

# GeoPlexus, Inc.

Health & Safety Training • Geo/Environmental Personnel • Engineering Geology Consultants • Environmental Management Consultants

September 12, 1996

Walsh Pacific Construction  
EBMUD Adeline Maintenance Facility  
2130-A Adeline Street  
Oakland, CA 94607  
Attn.: Mr. Mike Perotti

Subject: Addendum No. 2 to Materials Management Plan for  
EBMUD Adeline Maintenance Facility, Oakland, CA

Reference. (a) Materials Management Plan for EBMUD Adeline Maintenance Facility,  
Oakland, CA, prepared by Geo Plexus, Inc., dated January 18, 1996

Dear Mr. Perotti


As requested and authorized on July 17, 1996, Geo Plexus, Incorporated is pleased to provide the attached Addendum No. 2 to the Materials Management Plan (MMP), reference (a), for the planned additional investigation activities for the Phase 2 and Phase 3 construction sites at the EBMUD Adeline Maintenance Center (AMC)


Reference (a) presented the general site history and environmental issues for the project, an evaluation of human and environmental risks associated with the known soil contaminants, remedial action criteria for the planned construction phases, and phase-specific guidelines to be implemented to complete the earthwork associated with the construction.

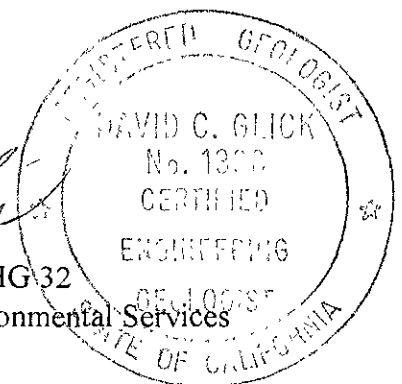
The attached document summarizes the proposed investigation activities to further define and evaluate the known environmental site conditions and to update the current construction excavation and soil disposal plans for the AMC Phase 2 and Phase 3 construction sites. The document also includes a RBCA Tier 1 evaluation for volatile organic and polynuclear aromatic compounds known to be present or anticipated to be encountered in the phase 2 and 3 construction areas which were not addressed in the MMP or Addendum No. 1. Review comments provided by Ms. Eileen Fanelli with EBMUD have been incorporated in this document along with our response to your comments

Should you require additional information or need clarification of any information presented in this document, please contact our office.

Respectfully submitted,  
Geo Plexus, Incorporated

  
Kimberly F. Leeds,  
President

  
David C. Glick, CEG 1338, HG-32  
Director, Geologic and Environmental Services



ENVIRONMENTAL  
PROTECTION  
96 OCT -2 PM 3:49

cc. C95041

**ADDENDUM No. 2 TO  
MATERIALS MANAGEMENT PLAN  
for  
EAST BAY MUNICIPAL UTILITY DISTRICT  
ADELINE MAINTENANCE CENTER  
1200 21st STREET  
OAKLAND, CALIFORNIA**

**INTRODUCTION**

East Bay Municipal Utility District (EBMUD) is constructing a new Adeline Maintenance Center (AMC) at the site of the existing AMC. The AMC site comprises four city blocks, as shown in Figure 1. Walsh Pacific Construction (WPC) has been retained by EBMUD as the design/build contractor for the AMC project which includes demolition of several existing structures, the construction of 5 new buildings, and remodeling of 2 buildings. The construction project will be completed in 3-phases over a 2-year period ending approximately April, 1998. Phase-1 of construction is currently in progress and Phase-2 is scheduled to begin in December, 1996. Phase-3 of the construction is scheduled to begin in October, 1977.

Alameda County Health Department is the lead regulatory agency providing oversight of environmental investigations and remedial activities conducted at the site.

A Materials Management Plan (MMP) for the EBMUD AMC was prepared by Geo Plexus, Inc., (dated January 18, 1996) which presented the general history of the project site, presented an evaluation of human and environmental risks associated with the known soil contaminants, presented remedial action criteria for the planned construction phases, and presented phase-specific guidelines to be implemented to complete the earthwork associated with the construction. Addendum No. 1 was prepared to incorporate responses to comments on the MMP and to address additional characterization and proposed remedial action for the Phase-1 construction site.

The purpose of this Addendum No. 2 to the MMP is to present the work plan for additional investigation activities to further define the extent of soil contamination above the threshold criteria in areas included in the Phase 2 and Phase 3 construction. This document also includes a RBCA Tier 1 evaluation for volatile organic and polynuclear aromatic compounds known to be present or anticipated to be encountered in the phase 2 and 3 construction areas which were not addressed in the MMP or Addendum No. 1.

Figure 2 illustrates the Phase 2 and Phase 3 construction areas, the location of the existing structures, and the location of the planned structures.

### PREVIOUS REMEDIAL ACTION

Six underground storage tanks were excavated and removed from the former gasoline service station located within the Phase 2 construction area in November, 1994 (see Figure 3). The excavation was extended vertically to a depth of 13- to 16-feet below the ground surface. The final excavation boundaries are shown on Figure 4. Residual, near surface soil contamination which could not be excavated at that time remains in-place around the perimeter of the excavation, particularly beneath West Grand Avenue and beneath the existing former service station building. Based on the established threshold criteria, the remaining soil contamination beneath West Grand Avenue does not require excavation; however, the soil beneath the former service station within the footprint of the proposed structure will be required to be removed and disposed/treated.

Perched water was observed seeping from various locations along the side walls of the excavation and along the sand backfill for the various utility lines encountered by the excavation. The water was extracted directly from the excavation by vacuum processes and contained by Erickson, Inc. and manifested as oily water for disposal/recycling. Following removal of this water, the excavation remained dry to depths of 16-feet (limits of excavation).

### PREVIOUS INVESTIGATIVE ACTION

A preliminary site assessment was performed by Geo Plexus, Inc. in 1995 which included advancing 6 borings (B2-1, B2-3, B2-4, B2-5, B2-7, and B2-8) within the Phase 2 project site and 3 exploration borings (B3-2, B3-3, and B3-4) within the Phase 3 project site (see Figure 5). Due to the, then recent, remedial excavation activities the area of known contamination around the former tank excavation and beneath the existing former service station were not included in the investigation.

The soil borings identified the presence of low concentrations of TPH-gas and Volatile Aromatic Compounds (BTEX) and low to moderate concentrations of TPH-diesel and oil and grease compounds beneath the existing auto service building (Borings B3-3 and B3-4). Low concentrations of Tetrachloroethene were also detected in boring B3-3. These two borings were advanced immediately adjacent to existing hydraulic lifts and the compounds are considered to be related to the hydraulic lifts (which are scheduled for removal during site demolition) and not from additional sources (e.g., underground tanks or sumps).

Soil Boring B2-7 was advanced immediately adjacent to the existing underground waste oil tank which is scheduled for removal at the time of building demolition. High concentrations of TPH-diesel, oil and grease compounds, and Volatile Halogenated Compounds were detected in samples obtained at depths of 6- to 7-feet; however, these compounds were not detected in the 9.5- to 10-foot sample. This suggests that the petroleum compounds are bound to the soils and will be directly abated by excavation subsequent to removal of the tank.

Based on the known site conditions, the areas where soil is likely to contain contaminants of concern above threshold criteria for the Phase 2 AMC construction include.

- gasoline and diesel compounds beneath the former service station building; and
- petroleum hydrocarbons and chlorinated solvents beneath the auto shop.

Based on the known site conditions, the areas where soil is likely to contain contaminants of concern above threshold criteria for the Phase 3 AMC construction include:

- diesel and oil and grease compounds beneath the existing waste oil tank; and
- VOC's, PNA's, and heavy metal compounds beneath the existing waste oil tank.

### THRESHOLD CRITERIA

The MMP and the Response to Alameda County Review Comments on the MMP outlined the general soil contaminants and established the threshold criteria for specific petroleum related contaminants of concern at the AMC site. The principal sources of the contaminants of concern include:

- petroleum hydrocarbon fuel compounds (gasoline and diesel)
- used petroleum hydrocarbon compounds (waste oil and grease)
- organic solvents

Table 1 of the MMP, and Addendum No. 1, presented threshold criteria for petroleum related compounds anticipated to be encountered at the AMC. Volatile Organic Compounds (VOC's) and Polynuclear Aromatic Compounds (PNA's) were not anticipated to be encountered in the AMC Phase-1 construction site and were not included in the initial threshold criteria evaluation.

To assess the potential health risk of VOC's and PNA's for the AMC Phase 2 and Phase 3 construction sites, an additional risk based corrective action analysis was performed in accordance with the procedures presented in ASTM E 1739-95. This analysis (included as Appendix 2A) was performed using a commercially available, automated process known as "Tier 2 RBCA Tool Kit" published by Groundwater Services, Inc. This evaluation maintained the "commercial" health risk of  $1 \times 10^{-4}$  as established in the MMP and included the VOC and PNA constituents known to be present (based on previous testing) or anticipated to be encountered (based on the presence of waste oils) and is conservative for the development of petroleum related soil clean up levels at the AMC site.

Table 1 presents the updated threshold criteria for soil at the AMC for petroleum hydrocarbon contaminants, VOC's, and PNA's based on the protection of ground water resources from compounds leaching from the soil as established in the MMP.

*Default  
 factors*

TABLE 1

THRESHOLD VALUES FOR SOIL

*Whe*

Constituent	Threshold Values for Within Building Footprint	RBSL Threshold Values for Outside Building Footprint
TPH gas	100 ppm	unlimited
TPH diesel	1,000 ppm	unlimited
Oil & Grease	1,000 ppm	unlimited
Benzene	0.3 ppm	1.67 ppm*
Toluene	0.3 ppm	360 ppm
Ethylbenzene	1 ppm	130 ppm ?
Xylenes	1 ppm	Res
Napthalene	1 ppm	64 ppm ✓
Benzo(a)pyrene	1 ppm	Res
1,4 Dichlorobenzene	310 ppm	310 ppm
1,1 Dichloroethane	92 ppm	92 ppm
1,2 Dichloroethane	2.5 pm	2.5 pm
Fluoranthene	Res	Res
Phenanthrene	Res	Res
Pyrene	Res	Res
Tetrachloroethane	8,800 ppm <i>really?</i>	8,800 ppm
1,1,1-Trichloroethane	330 ppm	330 ppm
1,1,2-Trichloroethane	0.42 ppm	0.42 ppm
Trichloroethene	2.4 ppm	2.4 ppm

RBSL - Risk Based Screening Level from RBCA Tier 1 Evaluation

\* Value of 5.82 ppm reduced by 29 percent in accordance with RWQCB guidelines.

Res - selected risk level is not exceeded for pure compound present at any concentration.

*W. [unclear]*

Based on the established threshold criteria, EBMUD and Alameda County agreed that soil within the proposed footprints of the planned structures would be excavated to concentrations below the Tri-Regional Guidelines and soil outside the proposed footprints of the planned structures would be excavated to concentrations below the ASTM-RBCA Tier-1 RBSL's. As there are no Tri-Regional Guidelines for VOC's and PNA's, and the calculated RBSL's for soil leaching to ground water are more conservative than calculated RBSL's for soil volatilization indoors, the RBSL's for soil leaching to ground water for these compounds will be applied to all areas of the AMC Phase-2 and Phase-3 construction sites.

Threshold Criteria for heavy metal compounds will be as stipulated in the California Code of Regulations Title 22 as Total Threshold Limit Concentrations (TTLC) as described in the MMP. TTLC values for the LUFT-5 Metals (for waste oil evaluation) are outlined in Table 2.

