

SUPPLEMENTAL SITE INVESTIGATION REPORT

Continue QMR

Tabulate historic ^{DIV} GORE and Analytical results.

No measurement of TOC/FOC done.

Analyze for PAH in MW-1 or MW-4 depending on which sample has highest TPHd.

MLK Property
4629 Martin Luther King Jr. Way
Oakland, California

February 26, 1999

ADVANCED ASSESSMENT AND REMEDIATION SERVICES

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February 26, 1999

Ms. Eva Chu
Alameda County Health Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

**Subject: Submittal of Supplemental Site Investigation Report for
 Petroleum Hydrocarbon Contaminated Soil and Groundwater Site
 4629 Martin Luther King, Jr. Way, Oakland, California**

Dear Ms. Chu:

Advanced Assessment and Remediation Services (AARS), is pleased to present this supplemental site investigation report for the above referenced site.

This report has been prepared in general accordance with the Tri-Regional Board Staff Recommendation for Preliminary Investigation and Evaluation of Underground Tank Sites, Addendum to Appendix A, dated August 30, 1991, and the guidelines of Alameda County Environmental Health Department. This report summarizes information pertaining to the underground tank removal, preliminary site assessment and supplemental site investigation at the above referenced site.

Please contact Tridib Guha at (925) 363-1999 if you have any questions regarding this report.

Sincerely,

Advanced Assessment and Remediation Services

Tridib K. Guha, R.G., R.E.A.
Principal

Enclosure

cc: Ms. Lynn Nightingale, San Francisco, California

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SUPPLEMENTAL SITE INVESTIGATION

at

**MLK Property
4629 Martin Luther King Jr. Way
Oakland, California**

INTRODUCTION

This report presents the results and findings of the supplemental site investigation conducted by Advanced Assessment and Remediation Services (AARS) at the MLK Property, 4629 Martin Luther King Jr. Way, Oakland, California. The need for this supplemental site investigation work was based on the findings of the site investigation by Subsurface Consultants, Inc. (SCI) and the groundwater quality investigation by AARS.

1.1 Purpose and Objectives

The primary goals of the Supplemental Site Investigation report are to:

1. Define the extent of soil and groundwater contamination;
2. Document all site assessment work performed at the site;
3. Address the concerns of the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) and the Alameda County Environmental Health Department (ACEHD);
4. Develop an appropriate course of action for additional investigation or remediation, if warranted, in accordance with regulatory agency requirements.

1.2 Scope of Work

For this Supplemental Site Investigation, AARS has performed the following tasks:

1. Summarized the previous site investigation;
2. Prepared a work plan and health and safety plan;
3. Acquired the necessary permits for field activities;
4. Installed five soil borings, converted them to two temporary wells and three permanent groundwater monitoring wells;
5. Screened soil samples in the field for volatile organic compounds (VOCs) and submitted the selected soil samples for laboratory analysis;

6. Sampled temporary wells and developed, sampled and surveyed permanent monitoring wells;
7. Analyzed soil and groundwater samples for specified constituents;
8. Evaluated soil and groundwater sampling and analytical results and other data;
9. Prepared a report presenting the results and findings of the above activities and appropriate recommendations.

2.0 SITE CHARACTERISTICS

A brief description of the site location and summary of past activities is presented below.

2.1 Site Description

The project site is located at 4629 Martin Luther King Jr. Way, Oakland, California. The site is set in a commercial development and consists of an unoccupied one-story warehouse type structure and an office building with a concrete slab-on-grade floor. The structure has plan dimensions of approximately 110 by 192 feet.

The property is bounded by Martin Luther King, Jr. Way to the east, and commercial development to the south. Single-family residences are located west of the property. A large paved parking area is located north of the building, across 47th Street.

The site is located at an elevation of approximately 80 feet above mean sea level. San Francisco Bay is located approximately 1½ miles west of the project site. A site vicinity map and a site plan are presented in Figure 1 and Figure 2 respectively.

2.2 Site History

"In July 1992, five underground storage tanks (two tanks had stored gasoline and three had stored fuel oil) were excavated and removed by SEMCO Inc.. Soil samples were collected from the excavations. Analytical results indicated that petroleum hydrocarbons, quantified as diesel and oil & grease, were present in the soil below the fuel tanks. Additionally, toluene, ethylbenzene and xylenes were detected at low concentrations in the soil. Petroleum hydrocarbons and benzene, toluene, ethylbenzene and xylenes (BTEX) were not detected in samples obtained from the gasoline tank excavations at concentrations above the reporting limits" [Subsurface Consultants, Inc.(SCI) 1993].

In May 1993, SCI conducted a site investigation by drilling and sampling nine soil borings and analyzing selected soil samples. SCI reported that oil and grease and diesel hydrocarbons were detected in the soil beneath and adjacent to the previous fuel oil tanks, at concentrations of up to 760 and 1700 mg/kg, respectively.

In November 1995, AARS conducted a site investigation by installing two temporary wells and one monitoring well, and analyzing selected soil and groundwater samples. The analytical results for soil

and groundwater samples indicated the presence of total recoverable petroleum hydrocarbons as total oil and grease (TOG), total petroleum hydrocarbon as gasoline (TPHg), total petroleum hydrocarbon as diesel (TPHd), and benzene.

Previous reports issued for this site are:

"Preliminary Fuel Oil Contamination Assessment 4629 Martin Luther King Jr. Way, Oakland, California", Subsurface Consultants, Inc., November 4, 1993.

"Groundwater Quality Investigation Report at 4629 Martin Luther King Jr. Way, Oakland, California", Advanced Assessment and Remediation Services, January 19, 1996.

2.3 Regional Geology and Hydrogeology

The site is located on a broad alluvial plain on the east side of San Francisco Bay. The plain is characterized by nearly level topography. The uppermost lithologic member is the San Antonio Formation. The San Antonio sediments were deposited in a complex and ever-changing depositional environment that ranged from alluvial fans to flood plains to lakes to swamps to beaches. Locally, the alluvial deposits consist largely of interfingered lenses of clayey gravel, sandy and silty clays and sand-clay-silt mixtures. Individual units are discontinuous and difficult to correlate over distance.

Groundwater at this site is shallow. Soil borings drilled during May of 1993, November 1995 and December 1998, encountered groundwater at 17 to 27 feet below ground surface (bgs). However, groundwater level may fluctuate with tidal variations. The general groundwater flow direction is toward San Francisco Bay to the west.

3.0 **FIELD METHODS AND PROCEDURES**

To assess the nature and extent of contamination in groundwater, five soil borings were drilled on-site. Three of the soil borings were converted into monitoring wells, and the other two were converted into temporary wells. Soil samples were collected and classified during drilling, starting at one foot bgs, and selected samples were analyzed for petroleum hydrocarbon constituents specified in section 4.0. The temporary wells were sampled and the permanent monitoring wells were developed, sampled and surveyed. The procedures and methods used during field activities were in accordance with the requirements and guidelines of the ACEHD and RWQCB.

3.1 Soil Borings and Sampling

Prior to commencement of drilling activities, permits for the proposed groundwater monitoring well and temporary wells were obtained from the Alameda County Water Agency. The work plan was approved by the ACEHD. Underground Service Alert was informed 72 hours prior to drilling. Copies of the permit and the letter of work plan approval are presented in Appendix A.

Prior to drilling the surface concrete was removed by diamond-saw cutting at the proposed drilling locations. On December 16 and 17, 1998, AARS supervised the drilling of five soil borings.

The drilling activities were performed by Gregg Drilling and Testing of Martinez, California, using a limited access drilling rig (RHINO D-15). Soil boring MW-2 and MW-3 were drilled with an 8-inch-hollow-stem auger and soil borings TW-3, TW-4 and TW-5 were drilled with a 6-inch hollow-stem auger. Soil borings MW-2 and MW-3 were drilled to total depths of 30 feet bgs and TW-3, TW-4 and TW-5 were drilled to total depths of 25 feet bgs. Soil sample collected at 20 feet bgs from soil boring TW-5 had a very strong gasoline odor and recorded a high Organic Vapor Analyzer (OVA) reading. Additionally, a sheen was noted in a groundwater sample collected from soil boring TW-5. Therefore, soil boring TW-5 was reentered with an 8 inch hollow-stem auger and drilled to 30 feet bgs.

During drilling, soil samples were collected starting from one foot bgs. Soil samples were collected either from drill cuttings or using a modified California split-spoon sampler lined with clean brass tubes. One soil sample was collected from each borehole at a depth of 18 to 19 feet bgs, just above the water table and submitted for laboratory analyses. One additional soil sample was collected from TW-4 at 10 feet bgs for physical properties analysis. The soil sample tubes were sealed using plastic caps and teflon tape and placed immediately in an iced cooler for shipment to the analytical laboratory. The soil borings were lithologically logged in the field using the Unified Soil Classification System. Soil samples were screened in the field using a portable combustible gas indicator. Details of the sampling depths are presented in boring logs in Appendix B.

3.2 Qualitative Water Survey

The qualitative groundwater survey is essentially a screening process to assist in determining the appropriate locations of additional monitoring wells necessary to define the lateral extent of groundwater contamination, as well as to obtain information on subsurface soils. The procedure is based on soil boring and sampling, combined with temporary wells for groundwater sampling.

Soil borings, TW-3, TW-4 and TW-5 were advanced three to five feet below the top of the saturated zone. Two inch diameter 0.010-inch slotted screen (flush-threaded, Schedule 40 PVC) covered with a polyester filter sock was installed in the boreholes. The water in TW-4 and TW-5 was allowed to stabilize and a small volume, approximately three to four gallons of water was purged. Following purging, a water sample was collected from each of these temporary wells and the casings were removed. The borings were subsequently backfilled to grade with neat cement. Because sheen was noted in groundwater sample from TW-5, it was drilled to 30 feet bgs and converted into a permanent monitoring well, MW-4.

Groundwater was not encountered in soil boring TW-3 during drilling, it was left open for five hours. Groundwater was then sampled using 0.75 inch diameter PVC casing.

3.3 Groundwater Monitoring Well Construction

Soil borings MW-2, MW-3 and MW-4 (TW-5) were converted into groundwater monitoring wells and completed to a total depth of 30 feet bgs. Each monitoring well was constructed with one 10-foot section and one five-foot section of two-inch diameter flush-threaded, Schedule 40, PVC blank casing and one 10-foot and one five-foot section of two-inch diameter 0.010-inch, slotted PVC casing, which extended to a depth of at least 10 feet beneath the water table. The annular space surrounding the screened portion was backfilled with #2 Monterey sand to 2 feet above the top of the screened section. A 2-foot thick bentonite annular seal was placed above the filter pack. The

remaining annulus was grouted with neat cement to the surface. A well box was installed slightly above grade with a locking watertight well cap to ensure the integrity of the well. Monitoring well construction details are included in Appendix B.

3.4 Monitoring Well Development and Sampling

Well development and sampling procedures were conducted in accordance with RWQCB guidelines and ACEHD requirements.

Monitoring wells MW-3 and MW-4 were developed on December 17, 1998, MW-2 was developed by removing a minimum of 10 casing volumes of water from the wells with a two-inch-diameter PVC bailer. Monitoring well MW-1 was developed in November 15, 1995. Only three casing volumes of water were removed from this well prior to sampling.

Prior to development of wells a groundwater sample was collected from each for inspection. Groundwater samples from each well had sheen and strong gasoline odor and presence of bubbles of floating product were noted from MW-1, MW-3 and MW-4. During purging of the wells and prior to sampling, pH, specific conductivity, and temperature measurements of purged water were recorded and observed to stabilize, indicating that formation water had entered the well. A groundwater sample was then collected from each well at a minimum 94 % total recovery. Field observations during well development and purging prior to sampling are presented in Appendix C.

The groundwater samples were collected in clean containers and transported in an iced cooler to the laboratory for analysis following standard chain of custody procedures.

3.5 Groundwater Level Monitoring and Surveying

Top-of-well-casing elevations for MW-1 through MW-4 were surveyed on December 18, 1998. A bench mark, with an assumed elevation of 100.00 feet above sea level, was established on top of the south curb at the 47th Street entrance to the center of the building. All wells were surveyed relative to this common datum.

Groundwater levels in each well were measured to the nearest 0.01 foot on December 18, 1998, from the top of the PVC casing using an electric sounder. Groundwater surface elevation contours, based on interpretation of groundwater level and survey data, are presented in Figure 3. Survey data and water level measurements are presented in Table 1.

