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Environmental Technology, Inc.

ENVIRONMENTAL
PROTECTION
95 AUG 30 PM 2:29

August 29, 1995

Jennifer Eberle
Alameda County Department of
Environmental Health
UST Local Oversight Program
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

STID 3749

Re: ***Corrective Action Plan***
706 Harrison Street
Oakland, California

Dear Ms. Eberle:

Cambria Environmental Technology is pleased to submit this corrective action plan (CAP) for remediation system installation and operation at the site referenced above. We are submitting this CAP on behalf of Mr. Bo Gin, the property owner, in response to your recent request. The project objective is to remediate both soil and ground water as quickly as possible, to take advantage of dry soils before winter rains saturate the soil and raise the ground water table. Discussed below are the site background, previous investigations, site geology, hydrocarbon distribution, and our recommended corrective action plan. We also evaluate several remedial alternatives and present our recommended scope of work for implementing the corrective action plan

SITE BACKGROUND

Site Location: The site is located at the eastern corner of 7th Street and Harrison Street in Oakland, California (Figure 1). The boring and well locations are shown on Figure 2. Topography in the area slopes generally southward towards the Oakland Inner Harbor. The site is located about one-half mile west of Lake Merrit and one-half mile northeast of the Oakland Harbor.

Adjacent Hydrocarbon Sources: Six active or former gasoline service stations are located within one block of the site. Union 76 sites occupy the western corner of Harrison Street and Seventh Street and the southeast corner of Harrison Street and Eighth Street. A Texaco site occupies the western corner of Harrison Street and Eighth Street. An Exxon site occupies the western corner of Alice Street and Eighth Street. An Arco site occupies a lot on the east side of Alice Street between Seventh Street and Eighth Street. An active Shell site occupies the northern adjacent lot, immediately upgradient of the subject

site. Based on the most recent ground water analytic data, it appears that the adjacent, upgradient active Shell service station may be contributing hydrocarbons to the subject site.

PREVIOUS INVESTIGATIONS AT THE 706 HARRISON SITE

August 1988 Soil Borings: In August 1988, Frank Lee and Associates of Fremont, California drilled seven onsite soil borings to a maximum depth of 20 ft. A maximum of 19 parts per million (ppm) total petroleum hydrocarbons and 0.83 ppm benzene were detected in a composite soil sample collected from a boring drilled adjacent to the existing USTs, located at the southwestern corner of the site.

January 1991 Tank Removals: In January 1991, Tank Protection Engineers of Union City, California removed four 1,000-gallon gasoline USTs, two 6,000-gallon gasoline USTs, and one waste oil tank. Up to 9,400 ppm total petroleum hydrocarbons as gasoline (TPHg) and 75 ppm benzene were detected in the confirmation soil samples collected.

February 1993 Overexcavations: In February 1993, Dennis Bates and Associates (DBA) of Monterey, California overexcavated an unspecified volume of hydrocarbon-bearing soil from three excavations in the vicinity of the former UST locations. Since they did not shore the excavations, they were unable to remove all of the hydrocarbon contaminated soil. A soil sample collected at 16 ft depth contained 4,300 ppm TPHg and 66 ppm benzene.

July 1993 Monitoring Well and Soil Vapor Extraction Well Installation: In July 1993, DBA installed monitoring wells MW-1, MW-2 and MW-3 and soil vapor extraction wells VW-1 and VW-2. Maximum concentrations of 6,000 ppm TPH-G and 210 ppm benzene were detected in the 17 ft depth soil sample collected from VW-2.

December 1993 Soil Borings: In December 1993, DBA collected shallow soil samples from a former pump island location. A maximum of 17 ppm organic lead was detected in a soil sample collected from two ft depth.

April 1994 Soil Vapor Extraction Test: In April 1994, Remediation Testing and Design (RTD) of Santa Cruz, California conducted a soil vapor extraction (SVE) feasibility study. Up to 8,353 parts per million by volume (ppmv) TPHg were detected in the vapor samples analyzed onsite using a Beckman Model 400 Total Hydrocarbon Analyzer with a flame ionization detector (FID). The vapor sample analyzed at an analytic laboratory contained only 21 ppm TPHg, which is not considered representative for wells

with free product and high FID readings. Because the test was performed during seasonally high water table conditions when the well screens were submerged by the water table, the SVE testing extracted ground water from wells VW-1 and VW-2 at about 0.2 gallons per minute each. RTD concluded that soil vapor extraction was an effective remedial alternative for this site, especially if it is conducted after the water table declines and exposes the well screen.

November 1994 Investigation and SVE Well Installation: Between November 28 and December 2, 1994, *Cambria* drilled nine soil borings and installed four ground water monitoring wells and three combination soil vapor extraction/air sparging wells at the site. Up to 15,000 ppm TPHg were detected in soil samples collected at the water table from four of the nine borings. TPHg, as high as 410 ppm, were detected in the vadose zone at 11 ft depth in boring SB-C/VW-3.

Up to 2,500 parts per billion (ppb) TPHg and 32 ppb benzene were detected in ground water samples collected from onsite wells. No TPHg were detected in ground water samples collected from offsite monitoring wells MW-5 through MW-7. Ground water depth was about 17 ft and flows toward the southwest.

HYDROCARBON DISTRIBUTION AND SITE HYDROGEOLOGY

Hydrogeology: The unsaturated and saturated soil consists primarily of moderate to high permeability sand, silty sand, and sandy silt with varying proportions of clay. According to the limited data, the ground water depth fluctuates between 17 and 20 ft annually. According to the December 29, 1994 ground water elevation data, the ground water gradient is about 0.009 ft/ft and flows toward the southwest (Figure 3).

Hydrocarbons in Soil: Most of the hydrocarbon source in soil was excavated during the tank removal and overexcavation activities. However, residual hydrocarbons remained beyond the limits of the excavation along Harrison Street since additional unshored excavation was not possible without soil sloughing from beneath the street. Based on historical analytical results and *Cambria*'s most recent investigation, it appears that the remaining hydrocarbons in soil are restricted to the western side of the property, primarily near the water table at a depth of 15 to 20 ft (Figure 4). Soil analytic results from previous investigations are included in Attachment A. The highest TPHg concentrations in soil were 15,000 ppm at 17.5 ft depth in the boring for well VW/SP-4, and 14,000 ppm at 18 ft depth in the boring for well VW/SP-3. Nonetheless, photo-ionization detector (PID) measurements during the recent well installation also indicate the presence of hydrocarbons in soil well above the water table and close to the

ground surface. (This is common for sites underlain by sandy soil). Since no hydrocarbons were detected in soil during installation of upgradient well MW-4, no onsite upgradient hydrocarbon source in soil is apparent. Separate-phase hydrocarbons (SPHs) detected intermittently in wells VW-1 and VW-2 indicate the presence of significant hydrocarbons in the capillary fringe near the western side of the property. SPHs have been removed with Soakease absorbent materials during the past 2 years.

Hydrocarbons in Ground Water: Based on limited analytic data and SPH data, hydrocarbon concentrations in ground water are highest beneath the former tank location on the western side of the property. Benzene concentrations in ground water are shown in Figure 5. Although SPHs were detected in VW-1 and VW-2 during the SVE testing, we have no additional SPH data from this site. Hydrocarbons are detected in all site ground water monitoring wells except MW-3. Based on the distribution of hydrocarbons in onsite soil and ground water and the southwestern ground water flow direction, hydrocarbons may extend offsite a limited distance to the southwest beneath Seventh Street. Although no hydrocarbons were detected in soil samples collected from well MW-5, low concentrations of benzene and xylenes were detected in the ground water samples collected from this well. No hydrocarbons were detected in ground water monitoring wells MW-6 and MW-7.

Cambria installed monitoring well MW-4 upgradient of the potential onsite hydrocarbon sources and immediately downgradient of the adjacent Shell service station to investigate the possibility of an upgradient hydrocarbon source. Concentrations of 2,500 ppb TPHg and 32 ppb benzene were detected in ground water sampled from upgradient well MW-4, and may suggest that the upgradient active Shell service station is contributing dissolved hydrocarbons onto the subject site.

REMEDIATION GOALS

Since the subject property is located in Oakland, the Alameda County Department of Environmental Health (ACDEH) is the lead regulatory agency in overseeing site characterization and in establishing remediation goals and in monitoring cleanup. The ACDEH uses site specific considerations and risk criteria in establishing cleanup standards. However, in the absence of these site specific considerations, their "default" cleanup standards require that gasoline impacted soil be remediated to below detection limits for total petroleum hydrocarbons as gasoline (TPHg) and benzene, using typical industry detection limits of one ppm for TPHg and 0.05 ppm for benzene. Ground water is often required to be remediated to Department of Toxic Substances Control (DTSC) maximum contaminant levels for drinking water. Although no drinking water standards have been established for TPHg, the benzene drinking water standard is 0.001 ppm.

The ACDEH allows use of either these conservative default standards, or flexible, risk-based decision criteria to establish cleanup standards for soil. They allow risk-based decisions because they recognize that no two sites are identical since site characteristics such as ground water usage, site stratigraphy, ground water depth and flow direction vary greatly between sites, resulting in varying risk to ground water resources and to human exposure. Hydrogeologic considerations they use in establishing soil cleanup standards include soil permeability and heterogeneity, ground water depth, infiltration rates, the presence or absence of vertical channeling and the mobility of the released compounds in soil and ground water. Once adequate soil and ground water analytic data is collected and the potential human exposure pathways are determined, appropriate soil cleanup levels can be negotiated with the ACDEH. The primary factor that they will consider in establishing the soil cleanup goals is the potential threat that the residual hydrocarbons present to ground water.

