URS

January 30, 2001

Mr. Amir Gholami
Hazardous Materials Specialist
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Number 250
Alameda, California 94502

RE: Report Submittal
Site Assessment and Groundwater Monitoring
Former Sears Retail Center #1058
2633 Telegraph Avenue
Oakland, California
Case I.D. #STID 1082
Job No. 00188-136-170
For Sears, Roebuck & Co.

Dear Mr. Gholami

Submitted with this letter is a URS report prepared on behalf of Sears, Roebuck & Co. Presented in the report are results of a Site Assessment and groundwater monitoring conducted at the above-referenced site. This investigation was designed to characterize subsurface soil and groundwater conditions in the vicinity of a former 10,000-gallon fuel oil underground storage tank (UST). Previous investigations indicated that soil and groundwater around the former UST is impacted by bunker-C fuel oil. This investigation was conducted in accordance with a Work Plan dated February 24, 2000 that was prepared following a October 29, 1999 letter from the Alameda County Environmental Health Service (ACEHS) requesting that groundwater monitoring wells be installed near the former UST.

Quarterly groundwater monitoring will continue within the current scope of work for one full year. Please feel free to contact me at Tarek Kardous 714-835-6886 if you have questions or comments.

Respectfully Submitted,

URS CORPORATION

J.S. Rowlands, R.G.
Project Manager

Taras B. Kruk, R.G., C.HG.
Senior Hydrogeologist

cc: Mr. Scott DeMuth, Sears Roebuck and Co.
Mr. Ryan Hartley, URS Corporation
Mr. Tim Lester, Environmental Equalizers

URS

REPORT
WELL INSTALLATION AND 2000 SECOND QUARTERGROUNDWATER MONITORING
FORMER SEARS RETAIL CENTER #1058
2633 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA
CASE I.D. # STID 1082
FOR SEARS, ROEBUCK & CO.

D&M/URS Job No. 00188-248-128
January 30, 2001

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICIES

REPORT
WELL INSTALLATION AND 2000 SECOND QUARTER
GROUNDWATER MONITORING
FORMER SEARS RETAIL CENTER #1058
2633 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA
CASE I.D. # STID 1082
D&M/URS JOB NO. 00188-248-128
FOR SEARS, ROEBUCK & CO.

EXECUTIVE SUMMARY

Presented in this report are the results of a Well Installation and 2000 Second Quarter Groundwater Monitoring conducted at the above-referenced site. This investigation was designed to characterize subsurface soil and groundwater conditions in the vicinity of a slurry filled 10,000-gallon underground storage tank (UST) historically used to store fuel oil.

The property is currently occupied by a vacant Sears retail store that was constructed in 1930 and an above-grade parking garage that was constructed in the 1960's. Previous investigations in 1998 by others indicated that soil and groundwater beneath the site was impacted by petroleum hydrocarbons. In October 1998, URS and our subcontractor conducted in-place closure activities for the fuel-oil UST under regulatory oversight by the City of Oakland Fire Prevention Bureau. The UST was slurry filled in-place. A Work Plan was prepared in response to an October 29, 1999 letter from the Alameda County Environmental Health Service (ACEHS) requiring that groundwater monitoring wells be installed in the vicinity of the slurry filled UST.

The investigation determined the current groundwater potentiometric surface beneath the site occurs at elevations of 15.5 to 18 feet above MSL (approximately 9.5 to 11 feet below ground surface). Shallow groundwater beneath the site flows to the southeast with an approximate gradient of 0.024 foot per foot.

Soil samples collected during the investigation contained petroleum hydrocarbons at concentrations ranging from non-detect to 3,200 milligrams per kilogram. BTEX and MTBE were not detected in any soil samples. Groundwater samples collected during the first quarterly monitoring event contained petroleum hydrocarbon concentrations ranging from non-detect to 1,200 micrograms per kilogram (µg/L). BTEX and MTBE were not detected in any of the groundwater samples.

For structural support and health and safety considerations, URS recommends that the UST vault and access manway be filled with slurry. One additional groundwater monitoring well should be installed onsite directly down gradient of the slurry filled UST to complete definition of the groundwater contaminant plume. Attenuation monitoring should be continued for two quarters following the additional well installation. It is the opinion of URS that the site may be eligible for closure during the next year under the Urban Land Redevelopment Program for the City of Oakland. Additional groundwater investigation and monitoring should be completed prior to submitting a site closure request.

REPORT
WELL INSTALLATION AND 2000 SECOND QUARTER
GROUNDWATER MONITORING
FORMER SEARS RETAIL CENTER #1058
2633 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA
CASE I.D. # STID 1082
URS/D&M JOB NO. 00188-248-128
FOR SEARS, ROEBUCK & CO.

1.0 INTRODUCTION/PURPOSE

This report has been prepared by URS Corporation (URS; formerly as Dames & Moore) on behalf of Sears, Roebuck & Co. (Sears). It presents results of a Well Installation and 2000 Second Quarter Groundwater Monitoring conducted at the above-referenced site (Figure 1). The former Sears retail center (Site) is located at 2633 Telegraph Avenue. The purpose of the investigation was to characterize subsurface soil and groundwater conditions in the vicinity of a slurry filled 10,000-gallon fuel oil underground storage tank (UST, Figure 2). The proposed methods of the investigation was presented in the Site Work Plan dated February 24, 2000 (Dames & Moore, 2000). The Work Plan was prepared in response to an October 29, 1999 letter from the Alameda County Environmental Health Service (ACEHS) requiring that groundwater monitoring wells be installed in the vicinity of the slurry filled UST and a former dry cleaning unit at the Site.

Requirements of the investigation, as stated by ACEHS, presumed that Sears was the owner and sole responsible party for the property. Details regarding the property ownership were subsequently provided to ACEHS by Sears and it was determined that Sears only maintains responsibility for environmental issues related to the slurry filled 10,000-gallon fuel oil UST. As such, the scope of work conducted on Sears behalf has been limited to investigative work related to the slurry filled 10,000-gallon fuel oil UST.

The scope of work consisted of installing three groundwater monitoring wells in the vicinity of the slurry filled UST. One of the wells was installed immediately north of the slurry filled UST to determine if free-phase product was present. Two groundwater wells were installed south and southwest of the slurry filled UST, down gradient of the estimated groundwater flow direction. Soil samples were collected during drilling activities and analyzed for petroleum hydrocarbons to assess residual fuel oil concentrations in the vadose zone. Groundwater samples were collected from the monitoring wells, representing the first quarterly monitoring event.

2.0 SITE DESCRIPTION

The Site is bounded by 27th Street to the north, Telegraph Avenue to the east, Sycamore Street to the south, and Northgate Avenue to the west (Figure 2). The property is currently occupied by a vacant Sears retail store that was constructed in 1930 and an above-grade parking garage that was constructed in the 1960's. Prior to the construction of the store, single- and multi-family residences dating to the turn of the century occupied the site. The former Sears retail center is three stories tall (approximately 120,000 square feet) with a basement. At the time of the investigation, the building was in the construction phase of a retro-fit project. The Site elevation is approximately 30 feet above mean sea level (MSL), which slopes gently to the south towards San Francisco Bay.

A slurry filled 10,000-gallon fuel oil UST is located at the northern end of the retail center along 27th Street. It is constructed of single-walled steel with product piping that extends into a nearby basement (former boiler room) of the retail center. The top of the UST is located beneath the loading dock of the store approximately 25 to 30 feet below ground surface (bgs). It is accessible through an opening in the loading dock where a 5 feet by 5 feet shaft extends down to the UST. The UST is contained in a concrete vault estimated to be about 10 feet high and 30 feet long. The product piping was sealed and capped when the UST was taken out of commission sometime during the 1960's.

3.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Site is approximately 1.5 miles east of the San Francisco Bay and three miles west of the Diablo Range in Oakland, California. The Site is located on the eastern flank of The San Francisco Basin, a broad Franciscan depression. The basement rock is respectively overlain by the Santa Clara Formation, the Alameda Formation, and the Temescal Formation. These formations consist of unconsolidated sediments ranging in total thickness to approximately 1000 feet. The Pleistocene Santa Clara Formation consists primarily of alluvial fan deposits that are interspersed with lake, swamp, river channel, and flood plain deposits. The overlying Alameda Formation was deposited in an estuary environment and consists for organic clays and alluvial fan deposits of sands, gravels and silts. The uppermost Holocene Temescal Formation is an alluvial deposit ranging in thickness from one to 50 feet and consists primarily of silts and clays with a basal gravel unit. (CRWQCB, San Francisco Bay Region, June 1999).

The site is located within the Oakland sub-area East Bay Plain groundwater basin. The East Bay Plain groundwater basin encompasses approximately 115 square miles and is bounded by San Pablo

Bay to the north, Alameda County to the south, the Hayward Fault to the east, and San Francisco Bay to the west. Groundwater flow in the basin typically follows surface topography. Historical groundwater production wells in the Oakland sub-area were screened at depths greater than 200 feet below ground surface (BGS) beneath the Yerba Buena Mud Member of the Alameda Formation. The Yerba Buena Mud is a black organic clay with an average thickness of 25 to 50 feet that forms an aquitard between upper and lower groundwater bearing units. From the 1860's until water importation programs were initiated in the 1930's, groundwater in the East Bay Plain was utilized as the primary municipal water source. Current beneficial uses of groundwater in the basin are minimal (CRWQCB, San Francisco Bay Region, June 1999).

4.0 PREVIOUS INVESTIGATIONS

Lowney Associates (Lowney) performed a "Phase I Environmental Site Assessment (ESA) and Soil and Groundwater Quality Evaluation" in April 1998 and a "Phase II Soil and Groundwater Evaluation," in July 1998. The first assessment included advancing five exploratory borings in three areas of recognized environmental concerns for collection of soil samples and groundwater grab samples (Figure 2). Borings EB-1, EB-2, and EB-3 were driven in an area between the boiler room and a suspect pipe in the 27th Street sidewalk. Two borings were drilled within 10 feet of an adjacent dry cleaners (EB-4) and in the vicinity of a possible former tire and oil shop at the southwest corner of the retail store (EB-5). Detectable concentrations of total petroleum hydrocarbons (TPH) ranging from 79 milligrams per kilogram (mg/kg) to 9,500 mg/kg were present in soil samples collected from borings EB-1, EB-2, EB-3 and EB-5. Benzene was not detected in any of the soil samples submitted for chemical analysis.

During the second assessment conducted by Lowney, seven additional borings were advanced down gradient of the anticipated groundwater flow direction to collect selected soil and groundwater grab samples (Figure 2). The investigation also confirmed the location and existence of the 10,000-gallon UST beneath the loading dock of the retail center and identified the piping beneath the sidewalk of 27th Street as the UST fill line. Soil samples collected from borings EB-6 through EB-12 contained non-detectable (ND) concentrations of TPH and benzene, toluene, ethylbenzene, total xylenes (BTEX). A summary of the soil sample depths and analytical results for the investigations conducted by Lowney are included in Table 1.

Groundwater grab samples were collected by Lowney during the two assessments from borings EB-1 through EB-6, EB-10, EB-11, and EB-12. Groundwater grab samples collected from borings EB-1, EB-2, EB-3, and EB-5 contained detectable concentrations of TPH ranging from 38,000 micrograms

per liter (µg/L) to 480,000 µg/L. Groundwater grab samples collected from borings EB-2 and EB-4 contained detectable concentrations of benzene at 4.8 µg/L and 4.3 µg/L, respectively. The remaining groundwater grab samples contained ND concentrations of TPH and BTEX. A summary of the groundwater analytical results for the investigations conducted by Lowney are included in Table 2.

SECOR International Incorporated (SECOR) subsequently performed an additional soil and groundwater investigation during November 1998 to further assess subsurface soils and groundwater near the southeastern corner of the property. The scope of work was approved by the ACEHS and included the advancement of nine soil borings (EB-13 through EB-21) for the collection of soil and groundwater grab samples (Figure 2). The results and conclusions are presented in SECOR's Summary Report, "Subsurface Investigation and Site Closure Tasks," December 8, 1998. Soil samples collected from borings EB-19, EB-20, and EB-21 contained detectable concentrations of TPH ranging from 4 mg/kg to 160 mg/kg. All soil samples, excluding EB-20-7, analyzed during the investigation contained ND concentrations of BTEX. Soil sample EB-20-7 contained 0.044 mg/kg of ethylbenzene and ND concentrations of benzene, toluene and total xylenes. The soil sample depths and analytical results are included in Table 1.

Groundwater grab samples collected by SECOR from borings EB-13, EB-14, EB-15 and EB-18 contained TPH concentrations ranging from ND to 2,300 µg/L. The groundwater grab samples collected from borings EB-13, EB-15 and EB-18 contained ND concentrations of BTEX. Groundwater grab sample EB-14 contained ND concentrations of benzene and toluene, 3.2 µg/L ethylbenzene, and 6.1 µg/L total xylenes. The groundwater analytical results for samples collected by SECOR are included in Table 2.

5.0 SLURRY FILL OF FUEL OIL UST

From October 19 to December 2, 1998, URS and subcontractor, Foss Environmental, (team) conducted in-place closure activities for the fuel-oil UST in accordance with City of Oakland Fire Prevention Bureau, Closure Permit #94-98. The closure activities were conducted after obtaining a closure permit and preparing a site-specific health and safety plan. During the UST closure activities the UST was accessed, evacuated, cleaned and filled with concrete slurry. URS submitted a letter report to the City of Oakland Fire Prevention Bureau dated February 22, 1999 that documents the in-place closure activities (Appendix A). Approximately 2 ½ cubic yards of oily soil was removed from the access shaft, transported offsite, and disposed at an approved facility.

Approximately 500 gallons of oily water pumped from the access shaft and vault, and 10,000 gallons of oily water pumped from the UST was transported offsite and disposed at an approved facility. The letter report provides a tank description, scope of work performed, hazardous waste management activities and attached forms and bills of lading, conclusions, and recommendations.

The City of Oakland Fire Prevention Bureau forwarded the UST closure report to Ms. Madhulla Logan of ACEHS. The case was turned over to Ms. Juliet Shin of ACEHS who issued a letter on October 29, 1999 to Sears requesting a site assessment work plan and a list of responsible parties. The letter requested the installation of three groundwater monitoring wells to assess subsurface conditions related to the former UST and dry cleaning facility. It is our understanding that the case was subsequently turned over to Mr. Amir Gholami of ACEHS, who was made aware of the property ownership issues and responsibilities by Sears. Resolution of property ownership issues resulted in Sears assuming the responsibility of assessing conditions solely related to the slurry filled, fuel oil UST.

6.0 FIELD METHODS

The scope of work presented herein addresses the requirements for case closure of the site by the ACEHS. Three groundwater monitoring wells (FOMW-1 through FOMW-3) were drilled and installed in the vicinity of the slurry filled UST. Placement of the wells, as shown on Figure 2, was based on the inferred direction of groundwater flow from local topography. The wells were completed 20 feet into shallow groundwater to a depth of approximately 30 feet below ground surface (bgs). The following sections detail the scope of work performed for the well installation and groundwater monitoring conducted at the Site.

6.1 PERMITS

Prior to initiating field activities, well construction permits, presented in Appendix B were obtained from the City of Oakland Public Works Department.

6.2 HEALTH AND SAFETY PLAN

Prior to initiating the field activities, URS prepared a site-specific Health & Safety plan to:

- Identify and describe potentially hazardous substances which may be encountered during field operations;

- Specify protective equipment and clothing for on-site activities;

- Outline measures to be implemented in the event of an emergency.

URS field personnel reviewed the Health & Safety plan prior to commencing the field procedures. Field monitoring activities were recorded and the Health and Safety Plan and maintained in the project files at URS's San Francisco office. A copy of the Health and Safety Plan remained onsite during field operations.

6.3 UTILITY CLEARANCE

In accordance with California State Assembly Bill 73, URS notified Underground Services Alert (USA) a minimum of 48 hours prior to initiation of intrusive field tasks. Proposed locations of the subsurface investigation were marked with white paint as required by USA. USA contacted utility owners of record within the Site vicinity and notified them of our intention to conduct subsurface investigations in proximity to buried utilities. All utility owners of record, or their designated agents, were expected to clearly mark the position of their utilities on the ground surface throughout the area designated for investigation.

For each drilling location, surface geophysics was used in an effort to identify subsurface lines and obstructions. Geophysical methods conducted by Subtronic Corporation of Concord, California on May [illegible] identify subsurface obstructions, utilities and conduits. These features are detected due to the ferrous and electrically conductive material of their construction. The USA records and geophysical survey conducted by Subtronic Corp. indicated that there were no obvious utility conflicts at the proposed boring locations.

6.4 SOIL BORINGS AND SAMPLING

URS contracted Gregg Drilling and Testing of Martinez, California to perform the drilling and installation of the groundwater monitoring wells. Soil boring FOMW-1 was drilled May 18, 2000 with a B-53 drill rig equipped with 10-inch diameter hollow-stem augers. Soil boring FOMW-2 and

FOMW-3 were drilled May 19, 2000 with a limited access drill rig equipped with 8-inch diameter hollow-stem augers. Detailed logs of the subsurface materials encountered at each boring location are provided in Appendix C. Soils were classified in accordance with the Unified Soil Classification System (USCS). Soil borings were drilled and soil samples were collected in general accordance with American Society of Testing and Materials (ASTM) D1586-84, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Drilling and sampling activities were conducted by personnel under the direct supervision of a URS California Registered Geologist and/or Professional Engineer.

The first 5 to 6 feet of each boring was hand-augured to assess the potential presence of subsurface utilities or other structures. Below that depth, soil samples were collected through the hollow stem of the auger at 5-foot intervals using a split-spoon sampler equipped with stainless steel sleeves. The B-53 drill rig sampler was driven 18 inches with a standard 30-inch drop of a 140-pound hammer. Hammer blow counts were recorded on the Boring Logs. The limited access rig used a push-probe type sampling technique to drive the sampler 18-inches with a pneumatic hammer and the weight of the rig.

Upon retrieval of the sampler at each sampling interval, the sample sleeves were separated and observed for possible staining. Samples were also screened for organic gases using an Organic Vapor Analyzer (OVA) equipped with a Flame Ionization Detector (FID). For OVA evaluation, each soil sample was extruded into a clean stainless steel sample sleeve, disaggregated, and then capped and allowed to equilibrate. The OVA probe was then inserted into the sample sleeve and a reading obtained. The OVA readings were recorded on the Boring Logs. Three soil samples were collected from each borehole for laboratory analysis; the sample just at or above the capillary fringe, and the two samples from each boring with the highest OVA measurement. If all OVA measurements were at background levels and there was no apparent hydrocarbon staining, then the three deepest samples collected above groundwater were submitted for laboratory analysis.

The undisturbed sample sleeves selected for analysis were covered with Teflon™ film and fitted with snug-fitting plastic end caps, sealed with Parafilm™ (a volatile-organics-free laboratory film), labeled, and logged on a chain of custody document. The sample labels affixed to the end caps included the following information; boring designation, sample number, sample depth, date, collector initials, owner, sample location, and time of collection. The sealed and labeled samples were placed in an ice chest maintained at a temperature of 3 to 7 degrees centigrade and transported, under chain of custody, to a California Department of Health Services (CDHS) certified laboratory for analysis.

Drilling and sampling equipment was decontaminated prior to use in each borehole. Sampling equipment was also decontaminated between each sampling depth. The decontamination procedure consisted of a wash with a laboratory detergent (e.g. Alconox) and water followed by rinses with de-ionized water, and air drying.

6.5 MONITORING WELL INSTALLATION AND CONSTRUCTION

Soil borings FOMW-1, FOMW-2 and FOMW-3 were converted to groundwater monitoring wells. Well FOMW-1 was screened from approximately 11 to 31 feet bgs. Well FOMW-2 was screened from approximately 8 to 28 feet bgs. Well FOMW-3 was screened from approximately 5 to 30 feet bgs. FOMW-1 was constructed of 4-inch diameter flush-threaded Schedule 40 polyvinyl chloride (PVC). FOMW-2 and FOMW-3 were constructed of 2-inch diameter flush-threaded Schedule 40 PVC. Screened casing intervals were constructed using 5 and10-foot sections of slotted casing having 0.010-inch (10 slot) openings.

Upon completion of the borehole, the well screen and casing was lowered through the hollow-stem augers and suspended above the bottom of the borehole while a #2/12 sand filter pack was installed. The #2/12 sand filter pack was placed in the bottom of the borehole and extended to approximately 2 feet above the top of the slotted casing. A hydrated bentonite pellet transition seal approximately 2 feet thick was placed immediately above the filter pack. The annular space above the bentonite seal was filled with a concrete slurry, and a well box was cemented into place at the ground surface. The well boxes are traffic-rated and flush-mounted with a gentle slope from the crown of the box lid to the adjacent ground surface. Each well casing was fitted with a locked cap. Well construction details are shown on the boring logs (Appendix C).

After a period of over 72 hours, Gregg Drilling developed the monitoring wells by surging with a surge block, followed by bailing and purging. Purged water was monitored for temperature, pH, conductivity, and turbidity and measurements were recorded on well development logs. Purging continued until monitored parameters stabilized to within $\pm$10 percent and three casing volumes of groundwater had been removed. The monitoring well development logs are presented in Appendix D. The wells were left to stabilize over 72 hours prior to sampling.

6.6 SURVEY ACTIVITIES

Groundwater monitoring wells FOMW-1, FOMW-2 and FOMW-3 were surveyed by licensed

California Land Surveyors with respect to the California State Plane Coordinate System horizontal (NAD27) and vertical (NGVD29) datums. The monitoring wells were surveyed during June 8, 2000 by URS of Pleasanton, California. Survey data for the monitoring wells are included in Appendix E.

6.7 WASTE MANAGEMENT

Both liquid wastes(well development and purge water)and solid wastes (drill cuttings) were collected and stored in 55-gallon DOT-approved drums. Containers were numbered to identify the source of the wastes. The containers were stored onsite and properly disposed of following review of the chemical analysis data.

7.0 QUARTERLY GROUNDWATER MONITORING

The first quarter of groundwater sampling was performed on June 8, 2000. The monitoring was performed on the three groundwater wells FOMW-1, FOMW-2, and FOMW-3. The monitoring consisted of groundwater gauging, purging, sampling and analysis. A description of field methods and results is presented in the following section. The details of the monitoring procedures are presented below.

7.1 GROUNDWATER GAUGING AND CONTOURING

Prior to sampling, each groundwater monitoring well was observed for the presence of free product using a disposable polyethylene bailer. Free product was not observed in any of the wells. Water levels were gauged using a Solinst water level indicator relative to the surveyed top of casing. Based on results of the water level measurements, an interpretive groundwater contour map was generated by standard three-point convention. Groundwater depths and elevations are listed on Table 3. A Site map showing groundwater flow direction is provided as Figure 3.

7.2 PURGING AND SAMPLING METHODS

Prior to sample collection, each well was purged of approximately three to five well casing volumes using a disposal polyethylene bailer or two-stage submersible pump. Water purged from each well was monitored for field parameters, including temperature, pH, electrical conductivity, dissolved

oxygen, ferrous iron (Fe^{++}), and oxygen/reduction (redox). The Field Record of Water Sampling forms for each well are presented in Appendix F.

The purging was terminated when temperature, pH, and conductivity measurements stabilized. Following the purging and well recovery to at least 80% of original static water levels (or after one hour of recovery), groundwater samples were collected for laboratory analysis by lowering a bailer approximately one to two feet below the air-water interface. Water samples were collected from the monitoring wells using a separate dedicated bailer for each well. Prior to sampling, each bailer was fitted with a low-flow velocity sampling port to minimize sample turbulence and volatilization. The bailers were cleaned prior to their use by washing in a solution of Alconox, rinsing with tap water, final rinsing with deionized water, and air drying.

Sample containers and handling procedures conformed to the established protocols for each specific parameter as described in EPA SW-846. The sample bottles, once filled and preserved as required, were properly labeled and logged on a chain of custody form. The label included well identification number, sample number, date and time sampled, job number, site/client name and location, and sampling personnel's initials. The sealed and labeled samples were placed in ice chests maintained and temperature of 4 to 7 degrees centigrade and transported to a CDHS-Certified testing laboratory. Chain-of-custody records were maintained throughout the sampling program.

8.0 LABORATORY ANALYSIS PROGRAM

Soil samples submitted to the CDHS-Certified laboratory were analyzed for total extractable petroleum hydrocarbons as diesel-range (TEPH-diesel) and bunker-oil range (TEPH-bunker oil) by modified EPA 8015, and for the volatile fuel constituents BTEX and methyl-tertiary butyl ether (MTBE) by EPA 8260. Groundwater samples were analyzed for TEPH-diesel and TEPH-bunker oil by modified EPA 8015, BTEX and MTBE by EPA 8260A. As part of the attenuation monitoring program, the groundwater samples were also analyzed for dissolved methane by headspace analysis, total alkalinity by EPA 310.1, total dissolved solids (TDS) by EPA 160.1, hydrocarbon degraders by ASTM G-22, and heterotrophic plate count by SM 9215A.

9.0 INVESTIGATIVE RESULTS

9.1 LITHOLOGIC CONDITIONS

Subsurface soil conditions beneath the Site were evaluated based on soil boring logs from previous investigations and soil samples collected during this investigation. Lithologic descriptions for the soil types encountered during this investigation are provided in the boring logs (Appendix C).

The shallow subsurface soil encountered during soil boring activities consisted of low permeability clays and silts in the vadose zone with some sand-rich lenses. Most of the soil was olive brown sandy clay to silty clay with lenses of sand.

Disturbed native material fill was encountered within the former UST area. The fill is similar to the natural soils encountered beneath the site and were presumably excavated, stockpiled on-site and back-filled into the excavation during UST construction. Soil boring FOMW-1 was placed directly adjacent to the slurry filled UST to assess the potential presence of free product in the subsurface. The upper 22 feet of FOMW-1 appears to be located within the UST native fill. Visible hydrocarbon product was observed in the fill soil collected at a depth of 20 feet bgs from boring FOMW-1.

Soil borings FOMW-2 and FOMW-3 were installed south and southwest of the slurry filled UST in the inferred down gradient groundwater flow direction. A saturated sand lens was encountered in FOMW-3 at a depth of 11 feet bgs. Soil samples from 10 and 15 feet bgs revealed greenish gray staining and petroleum hydrocarbon odors with OVA readings of 57 and 29 parts per millions (ppm), respectively. No odor or discoloration was encountered in FOMW-2.

9.2 SHALLOW GROUNDWATER CONDITIONS

The groundwater potentiometric surface beneath the site occurs at depths ranging from 9.5 to 11 feet bgs or an elevation of 15.5 to 18 feet above MSL. The water bearing zones are moderately confined, as water levels ascended within drill rods after penetration of the coarser-grained water bearing units. According to the water level measurements, groundwater flow is to the southeast with an approximate gradient of 0.024 foot per foot. An examination of the boring logs indicates that the shallow subsurface stratigraphy beneath the site contains coarse lenses and channel deposits. The lenses and channels may provide preferential pathways for groundwater flow which contradict the

general groundwater flow direction beneath the site. Groundwater elevations and flow directions are presented in Table 3 and shown on Figure 3.

9.3 LABORATORY ANALYTICAL RESULTS

Chemical analyses results of the soil and groundwater samples collected during this investigation are presented in Tables 4 and 5. The CDHS-Certified laboratory reports, chain-of-custody forms, and the level III validation reports are presented in Appendix G. Results of the analyses are discussed in the following section.

9.3.1 Soil Analytical Results

Soil samples collected during this investigation were analyzed for TEPH-diesel fuel, TEPH-bunker oil, BTEX and MTBE. The sample collected from FOMW-1 at 20 feet bgs (FOMW-1-20) contained detectable amounts of TEPH-bunker oil at a concentration of 3,200 mg/kg. The samples collected from FOMW-3 at 6, 11 and 16 feet bgs contained detectable amounts of TEPH-diesel fuel at respective concentrations of 51 mg/kg, 1900 mg/kg, and 19 mg/kg. None of the soil samples collected and submitted for chemical analysis during this investigation contained detectable concentrations of BTEX or MTBE.

9.3.2 Groundwater Analytical Results

Groundwater samples collected during this investigation were analyzed for TEPH-diesel fuel, TEPH-bunker oil, BTEX, MTBE, dissolved methane, total alkalinity, TDS, hydrocarbon degraders, and heterotrophic plate count. The groundwater samples analyzed for TEPH-Bunker Oil revealed concentrations at [redacted] mg/L in [redacted]. None of the groundwater samples collected and submitted for chemical analysis during this investigation contained detectable concentrations of BTEX or MTBE.

Analytical results for the biological parameters detected in FOMW-1, 2 and 3 are respectively reported below:

- TDS: 360, 250, 330 milligrams per liter (mg/L);

- Total Alkalinity: 230, 150, 190 mg/L;
- Methane: not detected (0.01 µg/L);
- Hydrocarbon Degraders: 390, 1.0, 440 colony forming units per millimeter (cfu/mL); and
- Heterotrophic Plate Count: 4,000, 110, 110,000 cfu/mL.

10.0 DISCUSSION

The objectives of this Well Installation and 2000 Second Quarter Groundwater Monitoring were to: (1) further characterize the vertical and lateral extent of petroleum hydrocarbon-impacted soils in the vicinity of the slurry filled UST; (2) determine depth, flow direction, and constituent concentrations of shallow groundwater beneath the site; (3) identify appropriate response actions for the petroleum hydrocarbons detected in soil and groundwater.

Results of the investigation indicate that TEPH-bunker oil is present in the soil next to the UST in well FOMW-1 (3,200 mg/kg) and in previous soil boring EB-2 (9,500 mg/kg) by Lowney (1998). BTEX and MTBE were not detected in any soil samples collected and analyzed during this investigation. Groundwater analyzed for TEPH-Bunker Oil revealed concentrations at 1,200 ug/L in FOMW-1 and FOMW-3. BTEX and MTBE were not detected in any groundwater samples collected and analyzed during the first quarterly groundwater monitoring event. Results of the physical and biological testing are typical of nonaggressive oxidizing conditions. They also imply that conditions exist for biodegradation of petroleum hydrocarbons in the soil and groundwater.

Shallow groundwater flow beneath the site is towards the southwest with a gradient of approximately 0.024 foot per foot. Based on beneficial uses of groundwater in the Site vicinity, and the constituent concentrations detected during this and previous investigations, there appears to be no significant risk of petroleum hydrocarbon exposure to any sensitive receptors in the area.

The Urban Land Redevelopment (URL) Program is a joint effort by the City of Oakland, Alameda County Environmental Health, and the Regional Water Quality control Board to facilitate the cleanup and redevelopment of contaminated properties within the City of Oakland. As a reference, a copy of the URL program guidance document is provided as Appendix H. In accordance with the URL Program, URS plans to further evaluate site conditions related to the petroleum hydrocarbon plume and establish closure conditions for the slurry filled UST. In order to establish closure

criteria, the following additional investigative activities are proposed for the Site:

- Install one well downgradient of FOMW-1 to further delineate the petroleum hydrocarbon impacted plume.

- Complete the four quarters of groundwater monitoring that were implemented as part of this program.

- Completely fill the UST vault and access man way with slurry to eliminate the potential of collapse, and unauthorized entry into the vault.

- After four quarters of groundwater monitoring, complete a Tier 2 analysis in accordance with the URL Program guidance document.

Given our current understanding of the petroleum hydrocarbon plume conditions, the Site will likely conform with Tier 2 closure criteria.

11.0 SCHEDULE

This report represents the first submittal for groundwater monitoring at the site. Subsequent sampling events have been completed in October and December 2000. Future groundwater monitoring events scheduled for March of 2001 will include analysis of attenuation parameters nitrate and sulfate. URS proposes to install one additional groundwater monitoring well during the course of the groundwater monitoring program. URS will continue to notify ACEHS personnel of upcoming field activities.

-o0o-

Should you have any questions or comments, please do not hesitate to contact us.

Respectfully Submitted,

URS CORPORATION

Taras B. Kruk, R.G., C.HG.
Senior Hydrogeologist

J.S. Rowlands, R.G.
Project Manager

REGISTERED GEOLOGIST
JOHN SCOTT ROWLANDS
No. 7013
Expires 3/31/02
REGISTERED GEOLOGIST
STATE OF CALIFORNIA

12.0 REFERENCES

California Regional Water Quality Control Board—San Francisco Bay Region Groundwater Committee (RWQCB), 1999. *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report*. June 1999, 106 p.

Dames & Moore, 2000. *Site Assessment and Groundwater Monitoring Work Plan*, Former Sears Retail Center #1058, 2633 Telegraph Avenue, Oakland, California, February 24.

Figuers, S., 1998. Groundwater Study and Water Supply History of the East Bay Plain, Alameda and Contra Costa Counties, California, 12 p.

Lowney, 1998. *Phase I Environmental Site Assessment and Soil and Groundwater Quality Evaluation*, 2633 Telegraph Avenue, Oakland, California, April 21.

Lowney, 1998. *Soil and Groundwater Quality Evaluation*, 2633 Telegraph Avenue, Oakland, California, July 6.

Muir, Kenneth S., 1993. *Geologic Framework of the East Bay Plain Groundwater Basin, Alameda, California. Prepared for the Alameda County Flood Control and Water Conservation District*, August 1993.

SECOR, 1998. Summary Report Subsurface Investigation and Site Closure Tasks, 2633 Telegraph Avenue, Oakland, California, December 8.

Table 1
RESULTS OF PREVIOUS SOIL ANALYSES
FORMER SEARS PROPERTY #1058
2633 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA
(concentrations in parts mg/kg)

Sample Number and Depth	Date of Sample	TPH-Diesel	TPH-Bunker Oil	TPH-Fuel Oil	TPH-Motor Oil	TPH-Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	Stoddard Solvent	VOCs (8010)
Sampling performed by Lowney, 1998												
EB-1-12	4/7/98	ND	ND	ND	-	-	ND	ND	ND	ND	-	-
EB-1-16	4/7/98	ND	**3,800**	ND	-	-	ND	ND	ND	ND	-	-
EB-2-16	4/7/98	ND	ND	ND	-	-	ND	ND	ND	ND	-	-
EB-2-20	4/7/98	ND	**9,500**	ND	-	-	ND	ND	ND	ND	-	-
EB-3-13	4/7/98	ND	ND	ND	-	-	ND	ND	ND	ND	-	-
EB-3-17	4/7/98	ND	**1,300**	ND	-	-	ND	ND	ND	ND	-	-
EB-4-8	4/7/98	-	-	-	-	-	-	-	-	-	-	ND
EB-4-12	4/7/98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
EB-5-6	4/7/98	ND	**79**	ND	ND	**2.5**	ND	ND	ND	ND	ND	ND
EB-5-14	4/7/98	**530**	ND	ND	ND	**240***	ND	ND	ND	**0.41**	**280**	ND
EB-6-11	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-6-17	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-7-10	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-7-14	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-8-9	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-8-11	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-9-11	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-9-15	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-10-11	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-10-16	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-11-9	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-11-13	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-12-9	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
EB-12-13	5/12/98	ND	ND	ND	-	-	ND	ND	ND	ND	ND	-
Sampling performed by Secor, 1998												
EB-13-7	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	**0.0191**
EB-13-16	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-14-4	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-14-7	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-15-6	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-15-13	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-16-7	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-16-13	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-18-4	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-18-16	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-18-22	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-19-22	11/10/98	**5.8**	ND	-	ND	-	ND	ND	ND	ND	ND	ND
EB-20-7	11/10/98	**160**	ND	-	**70**	-	ND	ND	**0.044**	ND	ND	**0.0452**
EB-20-13	11/10/98	**140**	ND	-	ND	-	ND	ND	ND	ND	ND	ND
EB-20-22	11/10/98	**4**	ND	-	ND	-	ND	ND	ND	ND	ND	ND
EB-21-22	11/10/98	**4.7**	ND	-	ND	-	ND	ND	ND	ND	ND	ND

Notes:
ND = Not Detected at or above the state laboratory reporting limit
- = Not Analyzed
* TPH-Gas chromatogram, although within reporting limits, does not match typical Gas pattern.
[1] Tetrachloroethene
[2] Isopropyl-benzene

Table 2
RESULTS OF PREVIOUS GROUNDWATER ANALYSES
FORMER SEARS PROPERTY #1058
2633 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA
(concentrations in µg/L)

Sample Number	Date of Sample	TPH-Diesel	TPH-Bunker Oil	TPH-Fuel Oil	TPH-Motor Oil	TPH-Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes	Stoddard Solvent	VOCs (8010)
Sampling performed by Lowney, 1998												
EB-1	4/7/98	ND	38,000	ND	-	-	ND	ND	ND	ND	-	-
EB-2	4/7/98	ND	480,000	ND	-	-	4.8	1.8	1.4	5.2	-	-
EB-3	4/7/98	ND	150,000	ND	-	-	ND	ND	ND	ND	-	-
EB-4	4/7/98	ND	ND	ND	ND	1,600	4.3	3.7	ND	ND	9,100	ND
EB-5	4/7/98	ND	330,000	ND	ND	100*	ND	ND	ND	ND	ND	1
EB-6	5/12/98	ND	ND	-	-	-	ND	ND	ND	ND	ND	-
EB-10	5/12/98	ND	ND	-	-	-	ND	ND	ND	ND	ND	-
EB-11	5/12/98	ND	ND	-	-	-	ND	ND	ND	ND	ND	-
EB-12	5/12/98	ND	ND	-	-	-	ND	ND	ND	ND	ND	-
Sampling performed by Secor, 1998												
EB-13	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-14	11/9/98	-	-	-	-	-	ND	ND	3.2	6.1	2,300	2,3,4
EB-15	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-
EB-18	11/9/98	-	-	-	-	-	ND	ND	ND	ND	ND	-

Notes:
Results in µg/L
ND = Not Detected at or above laboratory reporting limits
- = Not Analyzed
* TPH-Gas chromatogram, although within reporting limits, does not match typical Gas pattern; see laboratory results
[1] Tetrachloroethene detected at 0.6 µg/L.
[2] Naphthalene detected at 11 µg/L.
[3] Trichloroethene detected at 5.7 µg/L.
[4] Isopropylbenzene detected at 62 µg/L.

Table 3
Groundwater Levels and Parameters
Sears Retail Center Store No. 1058
Oakland, California

Monitoring Well No.	Date Collected	Notes	GROUNDWATER LEVELS			GROUNDWATER SAMPLING FIELD PARAMETERS					
			Depth to Groundwater (feet bgs)	Casing Elevation (MSL)	Groundwater Elevation (MSL)	Temp. (Celcius)	pH	Cond (uS)	Redox (mV)	Dissolved Oxygen (mg/l)	Ferrous Iron (%)
FOMW-1	6/8/00	1,2	9.59	27.81	18.22	18.3	6.72	659	13	0.28	--
FOMW-2	6/8/00	--	11.14	26.65	15.51	14.7	7.00	673	10	2.92	--
FOMW-3	6/8/00	2	10.48	26.80	16.32	15.0	6.87	689	23	0.22	--

Notes:
MSL - Mean Sea Level
Groundwater Elevation reference to MSL
Groundwater Elevation = Top of casing elevation - Depth to Water.
1 Sheen observed on water surface.
2 Petroleum ordor in groundwater
-- Not analyzed/Not available.

Table 4
Results of Soil Analysis
Sears Retail Center Store No. 1058
Oakland, California

During MWDT

Monitoring Well No.	Notes	Sample Date	LABORATORY ANALYTICAL RESULTS						
			Volatile Organics by GC/MS 8260A					TEPH	
			B	T	E	X	MTBE	Diesel	Bunker-C
			(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(mg/kg)	(mg/kg)
FOMW-1-11	--	5/18/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	< 50.0
FOMW-1-16	--	5/18/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	< 50.0
FOMW-1-20	1	5/18/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	**3200**
FOMW-2-6	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	< 50.0
FOMW-2-11	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	< 50.0
FOMW-2-16	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	< 1.0	< 50.0
FOMW-3-6	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	**51**	< 50.0
FOMW-3-11	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	**1900**	< 50.0
FOMW-3-16	--	5/19/00	< 5.0	< 5.0	< 5.0	< 10.0	< 5.0	**19**	< 50.0

Notes:

TEPH - Total extractable petroleum hydrocarbons

B T E X - Benzene, Toluene, Ethylbenzene, Total Xylenes

MTBE - Methyl t-butyl ether

< - Analyte not detected above indicated method detection limit

-- - Not analyzed/Not available.

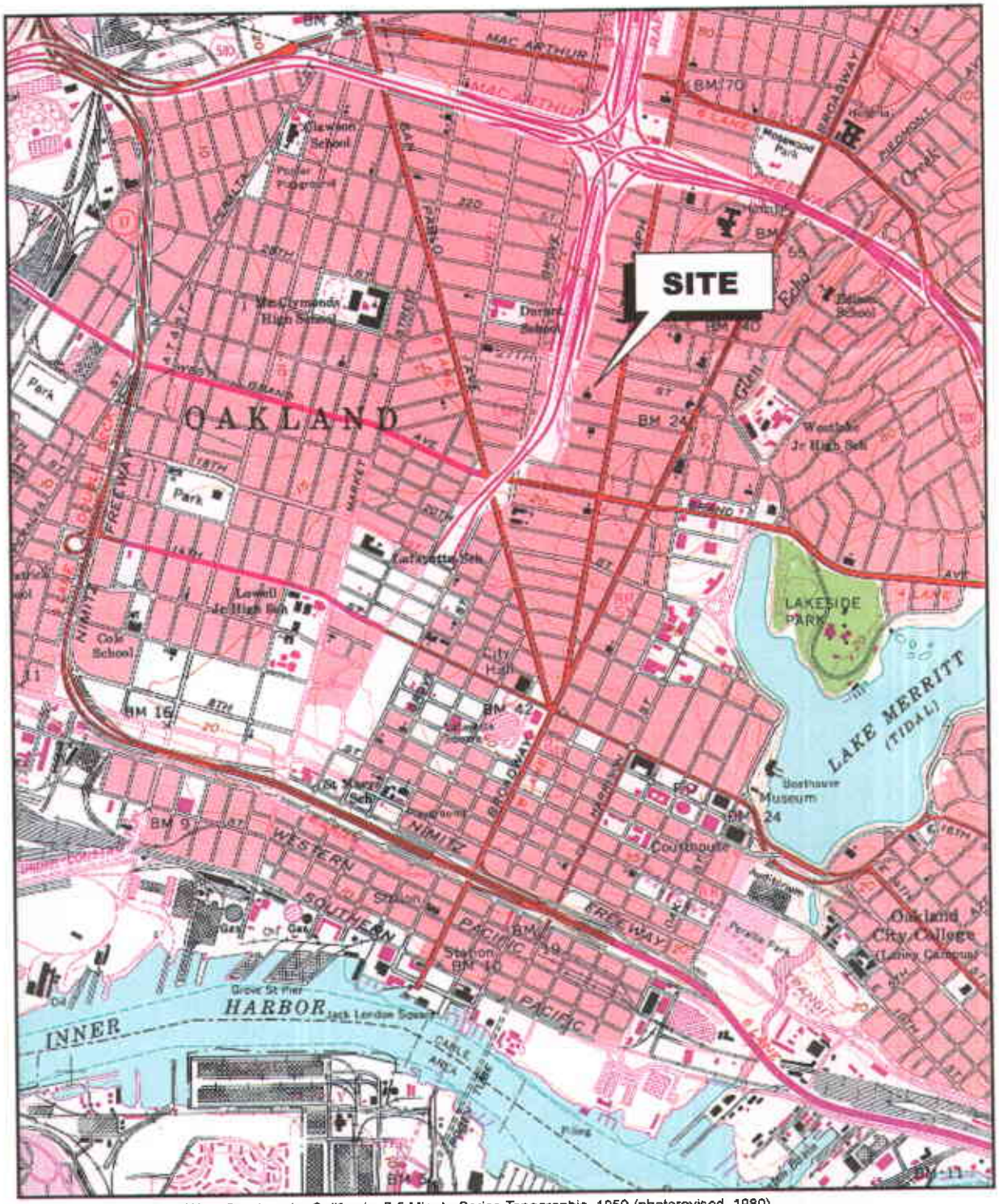
1 Free phase product observed on sample

TABLE 5
SUMMARY OF GROUNDWATER MONITORING
SEARS RETAIL STORE NO. 1058
OAKLAND, CALIFORNIA

Monitoring Well No.	Sample Date	Notes	LABORATORY ANALYTICAL RESULTS							LABORATORY ANALYTICAL RESULTS				
			Volatile Organics by GC/MS 8260A					TEPH		Total Dissolved Solids	Total Alkalinity	Dissolved Methane	Hydrocarbon Degraders	Heterotrophic Plate Count
			B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE (ug/L)	Diesel (ug/L)	Bunker Oil (ug/L)	(mg/L)	(ug/L)	(ug/ML)	(CFU/ML)	(CFU/ML)
FOMW-1	6/8/00	--	< 0.5	< 0.5	< 0.5	< 1	< 5	< 50	J 1200	360	230	< 0.01	390	4000
FOMW-2	6/8/00	--	< 0.5	< 0.5	< 0.5	< 1	< 5	< 50	< 50	250	150	< 0.01	1	110
FOMW-3	6/8/00	--	< 0.5	< 0.5	< 0.5	< 1	< 5	< 50	J 1200	330	190	< 0.01	440	110000
FOMW-3	6/8/00	1	< 0.5	< 0.5	< 0.5	< 1	< 5	< 50	J 1100	330	180	< 0.01	50	8000

Notes:

TPH - Total extractable petroleum hydrocarbons
B T E X - Benzene, Toluene, Ethylbenzene, Total Xylenes
MTBE - Methyl t-butyl ether
1: Duplicate sample
J - Bunker-C detections were quatitated against the diesel standard and flagged as estimated concentrations
< - Analyte not detected above indicated method detection limit
-- - Not analyzed/Not available.



