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ENVIRONMENTAL CONSULTING

25 July 2001
S9171-C1.01

AUG 06 2001

Douglas Herman
Environmental Health and Safety Compliance Department
Port of Oakland
530 Water Street, 2nd Floor
Oakland, CA 94607

Subject: Soil and Groundwater Sampling Plan and Closure Plan, Intake and Discharge Tunnels, Former Seabreeze Yacht Center, Oakland, California

Dear Douglas:

Enclosed please find five copies of the Soil and Groundwater Sampling Plan and Closure Plan. As we discussed, a copy of the final report, along with the Project Manual and Plans prepared by the Port Engineering Department, should be submitted to Alameda County Health Care Agency and the California Regional Water Quality Control Board in response to their 13 May 2000 letter to the Port. Should you have any questions, or need further information, please do not hesitate to contact us at your convenience.

Sincerely,

Rhodora Del Rosario, P.E.
Civil Engineer

Yane Nordhav
Principal
Reg. Geologist No. 4009

RPD:YN:km
Enclosure

S9171C11.pln.wpd-7/253/01

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SOIL AND GROUNDWATER SAMPLING PLAN AND CLOSURE PLAN INTAKE AND DISCHARGE TUNNELS

JULY 2001

FORMER SEABREEZE YACHT CENTER
Oakland, California

For:

Environmental Health and Safety Compliance Department
Oakland, California

S9171-C1

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SOIL AND GROUNDWATER SAMPLING PLAN AND CLOSURE PLAN INTAKE AND DISCHARGE TUNNELS

INTRODUCTION

This Soil and Groundwater Sampling Plan and Closure Plan (Plan) has been prepared in response to the 13 May 2000 letter from Alameda County Health Care Agency (County) requesting the collection of additional soil and groundwater samples at the former Seabreeze Yacht Center (site) located in Oakland, California. In particular, the County requested samples be collected along the intake and discharge tunnels to complete site characterization. A copy of the letter is provided in Appendix A and a copy of the Port of Oakland's 9 August 2000 response letter, indicating that a Sampling Plan will be prepared, is provided in Appendix B. In April 2001, a draft of this Plan was submitted to the County and the San Francisco Regional Water Quality Control Board (RWQCB). Comments were received electronically on 25 June 2001 (Appendix C). This Final Plan has been prepared in response to the comments received on 25 June 2001.

BACKGROUND

A steam generating power plant was operating at the site from 1909 through the late 1950s. The power plant was constructed at the northern corner of the site (Figure 2). Saltwater was pumped from an underground intake tunnel to provide cooling water for the steam condensers of the former power plant. Used cooling water was then discharged to Clinton Basin through a separate underground discharge tunnel. The foundation of the power plant and the underground tunnels remain on the site.

The intake tunnel parallels Fifth Avenue, and extends from the northern edge of the power plant concrete foundation to about the southwest shoreline of the site. The intake tunnel is approximately 710 feet long; about 160 feet is within the concrete foundation (Figure 2). The discharge tunnel extends from the southern boundary of the concrete foundation to about the northwest shoreline at the site, in the vicinity of the existing wharf. The discharge tunnel is about 410 feet long; about 160 feet are within the concrete foundation. Other structures associated with the power plant included an aboveground fuel storage tank within a concrete containment and aboveground fuel pipeline; the concrete containment, the tank, and the pipelines have been removed.

Several soil and groundwater investigations at the site have been conducted since 1990. Approximately 250 soil and 69 groundwater samples from nine wells have been collected and analyzed for various chemical compounds. A compilation of the soil and groundwater quality data from the site through January 1999 is provided in the *Compilation of Historic Site Data, Bunker C Toxicity, and Tunnel Remediation Workplan Report* (BASELINE, 1999). The data originally compiled in that report were documented in the following:

- Preliminary Remedial Investigation, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, November 1990 (BASELINE, 1990)

- Phase II Remedial Investigation, Seabreeze Yacht Center, Inc., Oakland, California, March 1992 (BASELINE, 1992)

- Phase III Remedial Investigation, Seabreeze Yacht Center, Inc., Oakland, California, September 1994 (BASELINE, 1994a)

- Subsurface Investigation, Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, December 1994 (BASELINE, 1994b)

- Subsurface Investigation, Second Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, April 1995 (BASELINE, 1995a)

- Third Interim Report, Additional Subsurface Investigation, Seabreeze Yacht Center, Inc., Oakland, California, October 1995 (BASELINE, 1995b)

- Analytical Results for Soil Sampling, 4 October 1995, at Seabreeze Site, Oakland, 16 October 1995 (BASELINE, 1995c)

- Concrete Containment Structure Removal and Remediation Oversight, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, January 1997. (BASELINE, 1997)

- Quarterly and Annual Groundwater Monitoring Reports dated 19 August 1996, 18 October 1996, 22 January 1997, 14 May 1997, 29 July 1997, 25 February 1998, January 1999, February 2000, and February 2001 (BASELINE, 1996 to 2001).

In August 1999, a tunnel investigation and remediation workplan was prepared by BASELINE on behalf of the Port. The investigation identified the presence of soil and debris/sediments in the tunnel hatchways and manway. The remediation approach presented in the August 1999 workplan was conceptually approved by the County in their 18 May 2000 letter to the Port with the following requirements:

1. Closure plan which prescribes the methods to be used to seal the tunnels and steps to be taken to assure the adequacy of the seal (absence of voids and assure long-term stability and integrity);

2. Sampling plan to take additional soil and groundwater samples along the intake and discharge tunnels to complete site characterization (groundwater samples are to be filtered and passed through silica gel cleanup prior to chemical analysis);

3. Evidence of filing a deed restriction or Risk Management Plan limiting the future land use of the site following completion of site remediation;

4. Health and safety plan for future maintenance or construction workers prior to future site development;
5. Soil and groundwater management plan prior to future site development; and

6. Properly close all on-site monitoring wells and proof of all required items prior to requesting site closure.

The purpose of this Sampling and Closure Plan is to fulfill the first and second requirements described above. In addition, the Port has prepared a Project Manual and Plans that provide technical details for sealing the tunnels (submitted as a separate attachment. The remaining requirements will be addressed following tunnel remediation.

Following tunnel sealing activities, the Port will prepare a Risk Management Plan to fulfill Requirement 4, described above. The Risk Management Plan will identify protocol for managing risks associated with COCs that could potentially be encountered at the site and, at a minimum, will include institutional controls to eliminate exposure to impacted soils (e.g., capping the entire site with clean fill or impervious material). The population to be targeted in the Risk Management Plan will include construction workers, future utility workers, and future commercial site tenants.

SITE CHARACTERIZATION

Past Soil Investigations

In 1989, the County collected soil samples throughout the site, which revealed the presence of high levels of metals (specifically copper) in subsurface soils. In response to these data, the County issued a Notice of Violation to the Port. Since then, approximately 250 random and source-specific soil samples have been collected at the site to fully characterize both the lateral and vertical extent of contamination in subsurface soils.

Samples were collected at potential source areas, including the former power plant, former pipeline supplying fuel to the power plant, stained soil areas, and the aboveground fuel storage tank. In addition, randomly selected soil samples were collected to characterize the soil quality throughout the entire site, independent of the source-specific areas. Both source-specific and randomly selected soil samples were collected in the vicinity of the intake and discharge tunnels. Soil samples were analyzed for one or more of the following constituents (Tables 1 and 2) (soil sample locations are shown on Figures 3 through 5):

- Metals
- Total petroleum hydrocarbons (TPH) as kerosene, diesel, motor oil, and bunker C
- Oil and grease
- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Creosote
- Polycyclic biphenyls (PCBs)

The results of past soil investigations are documented in the previously-referenced reports which have all been submitted to the County. Data from the site investigations indicated that the contaminants of concern (COCs) at the site are metals and TPH as diesel, motor oil, and bunker C fuel . Contaminated soil located within the vicinity of the former aboveground fuel tank was removed during remediation activities conducted in 1996.

Past and Ongoing Groundwater Investigations

Groundwater investigations at the site began in 1991. Nine shallow groundwater monitoring wells have been installed throughout the site. A total of 69 groundwater samples have been collected from hydropunches and wells. The samples were analyzed for one or more of the following (Tables 1 and 2) (groundwater monitoring well locations are shown on Figure 6):

- Metals
- TPH as gasoline, kerosene, diesel, motor oil, and bunker C
- Oil and Grease
- VOCs
- Methyl tertiary butyl ether (MTBE)

The results of past groundwater investigations are documented in the previously-referenced reports. The COCs in the groundwater are limited to metals and TPH as diesel, motor oil, and bunker C. From July 1996 through June 1997, quarterly groundwater monitoring was conducted at five wells, as required by the County (County, 1997). The samples were analyzed for copper, lead, and TPH as diesel. Following the June 1997 monitoring event, the County approved the Port's request to 1) reduce monitoring to annually 2) monitor four wells instead of five, and 3) to analyze subsequent groundwater samples for TPH as diesel only. The most recent groundwater monitoring occurred in January 2001. None of the groundwater samples collected during any of the annual monitoring events (since January 1998) have contained TPH as diesel above the laboratory reporting limits of approximately 0.05 milligram per liter (mg/L).

The groundwater at the site would not be considered a potential drinking water source based on the electrical conductivity measured during monitoring activities. The State Water Resources Control Board (SWRCB) has defined a potential drinking water source as one that contains an electrical conductivity of less than 5,000 micromhos per centimeter (µmhos/cm) or produces more than 200 gallons per day per well. The electrical conductivity of the groundwater at the site has consistently exceeded 5,000 µmhos/cm.

Past Human Health Risk Assessment

In 1998, a human health risk assessment was conducted to evaluate risks to current beach cleanup workers under existing conditions and to future commercial workers from potential exposure to site contaminants (i.e., TPH and metals) in soil and groundwater.[1] The assessment concluded that the

[1] The human health risk assessment included evaluation of contaminants present along the shoreline.

calculated cumulative excess lifetime cancer risk and hazard index for current and future workers are below the negligible excess lifetime cancer risk of 1×10^{-6} (one-in-one million) and below the hazard index of 1.0. For metals (i.e., lead), the assessment concluded that the blood lead concentration in current and future workers would not exceed the threshold of 10 micrograms per deciliter at the 99th percentile. Based on the assessment results, institutional controls to protect current site users and future commercial workers were not warranted.

SOIL AND GROUNDWATER DATA EVALUATION

The purpose of this section is to demonstrate that representative samples have already been collected from the site to fully characterize the soil and groundwater quality and to evaluate whether the COCs constitute a potential excess risk to users of the site or ecological receptors.

Representativeness of Data

Both random and source-specific soil samples have been collected at depths ranging from zero to 8.5 feet below ground surface. Random soil samples were collected to provide representative samples of the subsurface soils at the site, as specified in the U.S. Environmental Protection Agency's (U.S. EPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Method, SW-846* (SW-846) (U.S. EPA, 1986). Source-specific soil samples were collected to determine the horizontal and vertical extent of contamination from known sources at the site.

Regional Water Quality Control Board Risk-Based Screening Levels

The San Francisco Regional Water Quality Control Board (SFRWQCB) has prepared a document entitled *Application of Risk-Based Screening Levels (RBSLs)and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final* (SFRWQCB, 2000). The document presents RBSLs for soil and groundwater that consider protection of both human health and ecological receptors.

The RBSLs for **soil** take into account: 1) protection of human health through direct and indirect contact of impacted soil, and inhalation of vapors in indoor air; 2) protection of groundwater quality from leaching of contaminants; 3) protection of terrestrial ecological receptors; and 4) protection against nuisance concerns and general resource degradation.

For **groundwater** quality, the RBSLs consider: 1) protection of human health by ingestion of contaminated groundwater and inhalation of vapors in indoor air; 2) protection of aquatic life (from discharge to surface water); and 3) protection against nuisance concerns (e.g., odors) and general resource degradation.

In general, contaminants present at concentrations below the corresponding RBSLs would not be considered to pose a significant threat to human health and the environment. However, contaminant concentrations above the RBSLs do not necessarily indicate that a significant risk exists at a site. It does, however, generally indicate that additional investigation and/or a more in-depth evaluation of potential risks is warranted.

The RBSLs presented in the SFRWQCB document are compiled in a series of four lookup tables each of which includes RBSLs for soil and groundwater.[2]

For each lookup table, soil RBSLs are provided for two land use scenarios, residential and industrial/commercial. Each lookup table also provides two groundwater RBSLs for 1) drinking water resource (either threatened or not threatened) and 2) "elevated threat to surface water." The RBSLs established under the drinking water resource scenario are intended to protect aquatic life. According to the SFRWQCB document, the levels provided under the "elevated threat to surface water" scenario are intended to protect human health from consumption of aquatic organisms in which chemicals have bioaccumulated. Consideration of the bioaccumulation criteria, will be most appropriate for sites where the potential discharge of large plumes of impacted groundwater have long-term impacts to surface water quality.

Methodology for Soil and Groundwater Data Comparison with RBSLs

Soil and groundwater data for the COCs (i.e., metals and TPH diesel, motor oil, and bunker C) collected from the site were compared to the corresponding RBSLs to determine whether soils and groundwater could potentially pose a significant threat to human health and the environment.[3] Specifically, the 95 percent one-tailed Upper Confidence Limits (95UCL) for the individual metals and TPH (as diesel, motor oil, and bunker C) in soil and groundwater were calculated (Tables 3 through 8) and compared to the RBSLs. In calculating the 95UCLs, a value of one-half of the laboratory reporting limits was used for data that were not reported above the laboratory reporting limits.[4]

For the TPH diesel and motor oil groundwater data, the 95UCL was calculated only using the data from samples that were subjected to silica gel cleanup. The 95UCL for TPH bunker C was not calculated since none of the samples subjected to a silica gel cleanup contained TPH bunker C above the laboratory reporting limits of 0.3 or 0.5 mg/L.

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[2] The four lookup tables are referenced as Tables A, B, C, and D. Lookup tables A and B provide RBSLs for near-surface soil at depths less than three meters; Table A also provides RBSLs for groundwater that is considered a current or potential source of drinking water and Table B provides RBSLs for groundwater that is not considered a current or potential source of drinking water. Table C and D provide RBSLs for soil at deeper than three meters; Table C also provides RBSLs for groundwater that is considered a current or potential source of drinking water and Table D provides RBSLs for groundwater that is not considered a current or potential source of drinking water.

[3] Previous soil samples collected in areas that have been removed as part of past remediation activities (e.g., concrete containment removal) are not included in this data evaluation.

[4] For TPH as bunker C, two sets of soil and groundwater data are available; one set is based on bunker C quantification using the laboratory standard and the second is based on quantification using the site standard. For this evaluation, the 95UCL was individually calculated for the two sets of soil data. For groundwater, only the data quantified using the laboratory standard were considered since none of the site standard data were from samples subjected to a silica gel cleanup.

The 95UCLs were then compared to the corresponding RBSLs provided in "Table B" of the SFRWQCB document. These RBSLs provide screening levels for near-surface soils less than three meters (ten feet) below ground surface and for groundwater that is not considered a potential drinking water source. The soil RBSLs for the commercial/industrial land-use scenario were used since the site will not be developed for residential purposes. ∴ need for deed restriction

The groundwater RBSLs for "Drinking Water Resource not Threatened" were used for comparison (Appendix C of the SFRWQCB document).[5] In addition, a dilution attenuation factor (DAF) of ten was conservatively applied to the groundwater RBSLs to account for groundwater attenuation.[6] The average distance from the groundwater monitoring wells to the surveyed highwater tide line of the Oakland Estuary Clinton Basin is estimated to be greater than 90 feet. Therefore, application of a DAF to the RBSLs is reasonable to account for the attenuation of COCs in groundwater between the sampling location and the point of discharge to the Oakland Estuary/Clinton Basin, where the ecological receptors are present.[7]

Soil and Groundwater Data Evaluation Results

The 95UCLs for metals and TPH in soil and groundwater are provided in Tables 3 through 8. The 95UCLs for **arsenic, chromium, and TPH as diesel, motor oil, and bunker C** (laboratory and site standards) exceeded the corresponding soil RBSLs; the 95UCLs for the remaining metals were below the corresponding soil RBSLs.[8]

For groundwater, the 95UCLs for **barium, lead, selenium, and silver** exceeded the corresponding groundwater RBSLs. The 95UCLs for the remaining metals and for TPH as diesel, motor oil, and bunker C were below the corresponding RBSLs.[9] The following discussion provides further evaluation of whether the COCs for which the 95UCLs exceeded RBSLs could contribute to unacceptable human health risks or environmental degradation.

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[5] The SFRWQCB also includes mercury RBSLs for the "to protect against elevated threats to surface water" scenario. The mercury data were also compared with this RBSLS.

[6] The National Oceanic and Atmospheric Association (NOAA) acknowledges that some level of dilution occurs when groundwater is discharged to surface water. NOAA considers a dilution attenuation factor of ten to be a conservative dilution factor for the discharge of groundwater to surface water.

[7] Similar DAFs have been established for other RWQCB-adopted site cleanup requirements within the Bay Area, including the adoption of site cleanup requirements for the proposed Eastshore Park Property in Alameda and Contra Costa Counties (Order No. 98-072). For this order, a DAF of ten was applied on the groundwater action levels for areas beyond the 50-foot shoreline (SFRWQCB, 1998).

[8] The 95UCLs were not calculated for selenium or thallium since none of the soil samples contained these metals above the laboratory reporting limit of 2.5 mg/kg. However, one-half of the laboratory reporting limit is below the corresponding selenium and thallium RBSLs of 10 and 29 mg/kg, respectively.

[9] The 95UCL was not calculated for cadmium, chromium, mercury, nickel, and zinc, since none of the samples contained these metals above the laboratory reporting limits. However, one-half of the laboratory reporting limits for these metals is below the corresponding DAF-adjusted RBSLs.

Arsenic in Soil

The 95UCL for arsenic in soil is 7.7 milligrams per kilogram (mg/kg). The RBSLS for arsenic is 2.7 mg/kg and is based on direct contact of humans with soil (ingestion and dermal contact). The RBSLS was back calculated from an excess lifetime cancer risk of 1×10^{-6} (one-in-one million). In calculating the RBSLS, it was assumed that the industrial/commercial worker would spend 250 days a year at the site for 25 years, ingest 50 mg of soil per day, and other conservative assumptions. Exposure of industrial/commercial workers to 7.7 mg/kg (calculated 95UCL concentration) would contribute to a 2.85×10^{-6} excess lifetime cancer risk, which is within the range considered by regulatory agencies to be of no significant risk (1×10^{-4} to 1×10^{-6}).

