



March 22, 2002

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WORKPLAN
for
SOIL AND GROUNDWATER ASSESSMENT
at
5725 Thornhill Drive
Oakland, California

Submitted by:
AQUA SCIENCE ENGINEERS, INC.
208 West El Pintado
Danville, CA 94526
(925) 820-9391

1.0 INTRODUCTION

This submittal outlines Aqua Science Engineers, Inc. (ASE)'s workplan for a soil and groundwater assessment at the property located at 5725 Thornhill Drive in Oakland, California (Figure 1). The proposed site assessment activities were initiated by Mr. Mo Mashhoon, owner of the property, to meet the requirements of the Alameda County Health Care Services Agency (ACHCSA) as outlined in their letter dated June 8, 2001 (Appendix A).

2.0 BACKGROUND INFORMATION

The subject site has been a gasoline service station since the 1950s. The site dispenses gasoline and has conducted auto repair at the site. A 550-gallon steel underground storage tank (UST) for the storage of waste oil was removed from the site by Penn Environmental in November 1998. Soil samples collected from the excavation contained up to 1,100 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G), 2,700 ppm total petroleum hydrocarbons as diesel (TPH-D) and 4,200 ppm total petroleum hydrocarbons as motor oil (TPH-MO).

On February 4, 1999, Penn Environmental overexcavated contaminated soil surrounding the former waste oil UST. This soil was previously removed but was placed back into the excavation temporarily. This soil was once again removed from the excavation to be transported for disposal. ASE collected confirmation soil samples from two sidewalls of the excavation at that time. Sidewall samples were collected since the bottom of the excavation was saturated. These samples were collected from a backhoe bucket from a depth of approximately 5.5-feet below ground surface (the capillary zone). The soil samples were analyzed for TPH-G, TPH-D, TPH-MO, benzene, toluene, ethyl benzene and total xylenes (collectively known as BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8020. These analyses were requested by Mr. Hernan Gomez of the Oakland Fire Department in a telephone conversation on February 4, 1999. The only compound detected in these two soil samples was 0.040 ppm MTBE in one of the two samples.

In July 1999, ASE drilled boring BH-A in the vicinity of the former waste oil UST using a Geoprobe hydraulic sampling rig in order to collect groundwater samples for analysis and to collect samples to analyze for additional parameters not previously requested by the City of Oakland. No halogenated volatile organic compounds (HVOCs), semi-volatile organic compounds (SVOCs) or polychlorinated biphenols (PCBs) were

detected in either soil or groundwater samples collected from the boring. None of the metal concentrations detected in the soil sample exceeded United States Environmental Protection Agency (US EPA) Region IX preliminary remediation goals (PRGs) for residential soil. Total petroleum hydrocarbons were detected in groundwater samples collected from the boring at 1,700 parts per billion (ppb) in the gasoline range, 10,000 ppb in the diesel range and 4,700 ppb in the motor oil range. The only compounds that were detected at concentrations above California Department of Health Services (DHS) maximum contaminant levels (MCLs) for drinking water were MTBE and cadmium.

On September 6, 2000, ASE drilled soil borings BH-B and BH-C at the site using a Geoprobe hydraulic sampling rig. Boring BH-B was located at the southwest corner of the property. Boring BH-C was located off-site to the west near the underground creek conduit. The soil sample collected at 7.5-foot bgs in boring BH-B contained 240 ppm TPH-G, 370 ppm TPH-D, 0.043 ppm benzene, and 0.13 ppm ethyl benzene. There were no compounds detected above laboratory reporting limits in the soil sample collected in boring BH-C. The groundwater samples collected from boring BH-B contained 12,000 ppb TPH-G, 11,000 ppb TPH-D, 420 ppb TPH-MO, 44 ppb benzene, 360 ppb ethyl benzene, 49 ppb total xylenes, and 4,300 ppb MTBE. The groundwater samples collected from boring BH-C contained 7,300 ppb TPH-G, 25,000 ppb TPH-D, 620 ppb TPH-MO, and 5,300 ppb MTBE.