Source: USGS, Oakland West Quadrangle, California, 7.5 Minute Series Topographic, 1959 (photorevised, 1980)

N

SITE LOCATION MAP

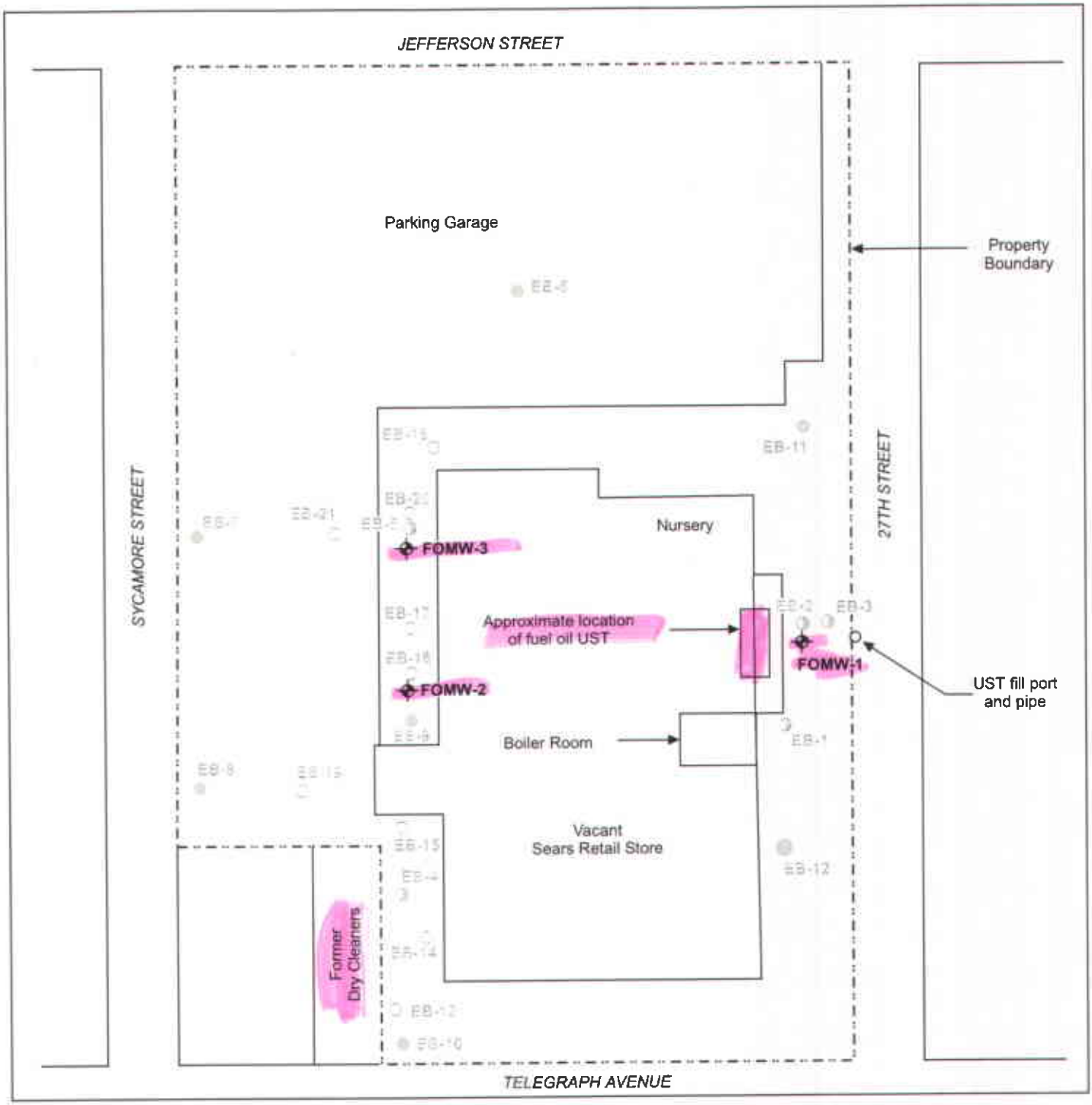
Sears Roebuck & Company
Soil & Groundwater Evaluation
Oakland, California

February 2000
00188-248-170

URS

FIGURE 1

1/25/00 sv ..\00188-248\slm.cdr



LEGEND

- Approximate location of exploratory boring (Lowney, May 1998)
- Approximate location of exploratory boring (Lowney, April 1998)
- Approximate location of exploratory boring (SECOR, November 1998)
- Fuel oil monitoring well locations (URS/Dames & Moore)

NOTES

(1) Soil and groundwater analytical results presented in tables 1 through 5.

Reference: Lowney Associates (1998)
SECOR (1998)

N

0 100

Approximate Scale in Feet

SITE PLAN SHOWING BORING AND MONITORING WELL LOCATIONS

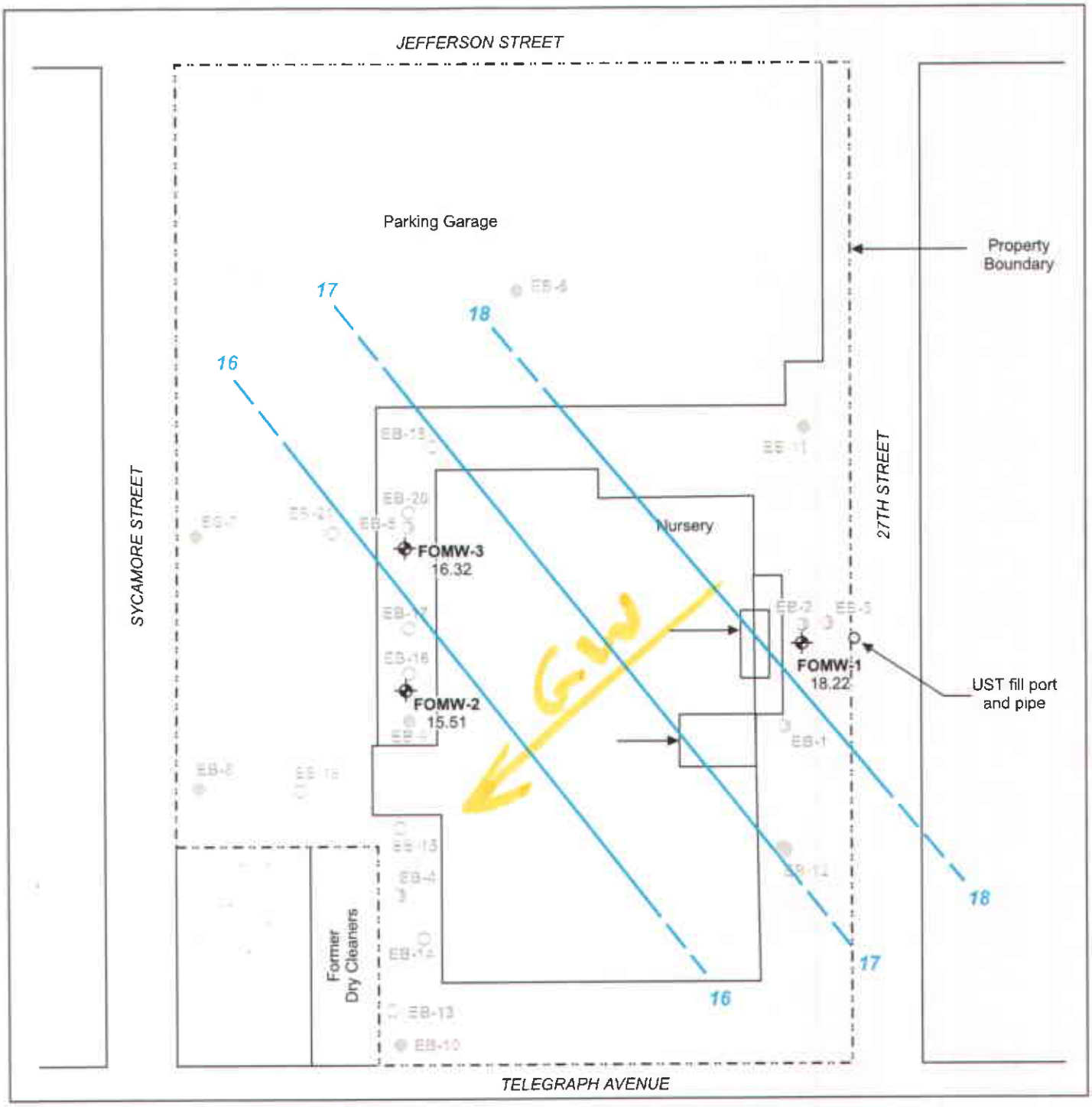
Sears Roebuck & Company
Site Assesment
Oakland, California

August 2000
00188-248-170

URS Dames & Moore

FIGURE 2

8/25/00 sv ..\00188-248\Aug spbmw.cdr



LEGEND

- Approximate location of exploratory boring (Lowney, May 1998)
- Approximate location of exploratory boring (Lowney, April 1998)
- Approximate location of exploratory boring (SECOR, November 1998)
- Fuel oil monitoring well locations (URS/Dames & Moore)
- 15.51 Water level measurements in feet above Mean Sea Level Datum (MSLD)
- 16 Groundwater contours for June, 2000 in feet above Mean Sea Level Datum (MSLD)

Reference: Lowney Associates (1998)
SECOR (1998)

0 100
Approximate Scale in Feet

NOTES

(1) Soil and groundwater analytical results presented in tables 1 through 5.

2000 SECOND QUARTER GROUNDWATER LEVELS AND CONTOURS

Sears Roebuck & Company
Site Assessment
Oakland, California

August 2000
00188-248-170

URS Dames & Moore

FIGURE 3

8/25/00 sv ..\00188-248\glc.cdr

APPENDIX A

UST IN-PLACE CLOSURE REPORT

Original

February 22, 1999

Mr. Steve Crawford
City of Oakland, Fire Prevention Bureau
250 Frank Ogawa Plaza, Suite 3341
Oakland, California 94612-2032

RE: UST In-Place Closure
Former Retail Center
2633 Telegraph Avenue
Oakland, California
D&M Job No. 00188-248-128
For Sears, Roebuck and Co.

Dear Mr. Crawford:

INTRODUCTION

This letter report has been prepared by Dames & Moore on behalf of Sears, Roebuck and Co. (Sears) to document the in-place closure of a 10,000-gallon fuel-oil underground storage tank (UST) at 2633 Telegraph Avenue, Oakland, California. The site consists of a vacant four-story former Sears retail store that was built in 1930. The property is currently owned by Haagen Company, LLC (Haagen). The in-place closure activities were conducted by Foss Environmental, as a subcontractor to Dames & Moore, in accordance with Closure Permit #94-98 obtained from the City of Oakland Fire Prevention Bureau (attached). The following attachments have been included in this report to document the closure activities:

- Tank Closure Permit #94-98
- Photo Log of Site Activities
- Non-Hazardous Water Transport Form (for water disposal).
- Bill of Lading (for water disposal).
- Soil Inventory Form (for excavated soil).

- Invoice for Sand Concrete Slurry (for UST backfill).

TANK DESCRIPTION

The UST is constructed of single-walled steel with product piping that extends into a nearby basement of the retail center. The top of the UST is present beneath the loading dock of the store; approximately 25 to 30 feet below grade. It is accessible through an opening in the loading dock where a 5 feet by 5 feet shaft extends down to the UST. The UST capacity is 10,000 gallons and is contained in a concrete vault estimated to be about 10 feet high and 30 feet long. Most of the annular space, between the vault and UST, had previously been filled with a sand slurry. In addition, the vault has filled with groundwater. The product piping was previously capped and sealed.

SCOPE OF WORK

In-place closure of the UST was conducted by Foss Environmental (a state-licensed contractor with hazardous waste certification), and field activities were supervised by a California Registered Geologist (Taras B. Kruk, R.G. # 5681) from Dames & Moore. The scope of work included the following tasks:

- Obtained an in-place UST abandonment permit from the City of Oakland Fire Prevention Bureau.
- Prepared a site-specific health and safety plan for the in-place abandonment.
- Hand-excavated soil in the vault and shaft above the UST manhole.
- Pumped groundwater from the vault to access the UST.
- Pumped liquids (oily water) from the UST.
- Triple-rinsed the inside of the UST.

- Pumped out rinsate from the UST.
- Filled the UST with a concrete sand slurry.
- Disposed of fluids removed from the UST and vault.
- Prepared this letter report.

FOSS conducted site operations starting Thursday October 29, 1998 and ending Wednesday December 2, 1998. In accordance with permit requirements, Mr. John Holderman of Foss Environmental gave advanced notification of closure activities to Mr. Leroy Griffin of the Oakland Fire Prevention Bureau. The closure process consisted of accessing the UST by exposing and opening a manhole, assembling a heat exchange unit above the UST, removing and disposing of the UST contents, cleaning out the UST, and filling the UST with a sand concrete slurry. In order to expose the manhole, about 4 feet of oily soil located in the shaft was hand-excavated (about 2-1/2 cubic yards lifted to the surface) and about 500 gallons of oily water was pumped from the shaft and vault. About 10,000 gallons of oily water was then pumped from the UST. The UST was then triple-rinsed and an additional 1,500 gallons of rinsate water removed. Once the UST was empty, the UST was filled with a sand concrete slurry (see attached invoices for backfill confirmation).

WASTE MANAGEMENT

The 2-1/2 cubic yards of hand-excavated soil were placed in three "tri-wall" containers and the oily water was pumped into a holding tank that was brought on site. The oily water and rinsate were transported with a Non-Hazardous Water Transport Form and bills of lading (attached) to Seaport Environmental in Redwood City, California for treatment and recycling. The three "tri-wall" containers remain on site for future pickup by Clean Harbors, Inc. (see attached inventory).

CONCLUSIONS AND RECOMMENDATIONS

To date, the UST has been closed in place in accordance with the permit requirements. Subsurface soils and groundwater surrounding the UST, however, have yet to be investigated. Based on the results of a previous investigation, conducted by Lowney Associates on behalf of Haagen (Phase I Environmental Site Assessment and Soil and Ground Water Quality Evaluation report dated April 21, 1998), subsurface soils and groundwater around the UST are possibly impacted by fuel oil. Consequently, Dames & Moore personnel have contacted Ms. Medula Logan of the Alameda County Environmental Health Department (ACEHD) for guidance to obtain closure for the UST. On the basis of our findings and discussions with Ms. Logan, Dames & Moore recommends that the matter be referred to the California Regional Water Quality Control Board local oversight program under jurisdiction of the ACEHD. The next phase of work would be a subsurface soil and groundwater assessment under regulatory oversight of the ACEHD.

-o0o-

We appreciate your attention to this matter. Please feel free to contact Mr. John Holderman of Foss Environmental at (510) 749-4135 or Mr. Taras Kruk of Dames & Moore at (714) 433-2000 if you have any questions or comments.

Very truly yours,
DAMES & MOORE

Taras B. Kruk, R.G., C.HG.
Project Manager

w/Attach.

cc: Scott M. DeMuth, Sears, Roebuck and Co.
Mr. Tim Lester, Environmental Equalizers

0215SCRA.doc

Tank Closure Permit #94-98

City Of Oakland
FIRE PREVENTION BUREAU

250 Frank Ogawa Plaza, Ste. 3341
Oakland California 94612-2032
510-238-3851

Permit To Excavate And Install, Repair, Or Remove Inflammable Liquid Tanks

Oakland, California July 20, 1998

Tank Permit Number: 94-98

Permission Is Hereby Granted To:

Close In Place fuel oil **Tank And Excavate Commencing:** **Feet Inside:** property **Line.**

On The: south side of 27th St., 220 feet west of Telegraph AVe.

Site Address: 2633 Telegraph Ave. **Present Storage:**

Owner: Haagen Hollywood Partnership **Address:** 3500 Sepulveda Blvd. **Phone:** (310) 546-4540

Applicant: Foss Environmental Services Co. **Address:** 1605 Ferry Pt., Alameda, 94501-5021 **Phone:** (510) 749-1390

Dimensions Of Street (sidewalk) Surface To Be Disturbed : X **No. Of Tanks** 1 **Capacity** 7000 **Gallons, Each**

Remarks UST located approximately 23 feet beneath loading dock

---

This Permit Is Granted In Accordance With Existing City Ordinances. Owner Hereby Agrees To Remove Tanks On Discontinuance Of Use Or When Notified By The City Authorities When Installing, Removing Or Repairing Tanks, No Open Flame To Be On Or Near Premises.

CERTIFICATE OF TANK AND EQUIPMENT INSPECTION

Type Of Inspection:

Inspected And Passed On:

By:

Approved: JERRY E. BLUEFORD
Fire Marshal

UST/AST Installations/modifications:

Pressure Test: Inspected By: **Date:**

Primary Piping Test: Inspected By: **Date:**

Inspection Fee Paid: $

Received By:

Secondary Containment & Sump Testing:

Inspected By: **Date:**

Final: Inspected By: **Date:**

Before Covering Tanks, Above Certification Must Be Signed When Ready For Inspection Notify Fire Prevention Bureau 238-3851

THIS PERMIT MUST BE LEFT ON THE WORK SITE AS AUTHORITY THEREFORE

Shaft Access to UST

Hand Excavation and Dewatering

UST Vault Interior

"Tri-Wall" Containing Excavated Soil

Non-Hazardous Water Transport Form
(for water disposal)

NON-HAZARDOUS WATER TRANSPORT FORM

GENERATOR INFORMATION

Sears & Robuck
2633 Telegraph Avenue
OaklandCa

CUSTOMER INFORMATION

Foss Environmental Services

PO # A8791-09

DESCRIPTION OF WATER: Tank Cleaning

NON-HAZARDOUS WASTE WATER, MONITORING WELL PURGE WATER AND/OR AUGER RINSATE, TANK RINSATE OR ABOVE DESCRIBED WATER. THIS WATER MAY CONTAIN DISSOLVED HYDROCARBONS."I CERTIFY THAT THE ABOVE NAMED MATERIAL IS A LIQUID EXEMPT FROM RCRA PER 40 CFR 261.4 (b)(10)AND DOES NOT MEET THE CRITERIA OF HAZARDOUS WASTE AS DESCRIBED IN 22 CCR ARTICLE 11 OR ANY OTHER APPLICABLE STATE LAW, HAS BEEN PROPERLY DESCRIBED, CLASSIFIED AND PACKAGED AND IS IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO APPLICABLE REGULATIONS.

Generator/Authorised Agent — Sign — 11-30-98 date

SITE INFORMATION

2633 Telegraph Avenue
Oakland
Ca

GROSS	
TARE	
NET	
TOTAL GALLONS	2500

Calculated at 8.34lbs per USG

TRANSPORTER INFORMATION

Foss Environmental

Truck ID: 2011/3028

Driver: R.A. Nobles 11-30-98
Print full name & sign — date

TIME OUT	6:03
TIME IN	5:34
TIME SPENT	29 min

DISPOSAL FACILITY INFORMATION

Seaport Environmental
675 Seaport Boulevard
Redwood City, Ca 94063
Phone: (650) 364 1024

Approval Number: 801 - 345

Solids %Wt | pH

Solids Surcharge ¢/USG

Received by: Javier Valdez 11-30-98
Print full name & sign — date

M 17 11

Bill of Lading
(for water disposal)

954572/028750

3-PART STOCK FORM NO. B-3876

STRAIGHT BILL OF LADING— SHORT FORM

ORIGINAL — NOT NEGOTIABLE

Shipper's No. _____

Carrier's Name: Foss Env

Carrier's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of lading.

at 5:00pm (Date) Nov 5 19 98 FROM Sear's UST, 27th St

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in the Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned TO Trident Management Inc (Mail or street address for purposes of notification only.)

On Collect on Delivery Shipments, the letters "COD" must appear before consignee's name or as otherwise provided in Item 430, Sec. 1.

Destination 1605 Ferry Pt Street Alameda City

County CA State 9450 Zip

Route Delivery Address ★

(★To be filled in only when shipper desires and governing tariffs provide for delivery thereat.)

Delivering Carrier Foss Env Car or Vehicle Initials and No. _____

Collect on Delivery $ _____ And Remit to _____

Street _____ City _____ State

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

Mark Sun

(Signature of consignor.)

C. O. D. Charges to be Paid by ☐ Shipper ☐ Consignee

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Received $ _____ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____

(The signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ _____

† "The fibre containers used for this shipment conform to the specifications set forth in the box maker's certificate thereon, and all other requirements of Rule 41 of the Uniform Freight Classification and Rule 6 of the National Motor Freight Classification."

† Shipper's imprint in lieu of stamp; not a part of bill of lading approved by the Interstate Commerce Commission.

No. Packages	H.M.	Kind of Package, Description of Articles, Special Marks, and Exceptions	*Weight (Subject to Correction)	Class or Rate	Check Column
001		Tanker Truck	4700gal		
		oily water (oil < 1%)			
		PO 8791-08 / 50500			

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.

NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

J. Ch. ERD for Sears Shipper, Per 11/5/98

Permanent post-office address of shipper,

J. Ch. ERD (Foss) Agent

Per 11/5/98

1

954572/02B750

3-PART STOCK FORM NO. B-3876

STRAIGHT BILL OF LADING— SHORT FORM

ORIGINAL – NOT NEGOTIABLE

Shipper's No. _____

Carrier's Name: Foss Env.

Carrier's No. _____

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of lading,

at 2:00 pm (Date) Nov. 5 19 98 FROM Sears UST, 27th St

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in the Uniform Freight Classification in effect on the date hereof, if this is a rail or rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address for purposes of notification only.)

Consigned TO Trident Mgmt.

On Collect on Delivery Shipments, the letters "COD" must appear before consignee's name or as otherwise provided in Item 430, Sec. 1.

Destination _____ Street 1605 Ferry Pt City Alameda

County _____ State CA Zip 94501

Route _____ Delivery Address★ _____

(★To be filled in only when shipper desires and governing tariffs provide for delivery thereat.)

Delivering Carrier Foss Env. Car or Vehicle Initials and No. _____

Collect on Delivery $ _____ And Remit to _____

Street _____ City _____ State _____

No. Packages	H.M.	Kind of Package, Description of Articles, Special Marks, and Exceptions	*Weight (Subject to Correction)	Class or Rate	Check Column
0001		Tanker Truck	5,000 gal		
		oily Water (oil < 1%)			
		P.O. A8791-08/50200			

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.
NOTE — Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

/s/ [illegible] for Sears Shipper, Per 11/5/98

Permanent post-office address of shipper.

/s/ [illegible] (Foss) Agent

Per 11/5/98

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

/s/ [illegible]
(Signature of consignor.)

C. O. D. Charges to be Paid by
☐ Shipper ☐ Consignee

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Received $ _____ to apply in prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(The signature here acknowledges only the amount prepaid.)

Charges Advanced:

$ _____

† "The fibre containers used for this shipment conform to the specifications set forth in the box maker's certificate thereon, and all other requirements of Rule 41 of the Uniform Freight Classification and Rule 5 of the National Motor Freight Classification."
† Shipper's imprint in lieu of stamp; not a part of bill of lading approved by the Interstate Commerce Commission.

Soil Inventory Form
(for excavated soil)

DAMES & MOORE DRUMMED MATERIAL INVENTORY FORM
SEARS LIFT REMOVAL PROJECTS

Store No. (no #) Address/City/State/Zip 2633 Telegraph Avenue, Oakland, CA 94612

Sears Facility Contact and Phone # Mr. Tim Lester of Environmental Equalizers (760 744 0679)

Dames & Moore Local Representative/Phone # Mr. John Holderman of Foss Environmental (510 749 4135)

Dames & Moore Project Manager/Phone # Taras Kruk (714 433 2390 #346)

Total No. of Drums 3 Accumulation Start Date 10/30/98

Drum Storage Location Loading dock area, south side of 27th Street, 220 feet west of Telegraph Ave.

Contents	# of Drums	Drum ID (A,B,C)	Lid Type (Open or Bung) (O or B)	Label Type Hazardous, Non-Hazardous, Unclassified (H/N/U)	Drum Description: Color, Condition, Size
Fuel Oil					
Fuel Oil/Water Mixture					
Fuel Oil Impacted Purge Water					
Fuel Oil Impacted Sludge					
Fuel Oil Impacted Debris					
Fuel Oil Impacted Soil	3	A, B, C	—	N	Gray; Rectangular "Tri-Wall" Containers; New; 1 cu yd
Other:					

NOTE: **All drums must be labeled with: (1) A short description of the contents; (2) the date of generation; and (3) a unique drum ID (e.g., A,B,C, etc.).**

Invoice for Sand Concrete Slurry
(for UST backfill)

RIGHT AWAY REDY MIX, INCORPORATED

401 Kennedy Street, Oakland, CA 94606-5321 • (510) 536-1900
30100 Union City Blvd., Union City, CA 94587-1512 • (510) 489-0515
5501 Imhoff Drive, Martinez, CA 94553-4391 • (925) 682-1700
501 El Charro Road, Pleasanton, CA 94588-9617 • (925)443-2300
Business Office: 725 Julie Ann Way, Oakland, CA 94621-4037 • (510) 632-0602
Dispatcher 1-800-696-0515

INVOICE 370902

CAUTION

May cause eye or skin injury. Contains portland cement. Freshly mixed cement, mortar, concrete, or grout may cause skin injury.

TAKE THESE PRECAUTIONS:

1. Avoid all contact with eyes.
2. Wear rubber boots and gloves, and avoid prolonged contact directly with skin or through porous materials.
3. In case of contact with skin or eyes, FLUSH THOROUGHLY WITH WATER.
4. If irritation persists, get medical attention promptly.
5. Keep children away.
6. WARNING: THIS PRODUCT CONTAINS ONE OR MORE CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

TERMS & CONDITIONS

By accepting delivery buyer agrees to the following terms:
ALL ORDERS ARE FOR STREET CURB DELIVERY; buyer will assume all responsibility for any damage where delivery is made inside the curb;
A clean out area must be provided and buyer assumes responsibility for cleaning street;
All charge balances due by the 10th day of the month following date of purchase;
A service charge of 1-1½% per month will be charged on all past due balances;
Quoted rate valid only if account payments remain current;
All COD orders cash only unless prior verification of check; there is a $15.00 service charge on all returned checks;
NOTICE TO PROPERTY OWNER: DO NOT rely upon this invoice as proof of payment;
Please read mechanic's lien law notice on back of invoice;
Reasonable attorney fees to be allowed in the event of any legal proceeding arising out of a breach of this agreement.

Received by _____

Print name _____ Driver License # _____

000247

CUSTOMER ID	P.O. NUMBER	TERMS	JOB NUMBER	BATCH TIME	DATE	INVOICE
~~931464~~		COD		9:21AM	2Dec98	370902

SOLD TO	DELIVER TO	WATER ADDED: GALLONS -1	INITIAL
FOSS ENVIRONMENTAL	27TH & TELEGRAPH OAKLAND AT SEARS BLDG.		

QUANTITY THIS LOAD	QUANTITY ORDERED	QUANTITY DELIVERED	PRODUCT CODE	PRODUCT DESCRIPTION	UNIT OF MEASURE	UNIT PRICE	EXTENDED PRICE
7.00	50.00	34.00	239	49K SAND PUMP	CY		

TRUCK	DRIVER	PLANT	DUE AT JOB	STAND-BY CONDITIONS:	INITIAL
16	JIM	1	ASAP	4 MINUTES PER YARD; $1.00 PER MINUTE IN EXCESS.	

ARRIVE JOB	STAND-BY START	START POUR	FINISH POUR	LEFT JOB	TOTAL MINUTES	TIME ALLOWED	STAND-BY TIME	ARRIVE PLANT
940			1040	1040				

TAX	
SUB TOTAL	
STAND-BY TIME	0
TOTAL	

SPECIAL INSTRUCTIONS

RACP 308

WEIGHMASTER'S CERTIFICATE OF WEIGHT AND MEASURE

THIS IS TO CERTIFY that the described commodity was weighed, measured or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professionals Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

By NILL HO Weighed at OAKLAND

Right Away Redy Mix Weighmaster

RIGHT AWAY REDY MIX, INCORPORATED

401 Kennedy Street, Oakland, CA 94606-5321 • (510) 536-1900
30100 Union City Blvd., Union City, CA 94587-1512 • (510) 489-0515
5501 Imhoff Drive, Martinez, CA 94553-4391 • (925) 682-1700
501 El Charro Road, Pleasanton, CA 94588-9617 • (925)443-2300
Business Office: 725 Julie Ann Way, Oakland, CA 94621-4037 • (510) 632-0602
Dispatcher 1-800-696-0515

INVOICE

370906

CAUTION

May cause eye or skin injury. Contains portland cement. Freshly mixed cement, mortar, concrete, or grout may cause skin injury.

TAKE THESE PRECAUTIONS:

1. Avoid all contact with eyes.
2. Wear rubber boots and gloves, and avoid prolonged contact directly with skin or through porous materials.
3. In case of contact with skin or eyes, FLUSH THOROUGHLY WITH WATER.
4. If irritation persists, get medical attention promptly.
5. Keep children away.
6. WARNING: THIS PRODUCT CONTAINS ONE OR MORE CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

TERMS & CONDITIONS

By accepting delivery buyer agrees to the following terms:
ALL ORDERS ARE FOR STREET CURB DELIVERY; buyer will assume all responsibility for any damage where delivery is made inside the curb;
A clean out area must be provided and buyer assumes responsibility for cleaning street;
All charge balances due by the 10th day of the month following date of purchase;
A service charge of 1-1½% per month will be charged on all past due balances;
Quoted rate valid only if account payments remain current;
All COD orders cash only unless prior verification of check; there is a $15.00 service charge on all returned checks;
NOTICE TO PROPERTY OWNER: DO NOT rely upon this invoice as proof of payment;
Please read mechanic's lien law notice on back of invoice;
Reasonable attorney fees to be allowed in the event of any legal proceeding arising out of a breach of this agreement.

Received by _____

Print name _____ Driver License # _____

CUSTOMER ID	P.O. NUMBER	TERMS	JOB NUMBER	BATCH TIME	DATE	INVOICE
0002847		CHG		1013AM	2Dec90	370906

SOLD TO	DELIVER TO	WATER ADDED: GALLONS	INITIAL
FOSS ENVIRONMENTAL	27TH & TELEGRAPH OAKLAND AT SEARS BLDG.		

QUANTITY THIS LOAD	QUANTITY ORDERED	QUANTITY DELIVERED	PRODUCT CODE	PRODUCT DESCRIPTION	UNIT OF MEASURE	UNIT PRICE	EXTENDED PRICE
9.00	50.00	43.00	239	4SK SAND PUMP	Y		
1.00			998	VIBRATOR RENTAL			

TRUCK	DRIVER	PLANT	DUE AT JOB	STAND-BY CONDITIONS:	INITIAL
49	BILL A.	1	ASAP	4 MINUTES PER YARD; $1.00 PER MINUTE IN EXCESS.	

ARRIVE JOB	STAND-BY START	START POUR	FINISH POUR	LEFT JOB	TOTAL MINUTES	TIME ALLOWED	STAND-BY TIME	ARRIVE PLANT
10:10	10:40	10:40	11:10	11:10	30	26	4	

TAX	
SUB TOTAL	
STAND-BY TIME	
TOTAL	

SPECIAL INSTRUCTIONS

RACP

WEIGHMASTER'S CERTIFICATE OF WEIGHT AND MEASURE

THIS IS TO CERTIFY that the described commodity was weighed, measured or counted by a weighmaster, whose signature is on this certificate, who is a recognized authority of accuracy, as prescribed by Chapter 7 (commencing with Section 12700) of Division 5 of the California Business and Professionals Code, administered by the Division of Measurement Standards of the California Department of Food and Agriculture.

By BILL [illegible] Weighed at OAKLAND

APPENDIX B

CITY OF OAKLAND PUBLIC WORKS DEPARTMENT DRILLING PERMIT

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
933 ELMHURST ST, HAYWARD, CA, 94544
MARLON MAGALLANES
510.782.1939 (FAX)
510. 670.5554 (PHONE)

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT FORMER SEARS RETAIL CENTER
2633 TELEGRAPH AVE
OAKLAND CA

CLIENT
Name SEARS - Dept. 766K/BK-262
Address 3333 BEVERLY RD Phone
City HOFFMAN, IL 60179 Zip

APPLICANT
Name RYAN SEELBACH - DAMES & MOORE Fax 415.882.9261
Address 221 MAIN ST. #600 Phone 415.243.2857
City SAN FRANCISCO. Zip 94105

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	( )	General	( )
Water Supply	( )	Contamination	( )
Monitoring	(X)	Well Destruction	( )

PROPOSED WATER SUPPLY WELL USE

New Domestic	( )	Replacement Domestic	( )
Municipal	( )	Irrigation	( )
Industrial	( )	Other	( )

DRILLING METHOD:

Mud Rotary	( )	Air Rotary	( )	Auger	(X)
Cable	( )	Other	( )		

DRILLER'S LICENSE NO. C-485165

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 4 in. Depth 50 ft.
Surface Seal Depth 10 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings Maximum
Hole Diameter in. Depth ft.

ESTIMATED STARTING DATE 5/18/00
ESTIMATED COMPLETION DATE 5/19/00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Ryan Seelbach DATE 5/9/00

FOR OFFICE USE

PERMIT NUMBER W00-224
WELL NUMBER
APN

PERMIT CONDITIONS
Circled Permit Requirements Apply

(A) GENERAL
(1) A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2) Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources — WELL COMPLETION REPORT —
(3) Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

(C) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED Frank L. Codd DATE 5/11/00

TOTAL P.01

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 ELMHURST ST. HAYWARD, CA 94544
PHONE ( ) MARLON MAGALLANES
510.782-1939 (FAX)
510. 670.5554 (PHONE)

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT FORMER SEARS RETAIL CENTER
2633 TELEGRAPH AVE
OAKLAND CA

CLIENT
Name SEARS - Dept. 766K/BX-262
Address 3333 BEVERLY RD Phone
City HOFFMAN, IL 60179 Zip

APPLICANT
Name RYAN SEELBACH - DAMES & MOORE Fax 415.882.9261
Address 221 MAIN ST. 9th Phone 415.243.7837
City SAN FRANCISCO. Zip 94105

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	[ ]	General	[ ]
Water Supply	[ ]	Contamination	[ ]
Monitoring	[X]	Well Destruction	[ ]

PROPOSED WATER SUPPLY WELL USE

New Domestic	[ ]	Replacement Domestic	[ ]
Municipal	[ ]	Irrigation	[ ]
Industrial	[ ]	Other	[ ]

DRILLING METHOD:

Mud Rotary	[ ]	Air Rotary	[ ]	Auger	[X]
Cable	[ ]	Other	[ ]		

DRILLER'S LICENSE NO. C-485165

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 4 in. Depth 50 ft.
Surface Seal Depth -10 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings Maximum
Hole Diameter in. Depth ft.

ESTIMATED STARTING DATE 5/18/00
ESTIMATED COMPLETION DATE 5/19/00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Ryan Seelbach DATE 5/9/00

FOR OFFICE USE

PERMIT NUMBER WO0-229
WELL NUMBER
APN

PERMIT CONDITIONS
Circled Permit Requirements Apply

(A.) GENERAL.
(1.) A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2.) Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources WELL COMPLETION REPORT
(3.) Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED Frank J. Cadd DATE 5/2/00

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
399 ELMHURST ST. HAYWARD, CA 94544
PHONE MARLON MAGALLANES
510.782-1939 (FAX)
510. 670.5554 (PHONE)

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT FORMER SEARS RETAIL CENTER
2633 TELEGRAPH AVE
OAKLAND CA

CLIENT
Name SEARS - Dept. 766K/BX-262
Address 3333 BEVERLY RD Phone
City HOFFMAN, IL 60179 Zip

APPLICANT
Name RYAN SEELBACH - DAMES & MOORE Fax 415.882.9261
Address 221 MAIN ST. #600 Phone 415.243.3857
City SAN FRANCISCO Zip 94105

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	[ ]	General	[ ]
Water Supply	[ ]	Contamination	[ ]
Monitoring	[X]	Well Destruction	[ ]

PROPOSED WATER SUPPLY WELL USE

New Domestic	[ ]	Replacement Domestic	[ ]
Municipal	[ ]	Irrigation	[ ]
Industrial	[ ]	Other:	[ ]

DRILLING METHOD:

Mud Rotary	[ ]	Air Rotary	[ ]	Auger	[X]
Cable	[ ]	Other	[ ]		

DRILLER'S LICENSE NO. C-485165

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2 in. Depth 50 ft.
Surface Seal Depth 20 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings ____ Maximum
Hole Diameter ____ in. Depth ____ ft.

ESTIMATED STARTING DATE 5/18/00
ESTIMATED COMPLETION DATE 5/19/00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Ryan Seelbach DATE 5/9/00

FOR OFFICE USE

PERMIT NUMBER W00-230
WELL NUMBER
APN

PERMIT CONDITIONS
Circled Permit Requirements Apply

(A.) GENERAL.
(1.) A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2.) Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources – WELL COMPLETION REPORT –
(3.) Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED Frank L Cedd DATE 5-12-00

APPENDIX C

LOG OF MONITORING WELL BORINGS

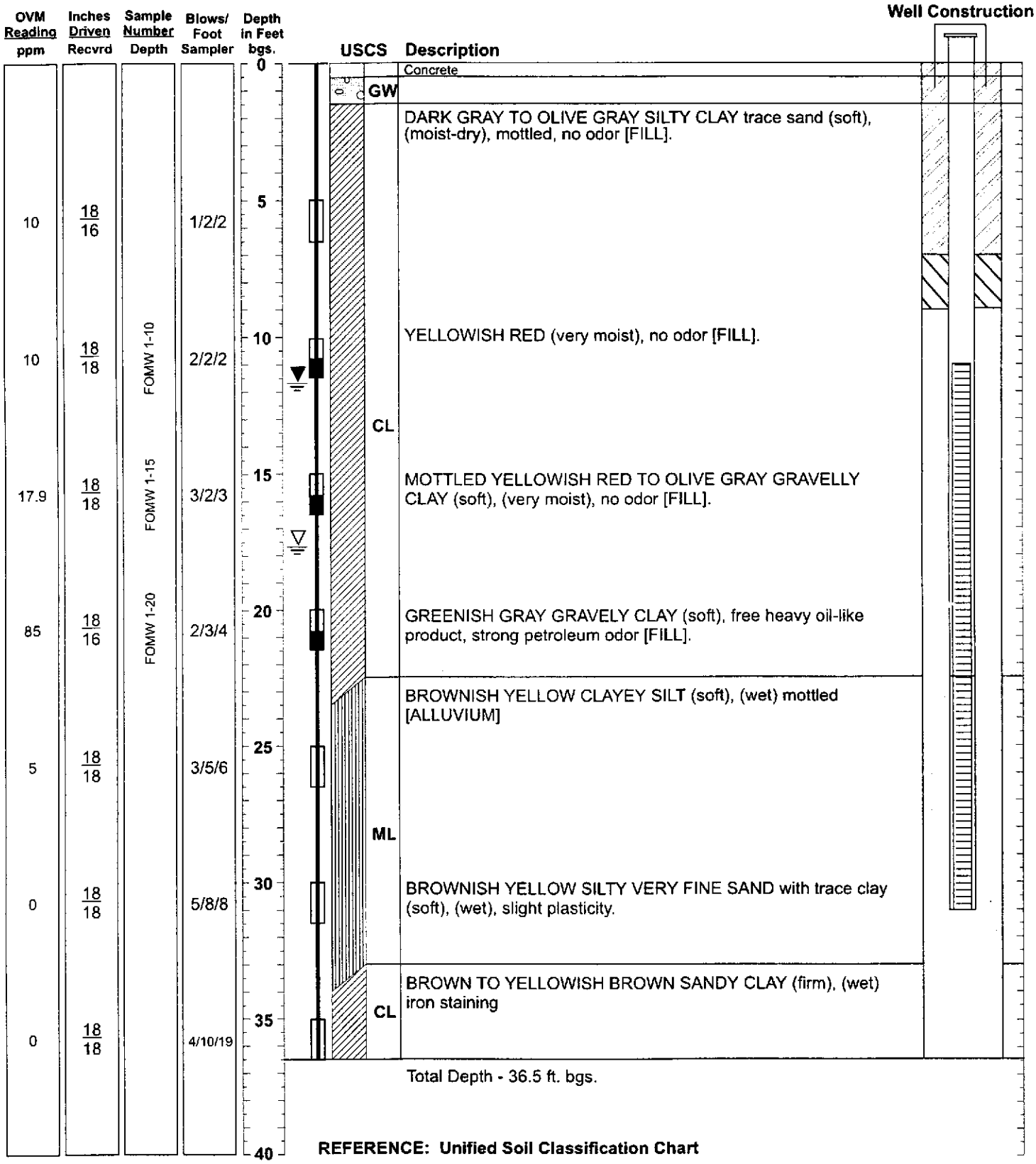
SITE ID: FOMW-1

URS

Project Name: Sears
Project Number: 00188-248-128
Location: Oakland, CA
Date(s) Drilled: 05/18/00
Elevation: NA
Drilling Method: Hollow Stem Auger
Drill Rig: D-5

Borehole Dia.: 10"
Sampler Type: CA
Annular Fill
Type: Grout fm: 0.00' to: 7.00'
Type: Bentonite fm: 7.00' to: 9.00'
Type: Gravel fm: 9.00' to: 31.00'

Blank Casing
Type: PVC Dia: 4.00" Sch: 40
Screens
Type: Slotted Size: .010" fm: 11.00' to 31.00'



Total Depth - 36.5 ft. bgs.

REFERENCE: Unified Soil Classification Chart

8/25/00 sv ..\00188-136\FOMW-1.cdr

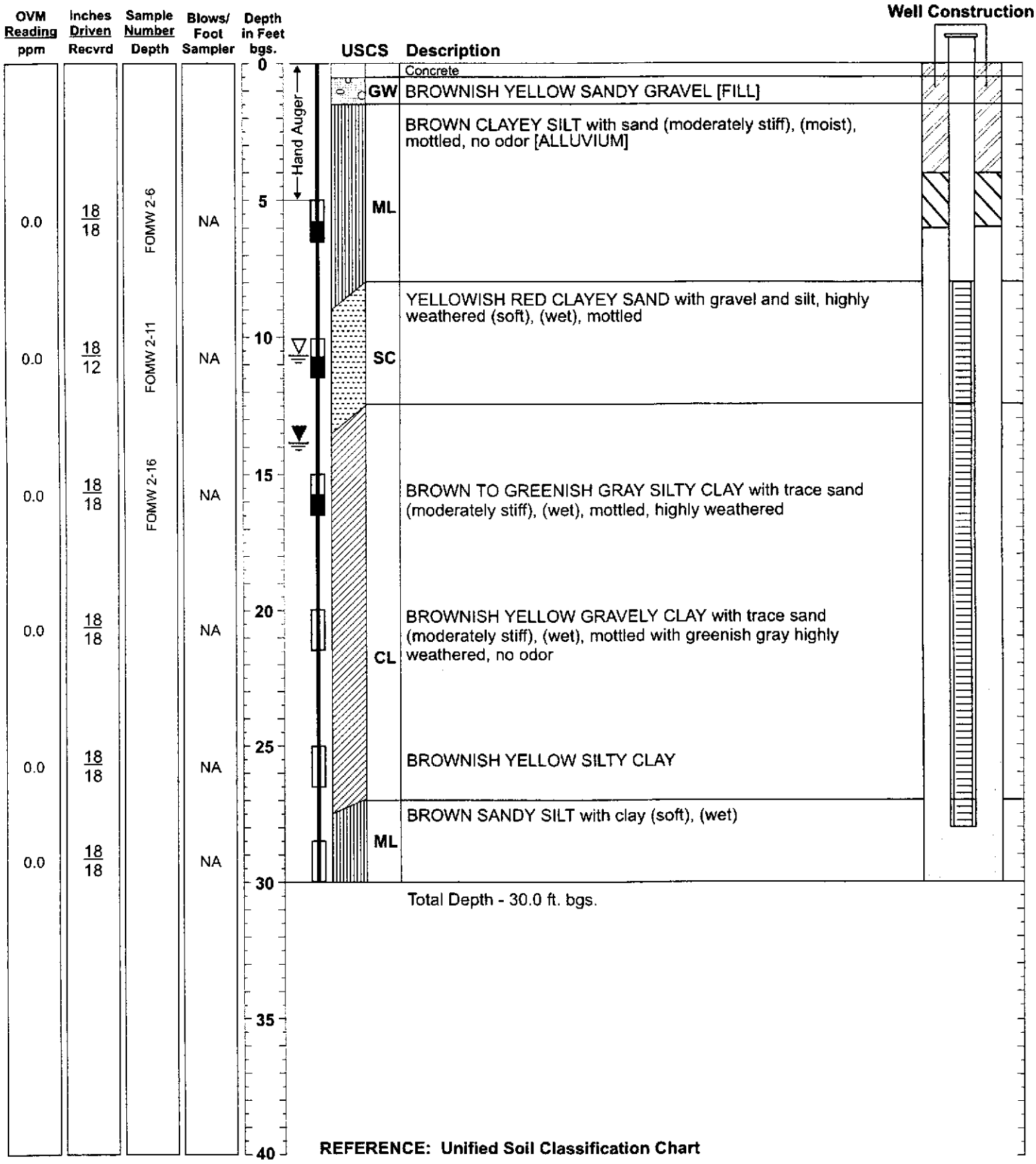
SITE ID: FOMW-2

URS

Project Name: Sears
Project Number: 00188-248-128
Location: Oakland, CA
Date(s) Drilled: 05/19/00
Elevation: NA
Drilling Method: Hollow Stem Auger
Drill Rig: Limited Access

Borehole Dia.: 8"
Sampler Type: CA
Annular Fill
Type: Grout fm: 0.00' to: 4.00'
Type: Bentonite fm: 4.00' to: 6.00'
Type: Gravel fm: 6.00' to: 28.00'

Blank Casing
Type: PVC Dia: 2.00" Sch: 40
Screens
Type: Slotted Size: .010" fm: 8.00' to 28.00'



Total Depth - 30.0 ft. bgs.

