SOIL BORING AND MONITORING WELL INSTALLATION WORK PLAN
3635 13th Avenue
Oakland, CA 94610

Prepared For

John Williamson
1511 Wellington Street
Oakland, CA 94602

Prepared By

All Environmental, Inc.
2641 Crow Canyon Road, Suite 5
San Ramon, CA 94583

1/26/94

December 9, 1993

ALL ENVIRONMENTAL, INC.
Environmental Engineering & Construction
2641 Crow Canyon Rd., Ste. 5 • San Ramon, CA 94583 • (510) 820-3224

January 26, 1994

Mr. John Williamson
1511 Wellington Street
Oakland, CA 94602

Dear Mr. Williamson:

Re: **Soil Boring and Monitoring Well Installation Work Plan**
3635 13th Avenue, Oakland, CA

We are enclosing one copy of the Work Plan for Soil Boring and Monitoring Well Installation at 3635 13th Avenue, Oakland.

We are also forwarding one copy of this work plan to Ms. Jennifer Eberle at the Alameda County Health Care Services Agency (ACHCSA).

Please call me should you have any questions.

Sincerely,

G. W. Roy, P.E.

c.c. Ms. J. Eberle, ACHCSA

FAX: (510) 838-2687

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1.0 INTRODUCTION

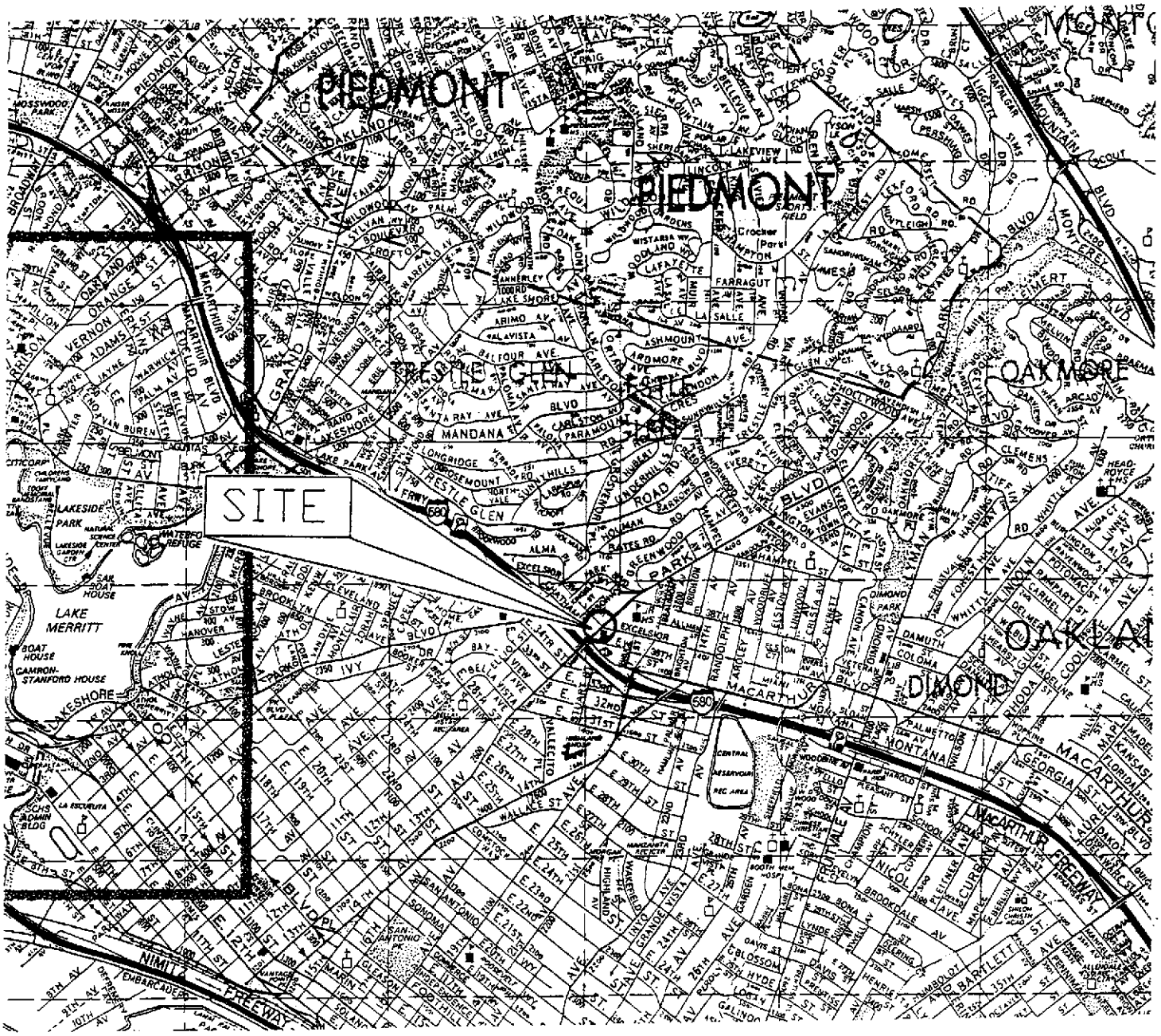
All Environmental, Inc. (AEI) has prepared this workplan on behalf of John Williamson, in response to his request for a soil and groundwater investigation at 3635 13th Avenue in Oakland, California. The proposed site assessment activities have been initiated by the property owner in accordance with the Regional Water Quality Control Board's requirements. AEI proposes soil borings and the installation of three groundwater monitoring wells in those borings. This subsurface investigation would include borehole "logging", soil sampling and analysis, well development, groundwater sampling and analysis, and determining the groundwater gradient via well elevation surveying. Prior to the commencement of field activities, this work plan will be approved by the Alameda County Health Care Services Agency, and well construction permits will be obtained from the Alameda County Flood Control and Water Conservation District, Zone 7.

