groundwater resources inc.
A RESNA Company
1500 SO. UNION AVE.
BAKERSFIELD, CALIFORNIA 93307
General Engineering Contractor
Class A/Haz License No. 609572

RESNA
Environmental Solutions
Through Applied Science,
Engineering & Construction

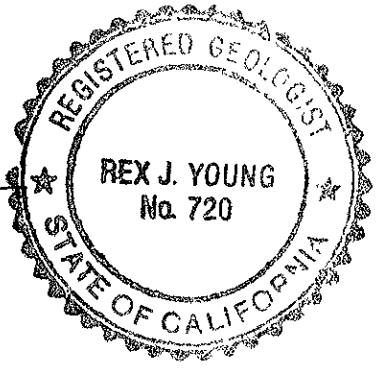
MALIBU GRAND PRIX
8000 South Coliseum Way
Oakland, California

SITE ASSESSMENT REPORT
January 13, 1992

Report prepared for

MALIBU GRAND PRIX
7301 Topanga Canyon Boulevard
Canoga Park, California 91303

by
RESNA/Groundwater Resources Inc.



Rex J. Young
Rex J. Young
Registered Geologist #720

Marc H. Selover
Marc H. Selover
Manager of Geosciences & Engineering

MAILING ADDRESS: P. O. BOX 9383, BAKERSFIELD, CA 93389 (805) 835-7700
FAX (805) 835-7717

MALIBU GRAND PRIX
8000 South Coliseum Way
Oakland, California

SITE ASSESSMENT REPORT
January 13, 1992

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EXECUTIVE SUMMARY

Gasoline hydrocarbons were found in all groundwater monitoring wells located near the Race Track tank excavation and hydrocarbons were also reported in four of five wells located near the Castle tank excavation; hydrocarbon concentration levels in the groundwater are less than previously reported. RESNA/Groundwater Resources Inc. (RESNA) recommends isolation or elimination of groundwater recharge areas, and further assessment of the impacted soil at both locations for the purpose of planning soil remediation while monitoring the groundwater plumes.

1.0 INTRODUCTION

RESNA has performed additional monitoring and assessment of hydrocarbon plumes in the soil and groundwater at the Malibu Grand Prix Race Track and Castle areas, 8000 South Coliseum Way, Oakland, California (Plate 1). This report reviews the past history of the site, gives the results of the analysis of soil and water samples, interpretation of findings and revised recommendations based on the findings.

2.0 BACKGROUND

The Malibu Grand Prix (MGP) facility maintained two 6,000 gallon underground storage tanks containing marine mix gasoline. The tanks were located at the MGP Castle and Race Track. They were removed on March 29, 1989 and February 1, 1990 respectively. Closure reports were submitted to the Alameda County Department of Environmental Health with all relevant waste manifests and analysis results. On June 29, 1989 a letter from Alameda County was sent to Malibu Grand Prix Corp. requiring an initial site investigation to determine the extent of soil and groundwater contamination present at the MGP Castle while a verbal request was issued for an assessment at the Race Track at the time of the removal. The site assessment at the Castle began on September 21, 1989 and a report was issued on November 15, 1989 recommending further work. The assessment work at the Race Track, and the continued assessment at the Castle began on June 12, 1990. Monitoring Wells 1 through 10 were sampled July 17, 1991. Four additional monitoring wells (MWs) at the Castle and four additional MWs at the Race Track were constructed on August 27-30, 1991. All monitoring wells, MW-1 through -18, were sampled October 9, 10, 11, 1991, for water analyses. Pump tests and slug tests were performed on selected wells October 8, 9, and 10, 1991.

3.0 BORINGS AND MONITORING WELL COMPLETIONS

Eight groundwater monitoring wells were made on the days of August 27-30, 1991. MWs 11-14 were constructed west and southwest of the Castle tank location in an attempt to define the downgradient terminus of the groundwater plume (Plate 2). MWs 15-18 were constructed at the Race Track to define the limits of the groundwater plume at that location. Construction of the groundwater monitoring wells was accomplished by advancing ten-inch hollow stem augers to depths of 20 to 25 feet. Fifteen feet of four-inch PVC, 0.020" slotted casing were placed in each borehole with four or five feet of blank casing to the surface (see Log of Borings, Plates 8 through 15). A filter pack of #1/20 sand was placed to four feet from the surface. Each well has a two to three foot bentonite surface seal and was capped with concrete. All of the wells were secured with locking caps and a traffic box.

