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March 6, 1995

Ms. Madhulla Logan  
Alameda County Health Care Services Agency  
Department of Environmental Health  
1131 Harbor Bay Parkway, #250  
Alameda, CA 94502-6577

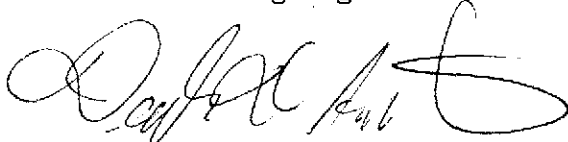
Re: Workplan for Monitoring Well Installation  
Mills College Corporation Yard, Oakland, California  
*Project No.: K275-H*

Dear Ms. Logan:

Harza is pleased to submit this workplan for installation of an additional monitoring well at the Mills College Corporation Yard. Please notify us if this workplan is acceptable.

Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

**Harza Consulting Engineers and Scientists**

Derek D. Armentrout  
Project Chemist

DA:aa\encl.

Copies: Addressee (1)

ENVIRONMENTAL  
PROTECTION  
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**Monitoring Well Installation Workplan**  
**Mills College Corporation Yard**  
**Oakland, California**

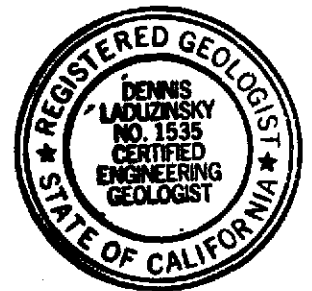
March 6, 1995

*Prepared For:*

Mills College  
5000 MacArthur Boulevard  
Oakland, CA 94613

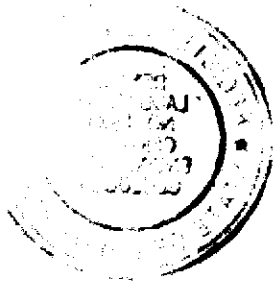
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- A Well Installation Procedures

**Monitoring Well Installation Workplan**  
**Mills College Corporation Yard**  
**Oakland, California**

**1.0 INTRODUCTION**

This workplan presents the procedures to be followed during installation of an additional ground water monitoring well at the Mills College Corporation Yard in Oakland, California. The project location is shown on the Site Vicinity Map (Figure 1).

The purpose of this investigation is to provide additional information on the downgradient extent of petroleum hydrocarbons in ground water related to a previously removed gasoline underground storage tank (UST) at the site. This additional investigation has been requested by the Alameda County Health Care Services Agency (ACHCSA) in their December 13, 1994 letter.

**2.0 BACKGROUND**

In October 1988, a 1,000-gallon gasoline UST was removed from the Corporation Yard facility. A report prepared by Blaine Tech Services, Inc. of San Jose, California, indicated that soil samples collected from a depth of 21 feet below ground surface (bgs) following tank removal contained moderately high levels of total petroleum hydrocarbons as gasoline (TPHg). It is understood that 100 cubic yards of contaminated soils were excavated from the tank pit area at the time of tank removal and aerated on-site. On February 15, 1989, the ACHCSA subsequently issued a letter, requesting investigation of the vertical and lateral extent of petroleum hydrocarbons in soil and ground water related to the former tank.

Beginning in June 1989, Harza (formerly Kaldveer Associates) performed soil and ground water quality investigations at the site, consisting of the installation and sampling of three ground water monitoring wells and two additional shallow soil borings.

The results of these investigations, presented in a report titled "Soil and Ground Water Testing Report For Mills College Corporation Yard", dated May 7, 1991, indicated that the majority of gasoline contamination in the unsaturated zone near the tanks appeared to have been removed during the soil excavation program. Analysis of ground water samples collected from the monitoring wells since June 1989 have indicated the presence of TPHg at concentrations up to 11 parts per million (ppm).

The measured ground water flow direction at the site has usually been toward the south, beneath the existing Corporation Yard buildings, but recently has exhibited a shift toward the west.

In May 1994, well MW-4 was installed downgradient of the Corporation Yard along Seminary Avenue in response to the ACHCSA letter of April 23, 1993 requesting an additional downgradient monitoring point. In their September 7, 1994 letter, the ACHCSA expressed concern that well MW-4 was not screened in the same aquifer as wells MW-1 through MW-3, and requested an investigation to determine if well MW-4 was hydraulically connected to the other wells. A geologic and geo-chemical investigation was performed in October 1994, and indicated that the well was most likely hydraulically connected to wells MW-1 through MW-3 at depth, but a conclusive determination could not be made, particularly along the upper surface of the ground water where floating hydrocarbons, such as gasoline, tend to reside. The ACHCSA has requested that further work be conducted to better delineate the extent of the contaminant plume in the westerly direction.

