

A Report Prepared for

California Regional Water Quality Control Board  
San Francisco Bay Region  
1111 Jackson Street, Room 6000  
Oakland, California 94607

**REPORT OF SYSTEM MONITORING  
OCTOBER 1989  
SOIL TREATMENT SYSTEM  
PACIFIC RENAISSANCE PLAZA  
OAKLAND, CALIFORNIA**

HLA Job No. 9382,040.02

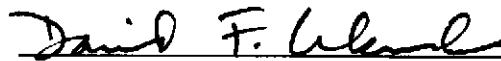
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## 1.0 INTRODUCTION AND BACKGROUND

### 1.1 Introduction

This report describes the operation and monitoring of the in situ soil treatment system at the Pacific Renaissance Plaza (PRP) site in Oakland, California, for the period between October 5 and November 2, 1989. The PRP site, part of the Oakland Chinatown Redevelopment Project Area, is bounded by 9th, Franklin, and Webster streets and the East Bay Municipal Utility District (EBMUD) property line approximately 100 feet north of the centerline of 10th Street (Plate 1). The soil treatment system is designed to remove petroleum hydrocarbons from soil within the site boundaries before the soil is excavated during construction of the complex. The system began operation on March 4, 1989. Discussions with Pacific Renaissance Associates, the developer of the project, indicate that construction is scheduled to begin in February 1990.

This report has been prepared by Harding Lawson Associates (HLA) on behalf of the City of Oakland Redevelopment Agency (Agency). It is submitted in accordance with monitoring and reporting requirements set forth by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), in a letter to the City of Oakland dated February 22, 1989, and clarified in a letter dated March 17, 1989, from HLA to the RWQCB.

### 1.2 Previous Reports

Site history and characterization activities completed by HLA in 1988 are reported in *Site Characterization, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California (HLA, 1988)*. The site characterization report also presents a preliminary screening of soil treatment alternatives and an evaluation of the

potential for effectively removing hydrocarbons from soil at the site using biodegradation. The *Report of Waste Discharge, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California (HLA, 1989a)*, discusses the design of the soil treatment system and presents the results of the biodegradation treatability study and the proposed operations and monitoring plan for the system. Site background, environmental setting, and previous investigations are also described in the report.

Characterization of the extent of soil contamination at the PRP site was updated in the *Report of System Monitoring: March 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California (HLA, 1989b)*, using results of analyses of soil samples collected during treatment system well installation activities. System operation and monitoring from March through September are described in *HLA, 1989b through h*. The objective of the system and a description of the process are presented in *HLA, 1989e*.

## 2.0 TREATMENT SYSTEM OPERATIONS

System operational activities and adjustments made in October are summarized below:

- o Pumps in extraction wells EW-1, EW-2, EW-9, EW-10, EW-13, EW-14, EW-20, and EW-21 were reconditioned; the pumps were removed from the wells and run in a chlorine/soap bath. Flowmeters and water-level probes for each of these wells were also cleaned. The probes and flowmeter at EW-18 were replaced.
- o Injection Wells IW-1, IW-2, IW-4, IW-6, IW-7, IW-8, IW-9, and IW-11 were redeveloped by swabbing, bailing and pumping to increase flow.
- o The concentration of nutrients added to the injection water was maintained at 60 parts per million (ppm).
- o The sand for the sand filter was changed on October 27 from Lonestar #3 to Lonestar #2/20.
- o To increase the flow of nutrient-enriched water in selected areas, three injection wells (IW-12, IW-13, and IW-14) were installed along 9th Street on November 1 and 2 and one infiltration basin (BA-10) was excavated adjacent to 10th Street near the corner of Franklin Street on November 3 and 4 (Plate 1). The basin and wells will be equipped with individual flowmeters to monitor infiltration and injection rates. The basin and wells are expected to be operational by mid-November.

### 3.0 TREATMENT SYSTEM MONITORING

#### 3.1 Flow Rate, Water-Level, and Water Chemistry Monitoring

Flow rates, water levels, and water chemistry were monitored using procedures described in *HLA, 1989e*. Water samples were collected from selected extraction wells, injection wells, and monitoring wells and analyzed for inorganic and organic constituents and microbial populations. For each well, Table 1 presents the sampling frequency, analytical parameters, and EPA test methods used (for organic constituents). The sampling schedule may be modified in subsequent months in response to the operation and performance of the system.

#### 3.2 Numerical Modeling of Ground-Water Flow

The numerical model of ground-water flow at the site, developed during the design phase of the project, is described in the *Report of Waste Discharge (HLA, 1989a)*. The model is based on the U.S. Geological Survey ground-water flow computer code MODFLOW (*McDonald and Harbaugh, 1984*). Individual injection well, infiltration basin, and extraction well flow rates from October 3 to November 1 were averaged for use as model input (Tables 2 and 3) for simulating ground-water elevations at the site for November (Plate 2).

#### 3.3 Confirmation Borings - Soil Sampling and Analysis

Soil samples were collected and analyzed for petroleum hydrocarbons and volatile organic constituents to assess the progress of soil treatment and to further characterize chemicals in site soils. On October 27, 1989, four confirmation borings, designated BC-13 through BC-16, were drilled and sampled (Plate 3). Drilling was performed by Bayland Exploration, Inc., of Suisun, California, using a CME-55 hollow-stem auger rig. An HLA geologist supervised the drilling, performed health and safety monitoring, and collected samples for lithologic characterization, for field screening of volatile



organic compounds (VOCs), and for chemical analyses. Soils were logged using the Unified Classification System (USCS) and Munsell Color Index Chart. Field screening for VOCs was performed using a portable Century flame ionization organic vapor analyzer (OVA).

Soil samples were collected at 1.5-foot intervals from approximately 22 feet below ground surface (bgs) to the total depth of the borings (28 feet bgs) using a 1.5-foot long modified California split-barrel sampler lined with three 6-inch long 2.5-inch-diameter stainless steel tubes. This sampling scheme provided a 6-foot-long continuously sampled interval through the target zone of suspected soil contamination. The bottom tube of each sample drive was sealed on both ends with aluminum foil, plastic end caps, and electrician's tape, labeled, and placed in an ice chest for cool storage. Soil in the second tube was screened in the field for VOCs using an OVA and checked for the presence of hydrocarbon odors and evidence of staining. The remaining tube of soil was used for lithologic logging.

Soil samples were submitted to Pace Laboratories, Inc., under chain of custody for chemical analysis. Four soil samples from each boring were analyzed for total petroleum hydrocarbons (TPH) calibrated as gasoline and for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Test Methods 8015 (modified) and 8020, respectively.

#### **3.4 Injection Well - Installation, Soil Sampling and Analysis**

Three injection wells (IW-12, IW-13, I-14) were drilled and installed on November 1 and 2 to increase the flow of nutrient-enriched water along 9th Street. Boreholes were drilled to depths of 35 to 36 feet below ground surface by Bayland Exploration, Inc. of Suisun, California, using a CME-55 hollow-stem auger rig. HLA field protocol for drilling and soil sampling was followed as described in Section 3.3.

One soil sample from each boring was submitted to Pace Laboratories, Inc. under chain of custody for analysis of TPH (calibrated as gasoline) and BTEX using EPA Test Methods 8015 (modified) and 8020, respectively.

The injection wells were constructed of 4-inch-diameter Schedule 40 PVC casing with 20 feet of 0.020-inch slotted screen. Screened intervals are generally between 10 and 35 feet below grade and the tops of casing are completed approximately 5 feet above grade. The sand filter pack consisted of Monterey #3 Sand and was placed from the bottom of the borehole annulus to approximately 1 foot above the top of the screen. A three-foot bentonite pellet seal was placed above the sand and cement grout placed to the ground surface.

#### 4.0 RESULTS

##### 4.1 Hydraulic Analysis

Flow rates for wells and infiltration basins installed by HLA were calculated based on readings from the flowmeters on the wellheads. Average injection and extraction rates for October are presented in Tables 2 and 3. From October 3 to November 1, the total flow rate for all injection wells was about 19.4 gallons per minute (gpm). The flow rate for injection wells located south of 10th Street, Wells IW-1 through IW-9, was about 17.1 gpm. The average flow rate into Basins BA-1 through BA-7 was about 4.6 gpm from October 3 to November 1, and the average flow rate into Basins BA-8 and BA-9 was about 0.5 gpm (Table 2). All the influent to these covered basins is assumed to infiltrate. Total flow into all injection wells and infiltration basins, calculated as a monthly average, was about 24.5 gpm.

During this monitoring period, the total flow rate for all extraction wells was 24.2 gpm. The flow rate for Wells EW-1 through EW-20 was about 23.2 gpm, and for Well EW-21 and Well EW-22 was about 1.0 gpm (Table 3). The average injection/infiltration rates and extraction rates were approximately equal in October.

Table 4 presents measurements of depth to water in monitoring wells and calculated water-level elevations from January 3 to November 1, 1989. Ground-water elevations on November 1, 1989, are shown on Plate 2 and represent conditions approximately 242 days after system startup. Contours of ground-water elevations simulated using the numerical model are also presented on Plate 2. Flow rates for the infiltration basins were included in the model input for the November 1 simulation. In some cases, locations of injection and extraction points used in the model differ slightly from actual well locations because of the nature of discretization of the modeled area.

Water-level contours calculated using the site model can be used to assess the hydraulic control of injected water. Simulated contours for November 1 (Plate 2)

indicate overall hydraulic control of injected water. Most injected water is recovered by the extraction wells without traveling off site. At the eastern and western ends of the site, some of the injected water may travel off site as it moves toward the extraction wells.

In general, the simulated water levels show good agreement with water-level elevations measured at monitoring wells. A linear regression analysis of observed versus simulated ground-water elevations was performed for the November 1 data. The regression coefficient, R, is the measure of least squares best fit and was calculated to have a value of 0.95 for the November 1 results, where R = 1.00 represents a perfect match.

#### 4.2 Distribution of Inorganic Constituents and Microbial Populations in Ground Water

Tables 5 and 6 present the inorganic chemical and microbiological analysis results for the bioremediation treatment system from startup through November 1, 1989. Nitrate and phosphate concentrations in ground water at the site for the November 1 sampling round are presented on Plate 4 and 5, respectively.

#### 4.3 Distribution of Petroleum Hydrocarbons in Ground Water

Results of organic analyses of ground-water samples are presented in Table 7. Laboratory data sheets are presented in Appendix A. Petroleum hydrocarbon concentrations as TPH (gasoline) for the November 1-2 sampling round are presented on Plate 6.

Reported TPH values for samples from Monitoring Wells MW-12, MW-15, and MW-16 are higher for the November sampling round than for the October round.

Reported TPH values for the November round for remaining wells are similar to or less than values for October. Petroleum hydrocarbons as TPH were not detected at MW-18, located west of the treatment area.

November TPH values in ground-water samples from Extraction Wells EW-7, EW-8, EW-10, EW-15, EW-16, and EW-19 decreased from the previous sampling round, while concentrations in samples from EW-1, EW-4, EW-12, and EW-21 increased.

#### 4.4 Soil Analysis

Lithologic characterization of soils from confirmation borings and injection well borings indicate geologic materials similar to those observed and characterized during previous soil boring and well installation activities at the site, as described in *HLA, 1988 and 1989b*. Predominantly yellowish brown and olive-brown silty sands (SM), poorly graded sands (SP), and clayey sands (SC) were encountered to the total depths of the borings.

Results of OVA headspace and laboratory analysis of soil samples from the confirmation borings are presented in Table 8. Locations of confirmation borings, new injection wells and previous HLA borings and injection wells are shown on Plate 3. Laboratory data sheets are presented in Appendix B.

Of the nineteen soil samples analyzed, only three had TPH concentrations greater than 1,000 milligrams per kilogram (mg/kg); fourteen samples had TPH concentrations less than 100 mg/kg. The highest measured TPH concentration (as gasoline) was 2,600 mg/kg in the 26 to 26.5 foot sample from BC-13. TPH was not detected in the 24.5 to 25 foot samples collected from confirmation borings BC-14 and BC-16.

Results of soil analysis also indicate that within the area of highest levels of petroleum hydrocarbons at BC-13 and BC-16, there is significant variability in

hydrocarbon concentrations. TPH values measured in four samples from BC-13 and four samples from BC-16 ranged from 8.1 to 2,600 mg/kg and from not detected to 310 mg/kg, respectively, reflecting variations over a vertical distance of approximately 4 feet.

Benzene, toluene, ethylbenzene, and xylenes were detected in confirmation boring soil samples. The maximum concentrations of these compounds were measured in the 26 to 26.5 foot sample from Boring BC-13 at 19 mg/kg benzene, 190 mg/kg toluene, 53 mg/kg ethylbenzene, and 380 mg/kg xylenes. In general, high concentrations of BTEX compounds correlate with high TPH values.

**5.0 ACTIVITIES PLANNED FOR NOVEMBER 1989**

On the basis of observed performance, selected injection wells will be redeveloped to improve the injection rate efficiency. Wells will be swabbed over the entire screened interval to remove silt from the slotted sections. The wells will be bailed to remove the silt and then pumped until the water is clear.

Monitoring of water levels, flow rates, and inorganic and organic constituent concentrations will continue.

## 6.0 REFERENCES

- Harding Lawson Associates, 1988. *Site Characterization, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California*. December 22.
- \_\_\_\_\_, 1989a. *Report of Waste Discharge, Pacific Renaissance Plaza, Chinatown Redevelopment Area, Oakland, California*. February.
- \_\_\_\_\_, 1989b. *Report of System Monitoring: March 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. May 4.
- \_\_\_\_\_, 1989c. *Report of System Monitoring: April 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. May 31.
- \_\_\_\_\_, 1989d. *Report of System Monitoring: March through May 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. July 10.
- \_\_\_\_\_, 1989e. *Report of System Monitoring: June 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. August 2.
- \_\_\_\_\_, 1989f. *Report of System Monitoring: July 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. October 5.
- \_\_\_\_\_, 1989g. *Report of System Monitoring: June through August 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. October 2.
- \_\_\_\_\_, 1989h. *Report of System Monitoring: September 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California*. October 31.
- McDonald, D.G., and A.W. Harbaugh, 1984. *A Modular Three-Dimensional Finite Difference Ground-Water Flow Model*, U.S. Geological Survey, Open-File Report 83-875.



Table 1. Schedule for Sampling, Measurement, and Analysis  
Soil Treatment System  
Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis								
		Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
<b>Injection Wells</b>										
Composite	D	B	B	B	--	--	--	--	--	--
IW-1	D	--	--	--	--	--	--	--	--	--
IW-2	D	--	--	--	--	--	--	--	--	--
IW-3	D	--	--	--	--	--	--	--	--	--
IW-4	D	--	--	--	--	--	--	--	--	--
IW-5	D	--	--	--	--	--	--	--	--	--
IW-6	D	--	--	--	--	--	--	--	--	--
IW-7	D	--	--	--	--	--	--	--	--	--
IW-8	D	--	--	--	--	--	--	--	--	--
IW-9	D	--	--	--	--	--	--	--	--	--
IW-10	D	--	--	--	--	--	--	--	--	--
IW-11	D	--	--	--	--	--	--	--	--	--
<b>Extraction Wells</b>										
Composite	D	B	B	B	--	--	--	M	M	M
EW-1	D	M	M	M	--	--	M	M	--	M
EW-2	D	--	--	--	--	--	M	--	--	--
EW-3	D	--	--	--	--	--	M	--	--	--
EW-4	D	B	B	B	B	--	M	M	--	M
EW-5	D	--	--	--	--	--	M	--	--	--

Table 1. Schedule for Sampling, Measurement, and Analysis (continued)  
 Soil Treatment System  
 Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis								
		Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
EW-6	D	X	X	X	--	--	M	--	--	--
EW-7	D	B	B	B	B	--	B	X	--	X
EW-8	D	B	B	B	B	--	B	M	--	M
EW-9	D	--	--	--	--	--	--	--	--	--
EW-10	D	M	M	M	M	--	B	M	--	M
EW-11	D	N	M	M	M	--	M	--	--	--
EW-12	D	M	M	M	M	--	--	--	--	--
EW-13	D	--	--	--	--	--	M	--	--	--
EW-14	D	M	M	M	M	--	M	M	--	M
EW-15	D	B	B	B	B	--	B	M	--	M
EW-16	D	M	M	M	--	--	M	M	--	M
EW-17	D	--	--	--	--	--	M	--	--	--
EW-18	D	--	--	--	--	--	M	--	--	--
EW-19	D	B	B	B	--	--	B	M	--	M
EW-20	D	--	--	--	--	--	--	--	--	--
EW-21	D	B	B	B	B	--	B	M	--	M
EW-22	D	--	--	--	--	--	--	--	--	--

Table 1. Schedule for Sampling, Measurement, and Analysis (continued)  
 Soil Treatment System  
 Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis								
		Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
Monitoring Wells										
MW-2	W	--	--	--	--	--	--	--	--	--
MW-3	W	--	--	--	--	--	--	--	--	--
MW-5	W	--	--	--	--	--	--	--	--	--
MW-6	W	--	--	--	--	--	--	--	--	--
MW-7	W	M	M	M	--	--	X	M	--	M
MW-8	W	--	--	--	--	--	--	--	--	--
MW-9	W	M	M	M	--	--	M	M	--	M
MW-10	W	B	B	B	--	--	B	M	--	M
MW-11	W	B	B	B	M	--	B	M	--	M
MW-12	W	M	M	M	--	--	X	M	--	M
MW-13	W	M	M	M	--	--	M	M	--	M
MW-14	W	M	M	M	--	--	M	M	--	M
MW-15	D	M	M	M	--	--	M	M	--	M
MW-16	D	B	B	B	M	--	B	M	--	M
MW-17	D	B	B	B	B	--	B	M	--	M
MW-18	W	M	M	M	--	--	--	M	--	M

## Notes:

- D = daily
- W = weekly
- B = biweekly
- M = monthly
- X = sampled this round but not scheduled for regular sampling
- = no analysis or measurement

Table 2. Injection Well and Infiltration Basin Flow Rates -  
October 1989

## Injection Well Flow Rates

Meter No.	01-Nov-89 Totalizer Reading	03-Oct-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
IW-1	1292816	1197058	41735	2.29
IW-2	1204471	1098629	41735	2.54
IW-3	1012573	909466	41735	2.47
IW-4	1164095	1033341	41735	3.13
IW-5	369764	334433	41735	0.85
IW-6	579954	540379	41735	0.95
IW-7	1335877	1240569	41735	2.28
IW-8	473991	448972	41735	0.60
IW-9	754607	672446	41735	1.97
IW-10	101685	99809	41735	0.04
IW-11	483897	390383	41735	2.24
Total (1-9)	8188148	7475293	41735	17.08
Total (10,11)	585582	490192	41735	2.29
Total (1-11)	8773730	7965485	41735	19.37

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Note: Totalizer readings in gallons.

