AEI CONSULTANTS
ENVIRONMENTAL & CIVIL ENGINEERING

2500 Camino Diablo, Suite 200, Walnut Creek, CA 94597
Phone: (925) 283-6000 Fax: (925) 944-2895

May 12, 2006

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

Subject: **Soil Gas Investigation Work Plan**
245 8th Street
Oakland, California
AEI Project No. 116907
ACEH Toxics Case RO0000202

Dear Mr. Wickham:

Enclosed is one electronic copy of the recently completed Soil Gas Investigation Work Plan prepared for the subject facility at the request of Alameda County Environmental Health (ACEH).

If you have questions or comments, please don't hesitate to contact me or Peter McIntyre at (925) 283-6000.

Sincerely,
AEI Consultants

Richard J. Bradford
Project Manager

Enclosure

AEI CONSULTANTS
ENVIRONMENTAL & CIVIL ENGINEERING

2500 Camino Diablo, Suite 200, Walnut Creek, CA 94597
Phone: (925) 283-6000 Fax: (925) 944-2895

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May 12, 2006

Mr. Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 945023-6577

Soil Gas Investigation Work Plan
245 8th Street
Oakland, CA
AEI Project No. 116907
ACEH Toxics Case RO0000202

Dear Mr. Wickham:

The following work plan has been prepared on behalf of Mr. Victor Lum of Vic's Automotive located at 245 8th Street in Oakland, California. This work plan outlines a scope of work to take place at the above referenced property. AEI Consultants (AEI) has been retained by Mr. Victor Lum to provide environmental engineering and consulting services associated with a release of petroleum hydrocarbons at the site. This work plan is in response to the Alameda County Environmental Health's (ACEH) letter, dated March 20, 2006, requesting soil gas sampling. AEI plans to install and sample four dedicated soil gas probes in order to further evaluate the potential for indoor air vapor intrusion.

SITE DESCRIPTION AND BACKGROUND

The subject property (hereafter referred to as the "site" or "property") is located in a mixed commercial and residential area of Oakland, Alameda County, California. The site is a lot on the south corner of Alice Street and 8th Street, and is currently developed with a gasoline station and automotive repair facility (Figure 2). The property covers approximately 9,375 square feet and is improved with an approximately 1,200 square foot building located centrally on the property used for automotive repair, cashier, and office. The current UST hold and the dispenser island are located to the north of the building, along 8th Street. The remainder of the property is paved with asphalt.

Between June 1993 and August 1994, AEI removed a total of seven (7) underground storage tanks (USTs) from the property. The tanks consisted of four (4) 1,000-gallon and two (2) 6,000-gallon gasoline tanks and one (1) 250-gallon waste oil tank. The former locations of the tanks are shown on Figure 2. Impacted soil was removed from beneath the former tank area. Groundwater was encountered beneath the former 6,000-gallon tanks. Light non-aqueous phase liquid (LNAPL) was observed on the water table beneath the southern tank. The excavated soil was transported to an appropriate disposal facility and the excavation was backfilled with clean fill material. A new tank

system was installed just west of the dispenser island.

Two groundwater monitoring wells (MW-1 and MW-2) were installed in July 1995. The first two episodes of monitoring revealed total petroleum hydrocarbons as gasoline (TPH-g) and Benzene up to 210,000 µg/L and 720 µg/L, respectively, in MW-2. LNAPL was discovered in MW-1, which ranged from 1.20 to 4.39 feet thick between December 1995 and March 1996.

Three soil borings (SB-1 through SB-3) were advanced in August 1996. Groundwater samples collected from each of the borings contained TPH-g and Benzene ranging from 120,000 to 140,000 µg/L, and from 12,000 to 19,000 µg/L, respectively. Methyl tertiary-butyl ether (MTBE) was also present in all three samples, up to 27,000 µg/L. Although free phase product was not observed in the field, qualitative laboratory observations indicated an immiscible sheen in the samples. Manual bailing and pumping of LNAPL from MW-1, and monitoring of MW-2 occurred intermittently through 1997. Two additional groundwater monitoring wells (MW-3 and MW-4) were installed in May 2001. Refer to Tables 1 and 2 for data collected from these wells. An LNAPL recovery pump was installed in MW-1 in June 2001.

Fourteen (14) additional soil borings were performed on and offsite in 2003, from which soil, groundwater, and soil vapor samples were collected to further characterize the extent of the release. On January 11, 19, and 20, 2005, AEI installed a total of six (6) additional wells; three (3) extraction/monitoring wells on the subject site (MW-5 to MW-7) and three (3) extraction/monitoring wells at 708 Alice Street (MW-10 to MW-12). Note that wells MW-8 and MW-9 were proposed for installation in the public right of way, north of and west of the site. However, due to insurance and permitting limitations imposed by the City of Oakland, these wells were not been installed, and likely cannot be installed in City of Oakland right-of-way. Surveying of the six new wells was complete as of January 2006.

A 15-day high vacuum dual phase extraction (HVDPE) pilot test was conducted from July 11 to July 27, 2005. Vapor flow rates ranged from approximately 170 to 190 standard cubic feet per minute (scfm) under a sustained vacuum of 16 to 17 inches of mercury. Significant drawdown and vacuum response was observed in many of the monitoring points. A total of 80,740 gallons of water was recovered and treated for an average flow rate of about 4.1 gallons per minute over the 15-day pilot test. Approximately 5 pounds per day of dissolved phase and 697 lbs/day of vapor phase hydrocarbons were recovered. Based on the favorable results, implementation of a fixed base HVDPE system is currently underway.

Refer to Figure 2 for locations of monitoring wells, soil borings, and former USTs. Historical analytical data is included in Tables 1 through 3.

GEOLOGY AND HYDROGEOLOGY

The elevation of the site is approximately 27 to 29 feet above mean sea level (amsl). The site is flat; however, the topography of the area slopes gently to the southwest. The site is located between Lake Merritt and the Oakland Inner Harbor channel, approximately one-half mile from each. The near surface sediments are mapped as Holocene and Pleistocene Merritt Sand Deposits (Qms) (Helley, et al, 1997). Depth to the Franciscan Formation basement underlying the unconsolidated deposits is approximately 400 feet (Norfleet, 1998).

Based on the logs of soil borings advanced at the site, the native soils generally consist of fine to medium grained sands with silt and clay present to at least 28 feet bgs, the deepest explored at the site. Typically, silty and clayey fine grained sand have been encountered to depths of 15 to 18 feet bgs. This is underlain by poorly graded, clean to slightly clayey and silty fine to medium sand. Both sand bodies represent a single hydrologic system. Sediments have been relatively uniform throughout the investigation area and both sand units appear to represent a single hydrologic system.

Groundwater depths have typically ranged from 13 to 17 feet bgs, corresponding to elevation of approximately 10 to 14 feet above mean sea level (msl). Annual water levels fluctuate by approximately 3 to 4 feet. Groundwater has consistently flowed to the south-southeast with a hydraulic gradient of approximately 10^{-3} ft/ft.

SOIL VAPOR PROBE INSTALLATION

Introduction

As requested by ACEH, permanent soil gas probes will be installed at the subject and adjacent properties to evaluate the potential for indoor air vapor intrusion into two residential buildings located at 712 and 718 Alice Street. Soil gas data collected from the probes will be utilized to confirm if elevated concentrations of fuel hydrocarbons extending off-site beneath adjacent buildings pose a risk to human health via the vapor migration exposure pathway.

Soil gas probe installation and sampling will be performed in accordance with the currently accepted protocols of the state and local regulatory oversight agencies and the standards and practices of the environmental engineering field. Specifically, soil gas probe installation, sample collection, and sample analyses procedures will be performed in accordance with the most recent *Advisory – Active Soil Gas Investigations* (ASGI), dated January 28, 2003, jointly issued by the Department of Toxic Substances Control (DTSC) and Los Angeles Regional Water Quality Control Board (LARWQCB). Detailed operating procedures and practices are outlined below.

A total of four (4) permanent soil gas probe installation and sampling locations are proposed. Based on the analytical results of the first round of soil gas sampling, additional soil gas

sampling locations may be proposed. Each probe will be advanced to a target depth of approximately 8 feet bgs, unless certain conditions encountered in the field dictate otherwise.

Soil gas probes will be installed and soil gas samples will be collected from more permeable and most-impacted depth in the unsaturated zone which may contain highest vapor phase contaminant concentrations. The installation locations of the proposed soil gas probes are depicted on Figure 3. Exhibit 1 below summarizes the soil gas probe installation locations and the rationale behind selecting these locations.

EXHIBIT 1: PROPOSED SOIL GAS PROBE LOCATIONS

Boring ID	Location	Purpose
GP-1	Western corner of subject property E-SE of MW-6	Investigate soil gas concentrations closest to the former source areas and near the front of 718 Alice Street
GP-2	Southern portion of property E-SE of MW-2 near the rear corner of 718 Alice Street	Investigate soil gas concentrations furthest away from the former source areas and near the rear of 718 Alice Street
GP-3	Southern corner of 712 Alice Street E-SE of MW-12	Investigate soil gas concentrations offsite near the rear of 712 Alice Street
GP-4	Southeastern corner of 712 Alice Street N-NE of MW-11	Investigate soil gas concentrations offsite near the front of 712 Alice Street

Permitting & Utility Clearances

One to two weeks prior to drilling, a well installation permit and an inspection date and time will be obtained from the Alameda County Public Works Agency. At least three days prior to drilling, Underground Service Alert (USA) North will be notified and a private utility locator will clear all proposed boring locations. The USA North members' and private utility locator markings will also serve to identify any potential preferential pathways or "conduits" for contaminant migration that may exist near the adjacent buildings. This information will be presented on one of the figures of the final report.

All drilling work will be performed by a California C57 licensed drilling subcontractor working under the direction of AEI's professional geology or engineering staff. The selected contractor will be required to have ample experience in performing soil gas probe installation and sampling.

Once drilling dates have been confirmed, the property owner, and all other involved parties will be given adequate notification to schedule any required site inspections.

Soil Gas Probe Installation / Construction

Permanent soil gas probes will be installed in locations as proposed in Figure 3. Soil gas probe installation using direct push methods does not allow for continuous collection of soil core samples, since only probe rods and not sample tubes are used to drive the soil gas implants into the subsurface. Moreover, soil contamination at the site is well-characterized by AEI's previous subsurface investigations. Collection of additional soil samples is unnecessary and not included in this scope of work. Installation procedures for the soil gas probe implants are as follows:

Probe rods are first driven to the desired depth using a point holder and an implant anchor/drive point. A pre-cut length of ¼-inch O.D. tubing (at least 48-inches longer than the probe depth) transported in a sealed zipper locking bag is attached to the implant. The open end of the tubing is plugged. The implant and tubing are lowered down the inside of the probe rod until implant hits the anchor/drive point. The tubing is then rotated counterclockwise to engage the threads.

Approximately 150 mL of #2/12 coarse sand, such as a Monterey sand, is then poured down the inside diameter of the probe rods around the outside of the tubing. Probes rods are retracted 10 to 24 inches and a bentonite seal mixture is emplaced. At least one foot of dry granular bentonite is emplaced on top of each sand pack to prevent infiltration of the grout mixture. The probe rods are pulled out and the hole is grouted with a mixture of cement/sand or bentonite/sand.

The tubing will be marked at the surface to identify the probe location and depth. A gas-tight Swagelok® valve will be used to cap the sampling tube. An 8 to 12-inch diameter well box will be installed so that the probes are properly secured and completed to prevent infiltration of water into the subsurface and to prevent possible damage.

Leak Test

All soil gas probes will be leak tested following procedures outlined in the ASGI. A leak test dome will be placed over the sampling probe at the surface. A rag moistened with isopropyl alcohol or shaving cream will be place under the dome as a leak test tracer substance. These tracer compounds are not present in gasoline. If a tracer compound is detected in the sample, the cause will be evaluated and corrected and the soil gas probe will be retested before subsequent sampling. Leaking should not be of great concern since permanent soil gas probes installed properly have little potential for leakage unlike temporary soil gas sampling systems. Appropriate methods will be used to analyze for isopropyl alcohol tracer gas with a detection limit of ≤10 micrograms per liter of air (ug/L).

Soil Gas Sampling Procedures

Soil gas samples will not be collected from newly installed probes for at least 30 minutes. After the probe is adequately purged, samples will be collected into laboratory-evacuated Summa™ canisters pending transportation to the laboratory. A pressure gauge and flow regulator will be place inline between the soil gas probe and Summa™ canister to ensure that it is filled at the

recommended 100 to 200 milliliters per minute (mL/min) flow rate. Sample collected into Summa™ canisters must be analyzed within 72 hours of collection.

Soil gas sampling may be delayed by up to five days if measurable precipitation (defined in the ASGI as ½-inch or greater) or onsite watering has occurred in the previous week. If no flow to low flow conditions are caused by saturated soils, soil gas sampling will stop and have to be rescheduled.

Purge Volume, Flushing, and Decontamination Procedures

Three volumes of air will be purged from the sample tubing before collecting a soil gas sample. This ensures that a sufficient volume of ambient air is removed from the sampling point and that samples collected are representative of subsurface conditions. The purge volume will be calculated by summing the volume of the sample tubing and annular space around the probe tip.

Analytical Methodology / Sample Analyses

Soil gas samples collected in Summa™ canister shall not be chilled or shipped by air in order to avoid drastic changes in ambient pressure. Soil gas samples will be delivered (by ground) under proper chain of custody protocol to Air Toxics Ltd. of Folsom, California (Department of Health Services Certification #02110CA). Air Toxics Ltd. is certified and experienced in soil gas sample analytical methods. Samples will be analyzed for TPH-g by EPA Method TO-3 and for volatile organic compounds (VOCs), including BTEX & MTBE by EPA Method TO-15 along with the leak detection compounds, with appropriate detection limits. Laboratory procedures will include appropriate quality assurance / quality control analyses, including method blanks and use of surrogates during sample analyses. Analytical equipment calibration should be in accordance with the most current ASGI.

Equipment Decontamination

Probe rods, drive points, and other subsurface probing tools used to install the soil gas implants will be decontaminated between installations with a triple rinse system. The triple rinse system will consist of cleansing the sample tools with Liquinox® or similar detergent, followed by rinsing with tap water, and a final rinsing with distilled water.

Waste Storage

Investigation derived wastes (IDWs), such as soil cuttings and rinse water, will be containerized in sealed DOT-approved 55-gallon drums, labeled appropriately, and secured in a location onsite pending results of sample analyses for characterization and proper disposal. IDWs will be handled and disposed in accordance with federal, state, and local requirements.

SOIL GAS SAMPLING AND MONITORING SCHEDULE

The soil vapor probes will be monitored on a quarterly basis in conjunction with quarterly groundwater monitoring. Soil gas sampling will be performed by one of AEI's professional staff members, while groundwater sampling will be performed by AEI's senior technician.

The DPE system will be shut down for a period of at least 24 hours prior to sampling to allow subsurface conditions to equilibrate and to ensure that negative pressure in the subsurface does not biased the soil gas sampling results.

If installed in the appropriate locations, soil gas probes may serve a useful dual purpose to monitor signs of biodegradation and remedial progress. In-situ respiration data, such as soil gas oxygen and carbon dioxide concentrations can be collected with minimal effort on a quarterly basis in conjunction with soil gas sampling. This information can be used in conjunction with concentrations of VOCs in the soil gas overtime to evaluate how much biological activity or aerobic biodegradation is occurring and its overall impact on remediation.

REPORTING

AEI will prepare and issue a final report following receipt of all necessary analytical results. The soil gas investigation report will include the following: figures to include at minimum a site location map, scaled site plan with soil gas probe locations, soil gas iso-concentration maps for contaminants of concern, and as-built soil gas probe construction details, data summary tables, boring logs, and copies of field notes and laboratory analytical reports.