### **3.0 SCOPE OF WORK**

The investigation will consist of five tasks.

#### **3.1 Task 1 - Workplan Preparation**

This workplan has been prepared for submittal to the ACHCSA to document the procedures to be followed during this investigation.

#### **3.2 Task 2 - Well Installation**

One ground water monitoring well will be installed to a depth of approximately 30 feet. Ground water elevations will first be measured in existing wells MW-1 through MW-3 to determine the current ground water flow direction. The well will be placed downgradient of the existing wells in the approximate location shown on Figure 2.

Well installation procedures are attached as Appendix A.

#### **3.3 Task 3 - Well-Top Survey**

The new well-top elevation will be surveyed relative to the existing Corporation Yard wells. Ground water levels will be measured in the new well and the existing four wells for use in developing a ground water elevation contour map.

### 3.4 Task 4 - Well Development and Sampling

The new well will be developed at least 24 hours after installation using a bailer or suitable pump. Development will consist of the rapid removal of at least 10 casing volumes of water from the well until the water is relatively free of sand, silt, and turbidity.

The well will be sampled at least 24 hours after development. Sampling will occur concurrent with quarterly monitoring of the other Corporation Yard monitoring wells. All samples will be analyzed for TPHg using EPA Method 5030/GCFID, and for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8020.

Following ground water level measurements, a minimum of three well-casing volumes of water will be purged from each well using a Teflon bailer. Purging will consist of the gradual removal of water from the well until physical parameters such as pH, temperature, and electrical conductivity have stabilized. Following purging, samples will be decanted from the bailer into appropriate sample containers, labeled, and placed in refrigerated storage for transport to the laboratory under chain-of-custody control. Sampling equipment will be cleaned between wells to reduce the potential for cross contamination. Purge water will be contained on-site.

### 3.5 Task 5 - Report Preparation

We will submit a report describing the investigation, results of the laboratory analyses, and our conclusions concerning the extent of petroleum hydrocarbons in ground water. This report will be combined with the quarterly monitoring report for the Corporation Yard site.

## 4.0 SCHEDULE

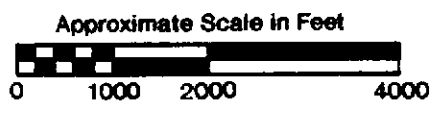
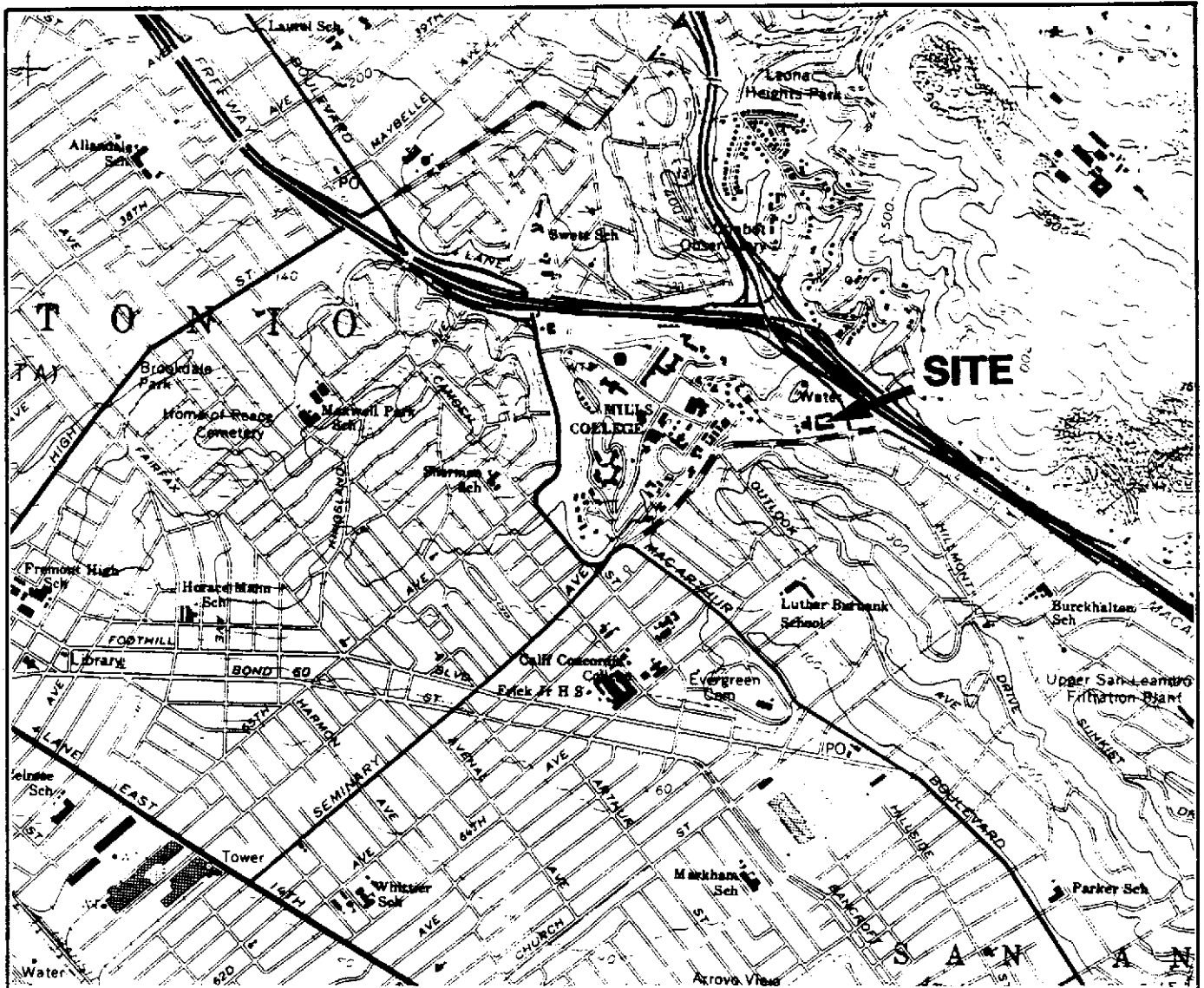
We anticipate installing the new well in March 1995, and performing sampling and analysis during the next quarterly monitoring event for the Corporation Yard, scheduled for April 1995. The well installation and ground water sampling report will be submitted to the ACHCSA within one month of the completion of field activities.