REFERENCE: Unified Soil Classification Chart

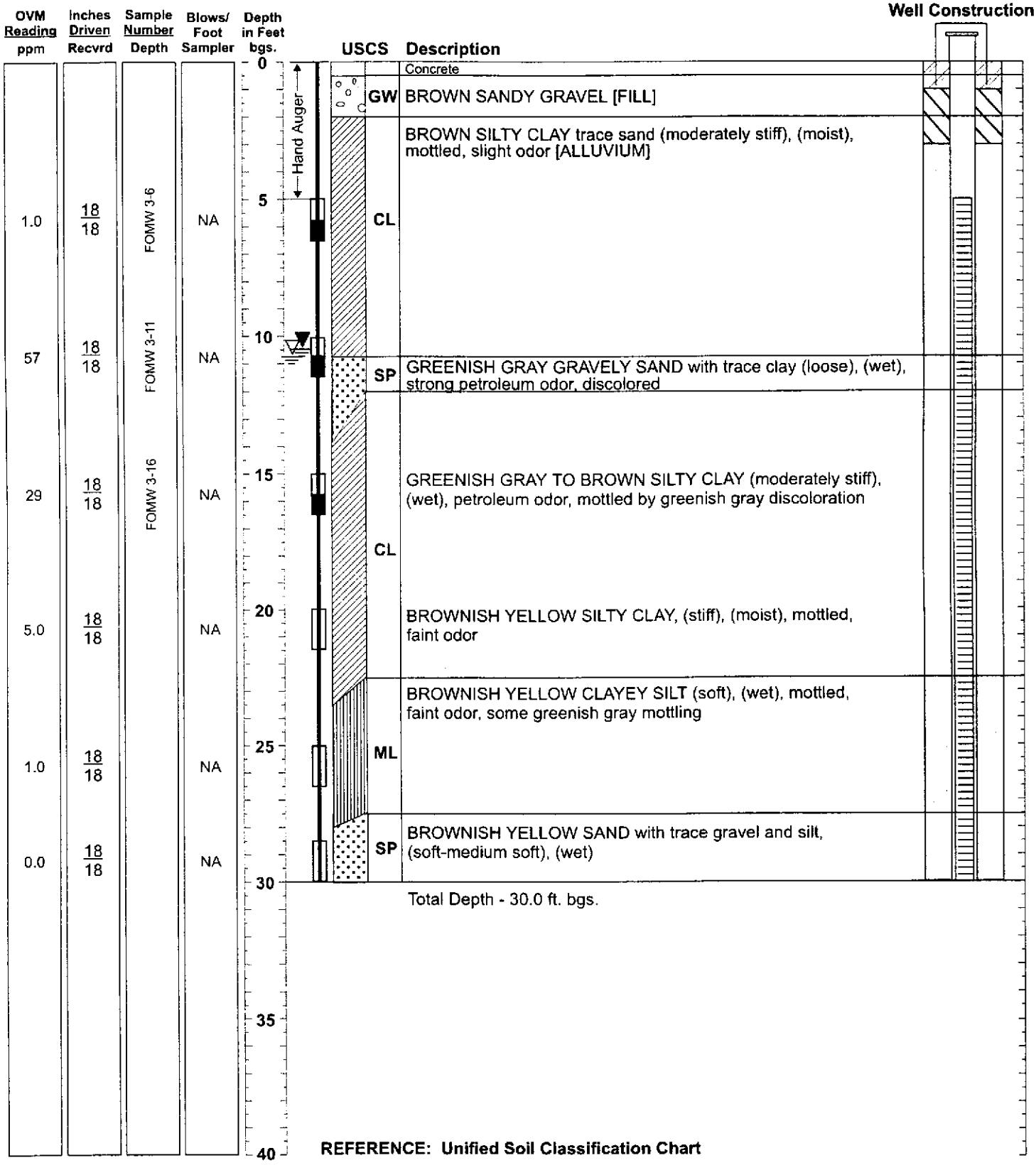
8/25/00 sv ..\00188-136\FOMW-2.cdr

SITE ID: FOMW-3 — URS

Project Name: Sears
Project Number: 00188-248-128
Location: Oakland, CA
Date(s) Drilled: 05/19/00
Elevation: NA
Drilling Method: Hollow Stem Auger
Drill Rig: Limited Access

Borehole Dia.: 8"
Sampler Type: CA
Annular Fill
Type: Grout fm: 0.00' to: 1.00'
Type: Bentonite fm: 1.00' to: 3.00'

Blank Casing
Type: PVC Dia: 2.00' Sch: 40
Screens
Type: Slotted Size: .010" fm: 5.00' to 30.00'



REFERENCE: Unified Soil Classification Chart

8/22/00 sv ..\00188-136\FOMW-3.cdr

APPENDIX D

MONITORING WELL DEVELOPMENT LOGS

WELL DEVELOPMENT DATA SHEET

WELL NUMBER: FOMW-1
DEPTH OF WELL: 31
CASING TYPE/DIAMETER: 4"
BOREHOLE DIAMETER: 10"
EFFECTIVE INTERVAL: [illegible]
REFERENCE POINT: TOC

JOB NUMBER: 00188-248
OWNER: SEARS
LOCATION: OAKLAND
DATE DEVELOPED: 5.25.00
DEVELOPED BY: RS
SURFACE ELEVATION:

ONE CASING VOLUME (Gallons): 13
TOTAL VOLUME EVACUATED (Gallons): 75
NUMBER OF CASING VOLUMES EVACUATED: 5.7

DRILLING METHOD: Hollow Stem [illegible]

DEVELOPMENT METHOD: [illegible] stage [illegible] pump

DATE	TIME	WATER LEVEL BEFORE EVACUATION	GALLONS EVACUATED	EQUIV. CASING VOL.	pH	CONDUCTIVITY		TEMP.	COMMENTS (appearance of water, odor, etc.)
						mV	[illegible]	C°	
5.25.00	1310	9.89	0						[illegible]
	1318		10		5.91	108	1.34	19.4	[illegible]
	1325		20		7.00	[illegible]	0.73	19.4	sheen
	1332		30		[illegible]	65	[illegible]	19.3	
	1542		40		6.00	100	0.73	19.6	
	1555		50		6.5	123	0.62	19.5	mod. turbidity
	1606		60		6.91	65	0.56	19.5	
	[illegible]		70		6.93	66	0.56	19.5	low turbidity

stop @ 1335 to move purge water
start @ 1540

[illegible] @ 75 gal

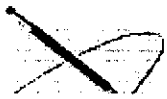
OBSERVATIONS AND COMMENTS:

pump set very deep to keep well pumping
No product measured
[illegible]

LOG OF DEVELOPMENT

APPENDIX E

MONITORING WELL SURVEY DATA



Skip Carleton
06/16/00 02:57 PM

To: Ryan Seelbach/SanFrancisco/URSCorp@URSCORP
cc:
Subject: MONITORING WELLS @ SEARS BLDG. - OAKLAND

DEAR RYAN,

I'M GOING TO FAX YOU THE FIELD NOTES IN ADDITION TO THIS WELL ELEVATION DATA BELOW.

FOMW-1

Top @ ground	28.24'
Top 4" PVC casing	27.81'

FOMW-2

Top @ ground	26.91'
Top 2" PVC casing	26.65'

FOMW-3

Top @ ground	27.16'
Top 2" PVC casing	26.80'

THE ABOVE ELEVATIONS ARE BASED ON CITY OF OAKLAND BENCHMARK "8 SE 77" WHICH HAS AN ELEVATION OF 24.539'.

CALL IF YOU NEED ANYTHING ELSE.

SKIP

URS

Facsimile

To: RYAN SEELBACH

Firm: URS DMC

Facsimile: 415 882 9261

From: SKIP CARLETON

Date: 6/16/00

Page 1 of : 4

Subject: MONITORING WELLS @ SEARS BLDG. OAKLAND

Message: ATTACHED ARE THE SURVEY FIELD NOTES, CALL IF YOU NEED CLARIFICATION

cc:

URS Corporation
7901 Stoneridge Drive, Suite 427
Pleasanton, CA 94588-3600
Tel: 925.463.2000
Fax 925.463.0510
www.urscorp.com

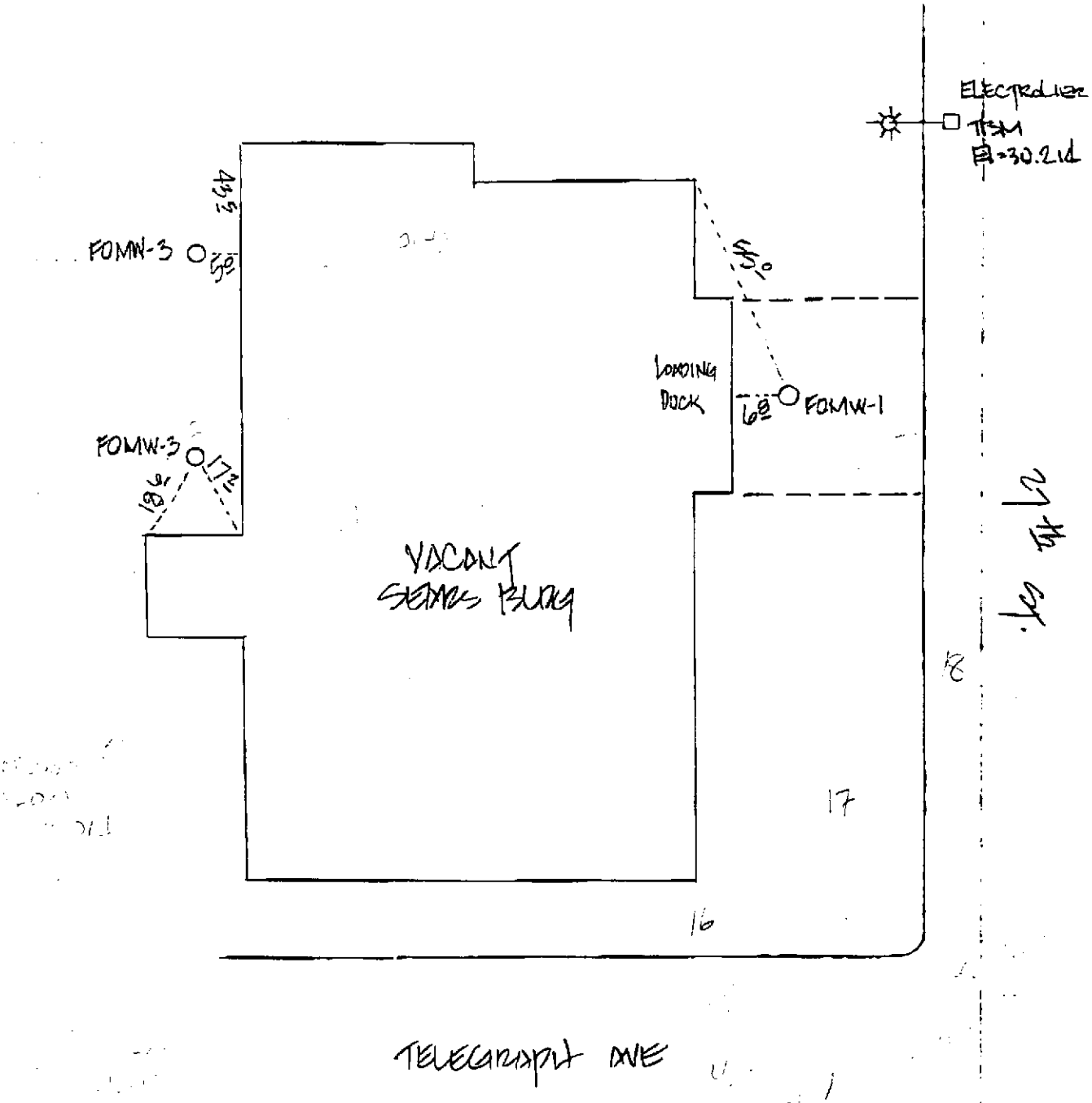
URS Greiner

Job SEARS BLDG | Project No. H2099000166.20 | Sheet 3 of 3

Description MONITORING WELLS | Computed By | Date 6-3-00

Checked By | Date

#5



Greiner

DIFFERENTIAL LEVELS

1241 E. DYER RD., STE. 250, SANTA ANA, CA 92705-5605, (714) 556-9260
225 W. HOSPITALITY LANE, STE. 200, SAN BERNARDINO, CA 92406 (909) 884-9900
445 SOUTH FIGUEROA STREET, STE. 2700, LOS ANGELES, CA 90071 (213) 489-6882

JOB NAME	JOB NO.	PARTY	DATE / PAGE / FILE NAME
SEARS BLDG 27th & TELEGRAPH	H2099000060.20		DATE 6-8-00 PAGE 1 OF FILE NAME

DESCRIPTION: MONITORING WELLS | INST. | REDUCED BY:

STATION	B S	H I	F S	ELEV.	B M ELEV.	POINT DESCRIPTIONS
BM					24.539	CITY MON & SET
						39' WEST of ℄ TELEGRAPH; 5' North of ℄ 26th
						IN SIDEWALK - BRASS PIN IN WELL
	6.772	31.311				
TP-1			3.500	27.751		
	5.437	33.188				
TBM			2.974	30.214		Cut "□" ON CONC BASE OF ELECTROLIER SOUTH
	2.731	32.945				SIDE of 27th & BUS BLK TO SEARS PARKING LOT
TP-2			5.180	27.765		
	3.802	31.567				
BM			1.014	26.553	(24.539)	

Greiner

DIFFERENTIAL LEVELS

1241 E. DYER RD., STE. 250, SANTA ANA, CA 92705-5605, (714) 556-9260
225 W. HOSPITALITY LANE, STE. 200, SAN BERNARDINO, CA 92408 (909) 884-9900
445 SOUTH FIGUEROA STREET, STE. 2700, LOS ANGELES, CA 90071 (213) 489-6882

JOB NAME	JOB NO.	PARTY	DATE / PAGE / FILE NAME
SEARS BLDG 27th & TELEGRAPH	112099000006.20		DATE 6-8-99 PAGE 2 OF ___ FILE NAME ___

DESCRIPTION:	INST.	REDUCED BY:
MONITORING WELLS		

STATION	B S	H I	F S	ELEV.	B M ELEV.	POINT DESCRIPTIONS
TBM				30.214		
	2.663	32.877				
			4.636	28.242		FOMW-1 TOP @ GROUND
			5.067	27.811		" TOP 4" PVC CASING
TP-1			5.650	27.228		
	4.635	31.863				
			4.703	27.160		FOMW-3 TOP @ GROUND
			5.066	26.797		" TOP 2" PVC CASING
			4.950	26.913		FOMW-2 TOP @ GROUND
			5.214	26.649		" TOP 2" PVC CASING
TBM			1.648	30.215	(30.214)	

APPENDIX F

FIELD RECORD OF WATER SAMPLING

Dames & Moore
FIELD RECORD OF WATER SAMPLING

WELL NO. FOMW-1 JOB NUMBER [illegible]

DEPTH OF WELL 21 CLIENT [illegible]

CASING TYPE/DIAMETER [illegible] LOCATION [illegible]

BOREHOLE DIAMETER [illegible] SAMPLED BY: [illegible]

SCREENED INTERVAL 11 TO 31 SAND PACK INTERVAL [illegible] TO [illegible]

REF. POINT TOC ELEVATION [illegible] DATUM [illegible]

PURGING PRIOR TO SAMPLING

PURGING METHOD [illegible]

PUMP FLOW RATE [illegible]

INITIAL WATER LEVEL 9.59 ONE CASING/BOREHOLE VOLUME (Gallons) [illegible]

DATE	TIME	TEMP (°)	SPEC. COND.	pH	GALLONS REMOVED	EQUIVALENT CASING VOL.		COMMENTS (appearance of water, odor, etc.)
[illegible]	[illegible]	[illegible]	681	6.70	5	[illegible]	.41	[illegible]
	1229	17.6	[illegible]	6.78	10	[illegible]	.22	[illegible]
	[illegible]	[illegible]	878	6.74	15	[illegible]	.37	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	20	13	.28	[illegible]

RECORD OF SAMPLING

SAMPLING METHOD [illegible]

DATE OF SAMPLE [illegible] TIME [illegible] DEPTH OF SAMPLE [illegible]

SAMPLE NO.	CONTAINER TYPES	ANALYSIS

TEMP. [illegible]

SPEC. COND. [illegible]

pH [illegible]

COMMENTS: [illegible]

Dames & Moore
FIELD RECORD OF WATER SAMPLING

WELL NO. FOMW-2 JOB NUMBER 00188-248

DEPTH OF WELL 28' CLIENT Sears Oak

CASING TYPE/DIAMETER 2" PVC LOCATION

BOREHOLE DIAMETER 8" SAMPLED BY: ERS

SCREENED INTERVAL 8 TO 28 SAND PACK INTERVAL TO

REF. POINT TOC ELEVATION DATUM

PURGING PRIOR TO SAMPLING

PURGING METHOD 12 V single stage pump.

PUMP FLOW RATE

INITIAL WATER LEVEL 11.14 ONE CASING/BOREHOLE VOLUME (Gallons) 3

28 11 17

DATE	TIME	TEMP (°)	SPEC. COND.	pH	GALLONS REMOVED		EQUIVALENT CASING VOL.		COMMENTS (appearance of water, odor, etc.)
					Redox		Fe^{++}	DO	
6.8.00	1004	14.3	669	6.88	.44	3		4.01	slightly cloudy
	1007	14.5	728	6.99	-17	6		3.72	clear
	1010	4.7	673	7.00	-10	9	0.0	2.92	

RECORD OF SAMPLING

SAMPLING METHOD Bailer

DATE OF SAMPLE 6/8/00 TIME 1045 DEPTH OF SAMPLE

SAMPLE NO.	CONTAINER TYPES	ANALYSIS

TEMP.

SPEC. COND.

pH

COMMENTS:

Dames & Moore
FIELD RECORD OF WATER SAMPLING

WELL NO. FOMW-3 JOB NUMBER [illegible]

DEPTH OF WELL 30 CLIENT SEARS

CASING TYPE/DIAMETER 2" PVC LOCATION OAKLAND

BOREHOLE DIAMETER 8" SAMPLED BY: [illegible]

SCREENED INTERVAL 5 TO 30 SAND PACK INTERVAL ____ TO ____

REF. POINT ____ ELEVATION ____ DATUM ____

PURGING PRIOR TO SAMPLING

PURGING METHOD 12 v. pump

PUMP FLOW RATE ____

INITIAL WATER LEVEL 2.18 ONE CASING/BOREHOLE VOLUME (Gallons) 3.3

DATE	TIME	TEMP (°)	SPEC. COND.	PH	GALLONS REMOVED	EQUIVALENT CASING VOL.	mV Redox O2	COMMENTS (appearance of water, odor, etc.)
10.7.00	1113	15.2	824	6.84		1	120 .26	Slight brown color
	1115	14.9	648	6.96		3	116 .24	Light brn, no odor
	1117	14.9	718	6.87		6	100 .24	
	[illegible]	15.0	649	[illegible]	9.0	10	23 .22	

RECORD OF SAMPLING

SAMPLING METHOD [illegible]

DATE OF SAMPLE 10/7/00 TIME 1145 DEPTH OF SAMPLE ____

SAMPLE NO.	CONTAINER TYPES	ANALYSIS

TEMP. ____

SPEC. COND. ____

pH ____

COMMENTS: ____

APPENDIX G

LABORATORY REPORTS AND LEVEL III DATA VALIDATION

URS Greiner Dames and Moore
221 Main Street #600
San Francisco, CA 94105

Attn.: Ryan Seelbach

Project: 00188-248
Sears Oakland

Attached is our report for your samples received on Friday May 19, 2000
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after June 18, 2000 unless you have requested otherwise. We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919. You can also contact me via email. My email address is: asalimpour@chromalab.com

Sincerely,

Afsaneh Salimpour

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-05-0436

MTBE - Volatile Organics by GC/MS

URS Greiner Dames and Moore

221 Main Street #600
San Francisco, CA 94105

Attn: Ryan Seelbach

Phone: (415) 243-3837 Fax: (415) 882-9261

Project #: 00188-248

Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMN-1-11	Soil	05/18/2000 09:40	1
FOMN-1-16	Soil	05/18/2000 09:43	2
FOMN-1-20	Soil	05/18/2000 09:48	3
FOMN-2-6	Soil	05/19/2000 07:50	4
FOMN-2-11	Soil	05/19/2000 07:55	5
FOMN-2-16	Soil	05/19/2000 08:00	6
FOMN-3-6	Soil	05/19/2000 09:25	7
FOMN-3-11	Soil	05/19/2000 09:30	8
FOMN-3-16	Soil	05/19/2000 09:35	9

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-1-11**	Lab Sample ID:	**2000-05-0436-001**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 16:59
Sampled:	05/18/2000 09:40	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 16:59	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 16:59	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 16:59	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 16:59	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 16:59	
Surrogate(s)						
1,2-Dichloroethane-d4	86.8	70-121	%	1.00	05/25/2000 16:59	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-1-16**	Lab Sample ID:	**2000-05-0436-002**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 17:38
Sampled:	05/18/2000 09:43	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 17:38	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 17:38	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 17:38	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 17:38	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 17:38	
Surrogate(s)						
1,2-Dichloroethane-d4	87.0	70-121	%	1.00	05/25/2000 17:38	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-1-20**	Lab Sample ID:	**2000-05-0436-003**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 18:17
Sampled:	05/18/2000 09:48	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Sample/Analysis Flag Irn (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	25	ug/Kg	5.00	05/25/2000 18:17	
Benzene	ND	25	ug/Kg	5.00	05/25/2000 18:17	
Ethylbenzene	ND	25	ug/Kg	5.00	05/25/2000 18:17	
Toluene	ND	25	ug/Kg	5.00	05/25/2000 18:17	
Total xylenes	ND	50	ug/Kg	5.00	05/25/2000 18:17	
Surrogate(s)						
1,2-Dichloroethane-d4	87.7	70-121	%	1.00	05/25/2000 18:17	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-2-6**	Lab Sample ID:	**2000-05-0436-004**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 20:13
Sampled:	05/19/2000 07:50	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 20:13	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 20:13	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 20:13	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 20:13	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 20:13	
Surrogate(s)						
1,2-Dichloroethane-d4	87.1	70-121	%	1.00	05/25/2000 20:13	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-2-11**	Lab Sample ID:	**2000-05-0436-005**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 20:51
Sampled:	05/19/2000 07:55	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 20:51	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 20:51	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 20:51	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 20:51	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 20:51	
Surrogate(s)						
1,2-Dichloroethane-d4	83.5	70-121	%	1.00	05/25/2000 20:51	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-2-16**	Lab Sample ID:	**2000-05-0436-006**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 21:30
Sampled:	05/19/2000 08:00	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 21:30	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 21:30	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 21:30	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 21:30	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 21:30	
Surrogate(s)						
1,2-Dichloroethane-d4	84.9	70-121	%	1.00	05/25/2000 21:30	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-3-6**	Lab Sample ID:	**2000-05-0436-007**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 22:09
Sampled:	05/19/2000 09:25	QC-Batch:	2000/05/25-01.09
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 22:09	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 22:09	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 22:09	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 22:09	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 22:09	
Surrogate(s)						
1,2-Dichloroethane-d4	96.9	70-121	%	1.00	05/25/2000 22:09	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-3-11**	Lab Sample ID:	**2000-05-0436-008**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/26/2000 13:21
Sampled:	05/19/2000 09:30	QC-Batch:	2000/05/26-01.06
Matrix:	Soil		

Sample/Analysis Flag lrn (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	23	ug/Kg	4.50	05/26/2000 13:21	
Benzene	ND	23	ug/Kg	4.50	05/26/2000 13:21	
Ethylbenzene	ND	23	ug/Kg	4.50	05/26/2000 13:21	
Toluene	ND	23	ug/Kg	4.50	05/26/2000 13:21	
Total xylenes	ND	45	ug/Kg	4.50	05/26/2000 13:21	
Surrogate(s)						
1,2-Dichloroethane-d4	102.0	70-121	%	1.00	05/26/2000 13:21	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMN-3-16**	Lab Sample ID:	**2000-05-0436-009**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/25/2000 16:46
Sampled:	05/19/2000 09:35	QC-Batch:	2000/05/25-01.06
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/Kg	1.00	05/25/2000 16:46	
Benzene	ND	5.0	ug/Kg	1.00	05/25/2000 16:46	
Ethylbenzene	ND	5.0	ug/Kg	1.00	05/25/2000 16:46	
Toluene	ND	5.0	ug/Kg	1.00	05/25/2000 16:46	
Total xylenes	ND	10	ug/Kg	1.00	05/25/2000 16:46	
Surrogate(s)						
1,2-Dichloroethane-d4	98.1	70-121	%	1.00	05/25/2000 16:46	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report
MTBE - Volatile Organics by GC/MS

Method Blank | **Soil** | **QC Batch # 2000/05/25-01.09**

MB: 2000/05/25-01.09-001 | Date Extracted: 05/25/2000 12:59

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	5.0	ug/Kg	05/25/2000 12:59	
Chlorobenzene	ND	5.0	ug/Kg	05/25/2000 12:59	
1,1-Dichloroethene	ND	5.0	ug/Kg	05/25/2000 12:59	
Ethylbenzene	ND	5.0	ug/Kg	05/25/2000 12:59	
Toluene	ND	5.0	ug/Kg	05/25/2000 12:59	
Trichloroethene	ND	5.0	ug/Kg	05/25/2000 12:59	
Total xylenes	ND	10	ug/Kg	05/25/2000 12:59	
MTBE	ND	5.0	ug/Kg	05/25/2000 12:59	
Surrogate(s)					
1,2-Dichloroethane-d4	86.4	70-121	%	05/25/2000 12:59	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report
MTBE - Volatile Organics by GC/MS

Method Blank | **Soil** | **QC Batch # 2000/05/25-01.06**

MB: 2000/05/25-01.06-001 | Date Extracted: 05/25/2000 13:02

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	5.0	ug/Kg	05/25/2000 13:02	
Chlorobenzene	ND	5.0	ug/Kg	05/25/2000 13:02	
1,1-Dichloroethene	ND	5.0	ug/Kg	05/25/2000 13:02	
Ethylbenzene	ND	5.0	ug/Kg	05/25/2000 13:02	
Toluene	ND	5.0	ug/Kg	05/25/2000 13:02	
Trichloroethene	ND	5.0	ug/Kg	05/25/2000 13:02	
Total xylenes	ND	10	ug/Kg	05/25/2000 13:02	
MTBE	ND	5.0	%	05/25/2000 13:02	
Surrogate(s)					
1,2-Dichloroethane-d4	101.2	70-121	%	05/25/2000 13:02	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report
MTBE - Volatile Organics by GC/MS

Method Blank | **Soil** | **QC Batch # 2000/05/26-01.06**

MB: 2000/05/26-01.06-001 | Date Extracted: 05/26/2000 11:54

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	5.0	ug/Kg	05/26/2000 11:54	
Chlorobenzene	ND	5.0	ug/Kg	05/26/2000 11:54	
1,1-Dichloroethene	ND	5.0	ug/Kg	05/26/2000 11:54	
Ethylbenzene	ND	5.0	ug/Kg	05/26/2000 11:54	
Toluene	ND	5.0	ug/Kg	05/26/2000 11:54	
Trichloroethene	ND	5.0	ug/Kg	05/26/2000 11:54	
Total xylenes	ND	10	ug/Kg	05/26/2000 11:54	
MTBE	ND	5.0	ug/Kg	05/26/2000 11:54	
Surrogate(s)					
1,2-Dichloroethane-d4	102.8	70-121	%	05/26/2000 11:54	

To: **URS Greiner Dames and Moore**
Attn: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2000/05/25-01.09**

LCS: 2000/05/25-01.09-002 Extracted: 05/25/2000 11:34 Analyzed 05/25/2000 11:34
LCSD: 2000/05/25-01.09-003 Extracted: 05/25/2000 12:20 Analyzed 05/25/2000 12:20

Compound	Conc. [ug/Kg]		Exp.Conc. [ug/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	99.5	104	100.0	100.0	99.5	104.0	4.4	69-129	20		
Chlorobenzene	112	115	100.0	100.0	112.0	115.0	2.6	61-121	20		
1,1-Dichloroethene	107	117	100.0	100.0	107.0	117.0	8.9	65-125	20		
Toluene	102	104	100.0	100.0	102.0	104.0	1.9	70-130	20		
Trichloroethene	93.5	96.5	100.0	100.0	93.5	96.5	3.2	74-134	20		
Surrogate(s)											
1,2-Dichloroethane-d4	432	454	500	500	86.4	90.8		70-121			

To: **URS Greiner Dames and Moore**
Attn: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2000/05/25-01.06**

LCS: 2000/05/25-01.06-002 Extracted: 05/25/2000 11:36 Analyzed 05/25/2000 11:36
LCSD: 2000/05/25-01.06-003 Extracted: 05/25/2000 12:19 Analyzed 05/25/2000 12:19

Compound	Conc. [ug/Kg]		Exp.Conc. [ug/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	120	123	100.0	100.0	120.0	123.0	2.5	69-129	20		
Chlorobenzene	104	104	100.0	100.0	104.0	104.0	0.0	61-121	20		
1,1-Dichloroethene	108	108	100.0	100.0	108.0	108.0	0.0	65-125	20		
Toluene	120	122	100.0	100.0	120.0	122.0	1.7	70-130	20		
Trichloroethene	114	116	100.0	100.0	114.0	116.0	1.7	74-134	20		
Surrogate(s)											
1,2-Dichloroethane-d4	488	474	500	500	97.6	94.8		70-121			

To: **URS Greiner Dames and Moore**
Attn: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2000/05/26-01.06**

LCS: 2000/05/26-01.06-002 Extracted: 05/26/2000 10:27 Analyzed 05/26/2000 10:27
LCSD: 2000/05/26-01.06-003 Extracted: 05/26/2000 11:10 Analyzed 05/26/2000 11:10

Compound	Conc. [ug/Kg]		Exp.Conc. [ug/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	113	113	100.0	100.0	113.0	113.0	0.0	69-129	20		
Chlorobenzene	103	103	100.0	100.0	103.0	103.0	0.0	61-121	20		
1,1-Dichloroethene	105	103	100.0	100.0	105.0	103.0	1.9	65-125	20		
Toluene	117	117	100.0	100.0	117.0	117.0	0.0	70-130	20		
Trichloroethene	112	111	100.0	100.0	112.0	111.0	0.9	74-134	20		
Surrogate(s)											
1,2-Dichloroethane-d4	499	496	500	500	99.8	99.2		70-121			

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-05-0436

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 8260A

Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Matrix Spike (MS / MSD) **Soil** **QC Batch # 2000/05/25-01.06**

Sample ID: **FOMN-3-16** Lab Sample ID: 2000-05-0436-009

MS: 2000/05/25-01.06-004 Extracted: 05/25/2000 21:05 Analyzed: 05/25/2000 21:05 Dilution: 1.0

MSD: 2000/05/25-01.06-005 Extracted: 05/25/2000 21:49 Analyzed: 05/25/2000 21:49 Dilution: 1.0

Compound	Conc. [ug/Kg]			Exp.Conc. [ug/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	MS	MSD	Sample	MS	MSD	MS	MSD	[%]	Recovery	RPD	MS	MSD
Benzene	89.3	103	ND	86.5	96.5	103.2	106.7	3.3	69-129	20		
Chlorobenzene	78.1	92.6	ND	86.5	96.5	90.3	96.0	6.1	61-121	20		
1,1-Dichloroethene	83.3	93.4	ND	86.5	96.5	96.3	96.8	0.5	65-125	20		
Toluene	91.1	106	ND	86.5	96.5	105.3	109.8	4.2	70-130	20		
Trichloroethene	87.8	101	ND	86.5	96.5	101.5	104.7	3.1	74-134	20		
Surrogate(s)												
1,2-Dichloroethane-d4	469	486		500	500	93.8	97.2		70-121			

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-05-0436

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 8260A

Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Matrix Spike (MS / MSD) **Soil** **QC Batch # 2000/05/25-01.09**

Sample ID: **FOMN-2-6** Lab Sample ID: 2000-05-0436-004

MS: 2000/05/25-01.09-004 Extracted: 05/25/2000 18:55 Analyzed: 05/25/2000 18:55 Dilution: 1.0

MSD: 2000/05/25-01.09-005 Extracted: 05/25/2000 19:34 Analyzed: 05/25/2000 19:34 Dilution: 1.0

Compound	Conc. [ug/Kg]			Exp.Conc. [ug/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	MS	MSD	Sample	MS	MSD	MS	MSD	[%]	Recovery	RPD	MS	MSD
Benzene	101	95.4	ND	99.2	94.3	101.8	101.2	0.6	69-129	20		
Chlorobenzene	111	106	ND	99.2	94.3	111.9	112.4	0.4	61-121	20		
1,1-Dichloroethene	104	84.7	ND	99.2	94.3	104.8	89.8	15.4	65-125	20		
Toluene	101	97.9	ND	99.2	94.3	101.8	103.8	1.9	70-130	20		
Trichloroethene	100	91.1	ND	99.2	94.3	100.8	96.6	4.3	74-134	20		
Surrogate(s)												
1,2-Dichloroethane-d4	429	490		500	500	85.8	98.0		70-121			

To: **URS Greiner Dames and Moore**
Attn:Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Legend & Notes

MTBE - Volatile Organics by GC/MS

Analysis Flags

lrn

Reporting limits raised due to high level of non-target analyte materials.

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-05-0436

Total Extractable Petroleum Hydrocarbons (TEPH)

URS Greiner Dames and Moore

221 Main Street #600
San Francisco, CA 94105

Attn: Ryan Seelbach

Phone: (415) 243-3837 Fax: (415) 882-9261

Project #: 00188-248

Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMN-1-11	Soil	05/18/2000 09:40	1
FOMN-1-16	Soil	05/18/2000 09:43	2
FOMN-1-20	Soil	05/18/2000 09:48	3
FOMN-2-6	Soil	05/19/2000 07:50	4
FOMN-2-11	Soil	05/19/2000 07:55	5
FOMN-2-16	Soil	05/19/2000 08:00	6
FOMN-3-6	Soil	05/19/2000 09:25	7
FOMN-3-11	Soil	05/19/2000 09:30	8
FOMN-3-16	Soil	05/19/2000 09:35	9

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-1-11**	Lab Sample ID:	**2000-05-0436-001**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/18/2000 09:40	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	1.0	mg/Kg	1.00	05/24/2000 03:21	
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 03:21	
Surrogate(s)						
o-Terphenyl	74.3	60-130	%	1.00	05/24/2000 03:21	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-1-16**	Lab Sample ID:	**2000-05-0436-002**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/18/2000 09:43	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	1.0	mg/Kg	1.00	05/24/2000 04:00	
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 04:00	
Surrogate(s)						
o-Terphenyl	88.8	60-130	%	1.00	05/24/2000 04:00	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-1-20**	Lab Sample ID:	**2000-05-0436-003**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/18/2000 09:48	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	3200	20	mg/Kg	20.00	05/26/2000 16:35	ndp
Bunker-C	ND	1000	mg/Kg	20.00	05/26/2000 16:35	
Surrogate(s)						
o-Terphenyl	138.5	60-130	%	20.00	05/26/2000 16:35	sh

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-2-6**	Lab Sample ID:	**2000-05-0436-004**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 07:50	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	1.0	mg/Kg	1.00	05/24/2000 04:40	
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 04:40	
Surrogate(s)						
o-Terphenyl	83.4	60-130	%	1.00	05/24/2000 04:40	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-2-11**	Lab Sample ID:	**2000-05-0436-005**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 07:55	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	1.0	mg/Kg	1.00	05/24/2000 05:20	
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 05:20	
Surrogate(s)						
o-Terphenyl	90.5	60-130	%	1.00	05/24/2000 05:20	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-2-16**	Lab Sample ID:	**2000-05-0436-006**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 08:00	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	1.0	mg/Kg	1.00	05/24/2000 16:32	
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 16:32	
Surrogate(s)						
o-Terphenyl	75.7	60-130	%	1.00	05/24/2000 16:32	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-3-6**	Lab Sample ID:	**2000-05-0436-007**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 09:25	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	51	1.0	mg/Kg	1.00	05/24/2000 17:22	ndp
Bunker-C	ND	50	mg/Kg	1.00	05/24/2000 17:22	
Surrogate(s)						
o-Terphenyl	89.8	60-130	%	1.00	05/24/2000 17:22	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-3-11**	Lab Sample ID:	**2000-05-0436-008**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 09:30	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	1900	10	mg/Kg	10.00	05/25/2000 18:33	ndp
Bunker-C	ND	500	mg/Kg	10.00	05/25/2000 18:33	
Surrogate(s)						
o-Terphenyl	94.1	60-130	%	10.00	05/25/2000 18:33	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMN-3-16**	Lab Sample ID:	**2000-05-0436-009**
Project:	00188-248 Sears Oakland	Received:	05/19/2000 18:12
		Extracted:	05/23/2000 07:21
Sampled:	05/19/2000 09:35	QC-Batch:	2000/05/23-01.10
Matrix:	Soil		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	19	1.0	mg/Kg	1.00	05/25/2000 17:43	ndp
Bunker-C	ND	50	mg/Kg	1.00	05/25/2000 17:43	
Surrogate(s)						
o-Terphenyl	87.4	60-130	%	1.00	05/25/2000 17:43	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Batch QC Report

Total Extractable Petroleum Hydrocarbons (TEPH)

Method Blank **Soil** **QC Batch # 2000/05/23-01.10**

MB: 2000/05/23-01.10-001 Date Extracted: 05/23/2000 07:21

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Diesel	ND	1	mg/Kg	05/24/2000 03:21	
Bunker-C	ND	50	mg/Kg	05/24/2000 03:21	
Surrogate(s)					
o-Terphenyl	95.0	60-130	%	05/24/2000 03:21	

To: **URS Greiner Dames and Moore**
Attn: Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Batch QC Report

Total Extractable Petroleum Hydrocarbons (TEPH)

Laboratory Control Spike (LCS/LCSD) **Soil** **QC Batch # 2000/05/23-01.10**

LCS: 2000/05/23-01.10-002 Extracted: 05/23/2000 07:21 Analyzed 05/24/2000 05:59
LCSD: 2000/05/23-01.10-003 Extracted: 05/23/2000 07:21 Analyzed 05/24/2000 06:38

Compound	Conc. [mg/Kg]		Exp.Conc. [mg/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Diesel	34.6	35.8	41.7	41.7	83.0	85.9	3.4	60-130	25		
Surrogate(s)											
o-Terphenyl	22.9	22.9	20.0	20.0	114.5	114.5		60-130			

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-05-0436

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 8015M

Prep Method: 3550/8015M

Batch QC Report

Total Extractable Petroleum Hydrocarbons (TEPH)

Matrix Spike (MS / MSD) **Soil** **QC Batch # 2000/05/23-01.10**

Sample ID: **FOMN-1-11** Lab Sample ID: 2000-05-0436-001

MS: 2000/05/23-01.10-004 Extracted: 05/23/2000 07:21 Analyzed: 05/24/2000 07:18 Dilution: 1.0

MSD: 2000/05/23-01.10-005 Extracted: 05/23/2000 07:21 Analyzed: 05/24/2000 08:00 Dilution: 1.0

Compound	Conc. [mg/Kg]			Exp.Conc. [mg/Kg]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	MS	MSD	Sample	MS	MSD	MS	MSD	[%]	Recovery	RPD	MS	MSD
Diesel	32.9	32.1	ND	41.7	41.6	78.9	77.2	2.2	60-130	25		
Surrogate(s)												
o-Terphenyl	21.2	20.0		20.0	20.0	106.0	100.0		60-130			

To: **URS Greiner Dames and Moore**
Attn:Ryan Seelbach

Test Method: 8015M
Prep Method: 3550/8015M

Legend & Notes

Total Extractable Petroleum Hydrocarbons (TEPH)

Analyte Flags

ndp

Hydrocarbon reported does not match the pattern of our Diesel standard

sh

Surrogate recoveries were higher than QC limits due to matrix interference.

Reference #: 52277

CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

1220 Quarry Lane • Pleasanton, California 94566-4756
510/484-1919 • Facsimile 510/484-1096

Chain of Custody

2000-05-0436

DATE 5/19/00 PAGE 1 OF 1

PROJ MGR RYAN SEELBACH
COMPANY URS, DAMES & MOORE
ADDRESS 221 MAIN ST #600
SF, CA 94105

SAMPLERS (SIGNATURE) Ryan Seelbach
(PHONE NO.) 415-243-3837
(FAX NO.) 415-882-9261

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH-(EPA 8015,8020) ☐ Gas w/ ☐ BTEX ☐MTBE	PURGEABLE AROMATICS BTEX (EPA 8020)	TPH-Diesel (EPA 8015M)	TEPH (EPA 8015M) ☒WATER ☐Diesel ☐M.O.☒Other OIL	PURGEABLE HALOCARBONS (EHVOCs) (EPA 8010)	VOLATILE ORGANICS (VOCs) (EPA 8260)	SEMIVOLATILES (EPA 8270)	TOTAL OIL AND GREASE (SM 5520 B+F, E+F)		☐ PESTICIDES (EPA 8080) ☐ PCB'S (EPA 8080)	PNA's by ☐ 8270 ☐ 8310	☐ Spec. Cond. ☐ TSS ☐ TDS	LUFT METALS: Cd, Cr, Pb, Ni, Zn	CAM ... METALS (EPA 6010/7470/7471)	TOTAL LEAD	☐ W.E.T. (STLC) ☐ TCLP	☐ Hexavalent Chromium ☐ pH (24 hr hold time for H20)	BTEX & MTBE EPA 8260	###		NUMBER OF CONTAINERS
FOMW-1-11	5-18-00	940	Soil	—				X														X				
FOMW-1-16	5-18-00	943	Soil	—				X														X				
FOMW-1-20	5-18-00	948	Soil	—				X														X				
FOMW-2-6	5-19-00	750	Soil	—				X														X				
FOMW-2-11	5-19-00	755	Soil	—				X														X				
FOMW-2-16	5-19-00	800	Soil	—				X														X				
FOMW-3-6	5-19-00	925	Soil	—				X														X				
FOMW-3-11	5-19-00	930	Soil	—				X														X				
FOMW-3-16	5-19-00	935	Soil	—				X														X				

PROJECT INFORMATION

PROJECT NAME: SEARS OAKLAND
PROJECT NUMBER: 00188-248
P.O. #:

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS:
HEAD SPACE:
TEMPERATURE:
CONFORMS TO RECORD:

TAT: STANDARD 5-DAY | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS:
Report: ☐ Routine ☐ Level 2 ☒ Level 3 ☐ Level 4 ☐ Electronic Report

RELINQUISHED BY 1	RELINQUISHED BY 2	RELINQUISHED BY 3
(SIGNATURE) Ryan Seelbach (TIME) 1600	(SIGNATURE) (TIME)	(SIGNATURE) (TIME) 1812
(PRINTED NAME) Ryan Seelbach (DATE) 5-19-00	(PRINTED NAME) (DATE)	(PRINTED NAME) (DATE)
(COMPANY) D&M - URS.	(COMPANY)	(COMPANY)
RECEIVED BY 1	**RECEIVED BY 2**	**RECEIVED BY (LABORATORY) 3**
(SIGNATURE) (TIME)	(SIGNATURE) (TIME)	(SIGNATURE) Denise Harrington (TIME)
(PRINTED NAME) (DATE)	(PRINTED NAME) (DATE)	(PRINTED NAME) D. Harrington 1812 (DATE)
(COMPANY)	(COMPANY)	(COMPANY) Chromalab 5/19/00

CHROMALAB, INC.
Environmental Services (SDB)

Submission #: 2000-06-0152
Date: June 22, 2000

URS Greiner Dames and Moore
221 Main Street #600
San Francisco, CA 94105

Attn.: Ryan Seelbach

Project: 00188-248
Sears Oakland

Attached is our report for your samples received on Thursday June 8, 2000
This report has been reviewed and approved for release. Reproduction of this report is permitted only in its entirety.

