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July 20, 1999

Mr. Barney M. Chan
Alameda County
Department of Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Claim No. 7912
Site Address: 3609 International Blvd., Oakland, California

Dear Mr. Chan:

Enclosed for your review is SOMA's report entitled "Work Plan to Conduct Ves Testing for Installation of the Remediation System" at the subject site.

Thank you for your time in reviewing this report. If you have any questions or comments, please call me or Mansour at (925) 244-6600.

Sincerely,

Bryce J. Scofield
Project Engineer

BJS/jb

Enclosures

cc: Mr. Mark Owens
State Water Resources Control Board

Mr. Abolghassem Razi
Tony's Express Auto Service

ENVIRONMENTAL PROTECTION
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# WORK PLAN TO CONDUCT VES TESTING FOR INSTALLATION OF THE REMEDIATION SYSTEM AT TONY'S EXPRESS AUTO SERVICE 3609 INTERNATIONAL BLVD. OAKLAND, CALIFORNIA

**PROJECT 99-2332**

**July 20, 1999**

**PREPARED FOR**

Mr. Abolghassem Razi
3609 International Blvd.
Oakland, CA 94601

**PREPARED BY**

**SOMA Environmental Engineering, Inc.**
**2680 Bishop Drive. Suite 203**
**San Ramon, California 94583**

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## INTRODUCTION

This work plan has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Abolghassem Razi, the owner of Tony's Express Auto Service. The Tony's Express Auto Service (the "Site) is located at 3609 International Blvd., Oakland, California. This work plan has been prepared based on the Alameda County Environmental Health Services (ACEHS) request dated June 29, 1999.

The Site is located at the intersection of 36th Avenue and International Boulevard formerly known as East 14th Street, Oakland, California, see Figure 1. It is currently used as a gasoline service station and mechanic shop. The Site is relatively flat, and the surrounding properties are primarily commercial businesses and residential housing. Figure 2 shows the location of the main building, fuel tank areas, on-site and off-site groundwater monitoring wells. Currently, the groundwater monitoring wells are being monitored on a quarterly basis. Figure 3 shows the latest groundwater contour data from June 10, 1999. Results from the groundwater monitoring program have indicated elevated levels of petroleum hydrocarbons in the groundwater beneath the Site. The source of petroleum hydrocarbons in the groundwater is believed to be the former underground storage tanks (USTs), which were used to store gasoline at the Site. The results of Risk Based Corrective Action (RBCA) conducted by SOMA indicate adverse health risk for on-site workers and off-site residents to chemicals emanating from the Site.

The purpose of this work plan is for:

1. Construction of French Drain
2. Conducting Pilot Testing of Existing VES Wells
3. Installation of VES/Air Sparging Wells
4. Installation of Groundwater Remediation System

This work plan discusses the procedure for testing existing VES wells and a detailed description of the equipment required for installing the air sparging system and treatment facility for the remediation of soil and groundwater at the Site.

**BACKGROUND**

Currently, the Site is used as a gasoline service station. The environmental investigation at the subject property started since 1992, when Mr. Razi, the property owner retained Soil Tech Engineering, Inc. (STE) of San Jose to conduct a limited subsurface investigation. The purpose of the STE investigation was to determine whether or not the soil near the product lines and underground storage tanks (USTs) have been impacted with petroleum hydrocarbons. STE drilled six soil borings to a depth of 15 feet below the ground surface (bgs). The results of this investigation revealed elevated levels of petroleum hydrocarbons as TPH-g (up to 460 mg/kg) and detectable levels of benzene, toluene, ethylbenzene and xylenes (BTEX) in soil samples.

In July 1993, STE removed one single-walled 10,000-gallon gasoline tank and one single-walled 6,000-gallon gasoline tank along with a 550-gallon waste oil tank from the Site. These tanks were replaced by double-walled USTs. Currently, there is one 10,000 gallon double-walled gasoline tank and two 6,000 gallon double-walled gasoline tanks beneath the Site. During the UST upgrade, STE collected soil samples from the bottom and side-walls of excavated pits at depths of 12 and 7 feet as well as underneath the piping area and analyzed for TPH-g and BTEX. The results of the laboratory analysis on soil samples collected from the bottom of the excavation showed up to 460 mg/kg TPH-g. However, the samples collected below the piping showed elevated levels of TPH-g (up to 4,100 mg/kg).

Due to the presence of elevated levels of TPH-g, ACEHS requested a work plan for subsurface investigation. In August 1993, STE drilled thirteen soil borings and converted three of them into groundwater monitoring wells of MW-1, MW-2 and MW-3. To allow for future in-situ remediation of impacted soils, STE drilled four vertical 6-inch diameter soil vapor extraction probes. In addition, two horizontal perforated pipes were installed connecting four soil borings together through a manifold. The manifold was connected to a vault in front of the northeast corner of the on-site building.

In August 1995, STE installed five additional groundwater monitoring wells, MW-4 through MW-8). In August 1996, STE conducted additional site characterization activities. During this period, STE drilled five soil borings and converted three of them to groundwater monitoring wells of MW-9 through MW-11.

