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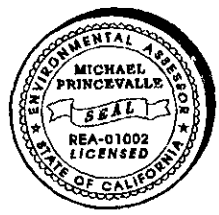
PROPOSAL FOR SOIL VENTING SYSTEM

1700 Park Street
Alameda, California

MANAGEMENT AND CONSULTING



California Registered Environmental Assessors
California Certified Engineering Geologist
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Oregon Registered UST Soil Cleanup Supervisors

"An Environmental Management Company"

PROPOSAL FOR SOIL VENTING SYSTEM

Request for Authority
to Construct a
Soil Venting System
Permit to Operate

Cavanaugh Motors Facility
1700 Park Street
Alameda, California

Project Number 109001
May 15, 1992

prepared for

Mr. Dave Cavanaugh
Cavanaugh Motors
1700 Park Street
Alameda, California 94501

prepared by

TMC Environmental Inc.
13908 San Pablo Avenue, Suite 101
San Pablo, California 94806

TABLE OF CONTENTS

1700 Park Street, Alameda California

TABLES

CHARTS

PLATES

PROPOSAL FOR SOIL VENTING SYSTEM

1700 Park Street, Alameda California

1.0 GENERAL SITE INFORMATION

1.1 SITE LOCATION

The subject property, called the site in this workplan, is located at the following address and description:

1700 Park Street, Alameda, California 94501
Alameda County
Appraisers parcel number: APN 70-192-21-1 and 24
Lots 1, 2, 3, portion of 4, 7 Block E of Alameda
Station Homestead Tract (Book 17 page 60)

The site is at the northeast corner of the intersection of Park Street and Buena Vista Avenue. The corner lot is approximately 150 feet by 200 feet.

1.2 PROPERTY OWNER

The current property owner is:

Mr. Dave Cavanaugh
1700 Park Street
Alameda, California 94501

Mr. Cavanaugh is the owner contact. He can be reached at (510) 523-5246.

1.3 CONSULTANT OF RECORD

The consultant of record for this project is:

TMC Environmental Inc. (TMC)
13908 San Pablo Avenue, Suite 101
San Pablo, California 94806

The contact for TMC is Mr. Tom Edwards, president or Mark Youngkin, vice president. Mr. Edwards or Mr. Youngkin can be reached at 510-232-8366.

1.4 SITE CONDITION

The site has been used for an automobile dealership. The site is in a mixed commercial, retail, and residential neighborhood. Current activities on site include: a new car showroom, sales offices, parts storage and distribution, outside car storage, and vehicle repair shop with hydraulic hoists. Pedestrian and vehicle traffic is heavy in this neighborhood and site. The site contains a large building with paved parking areas and driveways.

Access to the dealership is from both Park Street that borders the property on the northwest and Buena Vista Avenue that borders the property on the southwest. A gasoline station and automobile dealers occur across Park Street to the north. An automotive repair shop and machine tool shop bounds the site on the east. A residential neighborhood bounds the site on the south. Island High School, a part of the Alameda Unified School District, is located one block to the east of the site on Eagle Avenue.

1.5 LEAD IMPLEMENTING AGENCY

As stated in a letter to Mr. Dave Cavanaugh dated January 31, 1990 from the Alameda County Health Care Services Agency; the lead implementing agency authorized by the Regional Water Quality Control Board to oversee this site is the:

Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials
80 Swan Way, Room 200
Oakland, California 94621

The officer overseeing this case is:

Ms. Juliet Chin, Hazardous Materials Specialist

Inquiries regarding this case should be referred to Ms. Chin at 510-271-4320.

2.0 CONTAMINATION INFORMATION

2.1 550 GALLON GASOLINE TANK

The automotive dealership recorded daily inventory records from 1948 until August 10, 1989 when the gasoline tank retired from service. A certified underground tank testing company tested the tank gasoline tank in August 1986, June 1988, and August 1989. The August 4, 1989 tank testing indicated the filler tube was leaking. No estimate of product loss is available. The period of product loss is less than one year, between tank testing episodes. The tank, dispenser, and piping was reported in good condition with no holes when removed on December 15, 1989 by the Scott Corporation. Approximately 10-15 cubic yards of soil was excavated during the tank removal.

TMC removed most of the accessible gasoline contaminated soil surrounding the former location of the underground tank in a controlled excavation on April 26, 1990.

TMC aerated the excavated soil on site, then disposed of the treated soil at Durham Landfill. The adjacent building prevented the complete excavation of the gasoline contaminated soil. Soil borings estimated the remaining extent of soil contamination. TMC installed and sampled four ground water monitoring wells. The excavated soil was aerated on site until no detectable results were obtained. TMC reported the results of the 550 gallon gasoline tank investigation in a report dated July 11, 1990, titled "Preliminary Assessment Report" submitted to Cavanaugh Motors.