The ACDEH uses a similar risk-based approach in establishing ground water cleanup goals. They consider the site hydrogeology, the contaminant properties, the location of nearby human receptors and the projected future land use in evaluating the potential for human exposure to the released compounds. The results of the soil and ground water investigation activities are used as inputs to this risk-assessment process to determine the site specific cleanup goals for ground water. If a risk-based decision process is not used to determine site specific cleanup goals for this site, then the drinking water standards described above are likely to be used as ground water cleanup standards.

In addition to these risk-based approaches, the ACDEH also uses an alternative approach recently approved by the Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) in regulating site cleanup. The new closure program, called the Non-Attainment Area (NAA) policy, is enjoying increased use among Bay Area regulatory agencies including the ACDEH. The program is based on the RWQCB's recognition that extensive cleanup efforts are not always necessary or cost-effective to protect the state's ground water resources. The RWQCB has established two categories of sites where case closure may be granted: I) sites with ground water and soil contamination that present limited risk to the environment and human health, and II) sites where the approved remediation program has not resulted in compliance with state water quality objectives. The program allows the establishment of alternative compliance points such as property lines or the existing plume boundaries if all of the following criteria are met:

- Adequate characterization has fully defined the site stratigraphy and has demonstrated that the plume is not and will not migrate either horizontally or vertically,

- The source material (usually unsaturated soil beneath/adjacent to the source) has been undertaken,

- Available technologies will be unable to significantly improve ground water conditions, and

- An acceptable plan is submitted for containing and managing remaining risks posed by the residual contaminants in ground water.

Based on our familiarity with this program and on our preliminary understanding of the site conditions, the 706 Harrison Street site is a strong candidate for closure under this program, and the following remediation plan is designed to satisfy the NAA closure requirements. NAA for closure

RECOMMENDED CORRECTIVE ACTION PLAN AND EVALUATED ALTERNATIVES

Since the subsurface soil consists of moderate and high permeability materials, combined SVE and air sparging should prove to be the most cost-effective and fastest remedial technique. SVE will remediate the unsaturated soils while the air sparging will remediate the saturated zone. Air sparging is especially effective since it strips hydrocarbons from ground water, enhances air flow in the capillary fringe, and stimulates insitu biodegradation of hydrocarbons by supplying oxygen to indigenous microbes.

This SVE/air sparging approach was also recommended by RTD after they performed feasibility testing in April 1994. RTD recommended installing three SVE/air sparging wells, and also operating a vacuum extraction system to extract soil vapor from VW-1 and VW-2. *Cambria* installed the three additional SVE/air sparge wells (VW/SP-3, VW/SP-4 and VW/SP-5) in November 1994. The newly installed SVE wells are screened ten ft above the ground water table and the ground water sparge wells ten ft below. Based on the relatively high estimated permeability of the vadose zone soils and the additional well screen, we anticipate significantly greater vapor flow and vacuum influence from these new wells than RTD observed during their testing of VW-1 and VW-2. Flow from the new wells should also be higher because the VW-1 and VW-2 well screens were flooded during the earlier testing because of the seasonably high water table. Vapor extraction from VW-1 and VW-2 when the water table is lower should yield better vapor flow and vacuum influence than that observed during the earlier testing. Vacuum influence results were inconclusive during the RTD testing. Assuming an estimated radius of influence for each well of at least 20 ft, the existing wells should allow sufficient remediation of the hydrocarbon-bearing soil and ground water.

Although RTD recommended using a drop tube to extract ground water in addition to soil vapor, this will require costly ground water treatment and disposal, and more costly vapor extraction equipment and electrical usage. Also, ground water extraction will not be needed since our recommended air sparging system will remediate ground water. Furthermore, the new SVE wells should allow sufficient vapor flow in the vadose zone without the need for significant flow from wells VW-1 and VW-2. Last, ground water extraction is not recommended because it is generally ineffective in reducing dissolved hydrocarbon concentrations, and because it would increase the flow of hydrocarbons from the upgradient Shell station onto the subject site.

RECOMMENDED CORRECTIVE ACTION SCOPE OF WORK

After researching the available utilities and permit requirements for the subject site, *Cambria* recommends implementing the following corrective action plan according to the following sequence of tasks:

Task 1. Air Sparge Well Testing
Task 2. System Permitting
Task 3. System Installation
Task 4. Treatment Equipment, Operation, and Reporting

The corrective action plan layout is shown in Figure 6. Task 1 involves brief air sparge testing to allow proper selection of cost-effective air sparge equipment, and to evaluate the equipment effectiveness for air sparging. For the remaining tasks, *Cambria* recommends using a single SVE treatment system that will operate cost-effectively during the full duration of the project. Based on our experience with several other remediation projects with similar high vapor-phase hydrocarbon concentrations in fairly permeable soils, we recommend using a combined thermal/catalytic oxidizer capable of treating the initially high hydrocarbon concentrations in thermal mode, and the lower concentrations over the remainder of the project in catalytic mode. This should be appropriate for this site since the feasibility test detected vapor-phase hydrocarbon concentrations about 10,000 ppmv, which is typical for sites with a history of separate-phase hydrocarbons.

Cambria does not recommend installing any additional wells at this time because the existing site wells should sufficiently influence the area of concern. We anticipate that three to six months of system operation may remediate the site to acceptable levels.

Task 1. Air Sparge Well Testing

To select the most cost-effective and most appropriate air sparge system we recommend testing the air sparge wells. This brief testing would evaluate the air pressure required to inject 5 to 10 scfm of air into each well. If the air pressure required to inject air is about 15 psig or less a positive-displacement blower would be the most cost-effective air sparging equipment. If the air pressure is greater than 15 psig then a reciprocating piston-type air compressor would be more appropriate.

Task 2. System Permitting

The City of Oakland Building Department will require a permit for electrical service at the site, for an approximate fee of $100. The Oakland Fire Department will require an approximate fee of $300 for inspection of the propane tank and system. The Bay Area Air Quality Management District (BAAQMD) will require a permit for the system, which includes a total $496 fee. The City of Oakland will not impose additional requirements unless a system pad or fence greater than 6 ft tall is installed.

Task 3. System Installation

Task 3.a) System Piping and Enclosure

This task involves installing air sparge and vapor extraction piping from the wells to the treatment area. Our recommended design includes flow meters on each air sparge line and ports for flow meters within each vapor extraction line. All piping will slope downwards towards the wells to allow entrained water to drain back to the well. A 6 ft tall fence will enclose the treatment equipment and manifolded piping in the treatment equipment area.

Task 3.b) Electrical

Since electrical service is available beneath the sidewalk adjacent to the site, the most cost-effective electrical service will involve stubbing an electrical conduit inside the existing underground electrical vault from the treatment area. 100 amp, 230 volt single-phase service is sufficient to operate the SVE and air sparge system.

Task 4. Treatment Equipment, Operation and Reporting

Task 4.a) SVE Equipment

Based on the vapor-phase concentrations of about 10,000 ppmv during SVE testing, and assuming a total system flow rate of at least 100 scfm from the new wells and previously tested wells VW-1 and VW-2, the SVE system should be capable of extracting and treating about 320 pounds per day (ppd) of hydrocarbons initially. Although RTD recommended a SVE system capable of treating about 120 ppd based on their SVE test results, the three newly installed SVE/air sparging wells will allow significantly higher removal rates, closer to the 320 ppd estimate. Therefore, we recommend installing a treatment system that is cost effective both for the anticipated initial removal rate, and for the lower hydrocarbon removal rates anticipated towards the middle and end of the system operation. System operation could last up to six months or longer depending on hydrocarbon desorption from subsurface materials and the degree to which rain infiltration slows the remediation effort. Last, the SVE treatment system will include automatic dilution to allow the system to automatically optimize as the vapor-phase concentrations change during system operation.

Task 4.b) Air Sparging Equipment

If the air pressure required to inject air is about 15 psig or less based on the air sparge testing, we recommend installing a positive-displacement blower as the most cost-effective air sparging equipment. If the air pressure is greater than 15 psig then installing a reciprocating piston-type air compressor would be more appropriate. The equipment should include an air filter, silencers, particle filters, a pressure relief valve, and allow flow control between individual air sparge wells.

Task 4.c) Startup & Initial Monitoring

This task involves installation of the SVE and air sparge equipment and connection to utilities. The startup will also consist of performing startup testing as required by the BAAQMD, and as necessary to optimize remedial effectiveness. This includes measuring concentrations, flow rates and pressures within each well, and vapor concentrations entering the SVE treatment system.

Task 4.d) Operation and Maintenance

This includes all labor and supplies to perform monthly O&M of the SVE and air sparge system.

Task 4.e) Reporting

We recommend quarterly reporting of the remediation system performance. This reporting could accompany a ground water monitoring report if performed.

Task 4.f) Analytic Costs

This task includes all analytic costs required by BAAQMD permits.

OPTIONAL GROUND WATER MONITORING

not optional

To satisfy the regulatory requests and to evaluate the performance of the corrective action, we recommend performing ground water monitoring quarterly during the implementation of the corrective action plan. Once the corrective action plan has ended, a less frequent monitoring schedule, such as once or twice annually, would be more appropriate. Each monitoring event would involve measuring depth to water and collecting ground water samples from the 7 site wells for submittal to a California-certified laboratory for TPH-G and benzene, ethylbenzene, toluene, and xylenes (BETX) analyses. A brief report after each sampling should be submitted that outlines sampling methodology, presents the analytic results, and describes the ground water flow direction and distribution of dissolved hydrocarbons. This report could include performance data for the remediation system.