In December 1997, Mr. Razi retained Western Geo-Engineers (WEGE) to conduct additional investigation including a slug test and risk based corrective action (RBCA) using groundwater monitoring data. The results of slug tests conducted by WEGE indicated that hydraulic conductivity of the saturated sediment ranges between 0.4 and 10.4 feet per day. The results of hydraulic conductivity measurement conducted by WEGE contradict the lithologic logs of groundwater monitoring wells prepared by STE. As the lithologic logs of the groundwater monitoring wells indicate the saturated sediments beneath the Site are primarily comprised of fine-grained sediments such as silt and clay.

The RBCA study conducted by WEGE is unrealistic and incomplete. For instance, using shallow groundwater beneath the Site by the future Site workers and the nearby residents as a drinking water source is very unrealistic. On the other hand, the study does not consider the indoor air concentration for the current and future off-site residents as an exposure media. As a result, the report offers minimal information to the reader and results cannot be used as a decision-making tool.

Since December 1997, Mr. Razi has retained WEGE to conduct groundwater monitoring on a quarterly basis. Today after almost 6-years of monitoring and site investigation the plume of groundwater contaminants are reportedly migrating to off-site areas and impacting the nearby residents. Among the chemicals of potential concern is benzene and MTBE, which reportedly have migrated beyond the property's boundary.

SOMA has produced two recent reports which detail work performed at the site, including pump tests on groundwater wells, groundwater modeling, and RBCA. The reports have documented the need for immediate remediation at the Site in order to eliminate the possibility of adverse health effects.

## SCOPE OF WORK

On June 29, 1999 a meeting was held at the ACEHS offices. The participants in the meeting were Mr. Barney Chan, Ms. Madhulla Logan, Mr. Abolghassem Razi and Mr. Mansour Sepehr of SOMA. The major items that were discussed in the meeting were the work plan and a feasibility study. Based on the ACEHS request the following are the scope of the current work plan:

1. Construction of French Drain;
2. Conducting Pilot Testing of Existing VES Wells;
3. Installation of VES/Air Sparging Wells:
4. Installation of Groundwater Remediation System.

The following is a brief description of each component of the proposed work plan.

***Construction of French Drain:***

The results from MODFLOW modeling of the Site indicate that a French Drain would be the best option for capturing the groundwater plume before it migrates off-site and draw back some contamination that has already migrated under neighboring residential units. The drain has been conceptualized for installation at the rear of the property as shown in Figure 4. MODFLOW was used to design an effective groundwater remediation system utilizing a French Drain to remove contaminants in the groundwater. Through the modeling study, **SOMA designed a French Drain with the required dimensions, they are: 90 feet long by 6 feet wide by 20 feet deep. Details of the French Drain can be seen in Figure 5.**

Before beginning excavation, a private utility locator, along with Underground Alert System (UAS) utility locator will be contacted to conduct a subsurface survey of the area. If all clear, construction will require the existing asphalt pavement to be cut away to expose the soil. Excavating equipment will be used to remove the soil from the trench. Due to the strong possibility of the soil being contaminated, it will most likely have to be disposed of off-site at a permitted landfill. There is no room at the site to store the soil and aerate it, therefore, disposal of the removed material is the only option.

Excavation will be done to a depth of 20 feet, at which time a layer of geofabric will be placed in the drain. Approximately 1 foot of pea gravel will be placed in the bottom of the ditch before the French Drain Extraction Manifold is placed in the bottom. The remaining volume will be backfilled with more pea gravel to a depth of 2 feet bgs. At that depth, another layer of geofabric will be placed on the gravel and covered with 1.5 feet of clay material. The protruding manifold pipes will be cut down and placed into a protective box or casing. The top of the French Drain will be capped with reinforced concrete. This will be necessary to allow access to the back alley to both Tony's Express personnel and to neighboring businesses. Asphalt pavement will not be adequate to support repetitive loading without causing damage to the structure of the drain.

***Conducting Pilot Testing of Existing VES Wells:***

In order to properly design the VES and Air Sparging systems, SOMA will conduct VEX pilot testing at the Site. Testing will be performed on wells P-1 though P-4. The objective of the testing will be the evaluation of intrinsic permeability of the soil. Vapor flow modeling will be performed using the GAS-3D model developed by SOMA in order to evaluate the flow rate of air through the soil. The GAS-3D model will also assist in evaluating the mass removal rate of the contamination. The model will verify the number of VES wells and Air Sparging wells. Final design of the system size will follow the modeling, including blower and vacuum specifications.

Pilot testing will be done by using specialized equipment that will measure the vacuum drawn on surrounding wells when extracting from a nearby well.

***Installation of VES/Air Sparging Wells:***

Past work at the Site included the installation of four VES wells that were linked together in a manifold system. Further modeling by SOMA suggests that these extraction wells may not be sufficient in removing all contamination in the vadose zone. Pilot testing will answer those questions and allow for a more efficient system to be put in place, which will remove the trapped contamination with the best efficiency. If pilot testing of the existing VES wells indicates that the current plan to use four extraction wells (P-1 through P-4) and three air injection wells (MW-1, MW-2, and MW-3) is not sufficient, then plans may be modified to include extra injection or extraction wells. New injection and/or extraction wells will be installed on-site to assist in cleaning the soil of the estimated 2,265 pounds of TPH-g still trapped in the soil beneath the site (SOMA 1999).

Air Sparging and Vapor Extraction is required in order to remove the contamination trapped beneath the site. Excavation was eliminated as a possible option due to the difficulties of shoring up the existing structures and the length of time that the station would be shut down.

