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#3737

October 14, 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 "Installation of French Drain & Groundwater Remediation System Details" at the subject site.

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

Sincerely,

Mansour Sepehr, Ph.D., P.E.
Principal Hydrogeologist

MS/jb

Enclosure

cc: Mr. Mark Owens
State Water Resources Control Board

Mr. Abolghassem Razi
Tony's Express Auto Service

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INSTALLATION OF FRENCH DRAIN & GROUNDWATER REMEDIATION SYSTEM DETAILS

Tony's Express Auto Service

Oakland, California

October 14, 1999

Project 99-2332

Prepared for

Tony's Express Auto Service
3609 International Blvd.
Oakland, California

Prepared by

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

TABLE OF CONTENTS

List of Figures

List of Appendices

1.0 INTRODUCTION

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Abolghassem Razi, the property owner. The site is located at 3609 International Boulevard Oakland, California (the "Site"), see Figure 1. This report documents installation of a French drain in late August and early September 1999.

The French drain installation in September 1999 was completed based on the recommendation of the Corrective Action Plan (CAP) document dated July 1, 1999 prepared by SOMA (SOMA July 1, 1999) followed by approval from the State Water Control Resource Board (SWCRB). Prior to preparation of the CAP, SOMA conducted groundwater flow modeling to test various groundwater extraction schemes for groundwater remediation. Based on the recommendation of the CAP, installation of the French drain for groundwater extraction purposes was the most cost effective and feasible solution for removal of petroleum hydrocarbon beneath the Site.

1.1 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 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.

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 similar sized 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.

In December 1997, Mr. Razi retained Western Geo-Engineers (WEGE) to conduct additional investigation and perform groundwater monitoring on a quarterly basis. The results of WEGE groundwater monitoring events indicated elevated levels of petroleum hydrocarbons and MTBE in groundwater. Since April 1999 Mr. Razi has retained SOMA to conduct additional Site investigation, groundwater monitoring and implementation of the corrective action at the Site

1.2 Site Hydrogeology

Based on the results of previous investigations, groundwater was encountered at depths ranging between 7 and 14 feet beneath the Site. Figure-2 shows the location of on-site and off-site groundwater monitoring wells. The historical static water level elevations measured at different monitoring wells have been reported in the previous groundwater-monitoring reports. The groundwater elevation contour map based on the recent water levels measured in the August 1999 monitoring event is presented in Figure-2. As shown in Figure-2, groundwater flows from the north to the south with an average gradient of 0.014 ft/ft. Based on the results of the pumping test conducted by SOMA, hydraulic conductivity of the saturated sediments ranges between 1.5 and 18.3 feet day. Assuming the effective porosity of saturated sediments to be 0.35, the groundwater flow velocity range between 22 feet and 267 feet per year.

1.3 Scope of Work

The scope of this report is to document the installation of the French drain in the alley located behind Tony's Express Auto Service and details of the groundwater remediation system.

2.0 FIELD ACTIVITIES

Field activities involved installation of a French drain and the subsequent removal of petroleum impacted soils from the property and construction of a groundwater remediation system. The following is a brief description of field activities conducted during late August and September 1999.

2.1 Installation of the French Drain

In August 1999, SOMA retained DJK Construction (DJK) as a subcontractor to install the French Drain. On August 30, 1999 using an excavator equipped with a 3-foot wide bucket, DJK initiated removing the asphalt pavement for construction of the French drain. Figure-3 shows the location of the French drain. Near the surface, the soil type was light brown clay with no apparent staining or hydrocarbon odor. Below the 10-feet, the soil had some visible staining and a strong hydrocarbon odor was evident indicating a possible petroleum hydrocarbon contamination. The petroleum odor intensified as the depth of the excavation increased. Small sandy clay pockets existed below 12 feet and groundwater was encountered at approximately 16 feet below the ground surface.

The excavated soils to a depth of 10 feet were transported to a local landfill and disposed of as non-contaminated material. Below 10 feet, the soil was shipped to the Altamont landfill which is permitted to accept petroleum contaminated soils.

The dimensions of the French drain are 3 to 4-feet wide, 75-feet long and 20 to 21-feet deep, see Figure-4. The center riser of the drain was about 1 foot deeper than the ends. The variation in depth was to allow water to flow to the center riser, which will be as an extraction point for the groundwater remediation system.

