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

Marketing Department

92 MAR 17 AM 9:27

March 12, 1992

Ms. Pamela Evans
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

Re: Chevron Service Station #9-0504
15900 Hesperian Blvd., San Lorenzo

Dear Ms. Evans:

Enclosed we are forwarding the Remediation Work Plan dated March 4, 1992, prepared by our consultant Weiss Associates (Weiss) for the above referenced site. This work plan presents the results of the pump test performed in January, 1992, which was the basis for the ground water remediation system design.

Chevron will proceed with the permitting and installation of the remediation system. We would appreciate your review and formal concurrence prior to implementation of this work plan.

If you have any questions or comments, please do not hesitate to contact me at (510) 842-9581.

Very truly yours,
CHEVRON U.S.A. PRODUCTS COMPANY

Nancy Vukelich
Site Assessment and Remediation Engineer

Enclosure

cc: Mr. Eddy So, RWQCB-Bay Area
Ms. B.C. Owen
File (9-0504W1)

Mr. Bruce E. Prigoff, Esq.
Steefel, Levitt & Weiss
One Embarcadero Center, 29th Floor
San Francisco, CA 94111

Weiss Associates Environmental and Geologic Services

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

March 4, 1992

Ms. Nancy Vukelich
Chevron U.S.A. Products Company
P.O. Box 5004
San Ramon, CA 94583-0804

Re: Remediation Work Plan
Chevron SS #9-0504
15900 Hesperian Blvd.
San Lorenzo, California
WA Job # 4-551-08

Dear Ms. Vukelich:

As you requested, Weiss Associates (WA) prepared this ground water remediation work plan for the subject site (Figure 1). This work plan contains a brief background, presents pump test data, presents the proposed remediation method and discusses permit requirements.

BACKGROUND

Chevron Service Station #9-0504 is located at 15900 Hesperian Boulevard, San Lorenzo, California (Figure 1). There are currently eleven ground water monitoring wells at the site as shown in Figure 2. These wells are screened in the uppermost water bearing zone to a total depth of between about 20 and 25 ft. Gettler-Ryan Inc., of Hayward, California, installed ground water monitoring wells C-1 through C-5 at the site in December 1983[1]. GeoStrategies Inc. (GSI) of Hayward, California, installed ground water monitoring wells C-6, C-7, and C-8 in November 1989. In August 1990, GSI installed off-site ground water monitoring wells C-9, C-10, and C-11[2].

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1 Gettler-Ryan Inc., January 9, 1984, Well Installation Report for Chevron Service Station #9-0504, San Lorenzo, California, consultant's report prepared for Chevron USA, 1pp. and 1 attachment.

2 GeoStrategies Inc., October 19, 1990, Well Installation Report for Chevron Service Station #9-0504, San Lorenzo, California, consultant's report prepared for Chevron USA, 7pp. and 4 attachments.

Boring logs indicate that sediments beneath the site consist of low permeability clay and silt to the total explored depth of up to 25.5 ft. Local sand and gravel lenses are contained in the clay and silt. Ground water is currently about 14 ft below ground surface. Ground water beneath the site flows toward the southwest at a gradient of about 0.002 ft/ft.[3]

Apparently, no soil samples were analyzed when wells C-1 through C-5 were installed. However, analytic results of soil samples from borings for wells C-6 through C-11 showed no detectable hydrocarbons except in the borings for wells C-7 and C-8 where total hydrocarbon petroleum as gasoline (TPH-G) were detected near the ground water interface at 4.0 and 37 parts per million (ppm), respectively. Also, 3.7 ppm was detected at 10.5 ft below ground surface in boring C-7.

