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April 21, 2003

Mr. Don Hwang
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Alameda County

APR 24 2003

Environmental Health

**SUBJECT: SAMPLING AND CLOSURE REPORT
BROADWAY VOLKSWAGEN,
2740 BROADWAY AVENUE,
OAKLAND, CALIFORNIA;
PROJECT NO. 55306**

Mr. Hwang:

Please find the enclosed copy of the Sampling and Closure Report dated March 24, 2000 for the above referenced site which you requested. Call if you have any questions.

Sincerely,
MACTEC ENGINEERING & CONSULTING

A handwritten signature in black ink, appearing to read "Jason T. House", with a long horizontal line extending to the right.

Jason T. House
Staff Environmental Scientist

N:\data\projects\2002\55306\042103let



Harding ESE

A MACTEC COMPANY

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HARDING ESE formerly Environmental Science and Engineering (ESE)
has recently relocated.

The old address is as follows:

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All of the services you have been receiving and the personnel you have
been working with may now be reached at the following address:

**Harding ESE
1320 Arnold Drive, Suite 263
Martinez, CA 94553**

Please use the above information to update your records, also note that
our phone and fax numbers have not changed.

Thank you.

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**SAMPLING AND CLOSURE REPORT
PROPERTY NO. 4826
BROADWAY VOLKSWAGEN
2740 BROADWAY AVENUE
OAKLAND, ALAMEDA COUNTY, CALIFORNIA**

**Prepared For:
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March 24, 2000

ESE PROJECT NO. 6599065

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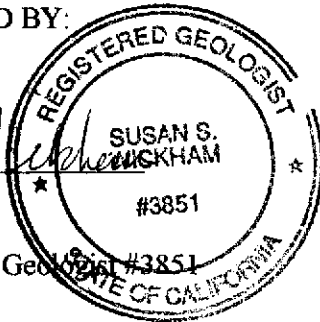
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This report has been prepared by Environmental Science & Engineering, Inc., for the exclusive use of Trammell Crow Company as it pertains to the property located at 2740 Broadway Avenue in Oakland, Alameda County, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists, engineers, and environmental professionals practicing in this field. No other warranty, expressed or implied, is made as to the professional opinions in this report.

REPORT PREPARED BY:

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AND

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1.0 INTRODUCTION

Environmental Science & Engineering, Inc., (ESE) was retained by the Trammell Crow Company (Trammell Crow) to perform sampling at the Trammell Crow Property No. 4826 (Broadway Volkswagen) located at 2740 Broadway Avenue in Oakland, Alameda County, California (Figure 1). This report describes the procedures used in sampling, site conditions during sampling, and reports the findings of analysis.

The scope of work is in accordance with that agreed upon in a meeting on April 26, 1999, between Alameda County Health Care Services Agency (ACHCSA) and Trammell Crow. ESE was also in attendance at that meeting and subsequently prepared a work plan dated June 11, 1999, for the agreed upon work. ACHCSA approved the work plan with additional items in their correspondence dated June 21, 1999. ESE responded to the June 21, 1999, letter and a final work plan was agreed upon.

1.1 Site Description

The site is located on the southeast corner of the intersection of Broadway Avenue and 28th Street in Oakland, Alameda County, California (Figure 1) in a predominantly commercial area. The Broadway Volkswagen automobile dealership currently occupies the site and consists of a three-story steel-reinforced concrete building, multiple service bays and a showroom (Figure 2). Numerous automobile dealerships and maintenance shops are in operation in the immediate area. Underground service utilities are present within the right-of-way of 28th Street immediately adjacent to the site and along Broadway Avenue.

1.2 Geology/Hydrogeology

The site is at an approximate elevation of 30 feet above mean sea level (amsl) in an area of moderately sloping topography. It is situated on an alluviated highland portion of Oakland and is topographically characterized by a gentle southeasterly slope toward Lake Merritt, which lies approximately 2,000 feet south of the site. Soil borings drilled to depths of approximately 30 feet below ground surface (bgs) indicated that the subsurface consists of clay, silty clay, sandy clay, silt, sandy silt, and sand. A sand

layer, approximately 2-feet thick, is present beneath the site at approximately 11 to 17 feet bgs and is sloping in a general northwesterly direction (ESE, 1991a).

The shallow groundwater flow, as determined in site monitoring wells, beneath the site is generally toward the west-northwest. Perched groundwater beneath the site has been observed at depths of 11 to 17 feet bgs, with observed elevations between 16 to 23 feet amsl. Historical measurements of groundwater elevation data are shown in Table 1. A site plan showing the relative groundwater elevation is included as Figure 3.

1.3 Project Background

During August 1988, two underground storage tanks (USTs), consisting of one 500-gallon waste oil UST and one 3,000-gallon gasoline UST were removed from an area at the northeast side of the site along 28th Street (Figure 2). Soil samples collected during the removal of the USTs were reported to contain detectable concentrations (B-C1 @ 13.4 feet bgs = <10 ppm TPH-g and 1.3, 0.9, 0.3, and <0.3 ppm BTEX respectively; B-D1 @ 13.4 feet bgs = 2,900 ppm TPH-g, 1,200 ppm Oil & Grease, 1.4, 6.6, 46, 12 ppm BTEX) of total petroleum hydrocarbons as gasoline (TPH-g), Oil & Grease, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) (ESE, 1989), Figure 4. Soil samples collected from borings, SB-3 and SB-4, drilled subsequent to the tank removal also contained detectable concentrations of TPH-g and BTEX (ESE, 1991a). (SB-3 @ 10 feet bgs = 740 ppm TPH-g, 1,200, 30,000, 9,400, 42,000 ppm BTEX; SB-4 @ 15 feet bgs = 13 ppm TPH-g, 610, 1,100, 170, and 840 ppm BTEX, respectively). Figure 4 shows the approximate location of UST removal and Figure 5 shows the approximate location of soil borings and a summary of laboratory analytical results.

Boring logs for five additional groundwater monitoring wells (MW-1, MW-3, MW-4, MW-5, and MW-6) installed by ESE at the site indicate the presence of clay sediments with perched, moist to wet sand beds at depths ranging between 11 to 17 feet bgs (ESE, 1991a; ESE, 1991b). ESE installed wells MW-1 and MW-3 to a depth of approximately 20 feet bgs and screened both over the lithological interval containing the perched sand beds and upper groundwater interval. ESE identified one 2-foot thick perched sand bed in wells MW-5 and MW-6 at depths of 17 and 11 feet, respectively (ESE, 1991b).

The sand bed was observed to have an apparent dip toward the west. Clay sediments above and immediately below the sand beds were observed to be dry.

Soil samples collected from the sand beds in borings MW-5 and MW-6 were noted to have a fuel odor and detectable volatile organic compound (VOC) concentrations as determined using a photo-ionization detector (PID). However, ESE did not detect fuel vapors or VOCs with a PID in samples of clay collected above and below the sand bed in the borings. No detectable concentrations of halogenated VOCs (HVOCs) have been reported to occur in soil samples collected from the sand and clay sediments at the site. The analytical results of soil samples collected at this site indicate the petroleum hydrocarbon affected soil beneath the site was limited to the immediate area surrounding the former UST locations.

A sandy clay aquifer was intersected beneath the clay unit containing the perched sand beds at a depth of approximately 22 to 23 feet bgs in wells MW-4, MW-5, and MW-6. Monitoring well MW-4 was installed to a depth of 25 feet bgs and wells MW-5 and MW-6 were installed to a depth of 30 feet bgs. These three wells were screened over the interval containing the sandy clay aquifer as well as the perched sand beds.

Detectable concentrations of TPH-g, BTEX, and HVOCs including trichloroethylene (TCE), tetrachloroethylene (PCE), and 1,2-Dichloroethane (DCA) have been reported to occur in some groundwater samples collected from various site wells since May 13, 1991 (ESE, 1991a, 1991b, 1992, 1993). Historically, the highest concentrations of TPH-g and BTEX have been reported in groundwater samples collected from well MW-3, located west and hydraulically downgradient of the former UST area. Well MW-3 is selectively screened to recharge with water from the perched sand beds. The highest concentrations of HVOCs have been reported to occur in groundwater samples collected from wells screened into the deeper aquifer (MW-4, MW-5, and MW-6). Contours of TCE concentration in groundwater indicate an offsite source of TCE located to the north of the UST area. ESE concluded that groundwater containing TCE was cross-contaminating the upper perched sand beds at the site by upwardly migrating through the monitoring wells completed in both the deeper clay aquifer and the shallower sand beds (ESE, 1993).

Background research by ESE (ESE, 1991a) indicated that several sites surrounding the site handled petroleum hydrocarbons and solvents containing HVOCs. In addition, numerous unauthorized releases at other properties have been documented by the ACHCSA and the RWQCB (ESE, 1991a).

Wells MW-4, MW-5, and MW-6 were abandoned in March 1994. The ACHCSA recommended that one additional well be installed further west of MW-3 to define the TPH-g plume in the downgradient direction (ACHCSA, 1993). Well MW-7 was installed for this purpose (ESE, 1994).

ESE performed a soil vapor extraction test in 1994 (ESE, 1995a) and aquifer testing in 1995 to determine feasibility for a remediation system. The results of these tests were reported in the Remedial Action Plan (RAP) dated August 25, 1995 (ESE, 1995b). The RAP was approved by the ACHCSA in September 1995. A dual phase extraction and treatment system was constructed in late 1995 and early 1996. The vapor phase of the system was put into operation in February 1996 and the groundwater phase was initiated in April 1996. A summary of laboratory analytical results of groundwater sampling is included in Table 2.

