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KEI-P89-0805.P6
April 15, 1991

Unocal Corporation
2000 Crow Canyon Place, #400
P.O. Box 5155
San Ramon, California 94583

Attention: Mr. Ron Bock

RE: Work Plan/Proposal
Unocal Service Station #0746
3943 Broadway
Oakland, California

INTRODUCTION

1. Background:

Kaprealian Engineering, Inc'S. (KEI) work at the site began on August 16, 1989 when KEI was asked to collect soil samples following the removal of two underground fuel storage tanks and one 280 gallon waste oil tank at the site. The fuel tanks consisted of one 10,000 gallon unleaded tank and one 10,000 gallon super unleaded tank. The tanks were made of steel and no apparent holes or cracks were observed in any of the tanks. Water was encountered in the fuel tank pit at a depth of about 10 feet, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, designated as SW1 through SW6, were collected from the sidewalls of the gasoline tank pit approximately six inches above the water table. One soil sample was collected from the bottom of the waste oil tank excavation at a depth of 8 feet. Soil sample point locations are shown on the attached Site Plan, Figure 2.

On August 17, 1989, approximately 1,500 gallons of ground water was pumped from the fuel tank pit. One water sample, labeled W1, was then collected from the fuel tank pit.

To accommodate the installation of new, larger tanks, additional soil was excavated approximately 14 feet laterally along the north wall of the tank pit, in the vicinity of sample points SW1 and SW2. On August 18, 1989, KEI returned to the site to collect additional soil samples. One soil sample, labeled SW2(R), was collected from the north sidewall of the fuel tank pit after additional excavation at a depth of 9.5 feet. Also, on August 18, 1989, four soil samples,

labeled P1 through P4, were collected from the product pipe trenches at depths ranging from 5 to 6.5 feet. After soil sampling, the pipe trenches were excavated to the sample depths. Collection points for the soil samples are shown on the attached Site Plan, Figure 2.

KEI again returned to the site on August 24, 1989 to collect an additional ground water sample. After approximately 5,000 gallons of contaminated ground water was pumped from the fuel tank pit, one ground water sample, labeled W2, was collected.

All soil and water samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). The soil sample collected from beneath the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease (TOG), and EPA method 8010 constituents.

Analytical results of soil samples collected from the fuel tank pit indicated non-detectable levels of TPH as gasoline and BTX&E for all samples except samples SW1 and SW2, which showed levels of TPH as gasoline at 13 ppm and 290 ppm, respectively. However, the entire area of sample points SW1 and SW2 was excavated as described above, and the new sample SW2(R), showed non-detectable levels of TPH as gasoline and BTX&E. Analytical results of the soil sample collected from the waste oil tank pit showed non-detectable levels of all constituents analyzed, except for TPH as gasoline at 1.6 ppm and toluene at 1.3 ppm. Analytical results of soil samples collected from pipe trenches showed levels of TPH as gasoline ranging from 3.8 ppm to 36 ppm, and benzene ranging from non-detectable to 0.52 ppm. The analytical results of ground water samples collected from the tank pit (W1) showed 4,700 ppb of TPH as gasoline, 180 ppb of benzene (after purging 1,500 gallons), while W2 showed 1,200 ppb of TPH as gasoline, and 12 ppb of benzene (after purging 5,000 gallons). Analytical results of the soil samples are summarized in Table 5, and water samples in Table 6. Documentation of soil sample collection and sample analytical results are presented in KEI's report (KEI-J89-0805.R1) dated August 30, 1989. To comply with the requirements of the regulatory agencies and based on the analytical results, KEI proposed installation of three monitoring wells.

On October 17, 1989, three two-inch diameter monitoring wells, designated as MW1, MW2 and MW3 on the attached Site Plan, Figure 1, were installed at the site. The three wells were

drilled and completed to total depths ranging from 20 to 22.5 feet. Ground water was encountered at depths ranging from 11 to 13 feet beneath the surface during drilling. The wells were developed on October 26 and 30, 1989, and initially sampled on November 1, 1989.

Water and selected soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for TPH as gasoline and BTX&E. Analytical results of all soil samples collected from the borings for monitoring wells MW1 and MW2 showed non-detectable levels of TPH as gasoline and BTX&E, except in sample MW1(5) collected at a depth of 5 feet, which showed TPH as gasoline at 8.5 ppm and xylenes at 0.14 ppm. Soil samples collected from the boring for well MW3 showed TPH as gasoline at levels ranging from 3.1 ppm to 1,100 ppm, and benzene levels ranging from 0.068 ppm to 16 ppm. The analytical results of water samples collected from wells MW2 and MW3 showed TPH as gasoline concentrations at 200 ppb and 13,000 ppb, respectively. Benzene was detected in well MW3 only, at a concentration of 57 ppb. Analytical results for the soil samples are summarized in Table 3, and water samples in Table 2. Based on analytical results of the soil and ground water samples, KEI recommended the installation of three additional monitoring wells to further define the extent of contamination. The details of the monitoring well installation activities and recommendation for further work are presented in KEI's report (KEI-P89-0805.R4) dated November 30, 1989.

On January 26, 1990, two two-inch diameter monitoring wells (designated as MW4 and MW5 on the attached Site Plan, Figure 1) were installed at the site. A third proposed monitoring well could not be installed because of underground utilities and an on-site storage shed. The two wells were drilled and completed to total depths each of 20 feet. Ground water was encountered at depths of approximately 12.5 feet beneath the surface during drilling. The new wells were developed on February 9, 1990, and all wells were sampled on February 15, 1990.

Water and soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California, for TPH as gasoline and BTX&E. Analytical results of the soil samples, collected from the borings for monitoring wells MW4 and MW5, indicated levels of TPH as gasoline ranging from 2.5 ppm to 370 ppm. Benzene was detected at concentrations ranging from non-detectable to 1.8 ppm. Analytical results of the water samples collected from monitoring well MW2 showed non-detectable levels of all constituents analyzed. In wells MW1 and

MW4, TPH as gasoline was detected at 170 ppb and 150 ppb, respectively, and benzene was detected at 7.9 ppb and 8.0 ppb, respectively. In wells MW3 and MW5, TPH as gasoline was detected at 20,000 ppb and 24,000 ppb, respectively, and benzene was detected at 1,700 ppb and 1,500 ppb, respectively. Results of the soil analyses are summarized in Table 4, and the water analyses in Table 2.