A written discussion of the soil gas sampling procedures, analytical methods, summary of findings, conclusions, and recommendations will be included. Any deviations from this work plan and data inconsistencies will be discussed. AEI will compare the results with San Francisco Bay Area Regional Water Quality Control Board's Environmental Screening Levels (ESLs) for shallow soil gas screening for evaluation of potential indoor-air impacts to determine whether or not further evaluation or additional soil gas sampling locations are necessary. Quarterly soil gas sampling results will be reported with regular quarterly groundwater monitoring reports. The project will be overseen and the report(s) will be signed by an AEI California registered professional geologist or engineer in accordance with the Business and Professional Code, Chapters 7 and 12.5, and the California Code of Regulations, Title 16, Chapters 5 and 29.

SITE HEALTH AND SAFETY

Prior to commencing field activities, a site safety meeting will be held at a designated command post near, but not in, the working area. Emergency procedures will be outlined at this meeting, including an explanation of physical hazards associated with direct-push and drilling work and the hazards of known or suspected contaminants of concern. The route to be nearest hospital will be identified and a map with directions will be included in the health and safety plan (HASP). All site personnel will be in Level D personal protection equipment, which is the anticipated maximum level of protection needed. A working area will be established with barricades, orange traffic cones, and/or yellow caution tape to delineate the exclusion zone where a work uniform, hard hats, and steel-toed shoes must be worn, and where unauthorized personnel will not be allowed. A site-specific HASP conforming to Part 1910.120 (i) (2) of 29 CFR will be on site at all times during the project. All personnel performing work in the field will be required to have complete a 40-hour HAZWOPER training session in accordance with 29 CFR 1910.120.

REFERENCES

1. *Advisory – Active Soil Gas Investigations*, California Department of Toxic Substances Control: Glendale, CA and Los Angeles Regional Water Quality Control Board: Los Angeles, CA January 28, 2003.

2. *Evaluating Leaks in a Soil Gas Sample Train*, Air Toxics Ltd., Folsom, CA 2006.

3. *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*, California Department of Toxic Substances Control: Glendale, CA and California Environmental Protection Agency, Sacramento, CA December 15, 2004, rev. February 7, 2005.

4. *Soil Implants Operation*, Geoprobe Systems®, Salina, KA 2005.

5. *Subject: Fuel Leak Case No. RO0000202, Vic's Automotive, 245 8th Street, Oakland, CA*, Alameda County Environmental Health, Alameda, CA March 20, 2006.

6. *Subsurface Vapor Sampling Using a Geoprobe and Summa Canisters* (GPP Guidelines) DRAFT, San Mateo County Environmental Health Services Agency, Redwood City, CA June 2004.

ESTIMATED SCHEDULE

Once the scope of work has been agreed upon and finalized by all involved parties, field work will be scheduled and the client, ACEH, and ACPWA will be notified of the schedule. It is expected that soil gas probe installation will occur within approximately 2 to 3 weeks of work plan approval. The final report will be issued approximately 1 month following receipt of all necessary documentation and analytical data.

AEI requests your approval to proceed with this project. Please contact the undersigned at (925) 283-6000 if you have any questions or need any additional information.

Sincerely,
AEI Consultants

Richard J. Bradford
Project Manager

Peter McIntyre, PG, REA
Senior Geologist

REGISTERED GEOLOGIST
PETER J. MCINTYRE
Exp. 3/31/08
No. 7702
STATE OF CALIFORNIA

Figures

Figure 1 – Site Location Map
Figure 2 – Site Layout Plan
Figure 3 – Proposed Soil Gas Probe Locations
Figure 4 – Groundwater Analytical Data (2/9/06)

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Table 1 – Historical Soil Analytical Data
Table 2 – Historical Groundwater Analytical Data
Table 3 – Historical Soil Vapor Analytical Data

Appendices

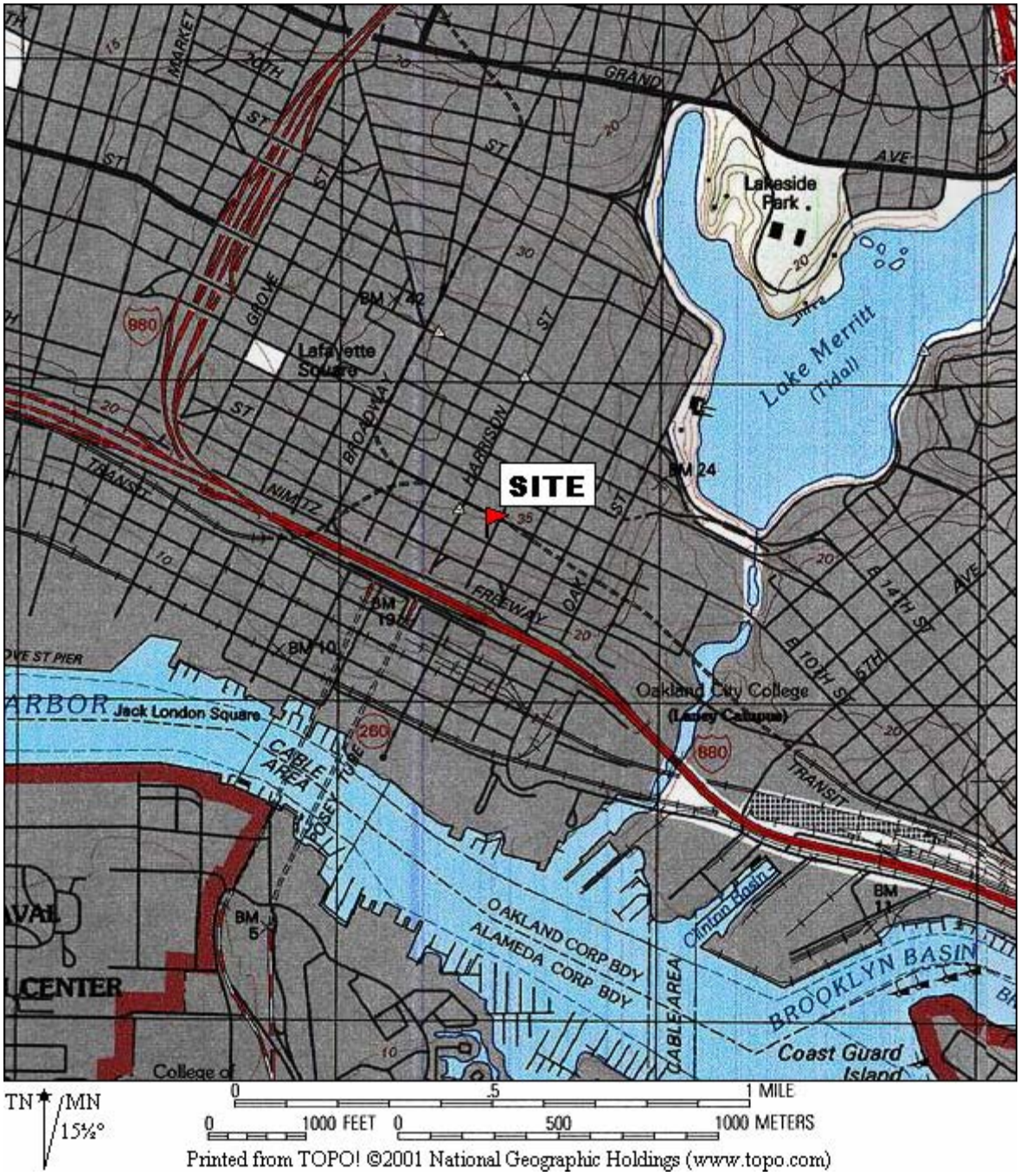
Appendix A – Previous Soil Boring Logs
Appendix B – Typical Soil Gas Probe Construction
Appendix C – Geoprobe® Systems Soil Gas Implants Operation

Distribution:

Mr. Victor Lum
Vic's Automotive
245 8th Street
Oakland, CA 94607

Mr. Jerry Wickham (electronic copy)
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

FIGURES



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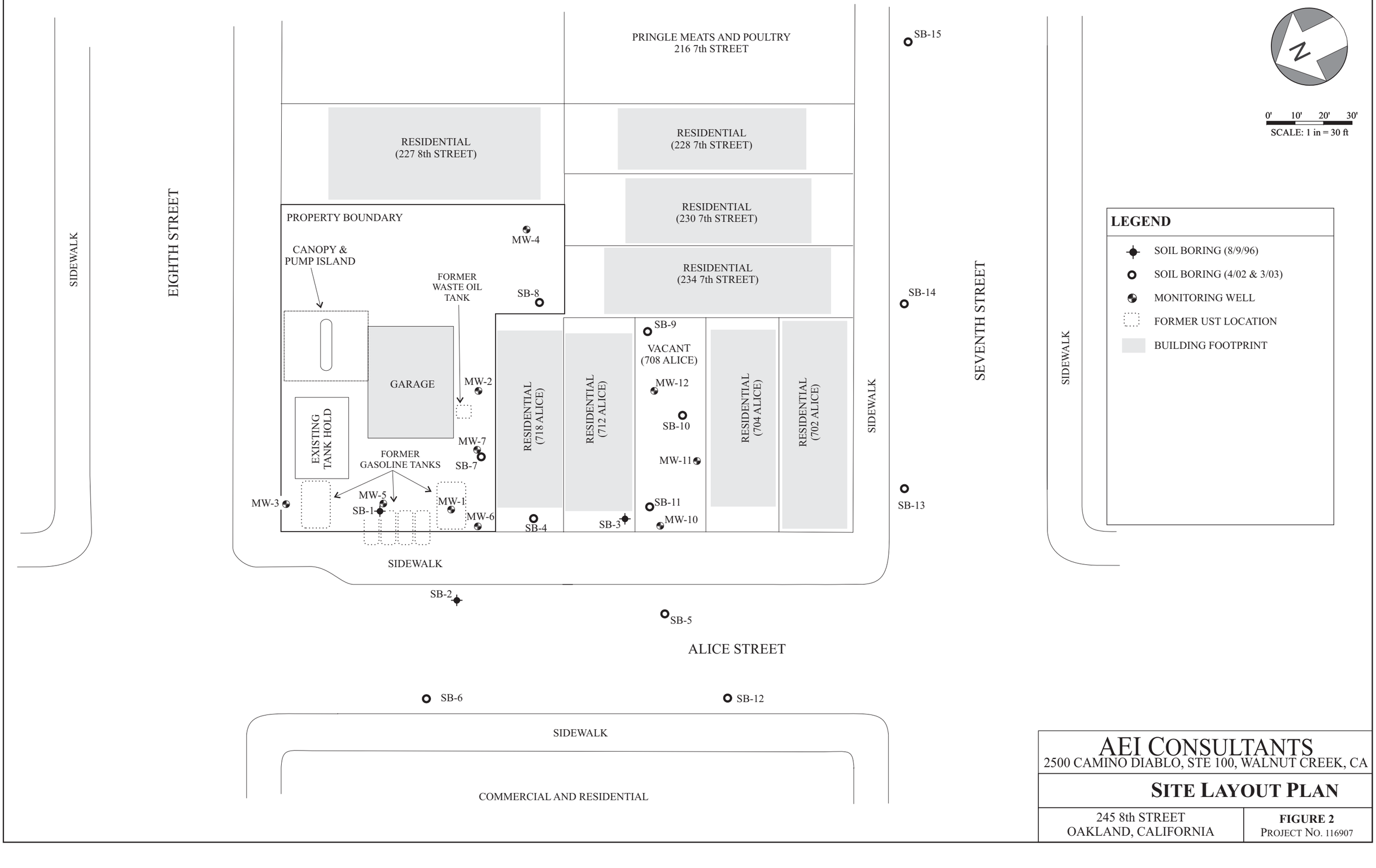
AEI CONSULTANTS 2500 CAMINO DIABLO BLVD, STE 100, WALNUT CREEK	
SITE LOCATION MAP	
245 8th STREET OAKLAND, CALIFORNIA	**FIGURE 1** AEI PROJECT NO. 116907



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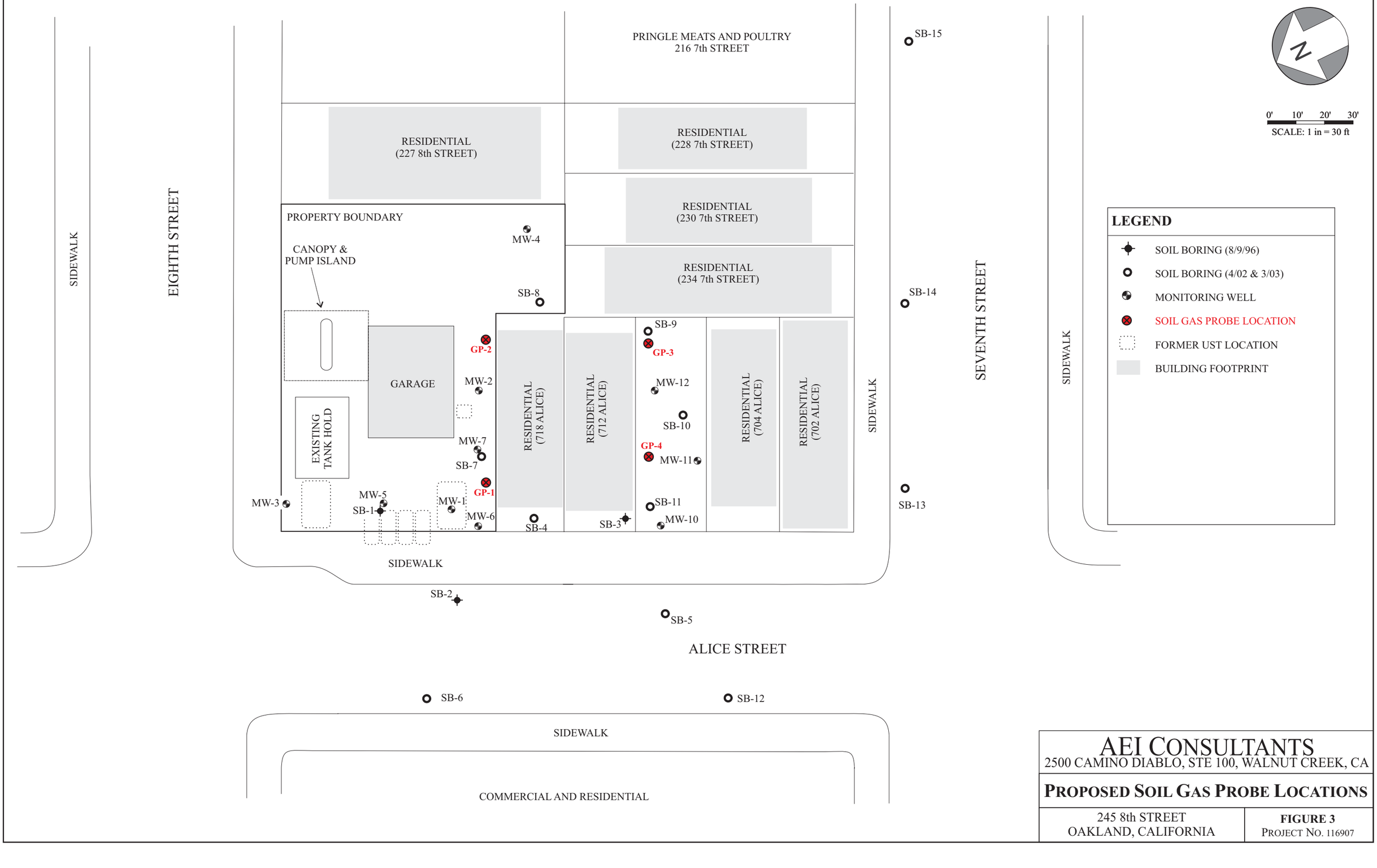
2500 CAMINO DIABLO, STE 100, WALNUT CREEK, CA