The remediation system operated until March 1998 when the system was shut down. A closure report for the site was prepared and finalized in December 1998. The closure report requested closure based on health risk assessment. A meeting between ACHCSA, Trammel Crow, and ESE took place on April 26, 1999, and this scope of work was developed as a result of that meeting.

1.4 Scope of Work

The scope of work for this sampling event included sampling soil immediately adjacent to the former UST near to former boring SB-3 and SB-4 (Figure 2). The purpose of the soil sampling was to determine the concentrations of TPH-g adjacent to the area remediated by the vapor extraction system and values to initial concentrations when the UST was removed. In addition to soil sampling, groundwater samples were collected from two wells located at the site. Prior to sampling, the wells were redeveloped, surveyed, and sampled. Soil and groundwater samples were submitted for laboratory analysis. Upon completion of work this report was prepared.

2.0 WORK PERFORMED

Prior to the start of site work, ESE generated a site-specific health & safety plan (HASP) for direct-push activities. Drilling permits were obtained from Alameda County Zone 7. In addition, Underground Service Alert and facility personnel were contacted, for clearance of underground utilities prior to conducting any drilling activities.

2.1 Well Redevelopment and Surveying

On July 29, 1999, ESE redeveloped groundwater monitoring wells MW-1 and MW-3. The wells had not been used in several years and were cleaned out prior to sampling. The redevelopment procedures included surging and bailing each section of the well until debris-free water was obtained. Well redevelopment logs are located in Appendix A.

After redevelopment, the well tops were refitted and a survey notch cut into the top of each. All three monitoring wells at the site were surveyed using a relative datum.

2.2 Groundwater Monitoring Well Sampling

On August 3, 1999, ESE returned to the site to sample groundwater monitoring wells MW-1 and MW-3. Sampling procedures included purging the well of a minimum of three volumes of water and measuring pH, specific conductivity, temperature, and turbidity during purging. Purging was considered complete when the water was clear and measurements were constant. Well purging and sampling data forms are located in Appendix B. The purge water was collected and stored in 55-gallon drums and then transported and disposed of by a certified transporter. The waste manifest form is located in Appendix C.

Samples were collected from well MW-1 and MW-3. Groundwater samples were obtained from the wells by lowering a new disposable bailer into each well. The groundwater was then dispensed from the bailers into laboratory supplied 40-milliliter glass vials containing hydrochloric acid (a preservative). Three vials were collected for each well. The sample vials were then sealed with a Teflon-lined cap,

labeled, placed on ice in a cooler and transported under a chain-of-custody document to McCampbell Analytical, Inc., (McCampbell). Samples were dispensed into laboratory supplied vials and placed on ice in a cooler and shipped under chain of custody to McCampbell.

2.3 Soil Sampling

On September 3, 1999, ESE directed Gregg Drilling, Inc., (Gregg) of Martinez, California, to conduct two direct-push soil borings (borings) in the area of the former UST. ESE employed direct-push technology drilling techniques (i.e., Geoprobe®). A Geoprobe® is a reconnaissance tool employed to assist in determining the magnitude and horizontal extent of chemical constituents in soil and groundwater. To conduct the direct-push investigation, a 2-1/4 inch diameter probe was pneumatically advanced in four-foot intervals to several feet below groundwater. At each four-foot interval, an internal acetate liner, containing a continuous core of soil, was removed and an approximately one (1) foot section of soil-filled acetate liner was selected for laboratory analysis. The sampling equipment was decontaminated between each boring to assist in preventing cross contamination of borings. The borehole was backfilled to the surface with Portland cement and 5% bentonite using a tremmie. Drill cuttings and decon water were contained and disposed of appropriately. Prior to demobilization, the work areas were cleaned and the site restored to near its original condition.

Boring SB-1E was placed within the former UST area and adjacent to previous boring SB-4. Boring SB-2E was placed just outside of the former UST area and adjacent to previous boring SB-3. Approximate location of confirmation soil borings and a summary of laboratory analytical results are shown on Figure 6.

Boring SB-1E was completed at a depth of 15.8 feet. The upper portion of the boring went through pea gravel from the former UST backfill. Poor recovery of samples was noted from 0 to 12 feet bgs due to the presence of pea gravel. A soil sample was collected from 13.8 to 15.8 feet. This sample was described as sand from 13.8 to 14.5 feet bgs and clay below 14.5 feet bgs. Two samples from this boring were submitted for analysis and were designated SB-1E @ 13.8-14.8 and SB-1E @ 15.8. The soil sample collected from SB-1E designated @ 15.8 feet should have been designated @ 14.8-15.8

In boring SB-2E, one soil sample was collected from the soil at approximately 6.8 to 7.8 feet bgs at the soil/water interface. This sample was clayey and had no odor. A second soil sample was recovered from the 8 to 11 foot bgs interval. This sample contained plastic clays, which prevented extrusion of the sample. The entire tube was capped, chilled, and taken back to the drilling company's shop and the sample extruded there. Two soil samples from boring SB-2E were submitted for analysis: SB-2E at 6.8-7.8 and SB-2E at 9.5-10.5.

All soil samples were labeled with project number, sample location, sample identification number, sample depth, name of sampler, date, and time of sampling, placed on ice in a cooler for preservation of sample integrity during transportation to the laboratory. Sample collection, decontamination, and laboratory quality control (QC) procedures followed Environmental Protection Agency (EPA) accepted protocol.

2.4 Laboratory Analysis

ESE submitted soil and groundwater samples to McCampbell Analytical Inc., a State of California certified analytical laboratory located in Pacheco, California. The laboratory analytical reports and analysis request and chain-of-custody records are included in Appendix D. Two groundwater samples, one blind duplicate and one field blank (total four groundwater samples) and a total of four soil samples from two borings were selected for analysis based upon agency direction, visual observations, and the sample depth interval.

- Total Petroleum Hydrocarbons (TPH) as using EPA Method 8015 Modified; and
- Benzene, toluene, ethylbenzene, and xylene (BTEX) (USEPA Method 8020).

3.0 RESULTS

3.1 Groundwater Measurements

Depth to groundwater, at about 10 feet bgs, in August 1999, was within the range previously found at the site in the first water encountered. Groundwater flow direction, with the limited number of wells measured (three in a row) was to the west and was consistent with previously measured wells found in the upper water-bearing zone. Calculated groundwater gradient for August 1999, was 0.004 feet/foot.

3.2 Groundwater Analysis

The groundwater sample from well MW-1 was non-detectable for TPH-g and BTEX at detection limits required by the ACHCSA. Well MW-1 is located east of the former UST and locally upgradient. The groundwater sample from well MW-3 contained detectable TPH-g at a concentration of 21,000 ug/L (micrograms per liter) or an equivalent of 21 ppm (parts per million). BTEX was detected in MW-3 groundwater samples at concentrations of 5,500, 2,300, 470, and 990 ug/L, respectively. Well MW-3 is located west of and locally downgradient from the former UST. A summary of laboratory analytical results of groundwater sampling is included in Table 2.

3.3 Soil Sample Analysis

Soil samples from Boring SB-1E were collected from below pea gravel in the former tank pit and adjacent to former Soil Boring SB-4. Of note is that samples were collected from a sand layer that lies between the upper and lower clays at depths of 13.8 to 14.8 feet bgs and 14.8 to 15.8 feet bgs. Detectable TPH-g levels were found at maximum concentrations of 2,600 mg/Kg or ppm. BTEX levels were found at concentrations of 13, 180, 37, and 160 mg/Kg or ppm respectively.

Boring SB-2E was located outside of the former tank pit and adjacent to former soil boring SB-3. In Boring SB-2E, soil samples were collected in the upper clay unit at depths of 6.8 to 7.8 feet bgs and 9.5 to 10.5 feet bgs. No detectable hydrocarbons were found in the soil samples from SB-2E. A summary of laboratory analytical results of soil sampling is included in Table 3.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Groundwater flow direction has remained to the west within the three wells measured. Of note is that these wells measure the first groundwater, which is likely a semi-confined aquifer due to the overlying clay. This upper aquifer may be influenced by the beds dipping westward, sewers, storm drains, foundations, and utility corridors. Regional groundwater water is likely to follow topography and drain eastward toward Lake Merritt.

Groundwater at the site is impacted with TPH-g in the area locally downgradient from the former UST. Groundwater samples from east of the former UST, (MW-1) were nondetectable for TPH and gas constituents, as noted in the past. Groundwater samples from MW-3 located locally downgradient (west) of the former UST, contained detectable TPH-g and gasoline constituents at concentrations similar to the September 1996 levels (see Table 2) and much higher than the concentrations found in December 1996 and November 1997.

When comparing the soil samples collected in 1988 and 1991 to those collected in 1999, it appears that the upper clay layer has been cleaned to nondetectable concentrations of TPH-g and the lower sand unit has a very limited zone of elevated TPH directly below the former UST. TPH-g concentrations (SB-4 @ 15 feet bgs, drilled 1991= 13 ppm TPH-g, SB-3 at 15 feet = 5.9 ppm TPH-g and SB1-E drilled 1999, @ 15 feet bgs =2,600 ppm TPH-g).

