



Environmental
Science &
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TO: Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

DATE: June 3, 1994

ATTN: Ms. Juliet Shin

JOB NUMBER: 6-93-5112

SUBJECT: Former Bill Chun Service Station, 2301 Santa Clara Avenue, Alameda, CA

WE ARE TRANSMITTING THE FOLLOWING:

First Quarter 1994 Ground Water Monitoring Report

CC: Ms. Julie Rose, Randick & O'Dea

DIST:
LB
FILE
ORIGINATOR

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

BY Michael E. Quillin

Michael E. Quillin, R.G.
Senior Hydrogeologist

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FIRST QUARTER 1994
GROUND WATER MONITORING
FORMER BILL CHUN SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, ALAMEDA COUNTY, CALIFORNIA

(ESE PROJECT #6-93-5112)

PREPARED FOR:

MR. WAYNE CHUN
265 HERON DRIVE
PITTSBURG, CALIFORNIA 94565

AND

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

PREPARED BY:

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

MAY 26, 1994



This report has been prepared by Environmental Science & Engineering, Inc. for the exclusive use of Mr. Wayne Chun as it pertains to the former Bill Chun Service Station, located at 2301 Santa Clara Avenue in Alameda, Alameda County, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this report.

REPORT PREPARED BY:

Ch H. Valcheff

Christopher H. Valcheff
Staff Geologist

5/26/94

DATE

UNDER THE PROFESSIONAL REVIEW AND SUPERVISION OF:

Michael E. Quillin

Michael E. Quillin
Senior Hydrogeologist
California Registered Geologist No. 5315

5/31/94

DATE

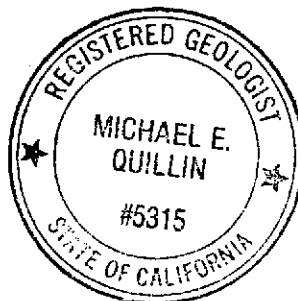


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1.0 INTRODUCTION

This report was prepared by Environmental Science & Engineering, Inc. (ESE), and presents the results of First Quarter 1994 ground water monitoring at the Former Bill Chun Service Station ("site") located at 2301 Santa Clara Avenue in Alameda, Alameda County, California (see Figure 1 - Location Map). Field activities that are the subject of this report were conducted by ESE in January, February, and March 1994. They included measuring static water levels and collecting ground water samples from the existing monitoring wells and analyzing ground water samples for petroleum hydrocarbon content.

1.1 SITE DESCRIPTION

The site is a former service station consisting of a kiosk, a single fuel island with associated canopy, and a separate two-bay repair service building (see Figure 2 - Site Map). An excavation resulting from the July 1992 removal of three underground storage tanks (USTs) remains open. A security fence has been present around the site since January 1993.

The site is relatively flat with an approximate elevation of 30 feet above mean sea level (USGS, 1980). Site physiography and geology were summarized in ESE's March 1993 Preliminary Site Assessment (PSA) report (ESE, 1993a).

1.2 INVESTIGATION BACKGROUND

Site investigation was initiated in July 1992, when Parker Environmental Services (Parker) directed the excavation and removal of three gasoline USTs (two 550-gallon and one 285-gallon) and their associated fuel lines and dispensers. Parker reported that a two-inch hole was observed at the bottom of the 285-gallon tank, for which original contents (type of gasoline) were not specified. Parker collected six soil samples in conjunction with the excavation, which was performed by Burnabe & Brinker (B&B): One sample of undisturbed soil from beneath each of the former tanks (approximately nine feet below grade), one from beneath the former fuel island, and two from the stockpiled soil resulting from tank

excavation. Sample locations were reportedly directed by a representative of the Alameda County Health Care Services Agency, Department of Environmental Health (Alameda County). Those locations were shown in Figure 2 - Site Map of ESE's PSA report (ESE, 1993a).

In an August 4, 1992 letter report to B&B, Parker reported the results of soil sample analysis (Parker, 1992). Concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-gas) up to 16,000 milligrams per Kilogram (mg/Kg) or parts per million (ppm) were reported. Concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) up to 1,400 ppm were reported. By far, the highest concentrations of petroleum hydrocarbons were detected in samples collected from beneath the former tanks. ESE was informed by a Parker representative that overexcavation of soil was not performed (Jim Parker, personal communication, 1993).

A stockpile with an estimated volume of 50-60 cubic yards was generated as a result of tank excavation. As part of ESE's PSA, the stockpile was profiled and appropriately disposed. That work was documented in ESE's PSA report (ESE, 1993a).

In January 1993, ESE performed the referenced PSA, which included drilling three soil borings to a depth of approximately 25 feet below ground surface (bgs), sampling soil at five foot intervals within the borings and having selected samples analyzed for petroleum hydrocarbon content, installing two-inch diameter monitoring wells in the borings (MW-1, MW-2, and MW-3; Figure 2 - Site Map), measuring static water levels in the wells, and collecting ground water samples which were analyzed for petroleum hydrocarbon content. The work was performed in accordance with ESE's Workplan for Preliminary Site Assessment (ESE, 1992), which was approved, with modifications, by Alameda County in a December 30, 1992 letter to Mr. Wayne Chun (Alameda County, 1992).

ESE's PSA determined that soil in the vicinity of the three borings was impacted with petroleum hydrocarbons, particularly at the approximate vadose zone/saturated zone

interface (approximately 10-15 feet bgs). Analytical results for soil samples collected from 10 feet bgs in each boring confirmed that concentrations of petroleum hydrocarbons ranged from 640 to 5,800 ppm. Hydrocarbons detected in soil samples from borings MW-1 and MW-3 were quantified by the analytical laboratory as weathered gasoline. Hydrocarbons in the diesel fuel range were not quantified in any of the samples.

Static water levels in resultant monitoring wells MW-1, MW-2, and MW-3 were approximately nine feet bgs when measured on January 7, 1993. ESE estimated the approximate direction of ground water flow beneath the site as generally westward toward Oak Street (Figure 2). Ground water samples collected from the wells at that time reported TPH-gas concentrations ranging from 8.5 to 110 milligrams per Liter (mg/L) or ppm. In MW-3, the hydrocarbons were quantified as weathered gasoline. No diesel was quantified in any of the samples. BTEX concentrations in the samples ranged from nondetectable to 20 ppm.

In September 1993, ESE performed an additional site investigation to define the extent of petroleum hydrocarbons in site soil and ground water and to further characterize the shallow site subsurface in order to evaluate remedial options. The activities performed included installing four new monitoring wells, collecting soil and ground water samples and analyzing both for petroleum hydrocarbons. The results of this additional investigation are presented in ESE's October 1993 Report of Findings and Additional Site Assessment and Third Quarter 1993 Ground Water Monitoring.

ESE conducted quarterly monitoring activities in December 1993. The results of these activities are summarized in ESE's Fourth Quarter 1994 Ground Water Monitoring dated January 6, 1994.

A workplan for additional site assessment was prepared by ESE in April 1994 and submitted to Alameda County. The workplan addressed additional investigation required by Alameda County in via October 7, 1993 letter correspondence to Mr. Wayne Chun, site

representative. The workplan was approved by Alameda County subject to additional requirements/reminders in via May 16, 1994 letter correspondence to Mr. Chun. Implementation of the workplan is pending.

2.0 GROUND WATER MONITORING

2.1 Ground Water Elevations

On January 6, February 3, and March 4, 1994, ESE measured the static water levels in the seven wells using an electric interface probe. Measurements were made relative to the surveyed datum for each well. ESE calculated the relative ground water elevations for the purpose of preparing ground water elevation contour maps, from which ESE estimated the general direction and magnitude of ground water gradient.

2.2 Ground Water Sampling and Analysis

On March 4, 1994, ESE purged each well and collected ground water samples in accordance with ESE Standard Operating Procedure (SOP) No. 3 for Ground Water Monitoring and Sampling from Monitoring Wells (Appendix A). Purge water was stored in appropriately labeled DOT-rated drums and stored onsite pending analysis and recycling. ESE did not collect ground water samples from wells MW-5 and MW-7 due to the presence of free product on ground water in those wells.

Ground water samples were preserved for analysis and transferred under chain of custody documentation to Sequoia Analytical (Sequoia), a State-certified laboratory. Sequoia analyzed each sample for total purgeable petroleum hydrocarbons (TPHg) with BTEX distinction using EPA Method 5030/8015/8020, and for total extractable petroleum hydrocarbons (TEPH) using EPA Method 3510/3520/8015.

As a measure of field quality assurance and quality control (QA/QC), ESE transported a laboratory-supplied trip blank consisting of deionized water, with ground water samples in the same cooler and analyzed it for and BTEX. This provides an analytical check on ESE's sample handling and transport procedures.

3.0 RESULTS

3.1 Ground Water Elevations

Ground water elevation data and free product thicknesses for monitoring events at the site are presented in Table 1 - Historical Ground Water Elevation Data. Ground water elevations for the current monitoring events are contoured in Figure 3 - Ground Water Elevations, January 6, 1994, Figure 4 - Ground Water Elevations, February 3, 1994, and Figure 5 - Ground Water Elevations, March 4, 1994. The estimated direction of ground water flow was observed to be to the north-northeast with an approximate gradient of 0.006 (33 ft/mile) for the January event, to the northwest with an approximate gradient of .02 (110 ft/mile) for the February event, and again towards the north-northwest with a gradient of approximately 0.009 (45 ft/mile) for the March event.

Free phase product was observed in well MW-5 for all three events and free phase product was present in well MW-7 for the February and March events. Elevation data presented in Figures 3, 4, and 5 have been corrected for the presence of free product, using a specific gravity for gasoline of 0.82.

Sample data sheets for each well, showing purge volumes and results of physical sample characterization (pH, temperature, and conductivity) are presented in Appendix B - Sample Data Sheets.

3.2 Ground Water Chemistry

Analytical results for ground water samples collected by ESE since monitoring was initiated in January 1993 are summarized in Table 2 - Historical Analytical Results for Ground Water Samples. Concentrations of petroleum hydrocarbons detected in each well during the March sampling event are presented in Figure 6 - Concentrations of Petroleum Hydrocarbons, March 4, 1994. Laboratory reports and chain of custody documentation for the samples are presented in Appendix C - Analytical Results and Chain of Custody Documentation for Ground Water Samples.