**TABLE 2**

**HEAVY METAL THRESHOLD VALUES FOR SOIL**

Metals of Concern	Threshold Values TTLC
Cadmium	100 ppm
Chromium	2,500 ppm
Lead	1,000 ppm
Nickel	2,000 ppm
Zinc	5,000 ppm

**PROPOSED SUPPLEMENTAL INVESTIGATION**

Supplemental investigation activities are planned to determine/verify the limits of known/suspected soil contamination and to reduce the uncertainty of remediation requirements for the Phase 2 construction areas. The investigation would be accomplished by advancing 21 additional soil borings at the locations indicated on Figure 6. The actual number and locations of the borings may vary depending on the conditions encountered in the field

The borings will be advanced by a licenced C-57 drilling contractor and will be logged under the supervision of a State of California Certified Engineering Geologist. The borings will be permitted through Alameda County Flood Control and Water Conservation District (Zone 7) and the work will be coordinated with Alameda County Department of Environmental Health personnel.

The soils encountered in the borings will be monitored in the field for evidence of hydrocarbon content and organic vapors through the use of a portable photo-ionization detector (PID) and combustible gas meter. Soil samples will be obtained at various depths ranging from 2- to 18-feet below the ground surface to determine the stratigraphic variations in soil/contaminant conditions.

The soil borings will be advanced using an eight-inch, nominal diameter, continuous flight hollow stem auger. Drilling and sampling equipment used for advancing the exploratory borings will be thoroughly steam cleaned before drilling begins to prevent the introduction of off-site contamination. Sampling equipment will be cleaned between sample events by steam cleaning or using a phosphate-free detergent bath and double rinsed in hot water baths to prevent cross contamination. Pre-cleaned stainless steel or brass liners will be placed in the sampler to retain the soil. The drilling and sampling equipment will be steam cleaned subsequent to completion of the field activities. Soil cuttings and rinsate waters derived from the boring/cleaning will be retained in 55-gallon containers and stored on-site during the drilling pending results of the analytical testing.

Soil samples will be obtained at changes in lithology and where suspected soil contamination exists through the use of a 2 inch I.D. split-barrel sampler advanced into the undisturbed soil by a 140 pound hammer repeatedly falling 30 inches. Sand catchers will be used as necessary to retain the samples. A split-barrel, standard penetration sampler will be used should the 2 inch sampler prove ineffective at obtaining the samples.

The soil samples will be immediately sealed in the liners using aluminum foil or teflon tape and plastic caps and properly labeled including: the date, time, sample location, and project number. The samples will be immediately placed in a cooler maintained at 3-5°C for transport to the laboratory under chain-of-custody documentation.

Sampling equipment will be cleaned between sample events using a phosphate-free detergent bath and double rinsed to prevent cross contamination. The sampling equipment will also be cleaned subsequent to completion of the field activities.

Approximately nine (9) of the borings (see Figure 6) will be extended to depths of 60-feet to provide geotechnical engineering design parameters for the proposed structure. Additional sampling will be performed by Geo Resource Consultants, Inc. to collect soil data for foundation design.

*mix water well  
with native  
soil*

The soil borings will be grouted with an 11-sack sand-slurry mixed at a batch plant and delivered to the project site or with a 5% bentonite cement slurry mixed on-site with a chem grout mixer. Should the borings extend to beyond 30-foot depth, or if more than 2-feet of ground water exist in the soil borings, the sand-slurry or cement slurry will be placed using the tremmie-method.

### ANALYTICAL TESTING

The soil samples will be submitted to and tested by McCampbell Analytical, a State of California, Department of Health Services certified testing laboratory. Analytical testing will be scheduled and performed in accordance with the State of California, Regional Water Quality Control Board, and Alameda County Department of Environmental Health guidelines. The soil samples from the borings will be tested for the previously identified contaminants to establish the boundaries of the contamination. The testing could include some or all of the following.

- Total Petroleum Hydrocarbons as gasoline by Method GCFID 5030/8015,
- Total Petroleum Hydrocarbons as diesel by Method GCFID 3550/8015;
- Volatile Aromatics (BTEX) and MTBE by EPA Method 8020;
- Oil and Grease Compounds by EPA Method 5520;
- Volatile Halogenated Compounds by EPA Method 8010; or
- Polynuclear Aromatic Compounds by EPA Method 8100.

The actual testing program will be selected based on the location of the boring relative to previous investigations, field observations, and PID measurements recorded at the time of the boring

### PROPOSED TEST PITS

If additional soil samples are required for pre-excavation characterization for disposal/treatment these samples will be collected from test pits advanced within the known/identified area of soil contamination immediately prior to start of excavation. The test pits will be located to obtain composite samples for analytical testing for pre-profiling for landfill disposal or thermal incineration. The actual number of test pits required for this characterization will be determined based on the volume of soil suspected to be subject to disposal or recycling and the requirements of the disposal/treatment facility. The test pit samples selected for pre-characterization will be composited by the analytical testing laboratory as 4-part composite samples and tested for those parameters required by the disposal facility.



### SUMMARY OF FINDINGS REPORT

The field observation records and analytical test data will be reviewed to establish the limits of the soil contamination and to further establish the limits of planned excavation within and exterior to the planned structure using the evaluation criteria set forth in the MMP and this Addendum.

A letter report will be issued containing the field observations, chain-of-custody documentation, analytical test data and other pertinent observations recorded.

A Phase 2, and Phase 3, Remedial Implementation Plan base map will be prepared identifying the limits of planned excavation. The disposal/treatment facility will be identified at that time.

### EXCAVATION PROTOCOLS

Excavation of the soil containing contaminants above threshold criteria as set forth in the MMP and this Addendum will be performed by a licensed A contractor with Hazardous Materials Certification under direct oversight from Geo Plexus, Inc. personnel.

The construction activities will proceed with excavation and direct off-hauling of the contaminated soils to the limits established by the remedial action criteria.

Field screening of the excavated soils will be performed on-site through the use of an Organic Vapor Analyzer (OVA) or Organic Vapor Meter (OVM) as the excavation proceeds. In addition to the vapor monitoring, soil samples will be collected and analyzed in the field for presence of petroleum hydrocarbons with field test kits (as outlined in the MMP).

Soils exhibiting evidence of petroleum contamination (e.g., visible staining, visible sheen and/or product, noticeable odors, etc.) or concentrations of petroleum products above established threshold criteria will continue to be excavated and off-hauled.

Field observations will be recorded during the excavation to document the soil excavation and disposal activities and to determine the appropriate time and locations for collection of verification samples.

The excavation will proceed laterally and vertically beneath the planned structure until the soil conditions are below the threshold criteria set forth in the MMP and this Addendum.

The excavation will proceed laterally and vertically outside of the planned building footprint until the soil concentrations are within the threshold criteria for areas outside building footprints set forth in the MMP or until functional excavation limits are encountered (i.e., encroachment of structures to remain, public property, etc.).

### CONFIRMATION SAMPLING

Final verification samples of the native soil materials at the base of the excavation and from the excavation sidewalls will be obtained upon completion of the remedial excavation activities to document the site conditions prior to backfilling and construction as described in the MMP.

Approximately 1 sample per 200 square feet will be obtained in areas where contamination above threshold criteria is removed. However, this rate may be revised based on an evaluation using EPA SW-846 guidelines following determination of the extent of contamination and definition of the limits of excavation.

The verification soil samples will be obtained from the excavation sidewalls and excavation bottom by advancing a pre-cleaned 2 inch I.D. brass or stainless steel liner into the undisturbed soil. Should the excavated area to be sampled not be directly accessible for personnel for safety reasons, the samples will be obtained remotely through the use of a backhoe or excavator.

The soil samples will be immediately sealed, labeled, contained, and transported in accordance with the protocols previously described for the test pit samples. The soil samples will be submitted to and tested by McCampbell Analytical. The testing would include some or all of the following, depending on the contaminants of concern detected during the supplemental investigation activities:

Total Petroleum Hydrocarbons as gasoline by Method GCFID 5030/8015  
Total Petroleum Hydrocarbons as diesel by Method GCFID 3550/8015  
Volatile Aromatics (BTEX) and MTBE by EPA Method 8020  
Oil and Grease Compounds by EPA Method 5520.



### EXCAVATION DOCUMENTATION

Geo Plexus personnel will provide continuous observation of the excavation activities to assure compliance with the MMP. On site documentation of the field conditions and remedial activities will be recorded on a daily basis and include air/vapor monitoring data, field test kit analysis data, sampling data, and chain-of-custody documentation for any samples collected and other pertinent observations recorded. A base map will be updated daily identifying the locations of the excavation limits and noting the sample locations.

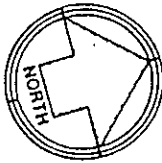
### DEWATERING

It is anticipated that perched ground water (as observed in the previous excavations) will be encountered in localized areas during the planned construction excavation. It is currently planned to evacuate the perched water in the vicinity of the remedial excavation with diaphragm pumps and to treat the water with activated carbon canisters prior to discharge of the water under appropriate permit conditions. Specific details of the dewater/treatment plans will be contained in the specific permit applications as described in the MMP.

### SCHEDULE OF ACTIVITIES

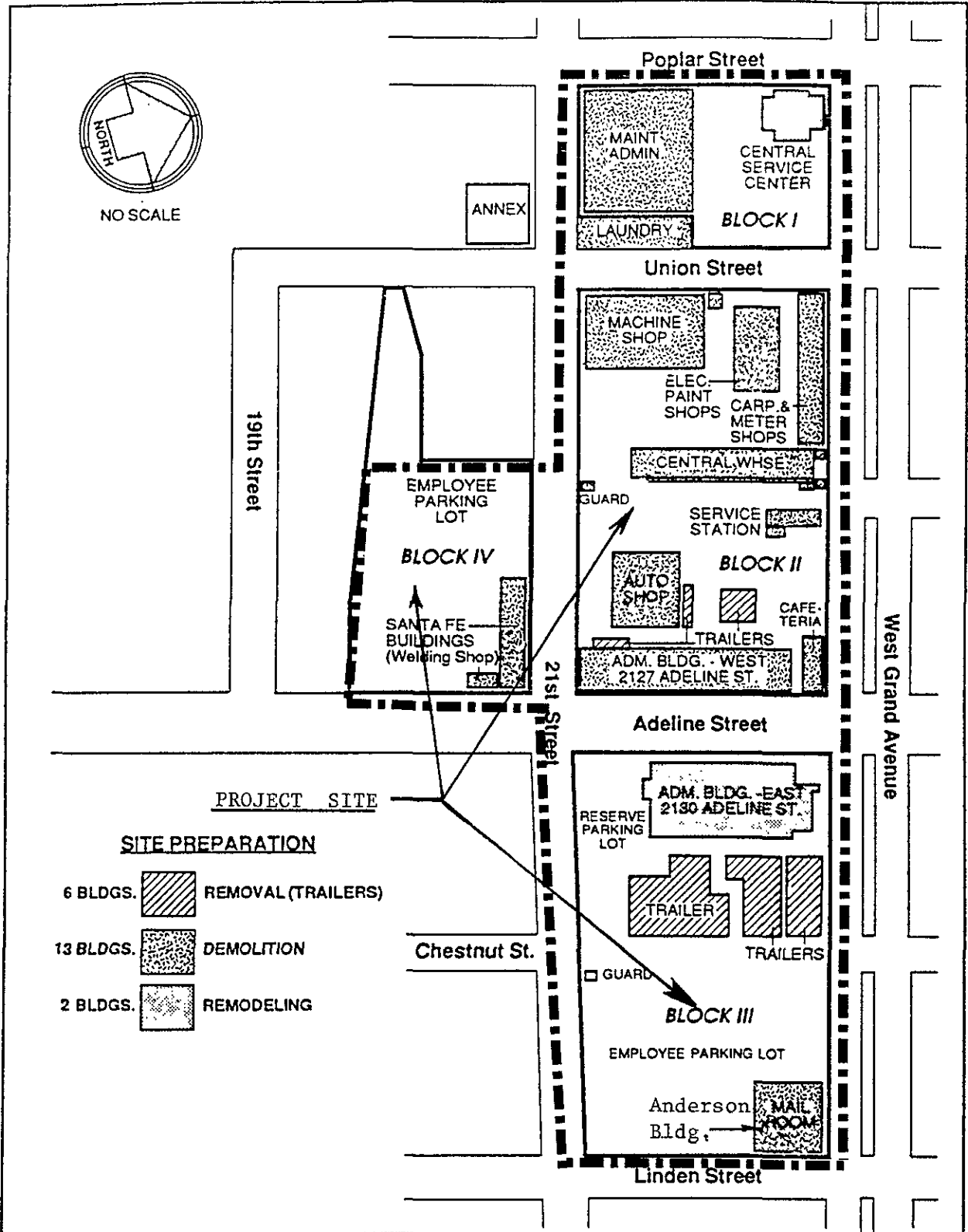
The following represents the schedule for the investigation and construction activities for the AMC Phase-2 and Phase-3 project areas.

