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October 29, 2001

#263

Barney M. Chan, Hazardous Materials Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

NOV 06 2001

Re: Site Characterization Workplan
Vic's Automotive Services
245 Eighth Street
Oakland, California
AEI Project No. 4603

Dear Mr. Chan:

The following workplan is submitted by AEI Consultants (AEI) on behalf of Mr. Victor Lum, the owner of the above referenced property (Figure 1). The workplan was prepared in response to the Alameda County Health Care Services Agency's (ACHCSA) request for a scope of work to define the lateral and vertical extent of the hydrocarbon release at the property. A previous workplan was submitted on February 27, 2001 in which a two-phase investigation was described. The first phase has already been completed, consisting of the installation of two groundwater-monitoring wells on the property, and resumption of free product recovery using an active skimmer pump. A second phase was proposed that entailed reconnaissance sampling and analysis of soil vapor, soil, and groundwater down gradient of Vic's Auto.

Specifically with regard to the second phase, the scope of this workplan entails the advancement of 12 borings using the Geoprobe drilling method. Soil vapor and groundwater samples will be collected from all of the borings. Samples will be analyzed for gasoline hydrocarbon components to yield qualitative information about the areal extent of contamination, relative levels of contamination from point to point, and the likelihood of occurrence of free product at a given location. The results of the soil vapor and groundwater analytical survey will be used to determine the present location of the free product and dissolved product groundwater plumes, and to select locations for installation of additional wells.

This workplan adds a third phase, consisting of the installation of three offsite down gradient groundwater monitoring-/free product recovery- wells. The purpose of the additional wells is to facilitate monitoring of the free product and dissolved product groundwater plumes, and to enable removal of free product that may have drifted down gradient from the site.

To summarize then, the investigation is taking place in three phases:

- Phase 1: installation of two additional onsite groundwater monitoring wells and a free product recovery system (accomplished);
- Phase 2: on-site and off-site reconnaissance characterization of gasoline petroleum hydrocarbons in soil vapor and groundwater;
- Phase 3: installation of (3) groundwater monitoring/recovery wells at locations to be determined based on Phase 2 results.

I. Site Description and Background

The property is located in a commercial zone at the corner of Eighth and Alice Streets in Oakland, and is approximately 0.23 acres in area. The single building located on the property contains both an auto repair shop and an office for Vic's Automotive Services. The building is surrounded by an asphalt-paved parking lot (see Figure 2). A gasoline dispenser island and canopy are located north of the building.

Five underground storage tanks (USTs) were removed from the site in 1993 by AEI, and two additional USTs were removed by AEI in 1994. Contaminated soils, groundwater, and free phase floating product were observed in the excavations.

Two groundwater-monitoring wells, MW-1 and MW-2, were installed in 1995. The water table was measured at approximately 17 feet bgs. Approximately two feet of floating product were discovered in MW-1. Analyses of groundwater samples from MW-2 indicated that concentrations of 68,000 ppb TPH-g and 480 ppb benzene were present.

The hydraulic gradient was determined using two off-site wells that had been installed for a subsurface investigation at a neighboring site. It was determined that the groundwater flow direction was to the south with a gradient of approximately 0.01 foot per foot.

At least 45 gallons of free product were removed from MW-1 by manual bailing from July 1995 to October 1996. In November 1996, AEI installed a skimmer pumping system and removed approximately 900 gallons of product and water.

In early August 1996, AEI advanced three soil borings (SB-1, SB-2, and SB-3) to define the extent of the free product plume (refer to Figure 2 for boring locations). Sheen was observed on the grab groundwater sample collected from SB-2, advanced approximately 25 feet west of MW-1, but no sheen was observed on the groundwater samples collected from SB-1 or SB-2. Upon analysis, however, significant concentrations of BTEX and MTBE were found in the samples.

No work at the site ensued during the period August 1996 to May 2001.

