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**SUMMARY OF REMEDIAL ACTIVITIES AND  
RECOMMENDED SITE CLOSURE MEASURES**

**1600 63rd Street  
Emeryville, California**

7/30/98

**July 30, 1998  
SOMA Project 96-2081**

Prepared for

1600 63rd Street Associates, Inc.  
c/o Wareham Development Group  
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Prepared by

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July 30, 1998

Susan Hugo  
Alameda County Health Care Services Agency  
Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502

Re: Summary of Remedial Activities and Recommended Site Closure Measures Report  
1600 63<sup>rd</sup> Street, Emeryville, California

Dear Ms. Hugo:

Enclosed is a copy of the SOMA Summary of Remedial Activities and Recommended Site Closure Measures Report for the property at 1600 63<sup>rd</sup> Street, Emeryville, California. This report is submitted on behalf of the property owner, 1600 63<sup>rd</sup> Street Associates, Inc.

Please call us at (510) 654-3900 should you have any questions or comments regarding this document.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn Leong".

Glenn Leong  
Vice President and Senior Scientist

A handwritten signature in black ink, appearing to read "Jeff Hennier".

Jeff Hennier  
Associate Hydrogeologist  
California Registered Geologist (4605)  
California Certified Hydrogeologist (105)

Enclosure

cc: Dan Nourse, 1600 63<sup>rd</sup> Street Associates, Inc.

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July 30, 1998



**SUMMARY OF REMEDIAL ACTIVITIES  
AND RECOMMENDED SITE CLOSURE MEASURES  
1600 63rd Street  
Emeryville, California**

**1.0 INTRODUCTION**

This Summary of Remedial Activities and Site Closure Measures Report is submitted to the Alameda County Department of Environmental Health Services (ACDEHS) on behalf of the property owner, 1600 63rd Street Associates, Inc., for property at 1600 63rd Street, Emeryville, California ("the Site"). Investigations conducted by Engineering Science (ES) and Harding Lawson Associates (HLA) at the Site in 1988 and 1989 found petroleum hydrocarbons and other chemicals in soil and ground water that appear to be associated with former historical use of the property as a tallow manufacturing facility. This report contains a comprehensive summary and evaluation of the remedial investigation and monitoring data collected at the Site and presents recommended measures to achieve Site closure.

**1.1 Site Description**

The Site is located at 1600 63rd Street in Emeryville, approximately 2,000 feet east of the San Francisco Bay (Figure 1). The Site is approximately 2.75-acres in size and is currently occupied by Fedex. The Site vicinity consists primarily of commercial and industrial land uses. The Site is bounded by 63rd and 64th Streets to the south and north, respectively City of Emeryville Fire Station No. 2 to the east, and Overland Avenue and the Southern Pacific Railroad right-of-way to the west (Figure 1).

The ground surface in the Site vicinity is approximately 10- to 15-feet above mean sea level and slopes gently towards the Bay. Due to the Site's proximity to the Bay, shallow-depth sediments in the Site vicinity consist primarily of fine-grained silt and clay sediments deposited in tidal marsh and estuarine environments.

**1.2 Background Summary**

The current tenant has operated a Fedex shipping facility at the Site since the Site was redeveloped and construction of the Fedex building was completed in 1989. The Site was originally developed and operated as a tallow manufacturing plant by Peterson Manufacturing Company ("Peterson") in 1914 (ES, 1988). In 1987, the Site was purchased by 1600 63rd Street Associates, Inc. and the manufacturing plant was demolished during redevelopment. Historical records indicate six underground storage tanks (UST) were previously located at the Site (Figure 2). Four USTs, six sumps, seven aboveground storage tanks (AST), a water-supply well and



other appurtenances related to Peterson's manufacturing operations were removed during redevelopment activities in 1988 (ES, 1988). Two USTs were reported to have been previously removed from the Site (ES, 1988). No other USTs are known or suspected to be present at the Site.

During the period of Site demolition and the UST, sump and AST removal in 1988, ES conducted soil and ground-water investigations at the Site (ES, 1988). In addition to tank and sump removals, remedial actions were conducted at the Site in 1988 that included excavation, remediation and replacement of petroleum hydrocarbon impacted soil and closure of the industrial water well located at the Site.

HLA conducted additional characterization activities at the Site in 1989 that included the installation of five monitoring wells and an area well survey (HLA, 1989). HLA conducted quarterly ground-water monitoring at the Site during the period between June 1989 and May 1991 (HLA, 1991). Certified Engineering and Testing Company (Certified) conducted confirmatory soil and ground-water sampling at the Site in 1994 (Certified, 1994).

A summary of the results of investigation, monitoring and remedial activities conducted at the Site are presented in subsequent sections.

## **2.0 SUMMARY OF SITE REMEDIAL ACTIONS**

### **2.1 Tank and Sump Removal**

#### **2.1.1 Underground Storage Tank Removal**

Six USTs (USTs 1 through 6) were reportedly used by Peterson at the Site (Figure 2). The USTs reportedly stored solvents (primarily hexane; UST 1), gasoline or diesel (USTs 1, 2, 3, 4 and 6), and boiler fuel (UST 5). USTs 5 and 6 were reportedly excavated by Peterson in 1963 and the mid-1970's, respectively. USTs 1 through 4, the contents from each UST and rinseate were removed and disposed off-site in April 1988 (ES, 1988). The USTs were reportedly 10,000-gallon capacity and constructed of steel. Prior to their removal, ES sampled the contents of each UST. ES's descriptions of the UST samples and analytical results are included in Appendix A (see ES Table 4-2).

#### **2.1.2 Aboveground Storage Tank Removal**

Seven aboveground storage tanks (AST-1 through AST-7) were reportedly used by Peterson at the western portion of the Site (Figure 2). The ASTs were reported to range in size from 850 to 36,000 gallons. At the time of Site redevelopment, each of the ASTs except AST-6 contained residual liquid and/or sludge materials. ES sampled the contents of each AST prior to their removal. ES's descriptions of the AST samples and analytical results are included in Appendix A (see ES Table 4-4). The ASTs were reportedly emptied and destroyed under the direction of Plant Reclamation of Richmond (ES, 1988).

#### **2.1.3 Sump Removal**

Five subsurface sumps were reportedly used by Peterson at the Site (Figure 2). With the exception of sump LM-S which was constructed of metal, each of the sumps were constructed of concrete and reportedly contained liquid materials prior to Site redevelopment (ES, 1988). ES's descriptions of samples collected from the contents of each sump and analytical results are included in Appendix A (see ES Table 4-5). Following evaluation of the analytical results, the contents of each sump were disposed off-site or used for dust control on-site (ES, 1988). The sumps were reportedly emptied and destroyed under the direction of Plant Reclamation of Richmond (ES, 1988).

### **2.2 Soil Excavation**

Remedial actions consisting of soil excavation of petroleum hydrocarbon impacted soil were conducted at three areas of the Site in April and May 1988 (ES, 1988). Excavation of soil with total petroleum hydrocarbon (TPH) concentrations greater than 1,000 ppm was conducted at

Locations A, B and C (Figure 3). Excavated soil was stockpiled and treated on-site prior to placement beneath asphalt parking areas of the redeveloped Site (ES, 1988).

### Location A

Based on results of soil investigations indicating elevated concentrations of TPH in soil, soil excavation was conducted at Location A in the area adjacent to USTs 2 and 3 (Figure 3). Soil excavation was conducted to a depth of approximately 10 feet and confirmation soil samples were collected from the perimeter of the excavation to confirm removal of soil containing TPH concentrations greater than 1,000 ppm. Illustrations of the progress and final configuration of the Location A soil excavation and locations of confirmation soil samples are included in Appendix B (see ES Figures 5-2 through 5-5). Also included in Appendix B (see ES Table 5-1) are descriptions of confirmation samples from the Location A excavation pit and analytical results. These data indicate residual soil at the perimeter of the Location A excavation contain TPH concentrations of less than 1,000 ppm.

### Location B

Based on results of soil investigations conducted at the Site, soil excavation was conducted at Location B, located west of the Peterson main plant building (Figure 3). Approximately 70 cubic yards of soil was excavated to a depth of approximately 10 feet at location B (ES, 1988). A composite soil sample collected from the sidewalls and base of the excavation indicated TPH was not detected in soil at the perimeter of the excavation (Appendix B, Table 5-1).

### Location C

Soil excavation was conducted at Location C, located adjacent to UST 1 (Figure 3). Soil excavation at Location C was conducted to a depth of approximately 6 feet at three exploratory trenches (ES, 1988). Two of the exploratory trenches encountered fill materials that were described as a former burn pit area (ES, 1988). Apparent diesel-contaminated soil was excavated from the third exploratory trench. A composite soil sample collected from the sidewalls and bases of the exploratory trenches indicated TPH was not detected (Appendix B, ES Table 5-1). Analysis for semi-volatile compounds (EPA method 8270 analytes) in composite soil and water samples collected from the exploratory trenches indicated only pyrene (1.2 ppm) was detected in the soil sample (Appendix B, ES Table 5-1). Analysis for petroleum hydrocarbons and polychlorinated biphenyls (PCB) in a composite water sample indicate only TPH (2.8 ppm), oil and grease (2 ppm) and lead (1.1 ppm) were detected (Appendix B, Table 5-1).

## **2.3 Deep Well Closure**

Investigations and remedial actions were conducted of a deep industrial water well at the Site in 1988. The well was located within the central portion of the Site and was apparently used by Peterson in their manufacturing operations (Figure 3). ES contracted a well driller to clear obstructions in the well to the well bottom, conduct a video inspection of the well to assess the perforated intervals in the well, and close the well in accordance with regulatory guidelines.



Upon clearing obstructions from the deep well and conducting a video inspection, it was determined that the well was 322 feet deep with perforated intervals from 72 to 113 feet, 134 to 166 feet, and 195 to 227 feet below ground surface (ES, 1988). ES reportedly measured 24 feet of floating product in the well after the well was cleared of obstructions. Product samples from the well indicated concentrations of TPH as gasoline (TPHg) (780 ppm), TPH as diesel (TPHd) (250 ppm) and PCBs (Aroclor at 59 ppm)(Appendix C, ES Table 4-6). The floating product was pumped out and approximately 13,000 gallons of water were purged from the well. Lower concentrations of TPH (550 ppm), benzene (0.007 ppm), and PCBs (Aroclor 1254 at 0.01 ppm) were detected (Appendix C, ES Table 4-6).

In April and May 1988, ground-water samples were collected from discrete, perforated depth intervals in the deep well at depths of 90-, 150- and 300 feet (ES, 1988). Analytical results for samples collected from the deep well are summarized in Appendix C. The results indicate a trace concentration of PCBs (Aroclor 1254 at 0.0024 ppm) was detected only in the 90-foot depth sample. TPH (up to 40 ppm) was detected in the 90- and 150-foot samples, and was not detected in the 300-foot sample. Concentrations of volatile organic compounds (i.e., acetone at 0.1 ppm) and semi-volatile compounds (i.e., pyrene at 0.016 ppm) were also detected in the 300-foot depth sample. Following completion of investigation and sampling activities, the well was decommissioned by cutting linear perforations in the metal well casing and filling the well with neat cement on May 12, 1988 (ES, 1988).