Approval of Addendum No. 2 by Alameda County	September 18, 1996
Permitting	September 20-25, 1996
Field Investigation	October 10-15, 1996
Phase-2 Test Pits	October 25-30, 1996
Water Discharge Permitting	November/December, 1996
Phase-2 Construction	
Site Demolition	November/December, 1996
Excavation Activities	December, 1996 - January, 1997
Excavation Backfilling	January, 1997
Phase-3 Test Pits	August, 1997
Phase-3 Construction	
Site Demolition	October, 1997
Excavation Activities	February, 1998
Excavation Backfilling	March, 1998



NO SCALE

ANNEX



PROJECT SITE

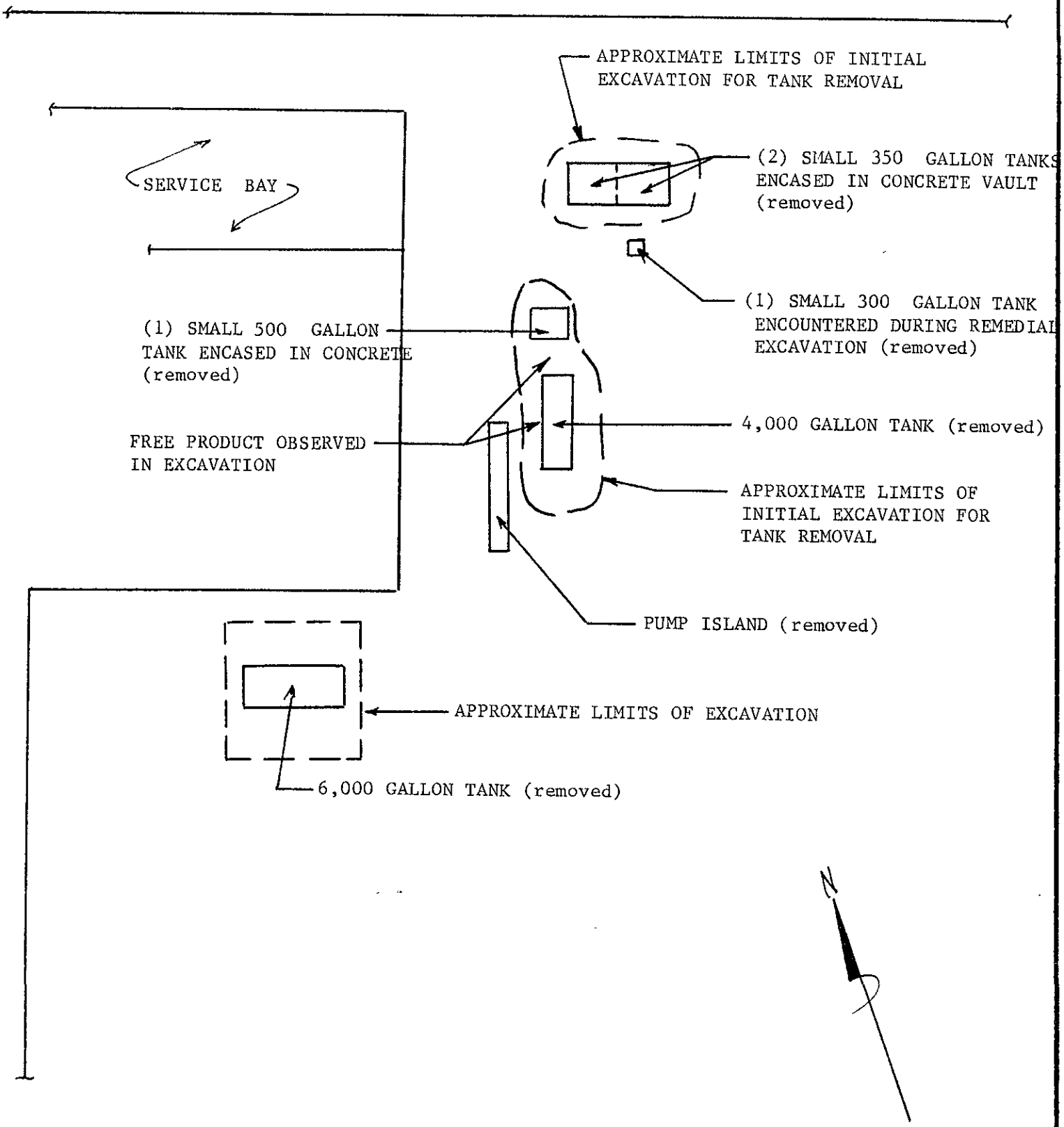
**SITE PREPARATION**

- 6 BLDGS. REMOVAL (TRAILERS)
- 13 BLDGS. DEMOLITION
- 2 BLDGS. REMODELING

Chestnut St.

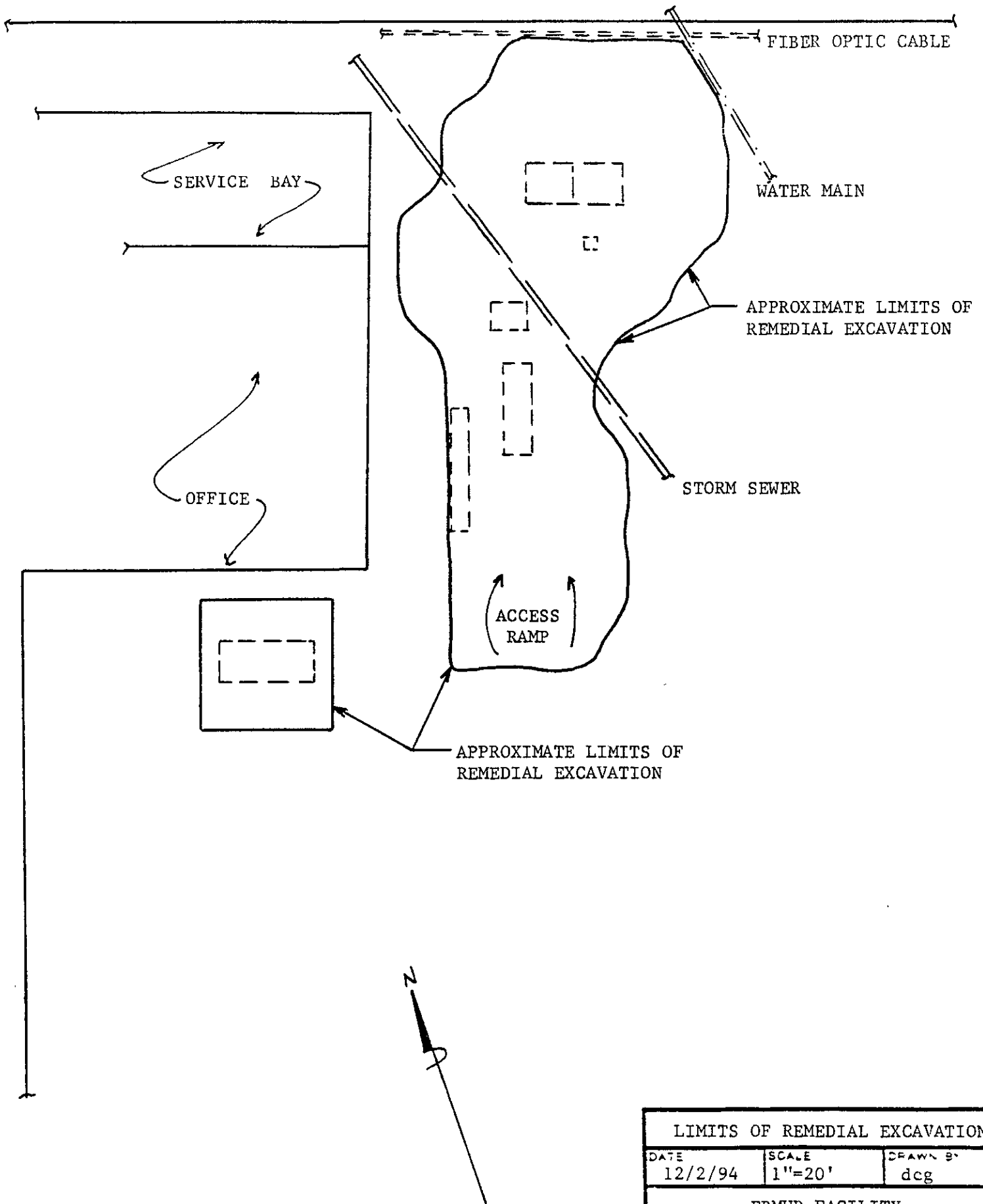
EBMUD FACILITY		
DATE	SCALE	DRAWN BY
2/12/95	n/a	dcg
SITE PLAN		
		Figure 1