Exposure of impacted arsenic soil to future tenants would also be controlled through the implementation of the Risk Management Plan. Therefore, the presence of arsenic at the site would not present an unacceptable health risk for future users at the site.

Chromium in Soil

The 95UCL for chromium in soil is 25 mg/kg. The RBSLS for total chromium is 12 mg/kg and is also based on direct contact with soil by construction/trench workers. Exposure by the construction/trench worker to 25.3 mg/kg total chromium would result in a 2.1×10^{-6} excess lifetime cancer risk. As previously indicated, this risk estimate is within the range of risk estimates considered to be no significant risk by regulatory agencies. Exposure of impacted chromium soil to future tenants would also be controlled through the implementation of the Risk Management Plan. Therefore, the presence of chromium at the site would not present an unacceptable health risk for future users at the site.

TPH as Diesel, Motor Oil, and Bunker C in Soil

The 95UCLs for TPH as diesel, motor oil, bunker C quantified using the laboratory standard, and TPH as bunker C quantified using the site standard are 1,007.3, 1,050, 5,474.9, and 5,602.9 mg/kg, respectively; the corresponding soil SFRWQCB RBSLs for these contaminants are 500 mg/kg for TPH diesel (middle distillates), and 1,000 mg/kg for TPH as motor oil or bunker C (residual fuels).

The RBSLs for TPH as diesel, motor oil, and bunker C are for the protection of groundwater quality through the mechanism of constituents leaching from the soil into the groundwater. These RBSLs were developed to protect aquatic life from discharge of impacted groundwater to surface water.[10] The RBSLs were conservatively calculated by assuming no dilution would occur before discharge to surface water. The RBSLS document indicates that these soil RBSLs presented for many of the petroleum-related compounds and TPH do not consider the widely recognized potential for natural attenuation in groundwater (SFRWQCB, 2000). If actual threat to groundwater quality can be demonstrated to be minimal, then significantly less stringent screening levels for soil may be appropriate (SFRWQCB, 2000).

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[10] The corresponding human health direct contact SFRWQCB RBSLS for TPH as diesel, motor oil, and bunker C are 11,000 mg/kg. The calculated 95UCLs for these constituents are below the SFRWQCB RBSLs.

The source of petroleum contamination at the site is attributed to the operation of the former power plant. The power plant operated at the site from 1909 until the late 1950s and was then abandoned in 1959. The large aboveground concrete containment for the former fuel tank was removed in 1996. Equilibrium between the petroleum hydrocarbons in the soil and the groundwater is expected to have been reached over the past 40+ years. Therefore, the TPH concentrations in groundwater were compared to the corresponding groundwater RBSLs to determine whether there would be a potential risk to aquatic life from contaminants in soil leaching into the groundwater and subsequently to the Oakland Estuary/Clinton Basin.

The 95UCL for TPH diesel and motor oil (silica gel cleanup data) in groundwater (4.2 and 0.17, mg/L, respectively) are below the corresponding groundwater DAF-adjusted RBSLs of 6.4 mg/L. In addition, none of the laboratory reporting limits for TPH bunker C exceed the corresponding DAF adjusted RBSLS of 6.4 mg/L.[11] Therefore, these data indicate that the TPH in the soils are not a threat to groundwater quality since actual groundwater concentrations are below the DAF-adjusted RBSLs.

Barium in Groundwater

The 95UCL for barium in groundwater is 0.11 mg/L. Since none of the groundwater samples were filtered prior to analysis the value is likely an over-estimate of the barium concentration dissolved in the groundwater. The RBSLS for barium is 0.0039 mg/L and is based on the freshwater ecotox chronic threshold established by U.S. EPA. Since the groundwater discharges to a saltwater environment, use of a freshwater criterion is inappropriate. However, SFRWQCB has not identified a corresponding ecotox chronic threshold for saltwater. According to the 1986 U.S. EPA Water Quality Criteria for Water, soluble barium concentrations in marine water (saltwater) generally would have to exceed 50 mg/L before toxicity to aquatic life would be expected (1986, U.S. EPA). The 95UCL for barium (0.11 mg/L) in the groundwater is well below this threshold (50 mg/L) and, therefore, does not appear to contribute an adverse risk to aquatic receptors.

Lead in Groundwater

The 95UCL for lead in groundwater is 0.017 mg/L. It should be noted that the 95UCL for lead in groundwater is based on 46 data points, of which only 16 samples were reported above the laboratory reporting limit. Of these samples, five were filtered prior to analysis. Therefore, the calculated 95UCL is likely artificially elevated and is greater than the dissolved lead concentration.

The RBSLS for lead in groundwater is based on the Region 2 Basin Plan and is equivalent to the U.S. EPA freshwater criteria for continuous concentration (0.0032 mg/L) (SFRWQCB, 2000). The corresponding saltwater criterion for continuous concentration is 0.0081 mg/L (under the California Toxics Rule) (SFRWQCB, 2000). The 95UCL concentration of 0.017 mg/L slightly exceeds this level and is well below the DAF-adjusted RBSLS concentration of 0.081 mg/L. None of the actual dissolved lead concentrations (from filtered samples) reported above the laboratory reporting limits

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[11] None of the samples subjected to a silica gel cleanup contained TPH bunker C above the laboratory reporting limits.

was above the saltwater criterion of 0.0081 mg/L or DAF-adjusted criterion of 0.081 mg/L. Therefore, the dissolved lead concentrations in the groundwater do not appear to pose an adverse risk to aquatic receptors.

Selenium in Groundwater

The 95UCL for selenium in groundwater is 0.01 mg/L. The 95UCL was based on four data points, three were reported as "ND" (laboratory reporting limit of 0.005 mg/L). The one sample quantified above the laboratory reporting limit was 0.011 mg/L and was not filtered prior to analysis.

The RBSLS for selenium in groundwater (0.005 mg/L) is based on the ecological freshwater criteria for continuous concentration. The corresponding saltwater continuous concentration is 0.071 mg/L (SFRWQCB, 2000). The 95UCL concentration (and the one reported selenium concentration above the laboratory reporting limit) was well below this level (as well as the DAF-adjusted concentration of 0.71 mg/L). Therefore, selenium in the groundwater does not appear to pose an adverse risk to aquatic life.

Silver in Groundwater

None of the samples contained silver above the laboratory reporting limits of 0.01 and 0.007 mg/L. The RBSLS for silver (0.00012 mg/L) is based on the freshwater criteria for continuous concentration established by U.S. EPA. The corresponding saltwater criteria for continuous concentration is 0.00092 mg/L. One-half of each of the two laboratory reporting limits (0.005 and 0.0035 mg/L) is below the DAF-adjusted saltwater criteria. Therefore, silver in the groundwater does not appear to contribute to adverse ecological impacts.

Conclusion

The concentrations of COCs (metals and TPH) in soil and groundwater at the site do not appear to contribute to adverse human health or ecological impacts. This conclusion is based on a comparison of representative soil and groundwater quality site data against SFRWQCB RBSLs. Therefore, additional site characterization is not needed to assess potential human health and ecological risks from soil and groundwater at the site.

SOIL AND GROUNDWATER SAMPLING PLAN ALONG INTAKE AND DISCHARGE TUNNELS

As indicated in the Closure Plan for the intake and discharge tunnel remediation, a section of the each tunnel would be exposed, punctured, and sealed with concrete fill. During tunnel remediation, the grab soil and groundwater samples with be collected in the excavation areas where the tunnels would be exposed. The purpose of the soil and groundwater sampling would be to evaluate the soil and groundwater quality in the intake and discharge tunnel vicinity and ensure that the soil and groundwater quality in these areas are consistent with the quality found throughout the rest of the site.

Four soil borings will be installed at each excavation area down to the estimated bottom of the tunnel (Figure 7). Up to four soil samples will be collected in each soil boring, at depths between the top and bottom of the tunnel. Up to 16 soil samples will be collected from each excavation. The soil samples collected from each boring will be composited into one sample by the laboratory before analysis, resulting in a total of eight composite soil samples. The laboratory would retain a portion of each discrete sample in the event additional analyses of these samples were needed. as field screened

Direct-push method will be used to install the soil borings and collect the soil samples. Continuous samples will be collected to identify the lithology. All samples retained for chemical analysis will be handled in accordance with BASELINE's Standard Operating Procedures and submitted to a State-certified laboratory for analysis. Soil samples will be submitted to STL Chromalab in Pleasanton and analyzed for Title 22 metals using EPA Methods 6000/7000 series and TPH as diesel, motor oil, and bunker C using Modified EPA Method 8015 with silica gel cleanup.

Grab groundwater samples will be collected from two of the four soil borings in each excavation area. The grab groundwater samples will be collected by inserting a temporary perforated well casing with a sand pack filter into the boring until sufficient water has accumulated in the boring. Groundwater samples will be retrieved either with a new disposable bailer or a peristaltic pump and new tubing. The groundwater samples will be submitted to STL Chromalab in Pleasanton and analyzed for Title 22 metals and TPH diesel, motor oil, and bunker C. The groundwater samples will be filtered by the laboratory prior to performing the metals and TPH analyses; the samples would also be subjected to a silica gel cleanup prior to performing the TPH analysis.[12]

A site-specific health and safety plan will be prepared prior to commencement of field activities. All field activities will be directed by a BASELINE registered geologist. Generated soil cuttings will be placed in drums, sealed, labeled, and retained at the site. Decontamination water will also be drummed and retained on-site. Disposal of the drummed soil and decontamination water will be undertaken by the Port.

Initial screening of the soil data would be conducted to evaluate whether soil excavated during tunnel remediation activities could be reused as backfill on-site. The soil screening evaluation would be conducted using Risk-Based Screening Levels (RBSLs) developed for protection of human health from direct exposure of chemicals contained in the soil and compiled by the RWQCB, San Francisco Bay Region. The RBSLs are based on the U.S. EPA Region IX Preliminary Remediation Goals and are compiled in the 2000 RWQCB document (Application of RBSLs and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final). The RBSLs would be based on a commercial/industrial scenario.[13] The RBSLs of TPH (diesel, motor oil, and bunker C), lead, and copper would be 11,000, 750, and 15,000 mg/kg, respectively. is this right?

[12] The laboratory method spike samples will be subjected to the same procedures as the collected samples and will be spiked before sample preparation.

[13] Soil quality data would not be compared to RBSLs developed for protection of ecological receptors since groundwater monitoring data collected from the site have indicated that the contaminants present at the site do not pose an adverse ecological impact.

Should treat intake & discharg areas separately

The evaluation would compare the reported maximum concentrations of the chemicals of concern with the RBSLs; soil data not reported above the laboratory reporting limits would not be considered. Chemical concentrations that exceed the RBSL would further be evaluated by: 1) calculating the 95% UCL of the mean of the soil data (from all composited samples) if one of the composited samples exceeded the RBSL; and 2) comparing the 95% UCL with the corresponding RBSL. If the 95% UCL exceeded the RBSL, the individual samples from the composites would be analyzed discretely to assess whether the 95% UCL for all samples would exceed the RBSL. If the RBSL were exceeded, the soil would not be reused on-site.

this is not appropriate

A groundwater risk-based screening evaluation would also be conducted to confirm the groundwater quality in the tunnel vicinity will not constitute potentially adverse human health or ecological risks. The evaluation would include using RBSLs developed for protection of human health (from indoor air impact), aquatic life, and elevated threat to surface water. These RBSLs would be based on the San Francisco Bay Area Basin Plan for Region 2, Interim California Toxics Rule Criterion for Continuous Concentration, U.S. EPA Criterion for Continuous Concentration, and screening levels carried out for the Presidio of San Francisco and San Francisco Airport; the RWQCB RBSL document includes a summary of these screening levels. The RBSLs for TPH (diesel, motor oil, and bunker C), lead, and copper would be 0.64, 0.0081, and 0.0031 mg/L, respectively. The methodology for conducting the evaluation would be similar to the approach described above for the soil evaluation.

A report will be prepared to document field sampling activities, data evaluation, conclusions, and recommendations. Sampling activities will be undertaken following approval of this sampling plan by the County and the RWQCB.

CLOSURE PLAN FOR SEALING INTAKE AND DISCHARGE TUNNELS

Previous investigations at the tunnel hatchways indicate that the tunnels contain debris/sediments, water with an oily sheen on the surface, and free product. Water samples collected in the tunnel hatchways in 1995 contained total petroleum hydrocarbons as diesel and bunker C in the tunnel water, ranging from 0.33 to 2.2 mg/L for TPH diesel and less than the laboratory reporting limit to 6.8 mg/L for TPH bunker C (BASELINE, 1995). The water contained in the tunnels appears to be directly connected to Clinton Basin and the Estuary, since water level measurements collected in the intake and discharge tunnel hatchways fluctuated with rising and falling tides.

This Closure Plan describes the approach for sealing the intake and discharge tunnels, as required by the County. The purpose of sealing the tunnels is to prevent petroleum contaminated water and/or sediments, potentially present in the tunnels, from discharging to the Estuary. This Closure Plan supercedes the tunnel sealing approach described in the August 1999 Phase One Tunnel Remediation and Phase Two Work Plan Intake and Discharge Tunnels Report submitted to the County (BASELINE, 1999).[14]

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[14] As indicated previously, the Project Manual and Plans provide the technical details for sealing the tunnels; the Manual and Plans have been provided to the County as a separate attachment.

A section of the intake and discharge tunnels will be sealed within the shoreline vicinity.[15] The seal will consist of concrete and will be approximately five to ten feet long, three feet wide (tunnel width), and six feet high (tunnel height). The tunnel seals will be located approximately 30 feet from the nearest high tide shoreline (Figure 7).

The tunnel seal sections will be located using exploratory excavation methods. Existing drawings and past field information will be used to determine the sections.[16] Thereafter, the concrete tunnel top and inner horizontal dividing wall (if present) will be demolished using a backhoe or similar excavation equipment. Generated concrete debris (from tunnel top/wall demolition) and sediment or sludge encountered in and within two feet of the tunnel seal section will be completely removed from the excavation.[17] Concrete and sediment or sludge will be removed during lowest tide to ensure that water from the Estuary/Clinton Basin is not present in the excavation during removal activities. The tunnel side walls and bottom will be left in place (Figure 7).

After the seal sections are cleared, formwork will be installed in the seal sections, as necessary, to prevent water (from the Estuary/Clinton Basin) or sludge or sediment from entering the seal sections. The formwork will include the placement of barriers at the seal section ends and along the length of the tunnels (Figure 7). At lowest tide, controlled density fill concrete slurry will be poured within the formwork to create the concrete seal. The slurry will be poured to the top of the tunnel to ensure a complete and adequate seal.

After the seal is constructed, the excavation will be backfilled to the surface with excavated soil pending the results of the soil screening evaluation (see Sampling Plan section). Excavated soil not used for backfill would be characterized and disposed of off-site in accordance with regulatory requirements.[18] Concrete debris (from tunnel top/wall demolition) and sediment or sludge removed from the tunnels will also be characterized and transported off-site for disposal, in accordance with regulatory requirements.

This Closure Plan would be implemented following receipt of approval by the County. The Port will be responsible for implementing this workplan and oversee contractor activities. Following completion of tunnel sealing activities, a report would be prepared by the Port to document field activities, conclusions, and disposal activities.

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[15] Existing drawings and past site visits indicate that the tunnel ends extend beyond the shoreline and terminate within the estuary/basin. It would not be feasible to attempt to seal the tunnel ends.

[16] The precise tunnel locations could not be determined using the video camera and hydrosystem locator unit during the 1999 tunnel investigation (BASELINE, 1999).

[17] Sediment and/or sludge removed from the tunnels would be stockpiled on top of, and covered with, visquene.

[18] All excavated soil will be stockpiled on top of and underneath visquene.

LIMITATIONS

The conclusions presented in this report are professional opinions based on the indicated data described in this report. They are intended only for the purpose, site, and project indicated. Opinions and recommendations presented herein apply to site conditions existing at the time of our study. Changes in the conditions of the subject property can occur with time due to natural processes or the works or the works of man, on the subject sites or on adjacent properties. Changes in applicable standards can also occur as the result of legislation or from broadening knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

REFERENCES

Alameda County Health Care Services, Environmental Health Services, 1997, Letter to the Port of Oakland, August 28.

BASELINE, 1996 to2001, Quarterly and Annual Groundwater Monitoring Reports dated 19 August 1996, 18 October 1996, 22 January 1997, 14 May 1997, 29 July 1997, 25 February 1998, January 1999, February 2000, and February 2001.

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BASELINE, 1997, Concrete Containment Structure Removal and Remediation Oversight, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, January.

BASELINE, 1995a, Subsurface Investigation, Second Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, April.

BASELINE, 1995b, Third Interim Report, Additional Subsurface Investigation, Seabreeze Yacht Center, Inc., Oakland, California, October.

BASELINE, 1995c, Analytical Results for Soil Sampling, 4 October 1995, at Seabreeze Site, Oakland, 16 October.

BASELINE, 1994a, Phase III Remedial Investigation, Seabreeze Yacht Center, Inc., Oakland, California, September.

BASELINE, 1994b, Subsurface Investigation, Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, December.

BASELINE, 1992, Phase II Remedial Investigation, Seabreeze Yacht Center, Inc.,Oakland, California, March.

BASELINE, 1990, Preliminary Remedial Investigation, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, November.

