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Alameda County  
Environmental Health

October 31, 2007

WORKPLAN  
for  
ADDITIONAL SOIL, GROUNDWATER, SOIL VAPOR AND INDOOR AIR ASSESSMENT  
at  
Lim Property  
250 8<sup>th</sup> Street  
Oakland, California

Submitted by:  
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## **1.0 INTRODUCTION**

This report presents Aqua Science Engineers, Inc.'s (ASEs) workplan for an additional soil, groundwater, soil vapor and indoor air investigation at the Lim Property located at 250 8th Street in Oakland, California (Figures 1 and 2). This workplan was prepared as required by the Alameda County Health Care Services Agency (ACHCSA) in their letter dated August 28, 2007.

## **2.0 SITE HISTORY AND BACKGROUND INFORMATION**

### **2.1 May 1992 Underground Storage Tank Removal**

A gasoline service station previously occupied the site. In May 1992, ASE removed ten underground fuel storage tanks (USTs) from the site. The USTs consisted of one (1) 10,000-gallon gasoline tank, one (1) 5,000-gallon diesel tank, three (3) 2,000-gallon gasoline tanks, one (1) 2,000-gallon diesel tank, three (3) 500-gallon gasoline tanks and one (1) 250-gallon waste oil tank. Up to 10,000 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) and 5,900 ppm total petroleum hydrocarbons as diesel (TPH-D) were detected in soil samples collected during the tank removal.

### **2.2 December 1992 through March 1993 Soil Overexcavation**

Between December 1992 and March 1993, All Environmental of San Ramon, California overexcavated 1,762 cubic yards of soil from the site and off-hauled the soil to the BFI Landfill in Livermore, California for disposal (Figure 2). Analytical results show that all on-site soil with hydrocarbon concentrations greater than 10 ppm was removed from the site with the exception of soil along the 8th Street shoring. Up to 1,800 ppm TPH-G and 120 ppm TPH-D were detected in soil samples collected along the shoring indicating that contamination likely extends below 8th Street. This contamination left in place may still be a source for groundwater contamination.

### **2.3 January 1995 Monitoring Well Installation**

In January 1995, ASE installed monitoring wells MW-1 and MW-2 at the site (Figure 2). High hydrocarbon concentrations were detected in monitoring well MW-2, downgradient of the site. Moderate hydrocarbon concentrations were detected in on-site monitoring well MW-1.

### **2.4 January 1996 Borings and Groundwater Sampling**

In July 1996, ASE collected groundwater samples from each monitoring well and drilled borings BH-C and BH-D to further define the width of the hydrocarbon plume downgradient of the site. Relatively high hydrocarbon concentrations were detected in groundwater samples collected from monitoring well MW-2, downgradient of the site. Slightly lower but still very high hydrocarbon concentrations were detected in groundwater samples collected from boring BH-D, west of monitoring well MW-2. Very low hydrocarbon concentrations were detected in groundwater samples collected from monitoring well MW-1, located on the site, and boring



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BH-C, east of monitoring well MW-2. Based on these findings, the plume appeared to be moving to the south of Excavation I.

## 2.5 Quarterly Groundwater Monitoring

In April 1995, ASE began a quarterly groundwater monitoring program for the site. Since that time, the site has been on either a quarterly or semi-annual sampling schedule. Depth to groundwater data and analytical results for all groundwater sampling periods are tabulated in Tables One through Three.

## 2.6 June 1997 Remedial Action Plan

On June 5, 1997, ASE prepared a remedial action plan (RAP) addressing the need for groundwater remediation at the site, describing the appropriateness of several remedial options and choosing an option. Low flow hydrogen peroxide injection was chosen as the groundwater remediation option of choice for the site in order to raise dissolved oxygen (DO) concentrations in the groundwater to stimulate in-situ bioremediation.

## 2.7 February 1999 Hydrogen Peroxide Remediation System Installation

On February 2 and 3, 1999, five (5) injection wells were installed at the site (Figure 2). On February 18, 1999, the injection system began operation. It delivered a water and hydrogen peroxide solution to each injection well on a constant basis. DO concentrations within the injection wells rose to above 20 ppm. Groundwater in downgradient monitoring well MW-2 never showed a measurable increase in DO.

## 2.8 June 1999 Discovery of Free-Floating Hydrocarbons

On June 22, 1999, while measuring the DO content within the injection wells, ASE discovered that the DO probe had a very strong gasoline odor when removed from injection well IW-5. A clear bailer was inserted into IW-5 to check for the presence of free-floating hydrocarbons. The bailer contained approximately 18-inches of what appeared to be aged gasoline. On June 24, 1999, ASE returned to the site with an interface probe to accurately measure the thickness of the free-floating hydrocarbons. On that day, 1.75-feet of free-floating hydrocarbons was measured on the water surface in IW-5. Injection well IW-4 (15-feet east of IW-5) was measured with the interface probe and did not contain a measurable thickness of floating hydrocarbons. On June 24, 1999, ASE bailed the free-floating hydrocarbons from IW-5 until only a sheen was present on the water surface. Approximately 3 gallons of product was removed from IW-5. ASE continued to measure and bail the floating product within well IW-5 on a bi-weekly basis.

## 2.9 January 2000 Monitoring Well Installation

In January 2000, ASE installed groundwater monitoring wells MW-3 and MW-4, east of injection well IW-5 and monitoring well MW-2 (Figure 2). High hydrocarbon concentrations



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were detected in groundwater samples collected from both of these wells, including up to 140,000 parts per billion (ppb) TPH-G, 13,000 ppb TPH-D and 22,000 ppb benzene.

#### 2.10 April 2000 Groundwater Sampling

In April 2000, ASE collected groundwater samples from all four monitoring wells. Elevated hydrocarbon concentrations were detected in groundwater samples collected from monitoring wells MW-2, MW-3 and MW-4, including up to 240,000 ppb TPH-G, 700,000 ppb TPH-D and 35,000 ppb benzene. Monitoring well MW-3 contained free-floating hydrocarbons.

#### 2.11 Hydrogen Peroxide System Discontinuation

On November 27, 2000, with the approval of the Alameda County Health Care Services Agency, ASE turned off the hydrogen peroxide injection system since there was no noticeable DO increase in downgradient monitoring wells MW-2 and MW-4 on the west side of 8<sup>th</sup> Street.

#### 2.12 May 2002 Monitoring Well Installation

In May 2002, ASE installed groundwater monitoring wells MW-5 and MW-7 south of the site, across 8th Street, and MW-6 northwest of the site approximately 70 feet west of existing monitoring well MW-3 (Figure 2). Low concentrations of MTBE were identified in groundwater samples collected from wells MW-5 and MW-6. High concentrations of petroleum hydrocarbons were identified in well MW-7, including up to 38,000 ppb TPH-G and 890 ppb benzene.

#### 2.13 October 2004 Dual-Phase Extraction Event

In October 2004, CalClean mobilized to the site with a truck-mounted Dual-Phase Extraction (DPE) system to perform both a DPE pilot test and a 14-day DPE interim remediation event at the site. At the completion of the DPE interim remediation event, a total of 94,470 gallons of free-product and groundwater were removed from three extraction wells. The average TPH-G concentration in the extracted groundwater was 13,900 ppb; the average benzene concentration of that extracted groundwater was 780 ppb. The extracted groundwater was treated on-site with activated carbon vessels, and then discharged, under permit, to the East Bay Municipal Utilities District (EBMUD) sanitary sewer system on-site.

A total of 2.3 million cubic feet of hydrocarbon-laden vapors were extracted from three extraction wells during the 15 day event. Based on field measurements and laboratory analytical data, over 7,000 pounds of petroleum hydrocarbons were extracted from three extraction wells during the 15-day event. This equates to approximately 1,150 gallons of petroleum hydrocarbons. The extracted vapors were treated on-site by CalClean's thermal oxidizer. Based on the success of this DPE event, ASE recommended a second DPE event for the site prior to designing and installing a long-term remediation system.



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#### 2.14 Current Quarterly Groundwater Monitoring Program

The site is currently on a quarterly groundwater monitoring program. Depth to groundwater and analytical results for all historical groundwater sampling events are tabulated in Tables One through Three.

#### 2.15 October 2006 Workplan for Additional Assessment, Sensitive Receptor Survey, Area Well Survey, Conduit and Potential Preferential Pathway Survey, and Conceptual Site Model

In October 2006, ASE prepared a workplan to conduct an additional soil and groundwater assessment at the site. Also included in this document were a sensitive receptor survey, an area well survey, a conduit and potential preferential pathway survey, and a conceptual site model.

ASE prepared a map showing property usage within approximately one block of the site, specifically to search for sensitive receptors such as schools, daycare facilities, hospitals, or medical facilities. A summer school (Chinese Presbyterian Church School) is located across 8<sup>th</sup> Street to the southwest of the site at 265 8<sup>th</sup> Street. This school has monitoring wells MW-4 and MW-7 just in front of the school, and it is possible that the hydrocarbon plume extends beneath the church and school. No other schools, daycares, or medical facilities were located. None of the buildings across 8<sup>th</sup> Street downgradient of the site appeared to have basements. The nearest surface water bodies are the Oakland Inner Harbor and Lake Merritt, both over 2,000-feet from the site. It is highly unlikely that the hydrocarbon plume has reached either of these surface water bodies.

A conduit and potential preferential pathway study was conducted by reviewing Underground Service Alert (USA) markings in the site vicinity, reviewing as-built drawings supplied by the city, and contacting individuals that would have knowledge of the individual utility lines. There were no underground utility lines beneath 8<sup>th</sup> Street directly downgradient of the site that could present a potential preferential pathway for the movement of groundwater. Storm and sanitary sewer lines beneath Alice Street, crossgradient of the site, and beneath 7<sup>th</sup> Street, a block (approximately 350-feet) downgradient could be potential conduits for the preferential movement of groundwater only during very rare periods of unusually high groundwater levels.

ASE conducted an area well survey to locate water wells within a 2,000-foot radius of the site. A total of 149 wells are located within the study area. Of these wells, 129 are listed as monitoring or test wells, 10 are listed as piezometers, one is listed as a cathodic protection well, two are listed as extraction wells (for remediation), one is an air sparging well, one is listed as a domestic well, one is listed as an abandoned well, two are listed as destroyed wells, and two are of unknown usage. Although listed as a domestic well, the well labeled as domestic is owned by Western Union and has a listed depth of 33-feet. Based on this information, it is highly unlikely that this well is used for groundwater consumption. Based on all of the information known from these wells, (a) no water supply wells are located in the site vicinity, and (b) none of the other



wells downgradient of the site appear to present a potential conduit for the downward movement of contamination.

#### 2.16 January 2007 Soil Vapor Sampling Workplan

On January 18, 2007, ASE prepared a workplan to conduct a soil vapor sampling assessment at the site. This work was requested by the ACHCSA in their letter dated November 20, 2006. This soil vapor survey was to be conducted in conjunction with the work described in ASE's October 23, 2007 workplan. This workplan was subsequently approved by the ACHCSA with the addition of three additional soil vapor sample locations.