Please note that any unused portion of the samples will be discarded after July 8, 2000 unless you have requested otherwise. We appreciate the opportunity to be of service to you. If you have any questions, please call me at (925) 484-1919. You can also contact me via email. My email address is: asalimpour@chromalab.com

Sincerely,

Afsaneh Salimpour

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

MTBE - Volatile Organics by GC/MS

URS Greiner Dames and Moore

221 Main Street #600
San Francisco, CA 94105

Attn: Ryan Seelbach

Phone: (415) 243-3837 Fax: (415) 882-9261

Project #: 00188-248

Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMW-1	Water	06/08/2000 13:15	1
FOMW-2	Water	06/08/2000 10:45	2
FOMW-3	Water	06/08/2000 11:45	3
FOMW-5	Water	06/08/2000	4

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 8260A

Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMW-1**	Lab Sample ID:	**2000-06-0152-001**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/12/2000 22:03
Sampled:	06/08/2000 13:15	QC-Batch:	2000/06/12-02.39
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/L	1.00	06/12/2000 22:03	
Benzene	ND	0.50	ug/L	1.00	06/12/2000 22:03	
Ethylbenzene	ND	0.50	ug/L	1.00	06/12/2000 22:03	
Toluene	ND	0.50	ug/L	1.00	06/12/2000 22:03	
Total xylenes	ND	1.0	ug/L	1.00	06/12/2000 22:03	
Surrogate(s)						
1,2-Dichloroethane-d4	105.3	76-114	%	1.00	06/12/2000 22:03	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMW-2**	Lab Sample ID:	**2000-06-0152-002**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/12/2000 22:38
Sampled:	06/08/2000 10:45	QC-Batch:	2000/06/12-02.39
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/L	1.00	06/12/2000 22:38	
Benzene	ND	0.50	ug/L	1.00	06/12/2000 22:38	
Ethylbenzene	ND	0.50	ug/L	1.00	06/12/2000 22:38	
Toluene	ND	0.50	ug/L	1.00	06/12/2000 22:38	
Total xylenes	ND	1.0	ug/L	1.00	06/12/2000 22:38	
Surrogate(s)						
1,2-Dichloroethane-d4	104.8	76-114	%	1.00	06/12/2000 22:38	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMW-3**	Lab Sample ID:	**2000-06-0152-003**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/12/2000 23:13
Sampled:	06/08/2000 11:45	QC-Batch:	2000/06/12-02.39
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/L	1.00	06/12/2000 23:13	
Benzene	ND	0.50	ug/L	1.00	06/12/2000 23:13	
Ethylbenzene	ND	0.50	ug/L	1.00	06/12/2000 23:13	
Toluene	ND	0.50	ug/L	1.00	06/12/2000 23:13	
Total xylenes	ND	1.0	ug/L	1.00	06/12/2000 23:13	
Surrogate(s)						
1,2-Dichloroethane-d4	100.1	76-114	%	1.00	06/12/2000 23:13	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

MTBE - Volatile Organics by GC/MS

Sample ID:	**FOMW-5**	Lab Sample ID:	**2000-06-0152-004**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/19/2000 19:59
Sampled:	06/08/2000	QC-Batch:	2000/06/19-01.39
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
MTBE	ND	5.0	ug/L	1.00	06/19/2000 19:59	
Benzene	ND	0.50	ug/L	1.00	06/19/2000 19:59	
Ethylbenzene	ND	0.50	ug/L	1.00	06/19/2000 19:59	
Toluene	ND	0.50	ug/L	1.00	06/19/2000 19:59	
Total xylenes	ND	1.0	ug/L	1.00	06/19/2000 19:59	
Surrogate(s)						
1,2-Dichloroethane-d4	88.7	76-114	%	1.00	06/19/2000 19:59	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report
MTBE - Volatile Organics by GC/MS

Method Blank | **Water** | **QC Batch # 2000/06/12-02.39**

MB: 2000/06/12-02.39-001 | Date Extracted: 06/12/2000 15:20

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	0.5	ug/L	06/12/2000 15:20	
Ethylbenzene	ND	0.5	ug/L	06/12/2000 15:20	
Toluene	ND	0.5	ug/L	06/12/2000 15:20	
Total xylenes	ND	1.0	ug/L	06/12/2000 15:20	
Surrogate(s)					
1,2-Dichloroethane-d4	105.6	76-114	%	06/12/2000 15:20	

To: **URS Greiner Dames and Moore** Test Method: 8260A

Attn.: Ryan Seelbach Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Method Blank **Water** **QC Batch # 2000/06/19-01.39**

MB: 2000/06/19-01.39-001 Date Extracted: 06/19/2000 19:20

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Benzene	ND	0.5	ug/L	06/19/2000 19:20	
Ethylbenzene	ND	0.5	ug/L	06/19/2000 19:20	
Toluene	ND	0.5	ug/L	06/19/2000 19:20	
Total xylenes	ND	1.0	ug/L	06/19/2000 19:20	
Surrogate(s)					
1,2-Dichloroethane-d4	100.2	76-114	%	06/19/2000 19:20	

To: **URS Greiner Dames and Moore**
Attn: Ryan Seelbach

Test Method: 8260A
Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2000/06/12-02.39**

LCS: 2000/06/12-02.39-002 Extracted: 06/12/2000 13:59 Analyzed 06/12/2000 13:59
LCSD: 2000/06/12-02.39-003 Extracted: 06/12/2000 14:45 Analyzed 06/12/2000 14:45

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	50.0	52.8	50.0	50.0	100.0	105.6	5.4	69-129	20		
Toluene	48.2	47.4	50.0	50.0	96.4	94.8	1.7	70-130	20		
Surrogate(s)											
1,2-Dichloroethane-d4	481	506	500	500	96.2	101.2		76-114			

To: **URS Greiner Dames and Moore**

Attn: Ryan Seelbach

Test Method: 8260A

Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2000/06/19-01.39**

LCS: 2000/06/19-01.39-002 Extracted: 06/19/2000 17:56 Analyzed 06/19/2000 17:56

LCSD: 2000/06/19-01.39-003 Extracted: 06/19/2000 18:42 Analyzed 06/19/2000 18:42

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Benzene	51.7	52.2	50.0	50.0	103.4	104.4	1.0	69-129	20		
Toluene	50.1	51.2	50.0	50.0	100.2	102.4	2.2	70-130	20		
Surrogate(s)											
1,2-Dichloroethane-d4	474	507	500	500	94.8	101.4		76-114			

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 8260A

Prep Method: 5030

Batch QC Report

MTBE - Volatile Organics by GC/MS

Matrix Spike (MS / MSD) **Water** **QC Batch # 2000/06/19-01.39**

Sample ID: **FOMW-5** Lab Sample ID: 2000-06-0152-004

MS: 2000/06/19-01.39-004 Extracted: 06/19/2000 21:05 Analyzed: 06/19/2000 21:05 Dilution: 1.0

MSD: 2000/06/19-01.39-005 Extracted: 06/19/2000 21:40 Analyzed: 06/19/2000 21:40 Dilution: 1.0

Compound	Conc. [ug/L]			Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	MS	MSD	Sample	MS	MSD	MS	MSD	[%]	Recovery	RPD	MS	MSD
Benzene	50.2	50.0		50	50	100.4	100.0	0.4	69-129	20		
Toluene	50.0	46.9		50	50	100.0	93.8	6.4	70-130	20		
Surrogate(s)												
1,2-Dichloroethane-d4	478	462		500	500	95.6	92.4		76-114			

CHROMALAB, INC.
Environmental Services (SDB)

Submission #: 2000-06-0152

Air Analysis

URS Greiner Dames and Moore
221 Main Street #600
San Francisco, CA 94105
Attn: Ryan Seelbach
Phone: (415) 243-3837 Fax: (415) 882-9261
Project #: 00188-248
Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMW-1	Water	06/08/2000 13:15	1
FOMW-2	Water	06/08/2000 10:45	2
FOMW-3	Water	06/08/2000 11:45	3
FOMW-5	Water	06/08/2000	4

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 3810M
Prep Method: 3810

Air Analysis

Sample ID:	**FOMW-1**	Lab Sample ID:	**2000-06-0152-001**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/20/2000 15:00
Sampled:	06/08/2000 13:15	QC-Batch:	2000/06/20-01.37
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Methane	ND	0.010	ug/ml	1.00	06/20/2000 17:31	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 3810M

Prep Method: 3810

Air Analysis

Sample ID:	**FOMW-2**	Lab Sample ID:	**2000-06-0152-002**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/20/2000 15:00
Sampled:	06/08/2000 10:45	QC-Batch:	2000/06/20-01.37
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Methane	ND	0.010	ug/ml	1.00	06/20/2000 17:39	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 3810M
Prep Method: 3810

Air Analysis

Sample ID:	**FOMW-3**	Lab Sample ID:	**2000-06-0152-003**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/20/2000 15:00
Sampled:	06/08/2000 11:45	QC-Batch:	2000/06/20-01.37
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Methane	ND	0.010	ug/ml	1.00	06/20/2000 17:48	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 3810M
Prep Method: 3810

Air Analysis

Sample ID:	**FOMW-5**	Lab Sample ID:	**2000-06-0152-004**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/20/2000 15:00
Sampled:	06/08/2000	QC-Batch:	2000/06/20-01.37
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Methane	ND	0.010	ug/ml	1.00	06/20/2000 17:55	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 3810M
Prep Method: 3810

Batch QC Report
Air Analysis

Method Blank | **Water** | **QC Batch # 2000/06/20-01.37**

MB: 2000/06/20-01.37-001 | Date Extracted: 06/20/2000 15:00

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Methane	ND	0.01	ug/ml	06/20/2000 16:21	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn: Ryan Seelbach

Test Method: 3810M

Prep Method: 3810

Batch QC Report

Air Analysis

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2000/06/20-01.37**

LCS: 2000/06/20-01.37-002 Extracted: 06/20/2000 15:00 Analyzed 06/20/2000 16:34

LCSD: 2000/06/20-01.37-003 Extracted: 06/20/2000 15:00 Analyzed 06/20/2000 16:41

Compound	Conc. [ug/ml]		Exp.Conc. [ug/ml]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Methane	0.0671	0.0683	0.0721	0.0721	93.1	94.7	1.7	65-135	35		

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

Total Dissolved Solids (TDS)

URS Greiner Dames and Moore

221 Main Street #600
San Francisco, CA 94105

Attn: Ryan Seelbach

Phone: (415) 243-3837 Fax: (415) 882-9261

Project #: 00188-248

Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMW-1	Water	06/08/2000 13:15	1
FOMW-2	Water	06/08/2000 10:45	2
FOMW-3	Water	06/08/2000 11:45	3
FOMW-5	Water	06/08/2000	4

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 160.1
Prep Method: 160.1

Total Dissolved Solids (TDS)

Sample ID:	**FOMW-1**	Lab Sample ID:	**2000-06-0152-001**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 13:15
Sampled:	06/08/2000 13:15	QC-Batch:	2000/06/13-01.28
Matrix:	Water		

Sample/Analysis Flag o (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
TDS	360	20	mg/L	2.00	06/13/2000 13:15	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 160.1

Prep Method: 160.1

Total Dissolved Solids (TDS)

Sample ID:	**FOMW-2**	Lab Sample ID:	**2000-06-0152-002**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 13:15
Sampled:	06/08/2000 10:45	QC-Batch:	2000/06/13-01.28
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
TDS	250	10	mg/L	1.00	06/13/2000 13:15	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn.: Ryan Seelbach

Test Method: 160.1

Prep Method: 160.1

Total Dissolved Solids (TDS)

Sample ID:	**FOMW-3**	Lab Sample ID:	**2000-06-0152-003**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 13:15
Sampled:	06/08/2000 11:45	QC-Batch:	2000/06/13-01.28
Matrix:	Water		

Sample/Analysis Flag o (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
TDS	330	33	mg/L	3.33	06/13/2000 13:15	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 160.1
Prep Method: 160.1

Total Dissolved Solids (TDS)

Sample ID:	**FOMW-5**	Lab Sample ID:	**2000-06-0152-004**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 13:15
Sampled:	06/08/2000	QC-Batch:	2000/06/13-01.28
Matrix:	Water		

Sample/Analysis Flag o (See Legend & Note section)

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
TDS	330	50	mg/L	5.00	06/13/2000 13:15	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 160.1
Prep Method: 160.1

Batch QC Report
Total Dissolved Solids (TDS)

Method Blank **Water** **QC Batch # 2000/06/13-01.28**

MB: 2000/06/13-01.28-001 Date Extracted: 06/13/2000 13:00

Compound	Result	Rep.Limit	Units	Analyzed	Flag
TDS	ND	10	mg/L	06/13/2000 13:00	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn: Ryan Seelbach

Test Method: 160.1

Prep Method: 160.1

Batch QC Report

Total Dissolved Solids (TDS)

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2000/06/13-01.28**

LCS: 2000/06/13-01.28-002 Extracted: 06/13/2000 13:00 Analyzed 06/13/2000 13:00

LCSD: 2000/06/13-01.28-003 Extracted: 06/13/2000 13:00 Analyzed 06/13/2000 13:00

Compound	Conc. [mg/L]		Exp.Conc. [mg/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
TDS	966	923	1000	1000	96.6	92.3	4.6	80-120	20		

To: **URS Greiner Dames and Moore**
Attn:Ryan Seelbach

Test Method: 160.1
Prep Method: 160.1

Legend & Notes

Total Dissolved Solids (TDS)

Analysis Flags

o

Reporting limits were raised due to high level of analyte present in the sample.

CHROMALAB, INC.
Environmental Services (SDB)

Submission #: 2000-06-0152

Total Extractable Petroleum Hydrocarbons (TEPH)

URS Greiner Dames and Moore
221 Main Street #600
San Francisco, CA 94105
Attn: Ryan Seelbach
Phone: (415) 243-3837 Fax: (415) 882-9261
Project #: 00188-248
Project: Sears Oakland

Samples Reported

Sample ID	Matrix	Date Sampled	Lab #
FOMW-1	Water	06/08/2000 13:15	1
FOMW-2	Water	06/08/2000 10:45	2
FOMW-3	Water	06/08/2000 11:45	3
FOMW-5	Water	06/08/2000	4

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMW-1**	Lab Sample ID:	**2000-06-0152-001**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 08:53
Sampled:	06/08/2000 13:15	QC-Batch:	2000/06/13-02.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	06/19/2000 04:46	
Bunker-C	1200	50	ug/L	1.00	06/19/2000 04:46	rd
Surrogate(s)						
o-Terphenyl	103.0	60-130	%	1.00	06/19/2000 04:46	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMW-2**	Lab Sample ID:	**2000-06-0152-002**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 08:53
Sampled:	06/08/2000 10:45	QC-Batch:	2000/06/13-02.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	06/17/2000 10:56	
Bunker-C	ND	50	ug/L	1.00	06/17/2000 10:56	
Surrogate(s)						
o-Terphenyl	99.9	60-130	%	1.00	06/17/2000 10:56	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMW-3**	Lab Sample ID:	**2000-06-0152-003**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 08:53
Sampled:	06/08/2000 11:45	QC-Batch:	2000/06/13-02.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	06/17/2000 10:16	
Bunker-C	1200	50	ug/L	1.00	06/17/2000 10:16	rd
Surrogate(s)						
o-Terphenyl	125.5	60-130	%	1.00	06/17/2000 10:16	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Total Extractable Petroleum Hydrocarbons (TEPH)

Sample ID:	**FOMW-5**	Lab Sample ID:	**2000-06-0152-004**
Project:	00188-248 Sears Oakland	Received:	06/08/2000 19:05
		Extracted:	06/13/2000 08:53
Sampled:	06/08/2000	QC-Batch:	2000/06/13-02.10
Matrix:	Water		

Compound	Result	Rep.Limit	Units	Dilution	Analyzed	Flag
Diesel	ND	50	ug/L	1.00	06/17/2000 09:37	
Bunker-C	1100	50	ug/L	1.00	06/17/2000 09:37	rd
Surrogate(s)						
o-Terphenyl	119.8	60-130	%	1.00	06/17/2000 09:37	

To: **URS Greiner Dames and Moore**
Attn.: Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Batch QC Report
Total Extractable Petroleum Hydrocarbons (TEPH)

Method Blank **Water** **QC Batch # 2000/06/13-02.10**

MB: 2000/06/13-02.10-001 Date Extracted: 06/13/2000 08:53

Compound	Result	Rep.Limit	Units	Analyzed	Flag
Diesel	ND	50	ug/L	06/17/2000 05:39	
Bunker-C	ND	50	ug/L	06/17/2000 05:39	
Surrogate(s)					
o-Terphenyl	104.0	60-130	%	06/17/2000 05:39	

CHROMALAB, INC.

Environmental Services (SDB)

Submission #: 2000-06-0152

To: **URS Greiner Dames and Moore**

Attn: Ryan Seelbach

Test Method: 8015m

Prep Method: 3510/8015M

Batch QC Report

Total Extractable Petroleum Hydrocarbons (TEPH)

Laboratory Control Spike (LCS/LCSD) **Water** **QC Batch # 2000/06/13-02.10**

LCS: 2000/06/13-02.10-002 Extracted: 06/13/2000 08:53 Analyzed 06/17/2000 11:36

LCSD: 2000/06/13-02.10-003 Extracted: 06/13/2000 08:53 Analyzed 06/17/2000 12:16

Compound	Conc. [ug/L]		Exp.Conc. [ug/L]		Recovery [%]		RPD	Ctrl. Limits [%]		Flags	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	[%]	Recovery	RPD	LCS	LCSD
Diesel	1020	1020	1250	1250	81.6	81.6	0.0	60-130	25		
Surrogate(s)											
o-Terphenyl	23.7	23.8	20.0	20.0	118.5	119.0		60-130			

To: **URS Greiner Dames and Moore**
Attn:Ryan Seelbach

Test Method: 8015m
Prep Method: 3510/8015M

Legend & Notes

Total Extractable Petroleum Hydrocarbons (TEPH)

Analyte Flags

rd

Quantitation for the above analyte is based on the response factor of Diesel

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # L161-09 **Date:** 6/12/00

Chromalab
1220 Quarry Lane
Pleasanton CA 94566-4756

Project: 2000-06-0152

PO#

Date Rec'd: 6/09/00
Date Started: 6/09/00
Date Completed: 6/12/00

Date Sampled: 6/08/00
Time:
Sampler:

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
FOMW-1	L35048	10	2320B	Total Alkalinity	230	mg/L
FOMW-2	L35049	10	2320B	Total Alkalinity	150	mg/L
FOMW-3	L35050	10	2320B	Total Alkalinity	190	mg/L
FOMW-5	L35051	10	2320B	Total Alkalinity	180	mg/L

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# L161-09

QC REPORT

Chromalab
1220 Quarry Lane
Pleasanton CA 94566-4756

Dates Analyzed 6/9/00-6/12/00

Analyte	Batch #	Method	MS % Recovery	MSD % Recovery	RPD	Blank
Total Alkalinity	I04455	2320B	99.5	101.0	1.5	ND

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

CytoCulture
ENVIRONMENTAL
BIOTECHNOLOGY
CytoCulture International, Inc. 1986

Client: Dames & Moore, Inc.
Project No. 00188-248
Contact: Ryan Seelbach
221 Main Street #600
San Francisco, CA 94105

Reporting Date: June 20, 2000
CytoCulture Lab Login: 00-28
Project Description: Sears Oakland

Tel: (415) 896-5858 Fax: (415) 882-9261

SAMPLES: Four water samples were received by Golden State Delivery on 6/9/00. The samples were assayed the same day and stored at 4°C for any follow up work.

Hydrocarbon-Degrading and Total Heterotrophic Bacteria Enumeration Assays

ANALYSIS REQUEST: Bacterial enumeration for aerobic petroleum hydrocarbon-degraders (broad range petroleum hydrocarbons, specifically: Bunker C, diesel, gasoline) and total heterotrophic plate counts by method 9215A (HPC).

CARBON SOURCE: Bunker C, diesel and gasoline hydrocarbons were dissolved into agar plates as the sole carbon and energy sources for the growth of hydrocarbon-degrading aerobic bacteria. Heterotrophic plates were made up with standard methods total plate count agar containing a wide range of carbon sources derived from yeast extract, tryptone and glucose.

PROTOCOLS:

Hydrocarbon Degraders: Sterile agar plates (100 x 15 mm) were prepared with minimal salts medium at pH 6.8 with 1.5% noble agar and hydrocarbons, without any other carbon sources or nutrients added. Triplicate plates were inoculated with 1.0 ml of sample or log dilutions of the sample at 10^0, 10^{-1}, 10^{-2} and 10^{-3}. The hydrocarbon plates were poured and counted after 10 days incubation at 30 Deg. The plate count data are reported as colony forming units (cfu) per milliliter (ml). Each bacteria population value represents a statistical average of the plate count data obtained with inoculations for two of the four log dilutions tested.

Heterotrophs: Sterile agar plates (100 x 15 mm) were prepared with minimal salts medium and 2.35% heterotrophic plate count agar at pH 6.8 without any other carbon sources or nutrients added. Plates were inoculated with 1.0 ml of water sample, or a log dilution of the sample, in triplicate at sample dilutions of 10^0,10^{-1}, 10^{-2}, and10^{-3}. The heterotroph plates were poured and counted after 2 days of incubation at 30 Deg. C. The plate count data are reported as colony forming units (cfu) per milliliter (ml) of sample. Each enumeration value represents a statistical average of two of the four log dilutions inoculated in plates.

Aerobic
Hydrocarbon-Degrading and Heterotrophic Bacteria Enumeration Results

CLIENT SAMPLE NUMBER	SAMPLE DATE	HYDROCARBON DEGRADERS (CFU/ML)	HYDROCARBONS TESTED	HETEROTROPHIC PLATE COUNT (CFU/ML)
FOMW 1	6/08/00	3.9×10^2	Bunker C, diesel	4.0×10^3
FOMW 2	6/08/00	1×10^1	Bunker C, diesel	1.1×10^3
FOMW 3	6/08/00	4.4×10^2	Bunker C, diesel	1.1×10^5
FOMW 5	6/08/00	5×10^2	Bunker C, diesel	8.0×10^4
Positive control	6/09/00	9.5×10^8	Bunker C, diesel	1.1×10^9

ND = Non-detectable; 1.0×10^1 cfu/ml is the lowest detection level for this assay.

A hydrocarbon-degrading bacteria positive control sample was run concurrently with these samples using a previously characterized mixed culture of bacteria from Northern California contaminated groundwater sites.

CytoCulture is available on a consulting basis to assist in the interpretation of these data and their application to field bioremediation protocols.

Randall von Wedel, Ph.D.
Principal Biochemist and Director of Research

C:\cytolab\lab reports\lab-dames&moore\00-28

Reference #: 5269C

CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

1220 Quarry Lane • Pleasanton, California 94566-4756
(925) 484-1919 • Fax (925) 484-1096

2000-06-0152

Chain of Custody

DATE 6/8/00 PAGE 1 OF 1

PROJ. MGR RYAN SEELBACH
COMPANY DAMES & MOORE
ADDRESS 221 MAIN ST #600
SF, CA 94105
SAMPLERS (SIGNATURE) Ryan Seelbach
(PHONE NO.) 415-243-3837
(FAX NO.)

ANALYSIS REQUEST

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH-(EPA 8015,8020) ☐ Gas w/ ☐ BTEX ☐MTBE	PURGEABLE AROMATICS BTEX (EPA 8020)	TPH-Diesel (EPA 8015M)	TEPH (EPA 8015M) Bunker ☒Diesel ☐ M.O. ☐Other Oil	PURGEABLE HALOCARBONS (EVOCs) (EPA 8010)	VOLATILE ORGANICS (EPA 8260) BTEX MTBE	SEMIVOLATILES (EPA 8270)	Oil & Grease ☐ Petrol ☐ Total ☐ 1664	dissolved Methane by headspace analysis	☐ PESTICIDES(EPA 8080) ☐ PCB'S (EPA 8080)	PNA's by ☐ 8270 ☐ 8310	☐ Spec. Cond. ☐ TSS ☐ TDS	LUFT METALS: Cd, Cr, Pb, Ni, Zn	CAM 17 METALS (EPA 6010/7470/7471)	TOTAL LEAD	☐ W.E.T. (STLC) ☐ TCLP	☐ Hexavalent Chromium ☐ pH (24 hr hold time for H2O)	total Alkalinity 310.1	TDS 160.1		NUMBER OF CONTAINERS
FOMW-1	6/8/00	1315	H_2O					X		X			X										X	X		
FOMW-2		1045						X		X			X										X	X		
FOMW-3		1145						X		X			X										X	X		
FOMW-5		-						X		X			X										X	X		

PROJECT INFORMATION

PROJECT NAME: SEARS OAKLAND
PROJECT NUMBER: 00188-248
P.O. #

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS
HEAD SPACE
TEMPERATURE 5.5°C
CONFORMS TO RECORD

TAT: STANDARD 5-DAY | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS:
Report: ☐ Routine ☐ Level 2 ☒ Level 3 ☐ Level 4 ☐ Electronic Report

	RELINQUISHED BY 1	RELINQUISHED BY 2	RELINQUISHED BY 3
(SIGNATURE) (TIME)	Ryan Seelbach		
(PRINTED NAME) (DATE)	RYAN SEELBACH 6/8/00		
(COMPANY)	DAMES & MOORE		

	RECEIVED BY 1	RECEIVED BY 2	RECEIVED BY (LABORATORY) 3
(SIGNATURE) (TIME)			Denise Harrington
(PRINTED NAME) (DATE)			D Harrington 1905
(COMPANY) (LAB)			Chromalab 6/8/00

Dames & Moore

Subcontracted Microbiology Assays
performed by

CytoCulture Environmental Biotechnology

00-28

Chain of Custody Form

Dames & Moore Project Name: SEARS - OAKLAND Project No. 00188-248	Dames & Moore Analytical Laboratories Purchase Order / LOG IN #:
Dames & Moore Analytical client:	Dames & Moore Analytical Laboratories Project Manager:
Address to Send Results: 221 MAIN ST, #600 SF, CA 94105	
Fax for Sending Data: 415-882-9261	Contact / Project Manager: RYAN SEELBACH
Tel for Follow-up: 415-243-3837	Sampler / Recorder: "

Sample I.D.	Sampling		Matrix		Analyses Requested								
Indicate target Hydrocarbon range (e.g., gas, diesel, oil)	Date	Time	Soil	Water	Aerobic Hydrocarbon Degrading Bacteria	Aerobic Heterotrophic Bacteria	pH	DO	NH_3	PO_4	NO_3	SO_4	Other Tests or Comments
Bunker Oil	6/8/00												
FOMW-1	"	1315		X	X	X							
FOMW-2	"	1045		X	X	X							
FOMW-3	"	1145		X	X	X							
FOMW-5	"	—		X	X	X							

Chain of Custody Record	Signature of this form constitutes	a firm Purchase Order for services.	Payment DUE on Reporting Date.
Relinquished by: Ryan Seelbach	Date/Hr: 6/8/00 / 1330	Received by:	Date/Hr:
Received for CytoCulture Lab by:	Date/Hr: 6/9/00 1445 FR	CytoCulture Tel: 510-233-0102 Lab Services Fax: 510-233-3777	Please fax Chain of Custody form to CytoCulture prior to delivery.

LEVEL III Data Validation Report

PROJECT: Sears Oakland

LABORATORY: Chromalab, Inc. Pleasanton, CA

LAB NUMBER: 2000-06-0152

SAMPLES: FOMW-1, FOMW-2, FOMW-3, FOMW-5

MATRIX: Water

Analysis	TPH-Diesel, Bunker–C 8015M	Methane 3810M
Holding Time	✓	✓
Surrogate Recovery	✓	NA
MS/MSD	NA	NA
LCS (Blank Spike)	✓	✓
Method Blanks	✓	✓
Duplicates	NA	NA
Trip/Field/Equipment Blanks	NA	NA
Reporting Limits	✓	✓
Chromatography	Note 1	NA

✓ – QC criteria were met.

Notes: 1. The Bunker-C concentrations were quantitated against the diesel standard. Consequently, all reported concentrations of Bunker-C were flagged, "J," estimated.

Summary:

Based on this Level III validation, these data are usable, as qualified, for their intended purpose. None of these data were rejected.

LEVEL III Data Validation Report

PROJECT: Sears Oakland

LABORATORY: Chromalab, Inc. Pleasanton, CA

LAB NUMBER: 2000-06-0152

SAMPLES: FOMW-1, FOMW-2, FOMW-3, FOMW-5

MATRIX: Water

Analysis	BTEX/MTBE 8260A	Total Dissolved Solids (TDS) 160.1
Holding Time	✓	✓
Surrogate Recovery	✓	NA
MS/MSD	✓	NA
LCS (Blank Spike)	✓	NA
Method Blanks	✓	✓
Duplicates	NA	NA
Trip/Field/Equipment Blanks	NA	NA
Reporting Limits	✓	Note 1

✓ – QC criteria were met.

Notes: 1. In order to quantitate dissolved solids the following dilutions were required:

Sample	Dilution Factor
FOMW-1	2.00
FOMW-3	3.33
FOMW-5	5.00

Reporting limits were increased in proportion to the dilution factors. Reported concentrations of dissolved solids exceeded the elevated reporting limits.

Summary:

Based on this Level III validation, these data are usable for their intended purpose. None of these data were qualified or rejected.

APPENDIX H

CITY OF OAKLAND URBAN LAND REDEVELOPMENT GUIDELINES

Urban Land Redevelopment Program

Welcome!

Are you trying to buy or develop a site that you know or suspect to be contaminated? Are you confused by California's environmental regulatory structure? Are you wondering if you will need to clean up your site and, if so, how much? If the answer to any of these questions is "yes", the **Urban Land Redevelopment Program** can help. This web page provides a brief description of the program and allows you to view or download the latest documents.

What is the Urban Land Redevelopment Program?

The Urban Land Redevelopment (ULR) Program is a collaborative effort by the City of Oakland and the principal agencies charged with enforcing environmental regulations in Oakland (Department of Toxic Substances Control, Regional Water Quality Control Board, and Alameda County Environmental Health) to facilitate the cleanup and redevelopment of contaminated properties. The ULR Program is coordinated by the City of Oakland and is specific to Oakland sites.

The ULR Program clarifies environmental investigation requirements, standardizes the regulatory process and establishes Oakland-specific, risk-based corrective action (RBCA) standards for qualifying sites. RBCA standards are criteria that, when met, adequately address the risk posed by contamination to human health. Through a comprehensive risk-based approach, the ULR Program can help you to design a corrective action strategy that is cost-effective while still providing a high level of protection for the public.

How the ULR Program Can Assist You

Regulatory "closure" is often critical to securing investors for development at contaminated sites; however, the local, state and federal regulatory requirements associated with environmental site assessment and cleanup can be confusing. The ULR Program can save you time and money by assisting you to:

- Reduce the amount of investigation required to determine appropriate corrective actions
- Obtain quicker regulatory agency approval of the corrective actions
- Minimize the cost of implementing the corrective actions
- Provide potential lenders with greater certainty regarding your environmental costs
- Better estimate your overall project costs
- Work cooperatively with those living and working in the vicinity of your site
- Receive regulatory site closure quicker
- Realize development goals faster

Download or View ULR Program Documents

The PDF documents listed below may be downloaded or viewed online using Adobe Acrobat Reader. Simply click on the name of the document you want to download or view. If you do not have Adobe Acrobat Reader, click on the icon at the left to open a new browser window and download the most current version at no cost. Note: the Oakland RBCA spreadsheet requires Microsoft Excel 97 or later; the Eligibility Checklist and Cover Sheet require Microsoft Word 97 or later. **Remember to only print the documents you actually need-- Save Paper!**

Guidance Documents

The City of Oakland has created several guidance documents to help you participate in the ULR Program. You should begin by reviewing the *Oakland Urban Land Redevelopment Program: Guidance Document.* This and other instructional materials that you may wish to consult are described briefly below.

Oakland Urban Land Redevelopment Program Guidance Document: This user-friendly document provides an overview of the ULR Program and helps you understand the ULR process.guidance.pdf (870K)

Oakland Risk-Based Corrective Action Eligibility Checklist: This one-page document is a template version of the eligibility checklist found in the ULR Program Guidance Document. The Eligibility Checklist requires Microsoft Word 97 or later. eligible.doc (37K)

Corrective Actions to Meet Oakland RBCA Eligibility Criteria: This one-page document provides options available to meet the criteria described in the Oakland RBCA Eligibility Checklist if your site does not initially pass the checklist. correct.pdf (7K)

Oakland Risk-Based Corrective Action Exposure Assessment Worksheet: This one-page document is an enlarged template version of the flow chart found in the ULR Program Guidance Document. exposure.pdf (9K)

Oakland Risk-Based Corrective Action Cover Sheet: This one-page document is a template version of the sample cover sheet for Oakland RBCA submittals found in the ULR Program Guidance Document. The Cover Sheet requires Microsoft Word 97 or later. cover.doc (43K)

Oakland Risk-Based Corrective Action Spreadsheet: This Excel file is used to calculate the Oakland-specific risk-based corrective action levels promulgated as part of the ULR Program, and may be used to calculate more site-specific, Tier 3 levels for your site. The Oakland RBCA spreadsheet requires Microsoft Excel 97 or later. wksheet2.xls (722K)

Survey of Background Metal Concentration Studies: This one-page document contains a table with results from background metal concentrations studies at locations

where the geology is likely to be similar to that of sites in Oakland. metals.pdf (11K)

Technical Background

The Oakland-specific RBCA standards are the product of extensive scientific research and mathematical models that take into account chemical toxicity, human exposure, tolerance for risk, geologic and climatic conditions, land use and other factors.

Oakland Risk-Based Corrective Action: Technical Background Document: This is a large, highly-technical document that provides the scientific basis for the Oakland-specific risk-based corrective action levels promulgated as part of the ULR Program. techback.pdf (509K)

Oakland Benzene Partitioning Study Synopsis: This three-page document summarizes a study undertaken by the City of Oakland to better understand sorption of organic chemicals to different soil types. focstudy.pdf (19K)

Permit Tracking

Permit tracking is an innovative institutional control created through the ULR Program that can assist you in implementing effective and cost-efficient corrective actions at contaminated sites.

Oakland's Permit Tracking Control: Managing Long-Term Risk: This three-page document describes how permit tracking is used to both protect public health and reduce the expense of corrective actions. pts.pdf (20K)

Community Input

The ULR Program Oversight Committee sought community input in the formation of the ULR Program.

Consensus Recommendations for Implementing the Oakland Urban Land Redevelopment Program, Report of the Community Review Panel: This report was written by a panel of Oakland residents representing the diversity of interests in Oakland. crreport.pdf (107K)

E-mail Questions or Feedback

or contact Mark Gomez at 510-238-7314
mmgomez@oaklandnet.com

Oakland RBCA Eligibility Checklist

The Oakland Tier 1 RBSLs and Tier 2 SSTLs are intended to address human health concerns at the majority of sites in Oakland where commonly-found contaminants are present. Complicated sites—especially those with continuing releases, ecological concerns or unusual subsurface conditions—will likely require a Tier 3 analysis. The following checklist is designed to assist you in determining your site's eligibility for the Oakland RBCA levels.

CRITERIA	YES	NO
1. Is there a continuing, *primary* source of a chemical of concern, such as a leaking container, tank or pipe? (This does *not* include residual sources.)	☐	☐
2. Is there any mobile or potentially-mobile free product?	☐	☐
3. Are there more than five chemicals of concern at the site at a concentration greater than the lowest applicable Oakland RBCA level?	☐	☐
4. Are there any preferential vapor migration pathways—such as gravel channels or utility corridors—that are potential conduits for the migration, on-site or off-site, of a volatilized chemical of concern?	☐	☐
5. Do both of the following conditions exist? (a) Groundwater is at depths less than 300 cm (10 feet) (b) Inhalation of volatilized chemicals of concern from groundwater in indoor or outdoor air is a pathway of concern but groundwater ingestion is *not**	☐	☐
6. Are there any existing on-site or off-site structures intended for future use where exposure to indoor air vapors from either soil or groundwater is of concern *and* one of the following three conditions is present? (a) A slab-on-grade foundation that is less than 15 cm (6 inches) thick (b) An enclosed, below-grade space (e.g., a basement) that has floors or walls less than 15 cm (6 inches) thick (c) A crawl space that is not ventilated	☐	☐
7. Are there any immediate, acute health risks to humans associated with contamination at the site, including explosive levels of a chemical?	☐	☐
8. Are there any complete exposure pathways to nearby ecological receptors, such as endangered species, wildlife refuge areas, wetlands, surface water bodies or other protected areas?	☐	☐

*If groundwater ingestion *is* a pathway of concern, the associated Oakland RBCA levels will be more stringent than those for any groundwater-related inhalation scenario, rendering depth to groundwater irrelevant in the risk analysis.

If you answer "no" to all questions, your site is eligible for the Oakland RBCA levels. If you answer "yes" to any of the questions, your site is *not* eligible for the Oakland RBCA levels at this time.

Oakland Urban Land Redevelopment Program: Guidance Document

City of Oakland
Public Works Agency

January 1, 2000

CONTENTS

LIST OF TABLES AND FIGURES

Tables

Figures

FOREWORD

The *Oakland Urban Land Redevelopment Program: Guidance Document* is intended to assist property owners, developers, lenders, City personnel, and environmental consultants to clean up and redevelop contaminated properties by applying risk-based corrective action at Oakland sites.

The Urban Land Redevelopment (ULR) Program was developed through a grant from the United States Environmental Protection Agency (U.S. EPA), Region 9, Office of Underground Storage Tanks. ULR Program participants that have assisted the City of Oakland Public Works Agency, Environmental Services Division, in the formation of this document include: the Alameda County Department of Environmental Health, the Department of Toxic Substances Control, the San Francisco Bay Regional Water Quality Control Board, the U.S. EPA, the Community Review Panel[1], Spence Environmental Engineering and volunteer environmental consultants[2].

This document is written to be both understandable to those readers who are new to the environmental investigation and cleanup process and helpful to those readers who are experts in the field. Although the size of this document may appear overwhelming at first glance, upon closer inspection you will notice that the body is only 21 pages in length. The bulk of the document is made up of appendices that are comprised largely of tables and lists that need only be quickly referenced as individual questions arise. To assist the reader, several didactic aides have been included: a glossary at the end of the document provides definitions of common terminology in the risk assessment field and a list of acronyms frequently encountered; text boxes that present hypothetical examples and other useful information may be found throughout the body; and for those who find visual illustrations helpful in understanding new processes and concepts, flow charts have also been included.

"Brownfields"—abandoned or underutilized sites where the potential costs associated with real or suspected contamination are inhibiting redevelopment—are the focus of revitalization efforts throughout Oakland. The ULR Program has been carefully designed to support these efforts by reducing the uncertainty and magnitude of environmental investigation and cleanup costs. It is hoped that the ULR Program will further Oakland's goal of encouraging in-fill development over urban sprawl, revitalizing our city while protecting its residents and preserving open space for future generations.

Please forward any comments or suggestions for improving this document to:

Mark Gomez
City of Oakland
Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, CA 94612

Phone: (510) 238-7314
FAX: (510) 238-7286
e-mail: mmgomez@oaklandnet.com

1.0 INTRODUCTION

Are you trying to buy or develop a site that you know or suspect to be contaminated? Are you confused by California's environmental regulatory structure? Are you wondering if you will need to clean up your site and, if so, how much? If the answer to any of these questions is "yes", the *Oakland Urban Land Redevelopment Program: Guidance Document* can help.

1.1 What is the Urban Land Redevelopment Program?

The Urban Land Redevelopment (ULR) Program is a collaborative effort by the City of Oakland and the principal agencies charged with enforcing environmental regulations in Oakland to facilitate the cleanup and redevelopment of contaminated properties. The ULR Program is coordinated by the City of Oakland and is specific to Oakland sites.

The ULR Program clarifies environmental investigation requirements, standardizes the regulatory process and establishes Oakland-specific, risk-based corrective action (RBCA) standards for qualifying sites. RBCA standards are criteria that, when met, adequately address the risk posed to human health by contamination. Contaminated sites vary greatly in terms of complexity, physical and chemical characteristics, and in the risk that they may pose. The ULR Program recognizes this diversity and is designed to encourage assessments and remedial solutions that are appropriately tailored to site-specific conditions and risks.[3] Through a comprehensive risk-based approach, the ULR Program can help you design a corrective action strategy that is cost-effective while still providing a high level of protection for Oakland's residents and workers.

1.2 How the ULR Program Can Assist You

Regulatory "closure" is often critical to securing investors for development of contaminated sites; however, the local, state and federal regulatory requirements associated with environmental site assessment and cleanup can be confusing. The ULR Program can save you time and money by assisting you to:

- ☞ Reduce the amount of investigation required to determine appropriate corrective actions
- ☞ Obtain quicker regulatory agency approval of the corrective actions
- ☞ Minimize the cost of implementing the corrective actions
- ☞ Provide potential lenders with greater certainty regarding your environmental costs
- ☞ Better estimate your overall project costs
- ☞ Work cooperatively with those living and working in the vicinity of your site
- ☞ Receive regulatory site closure quicker
- ☞ Realize development goals faster

The following pages take you step-by-step through the ULR Program.

2.0 OAKLAND RISK-BASED CORRECTIVE ACTION APPROACH

The centerpiece of the ULR Program is a simple, scientific approach to establishing Oakland-specific RBCA standards for Oakland sites.[4] The Oakland RBCA approach follows the guidelines presented in the American Society for Testing and Materials (ASTM) Standard E-1739. ASTM is the leading national professional organization providing guidance on environmental remediation. The ASTM RBCA standard has been endorsed by the U.S. EPA.

2.1 Understanding the Tiered RBCA Process

ASTM prescribes a three-tiered decision-making process for evaluating sites with potential environmental issues. In Tier 1, sites are characterized through information collected from historical records, a visual inspection, and minimal site investigation. Contaminant sources, impacted human and environmental receptors, and potential contaminant transport pathways are identified. Site concentrations are compared with Tier 1 risk-based screening levels (RBSLs) for all applicable exposure pathways. Site concentrations above Tier 1 RBSLs must be addressed through corrective actions or further analysis under Tiers 2 or 3.

In Tier 2, additional site characterization constituting a minimal incremental effort is undertaken to establish site-specific target levels (SSTLs). Tier 2 SSTLs are generally less stringent than Tier 1 RBSLs, but are still based on conservative assumptions. Site concentrations are compared with Tier 2 SSTLs for all applicable exposure pathways. Site concentrations above Tier 2 SSTLs must be addressed through corrective actions or further analysis under Tier 3.

Tier 3 represents a substantial incremental effort relative to Tiers 1 and 2. The analysis is more complex and may include highly-detailed site assessment, probabilistic evaluations, and sophisticated chemical fate and transport models. Tier 3 SSTLs are established and, if the selected target levels are exceeded and corrective action is necessary, a corrective action plan must be developed and implemented.[5]

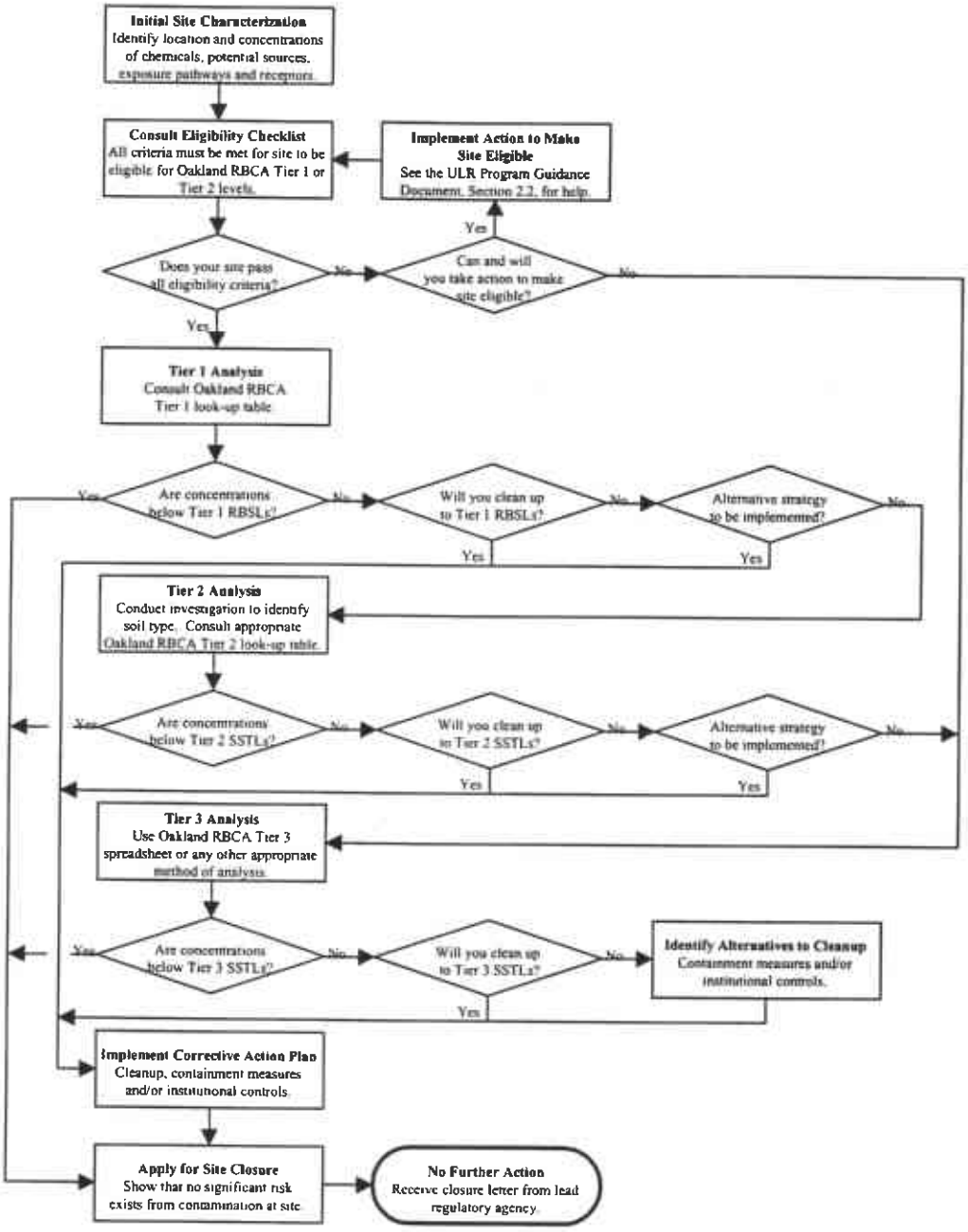
The ULR Program follows the ASTM guidelines and provides the following:

- ☞ Oakland-specific Tier 1 RBSLs (Appendix E)
- ☞ Oakland-specific Tier 2 SSTLs based on Oakland's geology (Appendix F)
- ☞ Guidance for conducting a cost-efficient Tier 3 analysis (Appendix G)

The Oakland RBCA Tier 1 RBSLs and Tier 2 SSTLs address commonly-found chemicals of concern. They represent an "evergreen" set of values that is updated whenever new information becomes available. The Tier 1 RBSLs may be applied at all sites in Oakland; the Tier 2 SSTLs may be applied only at sites where one or more of the three predominant Oakland soil types prevails (see Section 2.3.4). In order to use either the Tier 1 or Tier 2 Oakland RBCA levels, your site must first pass a set of eligibility criteria (see Section 2.2).

