Environmental
Science &
Engineering, Inc.

A CILCORP Company

REPORT OF FINDINGS
FIRST QUARTER 1994 GROUND WATER MONITORING
ALAMEDA HOUSING AUTHORITY
1916 WEBSTER STREET
ALAMEDA, CALIFORNIA

(ESE PROJECT #6-94-5199)

PREPARED FOR:

ALAMEDA HOUSING AUTHORITY
701 ATLANTIC AVENUE
ALAMEDA, CALIFORNIA 94501

PREPARED BY:

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
4090 NELSON AVENUE, SUITE J
CONCORD, CALIFORNIA 94520

APRIL 6, 1994

This First Quarter 1994 Ground Water Monitoring Report has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of the Alameda Housing Authority as it pertains to its site located at 1916 Webster Street in Alameda, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this report.

REPORT PREPARED BY:

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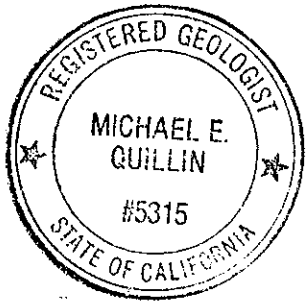
Senior Hydrogeologist
California Registered Geologist No. 5315

APRIL 6, 1994
Date



REVIEWED BY:

Jerry McHugh
Senior Engineer

APR. 7, 1994
Date

ESE PROJECT #6-94-5199

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

This report presents the findings of quarterly ground water monitoring performed by Environmental Science & Engineering, Inc. (ESE) on January 26, 1994, at the Alameda Housing Authority (AHA) site located at 1916 Webster Street in Alameda, California (Figure 1). ESE prepared this report on behalf of the AHA for submittal to the Alameda County Health Care Services Agency (ACHCSA) and the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region for review. The ACHCSA is the lead agency for this site and is responsible for approving site closure with RWQCB concurrence.

Ground water monitoring activities performed by ESE include measurement of static ground water levels in existing site wells, collection of ground water samples from those wells, and preparation of this technical report. The locations of existing wells MW-1, MW-2, and MW-3 are shown in Figure 2.

1.1 SITE DESCRIPTION

The site is located at the intersection of Webster Street and Atlantic Avenue in Alameda (Figure 1). The site is at an approximate elevation of six feet above mean sea level (msl) and has relatively flat topography (U.S.G.S, 1980). The site is located approximately 1/2-mile south of the Oakland Inner Harbor and 3/4-mile north of San Francisco Bay. Several residential units, schools and commercial businesses are located near the site.

2.0 BACKGROUND

2.1 UNDERGROUND STORAGE TANK REMOVAL

The site consists of a warehouse, offices that are leased and occupied, and a parking lot. The potential for petroleum hydrocarbon impacts to soil and ground water was identified during the removal of a 280-gallon gasoline underground storage tank (UST) on July 16, 1986. Reportedly, the UST had not been in service for many years but contained a mixture

of water and leaded gasoline. The UST contents were evacuated prior to the tank removal. Reportedly, there were no visible holes in the UST, however, laboratory analysis of soil samples collected from the excavation identified elevated concentrations of benzene, toluene, and xylenes (Aqua Science, 1986a).

Based on the results of the soil analysis, additional contaminated soil was excavated and additional samples were collected in July and August 1986. During this time, eight boreholes (B1 through B6; MW1 and MW2) were drilled on the site (Figure 2). Two of these boreholes were converted to monitoring wells (MW1 and MW2). Ground water samples were collected from the borings and the monitoring wells (Aqua Science, 1986b). Analytical results for those samples reported the highest concentrations of total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene and xylenes (BTX) in ground water sampled from boring B-1, located north of and downgradient of the former UST. With the exception of boring B-2, one or more of TPH-G and BTX constituents were detected in each of the ground water samples.

A review of the site investigation reports indicated that soil excavation was terminated near the northern site boundary after field screening and visual observations indicated that contaminated soil had been removed. It was reported that approximately 130 cubic yards of contaminated soil was excavated and aerated on the site. The treated soil was used as backfill in the excavation (Aqua Science, 1986c).

2.2 SITE INVESTIGATIONS

No additional work was conducted at the site until 1990 when PRC Environmental Management, Inc. collected ground water samples from the two monitoring wells (MW1 and MW2) as part of the sampling program for the nearby Alameda Naval Air Station. The samples were analyzed for volatile organic compounds (VOCs) by EPA Method 624 and extractable organic compounds (EOCs) by EPA Method 625. No VOCs or EOCs were reported from either of the monitoring wells (PRC Environmental Management, 1990).

One additional monitoring well (MW3) was installed by Versar in July 1991 (Versar, 1991b). MW3 was installed to determine the local ground water gradient and to evaluate the ground water quality. The two previously installed monitoring wells (MW1 and MW2) were evaluated as to their condition and were determined to be suitable for use as monitoring wells. MW1, MW2 and MW3 were developed and ground water samples were collected. The ground water samples were analyzed for TPH-G and for benzene, toluene, ethylbenzene, and xylenes (BTEX).

TPH-G and BTEX were not detected in the ground water samples collected in July 1991 from MW1 and MW3. TPH-G and toluene were not detected in the ground water sample collected from MW2. However, benzene at 3.7 micrograms per liter (μg/L), ethylbenzene at 0.50 μg/L, and xylenes at 5.1 μg/L were detected in the MW2 sample. The benzene concentration was slightly above the California Maximum Contaminant Level (Cal MCL) of 1.0 μg/L (Versar, 1991a).

In addition to MW3, a shallow soil boring (BH-7) was drilled at the north end of the previously excavated area to verify the areal extent of soil contamination. Soil samples from BH-7 contained concentrations of TPH-G and BTEX, indicating that impacted soil was present north of the previous excavation limits (Versar, 1991b).

In July 1992, Versar drilled six borings B8 through B13 (Figure 2) to delineate the limits of hydrocarbon impacted soil and ground water (Versar, 1992a). Soil and ground water samples were collected from each boring and analyzed for TPH-G and BTEX. The soil and ground water samples from boring B8 were also analyzed for total lead. With the exception of boring B-9, all soil and ground water samples were reported to contain nondetectable concentrations of TPH-G and BTEX. Xylenes were reported in the soil sample collected from boring B-9; benzene and xylenes were reported in the ground water sample from that boring.

