

# GETTLER-RYAN INC.

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## TRANSMITTAL

TO: David DeWitt  
Tosco Marketing Company

DATE:  
PROJECT NO.  
SUBJECT:

April 23, 2001  
140065.02  
SS No. 0752 SCM

From: Jed Douglas

APR 25 2001

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### COMMENTS:

**This report and attachments contain well location and construction details obtained from water well drillers reports filed with DWR. California Water Code Section 13753 states that these reports are confidential and not for public use or inspection. Therefore, this report or its attachments should not be placed in files accessible to the general public.**

Signed: 

COPIES TO: Mr. Barney Chan – Alameda County Health Care Services



# GETTLER-RYAN INC.

## SITE CONCEPTUAL MODEL

For

Tosco (76) Service Station No. 0752  
800 Harrison Street,  
Oakland, California

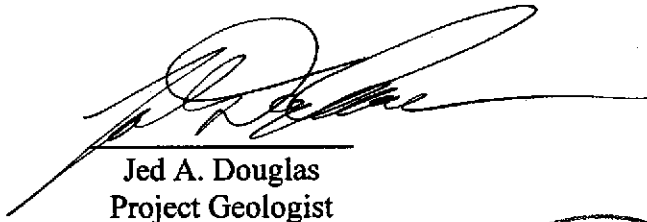
Report No. 140065.02-1

### Prepared for:

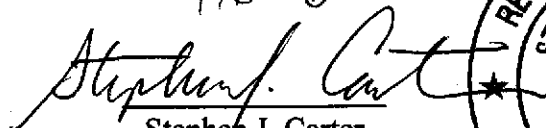
Mr. David De Witt  
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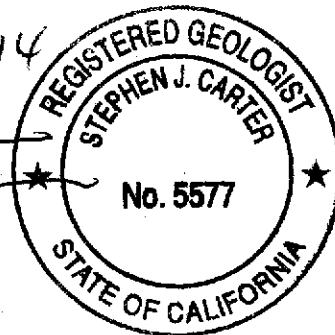
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April 23, 2001

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# **SITE CONCEPTUAL MODEL**

For

Tosco (76) Service Station No. 0752  
800 Harrison Street,  
Oakland, California

Report No. 140065.02-1

## **1.0 INTRODUCTION**

At the request of Tosco Marketing Company (Tosco), Gettler-Ryan Inc. (GR), has prepared this Site Conceptual Model (SCM) for the subject site. This SCM was prepared in response to a letter from the Alameda County Environmental Health Services (ACEHS), dated December 19, 2000. The ACEHS letter requested the preparation of an SCM, and possible explanations for intermittent spikes in fuel oxygenate concentrations observed in groundwater samples collected during semi-annual groundwater monitoring and sampling events.

## **2.0 SITE DESCRIPTION**

### **2.1 General**

The subject site is an operating 76 Service Station situated on the eastern corner of the intersection of Harrison Street and Eighth Street in Oakland, California (Figure 1). The site is bounded to the north and west by Harrison Street, to the east and southeast by a church, apartments, and an office building, to the south by Eighth Street, and to the southwest by a former Shell Service Station. Properties in the immediate site vicinity are used for residential and commercial purposes that include stores, restaurants, offices and a bank.

Current site facilities consist of the service station building, three product dispenser islands under two canopies, and two 12,000-gallon double-wall poly-steel gasoline underground storage tanks (USTs). Eight groundwater monitoring wells (MW-1 through MW-8) and twelve soil borings (EB1 through EB12) have been installed at and in the site vicinity. Locations of the pertinent site features are shown on the Site Plan (Figure 2).

### **2.2 Geology and Hydrogeology**

Based on review of regional geologic maps (U.S. Geological Survey, 1979), the subject site is underlain by Quaternary-age dune sand deposits referred to as the Merritt Sand. The Merritt Sand is described as typically consisting of loose, well-sorted, fine-to medium-grained sand with silt. This sand apparently reaches a maximum depth of approximately 50 feet bgs in the Oakland area.

Based on the results of Kaprealian Engineering, Inc. (KEI) subsurface studies, the site is underlain by fill materials to a depth of between 1 and 7 feet below grade. The fill is in turn underlain by unconsolidated sediments to the maximum depth explored of 35 feet bgs.

The deposits underlying the fill consist of fine-grained sand with silt. This sand sequence is in turn underlain by silty to sandy clay, clayey sand, and clayey or sandy silt, beginning at a depth of between 30 and 33 feet bgs and extending to the total depth explored (35 feet bgs).

~~As of January 1994, the ~~unconsolidated sediments~~ beneath the site is approximately 18 to 21 feet thick and consists of ~~fine-grained sand with silt~~. The saturated zone also predominantly consists of ~~fine-grained sand with silt~~, which is the predominant soil type encountered in the existing wells and supplementary borings installed at the site.~~

KEI had a particle size analysis (sieve analysis) performed on a saturated sample collected from the boring for well MW-2 at a depth of 30 feet bgs. The analysis indicated that the sample consisted of approximately 90% fine sand, 8% medium sand, and 2% silt and clay. The sample was classified as a poorly sorted fine-grained sand (SP).

Previous investigations have encountered first groundwater at approximately 21 to 24 feet below ground surface (bgs). Historically, depth to groundwater in the monitoring wells has been measured between approximately 16 and 21 feet bgs. Groundwater beneath the site flows predominantly toward the southwest, at gradients ranging from 0.008 to 0.01 ft/ft. The nearest surface waters are Oakland Inner Harbor and Lake Merritt, each located approximately ½ mile southwest and east of the site, respectively.

### **2.3 Previous Environmental Investigation**

Initial field work was conducted by KEI on November 9, 1990, when two gasoline USTs and one waste oil UST were removed from the site. The tanks consisted of one 10,000 gallon regular unleaded gasoline storage tank, one 10,000 gallon super unleaded gasoline storage tank, and one 280 gallon waste oil tank. The tanks were made of steel, and no apparent holes or cracks were observed in the fuel tanks, however, the waste oil tank contained one 1/8th-inch square hole.

Two soil samples were collected from beneath the fuel tanks at depths of approximately 14 feet bgs. Two soil samples were collected from the fuel tank pit south sidewall at depths of approximately 12 feet bgs. One soil sample was collected from beneath the waste oil tank at a depth of approximately 6.5 feet bgs. On November 12, 1990, due to observed soil staining, KEI collected an additional soil sample from the fuel tank pit at a depth of approximately 19 feet bgs. KEI returned to the site on December 20, 1990, in order to collect soil samples from beneath the pump islands. Six samples were collected from beneath the six fuel dispensers and one sample

was collected from the product pipe trench. These samples were collected at depths of approximately 2.5 feet bgs. KEI again returned to the site on December 26, 1990, in order to collect a sample from the pump island excavation (due to hydrocarbon impact observed during previous excavation activities). One additional soil sample was collected from beneath the fuel dispenser at a depth of approximately 6 feet bgs.

At the request of the ACEHS, on January 3, 1991, KEI returned to the site in order to collect one additional soil sample from beneath the waste oil tank pit. After sampling, the waste oil tank pit was overexcavated to the sample depth of 9.5 feet bgs.

Based on the analytical results, KEI recommended that an in-situ remediation system design be developed and implemented to remediate the residual soil contamination in the fuel tank pit and the southerly pump island. However, prior to designing the recommended remediation system and in order to comply with the requirements of the Regional Water Quality Control Board (RWQCB) and the ACEHS, KEI recommended the installation of three monitoring wells and two exploratory borings at the site.

On ~~March 29 and 30, 1991~~, three 2 inch diameter monitoring wells (MW-1, MW-2, and MW-3) ~~and two exploratory borings (EB-1 and EB-2) were installed at the site.~~ The monitoring wells were completed to total depths ranging from 33 to 35 feet bgs. The exploratory borings were each drilled to total depths of 23 feet bgs. Groundwater was encountered during drilling at depths ranging from approximately ~~22.5 to 24 feet bgs.~~

On ~~September 29 and October 1, 1992~~, three additional 2 inch diameter monitoring wells (MW-4, MW-5, and MW-6) were installed at and in the site vicinity to further delineate the extent of petroleum hydrocarbon impact to groundwater. The three new wells were each completed to total depths ranging from 32 to 33 feet bgs. Groundwater was encountered during drilling at depths ranging from 21.5 to 23 feet bgs.

In KEI's report dated January 21, 1993, KEI concluded that the extent of groundwater contamination had not been defined in the vicinity of the site. Therefore, KEI recommended the installation of two additional off-site monitoring wells in order to further define the extent of groundwater impact.

On ~~April 14, 1993~~, two additional 2 inch diameter monitoring wells (MW-7 and MW-8) were installed in the vicinity of the site. Monitoring well MW-7 was completed to a total depth of 33 feet bgs. Well MW-8 was completed to a depth of 29 feet bgs. During drilling, groundwater was encountered at depths ranging from ~~21.5 to 23 feet bgs.~~

• ORC added to some wells in \_\_\_\_\_?

The analytical results of the soil samples collected from the borings for the two new monitoring wells (MW-7 and MW-8) indicated non-detectable concentrations of TPH as gasoline (TPHg) and BTEX. Therefore, KEI concluded that the horizontal extent of the soil impact at the site had been defined, and that the impact was limited to the areas beneath the fuel tanks and the southernmost pump island.

Based on the monitoring data collected and evaluated through April of 1993, KEI recommended a modification to the monthly monitoring program. The groundwater flow direction had been consistently to the southwest or south-southwest during the preceding six consecutive quarters of monitoring. In addition, no free product or sheen had been detected in any of the wells through April of 1993. Therefore, KEI recommended that the monitoring frequency for all of the wells be reduced from monthly to quarterly.

In 1996, the monitoring and sampling program was changed to a semi-annual schedule. Additionally, the product piping was replaced with double-walled fiberglass piping, and tank gauging and remote monitoring systems were installed. In November 2000, the multi-port fill buckets for over-fill, spill containment and vapor recovery were replaced.

## **2.4 Status of Downgradient Service Stations**

### Chan's Former Shell Service Station

A former Shell station is located at 726 Harrison Street, across 8<sup>th</sup> Street from the site. A brief history of the Shell station follows:

- 1995 Four gasoline USTs removed. Elevated levels of petroleum hydrocarbons detected in confirmation samples. Overexcavation of 530 tons of impacted soil. Impacted soil remains in place under the building and under sidewalks of adjacent streets.
- 1997 Monitoring well MW-1 installed. Elevated concentrations of MtBE (7,400 ppb - 7/97) detected in groundwater samples.
- 1998 Monitoring wells MW-2 through MW-4 installed. Elevated concentrations of TPHg and MtBE detected in groundwater samples from wells MW-3 (6,500/3,900 ppb) and MW-4 (880/950 ppb).
- 2000 Eight quarters of groundwater sampling data show consistent elevated concentrations of TPHg and MtBE detected in wells MW-1, MW-3 and MW-4. Concentrations of TPHg range from: 9,300 to 44,000 ppb in MW-1; 230 to 6,500 in MW-3; and <250 to 3,800 in MW-4. Concentrations of MtBE range from: 7,400 to 43,000 ppb in MW-1; 830 to 3,900 ppb in MW-3; and 440 to 3,700 ppb in MW-4.
- 2000 ACEHS requests Work Plan for Remediation at the Shell station.

### Former Arco Service Station

A former Arco station is located at 706 Harrison Street, immediately adjacent to the former Shell station. A brief history of the Arco station follows:

- 1988 Seven soil borings installed. Minimal hydrocarbon impact detected in soil.
- 1991 Removal of six gasoline USTs and one waste oil tank. Elevated levels of petroleum hydrocarbons detected in soil confirmation samples.
- 1993 Overexcavation of unspecified amount of impacted soil. Impacted soil remains in place under Harrison Street indicated by elevated concentrations of petroleum hydrocarbons detected in confirmation samples.
- 1993 Monitoring wells MW-1 through MW-3 installed, along with soil vapor extraction wells VW-1 and VW-2.
- 1994 Soil vapor extraction test performed. Up to 8,353 ppm TPHg detected in vapor samples. Vapor extraction determined to be feasible remedial method.
- 1994 Installation of nine soil borings, three groundwater monitoring wells and three vapor extraction/air sparge wells. Up to 15,000 ppm TPHg detected in soil samples. Up to 2,500 ppb of TPHg detected in groundwater samples.
- 1995 Soil vapor extraction system installed and begins operating.
- 2000 Four years of groundwater sampling data show consistent elevated concentrations of TPHg and MtBE detected in wells MW-1, MW-2 and MW-4. Concentrations of TPHg range from: 12,000 to 48,000 ppb in MW-1; 39,000 to 180,000 ppb in MW-2; and 1,700 to 12,000 ppb in MW-4. Concentrations of MtBE range from: 400 to 16,000 ppb in MW-1; <200 to 6,500 ppb in MW-2; and <170 to 5,400 ppb in MW-4.
- 2000 Arco requests that ACEHS issue permission to shutdown vapor extraction remediation system. ACEHS replied with numerous questions and concerns to be addressed prior to allowing system shutdown.



### 3.0 SITE CONCEPTUAL MODEL

The SCM is presented in Figure 3. Components of the SCM include figures, tables and charts presented in the appendices. Information utilized to create the SCM includes:

- Vicinity and site maps showing site location, site features, locations of soil borings and groundwater monitoring wells, locations of geologic cross-sections, and locations of water producing wells within a one mile radius of the site (Figures 1, 2 and 8).
- Potentiometric surface contour map with groundwater elevations, flow direction and calculated gradient (Appendix B).
- Geologic cross-sections with subsurface features (Figures 4 and 5).
- Groundwater concentration maps with iso-contours for TPHg and MtBE (Figures 6 and 7).
- Charts of TPHg, benzene and MtBE concentrations in monitoring wells MW-1 through MW-8, for data collected since 1993 (Appendix A).
- Charts of TPHg, benzene and MtBE concentrations versus distance from the UST pit (source area) (Appendix A).
- Historical groundwater data tables (Appendix B).
- Historical soil data tables (Appendix C).
- Boring logs and well construction details (Appendix C).

#### Discussion of Site Conceptual Model

The SCM and geologic cross-sections (Figures 3, 4 and 5) show that the site is underlain primarily with sand to depths between 30 and 35 feet bgs. The sand is underlain by silt and clay to the total explored depths of 33 feet bgs, which are interpreted as estuarine deposits. Review of the attached charts showing changes in hydrocarbon concentrations over time (Appendix A) reveal specific trends. Spikes in groundwater concentrations of TPHg, benzene and MtBE were observed in the January sampling event for the years 1998 through 2000 in most of the site monitoring wells. These concentration spikes do not appear to correlate to changes in groundwater elevation. Review of maintenance records for the station indicated that the UST spill bucket containment system had failed, and reports of water in the USTs were also noted. The spill containment failure and water in the USTs were only observed in the rainy season, when precipitation probably contributed to the spill bucket overflow. Seasonal failure of the spill containment system appears to have caused the concentration spikes in groundwater observed during the January sampling events. The spill containment buckets were replaced in November of 2000, and the concentration versus time charts reveal a consistent decrease in dissolved petroleum concentrations in all the wells, except for a slight increase in well MW-2, during the January 2001 sampling event.

If containment bucket replaced in 11/00 NO trend  
Can be obtained by 4/01.

Peak concentrations of petroleum hydrocarbons detected in groundwater at the former Chan's Shell Service Station (Chan's) have been reported at 44,000 ppb of TPHg, 2,800 ppb of benzene, and 43,000 ppb of MtBE in Chan's well MW-1. Similarly, peak concentrations of hydrocarbons detected in groundwater at the former Arco Service Station (Arco) have been reported at 110,000 ppb of TPHg, 18,000 ppb of benzene, and 16,000 ppb of MtBE in Arco wells MW-1 and MW-2.

~~The highest hydrocarbon concentrations detected in Tosco's onsite downgradient wells MW-7 and MW-8 have been reported at 560 ppb of TPHg, 170 ppb of benzene, and 10,000 ppb of MtBE (by EPA Method 8020).~~ These concentrations detected in Tosco's downgradient wells (MW-7 on 10/95) are significantly lower than those detected at both Chan's and Arco's sites. While Tosco does not deny that their service station has contributed to the regional hydrocarbon plume, it is obvious that Tosco is not primarily responsible for the observed impact to groundwater beneath the former Shell or Arco sites.

Current groundwater concentrations of TPHg and MtBE at the Tosco site are presented on the isoconcentration maps (Figures 6 and 7). These figures indicate that the hydrocarbon plumes are confined to the site and immediate site vicinity.

The site is situated approximately ½ mile north/northeast of the Oakland Inner Harbor. Regional groundwater flow is toward the southwest, toward the Harbor and San Francisco Bay. Historical data indicates that groundwater beneath the site predominantly flows toward the southwest, following the slope of the surface topography (Appendix B).

The site is located in an industrial/commercial area of Oakland. ~~A one-mile radius well search performed by the Alameda County Public Works Agency revealed no domestic municipal wells in the area.~~ Five other wells were identified within one mile, four irrigation wells and one industrial well. The locations of the wells are presented on Figure 8. The nearest well to the site is an irrigation well at Laney College, located approximately 1,800 feet southeast of the site. This well is located cross-gradient from the site. All the identified wells are much deeper than the shallow groundwater zone beneath the site. ~~The data for the well search is presented in Table 9.~~ The only downgradient sensitive receptor identified in the site vicinity is Oakland Inner Harbor, located approximately ½ mile southwest of the site.

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GR spoke with Mr. Chuck Hedley of the RWQCB - San Francisco Bay Region on June 2, 1999. Mr. Hedley indicated the RWQCB uses the following values to evaluate risk to marine water: TPHg=3,700 ppb and TPHd=640 ppb. Wells within 300 feet of the Bay that contain petroleum hydrocarbon concentrations in excess of these values will require additional work. Mr. Hedley indicated that these concentrations are interim, or draft, and the Board does not plan to issue any formal guidelines based on these numbers. Mr. Ravi Arulanantham of the RWQCB - San Francisco Bay Region, utilizes the following concentrations for MtBE: acute effects in freshwater = 115,000 ppb; chronic effects in freshwater = 66,000 ppb; acute effects in marine water = 14,000 ppb; and, chronic effects in marine water = 8,000 ppb. Wells at the subject site are over 2,600 feet from the waters of the Oakland Inner Harbor. Based on the distance from the Harbor, the concentrations present in groundwater at the site and the plume being defined, it does not appear that the RWQCB will require additional investigation or delineation of the hydrocarbons detected in the site wells.

#### 4.0 RECOMMENDATIONS

Based on the final Draft Guidelines for Investigation and Cleanup of MTBE and other ether-based oxygenates (3/27/00), Tosco Service Station No. 0752 is assigned an investigation priority of Class D. A Class D site is described as "not located in an area that is most vulnerable to contamination and has concentrations of MTBE in groundwater over 5 ppb". Based on conversation with the RWQCB, the site is unlikely to be located within a vulnerable groundwater basin, and no domestic or municipal drinking water wells were identified within one mile of the site. Class D sites should have a cleanup priority classification determined within five years.

Based on the SCM, hydrocarbon impact to groundwater appears to have historically been related to faulty spill containment equipment, which was failing during the rainy season. The faulty equipment was replaced in November of 2000. ~~GR understands that as of January 1, 2001, Tosco is no longer using gas containing MtBE in its service stations in California.~~ The primary sources have been removed, and only residual impact remains at the site. Therefore, due to the current extent of MtBE impact predominantly confined to the site and immediate vicinity, the stability and configuration of the plume, the replacement of faulty equipment, the absence of MtBE in current fuels, and the lack of sensitive receptors in the immediate site vicinity, additional delineation is not warranted. GR recommends continuing the sampling of groundwater for chemical concentrations for the next four consecutive quarters. After that time, recommendations will be made for reducing the groundwater monitoring and sampling schedule, or requesting site closure.

## 5.0 REFERENCES

- Gettler - Ryan Inc., 2001, Groundwater Monitoring and Sampling Report, First Semi-Annual Event of January 2, 2001, dated March 2, 2001.
- Regional Water Quality Control Board – San Francisco Bay Region, 2001, File Review of Former Chan's Shell Service Station and Former Arco Service Station, performed February 2, 2001.
- State Water Resources Control Board, 2000, Final Draft Guidelines for Investigation and Cleanup of MTBE and Other Ether-Based Oxygenates, dated March 27, 2000.
- Kaprealian Engineering Inc., 1997, Soil Sampling Report, Unocal Service Station #0752, Oakland, California, dated January 10, 1997.
- ..., 1995, Pilot Vapor Extraction Test Report, dated October 23, 1995.
- ..., 1994, Subsurface Investigation Report, dated April 1, 1994.
- ..., 1993, Continuing Groundwater Investigation, dated May 23, 1993.
- ..., 1992, Continuing Groundwater Investigation, dated November 17, 1992.
- ..., 1991, Preliminary Groundwater Investigation, dated July 5, 1991.
- ..., 1991, Soil Sampling Report, dated February 1, 1991.
- U.S. Geological Survey Professional Paper 943 Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning by E.J. Helley and KR. Lajoie, 1979
- U.S. Geological Survey, 1959, Oakland West Quadrangle, California, 7.5 Minute Series (Topographic): Scale 1:24,000, photorevised 1980.

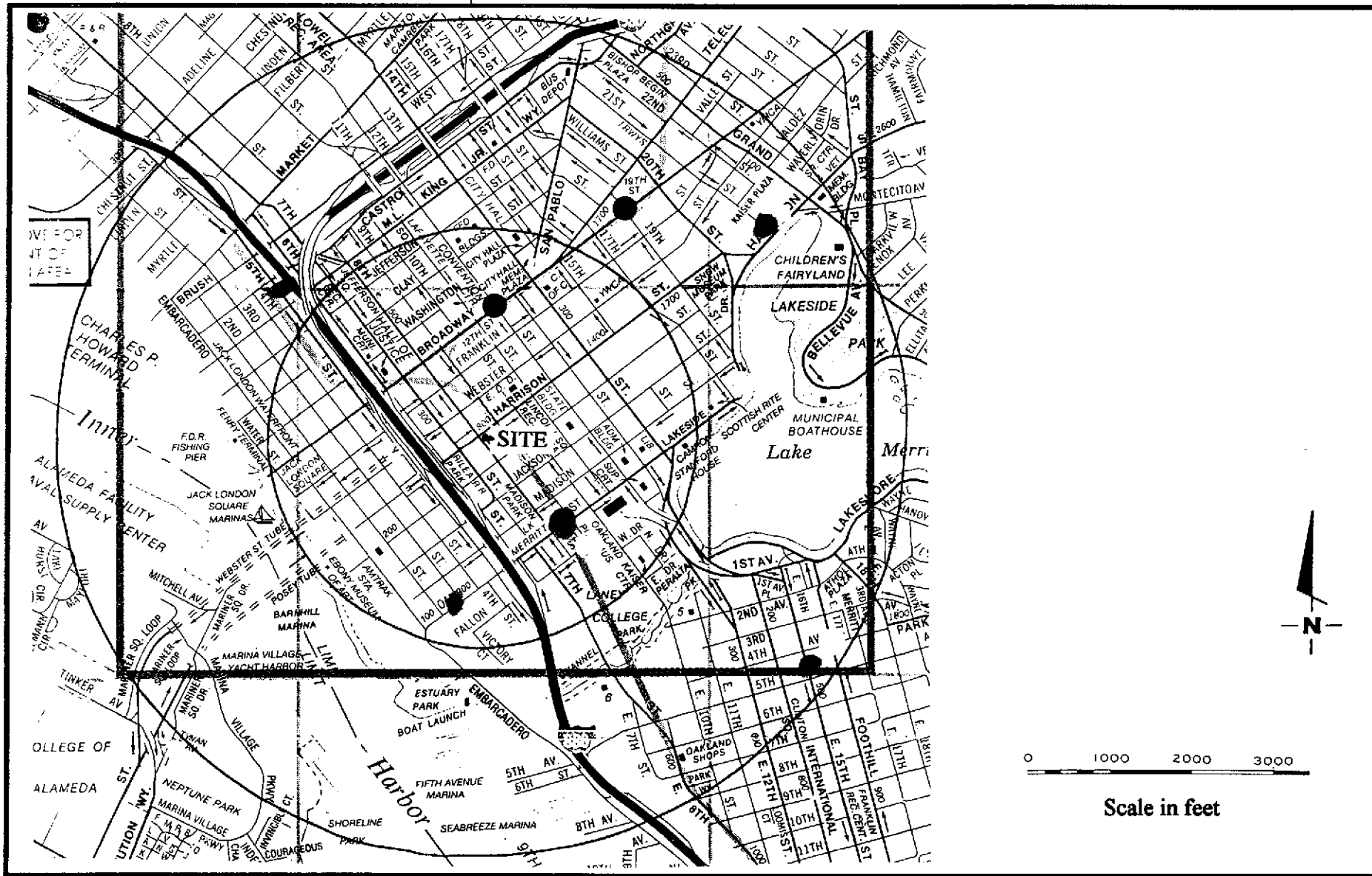
**TABLE 1 - WELL SEARCH DATA**

Tosco Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

Map ID	Well Owner	Well Location	Well Use	Maximum Pumping Rate (gpm)	Year Installed	Depth (feet)	Screen Interval		Well	
							From (feet)	To (feet)	Diameter (inches)	DTW (feet)
1	Laney College	900 Fallon Street	Irr	44	Dec-90	190	-	-	8	30
2	E. D. Coat	715 4th Street	Ind	110	Feb-78	108	-	-	10	10
3	Ahmanson Commercial	2100 Harison Street	Irr	2	Mar-91	290	-	-	6	20
4	Lakeside Corporation	244 Lakeside Drive	Irr	50	1977	95	-	-	6	30
5	Central French LDY	425 Foothill Boulevard	Irr	35	1914	214	-	-	14	-