3.6 Soil Cuttings and Well Development Water Storage and Disposal

Soil cuttings generated during drilling and sampling of the soil borings were stockpiled on site for proper disposal.

All purged water generated from the well development and sampling, as well as decontamination rinseate, were stored in properly-labeled 55-gallon DOT 17H drums for proper disposal.

4.0 ANALYTICAL METHODS AND RESULTS

All soil and groundwater samples were analyzed by McCampbell Analytical Inc. of Pacheco, California, a California- certified Laboratory. All chemical analyses of soil and groundwater samples were performed using standard test methods of the United States Environmental Protection Agency (EPA) and the California Department of Health Services (Cal-DHS), as discussed below.

4.1 Analysis of Soil Samples

A total of five soil samples were collected for chemical analysis, one sample from each soil boring at depths of 18 to 19 feet bgs. Soil samples were analyzed for total Petroleum hydrocarbon as gasoline (TPHg) using EPA Methods 8015 and 8020, benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020, methyl tertiary butyl ether (MTBE) using EPA Method 8020, total petroleum hydrocarbon as diesel (TPHd) and as motor oil (TPHmo) using EPA Methods 8015. Results of soil sample analyses are presented in Table 2. The official laboratory reports and chain of custody documents are included in Appendix D.

4.2 Analysis of Groundwater Samples

All groundwater samples were analyzed for TPHg using EPA Method 8015 modified, BTEX/MTBE using EPA Method 8020, TPHd-TPHmo using EPA Method 8015 modified. Results of groundwater analyses are summarized in Table 3. After the analyses of the samples were performed ACEHS requested additional analysis for mineral spirits. The official laboratory reports and chain of custody documents are included in Appendix D.

4.3 Analysis of Soil Sample for Physical Properties

One soil sample (TW4-10S) was analyzed for physical properties; particle size and sieve analyses using ASTM D422 method, porosity, specific gravity by using ASTM D854 method, and density by using ASTM D2937 method. Physical property analysis was performed at Cooper Testing Labs of Mountain View, a California-certified geotechnical laboratory. The results of physical property analyses are summarized in Table 4. The official laboratory reports are included in Appendix E.

5.0 DISCUSSION OF RESULTS

A brief description of site geology and hydrogeology based on the results of the drilling activities is presented below. The results of the laboratory analysis of the soil and groundwater samples collected during this investigation are also discussed below.

5.1 Site Geology

The subsurface lithology in all eight soil borings comprises a fine-grained alluvial material consisting of stiff clay, poorly sorted clay and silty clay and clayey sand with fine gravel to the maximum explored depth of 30 feet in MW-1 through MW-4 and TW-2. Most of the clays and silty clays are stiff with high plasticity.

5.2 Site Hydrogeology

Groundwater was encountered between 20 and 21 feet bgs during drilling on December 16 and 17, 1998. Although no groundwater was encountered during drilling of TW-3, a very moist zone, approximately two feet thick was noted at 12 feet bgs. The borehole was left open for 4 hrs, it was still dry. Groundwater subsequently noted in TW-3, at a period five hours, perhaps the result of temporary perched saturation. The groundwater elevations from monitoring wells MW-1 through MW-4, as measured on December 18, 1998, were used to develop the groundwater elevation contour map shown in Figure 3. The groundwater flow direction has been calculated to be to the southwest, with an average gradient of approximately 0.033 foot per foot. The average depth to stabilized groundwater in these wells was approximately 20 feet bgs on December 18, 1998, which could vary with seasonal conditions.

5.3 Soil analysis

Analytical results for four soil samples (MW2-18S, MW3-19S, TW3-18S and TW4-18S) indicated concentration of TPHg, BTEX, MTBE, TPHd and TPHmo below detection limits (nondetect). Only soil sample TW5-18S was found to contain petroleum hydrocarbons above detection limits, with TPHg at 43 parts per million (ppm), TPHd at 20 ppm, toluene at 0.016 and ethylbenzene at 0.054 ppm.

5.4 Groundwater Analysis

Analytical results for groundwater samples from four monitoring wells (MW-1 through MW-4) and two temporary wells (TW-3 and TW-4) are presented in Table 3. Table 4 also includes the groundwater sampling results from the previous site investigation. The concentrations of TPHg and TPHd measured during December 1998 are presented in Figures 6 and 7 respectively. Groundwater samples from three monitoring wells MW-1, MW-3 and MW-4, were found to contain TPHg ranging from 480 to 4000 parts per billion (ppb). No petroleum hydrocarbons were detected in samples from MW-2, TW-3 and TW-4. TPHd concentrations ranging from 140 to 4,300 ppb were measured in groundwater samples from MW-1 through MW-4 and TW-3. TPHmo was detected in one sample, TW-3, at 430 ppb. Benzene was detected in groundwater samples from MW-1, MW-3, MW-4 and TW-4, at concentrations ranging from 0.085 to 12 ppb. Toluene, ethylbenzene and xylenes concentrations ranging from 1.0 to 3.7 ppb were measured in groundwater samples from MW-1, MW-3 and MW-4. The highest concentrations of TPHg and TPHd were measured in the groundwater sample from MW-4. The concentration of TPHd in groundwater samples from MW-1 dropped significantly from the previous investigation. TPHg concentrations have increased, however. The laboratory reported that there are no indications of mineral spirits on chromatograms.

5.5 Physical Properties Analysis

The results of physical properties analysis is presented in Table 4. The sample analyzed is described as brown clay with sand with a specific gravity of 2.71, moisture content of 19.3%, dry and wet densities of 104.7 and 124.91 pounds per cubic feet (pcf) respectively. This physical properties evaluation is necessary for risk evaluation for future site closure.

6.0 SUMMARY OF FINDINGS AND CONCLUSIONS

The findings and conclusions based on the results of the subsurface investigative work performed at the site, as well as on results of previous work, are summarized below.

- o The subsurface lithology is predominantly composed of clays and silty clays with a few stringers of sandy silt and clayey gravels, which are limited in lateral extent.
- o A permeability barrier may occur near soil boring TW-3, since it was the only boring where no groundwater was encountered during drilling.
- o Shallow groundwater at the site has been impacted by petroleum hydrocarbon; sheen and bubbles of floating product are present. Analytical results for groundwater samples indicate concentrations of TPHg ranging from 480 and 4800 ppb, TPHd from 140 to 4,300 ppb, and benzene from 0.85 to 12 ppb.
- o Highest concentrations of TPHg and TPHd occur in groundwater samples from MW-4 and MW-3, which are located in the western end of the property. Benzene concentrations range from 0.85 to 12 ppb.
- o TPHg and TPHd were detected in only one soil sample at concentrations of 43 ppm and 20 ppm respectively. BTEX and MTBE compounds were not detected in any of the soil samples.
- o The groundwater flow direction has been calculated to be to the southwest, with an average gradient of approximately 0.033 foot per foot. The average depth to stabilized groundwater in these wells was approximately 20 feet bgs on December 18, 1998.
- o Maps showing contours TPHg and TPHd concentrations in groundwater, developed from the results of groundwater analyses indicate that the dissolved-phase petroleum hydrocarbon plume has migrated to the southwest in the direction of groundwater flow. The nature and extent of groundwater contaminant plume within the property has been defined.

7.0 RECOMMENDATIONS

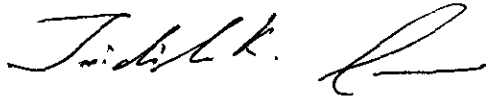
The primary issue requiring resolution is remediating the hydrocarbon plume for an expedited site closure. To address this, AARS recommends:

1. Treatment of the plume with oil consuming bacteria or oxygen releasing compound.
2. Initiation of a regular quarterly groundwater monitoring and sampling program at the site to establish a history for water levels, hydrocarbon concentrations and dissolved oxygen.

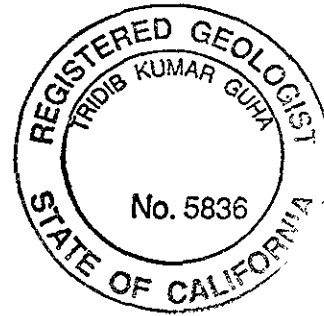
7.0 CERTIFICATION

The information provided in this report is based on the recent site investigation and previous work conducted at the site. All data presented in this report is believed to be factual and accurate, unless proven otherwise. Any conclusions or recommendations provided within are based on our expertise and experience conducting work of a similar nature.

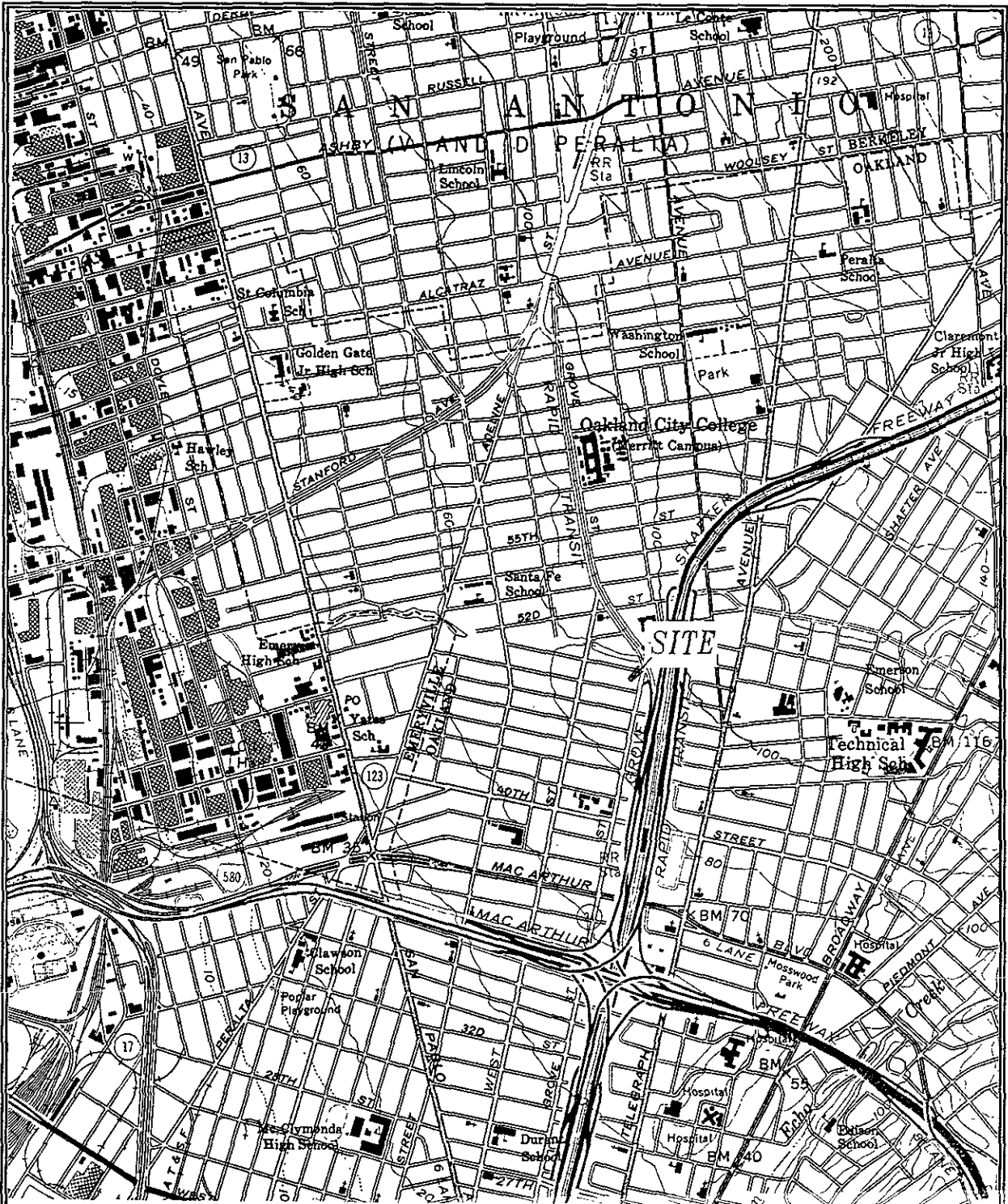
Advanced Assessment and Remediation Services



Tridib K. Guha
Registered Geologist Number 5836



FIGURES



Source: U.S.G.S. Map Oakland West Quadrangle, California
 7.5 Minute Series (Topographic)
 Photographed 1959
 Photorevised 1980