Based on the analytical results, KEI recommended the installation of four additional monitoring wells (two on-site, and two off-site) to further define the extent of detected contamination. In addition, KEI recommended continuation of the monthly monitoring and quarterly sampling program. The details of the monitoring well installation activities and recommendations for further work are presented in KEI's report (KEI-P89-0805.R5) dated March 16, 1990.

On October 23, 1990, four two-inch diameter monitoring wells (designated as MW6, MW7, MW8 and MW9 on the attached Site Vicinity Map) were installed at the site. The four wells were drilled and completed to total depths ranging from 20 to 22 feet. Ground water was encountered at depths ranging from 11.7 to 12.7 feet beneath the surface during drilling. All wells were surveyed by a licensed surveyor (Kier & Wright of Pleasanton, California) to Mean Sea Level and to a vertical accuracy of 0.01 feet. The new wells were developed on October 26, 1990, and all wells were sampled on November 7, 1990. Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Concord, California, for TPH as gasoline and BTX&E.

The analytical results of the soil samples, collected from the borings for monitoring wells MW6 through MW9, showed non-detectable levels of TPH as gasoline and benzene in all analyzed samples, except in MW7(5), MW9(10) and MW9(12), which showed TPH as gasoline levels of 11 ppm, 84 ppm and 120 ppm, respectively, with benzene levels detected only in samples MW9(10) and MW9(12) at 0.32 ppm and 0.19 ppm, respectively. The analytical results of the ground water samples, collected from all nine wells, showed non-detectable levels of TPH as gasoline and BTX&E in wells MW1, MW2, MW6 and MW7, except for TPH as gasoline detected at a level of 45 ppb in well MW1. In wells MW3, MW4, MW5, MW8 and MW9, TPH as gasoline was detected at levels of 42,000 ppb, 180 ppb, 20,000 ppb, 4,700 ppb and 480 ppb, respectively, with benzene detected at levels of 1,400 ppb, 1.5 ppb, 640 ppb, 28 ppb and 7.8 ppb, respectively. Results of the soil analyses are summarized in Table 3, and water analyses in Table 2. Documentation of well installa-

tion, sample collection and sample results are presented in KEI's report (KEI-P89-0805.R6) dated December 17, 1990. Based on the analytical results, KEI recommended continuation of the monthly monitoring and quarterly sampling program.

2. Site Description:

The subject site is presently used as a gasoline station. The site is situated on gently sloping south-southwest trending topography, and is located at the southwest corner of the intersection of Broadway and 40th Street in Oakland, California. A Location Map, Site Vicinity Map, and Site Plans are attached to this report.

3. Hydrology and Regional Geology:

Based on the water level data gathered during the quarter, ground water flow direction appeared to be towards the southwest at an average gradient of approximately 0.014 on February 25, 1991, relatively unchanged from the flow direction determined for October 25, 1990. Water levels have fluctuated during the quarter, showing a net increase of between 0.08 and 0.27 feet in all wells since November 7, 1990, except for MW2, which showed a net decrease of 0.02 feet. Recent monitoring data are summarized in Table 1.

Based on review of regional geologic maps (U.S. Geological Survey Miscellaneous Geologic Investigations Map I-239 "Areal and Engineering Geology of the Oakland West Quadrangle, California" by D.H. Radbruch, 1957), the site is underlain by Quaternary-age alluvium fan deposits (Temescal Formation), which typically consists of lenses of clayey gravel, sandy silty clay and sand-clay-silt mixtures. Specifically, the subsurface earth materials at the site, based on our previous subsurface exploration activities, consist predominantly of clayey silt and silty clay to gravelly clay with local lenses of well graded sand or gravel, and clayey sand or gravel. The lenses of coarse grained soils are generally less than about 2 feet thick. Artificial fill materials were encountered at the surface of this site varying from about 2 to 2.5 feet thick in the vicinity of wells MW4 and MW5.

The results of our most recent subsurface study indicates the site and immediate vicinity is underlain by artificial fill materials extending to depths below grade ranging from about 2-1/4 to 5-3/4 feet. The fill materials are inturn underlain by silty clay materials extending to depths below grade ranging from about 7-1/4 to 11-1/2 feet and which are about 4-

3/4 to 6-1/2 feet in thickness. This silty clay zone is inturn underlain by a coarse-grained sequence consisting predominantly of clayey gravel (except in MW7 where clayey sand and a well graded gravel lens were also encountered). This coarse-grained zone extends to depths below grade ranging from 10 to 15-1/2 feet and ranging in thickness from approximately 3-1/2 to 4 feet. Ground water was encountered during drilling within this coarse-grained sequence in all borings except MW6. The coarse-grained sequence is inturn underlain by a fine-grained zone consisting of gravelly or sandy clay, silty clay, or clayey silt extending to the maximum depth explored (22 feet).

PROPOSED FIELD WORK

PHASE II - DEFINING THE EXTENT OF SUBSURFACE CONTAMINATION

1. KEI proposes to install three two-inch diameter monitoring wells, designated as MW10, MW11 and MW12 on the attached Site Vicinity Map, Figure 4, using hollow stem auger equipment. Permits will be obtained from the Alameda County Flood Control Agency, and the City of Oakland. Off-site access will be secured from the affected property owners, as necessary, prior to beginning work.

   The wells will be drilled about 10 feet into the saturated zone of the first encountered ground water unless a 5 foot thick clay aquitard is encountered first, at which time drilling will be terminated. Any portion of a clay aquitard which was drilled into that exceeds 3 vertical feet will be backfilled with coarse bentonite clay chips.

2. Soil samples will be collected at a maximum spacing of 5 foot intervals, significant changes in lithology, at obvious areas of contamination, and at/or within the soil/ground water interface beginning at a depth of about 4 to 5 feet below grade. Sampling for laboratory analyses and lithologic logging purposes will continue until the first water table is encountered. Sampling for lithologic logging purposes only will continue below the water table to the total depth drilled. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field engineer or geologist. Samples will be collected in a California modified split-spoon sampler with two-inch diameter brass liners. The sampler will be advanced ahead of the drilling augers at designated depths by dropping a 140 pound hammer 30 inches. Blow counts will be recorded. Samples will be removed from the sampler and retained in brass liners. The

liners will be sealed with aluminum foil, plastic caps and tape. They will be labeled and stored on ice for delivery to a state certified laboratory.