Ms Jennifer Eberle
August 29, 1995

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CLOSING

This corrective action plan is designed to satisfy the remediation objectives of the Alameda County Department of Environmental Health. Since the property owner would like to implement corrective action before the winter rains, please review and approve this corrective action plan at your earliest convenience. Please feel free to contact us if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

David Elias
Project Geologist

Bob Clark-Riddell, PE
Principal Engineer

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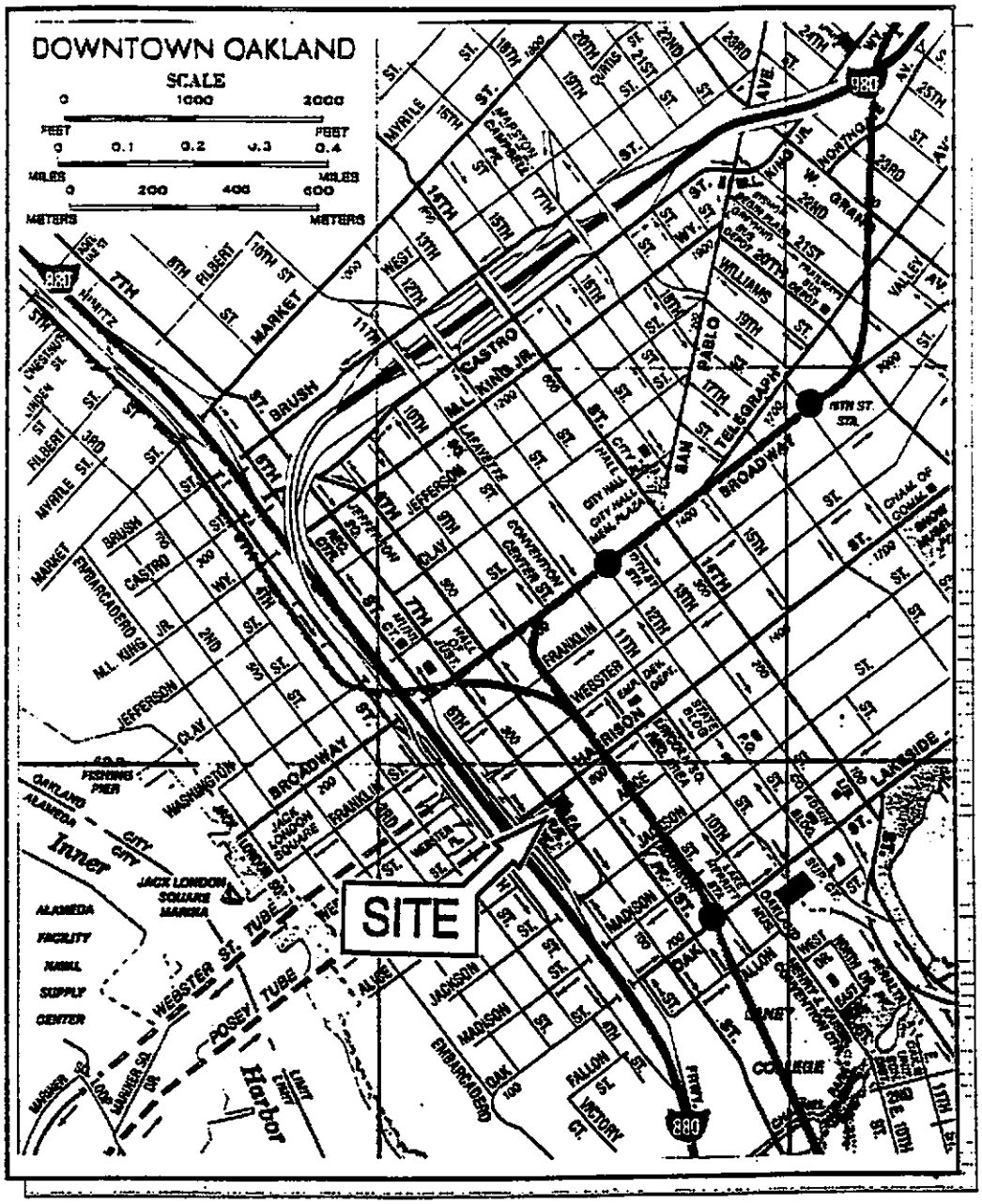
Figures
1 - Site Location Map
2 - Boring and Well Location Map
3 - Ground Water Elevation Map
4 - TPHg Concentrations in Soil at 10 - 20 ft Depth
5 - Benzene Concentrations in Ground Water
6 - Corrective Action Plan Layout

Attachment:
A - Analytic Data for Soil
B - Analytic Data for Ground Water
C - Boring Logs and Well Construction Details

cc: Mr. Bo Gin
Oakland Auto Parts and Tires
288 11th Street
Oakland, California 94706



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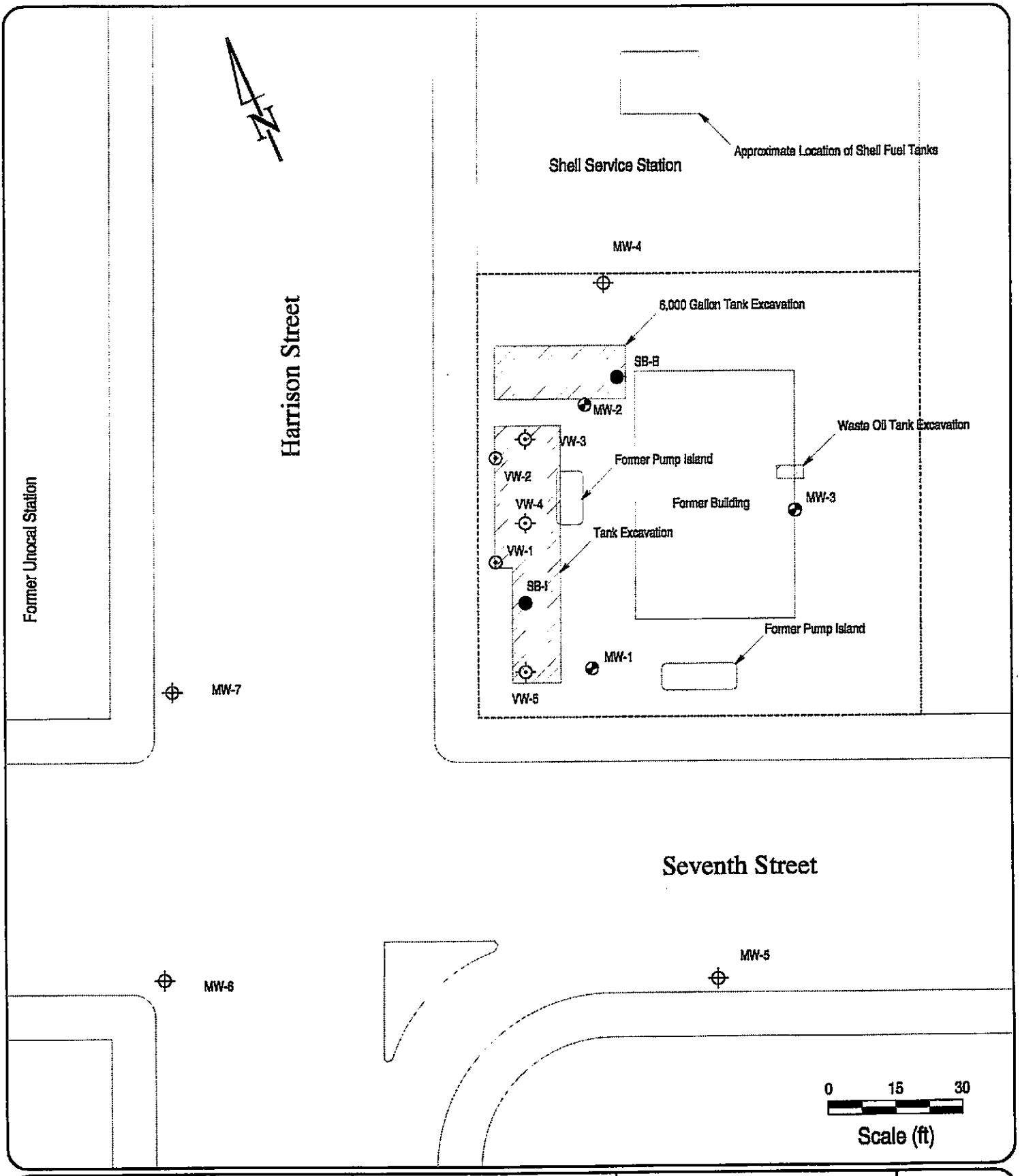
Site Location Map

Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
1



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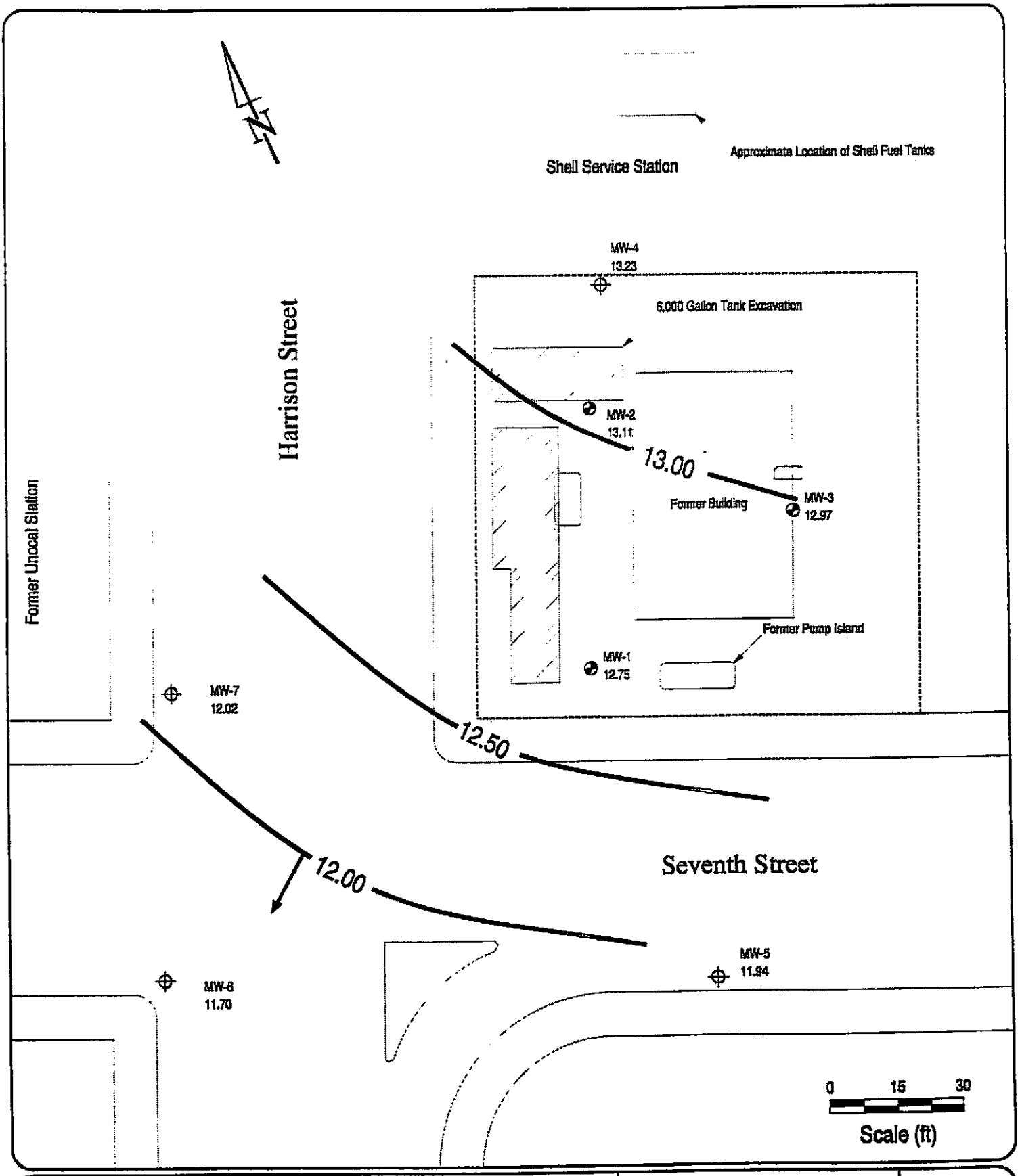
- New Ground Water Monitoring Well
- New SVE/Sparging Well – Cambria's
- New Soil Boring
- Previously Installed Monitoring Well
- Previously Installed SVE Well

Well and Boring Locations

Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
2



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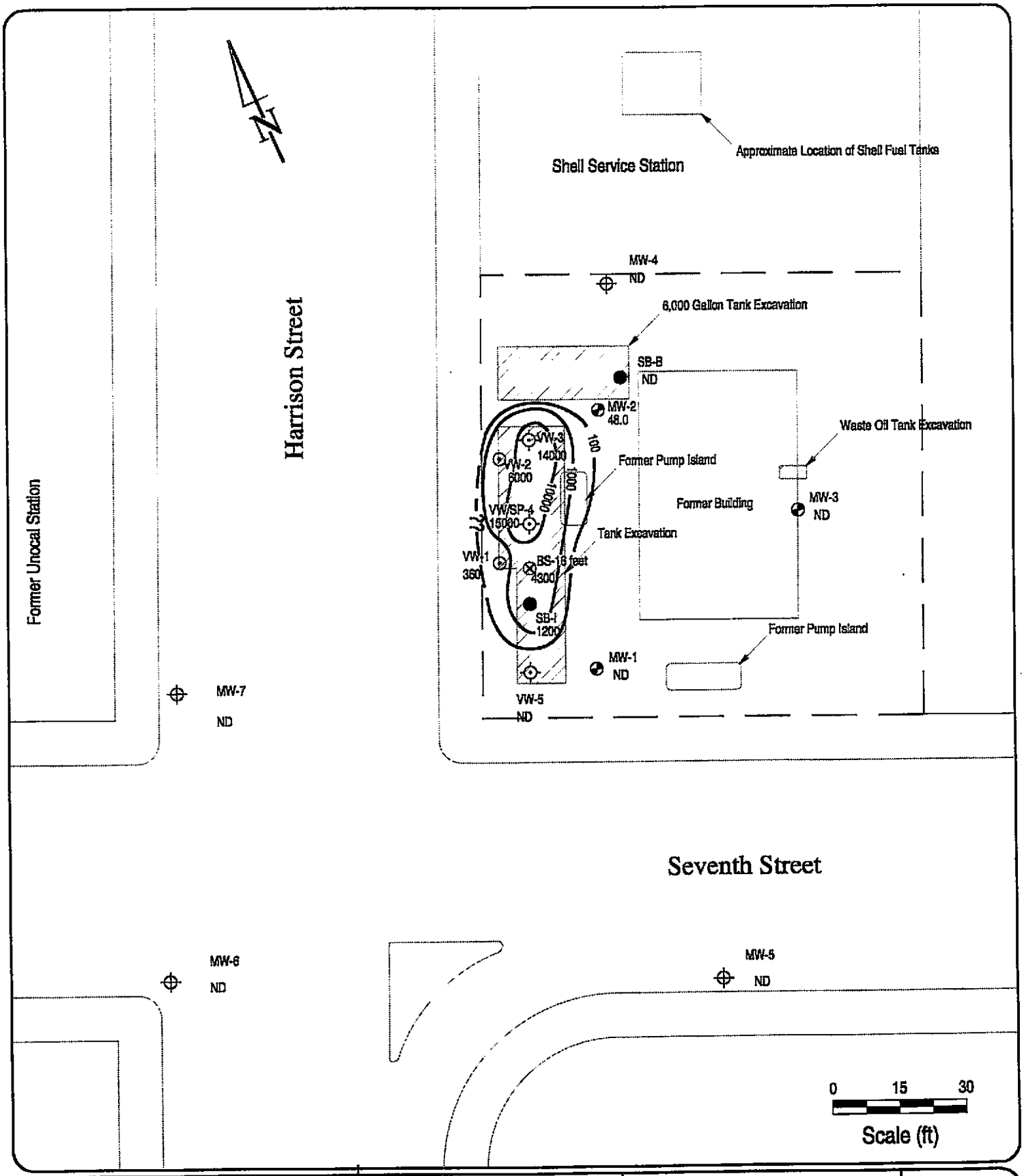
⊕ New Ground Water Monitoring Well
◐ Previously Installed Monitoring Well
XXX Ground Water Elevation (ft above msl)
← Ground Water Flow Direction

Ground Water Elevation
December 29, 1994

Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
3



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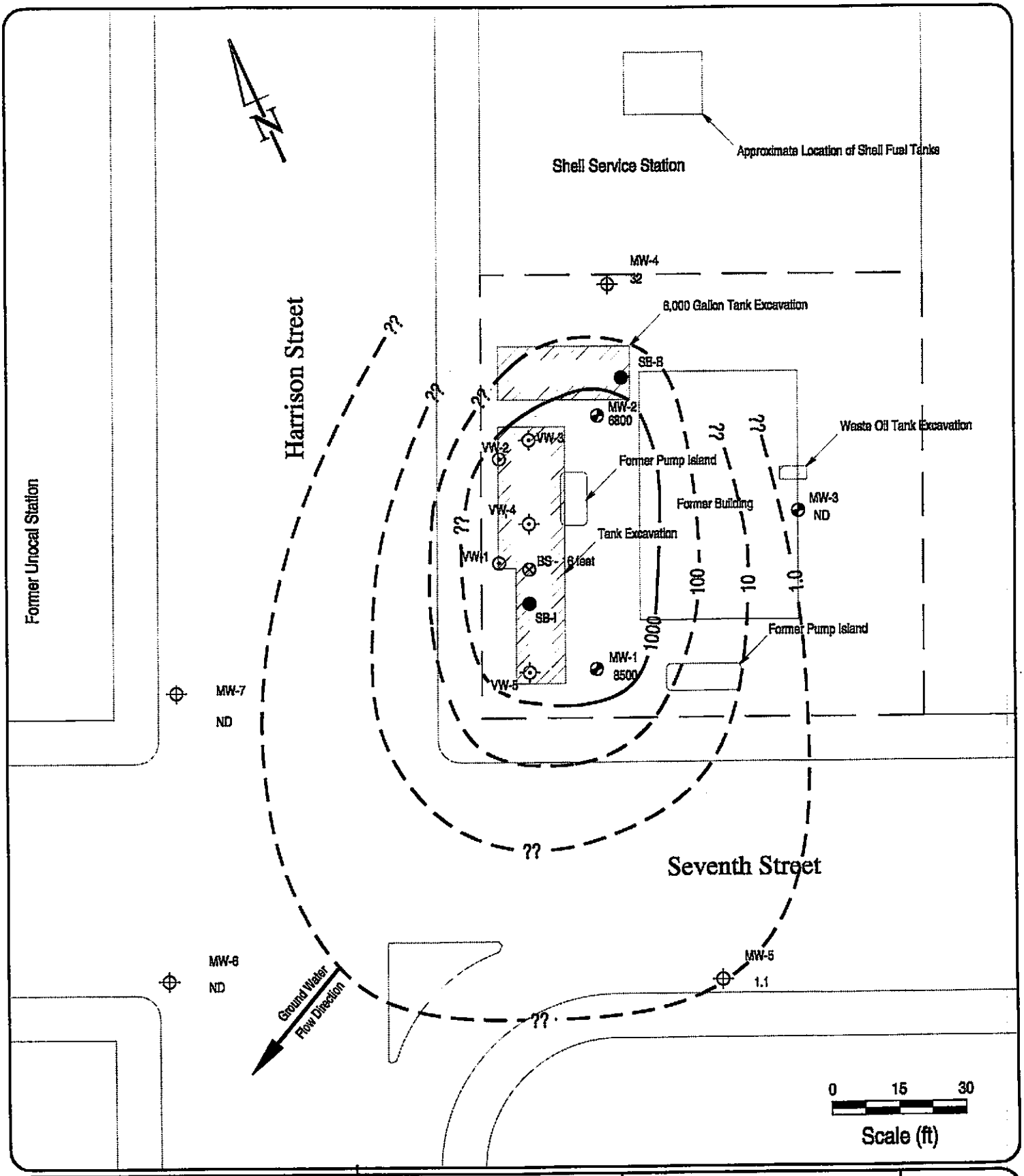
ND	No TPHg Detected
⊕	New Ground Water Monitoring Well
⊙	New SVE/Sparging Well
●	New Soil Boring
◒	Previously Installed Monitoring Well
⊙	Previously Installed SVE Well
⊗	Bottom Sample
⌒	TPHg Concentration Contour
XXXX	TPHg Concentration in Soil