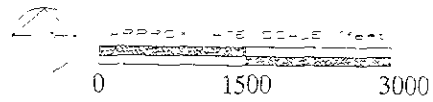
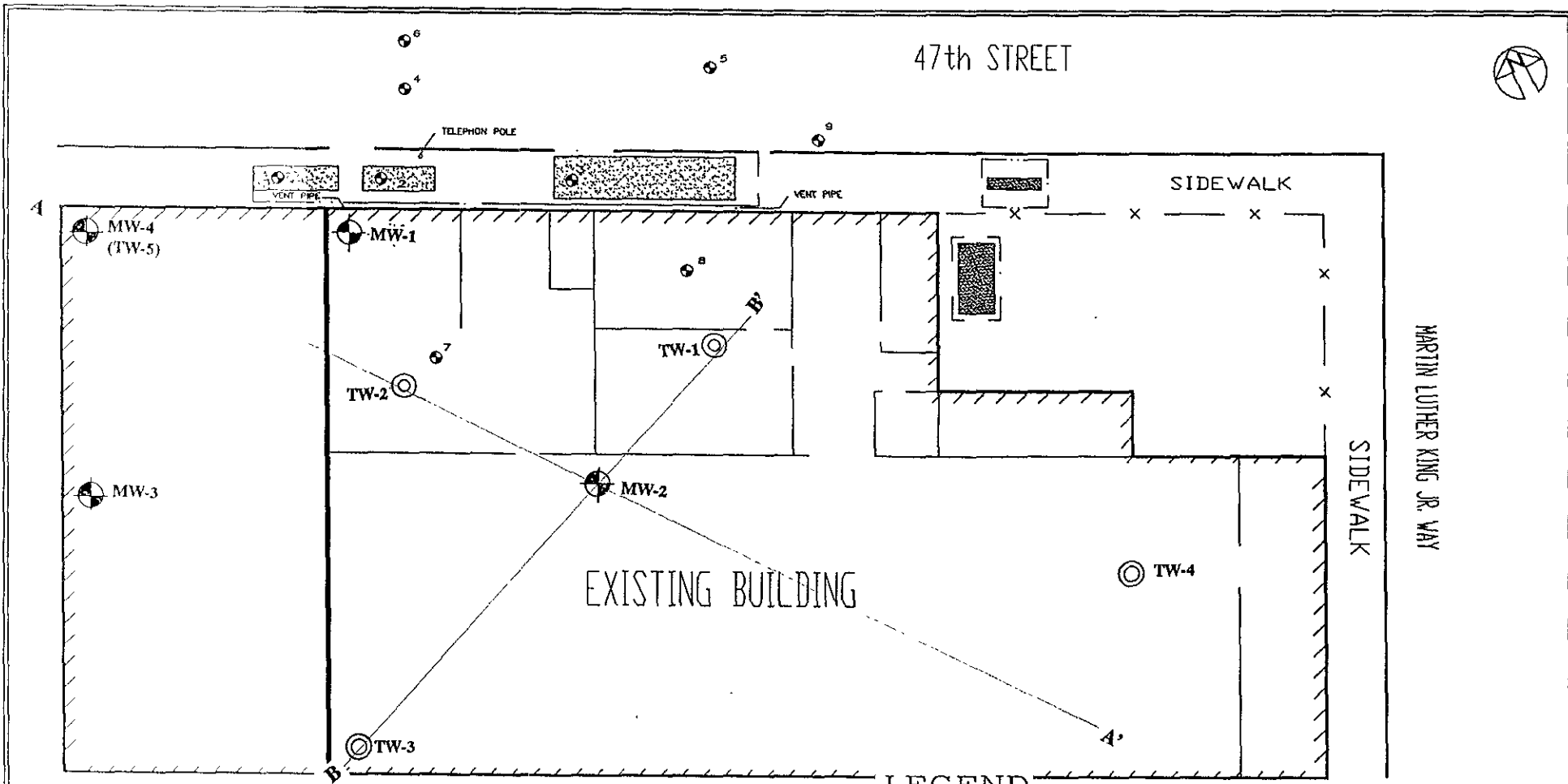


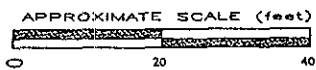
FIGURE 1: SITE VICINITY MAP

4629 Martin Luther King Jr. Way
 Oakland, California

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 Remediation Services**
 2380 Salvio Street, Suite 202
 Concord, California 94520



SOURCE Subsurface Consultants, Inc., November 1993 (modified)



LEGEND

	TEST BORING BY SUBSURFACE CONSULTANT		TW-2 TEMPORARY WELL
	APPROXIMATE LOCATION OF PREVIOUS HEATING OIL FUEL TANKS		MW-1 MONITORING WELL
	APPROXIMATE LOCATION OF PREVIOUS GASOLINE TANK		EXTENT OF TANK EXCAVATION
			A - A' CROSS SECTION LINE

FIGURE 2: SITE PLAN
 MLK PROPERTY
 4629 Martin Luther King Jr. Way
 Oakland, California

ADVANCED ASSESSMENT AND REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, California 94520

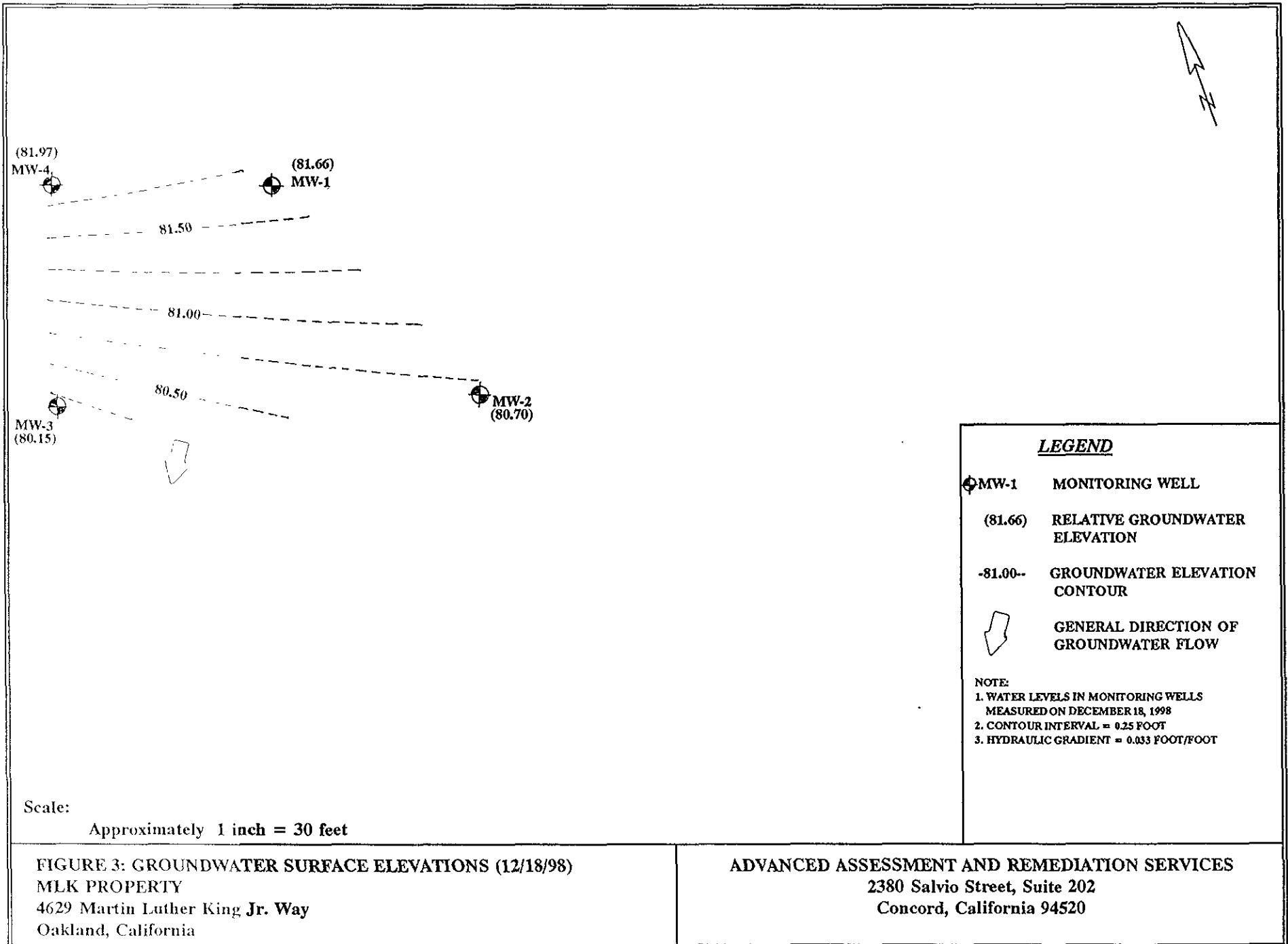
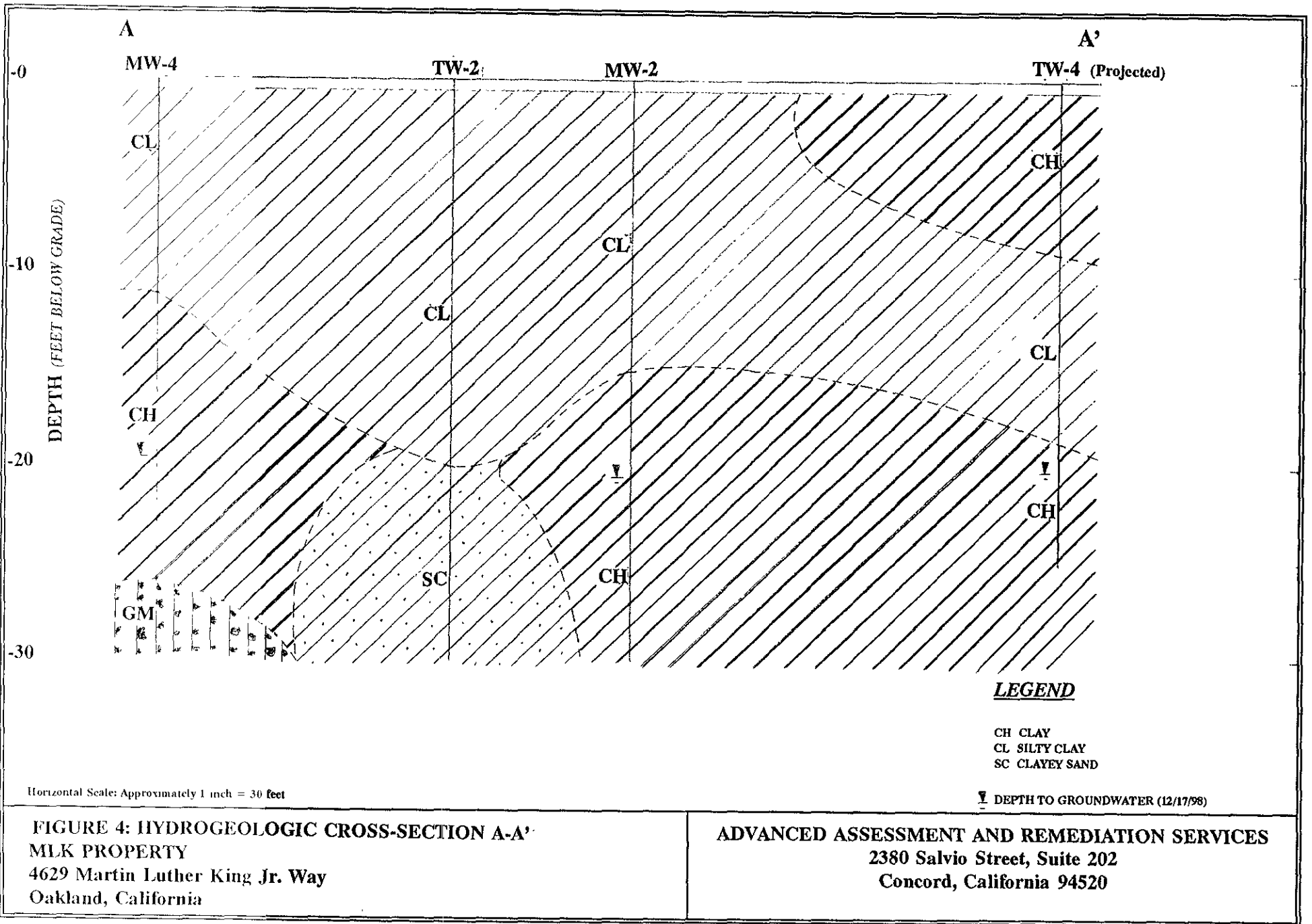
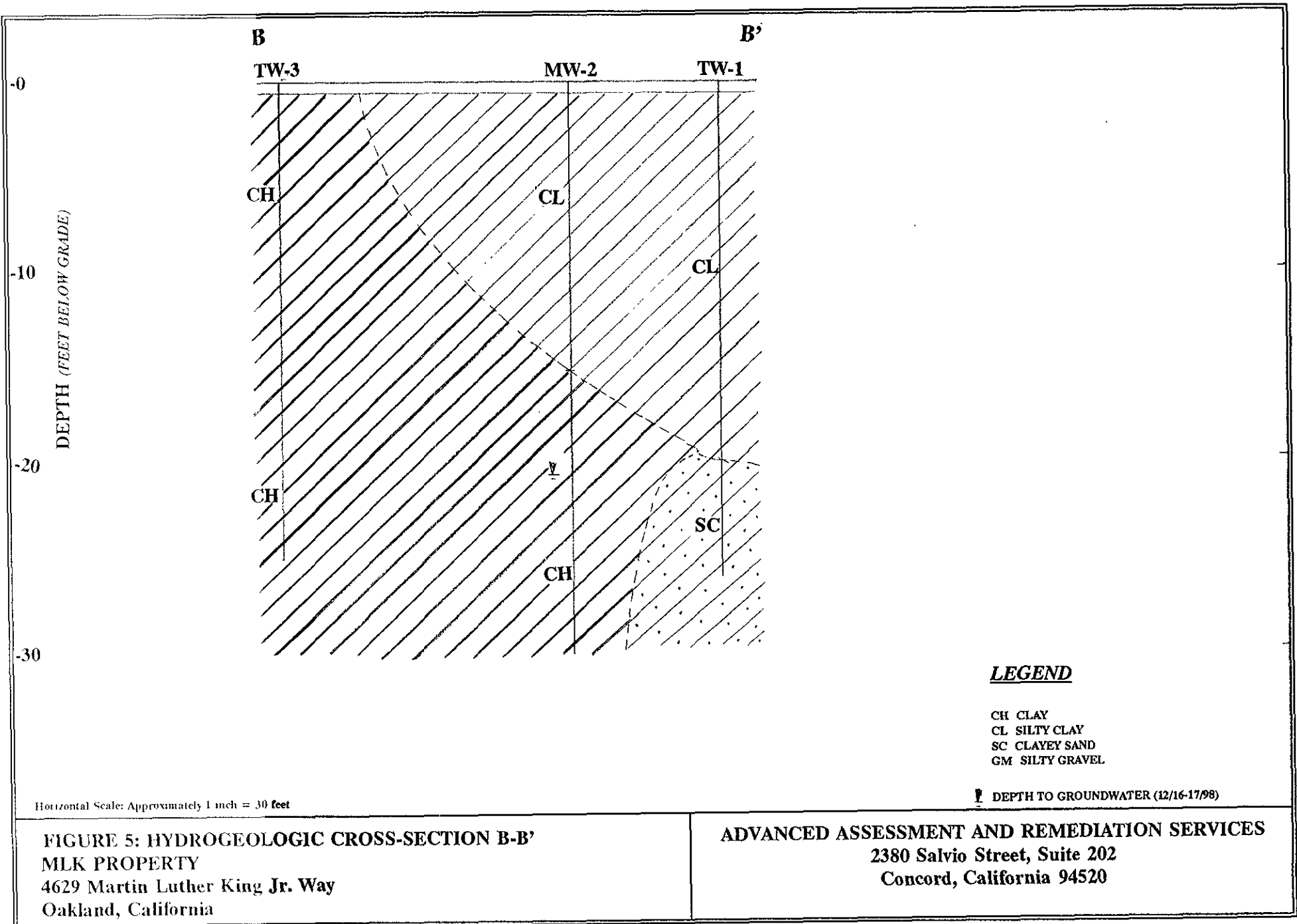


