K&B
ENVIRONMENTAL

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XCASTPROP.DOC

May 19, 1992

Mr. Ted Simas
Mr. Kieth Simas
Xtra Oil Company
2307 Pacific Ave.
Alameda, California 94501

RE: Site Remediation Plan for Soil and Groundwater Contamination at 3495 Castro Valley Blvd. Castro Valley, Ca.

Dear Mr. Simas,

The attached proposed workplan describes the activities to be performed during the removal and installation of four underground storage tanks at the subject facility. The permits for both removal and installation of four tanks has been approved by the Alameda County Health Department.

The attached remediation work plan was based on test results, analytical data compiled from soil borings, hydrogeological data and the future plans for site renovation.

If you have any questions please feel free to contact me at your convenience.

Sincerely,

Kip Porter

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ENVIRONMENTAL

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Soil and Groundwater Remediation Workplan
3495 Castro Valley Blvd.
Castro Valley, CA

Prepared for:
Xtra Oil Company

May 1992

Table of Contents

Background

The site is presently used as an active gasoline station owned and operated by Xtra Oil. The site contains four 10,000 gallon underground fuel storage tanks. Three of the tanks contain gasoline and the fourth tank contains diesel fuel. A 550 gallon waste oil tank was removed from the site in November 1988. A site location map (figure 1) and a site vicinity map (figure 2) and site plan (figure 3) are attached to this report.

Three monitoring wells designated as MW-1, MW-2 and MW-3 were installed at the site on 2/15/90 by Wege Western Geo-Engineers. Soil samples collected during drilling operations revealed Total Petroleum Hydrocarbons (TPH) gasoline and TPH diesel contamination in borings MW-1 and MW-3 at depths ranging from 5 to 15 feet below grade and in boring MW-2 at depths ranging from 10 to 15 feet below grade. The analytical report from Wege Western Geo-Engineers showed levels of TPH gasoline contamination between 40 and 1400 PPM at MW-1 and 95 to 230 PPM at MW-2. Soil samples from MW-3 showed TPH gasoline contamination levels ranging from 25 to 250 PPM and TPH diesel contamination up to 1200 PPM. Groundwater was encountered in the borings at a depth of 15 feet below grade.

On 2/15/91 Wege Western Geo-Engineers also drilled three exploratory soil borings, designated as SB1, SB2 and SB3. Soil samples were collected at depths of 10 and 12 feet below grade. Soil samples from borings SB-1, SB-2 and SB-3 were collected on 2/15/91. Soil sample analytical results from SB-1 indicated levels of TPH gasoline contamination up to 1700 PPM at 10 feet below grade.

In boring SB-2 TPH gasoline was detected at concentrations of 800 PPM and 2000 PPM at depths of 10 and 12 feet below grade, respectively. In boring SB-3 identical results of TPH gasoline contamination were encountered at 10 and 12 feet below grade as were encountered in boring SB-2.

A groundwater monitoring and sampling program was implemented on 2/20/90. Review of the previous quarterly monitoring program shows TPH gasoline and TPH diesel contamination at all three wells.

Site Status

A permit for the removal and installation of four underground storage tanks, has been approved by the Alameda County Health Department. Other recent activities performed at the subject facility have included, monthly sampling and analysis of monitoring wells, a soil gas survey and vapor extraction feasibility study.

The results of the soil gas survey conducted on 11/5/91 indicated substantial levels of contamination was detected in the area west of the pump islands and around the existing and proposed tank pits.

The results of the vapor extraction feasibility study indicated low to moderate permeability, due to the clay layers existing throughout the site. During the feasibility test, vacuum influence measurements were recorded at points located as far away as 35 feet from the point of extraction. The average distance to points measured for vacuum influence was approximately 20 feet. The areas selected for feasible extraction design has considered the permeability factors associated with the soil at various depths. The design of the vapor probe will allow for a higher rate of extraction at the interface of the aquifer, where boring logs indicates a more permeable soil. The rate of hydrocarbon extraction, (in pounds of gasoline per day) will be dependent upon the size and type of blower used.

Removal of 1300 yards of contaminated soil and the removal of free floating product from groundwater, should have a significant affect on levels of petroleum product contamination. This effort will bring us a long way towards the overall goal of remediation of the soil and groundwater.

Hydrogeology

Water levels were measured a total of three times at each well during the previous quarters. A slight sheen of free product and odor was found at each well during monitoring activities. Groundwater levels have decreased in all of the wells during the quarter, with the measured depth to groundwater ranging from 8.95 to 10.39 feet.

Groundwater flow direction has remained relatively constant and to the southeast during the last quarter, with flow directions between 557E and 524E and gradients of 0.0055, 0.0061 and 0.0051. San Lorenzo Creek is located approximately 450 feet east of the site. A site location map is attached in the appendix as Figure 1.

Objective:

The goal of this work plan is to address and approach the initial phases of soil and groundwater remediation. The initial remediation phase will be conducted during the removal of four 10,000 gallon underground storage tanks. The plan is to remove the old storage tanks, excavate soil from the tank pit area and dig trenching for migration control. Once groundwater at the tank pit area has been exposed, any free floating product will be removed. The new tank pit area will then be converted into a gravel sump "french drain" system, with a groundwater extraction well located in the southeast corner.

Further excavation of soil will be conducted during the installation of four new 12,000 gallon tanks. In order to feasibly excavate soil from the new tank pit area, the old tank pit cavity will have to be back-filled and the soil compacted right a way, in order to maneuver equipment needed for excavating the new tank pit area. The new tank pit area will generate the majority of the contaminated soil to be removed from the site. An emphasis will be placed on removing the "hot spots" of contamination from the old tank pit area.

The proposed workplan will occur in several phases. This work plan discusses the first three phases of operation in detail.

Phase one will consist of:

- o Removing soil from the old and new tank pit areas.
- o Removal of free floating product.
- o Installation of a french drain system and groundwater extraction well.
- o Ex-situ treatment of soil and groundwater

The extraction well will be placed at the edge of the new tank pit area adjacent to the old tank pit area, then back-filled with gravel. The well may possibly be used for the future extraction of groundwater, (if needed) and may also be used for soil vapor extraction.

Phase two of the operation will include:

- o Installation of the soil vapor extraction probes
- o Plumbing and manifold system.

Phase three of the project will monitor the effects of the soil excavation, vapor extraction (if used) and preliminary groundwater extraction.

It is our belief that the excavation of soil and the extraction of groundwater from the tank pit areas, will show a substantial decrease in groundwater contamination levels. Should the data gathered during phase three indicate significant levels of contamination remaining additional phases will be developed.

