PACIFIC
ENVIRONMENTAL
GROUP, INC.

January 20, 1988
Project 130-12.03

Gettler-Ryan Inc.
1992 National Avenue
Hayward, CA 94545

Attn: Mr. Jeff Ryan

Re: ARCO Service Station #4931
MacArthur Blvd. (at West Street)
Oakland, California

Gentlemen:

This letter presents the results of a groundwater investigation documented by Pacific Environmental Group, Inc. (PACIFIC) at the ARCO service station located at 731 West MacArthur Boulevard and West Street in Oakland, California (see Figures 1 and 2). The scope of work included; a survey to determine the location of documented water-supply wells within a 1/2-mile radius of the site, installation of four groundwater monitoring wells, and sampling and analysis of groundwater from all site wells.

BACKGROUND

The project site has four gasoline tanks in a common excavation located in the eastern portion of the site. There is currently no waste oil tank at the station.

Eight groundwater monitoring wells (A-1 through A-8) have been previously installed at the site by other consulting firms. Monitoring Wells A-1 through A-4 were installed prior to December, 1982, but no information is available regarding the exact date of installation, or the consulting firm performing the investigation. Wells A-5 through A-8 were installed in March, 1983 by Groundwater Technology, Inc. (GTI). Well A-1 was destroyed in August, 1983, possibly during tank replacement activities.

Gettler-Ryan Inc. has been monitoring all site wells for water level and presence of floating product since late 1982. According to their records, floating product has

been detected intermittently in four site wells since March, 1983. Product has been noted in Wells A-2, A-4 and A-8 at maximum thicknesses of 0.5, 4.0, and 0.3 feet, respectively. Product film was noted in Well A-5 during the first quarter of 1984.

The purpose of PACIFIC's investigation was to define the downgradient extent of hydrocarbons detected in the groundwater during the previous investigations.

PROCEDURES

Four monitoring wells (A-9, A-10, A-11 and A-12) were installed by PACIFIC on December 15 and 16, 1987 at the locations shown on the attached Figure 3. Well A-9 is located in the southwest corner of the station, Well A-10 is located along the southern property line, and Wells A-11 and A-12 were drilled on West Street, west of the site.

The borings for the wells were drilled using either 8-inch (Wells A-10, A-11, and A-12) or 12-inch (Well A-9) diameter hollow-stem auger drilling equipment, and were logged by a PACIFIC geologist using the Unified Soil Classification System. Soil samples for logging were collected at five-foot depth intervals by advancing a California-modified split-spoon sampler with brass liners into undisturbed soil beyond the tip of the auger. The sampler was driven a maximum of 18 inches, using a 140-pound hammer with a 30-inch drop. Boring logs are attached to this report.

Boring A-9 was advanced to a depth of 45 feet, and Borings A-10, A-11 and A-12 were advanced to a depth of 30-1/2 feet each. Borings A-10, A-11, and A-12 were completed as monitoring wells by the installation of 3-inch diameter, Schedule 40 PVC casing and 0.020-inch factory-slotted screen. Well A-9 was constructed with 6-inch diameter casing in the event that aquifer-testing is required in order to determine parameters for remedial action design. In each well the screen was placed through the entire saturated section, extending approximately three to four feet above the static water level. Graded sand pack was placed in the annular space across the screened interval, and extends approximately two feet above the screen. A bentonite and concrete seal extends from the sand pack to the ground surface. A locking cap and protective vault box were installed on the top of each monitoring well. Well construction details are summarized on the attached boring logs.

The surface (box) elevation of each of the newly installed wells was surveyed to the nearest 0.01 foot (relative to a project datum) by Gettler-Ryan Inc.