FIGURE 3: GROUNDWATER SURFACE ELEVATIONS (12/18/98)
 MLK PROPERTY
 4629 Martin Luther King Jr. Way
 Oakland, California

ADVANCED ASSESSMENT AND REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, California 94520





Horizontal Scale: Approximately 1 inch = 30 feet

FIGURE 5: HYDROGEOLOGIC CROSS-SECTION B-B'
 MLK PROPERTY
 4629 Martin Luther King Jr. Way
 Oakland, California

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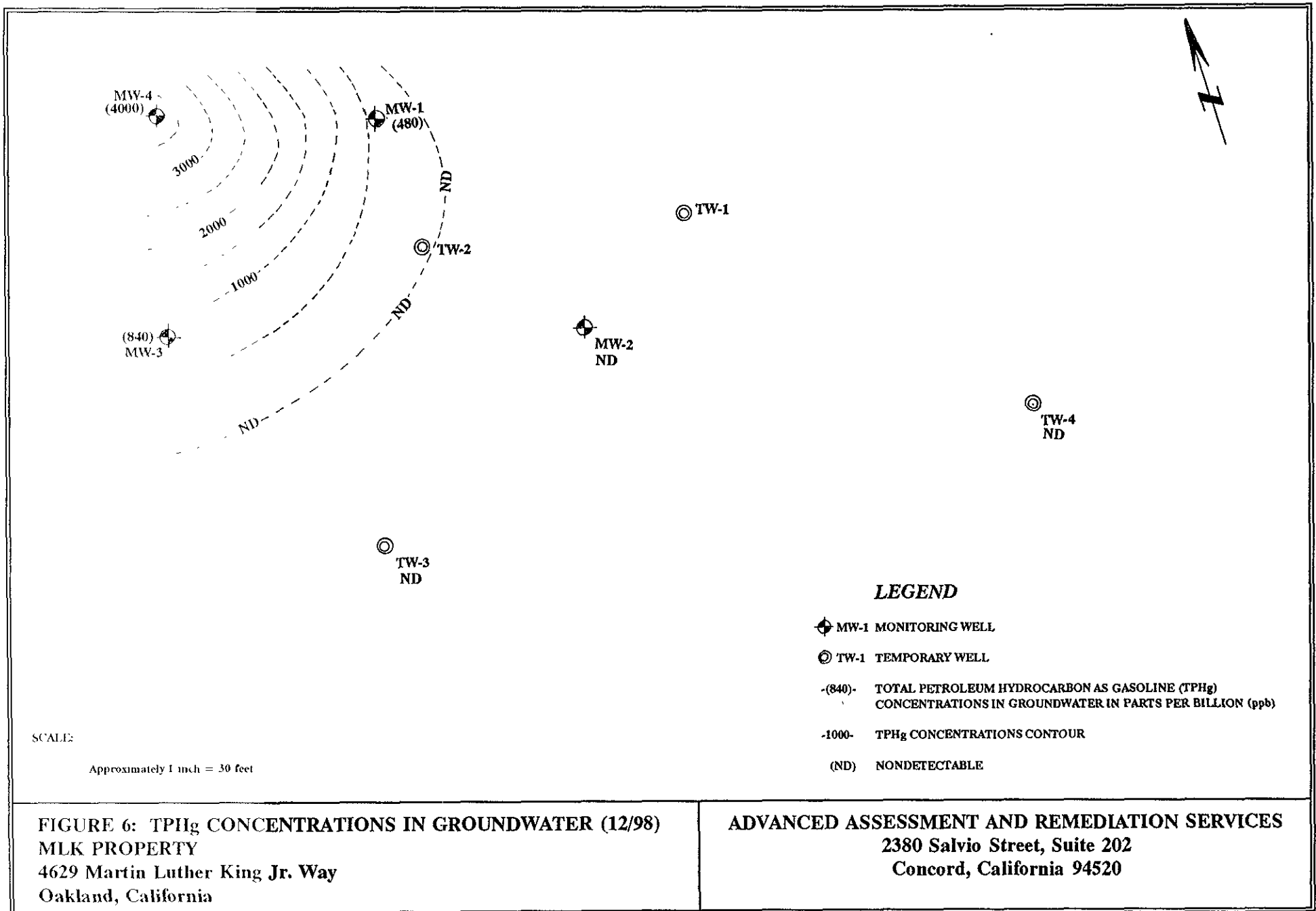


FIGURE 6: TPHg CONCENTRATIONS IN GROUNDWATER (12/98)
MLK PROPERTY
 4629 Martin Luther King Jr. Way
 Oakland, California

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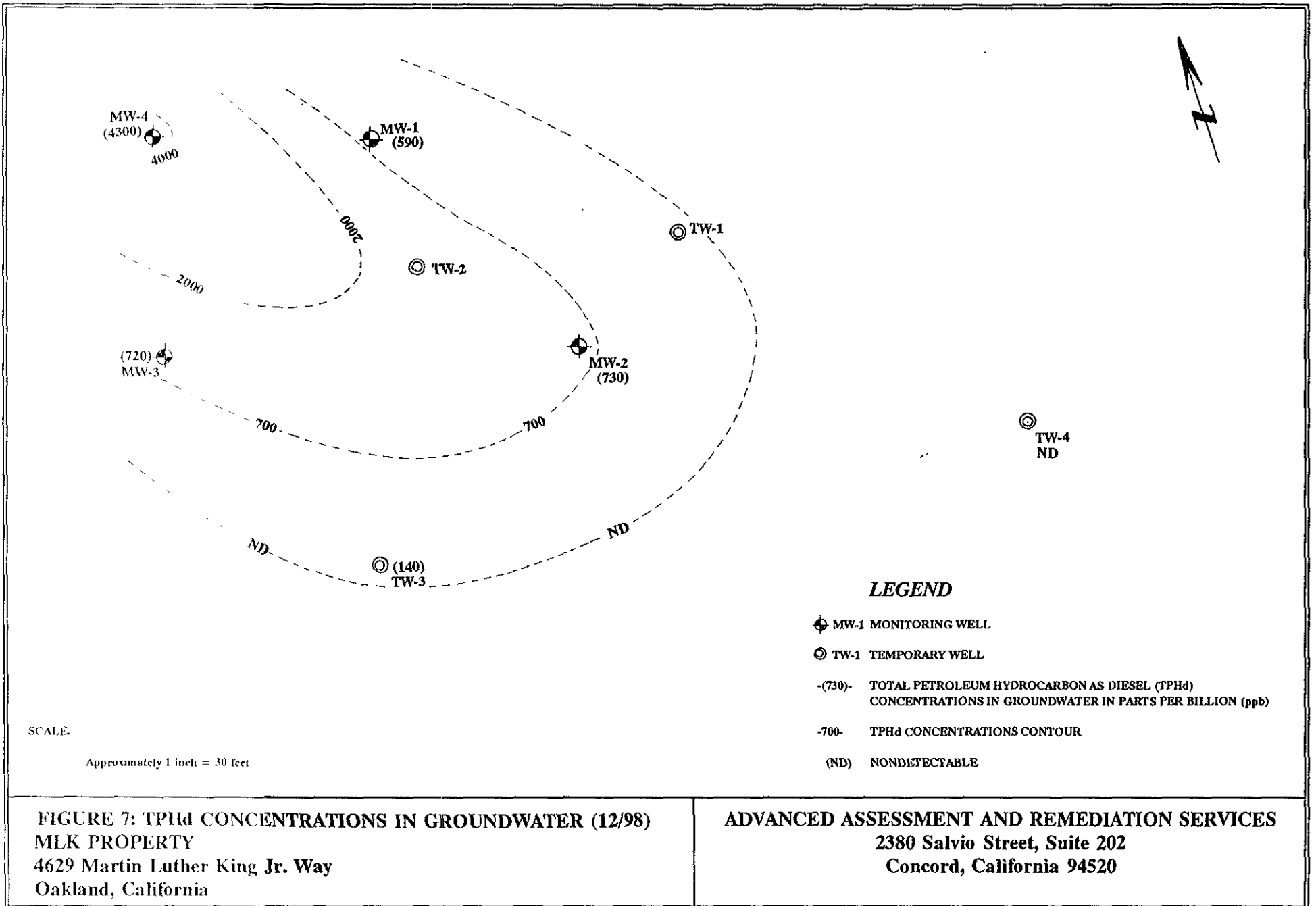


FIGURE 7: TPHd CONCENTRATIONS IN GROUNDWATER (12/98)
MLK PROPERTY
 4629 Martin Luther King Jr. Way
 Oakland, California

ADVANCED ASSESSMENT AND REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, California 94520

TABLES

TABLE 1: SURVEY AND WATER LEVEL MONITORING DATA
MLK Property
4629 Martin Luther King Jr. Way
Oakland, California

Well No.	Date of Measurement	Top of Casing Elevation (Feet - Relative)	Depth to Groundwater (Feet)	Product Thickness (Feet)	Groundwater Elevation (Feet - Relative)
MW-1	12-18-98	101.15	19.49	0.00	81.66
MW-2	12-18-98	101.29	20.59	0.00	80.70
MW-3	12-18-98	100.95	20.80	0.00	80.15
MW-4	12-18-98	100.90	18.93	0.00	81.97

Note: A bench mark, with an assumed elevation of 100.00 feet (Above Mean Sea Level), was established on top of the south curb at the 47th Street entrance to the center of the building; all well elevations are relative to this.

