aqua science engineers inc.

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WORKPLAN
for a
SOIL AND GROUNDWATER ASSESSMENT
at
The Olympic Service Station
1436 Grant Avenue
San Lorenzo, California

Submitted by:
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1.0 INTRODUCTION

This submittal presents Aqua Science Engineers, Inc. (ASE)'s workplan for a soil and groundwater assessment at the former Olympic Service Station located at 1436 Grant Avenue in San Lorenzo, California (Figure 1). The site assessment activities were initiated by the property owner, Mr. George Jaber, as required in a letter from the Alameda County Health Care Services Agency (ACHCSA) dated February 1, 2001. The scope of work for this assessment was discussed with Mr. Scott Seery of the ACHCSA at his office on January 16, 2001. The purpose of this assessment is to define the downgradient extent of soil and groundwater contamination at the site.

2.0 BACKGROUND INFORMATION

2.1 Underground Storage Tank Removal Project

In July 1998, Reese Construction removed one 10,000 gallon gasoline underground storage tank (UST), one 8,000 gallon gasoline UST, one 5,000 gallon diesel UST, one 250 gallon waste-oil UST and six dispensers from the subject site. At the time of the UST removal, groundwater was present in the fuel UST pit; no water was present in the waste-oil UST pit. Soil samples collected from the excavation sidewalls, excavation bottoms and stockpiled soil contained elevated concentrations of petroleum hydrocarbons, solvents and lead. The highest concentrations were as follows: total petroleum hydrocarbons as gasoline (TPH-G) at 5,700 parts per million (ppm), total petroleum hydrocarbons as diesel (TPH-D) at 1,300 ppm, oil and grease (O&G) at 4,300 ppm, benzene at 30 ppm, toluene at 180 ppm, ethyl benzene at 93 ppm, total xylenes at 430 ppm, methyl tertiary butyl ether (MTBE) at 27 ppm, and lead at 1,900 ppm. The waste-oil UST excavation also contained 26 parts per billion (ppb) 1,1-dichloroethane (1,1-DCA), 100 ppb cis-1,2-dichloroethene (cis-1,2-DCE), and 1,200 ppb tetrachloroethene (PCE). See the Reese Construction UST Removal letter dated September 14, 1998 for further information on the UST removal.

2.2 Stockpiled Soil Sampling

On November 11, 1998, ASE collected soil samples from the stockpiled soil that previously surrounded the gasoline and diesel-fuel USTs. The purpose was to determine whether the stockpiled soil was suitable for re-use as backfill material. Four composited soil samples were collected from the two fuel UST stockpiles and were analyzed for TPH-G, TPH-D,

benzene, toluene, ethyl benzene and total xylenes (collectively known as BTEX), MTBE, and total lead. The soil samples contained no detectable concentrations of TPH-G, up to 280 ppm TPH-D, no detectable concentrations of benzene, up to 0.055 ppm toluene, 0.026 ppm ethylbenzene, 0.066 ppm total xylenes, 0.012 ppm MTBE and 110 ppm total lead. These results were reported in an ASE letter report dated November 24, 1998 to Mr. Scott Seery of the ACHCSA. Mr. Seery then gave ASE verbal approval to re-use the stockpiled soil for backfill in the fuel UST excavation. The fuel UST excavation was subsequently backfilled and compacted by a company subcontracted directly by Mr. Jaber.

2.3 Waste-Oil UST Overexcavation

Due to the presence of elevated concentrations of petroleum hydrocarbons, oil and grease, volatile organic compounds (VOCs) and total lead at the bottom of the waste-oil UST excavation, ASE recommended overexcavation of the area followed by confirmation soil sampling. On December 18, 1998, ASE witnessed the overexcavation of the waste-oil UST pit. The excavation activities continued to a depth of 12-feet below ground surface (bgs) using a backhoe. Deeper excavation was not feasible due to the location of the excavation in relation to the adjacent building wall. The excavated spoils were stockpiled with the spoils generated during the UST removal.