Ground water monitoring was performed by Versar in 1992 and 1993.

In January 1994, AHA contracted ESE to perform soil and ground water remediation at the site, and to provide quarterly ground water monitoring and reporting services. In February 1994, ESE submitted on behalf of AHA a corrective action plan (CAP) to the ACHCSA and the RWQCB for review and comment (ESE, 1994). The CAP presented the objectives, technical approach, proposed cleanup goals, and proposed implementation schedule for remedial measures for soil and ground water cleanup at the site.

3.0 SITE GEOLOGY/HYDROGEOLOGY

The site is located in the Coast Ranges geomorphic province, at an approximate elevation of six feet above mean sea level. The area is tectonically active, being situated between the Hayward fault on the east and the San Andreas Fault on the west. The underlying bedrock consists of Mesozoic sedimentary and volcanic rocks found throughout the Coast Ranges.

The general area surrounding the site is underlain by unconsolidated Pleistocene marine and nonmarine sediments that are known as the Merritt Sand (Helley and LaJoie, 1979). The unit is composed primarily of loose, well sorted, fine to medium grained sand particles with interbedded clays and silts which dominate the shallow subsurface at the site. The local soil stratigraphy at the site consists of sandy fill overlying sandy clays and sands.

The first ground water at the site occurs at approximately five feet below ground surface. Historical ground water level data are presented in Table 1.

4.0 GROUND WATER MONITORING PROCEDURES

4.1 GROUND WATER ELEVATIONS

On January 26, 1994, ESE measured static water levels in wells MW-1, MW-2, and MW-3 using an electric water level tape. Measurements were made relative to the surveyed datum for each well. ESE calculated relative ground water elevations for the purpose of preparing a ground water elevation contour map (Figure 3), from which ESE estimated the general direction and magnitude of the ground water gradient in the vicinity of the site. Field documentation for water level measurements, including well purging results, are presented in Appendix A - Well Purging and Sampling Data.

4.2 GROUND WATER SAMPLING AND ANALYSIS

Ground water samples were collected from wells MW-1, MW-2, and MW-3 after each was purged of approximately three casing volumes in accordance with ESE Standard Operating Procedure (SOP) No. 3 for Ground Water Monitoring and Sampling from Monitoring Wells (Appendix B). Samples were transported under appropriate chain of custody documentation to Chromalab, Inc. (Chromalab), a State-certified laboratory. Chromalab analyzed samples for TPH-G and BTEX using EPA Method 5030/8015/602, for total lead using EPA Method 3010/6010, and for organic lead using California Department of Health Services (DHS) - prescribed methodology.

5.0 RESULTS

5.1 GROUND WATER ELEVATIONS

Ground water elevations measured by ESE on January 26, 1994 are presented with historical ground water elevation data in Table 1. Current ground water elevation data are contoured in Figure 3. The results show that the primary direction of ground water flow on that date is to the north-northeast, with a gradient of approximately 0.04 feet/foot (220 feet/mile).

No free-phase petroleum hydrocarbons (product) were observed in any of the wells.

5.2 GROUND WATER CHEMISTRY

Analytical results for ground water samples collected by ESE on January 26, 1994 are summarized with historical data in Table 2 and graphically presented in Figure 4. Laboratory reports and chain of custody documentation for these samples are presented in Appendix C - Laboratory Reports and Chain of Custody Documentation for Ground Water Samples. It is noted in Table 2 and Figure 4 that none of the samples reported detectable TPH-G, BTEX, or organic lead at the appropriate method reporting limits. The sample from well MW-2 reported total lead at a concentration of 70 μg/L, which exceeds the California Primary Maximum Contaminant Level (MCL) of 50 μg/L for drinking water.

6.0 CONCLUSIONS

Based on findings from this quarterly monitoring event, ESE concludes the following:

- The primary direction of ground water flow at the site is toward the north; this will be the preferred direction of migration for petroleum hydrocarbons or other contaminants that may be present in site ground water.
- Ground water monitored in the vicinity of the existing site wells does not appear to be impacted by petroleum hydrocarbons. Total lead detected above the California Primary MCL in well MW-2 may be related to leaded gasoline.

7.0 REFERENCES

Aqua Science Engineers, Inc. (Aqua Science), 1986a, A Proposal for Soil and Water Investigation at the Alameda Housing Authority; dated August 11, 1986.

_____, 1986b, Soils Investigation, A Summary of Findings and a Proposal for Remedial Action, dated September 4, 1986.

_____, 1986c, Soil and Water Quality Treatment Summary and Recommendations, A Final Report, dated October 16, 1986.

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Helley, E.J. and K.R. LaJoie, 1979, Flatland Deposits of the San Francisco Bay Region, California - Their Geology and Engineering Properties and their Importance to Comprehensive Planning, U.S. Geologic Survey Professional Paper 943, United States Government Printing Office, Washington, D.C., 88 pp.

Norris, R.M. and Webb, R.W., 1990, Geology of California: John Wiley and Sons, New York, 541 p.

PRC Environmental Management, Inc., October 11, 1990, Copy of Laboratory Analytical Results; dated October 11, 1990.

U.S. Geological Survey (USGS), 1980, 7.5 Minute Topographic Series, Oakland West, California Quadrangle, 1959; Photorevised 1980.

Versar, Inc. (Versar), 1991a, Work Plan for the Subsurface Evaluation at 1916 Webster Street, Alameda, California; dated March 22, 1991.

_____, 1991b, Stage One Site Assessment of the Housing Authority of the City of Alameda Site at 1916 Webster Street, Alameda, California; dated November 4, 1991.

