



June 29, 2006

Mr. Amir Gholami  
Alameda County Environmental Health  
1131 Harbor Parkway  
Alameda, CA 94502

Subject: Low-Risk Case Closure Report

Site: Former Caltrans Hegenberger Maintenance Station, 555 Hegenberger Road,  
Oakland, California

Dear Mr. Gholami:

Please find enclosed one copy of the above referenced report. The report was prepared on behalf of Caltrans for the purpose of acquiring case closure from the Alameda County Environmental Health Department.

If you have any questions concerning the contents of the report please give me a call at (925) 371-5900.

Sincerely,  
GEOCON CONSULTANTS, INC.

John Love, PG  
Sr. Project Geologist

# LOW-RISK CASE CLOSURE SUMMARY REPORT

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FORMER HEGENBERGER  
MAINTENANCE STATION  
555 HEGENBERGER ROAD  
OAKLAND, CALIFORNIA



**GEOCON**

CONSULTANTS, INC

GEOTECHNICAL  
ENVIRONMENTAL  
MATERIALS

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION  
DISTRICT 4  
OFFICE OF ENVIRONMENTAL ENGINEERING  
111 GRAND AVENUE  
OAKLAND, CALIFORNIA

PREPARED BY:

GEOCON CONSULTANTS, INC.  
2356 RESEARCH DRIVE  
LIVERMORE, CALIFORNIA

CALTRANS CONTRACT NO. 04A1862  
TASK ORDER NO. 31

GEOCON PROJECT NO. E8220-06-31

JUNE 2006



Project No. E8220-06-31  
June 22, 2006

Mr. Bahram Sazegar  
California Department of Transportation  
District 4  
111 Grand Avenue, 14<sup>th</sup> Floor  
Post Office Box 23660  
Oakland, California 94623-0660

Subject:       LOW RISK CASE CLOSURE SUMMARY REPORT  
                  FORMER HEGENBERGER MAINTENANCE STATION  
                  555 HEGENBERGER ROAD, OAKLAND, CALIFORNIA  
                  CONTRACT NO. 04A1862, TASK ORDER NO. 31

Dear Mr. Sazegar:

In accordance with California Department of Transportation (Caltrans) Contract No. 04A1862 and Task Order No. 31, Geocon has performed environmental engineering services associated with the Former Caltrans Hegenberger Maintenance Station located at 555 Hegenberger Road in Oakland, California.

The scope of services contained in this report consisted of compiling data presented in reports prepared by Geocon and other consultants for the purpose assessing subsurface soil and groundwater quality conditions with current regulatory guidelines required for case closure as a low risk soil and groundwater site.

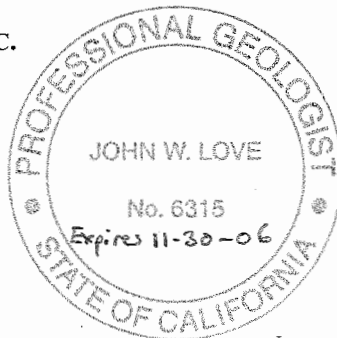
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If there are any questions concerning the contents of this report, or if Geocon may be of further service, please contact the undersigned at your convenience

Sincerely,

GEOCON CONSULTANTS, INC.

John Love, PG  
Sr. Project Geologist



Richard Day, CEG, CHG  
Regional Manager

RSD:RWD:rjk

- (3) Addressee
- (1) Amir Gholami, Alameda County Department of Environmental Health

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# LOW-RISK CASE CLOSURE SUMMARY REPORT

## 1.0 INTRODUCTION

This Low Risk Case Closure Summary Report for the California Department of Transportation (Caltrans) Former Hegenberger Maintenance Station was prepared under Caltrans Contract No. 4A1862 and Task Order (TO) No. 31. The report was prepared to summarize soil and groundwater sample results obtained during previous source removal and characterization studies for the purpose of obtaining case closure from the Alameda County Department of Environmental Health (DEH) and the Regional Water Quality Control Board – San Francisco Bay Region (RWQCB).

### 1.1 Site Description

The subject site is located at 555 Hegenberger Road in Oakland, California, approximately ½ mile south of the Oakland Coliseum near the northeast corner of the intersection of Interstate 880 and Hegenberger Road as shown on Figure 1, Vicinity Map. The site was formerly used by Caltrans to store and service maintenance vehicles and equipment. The site currently exists as a General Motors Corporation (GMC) Truck Center that uses the former Caltrans site to park and store vehicles.

The Caltrans site structures shown on Figure 2, which were removed from the site between 1994 and 1996, included two 2,000-gallon diesel and two 6,500-gallon steel gasoline underground storage tanks (USTs), product pipelines, vapor return lines, fuel dispenser island, and vehicle maintenance building. The former Caltrans site now exists as a flat lot paved with asphalt.

### 1.2 Background

In July 1993, Clayton Environmental Consultants (Clayton) conducted a limited environmental assessment of the GMC property located west of the Caltrans site. The purpose of the investigation was to assess whether petroleum hydrocarbon compounds associated with the Caltrans USTs had impacted soil and groundwater beneath the GMC site located immediately west of the Caltrans facility. Clayton advanced four soil borings (BH-1 through BH-4) along the GMC / Caltrans property boundary as shown on Figure 2. Results of the investigation indicated that total petroleum hydrocarbons as gasoline (TPHg) and as diesel (TPHd), and oil and grease (O&G) were present in soil and groundwater beneath the GMC site as a result of the Caltrans USTs.

In September 1994, the USTs, associated piping, and fuel dispensers were removed from the Caltrans site, and approximately 393 tons of petroleum hydrocarbon-impacted soil were removed and disposed offsite. Confirmation soil samples collected from the UST excavation indicated that petroleum hydrocarbons had impacted soil beneath and around the former USTs.

In September and October 1995, six temporary borings (BH-1 through BH-6) were advanced, and five monitoring wells (MW-1 through MW-5) were constructed at the site (see Figure 2) to assess the vertical and lateral extent of impacts to soil and groundwater beneath the Caltrans site. Results of the investigation indicated that a limited amount of soil in the immediate vicinities of the former USTs and pump island were impacted by petroleum hydrocarbons from the former fuel system; the O&G previously reported at the site may be naturally occurring organic matter; the maximum TPHg and benzene concentrations in groundwater beneath the site were 1.3 mg/l and 0.66 mg/l, respectively; and additional investigation would be necessary to define the lateral extent of dissolved hydrocarbons in groundwater north, west and east of the former UST excavation.

In December 2001, four soil borings (BH-6 through BH-9) were advanced at the Caltrans and GMC sites to assess the lateral extent of the petroleum hydrocarbon plume in groundwater (see Figure 2). One boring (BH-6) was drilled through the center of the former UST excavation; one boring (BH-7) was placed near the former fuel dispenser island; and two borings (BH-8 and BH-9) were positioned in the down gradient groundwater flow direction on the GMC site. Results of the December 2001 investigation indicated that low concentrations of petroleum hydrocarbons were present down gradient of monitoring wells MW-3 and MW-4 and the lateral extent of the plume beneath the area was adequately defined.

Groundwater monitoring at the Former Caltrans Hegenberger Maintenance Station has been conducted on an annual basis since 2001.

## 2.0 SITE LITHOLOGY AND HYDROGEOLOGIC CONDITIONS

Subsurface soil and groundwater conditions were obtained from boring logs included in site investigation reports prepared by Geocon Consultants, Inc.

### 2.1 Site Lithology

The site lithology consists of unconsolidated alluvium and near-shore to wetlands deposits consisting of predominantly fine sands, black bay mud, and silts inter-fingered with lesser amounts of clay and silt mixed sands and gravels.

Soils encountered during past drilling operations at the site consisted of three feet of fill material (sub-angular clayey gravel) overlying moist, black, low permeability silty clay and clay deposits that extend to depths of approximately 13 feet below ground surface (bgs) and that overly stratigraphic units of saturated, olive-brown, silty sands, clayey sands, and clayey gravels to the maximum depth drilled of 20 feet bgs. Generalized east-west and north-south geologic cross-sections are presented as Figures 3 and 4. Copies of boring logs and well completion diagrams are included in Appendix A.

### 2.2 Site Hydrogeology

The groundwater flow direction in the vicinity of the site appears to flow in a radial direction centered somewhere near monitoring well MW-1 (see Figures 3 and 4) at gradients ranging from 0.042 to 0.006 foot per foot (ft/ft). However, based on the contaminant concentrations reported in groundwater samples collected from the five monitoring wells, the predominant flow direction(s) impacting the distribution of contaminants in groundwater beneath the area appears to be towards the southwest to north directions.

During the installation of monitoring wells MW-1 through MW-5 in September 1995, water was first encountered while drilling at 13 to 18 feet bgs. After construction and development, static water level measurements were measured between 6.42 and 6.88 feet bgs, indicating confined or semi-confined groundwater conditions. Inspection of the well logs (Appendix A) indicate the top of the water bearing zone coincides with the base of a 13 ft. thick layer of stiff, moist, black clay with medium plasticity that acts as the confining bed. Historic depth to groundwater data are presented in Table 2.



### 3.0 SOIL AND GROUNDWATER QUALITY CONDITIONS

Soil and groundwater sample results were compiled from previous investigations conducted by Clayton (1993), GHH Engineering, Inc. (November and December 1994), and Geocon (January 1996, July 2002, and June 2005).

#### 3.1 Excavation Soil Sample Results

In September 1994, the USTs, associated piping, and fuel dispensers were removed from the Caltrans site. Approximately 393 tons of petroleum impacted soil were removed from the site and disposed at the Vasco Road Class II Landfill during the UST removal activities.

Eight confirmation soil samples (TE-1 through TE-8) were collected from the over-excavated UST pit, and two soil samples (PI-1 and PI-2) were collected beneath the former fuel dispenser island (see Figure 2). Results of the soil samples indicated that TPHg was present in several sample locations at concentrations as high as 480 milligrams per kilogram (mg/kg), TPHd was present at concentrations as high as 380 mg/kg, O&G was present as high as 1,900 mg/kg, and BTEX compounds were reported as high as 7.6 mg/kg (ethylbenzene) with the highest benzene concentration being report at 2.0 mg/kg. Composite stockpile soil samples collected from over-excavated soil were reported to contain TPHg, TPHd, and O&G at concentrations ranging from non-detect to 330 mg/kg (O&G) and BTEX compounds as high as 1.010 mg/kg (benzene). The confirmation soil sample and composite stockpile sample results are presented in Table 1.

#### 3.2 Temporary Boring and Monitoring Well Borehole Soil Sample Results

In July 1993, Clayton conducted a limited environmental assessment of the GMC property located west of the Caltrans site. The purpose of the investigation was to assess whether petroleum hydrocarbon compounds associated with the Caltrans USTs had impacted soil and groundwater beneath the GMC site located immediately west of the Caltrans facility. Clayton advanced four soil borings (BH-1 through BH-4) along the GMC / Caltrans property boundary as shown on Figure 2. Results of the investigation indicated that TPHg and TPHd, and O&G were present in soil at concentrations as high as 480 mg/kg, and TPHg and TPHd were present in groundwater at concentrations as high as 0.78 milligrams per liter (mg/l) and 47 mg/l, respectively. None of the soil or groundwater samples were analyzed for benzene, toluene, ethylbenzene, or xylenes (BTEX).

In September and October 1995, six temporary borings (BH1 through BH6) were advanced, and five monitoring wells (MW-1 through MW-5) were constructed at the site (see Figure 2). Results of the investigation indicated that soil beneath the site remained largely unaffected by the petroleum hydrocarbon release from the former Caltrans fuel system. The only TPHg and TPHd concentrations detected above the reporting limits were in borings BH6 and MW-5. TPHg was reported at a

concentration of 1.6 mg/kg in the 5-foot soil sample collected from the MW5 borehole, and TPHd was reported at concentrations of 24 mg/kg and 16 mg/kg in the 6- and 11-foot soil samples collected from boring BH6 advanced beneath the former fuel dispenser island. Likewise, BTEX compounds were reported in three boreholes at concentrations ranging from 0.006 mg/kg (ethylbenzene) to 0.88 mg/kg (xylenes), with the only benzene concentrations (0.012 mg/kg and 0.030 mg/kg) being reported in the 8- and 20-foot soil samples collected from the MW3 borehole.

Analytical laboratory results of soil samples collected during the 1995 investigation are presented in Table 1, and groundwater sample results collected from MW-1 through MW-5 are presented in Table 2.

### **3.3 Temporary Boring Grab Groundwater Sample Results**

A total of six grab groundwater samples have been collected in conjunction with the former Caltrans USTs. Grab groundwater samples were collected from temporary borings BH1 and BH3 during the 1993 GMC site investigation conducted by Clayton, and four additional grab groundwater samples (one from each boring) were collected from borings B-6 to B-9 during the 2001 investigation conducted by Geocon.

Temporary borings BH1 and BH3 were advanced in 1993 along the west margin of the former UST excavation on the GMC site, approximately one year before the Caltrans tanks were removed (see Figure 2). The grab groundwater samples were analyzed for TPHg and TPHd (BTEX analysis was not performed during this investigation). The highest TPHg concentration reported during the 1993 investigation was 0.78 mg/l in the BH1 grab groundwater sample, and the highest TPHd concentration (47 mg/l) was in the BH3 grab groundwater sample.

The grab groundwater samples collected from borings BH-6 through BH-9 in 2001 were analyzed for TPHg, TPHd, BTEX, MTBE, and VOCs. TPHg and TPHd were reported in all grab groundwater samples analyzed for these constituents at concentrations ranging from 0.06 mg/l (TPHg) to 0.3 mg/l (TPHd). Toluene and xylenes were reported in the BH8 and BH-9 grab groundwater samples at concentrations ranging 0.0007 mg/l to 0.0015 mg/l. Benzene and MTBE were reported as non-detect in all four grab groundwater samples.

Volatile organic compounds (VOCs) 1,1,2-trichloroethane (0.010 mg/l), 1,1-dichloroethane (0.099 mg/l), and 1,1-dichloroethene (0.054 mg/l) were reported in the BH7 grab groundwater sample collected along the east property margin near Hegenberger Road; however, these compounds were not detected in any other boring location, and these analytes were attributed to an unknown offsite source.

Grab groundwater sample results from the 1995 and 2001 investigations are presented in Table 3.

### 3.4 Monitoring Well Groundwater Sample Results

Monitoring wells MW-1 through MW-5 were constructed in September 1995. The wells were sampled on a quarterly basis from October 1995 until November 1996, and then once in February 1998. The wells were not sampled again until March 2001, at which time annual sampling of the wells began and continued until May 2005.

Groundwater samples have been collected 12 times from monitoring wells MW-1 through MW-5 since October 1995. Groundwater samples were initially sampled for TPHg, TPHd, TPHmo, O&G, BTEX and MTBE; however, TPHmo, O&G and MTBE have since been dropped from the analyte list because they were not detected at concentrations which the DEH felt warranted additional testing. VOCs were added to the suite of analyses in December 2001; however they were eliminated from the requested analyte list in 2002 because they were not detected at concentrations of concern to the DEH.

Groundwater sample results from the five wells are presented in Table 2, and isoconcentration maps for TPHg and benzene reported for the years 1995 (initial), 2001 (interim), and 2005 (recent) are presented as Figures 7 through 12.

The lateral extent of TPHg and benzene in groundwater increased at the site between 1995 and 2001, however, sometime between 1998 and 2001 the plume size appears to have stabilized.

TPHg and benzene concentration charts for MW-1 through MW-5 are provided in Appendix B. As the charts indicate, TPHg concentrations in monitoring wells MW-1, and MW-3 through MW-5 have decreased since 2001, while concentrations in monitoring well MW-2 show an apparent increasing trend during the same time period. An additional time versus TPHg concentration graph is provided for MW-2 which indicates that while TPHg concentrations have increased in this well since 2001, the slope of the time/concentration line is nearly flat (indicating a near stable concentration trend) when concentrations since 1995 are plotted. An accurate time versus concentration trend is difficult to plot for TPHg concentrations in MW-2 because the reported TPHg concentrations are usually just above or just below the method detection limits. Additionally, the benzene concentrations in MW-2 show a decreasing trend whether data collected prior to 2001 is omitted or not.

#### 4.0 SENSITIVE RECEPTORS

The nearest surface waters are a drainage canals located approximately 1,800 feet west and southwest of the site (see Figure 1). The canals both drain into San Leandro Bay located approximately one mile northwest of the site. Based on the site's proximity to the canals, petroleum hydrocarbons originating from the Caltrans site do not pose a threat to aquatic biota associated with San Leandro Bay or its tributaries.

Based on the site history presented in the report prepared by GHH Engineering, Inc., entitled *Initial Site Assessment, Caltrans Oakland Facility, 555 Hegenberger, Oakland, California*, dated November 1994, there should not be any utilities buried deeper than first encountered groundwater (13 feet bgs) which could provide a preferential pathway for subsurface contaminant migration.

## **5.0 COMPARISON OF CONTAMINANT CONCENTRATIONS AND CITY OF OAKLAND ENVIRONMENTAL RISK-BASED SCREENING LEVELS**

Tier 1 Risk-Based Screening Levels (RBSLs) developed by the City of Oakland Public Works Agency, Environmental Services Division (PWA), and Tier 3 Site Specific Target Levels (SSTLs) developed using PWA software, were compared with contaminant concentrations in soil and groundwater beneath the Caltrans site. The applied RBSLs and SSTLs were based on viable exposure pathways associated with present and potential future property uses of the Caltrans site. Tier 1 RBSLs and Tier 3 SSTLs are presented in Appendix C, along with the input parameters used to develop each.

Since shallow-depth groundwater beneath the site is not used for drinking water purposes, the only exposure pathways applicable for the site are vapor intrusion from groundwater and soil to indoor and outdoor air, and direct exposure to soil (workers contacting excavated soil). Additionally, although RBSL and SSTL comparisons were made for both residential and commercial sites, the appropriate classification of the Caltrans site is that of a commercial property underlain by low permeable soils (clays and silts).

Geocon completed the City of Oakland Risk-Based Corrective Action (RBCA) Eligibility Checklist (provided in Appendix C) to determine if the site was eligible for comparison with the Tier 1 or Tier 2 RBSLs, or whether comparison with Tier 3 SSTLs was necessary. Results of the checklist indicate that establishment of Tier 3 SSTLs was necessary for the Caltrans South Oakland site because groundwater is less than 10 feet bgs, and inhalation of volatilized contaminants of concern (COCs) from groundwater to indoor air or outdoor air is a pathway of concern but groundwater ingestion is not.

Tier 3 SSTLS were calculated for the site using the City of Oakland software available on the PWA website. Based on the site lithology, Geocon used the clayey silts input default parameters, and site specific depth to groundwater and depth to subsurface soil data to calculate Tier 3 SSTLS.

Since the Tier 3 SSTLS are typically less stringent than the Tier 1 RBSLs, comparison of COC concentrations in soil and groundwater beneath the site with both the Tier 1 RBSLs and Tier 3 SSTLS are presented to further justify the site's qualification for low risk closure.

The COCs at the site include BTEX and MTBE.

### **5.1 Volatilization of Contaminants in Groundwater to Indoor and Outdoor Air**

A comparison of COC concentrations in groundwater beneath the site with the Tier 1 RBSLs established by the City of Oakland for BTEX and MTBE volatilization from groundwater to indoor and outdoor air are shown in Tables 4 and 4A, and Tier 3 SSTL comparisons are provided in Tables 5 and 5A. For comparison purposes, the maximum reported concentrations at the site were used, as were the most recent concentrations reported during the groundwater sample event conducted in May 2005. The contaminant concentrations were compared with the RBSLs and SSTLS established for both residential and commercial sites.

The maximum reported contaminant concentrations at the site do not exceed the Tier 3 SSTLs.

The only exceedance noted in the comparison of groundwater concentrations with the Tier 1 RBSLs was benzene. The highest benzene concentration of 3.070 mg/l exceeded the Tier 1 residential and commercial carcinogenic RBSLs of 0.11 mg/kg and 1.8 mg/kg, respectively (see Table 4). No other Tier 1 RBSLs were exceeded.

### **5.1.1 Calculated TPHg and Benzene Half-Life Concentrations in Groundwater**

After the USTs and contaminated soil surrounding the tanks were removed in 1995, TPHg and benzene concentrations in monitoring wells MW-1 through MW-5 generally increased until sometime between 1995 and 2001, at which time contaminant concentrations began to decrease in all wells. This conclusion is supported by TPHg concentration trends plotted on charts for monitoring wells MW-1 through MW-5 provided in Appendix B. The TPHg concentration plot for MW-2 shows a slight increasing trend over time; however, this is a result of low to non-detect concentrations historically reported at the location.

Both arithmetic and semi-logarithmic graphs were plotted for TPHg concentrations reported in MW-1 through MW-5 from December 2001 to May 2005. With the exception of MW-2, all wells show clear decreasing TPHg concentration trends since 2001, indicating that contaminant concentrations are attenuating with time. The apparent increasing TPHg concentrations in MW-2 are likely due to its proximity to the former UST excavation, shifting groundwater flow directions, and low concentrations (TPHg detections in MW-2 are generally just above the reporting limit). If TPHg concentrations in MW-2 are plotted from October 1995 to May 2005, the TPHg concentration trend line is nearly flat, indicating that TPHg concentrations in MW-2 have generally increased from 2001 to May 2005; however, they have remained within historical levels over the last 10 years. The potential that TPHg concentrations in MW-2 will decrease within a reasonable time frame is supported by declining benzene concentrations reported in this same well.

Arithmetic and semi-logarithmic graphs were also plotted for benzene concentrations reported in MW-1 through MW-5 from October 1995 to May 2005. Graphs were also prepared for benzene concentrations reported in MW-2 from December 2001 to May 2005 to compare with the TPHg graphs prepared for this same well (see Appendix B). The benzene concentrations in monitoring wells MW-1 through MW-5 show a decreasing concentration trend over the last 10 years.

Based on the contaminant trend slopes of each well, the half-life for TPHg and benzene concentrations in MW1 through MW5 can be calculated using the following formula:

$$t_{0.5} = \ln(0.5) / \text{slope.}$$

Where:

$$t_{0.5} = \text{half-life of MTBE [days]}$$

$\ln(0.5) =$  natural log of 0.5 (equals -0.693)  
slope = first order degradation constant [ $\text{day}^{-1}$ ]

The TPHg degradation constants (trendline slope) for wells MW-1, and MW-3 through MW-5 range from -0.0003 to -0.0006. This equates to a TPHg half-life ranging from 1,155 days (3.16 years) to 2,310 days (6.33 years). The benzene degradation trendline slope for wells MW-1 through MW-5 range from -0.0038 to -0.0005. This equates to a benzene half-life ranging from 182 days (0.50 years) to 1,386 days (3.80 years).

This graphical method used to determine site-specific degradation rate and half-life is consistent with the approach presented in “*Regression Techniques and Analytical Solutions to Demonstrate Intrinsic Bioremediation. In: Intrinsic Bioremediation*” (Buscheck and Alcantar, 1995).

## 5.2 Volatilization of Contaminants in Soil to Indoor and Outdoor Air

A comparison of COC concentrations in soil beneath the site with the Tier 1 RBSLs established by the City of Oakland for BTEX and MTBE volatilization from soil to indoor and outdoor air are shown in Tables 6 and 6A, and Tier 3 SSTL comparisons are provided in Tables 7 and 7A. For comparison purposes, the maximum reported concentrations at the site were used to compare with the RBSLs and SSTLs established for both residential and commercial sites.