A confirmation soil sample collected from the bottom of the excavation contained 940 ppm total petroleum hydrocarbons as motor oil (TPH-MO), 250 ppm TPH-D, 570 ppm O&G and 996 ppm total lead. TPH-G, BTEX, MTBE, cadmium, chromium, nickel, zinc, VOCs, and semi-volatile organic compounds (SVOCs) concentrations were below action levels. The TPH concentrations in the soil sample collected from 12-feet bgs were significantly lower than the concentrations in soil sample collected just below the UST after it removal. The total lead concentration was roughly half of the concentration of the soil sample collected just below the UST after it removal.

A four-point composite soil sample collected from the stockpiled soil was analyzed for TPH-G, TPH-D, TPH-MO, BTEX, MTBE, O&G, LUFT 5 metals, VOCs, SVOCs, and soluble lead using the waste extraction test (WET) and the toxicity characteristic leaching procedure (TCLP). The stockpiled soil sample contained 2,100 ppm TPH-MO, 550 ppm TPH-D, 1,300 ppm O&G and 54 ppm WET lead. The TCLP lead concentration was less than the detection limit of 1 ppm. The remaining compounds had concentrations below action levels.

The waste-oil UST excavation was subsequently backfilled completely with import material. The 15.3 tons of stockpiled soil was transported from the site by Lutrell Trucking to Chemical Waste Management in Kettleman City, California for disposal on September 24, 1999.

2.4 Dispenser Area

On December 18, 1998, ASE collected a confirmation soil sample following soil overexcavation in the area of one of the former dispensers that contained 5,700 ppm TPH-G in a soil sample at the time of the removal of one of the dispensers. The confirmation soil sample was analyzed for TPH-G, TPH-D, BTEX, MTBE and total lead. TPH-G, TPH-D, BTEX and MTBE were not detected above detection limits. The total lead concentration was 6.3 ppm.

2.5 Monitoring Well Installation

In September 1999, ASE constructed monitoring wells MW-1, MW-2 and MW-3 at the site. TPH-G, TPH-D and MTBE were detected in the groundwater sample collected from monitoring well MW-1 at 3,900 ppb, 87 ppb and 3,500 ppb, respectively. TPH-G and MTBE were detected in the groundwater sample collected from monitoring well MW-2 at 70 ppb and 11 ppb, respectively. No TPH-MO, O&G, VOCs or SVOCs were detected in the groundwater samples collected from monitoring well MW-2, next to the former waste oil UST. The groundwater sample collected from monitoring well MW-3 contained 3,900 ppb TPH-G, 300 ppb TPH-D, 900 ppb benzene, 89 ppb toluene, 160 ppb ethyl benzene, 560 ppb total xylenes, and 790 ppb MTBE. Groundwater appeared to flow to the northwest beneath the site at a gradient of approximately 0.0025-feet/foot.

2.6 Quarterly Groundwater Monitoring

Between October 1999 and October 2001, ASE collected groundwater samples from the three site wells on a quarterly basis. During this period, groundwater samples collected from monitoring well MW-1 contained up to 4,100 ppb TPH-G, 84 ppb TPH-D, 120 ppb benzene, and 6,100 ppb MTBE. Groundwater samples collected from monitoring well MW-2 contained up to 370 ppb TPH-G and 990 ppb MTBE. Groundwater samples collected from monitoring well MW-3 contained up to 3,900 ppb TPH-G, 640 ppb TPH-D, 900 ppb benzene, 89 ppb toluene, 180 ppb ethyl benzene, 560 ppb total xylenes, and 790 ppb MTBE. The predominant groundwater flow during this period was to the west.

3.0 PROPOSED SCOPE OF WORK (SOW)

Based on the requirements of the ACHCSA, ASE's proposed SOW is as follows:

1) Prepare a workplan for submittal to the ACHCSA.

2) Obtain a drilling permit from the Alameda County Public Works Agency.

3) Drill three (3) soil borings downgradient of the site. These borings will be drilled to a depth of approximately 16-feet below ground surface (bgs) for the collection of soil and groundwater samples.

4) Analyze one soil and one groundwater sample from each boring at a CAL-EPA certified analytical laboratory for TPH-D by modified EPA Method 8015, and TPH-G, BTEX and the fuel oxygenates MTBE, DIPE, ETBE, TAME and TBA by EPA Method 8260.