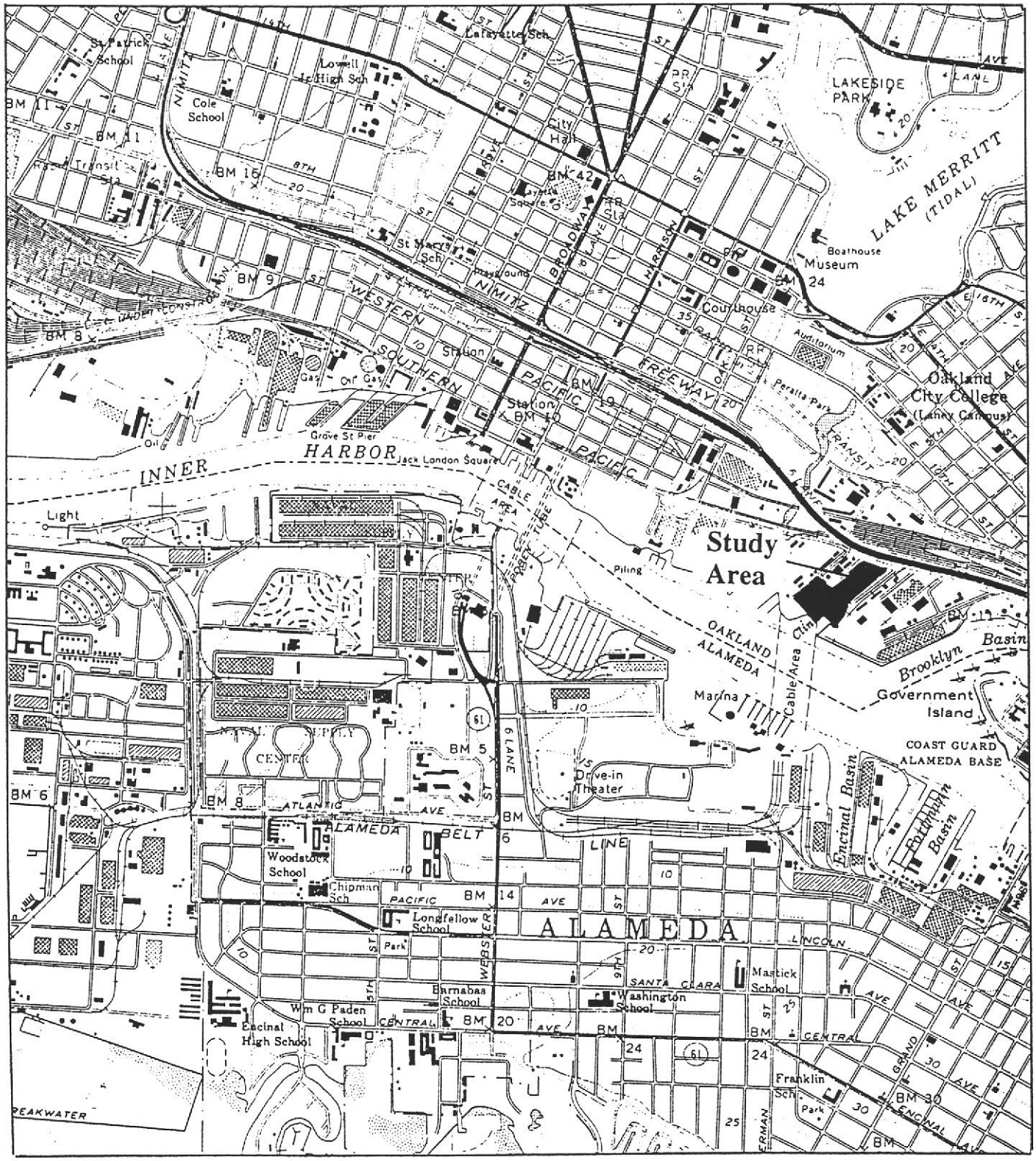
San Francisco Regional Water Quality Control Board (SFRWQCB), 2000, Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final, September.

San Francisco Regional Water Quality Control Board (SFRWQCB), 1998, Order No. 98-072, Adoption of Site Cleanup Requirements for Catellus Development Corporation and San Francisco Pacific Property, Inc., Proposed Eastshore Park Property, Berkeley and Albany (Alameda County) and Richmond (Contra Costa County), July 15.

U.S. Environmental Protection Agency, 1986, Quality Criteria for Water, May 1.

REGIONAL LOCATION

Figure 1



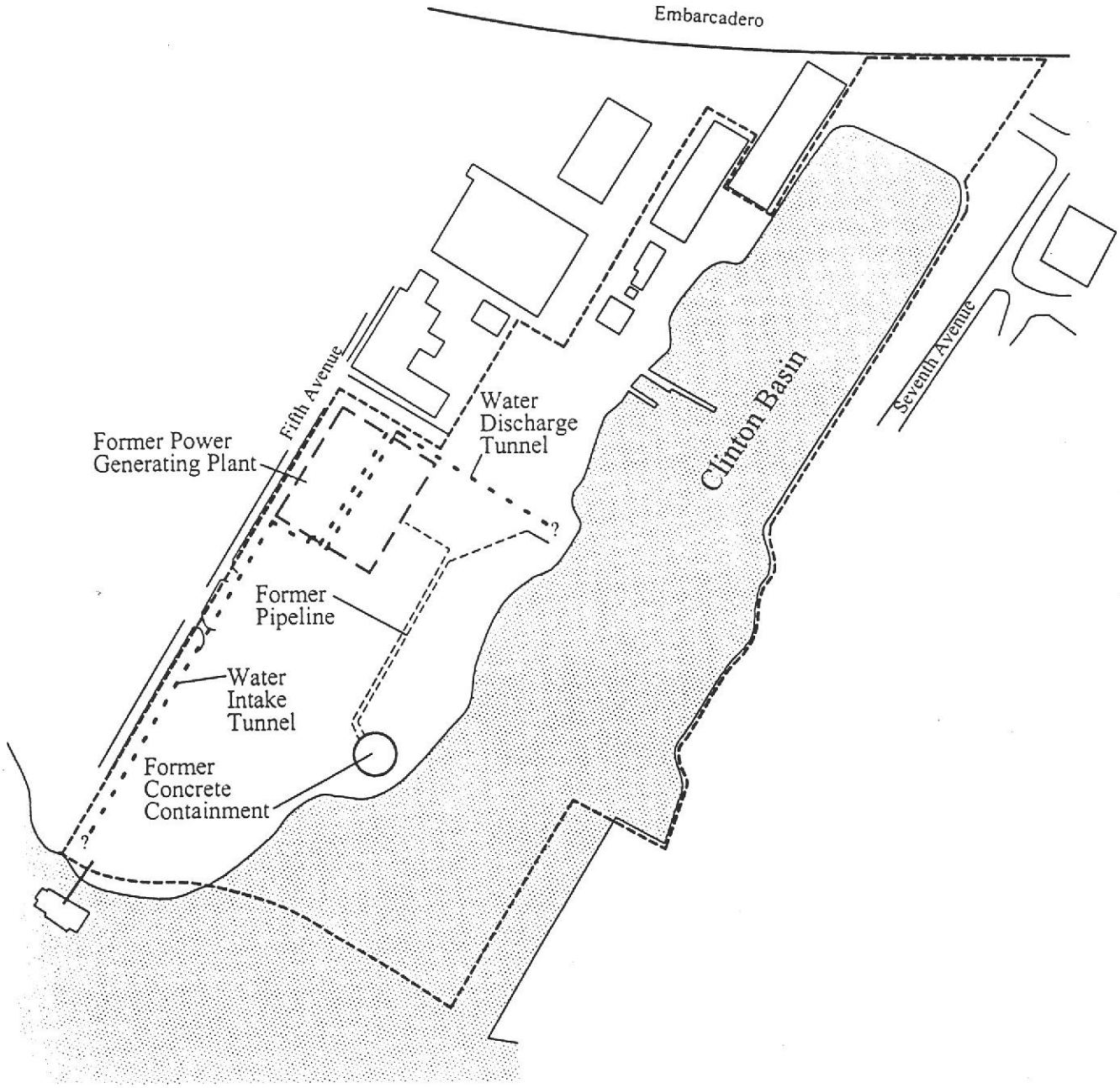
Seabreeze Yacht Center Study Area
Oakland, California

BASELINE

S9171-C1 4/12/99

STUDY AREA

Figure 2



Legend

------ Seabreeze Yacht Center Study Area Boundary

Seabreeze Yacht Center Study Area
Oakland, California

0 200 Feet

BASELINE

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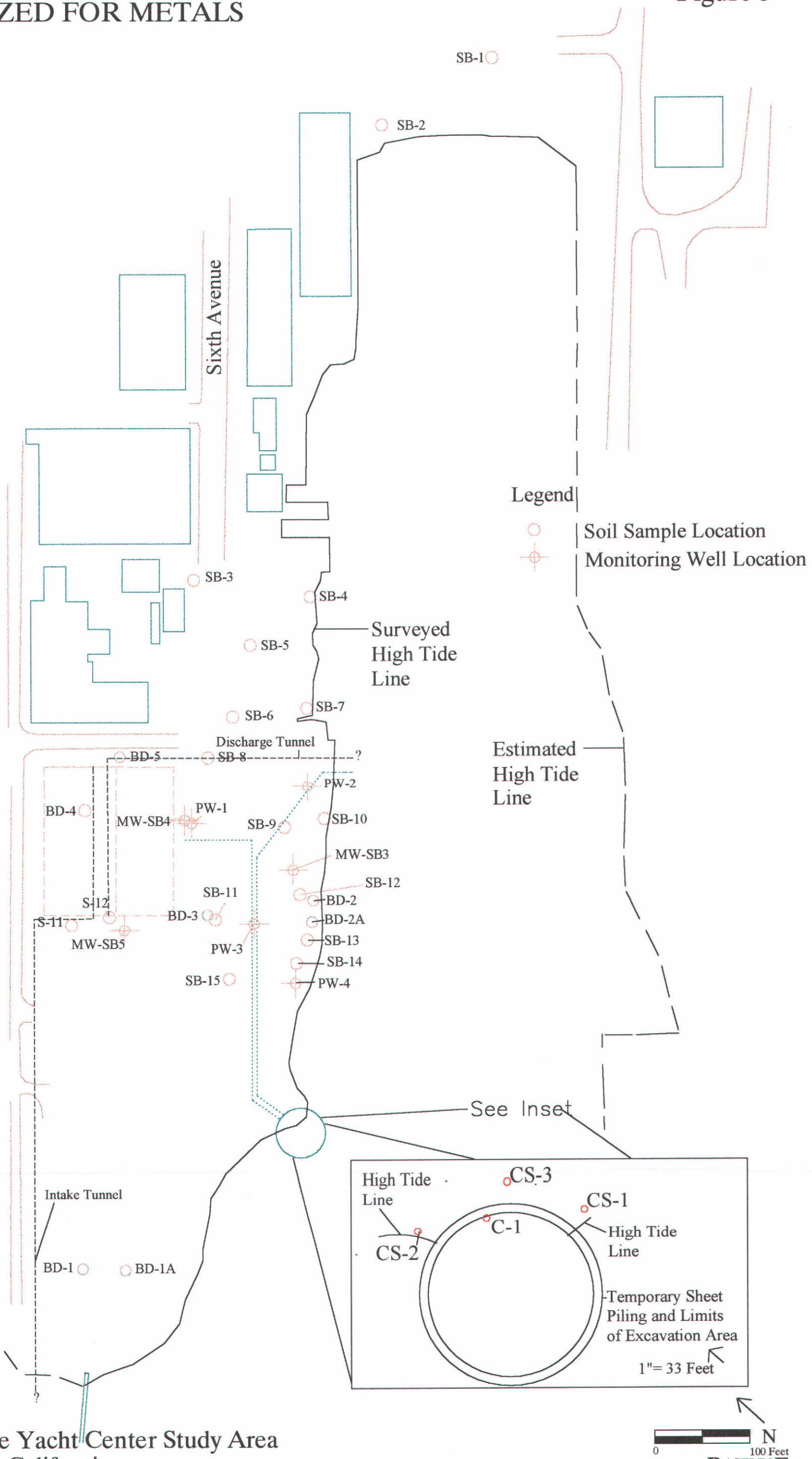
LOCATION OF SOIL SAMPLES ANALYZED FOR METALS

Figure 3



Seabreeze Yacht Center Study Area
Oakland, California

BASELINE

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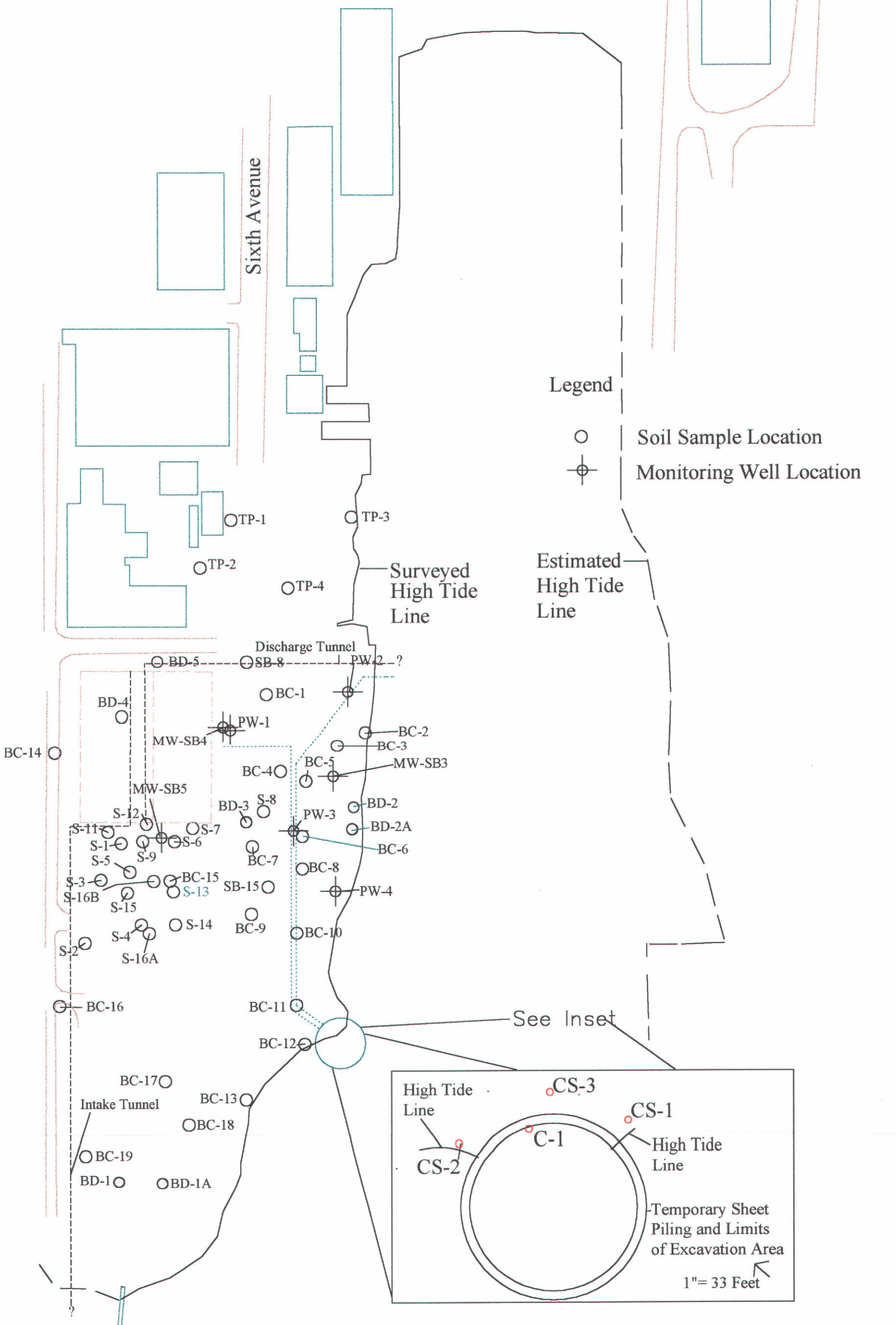
LOCATION OF SOIL SAMPLE ANALYZED FOR PETROLEUM

Figure 4



Seabreeze Yacht Center Study Area
Oakland, California

BASELINE

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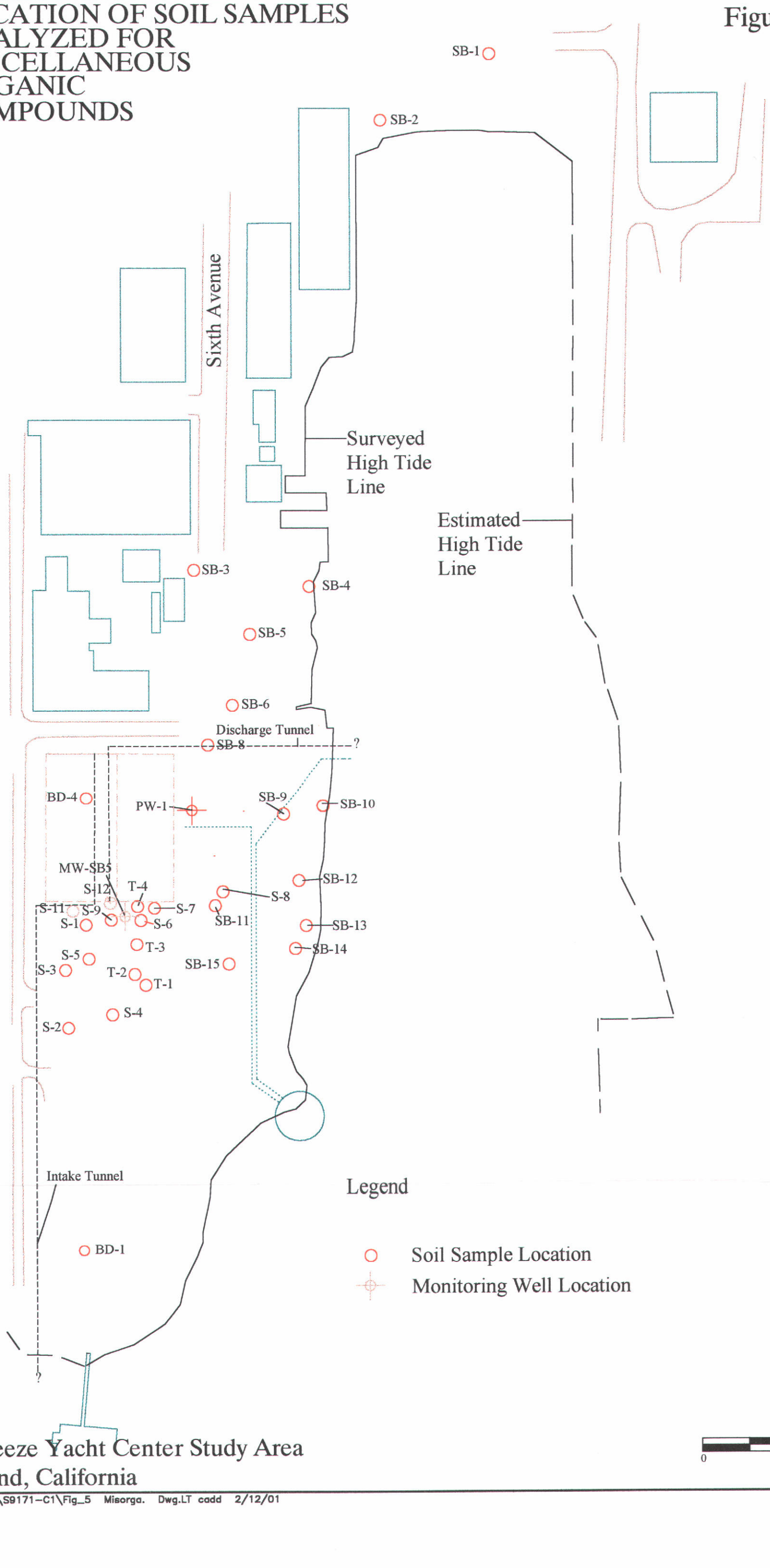
LOCATION OF SOIL SAMPLES ANALYZED FOR MISCELLANEOUS ORGANIC COMPOUNDS