2.0 SITE DESCRIPTION

The site is located less than 1/8th of a mile northeast of Interstate 580 and less than 1 mile northeast of the Alameda Estuary (Figure 1: Site Location Map).

The property under investigation was previously a gasoline service station and is presently a vacant lot, surrounded by residential buildings. The property is relatively level with 13th Avenue sloping downward towards the southwest (Figure 2: Site Map).

The site's subsurface geology consists of a thin artificial fill resting upon the unconsolidated alluvial and fluvial clay deposits typical to recent sediments. Due to shallow freshwater aquifers, a local water table less than 20 feet below the surface may be expected. Groundwater flow direction is expected to approximate the land surface gradient, which is



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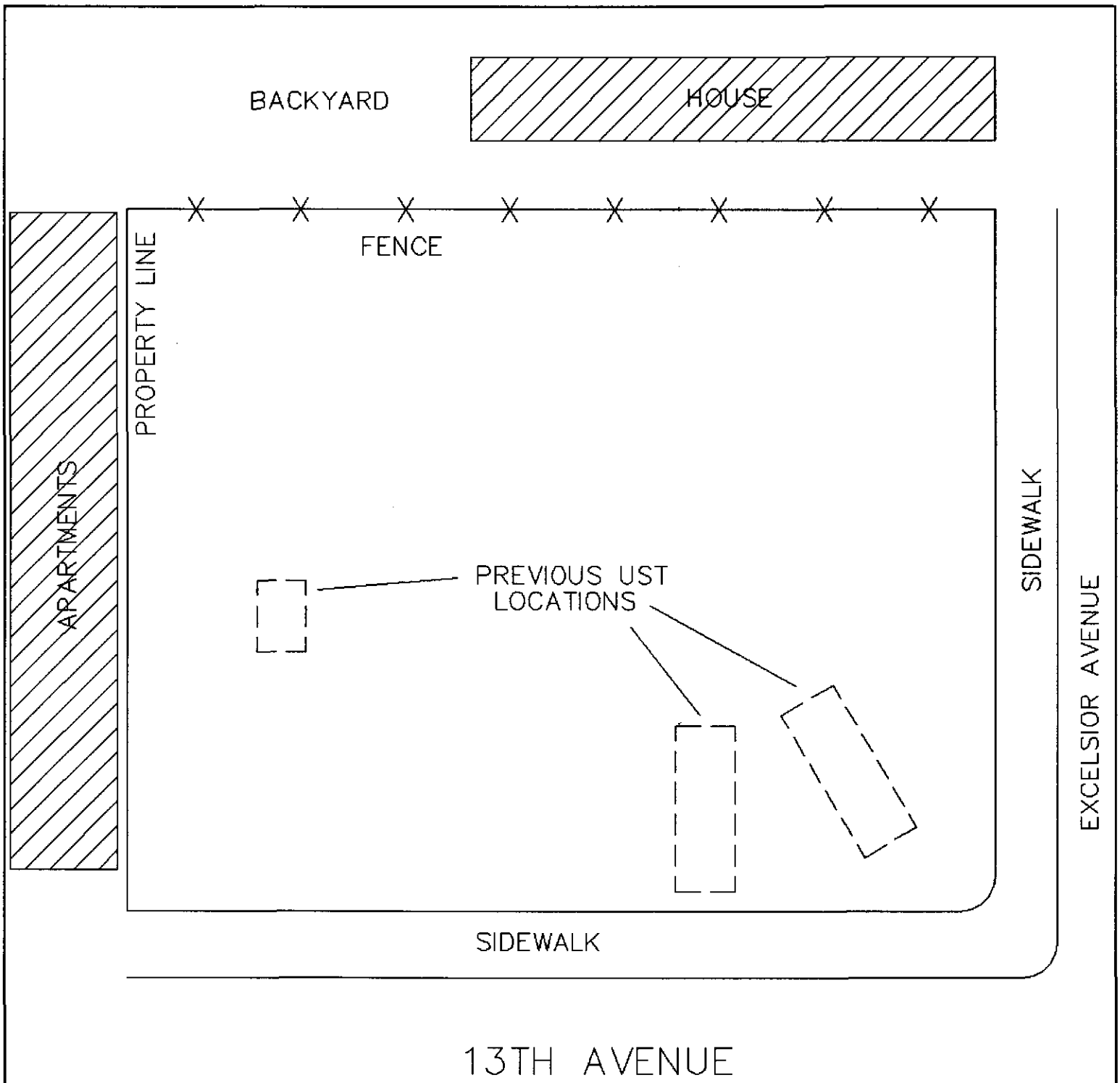
From Thomas Bros. Map – 1993

ALL ENVIRONMENTAL, INC. 2641 CROW CANYON RD, SAN RAMON		
SCALE: 1 INCH = 2,200 FT.	APPROVED BY:	DRAWN BY: S.P.
DATE: 11/22/93		REVISED: S.P.
SITE LOCATION MAP		
3635 13TH AVENUE		DRAWING NUMBER: FIGURE 1



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SITE MAP		
3635 13TH. AVENUE		DRAWING NUMBER: FIGURE 2

downhill to the southwest. On this basis, two monitoring wells will be placed on the southwest side of the overexcavations and within 10 feet of the overexcavation perimeters. A third monitoring well will be placed in an up gradient location, near the north corner of the property, to determine groundwater flow direction.

3.0 SITE BACKGROUND

In December 1992, three underground storage tanks (One 250-gallon steel waste oil tank, one 500-gallon steel gasoline tank, and one 1000-gallon steel gasoline tank) were removed by others and disposed of from the site at 3635 13th Street. Soil samples revealed contamination, particularly associated with the waste oil tank, which required overexcavation and disposal of contaminated soil. AEI completed overexcavating and disposed of contaminated soil in November 1993. AEI also demolished an office and shop building at the site.

Removal, overexcavation and disposal of contaminated soil are described in the report included in Appendix A.

4.0 GEOLOGY AND HYDROGEOLOGY

San Francisco Bay lies in a low area in the Coast Range province, a region of northwest trending faults, hills and valleys. The Bay is a flooded valley which is thought to have originally formed by erosion of the ancestral Sacramento River (Jenkins, 1951) and subsequently widened by subsidence and a rise in sea level. Quaternary (Pleistocene to Recent) sediments deposited in what is now the Bay, include both shallow marine and continental deposits.

