PIERS
Environmental Services, Inc.

1330 S. Bascom Ave., Suite F
San Jose, CA 95128

Tel (408) 559-1248 Fax (408) 559-1224

March 18, 2004

Mr. Barney Chan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: **Work Plan for Site Characterization**
2926 - 2942 San Pablo Avenue (Fuel Leak Case No. RO0002567)
Oakland, CA

Dear Mr. Chan:

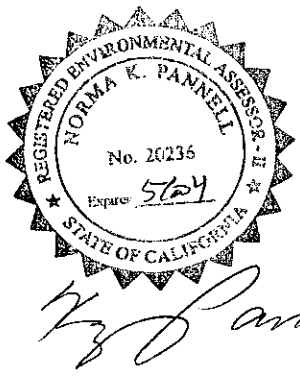
On March 12, 2004, I spoke with Ms. Donna Drogos of your office, who instructed me to direct this work plan to you, however, she mentioned that it is possible that the case would be handled in your Toxics division. All of the previous reports for this case have been previously provided to you.

As stated in the attached work plan, the Property owner has a commitment letter from the City of Oakland Community and Economic Development Agency (OCEDA) for a monetary loan to pay for site characterization. This work plan is also being submitted to the OCEDA.

The Property owner and the City of Oakland are very interested in seeing this case move forward so that the loan can be funded, the site characterized and eventually remediated and closure obtained. The next step is to obtain from you a review of the attached work plan. Please let us know how much time will be necessary for you to complete this review. I can be reached at (510) 593-5382. cell (H)

Sincerely,
PIERS Environmental Services, Inc.

Copy 2 LOP additional Report



Signing For
Joel G. Greger
CEG # EG1633, REA # 07079

Attachment

cc: Mr. James Chung
Mr. Mark Gomez, City of Oakland

Work Plan for Site Characterization
at
2942 San Pablo Avenue
Oakland, California

Performed For:
Mr. James Chung
San Pablo Auto Body
2924 San Pablo Avenue
Oakland, CA 94608

Prepared By:
PIERS Environmental Services, Inc.
1330 S. Bascom Avenue, Suite F
San Jose, CA 95128

March 2004
Project: 03408

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March 18, 2004

Mr. Barney Chan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: **Work Plan for Site Characterization**
2942 San Pablo Avenue
Oakland, CA

Dear Mr. Chan:

PIERS Environmental Services Inc. (PIERS) has prepared this work plan to propose additional investigative work that will additionally characterize the vertical and lateral extent of volatile organic compounds (VOCs), particularly trichloroethene (TCE) and its breakdown products, at the above-referenced site, and gather necessary information to plan remedial measures. The proposed scope of work includes obtaining permits from the Alameda County Public Works Agency, completion of on- and off-site exploratory borings using a dual capability "Geoprobe"/auger drill rig equipped with a membrane interface probe (MIP); collection of soil and grab groundwater samples; submission of the soil and groundwater samples for chemical analysis; data analysis and interpretation; and preparation of a technical report.

The Property owner has tentative approval from the City of Oakland Community and Economic Development Agency (OCEDA) for a monetary loan to pay for site characterization. This work plan is also being submitted to the OCEDA.

SITE DESCRIPTION AND BACKGROUND

The Property is located on the eastern side of San Pablo Avenue, at the intersection with 30th Street, in the City of Oakland, Alameda County, California (see Figure 1).

Historical research conducted for this investigation, including aerial photographs, Sanborn Fire Insurance Maps, historical city directories, and Oakland Building Department records, has identified the following prior uses for the northern of the two Property parcels (2942 San Pablo Avenue). In 1902 (Sanborn map), this parcel was occupied by a cleaning and dyeing business in a building just to the north of the existing Property building, and a small garage was present adjacent to 30th Street. The cleaning and dyeing business could potentially be of environmental concern, however, based on the elapsed time since this use, and no evidence of any impacts to the subsurface soils, no further investigation appears warranted. In 1912 (Sanborn map), the northern parcel contained a yard and residence.

In 1930 (building department permit), the northern parcel was occupied by a golf club. From 1940 through 1984 (city directories), a tire sales and service business was located on the northern parcel. Beginning by approximately 1947 (1946 building department permits), a service station was located just to the south of the tire business, north of the existing building, in the area where the former pump island remains (see Figure 3). The "Battery Specialists" is also listed in the city directories between 1973 and 1978, and apparently operated in conjunction with the tire business. The duration of the service station operation is unclear, although it apparently had ceased by 1967 (Sanborn map). Since approximately 1984, the parcel has apparently been vacant, except for parking usage.

The southern parcel, where the existing auto body shop is now, was vacant on the 1902 and 1912 Sanborn maps. On the 1951 and 1952 Sanborn maps, the existing building is present and shown as occupied by an auto seat cover business, with a gymnasium on a mezzanine level at the rear. On maps between 1959 and 1962, the rear of the building is shown as used for auto body work. Cal Tech Metal Finishers apparently occupied the building in 1987 (building department records). Micromatic Finishers occupied the building between 1989 and 1993 (city directories). Ward's Auto Repair occupied the building and apparently also used the vacant lot to the north between 1994 and 1999 (building department records). The existing auto body business has occupied the building since 2001 (city directories).

Also on the 1951 and 1952 maps, the adjacent parcel to the east of the Property near 30th Street is shown as occupied by a plating works. This parcel is currently vacant. A plating room with two apparent above-ground storage tanks (AST) is shown adjacent to the rear portion of the existing Property building. On the Sanborn maps, it is stated that the room was not in use. A structure shown as a "polishing room" is shown closer to 30th Street and adjacent to the Property, with the main plating works building also adjacent to 30th Street, to the east of the "polishing room". Portions of the slabs for these buildings were observed during PIERS' reconnaissance.

A previous environmental report was provided to PIERS. The previous environmental report was entitled "Soil/Environmental Report, 2942 San Pablo Avenue, Oakland, California", by Globe Soil Engineers, dated November 19, 1999. The scope of work for this report included three soil borings. No evidence of prior use of environmental concern was found by Globe Soil Engineers during their historical investigation. Three soil borings were completed, equally distributed across the vacant portion of the Property, at the approximate locations shown on Figure 3. Samples were collected from each of the borings at approximately two, six, ten, and fifteen feet below grade. The samples at the different depths from each boring were apparently composited as a single sample for each boring prior to analysis. Analytical results for these samples were attached to the report provided to PIERS. The analyses yielded non-detectable results for Total Petroleum Hydrocarbons (TPH) as gasoline, benzene, toluene, ethylbenzene and xylenes (BTEX), and methyl-tert-butyl-ether (MTBE) by EPA Methods 8015 and 8020, volatile organic compounds (VOCs) by EPA Method 8010, and pesticides by EPA Method 8080. Globe Soil Engineers concluded that, "the soil at the site is not contaminated with pesticides, metals, volatile organics, gasoline, diesel, creosote, heavy oils, grease, or other hydrocarbon products". The analytical results for metals, diesel, creosote, heavy oils and grease were not included in the report provided to PIERS.

Because the former use of the Property as a service station was not identified in the previous report, the borings completed by Globe Soil Engineers do not appear to have specifically targeted the probable location of the former tank pit, or the pump island, and the borings appear to be located upgradient of these features. PIERS recommended that three additional soil borings be completed at the Property. Boring B4 was be located at the former pump island, to investigate whether there are any hydrocarbon impacts in the soil at this location. The exact location of the former tank pit is not known. Borings B5 and B6 was therefore located on either side of the former pump island, to investigate these areas that are the most likely locations of the former tanks.