Work at the site was revived in response to a letter from the ACHCSA dated January 4, 2001, and addressed to Mr. Victor Lum. The letter requested that additional characterization take place both on and off site, and that free product recovery from MW-1 be resumed. Based on the results

of the August 1997 investigation, it was evident that the NAPL had spread to the west and south of the site, as had the dissolved phase plume. Additional off-site monitoring wells would be necessary to assess the extent of the impacted groundwater down gradient from the site. A workplan was prepared dated February 27, 2001 that described a two-phased investigation as previously described.

Phase 1 was completed in late May 2001. Two soil borings were advanced to 25 feet bgs, and converted to onsite groundwater monitoring wells MW-3 and MW-4 (Figure 2). A free product recovery system consisting of an active skimmer pump was installed.

A recent episode of groundwater monitoring confirmed a groundwater flow direction to the south/southeast. Free and dissolved phase hydrocarbons appeared to be limited in lateral extent to the north and east.

AEI issued a report dated July 31, 2001 that described the installation of on-site groundwater monitoring wells and an active skimmer pump in MW-1. The following information was gathered as a result of monitoring the on-site wells: Table 1 shows groundwater elevation data, including free product thickness. A thickness of 1.63 feet of free product was present in MW-1. Table 2 shows the results of soil sample analyses. All samples were non-detect for TPH as gasoline, BTEX, and MTBE. Table 3 shows groundwater sample analytical data. TPH as gasoline, benzene, and MTBE were detected in MW-2 at 69,000 µg/l, 7,200 µg/l, and 4,400µg/l, respectively. TPH as gasoline was detected in MW-3 at 550 µg/l. No detectable concentrations of hydrocarbons were present in MW-4.

II. Geologic Setting

According to logs of soil borings advanced by AEI, the near surface native sediments beneath the site consist of fine to medium clean to silty and clayey sand. Saturation was observed during the drilling at approximately 20 feet below ground surface (bgs) in each boring. The water table was found at a depth of 15 to 16 feet bgs.

The site is located at 29 feet above mean sea level (msl). The site is flat; however, the topography of the area slopes gently to the southwest. Groundwater beneath the site flows to the south/southeast. The hydraulic gradient was calculated as 0.0074 ft/ft.

Results of the second episode of sampling of the four wells will be reported shortly under separate cover.

III. Scope of Work

AEI proposes to advance a total of twelve (12) soil borings (SB-4 to SB-17) to conduct a reconnaissance soil vapor survey. Refer to Figure 3 for proposed boring locations. The locations of the proposed borings and wells were chosen to determine the extent to which free-floating product and dissolved hydrocarbons may have migrated cross gradient and down gradient in the shallow groundwater flow system. Soil vapor samples will be analyzed to determine

concentrations of gasoline hydrocarbons, and these data will be used to select locations of groundwater monitoring wells.

Geoprobe Drilling, Reconnaissance Soil Vapor and Groundwater Sampling (Phase II)

All drilling will be performed by a California licensed (C57) drilling contractor, working under the direction of an AEI geologist. Prior to beginning fieldwork, drilling/well construction permits will be obtained from the Alameda County Public Works Agency (ACPWA).

Borings will be advanced with a standard truck-mounted Geoprobe® or a limited access direct-push drilling system, depending upon access and drill site conditions. Soil borings (SB-4 through SB-18) will be advanced to the water table, estimated to occur at a depth of 18 feet bgs. A grab water sample will be collected. Water will be collected and sealed within 40-ml VOA vials assuring that no air space or bubbles are visible. A second drill hole will be advanced to a depth of approximately 3 feet above the water table, and soil gas will be collected using the post run tubing (PRT) system. The PRT system assures that the sample will be taken from the desired depth at the bottom of the hole. The sample will be drawn through a disposable point, through an adapter, and into the sample tubing. Soil vapor will be purged with a portable vacuum pump that is connected to the tubing, and a sample will be collected in a Tedlar bag that is inline between the PRT sampler and the vacuum pump. Following the collection of soil vapor, the rods will be withdrawn and the boring will be backfilled with neat cement grout.