TPHg Concentrations in Soil
at 10-20 Depth
Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
4



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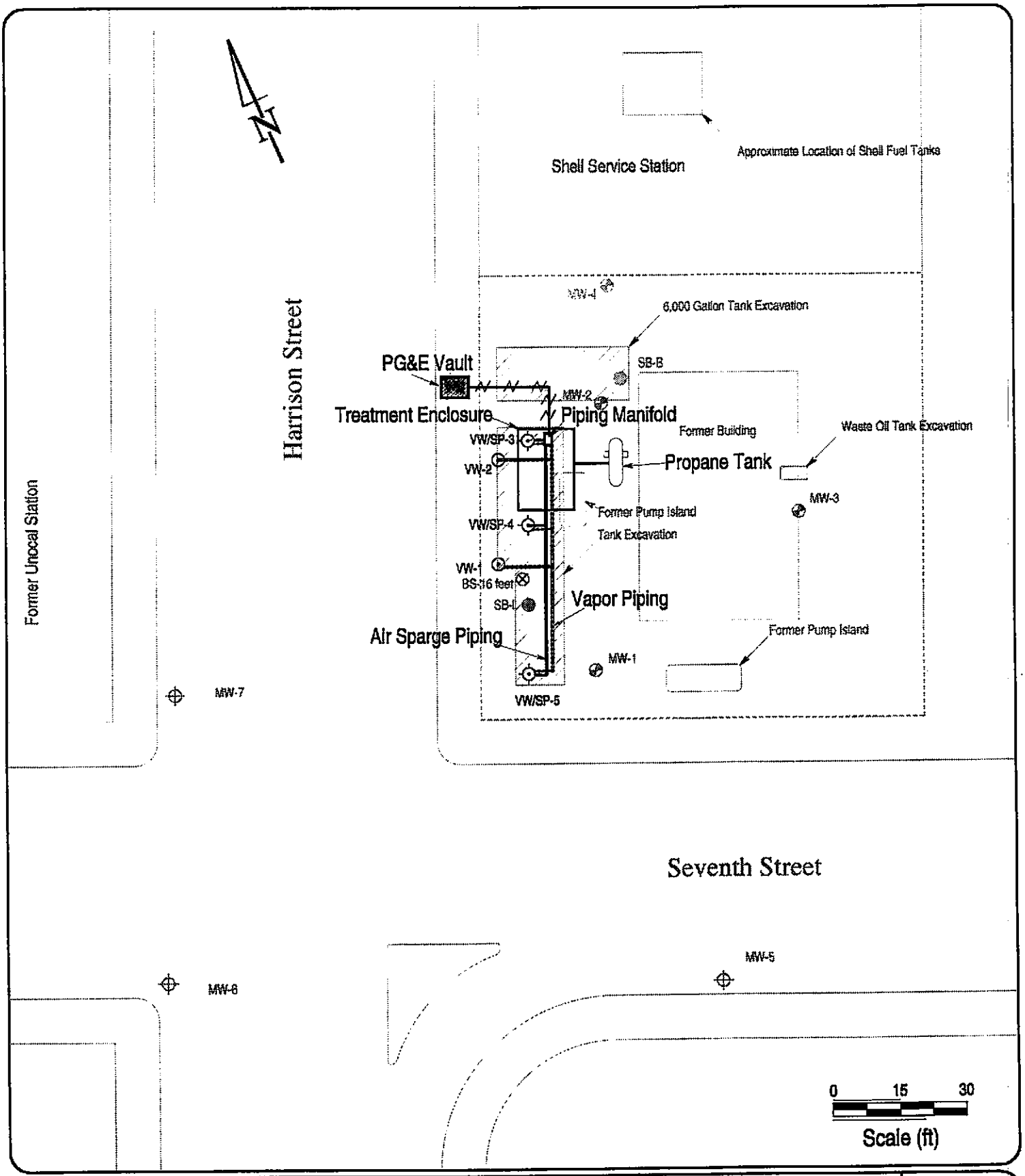
ND	No Benzene Detected
⊕	New Ground Water Monitoring Well
⊙	New SVE/Sparging Well
●	New Soil Boring
◒	Previously Installed Monitoring Well
⊙	Previously Installed SVE Well
⊗	Bottom Sample
⌒	Benzene Concentration Contour
XXXX	Benzene Concentration in Water (ppb)

Benzene Concentrations in Ground Water
Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
5



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- New Ground Water Monitoring Well
- New SVE/Sparging Well
- Bottom Sample
- New Soil Boring
- Previously Installed Monitoring Well
- Previously Installed SVE Well

Corrective Action Plan
Layout
Former Arco Station
706 Harrison Street
Oakland, California

FIGURE
6

Attachment A

Analytic Data for Soil

Table 2

Analytical Results for Soils

Total Recoverable Petroleum Hydrocarbons (TRPH)
Total Lead (Pb)
TPH as Gasoline (TPHg)
Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX)

Date Sampled: 22/23 July 1993
All Results Reported in PPM (mg/kg)

WELL	DEPTH	TRPH	PB	TPHg	B	T	EB	X
MW-1	5	NA	ND	ND	ND	ND	ND	ND
	10	NA	ND	ND	ND	ND	ND	ND
	15	NA	ND	ND	ND	ND	ND	ND
	20	NA	ND	ND	ND	ND	ND	ND
MW-2	5	NA	ND	ND	ND	ND	ND	ND
	10	NA	ND	ND	0.059	0.036	0.0061	0.031
	15	NA	ND	48	0.56	2.8	1.5	8.8
MW-3	5	ND	ND	ND	ND	ND	ND	ND
	10	ND	ND	ND	ND	ND	ND	ND
	15	ND	ND	ND	ND	ND	ND	ND
	20	ND	ND	ND	ND	ND	ND	ND
VW-1	17	NA	ND	360	18	40	13	68
VW-2	17	NA	ND	6000	210	890	210	1200

NA = SAMPLE NOT ANALYZED FOR THIS COMPOUND
ND = NOT DETECTED

NOTE: A 20 FOOT SAMPLE FROM MW-2 WAS NOT COLLECTED BECAUSE OF GROUNDWATER

Table 2. Soil Analytic Data - Former Arco Station - 706 Harrison Street Oakland, California

Borings/ well ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
			Concentrations in parts per million (mg/kg)				
SB-A/MW-4	11/28/94	16.0	nd	nd	nd	nd	nd
SB-A/MW-4[a]	11/28/94	17.5	nd	nd	nd	nd	nd
SB-A/MW-4	11/28/94	26.0	nd	nd	nd	nd	nd
SB-A/MW-4[ab]	11/28/94	26.0	nd	0.021	nd	nd	nd
SB-B	11/28/94	11.0	nd	nd	nd	nd	nd
SB-B	11/28/94	16.0	nd	nd	nd	nd	nd
SB-B	11/28/94	26.0	1.1	0.18	0.054	0.024	0.071
SB-C/VW-3	11/28/94	11.0	410	nd	2.0	3.7	22
SB-C/VW-3	11/28/94	18.0	14,000	120	620	220	1,100
SB-C/VW-3	11/28/94	26.0	nd	0.059	0.041	0.0028	0.050

Table 2 continued on next page...

Table 2. Soil Analytic Data - Former Arco Station - 706 Harrison Street Oakland, California

Borings/ well ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
			Concentrations in parts per million (mg/kg)				
SB-D/VW-4	11/29/94	17.5	15,000	160	700	240	1,200
SB-E/VW-5	11/30/94	11.0	nd	nd	nd	nd	nd
SB-E/VW-5	11/30/94	17.0	nd	nd	nd	nd	nd
SB-E/VW-5	11/30/94	26.0	nd	nd	0.012	nd	nd
SB-F/MW-5	11/30/94	18.0	nd	nd	nd	nd	nd
SB-G/MW-6	12/1/94	16.0	nd	nd	nd	nd	nd
SB-H/MW-7	12/2/94	16.0	nd	nd	nd	nd	nd
SB-H/MW-7	12/2/94	18.0	nd	nd	nd	nd	nd
SB-H/MW-7	12/2/94	26.0	nd	nd	nd	nd	nd
SB-I	12/2/94	11.0	nd	nd	nd	nd	nd

Table 2 continued on next page...

Table 2. Soil Analytic Data - Former Arco Station - 706 Harrison Street Oakland, California

Borings/ well ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
			Concentrations in parts per million (mg/kg)				
SB-I	12/2/94	18.0	1,200	nd	12	13	78
SB-I	12/2/94	26.0	4.4	nd	0.013	0.018	0.055

Abbreviations

TPHg = Total petroleum hydrocarbons as gasoline
nd = not detected

Notes

a = sample analyzed after the 14 day holding time
b = sample reanalyzed to confirm anomalous results
TPHg analyzed by modified EPA Method 8015
Benzene, ethylbenzene, toluene and xylenes analyzed by EPA Method 8020

Gasoline (TPHg). There were no Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX) fractions detected in this sample.

