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April 27, 1994
SCI 838.002

Ms. Eva Chu
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

Work Plan
Supplemental Soil and
Groundwater Investigation
2801 MacArthur Boulevard
Oakland, California

Dear Ms. Chu:

This letter presents a proposed work plan to conduct a supplemental subsurface investigation at the referenced site. The work plan has been prepared and submitted by Subsurface Consultants, Inc. (SCI) on behalf of A.P.A. Fund, Ltd.

Several phases of previous study have been completed by SCI and other consultants. The studies completed to date have been successful in establishing the general characteristics of gasoline contamination that exist on-site in soil and groundwater. Upon further evaluation of the data, we conclude that because of the depth of the contamination problem and the soil conditions, additional information is needed to more definitively evaluate remediation alternatives and costs, and to design the remediation system. The additional investigation proposed herein is intended to provide the additional information.

We propose to more accurately define the lateral and vertical extent of soil contamination in areas where hydrocarbon concentrations are highest. Because of the depth and lateral extent of the problem, it is appropriate to define the area of proposed remediation to a greater accuracy, prior to evaluating/designing remedial alternatives, than is possible with the available data. Additionally, it is proposed to convert one of the test borings drilled during this phase of study to a groundwater monitoring well. This well will serve as an "upgradient" well, one of which does not currently exist.

Test Borings

The site will be further investigated by drilling six (6) test borings approximately 35 to 40 feet deep. One of the borings will be located in the city right-of-way and will be converted into a groundwater monitoring well. The test borings will be drilled using truck-mounted, 8-inch-diameter, hollow-stem auger equipment. Proposed test boring and groundwater monitoring well locations are presented on the Site Plan.

Prior to drilling, a permit will be obtained from the Alameda County Water Agency, Zone 7. Our engineer will observe drilling operations and prepare detailed logs of the borings. Soil samples will be obtained from the borings using a California Drive Sampler having an outside diameter of 2.5 inches and an inside diameter of 2.0 inches. Soil samples will be obtained at 5 foot intervals in the upper 25 feet. Two of the borings will be continuously cored between depths of 25 and 40 feet. The remaining four borings will be continuously sampled between 25 and 40 feet, using a split barrel sampler. An organic vapor meter (OVM) will be used to screen all samples obtained from the test borings.

Soil samples will be retained in brass sample liners. Teflon sheeting will be placed on the ends of the liners prior to capping and sealing with tape. Upon sealing and labeling, the samples will be promptly refrigerated on-site in an ice chest. Samples will remain under refrigeration until delivery to the laboratory.

All augers, drill rods, sampling equipment, well casings, etc., that will be placed in the test borings will be cleaned prior to their initial use and prior to each subsequent use to reduce the likelihood of cross-contamination between borings and/or samples. Upon completion of drilling, the boring drilled in the city right-of-way will be converted to a groundwater monitoring well. Any of the remaining borings that exhibit signs of contamination will be converted into soil vapor extraction wells to be used in the event that a soil vapor extraction pilot test is warranted.

The groundwater monitoring well will be constructed of 2-inch-diameter, Schedule 40 PVC pipe having flush threaded joints. The lower 15 feet of the well will consist of machine slotted well screen having 0.020 inch slots. The annular space around the screened section will be backfilled with Lonestar #3 sand. A bentonite seal, approximately 12 inches thick, will be placed above the sand. The annular space above the bentonite seal will be backfilled with cement/bentonite grout. The well will be finished below grade in a traffic rated utility box and will be secured by a locking cap.

The vapor wells will be similarly constructed. The screened section of the vapor wells will be set within the zone of observed contamination.

Groundwater levels will be measured in the wells prior to development/purging. The new well will be developed by bailing or pumping, until the water becomes relatively free of turbidity, and temperature, conductivity and pH have stabilized. When the well has recharged to at least 80 percent of its original volume, a groundwater sample will be obtained using a disposable, pre-cleaned sampler. The water sample will be placed in pre-cleaned containers and refrigerated until delivery to the analytical laboratory. The soil and water samples will be accompanied by Chain-of-Custody records.

Soil cuttings and water generated during drilling and well development will be placed in steel drums and left on-site for later disposal. A level survey will be performed to determine the elevation of the top of well casing (TOC) in relation to the existing on-site wells. The TOC elevations and groundwater depths will be used to evaluate groundwater flow direction and gradient.

Analytical Testing

Soil and groundwater samples will be analyzed by a California Department of Health Services (DHS) certified analytical laboratory. Selected soil and groundwater samples will be analyzed for:

1. Total petroleum hydrocarbons, as gasoline - EPA 5030/8015, and
2. Benzene, toluene, ethylbenzene and xylenes, (BTEX) - EPA 5030/8020.

Soil Property Testing

Characteristics of the subsurface materials will be examined in order to complete more detailed evaluations of remedial alternatives. The following tests will be performed on selected samples.