Figure 1 presents the entire tiered Oakland RBCA process in flow chart form, from establishing site eligibility to receiving regulatory site closure.

Figure 1. Flowchart of the Tiered Oakland RBCA Process



2.2 Qualifying for the Oakland RBCA Levels

The Oakland Tier 1 RBSLs and Tier 2 SSTLs are intended to address human health concerns at the majority of sites in Oakland where commonly-found contaminants are present. Complicated sites—especially those with continuing releases, ecological concerns or unusual subsurface conditions—will likely require a Tier 3 analysis. The checklist that comprises Table 1 is designed to assist you in determining your site's eligibility for the Oakland RBCA levels.[6]

Table 1. Oakland RBCA Eligibility Checklist

CRITERIA	YES	NO
1. Is there a continuing, *primary* source of a chemical of concern, such as a leaking container, tank or pipe? (This does *not* include residual sources.)	☐	☐
2. Is there any mobile or potentially-mobile free product?	☐	☐
3. Are there more than five chemicals of concern at the site at a concentration greater than the lowest applicable Oakland RBCA level?	☐	☐
4. Is there a preferential vapor migration pathway—such as a gravel channel or a utility corridor—that is less than 1 meter from *both* of the following? (a) A source area containing a volatile chemical of concern (b) A structure where inhalation of indoor air vapors is of concern	☐	☐
5. Do *both* of the following conditions exist? (a) Groundwater is at depths less than 300 cm (10 feet) (b) Inhalation of volatilized chemicals of concern from groundwater in indoor or outdoor air is a pathway of concern but groundwater ingestion is *not**	☐	☐
6. Are there any existing on-site or off-site structures intended for future use where inhalation of indoor air vapors from either soil or groundwater is of concern *and* one or more of the following four conditions is present? (a) Chemicals of concern located less than one meter below the structure (b) A slab-on-grade foundation less than 15 cm (6 inches) thick (c) An enclosed, below-grade space (e.g., a basement) that has floors or walls less than 15 cm (6 inches) thick (d) A crawl space that is not ventilated	☐	☐
7. Are there any immediate, acute health risks to humans associated with contamination at the site, including explosive levels of a chemical?	☐	☐
8. Are there any existing or potential exposure pathways to nearby ecological receptors, such as endangered species, wildlife refuge areas, wetlands, surface water bodies or other protected areas?	☐	☐

*If groundwater ingestion *is* a pathway of concern, the associated Oakland RBCA levels will be more stringent than those for any groundwater-related inhalation scenario, rendering depth to groundwater irrelevant in the risk analysis.

If the answer to all questions is "no", your site is eligible for both the Oakland Tier 1 RBSLs and Tier 2 SSTLs. Proceed to Section 2.3 for guidance on meeting the minimum Tier 1 and Tier 2 site characterization requirements.

If the answer to any of the questions is "yes", your site is *not* eligible for the Oakland Tier 1 or Tier 2 RBCA levels at this time. You have two options:

(1) Implement any available corrective actions to make your site eligible; or
(2) Undertake a Tier 3 analysis

Table 2 presents a list of corrective actions that may be implemented to change conditions at your site so that it meets the eligibility criteria.

Table 2. Corrective Actions to Meet Eligibility Criteria

Criterion #	Available Corrective Action(s)
1	Remove the primary source.
2	Remove the free product in question.
3	Analyze the potential cumulative and synergistic effects of the chemicals of concern. If aggregate risk is below 10^{-6} for Tier 1 or 10^{-5} for Tier 2, then the applicable RBSLs or SSTLs may be applied as cleanup goals.
4	Fill in the preferential vapor migration pathway with an appropriate inert and impermeable material.
5	Implement a containment measure (such as a vapor barrier) to eliminate inhalation of vapors from groundwater as a pathway of concern.
6	Implement a containment measure (such as a vapor barrier) to eliminate inhalation of indoor air vapors as a pathway of concern.
7	Remove the conditions posing the acute health risk (may include removing or reducing the concentration of chemicals and ventilating or destroying impacted structures).
8	Implement a containment measure to ensure no exposure of ecological receptor(s). *Note:* If past or current exposure exists, you will have to undertake an ecological risk analysis. If the analysis shows that risks to human health are greater than those posed to ecological receptors *and* that no aesthetic issues (e.g., offensive odors or discoloration of impacted surface waters) exist, then the Oakland RBCA levels may be used.

If corrective actions can be taken to make your site eligible *and* you believe that applying the Oakland Tier 1 or Tier 2 RBCA levels is the most economical way to address human health considerations at your site, then you should undertake the appropriate corrective actions. Once your site passes all the eligibility criteria, consult Section 2.3 for guidance on meeting the minimum Tier 1 and Tier 2 site characterization requirements.

If there are no corrective actions available to make your site eligible for the Oakland RBCA levels *or* you believe any available corrective action(s) to be uneconomical, consult Section 3.4 for a detailed explanation of the Tier 3 process and how the ULR Program can assist you in conducting additional, cost-effective, site-specific analysis.

2.3 Characterizing Your Site

If your site passes the Oakland RBCA eligibility criteria and you wish to apply the Oakland Tier 1 RBSLs or Tier 2 SSTLs, you will have to conduct the necessary investigation to characterize your site. For the Oakland RBCA approach, an adequate investigation will include the following:

- ☞ Source characterization
- ☞ Identification of potential exposure pathways and receptors
- ☞ Determination of land use scenario
- ☞ Soil categorization (for Tier 2 only)

Guidelines for conducting this investigation in a satisfactory manner are provided in sections 2.3.1 through 2.3.4.

2.3.1 Source Characterization

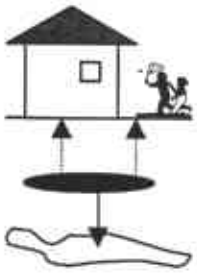
The origin, current location and character of contaminants at your site should be investigated. Historical records of site activities and past chemical releases may be used to identify chemicals of concern and to locate major sources of these compounds. When and where there is insufficient information, chemical analyses should be employed.

> ***What jargon is used by professionals?***
> In the parlance of environmental investigation, an historical records search is typically referred to as Phase I work. Soil and groundwater sampling and analyses are typically referred to as Phase II work..

Your investigation should focus on:

- ☞ delineating the size of the contaminant source area or plume
- ☞ identifying the locations and maximum concentrations of the most prevalent, toxic and mobile chemicals

2.3.2 Identification of Potential Exposure Pathways and Receptors



To better define actual risk from contamination at your site, you must determine who or what may be exposed to the contamination and how. Information may be obtained from visual inspections, a review of development plans, water well records, engineering drawings, and hydro-geological data.

> ***How are people exposed to contamination?***
> There are three principal ways that humans may be exposed to contaminants in the ground: (1) ingestion of and/or dermal contact with contaminated soil; (2) ingestion of and/or dermal contact with contaminated ground-water; and (3) inhalation of contaminants that have vaporized from the soil or groundwater.

Key issues to consider when identifying potential exposure pathways and receptors include:

- ☞ Potential transport mechanisms, such as chemical volatilization, leaching, groundwater transport and well-water extraction
- ☞ Potential "preferential migration pathways", such as sewers and utility corridors
- ☞ The location of potential on-site and off-site "receptors", both human and environmental
- ☞ Current and potential future uses of your site, as well as surrounding land, groundwater, surface water, and sensitive habitats[7]

Appendix D contains an exposure assessment worksheet that can assist you to identify potential exposure pathways of concern at your site. If any exposure pathway identified for analysis in the Oakland RBCA approach (see Section 2.4, Table 3) is to be discounted, you must provide adequate evidence that this is a reasonable decision.

2.3.3 Land Use Scenario

The Oakland RBCA approach establishes different standards for residential and commercial/industrial land uses. Standards are relatively more stringent for residential land use than for commercial/industrial land use because:

- ☞ The frequency and duration of exposure tends to be greater
- ☞ Young children are assumed to be exposed

Residential standards will be applied at your site unless you demonstrate that commercial/industrial standards are more appropriate. If you wish to apply commercial/industrial standards at your site, you must show that none of the following is a potential on-site or off-site point of exposure:

- ☞ a residence, including any mobile home or factory-built housing constructed or installed for use as a permanently occupied human habitation
- ☞ a hospital for humans
- ☞ a school for persons under 21 years of age
- ☞ a day care center for children
- ☞ any permanently occupied human habitation other than those used for industrial purposes.[8]

> ***Example: Determining the Land Use Scenario***
> You are interested in redeveloping the site of a former gas station into a mini-market. There is petroleum-related contamination in the soil from a leaking underground storage tank. The site is located in a commercially-zoned area with no nearby schools or hospitals. There is a day care center on the second floor of a nearby building, but there is no exposure pathway leading from the contamination in soil to the day care center. Commercial/industrial standards may be applied.

Please note that, with respect to the first and last requirements, multi-unit housing structures where there is no exposed soil may be exempted under certain conditions. The lead regulatory agency will determine this on a case-by-case basis.

2.3.4 Soil Categorization

The Oakland RBCA approach identifies three Oakland-specific soil types for determining the appropriate Tier 2 SSTLs:

- ☞ Merritt sands
- ☞ Sandy silts
- ☞ Clayey silts

Merritt sands are primarily located in the flatlands area to the west of Lake Merritt. They are a fine-grained, silty sand with lenses of sandy clay and clay.[9] Merritt sands have a low moisture content and high permeability.

Sandy silts are found throughout Oakland. They are made up of unconsolidated, moderately sorted sand, silt, and clay sediments, with both fine-grain and course-grain materials. Sandy silts have a medium moisture content and moderate permeability.

Clayey silts are primarily found along the Bay and estuary, and in land fills from those areas. They may contain organic materials, peaty layers and small lenses of sand. Clayey silts have a high moisture content and low permeability.

The Oakland RBCA Tier 2 SSTLs take into account potential for contaminant sorption and migration in the different soil types, because these characteristics affect levels of human exposure. For most exposure pathways, the Tier 2 SSTLs for Merritt sands are the most stringent, while the SSTLs for clayey silts are the least stringent.

Geographic location, information on nearby sites, visual inspections, hydrologic and geologic records, and laboratory analyses may be used as evidence of soil type. You will need to provide the following minimum information:

- ☞ A laboratory grain size analysis of soil at your site
- ☞ A vertical cross-section of site geology (a standard boring log illustration is sufficient)

> ***Example: Identifying Soil Type***
> You own a contaminated site located in downtown Oakland. U.S. Geological Survey maps, data from boring logs and a grain size analysis of soil samples indicate that the site overlies the Merritt formation that pervades much of downtown. The Tier 2 SSTLs for Merritt Sands are applicable at your site.

For some chemicals of concern and some exposure pathways, soil type has a significant impact on the Oakland RBCA levels; for others, it does not. Before undertaking additional analyses to determine the soil type at your site, it is advisable to first determine whether or not moving from Tier 1 to Tier 2 will have a meaningful impact on your potential corrective action costs. This can be done by comparing the Tier 1 RBSLs with the anticipated Tier 2 SSTLs for each chemical of concern.

Keep in mind that some sites may have different soil types in stratified layers. In such cases, it is important to assess each potential exposure pathway with respect to the appropriate soil type.[10]

2.4 Reading the Oakland RBCA Look-up Tables

The Oakland Tier 1 and Tier 2 look-up tables contain RBCA levels for commonly-found chemicals of concern based on:

- the media in which they are found
- the potential exposure pathways
- the land use
- the type of risk posed

The Oakland Tier 1 RBSLs may be applied at all sites in Oakland; the Oakland Tier 2 SSTLs may be applied only at sites where one or more of the three predominant Oakland soil types (Merritt sands, sandy silts or clayey silts) prevails.

Table 3 presents an example Oakland RBCA look-up table for the chemical benzene.

Table 3. Example of an Oakland RBCA Look-up Table

Medium	Exposure Pathway	Land Use	Type of Risk	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.7E+01
			Hazard	9.9E+01
		Commercial/ Industrial	Carcinogenic	1.5E+02
			Hazard	9.2E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.0E-01
			Hazard	2.3E+00
		Commercial/ Industrial	Carcinogenic	1.1E+01
			Hazard	6.7E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	3.9E+00
			Hazard	1.6E+01
		Commercial/ Industrial	Carcinogenic	1.5E+01
			Hazard	9.1E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.0E-02*
			Hazard	*1.0E-02*
		Commercial/ Industrial	Carcinogenic	*1.0E-02*
			Hazard	*1.0E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.4E+00
			Hazard	4.7E+00
		Commercial/ Industrial	Carcinogenic	2.2E+01
			Hazard	1.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.8E+00
			Hazard	7.2E+00
		Commercial/ Industrial	Carcinogenic	6.9E+02
			Hazard	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-03*
			Hazard	*1.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-03*
			Hazard	*1.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	6.3E-02
			Hazard	1.8E-01

For each chemical of concern at your site, the Oakland RBCA look-up tables are designed to be read from left to right, in the following manner:

Step 1: Identify all media in which the chemical of concern is found at your site. Surficial soil is defined as the top one meter of soil. Subsurface soil is all soil deeper than one meter and above groundwater. Groundwater is non-surface water located below the water table in an aquifer. Water used for recreation refers to surface water or groundwater with which a person may come into contact during recreational activities such as swimming or wading. You may disregard all rows relating to media in which the chemical of concern is not found. (*Note:* if a chemical of concern capable of leaching to groundwater is present in the surficial soil *and* groundwater at your site is considered a source of drinking water, you should—for purposes of the RBCA analysis—consider the chemical to be present in the subsurface soil even if it is not detected there currently.)

Step 2: For each medium where the chemical of concern is found at your site, identify the exposure pathways via which humans may be exposed to the chemical of concern (see Section 2.3.2 and Appendix D for guidance). You may disregard all rows relating to exposure pathways that are not applicable at your site.

Step 3: Identify the land use scenario—either residential or commercial/industrial—that reflects your planned use for the site (see Section 2.3.3 for guidance). For each exposure pathway applicable at your site, different RBCA levels are presented based on land use. You may disregard all rows relating to the land use scenario that is not applicable at your site.

> ***Example: Identifying the RBCA Level to Apply***
> Let us say that a site contaminated with benzene qualifies for the commercial/industrial land use scenario and that there is no surficial soil, groundwater or surface water contamination (i.e., benzene is only found in soil deeper than one meter). Furthermore, groundwater is not considered a source of drinking water. In this case, the exposure pathways from surficial soil, groundwater and water used for recreation may be eliminated as pathways of concern. Referring to Table 3, we find that the applicable RBCA level is 11 mg/kg of benzene in subsurface soil.

Step 4: For all rows that still apply, read across until you reach the column headed by the chemical of concern in question. Chemicals of concern are listed alphabetically, from left to right. Some chemicals of concern are considered carcinogens; other chemicals of concern are considered "hazards" (i.e., they may cause non-carcinogenic health problems); and some chemicals of concern are considered both carcinogenic and a hazard. In this last case, you will need to compare the RBCA level presented in the "carcinogenic" risk row with the RBCA level presented in the "hazard" risk row. The *lower* of these two levels will apply at your site.

Step 5: Compare the concentrations of each chemical of concern found at your site with the applicable Oakland RBCA level(s) in the appropriate Tier 1 or Tier 2 look-up table. If site concentrations are below the applicable RBCA level(s), then no significant risk is posed to human health. If site concentrations are above the applicable RBCA level(s), then further site-specific analysis must be undertaken and/or a corrective action plan implemented to address the identified risk. (These options are discussed in more detail in sections 3.2 through 3.4.)

3.0 ESTABLISHING CORRECTIVE ACTION STANDARDS

Once you have determined that there is contamination of potential concern at your site, the next step is to establish corrective action standards.

3.1 Identifying the Lead Regulatory Agency

The first task in establishing corrective action standards is to identify the lead regulatory agency for your site. Table 4 outlines the oversight responsibilities of the principal environmental agencies charged with regulating sites in Oakland.

Table 4. Environmental Regulatory Agency Oversight Responsibilities

Regulatory Agency	Responsibilities
Alameda County Department of Environmental Health	☞ Underground storage tank sites with associated contamination ☞ Hazardous materials storage ☞ Management of hazardous waste ☞ Disposal of solid and medical wastes
Department of Toxic Substances Control, Region 2	☞ Management, transportation, recycling, treatment and disposal of all hazardous wastes ☞ Regulation of generators, transporters, and treatment, storage and disposal facilities ☞ Source reduction planning
City of Oakland Fire Department	☞ Underground storage tank sites ☞ Hazardous Materials Management Plans for operating businesses ☞ Permit Tracking
San Francisco Bay Regional Water Quality Control Board	☞ Groundwater, surface water and storm water quality control
State Water Resources Control Board	☞ Establishment of state-wide water quality standards
United States Army Corps of Engineers	☞ Protection of wetlands and navigable waters
United States EPA, Region 9	☞ Establishment of national and regional cleanup standards ☞ Superfund sites

Of the regulatory agencies listed in Table 4, only the first four are regularly involved in the oversight of Oakland sites with soil and groundwater contamination. For almost all sites in Oakland, the following regulatory scheme will apply:

- The City Fire Department will oversee the *removal* of underground storage tanks (USTs).
- Either the City Fire Department or Alameda County will oversee the *assessment* and, if necessary, *remediation* of contamination associated with USTs.[11]
- The Department of Toxic Substances Control (DTSC) will oversee non-UST sites with just soil contamination.
- The Regional Water Quality Control Board (RWQCB) will oversee non-UST sites with groundwater or surface water contamination, and may work jointly with Alameda County on UST sites where groundwater, surface water or storm water is impacted.

You should contact the appropriate regulatory agency to schedule a preliminary meeting at which establishment of a lead agency, available site information, identification of a case worker and regulatory oversight fees may be discussed. Appendix A provides a list of regulatory agency addresses and phone numbers.

What are the regulatory oversight fees?
Regulatory oversight fees will be charged by the lead regulatory agency at your site to cover the cost of staff time spent on your project. The City Fire Department, Alameda County and DTSC will typically require that a deposit be paid up-front; the RWQCB will bill you as staff time is expended. Excess fees not spent will be returned to you at the conclusion of regulatory oversight.

Pro-active, voluntary actions to assess and address environmental contamination will facilitate your negotiations with the regulators and lead to a more timely and cost-effective resolution. If you have difficulty establishing a lead regulatory agency, the ULR Program Oversight Committee can help. Contact the City of Oakland Public Works Agency, Environmental Services Division, for assistance.

3.2 Undergoing the Tier 1 Process

Tier 1

If your site qualifies for the Oakland Tier 1 RBSLs (see Section 2.2), the first step in evaluating your options is to consult the Tier 1 look-up tables. If the existing concentration of any and all chemicals of concern at your site is lower than the RBSL for each applicable exposure pathway, you may immediately petition the lead regulatory agency for site closure (see Section 5.0). If the existing concentration of a chemical of concern at your site is higher than the Tier 1 RBSL for any applicable exposure pathway, you may undertake one or more of the following options:

- Remove contamination at your site until concentrations of any and all chemicals of concern are at or below the applicable RBSLs.
- Implement a containment measure and/or an institutional control that effectively eliminates, or reduces to an acceptable level, exposure via a pathway of concern (see sections 4.2 and 4.3).
- Perform additional site-specific analysis under Tier 2 or 3.

3.3 Undergoing the Tier 2 Process

Tier 2

The Oakland RBCA Tier 2 process is similar to the Tier 1 process. If your site qualifies for the Oakland Tier 2 SSTLs, the first step in evaluating your options is to consult the Tier 2 look-up tables for the appropriate soil type (see Section 2.3.4). If the existing concentration of any and all chemicals of concern at your site is lower than the Tier 2 SSTL for each applicable exposure pathway, you may immediately petition the lead regulatory agency for site closure (see Section 5.0). If the existing concentration of a chemical of concern at your site is higher than the Tier 2 SSTL for any applicable exposure pathway, you may undertake one or more of the following options:

- ☞ Remove contamination at your site until concentrations of any and all chemicals of concern are at or below the applicable SSTLs.
- ☞ Implement a containment measure and/or an institutional control that effectively eliminates, or reduces to an acceptable level, exposure via a pathway of concern (see sections 4.2 and 4.3).
- ☞ Perform additional site-specific analysis under Tier 3.

3.4 Undergoing the Tier 3 Process

Tier 3

The Tier 3 process is substantially different from the Oakland RBCA Tier 1 and Tier 2 processes. For sites that do not qualify for the Oakland Tier 1 RBSLs or Tier 2 SSTLs, or for which a Tier 3 analysis is preferred, the first step is to reach agreement with the lead regulatory agency on an acceptable method of site-specific analysis.

In Tier 3, you may use any analytical method acceptable to the lead regulatory agency to determine site-specific corrective action standards. In choosing a method of analysis, you should consider which method will most directly and economically address areas of concern at your site. In some cases, applying additional site-specific data to the Oakland RBCA model will prove to be the best choice; in other cases, an alternative method of analysis will be more appropriate. An environmental professional should make this determination.

The ULR Program can assist you in significantly reducing the costs associated with a Tier 3 Oakland RBCA analysis. The Oakland RBCA Excel spreadsheet that is used to calculate the Oakland Tier 1 RBSLs and Tier 2 SSTLs may be downloaded at no cost off of the ULR Program web page at www.oaklandpw.com. Appendix G identifies and describes those input parameters that should be the focus of a cost-effective Tier 3 analysis, and walks you through the simple process of changing input parameter values in the spreadsheet to calculate RBCA standards that more accurately reflect risk posed by contamination at your site.

4.0 PREPARING A CORRECTIVE ACTION PLAN

Once you have established with the lead regulatory agency the RBCA standards that will apply at your site, you must submit a corrective action plan (CAP) specifying how and when the standards will be met. (See Appendix H for a sample cover sheet.) The CAP may include one or more of the following, depending on the complexity of your site:

- How you will apply the Tier 1, 2 or 3 RBCA levels
- What containment measures you will use
- What institutional controls you will implement
- How you will comply with public notification requirements

4.1 Applying RBCA Levels

RBCA levels may be applied in two ways:

- To show that existing concentrations of chemicals of concern do not pose a significant risk
- As target cleanup levels for removal of chemicals of concern

Your CAP should identify the exposure pathways of concern at your site and how the applicable Tier 1, 2 or 3 RBCA levels for those exposure pathways will be applied.

4.2 Using Containment Measures

Your CAP should specify any existing or proposed containment measure(s) that will be used to reduce or eliminate risk via potential exposure pathways. Containment measures that are commonly employed include vapor barriers, asphalt caps, moisture barriers and slurry walls. These types of engineered controls can be very effective at reducing or eliminating exposure to chemicals of concern, and they are often less expensive, easier to implement, and more effective than techniques that physically remove contaminants.

> ***Example: Eliminating Risk through Containment***
> A risk assessment at your site indicates an indoor air inhalation risk from PCE vapors originating from soil and groundwater contamination. As part of new construction, you will install a vapor barrier in the building above the contamination. The vapor barrier will block the volatilization of PCE to the indoor air of the building. The exposure pathway "inhalation of indoor air vapors" may be eliminated as a pathway of concern from both subsurface soil and groundwater.

Your CAP should identify the exposure pathways that are affected by your containment measure(s) and any performance measures that may be appropriate for demonstrating the effectiveness of the containment measure(s).

4.3 Implementing Institutional Controls

Your CAP should specify any institutional controls that will be implemented for your site. Institutional controls are those controls that can be employed by responsible parties and regulatory agencies to ensure the future protection of human health and environmental resources when contamination at levels of potential concern will remain at your site. The implementation of effective institutional controls is often crucial to allaying concern among regulators and site neighbors that the conditions upon which a risk assessment is based (e.g., the existence of an asphalt cap covering contaminated soil) might be compromised in the future.

Institutional controls that are commonly used include deed restrictions, land use restrictions, access controls, recording notices and contractual obligations. In addition to these, the City of Oakland has implemented an innovative institutional control that can assist you: *permit tracking*.

Under permit tracking, if your site is granted "conditional" regulatory site closure (i.e., closure is dependent upon certain conditions being maintained in the future), it will be flagged in the City of Oakland Permit Tracking System (PTS). The PTS is a computerized system that tracks all City permits from filing to issuance and provides the user with a permitting and inspection history. Central Permit Counter staff, who process all permitting operations related to development, inspection and enforcement under the building, planning, zoning and housing codes of the City, record all new permitting information in the PTS.

Future permit applications for work that might alter the conditions of site closure or require compliance with a risk management plan (see Section 5.2) are routed for special review to the City of Oakland Fire Department, Hazardous Materials Management Program (HMMP).

> ***Example: Ensuring Future Protection***
> You are planning to redevelop a former shipyard as a packaging facility. Petroleum hydrocarbons present in the soil from past uses are measured at concentrations below the commercial/industrial RBCA levels but above the residential RBCA levels. The lead regulatory agency agrees to apply the commercial/industrial RBCA standards provided that the site remains non-residential. The City of Oakland permit tracking control will ensure that future applications for change of land use permits undergo special review and that the risk posed by the remaining petroleum hydrocarbons is re-addressed if residential land use is ever proposed.

The City of Oakland permit tracking control is mandatory for all Oakland sites granted "conditional" closure. The permit tracking control facilitates the implementation of cost-effective corrective actions by helping to allay community concerns and bolster regulatory agency confidence that the conditions of site closure will be complied with. In some cases, the permit tracking control may obviate the need for a deed restriction that could unfairly stigmatize and devalue your property.

The City's permit tracking control has been carefully designed to provide added assurance that human health and environmental resources will be protected without needlessly delaying future construction and development projects (see Appendix C for more details).

4.4 Complying with Public Notification Requirements

Public notification requirements for environmental site assessment and corrective action work will vary depending on the policies of the lead regulatory agency and the complexity of your site. You will need to consult the lead regulatory agency to determine the public notification requirements that apply at your site.

The ULR Program encourages you to take a proactive stance towards public notification. By informing those who live and work in the vicinity of your site about any site assessment and corrective action work that will take place, you can help to establish a cooperative relationship with your community. Such a relationship can help you avoid costly last-minute project delays and ensure that your future development efforts enjoy the maximum potential for success.

> ***Example: Soliciting Community Input***
> The Department of Toxic Substances Control (DTSC) is the lead regulatory agency for your site, a former scrap yard located in a mixed residential and commercial neighborhood. In discussions with the DTSC project manager, you are informed that DTSC policy requires an assessment of community interest in the site "to determine the need and the mechanisms for establishing open lines of communication"[12]. By identifying the census tract in which your site is located, you quickly find CBOs and local schools that might be interested in your planned activities. In cooperation with DTSC, you send a letter to each of these CBOs and schools explaining the corrective actions you plan to undertake and providing them with a contact and forum to express any concerns that they might have.

The ULR Program Community Review Panel, consisting of individuals representing the diversity of Oakland residents and interests, was invaluable in formulating a public notification strategy for Oakland sites. Per their recommendations, the ULR Program provides a list of Oakland schools and community-based organizations (CBOs), categorized by the census tract(s) in which they are located or have indicated an interest (see Appendix B). You can easily identify the schools and CBOs that should be contacted as part of compliance with any relevant public notification requirements by identifying the census tract in which your site is located. Appendix B contains a census tract map for Oakland, as well as the addresses and phone numbers of all schools and CBOs that are listed.

Both common sense and the Oakland Blight Ordinance, enacted March 24, 1998, dictate that "materials which are toxic, hazardous or offensive must be properly and safely contained and appropriately disposed so as not to accumulate and pose a threat to the health and safety of the community."[13] This ordinance will be strictly enforced at all sites suspected or known to be contaminated. Your site should be properly fenced or access otherwise controlled until such time as the contamination issue has been adequately addressed. This precaution will protect both nearby residents against hazardous exposure and your interests against liability claims.

5.0 OBTAINING REGULATORY SITE CLOSURE

Once you have complied with any public notification requirements and your CAP has been successfully implemented, you may request regulatory "site closure" from the lead regulatory agency. To obtain site closure, you must submit sufficient evidence to satisfy the lead regulatory agency that the agreed-upon corrective action standards have been met.

5.1 Receiving a "No Further Action" Letter

Regulatory site closure is typically granted in the form of a "no further action" letter from the lead regulatory agency. A no further action letter will state that no further corrective action is required concerning any identified chemicals of concern still present at your site. In some cases, this declaration of site closure will be "conditional" (i.e., tied to land use, maintenance of containment measures and/or implementation of institutional controls).

Your site will receive a no further action letter when the lead regulatory agency is satisfied that either:

(1) initial concentrations of chemicals of concern are shown to be below the applicable Tier 1, 2 or 3 RBCA levels; *or*
(2) concentrations of chemicals of concern after cleanup are shown to be below the applicable Tier 1, 2 or 3 RBCA levels; *or*
(3) containment measures and/or institutional controls have been undertaken to sufficiently reduce or eliminate potential exposure via pathways for which concentrations of chemicals of concern are higher than the applicable Tier 1, 2 or 3 RBCA levels; *and*
(4) if required, a risk management plan has been submitted to and approved by the lead regulatory agency (see Section 5.2).

5.2 Implementing a Risk Management Plan

In some cases, the lead regulatory agency will require you to submit a risk management plan (RMP) that specifies how remaining contamination will be managed to ensure the continued protection of human health and the environment. Your RMP should include any maintenance, inspections, monitoring, future testing, reporting or other activities that you will perform. All containment measures and institutional controls should also be described in detail.

A copy of the RMP must be submitted to both the lead regulatory agency and the City Fire Department, HMMP. Failure to comply with the RMP may result in the lead regulatory agency "re-opening" your site for regulatory scrutiny.

APPENDIX A: AGENCY CONTACTS

The following is a list of addresses and phone numbers for environmental regulatory agencies and other organizations, such as utility companies, that may need to be contacted in the course of environmental site assessment, remediation and development efforts:

Alameda County
Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502-6577
(510) 567-6782

Department of Toxic Substances Control,
Cal-EPA Region 2
700 Heinz St., Building F, Suite 200
Berkeley, CA 94710
(510) 540-2122

City of Oakland Fire Department
Hazardous Materials Management Program
1605 Martin Luther King, Jr. Way
Oakland, CA 94612
(510) 238-7759

City of Oakland
Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, CA 94612
(510) 238-7314

San Francisco Bay
Regional Water Quality Control Board
1515 Clay Street
Oakland, CA 94612
(510) 622-2374

East Bay Municipal Utility District
375 11th St.
Oakland, CA 94607
(510) 287-0600

Pacific Gas & Electric
1919 Webster St.
Oakland, CA 94601
(510) 437-2233

Pacific Bell
2140 Webster St.
Oakland, CA 94612
1 (800) 848-5580

State Water Resources Control Board
2014 T St.
Sacramento, CA 95818
(916) 227-4400

AT&T Cable Services
4215 Foothill Blvd.
Oakland, CA 94601
(510) 261-6800

Underground Services Alert
4090 Nelson Ave., Suite A
Concord, CA 94520
1-800-642-2444

United States
Environmental Protection Agency
75 Hawthorne St.
San Francisco, CA 94105
(415) 744-1305

APPENDIX B: SCHOOLS AND COMMUNITY-BASED ORGANIZATIONS

The ULR Program encourages you to take a proactive stance towards public notification. Section B.1 provides a list of schools and community-based organizations (CBOs), organized by the census tract(s) in which they are located and/or have indicated interest, that should be contacted as part of compliance with any relevant public notification requirements. A census tract map of Oakland is presented at the end of the section (see page 37). Section B.2 provides the address and phone number for each school and CBO, which are listed alphabetically.

B.1 Schools and CBOs by Census Tract

There are 104 census tracts in Oakland. Note that all Oakland census tracts begin with "40"; this prefix is omitted from the headings below to make the census tracts easier to locate.

Tract 01
Claremont Middle School
Kaiser School
Montera JHS
Oakland Technical HS
Skyline Blvd. Neighborhood Assoc.
Skyline HS
Thornhill School

Tract 02
Alpine Terrace Neighborhood Assoc.
Chabot School
Claremont Middle School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Rockridge Community Planning Council
Shattuck Neighborhood Action Coalition
Temescal Neighbors Together

Tract 03
Alpine Terrace Neighborhood Association
Chabot School
Claremont Middle School
Emerson School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Rockridge Community Planning Council
Shattuck Neighborhood Action Coalition
Temescal Neighbors Together
Verdese Carter Middle School
Washington School

Tract 04
Claremont Middle School
Emerson School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Peralta Year Round
Rockridge Community Planning Council
Shattuck Neighborhood Action Coalition

Tract 05
Claremont Middle School
Golden Gate School
Jefferson Year Round
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Peralta Year Round
Santa Fe School
Shattuck Neighborhood Action Coalition

Tract 06
Claremont Middle School
Emerson School
Oakland Technical HS
OCD-North Oakland
Rockridge Community Planning Council
Sante Fe School
Shattuck Neighborhood Action Coalition
Verdese Carter Middle School
Washington School

Tract 07
Claremont Middle School
Golden Gate School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Sante Fe School
Shattuck Neighborhood Action Coalition
Verdese Carter Middle School
Washington School

Tract 08
Golden Gate School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Shattuck Neighborhood Action Coalition
Verdese Carter Middle School

Tract 09
Golden Gate School
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
Sante Fe School
Shattuck Neighborhood Action Coalition
Verdese Carter Middle School

Tract 10
Emerson School
Foster Middle School
Golden Gate School
Hoover School
Longfellow School
McClymonds HS
Mosswood Community Alliance
Oakland Technical HS
OCD-North Oakland
OCD-West Oakland
Sante Fe School
Verdese Carter Middle

Tract 11
Broadway MacArthur Neighbors
Emerson School
Longfellow School
Mosswood Community Alliance
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
OCD-West Oakland
Peralta Year Round
Sante Fe School
Temescal Neighbors Together
Verdese Carter Middle School
Westlake JHS

Tract 12
Broadway MacArthur Neighbors
Emerson School
Golden Gate School
Longfellow School
Mosswood Community Alliance
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
OCD-West Oakland
Peralta Year Round
Rockridge Community Planning Council
Temescal Neighbors Together
Verdese Carter Middle School

Tract 13
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Emerson School
Foster Middle School
Hoover-Durant-Grove "L" Neighborhood Group
Hoover School
Manzanita Year Round
Mosswood Community Alliance
North Oakland District Community Council
Oakland Technical HS
OCD-North Oakland
OCD-West Oakland
Oak Center Neighborhood Association
Westlake JHS
West Oakland Coalition for Environmental Health

Tract 14
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Foster Middle School
Hoover-Durant-Grove "L" Neighborhood Group
Hoover School
Longfellow School
McClymonds HS
Mosswood Community Alliance
Oakland Technical HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 15
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Emerson School
Foster Middle School
Hoover-Durant-Grove "L" Neighborhood Group
Hoover School
McClymonds HS
Mosswood Community Alliance
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 16
Assoc. of Africans and African Americans
Bella Vista Year Round

Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Foster Middle School
Hoover-Durant-Grove "L" Neighborhood Group
Hoover School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 17
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Foster Middle School
Franklin Year Round
Garfield Year Round
Hawthorne Year Round
Hoover-Durant-Grove "L" Neighborhood Group
Hoover School
Jubilee West, Inc.
Lowell Middle School
Longfellow School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
Prescott School
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 18
Assoc. of Africans and African Americans
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Jubilee West, Inc.
Lowell Middle School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
Prescott School
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 19
Assoc. of Africans and African Americans
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Jubilee West, Inc.
Lowell Middle School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
Prescott School
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 20
Assoc. of Africans and African Americans
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Jack London Neighborhood Assoc.
Jubilee West, Inc.
M.L. King Jr. School
Lowell Middle School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-Chinatown/Central
OCD-West Oakland
South of the Nimitz Improvement Council (SONIC)
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 21
Assoc. of Africans and African Americans
Economic Council for West Oakland Revitalization
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Cole School
Hoover-Durant-Grove "L" Neighborhood Group
Jubilee West, Inc.
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 22
Assoc. of Africans and African Americans
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Jubilee West, Inc.
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
Prescott School
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 23
Assoc. of Africans and African Americans

Bella Vista Year Round
Chester Street Community Organization
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Franklin Year Round
Garfield Year Round
Hoover-Durant-Grove "L" Neighborhood Group
Jubilee West, Inc.
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
Prescott School
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 24
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Hoover-Durant-Grove "L" Neighborhood Group
Jubilee West, Inc.
Lafayette School
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 25
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Hoover-Durant-Grove "L" Neighborhood Group
Jubilee West, Inc.
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-West Oakland
West Oakland Coalition for Environmental Health
West Oakland Commerce Assoc.

Tract 26
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Cole School
Economic Council for West Oakland Revitalization
Hoover-Durant-Grove "L" Neighborhood Group
Jubilee West, Inc.
Lafayette School
Lincoln School
Lowell Middle School
M.L. King Jr. School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-Chinatown/Central
OCD-West Oakland
West Oakland Coalition for Environmental Health

Tract 27
Assoc. of Africans and African Americans
Coalition for West Oakland Revitalization, Inc.
Economic Council for West Oakland Revitalization
Lafayette School
Lowell Middle School
McClymonds HS
Oak Center Neighborhood Assoc. (OCNA)
OCD-Chinatown/Central
OCD-West Oakland
West Oakland Coalition for Environmental Health

Tract 28
Assoc. of Africans and African Americans
Central Business District Assoc. of Oakland
Coalition for West Oakland Revitalization, Inc.
Hoover-Durant-Grove "L" Neighborhood Group
Lafayette School
Lakeview School
Lincoln School
Oak Center Neighborhood Assoc. (OCNA)
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
West Oakland Coalition for Environmental Health

Tract 29
Central Business District Assoc. of Oakland
Lakeview School
Lincoln School
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
Westlake JHS

Tract 30
Central Business District Assoc. of Oakland
Laney Neighborhood Assoc.
Lincoln School
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
Westlake JHS

Tract 31
Central Business District Assoc. of Oakland
Coalition for West Oakland Revitalization, Inc.
Cole School
Hoover-Durant-Grove "L" Neighborhood Group
Lafayette School
Lincoln School
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
Westlake JHS
West Oakland Coalition for Environmental Health

Tract 32
Cole School
Jack London Neighborhood Assoc.
Laney Neighborhood Assoc.
Lincoln School
Oak Center Neighborhood Assoc. (OCNA)
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
South of the Nimitz Improvement Council (SONIC)
Westlake JHS
West Oakland Coalition for Environmental Health

Tract 33
Jack London Neighborhood Assoc.
Laney Neighborhood Assoc.
Lincoln School
Oak Center Neighborhood Assoc. (OCNA)
Oakland Technical HS
OCD-Chinatown/Central
South of the Nimitz Improvement Council (SONIC)
Westlake JHS

Tract 34
Adams Point Neighborhood Coalition
Adams Point Preservation Society (APPS)
The Lake Coalition
Lakeview School
Laney Neighborhood Assoc.
Lincoln School
Oak Center Neighborhood Assoc. (OCNA)
Oakland HS
Oakland Technical HS
OCD-Chinatown/Central
Westlake JHS

Tract 35
Adams Point Preservation Society (APPS)
Lakeview School
Mosswood Community Alliance
North Oakland District Community Council
Oak Center Neighborhood Assoc. (OCNA)
Oakland Technical HS
OCD-Chinatown/Central
OCD-West Oakland
Piedmont Ave. School
Westlake JHS

Tract 36
Adams Point Preservation Society (APPS)
The Lake Coalition
Lakeview School
North Oakland District Community Council
Oak Center Neighborhood Assoc. (OCNA)
Oakland HS
OCD-Chinatown/Central
Westlake JHS

Tract 37
Adams Point Preservation Society (APPS)
The Lake Coalition
Lakeview School
North Oakland District Community Council
Oak Center Neighborhood Assoc. (OCNA)
Oakland HS
OCD-Chinatown/Central
Westlake JHS

Tract 38
Adams Point Preservation Society (APPS)
Crocker Highlands School
Edna M Brewer JHS
Lakeview School
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio
Westlake JHS

Tract 39
Adams Point Preservation Society (APPS)
Lakeview School
Oakland HS
OCD-Chinatown/Central
Oakland Technical HS

Tract 40
North Oakland District Community Council
OCD-Chinatown/Central
OCD-North Oakland
OCD-West Oakland
Oakland Technical HS
Piedmont Ave. Neighborhood Improvement League (PANIL)
Piedmont Ave School
Verdese Carter Middle School
Westlake JHS

Tract 41
Emerson School

Longfellow School
North Oakland District Community Council
OCD-Chinatown/Central
OCD-North Oakland
OCD-West Oakland
Oakland Technical HS
Piedmont Ave. Neighborhood Improvement League (PANIL)
Piedmont Ave. School
Rockridge Community Planning Council (RCPC)

Tract 42
Alpine Terrace Neighborhood Assoc.
Chabot School
Claremont Middle School
Hillcrest School
Montclair School
Montera JHS
North Oakland District Community Council
OCD-Chinatown/Central
OCD-North Oakland
OCD-West Oakland
Oakland Technical HS
Rockridge Community Planning Council (RCPC)
Skyline HS

Tract 43
Alpine Terrace Neighborhood Assoc.
Chabot School
Claremont Middle School
Hillcrest School
North Oakland District Community Council
Rockridge Community Planning Council (RCPC)

Tract 44
Glen Arms Neighborhood Coalition
Montera JHS
OCD-Chinatown/Central
OCD-West Oakland
Skyline Blvd. Neighborhood Assoc.
Skyline HS
Thornhill School

Tract 45
Montclair School
Montera JHS
OCD-Chinatown/Central
OCD-San Antonio
Skyline HS
Thornhill School

Tract 46
Carl Munck School
Joaquin Miller School
Montclair School
Montera JHS
OCD-Chinatown/Central
OCD-Fruitvale
OCD-San Antonio

Tract 47
Bret Harte JHS
Edna M Brewer JHS
Glenview School
Joaquin Miller School
Lincoln-Charleston Street Organization
Montera JHS
Oakland HS
OCD-Chinatown/Central
OCD-Fruitvale
OCD-San Antonio
Sequoia School
Skyline HS

Tract 48
Bret Harte JHS
Dimond Improvement Association
Edna M Brewer JHS
Glenview School
Lincoln-Charleston Street Organization
Oakland HS
OCD-Fruitvale
OCD-San Antonio
Sequoia School

Tract 49
Dimond Improvement Association
Edna M Brewer JHS
Glenview Neighborhood Association
Glenview School
Manzanita Year Round
Oakland HS
OCD-Fruitvale
OCD-San Antonio
San Antonio-Community Development Corporation (CDC)

Tract 50
Crocker Highlands School
Edna M Brewer JHS
Glenview Neighborhood Assoc.
Glenview School
Greater Mandana Action Committee (GMAC)
Lakeview School
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio
San Antonio-Community Development Corporation (CDC)

Tract 51
Crocker Highlands School
Edna M Brewer JHS
Lakeview School
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio

Tract 52
Adams Point Neighborhood Coalition
Brooklyn Neighborhood Preservation Association
Cleveland School
Edna M Brewer JHS
Lakeview School
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio
San Antonio-Community Development Corporation (CDC)

Tract 53
Adams Point Neighborhood Coalition
Brooklyn Neighborhood Preservation Association
Cleveland School
Edna M Brewer JHS
Franklin Year Round
Laney Neighborhood Assoc.
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

Tract 54
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Cleveland School
Edna M Brewer JHS
Franklin Year Round
Oakland HS
OCD-Chinatown/Central
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

Tract 55
Allegro Neighborhood Group
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Cleveland School
Edna M Brewer JHS
Oakland HS
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

Tract 56
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Cleveland School
Edna M Brewer JHS
Foster Middle School
Fruitvale School
Oakland HS
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

Tract 57
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Edna M Brewer JHS
Glenview School
Lockwood Year Round
Manzanita Year Round
Oakland HS
OCD-Fruitvale
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

Tract 58
Bella Vista Area Neighbors
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Edna M Brewer JHS
Garfield Year Round
Manzanita Year Round
Oakland HS
OCD-Fruitvale
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)
Wallace Street Neighborhood Assoc.