SITE LAYOUT PLAN

245 8th STREET
OAKLAND, CALIFORNIA

FIGURE 2
PROJECT NO. 116907



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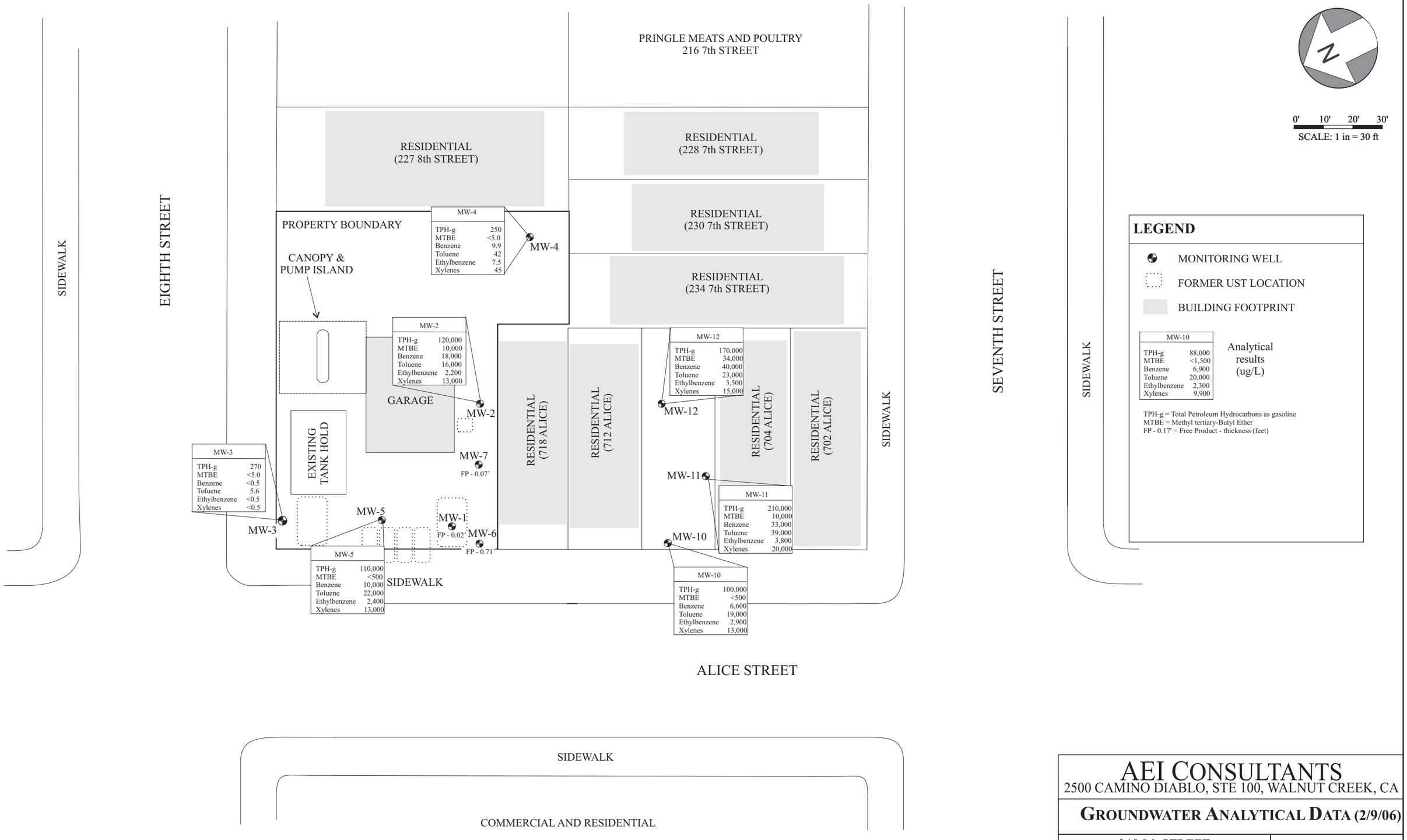
2500 CAMINO DIABLO, STE 100, WALNUT CREEK, CA

PROPOSED SOIL GAS PROBE LOCATIONS

245 8th STREET
OAKLAND, CALIFORNIA

FIGURE 3
PROJECT NO. 116907



AEI CONSULTANTS

2500 CAMINO DIABLO, STE 100, WALNUT CREEK, CA

GROUNDWATER ANALYTICAL DATA (2/9/06)

245 8th STREET
OAKLAND, CALIFORNIA

FIGURE 4
PROJECT NO. 116907

TABLES

Table 1: Soil Sample Analytical Data
Vic's Automotive, 245 8th Ave., Oakland, CA

Sample ID	Date Collected	TPHg mg/kg	TOG mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg
MW-1 (6')	7/14/95	390	-	-	0.280	0.290	0.290	0.620
MW-1 (11')	7/14/95	370	-	-	0.240	0.240	0.230	0.610
MW-2 (6')	7/14/95	ND	24	-	ND	ND	ND	ND
MW-2 (11')	7/14/95	300	38	-	0.300	0.230	0.240	0.630
SB-1 (18')	8/18/96	9,100	-	47.0	57	580	190	1,000
SB-1 (24')	8/18/96	30	-	0.20	0.37	1.4	0.52	2.5
SB-2 (24')	8/18/96	1.1	-	0.032	0.11	0.17	0.018	0.099
SB-3 (24')	8/18/96	16	-	4.7	1.6	2.5	0.21	0.95
MW-3 15'	5/25/01	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-3 20'	5/25/01	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-4 15'	5/25/01	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-4 20'	5/25/01	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-4 12'	4/2/03	25	-	ND<0.5	0.41	1.0	0.2	1.3
SB-4 15'	4/2/03	260	-	ND<1.7	3.5	15	4.5	23
SB-5 11'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-6 16'	4/2/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-7 12'	4/2/03	700	-	ND<10	6.0	25	9.3	50
SB-7 18'	4/2/03	4,900	-	ND<25	65	260	77	400
SB-8 17'	4/2/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-9 16'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-10 12'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-11 12'	4/3/03	1.4	-	ND<0.05	0.12	0.10	0.026	0.066
SB-11 16'	4/3/03	2,700	-	ND<30	29	170	49.0	250
SB-12 15'	4/2/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-13 14'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-14 14'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-15 14'	4/3/03	ND<1.0	-	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-5 16'	1/11/2005	100	-	ND<5.0	2.6	6.0	1.5	8.4
MW-5 20'	1/11/2005	37	-	ND<0.50	2.6	5.6	0.91	4.6
MW-7 16'	1/11/2005	19	-	2.9	3.3	3.5	0.4	1.9
MW-7 20.5'	1/11/2005	340	-	ND<5.0	9.6	25	7.0	35
MW-6 20'	1/19/2005	14	-	ND<0.25	0.099	4.1	0.33	1.7
MW-10 15.5'	1/20/2005	840	-	ND<2.0	11	58	16	83
MW-11 15.5'	1/19/2005	3,200	-	ND<10	35	320	85	430
MW-12 15.5'	1/19/2005	13	-	8.5	2.5	2.8	0.22	1.1

ND - not detected

mg/kg - milligrams per kilogram

TPHg - total petroleum hydrocarbons as gasoline

MTBE - methy tertiary butyl ether

TOG - Total Oil and Grease

Table 2: Groundwater Sample Analytical Data
Vic's Automotive, 245 8th Ave, Oakland, CA

Well/Sample ID	Date Collected	Apparent LNAPL Thickness (ft)	TPH-g µg/L *EPA Method 8015Cm*	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L
						EPA Method 8021B		
MW-1	6/29/2001	1.63	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	10/10/2001	0.08	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	1/9/2002	<0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	4/24/2002	<0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	7/24/2002	~0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/5/2002	~0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/4/2003	~0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	5/2/2003	0.08	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	8/4/2003	0.23	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/3/2003	1.27	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/9/2004	0.18	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	5/10/2004	Inaccessible	-	-	-	-	-	-
	8/9/2004	0.21	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/9/2004	0.24	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/3/2005	0.17	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	5/9/2005	0.12	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	8/5/2005	0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/9/2005	0.01	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/9/2006	**0.02**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**
MW-2	6/29/2001	0.0	69,000	4100/4400*	7,200	6,100	1,500	7,000
	10/10/2001	0.0	87,000	14,000	22,000	12,000	2,700	9,100
	1/9/2002	0.0	130,000	11,000	30,000	19,000	3,800	14,000
	4/24/2002	Sheen	210,000	32,000	38,000	23,000	4,600	19,000
	7/24/2002	Sheen	170,000	36,000	48,000	12,000	3,700	8,600
	11/5/2002	Sheen	190,000	36,000	45,000	25,000	4,600	16,000
	2/4/2003	Sheen	150,000	27,000	51,000	24,000	4,200	14,000
	5/2/2003	Sheen	150,000	35,000	39,000	11,000	3,800	9,900
	8/4/2003	Sheen	120,000	29,000	32,000	5,000	3,200	7,200
	11/3/2003	Sheen	120,000	24,000	33,000	4,300	3,200	5,400
	2/9/2004	Sheen	130,000	19,000	27,000	7,700	3,100	7,600
	5/10/2004	Sheen	67,000	13,000	20,000	3,000	2,300	4,100
	8/9/2004	Sheen	100,000	22,000	27,000	7,100	2,800	6,600
	11/9/2004	Sheen	100,000	23,000	27,000	6,100	3,000	5,600
	2/3/2005	Sheen	84,000	11,000	23,000	5,000	3,000	5,500
	5/9/2005	Sheen	74,000	14,000	21,000	4,200	2,300	3,300
	7/27/2005	Sheen	9,500	910	1,400	1,000	180	960
	8/5/2005	Sheen	74,000	4,000	8,800	11,000	1,300	7,600
	11/9/2005	Sheen	120,000	16,000	21,000	14,000	2,300	13,000
	2/9/2006	**Sheen**	**120,000**	**10,000**	**18,000**	**16,000**	**2,200**	**13,000**
MW-3	6/29/2001	0.00	550	<5.0	<0.5	3.1	3.2	1.2
	10/10/2001	0.00	470	<5.0	0.77	5.3	3.3	5.9
	1/9/2002	0.00	1,000	<5.0	0.90	7.6	7.8	25
	4/24/2002	0.00	1,500	<5.0	0.64	7.2	12	14
	7/24/2002	0.00	1,200	<5.0	10	17.0	11	25
	11/5/2002	0.00	1,800	<25	33	43.0	18	31
	2/4/2003	0.00	450	<5.0	<0.5	5.0	<0.5	0.77
	5/2/2003	0.00	340	<5.0	7.3	10.0	2.5	7.3
	8/4/2003	0.00	170	<5.0	5.8	5.9	1.5	4.9
	11/3/2003	0.00	54	<5.0	<0.5	<0.5	<0.5	<0.5
	2/9/2004	0.00	190	<5.0	<0.5	3.6	<0.5	<0.5
	5/10/2004	0.00	280	<5.0	<0.5	3.4	<0.5	<0.5
	8/9/2004	0.00	290	<5.0	<0.5	3.8	<0.5	<0.5
	11/9/2004	0.00	220	<5.0	<0.5	4.0	<0.5	<0.5
	2/3/2005	0.00	160	<5.0	13	30	3.0	21
	5/9/2005	0.00	200	<5.0	<0.5	3.9	<0.5	<0.5
	8/5/2005	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	11/9/2005	0.00	130	<5.0	<0.5	2.3	<0.5	<0.5
	2/9/2006	**0.00**	**270**	**<5.0**	**<0.5**	**5.6**	**<0.5**	**<0.5**

Table 2: Groundwater Sample Analytical Data
Vic's Automotive, 245 8th Ave, Oakland, CA

Well/Sample ID	Date Collected	Apparent LNAPL Thickness (ft)	TPH-g µg/L	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L
			EPA Method 8015Cm	*EPA Method 8021B*				
MW-4	6/29/2001	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	10/10/2001	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	1/9/2002	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	4/24/2002	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	7/24/2002	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	11/5/2002	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	2/4/2003	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	5/2/2003	0.00	500	10	68	71	18	65
	8/4/2003	0.00	270	<5.0	30	29	9.2	32
	11/3/2003	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	2/9/2004	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	5/10/2004	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	8/9/2004	0.00	130	<5.0	14	13	5.3	17
	11/9/2004	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	2/3/2005	0.00	370	<5.0	<0.5	4.1	<0.5	0.64
	5/9/2005	0.00	840	<5.0	50	180	21	110
	7/27/2005	0.00	<50	<5.0	<0.5	<0.5	<0.5	<0.5
	8/5/2005	0.00	310	<5.0	7.5	57	10	53
	11/9/2005	0.00	290	<5.0	12	61	8.8	49
	2/9/2006	**0.00**	**250**	**<5.0**	**9.9**	**42**	**7.5**	**45**
MW-5	2/3/2005	0.0	78,000	<1,000	7,600	13,000	2,200	9,600
	5/9/2005	0.0	60,000	<900	6,100	9,900	1,600	6,600
	7/27/2005	nm	120,000	1,100	10,000	19,000	2,100	13,000
	8/5/2005	0.0	59,000	<500	4,100	10,000	1,200	6,600
	11/9/2005	0.0	44,000	<500	3,300	7,400	1,100	4,900
	2/9/2006	**0.0**	**110,000**	**<500**	**10,000**	**22,000**	**2,400**	**13,000**
MW-6	2/3/2005	Sheen	130,000	<1,000	2,400	33,000	2,400	15,000
	5/9/2005	Sheen	170,000	<4,000	11,000	43,000	3,100	16,000
	8/5/2005	0.37	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/9/2005	0.37	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/9/2006	**0.71**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**
MW-7	2/3/2005	Sheen	220,000	18,000	45,000	44,000	3,500	18,000
	5/9/2005	0.03	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	8/5/2005	0.05	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	11/9/2005	0.12	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp	ns/fp
	2/9/2006	**0.07**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**	**ns/fp**
MW-10	2/3/2005	0.00	36,000	<500	4,700	7,200	660	3,400
	5/9/2005	0.00	88,000	<1,500	6,900	20,000	2,300	9,900
	8/5/2005	0.00	88,000	<1,100	10,000	21,000	1,900	9,800
	11/9/2005	0.00	63,000	<1,100	5,400	13,000	1,900	7,900
	2/9/2006	**0.00**	**100,000**	**<500**	**6,600**	**19,000**	**2,900**	**13,000**
MW-11	2/3/2005	Sheen	170,000	<3,000	23,000	35,000	3,100	16,000
	5/9/2005	Sheen	210,000	3,500	29,000	40,000	3,400	16,000
	7/27/2005	Sheen	220,000	2,500	26,000	37,000	3,200	18,000
	8/5/2005	Sheen	210,000	<2,500	35,000	42,000	3,300	16,000
	11/9/2005	Sheen	180,000	9,100	32,000	47,000	3,600	18,000
	2/9/2006	**Sheen**	**210,000**	**10,000**	**33,000**	**39,000**	**3,800**	**20,000**
MW-12	2/3/2005	Sheen	250,000	100,000	52,000	41,000	3,400	15,000
	5/9/2005	Sheen	210,000	91,000	44,000	28,000	3,300	13,000
	8/5/2005	Sheen	170,000	52,000	38,000	28,000	3,000	12,000
	11/9/2005	Sheen	180,000	52,000	39,000	25,000	2,900	12,000
	2/9/2006	**Sheen**	**170,000**	**34,000**	**40,000**	**23,000**	**3,500**	**15,000**

µg/L = micrograms per liter (ppb)

TPH-g = total petroleum hydrocarbons as gasoline

MTBE = methyl tertiary-butyl ether

ns/fp = not sampled / free product

* samples re-analyzed by EPA Method 8260 (expressed as EPA 8020 / EPA 8260)

Please refer to Appendix B: Lab Analytical and Chain of Custody Documentation for detailed analytical reports including dilution factors

