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ETIC ENGINEERING

22 April 2004

Mr. Don Hwang
Hazardous Materials Specialist
Local Oversight Program
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: **Preliminary High Vacuum Dual Phase Extraction Pilot Test Summary**
Former Val Strough Chevrolet
327 34th Street
Oakland, California

Dear Mr. Hwang:

ETIC Engineering, Inc. is pleased to submit this preliminary high vacuum dual-phase extraction (DPE) pilot test summary for the referenced site. The DPE pilot test was conducted to determine the potential applicability of this technology, and in response to your 15 July 2003 request for source cleanup at the site. As discussed during our 14 April 2004 telephone conversation, a new tenant will occupy the property beginning 1 September 2004 and the site is undergoing renovations. To minimize impacts to business operations, we are coordinating piping/trenching installation activities with these renovations with completion by 1 September 2004.

To meet this construction schedule, we completed the DPE pilot test in accordance with the procedures outlined in our February 2004 *Supplemental Site Investigation Report and Dual-Phase Extraction Pilot Test Workplan.* The following presents our preliminary analysis of the DPE pilot test data. Based on the localized elevated hydrocarbons in soil and separate phase hydrocarbons (SPH) and the success of the DPE pilot test, we plan to conduct a series of short-term DPE events for source cleanup. We are beginning preparation of an *Interim Remedial Action Plan* (IRAP), which will present our site conceptual model, finalized DPE pilot test analysis, and proposed scope of work. To meet the construction deadline, including acquisition of applicable permits, we anticipate that IRAP approval will be needed by 1 June 2004. The following presents a site conditions summary, DPE pilot test summary, discussion, and request for written concurrence.

SITE CONDITIONS SUMMARY

Site Use: The site is an automobile dealership and service center. The site vicinity is largely commercial.

Monitoring Wells: There are seven monitoring wells (MW1 to MW7) located at the site. Except for wells MW6 and MW7, the wells are located in the dealership and service center building.

Primary Sources: Two underground storage tanks (one gasoline and the other used oil) were located beneath the sidewalk on the 34th Street side of the property and a fuel dispenser was located inside the building. These primary sources were removed from the site in 1993.

Soil Types: As shown on Figures 1 and 2, the site subsurface generally consists of several feet of artificial fill, which is, in turn, underlain, by silt and clay to 15-20 feet below ground surface (bgs), and silty sand and fine-grained sand mixed with thin clay intervals to the total depth explored of 35 feet bgs.

Depth to Water: In March 2004, groundwater was observed at approximately 18 feet bgs.

Primary Constituents of Potential Concern: The primary constituents of potential concern at the site are total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene and total xylenes (BTEX) and methyl tert butyl ether (MTBE).

Extent of Primary COPCs in Soil and Groundwater: Soil sampling and groundwater monitoring results indicate the presence of more than 1,000 milligrams per kilogram (mg/kg) TPHg near the former USTs and separate phase hydrocarbons (SPH) in wells MW2 and MW3 located in the service area (see Figures 1 and 2). These findings indicate that the secondary source area is limited in extent and located near wells MW2 and MW3. The primary COPCs in groundwater are largely limited to within the property boundaries.

DPE PILOT TEST SUMMARY

On 30 and 31 March 2004, a 15-hour DPE pilot test was conducted at the site. Vacuum was applied to wells MW2 and MW3 and both combined, while monitoring water and vacuum levels in wells MW1, MW4 and MW5. In contrast to recent monitoring activities, no SPH was observed in wells MW2 or MW3 immediately prior to the test. The following summarizes our preliminary DPE pilot test findings.

More than 1 foot of Water Level Drawdown observed more than over 50 feet from the extraction wells: During the combined test, the maximum drawdown observed in the observation wells are presented in Table A.

Table A: Maximum Drawdown Values

Monitoring Well	Maximum Drawdown (feet)	Distance to Nearest Extraction Well (feet)	Nearest Extraction Well
MW1	1.54	52	MW3
MW3	0.76	27	MW2
MW4	1.22	54	MW3

Stable Extracted Vapor Concentrations: During the tests a portable photo ionization detector (PID) was used to measure the hydrocarbon concentrations in extracted vapors during the test. The measured concentrations during the combined well test were greater than the instrument range of 4,000 parts per million by volume (ppmv). As shown on Table B below, these qualitative PID measurements were confirmed by the relatively stable hydrocarbon concentrations in analyzed vapor samples.