ESE believes that the site is plagued by incoming petroleum hydrocarbons in the lower sand zone and that remediating the site using vapor extraction may pull additional hydrocarbons from adjacent areas onto the site. Reasoning for this opinion is as follows:

1. 1996/1997 groundwater data revealed clean groundwater from wells during system operation (see Table 2).
2. The vapor extraction system was known to pull water at times and locally influenced the gradient of the groundwater. By reversing the gradient, plumes of contaminated groundwater may have been pulled onto the site from downgradient and cross gradient locations such as the site across the street, sanitary sewer, and storm sewers.

3. The upper clay soil has been verified to be clean of petroleum hydrocarbons. This layer extended from beneath the surface to approximately the upper half of the former UST.

4. Only a small area of the sand zone, located below the UST contains substantial TPH-g concentrations. Due to groundwater levels and overlying pea gravel, remediation efforts have not been effective in this limited area of the lower zone. The impacted area is too small to warrant additional remediation. The estimated extent of hydrocarbon impacted groundwater is shown in Figure 7.

Based on the conclusions of this report, ESE on behalf of Trammell Crow requests closure for the UST case.

5.0 CLOSURE DECISION CONSIDERING RISK MANAGEMENT

The risk assessment summary presented in the closure report (QST, 1999) was predicated on the concentrations of the chemicals of concern (COC) after remedial action and the site description. The results of the confirmation sampling now indicate that the maximum COC concentrations for benzene and TPH-g in soil and in groundwater from locations previously sampled, are greater than measured previously, even after remedial action. Risk management consideration of these findings leads to the same conclusion as presented in Section 4.0 of the Closure Report.

5.1 Risk Assessment

The use of risk assessment in environmental decision making is based on the principle that risk reduction, considering applicable exposure pathways, is better than mass reduction without consideration for applicable exposure pathways. This ties to the associated principle of risk management that where there is no exposure there is no risk. These rather abstract thoughts apply to the Broadway Volkswagen property because it is highly unlikely that anyone will be exposed to the soil under the concrete sidewalk and building foundation. However, the comparison was drawn in the site closure report that the maximum benzene concentration in soil (2.2 mg/kg) was only slightly higher than the industrial soil Preliminary Remediation Goal (PRG) of 1.4 mg/kg. For this addendum report, the elements of the risk summary in the closure report are updated as follows.

5.1.1 Chemicals of Concern

The COCs for risk assessment and environmental decision making remain as TPH-g and BTEX, as specified in the site closure report.

5.1.2 Site Conceptual Model

The site conceptual model description remains the same, specifying soil and groundwater as the environmental media of concern. There is one caveat. It is highly unlikely that anyone will be exposed to the soil under the concrete sidewalk and building foundation. In that regard, risk assessment of soil

according to any exposure scenario, commercial-industrial or residential, is very conservative. It is also highly unlikely that anyone will be exposed in the shallow groundwater at about 10-12 feet bgs in a potable -use scenario, be it residential or commercial-industrial.

5.1.3 Exposure and Toxicity Assessments

The commercial-industrial soil PRG for benzene cited in the site closure report has been revised by Region IX EPA as of October 1, 1999. It is now 1.5 mg/kg based on a target risk of 1×10^{-6} increased lifetime cancer risk (ILCR). As cited in our work plan of June 11, 1999, a target risk of 1×10^{-5} ILCR is used for the commercial-industrial scenario, resulting in a PRG of 15 mg/kg, based on the federal cancer slope factor (oral exposure route) of $0.029 \text{ (mg/kg-day)}^{-1}$. The PRG is revised for the California EPA cancer slope factor of $0.1 \text{ (mg/kg-day)}^{-1}$ as follows:

$$15 \text{ mg/kg} \quad \times \quad \frac{0.029 \text{ (mg/kg-day)}^{-1}}{0.1 \text{ (mg/kg-day)}^{-1}} \quad = \quad \underline{4.35 \text{ mg/kg}}$$

The maximum soil concentrations found in Boring SB-1E were as follows:

COC	SB-1E Conc. (mg/kg)	EPA Region IX Industrial Soil PRG (mg/kg)
Benzene	13	4.35*
Toluene	180	520
Ethylbenzene	37	230
Xylenes (mixed)	160	210
TPH-g	2,600	**
*Modified for California cancer slope factor and target risk of 1×10^{-5} ILCR.		
**There is no PRG for TPH-g, but Appendix A of the Site Closure Report indicates that the measured concentration is not a particular concern for health impact. Benzene is also measured directly as a surrogate for the carcinogenic properties of TPH-g.		

Of the BTEX analytes, only benzene exceeds the industrial soil PRG. In fact, a sample from SB-1E (the same location as SB-4 in the site closure report) yields over 5 times the prior maximum concentration of 2.3 mg/kg cited in the site closure report. Given the fact the source has been removed, the VE system was in operation, and additional time has passed, ESE believes that the benzene result is consistent with contribution from offsite sources.

The comparison of the groundwater results from monitoring well, MW-3, to EPA Region IX tap water PRGs is as follows:

COC	MW-3 8/5/99 Conc. (mg/L)	California MCLs (mg/L)
Benzene	5.5	0.001
Toluene	2.3	0.150
Ethylbenzene	0.47	0.700
Xylenes (mixed)	0.99	1.750
TPH-g	21	*
*There is not an MCL, either federal or California, for TPH-g, but Appendix A of the Site Closure Report indicates that the measured concentration is not a concern for health impact.		

The risk characterization of the groundwater results is discussed in the next section.

5.1.4 Risk Characterization

The measured maximum concentrations of the COCs can serve as indicators, but they are not necessarily representative of the soil and water quality that might leave the site to cause a health concern. The site characterization indicates that soil beneath the former underground storage tank (UST) locations has a maximum COC concentration for benzene that exceeds the industrial PRG. However, that concentration is located in the sand lens between the upper and lower clays at 13.8-14.8 feet bgs and 14.8-15.8 feet bgs. It is implausible that exposure to this concentration will occur in an industrial exposure setting consisting of 8-hour days for 25 years. This situation is comparable to the risk management principle of no-exposure/no-risk. The situation presumably exists as it has been measured, but its potential for health impact is *de minimis*. The measured maximum concentrations of benzene and toluene in groundwater exceed California MCLs. However, the contaminant reduction factor (CRF) of 15.3 for the maximum toluene concentration ($2.3/0.150 = 15.3$) would be accommodated easily in the process of shallow groundwater mixing with deeper groundwater. Impact from toluene on area groundwater quality should be *de minimis*. The CRF for the maximum benzene concentration in the shallow groundwater is 5500 ($5.5/0.001 =$

5500). Considering the groundwater monitoring results for benzene reported in Table 2 of the Site Closure Report, the current result is consistent with a very localized situation at MW-3 that is not indicated at either MW-1 or MW-7 (both had not-detected results consistently in 1996 and 1997). Further, the trend of the results in MW-3 from 1989 to the current result, indicate that natural attenuation processes have resulted in a receding benzene concentration since 1996. The prospect is that this trend will continue without further remedial action, and that the amount of groundwater involved in this very localized situation is not a significant threat to the deeper groundwater. In other words, it is likely that a CRF of 5300 can be accommodated based on the relatively small amount of shallow groundwater that would be incorporated into the much larger mass of the deeper groundwater. It is implausible that the shallow groundwater will be used for potable or other use, and natural attenuation is very likely to remove the situation going forward.

5.2 Remedial Action

Remedial action has been conducted over the past 12 years, including removal of the USTs and soil for mass removal and implementation of soil vapor extraction and groundwater pump-and-treat to reduce soil and groundwater COC concentrations and thereby reduce risk.

5.3 Risk Based Decision Support

Risk-based evaluation of the additional sampling results provides valuable information in support of the closure of the environmental investigation of the Broadway Volkswagen property.

The Site Closure Report and additional sampling indicate a localized area of COCs in soil and in groundwater. In soil, the upper clay soil has been verified clean of petroleum hydrocarbons. Only a small area of the sand zone contains a benzene concentration of concern. The groundwater results in both the Site Closure Report and additional sampling indicate maximum concentrations of benzene and toluene at MW-3 that exceed MCLs. These localized areas of soil and groundwater do not constitute an exposure threat and can be accommodated by natural attenuation processes in the environmental media.

6.0 REFERENCES

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- QST Environmental Inc., 1999, Site Closure Report, Property No. 4826, Broadway Volkswagen, 2740 Broadway Avenue, Oakland, California, QST Project No. 6598059, March 1, 1998.