Table 3

Soil Vapor Sample Analytical Data

Sample ID	Date Collected	TPHg µg/L	MTBE µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylenes µg/L
SB-4 4' V	4/2/03	ND<25	ND<2.5	ND<0.25	ND<0.25	ND<0.25	ND<0.25
SB-7 4' V	4/2/03	ND<25	ND<2.5	ND<0.25	ND<0.25	ND<0.25	ND<0.25
SB-8 4' V	4/2/03	ND<25	ND<2.5	ND<0.25	ND<0.25	ND<0.25	ND<0.25
SB-16 4' V	4/2/03	ND<25	ND<2.5	ND<0.25	ND<0.25	ND<0.25	ND<0.25
SB-17 4' V	4/2/03	ND<25	ND<2.5	ND<0.25	ND<0.25	ND<0.25	ND<0.25

ND - not detected

µg/L - micrograms per liter

TPHg - total petroleum hydrocarbons as gasoline

MTBE - methyl tertiary butyl ether

Please refer to Laboratory Analytical Data for further detailed lab information including lab reporting limits and dilution factors

APPENDIX A

BORING LOGS

PROJECT: LUM #1255	**LOG OF WELL NUMBER:** MW-1
BORING LOC.: IN LOCATION OF FORMER 6,000 GALLON GASOLINE TANK	ELEVATION, TOC: 23.420
DRILLING CONTRACTOR: GREGG DRILLING	START DATE: 7/14/95 / END DATE: 7/14/95
DRILLING METHOD: HOLLOW STEM AUGER	TOTAL DEPTH: 28' / SCREEN INT: 8-28'
DRILLING EQUIPMENT: MOBILE B-61	DEPTH TO WATER: 17' / CASING: 4" PVC
SAMPLING METHOD: 2" DRIVE SAMPLER	LOGGED BY: JSA
HAMMER WEIGHT and FALL: 140 lb, 30"	RESPONSIBLE PROFESSIONAL: MCP

DEPTH (feet)	SOIL SYMBOLS	DESCRIPTION	SAMPLES: SAMPLE NO.	SAMPLES: INTERVAL	SAMPLES: BLOW COUNTS	WELL CONSTRUCTION DETAILS
0	AB	0.0 - 0.6; Asphalt, 3" Aggregate Base.				Universal Well Cover
1						
2						Locking Wing Nut
3						Neat Cement Grout
4	GC	0.6 - 9.5; Sandy Clayey Gravel (Fill); olive brown (5YR 4/4); 80% fines, 20% gravel; loose.				
5					7	Blank SCH 40 PVC (2")
6		Hyd odor	S-1		5	Bentonite
7					4	
8						
9						
10	SC	9.5 - 28.0; Clayey Sand; greyish olive (10YR 4/2); 10% fines, 90% sand; med. dense.			7	No. 3 Monterey Sand
11					7	
		Hyd odor	S-2		4	
12						
13						.020" Slotted Well Screen
14						

PROJECT: LUM #1255

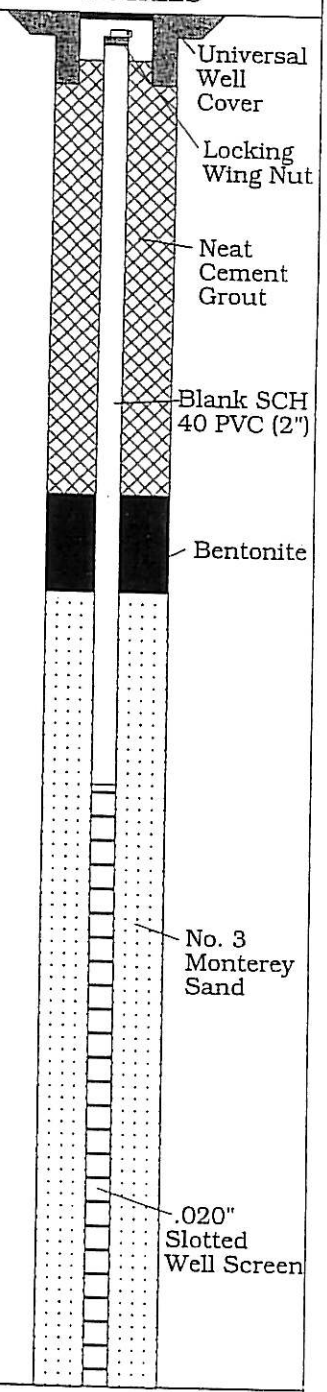
LOG OF BOREHOLE: MW-1

DEPTH (feet)	SOIL SYMBOLS	DESCRIPTION	SAMPLES: SAMPLE NO.	SAMPLES: INTERVAL	SAMPLES: BLOW COUNTS	WELL CONSTRUCTION DETAILS
15		9.5 - 28.0; Clayey Sand (cont.)				
16		Color Change; light olive brown (5YR 5/6); compact, moist.			4	
					11	
		Hyd odor	S-3		24	
17						▼
18	SC					
19						
20		Same.			17	
21					19	
			S-4		31	
22						
23						
24						
25						
26						
27						
28						End Cap
		Terminated at 28.0'				
29						
30						
31						

PROJECT: LUM #1255	**LOG OF WELL NUMBER:** MW-2
BORING LOC.: SOUTH OF FORMER WASTE OIL TANK	ELEVATION, TOC: 23.980
DRILLING CONTRACTOR: GREGG DRILLING	START DATE: 7/14/95 / END DATE: 7/14/95
DRILLING METHOD: HOLLOW STEM AUGER	TOTAL DEPTH: 28' / SCREEN INT: 8-28'
DRILLING EQUIPMENT: MOBILE B-61	DEPTH TO WATER: 18' / CASING: 4" PVC
SAMPLING METHOD: 2" DRIVE SAMPLER	LOGGED BY: JSA
HAMMER WEIGHT and FALL: 140 lb, 30"	RESPONSIBLE PROFESSIONAL: MCP

DEPTH (feet)	SOIL SYMBOLS	DESCRIPTION	SAMPLES: SAMPLE NO.	SAMPLES: INTERVAL	SAMPLES: BLOW COUNTS
0	AB	0.0 - 0.6; Asphalt, 3" Aggregate Base.			
3	SC	0.6 - 28.0; Clayey Sand; dark yellowish orange (10YR 6/6); 5% fines, 95% sand; med. dense.			
6					2
					6
		No odor	S-1		20
9		Color Change; mod. yellow brown (10YR 5/4) compact.			
10					10
11					10
		No odor	S-2		21
14					

WELL CONSTRUCTION DETAILS



PROJECT: LUM #1255

LOG OF BOREHOLE: MW-2

DEPTH (feet)	SOIL SYMBOLS	DESCRIPTION	SAMPLES: SAMPLE NO.	SAMPLES: INTERVAL	SAMPLES: BLOW COUNTS	WELL CONSTRUCTION DETAILS
15		0.6 - 28.0; Clayey Sand (cont.)				
16					5	
					9	
		Hyd odor	S-3		19	
17						
18	SC					
19		Same.				
20						
21						
22						
23						
24						
25						
26						
27						
28						End Cap
		Terminated at 28.0'				
29						
30						
31						

Project No: 4332

Sheet: 1 of 1

Project Name: LUM

Log of Borehole: MW-3

Client: VIC'S AUTOMOTIVE

Location: NORTH CORNER

Depth (ft)	USCS Symbol	USCS Label	Subsurface Description	Sample Data: Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
1–4			***SAND*** Fine to medium clean sand						
5		SM	Silty sand, damp						
6				MW-3 5'	SS	38	100		PID = 0 ppm; No hydrocarbon (HC) odor
7–9									
10		SM	Sand with clay and silt						
11				MW-3 10'	SS	22	70		PID = 0 ppm; No HC odor
12–14									
15		SC							Same as above
16			Clay increasing	MW-3 15'	SS	54	100		
17–19									
20		SP	Sand - few fines						Strong HC odor
21				MW-3 20'	SS	49	100		PID = 253 ppm
22–24									
25		SP	Fine to med sand, saturated						
26				MW-3 25'	SS	43	80		PID = 16 ppm
27			End of Borehole						
28									

Drill Date 5/25/01

Drill Method: HOLLOW AUGER

Total Depth: 25

Depth to Water: 20.5

Reviewed by: EW

Logged by: PJM

AEI Consultants
3210 Old Tunnel Road, Suite B
Lafayette, CA 94549
(925) 283-6000

Project No: 4332

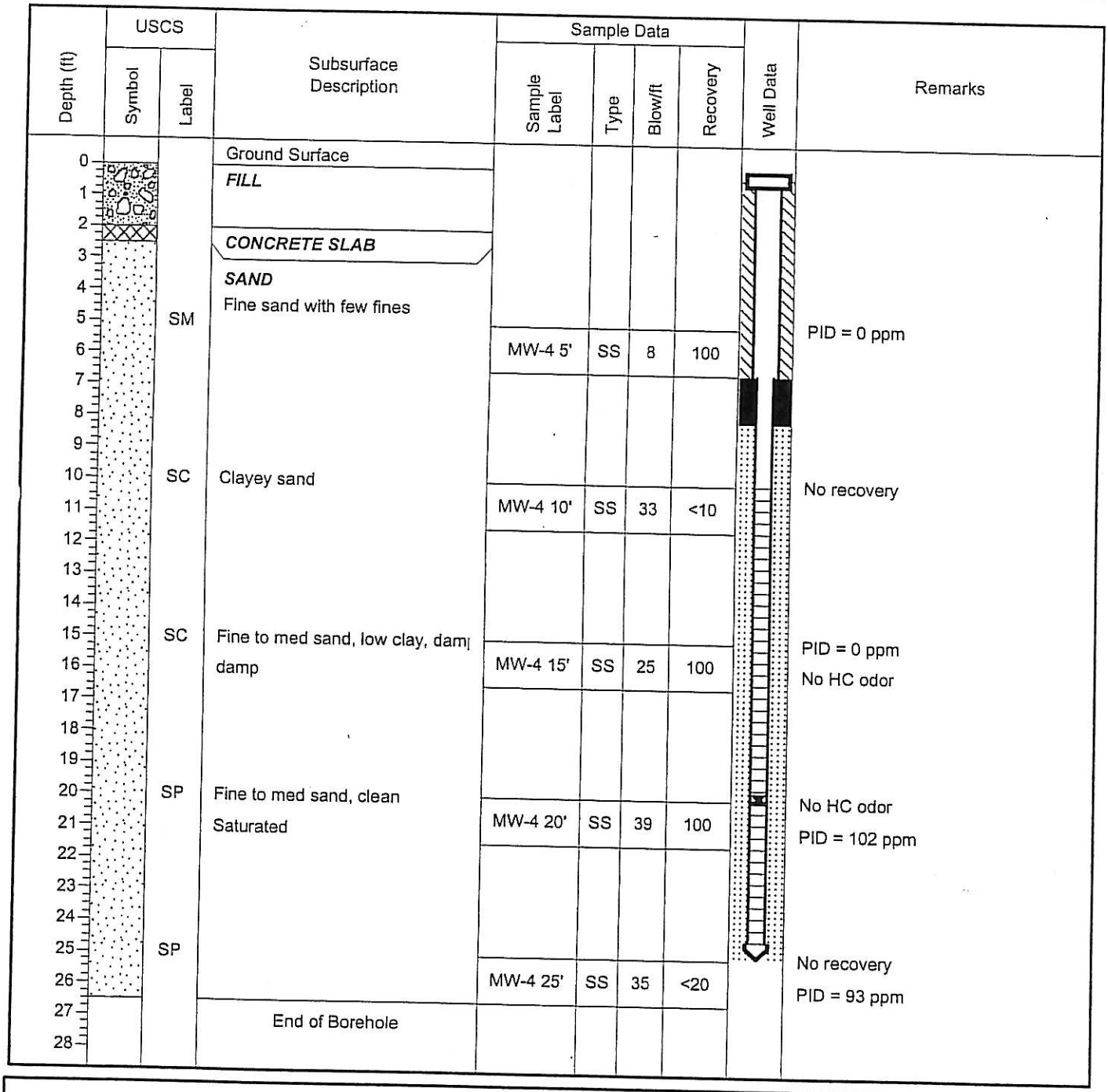
Sheet: 1 of 1

Project Name: LUM

Log of Borehole: MW-4

Client: VIC'S AUTOMOTIVE

Location: SOUTH CORNER



Depth (ft)	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
1			***FILL***						
2			***CONCRETE SLAB***						
3			***SAND***						
4			Fine sand with few fines						
5		SM							
6				MW-4 5'	SS	8	100		PID = 0 ppm
7									
8									
9									
10		SC	Clayey sand						
11				MW-4 10'	SS	33	<10		No recovery
12									
13									
14									
15		SC	Fine to med sand, low clay, dam						
16			damp	MW-4 15'	SS	25	100		PID = 0 ppm No HC odor
17									
18									
19									
20		SP	Fine to med sand, clean						
21			Saturated	MW-4 20'	SS	39	100		No HC odor PID = 102 ppm
22									
23									
24									
25		SP							
26				MW-4 25'	SS	35	<20		No recovery PID = 93 ppm
27			End of Borehole						
28									

Drill Date 5/25/01

Drill Method: HOLLOW AUGER

Total Depth: 25

Depth to Water: 20

Reviewed by: EW

Logged by: PJM

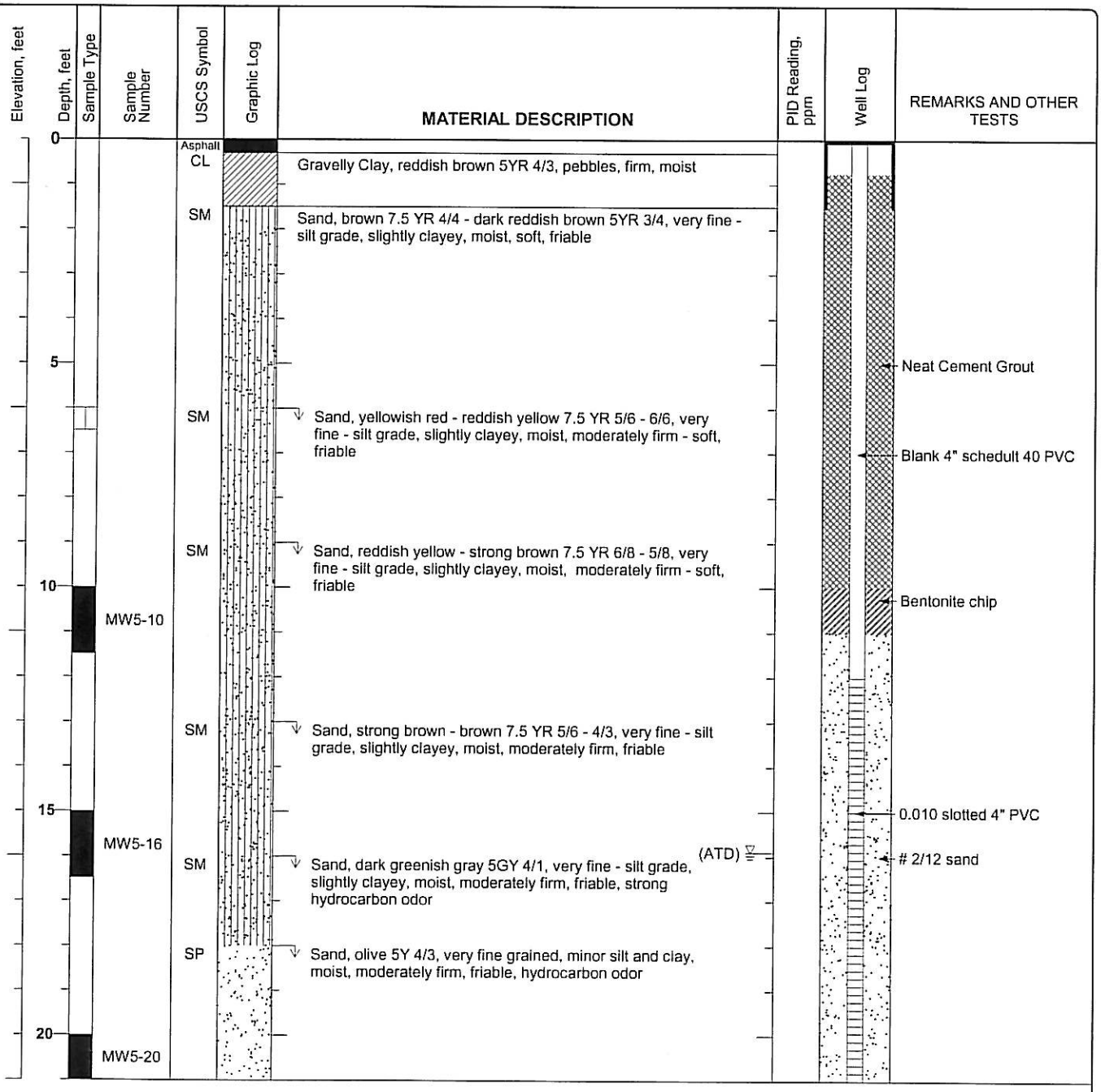
AEI Consultants
3210 Old Tunnel Road, Suite B
Lafayette, CA 94549
(925) 283-6000

Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-5

Sheet 1 of 2

Date(s) Drilled **January 11, 2005**	Logged By **Robert F. Flory**	Checked By **Adrian Angel**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **15.9 feet ATD**	Sampling Method(s) **ModCal, Grab**	Hammer Data
Borehole Backfill **Well Completion**	Location	



Figure

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Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-5

Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	21		MW5-20	SM		Sand, brown 7.5 YR 4/4 - dark reddish brown 5YR 3/4, very fine - silt grade, slightly clayey, moist, soft, friable (cont.)			
						Bottom of Boring at 22 feet bgs			
	26								
	31								
	36								
	41								
	46								
	51								
	56								

Figure

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Project: Vic's Automotive Project Location: 245 8th Street, Oakland, CA Project Number: 9482	**Log of Boring MW-6** Sheet 1 of 2

Date(s) Drilled **January 19, 2005**	Logged By **Adrian Angel**	Checked By **Robert F. Flory**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **10 1/2 inch**	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **Not Measured**	Sampling Method(s) **ModCal, Grab**	Hammer Data
Borehole Backfill **Well Completion**	Location	

Depth, feet	Sample Type	Sample Number	USCS Symbol	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
0			Asphalt				
			CL	Gravelly Clay, reddish brown 4/3, pebbles, firm, moist			
			SM	Sand, brown 7.5 YR 4/4 - dark reddish brown 5YR 3/4, very fine - silt grade, slightly clayey, moist, soft, friable			
5							Neat Cement Grout
			SM	Sand, yellowish brown 10 YR 5/4, very fine - silt grade, slightly clayey, moist, moderately firm - soft, friable			Blank 4" schedult 40 PVC
			SM	Sand, dark brown 10 YR 4/3 with streaks greenish gray 5G 5/1, very fine - silt grade, slightly clayey, moist, moderately firm - soft, friable, strong hydrocarbon odor			
10		MW6-10.5			47		Bentonite chip
			SM	Sand, greenish gray - dark greenish gray 10GY 5/1 - 4/1, very fine - silt grade, slightly clayey, moist, moderately firm, friable, strong hydrocarbon odor			
15		MW6-15.5			30		0.010 slotted 4" PVC # 2/12 sand
			SP	Sand, grayish green 5G4/2 - olive 5Y 4/3, very fine grained, minor silt and clay, moist, moderately firm, friable, hydrocarbon odor			
20		MW6-20.5					

Figure

X:\PROJECTS\CHARACTERIZATION & REMEDIATION\Vic's Automotive Oakland (PJM)\9482 WI and HVDPE\WI Report and Notes\MW-5_MW-12.bgs [augerwell 20.tpl]

Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-6

Sheet 2 of 2

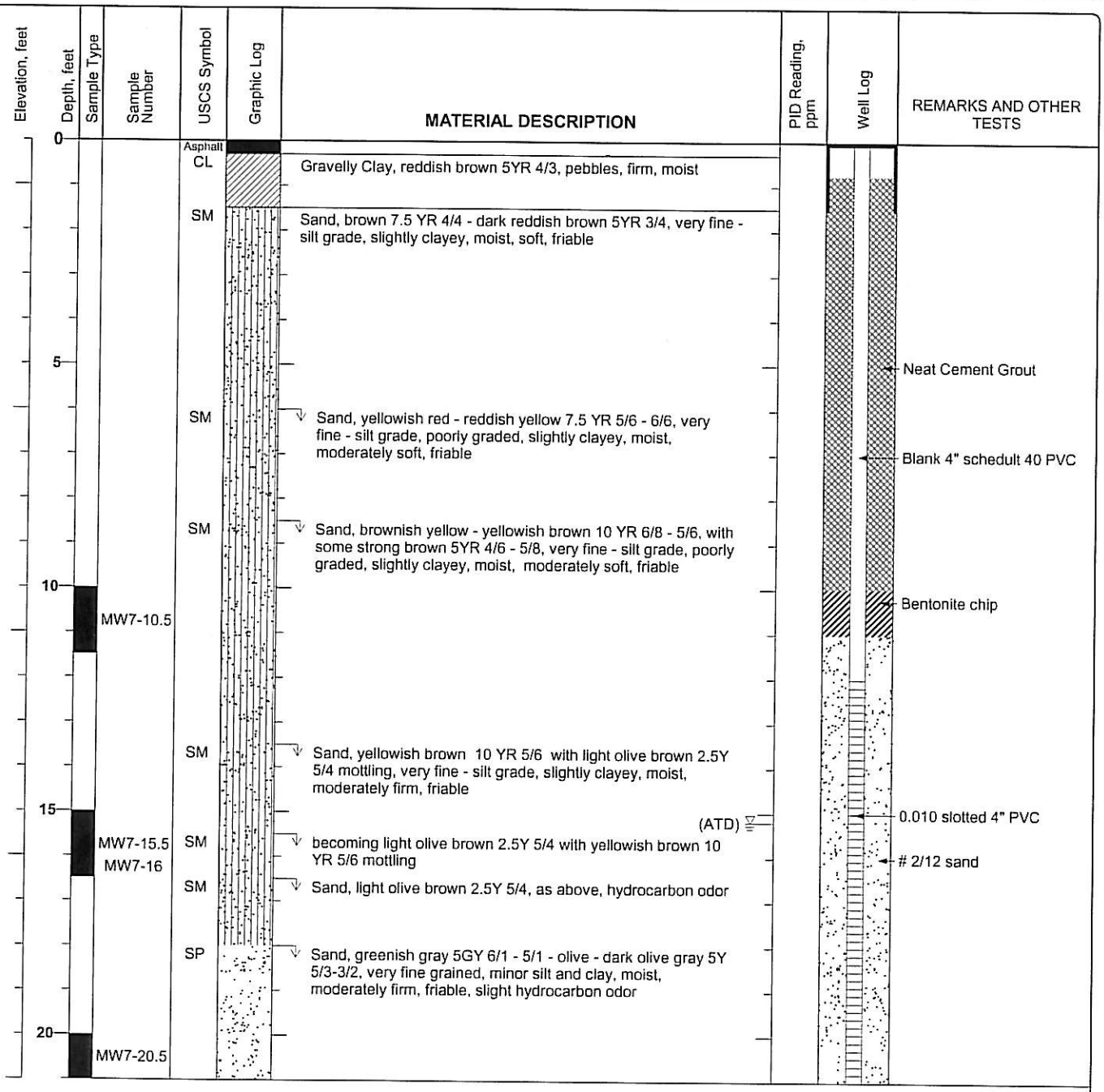
Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	21		MW6-20.5	SM		Sand, brown 7.5 YR 4/4 - dark reddish brown 5YR 3/4, very fine - silt grade, slightly clayey, moist, soft, friable (cont.)			
						Bottom of Boring at 22 feet bgs			
	26								
	31								
	36								
	41								
	46								
	51								
	56								

Figure

X:\PROJECTS\CHARACTERIZATION & REMEDIATION\CHARACTERIZATION\Vic's Automotive Oakland (PJM)\9482 WI and HVDPE\WI Report and Notes\MW-5_MW-12 bgs [augerwell 20.tpl]

Project: Vic's Automotive Project Location: 245 8th Street, Oakland, CA Project Number: 9482	**Log of Boring MW-7** Sheet 1 of 2

Date(s) Drilled **January 11, 2005**	Logged By **Robert F. Flory**	Checked By **Adrian Angel**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **10 1/2 inch**	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **15.2 feet ATD**	Sampling Method(s) **ModCal**	Hammer Data
Borehole Backfill **Well Completion**	Location	



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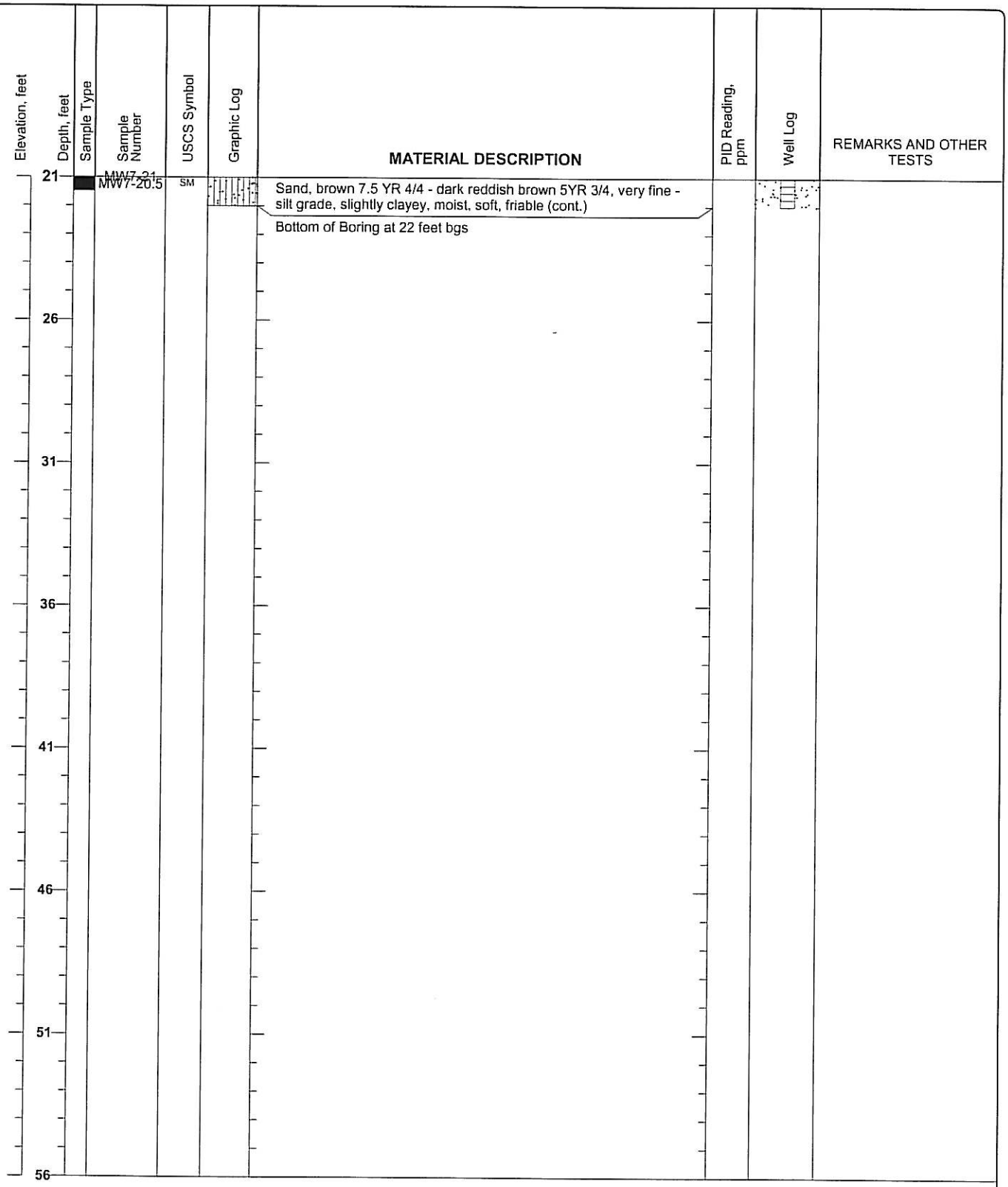
Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-7

Sheet 2 of 2



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Project: Vic's Automotive Project Location: 245 8th Street, Oakland, CA Project Number: 9482	**Log of Boring MW-10** Sheet 1 of 2

Date(s) Drilled **January 20, 2005**	Logged By **Adrian Angel**	Checked By **Robert F. Flory**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **10 1/2 inch**	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **12.5 feet after 30 min.**	Sampling Method(s) **ModCal**	Hammer Data
Borehole Backfill **Well Completion**	Location	

Depth, feet	Sample Type	Sample Number	USCS Symbol	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
0			CL	Bare soil with some grass Gravelly Clay, dark brown 10 YR 3/3, pebbles, firm, moist			
			SM	Sand, very dark brown 10 YR 2/2, very fine - silt grade, slightly clayey, moist, soft, friable			
5							Neat Cement Grout
			SM	Sand, brown 7.5 YR 4/3, very fine - silt grade, poorly graded, slightly clayey, moist, moderately soft, friable			Blank 4" schedult 40 PVC
10		MW10-10.5	SM	Sand, dark brown - brown - 7.5 YR 3/3 -4/3 - 5/3 with some streaks olive 5Y 4/3, very fine - silt grade, poorly graded, slightly clayey, moist, moderately soft, friable	73		Bentonite chip
				(after 30 min.) ▼			
			SM	Sand, strong brown 7.5YR 5/3 with abundant streaks olive 5Y 4/3, - grayish green 5G 4/2, very fine - silt grade, slightly clayey, moist, moderately firm, friable			
15		MW10-15.5			609		0.010 slotted 4" PVC # 2/12 sand
			SP	Sand, greenish gray 5G 6/1 - grayish green 5G 4/2, very fine grained, minor silt and clay, moist, moderately firm, friable, hydrocarbon odor			
20		MW10-20.5			4.8		

Figure

X:\PROJECTS\CHARACTERIZATION & REMEDIATION\Vic's Automotive Oakland (PJM)\9482 WI and HVDPE\WI Report and Notes\MW-5_MW-12.bgs [augerwell 20.lpl]

Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-10

Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	21		MW10-20.5	SM		Sand, very dark brown 10 YR 2/2, very fine - silt grade, slightly clayey, moist, soft, friable (cont.)	4.8		
						Bottom of Boring at 22 feet bgs			
	26								
	31								
	36								
	41								
	46								
	51								
	56								

Figure

X:\PROJECTS\CHARACTERIZATION & REMEDIATION\CHARACTERIZATION\Vic's Automotive Oakland (PJM)\9482 WI and HVDPE\WI Report and Noles\MW-5_MW-12.bgs [augerwell 20 tpl]

Project: Vic's Automotive Project Location: 245 8th Street, Oakland, CA Project Number: 9482	**Log of Boring MW-11** Sheet 1 of 2

Date(s) Drilled **January 20, 2005**	Logged By **Adrian Angel**	Checked By **Robert F. Flory**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **10 1/2 inch**	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **12.5 feet after 30 min.**	Sampling Method(s) **ModCal**	Hammer Data
Borehole Backfill **Well Completion**	Location	

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	0			CL		Bare soil with some grass Gravelly Clay, very dark brown 7.5 YR 2.5/3, pebbles, firm, moist - 5" piece of concrete @ 2 feet bgs			
				SM		Sand, brown 7.5 YR 4/3, very fine - silt grade, slightly clayey, moist, soft, friable			
	5								Neat Cement Grout
									Blank 4" schedult 40 PVC
				SM		Sand, brown 7.5 YR 4/3, very fine - silt grade, poorly graded, slightly clayey, moist, moderately soft, friable			
	10		MW11-10				70		Bentonite chip
						(after 30 min.) ▼			
				SM		Sand, brown - 7.5 YR 5/3, very fine - silt grade, poorly graded, slightly clayey, moist, moderately firm, friable, hydrocarbon odor			
	15		MW11-15.5				364		0.010 slotted 4" PVC
									# 2/12 sand
				SP		Sand, yellowish brown 10YR 5/4 with some greenish gray 5G 4/1, very fine grained, minor silt and clay, moist, moderately firm, friable, hydrocarbon odor			
	20		MW11-20.5						