**Explanation**

DTW = depth to water  
 gpm = gallons per minute  
 Irr - irrigation  
 Ind = industrial  
 - = information not available



**Gettler - Ryan Inc.**

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**VICINITY MAP**

Tosco (76) Service Station No. 0752

800 Harrison Street

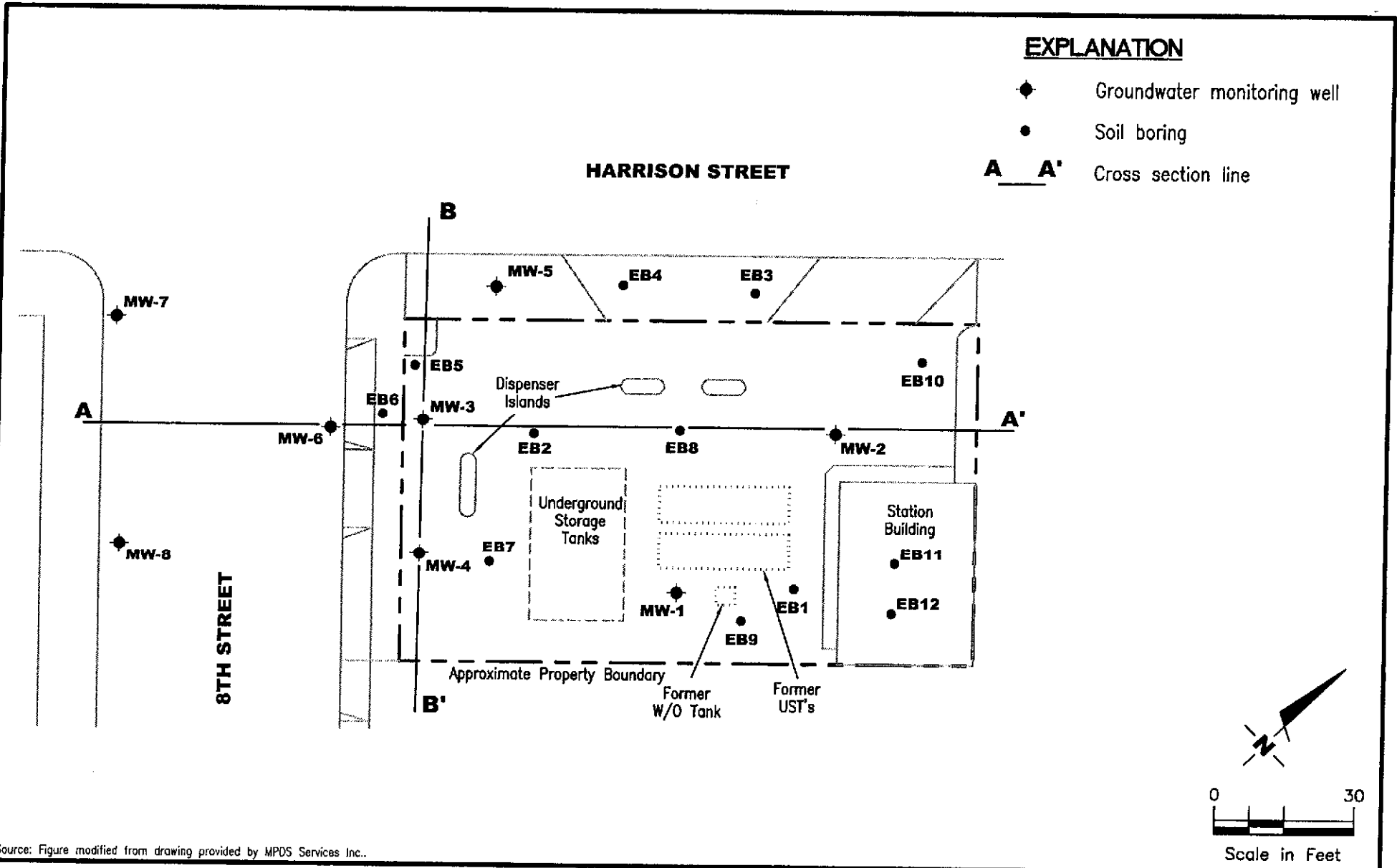
Oakland, California

Figure

**1**

Job Number  
140065.02

Date  
02/01



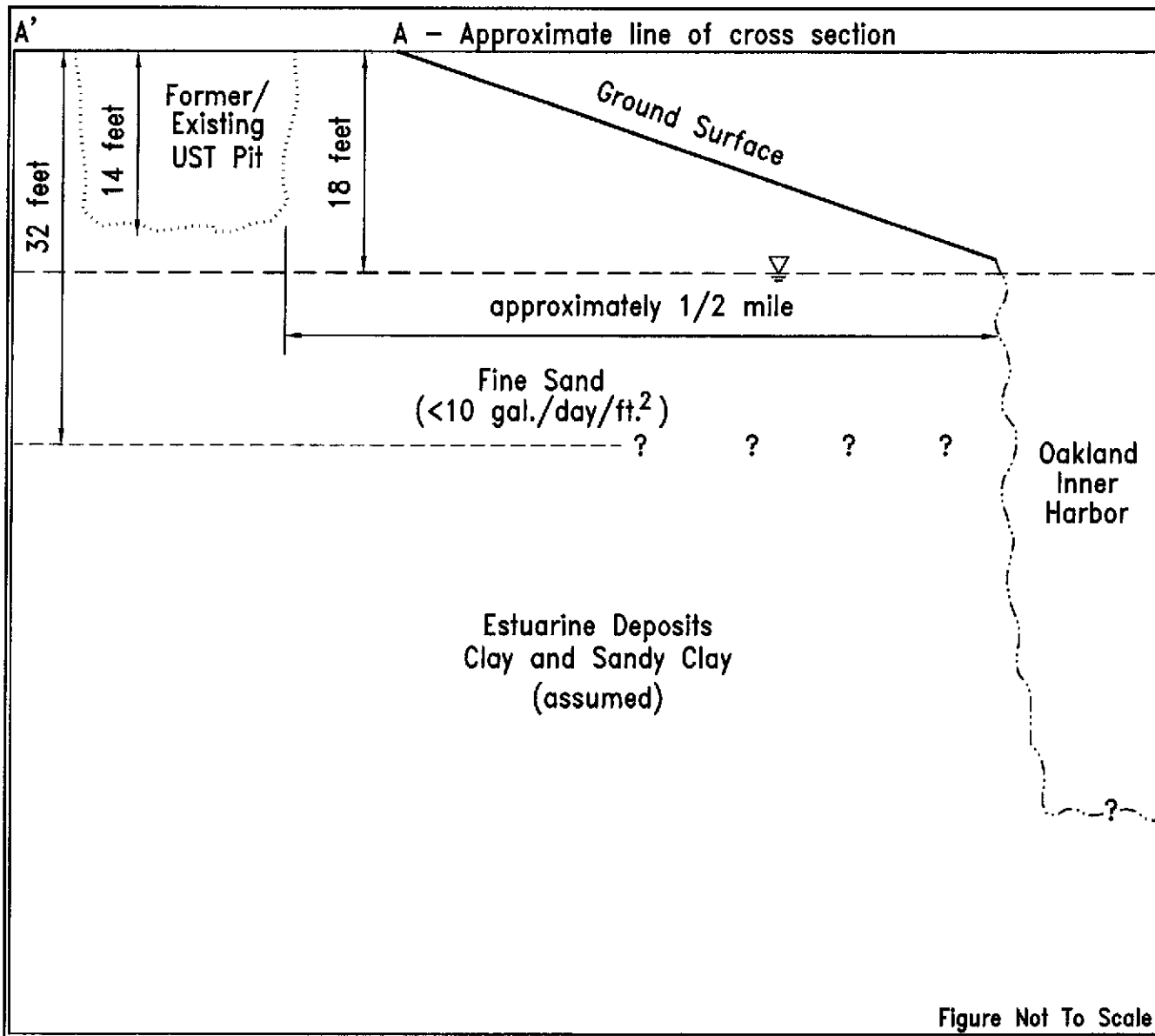
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**SITE PLAN**  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

FIGURE  
**2**

PROJECT NUMBER 140065	REVIEWED BY	DATE 3/01	REVISED DATE
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Type:  
Shallow groundwater

Source:  
MTBE = 368 ppb

Pathways:  
Incomplete

Receptor:  
Oakland Inner Harbor  
approximately  
1/2 mile away

Remediation:  
Excavation  
Natural attenuation  
Spill containment  
equipment replacement

Investigation Priority:  
Class D  
Determine cleanup  
priority classification  
within 5 years

Figure Not To Scale



**SITE CONCEPTUAL MODEL**  
Tosco (76) Service Station No. 0752  
800 Harrison Street  
Oakland, California

FIGURE  
**3**

PROJECT NUMBER  
140065

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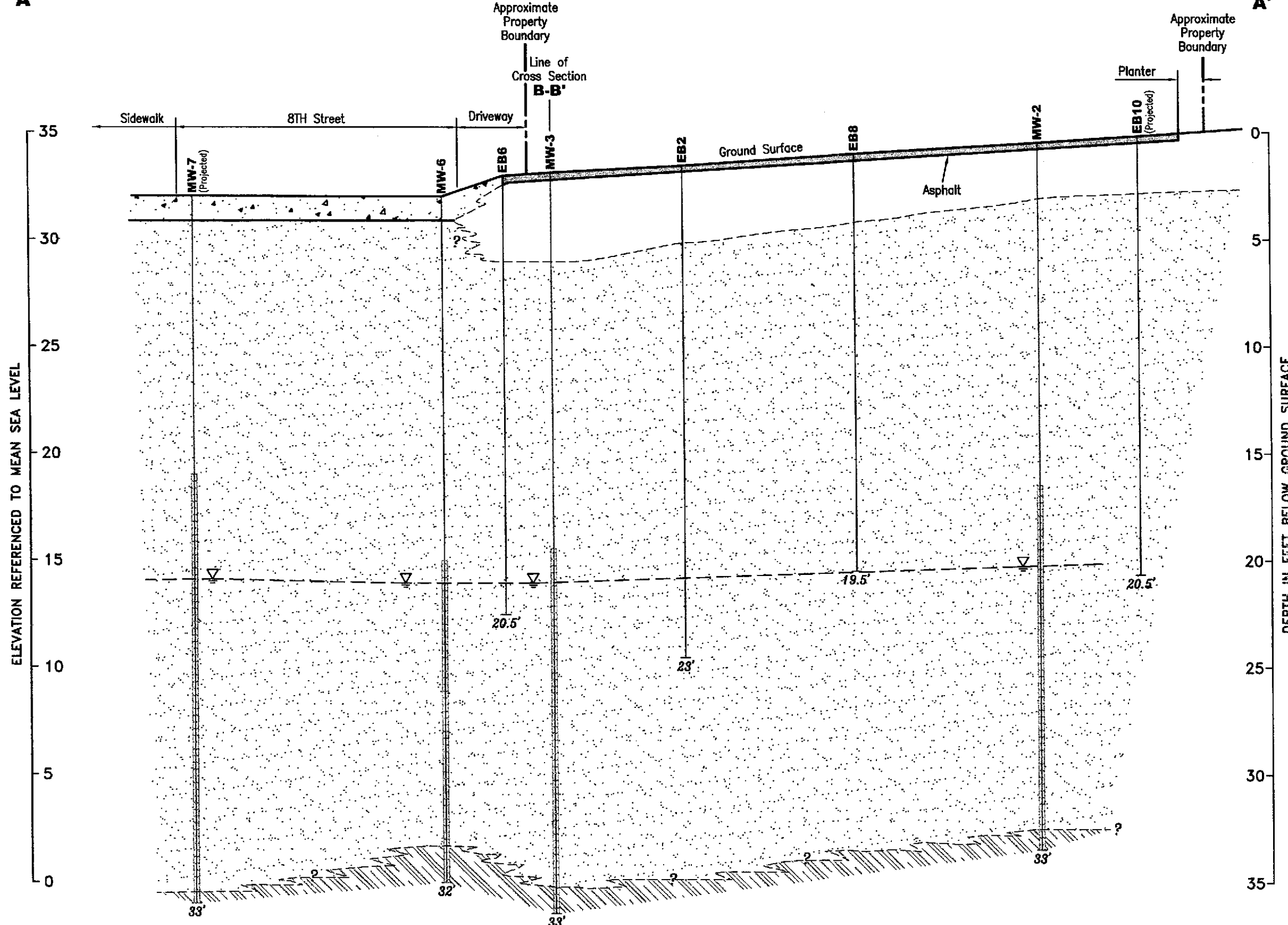
DATE  
3/01

REVISED DATE



SW  
A

NE  
A'



EXPLANATION

- Boring including well screen interval
- 32' Depth to bottom of boring
- Water Level (07/19/00)
- Fill
- Concrete
- Silt and clay
- Sand

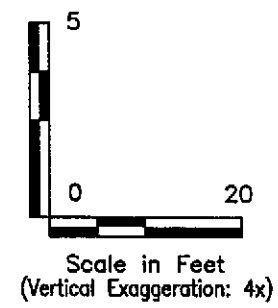


FIGURE  
4

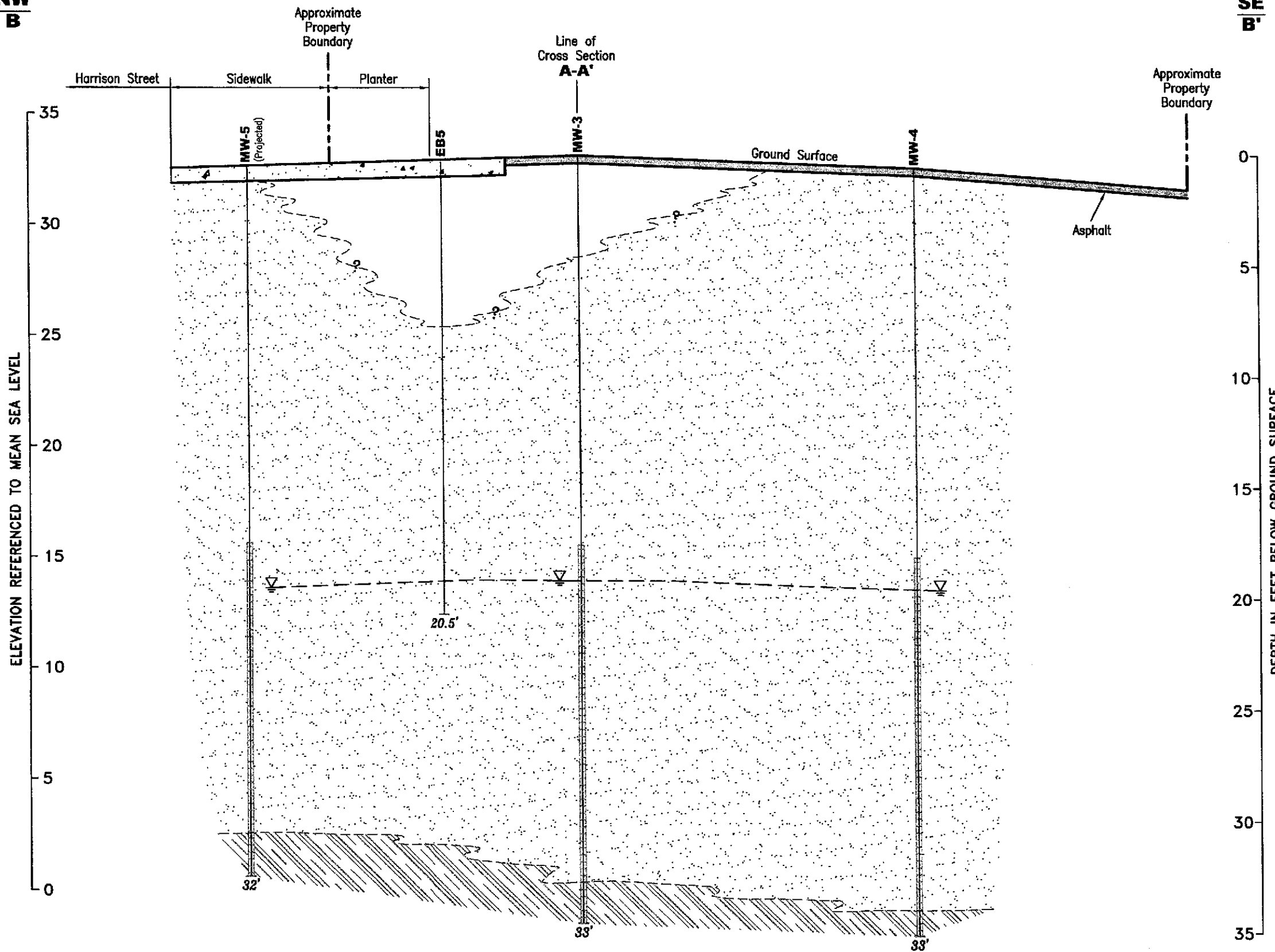
CROSS SECTION A-A'  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

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NW  
B

SE  
B'



**EXPLANATION**

- Boring including well screen interval
- 32' Depth to bottom of boring
- Water Level (07/19/00)
- Fill
- Concrete
- Silt and clay
- Sand

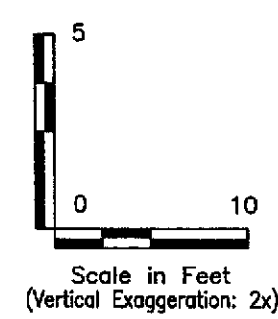
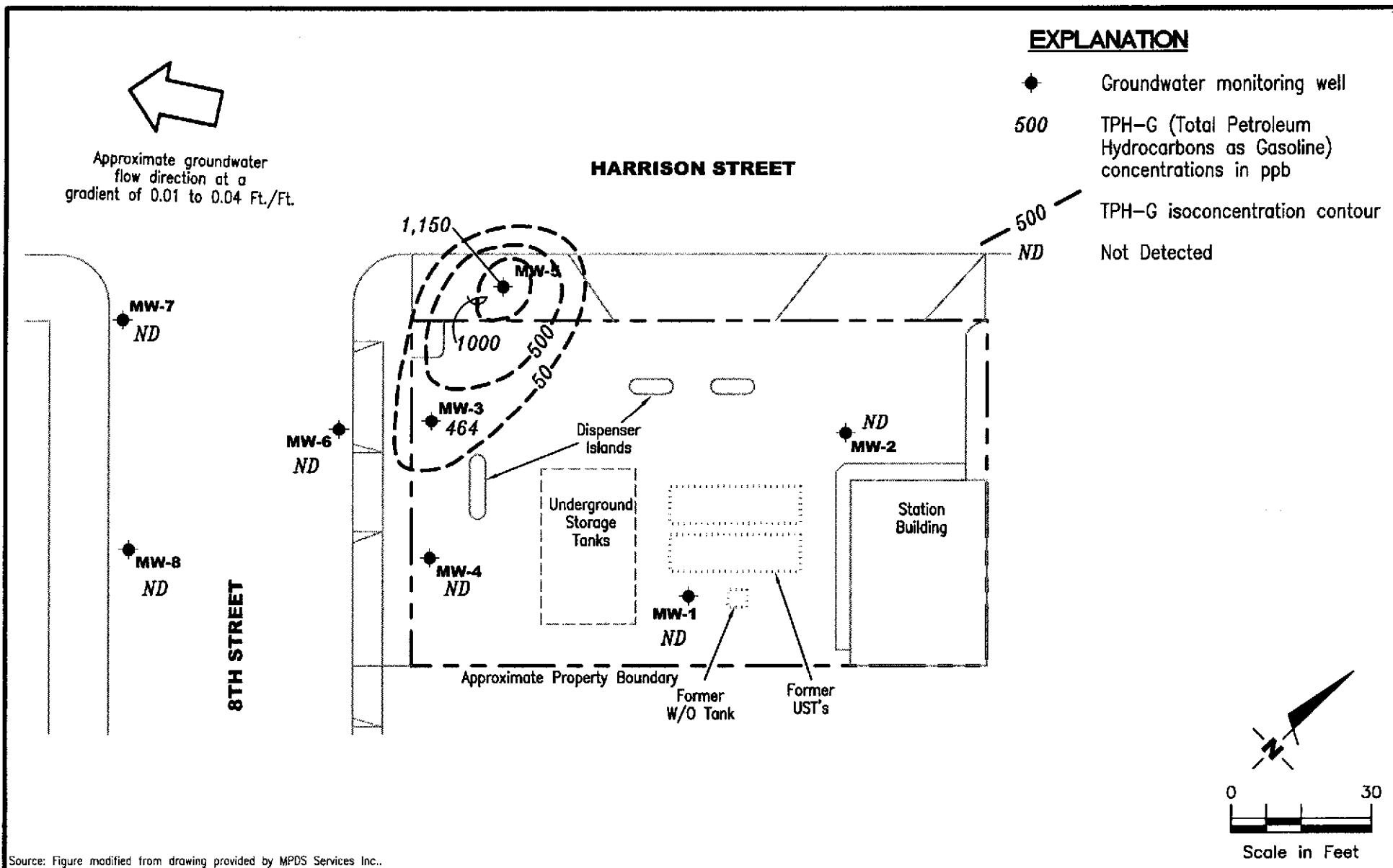


FIGURE  
**5**

**CROSS SECTION B-B'**  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

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**TPHG ISOCONCENTRATION MAP**  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