### 3.0 SUMMARY OF REMEDIAL INVESTIGATIONS

#### 3.1 Soil Investigation Results

In March 1987, Kaldveer Associates (Kaldveer) collected soil samples from six borings (EB-1 through EB-6) to assess subsurface soil conditions as a result of Peterson's operations at the Site (HLA, 1989). The soil samples were collected from the borings at depths between 3 feet and 7.5 feet below ground surface. With the exception of boring EB-5, the Kaldveer borings were located near USTs at the Site (Figure 2). Boring EB-5 was located on the west side of the Peterson main plant building (Figure 2). Analytical results indicate concentrations of TPH as oil and grease (1,300 ppm), gasoline (TPHg; 1,600 ppm) and diesel (TPHd; 380 ppm) were detected in the soil samples (Table 1). Lithologic data collected from the borings indicate sediments between ground surface and depths of 8 feet generally consist of silty clay and fill materials that contained silty clay, sand and gravel (Kaldveer, 1988). Sediments underlying the near-surface materials were described as silty clay, sandy silt and gravelly sands to a depth of approximately 20.5 feet (Kaldveer, 1988).

Based on the soil analytical results collected by Kaldveer in March 1987, additional soil investigations were conducted at the Site by ES between September 1987 and May 1988 (ES, 1988). In September 1987, ES collected soil samples from nine borings to assess the presence and extent of petroleum hydrocarbons in Site soil. Soil samples were collected from the borings at depths between 1 foot and 10 feet below ground surface. Seven of nine ES borings were located near USTs at the Site (Figure 2). TPH as gasoline (up to 1,300 ppm at borings BH-4 and BH-5) and diesel (up to 20 ppm at boring BH-7) were detected in samples from borings located near the USTs (Table 1). Oil and grease (4,800 ppm) and TPH (1,900 ppm) were detected at boring BH-1, located near the ASTs at the Site. Oil and grease (100 ppm) was detected in the sample from boring BH-3, located at the north side of the Peterson main plant building. Analytical results for soil samples collected by ES in November 1987 and January 1988 from well borings MW-1 through MW-3 were generally consistent with previous soil sampling results (Table 1).

In May 1988, ES collected surface soil samples on a 100-foot grid at the Site to characterize surface materials (ES, 1988). Results of the surface soil sample analyses indicate concentrations of TPH (20 ppm), PCBs (0.042 ppm of Aroclor 1260) and low levels of metals were detected (Tables 1 and 2). Additionally, ES analyzed a sample of tarry "asphalt" or bitumen collected from a metal cylinder at the Site (Table 1).

HLA collected soil samples for analysis from well boring MW-2 in June 1989. Well boring MW-2 is located adjacent to the former location of UST 1 (Figure 4). Analysis results for samples collected at depths of 5 and 9.5 feet indicate only TPH as gasoline (15 ppm) and diesel (212 ppm) and low levels of metals were detected (Tables 1 and 2). The samples did not detect halogenated or aromatic volatile organic, semi-volatile organic, organochlorine pesticide and PCB compounds (HLA, 1989).

In July 1994, Certified collected soil samples from four borings located within an approximate 50-foot radius of monitoring well MW-2. The objective of Certified's soil investigation was to assess the extent of petroleum hydrocarbons adjacent to monitoring well MW-2. Certified soil samples B1 through B4 were collected below the ground-water surface at a depth of 12 feet below ground surface and analyzed for TPH as gasoline (TPHg) and diesel (TPHd), and benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds. Only trace concentrations of benzene (up to 0.01 ppm), toluene (up to 0.1 ppm), ethylbenzene (up to 0.14 ppm) and total xylenes (up to 0.47 ppm) were detected in the Certified soil samples (Table 1).

## 3.2 Ground-Water Investigation Results

### 3.2.1 Introduction

In November 1987, ES installed three temporary ground-water monitoring wells to assess the presence and extent of petroleum hydrocarbons in ground water at the Site. The locations of monitoring wells ES/MW-1 through ES/MW-3 are shown in Figure 3. The well locations were selected to assess ground-water quality at areas of the Site where relatively high concentrations of petroleum hydrocarbons were detected in soil samples (ES, 1988). ES installed monitoring wells adjacent to UST 1 (well ES/MW-3) and USTs 2 and 3 (well ES/MW-1). Additionally, one monitoring well was installed at the downgradient (west) boundary of the Site (well ES/MW-1). The wells were completed to depths between approximately 21 and 25 feet below grade and constructed with well screens placed across the interval from the total depth of each well to within 6 feet of the ground surface. Samples were collected from wells ES/MW-1 and ES/MW-2 in November 1987 and well ES/MW-3 in January 1988. The ES wells were decommissioned in February 1988 to accommodate remedial and redevelopment construction activities at the Site.

Following completion of remedial actions and redevelopment construction activities at the Site, HLA conducted additional ground water investigations in June 1989. HLA installed five monitoring wells (MW-1 through MW-5) to assess the extent of petroleum hydrocarbons in ground water. HLA monitoring wells were installed to: 1) assess potential upgradient off-site sources of petroleum hydrocarbons (i.e., well MW-3); 2) assess the extent of petroleum hydrocarbons in ground water adjacent to the former UST locations (i.e., wells MW-1, MW-2 and MW-5); and 3) assess the extent of petroleum hydrocarbons at the downgradient (west) boundary of the Site (i.e., well MW-4).

The HLA wells were completed to depths between approximately 18.5 and 32 feet below grade and constructed with the well screens placed across various depth intervals between 10 and 32 feet below ground surface in each well. Samples were initially collected from wells in June 1989 and quarterly monitoring was conducted at the wells until May 1991. Certified collected ground-water samples from well MW-2 in November 1992 and July 1994.

Shallow ground-water zone sediments encountered in the HLA well borings (i.e., depth interval between approximately 6 and 25 feet below ground surface) consisted primarily of clay and silty clay sediments with relatively thin silty sand sediment intervals that represent the primary water yielding zones (see Appendix A in HLA, 1989).

### 3.2.2 Ground-Water Flow Direction And Gradient

Quarterly monitoring of ground-water levels was conducted at the HLA wells between June 1989 and May 1991. Quarterly monitoring results indicate the historical depth to ground water measured in on-site wells varied between 3.73 feet (well MW-3 in July 1990) and 7.24 feet (well MW-4 in December 1989) below ground surface (HLA, 1991). Potentiometric data collected at the Site indicate the general direction of ground-water flow is toward the west (see Plate 3 of HLA, 1991 in Appendix D).

### 3.2.3 Results Of Ground-Water Sample Analysis

Ground-water quality data was collected at the Site during the following sampling events: 1) initial sampling of ES temporary monitoring wells in November 1987 and January 1988; 2) quarterly monitoring conducted at the HLA wells between June 1989 and May 1991; and 3) sampling at one well (MW-2) in November 1992 and July 1994. At various sampling events, ground-water samples were analyzed for TPH as oil and grease, gasoline, diesel and kerosene; aromatic and halogenated volatile organic compounds (EPA method 8010/8020 and 8240 analytes); organochlorine pesticide and PCB compounds (EPA method 8080 analytes); semi-volatile organic compounds (EPA method 8270 analytes); and priority pollutant metals. An historical summary of the ground-water sample analyses results are presented in Table 3.

Historical analysis results for Site monitoring wells MW-1 through MW-5 indicate benzene and halogenated volatile organic compounds were not detected (Table 3). Only trace concentrations (less than 0.043 ppm) of toluene, ethylbenzene or total xylenes were historically detected and none of those compounds were detected in the most recent samples collected. The following petroleum hydrocarbon compounds and maximum concentrations were detected: TPHd (61 ppm) and TPHg (380 ppm); however, only TPHd (6 ppm) was detected in the most recent samples collected. Historically, the highest concentrations of petroleum hydrocarbons were detected in the downgradient well MW-2 (Table 3). Petroleum hydrocarbons were only sporadically detected in other Site monitoring wells.

Other chemicals detected in Site monitoring wells include trace concentrations (up to 0.0009 ppm) of PCBs detected in two wells during the September 1989 sampling event (Table 3). PCBs were not detected in subsequent sampling events. Trace concentrations of several organochlorine pesticide compounds (up to 0.00035 ppm of gamma-BHC) and semi-volatile organic compounds (up to 0.018 ppm of 2-methyl-naphthalene) were only sporadically detected in ground-water samples collected prior to February 1990 (Table 3).

#### 4.0 REGIONAL AND LOCAL HYDROGEOLOGY

The ground surface in the Site vicinity is approximately 15 feet above mean sea level and slopes gently toward the west. Ground water is encountered at a depth of approximately 5 feet below ground surface in the Site vicinity and generally flows in the direction of the natural surface topography (west) toward the Bay, located approximately 2,000 feet from the Site (Figure 1).

Due to the Site's proximity to the Bay, near-surface sediments consist of fill materials underlain by predominantly of fine-grained silt and clay sediments and Bay Mud sediments deposited in tidal marsh and estuarine environments. Regionally, the upper sediment intervals (within approximately 200 feet of ground surface) reportedly consist primarily of silt and clay sediments with no major regional aquifers present. Sand and gravel water-yielding strata within the upper sediment interval are typically present as lenticular units of limited lateral and vertical extent. Typical hydraulic conductivity values for the types of silt and clay sediments found at the Site range between  $10^{-3}$  to  $10^{-5}$  cm/s.

## 5.0 BENEFICIAL USES OF GROUND WATER

The Site is relatively small (approximately 2.75 acres) and is located in a mixed residential, commercial, light industrial area approximately 2,000 feet east of the San Francisco Bay (Figure 1). Potential beneficial uses of ground water within the San Francisco Bay Basin include municipal (domestic), industrial and agricultural supply.

As discussed in Section 2.3 of this report, an industrial water well that was formerly located at the Site was properly abandoned in 1988 (ES, 1988). Review of a regional well survey conducted for the Site by HLA indicates one industrial water well is reportedly located within a 1-mile radius of the Site (HLA, 1993). The industrial water well is reportedly located at 5702B Adeline Street, approximately 1-mile southeast (upgradient) of the Site. No additional information was obtained regarding the active or inactive status of the well. The well is located outside and upgradient of the extent of petroleum hydrocarbon impacted ground water near the Site.

Water supply for the Site and nearby facilities is provided by East Bay Municipal Utility District (EBMUD) from municipal water sources located outside of a 1-mile radius from the Site. The availability of water from EBMUD, institutional controls, and use of deeper aquifer supplies precludes the use of shallow ground water as a potential source for municipal, industrial and agricultural water supplies in the Site vicinity.

Based on Site investigation and monitoring data, the Site shallow ground water is characterized as "low risk" (RWQCB, 1996). The SWRCB defines "low risk" ground water as "shallow ground water with maximum depth to water less than 50 feet and no drinking water wells screened in the shallow groundwater zone within 250 feet of the leak" (SWRCB, 1995). The potential for impacts from shallow to deeper ground water at the Site is minimal due to the relatively shallow depth to ground water (i.e., approximately 25 feet bgs) and the limited extent of residual petroleum hydrocarbons in shallow ground water at the Site (i.e., less than 250 feet downgradient). Additionally, no vertical conduits (i.e., deep wells) remain at the Site and the Site is underlain by low permeability, fine-grained clay and silt sediments that would be expected to restrict the vertical migration of contaminants in ground water. Therefore, beneficial uses of off-site ground water are not expected to be further impacted by migration of petroleum hydrocarbons in shallow ground water at the Site. Additionally, no surface water features are located within the extent of petroleum hydrocarbon impacted ground water near the Site.

