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ENVIRONMENTAL PROTECTION

99 JAN 13 PM 3:05

January 11, 1999

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

#13

Re: **Letter Response and Work Plan**
Shell-branded Service Station
WIC #204-5508-3400
4411 Foothill Boulevard
Oakland, California

Conversation w/ D. Ataide! Shoot for Draft Feb 19th / reply to my comments/concerns.

Dear Mr. Chan:

On behalf of Equiva Services LLC (Equiva), Cambria Environmental Technology, Inc. (Cambria) is submitting this letter response and work plan in response to the Alameda County Health Care Services Agency (ACHCSA) letter to Equiva dated December 7, 1998. Following is a response to specific items requested in the letter and our proposed scope of work for additional site investigation and enhancing dissolved oxygen in groundwater.

RESPONSE TO LETTER ITEMS

Provide an explanation for the fluctuating concentrations of TPHg and MTBE being observed at this site: Fluctuating concentrations of total petroleum hydrocarbons as gasoline (TPHg) and methyl tert-butyl ether (MTBE) are likely a result of fluctuating groundwater levels and changes in groundwater flow direction over time. MTBE concentrations have been monitored in site wells since September of 1996. Between September 1996 and September 1998, depths to groundwater in the highest MTBE well S-2, have ranged from 7.97 feet below ground surface (ft bgs) to 10.50 ft bgs, a difference of 2.53 feet. Figures A and B presented below illustrate depths to groundwater versus TPHg and MTBE concentrations for well S-2. The groundwater gradient for that time period has ranged from 0.005 to 0.05 percent.

In addition to fluctuating groundwater levels and gradients, the groundwater flow direction has varied over time which may also contribute to fluctuating concentrations of TPHg and MTBE. The groundwater flow direction onsite has primarily been to the northwest. However, flow direction has varied from north to northeast and for the June 1997 sampling event the flow direction was to the southwest. Previous groundwater contour maps are presented in Attachment A.

Oakland, CA
Sonoma, CA
Portland, OR
Seattle, WA

Cambria Environmental Technology, Inc.

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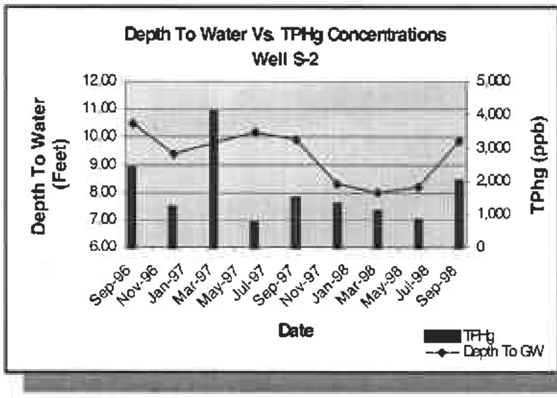

Figure A

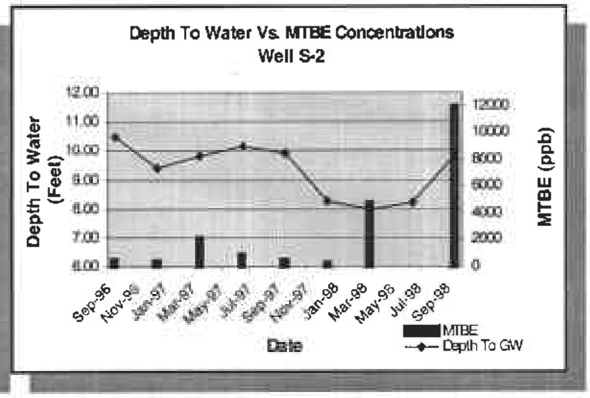

Figure B

(1) makes no sense to me.

Where are the sources of soil and groundwater contamination and is there a need to further characterize the site either on or off-site? This Shell-branded service station was recently upgraded by Paradiso Mechanical of San Leandro, California (Paradiso) in August of 1998. Paradiso added secondary containment to the gasoline turbines and dispensers (Figure 1). This phase of upgrades completes upgrades required for equipment to meet 1998 standards, eliminating future primary sources of petroleum hydrocarbons and MTBE. what about past releases? (2)

Residual petroleum hydrocarbons and MTBE in soil may be acting as secondary sources of these compounds in groundwater. Soil analytical results for site monitoring wells and dispenser sample locations are presented in Table 1 and Table 2 respectively.

The highest concentrations of residual petroleum hydrocarbons in soil are from the areas beneath dispenser 1 and dispenser 2. Concentrations of TPHg were 1,100 parts per million (ppm) from beneath dispenser 1 at 2 ft bgs, and 1,500 ppm from dispenser 2 at 2 ft bgs during the August 1998 dispenser soil sampling event. Based on these TPHg concentrations and historical variations in groundwater flow directions, further site investigation on the southeast portion of the site is warranted. To further delineate petroleum hydrocarbon distribution and groundwater flow direction, Cambria proposes installation of one additional monitoring well (S-4) at the location shown on Figure 1.

any attempt to remove impacted soil beneath dispensers (3)

I don't see the location as being affected (4)

Our scope of work for this investigation includes:

- Preparing a site Health and Safety Plan, coordinating field activities, securing drilling permits and notifying Underground Service Alert;
- Drilling and installing one 4-inch diameter ground water monitoring well and collecting soil samples;

- Preparing an investigation report presenting the results of the soil sampling.

Specific tasks are discussed below.

Site Health and Safety Plan: We will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site and signed by each site worker.

Utility Location: Cambria will notify Underground Service Alert (USA) of our proposed drilling activities. USA will have the underground utilities in the site vicinity identified. In addition, Cambria will arrange to have a private line locator survey the proposed drilling location for underground utilities.

Permits: We will obtain the necessary permits for the installation of the wells from the Alameda County Department of Public Works.

Monitoring Well Installation: The 4-inch diameter ground water monitoring well will be installed using a drill rig equipped with hollow-stem augers. We will collect soil samples at five foot intervals or at lithologic changes, and from just above the water table. We will select soil samples for chemical analysis based on observations of staining and odor and on the results of field screening with a volatile vapor analyzer. The well will be developed using a combination of ground water surging and extraction. Following development, the well will be sampled on a quarterly basis. The well top-of-casing elevation will be surveyed with respect to mean sea level and for horizontal location with respect to an onsite or nearby off-site landmark. Our standard field procedures for monitoring well installations are presented in Attachment B.

Chemical Analysis: Selected soil samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg) by modified EPA Method 8015, and benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8020. The highest MTBE concentrations detected by EPA Method 8020 in each boring will be confirmed by EPA Method 8260. Groundwater samples collected during scheduled monitoring events will be analyzed for TPHg by modified EPA Method 8015, and BTEX and MTBE by EPA Method 8020.