FIGURE

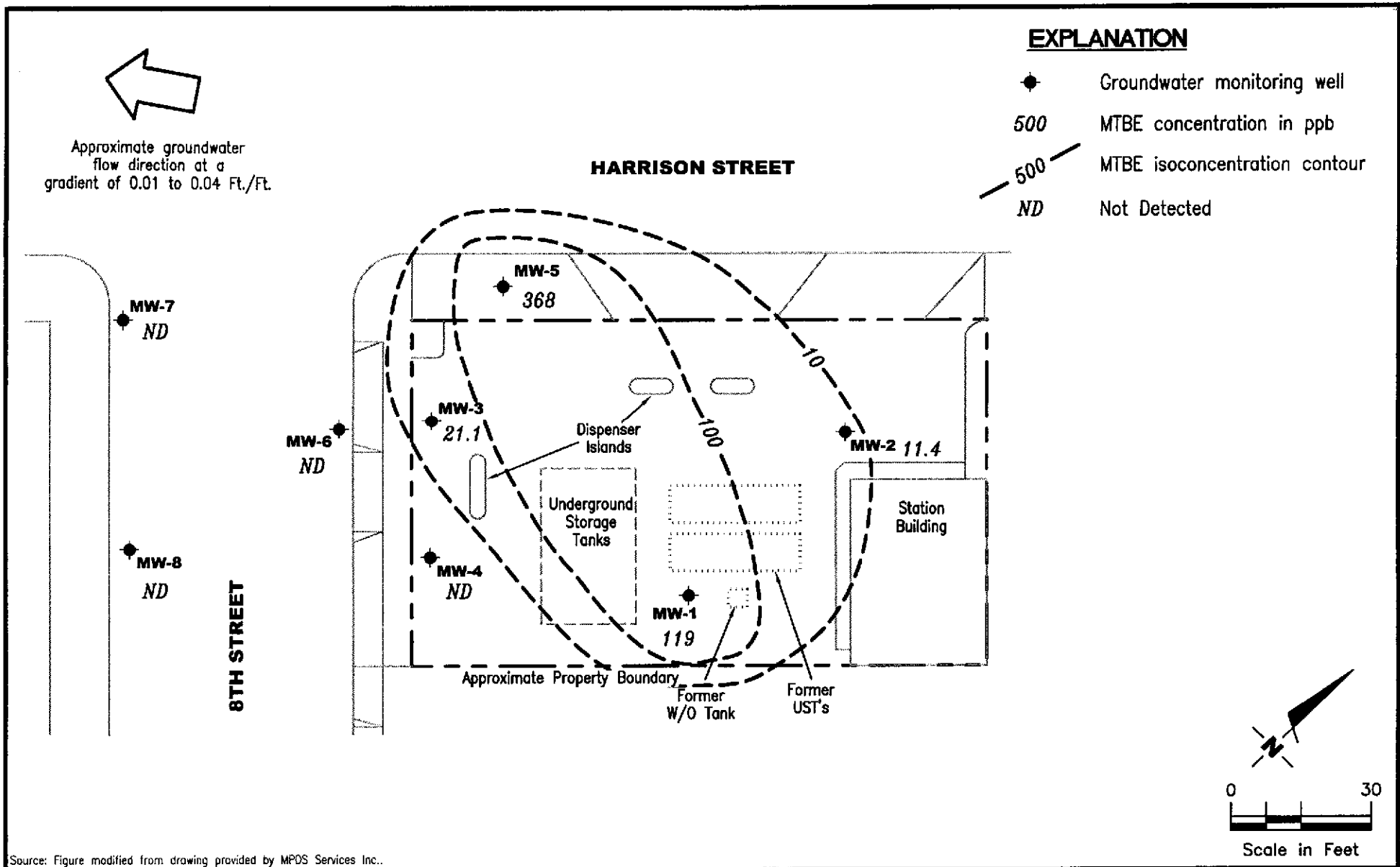
6

PROJECT NUMBER  
 140065

REVIEWED BY

DATE  
 January 2, 2001

REVISED DATE



**GETTLER - RYAN INC.**  
 6747 Sierra Ct., Suite J  
 Dublin, CA 94568 (925) 551-7555

**MTBE ISOCONCENTRATION MAP**  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

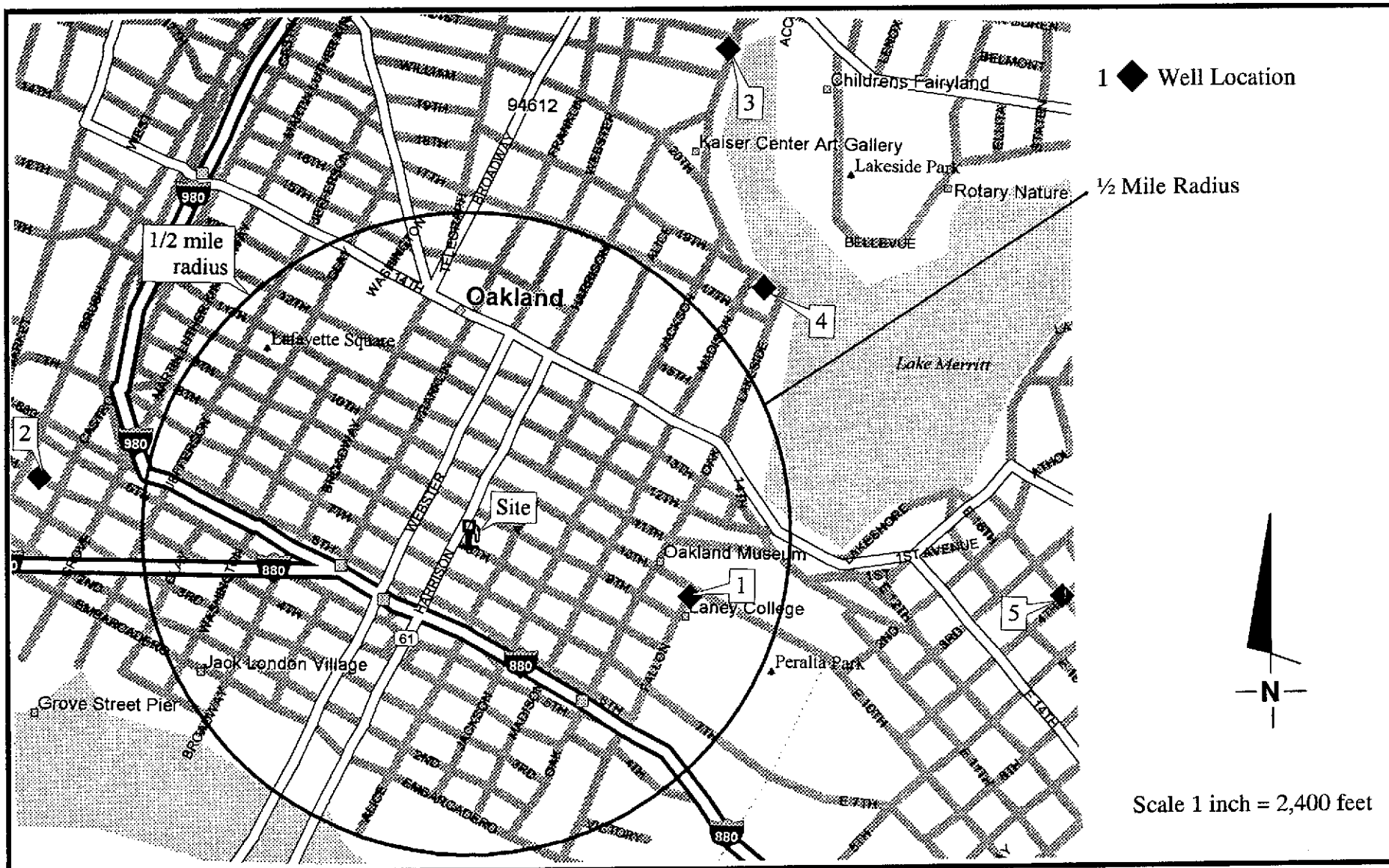
FIGURE  
**7**

PROJECT NUMBER  
 140065

REVIEWED BY

DATE  
 January 2, 2001

REVISED DATE



**Gettler - Ryan Inc.**

6747 Sierra Ct., Suite J (925) 551-7555  
 Dublin, CA 94568

WELL SEARCH MAP  
 Tosco (76) Service Station No. 0752  
 800 Harrison Street  
 Oakland, California

FIGURE

**8**

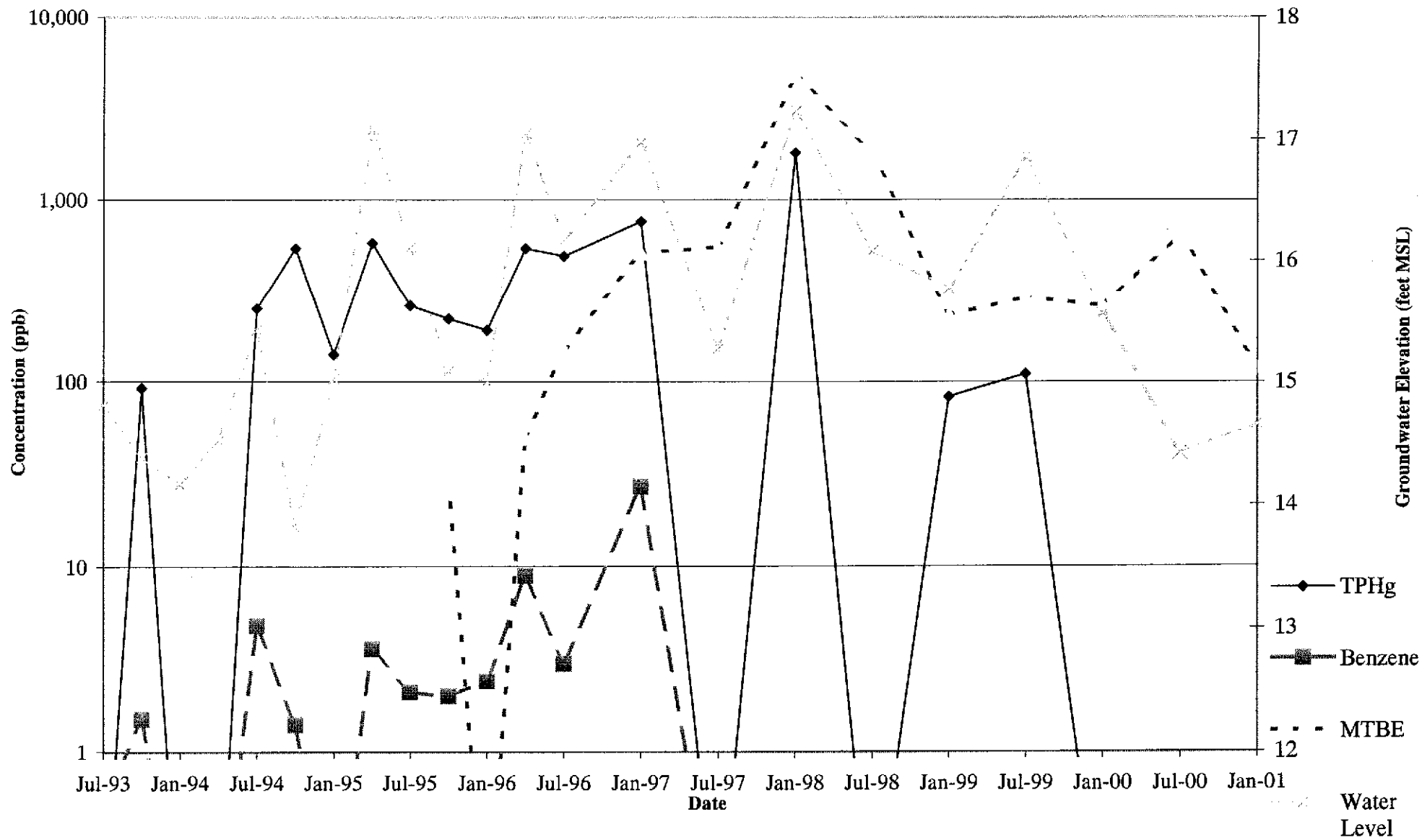
Job Number  
 140065.02

Date  
 04/01

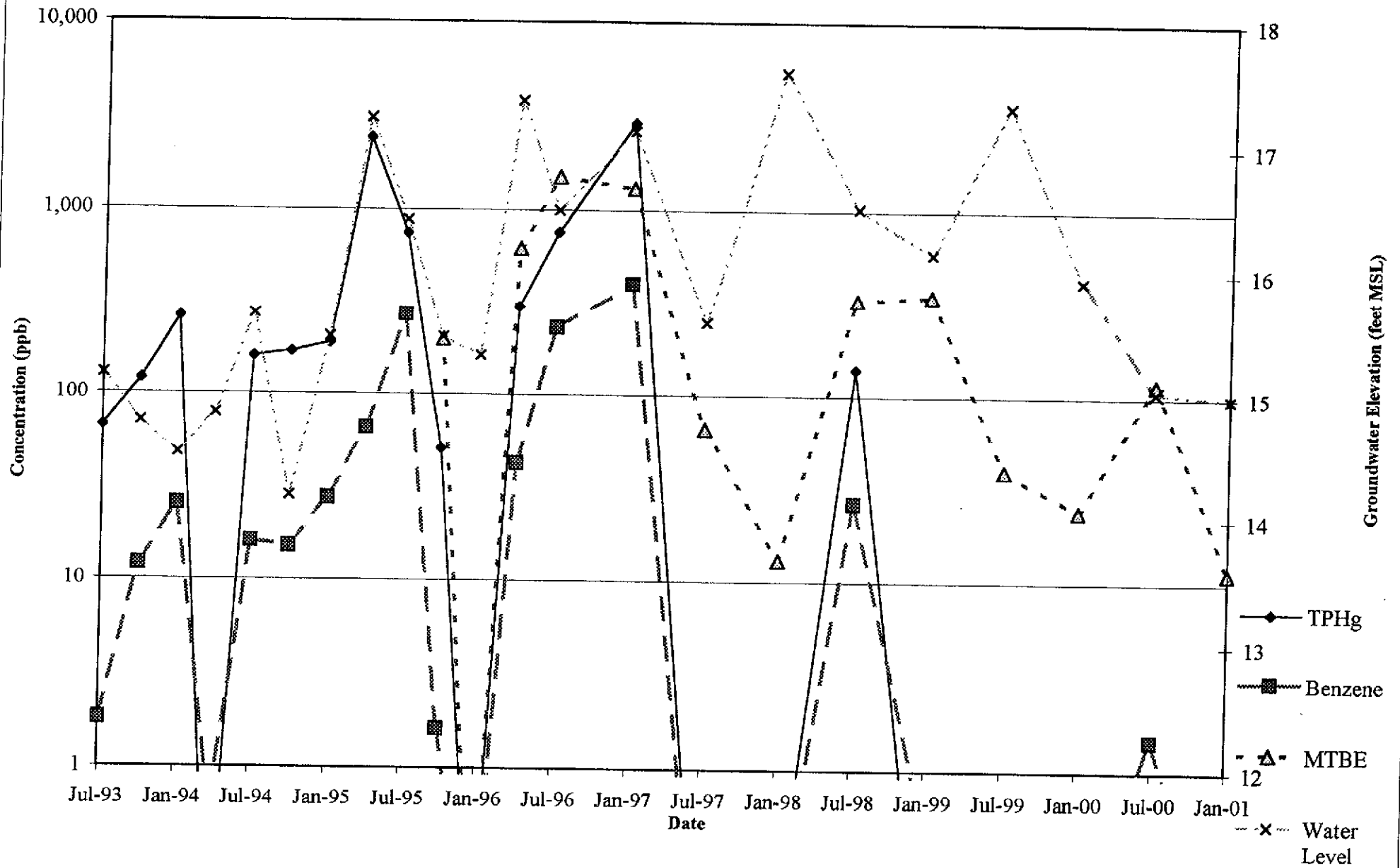
APPENDIX A

CONCENTRATION VERSUS TIME AND  
CONCENTRATION VERSUS DISTANCE CHARTS

**Tosco 76 Service Station No. 0752**  
**Groundwater Concentration vs. Time**  
**MW-1**

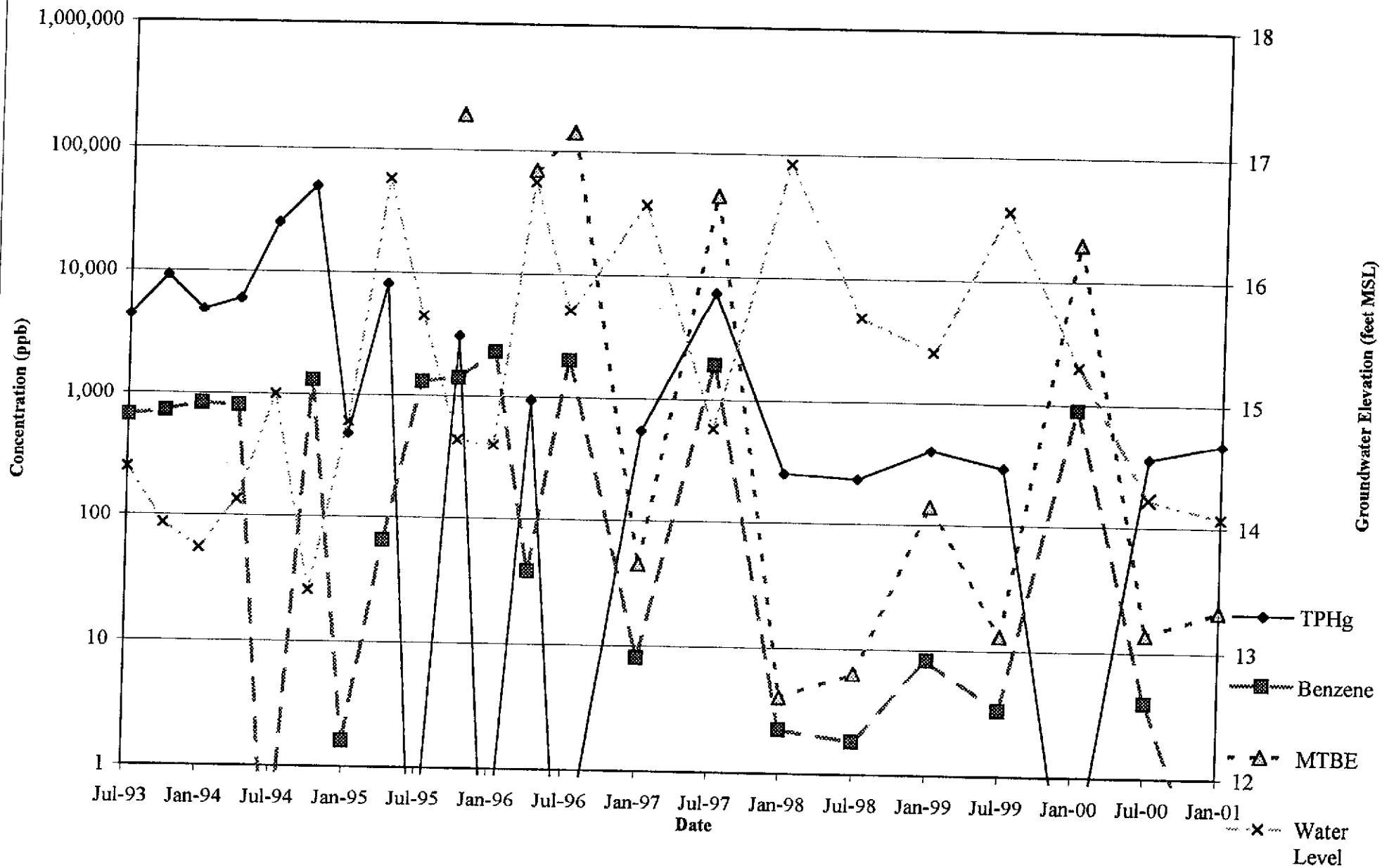


Tosco 76 Service Station No. 0752  
 Groundwater Concentration vs. Time  
 MW-2

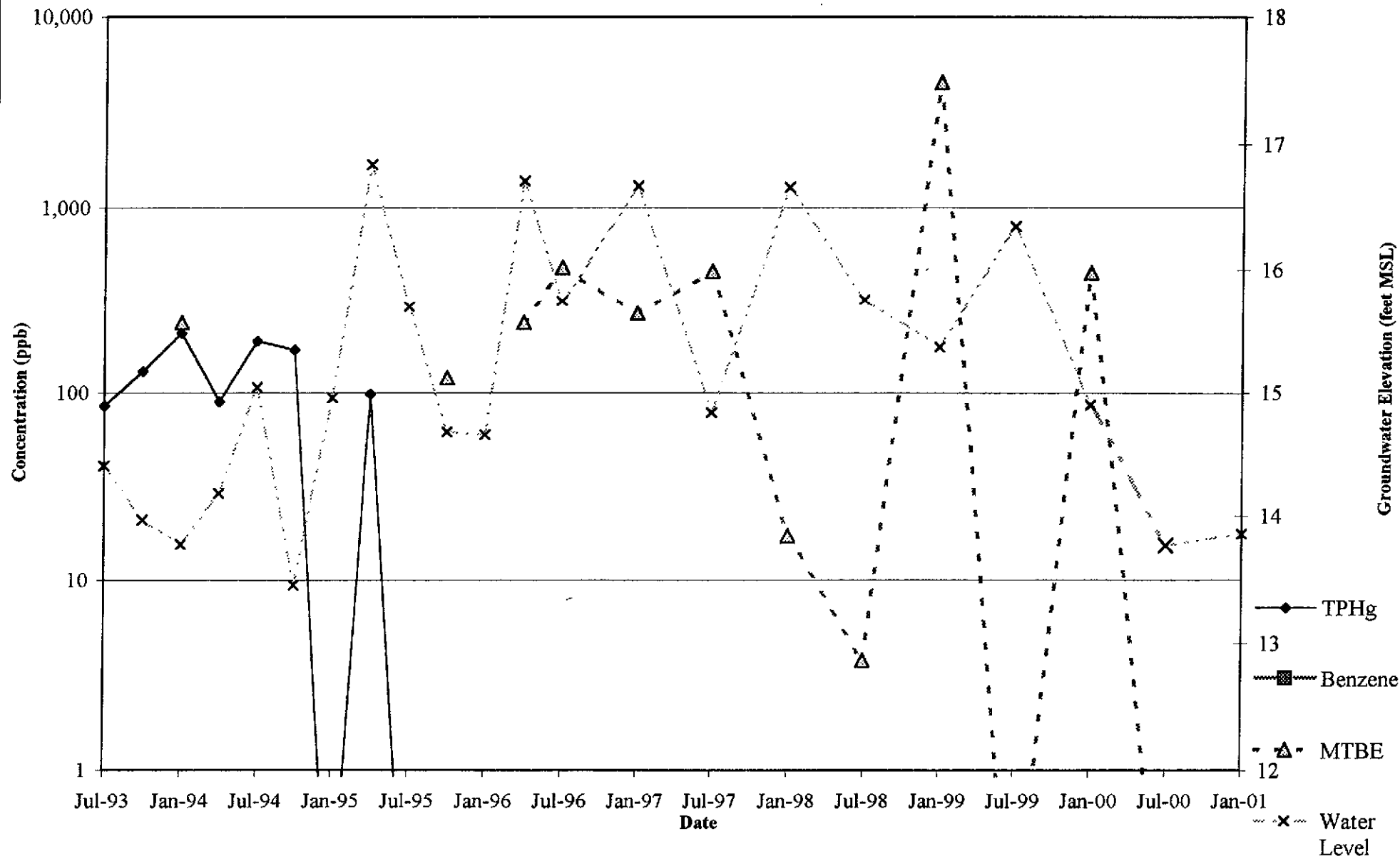




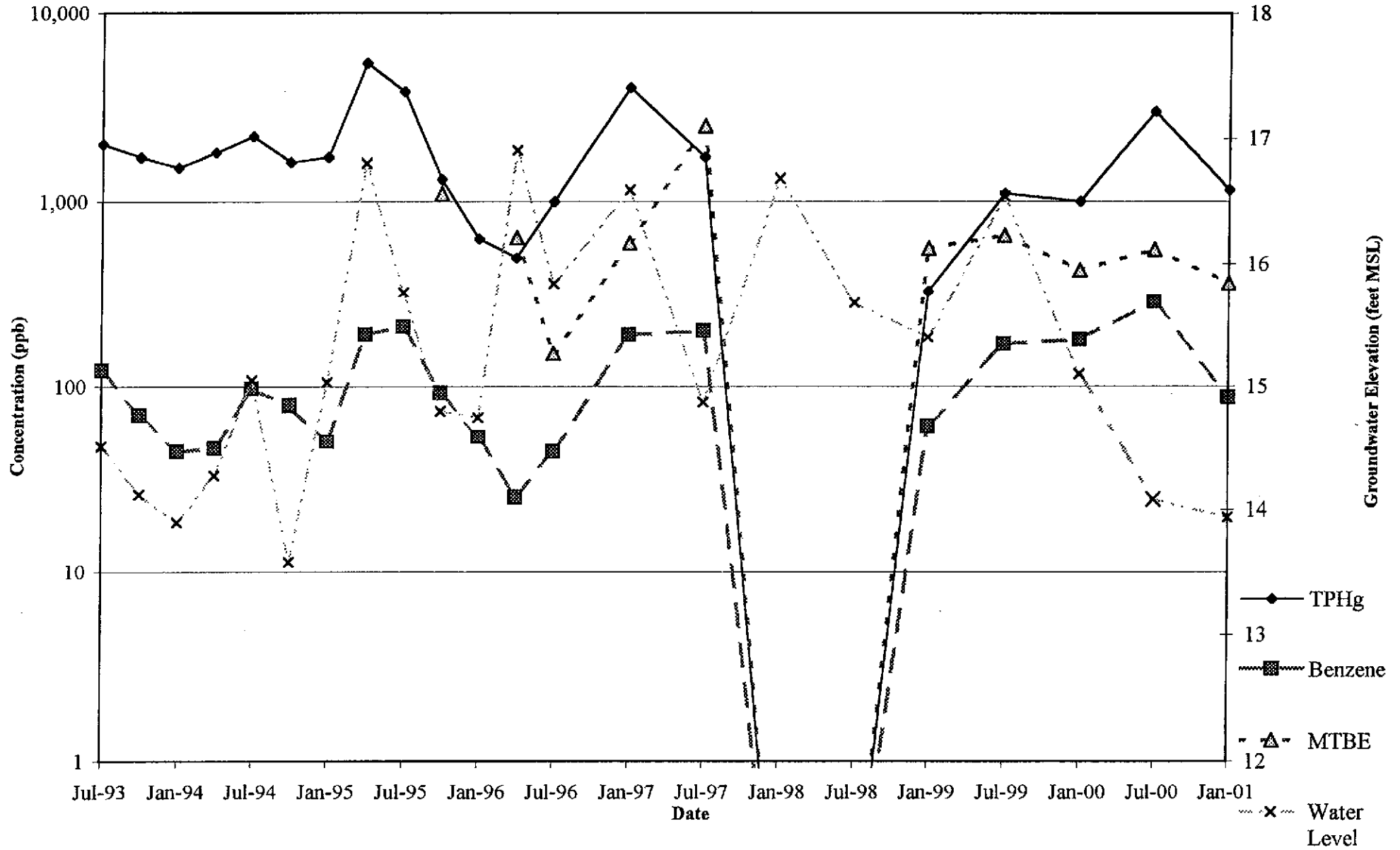
**Tosco 76 Service Station No. 0752  
Groundwater Concentration vs. Time  
MW-3**