PHASE ONE SCOPE

During the removal of the existing four 10,000 gallon tanks, the excavated soil will be stored on site for aeration and treatment. This soil will consist mainly of a sand and gravel back-fill material. This type of soil can easily be remediated to lower levels of contamination utilizing aeration methods. The sand and gravel back-fill materials will be segregated and stock piles will be stored on-site and covered by plastic.

The primary areas targeted for excavation, will be the old tank pit, migration trenches and the location selected for the new tank pit. Approximately 400 cubic yards of soil will be removed from the old tank pit. Approximately 900 cubic yards of soil will be removed from the new tank pit area as well. The phase one excavation operation will consist of the removal of as much soil as the site can accommodate and still keep the contractor working.

Excavation efforts will also include trenching to be dug along the south and southeast portion of the property, for migration control. A site plan map detailing the proposed areas of excavation and trenching is included in the appendix as **Figure 4**. Excavated soil will be segregated on site based on levels of contamination and ease of aeration.

The procedures used for soil excavation will have to take in to account the quantity of soil accumulated and the size of the excavation area. In order to retain enough working space to excavate the new tank pit area, a minimum amount of soil will be taken from the existing tank pit area. The methods used for treating the soil will be discussed on page 6 of this report. The excavation of the old tank pit area, migration control trenching and new tankpit area will create an estimated total volume of soil removed to be approximately 1300 cubic yards.

Free Product Removal

The current depth to groundwater is approximately 10 feet below grade. During the removal of the tanks it will be necessary to excavate below the groundwater table (approximately 13 feet below grade). Once groundwater has been exposed an attempt will be made to pump out any obvious free floating product. This will be done by using a surface pump with an in-line separator or vacuum truck, attached to a hose and skimming apparatus. Once all free floating product has been removed, groundwater from the pit will then be pumped into a vacuum truck licensed for hauling hazardous waste. An option of pumping the groundwater into a portable baker tank for on-site treatment of any remaining dissolved product is being considered.

Groundwater Extraction Well

The volume of groundwater to be pumped will be based on site conditions including storage capacity. [redacted] product and groundwater pumping has been completed, a groundwater extraction well will be installed. The extraction well will be used for future groundwater pumping, if further remediation and treatment is needed. The extraction well will be placed at the outer edge of the of the new tank pit area to a depth of 15 feet below grade. The new tank pit area will then be filled with pea-gravel to a depth of 8 to 10 feet below grade. The pea-gravel will act as a sump basin or "french drain". The extraction well will be constructed of an eight inch diameter schedule 80 PVC pipe with 1/4 inch holes (approximately one every 2 inches) drilled into the lower portion of the pipe. The extraction well will be permitted under the requirements of the Alameda County Flood Control and Water Conservation District (Zone 7). A design drawing of the groundwater extraction well can be found in the attachments as figure 5.

Excavation of New Tank Pit Area

The area designated for the installation of four 12,000 gallon storage tanks is located west of the existing tank pit. This area will have to be excavated after the old tank pit is backfilled and soil is compacted to grade. This will be necessary in order to accommodate the equipment needed for the task. The size of the area needed for the new tanks will measure 78 feet by 30 feet by 12 feet deep. An excavation of this size will create a substantial volume of soil, (approximately 900 cubic yards). Excavated soil will be stock piled and segregated during excavation, based on levels of contamination, space available and ease of treatment by aeration and bio-remediation techniques.

On-Site Treatment of Soil

The on-site treatment of excavated soil will be performed using a combined technique of aeration and bio-remediation or using a skip loader to manually aerate sections of the stock pile.. The stock piles will be aerated through a network of perforated PVC piping placed within the center of the pile and attached to a vacuum blower apparatus. In addition to aeration, the soil will be mixed with mushroom compost. This will increase the biological activity and shorten the treatment time dramatically. Composite soil samples will be taken to determine the levels of contamination prior to treatment. In order to demonstrate compliance with air quality guidelines a permit application for controlled aeration, to include effluent test results from the blower unit, will be submitted to the Bay Area Air Quality Management District. A design drawing of the soil treatment system can be found in the appendix as Figure 6.

If manual aeration with a skip loader is found to be a more cost effective means of treatment then appropriate steps would be taken in order to comply with the Bay Area Air Quality Management Districts guidelines. Once treated the soil will be manifested and transported to the appropriate landfill.

On-Site Treatment of Groundwater

If a vacuum truck is not selected as a means to extract groundwater than groundwater will be pumped from the tank pit will be treated using a bio-remediation batch reactor and/or fixed film reactor system, combined with aeration for oxygen enhancement. A sponge devise, similar in technology to a fixed film reactor, will be placed at the suction end of a submersible circulation pump placed inside the treatment tank. This is based on the principle that natural or bio-augmented populations of microorganisms will attach to the media during reaction providing long term retention and circulation of bio-mass. The submersible circulation pump will be connected to a rotating sprayer unit, which will be discharging water within the headspace area of the tank for oxygenation. Ambient air will also be used to increase oxygen levels by using a small compressor pump, mounted on the exterior of the tank which will discharge air through a perforated pipe placed at the bottom of the tank.

Laboratory simulation models using groundwater samples, will be run in order to determine batch loading rates and determining the rate of petroleum product degradation using the treatment methods stated above. A POTW permit application will be submitted prior to discharging any treated groundwater into the sewer system.

The analytical requirements and sampling frequencies will be determined by the parameters outlined in the POTW permit. A drawing showing the groundwater treatment system design is attached as Figure 7.

Sampling and Analysis of Soil

Soil sampling will be conducted using the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites dated August, 1990 and the LUFT manual guidelines for tank removal projects. The analytical data accumulated throughout the project has thoroughly characterized the extent of soil and groundwater contamination at the site. This information will enable us to determine the number and locations of samples needed to evaluate the remediation work. The areas suggested for analyzing samples will be the tank pit walls and composite samples of the soil stock piles. Soil samples collected will be analyzed for TPH gasoline, BTE&X and diesel fuel at a State Certified Laboratory. A standard three part label and chain of custody form will be maintained to insure sample integrity. Samples will be stored on blue ice during handling and transportation. A sample label and chain of custody form is included in the appendix.

Excavated soil will be segregated based on contamination levels and ease of treatment. Soil will be screened for contamination levels using a Beckman 400 Hydrocarbon Analyzer equipped with an FID. Soil gas vapors will be analyzed using a standard headspace method of analysis. This method consists of heating a portion of soil in a VOA vial and applying a vacuum using an air sampling pump connected to the hydrocarbon analyzer. Instrument calibration will be conducted using propane in air standards and analytical grade nitrogen for establishing a zero baseline.

