reviewed 5-6-92
SOS
- requested project time-line

Chevron U.S.A. Products Company
2410 Camino Ramon, San Ramon, California • Phone (510) 842-9500
Mail Address: P.O. Box 5004, San Ramon, CA 94583-0804

92 APR 17 PM 1:09

Marketing Department

April 13, 1992

Mr. Scott Seery
Alameda County Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

Re : Former Chevron Service Station #9-2960
2416 Grove Way, Castro Valley, CA 94546

Mr. Seery :

Enclosed is the work plan dated April 8, 1992 for the installation of a remediation system for the above referenced site. The remediation system will consist of a soil vapor extraction system (SVE) in conjunction with a pump & treat system (P&T). Briefly, vapors will be extracted from well C-1 and treated by thermal catalytic oxidizer. Groundwater will be extracted from electric submersible pump a in newly installed well adjacent to well C-1. Groundwater will then be treated by aqueous-phase granulated activated carbon (GAC) and discharged into sanitary sewer system. Separate phase product will be collected using a passive skimmer which will be emptied on a routine basis.

A new four inch sanitary sewer lateral is planned to be installed before Grove Way is repaved.

If you have any questions or comments, please feel free to call me at (510) 842-8752.

Sincerely,

Kenneth Kan

Kenneth Kan
Engineer

LKAN/MacFile 9-2960R6

Enclosure

cc : Mr. Rich Hiett, RWQCB-S.F.Bay Region
2101 Webster Street, Suite 500, Oakland, CA 94612

Mr. Bob Yule, First Presbyterian Church
2490 Grove Way, Castro Valley, CA 94546

Ms. Bette Owen, Chevron U.S.A., Inc.

Weiss Associates Environmental and Geologic Services

5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: **510-547-5420**

92 T.L.H.

April 8, 1992

Mr. Kenneth L. Kan
Chevron U.S.A., Inc.
P.O. Box 5004
San Ramon, CA 94583-0804

Re: Remediation Work Plan
Former Chevron SS #9-2960
2416 Grove Way
Castro Valley, California
WA Job # 4-552-80

Dear Mr. Kan:

As you requested, Weiss Associates (WA) prepared this remediation work plan for the former Chevron Service Station #9-2960, located at the northeast corner of Redwood Road and Grove Way, Castro Valley, California (Figure 1). This work plan contains a brief background, remediation approach, proposed remediation, and permit requirements.

BACKGROUND

On June 19, 1986, all four underground storage tanks (USTs) and product lines were removed as part of the site demolition. The gasoline tank pit was overexcavated to a depth of between 19 and 23 ft where the ground water capillary zone was encountered. Analysis of unsaturated soil samples collected from the excavation wall by Blaine Tech Services, San Jose, California, on August 8, 1991, showed a maximum total hydrocarbons concentration of 49 parts per million (ppm). However, a soil sample collected from the capillary zone at the bottom of the excavation showed 170 ppm total hydrocarbons suggesting impact on the ground water beneath the site.[1] By September 1986, the tank pit was backfilled and Testing Engineers, Inc.,

[1]Blaine Tech Services, August 21, 1986, Report # 86220B1, results of August 8, 1986 soil sampling; consultant's letter prepared for Chevron USA, 3 pp. 2 attachments 5 pp.

had completed compaction tests at six locations.[2] No hydrocarbons were detected in the soil beneath the former waste oil tank[3].

Seven ground water monitoring wells are on or adjacent to the site. Figure 2 shows the monitoring well locations. EMCON Associates (EMCON), San Jose, California installed onsite monitoring wells C-1 through C-4 in October, 1986.[4] GeoStrategies Inc. (GSI), Hayward, California, installed offsite monitoring wells C-5 through C-7 to define the horizontal extent of dissolved hydrocarbons.[5] All seven wells are between 30 and 34 ft deep and are screened in the uppermost water-bearing zone.