## Infiltration Basin Flow Rates

Meter No.	01-Nov-89 Totalizer Reading	03-Oct-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
BA-1	174761	143571	41735	0.75
BA-2	86296	64918	41735	0.51
BA-3	135521	112800	41735	0.54
BA-4	87045	75577	41735	0.27
BA-5	291633	209752	41735	1.96
BA-6 *	2909	2909	41735	0.00
BA-7	105254	82640	41735	0.54
BA-8	87363	72240	41735	0.36
BA-9	42651	35451	41735	0.17
Total (1-7)	883419	692167	41735	4.58
Total (8,9)	130014	107691	41735	0.53
Total (1-9)	1013433	799858	41735	5.12

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Note: Totalizer readings in gallons.

\*: Basin flow rate is included in BA-5

Table 3. Extraction Well Flow Rates - October 1989

Meter No.	01-Nov-89 Totalizer Reading	03-Oct-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
EW-1	314715	266687	41730	1.15
EW-2	333653	286368	41730	1.13
EW-3	535256	458751	41730	1.83
EW-4	384568	336341	41730	1.16
EW-5	448560	405158	41730	1.04
EW-6	169047	155344	41730	0.33
EW-7	134594	127723	41730	0.16
EW-8	317940	283158	41730	0.83
EW-9	363902	313040	41730	1.22
EW-10	298490	273315	41730	0.60
EW-11	311231	270622	41730	0.97
EW-12	258586	222856	41730	0.86
EW-13	280410	248824	41730	0.76
EW-14	319573	281477	41730	0.91
EW-15	507813	446564	41730	1.47
EW-16	836930	748854	41730	2.11
EW-17	698568	615480	41730	1.99
EW-18	721411	646545	41730	1.79
EW-19	555577	478024	41730	1.86
EW-20	275210	234614	41730	0.97
EW-21	86424	65871	41730	0.49
EW-22	22528	918	41730	0.52
Total (1-20)	8066034	7099745	41730	23.16
Total (21-22)	108952	66789	41730	1.01
Total (1-22)	8174986	7166534	41730	24.17

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 Note: Totalizer readings in gallons.

Table 4. Water-Level Elevations - January through October 1989

Well No.	MW-2		MW-3		MW-5		MW-6		MW-7		MW-8		MW-9	
	GROUND SURFACE 40.05	TOP OF CASING 39.55	GROUND SURFACE 39.02	TOP OF CASING 38.35	GROUND SURFACE 38.45	TOP OF CASING 37.86	GROUND SURFACE 39.95	TOP OF CASING 39.59	GROUND SURFACE 39.35	TOP OF CASING 39.10	GROUND SURFACE 40.63	TOP OF CASING 40.47	GROUND SURFACE 38.65	TOP OF CASING 38.50
DATE	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
03-Jan-89	33.10	6.45	32.35	6.00	33.00	4.86	30.22	9.37	31.15	7.95	32.78	7.69	30.58	7.92
05-Jan-89	-	-	32.35	6.00	33.00	4.86	30.22	9.37	31.15	7.95	32.78	7.69	30.58	7.92
02-Feb-89	33.05	6.50	33.01	5.34	31.82	6.04	30.23	9.36	30.51	8.59	32.62	7.85	31.67	6.83
08-Feb-89	33.83	5.72	32.21	6.14	32.02	5.84	31.05	8.54	31.44	7.66	33.03	7.44	30.65	7.85
15-Feb-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Feb-89	30.59	8.96	29.26	9.09	31.90	5.96	30.05	9.54	30.21	8.89	31.96	8.51	30.16	8.34
25-Feb-89	29.85	9.70	28.68	9.67	30.32	7.54	30.57	9.02	31.10	8.00	31.90	8.57	30.80	7.70
02-Mar-89	-	-	-	-	-	-	-	-	-	-	-	-	30.05	8.45
11-Mar-89	-	-	-	-	-	-	-	-	-	-	-	-	23.06	15.44
18-Mar-89	-	-	32.20	6.15	32.01	5.85	-	-	31.52	7.58	-	-	22.45	16.05
25-Mar-89	-	-	27.76	10.59	27.53	10.33	-	-	30.08	9.02	-	-	22.62	15.88
30-Mar-89	-	-	-	-	-	-	-	-	-	-	-	-	23.00	15.50
04-Apr-89	28.52	11.03	27.56	10.79	-	-	28.00	11.59	29.00	10.10	30.45	10.02	22.61	15.89
08-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	23.12	15.38
11-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	23.37	15.13
12-Apr-89	28.59	10.96	27.63	10.72	-	-	27.17	12.42	28.96	10.14	30.45	10.02	-	-
18-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Apr-89	-	-	-	-	-	-	-	-	28.13	10.97	-	-	23.36	15.14
25-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	22.80	15.70
02-May-89	28.71	10.84	26.84	11.51	-	-	27.49	12.10	28.54	10.56	29.80	10.67	22.73	15.77
09-May-89	27.99	11.56	26.58	11.77	26.11	11.75	27.34	12.25	28.34	10.76	29.68	10.79	23.04	15.46
17-May-89	27.80	11.75	26.62	11.73	-	-	27.11	12.48	28.16	10.94	29.27	11.20	23.33	15.17
22-May-89	27.52	12.03	28.17	10.18	25.98	11.88	26.89	12.70	27.69	11.41	28.68	11.79	23.94	14.56
31-May-89	27.99	11.56	26.28	12.07	-	-	27.11	12.48	28.28	10.82	29.31	11.16	24.17	14.33
05-Jun-89	27.60	11.95	25.83	12.52	24.96	12.90	27.00	12.59	28.18	10.92	29.41	11.06	19.72	18.78
14-Jun-89	27.58	11.97	26.00	12.35	25.52	12.34	26.88	12.71	28.09	11.01	29.20	11.27	20.53	17.97
19-Jun-89	-	-	-	-	-	-	-	-	-	-	-	-	20.31	18.19
28-Jun-89	-	-	27.88	10.47	25.39	12.47	-	-	-	-	-	-	21.26	17.24
05-Jul-89	27.34	12.21	25.92	12.43	25.50	12.36	26.66	12.93	27.68	11.42	28.99	11.48	21.88	16.62
21-Jul-89	-	-	24.73	13.62	25.44	12.42	-	-	27.60	11.50	-	-	21.39	17.11
28-Jul-89	-	-	-	-	-	-	-	-	-	-	-	-	21.36	17.14
01-Aug-89	27.22	12.33	26.67	11.68	25.36	12.50	26.61	12.98	27.44	11.66	28.79	11.68	21.60	16.90
09-Aug-89	27.18	12.37	25.91	12.44	25.36	12.50	26.57	13.02	27.40	11.70	28.74	11.73	21.66	16.84
15-Aug-89	27.24	12.31	25.95	12.40	25.48	12.38	27.63	11.96	27.62	11.48	28.79	11.68	21.80	16.70
30-Aug-89	27.21	12.34	-	-	25.69	12.17	26.60	12.99	27.52	11.58	28.66	11.81	22.98	15.52
06-Sep-89	27.22	12.33	25.93	12.42	25.55	12.31	26.61	12.98	27.38	11.72	28.77	11.70	21.97	16.53
28-Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	22.37	16.13
03-Oct-89	26.71	12.84	25.24	13.11	24.75	13.11	26.30	13.29	27.35	11.75	28.29	12.18	22.55	15.95
01-Nov-89	26.49	13.06	25.07	13.28	24.55	13.31	26.12	13.47	26.96	12.14	28.14	12.33	22.33	16.17

## Notes:

Elevations are in feet above mean sea level (MSL).  
Depth to water in feet measured from top of casing.

Table 4. Water-Level Elevations - January through October 1

Well No.	MW-17		MW-18	
	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING
	39.16	40.16	36.56	35.88
DATE	Depth to Water	Elevation	Depth to Water	Elevation
03-Jan-89	-	-	-	-
05-Jan-89	-	-	-	-
02-Feb-89	-	-	-	-
08-Feb-89	-	-	-	-
15-Feb-89	-	-	26.89	8.99
18-Feb-89	-	-	-	-
25-Feb-89	32.02	8.14	26.90	8.98
02-Mar-89	-	-	26.66	9.22
11-Mar-89	23.45	16.71	26.28	9.60
18-Mar-89	23.35	16.81	26.18	9.70
25-Mar-89	23.35	16.81	25.70	10.18
30-Mar-89	-	-	-	-
04-Apr-89	24.18	15.98	26.10	9.78
08-Apr-89	24.28	15.88	25.82	10.06
11-Apr-89	24.83	15.33	-	-
12-Apr-89	-	-	26.16	9.72
18-Apr-89	24.64	15.52	-	-
19-Apr-89	-	-	25.89	9.99
25-Apr-89	24.57	15.59	27.91	7.97
02-May-89	22.71	17.45	25.76	10.12
09-May-89	23.89	16.27	25.38	10.50
17-May-89	24.85	15.31	25.59	10.29
22-May-89	25.28	14.88	25.27	10.61
31-May-89	24.91	15.25	26.04	9.84
05-Jun-89	22.62	17.54	25.98	9.90
14-Jun-89	20.44	19.72	25.89	9.99
19-Jun-89	19.72	20.44	25.91	9.97
28-Jun-89	20.89	19.27	25.76	10.12
05-Jul-89	21.56	18.60	25.68	10.20
21-Jul-89	21.52	18.64	25.58	10.30
28-Jul-89	20.25	19.91	-	-
01-Aug-89	21.15	19.01	25.32	10.56
09-Aug-89	21.59	18.57	25.31	10.57
15-Aug-89	21.21	18.95	25.49	10.39
30-Aug-89	23.24	16.92	25.37	10.51
06-Sep-89	22.75	17.41	25.24	10.64
28-Sep-89	23.34	16.82	-	-
03-Oct-89	23.65	16.51	25.38	10.50
01-Nov-89	23.98	16.18	25.68	10.20

## Notes:

Elevations are in feet above mean sea level (MSL).  
Depth to water in feet measured from top of casing.

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		TC	HCU
		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
EW-1								
	15-Mar-89	17.6	ND	NT	ND	ND	7.8E+6	1.2E+2
	29-Mar-89	9.7	3.5	NT	NT	ND	1.8E+6	3.8E+2
	04-Apr-89	13.2	3.8	NT	ND	ND	3.3E+5	2.2E+2
	11-Apr-89	24.6	2.8	NT	NT	ND	NT	NT
	18-Apr-89	30.8	1.0	4.1	ND	ND	3.3E+5	7.8E+1
	25-Apr-89	33.4	3.0	4.8	NT	ND	6.8E+4	2.1E+1
	02-May-89	37.0	5.0	4.9	NT	ND	4.5E+5	9.5E+1
	09-May-89	22.9	2.5	9.8*	NT	ND	5.2E+5	7.0E+2
	17-May-89	37.0	1.5	7.5	NT	ND	2.6E+5	1.4E+2
	23-May-89	15.8	5.3	11.1	NT	ND	NT	NT
	31-May-89	52.8	2.8	5.9	NT	ND	7.6E+5	4.6E+2
	05-Jun-89	25.9	ND	14.5	NT	ND	NT	NT
	14-Jun-89	17.6	2.3	12.6	NT	ND	NT	NT
	20-Jun-89	NT	NT	19.3	NT	NT	NT	NT
	27-Jun-89	52.8	NT	16.5	NT	NT	NT	NT
	06-Jul-89	47.3	4.0	13.3	NT	ND	9.3E+5	7.0E+3
	22-Jul-89	33.0	6.7	NT	NT	ND	NT	NT
	03-Aug-89	46.2	7.8	NT	NT	ND	NT	NT
	07-Sep-89	63.8	14.5	17.7	NT	ND	NT	NT
	18-Sep-89	74.8	17.0	12.2	NT	ND	NT	NT
	29-Sep-89	NT	NT	17.3	NT	NT	NT	NT
	05-Oct-89	59.4	21.5	14.9	NT	ND	NT	NT
	02-Nov-89	59.4	24.0	16.2	NT	ND	NT	NT
EW-2								
	23-May-89	NT	NT	15.8	NT	NT	NT	NT
	31-May-89	NT	NT	12.7	NT	NT	NT	NT
	05-Jun-89	NT	NT	16.3	NT	NT	NT	NT
	14-Jun-89	NT	NT	15.6	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.6	NT	NT	NT	NT
	27-Jun-89	NT	NT	18.9	NT	NT	NT	NT
	06-Jul-89	NT	NT	16.5	NT	NT	NT	NT
	21-Jul-89	NT	NT	16.5	NT	NT	NT	NT
	07-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
EW-3								
	23-May-89	NT	NT	20.0	NT	NT	NT	NT
	31-May-89	NT	NT	18.3	NT	NT	NT	NT
	05-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	14-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.7	NT	NT	NT	NT
	27-Jun-89	NT	NT	NT	NT	NT	NT	NT
	06-Jul-89	NT	NT	14.0	NT	NT	NT	NT



Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		ENUMERATION	
		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	TC	HCU
LOD							NA (CFU/ml)	NA (CFU/ml)
	21-Jul-89	NT	NT	>20.0	NT	NT	NT	NT
	07-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	19.9	NT	NT	NT	NT
	29-Sep-89	NT	NT	18.5	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
EW-4	15-Mar-89	16.7	0.6	NT	ND	ND	5.1E+6	9.5E+1
	29-Mar-89	25.5	2.8	NT	NT	ND	5.3E+5	1.7E+2
	04-Apr-89	31.7	4.0	NT	ND	ND	2.5E+5	6.8E+1
	11-Apr-89	34.1	3.3	NT	NT	ND	4.3E+4	4.5E+1
	18-Apr-89	43.6	5.3	7.9	ND	ND	4.3E+4	1.1E+2
	25-Apr-89	49.3	5.0	4.8	NT	ND	9.0E+4	1.7E+2
	02-May-89	48.4	9.0	4.9	NT	ND	2.5E+5	2.0E+3
	09-May-89	70.4	11.8	9.8*	NT	ND	NT	NT
	17-May-89	50.6	16.0	7.5	NT	ND	NT	NT
	23-May-89	52.8	17.0	NT	NT	ND	5.8E+6	7.8E+1
	31-May-89	47.9	17.0	18.9	NT	ND	NT	NT
	05-Jun-89	49.1	16.6	>20.0	NT	ND	1.3E+5	4.9E+2
	14-Jun-89	27.1	17.0	14.5	NT	ND	6.1E+5	2.4E+5
	20-Jun-89	48.4	17.0	18.5	NT	ND	2.3E+6	2.2E+4
	27-Jun-89	NT	18.0	16.8	NT	ND	8.0E+5	1.4E+4
	06-Jul-89	48.4	17.0	13.9	NT	ND	NT	NT
	22-Jul-89	45.1	20.5	NT	NT	ND	NT	NT
	03-Aug-89	57.2	20.5	NT	NT	ND	NT	NT
	17-Aug-89	61.6	20.0	NT	NT	0.7	NT	NT
	07-Sep-89	83.6	12.0	9.0	NT	1.3	NT	NT
	18-Sep-89	72.6	24.6	8.1	NT	1.2	NT	NT
	29-Sep-89	NT	NT	8.6	NT	NT	NT	NT
	05-Oct-89	NT	NT	4.8	NT	NT	NT	NT
	23-Oct-89	70.4	17.0	9.1	NT	1.2	2.9E+5	5.4E+3
	02-Nov-89	69.5	18.0	4.7	NT	0.9	--	--
EW-5	29-Mar-89	28.0	3.8	NT	NT	ND	NT	NT
	18-Apr-89	NT	NT	8.6	NT	NT	NT	NT
	25-Apr-89	NT	NT	12.8	NT	NT	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	NT	NT	15.0*	NT	NT	NT	NT
	17-May-89	NT	NT	NT	NT	NT	NT	NT
	23-May-89	NT	NT	>20.0	NT	NT	NT	NT
	31-May-89	NT	NT	17.8	NT	NT	NT	NT
	05-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	14-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	19.6	NT	NT	NT	NT
	06-Jul-89	NT	NT	19.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	18.5	NT	NT	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
EW-6	29-Sep-89	NT	NT	8.5	NT	NT	NT	NT
	05-Oct-89	NT	NT	16.5	NT	NT	NT	NT
	23-May-89	NT	NT	7.6	NT	NT	NT	NT
	31-May-89	NT	NT	17.5	NT	NT	NT	NT
	05-Jun-89	NT	NT	14.5	NT	NT	NT	NT
	14-Jun-89	NT	NT	12.3	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.5	NT	NT	NT	NT
	27-Jun-89	NT	NT	12.0	NT	NT	NT	NT
	06-Jul-89	NT	NT	8.2	NT	NT	NT	NT
	18-Sep-89	NT	NT	10.3	NT	NT	NT	NT
EW-7	29-Sep-89	NT	NT	0.8	NT	NT	NT	NT
	05-Oct-89	NT	NT	0.8	NT	NT	NT	NT
	02-Nov-89	34.8	11.0	2.6	NT	ND	NT	NT
	23-May-89	NT	NT	1.8	NT	NT	NT	NT
	31-May-89	NT	NT	11.2	NT	NT	NT	NT
	05-Jun-89	NT	NT	5.3	NT	NT	NT	NT
	14-Jun-89	NT	NT	5.6	NT	NT	NT	NT
	20-Jun-89	NT	NT	1.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	8.0	NT	NT	NT	NT
	06-Jul-89	37.4	3.3	6.2	NT	ND	NT	NT
EW-8	18-Sep-89	NT	NT	1.5	NT	NT	NT	NT
	29-Sep-89	NT	NT	1.1	NT	NT	NT	NT
	05-Oct-89	39.2	11.0	1.0	NT	0.6	2.2E+6	7.9E+3
	23-Oct-89	26.9	4.8	0.9	NT	ND	3.5E+5	3.5E+3
	02-Nov-89	17.6	3.5	1.5	NT	ND	--	--
	15-Mar-89	11.4	0.5	NT	ND	ND	NT	NT
	29-Mar-89	28.0	3.5	NT	NT	ND	NT	NT
	04-Apr-89	33.0	3.8	NT	ND	ND	3.1E+5	1.4E+2
	11-Apr-89	37.8	2.8	NT	NT	ND	2.0E+4	4.5E+1
	18-Apr-89	33.4	3.8	4.0	NT	ND	4.1E+5	1.4E+2
25-Apr-89	47.5	8.0	10.9	NT	ND	3.4E+4	9.5E+1	
02-May-89	39.6	11.0	9.8	NT	ND	6.8E+4	5.6E+2	
09-May-89	39.6	15.5	12.1*	NT	ND	6.5E+5	1.8E+2	
17-May-89	57.2	14.3	6.9	NT	ND	NT	NT	
23-May-89	47.5	13.3	14.9	NT	ND	NT	NT	
31-May-89	57.2	13.0	NT	NT	ND	2.5E+5	3.8E+2	
05-Jun-89	57.2	15.8	15.9	NT	ND	NT	NT	
14-Jun-89	39.6	15.0	16.9	NT	ND	NT	NT	
20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT	
27-Jun-89	55.0	15.5	15.6	NT	0.5	NT	NT	
06-Jul-89	36.4	16.4	10.7	NT	0.6	2.3E+6	4.9E+4	
22-Jul-89	33.7	18.3	NT	NT	0.8	6.4E+5	4.9E+4	
03-Aug-89	46.2	25.5	NT	NT	3.1	1.5E+7	1.2E+3	

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	06-Jul-89	55.0	16.0	15.8	NT	ND	9.1E+6	1.1E+5
	22-Jul-89	23.8	18.3	NT	NT	1.4	NT	NT
	03-Aug-89	42.9	20.0	NT	NT	2.1	NT	NT
	17-Aug-89	52.8	25.6	NT	NT	2.3	8.0E+5	3.1E+3
	07-Sep-89	55.0	25.0	18.8	NT	1.3	NT	NT
	18-Sep-89	NT	NT	19.8	NT	NT	NT	NT
	29-Sep-89	NT	NT	15.1	NT	NT	NT	NT
	05-Oct-89	55.0	25.8	14.0	NT	2.9	NT	NT
	02-Nov-89	28.2	20.0	13.3	NT	2.2	NT	NT
EW-17								
	18-Apr-89	NT	NT	16.8	NT	NT	NT	NT
	25-Apr-89	6.2	8.3	NT	ND	ND	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	66.0	19.8	18.0*	NT	ND	1.2E+6	1.6E+4
	17-May-89	46.2	15.8	7.8	NT	ND	8.5E+5	3.5E+3
	23-May-89	44.0	14.2	18.0	NT	ND	6.5E+5	9.5E+2
	31-May-89	46.2	14.0	19.6	NT	ND	6.5E+5	2.8E+3
	05-Jun-89	52.8	13.2	18.2	NT	ND	NT	NT
	14-Jun-89	45.1	14.2	17.0	NT	ND	NT	NT
	20-Jun-89	NT	NT	18.5	NT	NT	NT	NT
	27-Jun-89	NT	NT	16.1	NT	NT	NT	NT
	06-Jul-89	NT	NT	16.4	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
EW-18								
	18-Apr-89	NT	NT	10.5	NT	NT	NT	NT
	25-Apr-89	6.2	NT	9.2	NT	NT	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	NT	NT	18.2*	NT	NT	NT	NT
	17-May-89	38.4	NT	8.0	NT	ND	NT	NT
	23-May-89	37.0	NT	17.8	NT	ND	7.0E+5	NT
	31-May-89	46.2	NT	17.8	NT	ND	5.4E+6	1.7E+3
	05-Jun-89	NT	NT	19.1	NT	NT	NT	NT
	14-Jun-89	42.9	NT	14.5	NT	ND	NT	NT
	20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	27-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	06-Jul-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
EW-19								
	15-Mar-89	NT	NT	NT	NT	NT	NT	NT
	29-Mar-89	NT	NT	NT	NT	NT	NT	NT
	04-Apr-89	18.5	4.0	NT	ND	ND	NT	NT
	11-Apr-89	33.4	4.0	NT	NT	ND	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		ENUMERATION	
		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	MA (CFU/ml)
	18-Apr-89	41.8	7.0	9.0	NT	ND	NT	NT
	25-Apr-89	NT	NT	7.2	NT	NT	NT	NT
	02-May-89	50.6	2.5	7.2	NT	ND	NT	NT
	09-May-89	NT	6.8	13.5*	NT	NT	NT	NT
	17-May-89	38.4	3.3	8.3	NT	ND	1.1E+6	1.6E+4
	23-May-89	37.0	2.5	16.5	NT	ND	NT	NT
	31-May-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Jun-89	46.2	3.5	18.5	NT	ND	7.9E+5	1.1E+4
	14-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	27-Jun-89	NT	NT	19.5	NT	NT	NT	NT
	06-Jul-89	56.8	8.5	>20.0	NT	ND	2.5E+6	1.6E+6
	22-Jul-89	44.0	11.0	NT	NT	ND	NT	NT
	03-Aug-89	46.9	16.0	NT	NT	ND	NT	NT
	17-Aug-89	61.6	17.2	NT	NT	NT	2.9E+4	1.7E+3
	07-Sep-89	61.6	24.6	>20.0	NT	>20.0	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	70.4	27.5	>20.0	NT	ND	NT	NT
	23-Oct-89	59.4	27.0	>20.0	NT	ND	NT	NT
	02-Nov-89	57.9	32.5	>20.0	NT	ND	NT	NT
EW-20	14-Jun-89	NT	NT	19.1	NT	NT	NT	NT
	20-Jun-89	NT	NT	17.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	17.5	NT	NT	NT	NT
	06-Jul-89	NT	NT	16.7	NT	NT	NT	NT
	22-Jul-89	NT	NT	17.1	NT	NT	NT	NT
	07-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	19.9	NT	NT	NT	NT
	29-Sep-89	NT	NT	14.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
EW-21	23-May-89	NT	NT	NT	NT	NT	NT	NT
	31-May-89	17.6	5.0	NT	NT	ND	3.7E+4	2.4E+4
	05-Jun-89	17.6	1.3	NT	NT	ND	9.3E+4	7.9E+3
	14-Jun-89	26.0	1.0	NT	NT	ND	5.8E+4	2.4E+4
	20-Jun-89	29.0	0.8	NT	NT	ND	1.5E+5	7.0E+3
	27-Jun-89	27.1	0.8	NT	NT	ND	NT	NT
	06-Jul-89	43.6	0.5	NT	NT	ND	NT	NT
	22-Jul-89	26.8	0.5	NT	NT	ND	NT	NT
	03-Aug-89	26.8	0.5	NT	NT	ND	NT	NT
	17-Aug-89	48.0	3.0	NT	NT	ND	2.9E+4	1.7E+3
	07-Sep-89	23.8	7.8	9.0	NT	ND	NT	NT
	18-Sep-89	39.2	9.5	9.4	NT	ND	NT	NT
	29-Sep-89	NT	NT	7.9	NT	NT	NT	NT
	05-Oct-89	39.4	9.5	10.3	NT	ND	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	23-Oct-89	48.0	9.1	13.8	NT	ND	NT	NT
	02-Nov-89	39.2	12.0	15.4	NT	ND	NT	NT
Injection Composite								
	21-Mar-89	26.0	42.0	NT	NT	15.0	NT	NT
	18-Apr-89	37.8	110.0	NT	NT	37.4	NT	NT
	24-Apr-89	24.6	45.0	NT	NT	22.0	NT	NT
	01-May-89	23.2	40.0	NT	NT	8.3	NT	NT
	09-May-89	29.9	13.5	NT	NT	1.5	NT	NT
	17-May-89	24.6	37.5	NT	NT	6.1	NT	NT
	23-May-89	31.7	42.5	NT	NT	9.1	NT	NT
	31-May-89	45.1	50.0	NT	NT	14.5	NT	NT
	06-Jun-89	35.9	30.0	NT	NT	10.2	NT	NT
	20-Jun-89	35.9	35.0	NT	NT	8.8	NT	NT
	27-Jun-89	26.4	29.0	NT	NT	9.8	NT	NT
	06-Jul-89	34.8	42.5	NT	NT	9.4	NT	NT
	22-Jul-89	23.8	42.5	NT	NT	10.2	NT	NT
	03-Aug-89	23.8	38.5	NT	NT	10.2	NT	NT
	17-Aug-89	17.6	80.0	NT	NT	16.0	NT	NT
	07-Sep-89	35.0	50.0	NT	NT	10.9	NT	NT
	18-Sep-89	55.0	58.0	NT	NT	17.4	NT	NT
	05-Oct-89	48.4	35.0	NT	NT	5.4	NT	NT
	23-Oct-89	33.4	40.5	NT	NT	6.2	NT	NT
	02-Nov-89	18.7	39.0	NT	NT	7.3	NT	NT
Extraction Composite								
	21-Mar-89	NT	NT	NT	NT	NT	NT	NT
	18-Apr-89	NT	NT	NT	NT	NT	NT	NT
	24-Apr-89	55	6.8	NT	NT	ND	NT	NT
	01-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	44.0	15.6	NT	NT	ND	NT	NT
	17-May-89	44.0	13.0	NT	NT	0.5	NT	NT
	23-May-89	45.4	15.5	NT	NT	ND	NT	NT
	31-May-89	48.4	11.0	NT	NT	ND	NT	NT
	06-Jun-89	38.5	12.0	NT	NT	ND	NT	NT
	20-Jun-89	27.1	14.0	NT	NT	ND	NT	NT
	27-Jun-89	50.6	13.6	NT	NT	ND	NT	NT
	06-Jul-89	66.0	16.6	NT	NT	0.5	NT	NT
	22-Jul-89	37.4	18.0	NT	NT	0.8	NT	NT
	03-Aug-89	48.4	21.4	NT	NT	1.4	NT	NT
	17-Aug-89	39.6	NT	NT	NT	1.7	NT	NT
	07-Sep-89	NT	NT	NT	NT	NT	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON		TC	HCU
		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	18-Sep-89	59.4	28.0	NT	NT	1.9	NT	NT
	05-Oct-89	61.6	27.5	NT	NT	4.0	NT	NT
	23-Oct-89	57.2	26.0	NT	NT	2.9	NT	NT
	02-Nov-89	NT	NT	NT	NT	NT	NT	NT

## NOTES:

HCU: Hydrocarbon Utilizers

TC: Total Count

LOD: Limit of Detection.

NA: Limit of Detection not applicable.

ND: Not detected at or above LOD.

NT: Not tested.

\*: Dissolved oxygen samples collected on 5/12/89.

--: Results not available.

Inorganic constituents are reported in parts per million (ppm).

Microbial counts are reported in colony-forming units per milliliter of water (CFU/ml).

Analysis performed by HLA Laboratory.

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL ENUMERATION	
				OXYGEN	IRON (Fe)		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/L)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
MW-1	03-Aug-89	5.3	ND	NT	NT	ND	NT	NT
MW-5	06-Jun-89	10.1	2.5	1.7	NT	ND	NT	NT
	06-Jul-89	NT	2.5	1.7	NT	ND	NT	NT
MW-7	06-Jun-89	ND	4.8	1.8	NT	ND	NT	NT
	06-Jul-89	ND	ND	1.8	NT	ND	NT	NT
	22-Jul-89	ND	0.5	NT	NT	ND	NT	NT
	03-Aug-89	ND	3.3	NT	NT	ND	NT	NT
	07-Sep-89	ND	9.0	NT	NT	ND	NT	NT
	05-Oct-89	ND	8.0	NT	NT	ND	NT	NT
	02-Nov-89	ND	ND	5.3	NT	ND	NT	NT
MW-8	06-Jun-89	NT	NT	4.2	NT	NT	NT	NT
	06-Jul-89	NT	NT	4.2	NT	NT	NT	NT
	02-Nov-89	NT	NT	6.5	NT	NT	NT	NT
MW-9	03-Mar-89	37.0/32.0*	1.5	1.0**	ND	ND	5.3E+5	9.5E+2
	15-Mar-89	6.0	6.0	NT	ND	ND	5.9E+6	1.8E+2
	29-Mar-89	37.0	32.0	NT	NT	ND	1.8E+6	2.1E+2
	04-Apr-89	41.8	36.0	NT	ND	ND	3.6E+5	1.1E+2
	11-Apr-89	42.1	60.0	NT	NT	ND	3.6E+5	1.4E+2
	18-Apr-89	56.3	60.0	8.4	ND	0.9	1.2E+6	2.2E+2
	25-Apr-89	88.0	50.0	>20.0	NT	2.9	9.9E+5	3.5E+3
	02-May-89	74.8	62.5	18.2	NT	4.8	3.5E+6	5.4E+3
	09-May-89	44.0	37.5	16.6	NT	6.2	NT	NT
	17-May-89	41.0	21.3	8.5	NT	5.6	NT	NT
	23-May-89	54.1	20.0	NT	NT	3.9	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	46.2	34.0	NT	NT	10.8	NT	NT
	14-Jun-89	63.8	14.0	13.9	NT	3.3	NT	NT
	06-Jul-89	56.8	30.0	NT	NT	NT	NT	NT
	22-Jul-89	37.4	29.0	NT	NT	4.4	NT	NT
	03-Aug-89	38.5	25.0	NT	NT	5.5	NT	NT
	17-Aug-89	74.4	20.0	NT	NT	3.9	NT	NT
	07-Sep-89	83.6	39.0	15.5	NT	6.6	NT	NT
05-Oct-89	105.6	41.3	13.5	NT	5.6	NT	NT	
02-Nov-89	78.3	18.6	18.9	NT	2.3	NT	NT	
MW-10	03-Mar-89	8.4/5.5*	1.0	4.0**	ND	ND	2.3E+5	3.5E+2
	15-Mar-89	5.5	1.2	NT	ND	ND	NT	NT
	29-Mar-89	11.4	4.5	NT	NT	ND	NT	NT
	04-Apr-89	15.0	1.3	NT	ND	ND	NT	NT
	11-Apr-89	16.5	2.3	NT	NT	ND	NT	NT