Figure 5



Seabreeze Yacht Center Study Area
Oakland, California

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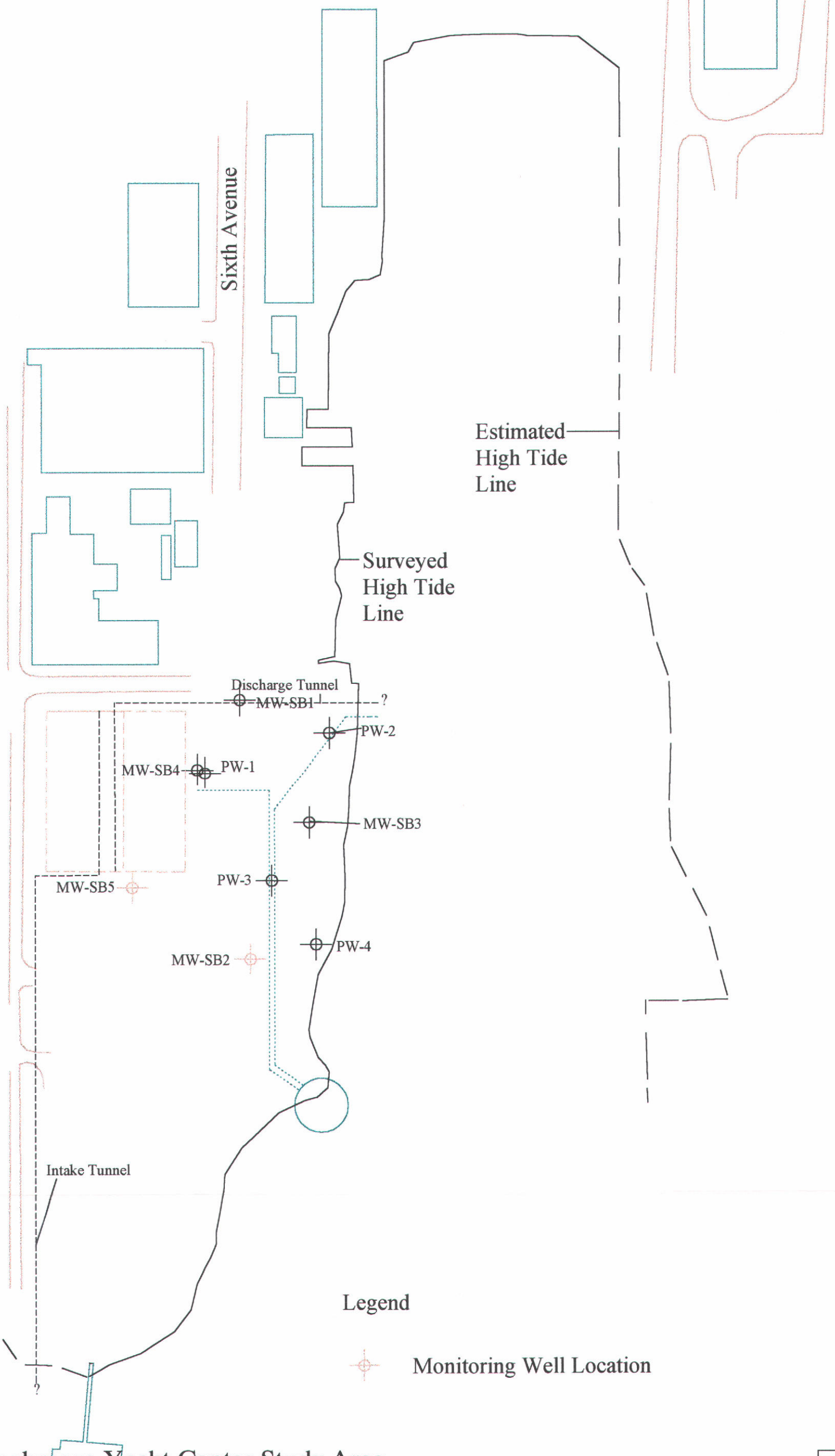
LOCATION OF GROUNDWATER MONITORING WELLS

Figure 6



Seabreeze Yacht Center Study Area
Oakland, California

BASELINE

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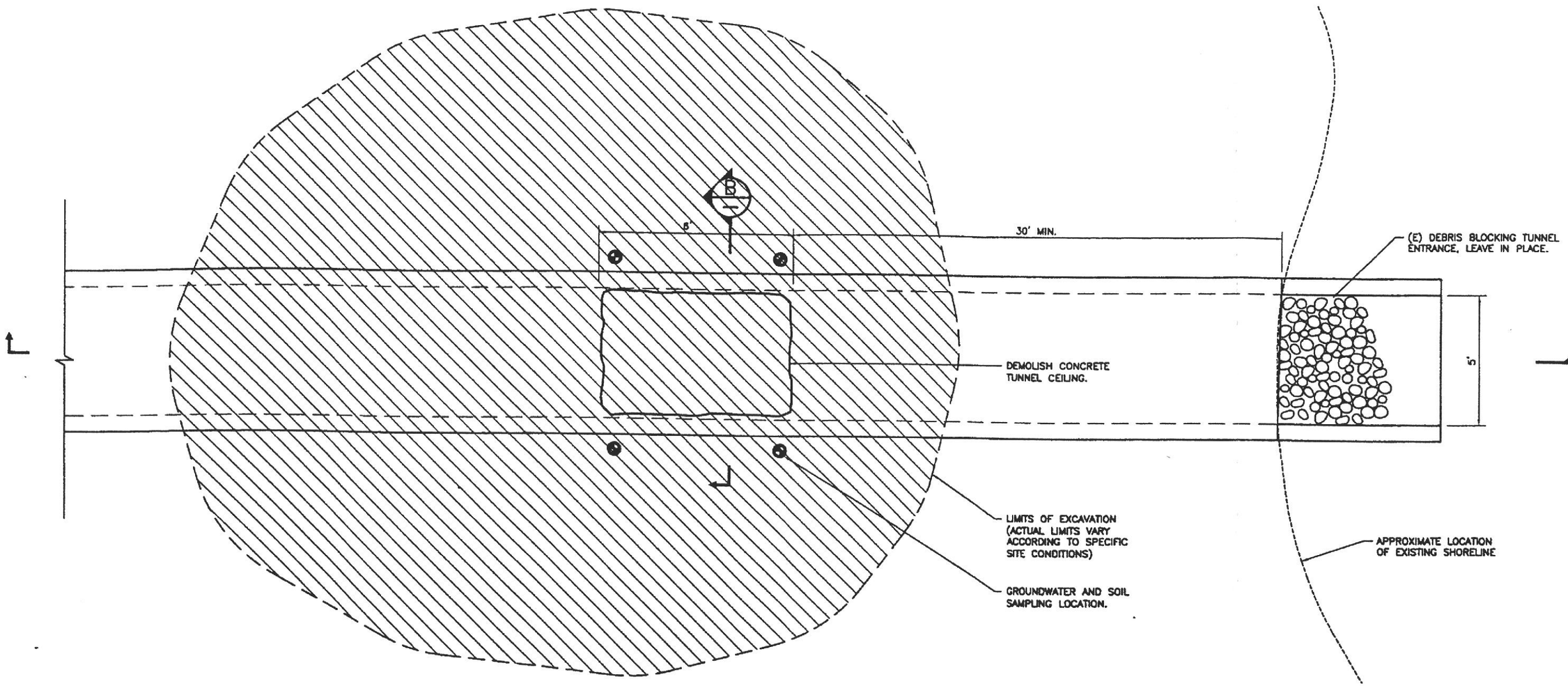
PROPOSED GRAB SOIL AND GROUNDWATER SAMPLING LOCAITON

Figure 7



1 / 2 3 TYPICAL DETAIL
NTS

NOTES:

1. ALL DIMENSIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL MAKE THE APPROPRIATE ADJUSTMENTS TO THE WORK FOR THE ACTUAL DIMENSIONS.
2. TUNNEL ENTRANCE MAY BE PARTIALLY OR FULLY SUBMERGED DURING CONSTRUCTION. REMOVAL OF SLUDGE AND PLACEMENT OF CONCRETE SHALL BE PERFORMED WITHIN TWO HOURS OF PUBLISHED LOW LOW TIDE TO PREVENT CLINTON BASIN/OAKLAND ESTUARY WATER FROM INTERFERING WITH THE SEALING PROCESS.

Seabreeze Yacht Center Study Area
Oakland, California

Source: Port of Oakland, Project Plans for construction of seals for intake and discharge tunnels at former Seabreeze Yacht Center.

Not to Scale

BASELINE

D:\Graphics\S9171-C1\Closure Plan\Proposed Grab Soil.cdr 4/18/01

TABLE 1
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
METALS, AND TPH AS DIESEL, MOTOR OIL, AND BUNKER C
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
SOIL										
Preliminary	SB-1	9/6/90	0.5	x	x	x				
Preliminary	SB-1	9/6/90	1	x	x	x				
Preliminary	SB-1	9/6/90	3.5	x	x	x				
Preliminary	SB-2	9/6/90	0.5	x	x	x				
Preliminary	SB-2	9/6/90	1	x	x	x				
Preliminary	SB-2	9/6/90	3	x	x	x				
Preliminary	SB-2	9/6/90	5	x	x	x				
Preliminary	SB-3	9/6/90	0.5	x	x	x				
Preliminary	SB-3	9/6/90	1	x	x	x				
Preliminary	SB-3	9/6/90	3.5	x	x	x				
Preliminary	SB-4	9/6/90	0.5	x	x	x				
Preliminary	SB-4	9/6/90	1	x	x	x				
Preliminary	SB-4	9/6/90	3.5	x	x	x				
Preliminary	SB-5	9/6/90	0.5	x	x	x				
Preliminary	SB-5	9/6/90	1	x	x	x				
Preliminary	SB-5	9/6/90	3.5	x	x	x				
Preliminary	SB-6	9/6/90	0.5	x	x	x				
Preliminary	SB-6	9/6/90	2	x	x	x				
Preliminary	SB-7	9/6/90	1	x	x	x				
Preliminary	SB-8	9/6/90	0.5	x	x	x				
Preliminary	SB-8	9/6/90	1	x	x	x				
Preliminary	SB-8	9/6/90	2.5	x	x	x				
Preliminary	SB-9	9/6/90	0.5	x	x	x				
Preliminary	SB-9	9/6/90	1	x	x	x				
Preliminary	SB-9	9/6/90	3.5	x	x	x				
Preliminary	SB-10	9/6/90	0.5	x	x	x				
Preliminary	SB-10	9/6/90	1	x	x	x				
Preliminary	SB-10	9/6/90	3	x	x	x				
Preliminary	SB-11	9/7/90	0.5	x	x	x				
Preliminary	SB-11	9/7/90	1	x	x	x				
Preliminary	SB-11	9/7/90	3	x	x	x				
Preliminary	SB-12	9/7/90	0.5	x	x	x				
Preliminary	SB-12	9/7/90	1	x	x	x				
Preliminary	SB-12	9/7/90	2.5	x	x	x				
Preliminary	SB-13	9/7/90	0.5	x	x	x				
Preliminary	SB-13	9/7/90	1	x	x	x				
Preliminary	SB-13	9/7/90	2.5	x	x	x				
Preliminary	SB-14	9/7/90	0.5	x	x	x				
Preliminary	SB-14	9/7/90	1	x	x	x				
Preliminary	SB-14	9/7/90	3	x	x	x				
Preliminary	SB-15	9/7/90	0.5	x	x	x				
Preliminary	SB-15	9/7/90	1	x	x	x				
Preliminary	SB-15	9/7/90	3.5	x	x	x				
Phase II	SB-6A	4/9/91	0.5		x					
Phase II	SB-6A	4/9/91	1.0		x					
Phase II	SB-6B	4/9/91	0.5		x					

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Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
Phase II	SB-6B	4/9/91	1.0		x					
Phase II	SB-6C	4/9/91	0.5		x					
Phase II	SB-6C	4/9/91	1.0		x					
Phase II	SB-6D	4/9/91	0.5		x					
Phase II	SB-6D	4/9/91	1.0		x					
Phase II	SB-6E	4/9/91	0.5		x					
Phase II	SB-6E	4/9/91	1.0		x					
Phase II	SB-6F	4/9/91	0.5		x					
Phase II	SB-6F	4/9/91	1.0		x					
Phase II	SB-6G	4/9/91	0.5		x					
Phase II	SB-6G	4/9/91	1.0		x					
Phase II	SB-6H	4/9/91	0.5		x					
Phase II	SB-6H	4/9/91	1.0		x					
Phase II	SB-9A	4/9/91	0.5		x					
Phase II	SB-9A	4/9/91	1.0		x					
Phase II	SB-9B	4/9/91	0.5		x					
Phase II	SB-9B	4/9/91	1.0		x					
Phase II	SB-9C	4/9/91	0.5		x					
Phase II	SB-9C	4/9/91	1.0		x					
Phase II	SB-9D	4/9/91	0.5		x					
Phase II	SB-9D	4/9/91	1.0		x					
Phase II	SB-9E	4/9/91	0.5		x					
Phase II	SB-9E	4/9/91	1.0		x					
Phase II	SB-9F	4/9/91	0.5		x					
Phase II	SB-9F	4/9/91	1.0		x					
Phase II	SB-9G	4/9/91	0.5		x					
Phase II	SB-9G	4/9/91	1.0		x					
Phase II	SB-9H	4/9/91	1.0		x					
Phase II	SB-12A	4/9/91	0.5		x	x				
Phase II	SB-12A	4/9/91	1.0		x	x				
Phase II	SB-12B	4/9/91	0.5		x	x				
Phase II	SB-12B	4/9/91	1.0		x	x				
Phase II	SB-12C	4/9/91	0.5		x	x				
Phase II	SB-12C	4/9/91	1.0		x	x				
Phase II	SB-12D	4/9/91	0.5		x	x				
Phase II	SB-12D	4/9/91	1.0		x	x				
Phase II	SB-12E	4/9/91	0.5		x	x				
Phase II	SB-12E	4/9/91	1.0		x	x				
Phase II	SB-12F	4/9/91	0.5		x	x				
Phase II	SB-12F	4/9/91	1.0		x	x				
Phase II	SB-12G	4/9/91	0.5		x	x				
Phase II	SB-12G	4/9/91	1.0		x	x				
Phase II	SB-14A	4/8/91	0.5		x					
Phase II	SB-14A	4/8/91	1.0		x					
Phase II	SB-14B	4/8/91	0.5		x					
Phase II	SB-14B	4/8/91	1.0		x					
Phase II	SB-14C	4/8/91	0.5		x					

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Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
Phase II	SB-14C	4/8/91	1.0		x					
Phase II	SB-14D	4/8/91	0.5		x					
Phase II	SB-14D	4/8/91	1.0		x					
Phase II	SB-14E	4/8/91	0.5		x					
Phase II	SB-14E	4/8/91	1.0		x					
Phase II	SB-14F	4/8/91	0.5		x					
Phase II	SB-14F	4/8/91	1.0		x					
Phase II	SB-14G	4/9/91	0.5		x					
Phase II	SB-14G	4/9/91	1.0		x					
Phase III	SB-6H	1/7/94	1.5		x					
Phase III	SB-6I	1/7/94	0.5		x					
Phase III	SB-6I	1/7/94	1.0		x					
Phase III	SB-6J	1/7/94	0.5		x					
Phase III	SB-6K	1/7/94	0.5		x					
Phase III	SB-6K	1/7/94	0.5		x					
Phase III	SB-6L	1/7/94	1.0		x					
Phase III	SB-9	1/7/94	1.5		x					
Phase III	SB-9D	1/7/94	1.5		x					
Phase III	SB-9F	1/7/94	1.5		x					
Phase III	SB-9G	1/7/94	1.5		x					
Phase III	SB-9H	1/7/94	1.5		x					
Phase III	SB-9I	1/7/94	0.5		x					
Phase III	SB-9J	1/7/94	0.5		x					
Phase III	SB-9J	1/7/94	1.0		x					
Phase III	SB-9K	1/7/94	0.5		x					
Phase III	SB-9K	1/7/94	1.0		x					
Phase III	SB-9L	1/7/94	1.0		x					
Phase III	SB-9M	1/7/94	0.5		x					
Phase III	SB-9M	1/7/94	1.0		x					
Phase III	SB-9N	1/7/94	1.0		x					
Phase III	SB-9O	1/7/94	0.5		x					
Phase III	SB-9O	1/7/94	1.0		x					
Phase III	SB-9O	1/7/94	1.5		x					
Phase III	SB-12A	1/7/94	1.5		x	x				
Phase III	SB-12C	1/7/94	1.5		x	x				
Phase III	SB-12H	1/7/94	0.5		x	x				
Phase III	SB-12H	1/7/94	1.0		x	x				
Phase III	SB-12H	1/7/94	1.5		x	x				
Phase III	SB-12I	1/7/94	0.5		x	x				
Phase III	SB-12I	1/7/94	1.0		x	x				
Phase III	SB-12J	1/7/94	0.5		x	x				
Phase III	SB-12J	1/7/94	1.0		x	x				
Phase III	SB-12K	1/7/94	1.0		x	x				
Phase III	SB-12L	1/10/94	0.5		x	x				
Phase III	SB-12L	1/10/94	1.0		x	x				
Phase III	SB-12L	1/10/94	1.5		x	x				
Phase III	SB-14C	1/7/94	1.5		x					