Materials underlying the site consist primarily of low to moderate permeability clay, clayey silts and sands to a depth of about 7 to 12 ft underlain by moderately permeable silty sand with clay, silt and minor gravel interbeds. Ground water beneath the site is currently about 16 to 20 ft below ground surface and flows west-southwest with an approximate gradient of 0.005 ft/ft.[6]

Separate-phase hydrocarbon thickness in well C-1 has been measured up to 1.24 ft. Separate-phase hydrocarbons have not been detected in any of the other monitoring wells. In January 1990, Chevron initiated interim recovery of separate-phase hydrocarbons from well C-1. September 1991 analytic results show 3.6 ppm total petroleum hydrocarbons as gasoline (TPH-G) and 1.4 ppm benzene in ground water from well C-2. Hydrocarbon concentrations in ground water from wells C-3 and C-4 were .26 and 0.087 TPH-G and .052 and .0016 ppm

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2 EA Engineering, Science and Technology, Inc., November 11, 1987 Report of Investigation and Risk Assessment for Chevron Service Station #9-2960. Castro Valley, California; consultant's report for Chevron USA, 33 pp. and 3 attachments.

3 Blaine Tech Services, August 21, 1986, Report # 86220B1, results of August 8, 1986 soil sampling; consultant's letter prepared for Chevron USA, 3 pp. 2 attachments 5 pp.

4 EMCON Associates, November 4, 1986, Monitoring Wells Installation Report for Chevron Service Station #9-2960. Castro Valley, California; consultant's report prepared for Chevron USA, 2 pp. and 1 attachment 13 pp.

5 GeoStrategies, Inc., November 15, 1990, Well Installation Report for Chevron Service Station #9-2960, Castro Valley, California; consultant's report for Chevron USA, 7 pp. and 4 attachments.

6 Alton Geoscience, November 8, 1991, Quarterly Ground Water Monitoring Report; consultant's letter report for Chevron USA, 2 pp. and 4 attachments.

benzene, respectively. Hydrocarbons were not detected in upgradient well C-5 or in downgradient wells C-6 and C-7.[7]

REMEDIATION APPROACH

We used the following criteria to determine the most cost-effective and expedient remediation for the subject site:

- Presence of separate-phase hydrocarbons in well C-1,
- Limited horizontal and vertical extent of detected hydrocarbon concentrations beneath the site,
- Results of soil vapor extraction (SVE) testing,
- Anticipated ground water pumping rate, and
- Air emissions and ground water discharge regulations.

Separate-phase Hydrocarbons

Water level data suggests that the majority of hydrocarbons is in soils about two ft above the current water table near well C-1. In April 1991, when the water level was about 17 ft below ground surface, only about 0.04 ft of separate-phase hydrocarbons were measured. In late 1990 and late 1991, when the water level was closer to 19 ft below ground surface, between 0.70 and 1.24 ft of separate phase hydrocarbons were measured. This suggests that separate-phase hydrocarbons become suspended in the capillary fringe as water levels drop. Separate-phase hydrocarbons have not measured in any other monitoring wells even though these wells have shown a similar fluctuation in water levels.

SVE Test Results

WA performed a SVE test at the site on December 18 and 19, 1991. Methodology and results were presented to Chevron, USA in a letter report dated January 15, 1992. Results indicate that SVE from well C-1 could effectively remove hydrocarbons from beneath the site.

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[7]Alton Geoscience, November 8, 1991, Quarterly Ground Water Monitoring Report: consultant's letter report for Chevron USA, 2 pp. and 4 attachments.

SVE from well C-1 induced effective influence at all onsite wells. However, the applied vacuum caused localized water table upwelling which could block the well screen along the capillary fringe thereby reducing SVE effectiveness. Local ground water extraction could minimize this mounding effect and maximize SVE effectiveness. Ground water extraction would also expedite dissolved hydrocarbon removal and mitigate possible offsite migration.

Anticipated Ground Water Pumping Rate

On February 5, 1992, Alton Geoscience, Concord, California performed recovery tests on wells C-1 and C-2. This data suggests that both wells can yield at least three to five gallons per minute (gpm). Pumping well form the vicinity of C-1 should effectively remove dissolved hydrocarbons from beneath the site.

Discharge Regulations

The Bay Area Air Quality Management District (BAAQMD) requires best available control technology for hydrocarbon emissions exceeding one lb/day TPH-G. BAAQMD also performs risk screen analyses for benzene emissions exceeding .05 lbs/day. SVE test results showed hydrocarbon mass removal rates of 687 and 0.19 lbs/day TPH-G and benzene, respectively. Remediation system mass removal rates will vary depending on vapor concentrations and flow rates. Typically, hydrocarbon concentrations will decline after the first few pore volumes are evacuated, therefore longer term mass removal rates will probably be less than seen during the SVE test.