4.0 SAMPLING PROCEDURES

All soil samples were collected using a two and one-half inch diameter California split spoon sampler containing three six-inch brass sleeves. The core-sampler was washed and rinsed after each use to

avoid cross contamination. Cores selected for analysis were sealed in the sleeve with teflon-lined plastic end-caps and integrity tape. All samples were labeled, chilled and transported to a state certified laboratory under a Chain of Custody.

Approximately three to four well volumes were pumped from each well to insure that the water present in the well was representative of the groundwater in the formation. The groundwater samples collected from each well by bailer were preserved in 40 ml vials having teflon-lined caps. Sample containers were labeled and chilled for transportation under Chain of Custody to a state certified laboratory where they were analyzed for Benzene, Toluene, Xylene and Ethylbenzene (BTX & E) and Total Petroleum Hydrocarbon (TPH) for gasoline.

5.0 FINDINGS

5.1 Race Track Area

Analyses of soil samples collected at or near the water table from monitoring well borings MW-15, —,-18 indicate that no hydrocarbons are present in the soil at any of these Race Track locations (see Table 1). Analyses of water samples collected from MW-3, -8,-9, -10 in July, 1991, reported gasoline constituents in all of the wells, and there were no edge-wells to show the lateral extent of the plume (Plate 4). Analyses of the water samples collected in October, 1991 from MWs -15,—, -18 reported TPH (g) concentration of 78 ppb in MW-16, but ND for all other gasoline constituents in MW-3, -15, -17, -18 (Plate 5).

While drilling MW-11 through -18, abundant debris material was observed in the cuttings down to a depth of about 10 feet. This material included glass, rubber, string, metal and wood. Before the water in MW-18 was disturbed by sampling procedures, it's surface was observed to be agitated by small bubbles rising in the well, accompanied by a strong odor of hydrogen sulfide. The water from MW-18 and MW-10, being clear at first, quickly turned black in the white plastic bucket where it was exposed to air. Metal hardware at well head of other MWs was coated with powdery yellow precipitate.

5.2 Castle Area

Analyses of soil samples collected in August, 1991, at or near the water table from monitoring well borings MW-11, —,-14 indicate that no hydrocarbons are present in the soil at any of these Castle locations (see Table 1). All water samples collected in July, 1991, from MW-1, -4, -6, and -7 were reported to contain hydrocarbons, but ND was reported in MW-2 and 5 (Plate 4). Lab results of analyses of water samples collected in October, 1991, reported that 6 MWs contain dissolved benzene and TPH (gasoline hydrocarbons) while MW-2, -6, -7, and -14 reported ND (Plate 5).

TABLE 1
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA
WATER SAMPLE ANALYSIS RESULTS, ppb

Well #	Date	Benzene	Toluene	Ethly-benzene	Total Xylenes	TPHg
MW-1	09/22/89	410	1800	1100	7100	35000
	06/14/90	.66	<.05	1.3	2.3	210
	07/17/91	<.05	.06	<.05	<.05	270
	10/09/91	<.05	<.05	<.05	<.05	370
MW-2	09/22/89	<.05	<.05	<.05	<.05	<50
	06/14/90	<.05	<.05	<.05	<.05	<50
	07/17/91	<.05	<.05	<.05	<.05	<50
	10/09/91	<.05	<.05	<.05	<.05	<50
MW-3	09/22/89	1.2	<.05	<.05	<.05	<50
	06/14/90	0.90	4	<.05	<.05	<50
	07/17/91	3.8	<.05	<.05	<.05	<50
	10/10/91	<.05	<.05	<.05	<.05	<50
MW-4	09/22/89	410	430	78	324	4000
	06/14/90	200	3.7	1.2	9.5	660
	07/17/91	49	4.3	1.5	38	1100
duplicate	07/17/91	45	2.7	1.0	33	1000
	10/09/91	0.8	<.05	<.05	<.05	88
MW-5	06/14/90	<.05	<.05	<.05	<.05	<50
	07/17/91	<.05	<.05	<.05	<.05	<50
	10/09/91	<.05	<.05	<.05	<.05	110
MW-6	06/14/90	73	<.05	17	29.7	1800
	07/17/91	7.4	<.05	<.05	5.6	1200
	10/09/91	<.05	<.05	<.05	<.05	<50
MW-7	06/14/90	0.84	<.05	1.2	1.8	58
	07/17/91	12	1.7	4.7	3.8	120
	10/09/91	<.05	<.05	<.05	<.05	<50
MW-8	06/14/90	680	36	150	1060	13000
	07/17/91	330	1.8	1.7	3.6	1300
	10/10/91	3.1	0.6	0.7	<.05	76
duplicate	10/10/91	3.2	0.6	0.7	<.05	72
MW-9	06/14/90	12	0.78	4.5	2.54	3200
	07/17/91	3.4	<.05	<.05	<.05	87
	10/10/91	1.8	<.05	<.05	<.05	100
MW-10	06/14/90	20	.69	4.3	7.7	400
	07/17/91	4.2	<.05	<.05	<.05	290
	10/10/91	<.05	<.05	<.05	<.05	90
MW-11	10/09/91	<.05	1.2	1.0	6.4	430