1. Permeability,

2. Moisture Content/Dry Density,

3. Sieve Analysis,

4. -200 Sieve,

5. Porosity,

6. Atterberg Limits,

7. Total Organic Carbon,

8. Microbiological Standard Plate Count and Pseudomonads, and

9. Nutrient Levels (TKN, NH_3, NO_3, PO_4, K),

10. Cation exchange capacity, and

11. Oxidation - Reduction Potential

Groundwater Slug Testing

Groundwater slug tests will be performed in the groundwater monitoring wells to evaluate aquifer characteristics. Because the wells recharge slowly, they will be evacuated and the rate of recharge will be measured during testing.

Report

Based upon the results of the investigation, SCI will prepare a report recording our conclusions/recommendations regarding:

1. Soil and groundwater conditions;

2. The extent of soil contamination;

3. Remediation alternatives based on the new data.

The report will include boring logs, analytical test reports and Chain-of-Custody records.

We look forward to your favorable review of our work plan. If you have any questions, please call.

Yours very truly,

Subsurface Consultants, Inc.

James P. Bowers
Geotechnical Engineer 157 (expires 3/31/96)

MFW:JPB:sld

cc: Ms. Aniko Molnar
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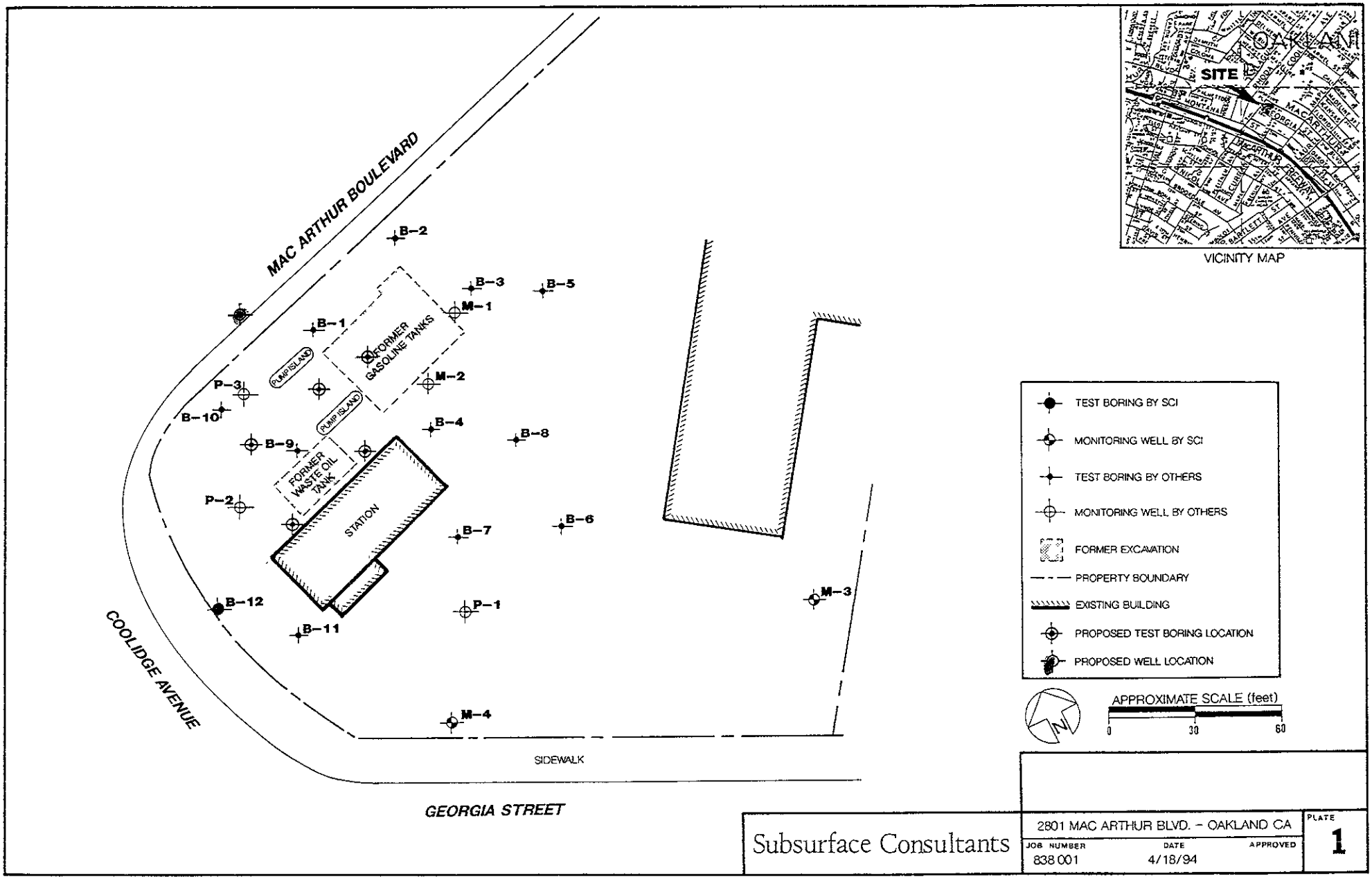
Attachments: Plate 1 - Site Plan



Subsurface Consultants

2801 MAC ARTHUR BLVD. - OAKLAND CA

JOB NUMBER	DATE	APPROVED
838 001	4/18/94	

PLATE 1