Reporting: Upon receipt of the analytical results, we will prepare an investigation report that, at a minimum, will contain:

- A summary of the site background and history;
- Descriptions of the drilling, soil sampling, and well installation methods;

- Boring log;
- Tabulated analytic results;
- Analytic reports and chain-of-custody forms;
- Soil and water disposal methods; and,
- A discussion of the hydrocarbon distribution in the subsurface.

Further off-site investigation is not proposed at this time. Two adjacent sources of petroleum hydrocarbons exist within the vicinity of the site. An active Chevron service station (Chevron) is located at 4265 Foothill Boulevard and an active Union 76 (BP) service station is located at 4280 Foothill Boulevard (Figure 1). Between the Shell-branded site, the Chevron site and the BP site, concentrations of petroleum hydrocarbons and MTBE in groundwater in the vicinity have largely been delineated.

How is the plume migrating off site and are there any preferential migration pathways? With the proximity of the Chevron and BP sites there may be a commingled hydrocarbon and MTBE plume adjacent to the Shell-branded site. To better assess off-site plume migration and groundwater gradient and flow direction, Cambria recommends coordinated sampling for all three sites for future groundwater monitoring events. Combined data for the three sites will facilitate a better overall picture of groundwater flow and contaminate distribution in the area. This will allow for the need and responsibility for further assessment. At the direction of your agency, Cambria will coordinate future joint sampling events.

This is already done. See Alisto's report for BP. (5)

Cambria contacted the City of Oakland and reviewed city maps and records for Foothill Boulevard and High Street, adjacent to the site. Storm drain and sanitary sewer locations are shown on Figure 1. Once combined groundwater contour data from all three sites is obtained, Cambria will be able to further evaluate preferential migration pathways. Why is combined gradient necessary?

Provide plan to enhance dissolved oxygen (DO) in groundwater. To enhance DO in groundwater, Cambria proposes to inject hydrogen peroxide into site wells. Cambria recommends coordinating with the adjacent Chevron and BP sites to perform hydrogen peroxide injection at all three sites concurrently. The specific tasks to be performed are described below.

Site Health and Safety Plan: We will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and signed by each site worker.

Approval/Permits: Cambria will contact the ACHCSA and the Regional Water Quality Control Board (RWQCB) to determine if any permit or approvals are required to add hydrogen peroxide into

- What is est. size of plume?
- This add'n of H_2O_2 would only treat localized area, like "sock's", right?
How much O_2 is released?
#5
$H_2O_2 \rightleftharpoons H_2O + \frac{1}{2} O_2$

the subsurface.

Hydrogen Peroxide Injection: Cambria will add an approximate 8% solution of hydrogen peroxide (diluted from a 35% solution) into all site wells. The hydrogen peroxide solution will be added into each well to approximately 5 ft below top of casing (approximately 20 gallons) and allowed to infiltrate. Following the addition of the hydrogen peroxide, a slug of tap water will be added to the well to help facilitate the infiltration of the hydrogen peroxide into the aquifer. The amount of hydrogen peroxide and tap water added to each well will be based on the diameter of the well, depth to ground water, and the permeability of the soil. Hydrogen peroxide will added on a weekly basis for a period of 6 weeks during the beginning of the 2nd quarter of 1999. Dissolved oxygen measurements will be collected each week, prior to the addition of the hydrogen peroxide, and again during quarterly ground water monitoring. The wells will be allowed to equilibrate for 6 weeks prior to the collection of quarterly ground water samples. A second phase of hydrogen peroxide addition will be performed for a period of 6 weeks during the subsequent quarter.

Reporting: After the analytic results are received from the two quarterly ground water sampling events, Cambria will prepare an interim remedial evaluation report that, at a minimum, will contain:

- Description of field activities including the volume of hydrogen peroxide added;
- Tabulated groundwater analytical results;
- Laboratory analytical reports and chain of custody forms; and
- Summary of the effectiveness of hydrogen peroxide injection to enhance DO in groundwater.

SCHEDULE

Upon receiving written approval of the work proposed above, Cambria will apply for the necessary permits and begin scheduling field activities.

Robby Pendarvis!
TPE Orange County

CLOSING

We appreciate the opportunity to work with you on this project. Please call Darryk Ataide at (510) 420-3339 if you have any questions or comments.

pager 716-3730

Sincerely,

Cambria Environmental Technology, Inc.

Darryk Ataide
Environmental Scientist

Diane M. Lundquist
Principle Engineer

REGISTERED PROFESSIONAL ENGINEER
DIANE M. LUNDQUIST
NO. C46725
CIVIL
STATE OF CALIFORNIA

Attachments: A - Historical Groundwater Contour Maps
B - Standard Field Procedures For Monitoring Well Installations

cc: Karen Petryna, Equiva Services LLC, P.O. Box 6249, Carson, CA 90749-6249

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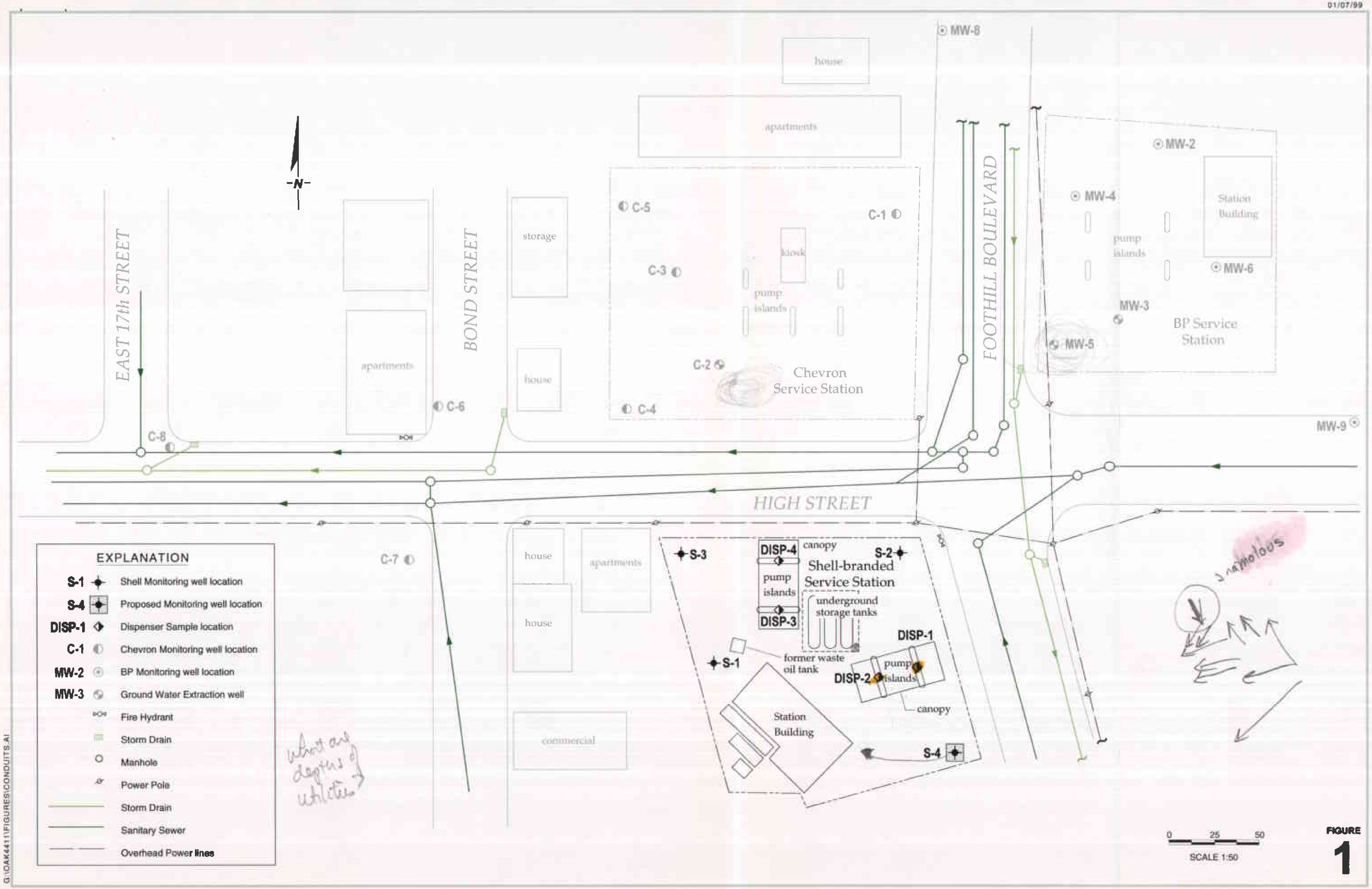
01/07/99