TABLE 2: SUMMARY OF ANALYTICAL RESULTS OF SOIL SAMPLING

**MLK Property
4629 Martin Luther King Jr. Way
Oakland, California**

Sample ID	Date of Sampling	TPHg (mg/kg)	MTBE (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	TRPH as TOG (mg/kg)
MLK MW1-S21	11/14/95	350	NA	ND<0.02	0.23	ND<0.02	0.39	180	NA	380
MLK IW1-S21	11/15/95	500	NA	ND<0.02	ND<0.02	ND<0.02	ND<0.02	200	NA	500
MLK IW2-S21	11/15/95	38	NA	ND	ND	ND	0.029	33	NA	100
MW2-18S	12/17/98	ND	ND	ND	ND	ND	ND	ND	ND	-
MW3-19S	12/16/98	ND	ND	ND	ND	ND	ND	ND	ND	-
IW3-18S	12/17/98	ND	ND	ND	ND	ND	ND	ND	ND	-
IW4-18S	12/17/98	ND	ND	ND	ND	ND	ND	ND	ND	-
IW5-18S	12/16/98	43	ND	ND	0.016	0.054	ND	20	ND	-
RL	12/17-12/23/98	1	0.05	0.005	0.005	0.005	0.005	1	5	1

Notes

ND- Not Detected NA- Not Analyzed RL- Reporting Limit
 mg/kg- Milligram per kilogram (parts per million)
 TPHg- Total petroleum hydrocarbon as gasoline (EPA method modified 8015)
 TPHd- Total petroleum hydrocarbon as diesel (EPA method modified 8015)
 TPHmo- Total petroleum hydrocarbon as motor oil (EPA method modified 8015)
 TRPH as TOG- Total recoverable petroleum hydrocarbon as oil and grease (EPA method 418.1)
 MTBE- Methyl Tertiary Butyl Ether (EPA method 8020)
 Benzene, toluene, ethylbenzene, and total xylenes (EPA method 8020)

TABLE 3: SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER SAMPLING
MLK Property
4629 Martin Luther King Jr. Way
Oakland, California

Sample ID	Date of Sampling	TPHg (µg/L)	MTBE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TPHd µg/L	TPHmo µg/L	TRPH as TOG (mg/L)	Lead (mg/L)
MLK MW1-W	11/15/95	220	NA	2.3	ND	ND	0.68	20,000	NA	9.9	0.021
MW1-GW	12/17/98	480	ND	12	1.9	ND	2.9	590	ND	-	ND
MLK 1W1-W	11/15/95	580	NA	ND	ND	ND	ND	12,000	NA	7.7	11
MLK 1W2-W	11/15/95	190	NA	ND	ND	ND	ND	1,600	NA	3.7	1
MW2-GW	12/18/98	ND	ND	ND	ND	ND	ND	730	ND	-	ND
MW3-GW	12/17/98	840	ND	3.6	1.1	1.0	2.2	720	ND	-	ND
MW4-GW	12/17/98	4,000	ND	11	3.7	10	2.9	4,300	ND	-	ND
1W3-GW	12/17/98	ND	ND	ND	ND	ND	ND	140	430	-	ND
1W4-GW	12/17/98	ND	ND	0.85	0.86	ND	ND	ND	ND	-	ND
RL	12/17-12/23/98	50	5	0.5	0.5	0.5	0.5	50	250	1.0	0.005

Notes

ND- Not Detected RL- Reporting Limit NA- Not Analyzed
mg/L- Milligram per liter (parts per million)
µg/L- Microgram per liter (parts per billion)
TPHg- Total petroleum hydrocarbon as gasoline (EPA method modified 8015)
TPHd- Total petroleum hydrocarbon as diesel (EPA method modified 8015)
TPHmo- Total petroleum hydrocarbon as motor oil (EPA method modified 8015)
MTBE- Methyl Tertiary Butyl Ether (EPA method 8020)
Benzene, toluene, ethylbenzene, and total xylenes (EPA method 8020)
Lead- (EPA method 6010)

TABLE 4: PHYSICAL PROPERTIES OF SOIL SAMPLE
MLK Property
4629 Martin Luther King Jr. Way
Oakland, California

Sample ID #: TW4-10S	Date of Sampling: 12/17/98
Specific Gravity	2.71
Void Ratio	0.617
Porosity	38.1%
Saturation%	84.8%
Moisture%	19.3%
Dry Density (pcf)	104.7
Wet Density (pcf)	124.91
Gravel	4.4%
Sand	25.8%
Silt	34.8%
Clay	35.0%
Description: Brown CLAY with sand	

Note:

pcf Pounds per cubic feet

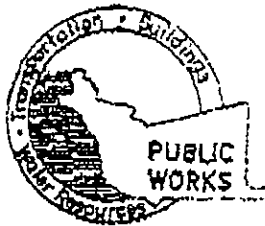
Analytical Methods Used:

- Particle Size, Sieve Analyses - ASTM D422
- Porosity, Specific Gravity - ASTM D854
- Density - ASTM D2937

*No measure of
total organic carbon
content.*

APPENDIX A

Permits



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
921 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT
4629 Martin Luther King Jr. Way
Oakland, CA

PERMIT NUMBER 98WR462
WELL NUMBER _____
APN _____

California Coordinates Source _____ N. Accuracy ± _____ ft.
CCN _____ N. CCE _____ ft.
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

CLIENT
Name Lynn Nightingale
Address 1390 Market Street Phone 415-554-0200
City San Francisco Zip 94102-5306

- (A) GENERAL
 1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
 2. Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
 3. Permit is void if project not begun within 90 days of approval date.

APPLICANT
Name Advanced Assessment and Remediation Services Fax 925-363-1998
Address 2380 Salvia St #202 Phone 925-363-1999
City Concord Zip 94520

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

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	<input type="checkbox"/>	General	<input type="checkbox"/>
Water Supply	<input checked="" type="checkbox"/>	Contamination	<input type="checkbox"/>
Monitoring	<input checked="" type="checkbox"/>	Well Destruction	<input type="checkbox"/>

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

PROPOSED WATER SUPPLY WELL USE

New Domestic	<input type="checkbox"/>	Replacement Domestic	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>
Industrial	<input type="checkbox"/>	Other _____	<input type="checkbox"/>

- D. GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremie cement grout shall be used in place of compacted cuttings.
- E. CATHODIC
Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION
See attached.
- G. SPECIAL CONDITIONS

DRILLING METHOD:

Mud Rotary	<input type="checkbox"/>	Air Rotary	<input type="checkbox"/>	Auger	<input checked="" type="checkbox"/>
Cable	<input type="checkbox"/>	Other	<input type="checkbox"/>		

DRILLER'S LICENSE NO. C57 48165

WELL PROJECTS

Drill Hole Diameter	<u>8.5</u> in.	Maximum	
Casing Diameter	<u>2</u> in.	Depth	<u>30</u> ft.
Surface Seal Depth	<u>5</u> ft.	Number	<u>2</u>

GEOTECHNICAL PROJECTS

Number of Borings	<u>2</u>	Maximum	
Hole Diameter	<u>8.5</u> in.	Depth	<u>25</u> ft.

ESTIMATED STARTING DATE Nov. 5, 1998
ESTIMATED COMPLETION DATE Nov. 6, 1998

APPROVED [Signature] DATE 10/30/98

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

APPLICANT'S SIGNATURE [Signature] DATE 10-30-98

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



ENVIRONMENTAL HEALTH SERVICES

1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6377
(510) 567-6700
(510) 337-9335 (FAX)

StID 1489

August 5, 1998

Ms. Lynn Nightingale
102 Flying Cloud Isle
Foster City, CA 94404

RE: Work Plan Approval for 4629 MLK Jr Way, Oakland, CA

Dear Ms. Nightingale:

I have completed review of AARS' July 1998 "Work Plan for Supplemental Groundwater Quality Investigation" and the revised site plan depicting locations of the proposed temporary and permanent groundwater monitoring wells. The work plan is acceptable with the following changes/additions:

1. include analysis for TPH as stoddard solvent in all water samples;
2. only water from monitoring wells MW-1 and MW-2 need to be analyzed for chlorinated solvents, using Method 8240;
3. analysis for lead should be for total soluble lead, where the water sample (from wells MW-1 and MW-2 only) is filtered prior to analysis; and,
4. soil sample from TW-4, if "clean", should be selected for physical parameter analyses, where total carbon content quantification is also included;

Although records do not show that permits were taken for the installation of underground storage tanks (UST) inside the existing building, there exists what appears to be a UST, possible two, at the site (see enclosed site plan). The UST and any associated piping must be properly closed (either removed or filled with an inert material). The Oakland Fire Department is the lead agency for the closure of USTs. You should contact Mr. Leroy Griffin at (510) 238-7759 for applicable permits.

If you have any questions, I can be reached at (510) 567-6762.

eva chu
Hazardous Materials Specialist

c: Tridib Guha, AARS, 3800 Vista Oaks Dr, Suite 201, Martinez, CA 94553
Leroy Griffin, Oakland Fire Dept (w/)

enclosure

ntngale10

APPENDIX B

Boring Logs and Monitoring Well Installation Details

Monitoring Well No. MW-1

PROJECT: MLK Property, Oakland
 DRILL METHOD: HSA
 INITIAL GW DEPTH: 24 ft.

DATE: 11-14-95
 HOLE DIA.: 8 in.
 FINAL GW: 22.8 ft.

LOGGED BY: T. Guha
 SAMPLER: Split Spoon
 HOLE ELEV.: 80 ft. MSL

DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	BLOWS/FT	PTD (ppm)	WELL CONSTRUCTION DETAIL
<p>CONCRETE: (5 in.)</p> <p>CLAYEY SAND: brownish yellow (10YR 5/8) soft, slightly moist. @ 2 ft. reddish black (10R 2.5/1).</p>	SC	0-5	0-5				<p style="text-align: right;">Locking Christy Box</p> <p style="text-align: right;">Cement / Bentonite Grout Seal</p> <p style="text-align: right;">2" Ø Sch.40 PVC Well Casing</p> <p style="text-align: right;">Bentonite Pellet Seal</p> <p style="text-align: right;">2" Ø Sch.40 PVC Well Screen 0.020" slot size</p> <p style="text-align: right;">#3 Sand</p> <p style="text-align: right;">Threaded End Cap</p>
<p>SANDY CLAY: dark gray (2.5YR N4/1) soft, moist, low plasticity.</p>	CL	5-11	5-11	6	30	125	
<p>SILTY CLAY: light brownish gray (10YR 6/2) soft, moist, high plasticity.</p> <p>@ 15 ft. color changes to grayish brown (10YR 5/2).</p>		11-16	11-16	11	34	94	
<p>@ 20 ft. with some sand, strong odor.</p>		16-21	16-21	16	19	96	
<p>SILTY CLAY: light brownish gray (10YR 6/2) some sand, soft, wet, high plasticity, slight odor.</p>		21-26	21-26	21	26	1750	
<p>Bottom of hole at 30 feet.</p>		26-30	26-30	26			

ADVANCED ASSESSMENT AND REMEDIATION SERVICES
 5016 GLOUCESTER LANE MARTINEZ, CA 94553
 510-370-8295

Notes:
 Borehole was drilled by Soils Exploration Services using a Limited Access Rig, Access II.