3. Finalized Boring Logs will be prepared from field logs and submitted to the Alameda County Health Care Services, and to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

4. Ground water is anticipated at approximately 9 to 12 feet below grade based on the ground water level found in the existing monitoring wells.

5. Well Construction:

   Casing Type: Schedule 40 PVC, flush threaded joints, 0.010 inch factory slot, two-inch diameter. Screen to run from total depth of the well to approximately 5 feet above the depth of the first encountered ground water. Monterey sand (#2/16) will fill the annular space from total depth to 2 feet above the perforated casing interval. A one to two foot thick bentonite seal will be placed in the annular space on top of the sand pack. Neat cement grout will be placed on top of the bentonite seal to the surface.

   Well casings will be secured with a waterproof cap and a padlock. A round, watertight, flush-mounted well cover will be concreted in place over the top of each casing.

6. Water levels will be measured with an electronic sounder. The wells will be developed using a surface pump approximately one week after well completion. Wells will be pumped until expelled water is clear and free of turbidity. Effluent generated during well development will be contained in DOT-approved drums and hauled from the site by a licensed hazardous materials hauler.

   Casing elevations will be surveyed by a licensed land surveyor to Mean Sea Level and to a vertical accuracy of 0.01 feet.

7. Ground Water Sampling:

   The wells will be purged with a surface bailer a minimum of four casing volumes prior to sampling and at least 72 hours after development. After recovery, samples will be collected using a clean Teflon bailer and promptly decanted into 40 ml VOA vials and/or one liter amber bottles, as appropriate. Vials and/or bottles will be sealed with Teflon-lined screw

caps, labeled and stored on ice for delivery to a state certified laboratory. The sampling bailer will be cleaned with soap and a clean water rinse between uses.

Wells will be checked for free product and sheen (using an interface probe and/or paste tape) prior to development and sampling.

Properly executed Chain of Custody documentation will accompany all samples.

8. Laboratory Analyses:

Water and selected soil samples will be analyzed by Sequoia Analytical Laboratory in either Concord or Redwood City, California, both state certified laboratories, for TPH as gasoline using EPA method 5030 in conjunction with modified 8015, and BTX&E using EPA method 8020, as recommended by the RWQCB, and as specified in the Tri-regional guidelines.

Analytical results will be presented in tabular form, showing sample depths, results and detection limits.

The analytical results will be used to delineate the vertical and lateral extent of the contaminants in soil and ground water.

9. Hydrology:

Ground water flow direction will be determined from the survey data and water table depths from both the new and existing wells. The flow direction will be shown on the Site Plan.

10. Ongoing Pumping, Monitoring and Sampling:

10.1 Monitor all monitoring wells on a monthly basis. Record the elevation of the water table and any abnormal conditions noted during inspection, including presence of product and sheen.

10.2 Purge and sample ground water from all monitoring wells, and analyze for TPH as gasoline and BTX&E on a quarterly basis. Prior to sampling, water table elevation will be recorded as well as the presence of any free product.

10.3 Wells MW3, MW4, MW5 and MW8 will be purged of a minimum of 55 gallons on a weekly basis.

10.4 Preparation and submission of quarterly technical reports summarizing the field activity water sampling and analyses with discussion and recommendations.

11. Conclusions:

Conclusions and results of Phase II will be described in a technical report.

The technical report will be submitted to the Alameda County Health Care Services, and to the RWQCB.

PHASE III

Once the zero line is established through the completion of Phase II, a final remedial plan will be developed.

Interpretations of the subsurface stratigraphy will be used in consideration of various remedial options such as soil venting and/or ground water pumping and treatment.

PHASE IV

Implementation of the remediation plan.

LIMITATIONS

Soil deposits and rock formations may vary in thickness, lithology, saturation, strength and other properties across any site. In addition, environmental changes, either naturally-occurring or artificially-induced, may cause changes in the extent and concentration of any contaminants. Our studies assume that the field and laboratory data are reasonably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state certified laboratory. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

Should you have any questions regarding this work plan/proposal, please do not hesitate to call me at (707) 746-6915.

Approved by:

Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/92

Timothy R. Ross
Project Manager

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Attachments: Tables 1 through 6
Location Map
Site Plans - Figures 1 & 2
Site Vicinity Maps - Figures 3 & 4
Typical Well Completion Diagram

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TABLE 1

SUMMARY OF MONITORING DATA

| Date | Well No. | Ground Water Elevation (feet) | Depth to Water (feet) | Product Thickness | Sheen | Water Bailed (gallons) |
|---|---|---|---|---|---|---|
| 2/25/91 | MW1 | 72.32 | 8.75 | 0 | None | 15 |
| | MW2 | 71.49 | 10.13 | 0 | None | 12 |
| | MW3 | 71.27 | 10.74 | 0 | None | 31 |
| | MW4 | 70.65 | 10.83 | 0 | None | 6 |
| | MW5 | 71.09 | 10.50 | 0 | None | 45 |
| | MW6 | 72.08 | 8.39 | 0 | None | 13 |
| | MW7 | 72.46 | 9.37 | 0 | None | 15 |
| | MW8 | 69.89 | 11.82 | 0 | None | 26 |
| | MW9 | 69.51 | 11.62 | 0 | None | 25 |
| 2/18/91 | MW3 | 71.39 | 10.62 | 0 | Yes | 32 |
| | MW5 | 71.24 | 10.35 | 0 | Yes | 55 |
| | MW8 | 70.06 | 11.65 | 0 | None | 23 |
| 2/11/91 | MW3 | 71.82 | 10.19 | 0 | Yes | 55 |
| | MW5 | 71.68 | 9.91 | 0 | None | 55 |
| | MW8 | 70.57 | 11.14 | 0 | None | 55 |
| 2/04/91 | MW3 | 71.77 | 10.22 | 0 | Yes | 27 |
| | MW5 | 71.25 | 10.34 | 0 | Yes | 13 |
| | MW8 | 70.29 | 11.42 | 0 | None | 32 |
| 1/28/91 | MW3 | 71.11 | 10.90 | Trace | N/A | 35 |
| | MW5 | 70.97 | 10.62 | 0 | Yes | 55 |
| | MW8 | 69.71 | 12.00 | 0 | None | 23 |
| 1/21/91 | MW3 | 71.18 | 10.83 | 0 | None | 35 |
| | MW5 | 71.04 | 10.55 | 0 | None | 25 |
| | MW8 | 69.80 | 11.91 | 0 | None | 55 |
| 1/14/91 | MW3 | 71.34 | 10.67 | 0 | Yes | 35 |
| | MW5 | 71.19 | 10.40 | 0 | Yes | 55 |
| | MW8 | 69.98 | 11.73 | 0 | None | 20 |
| 1/07/91 | MW1 | 72.00 | 9.07 | 0 | None | 0 |
| | MW3 | 71.13 | 10.49 | 0 | None | 0 |
| | MW3 | 71.05 | 10.96 | 0 | None | 30 |
| | MW4 | 69.93 | 11.55 | 0 | None | 0 |
| | MW5 | 70.78 | 10.81 | 0 | None | 35 |
| | MW6 | 72.29 | 8.18 | 0 | None | 0 |
| | MW7 | 72.55 | 9.28 | 0 | None | 0 |
| | MW8 | 70.09 | 11.62 | 0 | None | 35 |
| | MW9 | 69.54 | 11.59 | 0 | None | 0 |

