (**Attachment A**) requested the preparation of a work plan for the delineation of the hydrocarbon plume in the soil and groundwater.

In an e-mail correspondence dated February 26, 2007 (**Attachment A**), Clearwater staff requested that ACEH staff respond to the recommendations previously made by the client's project manager, Mr. Bill Mouat, for the installation of a groundwater extraction well. ACEH responded via e-mail on February 28, 2007, that although implementation of interim remedial measures may be premature without having first defined the extent of the impact of the hydrocarbon plume, site characterization could be conducted in conjunction with migration control measures.

Background

UST Removal and Site Investigation History

Clearwater supervised the removal of a single-wall underground fuel storage tank (UST) with a capacity of 3,750 gallons from the property on February 22, 2000, under permit from the City of Oakland Fire Department, by Fast-Tek Engineering Support Services (Fast-Tek), of Pt. Richmond, California. Clearwater collected two soil samples and one groundwater sample from the excavation pit and analyzed the samples for total petroleum hydrocarbons as diesel (TPH-d), TPH as gasoline (TPH-g), methyl tertiary butyl ether (MTBE) and BTEX components (benzene, toluene, ethyl benzene, and total xylenes). The analytical results of the soil samples indicated concentrations of up to 850 milligrams per kilogram (mg/Kg) of TPH-d and 920 mg/Kg of TPH-g, in addition to minor levels of BTEX. The groundwater sample from the excavation pit contained 7,400 micrograms

per liter (µg/L) of TPH-d and 34,000 µg/L of TPH-g, with lesser concentrations of BTEX. MTBE was not detected above the reporting limit in either the soil or pit water samples. The depth to the water in the pit at the time of the sample collection was 7 feet below ground surface (bgs). The results of the UST closure were reported in the Clearwater, March 21, 2000, *UST Closure Report, Zimmerman Property, 3442 Adeline Street, Oakland, California*, which was submitted to the City of Oakland Fire Department.

In a facsimile dated May 15, 2006, the City of Oakland Fire Department requested that additional soil and, if necessary, groundwater samples be collected in the area where the former UST was located. The additional soil and groundwater samples were required by the City of Oakland Fire Department so that they may make an accurate determination about contamination at the property.

On June 23, 2006, under the supervision of a Clearwater geologist, Fast-Tek completed four direct-push soil borings to approximately 16 feet bgs. The Geoprobe® Macro-Core Soil Sampling System was used to obtain continuous soil cores and to minimize soil cuttings from the borings. The four soil borings, S1 through S4, were completed around the former UST location (**Figure 2b**). All the borings were driven through or near the sidewalk. A total of 16 soil samples (four per boring) were sent under Chain-of-Custody documentation to Kiff Analytical, LLC (Kiff), of Davis, California, a California Department of Health-certified laboratory for analysis of TPH-d, TPH-g, BTEX and 1,2-dichloroethane/1,2-dibromoethane (1,2-DCA/EDB). One grab groundwater sample was collected through a temporary well casing from each boring, using a separate disposable bailer at each boring, and submitted to Kiff for the same analytical suite as the soil samples.

All the soil samples, except sample S2-14.0 (soil sample from boring S2 at a depth of 14.0 feet bgs), contained reportable concentrations of TPH-d. Reportable concentrations

of TPH-d ranged from a high of 250 mg/Kg in the soil sample from boring S3 at a depth of 7.5 feet bgs (S3-7.5) to a low of 1.2 mg/Kg in the soil sample from boring S1 at a depth of 14.5 feet bgs (S1-14.5). The samples with high concentrations of TPH-d were flagged by the laboratory with a note stating that "hydrocarbons reported as TPH-d do not exhibit a typical diesel chromatographic pattern, these hydrocarbons are higher boiling point than typical diesel fuel."

TPH-g concentrations in soil ranged from below the reporting limit of 1.0 mg/Kg for eight samples to 1,200 mg/Kg for sample S3-7.5. BTEX concentrations were low or below the reporting limit in all the samples, except for samples S2-7.5, S2-12.0, and S3-7.5, which contained primarily total xylenes, at concentrations of 24 µg/L, 2.4 µg/L, and 100 µg/L, respectively. All the soil sample results were below the reporting limit for 1,2-DCA/EDB. **Table 1** presents the Cumulative Soil Sample Analytical Results (results from Year 2000 and the 2006 sampling event).

All the grab groundwater samples contained reportable concentrations of petroleum hydrocarbons. Floating product was observed within the sample vials from each of the borings. TPH-g concentrations ranged from 20,000 µg/L in sample S1-W to 120,000 µg/L in sample S4-W. Because of the high detections of TPH-g, all the TPH-d analyses were reported at below reporting-limit concentrations; however, the elevated TPH-d reporting limits ranged from 4,000 µg/L for sample S2-W to 40,000 µg/L for sample S4-W. All the grab groundwater samples contained reportable concentrations of BTEX components, except for sample S4-W, which was below the reporting limit for toluene, at a reporting limit of 15 µg/L. Sample S2-W contained the highest concentration of BTEX components (7,000 µg/L of benzene, 260 µg/L of toluene, 920 µg/L of ethyl benzene, and 2,800 µg/L of total xylenes). All the grab groundwater sample results were below the reporting limit for 1,2-DCA/EDB. Silica gel clean-up was not used on any of the groundwater samples. **Table 2** presents the Cumulative Groundwater Sample Analytical Results (tank removal Year 2000 data as well as grab groundwater 2006 samples).

Soil Lithology and Hydrology

The soil boring logs indicate that the property's lithology is significantly variable over relatively short distances. In general, the upper five to seven feet consists of silty lean clay soil. Between five to seven feet the lithology includes primarily sandy clayey gravel soil. The clayey gravel extends to a depth of approximately 14 feet in all the borings, where it is underlain by lean clay soil to a depth of at least 16 feet bgs, the maximum depth explored. Boring logs from the June 23, 2006 subsurface investigation event are included as **Attachment B**.

Proposed Subsurface Investigation

Clearwater proposes the installation of eleven soil borings, S5 through S16, to a depth of approximately 16 feet 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 3**).

According to the results of the previous subsurface investigation conducted on June 23, 2006, the highest sorbed-phase concentrations of TPH-g reported were in the soil samples collected from S3 (1,200 mg/Kg) and S4 (820 mg/Kg) at a depth of 7.5 feet bgs. The soil samples collected from approximately the same depth in S1 and S2 contained concentrations of TPH-g at 100 mg/Kg and 460 mg/Kg, respectively. Concentrations of TPH-g reported in the grab water samples collected from each of the soil borings also exhibited the same distribution of hydrocarbon concentrations such that the highest concentrations of TPH-g detected in the groundwater were reported in the samples collected from S3 (23,000 µg/L (S3-W)) and S4 (120,000 µg/L (S4-W)). The San Francisco Bay lies approximately one mile west of the property; therefore, it is assumed that the groundwater flow direction is towards the west.