5) Following collection of the soil and groundwater samples, backfill each boring with neat cement to the ground surface.

6) Collect groundwater samples from the three site groundwater monitoring wells and analyze the groundwater samples at a CAL-EPA certified analytical laboratory for TPH-D by modified EPA Method 8015, and TPH-G, BTEX and the fuel oxygenates MTBE, DIPE, ETBE, TAME and TBA by EPA Method 8260.

7) Prepare a report presenting results from this assessment.

Details of the assessment are presented below.

TASK 1 - PREPARE A WORKPLAN

Based on the site history, ASE has prepared this workplan. A site-specific health and safety plan was previously prepared for this site. A nearby hospital is designated in the site safety plan as the emergency medical facility of first choice. A copy of the site specific health and safety plan will be available on-site at all times.

TASK 2 - OBTAIN NECESSARY PERMITS

ASE will obtain a drilling permit from the Alameda County Public Works Agency. ASE will also notify Underground Service Alert (USA) to have underground utility lines marked in the site vicinity at least 48 hours prior to drilling.

TASK 3 - DRILL THREE SOIL BORINGS AT THE SITE AND COLLECT SOIL AND GROUNDWATER SAMPLES FROM THE BORINGS

ASE will drill three soil borings at the locations shown on Figure 2. These borings will be located downgradient of the site. **These borings will be drilled using a Geoprobe or similar type drill rig.** A qualified ASE geologist will direct the drilling. Undisturbed soil samples will be collected continuously 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 acetate tubes using a drive sampler advanced as the boring progresses. Each sample will be immediately removed from the sampler, cut, trimmed, sealed with Teflon tape and plastic caps, secured with duct tape, and 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 then 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.

A groundwater sample will be collected from each boring. Drilling will be halted at the water table and a Hydropunch or similar type device will be utilized to collect groundwater samples from the borings. The groundwater samples will be contained in 40-ml volatile organic analysis (VOA) vials, preserved with hydrochloric acid, and sealed without headspace. The samples will then be labeled with the site location, sample designation, date and time the samples were collected, and the initials of

the person collecting the samples and chilled in an ice chest with wet ice for transport to a state-certified analytical laboratory under chain-of-custody.

All sampling equipment will be cleaned in buckets with brushes and a TSP or Alconox solution, then rinsed twice with tap water.

TASK 4 - ANALYZE THE SOIL AND GROUNDWATER SAMPLES

At least one soil and one groundwater sample from each boring will be analyzed at a CAL-EPA certified analytical laboratory for TPH-D by modified EPA Method 8015, and TPH-G, BTEX and the fuel oxygenates MTBE, DIPE, ETBE, TAME and TBA by EPA Method 8260. The soil sample analyzed will be chosen based on field observations such as odors, staining and OVM readings. If no field indications of contamination are present, a soil sample from the capillary zone will be analyzed.

TASK 5 - BACKFILL THE BORINGS WITH NEAT CEMENT

Following collection of the soil and groundwater samples, ASE will backfill the borings with neat cement placed by tremie pipe.

TASK 6 - COLLECT AND ANALYZE GROUNDWATER SAMPLES FROM THE THREE SITE MONITORING WELLS

ASE will collect groundwater samples from the three site monitoring wells. Prior to purging and sampling, the groundwater surface in each well will be checked for sheen or free-floating hydrocarbons. The depth to groundwater in all site wells will also be measured and recorded 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 will be decanted from the bailers into 40-ml glass VOA vials, preserved with hydrochloric acid, sealed without headspace and 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 then 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.

Each groundwater sample will be analyzed by the CAL-EPA certified analytical laboratory for TPH-D by modified EPA Method 8015, and TPH-G, BTEX and the fuel oxygenates MTBE, DIPE, ETBE, TAME and TBA by EPA Method 8260.

TASK 7 - PREPARE A SUBSURFACE ASSESSMENT REPORT

ASE will submit a report outlining the methods and findings of this assessment. The report will be submitted under the seal of state registered civil engineer or geologist. This report will include a summary of all work completed during this assessment including tabulated soil and groundwater analytical results, conclusions and recommendations. Copies of the analytical report and chain of custody will be included as appendices.