Tract 59
Bella Vista Year Round
Brooklyn Neighborhood Preservation Association
Franklin Year Round
Garfield Year Round
Oakland HS
OCD-Fruitvale
OCD-San Antonio
Roosevelt JHS
San Antonio-Community Development Corporation (CDC)

OCD-Elmhurst
Sherman School
Webster Street Tract Neighbors

Tract 79
B.E.S.T. Neighborhood Association
Bret Harte JHS
Fremont HS
High Street Neighborhood Alliance
John Swett School
OCD-Central East Oakland
OCD-Elmhurst
Redwood Heights Improvement Assoc. Inc., (RHIA)
Redwood Heights School
Skyline HS
Webster Street Tract Neighbors

Tract 80
Carl Munck School
Howard School
Joaquin Miller School
Montera JHS
OCD-Central East Oakland
Redwood Heights Improvement Assoc. Inc., (RHIA)
Sherman School
Skyline School
Whittier Year Round

Tract 81
Bret Harte JHS
Burckhalter School
Carl Munck School
Howard School
John Swett
King Estates JHS
Leona Heights Improvement Assoc.
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Redwood Heights Improvement Assoc. Inc., (RHIA)
Skyline HS
Webster Tract Neighbors

Tract 82
Burbank School
Burckhalter School
Castlemont HS
Frick JHS
King Estates JHS
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 83
Burbank School
Burckhalter School
Castlemont HS
Howard School
King Estate JHS
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Parker School
Webster Tract Neighbors

Tract 84
Burbank School
Castlemont HS
Frick JHS
Markham School
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Parker School
Webster School
Webster Tract Neighbors

Tract 85
Castlemont HS
Coliseum/Homeowner Association
Frick JHS
Havenscourt JHS
Markham School
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster School
Webster Tract Neighbors

Tract 86
Burbank School
Castlemont HS
Coliseum/Homeowner Association
Frick JHS
Havenscourt JHS
Markham School
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors
Whittier Year Round

Tract 87
Burbank School
Coliseum/Homeowner Association
Fremont HS
Frick JHS
Havenscourt JHS
Markham School
OCD-Central East Oakland
OCD-Elmhurst

Organized People of Elmhurst Neighborhood Assoc.
Sherman School
Webster Tract Neighbors
Whittier Year Round

Tract 88
Castlemont HS
Coliseum/Homeowner Association
Fremont HS
Havenscourt JHS
Lockwood Year Round
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 89
Castlemont HS
Coliseum/Homeowner Association
Havenscourt JHS
Highland Year Round
Lockwood Year Round
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 90
Brookfield School
Castlemont HS
Havenscourt JHS
James Madison Middle School
OCD-Central East Oakland
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 91
Brookfield School
Castlemont HS
James Madison Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Sobrante Park School
Webster Tract Neighbors

Tract 92
Castlemont HS
James Madison Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Sobrante Park School
Webster Tract Neighbors

Tract 93
Castlemont HS
Coliseum/Homeowner Association
Concerned Citizens of Elmhurst Neighborhood Assoc.
Elmhurst Middle School
James Madison Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Stonehurst School
Webster Tract Neighbors

Tract 94
Castlemont HS
Coliseum/Homeowner Association
Elmhurst Middle School
Highland Year Round
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Stonehurst School
Webster Tract Neighbors

Tract 95
Castlemont HS
Coliseum/Homeowner Association
Elmhurst Middle School
Havenscourt JHS
Highland Year Round
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 96
Castlemont HS
Coliseum/Homeowner Association
E Morris Cox School
Elmhurst Middle School
Frick JHS
Havenscourt JHS
Highland Year Round
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster School
Webster Tract Neighbors

Tract 97
Castlemont HS
Concerned Citizens of Elmhurst Neighborhood Assoc.
Cox Elementary School
Elmhurst Middle School
Frick JHS
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Parker School
Webster School
Webster Tract Neighbors

Tract 98
Castlemont HS
Howard School
King Estates JHS
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Parker School
Sequoyah Hills/Oak Knoll Neighborhood Assoc.
Toler Heights Elementary School
Webster Tract Neighbors

Tract 99
Grass Valley School
Howard School
King Estates JHS
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Sequoyah Hills/Oak Knoll Neighborhood Assoc.
Skyline HS
Webster Tract Neighbors

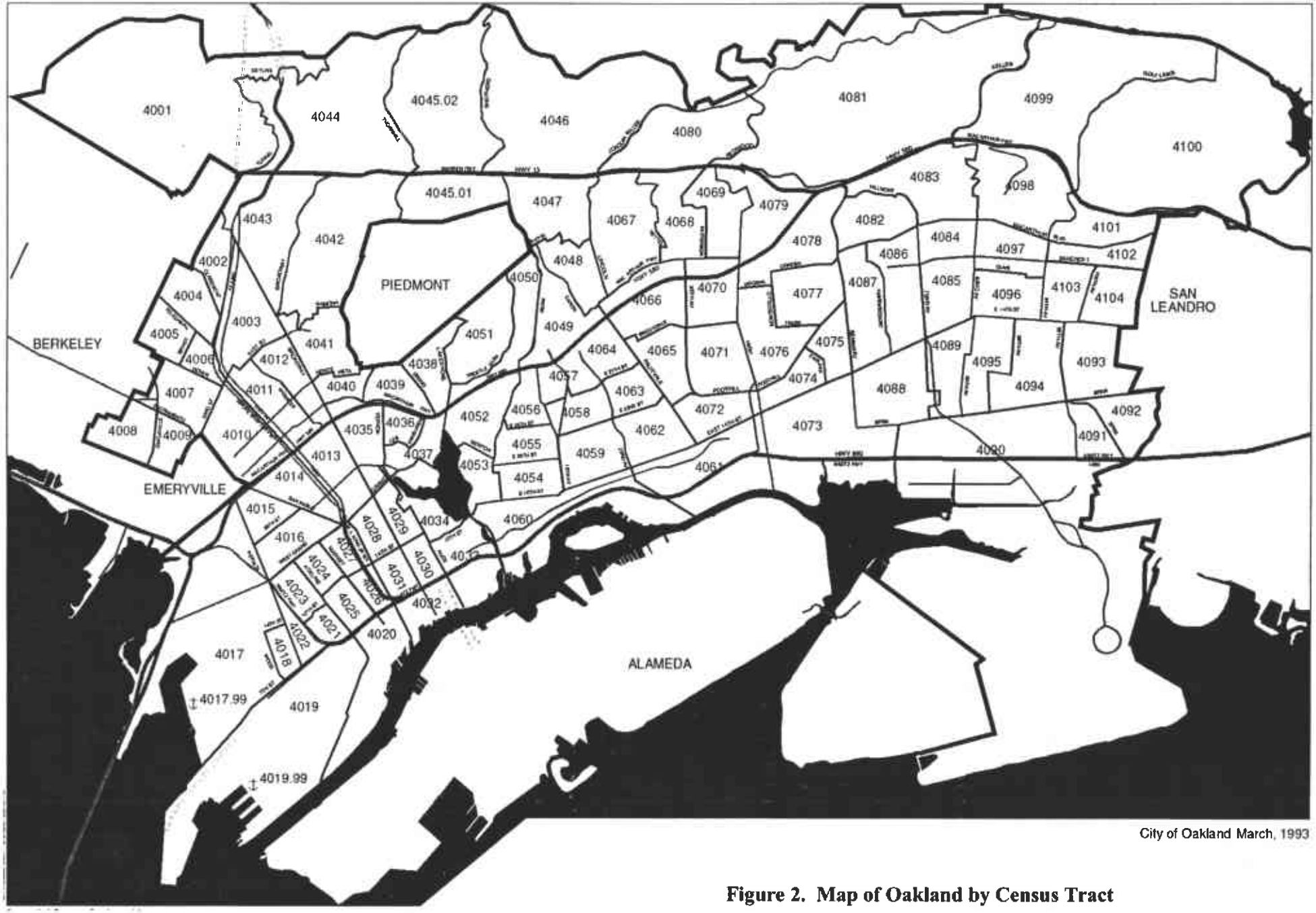
Tract 100
Castlemont HS
Grass Valley School
King Estates JHS
Marshall School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Sequoyah Hills/Oak Knoll Neighborhood Assoc.
Skyline HS
Webster Tract Neighbors

Tract 101
Castlemont HS
Cox Elementary School
King Estates JHS
Marshall School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Parker School
Toler Heights Elementary School
Webster Tract Neighbors

Tract 102
Castlemont HS
Concerned Citizens of Elmhurst Neighborhood Assoc.
Cox Elementary School
Elmhurst Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 103
Castlemont HS
Coliseum/Homeowner Association
Concerned Citizens of Elmhurst Neighborhood Assoc.
Cox Elementary School
Elmhurst Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors

Tract 104
Castlemont HS
Coliseum/Homeowner Association
Concerned Citizens of Elmhurst Neighborhood Assoc.
Cox Elementary School
Elmhurst Middle School
OCD-Elmhurst
Organized People of Elmhurst Neighborhood Assoc.
Webster Tract Neighbors



City of Oakland March, 1993

Figure 2. Map of Oakland by Census Tract

B.2 School and CBO Addresses and Phone Numbers

Adams Point Neighborhood Coalition
Rev. Lucy Kolin
Resurrection Lutheran Church
397 Euclid Ave.
Oakland, CA 94610
(510) 444-5382

Adams Point Preservation Society
Ron Morra
Barbara Neustadter
P.O. Box 10823
Oakland, CA 94610-0823
(510) 451-2118 / 835-1132
(FAX) 208-3614

Allegro Neighborhood Group
Rosetta Moses
1202 E. 23rd St.
Oakland, CA 94606
(510) 436-8938
(FAX) 436-8938

Allendale Year Round Elementary
3670 Penniman Ave.
Oakland, CA 94619
(510) 879-1010
(FAX) 879-1019

Alpine Terrace Neighborhood Assoc.
Carl Kuhnert
137 Alpine Terrace
Oakland, CA 94618
(510) 654-4062

Association of Africans and African Americans
Queen E. Thurston
P.O. Box 10612
Oakland, CA 94610-9991
(510) 452-4180

Bella Vista Area Neighbors
Terrel Brand
1171 Bay View Ave.
Oakland, CA 94610
(510) 534-2552

Bella Vista Year Round Elementary
1025 East 28th St.
Oakland, CA 94610
(510) 879-1020
(FAX) 879-1027

B.E.S.T. Neighborhood Assoc.
Don Lindley
3830 Enos Ave.
Oakland, CA 94619-2810
(510) 482-0350 / 530-5641

Bret Harte Junior High School
3700 Coolidge Avenue
Oakland, CA 94602
(510) 879-2060
(FAX) 879-2069

Broadway MacArthur Neighbors
Mary Sanichas
709 Paloma Ave.
Oakland, CA 94610-2448
(510) 763-6760

Brookfield School
401 Jones Ave.
Oakland, CA 94603
(510) 879-1030
(FAX) 879-1039

Brooklyn Neighborhood Preservation Assoc.
Bruno Brandli
2106 9th Ave.
Oakland, CA 94606
(510) 533-2792

Burbank School
3550 64th Avenue
Oakland, CA 94605
(510) 879-1040
(FAX) 879-1049

Burckhalter School
3994 Burckhalter Avenue
Oakland, CA 94605
(510) 879-1050
(FAX) 879-1059

Calvin Simmons Junior High School
2101 35th Avenue
Oakland, CA 94601
(510) 879-2050
(FAX) 879-2059

Carl Munck Elementary School
11900 Campus Drive
Oakland, CA 94619
(510) 879-1680
(FAX) 879-1689

Castlemont High School
8601 MacArthur Blvd.
Oakland, CA 94605
(510) 879-3010
(FAX) 879-3019

Central Business District Assoc. of Oakland
Arthur S. Goldman
C/o Ritchie Commercial
1940 Webster Street
Oakland, CA 94612
(510) 834-6464
(FAX) 891-9453

Chabot Elementary School
6686 Chabot Road
Oakland, CA 94618
(510) 879-1060
(FAX) 879-1069

Chester Street Community Organization
Renee Morrison
343 Chester St.
Oakland, CA 94607
(510) 444-4494

Claremont Middle School
5750 College Avenue
Oakland, CA 94618
(510) 879-2010
(FAX) 879-2019

Cleveland Elementary School
745 Cleveland Street
Oakland, CA 94606
(510) 879-1080
(FAX) 879-1089

Coalition for West Oakland Revitalization, Inc.
Mr. Arthur O'Neal
1801 Adeline St.
Suite #209
Oakland, CA 94607
(510) 644-2709

Cole School
1011 Union Street
Oakland, CA 94607
(510) 879-1090
(FAX) 879-1099

Coliseum/Homeowner Assoc.
Sylvester Grisby Sr.
1186 73rd Ave.
Oakland, CA 94621
(510) 632-7694
(FAX) 632-7694

Concerned Citizens of Elmhurst Neighborhood Association, Inc.
Altha Washington
P.O. Box 43622
Oakland, CA 94624
(510) 632-5983

Cox Elementary School
9860 Sunnyside Street
Oakland, CA 94603
(510) 879-1100
(FAX) 879-1109

Crocker Highlands Elementary School
525 Midcrest Road
Oakland, CA 94610
(510) 879-1110
(FAX) 879-1119

Dimond Improvement Assoc.
Karen Marie Schroeder
P.O. Box 27355
Oakland, CA 94602
(510) 531-5351

Economic Council for West Oakland Revitalization
Queen E. Thurston
P.O. Box 70321 Station D
Oakland, CA 94612-0321
(510) 452-4180

Edna Brewer Middle School
3748 13th Avenue
Oakland, CA 94610
(510) 879-2100
(FAX) 879-2362

Elmhurst Middle School
1800 98th Avenue
Oakland, CA 94603
(510) 879-2020
(FAX) 879-2029

Emerson Elementary School
4803 Lawton Avenue
Oakland, CA 94609
(510) 879-1150
(FAX) 879-1159

Fifth Avenue Waterfront Coalition
Robin Bartoo
499 Embarcadero Suite 2-16
Oakland, CA 94606
(510) 465-2533

Foster Elementary School
2850 West Street
Oakland, CA 94608
(510) 879-2080
(FAX) 879-2089

Franklin Year Round Elementary
915 Foothill Blvd.
Oakland, CA 94606
(510) 879-1160
(FAX) 879-1164

Fremont High School
4610 Foothill Boulevard
Oakland, CA 94601
(510) 879-3020
(FAX) 879-3029

Frick Junior High School
2845 64th Avenue
Oakland, CA 94605
(510) 879-2030
(FAX) 879-2039

Fruitvale Elementary School
3200 Boston Ave.
Oakland, CA 94602
(510) 879-1170
(FAX) 879-1179

Fruitvale Main Street
Darlene Drapkin
Spanish Speaking Unity Council
1900 Fruitvale Ave. #2A
Oakland, CA 94601
(510) 535-6912
(FAX) 534-7771

Garfield Year Round Elementary
1640 22nd Avenue
Oakland, CA 94606
(510) 879-1180
(FAX) 879-1189

Glenview Elementary School
4215 La Cresta Avenue
Oakland, CA 94602
(510) 879-1190
(FAX) 879-1199

Glenview Neighborhood Assoc.
Michael Gabriel
3945 Greenwood Ave.
Oakland, CA 94602
(510) 482-3128 / 273-4074

Glen Arms Neighborhood Coalition
Vickie Wilcox
6078 Fairlane Dr.
Oakland, CA 94611
(510) 601-7593
(FAX) 296-8955

Golden Gate Elementary School
6200 San Pablo Ave.
Oakland, CA 94608
(510) 879-1200
(FAX) 879-1209

Grass Valley Elementary School
4720 Dunkirk Avenue
Oakland, CA 94605
(510) 879-1220
(FAX) 879-1229

Greater Mandana Action Coalition
David Flack
915 York St.
Oakland, CA 94610
(510) 465-0778

Havenscourt Junior High School
1390 66th Avenue
Oakland, CA 94621
(510) 879-2070
(FAX) 879-2079

Hawthorne Year Round Elementary
1700 28th Avenue
Oakland, CA 94601
(510) 879-1240
(FAX) 879-1249

High Street Neighborhood Alliance
Suzanne Tipton
P.O. Box 19143
Oakland, CA 94619
(510) 534-3429
(FAX) 534-3429

Highland Elementary School
8521 A Street
Oakland, CA 94621
(510) 879-1260
(FAX) 879-1269

Hillcrest School
30 Marguerite Drive
Oakland, CA 94618
(510) 879-1270
(FAX) 879-1279

Hoover-Durant-Grove "L" Neighborhood Group
Georgia R. Davenport
3030 Martin Luther King Jr. Way
Oakland, CA 94609
(510) 655-9940

Hoover Elementary School
890 Brockhurst St.
Oakland, CA 94608
(510) 879-1700
(FAX) 879-1709

Horace Mann Year Round Elementary
5222 Ygnacio Avenue
Oakland, CA 94601
(510) 879-1360
(FAX) 879-1369

Howard Elementary School
8755 Fontaine Street
Oakland, CA 94605
(510) 879-1660
(FAX) 879-1669

Jack London Neighborhood Assoc.
Wilda L. White
247 Fourth Street, Loft 201
Oakland, CA 94607
(510) 452-3355
(FAX) 452-3800

James Madison Middle School
400 Capistrano Drive
Oakland, CA 94603
(510) 879-2150
(FAX) 879-2159

Jefferson Year Round Elementary
2035 40th Avenue
Oakland, CA 94601
(510) 879-1280
(FAX) 879-1289

Joaquin Miller Elementary School
5525 Ascot Drive
Oakland, CA 94611
(510) 879-1420
(FAX) 879-1429

John Swett School
4551 Steele Street
Oakland, CA 94619
(501) 879-1560
(FAX) 879-1569

Jubilee West, Inc.
Josefina Vazquez
Larry Masuda
1485 8th St.
Oakland, CA 94607
(510) 839-6776

Kaiser School
25 South Hill Court
Oakland, CA 94618
(510) 879-1710
(FAX) 879-1719

King Estates Junior High School
8251 Fontaine Street
Oakland, CA 94605
(510) 879-2160
(FAX) 879-2169

Lafayette Elementary School
1700 Market Street
Oakland, CA 94607
(510) 879-1290
(FAX) 879-1299

The Lake Coalition
Phil Tagami
600 Grand Ave. #404
Oakland, CA 94610
(510) 268-8500

Lakeview Elementary School
746 Grand Avenue
Oakland, CA 94610
(510) 879-1300
(FAX) 879-1309

Laney Neighborhood Assoc.
Elaine R. Schiano
1100 4th Ave.
Oakland, CA 94606
(510) 893-6703

Laurel Elementary School
3750 Brown Avenue
Oakland, CA 94619
(510) 879-1310
(FAX) 879-1319

Lazear Elementary School
824 29th Avenue
Oakland, CA 94601
(510) 879-1320
(FAX) 879-1329

Leona Heights Improvement Assoc.
Gordon L. Laverty
4540 Mountain View Ave.
Oakland, CA 94605
(510) 531-4860
(FAX) 531-0128

Lincoln Elementary School
225 11th Street
Oakland, CA 94607
(510) 879-1330
(FAX) 879-1339

Lincoln-Charleston Street Organization
Leila H. Moncharsh
440 Grand Ave., Suite #360
Oakland, CA 94610
(510) 433-0390
(510) 531-2715

Lockwood Year Round Elementary
6701 East 14th St.
Oakland, CA 94621
(510) 879-1340
(FAX) 879-1349

Longfellow Elementary School
3877 Lusk Street
Oakland, CA 94608
(510) 879-1350
(FAX) 879-1359

Lowell Middle School
991 14th Street
Oakland, CA 94607
(510) 879-2090
(FAX) 879-2099

Manzanita Elementary School
2409 East 27th St.
Oakland, CA 94601
(510) 879-1370
(FAX) 879-1379

Markham Elementary School
7220 Krause Avenue
Oakland, CA 94605
(510) 879-1380
(FAX) 879-1389

Marshall Elementary School
3400 Malcolm Avenue
Oakland, CA 94605
(510) 879-1740
(FAX) 879-1749

M. L. King Jr. Elementary School
960 10th St.
Oakland, CA 94607
(510) 879-1820
(FAX) 879-1829

Maxwell Park Elementary School
4730 Fleming Avenue
Oakland, CA 94619
(510) 879-1390
(FAX) 879-1399

McClymonds High School
2607 Myrtle Street
Oakland, CA 94607
(510) 879-3030
(FAX) 879-1936

Melrose Elementary School
1325 53rd Avenue
Oakland, CA 94601
(510) 879-1410
(FAX) 879-1419

Montclair Elementary School
1757 Mountain Boulevard
Oakland, CA 94611
(510) 879-1430
(FAX) 879-1439

Montera Junior High School
5555 Ascot Drive
Oakland, CA 94611
(510) 879-2110
(FAX) 879-2119

Mosswood Community Alliance
Donna Howell
458 37th St.
Oakland, CA 94609
(510) 420-5757

North Oakland District Community Council
Joel Tolbert
P.O. Box 21004
Oakland, CA 94620
(510) 654-7953

Oak Center Neighborhood Assoc.
Ellen Wyrick-Parkinson
1420 Magnolia St.
Oakland, CA 94607
(510) 835-2290
(FAX) 835-2290

Oakland Community Development Districts (OCD)

OCD-Central East Oakland
Carolyn Sandidge
3526 65th Ave.
Oakland, CA 94605
(510) 238-3716 / 638-0483

OCD-Chinatown/Central
Ray King
325 Lenox Ave., #401
Oakland, CA 94610
(510) 238-3716 / 272-1523

OCD-Elmhurst
Gladys Green
1187 78th Ave.
Oakland, CA 94621
(510) 638-7583 / 238-3716

OCD-Fruitvale
Beverly Blythe
3424 Salisbury St.
Oakland, CA 94601
(510) 238-3716 / 533-1448

OCD-North Oakland
Shyaam Shabaka
5188 Coronado Ave.
Oakland, CA 94618
(510) 238-3716 / 653-5915

OCD-San Antonio
Cleveland Thomas
1615 10th Ave.
Oakland, CA 94606
(510) 536-9750 / 238-3716

OCD-West Oakland
Janet Patterson
1120 8th St., D
Oakland, CA 94607
(510) 238-3716 / 832-4040

Oakland High School
1023 MacArthur Blvd.
Oakland, CA 94610
(510) 879-3040
(FAX) 879-3049

Oakland Technical High School
4351 Broadway
Oakland, CA 94611
(510) 879-3050
(FAX) 879-3059

Organized People of Elmhurst Neighborhood Assoc.
T.J. Lackey
P.O. Box 43034
Oakland, CA 94624-0034
(510) 430-8103

Parker Elementary School
7929 Ney Avenue
Oakland, CA 94605
(510) 879-1440
(FAX) 879-1449

Verdese Carter Middle School
132 E. 12th Street
Oakland, CA 94606
(510) 452-2010
(FAX) 452-2017

Peralta Year Round Elementary
460 63rd St.
Oakland, CA 94609
(510) 879-1450
(FAX) 879-1459

Piedmont Avenue Elementary School
4314 Piedmont Avenue
Oakland, CA 94611
(510) 879-1460
(FAX) 879-1469

Piedmont Avenue Neighborhood Improvement League
Valerie Winemiller
P.O. Box 20375
Oakland, CA 94620-0375
(510) 653-4552 / 654-5454

Prescott Elementary School
920 Campbell Street
Oakland, CA 94607
(510) 879-1470
(FAX) 879-1479

Redwood Heights Elementary School
4401 39th Avenue
Oakland, CA 94619
(510) 879-1480
(FAX) 879-1489

Redwood Heights Improvement Assoc., Inc.
Richard Cowan
P.O. Box 13097
Oakland, CA 94661
(510) 482-3471

Rockridge Community Planning Council
Chad Thompson
5530 Carlton
Oakland, CA 94618
(510) 654-5165

Roosevelt Junior High School
1926 19th Avenue
Oakland, CA 94606
(510) 879-2120
(FAX) 879-2129

San Antonio – Community Development Corporation (CDC)
Don Davenport
2228 E. 15th St.
Oakland, CA 94606
(510) 536-1715
(FAX) 536-4066

Santa Fe Elementary School
915 54th Street
Oakland, CA 94608
(510) 879-1500
(FAX) 879-1509

Sequoia Elementary School
3730 Lincoln Avenue
Oakland, CA 94602
(510) 879-1510
(FAX) 879-1519

Sequoyah Hills / Oak Knoll Neighborhood Assoc.
Lisa Maule
4030 Sequoyah Rd.
Oakland, CA 94605
(510) 568-4940

Shattuck Neighborhood Action Coalition
Don Link
6510 Raymond St.
Oakland, CA 94609
(510) 658-8632
(FAX) 658-4613

Sherman Elementary School
5328 Brann Street
Oakland, CA 94619
(510) 879-1530
(FAX) 879-1539

Skyline Boulevard Neighborhood Association
Steven Renten
6038 Skyline Blvd.
Oakland, CA 94611
(510) 654-7497

Skyline High School
12250 Skyline Boulevard
Oakland, CA 94619
(510) 879-3060
(FAX) 879-3069

Sobrante Park Elementary School
470 El Paseo Drive
Oakland, CA 94603
(510) 879-1540
(FAX) 879-1549

South of the Nimitz Improvement Council (SONIC)
Mort Howard
229 Harrison St.
Oakland, CA 94607
(510) 893-9829

Stonehurst Elementary School
10315 E Street
Oakland, CA 94603
(510) 879-1550
(FAX) 879-1559

Temescal Neighbors Together
Josie Summers
416 45th St.
Oakland, CA 94609
(510) 601-0574

Thornhill Elementary School
5880 Thornhill Drive
Oakland, CA 94611
(510) 879-1570
(FAX) 879-1579

Toler Heights Elementary School
9736 Lawlor Street
Oakland, CA 94605
(510) 879-1590
(FAX) 879-1953

Verdese Carter Middle School
4521 Webster St.
Oakland, CA 94609
(510) 879-2140
(FAX) 879-2149

Wallace Street Neighborhood Assoc.
Saill White
2600 Wallace St.
Oakland, CA 94606
(510) 536-9764
(FAX) 534-8454

Washington Elementary School
581 61st Street
Oakland, CA 94609
(510) 879-1610
(FAX) 879-1619

Webster Academy
8000 Birch Street
Oakland, CA 94621
(510) 879-1620
(FAX) 879-1629

The Webster Tract Neighbors Assoc.
Jacquee Castain
1633 84th Ave.
Oakland, CA 94621
(510) 568-5333 / 382-9727
(FAX) 382-9726

Westlake Junior High School
2629 Harrison Street
Oakland, CA 94612
(510) 879-2130
(FAX) 879-2139

West Oakland Coalition for Environmental Health
Willie Keyes
1223 34th St., Ste. 1000
Oakland, CA 94609
(510) 601-0928

West Oakland Commerce Assoc.
George Burtt
P.O. Box 1947
Orinda, CA 94563
(510) 839-6999
(FAX) (925) 283-9924

Whittier Year Round Elementary School
6328 East 17th Street
Oakland, CA 94621
(510) 879-1630
(FAX) 879-1639

APPENDIX C: CITY OF OAKLAND PERMIT TRACKING

The City of Oakland permit tracking control relies on three main components: interagency communication, a one-stop shop for City permits, and the hazardous materials expertise of City staff. Under the City's permit tracking control, the regulatory agencies copy the City of Oakland Fire Department, Hazardous Materials Management Program (HMMP), on all closure letters and accompanying documentation, such as risk management plans. The HMMP, which has a seat at the City's "one-stop shop" Central Permit Counter, enters information on sites receiving conditional closure into the Permit Tracking System (PTS). Sites where closure is not dependent upon any conditions remaining in place are not flagged in the PTS. Closure documentation on all sites is filed away for future reference in the HMMP library.

Permit applications are only routed to the HMMP for special review if they (1) involve work that may alter the site conditions upon which regulatory closure was granted or (2) involve work that may otherwise trigger compliance with a risk management plan (RMP). The procedures for routing permit applications for special review categorize City permit applications into three types:

- "No review" permits involve work that never threatens to alter the site conditions upon which regulatory closure was granted or trigger compliance with an RMP (e.g., re-roofing);
- "Discretionary review" permits involve work that may, but often does not (e.g., electrical rewiring)
- "Mandatory review" permits (for excavation work, grading work, land use changes and variances) involve work that by its nature always necessitates special review.

Applications for "no review" permits undergo no special review and are immediately processed under standard procedures. Applications for "discretionary review" permits frequently require no special review and are immediately processed under standard procedures. However, if Central Permit Counter staff reviews information available through the PTS and determines that the proposed work may either alter site conditions or trigger RMP compliance, the application is routed to the HMMP for special review. Applications for "mandatory review" permits are always routed to the HMMP for special review.

The PTS does not allow for permits under special review to be issued until cleared in the PTS by the HMMP. The HMMP consults its copies of the closure letter and any accompanying documentation prior to making one of three determinations:

(1) issue the permit; no contamination-related concerns exist
(2) issue the permit once the applicant has shown how compliance with the closure letter or RMP will be achieved
(3) direct the applicant to contact the regulatory agency that issued the closure letter to obtain approval for the proposed work

Figures 3 and 4 present the regulatory and permitting decision-making processes for the permit tracking control in flow chart form.

Figure 3. Interagency Communication and Data Storage Procedures for Sites Granted Closure

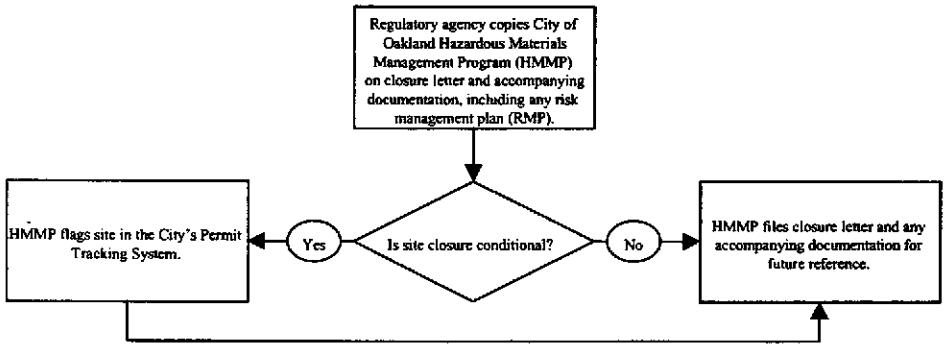
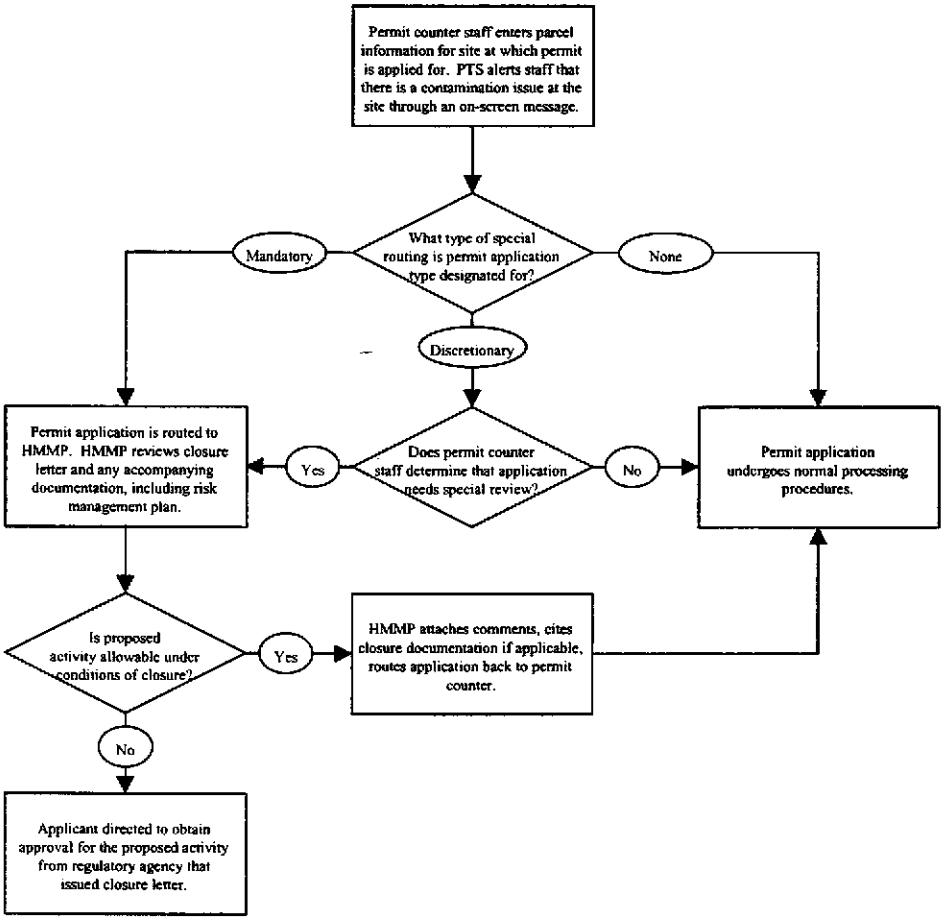


Figure 4. City of Oakland Permitting Process for Sites Granted Conditional Closure



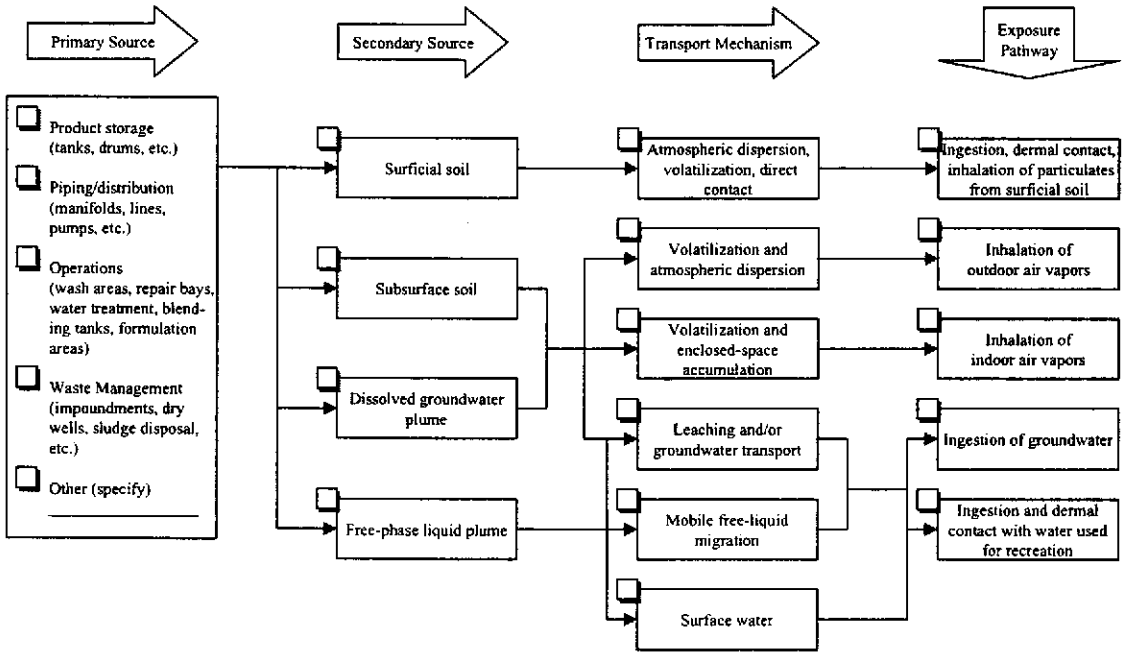
APPENDIX D: EXPOSURE ASSESSMENT WORKSHEET

The exposure assessment worksheet presented below (Figure 5) can assist you to identify potential exposure pathways at your site. It is based on the worksheet presented in ASTM (1995), Figure 2.[14] The worksheet has been modified to reflect the Oakland RBCA approach. A larger version may be downloaded off of the ULR Program web page at www.oaklandpw.com.

The worksheet is read left to right. Begin by checking off the box for each primary source of contamination at your site. Next, check off the box for each secondary source of contamination originating from the primary source(s) at your site. For each secondary source identified, follow the arrows and check off the box for each transport mechanism that may be transporting contamination away from the source. Finally, for each transport mechanism identified, follow the arrows and check off the box for each exposure pathway via which humans may potentially be exposed to the contamination. Note that the exposure pathways "inhalation of outdoor air vapors" and "inhalation of indoor air vapors" may apply to contamination in subsurface soil or groundwater, or both.

All exposure pathways checked off should be addressed by your risk-based analysis and, if necessary, by your corrective action plan.

Figure 5. Oakland RBCA Exposure Assessment Worksheet



APPENDIX E: TIER 1 RISK-BASED SCREENING LEVELS

This appendix contains the complete set of Oakland Tier 1 RBSLs. The Oakland Tier 1 RBSLs may be applied at all Oakland sites that meet the eligibility criteria specified in Section 2.2.

Please note that the Oakland RBCA look-up tables will be updated whenever new or better information becomes available. It is recommended that you consult the ULR Program web page at www.oaklandpw.com to make sure that you have the latest version of the look-up tables before applying the Oakland Tier 1 RBSLs at your site.

For step-by-step assistance in reading the look-up tables, refer back to Section 2.4.