The following tables summarize the results of soil and water sampling and analyses:

GASOLINE TEST RESULTS FOR SOIL BORING SAMPLES
Summary of Laboratory Test Results for Soil Samples

Date Sampled	*Sample & depth*	*TPH gas mg/Kg*	*Benzene mg/kg*	*Toluene mg/kg*	*Ethyl benzene mg/Kg*	*Xylenes mg/Kg*
4-26-90	SOUTH-1	ND < 0.5	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
4-26-90	WEST-1	ND < 0.5	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-19-90	EB-1.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-19-90	EB-2.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-19-90	EB-3.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-19-90	EB-4.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	0.034
5-17-90	MW-1.5'	3,500	ND < 0.005	190	76	510
5-17-90	MW-2.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-17-90	MW-3.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	ND < 0.005
5-17-90	MW-4.5'	ND < 1.0	ND < 0.005	ND < 0.005	ND < 0.005	0.034

ND- Not detected below reporting limits

2.2 WASTE OIL TANK

A waste oil tank was also removed from the property. A separate investigation is in progress at the waste oil tank. The soil venting system does not concern the waste oil tank or investigation. A stockpile of soil excavated from former waste oil tank excavation exists on site. The pile is covered and volatile emissions are nondetectable at the surface of the pile with an organic vapor analyzer.

2.3 SOIL CONTAMINATION

The excavation of accessible contaminated soil was performed at the underground gasoline tank location. A large portion of the soil contamination was removed. The soil from the excavation was aerated on site until no detectable sampling results were obtained. The soil was disposed at a local Class III landfill. An area of gasoline contaminated soil remains under the foundation wall adjacent to the former gasoline tank location. The gasoline is in clayey sand soil within the capillary fringe zone above the groundwater interface.

Soil borings and laboratory analysis have defined the zero line of the remaining gasoline contamination. Concentrations of gasoline within the soil venting area are estimated at less than 3,500 ppm. The area of remaining gasoline contamination is small in area at less than 700 square feet. The gasoline is contained in native clayey sand at a depth of five to seven feet below grade. The estimated total volume of gasoline contaminated sand is 1400 cubic feet. Using an average concentration of 3500 ppm, a maximum quantity of 490 pounds or 82 gallons of gasoline is indicated.

3.0 PROPOSED WORK AND SCHEDULE

3.1 OBJECTIVES AND PURPOSE

Cavanaugh Motors is requesting the authority to construct and a permit to operate a soil venting system at the Cavanaugh Motors facility at 1700 Park Street in Alameda, California, herein called the site. The soil venting was required by the Alameda

County Health Care Services Agency in a letter dated January 29, 1992, to Cavanaugh Motors. The tasks presented agree with the recent guidelines published by the enforcing agency, the Alameda County Health Care Services Agency located in Oakland, California, and the chief state agency, the Bay Area Regional Water Quality Control Board located in Oakland, California.

The objective of this soil venting is to significantly reduce the lateral and vertical extent of gasoline contamination in the soils beneath the building foundation and groundwater interface zone. Further excavation of the gasoline contamination is limited by the building foundation. Because the groundwater is seven feet deep, the remaining gasoline contamination is required to be removed by the lead implementing agency.

The conditions at the site are suitable for a soil venting system. The volatile gasoline contamination is in a shallow clayey sand surrounded by clean sand soils. Soil venting is a simple technology that produces rapid and significant reductions in gasoline concentrations.

3.2 SCOPE OF WORK

The scope of work for the soil venting includes the following tasks:

1) the permitting of the system through the Bay Area Air Quality Management District

2) the installation and operation of a soil venting system

3) the monitoring of the system using a FID organic vapor analyzer

4) the drilling of four confirmation borings at the conclusion of vapor extraction

5) the laboratory testing of soil samples for TVH as gasoline with BTEX

6) the reporting of the results in a technical report to the lead implementing agency

3.3 SCHEDULE OF WORK

System permitting can normally commence 3 working days after your authorization requiring up to 16 weeks for agency permit review. The final report will be available when all relevant documentation has been received in our office. Quarterly progress reports will be provided to the lead agency.

TMC Environmental Inc. personnel are available to begin work upon receipt of authorization to proceed from the Client and the Bay Area Air Quality Control Board. A reasonable schedule for accomplishing the investigation described above is as follows:

TASK	DURATION IN WEEKS
Authorization to Proceed	1
Agency Permitting	5-12
Mobilize for Construction	8
Conduct Vapor Extraction	12
Verification Borings	2

The total time to perform the tasks is estimated at less than 24 weeks. TMC Environmental Inc. is confident that we can complete this project in an efficient and cost effective manner.