Laboratory analyses indicate that hydrocarbons are in ground water surrounding and down-gradient of the underground tanks. Up to 0.03 and 0.15 ft thick separate-phase hydrocarbons have been measured in wells C-1 and C-2, respectively. Interim remediation by weekly bailing of separate-phase hydrocarbons was started in November 1990. Since March 1991, no separate-phase hydrocarbons have been detected. Therefore, the frequency of thickness measurements was reduced to coincide with quarterly ground water sampling in September 1991. Lowering water levels may have trapped separate-phase hydrocarbons onto the newly exposed unsaturated soil. Therefore, separate-phase hydrocarbons may reappear in wells C-1 and C-2 if water levels rise again. Analytic results from the December 1991 ground water sampling detected 330, 8,200, 12,000, and 3,600 parts per billion (ppb) TPH-G in wells C-1, C-2, C-7, and C-8, respectively. Benzene concentrations were detected at 20, 510, 170, and 100 ppb in wells C-1, C-2, C-7, and C-8, respectively.[3]

On January 22, 1992, WA conducted short-term pump tests on wells C-1 and C-2 to estimate well yields and capture zones. Well C-1 was pumped at increasing flow rates for about 3.5 hours. Well C-2 was pumped for about 1 hour. Data indicates that each well yielded over three gallons per minute (gpm) during the test. We conservatively estimated a longer term flow rate of about two gpm, a hydraulic conductivity of 0.03 ft/minute, and a gradient of 0.004 ft/ft to model the anticipated capture zone. Figure 3 shows a plot of ground water capture by pumping both C-1 and C-2 simultaneously at individual well rates of two gpm. Modelling

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3 Alton Geoscience, February 21, 1992, Quarterly monitoring report, consultant's letter report.

suggests that pumping wells C-1 and C-2 at two gpm can potentially generate a capture zone at least 400 ft wide and 120 ft down gradient thereby effectively capturing offsite dissolved hydrocarbons as well as mitigating further offsite migration. Because the current ground water gradient is closer to 0.002 ft/ft, this capture zone is likely to be larger than modelled. However it is important to recognize that localized soil heterogeneities can affect the shape and size of the capture zone boundary.

REMEDIATION APPROACH

The following data were used to determine the most cost-effective treatment method for the subject site.

- Intermittent presence of separate-phase hydrocarbons in wells C-1 and C-2,
- Lateral extent of dissolved hydrocarbons,
- C-1 and C-2 pump test data, and
- Sanitary sewer discharge limits for benzene and TPH-G.

Because hydrocarbon concentrations are detected in ground water from down-gradient wells C-7 and C-8, we recommend ground water extraction to mitigate further migration and to remove dissolved hydrocarbons. Pump test data indicates that pumping both wells C-1 and C-2 should provide effective ground water capture. We recommend ground water treatment with granulated activated carbon (GAC) because the Oro Loma Sanitary District prohibits discharge of detectable benzene concentrations.

Although the extent of hydrocarbon concentrations in soil is not known, data suggests that elevated concentrations are probably limited to the immediate vicinity of the underground fuel tanks. Because it is an operating service station, onsite soil remedial measures will be evaluated future tank and piping retrofitting/remodelling activities.

PROPOSED REMEDIATION

The proposed ground water remediation consists of ground water extraction with electric submersible pumps from wells C-1 and C-2. The ground water will be pumped through an oil-absorbing filter and three, 1,000 lb granular activated carbon vessels plumbed in series. Treated ground water will be discharged into the sanitary sewer through an existing lateral. Influent piping and treatment system equipment will have double containment to protect against accidental spillage. Figure 4 shows the proposed piping and treatment system locations. Figure 5 shows a schematic diagram of the proposed treatment system.

At the expected total extraction rates of about 4-6 gpm and at conservatively estimated TPH-G concentrations of about 10 ppm, the remediation system will remove between 0.5 and 0.7 lbs TPH-G/day. Assuming a carbon adsorption capacity of 10%, carbon consumption will range from 5 to 7 lbs/day. By using 1,000 lb carbon beds, carbon change-out will be required every 140-200 days. Note that these are estimates and carbon consumption will vary with actual flow rates and hydrocarbon concentrations.

The system will be placed on a double containment pad enclosed within a slatted fence at the rear of the station. The system will be connected to the station electrical panel.

PERMIT REQUIREMENTS

Discharge to the sanitary sewer requires approval from two agencies; the Alameda County Department of Enviromental Health and the Oro Loma Sanitary District. WA will submit this work plan to each agency with a request to review and provide a written approval and/or comments on the proposed treatment and discharge.

Construction of the treatment system and connection to the sanitary sewer requires a permit from the Alameda County Building Permit Office. WA will apply for a combination permit which will cover plumbing, electrical, and construction activities. This will include submittal of a system schematic plan.