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.1E+01
		Commercial/ Industrial	Carcinogenic					1.5E+00		7.9E-01	8.5E+00
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.1E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	6.9E-02
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+00
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.9E-01
			Hazard	SAT	SAT	5.0E+03	SAT				7.6E+00
		Commercial/ Industrial	Carcinogenic							SAT	7.3E-01
			Hazard	SAT	SAT	2.9E+04	SAT				4.4E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*4.4E+00*	*1.2E+02*	6.8E-01	*2.1E-03*
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*
		Commercial/ Industrial	Carcinogenic					*4.4E+00*	*1.2E+02*	2.9E+00	*2.1E-03*
			Hazard	SAT	SAT	2.4E+00	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.1E-01
			Hazard	>SOL	>SOL	2.0E+04	>SOL				3.7E+00
		Commercial/ Industrial	Carcinogenic							>SOL	1.8E+00
			Hazard	>SOL	>SOL	5.8E+05	>SOL				1.1E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00
			Hazard	>SOL	>SOL	2.1E+05	>SOL				2.2E+02
		Commercial/ Industrial	Carcinogenic							>SOL	2.1E+01
			Hazard	>SOL	>SOL	>SOL	>SOL				1.3E+03
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-05	*1.0E-03*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-04	*1.0E-03*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis (2-ethylhexyl) phthalate	Butyl benzyl phthalate
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-02	2.5E-01		2.5E-01	4.5E+03	3.6E+01	
			Hazard			2.1E+02		3.7E+02	1.0E+03	1.0E+04
		Commercial/ Industrial	Carcinogenic	7.9E-02	7.9E-01		7.9E-01	1.7E+04	1.1E+02	
			Hazard			1.4E+03		6.8E+03	6.8E+03	6.8E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*6.2E+00*	2.1E+00		2.1E+00	9.6E+00	3.7E+03	
			Hazard	*6.2E+00*		SAT		9.6E+00	SAT	SAT
		Commercial/ Industrial	Carcinogenic	*6.2E+00*	8.9E+00		8.9E+00	9.6E+00	1.6E+04	
			Hazard	*6.2E+00*		SAT		9.6E+00	SAT	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-04*	5.6E-05		5.6E-05	4.0E-03	8.0E-03	
			Hazard	*2.0E-04*		>SOL		4.0E-03	3.1E-01	>SOL
		Commercial/ Industrial	Carcinogenic	*2.0E-04*	2.4E-04		2.4E-04	4.0E-03	3.4E-02	
			Hazard	*2.0E-04*		>SOL		4.0E-03	>SOL	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-06	1.1E-05		1.2E-05		5.1E-02	
			Hazard			>SOL		2.0E+00	>SOL	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cadmium	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.1E+03		1.8E+00		9.1E+00		1.3E+00
			Hazard	3.7E+01	1.2E+03	3.3E+01	7.9E+02	4.8E+02	7.4E+04	3.7E+02
		Commercial/ Industrial	Carcinogenic	7.9E+03		5.6E+00		2.9E+01		8.7E+00
			Hazard	6.8E+02	6.4E+03	2.1E+02	4.7E+03	3.0E+03	1.4E+06	6.8E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			2.7E-02		3.3E-01		
			Hazard		1.1E+00	4.6E-01	6.2E-01	1.2E+01		
		Commercial/ Industrial	Carcinogenic			4.3E-01		5.2E+00		
			Hazard		3.3E+01	1.3E+01	1.8E+01	3.5E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			7.6E-02		9.2E-01		
			Hazard		3.8E+00	1.5E+00	2.1E+00	4.1E+01		
		Commercial/ Industrial	Carcinogenic			2.9E-01		3.5E+00		
			Hazard		2.2E+01	8.8E+00	1.2E+01	2.4E+02		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.1E+00*		*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00
			Hazard	*1.1E+00*	2.9E+00	*3.0E-03*	*6.6E-02*	*1.5E-01*	8.5E+07	2.9E+00
		Commercial/ Industrial	Carcinogenic	*1.1E+00*		*3.0E-03*	*6.6E-02*	*1.5E-01*		2.9E+00
			Hazard	*1.1E+00*	1.9E+01	*3.0E-03*	*6.6E-02*	*1.5E-01*	5.6E+08	2.9E+00
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			1.6E-02		7.5E-01		
			Hazard		2.1E+00	2.7E-01	2.4E+00	2.8E+01		
		Commercial/ Industrial	Carcinogenic			2.6E-01		1.2E+01		
			Hazard		6.2E+01	7.8E+00	6.9E+01	8.0E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.1E+00		3.4E+01		
			Hazard		1.7E+02	2.2E+01	2.0E+02	1.5E+03		
		Commercial/ Industrial	Carcinogenic			4.2E+00		1.3E+02		
			Hazard		9.6E+02	1.3E+02	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.6E+00	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.0E+01	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.1E-03		3.9E-02		6.8E-03
			Hazard	2.0E-01	9.4E+00	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Chrysene	Copper	Cresol(-m)	Cresol(-o)	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E+00						7.4E-02
			Hazard		2.8E+03	2.6E+03	2.6E+03	2.6E+02	3.0E+03	
		Commercial/ Industrial	Carcinogenic	7.9E+00						2.3E-01
			Hazard		5.0E+04	1.7E+04	1.7E+04	1.7E+03	5.5E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT	*2.8E-01*				6.0E+00	1.9E+00
			Hazard		*2.8E-01*	2.2E+00	2.3E+00	2.1E-01	6.0E+00	
		Commercial/ Industrial	Carcinogenic	SAT	*2.8E-01*				6.0E+00	8.0E+00
			Hazard		*2.8E-01*	1.5E+01	1.5E+01	1.4E+00	6.0E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-04	*1.3E+00*				2.0E-01	1.6E-05
			Hazard		*1.3E+00*	7.8E-01	7.8E-01	7.8E-02	2.0E-01	
		Commercial/ Industrial	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	7.0E-05
			Hazard		*1.3E+00*	5.1E+00	5.1E+00	5.1E-01	2.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.6E-04						1.4E-06
			Hazard		1.5E+01	6.7E+00	6.4E+00	5.9E-01	7.0E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dichloro- ethane (1,1-)	Dichloro- ethane (1,2-) (EDC)	Dichloro- ethylene (1,1-)	Dichloro- ethylene (cis 1,2-)	Dichloro- ethene (trans 1,2)	Dimethylbenza- (a)anthracene (7,12)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	4.7E+01	3.9E+00	4.9E-01			
			Hazard	4.9E+03	1.4E+02	4.3E+02	4.8E+02	9.5E+02	1.6E+03
		Commercial/ Industrial	Carcinogenic	1.5E+02	1.2E+01	1.5E+00			
			Hazard	3.1E+04	8.8E+02	2.7E+03	3.0E+03	6.1E+03	1.0E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	8.6E-01	1.7E-01	9.4E-03			
			Hazard	1.3E+02	6.8E+00	3.0E+00	1.4E+01	1.9E+01	
		Commercial/ Industrial	Carcinogenic	1.4E+01	2.7E+00	1.5E-01			
			Hazard	SAT	2.0E+02	8.7E+01	4.1E+02	5.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.4E+00	4.8E-01	2.6E-02			
			Hazard	4.5E+02	2.3E+01	9.9E+00	4.7E+01	6.2E+01	
		Commercial/ Industrial	Carcinogenic	9.1E+00	1.8E+00	1.0E-01			
			Hazard	SAT	1.3E+02	5.8E+01	2.8E+02	3.6E+02	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*	
			Hazard	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*	SAT
		Commercial/ Industrial	Carcinogenic	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*	
			Hazard	6.4E-03	*3.8E-04*	*1.5E-02*	*8.2E-03*	*2.0E-02*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.3E+00	7.2E-01	1.4E-02			
			Hazard	3.6E+02	2.9E+01	4.3E+00	3.5E+01	3.2E+01	
		Commercial/ Industrial	Carcinogenic	3.6E+01	1.1E+01	2.2E-01			
			Hazard	>SOL	8.3E+02	1.2E+02	1.0E+03	9.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+02	1.8E+01	9.3E-01			
			Hazard	>SOL	8.6E+02	3.5E+02	1.6E+03	2.0E+03	
		Commercial/ Industrial	Carcinogenic	4.0E+02	6.9E+01	3.5E+00			
			Hazard	>SOL	5.0E+03	2.0E+03	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
		Commercial/ Industrial	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	2.1E-01	2.4E-02	1.3E-03			
			Hazard	1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic				9.7E-01	1.0E+01		8.4E-02	
			Hazard	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00	2.1E+03
		Commercial/ Industrial	Carcinogenic				3.0E+00	3.1E+01		2.6E-01	
			Hazard	6.7E+03	3.4E+04	6.8E+03			3.3E+04	1.7E+01	1.4E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	SAT		2.8E-01	
			Hazard	SAT	SAT	SAT			SAT	7.8E-01	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		4.5E+00	
			Hazard	SAT	SAT	SAT			SAT	2.3E+01	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	SAT		7.9E-01	
			Hazard	SAT	SAT	SAT			SAT	2.6E+00	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		3.0E+00	
			Hazard	SAT	SAT	SAT			SAT	1.5E+01	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic				6.7E-04	1.8E-03	*8.0E+00*	*7.8E-05*	
			Hazard	2.0E+00	3.9E+06	SAT			*8.0E+00*	*7.8E-05*	SAT
		Commercial/ Industrial	Carcinogenic				2.9E-03	SAT	*8.0E+00*	*7.8E-05*	
			Hazard	1.3E+01	SAT	SAT			*8.0E+00*	*7.8E-05*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		5.7E-01	
			Hazard	>SOL	>SOL	>SOL			>SOL	1.6E+00	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		9.0E+00	
			Hazard	>SOL	>SOL	>SOL			>SOL	4.6E+01	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		8.7E+00	
			Hazard	>SOL	>SOL	>SOL			>SOL	2.9E+01	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		3.3E+01	
			Hazard	>SOL	>SOL	>SOL			>SOL	1.7E+02	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic				2.2E-04	2.5E-03	*7.0E-01*	*5.0E-05*	
			Hazard	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*	>SOL
		Commercial/ Industrial	Carcinogenic				9.2E-04	1.1E-02	*7.0E-01*	*5.0E-05*	
			Hazard	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic				6.4E-03	>SOL		5.9E-04	
			Hazard	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD)-pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		2.5E-01				2.1E+01		
			Hazard	2.1E+03		4.7E+00	2.4E+04	2.6E+04	3.1E+03	2.0E+03	2.6E+02
		Commercial/ Industrial	Carcinogenic		7.9E-01				6.6E+01		
			Hazard	1.4E+04		3.0E+01	1.5E+05	1.6E+05	2.0E+04	1.3E+04	1.7E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				1.3E+00		
			Hazard	SAT		1.2E+01	4.5E+04	6.9E+03	7.4E+02	SAT	4.4E+03
		Commercial/ Industrial	Carcinogenic		SAT				2.0E+01		
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				3.5E+00		
			Hazard	SAT		4.0E+01	SAT	2.3E+04	2.5E+03	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT				1.3E+01		
			Hazard	SAT		2.3E+02	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	*3.2E-01*			3.1E-03		*7.6E-03*
			Hazard	2.6E+02		*3.2E-01*	1.7E+00	3.3E+00	3.1E-03	1.6E+02	*7.6E-03*
		Commercial/ Industrial	Carcinogenic		SAT	*3.2E-01*			3.1E-03		*7.6E-03*
			Hazard	SAT		*3.2E-01*	1.1E+01	2.2E+01	3.1E-03	1.1E+03	*7.6E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				6.7E+00		
			Hazard	>SOL		2.6E-01	6.5E+05	6.0E+04	4.0E+03	>SOL	2.4E+04
		Commercial/ Industrial	Carcinogenic		>SOL				1.1E+02		
			Hazard	>SOL		7.6E+00	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				2.3E+02		
			Hazard	>SOL		1.6E+01	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				8.7E+02		
			Hazard	>SOL		9.5E+01	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*
		Commercial/ Industrial	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>SOL		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		7.0E-06				1.3E-01		
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Naphthalene	Nickel	Nitro-benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.4E+04	5.5E+02	5.0E-02				2.8E+02	
			Hazard	2.0E+03	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02
		Commercial/ Industrial	Carcinogenic		1.3E+05	1.7E+03	1.8E-01				8.9E+02	
			Hazard	1.3E+04	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	6.9E+01				2.9E+03	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	1.1E+03				4.6E+04	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	1.9E+02				8.1E+03	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	7.3E+02				3.1E+04	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.2E+00*	*2.0E+01*	2.9E-01	*4.7E+00*				1.2E-01	*7.7E-01*
			Hazard	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	1.0E+01	SAT		*7.7E-01*
		Commercial/ Industrial	Carcinogenic	*1.2E+00*	*2.0E+01*	1.2E+00	*4.7E+00*				5.3E-01	*7.7E-01*
			Hazard	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	6.7E+01	SAT		*7.7E-01*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.3E-02				4.8E+03	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	3.6E-01				7.7E+04	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	3.2E-01				4.1E+04	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				1.5E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-02*	*1.0E-01*	1.3E-01	*5.0E-04*				6.7E-02	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL		*5.0E-02*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*	*1.0E-01*	5.7E-01	*5.0E-04*				2.9E-01	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL		*5.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			2.6E+00	1.6E-06				2.6E+00	
			Hazard	1.5E+00	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Silver	Stryene	Tetrachloro-ethane (1,1,2,2 -)	Tetrachloro-ethylene (PCE)	Tetraethyl Lead	Toluene	Trichloro-ethane (1,1,1-)	Trichloro-ethane (1,1,2-)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			1.0E+00	5.7E+00				3.8E+00
			Hazard	3.7E+02	9.8E+03	1.2E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02
		Commercial/ Industrial	Carcinogenic			3.1E+00	1.8E+01				1.2E+01
			Hazard	6.8E+03	6.3E+04	7.9E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			7.4E-01	3.0E-01				5.4E-01
			Hazard		SAT	1.0E+03	1.2E+01		3.6E+02	2.6E+02	3.1E+01
		Commercial/ Industrial	Carcinogenic			1.2E+01	4.8E+00				8.7E+00
			Hazard		SAT	SAT	SAT		SAT	SAT	8.9E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			2.1E+00	8.4E-01				1.5E+00
			Hazard		SAT	SAT	4.1E+01		SAT	8.7E+02	1.0E+02
		Commercial/ Industrial	Carcinogenic			7.8E+00	3.2E+00				5.8E+00
			Hazard		SAT	SAT	2.4E+02		SAT	SAT	5.9E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.5E+00*	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*
			Hazard	*2.5E+00*	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*
		Commercial/ Industrial	Carcinogenic	*2.5E+00*	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*
			Hazard	*2.5E+00*	*2.4E+00*	3.0E-03	*2.6E-02*	*2.4E+00*	*8.8E-01*	*7.8E-01*	*8.8E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			7.5E-01	2.0E-01				9.9E-01
			Hazard		>SOL	1.0E+03	8.4E+00		2.1E+02	2.4E+02	5.6E+01
		Commercial/ Industrial	Carcinogenic			1.2E+01	3.3E+00				1.6E+01
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	1.6E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.1E+01	1.3E+01				2.2E+01
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	1.5E+03
		Commercial/ Industrial	Carcinogenic			4.1E+01	5.1E+01				8.4E+01
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.5E-03	6.0E-03				1.8E-02
			Hazard	2.1E+00	9.3E+00	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Trichloro-ethylene (TCE)	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.9E+01		5.0E-01		
			Hazard	2.9E+02	5.2E+02		5.4E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic	5.9E+01		1.6E+00		
			Hazard	1.8E+03	9.5E+03		3.0E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.1E+00		1.3E-03		
			Hazard	1.3E+01			SAT	
		Commercial/ Industrial	Carcinogenic	1.7E+01		2.1E-02		
			Hazard	3.6E+02			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	3.0E+00		3.7E-03		
			Hazard	4.2E+01			SAT	
		Commercial/ Industrial	Carcinogenic	1.1E+01		1.4E-02		
			Hazard	2.4E+02			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.7E-02*		*6.5E-04*	*1.3E+01*	
			Hazard	*2.7E-02*	3.3E+02	*6.5E-04*	*1.3E+01*	8.8E+02
		Commercial/ Industrial	Carcinogenic	*2.7E-02*		*6.5E-04*	*1.3E+01*	
			Hazard	*2.7E-02*	2.2E+03	*6.5E-04*	*1.3E+01*	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	6.9E-01		3.7E-03		
			Hazard	8.1E+00			>SOL	
		Commercial/ Industrial	Carcinogenic	1.1E+01		5.9E-02		
			Hazard	2.3E+02			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	4.1E+01		2.5E-01		
			Hazard	5.7E+02			>SOL	
		Commercial/ Industrial	Carcinogenic	1.5E+02		9.6E-01		
			Hazard	>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.6E-03		2.6E-03		
			Hazard	7.2E-02	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

APPENDIX F: TIER 2 SITE-SPECIFIC TARGET LEVELS

This appendix contains the complete set of Oakland Tier 2 SSTLs for Merritt sands, sandy silts and clayey silts. The Oakland Tier 2 SSTLs may be applied only at sites that meet the eligibility criteria specified in Section 2.2 *and* where one or more of the three soil types has been shown to prevail (see Section 2.3.4).

Please note that the Oakland RBCA look-up tables will be updated whenever new or better information becomes available. It is recommended that you consult the ULR Program web page at www.oaklandpw.com to make sure that you have the latest version of the look-up tables before applying the Oakland Tier 2 SSTLs at your site.

For step-by-step assistance in reading the look-up tables, refer back to Section 2.4.

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.8E+00		3.7E+00	3.7E+01
			Hazard	3.9E+03	3.9E+03	5.8E+03	1.9E+04	2.2E+01	5.3E+03		9.9E+01
		Commercial/ Industrial	Carcinogenic					2.4E+01		1.6E+01	1.5E+02
			Hazard	4.0E+04	4.0E+04	5.4E+04	2.0E+05	3.8E+02	1.2E+05		9.2E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	7.0E-01
			Hazard	SAT	SAT	1.8E+03	SAT				2.3E+00
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+01
			Hazard	SAT	SAT	5.3E+04	SAT				6.7E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	3.9E+00
			Hazard	SAT	SAT	1.2E+04	SAT				1.6E+01
		Commercial/ Industrial	Carcinogenic							SAT	1.5E+01
			Hazard	SAT	SAT	7.0E+04	SAT				9.1E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*2.1E+01*	*6.0E+02*	3.2E+01	*1.0E-02*
			Hazard	SAT	SAT	2.1E+00	SAT	*2.1E+01*	*6.0E+02*		*1.0E-02*
		Commercial/ Industrial	Carcinogenic					*2.1E+01*	*6.0E+02*	SAT	*1.0E-02*
			Hazard	SAT	SAT	1.4E+01	SAT	*2.1E+01*	*6.0E+02*		*1.0E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.4E+00
			Hazard	>SOL	>SOL	2.0E+04	>SOL				4.7E+00
		Commercial/ Industrial	Carcinogenic							>SOL	2.2E+01
			Hazard	>SOL	>SOL	5.9E+05	>SOL				1.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	1.8E+02
			Hazard	>SOL	>SOL	4.2E+05	>SOL				7.2E+02
		Commercial/ Industrial	Carcinogenic							>SOL	6.9E+02
			Hazard	>SOL	>SOL	>SOL	>SOL				>SOL
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-04	*1.0E-03*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-03	*1.0E-03*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis (2-ethylhexyl) phthalate	Butyl benzyl phthalate
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.7E-01	3.7E+00		3.7E+00	4.5E+04	5.3E+02	
			Hazard			2.6E+02		3.8E+02	1.3E+03	1.3E+04
		Commercial/ Industrial	Carcinogenic	1.6E+00	1.6E+01		1.6E+01	1.7E+05	2.3E+03	
			Hazard			2.7E+03		8.5E+03	1.4E+04	1.4E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*SAT*	SAT		SAT	4.6E+01	SAT	
			Hazard	*SAT*		SAT		4.6E+01	SAT	SAT
		Commercial/ Industrial	Carcinogenic	*SAT*	SAT		SAT	4.6E+01	SAT	
			Hazard	*SAT*		SAT		4.6E+01	SAT	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-04*	5.6E-04		5.6E-04	4.0E-03	8.0E-02	
			Hazard	*2.0E-04*		>SOL		4.0E-03	3.1E-01	>SOL
		Commercial/ Industrial	Carcinogenic	*2.0E-04*	>SOL		>SOL	4.0E-03	>SOL	
			Hazard	*2.0E-04*		>SOL		4.0E-03	>SOL	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05	1.1E-04		1.2E-04		>SOL	
			Hazard			>SOL		2.0E+00	>SOL	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Cadmium	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.1E+04		2.5E+01		1.3E+02		1.4E+01
			Hazard	3.8E+01	1.3E+03	4.0E+01	9.2E+02	5.8E+02	7.7E+04	3.8E+02
		Commercial/ Industrial	Carcinogenic	7.9E+04		1.0E+02		5.3E+02		1.1E+02
			Hazard	8.5E+02	7.0E+03	3.6E+02	7.2E+03	5.4E+03	1.7E+06	8.5E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			2.7E-01		3.4E+00		
			Hazard		1.1E+00	4.5E-01	6.5E-01	1.3E+01		
		Commercial/ Industrial	Carcinogenic			4.3E+00		5.4E+01		
			Hazard		3.3E+01	1.3E+01	1.9E+01	3.7E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.5E+00		1.9E+01		
			Hazard		7.6E+00	3.0E+00	4.4E+00	8.5E+01		
		Commercial/ Industrial	Carcinogenic			5.8E+00		7.2E+01		
			Hazard		4.4E+01	1.8E+01	2.5E+01	4.9E+02		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*5.5E+00*		*1.4E-02*	*3.3E-01*	*7.3E-01*		1.4E+01
			Hazard	*5.5E+00*	1.4E+01	*1.4E-02*	*3.3E-01*	*7.3E-01*	4.1E+08	1.4E+01
		Commercial/ Industrial	Carcinogenic	*5.5E+00*		*1.4E-02*	*3.3E-01*	*7.3E-01*		1.4E+01
			Hazard	*5.5E+00*	9.1E+01	*1.4E-02*	*3.3E-01*	*7.3E-01*	2.7E+09	1.4E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			2.7E-01		9.1E+00		
			Hazard		3.3E+00	4.5E-01	4.0E+00	3.4E+01		
		Commercial/ Industrial	Carcinogenic			4.3E+00		1.4E+02		
			Hazard		9.5E+01	1.3E+01	1.2E+02	9.8E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			5.6E+01		1.0E+03		
			Hazard		7.3E+02	1.1E+02	>SOL	4.5E+03		
		Commercial/ Industrial	Carcinogenic			2.1E+02		3.9E+03		
			Hazard		>SOL	6.5E+02	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.6E+00	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.0E+01	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.1E-02		3.9E-01		6.8E-02
			Hazard	2.0E-01	9.4E+00	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Chrysene	Copper	Cresol(-m)	Cresol(-o)	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.7E+01						1.1E+00
			Hazard		2.8E+03	3.2E+03	3.2E+03	3.2E+02	3.1E+03	
		Commercial/ Industrial	Carcinogenic	1.6E+02						4.7E+00
			Hazard		6.3E+04	3.3E+04	3.3E+04	3.3E+03	6.8E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT	*1.7E+00*				2.9E+01	9.1E+01
			Hazard		*1.7E+00*	1.1E+01	1.1E+01	1.0E+00	2.9E+01	
		Commercial/ Industrial	Carcinogenic	SAT	*1.7E+00*				2.9E+01	SAT
			Hazard		*1.7E+00*	7.1E+01	7.4E+01	6.7E+00	2.9E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	1.6E-04
			Hazard		*1.3E+00*	7.8E-01	7.8E-01	7.8E-02	2.0E-01	
		Commercial/ Industrial	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	7.0E-04
			Hazard		*1.3E+00*	5.1E+00	5.1E+00	5.1E-01	2.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	>SOL						1.4E-05
			Hazard		1.5E+01	6.7E+00	6.4E+00	5.9E-01	7.0E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Dichloro- ethane (1,1-)	Dichloro- ethane (1,2-) (EDC)	Dichloro- ethylene (1,1-)	Dichloro- ethylene (cis 1,2-)	Dichloro- ethene (trans 1,2)	Dimethylbenza- (a)anthracene (7,12)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	6.6E+02	5.3E+01	7.0E+00			
			Hazard	6.0E+03	1.7E+02	5.2E+02	5.8E+02	1.2E+03	2.0E+03
		Commercial/ Industrial	Carcinogenic	2.7E+03	2.2E+02	3.0E+01			
			Hazard	5.8E+04	1.6E+03	4.9E+03	5.4E+03	1.1E+04	2.0E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	8.8E+00	1.8E+00	9.2E-02			
			Hazard	1.4E+02	7.2E+00	2.9E+00	1.5E+01	1.9E+01	
		Commercial/ Industrial	Carcinogenic	1.4E+02	2.9E+01	1.5E+00			
			Hazard	SAT	2.1E+02	8.5E+01	4.3E+02	5.5E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	5.0E+01	1.0E+01	5.2E-01			
			Hazard	9.3E+02	4.8E+01	2.0E+01	9.9E+01	1.3E+02	
		Commercial/ Industrial	Carcinogenic	1.9E+02	3.9E+01	2.0E+00			
			Hazard	SAT	2.8E+02	1.1E+02	5.7E+02	7.4E+02	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.1E-02	*1.9E-03*	*7.0E-02*	*4.0E-02*	*9.6E-02*	
			Hazard	3.1E-02	*1.9E-03*	*7.0E-02*	*4.0E-02*	*9.6E-02*	SAT
		Commercial/ Industrial	Carcinogenic	3.1E-02	*1.9E-03*	*7.0E-02*	*4.0E-02*	*9.6E-02*	
			Hazard	3.1E-02	*1.9E-03*	*7.0E-02*	*4.0E-02*	*9.6E-02*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.8E+01	7.7E+00	2.2E-01			
			Hazard	4.3E+02	3.1E+01	7.0E+00	4.0E+01	4.2E+01	
		Commercial/ Industrial	Carcinogenic	4.4E+02	1.2E+02	3.5E+00			
			Hazard	>SOL	8.9E+02	2.0E+02	1.2E+03	1.2E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	3.2E+03	4.1E+02	4.5E+01			
			Hazard	>SOL	2.0E+03	1.7E+03	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	1.6E+03	1.7E+02			
			Hazard	>SOL	>SOL	>SOL	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
		Commercial/ Industrial	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	2.1E+00	2.4E-01	1.3E-02			
			Hazard	1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic				1.4E+01	1.4E+02		1.2E+00	
			Hazard	1.3E+03	6.5E+03	1.3E+03			6.3E+03	3.3E+00	2.6E+03
		Commercial/ Industrial	Carcinogenic				6.0E+01	5.6E+02		5.2E+00	
			Hazard	1.3E+04	6.8E+04	1.4E+04			6.3E+04	3.1E+01	2.7E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	SAT		2.9E+00	
			Hazard	SAT	SAT	SAT			SAT	8.1E-01	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		4.6E+01	
			Hazard	SAT	SAT	SAT			SAT	2.4E+01	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	SAT		1.6E+01	
			Hazard	SAT	SAT	SAT			SAT	5.4E+00	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		6.2E+01	
			Hazard	SAT	SAT	SAT			SAT	3.2E+01	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic				3.3E-02	SAT	*3.8E+01*	*3.8E-04*	
			Hazard	9.9E+00	SAT	SAT			*3.8E+01*	*3.8E-04*	SAT
		Commercial/ Industrial	Carcinogenic				1.4E-01	SAT	*3.8E+01*	*3.8E-04*	
			Hazard	6.5E+01	SAT	SAT			*3.8E+01*	*3.8E-04*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		5.9E+00	
			Hazard	>SOL	>SOL	>SOL			>SOL	1.6E+00	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		9.3E+01	
			Hazard	>SOL	>SOL	>SOL			>SOL	4.8E+01	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		1.8E+02	
			Hazard	>SOL	>SOL	>SOL			>SOL	6.0E+01	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		6.9E+02	
			Hazard	>SOL	>SOL	>SOL			>SOL	3.5E+02	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic				2.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*	>SOL
		Commercial/ Industrial	Carcinogenic				9.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic				6.4E-02	>SOL		5.9E-03	
			Hazard	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD)-pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.7E+00				3.0E+02		
			Hazard	2.6E+03		5.8E+00	2.9E+04	3.1E+04	3.9E+03	2.5E+03	3.3E+02
		Commercial/ Industrial	Carcinogenic		1.6E+01				1.3E+03		
			Hazard	2.7E+04		5.5E+01	2.7E+05	2.7E+05	4.0E+04	2.6E+04	3.4E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				1.3E+01		
			Hazard	SAT		1.2E+01	5.6E+04	7.9E+03	8.0E+02	SAT	4.8E+03
		Commercial/ Industrial	Carcinogenic		SAT				2.1E+02		
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				7.6E+01		
			Hazard	SAT		8.2E+01	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT				2.9E+02		
			Hazard	SAT		4.7E+02	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	*1.5E+00*			1.6E-02		*4.0E-02*
			Hazard	SAT		*1.5E+00*	9.9E+00	1.8E+01	1.6E-02	7.7E+02	*4.0E-02*
		Commercial/ Industrial	Carcinogenic		SAT	*1.5E+00*			1.6E-02		*4.0E-02*
			Hazard	SAT		*1.5E+00*	6.5E+01	1.2E+02	1.6E-02	SAT	*4.0E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				7.6E+01		
			Hazard	>SOL		3.4E-01	6.6E+05	6.2E+04	4.5E+03	>SOL	2.5E+04
		Commercial/ Industrial	Carcinogenic		>SOL				1.2E+03		
			Hazard	>SOL		9.8E+00	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				5.8E+03		
			Hazard	>SOL		5.4E+01	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				>SOL		
			Hazard	>SOL		3.1E+02	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*
		Commercial/ Industrial	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>SOL		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		>SOL				1.3E+00		
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Naphthalene	Nickel	Nitro-benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.4E+05	7.8E+03	6.5E-01				4.1E+03	
			Hazard	2.5E+03	1.5E+03		1.4E+00	1.9E+04	3.8E+04	2.0E+03		3.8E+02
		Commercial/ Industrial	Carcinogenic		1.3E+06	3.3E+04	3.3E+00				1.7E+04	
			Hazard	2.5E+04	3.4E+04		1.8E+01	2.0E+05	3.9E+05	2.0E+04		8.5E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	6.9E+02				3.0E+04	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				4.8E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	SAT				1.6E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				6.1E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*5.8E+00*	*9.5E+01*	1.4E+01	*2.2E+01*				6.1E+00	*3.7E+00*
			Hazard	*5.8E+00*	*9.5E+01*		*2.2E+01*	SAT	5.1E+01	SAT		*3.7E+00*
		Commercial/ Industrial	Carcinogenic	*5.8E+00*	*9.5E+01*	6.1E+01	*2.2E+01*				2.6E+01	*3.7E+00*
			Hazard	*5.8E+00*	*9.5E+01*		*2.2E+01*	SAT	3.3E+02	SAT		*3.7E+00*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.4E-01				4.9E+04	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				7.8E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	>SOL				7.7E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				>SOL	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-02*	*1.0E-01*	1.3E+00	*5.0E-04*				6.7E-01	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL		*5.0E-02*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*	*1.0E-01*	5.7E+00	*5.0E-04*				2.9E+00	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL		*5.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			2.8E+01	1.6E-05				2.6E+01	
			Hazard	1.5E+00	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Silver	Stryene	Tetrachloro-ethane (1,1,2,2 -)	Tetrachloro-ethylene (PCE)	Tetraethyl Lead	Toluene	Trichloro-ethane (1,1,1-)	Trichloro-ethane (1,1,2-)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			1.4E+01	8.1E+01				5.2E+01
			Hazard	3.8E+02	1.2E+04	1.5E+03	5.8E+02	6.5E-03	1.1E+04	2.2E+03	2.3E+02
		Commercial/ Industrial	Carcinogenic			5.6E+01	3.4E+02				2.1E+02
			Hazard	8.5E+03	1.2E+05	1.4E+04	5.4E+03	6.8E-02	9.4E+04	2.3E+04	2.2E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			7.5E+00	3.0E+00				5.6E+00
			Hazard		SAT	1.0E+03	1.2E+01		3.7E+02	2.6E+02	3.2E+01
		Commercial/ Industrial	Carcinogenic			1.2E+02	4.8E+01				9.0E+01
			Hazard		SAT	SAT	SAT		SAT	SAT	9.2E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			4.3E+01	1.7E+01				3.2E+01
			Hazard		SAT	SAT	8.3E+01		SAT	SAT	2.1E+02
		Commercial/ Industrial	Carcinogenic			1.6E+02	6.5E+01				1.2E+02
			Hazard		SAT	SAT	SAT		SAT	SAT	1.2E+03
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.2E+01*	*1.1E+01*	1.5E-02	*1.3E-01*	*SAT*	*4.2E+00*	*3.7E+00*	*4.3E-02*
			Hazard	*1.2E+01*	*1.1E+01*	1.5E-02	*1.3E-01*	*SAT*	*4.2E+00*	*3.7E+00*	*4.3E-02*
		Commercial/ Industrial	Carcinogenic	*1.2E+01*	*1.1E+01*	1.5E-02	*1.3E-01*	*SAT*	*4.2E+00*	*3.7E+00*	*4.3E-02*
			Hazard	*1.2E+01*	*1.1E+01*	1.5E-02	*1.3E-01*	*SAT*	*4.2E+00*	*3.7E+00*	*4.3E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			7.8E+00	3.1E+00				1.1E+01
			Hazard		>SOL	1.1E+03	1.3E+01		2.8E+02	3.7E+02	5.9E+01
		Commercial/ Industrial	Carcinogenic			1.2E+02	5.0E+01				1.7E+02
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	1.7E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			2.2E+02	>SOL				4.9E+02
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	3.3E+03
		Commercial/ Industrial	Carcinogenic			8.5E+02	>SOL				1.9E+03
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.5E-02	6.0E-02				1.8E-01
			Hazard	2.1E+00	9.3E+00	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 6. Oakland Tier 2 SSTLs for Merritt Sands

Medium	Exposure Pathway	Land Use	Type of Risk	Trichloro-ethylene (TCE)	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.6E+02		6.9E+00		
			Hazard	3.5E+02	5.4E+02		6.0E+04	2.3E+04
		Commercial/ Industrial	Carcinogenic	1.1E+03		2.8E+01		
			Hazard	3.3E+03	1.2E+04		3.8E+05	5.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.1E+01		1.3E-02		
			Hazard	1.3E+01			SAT	
		Commercial/ Industrial	Carcinogenic	1.7E+02		2.0E-01		
			Hazard	3.7E+02			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	6.1E+01		7.1E-02		
			Hazard	8.5E+01			SAT	
		Commercial/ Industrial	Carcinogenic	2.3E+02		2.7E-01		
			Hazard	4.9E+02			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.3E-01*		*2.9E-03*	*6.4E+01*	
			Hazard	*1.3E-01*	1.6E+03	*2.9E-03*	*6.4E+01*	4.2E+03
		Commercial/ Industrial	Carcinogenic	*1.3E-01*		*2.9E-03*	*6.4E+01*	
			Hazard	*1.3E-01*	1.0E+04	*2.9E-03*	*6.4E+01*	2.8E+04
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	9.6E+00		6.0E-02		
			Hazard	1.1E+01			>SOL	
		Commercial/ Industrial	Carcinogenic	1.5E+02		9.6E-01		
			Hazard	3.3E+02			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		1.2E+01		
			Hazard	>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL		4.7E+01		
			Hazard	>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.6E-02		2.6E-02		
			Hazard	7.2E-02	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E+00		2.5E+00	2.7E+01
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.2E+01
		Commercial/ Industrial	Carcinogenic					1.5E+01		7.9E+00	8.5E+01
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.2E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	1.1E+00
			Hazard	SAT	SAT	3.3E+03	SAT				3.6E+00
		Commercial/ Industrial	Carcinogenic							SAT	1.7E+01
			Hazard	SAT	SAT	9.7E+04	SAT				1.1E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	2.0E+01
			Hazard	SAT	SAT	5.7E+04	SAT				8.0E+01
		Commercial/ Industrial	Carcinogenic							SAT	7.7E+01
			Hazard	SAT	SAT	SAT	SAT				4.7E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*8.9E+00*	*2.5E+02*	2.0E+01	*6.5E-03*
			Hazard	SAT	SAT	1.6E+00	SAT	*8.9E+00*	*2.5E+02*		*6.5E-03*
		Commercial/ Industrial	Carcinogenic					*8.9E+00*	*2.5E+02*	SAT	*6.5E-03*
			Hazard	SAT	SAT	1.0E+01	SAT	*8.9E+00*	*2.5E+02*		*6.5E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	3.4E+00
			Hazard	>SOL	>SOL	2.2E+04	>SOL				1.1E+01
		Commercial/ Industrial	Carcinogenic							>SOL	5.3E+01
			Hazard	>SOL	>SOL	6.2E+05	>SOL				3.2E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	1.0E+03
			Hazard	>SOL	>SOL	>SOL	>SOL				>SOL
		Commercial/ Industrial	Carcinogenic							>SOL	>SOL
			Hazard	>SOL	>SOL	>SOL	>SOL				>SOL
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-04	*1.0E-03*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-03	*1.0E-03*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis (2-ethylhexyl) phthalate	Butyl benzyl phthalate
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-01	2.5E+00		2.5E+00	4.5E+04	3.6E+02	
			Hazard			2.1E+02		3.7E+02	1.0E+03	1.0E+04
		Commercial/ Industrial	Carcinogenic	7.9E-01	7.9E+00		7.9E+00	1.7E+05	1.1E+03	
			Hazard			1.4E+03		6.8E+03	6.8E+03	6.8E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.9E+01*	SAT		SAT	1.9E+01	SAT	
			Hazard	*1.9E+01*		SAT		1.9E+01	SAT	SAT
		Commercial/ Industrial	Carcinogenic	*1.9E+01*	SAT		SAT	1.9E+01	SAT	
			Hazard	*1.9E+01*		SAT		1.9E+01	SAT	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-04*	5.6E-04		5.6E-04	4.0E-03	8.0E-02	
			Hazard	*2.0E-04*		>SOL		4.0E-03	3.1E-01	>SOL
		Commercial/ Industrial	Carcinogenic	*2.0E-04*	>SOL		>SOL	4.0E-03	>SOL	
			Hazard	*2.0E-04*		>SOL		4.0E-03	>SOL	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05	1.1E-04		1.2E-04		>SOL	
			Hazard			>SOL		2.0E+00	>SOL	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Cadmium	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.1E+04		1.8E+01		9.1E+01		1.3E+01
			Hazard	3.7E+01	1.3E+03	3.3E+01	8.0E+02	4.8E+02	7.4E+04	3.7E+02
		Commercial/ Industrial	Carcinogenic	7.9E+04		5.7E+01		2.9E+02		8.7E+01
			Hazard	6.8E+02	6.7E+03	2.1E+02	4.8E+03	3.0E+03	1.4E+06	6.8E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			4.1E-01		5.3E+00		
			Hazard		1.7E+00	6.8E-01	1.0E+00	2.0E+01		
		Commercial/ Industrial	Carcinogenic			6.5E+00		8.5E+01		
			Hazard		5.0E+01	2.0E+01	3.0E+01	5.8E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			7.6E+00		9.9E+01		
			Hazard		3.8E+01	1.5E+01	2.3E+01	4.4E+02		
		Commercial/ Industrial	Carcinogenic			2.9E+01		3.8E+02		
			Hazard		2.2E+02	8.8E+01	1.3E+02	2.5E+03		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.3E+00*		*8.8E-03*	*2.1E-01*	*4.7E-01*		5.8E+00
			Hazard	*2.3E+00*	8.5E+00	*8.8E-03*	*2.1E-01*	*4.7E-01*	1.7E+08	5.8E+00
		Commercial/ Industrial	Carcinogenic	*2.3E+00*		*8.8E-03*	*2.1E-01*	*4.7E-01*		5.8E+00
			Hazard	*2.3E+00*	5.6E+01	*8.8E-03*	*2.1E-01*	*4.7E-01*	1.1E+09	5.8E+00
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			1.3E+00		1.9E+01		
			Hazard		1.2E+01	2.2E+00	2.1E+01	7.2E+01		
		Commercial/ Industrial	Carcinogenic			2.1E+01		3.1E+02		
			Hazard		3.6E+02	6.4E+01	>SOL	2.1E+03		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			5.0E+02		5.4E+03		
			Hazard		>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL		>SOL		
			Hazard		>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.6E+00	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.0E+01	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.1E-02		3.9E-01		6.8E-02
			Hazard	2.0E-01	9.4E+00	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Chrysene	Copper	Cresol(-m)	Cresol(-o)	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E+01						7.4E-01
			Hazard		2.8E+03	2.6E+03	2.6E+03	2.6E+02	3.0E+03	
		Commercial/ Industrial	Carcinogenic	7.9E+01						2.3E+00
			Hazard		5.0E+04	1.7E+04	1.7E+04	1.7E+03	5.5E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT	*1.2E+00*				1.2E+01	5.7E+01
			Hazard		*1.2E+00*	7.0E+00	7.3E+00	6.5E-01	1.2E+01	
		Commercial/ Industrial	Carcinogenic	SAT	*1.2E+00*				1.2E+01	SAT
			Hazard		*1.2E+00*	4.5E+01	4.7E+01	4.3E+00	1.2E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	1.6E-04
			Hazard		*1.3E+00*	7.8E-01	7.8E-01	7.8E-02	2.0E-01	
		Commercial/ Industrial	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	7.0E-04
			Hazard		*1.3E+00*	5.1E+00	5.1E+00	5.1E-01	2.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	>SOL						1.4E-05
			Hazard		1.5E+01	6.7E+00	6.4E+00	5.9E-01	7.0E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Dichloro- ethane (1,1-)	Dichloro- ethane (1,2-) (EDC)	Dichloro- ethylene (1,1-)	Dichloro- ethylene (cis 1,2-)	Dichloro- ethene (trans 1,2)	Dimethylbenza- (a)anthracene (7,12)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	4.8E+02	3.9E+01	4.9E+00			
			Hazard	4.9E+03	1.4E+02	4.3E+02	4.8E+02	9.6E+02	1.6E+03
		Commercial/ Industrial	Carcinogenic	1.5E+03	1.2E+02	1.5E+01			
			Hazard	3.1E+04	8.8E+02	2.7E+03	3.0E+03	6.1E+03	1.0E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.4E+01	3.0E+00	1.4E-01			
			Hazard	2.2E+02	1.2E+01	4.3E+00	2.3E+01	2.9E+01	
		Commercial/ Industrial	Carcinogenic	2.2E+02	4.7E+01	2.2E+00			
			Hazard	SAT	3.4E+02	1.2E+02	6.7E+02	8.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.6E+02	5.5E+01	2.5E+00			
			Hazard	SAT	2.6E+02	9.5E+01	5.1E+02	6.4E+02	
		Commercial/ Industrial	Carcinogenic	9.7E+02	2.1E+02	9.6E+00			
			Hazard	SAT	1.5E+03	5.5E+02	SAT	3.7E+03	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.0E-02	*1.3E-03*	*4.2E-02*	*2.6E-02*	*6.0E-02*	
			Hazard	2.0E-02	*1.3E-03*	*4.2E-02*	*2.6E-02*	*6.0E-02*	SAT
		Commercial/ Industrial	Carcinogenic	2.0E-02	*1.3E-03*	*4.2E-02*	*2.6E-02*	*6.0E-02*	
			Hazard	2.0E-02	*1.3E-03*	*4.2E-02*	*2.6E-02*	*6.0E-02*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	6.0E+01	1.1E+01	1.0E+00			
			Hazard	9.4E+02	4.4E+01	3.2E+01	7.5E+01	1.0E+02	
		Commercial/ Industrial	Carcinogenic	9.6E+02	1.7E+02	1.6E+01			
			Hazard	>SOL	1.3E+03	9.2E+02	2.2E+03	3.0E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	1.8E+03	3.7E+02			
			Hazard	>SOL	8.4E+03	>SOL	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	6.7E+03	1.4E+03			
			Hazard	>SOL	>SOL	>SOL	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
		Commercial/ Industrial	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	2.1E+00	2.4E-01	1.3E-02			
			Hazard	1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic				9.6E+00	1.0E+02		8.4E-01	
			Hazard	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00	2.1E+03
		Commercial/ Industrial	Carcinogenic				3.0E+01	3.2E+02		2.6E+00	
			Hazard	6.7E+03	3.4E+04	6.8E+03			3.3E+04	1.7E+01	1.4E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	SAT		4.6E+00	
			Hazard	SAT	SAT	SAT			SAT	1.3E+00	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		7.4E+01	
			Hazard	SAT	SAT	SAT			SAT	3.8E+01	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	SAT		8.4E+01	
			Hazard	SAT	SAT	SAT			SAT	2.8E+01	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		3.2E+02	
			Hazard	SAT	SAT	SAT			SAT	1.6E+02	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic				2.1E-02	SAT	*2.4E+01*	*2.5E-04*	
			Hazard	6.3E+00	1.2E+07	SAT			*2.4E+01*	*2.5E-04*	SAT
		Commercial/ Industrial	Carcinogenic				8.9E-02	SAT	*2.4E+01*	*2.5E-04*	
			Hazard	4.1E+01	SAT	SAT			*2.4E+01*	*2.5E-04*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		7.0E+00	
			Hazard	>SOL	>SOL	>SOL			>SOL	2.0E+00	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		1.1E+02	
			Hazard	>SOL	>SOL	>SOL			>SOL	5.7E+01	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		6.8E+02	
			Hazard	>SOL	>SOL	>SOL			>SOL	2.2E+02	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		2.6E+03	
			Hazard	>SOL	>SOL	>SOL			>SOL	1.3E+03	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic				2.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*	>SOL
		Commercial/ Industrial	Carcinogenic				9.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic				6.4E-02	>SOL		5.9E-03	
			Hazard	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD)-pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		2.5E+00				2.1E+02		
			Hazard	2.1E+03		5.0E+00	2.4E+04	2.7E+04	3.1E+03	2.1E+03	2.6E+02
		Commercial/ Industrial	Carcinogenic		7.9E+00				6.6E+02		
			Hazard	1.4E+04		3.2E+01	1.6E+05	1.7E+05	2.0E+04	1.3E+04	1.7E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				2.2E+01		
			Hazard	SAT		1.3E+01	1.0E+05	1.4E+04	1.3E+03	SAT	8.1E+03
		Commercial/ Industrial	Carcinogenic		SAT				3.5E+02		
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				4.1E+02		
			Hazard	SAT		2.8E+02	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT				1.6E+03		
			Hazard	SAT		1.6E+03	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	*6.3E-01*			1.0E-02		*2.7E-02*
			Hazard	SAT		*6.3E-01*	7.5E+00	1.3E+01	1.0E-02	4.9E+02	*2.7E-02*
		Commercial/ Industrial	Carcinogenic		SAT	*6.3E-01*			1.0E-02		*2.7E-02*
			Hazard	SAT		*6.3E-01*	4.9E+01	8.4E+01	1.0E-02	SAT	*2.7E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				1.3E+02		
			Hazard	>SOL		8.4E-01	6.6E+05	6.6E+04	7.5E+03	>SOL	3.0E+04
		Commercial/ Industrial	Carcinogenic		>SOL				2.0E+03		
			Hazard	>SOL		2.4E+01	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				>SOL		
			Hazard	>SOL		3.1E+02	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				>SOL		
			Hazard	>SOL		1.8E+03	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*
		Commercial/ Industrial	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>SOL		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		>SOL				1.3E+00		
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Naphthalene	Nickel	Nitro-benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.4E+05	5.6E+03	5.0E-01				2.9E+03	
			Hazard	2.1E+03	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02
		Commercial/ Industrial	Carcinogenic		1.3E+06	1.8E+04	1.9E+00				9.3E+03	
			Hazard	1.3E+04	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	1.1E+03				4.7E+04	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				7.4E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	SAT				4.5E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				SAT	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*3.7E+00*	*4.0E+01*	9.2E+00	*1.4E+01*				3.9E+00	*1.6E+00*
			Hazard	*3.7E+00*	*4.0E+01*		*1.4E+01*	SAT	3.4E+01	SAT		*1.6E+00*
		Commercial/ Industrial	Carcinogenic	*3.7E+00*	*4.0E+01*	3.9E+01	*1.4E+01*				1.7E+01	*1.6E+00*
			Hazard	*3.7E+00*	*4.0E+01*		*1.4E+01*	SAT	2.2E+02	SAT		*1.6E+00*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.8E-01				5.0E+04	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				8.0E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	>SOL				>SOL	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				>SOL	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-02*	*1.0E-01*	1.3E+00	*5.0E-04*				6.7E-01	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL		*5.0E-02*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*	*1.0E-01*	5.7E+00	*5.0E-04*				2.9E+00	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL		*5.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			2.8E+01	1.6E-05				2.6E+01	
			Hazard	1.5E+00	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Silver	Stryene	Tetrachloro-ethane (1,1,2,2 -)	Tetrachloro-ethylene (PCE)	Tetraethyl Lead	Toluene	Trichloro-ethane (1,1,1-)	Trichloro-ethane (1,1,2-)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			1.0E+01	5.7E+01				3.8E+01
			Hazard	3.7E+02	1.0E+04	1.3E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02
		Commercial/ Industrial	Carcinogenic			3.3E+01	1.8E+02				1.2E+02
			Hazard	6.8E+03	6.4E+04	8.2E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			1.2E+01	4.6E+00				8.9E+00
			Hazard		SAT	1.6E+03	1.9E+01		5.7E+02	4.0E+02	5.0E+01
		Commercial/ Industrial	Carcinogenic			1.9E+02	7.3E+01				1.4E+02
			Hazard		SAT	SAT	SAT		SAT	SAT	1.5E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			2.1E+02	8.6E+01				1.6E+02
			Hazard		SAT	SAT	4.2E+02		SAT	SAT	1.1E+03
		Commercial/ Industrial	Carcinogenic			8.0E+02	3.3E+02				6.2E+02
			Hazard		SAT	SAT	SAT		SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*5.1E+00*	*7.2E+00*	9.5E-03	*7.8E-02*	*6.9E+00*	*2.7E+00*	*2.3E+00*	*2.8E-02*
			Hazard	*5.1E+00*	*7.2E+00*	9.5E-03	*7.8E-02*	*6.9E+00*	*2.7E+00*	*2.3E+00*	*2.8E-02*
		Commercial/ Industrial	Carcinogenic	*5.1E+00*	*7.2E+00*	9.5E-03	*7.8E-02*	*6.9E+00*	*2.7E+00*	*2.3E+00*	*2.8E-02*
			Hazard	*5.1E+00*	*7.2E+00*	9.5E-03	*7.8E-02*	*6.9E+00*	*2.7E+00*	*2.3E+00*	*2.8E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			9.2E+00	1.2E+01				1.4E+01
			Hazard		>SOL	1.3E+03	5.1E+01		>SOL	>SOL	8.0E+01
		Commercial/ Industrial	Carcinogenic			1.5E+02	2.0E+02				2.3E+02
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	2.3E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			8.1E+02	>SOL				2.0E+03
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				>SOL
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.5E-02	6.0E-02				1.8E-01
			Hazard	2.1E+00	9.3E+00	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 7. Oakland Tier 2 SSTLs for Sandy Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Trichloro-ethylene (TCE)	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.9E+02		5.0E+00		
			Hazard	2.9E+02	5.2E+02		5.6E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic	5.9E+02		1.6E+01		
			Hazard	1.8E+03	9.5E+03		3.1E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.7E+01		1.8E-02		
			Hazard	2.0E+01			SAT	
		Commercial/ Industrial	Carcinogenic	2.6E+02		2.8E-01		
			Hazard	5.7E+02			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	3.1E+02		3.3E-01		
			Hazard	4.3E+02			SAT	
		Commercial/ Industrial	Carcinogenic	1.2E+03		1.2E+00		
			Hazard	2.5E+03			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*8.2E-02*		*1.6E-03*	*4.0E+01*	
			Hazard	*8.2E-02*	6.7E+02	*1.6E-03*	*4.0E+01*	1.8E+03
		Commercial/ Industrial	Carcinogenic	*8.2E-02*		*1.6E-03*	*4.0E+01*	
			Hazard	*8.2E-02*	4.4E+03	*1.6E-03*	*4.0E+01*	1.2E+04
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.9E+01		2.8E-01		
			Hazard	3.4E+01			>SOL	
		Commercial/ Industrial	Carcinogenic	4.6E+02		4.4E+00		
			Hazard	9.9E+02			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		1.0E+02		
			Hazard	>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL		3.9E+02		
			Hazard	>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.6E-02		2.6E-02		
			Hazard	7.2E-02	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					2.6E+00		1.7E+00	1.9E+01
			Hazard	2.3E+03	2.3E+03	3.7E+03	1.2E+04	1.8E+01	5.0E+03		6.3E+01
		Commercial/ Industrial	Carcinogenic					9.5E+00		4.3E+00	4.9E+01
			Hazard	1.1E+04	1.1E+04	1.8E+04	5.6E+04	1.5E+02	7.1E+04		3.0E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	1.9E+00
			Hazard	SAT	SAT	6.3E+03	SAT				6.2E+00
		Commercial/ Industrial	Carcinogenic							SAT	3.0E+01
			Hazard	SAT	SAT	1.8E+05	SAT				1.8E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.6E+02
			Hazard	SAT	SAT	1.2E+05	SAT				6.5E+02
		Commercial/ Industrial	Carcinogenic							SAT	6.2E+02
			Hazard	SAT	SAT	SAT	SAT				SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*4.4E+00*	*1.3E+02*	1.4E+01	*4.5E-03*
			Hazard	4.0E+02	2.7E+02	1.5E+00	SAT	*4.4E+00*	*1.3E+02*		*4.5E-03*
		Commercial/ Industrial	Carcinogenic					*4.4E+00*	*1.3E+02*	5.8E+01	*4.5E-03*
			Hazard	SAT	SAT	9.7E+00	SAT	*4.4E+00*	*1.3E+02*		*4.5E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00
			Hazard	>SOL	>SOL	2.1E+04	>SOL				1.9E+01
		Commercial/ Industrial	Carcinogenic							>SOL	8.9E+01
			Hazard	>SOL	>SOL	6.2E+05	>SOL				5.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	>SOL
			Hazard	>SOL	>SOL	9.5E+05	>SOL				>SOL
		Commercial/ Industrial	Carcinogenic							>SOL	>SOL
			Hazard	>SOL	>SOL	>SOL	>SOL				>SOL
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-04	*1.0E-03*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-03	*1.0E-03*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis (2-ethylhexyl) phthalate	Butyl benzyl phthalate
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.7E-01	1.7E+00		1.7E+00	4.5E+04	2.4E+02	
			Hazard			1.6E+02		3.6E+02	7.8E+02	7.8E+03
		Commercial/ Industrial	Carcinogenic	4.3E-01	4.3E+00		4.3E+00	1.7E+05	6.2E+02	
			Hazard			7.4E+02		5.1E+03	3.7E+03	3.7E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
		Commercial/ Industrial	Carcinogenic	SAT	SAT		SAT		SAT	
			Hazard			SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.2E+01*	SAT		SAT	9.6E+00	7.3E+04	
			Hazard	*1.2E+01*		SAT		9.6E+00	SAT	SAT
		Commercial/ Industrial	Carcinogenic	*1.2E+01*	SAT		SAT	9.6E+00	SAT	
			Hazard	*1.2E+01*		SAT		9.6E+00	SAT	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL		>SOL		>SOL	
			Hazard			>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-04*	5.6E-04		5.6E-04	4.0E-03	8.0E-02	
			Hazard	*2.0E-04*		>SOL		4.0E-03	3.1E-01	>SOL
		Commercial/ Industrial	Carcinogenic	*2.0E-04*	>SOL		>SOL	4.0E-03	>SOL	
			Hazard	*2.0E-04*		>SOL		4.0E-03	>SOL	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05	1.1E-04		1.2E-04		>SOL	
			Hazard			>SOL		2.0E+00	>SOL	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Cadmium	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.1E+04		1.2E+01		6.2E+01		1.2E+01
			Hazard	3.6E+01	1.4E+03	2.6E+01	6.6E+02	3.7E+02	7.1E+04	3.6E+02
		Commercial/ Industrial	Carcinogenic	7.9E+04		3.3E+01		1.6E+02		6.6E+01
			Hazard	5.1E+02	6.5E+03	1.2E+02	3.1E+03	1.8E+03	1.0E+06	5.1E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			6.7E-01		9.3E+00		
			Hazard		2.9E+00	1.1E+00	1.9E+00	3.5E+01		
		Commercial/ Industrial	Carcinogenic			1.1E+01		1.5E+02		
			Hazard		8.4E+01	3.2E+01	5.5E+01	1.0E+03		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			6.1E+01		8.1E+02		
			Hazard		3.1E+02	1.2E+02	2.1E+02	3.6E+03		
		Commercial/ Industrial	Carcinogenic			2.3E+02		3.1E+03		
			Hazard		SAT	7.0E+02	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*1.1E+00*		*5.9E-03*	*1.6E-01*	*3.4E-01*		2.9E+00
			Hazard	*1.1E+00*	6.0E+00	*5.9E-03*	*1.6E-01*	*3.4E-01*	8.5E+07	2.9E+00
		Commercial/ Industrial	Carcinogenic	*1.1E+00*		*5.9E-03*	*1.6E-01*	*3.4E-01*		2.9E+00
			Hazard	*1.1E+00*	3.9E+01	*5.9E-03*	*1.6E-01*	*3.4E-01*	5.6E+08	2.9E+00
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			3.3E+00		3.1E+01		
			Hazard		2.6E+01	5.5E+00	5.5E+01	1.2E+02		
		Commercial/ Industrial	Carcinogenic			5.2E+01		5.0E+02		
			Hazard		7.5E+02	1.6E+02	>SOL	3.4E+03		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL		>SOL		
			Hazard		>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL		>SOL		
			Hazard		>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.6E+00	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.6E+01	5.0E-02
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*7.0E-02*	*1.0E-01*		5.0E-02
			Hazard	*5.0E-03*	1.0E+01	*5.0E-04*	*7.0E-02*	*1.0E-01*	1.0E+02	5.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.1E-02		3.9E-01		6.8E-02
			Hazard	2.0E-01	9.4E+00	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Chrysene	Copper	Cresol(-m)	Cresol(-o)	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.7E+01						4.9E-01
			Hazard		2.6E+03	1.9E+03	1.9E+03	1.9E+02	2.8E+03	
		Commercial/ Industrial	Carcinogenic	4.3E+01						1.3E+00
			Hazard		3.8E+04	9.2E+03	9.2E+03	9.2E+02	4.1E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	5.1E+04		
		Commercial/ Industrial	Carcinogenic	SAT						SAT
			Hazard			SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT	*1.2E+00*				6.2E+00	3.8E+01
			Hazard		*1.2E+00*	4.8E+00	5.0E+00	4.6E-01	6.2E+00	
		Commercial/ Industrial	Carcinogenic	SAT	*1.2E+00*				6.2E+00	1.6E+02
			Hazard		*1.2E+00*	3.2E+01	3.3E+01	3.0E+00	6.2E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL						>SOL
			Hazard			>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	1.6E-04
			Hazard		*1.3E+00*	7.8E-01	7.8E-01	7.8E-02	2.0E-01	
		Commercial/ Industrial	Carcinogenic	>SOL	*1.3E+00*				2.0E-01	7.0E-04
			Hazard		*1.3E+00*	5.1E+00	5.1E+00	5.1E-01	2.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	>SOL						1.4E-05
			Hazard		1.5E+01	6.7E+00	6.4E+00	5.9E-01	7.0E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Dichloro- ethane (1,1-)	Dichloro- ethane (1,2-) (EDC)	Dichloro- ethylene (1,1-)	Dichloro- ethylene (cis 1,2-)	Dichloro- ethene (trans 1,2)	Dimethylbenza- (a)anthracene (7,12)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.3E+02	2.7E+01	3.3E+00			
			Hazard	3.8E+03	1.1E+02	3.3E+02	3.7E+02	7.4E+02	1.2E+03
		Commercial/ Industrial	Carcinogenic	8.7E+02	7.1E+01	8.5E+00			
			Hazard	1.8E+04	5.1E+02	1.6E+03	1.8E+03	3.5E+03	5.6E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.4E+01	5.4E+00	2.3E-01			
			Hazard	3.8E+02	2.1E+01	7.2E+00	4.0E+01	4.9E+01	
		Commercial/ Industrial	Carcinogenic	3.9E+02	8.6E+01	3.6E+00			
			Hazard	SAT	6.2E+02	2.1E+02	1.2E+03	1.4E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.1E+03	4.2E+02	2.1E+01			
			Hazard	SAT	2.0E+03	7.8E+02	SAT	5.2E+03	
		Commercial/ Industrial	Carcinogenic	SAT	1.6E+03	7.8E+01			
			Hazard	SAT	SAT	SAT	SAT	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	1.4E-02	*9.9E-04*	*2.8E-02*	*1.9E-02*	*4.2E-02*	
			Hazard	1.4E-02	*9.9E-04*	*2.8E-02*	*1.9E-02*	*4.2E-02*	SAT
		Commercial/ Industrial	Carcinogenic	1.4E-02	*9.9E-04*	*2.8E-02*	*1.9E-02*	*4.2E-02*	
			Hazard	1.4E-02	*9.9E-04*	*2.8E-02*	*1.9E-02*	*4.2E-02*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	9.8E+01	1.5E+01	2.3E+00			
			Hazard	1.5E+03	6.0E+01	7.5E+01	1.2E+02	1.8E+02	
		Commercial/ Industrial	Carcinogenic	1.6E+03	2.4E+02	3.7E+01			
			Hazard	>SOL	1.7E+03	2.2E+03	3.4E+03	5.1E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL	3.5E+03	9.4E+02			
			Hazard	>SOL	>SOL	>SOL	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL	>SOL			
			Hazard	>SOL	>SOL	>SOL	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
		Commercial/ Industrial	Carcinogenic	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	
			Hazard	5.0E-03	*5.0E-04*	*6.0E-03*	*6.0E-03*	*1.0E-02*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	2.1E+00	2.4E-01	1.3E-02			
			Hazard	1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic				6.3E+00	7.0E+01		5.5E-01	
			Hazard	7.7E+02	3.9E+03	7.8E+02			3.9E+03	2.2E+00	1.6E+03
		Commercial/ Industrial	Carcinogenic				1.7E+01	1.8E+02		1.4E+00	
			Hazard	3.7E+03	1.9E+04	3.7E+03			1.8E+04	1.0E+01	7.4E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	SAT		7.5E+00	
			Hazard	SAT	SAT	SAT			SAT	2.1E+00	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		1.2E+02	
			Hazard	SAT	SAT	SAT			SAT	6.1E+01	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	SAT		4.5E+02	
			Hazard	SAT	SAT	SAT			SAT	1.5E+02	SAT
		Commercial/ Industrial	Carcinogenic				SAT	SAT		1.7E+03	
			Hazard	SAT	SAT	SAT			SAT	8.7E+02	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic				1.5E-02	SAT	*1.6E+01*	*1.8E-04*	
			Hazard	4.3E+00	7.9E+06	SAT			*1.6E+01*	*1.8E-04*	SAT
		Commercial/ Industrial	Carcinogenic				6.2E-02	SAT	*1.6E+01*	*1.8E-04*	
			Hazard	2.8E+01	SAT	SAT			*1.6E+01*	*1.8E-04*	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		8.5E+00	
			Hazard	>SOL	>SOL	>SOL			>SOL	2.4E+00	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		1.4E+02	
			Hazard	>SOL	>SOL	>SOL			>SOL	6.9E+01	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>SOL	>SOL		1.3E+03	
			Hazard	>SOL	>SOL	>SOL			>SOL	4.3E+02	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL		>SOL	
			Hazard	>SOL	>SOL	>SOL			>SOL	2.5E+03	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic				2.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*	>SOL
		Commercial/ Industrial	Carcinogenic				9.2E-03	>SOL	*7.0E-01*	*5.0E-05*	
			Hazard	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*	>SOL
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic				6.4E-02	>SOL		5.9E-03	
			Hazard	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD)-pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-napthalene (2-)	MTBE
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		1.7E+00				1.4E+02		
			Hazard	1.6E+03		3.9E+00	1.9E+04	2.2E+04	2.3E+03	1.6E+03	2.0E+02
		Commercial/ Industrial	Carcinogenic		4.3E+00				3.7E+02		
			Hazard	7.4E+03		1.8E+01	8.9E+04	1.0E+05	1.1E+04	7.4E+03	9.3E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				4.2E+01		
			Hazard	SAT		1.5E+01	1.9E+05	2.4E+04	2.5E+03	SAT	1.4E+04
		Commercial/ Industrial	Carcinogenic		SAT				6.7E+02		
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				3.5E+03		
			Hazard	SAT		1.6E+03	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT				SAT		
			Hazard	SAT		9.4E+03	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	*3.2E-01*			8.2E-03		*2.1E-02*
			Hazard	5.2E+02		*3.2E-01*	7.1E+00	1.1E+01	8.2E-03	3.2E+02	*2.1E-02*
		Commercial/ Industrial	Carcinogenic		SAT	*3.2E-01*			8.2E-03		*2.1E-02*
			Hazard	SAT		*3.2E-01*	4.7E+01	7.3E+01	8.2E-03	2.1E+03	*2.1E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				1.9E+02		
			Hazard	>SOL		1.4E+00	6.4E+05	6.5E+04	1.1E+04	>SOL	3.6E+04
		Commercial/ Industrial	Carcinogenic		>SOL				3.0E+03		
			Hazard	>SOL		4.1E+01	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				>SOL		
			Hazard	>SOL		6.0E+02	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL				>SOL		
			Hazard	>SOL		3.5E+03	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	6.3E-01		*2.0E-03*	7.8E+00	9.4E+00	5.0E-03	6.3E-01	*1.3E-02*
		Commercial/ Industrial	Carcinogenic		>SOL	*2.0E-03*			5.0E-03		*1.3E-02*
			Hazard	>SOL		*2.0E-03*	5.1E+01	6.1E+01	5.0E-03	4.1E+00	*1.3E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		>SOL				1.3E+00		
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Naphthalene	Nickel	Nitro-benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		3.4E+05	3.7E+03	3.6E-01				2.0E+03	
			Hazard	1.6E+03	1.4E+03		9.8E-01	1.2E+04	2.3E+04	1.2E+03		3.6E+02
		Commercial/ Industrial	Carcinogenic		1.3E+06	9.9E+03	1.1E+00				5.1E+03	
			Hazard	7.4E+03	2.0E+04		5.8E+00	5.6E+04	1.1E+05	5.6E+03		5.1E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	1.6E+03				6.6E+04	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				1.1E+06	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	SAT				3.9E+05	
			Hazard	SAT			SAT	SAT	SAT	SAT		
		Commercial/ Industrial	Carcinogenic			SAT	SAT				SAT	
			Hazard	SAT			SAT	SAT	SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.4E+00*	*2.0E+01*	6.5E+00	*9.4E+00*				2.8E+00	*8.0E-01*
			Hazard	*2.4E+00*	*2.0E+01*		*9.4E+00*	SAT	2.5E+01	SAT		*8.0E-01*
		Commercial/ Industrial	Carcinogenic	*2.4E+00*	*2.0E+01*	2.8E+01	*9.4E+00*				1.2E+01	*8.0E-01*
			Hazard	*2.4E+00*	*2.0E+01*		*9.4E+00*	SAT	1.6E+02	SAT		*8.0E-01*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	3.2E-01				4.9E+04	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				7.8E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	>SOL				6.6E+05	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				>SOL	
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	*2.0E-02*	*1.0E-01*	1.3E+00	*5.0E-04*				6.7E-01	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL		*5.0E-02*
		Commercial/ Industrial	Carcinogenic	*2.0E-02*	*1.0E-01*	5.7E+00	*5.0E-04*				2.9E+00	*5.0E-02*
			Hazard	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL		*5.0E-02*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			2.8E+01	1.6E-05				2.6E+01	
			Hazard	1.5E+00	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Silver	Styrene	Tetrachloro-ethane (1,1,2,2 -)	Tetrachloro-ethylene (PCE)	Tetraethyl Lead	Toluene	Trichloro-ethane (1,1,1-)	Trichloro-ethane (1,1,2-)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			7.2E+00	3.8E+01				2.7E+01
			Hazard	3.6E+02	7.7E+03	1.0E+03	3.7E+02	3.9E-03	7.1E+03	1.4E+03	1.5E+02
		Commercial/ Industrial	Carcinogenic			1.9E+01	1.0E+02				7.0E+01
			Hazard	5.1E+03	3.7E+04	4.7E+03	1.8E+03	1.9E-02	3.4E+04	6.5E+03	7.2E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			1.8E+01	7.6E+00				1.5E+01
			Hazard		SAT	2.5E+03	3.1E+01		9.3E+02	6.6E+02	8.4E+01
		Commercial/ Industrial	Carcinogenic			2.9E+02	1.2E+02				2.4E+02
			Hazard		SAT	SAT	SAT		SAT	SAT	2.4E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.0E+03	6.9E+02				1.1E+03
			Hazard		SAT	SAT	SAT		SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic			3.9E+03	SAT				4.2E+03
			Hazard		SAT	SAT	SAT		SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*2.6E+00*	*4.8E+00*	6.6E-03	*5.2E-02*	*4.6E+00*	*1.8E+00*	*1.5E+00*	*2.0E-02*
			Hazard	*2.6E+00*	*4.8E+00*	6.6E-03	*5.2E-02*	*4.6E+00*	*1.8E+00*	*1.5E+00*	*2.0E-02*
		Commercial/ Industrial	Carcinogenic	*2.6E+00*	*4.8E+00*	6.6E-03	*5.2E-02*	*4.6E+00*	*1.8E+00*	*1.5E+00*	*2.0E-02*
			Hazard	*2.6E+00*	*4.8E+00*	6.6E-03	*5.2E-02*	*4.6E+00*	*1.8E+00*	*1.5E+00*	*2.0E-02*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			1.1E+01	2.6E+01				1.9E+01
			Hazard		>SOL	1.5E+03	1.1E+02		>SOL	>SOL	1.1E+02
		Commercial/ Industrial	Carcinogenic			1.7E+02	>SOL				3.0E+02
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	3.1E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.5E+03	>SOL				4.0E+03
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL				>SOL
			Hazard		>SOL	>SOL	>SOL		>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
		Commercial/ Industrial	Carcinogenic	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
			Hazard	*1.0E-01*	*1.0E-01*	1.0E-03	*5.0E-03*	*1.5E-02*	*1.5E-01*	*2.0E-01*	*5.0E-03*
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			4.5E-02	6.0E-02				1.8E-01
			Hazard	2.1E+00	9.3E+00	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Table 8. Oakland Tier 2 SSTLs for Clayey Silts