Figure

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Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-11

Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	21		MW11-20.5	SM		Sand, brown 7.5 YR 4/3, very fine - silt grade, slightly clayey, moist, soft, friable (cont.)			
						Bottom of Boring at 22 feet bgs			
	26								
	31								
	36								
	41								
	46								
	51								
	56								

Figure

X:\PROJECTS\CHARACTERIZATION & REMEDIATION\CHARACTERIZATION\Vic's Automotive Oakland (PJM)\9482 WI and HVDPE\WI Report and Notes\MW-5_MW-12.bgs [augerwell 20.tpl]

Project: Vic's Automotive Project Location: 245 8th Street, Oakland, CA Project Number: 9482	**Log of Boring MW-12** Sheet 1 of 2

Date(s) Drilled **January 20, 2005**	Logged By **Adrian Angel**	Checked By **Robert F. Flory**
Drilling Method **Hollow Stem Auger**	Drill Bit Size/Type **10 1/2 inch**	Total Depth of Borehole **22 feet bgs**
Drill Rig Type **CME 75**	Drilling Contractor **HEW Drilling**	Approximate Surface Elevation
Groundwater Level and Date Measured **17 feet ATD**	Sampling Method(s) **ModCal**	Hammer Data
Borehole Backfill **Well Completion**	Location	

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	0			CL		Bare soil with some grass Gravelly Clay, dark brown 10 YR 3/3, pebbles, firm, moist			
				SM		Sand, very dark brown 10 YR 2/2, very fine - silt grade, slightly clayey, moist, soft, friable			
	5								Neat Cement Grout
				SM		Sand, brown 7.5YR 4/3, very fine - silt grade, slightly clayey, moist, soft, friable			Blank 4" schedult 40 PVC
	10								Bentonite chip
				SM		No Sample Recovery, auger returns Sand, as above,moderately soft, friable			
				SM		Sand, dark yellowish brown 7.5YR 4/6, very fine - silt grade, slightly clayey, moist, moderately firm, friable			
	15		MW12-15.5				5.1		0.010 slotted 4" PVC # 2/12 sand
						(ATD)			
				SP		Sand, dark bluish gray 10B 4/1, very fine grained, minor silt and clay, moist, moderately firm, friable, hydrocarbon odor			
	20		MW12-20.5				387		

Figure

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Project: Vic's Automotive
Project Location: 245 8th Street, Oakland, CA
Project Number: 9482

Log of Boring MW-12

Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Number	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	PID Reading, ppm	Well Log	REMARKS AND OTHER TESTS
	21		MW12-20.5	SM		Sand, very dark brown 10 YR 2/2, very fine - silt grade, slightly clayey, moist, soft, friable (cont.)	387		
						Bottom of Boring at 22 feet bgs			
	26								
	31								
	36								
	41								
	46								
	51								
	56								

Figure

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Project No: 5404

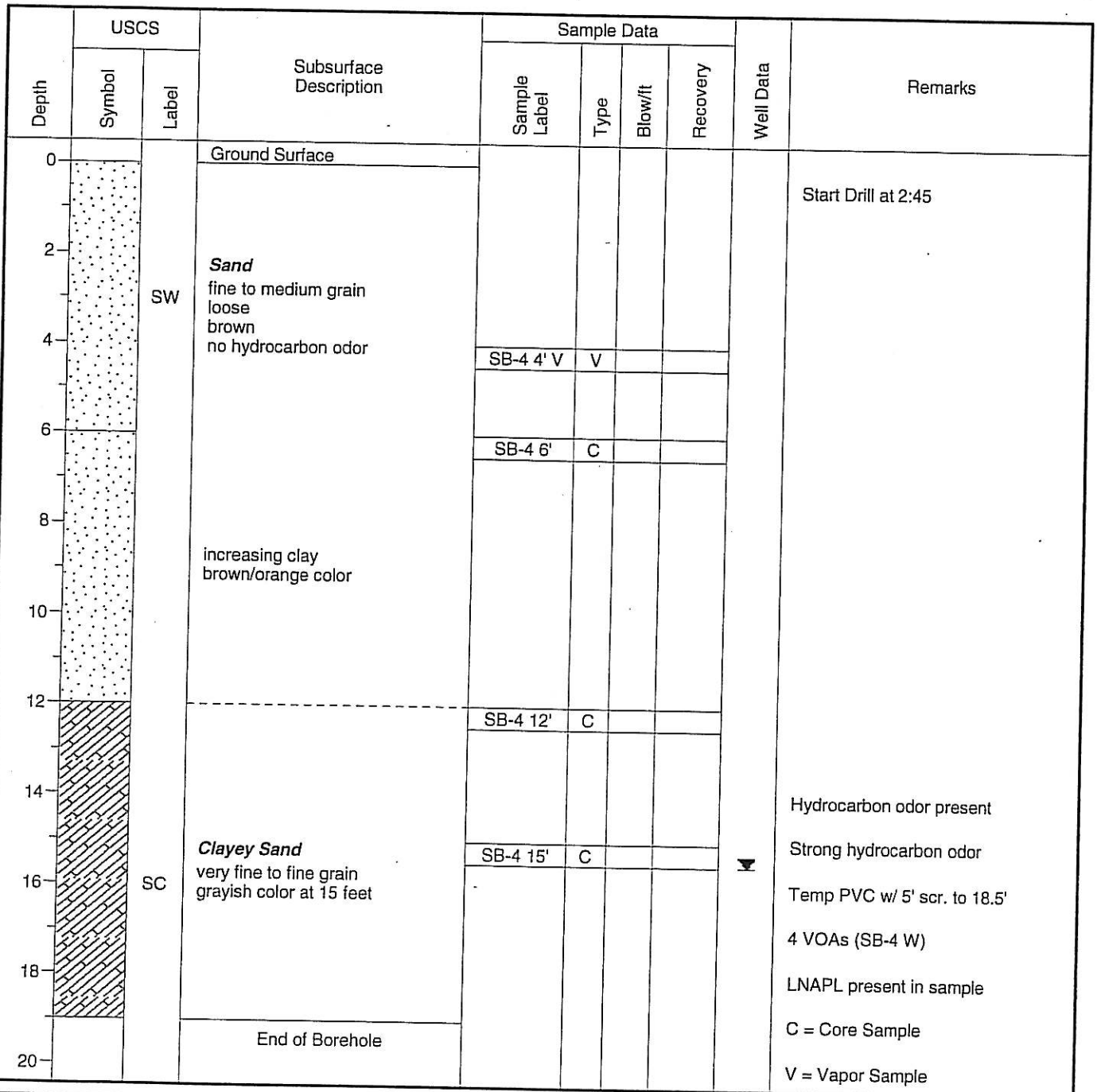
Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-4



Drill Date 4/2/03

Drill Method: Direct Push

Total Depth: 19

Depth to Water: 15.5

Reviewed by: LMS

Logged by: PJM

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Walnut Creek, CA 94597
(925) 283-6000

Project No: 5404

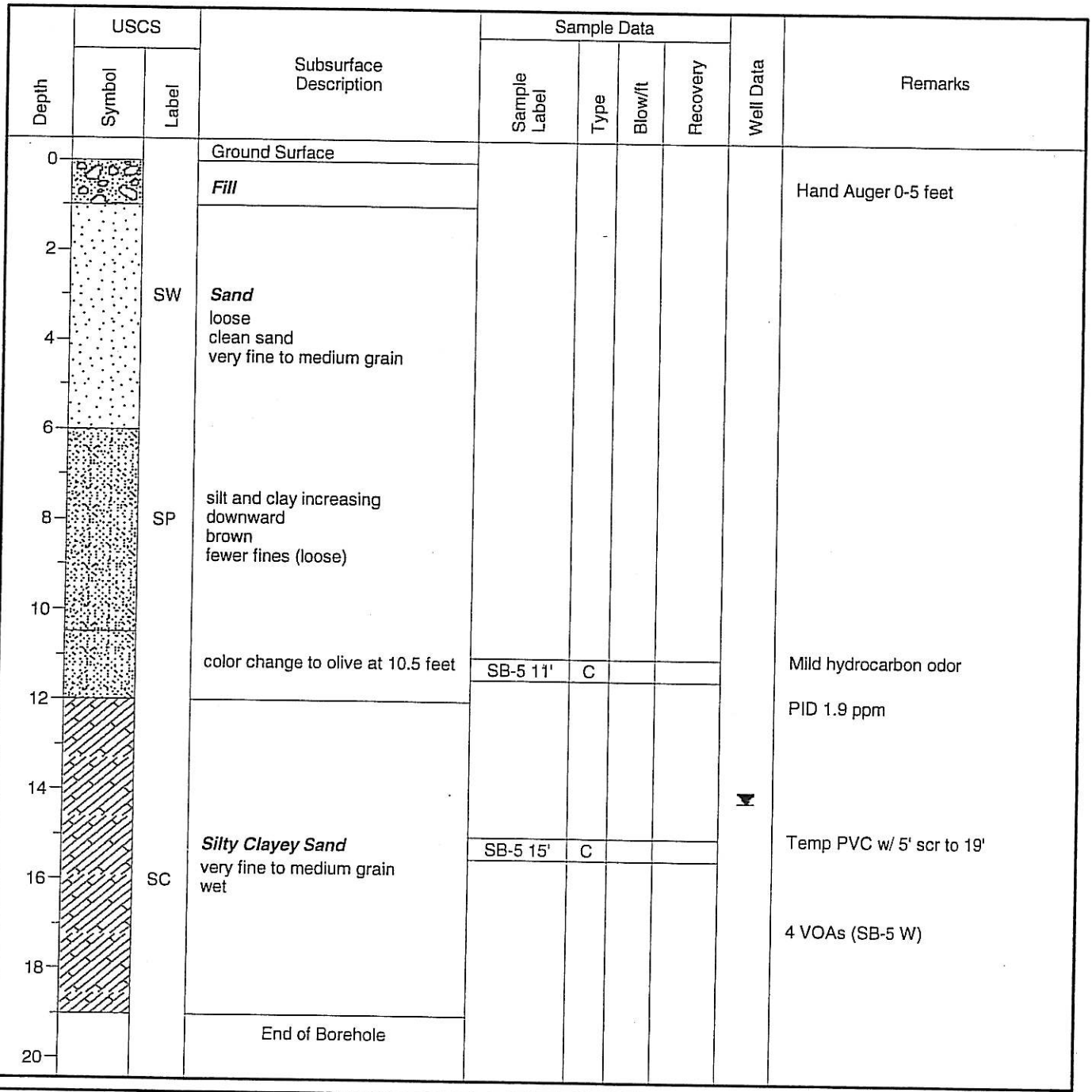
Sheet: 1 of 1

Project Name: Vics Automotive

Log of Borehole: SB-5

Client: Vic Lum

Location: 245 8th Street



Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 19

Depth to Water: 14.2

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

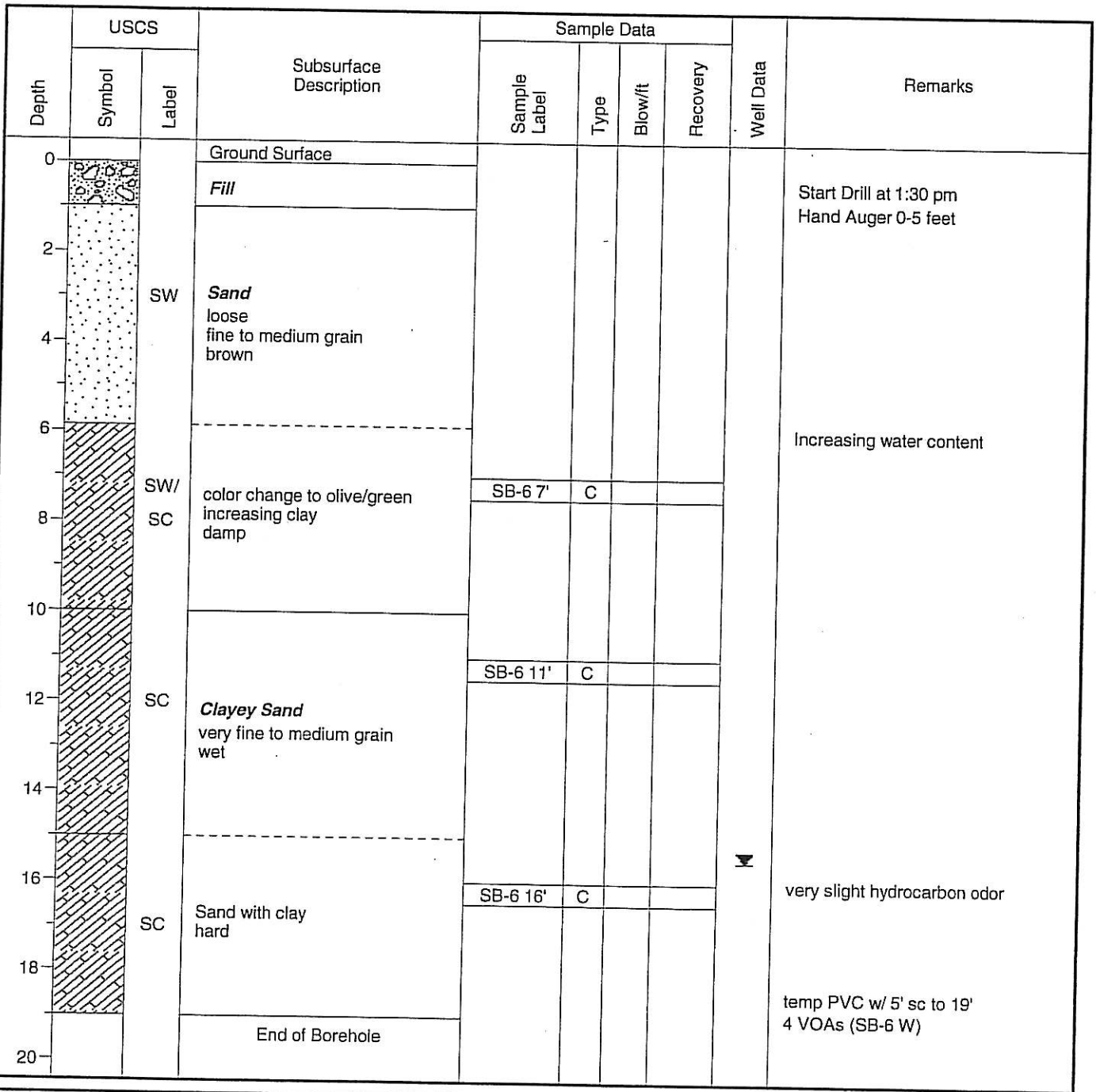
Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-6



Drill Date 4/2/03

Drill Method: Direct Push

Total Depth: 19

Depth to Water: 15.5

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-7

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Data: Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
			Fill						
2			***Sand*** loose fine to medium grain brown dry						
4		SW		SB-7 4' V	V				
6									
8		SW/ SC	sand w/ increasing clay, high moisture content						
10									
12				SB-7 12'	C				Strong HC odor
14		SC	***Clayey Sand*** fine to medium grain wet						No soil recovery 12-16'
16								▼	
		SW	dense sand with some fines						4 VOAs (SB-7 W)
18				SB-7 18'	C				
			End of Borehole						
20									