Scope of Phase Two

Phase Two of the soil and groundwater remediation efforts, will be conducted during the installation of the four 12,000 gallon storage tanks. After the excavation of the new tank pit has been completed, and the electrical lines and product lines have been installed, the vapor extraction system will then be constructed. The vapor probes will be installed using an air percussion hammer devise, driven to the target depth of eight feet below grade at the predetermined locations. The vapor extraction probes are constructed of a one inch diameter galvanized steel pipe. The perforated area will start at three feet below grade and extent to the bottom of the probes (eight feet below grade). The perforated area consists of 1/4 inch holes drilled approximately every inch (totaling approximately 50).

After the probes are driven, all the necessary plumbing connections will be made. All plumbing lines will be capped and sealed at the manifold, until the system is placed into operation. The probe design, location and plumbing of the vapor extraction system can be found in the appendix as Figures 8, and 9.

The plumbing for the groundwater extraction well will also be installed during this phase of the operation. The plumbing will consist of a groundwater discharge line and a separate line for the extraction of vapors.

PHASE THREE

Phase Three consists of monitoring the effects of the soil excavation and initial groundwater pumping. Quarterly sampling and analysis of monitoring wells will reveal the changes in sub-surface conditions and should readily establish the progress made during the initial phase of the operation. Sampling and analysis should occur for at least four consecutive quarters to allow for increased mobility of contaminants after disturbing the site for excavation.

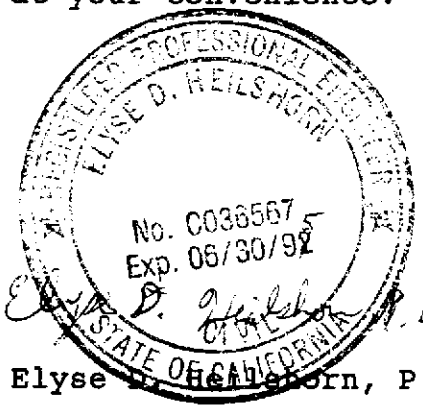
Summary

The workplan outlined in this report addresses remediation of soil and groundwater using a combination of several effective methods. The initial stages of the planed soil excavation and fee floating product removal, should remove the largest portion of product contamination. Installation of a vapor extraction system in conjunction with a groundwater extraction well will provide a readily accessible means for further remediation of soil and groundwater contamination. The availability of an effective in-situ treatment system will validate the use of previously contaminated soil to be used as backfill material and allow for continued treatment. The combination of vapor extraction and groundwater pumping has been proven to accelerate the removal of free phase, vapor phase and dissolved phases of petroleum product contamination. These efforts will bring us a long way towards our overall goal of remediation of the soil and groundwater.

Distribution

Copies of this proposal should be sent to Mr. Scott Seery at the Alameda County Health Department, Mr. Lester Feldman of the RWQCB and Mr. Bob Bohman of the Castro Valley Fire Department.

Should you have any questions please feel free to contact me at your convenience.



Sincerely,

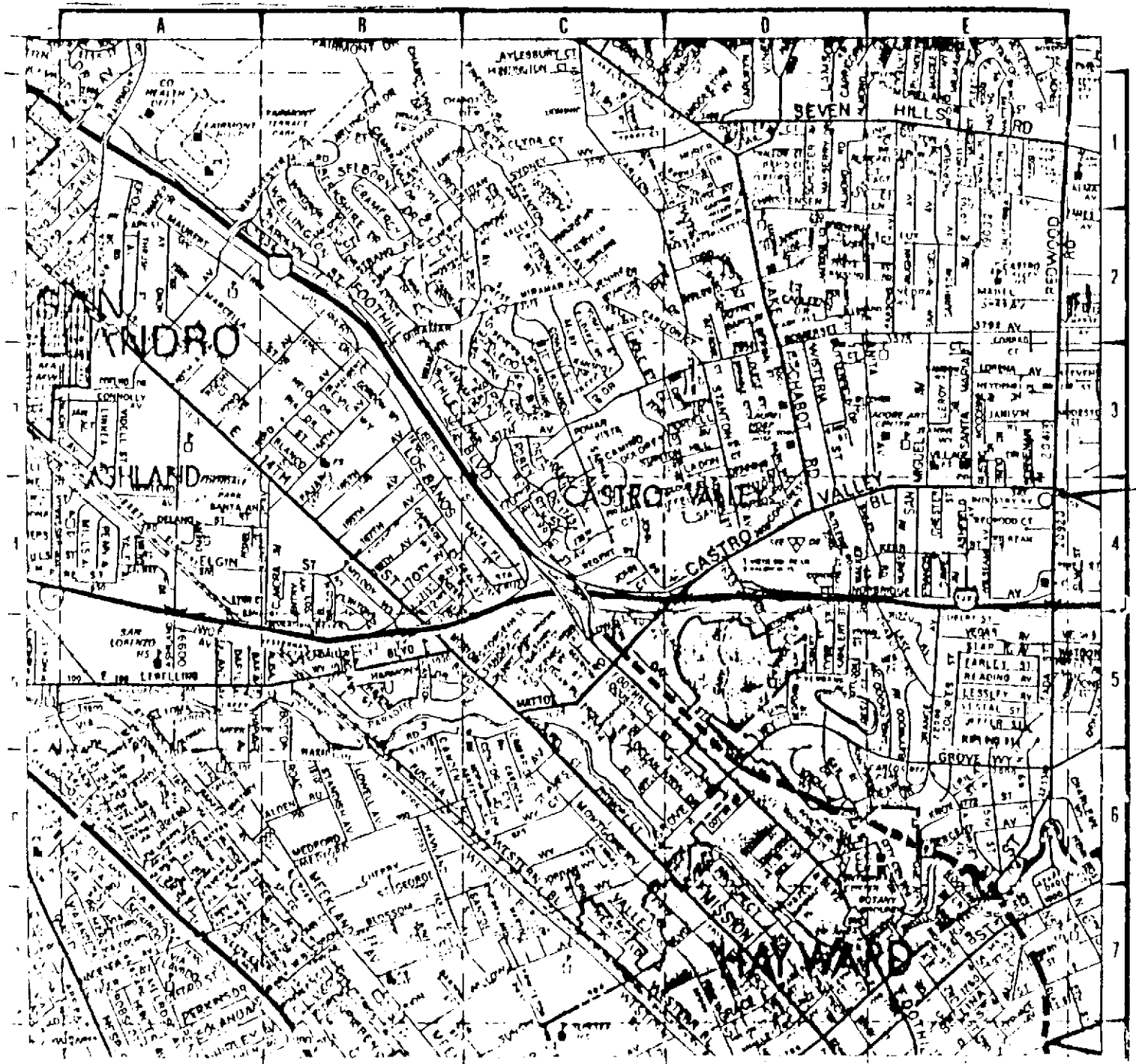
Kip Porter
Project Manager
K&B Environmental

Elyse D. Heilshorn, P.E.