Soil vapor and groundwater samples will be transported following chain of custody procedures to Mc Campbell Analytical, Inc. (DOHS Certification Number 1644) in Pacheco, California, for analysis of TPH as gasoline by EPA Method 5030/8015, and BTEX and MTBE by EPA Method 5030/8020.

Interpretation of Soil Vapor Analytical Results and Location of Wells (Phase II)

Analytical results for soil vapor and groundwater samples will be tabulated, plotted on a base map, and contoured to delineate the area affected by the hydrocarbon release. Two sub-areas will be mapped: one that has a probability of containing free product floating on the water table, and one that contains detectable hydrocarbons in soil vapor that could indicate the presence of dissolved product only in the groundwater. If soil gas concentrations are found to equal the saturated vapor content of the analyte, then it is a reasonable assumption that free product exists at that location. Lesser concentrations than the saturated vapor content of the analyte could be indicative of only the presence of dissolved product in the groundwater.

A brief interim report will be prepared that recommends locations of proposed groundwater monitoring wells. The recommended locations of three groundwater-monitoring wells will be designated on the soil vapor survey map. Soil samples will be collected for analysis from the borings. One of the wells will be located either where the presence of free product is suspected, or where soil vapor hydrocarbon concentrations are highest. This well will be used for possible free product recovery. The two remaining wells will serve as offsite groundwater monitoring wells and will be sited outside of the plume, based upon the soil vapor data. In this manner, the

results of the soil vapor survey will be confirmed, and the boundaries of the plume will be established.

Soil Borings, Soil Sampling, and Analysis (Phase III)

A hollow stem auger drill rig will be used to advance three soil borings to a nominal depth of 30 feet bgs at locations yet to be determined. Soil samples will be collected from the borings at approximately 5-foot intervals, and screened with a PID. Samples will be collected of undisturbed soil in either plastic or brass liners. The samples will be sealed with Teflon tape and plastic end caps. All samples will be stored in a cooler with water ice during field activities and during transportation to the laboratory.

All soil samples will be transported following chain of custody procedures to Mc Campbell Analytical, Inc. (DOHS Certification Number 1644) of Pacheco, California. One sample per boring will be analyzed for TPH as gasoline by EPA Method 5030/8015 and for BTEX and MTBE by EPA Method 5030/8020. Remaining soil samples will be held at the laboratory for ~~additional~~ possible analysis, if requested, within the acceptable hold time for volatile organic compounds. 8260 Confirmation

Well Construction and Sampling (Phase III)

The three wells will be constructed of 4" internal diameter, flush threaded PVC well casing. Each well will be screened with 15 feet of factory slotted .020" factory slotted well screen, set from approximately 10 feet below the water table to 5 feet above the water table to bracket water level fluctuations. The remainder of the well will be constructed with blank casing. The annulus of the well will be filled with a sand pack to a height of 2 feet above the top of the well screen. A 2-foot thick bentonite seal will be placed above the sand pack prior to setting the grout seal. The cement seal will be placed above the bentonite to ground surface. A locking, watertight well cap and traffic rated well box will be installed to complete the well.

The newly constructed wells will be developed no sooner than 72 hours after setting the grout seal. The wells will first be surged with a surge block to loosen any accumulated fines from the well screen and sand pack. A minimum of 10 well volumes of water will then be removed from the well.

The wells will then be surveyed by a California licensed land surveyor. The elevations of the tops of the well casings will be surveyed relative to mean sea level using a USGS benchmark. Distances between the wells will be measured as well. These data will be used to calculate hydraulic gradient and groundwater flow direction. to same benchmark as other wells

A minimum of 72 hours after development and every quarter thereafter, for a period of one year, the wells will be monitored and sampled. The wells will be opened and water levels with respect to the top of the well casing will be measured with an electric water level meter. Each well will be purged by removing a minimum of 4 well volumes, during which time the groundwater will

be monitored for the following parameters: temperature, pH, and total dissolved solids (TDS). Once the water levels return to a minimum of 90% of their original level within the well, a water sample will be collected. The water samples will be collected with clean disposable bailers and sealed within 40-ml VOA vials assuring that no air space or bubbles are visible. Samples will be transported in an iced cooler to Mc Campbell Analytical Inc. where they will be analyzed for TPH as gasoline (EPA Method 5030/8015), and BTEX and MTBE by EPA Method 5030/8020.