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 questions or concerns.

REGISTERED PROFESSIONAL ENGINEER
FATIMA S. LELIC
No. 43319
Exp. 3/31/92
CIVIL
STATE OF CALIFORNIA

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: Figures 1-5

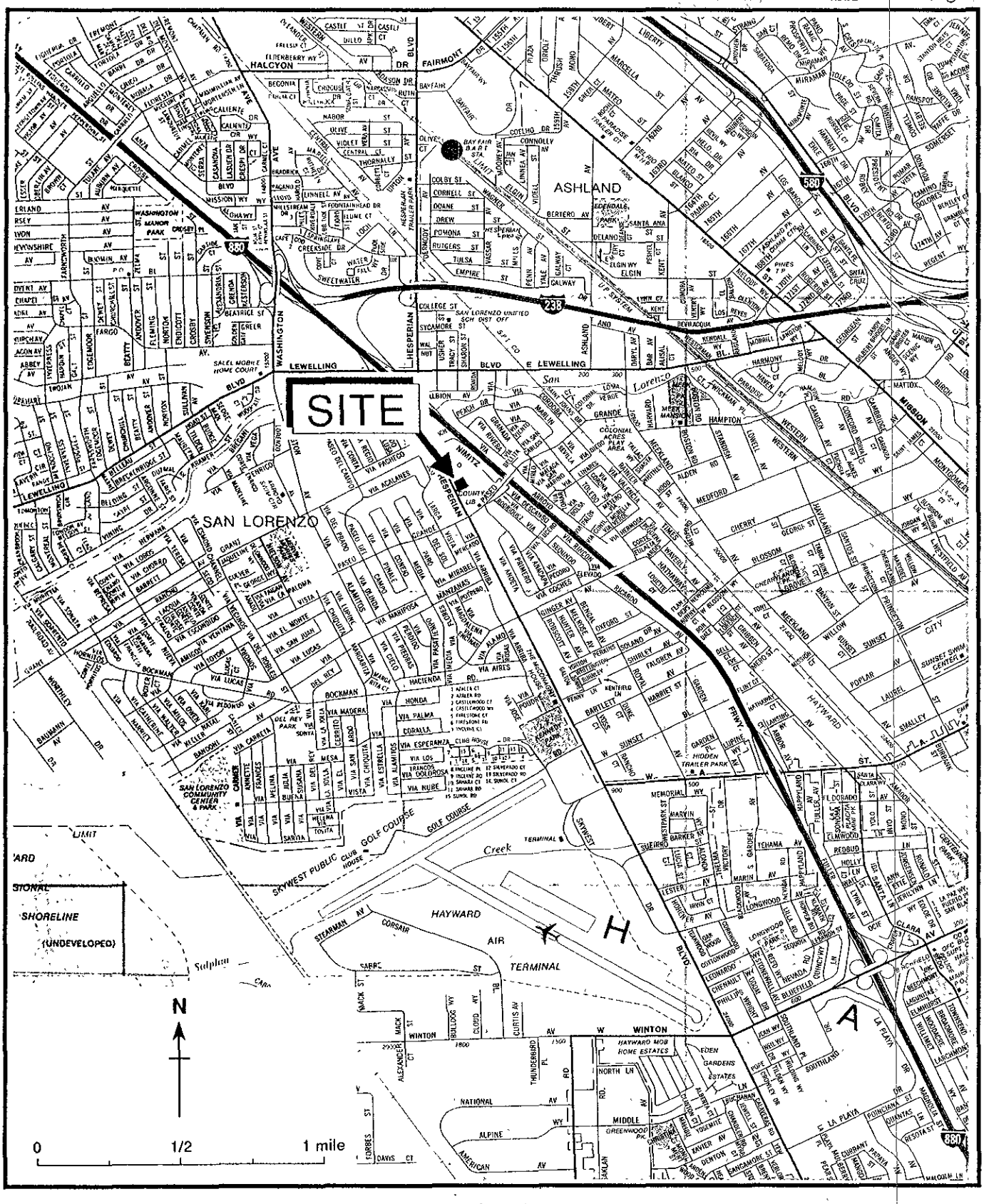

Figure 1. Site Location Map, Chevron Service Station #9-0504, 15900 Hesperian Blvd., San Lorenzo, California