Registered Civil Engineer
Registration No: C036567
Expiration Date:6/30/95

Attachments:

Figure 1: Site Location Map
Figure 2: Site Vicinity Map
Figure 3: Site Plan
Figure 4: Proposed Excavation and Trenching Map
Figure 5: Groundwater Extraction Well Design
Figure 6: Ex-Situ Soil Remediation System Design
Figure 7: Groundwater Treatment System Design
Figure 8: Vadose Probe Design
Figure 9: Vapor Extraction Plumbing Schematic



N

SCALE IN MILES
1/4 1/2 3/4

FIGURE 1
SITE LOCATION MAP
XTRA OIL CO.
3495 CASTRO VALLEY BLVD.
CASTRO VALLEY, CA.

BASE MAP FROM THOMAS BRO
1986 EDITION
ALAMEDA COUNTY

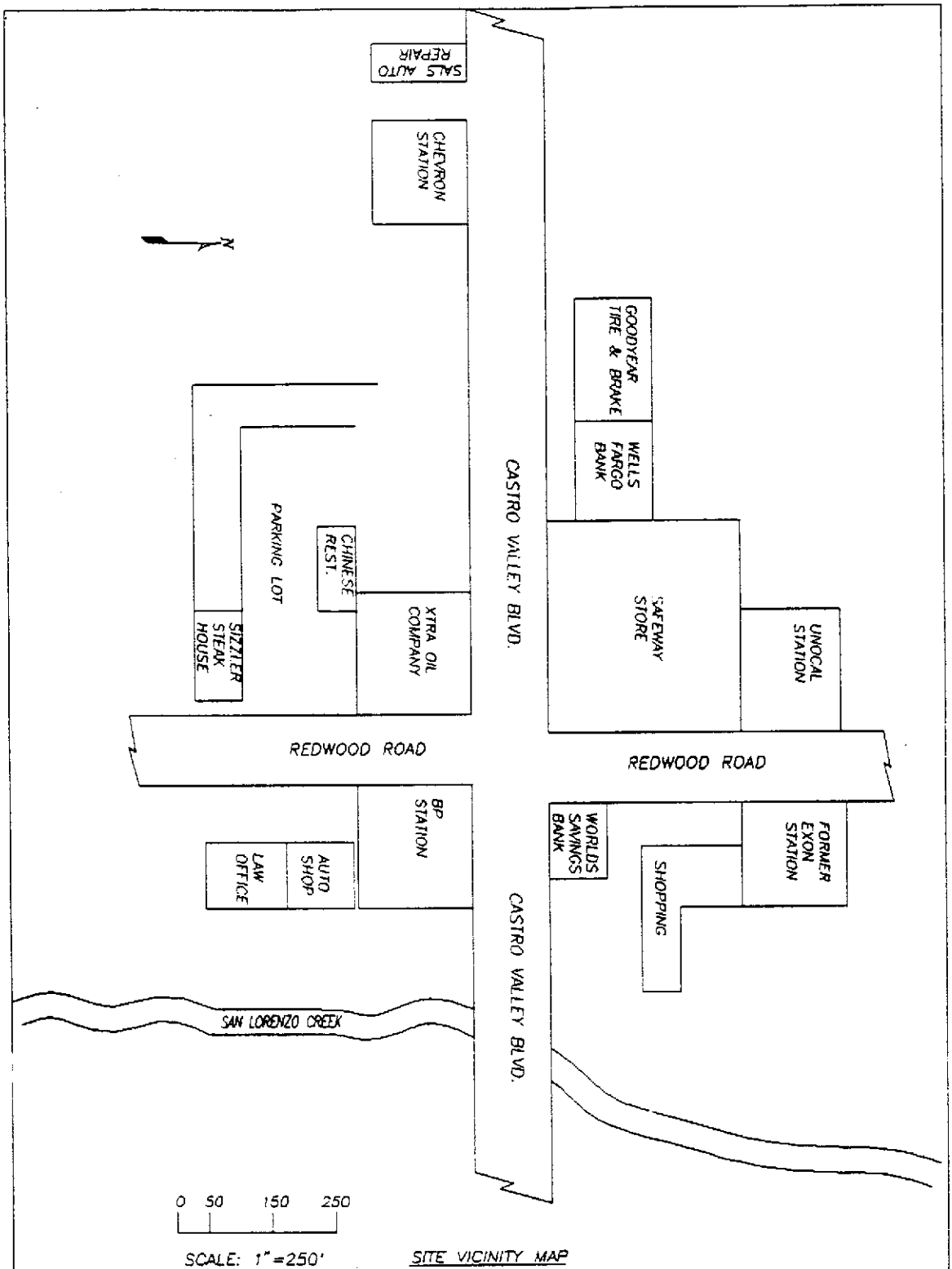


FIGURE 2

PROJECT NO. 035		K*B ENVIROMENTAL
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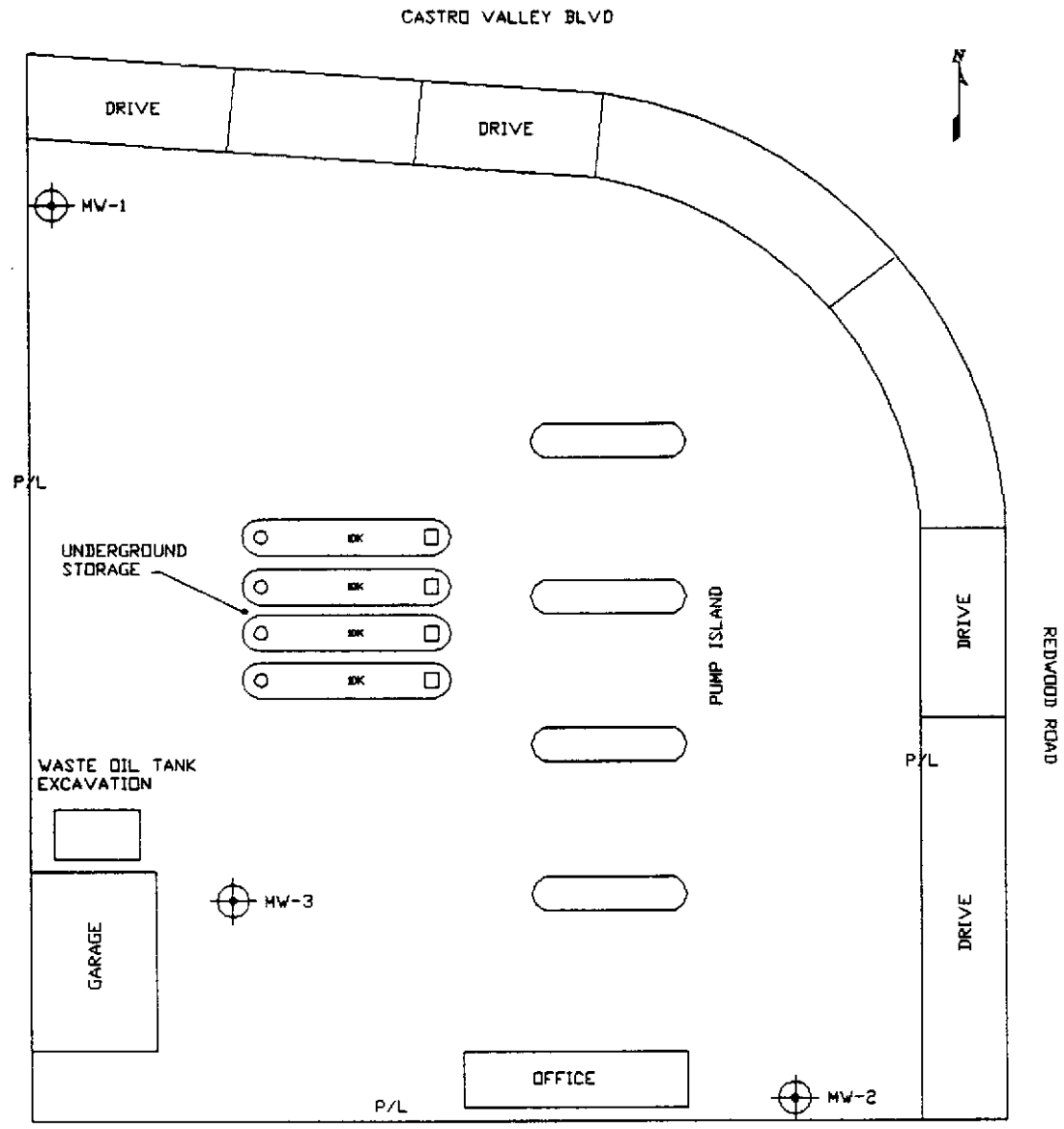
C.CATALANO	1/15/92	
REV NO.		



SITE PLAN

LEGEND:

MONITORING WELL

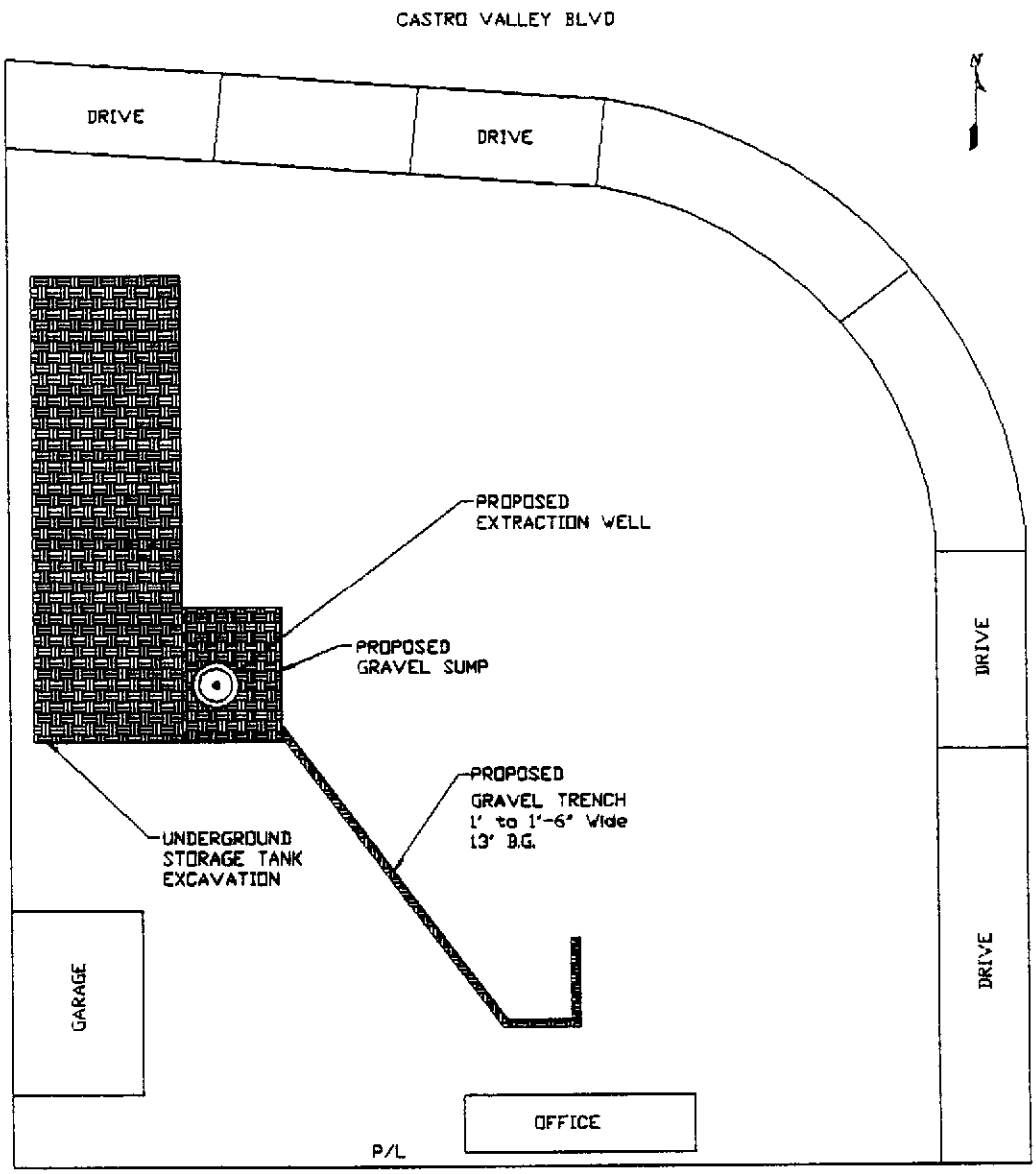
EXTRACTION WELL

P/L PROPERTY LINE

0 10 20 30 60

SCALE IN FEET

PROJECT NO. 035	K*B ENVIRONMENTAL
DRAWN: C.CATALANO	DATE: 1/24/92
REV NO. 1	EXTRA OIL COMPANY 3495 CASTRO VALLEY BLVD. CASTRO VALLEY, CA.