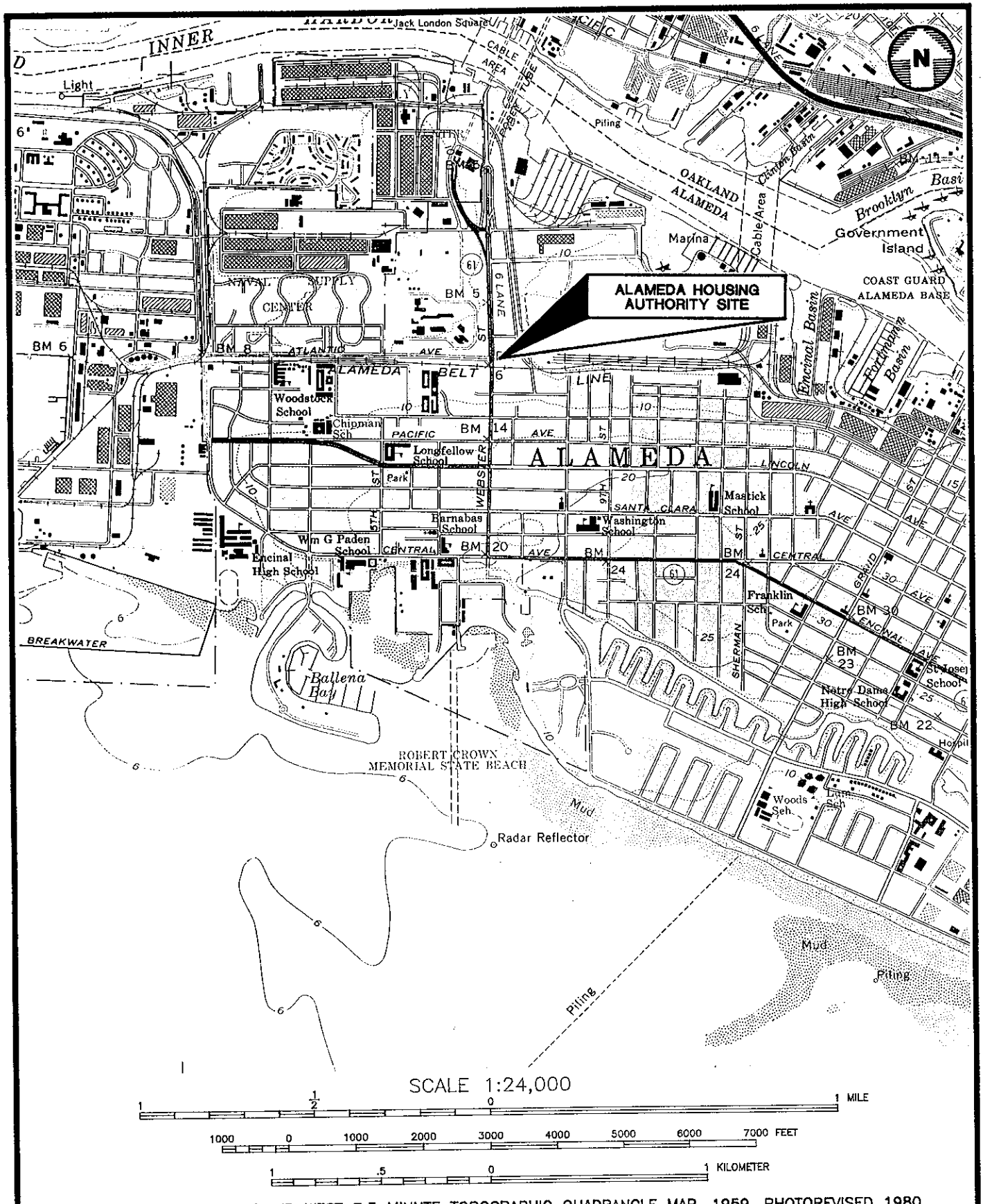
_____, 1992a, Quarterly Ground Water Sampling Report, Housing Authority of the City of Alameda Site at 1916 Webster Street, Alameda, California; dated January 27, 1992.

_____, 1992b, Quarterly Ground Water Sampling Report, Housing Authority of the City of Alameda Site at 1916 Webster Street, Alameda, California; dated June 9, 1992.

_____, 1993a, Quarterly Ground Water Sampling Report, Housing Authority of the City of Alameda Site at 1916 Webster Street, Alameda, California; dated March 12, 1993.