All site wells (A-2 through A-12) were sampled by PACIFIC on January 5, 1988. The sampling procedure consisted of first measuring the water level in each well, then checking each well for the presence of floating petroleum product using a clear teflon bailer. Groundwater samples were collected from all wells which did not contain floating product by first purging a minimum of four casing volumes of water from each well using a centrifugal pump. During purging, temperature, pH, and electrical conductivity were monitored in order to collect a representative sample. Samples were collected using a teflon bailer and were placed into appropriate EPA-approved containers. The samples were labeled, logged onto chain-of-custody documents, and transported on ice to the laboratory.

Groundwater samples were analyzed for the presence of dissolved gasoline and benzene, toluene and xylene (BTX) compounds. Analytical methods are summarized on the attached certified analytical reports.

FINDINGS

Well Survey

The California Department of Water Resources (DWR) was contacted in order to determine the location of possible water-supply wells within a 1/2-mile radius of the site. According to DWR records, there are three documented water-supply wells located within this area (designated A, B and C on Figure 1).

According to DWR records, all three water-supply wells were installed between 1926 and 1928. Wells A and B are located approximately 1300 feet to the northwest of the site. No information was available regarding the current status or usage of Well A. Well B was abandoned in 1958. Well C, located 2,400 feet west (downgradient, as measured in the shallow aquifer) of the site, is a 97-foot deep industrial well.

Subsurface Conditions

Soils encountered during drilling consisted primarily of 12 to 19 feet of clay and silt materials, underlain by sand and clayey sand, with minor clay interbeds to the total depth explored of 45 feet. Faint product odor was noted in soils from Boring A-9 at a depth of nine feet. No odor was observed in soils below 10-1/2 feet in A-9, or during drilling of any of the other wells.

Groundwater was first noted at a depth of approximately 10 feet, and stabilized at depths ranging from approximately 7.5 to 9 feet. Groundwater elevation contours based on liquid levels measured by Gettler-Ryan on January 12, 1988 indicate that groundwater flows westerly at an average gradient of 0.06 (see Figure 3). This groundwater flow direction correlates with the anticipated regional flow direction, which is generally to the west (based on surface topography and drainage patterns) towards San Francisco Bay.

Laboratory Results

On the date sampled, January 5, 1988, floating product was detected in Wells A-4 and A-8 at thicknesses of 0.02 and 0.18 foot, respectively. Samples were collected from the remaining wells and analyzed for the presence of dissolved gasoline and BTX compounds. Dissolved gasoline was detected in Well A-2 at 12,000 parts per billion (ppb) and in Wells A-3, A-6 and A-9 at concentrations ranging from 250 to 390 ppb. No gasoline was detected in groundwater samples collected from the other site wells. Laboratory results are summarized on the attached certified analytical reports.

A 1,000 ppb isoconcentration contour for dissolved gasoline is presented on Figure 3. This contour was plotted based on a logarithmic decrease in concentrations between monitoring wells. Figure 3 shows that the dissolved gasoline plume for gasoline has been defined to levels below 1,000 ppb in both a downgradient and lateral direction.

If you have any questions regarding the contents of this letter, please call.

Very truly yours,

PACIFIC ENVIRONMENTAL GROUP, INC.

for
Christine Wilson
Project Geologist

Susan Willhite
Senior Geologist
CEG 1272

TABLE 1

SUMMARY OF WELL SURVEY DATA

Water-Producing Wells
Within 1/2 Mile Radius of the Site

Map Symbol	Well Number	Depth (ft)	Year Drilled	Use
A	1S4W23E	?	1928	?
B	1S4W23E1	575 or 420	1926	Abandoned 1958
C	1S4W23M1	97	1927	Industrial