4.0 SOIL VENTING SYSTEM

4.1 RATIONAL FOR SOIL VAPOR EXTRACTION

Gasoline contaminated soil with a concentration of less than 3500 mg/Kg remains in the native soil surrounding the excavation of a former gasoline storage tank at a depth of 5 to 7 feet. We estimate about 1400 cubic feet of gasoline contaminated soil, above 100 mg/Kg total petroleum hydrocarbons as gasoline, could still exist in the ground. Sandy soils are present to a depth of at least 15 feet below grade. The ground water surface is about 7 to 8 feet below grade. The gasoline is in a clayey sand layer from 5 to 7 feet below grade at the groundwater interface. The clayey sand is overlain by clean sand. The small areal extent of volatile contamination and sandy soil conditions favor the vapor extraction method of remediation. A small amount of residual gasoline is expected to remain in the clayey sand.

Cavanaugh Motors proposes to install a soil venting system to reduce the in situ level of gasoline vapor in soil surrounding the former location of the 1000 gallon underground gasoline storage tank. By withdrawing vapor from the contaminated soil with a soil venting boring and blower, gasoline hydrocarbons are volatilized into the air stream. Providing a continual flow through the soil can reduce volatile hydrocarbon concentrations significantly. Chart 1, Soil Venting System Operation, shows the results of a similar case using the same soil venting system design, that was operated during February to March, 1992. Significant and rapid extraction of hydrocarbon vapors occurs with the soil venting system.

The extracted vapor is captured in activated carbon vessels. The carbon vessels are recycled commercially. Minimal hydrocarbon vapors, less than 10 ppm, are released into the atmosphere, and only on an intermittent basis. The soil venting system appears to be the best remediation choice for this site and residential neighborhood.

4.2 SOIL CLEAN UP GOALS

We estimate that the maximum gasoline concentration remaining in the soil is 3500 ppm as indicated by laboratory testing. Almost complete volatilization of the gasoline

in the clean sand soil is expected. Most of the gasoline is present in the clayey sand from 5-7 feet below grade. The clayey sand may not completely release all gasoline during vapor extraction. The objective is to reduce soil gasoline concentrations by vapor extraction to the following residual concentrations:

Total Volatile Hydrocarbons (TVH) as Gasoline- 50 mg/Kg
Benzene- 10 mg/Kg
Toluene- 10 mg/Kg
Ethylbenzene- 10 mg/Kg
Total Xylenes- 10 mg/Kg

The cleanup goal for TVH as gasoline represents more than a 98 percent reduction in concentration. These clean up goals would be verified by final soil boring and laboratory analysis.

4.3 SOIL VENTING SYSTEM DESIGN

Soil gasoline concentrations will be reduced using a conventional soil venting system. The carbon canister based system is designed to limit emissions to less than 10 ppm total hydrocarbons as measured with a FID organic vapor analyzer. Four soil venting borings have been installed surrounding the remaining area of soil gasoline contamination. A fifth soil venting well will be installed at the former tank location. The location of the borings are displayed on Plate 3, Soil Venting Plan. The maximum extent of possible soil gasoline contamination, as determined by soil borings, is also shown on this plate.

The central soil venting boring will be used to extract vapor from the soil. In the sand soil conditions, we expect one vapor well to produce a radius of influence sufficient to remediate the area of gasoline contamination. The surrounding four borings will be used to monitor the radius of influence of the vapor extraction through the use of vacuum gauges. The surrounding borings will be used for vapor extraction if the radius of influence is determined to be too small to cover the entire area of contamination.

The soil borings were constructed using the same stringent sealing guidelines as for ground water monitoring wells. The eight inch boring contains 2 feet of blank 2 inch PVC casing and 5 feet of 2 inch screen with a 0.020 slot and 2/16 sand. The vapor boring is screened from 2 to 7 feet below grade. A sand pack was placed from a depth of 3 to 7 feet. One and ½ foot of bentonite pellet seal was placed on top of the sand. One and ½ feet of neat portland cement surface seal was placed on top of the bentonite.

A schematic of the system is shown in Plate 3, Soil Venting Plan. The soil venting system is equipped with a Rotron blower capable of extracting vapors at a rate of 100 cubic feet per minute (cfm). The unit is completely enclosed to protect it against adverse weather conditions. Extracted vapors are channelled through the blower to two vapor phase carbon canisters joined in series. The vapor phase canisters will be used to meet Bay Area Air Quality Management District less than 10 ppm total hydrocarbon release requirements. The manufacturer and model of carbon canister is indicated on the authority to construct application and attached technical information provided by the canister manufacturer.