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TABLE 1
GROUNDWATER ELEVATION DATA
Broadway Volkswagen
2740 Broadway
Oakland, CA

Well Number	Date	Top of Well Casing Elevation (feet above MSL)	Depth to Ground Water from Top of Casing (feet)	Ground Water Elevation (feet above MSL)
MW-1	1/29/89	29.22	7.50	21.72
	2/6/89		9.00	20.22
	3/13/89		8.50	20.72
	5/13/91		12.60	16.62
	10/18/91		10.11	19.11
	10/27/92		9.63	19.59
	7/13/93		6.26	22.96
	6/27/96		6.25	22.97
	9/19/96		10.46	18.76
	12/13/96		5.85	23.37
	10/7/97		10.38	18.84
MW-3	1/29/89	30.00	11.70	18.30
	2/6/89		11.00	19.00
	3/13/89		10.70	19.30
	5/13/91		10.56	19.44
	10/18/91		10.21	19.79
	10/27/92		10.81	19.19
	7/13/93		9.64	20.36
	6/28/96		NM	NA
	9/19/96		11.22	18.78
	12/13/96		9.55	20.45
	12/13/96		11.14	18.86
MW-4*	1/29/89	29.70	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		11.20	18.50
	10/18/91		9.55	20.15
	10/27/92		9.21	20.49
	7/13/93		8.32	21.38

TABLE 1
GROUNDWATER ELEVATION DATA
Broadway Volkswagen
2740 Broadway
Oakland, CA

Well Number	Date	Top of Well Casing Elevation (feet above MSL)	Depth to Ground Water from Top of Casing (feet)	Ground Water Elevation (feet above MSL)
MW-5	1/29/89	30.50	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		-19.23	19.23
	10/27/92		#REF!	19.26
	7/13/93		#REF!	20.29
MW-6*	1/29/89	29.19	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		10.21	18.98
	10/27/92		9.78	19.41
	7/13/93		8.50	20.69
MW-7	1/29/89	Top of well casing not surveyed to date.	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		NM	NA
	10/27/92		NM	NA
	7/13/93		NM	NA
	6/27/96		9.70	--
	9/19/96		11.92	--
	12/13/96		10.13	--
12/13/96	11.82	--		

Notes:

MSL - Mean Sea Level

* - Well abandoned on 3/16/94

NM - Not Measured

NA - Not Applicable

TABLE 2
SUMMARY OF LABORATORY ANALYTICAL RESULTS
OF GROUNDWATER SAMPLING
Broadway Volkswagen
2740 Broadway
Oakland, CA

Well Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-G	MTBE
		concentrations (ug/L)					
MW-1	1/21/89	53	13	1.4	8.2	ND	NA
	5/16/91	ND	ND	ND	1.1	130	NA
	10/18/91	ND	ND	ND	ND	ND	NA
	10/27/91	ND	ND	ND	ND	ND	NA
	7/13/93	ND	ND	ND	ND	ND	NA
	6/27/96	ND	ND	ND	ND	ND	NA
	9/19/96	ND	ND	ND	ND	ND	NA
	12/13/96	ND	ND	ND	ND	ND	NA
	10/7/97	ND	ND	ND	ND	ND	ND
8/3/99	ND	ND	ND	ND	ND	ND	
MW-3	1/21/89	9,600	8,200	1,800	6,200	32,000	NA
	5/16/91	7,800	12,000	1,200	4,000	81,000	NA
	10/18/91	9,400	8,600	750	3,300	73,000	NA
	10/27/91	7,100	4,900	970	3,500	37,000	NA
	7/13/93	8,100	6,200	8,100	4,400	41,000	NA
	6/28/96	120	75	6.2	47	370	NA
	9/25/96	6,000	2,700	450	2,180	15,000	NA
	12/13/96	30	10	2	7.4	ND	NA
	DUP	12/13/96	21	7	1	4.9	ND
DUP	10/7/97	ND	ND	ND	ND	ND	ND
	10/7/97	21	7	1	4.9	ND	5.7
DUP	8/3/99	5,500	2,300	470.0	990.0	21,000	NA
MW-4*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	160	690	250	1,100	13,000	NA
	10/18/91	11.0	11.0	ND	15	ND	NA
	10/27/91	6.4	2.8	1.2	6.2	180	NA
	7/13/93	36	4.4	1.8	5.3	320	NA
MW-5*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
	10/18/91	3,500	530	670	1,100	16,000	NA
	10/27/91	ND	ND	ND	ND	87	NA
	7/13/93	ND	ND	ND	ND	90	NA
MW-6*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
	10/18/91	640	2,700	1,100	4,500	28,000	NA
	10/27/91	48	130	55	230	1,300	NA
	7/13/93	5.1	30	30	230	1,100	NA

TABLE 2
SUMMARY OF LABORATORY ANALYTICAL RESULTS
OF GROUNDWATER SAMPLING
Broadway Volkswagen
2740 Broadway
Oakland, CA

Well Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-G	MTBE
		concentrations (ug/L)					
MW-7	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
	10/18/91	NA	NA	NA	NA	NA	NA
	10/27/91	NA	NA	NA	NA	NA	NA
	7/13/93	NA	NA	NA	NA	NA	NA
	6/27/96	ND	ND	ND	ND	ND	NA
	9/19/96	ND	ND	ND	ND	67	NA
	12/13/96	ND	ND	ND	ND	ND	NA
	10/7/97	ND	ND	ND	ND	ND	ND

Notes:

TPH-G - Total Petroleum Hydrocarbons as gasoline

MTBE - Methyl tert-Butyl Ether

ug/L - micrograms per liter

ND - Not detected at or above detection limits

NA - Not Analyzed

DUP - duplicate sample

* - Wells abandoned on 3/16/94

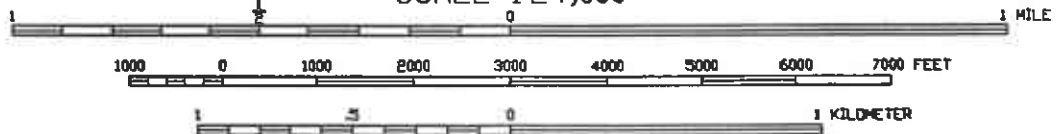
TABLE 3
SUMMARY OF ANALYTICAL RESULTS OF
SOIL SAMPLING AUGUST 5, 1999
Broadway Volkswagon
2740 Broadway
Oakland, CA

Sample ID	Depth ft bgs	TPH-g Method 8015M mg/kg	Benzene	Toluene	Ethylbenzene	Total Xylenes
			Method 8020 mg/kg			
SB-1E	13.8-14.8	84 (a)	0.94	4.5	1.2	7.4
SB-1E	14.8-15.8	2600 (a)	13	180	37	160
SB-2E	6.8-7.8	ND<1.0	ND<.005	ND<.005	ND<.005	ND<.005
SB-2E	9.5-10.5	ND<1.0	ND<.005	ND<.005	ND<.005	ND<.005


TPH-g Total Petroleum Hydrocarbons as gasoline
mg/kg milligrams per kilogram or parts per million
ft gs feet below ground surface
ND not detected at detection limit shown
laboratory comments
(a) unmodified or weakly modified gasoline significant



SCALE 1:24,000



OAKLAND WEST QUADRANGLE 7.5 MINUTES 1959, PHOTOREVISED 1980

 <p>Environmental Science & Engineering, Inc. A MACTEC Company</p>	<p>DATE 01/28/00</p>	<p>SITE LOCATION MAP</p>	<p>FIGURE NO. 1</p>
	<p>REVISD</p>		<p>TRAMMELL CROW PROP #4286 2740 BROADWAY OAKLAND, CALIFORNIA</p>
<p>1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA 94553-4189</p>	<p>CAD FILE 65990651</p>		



BROADWAY AVENUE

AUTOMOBILE INTERIOR SERVICE

AUTOMOBILE EXCHANGE SERVICE (AES)

MW-5
ABANDONED

MW-6
ABANDONED

28th STREET

VW-1

MW-3

VW-2

SB-2E
SB-3

SB-4
SB-1E

VW-3

MW-1

A'

A

MW-7

SHOWROOM

OFFICES

ENTRANCE

MW-4
ABANDONED

RAMP TO SECOND FLOOR

PARKING LOT

HALLWAY

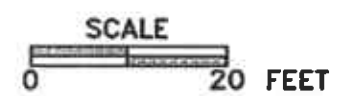
GARAGE

PARKING LOT

OFFICES

LEGEND:

- MW-7 MONITORING WELL
- SB-3 SOIL BORING
- VW-3 VAPOR EXTRACTION WELL
- FORMER UNDERGROUND TANK AREA



<p>Environmental Science & Engineering, Inc. A MACTEC Company</p> <p>1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553-4189</p>	<p>DATE 09/30/99</p>	<p>SITE MAP</p>	<p>FIGURE NO. 2</p>
	<p>REVISIONS</p>		<p>TRAMMELL CROW PROP. #4286 2740 BROADWAY OAKLAND, CALIFORNIA</p>
	<p>CAD FILE 659906502</p>		



BROADWAY AVENUE

AUTOMOBILE INTERIOR SERVICE

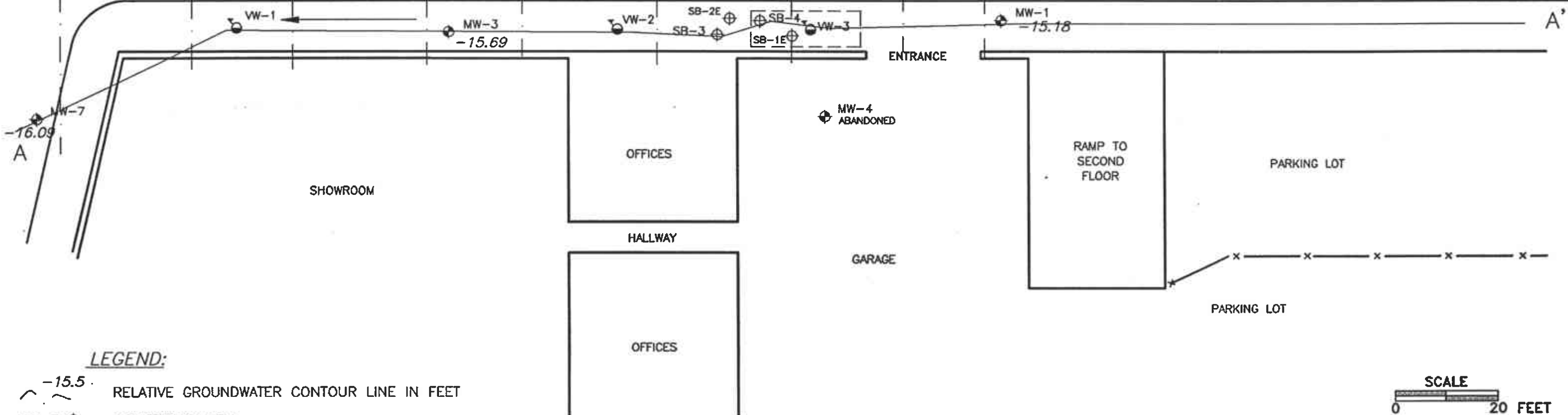
AUTOMOBILE EXCHANGE SERVICE (AES)