TANK & EXCAVATION LOCATIONS		
DATE	SCALE	DRAWN BY
12/2/94	1"=20'	dcg
EBMUD FACILITY		
		Figure 3

WEST GRAND AVENUE



FIBER OPTIC CABLE

WATER MAIN

APPROXIMATE LIMITS OF  
REMEDIAL EXCAVATION

STORM SEWER

SERVICE BAY

OFFICE

ACCESS  
RAMP

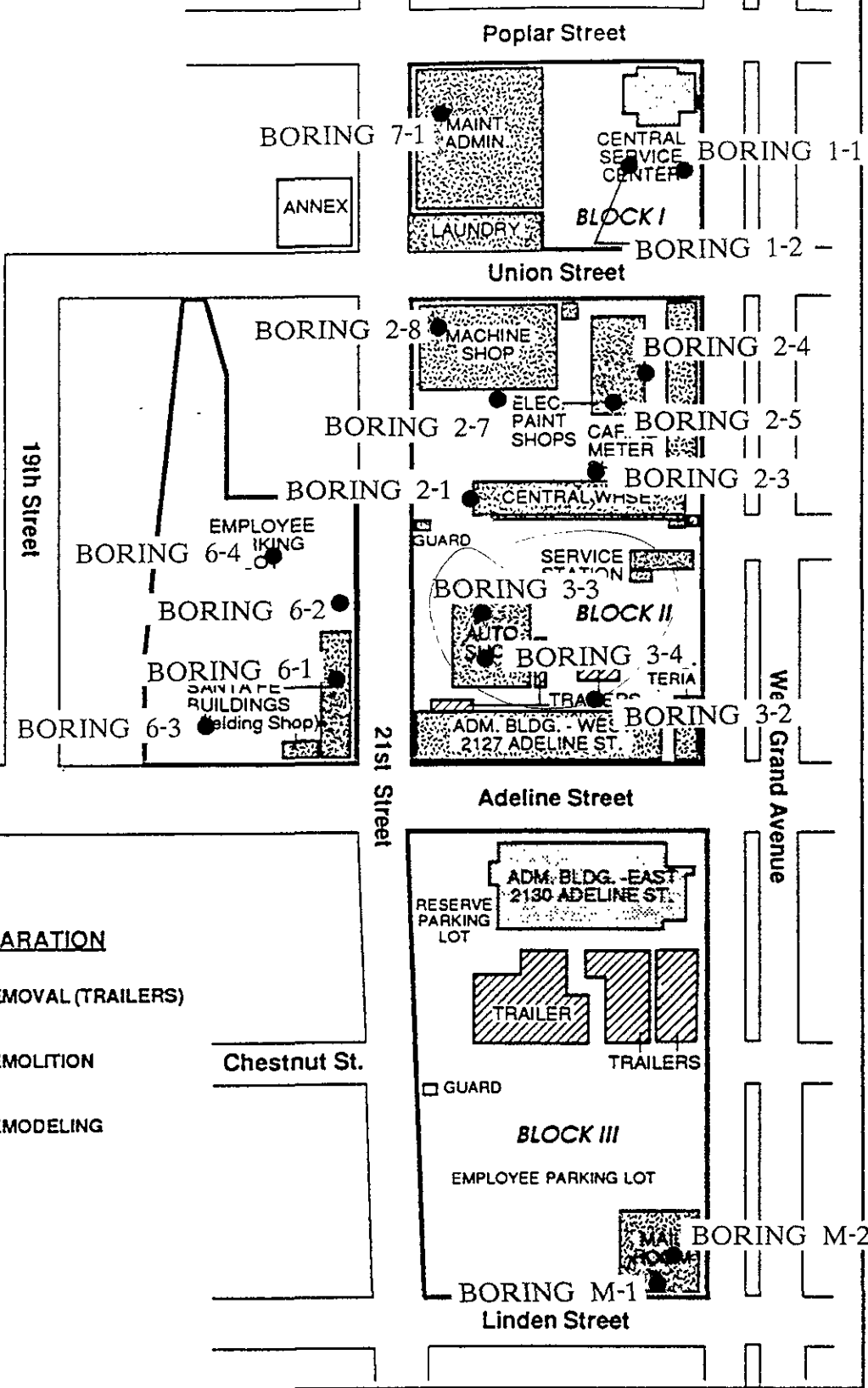
APPROXIMATE LIMITS OF  
REMEDIAL EXCAVATION



LIMITS OF REMEDIAL EXCAVATION		
DATE	SCALE	DRAWN BY
12/2/94	1"=20'	dgc
EBMUD FACILITY		
		Figure 4



NO SCALE



**SITE PREPARATION**

- 6 BLDGS. REMOVAL (TRAILERS)
- 13 BLDGS. DEMOLITION
- 2 BLDGS. REMODELING

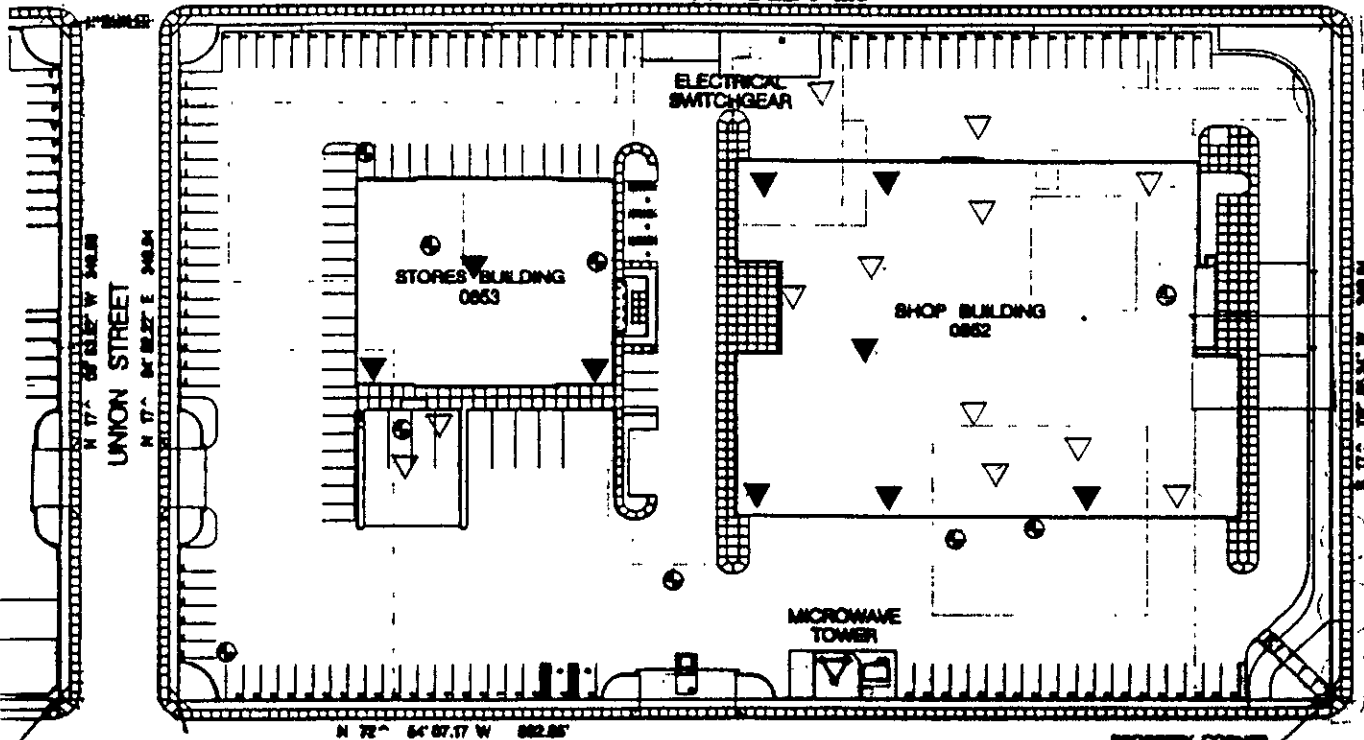
Chestnut St.

EBMUD FACILITY		
DATE 2/12/95	SCALE n/a	DRAWN BY dgc
BORING LOCATION PLAN		
		Figure 5



WEST GRAND AVENUE  
WEST GRAND AVENUE

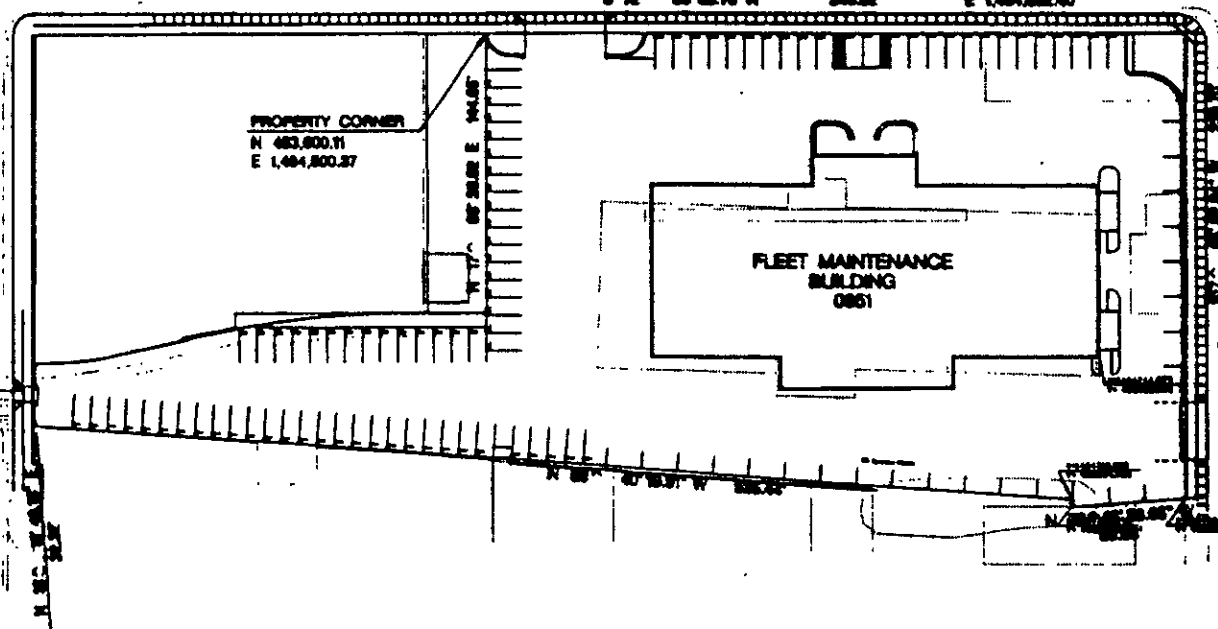
S 72° 07' 28" E 282.27'



21 ST STREET

S 72° 07' 28" W 240.00'

PROPERTY CORNER  
N 483,800.11  
E 1,484,800.37



NOTE:

- PREVIOUS BORING LOCATIONS
- ▽ PROPOSED BORING LOCATIONS
- ▼ PROPOSED "DEEP" GEOTECHNICAL BORINGS PER GEO RESOURCE CONSULTANTS



PROPOSED BORING LOCATIONS		
DATE 8/3/96	SCALE 1"=100'	DRAWN BY dcg
EBMUD AMC PHASE II SITE		
		Figure 6

**APPENDIX 2A**

**Tier 2 RBCA Tool Kit Analysis**

# RBCA TIER 1/TIER 2 EVALUATION

# Output Table 1

Site Name EBMUD Adeline Maintenance  
 Site Location Oakland, C  
 Identification  
 Date Completed  
 Completed By David Glick

Software GSI RBCA Spreadsheet  
 Version v 1.0

NOTE values which differ from Tier 1 default values are shown in bold italics and underlined

## DEFAULT PARAMETERS

Exposure Parameter	Definition (Units)	Residential			Commercial/Industrial	
		Adult	(1-6yrs)	(1-16 yrs)	Chronic	Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (l/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa in	Inhalation rate indoor (m <sup>3</sup> /day)	15			20	
IRa out	Inhalation rate outdoor (m <sup>3</sup> /day)	20			20	10
SA	Skin surface area (dermal) (cm <sup>2</sup> )	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm <sup>2</sup> -yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	<u>TRUE</u>			<u>TRUE</u>	
AAFd	Age adjustment on skin surface area	<u>TRUE</u>			<u>TRUE</u>	
tox	Use EPA tox data for air (or PEL based)	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Surface Parameters	Definition (Units)	Commercial/Industrial		
		Residential	Chronic	Construction
t	Exposure duration (yr)	30	25	1
A	Contaminated soil area (cm <sup>2</sup> )	<u>9.3E+06</u>		<u>9.3E+06</u>
W	Length of affected soil parallel to wind (cm)	<u>1.5E+03</u>		<u>1.5E+03</u>
W.gw	Length of affected soil parallel to groundwater (cm)	1.5E+03		
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02		
delta	Air mixing zone height (cm)	2.0E+02		
Lss	Definition of surficial soils (cm)	1.0E+02		
Pe	Particulate areal emission rate (g/cm <sup>2</sup> /s)	2.2E-10		

Groundwater Parameters	Definition (Units)	Value
delta gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw tr	Groundwater Transport velocity (cm/yr)	6.6E+03
Ks	Saturated Hydraulic Conductivity (cm/s)	
grad	Groundwater Gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
BC	Biodegradation Capacity (mg/L)	
BIO?	Is Bioattenuation Considered	FALSE
phi eff	Effective Porosity in Water-Bearing Unit	3.8E-01
fac sat	Fraction organic carbon in water-bearing unit	1.0E-03

Matrix of Exposed Persons to Complete Exposure Pathways	Residential		Commercial/Industrial	
	Chronic	Constrctn	Chronic	Constrctn
<b>Groundwater Pathways:</b>				
GW i	Groundwater Ingestion	FALSE	FALSE	
GW v	Volatilization to Outdoor Air	FALSE	FALSE	
GW b	Vapor Intrusion to Buildings	FALSE	FALSE	
<b>Soil Pathways</b>				
S v	Volatiles from Subsurface Soils	FALSE	TRUE	
SS v	Volatiles and Particulate Inhalation	FALSE	TRUE	TRUE
SS d	Direct Ingestion and Dermal Contact	FALSE	TRUE	TRUE
S l	Leaching to Groundwater from all Soils	FALSE	TRUE	
S b	Intrusion to Buildings - Subsurface Soils	FALSE	TRUE	