Equipment Decontamination

All drilling and sampling equipment will be washed between samples and between borings and well construction to minimize the likelihood of cross contamination between locations. The equipment will be washed in a triple rinse system. The augers will be steam cleaned between borings. Rinse water will be stored on site in 55-gallon drums.

Waste Handling

Drill cuttings will be stored on-site in DOT approved 55-gallon drums. On-site treatment or off-site disposal of contaminated drill cuttings is not a part of this work scope. It is likely that a licensed hauler will be contracted to transport the soils, under appropriate manifests, to a local landfill facility.

Groundwater removed from the wells during development and sampling and equipment rinse water will be stored on-site in 55-gallon drums. The water will be pumped from the drums by a licensed waste hauler on a milk-run basis at the request of the property owner.

Site Reconnaissance

A site reconnaissance will be made of the site vicinity and area for potentially impacted sensitive receptors. A review of Department of Water records for all permitted wells within a ½ mile radius of the site will be performed. The vicinity of the site will be studied for creeks and other surface waters and other sensitive receptors including human populations and/or wildlife habitat. The results will be reported with the project documentation.

Reporting

Following receipt of all laboratory reports and survey information, AEI will prepare a final technical report documenting the project. The report will include appropriate figures showing sampling locations, contaminant distribution, and hydrologic conditions. Laboratory results will be tabulated and laboratory reports will be included. Logs of the borings and well construction diagrams will also be presented. A discussion of the extent of the release will be made along with recommendations for remedial measures and remedial feasibility investigation pilot tests. The report will be delivered to the client upon completion.

Quarterly groundwater monitoring reports will be prepared and submitted to the ACHCSA following each episode of sampling.

IV. Site Safety

Prior to commencement of field activities, a site safety meeting will be held at a designated area. Emergency procedures will be outlined at this meeting. Also, the hazards of the known or suspected chemicals of interest will be explained. Level D personal protection equipment is the anticipated maximum amount of protection needed. A site safety plan conforming to Part 1910.120 (i) (2) of 29 CFR will be on site at all times during the project.

A working area will be established with barricades and warning tape to delineate the zone where hard hats and steel-toed shoes must be worn, and where unauthorized personnel will not be allowed. If, during drilling, fuel product odors are deemed to be substantial, half-face respirators with organic vapor cartridges will be worn.

A nearby hospital will be designated in the site safety plan as the emergency medical facility of first choice. A map with a course plotted to the hospital will be on-site.

V. Estimated Schedule

The permitting process will begin once a scope of work has been approved by the ACHCSA and a contractual agreement has been finalized with AEI. An estimated period of at least one month will be required to gain access to the drill locations. Gaining access is the most critical part of the schedule because it is beyond the control of AEI Consultants. Communication with owner/occupants of potential drill sites will be contacted by letter which will be copied to Mr. Barney Chan, ACHCSA.. Work will be scheduled following approval of the drilling permits. The ACHCSA will be given adequate notice of the day of drilling. Upon completion of the soil vapor survey, three to four weeks will be required for data interpretation, and for selection of groundwater monitoring well locations. Two weeks will be required to set up and complete the well installation project. Two weeks will be required to develop, sample, and survey the wells. Wells will be developed no sooner than 72 hours after construction, and they will be sampled no sooner than 72 hours after development. The final report will be issued two weeks after receipt of data from the laboratory.