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON (Fe)		ENUMERATION	TC
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	18-Apr-89	16.0	5.3	5.0	NT	ND	NT	NT
	25-Apr-89	14.1	2.0	2.2	NT	ND	NT	NT
	02-May-89	19.4	6.5	2.6	NT	ND	NT	NT
	09-May-89	17.6	1.8	3.1	NT	ND	NT	NT
	17-May-89	21.1	1.5	1.9	NT	ND	NT	NT
	23-May-89	17.6	1.3	NT	NT	ND	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	17.6	2.3	2.0	NT	ND	NT	NT
	14-Jun-89	23.1	ND	2.1	NT	NT	NT	NT
	06-Jul-89	20.9	ND	NT	NT	NT	NT	NT
	22-Jul-89	17.6	0.5	NT	NT	ND	NT	NT
	03-Aug-89	23.8	ND	NT	NT	ND	NT	NT
	17-Aug-89	16.5	1.3	NT	NT	ND	NT	NT
	07-Sep-89	18.0	1.5	6.2	NT	ND	NT	NT
	18-Sep-89	9.9	6.0	NT	NT	ND	NT	NT
	05-Oct-89	21.8	11.0	6.1	NT	0.7	NT	NT
	23-Oct-89	23.8	3.0	6.5	NT	ND	3.2E+6	7.0E+3
	02-Nov-89	21.1	1.5	8.9	NT	ND	--	--
MW-11	03-Mar-89	ND/ND*	0.8	2.0**	ND	ND	1.1E+6	2.8E+3
	15-Mar-89	ND	1.0	NT	ND	ND	NT	NT
	29-Mar-89	31.7	4.3	NT	NT	ND	NT	NT
	04-Apr-89	37.0	5.0	NT	ND	ND	NT	NT
	11-Apr-89	40.7	24.0	NT	NT	ND	3.8E+5	1.1E+2
	18-Apr-89	56.3	26.0	5.7	ND	ND	1.2E+6	1.7E+2
	25-Apr-89	44.0	29.7	11.8	NT	ND	4.7E+5	1.1E+3
	02-May-89	74.8	41.3	17.1	NT	ND	2.4E+6	5.4E+3
	09-May-89	57.2	29.7	12.5	NT	ND	1.4E+6	5.4E+3
	17-May-89	46.2	21.5	9.9	NT	ND	3.5E+6	1.6E+4
	23-May-89	52.8	15.8	NT	NT	ND	2.0E+6	3.3E+3
	31-May-89	58.3	29.7	>20.0	NT	ND	7.0E+5	2.4E+5
	06-Jun-89	66.0	33.0	NT	NT	ND	5.0E+6	2.8E+4
	14-Jun-89	52.8	25.7	14.9	NT	0.5	1.2E+7	2.4E+5
	20-Jun-89	61.6	24.8	12.8	NT	0.9	7.1E+6	1.1E+4
	06-Jul-89	56.8	32.8	NT	NT	NT	8.5E+6	5.4E+5
	22-Jul-89	33.0	27.2	NT	NT	9.6	NT	NT
	03-Aug-89	52.8	19.1	NT	NT	4.3	1.9E+5	1.1E+4
	17-Aug-89	58.3	38.9	NT	NT	5.8	1.1E+6	1.8E+4
	07-Sep-89	61.6	47.2	15.3	NT	7.4	1.3E+6	4.9E+3
	18-Sep-89	56.8	40.6	NT	NT	6.6	9.1E+6	9.5E+3
	05-Oct-89	70.4	47.5	19.4	NT	7.5	2.1E+6	1.1E+4
	23-Oct-89	50.6	41.3	11.4	NT	4.7	NT	NT
	02-Nov-89	56.5	40.0	16.4	NT	6.1	--	--
MW-12	03-Mar-89	11.4/6.2*	1.0	5.8**	ND	ND	7.1E+5	1.1E+1
	15-Mar-89	12.3	1.1	NT	ND	ND	NT	NT



Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON (Fe)		TC	HCU
		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	29-Mar-89	13.6	4.8	NT	NT	ND	NT	NT
	04-Apr-89	11.4	1.5	NT	ND	ND	NT	NT
	11-Apr-89	7.5	5.0	NT	NT	ND	NT	NT
	18-Apr-89	9.2	6.8	2.1	ND	ND	NT	NT
	25-Apr-89	3.5	1.8	1.4	NT	ND	NT	NT
	02-May-89	12.3	5.0	2.3	NT	ND	NT	NT
	09-May-89	9.7	2.5	2.2	NT	ND	NT	NT
	17-May-89	9.6	2.5	3.5	NT	ND	NT	NT
	23-May-89	8.3	1.3	1.8	NT	ND	NT	NT
	31-May-89	10.3	2.5	2.1	NT	ND	NT	NT
	06-Jun-89	9.2	2.8	NT	NT	ND	NT	NT
	20-Jun-89	8.4	1.0	4.0	NT	ND	NT	NT
	06-Jul-89	4.8	ND	NT	NT	NT	NT	NT
	22-Jul-89	5.3	0.5	NT	NT	ND	NT	NT
	03-Aug-89	7.7	0.5	NT	NT	ND	NT	NT
	17-Aug-89	2.0	1.3	NT	NT	ND	NT	NT
	07-Sep-89	4.5	4.8	NT	NT	ND	NT	NT
	18-Sep-89	4.2	5.8	NT	NT	ND	NT	NT
	05-Oct-89	3.4	5.3	NT	NT	ND	NT	NT
	02-Nov-89	7.0	2.3	4.9	NT	ND	NT	NT
MW-13								
	03-Mar-89	11.4/8.6*	1.0	2.0**	0.25	ND	4.1E+6	1.7E+2
	15-Mar-89	9.2	1.1	NT	ND	ND	NT	NT
	29-Mar-89	8.8	6.3	NT	NT	ND	NT	NT
	04-Apr-89	9.7	3.5	NT	ND	ND	NT	NT
	11-Apr-89	13.2	2.8	NT	NT	ND	NT	NT
	18-Apr-89	15.0	8.5	6.0	NT	ND	NT	NT
	25-Apr-89	20.2	2.5	NT	NT	ND	NT	NT
	02-May-89	37.8	2.3	6.8	NT	ND	NT	NT
	09-May-89	42.1	1.5	9.9	NT	ND	NT	NT
	17-May-89	37.0	1.5	10.3	NT	ND	NT	NT
	23-May-89	33.4	1.3	NT	NT	ND	NT	NT
	06-Jun-89	40.5	3.0	NT	NT	ND	NT	NT
	27-Jun-89	57.2	0.8	18.5	NT	ND	5.9E+5	1.1E+3
	06-Jul-89	36.5	ND	NT	NT	NT	5.6E+5	7.8E+2
	22-Jul-89	33.1	0.5	NT	NT	ND	NT	NT
	03-Aug-89	56.3	3.0	NT	NT	ND	NT	NT
	17-Aug-89	47.4	4.3	NT	NT	ND	NT	NT
	07-Sep-89	59.8	10.0	NT	NT	ND	NT	NT
	18-Sep-89	NT	NT	NT	NT	NT	NT	NT
	05-Oct-89	35.2	9.0	12.8	NT	ND	NT	NT
	02-Nov-89	41.8	3.0	13.1	NT	ND	NT	NT
MW-14								
	03-Mar-89	37.0/22.0*	0.8	3.0**	ND	ND	3.6E+5	2.2E+3
	15-Mar-89	37.0	1.0	NT	ND	ND	NT	NT
	29-Mar-89	22.8	3.8	NT	NT	ND	NT	NT

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL	
				OXYGEN	IRON (Fe)		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/L)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	04-Apr-89	29.9	3.8	NT	ND	ND	NT	NT
	11-Apr-89	37.4	2.8	NT	NT	ND	NT	NT
	18-Apr-89	43.6	5.8	NT	NT	ND	NT	NT
	25-Apr-89	35.2	1.3	NT	NT	ND	NT	NT
	02-May-89	40.5	5.3	6.7	NT	ND	NT	NT
	09-May-89	45.8	1.8	11.7	NT	ND	NT	NT
	17-May-89	51.0	1.5	9.2	NT	ND	NT	NT
	23-May-89	52.4	1.5	NT	NT	ND	NT	NT
	31-May-89	70.4	2.5	16.2	NT	ND	4.2E+5	2.4E+5
	06-Jun-89	44.7	2.0	NT	NT	ND	NT	NT
	27-Jun-89	48.4	0.8	12.0	NT	ND	1.1E+6	2.4E+5
	06-Jul-89	22.5	ND	NT	NT	NT	2.5E+6	2.4E+5
	22-Jul-89	33.4	0.5	NT	NT	ND	3.8E+6	9.5E+3
	03-Aug-89	38.7	3.0	NT	NT	ND	NT	NT
	17-Aug-89	35.2	4.3	13.0	NT	ND	NT	NT
	07-Sep-89	59.8	7.5	NT	NT	ND	NT	NT
	05-Oct-89	63.8	14.8	>20.0	NT	ND	NT	NT
	02-Nov-89	72.6	11.0	>20.0	NT	ND	NT	NT
MW-15								
	03-Mar-89	42.2/19.0*	0.9	4.0**	ND	ND	4.5E+5	2.8E+2
	10-Mar-89	40.5	2.2	NT	NT	NT	1.0E+6	2.8E+2
	15-Mar-89	35.2	1.2	NT	ND	ND	6.9E+6	2.8E+2
	29-Mar-89	20.2	4.2	NT	NT	ND	9.1E+5	2.1E+2
	04-Apr-89	24.6	5.3	NT	ND	ND	4.4E+5	1.4E+2
	11-Apr-89	23.1	4.0	NT	NT	ND	2.7E+6	1.7E+2
	18-Apr-89	31.9	1.3	6.3	ND	ND	3.1E+6	2.9E+1
	25-Apr-89	42.2	1.8	9.6	ND	ND	2.2E+5	4.6E+1
	02-May-89	50.6	3.5	11.4	NT	ND	8.5E+5	1.2E+2
	09-May-89	33.0	1.8	9.6	NT	ND	2.4E+6	2.4E+3
	17-May-89	48.4	2.3	12.1	NT	ND	4.6E+5	2.8E+3
	23-May-89	48.4	1.8	11.3	NT	ND	1.0E+6	3.3E+2
	06-Jun-89	53.9	2.5	NT	NT	ND	NT	NT
	06-Jul-89	46.9	7.5	NT	NT	ND	3.8E+6	3.3E+4
	22-Jul-89	28.2	10.3	NT	NT	ND	1.7E+6	2.2E+3
	03-Aug-89	38.5	10.8	NT	NT	ND	NT	NT
	17-Aug-89	70.4	18.6	NT	NT	ND	NT	NT
	07-Sep-89	56.8	29.0	16.5	NT	1.6	NT	NT
	18-Sep-89	56.8	32.0	NT	NT	1.6	NT	NT
	05-Oct-89	70.0	29.0	>20.0	NT	1.5	NT	NT
	02-Nov-89	60.7	36.0	>20.0	NT	1.9	NT	NT
MW-16								
	03-Mar-89	49.3/17.0*	1.2	2.0**	ND	ND	8.4E+5	1.4E+2
	10-Mar-89	14.5	2.2	NT	ND	ND	1.4E+5	1.2E+3
	15-Mar-89	11.4	3.0	NT	ND	ND	6.0E+6	1.1E+3
	29-Mar-89	33.4	7.2	NT	NT	ND	1.6E+6	3.5E+3
	04-Apr-89	39.6	11.5	NT	0.2	NT	2.2E+6	1.2E+3

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED	DISSOLVED	AMMONIA	MICROBIAL ENUMERATION	
				OXYGEN	IRON (Fe)		TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	11-Apr-89	37.8	16.0	NT	NT	ND	6.7E+5	1.4E+3
	18-Apr-89	52.8	20.0	14.0	ND	ND	1.3E+6	2.3E+2
	25-Apr-89	49.3	22.0	>20.0	ND	ND	5.1E+5	2.2E+2
	02-May-89	57.2	31.3	14.6	NT	ND	2.2E+6	1.7E+3
	09-May-89	59.4	23.6	15.3	NT	ND	4.0E+6	9.5E+2
	17-May-89	41.8	16.5	9.5	NT	ND	6.8E+5	1.4E+3
	23-May-89	46.2	23.9	17.3	NT	ND	1.0E+6	2.2E+3
	31-May-89	61.6	15.7	16.2	NT	ND	4.4E+5	4.9E+3
	06-Jun-89	43.6	18.2	NT	NT	ND	4.0E+6	2.8E+4
	20-Jun-89	61.6	7.6	5.3	NT	ND	1.1E+7	5.4E+4
	06-Jul-89	55.4	23.1	NT	NT	1.5	5.7E+6	4.9E+4
	22-Jul-89	55.0	10.7	NT	NT	ND	NT	NT
	03-Aug-89	45.8	10.0	NT	NT	1.3	1.1E+5	1.8E+3
	17-Aug-89	74.8	19.0	NT	NT	1.5	8.1E+5	1.4E+4
	07-Sep-89	61.6	52.1	16.6	NT	3.7	8.2E+5	1.1E+4
	18-Sep-89	28.2	42.9	NT	NT	5.4	1.4E+6	5.4E+4
	05-Oct-89	66.0	49.0	>20.0	NT	6.3	1.8E+6	7.9E+3
	23-Oct-89	48.4	36.5	>20.0	NT	4.7	NT	NT
	02-Nov-89	48.4	35.0	>20.0	NT	5.5	--	--
MW-17	03-Mar-89	NT	NT	NT	NT	NT	NT	NT
	10-Mar-89	12.3	0.8	NT	ND	ND	1.6E+5	1.1E+3
	15-Mar-89	7.5	3.1	NT	ND	ND	1.1E+7	3.5E+3
	29-Mar-89	25.5	3.8	NT	NT	ND	2.6E+6	1.1E+3
	04-Apr-89	35.2	3.5	NT	ND	ND	3.3E+6	6.8E+2
	11-Apr-89	49.4	8.0	NT	NT	ND	1.5E+6	3.9E+2
	18-Apr-89	52.8	16.0	11.8	ND	ND	1.2E+6	1.4E+2
	25-Apr-89	51.0	11.6	13.5	ND	ND	6.0E+5	1.7E+2
	02-May-89	52.8	17.0	13.3	NT	ND	5.1E+6	3.5E+2
	09-May-89	44.9	5.0	6.6	NT	ND	6.5E+6	9.5E+2
	17-May-89	47.7	17.6	8.4	NT	ND	3.0E+6	5.4E+3
	23-May-89	57.2	14.5	17.0	NT	ND	1.1E+6	3.9E+2
	06-Jun-89	46.2	16.0	NT	NT	ND	3.0E+6	3.5E+4
	14-Jun-89	42.9	18.0	15.4	NT	ND	3.0E+6	4.3E+4
	27-Jun-89	56.8	11.0	NT	NT	ND	1.1E+7	9.2E+4
	06-Jul-89	50.6	13.0	NT	NT	ND	7.2E+6	1.1E+5
	22-Jul-89	45.8	20.0	NT	NT	ND	7.3E+5	7.9E+4
	03-Aug-89	70.4	14.0	NT	NT	1.0	8.3E+4	1.3E+3
	17-Aug-89	63.8	20.0	NT	NT	1.7	2.3E+5	9.2E+3
	07-Sep-89	79.2	32.0	NT	NT	1.4	9.2E+6	1.3E+4
	18-Sep-89	71.5	24.6	NT	NT	3.3	6.5E+5	1.7E+4
	05-Oct-89	75.9	39.0	NT	NT	5.8	9.3E+5	2.4E+4
	23-Oct-89	52.8	38.0	>20.0	NT	4.7	7.5E+5	2.4E+3
	02-Nov-89	57.2	36.0	>20.0	NT	6.9		
MW-18	03-Mar-89	15.4/9.3*	0.5	2.9**	ND	ND	1.3E+6	7.9E+1

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Monitoring Well Samples

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION	
							TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/L)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	15-Mar-89	4.0	1.1	NT	ND	ND	NT	NT
	29-Mar-89	8.8	3.0	NT	NT	ND	NT	NT
	04-Apr-89	6.6	2.8	NT	ND	ND	NT	NT
	11-Apr-89	6.6	3.8	NT	NT	ND	NT	NT
	18-Apr-89	6.6	5.8	5.0	NT	ND	NT	NT
	25-Apr-89	2.2	1.3	3.0	NT	ND	NT	NT
	02-May-89	8.8	4.5	3.4	NT	ND	NT	NT
	09-May-89	11.6	1.8	4.1	NT	ND	NT	NT
	17-May-89	5.8	1.8	3.3	NT	ND	NT	NT
	23-May-89	14.5	1.5	3.9	NT	ND	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	17.1	1.3	NT	NT	ND	NT	NT
	27-Jun-89	8.8	0.8	NT	NT	ND	NT	NT
	06-Jul-89	15.7	ND	NT	NT	NT	NT	NT
	22-Jul-89	17.2	0.5	NT	NT	ND	NT	NT
	03-Aug-89	11.0	0.5	NT	NT	ND	NT	NT
	17-Aug-89	16.5	1.3	NT	NT	ND	NT	NT
	07-Sep-89	15.0	3.0	NT	NT	ND	NT	NT
	05-Oct-89	22.0	6.0	NT	NT	ND	NT	NT
	02-Nov-89	15.0	2.3	NT	NT	ND	NT	NT

## NOTES:

HCU: Hydrocarbon Utilizers

TC: Total Count

LOD: Limit of Detection.

NA: Limit of Detection not applicable.

ND: Not detected at or above LOD.

NT: Not tested.

\* : First value from HLA laboratory  
Second value from Pace Laboratories, Inc.

\*\* : Results from Pace Laboratories, Inc.

-- : Results not available.

Inorganic constituents reported in parts per million (ppm).

Microbial counts reported in colony-forming units per milliliter of water (CFU/ml).

Analyses performed by HLA laboratory unless otherwise indicated.

Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
LOD	(mg/l)	0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
MW-5	03-May-89	ND	ND	ND	0.029	ND
	06-Jun-89	ND	ND	ND	ND	ND
MW-7	04-Apr-89	ND	0.0007	0.0010	0.0012	ND
	03-May-89	ND	0.0012	0.0018	0.0048	0.27
	06-Jun-89	0.001	0.001	0.0022	0.0011	0.4
	07-Jul-89	0.0002	0.001	0.00034	0.0059	0.56
	02-Aug-89	ND	0.00152	0.0054	0.0059	0.7
	07-Sep-89	ND	ND	ND	0.00152	0.59
	05-Oct-89	ND	0.0011	0.0006	0.0013	0.73
	02-Nov-89	0.0002	0.001	0.0055	0.0036	0.63
MW-9	02-Mar-89	NT	NT	NT	NT	1.2
	04-Apr-89	0.19	0.35	0.041	0.36	1.5
	01-May-89	0.43	0.60	0.033	0.64	4.6
	06-Jun-89	0.36	0.106	0.110	0.10	1.6
	06-Jul-89	0.16	0.084	0.052	1.8	5.2
	02-Aug-89	0.032	0.034	0.012	1.6	4.9
	06-Sep-89	0.007	0.022	ND	0.36	1.5
	04-Oct-89	<0.025	0.08	<0.025	1.3	4.1
	01-Nov-89	0.0012/0.0007	0.014/0.015	ND/ND	0.67/0.69	3.1/2.9
MW-10	02-Mar-89	NT	NT	NT	NT	2.8
	04-Apr-89	1.6	0.76	0.13	0.68	4.2
	01-May-89	1.2	0.67	0.16	0.67	3.4
	06-Jun-89 a	0.66/0.64	0.14/0.14	0.11/0.10	0.24/0.14	4.8/4.3
	06-Jul-89	2.0	2.2	0.54	1.8	12
	02-Aug-89 a	8.8/8.6	1.7/1.7	0.36/0.34	1.5/1.5	19/20
	06-Sep-89 a	8.1/11	5.2/6.3	0.82/0.93	5.5/6.1	36/34
	04-Oct-89	40	79	11	94	620
	01-Nov-89	21	10	2.0	12	95
MW-11	02-Mar-89	NT	NT	NT	NT	15
	04-Apr-89	2.5	3.8	0.17	2.4	10
	19-Apr-89	3.8	2.8	ND	5.7	14
	01-May-89	1.3	1.7	0.069	1.7	5.2
	07-Jun-89	0.082	0.097	0.045	0.167	12
	06-Jul-89 a	2.1/2.3	2.5/2.8	0.14/0.16	2.6/3.0	15/15
	02-Aug-89	7.2	7.5	0.26	7.1	37
	06-Sep-89	5.0	6.5	0.41	5.2	47
	04-Oct-89	3.3	2.8	0.15	2.5	11
	01-Nov-89	2.1	2.8	0.11	1.8	13

Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
-----						
LOD	(mg/l)	0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
-----						
MW-12	15-Feb-89	ND	ND	ND	ND	ND
	03-Mar-89	NT	NT	NT	NT	ND
	05-Apr-89	0.0014	0.0023	ND	0.0054	ND
	02-May-89	0.026	0.0033	ND	0.0063	0.10
	07-Jun-89	0.034	0.0037	ND	0.012	0.18
	06-Jul-89	0.029	0.0025	ND	0.0059	0.12
	02-Aug-89	0.023	0.002	ND	0.005	ND
	07-Sep-89 a	0.051/0.059	0.0016/0.002	ND/ND	0.0049/0.0058	ND/ND
	05-Oct-89 a	0.037/0.040	0.0032/0.003	ND/ND	0.0086/0.0094	ND/ND
	02-Nov-89	0.0056	0.0011	ND	0.0019	0.071
MW-13	02-Mar-89	NT	NT	NT	NT	1.4
	04-Apr-89	0.041	0.039	0.0038	0.28	0.71
	01-May-89	0.048	0.049	0.013	0.13	0.34
	07-Jun-89	0.051	0.037	0.02	0.082	0.98
	06-Jul-89	0.210	0.054	0.013	0.109	0.76
	02-Aug-89	0.098	0.011	0.0005	0.031	0.27
	07-Sep-89	0.039	0.0020	ND	0.0050	ND
	04-Oct-89	4.0	1.6	0.20	1.5	9.2
	01-Nov-89	1.7	0.086	0.091	0.37	5.6
MW-14	02-Mar-89	NT	NT	NT	NT	ND
	04-Apr-89	0.44	0.063	ND	0.27	1.4
	01-May-89	0.35	0.011	ND	0.094	0.94
	07-Jun-89 a	0.057/ND	0.0022/ND	0.0005/ND	0.043/ND	1.1/0.64
	06-Jul-89	3.0	1.7	0.050	3.6	14
	01-Aug-89	0.49	0.084	ND	0.84	4.5
	06-Sep-89	1.0	0.090	ND	1.4	4.9
	04-Oct-89	0.70	0.015	ND	0.75	3.1
	01-Nov-89	0.36	0.0058	ND	0.24	1.4
MW-15	03-Mar-89	NT	NT	NT	NT	3.9
	04-Apr-89	0.88	0.97	0.11	0.93	3.7
	02-May-89	1.5	1.1	0.086	0.74	2.7
	07-Jun-89	5.7	4.3	0.3	2.4	22
	05-Jul-89	2.0	3.0	0.26	2.0	12
	03-Aug-89	2.6	2.8	0.75	3.8	24
	06-Sep-89	1.1	1.4	0.23	1.3	7.3
	04-Oct-89	0.59	1.1	0.076	0.59	3.7
	01-Nov-89	1.6	2.3	0.23	1.7	9.7

Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
-----						
LOD	(mg/l)	0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
-----						
MW-16	02-Mar-89	NT	NT	NT	NT	2.1
	04-Apr-89	2.1	2.2	0.18	1.4	6.7
	02-May-89	0.74	0.94	0.11	0.95	2.7
	07-Jun-89	0.37	0.56	0.51	0.35	14
	05-Jul-89	1.9	2.7	1.8	4.5	16
	03-Aug-89 a	1.8/1.9	2.6/2.6	0.18/0.19	5.7/6.0	17/17
	06-Sep-89	0.96	3.3	0.26	1.3	8.9
	04-Oct-89	0.72	2.1	0.16	1.3	5.4
	02-Nov-89	0.74	2.8	0.37	2.4	11
MW-17	04-Apr-89	3.1	2.9	0.27	3.9	12
	02-May-89	1.2	1.0	0.11	1.4	3.9
	07-Jun-89	1.2	1.2	ND	1.3	6.3
	05-Jul-89	3.0	3.3	2.7	3.9	18
	02-Aug-89	4.8	9.5	0.63	14	47
	03-Aug-89	5.1	6.1	0.73	12	NT
	06-Sep-89	2.8	4.5	0.32	8.4	21
	04-Oct-89	0.47	0.092	0.018	1.0	2.8
	01-Nov-89	0.19	0.011	0.11	0.18	0.93
MW-18	15-Feb-89	ND	ND	ND	ND	ND
	03-Mar-89	NT	NT	NT	NT	ND
	05-Apr-89	ND	ND	ND	ND	ND
	02-May-89	ND	ND	ND	ND	ND
	07-Jun-89	ND	ND	ND	ND	ND
	06-Jul-89	ND	ND	ND	ND	ND
	02-Aug-89	ND	ND	ND	ND	ND
	06-Sep-89	ND	ND	ND	ND	ND
	05-Oct-89	ND	ND	ND	ND	ND
	01-Nov-89	ND	ND	ND	ND	ND
EW-1	04-Apr-89	1.6	1.0	0.087	1.8	5.9
	01-May-89	3.2	1.2	0.15	1.4	6.3
	05-Jun-89	7.7	5.0	0.2	3.5	24
	05-Jul-89	4.4	5.1	0.32	3.8	24
	02-Aug-89	3.1	4.0	0.4	2.9	23
	06-Sep-89	3.0	3.7	0.26	3.0	11
	05-Oct-89	1.3	1.7	LT 0.10	0.3	7.3
	02-Nov-89	2.4	4.0	0.23	2.1	19

Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
LOD	(mg/l)	0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
EW-4	04-Apr-89	NT	NT	NT	NT	2.5
	01-May-89	0.56	0.28	0.034	0.72	2.0
	05-Jun-89	0.4	0.2	ND	0.6	3.1
	05-Jul-89	0.29	0.15	0.021	1.2	4.3
	02-Aug-89	0.23	0.1	0.023	1.1	6.3
	06-Sep-89	0.17	0.038	LT 0.0005	0.80	3.0
	02-Nov-89	0.12	0.089	0.009	0.48	5.3
EW-6	02-Nov-89	20	22	0.54	12	100
EW-7	05-Jul-89	18	16	0.67	10	74
	05-Oct-89	38	46	LT 0.50	11	210
	02-Nov-89	30	39	1.8	15	170
EW-8	01-May-89	1.1	0.49	0.021	0.30	2.3
	05-Jun-89	2.5	2.0	ND	1.4	8.3
	05-Jul-89	3.3	2.9	0.22	3.1	19
	02-Aug-89	5.7	5.6	0.33	5.8	37
	06-Sep-89	5.7	5.5	0.19	10	38
	05-Oct-89	13	4.6	LT 0.25	7.0	71
	02-Nov-89	8.1	8.6	0.21	6.2	56
EW-10	07-Sep-89	8.1	7.4	0.80	9.2	42
	05-Oct-89	6.1	4.6	0.20	7.0	19
	02-Nov-89	1.7	1.2	0.048	3.3	14
EW-11	07-Sep-89	7.7	8.0	0.52	5.3	25
EW-12	01-May-89	1.8	0.66	0.048	0.62	3.6
	05-Jun-89	25	20	0.8	11	71
	05-Jul-89	5.2	5.6	0.38	3.4	25
	02-Aug-89	4.5	5.4	0.39	3.3	25
	07-Sep-89	2.2	1.8	0.059	2.2	9.9
	05-Oct-89	4.4	5.5	LT 0.10	2.0	21
EW-13	19-Apr-89	0.068	0.0064	ND	0.20	0.79
	07-Sep-89	3.3	3.2	1.8	0.026	15
EW-14	05-Jul-89	1.8	1.7	0.08	1.1	8.7
	07-Sep-89	4.1	3.5	0.20	3.7	16
	05-Oct-89	4.3	5.2	LT 0.10	0.74	24



Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
LOD (mg/l)		0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
EW-15	19-Apr-89 #	13080	61000	16000	140000	660000
	05-Jul-89	2.0	2.8	0.26	2.9	19
	02-Aug-89	1.7	3.4	0.68	2.5	15
	07-Sep-89	8.4	7.6	0.20	6.3	37
	05-Oct-89	2.6	1.7	LT 0.10	0.62	12
	02-Nov-89	ND	0.0014	ND	0.0029	0.16
EW-16	04-Apr-89 @	2.8/3.3	2.0/2.6	0.10/0.14	0.99/1.2	8.9/8.8
	19-Apr-89	0.002	0.0027	ND	0.0021	0.57
	01-May-89	5.0	4.6	0.34	2.5	12
	05-Jun-89	2.5	2.6	ND	1.8	9.5
	05-Jul-89	2.8	3.6	0.28	1.8	16
	02-Aug-89	1.1	1.2	0.86	1.2	6.6
	07-Sep-89	2.6	2.7	0.21	1.9	11
	05-Oct-89	3.6	2.9	0.15	2.4	16
	02-Nov-89	1.8	1.7	0.82	0.33	11
EW-19	01-May-89	1.4	1.2	0.068	0.77	3.4
	05-Jun-89	0.9	0.6	ND	0.6	2.9
	05-Jul-89 @	2.2/1.4	0.62/0.71	0.041/0.043	0.72/0.8	4.8/5.3
	02-Aug-89	1.7	1.1	0.039	0.95	7.4
	07-Sep-89	2.5	2.1	0.15	1.5	9.1
	05-Oct-89	5.1	3.7	0.048	3.0	13
	02-Nov-89	0.35	0.29	0.028	0.31	3.2
EW-21	05-Jun-89	ND	ND	ND	0.3	3.2
	05-Jul-89	0.0026	0.015	0.017	0.095	1.1
	02-Aug-89	0.0027	0.012	0.0054	0.031	0.48
	07-Sep-89	0.0060	0.0095	0.0020	0.0026	0.34
	05-Oct-89	0.0009	0.0098	0.0012	0.0093	0.50
	02-Nov-89	0.002	0.028	0.0068	0.14	0.88

Table 7. Results of Organic Chemical Analyses of Monitoring and System Well Samples

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
LOD (mg/l)		0.0005/0.0002 *		0.0005/0.0002 *		0.25/0.05**
BLANK						
	05-Apr-89	0.5	ND	ND	ND	ND
	01-May-89	ND	ND	ND	ND	ND
	06-Jun-89	ND	ND	ND	ND	ND
	06-Jul-89	ND	ND	ND	ND	ND
	01-Aug-89	ND	ND	ND	ND	ND
	02-Aug-89	ND	ND	ND	ND	ND
	03-Aug-89	ND	ND	ND	ND	ND
	06-Sep-89	ND	ND	ND	ND	ND
	07-Sep-89	ND	ND	ND	ND	ND
	04-Oct-89	ND	ND	ND	ND	ND
	02-Nov-89	ND	ND	ND	ND	ND

## NOTES:

LOD: Limit of Detection.

ND: Not detected at or above LOD.

NT: Not tested.

\*: LOD Changed to 0.0002 on 01-May-89

\*\*: LOD Changed to 0.05 on 01-May-89

@: Two values indicate results of duplicate analyses.

LT: Less Than

#: Free product observed in well.

Organic constituents reported in milligrams per liter.

Analyses performed by PACE Laboratories, Inc.

Table 8. Results of Organic Chemical Analyses of Soil Samples from Confirmation Borings

Purgeable Aromatics (EPA Method 8020)  
 Petroleum Hydrocarbons (EPA Method 8015)

LOCATION	DEPTH (ft)	OVA HEADSPACE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH as GASOLINE
LOD		(mg/kg)	0.005	0.005	0.005	0.005	1.0
CONFIRMATION BORINGS							
BC-13 10/27/89	22.5-23	14	NT	NT	NT	NT	NT
	23-23.5	--	0.034	0.044	ND	3.3	8.1
	24-24.5	>1000	NT	NT	NT	NT	NT
	24.5-25	--	2.1	19	6.4	35	480
	25.5-26	>1000	NT	NT	NT	NT	NT
	26-26.5	--	19	190	53	380	2600
	26.5-27	>1000	NT	NT	NT	NT	NT
	27-27.5	--	5.0	67	16	150	1600
BC-14 10/27/89	22.5-23	720	NT	NT	NT	NT	NT
	23-23.5	--	0.012	0.045	0.009	0.10	1.8
	24-24.5	700	NT	NT	NT	NT	NT
	24.5-25	--	0.014	0.022	ND	0.033	ND
	25.5-26	>1000	NT	NT	NT	NT	NT
	26-26.5	--	0.12	0.12	0.006	0.061	1.4
	26.5-27	950	NT	NT	NT	NT	NT
	27-27.5	--	0.78	1.7	0.41	2.7	26
BC-15 10/27/89	22.5-23	300	NT	NT	NT	NT	NT
	23-23.5	--	0.005	0.009	ND	0.040	1.8
	24-24.5	>1000	NT	NT	NT	NT	NT
	24.5-25	--	0.035	0.031	ND	0.14	3.0
	25.5-26	>1000	NT	NT	NT	NT	NT
	26-26.5	--	1.5	2.2	0.46	2.8	23
	26.5-27	850	NT	NT	NT	NT	NT
	27-27.5	--	1.9	2.5	0.31	2.1	15
BC-16 10/27/89	22.5-23	130	NT	NT	NT	NT	NT
	23-23.5	--	0.011	0.13	0.026	0.22	1.9
	24-24.5	150	NT	NT	NT	NT	NT
	24.5-25	--	ND	0.042	ND	0.017	ND
	25.5-26	>1000	NT	NT	NT	NT	NT
	26-26.5	--	1.7	3.3	1.2	5.6	50
	26.5-27	980	NT	NT	NT	NT	NT
	27-27.5	--	0.56	0.49	4.9	29	310

## NOTES:

Organic constituents reported in milligrams per kilogram (mg/kg)

Analyses performed by PACE Laboratories

OVA Headspace measured in parts per million (ppm)

LOD: Limit of Detection unless otherwise noted

ND: Not detected at or above limit of detection (LOD)

NT: Not tested

Table 8. Results of Organic Chemical Analyses of Soil Samples from Confirmation Borings

Purgeable Aromatics (EPA Method 8020)  
 Petroleum Hydrocarbons (EPA Method 8015)

LOCATION	DEPTH (ft)	OVA HEADSPACE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH as GASOLINE
LOD	(mg/kg)		0.005	0.005	0.005	0.005	1.0
INJECTION WELLS							
IW-12 11/1/89	22.5-23	940	NT	NT	NT	NT	NT
	24-24.5	>1000	NT	NT	NT	NT	NT
	24.5-25	--	1.3	44	18	120	1100
	25.5-26	>1000	NT	NT	NT	NT	NT
IW-13 11/1/89	27-27.5	>1000	NT	NT	NT	NT	NT
	22.5-23	900	NT	NT	NT	NT	NT
	24-24.5	>1000	NT	NT	NT	NT	NT
	24.5-25	--	0.081	0.026	ND	0.15	2.2
	25.5-26	>1000	NT	NT	NT	NT	NT
IW-14 11/2/89	27-27.5	960	NT	NT	NT	NT	NT
	22.5-23	940	NT	NT	NT	NT	NT
	24-24.5	>1000	NT	NT	NT	NT	NT
	24.5-25	--	0.11	0.30	0.06	0.60	19
	25.5-26	950	NT	NT	NT	NT	NT
	27-27.5	350	NT	NT	NT	NT	NT