Castro Valley Sanitary District (CVSD) discharge limits for hydrocabons in water are 10 ppm Total Petroluem Hydrocarbons and non-detect for benzene. To meet the benzene discharge limit, carbon treatment is recommended.

PROPOSED REMEDIATION

The proposed remediation consists of SVE from well C-1 with ground water extraction from a new, six-inch diameter well installed a few ft east of C-1. Although SVE should effectively removed separate-phase hydrocarbons, WA will install a passive skimmer in the new

well which will be emptied during routine system maintenance. Figure 2 shows a plan view of the proposed system lay-out.

Soil Vapor Extraction and Treatment

The SVE system is schematically shown in Figure 3. Vapors will be extracted by a 200 cubic feet per minute (cfm) positive-displacement vacuum pump. Extracted vapors will be treated with a combination thermal and catalytic oxidizer (Thermox/Catox) supplementally fueled with natural gas. The Thermox system configuration will be capable of destroying up to about 350 lbs of hydrocarbons per day. To maximize supplemental fuel consumption efficiency, the system will be reconfigured to a Catox when mass removal rates decrease to about 190 lbs/day. When mass removal rates decrease to about five lbs/day, Thermox/Catox may be replaced with a carbon adsorption system.

Ground Water Extraction and Treatment

The ground water extraction and treatment system is schematically shown in Figure 4. Ground water will be extracted from the new, six-inch diameter well with an electric submersible pump placed near the bottom of the well to allow for maximum drawdown. This larger diameter well will have a greater yield than a three-inch well and will allow room for installing a passive skimmer to collect separate-phase hydrocarbons which may collect in the well. Based on the data from the C-1 recovery test, we anticipate a pumping rate between three and five gpm.

Extracted water will flow through double-contained piping to the treatment system. Water will then flow through a filter vessel with a replaceable oil-absorbing filter bag followed by three 1,000 lb aqueous-phase GACs plumbed in series. At an extraction rate of about three to five gpm and at TPH-G concentrations of about 40 ppm, the carbon system will remove about 1.4 to 2.3 lbs TPH-G/day. Assuming a carbon adsorption capacity of 10%, carbon consumptions will range from 14 to 23 lbs/day. By using 1,000 lb carbon vessels, carbon changeout will be required about every 40 to 70 days. However, these carbon consumption estimates will vary with actual flow and hydrocarbon concentrations.

Chevron will directly contract Emsco of Oakland, California to install a new sanitary sewer lateral to Grove Way for discharge of treated ground water. A totalizing flow meter will record total discharge. The ground water treatment system will be installed on a bermed concrete pad with a sump pump.

The entire treatment system will be enclosed in a 16 ft wide by 20 ft long by 8 ft high slatted fence.

Power and Supplemental Fuel

The remediation system will require both 115/240 volt single-phase and 240 volt three-phase electric power. Electrical service will be brought in from an over head pole to a utility pole at the system enclosure by Pacific Gas & Electric (PG&E).

The Thermox/Catox system requires supplemental fuel. This can be either propane or natural gas. A natural gas main lies under the north side of Grove Way. This can be connected to the system by PG&E. Because the system requires a gas pressure of 5 psi, and standard residential and commercial service is 1/4 psi, PG&E requires a written request for review and approval prior to connection.

PERMITTING

Alameda County Environmental Health Department requires work plan submittal for review and approval.

Soil vapor extraction will require permitting through the BAAQMD in two steps. First, we will submit an application for an Authority to Construct. This will allow construction and initial performance testing of the system. Secondly, we will report results of the performance test and request issuance of a Permit to Operate which permit operation for one year. The BAAQMD requires a second separate permit application and fee for switching over to a carbon treatment system. This can be filed at the same time as the THERMOX/CATOX permit application or any time thereafter.

CVSD requires work plan submittal for review and approval of new lateral installation and discharge. Inspections are required for the new lateral installation and system start-up.

Additionally, a system performance test is required prior to long-term discharge. This test consists of storing and sampling three hours worth of extracted ground water. Results must be reported and approval given prior to long term discharge.