Boring B-4, at the former pump island, was extended to a total depth of approximately 5 feet below grade. A slight odor of weathered hydrocarbons was observed at approximately 1.5 feet below grade. Boring B-5, adjacent to and north of the pump island, was extended to a total depth of approximately 20 feet below grade. An odor of weathered hydrocarbons was observed at 2 and 9.5 feet below grade. The groundwater had a definite odor of weathered gasoline. Boring B-6, adjacent to and south of the pump island, was extended to approximately 16 feet below grade. A slight odor of weathered hydrocarbons was present below 15 feet. A groundwater sample was collected, which had less of an odor than the sample from B-5. Neither of the deeper borings appeared to be located within backfill material typical of a former tank pit.

Where odors of hydrocarbons were observed, the soil samples were submitted for laboratory analyses. These samples consisted of B4 (1.5 ft), B5 (2 ft), and B5 (9.5 ft). TPH as gasoline was detected in all of these samples, at concentrations ranging from 0.711 to 1.38 parts per million (ppm). BTEX and MTBE ranged from predominantly non-detectable to very low concentrations. No significant concentrations of hydrocarbons were encountered in the three soil samples analyzed.

The groundwater sample from B-5, which had a strong odor of weathered gasoline, was analyzed for hydrocarbons and solvents. TPH as gasoline was detected in B-5 at a concentration of 5,310 parts per billion (ppb). Benzene was detected in B-5 at concentrations of 15.4 ppb and 37 ppb by EPA Methods 8020 and 8260, respectively. Ethylbenzene was detected in B-5 at concentrations of 351 ppb and 346 ppb by EPA Methods 8020 and 8260, respectively. Toluene and xylenes were detected in B-5 at concentrations of 14 ppb and 4.9 ppb, respectively (EPA Method 8020), and MTBE was non-detectable. The solvents trichloroethene (TCE), cis-1,2-dichloroethene, 1,2-dichloroethane, and 1,1-dichloroethene were detected in B-5 at concentrations of 3,780 ppb, 193 ppb, 10 ppb, and 3 ppb, respectively. The groundwater sample from B-6, which had a lesser odor of weathered gasoline, was analyzed for hydrocarbons. TPH as gasoline was detected in B-6 at a concentration of 277 ppb. Benzene was non-detectable. Ethylbenzene, toluene, xylenes, and MTBE were detected in B-6 at concentrations of 0.9 ppb, 0.9 ppb, 6.9 ppb, and 11 ppb, respectively.

This work was summarized in PIERS' Phase I Environmental Site Assessment (ESA) dated May. 2003. The analytical results of the soil samples are summarized on Table 1 attached to this report. The analytical results of the groundwater samples are summarized on Tables 2A and 2B.

In August 2003, the vacant portion of the Property was surveyed using a magnetometer. The purpose of this work was to determine if any underground storage tanks (USTs) or piping remained at the site. The magnetometer survey did not locate any of these features. One apparent underground hoist was sited at the location shown on Figure 2.

On August 20, 2003, four exploratory soil borings were completed at the Property. The borings, which were designated as B-7 through B-10, were located as shown on Figure 2. The purpose of borings B-7 and B-8 was to provide further delineation of hydrocarbons in groundwater, and to investigate potential sources of hydrocarbons in soil. The purpose of borings B-9 and B-10 was to investigate soil and groundwater conditions beneath the former polishing room and plating room, respectively.

All of the borings were continuously cored and the subsurface soils were logged for lithologic purposes and examined for evidence of contamination. Boring B-7 did not develop water at a depth of 20 feet below grade, and was extended to a depth of 32 feet below grade. When installing the PVC casing, the hole closed below 24 feet below grade. A single VOA of groundwater was collected after several hours. Boring B-8 was extended to twenty feet below grade, at which time slotted PVC casing was installed in the borehole and a grab groundwater sample was collected after one-half hour. Groundwater recharge during sample collection was very slow.

Boring B-9 was extended to 32 feet below grade, as the soils above this point did not appear to be sufficiently permeable to allow sample collection. However, upon retrieval of the rods, the borehole closed below 30 feet. Groundwater collected at approximately 28.3 feet after about ten minutes, and a sample was collected. Groundwater was very slow to recharge during the filling of the sample containers.

Boring B-10 was extended to four feet below grade for soil sample collection. Groundwater was not encountered.

At boring B-7, a moderate to strong odor of weathered gasoline or solvent was encountered beginning at 0.4 feet, and continuing through 7.5 feet, where there was less or no odor, except at 11.5 feet, 14.5 feet, and 18.6 feet, where there were thin (several inches thick) wet gravely zones. Samples selected for laboratory analyses (1 ft, 9.5 ft, and 14.5 ft depths) represented areas of the strongest odor.

The subsurface conditions encountered in B-7 consisted of dark gray silty clay (CL), which changed to light gray between 2.5 to 6 feet below grade. The soils graded to silt (ML) at approximately 6.5 feet below grade. Saturated clayey to sandy silt with a few thin gravely layers was encountered below 20 feet, and extended to the total depth explored (32 feet).

The lithologic conditions encountered in the other borings were generally similar to those encountered in B-7. No odors or other evidence of contamination was encountered in the other borings.

The soil samples were analyzed by McCampbell Analytical in Pacheco, California. The soil samples from B-7 at 1.0 foot below grade, 9.5 feet below grade, and 14.5 feet below grade, and the grab groundwater samples from B-7 and B-8, were analyzed for TPH as gasoline, BTEX, and MTBE by EPA Methods 8015-Modified and 8020. The soil samples from B-7, and the grab groundwater sample from B-8, were also analyzed for EPA Method 8010 constituents (volatile organic compounds). The grab groundwater samples from B-7 and B-9 were also analyzed for EPA Method 8260 constituents. The soil samples from B-9 and B-10 collected at 1.5 feet below grade were analyzed for EPA Method 8260 constituents, the CAM 17 metals, total cyanide, chromium VI, and pH.

The analytical results are summarized on Tables 1A through 1C, 2A, and 2B, and Figures 3 and 4 attached to this report. This work was summarized in PIERS' previous report "Report of Additional Phase II Investigation" dated September 2003.

On September 23, 2003, three additional exploratory borings were completed at the Property using a Geoprobe drilling rig provided by Vironex, Inc., a California-licensed driller. Prior to drilling, permits were obtained from the Alameda County Public Works Agency. The borings, which were designated as B-10B through B-12, were located as shown on Figure 2. The purpose of boring B-10B was to investigate soil conditions and groundwater beneath previous boring B-10, where TCE was encountered at a concentration of 0.25 ppm (in excess of the commercial ESL of 0.11 ppm) at 1.5 feet below grade. B10 was located at the former plating room. The purpose of borings B-11 and B-12 was to further delineate the extent of TCE in groundwater, and to investigate whether the TCE is migrating from an upgradient source.

At boring B-12, completed first, drilling rods fitted with a hydropunch tool were extended to a depth of 32 feet below grade, and the screen was retracted to expose the interval between 28 and 32 feet below grade. After waiting three-quarters of an hour, very little water had accumulated (not enough to allow sample collection). The drilling rods and hydropunch tool was retracted, at which time it was observed that the hydropunch screen was smeared with native material. Slotted PVC casing was then placed in the open hole, which had sealed below a depth of 28.8 feet below grade. After approximately 8 minutes, groundwater was measured at about 27.5 feet below grade and a sample was collected using a disposal bailer. One-half hour after sample collection, groundwater was measured at approximately 26.15 feet below grade.

At boring B-11, the drilling rods and hydropunch tool were extended to 32 feet below grade, and the screen exposed below 28 feet below grade. Water entered the screened interval and a sample was collected using thin vinyl tubing fitted with a chuck ball.