The maximum reported contaminant concentrations at the site do not exceed the Tier 3 SSTLs.

The only exceedances noted in the comparison of the maximum soil concentrations with the Tier 1 RBSLs was benzene. The highest benzene concentration of 2.0 mg/kg exceeded the Tier 1 residential and commercial carcinogenic RBSLs of 0.062 mg/kg and 1.1 mg/kg for volatilization to indoor air, as well as the residential and commercial RBSLs for volatilization to outdoor air of 0.19 mg/kg and 0.73 mg/kg (see Tables 6 and 6A). No other Tier 1 RBSLs were exceeded.

## 5.3 Direct Exposure to Contaminants in Soil

Should soil excavation take place at some point in the future as the result of redevelopment or modification to the Caltrans site, workers could potentially come into direct contact with petroleum-impacted soils. Contaminant concentrations in soil used to compare with the Tier 1 RBSLs and Tier 3 SSTLs for direct exposure are the maximum reported concentrations at the site. The RBSLs and SSTLs used to simulate the direct exposure pathway are those values listed under the surficial soil exposure route in the City of Oakland RBSL and SSTL tables provided in Appendix C.

The maximum reported contaminant concentrations in soil at the site do not exceed the Tier 1 RBSLs or the Tier 3 SSTLs.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of previous investigations and quarterly groundwater monitoring the following is concluded:

- Source removal was conducted in September 1994 when the USTs and contaminated soil surrounding the USTs were removed from the site.
- After several investigations, and quarterly groundwater monitoring events, the lateral and vertical extent of soil and groundwater contamination was adequately characterized. Impacts to soil are primarily restricted to the immediate vicinity of the former USTs.

The lateral extent of the petroleum hydrocarbon plume has changed through time, as shown in Figures 7 through 12; however, the plume appears to have stabilized over the last several years and contaminant concentrations are attenuating with time. Contaminant concentrations appear to have peaked sometime between 1998 and 2001, and have generally been decreasing ever since.

- Groundwater flow direction maps prepared for 1995 and 2005 (Figures 5 and 6) indicates groundwater beneath the study area flows in a radial direction centered near MW1; however, the distribution of contaminants in groundwater beneath the area indicates the predominant flow direction(s) range from northwest to southwest.
- A comparison of soil and groundwater contaminant concentrations with City of Oakland SSTLs indicates that no Tier 3 SSTL (which the site is classified under according to City of Oakland RBCA criteria) was exceeded under the residential or commercial land use scenarios. To further support case closure contaminant concentrations were also compared to Tier 1 RBSLs. The only compound which exceeds the Tier 1 RBSLs was benzene.

Based on the information presented in this report, the lateral extent of the plume has stabilized, and current COC concentrations do not pose an unacceptable risk to the environment or human health. Therefore, Geocon recommends the DEH consider this site for case closure as a low risk groundwater site.



## 7.0 LIMITATIONS

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered

## 8.0 REFERENCES

City of Oakland Public Works Agency, January 2000, Oakland Urban Land Redevelopment Program: Guidance Document

Clayton Environmental Consultants, September 1993, Untitled Correspondence (and Figure) to Alameda County Health Agency

Geocon Environmental Consultants, Inc., January 1996, Site Investigation Report For Hegenberger Maintenance Station, Oakland, California

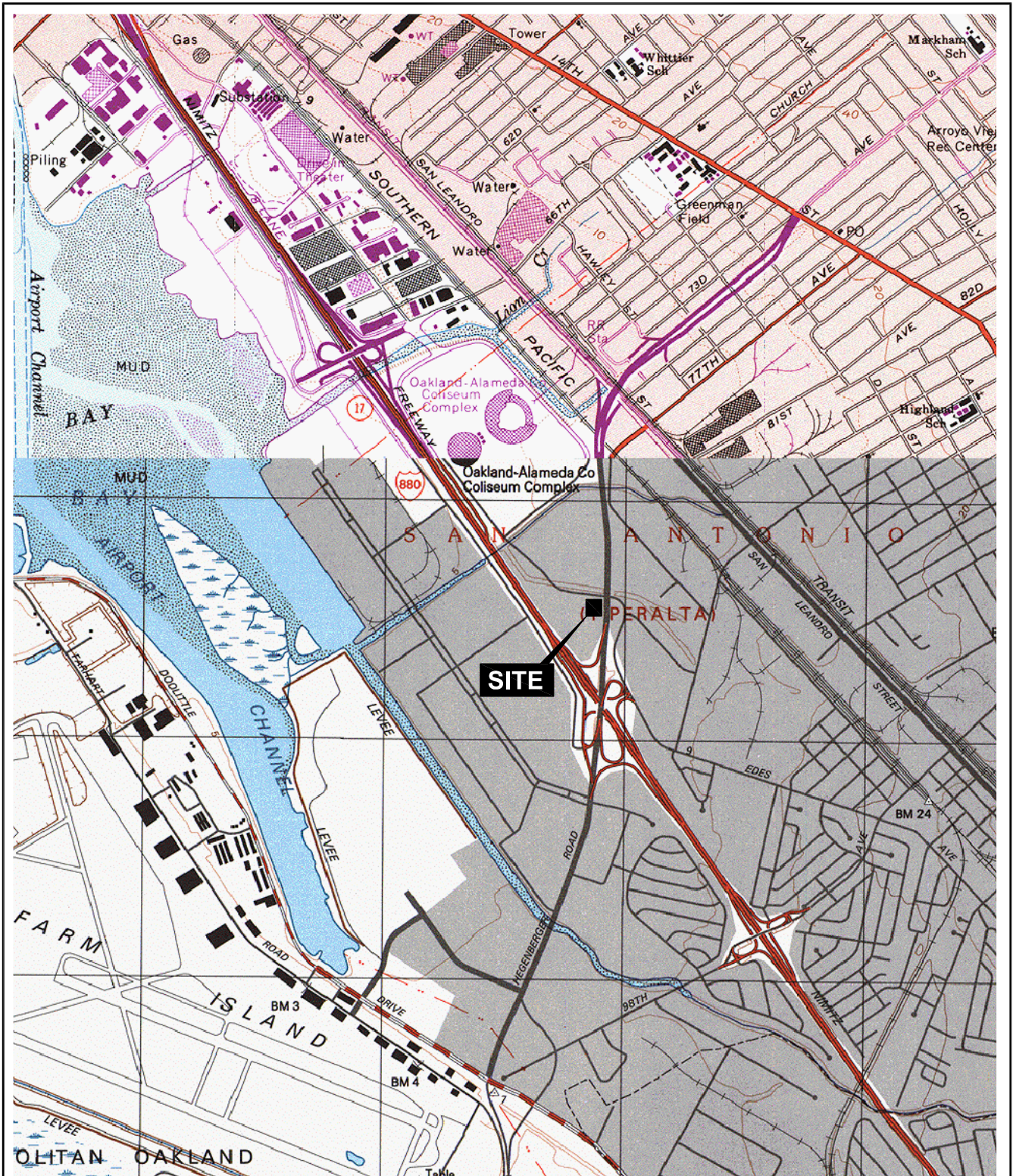
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2356 RESEARCH DRIVE, LIVERMORE, CALIFORNIA, 94550  
PHONE 925 371-5900 - FAX 925 371-5915



Hegenberger Maintenance Station

555 Hegenberger Road,  
Oakland, California

**VICINITY MAP**

GEOCON Proj. No. E8220-06-31

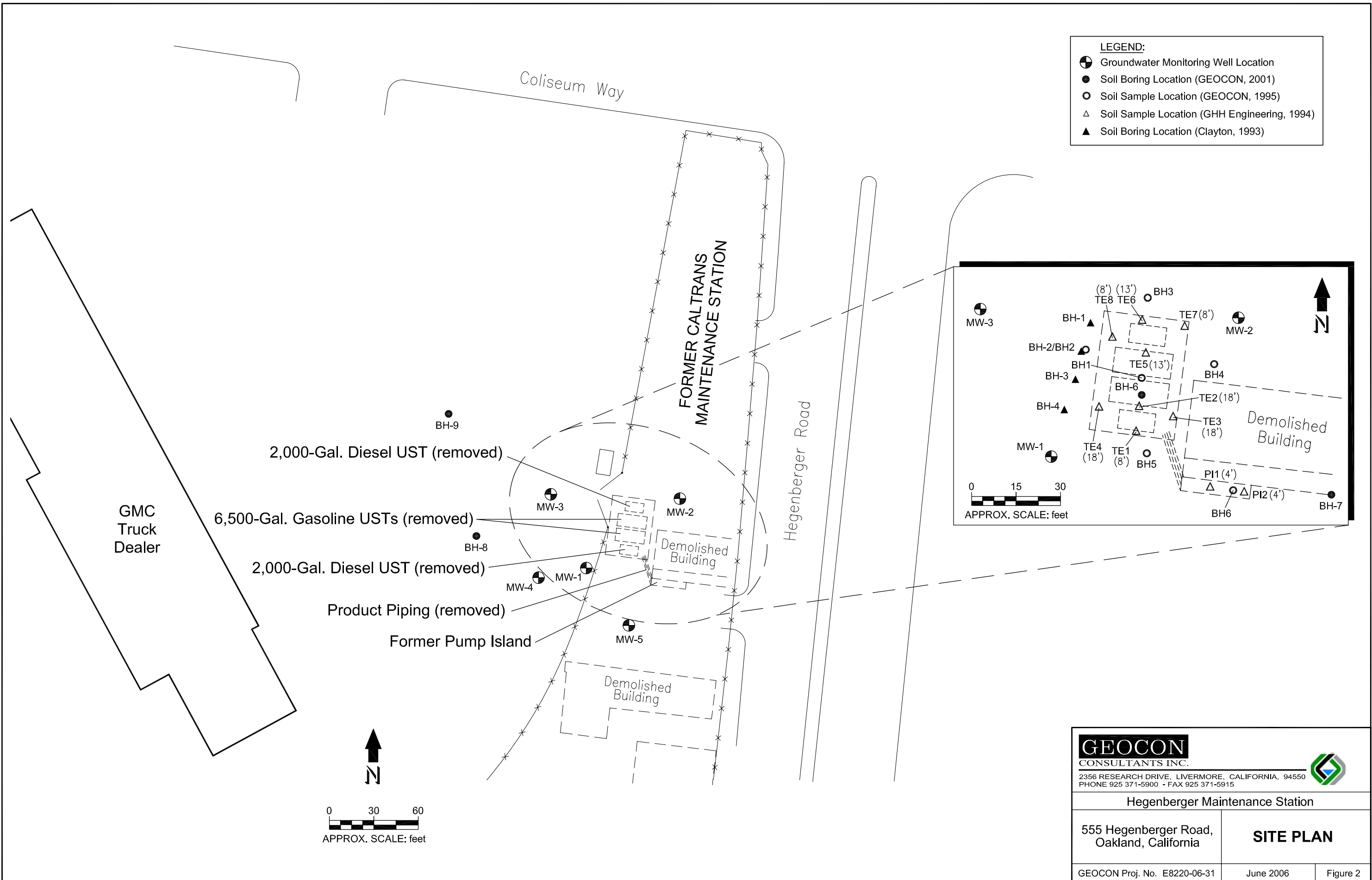
June 2006

Figure 1



**LEGEND:**

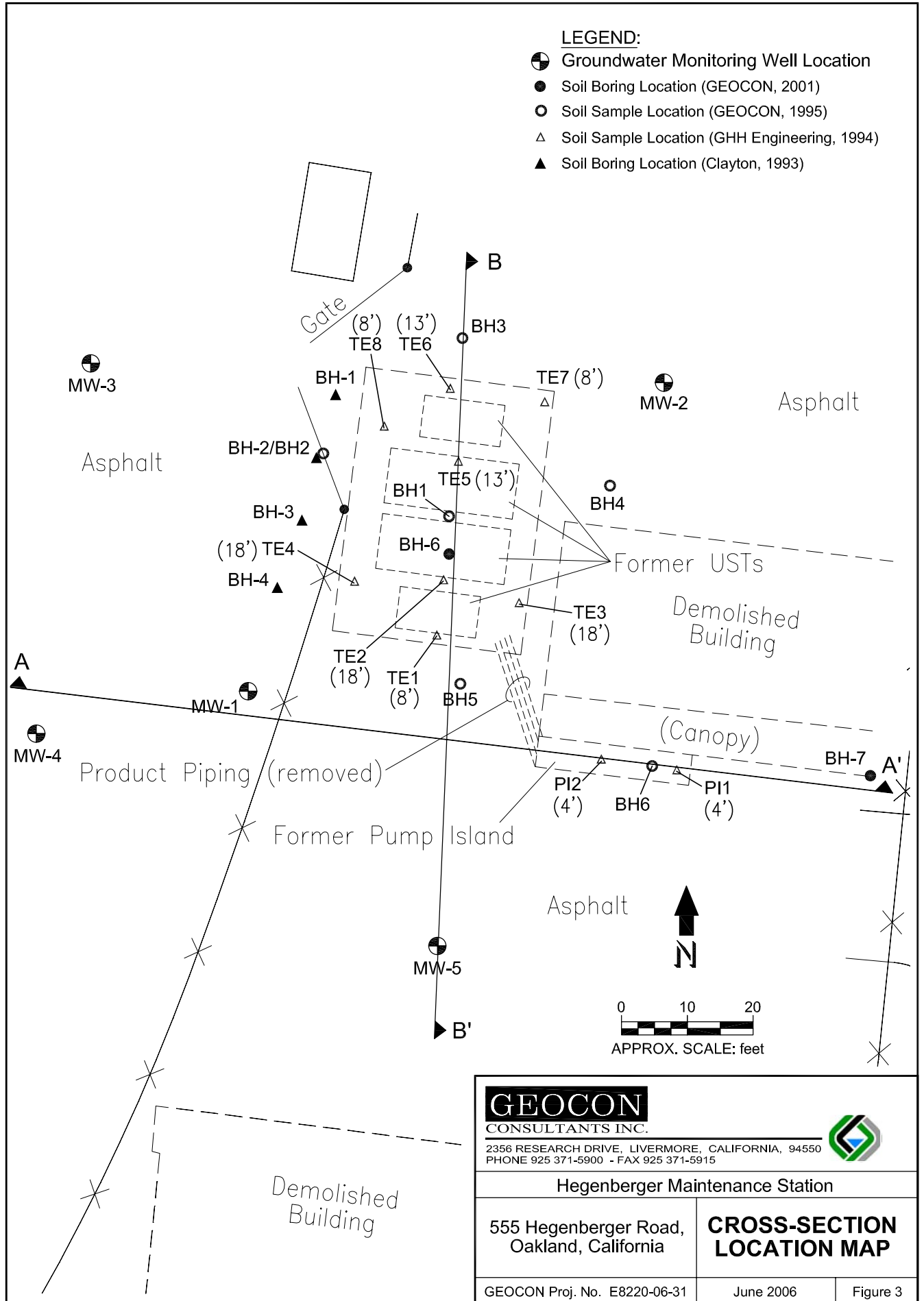
- ⊕ Groundwater Monitoring Well Location
- Soil Boring Location (GEOCON, 2001)
- Soil Sample Location (GEOCON, 1995)
- △ Soil Sample Location (GHH Engineering, 1994)
- ▲ Soil Boring Location (Clayton, 1993)



<p><b>GEOCON</b> CONSULTANTS INC.</p> <p>2356 RESEARCH DRIVE, LIVERMORE, CALIFORNIA, 94550 PHONE 925 371-5900 - FAX 925 371-5915</p>		
<p>Hegenberger Maintenance Station</p>		
<p>555 Hegenberger Road, Oakland, California</p>	<p><b>SITE PLAN</b></p>	
<p>GEOCON Proj. No. E8220-06-31</p>	<p>June 2006</p>	<p>Figure 2</p>

**LEGEND:**

- ⊕ Groundwater Monitoring Well Location
- Soil Boring Location (GEOCON, 2001)
- Soil Sample Location (GEOCON, 1995)
- △ Soil Sample Location (GHH Engineering, 1994)
- ▲ Soil Boring Location (Clayton, 1993)



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Hegenberger Maintenance Station

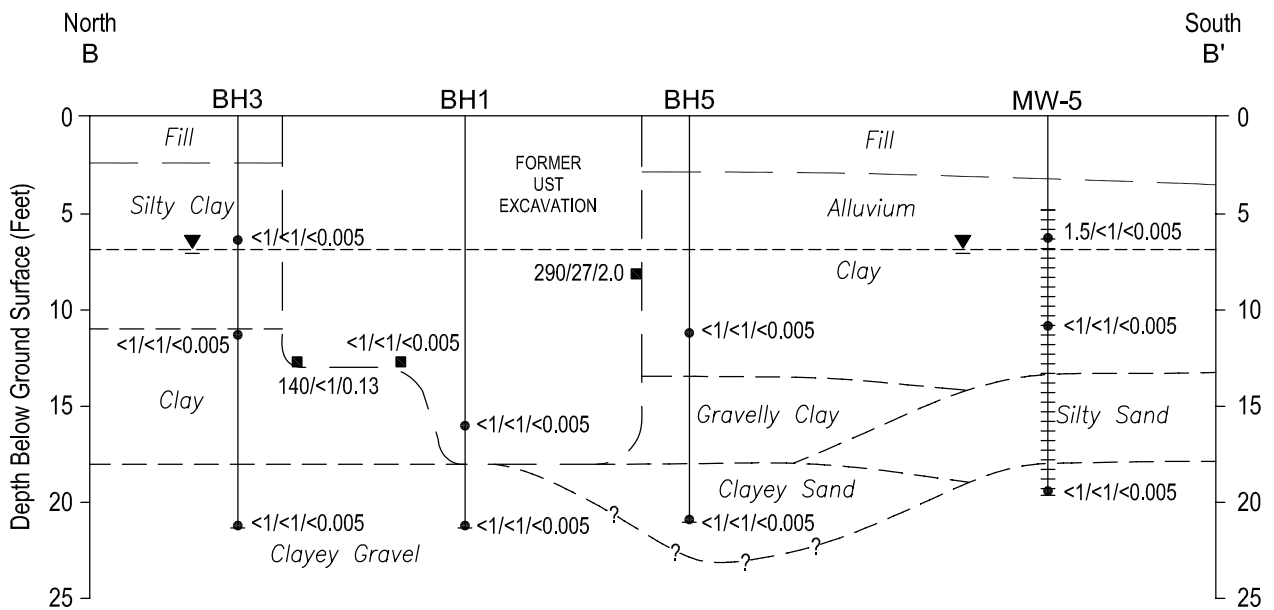
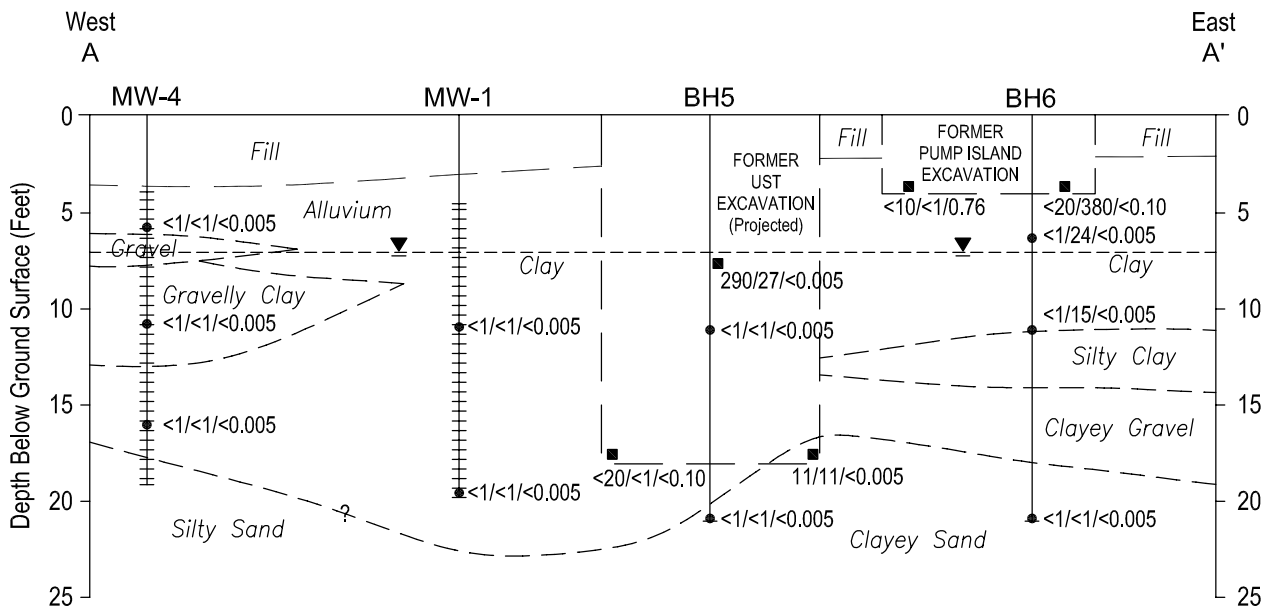
555 Hegenberger Road,  
 Oakland, California