WA will apply for an encroachment permit from Alameda County for trenching, the new well and continued used of all existing monitoring wells except C-4 and C-5. This is necessary because, as shown in Figure 2, much of the site property has been acquired by Alameda County and is now in their right-of-way. The encroachment permit(s) will also require a bond and completion of legal-hold-harmless documentation by Chevron. Alameda County also requires a fencing variance to approve system location and construction of an eight ft fence around the system. Approval of this variance includes a public hearing.

WA will apply for other required permits including a well permit and combination building permit.

WA is pleased to provide continued remediation services to Chevron. We look forward to working with you on this interesting project. Please feel free to call if you have any question or comments.

Sincerely,
Weiss Associates

Thomas R. Berry
Project Geologist

Fatima S. Lelic, P.E., D.E.E.
Principal Engineer

TRB:trb

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Attachments: Figure 1. Site Location Map
Figure 2. Proposed Remediation System Location Map
Figure 3. Soil Vapor Extraction System Schematic
Figure 4. Ground Water Extraction System Schematic

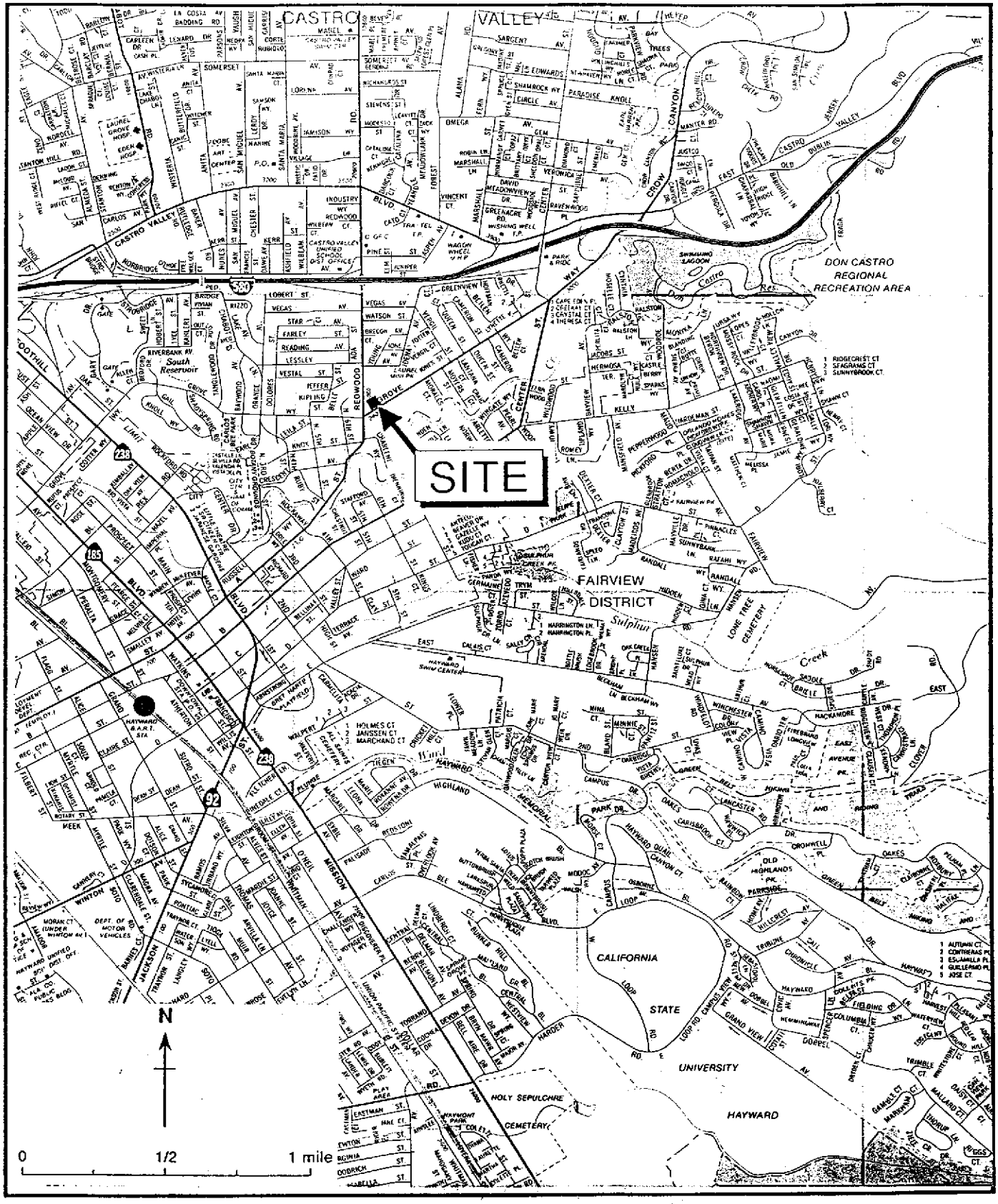

Figure 1. Site Location Map, Former Chevron Service Station #9-2960, 2416 Grove Way, Castro Valley, California