## 6.0 POTENTIAL EXPOSURE PATHWAYS

In addition to the potential impacts to beneficial uses of ground water addressed in Section 5.0 above, potential health risks posed by residual levels of chemicals in soil and shallow ground water, primarily petroleum hydrocarbons, include direct exposure to impacted soil and/or diffusing vapors. The chemicals detected in soil and groundwater include volatile organic compounds, semi-volatile organic compounds (including PCBs), and metals. The potential exposure pathways for volatile organic compounds, semi-volatile organic compounds and metals in soil includes incidental ingestion of soil, inhalation of fugitive dusts, and dermal contact. The potential exposure pathways for volatile organic compounds also includes inhalation of volatile emissions. Ingestion of drinking water from the site is not considered to be a complete exposure pathway (Section 5.0). The Site currently consists of a paved parking lot and commercial building zoned for commercial/industrial land use. Because direct access to soil is restricted by surface pavement and building foundations, the incidental ingestion of soil, inhalation of fugitive dusts, dermal contact exposure pathways are considered to be incomplete. The complete exposure pathways identified at the Site are limited to inhalation of volatile emissions from soil and ground-water to outdoor air and into buildings, and the subsequent inhalation of the volatilized organic compounds by commercial/industrial receptors.

Of the organic compounds detected in soil and groundwater, only benzene and PCBs are considered to be carcinogenic. PCBs were only detected in two soil samples at trace concentrations (up to 78  $\mu\text{g}/\text{kg}$ ) and in two ground-water samples at trace concentrations (up to 0.9  $\mu\text{g}/\text{l}$ ). Therefore, PCBs are not expected to pose a significant risk and were not further considered in this assessment of potential exposure pathways. Residual concentrations of benzene in soil and ground water at the Site were reviewed to assess the potential for soil and ground-water volatilization to outdoor air and into buildings. No other volatile organic compounds considered to be carcinogens were identified in soil and ground water investigations at the Site. Soil sampling results indicate a maximum benzene concentration of 0.7 ppm was detected at a depth of 5 feet in a soil sample collected prior to soil remedial activities in 1988; the average benzene concentration is 0.01 ppm in soil samples where benzene was detected (Table 1). Ground-water sampling results indicate the maximum benzene concentration detected in Site ground water is 1.7 ppm; however, benzene was not detected in ground water following completion of Site remedial activities in 1988 (Table 3). The benzene concentrations detected in Site soil are well below the U.S. EPA Region IX 1998 Preliminary Remediation Goal (PRG) levels for industrial sites (i.e., 1.4  $\text{mg}/\text{kg}$ ). Potential risk from benzene in ground water was not identified since benzene has not been detected in Site ground water since 1987.

Due to the relatively low concentrations of benzene that may be present in soil and shallow groundwater and the attenuation of volatile emissions from soil due to the presence of surface pavement and building foundations, potential human health carcinogenic risks would not be expected to exceed the  $10^{-4}$  to  $10^{-6}$  range of risk target levels. Therefore, no additional soil or ground-water remedial actions appear to be warranted to address trace levels of chemicals in the soil and shallow groundwater at the Site under current Site land use.

## 7.0 SUMMARY AND CONCLUSIONS

The following remedial actions were conducted at the Site during redevelopment and construction activities in 1988: underground and aboveground tank and sump removals; excavation, remediation and replacement of petroleum hydrocarbon impacted soil; and closure of an industrial water well were. Soil investigation results obtained following completion of soil excavation remedial actions indicate TPH concentrations of less than 1,000 ppm in areas adjacent to UST excavations at the Site. The Site is currently a paved parking lot and building with restricted access to soil and is zoned for commercial/industrial use. An evaluation of potential exposure pathways and Site soil data indicate residual contaminant levels at the Site would not be expected to pose potential health risks exceeding the  $10^{-4}$  to  $10^{-6}$  range of risk target levels. Therefore, it appears that adequate source removal actions have been conducted at the Site and no further remedial actions are recommended for Site soil.

Ground-water investigation results indicate relatively low concentrations of total petroleum hydrocarbons as diesel (up to 6 ppm) are present in shallow ground water at the Site. Based on these data, it appears that the petroleum hydrocarbon plume in shallow ground water at the Site has stabilized. Additionally, the presence of low permeability sediments at the Site (i.e., silty and sandy clays), the relatively flat ground-water gradient, and the biodegradable characteristics of petroleum hydrocarbons remaining in soil and shallow ground-water at the Site make it unlikely that significant hydrocarbon migration in ground water will occur before natural degradation occurs. Therefore, no remedial actions are recommended for Site shallow ground water.

The low water quality characteristics of shallow ground water and access to municipal water supplies precludes the use of shallow ground water as a potential source for drinking water in the Site vicinity. The Site shallow ground water is characterized as "low risk" ground water based on the relatively shallow depth to ground water (i.e., approximately 5 feet below ground surface). A deep industrial well located at the Site was abandoned in 1988 and no drinking water wells were identified within a 1-mile radius of the Site. An evaluation of potential exposure pathways and Site data indicate residual concentrations of petroleum hydrocarbons in soil and shallow ground water at the Site would not be expected to pose potential health risks exceeding the  $10^{-4}$  to  $10^{-6}$  range of risk target levels. Therefore, the potential health risks posed by residual petroleum hydrocarbon contamination in soil and shallow ground water at the Site appear to be minimal.

Investigations conducted of a deep industrial water well at the Site in 1988 indicate 24 feet of floating product was reportedly measured in the well. The floating product was pumped out and approximately 13,000 gallons of water were reportedly purged from the well (ES, 1988). Ground-water samples collected from discrete depth intervals in the well at depths of 90-, 150- and 300 feet indicate a trace concentration of PCBs (Aroclor 1254 at 0.0024 ppm) was detected only in the 90-foot depth sample; TPH (up to 40 ppm) was detected in the 90- and 150-foot samples; and concentrations of volatile organic compounds (i.e., acetone at 0.1 ppm) and semi-volatile compounds (i.e., pyrene at 0.016 ppm) were detected in the 300-foot depth sample (ES, 1988). Following completion of investigation and sampling activities, the well was decommissioned (ES, 1988).



## **8.0 RECOMMENDED CASE CLOSURE MEASURES**

Results of investigations and monitoring at the Site indicate petroleum hydrocarbons remaining in Site soil are restricted to a relatively small area and are below concentration levels that would be considered a potential health threat for identified Site exposure pathways. Ground-water investigation data indicate the petroleum hydrocarbon plume in shallow ground water appears to be stabilized and residual concentrations in shallow ground water are below concentration levels that would be considered a potential health threat for identified Site exposure pathways. Residual hydrocarbons in Site shallow ground water are expected to continue to be remediated as a result of biodegradation and other attenuation processes (LLNL, 1995).

To complete Site closure actions, SOMA recommends collection of a final round of samples from shallow Site wells and collection of deeper ground-water samples to assess the possible presence of residual petroleum hydrocarbons in the vicinity of the former deep industrial water well at the Site. The deeper ground water assessment is recommended to be conducted using in-situ testing methodology such as a cone penetrometer test (CPT), to collect ground water samples from the 90- and 150-foot depth intervals. These depth intervals correlate to reported perforated intervals in the former deep industrial well. In the event that deeper ground-water sampling results indicate that residual hydrocarbons are not detected or are measured at concentrations that are not expected to impact ground water beneficial uses, no further work is recommended and the Site should be considered for case closure. Upon the ACDEHS and RWQCB approval of case closure, the Site monitoring wells will be decommissioned in accordance with Department of Water Resources and Alameda County Flood Control and Water Conservation District regulations.

## 9.0 SELECTED REFERENCES

- American Society for Testing and Materials (ASTM). 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E 1739-95. November, 1995.
- Certified Engineering and Testing Company (Certified). 1994. Subsurface Investigation, 1600 63rd Street, Emeryville. November 22.
- Engineering-Science (ES). 1988. Site Characterization Report for Soil and Ground-Water Contamination at 1600 63rd Street Site, Emeryville. December 22.
- Harding Lawson Associates (HLA). 1989. Ground-Water Quality Investigation, 1600 63rd Street Emeryville. October 2.
- Harding Lawson Associates. 1991. Quarterly Ground-Water Monitoring, 1600 63rd Street Emeryville. November 21.
- Kaldveer Associates (Kaldveer). 1988. Foundation Investigation for Federal Express Building at Peterson Manufacturing Site, Emeryville, April 11.
- Regional Water Quality Control Board (RWQCB) - San Francisco Bay Region. 1996. Memorandum - Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites. January 5.
- State Water Resources Control Board (SWRCB). 1995. Letter from Walt Pettit, Executive Director, to RWQCBs and LOP Agencies. December 8.
- United States Environmental Protection Agency (U.S. EPA). Region 9 Preliminary Remediation Goals (PRGs) 1998. Region IX.

**TABLE 1**  
**SUMMARY OF SOIL SAMPLE ANALYSIS RESULTS**  
**1600 63rd Street, Emeryville, California**

Sampling Location	Notes	Depth (ft.)	Date Sampled	Chemical Concentrations Detected (ppm)								
				TOG	TPHg	TPHd	TPH	Benzene	Toluene	Ethylbenzene	Total Xylenes	PCB's
<b><u>Kaldveer</u></b>												
EB-1		3	3/30/87	NA	1,600	380	NA	NA	NA	NA	NA	NA
EB-2		2.5	3/30/87	ND (1)	NA	NA	NA	NA	NA	NA	NA	NA
EB-3		3	3/30/87	120 (1)	NA	NA	NA	NA	NA	NA	NA	NA
EB-4	(2)	4.5	3/30/87	NA	NA	NA	NA	0.006	0.011	ND	ND	NA
EB-5		6	3/30/87	1,300	NA	NA	ND	NA	NA	NA	NA	NA
EB-6		7.5	3/30/87	190 (1)	ND	NA	NA	NA	NA	NA	NA	NA
<b><u>Engineering Science</u></b>												
BH-1		2.5/6.5	9/2/87	4,800	NA	NA	1,900	NA	NA	NA	NA	NA
BH-3		1.0	9/8/87	100	NA	NA	<100	NA	NA	NA	NA	NA
BH-4		2.5/4.5	9/2/87	NA	1,300	NA	NA	NA	NA	NA	NA	NA
BH-5		2.5/6.0	9/2/87	NA	1,300	ND	NA	NA	NA	NA	NA	NA
BH-6		1.0/3.5	9/2/87	NA	17	NA	NA	NA	NA	NA	NA	NA
BH-7		3.5/9.5	9/8/87	NA	NA	20	NA	NA	NA	NA	NA	ND
BH-8		2.5/6.0/9.0	9/8/87	<100	NA	NA	<100	NA	NA	NA	NA	ND
BH-9A		5.5/10.0	9/9/87	NA	NA	16	NA	NA	NA	NA	NA	ND
BH-10		2.5	9/9/87	<100	NA	NA	<100	NA	NA	NA	NA	NA
WPRS-C	(2) (3)	0.25/0.5	5/11/88	NA	NA	NA	NA	ND	ND	ND	ND	0.042
Peterson-ASP	(2) (4)	2	5/6/88	NA	NA	NA	43,000	NA	NA	NA	0.71	ND
ES/MW-1	(5)	5	11/5/87	NA	360	(6)	NA	0.7	0.8	NA	1.2	NA
ES/MW-2		5	11/6/87	<250	NA	NA	<250	NA	NA	NA	NA	NA
ES/MW-3	(2)	4.5	1/6/88	NA	NA	NA	1,100	ND	0.6	ND	ND	<0.3
<b><u>HLA</u></b>												
MW-2	(7)	5	6/18/89	NA	15	212	NA	<0.005	<0.005	<0.005	<0.005	ND
		9.5	6/18/89	NA	<10	<10	NA	<0.005	<0.005	<0.005	<0.005	ND
<b><u>Certified</u></b>												
B1		12	7/13/94	NA	<2	<2	NA	0.011	0.100	0.140	0.260	NA
B2		12	7/13/94	NA	<2	<2	NA	0.013	0.038	0.040	0.120	NA
B3		12	7/13/94	NA	<2	<2	NA	0.010	0.100	0.140	0.470	NA
B4		12	7/13/94	NA	<2	<2	NA	<0.005	0.018	0.017	0.100	NA