The motor and electrical equipment is explosion proof and meets all local and national electrical codes. Located just before the in-line filter is a water trap, which will remove condensate water before the air stream enters the blower. The water trap also contains a static vacuum gauge which can be used to determine the system flow rate. To ensure the blower is not impeded, the intake line also has a bleed-in/bleed-off valve which can be opened and closed to fine-tune the system's performance. Vapors drawn from the well will be channelled to the security fenced blower-carbon canister unit located adjacent to the new repair shop wall.

Three monitoring ports along the air stream of the system will be used to determine when the carbon canisters need to be replaced and when the unit should be shut down permanently. The monitoring port located before the carbon canisters will be used to determine the concentration of hydrocarbon vapors being extracted from the ground. The monitoring port located between the canisters will be used to monitor the condition of the first carbon canister. The monitoring port located at the system's effluent will be used to monitor the effluent vapor concentration and last carbon canister condition.

Minimum flow rates for vapor extraction are estimated by dividing the total void volume in the contaminated area by some turnover time. Turnover times generally range from 15 minutes to 45 minutes.

Q cfm = volume of void space (cubic ft.) / turnover time

The volume of contaminated soil at this site is estimated to be approximately 1400 cubic feet. Soil types of the contaminated area are predominantly sand and clayey sand. The porosity of this type of geologic material typically ranges from 25% to 50% (Freeze and Cherry, 1979). Using a porosity value of 40%, the volume of void space in the contaminated area is estimated at 560 cubic feet. Assuming turnover times of 45 and 15 minutes, a minimum flow rate of 12 to 37 cfm is required to remediate the soil contaminated below ground. The system being installed is capable of 100 cfm. Normal system operating conditions are estimated to be about 50 cfm.

4.4 SOIL VENTING SYSTEM CONDITIONS AND MONITORING

The following conditions conform to the requirements of the Bay Area Air Quality Management District conditional Authority to Construct/ Permit to Operate.

Only one soil venting well will be operated at a time. The central vent well, SV-1, will be the primary source well. The surrounding wells will be used to monitor the radius of influence of the soil venting system by the use of vacuum gauges. The one soil venting boring SV-1 will be piped directly into the single blower of the soil venting system. The blower, referred to as S-1, is considered the source of air pollution emissions. The two carbon canisters are considered abatement devices referred to as A-1 and A-2, with A-1 closest to the source S-1. The stack pipe connected to the last carbon canister is considered the emission point, referred to as P-1. The following system conditions apply to source S-1:

1. The source S-1 will be vented at all times to at least two 175 pound (55 gallon) activated carbon vessels (or canisters) arranged in series.

2. The second to last carbon bed A-1 will be changed out with unspent carbon upon the detection at the carbon vessel outlet of 10% of the inlet stream hydrocarbon concentration to the carbon vessel as measured by a flame ionization detector (OVA-FID).

3. The last carbon bed A-2 will be changed out with unspent carbon upon the detection at the vessel outlet of initial hydrocarbon breakthrough as measured with an organic vapor analyzer-flame ionization detector (OVA-FID).

4. The limits set forth in Conditions number 2 and 3 will apply to non-methane hydrocarbon emissions. To determine the presence of methane in the exhaust stream, a reading will be taken with and without a carbon filter tip fitted on the OVA-FID probe. Concentrations measured with the carbon filter tip in place will be considered methane for the purpose of these conditions.

5. The source S-1 will be monitored by collecting and analyzing an air sample with a portable field instrument using a flame ionization detector (FID). No air bag samples will be collected for laboratory analysis. Monitoring will occur at the following locations:

    a) At the exhaust of S-1; the inlet to carbon bed A-1

    b) At the exhaust of A-1; the inlet to carbon bed A-2

    c) At the outlet of carbon bed A-2; the carbon bed that is last in series prior to venting to the atmosphere.

    The air sample readings will be recorded in a monitoring log as soon as taken. The monitoring results will be used to:

    a) Calculate the time of predicted breakthrough of organic compounds as carbon on a dry basis after carbon adsorption to maintain compliance with condition number 3

b) Determine the frequency of carbon change out necessary to maintain compliance with condition number 2

c) To maintain compliance with conditions number 2 and 3, the monitoring will be conducted on a daily basis. Based on actual measurements taken at the site during operation of the source S-1, a proposal will be made that the monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the Bay Area Air Quality Management District will be received prior to a change to the monitoring schedule.

6. The following information will be maintained in a log format for each month of operation of the source:

a) The hours of operation
b) Each monitoring reading or analysis result for the day of operation they are taken
c) The calculation of organic breakthrough from the carbon beds
d) The number of carbon beds removed from service.

Any variation from condition number 2 and/or 3 will be reported under separate cover letter with the log as well as the corrective action taken. In addition, a variation of condition number 2 and/or 3 will be submitted to the Bay Area Air Quality Management District at the time it occurs. The submittal will detail the corrective action taken and will include the data showing the variation as well at the time of occurrence.