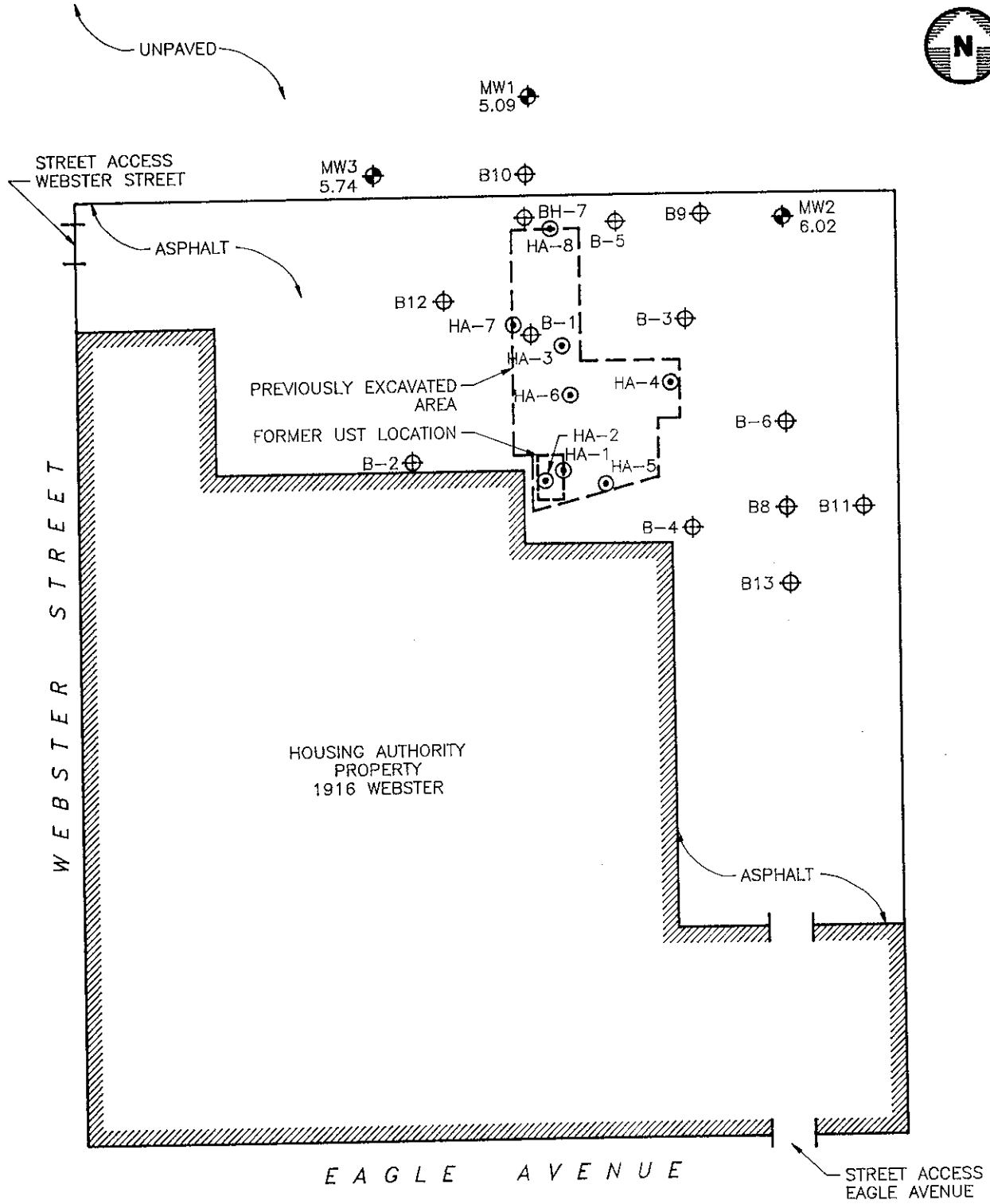
_____, 1993b, Draft Quarterly Ground Water Sampling Report, Housing Authority of the City of Alameda Site at 1916 Webster Street, Alameda, California; dated August 16, 1993.

FIGURES



ADAPTED FROM U.S.G.S. OAKLAND WEST 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP, 1959, PHOTOREVISED 1980.

ESE A CILCORP Company **Environmental Science & Engineering, Inc.**	DATE 2/94	LOCATION MAP	FIGURE NO. 1
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	REVISED	ALAMEDA HOUSING AUTHORITY 1916 WEBSTER STREET ALAMEDA, CALIFORNIA	PROJ. NO. 6-94-5199
	CAD FILE 51991001		