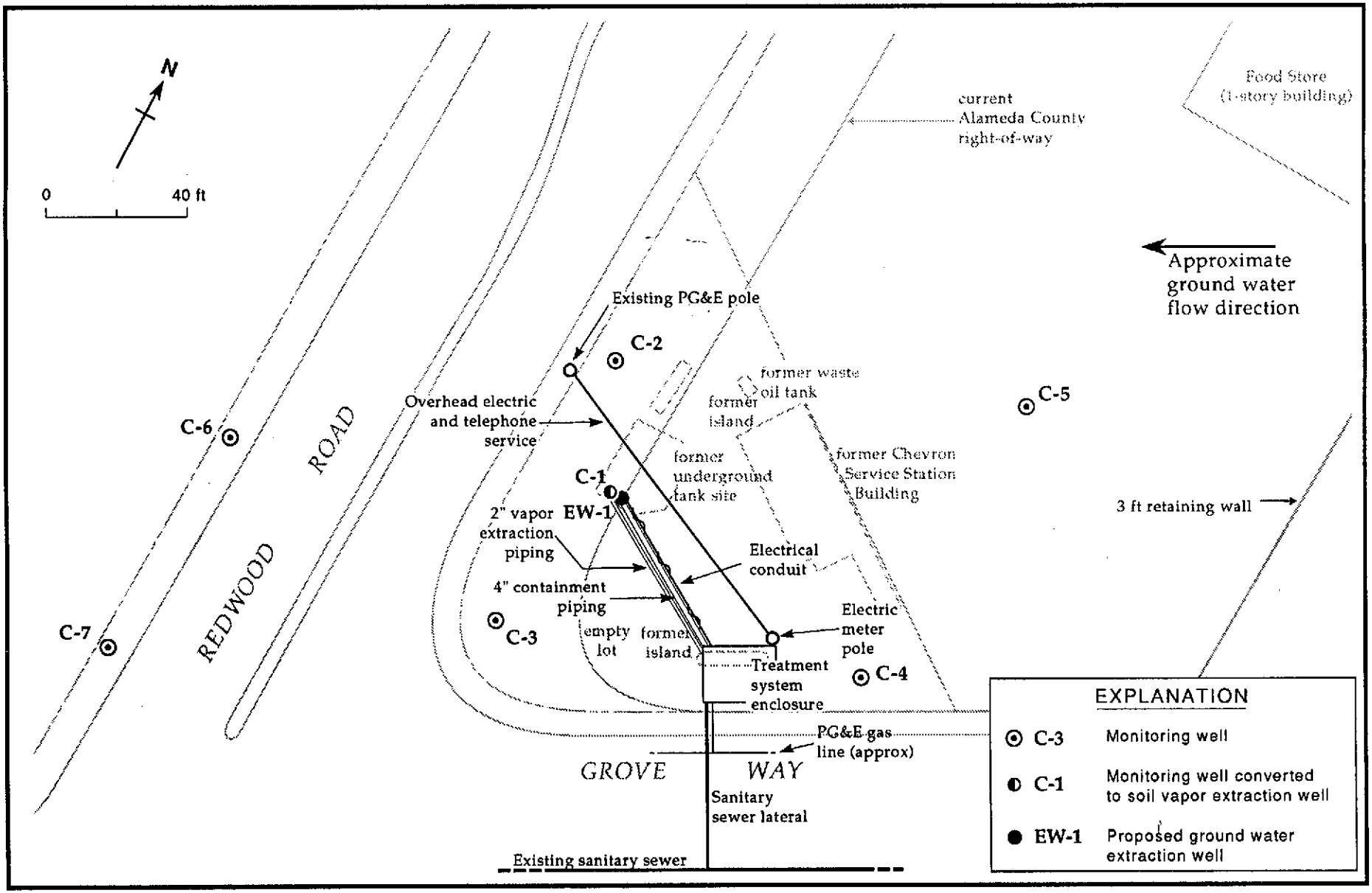

Figure 2. Proposed Remediation System Layout - Former Chevron Service Station #9-2960, 2416 Grove Way, Castro Valley, California