Boring B-10B was continuously cored to a depth of 12 feet below grade, and soil samples were collected at 3, 6, and 9 feet below grade. Below that depth, the hydropunch tool was extended to 32 feet below grade, and the screen exposed below 28 feet below grade. Sufficient water did not collect in the hydropunch. The hydropunch was gradually retracted over the next hour to approximately 29 feet below grade in an attempt to allow water to enter the screen. Following this unsuccessful attempt, the rods and tool were retracted and a slotted casing was placed in the borehole to a depth of 28.9 feet below grade. Because water did not initially collect in the casing, sample collection did not occur until approximately six hours later. At this time, groundwater was present at approximately 26.7 feet below grade, and a sample was collected using a disposable bailer.

The subsurface conditions encountered in B-10B were similar to previous conditions encountered, and consisted of very dark gray to black clayey silt (ML) to a depth of approximately 2.8 feet below grade, where it gradationally changed to olive silty clay and clay (CL). At approximately 5.2 feet, these soils graded into orangeish brown clayey silt and silt (ML) which became siltier with depth. Between approximately 6.5 and 8 feet below grade, and 9.2 and 12 feet below grade, highly weathered gravel was encountered within the silt.

The soil samples were analyzed by McCampbell Analytical in Pacheco, California, a California state-certified Hazardous Material Testing Laboratory. The soil samples from B-10B at 3, 6, and 9 feet below grade, and the grab groundwater samples from B-11 and B-12, were analyzed by EPA Method 8010. The grab groundwater sample from B-10B was analyzed by EPA Method 8260. The analytical results from this work and the previous investigations are summarized on Tables 1A through 1C, 2A, and 2B, and Figures 3 and 4.

DISCUSSION

On Tables 1A through 1C, 2A, and 2B, the analytical results for the soil and groundwater samples are tabulated and compared to residential and commercial Environmental Screening Levels (ESLs). As shown on Table 1A, the relatively low concentrations of hydrocarbons previously encountered in the soil samples from B7, and from previous borings B4 and B5 (as shown on Table 1A), are below their respective ESLs. Based on these findings, further investigation of hydrocarbons in soil has not been proposed.

The compounds trichloroethene (TCE), trans 1,2-dichloroethene, and cis-1,2-dichloroethene were detected in soil in borings B7, B9, and B10 (see Table 1B). Contaminants detected in excess of the ESLs include TCE in B-10B (9 ft) at a concentration of 0.54 ppm (the commercial ESL is 0.46 ppm), trans-1,2-DCE in B7 (14.5 ft) at a concentration of 1.4 ppm (the ESL is 0.67 ppm), and cis-1,2-DCE in B-10B (3 ft) and B-10B (9 ft) at concentrations of 0.24 ppm and 0.22 ppm, respectively (the ESL is 0.19 ppm). B10/10B was located at the former plating room. Further investigation of VOCs in soil in the vicinity of B-9, to attempt to locate a source for the groundwater contamination, is proposed.

gw potential

The results of the metals analyses (Table 1C) for the samples previously collected from borings B9 and B10 at 1.5 feet below grade did not indicate any CAM 17 metals in excess of the ESLs, except for chromium in B9, which was detected at a concentration of 63.6 ppm. As all of the metal concentrations fall within generally accepted ranges of background concentrations (Bradford et al, Background Concentrations of Trace and Major Elements in California Soils, 1966), further investigation of metals at the Property does not appear warranted.

The analytical results of the grab groundwater samples collected during this and the previous investigations are summarized on Tables 2A and 2B, and on Figures 3 and 4. The concentrations of hydrocarbons in groundwater now appear to be largely defined to the north and south, and undefined in the presumed downgradient direction. Samples from monitoring wells more representative of groundwater flow conditions would be expected to be an order of magnitude less than those encountered in the grab groundwater sampling. Further delineation downgradient would require drilling within San Pablo Avenue.

TCE was detected in groundwater in all grab groundwater samples collected to date where it was analyzed for, at elevated concentrations above the ESLs. The compounds 1,2-dichloroethane and cis-1,2-dichloroethene were also detected above the ESLs in B5, and presumably would have been detected above the ESLs in other samples, where they were not non-detectable due to dilution factors. Also, cis-1,2-dichloroethene was detected in Boring B10B at a concentration of 1,000 ppb. The analytical results collected to date indicate a source of TCE near B9. The vertical extent of TCE in groundwater, and the extent in soil, is undefined.

The deepest continuously cored borings completed to date were B-7 and B-9, which were cored to 32 feet below grade. Borings B-5 and B-10 were continuously cored to 20 feet below grade. In all of these borings, the subsurface conditions consisted predominantly of clayey to sandy silt, with occasional thin (several inches thick) gravely layers. Groundwater was slow to collect in the boreholes in sampling completed in August 2003, and may fluctuate significantly. Groundwater samples were collected in B-6 and B-5 in May 2003, at depths of 16 and 20 feet below grade, respectively. In August and September 2003, groundwater only collected in the boreholes at depths below 26 feet below grade, and was very slow to collect.

PROPOSED WORK

Based on the analytical results collected and evaluated to date, a scope of work is proposed to accomplish the following:

- vertical delineation of VOCs in groundwater and determination of permeability and soil conditions at previous boring B-9 (one boring),

- vertical delineation of VOCs in soil in the near vicinity of B-9 and attempt to locate any remaining on-site source in soil (four borings),

- vertical and lateral delineation of VOCs in groundwater and determination of permeability and soil conditions at the perimeter of the Property (three borings), and

- lateral delineation of VOCs in the first encountered groundwater, off-site (three borings).

The soil borings on the Property itself are proposed to be completed using the membrane interface probe (MIP), a system manufactured by Geoprobe Systems for the detection and measurement of Volatile Organic Compounds (VOCs) in the subsurface. In this system, a probe carrying a permeable membrane is advanced within the drilling rods or augers. At designated intervals, the probe membrane is heated which allows VOCs in the subsurface soils to cross the membrane, enter a carrier gas stream, and be carried to gas phase detectors at the top of the borehole for measurement. At the surface, total VOC readings are collected. In addition, an electrical conductivity log of the soils is generated, giving an indication of permeability, and allowing a determination of lithologic conditions.

It is anticipated that the information gathered will be used to investigate the feasibility of remedial measures, particularly injection methods. A certain amount of soil would be excavated to approximately 10 feet below grade upon completion of the owner's proposed oil changing facility, which also would presumably provide some remedial benefit.

The following sections describe each of the proposed phases of work:

Vertical Delineation of VOCs in Groundwater and Determination of Subsurface Lithology at B-9 (one boring, B-9B)

A soil boring will be advanced at the location of previous boring B-9, where the highest concentrations of TCE in groundwater discovered to date occur (240,000 ppb in a grab sample at approximately 28 feet). The boring will utilize the membrane interface probe (MIP) system. MIP sampling will be conducted at one-foot intervals, the closest resolution possible with the system. It is anticipated that the boring will be advanced to approximately 60 feet, to refusal, or until 15 to 20 feet of non-detectable concentrations of VOCs have been obtained. The total depth will be determined by field conditions. If a significant water-bearing zone is encountered with no VOC concentrations, sampling may be terminated.

Upon completion, a geoprobe/hollow stem auger boring will be installed to collect selected soil and groundwater samples for calibration of the total VOC data and the electrical conductivity data obtained with the MIP. The samples will be collected at areas that MIP sampling indicates significant contamination. The samples will be analyzed for VOCs by EPA Method 8010. Selected soil samples will also be analyzed by a geotechnical laboratory for hydrologic parameters to determine the feasibility of remediation.

All of the previous borings at the site collapsed over the last few feet upon withdrawal of the drilling rods. Because of this behavior, the small diameter (1.5-inch) of the rods used, and the low yield and slow recharge, cross-contamination of lower water-bearing zones is not anticipated to be a significant risk. If a significant water-bearing zone is indicated by MIP sampling, the confirmation sampling can be completed by using a dual-casing system. A larger diameter casing would be used to isolate upper water-bearing zones, and sampling equipment would be extended within it. The drill rig that the MIP system is mounted on is a dual geoprobe/auger rig.