6/18/91

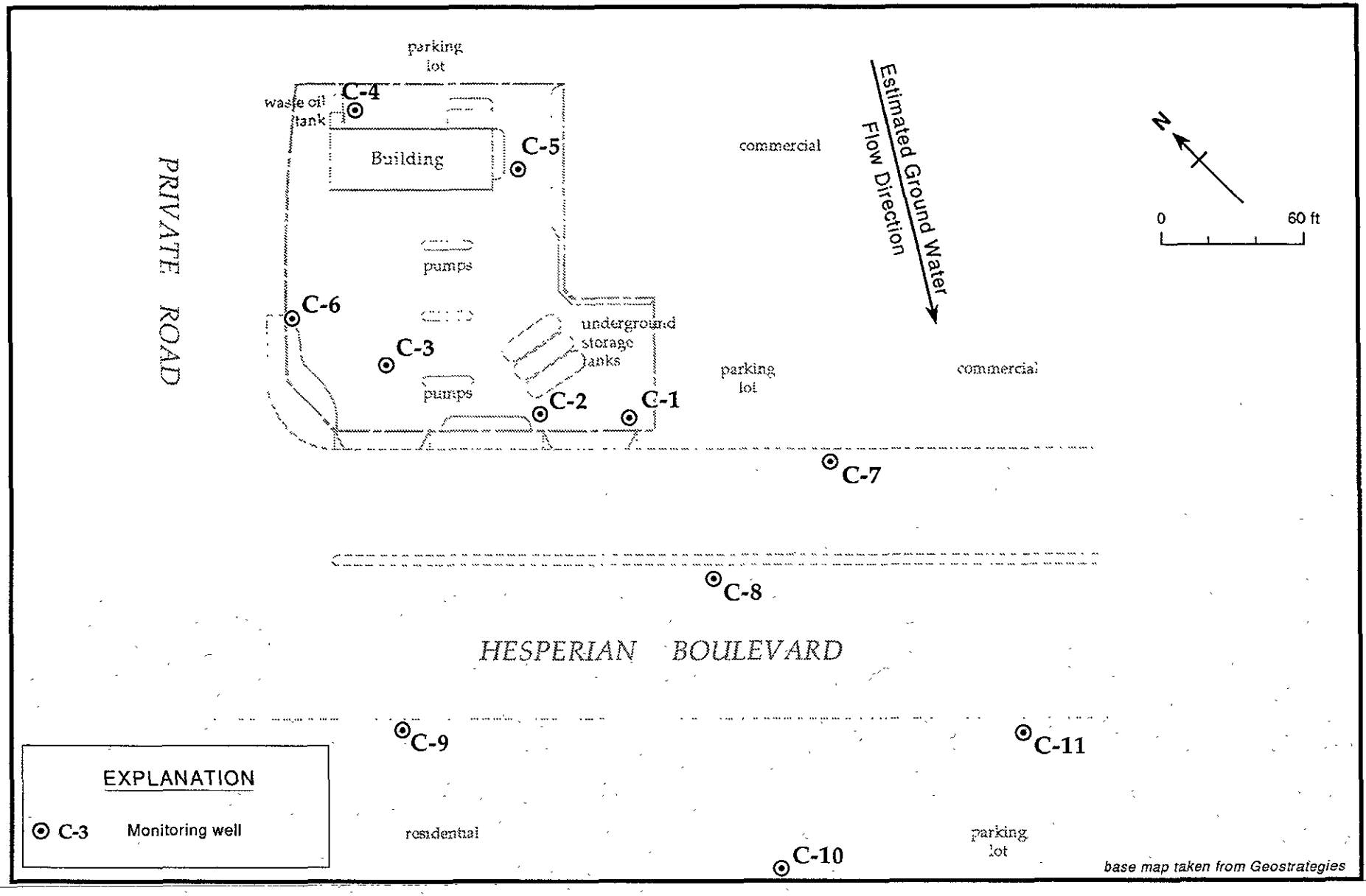

Figure 2. Monitoring Well Locations - Chevron Service Station #9-0505, 15900 Hesperian Blvd., San Lorenzo, California