MW-5
ABANDONED

MW-6
ABANDONED


28th STREET

-16.0 -15.9 -15.8 -15.7 -15.6 -15.5 -15.4 -15.3 -15.2



LEGEND:

- 15.5 RELATIVE GROUNDWATER CONTOUR LINE IN FEET
- MW-7 MONITORING WELL
- SB-3 SOIL BORING
- VW-3 VAPOR EXTRACTION WELL
- FORMER UNDERGROUND TANK AREA
- RELATIVE GROUND WATER FLOW

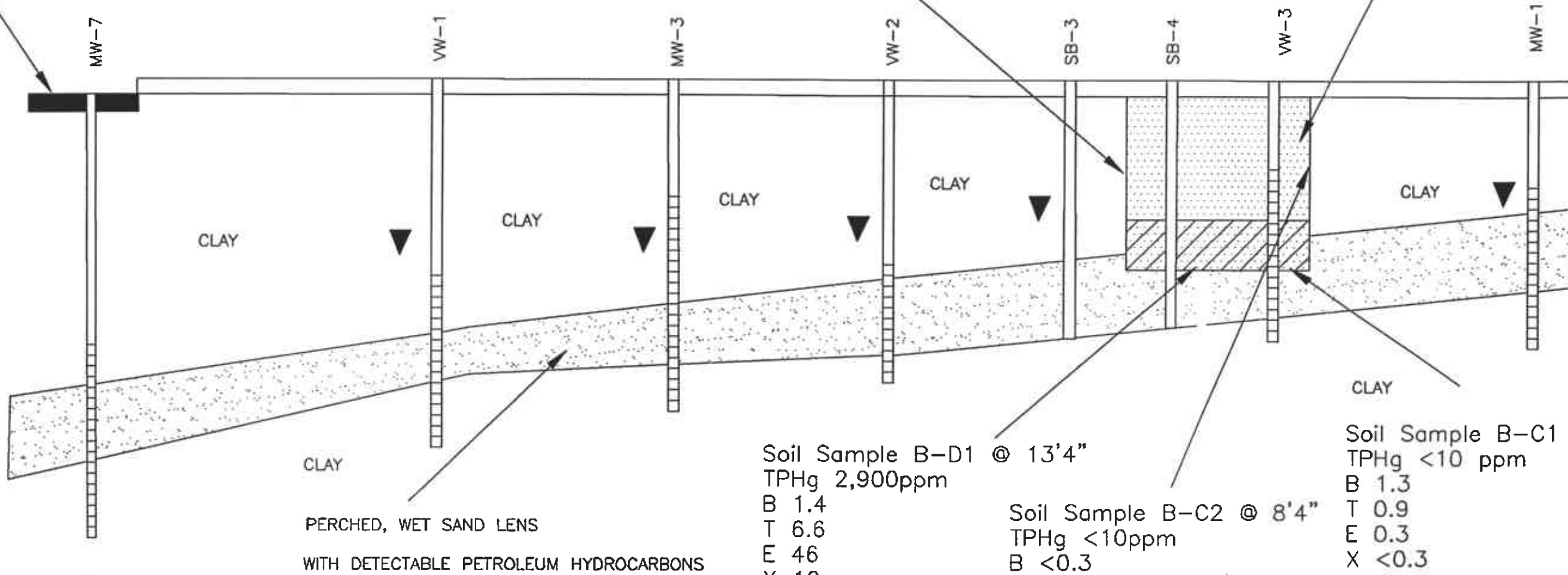
 Environmental Science & Engineering, Inc. A MACTEC Company 1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA 94553-4189	DATE 10/01/99	RELATIVE GROUNDWATER ELEVATION MAP TRAMMELL CROW PROP. #4286 2740 BROADWAY OAKLAND, CALIFORNIA	FIGURE NO. 3
	CAD FILE 65906503		PROJ. NO. 6599065

Soil Sample B-D2 @ 7'9"
 TPHg <10ppm
 B 2.2 T 26
 E 78 X 14
 O & G <50ppm

WEST A
 BROADWAY AVENUE

EAST A'

FORMER UST LOCATION



Soil Sample B-D1 @ 13'4"
 TPHg 2,900ppm
 B 1.4
 T 6.6
 E 46
 X 12
 O & G 1,200ppm

Soil Sample B-C2 @ 8'4"
 TPHg <10ppm
 B <0.3
 T <0.3
 E <0.3
 X <0.3
 O & G - NA

Soil Sample B-C1 @ 13'4"
 TPHg <10 ppm
 B 1.3
 T 0.9
 E 0.3
 X <0.3
 O & G - NA

LEGEND

- CLAY
- SAND
- PEA GRAVEL BACKFILL
- GROUND WATER WITH DETECTED HIGH CONCENTRATIONS OF PETROLEUM HYDROCARBONS
- MEASURED WATER LEVEL (7/1/94)

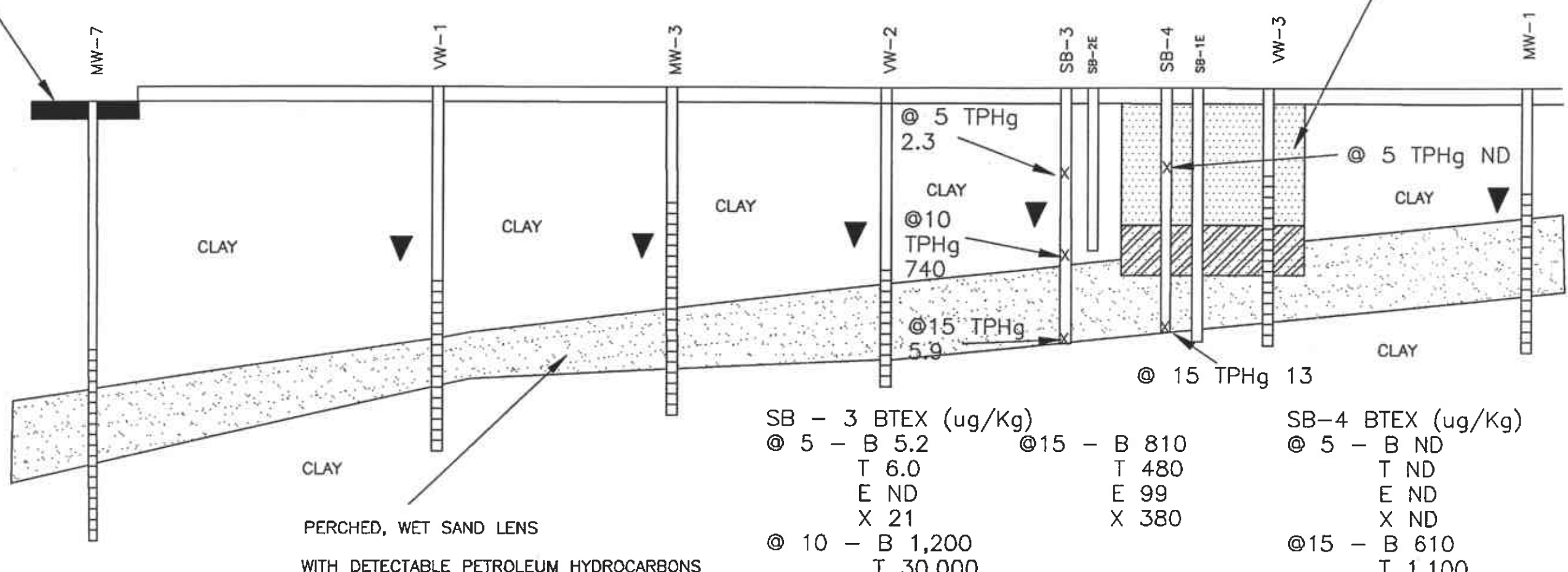
- MONITORING WELL BLANK CASING OR SOIL BORING
 - MONITORING WELL SCREENED INTERVAL
 - SOIL SAMPLE LOCATION TPH-g, BTEX, O&G IN ppm, 1988 SOIL
- NOT TO SCALE

Environmental Science & Engineering, Inc. A MACTEC Company	DATE 10/27/99	CROSS SECTION A-A' LOCATION OF UST REMOVAL SAMPLES AND SOIL BORINGS	FIGURE NO. 4
	REVISED		TRAMMEL CROW PROPERTY #4286 2740 BROADWAY OAKLAND, CALIFORNIA
1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553-4189	CAD FILE 69906504		