Vertical Delineation of VOCs in Soil and Attempt to Locate On-site Source inVicinity of B-9 (four borings, B-9C through B-9F)

The MIP system will be used to investigate soil conditions in near proximity to B-9. Four borings will be advanced to approximately 10 feet in the vicinity of B-9. MIP sampling will be conducted at approximately one-foot intervals, the closest resolution possible with the system. If elevated concentrations of VOCs are encountered, a geoprobe will be used to collect soil samples. The boring locations and depths may be adjusted based on field conditions encountered.

Additional Vertical and Lateral Delineation of VOCs in Groundwater, On Site (three borings, B13 through B-15)

Three borings will be completed at the perimeter of the Property using the MIP system. It is anticipated that the borings would extend to approximately 45 feet below grade. The total depth will be modified based on field conditions, as described for boring B-9B. MIP sampling will be conducted at one-foot intervals, the closest resolution possible with the system. The sample intervals, boring locations and depths would be adjusted based on conditions encountered. Any areas encountered containing significant contamination or significant water-bearing zones would also be sampled.

It is recognized that in the vicinity of B-14, it is possible that at the first water-bearing zone, hydrocarbon contamination may be encountered in addition to TCE and its breakdown products. However, laboratory analytical data has already been obtained for the first water-bearing zone, and the hydrocarbons would not be expected to extend significantly below that zone, allowing a qualitative determination of TCE concentrations.

Lateral Delineation of VOCs in First Water, Off Site (three borings, B16 through B-18)

As significant VOCs are present in the first encountered groundwater at the downgradient perimeter of the Property, three off-site soil borings are proposed. These borings would be extended to the first encountered groundwater using a geoprobe, and grab groundwater samples would be collected. The samples would be analyzed for VOCs by EPA Method 8260. This analytical method will also provide downgradient delineation of BTEX and MTBE from the former use of the Property as a service station.

Other Tasks and Methodology

Prior to implementation of this work plan, approval would be obtained from the RWQCB and Mr. Mark Gomez of the OCEDA. Prior to drilling, a health and safety plan would be prepared. The boring locations would be marked with white paint and Underground Service Alert would be contacted. Drilling permits would be obtained from the Alameda County Department of Public Works. An encroachment permit would be obtained from the City of Oakland for the three off-site borings.

Any sampling tools reused on site will be decontaminated prior to reuse. All borings will be sealed using bentonite and neat cement grout. Tremie pipes will be installed in the boreholes to facilitate grouting. Any soil generated will be stored on site in a 55-gallon drum, prior to proper disposal. Any decontamination water or groundwater generated during drilling will be stored in a drum.

The results of this work would be summarized in a technical report. The report would be submitted to the RWQCB, and to the OCEDA.

If you have any questions regarding this work plan, please do not hesitate to contact our office.

Sincerely,
PIERS Environmental Services, Inc.

REGISTERED GEOLOGIST
JOEL G. GREGER
No. EG 1633
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

REGISTERED ENVIRONMENTAL ASSESSOR - II
NORMA K. PANNELL
No. 20236
Expires 5/04
STATE OF CALIFORNIA

Joel G. Greger
Senior Project Manager
CEG # EG1633, REA # 07079

Kay Pannell
Chief Operations Officer
REP #5800, REA-II #20236

Attachments

Tables 1A-1C, 2A, and 2B
Figures 1 through 6

cc: Mr. James Chung

TABLES

TABLE 1A
SOIL ANALYTICAL RESULTS
Former Service Station
2942 San Pablo Avenue, Oakland

Sample/ Depth (feet)	Date Sampled	TPH-g (ppm)	TPH-ss (ppm)	Benzene (ppm)	Ethylbenzene (ppm)	Toluene (ppm)	Xylenes (ppm)	MTBE (ppm)
B4 (1.5')	5/8/2003	1.38	NA	<0.005	<0.005	<0.005	0.012	<0.005
B5 (2')	5/8/2003	1.37	NA	<0.005	<0.005	0.013	0.013	<0.005
B5 (9.5')	5/8/2003	0.711	NA	<0.005	0.007	<0.005	<0.010	<0.005
B7 (1')	8/20/2003	12	6.5	0.0093	0.032	0.0053	0.18	<0.05
B7 (9.5')	8/20/2003	12	5.7	0.017	0.04	0.015	0.29	<0.05
B7 (14.5')	8/20/2003	2.7	1.4	<0.005	0.01	0.005	0.065	<0.05
Reg. Limit								
PRG - Res.				0.6	8.9	520	270	62
Cal.Mod.								17
PRG - Ind.				1.3	20	520	420	160
Cal.Mod.								36

EXPLANATION:
ppm = parts per million NA = not analyzed
TPHg/TPH-ss =Total Petroleum Hydrocarbons as gasoline/stoddard solvent.
PRG = Preliminary Remediation Goals, residentail/industrial

TABLE 1B
SOIL ANALYTICAL RESULTS
Former Service Station
2942 San Pablo Avenue, Oakland

Sample/ Depth (feet)	Date Sampled	TCE (ppm)	trans-1,2-DCE	cis-1,2-DCE
B7 (1')	8/20/2003	0.022	<0.01	<0.01
B7 (9.5')	8/20/2003	0.0057	<0.005	<0.005
B7 (14.5')	8/20/2003	0.074	1.4	<0.005
B9 (1.5')	8/20/2003	0.065	0.019	0.04
B10 (1.5')	8/20/2003	0.25	0.0065	0.029
B10B (3')	9/23/2003	0.022	0.11	0.24
B10B (6')	9/23/2003	0.046	0.016	0.11
B10B (9')	9/23/2003	0.54	<0.033	0.22
Reg. Limit				
PRG-Res.		0.053	69	430
PRG-Comm.		0.11	230	1,560

EXPLANATION:
ppm = parts per million
TCE = Trichloroethene
DCE = Dichloroethene

TABLE 2A
GROUNDWATER ANALYTICAL RESULTS
Former Service Station
2942 San Pablo Avenue, Oakland

Sample/ Depth (feet)	Date Sampled	TPH-g (ppb)	TPH-ss (ppb)	Benzene (ppb)	Ethylbenzene (ppb)	Toluene (ppb)	Xylenes (ppb)	MTBE (ppb)
B5	5/8/2003	5,310	NA	15.4/37	351/346	14	4.9	<0.5
B6	5/8/2003	277	NA	<0.5	0.9	0.9	6.9	11/11
B7	8/20/2003	4,900	650	3.6	22	6.5	100/120	<17
B8	8/20/2003	<50	<50	<0.5	<0.5	0.55	0.52	<5.0
B10B	9/23/2003	NA	NA	<25	<25	<25	<25	<25
Reg. Limit								
MCL				1	700	150	1,750	13
PRG	(tap water)			0.34	2.9	720	210	130
Cal. Mod. PRG	(tap water)							6.2

EXPLANATION:
ppm = parts per million

TPHg/ss =Total Petroleum Hydrocarbons as gasoline/stoddard solvent

TABLE 2B
GROUNDWATER ANALYTICAL RESULTS
Former Service Station
2942 San Pablo Avenue, Oakland

Sample/ Depth (feet)	Date Sampled	1,1-DCE (ppb)	cis-1,2-DCE	1,2-DCA (ppb)	TCE (ppb)
B5	5/8/2003	3	193	10	3,780
B7	8/20/2003	<100	<100	<100	2,500
B8	8/20/2003	<0.5	<0.5	<0.5	13
B9	8/20/2003	<2,500	<2,500	<2,500	240,000
B10B	9/23/2003	<25	1,000	<25	2,400
B11	9/23/2003	<25	<25	<25	570
B12	9/23/2003	<50	<50	<50	1,100
Reg. Limit					
MCL		10	6.0	0.5	5.0
PRG		340	61	0.12	0.028

EXPLANATION:
ppm = parts per million

DCE = Dichloroethene
DCA = Dichloroethane
TCE = Trichloroethene.