#### 2.17 February and March 2007 Soil and Groundwater Sampling

Between February 27 and March 1, 2007, ASE drilled soil boring SB-1 through SB-7 using a Geoprobe direct-push hydraulic sampling rig. The purpose of SB-1 was to define the vertical extent of hydrocarbons beneath the site. The purpose of the remaining borings was to complete the definition of the horizontal extent of hydrocarbons. For boring SB-1, the Geoprobe was equipped with a dual-walled sampler. The dual-walled sampler allows the boring to advance with an external conductor casing to minimize potential cross-contamination by sealing off potentially contaminated soil and groundwater outside the external casing from the internal boring opening and sampling equipment. The TPH-G, TPH-D and BTEX concentrations in the soil sample collected from 20-feet below ground surface (bgs) in boring SB-1 exceeded the RWQCB environmental screening level (ESL) for residential soil where groundwater is not a current or potential source of drinking water. The TPH-G, TPH-D and benzene concentrations in the soil sample collected from 25-feet bgs in boring SB-1 also exceeded ESLs. None of the soil samples collected from boring SB-1 between 30-feet bgs and the total depth of 60-feet contained hydrocarbon concentrations exceeding ESLs. Groundwater samples collected from 20-23-feet bgs, 28-31-feet bgs and 51-53-feet bgs in boring SB-1 contained concentrations of TPH-G, benzene, toluene and total xylenes exceeding ESLs. Ethyl benzene concentrations also exceeded ESLs in samples collected from the 20-23-foot and 28-31-foot depths in this boring. It should be noted that concentrations decreased by an order of magnitude with each successive sample depth.

Boring SB-2 contained TPH-G and TPH-D concentrations exceeding ESLs, although none of the BTEX concentrations in this boring exceeded ESLs. None of the samples from the remaining borings (SB-3 through SB-7) contained TPH-G or BTEX concentrations exceeding ESLs, although groundwater samples collected from SB-3 and SB-4 contained TPH-D at concentrations exceeding ESLs.

The only oxygenate detected was 9.8 ppb MTBE in the groundwater sample collected from boring SB-7. Given the fact that MTBE hasn't been detected in groundwater at the site at elevated concentrations and since there are several other gas stations within a block of the subject site, it is likely that this MTBE was not related to the subject site.





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## 2.18 March 2007 Soil Vapor Sampling

In March 2007, ASE collected vapor samples from soil vapor sampling points SV-1 through SV-7 using a Geoprobe direct-push hydraulic sampling rig. The vapor concentrations were compared to both residential and commercial/industrial shallow soil gas screening levels for evaluation of potential vapor intrusion concerns as presented in the “Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater” document prepared by the RWQCB dated February 2005 (Volume 2; Table E-2). Benzene concentrations in all of the vapor samples except SV-5 exceeded both residential and commercial/industrial ESLs. The TPH-G concentrations also exceeded residential ESLs in all samples except SV-5, and exceeded the commercial/industrial ESL in sample SV-6.

### **3.0 OUTLINE OF PROPOSED SCOPE OF WORK (SOW)**

The purpose of this assessment is to further define the extent of soil and groundwater contamination at the site. The scope of work for this project is to:

- A) Conduct further sampling to evaluate the potential for indoor vapor intrusion to the properties south of 8<sup>th</sup> Street.
- B) Conduct further investigation to define the extent of soil, groundwater and soil vapor contamination to the north.
- C) Install one deeper monitoring well on the property to screen groundwater at depths between 42 and 49-feet bgs.
- D) Identify adjacent property owners.

More detailed information on each proposed task follows:

#### **4.0 TASK A - CONDUCT FURTHER SAMPLING TO EVALUATE THE POTENTIAL FOR INDOOR VAPOR INTRUSION TO THE PROPERTIES SOUTH OF 8<sup>TH</sup> STREET**

Although the ACHCSA only requested that an evaluation be made for properties south of 8<sup>th</sup> Street, the scope will be expanded to include the adjacent church at 280 8<sup>th</sup> Street and the on-site building. Mr. Kevin Braun, CIH, of Earth Safety Dynamics will conduct this portion of the assessment. A workplan for this portion of the assessment is included as Appendix A.

#### **5.0 TASK B - CONDUCT FURTHER INVESTIGATION TO DEFINE THE EXTENT OF CONTAMINATION TO THE NORTH**

The purpose of this assessment is to further define the extent of soil, groundwater and soil vapor contamination north of the site. The scope of work for this project is to:



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- 1) Obtain a drilling permit from the Alameda County Public Works Agency.
- 2) Obtain an access agreement with the property owner to the north.
- 3) Contract with a subsurface utility locating service to clear drilling locations of underground utility lines.
- 4) Drill three soil borings using a Geoprobe and collect soil and groundwater samples for analysis.
- 5) Analyze one soil and one groundwater sample collected from each boring at a CAL-DHS certified analytical laboratory for TPH-D by EPA Method 8015 and TPH-G, BTEX, fuel oxygenates and lead scavengers by EPA Method 8260B.
- 6) Collect soil vapor samples from three points north of the site, adjacent to borings described in Task 4.
- 7) Analyze the soil vapor samples at a CAL-DHS certified analytical laboratory for TPH-G and BTEX by EPA Method TO-15.
- 8) Following collection of the soil and groundwater samples, backfill the borings described in tasks 4 and 6 with neat cement placed by tremie pipe.
- 9) Prepare a report presenting results from this assessment. This report will present tabulated analytical results, an updated conceptual site model, conclusions, and recommendations.

Details of the assessment are presented below.

**TASK 1 - *OBTAIN A DRILLING PERMIT FROM THE ALAMEDA COUNTY PUBLIC WORKS AGENCY***

Prior to drilling, ASE will obtain a drilling permit from the Alameda County Public Works Agency.

**TASK 2 - *OBTAIN AN ACCESS AGREEMENT WITH THE PROPERTY OWNER NORTH OF THE SITE***

Prior to drilling, ASE will obtain an access agreement with the property owner north of the site to allow for the drilling and sampling on that property.



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**TASK 3 - *CONTRACT WITH AN UNDERGROUND UTILITY LINE LOCATING SERVICE TO ACCURATELY LOCATE UNDERGROUND UTILITY LINES***

ASE will contact USA at least 48 hours prior to drilling. ASE will also contract with a private underground utility locating service to pinpoint the location of utility lines in the drilling locations.

**TASK 4 - *DRILL THREE SOIL BORINGS ON THE PROPERTY TO THE NORTH AND COLLECT SOIL AND GROUNDWATER SAMPLES FROM THE BORINGS FOR ANALYSIS***

ASE will drill three soil borings in the property north of the site (Figure 3) and will collect soil and groundwater samples to define the extent of groundwater contamination upgradient of the site. The borings will be drilled using a Geoprobe or similar type direct-push drill rig. A qualified ASE geologist will direct the drilling.

Undisturbed soil samples will be collected continuously for subsurface hydrogeologic description and possible chemical analysis. The geologist will describe the soil according to the Unified Soil Classification System (USCS). Samples to be retained for analysis will be immediately removed from the sampler, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-DHS certified analytical laboratory. Samples will be retained for analysis at least every 5-feet, in areas of obvious soil contamination and at each lithologic contact.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with a photoionization detector (PID). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the PID will measure the vapor through a small hole, punched in the bag. These PID readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

Once groundwater is encountered, a groundwater samples will be collected from the boring using a bailer. Groundwater samples will be decanted from the bailer into 40-ml volatile organic analysis (VOA) vials, preserved with hydrochloric acid and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will then be sealed in plastic bags and cooled in an ice chest with wet ice for transport to a state-certified analytical laboratory under chain-of-custody.



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All sampling equipment will be cleaned in buckets with brushes and an Alconox solution, and then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums and stored on-site until off-site disposal can be arranged.

*TASK 5 - ANALYZE SOIL AND GROUNDWATER SAMPLES COLLECTED FROM THE BORINGS*

At least one soil and one groundwater sample from each of the soil borings will be analyzed at a CAL-DHS certified environmental laboratory for TPH-D by modified EPA Method 3510/8015M, and TPH-G, BTEX, oxygenates and lead scavengers by EPA Method 8260B. The soil sample selected for analysis will be the sample that appears to be most contaminated based on odors, staining, and or PID readings. If there is no evidence of contamination, then the sample collected from the capillary zone will be selected for analysis. If there appears to be significant contamination in any of the borings, then all of the samples collected in the area that appears contaminated will be analyzed, as well as the samples above and below the contamination

*TASK 6 - COLLECT SOIL VAPOR SAMPLES*

Three vapor points will be pushed to 3-feet bgs using drilling rods driven with a Geoprobe. The bottom of the rod will contain an expendable point. Once at depth, the drive rod will be retracted separating the expendable point and the rods and creating the desired void for sample collection. A Geoprobe Point Run Tubing (PRT) system adapter and new, unused polyethylene tubing will then be advanced through the inner drive rod and secured to the expendable point holder at the base of the rods. A hydrated bentonite seal will be placed around the rods and ground surface to prevent ambient air intrusion into the borehole. The borehole will then be allowed to equilibrate prior to purging and sampling. The tubing will then be purged of five volumes to insure that all ambient air is removed from the tubing using the Geoprobe vacuum/volume system. The sample will be collected in a 1-liter Summa canister with a rate between 100 to 200-ml per minute. The samples will be labeled with the site location, sample designation, date and time the samples are collected, and the initials of the person collecting the sample. The samples were then be delivered under chain of custody to a CAL-EPA certified analytical laboratory.

*TASK 7 - ANALYZE THE SOIL VAPOR SAMPLES*

Each soil vapor sample will be analyzed at a CAL-DHS certified environmental laboratory for TPH-G and BTEX by EPA Method TO-15.

*TASK 8 - BACKFILL THE BORINGS WITH NEAT CEMENT*

Following collection of the samples, the boreholes described in Tasks 4 and 6 will be backfilled with neat cement placed by tremie pipe.



*TASK 9 - PREPARE A SUBSURFACE ASSESSMENT REPORT*

ASE will prepare a subsurface assessment report presenting the methods and findings of this assessment. This report will include a summary of the results, the site background and history, tabulated soil, groundwater and soil vapor analytical results, an updated conceptual site model, conclusions and recommendations. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. This report will be submitted under the seal of a California registered civil engineer or geologist.

**6.0 TASK C - INSTALL ONE GROUNDWATER MONITORING WELL AT THE SITE INTO THE SECOND WATER-BEARING ZONE**

ASE will construct a monitoring well to screen the water-bearing zone between 42 and 49-feet bgs near previous boring location SB-1. The scope of work for this project is to:

- 1) Obtain a drilling permit from the Alameda County Public Works Agency.
- 2) Contract with a subsurface utility locating service to clear the drilling location of underground utility lines.
- 3) Drill a soil boring to 35-feet bgs and install a conductor casing.
- 4) Drill within the conductor casing to a depth of approximately 49-feet bgs and install a groundwater monitoring well.
- 5) After waiting 72-hours following the well installation, develop the monitoring well using surge block agitation and bailer and/or pump evacuation.
- 6) After waiting 72-hours following the well development, collect groundwater samples from the monitoring well.
- 7) Analyze the groundwater samples at a CAL-DHS certified analytical laboratory for TPH-D by EPA Method 8015 and TPH-G, BTEX, fuel oxygenates and lead scavengers by EPA Method 8260B.
- 8) Survey the elevation and horizontal location of the well.
- 9) Dispose of soil cuttings and wastewater produced during this assessment.
- 10) Include the methods and finding for this well installation in the report described in section 5.0.

Details of the assessment are presented below.



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**TASK 1 - *OBTAIN A DRILLING PERMIT FROM THE ALAMEDA COUNTY PUBLIC WORKS AGENCY***

Prior to drilling, ASE will obtain a drilling permit from the Alameda County Public Works Agency.

**TASK 2 - *CONTRACT WITH AN UNDERGROUND UTILITY LINE LOCATING SERVICE TO ACCURATELY LOCATE UNDERGROUND UTILITY LINES***

ASE will contact USA at least 48 hours prior to drilling. ASE will also contract with a private underground utility locating service to pinpoint the location of utility lines in the drilling locations.