4.0 SCHEDULE

ASE plans to begin field activities immediately upon approval of this workplan by the ACHCSA.

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

Respectfully submitted,

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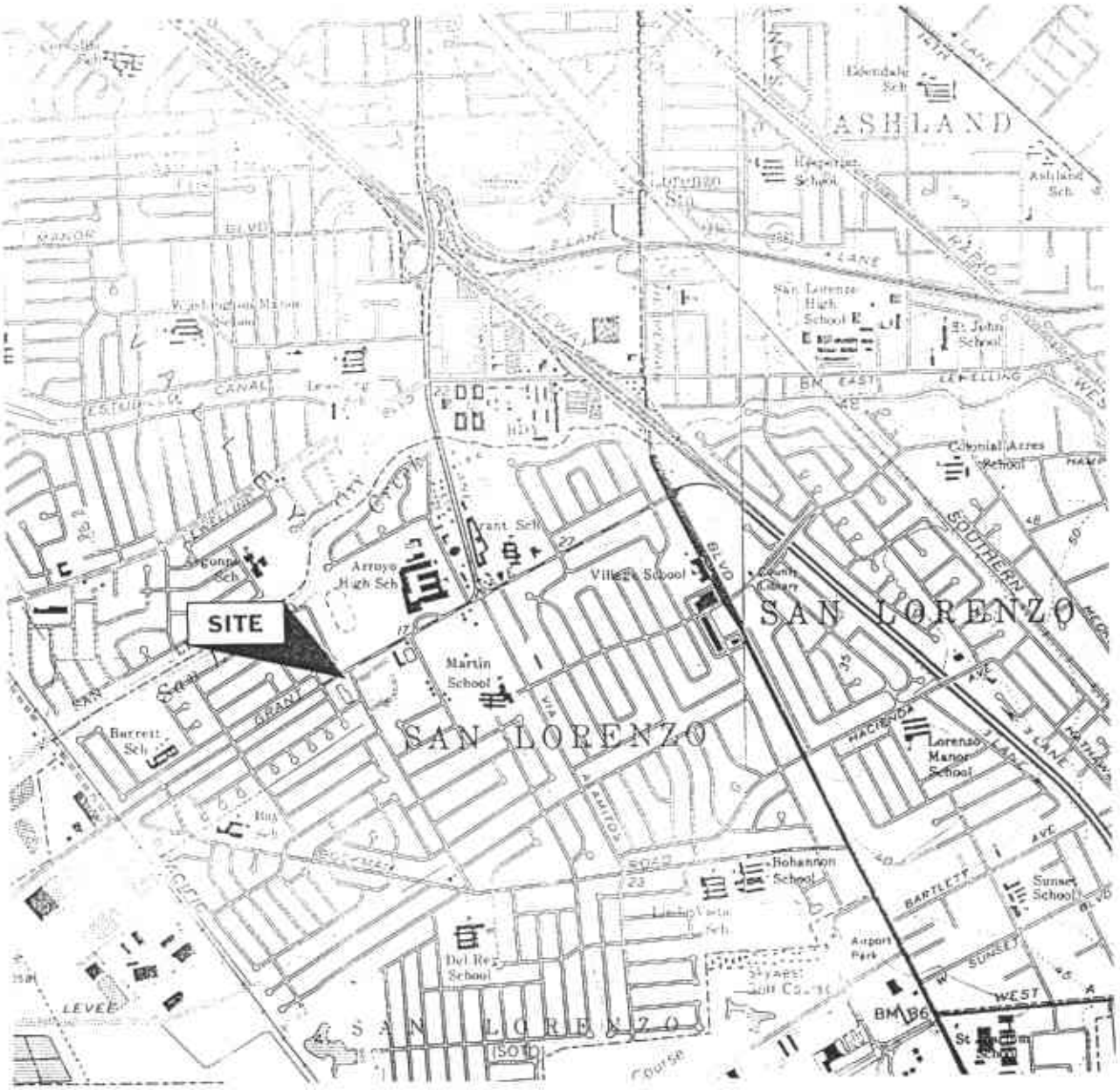