Results shown in Table 2 and Figure 6 document that ground water at all monitoring locations sampled has been impacted by petroleum hydrocarbons. These hydrocarbons are primarily in the gasoline range, but extractable hydrocarbons (diesel and non-diesel mixtures) were also detected in each sample. The highest concentrations of all ranges of petroleum hydrocarbons occur in wells downgradient of the former fuel island and USTs. Free product found in well MW-5 and MW-7 during the last two water level measurement events precluded collection of samples from those wells.

TEPH detected in samples from downgradient wells MW-1, MW-2, and MW-6 were quantitated by Sequoia as a diesel and unidentified hydrocarbon mixture. TEPH detected in samples from each of the remaining wells (MW-3 and MW-4) were quantitated as unidentified hydrocarbons.

Evaluation of current data presented in Table 2 demonstrates a general decrease in TPH-g concentrations in wells MW-1, MW-3, and MW-4. Wells MW-2 and MW-6, both downgradient of the tank pit and former fuel islands, showed a noticeable increase in TPH-g concentrations. Benzene concentrations decreased in wells MW-1, MW-2, and MW-4 and increased in wells MW-3 and MW-6. Concentrations of toluene decreased in wells MW-1 and MW-6 and increased in wells MW-2 and MW-3. Well MW-4 remained non-detect for toluene. Ethylbenzene and total xylenes concentrations decreased in all wells with the exception of well MW-2 which showed no change in concentration from the last sampling event (December 1993).

TEPH concentrations decreased in wells MW-1, MW-4, and MW-6 and increased in wells MW-2 and MW-3.

Free product was found in wells MW-5 and MW-7 but has decreased in thickness from the February to March measurement events.

3.3 Quality Control Sample

A trip blank collected by ESE, preserved with the remaining samples and analyzed for BTEX reported nondetectable concentrations of those constituents. The trip blank is a quality control sample collected as a check on ESE's sample handling and transport procedures. The results indicate that ESE's sample handling and transport procedures did not result in sample cross-contamination.

4.0 CONCLUSIONS

- The general direction of ground water flow beneath the site is to the north-northeast, which will be the generally preferred direction of migration for dissolved petroleum hydrocarbons in ground water.
- Ground water in all monitoring locations at the site has been impacted with petroleum hydrocarbons. The highest concentrations of hydrocarbons, primarily in the gasoline and apparent weathered gasoline ranges, occur in wells downgradient from the former USTs and fuel island at the site.
- Although a large proportion of petroleum hydrocarbons in ground water samples appears to be weathered gasoline, **high concentrations of volatile hydrocarbons (TPHg, benzene, and toluene), as well as free product in well MW-5 and MW-7, indicate that the release is relatively recent.**
- Free phase product present during the First Quarter 1994 in wells MW-5 and MW-7 indicates that the former fuel island, located directly upgradient from the well, is a possible source of petroleum hydrocarbons in addition to the former USTs.
- **Free phase product seems to be decreasing in thickness with the rise in the ground water table indicating that the amount of free product on ground water is localized and minimal.**
- **The increase in petroleum hydrocarbon concentrations in wells along the downgradient margin of the site indicates that there is a high probability of offsite migration of dissolved (and possibly free phase) petroleum hydrocarbons in ground water. As yet, characterization of petroleum hydrocarbons in ground water downgradient and offsite has not been performed.**

5.0 REFERENCES

Alameda County Health Care Services Agency, Department of Environmental Health, 1992, Written Communication to Mr. Wayne Chun, December 30, 1992.

Environmental Science & Engineering, Inc. (ESE), 1992, Workplan for Preliminary Site Assessment at Bill Chun Service Station located at 2301 Santa Clara Avenue, Alameda, California; Prepared for Alameda County Health Care Services Agency, Department of Environmental Health, December 16, 1992.

____, 1993a, Report on Preliminary Site Assessment at the Former Bill Chun Texaco Service, 2301 Santa Clara Avenue, Alameda, Alameda County, California: Prepared for Mr. Wayne Chun, March 31, 1993.

____, 1993b, Workplan for Remedial Investigation, Former Bill Chun's Service Station, 2301 Santa Clara Avenue, Alameda, Alameda County, California: Prepared for Alameda County Health Care Services Agency, Department of Environmental Health, August 24, 1993.

Parker Environmental Services (Parker), 1992, Underground Tank Removal Soil Sampling and Analysis Report, Letter Report to Mr. Jim Brinker, Burnabe & Brinker, Oakland, California, August 4, 1992.

____, 1993, Personal Communication with James D. Parker, September 22, 1993

United States Geological Survey (USGS), 1959 (Photorevised 1980), Oakland East Quadrangle, 7.5-Minute Series (Topographic), Scale: 1 = 24,000.

TABLE 1

HISTORICAL GROUND WATER ELEVATION DATA

**Former Bill Chun Service Center
2301 Santa Clara Avenue
Alameda, California**

| Well | Date | Datum (ft. AMSL) | Depth to Water | Depth to Product | Product Thickness | Corrected Ground Water Elevation (ft. AMSL) | |
|----------|----------|---------------------|-------------------|---------------------|----------------------|---|-------|
| MW-1 | 03/04/94 | 28.53 | 9.18 | NP | -- | 19.35 | |
| | 02/03/94 | | 9.50 | NP | -- | 19.03 | |
| | 01/06/94 | | 9.67 | NP | -- | 18.86 | |
| | 12/07/93 | | 9.66 | NP | -- | 18.87 | |
| | 11/16/93 | | 9.89 | NP | -- | 18.64 | |
| | 09/07/93 | | 9.63 | NP | -- | 18.90 | |
| | 01/07/93 | | 8.87 | NP | -- | 19.66* | |
| | MW-2 | 03/04/94 | 28.51 | 9.02 | NP | -- | 19.49 |
| | | 02/03/94 | | 9.37 | NP | -- | 19.14 |
| | | 01/06/94 | | 9.54 | NP | -- | 18.97 |
| 12/07/93 | | | 9.54 | NP | -- | 18.97 | |
| 11/16/93 | | | 9.73 | NP | -- | 18.78 | |
| 09/07/93 | | | 9.52 | NP | -- | 18.99 | |
| 01/07/93 | | | 8.78 | NP | -- | 19.73* | |
| MW-3 | | 03/04/94 | 28.82 | 9.11 | NP | -- | 19.71 |
| | | 02/03/94 | | 9.45 | NP | -- | 19.37 |
| | | 01/06/94 | | 9.62 | NP | -- | 19.20 |
| | 12/07/93 | | 9.60 | NP | -- | 19.22 | |
| | 11/16/93 | | 9.82 | NP | -- | 19.00 | |
| | 09/07/93 | | 9.62 | NP | -- | 19.20 | |
| | 01/07/93 | | 8.86 | NP | -- | 19.96* | |
| | MW-4 | 03/04/94 | 28.57 | 9.05 | NP | -- | 19.52 |
| | | 02/03/94 | | 9.31 | NP | -- | 19.26 |
| | | 01/06/94 | | 9.44 | NP | -- | 19.13 |
| 12/07/93 | | | 9.42 | NP | -- | 19.15 | |
| 11/16/93 | | | 9.60 | NP | -- | 18.97 | |
| 09/07/93 | | | 9.39 | NP | -- | 19.18 | |
| MW-5 | | 03/04/94 | 28.37 | 8.99 | 8.96 | 0.03 | 19.36 |
| | 02/03/94 | 9.51 | | 9.19 | 0.32 | 18.60 | |
| | 01/06/94 | 9.85 | | 9.27 | 0.58 | 19.00 | |
| | 12/07/93 | | 9.88 | 9.27 | 0.61 | 18.99 | |
| | 11/16/93 | | 9.99 | 9.45 | 0.54 | 18.82 | |
| | 09/07/93 | | 9.31 | NP | -- | 19.06 | |

TABLE 1 (cont...)

HISTORICAL GROUND WATER ELEVATION DATA

Former Bill Chun Service Center
 2301 Santa Clara Avenue
 Alameda, California

| Well | Date | Datum (ft. AMSL) | Depth to Water | Depth to Product | Product Thickness | Corrected Ground Water Elevation (ft. AMSL) |
|------|----------|---------------------|-------------------|---------------------|----------------------|---|
| MW-6 | 03/04/94 | 28.41 | 9.18 | NP | -- | 19.23 |
| | 02/03/94 | | 9.47 | NP | -- | 18.94 |
| | 01/06/94 | | 9.60 | NP | -- | 18.81 |
| | 12/07/93 | | 9.58 | NP | -- | 18.83 |
| | 11/16/93 | | 9.74 | NP | -- | 18.67 |
| | 09/07/93 | | 9.53 | NP | -- | 18.88 |
| MW-7 | 03/04/94 | 28.56 | 9.04 | 9.01 | 0.03 | 19.53 |
| | 02/03/94 | | 9.56 | 9.39 | 0.17 | 18.86 |
| | 01/06/94 | | 9.59 | NP | -- | 18.97 |
| | 12/07/93 | | 9.58 | NP | -- | 18.98 |
| | 11/16/93 | | 9.86 | NP | -- | 18.70 |
| | 09/07/93 | | 9.61 | NP | -- | 18.95 |

