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Converse Environmental Consultants California

55 Hawthorne Street, Suite 500
San Francisco, California 94105

Telephone **415 543-4200**
FAX 415 777-3157

October 23, 1989
88-44-361-01-236

Ms. Dyan Whyte
Waste Water Control Engineer
San Francisco Bay RWQCB
1111 Jackson Street, Sixth Floor
Oakland, California 94607

Subject: Former Shell Oil Company
500 40th Street
Oakland, California

Dear Ms. Whyte:

Converse Environmental West (CEW) is pleased to present this brief letter report describing the impact of the October 17, 1989 earthquake on the progress of subsurface investigations at the subject site.

On Monday, October 16, 1989, CEW began offsite drilling in the parking lanes of 40th Street, directly south of the site. Offsite monitoring well OMW-6 (see attached drawing) was completed without incident.

On Tuesday morning, October 17, 1989, during drilling of OMW-7, the drill rig sampler broke through the unmarked sewer lateral leading from the apartment house at 518 40th Street to the sewer main beneath 40th Street. Repairs to the lateral by a licensed plumbing contractor were initiated at 1:00 PM. The drill rig was repositioned across the street to drill and sample at OMW-9.

At the time of the 5:04 PM earthquake, OMW-9 had been explored to a total depth of 28 feet below ground surface (bgs) and sealed back to the top of a competent clay layer at 20 feet bgs. At OMW-7, the contractor had excavated a hole approximately 4 feet square and 6 feet deep in order to repair the sewer break. By 7:00 PM, work at OMW-7 ceased for safety reasons. Worker and public safety around the excavation was reduced by heavy foot and vehicular traffic from the MacArthur BART station on 40th Street.

Because of the damage to building and roadway structures in Oakland caused by the earthquake, city services such as emergency response and construction inspection have been focused on earthquake damage and immediate threats to life and health. Construction equipment and supplies, such as steel plates, backhoes, and generators are virtually unavailable. To date, the excavation at OMW-7 remains opens due to the unavailability of city inspectors to approve the repair work.

Acting with regard to public safety, and recognizing the potential for further disruption of other unmarked utilities beneath 40th Street, CEW suspended subsurface exploration after the earthquake. Augers were removed from OMW-9 on October 18, 1989. The borehole was sealed to the surface with bentonite on Saturday, October 21, 1989. The open excavation at OMW-7 will be filled upon completion of the city inspection.

Resumption of drilling activities has been scheduled for November 9, 1989.

Please contact me if you have any questions regarding the progress of the investigation.

Very truly yours,

Converse Environmental West

Robin Breuer
for

Marc I. Yalom
Project Hydrogeologist

MIY:miy

Enclosure

cc: Ms. Diane Lundquist - Shell Oil Company
Mr. Rafat Shahid - Alameda County Health Services Agency
Ms. Robin Breuer - Regulatory Affairs Specialist, CEW

Converse Environmental West

REPORT OF ACTIVITIES

SHELL OIL COMPANY FACILITY
500 40th Street
Oakland, California

For Quarter 3 1989
Submitted: October 25, 1989

RWQCB Representative:	Ms. Dyan Whyte Waste Water Control Engineer San Francisco Bay RWQCB 1111 Jackson Street, Sixth Floor Oakland, California 94607
LIA Representative:	Mr. Rafat Shahid Alameda County Health Services Agency Hazardous Materials 80 Swan Way, Room 200 Oakland, California 94621
Shell Engineer:	Ms. Diane Lundquist Environmental Engineer
Converse Project Manager:	Marc I. Yalom, Project Manager 55 Hawthorne Street, Suite 500 San Francisco, California 94105 (415) 543-4200
Registered Geologist in Charge:	Douglas W. Charlton, Principal Geologist 55 Hawthorne Street, Suite 500 San Francisco, California 94105 (415) 543-4200
Site Owners:	Joseph Heung Yu Chan Olivia Wai Yee Cheng Chan Ivy Tak Tsing Wong Shirley Tak Hing Kwong Magdalen Tak Fan Chan

1. SITE DESCRIPTION

1.1 Maps

Site Location Vicinity Map: Drawing 1
Plot Plan - Former Service Station Configuration: Drawing 2
Plot Plan - Present Shopping Center Configuration: Drawing 3
Plot Plan - Proposed Groundwater Monitoring Wells: Drawing 4

1.2 Neighborhood Topography

Slopes gently westward towards San Francisco Bay.

1.3 Primary Surface Waters Nearby

San Francisco Bay is located approximately 1.5 miles to the west.

1.4 Water Table Information

Quarter 3 1989 Depth to Water: Approximately 12' below grade.
Depth to Highest High Water: Approximately 11' below grade by redox boundary in soils.

2. INVESTIGATION HISTORY

2.1 Soil Borings Drilled to Period Start

B-1 through B-11 (IT 1982-84)
MW-2 through MW-4 (CEW 5/89)

2.2 Soil Borings Abandoned to Period Start

B-1 through B-11 (Date Unknown).

2.3 Groundwater Wells Drilled to Period Start

B-1 through B-11 (IT 1982-84)
MW-2 through MW-4 (CEW 5/89)

2.4 Groundwater Wells Abandoned to Period Start

B-6 was abandoned by IT in June, 1986. No records are available for abandonment of the other B-series wells. These wells are covered with pavement or buildings, and they can not be located.

2.5 Investigative History Summary

A chronological summary of site activities is presented in Table 1.

TABLE 1: Chronological Summary

DATE	DESCRIPTION OF ACTIVITY
7/82	IT installed 8 six inch diameter groundwater monitoring wells to 30 feet below ground surface (bgs) onsite. The wells were screened from 5 to 30 feet bgs. Combustible vapors were detected in the storm sewer system in the BART Station across the street.
7/82	IT Progress Report 1: Well installations and constructions were reported, and free product was noted in wells B-7 and B-8. Groundwater gradient was shown to be westward, towards the BART Station.
11/82	IT Progress Report 6: Groundwater gradient still towards well B-3. From September 1 to November 19, 1982, IT removed 35 pints of product from B-4. Well tops of casings (TOCs) were re-surveyed and groundwater gradient was confirmed toward B-3. Maximum product thickness was in B-4, at several inches.
12/82	IT Progress Report 7: Product thickness increased in B-3 in apparent response to rising water table. Product in B-4 remained at several inches.
1/83	IT Progress Report 8: Product in B-4 had diminished to film thickness.
2/83	IT Progress Report 9: Rainfall records were researched, and the relationship between rainfall, water table and product removed was charted by graph. Amount of product in B-4 appeared to vary inversely with water table; as water table rose with winter rains, the amount product in B-4 dropped. IT proposed that product was displaced downgradient as water table rose.
3/83	IT Progress Report 10: Vapor concentrations of TPH (expressed as percent lower explosive limit) were rising in wells B-1, B-2, B-3 and B-7. No product was measurable in B-4.
6/83	Rapid reappearance of product in well B-4, from negligible in May to 4+ feet by June 30 and 6.34 feet on July 15. Increase was also measured B-3, to a thickness of 0.66 feet in July. IT concluded that a reservoir of product existed in the tank backfill, and that as water table dropped in summer time this reservoir was allowed to escape by way of gravel lenses which were saturated at high water table seasons.
7/83	IT installed 8 inch diameter monitoring wells B-9 and B-10 to 20 feet bgs in native soils next to the tank backfill.
8/83	IT Progress Report 11: IT repeated the concept that product was released in surges through gravel lenses exposed to the water table during summer.
8/83	IT installed groundwater monitoring well B-11 and sand backfill in the southwest corner of the tank bed. No free-flowing product was encountered in this well.
9/83	IT drilled two 18 inch diameter borings to 30 feet bgs and completed same as 12 inch diameter recovery wells with screen intervals from 5 to 30 feet bgs. These wells, R-1 and R-2, were located near wells B-3 and B-4, directly west of the tank backfill.
10/83	IT purged and developed wells R-1 and R-2, holding a strong depression on the water table for 2 hours.
11/83	According to IT reference, the tanks were removed and, as part of this excavation wells R-1 and R-2 were also removed. No information was provided on tank excavation or associated soils/groundwater testing and reporting to regulatory agencies.

Chronological Summary
Continued

DATE	DESCRIPTION OF ACTIVITY
1/84	IT Progress Report 13: Wells B-3 and B-4 continued to contain measurable product, to thicknesses of 2 feet. In general, product thicknesses decreased during December and January. Product thicknesses also decreased after tank removal. Groundwater piezometric map showed a westward-trending, low area encompassing wells R-1, R-2, B-3 and B-4. This extended offsite, suggesting a paleodrainage which controlled product collection and migration offsite.
5/84	IT Report: The thicknesses of product in B-3 and B-4 measured from several inches to one foot during the period January to May 1984.
7/84	IT Report: Product thicknesses increased starting in mid-May in response to lowering water tables. This pattern was similar to the pattern observed in 1983.
8/84	IT Report: The thickness of product in B-3 remained one foot, while the amount of product in B-4 decreased. IT recommended looking for possible upgradient offsite sources.
9/84	IT Report: The thickness of product in B-4 started to increase (still at less than one inch) while the thickness of product in B-3 decreased (still on the order of one foot).
10/84	IT Report: New construction was noted.
1/85	IT Report: The thickness of product of B-3 had decreased to several inches and B-4 contained negligible measurable product. This pattern of decreasing product in the winter (high water table) months was consistent with that observed in the winters of 1982-83, and 1983-84.
2/85	IT Report: Significant measurable gasoline (1.64 feet) was discovered in B-8. The gasoline appeared degraded and "old". IT concluded that this gasoline could be from the same source as that contributing to observed in wells B-3 and B-4.
6/85	IT Report: Product thicknesses in B-3, B-4 and B-8 decreased from January to mid-May, with a dramatic decrease in B-8. IT repeated its interpretation that product thickness decreased as water tables rose and increased as water tables fell. IT further proposed that the product was trapped in permeable lenses, and migrated to different geographic areas as the water tables rose and fell.
12/85	IT Report: The thickness of product in B-3 increased to approximately 2 feet during the summer, showing the seasonal increase of prior years period. Simultaneously, no product was measured in B-8 after June 3, and product reappeared in B-2 in September and October. Product thickness in B-4 fluctuated at less than one foot thick during this period. IT recommended installing a recovery extraction trench along the west boundary of the property.
5/86	IT Quarterly Report: Product thickness decreased in wells B-3 and B-4 in response to seasonal rise in the water table.
6/86	IT requested permission to abandon B-6.
7/86	IT stated that Shell planned to remove the underground storage tanks in the near future.
8/86	IT Quarterly Report: IT noted seasonal decline in water table and negligible measurable product in wells B-2 and B-4, with approximately 2 feet of floating product in B-3.

Chronological Summary
Continued

DATE	DESCRIPTION OF ACTIVITY
9/86	A groundwater sample from B-3 contained volatile organics: 0.90 ppm; benzene: 0.32 ppm; toluene: 0.23 ppm; xylene: 0.16 ppm.
1/04/87(?)	A commercial shopping center building was erected on the property, covering wells B-2, B-6, B-7, B-9 and B-10. Wells B-1, B-3, B-4, B-5 and B-8 were covered by site parking and a rear driveway.
1/89	Shell transfers project to CEW.
4/07/89	Revised Work Plan submitted to RWQCB.
5/23/89	Monitoring wells MW-2, MW-3 and MW-4 installed, soil sampled.
6/20/89	Groundwater sampled, wells MW-2 through MW-4.
7/07/89	CEW issues Quarterly Report.
7/19/89	Groundwater sampled, wells MW-2 through MW-4.
8/01/89	Right-of-Entry Agreement sent to property owners of 518 40th Street.
8/04/89	CEW issues monthly (July 1989) monitoring report.
8/08/89	Groundwater sampled, wells MW-2 through MW-4.
9/11/89	Groundwater sampled, wells MW-2 through MW-4.
9/12/89	CEW issues monthly (August 1989) monitoring report.
9/19/89	CEW installs well MW-5; soils sampled and analyzed.

3. WORK COMPLETED THIS PERIOD

3.1 Introduction

Work initiated and completed during Quarter 3 1989 followed the task descriptions and modifications of the site Work Plan dated April 5, 1989. Data collected during the quarter are shown in **boldface** type in the tables below.

3.2 Right-of-Entry Agreement: 518 40th Street

A Right-of-Entry Agreement with the property owners of 518 40th Street is needed by Shell prior to installation of three onsite wells (EW-11 through EW-13) sited on the west edge of 500 40th Street (Drawing 4).

The Agreement was sent to the property owners of 518 40th Street on August 1, 1989. On August 29, 1989, the property owners indicated the Agreement was being reviewed by their attorneys. As of October 20, 1989 the executed Right-of-Entry had not been received by Shell or CEW.

Shell is presently preparing a written request that the RWQCB intervene to compel the owners of 518 40th Street to grant the Right-of-Entry.

3.3 Soil Boring Drilling/Sampling

One soil boring (MW-5) was drilled and sampled following the protocols described in Appendix A. Soil cuttings were handled by Crosby Overton, following task procedures described in Appendix B. Boring log is enclosed as Attachment 1. A summary of soil boring is presented in Table 2.

TABLE 2: Summary of Soil Borings Drilled

Boring No.	Date Drilled	T.D. (ft. bgs.)	Unsaturated Soil Samples (ft. bgs)	Saturated Soil Samples (ft. bgs)	Highest OVM**
MW-2	5/22/89	25	5,10,15	None	1000 at 11'
MW-3	5/23/89	21	5,10,15	None	750 at 11'
MW-4	5/23/89	20	5,10	15	Not taken*
MW-5	**9/19/89**	**20**	**4,8,12,16**	**None**	**0**

* Equipment difficulties
** ppm total volatile hydrocarbons

3.4 Well Installations

One groundwater monitoring well was installed and developed following the protocols in Appendices C and D. The well was installed as 4-inch diameter filter-packed PVC well through hollow-stem auger drilling equipment. Boring logs and as-built well construction diagrams of wells installed to date are included as Attachment 1. A summary of these well installation is provided in Table 3.

TABLE 3: Summary of Groundwater Monitoring Well Installations

Well No.	Date Installed	Diameter Well Bore (in.)	Initial Water Table (ft. bgs)	Static Water Table (ft. MSL)	T.D. (ft. bgs)	Screen (ft. bgs)	Bentonite Seal (ft. bgs)	Grout Seal (ft. bgs)
MW-2	5/22/89	12	15.5	NA*	25	20.0-9.0	9.0-7.0	7.0-0
MW-3	5/23/89	12	15.3	NA	21	19.0-9.5	9.5-8.0	8.0-0
MW-4	5/23/89	12	13.0	NA	20	15.5-9.5	9.5-7.5	7.5-0
MW-5	9/19/89	12	18.5	NA	20	20.0-10.0	9.0-8.0	8.0-0

* NA = Not available until wellheads are surveyed.

3.5 Soil Analyses and Results

Soil samples were properly packaged and transferred to a California State-certified analytical laboratory under proper chain of custody and preservation (see Appendix E). The samples were analyzed for TPH (as gasoline, diesel, and motor oil) and BTEX using EPA Methods 3550, 5050, 8015, and for Pb using EPA Methods 3050 and 7421. Analytical results are summarized in Table 4 and included as Attachment 2.

TABLE 4: Soil Analytical Results (ppm)

Boring No.	Sample Depth (ft. bgs)	TPH-g	TPH-d	TPH-mo	Benzene	Toluene	Ethyl-benzene	Xylene	Total Lead
MW-2	5,10,15	<10	<10	<10	<0.025	0.028	<0.075	<0.075	0.4
MW-2	10	<10	<10	18	<0.025	<0.025	<0.075	<0.075	1.0
MW-3	10	28	<10	<10	0.054	0.032	<0.075	0.099	<0.2
MW-3	5,10,15	<10	<10	<10	<0.025	<0.025	<0.075	<0.075	<0.2
MW-4	10	<10	<10	<10	<0.025	<0.025	<0.075	<0.075	<0.2
MW-4	5,10	<10	<10	<10	<0.025	<0.025	<0.075	<0.075	<0.2
MW-5	4	<10	<10	<10	<0.025	<0.025	<0.075	<0.075	12
MW-5	8	<10	<10	27	<0.025	<0.025	<0.075	<0.075	5.3
MW-5	12	<10	<10	13	<0.025	<0.025	<0.075	<0.075	3.3
MW-5	16	<10	<10	<10	<0.025	<0.025	<0.075	<0.075	5.7

3.6 Groundwater Analyses and Results

Groundwater samples were collected from 3 onsite wells, properly packaged and transferred to a California State-certified analytical laboratory under proper chain-of-custody and preservation (see Appendices E and F). All monthly samples were analyzed for TPH (as gasoline, diesel and motor oil), and BTEX (EPA Methods 3150, 5030, 8015 and 602). The July 1989 samples were analyzed for lead (EPA Method 7421). The analytical results are summarized in Table 5. Certified results from all analyses are enclosed as Attachment 3.