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Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
Phase III	SB-14H	1/7/94	1.0		x					
Phase III	SB-14I	1/7/94	1.0		x					
Phase III	BC-1	8/15/94	1.0						x	x
Phase III	BC-2	8/15/94	2.5						x	x
Phase III	BC-3	8/15/94	1.0						x	x
Phase III	BC-4	8/15/94	1.75						x	x
Phase III	BC-5	8/15/94	2.5						x	x
Phase III	BC-6	8/15/94	2.5						x	x
Phase III	BC-7	8/15/94	0.5						x	x
Phase III	BC-8	8/15/94	2.5						x	x
Phase III	BC-9	8/15/94	3.0						x	x
Phase III	BC-10	8/15/94	0.0						x	x
Phase III	BC-11	8/15/94	2.0						x	x
Phase III	BC-12	8/15/94	0.0						x	x
Phase III	BC-13	8/15/94	0.5						x	x
Phase III	BC-14	8/15/94	2.5						x	x
Phase III	BC-15	8/15/94	3.5						x	x
Phase III	BC-16	8/15/94	2.5						x	x
Phase III	BC-17	8/15/94	2.5						x	x
Phase III	BC-18	8/15/94	3.5						x	x
Phase III	BC-19	8/15/94	3.5						x	x
Interim	BD-1	11/10/94	2.0		x	x	x		x	x
Interim	BD-1	11/10/94	6.0		x	x	x		x	x
Interim	BD-1A	11/10/94	2.0		x	x	x		x	x
Interim	BD-1A	11/10/94	4.0		x	x	x		x	x
Interim	BD-2	11/10/94	2.0		x	x	x		x	x
Interim	BD-2	11/10/94	4.0		x	x	x		x	x
Interim	BD-2A	11/10/94	2.0		x	x	x		x	x
Interim	BD-2A	11/10/94	4.5		x	x	x		x	x
Interim	BD-3	11/22/94	2.5		x	x	x		x	x
Interim	BD-3	11/22/94	5	x	x	x	x		x	x
Interim	BD-4	11/10/94	0	x	x	x	x		x	x
Interim	BD-5	11/22/94	2.5		x	x	x		x	x
Interim	MW-SB3	11/10/94	2		x	x	x		x	x
Interim	MW-SB3	11/10/94	4.5		x	x	x		x	x
Interim	MW-SB4	11/22/94	2		x	x	x		x	x
Interim	MW-SB4	11/22/94	5	x	x	x	x		x	x
Interim	MW-SB4A	11/10/94	5	x	x	x	x		x	x
Interim	MW-SB5	11/22/94	2.0		x	x	x		x	x
Interim	MW-SB5	11/22/94	3	x	x	x	x		x	x
Interim	MW-SB5grab	11/22/94					x		x	x
2nd Interim	PW-1 18"	1/31/95	1.5				x			
2nd Interim	PW-1 24"	1/31/95	2				x			
2nd Interim	PW1 36"	1/31/95	3	x	x					
2nd Interim	PW1 B5'	1/31/95	5	x	x					
2nd Interim	PW-2 6"	1/30/95	0.5				x			

TABLE 1
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
METALS, AND TPH AS DIESEL, MOTOR OIL, AND BUNKER C
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
2nd Interim	PW2 4.5-6"	1/30/95	4.5	x	x		x			
2nd Interim	PW2 12"	1/30/95	1	x	x					
2nd Interim	PW-3 @ 6"	1/30/95	0.5				x			
2nd Interim	PW3 12"	1/30/95	1	x	x					
2nd Interim	PW-3 @ 5'	1/30/95	5				x			
2nd Interim	PW3 5.6'	1/30/95	5.6	x	x					
2nd Interim	PW-4 @ .6	1/30/95	0.5				x			
2nd Interim	PW4 12"	1/30/95	1	x	x					
2nd Interim	PW-4 @36"	1/30/95	3.0				x			
2nd Interim	PW4 42"	1/30/95	3.5	x	x					
2nd Interim	TP-1	3/6/95	3.0				x	x	x	
2nd Interim	TP-2	3/6/95	3.0				x	x	x	
2nd Interim	TP-2	3/6/95	5.5				x	x	x	
2nd Interim	TP-3	3/6/95	3.0				x	x	x	
2nd Interim	TP-4	3/6/95	3.0				x	x	x	
3rd Interim	S-1	8/11/95	2.0				x	x	x	
3rd Interim	S-1	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-2	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-2	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-3	8/11/95	2.0				x	x	x[1]	
3rd Interim	S-3	8/11/95	3.0				x	x	x[1]	
3rd Interim	S-4	8/11/95	2.0				x	x	x	
3rd Interim	S-4	8/11/95	3.0				x	x	x[1]	
3rd Interim	S-5	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-5	8/11/95	3.0				x	x	x	
3rd Interim	S-6	8/11/95	2.0				x	x	x[1]	
3rd Interim	S-6	8/11/95	3.0				x	x	x[1]	
3rd Interim	S-7	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-7	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-8	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-8	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-9	8/11/95	2.0				x	x	x	
3rd Interim	S-9	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-11	8/11/95	1.0		x	x				
3rd Interim	S-11	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-11	8/11/95	3.0		x	x	x	x[1]	x	
3rd Interim	S-12	8/11/95	1.0		x	x				
3rd Interim	S-12	8/11/95	2.0				x	x[1]	x	
3rd Interim	S-12	8/11/95	3.0				x	x[1]	x	
3rd Interim	S-12	8/11/95	4.0		x	x				
3rd Interim	S-12	8/11/95	6.0		x	x				
10/95 Data Rpt	S-13	10/4/95	4.5				x	x	x[1]	
10/95 Data Rpt	S-13	10/4/95	6.5				x	x	x[1]	
10/95 Data Rpt	S-14	10/4/95	5				x[1]	x[1]	x	

TABLE 1
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
METALS, AND TPH AS DIESEL, MOTOR OIL, AND BUNKER C
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
10/95 Data Rpt	S-14	10/4/95	7				x[1]	x[1]	x	
10/95 Data Rpt	S-15	10/4/95	6.5				x	x	x[1]	
10/95 Data Rpt	S-15	10/4/95	8.5				x	x	x[1]	
10/95 Data Rpt	S-16A	10/4/95	4				x	x	x[1]	
10/95 Data Rpt	S-16A	10/4/95	6				x	x	x[1]	
10/95 Data Rpt	S-16B	10/4/95	4.5				x	x[1]	x	
10/95 Data Rpt	S-16B	10/4/95	7				x	x	x[1]	
CC Removal	C-1	11/12/96	0.5		x	x	x	x	x	
CC Removal	CS-1	11/27/96	5.0		x	x	x	x	x	
CC Removal	CS-2	11/27/96	5.0		x	x	x	x	x	
CC Removal	CS-3	11/27/96	5.0		x	x	x	x	x	
Total Number of Soil Samples				56	178	98	67	25	68	39
GROUNDWATER										
2nd Interim	PW-1	2/2/95		x	x					
2nd Interim	PW-1	3/3/95					x	x[1]	x	
2nd Interim	PW-2	2/2/95		x	x					
2nd Interim	PW-2	3/3/95					x	x	x	
Q-rpt	PW-2	7/1/96			x	x	x		x	
Q-rpt	PW-2	9/16/96			x	x	x	x	x	
Q-rpt	PW-2	12/11/96			x	x	x	x	x	
Q-rpt	PW-2	3/14/97			x	x	x	x	x	
Q-rpt	PW-2	6/20/97					x			
2nd Interim	PW-3	2/2/95		x	x					
2nd Interim	PW-3	3/3/95					x	x	x	
2nd Interim	PW-4	2/2/95		x	x					
2nd Interim	PW-4	3/3/95					x	x	x	
Phase II	MW-SB1	4/17/91			x	x				
Phase II	MW-SB1 (dup)	4/17/91			x	x				
Phase II	MW-SB1	7/9/91			x	x				
Phase II	MW-SB1 (dup)	7/9/91			x	x				
Phase III	MW-SB1	1/10/94			x	x				
Phase III	MW-SB1 (dup)	1/10/94			x	x				
Phase III	MW-SB1	1/26/94			x	x				
Phase III	MW-SB1 (dup)	1/26/94			x	x				
Interim	MW-SB1	11/28/94			x	x	x		x	x
2nd Interim	MW-SB1	3/3/95					x	x	x	
Phase II	MW-SB2	4/17/91			x	x				
Phase II	MW-SB2	7/9/91			x	x				
Phase III	MW-SB2	1/10/94			x	x				
Phase III	MW-SB2	1/26/94			x	x				
Interim	MW-SB2	11/28/94			x	x	x		x	x

TABLE 1
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
METALS, AND TPH AS DIESEL, MOTOR OIL, AND BUNKER C
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
2nd Interim	MW-SB2	3/6/95					x	x	x	
2nd Interim	MW-SB2 (dup)	3/6/95					x	x	x	
Q-rpt	MW-SB2	7/1/96			x	x	x		x	
Q-rpt	MW-SB2 (dup)	7/1/96			x	x	x		x	
Q-rpt	MW-SB2	9/16/96			x	x	x	x	x	
Q-rpt	MW-SB2 (dup)	9/16/96		x	x	x	x	x	x	
Q-rpt	MW-SB2	12/11/96			x	x	x	x	x	
Q-rpt	MW-SB2	3/14/97			x	x	x	x	x	
Q-rpt	MW-SB2	1/28/98					x			
Q-rpt	MW-SB2	1/6/99					x			
Q-rpt	MW-SB2	1/19/01					x			
Interim	MW-SB3	11/14/94			x	x				x
Interim	MW-SB3 (dup)	11/14/94			x	x				x
Interim	MW-SB3	12/7/94					x		x	x
Interim	MW-SB3 (dup)	12/7/94					x		x	x
2nd Interim	MW-SB3	3/6/95					x	x	x	
Q-rpt	MW-SB3	7/1/96			x	x	x		x	
Q-rpt	MW-SB3	9/16/96			x	x	x	x	x	
Q-rpt	MW-SB3	12/11/96			x	x	x	x	x	
Q-rpt	MW-SB3	3/14/97			x	x	x	x	x	
Q-rpt	MW-SB3	6/20/97					x			
Q-rpt	MW-SB3 (dup)	6/20/97					x			
Q-rpt	MW-SB3	1/28/98					x			
Q-rpt	MW-SB3	1/6/99					x			
Q-rpt	MW-SB3 (dup)	1/6/99					x			
Q-rpt	MW-SB3	2/4/00					x			
Q-rpt	MW-SB3 (dup)	2/4/00					x			
Q-rpt	MW-SB3	1/19/01					x			
Interim	MW-SB4	11/28/94			x	x	x		x	x
2nd Interim	MW-SB4	3/3/95					x	x	x	
Q-rpt	MW-SB4	7/1/96			x	x	x		x	
Q-rpt	MW-SB4	9/16/96			x	x	x	x	x	
Q-rpt	MW-SB4	12/11/96			x	x	x	x	x	
Q-rpt	MW-SB4	3/14/97			x	x	x	x	x	
Q-rpt	MW-SB4	6/20/97					x			
Q-rpt	MW-SB4	1/28/98					x			
Q-rpt	MW-SB4	1/6/99					x			
Q-rpt	MW-SB4	2/4/00					x			
Q-rpt	MW-SB4	1/19/01					x			

TABLE 1
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
METALS, AND TPH AS DIESEL, MOTOR OIL, AND BUNKER C
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Sample Date	Depth (feet bgs)	Metals (excluding Pb and Cu)	Total Lead	Total Copper	TPH as Diesel	TPH as Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
Interim	MW-SB5	11/28/94			x	x	x		x	x
2nd Interim	MW-SB5	3/6/95					x	x	x	
2nd Interim	MW-SB5 (dup)	3/6/95					x	x	x	
Q-rpt	MW-SB5	7/1/96			x	x	x		x	
Q-rpt	MW-SB5	9/16/96			x	x	x	x	x	
Q-rpt	MW-SB5	12/11/96			x	x	x	x	x	
Q-rpt	MW-SB5 (dup)	12/11/96			x	x	x	x	x	
Q-rpt	MW-SB5	3/14/97			x	x	x	x	x	
Q-rpt	MW-SB5 (dup)	3/14/97			x	x	x	x	x	
Q-rpt	MW-SB5	6/20/97					x			
Q-rpt	MW-SB5	1/28/98					x			
Q-rpt	MW-SB5	1/6/99					x			
Q-rpt	MW-SB5	2/4/00					x			
Q-rpt	MW-SB5	1/19/01					x			
Total Number of Groundwater Samples				5	46	42	63	28	41	8

Notes:

bgs = below ground surface.
See Figures 3, 5, and 6 for sample locations.
Laboratory reports are included in the corresponding original report.
Metal samples analyzed by EPA Method 6000/7000 series.
TPH samples analyzed by Modified EPA Method 8015 or California DOHS Method, LUFT Manual, October 1989.
Std. = Standard.
Preliminary = Preliminary Remedial Investigation, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, November 1990 (BASELINE, 1990).
Phase II = Phase II Remedial Investigation, Seabreeze Yacht Center, Inc.,Oakland, California, March 1992 (BASELINE, 1992).
Phase III = Phase III Remedial Investigation, Seabreeze Yacht Center, Inc., Oakland, California, September 1994 (BASELINE, 1994a).
Interim = Subsurface Investigation, Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, December 1994 (BASELINE, 1994b).
2nd Interim = Subsurface Investigation, Second Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, April 1995 (BASELINE, 1995a).
3rd Interim = Third Interim Report, Additional Subsurface Investigation, Seabreeze Yacht Center, Inc., Oakland, California, October 1995 (BASELINE, 1995b).
10/95 Data Rpt = Analytical Results for Soil Sampling, 4 October 1995, at Seabreeze Site, Oakland, 16 October 1995 (BASELINE, 1995c).
CC Removal = Concrete Containment Structure Removal and Remediation Oversight, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, January 1997. (BASELINE, 1997).
Q-rpt = Quarterly and Annual Groundwater Monitoring Reports dated 19 August 1996, 18 October 1996, 22 January 1997, 14 May 1997, 29 July 1997, 25 February 1998, January 1999, February 2000, and February 2001 (BASELINE, 1996 to 2001).

[1] Analysis performed; however, concentration not reported due to hydrocarbon overlap.

TABLE 2
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
TPH AS GASOLINE AND KEROSENE, OIL AND GREASE, VOCs, SVOCs, and PCBs
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Date Sampled	Sample Depth (feet bgs)	TPH as Gasoline	TPH as Kerosene	Nonpolar O&G	Total O&G	MTBE	SVOCs	VOCs	PCBs
SOIL											
Preliminary	SB-1	9/6/90	3.5							x	
Preliminary	SB-2	9/6/90	5.0							x	
Preliminary	SB-3	9/6/90	3.5							x	
Preliminary	SB-4	9/6/90	3.5							x	
Preliminary	SB-5	9/6/90	3.5							x	
Preliminary	SB-6	9/6/90	2.0							x	
Preliminary	SB-8	9/6/90	0.5			x	x				
Preliminary	SB-8	9/6/90	2.5			x	x			x	
Preliminary	SB-9	9/6/90	3.5							x	
Preliminary	SB-10	9/6/90	3.0							x	
Preliminary	SB-11	9/7/90	3.0							x	
Preliminary	SB-12	9/7/90	2.5							x	
Preliminary	SB-13	9/7/90	2.5							x	
Preliminary	SB-14	9/7/90	3.0							x	
Preliminary	SB-15	9/7/90	0.5			x	x				
Preliminary	SB-15	9/7/90	1.0			x	x				
Preliminary	SB-15	9/7/90	3.5			x	x			x	
Phase III	BD-1	11/10/94	2.0						x [1]		
Phase III	BD-1	11/10/94	6.0						x [1]		
Interim	BD-4	11/10/94	0.0							x	
Interim	MW-SB5grab	11/22/94								x	
2nd Interim	PW-1	1/31/95	3.0						x		
2nd Interim	TP-1	3/6/95	3.0		x						
2nd Interim	TP-2	3/6/95	3.0		x						
2nd Interim	TP-2	3/6/95	5.5		x						
2nd Interim	TP-3	3/6/95	3.0		x						
2nd Interim	TP-4	3/6/95	3.0		x						
2nd Interim	T-1	3/6/95	3								x
2nd Interim	T-1	3/6/95	5.5								x
2nd Interim	T-2	3/6/95	3								x
2nd Interim	T-3	3/6/95	3								x
2nd Interim	T-4	3/6/95	3								x
3rd Interim	S-1	8/11/95	2.0								x
3rd Interim	S-1	8/11/95	3.0								x
3rd Interim	S-2	8/11/95	2.0								x
3rd Interim	S-2	8/11/95	3.0								x
3rd Interim	S-3	8/11/95	2.0								x
3rd Interim	S-3	8/11/95	3.0								x
3rd Interim	S-4	8/11/95	2.0								x
3rd Interim	S-4	8/11/95	3.0								x
3rd Interim	S-5	8/11/95	2.0								x
3rd Interim	S-5	8/11/95	3.0								x
3rd Interim	S-6	8/11/95	2.0								x
3rd Interim	S-6	8/11/95	3.0								x
3rd Interim	S-7	8/11/95	2.0								x
3rd Interim	S-7	8/11/95	3.0								x
3rd Interim	S-8	8/11/95	2.0								x
3rd Interim	S-8	8/11/95	3.0								x
3rd Interim	S-9	8/11/95	2.0								x

TABLE 2
SUMMARY OF SOIL AND GROUNDWATER ANALYSES PERFORMED
TPH AS GASOLINE AND KEROSENE, OIL AND GREASE, VOCs, SVOCs, and PCBs
Seabreeze Yacht Center Study Area, Oakland, California

Report	Sample Number	Date Sampled	Sample Depth (feet bgs)	TPH as Gasoline	TPH as Kerosene	Nonpolar O&G	Total O&G	MTBE	SVOCs	VOCs	PCBs
3rd Interim	S-9	8/11/95	3.0								x
3rd Interim	S-11	8/11/95	2.0								x
3rd Interim	S-11	8/11/95	3.0								x
3rd Interim	S-12	8/11/95	2.0								x
3rd Interim	S-12	8/11/95	3.0								x
GROUNDWATER											
2nd Intrm	PW-2	3/3/95			x						
2nd Intrm	PW-3	3/3/95			x						
Phase II	MW-SB1	4/17/91				x				x	
Phase III	MW-SB1	1/26/94				x				x	
Interim	MW-SB1	11/28/94								x	
Phase II	MW-SB2	4/17/91				x				x	
Phase III	MW-SB2	1/26/94				x				x	
Interim	MW-SB2	11/28/94								x	
2nd Intrm	MW-SB2	3/6/95			x						
Q-Rpt	MW-SB2	2/4/00							x		
Q-Rpt	MW-SB2	1/19/01							x		
Interim	MW-SB3	12/7/94		x						x[2]	
2nd Intrm	MW-SB3	3/6/95			x						
Q-Rpt	MW-SB3	2/4/00							x		
Q-Rpt	MW-SB3	1/19/01							x		
Interim	MW-SB4	11/28/94								x	
Q-Rpt	MW-SB4	2/4/00							x		
Q-Rpt	MW-SB4	1/19/01							x		
Interim	MW-SB5	11/28/94								x	
2nd Intrm	MW-SB5	3/6/95			x						
Q-Rpt	MW-SB5	2/4/00							x		
Q-Rpt	MW-SB5	1/19/01							x		

Notes:

bgs = below ground surface.
TPH = Total petroleum hydrocarbons.
O&G = Oil and grease.
MTBE = Methyl tertiary butyl ether.
SVOCs = Semivolatile organic compounds.
VOCs = Volatile organic compounds.
PCBs = Polychlorinated biphenyls.
MTBE = Methyl tertiary butyl ether.
See Figures 4, 5, and 6 for sample locations.

