PRELIMINARY SITE ASSESSMENT
CHILDREN'S HOSPITAL

4701 Martin Luther King,, Jr., Way
Oakland, California

May 9, 2000

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All engineering information, conclusions, and recommendations contained in this report have been prepared by a California Professional Engineer. All hydrogeologic and geologic information, conclusions, and recommendations contained in this report have been prepared by a California Registered Geologist.

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1. INTRODUCTION

This Preliminary Site Assessment (PSA) has been prepared by World Environmental Services and Technology, Inc. (WEST) for Children's Hospital for the property located at 4701 Martin Luther King, Jr., Way in Oakland, California ("the Site"; see Figure 1). Based upon concentrations of petroleum hydrocarbons in samples collected during the removal of three underground storage tanks (USTs) in 1990, Alameda County Health Care Services (ACHCS) requested in their letter dated January 24, 2000 that a PSA be prepared to "delineate the extent of soil and possible groundwater contamination at the site."

1.1 BACKGROUND

The Site consists of a gated and fenced parking lot for the Children's Hospital, which was developed in the 1990's. From the 1930s until conversion to a parking lot, a two-story commercial building was present on the Site. In October 1990, three USTs containing petroleum hydrocarbons were removed from the Site. Soil samples collected from the UST excavations revealed concentrations of petroleum hydrocarbons. Based upon the results, the Alameda County Health Care Services (ACHCS) requested further investigation of the Site to delineate the extent of petroleum hydrocarbons in soil and groundwater. The ACHCS requested that a Preliminary Site Assessment be prepared proposing a scope of work.

Immediately south of the Site across 47th Street, environmental investigations have been performed related to three former heating oil USTs at 4629 Martin Luther King Jr. Way (4629 MLK). Investigations at this property have revealed elevated concentrations of petroleum hydrocarbons in groundwater and in soil. Based upon the groundwater gradient and the location of the former heating oil USTs at the Site, the results of environmental investigations performed at 4629 MLK may be useful in delineating the extent of soil and potential groundwater impacts associated with the former USTs at the Site.

2. SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS

2.1 SITE DESCRIPTION

The Site is located along 47th Street, approximately 50 feet northwest of the intersection with Martin Luther King, Jr., Way in Oakland, California. The approximately one-half acre Site is located on two adjoining parcels identified as Alameda County Assessor's Parcel Numbers 013-1163-007 and 013-1163-009. The northern boundary of these two parcels overlies Temescal Creek. In the 1930s, a two-story commercial building was built on the Site. In the 1990s, the Site was redeveloped as a gated and fenced parking lot for the Children's Hospital. The sidewalk adjacent to the Site along 47th Street appears to have been recently replaced, except for a portion of sidewalk within 60 feet of Martin Luther King Jr., Way.

2.2 PREVIOUS INVESTIGATIONS

2.2.1 Previous Investigations at the Site

In December 1989, Robert Gils Associates, Inc., of Emeryville, California, advanced three soil borings at the Site and collected seven soil samples. One soil boring was located east and two soil soil borings were located west of an estimated location of an UST. One soil sample collected from stained soil reportedly observed in a soil boring was analyzed for total petroleum hydrocarbons as gasoline (TPHg), total petroleum hydrocarbons as diesel (TPHd), and benzene, toluene, ethyl benzene, and xylenes (BTEX). The preliminary analytical results did not reveal concentrations of TPHg, TPHd, or BTEX above their respective detection limits of 5 milligrams per kilogram (mg/kg), 10 mg/kg, and 0.1 mg/kg.

On October 9, 1990, three USTs were removed from the Site by Tom Daniels Excavating, Inc., of Danville, California, under the supervision of Aqua Terra Technologies of Walnut Creek, California. According to the Uniform Hazardous Waste Manifest number 90283209, one gasoline UST with a capacity of 2,000 gallons and two heating oil USTs with capacities of 2,000 gallons

and 500 gallons were removed from the Site. One excavation was advanced to remove the gasoline UST and a separate excavation was advanced to remove both heating oil USTs, see Figure 2. The USTs were reportedly disposed at Schnitzer Steel in Oakland, California. Because the sidewalk was replaced subsequent to the UST removals, there is no surface indication at the Site as to the former location of the USTs.

Four soil samples were collected on October 9, 1990 and three soil samples were collected on October 17, 2000 from the sidewalls of the two UST excavations. Concentrations in soil samples collected from the excavation of the gasoline UST reportedly revealed concentrations of TPHg up to 2,700 mg/kg, toluene up to 1.5 mg/kg, ethyl benzene up to 15 mg/kg, and xylenes up to 55 mg/kg.

Concentrations in soil samples collected from the excavation of the two heating oil USTs reportedly revealed concentrations of TPHg up to 38 mg/kg, TPHd up to 1,100 mg/kg, ethyl benzene up to 1.3 mg/kg, and xylenes up to 1 mg/kg. Benzene was not reported above the detection limit in soil samples collected from the gasoline or heating oil excavations. Table 1 summarizes the analytical results of previous investigations.

2.2.2 Previous investigations Adjacent to the Site

2.2.2.1 1993 Investigation

The property located at 4629 Martin Luther King Jr. Way ("4629 MLK") is located directly south of the Site and across 47th Street. Subsurface Consultants, Inc. of Oakland, California (SCI) authored a report on 4629 MLK dated November 1993. Although the text of the SCI 1993 report was not reviewed, WEST did review geologic logs for six soil borings, a site plan, and soil analytical data from nine soil borings. Based on available information, three former heating oil USTs were located beneath the sidewalk along 47th Street adjacent to 4629 MLK and two former gasoline USTs were also located at 4629 MLK, approximately 40 feet east of the former heating USTs, see Figure 2.