***Installation of the Remediation Systems:***

The results of SOMA (1999) groundwater flow and chemical transport modeling indicated that the plume of dissolved petroleum products has already migrated beyond the immediate vicinity of the Site and has reached residential areas. The beneficial use of shallow groundwater in on-site areas and immediately down gradient from the Site has already been impacted. A groundwater remediation system will be installed which consists of two major components. The first of which will be the Groundwater Remediation System intended to clean the groundwater and control the migration to the plume from going further off-site. The second part of the remediation system will be a Vapor Extraction/Air Sparging System to clean the soil and eliminate the source of contamination for the groundwater plume. Installation of the system will require connecting the existing VES wells together with new components.

The Groundwater Remediation System will be composed of the following major components which utilize the French Drain to draw the groundwater:

1) A pneumatic groundwater extraction pump located at the center riser of the French Drain;
2) Air compressor to power the pneumatic groundwater extraction pump;
3) 550 gallon temporary storage/equalization tank;
4) Level sensing probes for the storage tank;
5) Control panel for operating the system;
6) Two GAC tank units for filtering the contaminated groundwater;

Schematic details of the groundwater remediation system are shown in Figure 6.

Several pieces of equipment will be required for installing the VES/Air Sparging portion of the treatment system. The major components include:

1) Blower for injecting clean air into the soil through injection wells;
2) Vacuum for extracting air from the VES wells;
3) Carbon units for scrubbing out contaminated air before discharging to the atmosphere;

Schematic details of the Vapor Extraction System are shown in Figure 7.

Figure 8 shows additional detail of the Air Sparging system. This system will be designed to assist in cleaning the on-site soil by adding clean air to the ground. The VES will pull the clean air through the contaminated soil, transferring contamination from the soil to the clean air and removing it from the ground. The addition of air to the subsurface soils will increase the removal rate of the contamination from the soil, reducing the remediation time.