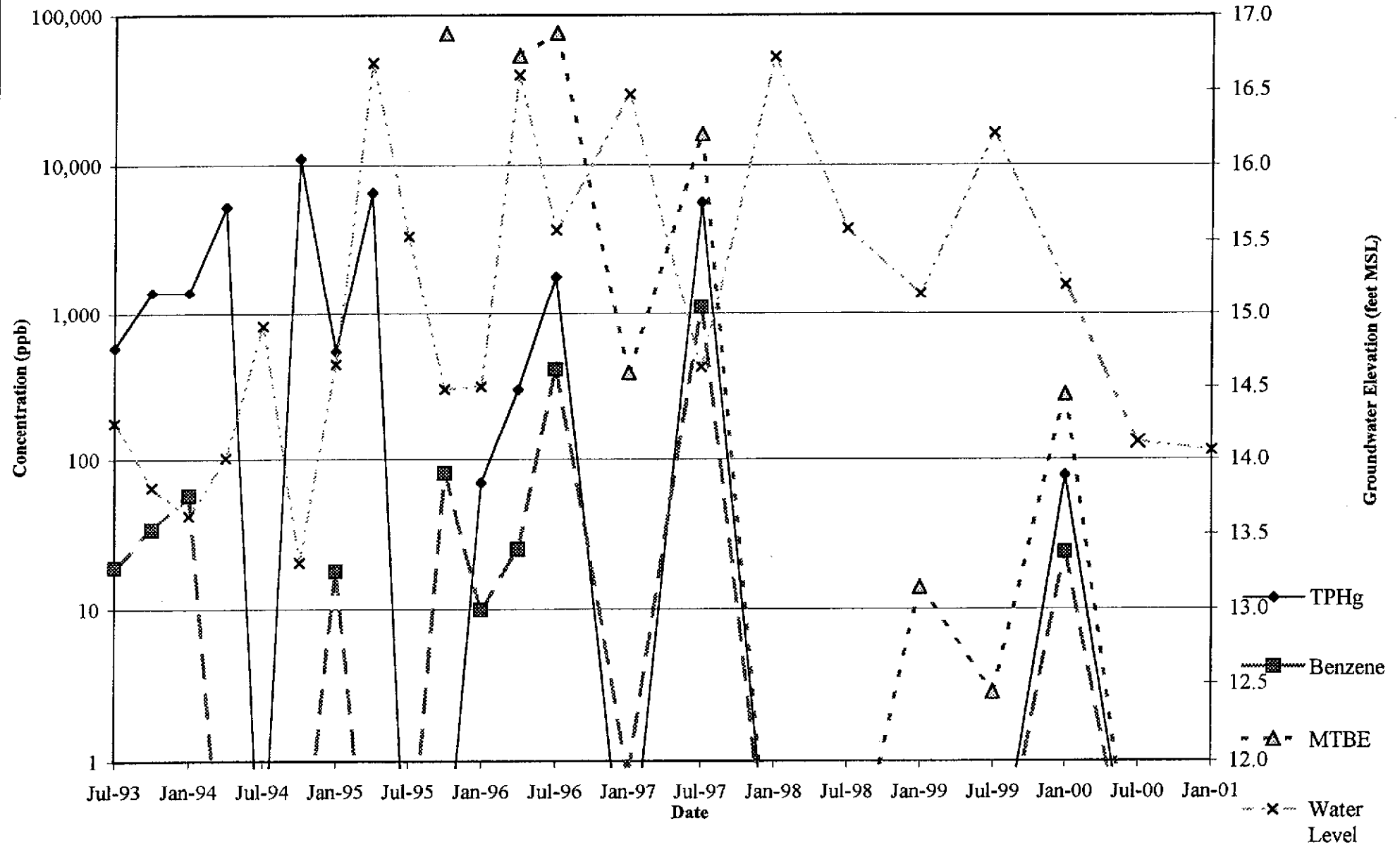
**Tosco 76 Service Station No. 0752  
Groundwater Concentration vs. Time  
MW-4**



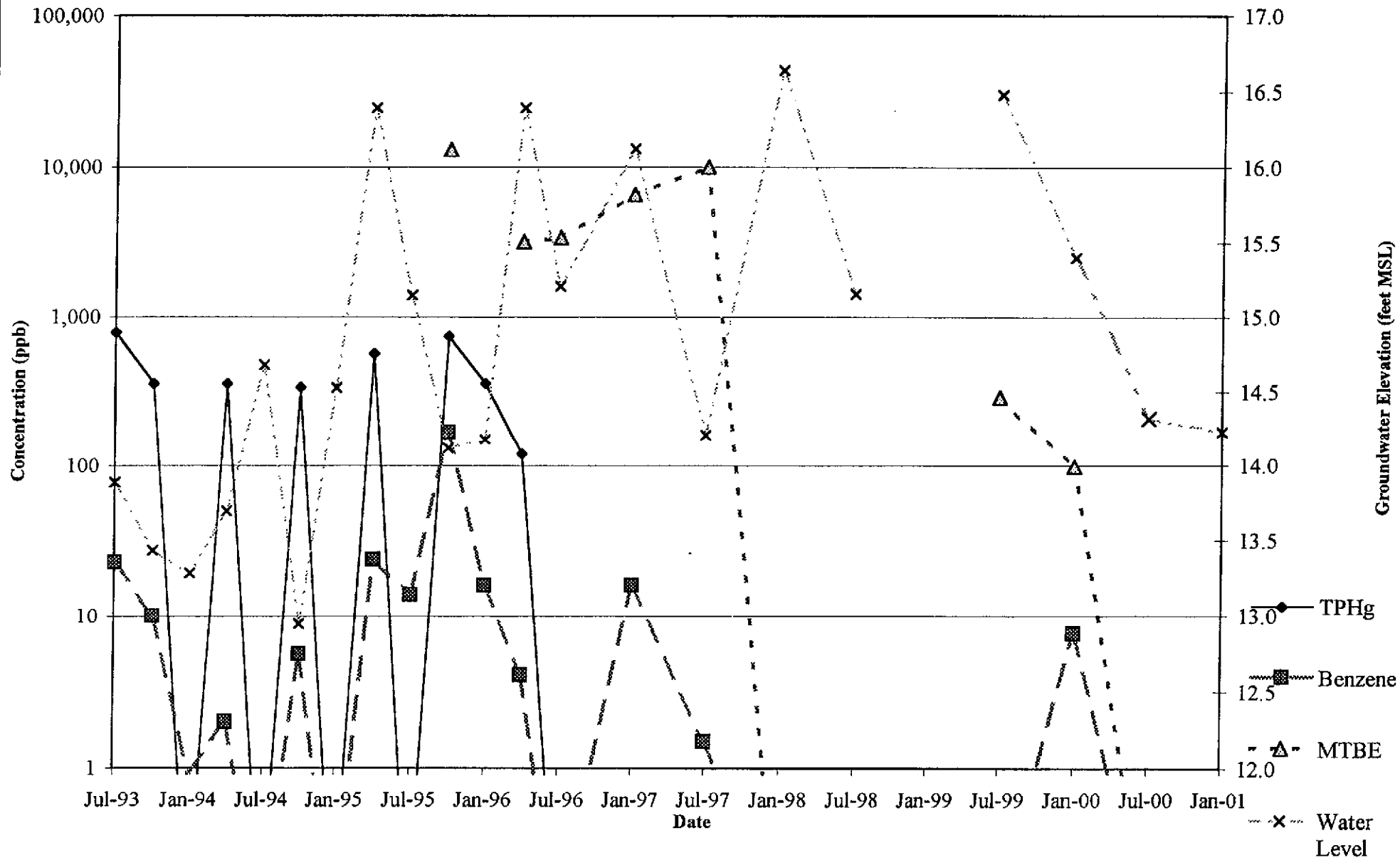
**Tosco 76 Service Station No. 0752**  
**Groundwater Concentration vs. Time**  
**MW-5**



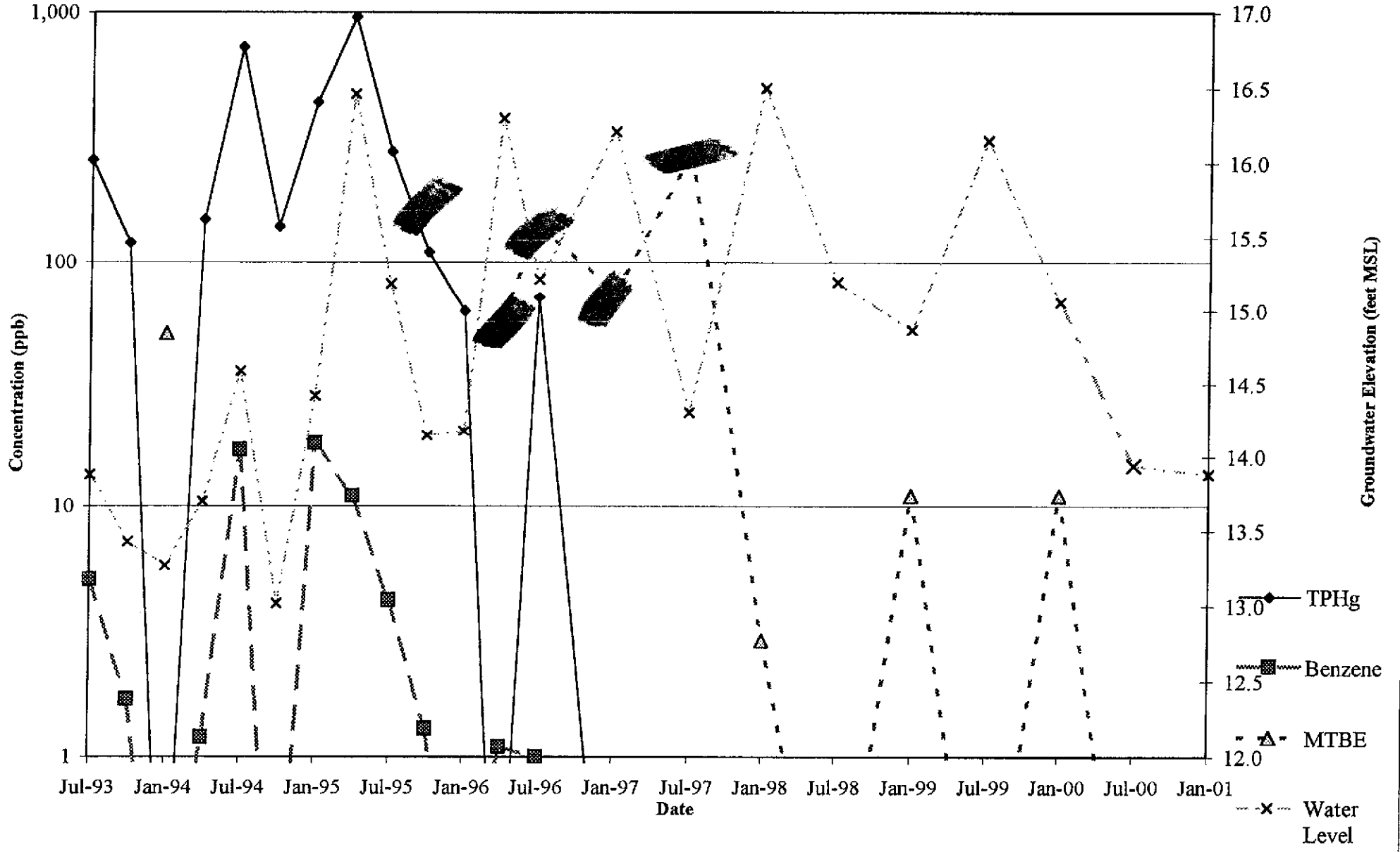
**Tosco 76 Service Station No. 0752**  
**Groundwater Concentration vs. Time**  
**MW-6**



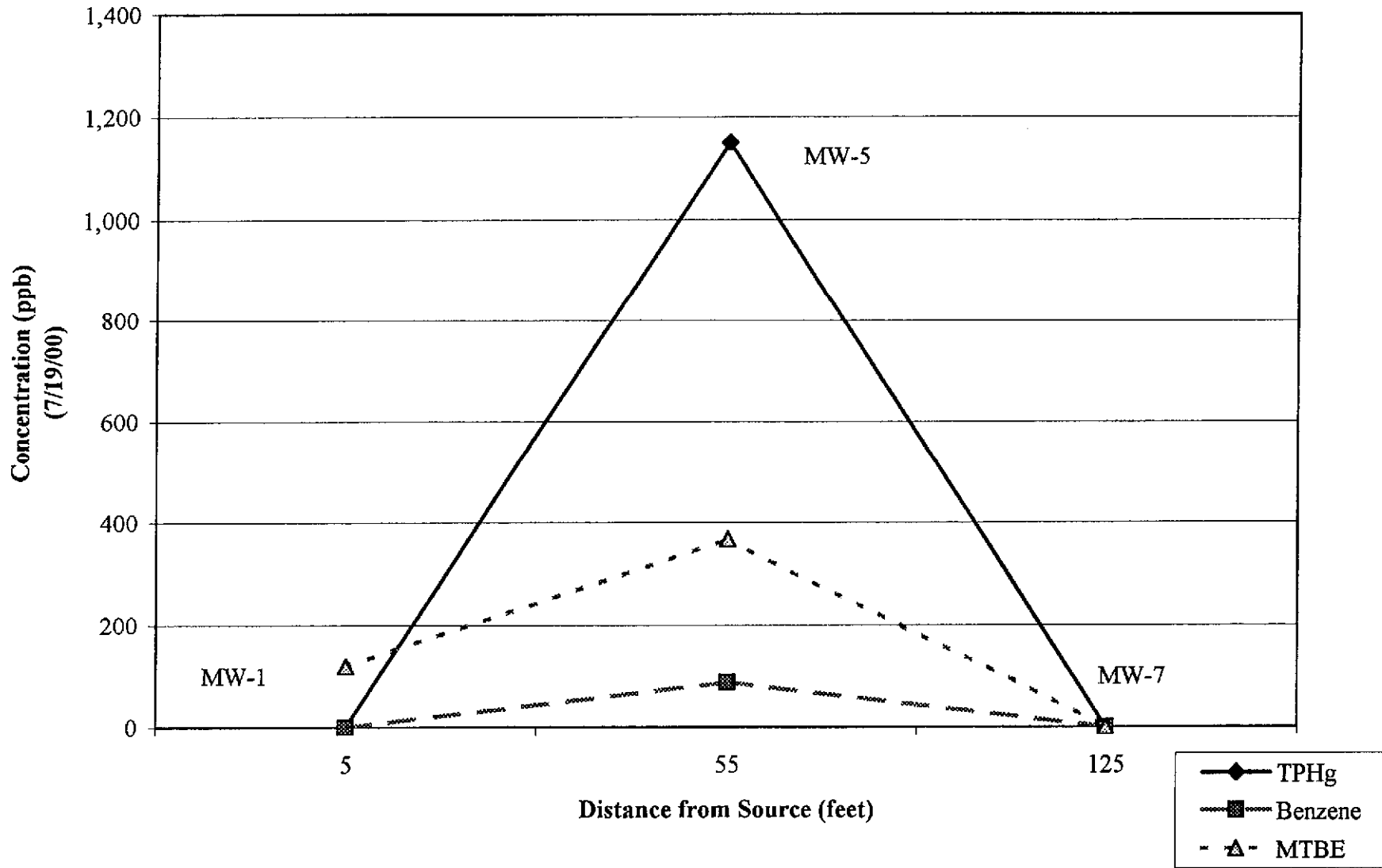
**Tosco 76 Service Station No. 0752**  
**Groundwater Concentration vs. Time**  
**MW-7**



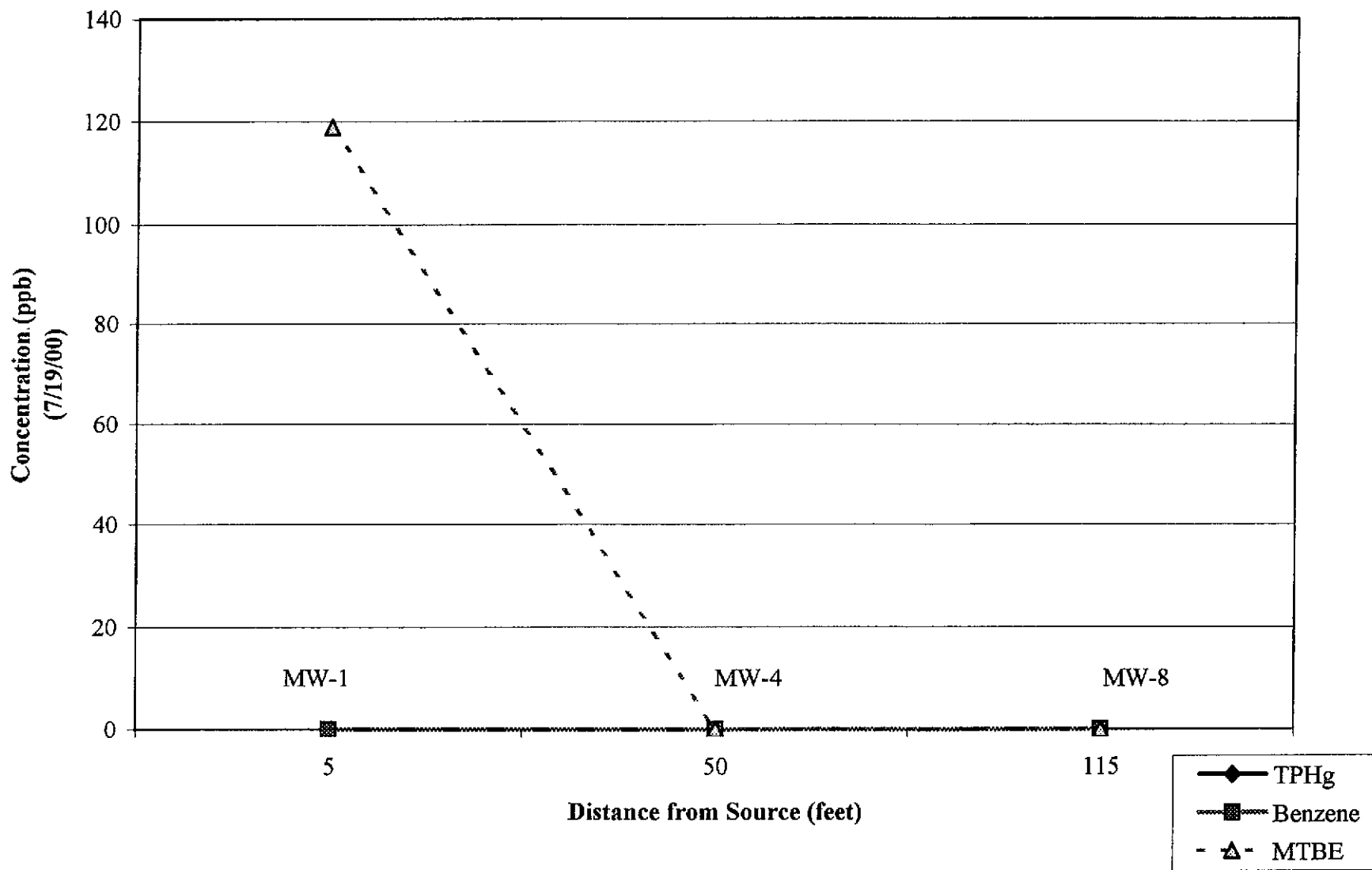
**Tosco 76 Service Station No. 0752**  
**Groundwater Concentration vs. Time**  
**MW-8**



### Tosco 76 Service Station No. 0752 Groundwater Concentrations vs. Distance from Tank Pit



**Tosco 76 Service Station No. 0752**  
**Groundwater Concentrations vs. Distance from Tank Pit**





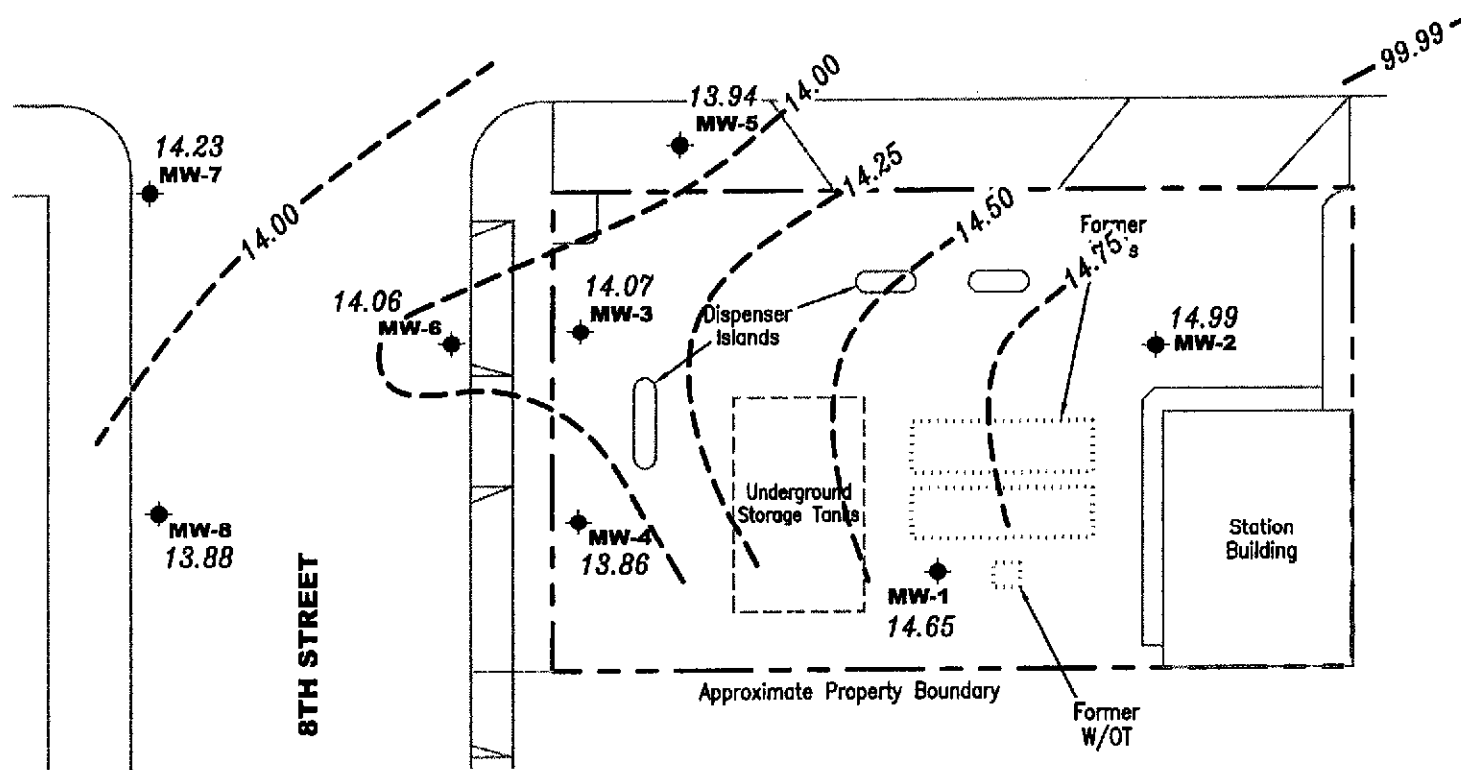
**APPENDIX B**  
**HISTORICAL GROUNDWATER DATA**

**EXPLANATION**

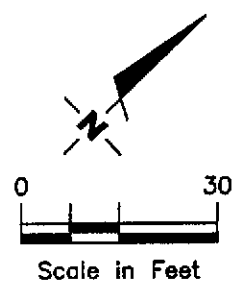
- Groundwater monitoring well
- 99.99 Groundwater elevation in feet referenced to Mean Sea Level (MSL)
- - - Groundwater elevation contour, dashed where inferred.

**HARRISON STREET**

**8TH STREET**



Approximate groundwater flow direction at a gradient of 0.01 to 0.04 Ft./Ft.



Source: Figure modified from drawing provided by MPDS Services Inc..

**GETTLER - RYAN INC.**  
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 Dublin, CA 94568 (925) 551-7555

**POTENTIOMETRIC MAP**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

FIGURE  
**1**

PROJECT NUMBER  
**180066**

REVIEWED BY

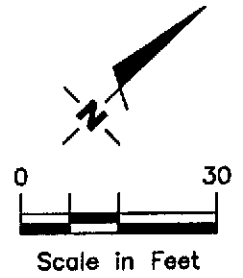
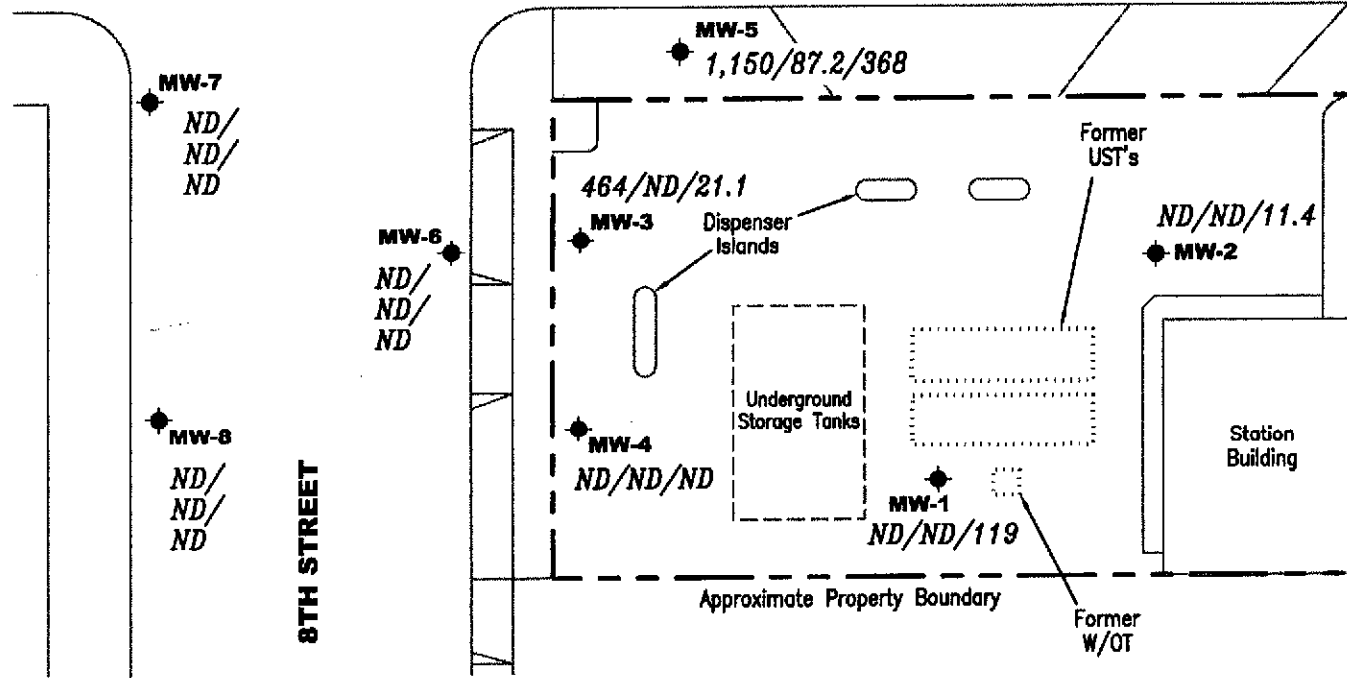
DATE  
January 2, 2001

REVISED DATE

**EXPLANATION**

- ◆ Groundwater monitoring well
- A/B/C TPH(G) (Total Petroleum Hydrocarbons as Gasoline)/ Benzene/MTBE concentrations in ppb
- ND Not Detected

**HARRISON STREET**



Source: Figure modified from drawing provided by MPDS Services Inc..