On October 23, 2000, ASE drilled soil borings BH-D and BH-E at the site using a Geoprobe hydraulic sampling rig. ASE also collected water samples from Temascal Creek. The soil sample collected at 11-foot bgs in boring BH-D contained 0.0074 ppm ethyl benzene, 0.023 ppm total xylenes, and 0.33 ppm MTBE. The soil sample collected at 9.5-foot bgs in boring BH-E contained 0.037 ppm MTBE. The groundwater samples collected from boring BH-D contained 13,000 ppb TPH-G, 110,000 ppb TPH-D, 18,000 ppb TPH-MO, 180 ppb benzene, 490 ppb ethyl benzene, 1,000 ppb total xylenes, and 16,000 ppb MTBE. The groundwater samples collected from boring BH-E contained 0.95 ppb toluene, 1.8 ppb total xylenes, and 730 ppb MTBE. No hydrocarbons were detected in the water sample collected from Temascal Creek.

3.0 PROPOSED SCOPE OF WORK (SOW)

ASE's proposed scope of work for this project is as follows:

- 1) Obtain a drilling permit from the Alameda County Public Works Agency and encroachment and excavation permits from the City of Oakland to allow for the installation of groundwater monitoring wells in the City of Oakland right-of-way.
- 2) Drill three soil borings in both on and off-site locations. A specialized limited access drill rig will be required due to the limited shoulder access in the off-site location.
- 3) Analyze one soil sample from each boring at a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015, TPH-D and TPH-MO by modified EPA Method 3550/8015, and BTEX and MTBE by EPA Method 8020.
- 4) Construct a 2-inch diameter groundwater monitoring well in each boring described in task 2.
- 5) Develop each monitoring well described in task 4 using surge block agitation and bailer evacuation.
- 6) Collect groundwater samples from all three monitoring wells.
- 7) Analyze one groundwater sample from each monitoring well at a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015, TPH-D and TPH-MO by modified EPA Method 3550/8015, and BTEX and MTBE by EPA Method 8020 or 8260.
- 8) Survey the top of casing elevation of each monitoring well relative to mean sea level (msl) and the longitude and latitude locations of the wells to Geotracker standards.
- 9) Destroy the three tank backfill wells by pressure grouting neat cement into the well.
- 10) Prepare a soil and groundwater assessment report for the site.

Details of the assessment are presented below.

TASK 1 - *OBTAIN THE NECESSARY PERMITS REQUIRED TO COMPLETE THIS PROJECT*

Prior to drilling, ASE will obtain a drilling permit from the ACPWA. ASE will also obtain encroachment and excavation permits from the City of

Oakland to allow for drilling and well installation in the Thornhill Drive right of way. Underground Service Alert (USA) will also be notified to have underground utility lines marked in the site vicinity at least 48 hours prior to beginning field activities. A traffic control plan will also be prepared and submitted to the city for approval as necessary.

TASK 2 - *DRILL THREE SOIL BORINGS IN ON AND OFF-SITE LOCATIONS AND COLLECT SOIL SAMPLES*

Using a limited access drill rig equipped with hollow-stem augers, ASE will drill three (3) soil borings in the locations shown on Figure 2. The drilling will be directed by a qualified geologist.

Undisturbed soil samples will be collected at 5-foot intervals as drilling progresses for subsurface hydrogeologic description and possible chemical analysis. The samples will be described by the ASE geologist according to the Unified Soil Classification System. The samples will be collected in brass or stainless steel tubes using a drive sampler driven ahead of the auger tip using hydraulic direct push. Samples to be retained for analysis will be immediately removed from the sampler, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, labeled with the site location, sample designation, date and time the sample was collected, and the initials of the person collecting the sample. The samples will be placed into an ice chest containing wet ice for delivery under chain of custody to a CAL-EPA certified analytical laboratory.

Soil from the remaining tubes not sealed for analysis will be removed for hydrogeologic description and will be screened for volatile compounds with an organic vapor meter (OVM). The soil will be screened by emptying soil from one of the tubes into a plastic bag. The bag will be sealed and placed in the sun for approximately 10 minutes. After the hydrocarbons have been allowed to volatilize, the OVM will measure the vapor through a small hole, punched in the bag. These OVM readings will be used as a screening tool only since these procedures are not as rigorous as those used in an analytical laboratory.

All sampling equipment will be cleaned in buckets with brushes and a TSP or Alconox solution, then rinsed twice with tap water. Rinsates will be contained on-site in 55-gallon steel drums and stored on-site until off-site disposal can be arranged.