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Conduit Study Map

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Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
WIC #204-5508-3400

FIGURE
1

Table 1

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

Shell Service Station - WIC#204-6852-1008
4411 Foothill Boulevard, Oakland, California

Well Number	Sample Depth (feet)	Sampling Date	TPHmo (ppm)	TPHd (ppm)	TPHg (ppm)	B (ppm)	T (ppm)	E (ppm)	X (ppm)
S-1	6.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	11.0	11/24/92	390	180	110	0.45	<0.005	2.2	8
	16.0	11/24/92	<1.0	<1.0	2.8	<0.050	0.51	0.097	0.50
	21.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	26.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
S-2	6	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	10.5	5/21/93	NT	<10	95	<0.005	<0.005	0.52	0.56
	15	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	0.013
S-3	6.5	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	11	5/21/93	NT	36	1,300	<0.005	<0.005	35	200
	15	5/21/93	NT	<10	<0.5	<0.005	0.019	0.020	0.11

<u>Notes:</u>

TPHd : Total petroleum hydrocarbons as diesel by EPA Method 8015 (modified)
TPHg : Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
BTEX : Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (modified)
NT : Not tested

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Table 2. Dispenser Sample Analytical Data - Shell-branded Service Station - WIC #204-0461-0501, 4411 Foothill Blvd., Oakland, California

Date	Sample ID	Depth (feet)	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
			←	(Concentrations reported in milligrams per kilogram)				→
8/26/98	D-1(2.0)	2.0	1,100	13(2.5)	9.2	4.1	15	61
8/26/98	D-2(2.0)	2.0	1,500	<6.2	3.6	4.3	7.1	21
8/26/98	D-3(2.0)	2.0	160	1.4	1.3	0.61	2.9	2.0
8/26/98	D-3(2.0)	2.0	180	0.83	0.29	0.17	0.10	0.43

Abbreviations and Notes:

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015.

MTBE = Methyl tert-butyl ether by EPA Method 8020. Result in parentheses represents MTBE by EPA 8260.

Benzene, ethylbenzene, toluene, and total xylenes by EPA Method 8020.

<n= Below detection limit of n milligrams per kilograms

ATTACHMENT A

Historical Groundwater Contour Maps

Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
WIC #204-5508-3400

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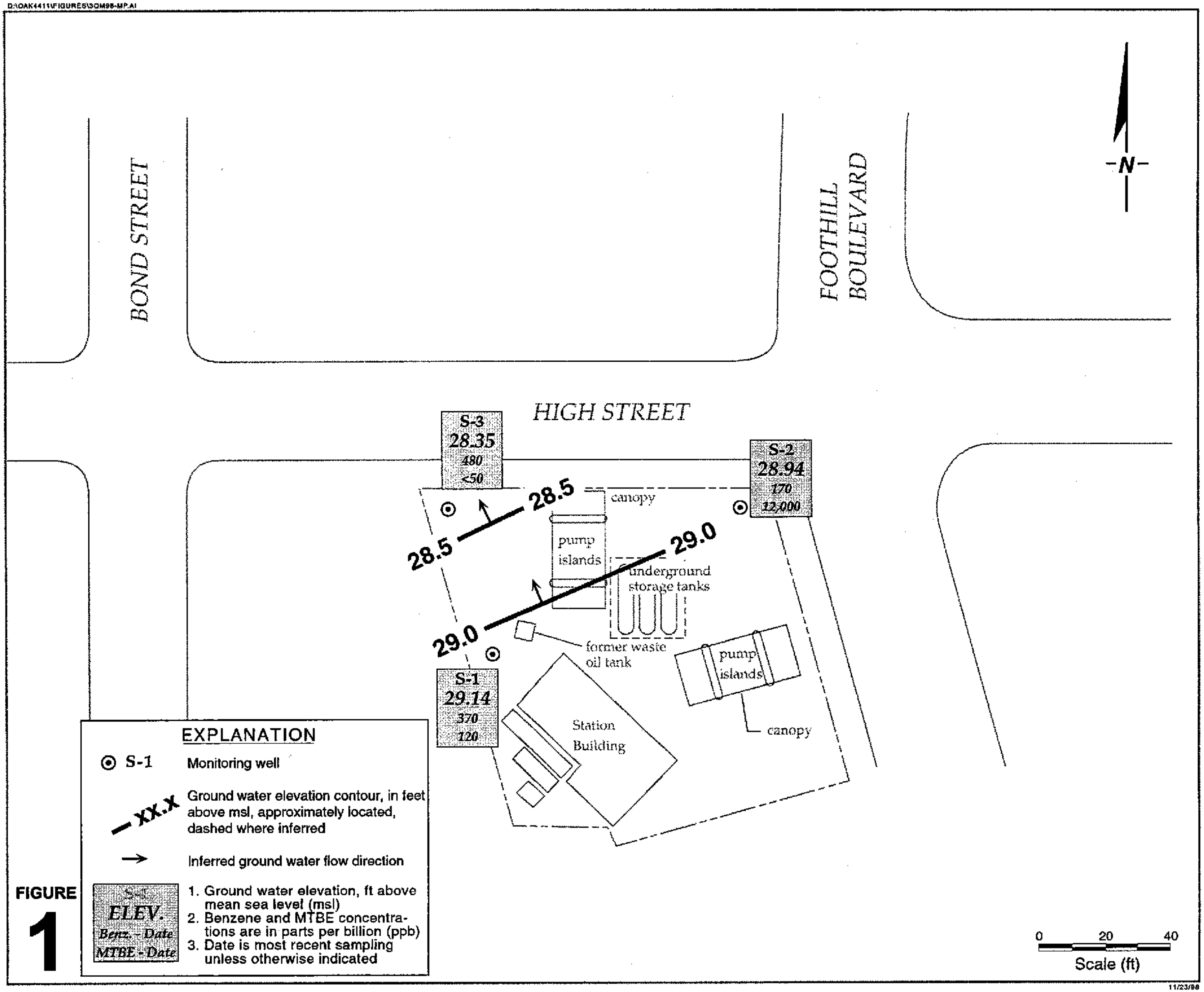
Ground Water Elevation Contours
September 1, 1998