Soil Parameters	Definition (Units)	Value
hc	Capillary zone thickness (cm)	<u>6.1E+00</u>
hv	Vadose zone thickness (cm)	<u>6.0E+02</u>
rho	Soil density (g/cm <sup>3</sup> )	1.7
foc	Fraction of organic carbon in vadose zone	0.01
phi	Soil porosity in vadose zone	0.38
Lgw	Depth to groundwater (cm)	<u>6.1E+02</u>
Ls	Depth to top of affected soil (cm)	1.0E+02
Lsubs	Thickness of affected subsurface soils (cm)	<u>3.6E+02</u>
pH	Soil/groundwater pH	6.5
<hr/>		
		<b>capillary      vadose      foundation</b>
phi w	Volumetric water content	0.342      0.12      0.12
phi.a	Volumetric air content	0.038      0.26      0.26

Matrix of Receptor Distance and Location on- or off-site	Residential		Commercial/Industrial	
	Distance	On-Site	Distance	On-Site
GW	Groundwater receptor (cm)	TRUE		TRUE
S	Inhalation receptor (cm)	TRUE		TRUE

Matrix of Target Risks	Residential	
	Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	<u>1.0E-04</u>
TRc	Target Risk (class C carcinogens)	<u>1.0E-04</u>
THQ	Target Hazard Quotient	1.0E+00
Opt	Calculation Option (1, 2, or 3)	1
Tier	RBCA Tier	1

Building Parameters	Definition (Units)	Residential	Commercial
		Lb	Building volume/area ratio (cm)
ER	Building air exchange rate (s <sup>-1</sup> )	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Dispersive Transport Parameters	Definition (Units)	Residential	Commercial
		<b>Groundwater</b>	
ax	Longitudinal dispersion coefficient (cm)		
ay	Transverse dispersion coefficient (cm)		
az	Vertical dispersion coefficient (cm)		
<b>Vapor</b>			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA CHEMICAL DATABASE

Physical Property Data

CAS Number	Constituent	type	Molecular Weight		Diffusion Coefficients				log (Koc) or log(Kd)		Henry's Law Constant		Pressure		Solubility								
			(g/mole)	ref	in air (cm2/s)	in water (cm2/s)	Dair	re	Dwat	re	(@ 20 - 25 C) (l/kg)	ref	(@ 20 - 25 C) (atm-m3)	(unitless)	re	(@ 20 - 25 C) (mm Hg) Pure	ref	Component	ref	acid pKa	base pKb	ref	
83-32-9	Acenaphthene	PAH	154.21	4	4.21E-02	4	7.69E-06	4	3.85	4	7.71E-03	3.21E-01	4	5.00E-03	4	1.32E-01	4						
120-12-7	Anthracene	PAH	178.23	4	3.24E-02	4	7.74E-06	4	4.15	4	6.75E-02	2.81E+00	4	1.30E-06	4	4.50E-02	5						
71-43-2	Benzene	A	78.1	5	9.30E-02	A	1.10E-05	A	1.58	A	5.29E-03	2.20E-01	A	9.52E+01	4	1.75E+03	A						
95-50-1	Dichlorobenzene (1,2) (-o)	AC	147	4	6.90E-02	4	7.90E-06	4	3.32	4	1.94E-03	8.07E-02	4	1.50E+00	4	1.50E+02	4						
106-46-7	Dichlorobenzene, (1,4) (-p)	AC	147	4	6.90E-02	4	7.90E-06	4	3.33	4	1.60E-03	6.65E-02	4	1.20E+00	4	1.45E+02	4						
75-34-3	Dichloroethane, 1,1-	C	98.96	4	7.42E-02	4	1.05E-05	4	1.76	4	1.54E-02	6.41E-01	4	5.91E+02	4	5.50E+03	5						
107-06-2	Dichloroethane, 1,2-	C	99	4	1.04E-01	4	9.90E-06	4	1.76	4	1.20E-03	4.99E-02	4	8.00E+01	4	8.69E+03	5						
100-41-4	Ethylbenzene	A	106.2	5	7.60E-02	A	8.50E-06	A	1.98	A	7.69E-03	3.20E-01	A	1.00E+01	4	1.52E+02	5						
206-44-0	Fluoranthene	PAH	202	4	3.02E-02	4	6.35E-06	4	4.58	4	6.70E-02	2.79E+00	4	1.77E-02	4	2.06E-01	5						
91-20-3	Naphthalene	PAH	128.2	4	7.20E-02	A	9.40E-06	A	3.11	A	1.18E-03	4.90E-02	A	2.30E-01	4	3.29E+01	4						
85-01-8	Phenanthrene	PAH	178.22	4	3.33E-02	4	7.47E-06	4	4.15	4	6.05E-03	2.52E-01	4	2.10E-04	4	1.60E+00	5						
129-00-0	Pyrene	PAH	202.3	4	2.72E-02	4	7.24E-06	4	4.58	4	7.00E-09	2.91E-07	4	4.20E-08	4	1.60E-01	5						
127-18-4	Tetrachloroethene	C	165.83	4	7.20E-02	4	8.20E-06	4	5.12	4	2.90E-02	1.21E+00	4	1.90E+01	4	1.43E+02	4						
108-88-3	Toluene	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	A	6.25E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29						
71-55-6	Trichloroethane, 1,1,1-	C	133.4	4	7.80E-02	4	8.80E-06	4	2.45	4	1.72E-02	7.15E-01	4	1.23E+02	4	1.26E+03	4						
79-00-5	Trichloroethane, 1,1,2-	C	133.4	4	7.80E-02	4	8.80E-06	4	0.00	4	7.40E-04	3.08E-02	4	2.50E+01	4	5.93E+03	4						
79-01-6	Trichloroethene	C	131.4	23	8.18E-02	6	1.05E-04	7	1.26	11	1.00E-02	4.17E-01	#	5.80E+01	23	1.00E+03	23						
1330-20-7	Xylene (mixed isomers)	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	A	6.97E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5						

Site Name: EBMUD Adeline Mai Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

RBCA CHEMICAL DATABASE

Toxicity Data

CAS Number	Constituent	Reference Dose (mg/kg/day)		re	Slope Factors 1/(mg/kg/day)		ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
		Oral RfD_oral	Inhalation RfD_inhal		Oral SF_oral	Inhalation SF_inhal			
83-32-9	Acenaphthene	6.00E-02	6.00E-02	R	-	-	R		
120-12-7	Anthracene	3.00E-01	3.00E-01	R	-	-	R	D	FALSE
71-43-2	Benzene	-	1.70E-03	R	2.90E-02	2.90E-02	A	A	TRUE
95-50-1	Dichlorobenzene (1,2) (-o)	9.00E-02	4.00E-02	R	-	-	R	D	FALSE
106-46-7	Dichlorobenzene, (1,4) (-p)	2.29E-01	2.29E-01	R	2.40E-02	2.40E-02	R	C	TRUE
75-34-3	Dichloroethane, 1,1-	1.00E-01	1.43E-01	R	-	-	R	C	FALSE
107-06-2	Dichloroethane, 1,2-	-	2.86E-03	R	9.10E-02	9.10E-02	R	B2	TRUE
100-41-4	Ethylbenzene	1.00E-01	2.86E-01	A	-	-	R	D	FALSE
206-44-0	Fluoranthene	4.00E-02	4.00E-02	A	-	-	R	D	FALSE
91-20-3	Naphthalene	4.00E-03	4.00E-03	A	-	-	R	D	FALSE
85-01-8	Phenanthrene	4.00E-03	4.00E-03					D	FALSE
129-00-0	Pyrene	3.00E-02	3.00E-02	R	-	-	R	D	FALSE
127-18-4	Tetrachloroethene	1.00E-02	-	R	5.20E-02	2.03E-03	R	C-B2	TRUE
108-88-3	Toluene	2.00E-01	1.14E-01	A,R	-	-	R	D	FALSE
71-55-6	Trichloroethane, 1,1,1-	9.00E-02	2.86E-01	R	-	-	R	D	FALSE
79-00-5	Trichloroethane, 1,1,2-	4.00E-03	-	R	5.70E-02	5.70E-02	R	C	TRUE
79-01-6	Trichloroethene	6.00E-03	-	R	1.10E-02	6.00E-03	R		TRUE
1330-20-7	Xylene (mixed isomers)	2.00E+00	2.00E+00	A	-	-	R	D	FALSE

Site Name: EBMUD Adelin Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level		Permissible Exposure		Relative Absorption Factors		Detection Limits			Half Life (First-Order Decay) (days)		ref	
		MCL (mg/L)	reference	Limit PEL/TLV (mg/m3)	ref	Oral	Dermal	Groundwater (mg/L)	ref	Soil (mg/kg)	re	Saturated		Unsaturated
83-32-9	Acenaphthene					1	0.05	0.01	C	0.66	S	204	204	H
120-12-7	Anthracene					1	0.05	0.01	C	0.66	S	920	920	H
71-43-2	Benzene	5.00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720	H
95-50-1	Dichlorobenzene (1,2) (-o)	6.00E-01	6 FR 3526 (30 Jan 91)	1.50E+02	ACGIH	1	0.5	0.002	C	0.66	S	360	360	H
106-46-7	Dichlorobenzene, (1,4) (-p)	7.50E-02	2 FR 25690 (08 Jul 8)	4.50E+02	OSHA	1	0.5	0.002	C	0.66	S	360	360	H
75-34-3	Dichloroethane, 1,1-			4.00E+02	OSHA	1	0.5	0.001	C	0.005	S	360	360	H
107-06-2	Dichloroethane, 1,2-	5.00E-03	2 FR 25690 (08 Jul 8)	4.00E+00	NIOSH	1	0.5	0.0005	C	0.005	S	360	360	H
100-41-4	Ethylbenzene	7.00E-01	6 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228	H
206-44-0	Fluoranthene					1	0.05	0.01	C	0.66	S	880	880	H
91-20-3	Naphthalene			5.00E+01	OSHA	1	0.05	0.01	C	0.01	S	258	258	H
85-01-8	Phenanthrene					1	0.05	0.01	C	0.66	S	400	400	H
129-00-0	Pyrene					1	0.05	0.01	C	0.66	S	3800	3800	H
127-18-4	Tetrachloroethene	5.00E-03	6 FR 3526 (30 Jan 91)	1.70E+02	ACGIH	1	0.5	0.0005	C			720	720	H
108-88-3	Toluene	1.00E+00	6 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
71-55-6	Trichloroethane, 1,1,1-	2.00E-01	6 FR 30266 (01 Jul 9)	1.90E+03	OSHA	1	0.5	0.005	C	0.005	S	546	546	H
79-00-5	Trichloroethane, 1,1,2-	5.00E-03	7 FR 31776 (17 Jul 9)	4.50E+01	OSHA	1	0.5	0.0002	C	0.005	S	730	730	H
79-01-6	Trichloroethene	5.00E-03	2 FR 25690 (08 Jul 8)	2.69E+02	ACGIH	1	0.5	0.001	C	0.005	S	1653	1653	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	6 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: EBMUD Adelin Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

**RBCA SITE ASSESSMENT**

Tier 1 Worksheet 6.1

Site Name EBMUD Adeline Maintenance Center  
 Site Location Oakland, C

Completed By David Glick  
 Date Completed 1/1/1904  
 Target Risk (Class A & B) 1 0E-4  
 Target Risk (Class C) 1 0E-4  
 Target Hazard Quotient 1 0E+0

MCL exposure limit?  
 PEL exposure limit?