**Notes:**

- |      |   |     |   |
|------|---|-----|---|
| NA   | = Not Analyzed                                    | (3) | Composite soil sample collected at roughly a 100 foot grid across the site from approximately 3 to 6 inches below the surface.                  |
| TOG  | = Total Petroleum Hydrocarbons as Oil and Grease. | (4) | 440 ppm lead, 6.1 ppm fluorene, 19 ppm phenanthrene, 7.7 ppm fluoranthene, 16 ppm pyrene, 23 ppm chrysene, 9.6 ppm benzo(a)anthracene detected. |
| TPHg | = Total Petroleum Hydrocarbons as Gasoline.       | (5) | 4.9 ppm lead detected.  |
| TPHd | = Total Petroleum Hydrocarbons as Diesel.         | (6) | Result reported as gasoline and diesel.   |
| TPH  | = Total Petroleum Hydrocarbons                    | (7) | Other EPA 8010, 8020, 8270 and 8080 analytes not detected.  |
| (1)  | GC/FID Waste Oil Standard                         |     |   |
| (2)  | Other EPA 8240 analytes not detected.             |     |   |

**TABLE 2**  
**SUMMARY OF SOIL SAMPLE ANALYSIS RESULTS FOR METALS**  
**1600 63rd Street, Emeryville, California**

Sampling Location	Depth (ft.)	Date Sampled	Chemical Concentrations Detected (ppm)								
			As	Ba	Cr	Co	Cu	Ni	Pb	Vn	Zn
<b>Engineering Science</b>											
ES/MW-1	5	11/5/87	NA	NA	NA	NA	NA	NA	4.9	NA	NA
<b>HLA</b>											
MW-2	5	6/18/89	<2.5	72	11	8.1	6	21	5	5.5	15
	9.5	6/18/89	4.2	170	17	8.9	16	15	48	16	64

**Notes:**

- NA = Not Analyzed
- As = Arsenic
- Ba = Barium
- Co = Cobalt
- Cr = Chromium
- Cu = Copper
- Ni = Nickel
- Pb = Lead
- Vn = Vanadium
- Zn = Zinc

TABLE 3  
SUMMARY OF HISTORICAL GROUND WATER ANALYTICAL RESULTS  
1600 63rd Street, Emeryville, California

Sample No.	Date Sampled	Notes	Chemical Concentrations Detected (ppm)									
			TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	PCB's	EPA 3080 Analytes	EPA 8270 Analytes	EPA 8240 Analytes
<b>Engineering Science</b>												
ES/MW-1	11/12/87	(1)	NA	NA	1.7	2.6	NA	4.2	NA	NA	NA	NA
ES/MW-2	11/12/87	(2)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ES/MW-3	1/13/88	(3)	NA	NA	NA	NA	NA	NA	<0.0003	NA	NA	0.002 (12)
<b>HLA</b>												
MW-1	6/18/89		<0.5	<0.5	<0.001	<0.001	<0.001	<0.001	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	0.0005	(4)	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		0.17	<0.05	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		0.16	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		0.2	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		0.7	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-2	6/25/89		<0.5	0.3	<0.005	<0.005	<0.005	<0.005	<0.0005	NA	(7)	<0.01
	9/21/89		1	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	(5)	(8)	<0.01
	12/20/89		<0.5	0.53	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	(9)	<0.01
	2/20/90		49	0.42	<0.005	<0.005	<0.005	<0.005	<0.0005	(6)	(10)	0.044 (13)
	5/11/90		8.4	1.2	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	<0.01
	5/11/90		<2.5	<0.5	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	<0.02
	7/20/90		27	3.9	<0.005	<0.005	<0.005	0.011	NA	ND	NA	NA
	7/20/90		30	2.3	<0.005	<0.0025	<0.0025	0.0033	NA	ND	NA	NA
	11/12/90		61	380	<0.005	<0.0005	<0.0005	0.0005	<0.0005	ND	NA	NA
	11/12/90		35	7	<0.005	0.0009	0.0001	0.0079	<0.0005	ND	NA	NA
	2/7/91		41	11	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	ND	NA	NA
	2/7/91		27	13	<0.005	<0.0005	<0.0005	0.043	<0.0005	ND	NA	NA
	5/8/91		43	88	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		26	150	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-3	7/18/89		<0.5	<0.5	<0.001	<0.001	<0.001	<0.001	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	0.11	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		0.12	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA

TABLE 3 (cont.)

Sample No.	Date Sampled	Notes	Chemical Concentrations Detected (ppm)									
			TPHd	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	PCB's	EPA 8080 Analytes	EPA 8270 Analytes	EPA 8240 Analytes
MW-4	6/25/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	12/20/89		NA	NA	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	0.12	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
MW-5	6/30/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	NA	NA	ND	<0.01
	9/21/89		<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	0.0009	(11)	ND	<0.01
	12/20/89		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	3/20/90		<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.0005	ND	ND	<0.01
	7/20/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	NA	ND	NA	NA
	11/12/90		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	2/7/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	5/8/91		<0.05	<0.05	<0.005	<0.0005	<0.0005	<0.005	<0.0005	ND	NA	NA
	<u>Certified</u>											
MW-2	11/19/92		22	0.59	<0.0003	0.0014	<0.0003	0.0015	NA	NA	NA	NA
	7/13/94		6	<2	<0.001	<0.001	<0.001	<0.001	NA	NA	NA	NA

## NOTES:

TOG = Total Petroleum Hydrocarbons as Oil and Grease.  
 TPHg = Total Petroleum Hydrocarbons as Gasoline.  
 TPHd = Total Petroleum Hydrocarbons as Diesel.  
 < = Below Specified Reporting Limits.  
 NA = Not Analyzed.

- (1) 0.031 ppm lead and 21 ppm total fuel hydrocarbons detected.
- (2) 200 ppm TOG detected.
- (3) 2.7 ppm total fuel hydrocarbons detected.
- (4) 0.0001 ppm endrin aldehyde detected.
- (5) 0.00016 ppm heptachlor and 0.00015 ppm 4,4'-DDD detected.
- (6) 0.00035 ppm Gamma-BHC detected.
- (7) Trace fluorene detected.
- (8) 0.006 ppm fluorene, 0.005 ppm bis(2-ethyl-hexyl) phthalate and 0.0061 ppm 2-methyl-naphthalene detected.
- (9) 0.012 ppm 2-methyl-naphthalene detected.
- (10) 0.0061 ppm fluorene, 0.018 ppm 2-methyl-naphthalene and 0.0055 phenanthrene detected.
- (11) 0.00015 ppm endrin aldehyde detected.
- (12) 0.002 ppm unknown EPA 8240 analyte detected.
- (13) 0.044 ppm acetone detected.



MAP SOURCE:  
 U.S.G.S. Oakland West, California  
 1:24,000 - Scale Series (Topographic)  
 Photo revised - 1980



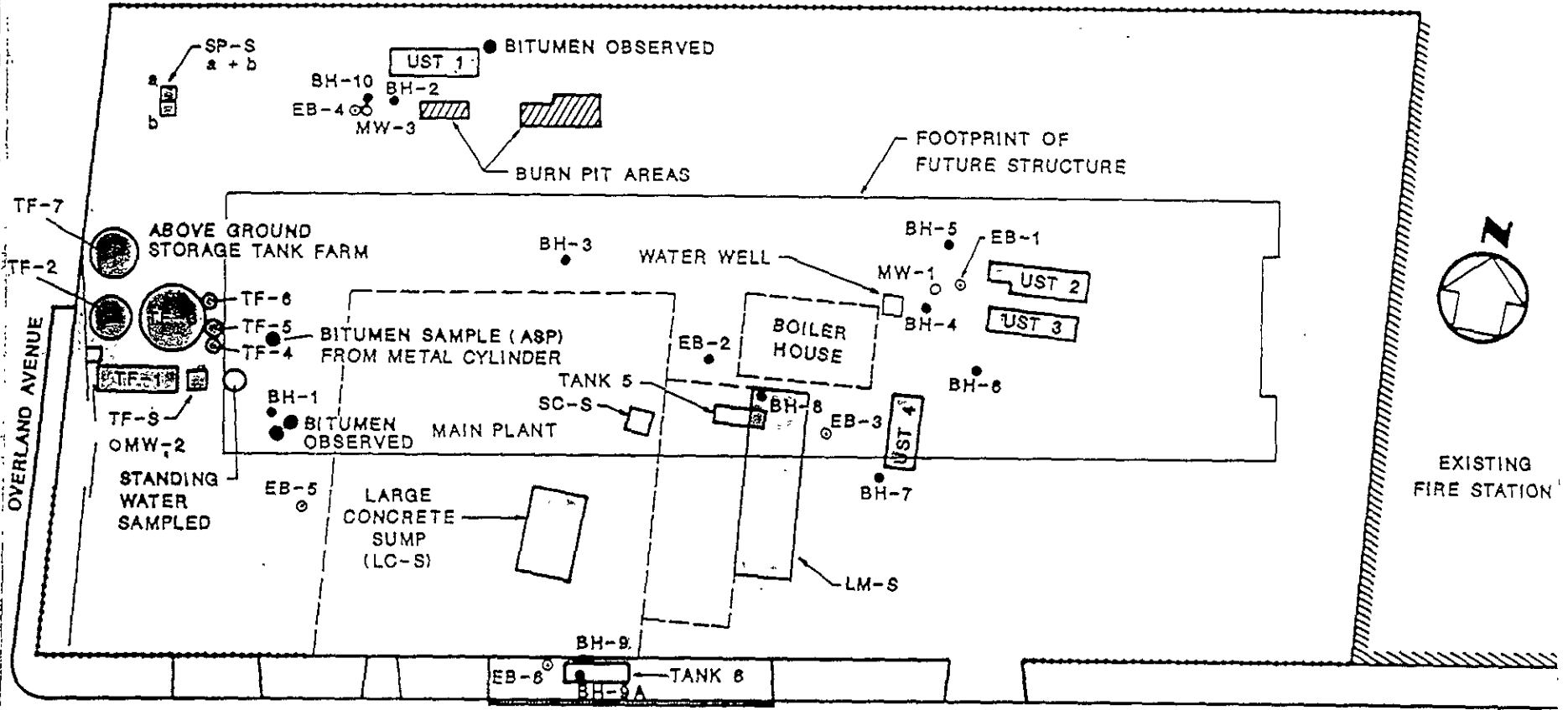
0 1/2 mile

Figure 1: Site Vicinity Map



SOMA CORPORATION

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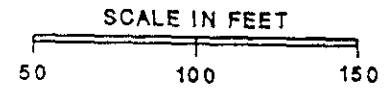
64TH STREET



**LEGEND**

- BH-1 ES BOREHOLE
- EB-1 KALDVEER BORING, APPROXIMATE LOCATION
- MW-1 MONITORING WELL
-  UNDERGROUND STORAGE TANK LOCATIONS
-  SUMP LOCATIONS