This workplan has been prepared according to current practices in the environmental engineering and consulting field and in accordance with the requirements of the ACHCSA's Groundwater Protection Program guidelines. AEI requests your approval to proceed with this project. Please contact either of the undersigned at (925) 283-6000 if you need additional information or have any questions.

Sincerely,
AEI Consultants

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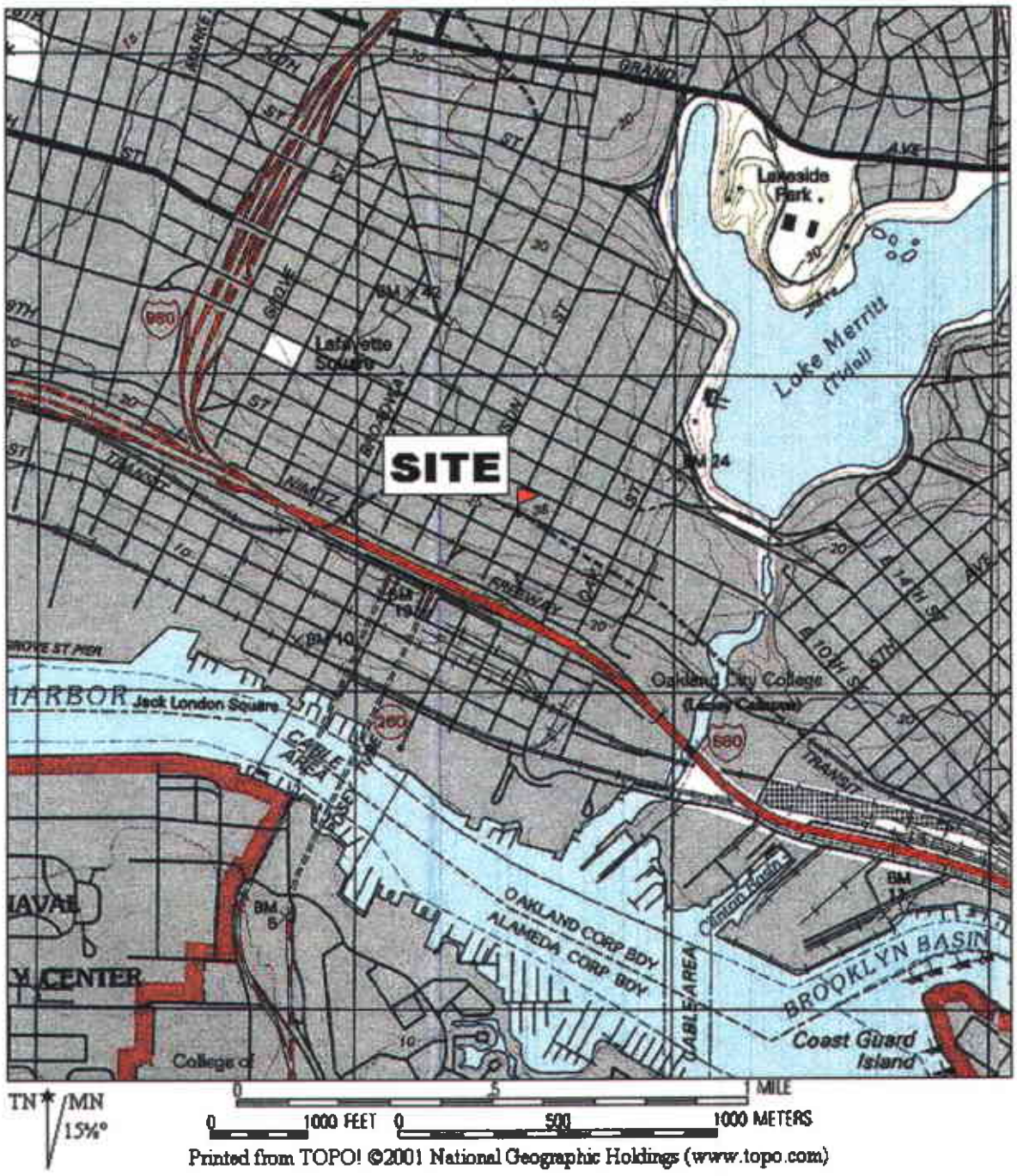
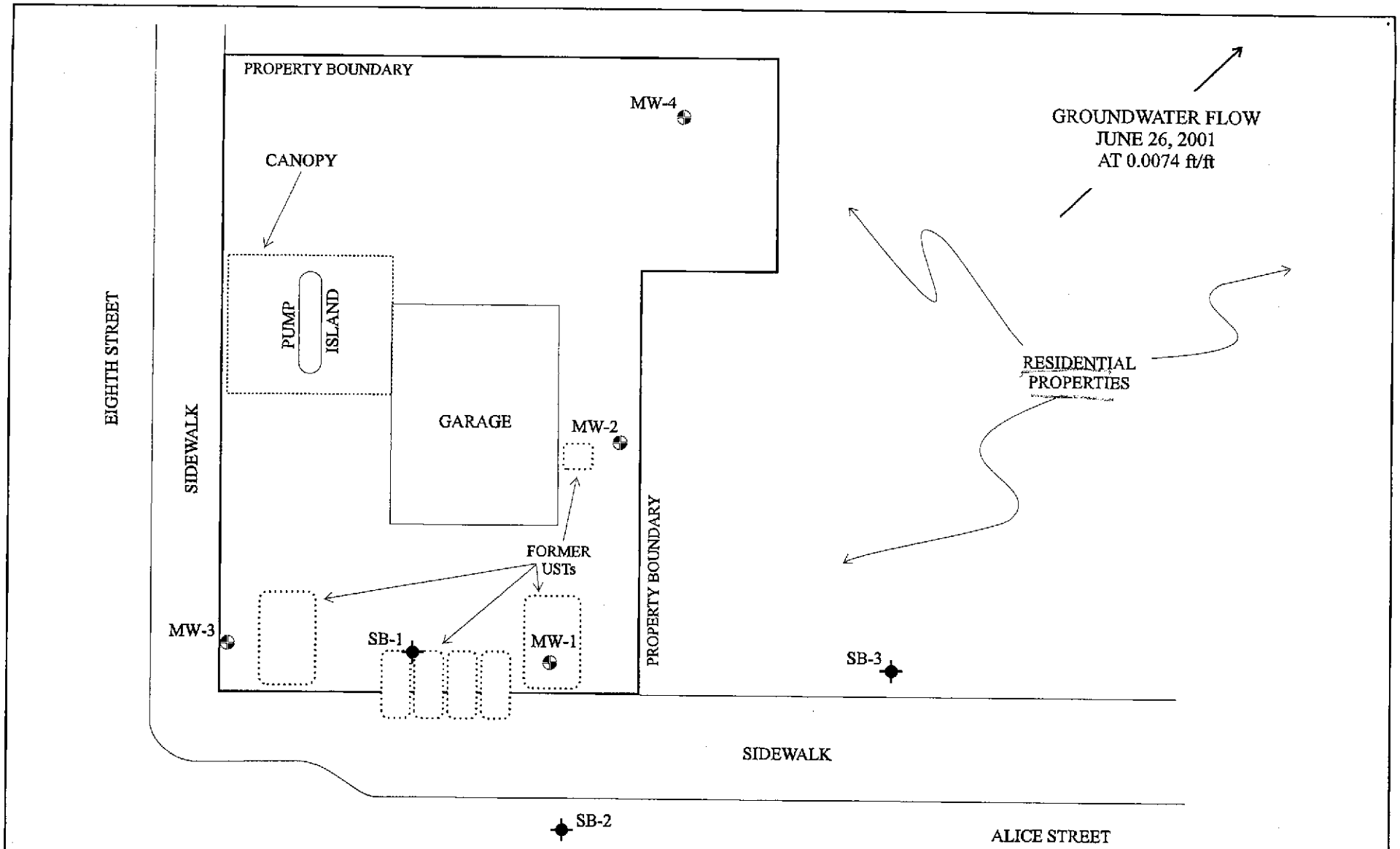
Figure 1 Site Location Map
Figure 2 Site Plan
Figure 3 Proposed Borehole Locations