**CROSS-SECTION  
 LOCATION MAP**

GEOCON Proj. No. E8220-06-31


June 2006

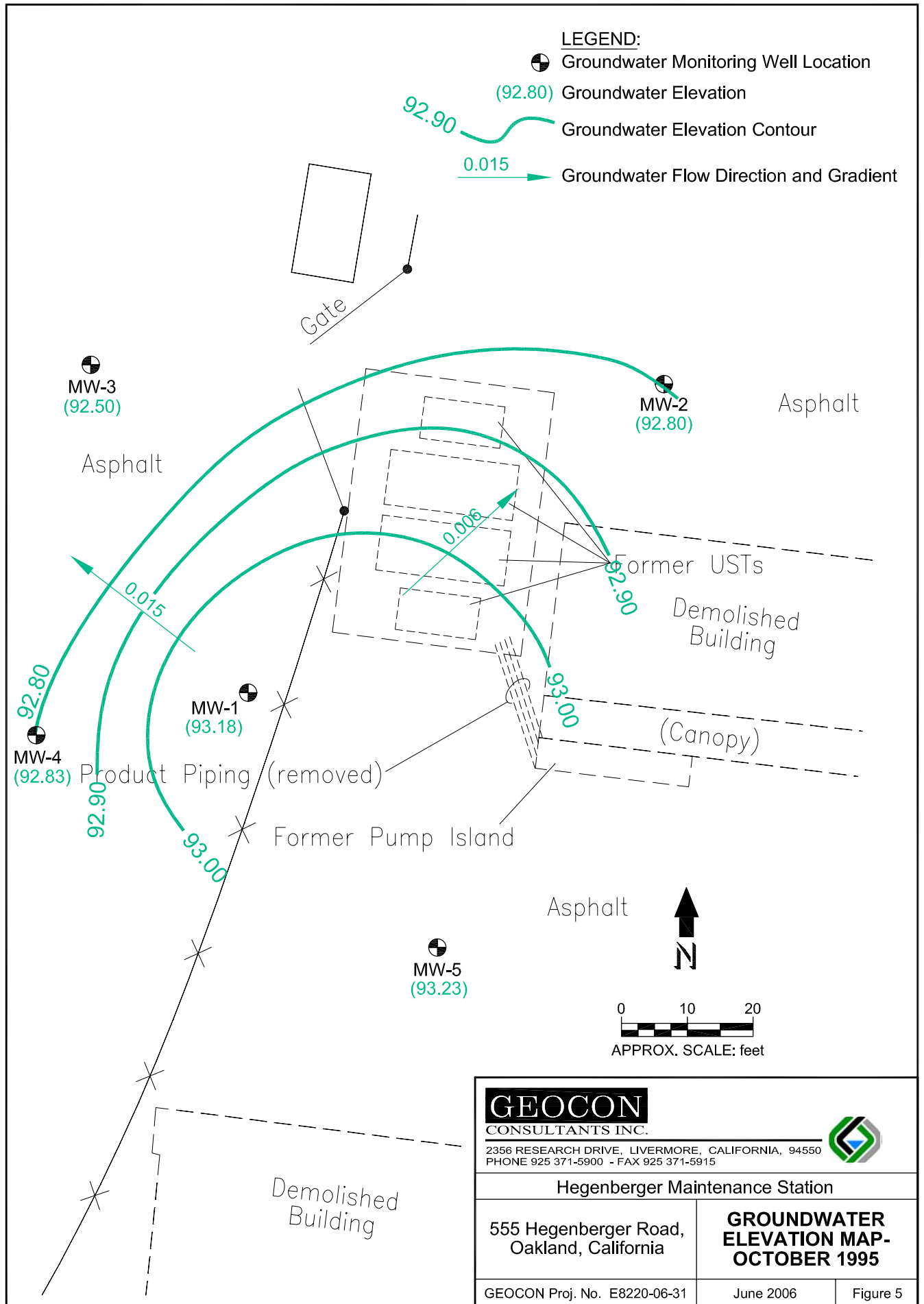
Figure 3



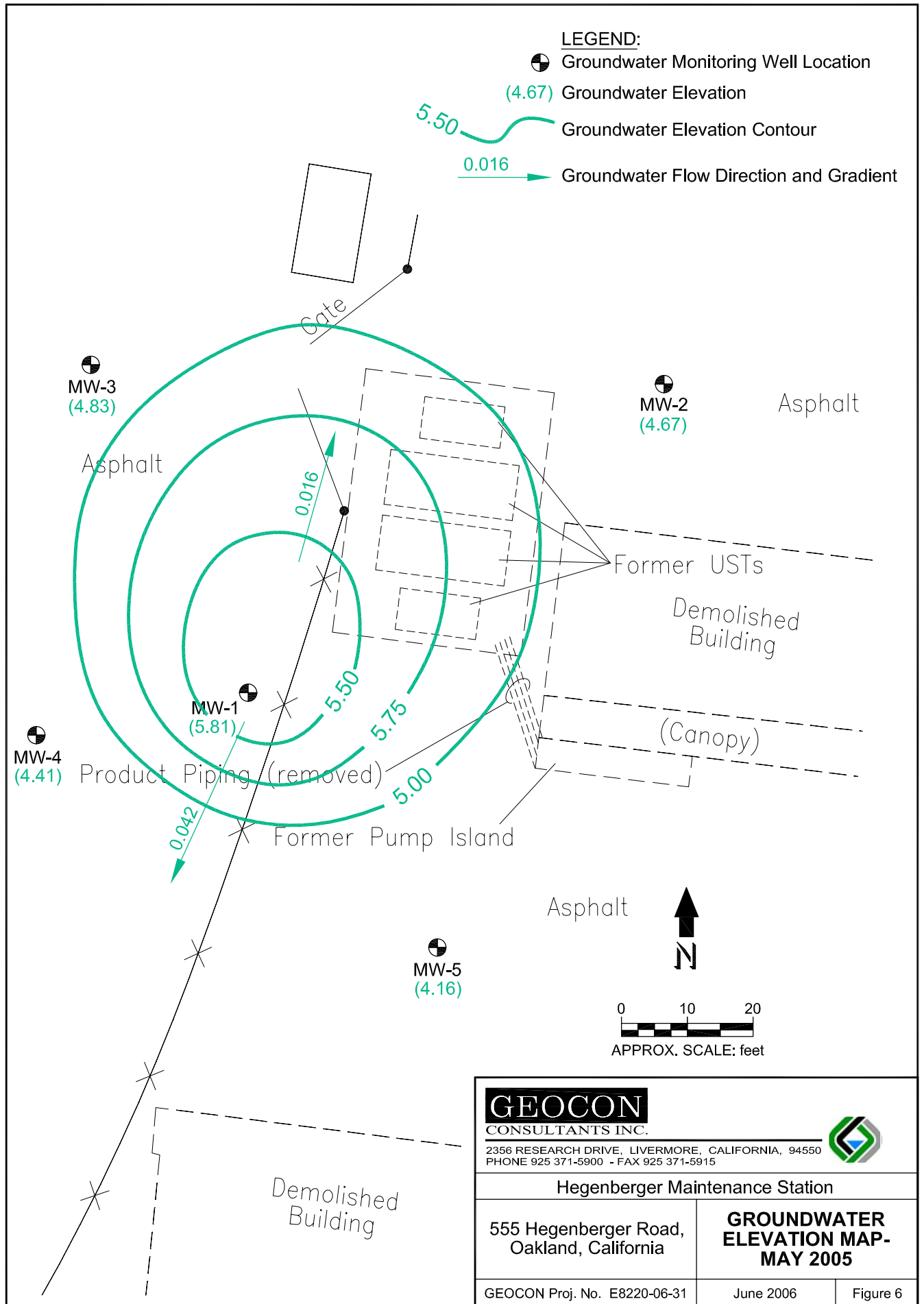
Scale:  
 1"=20' horizontal  
 1"=10' vertical

- BH1 Boring Location
- Sample Location
- Excavation Soil Sample Location
- 140/<1/0.13 TPHg/TPHd/Benzene Concentration (mg/kg)
- ▽ Approximate depth to groundwater (10/11/95)
- — — Approximate Geologic Contact
- - - - - Approximate Stratigraphic Contact
- TPHg Total Petroleum Hydrocarbons as Gasoline
- TPHd Total Petroleum Hydrocarbons as Diesel

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<b>Hegenberger Maintenance Station</b>		
555 Hegenberger Road, Oakland, California		<b>CROSS-SECTIONS          A-A' and B-B'</b>
GEOCON Proj. No. E8220-06-31		June 2006
		Figure 4

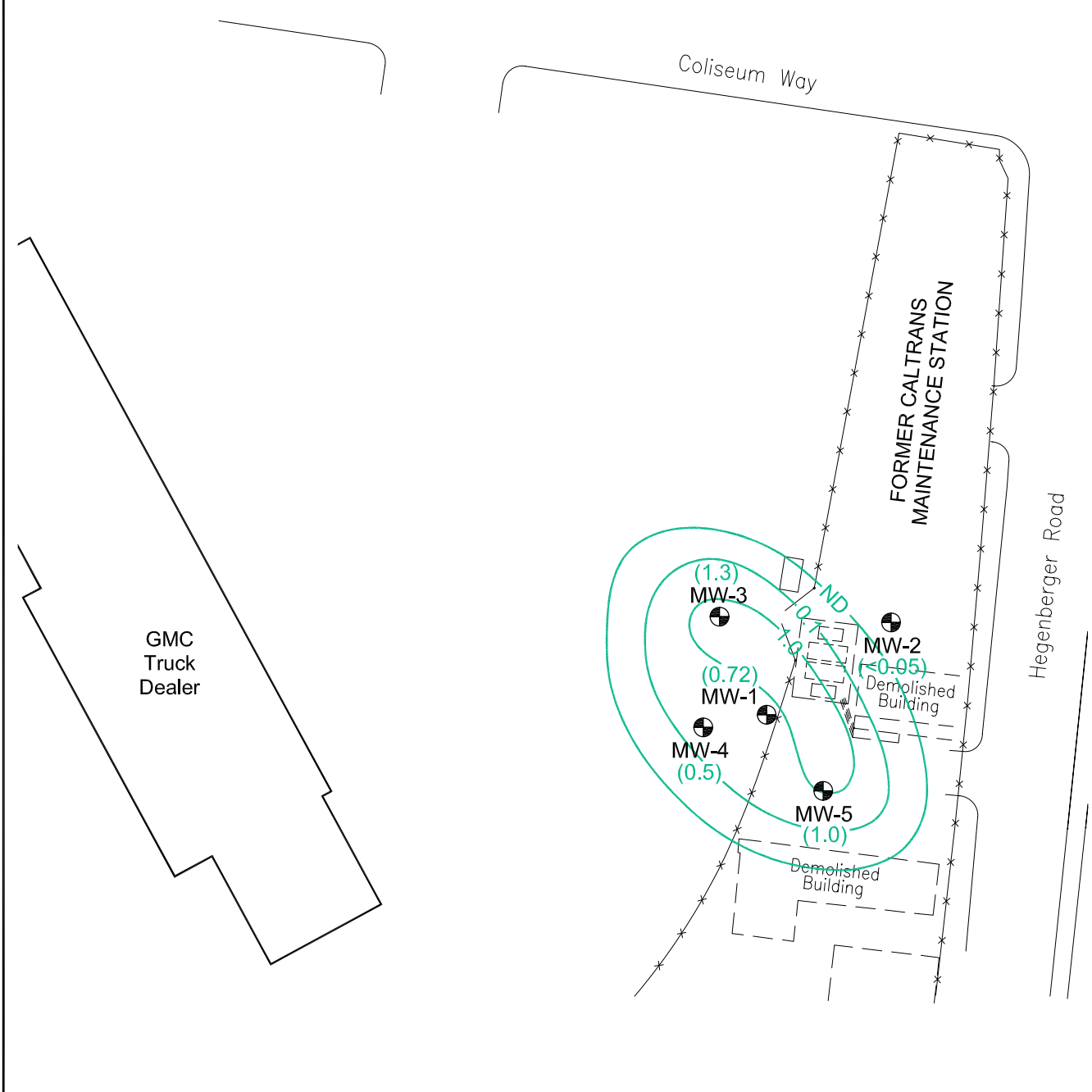


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Hegenberger Maintenance Station		
555 Hegenberger Road, Oakland, California		<b>GROUNDWATER          ELEVATION MAP-          OCTOBER 1995</b>
GEOCON Proj. No. E8220-06-31	June 2006	Figure 5





**LEGEND:**  
 ● Groundwater Monitoring Well Location  
 (1.3) TPHg Concentration (mg/L)

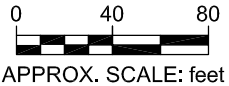
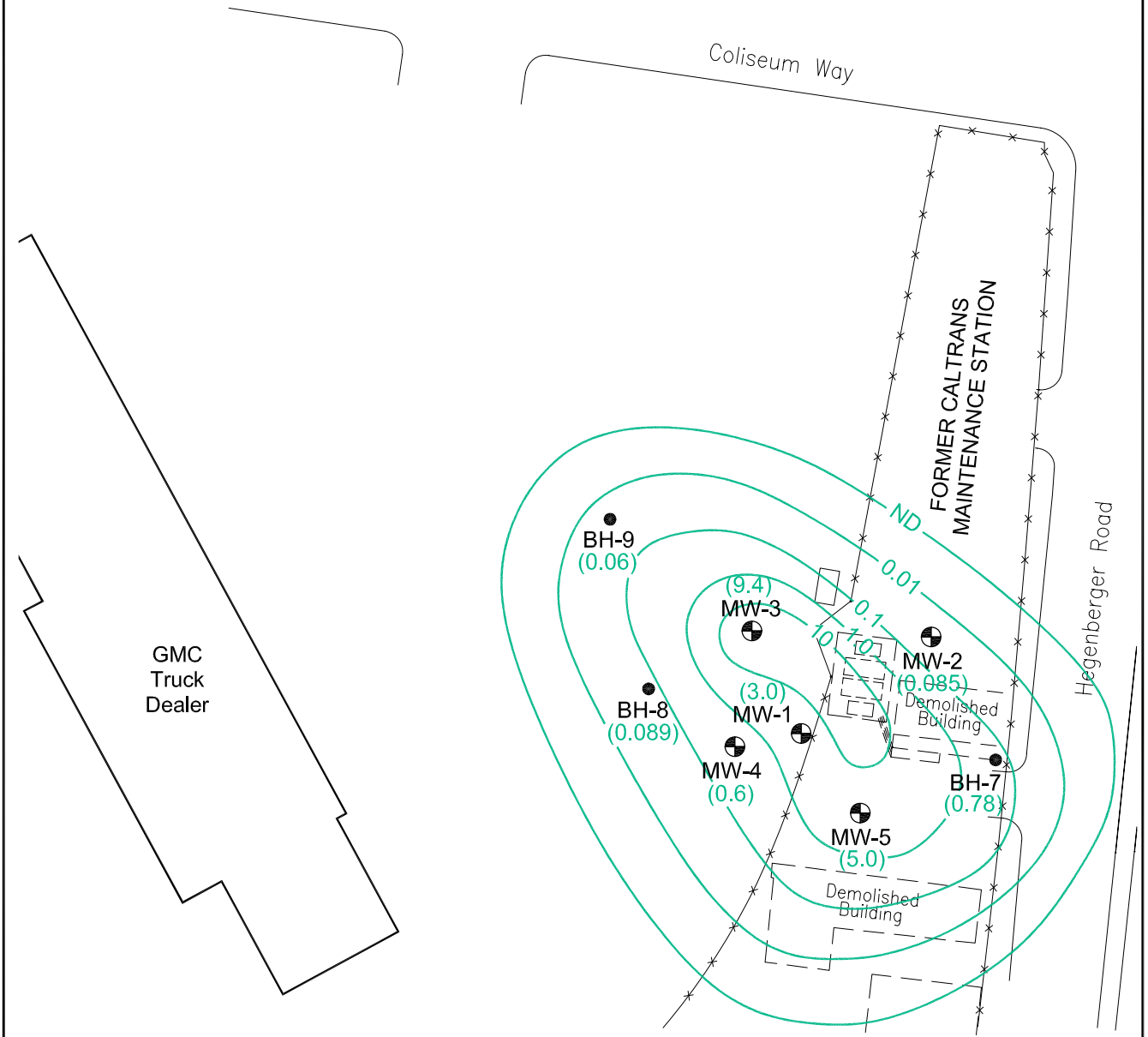


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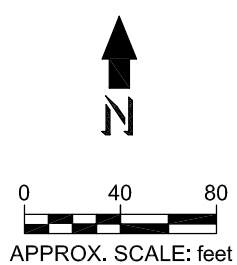
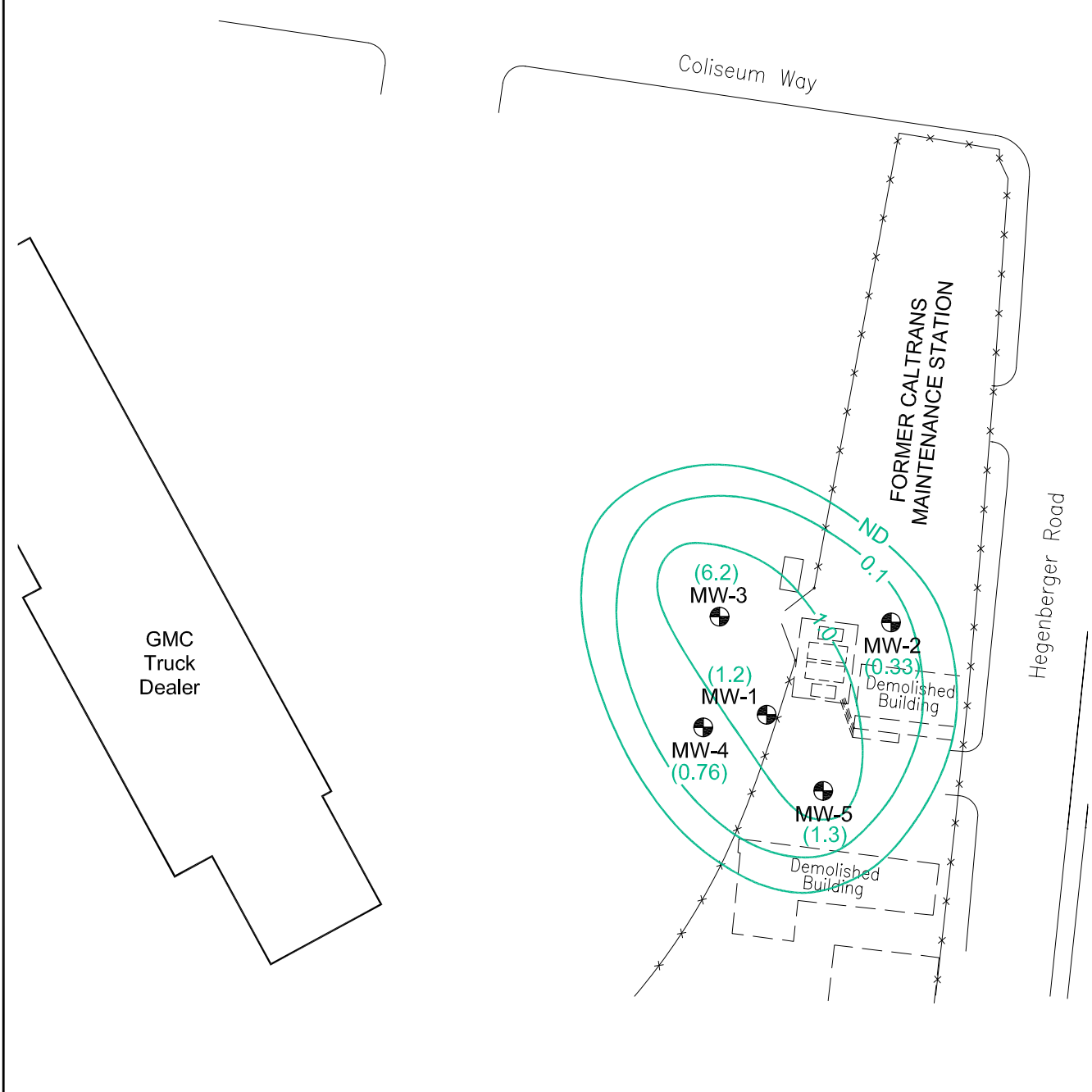
<b>Hegenberger Maintenance Station</b>	
555 Hegenberger Road, Oakland, California	<b>TPHg ISOCONCENTRATION MAP - 1995</b>
GEOCON Proj. No. E8220-06-31	June 2006
	Figure 7


- LEGEND:**
- Groundwater Monitoring Well Location
  - Soil Boring Location (GEOCON, 2001)
  - (9.4) TPHg Concentration (mg/L)



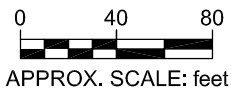
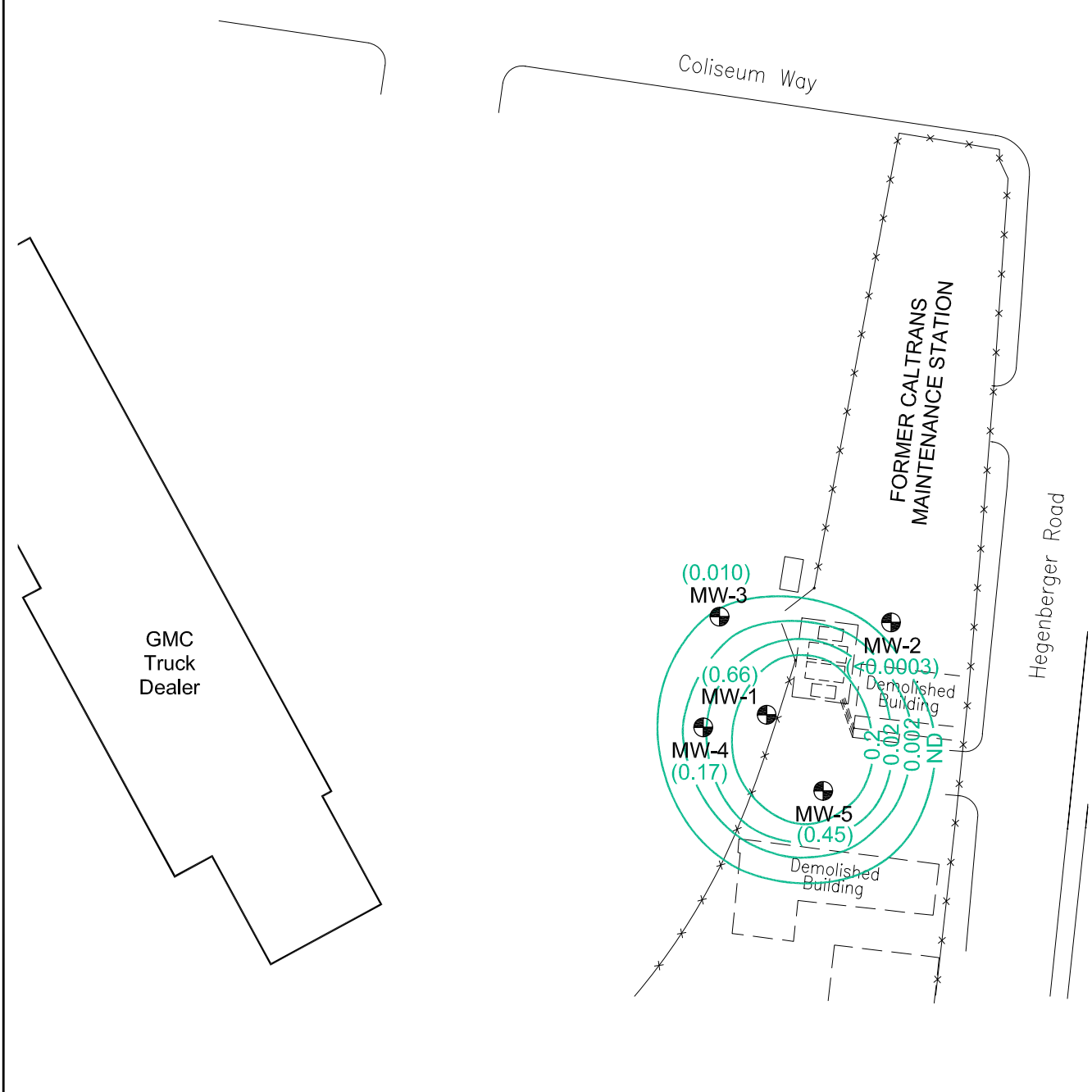
<b>GEOCON</b>		
CONSULTANTS INC.		
2356 RESEARCH DRIVE, LIVERMORE, CALIFORNIA, 94550 PHONE 925 371-5900 - FAX 925 371-5915		
<b>Hegenberger Maintenance Station</b>		
555 Hegenberger Road, Oakland, California	<b>TPHg ISOCONCENTRATION MAP - 2001</b>	
GEOCON Proj. No. E8220-06-31	June 2006	Figure 8

**LEGEND:**  
 ● Groundwater Monitoring Well Location  
 (1.3) TPHg Concentration (mg/L)



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Hegenberger Maintenance Station		
555 Hegenberger Road, Oakland, California	<b>TPHg</b> <b>ISOCONCENTRATION</b> <b>MAP - MAY 2005</b>	
GEOCON Proj. No. E8220-06-31	June 2006	Figure 9

**LEGEND:**  
 ● Groundwater Monitoring Well Location  
 (0.45) Benzene Concentration (mg/L)



**GEOCON**

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Hegenberger Maintenance Station