# FIGURES

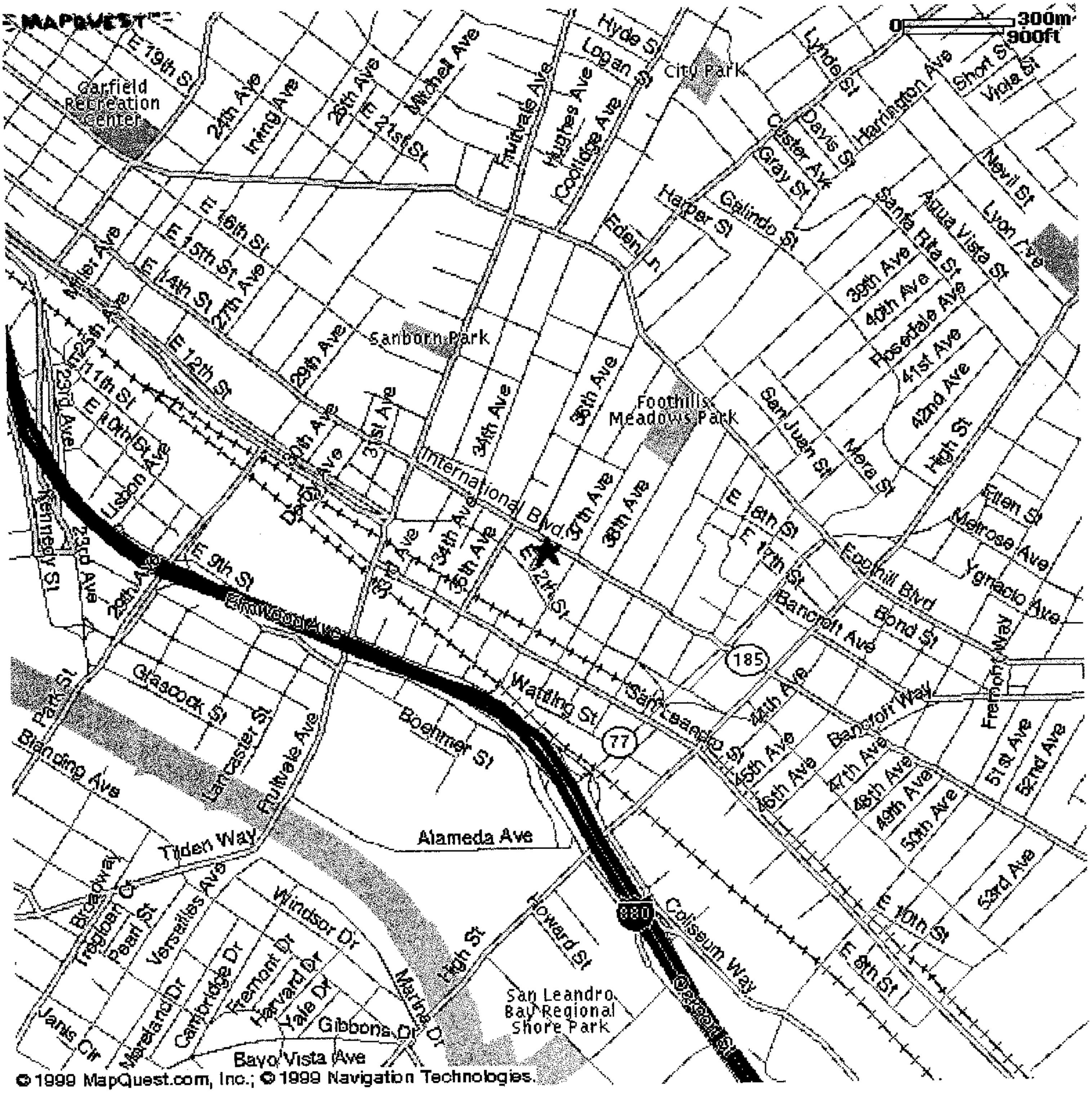


Figure 1: Site Location Map

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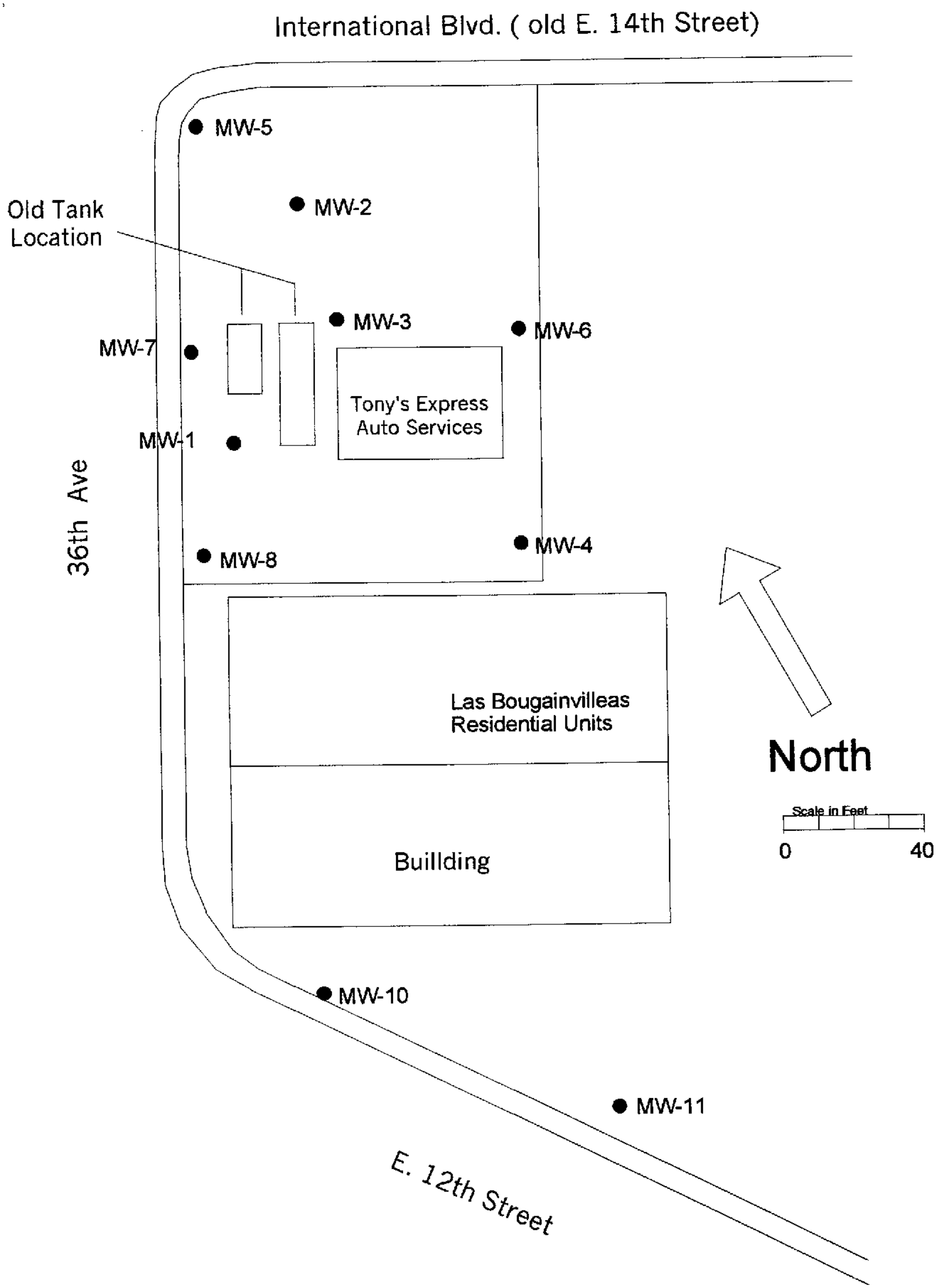