A file will be maintained containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this conditional Authority to Construct/Permit to Operate. All measurements, records and data will be maintained for at least two years following the date the data is recorded.

4.5 EMERGENCY SYSTEM SHUT DOWN

If the monitoring vapor readings at the outlet of carbon bed A-2 indicate detectable results, the source blower S-1 will be shut down and both vapor canisters in series will be replaced prior to restarting the system.

4.6 FINAL SYSTEM SHUT DOWN

When the vapor concentration of the extracted vapor is less than 100 ppm, the verifying borings will be schedule and drilled. Upon laboratory analysis results of less than the cleanup goals, the system will be shut down permanently. We estimate that the system will need to run for less than two months.

5.0 SOILS BORING VERIFICATION PROGRAM

TMC Environmental Inc. proposes to drill four exploratory soil borings in he vicinity of the former location of the 1000 gallon underground gasoline tank. The borings would be sampled at a depth of 5 and 7 feet below grade in the borings. Both samples would be screened for hydrocarbon with a organic vapor analyzer in the field. The sample with the highest hydrocarbon reading will be submitted for laboratory analysis.

Four soil samples would be submitted to a State certified Environmental Laboratory for laboratory chemical analysis of TPH as gasoline with benzene, toluene, ethylbenzene, and total xylenes (BTEX) distinction. The borings will verify that gasoline concentrations are below vapor extraction goals. The drilling of the borings and soil sampling would be performed according to the in the drilling, sealing, and sampling protocol of the section, Standard Operating Field Procedures, in the site workplan submitted for this project.

6.0 PREPARATION OF A TECHNICAL REPORT

The results of the soil venting will be presented in a technical report in accordance with the investigation guidelines of the Regional Water Quality Control Board and the Contra Costa County Health Services Department. A progress and quarterly monitoring report will likely be used to report the results. The report will be signed by a State-Certified Engineering Geologist. Copies of the report would be distributed to the Contra Costa County Health Services Department and Regional Water Quality Control Board for agency review.

7.0 HEALTH AND SAFETY

All work performed in construction, operation, monitoring, and soil sampling will follow the requirements of the site safety plan contained in the site contamination workplan previously submitted for this site. No health risk assessment is required for the soil venting system, since during normal operating conditions, no emissions occur with the soil venting system. On an intermittent basis, emissions less than 10 ppm, are allowed during the operation of the system.

Daily monitoring of the soil venting system will insure that emissions are controlled. Personnel working at Cavanaugh Motors will be instructed in the shut down of the system, if noticeable gasoline odors occur due to catastrophic failure of the system piping or canisters.

The Alameda Unified School District's Island High School is located on Eagle Avenue about 300-400 feet east of the site. The operating conditions of the soil venting system and emission limits of 10 ppm total hydrocarbons will provide adequate health and safety protection for the students and personnel at the high school. Security fencing will isolate the system from pedestrian access.