In 1993, SCI advanced nine soil borings in the vicinity of three former heating oil USTs located. One boring was located in each of three former heating oil UST locations and the remaining six borings were located north, south, and east of the former heating oil USTs. Three of the soil borings were located in 47th Street between 4629 MLK and the Site. Twenty soil samples were collected in the nine soil borings at depths between 11.5 feet bgs and 31 feet bgs. Based on the depth to groundwater observed in the borings, approximately 15 of the 20 soil samples were collected within the capillary fringe or below in groundwater.

The soil samples were analyzed for TPHd and oil and grease. The highest TPHd concentration of 1,700 mg/kg was reported in the soil sample collected within SB-3, at the easternmost former heating oil UST location. Elevated concentrations of TPHd in soil were also reported in soil samples collected within SB-2 at 570 mg/kg, located in the central former heating oil UST location, and from SB-7 at 750 mg/kg, located approximately 20 feet south of the former heating oil USTs. Similarly, elevated concentrations of oil and grease were reported in soil samples collected from soil borings SB-2, SB-3, and SB-7. Table 2 summarizes the reported analytical results for soil samples collected at 4629 MLK and Figure 2 shows the reported sampling locations.

2.2.2.2 Groundwater Monitoring

On February 7, 2000, Advanced Assessment and Remediation Services of Concord, California (AARS) performed quarterly groundwater monitoring within four monitoring wells located at 4629 MLK (AARS, 2000). The groundwater samples were analyzed for BTEX, TPHg, TPHd, and TPH as motor oil (TPHmo) by Priority Environmental Labs of Milpitas, California. AARS reportedly observed petroleum odors and sheen on groundwater collected from monitoring wells MW-1, MW-3, and MW-4. Analytical results of the quarterly groundwater monitoring indicate that MW-4, located approximately 40 feet west-southwest of the westernmost former heating oil UST, contained the highest concentrations of BTEX, TPHg, TPHd, and TPHmo at 3.4 µg/l, 2.2 µg/l, 8.9 µg/l, 29 µg/l, 2100 µg/l, 920 µg/l, and 3800 µg/l. Table 2 summarizes the reported analytical results for 4629 MLK and Figure 2 shows the reported sampling locations.

AARS tabulated concentrations of petroleum hydrocarbons in groundwater from 1995 through 2000, see Appendix A. Based upon the historical data, concentrations of petroleum hydrocarbons in all four monitoring wells have decreased over time. For example, the historical data from 1995 through 2000 for monitoring well MW-1, show that concentrations of TPHg decreased from 220 µg/l to 89 µg/l and benzene decreased from and 12 µg/l to less than the detection limit of 0.5 µg/l. Similarly, analytical data reported for monitoring well MW-4 from April 1998 to February 2000 show TPHg concentrations decreasing from 5100 µg/l to 2100 µg/l and benzene concentrations decreasing from 160 µg/l to 3.4 µg/l.

2.3 GEOLOGY AND HYDROGEOLOGY

2.3.1 Regional Geologic Setting

The Site is located within the Coast Ranges geomorphic province, which is characterized by a series of parallel, northwesterly-trending, folded and faulted mountain chains. In this part of the providence, the gentle low-lying topography is composed of reworked marine and nonmarine sedimentary deposits derived from steeply inclined hills located to the east of the Site. Quarternary (2 to 3 million years ago to the present) uplift resulted in the geologically recent formation of Bay Area hills and valleys including the East Bay hills. The uplift has caused erosion of the mountains and hills with accompanying deposition in the valleys.

2.3.2 Site Geology

Descriptions of soil encountered in the UST excavations advanced at the Site were not reviewed by WEST. However, geologic descriptions of soil encountered in six borings advanced at 4629 MLK were reviewed. The geologic materials encountered in these six borings generally consist of a silty clay from ground surface to approximately 10 feet below ground surface (bgs), a silty clayey sand to approximately 20 feet bgs, and a sandy clayey gravel to a depth of at least 32 feet bgs.

2.3.3 Site Hydrogeology

Groundwater was reportedly encountered between 20 feet and 25 feet bgs in the six soil borings advanced at 4629 MLK (SCI, 1993). Advanced Assessment and Remediation Services of Concord, California, reportedly measured depth to groundwater in four monitoring wells installed at this same property. On February 7, 2000, the depth to groundwater was reportedly measured to be approximately 15 feet bgs and the groundwater gradient at this property appears to be directed towards the south to southwest. However, based upon topography and experience in the area, the groundwater gradient direction is inferred to be towards the west and San Francisco Bay.

3. SCOPE OF WORK

A scope of work has been developed based on the findings reported to date and pursuant to the ACHSA letter of January 24, 2000. Accordingly, the purpose of this scope of work is to delineate the extent of petroleum hydrocarbons in soil and groundwater associated with the three former USTs at the Site.

The tasks identified to address the project goals for the proposed soil and groundwater investigation includes:

- Task 1: Verification of Former UST Locations and Groundwater Gradient
- Optional Task 2: Permitting, Utility Clearance, and Health & Safety Plan.
- Optional; Task 3: Soil Investigation Activities.
- Optional Task 4: Groundwater Investigation Activities.
- Optional Task 5: Groundwater Monitoring Well Installation.
- Task 6: Preparation of Report.