Traffic lane closure may be required to complete this drilling. The lane closure will comply with City of Oakland requirements.

TASK 3 - ANALYZE THE SOIL SAMPLES

At least one soil sample from each boring will be analyzed at a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015, TPH-D and TPH-MO by modified EPA Method 3550/8015, and BTEX and MTBE by EPA Method 8020 or 8260. The soil samples analyzed will be chosen based on field observations such as odors, staining and OVM readings. If no field indications of contamination are present, the unsaturated sample closest to the water table (capillary zone) will be analyzed.

TASK 4 - COMPLETE THE BORINGS AS MONITORING WELLS

ASE will complete the borings described in task 2 as 2-inch diameter groundwater monitoring wells. The wells will be constructed with 2-inch diameter, flush-threaded, schedule 40, 0.020-inch slotted PVC well screen and blank casing. The well casing will be lowered through the augers and #3 Monterey sand will be placed in the annular space between the well casing and the borehole to approximately 1.5-feet above the screened interval. Approximately 0.5-foot of bentonite pellets will be placed on top of the sand pack and will be hydrated with clean tap water. This bentonite layer will prevent the cement sanitary seal from infiltrating into the sand pack. Cement mixed with 3 to 5 percent bentonite powder by volume will be used to fill the annular space between the bentonite layer and the surface to prevent surface water from infiltrating into the well. The well head will be protected by a locking well plug and an at-grade, traffic-rated well box (See Figure 3 - Typical Monitoring Well).

Each well will be screened to monitor the first water-bearing zone encountered. Wells are typically screened with 5-feet of screen above the water table and 10 to 15-feet of screen below the water table. Based on the depth to water during previous assessments, ASE is anticipating that the wells will be screened between 5 and 20-feet bgs.

TASK 5 - DEVELOP THE MONITORING WELLS

The monitoring wells will be developed after waiting at least 72 hours following well construction. The wells will be developed using at least two episodes of surge block agitation and evacuation using bailers and/or pumps. At least ten well casing volumes of water will be removed during the development, and development will continue until the water appears to be reasonably clear. The well development purge water will be stored

temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 6 - SAMPLE THE MONITORING WELLS

After waiting 72 hours following the well development, ASE will collect groundwater samples from all three groundwater monitoring wells. Prior to purging and sampling, the groundwater surface in each well will be checked for sheen or free-floating hydrocarbons. The thickness of any free-floating hydrocarbons will be measured with an oil/water interface probe and an acrylic bailer lowered slowly to the groundwater surface and filled approximately half full for direct observation. ASE will also measure the depth to groundwater in all site wells prior to purging water from any well. Prior to sampling, each well will be purged of at least four well casing volumes of groundwater. The temperature, pH and electrical conductivity of evacuated water will be monitored during the well purging, and purging will continue beyond four well casing volumes if these parameters have not stabilized. Groundwater samples will be collected from each well using disposable polyethylene bailers. Groundwater samples to be analyzed for volatile compounds will be decanted from the bailers into 40-ml glass volatile organic analysis (VOA) vials, preserved with hydrochloric acid, and sealed without headspace. The samples to be analyzed for non-volatile compounds will be contained in 1-liter amber glass containers. The samples will be labeled with the site location, sample designation, date and time the samples were collected, and the initials of the person collecting the samples. The samples will be placed into an ice chest with ice for transport to the analytical laboratory under chain of custody. Purged groundwater will be stored temporarily on-site in sealed and labeled 55-gallon steel drums until off-site disposal can be arranged.

TASK 7 - ANALYZE THE GROUNDWATER SAMPLES

Groundwater samples collected from all three wells will be analyzed at a CAL-EPA certified analytical laboratory for TPH-G by modified EPA Method 5030/8015, TPH-D and TPH-MO by modified EPA Method 3550/8015, and BTEX and MTBE by EPA Method 8020 or 8260.

TASK 8 - SURVEY THE TOP OF CASING ELEVATION OF EACH WELL

A California state-registered land surveyor will survey the top of casing elevation of each well relative to mean sea level (msl). The longitude and

latitude of each monitoring well location will also be surveyed to Geotracker standards.