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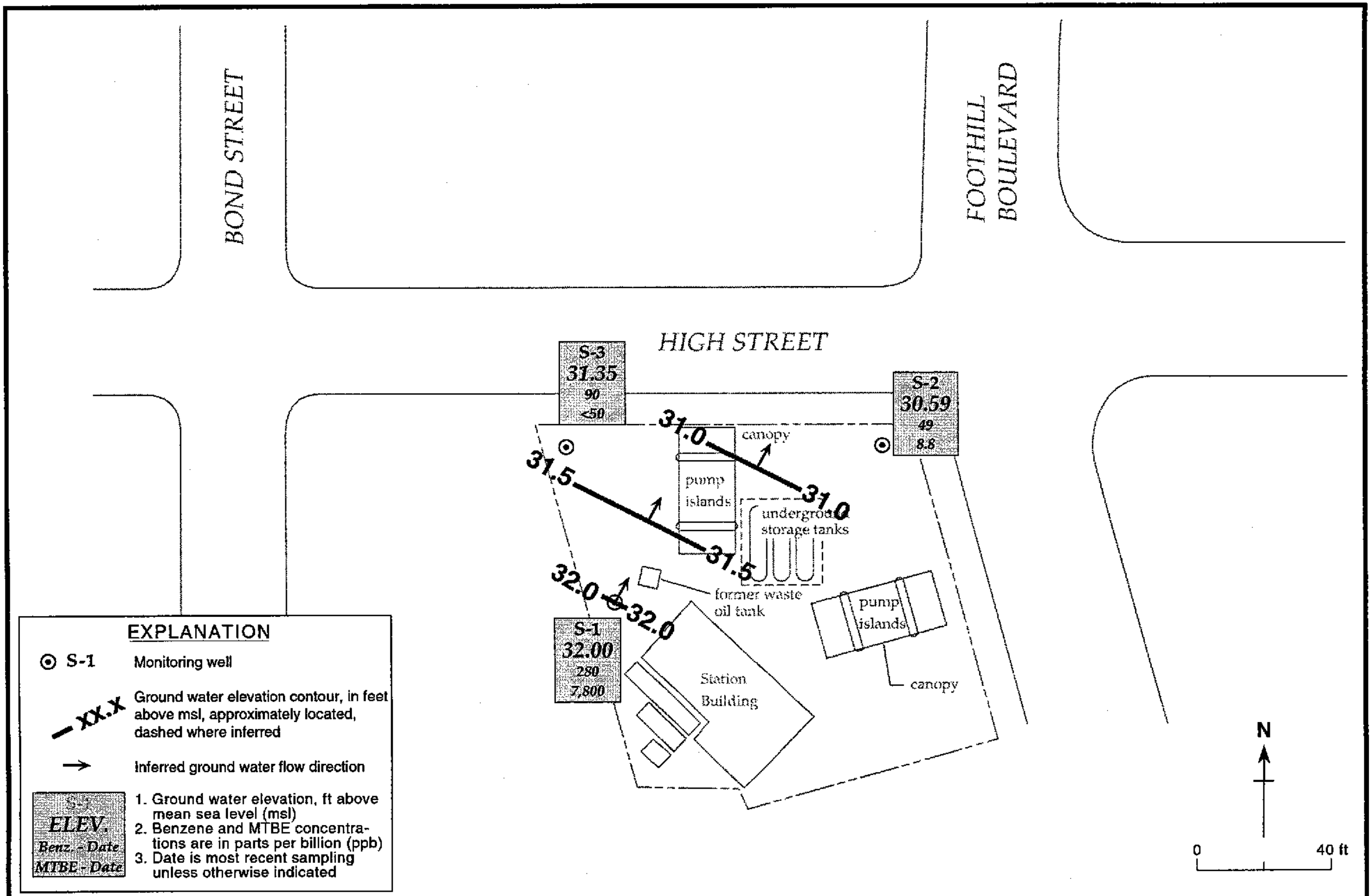

Figure 1. Ground Water Elevation Contours - June 23, 1998 - Shell-branded Service Station - WIC #204-5508-3400, 4411 Foothill Boulevard, Oakland, California