Drill Date 4/2/03

Drill Method: Direct Push

Total Depth: 18

Depth to Water: 15.7

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

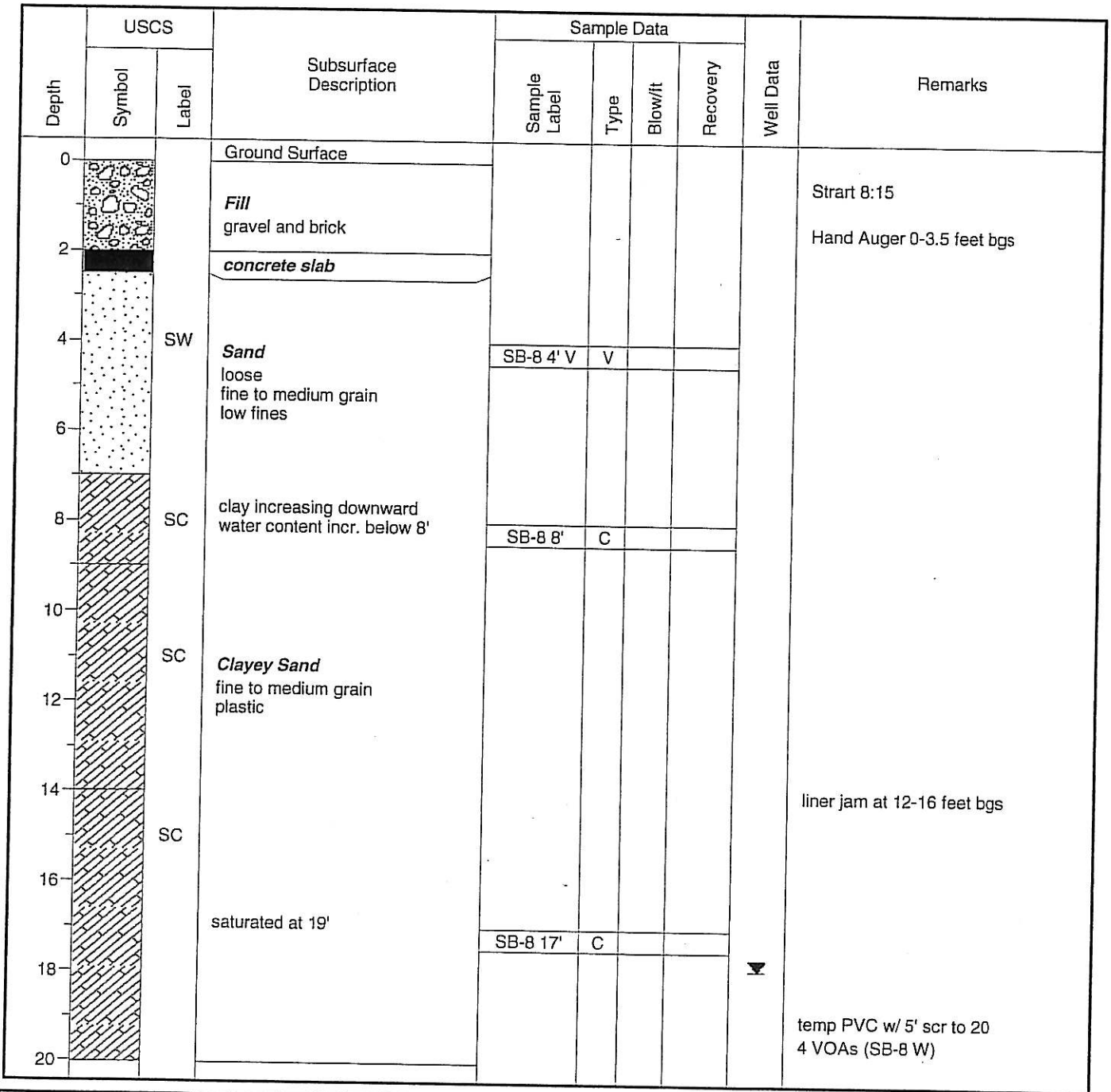
Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-8



Drill Date 4/2/03

Drill Method: Direct Push

Total Depth: 20

Depth to Water: 17.9

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-9

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
2			***Sand*** loose well sorted light and dark reddish brown low fines high moisture at 7 feet bgs						20% recovery 0-3 feet bgs
4		SW							
				SB-9 5'	C				PID <1.0 ppm
6									
8									
10			very compact at 10'						
12				SB-9 12'	C				PID <1.0 ppm No hydrocarbon odor
14		SW							
16			greenish/olive color locally	SB-9 16'	C			▼	PID <1.0 ppm
18									temp PVC w/ 5' scr to 21'
									4 VOAs (SB-9 W)
20									

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 20

Depth to Water: 15.5

Reviewed by: LMS

Logged by: BKR & PJM

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Project No: 5404

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Sheet: 1 of 1

Log of Borehole: SB-10

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
			Sand loose dark brown/reddish color low subangular gravels (<5%) medium to coarse grain						25% recovery 0-3 feet bgs
2		SW							
4									
				SB-10 5'	C				PID <1.0 ppm
6		SC	clay increasing below 6'						
			damp to wet clayey sand 6-7'						
8									liner shattered 8-13 feet bgs
10									
12				SB-10 12'	C				PID 5.9 ppm
14		SW	greenish/olive in places moist compact little fines						
16				SB-10 16'	C			▼	Slight hydrocarbon odor PID 10.0 ppm
18									Strong hydrocarbon odor PID >500 ppm temp PVC w/ 5' scr to 19'
			End of Borehole						4 VOAs (SB-10 W)
20									

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 19

Depth to Water: 16

Reviewed by: LMS

Logged by: BKR & PJM

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Project No: 5404

Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-11

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Data: Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
			Sand loose dark brown/reddish color medium to coarse grain						Start drill at 8:45 15% recovery 0-3 feet bgs
2									
4		SW							
				SB-11 5'	C				PID <1.0 ppm
6			Clay increasing below 6' damp to wet 6-7'						
8									
10			***Clayey sand*** dark brown clay with sand						liner jam at 10-11 feet bgs
12				SB-11 12'	C				PID 92.4 ppm Slight hydrocarbon odor
14		SW	Greenish color					▼	
16			Sand reddish brown color	SB-11 16'	C				PID 10.0 ppm
18									Strong hydrocarbon odor PID >500 ppm temp PVC w/ 5' scr to 20'
20									4 VOAs (SB-11 W)

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 20

Depth to Water: 14.5

Reviewed by: LMS

Logged by: BKR & PJM

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Project No: 5404

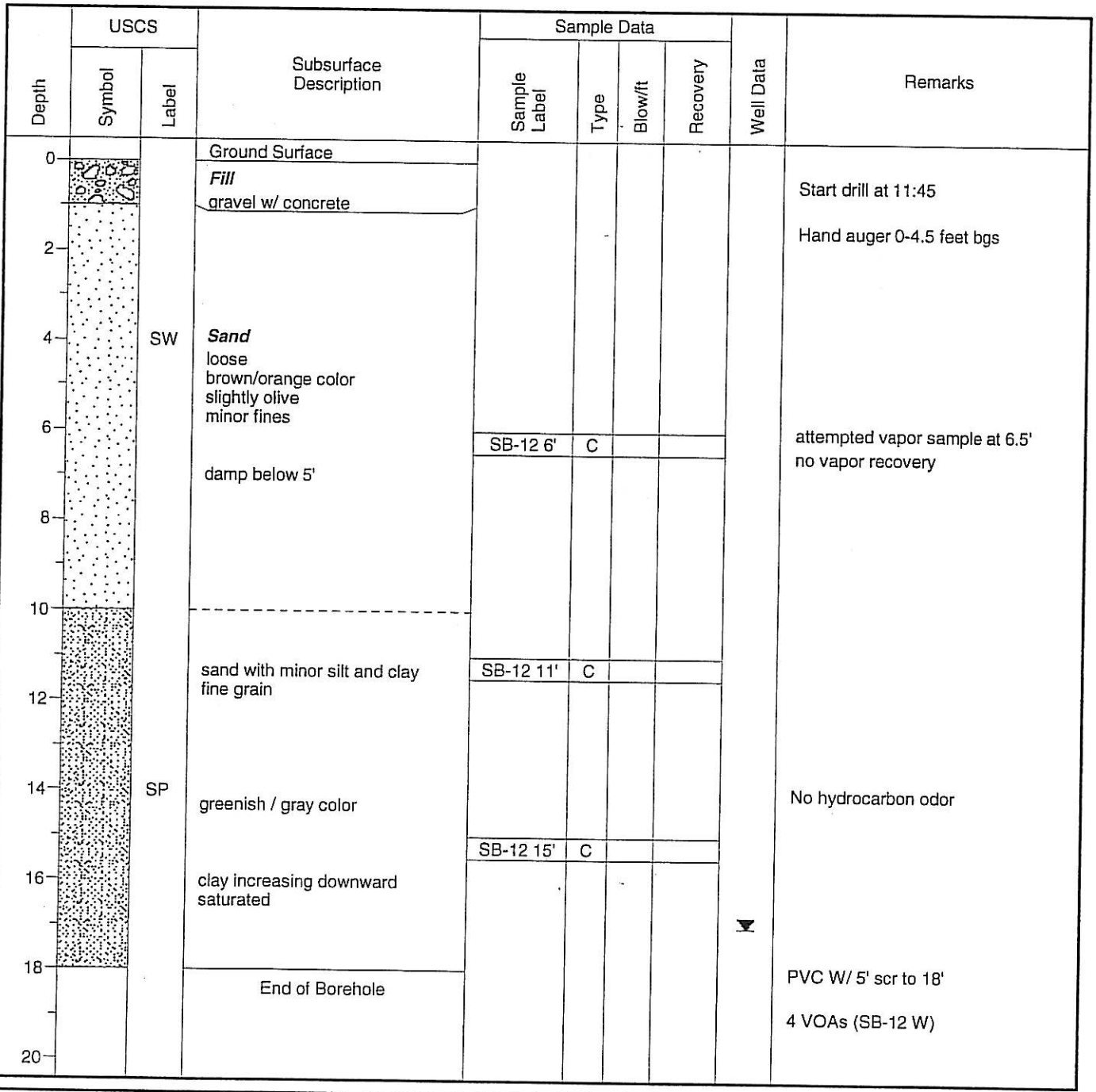
Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-12



Drill Date 4/2/03

Drill Method: Direct Push

Total Depth: 18

Depth to Water: 17

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-13

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
			AC / Fill Asphalt and concrete to 1' underlain by baserock						Hand auger 0-5 feet bgs
4		SW	***Sand*** loose light brown color						
6			fine to medium grain minor clay						vapor samp. attempt no recovery
			color change to olive/green at 8' damp	SB-13 7'	C				
10			clay increase slightly at 12'						
		SW		SB-13 11'	C				
12									
14				SB-13 14'	C			▼	No hydrocarbon odor slight sulfide odor
16			fine sand with low clay						temp PVC w/ 5' scr to 18'
		SP	saturated						4 VOAs (SB-13 W)
18			End of Borehole						
20									

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 18

Depth to Water: 14.7

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Sheet: 1 of 1

Log of Borehole: SB-14

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Type	Blow/ft	Recovery	Well Data	Remarks
0			Ground Surface						
			AC / Fill Asphalt underlain by baserock						
2			***Sand*** loose clean sand light brown/tan color						Hand auger 0-5 feet bgs
4		SW							
6			minor clay below 6' damp						
8									
10			***Clayey sand*** fine grain sand with clay damp						No hydrocarbon odor
				SB-14 11'	C				
12			color change to greenish/olive at 11.5'						
14		SC		SB-14 14'	C				
16			sand with clay fine to medium grain					▼	
18			saturated						temp PVC w/ 5' scr to 18.5' 4 VOAs (SB-14 W)
			End of Borehole						
20									

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 18.5

Depth to Water: 16.5

Reviewed by: LMS

Logged by: PJM

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Project No: 5404

Sheet: 1 of 1

Project Name: Vics Automotive

Client: Vic Lum

Location: 245 8th Street

Log of Borehole: SB-15

Depth	USCS Symbol	USCS Label	Subsurface Description	Sample Label	Sample Type	Sample Blow/ft	Sample Recovery	Well Data	Remarks
0			Ground Surface						
			Fill						Start drill at 12:55 pm
			Sand loose poorly graded						Hand auger 0-5 feet bgs
2			very fine-medium silt and clay increasing downward						
4		SP							
			wet soils 6-7'						
6									
			greenish/olive at 9'						
8									
10				SB-15 10'	C				No hydrocarbon odor
12			***Clayey sand*** fine to medium grain damp/wet					▼	
		SP		SB-15 14'	C				
14									
16			less fines, clean						
			color change to orange at 17'						
18			saturated						
			End of Borehole						PVC w/ 5' scr. to 18.5'
20									4 VOAs (SB-15 W)

Drill Date 4/3/03

Drill Method: Direct Push

Total Depth: 18.5

Depth to Water: 13.6

Reviewed by: LMS

Logged by: PJM

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APPENDIX B

TYPICAL SOIL GAS PROBE CONSTRUCTION

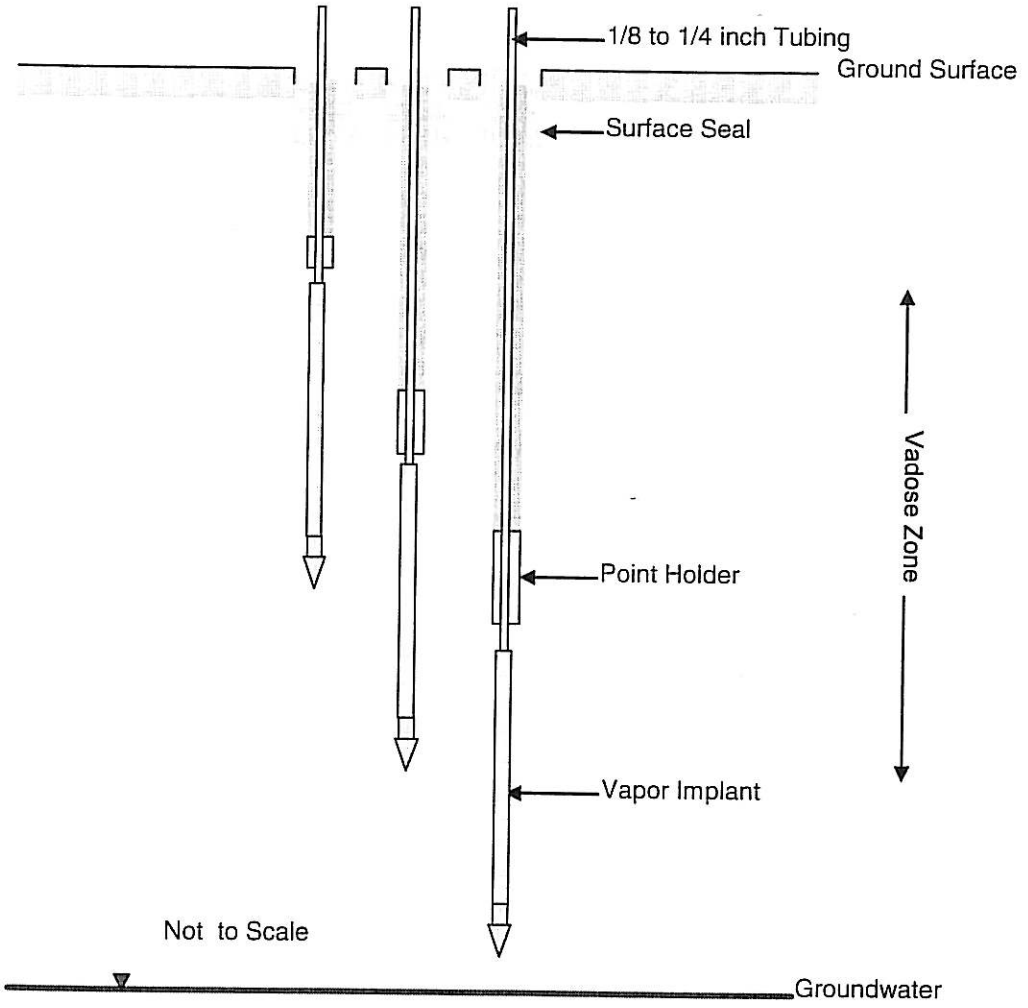


Figure C–6. Direct push permanent soil gas probe installation (developed based on illustration provided at www.geoprobe.com).