**FIGURES**

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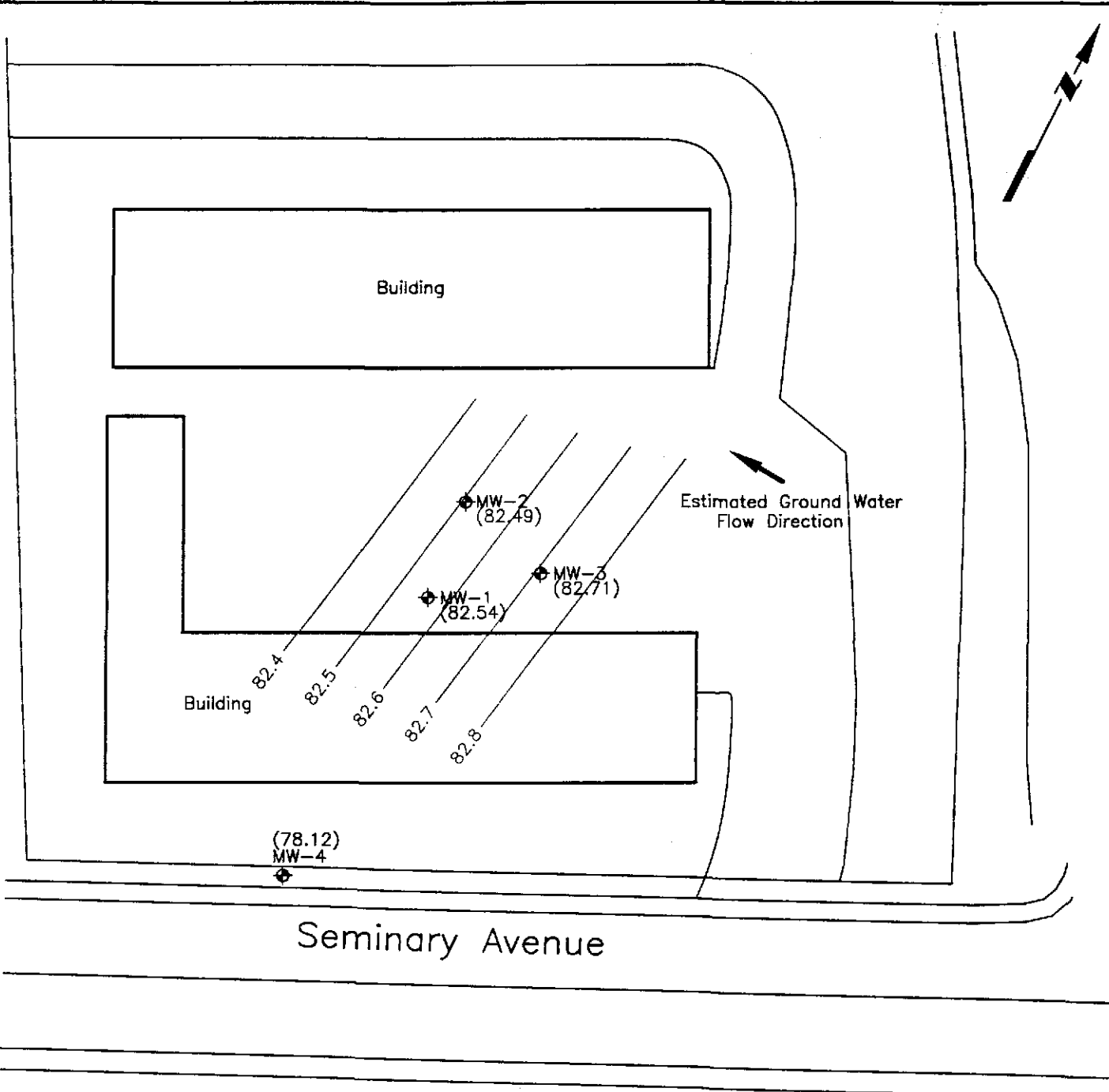