TABLE 5: Groundwater Analytical Results (ppm)

Well No.	Sample Date	TPH-g	TPH-d	Benzene	Toluene	Ethyl-benzene	Xylenes	Lead
MW-2	6/20/89	0.8	<0.01	0.046	0.0068	0.0027	0.056	NA
MW-2	7/18/89	1.4	0.4	0.033	0.0056	0.024	0.073	0.003
MW-2	8/08/89	0.23	0.50	0.0045	<0.0005	<0.0015	0.011	NA
MW-2	**9/11/89**	**0.50**	**0.31**	**0.019**	**0.0023**	**<0.0015**	**0.010**	**NA**
MW-3	6/20/89	2.3	<0.1	0.18	0.15	0.054	0.80	NA
MW-3	7/18/89	1.5	9.1	0.085	0.034	0.010	0.12	0.002
MW-3	8/08/89	2.5	0.71	0.13	0.073	0.0035	0.33	NA
MW-3	**9/11/89**	**1.9**	**0.23**	**0.18**	**0.074**	**0.0037**	**0.11**	**NA**
MW-4	6/20/89	<0.05	<0.01	<0.0005	<0.0015	<0.0015	<0.0015	NA
MW-4	7/18/89	<0.05	<0.05	<0.0005	<0.0015	<0.0015	<0.0015	0.003
MW-4	8/08/89	<0.05	<0.05	<0.0005	<0.0005	<0.0015	<0.0015	NA
MW-4	**9/11/89**	**<0.05**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0015**	**<0.0015**	**NA**

NA - Not Analyzed.

3.7 Physical Monitoring Results

Three wells were physically monitored for depth to water table, and measurement of floating product, if any. A summary of these results is presented in Table 6.

TABLE 6 Physical Monitoring Results: Evidence of Contamination

Well No.	Date	Depth to Water (ft)	Petroleum Water Odor	Thickness Floating Product (Inches)	Notes
MW-2	6/19/89	11.91	None	None	Soft sed. in bottom
MW-2	7/18/89	11.98	None	None	
MW-2	8/08/89	12.00	Slight	None	
MW-2	9/11/89	12.00	None	None	
MW-3	6/19/89	10.99	None	None	Soft sed. in bottom
MW-3	7/18/89	11.05	Slight	None	
MW-3	8/08/89	11.07	Slight	None	
MW-3	9/11/89	11.02	Slight	None	
MW-4	6/19/89	12.18	None	None	No seds.
MW-4	7/18/89	12.21	None	None	
MW-4	8/08/89	12.23	None	None	
MW-4	9/11/89	12.26	None	None	

4. REVIEW OF DATA

4.1 Groundwater Elevation and Gradient (See Drawings 5 through 7)

- Groundwater gradient is southward, at 0.007 ft/ft.
- The gradient is unchanged during the quarter.

4.2 Distribution of Fuel Contamination in Soil (See Drawings 8 and 9)

- TPH-g was detected at MW-2 at 10 feet bgs (28 ppm).
- TPH-d was not detected at any borehole.

- TPH-mo was detected at MW-2 at 10 feet bgs (18 ppm) and at MW-5 at 8 ft (27 ppm) and 12 ft (13 ppm) bgs.
- Benzene was detected at MW-3 at 10 ft bgs (0.054 ppm).
- Toluene was detected at MW-2 in the composite sample (0.028 ppm) and at MW-3 at 10 ft bgs (0.032 ppm).
- Ethylbenzene was not detected.
- Xylenes were detected at MW-3 at 10 ft bgs (0.099 ppm).
- Lead was detected at MW-2 at 10 feet bgs (1.0 ppm). Lead was detected at MW-5 at all four depth samples at concentrations ranging from 3.3 ppm (12 ft bgs) to 12 ppm (4 ft bgs).

4.3 Distribution of Dissolved Fuel Contamination in Groundwater (See Drawings 10 through 15)

- TPH-g was detected at MW-2 (1.4 ppm maximum) and MW-3 (2.5 ppm maximum).
- TPH-d was detected at MW-2 (0.50 ppm maximum) and MW-3 (9.1 ppm maximum).
- TPH-mo
- Benzene was detected at MW-2 (0.019 ppm maximum) and MW-3 (0.18 ppm maximum).
- Toluene was detected at MW-2 (0.0056 ppm maximum) and MW-3 (0.073 ppm maximum).
- Ethylbenzene was detected at MW-2 (0.024 ppm maximum) and MW-3 (0.010 ppm maximum).
- Xylenes were detected at MW-2 (0.073 ppm maximum) and MW-3 (0.33 ppm maximum).
- Lead was detected at MW-2 (0.003 ppm), MW-3 (0.002 ppm) and MW-4 (0.003 ppm).

4.4 Distribution of Floating Product on Groundwater

- No floating product was observed during Quarter 3 1989.

5. INTERPRETATIONS

The subsurface geology (see Drawing 16) is predominantly silty clay with trace to slight amounts of sand and gravel. Sand and gravel zones form thin layers at different depths. These larger grain zones likely provide the dominate pathway for horizontal groundwater flow.

Groundwater monitoring well MW-3 was installed within approximately 15 feet of abandoned well B-8. Well B-8 contained floating product (1.65 ft in thickness) as late as June 1985. Although residual contamination was detected in MW-3 soils and groundwater, no floating product has been observed. This indicated thinning and lateral spreading of contamination.

Wells MW-2, MW-4, and MW-5 are sited 30 ft or more from any abandoned well sites or previously recognized areas of contamination. Soil analytical results in MW-2 indicate lower contaminant concentrations than MW-3. Concentration further decline laterally from known sources at wells MW-4 and MW-5.

Sources or potential of motor oil detected in soils at MW-2 and MW-5 cannot be determined.

More precise interpretations regarding the movement of contamination will likely be possible with the installation of additional monitoring points in Quarter 4 1989 (see below).

6. WORK PLAN MODIFICATIONS

None.

7. WORK PLANNED FOR NEXT QUARTER

7.1 Groundwater Sampling and Anaylses

Groundwater will be sampled and analyzed quarterly, returning to the schedule established in the Work Plan. Groundwater will be analyzed for TPH-g, -d, -mo, and BTEX.

7.2 Onsite Well Installation

A Right-of-Entry Agreement from the property owners at 518 40th Street is needed prior to installation of extraction wells EW-11 through EW-13 (see Drawing 4). As of the date of this report, the property owners have failed to provide access.

In Quarter 4 1989 Shell will seek RWQCB intervention to compel the owners of 518 40th Street to provide Right-of-Entry for subsurface investigations.

Installation of the three onsite wells will proceed immediately when the Agreement is secured.

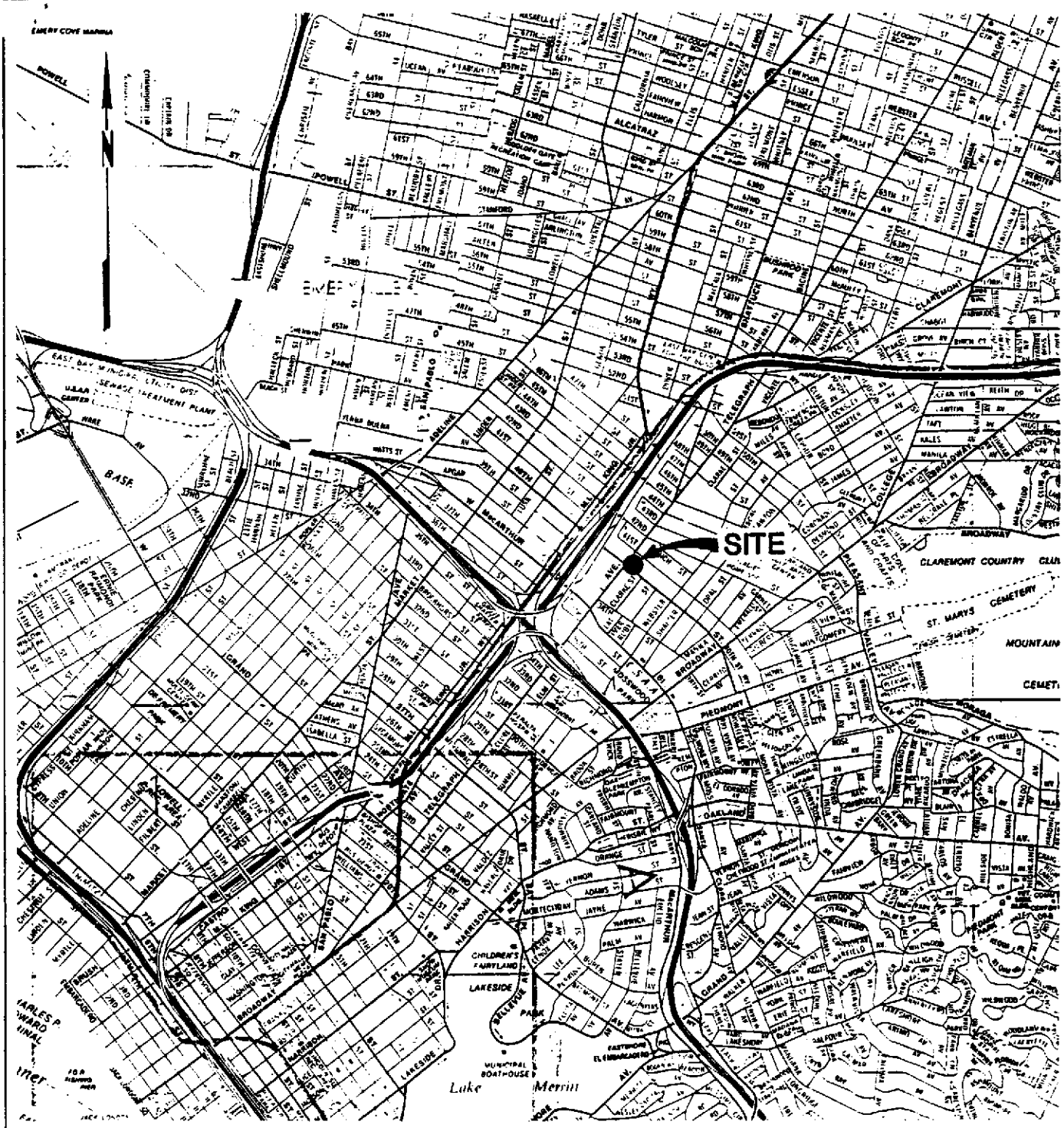
7.3 Onsite Interim Groundwater Remediation

Installation and operation of an interim onsite groundwater remediation system will commence upon completion of wells EW-11 through EW-13. The equipment and process of the proposed system was described in a letter (Attachment 4) to the RWQCB dated October 24, 1989.

7.4 Offsite Well Installation

Five offsite wells, OMW-6 through OMW-10, (See Drawing 4) will be installed down-gradient on 40th Street.

Installation of the offsite wells had commenced by issuance date of this report.



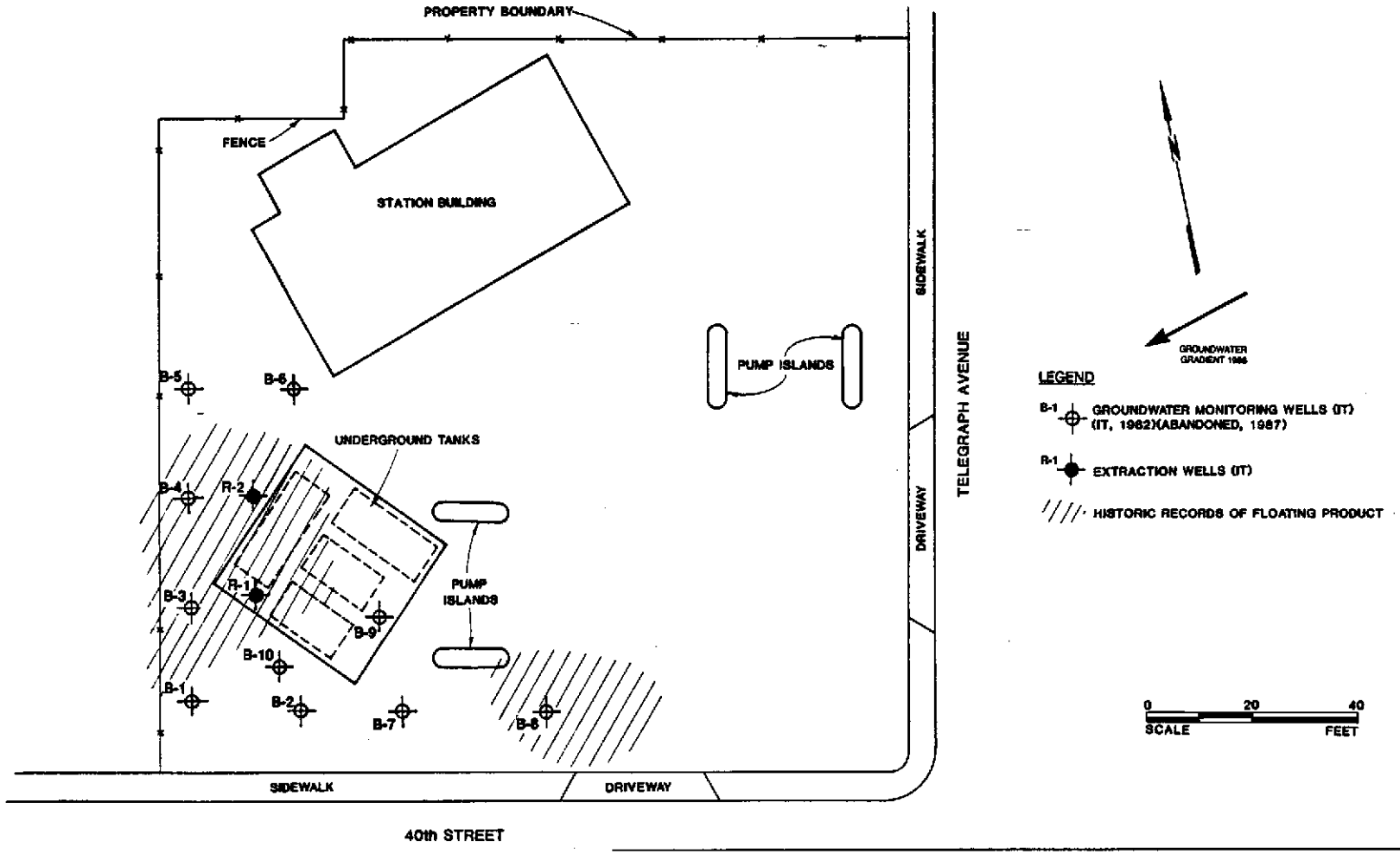
SOURCE: California State Automobile Association.