O&G samples analyzed by Method SMWW 17:5520 E&F.
TPH samples analyzed by Modified EPA Method 8015.
SVOC samples analyzed by EPA Method 8270.
VOC samples were analyzed by EPA Method 8240.
PCB samples were analyzed by EPA Method 8080.
MTBE samples analyzed by EPA Method 8021B.
Laboratory reports are included in the corresponding original report.

Preliminary = Preliminary Remedial Investigation, Seabreeze Yacht Center, Inc., 280 Sixth Avenue, Oakland, California, November 1990 (BASELINE, 1990).
Phase III = Phase III Remedial Investigation, Seabreeze Yacht Center, Inc., Oakland, California, September 1994 (BASELINE, 1994a).
Interim = Subsurface Investigation, Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, December 1994 (BASELINE, 1994).
2nd Interim = Subsurface Investigation, Second Interim Data Report, Seabreeze Yacht Center, Inc., Oakland, California, April 1995 (BASELINE, 1995a).
3rd Interim = Third Interim Report, Additional Subsurface Investigation, Seabreeze Yacht Center, Inc., Oakland, California, October 1995 (BASELINE, 1995b).
Q-rpt = Quarterly and Annual Groundwater Monitoring Reports dated February 2000, and February 2001 (BASELINE, 1996 to 2001).

[1] Analyzed only for cresote; analyzed using EPA Method 8270.
[2] Only analyzed for benzene, toluene, ethylbenzene, and xylenes using EPA Method 602.

TABLE 3
SUMMARY OF METALS CONCENTRATIONS IN SOIL
(Excluding Lead and Copper)
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample Number	Sample Date	Depth (feet bgs)	Total Sn	Total Sb	Total As	Total Ba	Total Be	Total Cd	Total Cr	Total Co	Total Hg	Total Mo	Total Ni	Total Se	Total Ag	Total Tl	Total V	Total Zn
SB-1	9/6/90	0.5	<5.0	--	--	--	--	<0.5	9.1	--	--	--	8.1	--	--	--	--	--
SB-1	9/6/90	1	<5.0	--	--	--	--	<0.5	14	--	--	--	25	--	--	--	--	--
SB-1	9/6/90	3.5	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	2.9	--	--	--	--	--
SB-2	9/6/90	0.5	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	<2.5	--	--	--	--	--
SB-2	9/6/90	1	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	<2.5	--	--	--	--	--
SB-2	9/6/90	3	<5.0	--	--	--	--	<0.5	18	--	--	--	27	--	--	--	--	--
SB-2	9/6/90	5	<5.0	--	--	--	--	<0.5	4.5	--	--	--	13	--	--	--	--	--
SB-3	9/6/90	0.5	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	<2.5	--	--	--	--	--
SB-3	9/6/90	1	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	<2.5	--	--	--	--	--
SB-3	9/6/90	3.5	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	2.5	--	--	--	--	--
SB-4	9/6/90	0.5	<5.0	--	--	--	--	0.5	11	--	--	--	24	--	--	--	--	--
SB-4	9/6/90	1	<5.0	--	--	--	--	<0.5	6.7	--	--	--	15	--	--	--	--	--
SB-4	9/6/90	3.5	<5.0	--	--	--	--	<0.5	3.5	--	--	--	6.6	--	--	--	--	--
SB-5	9/6/90	0.5	<5.0	--	--	--	--	0.6	18	--	--	--	19	--	--	--	--	--
SB-5	9/6/90	1	<5.0	--	--	--	--	<0.5	<2.5	--	--	--	<2.5	--	--	--	--	--
SB-5	9/6/90	3.5	<5.0	--	--	--	--	<0.5	13	--	--	--	17	--	--	--	--	--
SB-6	9/6/90	0.5	11	--	--	--	--	1.6	22	--	--	--	120	--	--	--	--	--
SB-6	9/6/90	2	<5.0	--	--	--	--	<0.5	6.6	--	--	--	21	--	--	--	--	--
SB-7	9/6/90	1	<5.0	--	--	--	--	<0.5	19	--	--	--	27	--	--	--	--	--
SB-8	9/6/90	0.5	<5.0	--	--	--	--	0.8	9.1	--	--	--	14	--	--	--	--	--
SB-8	9/6/90	1	<5.0	--	--	--	--	<0.5	20	--	--	--	20	--	--	--	--	--
SB-8	9/6/90	2.5	<5.0	--	--	--	--	<0.5	20	--	--	--	32	--	--	--	--	--
SB-9	9/6/90	0.5	<5.0	--	--	--	--	<0.5	36	--	--	--	26	--	--	--	--	--
SB-9	9/6/90	1	<5.0	--	--	--	--	<0.5	9.2	--	--	--	15	--	--	--	--	--
SB-9	9/6/90	3.5	<5.0	--	--	--	--	<0.5	12	--	--	--	14	--	--	--	--	--
SB-10	9/6/90	0.5	<5.0	--	--	--	--	<0.5	6.0	--	--	--	14	--	--	--	--	--
SB-10	9/6/90	1	<5.0	--	--	--	--	<0.5	4.0	--	--	--	9.5	--	--	--	--	--
SB-10	9/6/90	3	<5.0	--	--	--	--	<0.5	12	--	--	--	38	--	--	--	--	--
SB-11	9/7/90	0.5	<5.0	--	--	--	--	<0.5	21	--	--	--	38	--	--	--	--	--
SB-11	9/7/90	1	<5.0	--	--	--	--	<0.5	26	--	--	--	69	--	--	--	--	--
SB-11	9/7/90	3	<5.0	--	--	--	--	<0.5	28	--	--	--	28	--	--	--	--	--
SB-12	9/7/90	0.5	6.2	--	--	--	--	1.5	22	--	--	--	37	--	--	--	--	--
SB-12	9/7/90	1	<5.0	--	--	--	--	0.5	5.4	--	--	--	7.4	--	--	--	--	--
SB-12	9/7/90	2.5	<5.0	--	--	--	--	<0.5	22	--	--	--	26	--	--	--	--	--
SB-13	9/7/90	0.5	<5.0	--	--	--	--	<0.5	23	--	--	--	17	--	--	--	--	--
SB-13	9/7/90	1	<5.0	--	--	--	--	<0.5	13	--	--	--	18	--	--	--	--	--
SB-13	9/7/90	2.5	<5.0	--	--	--	--	<0.5	17	--	--	--	28	--	--	--	--	--
SB-14	9/7/90	0.5	<5.0	--	--	--	--	0.7	23	--	--	--	35	--	--	--	--	--
SB-14	9/7/90	1	<5.0	--	--	--	--	<0.5	15	--	--	--	25	--	--	--	--	--
SB-14	9/7/90	3	<5.0	--	--	--	--	<0.5	25	--	--	--	20	--	--	--	--	--
SB-15	9/7/90	0.5	<5.0	--	--	--	--	<0.5	12	--	--	--	25	--	--	--	--	--
SB-15	9/7/90	1	<5.0	--	--	--	--	<0.5	14	--	--	--	28	--	--	--	--	--
SB-15	9/7/90	3.5	<5.0	--	--	--	--	<0.5	14	--	--	--	32	--	--	--	--	--
BD-3	11/22/94	5	--	<3.0	<2.5	33	0.40	<0.25	41	5.5	<0.10	<0.99	35	<2.5	<0.50	<2.5	31	43
BD-4	11/10/94	0	--	<5.9	11	360	0.63	0.77	31	8.2	0.29	<2.0	39	<2.5	<0.99	<2.5	40	300
MW-SB4	11/22/94	5	--	<3.0	3.9	35	0.33	<0.25	37	4.5	<0.091	<1.0	28	<2.5	<0.50	<2.5	29	32
MW-SB4A	11/10/94	5	--	<6.0	13	440	1.0	<0.50	29	8.1	<0.091	<2.0	34	<2.5	<1.0	<2.5	30	30
MW-SB5	11/22/94	3	--	<3.0	11	200	1.2	2.4	38	11	0.40	1.7	180	<2.5	<0.50	<2.5	250	280
PW1 36"	1/31/95	3	--	--	2.6	54	--	<0.25	48	--	<0.095	--	--	<2.5	<0.50	--	--	--
PW1 B5'	1/31/95	5	--	--	5.0	120	--	0.49	22	--	<0.091	--	--	<2.5	<0.50	--	--	--
PW2 4.5-6	1/30/95	4.5	--	--	<2.5	28	--	<0.25	55	--	<0.10	--	--	<2.5	<0.50	--	--	--
PW2 12"	1/30/95	1	--	--	4.9	190	--	0.53	140	--	0.22	--	--	<2.5	<0.50	--	--	--
PW3 12"	1/30/95	1	--	--	5.7	140	--	0.58	35	--	<0.091	--	--	<2.5	<0.50	--	--	--
PW3 5.6'	1/30/95	5.6	--	--	4.4	61	--	<0.25	51	--	0.18	--	--	<2.5	<0.50	--	--	--
PW4 12"	1/30/95	1	--	--	5.5	86	--	0.40	31	--	<0.10	--	--	<2.5	<0.50	--	--	--
PW4 42"	1/30/95	3.5	--	--	6.7	180	--	0.25	33	--	0.13	--	--	<2.5	<0.50	--	--	--
No. of Samples			43	5	13	13	5	56	56	5	13	5	48	13	13	5	5	5
Maximum Concentration			11	<5.9	13	440	1.2	2.4	140	11	0.4	1.7	180	<2.5	<0.99	<2.5	250	300
Minimum Concentration			<5	<3	<2.5	28	0.33	<0.25	<2.5	4.5	<0.091	<1.0	<2.5	<2.5	<0.50	<2.5	29	30
Mean Concentration			2.784	2.090	5.862	148.23	0.7120	0.3838	20.60	7.460	0.1230	0.9390	26.38	--	0.2881	--	76.00	137.0
Variance			1.964	0.6530	13.79	16.433	0.1428	0.1522	443.8	6.523	0.01359	0.2441	893.1	--	0.008640	--	9,481	19,582
Standard Deviation			1.401	0.8081	3.713	128.19	0.3778	0.3902	21.07	2.554	0.1166	0.4941	29.88	--	0.09295	--	97.37	139.9
Standard Error			0.2137	0.3614	1.030	35.55	0.1690	0.05214	2.815	1.142	0.03233	0.2210	4.313	--	0.02578	--	43.54	62.58

TABLE 3
SUMMARY OF METALS CONCENTRATIONS IN SOIL
(Excluding Lead and Copper)
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample Number	Sample Date	Depth (feet bgs)	Total Sn	Total Sb	Total As	Total Ba	Total Be	Total Cd	Total Cr	Total Co	Total Hg	Total Mo	Total Ni	Total Se	Total Ag	Total Tl	Total V	Total Zn
t_{95}			1.682	2.132	1.782	1.782	2.132	1.673	1.673	2.132	1.782	2.132	1.678	--	1.782	--	2.132	2.132
95UCL			**3.1**	**2.9**	**7.7**	**212**	**1.1**	**0.47**	**25**	**9.9**	**0.18**	**1.4**	**33.6**	--	**0.33**	--	**169**	**270**
Risk Based Screening Level for Industrial/Commercial Land Use (Table B, SFRWQCB, 2000)			--	40	2.7	1500	8	12	12	80	10	40	150	10	40	29	200	600

Notes:
bgs = below ground surface
mg kg = milligrams per kilogram.
<x = Metal not identified above laboratory reporting limit of x
See Figure 3 for sample locations.
-- = not applicable not analyzed.
Data used to calculate the 95UCL; for metals not identified above the laboratory reporting limit , the adjusted value is 1/2 the laboratory reporting limit.
95UCL = One-tailed 95% Upper Confidence Limit.
t_{95} = Student's t value for one-tailed 95UCL.

Sn = Tin
Sb = Antimony
As = Arsenic
Ba= Barium
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Co = Cobalt
Hg = Mercury
Mo = Molybdenum
Ni = Nickel
Se = Selenium
Ag = Silver
Tl = Thallium
V = Vanadium
Zn = Zinc

TABLE 4
SUMMARY OF LEAD AND COPPER CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample ID	Sample Date	Depth (feet bgs)	Total Lead	Total Copper
SB-1	9/6/90	0.5	40	31
SB-1	9/6/90	1.0	36	20
SB-1	9/6/90	3.5	14	12
SB-2	9/6/90	0.5	<2.5	17
SB-2	9/6/90	1.0	<2.5	19
SB-2	9/6/90	3.0	36	19
SB-2	9/6/90	5.0	87	11
SB-3	9/6/90	0.5	<2.5	10
SB-3	9/6/90	1.0	3	12
SB-3	9/6/90	3.5	2.5	9.0
SB-4	9/6/90	0.5	69	100
SB-4	9/6/90	1.0	<2.5	21
SB-4	9/6/90	3.5	14	16
SB-5	9/6/90	0.5	6.5	34
SB-5	9/6/90	1.0	<2.5	26
SB-5	9/6/90	3.5	11	19
SB-6	9/6/90	0.5	650	140
SB-6	9/6/90	2.0	<2.5	11
SB-7	9/6/90	1.0	67	37
SB-8	9/6/90	0.5	51	79
SB-8	9/6/90	1.0	2.9	7.3
SB-8	9/6/90	2.5	5.9	16
SB-9	9/6/90	0.5	200	18
SB-9	9/6/90	1.0	160	12
SB-9	9/6/90	3.5	2.5	9.5
SB-10	9/6/90	0.5	12	130
SB-10	9/6/90	1.0	<2.5	79
SB-10	9/6/90	3.0	25	18
SB-11	9/7/90	0.5	72	33
SB-11	9/7/90	1.0	22	18
SB-11	9/7/90	3.0	5.5	29
SB-12	9/7/90	0.5	340	730
SB-12	9/7/90	1.0	17	20
SB-12	9/7/90	2.5	67	19
SB-13	9/7/90	0.5	31	10
SB-13	9/7/90	1.0	19	9.9
SB-13	9/7/90	2.5	33	76
SB-14	9/7/90	0.5	61	47
SB-14	9/7/90	1.0	55	81
SB-14	9/7/90	3.0	<2.5	18
SB-15	9/7/90	0.5	12	8.4
SB-15	9/7/90	1.0	39	9.8

TABLE 4
SUMMARY OF LEAD AND COPPER CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample ID	Sample Date	Depth (feet bgs)	Total Lead	Total Copper
SB-15	9/7/90	3.5	14	11
SB-6A	4/9/91	0.5	990	--
SB-6A	4/9/91	1.0	101	--
SB-6B	4/9/91	0.5	145	--
SB-6B	4/9/91	1.0	16.8	--
SB-6C	4/9/91	0.5	11.3	--
SB-6C	4/9/91	1.0	3.5	--
SB-6D	4/9/91	0.5	8.5	--
SB-6D	4/9/91	1.0	7.9	--
SB-6E	4/9/91	0.5	7.8	--
SB-6E	4/9/91	1.0	142	--
SB-6F	4/9/91	0.5	9.3	--
SB-6F	4/9/91	1.0	8.4	--
SB-6G	4/9/91	0.5	<3.0	--
SB-6G	4/9/91	1.0	67.3	--
SB-6H	4/9/91	0.5	50.5	--
SB-6H	4/9/91	1.0	102	--
SB-9A	4/9/91	0.5	<3.0	--
SB-9A	4/9/91	1.0	<3.0	--
SB-9B	4/9/91	0.5	60.8	--
SB-9B	4/9/91	1.0	34.8	--
SB-9C	4/9/91	0.5	483	--
SB-9C	4/9/91	1.0	45.3	--
SB-9D	4/9/91	0.5	119	--
SB-9D	4/9/91	1.0	82.4	--
SB-9E	4/9/91	0.5	138	--
SB-9E	4/9/91	1.0	125	--
SB-9F	4/9/91	0.5	152	--
SB-9F	4/9/91	1.0	509	--
SB-9G	4/9/91	0.5	217	--
SB-9G	4/9/91	1.0	53.7	--
SB-9H	4/9/91	1.0	382	--
SB-12A	4/9/91	0.5	413	1,780
SB-12A	4/9/91	1.0	490	40
SB-12B	4/9/91	0.5	116	368
SB-12B	4/9/91	1.0	70.5	87
SB-12C	4/9/91	0.5	86.8	237
SB-12C	4/9/91	1.0	97.0	55
SB-12D	4/9/91	0.5	82.2	418
SB-12D	4/9/91	1.0	68.5	51
SB-12E	4/9/91	0.5	128	2,280

TABLE 4
SUMMARY OF LEAD AND COPPER CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample ID	Sample Date	Depth (feet bgs)	Total Lead	Total Copper
SB-12E	4/9/91	1.0	51.7	210
SB-12F	4/9/91	0.5	115	95
SB-12F	4/9/91	1.0	17.9	23
SB-12G	4/9/91	0.5	68.6	164
SB-12G	4/9/91	1.0	28.1	33
SB-14A	4/8/91	0.5	52	--
SB-14A	4/8/91	1.0	73	--
SB-14B	4/8/91	0.5	6.4	--
SB-14B	4/8/91	1.0	51	--
SB-14C	4/8/91	0.5	105	--
SB-14C	4/8/91	1.0	91	--
SB-14D	4/8/91	0.5	90	--
SB-14D	4/8/91	1.0	52	--
SB-14E	4/8/91	0.5	38.1	--
SB-14E	4/8/91	1.0	91.3	--
SB-14F	4/8/91	0.5	36.5	--
SB-14F	4/8/91	1.0	70.1	--
SB-14G	4/9/91	0.5	126	--
SB-14G	4/9/91	1.0	79.8	--
SB-6H	1/7/94	1.5	<4.9	--
SB-6I	1/7/94	0.5	80	--
SB-6I	1/7/94	1.0	45	--
SB-6J	1/7/94	0.5	24	--
SB-6K	1/7/94	0.5	180	--
SB-6K	1/7/94	0.5	3700	--
SB-6L	1/7/94	1.0	49	--
SB-9	1/7/94	1.5	26	--
SB-9D	1/7/94	1.5	120	--
SB-9F	1/7/94	1.5	75	--
SB-9G	1/7/94	1.5	34	--
SB-9H	1/7/94	1.5	270	--
SB-9I	1/7/94	0.5	310	--
SB-9J	1/7/94	0.5	110	--
SB-9J	1/7/94	1.0	84	--
SB-9K	1/7/94	0.5	240	--
SB-9K	1/7/94	1.0	93	--
SB-9K	1/7/94	1.5		
SB-9L	1/7/94	1.0	<4.9	--
SB-9M	1/7/94	0.5	87	--
SB-9M	1/7/94	1.0	74	--
SB-9M	1/7/94	1.0	93	--