The youngest, surficial deposit is known as "Bay Mud" and occurs in areas adjacent to the Bay. Bay Mud is generally composed of unconsolidated, olive gray, or black silty clay. It is typically plastic and varies from soft to stiff. Organic remains such as shells and peat are not uncommon. Permeability is generally low except where lenses of sand and gravel occur. Bay Mud is mainly derived from the sediment load carried by the Sacramento and San Joaquin Rivers and has been deposited in the Bay for almost 10,000 years (Helley et al., 1979). Bay Mud continues to be deposited today.

The coarse-grained lenses of sediment found in this area are mainly alluvial fan or stream deposits. The sediment is found near the head of alluvial fans and along streams. This sediment grades into fine-grained deposits on flood plains and near the edges of alluvial fans.

Underlying the Bay Mud is Holocene younger alluvium. Holocene younger alluvium ranges up to 50 feet thick and is composed of unconsolidated sand and silt. The younger alluvium yields little water.

Pleistocene older alluvium underlies the younger alluvium, ranges up to 700 feet thick, and is composed of clay, silt, sand, and gravel. **The regional aquifer is contained in the older alluvium, and is confined. Groundwater recharge for this aquifer is along the Hayward fault to the east.**

5.0 SOIL BORING INVESTIGATION

The plan for site investigation includes hollow stem auger drilling, soil sampling and analysis, monitoring well construction, development of the wells, and groundwater sampling and analysis. Groundwater gradient and flow direction will be determined.

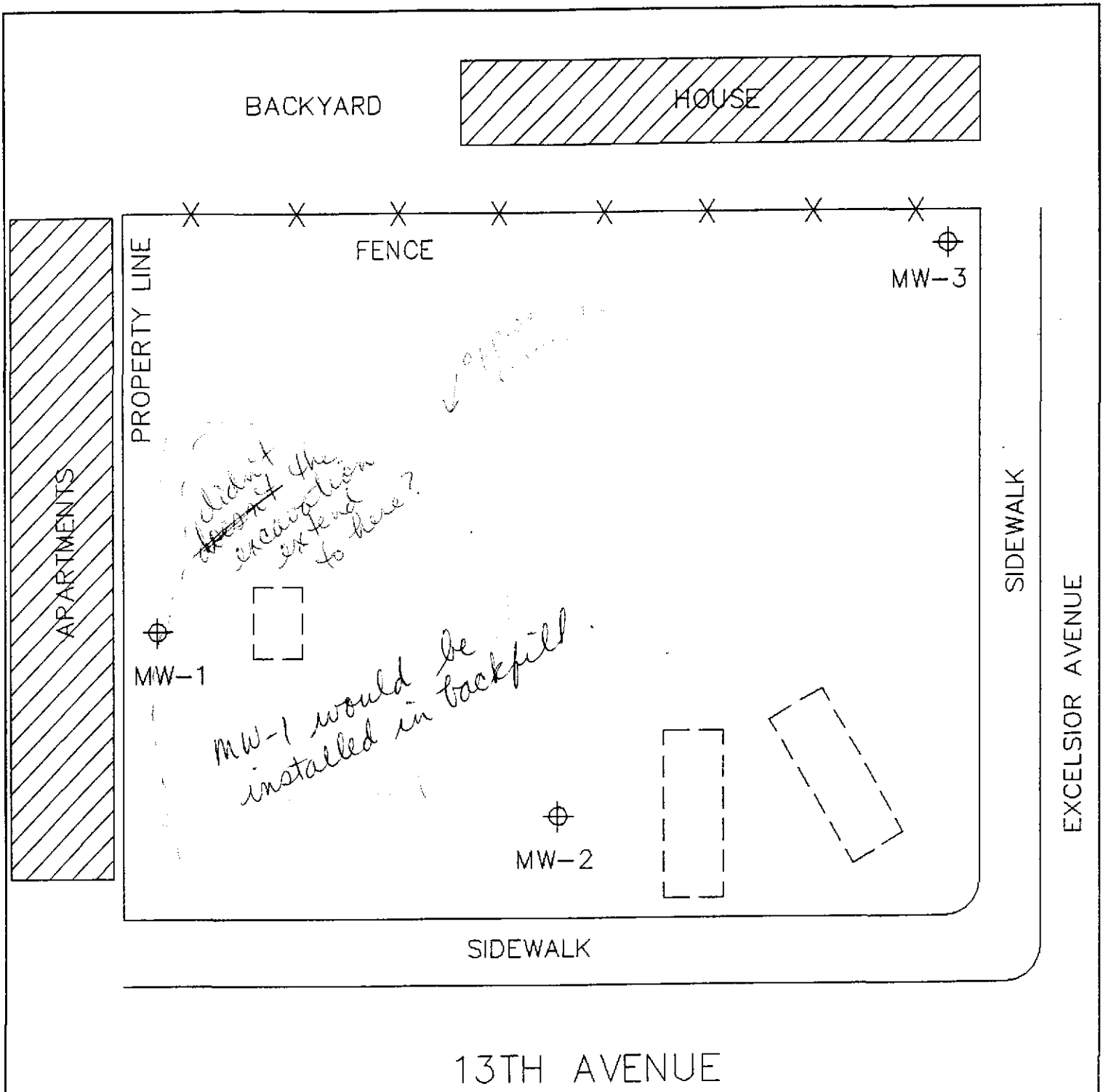
Gasoline, oil & grease, hydraulic fluid, and lead contaminated soils were identified in the former underground storage tank and hydraulic automobile lifts. Following overexcavation, laboratory analyses of the soil samples confirmed that the contaminated soil was successfully removed. except 26 ppm O+G.