Table 1 Previous Groundwater Elevation Data
Table 2 Previous Soil Sample Results
Table 3 Previous Groundwater Sample Results

cc: Mr. Victor Lum
Vic's Automotive Services
245 8th Street
Oakland, California 94607-4403



AEI CONSULTANTS 3210 OLD TUNNEL RD, STE B, LAFAYETTE, CA	
SITE LOCATION MAP	
245 8th STREET OAKLAND, CALIFORNIA	**FIGURE 1** PROJECT NO. 4603



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3210 OLD TUNNEL ROAD, SUITE B, LAFAYETTE, CA

SITE PLAN

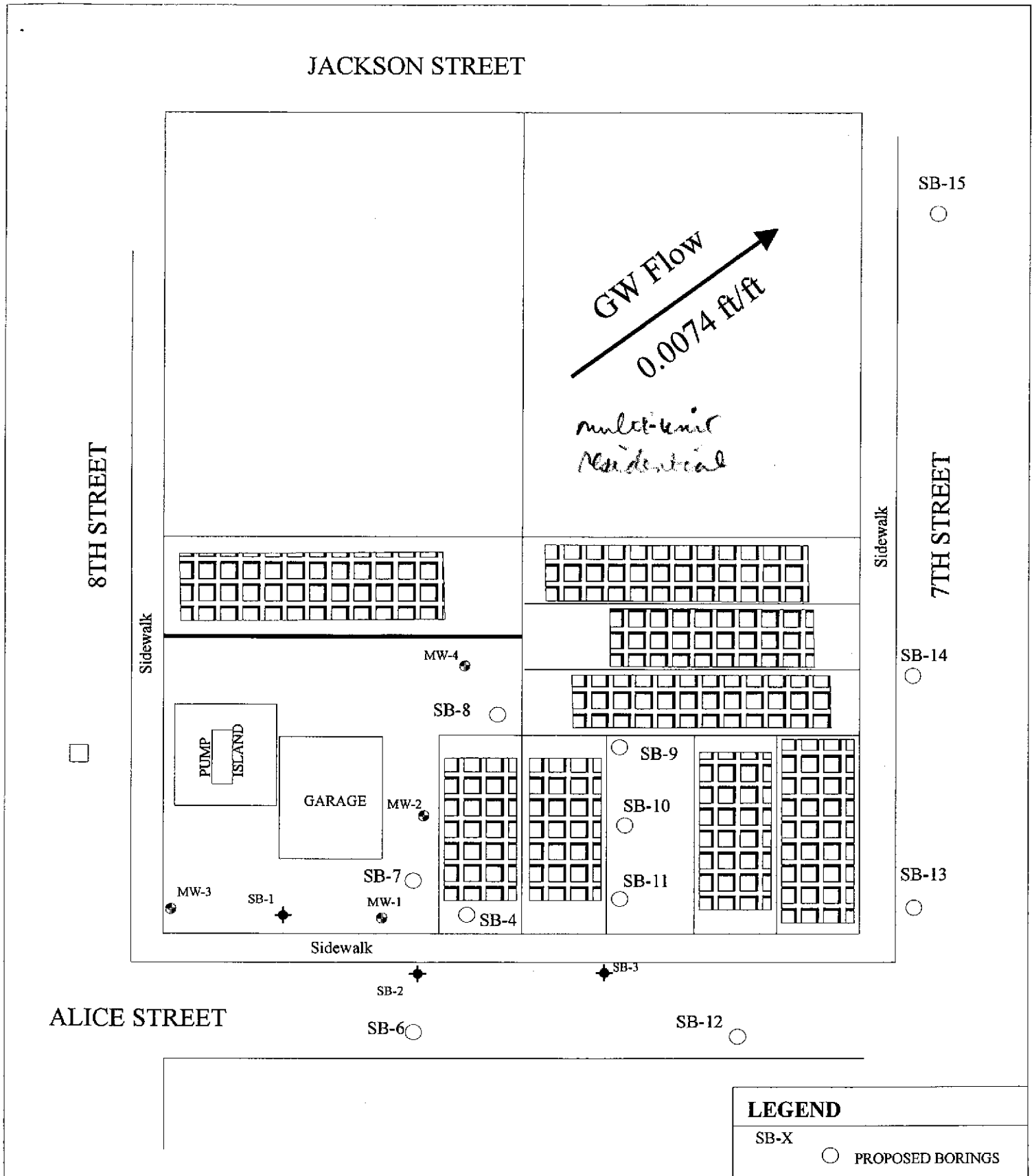
245 8th STREET
OAKLAND, CALIFORNIA

FIGURE 2
PROJECT NO. 4603

MONITORING WELLS

BORING LOCATIONS
ADVANCED 8/9/96

SCALE: 1 in = 25 ft



LEGEND

SB-X ○ PROPOSED BORINGS

RESIDENTIAL BUILDINGS

MONITORING WELLS

BORING LOCATIONS ADVANCED 8/9/96

N

SCALE: 1 inch = 37.5 feet

AEI CONSULTANTS

3210 OLD TUNNEL ROAD, SUITE B, LAFAYETTE, CA

PROPOSED BORING LOCATIONS

245 8th STREET
OAKLAND, CALIFORNIA

FIGURE 3
PROJECT NO. 4603

Table 1
Previous Groundwater Elevation Data

Well ID	Date Collected	Well Elevation (ft msl)	Depth to Water (ft)	Groundwater Elevation (ft amsl)	Depth to Free Product (ft)	Free Product Thickness (ft)
MW-1	6/29/01	27.73	16.52	*	14.89	1.63
MW-2	6/29/01	28.16	16.14	12.02	-	-
MW-3	6/29/01	29.21	16.60	12.61	-	-
MW-4	6/29/01	29.38	17.71	11.67	-	-

* = Measured groundwater level affected by free product presence, not used to calculate water table elevation

All well elevations measured from the top of the casing

Table 2
Previous Soil Sample Analytical Data