WEST A
BROADWAY AVENUE

EAST A'

FORMER UST LOCATION



SB - 3 BTEX (ug/Kg)


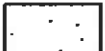
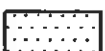
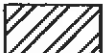

@ 5 - B 5.2
T 6.0
E ND
X 21
@ 10 - B 1,200
T 30,000
E 9,400
X 42,000




@ 15 - B 810
T 480
E 99
X 380


SB-4 BTEX (ug/Kg)

@ 5 - B ND
T ND
E ND
X ND
@ 15 - B 610
T 1,100
E 170
X 840

LEGEND

-  CLAY
-  SAND
-  PEA GRAVEL BACKFILL
-  GROUND WATER WITH DETECTED HIGH CONCENTRATIONS OF PETROLEUM HYDROCARBONS
-  MEASURED WATER LEVEL (7/1/94)

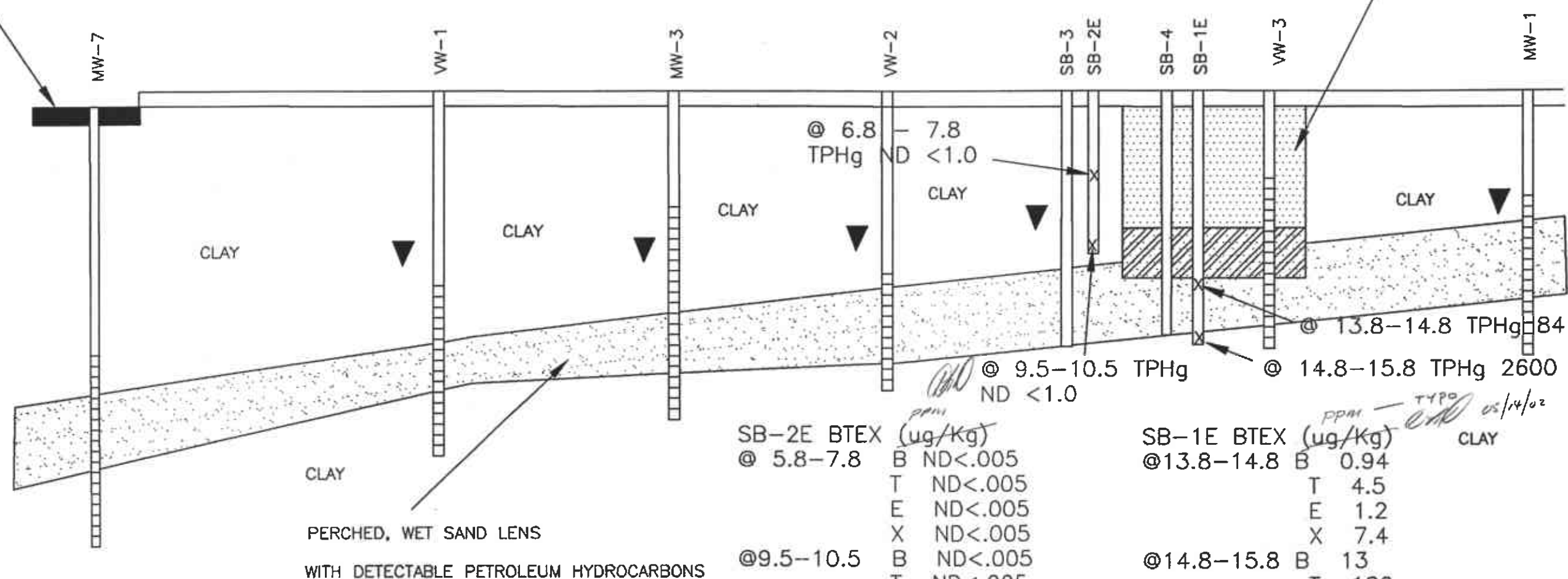
-  MONITORING WELL BLANK CASING OR SOIL BORING
 -  MONITORING WELL SCREENED INTERVAL
 -  SOIL SAMPLE LOCATION TPH-g in ppm, BTEX (ug/Kg), 1991 SOIL
- NOT TO SCALE

 Environmental Science & Engineering, Inc. A MACTEC Company	DATE 10/27/99	CROSS SECTION A-A' LOCATION OF SOIL BORINGS	FIGURE NO. 5
	REVISED		TRAMMEL CROW PROPERTY #4286 2740 BROADWAY OAKLAND, CALIFORNIA
1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553-4189	CAD FILE 69906505		

WEST A
BROADWAY AVENUE

EAST A'

FORMER UST LOCATION



LEGEND

- CLAY
 - SAND
 - PEA GRAVEL BACKFILL
 - GROUND WATER WITH DETECTED HIGH CONCENTRATIONS OF PETROLEUM HYDROCARBONS
 - MEASURED WATER LEVEL (7/1/94)
 - MONITORING WELL BLANK CASING OR SOIL BORING
 - MONITORING WELL SCREENED INTERVAL
 - SOIL SAMPLE LOCATION TPH-g, BTEX, O&G IN ppm, 1988 SOIL
- NOT TO SCALE

<p>Environmental Science & Engineering, Inc. A MACTEC Company</p>	<p>DATE 10/27/99</p>	<p>CROSS SECTION A-A' APPROXIMATE LOCATION OF CONFIRMATION SOIL BORINGS</p>	<p>FIGURE NO. 6</p>
	<p>REVISIONS</p>		
<p>1340 ARNOLD DRIVE, SUITE 126 MARTINEZ, CA. 94553-4189</p>	<p>CAD FILE 69906506</p>	<p>PROJ. NO. 6599065</p>	



BROADWAY AVENUE

AUTOMOBILE INTERIOR SERVICE

AUTOMOBILE EXCHANGE SERVICE (AES)

MW-5
ABANDONED

MW-6
ABANDONED

28th STREET

VW-1

MW-3

VW-2

SB-2E
SB-3

SB-4
SB-1E

VW-3

MW-1

A

A'

MW-7

ENTRANCE

MW-4
ABANDONED

OFFICES

RAMP TO SECOND FLOOR

PARKING LOT

SHOWROOM

HALLWAY

GARAGE

PARKING LOT

OFFICES

LEGEND:

MW-7 MONITORING WELL

SB-3 SOIL BORING

VW-3 VAPOR EXTRACTION WELL

FORMER UNDERGROUND TANK AREA

ESTIMATED EXTENT OF HYDROCARBON-IMPACTED GROUNDWATER



Environmental Science & Engineering, Inc.
A MACTEC Company

DATE
09/30/99

REVISED

1340 ARNOLD DRIVE, SUITE 126
MARTINEZ, CA. 94553-4189

CAD FILE
659906507

ESTIMATED EXTENT OF HYDROCARBON-IMPACTED GROUNDWATER

TRAMMELL CROW PROP. #4286
2740 BROADWAY
OAKLAND, CALIFORNIA

FIGURE NO.

7

PROJ. NO.

6599065

APPENDIX A
WELL REDEVELOPMENT LOGS

QST ENVIRONMENTAL INC.

WELL PURGING AND SAMPLING DATA FORM

REDEVELOPMENT

Client/Site Name: TRAMMELL / Broadway Jw
 Site Address: _____
 QST Field Personnel: TDD/JTH
 Facility UST ID: _____

Date: 07-29-99
 Well ID: MW-1
 QST Project #: 6599065
 QST Work Code: _____

Total Well Depth: 18.97 (silty)
 Depth To Free Product: _____
 Free Product Thickness: _____
 Casing Diameter: 2" SCHEDULE 40

Screened Interval: uk / 2:30pm
 Depth To Water: 8.43 / 9.53'
 Top Of Casing (Elevation): _____
 Time: 12:55pm

NEW
 SALINA
 +
 LOCK
 3210

Method Of Purging (i.e., Grundfos pump, peristaltic pump, or bailer) BAILER (GS)
REDEVELOPMENT

	Start	Interval I	Interval II	Interval III	Sample Point
Time					
pH					
Specific Conductivity					
Temperature					
Turbidity (Visual)					
Volume Purged (Gal)					
					(Total)

Method Of Sampling: _____
 Sample Date/Time: _____
 Sample ID Number: _____
 Laboratory Analysis Required: _____
 Sample Container Types: _____
 Number Of Sample Containers: _____
 QA/QC Samples Collected: _____
 Weather Conditions: _____

Comments: 1:15pm SURGE BOTTOM 5 FEET 15 MINUTES Empty 5 TIMES
SURGE UPPER 5 FEET 15 MINUTES Empty 5 TIMES
TOTAL PURGE 9+ GALLONS

Sample Collector Signature: [Signature] Date: 07-29-99

Gallons Per Foot Of Casing = 0.164
 Column Of Water (Ft) X 10.54
 Volume Of Casing (Gal) = 1.73
 Number Of Volumes To Purge X 5
 Total Volumes To Purge = 8.65 gallons
9 gallons

Information For Volume Based On Casing Inside Diameter (ID):
 4-Inch ID Casing, Schedule 40 = 1.51 Gallons Per Foot
 4-Inch ID Casing, Schedule 80 = 1.01 Gallons Per Foot
 2-Inch ID Casing, Schedule 40 = 0.17 Gallons Per Foot
 2-Inch ID Casing, Schedule 80 = 0.15 Gallons Per Foot

wellpurg.qst

QST ENVIRONMENTAL INC.