NOTES:

ft. AMSL = Feet Above Mean Sea Level

NP = No free product observed

* = Elevation corrected to reflect standardization of survey data

TABLE 2

HISTORICAL ANALYTICAL RESULTS FOR GROUND WATER SAMPLES

Former Bill Chun Service Center
2301 Santa Clara Avenue
Alameda, California

| Well | Date | TPH-g (µg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethylbenzene (µg/L) | Total Xylenes (µg/L) | TEPH (µg/L) |
|------|----------|-----------------|-------------------|-------------------|------------------------|-------------------------|----------------|
| MW-1 | 03/04/94 | 6,600 | 4,400 | 870 | 150 | 590 | 920 (4) |
| | 12/07/93 | 17,000 | 10,000 | 3,000 | 610 | 2,000 | 1,800 (1) |
| | 09/07/93 | 28,000 | 11,000 | 2,100 | 380 | 1,200 | 1,000 (2) |
| | 01/07/93 | 110,000 | 14,000 | 17,000 | 2,500 | 8,800 | ND < 3,000 |
| MW-2 | 03/04/94 | 130,000 | 22,000 | 22,000 | 3,500 | 16,000 | 18,000 (4) |
| | 12/07/93 | 86,000 | 28,000 | 17,000 | 35,000 | 16,000 | 8,200 (2) |
| | 09/07/93 | 140,000 | 46,000 | 28,000 | 3,300 | 15,000 | 8,200 (2) |
| | 01/07/93 | 85,000 | 20,000 | 8,500 | 1,500 | 4,300 | ND < 3,000 |
| MW-3 | 03/04/94 | 2,300 | 22 | 46 | 9.0 | 27 | 1,300 (5) |
| | 12/07/93 | 3,000 | 17 | 43 | 13 | 28 | 520 (2) |
| | 09/07/93 | 2,800 | 19 | 46 | 7.7 | 23 | 2,500 (1) |
| | 01/07/93 | 8,500 (3) | 170 | 70 | ND < 30 | ND < 30 | ND < 3,000 |
| MW-4 | 03/04/94 | 110 | ND < 0.5 | ND < 0.5 | ND < 0.5 | 0.63 | 56 (5) |
| | 12/07/93 | 610 | 6.6 | ND < 0.5 | 0.61 | 2.5 | 460 (2) |
| | 09/07/93 | 440 | 2.7 | 1.2 | 1 | 1.9 | 330 (2) |
| MW-5 | 03/04/94 | NS | NS | NS | NS | NS | NS |
| | 12/07/93 | NS | NS | NS | NS | NS | NS |
| | 09/07/93 | 37,000 | 2,700 | 1,700 | 870 | 4,600 | 1,700 (2) |
| MW-6 | 03/04/94 | 21,000 | 4,600 | 1,000 | 460 | 1,800 | 1,800 (4) |
| | 12/07/93 | 17,000 | 4,300 | 1,200 | 600 | 2,700 | 2,400 (2) |
| | 09/07/93 | 10,000 | 1,300 | 540 | 370 | 1,600 | 1,400 (2) |
| MW-7 | 03/04/94 | NS | NS | NS | NS | NS | NS |
| | 12/07/93 | 95,000 | 28,000 | 24,000 | 1,600 | 8,700 | 2,200 (1) |
| | 09/07/93 | 24,000 | 6,800 | 4,800 | 490 | 2,300 | 1,300 (1) |

NOTES:

TPH-g = Total Petroleum Hydrocarbons as Gasoline

µg/L = Micrograms per liter or parts per billion (ppb)

TEPH = Total Extractable Petroleum Hydrocarbons

NS = Not Sampled - Free Product present

ND = Not Detected

< = Less than listed quantitation limit

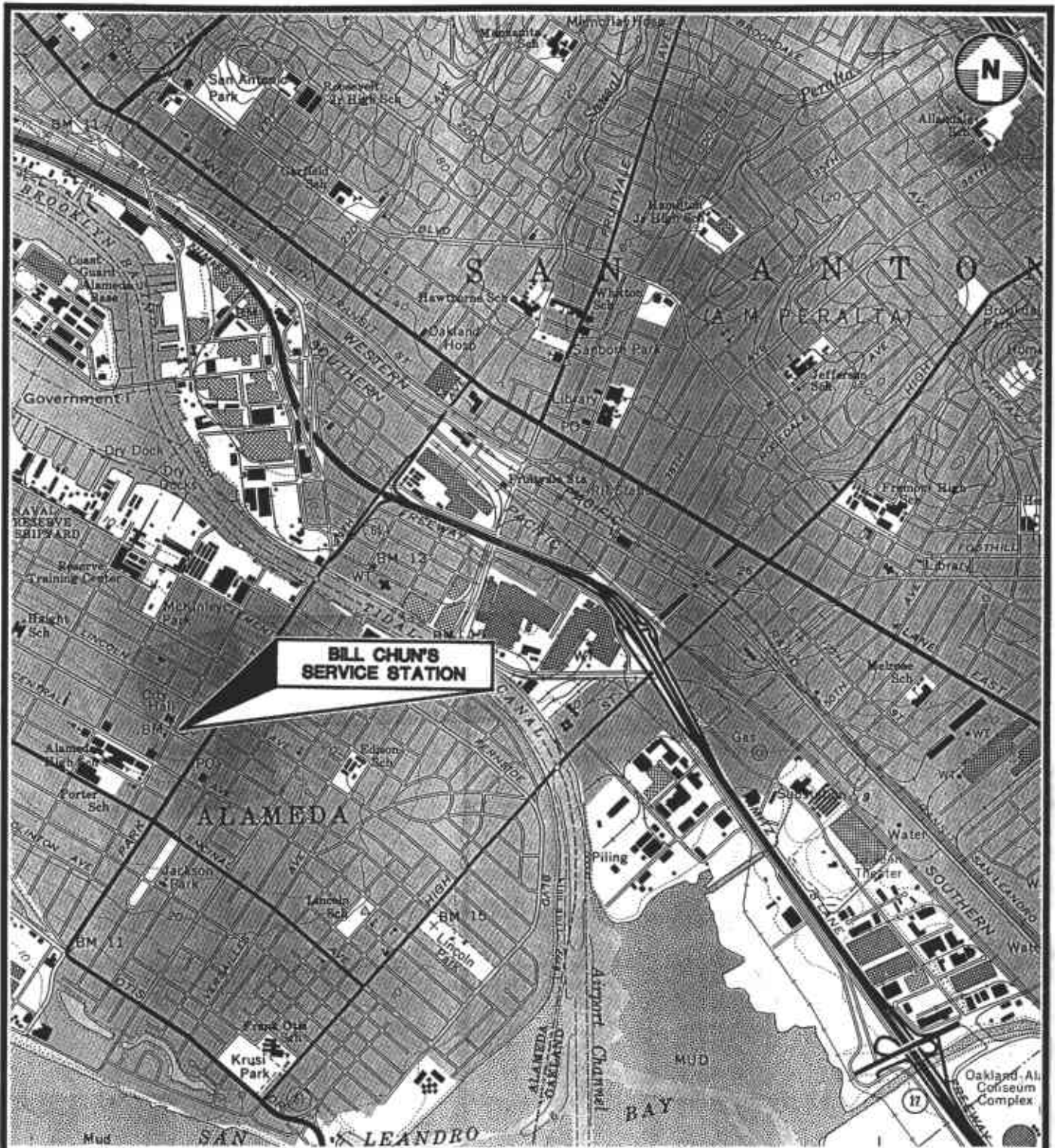
(1) = Quantitated as a non-diesel mixture (<C16)

(2) = Quantitated as a diesel and non-diesel mixture (<C16)

(3) = Quantitated as weathered gasoline

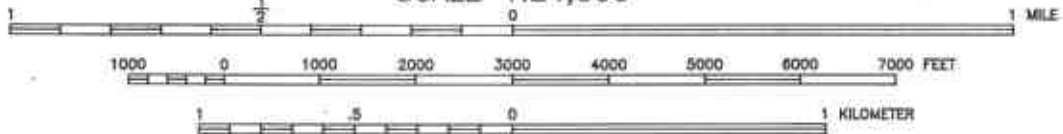
(4) = Quantitated as diesel and unidentified hydrocarbons (<C14)

(5) = Quantitated as unidentified hydrocarbons (<C14)



**BILL CHUN'S
SERVICE STATION**

SCALE 1:24,000



ADAPTED FROM U.S.G.S. OAKLAND EAST 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP, 1959, PHOTOREVISED 1980.