Clearwater recommends the installation of soil boring S5 to define the presumed upgradient hydrocarbon concentration, soil borings S6 through S9 to define the cross-gradient concentrations, and soil borings S10 through S16 to define the downgradient concentrations. The proposed locations of soil borings S5 through S9 will require City of Oakland permits: including an encroachment permit, traffic permit, and an excavation permit. A soil boring permit received from Alameda County Department of Public Works will be required to complete all twelve soil borings. The proposed locations for soil borings S10 through S16 are within the confines of the client's property; therefore, no access agreements will be required for these borings. The proposed locations for soil borings S10 through S13 along the warehouse wall will determine if additional subsurface investigation will be required in the residential area south west of the source zone. The proposed locations for soil borings S13 through S16 are placed to identify the zero contaminant line presumably downgradient from the source zone. The analytical results from soil borings S10 through S16 will also be considered in determining the direction of groundwater flow; It is hypothesized that high to low contaminant concentrations in groundwater will be detected in a parallel direction of groundwater flow perpendicular from the source area of the former UST location.

Drilling, Soil Sampling, and Analysis

Prior to conducting field activities, Clearwater will obtain a boring permit, 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 claimed 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 C**).

Under supervision of a Clearwater 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 16 feet as groundwater has previously been located at 12 ft 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 using EPA Method 5035 (see 5035SC™ Soil Core Sampler and Procedures in **Attachment C**), placed on dry ice, and submitted to Kiff for analysis of TPH-g and BTEX using EPA Method 8260B. 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, and BTEX. The protocol for setting a temporary well and collecting a grab-groundwater sample, Grab Groundwater Sample Collection Protocol, is provided in **Attachment C**. After the collection of grab-groundwater samples from each temporary well, a mini draw down pump test will be performed to establish local recharge rates 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.

Proposed Migration Control

Once the analytical results from the subsurface investigation event have been received and, Clearwater proposes to install a groundwater extraction trench to provide migration control over the presumed groundwater hydrocarbon plume sourcing from the former UST located at the property. Installation of the groundwater extraction trench is proposed downgradient of the source zone and within the confines of the client's property. Currently the proposal is to install the groundwater extraction trench perpendicular to the source area, however final construction details will be dependant upon the analytical results from the groundwater samples collected from S11 through S16 and the results of the mini draw down pump tests.

Clearwater proposes to install the groundwater extraction trench to a sufficient depth so that groundwater is encountered, although it is anticipated that the trench will not be deeper than the clay layer observed at 16 feet bgs. The depth of the extraction trench will be at least 2 feet below the capillary zone. The groundwater extraction trench will be approximately 4 feet wide and 10 feet long (**Figure 4**). Based on observations made of the soil during the removal of the UST and from the soil boring logs (which identify silty lean clay, sandy clayey gravel, sandy clay, clayey sand and lean clay and sandy lean clay sequences) the need for shoring is not expected, however shoring materials and supplies will be onsite and used as needed. The groundwater extraction trench will be installed at a sufficient distance from the walls of the warehouse so that the foundation will not be

compromised. A 2-foot layer of 3/8-inch pea gravel will be placed at the bottom of the trench, and then a 10-foot-long 12-inch diameter perforated schedule 40 polyvinyl chloride (pvc) pipe will be set on top of the gravel in the center of the trench. Each end of the perforated pipe will be sealed with a 12-inch pvc slip cap. At the middle of the perforated pipe, a T-connector will join an upright 12-inch diameter non-perforated pipe. The remaining area of the groundwater extraction trench will be backfilled with 3/8-inch pea gravel. A groundwater extraction pump (or sump pump) with low level float switches will be set at the bottom of the vertical pipe. The pump will then be connected for discharge to a 10,000-gallon (or greater) holding tank using a 2-inch inner diameter hose. The electricity for the extraction pump will be supplied by an existing secure line within the warehouse.

Groundwater samples will be collected from the holding tank influent sampling port on the holding tank upon startup of the extraction system and then periodically thereafter. For disposal purposes, additional groundwater samples collected from the holding tank once it is full will be required for waste profiling. Initially, the extracted groundwater will be stored in the holding tank until removal and disposal can be arranged with the appropriate disposal contractor. Depending on the levels of contamination and the amount of groundwater extracted from the trench, Clearwater recommends the use of a temporary groundwater treatment system and disposal of the treated water into the sanitary sewer under permit from the East Bay Municipal Utilities District (EBMUD). Groundwater extraction is recommended until the concentrations of detected hydrocarbons reach acceptable closure levels established by the ACEH.

During the installation of the groundwater extraction trench, the non-saturated soil removed from the trench will be placed in standard roll-off disposal bins. The bins will be lined with visqueen and stored onsite until disposal can be arranged with the proper disposal facility. The saturated soil will be placed in de-watering boxes until the majority of the liquids are separated from the soil. The groundwater separated from the saturated

soil will be collected into a basin at the bottom of the de-watering box, and a sump pump will be used to periodically pump the groundwater into 55-gallon DOT drums which will also be stored onsite until disposal can be arranged with InStrat Disposal Facility, located in Rio Vista, California.

To complete the waste profiling for the soil, a minimum of one 4-point composite soil sample will be collected and analyzed for concentrations of TPH-d by EPA Method 8015M, TPH-g, and BTEX by EPA Method 8260B. The soil will also be analyzed for concentrations of heavy metals referred to as Title 22 metals from California Code of Regulations (CCR Title XXII). The list includes Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Lead (Pb), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silver (Ag), Thallium (Tl), Vanadium (V), and Zinc (Zn).

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.

CLEARWATER
GROUP, INC.
Environmental Services

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 DHS-certified laboratory related to the work performed by Clearwater Group.

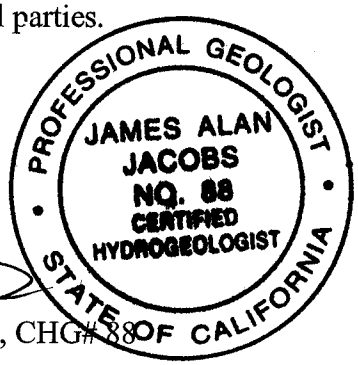
Information and interpretation presented herein are for the sole use of the client and regulating agency. A third party should not rely upon the information and interpretation contained in this document.