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08/10/98

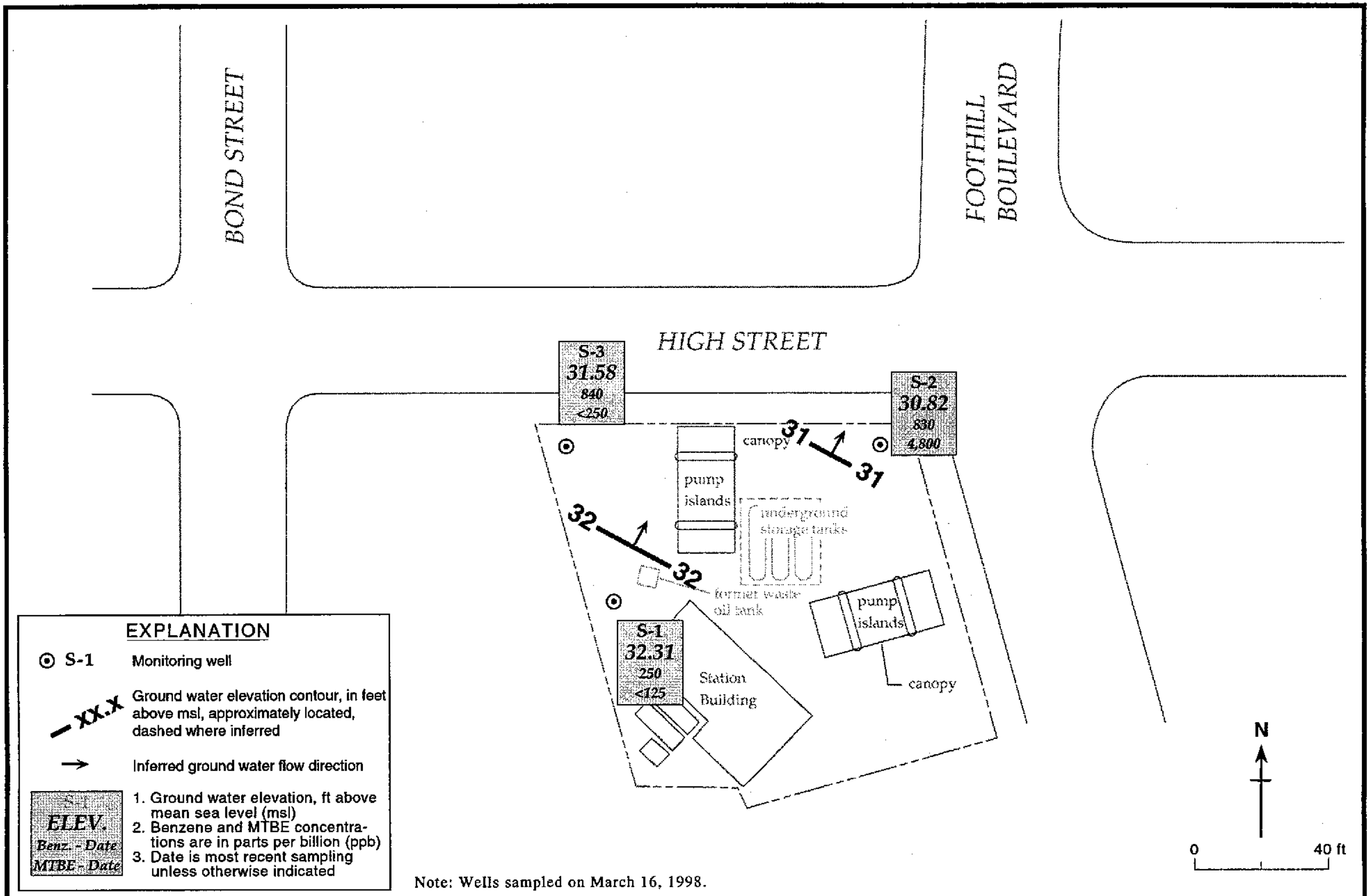

Figure 1. Ground Water Elevation Contours - March 12, 1998 - Shell Service Station - WIC #204-5508-3400, 4411 Foothill Boulevard, Oakland, California

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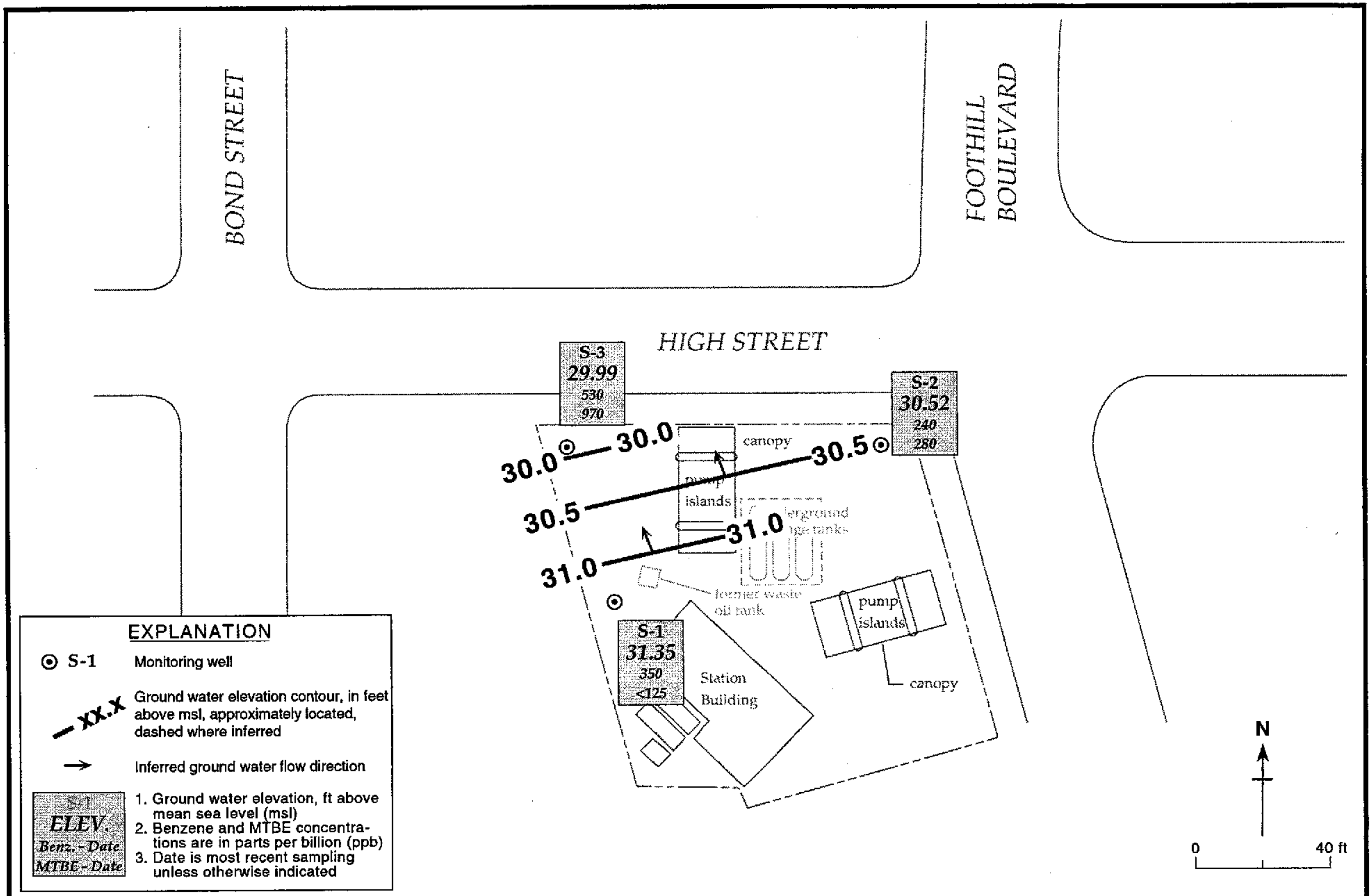

Figure 1. Ground Water Elevation Contours - December 11, 1997 - Shell Service Station - 4411 Foothill Boulevard, Oakland, California