2/25/92

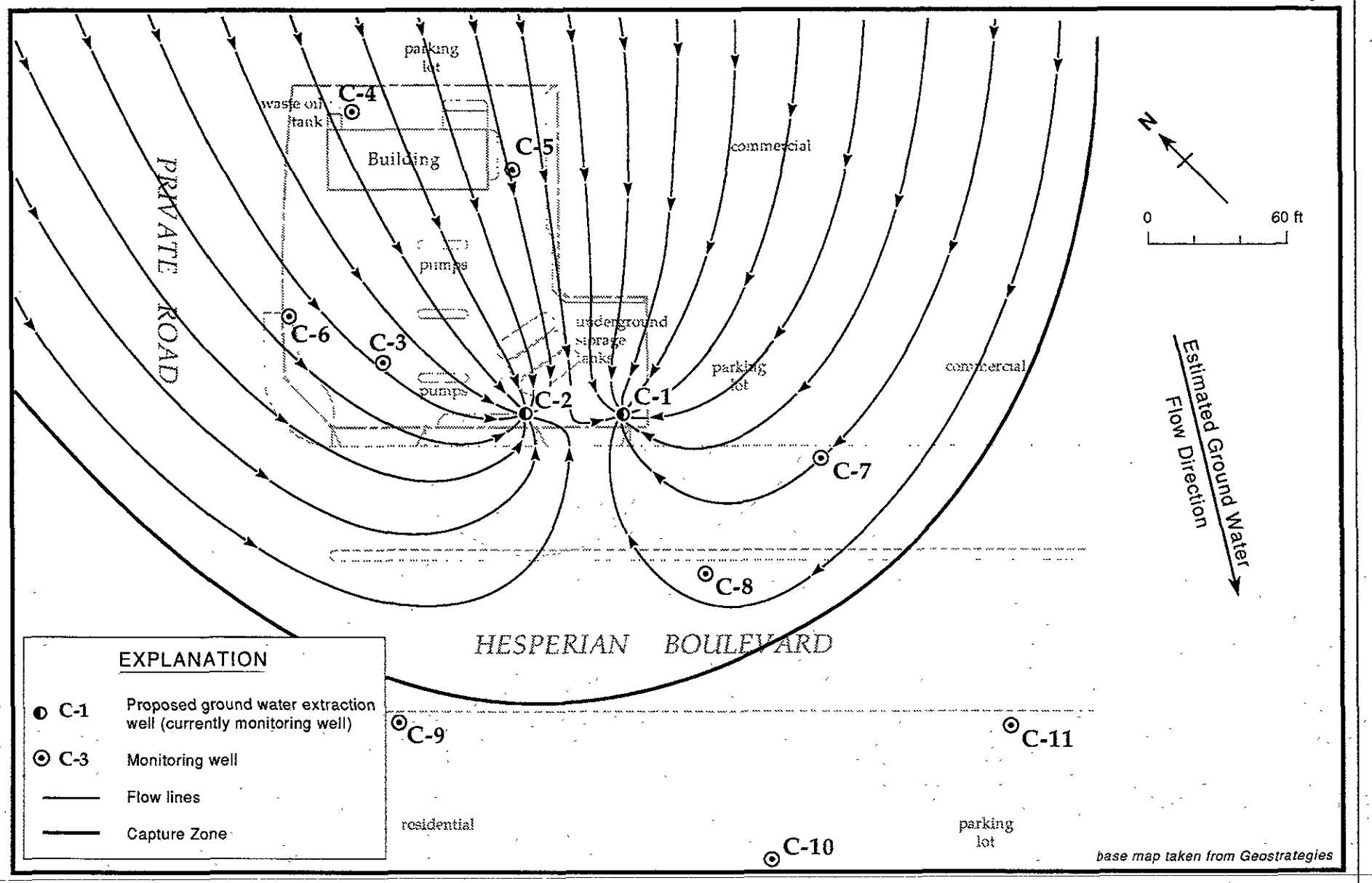

Figure 3. Capture Zone and Flowlines - Pumping Wells C-1 and C-2, 2 gpm Each Well - Chevron Service Station #9-0505, 15900 Hesperian Blvd., San Lorenzo, California