1 OF 1

Calculation Option: 1

**SURFACE SOIL RBSL VALUES  
 (< 3 FT BGS)**

RBSL Results For Complete Exposure Pathways ("X" if Complete)

CAS No.	Name	Representative Concentration (mg/kg)	Soil Leaching to Groundwater			Ingestion, Inhalation and Dermal Contact		Construction Worker	Applicable RBSL (mg/kg)	RBSL Exceeded ?	Required CRF
			X	Residential (on-site)	Commercial (on-site)	Regulatory(MCL) (on-site)	X	Residential (on-site)			
83-32-9	Acenaphthene	0.0E+0	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1
120-12-7	Anthracene	0.0E+0	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1
71-43-2	Benzene	1.2E-2	NA	5.8E+0	NA	NA	3.6E+2	>Res	5.8E+0	<input type="checkbox"/>	<1
95-50-1	Dichlorobenzene (1,2) (-o)	0.0E+0	NA	2.3E+3	NA	NA	>Res	>Res	2.3E+3	<input type="checkbox"/>	<1
106-46-7	Dichlorobenzene, (1,4) (-p)	0.0E+0	NA	3.1E+2	NA	NA	4.3E+2	>Res	3.1E+2	<input type="checkbox"/>	<1
75-34-3	Dichloroethane, 1,1-	0.0E+0	NA	9.2E+1	NA	NA	3.8E+3	3 3E+3	9.2E+1	<input type="checkbox"/>	<1
107-06-2	Dichloroethane, 1,2-	0.0E+0	NA	2.5E+0	NA	NA	1.1E+2	2 3E+3	2.5E+0	<input type="checkbox"/>	<1
100-41-4	Ethylbenzene	2.1E-2	NA	1.3E+2	NA	NA	>Res	>Res	1.3E+2	<input type="checkbox"/>	<1
206-44-0	Fluoranthene	2.9E+0	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1
91-20-3	Naphthalene	0.0E+0	NA	6.4E+1	NA	NA	>Res	>Res	6.4E+1	<input type="checkbox"/>	<1
85-01-8	Phenanthrene	3.9E+0	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1
129-00-0	Pyrene	3.3E+0	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1
127-18-4	Tetrachloroethene	0.0E+0	NA	8.8E+3	NA	NA	2.1E+2	6.4E+3	2.1E+2	<input type="checkbox"/>	<1
108-88-3	Toluene	1.9E-2	NA	3.6E+2	NA	NA	>Res	>Res	3.6E+2	<input type="checkbox"/>	<1
71-55-6	Trichloroethane, 1,1,1-	0.0E+0	NA	3.3E+2	NA	NA	3.5E+3	3.6E+3	3.3E+2	<input type="checkbox"/>	<1
79-00-5	Trichloroethane, 1,1,2-	0.0E+0	NA	4.2E-1	NA	NA	1.8E+2	>Res	4.2E-1	<input type="checkbox"/>	<1
79-01-6	Trichloroethene	0.0E+0	NA	2.4E+0	NA	NA	>Res	>Res	2.4E+0	<input type="checkbox"/>	<1
1330-20-7	Xylene (mixed isomers)	1.7E-1	NA	>Res	NA	NA	>Res	>Res	>Res	<input type="checkbox"/>	<1

**RBCA SITE ASSESSMENT**

Tier 1 Worksheet 6.2

Site Name EBMUD Adeline Maintenance Center  
 Site Location Oakland, C

Completed By David Glick  
 Date Completed 1/1/1904

1 OF 1

**SUBSURFACE SOIL RBSL VALUES  
 (> 3 FT BGS)**

Target Risk (Class A & B) 1.0E-4  
 Target Risk (Class C) 1.0E-4  
 Target Hazard Quotient 1.0E+0

MCL exposure limit?  
 PEL exposure limit?

Calculation Option: 1

RBSL Results For Complete Exposure Pathways ("x" If Complete)

CONSTITUENTS OF CONCERN	Representative Concentration (mg/kg)	Soil Leaching to Groundwater			Soil Volatilization to Indoor Air		Soil Volatilization to Outdoor Air		Applicable RBSL (mg/kg)	RBSL Exceeded ?	Required CRF
		Residential (on-site)	Commercial (on-site)	Regulatory(MCL) (on-site)	Residential (on-site)	Commercial (on-site)	Residential (on-site)	Commercial (on-site)			
83-32-9 Acenaphthene	0.0E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1
120-12-7 Anthracene	0.0E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1
71-43-2 Benzene	4.3E-1	NA	5.8E+0	NA	NA	7.8E-1	NA	3.3E+2	7.8E-1	<input type="checkbox"/>	<1
95-50-1 Dichlorobenzene (1,2) (-o)	9.8E-2	NA	2.3E+3	NA	NA	1.1E+3	NA	>Res	1.1E+3	<input type="checkbox"/>	<1
106-46-7 Dichlorobenzene, (1,4) (-p)	3.0E-2	NA	3.1E+2	NA	NA	3.9E+2	NA	>Res	3.1E+2	<input type="checkbox"/>	<1
75-34-3 Dichloroethane, 1,1-	2.1E-1	NA	9.2E+1	NA	NA	6.5E+1	NA	>Res	6.5E+1	<input type="checkbox"/>	<1
107-06-2 Dichloroethane, 1,2-	0.0E+0	NA	2.5E+0	NA	NA	2.6E+0	NA	5.6E+2	2.5E+0	<input type="checkbox"/>	<1
100-41-4 Ethylbenzene	2.7E+0	NA	1.3E+2	NA	NA	1.3E+2	NA	>Res	1.3E+2	<input type="checkbox"/>	<1
206-44-0 Fluoranthene	0.0E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1
91-20-3 Naphthalene	0.0E+0	NA	6.4E+1	NA	NA	1.1E+2	NA	>Res	6.4E+1	<input type="checkbox"/>	<1
85-01-8 Phenanthrene	0.0E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1
129-00-0 Pyrene	0.0E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1
127-18-4 Tetrachloroethene	1.9E+0	NA	8.8E+3	NA	NA	1.5E+4	NA	>Res	8.8E+3	<input type="checkbox"/>	<1
108-88-3 Toluene	2.4E+0	NA	3.6E+2	NA	NA	5.5E+1	NA	>Res	5.5E+1	<input type="checkbox"/>	<1
71-55-6 Trichloroethane, 1,1,1-	5.4E-1	NA	3.3E+2	NA	NA	1.3E+2	NA	>Res	1.3E+2	<input type="checkbox"/>	<1
79-00-5 Trichloroethane, 1,1,2-	0.0E+0	NA	4.2E-1	NA	NA	2.2E+0	NA	>Res	4.2E-1	<input type="checkbox"/>	<1
79-01-6 Trichloroethene	8.7E+2	NA	2.4E+0	NA	NA	2.1E+1	NA	>Res	2.4E+0	<input checked="" type="checkbox"/>	3.7E+02
1330-20-7 Xylene (mixed isomers)	6.5E+0	NA	>Res	NA	NA	>Res	NA	>Res	>Res	<input type="checkbox"/>	<1



**RBCA SITE ASSESSMENT**

Tier 1 Worksheet 6.3

Site Name: EBMUD Adeline Maintenance Center  
 Site Location: Oakland, C

Completed By: David Glick  
 Date Completed: 1/1/1904

**GROUNDWATER RBSL VALUES**

Target Risk (Class A & B) 1 0E-4  
 Target Risk (Class C) 1 0E-4  
 Target Hazard Quotient 1 0E+0

MCL exposure limit?  
 PEL exposure limit?

Calculation Option: 1

**RBSL Results For Complete Exposure Pathways ("x" if Complete)**

CONSTITUENTS OF CONCERN	Representative Concentration (mg/L)	Groundwater Ingestion			Groundwater Volatilization to Indoor Air		Groundwater Volatilization to Outdoor Air		Applicable RBSL (mg/L)	RBSL Exceeded ?	Required CRF
		Residential (on-site)	Commercial (on-site)	Regulatory(MCL) (on-site)	Residential (on-site)	Commercial (on-site)	Residential (on-site)	Commercial (on-site)			
CAS No. Name	(mg/L)									<input type="checkbox"/> If yes	Only if "yes" left
83-32-9 Acenaphthene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
120-12-7 Anthracene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
71-43-2 Benzene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
95-50-1 Dichlorobenzene (1,2) (-o)	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
106-46-7 Dichlorobenzene, (1,4) (-p)	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
75-34-3 Dichloroethane, 1,1-	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
107-06-2 Dichloroethane, 1,2-	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
100-41-4 Ethylbenzene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
206-44-0 Fluoranthene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
91-20-3 Naphthalene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
85-01-8 Phenanthrene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
129-00-0 Pyrene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
127-18-4 Tetrachloroethene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
108-88-3 Toluene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
71-55-6 Trichloroethane, 1,1,1-	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
79-00-5 Trichloroethane, 1,1,2-	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
79-01-6 Trichloroethene	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1
1330-20-7 Xylene (mixed isomers)	0.0E+0	NA	NA	NA	NA	NA	NA	NA	>Sol	<input type="checkbox"/>	<1

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8 1

Site Name. EBMUD Adeline Maintenance Center

Site Location. Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

1 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

AIR EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS: VAPOR AND

DUST INHALATION

Exposure Concentration

1) Source Medium

2) NAF Value (m<sup>3</sup>/kg)

Receptor

3) Exposure Medium

Air POE Conc (mg/m<sup>3</sup>) (1) / (2)

4) Exposure Multiplier

(IRxETxEFxED)/(BWxAT) (m<sup>3</sup>/kg-day)

5) Average Daily Intake Rate

(mg/kg-day) (3) X (4)

Constituents of Concern

	Surface Soil Conc (mg/kg)	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial
Acenaphthene	0.0E+0	1.5E+5	0.0E+0	2.0E-1	0.0E+0
Anthracene	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0
Benzene	1.2E-2	1.4E+5	8.8E-8	7.0E-2	6.1E-9
Dichlorobenzene (1,2) (-o)	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0
Dichlorobenzene, (1,4) (-p)	0.0E+0	1.4E+5	0.0E+0	7.0E-2	0.0E+0
Dichloroethane, 1,1-	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0
Dichloroethane, 1,2-	0.0E+0	1.4E+5	0.0E+0	7.0E-2	0.0E+0
Ethylbenzene	2.1E-2	1.4E+5	1.5E-7	2.0E-1	3.0E-8
Fluoranthene	2.9E+0	1.4E+5	2.1E-5	2.0E-1	4.1E-6
Naphthalene	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0
Phenanthrene	3.9E+0	2.6E+5	1.5E-5	2.0E-1	2.9E-6
Pyrene	3.3E+0	3.8E+7	8.7E-8	2.0E-1	1.7E-8
Tetrachloroethene	0.0E+0	2.5E+5	0.0E+0	7.0E-2	0.0E+0
Toluene	1.9E-2	1.4E+5	1.4E-7	2.0E-1	2.7E-8
Trichloroethane, 1,1,1-	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0
Trichloroethane, 1,1,2-	0.0E+0	1.4E+5	0.0E+0	7.0E-2	0.0E+0
Trichloroethene	0.0E+0	1.4E+5	0.0E+0	7.0E-2	0.0E+0
Xylene (mixed isomers)	1.7E-1	1.4E+5	1.2E-6	2.0E-1	2.4E-7

NOTE ABS = Dermal absorption factor (dim)  
AF = Adherence factor  
AT = Averaging time (days)

BW = Body Weight (kg)  
CF = Units conversion factor  
ED = Exp. duration (yrs)

EF = Exposure frequency (days/yr)  
ET = Exposure time (hrs/day)  
IR = Intake rate (L/day or mg/day)

POE = Point of exposure  
SA = Skin surface area (cm<sup>2</sup>)

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.1

Site Name: EBMUD Adeline Maintenance Center

Site Location: Oakland, CA

Completed By: David Glick

Date Completed: 1/1/1904

2 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

AIR EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: VAPOR

Exposure Concentration

TOTAL PATHWAY INTAKE (mg/kg-day)

INHALATION

1) Source Medium

2) NAF Value (m<sup>3</sup>/kg)

3) Exposure Medium

4) Exposure Multiplier

5) Average Daily Intake Rate

(Sum Intake values from surface & subsurface routes.)