555 Hegenberger Road,  
 Oakland, California

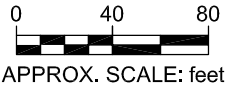
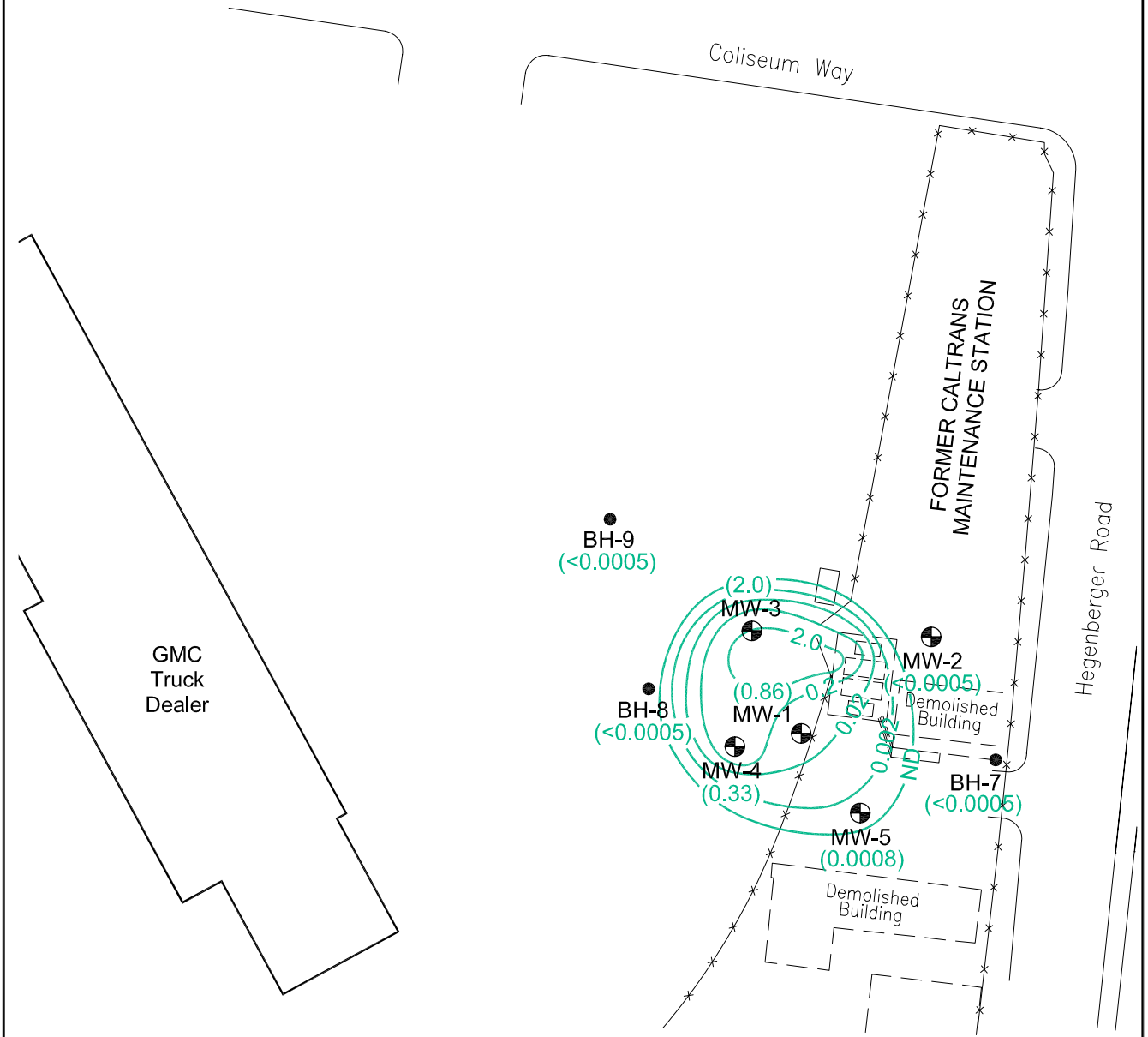
**BENZENE  
 ISOCONCENTRATION  
 MAP - OCTOBER 1995**

GEOCON Proj. No. E8220-06-31

June 2006

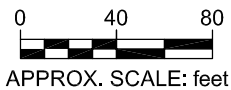
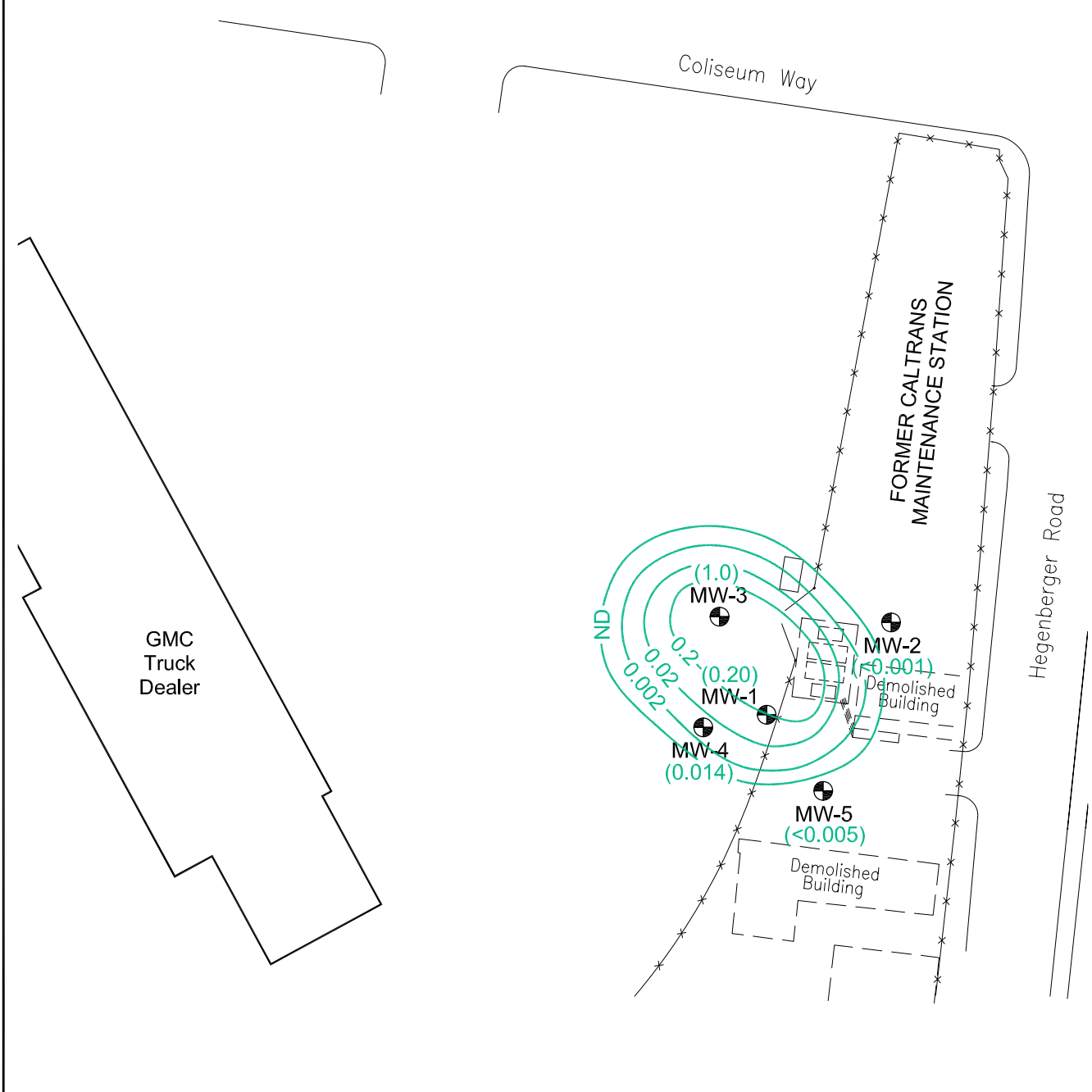
Figure 10

- LEGEND:**
- Groundwater Monitoring Well Location
  - Soil Boring Location (GEOCON, 2001)
  - (2.0) Benzene Concentration (mg/L)



<p><b>GEOCON</b> CONSULTANTS INC.</p> <p>2356 RESEARCH DRIVE, LIVERMORE, CALIFORNIA, 94550 PHONE 925 371-5900 - FAX 925 371-5915</p>		
<p>Hegenberger Maintenance Station</p>		
<p>555 Hegenberger Road, Oakland, California</p>		<p><b>BENZENE</b> <b>ISOCONCENTRATION</b> <b>MAP - DECEMBER 2001</b></p>
<p>GEOCON Proj. No. E8220-06-31</p>	<p>June 2006</p>	<p>Figure 11</p>

**LEGEND:**  
 ● Groundwater Monitoring Well Location  
 (0.20) Benzene Concentration (mg/L)



**GEOCON**

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Hegenberger Maintenance Station

555 Hegenberger Road,  
 Oakland, California

**BENZENE  
 ISOCONCENTRATION  
 MAP - MAY 2005**

GEOCON Proj. No. E8220-06-31

June 2006

Figure 12

**Table 1**  
**Soil Sample Results**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Sample Location	Date	Depth	TPHg (mg/kg)	TPHd (mg/kg)	O&G (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)	Organic Lead (mg/kg)	Other VOCs (mg/kg)
BH-1	July-93	6	340	280	480	--	--	--	--	--	--	--
BH-1	July-93	10.5	20	8	<50	--	--	--	--	--	--	--
BH-1	July-93	15.5	0.5	10	140	--	--	--	--	--	--	--
BH-3	July-93	5.5	6.3	44	0.18	--	--	--	--	--	--	--
BH-4	July-93	5.5	51	17	70	--	--	--	--	--	--	--
PI1	September-94	4	<20	380	2,200	<0.10	<0.10	0.18	<0.10	13	--	--
PI2	September-94	4	<10	<1.0	190	0.076	<0.05	<0.05	<0.05	13	--	--
TE1	September-94	8	290	27	1,900	2.0	<0.5	0.74	1.2	18	--	--
TE2	September-94	18	<1.0	<1.0	200	<0.005	<0.005	<0.005	<0.005	12	--	--
TE3	September-94	18	11	11	580	0.03	0.014	0.02	0.022	8.8	--	--
TE4	September-94	18	<20	<1.0	70	<0.10	<0.10	<0.10	<0.10	7.6	--	--
TE5	September-94	13	<1.0	<1.0	80	<0.005	<0.005	<0.005	<0.005	9.5	--	--
TE6	September-94	13	140	<1.0	1,200	0.13	<0.10	0.51	0.3	11	--	--
TE7	September-94	8	400	<1.0	530	0.83	<0.5	0.62	1.2	14	--	--
TE8	September-94	8	480	<1.0	100	1.8	0.51	7.6	8.7	8.9	--	--
PI-1	September-94	4	<20	380	--	<0.10	<0.10	0.18	<0.10	13	--	--
PI-2	September-94	4	<10	<1.0	--	0.076	<0.05	<0.05	<0.05	13	--	--
BH1	September-95	16	<1.0	<1.0	<50	<0.005	<0.005	0.006	0.021	--	<5.0	--
BH1	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH2	September-95	11	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH2	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH3	September-95	6	<1.0	<1.0	80	<0.005	<0.005	<0.005	<0.005	--	--	--
BH3	September-95	11	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH3	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH4	September-95	11	<1.0	<1.0	55	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH4	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH5	September-95	11	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH5	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH6	September-95	6	<1.0	24	80	<0.005	<0.005	<0.005	<0.005	--	--	--
BH6	September-95	11	<1.0	16	65	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH6	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-1	September-95	11	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-1	September-95	19.5	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-2	September-95	6	<1.0	<1.0	75	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-2	September-95	21	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-3	September-95	7.5	<1.0	<1.0	<50	0.012	<0.005	<0.005	<0.005	--	--	--
MW-3	September-95	11	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--

**Table 1**  
**Soil Sample Results**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Sample Location	Date	Depth	TPHg (mg/kg)	TPHd (mg/kg)	O&G (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)	Organic Lead (mg/kg)	Other VOCs (mg/kg)
MW-3	September-95	21	<1.0	<1.0	<50	<b>0.03</b>	<b>0.028</b>	<b>0.03</b>	<b>0.058</b>	--	<5.0	--
MW-4	September-95	5.5	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	--	--
MW-4	September-95	11	<1.0	<1.0	<b>75</b>	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-4	September-95	16	<1.0	<1.0	<b>75</b>	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-5	September-95	6	<b>1.6</b>	<1.0	<b>60</b>	<0.005	<b>0.02</b>	<b>0.028</b>	<b>0.088</b>	--	--	--
MW-5	September-95	11	<1.0	<1.0	<b>65</b>	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
MW-5	September-95	19.5	<1.0	<1.0	<50	<0.005	<0.005	<0.005	<0.005	--	<5.0	--
BH-6	December-01	11	<1.0	<b>1</b>	NA	<0.005	<0.005	<0.005	<0.005	--	--	<0.005
BH-9	December-01	6.5	<1.0	<b>1.7</b>	NA	<0.005	<0.005	<0.005	<0.005	--	--	<0.005

Notes:

Bold type indicates compound detected above reporting limit

TPHg = Total Petroleum Hydrocarbons as gasoline following EPA Test Method 8015B

TPHd = Total Petroleum Hydrocarbons as diesel following EPA Test Method 8015B

BTEX = benzene, toluene, ethylbenzene, and total xylenes following EPA Test Method 8020 (8260)

MTBE = methyl tertiary butylether following EPA Test Method 8020/8260B

mg/kg = milligrams per liter

ug/kg = micrograms per liter

-- = Analysis not performed

ND = Not detected at a concentration greater than the laboratory reporting limit.

< = less than indicated reporting limit



**Table 2**  
**Historical Depth to Water and Groundwater Sample Results**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Well	Date	TOC Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet amsl)	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	O&G (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethylbenzene (mg/l)	Xylenes (mg/l)	MTBE (mg/l)	Other VOCs (mg/l)
MW-1	10/11/1995	99.73	6.55	93.18	0.72	< 0.05	<0.050	<5	0.66	0.013	0.0047	0.0028	---	---
	1/17/1996	99.73	5.64	94.09	4.4	< 0.05	<0.050	---	1.00	0.03	0.021	0.017	---	---
	4/16/1996	99.73	5.46	94.27	6.05	7.45	---	---	0.914	0.0347	0.0344	0.0158	---	---
	8/26/1996	99.73	5.91	93.82	3.8	0.43	---	---	0.780	0.023	0.021	0.020	---	---
	11/14/1996	99.73	6.16	93.57	2.6	0.27	---	---	0.500	0.018	0.014	0.0089	---	---
	2/18/1998	99.73	3.82	95.91	3.1	0.90	---	---	0.240	0.018	0.0078	0.011	0.020	---
	3/30/2001	99.73	6.19	93.54	3.6	0.48	---	---	0.150	0.013	0.0007	0.0108	<0.0005	<0.005
	*** 12/26/2001	10.26	4.08	6.18	3.0	1.10	---	---	0.086	0.011	0.0034	0.0105	0.005	Isopropylbenzene=0.0079 n-butylbenzene=0.0051 n-propylbenzene=0.0053
9/30/2002	10.26	5.79	4.47	0.59	< 0.05	---	---	0.012	0.0027	<0.0005	0.0016	<0.0005	---	
2/20/2003	10.26	4.49	5.77	2.65	---	---	---	0.0369	0.0106	0.007	0.0181	<0.005	---	
1/12/2004	10.26	4.41	5.85	1.61	---	---	---	0.0056	0.0018	0.0016	0.0014	---	---	
5/12/2005	10.26	4.45	5.81	1.2	---	---	---	0.020	<0.005	<0.005	<0.005	---	---	
MW-2	10/11/1995	99.68	6.88	92.80	< 0.05	< 0.05	<0.050	<5	<0.0003	<0.0003	<0.0003	<0.0005	---	---
	1/17/1996	99.68	5.32	94.36	4.9	< 0.05	<0.050	---	2.10	<0.0015	<0.015	<0.015	---	---
	4/16/1996	99.68	5.81	93.87	< 0.05	< 0.05	---	---	0.0010	<0.0005	<0.0005	<0.0005	---	---
	8/26/1996	99.68	5.98	93.70	< 0.05	< 0.05	---	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	11/14/1996	99.68	6.72	92.96	< 0.05	0.056	---	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	2/18/1998	99.68	5.01	94.67	< 0.05	0.260	---	---	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	---
	3/30/2001	99.68	6.54	93.14	< 0.20	0.37	---	---	0.0027	0.0008	<0.0005	0.0008	<0.0005	<0.005
	*** 12/26/2001	10.22	5.53	4.69	0.085	0.14	---	---	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
	9/30/2002	10.22	6.48	3.74	< 0.05	< 0.05	---	---	<0.0005	<0.005	<0.0005	<0.0015	<0.0005	---
	2/20/2003	10.22	5.98	4.24	0.11	---	---	---	0.0066	<0.0005	<0.0005	<0.001	<0.0005	---
1/12/2004	10.22	5.69	4.53	0.067	---	---	---	<0.0005	<0.0005	<0.0005	<0.001	---	---	
5/12/2005	10.22	5.55	4.67	0.33	---	---	---	<0.001	<0.001	<0.001	<0.001	---	---	
MW-3	10/11/1995	98.92	6.42	92.50	1.3	< 0.05	<0.050	<5	0.0010	<0.0003	<0.0003	<0.0003	---	---
	1/17/1996	98.92	5.82	93.10	0.171	< 0.05	<0.050	---	0.064	<0.0003	0.001	<0.0003	---	---
	4/16/1996	98.92	5.85	93.07	6.74	0.565	---	---	2.770	0.031	0.0139	0.0219	---	---
	8/26/1996	98.92	5.72	93.20	0.7	0.70	---	---	0.180	0.0042	0.001	0.0046	---	---
	11/14/1996	98.92	6.28	92.64	0.3	0.12	---	---	0.0062	0.0012	0.0007	0.0014	---	---
	2/18/1998	98.92	4.65	94.27	11	2.5	---	---	3.070	0.05	0.054	0.019	0.025	---
	3/30/2001	98.92	5.62	93.30	9.9	0.49	---	---	2.00	0.048	0.039	0.039	---	Isopropylbenzene = 0.092 n-Butylbenzene = 0.036 n-Propylbenzene = 0.280 sec-Butylbenzene = 0.013
	*** 12/26/2001	9.46	4.66	4.80	9.4	1.70	---	---	1.50	0.046	0.033	0.028	0.012	Isopropylbenzene=0.085 n-Butylbenzene=0.039 n-propylbenzene=0.250
	9/30/2002	9.46	5.84	3.62	2.02	0.57	---	---	0.775	0.0172	0.001	0.0094	<0.0005	---
	2/20/2003	9.46	5.55	3.91	4.01	---	---	---	1.120	<0.050	<0.050	<0.10	<0.050	---
1/12/2004	9.46	4.77	4.69	3.32	---	---	---	0.632	0.0269	<0.025	<0.050	---	---	
5/12/2005	9.46	4.63	4.83	6.2	---	---	---	1.00	0.030	0.020	0.010	---	---	

Well	Date	TOC	Depth to	Groundwater	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	O&G (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethylbenzene (mg/l)	Xylenes (mg/l)	MTBE (mg/l)	Other VOCs (mg/l)
		Elevation (feet)	Water (feet)	Elevation (feet amsl)										
MW-4	10/11/1995	99.46	6.63	92.83	0.5	< 0.05	<0.050	<5	0.017	0.0011	<0.0003	0.0005	---	---
	1/17/1996	99.46	5.77	93.69	0.46	< 0.05	<0.050	---	0.072	0.0041	<0.0003	0.0017	---	---
	4/16/1996	99.46	5.89	93.57	2.20	< 0.05	---	---	0.851	0.0077	0.0014	0.0057	---	---
	8/26/1996	99.46	6.14	93.32	0.30	0.11	---	---	0.055	0.0049	0.0012	<0.0005	---	---
	11/14/1996	99.46	6.72	92.74	0.20	0.20	---	---	0.0034	<0.0005	---	<0.0005	---	---
	2/18/1998	99.46	5.02	94.44	1.60	0.28	---	---	0.320	0.0091	0.001	0.0006	0.0017	---
	3/30/2001	99.46	6.21	93.25	2.7	0.35	---	---	0.320	0.016	0.0053	0.0136	<0.0005	Isopropylbenzene = 0.0064
	*** 12/26/2001	10.00	5.37	4.63	0.6	0.20	---	---	0.033	0.003	<0.0005	0.0017	0.0008	<0.005
	9/30/2002	10.00	6.40	3.60	0.067	< 0.05	---	---	<0.0005	<0.0005	<0.0005	<0.0015	<0.0005	---
	2/20/2003	10.00	5.83	4.17	0.57	---	---	---	0.107	<0.010	<0.010	<0.0020	<0.010	---
	1/12/2004	10.00	5.41	4.59	0.70	---	---	---	0.122	0.0135	0.0006	0.0088	---	---
	5/12/2005	10.00	5.59	4.41	0.76	---	---	---	0.014	0.0057	<0.005	<0.005	---	---
	MW-5	10/11/1995	99.91	6.68	93.23	1.0	< 0.05	<0.050	<5	0.045	0.015	0.0019	0.0061	---
1/17/1996		99.91	5.74	94.17	< 0.05	< 0.05	<0.050	---	0.002	<0.0003	<0.0003	<0.0003	---	---
4/16/1996		99.91	5.85	94.06	1.74	0.855	---	---	0.157	0.0201	0.0039	0.0224	---	---
8/26/1996		99.91	5.99	93.92	0.90	0.27	---	---	0.055	0.0064	0.0009	0.0037	---	---
11/14/1996		99.91	6.70	93.21	0.70	0.32	---	---	0.031	0.0057	0.0007	0.0036	---	---
2/18/1998		99.91	5.74	94.17	1.20	0.58	---	---	0.014	0.0052	0.0008	0.0055	0.0095	---
3/30/2001		99.91	6.73	93.18	1.5	0.48	---	---	0.0072	0.0065	<0.0005	0.0107	<0.0005	n-Propylbenzene =0.0051
*** 12/26/2001		10.34	5.23	5.11	5.0	7.20	---	---	0.0008	0.0105	0.0036	0.0105	0.0036	Isopropylbenzene=0.006
9/30/2002		10.34	6.18	4.16	0.56	0.43	---	---	0.0018	0.0052	<0.0005	0.0065	<0.0005	---
2/20/2003		10.34	5.80	4.54	1.04	---	---	---	<0.0025	0.0086	<0.0025	0.0113	<0.0025	---
1/12/2004		10.34	5.60	4.74	1.82	---	---	---	0.0042	0.008	0.0006	0.0128	---	---
5/12/2005		10.34	6.18	4.16	1.3	---	---	---	<0.005	<0.005	<0.005	<0.005	---	---

Notes:

Bold type indicates compound present at concentration above reporting limit.