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

FIGURES

Figure 1: Site Location Map

Figure 2a: Site Vicinity Map

Figure 2b: Site Plan

Figure 3: Proposed Groundwater Extraction Trench and Soil Boring Locations

Figure 4: Proposed Groundwater Extraction Trench

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 Feb. 22, 2007
E-mail train dated February 26, 2007

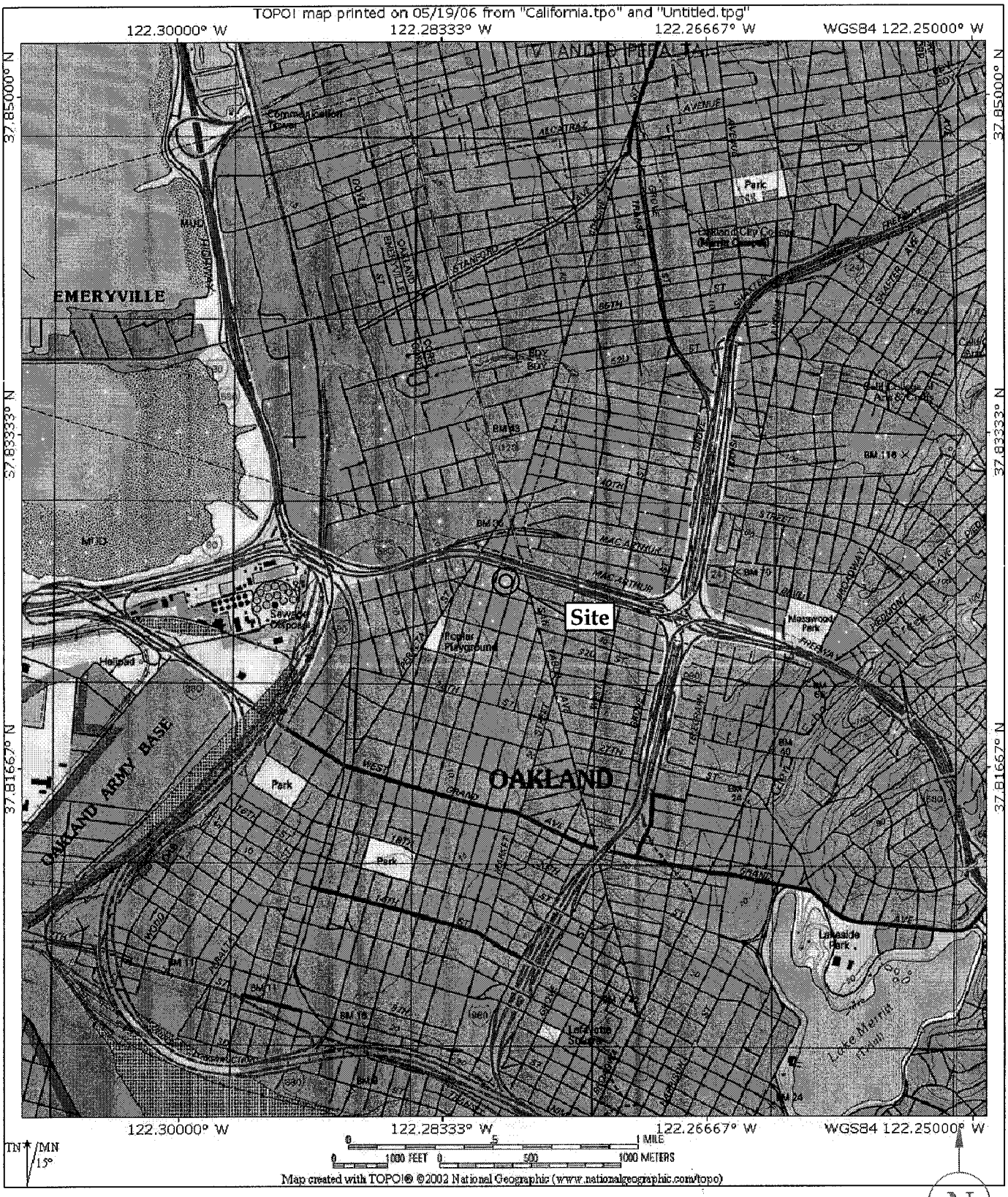
Attachment B: Boring Logs for Soil Borings S1 through S4

Attachment C: Clearwater Field Protocols:
Clearwater Direct-Push Drilling Investigation Procedures
5035SC™ Soil Core Sampler and Procedures
Grab Groundwater Sample Collection Protocol