63RD STREET

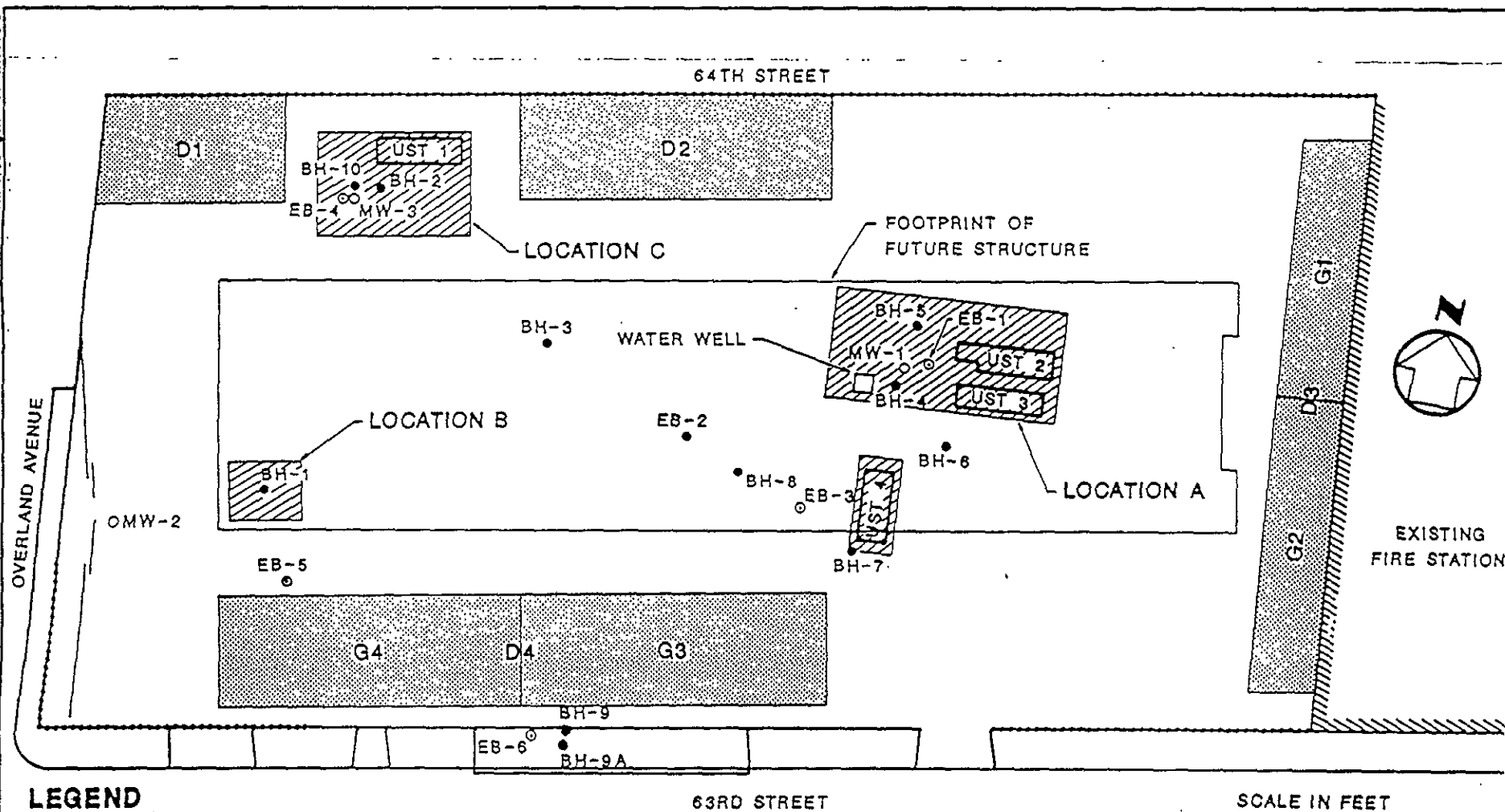


MAP SOURCE:  
 Engineering Science, 1988;  
 Base: "Plot Plan" by John F. Tulloch Engineers, Contractors, 1/24/68

Figure 2: Site Map Showing Historical Site Features and Sampling Locations  
 SOMA CORPORATION



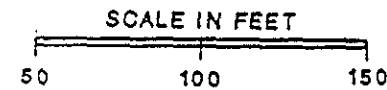
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**LEGEND**

- BH-1 ES BOREHOLE
- EB-1 KALDVEER BORING, APPROXIMATE LOCATION
- MW-1 MONITORING WELL
- UST 1 UNDERGROUND STORAGE TANK LOCATIONS

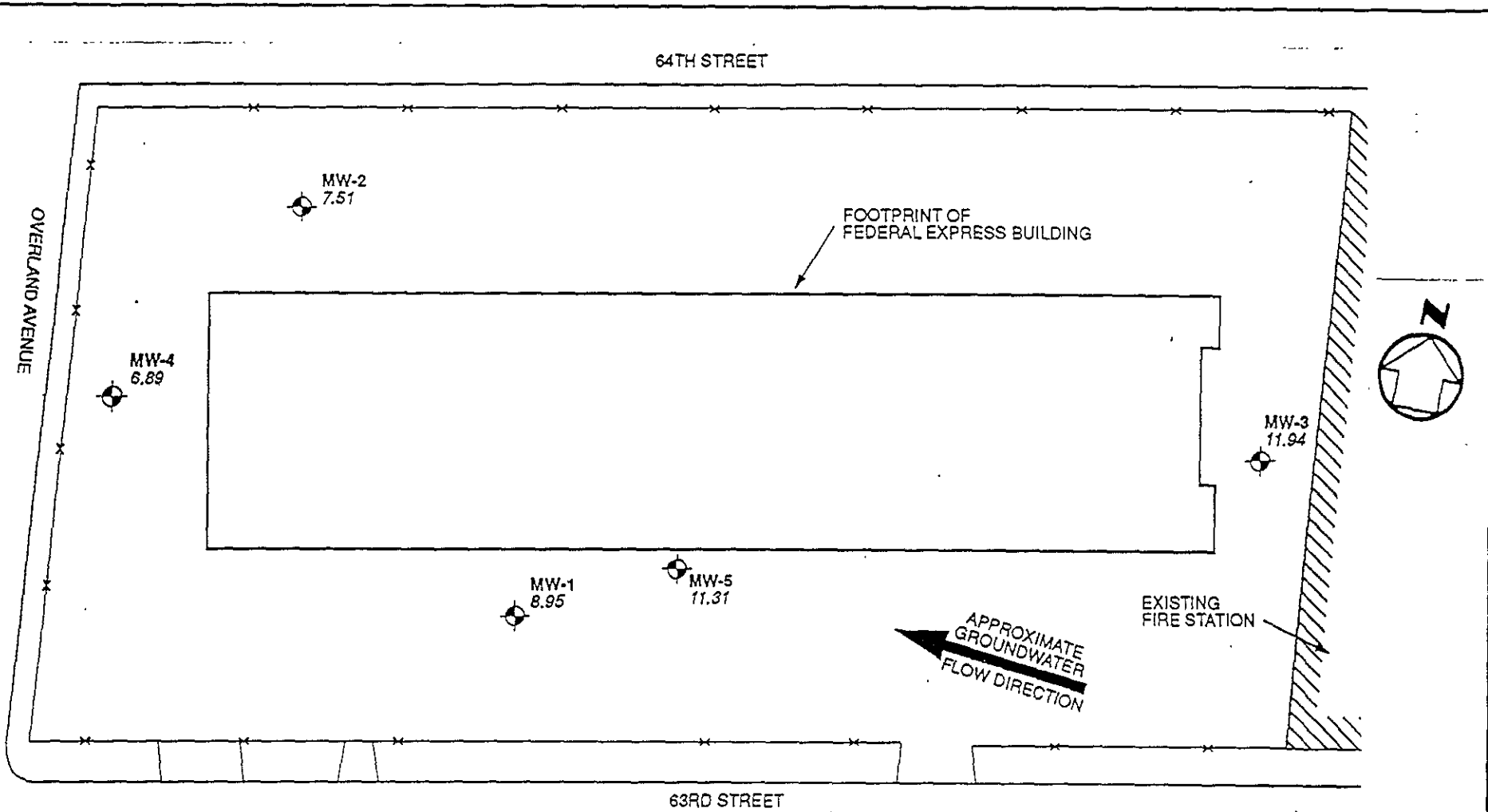
- SOIL AND TANK EXCAVATION AREAS
- LANDFARM REMEDIATION AREAS




MAP SOURCE:  
 Engineering Science, 1988;  
 Base: "Plot Plan" by John F. Tulloch Engineers, Contractors, 1/24/68

**Figure 3: Site Map Showing Sampling Locations and Excavation Areas**  
 SOMA CORPORATION

c:\hzured\wg\152-002\110986-4



**EXPLANATION**

- MW-1  HLA Monitoring Well
- 8.47 Groundwater elevation measured on May 8, 1991, in feet above mean sea level

**Figure 4: Site Map Showing HLA Monitoring Well Locations**

SOMA CORPORATION

MAP SOURCE:  
Harding Lawson Associates, 5/91

**APPENDIX A**

**ENGINEERING-SCIENCE SUMMARIES OF TANK AND SUMP**

**CONTENTS SAMPLING RESULTS**

Table 4-2  
 Analytical Results of Underground Storage Tank Contents  
 Wareham Development, Peterson Manufacturing Parcel

Tank ID	Status	Tank Size (gallons)	Depth of Tank Bottom (in feet)	Thickness of Tank Contents (in feet)	Description of Tank Contents	Analysis Performed	Analytical Results	Tank History	Date Sampled
UST1	Excavated	10,000	10.92	0.75	Amber water-like liquid with gray-brown sludge (separated) with diesel odor	GC/FID - TPH PCBs	46 mg/l C5-C12 Hydrocarbons 85 mg/kg Arochlor 1221 in oil	Stored hexane from 1965 to 1978. Reportedly stored water and #6 boiler fuel prior to excavation.	9/18/87
UST2	Excavated	10,000	10.58	0.42	Oily amber liquid with slight gas or solvent odor with surface beads of oil or water	GC/FID - TPH Tetraethyl lead	750 mg/l C9-C22 Hydrocarbons 0.3 mg/l	Tank in place at least since 1957. Stored #2 diesel fuel and possibly gasoline.	9/18/87
UST3	Excavated	10,000	10.75	0.38	Amber liquid with faint turpentine odor	GC/FID - TPH Tetraethyl lead	100% C9-C22 (mostly C10-C16) <0.2 mg/l Tetraethyl lead	Tank is 20 to 30 years old. Stored gasoline until 1981, then stored diesel fuel.	9/18/87
UST4	Excavated	10,000	10.79	0.38	Dark brown oil may contain animal fat	GC/FID - TPH PCBs	21% C9-C22 (mostly higher end) <1 mg/kg Arochlor in oil	Tank is about 20 years old. Initially contained #2 boiler fuel. Reportedly stored #6 boiler fuel prior to excavation.	9/18/87
UST5	Excavated	Unknown						Excavated in 1963. Tank formerly contained #2 boiler fuel and possibly gasoline.	
UST6	Excavated	8,000						Tank, present in 1957, was removed in the mid-1970's. Probably contained gasoline.	