**GETTLER - RYAN INC.**  
 6747 Sierra Ct., Suite J  
 Dublin, CA 94568 (925) 551-7555

**CONCENTRATION MAP**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

FIGURE  
**2**

PROJECT NUMBER 180066	REVIEWED BY	DATE January 2, 2001	REVISED DATE
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**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-1	06/05/91	--	--	ND	47	ND	ND	ND	ND	--	7.8	2.9	1.3
	09/30/91	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--
	12/30/91	--	--	ND	ND	ND	ND	ND	ND	--	6.4	2.1	0.9
	04/02/92	--	--	94	ND	ND	ND	ND	ND	--	7.1	2.6	1.4
	06/30/92	--	--	120	ND	ND	ND	ND	ND	--	9.5	2.2	1.3
	09/15/92	--	--	ND	76	1.0	ND	ND	ND	--	12	2.2	1.3
34.94	12/21/92	21.17	13.77	ND	95	0.69	ND	ND	1.0	--	12	1.4	0.83
	04/28/93 <sup>1</sup>	--	--	470 <sup>2</sup>	920	3.1	2.3	1.2	9.7	--	12	0.89	0.85
	07/23/93	20.13	14.81	ND	ND	0.5	0.66	ND	ND	--	16	1.3	0.91
34.69	10/05/93	20.30	14.39	57 <sup>3</sup>	92 <sup>5</sup>	1.5	ND	ND	0.72	--	13	1.3	0.66
	01/03/94 <sup>6</sup>	20.52	14.17	ND	ND	ND	ND	ND	ND	--	18	1.4	0.93
	04/02/94	20.16	14.53	ND	ND	ND	ND	ND	ND	--	15	1.1	0.68
	07/05/94	19.27	15.42	--	250	4.8	13	1.2	7.3	--	--	--	--
	10/06/94	20.87	13.82	--	540	1.4	ND	0.66	11	--	--	--	--
	01/02/95	19.67	15.02	--	140	ND	ND	ND	ND	--	--	--	--
	04/03/95	17.61	17.08	--	580	3.6	0.75	ND	4.0	--	--	--	--
	07/14/95	18.58	16.11	--	260	2.1	ND	ND	1.2	--	--	--	--
	10/10/95	19.60	15.09	--	220	2.0	ND	25	5.6	29	--	--	--
	01/03/96	19.69	15.00	--	190	2.4	ND	0.71	1.2	--	--	--	--
	04/10/96	17.65	17.04	--	540	8.9	1.7	1.5	7.4	50	--	--	--
	07/09/96	18.52	16.17	--	490	3.0	1.4	1.3	2.5	150	--	--	--
	01/24/97	17.72	16.97	--	760	27	0.89	5.2	10	510	--	--	--
	07/23/97	19.42	15.27	--	ND	ND	ND	ND	ND	550	--	--	--
NP	01/26/98	17.46	17.23	--	1,800 <sup>8</sup>	ND <sup>9</sup>	ND <sup>9</sup>	ND <sup>9</sup>	ND <sup>9</sup>	4,800	--	--	--
NP	07/03/98	18.61	16.08	--	ND <sup>9</sup>	ND <sup>9</sup>	ND <sup>9</sup>	ND <sup>9</sup>	ND <sup>9</sup>	1,800	--	--	--
	01/14/99	18.92	15.77	--	83 <sup>10</sup>	ND	ND	ND	ND	230	--	--	--
	07/15/99	17.84	16.85	--	110	ND	ND	ND	1.0	290	--	--	--
	01/07/00	19.13	15.56	--	ND	ND	ND	ND	ND	260	--	--	--
	07/19/00	20.27	14.42	--	ND	ND	ND	ND	ND	648	--	--	--
	01/02/01	20.04	14.65	--	ND	ND	ND	ND	ND	119	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-2	06/05/91	--	--	--	49	ND	ND	ND	ND	--	--	--	--
	09/30/91	--	--	--	130	18	0.53	14	9.6	--	--	--	--
	12/30/91	--	--	--	91	16	0.89	11	1.9	--	--	--	--
	04/02/92	--	--	--	88	12	0.32	6.3	7.2	--	--	--	--
	06/30/92	--	--	--	76	9.3	0.76	4.8	6.9	--	--	--	--
	09/15/92	--	--	--	1,300	91	5.7	80	110	--	--	--	--
34.97	12/21/92	20.85	14.12	--	960	97	3.2	74	96	--	--	--	--
	04/28/93	--	--	--	1,300	76	1.9	130	87	--	--	--	--
	07/23/93	19.81	15.16	--	66	1.8	ND	2.5	2.0	--	--	--	--
34.72	10/05/93	19.95	14.77	--	120	12	ND	2.1	12	--	--	--	--
	01/03/94	20.21	14.51	--	260	25	ND	5.5	26	--	--	--	--
	04/02/94	19.88	14.84	--	ND	0.65	ND	ND	0.99	--	--	--	--
	07/05/94	19.07	15.65	--	160	16	ND	0.73	10	--	--	--	--
	10/06/94	20.55	14.17	--	170	15	ND	1.4	11	--	--	--	--
	01/02/95	19.25	15.47	--	190	27	ND	0.95	11	--	--	--	--
	04/03/95	17.49	17.23	--	2,400	65	6.6	19	63	--	--	--	--
	07/14/95	18.30	16.42	--	750	270	ND	ND	13	--	--	--	--
	10/10/95	19.25	15.47	--	50	1.6	ND	ND	ND	200	--	--	--
	01/03/96	19.40	15.32	--	ND	ND	ND	ND	ND	--	--	--	--
	04/10/96	17.35	17.37	--	300	42	ND	2.4	9.0	620	--	--	--
	07/09/96	18.22	16.50	--	760	230	ND	1.3	2.4	1,500	--	--	--
	01/24/97	17.59	17.13	--	2,900	400	350	190	720	1,300	--	--	--
	07/23/97	19.13	15.59	--	ND	ND	ND	ND	ND	65	--	--	--
NP	01/26/98	17.12	17.60	--	ND	ND	ND	ND	0.58	13	--	--	--
NP	07/03/98	18.20	16.52	--	140	26	ND	0.95	5.0	330	--	--	--
	01/14/99	18.56	16.16	--	ND	0.54	ND	ND	ND	350	--	--	--
	07/15/99	17.39	17.33	--	ND	0.88	ND	ND	ND	39	--	--	--
	01/07/00	18.78	15.94	--	ND	ND	ND	ND	ND	24	--	--	--
	07/19/00	19.68	15.04	--	ND	1.45	ND	ND	ND	117	--	--	--
	01/02/01	19.73	14.99	--	ND	ND	ND	ND	ND	11.4	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-3	06/05/91	--	--	--	5,800	1,200	40	140	97	--	--	--	--
	09/30/91	--	--	--	6,800	1,400	130	290	240	--	--	--	--
	12/30/91	--	--	--	7,200	2,100	690	410	550	--	--	--	--
	04/02/92	--	--	--	8,000	1,400	200	300	310	--	--	--	--
	06/30/92	--	--	--	8,900	1,900	210	430	550	--	--	--	--
	09/15/92	--	--	--	10,000	1,900	330	400	580	--	--	--	--
33.39	12/21/92	20.02	13.37	--	8,500	1,500	150	310	330	--	--	--	--
	04/28/93	--	--	--	2,600	220	7.6	41	27	--	--	--	--
	07/23/93	19.00	14.39	--	4,400	660	26	160	82	--	--	--	--
33.14	10/05/93	19.20	13.94	--	9,200	720	88	140	140	--	--	--	--
	01/03/94	19.40	13.74	--	4,900	830	100	170	150	--	--	--	--
	04/02/94	19.01	14.13	--	6,000	800	30	140	110	--	--	--	--
	07/05/94	18.14	15.00	--	25,000 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--
	10/06/94	19.73	13.41	--	49,000 <sup>4</sup>	1,300	200	280	300	--	--	--	--
	01/02/95	18.36	14.78	--	480	1.6	ND	1.4	ND	--	--	--	--
	04/03/95	16.38	16.76	--	8,100 <sup>5</sup>	65	ND	ND	ND	--	--	--	--
	07/14/95	17.49	15.65	--	ND	1,300	ND	ND	ND	--	--	--	--
	10/16/95	16.56	14.64	--	3,100	1,400	56	53	62	100	--	--	--
	01/03/96 <sup>7</sup>	18.54	14.60	--	ND	2,300	110	150	140	--	--	--	--
	04/19/96	16.40	16.07	--	ND	2,000	ND	150	160	140,000	--	--	--
	07/14/96	16.77	15.77	--	ND	2,000	ND	150	160	140,000	--	--	--
	01/24/97	16.57	16.57	--	540	8.0	ND	11	9.9	45	--	--	--
	07/22/97	18.28	14.66	--	7,400	1,900	160	140	340	100	--	--	--
NP	01/26/98	16.22	16.92	--	250	2.2	1.9	0.87	1.9	4.0	--	--	--
NP	07/03/98	17.46	15.68	--	230	1.8	2.5	1.5	3.4	6.3	--	--	--
	01/14/99	17.73	15.41	--	400 <sup>10</sup>	8.2	2.7	0.90	5.9	140	--	--	--
	07/15/99	16.58	16.56	--	290 <sup>10</sup>	3.3	3.6	1.7	2.5	13	--	--	--
	01/07/00	17.94	15.20	--	ND	890	91	100	100	100	--	--	--
	07/19/00	18.92	14.22	--	354 <sup>12</sup>	3.87	2.61	0.646	ND	13.7	--	--	--
	01/02/01	19.07	14.07	--	464 <sup>12</sup>	ND	3.69	3.91	ND	21.1	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
Tosco (Unocal) Service Station #0752  
800 Harrison Street  
Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-4	10/19/92	--	--	--	480	0.51	2.1	2.8	6.8	--	--	--	--
33.12	12/21/92	19.73	13.39	--	220 <sup>4</sup>	ND	ND	0.97	0.74	--	--	--	--
	04/28/93	--	--	--	ND	ND	ND	ND	ND	--	--	--	--
	07/23/93	18.72	14.40	--	85 <sup>4</sup>	ND	ND	ND	ND	--	--	--	--
32.71	10/05/93	18.74	13.97	--	130 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--
	01/03/94	18.93	13.78	--	210	ND	ND	0.76	1.6	240	9.0	1.0	ND
	04/02/94	18.53	14.18	--	89	ND	ND	ND	ND	--	--	--	--
	07/05/94	17.67	15.04	--	190 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--
	10/06/94	19.25	13.46	--	170	0.85	ND	ND	0.74	--	--	--	--
	01/02/95	17.75	14.96	--	ND	ND	ND	ND	ND	--	--	--	--
	04/03/95	15.87	16.84	--	98 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--
	07/14/95	17.01	15.70	--	ND	ND	ND	ND	ND	--	--	--	--
	10/10/95	18.03	14.68	--	ND	ND	ND	ND	ND	120	--	--	--
	01/03/96 <sup>7</sup>	18.05	14.66	--	ND	ND	ND	ND	ND	--	--	--	--
	04/10/96	16.00	16.71	--	ND	ND	ND	ND	ND	240	--	--	--
	07/09/96	16.96	15.75	--	ND	ND	ND	ND	ND	480	--	--	--
	01/24/97	16.04	16.67	--	ND	ND	ND	ND	ND	270	--	--	--
	07/23/97	17.87	14.84	--	ND	ND	ND	ND	ND	460	--	--	--
NP	01/26/98	16.05	16.66	--	ND	ND	ND	ND	ND	17	--	--	--
NP	07/03/98	16.95	15.76	--	ND	ND	ND	ND	ND	3.8	--	--	--
	01/14/99	17.34	15.37	--	ND	ND	ND	ND	ND	4,600	--	--	--
	07/15/99	16.36	16.35	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/07/00	17.81	14.90	--	ND	ND	ND	ND	ND	450	--	--	--
	07/19/00	18.94	13.77	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/02/01	18.85	13.86	--	ND	ND	ND	ND	ND	ND	--	--	--
MW-5	10/19/92	--	--	--	2,700	61	5.0	100	61	--	--	--	--
33.25	12/21/92	19.75	13.50	--	1,700	51	4.7	83	34	--	--	--	--
	04/28/93	--	--	--	6,700	200	190	250	430	--	--	--	--
	07/23/93	18.74	14.51	--	2,000	122	8.0	68	47	--	--	--	--
32.95	10/05/93	18.83	14.12	--	1,700	70	6.2	54	40	--	--	--	--
	01/03/94	19.05	13.90	--	1,500	44	ND	42	46	--	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (mst)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-5	04/02/94	18.68	14.27	--	1,800	46	5.1	38	35	--	--	--	--
(cont)	07/05/94	17.90	15.05	--	2,200	97	8.4	37	36	--	--	--	--
	10/06/94	19.37	13.58	--	1,600	79	5.7	28	22	--	--	--	--
	01/02/95	17.92	15.03	--	1,700	50	8.6	30	28	--	--	--	--
	04/03/95	16.15	16.80	--	5,400 <sup>5</sup>	190	240	170	420	--	--	--	--
	07/14/95	17.18	15.77	--	3,800	210	100	130	190	--	--	--	--
	10/10/95	18.15	14.80	--	1,300	92	14	15	39	1,100	--	--	--
	01/03/96 <sup>7</sup>	18.20	14.75	--	630	53	4.4	8.3	13	--	--	--	--
	04/10/96	16.05	16.90	--	500	25	18	7.0	20	640	--	--	--
	07/09/96	17.11	15.84	--	1,000	44	20	10	34	150	--	--	--
	01/24/97	16.36	16.59	--	4,000	190	400	160	430	600	--	--	--
	07/23/97	18.08	14.87	--	1,700	200	23	18	45	2,500	--	--	--
NP	01/26/98	16.27	16.68	--	ND	ND	ND	ND	ND	ND	--	--	--
NP	07/03/98	17.27	15.68	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/14/99	17.55	15.40	--	330	61	4.1	2.2	2.9	560	--	--	--
	07/15/99	16.41	16.54	--	1,100	170	ND <sup>9</sup>	ND <sup>9</sup>	27	660	--	--	--
	01/07/00	17.85	15.10	--	1,000 <sup>11</sup>	180	6.3	ND <sup>9</sup>	14	430	--	--	--
	07/19/00	18.87	14.08	--	2,980 <sup>11</sup>	289	57.3	65.3	43.4	976	--	--	--
	10/03/00	18.47	14.48	--	--	--	--	--	--	--/553 <sup>13</sup>	--	--	--
	01/02/01	19.01	13.94	--	1,150 <sup>11</sup>	87.2	17.8	7.97	9.32	368	--	--	--
MW-6	10/19/92	--	--	--	3,900	420	12	60	28	--	--	--	--
32.42	12/21/92	19.17	13.25	--	2,300	370	11	39	15	--	--	--	--
	04/28/93	--	--	--	1,200	54	1.5	11	5.3	--	--	--	--
	07/23/93	18.17	14.25	--	580	19	0.99	3.4	2.7	--	--	--	--
32.16	10/05/93	18.35	13.81	--	1,400	34	ND	5.3	7.3	--	--	--	--
	01/03/94	18.54	13.62	--	1,400	57	ND	8.5	11	--	--	--	--
	04/02/94	18.15	14.01	--	5,300 <sup>4</sup>	ND	ND	ND	ND	--	--	--	--
	07/05/94	17.25	14.91	--	ND	ND	ND	ND	ND	--	--	--	--
	10/06/94	18.85	13.31	--	11,000 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--
	01/02/95	17.51	14.65	--	550	18	0.92	2.0	1.8	--	--	--	--
	04/03/95	15.48	16.68	--	6,600 <sup>5</sup>	ND	ND	ND	ND	--	--	--	--



**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-6	07/14/95	16.63	15.53	--	ND	ND	ND	ND	ND	--	--	--	--
(cont)	[REDACTED]	17.68	14.48	--	ND	81	ND	ND	ND	[REDACTED]	--	--	--
	01/03/96 <sup>7</sup>	17.66	14.50	--	70	9.9	0.58	ND	0.81	--	--	--	--
	[REDACTED]	15.56	16.60	--	300	25	4.7	0.94	2.7	[REDACTED]	--	--	--
	[REDACTED]	16.59	15.57	--	1,800	410	ND	12	ND	[REDACTED]	--	--	--
	01/24/97	15.69	16.47	--	ND	0.80	ND	ND	ND	390	--	--	--
	[REDACTED]	17.53	14.63	--	5,700	1,100	240	240	700	[REDACTED]	--	--	--
NP	01/26/98	15.44	16.72	--	ND	ND	ND	ND	ND	ND	--	--	--
NP	07/03/98	16.58	15.58	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/14/99	17.02	15.14	--	ND	ND	ND	ND	ND	14	--	--	--
	07/15/99	15.95	16.21	--	ND	ND	ND	ND	ND	2.8	--	--	--
	01/07/00	16.96	15.20	--	78 <sup>11</sup>	24	ND	0.66	17	280	--	--	--
	07/19/00	18.04	14.12	--	ND	ND	1.32	ND	0.974	ND	--	--	--
	01/02/01	18.10	14.06	--	ND	ND	ND	ND	ND	ND	--	--	--
MW-7													
32.49	04/28/93	--	--	--	110	2.8	1.3	1.4	1.7	--	--	--	--
	07/23/93	18.60	13.89	--	790	23	3.3	28	5.4	--	--	--	--
32.20	10/05/93	18.76	13.44	--	360	10	1.2	0.91	0.99	--	--	--	--
	01/03/94	18.91	13.29	--	ND	0.93	ND	0.75	1.9	--	--	--	--
	04/02/94	18.50	13.70	--	360	2.0	ND	ND	0.8	--	--	--	--
	07/05/94	17.52	14.68	--	ND	ND	ND	ND	ND	--	--	--	--
	10/06/94	19.25	12.95	--	340	5.6	0.85	ND	1.2	--	--	--	--
	01/02/95	17.67	14.53	--	ND	ND	ND	ND	ND	--	--	--	--
	04/03/95	15.81	16.39	--	570	24	ND	3.4	5.8	--	--	--	--
	07/14/95	17.05	15.15	--	ND	14	ND	ND	ND	--	--	--	--
	10/10/95	18.08	14.12	--	740	170	ND	ND	ND	13,000	--	--	--
	01/03/96 <sup>7</sup>	18.02	14.18	--	360	16	1.3	2.7	1.4	--	--	--	--
	04/10/96	15.81	16.39	--	120	4.1	1.5	ND	0.88	[REDACTED]	--	--	--
	07/09/96	16.99	15.21	--	ND	ND	ND	ND	ND	[REDACTED]	--	--	--
	01/24/97	16.08	16.12	--	ND	16	ND	ND	ND	[REDACTED]	--	--	--
	07/23/97	17.99	14.21	--	ND	1.5	ND	ND	0.62	10,000	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
MW-7	NP	01/26/98	15.56	16.64	--	ND	ND	ND	ND	0.56	ND	--	--
(cont)	NP	07/03/98	17.04	15.16	--	ND	ND	ND	ND	ND	ND	--	--
		01/14/99	INACCESSIBLE (PARKED CAR)		--	--	--	--	--	--	--	--	--
		07/15/99	15.72	16.48	--	ND	ND	ND	ND	290	--	--	--
		01/07/00	16.80	15.40	--	ND	7.7	ND	ND	4.4	98	--	--
		07/19/00	17.88	14.32	--	ND	ND	1.27	ND	0.979	ND	--	--
		01/02/01	17.97	14.23	--	ND	ND	ND	ND	ND	ND	--	--
<b>MW-8</b>													
32.33		04/28/93	--	--	--	450	18	1.8	1.8	1.4	--	--	--
		07/23/93	18.45	13.88	--	260	5.1	ND	0.6	ND	--	--	--
32.00		10/05/93	18.57	13.43	--	120 <sup>5</sup>	1.7	ND	ND	ND	--	--	--
		01/03/94 <sup>1</sup>	18.73	13.27	--	ND	ND	ND	ND	ND	51	1.5	1.2
		04/02/94	18.30	13.70	--	150	1.2	ND	ND	ND	--	--	--
		07/05/94	17.41	14.59	--	730	17	ND	1.6	ND	--	--	--
		10/06/94	18.98	13.02	--	140 <sup>5</sup>	ND	ND	ND	ND	--	--	--
		01/02/95	17.58	14.42	--	440	18	0.72	2.0	1.8	--	--	--
		04/03/95	15.54	16.46	--	960	11	ND	ND	ND	--	--	--
		07/14/95	16.81	15.19	--	280	4.2	2.6	1.1	3.3	--	--	--
		10/10/95	17.85	14.15	--	110	1.3	0.62	0.67	ND	170	--	--
		01/03/96 <sup>7</sup>	17.82	14.18	--	63	ND	0.51	ND	1.8	--	--	--
		04/10/96	15.70	16.30	--	ND	1.1	0.61	ND	ND	60	--	--
		07/09/96	16.78	15.22	--	72	1.0	ND	ND	ND	140	--	--
		01/24/97	15.79	16.21	--	ND	ND	ND	ND	ND	76	--	--
		07/23/97	17.69	14.31	--	ND	ND	ND	ND	ND	270	--	--
	NP	01/26/98	15.50	16.50	--	ND	ND	ND	ND	0.76	2.9	--	--
	NP	07/03/98	16.80	15.20	--	ND	ND	ND	ND	ND	ND	--	--
		01/14/99	17.13	14.87	--	ND	ND	ND	ND	ND	11	--	--
		07/15/99	15.85	16.15	--	ND	ND	ND	ND	ND	ND	--	--
		01/07/00	16.94	15.06	--	ND	ND	ND	ND	ND	11	--	--
		07/19/00	18.06	13.94	--	ND	ND	2.99	0.521	ND	ND	--	--
		01/02/01	18.12	13.88	--	ND	ND	ND	ND	ND	ND	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID/ TOC*	DATE	DTW (ft.)	GWE (msl)	TPH-D (ppb)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)	Chloro- form** (ppb)	PCE** (ppb)	TCE** (ppb)
<b>Trip Blank</b>													
TB-LB	01/26/98	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	07/03/98	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/14/99	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	07/15/99	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/07/00	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	07/19/00	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--
	01/02/01	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--

**Table 1**  
**Groundwater Monitoring Data and Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

**EXPLANATIONS:**

Groundwater monitoring data and laboratory analytical results prior to January 26, 1998, were compiled from reports prepared by MPDS Services, Inc.

TOC = Top of Casing  
 DTW = Depth to Water  
 (ft.) = Feet

GWE = Groundwater Elevation  
 (msl) = Relative to mean sea level

TPH-D = Total Petroleum Hydrocarbons as Diesel  
 TPH-G = Total Petroleum Hydrocarbons as Gasoline

B = Benzene  
 T = Toluene  
 E = Ethylbenzene  
 X = Xylenes  
 MTBE = Methyl tertiary butyl ether

PCE = Tetrachloroethene  
 TCE = Trichloroethene  
 (ppb) = Parts per billion  
 ND = Not Detected  
 -- = Not Measured/Not Analyzed  
 NP = No Purge

- \* TOC elevations are relative to mean sea level (msl), per the City of Oakland benchmark disk stamped "25/A" at the northeast corner of 7th and Harrison (Elevation = 28.81 feet msl). Prior to October 5, 1993, the DTW measurements were taken from the top of well covers.
- \*\* All EPA Method 8010 constituents were ND, except as indicated above.
- <sup>1</sup> 1,2-dichloroethane (1,2-DCA) was detected in MW-8 at a concentration of 4.0 ppb on 01/03/94, and 1.1 ppb in MW-1 on 04/28/93.
- <sup>2</sup> Laboratory report indicates the hydrocarbons detected did not appear to be diesel.
- <sup>3</sup> Laboratory report indicates the hydrocarbons detected appeared to be a diesel and non-diesel mixture.
- <sup>4</sup> Laboratory report indicates the hydrocarbons detected appeared to be a gasoline and non-gasoline mixture.
- <sup>5</sup> Laboratory report indicates the hydrocarbons detected did not appear to be gasoline.
- <sup>6</sup> A fuel fingerprint analysis was conducted on this sample. Laboratory report indicates total extractable petroleum hydrocarbons in this sample were not detected in high enough concentrations to compare with known standards and approximate their makeup.
- <sup>7</sup> Laboratory has identified the presence of MTBE at a level above or equal to the taste and odor threshold of 40 ppb in the sample collected from this well.
- <sup>8</sup> Laboratory report indicates gasoline and unidentified hydrocarbons C6-C8.
- <sup>9</sup> Detection limit raised. Refer to analytical reports.
- <sup>10</sup> Laboratory report indicates gasoline and unidentified hydrocarbons C6-C12.
- <sup>11</sup> Laboratory report indicates gasoline C6-C12.
- <sup>12</sup> Laboratory report indicates unidentified hydrocarbons C6-C12.
- <sup>13</sup> MTBE by EPA Method 8260.