## NOTES:

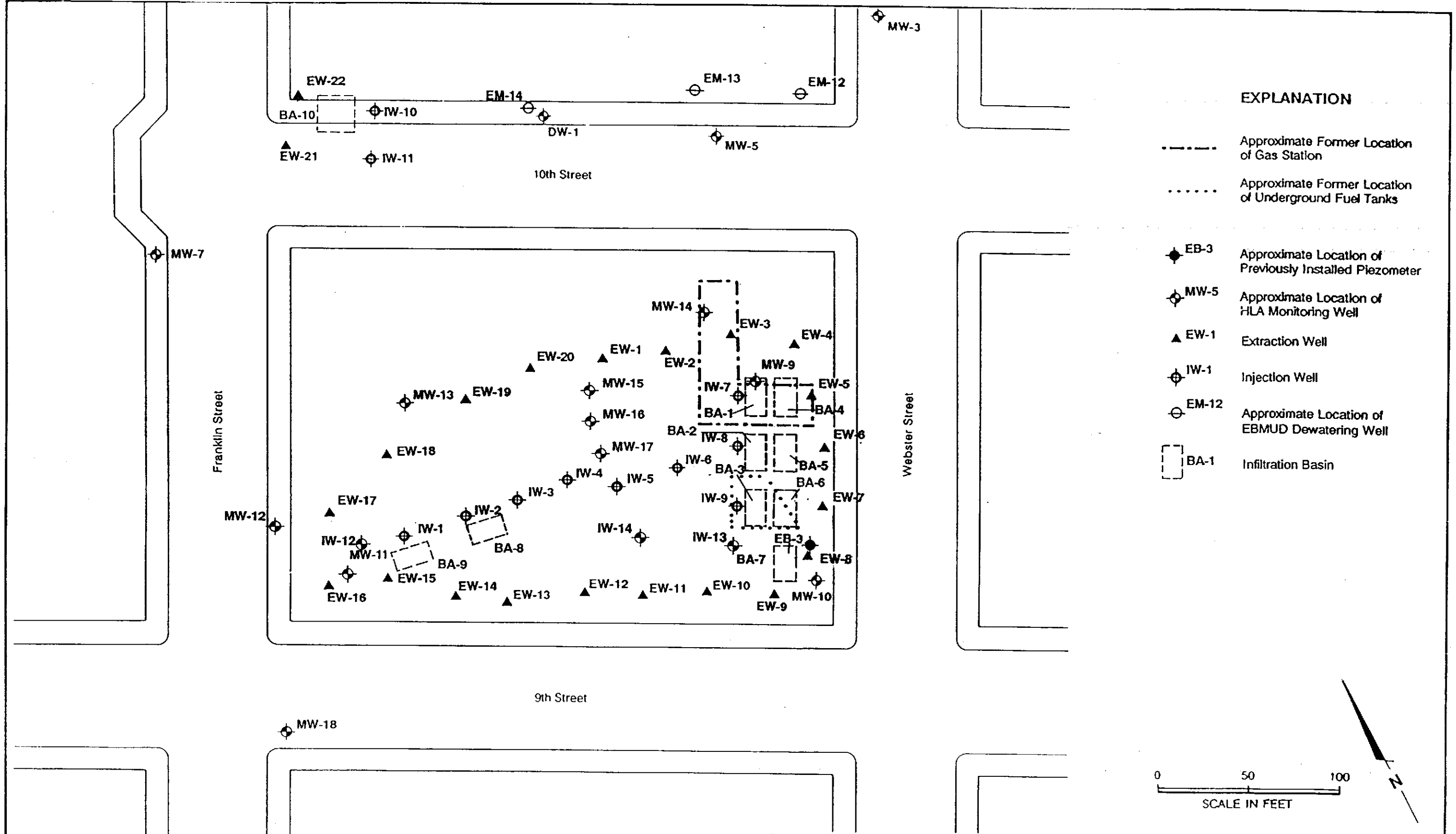
Organic constituents reported in milligrams per kilogram (mg/kg)

Analyses performed by PACE Laboratories

LOD: Limit of Detection unless otherwise noted

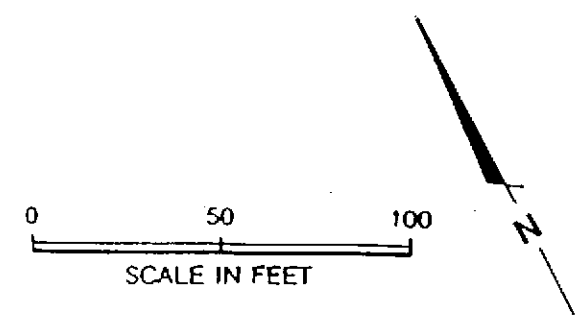
ND: Not detected at or above limit of detection (LOD)

NT: Not tested

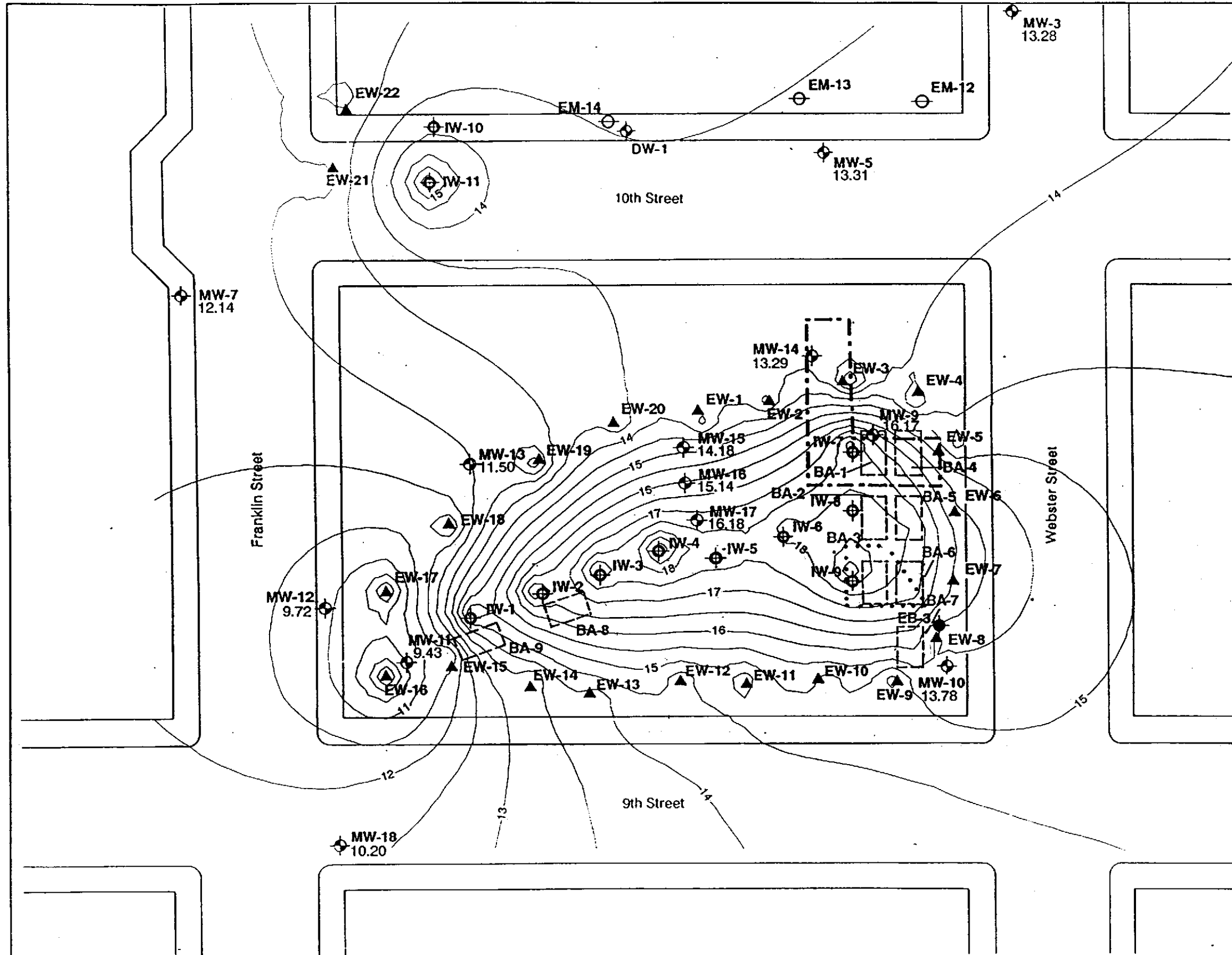


**EXPLANATION**

- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- ◆ EB-3 Approximate Location of Previously Installed Piezometer
- ◇ MW-5 Approximate Location of HLA Monitoring Well
- ▲ EW-1 Extraction Well
- ⊕ IW-1 Injection Well
- ⊖ EM-12 Approximate Location of EBMUD Dewatering Well
- BA-1 Infiltration Basin




<b>Harding Lawson Associates</b> Engineers, Geologists & Geophysicists	<b>Site Plan and Treatment System Well Locations</b> <small>PLATE</small> Soil Treatment System Pacific Renaissance Plaza Oakland, California				<b>1</b>
	DRAWN LZ	JOB NUMBER 09382,040.02	APPROVED DFL	DATE 11/89	REVISED  

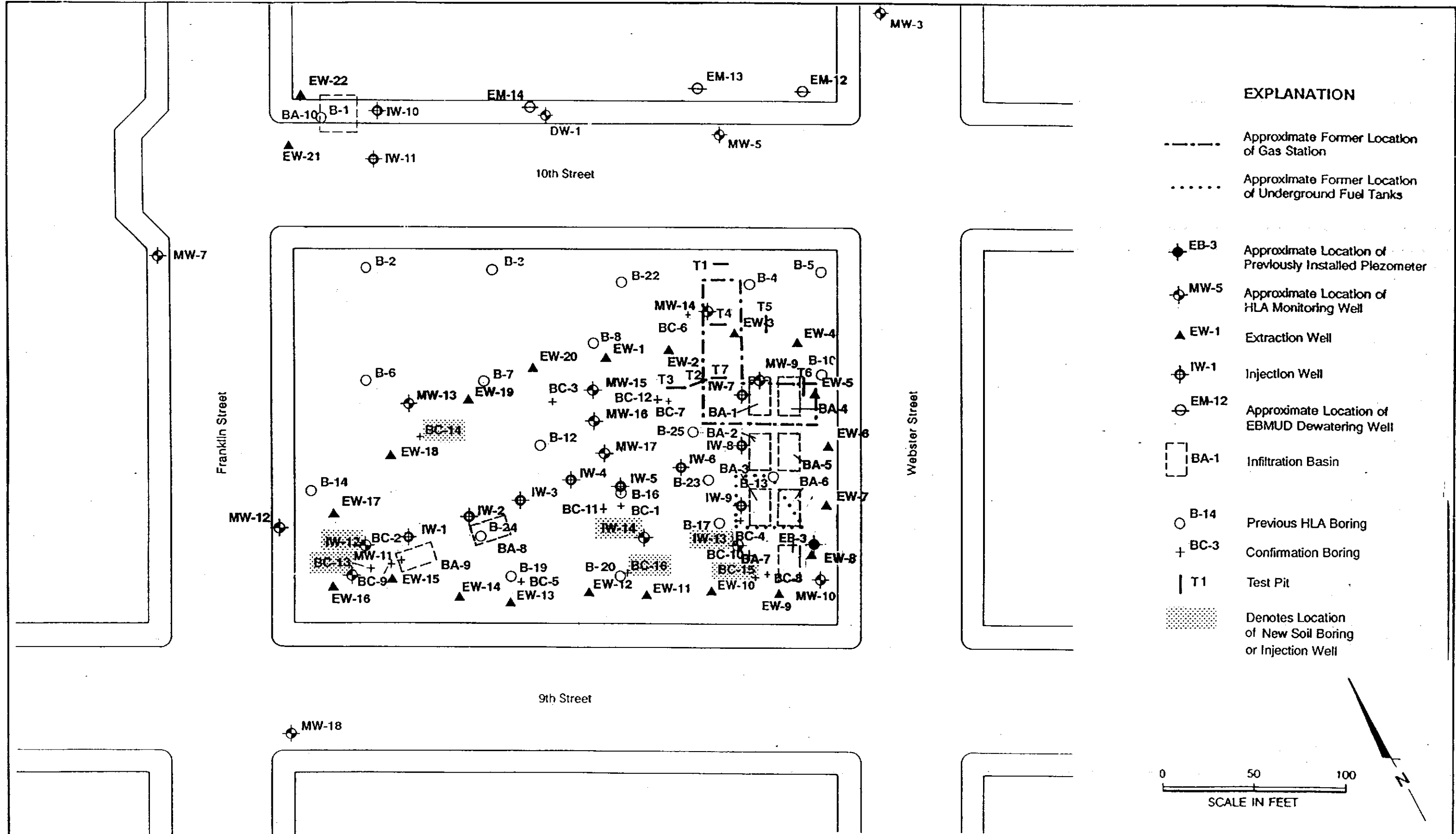


**EXPLANATION**

- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- ◆ EB-3 Approximate Location of Previously Installed Piezometer
- ⊙ MW-5 Approximate Location of HLA Monitoring Well
- ▲ EW-1 Extraction Well
- ⊕ IW-1 Injection Well
- ⊖ EM-12 Approximate Location of EBMUD Dewatering Well
- ⊔ BA-1 Infiltration Basin
- 18.78 Observed Ground-Water Elevation (feet above MSL)
- ⊖ 13 Simulated Ground-Water Elevation Contour (contour interval 0.5 feet)

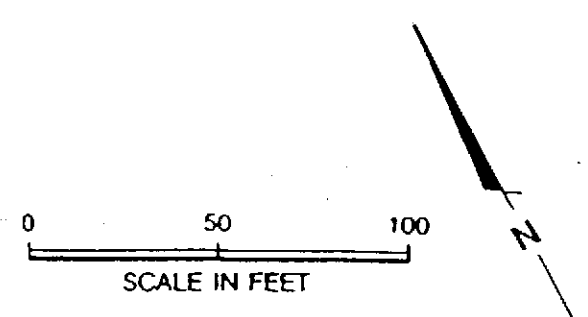


	<b>Harding Lawson Associates</b>		<b>Observed and Simulated Ground-Water Elevations - November 1, 1989</b> Soil Treatment System Pacific Renaissance Plaza Oakland, California		PLATE
	Engineers and Geoscientists				<b>2</b>
DRAWN NJB	JOB NUMBER 9382,040.02	APPROVED DPL	DATE 11/89	REVISED	DATE

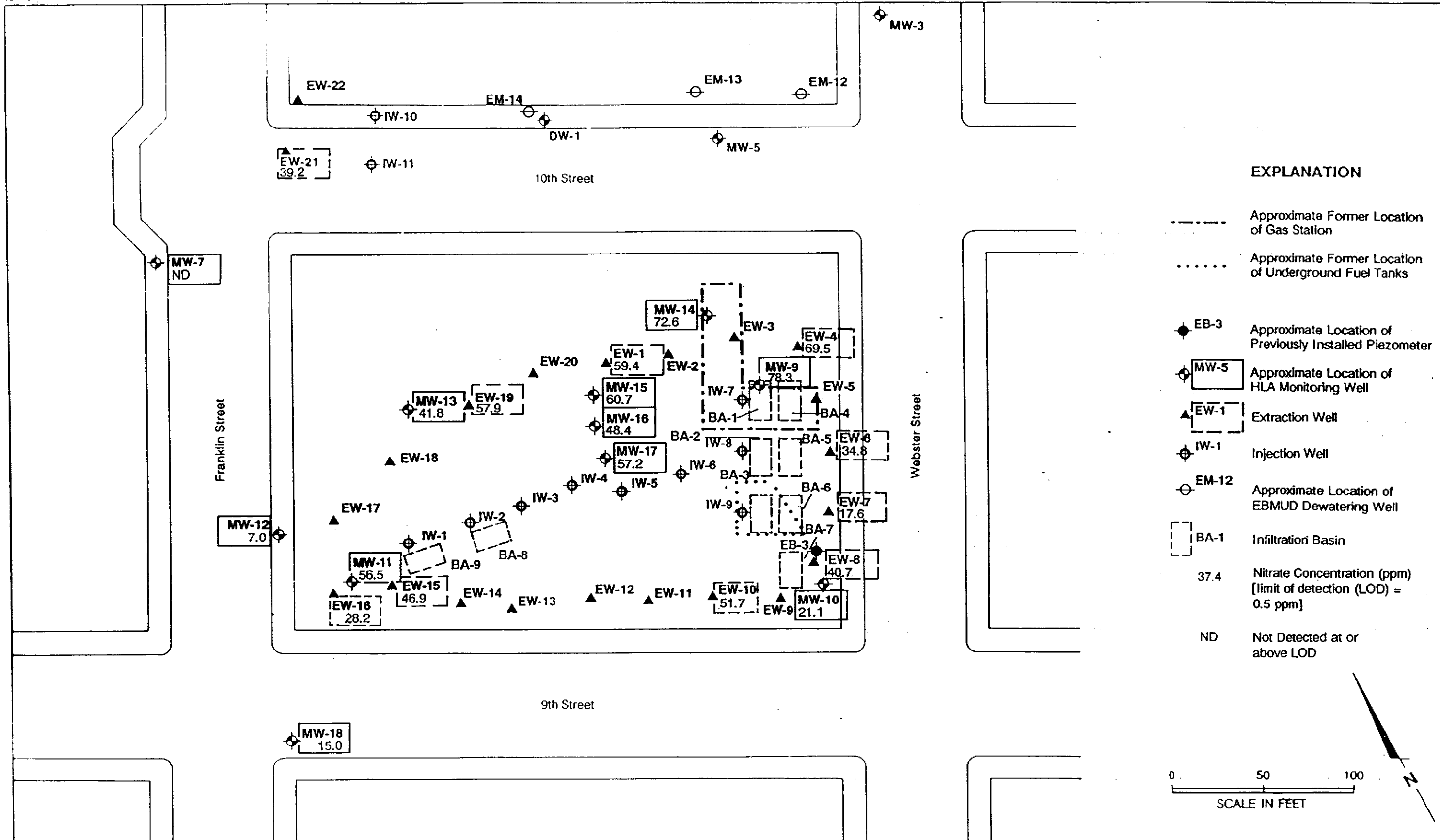


**EXPLANATION**

- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- ◆ EB-3 Approximate Location of Previously Installed Piezometer
- ⊕ MW-5 Approximate Location of HLA Monitoring Well
- ▲ EW-1 Extraction Well
- ⊕ IW-1 Injection Well
- ⊕ EM-12 Approximate Location of EBMUD Dewatering Well
- BA-1 Infiltration Basin
- B-14 Previous HLA Boring
- + BC-3 Confirmation Boring
- | T1 Test Pit
- ▨ Denotes Location of New Soil Boring or Injection Well