TOC = Top of well casing.

feet amsl = Feet above mean sea level

TPHg = Total Petroleum Hydrocarbons as gasoline

TPHd = Total Petroleum Hydrocarbons as diesel

TPHmo = Total Petroleum Hydrocarbons as motor oil

O&G = Oil and Grease

BTEX = benzene, toluene, ethylbenzene, and total xylenes following EPA Test Method 8020 (8260)

MTBE = Methyl tertiary butyl ether and tertiary amyl methylether[TAME] following EPA Test Method 8020/8260B

mg/l = milligrams per liter

--- = Analysis not performed

< = less than indicated reporting limit

\*\*\*= Change of base for elevation above mean sea level to the California State Coordinate System, Zone III

**Table 3**  
**Grab Groundwater Sample Results**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Boring ID	Date	TPHg (mg/l)	TPHd (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethylbenzene (mg/l)	Xylenes (mg/l)	MTBE (mg/l)	Other VOCs (mg/l)
BH1	7/23/1993	<b>0.78</b>	<b>1.3</b>	--	--	--	--	--	--
BH3	7/23/1993	--	<b>47</b>	--	--	--	--	--	--
BH-6	12/26/2001	<b>0.065</b>	<b>0.17</b>	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
BH-7	12/26/2001	<b>0.078</b>	<b>0.098*</b>	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	1,1,2-Trichloroethane = 0.010 1,1-Dichloroethane = 0.099 1,1-Dichloroethene = 0.054
BH-8	12/26/2001	<b>0.089</b>	---	<0.0005	<b>0.0007</b>	<0.0005	<b>0.0015</b>	<0.0005	<0.0005
BH-9	12/26/2001	<b>0.06</b>	<b>0.3</b>	<0.0005	<0.0005	<0.0005	<b>0.0008</b>	<0.0005	<0.0005

**Notes:**

Bold type indicates compound detected above reporting limit

TPHg = total Petroleum Hydrocarbons as gasoline

TPHd = total Petroleum Hydrocarbons as diesel

BTEX = benzene, toluene, ethylbenzene, and total xylenes following EPA Test Method 8020

MTBE = methyl tertiary butylether following EPA Test Method 8260B

mg/l = milligrams per liter

-- = analysis not performed

< = less than indicated reporting limit

**Table 4**  
**Tier 1 RBSL Comparison Table**  
**Groundwater to Indoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (mg/l)	Hazard (mg/l)	Carcinogenic (mg/l)	Hazard (mg/l)	*Maximum Concentration (mg/l)	**Most Current Concentration (mg/l)
Benzene	0.11	3.7	1.8	112	3.070	1.0
Toluene	NV	210	NV	>SOL	0.05	0.030
Ethylbenzene	>SOL	>SOL	>SOL	>SOL	0.054	0.020
Xylenes	>SOL	>SOL	>SOL	>SOL	0.039	0.010
MTBE	NV	24,000	NV	>SOL	0.025	<0.050

**Table 4A**  
**Tier 1 RBSL Comparison Table**  
**Groundwater to Outdoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (mg/l)	Hazard (mg/l)	Carcinogenic (mg/l)	Hazard (mg/l)	*Maximum Concentration (mg/l)	**Most Current Concentration (mg/l)
Benzene	5.6	222	21	1,300	3.070	1.0
Toluene	NV	>SOL	NV	>SOL	0.05	0.030
Ethylbenzene	>SOL	>SOL	>SOL	>SOL	0.054	0.020
Xylenes	>SOL	>SOL	>SOL	>SOL	0	0.010
MTBE	NV	>SOL	NV	>SOL	0.025	<0.050

Notes-

\* Maximum concentration reported at site in either grab or monitoring well groundwater sample

\*\* Groundwater data from May 2005 groundwater sample event

>SOL - RBSL exceeds solubility of chemical in water

mg/l - milligrams per liter

NV - No value. Compound not a known carcinogen.

**Table 5**  
**Tier 3 SSTL Comparison Table**  
**Groundwater to Indoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration (mg/l)
Benzene	5.9	20	93	570	3.070	1.0
Toluene	NV	>SOL	NV	>SOL	0.05	0.030
Ethylbenzene	NV	>SOL	NV	>SOL	0.054	0.020
Xylenes	NV	>SOL	NV	>SOL	0.039	0.010
MTBE	NV	40,000	NV	>SOL	0.025	<0.050

**Table 5A**  
**Tier 3 SSTL Comparison Table**  
**Groundwater to Outdoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration (mg/l)
Benzene	>SOL	>SOL	>SOL	>SOL	3.070	1.0
Toluene	NV	>SOL	NV	>SOL	0.05	0.030
Ethylbenzene	NV	>SOL	NV	>SOL	0.054	0.020
Xylenes	NV	>SOL	NV	>SOL	0.039	0.010
MTBE	NV	>SOL	NV	>SOL	0.025	<0.050

**Notes-**

\* Maximum concentration reported at site in either grab or monitoring well groundwater sample

\*\* Groundwater data from May 2005 groundwater sample event

>SOL - RBSL exceeds solubility of chemical in water.

mg/l - milligrams per liter

NV - No value. Compound not a known carcinogen.

**Table 6**  
**Tier 1 RBSL Comparison Table**  
**Soil to Indoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial / Industrial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	0.062	2.3	1.1	66	2
Toluene	NV	360	NV	SAT	0.51
Ethylbenzene	NV	SAT	NV	SAT	7.6
Xylenes	NV	SAT	NV	SAT	8.7
MTBE	NV	SAT	NV	SAT	Not Analyzed

**Table 6A**  
**Tier 1 RBSL Comparison Table**  
**Soil to Outdoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial / Industrial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	0.19	7.6	0.73	44	2
Toluene	NV	SAT	NV	SAT	0.51
Ethylbenzene	NV	SAT	NV	SAT	7.6
Xylenes	NV	SAT	NV	SAT	8.7
MTBE	NV	44,000	NV	SAT	Not Analyzed

Notes-

UCL - Upper confidence limit.

mg/kg - milligrams per kilogram

SAT - RBSL exceeds saturated soil concentration of compound

NV - No value. Compound not a known carcinogen.

**Table 7**  
**Tier 3 SSTL Comparison Table**  
**Soil to Indoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial / Industrial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	2.1	6.9	33	200	2
Toluene	NV	1,000	NV	SAT	0.51
Ethylbenzene	NV	SAT	NV	SAT	7.6
Xylenes	NV	SAT	NV	SAT	8.7
MTBE	NV	16,000	NV	SAT	Not Analyzed

**Table 7A**  
**Tier 3 SSTL Comparison Table**  
**Soil to Outdoor Air**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial / Industrial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	250	990	950	SAT	2
Toluene	NV	SAT	NV	SAT	0.51
Ethylbenzene	NV	SAT	NV	SAT	7.6
Xylenes	NV	SAT	NV	SAT	8.7
MTBE	NV	SAT	NV	SAT	Not Analyzed

Notes-

UCL - Upper confidence limit.

mg/kg - milligrams per kilogram

SAT - RBSL exceeds saturated soil concentration of compound

NV - No value. Compound not a known carcinogen.

**Table 8**  
**Tier 1 RBSL Comparison Table**  
**Direct Exposure to Soil**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	2.7	81	8,500	510	2
Toluene	NV	9,000	NV	56,000	0.51
Ethylbenzene	NV	5,100	NV	33,000	7.6
Xylenes	NV	54,000	NV	300,000	8.7
MTBE	NV	260	NV	1,700	Not Analyzed

**Table 9**  
**Tier 3 SSTL Comparison Table**  
**Direct Exposure to Soil**  
**Caltrans Former Hegenberger Maintenance Station**  
**Oakland, California**

Contaminant	Residential		Commercial		*Maximum Concentration (mg/kg)
	Carcinogenic (mg/kg)	Hazard (mg/kg)	Carcinogenic (mg/kg)	Hazard (mg/kg)	
Benzene	19	63	49	300	2
Toluene	NV	7,100	NV	34,000	0.51
Ethylbenzene	NV	3,900	NV	18,000	7.6
Xylenes	NV	53,000	NV	260,000	8.7
MTBE	NV	200	NV	930	Not Analyzed

Notes-

UCL - Upper confidence limit.

mg/kg - milligrams per kilogram

NV - No value. Compound not a known carcinogen.



# APPENDIX

# A

DEPTH IN FEET	PENETRAT. RESIST. BLWS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>BH 1</u>		WELL CONSTRUCTION	PID HEADSPACE (PPM)
				DATE DRILLED <u>9/26/95</u>	WATER LEVEL (ATD) <u>17.0'</u>		
				EQUIPMENT <u>MOBILE B-57 HSA</u> DRILLER <u>HAZMAT</u>			
SOIL DESCRIPTION							
1				3" ASPHALT Sandy Gravel base material			
2				FILL Stiff, moist, yellow-brown, Gravelly CLAY (CL)			
3							
4							
5							
6							
7							
8							
9							
10							
11		BH1-10 1140		-No sample			
12							
13							
14				-Becomes gray, strong odor			
15	30	BH1-15 1145		Stiff, very moist, gray, Silty CLAY, trace gravel (CL)			2
16							
17				Dense, wet, brown, fine grained, rounded, poorly graded GRAVEL (GP)			
18							
19				ALLUVIUM Very dense, wet, brown, Clayey, fine to coarse GRAVEL (fine to coarse gravel with clay matrix) (GC)			
20	75	BH1-20 1155					<1
21							
22				BORING TERMINATED AT 21.5 FEET			
23							
24							

Figure A-1, log of Boring BH 1

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: <b>Cement Bent. 0-21.5 ft.</b>
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: <b>IAN MOORHEAD</b>

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLMS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>BH 2</u>		WELL CONSTRUCTION	PID HEADSPACE (PPM)	
				DATE DRILLED <u>9/26/95</u>	WATER LEVEL (ATD) <u>8.0'</u>			
				EQUIPMENT <u>MOBILE B-57 HSA</u>	DRILLER <u>HAZMAT</u>			
SOIL DESCRIPTION								
1			3" ASPHALT					
2			Sandy GRAVEL base material					
3			ALLUVIUM					
4			Stiff, moist, black, clay, medium to high plasticity (CL)					
5	95	BH2-5	Oil staining - strong odor					
6		1515					1252	
7			Very dense, wet, black, Clayey, fine to coarse GRAVEL (GC)					
8			Strong odor					
9								
10	29	BH2-10						
11		1520	Stiff, wet, dark brown to black, CLAY, medium to high plasticity (CL)				88	
12								
13								
14								
15	34	BH2-15	Medium dense, wet, olive-brown, Clayey, fine grained SAND (SC)					
16		1525	Very weak odor				19.5	
17								
18								
19			Medium dense, saturated, olive brown, Silty SAND, trace gravel (SM)					
20	27	BH2-20						
21		1530					1.0	
22	BORING TERMINATED AT 21.5 FEET							
23								
24								

Figure A-2, log of Boring BH 2

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: Cement Bent. 0-21.5 ft.
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLWS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>BH 3</u>		WELL CONSTRUCTION	FID HEADSPACE (PPH)
				DATE DRILLED <u>9/26/95</u>	WATER LEVEL (ATD) <u>9.0'</u>		
				EQUIPMENT <u>MOBILE B-57 HSA</u>	DRILLER <u>HAZMAT</u>		
SOIL DESCRIPTION							
1				3" ASPHALT			
2				Sandy GRAVEL base material			
3				ALLUVIUM			
4				Stiff, moist, black, Silty CLAY, strong odor, trace gravel (CL)			
5	16	BH3-5		Oil staining - Strong odor			
6		1335					
7							
8				-Higher gravel content (10-20%)			
9				-Becomes wet			
10	22	BH3-10					74
11		1340					
12				Stiff, wet, gray to olive brown, mottled, CLAY, moderate odor (CL)			
13							
14							
15	17	BH3-15					26
16		1345		-Very weak odor			
17							
18							
19				Loose, saturated, brown, Clayey, fine to coarse GRAVEL (gravel with clay matrix) (GC)			
20	8	BH3-20					8
21		1350					
22				BORING TERMINATED AT 21.5 FEET			
23							
24							

Figure A-3, log of Boring BH 3

H8GR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: <b>Cement Bent. 0-21.5 ft.</b>
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: <b>IAN MOORHEAD</b>

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLWS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>BH 4</u>		WELL CONSTRUCTION	PID HEADSPACE (PPM)
				DATE DRILLED <u>9/26/95</u>	WATER LEVEL (ATD) <u>10.0'</u>		
				EQUIPMENT <u>MOBILE B-57 HSA</u> DRILLER <u>HAZMAT</u>			
SOIL DESCRIPTION							
1			3" ASPHALT				
2			FILL Coarse angular GRAVEL, with sand matrix (GP)				
3							
4			ALLUVIUM Stiff, moist, black, CLAY, trace silt, trace gravel, medium to high plasticity (CL) Strong odor				22
5	8	BH4-5 1420					
6							
7							
8							
9							
10	22	BH4-10 1425	-Becomes wet -Weak odor				1.0
11							
12							
13							
14			Dense, wet, yellow-brown, Clayey, fine to coarse GRAVEL (fine to coarse gravel with clay matrix) (GC)				<1
15	43	BH4-15 1430					
16							
17							
18							
19			Very dense, saturated, brown, poorly graded, fine to coarse GRAVEL, trace silt, clay (GP) (>50% fine gravel)				<1
20	63	BH4-20 1435					
21							
22							
23							
24							
				BORING TERMINATED AT 21.5 FEET			

Figure A-4, log of Boring BH 4

NBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: <b>Cement Bent. 0-21.5 ft.</b>
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: <b>IAN MOORHEAD</b>

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

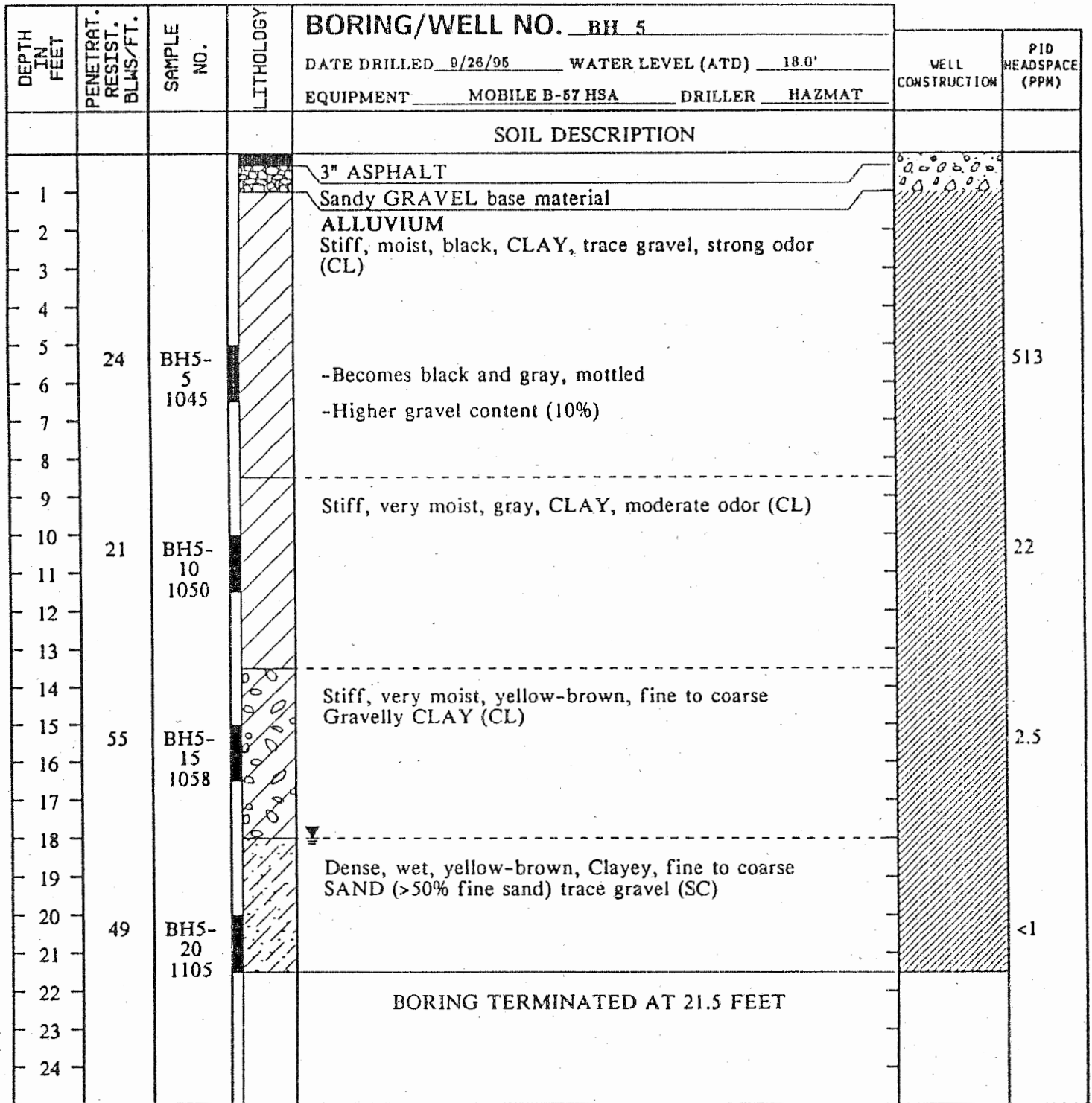


Figure A-5, log of Boring BH 5

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: <b>Cement Bent. 0-21.5 ft.</b>
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: <b>IAN MOORHEAD</b>

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.


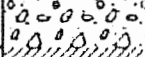


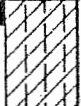


DEPTH IN FEET	PENETRAT. RESIST. BLMS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>BH 6</u>		WELL CONSTRUCTION	PID HEADSPACE (PPM)
				DATE DRILLED <u>9/26/95</u>	WATER LEVEL (ATD) <u>8.0'</u>		
				EQUIPMENT <u>MOBILE B-57 HSA</u>	DRILLER <u>HAZMAT</u>		
SOIL DESCRIPTION							
1				3" ASPHALT			
2				Sandy GRAVEL base material			
3				FILL SOIL			
4				Stiff, moist, black, gravelly CLAY, medium high plasticity, strong odor (CL)			
5	11	BH6-5 0938		ALLUVIUM			6
6				Stiff, moist, black, CLAY, medium high plasticity (CL)			
7				-Oil staining, strong odor			
8							
9				-Becomes wet			
10	31	BH6-10 0945					4
11				Stiff, saturated, gray, Silty CLAY, trace gravel, strong odor (CL)			
12							
13							
14							
15	60	BH6-15 1000					<1
16				Stiff, saturated, dark yellow-brown, Clayey, fine to coarse GRAVEL (gravel with clay matrix) weak odor (GC)			
17							
18							
19							
20	65	BH6-20 1005					<1
21				Very dense, saturated, brown, Clayey, fine to coarse SAND, trace gravel (fine to coarse SAND with clay matrix) (SC)			
22				BORING TERMINATED AT 21.5 FEET			
23							
24							

Figure A-6, log of Boring BH 6

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL:
DIAMETER & TYPE OF CASING:	WELL SEAL & INTERVAL:
CASING INTERVAL:	WELL SEAL QUANTITY:
WELL SCREEN:	ANNULUS SEAL/INTERVAL: <b>Cement Bent. 0-21.5 ft.</b>
SCREEN INTERVAL:	ADDITIVES:
WELL COVER:	WELL DEPTH:
FILTERPACK/INTERVAL:	ENGINEER/GEOLOGIST: <b>IAN MOORHEAD</b>

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. BH6		SOIL (USCS)	HEADSPACE (PPM)	
				DATE DRILLED 12/26/01	WATER LEVEL (ATD) 4.75'			
				EQUIPMENT GEOPROBE DRILLER VIRONEX				
SOIL DESCRIPTION								
1			3 INCHES ASPHALT Gravel backfill			GP		
2								
3								
4			Soft, wet, brown (10YR 4/3) Silty SAND with gravel			SM	0	
5			Saturated gravel backfill			GP		
6								
7								
8								
9			Saturated, crushed asphalt				0	
10			BORING TERMINATED AT 10 FEET  BORING LOCATED IN FORMER UST PIT COLLECTED GRAB GROUNDWATER SAMPLE					

Figure A1, Log of Boring BH6, page 1 of 1

BORING ELEVATION: NA	ENGINEER/GEOLOGIST: MATT HANKO
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NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



PROJECT NO. E8100-06-13

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. BH7		SOIL (USCS)	HEADSPACE (PPM)
				DATE DRILLED 12/26/01	WATER LEVEL (ATD) 12'		
				EQUIPMENT	GEOPROBE	DRILLER	VIRONEX
SOIL DESCRIPTION							
			1 FOOT ASPHALT/BASE				
1				Very soft, slightly moist, dark brown (10YR 3/2), Sandy SILT		ML	
2							
3							
4							
5							
6			Firm, moist, black (10YR 2/1) Clayey SILT, highly organic			OH	0
7							
8							
9							
10							
11		BH7-11	Soft, moist, dark yellowish brown (10YR 4/6), Sandy SILT			ML	
12			Loose, saturated, dark yellowish brown (10YR 4/6), coarse Silty SAND			SM	
13							
14							
15			Interlayers of saturated coarse SAND with gravel and stiff Silty CLAY			SP/CL	0
16							
17							
18							
19							
20				BORING TERMINATED AT 20 FEET			
				COLLECTED GRAB GROUNDWATER SAMPLE			

Figure A2, Log of Boring BH7, page 1 of 1

ENV\_NO\_WELL HEGEN.GPJ 01/07/02

BORING ELEVATION: NA	ENGINEER/GEOLOGIST: MATT HANKO
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NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. E8100-06-13

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	<b>BORING NO. BH8</b>		SOIL (USCS)	HEADSPACE (PPM)
				DATE DRILLED <u>12/26/01</u>	WATER LEVEL (ATD) <u>11.5'</u>		
				EQUIPMENT <u>GEOPROBE</u>	DRILLER <u>VIRONEX</u>		
SOIL DESCRIPTION							
			1 FOOT ASPHALT/BASE				
1			Very stiff, slightly moist, brown (10YR 4/3), Sandy CLAY with coarse sand			CL	
2			Firm slightly moist, gray (10YR 4/1), Sandy SILT			ML	
3							
4							
5		NO REC	NO REC				
6							
7			Loose, wet, dark gray (10YR 4/1), Silty SAND			SM	0
8			Firm, moist, black (10YR 2/1), Silty CLAY			CL	
9							
10							
11			▽				
12			Very firm, slightly moist, light olive brown (2.5Y 5/4), Silty CLAY			CL	
13							
14							
15							
BORING TERMINATED AT 15 FEET COLLECTED GRAB GROUNDWATER SAMPLE							

Figure A3, Log of Boring BH8, page 1 of 1

ENV\_NO\_WELL HEGEN.GPJ 01/07/02

BORING ELEVATION: <b>NA</b>	ENGINEER/GEOLOGIST: <b>MATT HANKO</b>
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NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. E8100-06-13

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. BH9		SOIL (USCS)	HEADSPACE (PPM)
				DATE DRILLED <u>12/26/01</u>	WATER LEVEL (ATD) <u>7.5'</u>		
				EQUIPMENT _____	GEOPROBE _____	DRILLER <u>VIRONEX</u>	
SOIL DESCRIPTION							
1			1 FOOT ASPHALT/BASE				
2			Firm, slightly moist, dark brown (10YR 3/3), Silty CLAY			CL	
3							
4			Soft, moist, gray (10YR 5/1), Clayey SILT			ML	
5							
6							
7		BH9-6.5	▽ Loose, saturated, dark gray (10YR 4/1), fine Silty SAND			SM	
8			Firm, moist, very dark brown (10YR 2/2), Silty CLAY			CL	
9							
10			Loose, saturated, dark gray (10YR 4/1), coarse SAND			SP	
11			Firm, moist, dark gray (10YR 4/1), Silty CLAY			CL	
12							
13							
14							
15							
				BORING TERMINATED AT 15 FEET			
				COLLECTED GRAB GROUNDWATER SAMPLE			