down gradient

TABLE 1
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA
WATER SAMPLE ANALYSIS RESULTS, ppb

Well #	Date	Benzene	Toluene	Ethly-benzene	Total Xylenes	TPHg
MW-12	10/09/91	<.05	2.6	0.8	5.1	1500
MW-13	10/09/91	<.05	0.9	0.6	3.0	720
MW-14	08/27/91	<.05	<.05	<.05	<.05	<50
hydropunch	10/09/91	<.05	<.05	<.05	0.9	<50
MW-15	10/10/91	<.05	<.05	<.05	<.05	<50
MW-16	10/09/91	<.05	<.05	<.05	<.05	78
MW-17	10/09/91	<.05	<.05	<.05	<.05	<50
MW-18	10/09/91	<.05	<.05	<.05	<.05	<50

SOIL SAMPLE ANALYSIS RESULTS, ppm

Sample #	Date	Benzene	Toluene	Ethly-benzene	Total Xylenes	TPHg
MW-11-8	08/28/91	<.005	<.005	<.005	<.005	<1.0
MW-12-10	08/28/91	<.005	<.005	<.005	<.005	<1.0
MW-13-6	08/28/91	<.005	<.005	<.005	<.005	<1.0
MW-14-8	08/27/91	<.005	<.005	<.005	<.005	<1.0
MW-16-10	08/29/91	<.005	<.005	<.005	<.005	<1.0
MW-17-8	08/30/91	<.005	<.005	<.005	<.005	<1.0
MW-18-10	08/29/91	<.005	<.005	<.005	<.005	<1.0

Clay soil was observed in the upper five feet of MW-11 while that interval was gravelly in the other wells. Debris material was noted from the borings and MWs drilled at the Castle. The soil encountered while boring below the debris-filled material was typically black to dark gray silty clay with low to medium plasticity.

5.3 Water Table Gradient

The groundwater table gradient calculated from previous measurements of MW-1, -2, and -3 has been between 7 and 8 feet per hundred feet in a westward direction. All of the wells have now been surveyed, relative to the first three, and depths to water have been measured so that contours can be drawn on the water table (Plate 3).

Measurements of depth to water in MW-2, beyond the radius of influence of pump tests, were also recorded at roughly half-hour intervals over a 9.5 hour period on October 9, 1991. These depth measurements, plotted against time, describe a sinusoidal curve with an amplitude of 5 inches and a period of 6.5 hours, which represents tidal effect distorted slightly by inhomogeniety of the soil (Plate 6).

Despite a possible 10-inch tidal-induced error of depth in the direction of the gradient across the well array, there is a gradient of 7 feet, or greater, per 100 feet. Contours of composite data from all of the wells (Plate 3) shows that the gradient is steeper at the east side of the parking lots than at the west side.

5.4 Well Tests

Pumping tests were performed on MW-7 and MW-18. Slug tests were performed on MW-7, -10, -17, and -18. The results of calculations to determine transmissivity and conductivity in MW-7 and MW-18 are shown in Table 2; test-data sheets are in Appendix B. The values of conductivity correspond to these expected in the more coarse-grained geologic materials encountered in borings at this site.