**TASK 3 - *DRILL ONE SOIL BORING TO A DEPTH OF APPROXIMATELY 35-FEET BGS AND INSTALL A CONDUCTOR CASING***

ASE will drill a soil boring in the location of previous boring SB-1 to a depth of approximately 35-feet bgs using a drill rig equipped with 12-inch diameter hollow-stem augers. This depth was estimated from the boring log for boring SB-1; however, the depth of the low permeability unit will be confirmed in the field by sampling with a split-barrel sampler. A conductor casing will then be installed to seal off the contaminated shallow water-bearing zone from the deeper drilling. Depending on the drilling company chosen, the diameter of the hollow-stem augers may vary. The conductor casing will have an internal diameter of at least 8-inches to allow for drilling inside the casing. Once the conductor casing is installed, a cement sanitary seal will be placed in the annulus between the boring and the casing. This seal will be allowed to set for approximately 48-hours prior to continuing the deeper drilling in this boring.

**TASK 4 - *DRILL WITHIN THE CONDUCTOR CASING AND INSTALL A GROUNDWATER MONITORING WELL***

Once the sanitary seal around the conductor casing is allowed to set, the drilling will continue through the conductor casing using 8-inch diameter hollow-stem augers.

Undisturbed soil samples will be collected at least every 5-feet for subsurface hydrogeologic description. The ASE geologist will describe the samples according to the Unified Soil Classification System. The samples will be collected in brass or stainless steel tubes using a split-barrel drive sampler advanced by repeated blows from a 140-lb. hammer dropped 18-inches.

ASE will complete the boring as a groundwater monitoring well. The monitoring well will be constructed with 2-inch diameter, flush-threaded, schedule 40, 0.020-inch factory slotted PVC well screen and blank casing. The well casing will be lowered through the augers and #3 Monterey sand will be placed in the annular space between the well casing and the borehole to approximately 2-feet above the screened interval. Approximately 2-feet of bentonite pellets will be placed on top of the sand pack. This bentonite layer will prevent the cement sanitary seal



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from infiltrating into the sand pack. Cement mixed with 3 to 5 percent bentonite powder by volume will be used to fill the annular space between the bentonite layer and the surface to prevent surface water from infiltrating into the well. The well head will be protected by a locking well plug and an at-grade, traffic-rated well box (See Figure 4 - Typical Monitoring Well).

The well will be screened to monitor the second water-bearing zone. ASE anticipates that the well will be screened between 42 and 49-feet bgs.

#### *TASK 5 - DEVELOP THE MONITORING WELL*

The monitoring well will be developed after waiting at least 72 hours after well construction. The well will be developed using at least two episodes of surge block agitation and bailer and/or pump evacuation. At least ten well casing volumes of water will be removed during the development, and development will continue until the water appears to be reasonably clear. The well development purge water will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

#### *TASK 6 - SAMPLE THE MONITORING WELL*

After waiting 72 hours after the well development, ASE will collect groundwater samples from the monitoring well. Prior to purging and sampling, ASE will measure the depth to groundwater using a water level meter. The well will then be purged of at least three well casing volumes of groundwater. The temperature, pH and electrical conductivity of evacuated water will be monitored during the well purging, and purging will continue beyond three well casing volumes if these parameters have not stabilized. Groundwater samples will be collected using a disposable polyethylene bailer. Groundwater samples will be decanted from the bailer into 40-ml glass volatile organic analysis (VOA) vials, preserved with hydrochloric acid, and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will be placed into an ice chest with ice for transport to the analytical laboratory under chain of custody. Purged groundwater will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

#### *TASK 7 - ANALYZE A GROUNDWATER SAMPLE FROM THE NEW MONITORING WELL*

A groundwater sample from the newly installed monitoring well will be analyzed at a CAL-EPA certified environmental laboratory for TPH-D by modified EPA Method 3510/8015M, and TPH-G, BTEX, oxygenates and lead scavengers by EPA Method 8260B.



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#### *TASK 8 - SURVEY THE TOP OF CASING ELEVATION OF THE WELL*

The top of casing elevation of the well will be surveyed relative to mean sea level (msl) by a California registered land surveyor. The longitude and latitude the well will also be surveyed to Geotracker standards.

#### *TASK 9 – DISPOSE OF WASTE SOIL AND GROUNDWATER PRODUCED DURING THIS ASSESSMENT*

ASE will properly dispose of drill cuttings, steam-cleaning rinsate and well purge water produced during this assessment. Arrangements for the disposal of this material will be made once analytical results are received from the sampling.

#### *TASK 10 - PREPARE A SUBSURFACE ASSESSMENT REPORT*

The description of the well installation and as well as all data associated with the well installation will be included in the report described in section 5.0 of this workplan. This report will include a summary of the results, the site background and history, description of the well construction, development and sampling, tabulated groundwater analytical results, results of the well survey, conclusions and recommendations. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. This report will be submitted under the seal of a California registered civil engineer or geologist.

### **7.0 TASK D – IDENTIFY ADJACENT PROPERTY OWNERS**

A list of all property owners for properties on the two blocks between Alice Street and Harrison Street and 7<sup>th</sup> Street and 9<sup>th</sup> Street will be provided to the ACHCSA. This list will include the street address, parcel number and owner name and mailing address for each property. A map showing the property locations will also be included.

### **8.0 SCHEDULE**

ASE will proceed with this project immediately upon approval of this workplan by the ACHCSA. Task D will be completed within 45 days of this workplan. ASE anticipates completing the drilling and other field work for this project in December 2007 assuming no difficulty in obtaining access agreements. ASE anticipates the submission of the report in February 2008.





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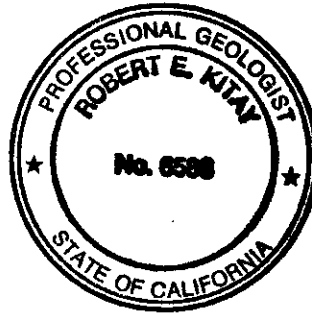
Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.

A handwritten signature in black ink that reads 'Robert E. Kitay'. The signature is written in a cursive style and is positioned to the left of the professional geologist seal.

Robert E. Kitay, B.G., R.E.A.  
Senior Geologist



cc: Alice and May Lee Lim, c/o Mr. Russell Lim, 1028 Annerly Road, Piedmont, CA 94610-1110

Mr. Jerry Wickham, Alameda County Health Care Services Agency, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502

Ms. Betty Graham, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, CA 94612

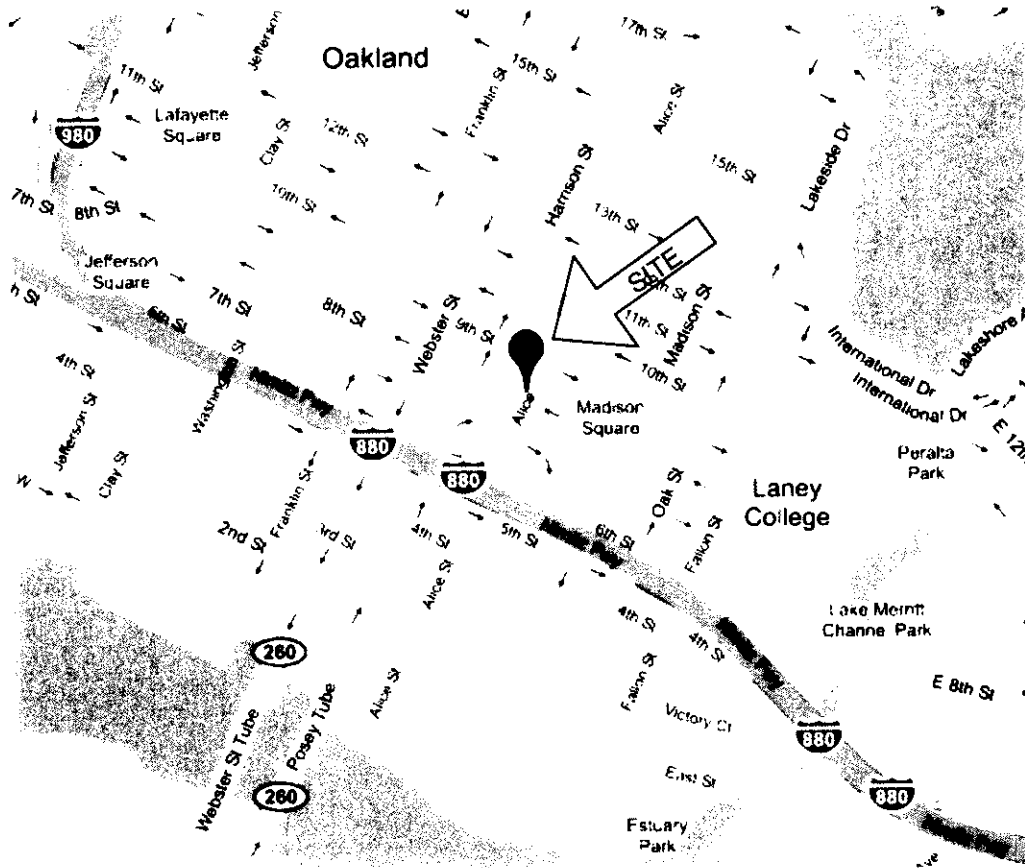


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## **FIGURES**



NORTH

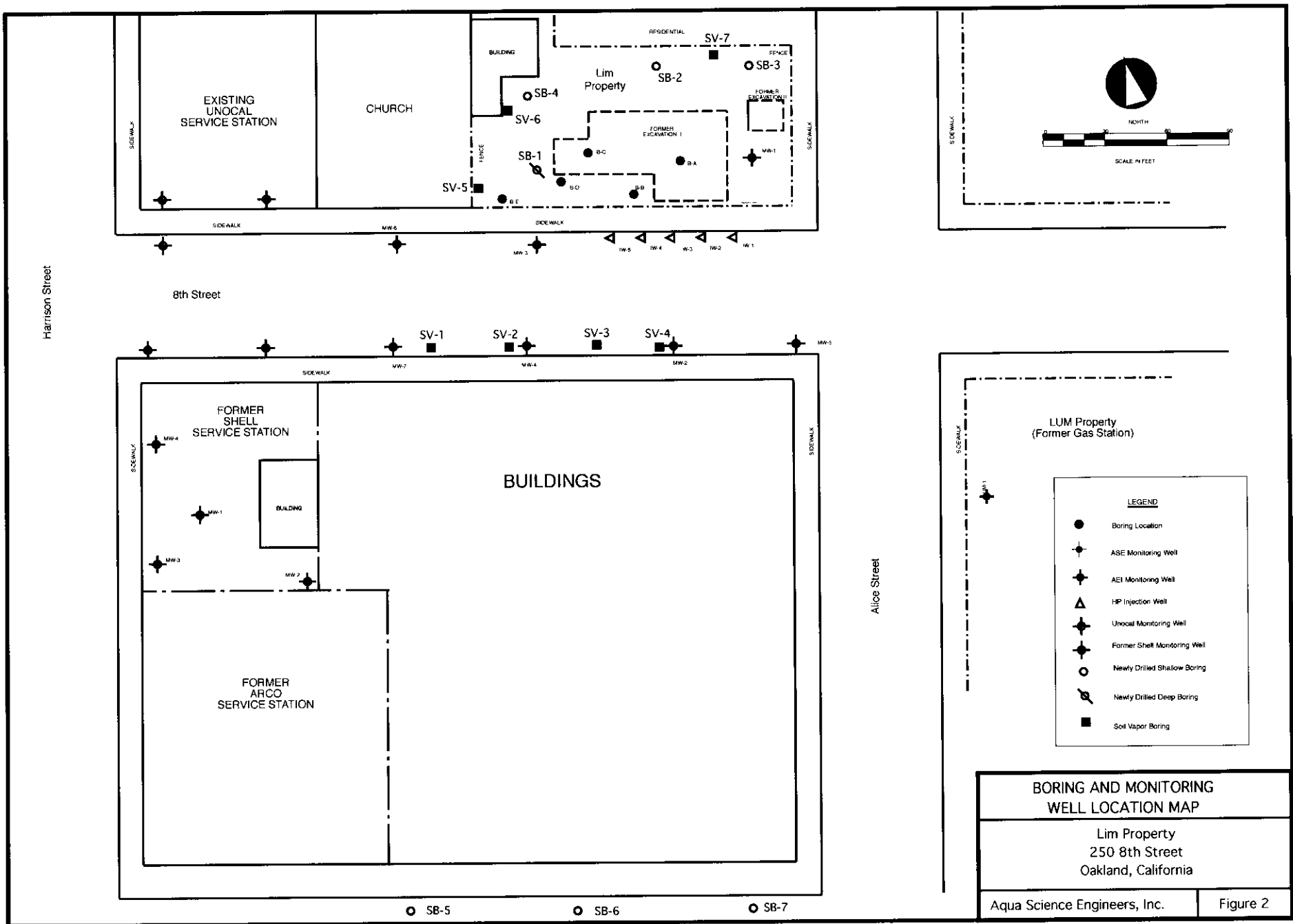


LOCATION MAP

LIM PROPERTY  
250 8<sup>TH</sup> STREET  
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS

FIGURE 1

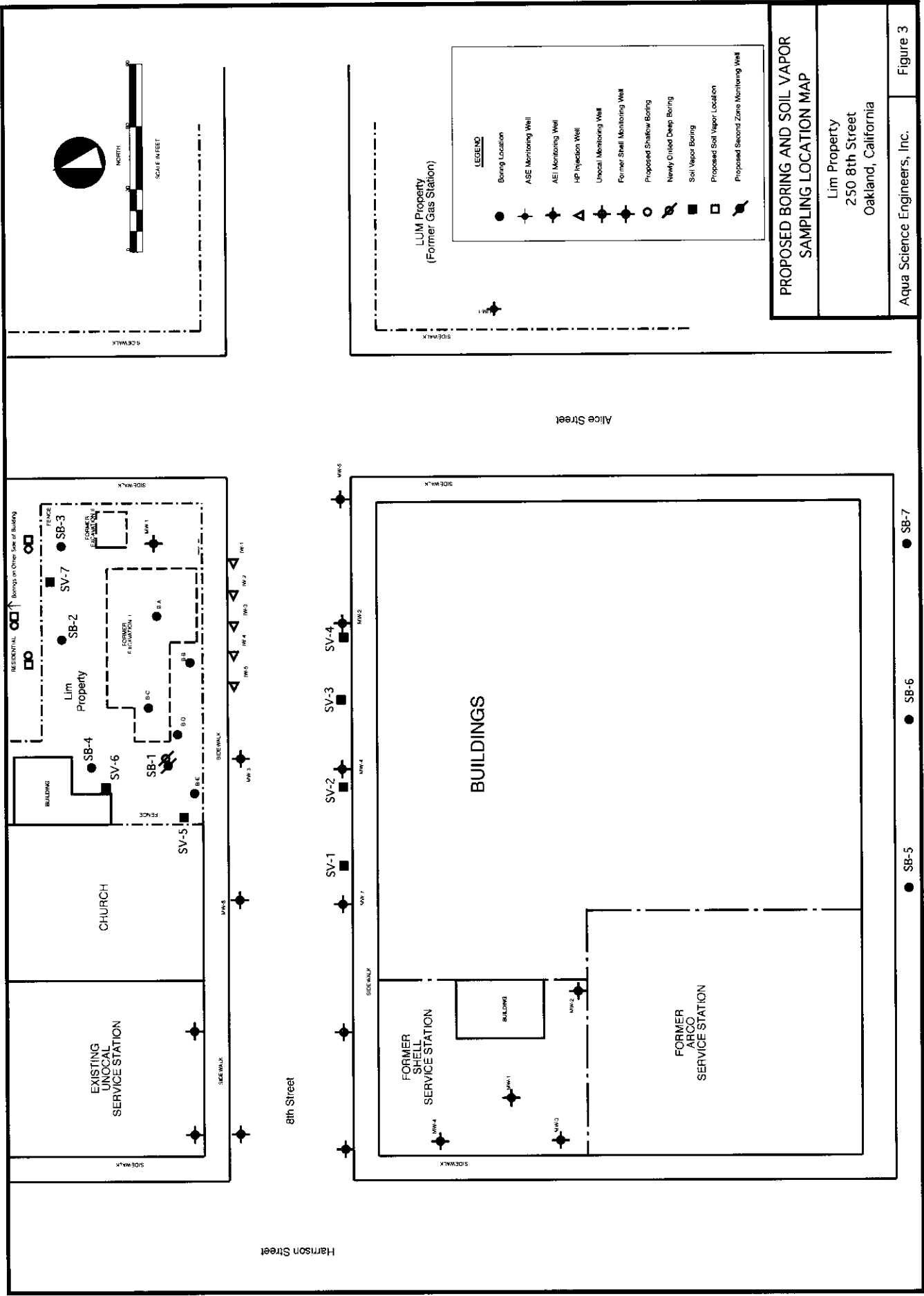


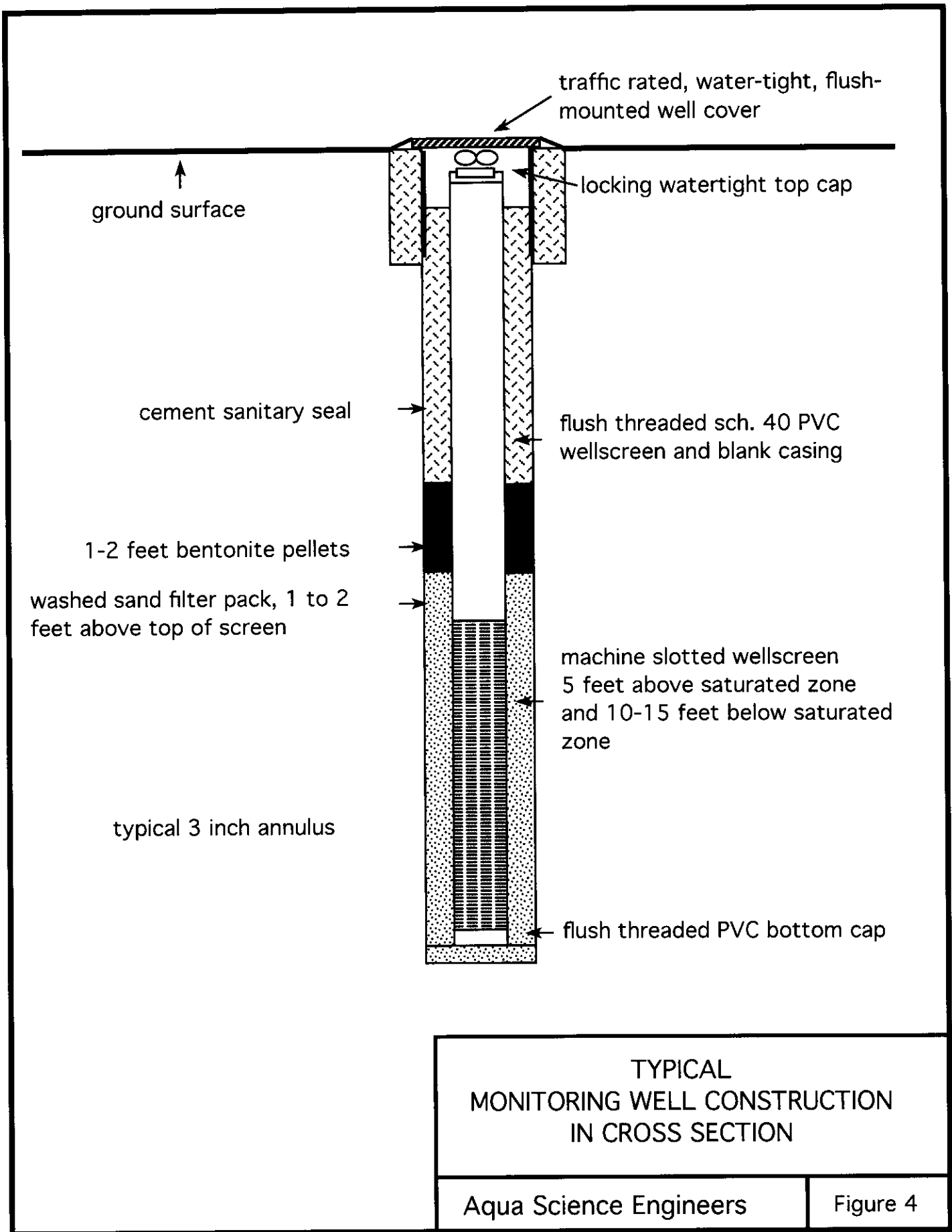
- LEGEND**
- Boring Location
  - ◆ ASE Monitoring Well
  - ◆ AEI Monitoring Well
  - ▲ HP Injection Well
  - ◆ Unocal Monitoring Well
  - ◆ Former Shell Monitoring Well
  - Newly Drilled Shallow Boring
  - Newly Drilled Deep Boring
  - Soil Vapor Boring

**BORING AND MONITORING WELL LOCATION MAP**

Lim Property  
250 8th Street  
Oakland, California

Aqua Science Engineers, Inc.      Figure 2







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## **TABLES**

**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)
<b>MW-1</b>	01/30/95	25.51	16.21		9.30
	04/12/95		15.71		9.80
	07/14/95		16.71		8.80
	10/17/95		17.72		7.79
	01/12/96		18.03		7.48
	07/25/96		16.82		8.69
	01/06/97		15.60		9.91
	07/08/97		17.31		8.20
	01/26/98		15.21		10.30
	07/23/98		15.38		10.13
	01/05/99		16.82		8.69
	07/13/99		15.89		9.62
	01/12/00		17.44		8.07
	04/24/00		16.37		9.14
	07/20/00		16.30		9.21
	10/24/00		17.25		8.26
	01/18/01		17.29		8.22
	04/05/01		15.88		9.63
	07/17/01	16.54		8.97	
	10/25/01	16.89		8.62	
	01/21/02	14.92		10.59	
	04/11/02	14.02		11.49	
	06/11/02	29.72	15.33	14.39	14.39
	09/17/02	15.96		13.76	13.76
	12/18/02	16.14		13.58	13.58
	03/25/03	16.16		13.56	13.56
	06/23/03	16.01		13.71	13.71
	09/26/03	16.57		13.15	13.15
	12/18/03	16.41		13.31	13.31
	03/12/04	14.64		15.08	15.08
	06/17/04	15.71		14.01	14.01
	09/17/04	16.35		13.37	13.37
	12/17/04	16.10		13.62	13.62
04/28/05	14.10		15.62	15.62	
07/19/05	15.94		13.78	13.78	
10/03/05	16.34		13.38	13.38	
12/06/05	16.21		13.51	13.51	
03/15/06	16.21		13.51	13.51	
06/28/06	14.92		14.80	14.80	
08/31/06	15.60		14.12	14.12	
11/21/06	17.20		12.52	12.52	
02/12/07	16.12		13.60	13.60	
05/02/07	16.92		12.80	12.80	
<b>08/09/07</b>			<b>17.58</b>	<b>12.14</b>	