During the excavation procedure, several silty-sand pockets were encountered at the east end of the ditch where the excavation began. As the trench was exposed to a depth of 20 feet, the sandy layers began to flake off the sides of the trench. The soil flaking began to increase as preparations were being made to install the first riser. Excess material was removed to lower the bottom of the trench elevation again, due to the flaking material. By the time the riser was set in place, several cubic yards of material had flaked off and had to be removed. Nearby asphalt was also affected by the small cave-ins. Cracks became visible that required more asphalt than expected when the trench was re-paved.

After the riser was set, backfilling began. The cave-ins continued until the backfill material had reached a stable depth in the trench. The original plan was to expose the entire ditch before setting the risers and backfilling, but due to the sandy pockets of soil, the methods for excavation had to be changed in the field. The new plan was to excavate in three smaller sections. This required that barricades be set near the end of each section to support the pea gravel backfill material. As each section of the trench was exposed, the barricade from the previous section was removed, allowing the pea gravel to flow down into the newly exposed trench. Some excavation was still required to bring the trench to the designed 20-foot depth. During the excavation process, some of the backfill material (pea gravel) had to be wasted. This allowed for a smooth transition between sections and allowed the total depth to remain constant at 20 to 21 feet below the ground surface. Following the excavation of each section, the barricade was set near the end of the open excavation and more backfill was placed to bring the entire trench up to a stable depth. This continued for the entire length of the trench and prevented further cave-ins or flakes from occurring. Out of scope work was conducted by DJK, due to the numerous obstacles that were encountered during the excavation.

After excavating each section of the trench, the bottom was filled with pea gravel to an approximate thickness of one foot. For each section a 6-inch diameter perforated PVC with T-sections, 25 feet in length, were lowered inside the trench over the pea gravel. The PVC risers were perforated from the bottom up to 10 feet below the ground surface and wrapped in filter fabric material to prevent the introduction of sediment inside the pipe. After placement, the three PVC risers connected to the T-sections were extended 4 feet above the ground level. Later on, the extended PVC risers were cut down to ground level and encased with a groundwater monitoring well Christy box. Figure-5 shows the details of a typical T-section.

The trench was backfilled with pea gravel to about 2-feet below the ground surface. Another layer of fabric was placed over the top of the pea gravel at that level. The top two feet of the trench was backfilled with base rock to serve as a more stable pad for replacement of the asphalt pavement. The filter fabric at 2 feet was designed to prevent the migration of the base rock downwards into the pea gravel fill material. The French drain installation was completed on September 3, 1998 when the asphalt was re-applied over the excavated sections.

On September 3, the groundwater was visible at a depth of about 14 feet in the trench. During excavation, it was estimated that the groundwater occurred at a depth of about 16 feet.

2.2 Installation of the Groundwater Remediation System

After the installation of the French drain, work began on the groundwater remediation system. Figure-6 illustrates the details of the installed system. The purpose of the groundwater remediation system is to remove all traces of petroleum hydrocarbons from the groundwater that is extracted from the trench. The system is also designed to prevent the continued off-site migration of petroleum hydrocarbon components. The system is composed of the following components:

2.2.1 Pneumatic Groundwater Pump:

The groundwater pump uses compressed air from a compressor to extract water from the center riser of the trench. Discharge from the pump is channeled under the asphalt to the storage tank. The pump can deliver contaminated groundwater to the system at a maximum rate of 25 gallons per minute (gpm). Tubing was also put in place inside the western riser during construction of the French drain to allow expansion of the system if required in the future.

2.2.2 Storage Tank:

Water from the groundwater pump discharges into a 200-gallon storage tank. The purpose of the tank is to provide equalization and maintain a more consistent flow to the granular activated carbon units. The tank also serves as a control point for the level sensors.

2.2.3 Transfer Pump:

The pump delivers water from the storage tank to the granular activated carbon units. The transfer pump can handle a maximum of 30 gpm. It was sized to allow for future expansion of the groundwater remediation system if another groundwater pump is placed inside the west riser.

2.2.4 Granular Activated Carbon Units (GAC):

The GAC units scrub out petroleum impurities from the groundwater. The system comprised of two carbon vessels. The first carbon vessel serves as a primary cleaning unit and the second unit provides a level of safety by acting as a purifier. Each unit is capable of providing a clean discharge independently. The units hold 150 pounds of activated carbon and can hold 41 gallons of water under pressure. Together the maximum treatment rate is 10 gallons per minute. Future expansion of the system would call for larger GAC units to be installed.

2.2.5 Flow Meter:

The flow meter measures the amount of groundwater leaving the second unit of the GAC system to the nearest 1/10 gallon. The mechanical unit tracks the total volume treated, handling up to 30 gpm accurately.