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TABLE 1 (Continued)

SUMMARY OF MONITORING DATA

| Date | Well No. | Ground Water Elevation (feet) | Depth to Water (feet) | Product Thickness | Sheen | Water Bailed (gallons) |
|---|---|---|---|---|---|---|
| 12/08/90 | MW1 | 72.17 | 8.90 | 0 | None | 0 |
| | MW2 | 71.45 | 10.17 | 0 | None | 0 |
| | MW3 | 71.12 | 10.89 | 0 | Yes | 55 |
| | MW4 | 70.38 | 11.10 | 0 | None | 0 |
| | MW5 | 70.94 | 10.65 | 0 | Yes | 55 |
| | MW6 | 71.96 | 8.51 | 0 | None | 0 |
| | MW7 | 72.35 | 9.48 | 0 | None | 0 |
| | MW8 | 69.71 | 12.00 | 0 | None | 35 |
| | MW9 | 69.22 | 11.90 | 0 | None | 0 |

| Well # | Surface Elevation* (feet) |
|---|---|
| MW1 | 81.07 |
| MW2 | 81.62 |
| MW3 | 82.01 |
| MW4 | 81.48 |
| MW5 | 81.59 |
| MW6 | 80.47 |
| MW7 | 81.83 |
| MW8 | 81.71 |
| MW9 | 81.13 |

* Elevation of top of well covers surveyed to Mean Sea Level.

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TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

| Date | Well # | TPH as Gasoline | Benzene | Toluene | Xylenes | Ethyl-benzene |
|---|---|---|---|---|---|---|
| 2/25/91 | MW1 | ND | ND | ND | ND | ND |
| | MW2 | ND | 0.68 | 0.42 | 0.86 | ND |
| | MW3 | 37,000 | 730 | 2,900 | 7,300 | 1,300 |
| | MW4 | 22,000 | 600 | 1,300 | 2,800 | 780 |
| | MW5 | 25,000 | 950 | 1,300 | 3,500 | 900 |
| | MW6 | ND | 0.37 | 0.40 | 1.5 | 0.35 |
| | MW7 | 70 | ND | ND | 0.52 | ND |
| | MW8 | 5,300 | 17 | 6.1 | 300 | 53 |
| | MW9 | 390 | 13 | 1.1 | 14 | 2.8 |
| 11/07/90 | MW1 | 45 | ND | ND | ND | ND |
| | MW2 | ND | ND | ND | ND | ND |
| | MW3 | 42,000 | 1,400 | 5,000 | 7,500 | 1,800 |
| | MW4 | 180 | 1.5 | 0.37 | 26 | 6.3 |
| | MW5 | 20,000 | 640 | 1,100 | 3,000 | 670 |
| | MW6 | ND | ND | ND | ND | ND |
| | MW7 | ND | ND | ND | ND | ND |
| | MW8 | 4,700 | 28 | 38 | 7,200 | 86 |
| | MW9 | 480 | 7.8 | 1.2 | 47 | 13 |
| 8/16/90 | MW1 | ND | ND | ND | ND | ND |
| | MW2 | ND | ND | 6.7 | ND | ND |
| | MW3 | 6,800 | 600 | 660 | 160 | 760 |
| | MW4 | 3,600 | 480 | 17 | 260 | 230 |
| | MW5 | 16,000 | 1,400 | 1,900 | 660 | 2,800 |
| 2/15/90 | MW1 | 170 | 7.9 | ND | 2.8 | 2.2 |
| | MW2 | ND | ND | ND | ND | ND |
| | MW3 | 20,000 | 1,700 | 2,100 | 3,100 | 750 |
| | MW4 | 150 | 8.0 | 8.0 | 45 | 10 |
| | MW5 | 24,000 | 1,500 | 1,700 | 3,600 | 260 |
| 11/01/89 | MW1 | ND | ND | ND | 0.30 | ND |
| | MW2 | 200 | ND | ND | 1.2 | 3.0 |
| | MW3 | 13,000 | 57 | 48 | 120 | 1.7 |
| Detection Limits | | 30 | 0.3 | 0.3 | 0.3 | 0.3 |

ND = Non-detectable.

Results in parts per billion (ppb), unless otherwise indicated.