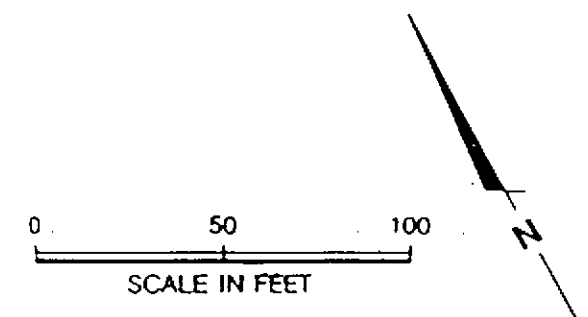


<p><b>Harding Lawson Associates</b> Engineers, Geologists &amp; Geophysicists</p>	<p>Site Plan Showing Well, Boring, Test Pit and Basin Locations Soil Treatment System Pacific Renaissance Plaza Oakland, California</p>			<p>PLATE <b>3</b></p>	
	<p>DRAWN LZ</p>	<p>JOB NUMBER 09382,040.02</p>	<p>APPROVED DFL</p>	<p>DATE 11/89</p>	<p>REVISED</p>



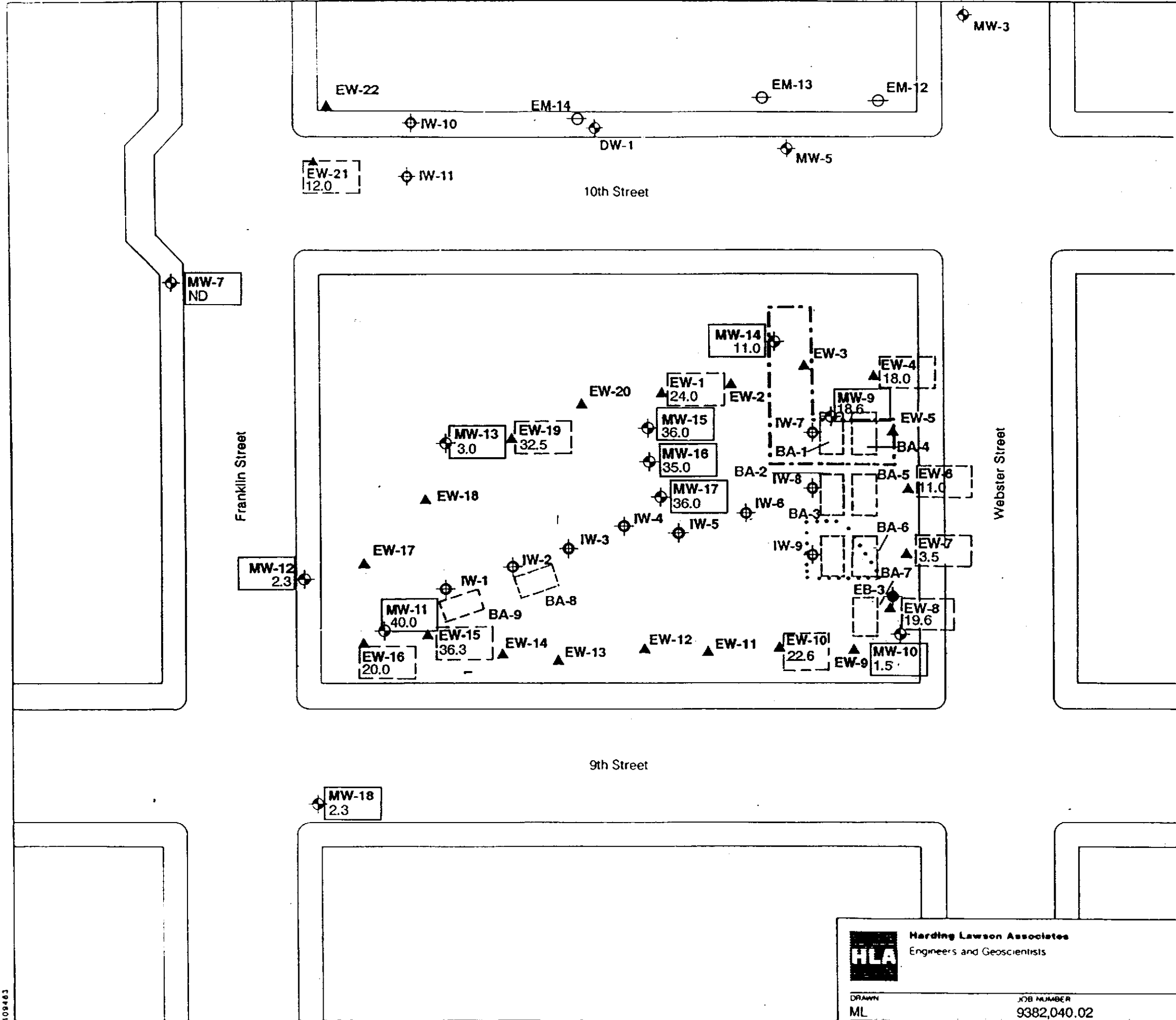
**EXPLANATION**

- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- EB-3 Approximate Location of Previously Installed Piezometer
- MW-5 Approximate Location of HLA Monitoring Well
- EW-1 Extraction Well
- IW-1 Injection Well
- EM-12 Approximate Location of EBMUD Dewatering Well
- BA-1 Infiltration Basin
- 37.4 Nitrate Concentration (ppm) [limit of detection (LOD) = 0.5 ppm]
- ND Not Detected at or above LOD



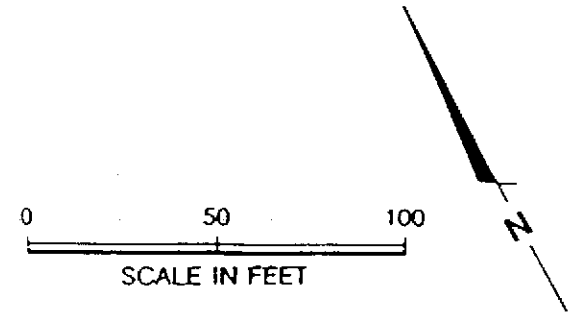
	<b>Harding Lawson Associates</b> Engineers and Geoscientists	<b>Concentrations of Nitrate in Ground Water - November 2, 1989</b> Pacific Renaissance Plaza Oakland, California			PLATE <b>4</b>
	DRAWN ML	JOB NUMBER 9382,040.02	APPROVED DFL	DATE 11/89	REVISION DATE





### EXPLANATION

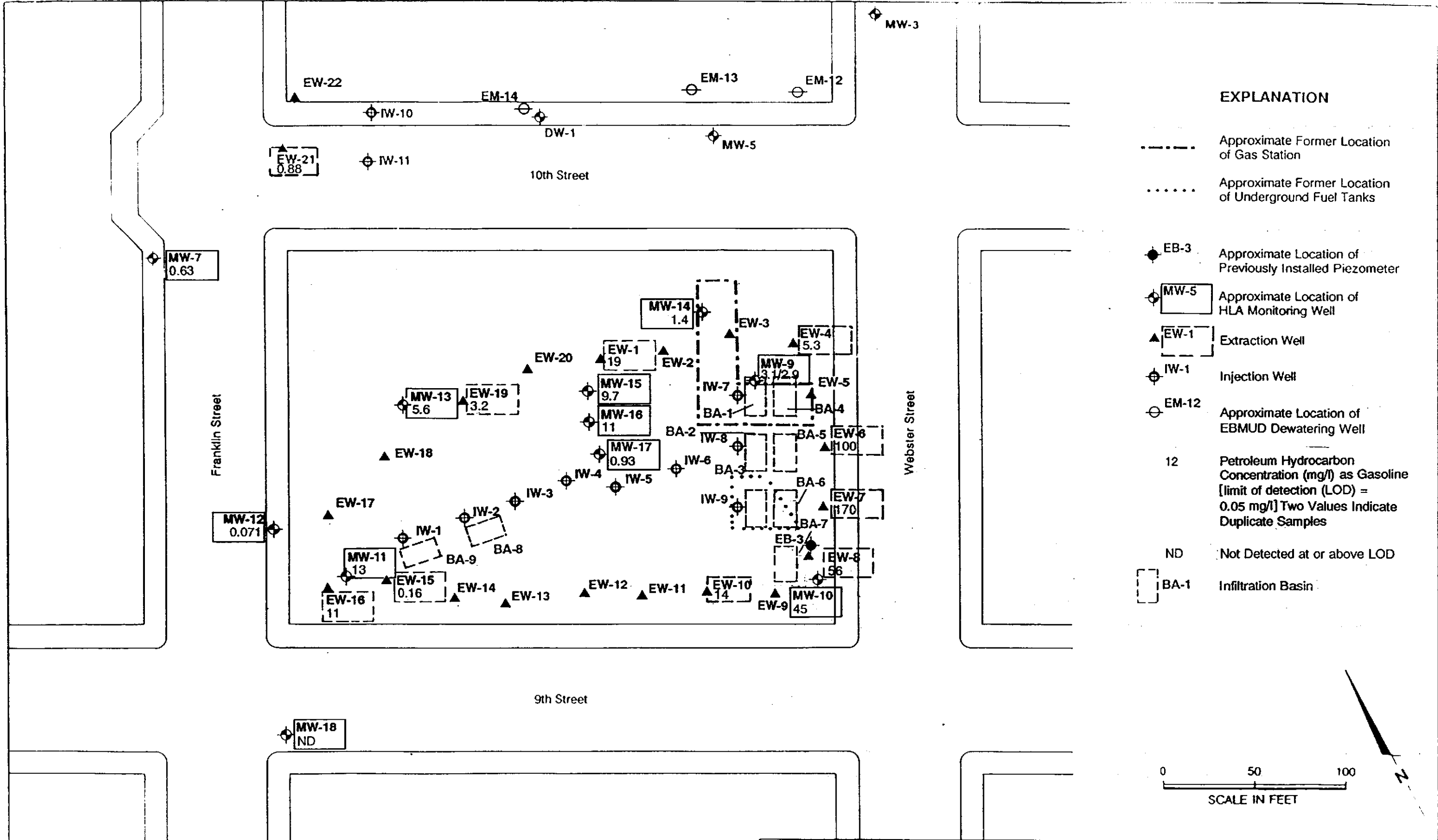
- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- ◆ EB-3 Approximate Location of Previously Installed Piezometer
- ◆ MW-5 Approximate Location of HLA Monitoring Well
- ▲ EW-1 Extraction Well
- ◆ IW-1 Injection Well
- EM-12 Approximate Location of EBMUD Dewatering Well
- BA-1 Infiltration Basin
- 16.0 Phosphate Concentration (ppm) [limit of detection (LOD) = 0.5 ppm]
- ND Not Detected at or above LOD



**HLA** Harding Lawson Associates  
Engineers and Geoscientists

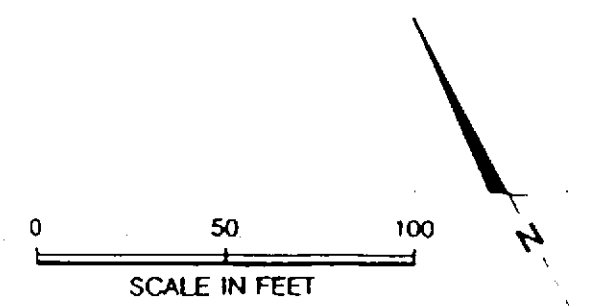
DRAWN: ML  
JOB NUMBER: 9382,040.02  
APPROVED: JFL  
DATE: 11/89

Concentrations of Phosphate in  
Ground Water - November 2, 1989  
Pacific Renaissance Plaza  
Oakland, California



**EXPLANATION**

- Approximate Former Location of Gas Station
- ..... Approximate Former Location of Underground Fuel Tanks
- ◆ EB-3 Approximate Location of Previously Installed Piezometer
- ◆ MW-5 Approximate Location of HLA Monitoring Well
- ▲ EW-1 Extraction Well
- ⊕ IW-1 Injection Well
- ⊖ EM-12 Approximate Location of EBMUD Dewatering Well
- 12 Petroleum Hydrocarbon Concentration (mg/l) as Gasoline [limit of detection (LOD) = 0.05 mg/l] Two Values Indicate Duplicate Samples
- ND Not Detected at or above LOD
- ▭ BA-1 Infiltration Basin



	<b>Harding Lawson Associates</b> Engineers and Geoscientists		<b>Concentrations of Petroleum Hydrocarbons in Ground Water - November 1-2, 1989</b> Pacific Renaissance Plaza Oakland, California		<b>6</b>
	DRAWN ML	JOB NUMBER 9382,040.02	APPROVED 	DATE 11/89	

**Appendix A**

**LABORATORY ANALYTICAL RESULTS FOR WATER SAMPLES**

November 17, 1989

Mr. David Leland  
Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94945


RE: PACE Project No. 491101.507  
Pacific Ren. Plaza

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received  
November 01, 1989.

If you have any questions concerning this report, please feel free  
to contact us.

Sincerely,

  
Stephen F. Nackord  
Director, Sampling and Analytical Services

Enclosures



REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

November 17, 1989
PACE Project
Number: 491101507

Attn: Mr. David Leland

Pacific Ren. Plaza

PACE Sample Number:
Date Collected:
Date Received:
Parameter

Table with 4 columns: MW-17, MW-15, MW-16, and MDL. Rows include sample numbers (787850, 787860, 787870), dates (11/01/89), and MDL values (89451101, 89451102, 89451103).

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):
Purgeable Fuels, as Gasoline (EPA 8015)
PURGEABLE AROMATICS (BTXE BY EPA 8020):

Table listing concentrations for Benzene, Ethylbenzene, Toluene, and Xylenes, total in mg/L.

MDL Method Detection Limit

Mr. David Leland  
Page 2

November 17, 1989  
PACE Project  
Number: 491101507

Pacific Ren. Plaza

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

		MW-14	MW-9	MW-9
		787880	787890	787900
		11/01/89	11/01/89	11/01/89
		11/01/89	11/01/89	11/01/89
<u>Units</u>	<u>MDL</u>	89451104	89451105	89451106

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015) mg/L

0.05 1.4 3.1 2.9

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene mg/L

0.0002 0.36 0.0012 0.0007

Ethylbenzene mg/L

0.0002 ND ND ND

Toluene mg/L

0.0002 0.0058 0.014 0.015

Xylenes, total mg/L

0.0002 0.24 0.67 0.69

MDL Method Detection Limit  
ND Not detected at or above the MDL.