The implementation of Tasks 2 through 5 will depend upon the findings from Task 1, which is designed to determine the (1) the actual location of former USTs at the Site, and (2) the groundwater gradient in the vicinity of the Site. Based upon the findings from Task 1, results of investigations at 4629 MLK may be used to delineate the extent of petroleum hydrocarbons in soil and groundwater downgradient from the Site. As such, implementation of Tasks 2 through 5 may or may not be necessary based upon the results of Task 1. For example, soil samples collected within soil borings 4, 5, 6, and 9 advanced in 47th Street may be used to delineate soil and groundwater quality associated with the former USTs at the Site. Also, groundwater samples collected from monitoring wells MW-1 through MW-4 may be used to characterize groundwater

quality downgradient of the former USTs at the Site. The results of Task 1 will be orally communicated with ACHCS prior to proceeding with the remainder of the proposed scope-of-work.

All geologic work will be performed under the direction of a California Registered Geologist and all engineering work will be performed under a California Professional Engineer. A detailed description of each task follows.

3.1 TASK 1: VERIFICATION OF FORMER UST LOCATIONS AND GROUNDWATER GRADIENT

The locations of the three former USTs removed from the Site in 1990 will be verified prior to implementing subsequent tasks. Effort to verify the UST locations will include an inspection of the Site to identify patches of surface materials, review of aerial photographs, interviews with current and past owners of the Site, and interviews with former contractors at the Site.

Because the groundwater gradient reported at 4629 MLK is inconsistent with the regional groundwater gradient towards the west and the San Francisco Bay, the groundwater gradient in the vicinity of the Site will be assessed by reviewing environmental reports for nearby properties, including 4629 MLK. Agency files for nearby sites also will be reviewed to evaluate groundwater gradients in the vicinity of the Site.

The property owner for 4629 MLK will be contacted to gain access to their property and monitoring wells. Previous environmental reports for 4629 MLK will be reviewed to evaluate historical groundwater gradients. As appropriate and with permission of the property owner, the elevations and locations of the four monitoring wells at 4629 MLK will be resurveyed. Based upon the results of the survey, the existing depth to groundwater data will be evaluated.

wells at 4629 were recently decommissioned

Based on the findings resulting from the implementation of this Task 1, the utility of existing data collected at 4629 MLK will be evaluated in lieu of performing Tasks 2, 3, 4, and 5. Findings and associated recommendations will be orally conveyed to ACHCS. If additional data are required,

proposed sampling locations shown on Figure 2 will be adjusted based on the verified location of the former USTs and the groundwater gradient.

3.2 OPTIONAL TASK 2: PERMITTING, UTILITY CLEARANCE, AND HEALTH & SAFETY PLAN

Prior to implementing Tasks 3, 4, or 5, a subsurface utility survey will be performed at the Site and permits will be obtained. Pursuant to California Assembly Bill AB 73, Underground Services Alert (USA) will be contacted to locate utilities entering and adjacent to the Site, and a private underground utility locating contractor will be used to identify utilities on the Site in the vicinity of the areas proposed for investigation.

Prior to drilling, a subsurface drilling permit will be obtained from the City of Oakland. The sampling locations shown in Figure 2 are contingent upon access limitations (i.e., site features, utilities) and final locations may be moved to the closest accessible location.

As required by the California Occupational Health and Safety Administration (CalOSHA) Title 8 §5192 *Hazardous Waste Operations and Emergency Response* and the U.S. Occupational Health and Safety Administration (OSHA) 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Responses*, a site Health and Safety Plan (HSP) will be prepared for use while conducting proposed field sampling activities. The HSP will be read and approved by the WEST Project Manager, a Quality Assurance Reviewer, and the On-Site Safety Officers of all subcontractors working at the Site.

3.2.1 Optional Task 3: Soil Investigation Activities

If the existing data collected at 4629 MLK do not adequately delineate soil and groundwater quality associated with the former USTs at the Site, then up to three soil borings, SB-1 through SB-3, may be advanced at the approximate locations shown on Figure 2. In lieu of existing data, the locations of these three soil borings have been selected to further characterize the lateral extent of petroleum hydrocarbons in soil and groundwater in the vicinity of the former USTs at

the Site. The sampling locations are contingent upon the findings from Task 1 and access limitations (i.e., site features, utilities).

The borings will be advanced using hydraulic direct push equipment. Soil samples will be collected continuously for lithologic description between ground surface and groundwater, which is anticipated at a depth of approximately 15 feet bgs. The soil boring will be advanced to approximately 3 feet below groundwater. A photo-ionization detector (PID) will be used to screen the soil and borehole for the presence of VOCs.

Soil samples will be collected for chemical analysis from approximately 5 feet bgs, 10 feet bgs, and 15 feet bgs by pushing a clean soil sampler lined with clean acetate or brass tubes into undisturbed soil. Actual soil sample collection depths will be based on visual and olfactory observations, PID readings, and changes in lithology (USEPA, 1996). The soil samples collected for chemical analysis will be sealed by installing plastic caps over the ends of the sample tube, labeled, and then placed in an insulated cooler, filled with ice.

The soil samples will be transported to a California State-certified laboratory under standard USEPA chain-of-custody protocols. The soil samples will be analyzed for TPHg and TPHd by EPA Method 8015, BTEX and methyl tertiary butyl ether (MTBE) by EPA Method 8260M, and lead by EPA Method 6010.