TASK 9 - PROPERLY DESTROY THE THREE TANK BACKFILL WELLS

ASE will properly destroy the three tank backfill wells by pressure grouting neat cement into the wells. Drilling out these wells is not a viable option due to their location relative to the USTs.

TASK 10 - PREPARE A SUBSURFACE ASSESSMENT REPORT

ASE will prepare a subsurface assessment report presenting the methods and findings of this assessment. This report will include a summary of the results, the site background and history, description of the well construction, development and sampling, tabulated soil and groundwater analytical results, conclusions and recommendations. Formal boring logs, analytical reports, and chain of custody documents will be included as appendices. This report will be submitted under the seal of a California registered civil engineer or geologist.

SCHEDULE

Upon approval of this workplan by the ACHCSA, the costs for this project will be presented to the California UST Cleanup Fund for pre-approval. The project will begin immediately upon pre-approval of the costs from the UST Cleanup Fund.

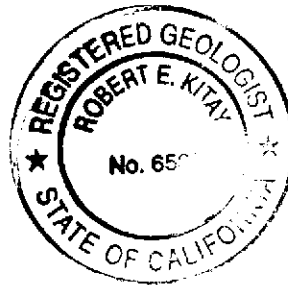
Should you have any questions or comments, please call us at (925) 820-9391.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.



Robert E. Kitay, R.G., R.E.A.
Senior Geologist



cc: Mr. Mo Mashhoon, 1721 Jefferson Street, Oakland, CA 94612

Mr. Don Hwang, Alameda County Health Care Services Agency, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502

Mr. Chuck Headlee, California Regional Water Quality Control Board, San Francisco Bay Region, 1515 Clay Street, Suite 1400, Oakland, CA 94612

APPENDIX A

June 8, 2001 Letter
From The ACHCSA

ALAMEDA COUNTY
HEALTH CARE SERVICES



AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1001 Harbor Bay Parkway, Suite 250
Alameda, CA 94501-8577
(510) 567-6700
FAX (510) 337-9315

June 8, 2001

Mo Mashhoon
Mash Petroleum, Inc.
5725 Thornhill Dr.
Oakland, CA 94611

Re: Mash Petroleum, 5725 Thornhill Dr., Oakland, CA 94611
RO0000317

Dear Mr. Mashhoon:

A water sample collected from Temescal Creek on December 5, 2000 and analyzed for total petroleum hydrocarbons as gasoline (TPH-G), TPH-diesel (TPH-D), TPH-motor oil (TPH-MO), benzene, toluene, ethyl benzene, xylene (BTEX), and methyl tertiary-butyl ether (MTBE), was nondetectable for all these constituents. Prior to this, on September 6, 2000, soil and groundwater samples were collected from two borings. Boring BH-B located at the property line downgradient from the underground tanks and the dispensers, had the following soil contaminants: 240 mg/kg TPH-G, 370 mg/kg TPH-D, 0.043 benzene, 0.13 ethyl benzene, and the following groundwater contaminants: 12,000 ug/l TPH-G, 11,000 ug/l TPH-D, 420 ug/l TPH-MO, 44 ug/l benzene, 360 ug/l ethyl benzene, 49 ug/l xylene, 4,300 ug/l MTBE. Boring BH-C located offsite and further downgradient and on the upgradient side of Temescal Creek had the following soil contaminants: none greater than the detection limits, and the following groundwater contaminants: 7,300 ug/l TPH-G, 25,000 ug/l TPH-D, 620 ug/l TPH-MO, 5,300 ug/l MTBE.

Additional work is required to delineate the extent of the release from the underground storage tank/s and to install groundwater monitoring wells. Also, destruction of the wells, MW-1, MW-2, and MW-3, in the underground tank pit, is required to prevent surface contamination from reaching the subsurface. Submit a workplan to meet these needs. If you have any questions, please call me at (510) 567-6746.