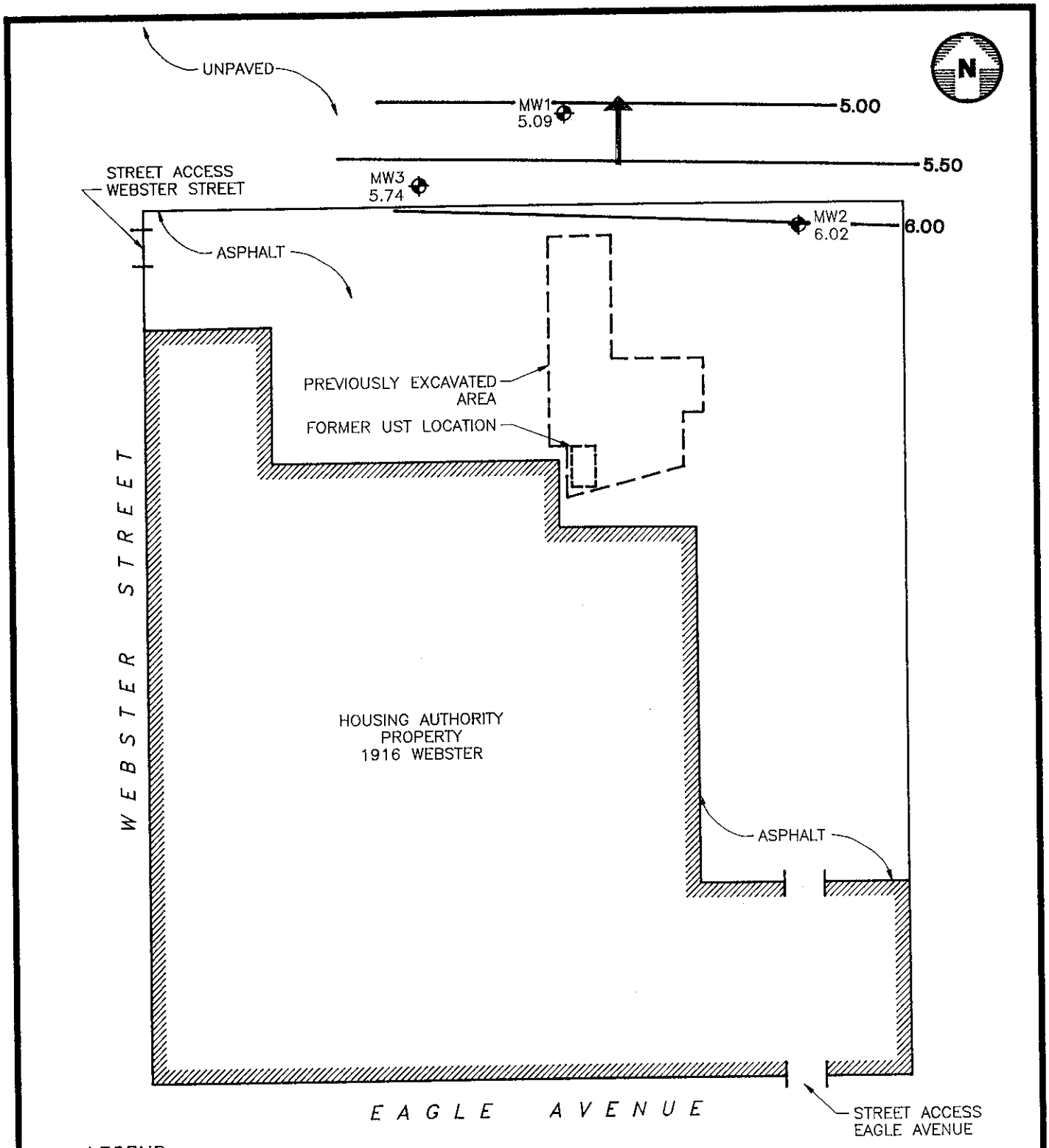


LEGEND

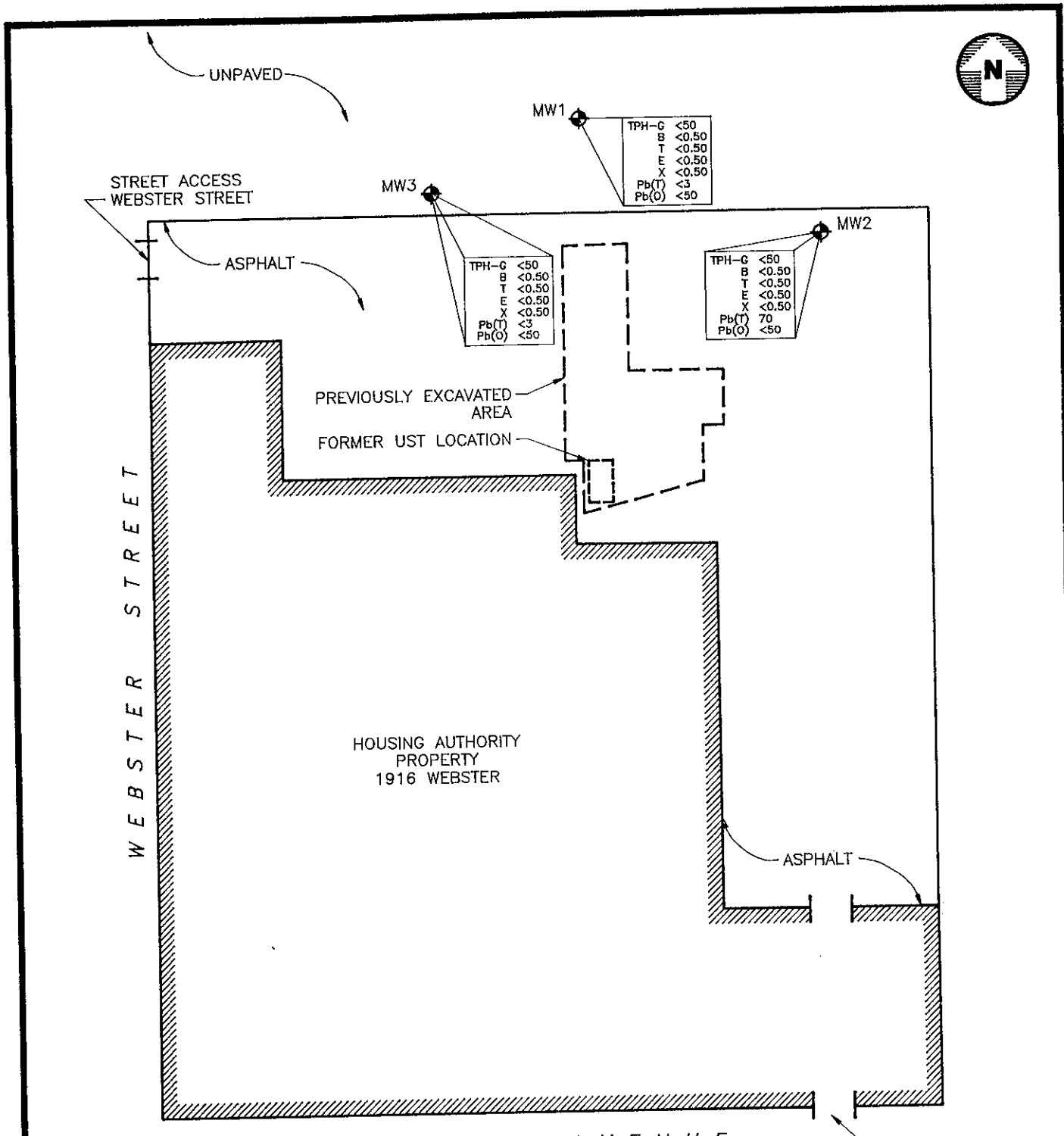
- GROUND WATER MONITORING WELL
- SOIL BORING LOCATION
- SOIL SAMPLE LOCATION

SCALE
0 30 FEET

Environmental Science & Engineering, Inc. (A CILCORP Company)	DATE 2/94	MONITORING WELL AND BORING LOCATIONS MAP	FIGURE NO. 2
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	REVISED	ALAMEDA HOUSING AUTHORITY 1916 WEBSTER STREET ALAMEDA, CALIFORNIA	PROJ. NO. 6-94-5199
	CAD FILE 51991004		



ESE A CILCORP Company — Environmental Science & Engineering, Inc.	DATE 2/94	GROUND WATER ELEVATIONS	FIGURE NO. 3
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	REVISED	ALAMEDA HOUSING AUTHORITY 1916 WEBSTER STREET ALAMEDA, CALIFORNIA	PROJ. NO. 6-94-5199
	CAD FILE 51991002		



LEGEND

- ◈ GROUND WATER MONITORING WELL
- TPH-G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X TOTAL XYLENES
- Pb(T) TOTAL LEAD
- Pb(O) ORGANIC LEAD

SCALE
0 30 FEET

ALL CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)

ESE A CILCORP Company **Environmental Science & Engineering, Inc.**	DATE 2/94	PETROLEUM HYDROCARBONS IN GROUND WATER JANUARY 26, 1994	FIGURE NO. 4
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	REVISED	ALAMEDA HOUSING AUTHORITY 1916 WEBSTER STREET ALAMEDA, CALIFORNIA	PROJ. NO. 6-94-5199
	CAD FILE 51991008		

TABLES

TABLE 1

GROUND WATER ELEVATION DATA (1)