All down-hole drilling and sampling equipment will be cleaned prior to use at each drilling location to prevent potential cross-contamination between locations. After sample collection, the borehole will be sealed with a bentonite-grout mix and the ground surface will be restored using similar replacement materials (i.e., asphalt or cement). Waste soil generated during drilling will be securely stored on-site in 55-gallon drums. Results of soil and groundwater sample analyses will be evaluated and appropriate disposal facilities contacted to arrange for transport and disposal of the waste materials.

3.2.2 Optional Task 4: Groundwater Investigation Activities

If the existing data collected at 4629 MLK do not adequately delineate groundwater quality associated with the former USTs at the Site, then grab groundwater samples may be collected from soil borings advanced in Task 3, see Figure 2. The soil borings will be advanced approximately 3 feet below the top of the groundwater surface, which is estimated at approximately 15 feet bgs. Upon reaching total depth, ¾-inch diameter PVC casing, with the bottom 5 feet to 10 feet containing 0.010-inch slots, will be placed temporarily in the borehole to provide access to groundwater. The PVC in the borehole will serve as a temporary piezometer.

Grab groundwater samples will be collected by lowering a disposable PVC bailer into the casing placed in the borehole. Groundwater samples to be analyzed for BTEX, MTBE, and TPHg will be collected with zero headspace in 40-milliliter glass volatile organic analysis (VOA) vials and preserved with hydrogen chloride. Groundwater samples to be analyzed for TPHd and TPHmo will be collected in 1-liter amber glass bottles. The groundwater samples will be labeled and placed in an insulated cooler filled with ice.

The samples will be transported to a California State-certified laboratory under standard USEPA chain-of-custody protocols. The groundwater samples will be submitted for analysis of TPHg and TPHd by EPA Method 8015 and for BTEX and MTBE, using EPA Method 8260M. In addition, the following parameters will be analyzed to evaluated natural biodegradation processes: nitrate (NO_3), dissolved ferrous iron (Fe^{+2}), sulfate (SO_4), sulfide, dissolved methane (CH_4), dissolved carbon dioxide (CO_2), and pH.

The groundwater gradient at the Site will be assessed by surveying the elevation of the piezometers installed at the Site in relation to the four monitoring wells located at 4629 Martin Luther King, Jr., Way. Surveying will be performed by a California licensed surveryor and the lateral locations will be measured. The depth to water will be measured in the temporary piezometers and the four nearby monitoring wells. The relative elevation of the groundwater surface will be calculated using the depth to water measurements and the relative vertical and

lateral locations will be used to determine the groundwater gradient direction and magnitude in the vicinity of the Site.

3.2.3 Optional Task 5: Groundwater Monitoring Well Installation

Based on the analytical results of the soil and groundwater sampling, a groundwater monitoring well might be installed to enable periodic monitoring of groundwater quality. The location of the monitoring well would be selected based on the analytical results and the groundwater gradient calculated for the Site.

The monitoring well would be installed using hollow stem auger drilling equipment. Soil samples would be collected at a minimum of 2.5-foot intervals from the borehole for lithologic description. Based on previous data collected at the Site, the depth to groundwater is anticipated to be approximately 8 feet below grade. The well screen would be 10 feet long and located to intercept the water table and allow for fluctuations of groundwater levels. The surface completion of the wells would be flush with ground surface and within watertight, traffic-rated concrete boxes. A survey would locate the monitoring well laterally and vertically.

Following installation, a groundwater sample would be collected and submitted to a California State-certified laboratory for analysis for TPHg using EPA Method 8015, and MTBE and BTEX using EPA Method 8260M. In addition, the following parameters will be analyzed to evaluated natural biodegradation processes: nitrate (NO_3), dissolved ferrous iron (Fe^{+2}), sulfate (SO_4), sulfide, dissolved methane (CH_4), dissolved carbon dioxide (CO_2), and pH.

Groundwater grab samples would be collected from the well, either using micro-purge techniques or following purging of at least three well volumes. Water quality parameters, including pH, dissolved oxygen, and electrical conductivity would be measured in the field. Groundwater grab samples would be collected from the wells either using a low flow pump through clean tubing, or by using a PVC or Teflon bailer. Immediately after collection, the groundwater samples would be placed in a cooler chilled with ice and transported to the laboratory.

3.2.4 Task 6: Preparation of Report

Geologic, hydrogeologic, and chemical data collected from the soil and groundwater investigation activities will be evaluated, summarized, and reported in accordance with the Tri-Regional Guidelines. The report will include the following:

- Detailed descriptions of the methodologies used to collect and analyze the data.
- Description of the Site and site geology, including appropriately scaled base maps showing the boring location and boring logs illustrating soils observed in the field.
- Presentation and interpretation of soil and groundwater analytical results and laboratory data certificates, including an assessment of the extent of petroleum hydrocarbons in soil and groundwater and potential impacts on beneficial uses of groundwater.
- Recommended corrective action plan.

3.3 SCHEDULE

Once approval of this Work Plan has been received from ACHCS, it is estimated that the total time to complete the soil and groundwater investigation tasks would be approximately eight to ten weeks. It is anticipated that the report presenting the results of the investigations and proposed remedial actions would be available in approximately 16 to 20 weeks.

4. SAMPLE ANALYSIS

All samples will be forwarded to a California State-certified laboratory for analysis under standard USEPA chain-of-custody protocols.