The focus of this investigation is to determine the possible presence of hydrocarbon contamination in the soil and groundwater with variation of depth at three select locations on the property. Soil and groundwater samples will be submitted for chemical analyses of total petroleum hydrocarbons as gasoline (EPA 5030/8015), BTEX (EPA 8020/602), hydraulic fluid (EPA 3550/8015), total lead (AA), and oil & grease (EPA 5520 D & F) at a state certified laboratory (Priority Environmental Labs). → don't have to

The three soil borings will be converted to groundwater monitoring wells at the depth of first encountered groundwater. The well designations MW-1, MW-2, and MW-3 will be used to reference the locations of soil borings and corresponding monitoring wells as indicated on the Boring and Well Location Map (Figure 3). Two monitoring wells will be placed at or near assumed down gradient locations within 10 feet of the perimeter of the two over-excavations. The other monitoring well will be placed at an up gradient location which will facilitate groundwater gradient determinations.

A Mobile Drill B-57 or CME 75 hydraulic rotary drill with 6.25" I.D. by 10.5" O.D. hollow stem augers will be used. Drilling will proceed to first encountered groundwater plus 10 feet, with an expected maximum of 30 feet depth below grade. If groundwater is not encountered in the first 50 feet of strata, the borings will be backfilled with neat portland cement.

Soil borings will be continuously logged onsite by a geologist using the Unified Soil Classification System. Undisturbed soil samples will be taken at 5 foot intervals, starting at 5 foot depth, with a hammer driven California Modified split spoon sampler. The sampler



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BORING AND WELL LOCATION MAP		
3635 13TH. AVENUE		DRAWING NUMBER: FIGURE 3

will be advanced ahead of the auger tip by successive hammer blows. The samples will be collected for visual classification and chemical analysis in two inch brass tubes. A total of two soil samples from each boring will be analyzed at a state certified laboratory. The soil samples selected for chemical testing will be determined by the geologist onsite at the time of sampling. Soil samples obtained during drilling will be screened in the field via sensory perceptions and portable organic vapor meter.

Samples designated for laboratory analysis will be sealed on the ends with aluminum foil, plastic caps, and tape. The samples will be placed in an ice chest with ice and delivered to a State certified laboratory with chain of custody documents. All soil samples will be analyzed for TPH-gasoline, BTEX, hydraulic fluid, total lead, and oil and grease.

A detailed description of sample collection and handling procedures by Priority Labs is appended to this work plan (Appendix C: Quality Assurance and Quality Control Plan).