Figure A4, Log of Boring BH9, page 1 of 1

ENV\_NO\_WELL HEGEN.GPJ 01/07/02

BORING ELEVATION: <b>NA</b>	ENGINEER/GEOLOGIST: <b>MATT HANKO</b>
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NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLMS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. <u>MW 1</u>		WELL CONSTRUCTION	PID HEADSPACE (PPM)	
				DATE DRILLED <u>9/27/95</u>	WATER LEVEL (ATD) <u>19.0'</u>			
				EQUIPMENT <u>MOBILE B-57</u> DRILLER <u>HAZMAT</u>				
SOIL DESCRIPTION								
1			3" ASPHALT					
2			FILL SOIL Sandy GRAVEL base material					
3			Medium dense, moist, brown, Clayey, fine to coarse GRAVEL (GC)					
4			ALLUVIUM Stiff, moist, black, CLAY, 10% gravel, medium plasticity, oil staining, strong odor (CL)					
5	40	MW1-5 1015					1356	
6								
7								
8								
9								
10	13	MW1-10 1025					22	
11			-Becomes very moist, rootlets, very weak odor					
12								
13			▼					
14			Stiff, wet, olive brown, brown mottled CLAY, medium to high plasticity, trace weathered gravel clasts (CL)					
15	18	MW1-15 1035					<1	
16								
17								
18								
19	21						<1	
20		MW1-20 1050						
21			BORING TERMINATED AT 20 FEET					
22								
23								
24								

Figure A-7, log of Boring MW 1

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL: 8 - 100lb Bags
DIAMETER & TYPE OF CASING: 4" Dia. PVC	WELL SEAL & INTERVAL: Bentonite Chlps 2-4.0 ft.
CASING INTERVAL: 0 - 4.5 ft.	WELL SEAL QUANTITY: 1.0 - 50lb Bag
WELL SCREEN: 0.02"	ANNULUS SEAL/INTERVAL: Cement Bent. 0-2.0 ft.
SCREEN INTERVAL: 4.5 to 19.5 ft.	ADDITIVES: None
WELL COVER: 12" Traffic Rated Cover	WELL DEPTH: 19.5 ft.
FILTERPACK/INTERVAL: #3 Sand 4.0 to 19.5 ft.	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLWS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. MW 2		WELL CONSTRUCTION	PID HEADSPACE (PPM)
				DATE DRILLED 9/27/95	WATER LEVEL (ATD) 13.5'		
				EQUIPMENT MOBILE B-57 DRILLER HAZMAT			
SOIL DESCRIPTION							
1			3" ASPHALT				
2			Sandy GRAVEL base material				
3			ALLUVIUM				
4			Stiff, moist, black, CLAY, trace of fine to coarse GRAVEL, strong odor (CL)				
5	13	MW2-5 1600					
6							
7							
8							8
9				-Becomes dark gray			
10	15	MW2-10 1605					
11				-No recovery			
12							
13							
14							
15	35	MW2-15 1615		Dense, wet, olive brown and orange brown, Silty SAND, very weak odor (SM)			1
16							
17							
18							
19	32	MW2-20 1625		Dense, saturated, brown, medium coarse SAND trace silt (SP)			<1
20							
21				BORING TERMINATED AT 20 FEET			
22							
23							
24							

Figure A-8, log of Boring MW 2

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL: 6.5 - 100lb Bags
DIAMETER & TYPE OF CASING: 4" Dia. PVC	WELL SEAL & INTERVAL: Bentonite Chips 2-4.0 ft.
CASING INTERVAL: 0 - 5.0 ft.	WELL SEAL QUANTITY: 1.0 - 50lb Bag
WELL SCREEN: 0.02"	ANNULUS SEAL/INTERVAL: Cement Bent. 0-2.0 ft.
SCREEN INTERVAL: 5 to 20 ft.	ADDITIVES: None
WELL COVER: 12" Traffic Rated Cover	WELL DEPTH: 20 ft.
FILTERPACK/INTERVAL: #3 Sand 4.0 to 20 ft.	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLHS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. MW 3		WELL CONSTRUCTION	PID HEADSPACE (PPH)	
				DATE DRILLED 9/27/95	WATER LEVEL (ATD) 13.0'			
				EQUIPMENT	MOBILE B-57	DRILLER	HAZMAT	
SOIL DESCRIPTION								
1			3" ASPHALT					
2			Sandy GRAVEL base material					
3			ALLUVIUM					
4			Stiff, moist, black CLAY, medium plasticity, moderate odor (CL)					
5	40	MW3-5						
6		1400		-No recovery			6	
7		MW3-8		-Trace fine to coarse gravel				
8		1406						
9								
10	16	MW3-10					5.5	
11		1414		-Weak odor				
12								
13								
14			Medium dense, wet, light olive brown, Silty SAND (SM)					
15	12	MW3-15					<1	
16		1425						
17								
18			Medium dense, saturated, gray, fine grained SAND, trace silt (SP)					
19								
20	18	MW3-20					<1	
21		1430						
22	BORING TERMINATED 21.5 FEET							
23								
24								

Figure A-9, log of Boring MW 3

HBGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL: 7 - 100lb Bags
DIAMETER & TYPE OF CASING: 4" Dia. PVC	WELL SEAL & INTERVAL: Bentonite Chips 2-4.0 ft.
CASING INTERVAL: 0 - 4.5 ft.	WELL SEAL QUANTITY: 1.0 - 50lb Bag
WELL SCREEN: 0.02"	ANNULUS SEAL/INTERVAL: Cement Bent. 0-2.0 ft.
SCREEN INTERVAL: 4.5 to 19.5 ft.	ADDITIVES: None
WELL COVER: 12" Traffic Rated Cover	WELL DEPTH: 19.5 ft.
FILTERPACK/INTERVAL: #3 Sand 4.0 to 19.5 ft.	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	PENETRAT. RESIST. BLHS/FT.	SAMPLE NO.	LITHOLOGY	BORING/WELL NO. MW 4		WELL CONSTRUCTION	PID HEADSPACE (PPM)	
				DATE DRILLED 9/27/95	WATER LEVEL (ATD) 13.0'			
				EQUIPMENT MOBILE B-57		DRILLER HAZMAT		
SOIL DESCRIPTION								
1			3" ASPHALT					
2			FILL SOIL					
3			Medium dense, moist, brown, Clayey, fine to coarse subangular gravel					
4			ALLUVIUM					
5	50/6"	MW4-5	Stiff, very moist, orange-brown and gray, mottled CLAY, medium-high plasticity (CL)				<1	
6		0805						
7			Dense, wet, gray-black, Clayey, fine to coarse GRAVEL, strong odor (gravel with clay matrix) (GC)					
8								
9			Stiff, wet, black, gravelly CLAY, strong odor (CL)					
10	23	MW4-10					26	
11		0816						
12								
13								
14			Stiff, wet dark olive-brown CLAY, medium to high plasticity, trace of gravel, pinhole structures, very weak odor (CL)				<1	
15	25	MW4-15						
16		0824						
17								
18								
19			Medium dense, saturated, brown, Silty SAND, trace clay (SM)					
20								
21	14	MW4-20						
22		0832	-Very poor recovery (slough)					
23			BORING TERMINATED AT 21.5 FEET					
24								

Figure A-10, log of Boring MW 4

HDGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL: 7 - 100lb Bags
DIAMETER & TYPE OF CASING: 4" Dia. PVC	WELL SEAL & INTERVAL: Bentonite Chlps 2-3.5 ft.
CASING INTERVAL: 0 - 4.0 ft.	WELL SEAL QUANTITY: 1.0 - 50lb Bag
WELL SCREEN: 0.02"	ANNULUS SEAL/INTERVAL: Cement Bent. 0-2.0 ft.
SCREEN INTERVAL: 4.0 to 19.0 ft.	ADDITIVES: None
WELL COVER: 12" Traffic Rated Cover	WELL DEPTH: 19.0 ft.
FILTERPACK/INTERVAL: #3 Sand 3.5 to 19.0 ft.	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

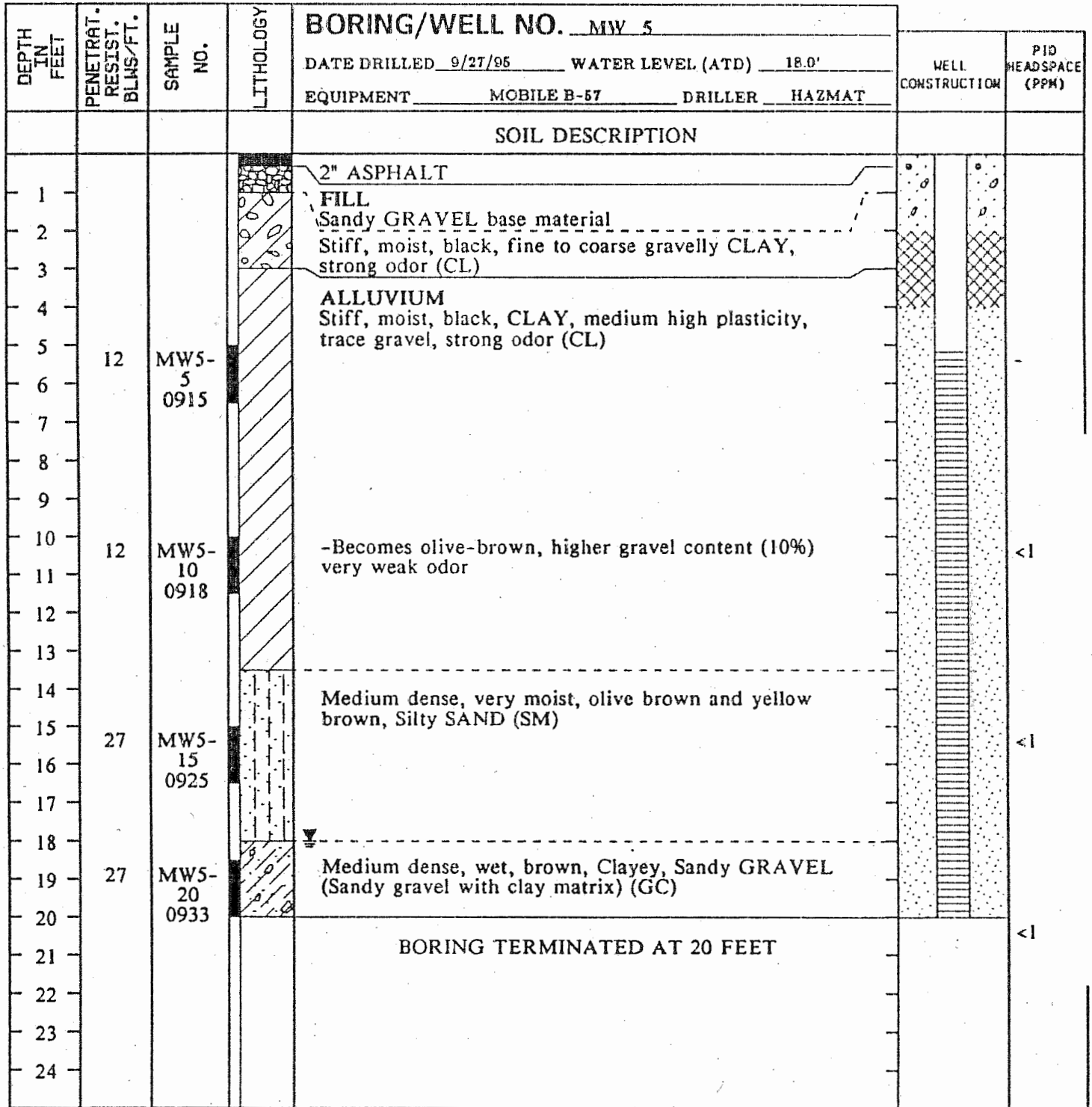


Figure A-11, log of Boring MW 5

HQGR

CASING ELEVATION:	QUANTITY OF FILTER MATERIAL: 6-3/4 - 100lb Bags
DIAMETER & TYPE OF CASING: 4" Dia. PVC	WELL SEAL & INTERVAL: Bentonite Chips 2-4.0 ft.
CASING INTERVAL: 0 - 5.0 ft.	WELL SEAL QUANTITY: 1.0 - 50lb Bag
WELL SCREEN: 0.02"	ANNULUS SEAL/INTERVAL: Cement Bent. 0-2.0 ft.
SCREEN INTERVAL: 5.0 to 20.0 ft.	ADDITIVES: None
WELL COVER: 12" Traffic Rated Cover	WELL DEPTH: 20.0 ft.
FILTERPACK/INTERVAL: #3 Sand 4.0 to 20.0 ft.	ENGINEER/GEOLOGIST: IAN MOORHEAD

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



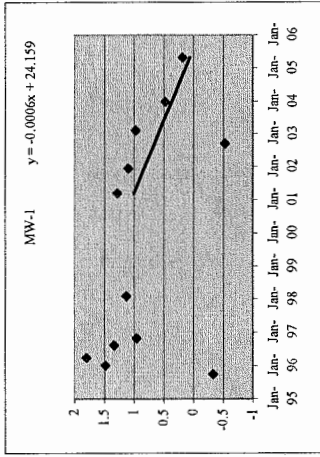
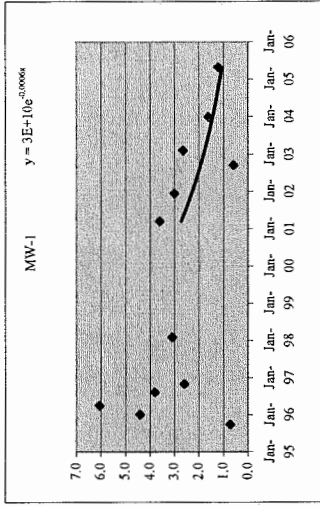
APPENDIX

**B**

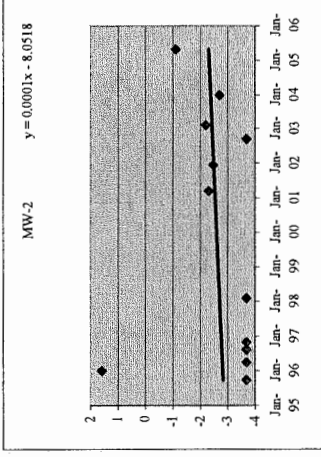
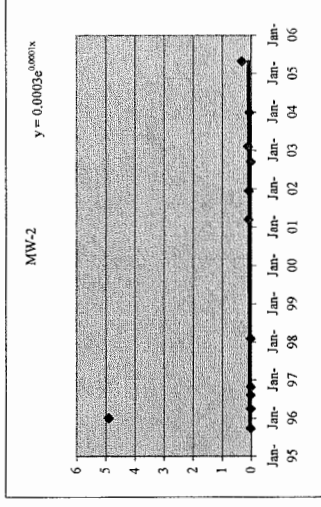
Well Date TPHg (mg/l) TPHg (mg/l) ln(TPHg) (mg/l)

half-life = 1155 days = 3.16 years

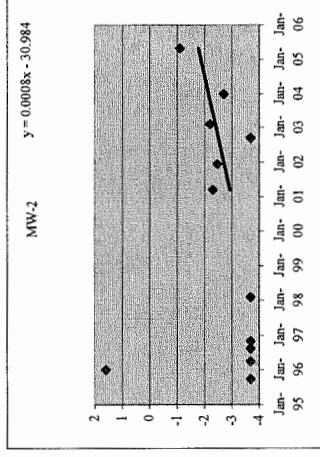
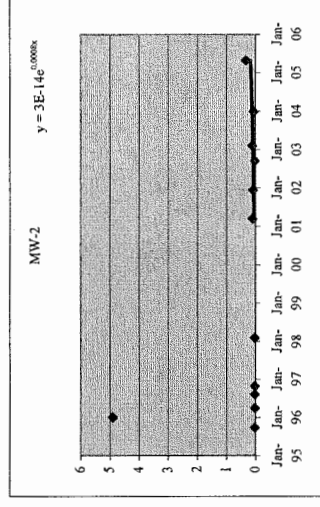
Well	Date	TPHg (mg/l)	TPHg (mg/l)	ln(TPHg) (mg/l)
MW-1	10/11/1995	0.72	0.72	-0.328504067
	1/17/1996	4.4	4.4	1.481604541
	4/16/1996	6.05	6.05	1.800058272
	8/26/1996	3.8	3.8	1.335001067
	11/14/1996	2.6	2.6	0.95511445
	2/18/1998	3.1	3.1	1.131402111
	3/30/2001	3.6	3.6	1.280933845
	12/26/2001	3.0	3.0	1.098612289
	9/30/2002	0.59	0.59	-0.527632742
	2/20/2003	2.65	2.65	0.97455964
	1/12/2004	1.61	1.61	0.476234179
	5/12/2005	1.2	1.2	0.182321557



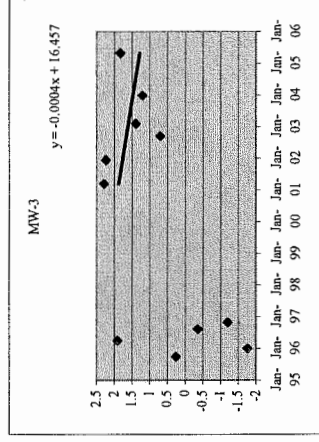
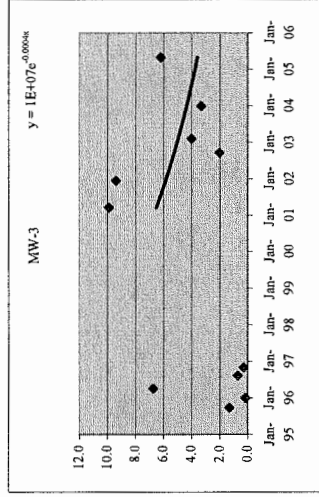
Well	Date	TPHg (mg/l)	TPHg (mg/l)	ln(TPHg) (mg/l)
MW-2	10/11/1995	< 0.05	0.025	-3.688879454
	1/17/1996	4.9	4.9	1.589235205
	4/16/1996	< 0.05	0.025	-3.688879454
	8/26/1996	< 0.05	0.025	-3.688879454
	11/14/1996	< 0.05	0.025	-3.688879454
	2/18/1998	< 0.05	0.025	-3.688879454
	3/30/2001	< 0.20	0.1	-2.302585093
	12/26/2001	0.085	0.085	-2.465104022
	9/30/2002	< 0.05	0.025	-3.688879454
	2/20/2003	0.11	0.11	-2.207274913
	1/12/2004	0.067	0.067	-2.703062666
	5/12/2005	0.33	0.33	-1.108662625



Well	Date	TPHg (mg/l)	TPHg (mg/l)	ln(TPHg) (mg/l)
MW-2	10/11/1995	< 0.05	0.025	-3.688879454
	1/17/1996	4.9	4.9	1.589235205
	4/16/1996	< 0.05	0.025	-3.688879454
	8/26/1996	< 0.05	0.025	-3.688879454
	11/14/1996	< 0.05	0.025	-3.688879454
	2/18/1998	< 0.05	0.025	-3.688879454
	3/30/2001	< 0.20	0.1	-2.302585093
	12/26/2001	0.085	0.085	-2.465104022
	9/30/2002	< 0.05	0.025	-3.688879454
	2/20/2003	0.11	0.11	-2.207274913
	1/12/2004	0.067	0.067	-2.703062666
	5/12/2005	0.33	0.33	-1.108662625

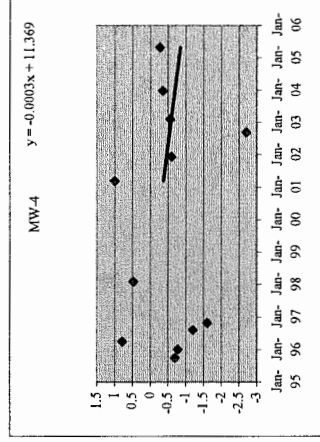
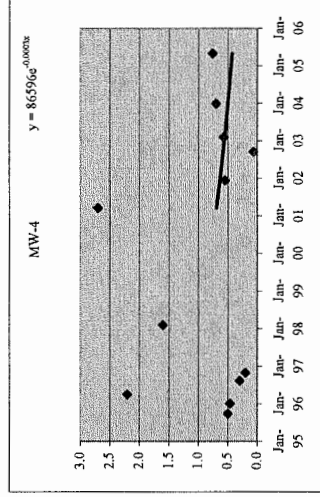


half-life = 1733 days = 4.74 years



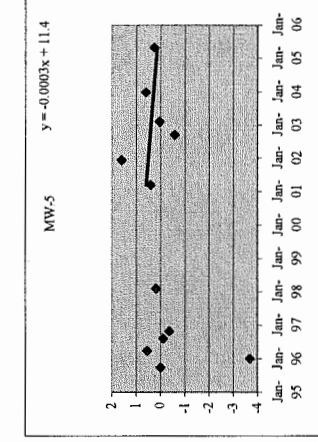
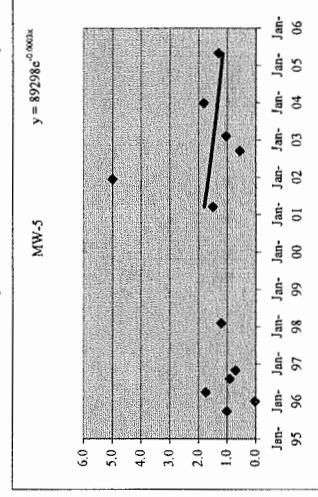
MW-3	10/11/1995	1.3	0.262364264
	1/17/1996	0.2	-1.766091722
	4/16/1996	6.74	1.908059925
	8/26/1996	0.7	-0.356674944
	11/14/1996	0.3	-1.203972804
	2/18/1998	11	2.397895273
	3/30/2001	9.9	2.292534757
	12/26/2001	9.4	2.240709689
	9/30/2002	2.02	0.703097511
	2/20/2003	4.01	1.388791241
	1/12/2004	3.32	1.199964783
	5/12/2005	6.2	1.824549292

half-life = 2310 days = 6.33 years



MW-4	10/11/1995	0.5	-0.693147181
	1/17/1996	0.46	-0.778705069
	4/16/1996	2.20	0.78845736
	8/28/1996	0.30	-1.203972804
	11/14/1996	0.20	-1.609437912
	2/18/1998	1.60	0.470003629
	3/30/2001	2.7	0.993251773
	12/26/2001	0.6	-0.597837001
	9/30/2002	0.067	-2.70306266
	2/20/2003	0.57	-0.562118918
	1/12/2004	0.70	-0.356674944
	5/12/2005	0.76	-0.274436846

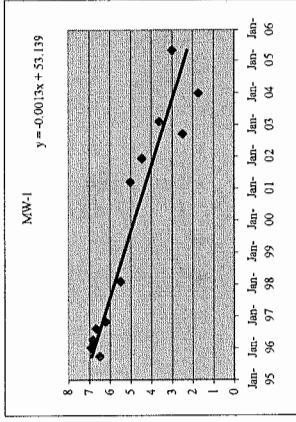
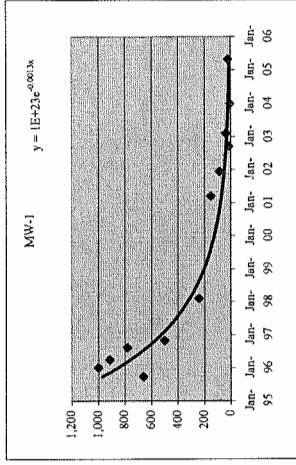
half-life = 2310 days = 6.33 years



MW-5	10/11/1995	1.0	0
	1/17/1996	< 0.05	-3.688879454
	4/16/1996	1.74	0.553885113
	8/26/1996	0.90	-0.105360516
	11/14/1996	0.70	-0.356674944
	2/18/1998	1.20	0.182321557
	3/30/2001	1.5	0.405465108
	12/26/2001	5.0	1.609437912
	9/30/2002	0.56	-0.579818495
	2/20/2003	1.04	0.039220713
	1/12/2004	1.82	0.598836501
	5/12/2005	1.3	0.262364264