Quality control samples will be collected during field activities to assess the quality of data from sampling. Travel blanks, duplicate samples, and equipment blanks, as appropriate, will be submitted with samples to the analytical laboratory under the same documentation and custody procedures as the accompanying original samples.

4.1 LABORATORY ANALYTICAL METHODOLOGY

The primary analytical laboratory will be Chromalab of Pleasanton, California. Entech Analytical of Sunnyvale, California, will be the secondary laboratory for confirmation and quality control analyses. As discussed in Section 3.0, the analytical methods that may be used in evaluating soil and groundwater from the Site include:

- EPA Method 8260 – volatile organic compounds, including benzene, toluene, ethyl benzene, xylenes, and MTBE. and other oxygenates EDB - TAME, DIPE, TBA
- EPA Method Modified 8015M - total petroleum hydrocarbons quantified as diesel (TPHd), gasoline (TPHg), and motor oil (TPHmo).
- EPA Method 6000/7000 Series – inorganic constituents.

The analytical methods identified for characterizing the soil and groundwater samples to be collected at the Site are described in Section 3. Any modifications to the sampling and analytical program will be reviewed with the regulatory agencies prior to implementation.

4.2 FIELD EQUIPMENT CALIBRATION

Field equipment, including PIDs, will be calibrated daily prior to each use, and calibration will be logged in the daily field report form. Instruments will be calibrated according to the procedures outlined in the handbook for each instrument.

4.3 LABORATORY CALIBRATION PROCEDURES

Laboratory instrument calibration is carried out to ensure that the analytical system is performing at the required sensitivity with acceptable linearity. Frequency of calibration is determined by manufacturer's guidelines, analytical method, or client-specified requirements. Calibration records are prepared and maintained for each piece of analytical equipment and made available for inspection upon request. Copies of the laboratory quality control evaluations will be included with the final project report.

4.4 TRAVEL BLANKS

Travel blanks will be submitted and may be analyzed to detect potential introduction of contaminants during transportation from the field to the laboratory. Travel blanks are prepared by the laboratory, travel to the field with sample containers, and are returned to the laboratory with the primary samples for analysis. Travel blanks may consist of distilled water in a clean container or a soil with measured concentrations of the chemicals of concern.

4.5 DUPLICATE SAMPLES

Duplicate samples will be collected and analyzed to check for sampling consistency. Duplicate samples will be collected immediately after the primary sample using the same equipment and procedure. Ten percent of the samples for each analysis will be duplicate samples.

4.6 EQUIPMENT BLANKS

Equipment blanks will be collected and may be analyzed to detect potential cross-contamination of sampling equipment used at more than one sampling location. However, if single-use disposable sampling equipment is used, then equipment blanks will not be collected. An equipment blank will be collected for each type of non-disposable sampling equipment, as appropriate. Only equipment reused for groundwater sampling will be tested. If sampling equipment is dedicated to individual wells, equipment blanks will not be necessary. If collected, distilled water will be poured into the decontaminated sampling equipment, then decanted into sample containers for analysis.

4.7 DATA QUALITY ASSESSMENT

The Data Quality Objectives (DQOs) for the implementation of the PSA are to report concentrations of chemicals within soil and groundwater within the accuracy and precision stipulated by the EPA Methods. In addition, the reporting limit for the each chemical will be below MCLs and U.S. Environmental Protection Agency, Region IX, PRGs (USEPA, 1998). A Data Quality Assessment (DQA) test will be conducted following sampling to ensure that the DQOs (i.e., decision error rate goals) are achieved and to determine whether the original estimate of the number of samples collected was adequate to achieve the DQOs. If sampling DQOs are not met, supplementary sampling may be recommended to achieve DQOs.

5. PROJECT DOCUMENTATION AND REPORTING

All analytical data will be subject to quality control review and validation at the laboratory and prior to soil characterization. All documentation forms will be recorded in ink. No documentation will be destroyed or discarded, even if this contains mistakes that require a replacement document. If an error is made on any of these documentation forms, the correction will be made by crossing a single line through the erroneous information without obliterating the original entry. All corrections will be initialed and dated.

Photographs taken during field activities will be noted in the daily report form with the date and time of the photo, location, direction, film roll, frame number, and description of photographic subject. All documentation related to the PSA will be identified using the Site address.

5.1 FIELD NOTEBOOKS

The sample custodian will maintain a field notebook containing sample collection forms. Each sample collection form will be specific to each sample source and will include the following:

Sample collection procedures:

- Date and time of collection.
- Date of shipping.
- Sample collection location.
- Sample identification.
- Intended analysis.
- Quality control samples, i.e., travel blanks and duplicate or split samples that may be included with the sample set.
- Sample preservation.

- Name of the sampler.
- Pertinent observations.

5.2 SAMPLE LABELS

A sample label will be attached to each sample. In the event that labels are lost, voided, or damaged, it will be noted on the chain-of-custody record. The sample label will include the following information:

- Unique sample identification.
- Exact date and time the sample was collected.
- The location of the sample.
- The sampler's name.
- Preservation or other substances introduced into the sample.
- Remarks or special considerations.

5.3 CHAIN-OF-CUSTODY RECORD

A chain-of-custody record will be used to track the possession of the samples from the time they are collected in the field until the time they are analyzed. The chain-of-custody record will be maintained with the project records and will contain the following information:

- Site name.
- Signature of collector.
- Date and time of collection.
- Sample identification number(s).
- Number of containers in the sample set.

- Description of the sample and container(s).
- Name and signature of persons, and the company they represent, who are involved in the chain of custody.
- Inclusive dates and times of possession.
- Requested analyses for each sample.