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on October 23, 1990)

| Sample Number | Depth (feet) | TPH as Gasoline | Benzene | Toluene | Xylenes | Ethyl-benzene |
|---|---|---|---|---|---|---|
| MW6(5) | 5 | ND | ND | ND | ND | ND |
| MW6(9) | 9 | ND | ND | ND | 0.010 | ND |
| MW6(11.5) | 11.5 | ND | ND | ND | ND | ND |
| MW7(5) | 5 | 11 | ND | ND | 0.032 | 0.0064 |
| MW7(8.5) | 8.5 | ND | ND | ND | 0.019 | ND |
| MW7(11.5) | 11.5 | ND | ND | ND | 0.036 | ND |
| MW8(5) | 5 | ND | ND | ND | ND | ND |
| MW8(10) | 10 | ND | ND | ND | 0.0080 | ND |
| MW9(5.5) | 5.5 | ND | ND | ND | ND | ND |
| MW9(10) | 10 | 84 | 0.32 | 0.27 | 0.51 | 0.63 |
| MW9(12) | 12 | 120 | 0.19 | 0.11 | 0.69 | 0.14 |
| Detection Limits | | 1.0 | 0.0050 | 0.0050 | 0.0050 | 0.0050 |

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

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TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

| Sample Number | Depth (feet) | TPH as Gasoline | Benzene | Toluene | Xylenes | Ethyl-benzene |
|---|---|---|---|---|---|---|
| **(Collected on October 17, 1989)** | | | | | | |
| MW1(5) | 5 | 8.5 | ND | ND | 0.14 | ND |
| MW1(10) | 10 | ND | ND | ND | ND | ND |
| MW2(5) | 5 | ND | ND | ND | ND | ND |
| MW2(10) | 10 | ND | ND | ND | ND | ND |
| MW2(12.5) | 12.5 | ND | ND | ND | ND | ND |
| MW3(5) | 5 | 3.1 | 0.068 | ND | ND | ND |
| MW3(10) | 10 | 69 | 0.89 | 2.6 | 7.9 | 2.0 |
| MW3(11) | 11 | 1,100 | 16 | 85 | 150 | 35 |
| **(Collected on January 26, 1990)** | | | | | | |
| MW4(5) | 5 | 22 | 0.059 | ND | ND | ND |
| MW4(7) | 7 | 2.5 | ND | ND | ND | ND |
| MW4(10) | 10 | 250 | 1.2 | 0.66 | 20 | 1.4 |
| MW4(11) | 11 | 280 | 1.0 | 4.0 | 36 | 7.6 |
| MW5(5) | 5 | 25 | 0.21 | ND | ND | ND |
| MW5(7.5) | 7.5 | 46 | 0.25 | 0.28 | 0.20 | 0.46 |
| MW5(10) | 10 | 140 | 1.5 | 1.7 | 10 | 4.0 |
| MW5(11.5) | 11.5 | 370 | 1.8 | 14 | 51 | 11 |
| Detection Limits | | 1.0 | 0.05 | 0.1 | 0.1 | 0.1 |

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

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TABLE 5

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on August 16, 17, 18 & 24, 1989)

| Sample # | Depth (feet) | TPH as Gasoline | TPH as Diesel | Benzene | Toluene | Xylenes | Ethyl-benzene |
|---|---|---|---|---|---|---|---|
| SW1 | 9.5 | 13 | -- | ND | 0.13 | 0.39 | 0.15 |
| SW2 | 9.5 | 290 | -- | 0.82 | 8.7 | 44 | 7.6 |
| SW2(R) | 9.5 | ND | -- | ND | ND | ND | ND |
| SW3 | 9.5 | ND | -- | ND | ND | ND | ND |
| SW4 | 9.5 | ND | -- | ND | ND | ND | ND |
| SW5 | 9.5 | ND | -- | ND | ND | ND | ND |
| SW6 | 9.5 | ND | -- | ND | ND | ND | ND |
| P1 | 6.5 | 6.1 | -- | ND | ND | ND | ND |
| P2 | 6.5 | 36 | -- | 0.52 | 4.4 | 8.0 | 1.4 |
| P3 | 5 | 20 | -- | 0.30 | 2.5 | 5.6 | 1.1 |
| P4 | 5 | 3.8 | -- | 0.11 | 0.19 | 0.23 | 0.1 |
| WO1* | 8 | 1.6 | ND | ND | 1.3 | ND | ND |
| Detection Limits | | 1.0 | 1.0 | 0.05 | 0.1 | 0.1 | 0.1 |

* TOG and EPA method 8010 constituents were non-detectable.

-- Indicates analysis not performed.

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-P89-0805.P6
April 15, 1991

TABLE 6

SUMMARY OF LABORATORY ANALYSES
WATER

| Sample # | TPH as Gasoline | Benzene | Toluene | Xylenes | Ethylbenzene |
|---|---|---|---|---|---|
| W1 | 4,700 | 180 | 420 | 860 | 150 |
| W2* | 1,200 | 12 | 10 | 88 | 5.9 |
| Detection Limits | 30 | 0.3 | 0.3 | 0.3 | 0.3 |

* Sample (W2) was collected after pumping 5,000 gallons of ground water from the fuel tank pit.

Results in parts per billion (ppb), unless otherwise indicated.