PROPOSED EXCAVATION

0 10 20 30 60

SCALE IN FEET

FIGURE 4

PROJECT NO. 035	K*B ENVIRONMENTAL
DRAWN: C.CATALANO / DATE: 4/9/92	XTRA OIL COMPANY 3495 CASTRO VALLEY BLVD. CASTRO VALLEY, CA.
REV NO. 1 / 5/20/92	

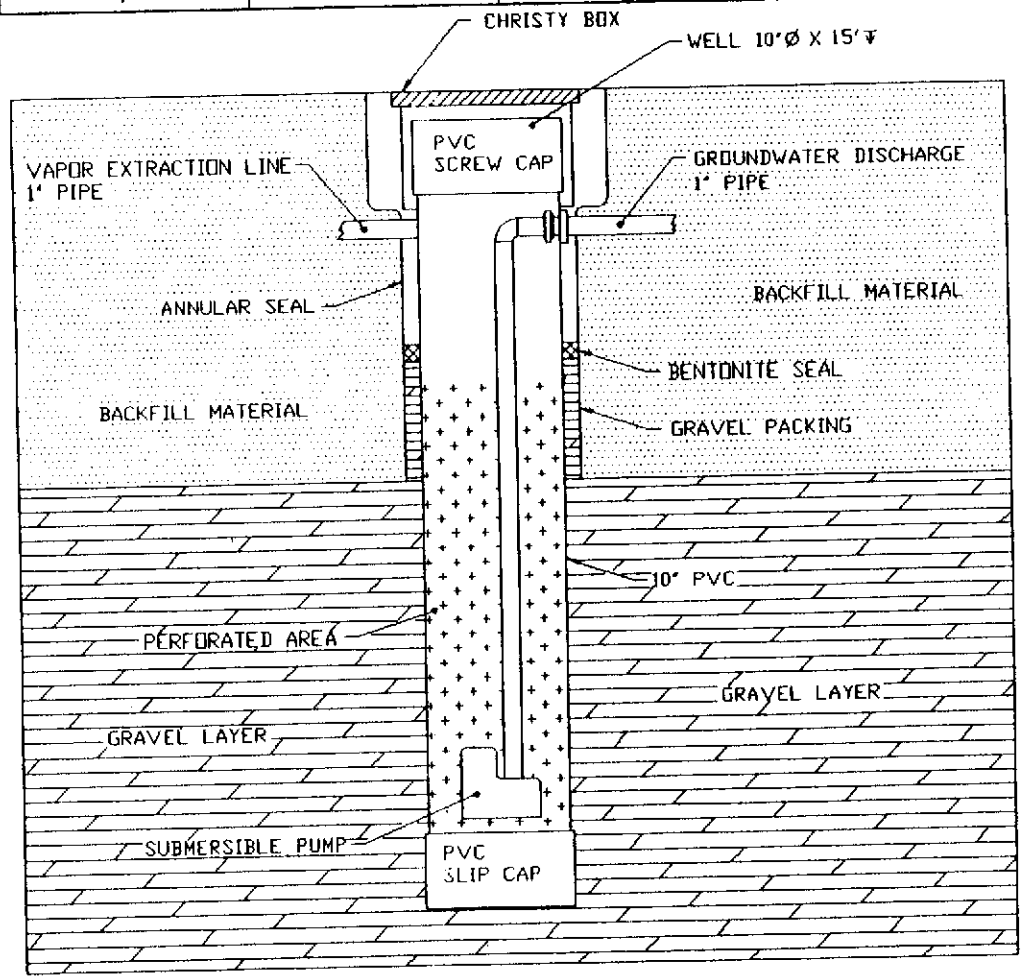
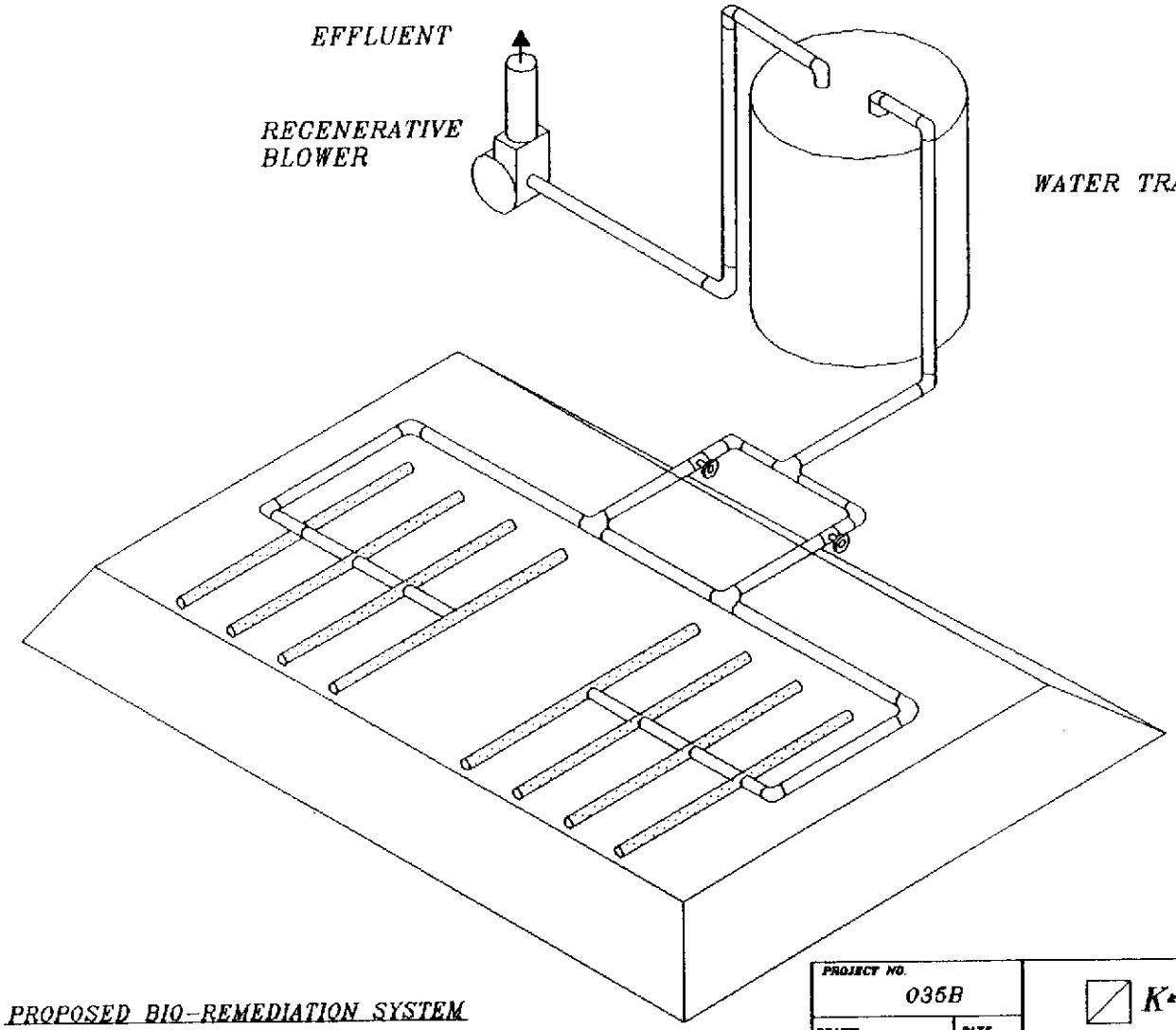