5.4 SUMMARY REPORT

Subsequent to investigation activities described in this PSA, a report summarizing the findings of the analytical testing and other pertinent data will be prepared for review and approval by DTSC. The report will contain:

- Summarized results of the soil and groundwater analytical data.
- Copies of the chain-of-custody forms.
- Field sampling sheets.
- Sample location figures.
- Laboratory certificates.

The report will be prepared under the supervision of an engineer registered in California, with appropriate qualifications.

6. REFERENCES

Advanced Assessment and Remediation Services, *Quarterly Groundwater Monitoring and Sampling Report,* February 25, 2000.

ASTM. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, E 1739-95.* November, 1995r.

California State Water Resources Control Board, *Resolution No. 88-63, Adoption Of Policy Entitled "Sources Of Drinking Water"*, 1988.

Lawrence Livermore National Laboratory, *Recommendations to Improve the Cleanup Processes for California's Leaking Underground Fuel* Tanks. October 16, 1995.

Regional Water Quality Control Board - San Francisco Bay Region, *Memorandum - Regional Board Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low-Risk Fuel Sites*, January 5, 1996.

Regional Water Quality Control Board - San Francisco Bay Region, *San Francisco Basin – Water Quality Control Plan*, June 21, 1995.

Subsurface Consultants, Inc., *Preliminary Fuel oil Contamination Assessment*, November 4, 1993, available information consisted of six soil borings, a site plan, and soil analytical data from nine soil borings.

TABLES

TABLES

TABLE 1
HISTORICAL ANALYTICAL RESULTS
Children's Hospital
4701 Martin Luther King, Jr., Way, Oakland, California

Sample I.D.	Date Sampled	Location	Benzene	Toluene	Ethyl Benzene	Xylenes	TPHg	TPHd
3194 [1]	12/7/89	adjacent to USTs	<0.1	<0.1	<0.1	<0.1	<5	<10
TSA1	10/9/90	Gasoline UST pit	<0.005	0.017	0.039	0.061	5	--
TSA2	10/9/90	Gasoline UST pit	<0.005	1.5	7.8	9.3	590	--
TSB	10/9/90	Heating Oil UST pi	<0.005	<0.005	0.13	1	38	1100
TSC	10/9/90	Heating Oil UST pi	<0.005	<0.005	<0.005	<0.005	<0.05	<10.0
TSA	10/17/90	Gasoline UST pit	<0.05	<0.05	5	9	530	--
TSB	10/17/90	Gasoline UST pit	<0.1	<0.1	15	55	2700	--
TSC	10/17/90	Gasoline UST pit	<0.05	0.05	10	22	1300	--
TSD	10/17/90	Gasoline UST pit	<0.025	<0.025	5	10	770	--

Notes:

All concentrations in mg/kg.

Samples TSA through TSD were collected from the sidewalls of UST excavations.

1: Preliminary analytical results

TPHg: Total petroleum hydrocarbons as gasoline

TPHd: Total petroleum hydrocarbons as diesel

-- not analyzed

TABLE 2
ANALYTICAL RESULTS
4629 Martin Luther King, Jr., Way, Oakland, California

Sample I.D.	Date Sampled	Depth (feet bgs)	Benzene	Toluene	Ethyl Benzene	Xylenes	TPHg	TPHd	TPHmo	Oil & Grease	Field Observations
Soil Samples, mg/kg											
1	1993	11.5	--	--	--	--	--	<1	--	<50	--
		20	--	--	--	--	--	6	--	<50	--
2	1993	15	--	--	--	--	--	14	--	<50	--
		23	--	--	--	--	--	570	--	<50	--
3	1993	18	--	--	--	--	--	310	--	380	--
		21	--	--	--	--	--	1700	--	160	--
		25	--	--	--	--	--	190	--	--	--
4	1993	21	--	--	--	--	--	80	--	<50	--
		31	--	--	--	--	--	<1	--	<50	--
5	1993	21	--	--	--	--	--	<1	--	<50	--
		27.5	--	--	--	--	--	<1	--	<50	--
		30.5	--	--	--	--	--	<1	--	<50	--
6	1993	21	--	--	--	--	--	16	--	<50	--
		27.5	--	--	--	--	--	<1	--	<50	--
7	1993	21.5	--	--	--	--	--	170	--	140	--
		25	--	--	--	--	--	<1	--	<50	--
8	1993	19	--	--	--	--	--	750	--	540	--
		24.5	--	--	--	--	--	<1	--	<50	--
9	1993	22	--	--	--	--	--	2	--	<50	--
		25	--	--	--	--	--	<1	--	<50	--
Groundwater Samples, µg/l											
MW-1	2/7/00	--	ND	ND	0.9	2.8	89	76	900	--	sheen and odor
MW-2	2/7/00	--	ND	ND	ND	ND	ND	ND	ND	--	no sheen or odor
MW-3	2/7/00	--	2.6	1.4	5.5	14	910	180	1400	--	sheen and odor
MW-4	2/7/00	--	3.4	2.2	8.9	29	2100	920	3800	--	sheen and odor

Notes:

TPHg: Total petroleum hydrocarbons as gasoline

TPHd: Total petroleum hydrocarbons as diesel

PHmo: Total petroleum hydrocarbons as motor oil

-- not analyzed

ND not detected

FIGURES

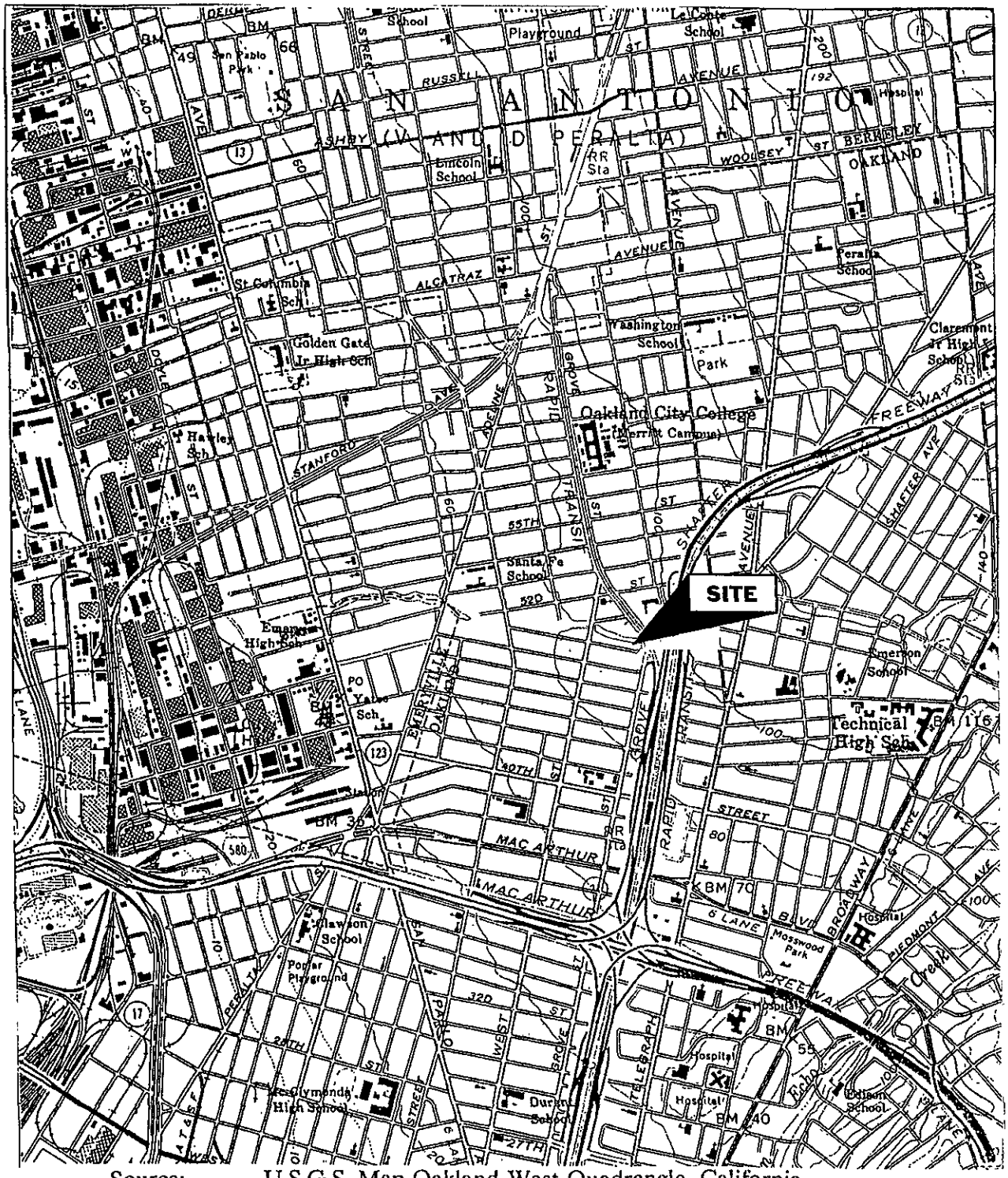

Figure 1	**SITE LOCATION** 4701 Martin Luther King, Jr. Way, Oakland, California	WEST World Environmental Services & Technology
April 2000	Children's Hospital of Oakland	