Sample ID	Date Collected	TPHg mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzen mg/kg	Xylenes mg/kg
MW-3 15'	5/25/01	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005
MW-3 20'	5/25/01	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005
MW-4 15'	5/25/01	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005
MW-4 20'	5/25/01	<1.0	<0.05	<0.005	<0.005	<0.005	<0.005
MDL		1.0	0.05	0.005	0.005	0.005	0.005

ND not detected

mg/kg milligrams per kilogram

TPHg total petroleum hydrocarbons as gasoline

MTBE methy tertiary butyl ether

MDL = method detection limit

* = These samples were reanalyzed for fuel oxygenated by EPA method 8260

Table 3
Previous Groundwater Sample Analytical Data

Well/Sample ID	Date Collected	NAPL thichness (ft)	TPHg µg/L	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L
MW-1	6/29/01	**1.63**	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
MW-2	6/29/01	0.0	**69,000**	**4400***	**7,200**	**6,100**	**1,500**	**7,000**
MW-3	6/29/01	0.0	**550**	<5.0	<0.5	**3.1**	**3.2**	**1.2**
MW-4	6/29/01	0.0	<50	<5.0	<0.5	<0.5	<0.5	<0.5
MDL			50	5.0	0.5	0.5	0.5	0.5

µg/L micrograms per liter

TPHg total petroleum hydrocarbons as gasoline

MTBE methyl tertiary butyl ether

* samples analyzed by EPA Method 8260, all others non detect (refer to laboratory report)

MDL = method detection limit

ns/fp = not sampled / free product

Note = Historical Groundwater elevation and quality data for wells MW-1 and MW-2 were not available