Two soil samples were obtained from the excavation prior to the sloughing/caving of the sidewalls. One sample (16 foot) was obtained from the excavator bucket from a depth of 16 feet below land surface and one sidewall sample (SW 10 feet) was obtained hand auguring into the sidewall at about 10 feet below land surface (PLATE 2A).

The 16 foot sample contained 4,300,000 ug/kg (parts per billion) TPHg, 66,000 ug/kg Benzene, 320,000 ug/kg Toluene, 130,000 ug/kg Ethyl Benzene and 730,000 ug/kg Xylenes.

No TPHg, BTEX was detected in the 10 foot sidewall sample.

4.0 SCOPE OF WORK

The approved work plan called for the characterization of the spoils pile, the installation and initial sampling of three groundwater monitoring wells, the installation of two vapor recovery wells, a soil performance pilot test and the evaluation of the pump island area for lead in the shallow soil.

5.0 DRILLING AND WELL CONSTRUCTION

5.1 GROUNDWATER MONITORING WELLS

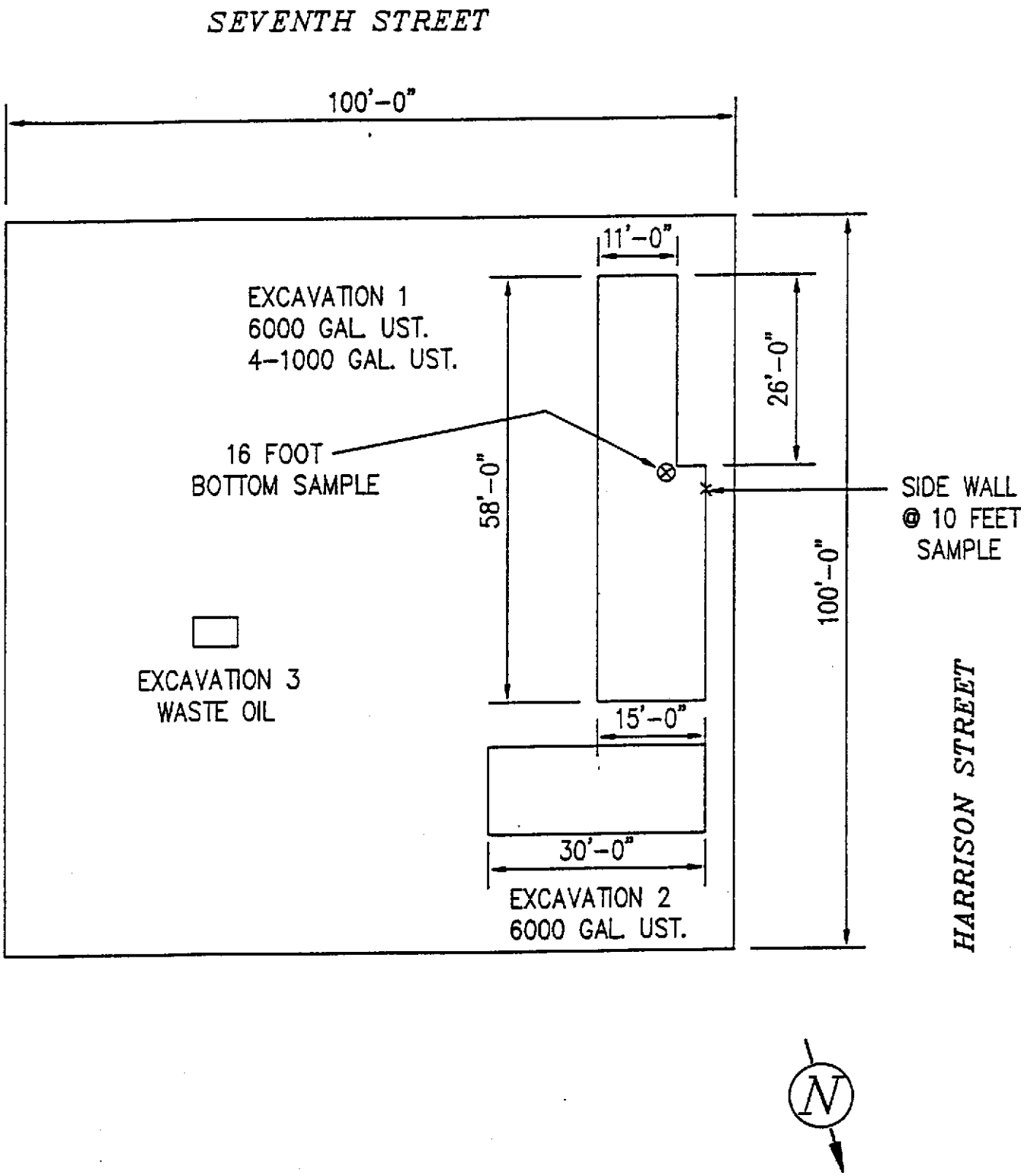
Three groundwater monitoring wells and two vapor extraction wells (MW-1, MW-2, MW-3, VW-1 and VW-2) were installed on 22 and 23 July 1993 (PLATE 3)

Borings for the groundwater monitoring wells were drilled to an approximate depth of 28 feet below land surface using continuous-flight, hollow-stem augers and a Mobile B-53 truck-mounted drill rig.

NOTE: The wells were initially specified to be drilled to a total depth of 40 feet BLS in order to perform a geotechnical investigation at the same time. This portion of the project discussed in the amended work plan was cancelled by the owner immediately prior to the drilling date.

The groundwater monitoring wells were constructed using 2-inch diameter, threaded PVC casing. No chemical cements, glues or solvents were used in the construction of the well.

The well annulus for each monitoring well was packed with washed No. 2/12 sand from the bottom of the borehole at 28 feet to about 2 feet above the screened interval at 18 feet BLS. The wells were screened with 0.02-inch slotted casing from 28 feet below the water table to 18 feet BLS. above the water table. A 1-foot bentonite seal was placed above the filter pack. The well annulus was then be backfilled to the surface with neat cement.



TITLE: SITE PLAN – UGT EXCAVATIONS/SAMPLE LOCATIONS SITE OAKLAND AUTO PARTS ADDRESS: 706 HARRISON STREET, OAKLAND, CA.	SCALE: 1 INCH = 20 FEET PROJECT # 1514N DATE: 16 MARCH 1993

DENNIS BATES ASSOCIATES, INC.
494 Alvarado Street, Suite B Monterey, CA. 93940
2011 Feliz Road, Novato, CA. 94945

PLATE: **2A**

Attachment B

Analytic Data for Ground Water

5.6.3 GROUNDWATER ANALYSIS

The three groundwater monitoring wells were developed on 10 August 1993 and sampled on 13 August 1993. All samples were to be analyzed for TPHg/BTEX and Total Lead. One groundwater sample from well MW-3 was to be analyzed using EPA Method 8270, Semivolatile (Extractable Organics) by GC/MS.

The results from the TPHg/BTEX and Total Lead analyses can be found in Table 3 below.

NONE OF THE 54 COMPOUNDS IN THE EPA 8270 METHOD WAS DETECTED IN GROUNDWATER FROM WELL MW-3.

Copies of the laboratory results and chain-of-custody documents can be found in Appendix D.

Table 3

Analytical Results for Groundwater

Total Lead (Pb)
TPH as Gasoline (TPHg)
Benzene, Toluene, Ethyl Benzene, Xylenes (BTEX)

Date Sampled: 13 August 1993
All Results Reported in PPB (ug/l)

WELL	Pb	TPHg	B	T	EB	X
MW-1	ND	20,000	8500	640	280	440
MW-2	ND	34,000	6800	10,000	740	3900
MW-3	ND	ND	ND	ND	ND	ND

ND = NOT DETECTED

5.7 WELL SURVEY

The well's will be surveyed by a California Licensed Land Surveyor to determine the top-of-casing (TOC) elevation above Mean Sea Level. This data will be used to calculate the groundwater gradient through the site and will be provided with the Quarterly Monitoring Report to be done in November of 1993.

6.0 GEOLOGIC SETTING

The San Francisco Bay lies in a low area in the Coast Range province, a region of northwest trending faults, hills and valleys. The site itself is situated on the flatlands, approximately 3500 feet from the eastern edge of the present Bay (Alameda Harbor). The Bay is a drowned valley which is thought to have originally formed by erosion of the ancestral Sacramento River (Jenkins, 1951) and subsequently widened by subsidence

Table 1. Ground Water Analytic Data - Former Arco Station - 706 Harrison Street Oakland, California

Well ID	Date Sampled	Depth to Water (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes
			Concentrations in parts per billion (µg/L)				
MW-4	12/16/94	18.10	2,500	32	6.5	4.5	17
MW-5	12/16/94	16.07	nd	1.1	nd	nd	2.4
MW-6	12/16/94	17.74	nd	nd	nd	nd	nd
MW-7	12/16/94	17.07	nd	nd	nd	nd	nd

Abbreviations

TPHg = Total petroleum hydrocarbons as gasoline

nd = not detected

Notes

TPHg analyzed by modified EPA Method 8015

Benzene, ethylbenzene, toluene and xylenes analyzed by EPA Method 8020

Attachment C

Boring Logs and Well Construction Details

Page 1

EXPLORATORY BORING LOG

PROJECT NAME : 1514 M
PROJECT NUMBER : Oakland Auto. Park
LOGGED BY: Glen White
BORING: MW1
DATE: 7/22/93

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
5		MW1-5		SM	Sand, Silty, slightly clayey, goldish brown, moist, firm, no odor.
10		MW1-10		SC	Sand, Clayey, Silty, blue-gray, moist, firm, heavy or old Hydrocarbon odor.
15		MW1-15		SM	Sand, Silty, olive green, moist, firm, heavy hc odor
20		MW1-20		SM	Sand, silty, slightly clayey, olive green, slight odor, moist, firm
25		—		SM	Sand, Silty, dark brown, wet, no odor.