Table B: Vapor Analytical Results

Sample ID	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
Comb wells-1	7,200	110	360	43	220	14
Comb wells-2	6,400	98	340	45	240	12
Effluent	<50	<1.0	<1.0	<1.0	<1.0	<0.50

Decreased Groundwater Hydrocarbon Concentrations in response to DPE Pilot Test: Groundwater samples were collected from the extraction wells at the end of the DPE pilot test. The groundwater analytical results for pre-test (due to SPH presence, these are the last samples analyzed) and post-test are summarized in Table C.

Table C: Groundwater Analytical Results

Sample ID	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
Pre-test MW2	5/21/02	150,000	8,600	25,000	3,500	26,000	4,800
Post-test MW2	3/31/04	49,000	1,700	9,300	1,700	16,000	630
Pre-test MW3	5/21/02	91,000	6,500	17,000	2,200	12,700	2,200
Post-test MW3	3/31/04	10,000	880	2,100	470	2,800	150

Radius of Influence of 50 feet or more: Based on the induced vacuum measurements obtained during the combined-well DPE test, the radius of vacuum influence was estimated at 55 to 70 feet. A maximum of 1.54 feet of groundwater drawdown was observed at approximately 50 feet from the extraction wells during the combined wells extraction of the DPE test.

Significant Hydrocarbon Mass Removal: Approximately 37 pounds and 1.6 pounds of hydrocarbons were estimated to be removed in the vapor and dissolved phases, respectively, during the short-term combined wells DPE pilot test. These results indicate hydrocarbon removal rates of approximately 90 pounds per day and 3.8 pounds per day in the vapor and dissolved phases during the short-term pilot test.

DISCUSSION

As shown on Figures 1 and 2, more than 1,000 mg/kg of TPHg has been reported in vadose and saturated soil in a limited area near wells MW2 and MW3, which have intermittently reported the presence of SPH. Much of this hydrocarbon mass is located beneath the dealership and service center building. Removal of this sorbed hydrocarbon mass and SPH (i.e., the secondary source) followed by natural attenuation is likely to be the most cost-effective approach to case closure.

As summarized above, DPE can influence subsurface vapor and water flow within 50 feet of wells MW2 and MW3, and effectively remove hydrocarbon mass from the site subsurface. Based on the location of most of the hydrocarbon mass beneath the site building and/or the distribution of hydrocarbon mass above and below the water table, other remedial technologies, such as excavation, soil-vapor extraction, groundwater extraction, and SPH bailing, are not likely to be as cost-effective as DPE at the site. Therefore, we plan to use DPE to remove hydrocarbon mass to the point where natural attenuation can be more effectively applied at the site.

REQUEST FOR WRITTEN CONCURRENCE

As mentioned previously, a transition of business operations at the site is dictating a short timeframe for permitting and installation of a piping/trenching at the site. To meet the construction schedule, we will prepare a IRAP, which will present a more complete analysis of the DPE pilot test and our proposed interim DPE activities. Shortly after IRAP submittal, we will begin permitting for remediation system construction, including air discharge and sanitary sewer discharge. To facilitate UST Fund reimbursement, please provide your written concurrence with IRAP preparation and permitting at your earliest convenience. Please contact us immediately if you have any concerns regarding our planned site activities.

CLOSING

We greatly appreciate your timely assistance with this project. If you have any questions or comments, please contact Katherine Brandt at (510) 208-1600, extension 11.

Sincerely,
ETIC ENGINEERING, INC.

Katherine Brandt

Katherine A. Brandt
Project Manager

Khaled Rahman

Khaled B. Rahman, R.G., C.Hg.
Senior Geologist

Attachments

Figure 1 – Geologic Cross-section A-A'
Figure 2 - Geologic Cross-section B-B'

Cc: Jonathan Redding, Wendel Rosen Black and Dean, 1111 Broadway, 24th Floor, Oakland, California 94607
Don Strough, Strough Family Trust of 1983, PO Box 489, Orinda, California 94563