Project No
 95018

LOG OF EXPLORATORY BORING NO. MW-2

Project: MLK Property.
 Drilling Co.: GREGG Drilling & Testing
 Start Date: 12/17/98
 End Date: 12/17/98

Drill Method: HSA
 Driller: Robert Deason
 Drill Rig: RHINO D-15

Logged By: T. Guha
 Sampler: Split Spoon
 Hole Dia.: 8 inch

LITHOLOGIC DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	DRIVEN in	RECOVERY-in	OVA (ppm)	WELL CONSTRUCTION DETAIL	
CONCRETE			0					<p style="text-align: right;">Christy Box</p> <ul style="list-style-type: none"> Neat Cement Bentonite Seal 2-inch SCH.40 PVC Blank Casing 2-inch SCH.40 0.010 slotted PVC screen Sand #2 Lonestar End cap 	
SILTY CLAY: dark gray, damp, soft	CL		-5-	☒	6 6 6	0			
same, color changes to brownish gray			-10-	☒	6 6 6	0			
CLAY: brownish gray, moist, stiff, high plasticity, no odor	CH		-15-	☒	6 6 6 6 6 6	0			
same, no odor			-20-		6 6 6	0			
same, wet, no odor			-25-	☒	6 6 6	0			
same, wet, no odor	CH		-30-	☒	6 6 6	0			
<i>BORE HOLE TERMINATED @ 30 feet</i>									
ADVANCED ASSESSMENT & REMEDIATION SERVICES 2380 Salvio Street, Suite 202 Concord, CA 94520			<i>Note Borehole was drilled by using a limited access rig</i>				Project No 98017 Page 1 of 1		

LOG OF EXPLORATORY BORING NO. MW-3

Project: MLK Property.
 Drilling Co.: GREGG Drilling & Testing
 Start Date: 12/16/98
 End Date: 12/16/98

Drill Method: HSA
 Driller: Robert Deason
 Drill Rig: RHINO D-15

Logged By: T. Guha
 Sampler: Split Spoon
 Hole Dia.: 8 inch

LITHOLOGIC DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	DRIVEN-in	RECOVERY-in	OVA (ppm)	WELL CONSTRUCTION DETAIL	
CONCRETE			0					<p style="text-align: right; margin-right: 50px;">Christy Box</p> <p style="text-align: right; margin-right: 50px;">Neat Cement</p> <p style="text-align: right; margin-right: 50px;">Bentonite Seal</p> <p style="text-align: right; margin-right: 50px;">2-inch SCH.40 PVC Blank Casing</p> <p style="text-align: right; margin-right: 50px;">2-inch SCH.40 0.010 slotted PVC screen</p> <p style="text-align: right; margin-right: 50px;">Sand #2 Lonestar</p> <p style="text-align: right; margin-right: 50px;">End cap</p>	
SILTY CLAY: dark gray, damp, soft same, color changes to brownish gray	CL	/ / / / / / / /	-5-	☒	6 6 6	0			
CLAY: gray, slightly moist, stiff, high plasticity, no odor color changes to yellowish brown, moist, stiff, high plasticity	CH	/ / / / / / / /	-10-	☒	6 6 6	0			
same, no odor	CH	/ / / / / / / /	-15-	☒	6 6 6 6 6	0			
same, wet	CH	/ / / / / / / /	-20-	☒	6 6 6 6 6	0			
SILTY CLAY: light brownish gray, soft, high plasticity, wet strong gasoline odor	CL	/ / / / / / / /	-25-	☒	6 6 6	1000			
<i>BORE HOLE TERMINATED @ 30 feet</i>									
			-30-	☒					

ADVANCED ASSESSMENT & REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, CA 94520

Note Borehole was drilled by using a limited access rig


Project No
 98017
 Page 1 of 1

LOG OF EXPLORATORY BORING NO. TW-3

Project: MLK Property.
 Drilling Co.: GREGG Drilling & Testing
 Start Date: 12/17/98
 End Date: 12/17/98

Drill Method: HSA
 Driller: R. Deason
 Drill Rig: RHINO D-15

Logged By: T. Guha
 Sampler: Split Spoon
 Hole Dia.: 6 inch

LITHOLOGIC DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	DRIVEN in	RECOVERY-in	OVA (ppm)	BORING CLOSURE
CONCRETE			0					 <p style="text-align: right; margin-right: 50px;">Neat Cement</p>
CLAY: dark gray, moist, soft, high plasticity	CH	/	-	☒			0	
Same, very moist, very stiff, high plasticity		/	-5-	☒				
	CH	/	-10-	☒			0	
Same, very moist,, stiff, high plasticity, no odor		/	-15-	☒			0	
		/	-20-	☒	6 6 6 6	6 6 6 6	0	
Same, color changes to light brown, moist, no petroleum odor	CH	/	-25-	☒			0	
<i>BORE HOLE TERMINATED @ 25 feet</i>								
			-30-					

ADVANCED ASSESSMENT & REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, CA 94520

Note Borehole was drilled by using a limited access rig. During drilling groundwater was not encountered. Borehole left open for 4 hours, it was still dry. After 5 hours there was some water groundwater sampled with a 0.75 inch diameter PVC casing.


Project No. 98017
 Page 1 of 1

LOG OF EXPLORATORY BORING NO. TW-4

Project: MLK Property.
 Drilling Co.: GREGG Drilling & Testing
 Start Date: 12/17/98
 End Date: 12/17/98

Drill Method: HSA
 Driller: R. Deason
 Drill Rig: RHINO D-15

Logged By: T. Guha
 Sampler: Split Spoon
 Hole Dia.: 6 inch

LITHOLOGIC DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	DRIVEN in	RECOVERY in	OVA (ppm)	BORING CLOSURE
CONCRETE			0					
CLAY: dark gray, damp, soft, high plasticity	CH	/ / / / / / / / / /	-5-	☒			0	
Same, light brown, slightly moist, stiff, high plasticity, no odor			-10-	☒	6	6	0	
SILTY CLAY: brown, with few rounded gravels and sand, moist, stiff, no odor	CL	/ / / / / / / / / /	-15-	☒	6	6	0	
same			-20-	☒	6	6	0	
CLAY: greenish brown, very moist, very stiff, high plasticity, no gasoline odor	CH	/ / / / / / / / / /	-25-	☒	6	6	0	
same, wet			-30-	☒			0	
<i>BORE HOLE TERMINATED @ 25 feet</i>								

ADVANCED ASSESSMENT & REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, CA 94520

Note Borehole was drilled by using a limited access rig. A groundwater sample was collected (see text)

Project No.
 98017
 Page 1 of 1

LOG OF EXPLORATORY BORING NO. MW-4/TW-5

Project: MLK Property.
 Drilling Co.: GREGG Drilling & Testing
 Start Date: 12/16/98
 End Date: 12/16/98

Drill Method: HSA
 Driller: Robert Deason
 Drill Rig: RHINO D-15

Logged By: T. Guha
 Sampler: Split Spoon
 Hole Dia.: 8 inch

LITHOLOGIC DESCRIPTION	USCS CLASS	GRAPHIC LOG	DEPTH	SAMPLE	DRIVEN in	RECOVERY-in	OVA (ppm)	WELL CONSTRUCTION DETAIL
CONCRETE			0					<p style="text-align: right; margin-right: 50px;">Christy Box</p> <p style="text-align: right; margin-right: 50px;">Neat cement</p> <p style="text-align: right; margin-right: 50px;">Bentonite Seal</p> <p style="text-align: right; margin-right: 50px;">2-inch SCH.40 PVC Blank Casing</p> <p style="text-align: right; margin-right: 50px;">2-inch SCH.40 0.010 slotted PVC screen</p> <p style="text-align: right; margin-right: 50px;">Sand #2 Lonestar</p> <p style="text-align: right; margin-right: 50px;">End cap</p>
SILTY CLAY: dark gray, damp, soft, high plasticity	CL		-5-	☒			0	
color changes to brown, moist, stiff, high plasticity	CL		-10-	☒			0	
CLAY: greenish gray, moist very stiff, high plasticity, no odor	CH		-15-	☒			0	
same, very strong gasoline odor	CH		-20-	☒	6	6	2000	
same, wet	CH		-25-	☒	6	6	5000	
SILTY GRAVEL: grayish brown, angular gravels with silt-sand mixtures	GM		-30-	☒	6	6		
<i>BORE HOLE TERMINATED @ 30 feet</i>								

ADVANCED ASSESSMENT & REMEDIATION SERVICES
 2380 Salvio Street, Suite 202
 Concord, CA 94520

Note Borehole was drilled by using a limited access rig Borehole was drilled to 25 feet A groundwater grab sample was collected, strong gasoline odor and sheen was noted Borehole was reentered with 8 inch augers drilled to 30 feet and converted into a monitoring well (see text)

Project No
 98017
 Page 1 of 1

UNIFIED SOIL CLASSIFICATION SYSTEM ASTM D2488-84

MAJOR DIVISIONS		SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS OVER 50% > No. 200 SIEVE SIZE	GRAVELS MORE THAN 1/2 OF COARSE FRACTION > NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH OVER 12% FINES	GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures	
	SANDS MORE THAN 1/2 OF COARSE FRACTION < NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH OVER 12% FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS OVER 50% < No. 200 SIEVE SIZE	SILTS & CLAYS LIQUID LIMIT 50% OR LESS	ML	Inorganic silty and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50%	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
		CH	Inorganic clays of high plasticity, fat clays	
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts	
		Pt	Peat and other highly organic soils	
HIGHLY ORGANIC SOILS				

SYMBOLS KEY

	Driven Interval
	Bulk or Classification Sample
	Laboratory Sample
	Undisturbed Samp. for Classification
	First encountered groundwater level
	Static groundwater level
(10YR 4/4) Munsell soil color 1990 edition	

GRAIN SIZE CHART

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL coarse fine	3" to No. 4 3" to 3/4" 3/4" to No. 4	76.2 to 4.76 76.2 to 19.1 19.1 to 4.76
SAND coarse medium fine	No. 4 to No. 200 No. 4 to No. 10 No. 10 to No. 40 No. 40 to No. 200	4.76 to 0.074 4.76 to 2.00 2.00 to 0.420 0.420 to 0.074
SILT & CLAY	Below No. 200	Below No. 0.074

ADVANCED ASSESSMENT &
REMEDIAL SERVICES
2380 Salvio Street, Suite 202
Concord, CA 94520

SOIL CLASSIFICATION CHART AND KEY TO BORING LOG

APPENDIX C

Monitoring Well Purge/Sample Worksheet

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORKSHEET

PROJECT NAME: MLK Property PROJECT NUMBER: 98017

SITE ADDRESS: 4629 Martin Luther King Jr. Way, Oakland, CA

WELL NUMBER: MW-1 WELL CASING DIA.: 2 inch DATE: 12-17-98

Stagnant Volume Calculation

Total Well Depth (ft) - Initial Depth to Water = Water Column Height (ft) - Time: 08:15
 30 - 19.65 = 10.35

Water column Height (ft) x Gallons/Linear Foot = Stagnant Volume (Gallons)
 10.35 x 0.17 = 1.8

(Gallons/Linear Foot: 2" dia. = 0.17; 4" dia. = 0.66; 6" dia. = 1.5)

Groundwater Inspection

Floating Product (ft. or in.): NOT MEASURABLE Sheen/Iridescence: YES Odor: STRONG GASOLINE ODOR

Time	Volume Purged (gal)	Temperature (degrees F)	pH	Conductivity μ S	Color/Turbidity/Other
12:15	0	67	7.25	1029	CLEAR WITH BUBBLES
12:28	2	66	7.16	1020	TURBID GRAYISH
12:43	4	66	7.20	1010	" "
12:57	6	66	7.20	1005	" "

Purged Water Containment

Purge Method Used:

gals stored in 55 gal (drums); Any previous drums? Capacity

Groundwater Sampling

Water Level Recovery (Depth to groundwater in feet)

(P) After purging: 22.66 (I) Initially: 19.65 (S) Before sampling: 19.70 Time: 16:20

(P-S)/(P-I) x 100 = 100 % Total Recovery: 98%

SAMPLE TIME 17:00

Sample Containers (How many? Preservatives?)