**KAPREALIAN ENGINEERING, INC.**
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LOCATION MAP

Unocal S/S #0746
3943 Broadway
Oakland, CA

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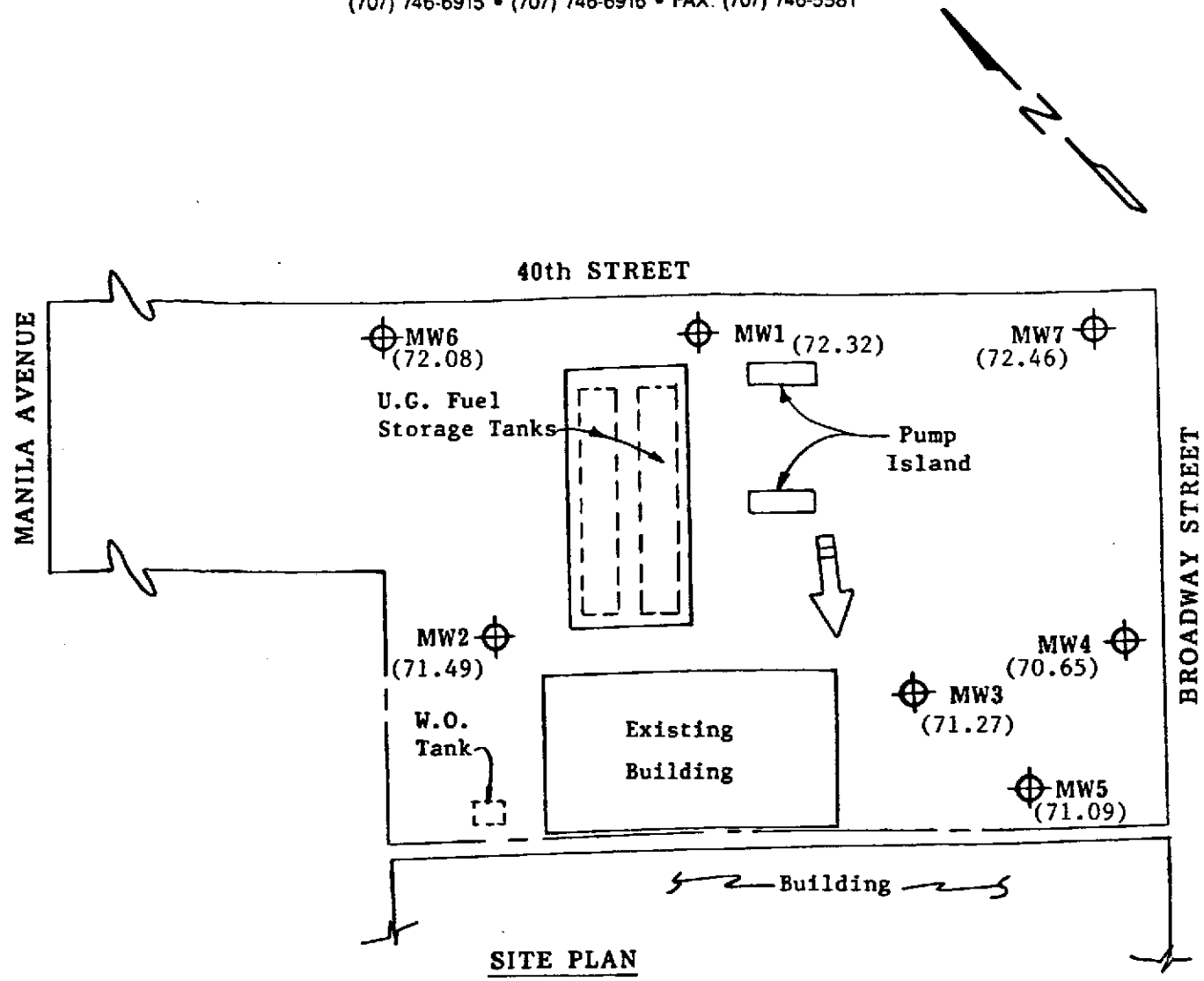


SITE PLAN
Figure 1

LEGEND

Monitoring Well (Existing)

( ) Ground water surface elevation in feet above Mean Sea Level on 2/25/91

Direction of ground water flow

0 30 60
Approx. Scale feet

Unocal Service Station #0746
3943 Broadway Street
Oakland, California

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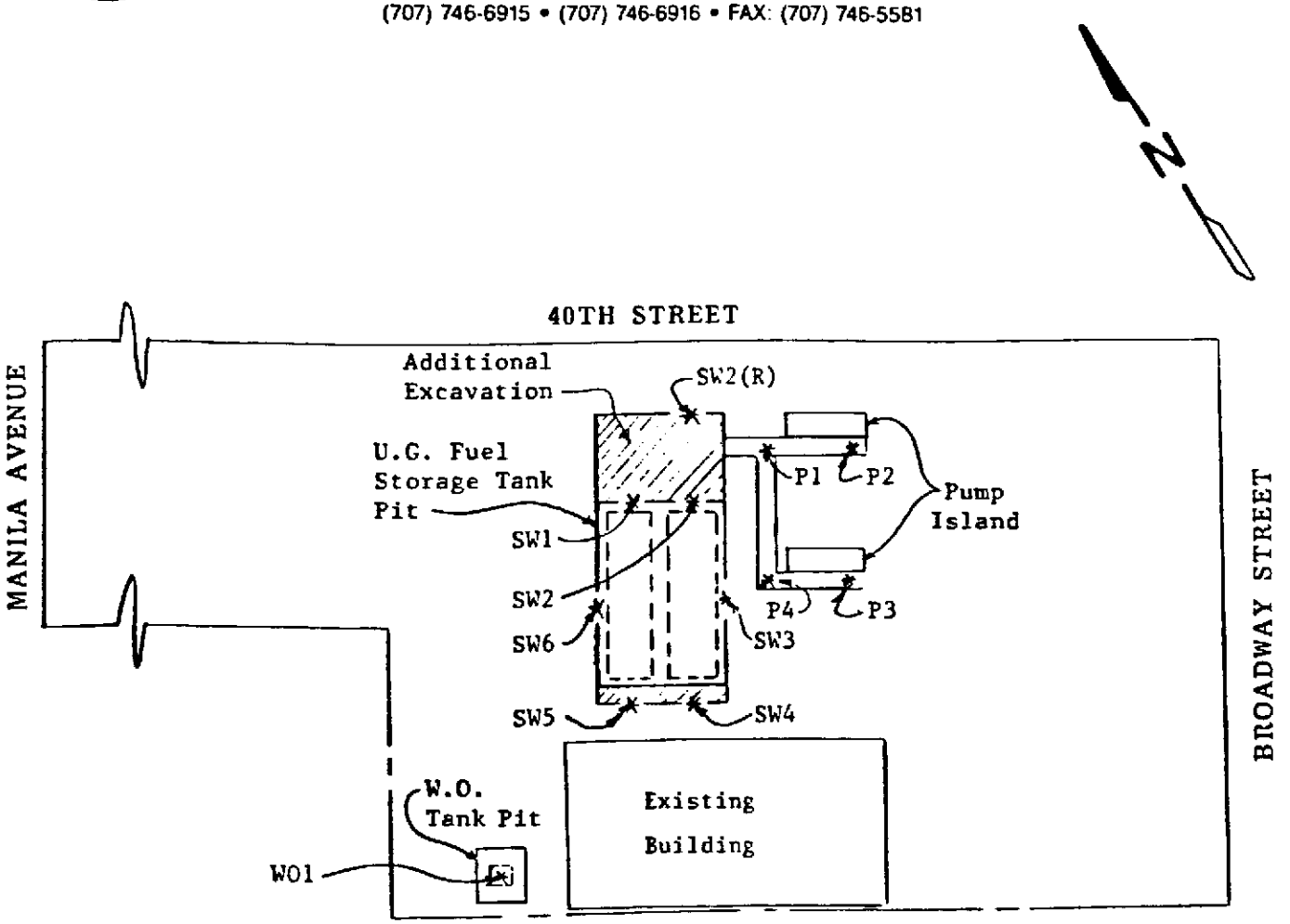