**Table 2**  
**Groundwater Analytical Results - Oxygenate Compounds**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID	DATE	TBA (ppb)	MTBE (ppb)	DIPE (ppb)	ETBE (ppb)	TAME (ppb)	1,2-DCA (ppb)	EDB (ppb)
MW-5	10/03/00	ND <sup>1</sup>	553	ND <sup>1</sup>	ND <sup>1</sup>	ND <sup>1</sup>	ND <sup>1</sup>	ND <sup>1</sup>

**EXPLANATIONS:**

TBA = Tertiary butyl alcohol  
 MTBE = Methyl tertiary butyl ether  
 DIPE = Di-isopropyl ether  
 ETBE = Ethyl tertiary butyl ether  
 TAME = Tertiary amyl methyl ether  
 1,2-DCA = 1,2-Dichloroethane  
 EDB = 1,2-Dibromoethane  
 ppb = Parts per billion

**ANALYTICAL METHOD:**

EPA Method 8260 for Oxygenate Compounds

<sup>1</sup> Detection limit raised. Refer to analytical reports.

**Table 3**  
**Groundwater Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID	DATE	TOG (ppm)	Cadmium (ppm)	Chromium (ppm)	Lead (ppm)	Nickel (ppm)	Zinc (ppm)
MW-1	06/05/91	ND	ND	0.0083	0.011	0.063	0.023
	09/30/91	ND	ND	0.019	ND	ND	0.11
	12/30/91	ND	ND	0.0078	0.0057	ND	0.046
	04/02/92	ND	ND	0.015	0.016	ND	0.02
	06/30/92	ND	ND	0.079	0.009	0.1	0.087

**EXPLANATIONS:**

Groundwater analytical results were compiled from reports prepared by MPDS Services, Inc.

TOG = Total Oil and Grease

ppm = Parts per million

ND = Not Detected

**Table 4**  
**Groundwater Analytical Results**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID	DATE	BOD (ppm)	Bicarbonate Alkalinity (ppm)	Calcium (ppm)	Iron (ppm)	Manganese (ppm)	Nitrate (ppm)	Sulfate (ppm)	Heterotrophic Plate Count (CFU/mL)
MW-1	04/10/96	--	160	21	15	2.6	--	--	--
MW-2	01/03/96	2.2	130	27	77	3.0	0.22	97	>5,700
	04/10/96	--	460	58	60	7.0	--	--	--
MW-3	01/03/96	4.3	430	43	61	5.4	0.23	16	350
	04/10/96	--	360	40	60	3.7	--	--	--
MW-4	01/03/96	ND	120	20	61	3.3	10	44	1,000
	04/10/96	--	160	25	43	2.0	--	--	--
MW-5	01/03/96	3.4	240	31	80	3.3	ND	17	>5,700
	04/10/96	--	240	22	18	2.4	--	--	--
MW-6	04/10/96	--	240	35	61	3.7	--	--	--
MW-7	04/10/96	--	210	44	120	4.8	--	--	--
MW-8	01/03/96	ND	310	37	62	3.3	0.57	20	>5,700
	04/10/96	--	380	37	63	3.6	--	--	--

**EXPLANATIONS:**

Groundwater analytical results were compiled from reports prepared by MPDS Services, Inc.

BOD = Biochemical Oxygen Demand

ppm = Parts per million

CFU/mL = Colony Forming Units per milliliter

-- = Not Analyzed

ND = Not Detected

**Table 5**  
**Dissolved Oxygen Concentrations**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID	DATE	Before Purging (mg/L)	After Purging (mg/L)
MW-1	04/10/96	--	3.04
	07/09/96	--	3.13
	01/24/97	--	2.56
	07/23/97	2.26	2.81
	01/26/98	3.97	--
	07/03/98	3.58	--
MW-2	01/03/96		1.80
	04/10/96	--	5.88
	07/09/96	--	0.71
	01/24/97	--	2.37
	07/23/97	1.40	0.97
	01/26/98	4.12	--
07/03/98	3.99	--	
MW-3	01/03/96		1.50
	04/10/96	--	4.63
	07/09/96	--	1.04
	01/24/97	--	1.46
	07/23/97	3.84	1.37
	01/26/98	1.84	--
07/03/98	2.16	--	
MW-4	01/03/96		1.20
	04/10/96	--	5.23
	07/09/96	--	4.91
	01/24/97	--	3.04
	07/23/97	<i>OK</i> 9.28	3.68
	01/26/98	3.36	--
07/03/98	4.07	--	
MW-5	01/03/96		2.80
	04/10/96	--	3.73
	07/09/96	--	3.25
	01/24/97	--	1.47
	07/23/97	<i>OK</i> 7.96	4.56
	01/26/98	5.30	--
07/03/98	4.73	--	
MW-6	04/10/96		4.50
	07/09/96	--	3.62
	01/24/97	--	6.21
	07/23/97	<i>OK</i> 10.90	3.31
	01/26/98	2.55	--
	07/03/98	3.11	--



**Table 5**  
**Dissolved Oxygen Concentrations**  
 Tosco (Unocal) Service Station #0752  
 800 Harrison Street  
 Oakland, California

WELL ID	DATE	Before Purging (mg/L)	After Purging (mg/L)
MW-7	04/10/96	--	5.10
	07/09/96	--	2.34
	01/24/97	--	1.91
	07/23/97	3.25	2.83
	01/26/98	3.44	--
	07/03/98	3.83	--
MW-8	01/03/96	--	1.30
	04/10/96	--	4.80
	07/09/96	--	1.32
	01/24/97	--	2.09
	07/23/97	4.08	3.27
	01/26/98	4.71	--
	07/03/98	5.16	--

**EXPLANATIONS:**

Dissolved oxygen concentrations prior to January 26, 1998, were compiled from reports prepared by MPDS Services, Inc.

mg/L = milligrams per liter

-- = Not Measured

APPENDIX C

HISTORICAL SOIL DATA AND BORING LOGS

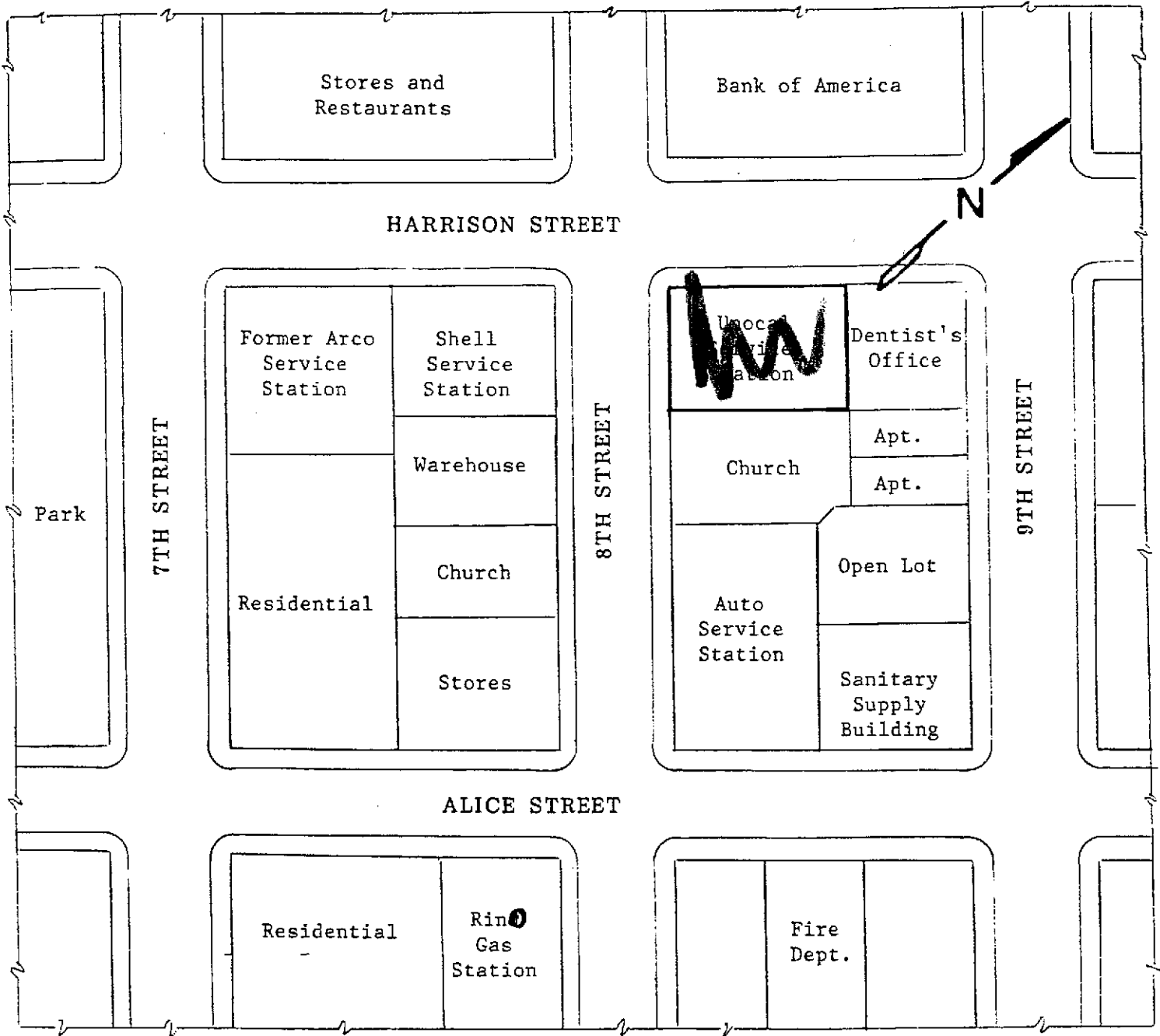


# KAPREALIAN ENGINEERING, INC.

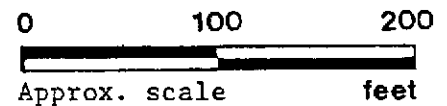
Consulting Engineers

P.O. BOX 996 • BENICIA, CA 94510

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SITE VICINITY MAP



Unocal S/S #0752  
800 Harrison Street  
Oakland, CA

KEI-P90-1103.R8  
 April 1, 1994

TABLE 1  
 SUMMARY OF LABORATORY ANALYSES  
 SOIL

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>	
5/29/91	EB1(55)	--	ND	ND	ND	ND	ND	
	EB1(10)	--	ND	ND	ND	ND	ND	
	EB1(15)	--	ND	0.0087	ND	ND	ND	
	EB1(20)	--	ND	ND	ND	ND	ND	
	EB1(22)	--	ND	ND	ND	ND	ND	
	EB2(5.5)	--	ND	ND	ND	ND	ND	
	EB2(10)	--	ND	ND	ND	ND	ND	
	EB2(15)	--	ND	ND	ND	ND	ND	
	EB2(20)	--	ND	ND	ND	ND	ND	
	EB2(22.5)	--	ND	ND	ND	ND	ND	
	3/17/94	EB3(5)	--	ND	ND	ND	ND	ND
		& EB3(9.5)	--	ND	ND	ND	ND	ND
	3/18/94	EB3(14.5)	--	ND	ND	ND	ND	ND
		EB3(19.5)	--	ND	ND	ND	ND	ND
		EB4(5)	--	ND	ND	ND	ND	ND
	EB4(9.5)	--	ND	ND	ND	ND	ND	
	EB4(14.5)	--	ND	ND	ND	ND	ND	
	EB4(19)	--	ND	ND	ND	ND	ND	
	EB5(5)	--	ND	ND	ND	ND	ND	
	EB5(10)	--	ND	ND	ND	ND	ND	
	EB5(15)	--	ND	ND	ND	ND	ND	
	EB5(19)	--	310*	0.71	2.4	1.3	2.2	
	EB6(4.5)	--	ND	ND	ND	ND	ND	
	EB6(9.5)	--	ND	ND	ND	ND	ND	
	EB6(14.5)	--	ND	ND	ND	ND	ND	
	EB6(19.5)	--	ND	ND	ND	ND	ND	
	EB7(5)	--	ND	ND	ND	ND	ND	
	EB7(10)	--	ND	ND	ND	ND	ND	
	EB7(15)	--	ND	ND	ND	ND	ND	
	EB7(19)	--	ND	ND	ND	ND	ND	
	EB8(5)	--	ND	ND	ND	ND	ND	
	EB8(10)	--	ND	ND	ND	ND	ND	
	EB8(15)	--	ND	ND	ND	ND	ND	
	EB8(18.5)	--	21,000	7.0	78	26	140	

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TABLE 1 (Continued)

SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>
3/17/94	EB9(5.5)	ND	1.6	ND	0.040	ND	0.99
&	EB9(10)	ND	ND	ND	ND	ND	ND
3/18/94	EB9(15)	ND	ND	ND	ND	ND	ND
(Con't)	EB9(20)	ND	ND	ND	ND	ND	ND
	EB10(5)	--	ND	ND	ND	ND	ND
	EB10(10)	--	ND	ND	ND	ND	ND
	EB10(15)	--	ND	ND	ND	ND	ND
	EB10(20)	--	ND	ND	ND	ND	ND
	EB11(5)	ND	1.8*	ND	0.0091	ND	0.0088
	EB11(6)	19♦	3.6**	ND	ND	ND	ND
	EB11(10)	ND	ND	ND	ND	ND	ND
	EB12(5)	ND	ND	ND	ND	ND	ND
	EB12(10.5)	ND	ND	ND	ND	ND	ND

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

- \* Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a gasoline and non-gasoline mixture.
- \*\* Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.
- ♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

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April 1, 1994

TABLE 2  
SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample Number</u>	<u>TOG</u>	<u>TPH as Hydraulic Fluid</u>	<u>Tetrachloro-ethene* (µg/kg)</u>	<u>1,1,1-tri-chloroethane* (µg/kg)</u>
3/17/94	EB9(5.5)	ND	ND	ND	ND
&	EB9(10)	ND	ND	ND	ND
3/18/94	EB9(15)	ND	ND	ND	ND
	EB9(20)	ND	ND	ND	ND
	EB11(5)	13,000	4,300	130	46
	EB11(6)	4,300	270	ND	ND
	EB11(10)	88	ND	ND	ND
	EB12(5)	ND	ND	ND	ND
	EB12(10.5)	ND	ND	ND	ND

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

\* All EPA method 8010 constituents were non-detectable, except as indicated above.

ND = Non-detectable.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.

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 April 1, 1994

TABLE 6  
 SUMMARY OF LABORATORY ANALYSES  
 SOIL

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>
5/23/91	MW1(5)*	2.2	1.1	ND	ND	ND	0.010
&	MW1(10)*	43	43	ND	0.0059	0.0074	0.43
5/30/91	MW1(15)*	120	250	0.80	0.73	0.91	2.9
	MW1(20)*	ND	ND	ND	ND	ND	ND
	MW1(24)*	ND	ND	ND	ND	ND	0.0073
	MW2(5)	--	ND	ND	ND	ND	0.0054
	MW2(10)	--	ND	ND	ND	ND	ND
	MW2(15.5)	--	ND	0.015	ND	0.0064	0.025
	MW2(20)	--	ND	0.0086	ND	ND	ND
	MW2(22)	--	ND	ND	ND	ND	ND
	MW3(5)	--	ND	ND	ND	ND	ND
	MW3(10)	--	ND	ND	ND	ND	ND
	MW3(15)	--	ND	ND	ND	ND	ND
	MW3(20)	--	ND	ND	ND	ND	ND
	MW3(23)	--	2.9	0.0079	ND	0.012	0.031
9/30/92	MW4(5)	--	ND	ND	ND	ND	ND
&	MW4(10)	--	ND	ND	ND	ND	ND
10/01/92	MW4(15)	--	ND	ND	ND	ND	ND
	MW4(20)	--	ND	ND	ND	ND	ND
	MW4(22.5)	--	27♦	ND	ND	ND	ND
	MW5(5)	--	ND	ND	ND	ND	ND
	MW5(10)	--	ND	ND	ND	ND	ND
	MW5(15)	--	ND	ND	ND	ND	ND
	MW5(20)	--	ND	ND	ND	ND	ND
	MW5(22)	--	1.1	ND	0.00600	ND	0.014

KEI-P90-1103.R8  
April 1, 1994

TABLE 6 (Continued)

SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl-benzene</u>	<u>Xylenes</u>
9/30/92	MW6(5)	--	ND	ND	ND	ND	ND
&	MW6(10)	--	ND	ND	ND	ND	ND
10/01/92	MW6(15)	--	ND	ND	ND	ND	ND
	MW6(20)	--	ND	ND	ND	ND	ND
	MW6(21.5)	--	.170	ND	0.38	1.8	4.5
4/14/93	MW7(5)	--	ND	ND	ND	ND	ND
	MW7(10)	--	ND	ND	ND	ND	ND
	MW7(15)	--	ND	ND	ND	ND	ND
	MW7(21)	--	ND	ND	ND	ND	ND
	MW8(5)	--	ND	ND	ND	ND	ND
	MW8(10)	--	ND	ND	ND	ND	ND
	MW8(15)	--	ND	ND	ND	ND	ND
	MW8(20.5)	--	ND	ND	ND	ND	ND

**NOTE:** The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

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

† Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.

ND = Non-detectable.

-- Indicates analysis was not performed.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.



KEI-P90-1103.R8  
April 1, 1994

TABLE 7  
SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample</u>	<u>Cadmium</u>	<u>Chromium</u>	<u>Lead</u>	<u>Nickel</u>	<u>Zinc</u>
5/29/91	MW1(5)	ND	64	11	32	30
	MW1(10)	ND	48	7.1	24	27
	MW1(15)	ND	11	06.0	42	28
	MW1(20)	ND	32	4.2	36	23
	MW1(24)	ND	20	5.0	31	23

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

ND = Non-detectable.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.

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April 1, 1994

TABLE 8

SUMMARY OF LABORATORY ANALYSES  
SOIL

(Collected on November 9 & 12, December 20 & 26, 1990,  
and January 3, 1991)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl- benzene</u>	<u>Xylenes</u>
A1	14.0	1,200	3.0	38	25	170
A2	12.0	ND	ND	0.0082	ND	0.024
B1	14.0	45	0.29	2.7	1.4	10
B2	12.0	ND	0.0063	0.0056	ND	0.011
C(19)	19.0	3,800	11	90	36	210
WO1*	6.5	ND	ND	ND	ND	ND
WO1(9.5)**		9.5	ND	ND	ND	ND
D1	2.5	ND	ND	ND	ND	ND
D2	2.5	45	0.22	1.8	0.71	5.5
D2(6)	6.0	1,200	0.24	28	28	170
D3	2.5	ND	ND	ND	ND	ND
D4	2.5	ND	ND	ND	ND	ND
D5	2.5	ND	ND	ND	ND	ND
D6	2.5	ND	ND	ND	0.018	ND
F1	2.5	ND	ND	ND	ND	ND

\* TOG, TPH as diesel, cadmium, and all EPA methods 8010 and 8270 constituents were non-detectable. Chromium, lead, zinc, and nickel were detected at 43 mg/kg, 1,100 mg/kg, 130 mg/kg, and 12 mg/kg, respectively.

\*\* TOG and lead were non-detectable. Chromium, zinc, and nickel were detected at 61 mg/kg, 20 mg/kg, and 40 mg/kg, respectively.

ND = Non-detectable.

Results are in milligrams per kilogram (mg/kg), unless otherwise indicated.

HARRISON STREET



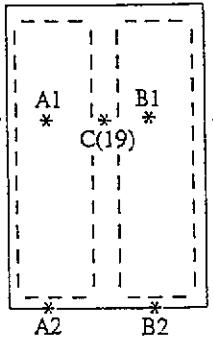
Existing Building

Former U.G. Fuel Storage Tank Pit

U.G. W.O. Tank Pit

D6 \*  
D5 \*  
D4 \*  
D3 \*

P1



WO1  
WO1(9.5)

New U.G. Fuel Storage Tank Pit

Pipe Trenches

D2 }  
D2(6) }

D1 \*

Pump Island (Typ. 3)

8TH STREET

**LEGEND**

\* Soil sample point location

0 20 40



Approx. scale feet

**SOIL SAMPLE POINT LOCATIONS**



KAPREALIAN ENGINEERING  
INCORPORATED

UNOCAL SERVICE STATION #0752  
800 HARRISON STREET  
OAKLAND, CA

FIGURE  
2

**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1109	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> MW1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		5" thick concrete slab over sand and gravel.
				Fill material consisting of silt, clay and gravel, with concrete, wood and glass, moist, gray, brown and yellowish brown mottled.
10/18/28		5	SP/ SM	Fine-grained sand, with silt, trace clay, moist, dense, pale brown to yellowish brown, trace black specks.
18/18/18		10		Fine-grained sand, with silt, trace root holes, moist, dense, olive gray and greenish gray mottled.
6/12/20		15		Fine-grained sand, with silt, trace silt, trace clay, moist, dense, olive brown with slight greenish gray mottling.
20/25/38			SP	Fine-grained sand, trace silt, moist, very dense, dark greenish gray to olive gray.
15/		20		Fine-grained sand, as above, moist, dense, olive gray.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1109	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> W.W. <i>ARB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> MW1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
/19/23	▽	0	SP	Fine-grained sand, trace silt, moist, dense, olive gray.
20/28/32		25	SP/ SM	Fine-grained sand, with silt, saturated, very dense, grayish brown to light olive brown.
28/32/45		30	SP	Very fine- to fine-grained sand, trace silt, saturated, very dense, grayish brown.
18/23/35		35	CL/ CH	Clay, with silt, trace fine-grained sand, moist, hard, light brownish gray to pale brown.
		40		TOTAL DEPTH: 35'



**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1103	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> MW2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
17/28/42	▽		SP	Very fine- to fine-grained sand, trace silt, saturated below 22.5', very dense, dark grayish brown.
22/38/50-3"		25		Very fine- to fine-grained sand, trace silt, saturated, very dense, grayish brown.
24/38/50		30		Very fine- to fine-grained sand, saturated, very dense, dark grayish brown.
			CL	Sandy clay, approximately 15% to 20% fine-grained sand, trace silt, moist, hard, light brownish gray.
		35		
		40		
				<b>TOTAL DEPTH: 33'</b>

## B O R I N G   L O G

Project No. KEI-P90-1103	Boring & Casing Diameter 9"                      2"	Logged By W.W. <i>DRB</i>
Project Name Unocal 800 Harrison St. Oakl	Well Cover Elevation	Date Drilled 5/30/91
Boring No. MW3	Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Asphalt pavement over sand and gravel.
			SM	Very fine- to fine-grained sand, with approximately 10% silt, moist, medium dense, very dark grayish brown.
				Sand, as above, brown, trace clay.
3/6/14		5	SP/ SC	Very fine- to fine-grained sand, with approximately 10% clay, trace silt, moist, medium dense, dark yellowish brown with light grayish brown mottling.
16/18/22		10		Very fine- to fine-grained sand, with approximately 5% clay, trace silt, moist, dense, yellowish to grayish brown, changing to olive gray below 10.3'.
16/33/41		15		Fine-grained sand, with approximately 5% clay, moist, very dense, olive.
9/14/		20		Fine-grained sand, with approximately 5% clay, moist, dense, light olive gray.



**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1103		<b>Boring &amp; Casing Diameter</b> 9"                      2"		<b>Logged By</b> W.W. <i>DRB</i>	
<b>Project Name</b> Unocal 800 Harrison St. Oakl		<b>Well Cover Elevation</b>		<b>Date Drilled</b> 5/30/91	
<b>Boring No.</b> MW3		<b>Drilling Method</b>	Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
/22			SP/ SC	Sand, with clay, as above.	
12/24/33			SP	Fine-grained sand, trace silt, very moist to saturated below 23.3', very dense, gray to greenish gray.	
16/28/42		25			Very fine- to fine-grained sand, trace silt, saturated, very dense, greenish gray.
19/29/40		30			Very fine- to fine-grained sand, trace silt, saturated, very dense, dark grayish brown to olive brown.
9/14/22			SP/ SC	Very fine- to fine-grained sand, with approximately 10% clay, very moist, very dense, light brownish gray.	
			SC/ CL	Very clayey sand to very sandy clay, moist to very moist, dense to hard, light yellowish brown.	
		35			
		40			
				TOTAL DEPTH: 33'	

## BORING LOG

Project No. KEI-P90-1103	Boring Diameter 9"	Logged By <i>JGG</i> W.W. <i>CEG 1633</i>
	Casing Diameter 2"	
Project Name Unocal S/S #0752 800 Harrison St., Oakland	Well Cover Elevation	Date Drilled 9/30/92
Boring No. MW4	Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling Co.