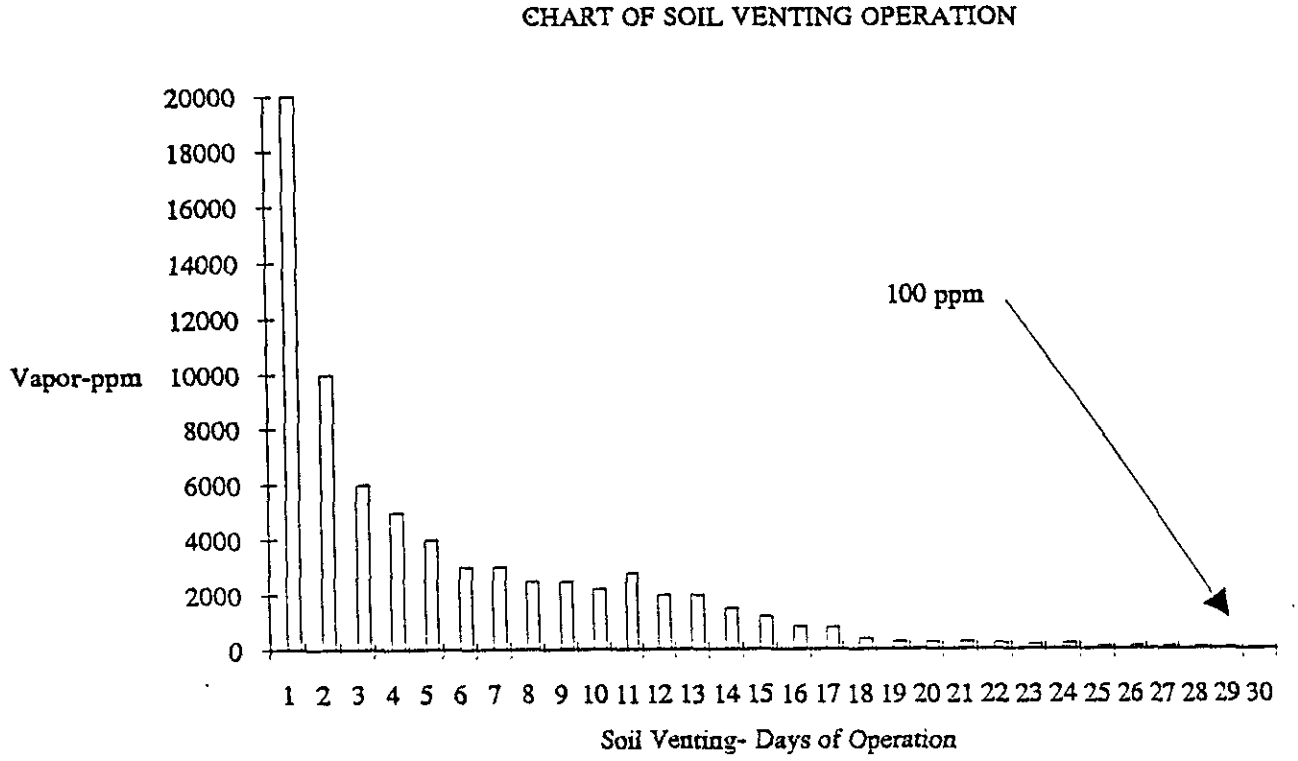
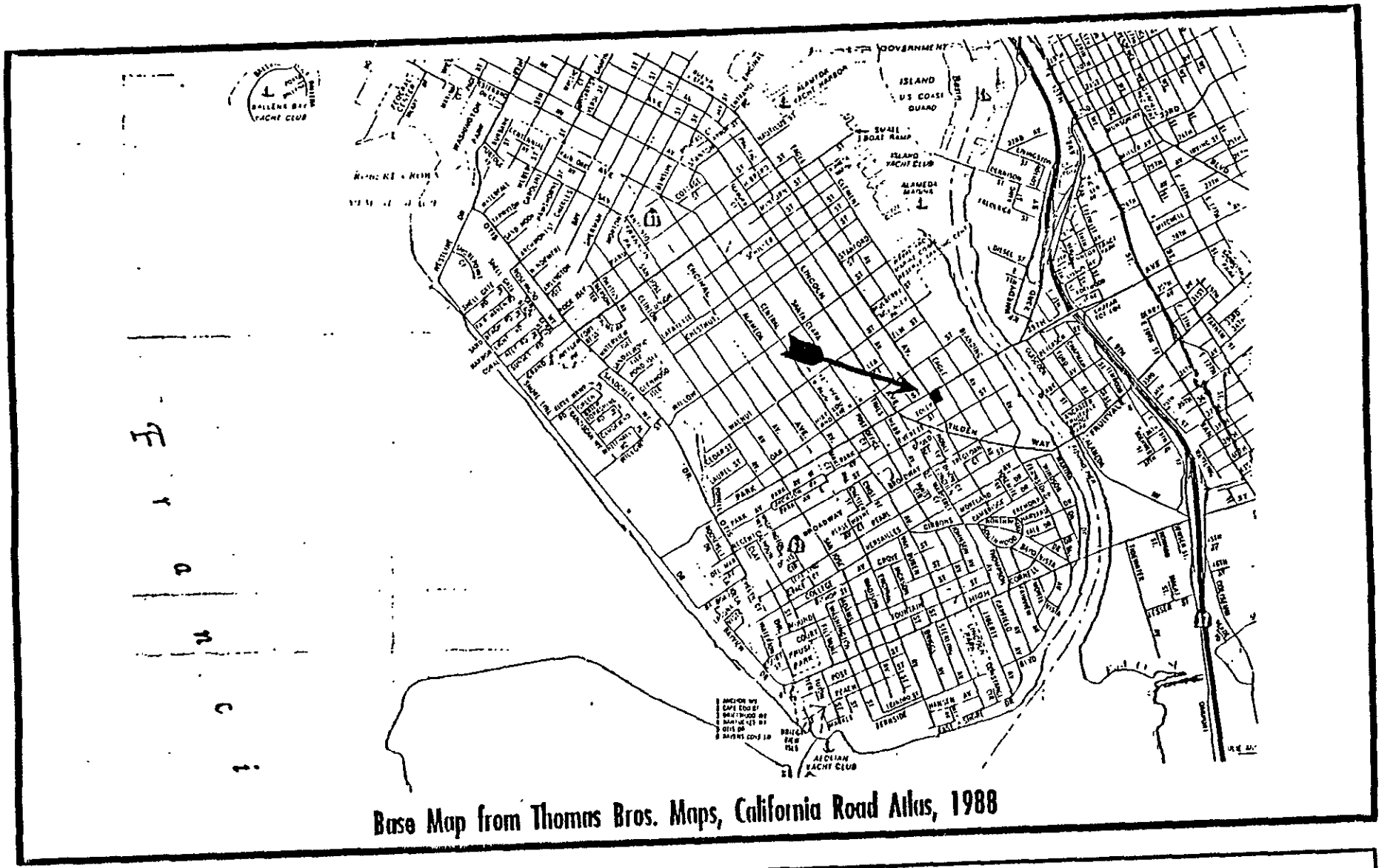