Source: California Department of Water Resources, Sacramento Office

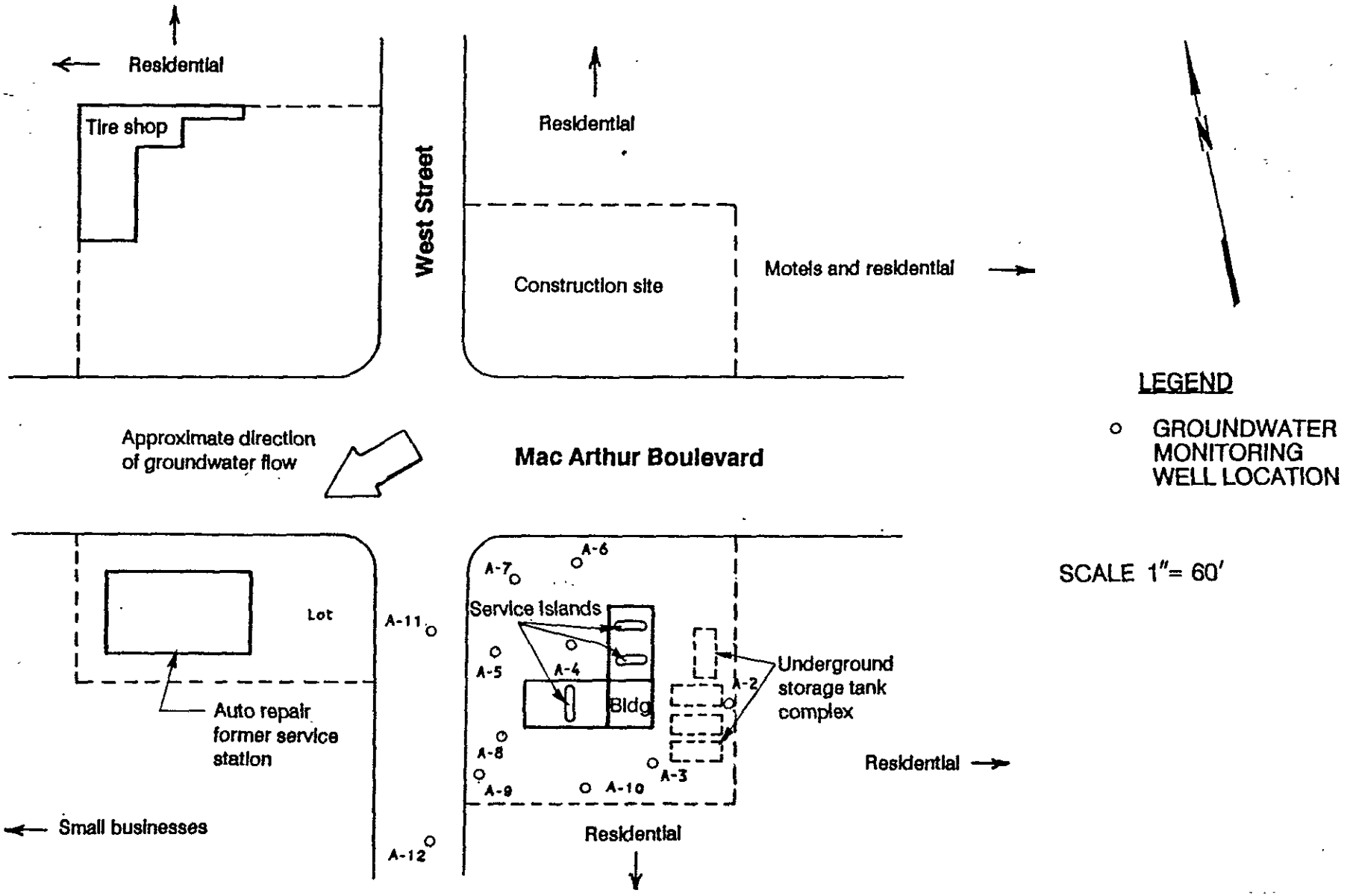
LEGEND

o Well location

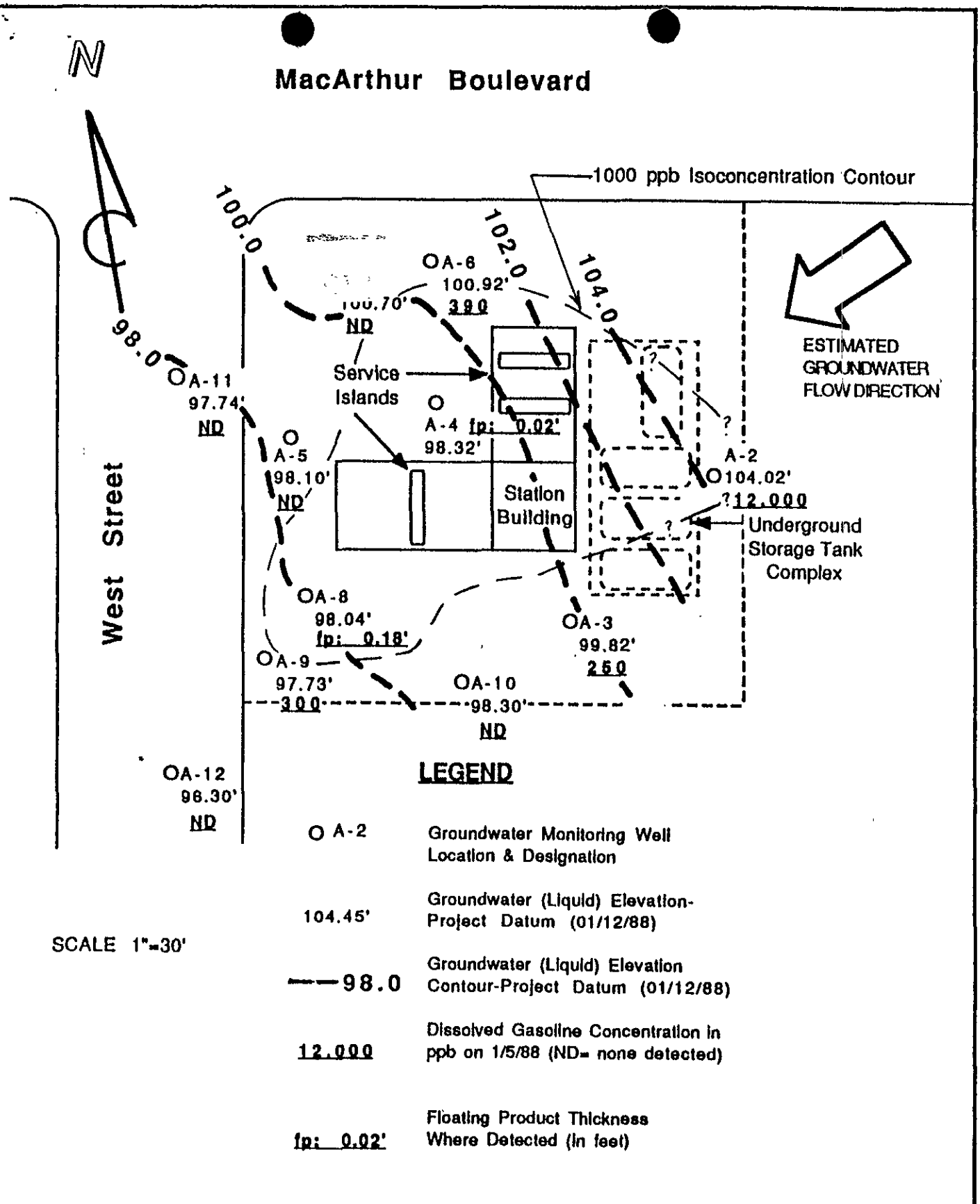
SCALE: 1" = 2000'

Source: U.S. Geological Survey topographic map

PACIFIC ENVIRONMENTAL GROUP INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 1
	WELL LOCATION MAP	PROJECT: 130-12.03



PACIFIC ENVIRONMENTAL GROUP, INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 2
	EXTENDED SITE MAP	PROJECT: 130-12.03



PACIFIC ENVIRONMENTAL GROUP, INC.	ARCO SERVICE STATION #4931 MacArthur Boulevard & West Street Oakland, California	FIGURE: 3
	GROUNDWATER CONTOUR MAP	PROJECT: 130-12.03