SITE LOCATION MAP

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale: AS SHOWN	Project No.: 88-44-361-01
Prepared by: KGC	Date: 4/4/89
Checked by: RMB/MIY	Drawing No.: 1
Approved by: DWC	

Converse Environmental
Consultants California



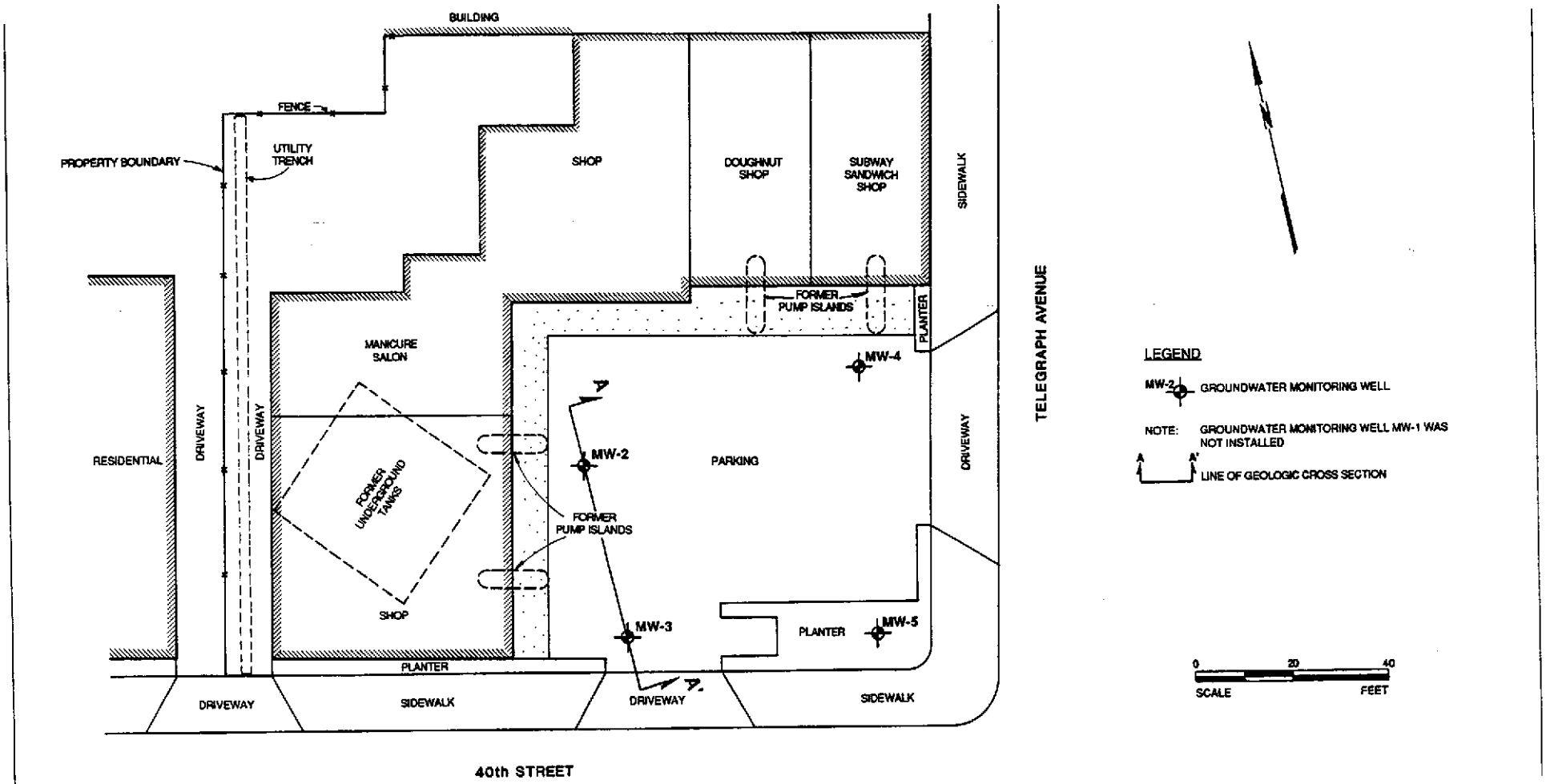
1986-1987 PLOT PLAN - BEFORE CONSTRUCTION OF SHOPPING CENTER

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale	AS SHOWN
Date	6/14/89
Prepared By	KGC
Checked By	RMB
Approved By	DWC
Project No.	88-44-361-01
Drawing No.	2

Converse Environmental Consultants California

Base Map: after Pacific Environmental Group, Inc. and IT Corporation



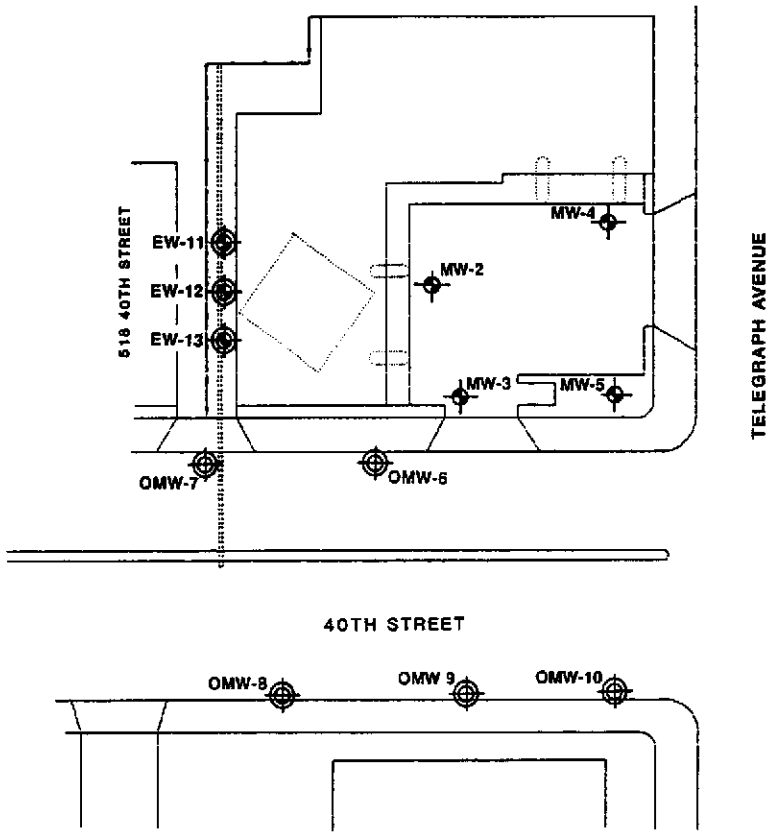
1989 PLOT PLAN Q3/89

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale	AS SHOWN
Date	7/6/89
Prepared By	KGC
Checked By	RMB
Approved By	DWC
Project No	88-44-361-01
Drawing No	3

Converse Environmental Consultants California

Base Map: Surveyed with EDM, Converse 1989.



GROUNDWATER GRADIENT

LEGEND

EW-11 PROPOSED EXTRACTION MONITORING WELL

OMW-1 PROPOSED OFFSITE GROUNDWATER MONITORING WELL

MW-2 GROUNDWATER MONITORING WELL

0 40 80

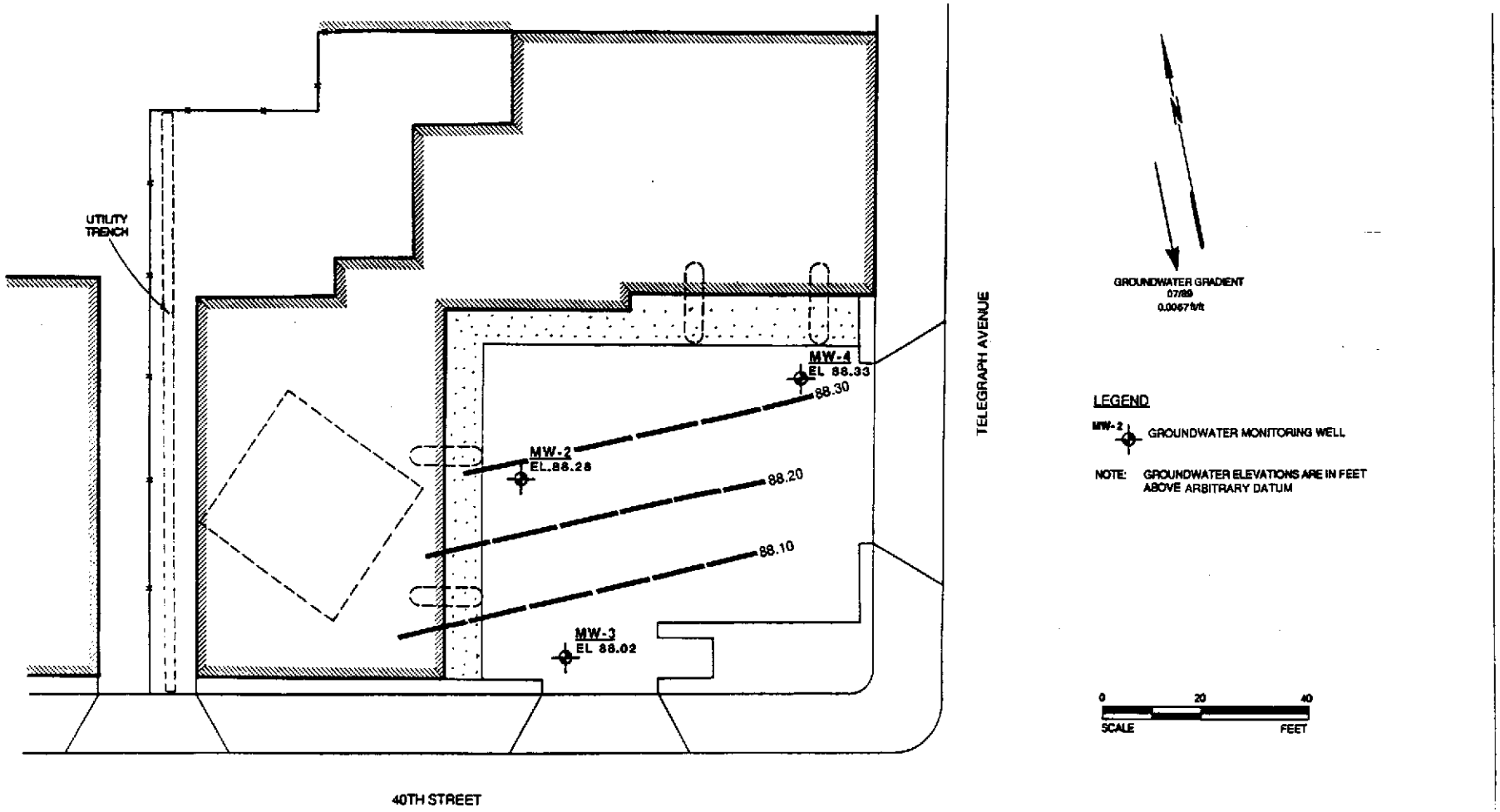
SCALE FEET

PROPOSED GROUNDWATER MONITORING WELLS Q3/89

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/11/89
Prepared By	MLL
Checked By	MIY
Approved By	DWC
Project No.	88-44-361-01
Drawing No.	4



GROUNDWATER GRADIENT JULY 1989

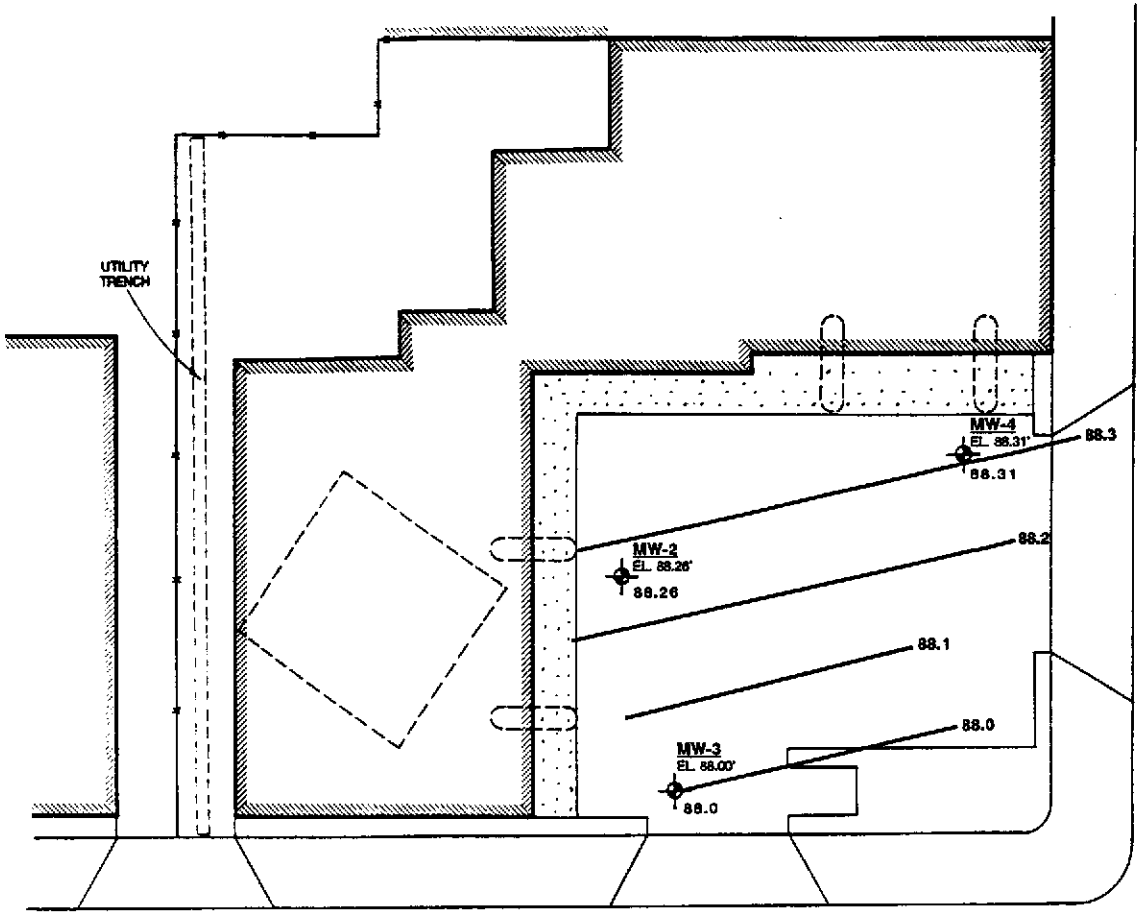
SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale	AS SHOWN
Date	7/28/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	DWC
Project No	88-44-361-01
Drawing No	5

Converse Environmental Consultants California

Base Map Surveyed with EDM Converse 1989

MODERN PASADENA BLUEPRINT 19914



GROUNDWATER GRADIENT

LEGEND

MW-3 GROUNDWATER MONITORING WELL

NOTE: GROUNDWATER ELEVATIONS ARE IN FEET ABOVE ARBITRARY DATUM

0 20 40
SCALE FEET

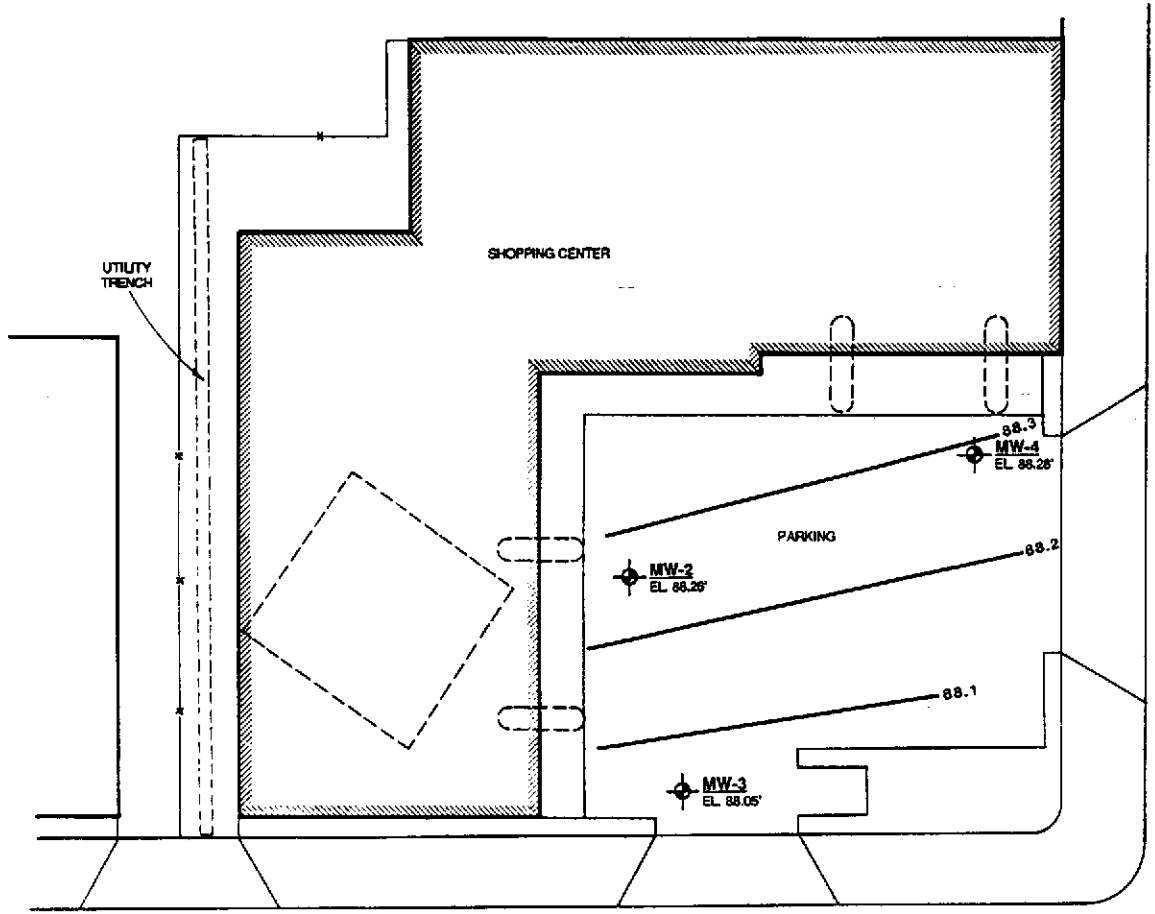
GROUNDWATER GRADIENT AUGUST 1989

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/11/89
Prepared By	MLL
Checked By	MIY
Approved By	CWC
Project No	88-44-361-01
Drawing No	6