TABLE 2
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA
CALCULATED VALUES OF TRANSMISSIVITY AND CONDUCTIVITY FROM WELL TESTS, November 1991

	MW-7	*MW-18*
Transmissivity (pump)	165 ft^2/day	91 ft^2/day
Transmissivity (slug)	116 ft^2/day	56.5 ft^2/day
Conductivity (slug)	12.4 ft/day	7.4 ft/day

6.0 DISCUSSION AND CONCLUSIONS

6.1 Groundwater Plumes

Depth-to-water data from all of the MWs in July and October, 1991, and the results of water sample analyses show that the plumes are rapidly changing shape and concentration. Daily and seasonal tidal fluctuations in the open ditches on the south and west sides of the Malibu Grand Prix site may be effecting both the shape and concentration of the plumes. Implications of recent studies of tidal effects on contaminant transport are that a zone of tidal influence should be properly delineated[1]. The disappearance and re-appearance of gasoline hydrocarbons in lab results from some of the MWs is interpreted to be caused by fluctuations of water table elevation which results in isolation followed by re-exposure of pockets of gasoline impacted vadose soil in the areas near the former underground storage tank locations. Decomposition of trash material in the back fill underlying the sites is contributing to the chemical nature of the plume and is a factor which has not been assessed. Hydrocarbon concentrations reported in water samples from the two areas have decreased, on average, over the period of time since the underground storage tanks were removed in March, 1989, and February, 1990.

The change of contour interval on top of the water table (Plate 3), which appears as a flexure in the top of the water table shown in cross section (Plate 8), implies that recharge areas exist east of the parking lots. Lawn irrigation east of the Race Track site and a boat pond immediately east of the Castle site are likely sources of recharge.

Data from the Malibu Grand Prix site in Oakland suggest that the tidal pumping action and chemical processes observed in action at these sites are mitigating the hydrocarbon-impacted water in an optimal manner. Prime considerations in a plan for remediation of these groundwater plumes are the cost-effectiveness of the method used and the level of cleanliness to which the water should be restored. Since hydrocarbon concentrations in the water are decreasing by natural means, it remains to be determined what the effect of the plumes is on the tidal water in the ditches, and whether efforts to accelerate the remediation would be cost effective.

Remedial action for the groundwater was recommended in a July 16, 1991, report, based on TPH (g) as high as 13,000 ppb in MW water samples, and on high benzene concentrations in water grab-samples from borings. Subsequent assessment of the groundwater plumes shows the plumes have become less concentrated.

7.0 RECOMMENDATIONS

7.1 Measures are recommended to eliminate groundwater recharge from the boat pond adjacent to the former tank location at the Castle. The objective of this

action is to permanently separate the vadose plume from the artificially elevated water table.

7.2 Construction of a groundwater barrier sump between the Race Track and the former underground tank location is recommended to protect the tank location from recharge caused by irrigation of the grass in the Track area. An alternative is an automatic irrigation control system which supplies the minimum required moisture in the root zone of the landscape vegetation. Without recharge, the water table will recede from the base of the gasoline impacted soil.

7.3 Further assessment of the extent of impaction of the soil around both of the former underground tank sites is recommended to provide information needed for recommendations regarding possible vadose remediation of those areas.

7.4 Quarterly monitoring of the MWs is recommended to further establish the decrease of gasoline hydrocarbons in the groundwater. Low-tide sampling of water in the ditch west of the Malibu Grand Prix facility is recommended, as long as the water table gradient is in that direction, to investigate whether there are gasoline hydrocarbons in the water. If there are gasoline hydrocarbons in the water an investigation should be made to find out if they come from drainage upstream from that which can be effected by incoming tide.