TABLE 4
SUMMARY OF LEAD AND COPPER CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample ID	Sample Date	Depth (feet bgs)	Total Lead	Total Copper
SB-9N	1/7/94	1.0	180	--
SB-9O	1/7/94	0.5	<5	--
SB-9O	1/7/94	1.0	<5	--
SB-9O	1/7/94	1.5	58	--
SB-12A	1/7/94	1.5	140	350
SB-12C	1/7/94	1.5	340	360
SB-12H	1/7/94	0.5	150	190
SB-12H	1/7/94	1.0	300	3,500
SB-12H	1/7/94	1.5	23	23
SB-12I	1/7/94	0.5	230	100
SB-12I	1/7/94	1.0	200	150
SB-12J	1/7/94	0.5	48	86
SB-12J	1/7/94	1.0	63	240
SB-12K	1/7/94	1.0	19	170
SB-12L	1/10/94	0.5	220	240
SB-12L	1/10/94	1.0	75	120
SB-12L	1/10/94	1.5	140	39
SB-14C	1/7/94	1.5	65	--
SB-14H	1/7/94	1.0	120	--
SB-14I	1/7/94	1.0	230	--
BD-1	11/10/94	2.0	<5.0	7.6
BD-1	11/10/94	6.0	190	15
BD-1A	11/10/94	2.0	21	13
BD-1A	11/10/94	4.0	23	14
BD-2	11/10/94	2.0	230	18
BD-2	11/10/94	4.0	130	20
BD-2A	11/10/94	2.0	590	23
BD-2A	11/10/94	4.5	91	28
BD-3	11/22/94	2.5	160	2,300
BD-3	11/22/94	5.0	8.1	19
BD-4	11/10/94	0.0	150	53
BD-5	11/22/94	2.5	78	38
MW-SB3	11/10/94	2.0	190	50
MW-SB3	11/10/94	4.5	310	53
MW-SB4	11/22/94	2.0	79	35
MW-SB4	11/22/94	5.0	10	15
MW-SB4A	11/10/94	5.0	6.2	13
MW-SB5	11/22/94	2.0	63	24
MW-SB5	11/22/94	3.0	320	150
PW1 36"	1/31/95	3.0	9.3	--

TABLE 4
SUMMARY OF LEAD AND COPPER CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample ID	Sample Date	Depth (feet bgs)	Total Lead	Total Copper
PW1 B5'	1/31/95	5.0	38	--
PW2 4.5-6B	1/30/95	4.5	6.4	--
PW2 12"	1/30/95	1.0	210	--
PW3 12"	1/30/95	1.0	81	--
PW3 5.6'	1/30/95	5.6	28	--
PW4 12"	1/30/95	1.0	43	--
PW4 42"	1/30/95	3.5	63	--
S-11	8/11/95	1.0	150	28
S-11	8/11/95	3.0	210	50
S-12	8/11/95	1.0	7.4	5.4
S-12	8/11/95	4.0	79	36
S-12	8/11/95	6.0	13	30
C-1	11/12/96	0.5	9.36	22.8
CS-1	11/27/96	5.0	10.9	19.7
CS-2	11/27/96	5.0	19.3	24.4
CS-3	11/27/96	5.0	26.2	27.4
No. of Samples			179	98
Maximum Concentration			3,700	3,500
Minimum Concentration			<2.5	7.3
Mean Concentration			117.9	32.79
Variance			89,984	1,264
Standard Deviation			300.0	35.56
Standard Error			22.42	3.592
t_{95}			1.653	1.661
95UCL			**154.9**	**38.76**
Risk Based Screening Level for Industrial/Commercial Land Use (Table B, SFRWQCB, 2000)			1,000	225

Notes:

bgs = below ground surface.

mg/kg = milligrams per kilogram.

<x = Metal not identified above laboratory reporting limit of x.

See Figure 3 for sample locations.

-- = not analyzed/not applicable.

Data used to calculate the 95UCL; for metals not identified above the laboratory reporting limit . the adjusted value is 1/2 the laboratory reporting limit.

95UCL = One-tailed 95% Upper Confidence Limit.

t95 = Student's t value for one-tailed 95UCL.

TABLE 5
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample Number	Date Sampled	Sample Depth (feet bgs)	TPH as Diesel	TPH Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
BC-1	8/15/94	1.0	--	--	1,900	1,900
BC-2	8/15/94	2.5	--	--	1,300	1,300
BC-3	8/15/94	1.0	--	--	1,100	1,100
BC-4	8/15/94	1.8	--	--	3,000	3,000
BC-5	8/15/94	2.5	--	--	2,000	2,000
BC-6	8/15/94	2.5	--	--	1,200	1,200
BC-7	8/15/94	0.5	--	--	1,000	1,100
BC-8	8/15/94	2.5	--	--	240	240
BC-9	8/15/94	3.0	--	--	<25	<25
BC-10	8/15/94	0.0	--	--	<25	<25
BC-11	8/15/94	2.0	--	--	200	200
BC-12	8/15/94	0.0	--	--	<25	<25
BC-13	8/15/94	0.5	--	--	2,000	2,300
BC-14	8/15/94	2.5	--	--	130	150
BC-15	8/15/94	3.5	--	--	750	670
BC-16	8/15/94	2.5	--	--	2,600	2,600
BC-17	8/15/94	2.5	--	--	<25	<25
BC-18	8/15/94	3.5	--	--	<25	<25
BC-19	8/15/94	3.5	--	--	240	240
BD-1	11/10/94	2.0	2	--	210	230
BD-1	11/10/94	6.0	6	--	370	410
BD-1A	11/10/94	2.0	<1	--	<30	<30
BD-1A	11/10/94	4.0	2	--	280	250
BD-2	11/10/94	2.0	40	--	1,600	1,800
BD-2	11/10/94	4.0	<20	--	2,300	2,500
BD-2A	11/10/94	2.0	<1	--	110	100
BD-2A	11/10/94	4.5	<20	--	12,000	11,000
BD-3	11/22/94	2.5	70	--	1,700	1,500
BD-3	11/22/94	5.0	480	--	2,000	1,800
BD-4	11/10/94	0.0	<10	--	1,600	1,900
BD-5	11/22/94	2.5	350	--	7,800	7,100
MW-SB3	11/10/94	2.0	66	--	4,000	4,500
MW-SB3	11/10/94	4.5	11	--	300	340
MW-SB4	11/22/94	2.0	2	--	160	140
MW-SB4	11/22/94	5.0	21	--	460	410
MW-SB4A	11/10/94	5.0	11,000	--	49,000	55,000
MW-SB5	11/22/94	2.0	30	--	1,200	1,100
MW-SB5	11/22/94	3.0	820	--	16,000	15,000
MW-SB5grab	11/22/94		8	--	140	150
PW-1 18"	1/31/95	1.5	30[1]	--	--	--

TABLE 5
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample Number	Date Sampled	Sample Depth (feet bgs)	TPH as Diesel	TPH Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
PW-1 24"	1/31/95	2.0	410[1]	--	--	--
PW-2 6"	1/30/95	0.5	1,000[1]	--	--	--
PW-2 @ 4.5-6'	1/30/95	4.5	620[1]	--	--	--
PW-3 @ 6"	1/30/95	0.5	<50[1]	--	--	--
PW-3 @ 5'	1/30/95	5.0	<50[1]	--	--	--
PW-4 @ .6	1/30/95	0.5	<50[1]	--	--	--
PW-4 @36"	1/30/95	3.0	<50[1]	--	--	--
TP-1	3/6/95	3.0	28	200	340	--
TP-2	3/6/95	3.0	<1	<25	<25	--
TP-2	3/6/95	5.5	14	120	190	--
TP-3	3/6/95	3.0	92	190	400	--
TP-4	3/6/95	3.0	<1	<25	<25	--
S-1	8/11/95	2.0	<1	<25	<25	--
S-1	8/11/95	3.0	11	--	170	--
S-2	8/11/95	2.0	85	--	2,700	--
S-2	8/11/95	3.0	40	--	360	--
S-3	8/11/95	2.0	150	220	--	--
S-3	8/11/95	3.0	560	630	--	--
S-4	8/11/95	2.0	1.5	<25	<25	--
S-4	8/11/95	3.0	1,400	<625	--	--
S-5	8/11/95	2.0	7.9	--	83	--
S-5	8/11/95	3.0	<1	<25	<25	--
S-6	8/11/95	2.0	67	250	--	--
S-6	8/11/95	3.0	580	1,700	--	--
S-7	8/11/95	2.0	1,700	--	30,000	--
S-7	8/11/95	3.0	110	--	770	--
S-8	8/11/95	2.0	22	--	450	--
S-8	8/11/95	3.0	11	--	99	--
S-9	8/11/95	2.0	<1	<25	32	--
S-9	8/11/95	3.0	24	--	90	--
S-11	8/11/95	2.0	18	--	850	--
S-11	8/11/95	3.0	130	--	20,000	--
S-12	8/11/95	2.0	6.1	--	950	--
S-12	8/11/95	3.0	73	--	490	--
						--
S-13	10/4/95	4.5	3,000	2,500	--	--
S-13	10/4/95	6.5	1,800	1,400	--	--
S-14	10/4/95	5	--	--	420	--
S-14	10/4/95	7	--	--	530	--
S-15	10/4/95	6.5	1,900	1,300	--	--

TABLE 5
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN SOIL
Seabreeze Yacht Center Study Area, Oakland, California
(mg/kg)

Sample Number	Date Sampled	Sample Depth (feet bgs)	TPH as Diesel	TPH Motor Oil	TPH as Bunker C Lab. Std.	TPH as Bunker C Site Std.
S-15	10/4/95	8.5	2,600	1,000	--	--
S-16A	10/4/95	4	2,600	<250	--	--
S-16A	10/4/95	6	6,300	2,000	--	--
S-16B	10/4/95	4.5			57,000	--
S-16B	10/4/95	7	4,700	4,700	--	--
						--
C-1	11/12/96	0.5	<5	<10	<10	--
CS-1[2]	11/27/96	5.0	19	44	<10	--
CS-2[2]	11/27/96	5.0	10	43	<10	--
CS-3[2]	11/27/96	5.0	22	30	<10	--
No. of Samples			66	25	68	39
Maximum Concentration			11,000	4,700	57,000	55,000
Minimum Concentration			<1	<10	<10	<25
Mean Concentration			654.3	672.2	3,456	3,162
Variance			2,955,004	1,220,764	99,680,536	81,764,521
Standard Deviation			1,719	1,105	9,984	9,042
Standard Error			211.6	221.0	1,211	1,448
t_{95}			1.669	1.711	1.668	1.686
95UCL			**1,007.3**	**1,050**	**5,474.9**	**5,602.9**
Risk Based Screening Level for Industrial/Commercial Land Use (Table B, SFRWQCB, 2000)			500	1,000	1,000	1,000

Notes:
bgs = below ground surface.
mg/kg = milligrams per kilogram.
-- = nota analyzed.
<x = Compound(s) not identified above laboratory reporting limit of x.
TPH = Total petroleum hydrocarbons.
Std. = Standard.
See Figure 4 for sample locations.
Data used to calculate the 95UCL; for samples not identified above the laboratory reporting limit , the adjusted value is 1/2 the laboratory reporting limit.
95UCL = One-tailed 95% Upper Confidence Limit.
t_{95} = Student's t value for one-tailed 95UCL.

[1] Quantification based on an extended range spanning both diesel and motor oil retention times.
[2] Silica gel cleanup performed on sample.

TABLE 6

SUMMARY OF METAL CONCENTRATIONS IN GROUNDWATER (EXCLUDING LEAD AND COPPER)

Seabreeze Yacht Center Study Area, Oakland, California

(mg/L)

Report	Sample Date	Total As	Total Ba	Total Cd	Total Cr	Total Hg	Total Ni	Total Se	Total Ag	Total Zn	Total Fe
MW-SB2 [1]	9/16/96	<0.005	–	<0.005	<0.007	<0.0002	<0.03	–	<0.007	<0.1	0.13
PW-1	2/2/95	0.019	0.018	<0.005	<0.01	<0.0002	–	<0.005	<0.01	–	–
PW-2	2/2/95	0.014	0.1	<0.005	<0.01	<0.0002	–	0.011	<0.01	–	–
PW-3	2/2/95	0.015	0.084	<0.005	<0.01	<0.0002	–	<0.005	<0.01	–	–
PW-4	2/2/95	0.014	0.081	<0.005	<0.01	<0.0002	–	<0.005	<0.01	–	–
No. of Samples		5	4	5	5	5	1	4	5	1	1
Maximum Concentration		0.019	0.1	<0.005	<0.01	<0.0002	<0.03	0.011	<0.01	<0.1	0.13
Minimum Concentration		<0.005	0.018	<0.005	<0.007	<0.0002	<0.03	<0.005	<0.007	<0.1	0.13
Mean Concentration		0.01290	0.07075	–	–	–	–	0.0046	–	–	–
Variance		0.00003805	0.0013063	–	–	–	–	0.00001806	–	–	–
Standard Deviation		0.006168	0.03614	–	–	–	–	0.004250	–	–	–
Standard Error		0.002759	0.01807	–	–	–	–	0.002125	–	–	–
t_{90}		2.132	2.353	–	–	–	–	2.353	–	–	–
95UCL		**0.019**	**0.11**	–	–	–	–	**0.010**	–	–	–
DAF-Adjusted RBSL (SFRWQCB, 2000)		0.36	50 [2]	0.011	1.8	0.00012/ 0.00051 [3]	0.082	0.71 [4]	0.0092 [5]	0.23	–

Notes: <x = Metal not identified above laboratory reporting limit of x.

mg/L = milligrams per liter.

-- = not applicable/ not analyzed

See Figure 6 for monitoring well locations.

t_{95} = Student's t value for one-tailed 95UCL

Data used to calculate the 95UCL; for samples not identified above the laboratory reporting limit , the adjusted value is 1/2 the laboratory reporting limit.

DAF-Adjusted RBSL = Risk Based Screening Level for drinking water resource not threatened multiplied by a Dilution Attenuation Factor of ten (2000, San Francisco Bay Regional Water Quality Control Board), unless otherwise specified.

As = Arsenic Ni = Nickel

Ba= Barium Se = Selenium

Cd = Cadmium Ag = Silver

Cr = Chromium Zn = Zinc

Hg = Mercury Fe = Iron

[1] Sample was filtered prior to analysis.

[2] The SFRWQCB RBSL for barium is 0.0039 mg/L. However, this RBSL is based on the ecotox threshold for freshwater. No corresponding saltwater threshold has been published. However, the 1986 USEPA Quality Criteria for Water indicates that the soluble barium concentaration in marine water generally would have to exceed 50 mg/L before toxicity to aquatic life would be expected. See text for further discussion.

[3] xx/yy = Mercury DAF-Adjusted RBSL for drinking water resource / Mercury DAF-Adjusted RBSL for elevated threat to surface water.

[4] The SFRWQCB RBSL for selenium is 0.005 mg/L. However, this RBSL is based on the the ecological freshwater criteria for continuous concentration. The corresponding saltwater criteria for continuous concentration is 0.071 mg/L. See text for further discussion.

[5] The SFRWQCB RBSL for silver is 0.00012 mg/L. However, this RBSL is based on the the ecological freshwater criteria for continuous concentration. The corresponding saltwater criteria for continuous concentration is 0.00092 mg/L. See text for further discussion.

TABLE 7
SUMMARY OF TOTAL LEAD AND COPPER CONCENTRATIONS IN GROUNDWATER
Seabreeze Yacht Center Study Area, Oakland, California
(mg/L)

Sample ID	Sample Date	Total Lead	Total Copper
PW-1	2/2/95	0.006	--
PW-2	2/2/95	0.0043	--
PW-2	7/1/96	<0.003	<0.01
PW-2	9/16/96	<0.003	<0.005
PW-2	12/11/96	0.0101	<0.003
PW-2	3/14/97	0.00401	<0.003
PW-3	2/2/95	<0.003	--
PW-4	2/2/95	<0.003	--
MW-SB1[1]	4/17/91	<0.07	0.0198
MW-SB1[1]	4/17/91	<0.07	0.0144
MW-SB1[1]	7/9/91	<0.06	<0.02
MW-SB1[1]	7/9/91	<0.06	<0.02
MW-SB1	1/10/94	<0.1	<0.02
MW-SB1	1/10/94	<0.1	<0.02
MW-SB1	1/26/94	0.012	0.037
MW-SB1	1/26/94	0.0039	0.026
MW-SB1	11/28/94	<0.003	0.014
MW-SB2[1]	4/17/91	<0.07	0.0481
MW-SB2[1]	7/9/91	<0.06	<0.02
MW-SB2	1/10/94	<0.10	0.02
MW-SB2	1/26/94	0.0048	0.014
MW-SB2	11/28/94	<0.003	0.054
MW-SB2	7/1/96	<0.003	0.055
MW-SB2	7/1/96	<0.003	0.065
MW-SB2[1]	9/16/96	<0.003	<0.005
MW-SB2[1]	9/16/96	<0.003	<0.005
MW-SB2[1]	12/11/96	0.00855	0.00354
MW-SB2[1]	3/14/97	0.00314	<0.003
MW-SB3	11/14/94	<0.003	<0.01
MW-SB3	11/14/94	<0.003	0.01
MW-SB3	7/1/96	0.0036	<0.01
MW-SB3[1]	9/16/96	<0.003	<0.005
MW-SB3[1]	12/11/96	<0.003	<0.003
MW-SB3[1]	3/14/97	<0.003	0.00529
MW-SB4	11/28/94	0.093	0.078
MW-SB4	7/1/96	0.014	0.013
MW-SB4[1]	9/16/96	<0.003	<0.005
MW-SB4[1]	12/11/96	0.00465	0.00674
MW-SB4[1]	3/14/97	0.00519	<0.003

TABLE 7
SUMMARY OF TOTAL LEAD AND COPPER CONCENTRATIONS IN GROUNDWATER
Seabreeze Yacht Center Study Area, Oakland, California
(mg/L)

Sample ID	Sample Date	Total Lead	Total Copper
MW-SB5	11/28/94	<0.003	0.019
MW-SB5	7/1/96	0.0031	0.012
MW-SB5[1]	9/16/96	<0.003	<0.005
MW-SB5[1]	12/11/96	0.00344	<0.003
MW-SB5[1]	12/11/96	<0.003	<0.003
MW-SB5[1]	3/14/97	<0.003	<0.003
MW-SB5[1]	3/14/97	<0.003	0.00318
No. of Samples		46	42
Maximum Concentration		0.093	0.078
Minimum Concentration		<0.003	<0.003
Mean Concentration		0.01275	0.01453
Variance		0.0003607	0.0003571
Standard Deviation		0.01899	0.01890
Standard Error		0.002800	0.002916
t_{95}		1.679	1.683
95UCL		**0.017**	**0.019**
DAF-Adjusted RBSL (SFRWQCB, 2000)		0.081 [2]	0.024

Notes: <x = Metal not identified above laboratory reporting limit of x.
mg/L = milligrams per liter.
-- = not analyzed.
See Figure 6 for monitoring well locations.
Data used to calculate the 95UCL; for samples not identified above the laboratory reporting limit , the adjusted value is 1/2 the laboratory reporting limit.
95UCL = One-tailed 95% Upper Confidence Limit.
t_{95} = Student's t value for one-tailed 95UCL.
DAF-Adjusted RBSL = Risk Based Screening Level for drinking water resource not threatened multiplited by a Dilution Attenuation Factor of ten (2000, San Francisco Bay Regional Water Quality Control Board), unlessotherwise specified.