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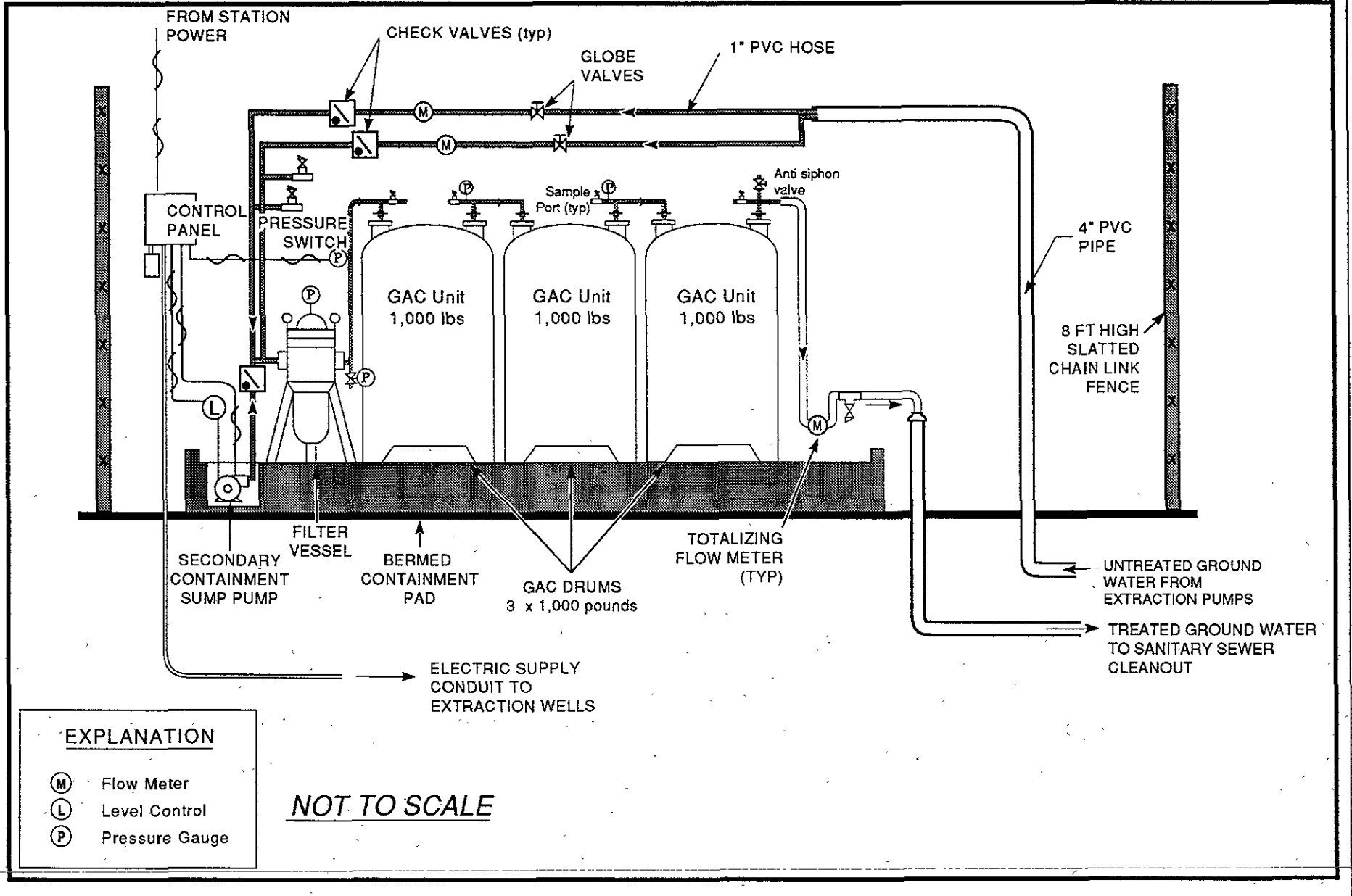

Figure 5. Proposed Ground Water Treatment System Schematic - Chevron Service Station #9-0504, 15900 Hesperian Boulevard, San Lorenzo, California