**Environmental
Science &
Engineering, Inc.**

4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

DATE

8/93

REVISED

CAD FILE

51121001

LOCATION MAP

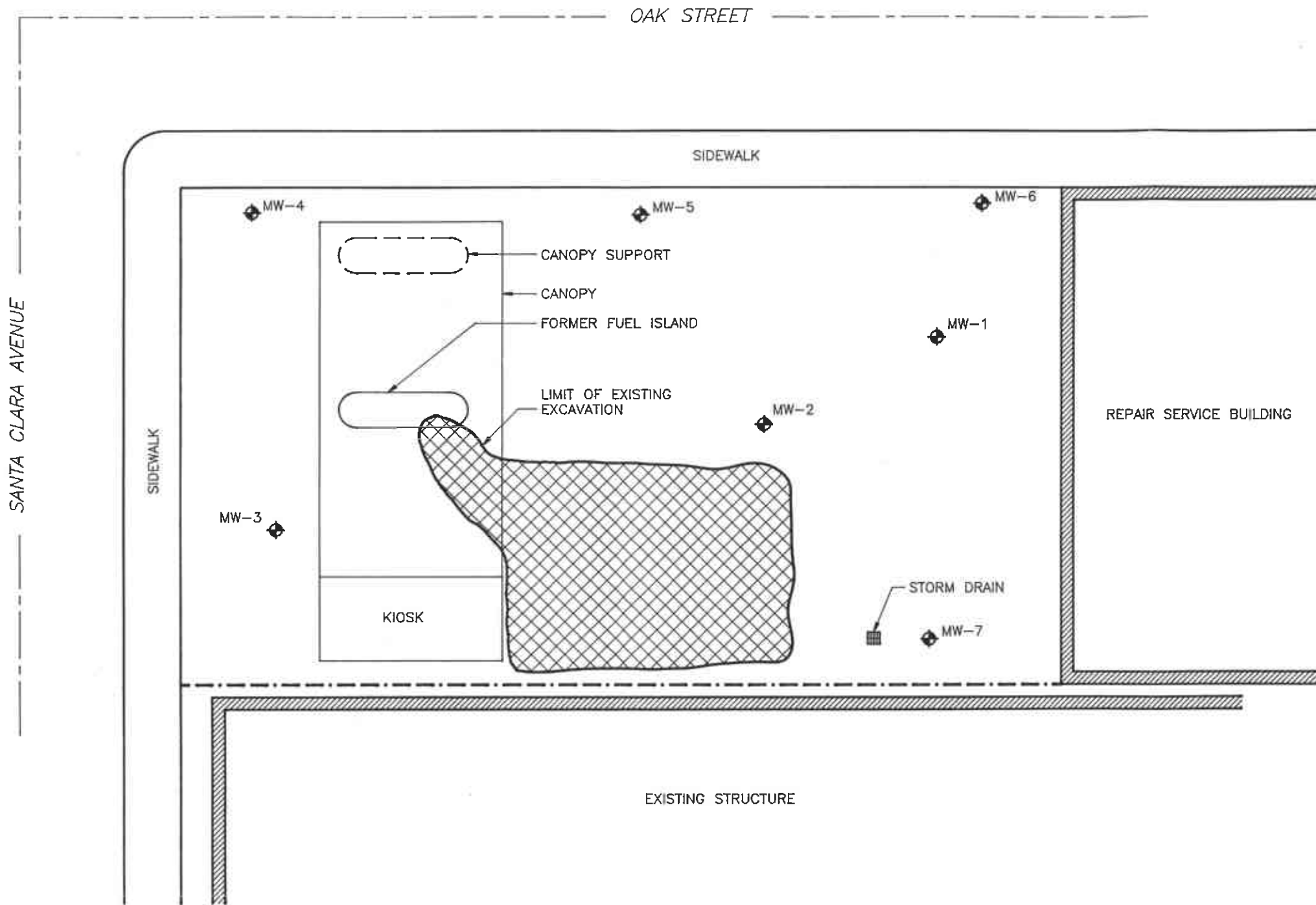
BILL CHUN'S SERVICE STATION
2301 SANTA CLARA AVENUE
ALAMEDA, CALIFORNIA

FIGURE NO.

1

PROJ. NO.


6-93-5112

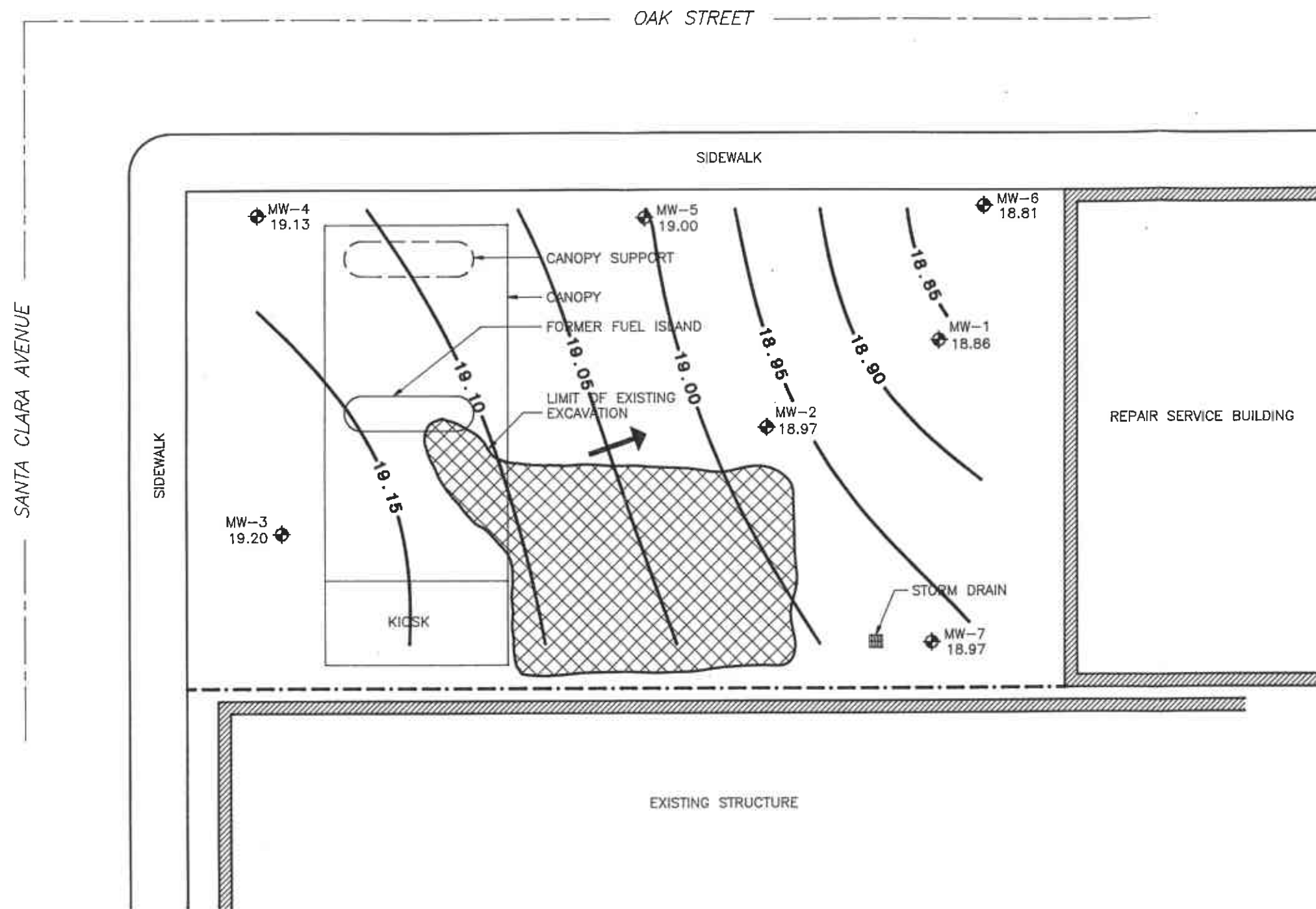


LEGEND

- ◆ EXISTING MONITORING WELL LOCATION
- - - - - PROPERTY BOUNDARY



| | | | |
|--|--|----------------------|---|
|  Environmental Science & Engineering, Inc. <small>A GILCORP Company</small> | DATE 8/93 | SITE MAP | FIGURE NO. 2 |
| | REVISED 9/93 MEQ | | BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA |
| | 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520 | CAD FILE 51121002 | |



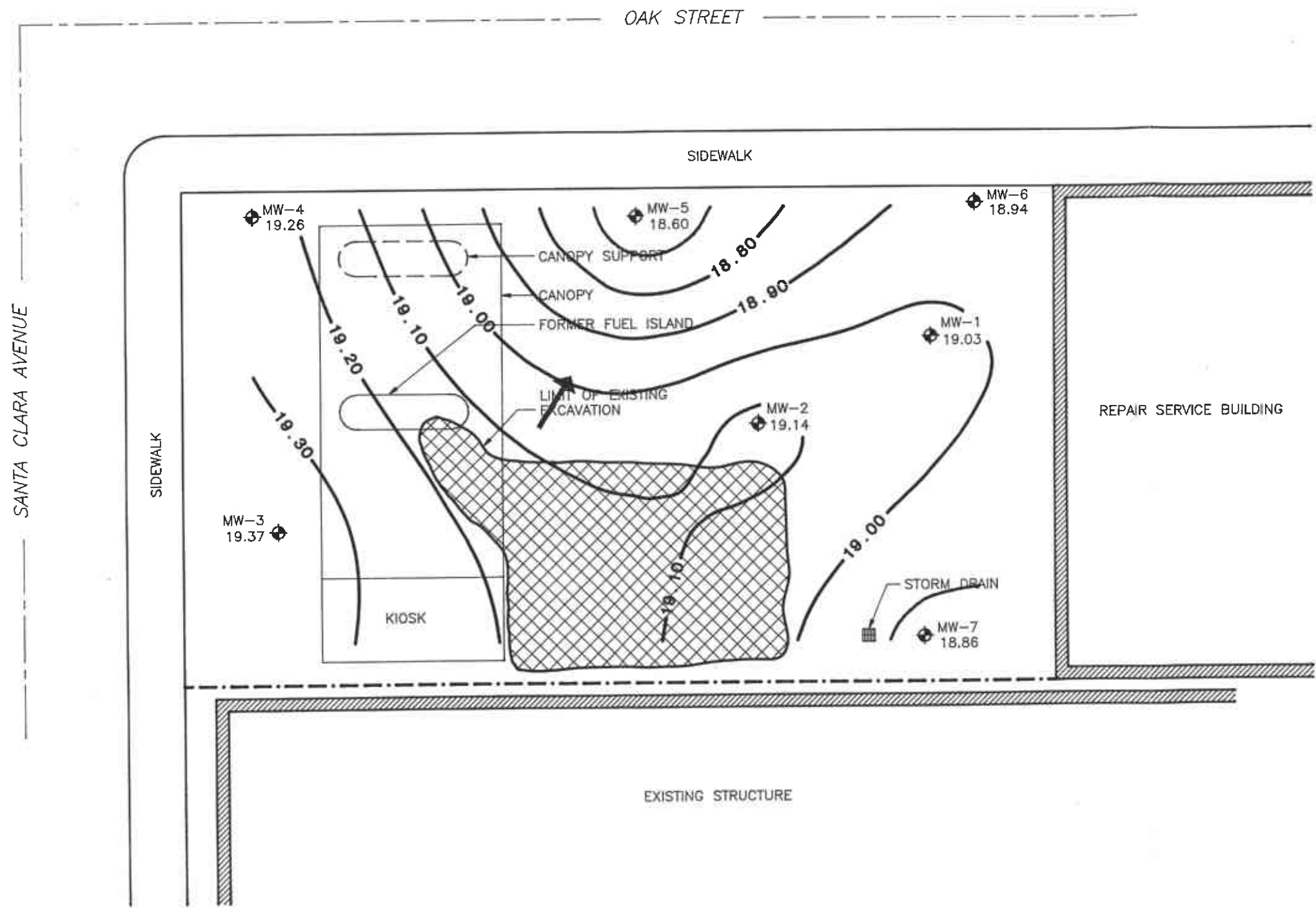
LEGEND

- EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY
- 19.20 GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
- 19.15 GROUND WATER ELEVATION CONTOUR IN FEET ABOVE MSL
- APPROXIMATE DIRECTION OF GROUND WATER FLOW