Table 4-4  
 Analytical Results of Above Ground Storage Tank Samples  
 Wareham Development, Peterson Manufacturing Parcel

Sample	Sample Descriptions	Analyses Performed	Analytical Results	Date Sampled
TF-1	White to gray solid (congealed fat)	413.2 - O&G 418.1 - TPH 8240 - VOCs  Moisture	330,000 ppm 12,000 ppm 3,600 ppb Chloroform 5,990 ppb C6-C7 Hydrocarbons 14.6 percent	3/1/88
TF-2	Yellowish to black semi-solid and solid	418.1 - TPH 8240 - VOCs	150,000 ppm 2,800 ppb Chloroform 14,000 ppb Acetone	4/1/88
TF-3	Dark red-brown semi-solid and solid	418.1 - TPH 8240 - VOCs	7,900 ppm ND	4/1/88
TF-4	Dark liquid	413.2 - O&G 418.1 - TPH 624 - VOCs	38 ppm 12 ppm ND	3/24/88
TF-5	Light-yellow semi-solid	418.1 - TPH 8240 - VOCs	5,200 ppm ND	4/1/88
TF-6	Iron oxide flakes	Not Analyzed		3/1/88
TF-7	Gray-black sludge with brown crusty surface	413.2 - O&G 418.1 - TPH 8240 - VOCs Moisture	43,000 ppm 1,900 ppm 2,600 ppb Toluene 78 percent	3/1/88
TF-W	Standing water northwest of Aboveground Tank 1, with red-brown oily phase (only water component analyzed)	413.2 - O&G 418.1 - TPH 8240 - VOCs	14 mg/l 4.8 mg/l 83 ug/l C6 Hydrocarbon	3/1/88

Table 4-5  
 Analytical Results of Sump Samples  
 Wareham Development, Peterson Manufacturing Parcel

Sample	Sample Descriptions	Analyses Performed	Analytical Results	Date Sampled
TF-S	Sump 10 feet east of Aboveground Tank 1, gray liquid with particulates and lumpy floating component	413.2 - O&G 418.1 - TPH 8240 - VOCs	4,200 ppm O&G 86 ppm 1,400 ppb Toluene	3/1/88
LC-S (IV Vat)	Concrete sump inside main building, light colored liquid with oily film on surface	413.2 - O&G	9 ppm	3/16/88
LM-Sa (OV Trough)	Surface sample from trough west of main building, grayish-colored liquid with no film on surface and strong fat odor	413.2 - O&G	570 ppm	3/16/88
LM-Sb	Sample collected at a depth of 3.5 feet in trough	413.2 - O&G	<5 ppm	3/22/88
LM-Sc	Sample collected at bottom of trough, minor black sediments	413.2 - O&G	<5 ppm	3/22/88
TF-Sa	Sample collected to verify high Toluene value in sample TF-S	8240 - VOCs	1,100 ppb Toluene	3/24/88
SC-S	Small concrete sump inside main plant, dark liquid with scummy surface	418.1 - TPH 413.2 - O&G 624 - VOCs	5,700 ppm 6,900 ppm 23 ppb Toluene	4/7/88
SP-Sa	South (larger) compartment of solvent plant sump, dark liquid with floating matter	418.1 - TPH 413.2 - O&G 624 - VOCs	34 ppm 47 ppm 21 ppb Toluene 220 ppb C5-C6 Hydrocarbons	4/7/88
SP-Sb	North (smaller) compartment of solvent plant sump, dark green liquid with floating matter	418.1 - TPH 413.2 - O&G 624 - VOCs	10 ppm 60 ppm 41 ppb C5-C6 Hydrocarbons	4/7/88

WAREHAM PETERSON SITE, EMERYVILLE, CALIFORNIA  
 CONTAMINATED SOIL EXCAVATION DETAILS  
 MAY 17, 1988

SAMPLE ID	ANALYSED FOR	GC PETROLEUM HYDROCARBONS (PPM)	DIESEL (PPM)
PP-1	(GC-FID)	1600	300
PP-2	(GC-FID)	ND	ND
PP-3	(GC-FID)	200	200
PP-4	(GC-FID)	91	91
PP-5	(GC-FID)	48	48
PP-6	(GC-FID)	2000	2000
PP-7	(GC-FID)	ND	ND
PP-8	(GC-FID)	200	200
PP-9	(GC-FID)	78	78

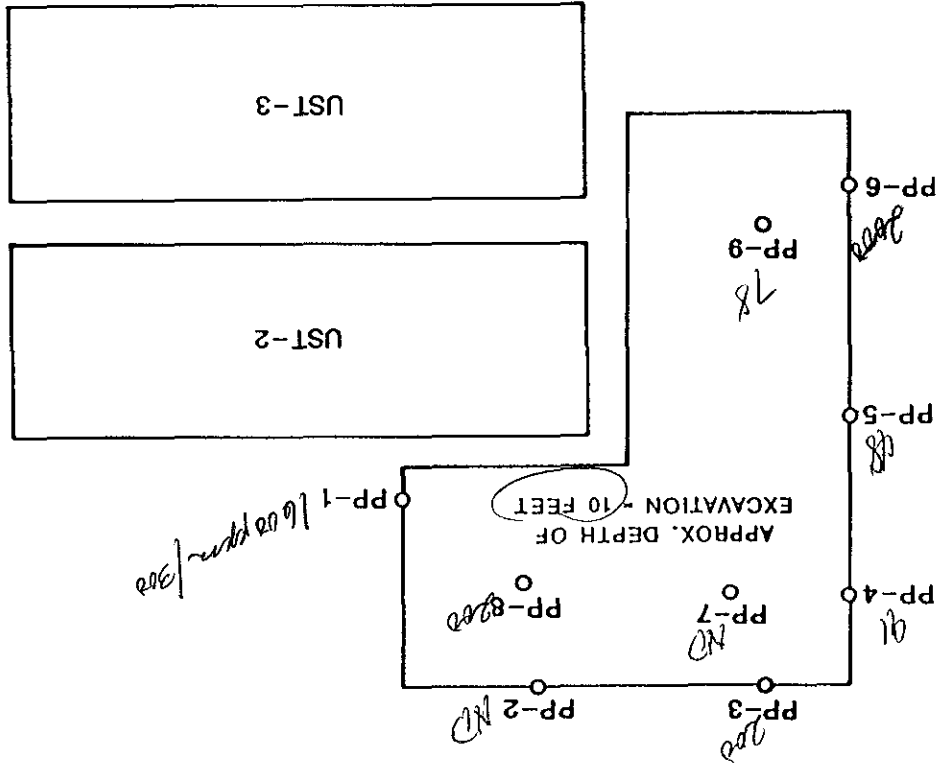
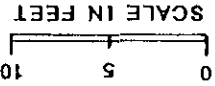


FIGURE 5-2

**APPENDIX B**

**ENGINEERING-SCIENCE SUMMARIES OF SOIL  
EXCAVATION SAMPLING RESULTS**



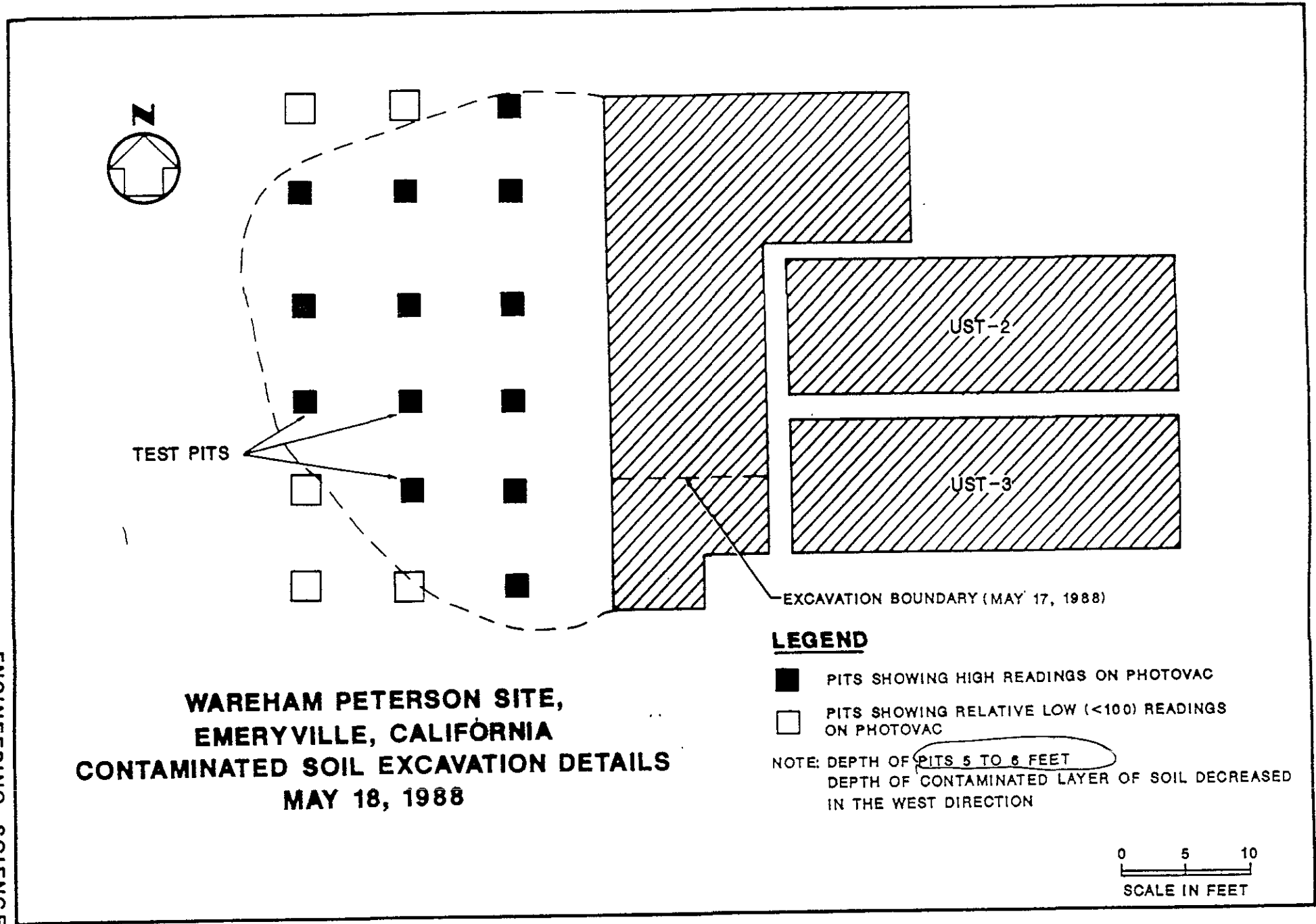
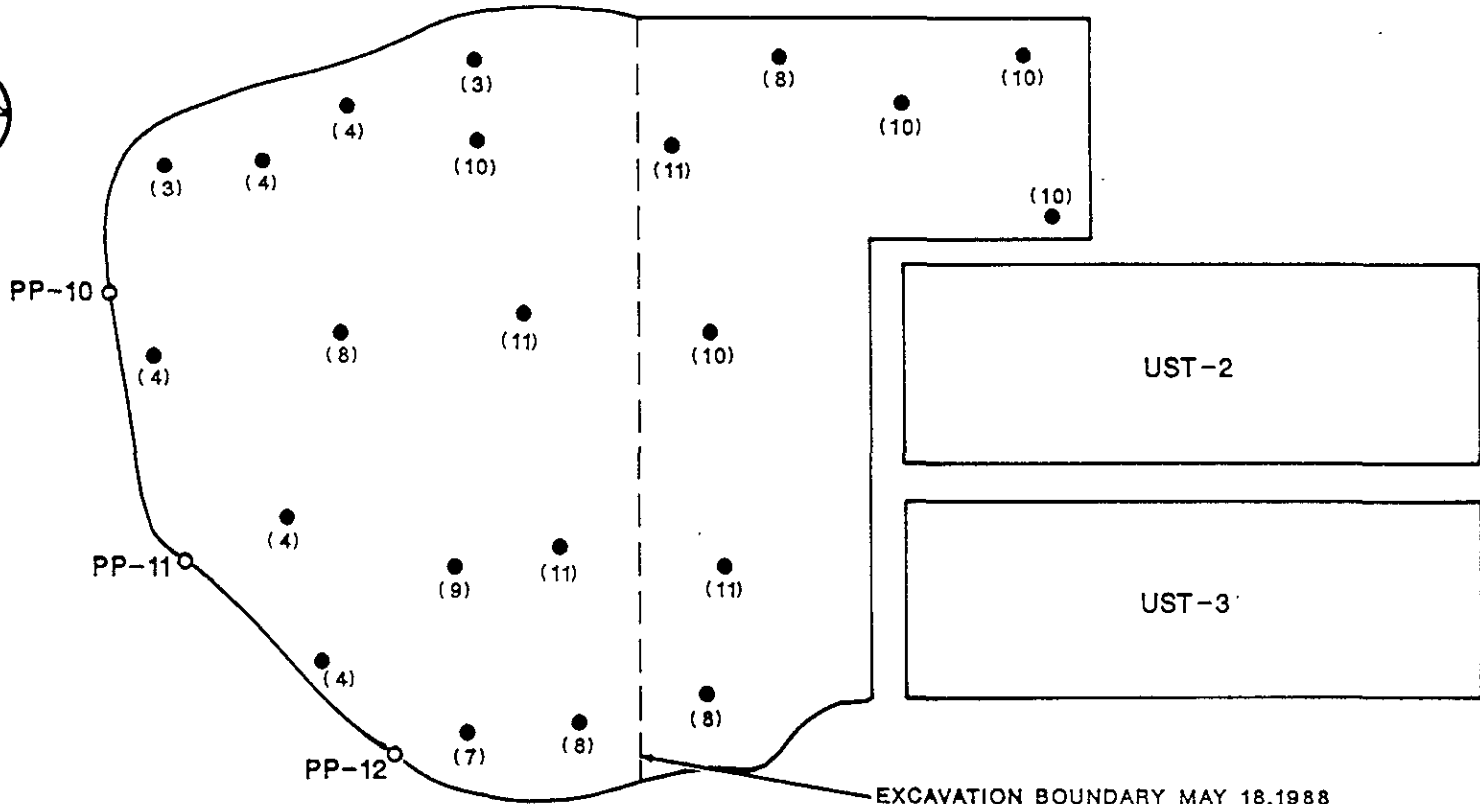