1 liter amber glass: 1; 40 ml VOA: 3; 500 ml polypropylene: 1

REMARKS:

SAMPLER: TRIDIS GUNA

SIGNATURE: *[Signature]*

(Print)

ADVANCED ASSESSMENT AND REMEDIATION SERVICES

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORKSHEET

PROJECT NAME: MLK Property PROJECT NUMBER: 98017

SITE ADDRESS: 4629 Martin Luther King Jr. Way, Oakland, CA

WELL NUMBER: MW-2 WELL CASING DIA.: 2 INCH DATE: 12-18-98

Stagnant Volume Calculation

Total Well Depth (ft) - Initial Depth to Water = Water Column Height (ft) - Time: 08:35
 30 20.59 9.41

Water column Height (ft) x Gallons/Linear Foot = Stagnant Volume (Gallons)
 9.41 0.17 1.6

(Gallons/Linear Foot: 2" dia. = 0.17; 4" dia. = 0.66; 6" dia. = 1.5)

Groundwater Inspection

Floating Product (ft. or in.): NONE Sheen/Iridescence: YES Odor: YES

Time	Volume Purged (gal)	Temperature (degrees F)	pH	Conductivity μ S	Color/Turbidity/Other
08:40	0	64	7.10	1400	CLEAR
08:50	1.5	64	7.12	1380	CLOUDY GRAYISH
09:00	3	63	7.14	1360	" "
09:10	5	63	7.10	1370	" "
09:20	6.5	63	7.12	1350	MUDDY GRAY
09:30	8	63	7.15	1340	" "
09:40	10	63	7.10	1345	" "
09:50	11.5	63	7.10	1345	" "
10:00	13	63	7.10	1325	" "
10:15	16	62	7.10	1330	" "

Purged Water Containment

Purge Method Used:

gals stored in 55 gal (drums); Any previous drums? Capacity

Groundwater Sampling

Water Level Recovery (Depth to groundwater in feet)

(P) After purging: 23.20 (I) Initially: 20.59 (S) Before sampling: 20.62 Time: 13:10

(P-S)/P-I x 100 = 100 % Total Recovery: 98.8 %

Sample Time 13:10

Sample Containers (How many? Preservatives?)

1 liter amber glass: 1; 40 ml VOA: 3; 500 ml polypropylene: 1

REMARKS:

SAMPLER: TRIDIB CRUHA

(Print)

SIGNATURE: *[Signature]*

ADVANCED ASSESSMENT AND REMEDIATION SERVICES

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORKSHEET

PROJECT NAME: MLK Property PROJECT NUMBER: 98017

SITE ADDRESS: 4629 Martin Luther King Jr. Way, Oakland, CA

WELL NUMBER: MW-3 WELL CASING DIA: 2 INCH DATE: 12-17-98

Stagnant Volume Calculation

Total Well Depth (ft) - Initial Depth to Water = Water Column Height (ft) - Time: 08:20
30 20.95 9.05

Water column Height (ft) x Gallons/Linear Foot = Stagnant Volume (Gallons)
9.05 0.17 1.5

(Gallons/Linear Foot: 2" dia. = 0.17; 4" dia. = 0.66; 6" dia. = 1.5)

Groundwater Inspection

Floating Product (ft. or in.): NOT MEASURABLE Sheen/Iridescence: YES Odor: STRONG GASOLINE ODOR

Time	Volume Purged (gal)	Temperature (degrees F)	pH	Conductivity μ S	Color/Turbidity/Other
10:30	0	65	6.83	2263	CLEAR WITH BUBBLES
10:40	1.5	64	7.08	2250	CLOUDY - GRAYISH
10:50	3	64	7.10	2220	TURBID GRAY
11:00	4.5	64	7.06	2230	MUDDY GRAY
11:10	6	64	7.10	2220	" "
11:20	7.5	64	7.08	2210	" "
11:30	9	64	7.10	2225	" "
11:40	10.5	64	7.05	2215	" "
11:55	12	64	7.10	2210	" "
12:10	14	64	7.08	2205	" "

Purged Water Containment

Purge Method Used:

gals stored in 55 gal (drums); Any previous drums? Capacity

Groundwater Sampling

Water Level Recovery (Depth to groundwater in feet)

(P) After purging: 23.68 (I) Initially: 20.95 (S) Before sampling: 21.11 Time: 16:23

(P-S)/P-I x 100 = 100 % Total Recovery: 94%

SAMPLE TIME 16:40

Sample Containers (How many? Preservatives?)

1 liter amber glass: 1; 40 ml VOA: 3; 500 ml polypropylene: 1

REMARKS:

SAMPLER: TRIDIB GUHA

(Print)

SIGNATURE: 

ADVANCED ASSESSMENT AND REMEDIATION SERVICES

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORKSHEET

PROJECT NAME: MLK Property PROJECT NUMBER: 98017

SITE ADDRESS: 4629 Martin Luther King Jr. Way, Oakland, CA

WELL NUMBER: MW-4 WELL CASING DIA.: 2 INCH DATE: 12-17-98

Stagnant Volume Calculation

Total Well Depth (ft) - Initial Depth to Water = Water Column Height (ft) - Time: 08:25
 30 - 19.15 = 10.85

Water column Height (ft) x Gallons/Linear Foot = Stagnant Volume (Gallons)
 10.85 x 0.17 = 1.8

(Gallons/Linear Foot: 2" dia. = 0.17; 4" dia. = 0.66; 6" dia. = 1.5)

Groundwater Inspection

Floating Product (ft. or in.): NOT MEASURABLE Sheen/Iridescence: YES Odor: STRONG GASOLINE ODOR
 BUBBLES

Time	Volume Purged (gal)	Temperature (degrees F)	pH	Conductivity μ S	Color/Turbidity/Other
08:26	0	62	7.35	869	CLEAR WITH BUBBLES
08:37	2	62	7.30	875	CLOUDY WITH SUSPENDED PARTICLES
08:50	4	61	7.30	857	CLOUDY GRAY
09:03	6	61	7.30	850	MUDDY GRAY
09:15	8	61	7.31	852	" "
09:28	10	61	7.30	856	" "
09:42	12	61	7.32	846	" "
09:55	14	61	7.31	840	" "
10:10	16	61	7.30	842	" "
10:25	18	61	7.30	840	" "

Purged Water Containment

Purge Method Used:

gals stored in 55 gal (drums); Any previous drums? Capacity

Groundwater Sampling

Water Level Recovery (Depth to groundwater in feet)

(P) After purging: 22.32 (I) Initially: 19.15 (S) Before sampling: 19.18 Time: 16:25

(P-S)/(P-I) x 100 = 100 % Total Recovery: 99%

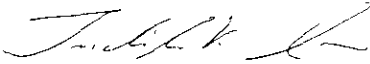
SAMPLE TIME 10:30

Sample Containers (How many? Preservatives?)

1 liter amber glass: 1; 40 ml VOA: 3; 500 ml polypropylene: 1

REMARKS:

SAMPLER: TRIDIB GWA

SIGNATURE: 

(Print)

ADVANCED ASSESSMENT AND REMEDIATION SERVICES

APPENDIX D

Certified Analytical Reports and Chain-of-Custody Documents



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
<http://www.mccampbell.com> E-mail: main@mccampbell.com

Advanced Assessment & Remediation Services 2380 Salvio St. Suite 202 Concord, CA 94520	Client Project ID: 4629 MLK Jr. Way, Oakland	Date Sampled: 12/16-12/18/98
		Date Received: 12/17-12/18/98
	Client Contact: Tridib Guha	Date Extracted: 12/17-12/18/98
	Client P.O:	Date Analyzed: 12/17/98

12/28/98

Dear Tridib:

Enclosed are:

- 1). the results of 11 samples from your **4629 MLK Jr. Way, Oakland.** project,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

After our analysis of these samples, Advanced Assessment & Remediation Services requested that we examine these chromatograms for "mineral spirits". The patterns present show no indication of mineral spirits.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director



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Advanced Assessment & Remediation Services 2380 Salvio St. Suite 202 Concord, CA 94520	Client Project ID: 4629 MLK Jr. Way, Oakland	Date Sampled: 12/16-12/18/98
		Date Received: 12/17-12/18/98
	Client Contact: Tridib Guha	Date Extracted: 12/17-12/18/98
	Client P.O:	Date Analyzed: 12/17-12/23/98

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) ⁺	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
00391	TW5-18S	S	43,g,j	ND	ND	0.016	0.054	ND	---#
00392	MW3-19S	S	ND	ND	ND	ND	ND	ND	100
00393	MW2-18S	S	ND	ND	ND	ND	ND	ND	101
00394	TW3-18S	S	ND	ND	ND	ND	ND	ND	101
00395	TW4-18S	S	ND	ND	ND	ND	ND	ND	103
00396	MW1-GW	W	480,a	ND	12	1.9	ND	2.9	116
00397	MW3-GW	W	840,j	ND	3.6	1.1	1.0	2.2	---#
00398	MW4-GW	W	4000,j	ND	11	3.7	10	2.9	---#
00399	TW3-GW	W	ND,i	ND	ND	ND	ND	ND	102
00400	TW4-GW	W	ND	ND	0.85	0.86	ND	ND	97
00516	MW2-GW	W	ND	ND	ND	ND	ND	ND	105
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	5.0	0.5	0.5	0.5	0.5	
	S		1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

~ cluttered chromatogram, sample peak coelutes with surrogate peak

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for the interpretation: a) unmodified or weakly modified gasoline is significant, b) heavier gasoline range compounds (the most mobile fraction) are significant (aged gasoline?), c) lighter gasoline range compounds (the most mobile fraction) are significant, d) gasoline range compounds having broad chromatographic peaks are significant, biologically altered gasoline?, e) TPH pattern that does not appear to be derived from gasoline (?) f) one to a few isolated peaks present, g) strongly aged gasoline or diesel range compounds are significant, h) lighter than water immiscible sheen is present, i) liquid sample that contains greater than ~5 vol % sediment, j) no recognizable pattern



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Advanced Assessment & Remediation Services 2380 Salvio St. Suite 202 Concord, CA 94520	Client Project ID: 4629 MLK Jr. Way, Oakland	Date Sampled: 12/16-12/18/98
	Client Contact: Tridib Guha	Date Received: 12/17-12/18/98
	Client P.O:	Date Extracted: 12/17-12/21/98
		Date Analyzed: 12/17-12/23/98

Diesel Range (C10-C23) and Oil-Range (C18+) Extractable Hydrocarbons as Diesel and Motor Oil*
 EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d) ⁺	TPH(mo) ⁺	% Recovery Surrogate
00391	TW5-18S	S	20,d	ND	97
00392	MW3-19S	S	ND	ND	99
00393	MW2-18S	S	ND	ND	102
00394	TW3-18S	S	ND	ND	101
00395	TW4-18S	S	ND	ND	101
00396	MW1-GW	W	590,b	ND	106
00397	MW3-GW	W	720,b,d	ND	106
00398	MW4-GW	W	4300,b,d	ND	106
00399	TW3-GW	W	140,g,i	430	106
00400	TW4-GW	W	ND	ND	107
00516	MW2-GW	W	730,b	ND	106
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	250 ug/L	
	S		1.0 mg/kg	5.0 mg/kg	

*water samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

The filtered chromatogram resulting in coeluted surrogate and sample peaks or surrogate peaks on elevated baseline or surrogate has been diminished by dilution of original extract

The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant, b) diesel range compounds are significant, no recognizable pattern of aged diesel is significant, c) gasoline range compounds are significant or medium boiling point pattern is present, does not meet diesel criteria, one to a few isolated peaks present, g) oil range compounds are significant, if lighter than water, immiscible sheen is present, if oil sample that contains greater than ~5 vol % sediment



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Advanced Assessment & Remediation Services 2380 Salvio St. Suite 202 Concord, CA 94520	Client Project ID: 4629 MLK Jr. Way, Oakland	Date Sampled: 12/16-12/18/98
	Client Contact: Tridib Guha	Date Received: 12/17-12/18/98
	Client P.O:	Date Extracted: 12/18/98
		Date Analyzed: 12/21/98

Lead*

EPA analytical methods 6010/200.7, 239.2*

Lab ID	Client ID	Matrix	Extraction °	Lead*	% Recovery Surrogate
00396	MW1-GW	W	Dissolved	ND	NA
00397	MW3-GW	W	Dissolved	ND	NA
00398	MW4-GW	W	Dissolved	ND	NA
00399	TW3-GW	W	Dissolved	ND	NA
00400	TW4-GW	W	Dissolved	ND	NA
00516	MW2-GW	W	Dissolved	ND	NA
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	S	TTLC		3.0 mg/kg	
	W	TTLC		0.005 mg/L	
	---	STLC,TCLP		0.2 mg/L	