**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)
<b>MW-2</b>	01/30/95	23.99	15.02		8.97
	04/12/95		14.75		9.24
	07/14/95		16.02		7.97
	10/17/95		16.94		7.05
	01/12/96		17.05		6.94
	07/25/96		16.02		7.97
	01/06/97		14.34		9.65
	07/08/97		16.52		7.47
	01/26/98		14.10		9.89
	07/23/98		14.70		9.29
	01/05/99		16.01		7.98
	07/13/99		15.40		8.59
	01/12/00		16.76		7.23
	04/24/00		15.67		8.32
	07/20/00		15.70		8.29
	10/24/00		16.56		7.43
	01/18/01		16.47		7.52
	04/05/01	15.88		8.11	
	07/17/01	15.35		8.64	
	10/25/01	15.63		8.36	
	01/21/02	13.55		10.44	
	04/11/02	13.74		10.25	
	06/11/02	28.19	14.06	14.13	
	09/17/02	14.67		13.52	
	12/18/02	14.88		13.31	
	03/25/03	15.11		13.08	
	06/23/03	14.94		13.25	
	09/26/03	15.49		12.70	
	12/18/03	15.13		13.06	
	03/12/04	13.50		14.69	
	06/17/04	14.63		13.56	
	09/17/04	15.19		13.00	
	12/17/04	14.88		13.31	
04/28/05	13.39		14.80		
07/19/05	15.27		12.92		
10/03/05	15.57		12.62		
12/06/05	15.35		12.84		
03/15/06	12.65		15.54		
06/28/06	14.45		13.74		
08/31/06	15.37		12.82		
11/21/06	16.22		11.97		
02/12/07	16.12		12.07		
05/02/07	16.12		12.07		
<b>08/09/07</b>			<b>16.85</b>		<b>11.34</b>

**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)	
<b>MW-3</b>	01/12/00	24.25	16.68	0.01	7.58*	
	04/24/00		15.58	0.15	8.79*	
	07/20/00		16.01	0.41	8.57*	
	10/24/00		16.95	0.21	7.47*	
	01/18/01		16.63	0.21	7.79*	
	04/05/01		15.16	0.23	9.27*	
	07/17/01		15.92	0.39	8.64*	
	10/25/01		16.26	0.38	8.29*	
	01/21/02		14.08	0.16	10.30*	
	04/11/02		14.59	0.54	10.09*	
	06/11/02		28.58	15.16	0.90	14.14*
	09/17/02			16.04	1.24	13.53*
	10/01/02	16.14		1.23	13.42*	
	10/25/02	15.80		0.60	13.26*	
	11/12/02	15.87		0.47	13.09*	
	12/18/02	15.42		0.47	13.54*	
	03/25/03	16.11		1.14	13.38*	
	06/23/03	16.58		1.86	13.49*	
	09/26/03	16.11		0.66	13.00*	
	12/18/03	15.83		0.59	13.22*	
	03/12/04	14.51		1.21	15.04*	
	06/17/04	15.25		0.68	13.87*	
	09/17/04	16.14	0.96	13.21*		
	12/17/04	15.05	0.25	13.73*		
	01/13/05	13.40	0.45	15.54*		
	04/28/05	15.31	2.43	15.21*		
	07/19/05	16.29	1.67	13.63*		
	10/03/05	16.10	1.47	13.66*		
	12/06/05	15.04	1.17	14.48*		
	03/15/06	12.65	2.41	15.49*		
	06/28/06	13.55	2.61	16.16*		
	08/31/06	14.85	2.20	15.49*		
11/21/06	16.05	1.10	13.41*			
02/12/07	15.96	0.35	12.90*			
05/02/07	15.11	0.09	13.54*			
<b>08/09/07</b>		<b>15.83</b>	<b>0.09</b>	<b>12.82*</b>		

**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)
<b>MW-4</b>	01/12/00	23.71	17.24		6.47
	04/24/00		16.18		7.53
	07/20/00		16.18		7.53
	10/24/00		17.03		6.68
	01/18/01		16.87		6.84
	04/05/01		15.28		8.43
	07/17/01		15.92		7.79
	10/25/01		16.23		7.48
	01/21/01		14.14		9.57
	04/11/02		14.43		9.28
	06/11/02	28.61	14.72		13.89
	09/17/02		15.29		13.32
	12/18/02		15.20		13.41
	03/25/03		15.53		13.08
	06/23/03		15.35		13.26
	09/26/03		15.91		12.70
	12/18/03		15.63		12.98
	03/12/04		13.88		14.73
	06/17/04		15.03		13.58
	09/17/04		15.61		13.00
	12/17/04	15.32		13.29	
	04/28/05	13.82		14.79	
	07/19/05	15.44		13.17	
	10/03/05	15.91		12.70	
	12/06/05	15.71		12.90	
	03/15/06	13.05		15.56	
	06/28/06	14.49		14.12	
	08/31/06	15.75		12.86	
	11/21/06	16.70		11.91	
	02/12/07	16.51		12.10	
	05/02/07	16.51		12.10	
<b>08/09/07</b>	<b>17.17</b>		<b>11.44</b>		

**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)	
<b>MW-5</b>	06/11/02	28.40	14.23		14.17	
	09/17/02		14.80		13.60	
	12/18/02		15.08		13.32	
	03/25/03		15.31		13.09	
	06/23/03		15.16		13.24	
	09/26/03		15.72		12.68	
	12/18/03		15.47		12.93	
	03/12/04		13.44		14.96	
	06/17/04		14.90		13.50	
	09/17/04		15.45		12.95	
	12/17/04		15.12		13.28	
	04/28/05		13.63		14.77	
	07/19/05		15.67		12.73	
	10/03/05		15.81		12.59	
	12/06/05		15.60		12.80	
	03/15/06		12.81		15.59	
	06/28/06		15.21		13.19	
	08/31/06		15.55		12.85	
	11/21/06		17.09		11.31	
	02/12/07		16.29		12.11	
05/02/07	16.21		12.19			
<b>08/09/07</b>	<b>16.97</b>		<b>11.43</b>			
<b>MW-6</b>	06/11/02	29.20	14.95		14.25	
	09/17/02		15.47		13.73	
	12/18/02		15.43		13.77	
	03/25/03		15.67		13.53	
	06/23/03		15.48		13.72	
	09/26/03		NOT MEASURED - SOUNDER MALFUNCTION			
	12/18/03		15.79		13.41	
	03/12/04		14.04		15.16	
	06/17/04		15.13		14.07	
	09/17/04		15.74		13.46	
	12/17/04		15.54		13.66	
	04/28/05		13.91		15.29	
	07/19/05		15.30		13.90	
	10/03/05		15.35		13.85	
	12/06/05		15.69		13.51	
	03/15/06		13.14		16.06	
	06/28/06		14.44		14.76	
	08/31/06		16.25		12.95	
	11/21/06		16.69		12.51	
	02/12/07		16.63		12.57	
05/02/07	16.57		12.63			
<b>08/09/07</b>	<b>17.19</b>		<b>12.01</b>			

**TABLE ONE**  
**Groundwater Elevation Data**  
**Lim Family Property**  
**250 8th Street**  
**Oakland, CA**

Well I.D.	Date of Measurement	Top of Elevation (msl)	Depth to Water (feet)	Product Thickness (feet)	Groundwater Elevation (msl)
<b>MW-7</b>	06/11/02	28.95	15.19		13.76
	09/17/02		15.73		13.22
	12/18/02	NOT MEASURED - CAR PARKED OVER WELL			
	03/25/03		15.96		12.99
	06/23/03		15.75		13.20
	09/26/03		16.29		12.66
	12/18/03		16.03		12.92
	03/12/04		14.28		14.67
	06/17/04		15.42		13.53
	09/17/04		16.02		12.93
	12/17/04		15.45		13.50
	04/28/05		14.15		14.80
	07/19/05		15.30		13.65
	10/03/05		16.25		12.70
	12/06/05		16.05		12.90
	03/15/06		13.36		15.59
	06/28/06		14.81		14.14
	08/31/06		16.13		12.82
	11/21/06		17.06		11.89
	02/12/07		16.97		11.98
05/02/07		16.93		12.02	
	<b>08/09/07</b>		<b>17.56</b>		<b>11.39</b>

**Notes:**

\* = Adjusted for the presence of free-floating oil by the equation: Top of Casing Elevation - Depth to Water + (0.8 x Floating Hydrocarbon Thickness) = Groundwater Elevation (Adjusted).

Top of casing elevations resurveyed by Mid Coast Engineers on 6/27/02 and 7/11/02.

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
All results are in parts per billion

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-1</b>							
01/30/95	740	200	3	5	1	4	--
04/12/95	400	500	< 0.5	< 0.5	3	< 2	--
07/14/95	520	400	1	< 0.5	2	3	--
10/17/95	400	200	0.5	1	3	< 2	--
01/12/96	120	890	< 0.5	< 0.5	< 0.5	< 1.0	< 2.0
07/08/96	320	300	0.52	2.7	1.2	2.3	< 5.0
01/06/97	110	75	< 0.5	0.68	< 0.5	< 0.5	< 5.0
07/08/97	380	290	< 0.5	1.5	1.4	1.9	< 5.0
01/26/98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
07/23/98	190	< 50	0.54	2.8	2	1.8	< 5.0
01/05/99	200	< 50	1.8	1.6	3.3	< 0.5	< 5.0
07/13/99	340	<50	<0.5	<0.5	2.6	<0.5	< 5.0
01/12/00	300	1,000	22	36	5.5	24	< 5.0
04/24/00	360	280*	< 0.5	< 0.5	< 0.5	2.1	< 5.0
07/20/00	290	150*	1.8	< 0.5	< 0.5	< 0.5	< 5.0
10/24/00	170**	280*	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
01/18/01	170**	150*	< 0.5	< 0.5	< 0.5	2.1	< 5.0
04/05/01	350**	190*	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
07/17/01	310	570	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
10/25/01	250	260	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
01/22/02	200	250	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
04/11/02	260	300	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
06/11/02	270	330	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
09/17/02	320	1,700	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
12/18/02	170	320	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
03/25/03	320	< 500	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
06/23/03	240	310	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
09/26/03	110	300	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
12/18/03	150	340	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
03/12/04	220	510	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
06/17/04	250	490	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
09/17/04	110	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
11/10/04***	180	400	0.68	< 0.5	1.7	< 0.5	< 5.0
12/17/04	77	130	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
04/28/05	250	190	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
07/19/05	340	na	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
10/03/05	170	< 100	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
12/06/05	140	67	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
03/15/06	170	< 80	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
06/28/06	230	130	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
08/31/06	310	< 200	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
11/21/06	220	160	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
02/23/07	140	120	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
05/02/07	180	140	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
<b>08/09/07</b>	<b>130</b>	<b>120</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
All results are in parts per billion