FIGURE 5-3



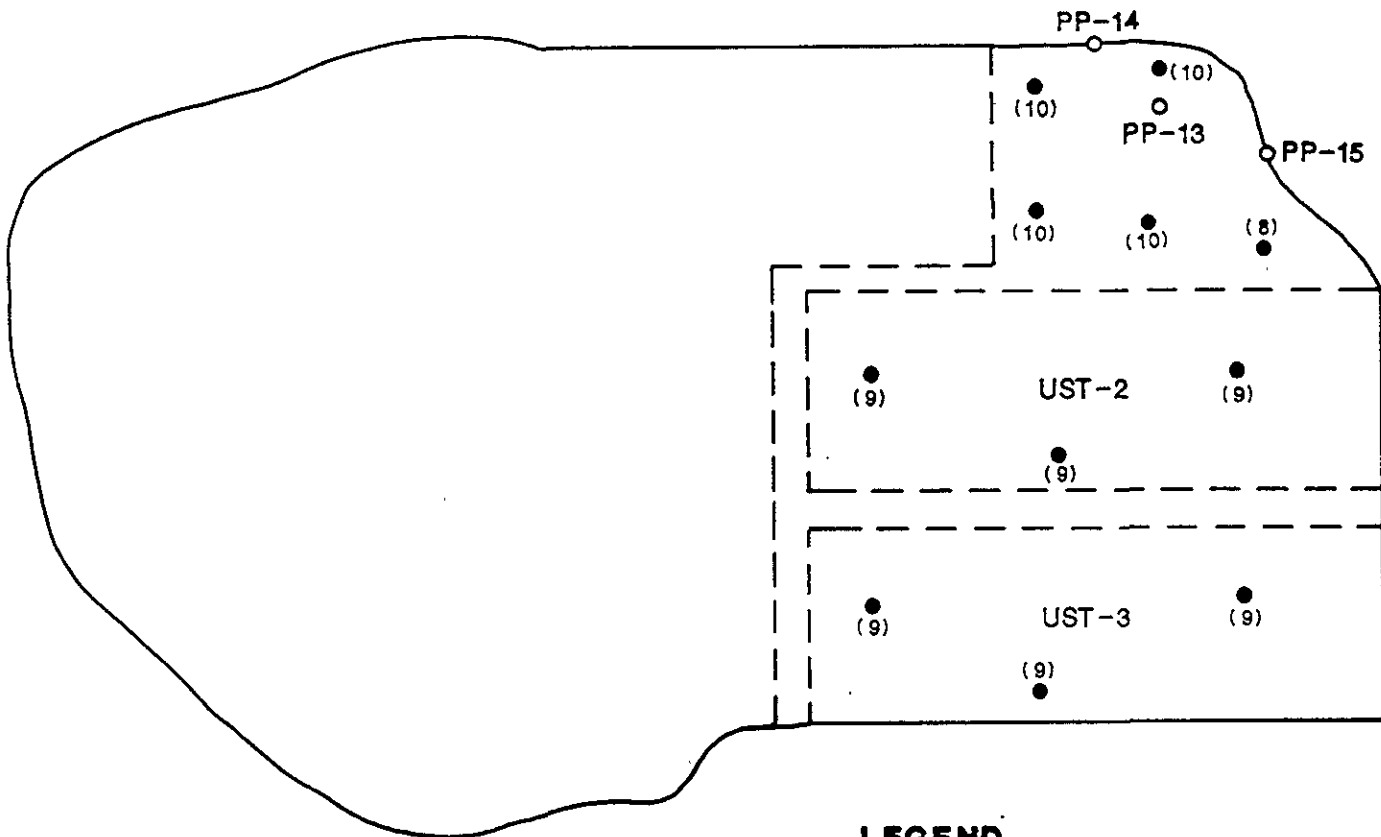
**LEGEND**

(4) - DEPTH IN FEET FROM THE SURFACE

**WAREHAM PETERSON SITE,  
EMERYVILLE, CALIFORNIA  
CONTAMINATED SOIL EXCAVATION DETAILS  
MAY 19, 1988**

SAMPLE ID	ANALYZED FOR	GASOLINE (PPM)	DIESEL (PPM)
PP-10	(GC-FID)	ND	ND
PP-11	(GC-FID)	ND	83
PP-12	(GC-FID)	ND	92





**WAREHAM PETERSON SITE,  
EMERYVILLE, CALIFORNIA  
CONTAMINATED SOIL EXCAVATION DETAILS  
MAY 23, 1988**

**LEGEND**

(10) - DEPTH OF EXCAVATION IN FEET

	SAMPLE ID	ANALYZED FOR	GASOLINE (PPM)	DIESEL (PPM)
Composite	PP-14	(GC-FID)	790	ND
	PP-15	(GC-FID)	490	ND
	PP-15 (Rerun)			



FIGURE 5-5

Table 5-1  
 Analytical Results of Confirmation Samples  
 from Hot Spot Remediation Areas  
 Warehouse Development, Peterson Manufacturing Parcel

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
PP-1	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	300 ppm Diesel 1600 ppm TPH	5/17/88
PP-2	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	ND Diesel ND TPH	5/17/88
PP-3	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	200 ppm Diesel 200 ppm TPH	5/17/88
PP-4	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	91 ppm Diesel 91 ppm TPH	5/17/88
PP-5	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	48 ppm Diesel 48 ppm TPH	5/17/88
PP-6	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	2000 ppm Diesel 2000 ppm TPH	5/17/88
PP-7	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	ND Diesel ND TPH	5/17/88
PP-8	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	200 ppm Diesel 200 ppm TPH	5/17/88
PP-9	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	78 ppm Diesel 78 ppm TPH	5/17/88
PP-10	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	ND Diesel ND Gasoline	5/20/88
PP-11	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	83 ppm Diesel ND Gasoline	5/20/88
PP-12	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	92 ppm Diesel ND Gasoline	5/20/88
PP-14 and 15	Composite	GC/FID - TPH	ND Diesel 750 ppm Gasoline	5/23/88
PP-15	Samples from sides and bottom of excavation near UST 2 and 3	GC/FID - TPH	ND Diesel 490 ppm Gasoline	5/25/88

Table 5-1 (continued)

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
EXNBH-1	Composite soil sample from excavation around BH-1 location	GC/FID - TPH	ND for gas, kerosene and diesel	5/9/88
EXNUST-1	Composite soil sample from excavations near UST-1 (MW-3 borehole sample contamination remedial action)	GC/FID - TPH	ND for gas, kerosene and diesel - (did note one unidentifiable oil)	5/9/88
PNA-S	Soil from Burn-Pit area (near UST-1)	8270 - (incl. PNAs)	1.2 ppm Pyrene	5/23/88
PNA-W	Water from Burn-Pit area (near UST-1)	8270 - (incl. PNAs)	ND	5/23/88
PIT-DIS	Water accumulated in excavations around UST-1/MW-3 location, composited from 3 pits/trenches	GC/FID - TPH PCBs 413.2 - O&G Pb	2800 ug/l Total Fuel Hydrocarbons, heavier than #2 Diesel ND 2.0 ppm 1.1 ppm	5/9/88
D1	Composite of 8 soil samples from remediation pad D1 at 8 and 16 inches	Moisture GC/FID - TPH	14.0 percent ND Gasoline 250 ppm Diesel	6/10/88
D2	Composite of 7 soil samples from remediation pad D2 at 8 and 16 inches	Moisture GC/FID - TPH	11.6 percent 33 ppm Gasoline 200 ppm Diesel	6/10/88

Table 5-1 (continued)

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
G1	Composite of 7 soil samples from remediation pad G1 at 8 and 16 inches	Moisture 602 - BTX  GC/FID - TPH	17.7 percent ND Benzene 0.0005 ppm Toluene 0.850 ppm Xylenes 570 ppm Gasoline 530 ppm Diesel	6/16/88
G2	Composite of 8 soil samples from remediation pad G2 at 8 and 16 inches	Moisture 602 - BTX  GC/FID - TPH	17.6 percent ND Benzene 0.0015 ppm Toluene 0.013 ppm Xylenes 250 ppm Gasoline 720 ppm Diesel	6/16/88
G3	Composite of 8 soil samples from remediation pad G3 at 8 and 16 inches	Moisture 602 - BTX  GC/FID - TPH	13.1 percent ND Benzene ND Toluene 0.021 ppm Xylenes 47 ppm Gasoline 180 ppm Diesel	6/16/88
G4	Composite of 8 soil samples from remediation pad G4 at 8 and 16 inches	Moisture 602 - BTX  GC/FID - TPH	15.5 percent ND Benzene ND Toluene ND Xylenes 64 ppm Gasoline ND Diesel	6/16/88
G8	Composite of 8 soil samples from remediation pads G1 and G2 at 8 inches	Mod. 8015 - TFH  602 - BTX	ND Gasoline ND Kerosine ND Diesel ND Benzene ND Toluene 0.018 ppm Xylenes ND Ethyl-benzene	6/12/88
G16	Composite of 8 soil samples from remediation pads G1 and G2 at 16 inches	Mod. 8015 - TFH  602 - BTX	60 ppm Gasoline ND Kerosine ND Diesel 0.009 ppm Benzene 0.190 ppm Toluene 3.000 ppm Xylenes 0.750 ppm Ethyl-benzene	6/12/88

Table 5-2  
 Analytical Results of Underground Storage Tank  
 Excavations: Soil and Groundwater Confirmation Samples  
 Wareham Development, Peterson Manufacturing Parcel