ANALYTICAL METHODS:
EPA Method 8260 or 8010.

FIGURES

IDENTIFIED HAZARDOUS MATERIALS SITES
RADIUS REPORT
Site Vicinity Map

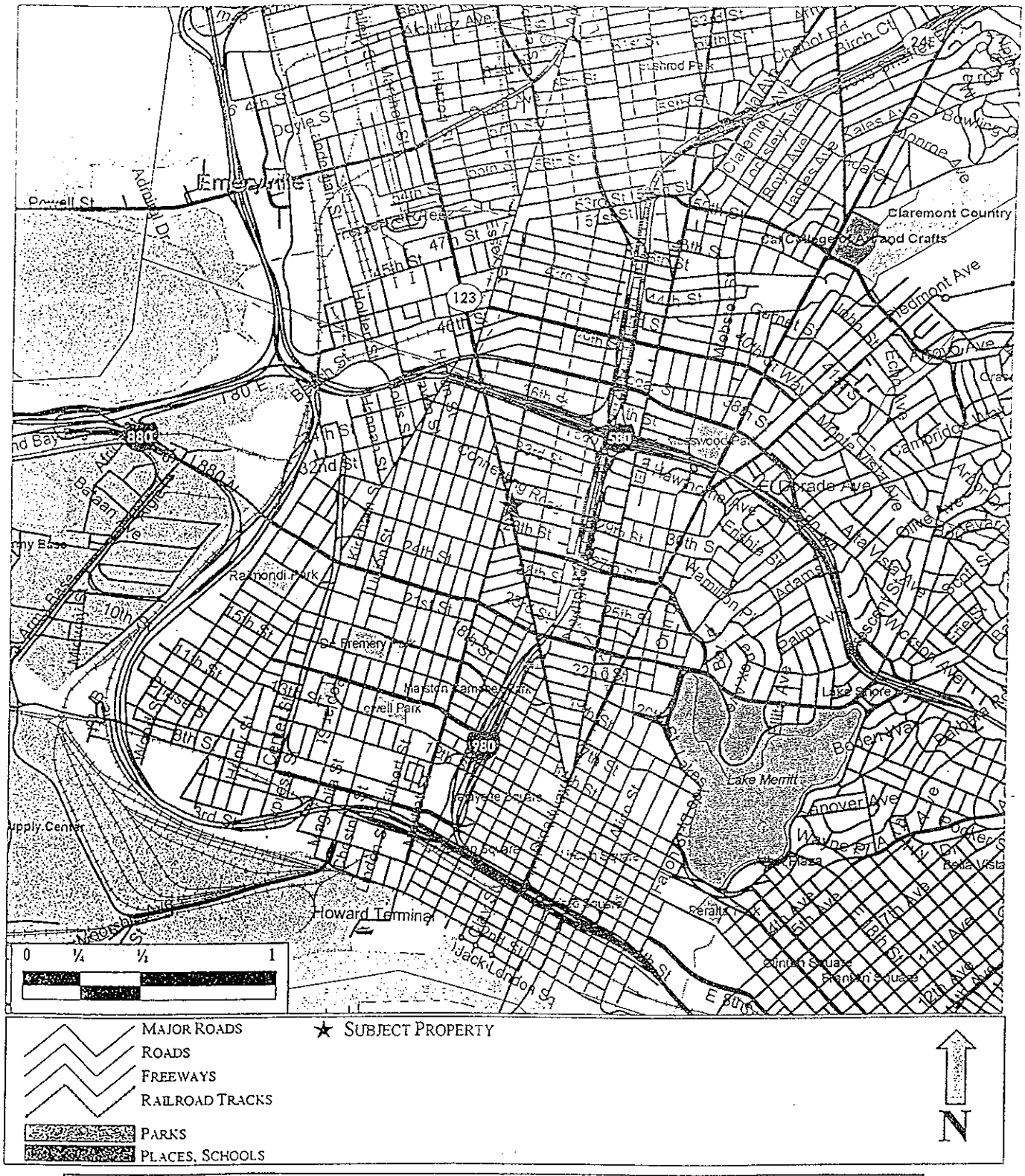


FIGURE 1

PROPERTY VICINITY MAP

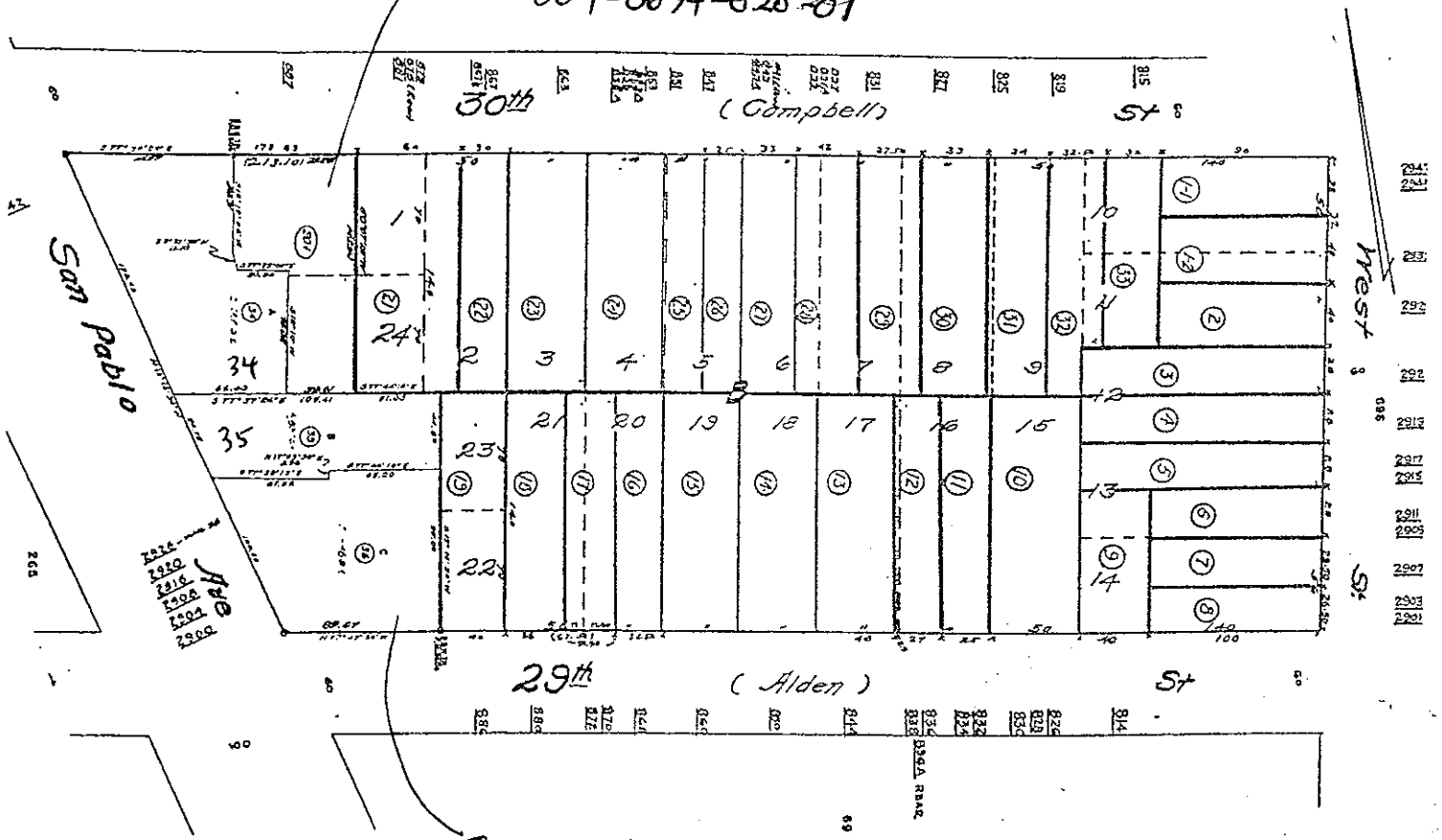
2926-2942 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