CHART 1 - TYPICAL SOIL VENTING SYSTEM OPERATION



Base Map from Thomas Bros. Maps, California Road Atlas, 1988

LEGEND

-N-

Scale: 1 inch = 2200 feet

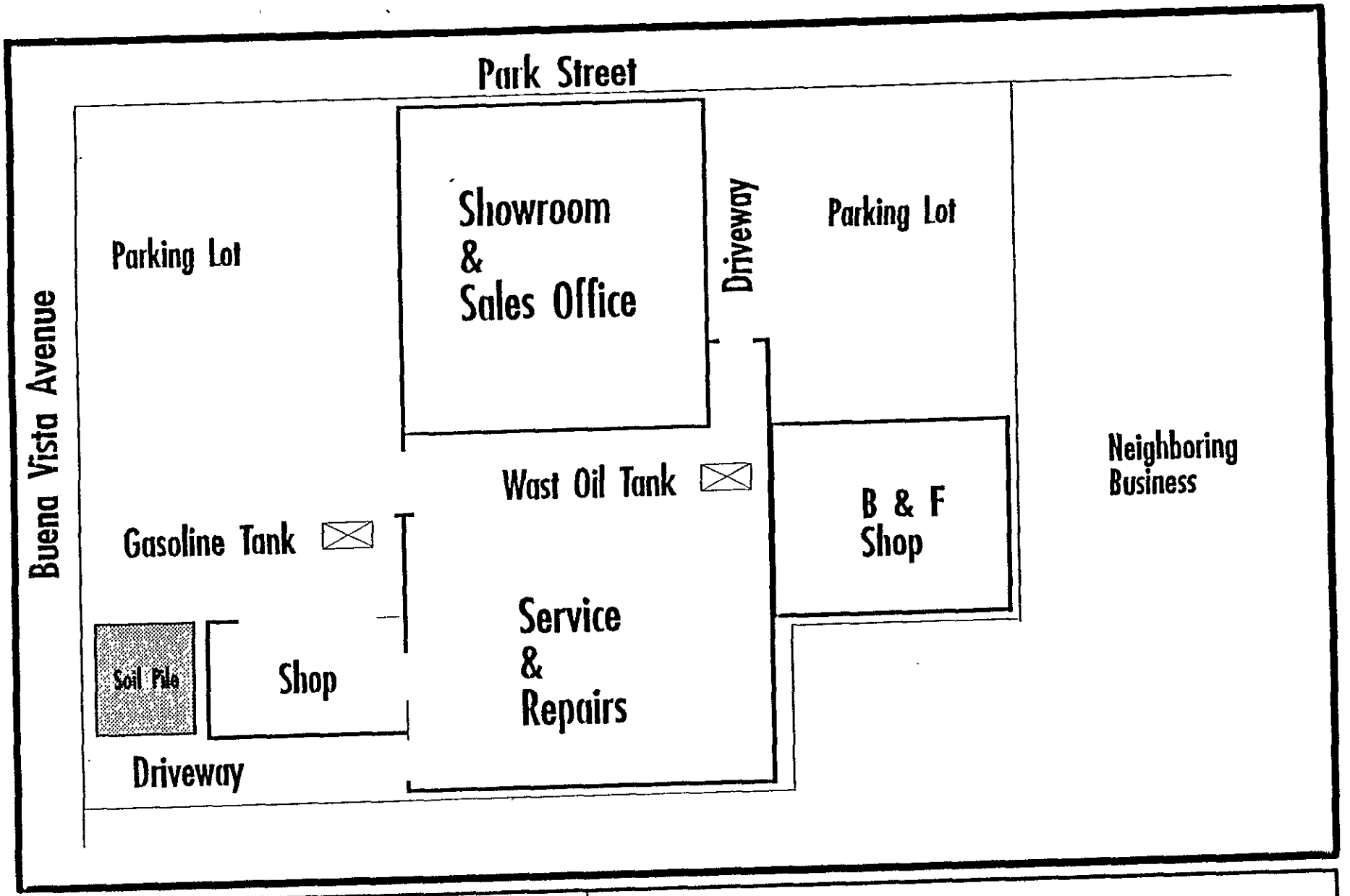
SITE VICINITY MAP

Cavanaugh Motors

1700 Park Street, Alameda, California

PLATE 1

THC ENVIRONMENTAL INC, SAN PABLO, CALIFORNIA



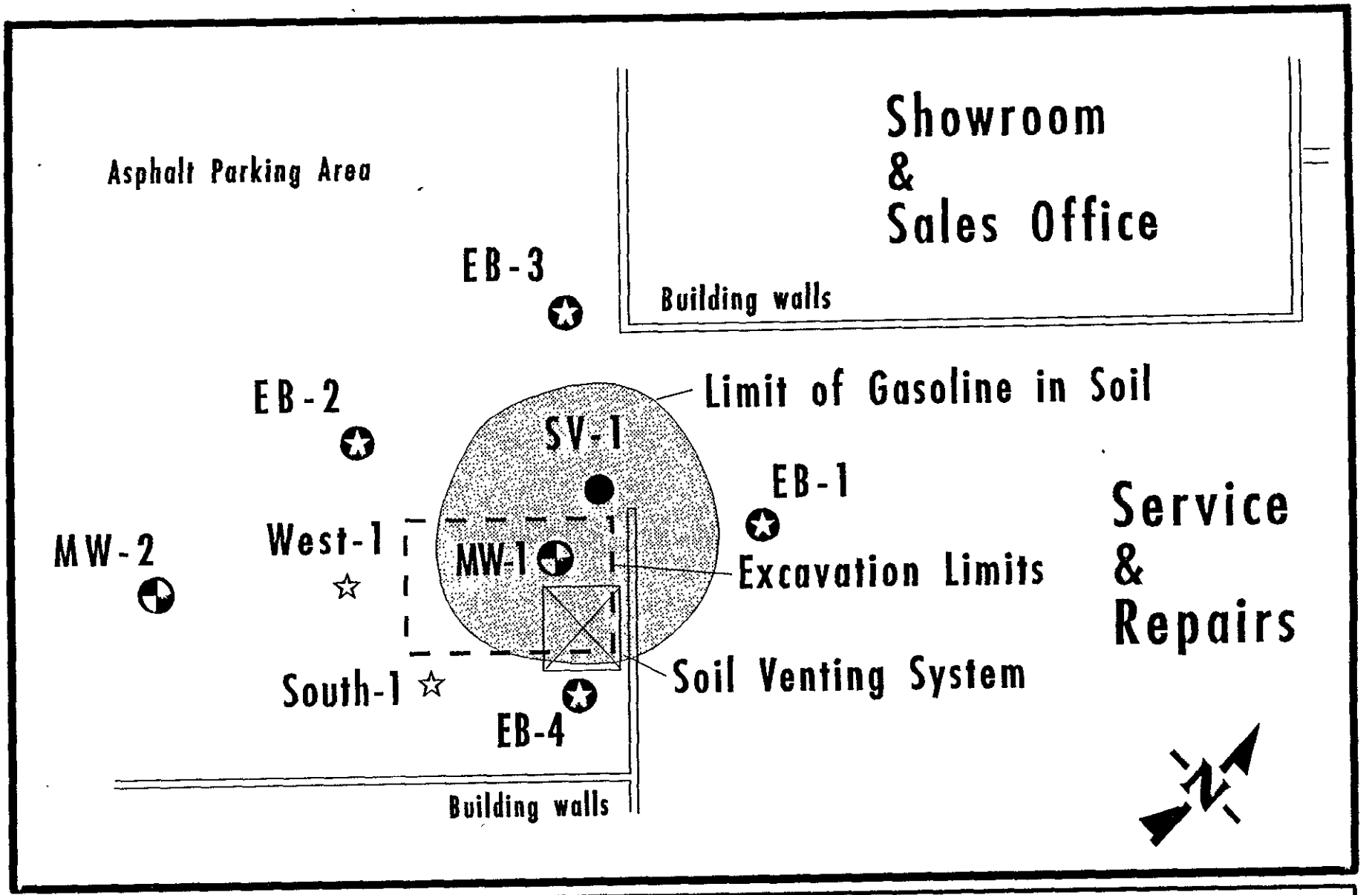
LEGEND

Scale: 1 inch = 30 feet
Project No. 109001
April 15, 1992

SITE MAP

Cavanaugh Motors

1700 Park Street, Alameda California



LEGEND

- Monitoring Well
- Soil Venting Extraction Well
- Vapor Monitor Boring
- Soil sample

Project No. 109001
May 1, 1992
Scale 1 inch = 10 feet

SOIL VENTING PLAN

Cavanaugh Motors

1700 Park Street, Alameda California

TMC ENVIRONMENTAL INC. SAN PABLO, CALIFORNIA

PLATE 3