Constituents of Concern	Subsurface Soil	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial
	Conc (mg/kg)	Receptor	Air POE Conc (mg/m <sup>3</sup> ) (1) / (2)	(IR×ET×EF×ED)/(BW×AT) (m <sup>3</sup> /kg-day)	(mg/kg-day) (3) X (4)	
Acenaphthene	0.0E+0	2.0E+5	0.0E+0	2.0E-1	0.0E+0	0.0E+0
Anthracene	0.0E+0	5.9E+4	0.0E+0	2.0E-1	0.0E+0	0.0E+0
Benzene	4.3E-1	3.8E+4	1.1E-5	7.0E-2	7.8E-7	7.9E-7
Dichlorobenzene (1,2) (-o)	9.8E-2	1.4E+5	6.9E-7	2.0E-1	1.3E-7	1.3E-7
Dichlorobenzene (1,4) (-p)	3.0E-2	1.8E+5	1.7E-7	7.0E-2	1.2E-8	1.2E-8
Dichloroethane, 1,1-	2.1E-1	3.8E+4	5.5E-6	2.0E-1	1.1E-6	1.1E-6
Dichloroethane, 1,2-	0.0E+0	3.8E+4	0.0E+0	7.0E-2	0.0E+0	0.0E+0
Ethylbenzene	2.7E+0	3.8E+4	7.0E-5	2.0E-1	1.4E-5	1.4E-5
Fluoranthene	0.0E+0	1.7E+5	0.0E+0	2.0E-1	0.0E+0	0.0E+0
Naphthalene	0.0E+0	1.4E+5	0.0E+0	2.0E-1	0.0E+0	0.0E+0
Phenanthrene	0.0E+0	6.4E+5	0.0E+0	2.0E-1	0.0E+0	2.9E-6
Pyrene	0.0E+0	2.6E+10	0.0E+0	2.0E-1	0.0E+0	1.7E-8
Tetrachloroethene	1.9E+0	5.7E+5	3.3E-6	7.0E-2	2.3E-7	2.3E-7
Toluene	2.4E+0	3.8E+4	6.3E-5	2.0E-1	1.2E-5	1.2E-5
Trichloroethane, 1,1,1-	5.4E-1	3.8E+4	1.4E-5	2.0E-1	2.8E-6	2.8E-6
Trichloroethane, 1,1,2-	0.0E+0	3.8E+4	0.0E+0	7.0E-2	0.0E+0	0.0E+0
Trichloroethene	8.7E+2	3.8E+4	2.3E-2	7.0E-2	1.6E-3	1.6E-3
Xylene (mixed isomers)	6.5E+0	3.8E+4	1.7E-4	2.0E-1	3.3E-5	3.3E-5

NOTE  
 ABS = Dermal absorption factor (dim)  
 AF = Adherence factor  
 AT = Averaging time (days)

BW = Body Weight (kg)  
 CF = Units conversion factor  
 ED = Exp duration (yrs)

EF = Exposure frequency (days/yr)  
 ET = Exposure time (hrs/day)  
 IR = Intake rate (L/day or mg/day)

POE = Point of exposure  
 SA = Skin surface area (cm<sup>2</sup>)

Serial g-265-vhx-686

Software GSI RBCA Spreadsheet  
 Version v 1.0

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.1

Site Name: EBMUD Adeline Maintenance Site Location: Oakland, CA

Completed By: David Glick

Date Completed: 1/1/1904

3 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS

(CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

DERMAL CONTACT

Exposure Concentration

1) Source Medium

4) Exposure Multiplier

(SAxAFxABSxCFxED)/(BWxAT) (1/day)

5) Average Daily Intake Rate

(mg/kg-day)

Constituents of Concern	Surface Soil Conc (mg/kg)	On-Site Residential	On-Site Commercial	On-Site Residential	On-Site Commercial
Acenaphthene	0.0E+0		2.3E-6		0.0E+0
Anthracene	0.0E+0		2.3E-6		0.0E+0
Benzene	1.2E-2		8.2E-6		9.8E-8
Dichlorobenzene (1,2) (-o)	0.0E+0		2.3E-5		0.0E+0
Dichlorobenzene, (1,4) (-p)	0.0E+0		8.2E-6		0.0E+0
Dichloroethane, 1,1-	0.0E+0		2.3E-5		0.0E+0
Dichloroethane, 1,2-	0.0E+0		8.2E-6		0.0E+0
Ethylbenzene	2.1E-2		2.3E-5		4.8E-7
Fluoranthene	2.9E+0		2.3E-6		6.6E-6
Naphthalene	0.0E+0		2.3E-6		0.0E+0
Phenanthrene	3.9E+0		2.3E-6		8.9E-6
Pyrene	3.3E+0		2.3E-6		7.6E-6
Tetrachloroethene	0.0E+0		8.2E-6		0.0E+0
Toluene	1.9E-2		2.3E-5		4.3E-7
Trichloroethane, 1,1,1-	0.0E+0		2.3E-5		0.0E+0
Trichloroethane, 1,1,2-	0.0E+0		8.2E-6		0.0E+0
Trichloroethene	0.0E+0		8.2E-6		0.0E+0
Xylene (mixed isomers)	1.7E-1		2.3E-5		3.9E-6

NOTE ABS = Dermal absorption factor (dim)  
AF = Adherence factor  
AT = Averaging time (days)

BW = Body Weight (kg)  
CF = Units conversion factor  
ED = Exp. duration (yrs)  
EF = Exposure frequency (days/yr)  
ET = Exposure time (hrs/day)  
IR = Intake rate (L/day or mg/day)

POE = Point of exposure  
SA = Skin surface area (cm<sup>2</sup>)

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.1

Site Name: EBMUD Adeline Maintena Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

4 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

SOIL EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS OR SEDIMENTS:

INGESTION

Exposure Concentration

1) Source Medium

4) Exposure Multiplier

(IRxCxEFxEDY/(BWxAT)) (1/day)

5) Average Daily Intake Rate

(mg/kg-day)

TOTAL PATHWAY INTAKE (mg/kg-day)

(Sum intake values from  
dermal & ingestion routes.)

Constituents of Concern	Surface Soil Conc (mg/kg)	4) Exposure Multiplier		5) Average Daily Intake Rate		TOTAL PATHWAY INTAKE (mg/kg-day)	
		On-Site Residential	On-Site Commercial	On-Site Residential	On-Site Commercial	On-Site Residential	On-Site Commercial
Acenaphthene	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Anthracene	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Benzene	1.2E-2		9.2E-7		1.1E-8		1.1E-7
Dichlorobenzene (1,2) (-o)	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Dichlorobenzene, (1,4) (-p)	0.0E+0		9.2E-7		0.0E+0		0.0E+0
Dichloroethane, 1,1-	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Dichloroethane, 1,2-	0.0E+0		9.2E-7		0.0E+0		0.0E+0
Ethylbenzene	2.1E-2		2.6E-6		5.4E-8		5.3E-7
Fluoranthene	2.9E+0		2.6E-6		7.4E-6		1.4E-5
Naphthalene	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Phenanthrene	3.9E+0		2.6E-6		1.0E-5		1.9E-5
Pyrene	3.3E+0		2.6E-6		8.5E-6		1.6E-5
Tetrachloroethene	0.0E+0		9.2E-7		0.0E+0		0.0E+0
Toluene	1.9E-2		2.6E-6		4.9E-8		4.8E-7
Trichloroethane, 1,1,1-	0.0E+0		2.6E-6		0.0E+0		0.0E+0
Trichloroethane, 1,1,2-	0.0E+0		9.2E-7		0.0E+0		0.0E+0
Trichloroethene	0.0E+0		9.2E-7		0.0E+0		0.0E+0
Xylene (mixed isomers)	1.7E-1		2.6E-6		4.4E-7		4.3E-6

NOTE

ABS = Dermal absorption factor (dim)  
AF = Adherence factor  
AT = Averaging time (days)

BW = Body Weight (kg)  
CF = Units conversion factor  
ED = Exp. duration (yrs)

EF = Exposure frequency (days/yr)  
ET = Exposure time (hrs/day)  
IR = Intake rate (L/day or mg/day)

POE = Point of exposure  
SA = Skin surface area (cm<sup>2</sup>)

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.1

Site Name EBMUD Adeline Maintenance Center

Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

5 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAY IS ACTIVE)

SOIL LEACHING TO GROUNDWATER/

INGESTION

Exposure Concentration

1) Source Medium

2) NAF Value (L/kg)

Receptor

3) Exposure Medium

Groundwater - POE (mg/L)

(1)/(2)

4) Exposure Multiplier

(IRxEFxED)/(BWxAT) (L/kg-day)

5) Average Daily Intake Rate

(mg/kg-day)

Constituents of Concern

	Soil Concentration (mg/kg)	On-Site Commercial	On-Site Commercial	On-Site Commercial	On-Site Commercial
Acenaphthene	0.0E+0	8.6E+2	0.0E+0	9.8E-3	0.0E+0
Anthracene	0.0E+0	1.7E+3	0.0E+0	9.8E-3	0.0E+0
Benzene	4.3E-1	5.9E+0	7.3E-2	3.5E-3	2.6E-4
Dichlorobenzene (1,2) (-o)	9.8E-2	2.5E+2	3.9E-4	9.8E-3	3.8E-6
Dichlorobenzene, (1,4) (-p)	3.0E-2	2.6E+2	1.2E-4	3.5E-3	4.0E-7
Dichloroethane, 1,1-	2.1E-1	9.0E+0	2.3E-2	9.8E-3	2.3E-4
Dichloroethane, 1,2-	0.0E+0	7.9E+0	0.0E+0	3.5E-3	0.0E+0
Ethylbenzene	2.7E+0	1.3E+1	2.1E-1	9.8E-3	2.0E-3
Fluoranthene	2.9E+0	4.6E+3	6.3E-4	9.8E-3	6.2E-6
Naphthalene	0.0E+0	1.6E+2	0.0E+0	9.8E-3	0.0E+0
Phenanthrene	3.9E+0	1.7E+3	2.3E-3	9.8E-3	2.2E-5
Pyrene	3.3E+0	4.6E+3	7.2E-4	9.8E-3	7.0E-6
Tetrachloroethene	1.9E+0	1.6E+4	1.2E-4	3.5E-3	4.2E-7
Toluene	2.4E+0	1.8E+1	1.4E-1	9.8E-3	1.3E-3
Trichloroethane, 1,1,1-	5.4E-1	3.6E+1	1.5E-2	9.8E-3	1.5E-4
Trichloroethane, 1,1,2-	0.0E+0	1.0E+0	0.0E+0	3.5E-3	0.0E+0
Trichloroethene	8.7E+2	3.8E+0	2.3E+2	3.5E-3	7.9E-1
Xylene (mixed isomers)	6.5E+0	3.0E+1	2.1E-1	9.8E-3	2.1E-3

NOTE AT = Averaging time (days)

BW = Body Weight (kg)  
CF = Units conversion factor  
ED = Exp duration (yrs)

EF = Exposure frequency (days/yr)  
IR = intake rate (L/day)

POE = Point of exposure

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.1

Site Name: EBMUD Adeline Maintenance Center

Site Location: Oakland, CA

Completed By: David Glick

Date Completed: 1/1/1904

6 OF 6

TIER 1 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

(CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: INGESTION

Exposure Concentration

1) Source Medium

2) NAF Value (dim)

Receptor

3) Exposure Medium

Groundwater POE Conc (mg/L) (1)/(2)

4) Exposure Multiplier

(IRxEFxED)/(BWxAT) (L/kg-day)

5) Average Daily Intake Rate

(mg/kg-day)

MAX. PATHWAY INTAKE (mg/kg-day)

(Maximum Intake of active pathways  
soil leaching & groundwater routes.)