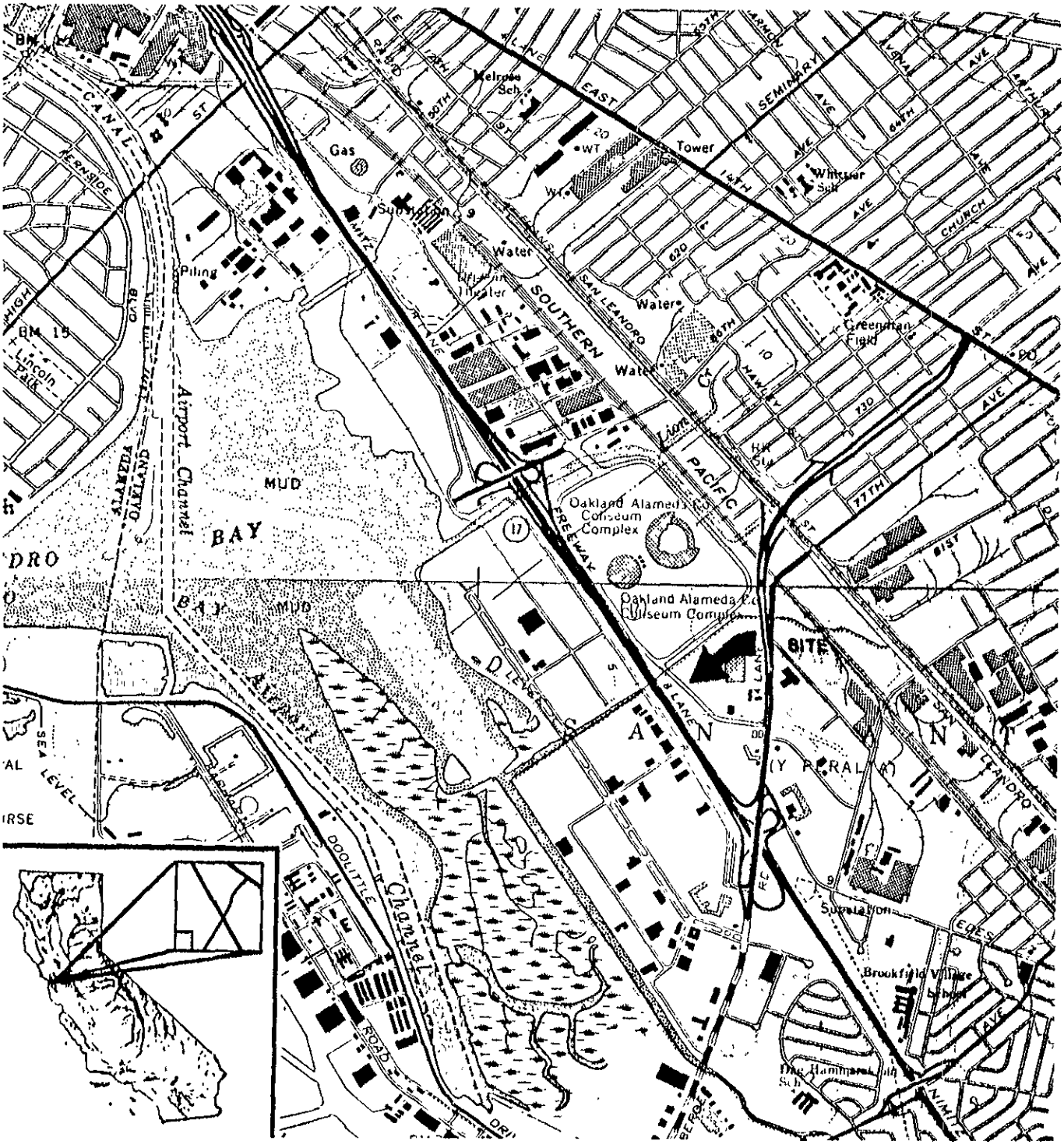
Also Soil Studies

It is recommended that monitoring of the natural improvement of groundwater quality (decrease in gasoline hydrocarbons) be continued until it is equal to the concentration levels of those constituents in the tidal ditch water.

1st need to establish cone of offsite water

8.0 REFERENCES

1) "Simulation of Tidal Effects on Contaminant Transport in Porous Media," by C.S. Yim and M.F.N. Mohsen, 1992. Groundwater, Volume 30, Number 1, Assoiciation of Ground Water Scientists and Engineers.