NOT TO SCALE
MAY 2002

Parcel Number:	009 -0694-034-00
Owner 1:	CHUNG, CHAE M & JUNG H
Owner 2:	
Phone:	(415)285-2713
Site Address:	2942 SAN PABLO AVE
Site City/State:	OAKLAND CA

Parcel Number:	009 -0694-035-00
* Owner 1:	CHUNG, CHAE M & JUNG H
Owner 2:	
Phone:	(415)285-2713
Site Address:	2926 SAN PABLO AVE
Site City/State:	OAKLAND CA

* Also own
887 30th St.
009-0694-020-01



John H. & Karen A Chung
4026 Third St. SF 94124
2900 San Pablo

FIGURE 2
PROPERTY PARCEL MAP

2926-2942 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

NOT TO SCALE
MAY 2003

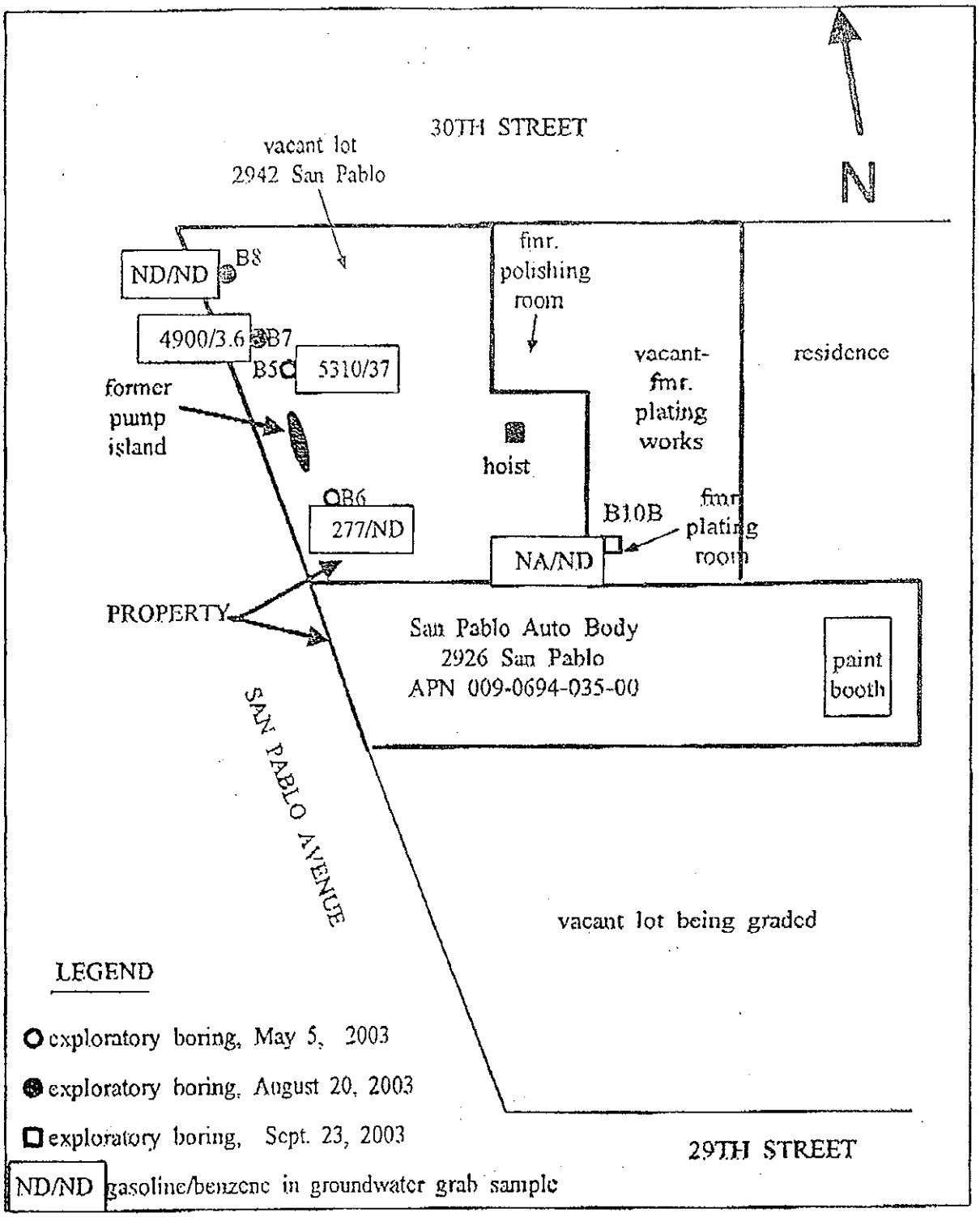


FIGURE 3

DISSOLVED HYDROCARBONS IN GROUNDWATER

2942 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

SCALE: 1" = 50'
OCTOBER 2003

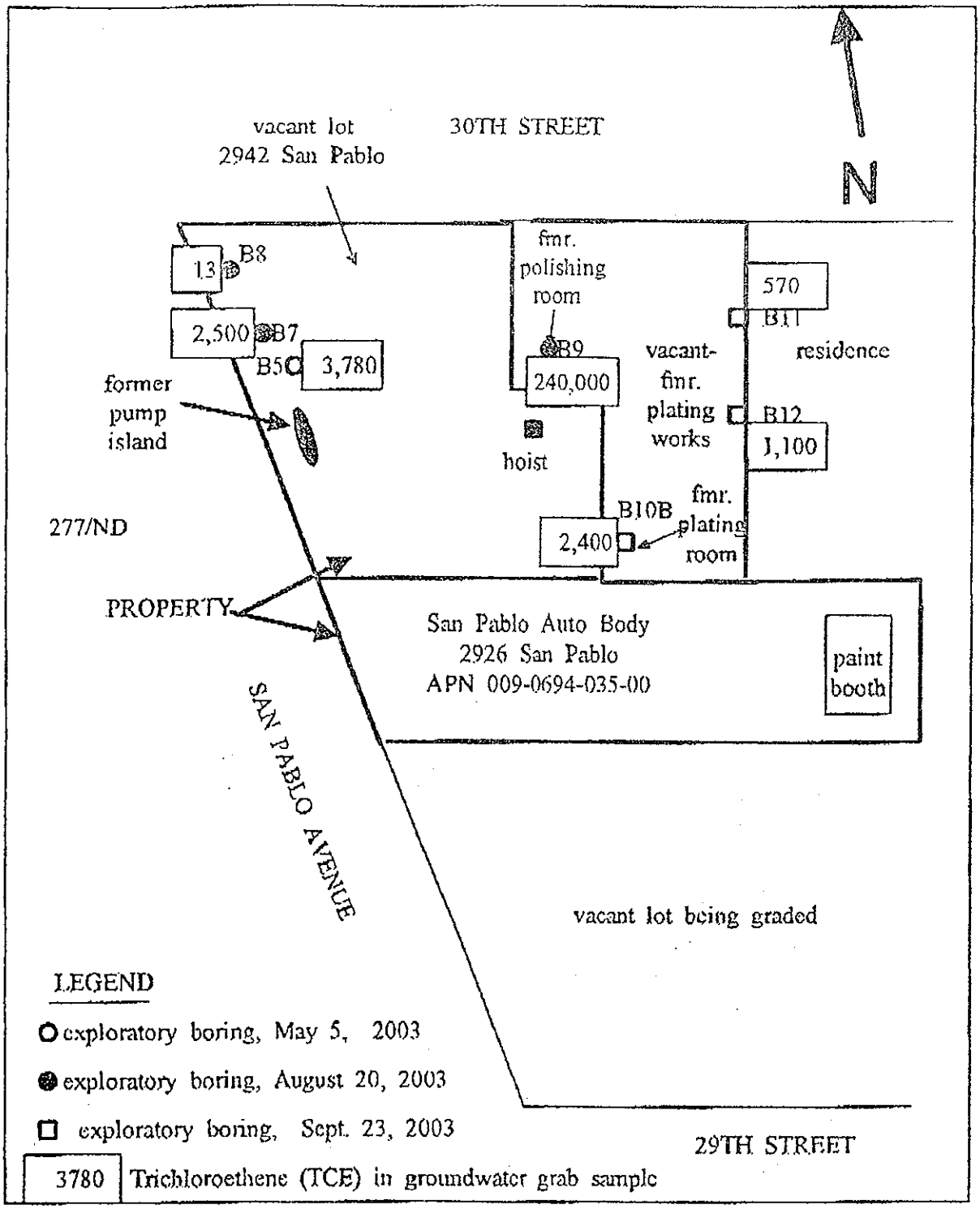


FIGURE 4
TCE IN GROUNDWATER

2942 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

SCALE: 1" = 50'
OCTOBER 2003

PIERS ENVIRONMENTAL SERVICES, INC. 1330 S. BASCOM AVE. SUITE F, SAN JOSE, CA 95128
PHONE: 408-559-1248 FAX: 408-559-1224 WWW.PIERSES.COM

ATTACHMENT A
LABORATORY ANALTYICAL DATA SHEETS
AND CHAIN OF CUSTODY

ATTACHMENT A
LABORATORY ANALTYICAL DATA SHEETS
AND CHAIN OF CUSTODY

McCampbell Analytical Inc.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Piers Environmental	Client Project ID: #03408; 2942 San Pablo	Date Sampled: 09/23/03
1330 S. Bascom Avenue, Ste. F		Date Received: 09/23/03
San Jose, CA 95128	Client Contact: Joel Greger	Date Extracted: 09/23/03
	Client P.O.:	Date Analyzed: 09/24/03-09/26/03

Halogenated Volatile Organics by P&T and GC-ELCD (8010 Basic Target List)*

Extraction Method: SW5030 Analytical Method: SW8021B Work Order: 0309425

Lab ID	0309425-003A	0309425-004A	0309425-005A		Reporting Limit for DF =1	
Client ID	B10 B(3')	B10 B(6')	B10 B(9')			
Matrix	S	S	S			
DF	4	1	6.7		S	W
Compound	**Concentration**				µg/Kg	µg/L
Bromodichloromethane	ND<20	ND	ND<33		5.0	NA