CONTOUR INTERVAL = 0.05 FEET

| | | | | |
|--|----------------------|---|---|------------------------|
| | DATE 9/93 | GROUND WATER ELEVATIONS JANUARY 6, 1994 | FIGURE NO. 3 | |
| | REVISED 5/94 MEQ | | BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA | PROJ. NO. 6-93-5112 |
| | CAD FILE 51121003 | | | |
| 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520 | | | | |



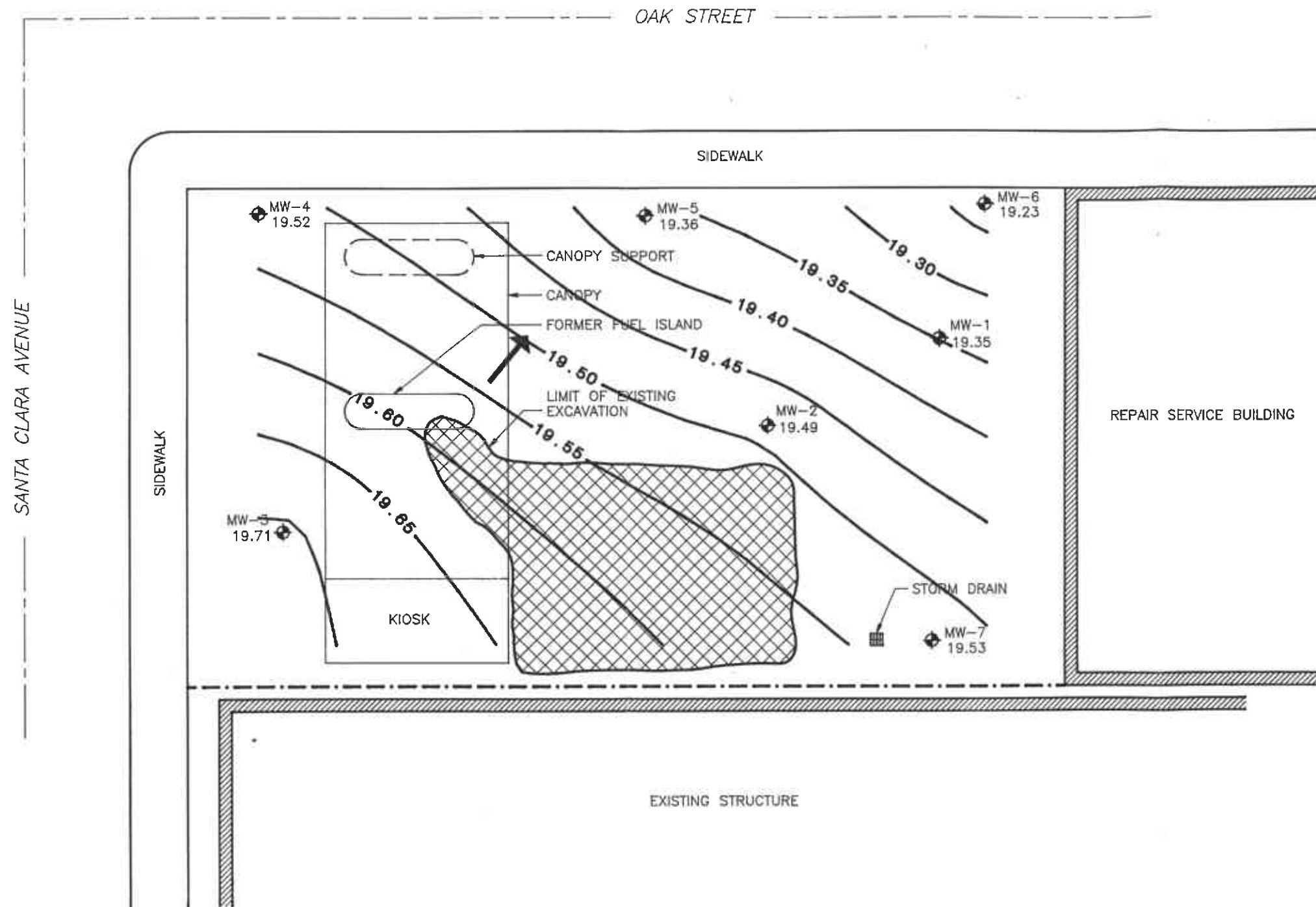
LEGEND

- EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY
- 19.37 GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
- 19.30 GROUND WATER ELEVATION CONTOUR IN FEET ABOVE MSL
- APPROXIMATE DIRECTION OF GROUND WATER FLOW



CONTOUR INTERVAL = 0.10 FEET

| | | | |
|--|---------------------|--|---|
| Environmental Science & Engineering, Inc. <small>A OGDORP Company</small> | DATE 9/93 | GROUND WATER ELEVATIONS FEBRUARY 3, 1994 | FIGURE NO. 4 |
| | REVISOR 5/94 MEQ | | BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA |
| 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520 | | CAD FILE 51121003 | |



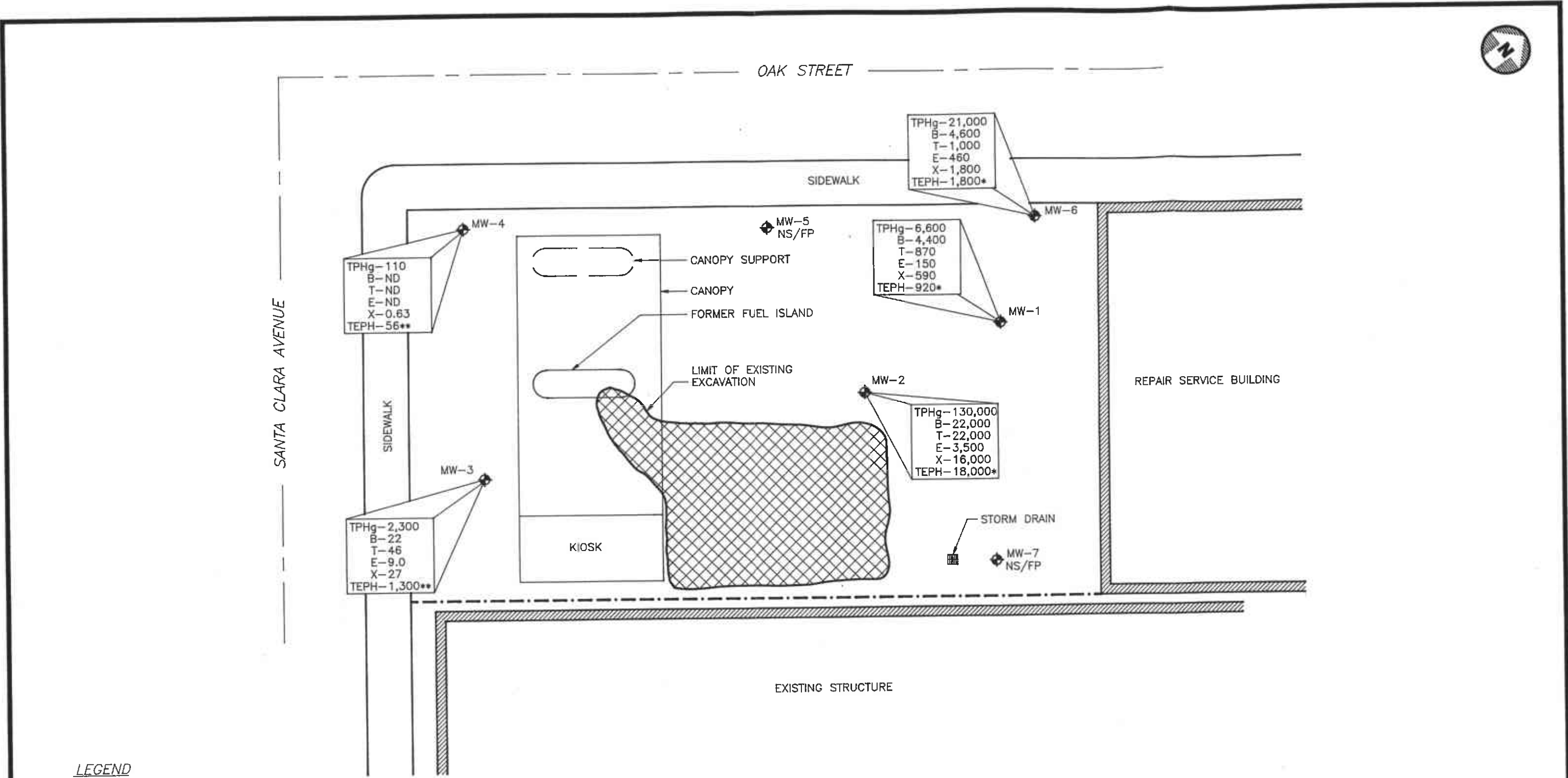
LEGEND

- EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY
- 19.71 GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
- 19.65 GROUND WATER ELEVATION CONTOUR IN FEET ABOVE MSL
- APPROXIMATE DIRECTION OF GROUND WATER FLOW



CONTOUR INTERVAL = 0.05 FEET


| | | | |
|--|----------------------|---|---|
| | DATE 9/93 | GROUND WATER ELEVATIONS MARCH 4, 1994 | FIGURE NO. 5 |
| | REVISED 5/94 MEQ | | BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA |
| 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520 | CAD FILE 51121003 | | PROJ. NO. 6-93-5112 |



LEGEND

- ◆ EXISTING MONITORING WELL LOCATION
- - - PROPERTY BOUNDARY
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (ppb)
- B BENZENE (ppb)
- T TOLUENE (ppb)
- E ETHYLBENZENE (ppb)
- X XYLENES (ppb)
- TEPH TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS (ppb)
- NS/FP NOT SAMPLED/FREE PRODUCT PRESENT
- * QUANTITATED BY SEQUOIA AS A DIESEL AND UNIDENTIFIED HYDROCARBON MIXTURE (<C14)
- ** QUANTITATED BY SEQUOIA AS UNIDENTIFIED HYDROCARBONS (<C14)
- ND NOT DETECTED



| | | | |
|---|----------------------|--|---|
|  Environmental Science & Engineering, Inc. <small>A GILCORP Company</small> | DATE 5/94 | CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN GROUND WATER MARCH 4, 1994 | FIGURE NO. 6 |
| | REVISED | | BILL CHUN'S SERVICE STATION 2301 SANTA CLARA AVENUE ALAMEDA, CALIFORNIA |
| 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520 | CAD FILE 51121009 | | |

APPENDIX A
ESE STANDARD OPERATING PROCEDURE NO. 3
FOR GROUND WATER MONITORING AND
SAMPLING FROM MONITORING WELLS

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.
CONCORD, CALIFORNIA OFFICE

STANDARD OPERATING PROCEDURE NO. 3
FOR GROUND-WATER MONITORING AND SAMPLING FROM MONITORING WELLS

Environmental Science & Engineering, Inc. (ESE) typically performs ground-water monitoring at project sites on a quarterly basis. As part of the monitoring program an ESE staff member will first gauge the depth to water and free product (if present) in each well, then collect ground-water samples from each well. Depth to water measurements are taken by lowering an electric fiberglass tape measure into the well and recording the occurrence of water in feet below a fixed datum set on the top of the well-casing. If free-phase liquid hydrocarbons (free product) are known or suspected to be present in the well, then an electric oil/water interface probe is used to determine the depth to the occurrence of ground-water and the free product in feet below the fixed datum on the top of the well-casing. Depth to water and depth to product measurements are measured and recorded within an accuracy of 0.005-foot. The electric tape and the electric oil/water interface probe are washed with an Alconox® detergent and tap water solution then rinsed with tap water between uses in different wells.