Figure 2: Location of Groundwater Monitoring Wells

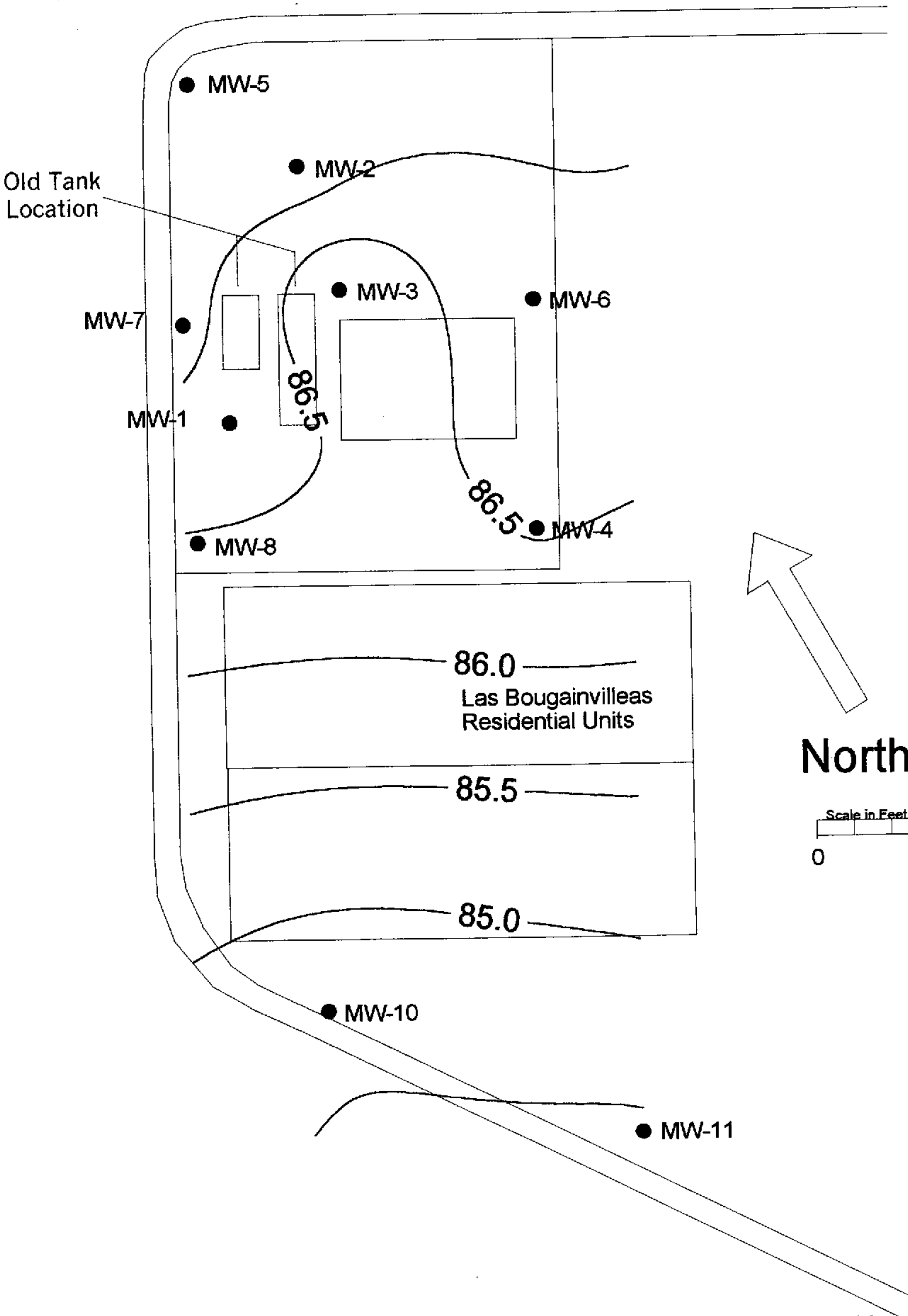


Figure 3: Groundwater Elevation Contour Map, June 10, 1999

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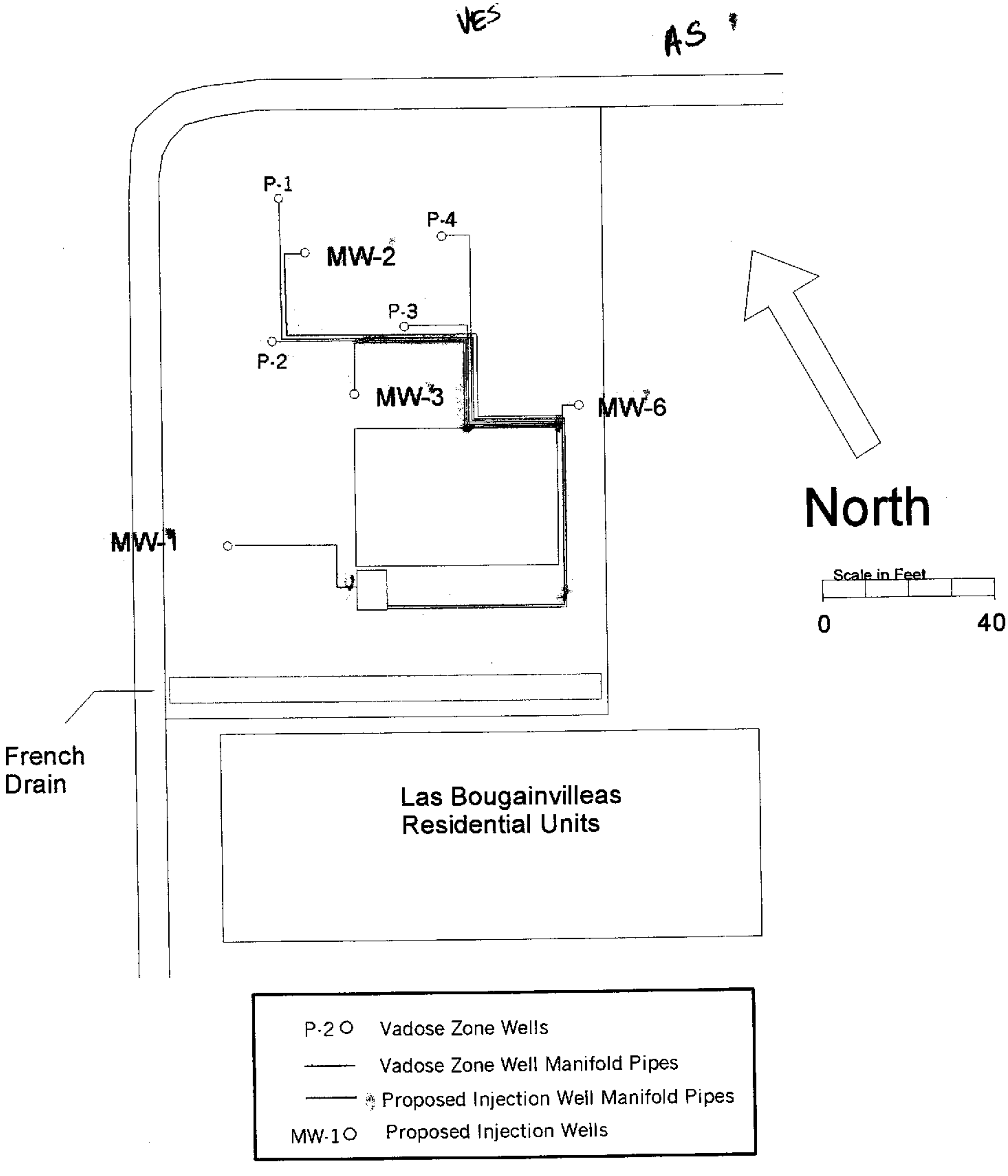