Bromoform	ND<20	ND	ND<33		5.0	NA
Bromomethane	ND<20	ND	ND<33		5.0	NA
Carbon Tetrachloride	ND<20	ND	ND<33		5.0	NA
Chlorobenzene	ND<20	ND	ND<33		5.0	NA
Chloroethane	ND<20	ND	ND<33		5.0	NA
2-Chloroethyl vinyl ether	ND<20	ND	ND<33		5.0	NA
Chloroform	ND<20	ND	ND<33		5.0	NA
Chloromethane	ND<20	ND	ND<33		5.0	NA
Dibromochloromethane	ND<20	ND	ND<33		5.0	NA
1,2-Dichlorobenzene	ND<20	ND	ND<33		5.0	NA
1,3-Dichlorobenzene	ND<20	ND	ND<33		5.0	NA
1,4-Dichlorobenzene	ND<20	ND	ND<33		5.0	NA
Dichlorodifluoromethane	ND<20	ND	ND<33		5.0	NA
1,1-Dichloroethane	ND<20	ND	ND<33		5.0	NA
1,2-Dichloroethane	ND<20	ND	ND<33		5.0	NA
1,1-Dichloroethene	ND<20	ND	ND<33		5.0	NA
cis-1,2-Dichloroethene	240	110	220		5.0	NA
trans-1,2-Dichloroethene	110	16	ND<33		5.0	NA
1,2-Dichloropropane	ND<20	ND	ND<33		5.0	NA
cis-1,3-Dichloropropene	ND<20	ND	ND<33		5.0	NA
trans-1,3-Dichloropropene	ND<20	ND	ND<33		5.0	NA
Methylene chloride	ND<20	ND	ND<33		5.0	NA
1,1,2,2-Tetrachloroethane	ND<20	ND	ND<33		5.0	NA
Tetrachloroethene	ND<20	ND	ND<33		5.0	NA
1,1,1-Trichloroethane	ND<20	ND	ND<33		5.0	NA
1,1,2-Trichloroethane	ND<20	ND	ND<33		5.0	NA
Trichloroethene	22	46	540		5.0	NA
Trichlorofluoromethane	ND<20	ND	ND<33		5.0	NA
Vinyl Chloride	ND<20	ND	ND<33		5.0	NA
Surrogate Recoveries (%)						
%SS:	103	111	112			
Comments						

* water and vapor samples and all TCLP & SPLP extracts are reported in µg/L, soil/sludge/solid samples in µg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content; k) reporting limit rasied due to insufficient sample amount.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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1102nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Piers Environmental	Client Project ID: #03408; 2942 San Pablo	Date Sampled: 09/23/03
1330 S. Bascom Avenue, Ste. F		Date Received: 09/23/03
San Jose, CA 95128	Client Contact: Joel Greger	Date Extracted: 09/29/03
	Client P.O.:	Date Analyzed: 09/29/03