Ground-water samples are collected from a well subsequent to purging a minimum of three to four well-casing volumes of ground water from the well, if the well bails dry prior to the removal of the required minimum volume, then the samples are collected upon the recovery of the ground water in that well to 80% of its initial static level. Ground water is typically purged from monitoring wells using either a hand-operated positive displacement pump, constructed of polyvinylchloride (PVC); a new (precleaned), disposable polyethylene bailer; or, a variable-flow submersible pump, constructed of stainless steel and Teflon®. The hand pumps and the submersible pumps are cleaned between each use with an Alconox® detergent and tap water solution followed by a tap water rinse. During the well purging process the conductivity, pH and temperature of the ground water are monitored by the ESE staff member. Ground-water samples are collected from the well subsequent to the stabilization of the of the conductivity, pH and temperature of the purge water, and the removal of four well-casing volumes of ground-water (unless the well bails dry). The parameters are deemed to have stabilized when two consecutive measurements are within 10% of each other, for each respective parameter. The temperature, pH, conductivity and purge volume measurements, and observations of water clarity and sediment content will be documented by the ESE staff member on ESE Ground-Water Sampling Data Forms.

Ground-water samples are collected by lowering a new (precleaned), disposable polyethylene bailer into the well using new, disposable nylon cord. The filled bailer is retrieved, emptied, then filled again. The ground water from this bailer is decanted into appropriate laboratory supplied glassware and/or plastic containers (if sample preservatives are required, they are added to the empty containers at the laboratory prior to the sampling event). The containers are filled carefully so that no headspace is present to avoid volatilization of the sample. The filled sample containers are then labeled and placed in a cooler with ice for transport under chain of custody documentation to the designated analytical laboratory. The ESE staff member will document the time and method of sample collection, and the type of sample containers and preservatives (if any) used. These facts will appear on the ESE Ground-Water Sampling Data Forms. ESE will collect a duplicate ground-water sample from one well for every ten wells sampled at each site. The duplicate will be a blind sample (its well designation will be unknown to the laboratory). The duplicate sample is for Quality Assurance and Quality Control (QA/QC) purposes, and provides a check on ESE sampling procedures and laboratory sample handling procedures. When VOCs are included in the laboratory analyses, ESE will include a trip blank, if required, in the cooler with the ground-water samples for analysis for the identical VOCs. The trip blank is supplied by the laboratory and consists of deionized water. The trip blank is for QA/QC purposes and provides a check on both ESE and laboratory sample handling and storage procedures. Since disposable bailers are used for sample collection, and are not reused, no equipment blank (rinsate) samples are collected.

APPENDIX B
SAMPLE DATA SHEETS



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-1
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well Casing I.D. (inches) | Gal/Ft. |
|---------------------------|---------|
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: - (ft.) PRODUCT THICKNESS: - (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 9.18 (ft.) WATER COLUMN: 10.22 (ft.) or WCV: 5.00 (gal)
DEPTH OF WELL: 19.40 (ft.) WELL CASING VOLUME: 1.67 (gal) ACTUAL VOLUME PURGED: 6.50 (gal)

| TIME | Volume (GAL) | pH (Units) | E.C. (Microhmhos) | Temperature (F°) | Turbid. (NTU) | Other |
|-------------|--------------|-------------|-------------------|------------------|---------------|---------------------|
| <u>1049</u> | <u>2.0</u> | <u>7.86</u> | <u>0.39</u> | <u>68.3</u> | <u>-</u> | <u>BLACK/STAINY</u> |
| <u>1051</u> | <u>4.0</u> | <u>7.64</u> | <u>0.67</u> | <u>66.8</u> | <u>-</u> | <u>CLEAR</u> |
| <u>1053</u> | <u>6.0</u> | <u>7.91</u> | <u>0.67</u> | <u>67.0</u> | <u>-</u> | <u>ll</u> |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

____ Displacement Pump _____ Other _____
____ Bailer (Teflon/PVC/SS) Submersible Pump

SAMPLE METHOD

____ Bailer (Teflon/PVC/SS) _____ Dedicated
 Bailer (Disposable) _____ Other

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------------|-------------|---------------|----------------|-------------------------|
| DUPLICATE | <u>MW-1</u> | <u>1155</u> | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-6/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS:

SAMPLER: Chris Valcheff PROJECT MANAGER: Mike Quillin
4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-2
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well Casing I.D. (Inches) | Gal/Ft. |
|---------------------------|---------|
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: - (ft.) PRODUCT THICKNESS: - (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 9.02 (ft.) WATER COLUMN: 11.89 (ft.) (3 or 4 WCV): 5.82 (gal)
DEPTH OF WELL: 20.91 (ft.) WELL CASING VOLUME: 1.94 (gal) ACTUAL VOLUME PURGED: 6.5 (gal)

| TIME | Volume (GAL) | pH (Units) | E.C. (1000 Micromhos) | Temperature (F°) | Turbid. (NTU) | Other |
|-------------|--------------|-------------|-----------------------|------------------|---------------|-------------------------|
| <u>1058</u> | <u>2.0</u> | <u>6.89</u> | <u>0.99</u> | <u>65.2</u> | <u>-</u> | <u>GREY/GREEN/SANDY</u> |
| <u>1100</u> | <u>4.0</u> | <u>6.69</u> | <u>1.04</u> | <u>64.8</u> | <u>-</u> | <u>TRANSPARENT</u> |
| <u>1102</u> | <u>6.0</u> | <u>6.55</u> | <u>1.03</u> | <u>64.3</u> | <u>-</u> | <u>CLEAR</u> |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

SAMPLE METHOD

Displacement Pump _____ Other _____
Bailer (Teflon/PVC/SS) _____ Submersible Pump
Bailer (Teflon/PVC/SS) _____ Bailer (Disposable) _____ Dedicated _____
Other _____

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------------|-------------|---------------|----------------|-------------------------|
| DUPLICATE | <u>MW-2</u> | <u>1205</u> | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-6/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS: _____

SAMPLER: Chris Valcheff PROJECT MANAGER: Mike Quillin
4090 Nelson Avenue, Suite J. Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-3
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well Casing | |
|---------------|---------|
| I.D. (inches) | Gal/Ft. |
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: — (ft.) PRODUCT THICKNESS: — (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 9.11 (ft.) WATER COLUMN: 11.68 (ft.) (3 or WCV): 5.72 (gal)
DEPTH OF WELL: 20.79 (ft.) WELL CASING VOLUME: 191 (gal) ACTUAL VOLUME PURGED: 8.00 (gal)

| TIME | Volume (GAL) | pH (Units) | EC (Microhmhos) | Temperature (F°) | Turbid. (NTU) | Other |
|-------|--------------|------------|-----------------|------------------|---------------|---|
| 0851 | 2.0 | 7.04 | 0.70 | 66.6 | — | SL 16179 GRY/BLACK/SDON TRANSPIRANT |
| 0953 | 4.0 | 6.46 | 0.63 | 66.5 | — | |
| 0955 | 6.0 | 6.09 | 0.61 | 66.8 | — | |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

____ Displacement Pump ____ Other
____ Bailer (Teflon/PVC/SS) Submersible Pump

SAMPLE METHOD

____ Bailer (Teflon/PVC/SS) ____ Dedicated
 Bailer (Disposable) ____ Other

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------------|-------------|---------------|----------------|-------------------------|
| DUPLICATE | <u>MW-3</u> | <u>1015</u> | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-6/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS: _____

SAMPLER: Chris Valcheff

PROJECT MANAGER: Mike Quillin

4090 Nelson Avenue, Suite J

Concord, CA 94520

Phone (510) 685-4053

Fax (510) 685-5323



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-4
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| I.D. (inches) | Gal/Ft. |
|---------------|---------|
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: — (ft.) PRODUCT THICKNESS: — (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 7.05 (ft.) WATER COLUMN: 13.19 (ft.) or WCV: 6.46 (gal)
DEPTH OF WELL: 22.24 (ft.) WELL CASING VOLUME: 2.15 (gal) ACTUAL VOLUME PURGED: 8.00 (gal)

| TIME | Volume (GAL) | pH (Units) | EC (Microhmhos) | Temperature (F) | Turbid. (NTU) | Other |
|-------------|--------------|-------------|-----------------|-----------------|---------------|-----------------------|
| <u>1000</u> | <u>2.0</u> | <u>7.01</u> | <u>0.50</u> | <u>66.5</u> | <u>—</u> | <u>CR 2.000/STAIN</u> |
| <u>1002</u> | <u>4.0</u> | <u>7.52</u> | <u>0.47</u> | <u>66.6</u> | <u>—</u> | <u>TRANSPARENT</u> |
| <u>1004</u> | <u>6.0</u> | <u>7.85</u> | <u>0.48</u> | <u>67.2</u> | <u>—</u> | <u>—</u> |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