2.2.6 Sampling Valves:

Sampling valves were located along the pipes delivering groundwater to the GAC units. The first sampling point was located prior to contaminated groundwater entering the first unit of the GAC system. This will be used as a baseline to identify the contamination concentrations entering the system. A second sampling point is located between the first and second unit of the GAC system. This will be the primary sample point to assist in determining when breakthrough occurs in the first stage unit. After breakthrough, the first stage will be changed to provide the proper safety factor of the second stage. The final sampling point was installed after the second stage. This will be used once breakthrough is seen in the first stage, to verify that the system is not violating the discharge parameters of its permit.

2.2.7 Discharge Point:

After the treated groundwater leaving the GAC units and being metered, it will be discharged through the existing wastewater plumbing located near the bathroom facilities of the existing structure.

2.2.8 Air Compressor:

A 2 horsepower air compressor with a 30-gallon horizontal tank is used to power the groundwater pneumatic pump. A pressure regulator controls the maximum pressure inside the air compressor at 120 psi.

2.2.9 Air Filter:

The air filter controls the airflow from the compressor to the pneumatic pump and scrubs out moisture. A dial on the air filter allows the system operator to adjust the pressure of air supplied to the pneumatic pump. Changes in the supplied air pressure controls the discharge rate from the French drain.

2.2.10 Control Panel:

The control panel links together all of the electrical components of the system and controls their activation. The level control sensors activate and shut off the air compressor and transfer pump via the control panel. The control panel also serves as a circuit breaker for the air compressor and transfer pump.

2.2.11 Level Control Sensors:

Four probes extend from the top of the storage tank to different levels within the tank. Two probes extend to the bottom of the tank. Together they make up the baseline sensor and the low-level sensor. When the water is near the bottom of the tank, the air compressor is activated, but the transfer pump is in a standby mode. At the mid-point in the tank, there is a high level sensor. When the water level reaches this point, the transfer pump is turned on and the air compressor continues to operate as normal. At ¾ full, the final sensor is the high/high alarm. This probe switches the air compressor to standby mode and continues to operate the transfer pump.

The treatment system has been sized to allow for future expansions, if allowable by site conditions. If the French drain is capable of delivering groundwater to the treatment system at a rate above those predicted, then it may be possible to expand the system by adding another pneumatic groundwater pump to the west riser. Additional pumps beyond the possible west riser pump are not expected to be necessary or possible due to fined-grained nature and low hydraulic conductivity of the saturated sediments at the Site. Decisions on system expansion will be made after reviewing the operational parameters of the system.

The groundwater treatment system was completed in early October 1999.

Influent and effluent groundwater samples were collected as the permit acquisition process from East Bay Municipal Utility District (EBMUD). The discharge permit is currently pending approval. The system is fully operational, but awaits final approval of the operation permit before it can begin full operation. Performance updates on the system will follow as required in the discharge permit from EBMUD.

3.0 REFERENCES

SOMA Environmental Engineering, Inc., June 21, 1999 "Further Site Characterization and Conducting Risk Based Corrective Action at Tony's Express Auto Services Site, 3609 International Boulevard, Oakland, California"

SOMA Environmental Engineering, Inc., July 1, 1999 "Corrective Action Plan, Tony's Express Auto Services Site, 3609 International Boulevard, Oakland, California"