Medium	Exposure Pathway	Land Use	Type of Risk	Trichloro-ethylene (TCE)	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.3E+02		3.5E+00		
			Hazard	2.2E+02	5.0E+02		5.3E+04	2.1E+04
		Commercial/ Industrial	Carcinogenic	3.3E+02		9.1E+00		
			Hazard	1.1E+03	7.2E+03		2.6E+05	3.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.7E+01		3.0E-02		
			Hazard	3.2E+01			SAT	
		Commercial/ Industrial	Carcinogenic	4.4E+02		4.8E-01		
			Hazard	9.3E+02			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.5E+03		2.7E+00		
			Hazard	3.4E+03			SAT	
		Commercial/ Industrial	Carcinogenic	SAT		1.0E+01		
			Hazard	SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*5.5E-02*		*1.1E-03*	*2.7E+01*	
			Hazard	*5.5E-02*	3.3E+02	*1.1E-03*	*2.7E+01*	8.9E+02
		Commercial/ Industrial	Carcinogenic	*5.5E-02*		*1.1E-03*	*2.7E+01*	
			Hazard	*5.5E-02*	2.2E+03	*1.1E-03*	*2.7E+01*	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	5.4E+01		6.6E-01		
			Hazard	6.3E+01			>SOL	
		Commercial/ Industrial	Carcinogenic	8.6E+02		1.0E+01		
			Hazard	>SOL			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		2.7E+02		
			Hazard	>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL		1.0E+03		
			Hazard	>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*5.0E-03*	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.6E-02		2.6E-02		
			Hazard	7.2E-02	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

APPENDIX G: TIER 3 GUIDANCE

In many cases, the most cost-effective method of Tier 3 analysis will be to apply additional site-specific data to the Oakland RBCA model. By replacing some of the conservative assumptions of Tiers 1 and 2 with data that represent actual conditions observed at your site, you will be able to calculate SSTLs that more accurately reflect existing and future risk.

The equations employed to calculate the Oakland RBCA levels are made up of many different "input parameters". The values used for some of these input parameters are standard and should not be adjusted under Tier 3. Others may be changed to reflect site-specific conditions. For each exposure pathway, there are many "adjustable" input parameters that influence the SSTLs. This appendix can assist you to conduct a time-efficient, cost-effective Tier 3 analysis by helping you to identify and focus on those adjustable input parameters that are most likely to have the greatest influence on your SSTLs. Just follow the five steps outlined below.

Step 1: Identify the exposure pathways of concern at your site.

See the Exposure Assessment Worksheet in Appendix D for assistance.

Step 2: For each exposure pathway of concern, identify the adjustable input parameters that should be the focus of an Oakland RBCA Tier 3 analysis.

Surficial Soil: Ingestion/Dermal/Inhalation
The following adjustable input parameters have a strong influence on the SSTL:
(1) Individual Excess Lifetime Cancer Risk (IELCR; applies to carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Skin surface area exposed to soil
(5) Soil ingestion rate
(6) Vadose zone air content (only if volatilization is a concern)
(7) Vadose zone water content (only if volatilization is a concern)
(8) Particulate emission rate
(9) Width of source area parallel to wind or groundwater flow direction

Subsurface Soil: Inhalation of Indoor Air Vapors
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Exposure time to indoor air
(5) Vadose zone air content
(6) Vadose zone water content
(7) Depth to subsurface soil sources

Subsurface Soil: Inhalation of Outdoor Air Vapors
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Exposure time to outdoor air
(5) Vadose zone air content
(6) Vadose zone water content
(7) Depth to subsurface soil sources
(8) Width of source area parallel to wind or groundwater flow direction

Subsurface Soil: Ingestion of Groundwater Impacted by Leachate
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Groundwater Darcy Velocity
(5) Infiltration rate through the vadose zone
(6) Width of source area parallel to wind or groundwater flow direction

Groundwater: Inhalation of Indoor Air Vapors
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Exposure time to indoor air
(5) Vadose zone air content
(6) Vadose zone water content
(7) Depth to groundwater

Groundwater: Inhalation of Outdoor Air Vapors
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency
(4) Exposure time to outdoor air
(5) Vadose zone air content
(6) Vadose zone water content
(7) Depth to groundwater
(8) Width of source area parallel to wind or groundwater flow direction

Groundwater: Ingestion
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency

Water Used for Recreation: Ingestion/Dermal
The following adjustable input parameters have a strong influence on the SSTL:
(1) IELCR (carcinogenic risk only)
(2) Exposure duration
(3) Exposure frequency to water used for recreation
(4) Skin surface area exposed to water used for recreation

Step 3: Identify the method(s) for determining and justifying the site-specific values that you will employ.

A good source of alternative literature values and statistical data for many of the adjustable input parameters may be found in Appendix B of *Oakland Risk-Based Corrective Action: Technical Background Document,* which may be downloaded off of the ULR Program web page at www.oaklandpw.com. Use of other literature values, as well as field measurements and laboratory analyses, may also be appropriate. Table 9 describes the adjustable input parameters listed under Step 2 above and provides comments on adjusting the values for each of them.

Table 9. Description of the Adjustable Oakland RBCA Input Parameters Under Tier 3

Input Parameter	Comments
Depth to subsurface soil sources	Depth to subsurface soil sources is the distance from the ground surface or building foundation to the subsurface contamination. Tiers 1 and 2 assume 100 cm. This value should be changed if the actual on-site depth to the subsurface contamination is different. The greater the depth to subsurface soil sources, the less risk is posed.
Depth to groundwater	Depth to groundwater is the depth from the ground surface or building foundation to the water table. Tiers 1 and 2 assume 300 cm. Actual site conditions can be easily measured in on-site wells. The greater the depth to groundwater, the less risk is posed.
Exposure duration	Exposure duration is the number of years over which an individual may be exposed to a chemical of concern. Tiers 1 and 2 assume 30 years. If appropriate, this value should be changed to reflect actual probable exposure. The shorter the exposure duration, the less risk is posed.
Exposure frequency	Exposure frequency is the number of days per year that an individual may be exposed to a chemical of concern. Tiers 1 and 2 assume 350 days per year for residential, 250 days per year for commercial/industrial. If appropriate, this value should be changed to reflect actual probable exposure frequency. The lower the exposure frequency, the less risk is posed.
Exposure frequency to water used for recreation	Exposure frequency to water used for recreation is the number of days per year that an individual may come in contact with water that is contaminated. Tiers 1 and 2 assume 120 days per year. If appropriate, this value should be changed to reflect actual probable exposure frequency. The lower the exposure frequency, the less risk is posed.
Exposure time to indoor air	Exposure time to indoor air is the number of hours per day that an individual may be inside an impacted structure. Tiers 1 and 2 assume 24 hours per day for residential, 9 hours per day for commercial/industrial. If appropriate, this value should be changed to reflect actual probable exposure. The shorter the exposure time, the less risk is posed.

Table 9—*Continued.*

Exposure time to outdoor air	Exposure time to outdoor air is the number of hours per day that an individual may be outside at an impacted site. Tiers 1 and 2 assume 16 hours per day for residential, 9 hours per day for commercial/industrial. If appropriate, this value should be changed to reflect actual probable exposure. The shorter the exposure time, the less risk is posed.
Foundation thickness	Foundation thickness is the vertical width of the foundation. Tiers 1 and 2 assume 15 cm. This value should be changed to reflect the actual foundation thickness of existing or future impacted structures. The thicker the foundation, the less risk is posed.
Groundwater Darcy velocity	Groundwater Darcy velocity is the product of hydraulic gradient and hydraulic conductivity, measured in cm per year. Tier 1 assumes 6 cm per year; Tier 2 assumes 600 cm for Merritt sands, 60 cm for sandy silts, and 6 cm for clayey silts. Hydraulic gradient can be easily estimated by measuring groundwater depth in three wells aligned in an equilateral triangle. Hydraulic conductivity may be estimated from literature values, or measured in the field through various methods. The greater the Darcy velocity, the less risk is posed.
Individual excess lifetime cancer risk (IELCR)	The IELCR is the target "acceptable" risk from exposure to carcinogens. Tier 1 RBSLs are based on a 10^{-6} IELCR; Tier 2 SSTLs are based on a 10^{-5} IELCR. The IELCR has a linear impact on the SSTL: changing it by a factor of ten results in a factor of ten change in the SSTL. The standard range for the IELCR is between 10^{-4} and 10^{-6}. Historically, regulatory agencies have been apt to accept more risk at commercial/industrial sites and less risk at residential sites. The higher the IELCR, the more risk is accepted (i.e., the SSTLs are higher).
Infiltration rate through the vadose zone	The infiltration rate is the amount of water that travels through the vadose zone and reaches groundwater. Tier 1 assumes 3 cm per year; Tier 2 assumes 9 cm for Merritt sands, 6 cm for sandy silts, and 3 cm for clayey silts. Your Tier 3 input parameter value should only be changed from the Oakland RBCA default value if there is a site-specific reason why it should be different. For example, if the site is capped, the infiltration rate should be reduced; if there is a truck wash/rinse area that drains through the contamination, it should be increased. The lower the infiltration rate, the less risk is posed.
Particulate emission rate	The particulate emission rate is the rate at which dust particles $\leq$ 10 micrograms become airborne and enter the breathing zone. Tiers 1 and 2 assume a value of 1.38 E-11 grams/cm^2/second. This value may be recalculated by employing site-specific values in the particulate emission rate equation presented in U.S. EPA's *Soil Screening Guidance*, which may be downloaded off of the Internet at www.epa.gov/superfund/resources/soil. The lower the particulate emission rate, the less risk is posed.
Skin surface area exposed to soil	Skin surface area exposed to soil is the surface area of skin that may come in contact with surficial soil. Tiers 1 and 2 assume 5000 cm^2 for adult residential, 2000 cm^2 for child residential, and 5000 cm^2 for commercial/industrial worker. The smaller the exposed skin surface area, the less risk is posed.
Skin surface area exposed to water used for recreation	Skin surface area exposed to water used for recreation is the surface area of skin that may come in contact with contaminated water. Tiers 1 and 2 assume 20,000 cm^2 for adult residential and 8,000 cm^2 for child residential. The smaller the exposed skin surface area, the less risk is posed.
Soil ingestion rate	Soil ingestion rate is the amount of soil ingested per day, either intentionally or inadvertently. Tiers 1 and 2 assume 100 mg per day for adult residential, 200 mg per day for child residential, and 50 mg per day for commercial/industrial worker. The lower the ingestion rate, the less risk is posed.

Table 9—*Continued.*

Soil to skin adherence factor	The soil to skin adherence factor is used to calculate the amount of soil that will stick to skin upon contact. Tier 1 assumes 0.5 mg/cm^2; Tier 2 assumes 0.2 mg/cm^2 for Merritt sands, 0.5 mg/cm^2 for sandy silts, and 1.0 mg/cm^2 for clayey silts. This value should be set equal to either one of the three values used for the soil types covered in Oakland RBCA Tier 2 or one of the values specified in U.S. EPA's *New Exposure Factors Handbook*, which may be downloaded off of the Internet at www.epa.gov/ncea/exposfac.htm. The less adherent the soil, the less risk is posed.
Vadose zone air content	The vadose zone air content is the fraction of the unsaturated zone that is air. Tier 1 assumes 0.26 cm^3/cm^3; Tier 2 assumes 0.2 cm^3/cm^3 for Merritt sands, 0.15 cm^3/cm^3 for sandy silts, and 0.1 cm^3/cm^3 for clayey silts. Air content may be calculated from your vadose zone water content and total porosity values. Subtract water content from total porosity to obtain air content. Units should be converted to fraction of air per total volume of soil. The lower the air content, the less risk is posed.
Vadose zone water content	The vadose zone water content is the fraction of the unsaturated zone that is water. Tier 1 assumes 0.12 cm^3/cm^3; Tier 2 assumes 0.12 cm^3/cm^3 for Merritt sands, 0.25 cm^3/cm^3 for sandy silts, and 0.4 cm^3/cm^3 for clayey silts. Water content may be measured in the lab from several soil samples collected at various depths between the source and the ground surface or building. Units should be converted to fraction of water per total volume of soil. The higher the water content, the less risk is posed.
Width of source area parallel to wind or ground-water flow direction	This distance is either the width of the source in the predominant direction of groundwater flow or the largest horizontal dimension of the source. Tiers 1 and 2 assume 1500 cm. To define the source area, soil samples should be taken in increasing distances from the center of the suspected source and analyzed for chemicals of concern. The perimeter of a source may then be defined by soil sample locations where laboratory analyses indicate non-detect. The narrower the source area, the less risk is posed.

Step 4: Calculate your Tier 3 SSTLs using the site-specific data you have collected.

Open the Oakland RBCA *Excel* spreadsheet, which may be downloaded off of the ULR Program web page at www.oaklandpw.com. Go to the inputs sheet by clicking on the tab marked "Inputs" at the bottom of your screen. At the top of the inputs sheet are four buttons labeled as follows: "Tier 1 defaults"; "Merritt Sands defaults"; "Sandy Silts defaults"; and "Clayey Silts defaults". Click on the button for the defaults on which you are building your Tier 3 analysis. (For example, if your site matches the clayey silts defaults for all input parameters except *depth to groundwater*, click on the "Clayey Silts defaults" button.) The spreadsheet will take a few seconds to change the default input parameter values and recalculate the RBCA levels. When it is finished, scroll down the screen to those input parameters whose values you wish to adjust. Using either the mouse or arrow keys, select the boxes containing the values to be adjusted. (Note that boxes shaded gray contain values that the spreadsheet does not allow to be adjusted. If you move the cursor over the shaded boxes, an on-screen comments box will appear and provide you with an explanation.) Once you have selected the box, type in your Tier 3 value. When you have finished making all changes, simply click on the tab marked "Tables". Your new Oakland RBCA Tier 3 SSTLs are now presented on screen.

Step 5: Submit a corrective action plan to the lead regulatory agency based on your Tier 3 SSTLs.

Refer to Section 4 of the body for guidance.

APPENDIX H: EXAMPLE OAKLAND RBCA COVER SHEET

The cover sheet presented in Figure 6 represents an example of a completed Oakland RBCA cover sheet for a corrective action plan at a fictional site. A cover sheet following this example format should accompany all submittals to the environmental regulatory agencies requesting application of the Oakland RBCA approach. A user-friendly template of this cover sheet may be downloaded off of the ULR Program web page at www.oaklandpw.com.

Figure 6. Example Oakland RBCA Cover Sheet

Oakland RBCA Cover Sheet

Project Proponent: XYZ Construction and Development, Inc.
Site Address: 1000 Imaginary Blvd.
Alameda County Parcel Number(s): 000-0000-000-00

Chemicals of Concern		
(1) Benzene	(4) Xylenes	(7)
(2) Toluene	(5)	(8)
(3) Ethylbenzene	(6)	(9)

Exposure Pathways of Concern

Surficial Soil
- ☒ Ingestion/dermal contact/inhalation

Subsurface Soil
- ☒ Ingestion of groundwater impacted by leachate
- ☒ Inhalation of indoor air vapors
- ☒ Inhalation of outdoor air vapors

Groundwater
- ☐ Ingestion of groundwater
- ☐ Inhalation of indoor air vapors
- ☐ Inhalation of outdoor air vapors

Water Used for Recreation
- ☐ Ingestion/dermal contact

Land Use Scenario

☐ Residential ☒ Commercial/Industrial

Method of Analysis

☐ Tier 1
☒ Tier 2 (specify soil type: ☐ Merritt sands ☒ sandy silts ☐ clayey silts)
☐ Tier 3 Model(s) employed: ☐ Oakland RBCA ☐ Other(s) (specify:)

Application of RBCA Levels

☒ As evidence that no further action required
☐ As target cleanup levels for removal or treatment of chemical(s) of concern
☐ Other (specify:)

Containment Measures

☐ Cap (specify material:)
☐ Other(s) (specify:)
☒ Vapor barrier (specify material: visqueen)
Exposure pathway(s) that will be affected: Subsurface Soil: inhalation of indoor air vapors

Institutional Controls

☒ Permit tracking ☐ Deed restriction ☐ Deed Notice ☒ Water well restriction
☐ Access control ☐ Other(s) (specify:)

Public Notification

Specify all actions to be taken: Neighborhood schools and CBOs will be notified in advance and given opportunity to comment on risk assessment

Submitted by: ACME Environmental Consultants, Inc. **Date submitted:** January 1, 2000

GLOSSARY OF TERMS

Acronyms

ASTM: American Society for Testing and Materials

CAP: Corrective Action Plan

CBO: Community-Based Organization

DTSC: Department of Toxic Substances Control (Cal EPA)

HMMP: Hazardous Materials Management Program (City of Oakland Fire Department)

IELCR: Individual Excess Lifetime Cancer Risk

MCL: Maximum Contaminant Level

PTS: City of Oakland Permit Tracking System

RBCA: Risk-Based Corrective Action

RBSL: Risk-Based Screening Level

RMP: Risk Management Plan

RWQCB: Regional Water Quality Control Board (Cal EPA)

SSTL: Site-Specific Target Level

ULR Program: Urban Land Redevelopment Program

U.S. EPA: United States Environmental Protection Agency

UST: Underground Storage Tank

Definitions

Aggregate Risk: The additive risk posed by multiple chemicals of concern.

Carcinogenic Risk: The potential for exposure to a chemical of concern to cause cancer.

Chemical of Concern: A chemical to which exposure at certain concentrations has been identified as posing a significant risk to human health.

Conditional Site Closure: Regulatory site closure based on certain conditions (e.g., land use, containment measures and/or institutional controls) being maintained.

Containment Measure: An engineered control, such as a vapor barrier or asphalt cap, that acts to reduce or eliminate exposure to a chemical of concern.

Corrective Action: A remedial action undertaken to reduce risk from a chemical of concern to an acceptable level.

Corrective Action Plan: A work plan submitted by the project proponent to the lead regulatory agency that specifies the corrective action(s) to be taken to address risk from potential exposure to chemicals of concern.

Exposure Pathway: The course that a chemical of concern takes from the source area to a receptor.

Free Product: Chemical product that has not dissolved into water or sorbed onto soil and retains its original state. Mobile free product is that which is free to move about under the forces of gravity.

Groundwater: Non-surface water located below the water table in an aquifer.

Hazard Risk: The potential for exposure to a chemical of concern to cause non-carcinogenic, chronic health problems.

Input Parameter: Variable in the RBCA model for which a value is substituted to calculate an RBSL or SSTL.

Institutional Control: A control, such as a land use or access restriction, that can be employed to ensure the future protection of human health and environmental resources when some level of contamination is allowed to remain on site.

Leachate: In the context of a risk assessment, contamination that migrates downward under the force of gravity from soil to groundwater.

Lead Regulatory Agency: The principal regulatory agency responsible for oversight.

Maximum Contaminant Level: The maximum concentration of a chemical of concern that is allowed in drinking water by the State of California.

Medium: In the context of an environmental site assessment, the geologic or hydrologic unit in which a chemical of concern is found.

No Further Action Letter: A regulatory "closure" letter issued by the lead regulatory agency affirming that no additional corrective action is required at a site.

Permit Tracking Control: A mandatory institutional control implemented by the City of Oakland for Oakland sites granted conditional regulatory closure. The permit tracking control flags sites granted conditional closure within the City's Permit Tracking System to ensure that future work at those sites does not put human health or environmental resources at new risk by altering the conditions upon which regulatory closure was granted.

Preferential Pathway: In the context of a risk assessment, a course that a chemical of concern takes from the source area to a receptor in which normal assumptions about diffusion, sorption, degradation and/or exposure levels may not apply (e.g., a sewer line or utility corridor).

Plume: Contaminant source area in groundwater.

RBCA Level or Standard: A concentration of a chemical of concern above which the risk posed to human health and environmental resources via a given exposure pathway is considered not acceptable.

Receptor: Any person, structure, utility, surface water, water supply or other environmental resource that may be adversely affected by exposure to a chemical of concern.

Release: Leakage or spill of a chemical of concern from its appropriate confines.

Remediation: In environmental parlance, a term commonly used to refer to corrective actions, such as cleanup or encapsulation, that may be employed at contaminated sites.

Risk: In the context of an environmental risk assessment, the potential for adverse health effects caused by exposure to a chemical of concern.

Risk-Based Assessment: An analysis to determine the need for, and extent of, corrective action based on the potential for adverse health effects caused by exposure to a chemical of concern.

Risk-Based Corrective Action: A remedial solution to environmental contamination based on risk.

Risk-Based Screening Level: A Tier 1 cleanup standard.

Risk Management Plan: A plan that in some cases must be submitted to the lead regulatory agency for approval as part of a risk-based, conditional closure agreement. An RMP specifies how remaining contamination will be managed to ensure the continued protection of human health and the environment.

Site Closure: Official regulatory affirmation that no further action is required to address contamination at a site.

Site-Specific Target Level: A Tier 2 or Tier 3 cleanup standard.

Sorption: The tendency for organic chemicals to adhere to soil particles, affecting rates of volatilization, diffusion and leaching.

Source: Origin of a released chemical of concern.

Subsurface Soil: In the context of a risk assessment, all soil deeper than one meter and above groundwater.

Surface Water: Any body of water accessible from the surface.

Surficial Soil: In the context of a risk assessment, the top one meter of soil.

Tier 1: A process in which minimal site characterization is performed and site concentrations of chemicals of concern are compared with risk-based screening levels for all applicable exposure pathways.

Tier 2: A process in which a moderate level of site characterization is performed and site concentrations of chemicals of concern are compared with site-specific target levels for all applicable exposure pathways.

Tier 3: A process in which substantial site characterization is performed and site-specific target levels are developed. If site concentrations of chemicals of concern exceed the target levels, a corrective action plan is developed and implemented.

Transport Mechanism: In the context of a risk assessment, the manner in which a contaminant is transported from the source to the point of exposure.

Vapor Barrier: Any barrier that eliminates or reduces the penetration of vaporized chemicals of concern from one side to the other.

Water Used for Recreation: Surface water or groundwater with which a person may come into contact during recreational activities, such as swimming or wading.

NOTES

[1] Copies of the Community Review Panel's report, *Consensus Recommendations for Implementing the Urban Land Redevelopment Program (1997)*, are available through the City of Oakland Environmental Services Division and may also be downloaded off of the ULR Program web page at www.oaklandpw.com.

[2] Firms that volunteered their time and assisted with peer review included: Cambria Environmental Technology; Chaney, Walton & McCall; Environ; Geomatrix Consultants; ICF Kaiser; Levine-Fricke-Recon; SECOR International; SOMA Environmental Engineering; Subsurface Consultants; Weiss Associates; and URS Greiner Woodward-Clyde.

[3] Language borrowed from *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (American Society for Testing and Materials 1995).

[4] A detailed discussion of the Oakland RBCA modeling approach, including a justification of all the input parameter values chosen, may be found in *Oakland Risk-Based Corrective Action: Technical Background Document* (Spence and Gomez 1998). Copies may be downloaded off of the ULR Program web page at www.oaklandpw.com.

[5] Language reflects the guidelines presented in ASTM (1995), *op. cit.*

[6] A user-friendly, template version of this checklist in Word may be downloaded off of the ULR Program web page at www.oaklandpw.com.

[7] Language reflects the guidelines presented in ASTM (1995), *op. cit.*

[8] Language adopted from California Health and Safety Code, Section 25232, Chapter 6.5.

[9] Radbruch, D. *Areal Engineering Geology of Oakland West Quadrangle, California.* United States Geological Survey, 1957.

[10] For example, if contamination at your site is located in a sandy silts unit underlain by clayey silts, it is appropriate to consult the *sandy silts* Tier 2 look-up table for the inhalation exposure pathways from soil and the *clayey silts* Tier 2 look-up table for the leachate to groundwater exposure pathway from soil.

[11] As part of a state-wide process to devolve regulatory responsibilities to local oversight authorities, known as "CUPA", the City Fire Department is gradually taking over regulatory responsibility at UST sites where contamination must be addressed. If your site has contamination associated with a leaking UST, you should speak with the Fire Department to determine whether the City or Alameda County will be the lead regulatory agency.

[12] State of California Environmental Protection Agency. Department of Toxic Substances Control, *Preliminary Endangerment Assessment Guidance Manual.* January 1994.

[13] City of Oakland. *A Guide to Oakland's New Blight Ordinance for Commercial & Industrial Business and Property Owners.* June 1998.

[14] ASTM (1995), *op. cit.*

Corrective Actions to Meet Oakland RBCA Eligibility Criteria

If you have consulted the Oakland RBCA Eligibility Checklist and determined that your site is not currently eligible for the Oakland Tier 1 or Tier 2 RBCA levels, you may be able to implement corrective actions that will make your site eligible. The following table presents a list of the options available to you to meet the criteria described in the Eligibility Checklist.

Corrective Actions to Meet Eligibility Criteria

Criterion #	Available Corrective Action(s)
1	Remove the primary source.
2	Remove the free product in question.
3	Analyze the potential cumulative and synergistic effects of the chemicals of concern. If aggregate risk is below 10^{-6} for Tier 1 or 10^{-5} for Tier 2, then the applicable RBSLs or SSTLs may be applied.
4	Fill in the preferential vapor migration pathway with an appropriate inert and impermeable material.
5	Implement a containment measure (such as a vapor barrier) to eliminate inhalation of vapors from groundwater as a pathway of concern.
6	Implement a containment measure (such as a vapor barrier) to eliminate inhalation of indoor air vapors as a pathway of concern.
7	Remove the conditions posing the acute health risk (may include removing or reducing the concentration of chemicals and ventilating or destroying impacted structures).
8	Implement a containment measure to ensure no exposure of ecological receptor(s). *Note:* If past or current exposure exists, you will have to undertake an ecological risk analysis. If the analysis shows that risks to human health are greater than those posed to ecological receptors *and* that no aesthetic issues (e.g., offensive odors or discoloration of impacted surface waters) exist, then the Oakland RBCA levels may be used.

If corrective actions can be taken to make your site eligible *and* you believe that applying the Oakland Tier 1 or Tier 2 RBCA levels is the most economical way to address human health considerations at your site, then you should undertake the appropriate corrective actions, as described above.

Oakland RBCA Cover Sheet

Project Proponent:
Site Address:
Alameda County Parcel Number(s):

Chemicals of Concern		
(1)	(4)	(7)
(2)	(5)	(8)
(3)	(6)	(9)

Exposure Pathways of Concern

Surficial Soil
- ☐ Ingestion/dermal contact/inhalation

Subsurface Soil
- ☐ Ingestion of groundwater impacted by leachate
- ☐ Inhalation of indoor air vapors
- ☐ Inhalation of outdoor air vapors

Groundwater
- ☐ Ingestion of groundwater
- ☐ Inhalation of indoor air vapors
- ☐ Inhalation of outdoor air vapors

Water Used for Recreation
- ☐ Ingestion/dermal contact

Land Use Scenario

☐ Residential ☐ Commercial/Industrial

Method of Analysis

☐ Tier 1
☐ Tier 2 (specify soil type: ☐ Merritt sands ☐ sandy silts ☐ clayey silts)
☐ Tier 3 Model(s) employed: ☐ Oakland RBCA ☐ Other(s) (specify:)

Application of RBCA Levels

☐ As evidence that no further action required
☐ As target cleanup levels for removal or treatment of chemical(s) of concern
☐ Other (specify:)

Containment Measures

☐ Cap (specify material:) ☐ Vapor barrier (specify material:)
☐ Other(s) (specify:)
Exposure pathways that will be affected:

Institutional Controls

☐ Permit tracking ☐ Deed restriction ☐ Deed Notice ☐ Water well restriction
☐ Access control ☐ Other(s) (specify:)

Public Notification

Specify all actions to be taken:

Submitted by: **Date submitted:**