Figure 4: Location of French Drain and Existing Vadose Zone Wells

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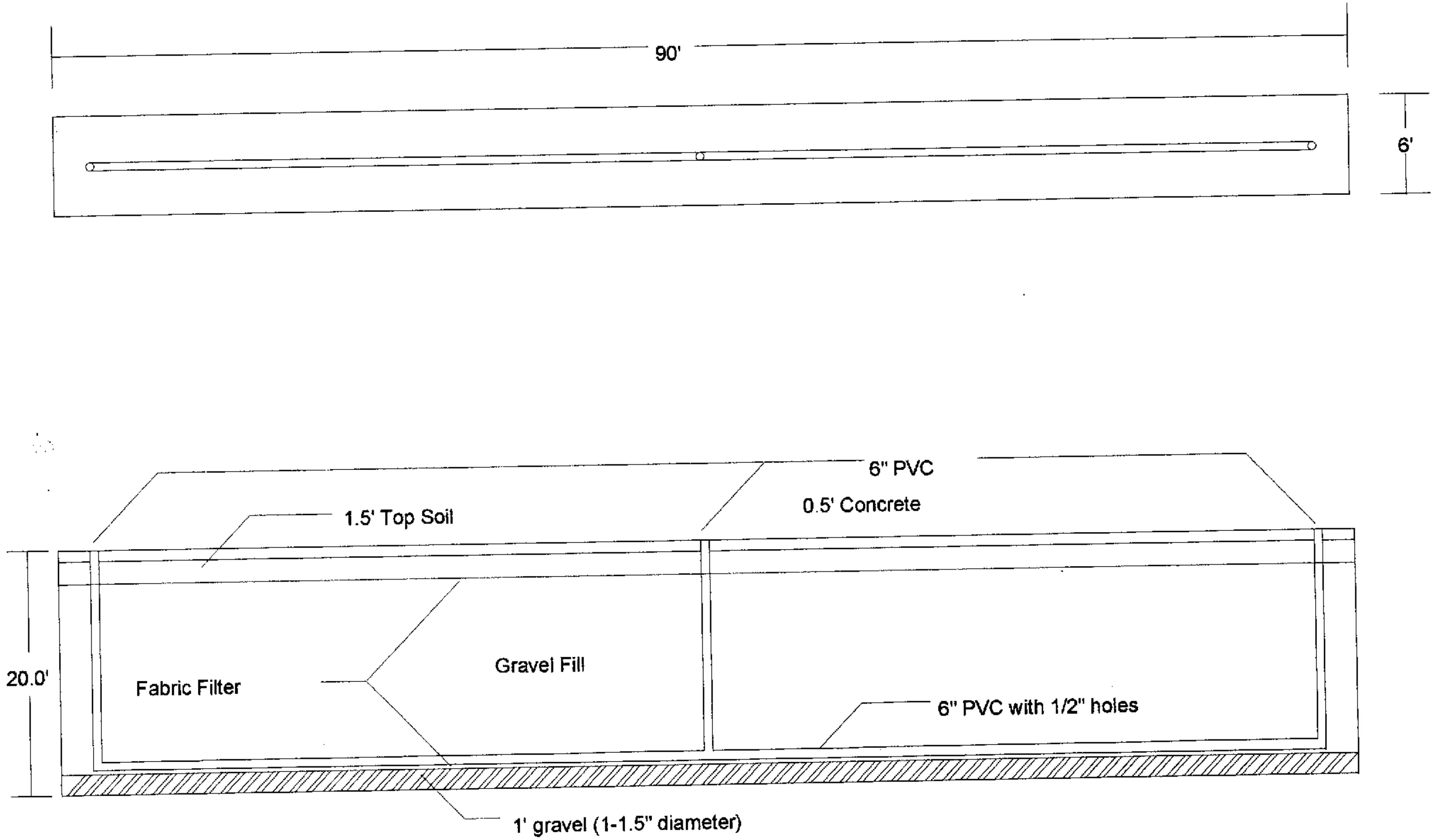