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-2</b>							
01/30/95	88,000	800	19,000	18,000	2,400	10,000	--
04/12/95	110,000	990	21,000	28,000	2,800	14,000	--
07/14/95	120,000	5,000	20,000	25,000	3,200	15,000	--
10/17/95	190,000	4,000	15,000	26,000	4,900	23,000	--
01/12/96	32,000	2,600	10,000	8,000	1,100	4,800	< 2
07/08/96	110,000	2,500	20,000	18,000	2,500	12,000	< 500
01/06/97	230,000	37,000	11,000	19,000	4,300	20,000	< 1,200
07/08/97	91,000	35,000	16,000	20,000	2,700	13,000	< 1,000
01/26/98	50,000	11,000	12,000	12,000	1,600	6,700	< 250
07/23/98	50,000	8,100#	11,000	8,300	1,800	7,000	1,100
01/05/99	50,000	7,600#	12,000	12,000	2,300	9,600	1,300
07/13/99	73,000	8,500	11,000	13,000	2,200	9,800	< 500
01/12/00	63,000	11,000	10,000	12,000	1,800	7,800	< 500
04/24/00	76,000	23,000*	7,100	14,000	2,000	9,400	< 500
07/20/00	68,000	5,300#	11,000	14,000	2,300	11,000	< 1,000
10/24/00	48,000	6,400*	11,000	9,400	1,500	7,300	< 500
01/18/01	37,000	4,600*	6,900	5,600	1,200	5,300	< 500
04/05/01	59,000	4,600*	7,100	9,800	1,600	7,600	< 500
07/17/01	90,000	< 10,000	9,200	14,000	2,700	11,000	< 50
10/25/01	79,000	< 3,800	9,200	14,000	2,400	11,000	< 50
01/22/02	76,000	< 2,300	7,000	13,000	2,200	9,600	< 50
04/11/02	76,000	< 1,500	7,800	11,000	2,900	12,000	< 50
06/11/02	72,000	< 2,500	7,300	9,600	2,500	12,000	< 50
09/17/02	52,000	< 3,000	5,000	5,400	2,100	9,100	< 20
12/18/02	46,000	< 6,000	2,900	3,000	1,800	7,600	22
03/25/03	87,000	< 8,000	7,900	9,300	2,900	12,000	< 50
06/23/03	46,000	< 3000	7,800	4,000	1,900	6,600	< 50
09/26/03	52,000	< 3000	9,100	3,500	1,300	5,000	< 50
12/18/03	61,000	< 4,000	13,000	3,500	1,600	5,600	< 20
03/12/04	53,000	< 4,000	9,100	3,500	1,700	5,700	< 25
06/17/04	59,000	< 3,000	7,100	4,000	1,700	7,300	< 25
09/17/04	33,000	--	9,800	1,200	1,300	4,000	< 20
11/10/04***	44,000	3,600	13,000	4,400	1,600	6,000	< 1000
12/17/04	54,000	< 3,000	7,900	2,200	1,700	3,900	< 15
04/28/05	81,000	< 3,000	7,000	6,000	2,100	8,700	< 15
07/19/05	59,000	na	7,900	4,400	1,900	7,000	< 15
10/03/05	34,000	< 800	7,800	810	1,000	2,800	< 15
12/06/05	26,000	< 800	6,100	940	770	2,000	< 15
03/15/06	33,000	< 1,500	7,700	2,600	1,400	4,200	< 15
06/28/06	96,000	< 4,000	10,000	14,000	2,900	12,000	< 15
8/31/06	47,000	< 3,000	5,800	5,100	2,200	8,700	< 15
11/21/06	51,000	< 1,500	6,800	3,400	1,700	6,200	< 15
02/23/07	38,000	< 1,500	7,800	2,000	1,500	4,600	< 15
05/02/07	55,000	< 3,000	6,500	5,100	2,400	8,600	< 15
<b>08/09/07</b>	<b>39,000</b>	<b>&lt; 3,000</b>	<b>6,600</b>	<b>2,200</b>	<b>1,600</b>	<b>4,900</b>	<b>&lt; 15</b>

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
All results are in parts per billion

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-3</b>							
01/12/00	140,000	13,000*	22,000	19,000	2,400	11,000	< 500
04/24/00	240,000	700,000*	33,000/ 35,000	52,000/ 87,000	5,700/ 18,000	28,000/ 84,000	< 5,000
07/20/00	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
10/24/00	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
01/18/01	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
04/05/01	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
07/17/01	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
10/25/01	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
01/22/02	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
04/11/02	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
06/11/02	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
09/17/02	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
12/18/02	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
03/25/03	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
06/23/03	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
09/26/03	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
12/18/03	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
03/12/04	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
06/17/04	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
09/17/04	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
11/10/04	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
12/17/04	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
04/28/05	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
07/19/05	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
10/03/05	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
12/06/05	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
03/15/06	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
06/28/06	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
8/31/06	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
11/21/06	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
02/23/07	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
05/02/07	NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS						
<b>08/09/07</b>	<b>NOT SAMPLED DUE TO FREE-FLOATING HYDROCARBONS</b>						



**TABLE TWO**

**Summary of Chemical Analysis of Groundwater Samples  
Petroleum Hydrocarbon Concentrations  
All results are in parts per billion**

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-4</b>							
01/12/00	99,000	7,900*	16,000	20,000	2,100	12,000	< 2,500
04/24/00	54,000	44,000*	3,400/ 4,500	13,000/ 20,000	1,800/ 2,800	8,800/ 14,000	< 1,300
07/20/00	8,000	3,500	9,200/ 11,000	20,000 22,000	2,500 3,400	12,000/ 13,000	< 1,000
10/24/00	98,000	8,000*	21,000	29,000	2,700	15,000	< 1,000
01/18/01	91,000	12,000	17,000/ 15,000	21,000/ 21,000	2,500/ 2,800	13,000/ 11,000	<1,000 <5,000
04/05/01	88,000	7,500*	6,900/ 3,200	18,000/ 9,000	2,500/ 1,300	12,000/ 6,400	< 1,000 < 500
07/17/01	95,000	< 3,000	8,000	16,000	2,900	11,000	49
10/25/01	89,000	< 2,200	9,300	18,000	2,400	12,000	66
01/22/02	80,000	< 2,300	4,600	15,000	2,500	11,000	< 50
04/11/02	90,000	< 900	6,600	18,000	2,800	12,000	55
06/25/02	110,000	< 3,000	10,000	20,000	2,900	13,000	< 100
09/17/02	110,000	< 3,000	9,600	21,000	2,800	13,000	< 100
12/18/02	97,000	< 4,000	8,000	20,000	2,600	12,000	< 50
03/25/03	97,000	< 7,500	7,600	22,000	2,500	12,000	< 100
06/23/03	100,000	< 3,000	9,600	22,000	3,300	15,000	< 100
09/26/03	110,000	< 4,000	9,300	17,000	2,100	10,000	< 50
12/18/03	110,000	< 2,000	8,900	19,000	2,500	12,000	< 25
03/12/04	96,000	< 4,000	6,500	18,000	2,700	12,000	< 40
06/17/04	110,000	< 4,000	10,000	20,000	2,900	13,000	< 50
09/17/04	78,000	--	9,300	15,000	2,400	11,000	<50
11/10/04***	87,000	4,300	15,000	21,000	3,000	16,000	< 1300
12/17/04	88,000	< 3,000	8,500	16,000	2,800	12,000	< 25
04/28/05	110,000	< 3,000	7,800	14,000	2,200	10,000	< 25
07/19/05	90,000	na	10,000	13,000	2,300	10,000	< 40
10/03/05	68,000	< 800	9,400	4,000	1,800	8,700	23
12/06/05	81,000	< 1,500	8,900	7,200	2,200	9,500	< 20
03/15/06	68,000	< 3,000	7,300	14,000	2,500	10,000	< 20
06/28/06	61,000	< 3,000	8,500	4,100	2,600	11,000	< 20
08/31/06	68,000	< 2,000	9,500	9,600	2,500	12,000	< 20
11/21/06	68,000	< 1,500	9,000	5,000	2,000	9,300	< 20
02/23/07	90,000	< 2,000	11,000	11,000	2,800	12,000	< 20
05/02/07	56,000	< 2,000	7,300	6,300	2,500	11,000	< 15
<b>08/09/07</b>	<b>52,000</b>	<b>&lt; 2,000</b>	<b>7,600</b>	<b>2,600</b>	<b>2,100</b>	<b>8,400</b>	<b>&lt; 15</b>

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
**All results are in parts per billion**

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-5</b>							
06/11/02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	28
09/17/02	< 50	110	< 0.5	< 0.5	< 0.5	< 0.5	4.8
12/18/02	< 50	140	< 0.5	< 0.5	< 0.5	< 0.5	1.8
03/25/03	< 50	130	< 0.5	< 0.5	< 0.5	< 0.5	7.4
06/23/03	< 50	390	< 0.5	< 0.5	< 0.5	< 0.5	17
09/26/03	< 50	700	< 0.5	< 0.5	< 0.5	< 0.5	21
12/18/03	< 50	550	< 0.5	< 0.5	< 0.5	< 0.5	16
03/12/04	< 50	490	< 0.5	< 0.5	< 0.5	< 0.5	9.1
06/17/04	< 50	510	< 0.5	< 0.5	< 0.5	< 0.5	9.8
09/17/04	< 50	--	< 0.5	< 0.5	< 0.5	< 0.5	5.5
11/10/04***	< 50	370	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
12/17/04	< 50	120	< 0.5	< 0.5	< 0.5	< 0.5	9.2
04/28/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	2.2
07/19/05	< 50	na	< 0.5	< 0.5	< 0.5	< 0.5	6.1
10/03/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	2.4
12/06/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
03/15/06	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	3.3
06/28/06	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	1.8
08/31/06	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	3.4
12/05/06	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	5.2
02/23/07	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	6.0
05/02/07	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	3.8
<b>08/09/07</b>	<b>&lt; 50</b>	<b>&lt; 50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>5.5</b>

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
All results are in parts per billion

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-6</b>							
06/11/02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	1.2
09/17/02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	1.0
12/18/02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	0.90
03/25/03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
06/23/03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
09/26/03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
12/18/03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
03/12/04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
06/17/04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
09/17/04	< 50	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
11/10/04***	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
12/17/04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
04/28/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
07/19/05	< 50	na	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
10/03/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
12/06/05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
03/15/06	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
06/28/06	< 50	< 50	< 0.5	< 0.5	< 0.5	0.65	< 0.5
08/31/06	< 50	< 50	< 0.50	2.4	0.90	4.0	< 0.50
11/21/06	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5.0
02/23/07	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
05/02/07	< 50	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
<b>08/09/07</b>	<b>&lt; 50</b>	<b>&lt; 50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>	<b>&lt; 0.50</b>

**TABLE TWO**  
**Summary of Chemical Analysis of Groundwater Samples**  
**Petroleum Hydrocarbon Concentrations**  
**All results are in parts per billion**

Well/ Date Sampled	TPH Gasoline	TPH Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE
<b>MW-7</b>							
06/25/02	38,000	< 2,000	890	5,100	1,200	5,200	< 20
09/17/02	26,000	< 2,000	590	3,600	880	4,000	< 20
12/18/02	NOT SAMPLED - CAR PARKED OVER WELL						
03/25/03	39,000	< 2,900	410	7,700	1,000	6,400	< 5.0
06/23/03	17,000	< 1,000	440	2,600	630	2,600	< 10
09/26/03	17,000	< 1,000	230	1,800	470	2,200	< 5.0
12/18/03	20,000	< 1,000	290	2,500	590	2,900	< 5.0
03/12/04	20,000	< 1,500	300	3,000	760	3,200	< 10
06/17/04	12,000	< 800	250	1,800	450	1,900	< 5.0
09/17/04	9,900	--	200	1,500	450	1,800	< 5.0
11/10/04***	20,000	1,900	550	4,200	920	4,000	< 500
12/17/04	14,000	< 800	220	1,700	530	2,000	< 3.0
04/28/05	13,000	< 300	84	1,000	660	2,200	< 2.5
07/19/05	16,000	na	170	1,800	540	2,200	< 2.5
10/03/05	7,400	< 200	140	710	350	1,100	< 0.50
12/06/05	22,000	< 600	240	2,300	800	3,400	< 5.0
03/15/06	3,800	< 200	4.6	160	120	620	< 0.50
06/28/06	6,400	< 500	19.0	340	490	940	< 0.90
08/31/06	20,000	< 600	160	2,200	1,300	3,500	< 2.5
11/21/06	21,000	< 1,000	240	2,500	880	3,400	< 5.0
02/23/07	10,000	< 200	150	1,300	580	2,400	< 2.5
05/02/07	26,000	< 1,000	300	2,400	1,800	6,700	< 2.5
<b>08/09/07</b>	<b>13,000</b>	<b>&lt; 800</b>	<b>250</b>	<b>800</b>	<b>1,000</b>	<b>3,000</b>	<b>&lt; 2.5</b>
<b>ESL</b>	<b>500</b>	<b>640</b>	<b>46</b>	<b>130</b>	<b>290</b>	<b>13</b>	<b>1,800</b>

Notes:

\* = Hydrocarbons reported are in the early diesel range, and do not match the laboratory standard.