Alameda Housing Authority
1916 Webster Street
Alameda, California

Well No.	Date	TOC-Elevation (feet)	DTW (feet)	Ground Water Elevation (feet)
MW-1	10/22/92	9.23	4.94	4.29
	03/19/93	9.23	3.72	5.51
	04/19/93	9.23	3.91	4.92
	05/30/93	9.23	3.94	5.29
	06/29/93	9.23	4.36	4.87
	08/04/93	9.23	4.55	4.68
	01/26/94	9.23	4.14	5.09
MW-2	10/22/92	10	5.22	4.78
	03/19/93	10	3.39	6.61
	04/19/93	10	3.78	6.22
	05/30/93	10	3.86	6.14
	06/29/93	10	4.41	5.59
	08/04/93	10	4.72	5.28
	01/26/94	10	3.98	6.02
MW-3	10/22/92	9.44	4.66	4.78
	03/19/93	9.44	3.18	6.26
	04/19/93	9.44	3.44	4.65
	05/30/93	9.44	3.45	5.99
	06/29/93	9.44	3.95	5.49
	08/04/93	9.44	4.13	5.31
	01/26/94	9.44	3.7	5.74

NOTES:

TOC = Top of Well Casing
DTW = Depth to Water
(1) = Data reported by ESE. Data prior to 01/26/94 reported by Versar, Inc.

TABLE 2

ANALYTICAL RESULTS: GROUND WATER SAMPLES (1)

Alameda Housing Authority
1916 Webster Street
Alameda, California

Sample I.D.	Date	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Total Lead (µg/L)	Organic Lead (µg/L)
MW1	07/91	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	11/91	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	02/92	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	07/92	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	03/93	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	04/93	NS	NS	NS	NS	NS	NA	NA
	06/93	<50	<0.30	<0.30	<0.30	<0.50	NA	NA
	01/94	<50	<0.50	<0.50	<0.50	<0.50	<3	<50
MW2	07/91	<50	3.7	<0.50	0.50	5.1	NA	NA
	11/91	<50	1.1	<0.50	<0.50	4.5	NA	NA
	02/92	<50	<0.50	<0.50	<0.50	1.6	NA	NA
	07/92	<50	<0.50	0.59	<0.50	<1.5	NA	NA
	03/93	<250	<52	<50	<59	<150	NA	NA
	04/93	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	06/93	<50	<0.30	<0.30	<0.30	.95	NA	NA
	01/94	<50	<0.50	<0.50	<0.50	<0.50	70	<50
MW3	07/91	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	11/91	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	02/92	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	07/92	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	03/93	<250	<52	<50	<59	<152	NA	NA
	04/93	<50	<0.50	<0.50	<0.50	<1.5	NA	NA
	06/93	<50	<0.30	<0.30	<0.30	<0.50	NA	NA
	01/94	<50	<0.50	<0.50	<0.50	<0.50	<3	<50
Cal MCL	--	--	1	100	680	1,750	50	--

NOTES:

µg/L = Micrograms per Liter
NA = Not analyzed for this constituent.
NS = No sample collected
(1) = January 1994 data reported by ESE. Data prior to 1/94 reported by Versar, Inc. (Versar 1991b, Versar 1992a, Versar 1992b, Versar 1993a and Versar 1993b)

APPENDIX A

WELL PURGING AND SAMPLING DATA

Environmental Science & Engineering, Inc.
A CH2MHILL Company

SAMPLE COLLECTION LOG

PROJECT NAME: A. H. A.
PROJECT NO.: 6-94-5199
DATE: Jan. 26, 94

SAMPLE LOCATION I.D.: MW-1
SAMPLER: Paul Marsden
PROJECT MANAGER: Mac Q.

CASING DIAMETER

2" X
4" ____
Other ____

SAMPLE TYPE

Ground Water X
Surface Water ____
Treat. Influent ____
Treat. Effluent ____
Other ____

WELL VOLUMES PER UNIT

Well Casing I.D. (inches)	Gal/Ft.
2.0	0.1632
4.0	0.6528
6.0	1.4690

DEPTH TO PRODUCT: Ø (ft.)
DEPTH TO WATER: 4.14 (ft.)
DEPTH OF WELL: 14.75 (ft.)

PRODUCT THICKNESS: Ø (ft.)
WATER COLUMN: 10.61 (ft.)
WELL CASING VOLUME: 1.7 (gal)

MINIMUM PURGE VOLUME (3 or 4 WCV): 6.8 (gal)
ACTUAL VOLUME PURGED: 8 (gal)

TIME	Volume (GAL)	pH (Units)	E.C. (Micromhos)	Temperature (F°)	Turbid. (NTU)	Other
			X1000			
	0	6.57	2.90	57.4°		
	2	6.52	2.91	57.0°		
	4	6.54	2.88	57.1°		
	8	6.53	2.89	56.9°		

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE Hydac 9 UNIT# 9009 DATE: 1/26 TIME: 1045 BY: PM
TURBIDITY: TYPE ____ UNIT# ____ DATE: ____ TIME: ____ BY: ____

PURGE METHOD

___Displacement Pump ___Other
X Bailer (Teflon/PVC/SS) ___Submersible Pump

SAMPLE METHOD

___Bailer (Teflon/PVC/SS) ___Dedicated
X Bailer (Disposable) ___Other

SAMPLES COLLECTED

	ID	TIME	DATE	LAB	ANALYSES
SAMPLE	MW-1	11:55	1/26	Cromalab	8010/8020/7421
DUPLICATE					
SPLIT					
FIELD BLANK					

COMMENTS: ____

SAMPLER: [signature] PROJECT MANAGER [signature]

4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323

Environmental Science & Engineering, Inc.
A CRLCORP Company

SAMPLE COLLECTION LOG

PROJECT NAME: A.H.A.
PROJECT NO.: 6-94-5799
DATE: Jan. 26, 94

SAMPLE LOCATION I.D.: MW-2
SAMPLER: Paul Marsden
PROJECT MANAGER: Mac Q.