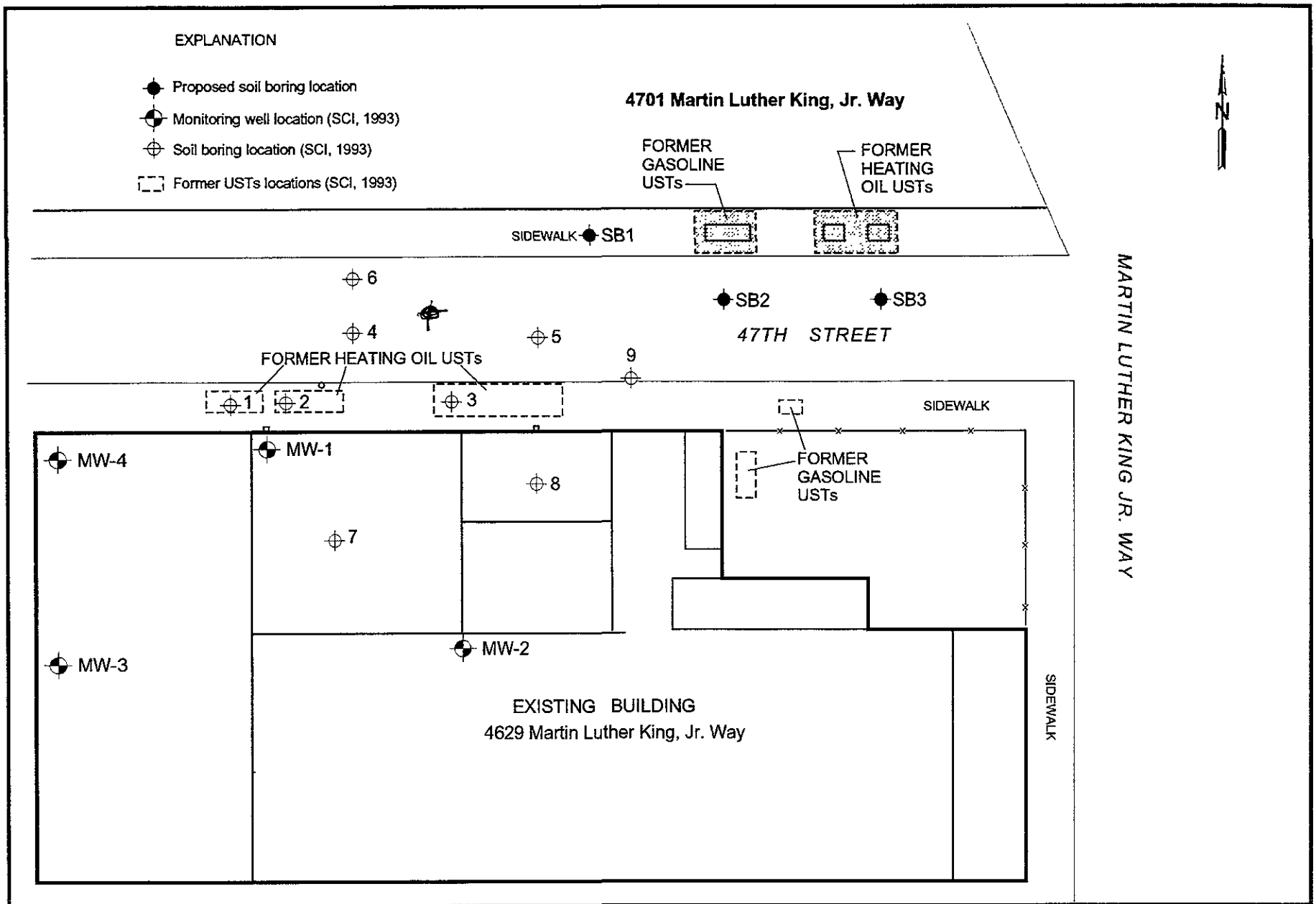

Figure 2	**SITE PLAN** 4701 Martin Luther King, Jr. Way, Oakland, California	W E S T World Environmental Services & Technology
April 2000	Children's Hospital of Oakland	

APPENDIX A

SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER AT 4629 MARTIN LUTHER KING JR. WAY BY AARS

TABLE 2: 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
MW1-GW	11/15/95	220	NA	2.3	ND	ND	0.68	20,000	NA
	12/17/98	480	ND	12	1.9	ND	2.9	590	ND
	04/23/99	390	ND	6.2	1.6	ND	2.0	670	360
	07/23/99	260/270*	ND/ND*	ND/ND*	ND/ND*	ND/ND*	0.6/ND*	ND	ND
	10/19/99	92	ND	ND	ND	0.7	2.2	56	600
	02/07/00	89	ND	ND	ND	0.9	2.8	76	900
MW2-GW	12/18/98	ND	ND	ND	ND	ND	ND	730	ND
	04/23/99	55	ND	ND	ND	ND	ND	240	ND
	07/23/99	ND/ND*	ND/ND*	ND/ND*	ND/ND*	ND/ND*	ND/ND*	ND	ND
	10/19/99	ND	ND	ND	ND	ND	ND	ND	ND
	02/07/00	ND	ND	ND	ND	ND	ND	ND	ND
MW3-GW	12/17/98	840	ND	3.6	1.1	1.0	2.2	720	ND
	04/23/99	1,800	8.23	54	4.7	1.7	5.8	980	ND
	07/23/99	1,800/1,600*	ND/ND*	ND/ND*	ND/ND*	0.7/ND*	1.8/ND*	240	1,800
	10/19/99	1,100	ND	2.8	1.9	6.1	18	190	1,400
	02/07/00	910	ND	2.6	1.4	5.5	14	180	1,400
MW4-GW	12/17/98	4,000	ND	11	3.7	10	2.9	4,300	ND
	04/23/99	5,100	24	160	11	31	10	2,900	ND
	07/23/99	3,100/2,900*	ND/ND*	ND/ND*	ND/ND*	1.2/ND*	3.8/ND*	1,600	5,900
	10/19/99	2,300	ND	3.9	2.6	11	31	890	4,200
	02/07/00	2,100	ND	3.4	2.2	8.9	29	920	3,800
RL	02/10-15/00	50	0.5	0.5	0.5	0.5	0.5	50	500

Notes: ND- Not Detected RL- Reporting Limit NA- Not Analyzed

* Confirmed (also quantified) by EPA Method 8260 for oxygenated volatile organic compounds(OVOCs); all other OVOCs were nondetect above the detection limit

µg/L- Microgram per liter (parts per billion)

TPHg- Total petroleum hydrocarbon as gasoline (EPA method modified 8015)

TPHd-TPHmo Total petroleum hydrocarbon as diesel/motor oil (EPA method modified 8015)

MTBE- Methyl Tertiary Butyl Ether (EPA method 602)

Benzene, toluene, ethylbenzene, and total xylenes (EPA method 602)

MLKQ4 TB2

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