All sampling equipment will be cleaned in buckets with brushes and a TSP or Alconox solution, then rinsed twice with tap water. The drill rig and augers will be steam cleaned between wells and onsite before departure. Rinsates will be contained onsite in sealed, labeled drums. follow up

Cuttings generated during drilling will be stored onsite in 55 gallon drums. Onsite treatment or offsite disposal of contaminated drill cuttings is not a part of this work scope. The responsible party will be advised of the soil sample results and soil treatment/disposal options. It is likely that a licensed hauler will be contracted to transport the soils as non-hazardous waste, under appropriate manifests, to a local landfill facility.

6.0 GROUNDWATER INVESTIGATION

Soil borings, as described above, will be converted to 2" monitoring wells. The wells will be constructed of 2 inch flush threaded Schedule 40 PVC casing, with up to 15 feet of .01" or .02" factory-slotted well screen. The top of the well screen will extend up to 3 feet above the encountered groundwater level to account for seasonal fluctuations (Figure 4: Typical Well Construction Diagram). The well casing will be inserted through the augers to a point a few inches above the borehole terminus where it will be suspended until the well is secured within the sand pack. Sand (#2 or #3) will be poured through the augers in one- to two-foot lifts up to about two feet above the top of the perforated casing. One to two feet of bentonite pellets will be placed above the sand, and activated with tap water. The seal will be finished up to the surface with tremmied cement/bentonite grout. A locking top cap and a flush-mounted watertight well cover will be installed.

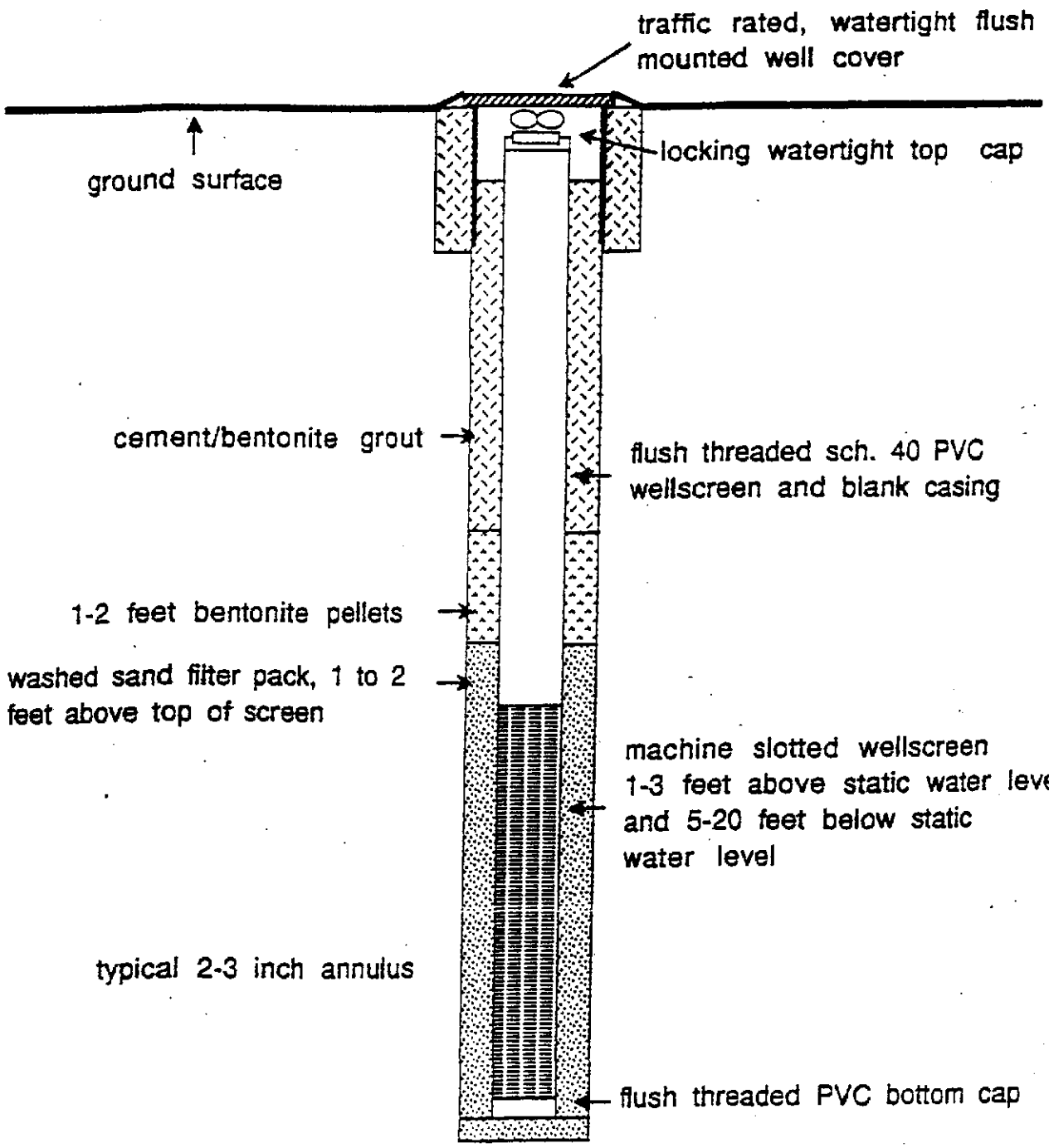
can we do 5' ?