[1] Sample was filtered prior to analysis.

[2] The SFRWQCB RBSL for lead is 0.0032 mg/L. However, this RBSL is based on the the ecological freshwater criterion for continuous concentration. The corresponding ecotox threshold for saltwater is 0.0081 mg/L. See text for further discussion.

TABLE 8
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN GROUNDWATER
Seabreeze Yacht Center Study Area, Oakland, California
(mg/L)

Sample ID	Sample Date	TPH Diesel	TPH Diesel with silica gel cleanup	TPH Motor Oil	TPH Motor Oil with silica gel cleanup	TPH Bunker C Lab Standard	TPH Bunker C Lab Standard with silica gel cleanup
PW-1	3/3/95	1.7	--	--	--	3.9	--
PW-2	3/3/95	1.7	--	1.1	--	4.4	--
PW-2[1]	7/1/96	<0.049	<0.049	--	--	<0.3	<0.3
PW-2[1]	9/16/96	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5
PW-2[1]	12/11/96	0.11	0.11	<0.25	<0.25	<0.5	<0.5
PW-2[1]	3/14/97	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5
PW-2	6/20/97	<0.05	--	--	--	--	--
PW-3	3/3/95	5.8	--	1.2	--	9.4	--
PW-4	3/3/95	0.61	--	<1.3	--	1.6	--
MW-SB1	11/28/94	1.3	--	--	--	4.8	--
MW-SB1	3/3/95	1.8	--	1.4	--	4.8	--
MW-SB2	11/28/94	12	--	--	--	30	--
MW-SB2	3/6/95	16	--	4.9	--	28	--
MW-SB2	3/6/95	18	--	<25	--	33	--
MW-SB2[1]	7/1/96	<0.05	<0.05	--	--	<0.3	<0.3
MW-SB2[1]	7/1/96	0.17	0.17	--	--	<0.3	<0.3
MW-SB2[1]	9/16/96	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5
MW-SB2[1]	9/16/96	0.17	0.17	<0.25	<0.25	<0.5	<0.5
MW-SB2[1]	12/11/96	0.16	0.16	<0.25	<0.25	<0.5	<0.5
MW-SB2[1]	3/14/97	0.061	0.061	<0.25	<0.25	<0.5	<0.5
MW-SB2	6/20/97	0.15	--	--	--	--	--
MW-SB2	1/28/98	<0.05	--	--	--	--	--
MW-SB2	1/6/99	<0.048	--	--	--	--	--
MW-SB2	1/19/01	<0.05	--	--	--	--	--
MW-SB3	11/14/94	--	--	--	--	--	--
MW-SB3	11/14/94	--	--	--	--	--	--
MW-SB3	12/7/94	1.4	--	3	--	3	--
MW-SB3	12/7/94	1.1	--		--	2.5	--
MW-SB3	3/6/95	2.3	--	1.5	--	5.8	--
MW-SB3[1]	7/1/96	<0.049	<0.049	--	--	<0.3	<0.3
MW-SB3[1]	9/16/96	<0.05	<0.05	0.28	0.28	<0.5	<0.5
MW-SB3[1]	12/11/96	0.19	0.19	<0.25	<0.25	<0.5	<0.5
MW-SB3[1]	3/14/97	0.085	0.085	<0.25	<0.25	<0.5	<0.5
MW-SB3	6/20/97	0.15	--	--	--	--	--
MW-SB3	6/20/97	0.1	--	--	--	--	--
MW-SB3	1/28/98	<0.05	--	--	--	--	--

TABLE 8
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN GROUNDWATER
Seabreeze Yacht Center Study Area, Oakland, California
(mg/L)

Sample ID	Sample Date	TPH Diesel	TPH Diesel with silica gel cleanup	TPH Motor Oil	TPH Motor Oil with silica gel cleanup	TPH Bunker C Lab Standard	TPH Bunker C Lab Standard with silica gel cleanup
MW-SB3	1/6/99	<0.049	--	--	--	--	--
MW-SB3	1/6/99	0.13	--	--	--	--	--
MW-SB3	2/4/00	<0.05	--	--	--	--	--
MW-SB3	2/4/00	<0.05	--	--	--	--	--
MW-SB3	1/19/01	<0.05	--	--	--	--	--
MW-SB4	11/28/94	1.1	--	--	--	4.3	--
MW-SB4	3/3/95	1.4	--	0.66	--	3	--
MW-SB4[1]	7/1/96	<0.049	<0.049	--	--	<0.3	<0.3
MW-SB4[1]	9/16/96	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5
MW-SB4[1]	12/11/96	0.12	0.12	<0.25	<0.25	<0.5	<0.5
MW-SB4[1]	3/14/97	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5
MW-SB4	6/20/97	0.11	0.11	--	--	--	--
MW-SB4	1/28/98	<0.05	<0.05	--	--	--	--
MW-SB4	1/6/99	<0.049	<0.049	--	--	--	--
MW-SB4	2/4/00	<0.05	<0.05	--	--	--	--
MW-SB4	1/19/01	<0.05	<0.05	--	--	--	--
MW-SB5	11/28/94	34	34		--	74	--
MW-SB5	3/6/95	15	15	8.1	--	34	--
MW-SB5	3/6/95	16	16	6.9	--	31	--
MW-SB5[1]	7/1/96	<0.049	<0.049	--	--	<0.3	<0.3
MW-SB5[1]	9/16/96	0.14	0.14	<0.25	<0.25	<0.5	<0.5
MW-SB5[1]	12/11/96	0.16	0.16	<0.25	<0.25	<0.5	<0.5
MW-SB5[1]	12/11/96	0.081	0.081	<0.5	<0.5	<0.5	<0.5
MW-SB5[1]	3/14/97	0.29	0.29	<0.25	<0.25	<0.5	<0.5
MW-SB5[1]	3/14/97	0.22	0.22	<0.5	<0.5	<0.5	<0.5
MW-SB5	6/20/97	0.27	--	--	--	--	--
MW-SB5	1/28/98	<0.05	--	--	--	--	--
MW-SB5	1/6/99	<0.05	--	--	--	--	--
MW-SB5	2/4/00	<0.05	--	--	--	--	--
MW-SB5	1/19/01	<0.05	--	--	--	--	--
No. of Samples		--	32	--	18	--	24
Maximum Concentration		--	34	--	0.28	--	<0.5
Minimum Concentration		--	<0.049	--	<0.25	--	<0.3
Mean Concentration		--	2.107	--	0.1475	--	--
Variance		--	48.23	--	0.002715	--	--
Standard Deviation		--	6.945	--	0.052	--	--
Standard Error		--	1.228	--	0.012	--	--

TABLE 8
SUMMARY OF TPH DIESEL, MOTOR OIL, AND BUNKER C CONCENTRATIONS IN GROUNDWATER
Seabreeze Yacht Center Study Area, Oakland, California
(mg/L)

Sample ID	Sample Date	TPH Diesel	TPH Diesel with silica gel cleanup	TPH Motor Oil	TPH Motor Oil with silica gel cleanup	TPH Bunker C Lab Standard	TPH Bunker C Lab Standard with silica gel cleanup
t_{95}		--	1.696	--	1.740	--	--
95UCL		--	**4.2**	--	**0.17**	--	--
DAF-Adjusted RBSL		--	6.4	--	6.4	--	6.4

Notes:

TPH = Total Petroleum Hydrocarbons.

<x = TPH not identified above laboratory reporting limit of x.

mg/L = milligrams per liter.

-- = not analyzed / not applicable.

See Figure 6 for monitoring well locations.

Data used to calculate the 95UCL; for samples not identified above the laboratory reporting limit , the adjusted value is 1/2 the laboratory reporting limit.

95UCL = One-tailed 95% Upper Confidence Limit.

t_{95} = Student's t value for one-tailed 95UCL.

DAF-Adjusted RBSL = Risk Based Screening Level for drinking water resource not threatened multiplited by a Dilution Attenuation Factor of ten (2000, San Francisco Bay Regional Water Quality Control Board), unlessotherwise specified.

' Sample subjected to a silica gel cleanup prior to analysis.

APPENDIX A

ALAMEDA COUNTY HEALTH CARE AGENCY
13 MAY 2000 LETTER

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

May 18, 2000
SLIC # 236

Mr. Douglas Herman
Port of Oakland
530 Water St.
Oakland CA 94604-2064

Re: Tunnel Remediation Work Plan for Seabreeze Yacht Center, 280 Sixth Ave., Oakland CA 94606

Dear Mr. Herman:

Our office has received and reviewed the April 15, 1999 **Transmittal of Requested Information** prepared for you by Baseline Environmental Consulting for the above referenced site including the proposed tunnel remediation work plan and the August 1999 **Phase One Tunnel Remediation Investigation and Phase Two Work Plan Intake and Discharge Tunnels.** I have discussed the findings and the proposal with the San Francisco Regional Water Quality Control Board (SFRWQCB).

Investigations at this site have been on-going since 1990. These investigations have identified historic uses of the site, characterized contamination of shallow soils and groundwater, and evaluated human health risks.

Remedial actions to date have included the removal and excavation of hydrocarbon contaminated soils from within the vicinity of the former above ground heating fuel storage container. The fuel was used to fuel the boilers, which generated steam to power the turbines of the former power plant.

By letter dated March 3, 1999, ACDEH requested submittal of a work plan for the remediation of the intake and discharge cooling water tunnels for the former power station. The April 15, 1999 Tunnel Remediation Work Plan met this requirement. It proposed using a video camera and hydro-system locator unit to investigate the condition, contents, dimensions and endpoint locations of the intake and discharge tunnels. However, the August 1999 Phase One Tunnel Remediation Investigation report stated that the video camera could not be used due to potential interference with embedded rebar. It proposes, as an alternative, that the intake and discharge tunnels be sealed near the shoreline without further investigation and that accumulated debris, sediment and oily material be left in place within the tunnels. This conceptual approach is approved, however, the proposed method of placing concrete over rip rap is not considered sufficient. This method would leave voids, thus defeating the main objective of the remedial action. Therefore, please adhere the to following additional requirements:

- Port shall provide a closure plan, which prescribes the methods to be used to seal the tunnels and the steps to be taken to assure the adequacy of the seal (absence of voids and assure long-term stability and integrity). This plan must be approved prior to starting the project.
- Port will provide a sampling plan to take additional soil and groundwater samples along the intake and discharge tunnels to complete site characterization. Groundwater samples should be filtered and passed through silica gel prior to chemical analysis. Your sampling plan must also be approved prior starting the project.
- After the completion of the remediation, the Port shall provide evidence of filing a deed restriction or Risk Management Plan (RMP), which limits the future land use of the site, prohibits the use of groundwater beneath the site and requires either an impervious cap or a clean soil covering over areas of known shallow soil contamination.
- Port shall prepare a health and safety plan for future maintenance or construction workers prior to any future site development.
- Port shall prepare a Soil and Groundwater Management Plan prior to any future site development.
- Port must properly close all on-site monitoring wells and provide proof of the aforementioned requirements prior to requesting site closure.

You may contact Ms. Betty Graham at (510) 622-2358 or myself at (510) 567-6765 or, if you have any questions.

Sincerely,

Barney M. Chan
Hazardous Materials Specialist

C: files, B. Chan
Ms. Betty Graham, RWQCB
Ms. Y. Nordhav, Baseline Environmental Consulting, 5900 Hollis St., Suite D, Emeryville, CA, 94608

SeabreezeWP

APPENDIX B

PORT OF OAKLAND 9 AUGUST 2000 LETTER

FOL 5917-C1

PORT OF OAKLAND

August 9, 2000

Mr. Barney M. Chan, Hazardous Materials Specialist
Alameda County Health Care Services
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Responses to Additional Requirements for Seabreeze Yacht Center, 280 6th Avenue, Oakland, California - SLIC #236

Dear Mr. Chan:

We are in receipt of your letter dated May 18, 2000 regarding the August 1999, Phase One Tunnel Remediation and Phase Two Work Plan for the intake and discharge tunnels at the Seabreeze Yacht Center (site). Your letter indicates that the County approved the proposed tunnel remediation conceptual approach of sealing the tunnels near the shoreline without further investigation and leaving accumulated debris, sediment, and oil material potentially in the tunnels. However, you requested the proposed method of sealing the tunnels (placing concrete over rip-rap) be elaborated upon in a closure plan to describe the steps to be taken to assure the adequacy of the seal. In addition, the following requirements were requested in the letter:

- Prepare a Sampling Plan to collect additional soil and groundwater samples along the intake and discharge tunnels to complete site characterization;
- Provide evidence of filing a Deed Restriction or Risk Management Plan after the completion of site remediation;
- Prepare a Health and Safety Plan for future maintenance or construction workers prior to any future site development;
- Prepare a Soil and Groundwater Management Plan prior to any future site development; and
- Properly close all on-site monitoring wells and provide proof of aforementioned requirements prior to requesting site closure.

A discussion of the Port's approach to address the County's requirements is provided below.

Closure Plan

The Port is currently preparing plans and specifications to seal the intake and discharge tunnels near the shoreline. The closure plan, which will include the plans and specifications, will be a modification of the August 1999 Phase One Tunnel Remediation and Phase Two Work Plan. The Closure Plan will address the method(s) to be implemented to seal the tunnels and steps to assure the adequacy of the seal.

Following completion, the plans and specifications will be submitted to the County for review and approval. The Port will then proceed with preparation of appropriate bid documents to solicit bids for the remediation.

Sampling Plan

The Port has conducted several comprehensive soil and groundwater investigations at the site from 1990 through 1996 and are continuing to perform annual groundwater monitoring at the site. These past efforts have fully characterized the site and contaminants of concern. The past investigations identified petroleum-containing sediments and oily water with oily sheen within the tunnels and petroleum-containing soils above the tunnels. The potential for petroleum-containing sediments within the tunnel to transport to the Clinton Basin would be eliminated once the tunnels are sealed. In addition, past groundwater monitoring events at the site have not identified contaminants of concern in the groundwater discharging into Clinton Basin that could affect ecological receptors.

To address the County's request for additional soil and groundwater samples along the tunnels, grab soil and groundwater samples will be collected in the excavations prior to sealing the tunnels. The samples will be analyzed for contaminants of concern (petroleum hydrocarbons and polynuclear aromatic hydrocarbons) to evaluate the soil condition adjacent to the tunnels. A sampling plan for the soil and groundwater sampling efforts will be included with the closure plan, discussed above, and submitted to the County for review and approval prior to implementation.

Deed Restriction or Risk Management Plan

Following completion of site remediation and prior to site development, the Port will prepare a Risk Management Plan (RMP). The RMP will identify soil and groundwater management procedures that will be followed during site development, and long term maintenance. The RMP will be submitted to the County for review and comment.

The Port could also file a deed restriction for the site that follows a format amenable to the County.

Health and Safety Plan for Future Maintenance or Construction Workers Prior to any Future Site Development

A site-specific Health and Safety Plan will be prepared following completion of site remediation and prior to the commencement of future site development. The Health and Safety Plan will be part of the requirements in the contractor bid documents for site development. The plan will address the health and safety of future maintenance and construction workers at the site. The plan will be required to meet the requirements of Title 8, California Code of Regulations, Section 5192(b)(4).

Soil and Groundwater Management Plan Prior to any Future Site Development

Soil and groundwater management procedures will be part of the Risk Management Plan for the site and will be prepared following completion of site remediation and prior to the commencement of future site development. The RMP will address proper on-site soil and groundwater management during site development and operation to protect human and ecological receptors.

On-site Monitoring Well Closure Prior to Requesting Site Closure

All on-site monitoring wells will be abandoned in accordance with the Alameda County Public Works Agency, Water Resources Section prior to requesting site closure from the County. Proof of the additional County requirements described above would also be submitted to the County prior to requesting site closure.

Should you have any questions or need further information, please do not hesitate to contact me at (510) 627-1184.

Sincerely,

Douglas P. Herman
Associate Port Environmental Scientist

Cc: Joyce Washington, Port of Oakland
Anne Henny, Port of Oakland
Betty Graham, RWQCB
Yane Nordhav, Baseline

C:\win\mydocs\projects\seabreeze\response to workplan comments

APPENDIX C

COUNTY AND RWQCB COMMENTS ON APRIL 2001 DRAFT WORKPLAN

June 25, 2001

Letter to Doug Herman

RE: Seabreeze Yacht Center, Comments on the Report "Project Manual and Plan Drawings and Soil and Groundwater Sampling Plan and Closure Plan, Intake and Discharge Tunnels, Former Seabreeze Yacht Center, Oakland" April 19, 2001

Approved:	Approved w/conditions: X Revise and Resubmit	Rejected:

Upon review and discussion of this office and that of the SFRWQCB, I request that you revise and resubmit the subject report in accordance with the following comments.

1) The sampling plan proposes that four soil borings to the depth of the tunnel invert be completed for each excavation and that up to four samples per boring be composited for laboratory analysis. In addition, two grab groundwater samples per excavation would be collected. This sampling design is acceptable, provided that discrete soil samples from each boring are retained for further analysis, if needed. Obviously contaminated borings should be analyzed discretely.

   In addition, please clarify the analytical procedures to be used for the groundwater samples. Will the metals samples be filtered in the field or in the lab? Will the TPH samples be filtered in addition to being treated with silica gel? Please insure that the method spike samples receive the same sample preparation as the field samples and are spiked **before** sample preparation?

2) For each chemical of concern set screening criteria that express allowable threshold concentrations for materials to be left in place or to be reused on-site. Include a table that lists each chemical of concern, its representative site concentrations, in soil and groundwater, and its respective screening criteria.

   The calculated 95% UCLs presented in the subject report are not acceptable as screening criteria. The RBSLs may be used, provided they are not cited as a primary reference.

3) Specify the applicable regulatory requirements for characterization, handling, transport, and disposal of contaminated materials. As written, it is not clear what regulatory requirements are anticipated or who is responsible for compliance.