FIGURE 5

PROPOSED EXTRACTION WELL CONSTRUCTION DIAGRAM

PROJECT NO.		K•B ENVIROMENTAL
DRAWN	DATE	XTRA OIL COMPANY 3495 CASTRO VALLEY BLVD. CASTRO VALLEY, CA.
C.CATALANO	4/9/92	
REV NO.		



PROPOSED BIO-REMEDIATION SYSTEM

FIGURE 6

PROJECT NO.	
035B	
DRAWN	DATE
C.CATALANO	4/9/92
REV NO.	

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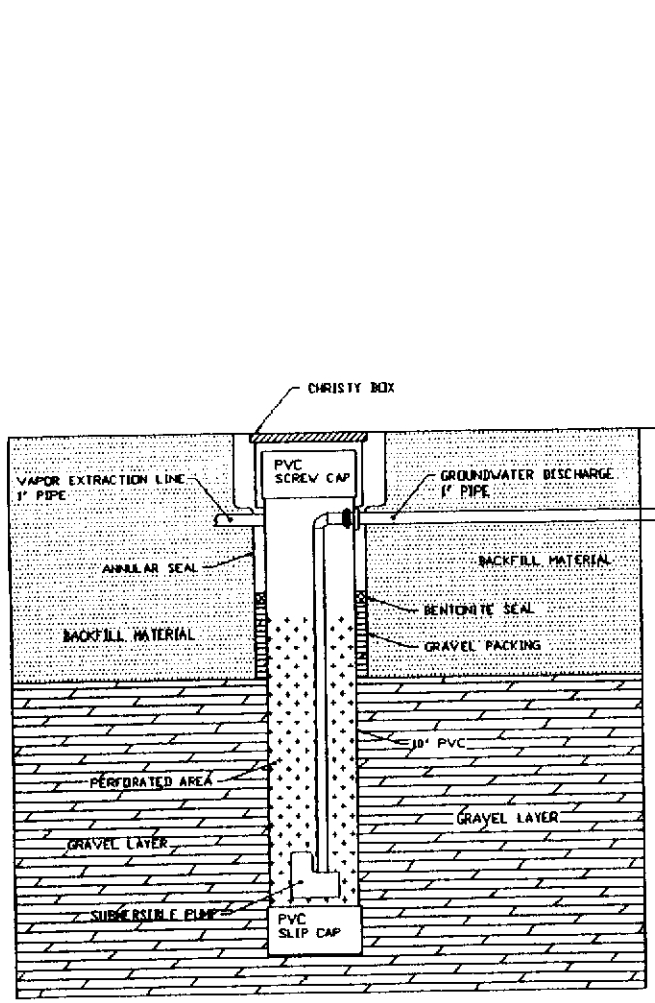
Xtra Oil Company
3495 Castro Valley Blvd.
Castro Valley, Ca.



PROPOSED GROUNDWATER EXTRACTION & TREATMENT SYSTEM

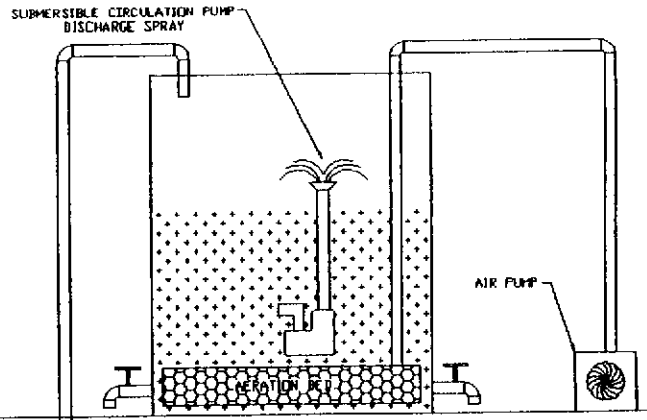
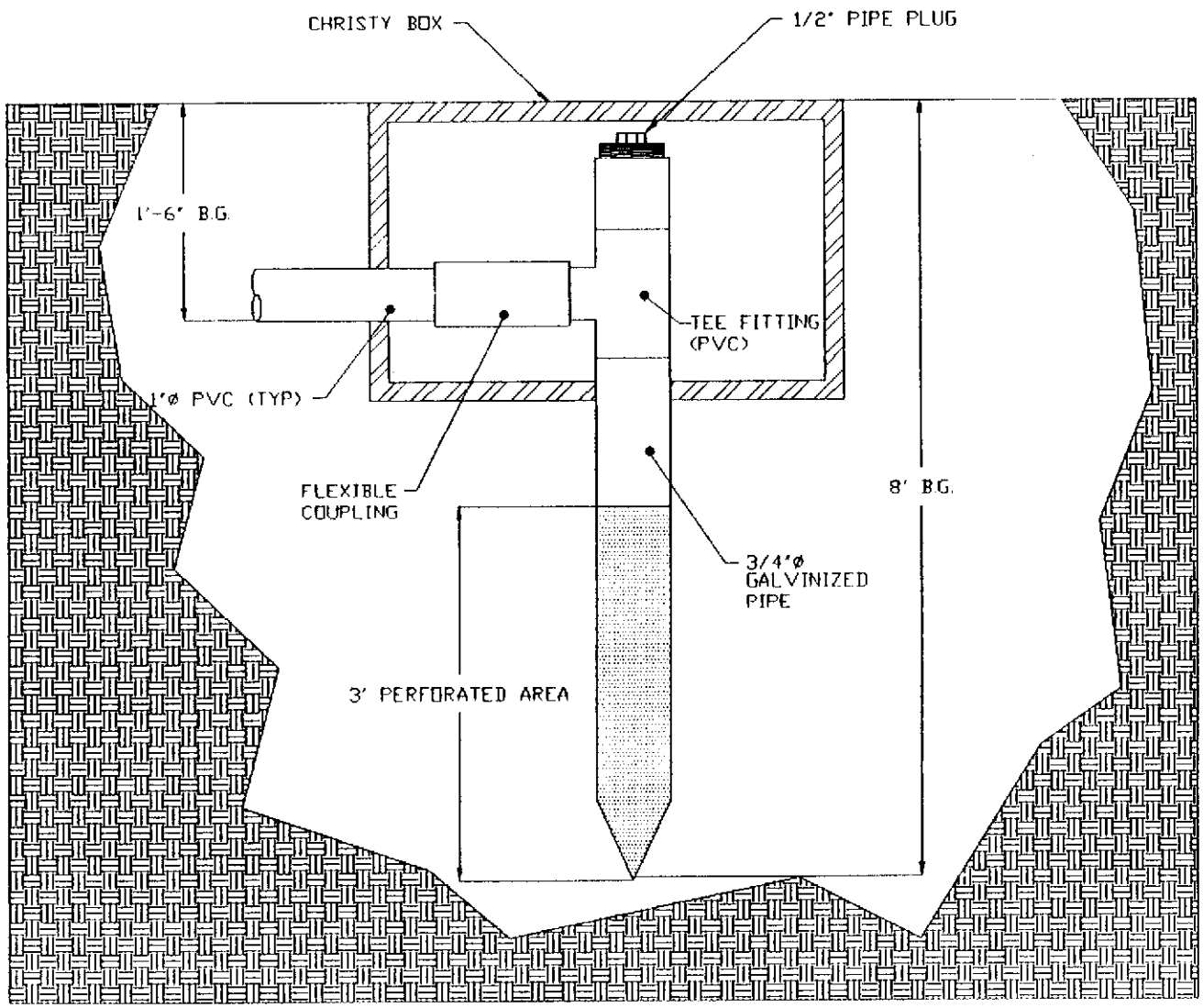