WELL PURGING AND SAMPLING DATA FORM

REDEVELOPMENT

Client/Site Name: TRAMMELL / BROADWAY W
 Site Address: _____
 QST Field Personnel: TDD / JTH
 Facility UST ID: _____

Date: 07-29-99
 Well ID: MW-3
 QST Project #: 65-99-065
 QST Work Code: _____

Total Well Depth: 18.51 (SILTY)
 Depth To Free Product: NA
 Free Product Thickness: NONE
 Casing Diameter: 2" SCHEDULE 40

Screened Interval: UK 2:08pm
 Depth To Water: 10.08 / 10.20 THEO
 Top Of Casing (Elevation): UK REMOVED
 Time: 11:34 am COMPUTER
TO ESTB
NEW-PLUG
M 245 125
NEW NORTH
FOR NEXT
SURVEY.
NEW LOCK
3210.

Method Of Purging (i.e., Grundfos pump, peristaltic pump, or bailer) BAILER (AUP.)
REDEVELOPMENT

	Start	Interval I	Interval II	Interval III	Sample Point
Time					
pH					
Specific Conductivity					
Temperature					
Turbidity (Visual)					
Volume Purged (Gal)					
					(Total)

Method Of Sampling: _____
 Sample Date/Time: _____
 Sample ID Number: _____
 Laboratory Analysis Required: _____
 Sample Container Types: _____
 Number Of Sample Containers: _____
 QA/QC Samples Collected: _____
 Weather Conditions: _____

Comments: 12:35 M SURGE BOTTOM 5 FEET, 15 MINUTES EMPTY W/ 5 TIMES
SURGE UNDER 5 FEET, 5 MINUTES EMPTY W/ 5 TIMES
TOTAL PURGE 7 GALLONS

Sample Collector Signature: [Signature] Date: 09-29-99

Gallons Per Foot Of Casing = 0.164
 Column Of Water (Ft) X 8.43
 Volume Of Casing (Gal) = 1.38
 Number Of Volumes To Purge X 5
 Total Volumes To Purge = 6.9 GALLONS
7 gallons

Information For Volume Based On Casing Inside Diameter (ID):
 4-Inch ID Casing, Schedule 40 = 1.51 Gallons Per Foot
 4-Inch ID Casing, Schedule 80 = 1.01 Gallons Per Foot
 2-Inch ID Casing, Schedule 40 = 0.17 Gallons Per Foot
 2-Inch ID Casing, Schedule 80 = 0.15 Gallons Per Foot

APPENDIX B
WELL PURGING AND SAMPLING DATA FORMS

QST ENVIRONMENTAL INC.

WELL PURGING AND SAMPLING DATA FORM

Client/Site Name: BROADWAY VW
 Site Address: _____
 QST Field Personnel: _____
 Facility UST ID: _____

Date: 08-03-99
 Well ID: MW-1
 QST Project #: 6599065
 QST Work Code: _____

Total Well Depth: 19'
 Depth To Free Product: NONE
 Free Product Thickness: NONE
 Casing Diameter: 2" SCHEDULE 40

Screened Interval: UK
 Depth To Water: 8.96'
 Top Of Casing (Elevation): TBD
 Time: 7:54am

Final
 9.56'
 10:31am

Method Of Purging (i.e., Grundfos pump, peristaltic pump, or bailer) _____

	Start	Interval I	Interval II	Interval III	Sample Point
Time	8:39am		9:06		10:25am
pH	5.90		7.04		17.43
Specific Conductivity	335		351		2.43
Temperature	64.2		64.4		70.2
Turbidity (Visual)	cloudy		BR. CLOUDY		CLEAR - SL. BR. CLOUDY
Volume Purged (Gal)	0		4.5		9
					(Total)

Method Of Sampling: _____
 Sample Date/Time: _____
 Sample ID Number: _____
 Laboratory Analysis Required: _____
 Sample Container Types: _____
 Number Of Sample Containers: _____
 QA/QC Samples Collected: _____
 Weather Conditions: _____
 Comments: _____

Sample Collector Signature:  Date: 09-29-99

Gallons Per Foot Of Casing = 0.164
 Column Of Water (Ft) X 10.04
 Volume Of Casing (Gal) = 1.65
 Number Of Volumes To Purge X 5
 Total Volumes To Purge = 8.25 (9.9)

Information For Volume Based On Casing Inside Diameter (ID):
 4-Inch ID Casing, Schedule 40 = 1.51 Gallons Per Foot
 4-Inch ID Casing, Schedule 80 = 1.01 Gallons Per Foot
 2-Inch ID Casing, Schedule 40 = 0.17 Gallons Per Foot
 2-Inch ID Casing, Schedule 80 = 0.15 Gallons Per Foot

wellpurg.qst

FB-1 (G) 10:10am SPARKLETS DISTILLED DRINKING H₂O

QST ENVIRONMENTAL INC.

WELL PURGING AND SAMPLING DATA FORM

Client/Site Name: BRANDWAY
 Site Address: _____
 QST Field Personnel: _____
 Facility UST ID: _____

Date: 08-05-99
 Well ID: MW-3
 QST Project #: 6599065
 QST Work Code: _____

Total Well Depth: 18.38'
 Depth To Free Product: NONE
 Free Product Thickness: NONE
 Casing Diameter: 2" SCHEDULE 40

Screened Interval: UK
 Depth To Water: 9.86'
 Top Of Casing (Elevation): _____
 Time: 7:50 am

Final
 10.21'
 10:13 am

Method Of Purging (i.e., Grundfos pump, peristaltic pump, or bailer) _____

Time	Start	Interval I	Interval II	Interval III	Sample Point
	4:18 am		4:33 am		10:01 am
pH	6.64		6.51		(12.93) BAD READING
Specific Conductivity	1412		710		638
Temperature	62.4		61.6		68.1
Turbidity (Visual)	Clear		++ CLAY		Clear
Volume Purged (Gal)	0		14		7+
	6.45				(Total)

Method Of Sampling: _____
 Sample Date/Time: _____
 Sample ID Number: _____
 Laboratory Analysis Required: _____
 Sample Container Types: _____
 Number Of Sample Containers: _____
 QA/QC Samples Collected: BD-1 TD
 Weather Conditions: _____
 Comments: _____

Sample Collector Signature:  Date: 09-29-99

Gallons Per Foot Of Casing = 0.164
 Column Of Water (Ft) X 8.52
 Volume Of Casing (Gal) = 1.40
 Number Of Volumes To Purge X 5
 Total Volumes To Purge = 7.0 gallons

Information For Volume Based On Casing Inside Diameter (ID):

4-Inch ID Casing, Schedule 40 = 1.51 Gallons Per Foot
 4-Inch ID Casing, Schedule 80 = 1.01 Gallons Per Foot
 2-Inch ID Casing, Schedule 40 = 0.17 Gallons Per Foot
 2-Inch ID Casing, Schedule 80 = 0.15 Gallons Per Foot

wellpurg.qst

MW-3 = BD-1

APPENDIX C
WASTE MANIFEST FORM

NO. 942182

NON-HAZARDOUS WASTE DATA FORM

TO BE COMPLETED BY GENERATOR
TRANSPORTER
TSD FACILITY

DATE: _____

NAME: Broadway VW EPA I.D. NO. _____

ADDRESS: 2740 Broadway PROFILE NO. _____

CITY, STATE, ZIP: Oakland, CA PHONE NO. () _____

CONTAINERS: No. 1 VOLUME 50 WEIGHT _____

TYPE: TANK TRUCK DUMP TRUCK DRUMS CARTONS OTHER _____

WASTE DESCRIPTION: NON-HAZARDOUS WATER and TPH GENERATING PROCESS: Decon/Purge Water

COMPONENTS OF WASTE		PPM	%	COMPONENTS OF WASTE		PPM	%
1.	<u>WATER</u>		<u>99-100%</u>	5.			
2.	<u>TPH</u>		<u>< 1%</u>	6.			
3.				7.	<u>BESI# 24402</u>		
4.				8.			

PROPERTIES: pH 7-10 SOLID LIQUID SLUDGE SLURRY OTHER _____

HANDLING INSTRUCTIONS: WEAR ALL APPROPRIATE PROTECTIVE CLOTHING

THE GENERATOR CERTIFIES THAT THE WASTE AS DESCRIBED IS 100% NON-HAZARDOUS.