2/25/92

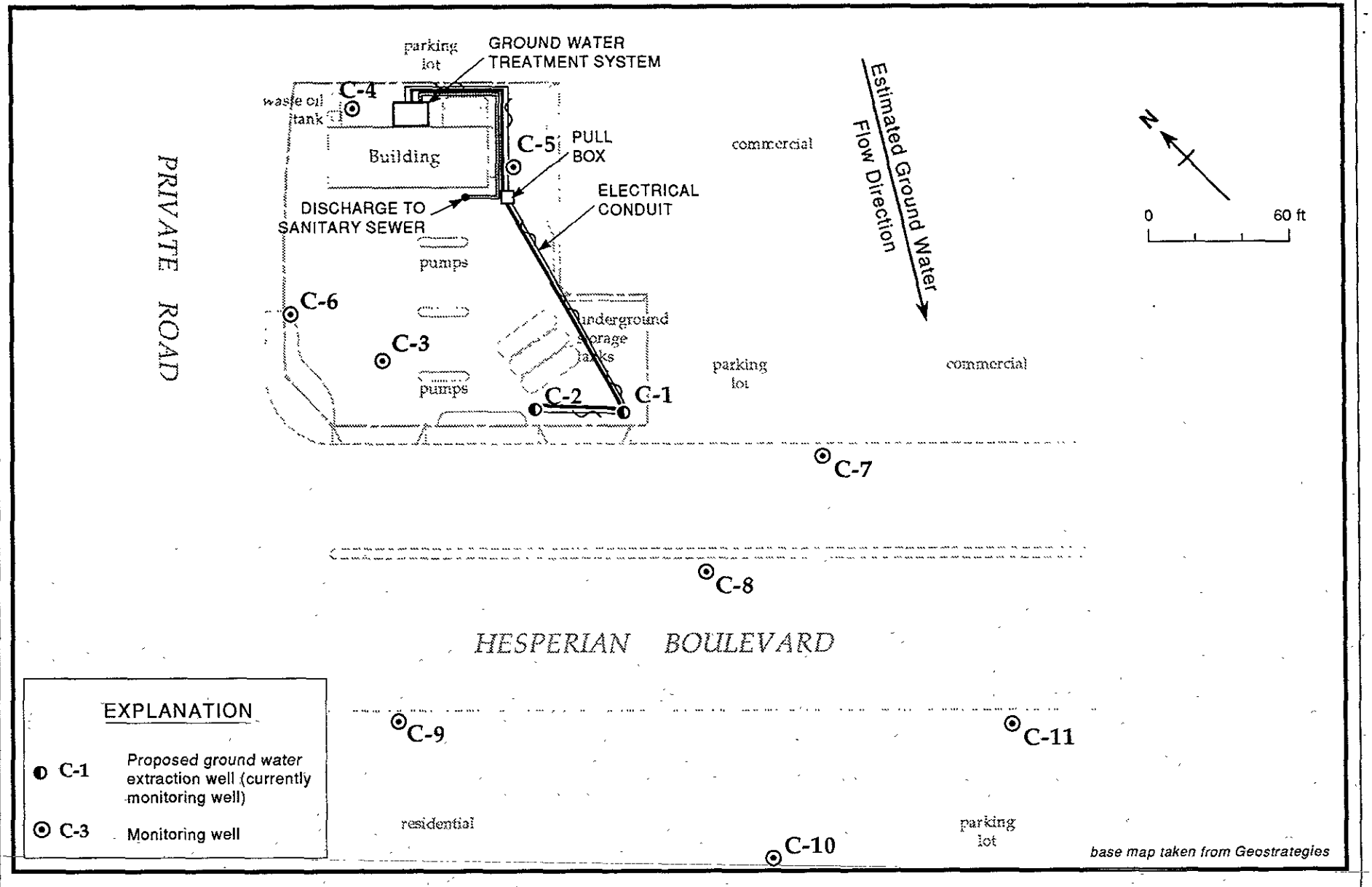

Figure 4. Proposed Ground Water Extraction System Plan - Chevron Service Station #9-0505, 15900 Hesperian Blvd., San Lorenzo, California

2/25/92