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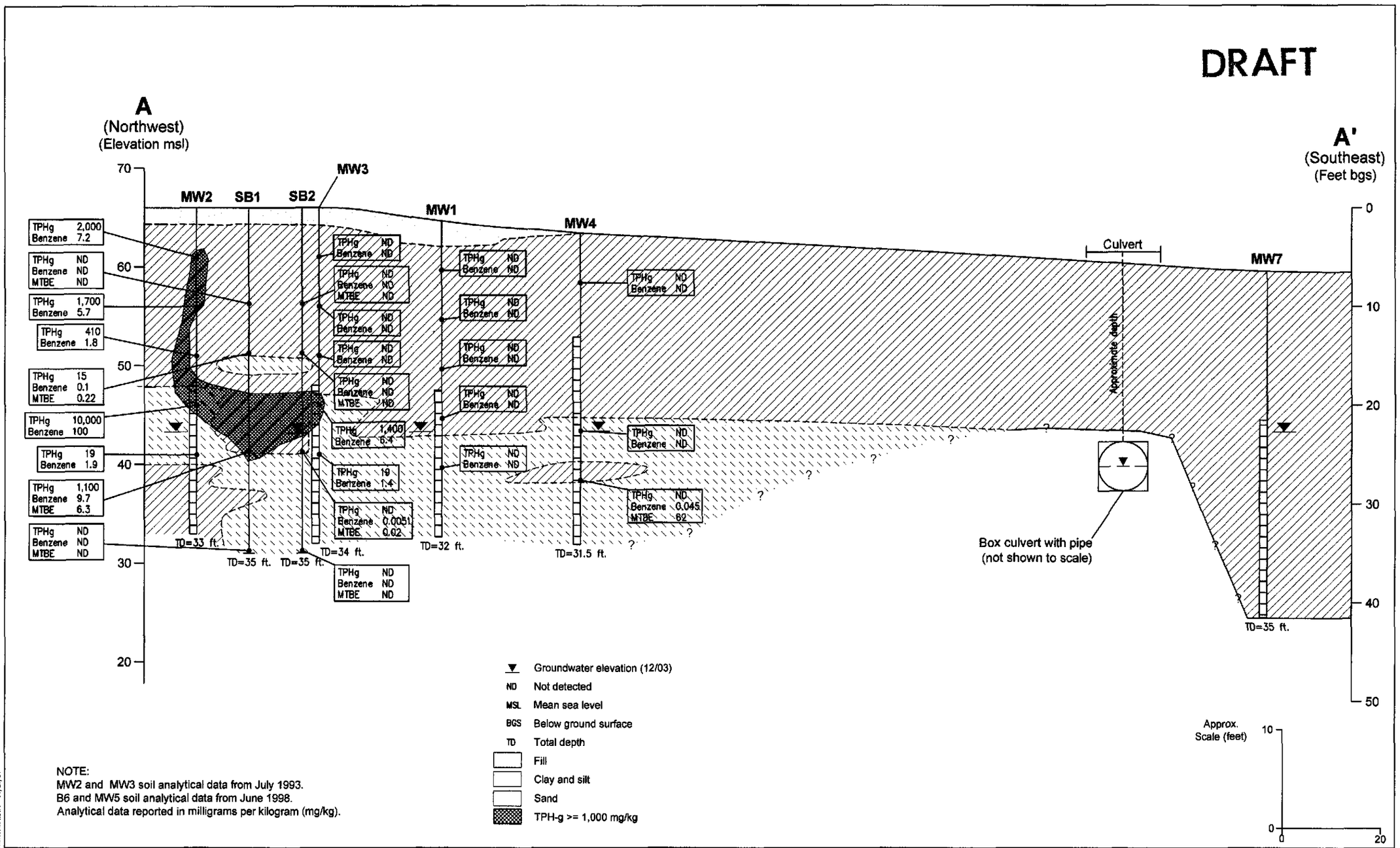

▼ Groundwater elevation (12/03)
ND Not detected
MSL Mean sea level
BGS Below ground surface
TD Total depth
Fill
Clay and silt
Sand
TPH-g >= 1,000 mg/kg

NOTE:
MW2 and MW3 soil analytical data from July 1993.
B6 and MW5 soil analytical data from June 1998.
Analytical data reported in milligrams per kilogram (mg/kg).