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

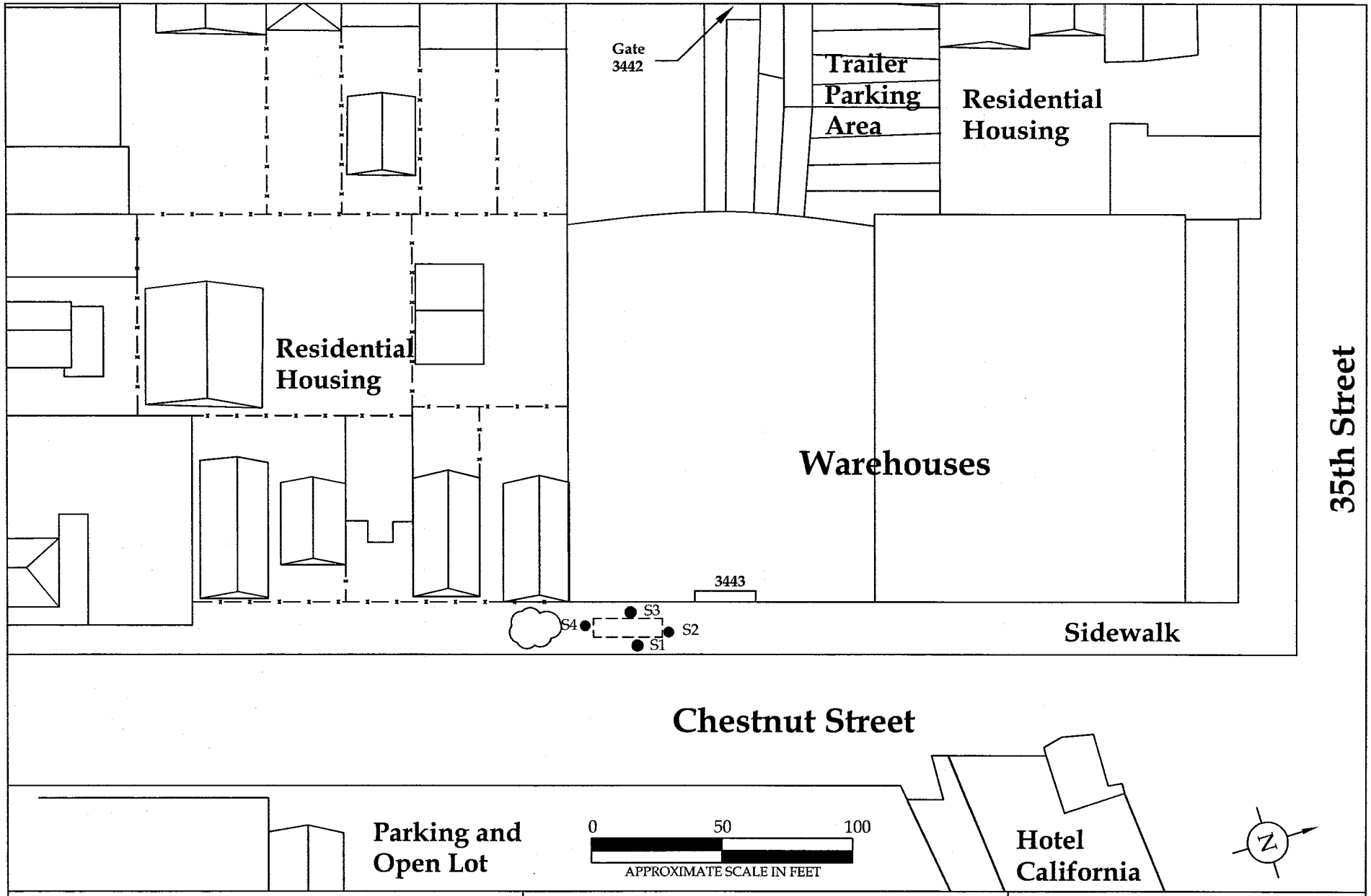


SITE LOCATION MAP

3442 Adeline Street
Oakland, California

CLEARWATER GROUP

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



LEGEND

- ● S1-S4 Soil Boring Locations
- [ ] Former UST Location
- —x—x— Fence
- Tree

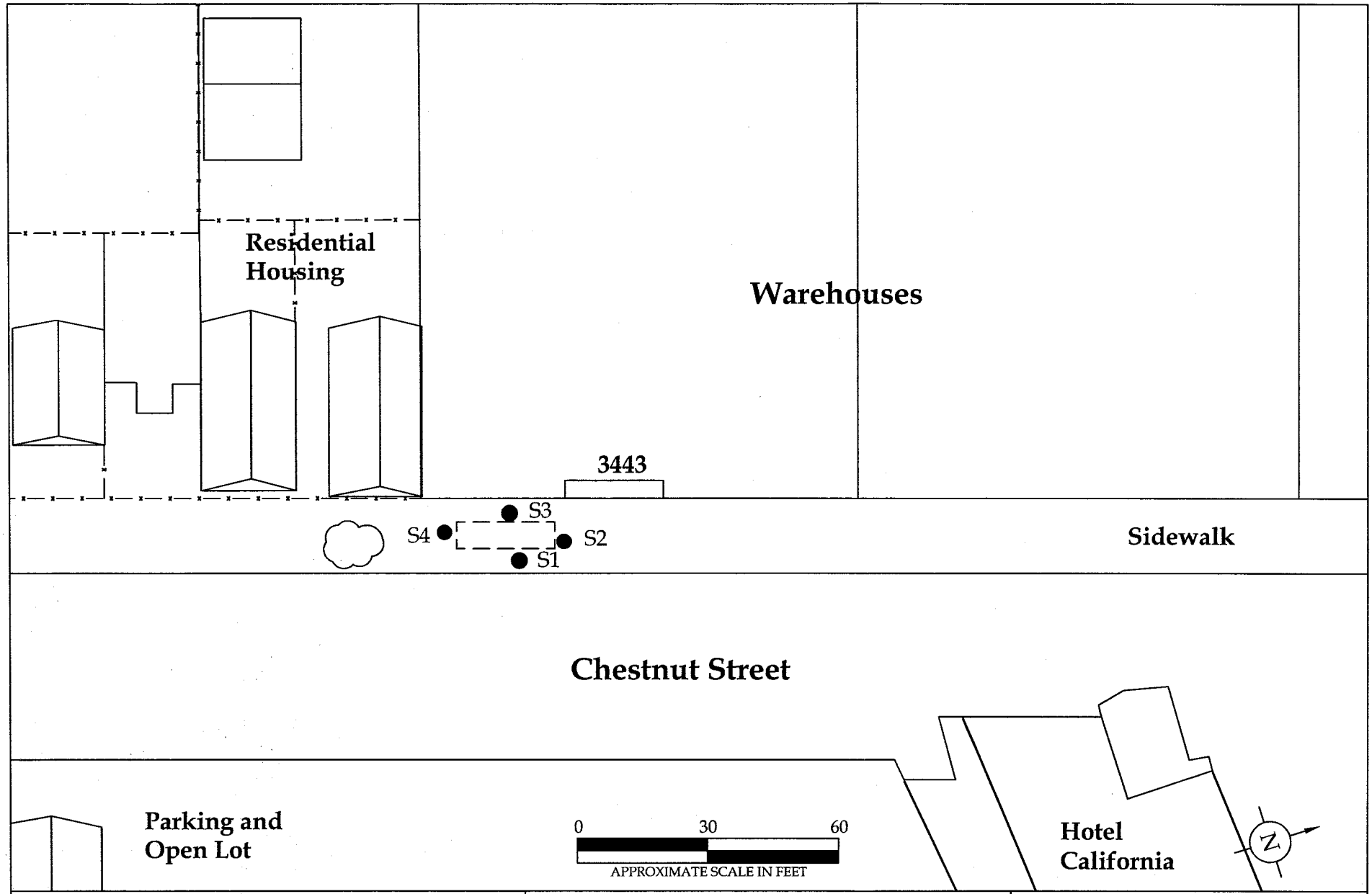
Site Vicinity Map

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

CLEARWATER GROUP

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

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



LEGEND

- S1-S4 Soil Boring Locations
- Former UST Location
- Fence
- Tree

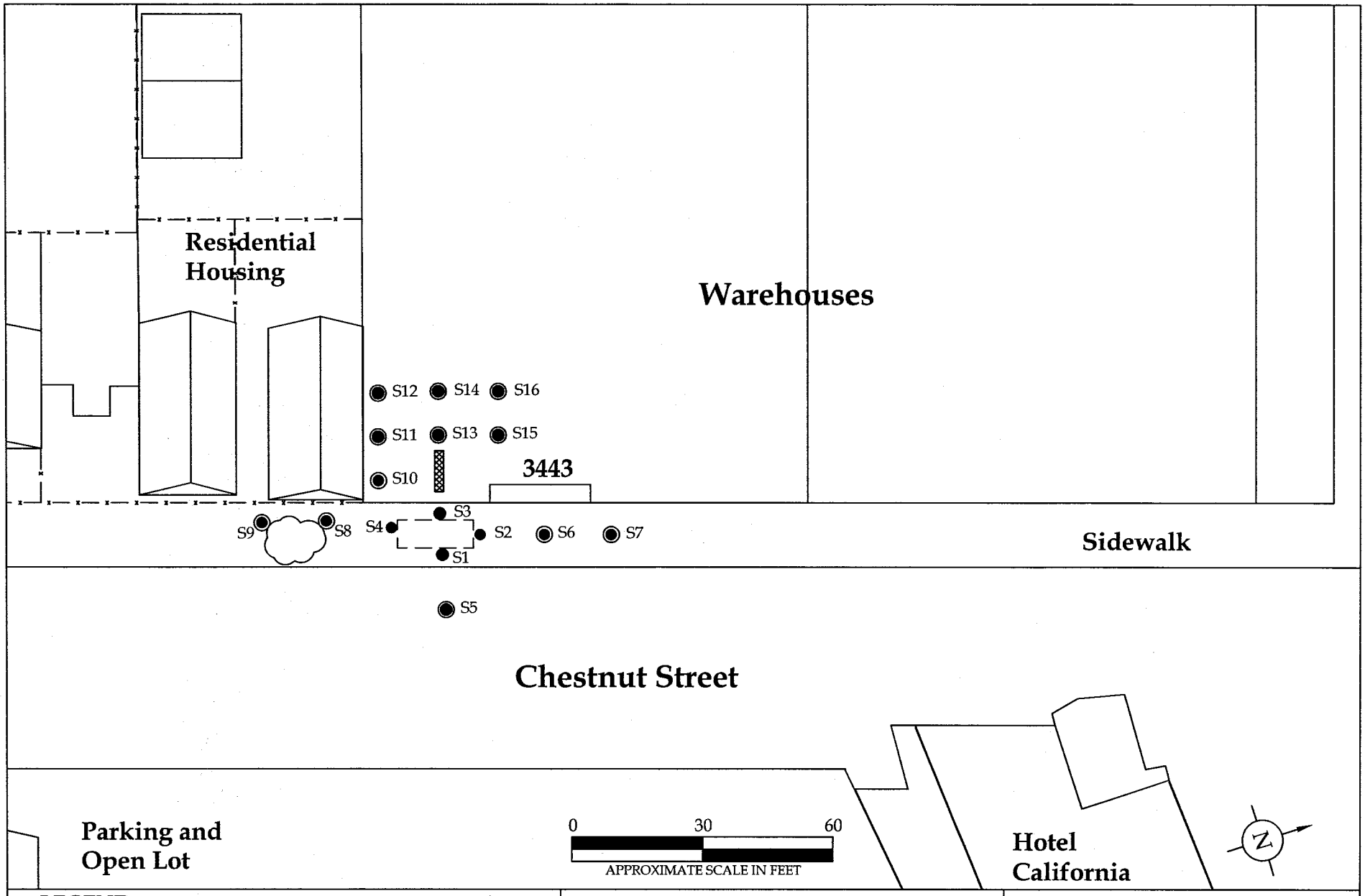
Site Plan

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

CLEARWATER GROUP

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

\\Tagi\Shares\Department\Jobs\AB013 Zimmerman\AB013F Workplan\Fig 2b Site Plan



LEGEND

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

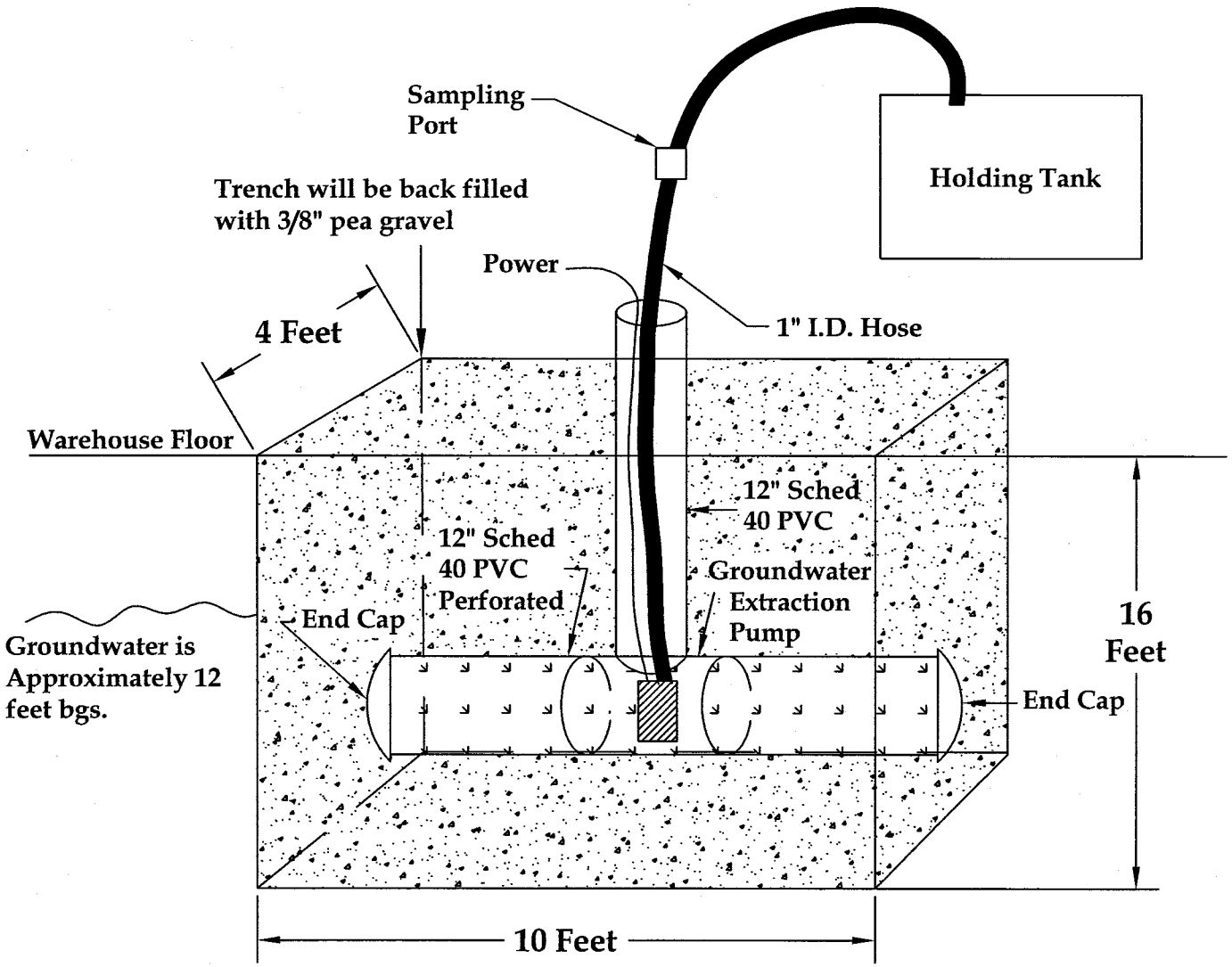
Proposed Groundwater Extraction Trench and Soil Boring Locations

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

CLEARWATER GROUP

Project No.	Figure Date	Figure
AB013F	**3/07**	**3**

\\Tagi\Shares\Department\Jobs\AB013 Zimmerman\AB013F Workplan\Fig 3 Proposed Groundwater Extraction tench and Soil Boring Locations