SAMPLE METHOD

Displacement Pump _____ Other _____
Bailer (Teflon/PVC/SS) _____ Submersible Pump
Bailer (Teflon/PVC/SS) _____ Bailer (Disposable) _____ Dedicated _____
Other _____

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------------|-------------|---------------|----------------|-------------------------|
| DUPLICATE | <u>MW-4</u> | <u>1025</u> | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-6/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS: _____

SAMPLER: Chris Valcheff

PROJECT MANAGER: Mike Quillin

4090 Nelson Avenue, Suite J

Concord, CA 94520

Phone (510) 685-4053

Fax (510) 685-5323



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-5
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well Casing | |
|---------------|---------|
| I.D. (inches) | Gal/Ft. |
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: 8.96 (ft.) PRODUCT THICKNESS: 0.03 (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 8.99 (ft.) WATER COLUMN: _____ (ft.) (3) or 4 WCV: _____ (gal)
DEPTH OF WELL: 21.13 (ft.) WELL CASING VOLUME: _____ (gal) ACTUAL VOLUME PURGED: _____ (gal)

| TIME | Volume (GAL) | pH (Units) | E.C. (Micromhos) | Temperature (F°) | Turbid. (NTU) | Other |
|-------|------------------------------|------------|------------------|------------------|---------------|-------|
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | <u>NOT SAMPLED = PRODUCT</u> | | | | | |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

____ Displacement Pump _____ Other
____ Bailer (Teflon/PVC/SS) Submersible Pump

SAMPLE METHOD

____ Bailer (Teflon/PVC/SS) _____ Dedicated
 Bailer (Disposable) _____ Other

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------|-------|---------------|----------------|-------------------------|
| DUPLICATE | _____ | _____ | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-G/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS: NOT SAMPLED

SAMPLER: Chris Valcheff PROJECT MANAGER: Mike Quillin
4090 Nelson Avenue, Suite J Concord, CA 94520 Phone (510) 685-4053 Fax (510) 685-5323



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-6
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well-Casing I.D. (inches) | Gal/Ft. |
|---------------------------|---------|
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: - (ft.) PRODUCT THICKNESS: - (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 9.18 (ft.) WATER COLUMN: 8.40 (ft.) or WCV: 4.11 (gal)
DEPTH OF WELL: 17.58 (ft.) WELL CASING VOLUME: 1.37 (gal) ACTUAL VOLUME PURGED: 6.00 (gal)

| TIME | Volume (GAL) | pH (Units) | E.C. (Microhmhos) ^{x 1000} | Temperature (F°) | Turbid. (NTU) | Other |
|-------------|--------------|-------------|-------------------------------------|------------------|---------------|------------------------|
| <u>1037</u> | <u>1.5</u> | <u>7.95</u> | <u>0.67</u> | <u>68.2</u> | <u>-</u> | <u>LT. GREEN/STAIN</u> |
| <u>1038</u> | <u>3.0</u> | <u>7.68</u> | <u>0.71</u> | <u>66.9</u> | <u>-</u> | <u>TRANSLUCENT</u> |
| <u>1039</u> | <u>4.5</u> | <u>7.36</u> | <u>0.80</u> | <u>67.0</u> | <u>-</u> | <u>"</u> |
| _____ | _____ | _____ | _____ | _____ | _____ | _____ |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

SAMPLE METHOD

____ Displacement Pump _____ Other
____ Bailer (Teflon/PVC/SS) Submersible Pump

____ Bailer (Teflon/PVC/SS) _____ Dedicated
 Bailer (Disposable) _____ Other

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------------|-------------|---------------|----------------|-------------------------|
| DUPLICATE | <u>MW-6</u> | <u>1195</u> | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-G/BTEX/TPH-D</u> |
| SPLIT | <u>DUP</u> | <u>"</u> | <u>"</u> | <u>"</u> | <u>"</u> |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS:

SAMPLER: Chris Valcheff

PROJECT MANAGER: Mike Quillin



Environmental
Science &
Engineering, Inc.

SAMPLE COLLECTION LOG

PROJECT NAME: BILL CHUN SVC. CENTER
PROJECT NO.: 6-93-5112
DATE: MARCH 4, 1994

SAMPLE LOCATION I.D.: MW-7
SAMPLER: CHRIS VALCHEFF
PROJECT MANAGER: MIKE QUILLIN

CASING DIAMETER

2"
4" _____
Other _____

SAMPLE TYPE

Ground Water
Surface Water _____
Treat. Influent _____
Treat. Effluent _____
Other _____

WELL VOLUMES PER UNIT

| Well-Casing I.D. (inches) | Gal/Ft. |
|---------------------------|---------|
| 2.0 | 0.1632 |
| 4.0 | 0.6528 |
| 6.0 | 1.4690 |

DEPTH TO PRODUCT: 9.01 (ft.) PRODUCT THICKNESS: 0.03 (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 9.04 (ft.) WATER COLUMN: _____ (ft.) (3) or 1 WCV: _____ (gal)
DEPTH OF WELL: 22.00 (ft.) WELL CASING VOLUME: _____ (gal) ACTUAL VOLUME PURGED: _____ (gal)

| TIME | Volume (GAL) | pH (Units) | E.C. (Micromhos) | Temperature (F°) | Turbid. (NTU) | Other |
|----------------------------------|--------------|------------|------------------|------------------|---------------|-------|
| NOT SAMPLED - PRODUCT | | | | | | |

INSTRUMENT CALIBRATION

pH/COND./TEMP.: TYPE HYDAC UNIT# 9308B DATE: 3-4-94 TIME: 0730 BY: CHV
TURBIDITY: TYPE _____ UNIT# _____ DATE: _____ TIME: _____ BY: _____

PURGE METHOD

___ Displacement Pump ___ Other
___ Bailer (Teflon/PVC/SS) Submersible Pump

SAMPLE METHOD

___ Bailer (Teflon/PVC/SS) ___ Dedicated
 Bailer (Disposable) ___ Other

SAMPLES COLLECTED

| SAMPLE | ID | TIME | DATE | LAB | ANALYSES |
|-------------|-------|-------|---------------|----------------|-------------------------|
| DUPLICATE | _____ | _____ | <u>3-4-94</u> | <u>SEQUOIA</u> | <u>TPH-6/BTEX/TPH-D</u> |
| SPLIT | _____ | _____ | _____ | _____ | _____ |
| FIELD BLANK | _____ | _____ | _____ | _____ | _____ |

COMMENTS: NOT SAMPLED - FREE PRODUCT

SAMPLER: Ch. Valcheff
4090 Nelson Avenue, Suite J Concord, CA 94520

PROJECT MANAGER: Mike Quillin
Phone (510) 685-4053 Fax (510) 685-5323

APPENDIX C
ANALYTICAL RESULTS AND CHAIN OF CUSTODY
DOCUMENTATION FOR GROUND WATER SAMPLES



Sequoia Analytical

680 Chesapeake Drive Redwood City, CA 94063 (415) 364-9600 FAX (415) 364-9233
 1900 Bates Avenue, Suite L Concord, CA 94520 (510) 686-9600 FAX (510) 686-9689
 819 Striker Avenue, Suite 8 Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Environmental Science & Engineering, Inc. Client Project ID: Bill Chun Svc. Center, 6-93-5112 Sampled: Mar 4, 1994
 4090 Nelson Ave., Ste J Sample Matrix: Water Received: Mar 4, 1994
 Concord, CA 94520 Analysis Method: EPA 5030/8015/8020 Reported: Mar 17, 1994
 Attention: Mike Quillin First Sample #: 403-0233

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 403-0233 MW-1 | Sample I.D. 403-0234 MW-2 | Sample I.D. 403-0235 MW-3 | Sample I.D. 403-0236 MW-4 | Sample I.D. 403-0237 MW-6 | Sample I.D. 403-0238 DUP |
|------------------------|-------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|
| Purgeable Hydrocarbons | 50 | 6,600 | 130,000 | 2,300 | 110 | 21,000 | 18,000 |
| Benzene | 0.5 | 4,400 | 22,000 | 22 | N.D. | 4,600 | 4,700 |
| Toluene | 0.5 | 870 | 22,000 | 46 | N.D. | 1,000 | 850 |
| Ethyl Benzene | 0.5 | 150 | 3,500 | 9.0 | N.D. | 460 | 400 |
| Total Xylenes | 0.5 | 590 | 16,000 | 27 | 0.63 | 1,800 | 1,500 |
| Chromatogram Pattern: | | Gasoline | Gasoline | Gasoline | Gasoline | Gasoline | Gasoline |

Quality Control Data

| | | | | | | |
|---|---------|---------|---------|---------|---------|---------|
| Report Limit Multiplication Factor: | 20 | 400 | 1.0 | 1.0 | 200 | 100 |
| Date Analyzed: | 3/16/94 | 3/16/94 | 3/16/94 | 3/15/94 | 3/15/94 | 3/15/94 |
| Instrument Identification: | HP-2 | HP-2 | HP-2 | HP-4 | HP-4 | HP-4 |
| Surrogate Recovery, %: (QC Limits = 70-130%) | 107 | 105 | 242* | 86 | 82 | 96 |

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
 Analytes reported as N.D. were not detected above the stated reporting limit.

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Karen L. Enstrom
 Project Manager

Please Note:

* High surrogate recovery was due to matrix interference from multiple peak coelution.



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 819 Striker Avenue, Suite 8 Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Environmental Science & Engineering, Inc. Client Project ID: Bill Chun Svc. Center, 6-93-5112 Sampled: Mar 1, 1994
 4090 Nelson Ave., Ste J Sample Matrix: Water Received: Mar 4, 1994
 Concord, CA 94520 Analysis Method: EPA 5030/8020 Reported: Mar 17, 1994
 Attention: Mike Quillin First Sample #: 403-0239

BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 403-0239 TRIP |
|---------------|-------------------------|---------------------------------|
| Benzene | 0.5 | N.D. |
| Toluene | 0.5 | N.D. |
| Ethyl Benzene | 0.5 | N.D. |
| Total Xylenes | 0.5 | N.D. |

Quality Control Data

Report Limit Multiplication Factor: 1.0
 Date Analyzed: 3/15/94
 Instrument Identification: HP-4
 Surrogate Recovery, %:
 (QC Limits = 70-130%) 92

Analytes reported as N.D. were not detected above the stated reporting limit.