28 NOV 89 7:21

(Revision of 11/17/89)  
November 27, 1989  
PACE Project  
Number: 491101507

Mr. David Leland  
Page 3

Pacific Ren. Plaza

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

		MW-10	MW-13	MW-11
		787910	787920	787930
		11/01/89	11/01/89	11/01/89
		11/01/89	11/01/89	11/01/89
<u>Units</u>	<u>MDL</u>	89451107	89451108	89451109

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):  
Purgeable Fuels, as Gasoline (EPA 8015)  
PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene	mg/L	0.0002	21	1.7	2.1
Ethylbenzene	mg/L	0.0002	2.0	0.091	0.11
Toluene	mg/L	0.0002	10	0.086	2.8
Xylenes, total	mg/L	0.0002	12	0.37	1.8

MDL Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

*Steve Mackard for*  
Douglas E. Oram, Ph.D.  
Organic Chemistry Manager

Hard [redacted] [redacted] soci [redacted]  
 200 Rush Landing Road  
 P.O. Box 6107  
 Novato, California 94948  
 415/892-0821  
 Telecopy: 415/892-1586

# CHAIN OF CUSTODY FORM

Lab: Face

Job Number: 09382039.02  
 Name/Location: PRP  
 Project Manager: Dave Leland

Samplers: David McEvans  
Glenn McCarter

Recorder: David McEvans  
 (Signature Required)

## ANALYSIS REQUESTED

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER				DATE				STATION DESCRIPTION/NOTES
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCL	Yr	Wk	Seq	Yr	Mo	Dy	Time	
01	X						2	89	45	1101	89	11	01	1140	MW-17	
02	X						2	89	45	1102	89	11	02	1150	MW-15	
03	X						2	89	45	1103	89	11	03	11200	MW-16	
04	X						2	89	45	1104	89	11	04	11340	MW-14	
05	X						2	89	45	1105	89	11	05	11355	MW-9	
06	X						2	89	45	1106	89	11	06	11405	MW-9 Dup	
07	X						2	89	45	1107	89	11	07	11410	MW-10	
08	X						2	89	45	1108	89	11	08	11501	MW-13	
09	X						2	89	45	1109	89	11	09	11520	MW-11	

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Plltnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	EPA 8015
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Request for amount from Phase Bore Leland w/ result

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>David McEvans</u>	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) <u>David McEvans</u>	DATE/TIME 11/1/89 15:57	RECEIVED FOR LAB BY: (Signature) <u>Monty</u>
METHOD OF SHIPMENT <u>delivered in cooler w/ ice PACE</u>		



November 17, 1989

Mr. David Leland  
Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94945

RE: PACE Project No. 491102.502  
Pacific Rensse Plaza

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received  
November 02, 1989.

If you have any questions concerning this report, please feel free  
to contact us.

Sincerely,



Stephen F. Nackord  
Director, Sampling and Analytical Services

Enclosures



REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

November 17, 1989
PACE Project Number: 491102502
PACE WP Number: LAB1116

Attn: Mr. David Leland

Pacific Rensse Plaza

PACE Sample Number:
Date Collected:
Date Received:
Parameter

Table with 4 columns: MW-18, MW-12, MW-7. Rows include sample numbers (788450, 788460, 788470), dates (11/02/89), and MDL numbers (# 89451110, # 89451111, # 89451111).

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Table with 5 columns: Parameter, Units, MDL, MW-18, MW-12, MW-7. Rows include Purgeable Fuels, Benzene, Ethylbenzene, Toluene, and Xylenes, total.

MDL Method Detection Limit
ND Not detected at or above the MDL.

Mr. David Leland  
Page 2

November 17, 1989  
PACE Project  
Number: 491102502

Pacific Rensse Plaza

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

	EW-1	EW-4	EW-6
	788480	788490	788500
	11/02/89	11/02/89	11/02/89
	11/02/89	11/02/89	11/02/89
<u>Units</u>	<u>MDL</u>	<u># 89451113</u>	<u># 89451114 # 89451115</u>

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):					
Purgeable Fuels, as Gasoline (EPA 8015)	mg/L	0.05	19	5.3	100
PURGEABLE AROMATICS (BTXE BY EPA 8020):					
Benzene	mg/L	0.0002	2.4	0.12	20
Ethylbenzene	mg/L	0.0002	0.23	0.009	0.54
Toluene	mg/L	0.0002	4.0	0.089	22
Xylenes, total	mg/L	0.0002	2.1	0.48	12

MDL Method Detection Limit

Mr. David Leland  
Page 3

November 17, 1989  
PACE Project  
Number: 491102502

Pacific Rensse Plaza

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

	EW-7	EW-8	EW-10
	788510	788520	788530
	11/02/89	11/02/89	11/02/89
	11/02/89	11/02/89	11/02/89
<u>Units</u>	<u>MDL</u>	<u># 89451116</u>	<u># 89451117</u>

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015) mg/L

0.05 170 - 56 14

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene mg/L

0.0002 30 8.1 1.7

Ethylbenzene mg/L

0.0002 1.8 0.21 0.048

Toluene mg/L

0.0002 39 8.6 1.2

Xylenes, total mg/L

0.0002 15 6.2 3.3

MDL Method Detection Limit

Mr. David Leland  
Page 4

November 17, 1989  
PACE Project  
Number: 491102502

Pacific Rensse Plaza

		EW-15	EW-16	EW-19
PACE Sample Number:		788540	788550	788560
Date Collected:		11/02/89	11/02/89	11/02/89
Date Received:		11/02/89	11/02/89	11/02/89
Parameter	Units	MDL # 89451119	# 89451120	# 89451112

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

	mg/L	0.05	0.16	11	3.2
Purgeable Fuels, as Gasoline (EPA 8015)					
PURGEABLE AROMATICS (BTXE BY EPA 8020):					
Benzene	mg/L	0.0002	ND	1.8	0.35
Ethylbenzene	mg/L	0.0002	ND	0.82	0.028
Toluene	mg/L	0.0002	0.0014	1.7	0.29
Xylenes, total	mg/L	0.0002	0.0029	0.33	0.31

MDL Method Detection Limit  
ND Not detected at or above the MDL.

Mr. David Leland  
Page 5

November 17, 1989  
PACE Project  
Number: 491102502

Pacific Rensse Plaza

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

EW-21  
788570  
11/02/89  
11/02/89  
# 89451122

Units      MDL

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015)	mg/L	0.05	-	0.88
---	------	------	---	------

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene	mg/L	0.0002	-	0.0020
Ethylbenzene	mg/L	0.0002	-	0.0068
Toluene	mg/L	0.0002	-	0.028

Xylenes, total	mg/L	0.0002	-	0.14
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MDL      Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.



Douglas E. Oram, Ph.D.  
Organic Chemistry Manager



# CHAIN OF CUSTODY FORM

Lab: Pace

Job Number: 09382, 039, 02  
 Name/Location: PRP  
 Project Manager: Dave Leland

Samplers: David ME Evans  
Gleua MEarter  
 Recorder: David ME Evans  
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pflmt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.				
X	X			X	X	X				
X				X	X	X				
X				X	X	X				
X				X	X	X				

CODE	MATRIX					#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER				DATE				STATION DESCRIPTION/NOTES	
	Water	Sediment	Soil	Oil		Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCL	Yr	Wk	Seq	Yr	Mo	Dy	Time		
1	X							2	89	45	11	20	89	11	02	09	20	EW-16
2	X							2	89	45	11	21	89	11	02	09	35	EW-19
3	X							2	89	45	11	22	89	11	02	09	35	EW-21
4	X	ONE						2	89	45	11	23	89	11	02	09	45	Injection Composite

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Regular turn around time Please call Dave w/ result

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>David ME Evans</u>	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) <u>David ME Evans</u>	DATE/TIME <u>11/23/89 12:08</u>	RECEIVED FOR LAB BY: (Signature) <u>J. Gardner</u> <u>11/23/89 12:58</u>
METHOD OF SHIPMENT <u>Delivered in cooler w/ice</u>		



**Appendix B**  
**LABORATORY ANALYTICAL RESULTS FOR SOIL SAMPLES**

November 01, 1989

Mr. John Skalbeck  
Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94948

RE: PACE Project No. 491027.507

Dear Mr. Skalbeck:

Enclosed is the report of laboratory analyses for samples received October 27, 1989.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,



Stephen F. Nackord  
Director, Sampling and Analytical Services

Enclosures



REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94948

November 01, 1989
PACE Project
Number: 491027507

Attn: Mr. John Skalbeck

PRP Oakland

PACE Sample Number: 786100 786110 786120
Date Collected: 10/27/89 10/27/89 10/27/89
Date Received: 10/27/89 10/27/89 10/27/89
Parameter Units MDL # 89441301 # 89441302 # 89441303

ORGANIC ANALYSIS

Boring Number Depth (Feet) 8C-13 8C-13 8C-13
23-23.5 24.5-25 26-26.5

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):
Purgeable Fuels, as Gasoline (EPA 8015) mg/kg wet 1.0 8.1 480 2600

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene mg/kg wet 0.005 0.034 2.1 19
Ethylbenzene mg/kg wet 0.005 ND 6.4 53
Toluene mg/kg wet 0.005 0.044 19 190

Xylenes, Total mg/kg wet 0.005 3.3 35 380

MDL Method Detection Limit
ND Not detected at or above the MDL.

Mr. John Skalbeck  
Page 2

November 01, 1989  
PACE Project  
Number: 491027507

PACE Sample Number:		786130	786140	786150	
Date Collected:		10/27/89	10/27/89	10/27/89	
Date Received:		10/27/89	10/27/89	10/27/89	
Parameter	Units	MDL	# 89441304	# 89441401	# 89441402

ORGANIC ANALYSIS

			Boring Number Depth (Feet)	BC-13	BC-14	BC-14
<u>PURGEABLE FUELS AND AROMATICS</u>						
TOTAL FUEL HYDROCARBONS, (LIGHT):						
Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	1600	-	-	-
<u>PURGEABLE AROMATICS (BTXE BY EPA 8020):</u>						
Benzene	mg/kg wet	0.005	5.0	0.012	0.014	0.014
Ethylbenzene	mg/kg wet	0.005	16	0.009	ND	ND
Toluene	mg/kg wet	0.005	67	0.045	0.022	0.022
Xylenes, Total	mg/kg wet	0.005	150	0.10	0.033	0.033

MDL Method Detection Limit  
ND Not detected at or above the MDL.

Mr. John Skalbeck  
Page 3

November 01, 1989  
PACE Project  
Number: 491027507

PACE Sample Number:	786160	786170	786180
Date Collected:	10/27/89	10/27/89	10/27/89
Date Received:	10/27/89	10/27/89	10/27/89
Parameter	<u>Units</u>	<u>MDL</u>	<u># 89441403</u>
			<u># 89441404</u>
			<u># 89441501</u>

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	1.4	75	1.8
---	-----------	-----	-----	----	-----

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene	mg/kg wet	0.005	0.12	0.69	0.005
---------	-----------	-------	------	------	-------

Ethylbenzene	mg/kg wet	0.005	0.006	0.69	ND
--------------	-----------	-------	-------	------	----

Toluene	mg/kg wet	0.005	0.12	2.4	0.009
---------	-----------	-------	------	-----	-------

Xylenes, Total	mg/kg wet	0.005	0.061	5.4	0.040
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MDL Method Detection Limit  
ND Not detected at or above the MDL.

Mr. John Skalbeck  
Page 4

November 01, 1989  
PACE Project  
Number: 491027507

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

	786190	786200	786210
	10/27/89	10/27/89	10/27/89
	10/27/89	10/27/89	10/27/89
	# 89441502	# 89441503	# 89441504
<u>Units</u>			
<u>MDL</u>			
<u>Boring Number</u>	BC-15	BC-15	BC-15
<u>Depth (Feet)</u>	24.5-25	26-26.5	27-27.5

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015)

mg/kg wet 1.0 3.0 23 15

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene

mg/kg wet 0.005 0.035 1.5 1.9

Ethylbenzene

mg/kg wet 0.005 ND 0.46 0.31

Toluene

mg/kg wet 0.005 0.031 2.2 2.5

Xylenes, Total

mg/kg wet 0.005 0.14 2.8 2.1

MDL Method Detection Limit  
ND Not detected at or above the MDL.

Mr. John Skalbeck  
Page 5

November 01, 1989  
PACE Project  
Number: 491027507

PACE Sample Number:  
Date Collected:  
Date Received:  
Parameter

	786220	786230	786240
	10/27/89	10/27/89	10/27/89
	10/27/89	10/27/89	10/27/89
	# 89441601	# 89441602	# 89441603
<u>Units</u>			
<u>Boring Number</u>	BC-16	BC-16	BC-16
<u>Depth (Feet)</u>	23-23.5	24.5-25	26-26.5

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015) mg/kg wet 1.0 1.9 ND 1100

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene mg/kg wet 0.005 0.011 ND 18

Ethylbenzene mg/kg wet 0.005 0.026 ND 29

Toluene mg/kg wet 0.005 0.13 0.042 87

Xylenes, Total mg/kg wet 0.005 0.22 0.017 160

MDL Method Detection Limit  
ND Not detected at or above the MDL.

Mr. John Skalbeck  
Page 6

November 01, 1989  
PACE Project  
Number: 491027507

PACE Sample Number: 786250  
Date Collected: 10/27/89  
Date Received: 10/27/89  
Parameter Units MDL # 89441604  
*Boring Number* *BC-16*  
*Depth (Feet)* *27-27.5*

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015) mg/kg wet 1.0 310

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene mg/kg wet 0.005 0.56

Ethylbenzene mg/kg wet 0.005 4.9

Toluene mg/kg wet 0.005 0.49

Xylenes, Total mg/kg wet 0.005 29

MDL Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.



Douglas E. Oram, Ph.D.  
Organic Chemistry Manager









REPORT OF LABORATORY ANALYSIS

Offices:  
Minneapolis, Minnesota  
Tampa, Florida  
Coralville, Iowa  
Novato, California  
Leawood, Kansas  
Irvine, California  
Asheboro, North Carolina

November 17, 1989

Mr. David Leland  
Harding Lawson Associates  
200 Rush Landing Road  
Novato, CA 94945

RE: PACE Project No. 491102.503  
Pacific Rensse Plaza

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received November 02, 1989.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

A handwritten signature in cursive script that reads "Stephen Nackord".

Stephen F. Nackord  
Director, Sampling and Analytical Services

Enclosures



REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

November 17, 1989
PACE Project
Number: 491102503

Attn: Mr. David Leland

Pacific Rensse Plaza

PACE Sample Number:
Date Collected:
Date Received:
Parameter

788580 788590 788600
11/02/89 11/02/89 11/02/89
11/02/89 11/02/89 11/02/89
#89451301 #89451201 #89451401

Units MDL
WELL NUMBER IW-13 IW-12 IW-14
DEPTH (FEET) 24.5-25 24.5-25 24.5-25

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):
Purgeable Fuels, as Gasoline (EPA 8015)
PURGEABLE AROMATICS (BTXE BY EPA 8020):
Benzene
Ethylbenzene
Toluene

mg/kg wet 1.0 2.2 1100 19
mg/kg wet 0.005 0.081 LT 1.3 0.11
mg/kg wet 0.005 ND 18 0.060
mg/kg wet 0.005 0.026 44 0.30
mg/kg wet 0.005 0.15 120 0.60

MDL Method Detection Limit
LT Less than.
ND Not detected at or above the MDL.

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Handwritten signature: Steve Mackord for Douglas E. Oram, Ph.D. Organic Chemistry Manager

**CHAIN OF CUSTODY FORM**

Lab: QAC

Samplers: QAL

Job Number: 09382 039 02

Name/Location: QRP

Project Manager: Q Leland

Recorder: [Signature]  
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Piktnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	3015-TPH GAS			
				X	X	X	X	X	X	

SOURCE CODE	MATRIX				#CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE			
	Water	Sediment	Soil	Oil	Unpres.	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	Yr	Wk	Seq	Yr	Mo	Dy	Time
48			X		1			89	5	1301	89	11	02	1609
48			X		1			89	5	1201	89	11	02	0904
48			Y		1			89	5	1401	89	11	02	1310

STATION DESCRIPTION/NOTES
245 - 25.0
245 - 25.0
245 - 25.0

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				

CHAIN OF CUSTODY RECORD	
RELINQUISHED BY: (Signature) <u>[Signature]</u>	RECEIVED BY: (Signature) _____ DATE/TIME _____
RELINQUISHED BY: (Signature) <u>[Signature]</u>	RECEIVED BY: (Signature) _____ DATE/TIME _____
RELINQUISHED BY: (Signature) <u>[Signature]</u>	RECEIVED BY: (Signature) _____ DATE/TIME _____
RELINQUISHED BY: (Signature) <u>[Signature]</u>	RECEIVED BY: (Signature) _____ DATE/TIME _____
DISPATCHED BY: (Signature) <u>[Signature]</u> DATE/TIME <u>1/29/92 1320</u>	RECEIVED FOR LAB BY: (Signature) <u>[Signature]</u> DATE/TIME <u>1/29/92 1320</u>
METHOD OF SHIPMENT <u>In cooler w/ ice</u>	

DISTRIBUTION  
REPORT OF SYSTEM MONITORING  
OCTOBER 1989  
SOIL TREATMENT SYSTEM  
PACIFIC RENAISSANCE PLAZA  
OAKLAND, CALIFORNIA  
December 1, 1989

Copy No. 4

		<u>Copy No.</u>
1 copy:	California Regional Water Quality Control Board San Francisco Bay Region 1111 Jackson Street, Room 6000 Oakland, California 94607  Attention: Mr. Don Dalke	1
2 copies:	City of Oakland Redevelopment Agency One City Hall Plaza Oakland, California 94612  Attention: Mr. Peter Chen	2-3
1 copy:	Alameda County Department of Environmental Health 80 Swan Way, Room 200 Oakland, California 94621  Attention: Mr. Lowell Miller	4
1 copy:	Job File	5
1 copy:	QC/Bound Report File	6

JDS/DFL/TLW/jjh/D10667-H

QUALITY CONTROL REVIEWER

Tamara L. Williams

Tamara L. Williams  
Geologist - 3954