The wells will be developed by surging and bailing of water into a DOT 17H drum until the water appears to be reasonably clear with a minimum of 5 well volumes removed.

Groundwater will be checked for sheen and free product prior to purging and sampling. Free product and sheen will be measured with an acrylic bailer which will be lowered slowly to the groundwater surface and filled about half full for direct observation. Water level measurements will be conducted and a survey of top-of-well casing elevations will be made.

Prior to obtaining water samples from the monitoring wells, not less than 5 well volumes of water will be bailed from the well and the well will be allowed to recharge. Samples will be obtained in a precleaned bailer, secured in 40 ml volatile organic analysis vials and glass liter bottles, placed in a cooler with wet ice and delivered to a State certified laboratory with chain of custody documents. Well development and sampling equipment will be decontaminated as described above, between well locations.

72 hr. bet well + devel. 9 ~~+ samp~~
+ bet devel. + samp



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WELL CONSTRUCTION DIAGRAM		
3635 13TH AVENUE		DRAWING NUMBER: FIGURE 4

7.0 SITE SAFETY

Prior to commencement of field activities, a site safety meeting will be held at a designated command post near the working area. Emergency procedures will be outlined at this meeting. Also, the hazards of the known or suspected chemicals of interest will be explained. Level D personal protection equipment is the anticipated maximum amount of protection needed. A site safety plan which conforms to Part 1910.120 (i) (2) of 29 CFR will be on site at all times during the performance of this project. (Appendix B: Health & Safety Plan)

A working area will be established with barricades and warning tape to delineate the zone where hard hats and steel-toe shoes must be worn, and where unauthorized personnel will not be allowed. If, during drilling, fuel product odors are deemed to be substantial, half-face respirators with organic vapor cartridges will be worn.

A nearby hospital will be designated in the site safety plan as the emergency medical facility of first choice. A map with a course plotted to the hospital will be onsite.

8.0 ESTIMATED SCHEDULE

Upon acceptance of this workplan by the Alameda County Health Services Department, work will commence within a two week period. Both the Alameda County Health Services Department and the Alameda County Water District will be given adequate notification of the scheduled day of drilling. Soil and groundwater laboratory results will be obtained within two weeks of collection. The final report will be prepared and copies will be delivered to

the Alameda County Health Services Department, the Regional Water Quality Control Board and the Alameda County Water District. A table describing the project schedule is as follows:

Week 1:	Workplan Preparation
Week 2 & 3:	Review of Workplan by the ACHCSA
Week 4:	Drilling and Well Sampling
Week 5:	Laboratory Analysis
Week 6:	Preparation of Final Reports

9.0 FINAL REPORT

A complete and final report of methods, findings, and conclusions from work proposed herein will be submitted to the client for forwarding to the appropriate agencies. The report will be submitted under the seal of a State Registered Geologist and a State Registered Chemical Engineer, Mr. Guy Roy (#3187). Mr. Roy and the staff of All Environmental, Inc. have implemented hundreds of tank removal, site investigation, and remediation projects throughout California.