FIGURE 7

PROJECT NO.	
035B	
DRAWN	DATE
C.CATALANO	4/9/92
REV NO.	

K*B ENVIROMENTAL

XTRA OIL COMPANY
3495 CASTRO VALLEY BLVD
CASTRO VALLEY, CA.



PLUMBING FOR VAPOR EXTRACTION SYSTEM

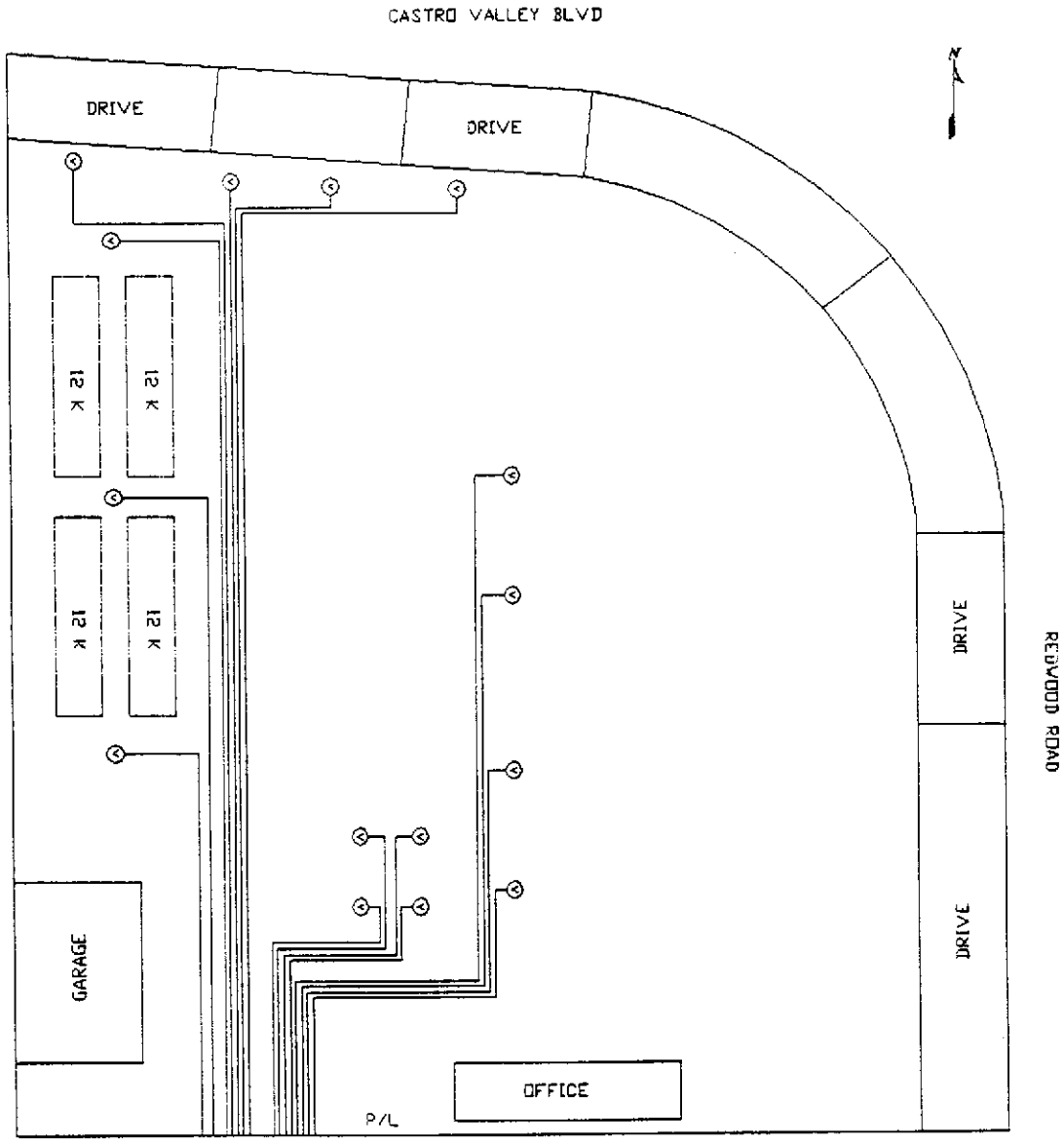
FIGURE 8

NOT TO SCALE

K•B ENVIRONMENTAL

XTRA OIL COMPANY
3495 CASTRO VALLEY BLVD.
CASTRO VALLEY, CA.

PROJECT NO.	DRAWN	DATE	REF NO.
035	C.CATALANO	4/8/92	



PLUMBING FOR VAPOR EXTRACTION SYSTEM

0 10 20 30 60

SCALE IN FEET

FIGURE 9

PROJECT NO. 035	K*B ENVIRONMENTAL
DRAWN: C.CATALANO / DATE: 4/9/92	XTRA OIL COMPANY 3495 CASTRO VALLEY BLVD. CASTRO VALLEY, CA.
REV NO.	