Figures – Soil Gas Probe Emplacement Methods

Figure 1 – Permanent/Semi-permanent Gas Probe Construction Diagram

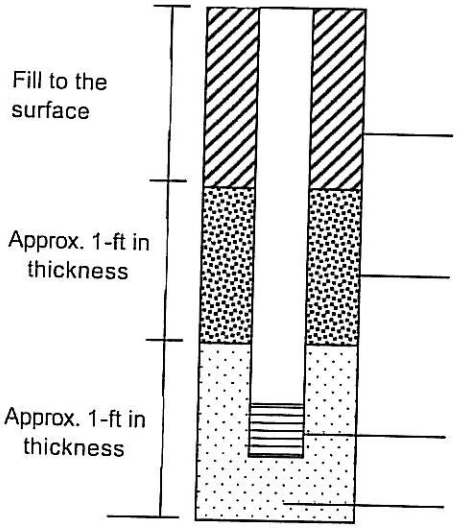
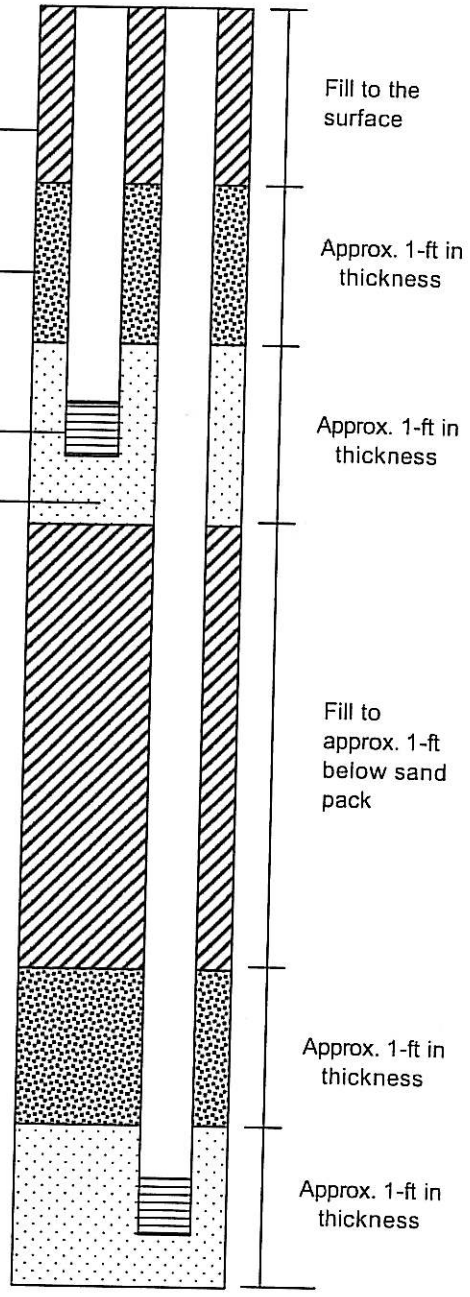
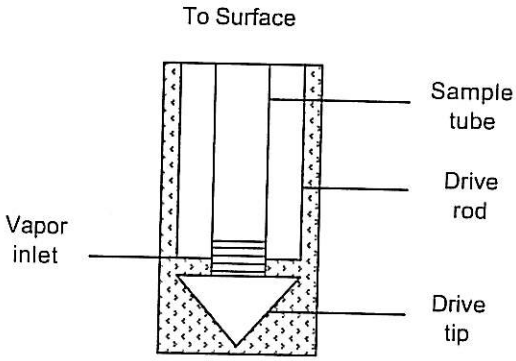


Figure 2 – Multi-depth Gas Probe Construction Diagram



Temporary Gas Probe Method



APPENDIX C

GEOPROBE SYSTEMS®
SOIL GAS IMPLANTS OPERATION

Implants Operation

from Geoprobe Systems®

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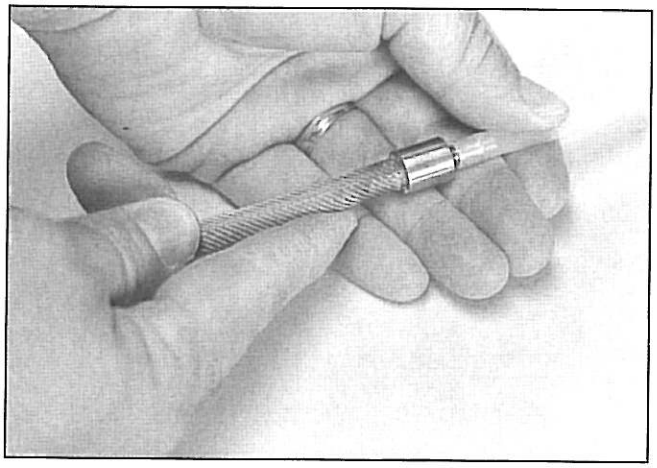


Attaching polyethylene tubing to the sampling implant.

Sampling Implants – Operation

Installation Instructions for Soil Gas Implants

1. Drive probe rods to the desired depth using a Point Holder (AT-13B) and an Implant Anchor/Drive Point (PR-14). DO NOT disengage the drive point when depth has been reached.

2. Attach appropriate tubing to the implant **(Figure 1)**. If tubing is pre-cut, allow it to be approximately 48 in. (1219 mm) longer than the required depth of the implant. Cover or plug the open end of the tubing.

3. Remove pull cap and lower the implant and tubing down inside the diameter of the probe rods until the implant hits the top of the Anchor/Drive Point. Note the length of the tubing to assure that proper depth has been reached.

4. Rotate tubing counterclockwise while exerting a gentle downward force to engage the PRT threads **(Figure 2)**. Pull up on the tubing lightly to test the connection. DO NOT cut excess tubing.

5. Position a Probe Rod Pull Plate or Manual Probe Rod Jack on the top probe rod. Exert downward pressure on the tubing while pulling the probe rods up. Pull up about 12 in. (305 mm).

6. If using 1/4-in. (6,4 mm) O.D. tubing or smaller, thread the excess tubing through the Implant Funnel and position it over the top probe rod. If using larger tubing, it may not be possible to install the glass beads.

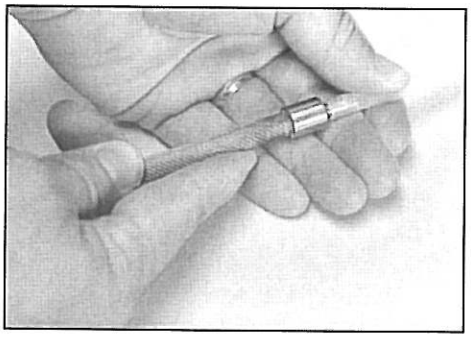


Figure 1. Attaching tubing to the sampling implant.

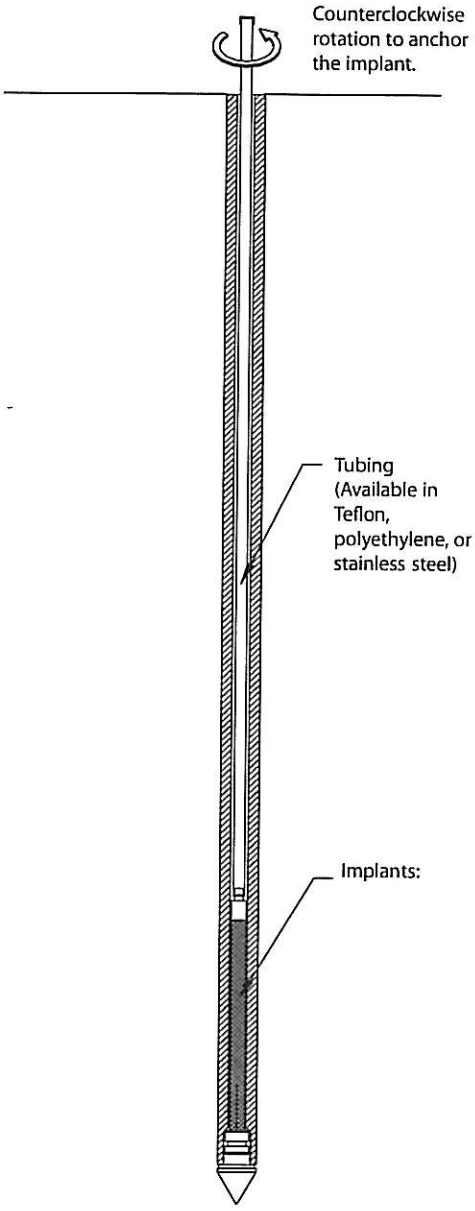


Figure 2. Once depth is achieved, the selected implant and tubing are inserted through the rods. The tubing is rotated to lock the implant into the drive point.

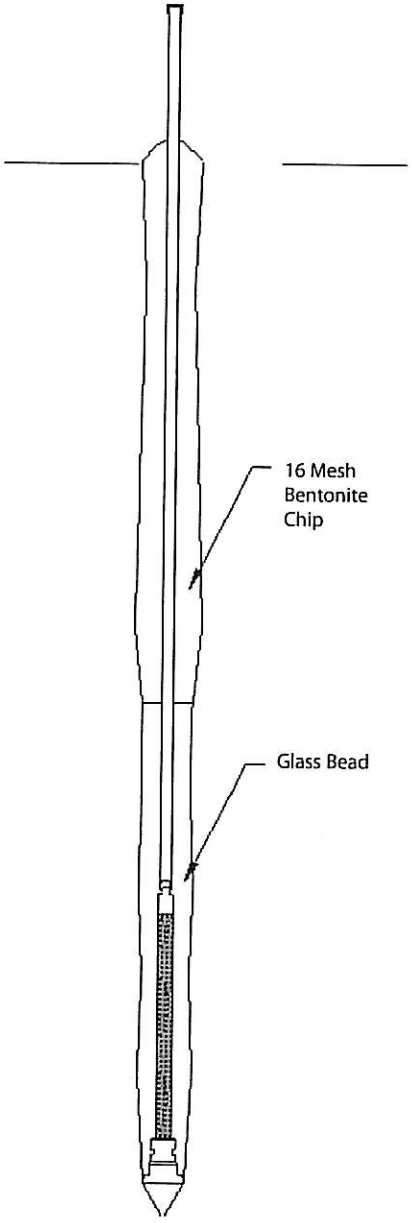


Figure 4. After the implant has been secured, the rods are removed and the annulus backfilled as appropriate.

7. Pour glass beads down the inside diameter of the probe rods around the outside of the tubing. Use the tubing to "stir" the glass beads into place around the implant. Do not lift up on tubing. It should take less than 150 mL of glass beads to fill the space around the implant.

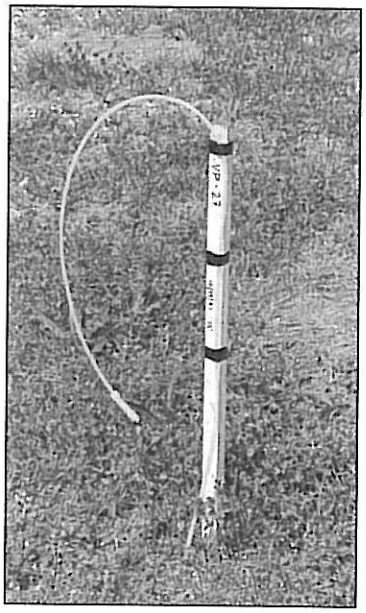
   NOTE: Backfilling through the rods with glass beads or glass beads/bentonite mixes can only be performed in the Vadose Zone, not below the water table.

8. Lift up an additional 18 to 24 in. (457 to 610 mm) and pour the bentonite seal mixture into place as in Step 7. The volume to be filled is about 154 mL per foot. It may be necessary to "chase" the seal mixture with distilled water to initiate the seal.

9. Pull the remaining rods out of the hole as in Step 5. Backfilling with sackcrete (cement/sand) or bentonite/sand may be done while removing the rods **(Figure 4)**. If the PR-14 Implant Anchor is used, the tubing may be cut flush with the top probe rod and a regular pull cap may be used to remove the remaining probe rods after Step 8.

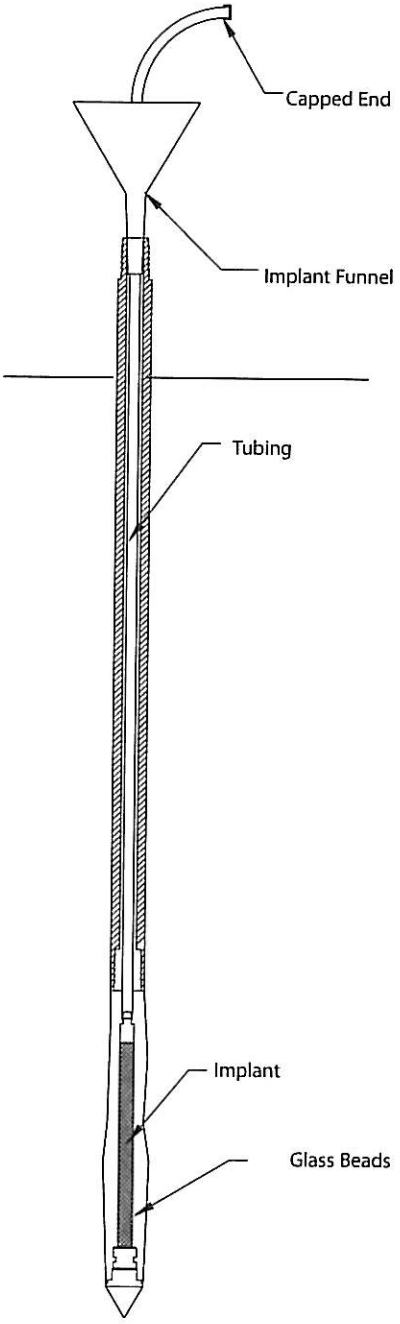
10. After the probe rods have been removed, cut the tubing at the surface, attach a connector or plug, and mark the location with a pin flag or stake. The point is ready for sampling now.

Figure 3. Glass Beads create a permeable layer around vapor sample implants.

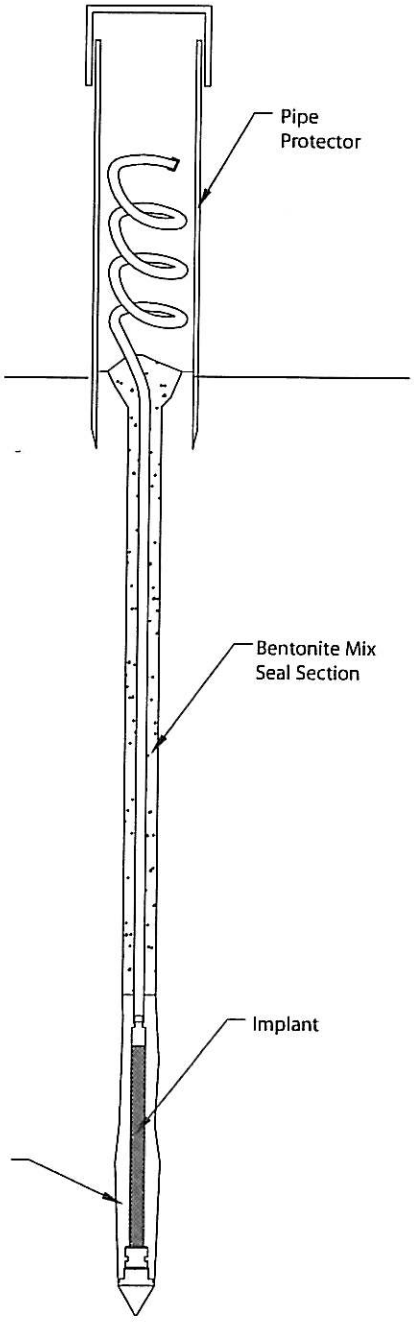


A vapor implant location.

Sampling Implants – Operation



Backfill materials include glass beads and bentonite sealants.



Example of completed permanent soil gas monitoring point.