Base Map Surveyed with EDM Converse 1989

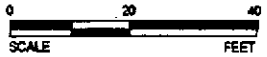


LEGEND

MW-1 ⊕ GROUNDWATER MONITORING WELL

GROUNDWATER GRADIENT CONTOURS INTERVAL= 0.1 FEET

NOTE: WATER TABLE ELEVATIONS ARE IN FEET ABOVE ARBITRARY DATUM



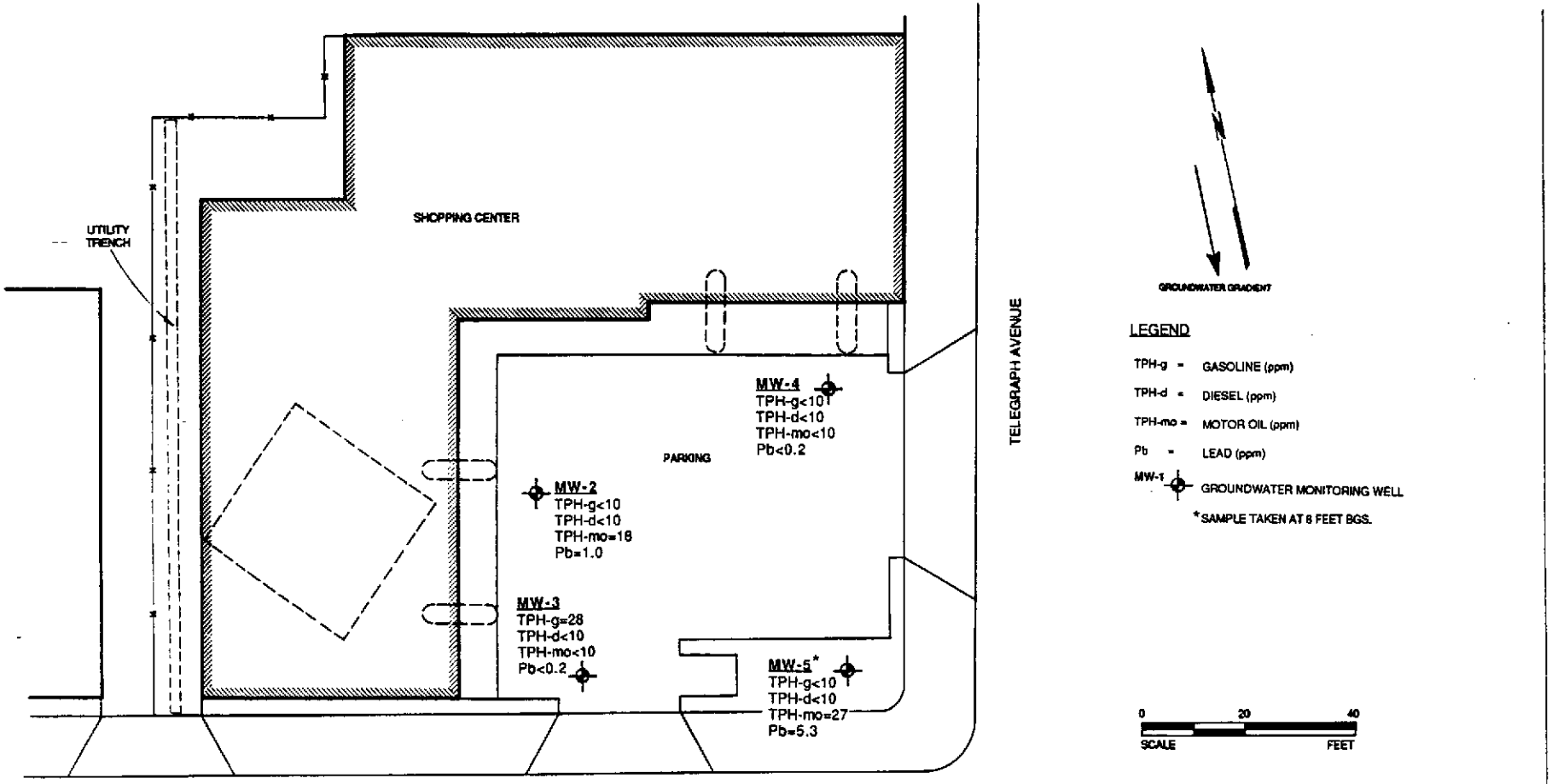
GROUNDWATER GRADIENT SEPTEMBER 1989

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	7/6/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	
Project No.	88-44-361-01
Drawing No.	7

Base Map Surveyed with EDM, Converse 1989



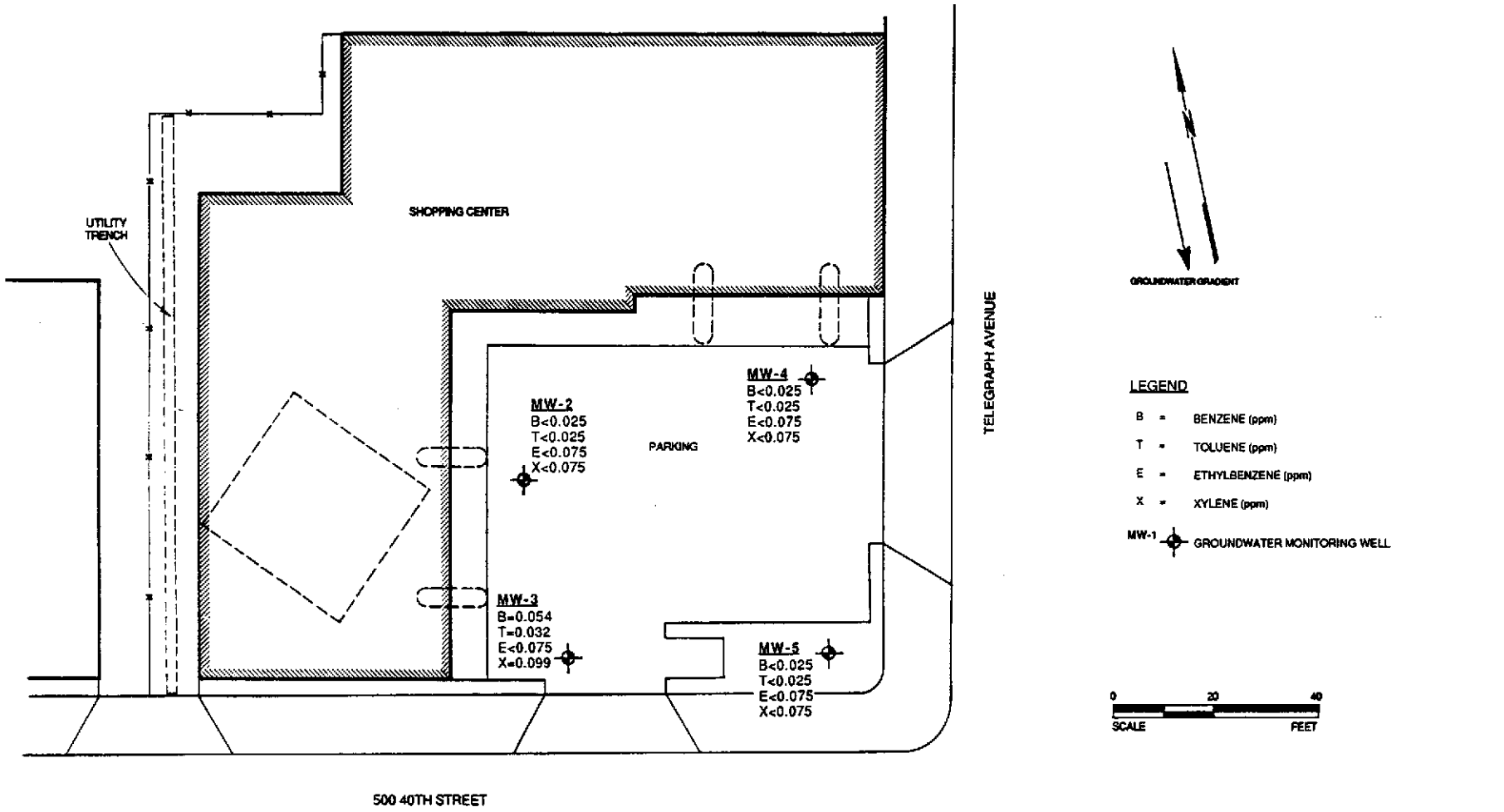
TPH AND Pb IN SOIL AT (-10')

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale	AS SHOWN
Date	7/6/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	
Project No.	88-44-361-01
Drawing No.	8

Converse Environmental Consultants California

Base Map : Surveyed with EDM, Converse 1989.



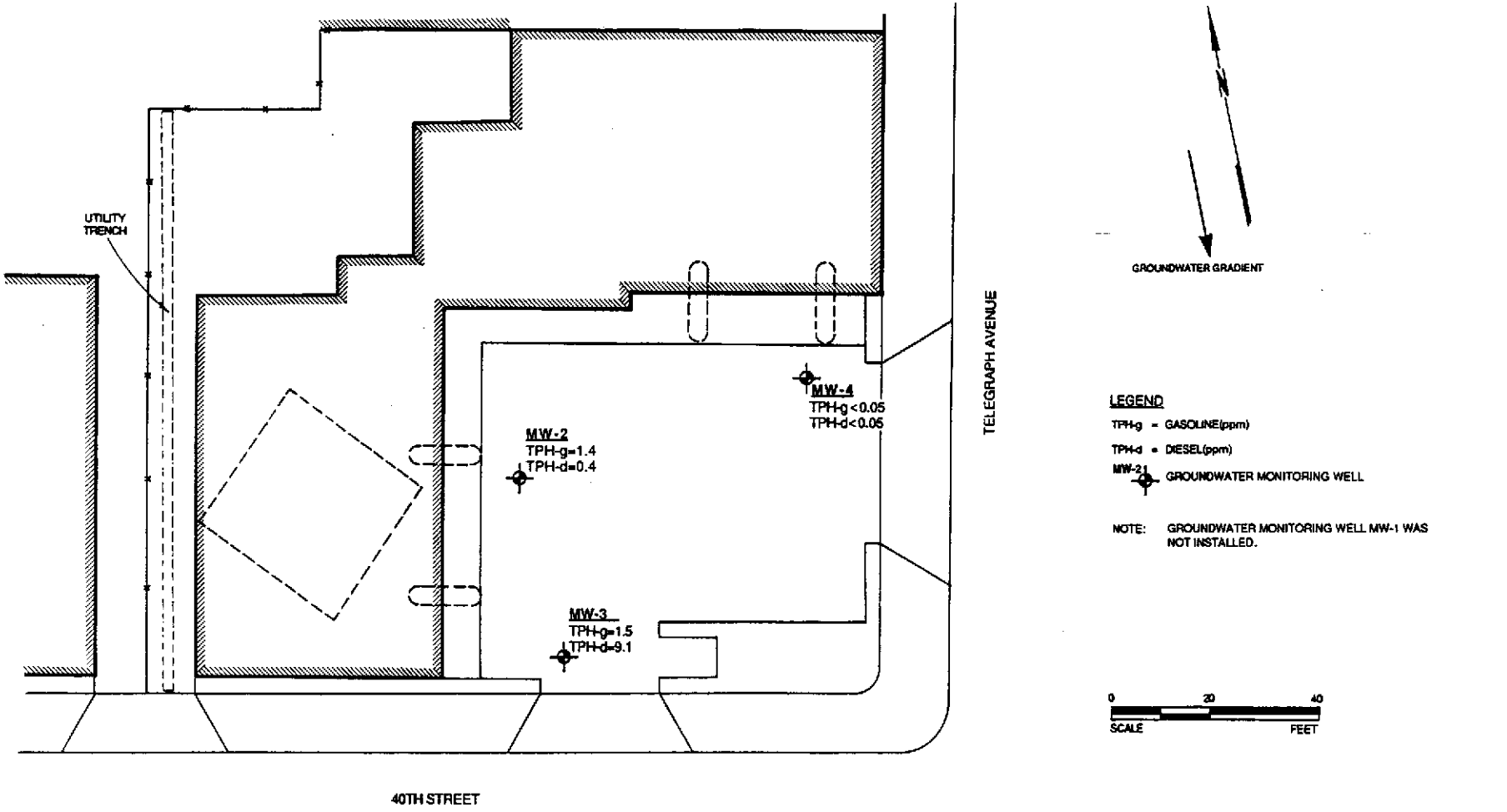
BTEX IN SOIL AT (-10')

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	7/6/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	
Project No.	88-44-361-01
Drawing No.	9

Base Map: Surveyed with EDM. Converse 1989



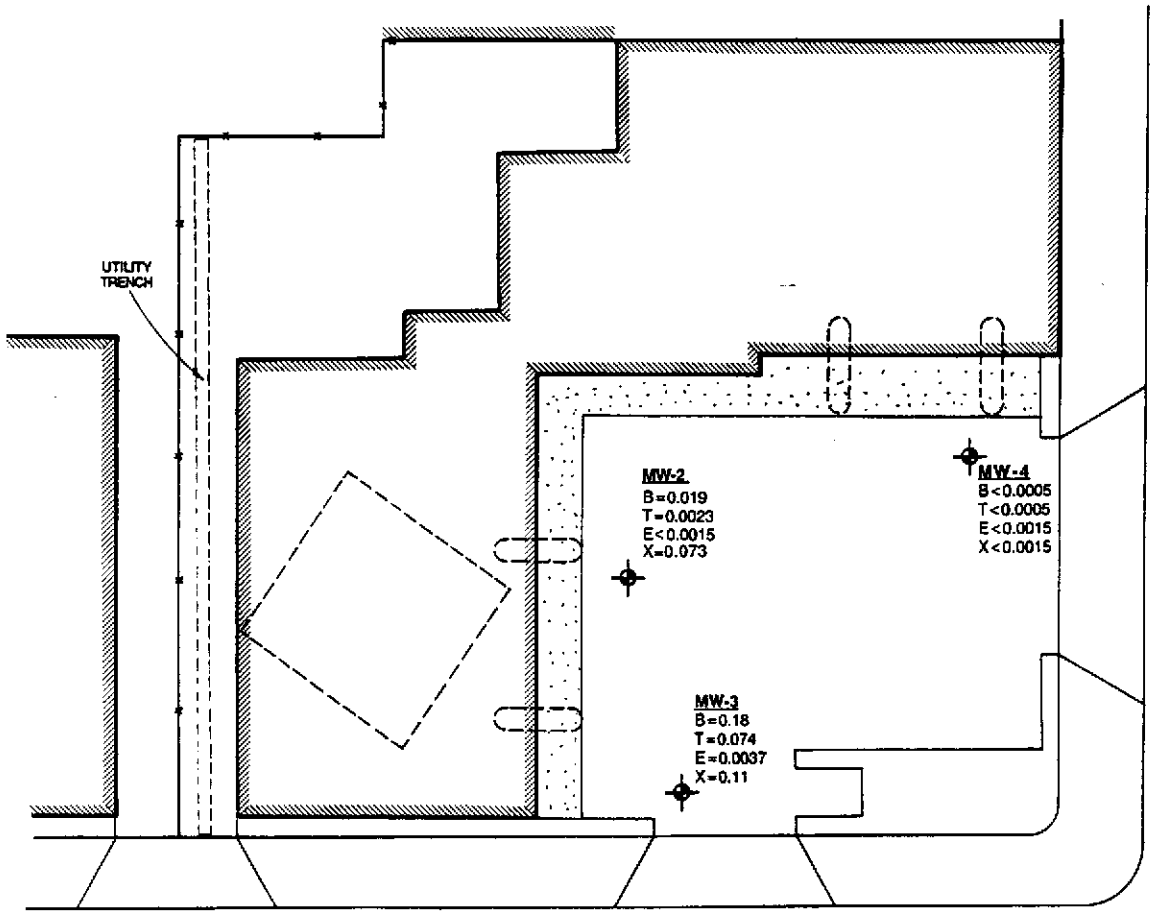
TPH IN GROUNDWATER JULY 1989

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	7/28/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	DWC
Project No.	88-44-351-01
Drawing No.	10

Base Map : Surveyed with EDM, Converse 1989.