CASING DIAMETER

2" X
4" ____
Other ____

SAMPLE TYPE

Ground Water X
Surface Water ____
Treat. Influent ____
Treat. Effluent ____
Other ____

WELL VOLUMES PER UNIT

Well Casing I.D. (inches)	Gal/Ft.
2.0	0.1632
4.0	0.6528
6.0	1.4690

DEPTH TO PRODUCT: 0 (ft.)
DEPTH TO WATER: 3.98 (ft.)
DEPTH OF WELL: 12.98 (ft.)

PRODUCT THICKNESS: 0 (ft.)
WATER COLUMN: 9 (ft.)
WELL CASING VOLUME: 1.4 (gal)

MINIMUM PURGE VOLUME
~~3 or~~ 4 WCV: 5.6 (gal)
ACTUAL VOLUME PURGED: 6 (gal)

TIME	Volume (GAL)	pH (Units)	E.C. (Micromhos)	Temperature (F°)	Turbid. (NTU)	Other
			X1000			
	0	6.15	4.96	58.3°		Dark
	2	6.18	4.95	58.1°		Yellow
	4	6.16	4.97	58.4°		
	6	6.14	4.96	58.0°		"

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE Hydac 9 UNIT# 9009 DATE: 1/26/94 TIME: 1045 BY: PM
TURBIDITY: TYPE ____ UNIT# ____ DATE: ____ TIME: ____ BY: ____

PURGE METHOD

___Displacement Pump ___Other
X Baller (Teflon/PVC/SS) ___Submersible Pump

SAMPLE METHOD

___Baller (Teflon/PVC/SS) ___Dedicated
X Baller (Disposable) ___Other

SAMPLES COLLECTED

	ID	TIME	DATE	LAB	ANALYSES
SAMPLE	MW-2	1225	1/26	Chroma	
DUPLICATE					
SPLIT					
FIELD BLANK					

COMMENTS: ____

SAMPLER: ____ PROJECT MANAGER ____

4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323

Environmental Science & Engineering, Inc.
A CH2M HILL Company

SAMPLE COLLECTION LOG

PROJECT NAME: A.H.A.
PROJECT NO.: 6-94-5199
DATE: Jan. 26. 94

SAMPLE LOCATION I.D.: MW-3
SAMPLER: Paul Marsden
PROJECT MANAGER: Mac Q.

CASING DIAMETER

2" X
4" ____
Other ____

SAMPLE TYPE

Ground Water X
Surface Water ____
Treat. Influent ____
Treat. Effluent ____
Other ____

WELL VOLUMES PER UNIT

Well Casing I.D. (inches)	Gal/Ft.
2.0	0.1632
4.0	0.6528
6.0	1.4690

DEPTH TO PRODUCT: 0 (ft.)
DEPTH TO WATER: 3.70 (ft.)
DEPTH OF WELL: 14.42 (ft.)

PRODUCT THICKNESS: 0 (ft.)
WATER COLUMN: 10.72 (ft.)
WELL CASING VOLUME: 1.7 (gal)

MINIMUM PURGE VOLUME
~~(3 of 4 WCV)~~: 6.Y (gal)
ACTUAL VOLUME PURGED: 8 (gal)

TIME	Volume (GAL)	pH (Units)	E.C. (Micromhos)	Temperature (F°)	Turbid. (NTU)	Other
			X1000			
	0	7.11	2.26	61.3°		Yellow
	2	7.09	2.26	61.6°		
	4	7.07	2.19	61.4°		
	8	7.07	2.26	61.3°		

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE Hydac 9 UNIT# 9009 DATE: 1-26-94 TIME: 10:45 BY: PM
TURBIDITY: TYPE ____ UNIT# ____ DATE: ____ TIME: ____ BY: ____

PURGE METHOD

___ Displacement Pump ___ Other
X Bailer (Teflon/PVC/SS) ___ Submersible Pump

SAMPLE METHOD

___ Bailer (Teflon/PVC/SS) ___ Dedicated
X Bailer (Disposable) ___ Other

SAMPLES COLLECTED

	ID	TIME	DATE	LAB	ANALYSES
SAMPLE	MW-3	11:20	1/26	Chemo	3010/8020/5421
DUPLICATE					
SPLIT					
FIELD BLANK					

COMMENTS: ____

SAMPLER: Paul Marsden PROJECT MANAGER M. Quill

4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323

APPENDIX B

ESE STANDARD OPERATING PROCEDURE NO. 3 FOR GROUND WATER MONITORING AND SAMPLING FROM MONITORING WELLS

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 3
FOR GROUND-WATER MONITORING AND SAMPLING FROM MONITORING WELLS

Environmental Science & Engineering, Inc. (ESE) typically performs ground-water monitoring at project sites on a quarterly basis. As part of the monitoring program an ESE staff member will first gauge the depth to water and free product (if present) in each well, then collect ground-water samples from each well. Depth to water measurements are taken by lowering an electric fiberglass tape measure into the well and recording the occurrence of water in feet below a fixed datum set on the top of the well-casing. If free-phase liquid hydrocarbons (free product) are known or suspected to be present in the well, then an electric oil/water interface probe is used to determine the depth to the occurrence of ground-water and the free product in feet below the fixed datum on the top of the well-casing. Depth to water and depth to product measurements are measured and recorded within an accuracy of 0.005-foot. The electric tape and the electric oil/water interface probe are washed with an Alconox® detergent and tap water solution then rinsed with tap water between uses in different wells.

Ground-water samples are collected from a well subsequent to purging a minimum of three to four well-casing volumes of ground water from the well, if the well bails dry prior to the removal of the required minimum volume, then the samples are collected upon the recovery of the ground water in that well to 80% of its initial static level. Ground water is typically purged from monitoring wells using either a hand-operated positive displacement pump, constructed of polyvinylchloride (PVC); a new (precleaned), disposable polyethylene bailer; or, a variable-flow submersible pump, constructed of stainless steel and Teflon®. The hand pumps and the submersible pumps are cleaned between each use with an Alconox® detergent and tap water solution followed by a tap water rinse. During the well purging process the conductivity, pH and temperature of the ground water are monitored by the ESE staff member. Ground-water samples are collected from the well subsequent to the stabilization of the of the conductivity, pH and temperature of the purge water, and the removal of four well-casing volumes of ground-water (unless the well bails dry). The parameters are deemed to have stabilized when two consecutive measurements are within 10% of each other, for each respective parameter. The temperature, pH, conductivity and purge volume measurements, and observations of water clarity and sediment content will be documented by the ESE staff member on ESE Ground-Water Sampling Data Forms.