[Signature] TYPED OR PRINTED FULL NAME & SIGNATURE

12/13/99 DATE

NAME: BESI EPA I.D. NO. _____

ADDRESS: 22422 TRABUCO ROAD #105-269 SERVICE ORDER NO. _____

CITY, STATE, ZIP: LAKE FOREST, CA 92630 PICK UP DATE: 12/13/99

PHONE NO.: 949-450-1010

TRUCK, UNIT, LD. NO.: 620955 TYPED OR PRINTED FULL NAME & SIGNATURE: [Signature] DATE: 12/13/99

NAME: DIMENNO KERDOOM EPA I.D. NO. _____

ADDRESS: 2000 N. ALAMEDA STREET DISPOSAL METHOD: LANDFILL OTHER Recycle

CITY, STATE, ZIP: COMPTON, CA 90222

PHONE NO.: 310-527-7100

TYPED OR PRINTED FULL NAME & SIGNATURE: [Signature] DATE: 12/13/99

GEN	OLD/NEW	L	A	TONS
TRANS		S	B	
CO		RTCD	MWDF	NONE

DISCREPANCY

APPENDIX D
LABORATORY ANALYTICAL REPORTS AND ANALYSIS
REQUEST AND CHAIN-OF-CUSTODY RECORDS



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

Environmental Science & Engineering, Inc. 1340 Arnold Drive, Suite 126 Martinez, CA 94553-4189	Client Project ID: #6599065-0700; Broadway VW	Date Sampled: 08/03/99
	Client Contact: Thomas Dalzell	Date Received: 08/03/99
	Client P.O:	Date Extracted: 08/03-08/04/99
		Date Analyzed: 08/03-08/04/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)*	MTBE	Benzene	Toluene	Ethylben- zene	Xylenes	% Recovery Surrogate
16588	MW-1	W	ND	---	ND	ND	ND	ND	103
16589	MW-3	W	21,0000,a	---	5500	2300	470	990	104
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	5.0	0.5	0.5	0.5	0.5	
	S		1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

* cluttered chromatogram; sample peak coelutes with surrogate peak

*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

EdH Edward Hamilton, Lab Director

QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/03/99

Matrix: WATER

Analyte	Concentration (ug/L) Sample (#16118)			Amount Spiked	% Recovery		RPD
	MS	MSD			MS	MSD	
TPH (gas)	0.0	102.5	105.4	100.0	102.5	105.4	2.8
Benzene	0.0	9.0	9.8	10.0	90.0	98.0	8.5
Toluene	0.0	9.2	10.0	10.0	92.0	100.0	8.3
Ethyl Benzene	0.0	9.5	10.3	10.0	95.0	103.0	8.1
Xylenes	0.0	28.4	30.9	30.0	94.7	103.0	8.4
TPH(diesel)	0.0	7979	8019	7500	106	107	0.5
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

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ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

ESE PROJECT NAME: BROADWAY / VJ ESE PROJECT #: 6599065-0700 PAGE 1 OF 1
 PROJECT LOCATION: OAKLAND, ALAMEDA Co., CA PROJECT DESCRIPTION: GWM WELL SAMPLING
 SAMPLE(S) COLLECTED BY (Signature): [Signature] PROJECT MANAGER: THOMAS D. DALZELL
 LABORATORY NAME: MCNAMBELL & ASSOCIATES LABORATORY PHONE NUMBER: 925-798-1620

Container ID	Lab ID # (Lab Use Only)	Date Sample Collected	Time Sample Collected	Number Of Containers	Type Matrix										Preservation (i.e., Ice, HCl, & etc.)	Location And/Or Description	Analysis Requested								Remarks		
					Grab	Composite	Discrete	Soil	Water	Air	Sludge	Product	Solid	Other			BTEX By 8020	PAHs By 8100	Total Lead By 7420	TPH By 8015 (M)	TCLP Lead	Paint Filter	Flash Point	Other:		Other:	Other:
MW-1		080399	10:25	4												✓											TPHg + BTEX
MW-3		080399	10:01	4											✓												TPHg + BTEX

16588
16589

ICE GOOD CONDITION HEAD SPACE ABSENT
 PRESERVATION APPROPRIATE CONTAINERS
 VOAS O&G METALS OTHER

Special Laboratory Reporting Limits: ALAMEDA COUNTY HEALTH CARE SERVICES AGREEMENT - LIST Turn Around Time: STANDARD REGULAR Other Notes: For Laboratory Use Only:
 Relinquished By: [Signature] Date/Time: 080399 11:32am Received By: [Signature] Relinquished By: Date/Time: Received By:
 Relinquished By: Date/Time: Received By: Relinquished By: Date/Time: Received By:

90



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

Environmental Science & Engineering, Inc. 1340 Arnold Drive, Suite 126 Martinez, CA 94553-4189	Client Project ID: #6599065-0700; Broadway VW	Date Sampled: 08/03/99
	Client Contact: Thomas Dalzell	Date Received: 08/03/99
	Client P.O:	Date Extracted: 08/03/99
		Date Analyzed: 08/03/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*
EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) [†]	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
16590	B-1	W	21,000,a	ND<100	5300	2200	450	920	103
16591	FB-1	W	ND	ND	ND	ND	ND	ND	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W	50 ug/L	5.0	0.5	0.5	0.5	0.5	0.5	
	S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

* cluttered chromatogram; sample peak coelutes with surrogate peak

*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553

Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/03/99

Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		
	Sample (#16118)	MS	MSD		MS	MSD	RPD
TPH (gas)	0.0	102.5	105.4	100.0	102.5	105.4	2.8
Benzene	0.0	9.0	9.8	10.0	90.0	98.0	8.5
Toluene	0.0	9.2	10.0	10.0	92.0	100.0	8.3
Ethyl Benzene	0.0	9.5	10.3	10.0	95.0	103.0	8.1
Xylenes	0.0	28.4	30.9	30.0	94.7	103.0	8.4
TPH(diesel)	0.0	7979	8019	7500	106	107	0.5
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$



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

Environmental Science & Engineering, Inc. 1340 Arnold Drive, Suite 126 Martinez, CA 94553-4189	Client Project ID: #65-99-065-0900; Broadway VW	Date Sampled: 08/05/99
	Client Contact: Thomas Dalzell	Date Received: 08/05/99
	Client P.O:	Date Analyzed: 08/05-08/06/99
		Date Extracted: 08/05/99

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*
EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) ⁺	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
16687	SB1-E 13.8-14.8	S	84,a	---	0.94	4.5	1.2	7.4	102
16688	SB1-E 14.8-15.8	S	2600,a	---	13	180	37	160	---
16689	SB2-E 6.8-7.8	S	ND	---	ND	ND	ND	ND	104
16690	SB2-E 9.5-10.5	S	ND	---	ND	ND	ND	ND	101
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	5.0	0.5	0.5	0.5	0.5	
	S		1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

* cluttered chromatogram; sample peak coelutes with surrogate peak

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than -5 vol. % sediment; j) no recognizable pattern.

Edward Hamilton Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
 Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/05/99

Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#09948)			Amount Spiked	% Recovery		
	MS	MSD			MS	MSD	RPD
TPH (gas)	0.000	1.877	2.004	2.03	92	99	6.6
Benzene	0.000	0.198	0.202	0.2	99	101	2.0
Toluene	0.000	0.204	0.210	0.2	102	105	2.9
Ethylbenzene	0.000	0.212	0.218	0.2	106	109	2.8
Xylenes	0.000	0.630	0.650	0.6	105	108	3.1
TPH(diesel)	0	293	285	300	98	95	3.0
TRPH (oil and grease)	0.0	21.1	22.0	20.8	101	106	4.2

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

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ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

ESE PROJECT NAME: <u>BROADWAY (NEW)</u>	ESE PROJECT #: <u>65-99-065-0900</u> PAGE <u>1</u> OF <u>1</u>
PROJECT LOCATION: <u>OAKLAND, ALAMEDA CO. CA</u>	PROJECT DESCRIPTION: <u>SOIL SAMPLING</u>
SAMPLE(S) COLLECTED BY (Signature): <u>[Signature]</u>	PROJECT MANAGER: <u>THOMAS D. DALZELL</u>
LABORATORY NAME: <u>MCCAMPBELL ANALYTICAL, INC.</u>	LABORATORY PHONE NUMBER: <u>925-798-1620</u>

Container ID	Lab ID # (Lab Use Only)	Date Sample Collected	Time Sample Collected	Type		Matrix										Location And/Os Description	Analysis Requested										Remarks								
				Grab	Composite	Discrete	Soil	Water	Air	Sludge	Product	Solid	Other	Preservation (i.e., Ice, HCl, & etc.)	BTEX By 8020		PAHs By 8100	Total Lead By 7420	TPH By 8015 (M) 9	TCLP Lead	Paint Filter	Flesh Point	Other:	Other:	Other:										
SB-1-E		080599	7:43am	1				✓	✓							ICE	Soil Bor. 2-SB-1-E	13.8-14.8	✓	✓											TPHg + BTEX 13.8-14.8	S=13			
SB-1-E		080599	7:43am	1				✓	✓							ICE	Soil Bor. 2-SB-1-E	11.8-15.8	✓	✓											TPHg + BTEX 11.8-15.8	S=14			
SB-2-E		080599	9:30am	1				✓	✓							ICE	Soil Bor. 2-SB-2-E	6.8-7.8	✓	✓											TPHg + BTEX 6.8-7.8	S=7.9			
SB-2-E		080599	9:40am	1				✓	✓							ICE	Soil Bor. 2-SB-2-E	9.5-10.5	✓	✓											TPHg + BTEX 9.5-10.5	S=9.5			
[Large signature and scribble]																																			

16687
16688
16689
16690

Special Laboratory Reporting Limits: <u>ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY - LIST</u>	Turn Around Time: <u>STANDARD REGULAR.</u>	Other Notes: <u>COLLECT SAMPLE FROM 5 END AS MARKED</u> <u>NEW JASON T. HOWE</u>	For Laboratory Use Only:
Relinquished By: <u>[Signature]</u>	Date/Time: <u>080599 11:12am</u>	Received By: <u>[Signature]</u>	Date/Time: _____
Relinquished By: <u>[Signature]</u>	Date/Time: _____	Received By: _____	Date/Time: _____

ICS GOOD CONDITION HEAD SPACE ABSENT	PRESERVATION APPROPRIATE CONTAINERS VOAS O&G METALS OTHER
--	--