Constituents of Concern	Groundwater Concentration (mg/L)				MAX. PATHWAY INTAKE (mg/kg-day)
		2) NAF Value (dim)	3) Exposure Medium	4) Exposure Multiplier	(Maximum Intake of active pathways soil leaching & groundwater routes.)
					On-Site
					Commercial
Acenaphthene	0.0E+0				0.0E+0
Anthracene	0.0E+0				0.0E+0
Benzene	0.0E+0				2.6E-4
Dichlorobenzene (1,2) (-o)	0.0E+0				3.8E-6
Dichlorobenzene, (1,4) (-p)	0.0E+0				4.0E-7
Dichloroethane, 1,1-	0.0E+0				2.3E-4
Dichloroethane, 1,2-	0.0E+0				0.0E+0
Ethylbenzene	0.0E+0				2.0E-3
Fluoranthene	0.0E+0				6.2E-6
Naphthalene	0.0E+0				0.0E+0
Phenanthrene	0.0E+0				2.2E-5
Pyrene	0.0E+0				7.0E-6
Tetrachloroethene	0.0E+0				4.2E-7
Toluene	0.0E+0				1.3E-3
Trichloroethane, 1,1,1-	0.0E+0				1.5E-4
Trichloroethane, 1,1,2-	0.0E+0				0.0E+0
Trichloroethene	0.0E+0				7.9E-1
Xylene (mixed isomers)	0.0E+0				2.1E-3

NOTE AT = Averaging time (days)

BW = Body Weight (kg)  
CF = Units conversion factor  
ED = Exp duration (yrs)

EF = Exposure frequency (days/yr)  
IR = Intake rate (L/day or mg/day)

POE = Point of exposure

Serial g-265-vhx-686

Software GSI RBCA Spreadsheet  
Version v 1.0

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.2

Site Name: EBMUD Adeline Maintenance Center

Site Location: Oakland, CA

Completed By: David Glick

Date Completed: 1/1/1904

1 OF 3

TIER 1 PATHWAY RISK CALCULATION

AIR EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK				TOXIC EFFECTS	
		(2) Total Carcinogenic Intake Rate (mg/kg/day)	(3) Inhalation Slope Factor (mg/kg-day) <sup>-1</sup>	(4) Individual COC Risk (2) x (3)	(5) Total Toxicant Intake Rate (mg/kg/day)	(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6)
		On-Site Commercial		On-Site Commercial	On-Site Commercial		On-Site Commercial
Acenaphthene	D				0.0E+0	6.0E-2	0.0E+0
Anthracene	D				0.0E+0	3.0E-1	0.0E+0
Benzene	A	7.9E-7	2.9E-2	2.3E-8	2.2E-6	1.7E-3	1.3E-3
Dichlorobenzene (1,2) (-o)	D				1.3E-7	4.0E-2	3.4E-6
Dichlorobenzene (1,4) (-p)	C	1.2E-8	2.4E-2	2.8E-10	3.3E-8	2.3E-1	1.5E-7
Dichloroethane, 1,1-	C				1.1E-6	1.4E-1	7.5E-6
Dichloroethane, 1,2-	B2	0.0E+0	9.1E-2	0.0E+0	0.0E+0	2.9E-3	0.0E+0
Ethylbenzene	D				1.4E-5	2.9E-1	4.8E-5
Fluoranthene	D				4.1E-6	4.0E-2	1.0E-4
Naphthalene	D				0.0E+0	4.0E-3	0.0E+0
Phenanthrene	D				2.9E-6	4.0E-3	7.3E-4
Pyrene	D				1.7E-8	3.0E-2	5.7E-7
Tetrachloroethene	C-B2	2.3E-7	2.0E-3	4.7E-10			
Toluene	D				1.2E-5	1.1E-1	1.1E-4
Trichloroethane, 1,1,1-	D				2.8E-6	2.9E-1	9.6E-6
Trichloroethane, 1,1,2-	C	0.0E+0	5.7E-2	0.0E+0			
Trichloroethene		1.6E-3	6.0E-3	9.5E-6			
Xylene (mixed isomers)	D				3.3E-5	2.0E+0	1.7E-5
		<b>Total Pathway Carcinogenic Risk =</b>		<b>9.5E-6</b>	<b>0.0E+0</b>	<b>Total Pathway Hazard Index =</b>	
						<b>2.3E-3</b>	<b>0.0E+0</b>



RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.2

Site Name: EBMUD Adeline Maintenance Center

Site Location: Oakland, C

Completed By: David Glick

Date Completed: 1/1/1904

2 OF 3

TIER 1 PATHWAY RISK CALCULATION

SOIL EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK						TOXIC EFFECTS			
		(2) Total Carcinogenic Intake Rate (mg/kg/day)		(3) Oral Slope Factor	(4) Individual COC Risk (2) x (3)		(5) Total Toxicant Intake Rate (mg/kg/day)		(6) Oral Reference Dose	(7) Individual COC Hazard Quotient (5) / (6)	
		On-Site Residential	On-Site Commercial	(mg/kg-day) <sup>-1</sup>	On-Site Residential	On-Site Commercial	On-Site Residential	On-Site Commercial	(mg/kg-day)	On-Site Residential	On-Site Commercial
Acenaphthene	D						0.0E+0	6.0E-2		0.0E+0	
Anthracene	D						0.0E+0	3.0E-1		0.0E+0	
Benzene	A		1.1E-7	2.9E-2		3.2E-9					
Dichlorobenzene (1,2) (-o)	D						0.0E+0	9.0E-2		0.0E+0	
Dichlorobenzene, (1,4) (-p)	C		0.0E+0	2.4E-2		0.0E+0	0.0E+0	2.3E-1		0.0E+0	
Dichloroethane, 1,1-	C						0.0E+0	1.0E-1		0.0E+0	
Dichloroethane, 1,2-	B2		0.0E+0	9.1E-2		0.0E+0					
Ethylbenzene	D						5.3E-7	1.0E-1		5.3E-6	
Fluoranthene	D						1.4E-5	4.0E-2		3.5E-4	
Naphthalene	D						0.0E+0	4.0E-3		0.0E+0	
Phenanthrene	D						1.9E-5	4.0E-3		4.7E-3	
Pyrene	D						1.6E-5	3.0E-2		5.3E-4	
Tetrachloroethene	C-B2		0.0E+0	5.2E-2		0.0E+0	0.0E+0	1.0E-2		0.0E+0	
Toluene	D						4.8E-7	2.0E-1		2.4E-6	
Trichloroethane, 1,1,1-	D						0.0E+0	9.0E-2		0.0E+0	
Trichloroethane, 1,1,2-	C		0.0E+0	5.7E-2		0.0E+0	0.0E+0	4.0E-3		0.0E+0	
Trichloroethene			0.0E+0	1.1E-2		0.0E+0	0.0E+0	6.0E-3		0.0E+0	
Xylene (mixed isomers)	D						4.3E-6	2.0E+0		2.2E-6	
		<b>Total Pathway Carcinogenic Risk =</b>		<b>0.0E+0</b>	<b>3.2E-9</b>	<b>Total Pathway Hazard Index =</b>		<b>0.0E+0</b>	<b>5.6E-3</b>		

RBCA SITE ASSESSMENT

Tier 1 Worksheet 8.2

Site Name: EBMUD Adeline Maintenance Center

Site Location: Oakland, CA

Completed By: David Glick

Date Completed: 1/1/1904

3 OF 3

TIER 1 PATHWAY RISK CALCULATION

GROUNDWATER EXPOSURE PATHWAYS

■ (CHECKED IF PATHWAYS ARE ACTIVE)

Constituents of Concern	(1) EPA Carcinogenic Classification	CARCINOGENIC RISK				TOXIC EFFECTS		
		(2) Total Carcinogenic Intake Rate (mg/kg/day)	(3) Oral Slope Factor	(4) Individual COC Risk (2) x (3)	(5) Total Toxicant Intake Rate (mg/kg/day)	(6) Oral Reference Dose	(7) Individual COC Hazard Quotient (5) / (6)	
		On-Site Commercial	(mg/kg-day) <sup>-1</sup>	On-Site Commercial	On-Site Commercial	(mg/kg-day)	On-Site Commercial	
Acenaphthene	D				0.0E+0	6.0E-2	0.0E+0	
Anthracene	D				0.0E+0	3.0E-1	0.0E+0	
Benzene	A	2.6E-4	2.9E-2	7.4E-6				
Dichlorobenzene (1,2) (-o)	D				3.8E-6	9.0E-2	4.2E-5	
Dichlorobenzene (1,4) (-p)	C	4.0E-7	2.4E-2	9.7E-9	1.1E-6	2.3E-1	4.9E-6	
Dichloroethane, 1,1-	C				2.3E-4	1.0E-1	2.3E-3	
Dichloroethane, 1,2-	B2	0.0E+0	9.1E-2	0.0E+0				
Ethylbenzene	D				2.0E-3	1.0E-1	2.0E-2	
Fluoranthene	D				6.2E-6	4.0E-2	1.5E-4	
Naphthalene	D				0.0E+0	4.0E-3	0.0E+0	
Phenanthrene	D				2.2E-5	4.0E-3	5.6E-3	
Pyrene	D				7.0E-6	3.0E-2	2.3E-4	
Tetrachloroethene	C-B2	4.2E-7	5.2E-2	2.2E-8	1.2E-6	1.0E-2	1.2E-4	
Toluene	D				1.3E-3	2.0E-1	6.6E-3	
Trichloroethane, 1,1,1-	D				1.5E-4	9.0E-2	1.6E-3	
Trichloroethane, 1,1,2-	C	0.0E+0	5.7E-2	0.0E+0	0.0E+0	4.0E-3	0.0E+0	
Trichloroethene		7.9E-1	1.1E-2	8.7E-3	2.2E+0	6.0E-3	3.7E+2	
Xylene (mixed isomers)	D				2.1E-3	2.0E+0	1.0E-3	
		<b>Total Pathway Carcinogenic Risk =</b>		<b>8.7E-3</b>	<b>0.0E+0</b>	<b>Total Pathway Hazard Index =</b>	<b>3.7E+2</b>	<b>0.0E+0</b>

**RBCA SITE ASSESSMENT**

Tier 1 Worksheet 8.3

Site Name EBMUD Adeline Maintenance Center Completed By: David Glick  
 Site Location: Oakland, C Date Completed: 1/1/1904

**TIER 1 BASELINE RISK SUMMARY TABLE**

**BASELINE CARCINOGENIC RISK**

**BASELINE TOXIC EFFECTS**

EXPOSURE PATHWAY	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
<b>AIR EXPOSURE PATHWAYS</b>										
Complete:	9.5E-6	1.0E-4	9.5E-6	N/A	<input type="checkbox"/>	1.3E-3	1.0E+0	2.3E-3	N/A	<input type="checkbox"/>
<b>GROUNDWATER EXPOSURE PATHWAYS</b>										
Complete:	8.7E-3	1.0E-4	8.7E-3	N/A	<input checked="" type="checkbox"/>	3.7E+2	1.0E+0	3.7E+2	N/A	<input checked="" type="checkbox"/>
<b>SOIL EXPOSURE PATHWAYS</b>										
Complete:	3.2E-9	1.0E-4	3.2E-9	N/A	<input type="checkbox"/>	4.7E-3	1.0E+0	5.6E-3	N/A	<input type="checkbox"/>
<b>CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)</b>										
	8.7E-3	1.0E-4	8.7E-3	N/A	<input checked="" type="checkbox"/>	3.7E+2	1.0E+0	3.7E+2	N/A	<input checked="" type="checkbox"/>