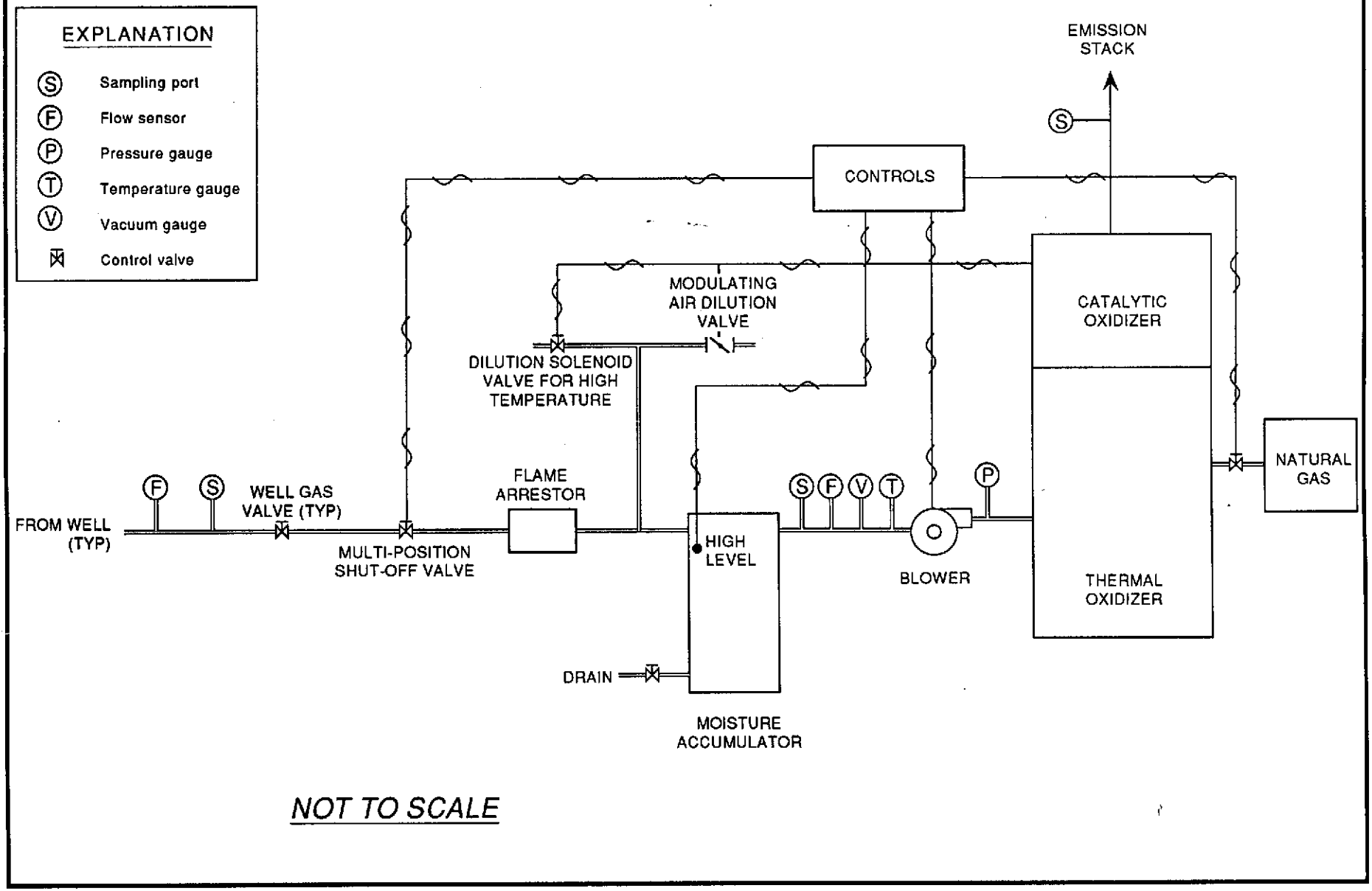

Figure 3. Process Flow Diagram - Soil Vapor Extraction with Thermal Oxidizer and Catalytic Module - Former Chevron Service Station #9-2960, 2416 Grove Way, Castro Valley, California