SITE PLAN
Figure 2

0 30 60
Approx. scale feet

LEGEND

* Sample Point Location

Unocal S/S #0746
3943 Broadway Street
Oakland, CA

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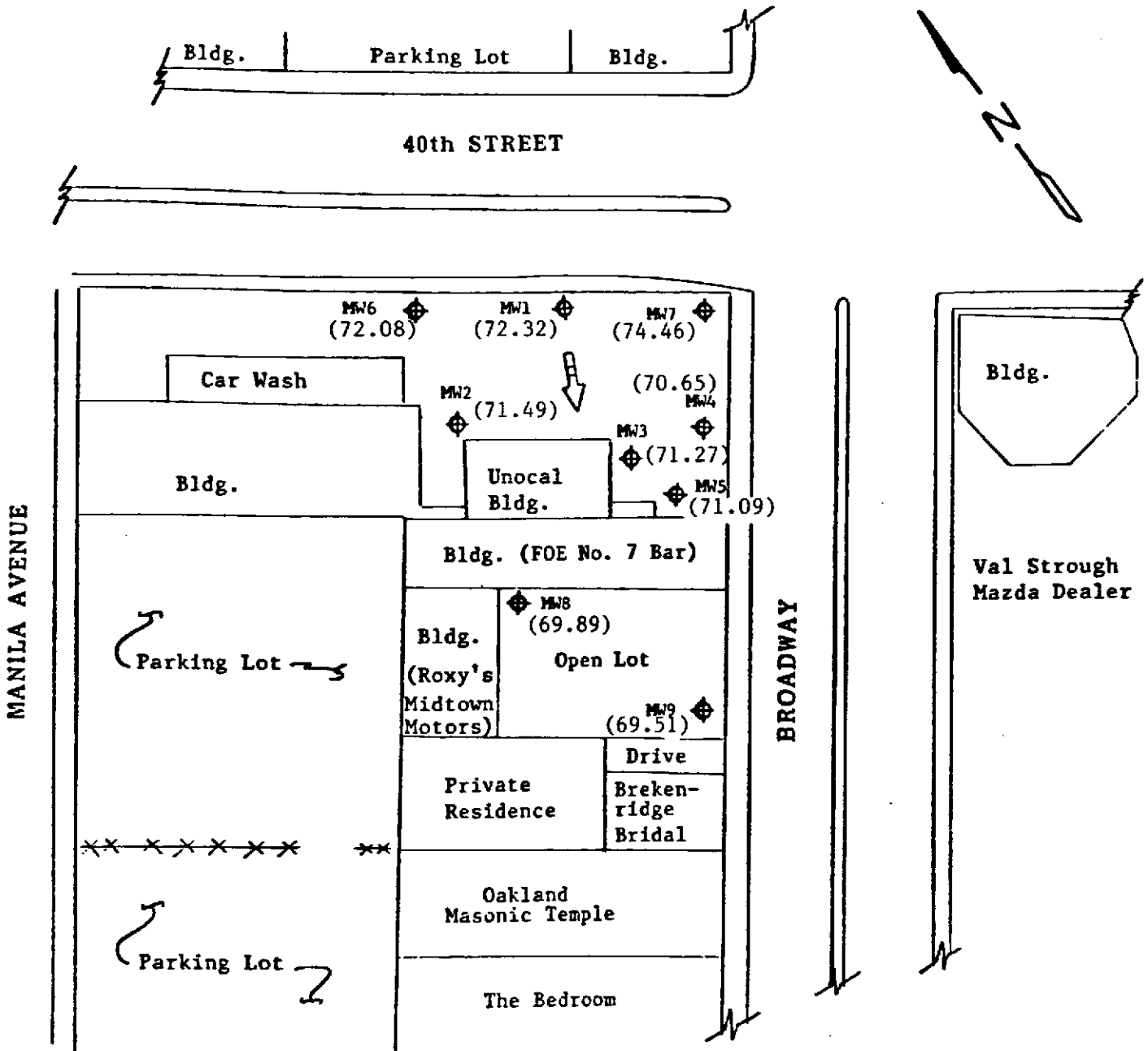


**SITE VICINITY MAP**
Figure 3

0 60 120
Approx. Scale feet

**LEGEND**

- Monitoring well
- ( ) Ground water elevation in feet above Mean Sea Level on 2/25/91
- Direction of Ground Water Flow