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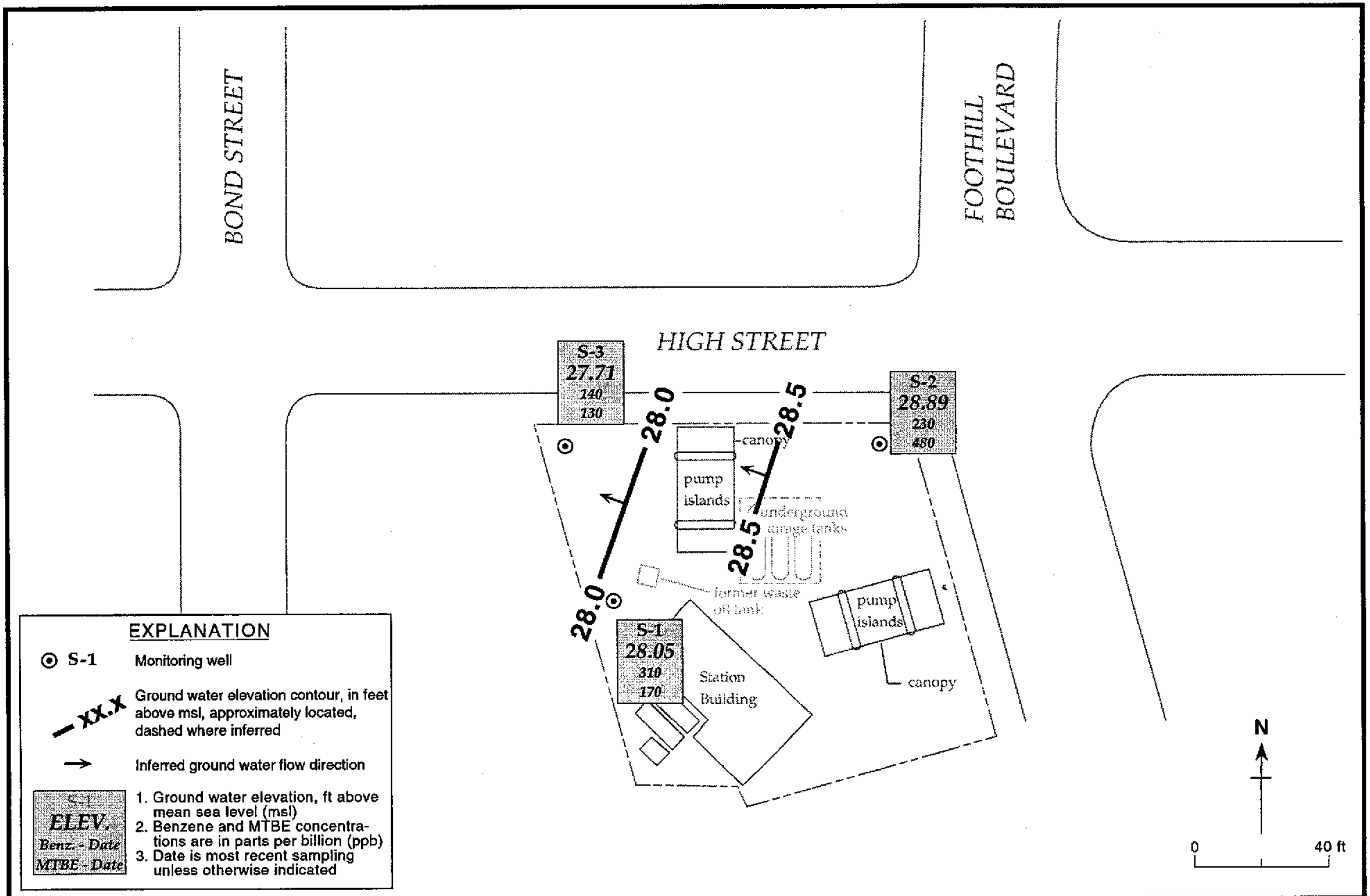

Figure 1. Ground Water Elevation Contours - September 17, 1997 - Shell Service Station WIC# 204-5508-3400 - 4411 Foothill Boulevard, Oakland, California

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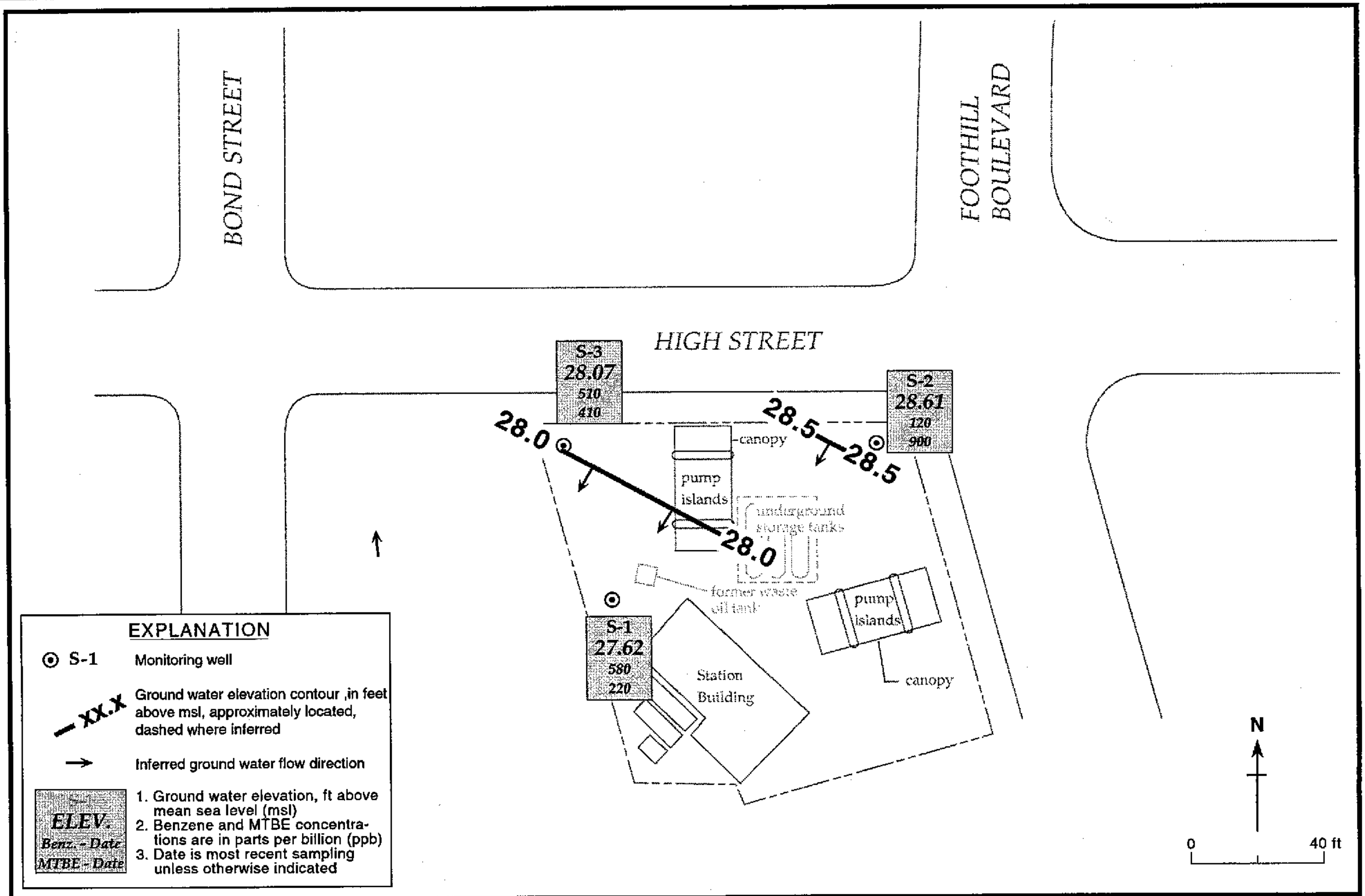