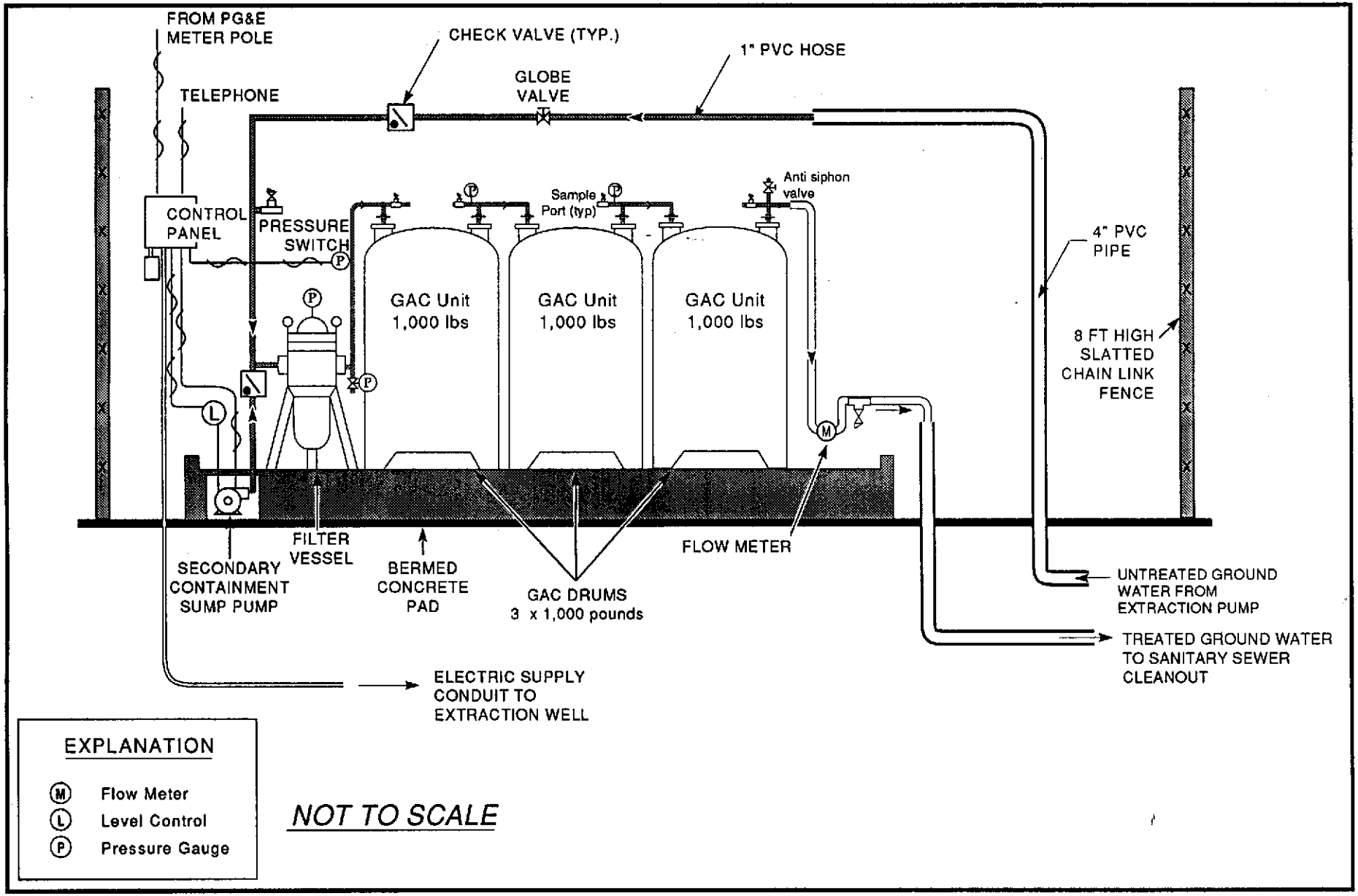

Figure 4. Proposed Ground Water Treatment System Schematic - Former Chevron Service Station #9-2960, 2416 Grove Way, Castro Valley, California

4/7/92