Neat Cement

Sand

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen White

BORING: MW1
DATE: 7/22

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
26					
27					
28		EOB			Bottom of boring at 28'
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen White
BORING: MW-2
DATE: 7/22

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
5		MW2-5	9/12/15	SM	Sand, Silty, Slightly clayey, goldish brown, moist, firm, no odor
10		MW2-10	11/12/12	SM	Sand, Silty, goldish brown, moist, firm, no odor
15		MW2-15	11/14/23	SM	Sand, A.A. no odor
20	▽		9/10/12	SM	Sand, Silty, brown, wet, moderate gasoline odor soft No Sample collected, Below water
25			10/22/24	SM	Sand, As above, Some Sheen on Sampler, Slight odor in Soil.

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen White
BORING: MW-2
DATE: 7/23

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
26					
27					
28					EOB @ 28'
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					

Page 1

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen White

BORING: MW3
DATE: 7/22

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
5		MW3-5	7/16/20	SM	Sand, Silty, goldish brown, moist, firm, no odor
10		MW3-10	7/11/14	SM	Sand, as above, hard. no odor
15		MW3-15	24/30/44	SM	Sand, Silty, goldish brown, hard, moist, no odor
20		MW3-20	7/16/23	SM	Sand, Silty, brown, moist, firm, no odor
21	▽				
24			15/22/44		Sand, Silty, brown w/ some rust, soft, wet, no odor
25					

EXPLORATORY BORING LOG

PROJECT NAME : Dekland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen white

BORING: MW3
DATE: 7/23

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
26					
27					
28					EOB @ 28'
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					

Page 1

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts

PROJECT NUMBER : 1514 N

LOGGED BY: Glen White

BORING: VW1

DATE: 7/22/93

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
1					Fill material
10					Odor in cuttings - Fill material
17		VW1-17		SM	Sand, silty, Olive green - gray, soft, moist, strong gasoline odor.
20					E.O.B. at 20'

Page 1

EXPLORATORY BORING LOG

PROJECT NAME : Oakland Auto Parts
PROJECT NUMBER : 1514N
LOGGED BY: Glen White
BORING: VW2
DATE: 7/22/93

DEPTH	DTW	SAMP #	OVA	USC	SOIL DESCRIPTION
1					Fill material
10					odor encountered, slight hydrocarbon
17	Heat Cement Grout / Sand	VW2-17	19/35/40		Sand, Silty, olive green, moist, soft, strong gasoline odor.
20					E.O.B. @ 20'

DRILLING LOG

Client: Mr. Bo K. Gin

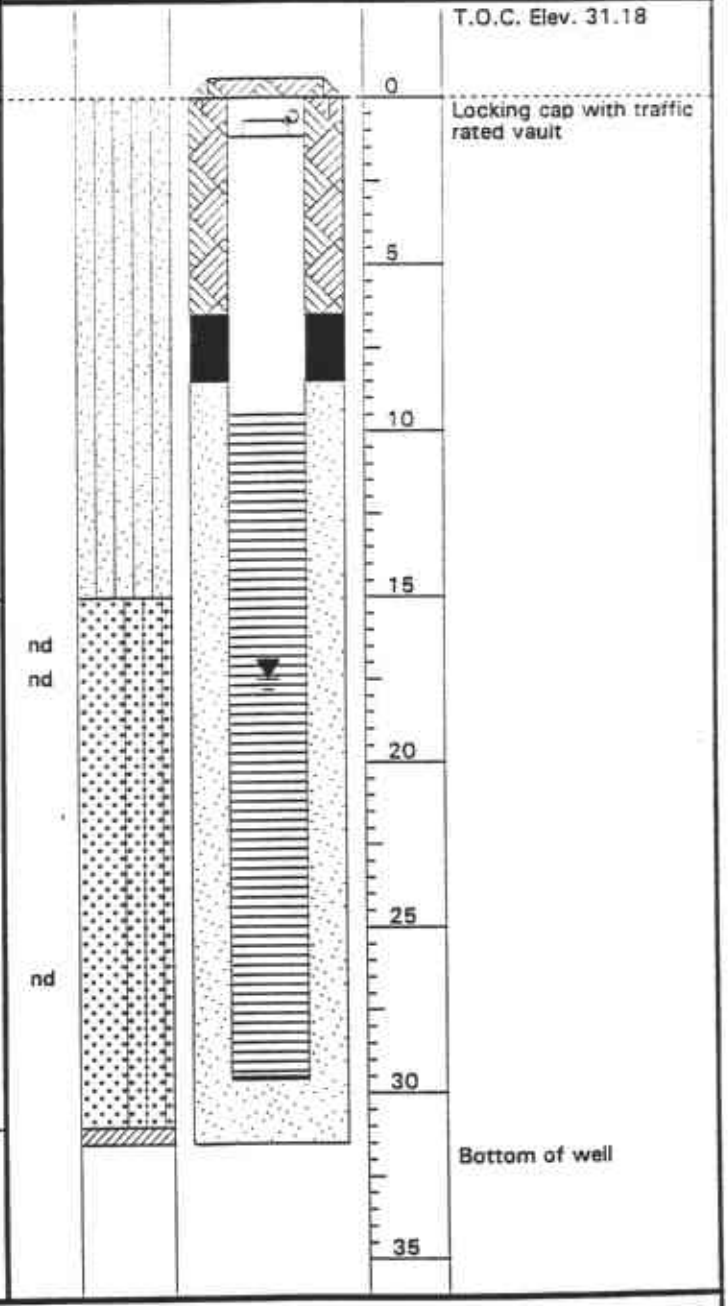
Project No: 23116 Phase Task 001

Well ID MW-4 Boring ID SB-A

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description
0	Ground Surface		
5	6 15 30		Silty SAND(SM);Brown; loose; damp; 20% silt, 80% fine to medium sand; moderate estimated hydraulic conductivity.
10	15 27 27		2% gravel and dense.
15	20 42 50 20 50 50		Occasional black manganese oxide blems.
20			SAND;(SW-SM); grayish green; moist; 10% silt, 90% very fine to moderate sand; possible presence of solvent.
25	20 33 40		
30	25 33 40		
35			Sandy CLAY (CL);Light brown; very stiff; moist; 70% clay, 30% fine to very fine sand; low to medium plasticity; low estimated hydraulic conductivity.



Driller	Soils Exploration	Development Yield	N/A	Bentonite Seal	6.5 to 8.5 ft
Logged By	David Elias	Well Casing	2" Dia. 0' to 9.5'	Sand Pack	Monterey sand
Drilling Started	11/28/94	Casing Type	Schedule 40 PVC	Sand Pack Type	#2/12
Drilling Completed	11/28/94	Well Screen	2" Dia. 9.5' to 29.5'	Static Water Level	17.50 ft Depth
Construction Completed	11/28/94	Screen Type	Schedule 40 PVC	Date	N/A
Development Completed	12/16/94	Slot Size	0.010-inch	Notes:	Northeast end of lot
Water Bearing Zones	17.5 to 31.5 ft	Drilling Mud	N/A		
		Grout Type	Portland Type I-II		

Cambria Environmental Technology, Inc.

BORING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Boring ID SB-B

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft.

Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth Feet	Additional Comments
0	Ground Surface						0	
5	18 25 27		Silty SAND (SM):Reddish brown; dense; damp; 1% clay, 39% silt, 60% fine to medium sand ; moderate estimated hydraulic conductivity.				5	
10	20 30 33		Reddish brown mottled gray	nd			10	
15	6 30 50		SAND (SW):Gray; very dense; damp; 2% silt, 98% fine sand; high estimated hydraulic conductivity; hydrocarbon odor: possible solvent.	nd			15	
20	16 25 33		Moist with hydrocarbon odor.				20	
25	17 30 50		Wet with no odor.	1			25	Bottom of boring
30							30	
35							35	

Driller Soils Exploration

Logged By David Elias

Water-Bearing Zones

Drilling Started 11/28/94

Drilling Completed 11/28/94

Grout Type Portland Type I-II

Notes: Northeast end of lot near MW-2

BOR 23116 2/15/95

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Well ID VW-3 Boring ID S8-C

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description
0	Ground Surface		
5			Clayey SAND (SC); Dark gray fill material; damp; 20% clay, 10% silt; 60% medium to very coarse sand, 10% gravel; low estimated hydraulic conductivity.
10	12 18 25		Silty SAND (SM);Reddish brown; medium dense; damp; 40% silt, 60% fine sand; moderate estimated hydraulic conductivity; no hydrocarbon odor.
15	27 33 38		20% silt, 80% fine to medium sand; very dense.
20	12 30 50 29 50		Gray, 90% fine to medium sand; moist; strong hydrocarbon odor. Brown.
25	10 22 33		
30	20 38 50		Mild hydrocarbon odor. Moist to wet.
35			

TPHg (ppm): 410; 14,000; nd

Graphic Log / Well Construction Graphics

Depth Feet	Well Construction Details
0	T.O.C. Elev. N/A
	Locking well caps with trafffic rated vault.
20	Bottom of 2" well.
30	Bottom of 1" well.