BASE: U.S.G.S. Oakland East 7.5 Minute Quadrangle (topographic)

**HARZA**  
*Consulting Engineers and Scientists*

**SITE VICINITY MAP**  
**MILLS COLLEGE**  
**CORPORATION YARD FACILITY**  
**Oakland, California**

PROJECT NO.	DATE	Figure 1
K275-H	March 1995	

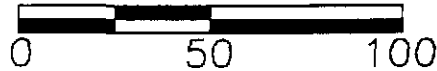


LEGEND

◆ Existing Monitoring Well Location

—82.4 Ground Water Contour 1/18/95

Approximate scale in feet



ek275h2

**HARZA**  
*Consulting Engineers and Scientists*

SITE PLAN

MILLS COLLEGE  
 CORPORATION YARD FACILITY  
 Oakland, California

PROJECT NO.	DATE	FIGURE NO.
K275-H	March 1995	2

**APPENDIX A**  
**Well Installation Procedures**

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## **APPENDIX A**

### **Well Installation Procedures**

The exploratory boring for monitoring well installation will be permitted through the Alameda County Flood Control and Water Conservation District. A truck-mounted drill rig equipped with 8-inch diameter hollow stem augers will be used to complete the boring. All equipment will be steam-cleaned prior to drilling. Sampling equipment will be cleaned with a laboratory grade detergent and rinsed with distilled water between samples to minimize cross-contamination.

Soil samples will be collected from the boring at 5-foot intervals using either a 2-inch I.D. Modified California sampler containing thin brass liners, or a standard penetration split-spoon sampler. The sampler will be driven with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler the last 12 inches of an 18-inch drive will be recorded as the penetration resistance (blows/foot) on the boring logs.

Soils encountered during drilling will be classified by Harza staff by visual examination in the field in accordance with the Unified Soil Classification System. Samples will be screened for hydrocarbon vapors in the field using a portable photoionization detector. Field hydrocarbon vapor measurements will be recorded on the boring logs. Soil samples for possible chemical analysis will be collected in 2-inch diameter, 6-inch long, brass liners. These samples will be examined for logging, sealed with Teflon-lined lids, labeled, and immediately placed in refrigerated storage. Chain-of-custody forms will be initiated in the field and accompany samples to a California Environmental Protection Agency certified laboratory.

Borings completed as ground water monitoring wells will be extended approximately 10 to 15 feet past the first free water encountered. They will be terminated at a shallower depth if a minimum of 5-feet of clay, acting as an aquitard, is encountered. Soil cuttings produced by the drilling operation will be stockpiled on the Corporation Yard site.

The boring will be converted to a monitoring well, utilizing 2" Schedule 40 threaded PVC pipe and slotted screen. The perforations will extend approximately 10 to 15 feet below, and 5 feet above, the upper zone of saturation. The perforated section annulus will be packed with clean graded sand to a level approximately two feet above the highest screen slots, and a one foot thick bentonite plug will be placed above the sand pack. The remaining annulus will be backfilled with cement grout to grade.

The well will be finished with a traffic rated concrete or metal box grouted to match the existing grade. The well will be completed with a locking cap to guard against vandalism. No solvents or glues will be used during monitoring well construction.