Sincerely,

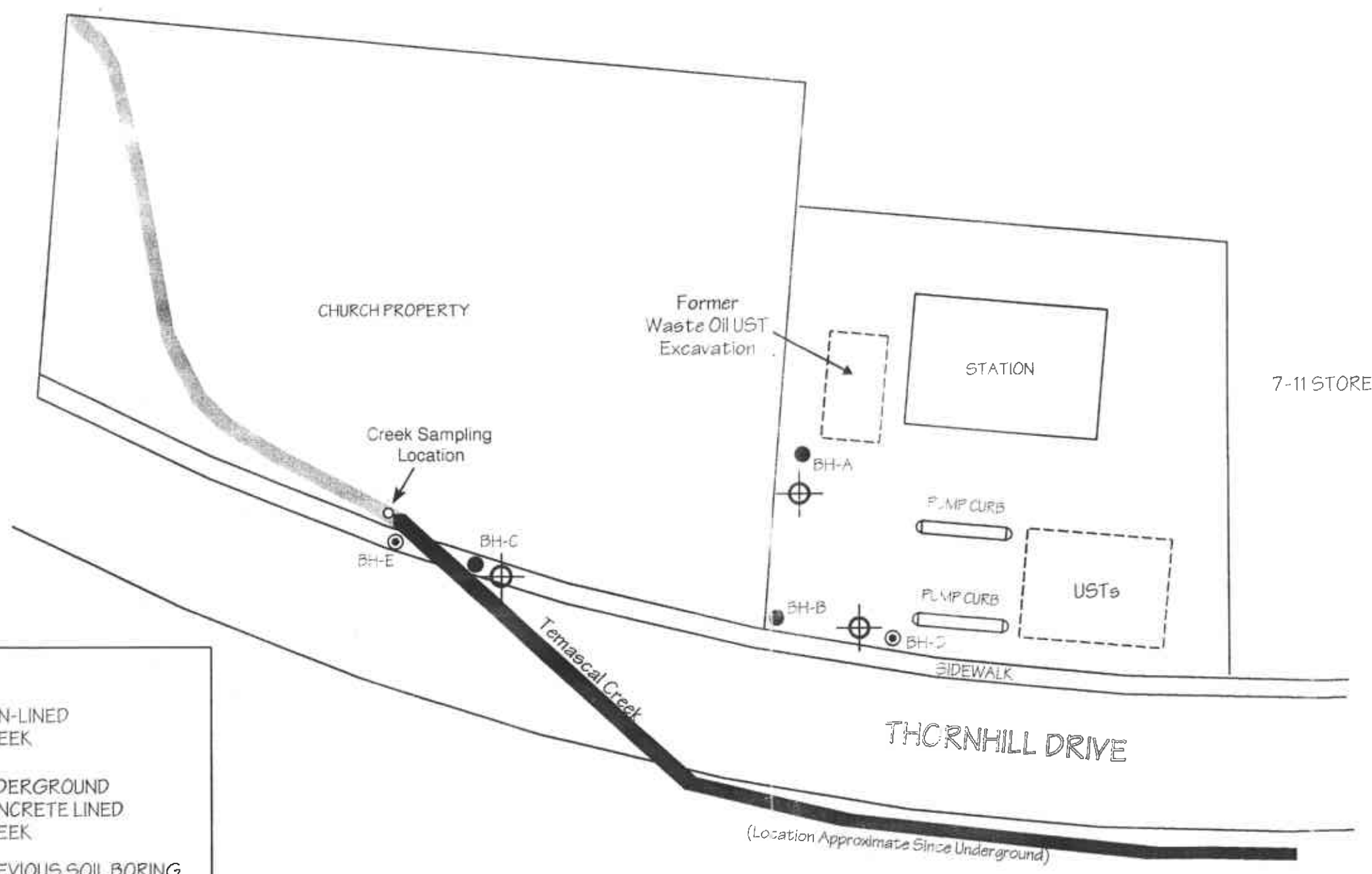
Don Hwang
Hazardous Materials Specialist

C: Robert Kitay, Aqua Science Engineers, Inc., 208 W. El Pintado Rd., Danville, CA
94526







File



SCALE
1" = 30'



LEGEND

-  NON-LINED CREEK
-  UNDERGROUND CONCRETE LINED CREEK
-  BH-A PREVIOUS SOIL BORING LOCATION
-  BH-D SOIL BORING LOCATION
-  CREEK SAMPLING LOCATION
-  PROPOSED MONITORING WELL LOCATION

SOIL BORING LOCATION MAP	
MASH PETROLEUM 5725 THORNHILL DRIVE OAKLAND, CA	
SCALE: 1" = 30'	DATE: 11/1/00
AQUA SCIENCE ENGINEERS, INC.	FIGURE 2