GROUNDWATER GRADIENT
07/89

LEGEND

B = BENZENE (ppm)
T = TOLUENE (ppm)
E = ETHYLBENZENE (ppm)
X = XYLENE (ppm)
MW-2 GROUNDWATER MONITORING WELL

NOTE: GROUNDWATER MONITORING WELL MW-1 WAS NOT INSTALLED

0 20 40
SCALE FEET

BTEX IN GROUNDWATER JULY 1989

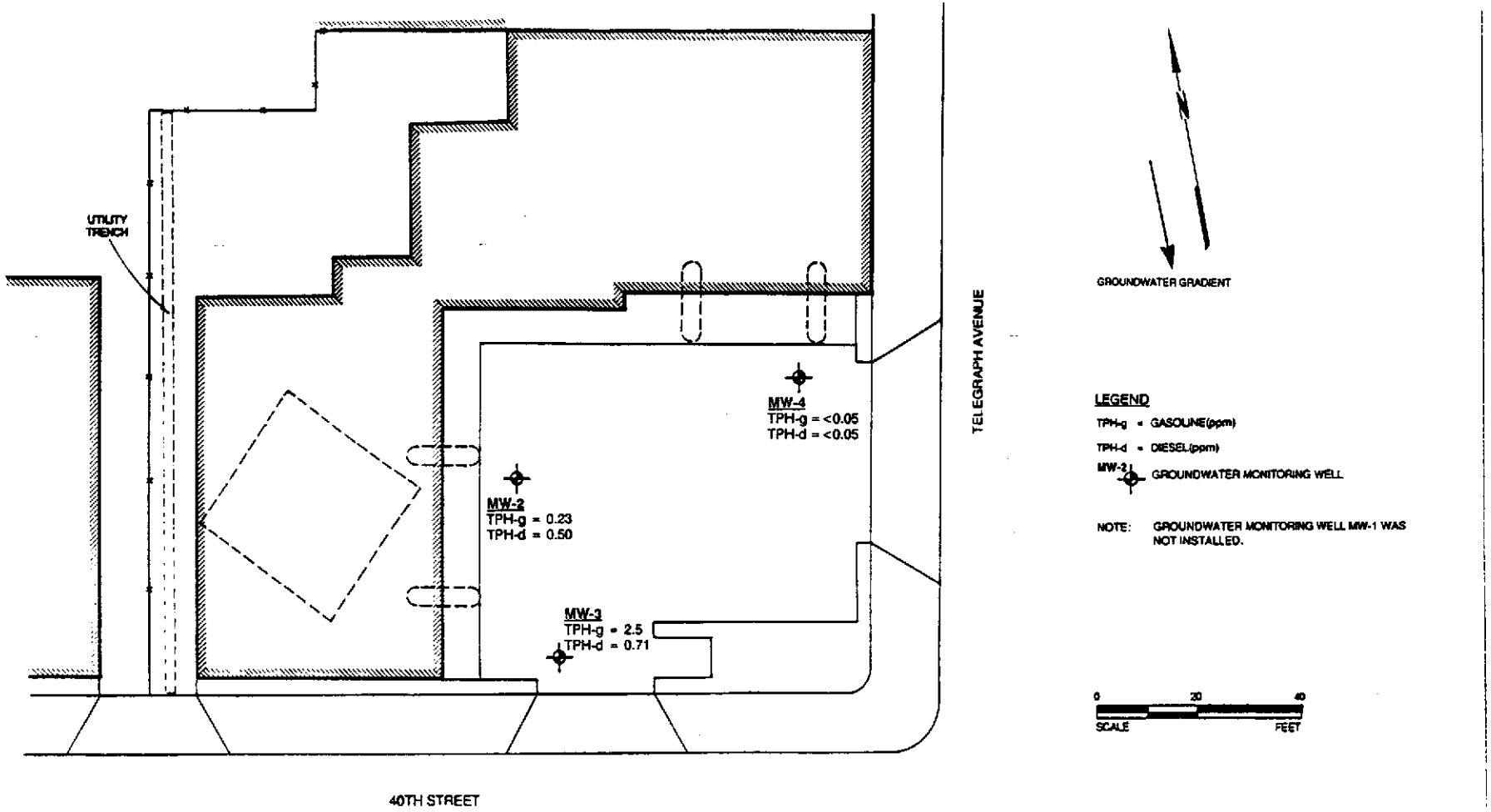
SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale: AS SHOWN
Date: 7/28/89
Prepared By: CRB/KGC
Checked By: RMB
Approved By: DWC

Project No.: 88-44-361-01
Drawing No.: 11

Converse Environmental Consultants California

Base Map: Surveyed with EDM, Converse 1989.



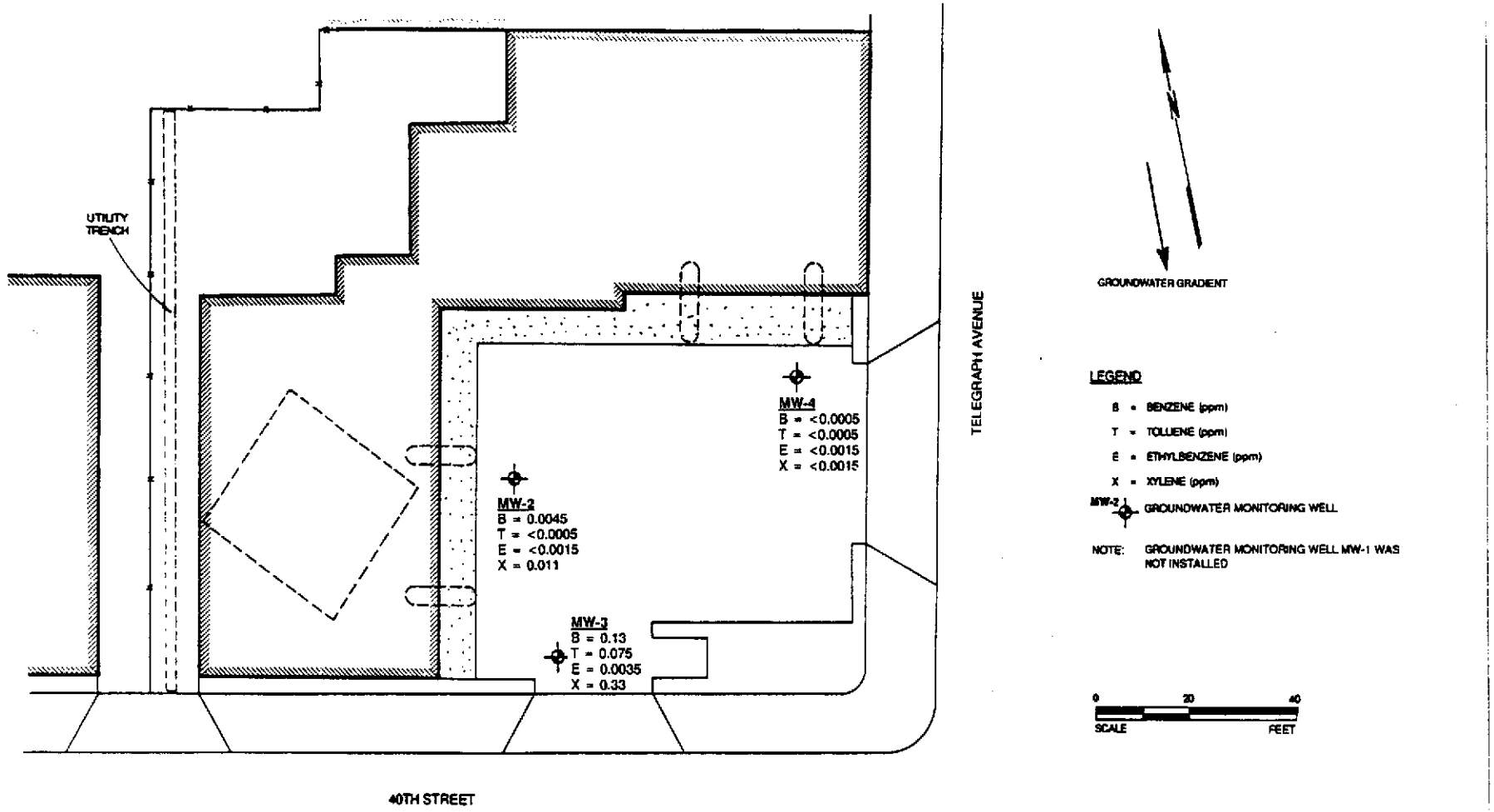
TPH IN GROUNDWATER AUGUST 1989

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/11/89
Prepared By	MLL
Checked By	MIY
Approved By	CWC
Project No	88-44-361-01
Drawing No	12

Base Map [illegible]



BTEX IN GROUNDWATER AUGUST 1989

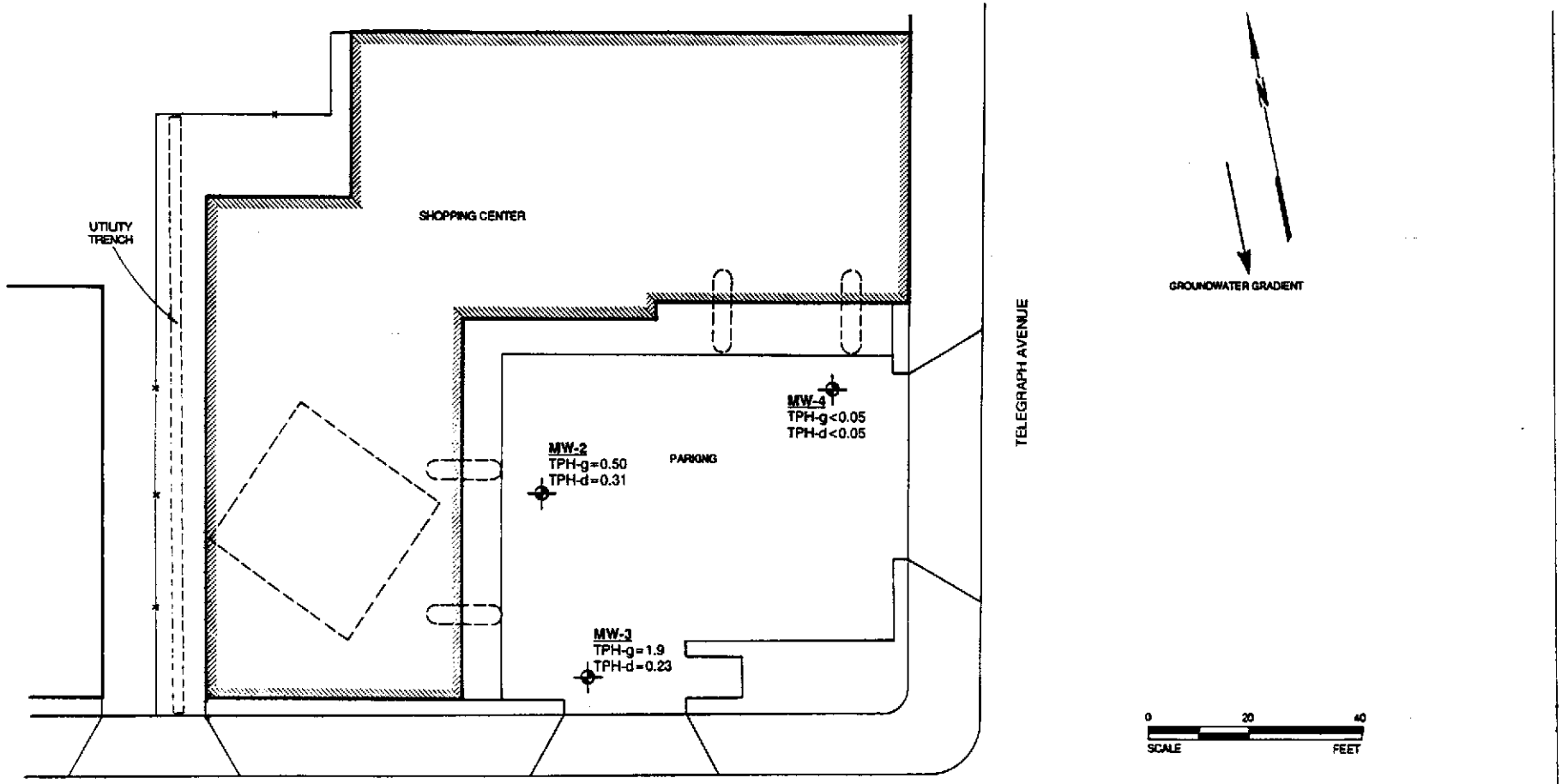
SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	AS SHOWN
Date	9/11/89
Prepared By	MLL
Checked By	MIY
Approved By	DWC
Project No	88-44-361-01
Drawing No	13

Base Map Surveyed with EDM Converse 1989

MODERN PASADENA BLUEPRINT



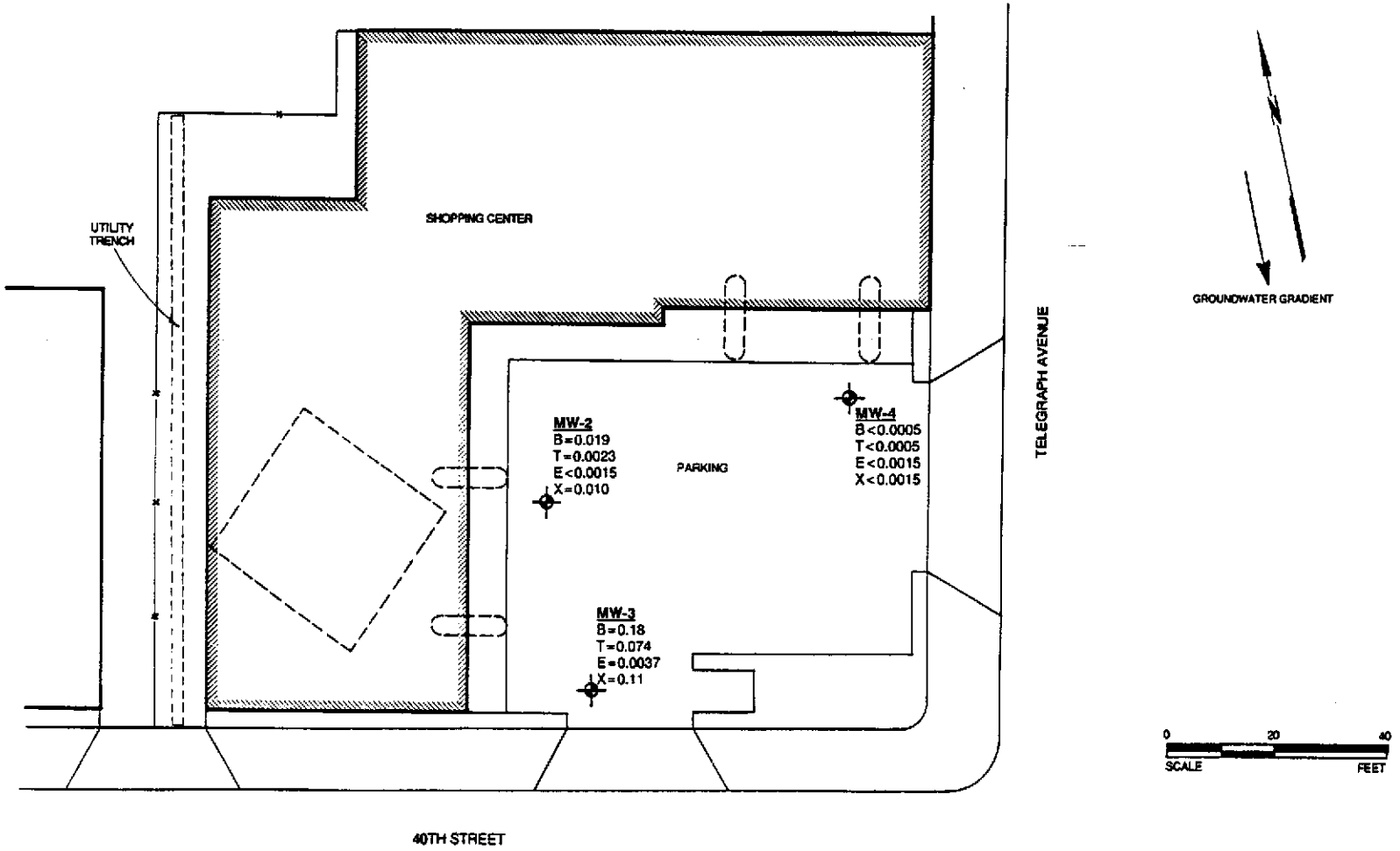
TPH IN GROUNDWATER SEPTEMBER 1989

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale	AS SHOWN
Date	10/12/89
Prepared By	CRB/KGC
Checked By	RMB
Approved By	
Project No.	88-44-361-01
Drawing No.	14