Figure 5: Details of the French Drain

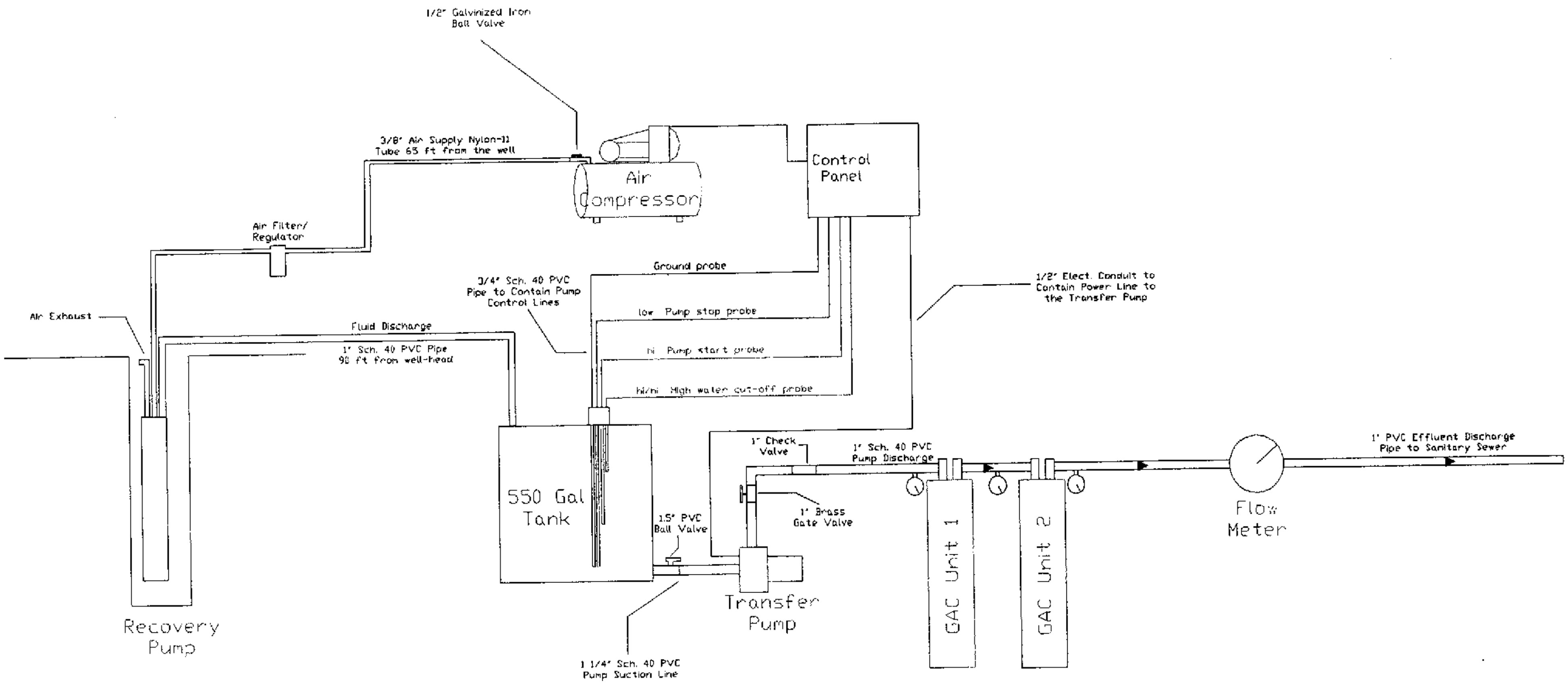


Figure 6: Schematic of the Groundwater Remediation System