FIGURES

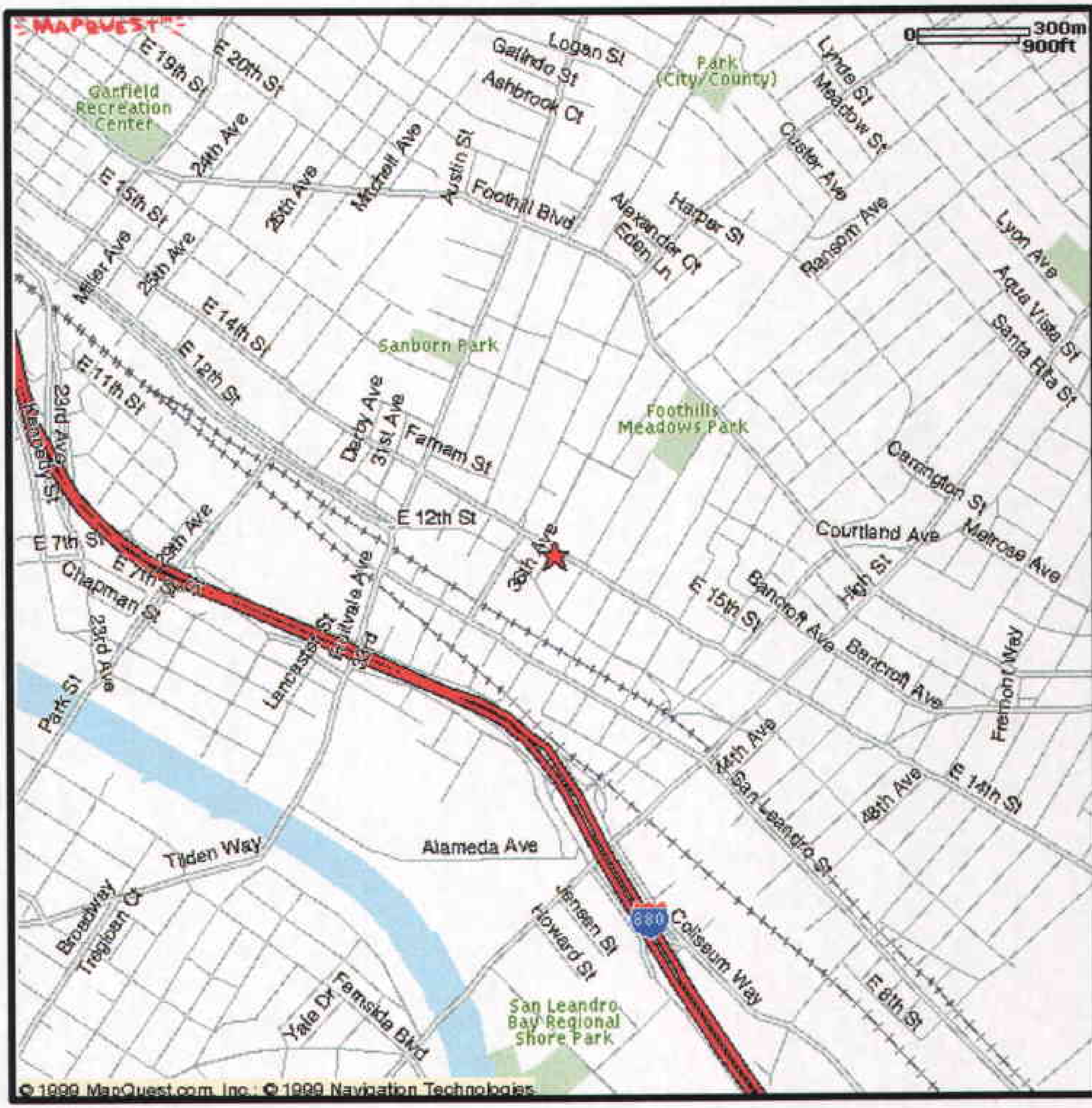

Figure 1: Site Location Map

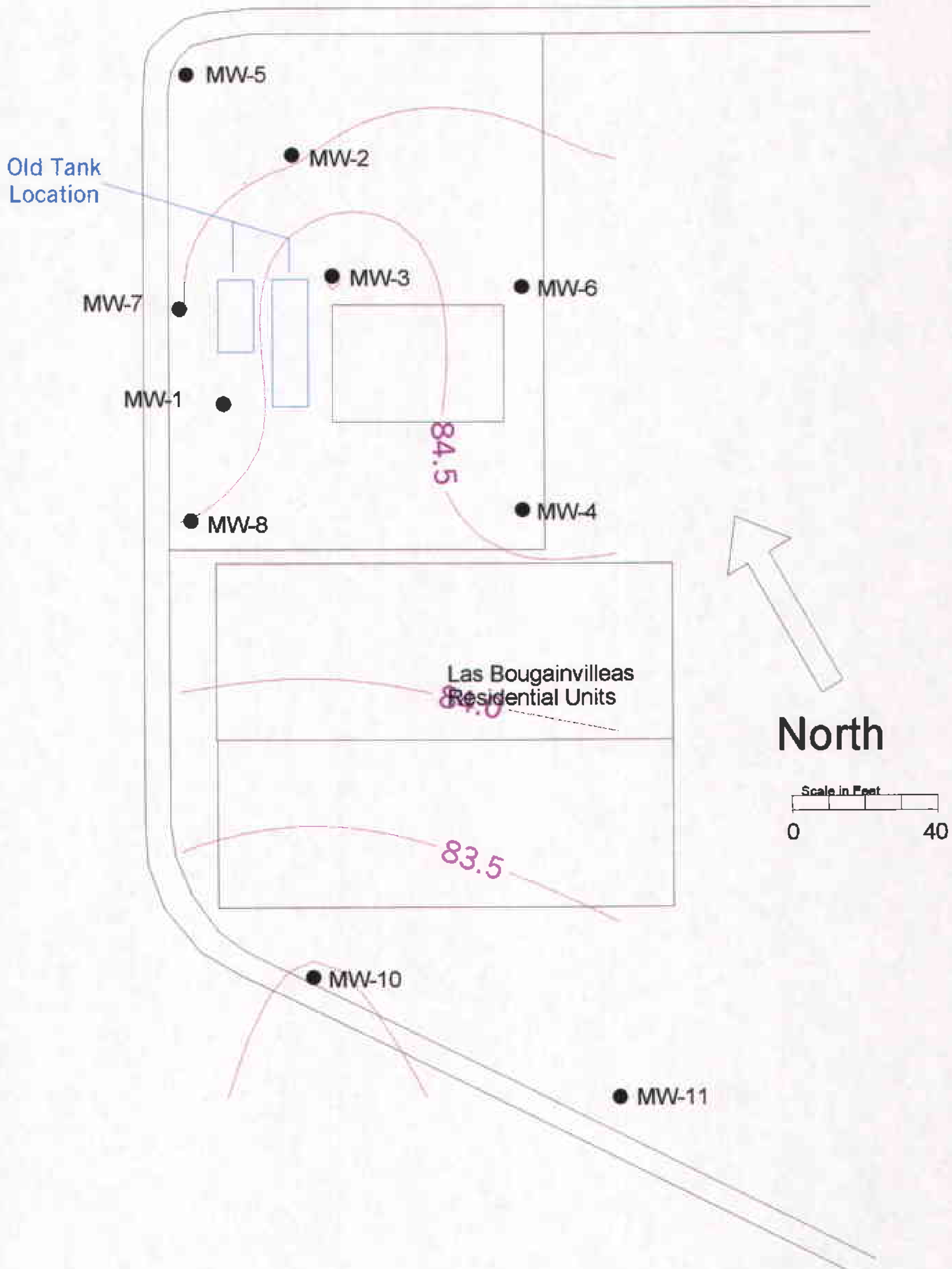