Driller Soils Exploration

Logged By David Elias

Drilling Started 11/28/94

Drilling Completed 11/28/94

Construction Completed 11/28/94

Development Completed N/A

Water Bearing Zones 18.2 to 29.5 ft

Development Yield N/A

Well Casing 2"/ 1" Dia. 0'/ 0' to 8'/ 27'

Casing Type Schedule 40 PVC

Well Screen 2" Dia. 8' to 18'

Screen Type Schedule 40 PVC

Slot Size 0.010-inch

Drilling Mud N/A

Grout Type Portland Type I-II

Bentonite Seal 5 to 6 and 23.5 to 25.5

Sand Pack Monterey sand

Sand Pack Type #1/20

Static Water Level 18.20 ft Depth

Date N/A

Notes: Located west side of lot near multiple tank excavation.

WELL 23116 2/15/95

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Well ID VW-4 Boring ID SB-D

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0	Ground Surface						0	T.O.C. Elev. N/A
5			Clayey SAND (SC); Dark gray fill material; damp; 20% clay, 10% silt; 60% fine sand, 10% gravel; low estimated hydraulic conductivity.				5	
10			Silty SAND (SM); Brown; damp; 40% silt, 60% fine sand ; moderate estimated hydraulic conductivity; no hydrocarbon odor.	<1			10	
15			Moderate hydrocarbon odor; 1% clay.				15	
	11 13 22		Clayey to Silty SAND(SC-SM); light brown; damp; 5% clay, 35% silt, 60% fine sand; low to moderate hydraulic conductivity.	<1				
20			SAND(SW); Gray, wet; 5% silt, 95% very fine to medium sand; high estimated hydraulic conductivity; strong hydrocarbon odor.				20	
25			Silty SAND; (SM); grey; wet; 40% silt, 60% fine sand; strong hydrocarbon odor.				25	
30							30	Bottom of boring
35							35	

Driller	Soils Exploration	Development Yield	N/A	Bentonite Seal	5 to 7 and 19 to 25.5
Logged By	David Elias	Well Casing	2"/1" Dia. 0'/0' to 8.0'/29.5	Sand Pack	Monterey sand
Drilling Started	11/29/94	Casing Type	Schedule 40 PVC	Sand Pack Type	#2/12
Drilling Completed	11/29/94	Well Screen	2"/1" Dia. 8'/28.5 to 18'/29.5	Static Water Level	18.00 ft Depth
Construction Completed	11/29/94	Screen Type	Schedule 40 PVC	Date	N/A
Development Completed	N/A	Slot Size	0.010-inch	Notes:	Located west side of lot near multiple tank excavation.
Water Bearing Zones	18.0 to 29.5 ft	Drilling Mud	N/A		
		Grout Type	Portland Type I-II		

WELL 23116 2/15/95

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Well ID VW-5 Boring ID SB-E

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0	Ground Surface						0	T.O.C. Elev. N/A
5			Silty to Clayey SAND (SC); Dark brown fill material; damp; 5% clay, 40% silt, 55% medium to very coarse sand; low estimated hydraulic conductivity.				5	
10	11 11 11		Silty SAND (SM); Reddish brown; medium dense; damp; 20% silt, 80% fine sand ; moderate estimated hydraulic conductivity. No hydrocarbon odor.				10	
15	3 1 1		Moderate hydrocarbon odor. 1% clay.	nd			15	
20	12 16 19		Clayey to Silty SAND(SW-SC); brown; wet; dense; 5% clay, 10% silt, 85% fine to medium sand.	nd			20	
25	20 44 98		Silty SAND(SM); greenish brown; very dense; damp to moist; 30% silt; 70% very fine to medium sand; moderate estimated hydraulic conductivity; moderate hydrocarbon odor.				25	
30	32 50		SAND; (SW); reddish brown; wet; very dense; 5% silt, 95% fine sand; no hydrocarbon odor, high estimated hydraulic conductivity.	nd			30	Bottom of boring
35							35	

Driller Soils Exploration

Logged By David Elias

Drilling Started 11/30/94

Drilling Completed 11/30/94

Construction Completed 11/30/94

Development Completed N/A

Water Bearing Zones N/A

Development Yield N/A

Well Casing 2"/1" Dia. 0'/0' to 7.0'/28.5

Casing Type Schedule 40 PVC

Well Screen 2"/1" Dia. 7'/28.5 to 17'/29.5

Screen Type Schedule 40 PVC

Slot Size 0.010-inch

Drilling Mud N/A

Grout Type Portland Type I-II

Bentonite Seal 5 to 6 and 18 to 26

Sand Pack Monterey sand

Sand Pack Type #2/12

Static Water Level _____ ft Depth

Date N/A

Notes: Located south west side of lot near multiple tank excavation.

WELL 23116 2/15/95

DRILLING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Well ID MW-6 Boring ID SB-G

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description	TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0	Ground Surface						0	T.O.C. Elev. 29.10
			Asphalt Concrete					Locking cap with traffic rated vault
5			Silty SAND (SM);Reddish brown; damp; 15% silt, 85% very fine to fine sand; moderate estimated hydraulic conductivity. No hydrocarbon odor.				5	
			Sandy to Silty CLAY (CL-ML); Brown; damp; 45% clay, 20% silt, 35% sand; medium plasticity; low estimated hydraulic conductivity.					
10			Silty SAND to Sandy SILT (SM); Light brown; damp; 2% clay, 49% silt, 49% sand; non plastic; low to moderate estimated hydraulic conductivity. Color change to grayish green.				10	
15	13 26 28						15	
			Silty SAND (SM);Grayish green mottled gray and reddish brown; damp; 1% clay; 19% silt, 80% fine to medium sand.	nd				
20							20	
25			Sandy SILT (SM);Brown; moist; 55% silt, 45% fine sand; non-plastic; moderate estimated hydraulic conductivity. No hydrocarbon odor.				25	
								Bottom of well
30							30	
35							35	

Driller Soils Exploration

Logged By David Elias

Drilling Started 12/1/94

Drilling Completed 12/1/94

Construction Completed 12/01/94

Development Completed 12/16/94

Water Bearing Zones 17.2 to 27.5 ft

Development Yield N/A

Well Casing 2" Dia. 0' to 11.5'

Casing Type Schedule 40 PVC

Well Screen 2" Dia. 11.5' to 26.5'

Screen Type Schedule 40 PVC

Slot Size 0.010-inch

Drilling Mud N/A

Grout Type Portland Type I-II

Bentonite Seal 8.5 to 10.5 ft

Sand Pack Monterey sand

Sand Pack Type #1/20

Static Water Level 17.20 ft Depth

Date N/A

Notes: Harrison Street south of 7th

DRILLING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Well ID MW-7 Boring ID SB-H

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft. Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description
0			Ground Surface
			Asphalt
			Brick
			Concrete
5			Silty SAND (SM); Light brown; damp; 30% silt, 70% sand; moderate estimated hydraulic conductivity.
			Sandy SILT (ML); Brown; damp; 55% silt, 45% very fine to medium sand; non-plastic; moderate estimated hydraulic conductivity. No hydrocarbon odor.
10			Silt increasing to 65%, very fine to fine sand to 35%, color change to gray.
15	10 25 15		Silty SAND; (SM); Grey; 20% silt, 80% sand; moderate estimated hydraulic conductivity. No hydrocarbon odor.
	27 50		40% silt, 60% sand, wet.
20	10 29 42		
25	22 38 44		SAND; (SW); brown; 3% silt, 97% very fine to fine sand; high estimated hydraulic conductivity; no hydrocarbon odor.
30			
35			

TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			0	T.O.C. Elev. 29.67
				Locking cap with traffic rated vault
			5	
			10	
nd			15	
nd			20	
nd			25	
			30	Bottom of well
			35	

Driller Soils Exploration

Logged By David Elias

Drilling Started 12/2/94

Drilling Completed 12/2/94

Construction Completed 12/2/94

Development Completed 12/16/94

Water Bearing Zones

Development Yield N/A

Well Casing 2" Dia. 0' to 13'

Casing Type Schedule 40 PVC

Well Screen 2" Dia. 13' to 28'

Screen Type Schedule 40 PVC

Slot Size 0.010-inch

Drilling Mud N/A

Grout Type Portland Type I-II

Bentonite Seal 10 to 12 ft

Sand Pack Monterey sand

Sand Pack Type #1/20

Static Water Level ft Depth

Date N/A

Notes: Harrison Street north of 7th Street.

WELL 23116 2/15/95

Cambria Environmental Technology, Inc.

BORING LOG

Client: Mr. Bo K. Gin

Project No: 23116 Phase Task 001

Boring ID SB-I

Location 706 Harrison Street Oakland, CA

Surface Elev. N/A ft.

Page 1 of 1

Depth Feet	Blow Count	Sample Interval	Lithologic Description
0	Ground Surface		
5	12 10 5		Clayey to Silty SAND (SM):Dark gray fill; medium dense; dry to damp; 5% clay, 35% silt, 60% medium to very coarse sand; low estimated hydraulic conductivity.
10	4 11 20		Sandy SILT (ML); Brown mottled grey; stiff; 60% silt, 40% very fine to fine sand; non-plastic; moderate estimated hydraulic conductivity; moderate hydrocarbon odor.
15			
20	12 50		SAND (SW):Gray; very dense; damp; 4% silt, 96% fine sand; high estimated hydraulic conductivity; strong hydrocarbon odor.
25	17 44 50		
30	32 50		
35			

TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth Feet	Additional Comments
			0	
nd			5	
			10	
1,200			15	
			20	
4			25	Bottom of boring
			30	
			35	

Driller Soils Exploration

Logged By David Elias

Water-Bearing Zones

Drilling Started 12/2/94

Drilling Completed 12/2/94

Grout Type Portland Type I-II

Notes: Southwest end of lot near MW-1

BOR 23116 2/15/95

Cambria Environmental Technology, Inc.