\*\* = Hydrocarbons reported do not match the laboratory gasoline standard.

\*\*\* = Grab sample - Not purged

# = Estimated concentration reported due to overlapping fuel patterns.

/ = Results separated by a slash represent results from two different laboratory

methods (8020/8260).

na = not analyzed

Non-detectable concentrations noted by the less than sign (<) followed by the detection limit.

Most recent data in bold.

ESL = Environmental screening levels presented in the "Screening For Environmental Concerns

**TABLE THREE**  
**Groundwater Analytical Results**  
**Oil & Grease and Volatile Organic Compounds**  
All results are in parts per billion

Date Sampled & Compound Analyzed	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
<u>7/8/97</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	-	-	-	-
Tetrachloroethane (PCE)	0.9	< 0.5	-	-	-	-	-
Other VOCs	< 0.5 - < 3	< 0.5 - < 3	-	-	-	-	-
<u>1/26/98</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	-	-	-	-
Trichloroethene	0.7	< 5.0	-	-	-	-	-
Tetrachloroethene	10	< 5.0	-	-	-	-	-
1,2-Dichloroethane	< 0.5	11	-	-	-	-	-
Other VOCs	< 0.5 - < 50	< 0.5 - < 50	-	-	-	-	-
<u>7/23/98</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	-	-	-	-
Tetrachloroethene	4	4.6	-	-	-	-	-
1,2-Dichloroethane	< 2	9.9	-	-	-	-	-
Other VOCs	< 2 - < 10	< 0.5 - < 5.0	-	-	-	-	-
<u>1/5/99</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	-	-	-	-
Tetrachloroethene	5.1	< 50	-	-	-	-	-
Trichloroethene	0.52	< 50	-	-	-	-	-
1,1,2,2-Tetrachloroethane	0.58	< 50	-	-	-	-	-
Chloroform	8.2	< 50	-	-	-	-	-
Other VOCs	< 0.5 - < 5	< 50 - < 500	-	-	-	-	-
<u>7/13/99</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	-	-	-	-
Tetrachloroethene	1.5	0.68	-	-	-	-	-
Chloroform	4.6	< 50	-	-	-	-	-
1,2-Dichloroethane	< 0.50	7.7	-	-	-	-	-
Other VOCs	< 0.5 - < 5	< 0.5 - < 500	-	-	-	-	-
<u>1/12/00</u>							
Hydrocarbon Oil and Grease	-	< 1,000	< 1,000	< 1,000	-	-	-
Tetrachloroethene	0.8	< 1.0	< 100	< 50	-	-	-
Chloroform	3.2	< 1.0	< 100	< 50	-	-	-
1,2-Dichloroethane	< 0.50	8.8	120	140	-	-	-
Acetone	-	-	25,000	6,400	-	-	-
Naphthalene	-	-	550	540	-	-	-
Isopropylbenzene	-	-	120	89	-	-	-
Other VOCs	< 0.5 - < 5.0	< 1.0 - < 4.0	< 100 - < 10,000	< 50 - < 5,000	-	-	-
<u>4/24/00</u>							
Hydrocarbon Oil and Grease	-	< 1,000	4,100	< 1,000	-	-	-
1,2-Dichloroethane	< 0.5	5.9	< 1,000	< 250	-	-	-
Naphthalene	-	-	3,800	590	-	-	-
Isopropylbenzene	-	-	1,200	< 250	-	-	-
Other VOCs	< 0.5 - < 5.0	< 5.0 - < 20	< 1,000 - < 100,000	< 250 - < 25,000	-	-	-
<u>7/20/00</u>							
Hydrocarbon Oil and Grease	-	< 1,000	-	< 1,000	-	-	-
Tetrachloroethene	0.59	< 5.0	FREE	< 200	-	-	-
Chloroform	2.1	< 5.0	PRODUCT	< 200	-	-	-
1,2-Dichloroethane	< 0.5	6.7	---	< 200	-	-	-
Acetone	-	-	NOT	< 20,000	-	-	-
Naphthalene	-	-	SAMPLED	730	-	-	-
Other VOCs	< 0.5 - < 20	< 5.0 - < 20	-	< 250 - < 20,000	-	-	-
<u>10/24/00</u>							
Hydrocarbon Oil and Grease	-	< 1,000	FREE	< 1,000	-	-	-
Tetrachloroethene	< 0.5	< 5.0	PRODUCT	< 250	-	-	-
Chloroform	1.0	< 5.0	NCT	< 250	-	-	-
Other VOCs	< 0.5 - < 20	< 5.0 - < 20	SAMPLED	< 250 - < 25,000	-	-	-
<u>1/18/01</u>							
Hydrocarbon Oil and Grease	-	2,100	FREE	1,300	-	-	-
Tetrachloroethene	1.3	< 5.0	---	< 250	-	-	-
Chloroform	6.4	< 5.0	NOT	< 250	-	-	-
Other VOCs	< 0.5 - < 20	< 5.0 - < 20	SAMPLED	< 250 - < 25,000	-	-	-

**TABLE THREE**  
**Groundwater Analytical Results**  
**Oil & Grease and Volatile Organic Compounds**  
All results are in parts per billion

Date Sampled & Compound Analyzed	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
<u>4/5/01</u>							
Hydrocarbon Oil and Grease	-	< 1.0	FREE	1,100.0	-	-	-
Tetrachloroethene	< 0.5	1.1	PRODUCT	< 50	-	-	-
1,2 dichloroethane	< 0.5	4.6	---	< 50	-	-	-
Trichloroethane	< 0.5	0.58	NOT	< 50	-	-	-
Naphthalene	-	-	---	320	-	-	-
Other VOCs	< 0.5 - < 2.0	< 5.0 - < 20	SAMPLED	< 50 - < 5,000	-	-	-
<u>7/17/01</u>							
Hydrocarbon Oil and Grease	-	< 500	FREE	< 500	-	-	-
Tetrachloroethene	-	-	PRODUCT	-	-	-	-
1,2 dichloroethane	< 0.5	< 50	---	69.0	-	-	-
Trichloroethane	-	-	NOT	-	-	-	-
Naphthalene	-	-	---	-	-	-	-
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>10/25/01</u>							
Hydrocarbon Oil and Grease	-	< 5,000	FREE	< 5,000	-	-	-
1,2 dichloroethane	-	< 50	PRODUCT	72	-	-	-
1,2 dibromoethane	-	< 50	NOT	< 50	-	-	-
Other VOCs	-	-	SAMPLED	---	-	-	-
<u>1/22/02</u>							
Hydrocarbon Oil and Grease	-	< 5,000	FREE	< 5,000	-	-	-
1,2 dichloroethane	-	< 50	PRODUCT	< 50	-	-	-
1,2 dibromoethane	-	< 50	NOT	< 50	-	-	-
Other VOCs	-	-	SAMPLED	---	-	-	-
<u>6/11/02</u>							
Oil and Grease	-	1,100	FREE	-	< 1,000	< 1,000	-
1,2 dichloroethane	-	< 50	PRODUCT	-	< 0.5	< 0.5	-
1,2 dibromoethane	-	< 50	NOT	-	< 0.5	< 0.5	-
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>6/25/02</u>							
Oil and Grease	-	-	FREE	1,400	-	-	< 1,000
1,2 dichloroethane	-	-	PRODUCT	< 100	-	-	< 20
1,2 dibromoethane	-	-	NOT	< 100	-	-	< 20
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>9/17/02</u>							
Oil and Grease	-	< 1,000	FREE	< 1,000	< 1,000	< 1,000	< 1,000
1,2 dichloroethane	-	< 20	PRODUCT	< 100	< 0.50	< 0.50	< 20
1,2 dibromoethane	-	< 20	NOT	< 100	< 0.50	< 0.50	< 20
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>12/18/02</u>							
Oil and Grease	-	1,200	FREE	< 1,000	< 1,000	< 1,000	CAR PARKED OVER WELL
1,2 dichloroethane	-	< 10	PRODUCT	< 50	< 0.50	< 0.50	< 10
1,2 dibromoethane	-	< 10	NOT	< 50	< 0.50	< 0.50	NOT SAMPLED
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>3/25/03</u>							
Oil and Grease	-	< 1,000	FREE	< 1,000	< 1,000	< 1,000	< 1,000
1,2 dichloroethane	-	< 50	PRODUCT	< 100	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	-	< 50	NOT	< 100	< 0.50	< 0.50	< 2.5
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>6/23/03</u>							
Oil and Grease	-	< 1,000	FREE	< 1,000	< 1,000	< 1,000	< 1,000
1,2 dichloroethane	< 0.5	< 50	PRODUCT	< 100	< 0.50	< 0.50	< 10
1,2 dibromoethane	< 0.5	< 50	NOT	< 100	< 0.50	< 0.50	< 10
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>9/26/03</u>							
Oil and Grease	-	< 1,000	FREE	< 1,000	< 1,000	< 1,000	< 1,000
1,2 dichloroethane	< 0.5	< 50	PRODUCT	87	< 0.50	< 0.50	< 5.0
1,2 dibromoethane	< 0.5	< 50	NOT	< 50	< 0.50	< 0.50	< 5.0
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>12/18/03</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 20	PRODUCT	46	< 0.50	< 0.50	< 5.0
1,2 dibromoethane	< 0.5	< 20	NOT	< 25	< 0.50	< 0.50	< 5.0
Other VOCs	-	-	SAMPLED	-	-	-	-

**TABLE THREE**  
**Groundwater Analytical Results**  
**Oil & Grease and Volatile Organic Compounds**  
 All results are in parts per billion