Figure 2: Groundwater Elevation Contour Map, August 23, 1999

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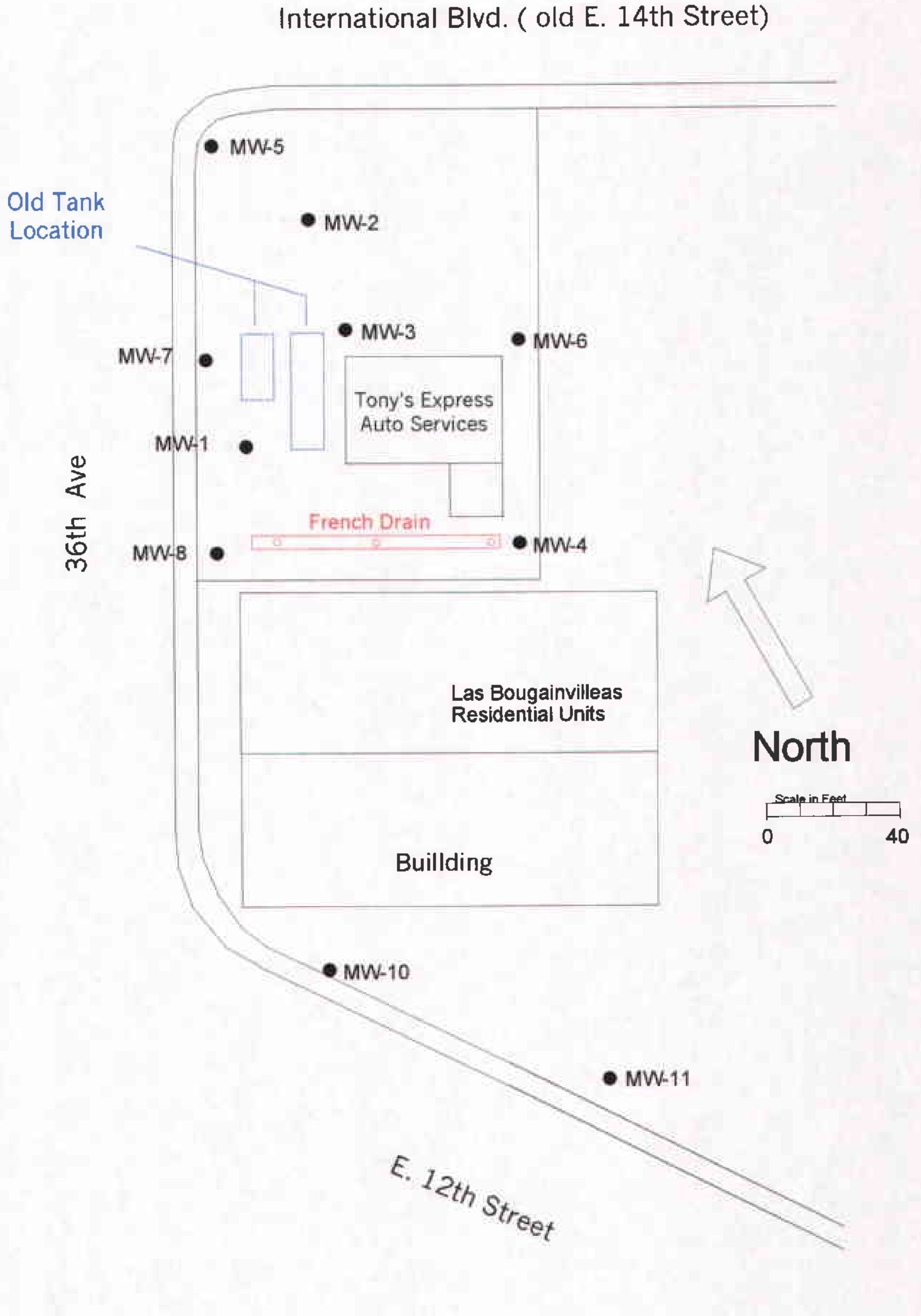