Figure 1. Ground Water Elevation Contours - June 11, 1997 - Shell Service Station WIC# 204-5508-3400 - 4411 Foothill Boulevard, Oakland, California

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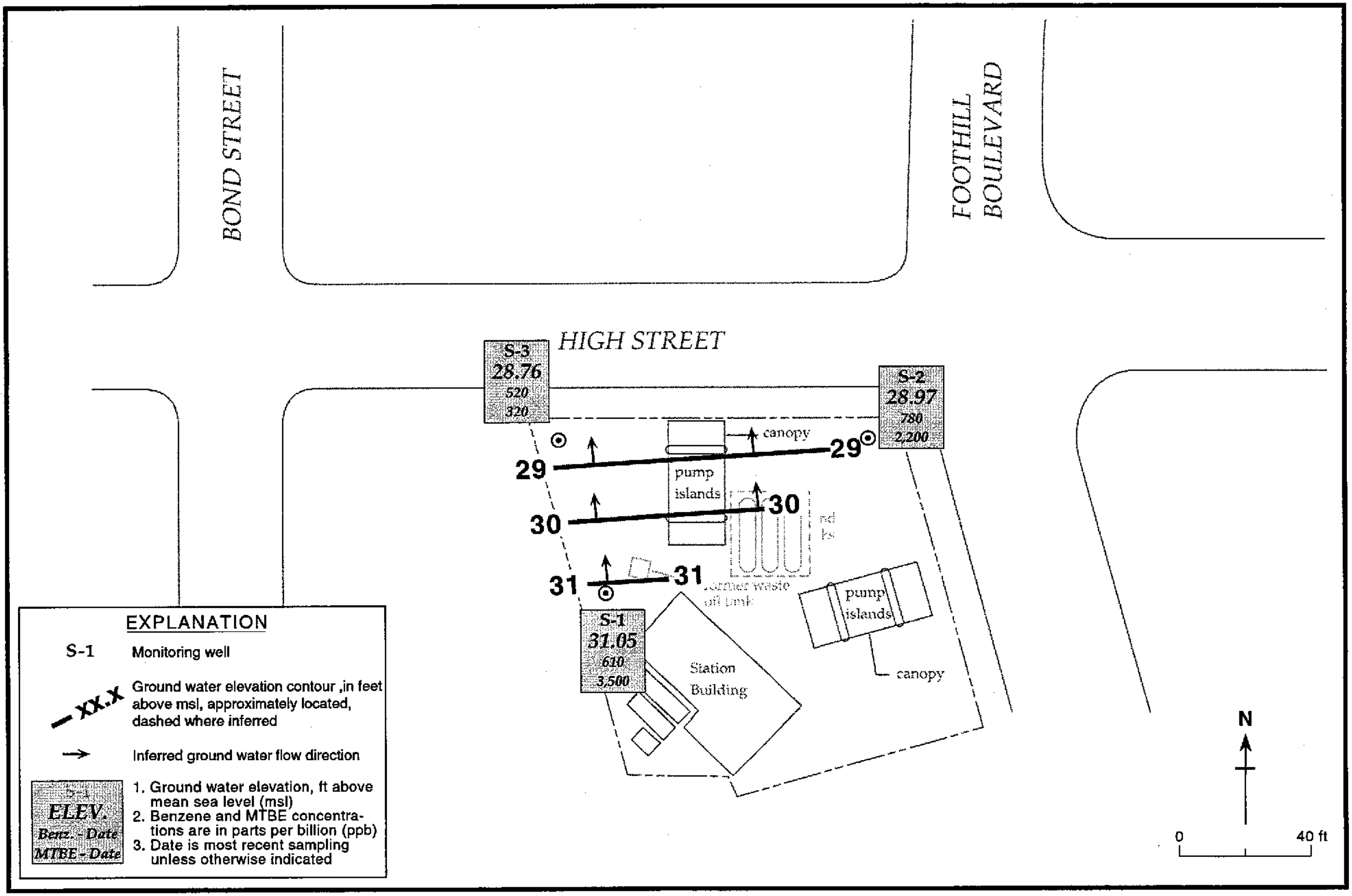

Figure 1. Ground Water Elevation Contours - March 17, 1997 - Shell Service Station WIC# 204-5508-3400 - 4411 Foothill Boulevard, Oakland, California