FILENAME: CROSS-SECTIONS0204.DWG 04/22/04

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GEOLOGIC CROSS-SECTION A-A'
VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE:
1

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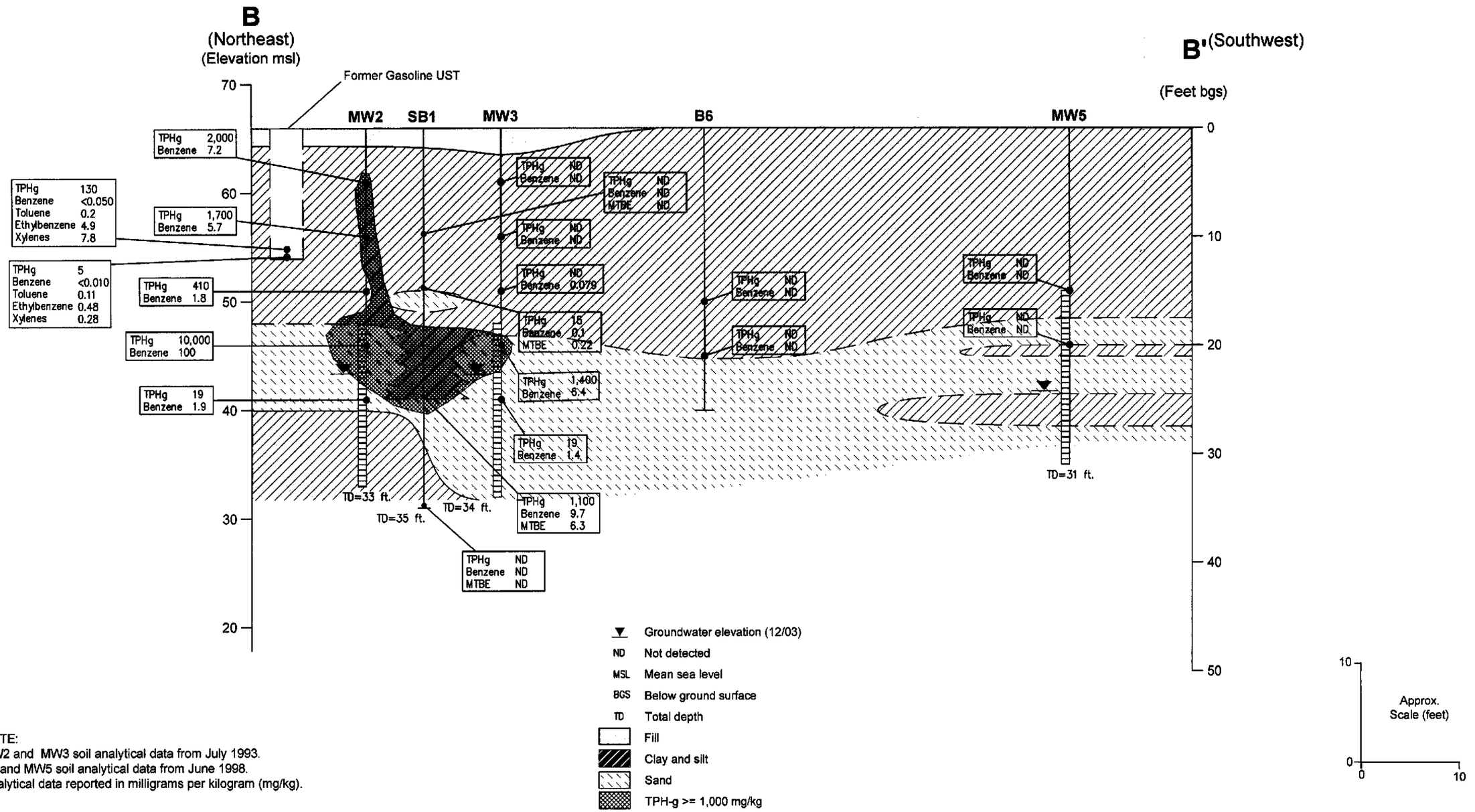

NOTE:
MW2 and MW3 soil analytical data from July 1993.
B6 and MW5 soil analytical data from June 1998.
Analytical data reported in milligrams per kilogram (mg/kg).

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GEOLOGIC CROSS-SECTION B-B'
VAL STROUGH CHEVROLET
327 34TH STREET
OAKLAND, CALIFORNIA

FIGURE:
2