Figure 3: Site Map Showing Existing Well Locations and French Drain

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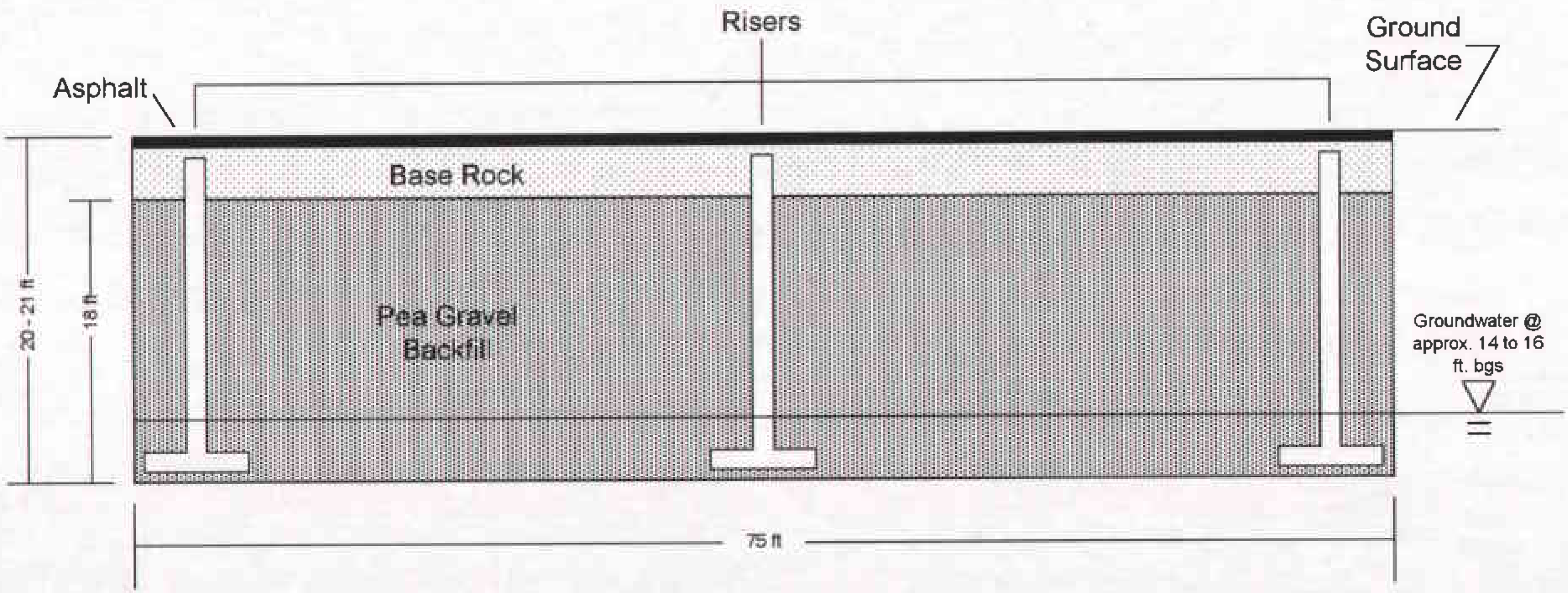