Proposed Groundwater Extraction Trench

3442 Adeline Street / 3433 Chestnut Street
Oakland CA.

CLEARWATER GROUP		
Project No. **AB013F**	Figure Date **3/07**	Figure **4**

\\Tagi\Shares\Department\Jobs\AB013 Zimmerman\AB013F Workplan\Fig 4 Proposed Groundwater Extraction Tench

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

February 22, 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 for the above referenced site including the reports entitled, "Phase II Subsurface Investigation," dated August 17, 2006 and "Underground (UST) Closure Report" dated March 21, 2000 prepared by Clearwater Group Inc. The Phase II report summarizes results from four soil borings advanced at the site on June 23, 2006. The soil borings were located adjacent to the former UST in the sidewalk on the northeast corner of the property. Petroleum hydrocarbons were detected in soil and groundwater samples collected from each of the four soil borings. Total petroleum hydrocarbons (TPH) as gasoline, TPH as diesel and benzene were detected in soil at concentrations up to 1,200 milligrams per kilogram (mg/kg), 850 mg/kg and 1.3 mg/kg, respectively. Additionally, TPHg, TPHd and benzene were detected in groundwater at concentrations up to 120,000 micrograms per liter (µg/L), 40,000 µg/L and 7,000 µg/L, respectively.