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		3 inches of asphalt over gravel base.
			CL	Clay, stiff, moist, very dark gray (10YR 3/1).
12/17/23		5	SP	Sand, estimated at 5-10% silt, moist, brown (10YR 4/3).
				Sand, estimated at 5-10% silt, trace clay, sand is fine-grained, dense, moist, light yellowish brown (10YR 6/4).
13/15/18		10		Sand, estimated at 5-10% silt, trace clay and gravel to 3/8 inches in diameter, dense, moist, pale brown (10YR 6/3) mottled with yellowish brown (10YR 5/4).
				Sand, estimated at 5-10% silt and trace clay, dense, moist, pale brown (10YR 6/3) mottled with yellowish brown (10YR 5/4).
11/21/38		15		Sand, estimated at 5-10% silt, dense, moist to very moist, light brownish gray (10YR 6/2).
10/16/24		20		

## BORING LOG

Project No. KEI-P90-1103		Boring Diameter 9" Casing Diameter 2"		Logged By <i>JGG</i> W.W. <i>CEG 1633</i>	
Project Name Unocal S/S #0752 800 Harrison St., Oakland		Well Cover Elevation		Date Drilled 9/30/92	
Boring No. MW4		Drilling Method Hollow-stem Auger		Drilling Company Woodward Drilling Co.	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
16/19/25	▼ =	25	SP	<p style="text-align: center;">————— Color change —————</p> <p>Sand, estimated at 5% silt, sand is fine-grained, dense, saturated, greenish gray (5GY 5/1).</p>	
17/19/26		30		<p style="text-align: center;">----- Color change -----</p> <p>Sand, estimated at 5% silt, sand is fine-grained, dense, saturated, grayish brown (10YR 5/2).</p>	
14/28/31			SC-CL	<p>Clayey sand/sandy clay, estimated at 10% silt, trace gravel to 3/8 inches in diameter, sand is fine-grained, very dense/hard, very moist, light brownish gray (2.5Y 6/2).</p>	
		35		TOTAL DEPTH: 33'	
		40			

## BORING LOG


<b>Project No.</b> KEI-P90-1103		<b>Boring Diameter</b> 9" <b>Casing Diameter</b> 2"		<b>Logged By</b> JGG W.W. CEG 1633	
<b>Project Name</b> Unocal S/S #0752 800 Harrison St., Oakland		<b>Well Cover Elevation</b>		<b>Date Drilled</b> 10/1/92	
<b>Boring No.</b> MW5		<b>Drilling Method</b> Hollow-stem Auger		<b>Drilling Company</b> Woodward Drilling Co.	
Penetration blows/6"	G. W. level	Depth (feet)	Samples	Stratigraphy USCS	Description
		0			9 inches of concrete pavement over sand base.
				SP	Sand, estimated at 5% silt, sand is fine-grained, medium dense, moist, brown (10YR 4/3).
13/19/31		5	■		Sand, estimated at 10% silt and 5% clay, sand is fine-grained, dense, moist, greenish gray (5GY 5/1) with olive (5Y 5/3) and yellowish brown (10YR 5/6), mottled.
10/16/25		10	■		Sand, estimated at 10-15% silt, trace clay, sand is fine-grained, dense, moist, light olive gray (5Y 6/2).
13/24/35		15	■		Sand, estimated at 10% silt, trace clay, sand is fine-grained, very dense, moist, greenish gray (5GY 5/1).
13/25/31		20	■		Sand, estimated at 5% silt, very dense, moist to very moist, greenish gray (5GY 5/1).
23					

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 9" <b>Casing Diameter</b> 2"	<b>Logged By</b> JGG W.W. <i>LEG 1633</i>
<b>Project Name</b> Unocal S/S #0752 800 Harrison St., Oakland	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 10/1/92
<b>Boring No.</b> MW5	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling Co.

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
31/55	▼	25	SP	Sand, estimated at 5% silt, sand is fine-grained, very dense, saturated, dark greenish gray (5GY 4/1).
21/29/30		30	CL-SC	Sand, trace silt, sand is fine-grained, dense to very dense, saturated, grayish brown (10YR 5/2).
				Sandy clay/clayey sand, estimated 5-10% silt, sand is fine-grained, hard to very dense, moist, light brownish gray (2.5Y)
		35		TOTAL DEPTH: 32'
		40		

## BORING LOG

Project No. KEI-P90-1103		Boring Diameter	9"	Logged By W.W. <i>JGG</i> <i>CEG 1633</i>
		Casing Diameter	2"	
Project Name Unocal S/S #0752 800 Harrison St., Oakland		Well Cover Elevation		Date Drilled 9/30/92
Boring No. MW6		Drilling Method	Hollow-stem Auger	Drilling Company Woodward Drilling Co.
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		9 inches of concrete over sand and gravel base.
17/26/30		5	SP	Sand, estimated at 5% silt, sand is fine-grained, medium dense, moist, brown (10YR 4/3).  Sand, estimated at 10% silt, trace clay, sand is fine-grained, dense, moist to very moist, yellowish brown (10YR 5/4) mottled with olive gray (5Y 5/2).
8/11/19		10	SM	Silty sand, estimated at 15% silt and 5% clay, sand is fine-grained, dense, moist to very moist, yellowish brown (10YR 5/4) mottled with light brownish gray (10YR 6/2).
10/26/55		15	SP	Sand, estimated at 10% silt, trace clay, very dense, moist to very moist, olive gray (5Y 5/2) mottled with greenish gray (5GY 5/1).
13/30/40		20		Sand, very dense, very moist, gray (5Y 6/1), mottled with light olive brown (2.5Y 5/3).
23				Sand, trace silt, sand is fine-grained, very dense, saturated, greenish gray (5GY 5/1).

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 9" <b>Casing Diameter</b> 2"	<b>Logged By</b> JGG W.W. CEG 1633
<b>Project Name</b> Unocal S/S #0752 800 Harrison St., Oakland	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 9/30/92
<b>Boring No.</b> MW6	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling Co.

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
47/50-5"		25	SP	Sand, trace silt, sand is fine-grained, very dense, saturated, greenish gray (5GY 5/1).
21/29/30		30	SM-ML	Sand, estimated at 5% silt, very dense, saturated, dark yellowish brown (10YR 4/4).
		35		Silty sand/sandy silt, trace clay, sand is fine-grained, very dense to hard, moist, pale brown (10YR 6/3).
		40		TOTAL DEPTH: 32'

## BORING LOG

Project No. KEI-P90-1103	Boring Diameter 8"	Logged By <i>JGG</i> D.L. <i>CEG 1633</i>
	Casing Diameter 2"	
Project Name Unocal S/S #0752 800 Harrison St., Oakland	Well Cover Elevation	Date Drilled 4/14/93
Boring No. MW7	Drilling Method Hollow-stem Auger	Drilling Company Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete slab over sand, gravel and concrete (fill).
				Poorly graded sand, medium-grained, loose, moist, dark yellowish brown.
4/8/6		5	SP	Clayey sand, estimated at 15% clay, medium dense, moist, brown, with iron oxide staining.
			SP	Poorly graded sand, estimated at 5-10% silt, medium dense, moist, dark yellowish brown.
9/14/22		10	SP	Poorly graded sand, trace silt, medium dense to dense, moist to very moist, olive and dark greenish gray, mottled.
6/14/19		15	SP	Poorly graded sand as above, predominantly medium-grained, estimated at 5-10% silt, medium dense to dense, moist, dark greenish gray.
8/15/20			SP	Poorly graded sand, medium-grained, trace silt, medium dense to dense, moist, dark olive.
9/16/22		20	SP	Poorly graded sand, predominantly medium-grained, trace to 10% silt, medium dense to dense, moist to saturated, greenish gray.
7/16/18	▼		SP	




## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8" <b>Casing Diameter</b> 2"	<b>Logged By</b> JGG <b>D.L.</b> CEG 1633
<b>Project Name</b> Unocal S/S #0752 800 Harrison St., Oakland	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 4/14/93
<b>Boring No.</b> MW7	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
6/13/18		25	SP	Poorly graded sand, predominantly medium-grained, trace to 10% silt, medium dense to dense, saturated, dark greenish gray and dark olive gray, mottled.
18/50		30	SP	Poorly graded sand, medium-grained. clean, dense to very dense, saturated, dark olive grading to dark olive brown.
4/10/18		33	ML	Sandy silt, trace clay, hard, friable, moist, light olive brown, sand is fine to medium-grained.
				TOTAL DEPTH: 33'
		35		
		40		

## BORING LOG

Project No. KEI-P90-1103		Boring Diameter	8"	Logged By D.L.	JGG CEG 1633
		Casing Diameter	2"		
Project Name Unocal S/S #0752 800 Harrison St., Oakland		Well Cover Elevation		Date Drilled 4/14/93	
Boring No. MW8		Drilling Method	Hollow-stem Auger	Drilling Company Great Sierra Exploration	
Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description	
		0		Concrete slab over sand (fill).	
				Granite slab or oblong boulder.	
				Poorly graded sand, medium-grained, loose, moist, dark yellowish brown.	
6/13/19		5	SP	Poorly graded sand, predominantly fine-grained, estimated at 5-10% silt and trace clay, medium dense to dense, moist, brown and dark yellowish brown mottled, grades to dark olive gray.	
11/14/14		10		Poorly graded sand, predominantly medium-grained, estimated at 5-10% silt, medium dense, moist, light olive brown with iron oxide staining.	
7/17/24		15		Poorly graded sand as above, except olive gray to dark olive gray.	
5/10/17		20		Poorly graded sand, predominantly medium-grained, estimated at 5 to 10% silt, medium dense to dense, moist to saturated, greenish gray.	
6/11/20					

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8" <b>Casing Diameter</b> 2"	<b>Logged By</b> JGG D.L. CEG1433
<b>Project Name</b> Unocal S/S #0752 800 Harrison St., Oakland	<b>Well Cover Elevation</b>	<b>Date Drilled</b> 4/14/93
<b>Boring No.</b> MW8	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
6/13/18		25	SP	Poorly graded sand, medium-grained, trace silt, medium dense, saturated, olive brown.
18/50		30	SM ML	Poorly graded sand, medium-grained, clean, medium dense, saturated, dark olive, with iron oxide staining. Silty sand, estimated at 20-25 silt, dense, cohesive, moist, light olive brown. Clayey silt, trace sand, hard, moist, light olive green.
4/10/18		35  40		TOTAL DEPTH: 31'

**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> EB1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		6" thick concrete slab over sand and gravel.
		5	SM	Fill material consisting of silty sand, with bricks and concrete chunks to 5" diameter, trace gravel, moist, dense, dark yellowish brown.
9/18/27		10	SP	Fine-grained sand, trace silt and clay, moist, dense, light yellowish brown and yellowish brown mottled with traces of gray.
11/15/18		15	SP	Very fine- to fine-grained sand, trace silt, moist, dense yellowish brown.
8/10/21		20	SP	Fine-grained sand, trace clay and silt, moist, dense, yellowish brown and light brownish gray mottled.
11/22/33		25		Fine-grained sand, trace clay and silt, moist, very dense, gray to light brownish gray.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> EB1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
10/20/33	▽		SP	Very fine- to fine-grained sand, trace silt, saturated below 22.3', very dense, olive gray.
		25		
		30		
		35		
		40		
				TOTAL DEPTH: 23'


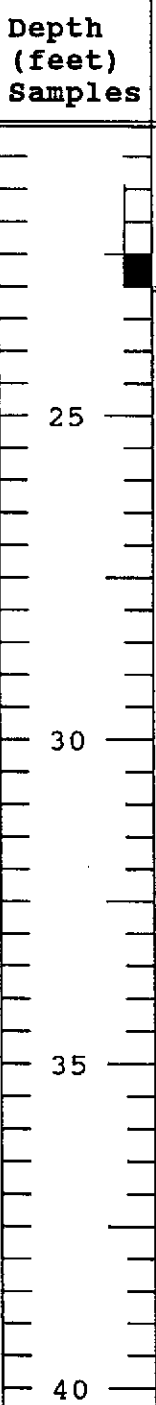
**B O R I N G   L O G**

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> EB2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Asphalt pavement over sand and gravel.
			SM	Fill material consisting of silty sand, with brick and concrete chunks, moist, brown to yellowish brown.
5/8/12		5	SP	Very fine- to fine-grained sand, trace silt, moist, medium dense, yellowish brown.
14/16/19		10		Very fine- to fine-grained sand, trace silt, moist, trace root holes, dense, yellowish brown to dark yellowish brown.
8/16/23		15	SP/SC	Fine-grained sand, with clay, trace silt, moist, dense, yellowish brown.
12/18/23		20	SP	Very fine- to fine-grained sand, trace clay and silt, moist, dense, light yellowish brown to light olive brown, trace gray mottling.


B O R I N G   L O G

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8"	<b>Logged By</b> W.W. <i>DRB</i>
<b>Project Name</b> Unocal 800 Harrison St. Oakl	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 5/29/91
<b>Boring No.</b> EB2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
11/18/37			SP	Very fine- to fine-grained sand, saturated below 22.9', trace clay, very dense, light olive brown.
<b>TOTAL DEPTH: 23'</b>				

## BORING LOG

Project No. KEI-P90-1103	Boring Diameter    8.5"	Logged By J.G. <i>JGG</i> <i>CEG 1633</i>
	Casing Diameter    N/A	
Project Name Unocal S/S #0752 800 Harrison Street, Oakland	Well Cover Elevation N/A	Date Drilled 3/18/94
Boring No. EB3	Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete slab (sidewalk)
				Silty sand, up to 15% silt, sand is fine to medium grained, loose to medium dense, moist, dark brown (fill and disturbed native soil).
8/12/32		5	SP	Poorly graded sand, fine to medium grained, medium dense, moist, yellowish brown.
				Poorly graded sand, up to 15% silt and trace clay, sand is predominantly medium grained, very dense, moist, light reddish brown, with heavy iron oxide staining.
12/17/23		10		Poorly graded sand, up to 10% variable silt content, predominantly medium grained, very dense, light reddish brown and medium brown mottled, mottled iron oxide staining.
				Poorly graded sand as above, except dense, gray, very moist.
8/12/20		15		Poorly graded sand as above, except wet.
11/18/23		20		
TOTAL DEPTH: 20.5'				



## BORING LOG

Project No. KEI-P90-1103	Boring Diameter    8.5"	Logged By <i>JGC</i> I.G. <i>LEG 1633</i>
	Casing Diameter    N/A	
Project Name Unocal S/S #0752 800 Harrison Street, Oakland	Well Cover Elevation N/A	Date Drilled 3/18/94
Boring No. EB4	Drilling Method Hollow-stem Auger	Drilling Company Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Concrete slab (sidewalk)
		5	SP	Poorly graded sand, predominantly medium grained, trace to 10% silt, medium dense, moist, brown, bricks and concrete debris common (fill).
7/14/20				Poorly graded sand, predominantly medium grained, up to 10% silt, dense, very moist, orange brown, mottled, iron-oxide staining.
13/16/23		10		Poorly graded sand as above, except very dense, gray to brownish gray, mottled, iron-oxide staining.
15/21/30		15		Poorly graded sand as above, gray.
13/15/20	☒	20		Poorly graded sand, predominantly medium grained, trace silt, very dense, wet, gray.
				TOTAL DEPTH: 20.5'


## BORING LOG

Project No. KEI-P90-1103	Boring Diameter	8.5"	Logged By D.L.	JGG CEG 1633
	Casing Diameter	N/A		
Project Name Unocal S/S #0752 800 Harrison Street, Oakland	Well Cover Elevation	N/A	Date Drilled 3/17/94	
Boring No. EB5	Drilling Method	Hollow-stem Auger	Drilling Company Woodward Drilling	

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete slab (sidewalk)
1/2/2		5	SP	Poorly graded sand, estimated at 5-10% silt with gravel, concrete and debris, loose, moist, predominantly dark brown and very dark grayish brown (fill and disturbed native soil).
9/5/16		10		Poorly graded sand, trace silt, predominantly medium grained, medium dense, moist, dark greenish gray.
12/19/38		15	SP	Poorly graded sand, trace silt, predominantly medium grained, dense to very dense, cohesive, moist, olive and olive gray, mottled.
17/28/40				Poorly graded sand, trace silt, predominantly medium grained, very dense grading to dense, moist grading to wet, dark greenish gray, with an occasional lens of silt.
14/19/22	▽	20		
				TOTAL DEPTH: 20.5'

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8.5" <b>Casing Diameter</b> N/A	<b>Logged By</b> <i>JGG</i> <b>J.G.</b> <i>CEG 1633</i>
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/18/94
<b>Boring No.</b> EB6	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Concrete slab (sidewalk)
		5	SP	Poorly graded sand, predominantly medium grained, moist, medium dense to dense, brown and dark brown, mottled with gravel and concrete debris (fill).
2/5/8		5		Poorly graded sand as above (fill).
		10	SP	Poorly graded sand, predominantly medium grained, up to 10% silt, dense, moist, light brown and light reddish brown, mottled, iron-oxide staining.
12/12/14		10		
		15		Poorly graded sand as above, except moist to very moist, very dense, gray.
10/21/30		15		
		18/20/24		Poorly graded sand as above.
18/20/24		20		Poorly graded sand, predominantly medium grained, trace to 10% silt, very dense, wet, gray.
11/17/25		20		
				TOTAL DEPTH: 20.5'

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8.5" <b>Casing Diameter</b> N/A	<b>Logged By</b> <i>JGG</i> <b>D.L.</b> <i>CEG 1633</i>
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/17/94
<b>Boring No.</b> EB7	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet)	Samples	Stratigraphy USCS	Description
		0			A.C. Pavement over sand and gravel base
					Silt, sand and gravel, with concrete and debris(fill).
4/13/20		5	■	SP	Poorly graded sand, trace to 10% variable silt content, sand is predominantly medium grained, medium dense, moist, brown and dark yellowish brown.
11/10/22		10	■		Poorly graded sand, trace silt, sand is predominantly medium grained, , medium dense, slightly cohesive, brown, with iron-oxide staining.
14/22/40		15	■		Poorly graded sand as above, except dense to very dense, dark yellowish brown.
16/28/32	▽	20	■		Poorly graded sand, clean to trace silt, sand is predominantly medium grained, dense to very dense, moist to wet, olive brown.
TOTAL DEPTH: 19.5'					

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8.5"	<b>Logged By</b> <i>JGG</i> D.L. <i>LEG 1633</i>
	<b>Casing Diameter</b> N/A	
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/17/94
<b>Boring No.</b> EB8	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Concrete Slab
NO DATA Samples Pushed		5	SP/SM	Poorly graded sand, predominantly medium grained, loose, moist, olive brown, with bricks and debris (fill and disturbed native soil).
		10		Poorly graded sand, trace silt, predominantly medium grained, medium dense, moist, olive brown and olive gray, mottled.
		15	SP	Poorly graded sand, estimated at 5-10% silt, trace clay, predominantly medium grained, medium dense, moist, dark olive gray and dark greenish gray, mottled.
		18.75		Poorly graded sand as above, moist to wet, grades to light olive brown below 18.75 feet, grades to dense.
		20		TOTAL DEPTH: 19.5'

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8.5" <b>Casing Diameter</b> N/A	<b>Logged By</b> JGG D.L. CEG 1633
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/17/94
<b>Boring No.</b> EB9	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete Slab
		5		Poorly graded sand, variable silt content, loose, slightly moist, predominantly brown to very dark grayish brown, with numerous bricks, cobbles and concrete (fill).
2/4/7		5	SM	Silty sand, estimated at 15% silt, trace clay, sand is predominantly medium grained, medium dense, moist, dark brown and dark yellowish brown, with heavy iron oxide staining.
		10		Poorly graded sand, clean to trace silt, sand is predominantly medium grained, medium dense to dense, moist, olive and olive gray, mottled.
10/16/23		10		
		15	SP	Poorly graded sand as above, except trace to 10% variable silt content.
12/14/18		15		
		20		Poorly graded sand, trace silt, medium grained, medium dense to dense, moist to wet, olive gray.
11/15/20		20		
				<b>TOTAL DEPTH: 20.5'</b>

## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 8.5"	<b>Logged By</b> <i>JGG</i> D.L. <i>CEG 1633</i>
	<b>Casing Diameter</b> N/A	
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/17/94
<b>Boring No.</b> EB10	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		
				A.C. Pavement over sand and gravel base, with concrete and asphalt debris (fill).
			SP	Poorly graded sand, loose, slightly moist, dark brown, with debris (fill and disturbed native soil).
6/17/19		5	SP/SM	Poorly graded sand, estimated at 10-15% silt, sand is predominantly medium grained, medium dense to dense, moist, olive brown, with iron-oxide staining.
			SP	Poorly graded sand, trace silt, medium grained, medium dense, moist, olive brown, with iron oxide staining.
13/20/24		10	SP/SM	Poorly graded sand, estimated at 10-15% silt, trace clay, sand is predominantly medium grained, dense, moist, olive brown.
			SP	Poorly graded sand, estimated at 5-10% silt, trace clay, medium dense to dense, moist, brown and dark yellowish brown, mottled.
8/14/18		15	SP	
				Poorly graded sand, trace silt, sand is medium grained, medium dense to dense, very moist to wet, dark greenish gray.
10/17/18	▽	20		
				TOTAL DEPTH: 20.5'

## BORING LOG

Project No. KEI-P90-1103	Boring Diameter    3"	Logged By D.L. <i>JGG</i> <i>CEG 1633</i>
	Casing Diameter    N/A	
Project Name Unocal S/S #0752 800 Harrison Street, Oakland	Well Cover Elevation N/A	Date Drilled 3/18/94
Boring No. EB11	Drilling Method N/A	Drilling Company Hand Augered by KEI Personnel

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati- graphy USCS	Description
		0		Concrete Slab
				Poorly graded sand, gravel, loose, slightly moist, brown, with bricks and concrete debris (fill and disturbed native soil).
		5	SP	Poorly graded sand, predominantly medium grained, loose to medium dense, slightly moist, olive brown, clean.
				Poorly graded sand, trace silt, sand is predominantly medium grained, medium dense, moist, dark yellowish brown grades to dark olive gray and dark greenish gray below 6 feet.
		10		Poorly graded sand, medium grained, trace to 10% silt, medium dense to dense, moist, dark greenish gray.
				TOTAL DEPTH: 10.5'
		15		
		20		



## BORING LOG

<b>Project No.</b> KEI-P90-1103	<b>Boring Diameter</b> 3"	<b>Logged By</b> <i>JGG</i> D.L. <i>LEG 1633</i>
	<b>Casing Diameter</b> N/A	
<b>Project Name</b> Unocal S/S #0752 800 Harrison Street, Oakland	<b>Well Cover Elevation</b> N/A	<b>Date Drilled</b> 3/18/94
<b>Boring No.</b> EB12	<b>Drilling Method</b> N/A	<b>Drilling Company</b> Hand Augered by KEI Personnel

Penetration blows/6"	G. W. level	Depth (feet) Samples	Stratigraphy USCS	Description
		0		Concrete Slab
				Poorly graded sand, loose, slightly moist, dark brown to very dark grayish brown, with bricks, gravel and concrete debris (fill).
			SP	Poorly graded sand, loose, moist, olive brown.
		5	SC	Clayey sand, estimated at 15% clay, medium dense, moist, dark brown and dark yellowish brown.
			SP/SM	Poorly graded sand with silt, trace clay, medium dense, moist, dark brown and dark yellowish brown.
			SP	Poorly graded sand, medium grained, up to 10% silt, medium dense to dense, moist, dark yellowish brown.
		10		TOTAL DEPTH: 11'
		15		
		20		

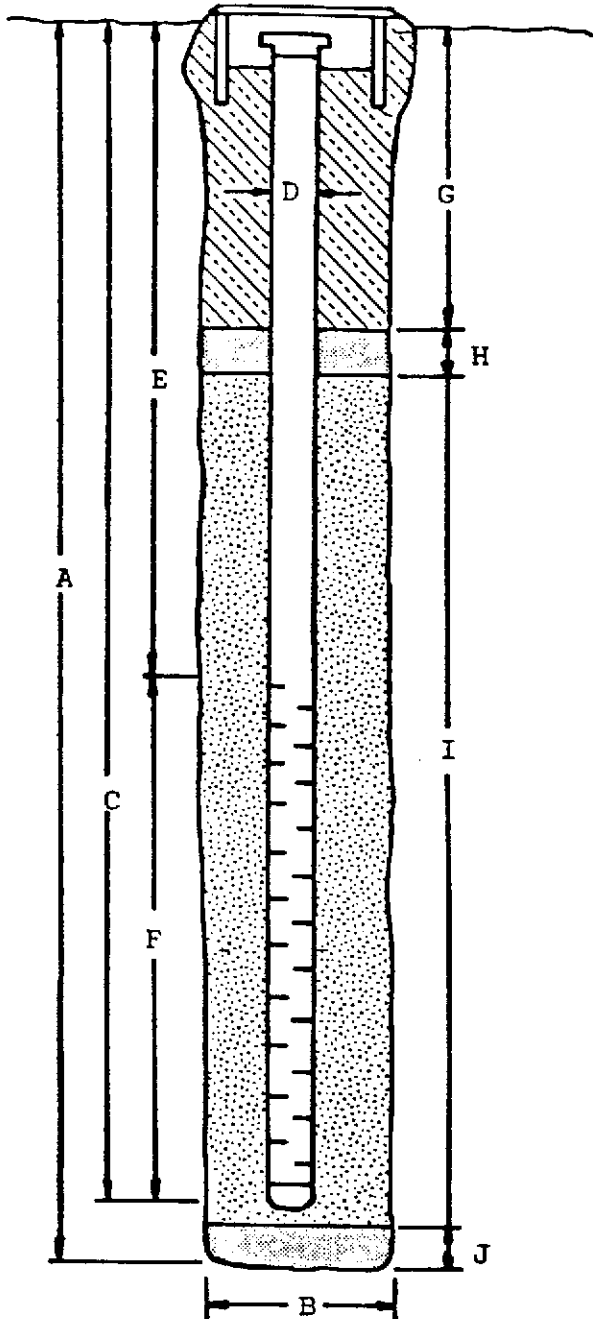
## W E L L   C O M P L E T I O N   D I A G R A M