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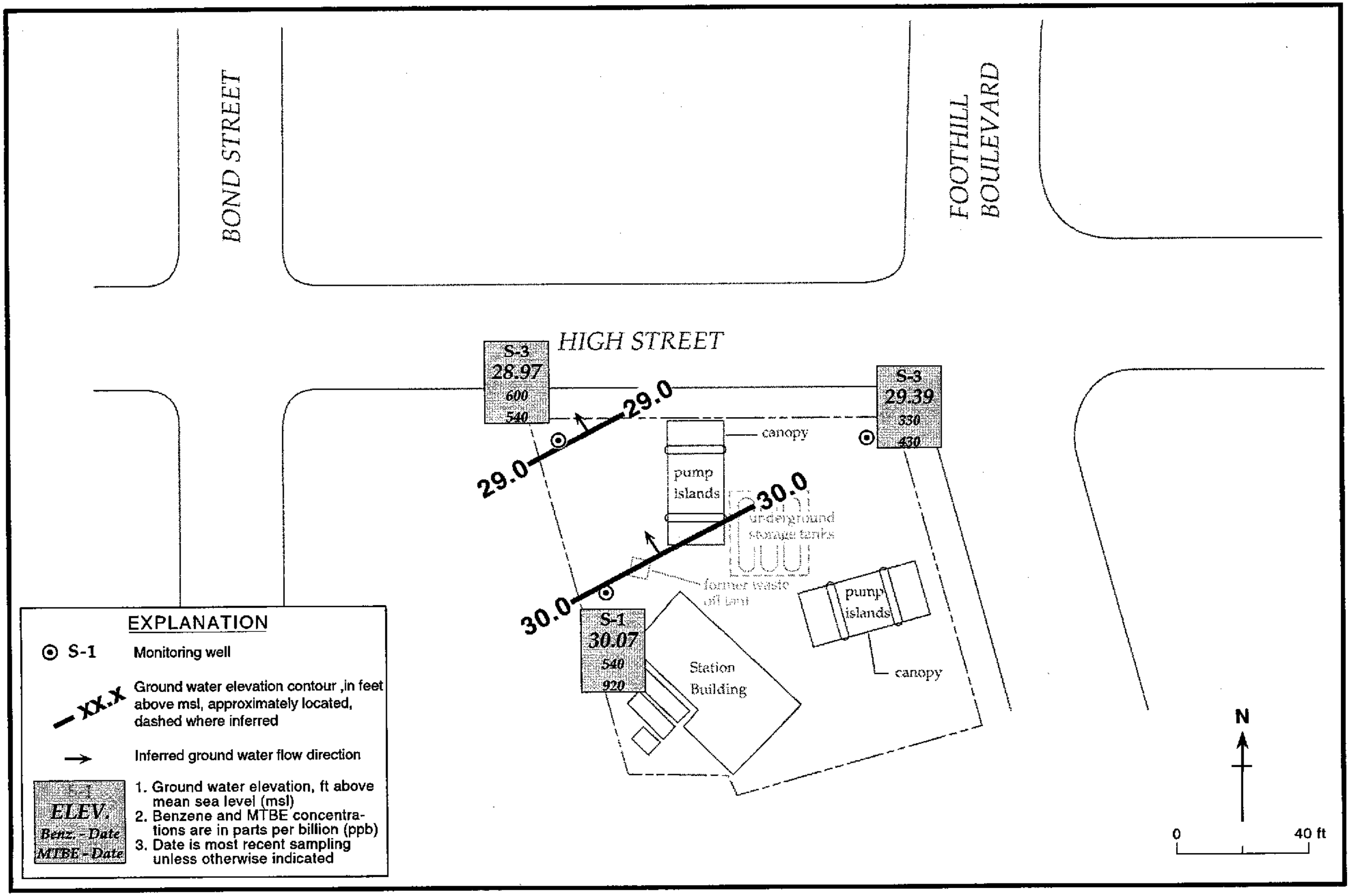

Figure 1. Ground Water Elevation Contours - December 19, 1996 - Shell Service Station WIC# 204-5508-3400 - 4411 Foothill Boulevard, Oakland, California

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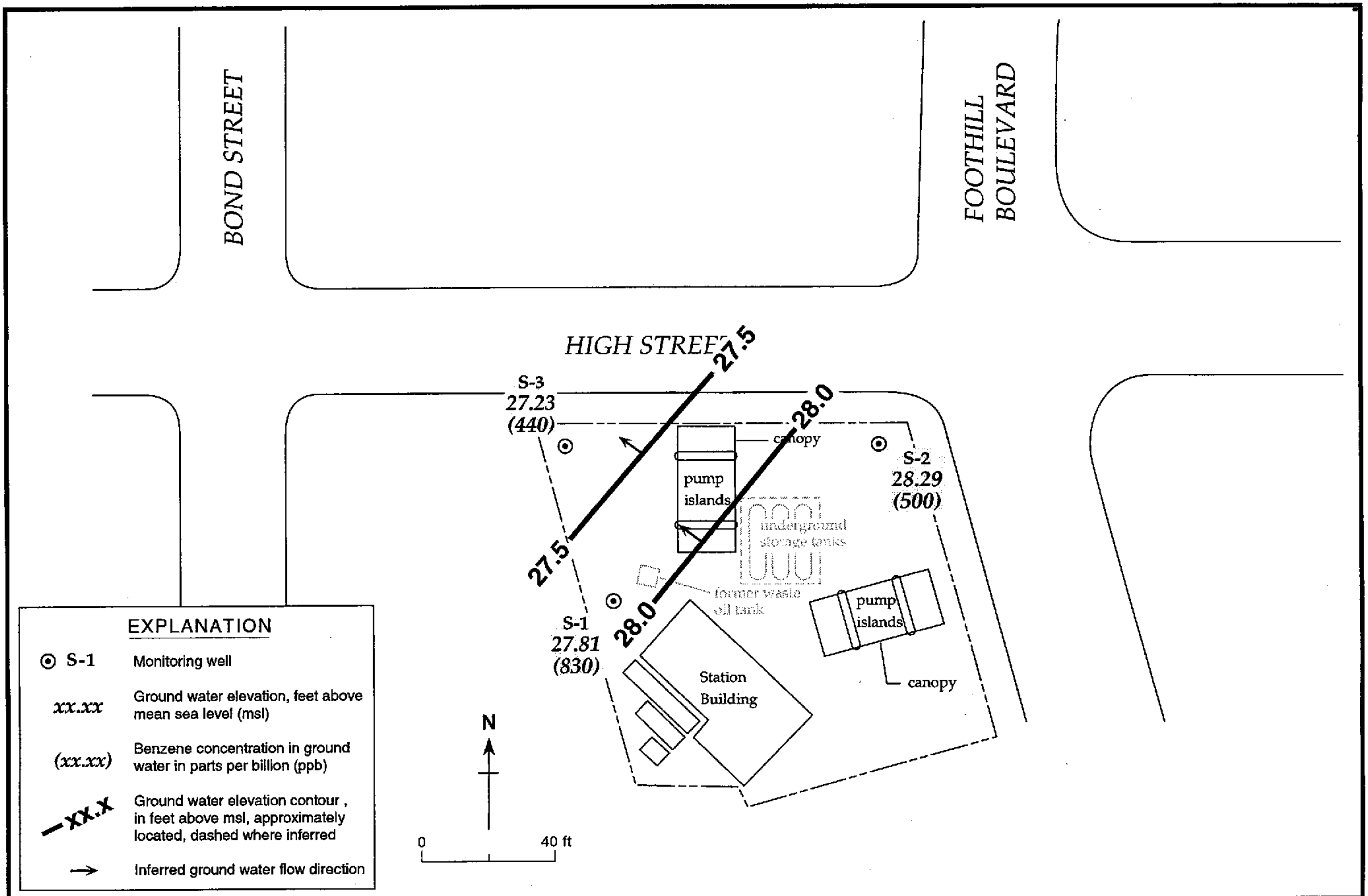

Figure 1. Monitoring Well Locations, Ground Water Elevation Contours, and Benzene Concentrations in Ground Water - September 6, 1996 - Shell Service Station WIC# 204-5508-3400 - 4411 Foothill Boulevard, Oakland, California

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ATTACHMENT B

Standard Field Procedures For Monitoring Well Installations

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

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