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Environmental Solutions Through Applied Science, Engineering & Construction

DATE: 01/17/92
PROJECT NUMBER: 4221-3

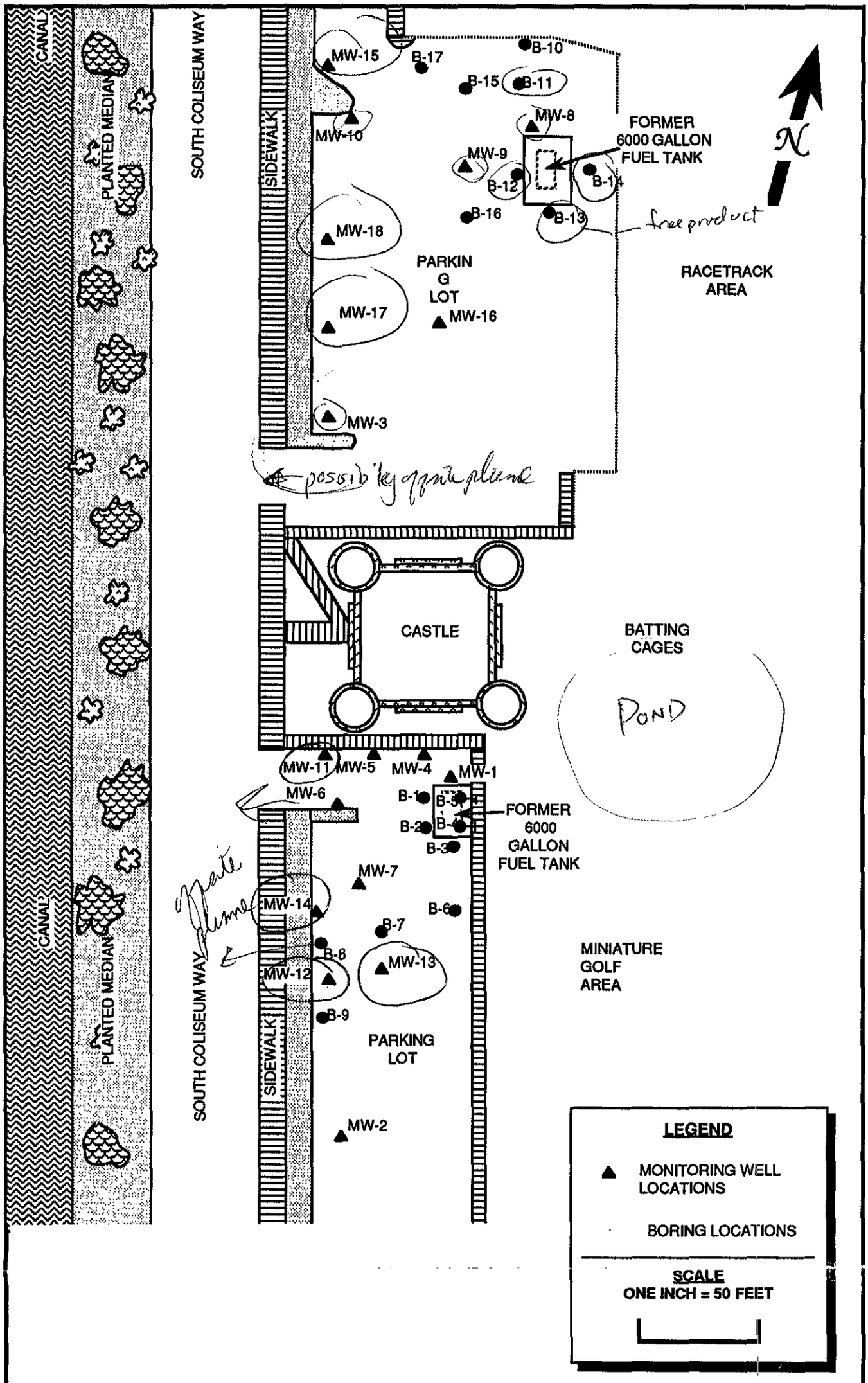
MALIBU GRAND PRIX

8000 South Coliseum Way
Oakland, California

LOCATION MAP

PLATE

1



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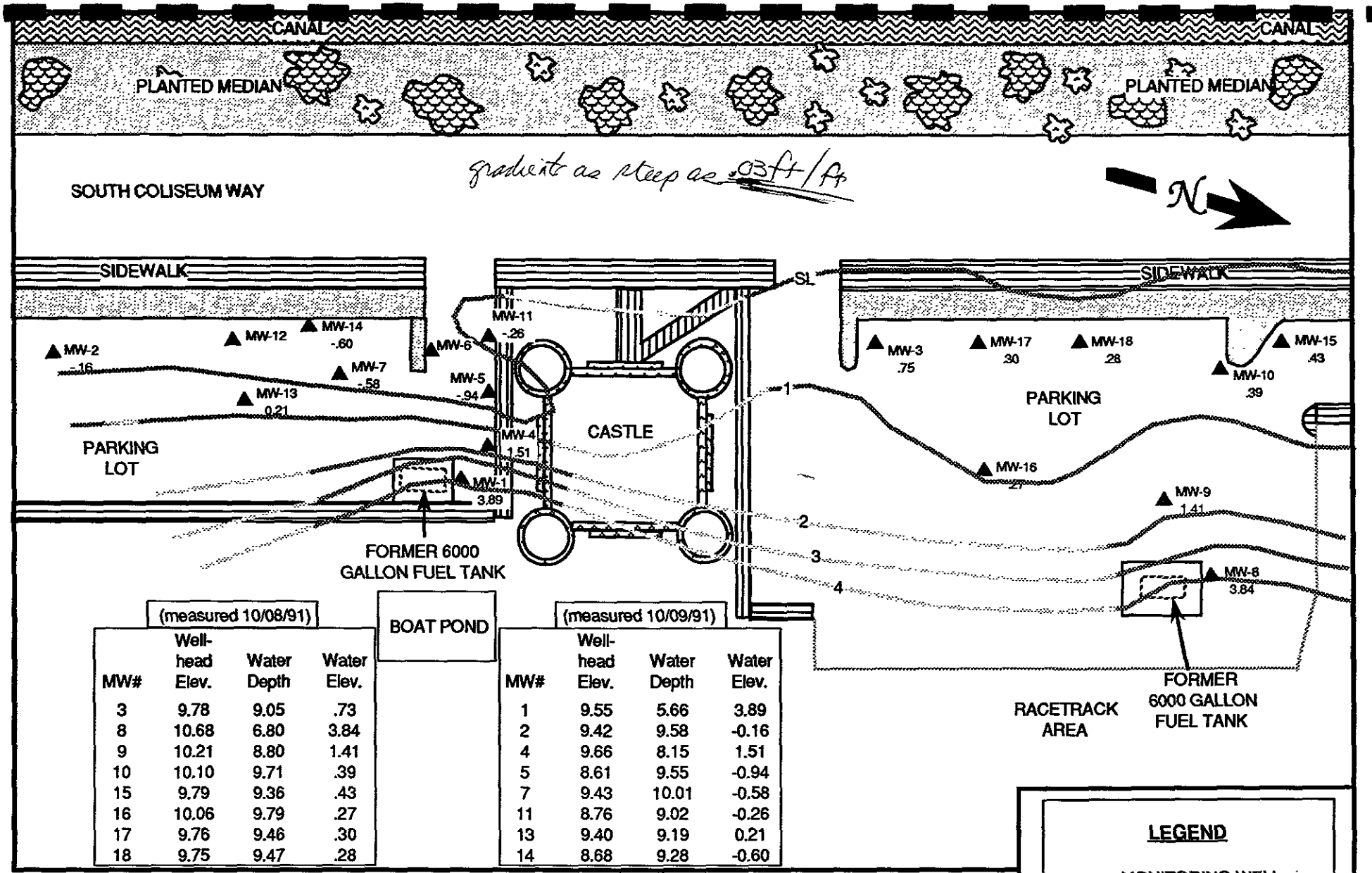
MALIBU GRAND PRIX
8000 SOUTH COLISEUM WAY

PLATE



(measured 10/08/91)

MW#	Well-head Elev.	Water Depth	Water Elev.
3	9.78	9.05	.73
8	10.68	6.80	3.84
9	10.21	8.80	1.41
10	10.10	9.71	.39
15	9.79	9.36	.43
16	10.06	9.79	.27
17	9.76	9.46	.30
18	9.75	9.47	.28

(measured 10/09/91)

MW#	Well-head Elev.	Water Depth	Water Elev.
1	9.55	5.66	3.89
2	9.42	9.58	-0.16
4	9.66	8.15	1.51
5	8.61	9.55	-0.94
7	9.43	10.01	-0.58
11	8.76	9.02	-0.26
13	9.40	9.19	0.21
14	8.68	9.28	-0.60