Tank Excavation	Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
UST-1	HT-1	Soil sample from beneath west end of tank	8240 - VOCs 8080 - PCBs GC/FID - TPH	21 ppb C6 Hydrocarbons 78 ppb Arochlor PCB 35 ppm Diesel	4/7/88
	HT-2	Soil sample from beneath east end of tank	8240 - VOCs 8080 - PCBs GC/FID - TPH	6 ppb Xylene 500 ppb Hexane 43 ppb Arochlor 1260 PCB 25 ppm Diesel	4/7/88
	HT-3	Soil sample from wet area near ground surface near east edge of the pit	8240 - VOCs 8080 - PCBs GC/FID - TPH	112 ppb Xylene 2100 ppb Hexane ND 260 ppm Hydrocarbons	4/7/88
UST-ISA	Additional soil sample from west end of pit approx. 6" above the water line.	8240 - VOCs 8080 - PCBs	170 ppb C6 Hydrocarbons ND	4/15/88	
UST-1W	Water sample from bottom of excavation	624 - VOCs 608 - PCBs	ND ND	4/15/88	
UST-1-WRE	Confirmation water sample from pit after purging	624 - VOCs 608 - PCBs GC/FID - TPH	ND ND 27 ppm	4/29/88	
UST-1W0	Oil from surface of water	608 - PCBs	ND	5/5/88	

Table 5-2 (continued)

Tank Excavation	Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
UST-2	UST-2SA	Soil sample collected from west end of excavation approx. 6" above water line	Mod. 8015 - TFH 8020 - BTX 8080 - PCBs	350 ppm Gasoline 150 ppb Benzene ND	4/12/88
	UST-2SB	Soil sample collected from east end of excavation approx. 6" above water line	Mod. 8015 - TFH 8020 - BTX	ND ND	4/12/88
	UST-2WA	Water sample collected from pit	602 - BTX	3,100 ppb Benzene 4,400 ppb Toluene 3,000 ppb Ethyl-Benzene 21,000 ppb Total Xylene	4/12/88
	UST-2WB	Water sample collected from pit	608 - PCBs	ND	4/15/88
	UST-2WRE	Water sample collected from pit after pumping dry	GC/FID - TPH 624 - VOCs  608 - PCBs	3.6 ppm TPH 810 ppb Benzene 1100 ppb Toluene 2200 ppb Total Xylene 3.1 ppb Arochlor 1254	4/27/88



Table 5-2 (continued)

Tank Excavation	Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
UST-3	UST-3SA	Soil sample from west end of tank pit approx. 6" above water	Mod. 8015 - TPH 8020 - BTX 8080 - PCBs	170 ppm Diesel ND ND	4/12/88
	UST-3SB	Soil sample from east end of tank pit approx 6" above water	Mod. 8015 - TPH 8020 - BTX	ND ND	4/12/88
	UST-3WA	Water sample from bottom of pit	602 - BTX	1,100 ppb Benzene 640 ppb Toluene 1,200 ppb Ethyl-Benzene 7,000 ppb Total Xylenes	4/12/88
	UST-3WRE	Water sample from pit after purging	GC/FID - TPH 602 - BTX 608 - PCBs	13 ppm ND	4/27/88
UST-4	UST-4SA	Soil sample from north end of tank pit approx. 6" above water	Mod. 8015 - TPH 8020 - BTX	ND ND	4/12/88
	UST-4SB	Soil sample from south end of tank pit approx. 6" above water	Mod. 8015 - TPH 8020 - BTX	ND ND	4/12/88
	UST-4WA	Water sample from bottom of pit	602 - BTX	19 ppb Benzene 18 ppb Total Xylenes	4/12/88
	UST-4WS	Water sample with floating sludge from bottom of pit	GC/FID - TPH 608 - PCBs 624 - VOCs	2.7 ppm C14-C20 2.0 ppm Arochlor 1254 PCB ND	5/5/88

**APPENDIX C**

**ENGINEERING-SCIENCE SUMMARY OF WELL CLOSURE**

**SAMPLING RESULTS**

Table 4-6  
 Analytical Results of Water Well Samples  
 Wareham Development, Peterson Manufacturing Parcel

Sample ID	Sample Description	Analyses Performed	Analytical Results	Date Sampled
WW-1-A	Grab sample from liquid surface in water well	Mod. 8015 - TPH	17,000 ppm	2/26/88
WW-1-1P	Product sample from water well	GC/FID - TPH	250 ppm Diesel #2 780 ppm Unleaded Gasoline	4/7/88
WW-1-2P	Product sample from water well	8080 - PCBs	59 ppm Arochlor	4/7/88
WW-1-1W	Grab sample of water from well after product removed	GC/FID - TPH 608 - PCBs 624 - VOCs	550 ppm 10 ppb Arochlor 1254 7 ppb Benzene 170 ppb Cyclohexane 340 ppb Methylcyclopentane 30 ppb 2,3-Dimethylbutane 130 ppb 3-Methylpentane 220 ppb 2-Methylpentane 340 ppb Hexane	4/13/88
WW-1-90	Environmental sample from 90 feet below top of casing of well, after purging	GC/FID - TPH 608 - PCBs 624 - VOCs  625 - Base Neutral Priority Pollutants	40 ppm Total Fuel Hydrocarbons 2.4 ppb ug/l Arochlor 1254 13 ppb Toluene 600 ppb 4-Methyl-2-pentanone 5 ppm C6-C11 Hydrocarbons 24 ppb Acenaphthene 32 ppb Anthracene 54 ppb Benzo(a)anthracene 18 ppb Benzo(a)pyrene 28 ppb Benzo(a)fluoranthene 8 ppb Benzo(g,h,i)perylene 30 ppb Benzo(k)fluoranthene 40 ppb Chrysene 4 ppb Dibenzo(a,h)anthracene 30 ppb Fluorene 70 ppb Fluoranthene 8 ppb Indeno(1,2,3-c,d)pyrene 110 ppb Phenanthrene 130 ppb Pyrene 50 ppm C9-C30 Hydrocarbons	5/11/88

Table 4-6 (continued)

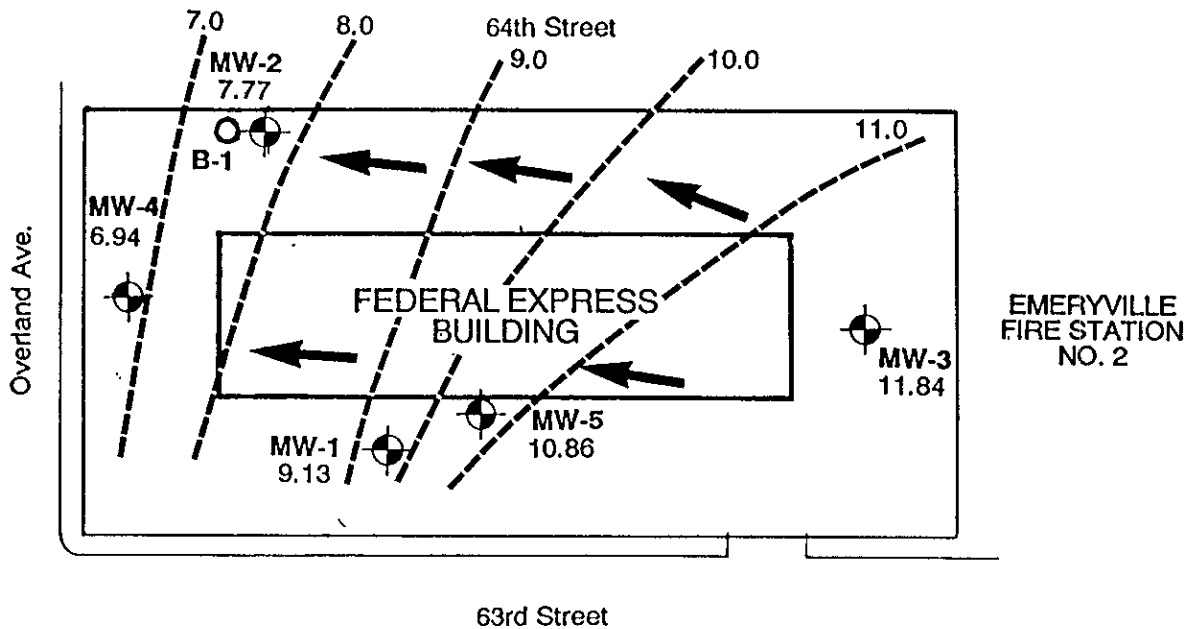
Sample	Sample Descriptions	Analyses Performed	Analytical Results	Date Sampled
WW-1-150	Environmental sample from 150 feet below top of casing of well after purging	GC/FID - TPH 608 - PCBs 624 - VOCs	3,300 ppb Total Fuel Hydrocarbons ND 200 ppb Acetone 900 ppb C6-C11 Hydrocarbons 500 ppb Methyl-Ethyl-Ketone	5/11/88
		625 - Base Neutral Priority Pollutants	4 ppb Acenaphthene 5 ppb Anthracene 5 ppb Benzo(a)anthracene 4 ppb Benzo(b)fluoranthene 4 ppb Benzo(k)fluoranthene 6 ppb Chrysene 4 ppb Fluorene 32 ppb Fluoranthene 19 ppb Phenanthrene 26 ppb Pyrene	
		General Mineral Analysis	20 ppm C9-C30 Hydrocarbons 7.5 meq/l Anions 9.8 meq/l Cations 600 ppm TDS 320 ppm Total Hardness 21 ppm Iron 2.2 ppm Manganese	5/11/88
WW-1-300	Environmental sample from 300 feet below top of casing of well, after purging	GC/FID - TPH 608 - PCBs 624 - VOCs	ND ND 100 ppb Acetone 400 ppb C6-C11 Hydrocarbons 400 ppb Methyl-ethyl-ketone	5/11/88
		625 - Base Neutral Priority Pollutants	4 ppb Benzo(a)anthracene 2 ppb Benzo(a)pyrene 2 ppb Benzo(k)fluoranthene 4 ppb Chrysene 18 ppb Fluorene 16 ppb Pyrene	
		General Mineral Analysis	7 ppm C9-C30 Hydrocarbons 10.6 meq/l Anions 10.6 meq/l Cations 640 ppm TDS 350 ppm Total Hardness 12 ppm Iron 2.9 ppm Manganese	

Table 4-6 (continued)





Sample ID	Sample Description	Analytes Performed	Analytical Results	Date Sampled
BT-A	Baker tank A composite from top, middle and bottom	3510/8015 - TPH 602 - BTX 608 - PCBs Metals - 13 Priority Pollutants	ND ND ND 100 ppb Ni 50 ppb Zn	5/20/88
BT-B	Baker tank B composite from top, middle and bottom	3510/8015 - TPH 602 - BTX 608 - PCBs Metals - 13 Priority Pollutants	1,100 ppb C7-C9 & C11-C22 Hydrocarbons ND ND 60 ppb Ni 200 ppb Se	5/20/88

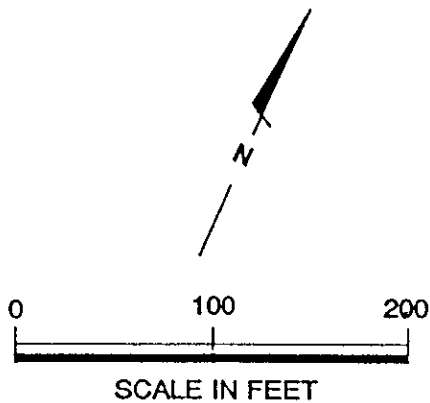
**APPENDIX D**

**HLA POTENTIOMETRIC MAP**



**EXPLANATION**

-  MW-1 9.13 Monitoring Well Water Level 8/3/89
-  B-1 Boring (abandoned)
-  Ground-Water Flow Direction
-  10.0 Water-Level Contour (relative to mean sea level)



**Harding Lawson Associates**  
Engineering and  
Environmental Services

**Monitoring Well Locations and Water Level Elevations**  
1600-63rd Street Association, Inc.  
Emeryville, California

PLATE

**3**

DRAWN JU	JOB NUMBER 18452,016.02	APPROVED 	DATE 8/89	REVISED DATE
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