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 Karen L. Enstrom
 Project Manager



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 819 Striker Avenue, Suite 8 Sacramento, CA 95834 (916) 921-9600 FAX (916) 921-0100

Environmental Science & Engineering, Inc. Client Project ID: Bill Chun Svc. Center, 6-93-5112 Sampled: Mar 4, 1994
 4090 Nelson Ave., Ste J Sample Matrix: Water Received: Mar 4, 1994
 Concord, CA 94520 Analysis Method: EPA 3510/3520/8015 Reported: Mar 17, 1994
 Attention: Mike Quillin First Sample #: 403-0233

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

| Analyte | Reporting Limit µg/L | Sample I.D. 403-0233 MW-1 | Sample I.D. 403-0234 MW-2 | Sample I.D. 403-0235 MW-3 | Sample I.D. 403-0236 MW-4 | Sample I.D. 403-0237 MW-6 | Sample I.D. 403-0238 DUP |
|--------------------------|-------------------------|---|---|---------------------------------|---------------------------------|---|---|
| Extractable Hydrocarbons | 50 | 920 | 18,000 | 1,300 | 56 | 1,800 | 2,000 |
| Chromatogram Pattern: | | Diesel and Unidentified Hydrocarbons <C14 | Diesel and Unidentified Hydrocarbons <C14 | Unidentified Hydrocarbons <C16 | Unidentified Hydrocarbons <C14 | Diesel and Unidentified Hydrocarbons <C14 | Diesel and Unidentified Hydrocarbons <C16 |

Quality Control Data

| | | | | | | |
|-------------------------------------|---------|---------|---------|---------|---------|---------|
| Report Limit Multiplication Factor: | 1.0 | 20 | 1.0 | 1.0 | 1.0 | 1.0 |
| Date Extracted: | 3/10/94 | 3/10/94 | 3/10/94 | 3/10/94 | 3/10/94 | 3/10/94 |
| Date Analyzed: | 3/16/94 | 3/17/94 | 3/16/94 | 3/16/94 | 3/16/94 | 3/16/94 |
| Instrument Identification: | HP-3B | HP-3B | HP-3B | HP-3B | HP-3B | HP-3B |

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
 Analytes reported as N.D. were not detected above the stated reporting limit.

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 Karen L. Enstrom
 Project Manager



Sequoia Analytical

680 Chesapeake Drive
1900 Bates Avenue, Suite L
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Concord, CA 94520
Sacramento, CA 95834

(415) 364-9600
(510) 686-9600
(916) 921-9600

FAX (415) 364-9233
FAX (510) 686-9689
FAX (916) 921-0100

Environmental Science & Engineering, Inc.
4090 Nelson Ave., Ste J
Concord, CA 94520
Attention: Mike Quillin

Client Project ID: Bill Chun Svc. Center, 6-93-5112
Matrix: Liquid

QC Sample Group: 4030233-39

Reported: Mar 18, 1994

QUALITY CONTROL DATA REPORT

| ANALYTE | Benzene | Toluene | Ethyl Benzene | Xylenes | Diesel |
|----------|-------------|-------------|---------------|-------------|----------|
| Method: | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8015 |
| Analyst: | J. Fontecha | J. Fontecha | J. Fontecha | J. Fontecha | K. Wimer |

| MS/MSD | Benzene | Toluene | Ethyl Benzene | Xylenes | Diesel |
|------------------------------------|---------|---------|---------------|---------|-----------|
| Batch#: | 4030612 | 4030612 | 4030612 | 4030612 | BLK031094 |
| Date Prepared: | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 | 3/10/94 |
| Date Analyzed: | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 |
| Instrument I.D.#: | HP-4 | HP-4 | HP-4 | HP-4 | HP-3A |
| Conc. Spiked: | 20 µg/L | 20 µg/L | 20 µg/L | 60 µg/L | 300 µg/L |
| Matrix Spike % Recovery: | 95 | 100 | 95 | 98 | 81 |
| Matrix Spike Duplicate % Recovery: | 100 | 100 | 95 | 97 | 76 |
| Relative % Difference: | 5.1 | 0.0 | 0.0 | 1.0 | 6.0 |

| LCS Batch#: | Benzene | Toluene | Ethyl Benzene | Xylenes | Diesel |
|-------------------|------------|------------|---------------|------------|-----------|
| 2LCS031594 | 2LCS031594 | 2LCS031594 | 2LCS031594 | 2LCS031594 | BLK031094 |
| Date Prepared: | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 | 3/10/94 |
| Date Analyzed: | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 | 3/15/94 |
| Instrument I.D.#: | HP-4 | HP-4 | HP-4 | HP-4 | HP-3A |
| LCS % Recovery: | 99 | 97 | 98 | 99 | 81 |

| % Recovery Control Limits: | Benzene | Toluene | Ethyl Benzene | Xylenes | Diesel |
|----------------------------|---------|---------|---------------|---------|--------|
| | 71-133 | 72-128 | 72-130 | 71-120 | 28-122 |

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

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Environmental Science & Engineering, Inc. Client Project ID: Bill Chun Svc. Center, 6-93-5112
 4090 Nelson Ave., Ste J Matrix: Liquid
 Concord, CA 94520
 Attention: Mike Quillin QC Sample Group: 4030233-39 Reported: Mar 18, 1994

QUALITY CONTROL DATA REPORT

| ANALYTE | Benzene | Toluene | Ethyl Benzene | Xylenes |
|----------|-------------|-------------|---------------|-------------|
| Method: | EPA 8020 | EPA 8020 | EPA 8020 | EPA 8020 |
| Analyst: | J. Fontecha | J. Fontecha | J. Fontecha | J. Fontecha |

| MS/MSD | Benzene | Toluene | Ethyl Benzene | Xylenes |
|------------------------------------|---------|---------|---------------|---------|
| Batch#: | 4030209 | 4030209 | 4030209 | 4030209 |
| Date Prepared: | 3/16/94 | 3/16/94 | 3/16/94 | 3/16/94 |
| Date Analyzed: | 3/16/94 | 3/16/94 | 3/16/94 | 3/16/94 |
| Instrument I.D.#: | HP-2 | HP-2 | HP-2 | HP-2 |
| Conc. Spiked: | 20 µg/L | 20 µg/L | 20 µg/L | 60 µg/L |
| Matrix Spike % Recovery: | 105 | 100 | 100 | 103 |
| Matrix Spike Duplicate % Recovery: | 115 | 110 | 105 | 102 |
| Relative % Difference: | 9.1 | 9.5 | 4.9 | 1.0 |

| LCS Batch#: | 1LCS031694 | 1LCS031694 | 1LCS031694 | 1LCS031694 |
|-------------------|------------|------------|------------|------------|
| Date Prepared: | 3/16/94 | 3/16/94 | 3/16/94 | 3/16/94 |
| Date Analyzed: | 3/16/94 | 3/16/94 | 3/16/94 | 3/16/94 |
| Instrument I.D.#: | HP-2 | HP-2 | HP-2 | HP-2 |
| LCS % Recovery: | 108 | 105 | 106 | 107 |

| % Recovery Control Limits: | 71-133 | 72-128 | 72-130 | 71-120 |
|----------------------------|--------|--------|--------|--------|
|----------------------------|--------|--------|--------|--------|

Please Note:
 The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL #1271

Karen L. Enstrom
Project Manager

DATE MARCH 4, 1994 PAGE 1 OF 1

CHAIN OF CUSTODY RECORD

PROJECT NAME BILL CHAN SVC. CENTER

ADDRESS 2301 SANTA CLARA AVE

ALAMEDA, CA

PROJECT NO. G-93-S112

SAMPLED BY CHRIS VALCHEFF

LAB NAME SEQUOIA

ANALYSES TO BE PERFORMED

MATRIX

NUMBER OF CONTAINERS



Environmental Science & Engineering, Inc.

4090 Nelson Avenue
Suite J
Concord, CA 94520

Phone (510) 685-4053

Fax (510) 685-5323

REMARKS
(CONTAINER, SIZE, ETC.)

| SAMPLE # | DATE | TIME | LOCATION | TPH-G | GTEx | TPH-D | | | | | | MATRIX | NUMBER OF CONTAINERS | REMARKS (CONTAINER, SIZE, ETC.) |
|----------|--------|------|----------|-------|------|-------|--|--|--|--|---|------------------|----------------------|---------------------------------|
| MW-1 | 3-4-94 | 1155 | ALAMEDA | X | X | X | | | | | | H ₂ O | 4 | 3 VOAs, 1 LTR 4030233 A-D |
| MW-2 | } | 1205 | } | X | X | X | | | | | | } | 4 | 0234 |
| MW-3 | | 1015 | | X | X | X | | | | | 4 | | 0235 | |
| MW-4 | | 1025 | | X | X | X | | | | | 4 | | 0236 | |
| MW-6 | | 1145 | | X | X | X | | | | | 4 | | 0237 | |
| DUP | 3-4-94 | 1145 | ALAMEDA | X | X | X | | | | | } | 4 | 0238 ✓ | |
| TRIP | 3/1/94 | | | | X | | | | | | | 2 | 2 VOAs ✓ 0239 AB | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | |
|--|--|----------------|-----------------|---------------------------------------|---|
| RELINQUISHED BY: (signature) 1. <i>Chris Valcheff</i> | RECEIVED BY: (signature) <i>R.D. Kelley</i> | date 3/4/94 | time 2:00 pm | 26 | TOTAL NUMBER OF CONTAINERS |
| 2. | | | | REPORT RESULTS TO: MIKE QUILLIN | SPECIAL SHIPMENT REQUIREMENTS COLD TRANSPORT HAND DELIVER |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | SAMPLE RECEIPT |

| | | |
|---|-------------------------|--|
| INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.): STANDARD T-A-T (5-7 DAY) | CHAIN OF CUSTODY SEALS | |
| | REC'D GOOD COND'TN/COLD | |
| | CONFORMS TO RECORD | |