Based on the concentrations of TPH detected in soil and groundwater, and considering that the Phase II investigation was confined to the area immediately adjacent to the former UST an additional investigation is required to determine the extent of soil and groundwater contamination in the vicinity of the former UST. We recommend that your investigation incorporate expedited site assessment techniques to collect soil samples, and depth-discrete groundwater samples prior to the installation of groundwater monitoring wells. Other options for additional investigation or remediation may also be appropriate at your site. We request that you immediately pursue any off-site access agreements that you may need to complete your investigation activities.

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:

- **March 30, 2007** – 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

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

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

Donna Drogos, ACEH
Steven Plunkett, ACEH
File

You forwarded this message on 2/28/2007 2:16 PM.

Jessica Moreno

From: Plunkett, Steven, Env. Health [steven.plunkett@acgov.org] **Sent:** Mon 2/26/2007 2:58 PM
To: Jessica Moreno
Cc: bandsm1@comcast.net
Subject: RE: RO 0002936
Attachments:

Jessica,

We think it may be premature to implement interim remedial measures without first having defined the extent of the problem. However we also understand the desire of your client to begin interim remediation. In this instance, ACEH requires proper site characterization coupled with the interim remedial activities that have been proposed for the site. The site characterization can be conducted in conjunction with the migration control measures, which may help mitigate contamination in the source area. Once the site characterized and interim remedial measure have been implemented, it will be important to established groundwater flow conditions and monitor the dissolved phase hydrocarbon plume.

Currently there is no data to determine the lateral extent of petroleum hydrocarbon contamination in soil and groundwater. The limited data available for the site is directly adjacent to the former UST location. Moreover, no data has been collected to determine the hydrogeologic conditions at the site.

I hope this helps to clarify any uncertainty regarding site characterization and interim remedial activities.

Steven Plunkett
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
510-383-1767
510-337-9355 Fax
steven.plunkett@acgov.org

From: Jessica Moreno [mailto:JMoreno@clearwatergroup.com]
Sent: Monday, February 26, 2007 1:17 PM
To: Plunkett, Steven, Env. Health
Cc: steffirz@gmail.com; Jim Jacobs; Olivia Jacobs; bandsm1@comcast.net
Subject: RO 0002936

Greetings Steven,
Clearwater is in receipt of the February 22, 2007 letter addressed to Mrs Steff Zimmerman regarding the property located at 3442 Adeline Street, Oakland, CA. The letter is in response to the Phase II Subsurface Investigation report dated August 17, 2006 and the UST Closure report dated March 21, 2000.

The way I read the letter is that you are requesting a work plan for additional investigation to define the extent of soil and groundwater contamination. It is my understanding that our client's project manager, Mr. Bill Mouat, has been in contact with your office regarding the installation of a groundwater extraction well. We have discussed the installation of the groundwater extraction well with Mr. Mouat and agree that it may provide hydraulic control over the hydrocarbon plume in the groundwater and expedite site clean up. However the February 22nd letter does not reference the extraction well and I am contacting you for clarification.

Is it your expectation to receive a work plan for additional investigation sans extraction well, or are you expecting to receive a work plan that addresses both the need to define the hydrocarbon plume and the installation of a groundwater extraction well? Our current agreement with Mrs. Zimmerman is for the preparation of a groundwater extraction well work plan. If you could clarify your request for this project I would greatly appreciate it as we have just one month to write the work plan and I do not want to delay the project due

to budget issues. I appreciate your assistance with this matter. With your response, would you be so kind as to supply the global ID for this site?

Thank You.
Sincerely,
Jessica Moreno
Project Manager
Clearwater Group
229 Tewksbury Ave.
Pt. Richmond, CA 94801
510-590-1096
jmoreno@clearwatergroup.com

ATTACHMENT B

BORING/WELL CONSTRUCTION LOG

CLEARWATER GROUP, INC.
Environmental Services

229 Tewksbury Ave, Point Richmond, California 94801

CLIENT/ **Zimmerman Property**
LOCATION **3442 Adeline Street**
Oakland, CA

DRILLING CONTRACTOR **Fast-Tek**
DRILL RIG OPERATOR **Eric Austin**
DRILL RIG TYPE **Geo Probe 5400**
LOGGED BY **Robert Nelson**
REVIEWED BY **James A. Jacobs, P.G.,C.H.G.**
PLANNED USE
DATES DRILLED: **6/23/06**
DRILLING START **N/A**
DRILLING FINISH **N/A**
Approximate First Encountered Water Depth
Approximate Stabilized Water Depth

BORING/ WELL NUMBER **S1**
PROJECT NUMBER **AB013E**
BORING DEPTH **16'**
WELL DEPTH **N/A**
SCREEN SLOT SIZE **N/A**
BORE/CASE DIAMETER **2"**
FILTER PACK **N/A**
WELL MATERIAL **N/A**
DEPTH TO WATER **N/A**

DEPTH (feet)	SAMPLING: BLOWS/ 6" INTERVAL	SAMPLING: INTERVAL	SAMPLING: RECOVERY	SAMPLING: ANALYTICAL	WATER LEVEL	OVM READING (ppm)	ESTIMATED PERCENT: GRAVEL	ESTIMATED PERCENT: SAND	ESTIMATED PERCENT: FINES	LITHOLOGY	USCS SYMBOL	LITHOLOGIC DESCRIPTION/ NOTES	WELL CONSTRUCTION DETAILS
0-1						0						(0.0- 0.3) Concrete 4"	Cement
1-5						0 0 0 0					CL	(0.3- 5.0) Silty Lean Clay (CL), very stiff, dry to moist, trace of fine sand, trace roots and root burrows, no odor, dark gray (10YR 4/1).	
5-14						0 60 110 120 40 40					GC	(5.0- 14.0) Sandy Clayey Gravel (GC), moist, moderate odor, dark green gray (5GY 4/1).	Bentonite
14-16						0					CL	(14.0- 16.0) Lean Clay, very stiff, moist to wet, trace of fine sand, no odor, streaked olive (5Y 5/4) on light olive brown (2.5Y 5/3)	

BORING/WELL CONSTRUCTION LOG

CLEARWATER GROUP, INC.
Environmental Services

229 Tewksbury Ave, Point Richmond, California 94801

CLIENT/ **Zimmerman Property**
LOCATION **3442 Adeline Street**
Oakland, CA

DRILLING CONTRACTOR **Fast-Tek**
DRILL RIG OPERATOR **Eric Austin**
DRILL RIG TYPE **Geo Probe 5400**
LOGGED BY **Robert Nelson**
REVIEWED BY **James A. Jacobs**
PLANNED USE
DATES DRILLED: **6/23/06**
DRILLING START **N/A**
DRILLING FINISH **N/A**
▽ Approximate First Encountered Water Depth
▼ Approximate Stabilized Water Depth