Converse Environmental Consultants California

Base Map - Surveyed with EDM. Converse 1989



BTEX IN GROUNDWATER SEPTEMBER 1989

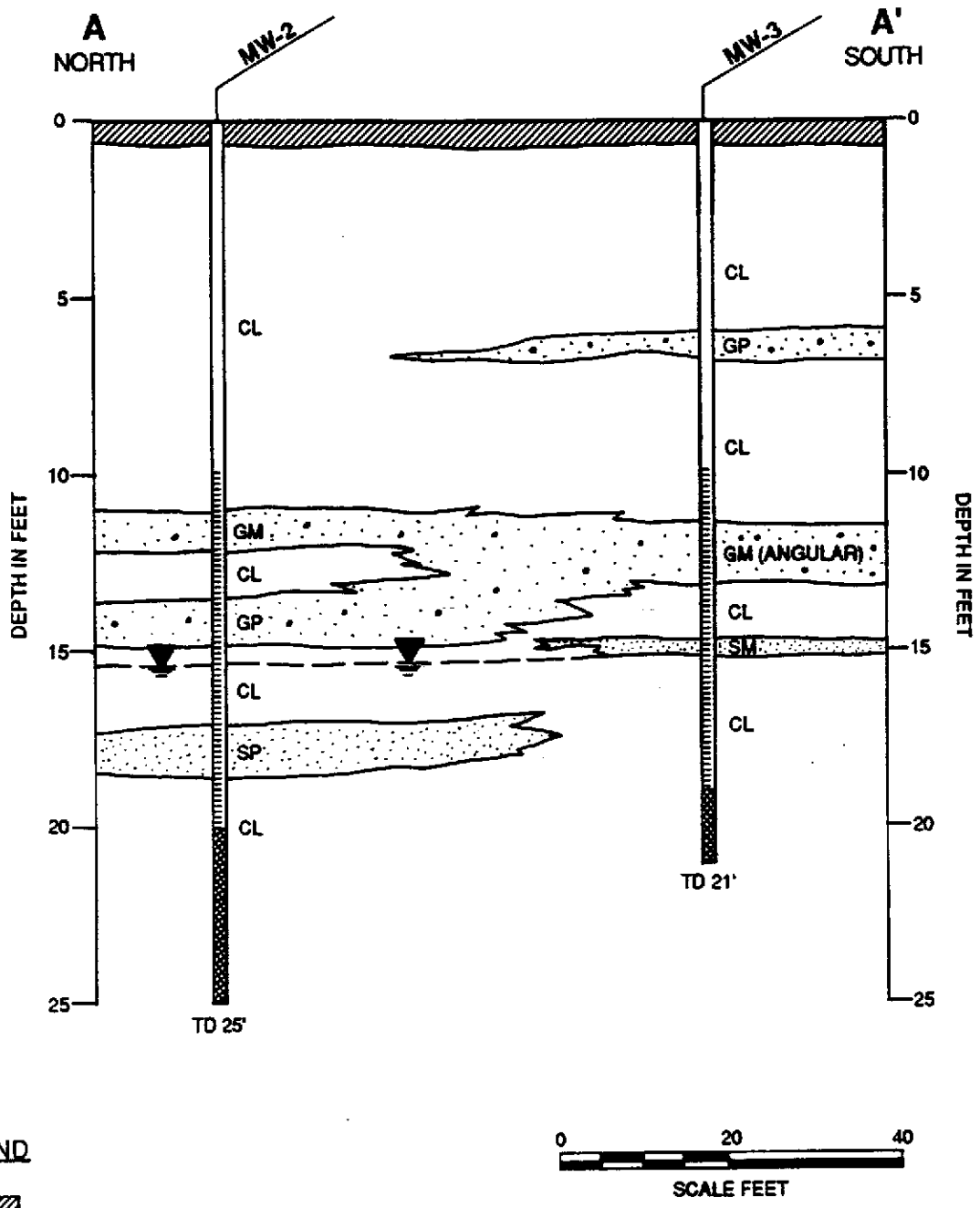
SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale: AS SHOWN
Date: 10/12/89
Prepared By: CRB/KGC
Checked By: RMB
Approved By:

Project No.: 88-44-381-01
Drawing No.: 15

Converse Environmental Consultants California

Base Map: Surveyed with EDM, Converse 1989.



CROSS SECTION A-A'

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale: AS SHOWN	Project No.: 88-44-361-01
Prepared by: CRB	Date: 6/22/89
Checked by: RMB	Drawing No.: 16
Approved by: DWC	

ATTACHMENT 1

LOG OF BORING NO. MW-5

DATE DRILLED: 9-19-89	ELEVATION:	WL TAKEN: 9-19-89	EQUIPMENT: 8"x 12" Hollow Stem Auger

DEPTH (ft)	SAMPLE	WATER LEVEL	SYMBOL	MOISTURE	CONSISTENCY	COLOR	DESCRIPTION		WELL CONSTRUCTION	BLOWS/FT.	O.V.M. (ppm)	T.P.H. (ppm)
				slightly moist	medium dense	dark brown	Gravelly SAND and SILT some rubble (Fill)					
					medium		Sandy SILT increasing Clay	ML				
	1					brown	Silty CLAY trace Sand, trace Gravel	CL		9	0	
5												
	2					brown mottled gray	Silty CLAY and fine SAND black tubelets	CL		11	0	
10												
	3			moist	medium	light brown mottled rust and gray	Sandy CLAY som Silt	CL		14	0	
15	4			moist	medium		Fine Sandy CLAY and SILT	CL		15	0	
				very moist								
				wet								
20							Total Depth of Boring: 20 ft. Below Ground Surface					

SHELL OIL COMPANY
500 40th Street
Oakland, California

Project No.
88-44-361-01

Converse Environmental Consultants California

Drawing No.
A-2

ATTACHMENT 2

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Soil

RECEIVED

OCT 4 1989

CONVERSE ENVIRONMENTAL

Marc Yalom
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

09-30-89
NET Pacific Log No: 7823
Series No: 212
Client Ref: Project# 88-44-361-01-11

Subject: Analytical Results for "Shell - 500 40th Street" Received 09-21-89.

Dear Mr. Yalom:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Gregg W. Oakes
Group Leader
Mass Spectroscopy

Approved by:

Sue J. Long
Group Leader
Classical Chemistry

/sm
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

ppm (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).

mg/L : Concentration in units of milligrams of analyte per liter of sample.

mL/L/hr : Milliliters per liter per hour.

MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.

N/A : Not applicable.

NA : Not analyzed.

ND : Not detected; the analyte concentration is less than applicable listed reporting limit.

NR : Not requested.

NTU : Nephelometric turbidity units.

RPD : Relative percent difference, 100 [Value 1 - Value 2]/mean value.

SNA : Standard not available.

ppm (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).

ug/L : Concentration in units of micrograms of analyte per liter of sample.

umhos/cm : Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

SAMPLE DESCRIPTION: MW5 1 @ 4 09-19-89
LAB NO.: (-35177)

Parameter	Reporting Limit	Results	Units
METHOD 7421			
Lead	0.2	12	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		09-27-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	ND	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-21-89	
DATE ANALYZED		09-22-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	ND	ppm

SAMPLE DESCRIPTION: MW5 2 0 8 09-19-89
LAB NO.: (-35178)

Parameter	Reporting Limit	Results	Units
METHOD 7421			
Lead	0.2	5.3	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		09-26-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	ND	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-21-89	
DATE ANALYZED		09-22-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	27	ppm

SAMPLE DESCRIPTION: MW5 3 @ 12 09-19-89
LAB NO.: (-35179)

Parameter	Reporting Limit	Results	Units
METHOD 7421			
Lead	0.2	3.3	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		09-26-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	ND	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-21-89	
DATE ANALYZED		09-22-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	13	ppm

SAMPLE DESCRIPTION: MW5 4 @ 16 09-19-89
LAB NO.: (-35180)

Parameter	Reporting Limit	Results	Units
METHOD 7421			
Lead	0.2	5.7	ppm
PETROLEUM HYDROCARBONS VOLATILE (SOIL)			
DILUTION FACTOR *		1	
DATE ANALYZED		09-26-89	
METHOD GC FID/5030			
as Gasoline	10	ND	ppm
METHOD 8020			
Benzene	0.025	ND	ppm
Ethylbenzene	0.075	ND	ppm
Toluene	0.025	ND	ppm
Xylenes, total	0.075	ND	ppm
PETROLEUM HYDROCARBONS EXTRACTABLE (SOIL)			
DILUTION FACTOR *		1	
DATE EXTRACTED		09-21-89	
DATE ANALYZED		09-22-89	
METHOD GC FID/3550			
as Diesel	10	ND	ppm
as Motor Oil	10	ND	ppm

Converse Consultants

PM : MIY

CHAIN OF CUSTODY RECORD

Project No.	Project Name
88-49-361-01-11	500 40th ST

Samplers: (signature) D. Coy

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	TPH G	TPH D	BTEX	Pb			Remarks
						4							(7823)
MW5	9/19	89			Drive 1 @ 4	1	X	X	X	X			std TAT
"					2 @ 8	1	X	X	X	X			
"					3 @ 12	1	X	X	X	X			
"					4 @ 16	1	X	X	X	X			

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
D. Coy	9/19/89 07:00	Jeff Wickham 9/20 14:20	Jeff Wickham	9/21/89 2:34 PM	K Cowell
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) (VIA NCS)	Received for Laboratory: (signature) R Jemple	Date/Time 9/24/89 0700

ATTACHMENT 3

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Formerly: ANATEC Labs, Inc.

Marc Yalom
Converse Consultants
55 Hawthorne St, Ste 500
San Francisco, CA 94105

09-22-89
NET Pacific Log No: 7742
Series No: 212
Client Ref: Proj# 88044-361

Subject: Analytical Results for "Shell-500 40th St" Received 09-14-89.

Dear Mr. Yalom:

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Submitted by:

Susan Joy Griffin
Group Leader
Gas Chromatography

Approved by:

Brian Fies
Group Leader
Atomic Spectroscopy

/ma
Enc: Sample Custody Document

KEY TO ABBREVIATIONS and METHOD REFERENCES

Abbreviations

mean : Average; sum of measurements divided by number of measurements.

mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).

mg/L : Concentration in units of milligrams of analyte per liter of sample.

mL/L/hr : Milliliters per liter per hour.

MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.

N/A : Not applicable.

NA : Not analyzed.

ND : Not detected; the analyte concentration is less than applicable listed reporting limit.

NR : Not requested.

NTU : Nephelometric turbidity units.

RPD : Relative percent difference, 100 [Value 1 - Value 2]/mean value.

SNA : Standard not available.

ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).

ug/L : Concentration in units of micrograms of analyte per liter of sample.

umhos/cm : Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

Parameter	Reporting Limit (ppm)	Descriptor, Lab No. and Results MW-2 09-11-89 1400 (-34904)	 MW-3 09-11-89 1333 (-34905)	 MW-4 09-11-89 1427 (-34906)
PETROLEUM HYDROCARBONS VOLATILE (WATER)				
DILUTION FACTOR *		1	1	1
DATE ANALYZED		09-21-89	09-21-89	09-21-89
METHOD GC FID/5030				
as Gasoline	0.05	0.50	1.9	ND
METHOD 602				
Benzene	0.0005	0.019	0.18	ND
Ethylbenzene	0.0015	ND	0.0037	ND
Toluene	0.0005	0.0023	0.074	ND
Xylenes, total	0.0015	0.010	0.11	ND
PETROLEUM HYDROCARBONS EXTRACTABLE (WATER)				
DILUTION FACTOR *		1	1	1
DATE EXTRACTED		09-14-89	09-14-89	09-14-89
DATE ANALYZED		09-15-89	09-15-89	09-15-89
METHOD GC FID/3510				
as Diesel	0.05	0.31	0.23	ND
as Motor Oil	0.05	ND	ND	ND

PM - MARCYALOM

7742

Converse Consultants

CHAIN OF CUSTODY RECORD

Project No. 88-44-361

Project Name SHELL

Samplers: (signature)

Station No.	Date	Time	Comp.	Grab	Station Location	Number of Containers	BTEX	TPH-GAS	TPH-DIESEL				Remarks
						12 VOAS 9 LITRES 21 total							
MW-2	9/11/89	2:00		✓	500 40th OAKLAND	7	X	X	X				STANDARD T.A.T.
MW-3	"	1:33		✓	" " "	7	X	X	X				
MW-4	"	2:27		✓	" " "	7	X	X	X				

Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
	9/11/89 16:45	9/13 13:45			
Relinquished by: (signature)	Date/Time	Received by: (signature)	Relinquished by: (signature)	Date/Time	Received by: (signature)
Relinquished by Courier: (signature)	Date/Time	Received by Mobile Lab: (signature)	Relinquished by Mobile Lab: (signature)	Date/Time	Received by Courier: (signature)
Method of Shipment		Shipped by: (signature)	Courier from Airport: (signature) CVIA NCSJ	Received for Laboratory: (signature)	Date/Time 9/14/89 0730

ATTACHMENT 4

Converse Environmental Consultants California

55 Hawthorne Street, Suite 500
San Francisco, California 94105

Telephone **415 543-4200**
FAX 415 777-3157

RMB

October 24, 1989
88-44-361-01-223

Ms. Dyan Whyte
Water Resource Control Engineer
San Francisco Bay Regional Water Quality Control Board
1111 Jackson Street, Sixth Floor
Oakland, California 94607

Subject: Letter of Intent to Install
Interim Groundwater Remediation System at
500 40th Street, Oakland, California, 94607

Dear Ms. Whyte:

This letter is to inform the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) of Converse Environmental West's (CEW) intent to install an interim groundwater remediation system for Shell Oil Company at 500 40th Street in Oakland, California.

CEW proposes to install an interim groundwater extraction and treatment system to control offsite migration. Additional soil and groundwater investigations are scheduled to further define soil and groundwater plumes. The following tasks are proposed and copies will be provided to your office for review of progress.

- Task I - Design Interim Groundwater Remediation System
- Task II - Install Extraction Wells
- Task III - Submit a POTW Application (EBMUD)
- Task IV - Procure Building Permits
- Task V - Construct Groundwater Conveyance System
- Task VI - Construct Treatment System
- Task VII - Conduct System Start-up
- Task VIII - Provide System Monitoring and Prepare Reports

The above tasks are described in detail below.

Task 1 - Design Interim Groundwater Remediation System.

An interim groundwater remediation system is currently under design for 10 gallons per minute of possible free product and dissolved product. Drawing 1 shows the locations of the three proposed extraction wells and the conveyance system to the treatment system. The interim treatment system will contain a total fluids pump, an oil/water separator, a product storage tank and aqueous activated carbon for dissolved product treatment.

Drawing 2 shows a schematic of the treatment system including an air stripper for removal of dissolved product from groundwater. An air stripper will not be incorporated into the system until sufficient chemical data is obtained to assist in designing an air stripper and provide information for obtaining an air discharge permit from the Bay Area Air Quality Management District (BAAQMD).

Detailed design drawings will be produced from Task 1 activities for submittal to the City of Oakland Building Department and the East Bay Municipal Utility District (EBMUD) to obtain a building permit and a water discharge permit respectively.

Task II - Install Extraction Wells.

Three extraction wells will be installed in the locations shown on Drawing 1. These locations are closest to the former underground storage tanks. Attachment 1 is a recent copy of the Monthly Groundwater Monitoring Report which includes a plot plan showing the location of the former underground storage tanks.

These extraction wells will be constructed of 5-inch diameter PVC with 0.02 inch slot size, completed at approximately 30 feet below grade. The wellhead will be completed in a traffic rated vault box and connected to the below grade conveyance system.

Task III - Submit a POTW Application.

Treated water will be discharge to the sanitary sewer under discharge conditions outlined by EBMUD, the local POTW. Detailed design drawings and an application for discharge will be submitted to EBMUD for review. Chemical data obtained from initial sampling of the newly constructed extraction wells will be provided to EBMUD.

Task IV - Procure Building Permits.

The interim groundwater treatment system will be permitted by the City of Oakland's Building Department. Detailed design drawings will be provided to the building department. CEW engineers will meet with the building department personnel and the Hazardous Material Inspector to expedite the permit process.

Task V and Task VI - System Construction.

The interim groundwater remediation system will be constructed by licensed contractors and inspected by the City of Oakland building inspectors. Construction activities will be performed as soon as the necessary permits are obtained. Drawing 3 outlines the schedule of activities of all tasks and allows two months for construction activities.

Task VII - Conduct System Start-up.

The system start-up will verify operation of process control equipment. The fail-safe systems will be tested to insure proper operation.

Task VIII - Provide System Monitoring and Reporting.

CEW will provide start-up and continuous monitoring as specified in the discharge permit. The initial system sampling will be conducted to verify that discharge conditions are met. CEW personnel will obtain water samples at monthly intervals and analyze these samples for TPH as gas, diesel and BTEX. The analytical results and average flowrate will be reported to the POTW and the SFBRWQCB on a monthly basis.

A schedule of these activities is provided on Drawing 3.

Please call myself or Dr. Douglas Charlton if you have any questions.