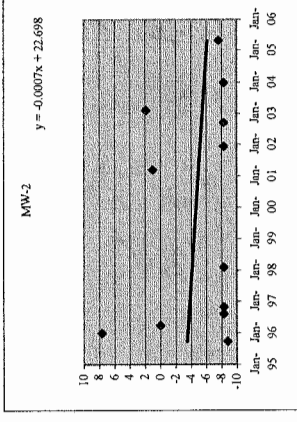
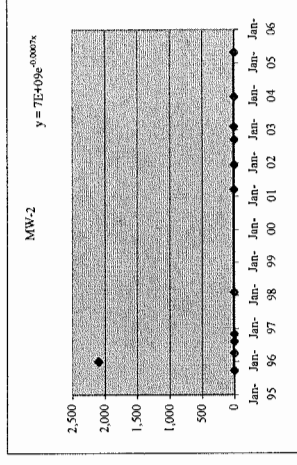
Well	Date	Benzene (ug/l)	Benzene (ug/l)	ln(Benzene) (ug/l)
MW-1	10/11/1995	0.66	660	6.492239835
	1/17/1996	1.00	1,000	6.907755279
	4/16/1996	0.914	914	6.817830571
	8/26/1996	0.780	780	6.65929392
	11/14/1996	0.500	500	6.214608098
	2/18/1998	0.240	240	5.480638923
	3/30/2001	0.150	150	5.010635294
	12/26/2001	0.086	86	4.454347296
	9/30/2002	0.012	12	2.48490665
	2/20/2003	0.0369	36.9	3.608211551
1/12/2004	0.0056	5.6	1.722766598	
5/12/2005	0.020	20	2.995732274	

half-life = 533 days = 1.46 years



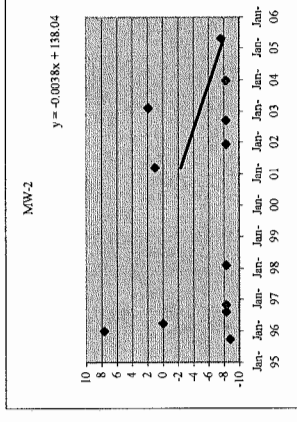
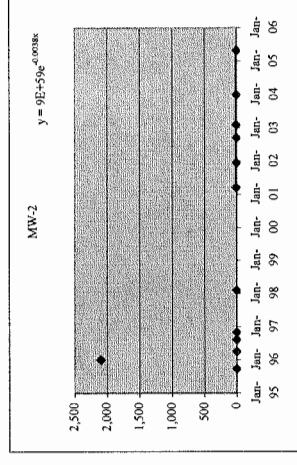
MW-2	10/11/1995	<0.0003	0.00015	-8.804875264
	1/17/1996	2.10	2,100	7.649692624
	4/16/1996	0.0010	1	0
	8/26/1996	<0.0005	0.00025	-8.29404964
	11/14/1996	<0.0005	0.00025	-8.29404964
	2/18/1998	<0.0005	0.00025	-8.29404964
	3/30/2001	0.0027	2.7	0.993251773
	12/26/2001	<0.0005	0.00025	-8.29404964
	9/30/2002	<0.0005	0.00025	-8.29404964
	2/20/2003	0.0066	6.6	1.887069649
1/12/2004	<0.0005	0.00025	-8.29404964	
5/12/2005	<0.001	0.00050	-7.60090246	

half-life = 990 days = 2.71 years



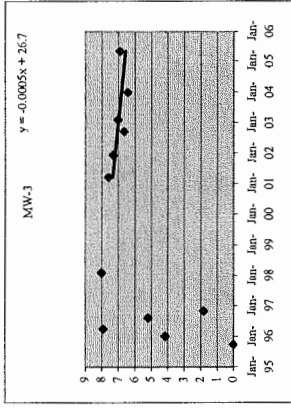
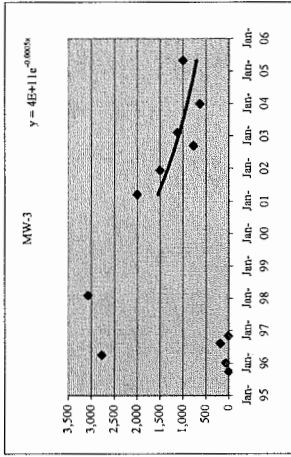
MW-2	10/11/1995	<0.0003	0.00015	-8.804875264
	1/17/1996	2.10	2,100	7.649692624
	4/16/1996	0.0010	1	0
	8/26/1996	<0.0005	0.00025	-8.29404964
	11/14/1996	<0.0005	0.00025	-8.29404964
	2/18/1998	<0.0005	0.00025	-8.29404964
	3/30/2001	0.0027	2.7	0.993251773
	12/26/2001	<0.0005	0.00025	-8.29404964
	9/30/2002	<0.0005	0.00025	-8.29404964
	2/20/2003	0.0066	6.6	1.887069649
1/12/2004	<0.0005	0.00025	-8.29404964	
5/12/2005	<0.001	0.00050	-7.60090246	

half-life = 182 days = 0.50 years



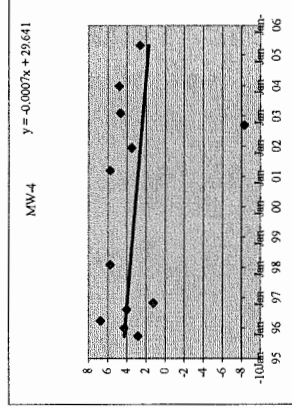
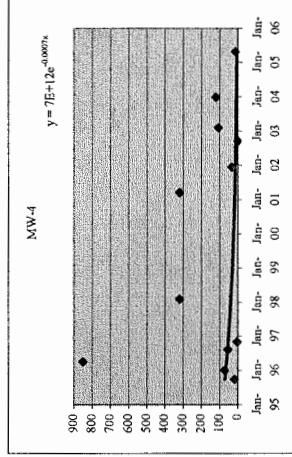
Well	Date	Benzene (ug/l)	Benzene (ug/l)	ln(Benzene) (ug/l)
MW-3	10/11/1995	0.0010	1	0
	1/17/1996	0.064	64	4.158883083
	4/16/1996	2.770	2,770	7.926602599
	8/26/1996	0.180	180	5.192956851
	11/14/1996	0.0062	6	1.824549292
	2/18/1998	3.070	3,070	8.029432841
	3/30/2001	2.00	2,000	7.60090246
	12/26/2001	1.50	1,500	7.313220387
	9/30/2002	0.775	775	6.652863029
	2/20/2003	1.120	1,120	7.021083964
1/12/2004	0.632	632	6.448889394	
5/12/2005	1.00	1,000	6.907755279	

half-life = 1386 days = 3.80 years



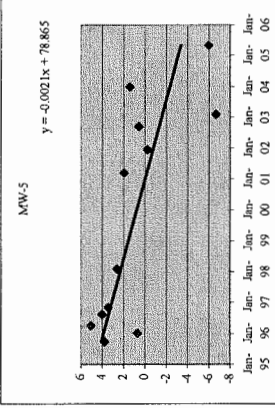
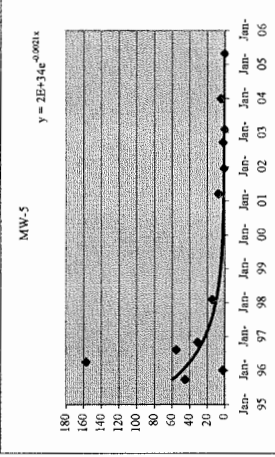
Well	Date	Benzene (ug/l)	Benzene (ug/l)	ln(Benzene) (ug/l)
MW-4	10/11/1995	0.017	17	2.833213344
	1/17/1996	0.072	72	4.276666119
	4/16/1996	0.851	851	6.746412129
	8/26/1996	0.065	55	4.007333185
	11/14/1996	0.0034	3.4	1.223775432
	2/18/1998	0.320	320	5.768320996
	3/30/2001	0.320	320	5.768320996
	12/26/2001	0.033	33	3.496507561
	9/30/2002	<0.0005	0.00025	-8.29404964
	2/20/2003	0.107	107	4.672828834
	1/12/2004	0.122	122	4.804021045
	5/12/2005	0.014	14	2.63905733

half-life = 990 days = 2.71 years



Well	Date	Benzene (ug/l)	Benzene (ug/l)	ln(Benzene) (ug/l)
MW-5	10/11/1995	0.045	45	3.80666249
	1/17/1996	0.002	2	0.693147181
	4/16/1996	0.157	157	5.056245805
	8/26/1996	0.055	55	4.007333185
	11/14/1996	0.031	31	3.433987204
	2/18/1998	0.014	14	2.63905733
	3/30/2001	0.0072	7.2	1.974081026
	12/26/2001	0.0008	0.8	-0.223143551
	9/30/2002	0.0018	1.8	0.587786665
	2/20/2003	<0.0025	0.00125	-6.684611728
	1/12/2004	0.0042	4.2	1.435084525
	5/12/2005	<0.005	0.0025	-5.991464547

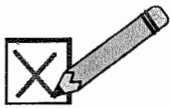
half-life = 330 days = 0.90 years



APPENDIX

C

## 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, <i>primary</i> source of a chemical of concern, such as a leaking container, tank or pipe? (This does <i>not</i> include residual sources.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Is there any mobile or potentially-mobile free product?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Are there more than five chemicals of concern at the site at a concentration greater than the lowest applicable Oakland RBCA level?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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 <i>not</i> *	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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 <i>and</i> 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	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Are there any immediate, acute health risks to humans associated with contamination at the site, including explosive levels of a chemical?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

\*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.

## Tier 1 Default Inputs

		Residential		Commercial/ Industrial
Input Parameters	Units	Child	Adult	Worker
<b>Soil-Specific Parameters</b>				
Capillary fringe thickness	cm	=adult residential	5	=adult residential
Capillary fringe air content	cm <sup>3</sup> /cm <sup>3</sup>		0.038	
Capillary fringe water content	cm <sup>3</sup> /cm <sup>3</sup>		0.342	
Fraction organic carbon (FOC*)	g oc/g soil		0.01	
Groundwater Darcy velocity	cm/yr		6	
Groundwater mixing zone thickness	cm		1524	
Infiltration rate through the vadose zone	cm/yr		3	
Soil bulk density	g/cm <sup>3</sup>		1.70	
Soil to skin adherence factor	mg/cm <sup>2</sup>	0.5	0.5	0.5
Total soil porosity	cm <sup>3</sup> /cm <sup>3</sup>	=adult residential	0.38	=adult residential
Vadose zone air content	cm <sup>3</sup> /cm <sup>3</sup>		0.26	
Vadose zone water content	cm <sup>3</sup> /cm <sup>3</sup>		0.12	
Vadose zone thickness	cm		295	
<b>Structural and Climatic Parameters</b>				
Areal fraction of cracks in building foundation	cm <sup>2</sup> /cm <sup>2</sup>	=adult residential	0.001	0.001
Foundation air content	cm <sup>3</sup> /cm <sup>3</sup>		0.26	=adult residential
Foundation water content	cm <sup>3</sup> /cm <sup>3</sup>		0.12	
Foundation thickness	cm		15	15
Lower depth of surficial soil zone	cm		100.0	=adult residential
Depth to subsurface soil sources	cm		100	
Depth to groundwater	cm		300	
Width of source area parallel to wind or groundwater flow direction	cm		1500	
Outdoor air mixing zone height	cm		200	
Particulate emission rate	g/cm <sup>2</sup> -s		1.38E-11	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s		322	=adult residential



## Tier 1 Default Inputs

Input Parameters	Units	Residential		Commercial/ Industrial
		Child	Adult	Worker
<b>Exposure Parameters</b>				
Averaging time for carcinogens	yr	=adult residential	70	=adult residential
Averaging time for non-carcinogens	yr	6	24	25
Averaging time for vapor flux	s	=adult residential	9.46E+08	7.88E+08
Body weight	kg	15	70	70
Building air volume/floor area	cm <sup>3</sup> /cm <sup>2</sup>	=adult residential	229	305
Exposure duration	yr	6	24	25
Exposure frequency	d/yr	350	350	250
Exposure frequency to water used for recreation	d/yr	120	120	0
Exposure time to indoor air	hr/d	24	24	9
Exposure time to outdoor air	hr/d	16	16	9
Exposure time to water used for recreation	hr/d	2	1.0	0
Groundwater ingestion rate	L/d	1	2	1
Indoor air exchange rate	1/s	=adult residential	5.60E-04	1.40E-03
Indoor inhalation rate	m <sup>3</sup> /d	10	15	20
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0
Outdoor inhalation rate	m <sup>3</sup> /d	10	20	20
Skin surface area exposed to soil	cm <sup>2</sup>	2000	5000	5000
Skin surface area exposed to water used for recreation	cm <sup>2</sup>	8000	20000	0
Soil ingestion rate	mg/d	200	100	50
<b>TARGET RISK LEVELS</b>				
Individual Excess Lifetime Cancer Risk	unitless	=adult residential	1.0E-06	1.0E-06
Hazard quotient	unitless		1.0	1.0

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00	2.5E-02	
			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	7.9E-02	
			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	SAT	
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00		
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+00	SAT	
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.9E-01	SAT	
			Hazard	SAT	SAT	5.0E+03	SAT				7.6E+00		
		Commercial/ Industrial	Carcinogenic							SAT	7.3E-01	SAT	
			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	6.2E+00
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	4.4E+00	1.2E+02		2.1E-03	6.2E+00	
		Commercial/ Industrial	Carcinogenic					4.4E+00	1.2E+02	2.9E+00	2.1E-03	6.2E+00	
			Hazard	SAT	SAT	2.4E+00	SAT	4.4E+00	1.2E+02		2.1E-03	6.2E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.1E-01	>SOL	
			Hazard	>SOL	>SOL	2.0E+04	>SOL				3.7E+00		
		Commercial/ Industrial	Carcinogenic							>SOL	1.8E+00	>SOL	
			Hazard	>SOL	>SOL	5.8E+05	>SOL				1.1E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00	>SOL	
			Hazard	>SOL	>SOL	2.1E+05	>SOL				2.2E+02		
		Commercial/ Industrial	Carcinogenic							>SOL	2.1E+01	>SOL	
			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	2.0E-04
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
		Commercial/ Industrial	Carcinogenic					5.0E-02	1.0E+00	2.4E-04	1.0E-03	2.0E-04	
			Hazard	>SOL	>SOL	1.0E+01	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03	1.1E-06	
			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

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis(2-ethylhexyl)-phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-01		2.5E-01	4.5E+03	3.6E+01		2.1E+03	
			Hazard		2.1E+02		3.7E+02	1.0E+03	1.0E+04	3.7E+01	1.2E+03
		Commercial/ Industrial	Carcinogenic	7.9E-01		7.9E-01	1.7E+04	1.1E+02		7.9E+03	
			Hazard		1.4E+03		6.8E+03	6.8E+03	6.8E+04	6.8E+02	6.4E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			1.1E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT				3.3E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			3.8E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT				2.2E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.1E+00		2.1E+00	9.6E+00	3.7E+03		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	2.9E+00
		Commercial/ Industrial	Carcinogenic	8.9E+00		8.9E+00	9.6E+00	1.6E+04		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	1.9E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			2.1E+00	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL				6.2E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			1.7E+02	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL				9.6E+02
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-05		5.6E-05	4.0E-03	8.0E-03		5.0E-03	
			Hazard		>SOL		4.0E-03	3.1E-01	>SOL	5.0E-03	1.6E+00
		Commercial/ Industrial	Carcinogenic	2.4E-04		2.4E-04	4.0E-03	3.4E-02		5.0E-03	
			Hazard		>SOL		4.0E-03	>SOL	>SOL	5.0E-03	1.0E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05		1.2E-05		5.1E-02			
			Hazard		>SOL		2.0E+00	>SOL	>SOL	2.0E-01	9.4E+00

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)	Cresol(-o)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.8E+00		9.1E+00		1.3E+00	2.5E+00				
			Hazard	3.3E+01	7.9E+02	4.8E+02	7.4E+04	3.7E+02		2.8E+03	2.6E+03	2.6E+03	
		Commercial/ Industrial	Carcinogenic	5.6E+00		2.9E+01		8.7E+00	7.9E+00				
			Hazard	2.1E+02	4.7E+03	3.0E+03	1.4E+06	6.8E+03		5.0E+04	1.7E+04	1.7E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.7E-02		3.3E-01			SAT				
			Hazard	4.6E-01	6.2E-01	1.2E+01				SAT	SAT	SAT	
		Commercial/ Industrial	Carcinogenic	4.3E-01		5.2E+00			SAT				
			Hazard	1.3E+01	1.8E+01	3.5E+02					SAT	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	7.6E-02		9.2E-01			SAT				
			Hazard	1.5E+00	2.1E+00	4.1E+01					SAT	SAT	
		Commercial/ Industrial	Carcinogenic	2.9E-01		3.5E+00			SAT				
			Hazard	8.8E+00	1.2E+01	2.4E+02					SAT	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.0E-03	6.6E-02	1.5E-01		2.9E+00	SAT	2.8E-01			
			Hazard	3.0E-03	6.6E-02	1.5E-01	8.5E+07	2.9E+00		2.8E-01	2.2E+00	2.3E+00	
		Commercial/ Industrial	Carcinogenic	3.0E-03	6.6E-02	1.5E-01		2.9E+00	SAT	2.8E-01			
			Hazard	3.0E-03	6.6E-02	1.5E-01	5.6E+08	2.9E+00		2.8E-01	1.5E+01	1.5E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.6E-02		7.5E-01			>SOL				
			Hazard	2.7E-01	2.4E+00	2.8E+01				>SOL	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	2.6E-01		1.2E+01			>SOL				
			Hazard	7.8E+00	6.9E+01	8.0E+02					>SOL	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+00		3.4E+01			>SOL				
			Hazard	2.2E+01	2.0E+02	1.5E+03					>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	4.2E+00		1.3E+02			>SOL				
			Hazard	1.3E+02	>SOL	>SOL					>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	5.6E-04	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.6E+01	5.0E-02		1.3E+00	7.8E-01	7.8E-01	
		Commercial/ Industrial	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.0E+02	5.0E-02		1.3E+00	5.1E+00	5.1E+00	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-03		3.9E-02		6.8E-03	1.6E-04				
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00	6.4E+00	

\*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)	Dichloro ethene (trans 1,2)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			7.4E-02	4.7E+01	3.9E+00	4.9E-01			
			Hazard	2.6E+02	3.0E+03		4.9E+03	1.4E+02	4.3E+02	4.8E+02	9.5E+02	
		Commercial/ Industrial	Carcinogenic			2.3E-01	1.5E+02	1.2E+01	1.5E+00			
			Hazard	1.7E+03	5.5E+04		3.1E+04	8.8E+02	2.7E+03	3.0E+03	6.1E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	8.6E-01	1.7E-01	9.4E-03			
			Hazard	SAT			1.3E+02	6.8E+00	3.0E+00	1.4E+01	1.9E+01	
		Commercial/ Industrial	Carcinogenic			SAT	1.4E+01	2.7E+00	1.5E-01			
			Hazard	SAT			SAT	2.0E+02	8.7E+01	4.1E+02	5.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	2.4E+00	4.8E-01	2.6E-02			
			Hazard	SAT			4.5E+02	2.3E+01	9.9E+00	4.7E+01	6.2E+01	
		Commercial/ Industrial	Carcinogenic			SAT	9.1E+00	1.8E+00	1.0E-01			
			Hazard	SAT			SAT	1.3E+02	5.8E+01	2.8E+02	3.6E+02	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic			6.0E+00	1.9E+00	6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
			Hazard	2.1E-01	6.0E+00		6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02	
		Commercial/ Industrial	Carcinogenic			6.0E+00	8.0E+00	6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
			Hazard	1.4E+00	6.0E+00		6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.3E+00	7.2E-01	1.4E-02			
			Hazard	>SOL			3.6E+02	2.9E+01	4.3E+00	3.5E+01	3.2E+01	
		Commercial/ Industrial	Carcinogenic			>SOL	3.6E+01	1.1E+01	2.2E-01			
			Hazard	>SOL			>SOL	8.3E+02	1.2E+02	1.0E+03	9.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	1.1E+02	1.8E+01	9.3E-01			
			Hazard	>SOL			>SOL	8.6E+02	3.5E+02	1.6E+03	2.0E+03	
		Commercial/ Industrial	Carcinogenic			>SOL	4.0E+02	6.9E+01	3.5E+00			
			Hazard	>SOL			>SOL	5.0E+03	2.0E+03	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic			2.0E-01	1.6E-05	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	7.8E-02	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02	
		Commercial/ Industrial	Carcinogenic			2.0E-01	7.0E-05	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	5.1E-01	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			1.4E-06	2.1E-01	2.4E-02	1.3E-03			
			Hazard	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	

\*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a) anthracene (7,12)	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	1.6E+03	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	1.0E+04	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		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	<i>8.0E+00</i>	<i>7.8E-05</i>		
			Hazard	SAT	2.0E+00	3.9E+06	SAT			<i>8.0E+00</i>	<i>7.8E-05</i>	SAT	
		Commercial/ Industrial	Carcinogenic					2.9E-03	SAT	<i>8.0E+00</i>	<i>7.8E-05</i>		
			Hazard	SAT	1.3E+01	SAT	SAT			<i>8.0E+00</i>	<i>7.8E-05</i>	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	<i>7.0E-01</i>	<i>5.0E-05</i>		
			Hazard	>SOL	3.1E-01	1.6E+00	>SOL			<i>7.0E-01</i>	<i>5.0E-05</i>	>SOL	
		Commercial/ Industrial	Carcinogenic					9.2E-04	1.1E-02	<i>7.0E-01</i>	<i>5.0E-05</i>		
			Hazard	>SOL	2.0E+00	1.0E+01	>SOL			<i>7.0E-01</i>	<i>5.0E-05</i>	>SOL	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					6.4E-03	>SOL		5.9E-04		
			Hazard	>SOL	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

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-naphthalene (2-)	MTBE	Naphthalene	
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	2.0E+03	
		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	1.3E+04	
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	SAT	
		Commercial/ Industrial	Carcinogenic		SAT					2.0E+01			
			Hazard	SAT		SAT	SAT	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	SAT	
		Commercial/ Industrial	Carcinogenic		SAT				1.3E+01				
			Hazard	SAT		2.3E+02	SAT	SAT	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	3.2E-01				3.1E-03		7.6E-03	1.2E+00
			Hazard	2.6E+02		3.2E-01	1.7E+00	3.3E+00	3.1E-03	1.6E+02	7.6E-03	1.2E+00	
		Commercial/ Industrial	Carcinogenic		SAT	3.2E-01				3.1E-03		7.6E-03	1.2E+00
			Hazard	SAT		3.2E-01	1.1E+01	2.2E+01	3.1E-03	1.1E+03	7.6E-03	1.2E+00	
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	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL					1.1E+02			
			Hazard	>SOL		7.6E+00	>SOL	>SOL	>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	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL				8.7E+02				
			Hazard	>SOL		9.5E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	6.3E-01		2.0E-03	7.8E+00	9.4E+00	5.0E-03	6.3E-01	1.3E-02	2.0E-02	
		Commercial/ Industrial	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	>SOL		2.0E-03	5.1E+01	6.1E+01	5.0E-03	4.1E+00	1.3E-02	2.0E-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	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



Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver	Stryene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.4E+04	5.5E+02	5.0E-02				2.8E+02				
			Hazard	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02	3.7E+02	9.8E+03	
		Commercial/ Industrial	Carcinogenic	1.3E+05	1.7E+03	1.8E-01				8.9E+02				
			Hazard	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03	6.8E+03	6.3E+04	
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	2.0E+01	2.9E-01	4.7E+00				1.2E-01	7.7E-01	2.5E+00	2.4E+00	
			Hazard	2.0E+01		4.7E+00	SAT	1.0E+01	SAT		7.7E-01	2.5E+00	2.4E+00	
		Commercial/ Industrial	Carcinogenic	2.0E+01	1.2E+00	4.7E+00				5.3E-01	7.7E-01	2.5E+00	2.4E+00	
			Hazard	2.0E+01		4.7E+00	SAT	6.7E+01	SAT		7.7E-01	2.5E+00	2.4E+00	
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	1.0E-01	1.3E-01	5.0E-04				6.7E-02	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	9.4E+00	>SOL		5.0E-02	1.0E-01	1.0E-01	
		Commercial/ Industrial	Carcinogenic	1.0E-01	5.7E-01	5.0E-04				2.9E-01	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	6.1E+01	>SOL		5.0E-02	1.0E-01	1.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.8E+00	1.6E-06				2.6E+00				
			Hazard	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00	2.1E+00	9.3E+00	

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water



Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Tetrachloroethane (1,1,2,2-)	Tetrachloroethylene (PCE)	Tetraethyl Lead	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride
Surficial Soil [mg/kg]	Ingestion/Dermal/Inhalation	Residential	Carcinogenic	1.0E+00	5.7E+00				3.8E+00	1.9E+01		5.0E-01
			Hazard	1.2E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02	2.9E+02	5.2E+02	
		Commercial/Industrial	Carcinogenic	3.1E+00	1.8E+01				1.2E+01	5.9E+01		1.6E+00
			Hazard	7.9E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03	1.8E+03	9.5E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.4E-01	3.0E-01				5.4E-01	1.1E+00		1.3E-03
			Hazard	1.0E+03	1.2E+01		3.6E+02	2.6E+02	3.1E+01	1.3E+01		
		Commercial/Industrial	Carcinogenic	1.2E+01	4.8E+00				8.7E+00	1.7E+01		2.1E-02
			Hazard	SAT	SAT		SAT	SAT	8.9E+02	3.6E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.1E+00	8.4E-01				1.5E+00	3.0E+00		3.7E-03
			Hazard	SAT	4.1E+01		SAT	8.7E+02	1.0E+02	4.2E+01		
		Commercial/Industrial	Carcinogenic	7.8E+00	3.2E+00				5.8E+00	1.1E+01		1.4E-02
			Hazard	SAT	2.4E+02		SAT	SAT	5.9E+02	2.4E+02		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02		6.5E-04
			Hazard	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02	3.3E+02	6.5E-04
		Commercial/Industrial	Carcinogenic	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02		6.5E-04
			Hazard	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02	2.2E+03	6.5E-04
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.5E-01	2.0E-01				9.9E-01	6.9E-01		3.7E-03
			Hazard	1.0E+03	8.4E+00		2.1E+02	2.4E+02	5.6E+01	8.1E+00		
		Commercial/Industrial	Carcinogenic	1.2E+01	3.3E+00				1.6E+01	1.1E+01		5.9E-02
			Hazard	>SOL	>SOL		>SOL	>SOL	1.6E+03	2.3E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+01	1.3E+01				2.2E+01	4.1E+01		2.5E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	1.5E+03	5.7E+02		
		Commercial/Industrial	Carcinogenic	4.1E+01	5.1E+01				8.4E+01	1.5E+02		9.6E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	1.1E-01	5.0E-04
		Commercial/Industrial	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	7.2E-01	5.0E-04
Water Used for Recreation [mg/l]	Ingestion/Dermal	Residential	Carcinogenic	4.5E-03	6.0E-03				1.8E-02	4.6E-03		2.6E-03
			Hazard	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00	

\*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		
			Hazard	5.4E+04	2.2E+04
Commercial/ Industrial		Carcinogenic			
		Hazard	3.0E+05	4.1E+05	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	<i>1.3E+01</i>	
			Hazard	<i>1.3E+01</i>	8.8E+02
Commercial/ Industrial		Carcinogenic	<i>1.3E+01</i>		
		Hazard	<i>1.3E+01</i>	5.8E+03	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	4.7E+00
Commercial/ Industrial		Carcinogenic	<i>1.8E+00</i>		
		Hazard	<i>1.8E+00</i>	3.1E+01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		
			Hazard	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

**Tier 3  
Clayey Silts Default Parameters (modified)**

		Residential		Commercial/ Industrial
Input Parameters	Units	Child	Adult	Worker
<b>Soil-Specific Parameters</b>				
Capillary fringe thickness	cm	=adult residential	152	=adult residential
Capillary fringe air content	cm <sup>3</sup> /cm <sup>3</sup>		0.010	
Capillary fringe water content	cm <sup>3</sup> /cm <sup>3</sup>		0.49	
Fraction organic carbon (FOC*)	g oc/g soil		0.02	
Groundwater Darcy velocity	cm/yr		6	
Groundwater mixing zone thickness	cm		1524	
Infiltration rate through the vadose zone	cm/yr		3	
Soil bulk density	g/cm <sup>3</sup>		1.33	
Soil to skin adherence factor	mg/cm <sup>2</sup>	1	1	1
Total soil porosity	cm <sup>3</sup> /cm <sup>3</sup>	=adult residential	0.5	=adult residential
Vadose zone air content	cm <sup>3</sup> /cm <sup>3</sup>		0.1	
Vadose zone water content	cm <sup>3</sup> /cm <sup>3</sup>		0.4	
Vadose zone thickness	cm		244	
<b>Structural and Climatic Parameters</b>				
Areal fraction of cracks in building foundation	cm <sup>2</sup> /cm <sup>2</sup>	=adult residential	0.001	0.001
Foundation air content	cm <sup>3</sup> /cm <sup>3</sup>		0.26	=adult residential
Foundation water content	cm <sup>3</sup> /cm <sup>3</sup>		0.12	
Foundation thickness	cm		15	15
Lower depth of surficial soil zone	cm		100.0	=adult residential
Depth to subsurface soil sources	cm		152	
Depth to groundwater	cm		396	
Width of source area parallel to wind or groundwater flow direction	cm		1500	
Outdoor air mixing zone height	cm		200	
Particulate emission rate	g/cm <sup>2</sup> -s		1.38E-11	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s		322	=adult residential

**Tier 3  
Clayey Silts Default Parameters (modified)**

		Residential		Commercial/ Industrial
Input Parameters	Units	Child	Adult	Worker
<b>Exposure Parameters</b>				
Averaging time for carcinogens	yr	=adult residential	70	=adult residential
Averaging time for non-carcinogens	yr	6	24	25
Averaging time for vapor flux	s	=adult residential	9.46E+08	7.88E+08
Body weight	kg	15	70	70
Building air volume/floor area	cm <sup>3</sup> /cm <sup>2</sup>	=adult residential	229	305
Exposure duration	yr	6	24	25
Exposure frequency	d/yr	350	350	250
Exposure frequency to water used for recreation	d/yr	120	120	0
Exposure time to indoor air	hr/d	24	24	9
Exposure time to outdoor air	hr/d	16	16	9
Exposure time to water used for recreation	hr/d	2	1.0	0
Groundwater ingestion rate	L/d	1	2	1
Indoor air exchange rate	1/s	=adult residential	5.60E-04	1.40E-03
Indoor inhalation rate	m <sup>3</sup> /d	10	15	20
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0
Outdoor inhalation rate	m <sup>3</sup> /d	10	20	20
Skin surface area exposed to soil	cm <sup>2</sup>	2000	5000	5000
Skin surface area exposed to water used for recreation	cm <sup>2</sup>	8000	20000	0
Soil ingestion rate	mg/d	200	100	50
<b>TARGET RISK LEVELS</b>				
Individual Excess Lifetime Cancer Risk	unitless	=adult residential	1.0E-05	1.0E-05
Hazard quotient	unitless		1.0	1.0

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					2.6E+00		1.7E+00	1.9E+01	1.7E-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	4.3E-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	2.1E+00	SAT	
			Hazard	SAT	SAT	6.5E+03	SAT			SAT	6.9E+00		
		Commercial/ Industrial	Carcinogenic							SAT	3.3E+01	SAT	
			Hazard	SAT	SAT	1.9E+05	SAT				2.0E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	2.5E+02	SAT	
			Hazard	SAT	SAT	1.9E+05	SAT				9.9E+02		
		Commercial/ Industrial	Carcinogenic							SAT	9.5E+02	SAT	
			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	1.2E+01
			Hazard	4.0E+02	2.7E+02	1.5E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
		Commercial/ Industrial	Carcinogenic					4.4E+00	1.3E+02	5.8E+01	4.5E-03	1.2E+01	
			Hazard	SAT	SAT	9.7E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	5.9E+00	>SOL	
			Hazard	>SOL	>SOL	2.2E+04	>SOL			>SOL	2.0E+01		
		Commercial/ Industrial	Carcinogenic							>SOL	9.3E+01	>SOL	
			Hazard	>SOL	>SOL	6.4E+05	>SOL				5.7E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	>SOL	>SOL	
			Hazard	>SOL	>SOL	>SOL	>SOL			>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic							>SOL	>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	2.0E-04
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
		Commercial/ Industrial	Carcinogenic					5.0E-02	1.0E+00	2.4E-03	1.0E-03	2.0E-04	
			Hazard	>SOL	>SOL	1.0E+01	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02	1.1E-05	
			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

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis(2-ethylhexyl)-phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.7E+00		1.7E+00	4.5E+04	2.4E+02		2.1E+04		
			Hazard		1.6E+02		3.6E+02	7.8E+02	7.8E+03	3.6E+01	1.4E+03	
		Commercial/ Industrial	Carcinogenic	4.3E+00		4.3E+00	1.7E+05	6.2E+02		7.9E+04		
			Hazard		7.4E+02		5.1E+03	3.7E+03	3.7E+04	5.1E+02	6.5E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT				
			Hazard		SAT		SAT			3.2E+00		
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT				
			Hazard		SAT		SAT			9.4E+01		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT				
			Hazard		SAT		SAT			4.8E+02		
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT				
			Hazard		SAT		SAT			SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT		SAT	9.6E+00	7.3E+04			1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	6.0E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT	9.6E+00	SAT			1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	3.9E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL				
			Hazard		>SOL		>SOL			2.6E+01		
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL				
			Hazard		>SOL		>SOL			7.7E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL				
			Hazard		>SOL		>SOL			>SOL		
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL				
			Hazard		>SOL		>SOL			>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-04		5.6E-04	4.0E-03	8.0E-02			5.0E-03	
			Hazard		>SOL		4.0E-03	3.1E-01	>SOL	5.0E-03	1.6E+00	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL	4.0E-03	>SOL			5.0E-03	
			Hazard		>SOL		4.0E-03	>SOL	>SOL	5.0E-03	1.0E+01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-04		1.2E-04		>SOL				
			Hazard		>SOL		2.0E+00	>SOL	>SOL	2.0E-01	9.4E+00	

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)	Cresol(-o)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.2E+01		6.2E+01		1.2E+01	1.7E+01				
			Hazard	2.6E+01	6.6E+02	3.7E+02	7.1E+04	3.6E+02		2.6E+03	1.9E+03	1.9E+03	
		Commercial/ Industrial	Carcinogenic	3.3E+01		1.6E+02		6.6E+01	4.3E+01				
			Hazard	1.2E+02	3.1E+03	1.8E+03	1.0E+06	5.1E+03		3.8E+04	9.2E+03	9.2E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.4E-01		1.0E+01			SAT				
			Hazard	1.2E+00	2.1E+00	3.8E+01				SAT	SAT		
		Commercial/ Industrial	Carcinogenic	1.2E+01		1.6E+02			SAT				
			Hazard	3.6E+01	6.1E+01	1.1E+03				SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	9.2E+01		1.2E+03			SAT				
			Hazard	1.8E+02	3.1E+02	5.5E+03				SAT	SAT		
		Commercial/ Industrial	Carcinogenic	3.5E+02		4.7E+03			SAT				
			Hazard	1.1E+03	SAT	SAT				SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	5.9E-03	1.6E-01	3.4E-01		2.9E+00	SAT	1.2E+00			
			Hazard	5.9E-03	1.6E-01	3.4E-01	8.5E+07	2.9E+00		1.2E+00	4.8E+00	5.0E+00	
		Commercial/ Industrial	Carcinogenic	5.9E-03	1.6E-01	3.4E-01		2.9E+00	SAT	1.2E+00			
			Hazard	5.9E-03	1.6E-01	3.4E-01	5.6E+08	2.9E+00		1.2E+00	3.2E+01	3.3E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	3.3E+00		3.3E+01			>SOL				
			Hazard	5.6E+00	5.5E+01	1.2E+02				>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	5.3E+01		5.2E+02			>SOL				
			Hazard	1.6E+02	>SOL	3.5E+03				>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	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.6E+01	5.0E-02		1.3E+00	7.8E-01	7.8E-01	
		Commercial/ Industrial	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.0E+02	5.0E-02		1.3E+00	5.1E+00	5.1E+00	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-02		3.9E-01		6.8E-02	>SOL				
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00	6.4E+00	

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)	Dichloro ethene (trans 1,2)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			4.9E-01	3.3E+02	2.7E+01	3.3E+00			
			Hazard	1.9E+02	2.8E+03		3.8E+03	1.1E+02	3.3E+02	3.7E+02	7.4E+02	
		Commercial/ Industrial	Carcinogenic			1.3E+00	8.7E+02	7.1E+01	8.5E+00			
			Hazard	9.2E+02	4.1E+04		1.8E+04	5.1E+02	1.6E+03	1.8E+03	3.5E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	2.7E+01	5.9E+00	2.5E-01			
			Hazard	SAT			4.2E+02	2.3E+01	8.0E+00	4.5E+01	5.5E+01	
		Commercial/ Industrial	Carcinogenic			SAT	4.3E+02	9.4E+01	4.0E+00			
			Hazard	SAT			SAT	6.8E+02	2.3E+02	1.3E+03	1.6E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	3.2E+03	6.3E+02	3.1E+01			
			Hazard	SAT			SAT	3.0E+03	1.2E+03	SAT	7.9E+03	
		Commercial/ Industrial	Carcinogenic			SAT	SAT	2.4E+03	1.2E+02			
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic			6.2E+00	3.8E+01	1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
			Hazard	4.6E-01	6.2E+00		1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02	
		Commercial/ Industrial	Carcinogenic			6.2E+00	1.6E+02	1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
			Hazard	3.0E+00	6.2E+00		1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	1.0E+02	1.6E+01	2.4E+00			
			Hazard	>SOL			1.6E+03	6.5E+01	7.5E+01	1.2E+02	1.8E+02	
		Commercial/ Industrial	Carcinogenic			>SOL	1.6E+03	2.6E+02	3.8E+01			
			Hazard	>SOL			>SOL	1.9E+03	2.2E+03	>SOL	5.3E+03	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	>SOL	4.1E+03	9.6E+02			
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL	>SOL	>SOL			
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic			2.0E-01	1.6E-04	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	7.8E-02	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02	
		Commercial/ Industrial	Carcinogenic			2.0E-01	7.0E-04	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	5.1E-01	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			1.4E-05	2.1E+00	2.4E-01	1.3E-02			
			Hazard	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00	

\*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water



Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a) anthracene (7,12)	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	1.2E+03	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	5.6E+03	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		8.0E+00		
			Hazard		SAT	SAT	SAT			SAT	2.2E+00	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT		SAT	1.3E+02	
			Hazard		SAT	SAT	SAT			SAT	6.5E+01	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					SAT	SAT		SAT	6.9E+02	
			Hazard		SAT	SAT	SAT			SAT	2.3E+02	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT		SAT	2.6E+03	
			Hazard		SAT	SAT	SAT			SAT	1.3E+03	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic						1.5E-02	SAT	1.6E+01	1.8E-04	
			Hazard	SAT	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	SAT	2.8E+01	SAT	SAT			1.6E+01	1.8E-04	SAT	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		9.4E+00		
			Hazard		>SOL	>SOL	>SOL			>SOL	2.6E+00	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		>SOL	1.5E+02	
			Hazard		>SOL	>SOL	>SOL			>SOL	7.6E+01	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic						>SOL	>SOL		1.7E+03	
			Hazard		>SOL	>SOL	>SOL			>SOL	5.5E+02	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		>SOL		
			Hazard		>SOL	>SOL	>SOL			>SOL	3.2E+03	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic						2.2E-03	>SOL	7.0E-01	5.0E-05	
			Hazard	>SOL	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	>SOL	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	>SOL	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

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD) pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-naphthalene (2-)	MTBE	Naphthalene	
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	1.6E+03	
		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	7.4E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				4.6E+01				
			Hazard	SAT		1.7E+01	1.9E+05	2.5E+04	2.7E+03	SAT	1.6E+04	SAT	
		Commercial/ Industrial	Carcinogenic		SAT					7.3E+02			
			Hazard	SAT		SAT	SAT	SAT	SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT				5.3E+03				
			Hazard	SAT		2.5E+03	SAT	SAT	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT					SAT			
			Hazard	SAT		1.4E+04	SAT	SAT	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	<i>3.2E-01</i>				8.2E-03		<i>2.1E-02</i>	<i>2.4E+00</i>
			Hazard	5.2E+02		<i>3.2E-01</i>	7.1E+00	1.1E+01	8.2E-03	3.2E+02	<i>2.1E-02</i>	<i>2.4E+00</i>	
		Commercial/ Industrial	Carcinogenic		SAT	<i>3.2E-01</i>				8.2E-03		<i>2.1E-02</i>	<i>2.4E+00</i>
			Hazard	SAT		<i>3.2E-01</i>	4.7E+01	7.3E+01	8.2E-03	2.1E+03	<i>2.1E-02</i>	<i>2.4E+00</i>	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				2.0E+02				
			Hazard	>SOL		1.5E+00	6.5E+05	6.8E+04	1.2E+04	>SOL	4.0E+04	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL					3.2E+03			
			Hazard	>SOL		4.3E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL				>SOL				
			Hazard	>SOL		6.3E+02	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL					>SOL			
			Hazard	>SOL		3.7E+03	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	<i>2.0E-03</i>				5.0E-03		<i>1.3E-02</i>	<i>2.0E-02</i>
			Hazard	6.3E-01		<i>2.0E-03</i>	7.8E+00	9.4E+00	5.0E-03	6.3E-01	<i>1.3E-02</i>	<i>2.0E-02</i>	
		Commercial/ Industrial	Carcinogenic		>SOL	<i>2.0E-03</i>				5.0E-03		<i>1.3E-02</i>	<i>2.0E-02</i>
			Hazard	>SOL		<i>2.0E-03</i>	5.1E+01	6.1E+01	5.0E-03	4.1E+00	<i>1.3E-02</i>	<i>2.0E-02</i>	
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	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

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver	Stryene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.4E+05	3.7E+03	3.6E-01				2.0E+03				
			Hazard	1.4E+03		9.8E-01	1.2E+04	2.3E+04	1.2E+03		3.6E+02	3.6E+02	7.7E+03	
		Commercial/ Industrial	Carcinogenic	1.3E+06	9.9E+03	1.1E+00				5.1E+03				
			Hazard	2.0E+04		5.8E+00	5.6E+04	1.1E+05	5.6E+03		5.1E+03	5.1E+03	3.7E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT	1.7E+03				6.7E+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				6.0E+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	2.0E+01	6.5E+00	9.4E+00				2.8E+00	8.0E-01	2.6E+00	4.8E+00	
			Hazard	2.0E+01		9.4E+00	SAT	2.5E+01	SAT		8.0E-01	2.6E+00	4.8E+00	
		Commercial/ Industrial	Carcinogenic	2.0E+01	2.8E+01	9.4E+00				1.2E+01	8.0E-01	2.6E+00	4.8E+00	
			Hazard	2.0E+01		9.4E+00	SAT	1.6E+02	SAT		8.0E-01	2.6E+00	4.8E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL	3.6E-01				4.9E+04				
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				7.9E+05				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL	>SOL				9.3E+05				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				>SOL				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-01	1.3E+00	5.0E-04				6.7E-01	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	9.4E+00	>SOL		5.0E-02	1.0E-01	1.0E-01	
		Commercial/ Industrial	Carcinogenic	1.0E-01	5.7E+00	5.0E-04				2.9E+00	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	6.1E+01	>SOL		5.0E-02	1.0E-01	1.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.8E+01	1.6E-05				2.6E+01				
			Hazard	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00	2.1E+00	9.3E+00	

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Tetrachloroethane (1,1,2,2-)	Tetrachloroethylene (PCE)	Tetraethyl Lead	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	7.2E+00	3.8E+01				2.7E+01	1.3E+02		3.5E+00	
			Hazard	1.0E+03	3.7E+02	3.9E-03	7.1E+03	1.4E+03	1.5E+02	2.2E+02	5.0E+02		
		Commercial/ Industrial	Carcinogenic	1.9E+01	1.0E+02				7.0E+01	3.3E+02		9.1E+00	
			Hazard	4.7E+03	1.8E+03	1.9E-02	3.4E+04	6.5E+03	7.2E+02	1.1E+03	7.2E+03		
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.9E+01	8.5E+00				1.6E+01	3.0E+01		3.3E-02	
			Hazard	2.7E+03	3.5E+01		1.0E+03	7.4E+02	9.1E+01	3.6E+01			
		Commercial/ Industrial	Carcinogenic	3.1E+02	1.3E+02				2.6E+02	4.8E+02		5.3E-01	
			Hazard	SAT	SAT		SAT	SAT	2.7E+03	1.0E+03			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.6E+03	SAT				1.7E+03	3.8E+03		4.1E+00	
			Hazard	SAT	SAT		SAT	SAT	SAT	SAT			
		Commercial/ Industrial	Carcinogenic	5.9E+03	SAT				SAT	SAT		1.6E+01	
			Hazard	SAT	SAT		SAT	SAT	SAT	SAT			
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02		1.1E-03	
			Hazard	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02	3.3E+02	1.1E-03	
			Commercial/ Industrial	Carcinogenic	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02		1.1E-03
				Hazard	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02	2.2E+03	1.1E-03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.2E+01	2.7E+01				2.1E+01	5.5E+01		6.7E-01	
			Hazard	1.6E+03	1.1E+02		>SOL	>SOL	1.2E+02	6.5E+01			
		Commercial/ Industrial	Carcinogenic	1.9E+02	>SOL				3.3E+02	8.8E+02		1.1E+01	
			Hazard	>SOL	>SOL		>SOL	>SOL	3.4E+03	>SOL			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.0E+03	>SOL				>SOL	>SOL		2.7E+02	
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL			
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL				>SOL	>SOL		1.0E+03	
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL			
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04	
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	1.1E-01	5.0E-04	
		Commercial/ Industrial	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04	
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	7.2E-01	5.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.5E-02	6.0E-02				1.8E-01	4.6E-02		2.6E-02	
			Hazard	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00		

\*Italicized concentrations based on California MCLs  
 SAT = RBSL exceeds saturated soil concentration of chemical  
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		
			Hazard	5.3E+04	2.1E+04
Commercial/ Industrial		Carcinogenic			
		Hazard	2.6E+05	3.1E+05	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	<i>2.7E+01</i>	
			Hazard	<i>2.7E+01</i>	8.9E+02
Commercial/ Industrial		Carcinogenic	<i>2.7E+01</i>		
		Hazard	<i>2.7E+01</i>	5.8E+03	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	4.7E+00
Commercial/ Industrial		Carcinogenic	<i>1.8E+00</i>		
		Hazard	<i>1.8E+00</i>	3.1E+01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		
			Hazard	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