**Unocal S/S #0746**
**3943 Broadway**
**Oakland, California**

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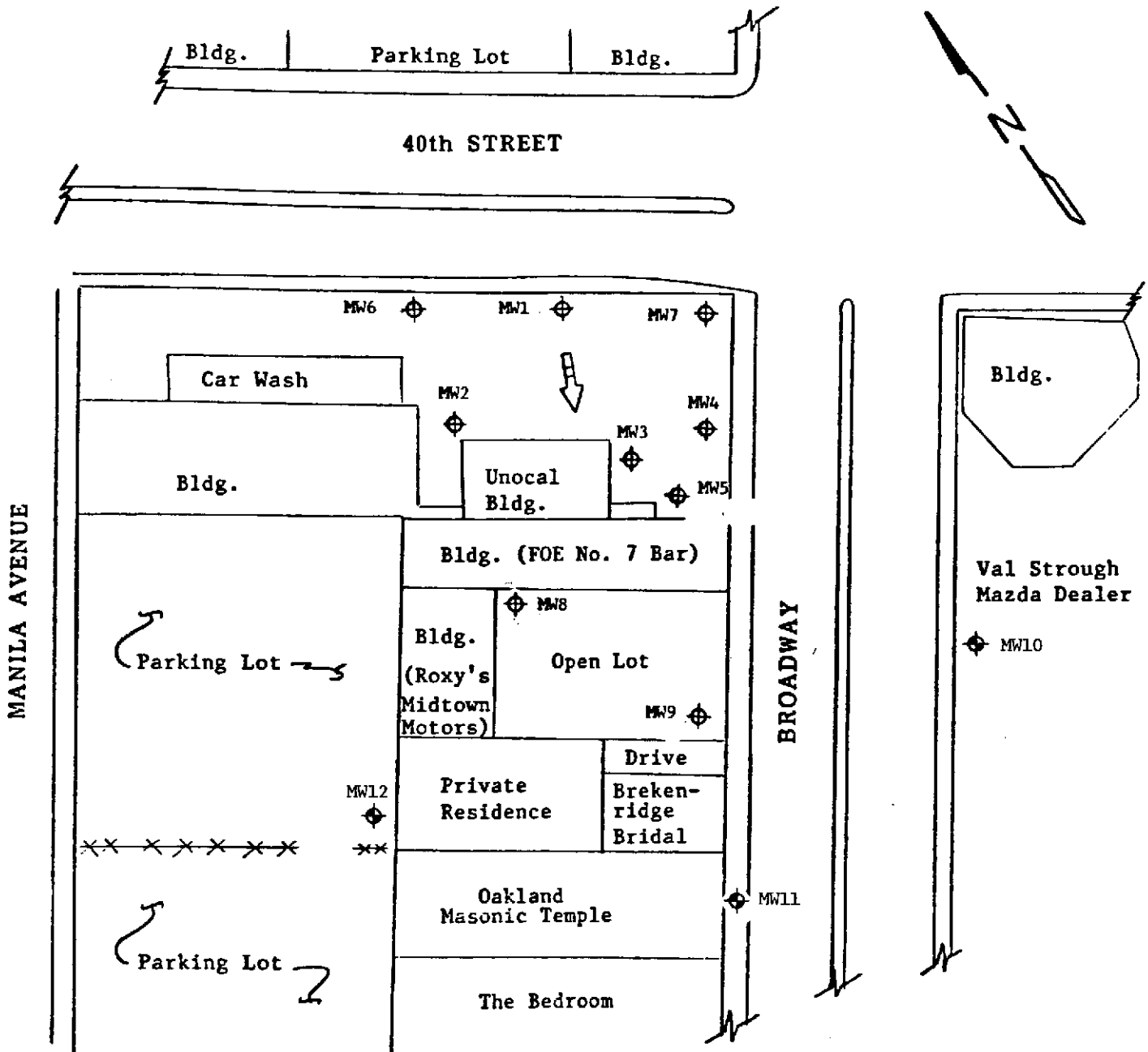



**SITE VICINITY MAP**
Figure 4

0 60 120
Approx. Scale feet

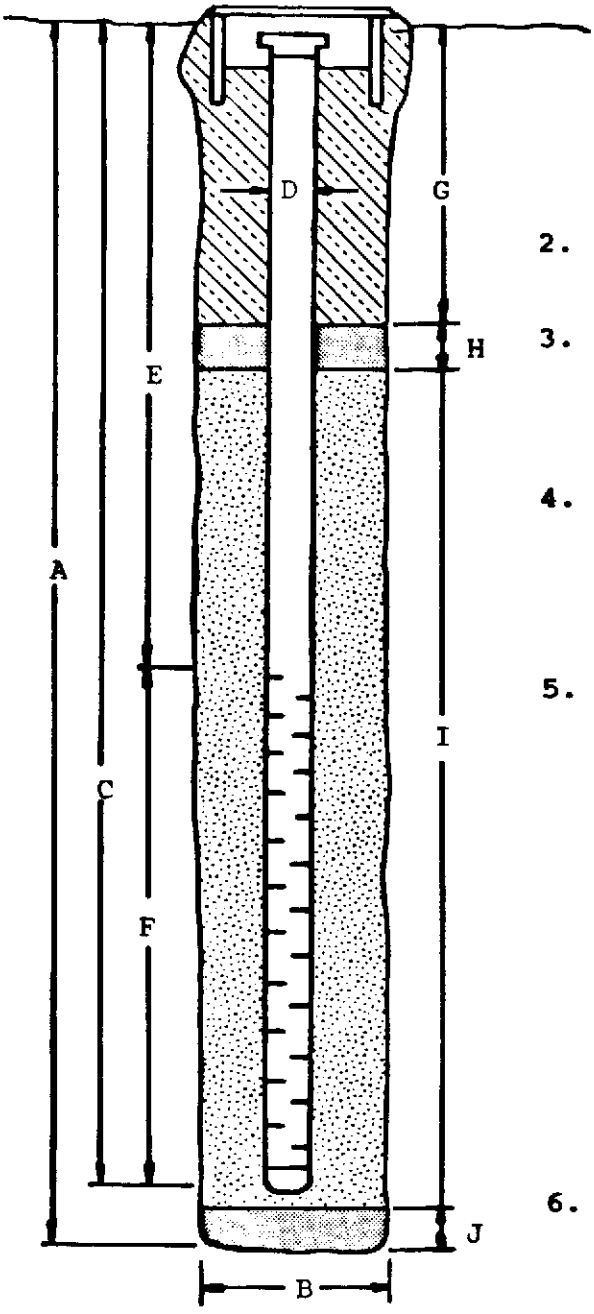
**LEGEND**

- Monitoring well (existing)
- Monitoring well (proposed)
- Direction of Ground Water Flow

**Unocal S/S #0746**
**3943 Broadway**
**Oakland, California**

## WELL COMPLETION DIAGRAM
## (SCHEMATIC)

Flush-mounted Well Cover




WELL DETAILS*

1. Well will be terminated 10 to 15 feet into first ground water unless a five foot thick aquitard is encountered below the water table, in which case the aquitard will be backfilled with bentonite pellets and the well terminated at the top of this aquitard [A].
2. Boring diameter [B] is 9 inches for 2 inch wells and 12 inches for 4 inch wells.
3. Perforated interval [F] will extend from bottom of casing to five feet above first ground water table (unless water <5 feet deep).
4. Schedule 40, PVC casing, 2 inch in diameter [D], will be used [C]. Screen is 0.020 or 0.010 inch factory machined slots, depending on filter pack grain size.
5. Filter pack will be placed from bottom of casing to two feet above perforated interval [I]. (Bottom seal [J] is not installed unless required.) One foot of bentonite [H] will be placed above the filter pack. Concrete grout [G] will be placed from top of bentonite seal to the surface (unless modified due to shallow water). Blank casing [E] will extend from the top of the perforated casing to the top of the hole.
6. The well will be installed with a waterproof cap, padlock and a flush-mounted well cover.

* See text for additional information.