Very truly yours,

Converse Environmental West

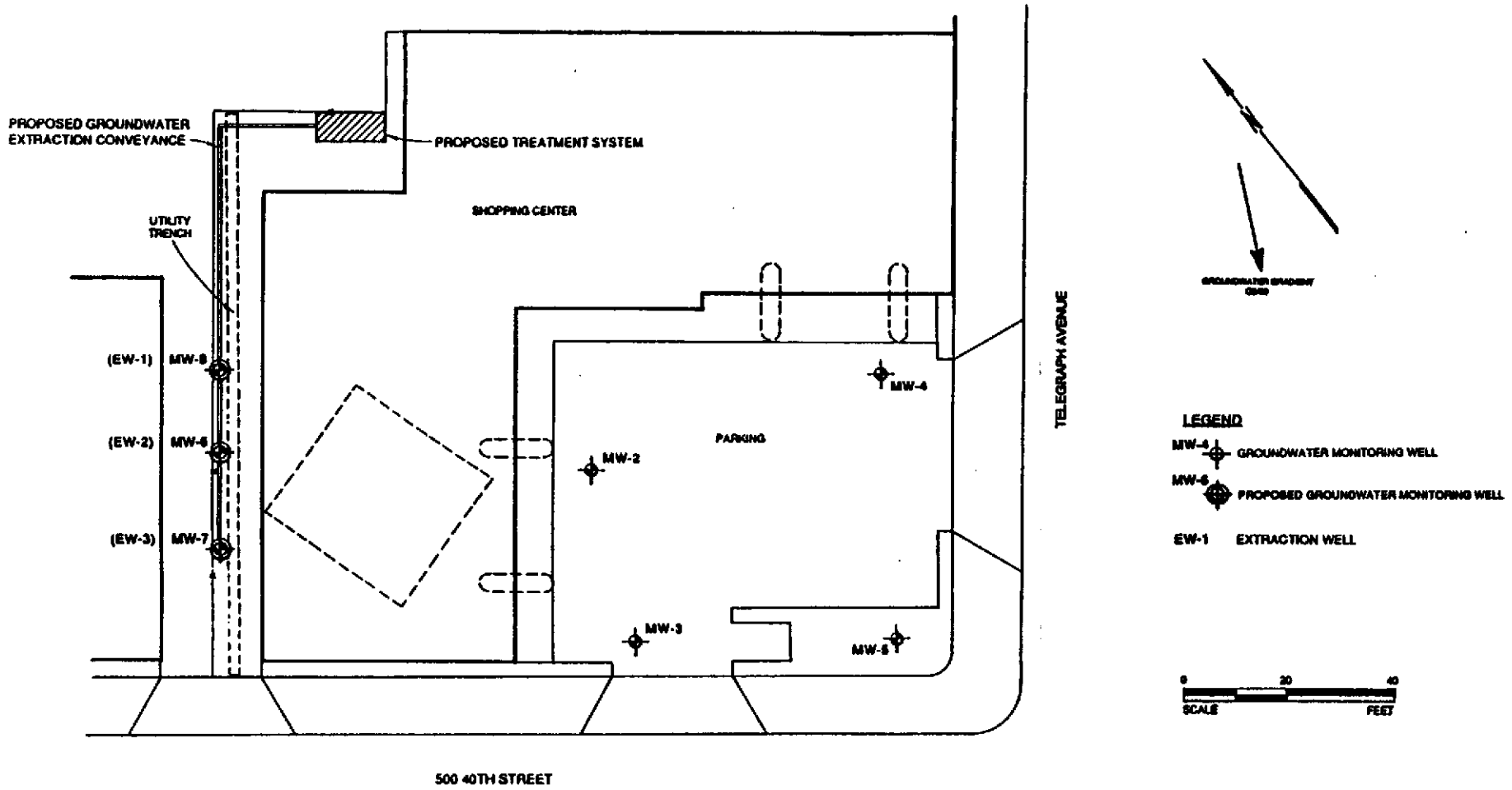
Daniel R Fitzgerald

Daniel R. Fitzgerald
Project Engineer

DRF:aar

Enclosure

cc: Ms. Diane Lundquist - Shell Oil Company (w/ encl.)
Mr. Rafad Shahid - Alameda City Health Department (w/ encl.)
Mr. Douglas W. Charlton - CEW (w/o encl.)
Ms. Robin M. Breuer - CEW (w/o encl.)



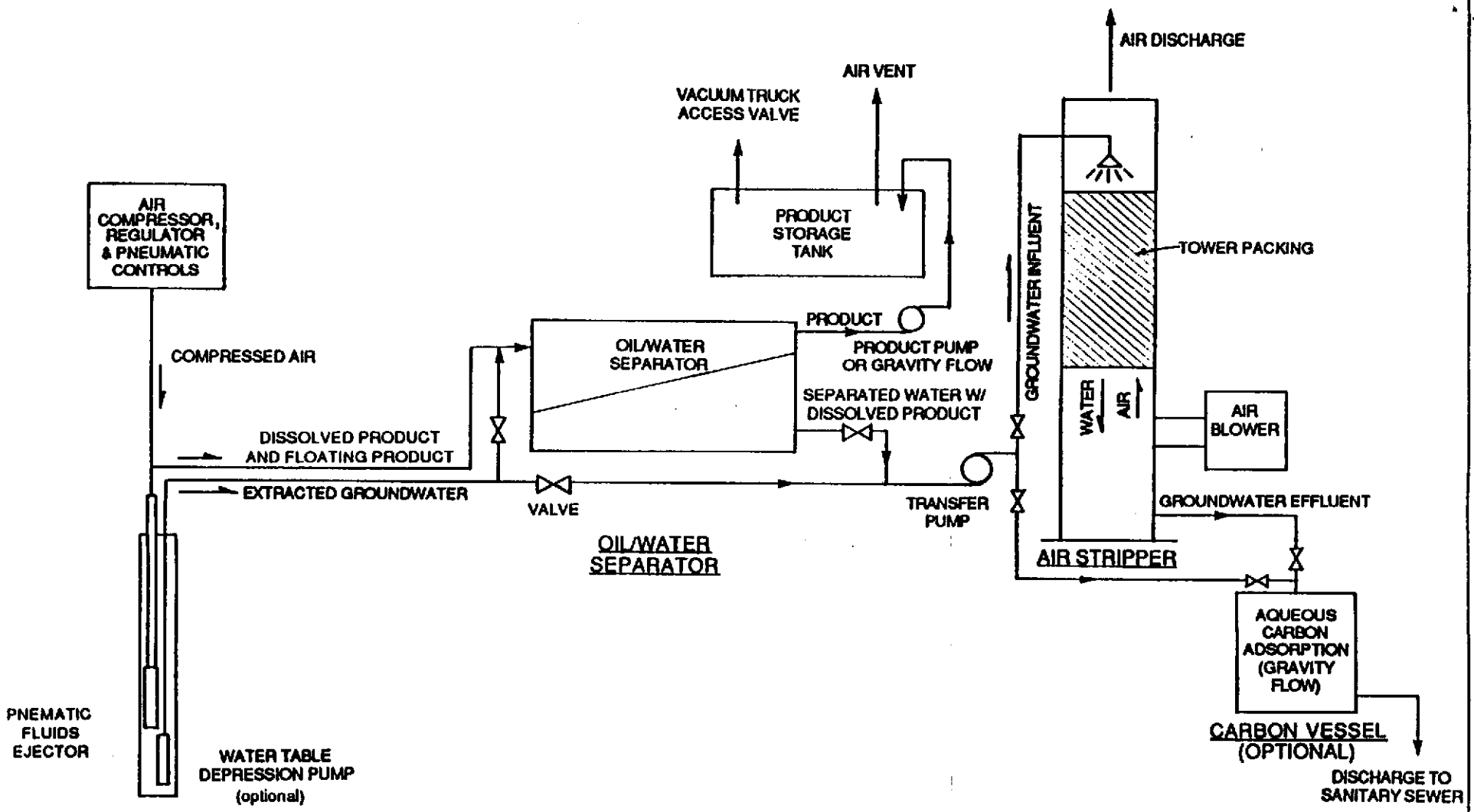
PROPOSED INTERIM REMEDIATION SYSTEM SCHEMATIC

SHELL OIL COMPANY
500 40th Street
Oakland, California

Scale: AS SHOWN
Date: 7/6/89
Prepared By: CRB/KGC
Checked By: RMS
Approved By:
Project No: 88-44-261-01
Drawing No: 1

Converse Environmental Consultants California

Base Map Surveyed with EDM Converse 1989



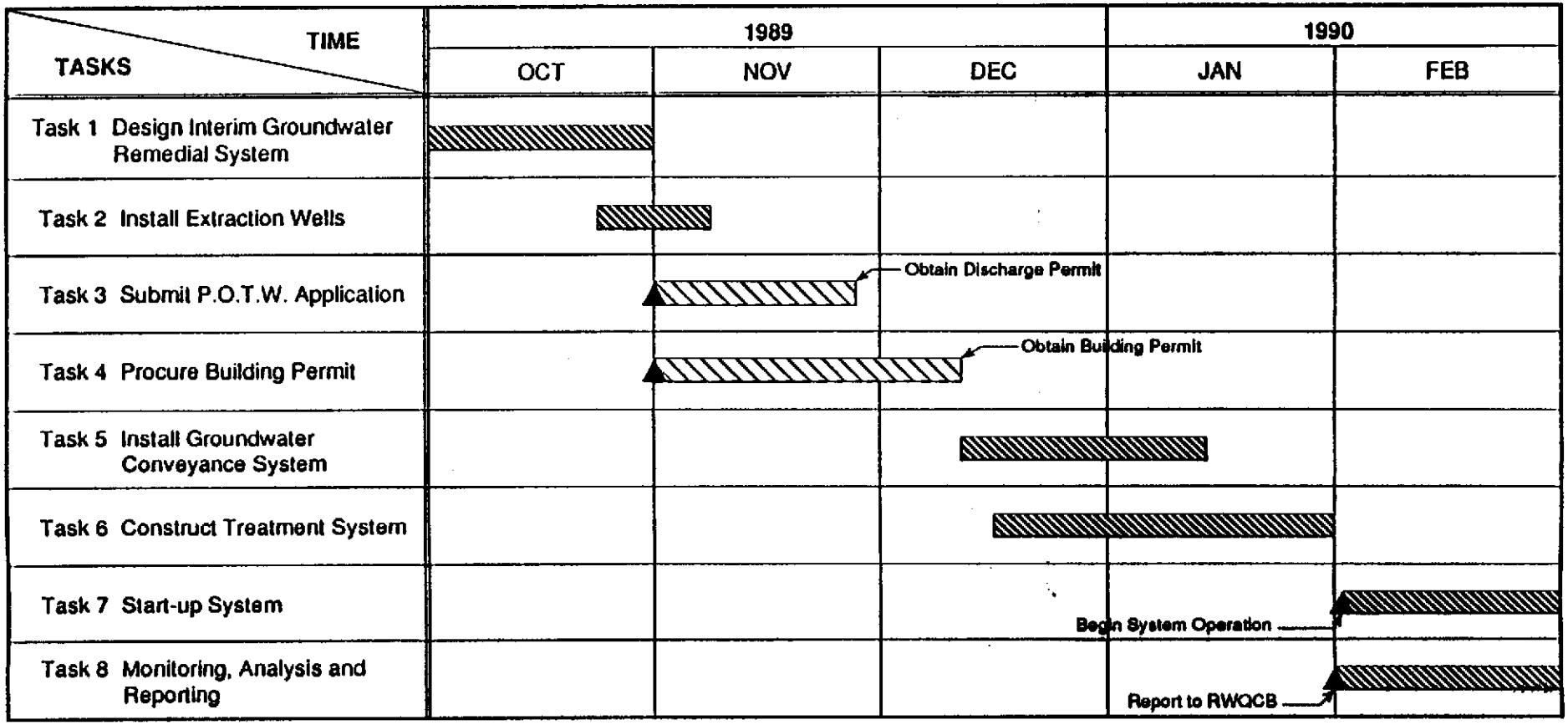
NOTE : STORAGE TANK CONSTRUCTED AS REQUIRED.

SCHEMATIC DRAWING OF GROUNDWATER REMEDIATION SYSTEM

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	NOT TO SCALE
Date	7/21/89
Prepared By	CRB
Checked By	DRF
Approved By	DRF
Project No	88-44-361-01
Drawing No	2



KEY :

Schedule Subject to Permits

Document Submittal

SCHEDULE OF ACTIVITIES

SHELL OIL COMPANY
500 40th Street
Oakland, California

Converse Environmental Consultants California

Scale	N/A
Date	10-6-89
Prepared By	LQL
Checked By	DRF
Approved By	RMB
Project No	88-44-361-01
Drawing No	3

APPENDIX A

Hollow-Stem Auger Drilling and Soil Sampling

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING

Borings shall be drilled with a hollow-stem auger and sampled with a modified California-type split-spoon sampler. Soil samples shall be of sufficient volume to perform the analyses which may be required, including replicate analyses. Aside from deionized water or distilled water, no fluids will be used in drilling.

Undisturbed (intact) soil samples shall be recovered from soil borings without introducing liquids into the borings. Soil samples as core or cuttings shall be taken continuously from ground surface to termination depth (TD), or through the aquifer zone of interest for lithologic logging.

Soils from all borings shall be described in detail using the Unified Soil Classification System and shall be logged by a professional geologist, civil engineer, or engineering geologist who is registered or certified by the State of California and who is experienced in the use of the Unified Soil Classification System. A technician trained and experienced in the use of the Unified Soil Classification System who is working under the direct supervision of one of the aforementioned professionals shall be qualified to log borings, provided the aforementioned professional reviews the logs and assumes responsibility for the accuracy and completeness of the logs.

All wet zones above the free water zone shall be noted and accurately logged.

If evidence of contamination is detected by sight, smell, or other field analytical methods, drilling shall be halted until the responsible professional determines if drilling deeper is advisable.

All drilling tools shall be thoroughly decontaminated with trisodium phosphate (TSP) or steam cleaner immediately before starting each boring.

Soil samples shall be taken in decontaminated brass sampling tubes in the split-spoon. The brass sleeves will be cut apart using a clean knife. The ends of the tubes will be covered tightly with teflon wrap, capped with tight-fitting plastic caps, wrapped with plastic electricians' tape, and properly labeled.

APPENDIX B
Drum Handling Procedures

OUTLINE OF DRUM HANDLING PROCEDURES

1. Complete drummed worksheets onsite, forward a copy to Shell.

2. Test material per Shell's site-specific test requirements.

3. Classify Material as: Clean/Non-Hazardous/Hazardous

4. Labeling of Drums

   - Pending Label: Used to describe material pending final analytical testing. Labels must be immediately affixed to drum during field work.

   - Non-Hazardous Label: Required within 48 hours after analytical results are received.

   - Hazardous Label: Required within 48 hours after analytical results are received.

   - For Pick-Up Label: Must be affixed to drum prior to Shell Hazardous Waste Coordinator arranged pick-up date.

5. Remove within 14 days of date of generation. Empty drums, where material was disposed in bulk, must be removed the same day they are emptied.

6. Dispose of Material:

   - Clean: Any local landfill
   - Non-Hazardous: Class III landfill. If a Class III landfill will not accept, contact Shell Hazardous Waste Coordinator for assistance
   - Hazardous: Class I landfill arranged by Shell Hazardous Waste Coordinator.

   Mail or FAX completed Hazardous Waste Pick-Up Forms to the Shell Hazardous Waste Coordinator with a copy of the analytical results and worksheets.

7. If required, contact the Shell Hazardous Waste Coordinator:

   Shell Oil Company
   Hazardous Waste Coordinator
   Anna Sampson
   P.O. Box 6249
   Carson, California 90749
   Phone: (213) 816-2037
   FAX: (213) 816-2114

8. Manifests may be signed by the onsite contractor or consultant, station dealer, or other authorized Shell Oil representatives. The transporter CAN NOT sign the manifest.

   IT IS THE RESPONSIBILITY OF THE CONTRACTOR/CONSULTANT TO ARRANGE FOR A PERSON TO SIGN THE MANIFEST ON THE DAY OF PICK-UP.

9. Reporting

   All reports must be received by the Shell Hazardous Waste Coordinator within 7 working days of disposal. Reports shall include the following:

   - Completed drummed soil and water worksheets.
   - Attach a copy of the analytical results.
   - State how and where material was disposed.
   - If drums are emptied and material was disposed in bulk, state how empty drums were handled.
   - The signed blue and yellow copies of the hazardous waste manifest.