Ground-water samples are collected by lowering a new (precleaned), disposable polyethylene bailer into the well using new, disposable nylon cord. The filled bailer is retrieved, emptied, then filled again. The ground water from this bailer is decanted into appropriate laboratory supplied glassware and/or plastic containers (if sample preservatives are required, they are added to the empty containers at the laboratory prior to the sampling event). The containers are filled carefully so that no headspace is present to avoid volatilization of the sample. The filled sample containers are then labeled and placed in a cooler with ice for transport under chain of custody documentation to the designated analytical laboratory. The ESE staff member will document the time and method of sample collection, and the type of sample containers and preservatives (if any) used. These facts will appear on the ESE Ground-Water Sampling Data Forms. ESE will collect a duplicate ground-water sample from one well for every ten wells sampled at each site. The duplicate will be a blind sample (its well designation will be unknown to the laboratory). The duplicate sample is for Quality Assurance and Quality Control (QA/QC) purposes, and provides a check on ESE sampling procedures and laboratory sample handling procedures. When VOCs are included in the laboratory analyses, ESE will include a trip blank, if required, in the cooler with the ground-water samples for analysis for the identical VOCs. The trip blank is supplied by the laboratory and consists of deionized water. The trip blank is for QA/QC purposes and provides a check on both ESE and laboratory sample handling and storage procedures. Since disposable bailers are used for sample collection, and are not reused, no equipment blank (rinsate) samples are collected.

APPENDIX C

LABORATORY REPORTS AND CHAIN OF CUSTODY DOCUMENTATION FOR GROUND WATER SAMPLES

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

February 2, 1994

ChromaLab File#: 9401267

ENV. SCIENCE & ENGINEERING

Atten: R. M. Qadir

Project: A.H.A.

Project#: 6-94-5199

Submitted: January 26, 1994

re: 3 samples for Gasoline and BTEX analysis.

Matrix: WATER
Sampled on: January 26, 1994
Method: EPA 5030/8015/602

Analyzed on: February 1, 1994
Run#: 2162

Lab # SAMPLE ID	Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
42282 MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
42283 MW-2	N.D.	N.D.	N.D.	N.D.	N.D.
42284 MW-3	N.D.	N.D.	N.D.	N.D.	N.D.
DETECTION LIMITS	50	0.5	0.5	0.5	0.5
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
BLANK SPIKE RECOVERY(%)	99	92	87	94	89

ChromaLab, Inc.

Billy Thach
Chemist

Eric Tam
Laboratory Director

UMS

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

CHROMALAB, INC.

Environmental Laboratory (1094)

5 DAYS TURNAROUND

February 8, 1994 ChromaLab File#: 9401267

ENV. SCIENCE & ENGINEERING

Atten: R. M. Qadir

Project: A.H.A. **Project#:** 6-94-5199
Submitted: January 26, 1994

re: 3 samples for Lead analysis.

Matrix: WATER *Extracted:* February 4, 1994
Sampled on: January 26, 1994 *Analyzed on:* February 8, 1994
Method: EPA 3010/6010 *Run#:* 2200

LAB #	CLIENT SAMPLE ID	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE RESULT (%)
42282	MW-1	N.D.	0.003	N.D.	83
42283	MW-2	0.070	0.003	N.D.	83
42284	MW-3	N.D.	0.003	N.D.	83

ChromaLab, Inc.

Refaat Mankarious, for

Charles Woolley
Chemist

Refaat Mankarious
Inorganics Supervisor

LIMS

2239 Omega Road,#1 • San Ramon, California 94583
(510) 831-1788 • Facsimile (510) 831-8798
Federal ID #68-0140157

GeoAnalytical Laboratories, Inc.

1031 Kansas Avenue
Modesto, CA 95351

Phone (209) 572-0900
FAX (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # F028-07
ChromaLab
2239 Omega Rd Ste 1
San Ramon CA 94583

Date: 02/01/94
Date Received: 01/28/94
Date Started: 01/31/94
Date Completed: 01/31/94

Project Name:
Project # 9401267

Sample ID	Lab ID	Detection Limit mg/L	Method	Analyte	Results mg/L
MW 1	F30522	0.05	LUFT	Organic Lead	ND
MW 2	F30523	0.05	LUFT	Organic Lead	ND
MW 3	F30524	0.05	LUFT	Organic Lead	ND

Ramiro Salgado
Chemist

Certification # E757

Donna Allsup
Laboratory Director

SUBM #: 9401267
CLIENT: ESCIENG
DUE: 02/02/94
REF: 14933

267/42282 - 42284

DATE Jan. 26, 94 PAGE 1 OF 1

PROJECT NAME A.H.A

ADDRESS 1916 Webster Street
Alameda

PROJECT NO. 6941-5197

SAMPLED BY Rick Merriken

LAB NAME Chroma Lab.

ESE Environmental Science & Engineering, Inc.
A CILCORP Company
4090 Nelson Avenue
Suite J
Concord, CA 94520
Phone (510) 685-4053
Fax (510) 685-5323

AN

SAMPLE #	DATE	TIME	LOCATION	8015 - GPH	EPA 8020	Lead 7421	Organic Lead (LUFT Manual)	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
MW-1	1/26	11:55	Alameda	X	X	X	X	Water	4	3 VOAs, 1 plastic bottle
MW-2	"	1225	"	X	X	X	X	Water	4	" " "
MW-3	"	11:20	"	X	X	X	X	Water	4	" " "

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1.			
2. R.M. Radir	R.M. Radir	1-26-94	16:20
3.		1-26-94	17:10
4.			
5.			

12 TOTAL NUMBER OF CONTAINERS

REPORT RESULTS TO: R.M. Radir

SPECIAL SHIPMENT REQUIREMENTS

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):
5 day TAT

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	