BORING/ WELL NUMBER **S2**
PROJECT NUMBER **AB013E**
BORING DEPTH **16'**
WELL DEPTH **N/A**
SCREEN SLOT SIZE **N/A**
BORE/CASE DIAMETER **2"**
FILTER PACK **N/A**
WELL MATERIAL **N/A**
DEPTH TO WATER **N/A**

DEPTH (feet)	SAMPLING: BLOWS/ 6" INTERVAL	SAMPLING: INTERVAL	SAMPLING: RECOVERY	SAMPLING: ANALYTICAL	WATER LEVEL	OVM READING (ppm)	ESTIMATED PERCENT: GRAVEL	ESTIMATED PERCENT: SAND	ESTIMATED PERCENT: FINES	LITHOLOGY	USCS SYMBOL	LITHOLOGIC DESCRIPTION/ NOTES	WELL CONSTRUCTION DETAILS
0-1						0					CL	(0.0- 0.3) Concrete 4"	Cement
1-2												(0.3- 3.5) Dark Gray Silty Clay (CL), stiff, dry to moist, trace of fine sand no odor, Black (10YR 2/1)	
2-3						0							
3-4													
4-5						0					CL	(3.5- 6.5) Silty Clay (CL) very stiff, dry, trace of very fine sand, no odor above 5', dark greenish gray (5GY4/1)	
5-6													
6-7						40					GC	(6.5- 7.0) Clayey Gravel layer, 40% fine subangular gravel, dark greenish gray (5GY 4/1).	
7-8						0					CL	(7.0- 11.5) Silty Clay (CL), very stiff, dry to moist, mottled and streaked dark greenish gray (5GY 4/1) on olive brown (2.5Y 4/3)	Bentonite Chips
8-9													
9-10						0							
10-11													
11-12						0							
12-13						20					GC	(11.5- 14.5) Clayey Gravel with sand (GC), wet, dense, 40% fine subangular gravel, 30% fine to coarse sand, 30% clay, moderate odor.	
13-14													
14-15						0					CL	(14.5- 16.0) Lean Clay, very stiff, moist, trace fine sand, no odor light olive brown (2.5Y 5/3)	
15-16						0						Sharp Contact at 14.5'	
16-17												(14.5-15.5) Heavy iron oxide staining	
17-18													
18-19													
19-20													
20-21													
21-22													
22-23													
23-24													
24-25													
25-26													
26-27													
27-28													
28-29													
29-30													

BORING/WELL CONSTRUCTION LOG

CLEARWATER GROUP, INC.
Environmental Services

229 Tewksbury Ave, Point Richmond, California 94801

CLIENT/ **Zimmerman Property**
LOCATION **3442 Adeline Street**
Oakland, CA

DRILLING CONTRACTOR **Fast-Tek**
DRILL RIG OPERATOR **Eric Austin**
DRILL RIG TYPE **Geo Probe 5400**
LOGGED BY **Robert Nelson**
REVIEWED BY **James A. Jacobs, P.G.,C.H.G.**
PLANNED USE
DATES DRILLED: **6/23/06**
DRILLING START **N/A**
DRILLING FINISH **N/A**
Approximate First Encountered Water Depth
Approximate Stabilized Water Depth

BORING/ WELL NUMBER **S3**
PROJECT NUMBER **AB013E**
BORING DEPTH **16'**
WELL DEPTH **N/A**
SCREEN SLOT SIZE **N/A**
BORE/CASE DIAMETER **2"**
FILTER PACK **N/A**
WELL MATERIAL **N/A**
DEPTH TO WATER **N/A**

DEPTH (feet)	SAMPLING: BLOWS/ 6" INTERVAL	SAMPLING: INTERVAL	SAMPLING: RECOVERY	SAMPLING: ANALYTICAL	WATER LEVEL	OVM READING (ppm)	ESTIMATED PERCENT: GRAVEL	ESTIMATED PERCENT: SAND	ESTIMATED PERCENT: FINES	LITHOLOGY	USCS SYMBOL	LITHOLOGIC DESCRIPTION/ NOTES	WELL CONSTRUCTION DETAILS
0-1						0						(0.0- 0.3) Concrete 4"	Cement
1-3						0					CL	(0.3- 6.0) Silty Lean Clay (CL), very stiff, moist, trace of fine sand, no odor, trace roots and root burrows, dark gray (10YR 4/1).	
3-5						0							
5-6						20						Non-distinct contact at 6'	
6-7						100					CL	(6.0- 7.5) Sandy Clayey (CL), dense, moist, micaceous, ~40% fine sand, moderate odor, trace gravel above 7.5', dark greenish gray (5GY 4/1).	
7-10											GC	(7.5- 14.0) Sandy Clayey Gravel, dense, moist, 40% fine subrounded gravel, 30% fine to coarse sand, 30% clay, weak odor, olive gray (5Y 4/2).	Bentonite
10-12						2							
12-13						2							
13-14						0							
14-15						0					CL	(14.0- 16.0) Lean Clay, very stiff, moist to wet, trace fine sand, no odor, streaked olive (5Y 4/3) on light olive brown (2.5Y 5/4)	
15-16						0							
16-30													

CLEARWATER GROUP, INC.
Environmental Services

229 Tewksbury Ave, Point Richmond, California 94801

CLIENT/ **Zimmerman Property**
LOCATION **3442 Adeline Street**
Oakland, CA

BORING/WELL CONSTRUCTION LOG

DRILLING CONTRACTOR **Fast-Tek**
DRILL RIG OPERATOR **Eric Austin**
DRILL RIG TYPE **Geo Probe 5400**
LOGGED BY **Robert Nelson**
REVIEWED BY **James A. Jacobs, P.G.,C.H.G.**
PLANNED USE
DATES DRILLED: **6/23/06**
DRILLING START **N/A**
DRILLING FINISH **N/A**
▽ Approximate First Encountered Water Depth
▼ Approximate Stabilized Water Depth

BORING/ WELL NUMBER **S4**
PROJECT NUMBER **AB013E**
BORING DEPTH **16'**
WELL DEPTH **N/A**
SCREEN SLOT SIZE **N/A**
BORE/CASE DIAMETER **2"**
FILTER PACK **N/A**
WELL MATERIAL **N/A**
DEPTH TO WATER **N/A**