SOIL:

1. Test Requirements and Methods: Per Shell's site-specific test requirements

   - TPH: EPA Method 8015
   - BTEX: EPA Method 8020
   - Lead:

     -One composite sample from each boring
     -See attached decision tree
     -Total Lead - EPA Method 7421
     -Inorganic (soluble) Lead - DOS Title 22, Waste Extraction Test, §22-66700

   - Ignitable:

     -One composite sample from each boring
     -Bunsen Burner Test Flame Test

2. Classification:

   - Clean: TPH, BTEX, and Lead non-detectable
   - Non-Hazardous if any are true:

     -TPH less than 1000 ppm

-Lead -Inorganic (soluble) Lead less than 5 ppm (STLC)
or less than 100 ppm (TTLC)
-Organic Lead less than 13 ppm (TTLC)

-Ignitable - If TPH < 1000 ppm do not conduct test

- Hazardous if any are true:

-TPH greater than 1000 ppm

-Lead -Inorganic (soluble) Lead greater than 5 ppm (STLC)
or greater than 1000 ppm (TTLC)
-Organic Lead greater than 13 PPM (TTLC)

-Ignitable -If TPH >1000 ppm, then conduct Bunsen Burner Test
-If soil burns vigorously and persistently, soils are RCRA D001

3. Responsibility for Disposal:
   - Clean: Consultant/Contractor
   - Non-Hazardous: Consultant/Contractor or Shell Hazardous Waste Coordinator
   - Hazardous: Shell Hazardous Waste Coordinator
4. Types of Drums: DOT-17H for a solid, solidified, or sludge material.
5. Disposal Facility:
   - Clean: Any local landfill
   - Non-Hazardous: Class III landfill. If a Class III landfill will not accept, contact Shell Hazardous Waste Coordinator for assistance
   - Hazardous: Class I landfill arranged by Shell Hazardous Waste Coordinator

WATER:

1. Test Requirements and Methods: Per Shell's site-specific test requirements.
   - TPH: EPA Method 8015
   - BTEX: EPA Method 602
2. Classification:
   - Clean Water: TPH and BTEX non-detectable

- Non-Hazardous:

  -Water with dissolved product and detectable TPH and BTEX
  -Water with free product
  -Free product only

3. Responsibility for Disposal:

   - Clean: Consultant/Contractor

   - Non-Hazardous: Consultant/Contractor or Shell Hazardous Waste Coordinator

4. Types of Drums: DOT-17C or DOT-17E for liquid or slurry

5. Disposal Facility:

   - Clean Water: Into dealer's sanitary sewer or with proper approval from Water Board to storm sewer

   - Non-Hazardous:

     Water with TPH and BTEX only -

     -Into dealer's sanitary sewer with approval from the POTW
     -Contact Shell Hazardous Waste Coordinator to arrange disposal

     Water with free product -

     -Contact Shell Hazardous Waste Coordinator to arrange disposal

   - Hazardous:

     Free product only -

     -Contact Shell Hazardous Waste Coordinator to arrange disposal

APPENDIX C

Groundwater Monitoring Well Construction

GROUNDWATER MONITORING WELL CONSTRUCTON

BOREHOLE DESIGN

Casing Diameter: The minimum diameter of well casings shall be 2 inches (nominal). Four-inch diameter well casings shall be preferred.

Borehole Diameter: The diameter of the borehole shall be a minimum of 4 inches and a maximum of 12 inches greater than the diameter of the well casing.

Shallow (Unconfined) Zone Wells: When groundwater is encountered or known to be within 45 feet of the ground surface, the borehole will be advanced through the aquifer to a competent aquitard. A competent aquitard is defined as being greater than 5 feet thick. To test the competency of the aquitard, the borehole will be drilled five feet into it. Once confirmed, the excess borehole shall be sealed with bentonite, concrete, or cement. The screened interval will begin 5 feet above the saturated zone and extend the full thickness of the aquifer or 20 feet into the saturated zone, whichever is reached first. The well screen will not extend into the aquitard, nor shall the screened interval exceed 25 feet in length.

If an aquitard is found to be less than 5 feet thick, it is assumed to represent a local lens. If the aquifer is greater than 20 feet thick and no competent aquitard is present, the well screen will be placed in the interval of 5 feet above and not more than 20 feet below the top of the saturated zone.

Deep (Confined) Zone Wells: Any monitoring well to be screened below the upper aquifer shall be installed as double-cased well. A steel conductor casing shall be placed through the upper water-bearing zone to prevent aquifer cross-contamination.

The conductor casing shall be installed in the following manner: a large diameter borehole (typically 18 inches) shall be drilled until it is determined that the first competent aquitard has been reached. A low carbon steel conductor casing shall be placed in the borehole to the depth drilled. Centralizers shall be used to center the casing in the borehole. The annular space between the conductor casing and the formation shall be cement-grouted from bottom to top by tremie pipe method. The grout shall be allowed to set for a minimum of 72 hours.

Drilling may continue inside the conductor casing, with a drill bit of smaller diameter than the conductor casing. If additional known aquifers are to be fully penetrated, the procedure can be repeated with successively small diameter conductor casings.

The bottom of the well screen in a confined aquifer shall be determined by presence or lack of a competent (5 foot) aquitard as described above. The screened interval in a confined zone shall extend across the entire saturated zone of the aquifer or to a length of 20 feet, which ever is less. The screened zone and filter pack shall not cross connect to another aquifer.

CONSTRUCTION MATERIALS

Casing Materials: Well casing shall be constructed of materials that have the least potential for affecting the quality of the sample, have sufficient strength, and resist rapid deterioration from corrosion. The most suitable material for a particular installation will depend upon the parameters to be monitored. Acceptable materials include PVC, stainless steel, or low carbon steel.

Casing Joints: Joints shall be connected by flush threaded couplers. Organic bonding compounds and solvents will not be used on joints.

Well Screen Slots: Well screen shall be factory slotted. The size of the slots shall be selected to allow sufficient groundwater flow to the well for sampling, minimize the passage of formation materials into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

Casing Bottom Plug: The bottom of the well casing will be permanently plugged, either by flush threaded screw-on or friction cap. Friction caps shall be secured with stainless steel set screws. No organic solvents or cements will be applied.

Filter Pack Material: Filter pack envelope materials shall be durable, waterworn, and washed clean of silt, dirt, and foreign matter. Sand size particles shall be screened silica sand. Particles shall be well rounded and graded to an appropriate size for retention of aquifer materials.

Bentonite Seal Material: Bentonite shall be pure and free of additives that may effect groundwater quality. Bentonite shall be hydrated with clean water.

Grout Seal Material: Cement grout shall consist of a proper mixture of Type I/II Portland cement, hydrated with clean water. Up to 3% bentonite may be added to the mixture to control shrinkage.

CONSTRUCTION PROCEDURES

Decontamination: All downhole tools, well casings, casing fittings, screens, and all other components that are installed in the well shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with clean water and detergent or tri-sodium phosphate, rinsed in clean water, then rinsed in distilled water.

Soil and water sampling equipment and materials used to construct the wells shall not donate to, capture, mask, nor alter the chemical composition of the soils and ground water.

Drilling Methods: Acceptable drilling methods include solid and hollow stem auger, percussion, direct circulation (mud) rotary, and air circulation direct, and reverse rotary. The best alternative is that which minimizes the introduction of foreign materials or fluids.

If drilling mud is employed, drilling fluid additives shall be limited to inorganic and non-hazardous compounds. Compressed air introduced to the borehole shall be adequately filtered to remove oil and particulates.

Soil Sampling Methods: Soil sampling shall be recovered according to protocols described in CEW Standard Operating Procedure: Soil Sampling of Boreholes.

Casing Installation: The casing will be set under tension to ensure straightness. Centralizers should be used where necessary to avoid unnecessary curvature or stress to the casing.

Sand Pack Installation: The sand pack will be installed so as to avoid bridging and the creation of void spaces. The tremie pipe method will be used where installatoin conditions or local regulations require. Drilling mud, when used, must be thinned prior to pack placement. The sand pack shall cover the entire screened interval and rise a minimum of two feet above the highest perforation.

Bentonite Seal Placement: The bentonite seal will be placed by a method that prevents bridging. Bentonite pellets can be placed by free fall if proper sinking through annular water can be assured. Bentonite slurry will be placed by the tremie pipe method from the bottom upward. The bentonite seal should be not less than 1 foot in thickness above the sand pack.

Grout Seal Placement: The cement grout mixture shall be hydrated with clean water and thoroughly mixed prior to placement. If substantial groundwater exists in the borehole, the grout shall be placed by tremie pipe method from the bottom upward. In a dry borehole, the grout may be surface poured. Grout will be placed in one continuous lift and will extend to the surface or to the well vault if the wellhead is completed below grade. A minimum of 5 feet of grout seal will be installed, unless impractical due to the shallow nature of the well.

Surface Completion: The wellhead will be protected from fluid entry, accidental damage, unauthorized access, and vandalism. A watertight cap shall be installed on the top of the well casing. Access to the casing should be controlled by a keyed lock.

Wellheads completed below grade will be completed in a concrete and/or steel vault, installed to drain surface runoff away from the vault opening.

Well Identification: Each well will be identified by well number, owner, and type of installation. Construction data, including depth, hole and casing diameter and screened interval will be noted.

APPENDIX D

Well Development

WELL DEVELOPMENT

INTRODUCTION

Newly installed groundwater monitoring wells will be developed to restore natural hydraulic conductivity of the formation, remove sediments from the well casing and filter pack, stabilize the filter pack and aquifer material, and ensure turbidity-free groundwater samples.

Wells may be developed by bailing, mechanical pumping, air lift, pumping, surging, swabbing, or an effective combination of methods. Wells will be developed until the well is free of sand, silt, and turbidity.

In some cases where low permeability formations are involved or the drilling mud used fails to respond to cleanup, initial development pumping may immediately dewater the well casing and thereby inhibit development. When this occurs, clean, potable grade water may be introduced into the well, followed by surging of the introduced waters with a surge block. This operation will be followed by pumping. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals shall set and cure not less than 24 hours prior to well development.

Decontamination: All well development tools and equipment shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with clean water and detergent or tri-sodium phosphate, rinsed with clean water, then rinsed with distilled water.

Development equipment shall not donate to, capture, mask, nor alter the chemical composition of the soils and ground water.

Introduction of Water: Initial development of wells in low permeability formations may dewater the casing and filter pack. When this occurs, clean, potable water can be introduced in to the well to enhance development.

Bailing: Development will begin by bailing to remove heavy sediments from the well casing. Care shall be taken to not damage the well bottom cap during lowering of the bailer.

Surging: Care shall be exercised when using surge block to avoid damaging the well screen and casing. When surging wells screened in coarse (sandy/gravelly) aquifers, the rate of surge block lifting shall be slow and constant. When surging wells screened in fine

(silty) aquifers, more vigorous lifting may be require. Between surging episodes, wells will be bailed to remove accumulated sediments.

Pumping: Development pumping rates shall be less than the recharge rate of the well in order to avoid de-watering.

Discharged Water Containment and Disposal: All water and sediment generated by well development shall be collected in 55-gallon steel drums. Development water will be temporarily contained onsite, pending sampling and laboratory analysis. All development water will be transported offsite by a licensed transporter to a licensed hazardous waste disposal or treatment facility. No development water shall be released to the environment.

MEASUREMENTS

Discharged Water Parameters: During development, discharged water shall be measured for the following parameters:

Parameter	Units of Measurement
pH	Units
Electrical Conductivity	umhos
Temperature	Degrees F or C
Turbidity	Nephelometric Turbidity Units (NTU's)
Sediment Production	_____
Depth to Water in Casing	Feet/Tenths
Volume of Water Discharged	Gallons

Sediment Production: Sediment production from the well shall be measured using Imhoff Cone.

Turbidity: The development water turbidity shall be measured using a nephelometer. Turbidity at the conclusion of development should be less than 5 NTU's.

Measurement Frequency: Parameters shall be measured not less than every 3 pre-development casing volumes of water discharged.

Documentation: All parameter measurements shall be documented in writing on CEW Development Logs (example attached). Additional documentation shall include the well owners name, the well designation, the date of development, pre- and post-development depths to water, methods of development, general development and notes and comments.

APPENDIX E
Chain-of Custody

CHAIN-OF-CUSTODY

SAMPLE COLLECTION, HANDLING AND IDENTIFICATION

Sample collection, handling, and identification will follow the guidelines set by the California Department of Health Services. Field records will be completed when the sample is collected and will be signed or initialed, including the date and time, by the sample collector(s). Field records will contain the following information:

1. Unique sample or log number;
2. Date and time;
3. Source of sample (including name, location and sample type);
4. Preservative used;
5. Analyses required;
6. Name of collector(s);
7. Pertinent field data (pH, DO, C1, residual, etc.); and
8. Serial number on seals and transportation cases.

Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the sample identification number, date and time of sample collection, source of sample preservative used, and the collector(s) initial(s). Analysis required will be identified. Where a label is not available, the same information will be affixed to the sample contained with an indelible, waterproof, marking pen.

The sample container will be placed in a transportation case along with the chain-of-custody record form, pertinent field records, and analyses request form. The transportation case will then be sealed and labeled. Records will be filled out legibly in pen.

TRANSFER OF CUSTODY AND SHIPMENT

When transferring the possession of the samples, the transferee will sign and record the date and time on the chain-of-custody record. Custody transfer, if made to a sample custodian in the field, will account for each individual sample, although samples may be transferred as a group.

The field custodian or field inspector will be responsible for properly packaging and dispatching samples to the appropriate laboratory for analysis. This responsibility includes filling out, dating, and signing the appropriate portion of the chain-of-custody record.

All packages sent to the laboratory will be accompanied by the chain-of-custody record and other pertinent forms. A copy of these forms will be retained by the originating office.

Mailed packages can be registered with return receipt requested. If packages are sent by common carrier, receipts should be retained as part of the permanent chain-of-custody documentation.

Samples to be shipped will be sealed locked so evidence of tampering may be readily detected.

LABORATORY CUSTODY PROCEDURES

Chain-of-custody procedures will be followed in the laboratory from the time of sample receipt to the time the sample is discarded.

The sample control officer (SCO) will be the designated custodian, and an alternate is designated to act as custodian in the custodian's absence. All incoming samples are received by the SCO, who shall indicate receipt by signing the accompanying custody forms and who shall retain the signed forms as permanent records.

The SCO will maintain a permanent log book to record, for each sample, the person delivering the sample, the person receiving the sample, date and time received, source of sample, sample identification or log number, how transmitted to the laboratory, and condition received (sealed, unsealed, broken container, or other pertinent remarks). A standardized format will be established for log book entries.

A clean, dry, isolated room, building, and/or refrigerated space that can be securely locked from the outside, will be designated as a "sample storage security area."

The SCO will ensure that heat-sensitive, light-sensitive samples, radioactive, or other sample materials having unusual physical characteristics, or requiring special handling, are properly stored and maintained prior to analysis.

Only the custodian will distribute samples to the section leaders who are responsible for the laboratory performing the analysis.

The laboratory area will be maintained as a secured area, restricted to authorized personnel only.

Laboratory personnel will be responsible for the care and custody of the sample once it is received by them. These personnel shall be prepared to testify that the sample was in their possession and view, or secured in the laboratory at all times, from the moment it was received from the SCO, until the time that the analyses are completed.

Once the sample analyses are completed, the unused portion of the sample, together with all identifying labels, will be returned to the SCO. The returned tagged sample will be retained in the custody room until permission to destroy the sample is received by the SCO.

Samples will be destroyed only upon the order of the Laboratory Director, in consultation with previously-designated Project Manager, and/or client, or when it is certain that the information is no longer required or the samples have deteriorated. The same procedure will apply to tags and laboratory records.

APPENDIX F
Groundwater Sampling

GROUNDWATER SAMPLING

Groundwater samples shall be collected for laboratory analysis by the following procedures:

1. Before sampling or purging begins, all bailers, pumps, cables and lines will be steam-cleaned. An established and designated cleaning area will be kept clean by lining with visqueen or using a cleaning rack.

2. A pre-purge sample shall first be obtained with a bailer from as deep in the well as possible. Standard "Water Sampling Field Survey Forms" will be filled out for this and all future samples, to include the following information:

   - Depth to water and total depth of water column, measured and recorded before purging begins;
   - Conductivity, checked and recorded for every 5 gallons of purged water (for small volumes); and
   - Purged volume (as appropriate), with stabilized readings for pH, conductivity and temperature.

The well shall then be bailed or pumped to remove four to ten well volumes prior to sampling. The well will be purged until conductivity has been stabilized. "Stabilized" is defined as three consecutive readings within 15% of one another. A casing volume will be based on actual measurements made on the day of sampling, i.e., the total depth minus depth to water on day of sampling, time the cross-sectioned area of the casing.

If the well is emptied before four to ten well volumes are removed, the sample shall be taken when the water level in the well recovers to 80% of its initial water level or better.

Whenever possible, samples will be collected within 24 hours after purging; ideally, samples will be collected immediately after purging.

Following the required volume of evacuation from the well, the sample shall be obtained with a teflon or stainless steel bailer on a 60-pound monofilament or polypropylene (washed) line. Care will be taken to properly clean cables with braided stainless steel cable or plastic coverings, if used. Air lift sampling and bladder pumps shall not be used.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No. 233, Monday, December 3, 1979, Page 69544, Table II) for the type of analysis to be performed.

Purge water will be properly disposed of or temporarily contained in steel barrels pending chemical analysis to designate proper disposal procedure.