Figure 4: French Drain Details

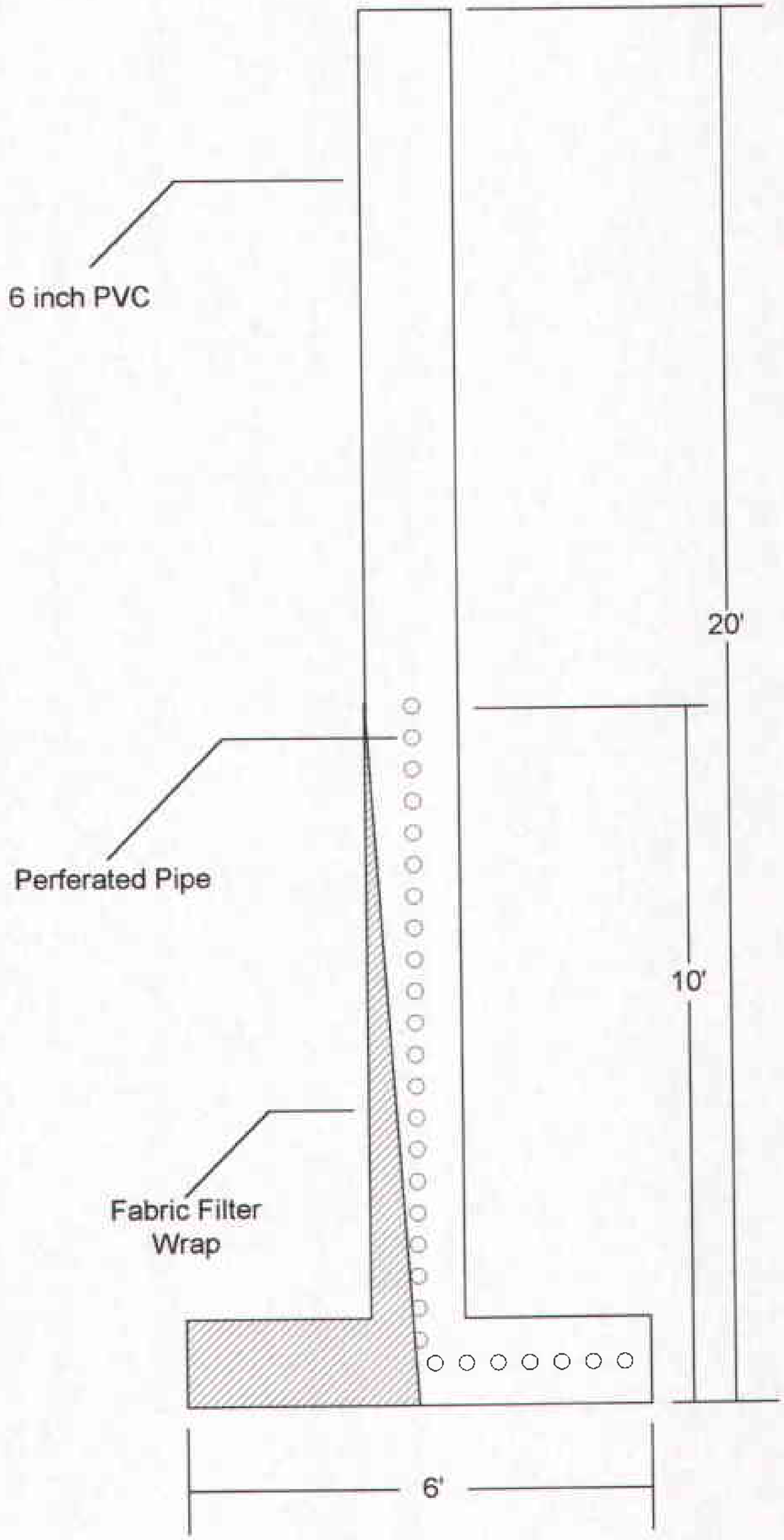

Figure 5: Details of Typical T-Section

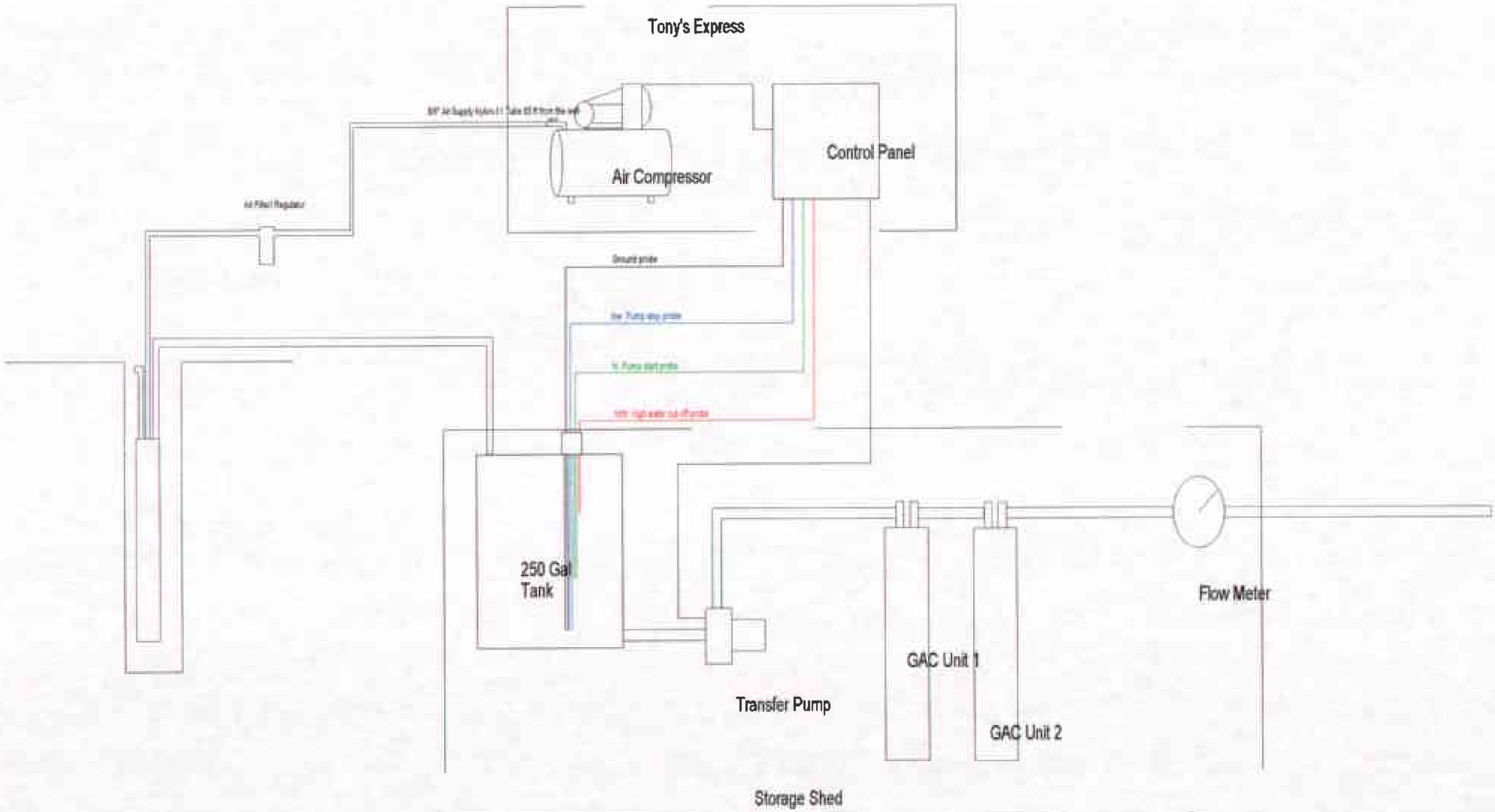

Figure 6: Groundwater Remediation System Details

APPENDIX A

Photographs During Installation of French Drain and Soil Excavation Activities

A-1: Begining French Drain Excavation

A-2: Side Wall Cave-In

A-3: Constructing a Riser

Appendix A: Photographs During Installation of French Drain & Soil Excavation Activities

A-4: Filter Fabric Wrapped Over Riser

A-5: Excavating Soil After Cave-In

A-6: East Riser Being Set

A-7: Backfilling East End with Pea Gravel

Appendix A: Photographs During Installation of French Drain & Soil Excavation Activities

A-8: Cave-In at the East End

A-9: Excavating Towards the Center

A-10: Setting the Trench Shoring

A-11: Backfilling French Drain at the Center Riser

Appendix A: Photographs During Installation of French Drain & Soil Excavation Activities

A-12: Pumping Water from the Excavation

A-13: Begining Backfill at the West End

A-14: Pea Gravel Backfill from West to East

A-15: Leveling the Backfill 2 Feet Below the Surface

Appendix A: Photographs During Installation of French Drain & Soil Excavation Activities

A-16: Filter Fabric On Top of Backfill


A-17: Compacting Base Rock Prior to Paving