Date Sampled & Compound Analyzed	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
<u>3/12/04</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 25	PRODUCT	< 40	< 0.50	< 0.50	< 10
1,2 dibromoethane	< 0.5	< 25	NOT	< 40	< 0.50	< 0.50	< 10
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>6/17/04</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 25	PRODUCT	93	< 0.50	< 0.50	< 5.0
1,2 dibromoethane	< 0.5	< 25	NOT	< 50	< 0.50	< 0.50	< 5.0
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>9/17/04</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	-	-	PRODUCT	-	-	-	-
1,2 dibromoethane	-	-	NOT	-	-	-	-
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>12/17/04</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 15	PRODUCT	53	< 0.50	< 0.50	< 3.0
1,2 dibromoethane	< 0.5	< 15	NOT	< 25	< 0.50	< 0.50	< 3.0
Other VOCs	-	-	SAMPLED	-	-	-	-
<u>4/28/05</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 15	PRODUCT	46	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.5	< 15	NOT	< 25	< 0.50	< 0.50	< 2.5
DIPE	0.67	90	SAMPLED	< 25	< 0.50	< 0.50	< 2.5
Other VOCs	< 0.5	< 15	-	< 25	< 0.50	< 0.50	< 2.5
<u>7/19/05</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 15	PRODUCT	73	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.5	< 15	NOT	< 40	< 0.50	< 0.50	< 2.5
DIPE	0.76	< 15	SAMPLED	< 20	2.1	< 0.50	< 2.5
TBA	< 5.0	77	-	< 20	< 5.0	< 5.0	< 5.0
Other VOCs	< 0.50	< 15	-	< 20	< 0.50	< 0.50	< 2.5
<u>10/9/05</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.5	< 15	FREE	62	< 0.50	< 0.50	< 0.50
1,2 dibromoethane	< 0.5	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 0.50
DIPE	< 0.5	< 15	NOT	23	1.7	< 0.50	< 0.50
TBA	< 5.0	< 70	SAMPLED	< 5.0	< 5.0	< 5.0	< 5.0
Other VOCs	< 0.5	< 15	-	< 20	< 0.50	< 0.50	< 0.50
<u>3/15/06</u>							
Oil and Grease	-	-	FREE	-	-	-	-
1,2 dichloroethane	< 0.5	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 0.50
1,2 dibromoethane	< 0.5	< 15	NOT	< 20	< 0.50	< 0.50	< 0.50
Other VOCs	< 0.5	< 15	SAMPLED	< 20	< 0.50	< 0.50	< 0.50
<u>6/29/06</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.5	33	FREE	20	< 0.50	< 0.50	< 0.90
1,2 dibromoethane	< 0.5	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 0.90
TBA	< 5.0	< 5.0	NOT	< 5.0	< 5.0	< 5.0	< 5.0
Other VOCs	< 0.5	< 15	SAMPLED	< 20	< 0.50	< 0.50	< 0.50
<u>8/31/06</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.50	< 15	FREE	36	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.50	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 2.5
DIPE	< 0.50	< 15	NOT	< 20	< 0.50	< 0.50	1.4
TBA	< 5.0	81	SAMPLED	< 5.0	< 5.0	< 5.0	< 15
Other VOCs	< 0.50	< 15	-	< 20	< 0.50	< 0.50	< 5.0
<u>11/21/06</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.50	< 15	FREE	42	< 0.50	< 0.50	< 5.0
1,2 dibromoethane	< 0.50	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 5.0
DIPE	< 0.50	< 15	NOT	< 20	1.7	< 0.50	< 5.0
TBA	< 5.0	82	SAMPLED	230	5.4	< 5.0	< 25
Other VOCs	< 0.50	< 15	-	< 20	< 0.50	< 0.50	< 5.0

**TABLE THREE**  
**Groundwater Analytical Results**  
**Oil & Grease and Volatile Organic Compounds**  
**All results are in parts per billion**

Date Sampled & Compound Analyzed	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
<u>2/12/07</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.50	< 15	FREE	36	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.50	< 15	PRODUCT	< 20	< 0.50	< 0.50	< 2.5
DIPE	1.2	< 15	NOT	< 20	1.4	< 0.50	< 2.5
TBA	< 5.0	190	SAMPLED	290	< 5.0	< 5.0	< 15
Other VOCs	< 0.50	< 15	-	< 20	< 0.50	< 0.50	< 2.5
<u>5/2/07</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.50	< 15	FREE	20	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.50	< 15	PRODUCT	< 15	< 0.50	< 0.50	< 2.5
DIPE	1.3	< 15	NOT	< 15	1.3	< 0.50	< 2.5
TBA	< 5.0	110	SAMPLED	160	< 5.0	< 5.0	< 50
Other VOCs	< 0.50	< 15	-	< 15	< 0.50	< 0.50	< 2.5
<u>8/9/07</u>							
Oil and Grease	-	-	-	-	-	-	-
1,2 dichloroethane	< 0.50	< 15	FREE	31	< 0.50	< 0.50	< 2.5
1,2 dibromoethane	< 0.50	< 15	PRODUCT	< 15	< 0.50	< 0.50	< 2.5
DIPE	0.85	< 15	NOT	15	1.3	< 0.50	< 2.5
TBA	< 5.0	81	SAMPLED	170	< 5.0	< 5.0	< 15
Other VOCs	0.96 PCE	< 15	-	< 15	0.72 PCE	< 0.50	< 2.5





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## **APPENDIX A**

Earth Safety Dynamics Workplan for Indoor Air Sampling

WORK PLAN FOR SAMPLING AND ANALYSIS OF VOLATILE ORGANIC  
COMPOUNDS IN INDOOR AIR POTENTIALLY IMPACTED BY SOIL VAPOR  
CONTAMINATION

FORMER INDUSTRIAL FACILITY

250 8<sup>TH</sup> STREET  
OAKLAND, CALIFORNIA

(Revision 0)

*Sampling Plan Prepared For:*

Aqua Science Engineers, Inc.  
55 Oak Court, Suite 220  
Danville, CA 94526

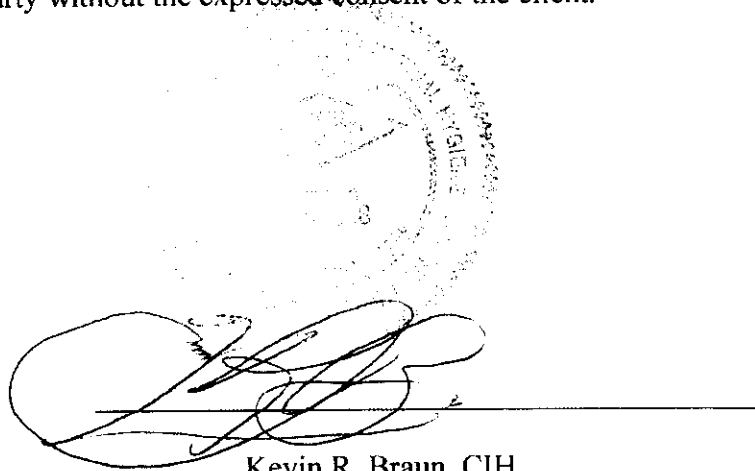
*Prepared By:*

Earth Safety Dynamics  
70 Rockrose Street  
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(925) 455-6601

October 31, 2007

## Limitations

Services provided by Earth Safety Dynamics and its subcontractors have been provided in accordance with generally accepted professional practices for the nature and conditions of similar work completed in the same or similar localities, at the time the work was performed. The scope of work for the project was conducted within the limitations prescribed by the client. This report represents only conditions present under the existing conditions and at the time the study was conducted, is not meant to represent a legal opinion. No other warranty, expressed or implied, is made. This sampling plan was prepared for the sole use of Aqua Science Engineers and may not be duplicated or used by any other party without the expressed consent of the client.

A circular professional seal for Kevin R. Braun, CIH, Certified Industrial Hygienist. The seal contains the text "Kevin R. Braun, CIH" and "Certified Industrial Hygienist" around the perimeter. A signature is written over the seal.

Kevin R. Braun, CIH  
Certified Industrial Hygienist

ABIH Certification # 7029

October 31, 2007

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Appendix A: Proposed Interior Sample Locations

## I. Introduction

A gas station was previously located on the property located at 250 8<sup>th</sup> Street in Oakland, California. A plume of groundwater contamination (consisting of elevated concentrations of volatile organic compounds) has been identified beneath the structure, resulting in elevated soil gas concentrations of these volatile organic compounds. This, in turn, has generated concern regarding possible vapor intrusion to the occupied spaces of the building.

The Alameda County Health Care Services Agency has issued a guidance document requesting an evaluation of the indoor air and consequent exposure potential to individuals working in the building. In accordance with these documents, Earth Safety Dynamics will obtain indoor air samples from potentially affected structures. Samples will be obtained over 8 hour periods using 6-liter Summa canisters submitted for analysis for the listed analytes in accordance with Modified EPA Method TO-15.

Sampling will be performed over a standard shift (between 08:00 and 17:00, M-F) during normal operations, with all doors, windows, and HVAC systems in usual configuration and usual operation. Care will be taken to ensure that no unusual activities (special equipment cleaning, repair, or unusual chemical processes, etc.) are undertaken on the day of sampling, and sampling will not be conducted if weather forecasts predict exceptionally high winds that might result in an abnormally high air exchange rate within the structure. Additionally, no smoking will be allowed in or in the immediate vicinity of the premises on the day of sampling. Samples will be obtained as follows:

- 1) Interior: Eight (8) 8-hour samples will be obtained from the interior of the structures (three from the building housing the beauty shop, photo shop, and produce market, and restaurant, two from the Chinese Presbyterian Church, two from the church at 280 8<sup>th</sup> Street, and one from the structure on the property itself at 250 8<sup>th</sup> Street). At least one will be in the immediate vicinity of known existing slab penetration(s), visible foundation cracks, or other obvious pathway for soil gas to intrude into the building envelope in the vicinity of areas of known elevated soil gas concentrations. Others will be obtained from high occupancy areas exhibiting the greatest potential for exposure to contaminants circulating in the building air.
- 2) Exterior Control: One (1) 8-hour sample will be obtained from the exterior of the building at a location that is not expected to be impacted by air exhausted from within the building envelope. It is anticipated that this sample will be taken from breathing zone height at a secure point (likely perimeter fence line) near the structure in the general upwind direction from the building. This is usually

northwest, but actual sample location will be based on conditions at the time of sampling.

- 3) Field Blank: One (1) pressurized blank canister will be subjected to all listed procedures except sampling period.

## II. Materials and Methods

All canister and flow controller preparation, sample analysis, and quality assurance tasks will be performed by Air Toxics, Limited of Folsom, California. Air Toxics is accredited by the American Industrial Hygiene Association (AIHA), United States and California Environmental Protection Agencies (USEPA and Cal/EPA). Evacuated canisters will be cleaned and certified (100%) by Air Toxics, Limited of Folsom, California. Canisters will be handled and shipped by laboratory and sampling personnel at all times in a manner that avoids excessive temperature changes or significant shock. Sampling and quality assurance procedures will follow the standard sampling and analytical methods detailed in Appendix A and outlined below:

1. **Verify initial canister vacuum prior to deployment (minimum 27" Hg):**
  - Verify gauge operation. If the indicator does not read zero, the gauge either needs equilibration (performed by briefly opening the rubber plug) or, if this does not work, must be replaced.
  - Confirm that valve is closed.
  - Remove the brass cap.
  - Attach gauge.
  - Attach brass cap to side of gauge tee fitting.
  - Open and close valve quickly (one second or less).
  - Read and record vacuum on gauge.
  - Verify that canister valve is closed and remove gauge.
  - Replace cap.
2. **Deploy canister and begin sampling:**
  - Choose a location that is not in direct sunlight or subject to significant temperature changes, as this will affect pressure relationships between canister interior and ambient, thereby altering sampling rate.
  - Remove brass cap.
  - Attach flow controller to canister. All fittings are ¼ inch Swagelok. Use 9/16 – inch end wrench taking care not to overtighten any fitting – finger tight plus ¼-turn of wrench is sufficient for all fitting and cap attachments.
  - Open valve ½ turn.
  - Monitor vacuum periodically during sampling period. Volume sampled is a linear function of canister vacuum. Ensure that vacuum is dropping approximately 1" Hg/hr. Terminate sampling at 5" Hg vacuum.
  - At end of sampling period, close valve (hand tight only) and disconnect flow controller.

**3. Verify final vacuum:**

- Read and record final canister vacuum. Should be between 3" and 7" Hg. If final vacuum approaches ambient (less than 1" Hg), sample should be discarded and sampling repeated.
- Replace brass cap.

**4. Package and ship samples:**

- Complete sample tag and chain of custody for all samples.
- Repackage in original packaging. Samples should not be refrigerated or otherwise chilled; rather, ship them at room temperature using a method that will ensure total holding time less than 72 hours.
- Ship to accredited laboratory (Air Toxics) under strict chain-of-custody protocol. Sample analysis must be performed in time to ensure total holding time of less than 14 days.

**III. Appendices**

**APPENDIX A: PROPOSED INTERIOR SAMPLE LOCATIONS**