DEPTH (feet)	SAMPLING: BLOWS/ 6" INTERVAL	SAMPLING: INTERVAL	SAMPLING: RECOVERY	SAMPLING: ANALYTICAL	WATER LEVEL	OVM READING (ppm)	ESTIMATED PERCENT: GRAVEL	ESTIMATED PERCENT: SAND	ESTIMATED PERCENT: FINES	LITHOLOGY	USCS SYMBOL	LITHOLOGIC DESCRIPTION/ NOTES	WELL CONSTRUCTION DETAILS
0-1						0					CL	(0.0- 0.3) Concrete 4"	Cement
1-2												(0.3- 4.5) Silty Lean Clay, stiff, moist, no odor, black (10YR 2/1).	
2-3						0							
3-4													
4-5						0							
5-6											CL	(4.5- 6.5) Sandy Lean Clay, stiff, moist, 20% very fine sand, dark greenish gray (10Y 4/1).	
6-7						0							
7-8						2					CL	(6.5- 7.0) 30% medium sand.	
8-9											GC	(7.0- 9.0) Sandy Graveley Clay (GC), dense, moist, 35% fine to coarse sand, strong odor, 40% sandstone and chert gravel, dark olive gray (5Y 3/2).	Bentonite
9-10						145					CL	(9.0- 10.5) Sandy Lean Clay (CL), stiff, moist, trace fine sand, yellowish brown (10YR 5/6).	
10-11											SC		
11-12					▽	Out of Range					GM	(10.5- 11.0) Clayey Sand (SC), dense, moist to wet, micaceous, strong odor, trace fine gravel, olive (5Y 4/3).	
12-13												(11.0- 13.5) Sandy Silty Gravel, dense, wet, dark olive gray (5Y 3/2).	
13-14						0					CL		
14-15						0						(13.5- 16.0) Sandy Lean Clay, stiff to soft, wet, very fine sand, olive (5Y 5/3)	
15-16													
16-30													

ATTACHMENT C

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

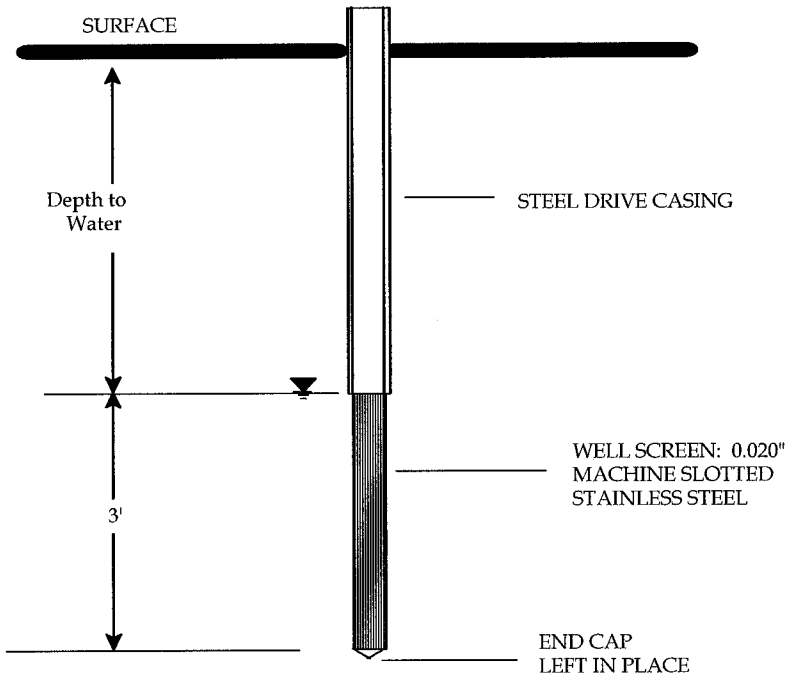


Figure 1

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.

Clearwater Group
229 Tewksbury Avenue
Point Richmond, CA 94801
Tel: 510-307-9943; Fax: 510-232-2823

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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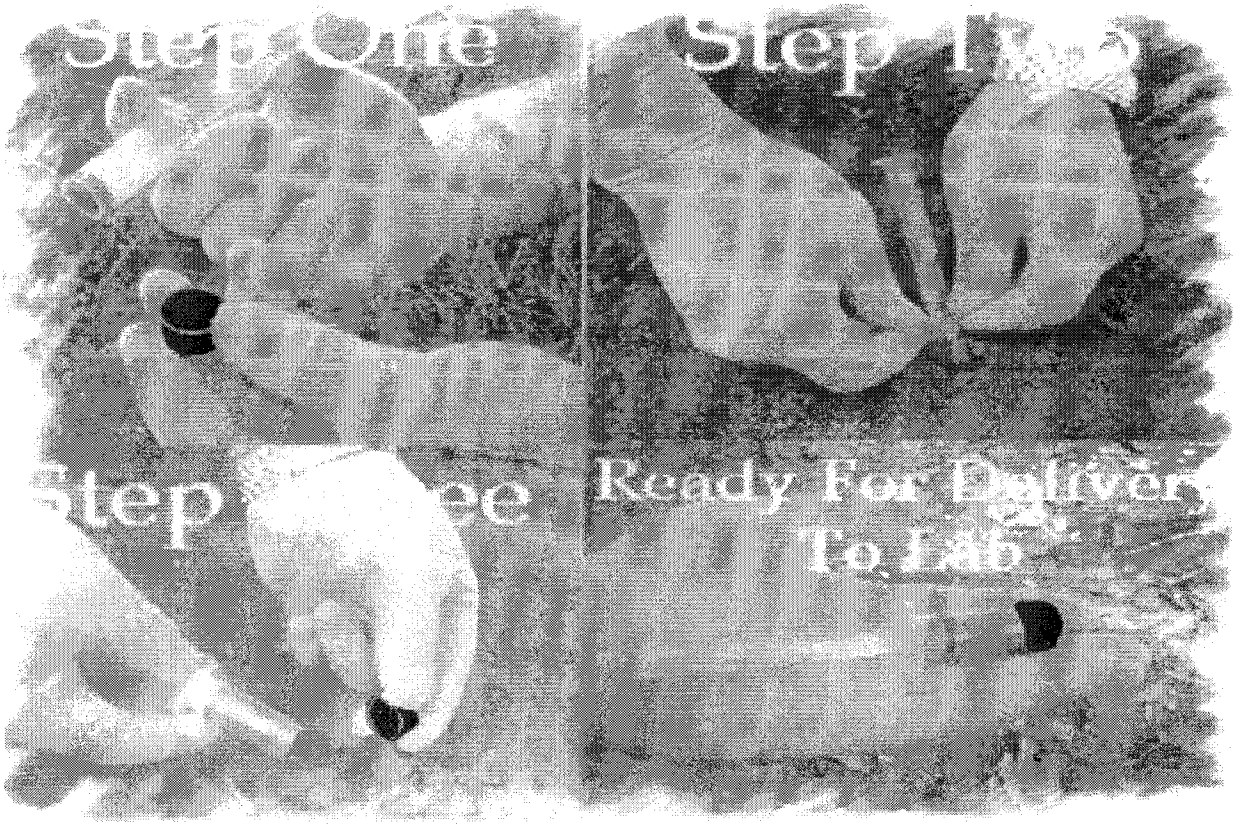
Clearwater Group
229 Tewksbury Avenue
Point Richmond, CA 94801
Tel: 510-307-9943; Fax: 510-232-2823



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.

Clearwater Group
229 Tewksbury Avenue
Point Richmond, CA 94801
Tel: 510-307-9943; Fax: 510-232-2823

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.