* soil and sludge samples are reported in mg/kg, wine samples in ug/wine, and water samples and all STLC / SFLP / TCLP extracts in mg/l
 † Lead is analysed using EPA method 6010 (ICP) for soils, sludges, STLC & TCLP extracts and method 239.2 (AA Furnace) for water samples
 ° EPA extraction methods 1311(TCLP), 3010/3020(water, TTLC), 3040(organic matrices TTLC), 3050(solids, TTLC) STLC - CA Title 22 surrogate diluted out of range, NA means surrogate not applicable to this analysis
 ‡ reporting limit raised due matrix interference
 § liquid sample that contains greater than ~2 vol % sediment this sediment is extracted with the liquid in accordance with EPA methodologies and can significantly effect reported metal concentrations

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/17/98

Matrix: WATER

Analyte	Concentration (mg/L)			Amount Spiked	% Recovery		
	Sample (#00246)	MS	MSD		MS	MSD	RPD
TPH (gas)	0.0	89.8	88.4	100.0	89.8	88.4	1.6
Benzene	0.0	9.3	9.0	10.0	93.0	90.0	3.3
Toluene	0.0	9.6	9.3	10.0	96.0	93.0	3.2
Ethyl Benzene	0.0	9.8	9.5	10.0	98.0	95.0	3.1
Xylenes	0.0	29.5	28.6	30.0	98.5	95.5	3.1
TPH(diesel)	0.0	159	163	150	106	109	2.6
TRPH (oil & grease)	0	23292	22975	23700	98	97	1.4

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/17/98

Matrix: SOIL

Analyte	Concentration (mg/kg)			Amount Spiked	% Recovery		RPD
	Sample (#97131)	MS	MSD		MS	MSD	
TPH (gas)	0.000	1.972	2.074	2.03	97	102	5.0
Benzene	0.000	0.194	0.186	0.2	97	93	4.2
Toluene	0.000	0.208	0.190	0.2	104	95	9.0
Ethylbenzene	0.000	0.196	0.192	0.2	98	96	2.1
Xylenes	0.000	0.578	0.560	0.6	96	93	3.2
TPH (diesel)	0	320	321	300	107	107	0.2
TRPH (oil and grease)	0.0	21.4	22.8	20.8	103	110	6.3

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

QC REPORT FOR ICP and/or AA METALS

Date: 12/20/98-12/21/98

Matrix: WATER

Extraction:

DISSOLVED

Analyte	Concentration (mg/L)			Amount	% Recovery		
	Sample	MS	MSD		MS	MSD	RPD
Total Lead	0.00	5.04	5.15	5.00	101	103	2.1
Total Cadmium	0.00	5.57	5.47	5.00	111	109	1.9
Total Chromium	0.00	5.05	5.04	5.00	101	101	0.2
Total Nickle	0.00	4.97	4.97	5.00	99	99	0.1
Total Zinc	0.00	5.33	5.26	5.00	107	105	1.4
Total Copper	0.00	4.81	4.68	5.00	96	94	2.8
DISSOLVED Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

13369

XGARS13

McCAMPBELL ANALYTICAL INC.

110 2ND AVENUE SOUTH, #D7
PACHECO, CA 94553-5560

Telephone: (925) 798-1620

Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME

RUSH 24 HOUR 48 HOUR 5 DAY

Report To: TRIDIA GUYA Bill To: _____
 Company: ADVANCED ASSESSMENT & REMEDIATION SERVICES
2380 SALVIO STREET, SUITE 202
CLUNY, CA 94520
 Tele: (925) 363-1999 Fax: (925) 363-1998
 Project #: _____ Project Name: M LK Property
 Project Location: 4629 MLK J. WAY, OAKLAND
 Sampler Signature: [Signature]

SAMPLE ID	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				BTEX & TPH as Gas (602/8020 + 8015) MTBE	TPH as Diesel (8015) - MOTOR OIL	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239,2/6010) DISSOLVED	RCI	Other	Comments						
		Date	Time			Water	Soil	Air	Sludge	Other	Ice	HCl	HNO ₃	Other																							
TW5-18S	OAKLAND	12-16-98	14:15	1	8 Tun		X																														00391
MW3-19S		12-16-98	11:15	1			X																													00392	
MW2-18S		12/17/98	8:30	1			X																													00393	
TW3-18S			11:15	1			X																													00394	
TW4-18S			12:58	1			X																													00395	
MW1-GW			17:00	5	1 Am 3 vial		X																													00396	
MW3-GW			16:40	5	1 Poly		X																													00397	
MW4-GW			16:30	5			X																													00398	
TW3-GW			16:45	5			X																													00399	
TW4-GW			14:36	5			X																													00400	

Relinquished By: _____ Date: 12/17/98 Time: 20:00 Received By: _____
 Relinquished By: _____ Date: _____ Time: 20:00 Received By: EDWARD OYSTANNIK
 Relinquished By: _____ Date: _____ Time: _____ Received By: _____

Remarks: PLEASE PROVIDE ALL CHROMATOGRAMS WITH THE FINAL REPORT.

ICE GOOD CONDITION HEAD SPACE ABSENT APPROPRIATE CONTAINERS

VOAS GCS METALS OTHER

Signature: [Signature]

APPENDIX E

Geotechnical Laboratory Report

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
0.50	15.0	49.0	43.0	0.0143	49.0	8.3	0.0581	67.4
1.00	15.0	45.0	39.0	0.0143	45.0	8.9	0.0427	61.1
2.00	15.0	42.0	36.0	0.0143	42.0	9.4	0.0310	56.4
5.00	15.0	39.0	33.0	0.0143	39.0	9.9	0.0201	51.7
15.00	16.0	35.0	29.2	0.0141	35.0	10.6	0.0118	45.8
30.00	17.0	32.0	26.4	0.0139	32.0	11.0	0.0084	41.5
60.00	17.0	29.3	23.7	0.0139	29.3	11.5	0.0061	37.2
120.00	17.0	27.0	21.4	0.0139	27.0	11.9	0.0044	33.6
240.00	17.0	25.0	19.4	0.0139	25.0	12.2	0.0031	30.5
480.00	17.0	23.5	17.9	0.0139	23.5	12.4	0.0022	28.1
1416.00	13.0	22.0	15.4	0.0147	22.0	12.7	0.0014	24.1

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% + 3" =	% GRAVEL = 4.4	(% coarse =	% fine = 4.4)
% SAND = 25.8	(% coarse = 3.7	% medium = 4.8	% fine = 17.3)
% SILT = 34.8	% CLAY = 35.0		

D₈₅ = 0.28 D₆₀ = 0.04 D₅₀ = 0.02

D₃₀ = 0.00

Specific Gravity
ASTM D-854

Cooper Testing Lab

Job#:	356-001	Date:	01/07/98				
Client:	AARS	By:	DC				
Project:	MLK Property						
Boring:	TW4-105						
Sample:							
Depth, ft.:							
Soil Classification: (visual)	see sieve						
Wt. of Pycnometer Soil & Water, gm:	715.4						
Temp. centigrade:	18						
Wt. of Pycnometer & Water, gm:	672.13						
Wt. Dry Soil, gm:	68.64						
Temp. Correction Factor:	1						
Specific Gravity:	2.71	ERR	ERR	ERR	ERR	ERR	

Remarks: The temperature correction factor is shown as 1 if the weight of the pycnometer is taken from the lab temperature correction curve.

COOPER TESTING LABS

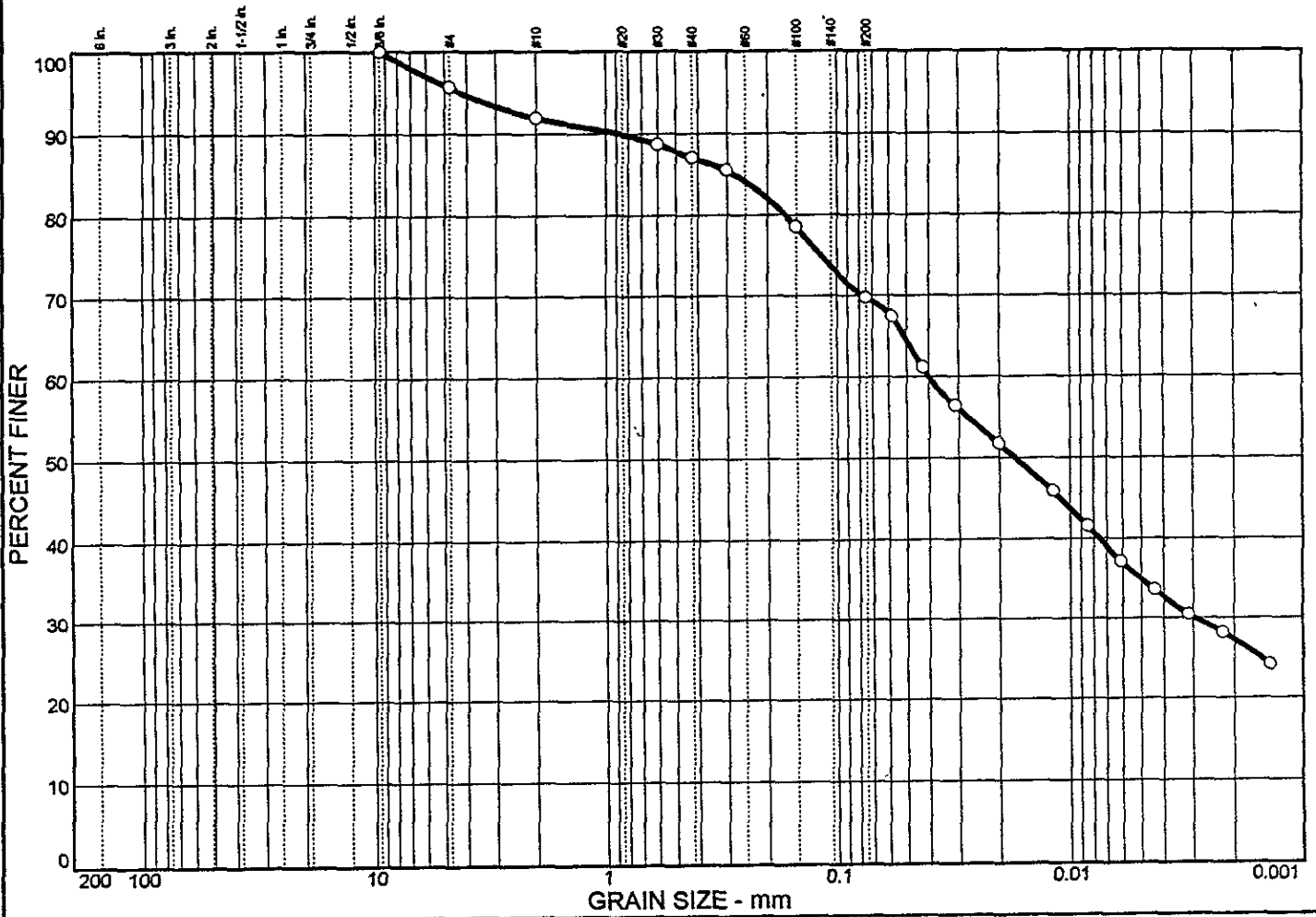
MOISTURE DENSITY - POROSITY DATA SHEET

Job # Client Project/Location Date	356-001 AARS MLK Property 1/6/99				
Boring #	TW4-105				
Depth (ft)					
Soil Type	see sieve				
Specific Gravity	2.71				
Volume Total cc	111.751				
Volume of Solids	69.130				
Volume of Voids	42.621				
Void Ratio	0.617				
Porosity %	38.1%				
Saturation %	84.8%				
Moisture %	19.3%				
Dry Density (pcf)	104.7				

Remarks

Test accuracy may be affected due to the small sample diameter (1.4").

PARTICLE SIZE DISTRIBUTION CURVES



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	4.4	3.7	4.8	17.3	34.8	35.0

LL	PL	D85	D60	D50	D30	D15	D10	G _c	C _u
		0.277	0.0402	0.0171	0.0029				

MATERIAL DESCRIPTION	USCS	AASHTO
○ brown CLAY w/sand		

Project No. 356-001 Client: AARS Project: MLK Property ○ Source: TW4-105	Remarks: ○
---	---------------