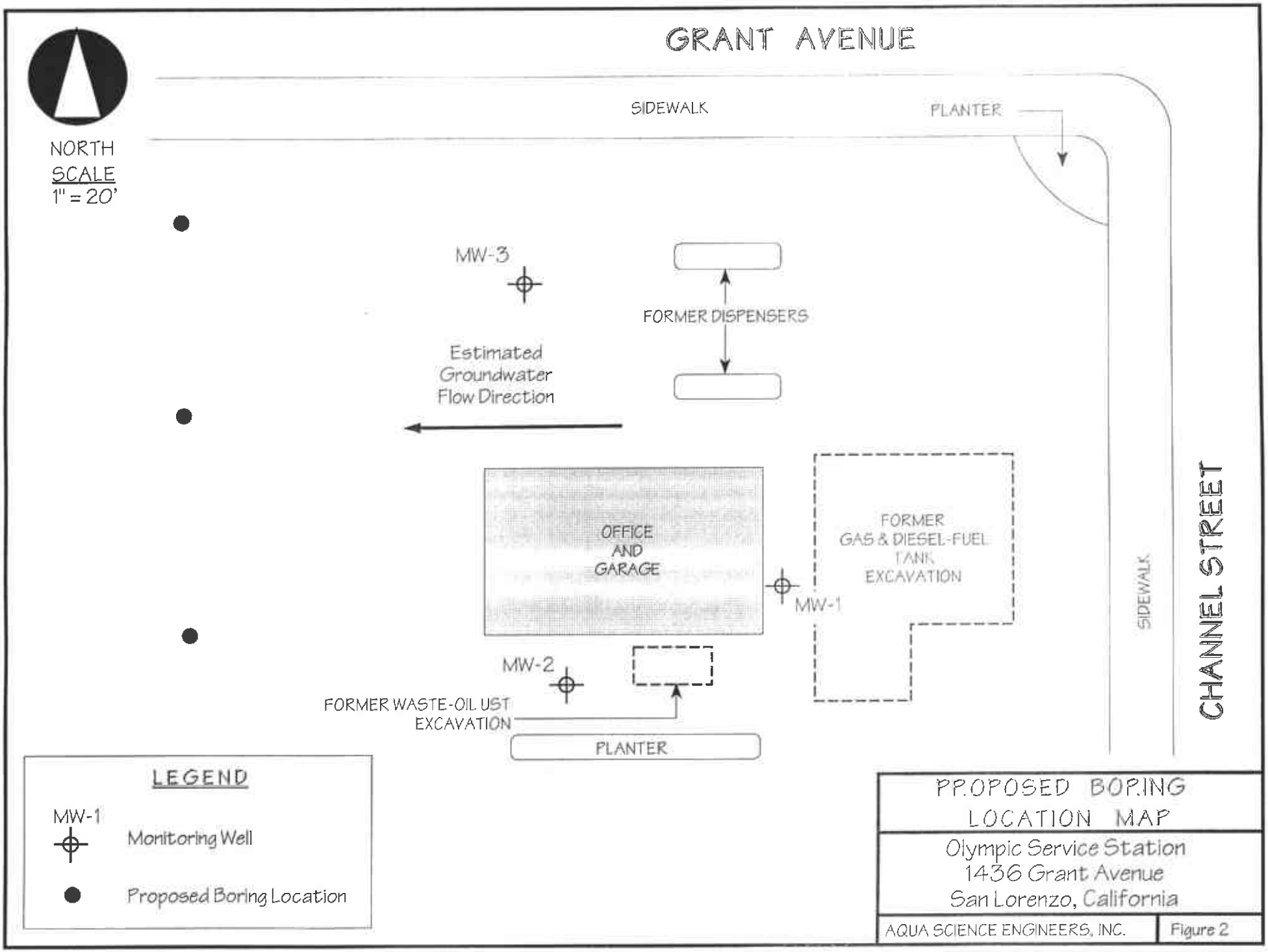


LOCATION MAP

Olympic Service Station
1436 Grant Avenue
San Lorenzo, California

AQUA SCIENCE ENGINEERS, INC. | Figure 1



PROPOSED BORING LOCATION MAP

Olympic Service Station
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AQUA SCIENCE ENGINEERS, INC. | Figure 2