Volatiles Organics by P&T and GC/MS (Basic Target List)*

Extraction Method: SW5030B Analytical Method: SW8260B Work Order: 0309425

Lab ID	0309425-006A
Client ID	B10
Matrix	Water

Compound	Concentration *	DF	Reporting Limit	Compound	Concentration *	DF	Reporting Limit
Acetone	ND<250	50	5.0	Benzene	ND<25	50	0.5
Bromobenzene	ND<25	50	0.5	Bromochloromethane	ND<25	50	0.5
Bromodichloromethane	ND<25	50	0.5	Bromoform	ND<25	50	0.5
Bromomethane	ND<25	50	0.5	2-Butanone (MEK)	ND<50	50	1.0
n-Butyl benzene	ND<25	50	0.5	sec-Butyl benzene	ND<25	50	0.5
tert-Butyl benzene	ND<25	50	0.5	Carbon Disulfide	ND<25	50	0.5
Carbon Tetrachloride	ND<25	50	0.5	Chlorobenzene	ND<25	50	0.5
Chloroethane	ND<25	50	0.5	2-Chloroethyl Vinyl Ether	ND<25	50	0.5
Chloroform	ND<25	50	0.5	Chloromethane	ND<25	50	0.5
2-Chlorotoluene	ND<25	50	0.5	4-Chlorotoluene	ND<25	50	0.5
Dibromochloromethane	ND<25	50	0.5	1,2-Dibromo-3-chloropropane	ND<25	50	0.5
1,2-Dibromoethane (EDB)	ND<25	50	0.5	Dibromomethane	ND<25	50	0.5
1,2-Dichlorobenzene	ND<25	50	0.5	1,3-Dichlorobenzene	ND<25	50	0.5
1,4-Dichlorobenzene	ND<25	50	0.5	Dichlorodifluoromethane	ND<25	50	0.5
1,1-Dichloroethane	ND<25	50	0.5	1,2-Dichloroethane (1,2-DCA)	ND<25	50	0.5
1,1-Dichloroethene	ND<25	50	0.5	cis-1,2-Dichloroethene	1000	50	0.5
trans-1,2-Dichloroethene	ND<25	50	0.5	1,2-Dichloropropane	ND<25	50	0.5
1,3-Dichloropropane	ND<25	50	0.5	2,2-Dichloropropane	ND<25	50	0.5
1,1-Dichloropropene	ND<25	50	0.5	cis-1,3-Dichloropropene	ND<25	50	0.5
trans-1,3-Dichloropropene	ND<25	50	0.5	Ethylbenzene	ND<25	50	0.5
Hexachlorobutadiene	ND<25	50	0.5	2-Hexanone	ND<25	50	0.5
Iodomethane (Methyl iodide)	ND<250	50	5.0	Isopropylbenzene	ND<25	50	0.5
4-Isopropyl toluene	ND<25	50	0.5	Methyl-t-butyl ether (MTBE)	ND<25	50	0.5
Methylene chloride	ND<25	50	0.5	4-Methyl-2-pentanone (MIBK)	ND<25	50	0.5
Naphthalene	ND<25	50	0.5	n-Propyl benzene	ND<25	50	0.5
Styrene	ND<25	50	0.5	1,1,1,2-Tetrachloroethane	ND<25	50	0.5
1,1,2,2-Tetrachloroethane	ND<25	50	0.5	Tetrachloroethene	ND<25	50	0.5
Toluene	ND<25	50	0.5	1,2,3-Trichlorobenzene	ND<25	50	0.5
1,2,4-Trichlorobenzene	ND<25	50	0.5	1,1,1-Trichloroethane	ND<25	50	0.5
1,1,2-Trichloroethane	ND<25	50	0.5	Trichloroethene	2400	50	0.5
Trichlorofluoromethane	ND<25	50	0.5	1,2,3-Trichloropropane	ND<25	50	0.5
1,2,4-Trimethylbenzene	ND<25	50	0.5	1,3,5-Trimethylbenzene	ND<25	50	0.5
Vinyl Acetate	ND<250	50	5.0	Vinyl Chloride	ND<25	50	0.5
Xylenes	ND<25	50	0.5				

Surrogate Recoveries (%)

%SS1:	115	%SS2:	104
%SS3:	91.7		

Comments: i

* water and vapor samples and all TCLP & SPLP extracts are reported in µg/L, soil/sludge/solid samples in µg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

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1330 S. Bascom Avenue, Ste. F			Date Received: 09/23/03
San Jose, CA 95128	Client Contact: Joel Greger		Date Extracted: 09/26/03-09/29/03
	Client P.O.:		Date Analyzed: 09/26/03-09/29/03

Halogenated Volatile Organics by P&T and GC-ELCD (8010 Basic Target List)*

Extraction Method: SW5030B | Analytical Method: SW8021B | Work Order: 0309425

Lab ID	0309425-001A	0309425-002A			Reporting Limit for DF =1	
Client ID	B12	B11				
Matrix	W	W				
DF	50	100			S	W
Compound	**Concentration**				µg/kg	µg/L
Bromodichloromethane	ND<25	ND<50			NA	0.5
Bromoform	ND<25	ND<50			NA	0.5
Bromomethane	ND<25	ND<50			NA	0.5
Carbon Tetrachloride	ND<25	ND<50			NA	0.5
Chlorobenzene	ND<25	ND<50			NA	0.5
Chloroethane	ND<25	ND<50			NA	0.5
2-Chloroethyl vinyl ether	ND<25	ND<50			NA	0.5
Chloroform	ND<25	ND<50			NA	0.5
Chloromethane	ND<25	ND<50			NA	0.5
Dibromochloromethane	ND<25	ND<50			NA	0.5
1,2-Dichlorobenzene	ND<25	ND<50			NA	0.5
1,3-Dichlorobenzene	ND<25	ND<50			NA	0.5
1,4-Dichlorobenzene	ND<25	ND<50			NA	0.5
Dichlorodifluoromethane	ND<25	ND<50			NA	0.5
1,1-Dichloroethane	ND<25	ND<50			NA	0.5
1,2-Dichloroethane	ND<25	ND<50			NA	0.5
1,1-Dichloroethene	ND<25	ND<50			NA	0.5
cis-1,2-Dichloroethene	ND<25	ND<50			NA	0.5
trans-1,2-Dichloroethene	ND<25	ND<50			NA	0.5
1,2-Dichloropropane	ND<25	ND<50			NA	0.5
cis-1,3-Dichloropropene	ND<25	ND<50			NA	0.5
trans-1,3-Dichloropropene	ND<25	ND<50			NA	0.5
Methylene chloride	ND<25	ND<50			NA	0.5
1,1,2,2-Tetrachloroethane	ND<25	ND<50			NA	0.5
Tetrachloroethene	ND<25	ND<50			NA	0.5
1,1,1-Trichloroethane	ND<25	ND<50			NA	0.5
1,1,2-Trichloroethane	ND<25	ND<50			NA	0.5
Trichloroethene	570	1100			NA	0.5
Trichlorofluoromethane	ND<25	ND<50			NA	0.5
Vinyl Chloride	ND<25	ND<50			NA	0.5
Surrogate Recoveries (%)						
%SS:	106	106				
Comments	*i*	*i*				

* water and vapor samples and all TCLP & SPLP extracts are reported in µg/L, soil/sludge/solid samples in µg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content; k) reporting limit raised due to insufficient sample amount.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

PRS

0300425

P.3

Oct 01 2003 10:03AM McCampbell Analytical, In 925-798-1622

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAY ☒

Report To: Joel Greger Bill To: Piers Environmental
Company: Piers Environmental
1330 S. Bascom Ave, Suite F
San Jose, CA 95128
Tele: (408) 559-1248 Fax: ~~(408) 559-1234~~ STO 757145
Project #: 03408 Project Name: 2942 San Pablo
Project Location: 2942 San Pablo Ave, Oakland
Sampler Signature: Joel Greger

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX: Water	Soil	Air	Sludge	Other	METHOD PRESERVED: Ice	HCl	HNO_3	Other
B1 ~~1 2 3~~	2942 San Pablo	9/23/03	10am	3	V	X					X	X		
B11 ~~1 2 3~~	↓	↓	1030Am	5	V	X					X	X		
B10B(3')			11am	1	L		X				X			
B10B(6')			↓	1	L		X				X			
B10B(9')				1	L		X				X			
B10 ~~B 1 2 3~~	↓	↓	5pm	2	V	X					X	X		

Analysis Request	Other	Comments
BTEX & TPH as Gas (602/8020 + 8015)/MTBE; TPH as Diesel (8015); Total Petroleum Oil & Grease (5520 E&F/B&F); Total Petroleum Hydrocarbons (418.1); EPA 601 / 8010; BTEX ONLY (EPA 602 / 8020); EPA 608 / 8080; EPA 608 / 8080 PCB's ONLY; EPA 624 / 8240 / 8260; EPA 625 / 8270; PAH's / PNA's by EPA 625 / 8270 / 8310; CAM-17 Metals; LUFT 5 Metals; Lead (7240/7421/239.2/6010); RCI	pH; TSS; Specific Conductivity	
X		
X		
X		
X		
X		
X		

Relinquished By:	Date:	Time:	Received By:
Joel Greger	9/23/03	6:33Am	Michelle Wallen

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
PRESERVATION ✓ APPROPRIATE
CONTAINERS ✓

VOAS	O&G	METALS	OTHER