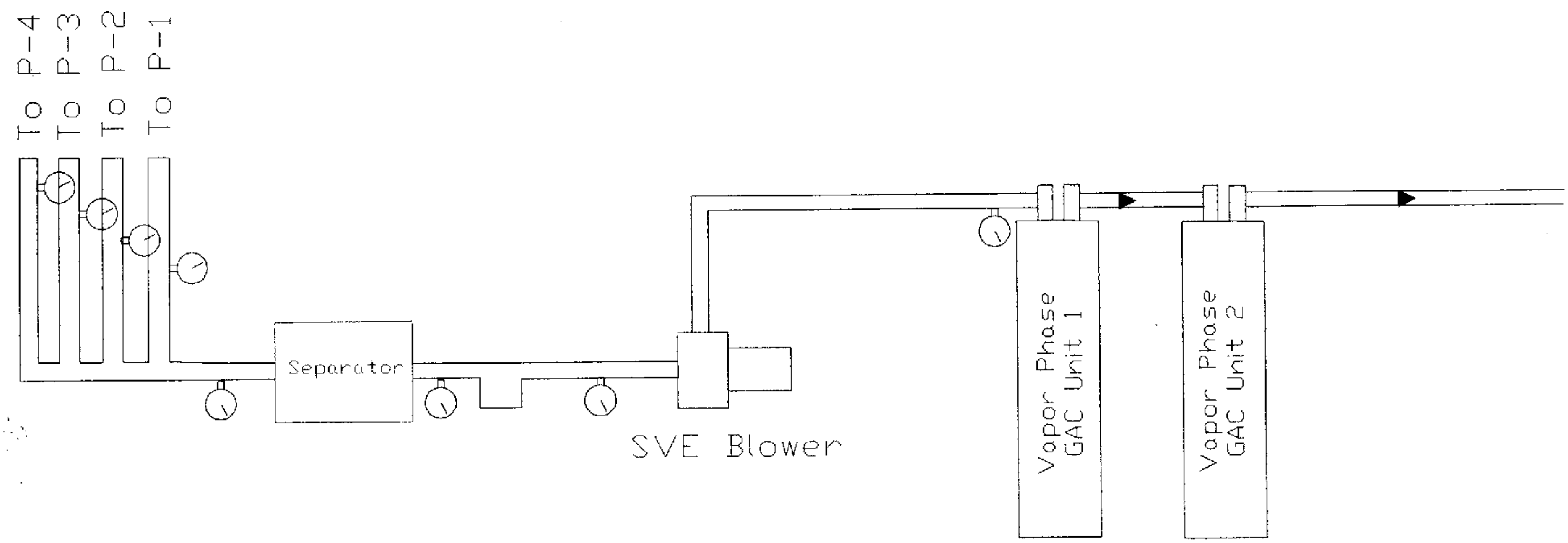


Figure 7: Schematic of the Vapor Extraction System

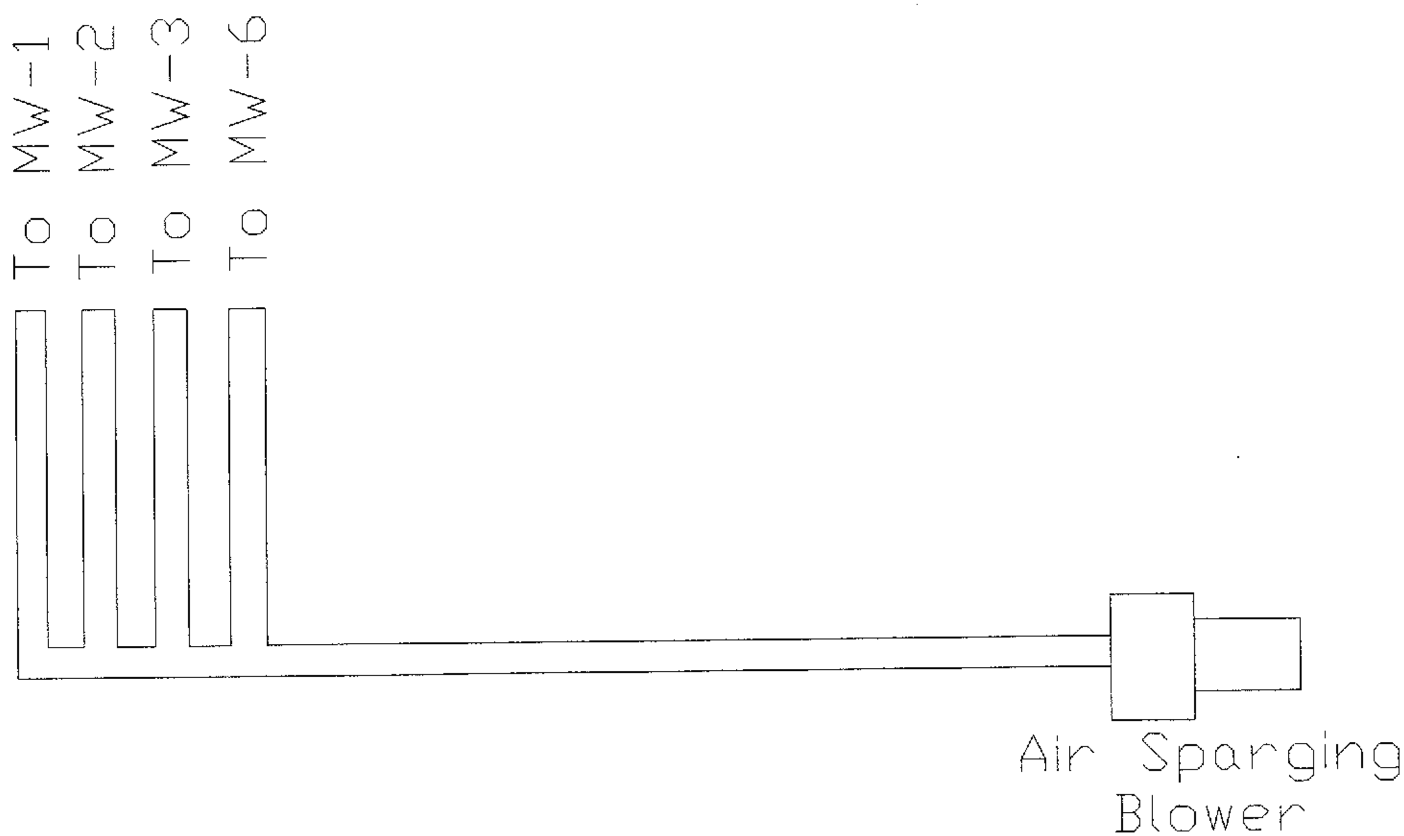


Figure 8: Schematic of the Air Sparging System