PROJECT NAME: Unocal 800 Harrison St. Oakland      BORING/WELL NO. MW1

PROJECT NUMBER: KEI-J90-1103

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



A. Total Depth: 35'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem  
Auger

C. Casing Length: 33.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"  
ID = 2.067"

E. Depth to Perforations: 13.5'

F. Perforated Length: 20'

Perforation Type: Machined  
Slot

Perforation Size: 0.020"

G. Surface Seal: 9.5'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 23.5'

Pack Material: RMC Lonestar  
Sand

Size: #3

J. Bottom Seal: none

Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

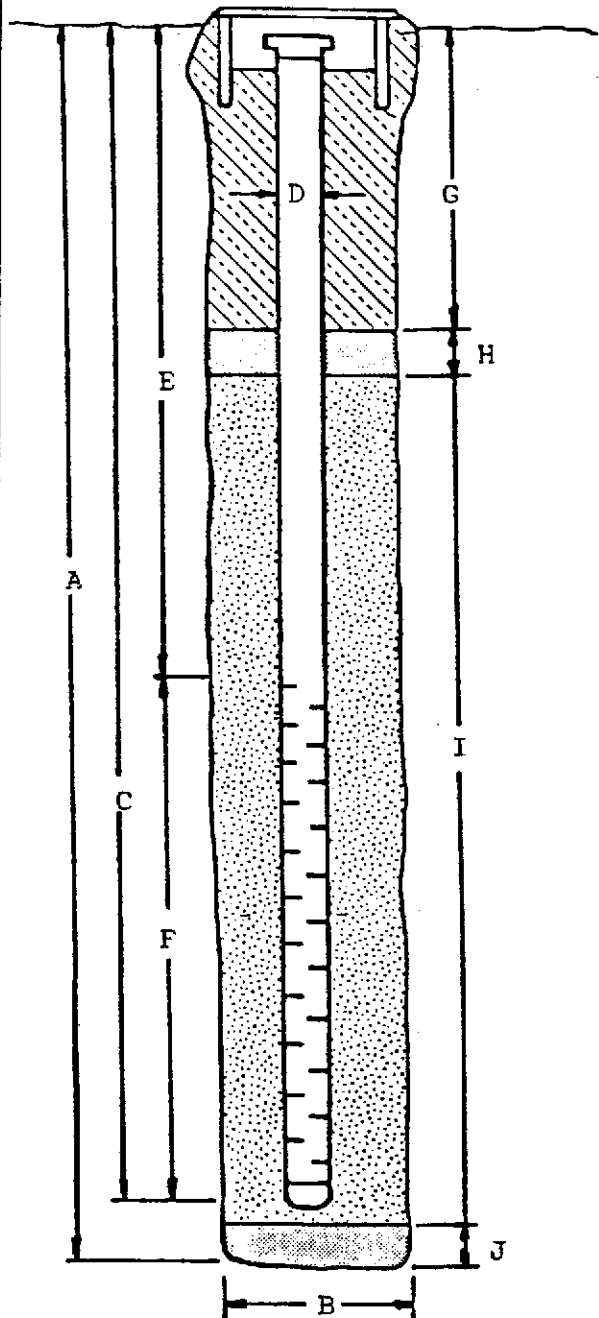
## W E L L   C O M P L E T I O N   D I A G R A M

PROJECT NAME: Unocal 800 Harrison St. Oakland    BORING/WELL NO. MW2

PROJECT NUMBER: KEI-J90-1103

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



A. Total Depth: 33'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem  
Auger

C. Casing Length: 33'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 15'

F. Perforated Length: 18'

Perforation Type: Machined  
Slot

Perforation Size: 0.020"

G. Surface Seal: 11'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 20'

Pack Material: RMC Lonestar  
Sand

Size: #3

J. Bottom Seal: none

Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

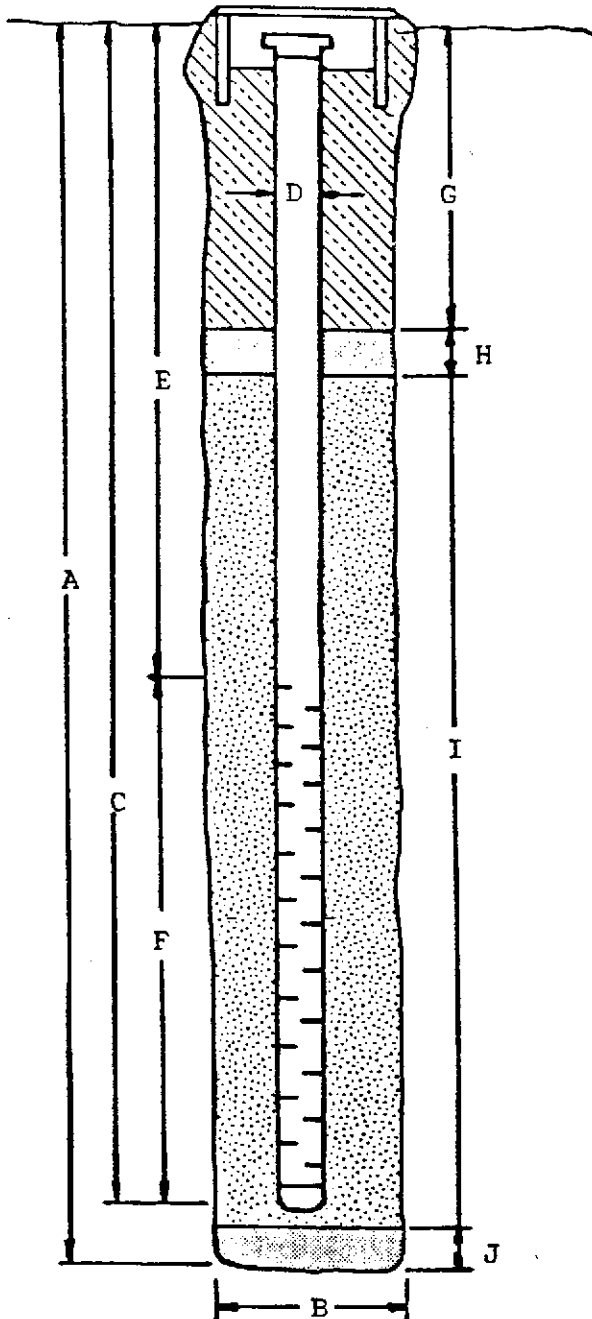
## W E L L   C O M P L E T I O N   D I A G R A M

PROJECT NAME: Unocal 800 Harrison St. Oakland      BORING/WELL NO. MW3

PROJECT NUMBER: KEI-J90-1103

WELL PERMIT NO.: \_\_\_\_\_

Flush-mounted Well Cover



A. Total Depth: 33'

B. Boring Diameter\*: 9"

Drilling Method: Hollow Stem  
Auger

C. Casing Length: 33'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 15'

F. Perforated Length: 18'

Machined  
Perforation Type: Slot

Perforation Size: 0.020"

G. Surface Seal: 11'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 20'

RMC Lonestar  
Pack Material: Sand

Size: #3

J. Bottom Seal: none

Seal Material: N/A

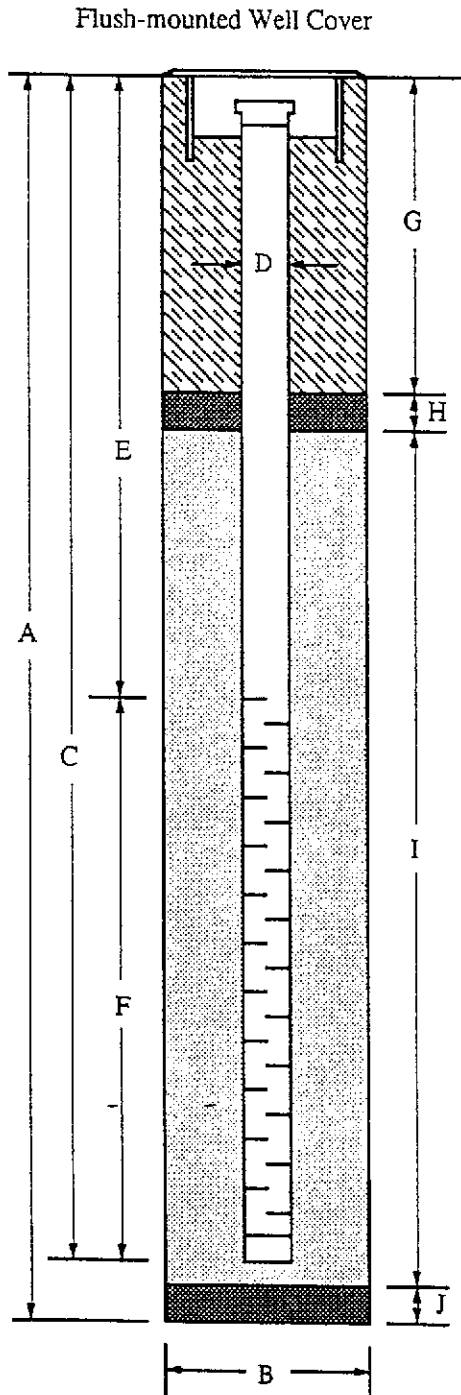
\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

## WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #0752, 800 Harrison St., Oakland WELL NO. MW4

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: 92453



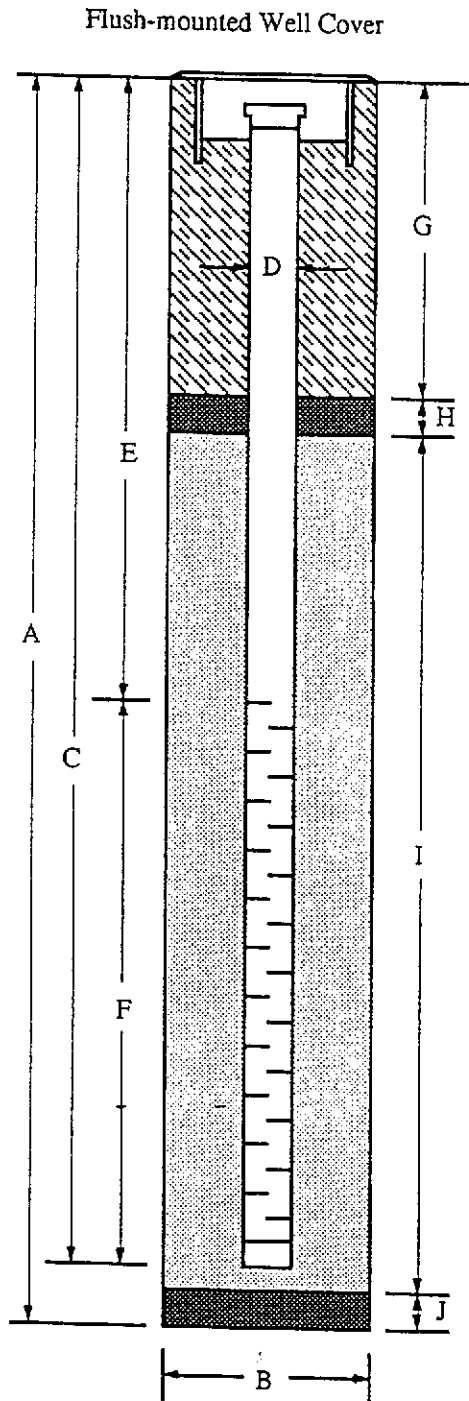
- A. Total Depth : 33'
- B. Boring Diameter: 9"
- Drilling Method: Hollow Stem Auger
- C. Casing Length: 33'
- Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"
- ID = 2.067"
- E. Depth to Perforations: 15'
- F. Perforated Length: 18'
- Perforation Type: Machined Slot
- Perforation Size: 0.020"
- G. Surface Seal: 11'
- Seal Material: Neat Cement
- H. Seal: 2'
- Seal Material: Bentonite
- I. Filter Pack: 20'
- Pack Material: RMC Lonestar Sand
- Size: #3
- J. Bottom Seal: None
- Seal Material: N/A

## WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #0752, 800 Harrison St., Oakland WELL NO. MW5

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: 92543



- A. Total Depth : 32'
- B. Boring Diameter: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 32'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 15'
- F. Perforated Length: 17'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 11'  
Seal Material: Neat Cement
- H. Seal: 2'  
Seal Material: Bentonite
- I. Filter Pack: 19'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A

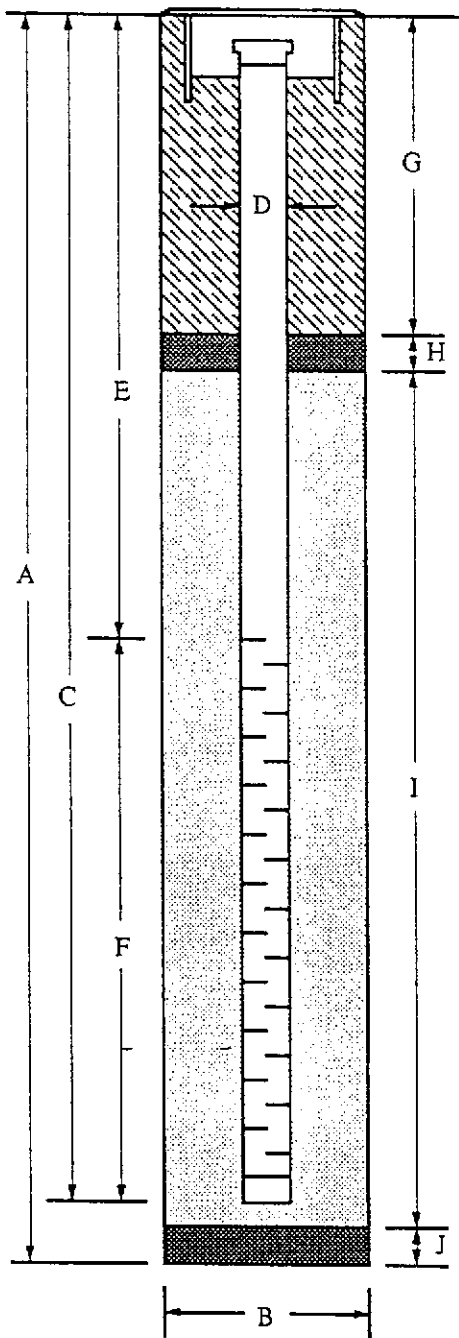
## WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #0752, 800 Harrison St., Oakland WELL NO. MW6

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: 92543

Flush-mounted Well Cover



- A. Total Depth : 32'
- B. Boring Diameter: 9"
- Drilling Method: Hollow Stem Auger
- C. Casing Length: 32'
- Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 15'
- F. Perforated Length: 17'
- Perforation Type: Machined Slot
- Perforation Size: 0.020"
- G. Surface Seal: 11'
- Seal Material: Neat Cement
- H. Seal: 2'
- Seal Material: Bentonite
- I. Filter Pack: 19'
- Pack Material: RMC Lonestar Sand
- Size: #3
- J. Bottom Seal: None
- Seal Material: N/A

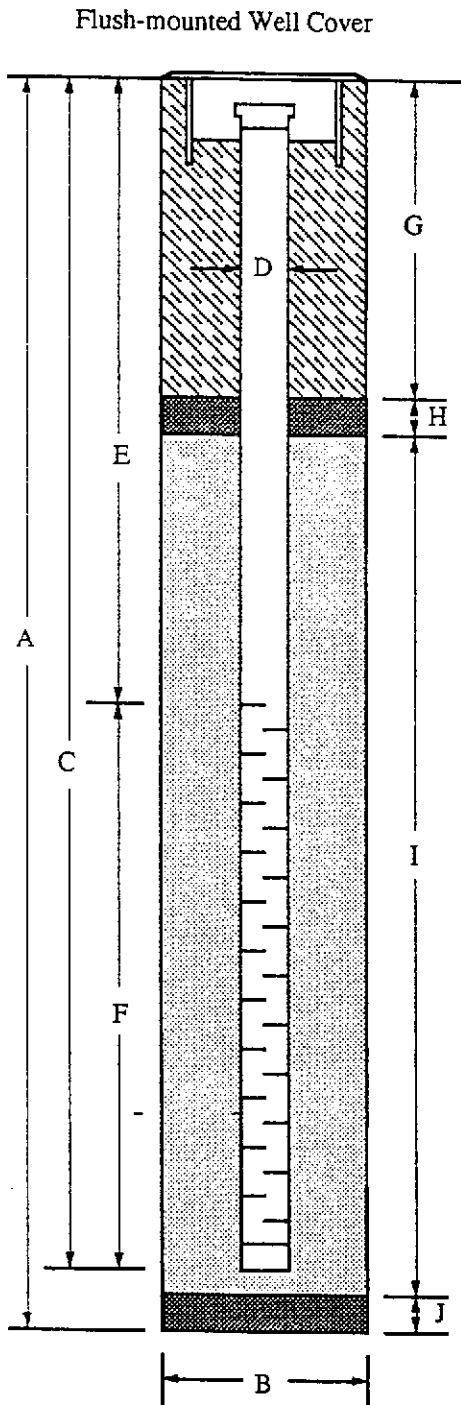
## WELL CONSTRUCTION DIAGRAM

PROJECT NAME: Unocal #0752, 800 Harrison St., Oakland

WELL NO.: MW7

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: ACFC&WCD 93076



- A. Total Depth : 33'
- B. Boring Diameter: 8"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 33'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 13'
- F. Perforated Length: 20'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 9'  
Seal Material: Neat Cement
- H. Seal: 2'  
Seal Material: Bentonite
- I. Filter Pack: 22'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A



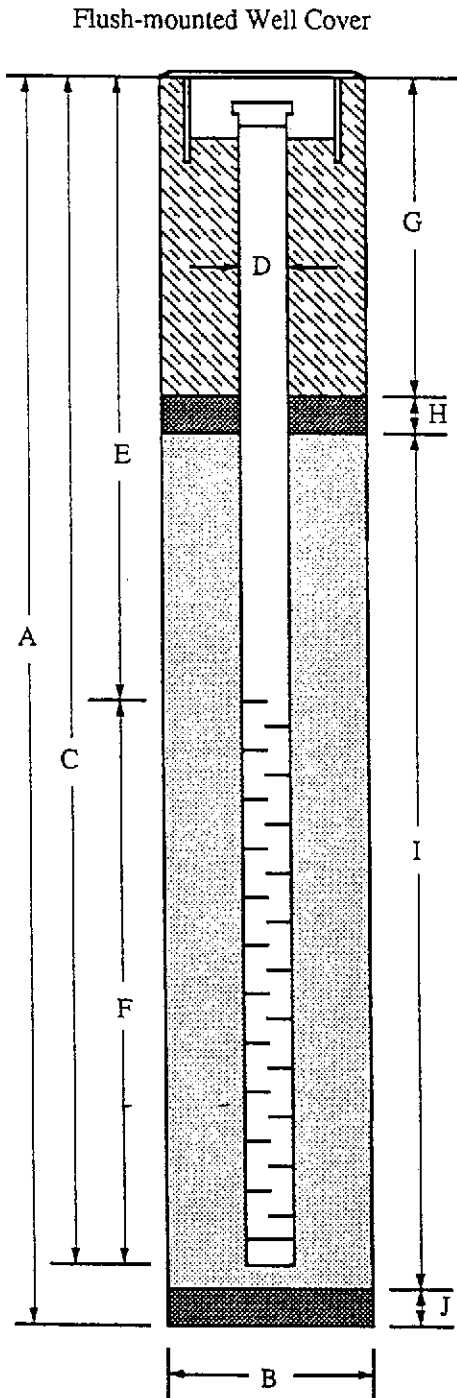
## WELL CONSTRUCTION DIAGRAM

PROJECT NAME: Unocal #0752, 800 Harrison St., Oakland

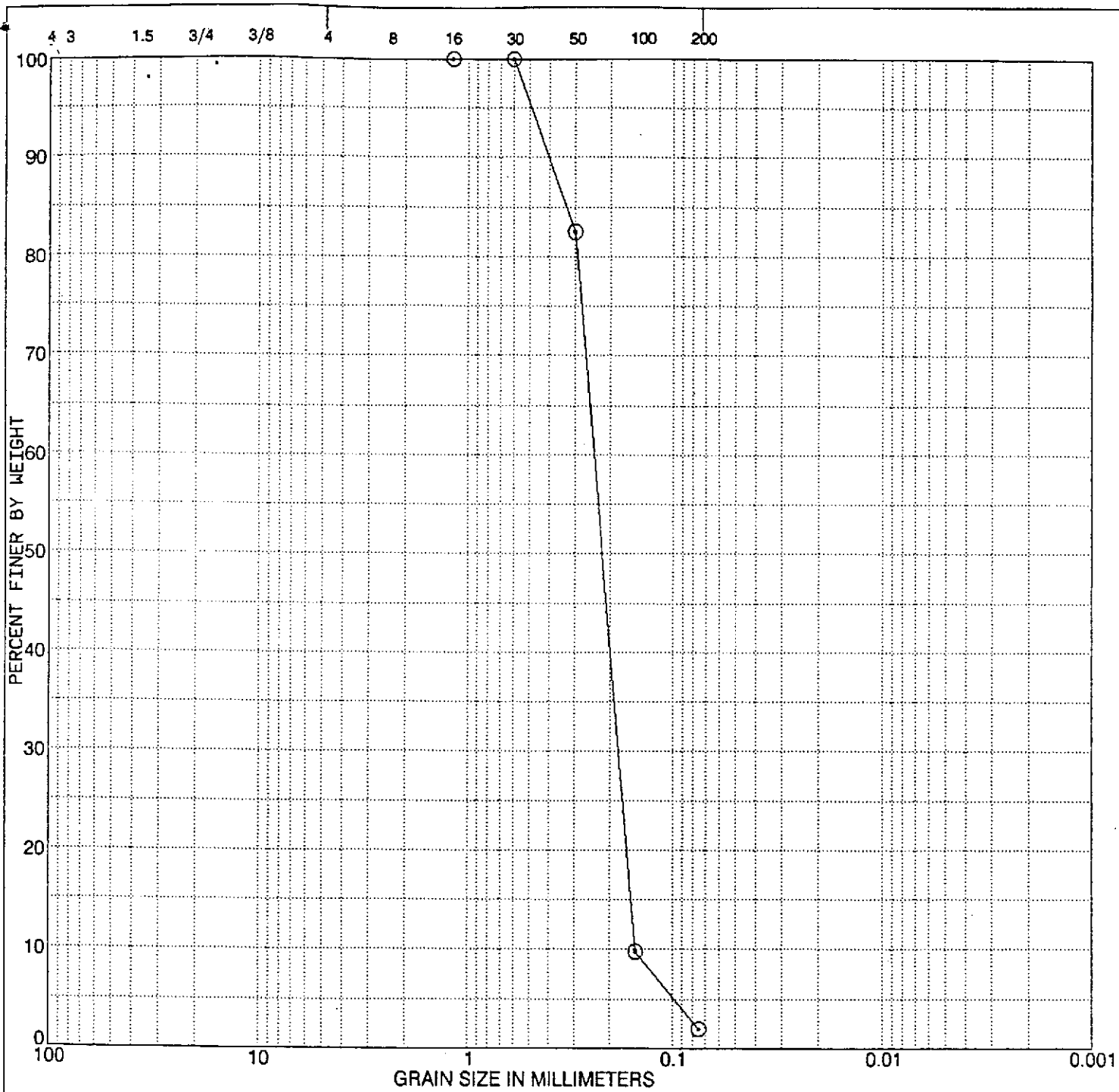
WELL NO.: MW8

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: ACFC&WCD 93076



- A. Total Depth : 31'
- B. Boring Diameter: 8"
- Drilling Method: Hollow Stem Auger
- C. Casing Length: 29'
- Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"
- ID = 2.067"
- E. Depth to Perforations: 11'
- F. Perforated Length: 18'
- Perforation Type: Machined Slot
- Perforation Size: 0.020"
- G. Surface Seal: 7'
- Seal Material: Neat Cement
- H. Seal: 2'
- Seal Material: Bentonite
- I. Filter Pack: 22'
- Pack Material: RMC Lonestar Sand
- Size: #3
- J. Bottom Seal: None
- Seal Material: N/A



Cobbles	GRAVEL		SAND			SILT	CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE		

SYMBOL	SAMPLE SOURCE	CLASSIFICATION
⊙	MW-2 @ 30.0'	Brown Sand (SP)