LEGEND

▲ MONITORING WELL LOCATIONS

SCALE
ONE INCH = 50 FEET

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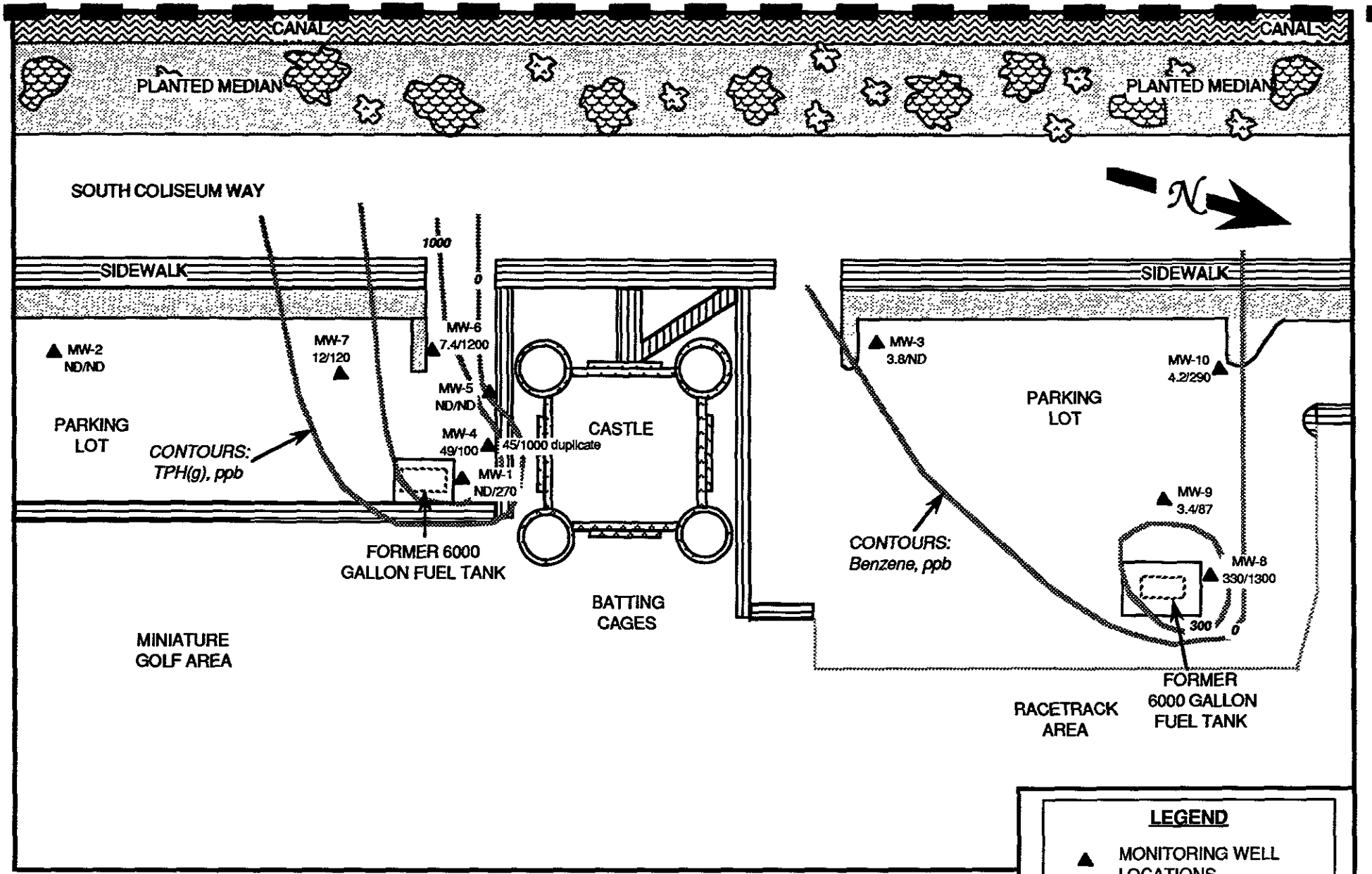
MALIBU GRAND PRIX
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA

TOP OF WATER TABLE CONTOURS OF COMPOSITE DATA

PLATE
3



LEGEND

▲ MONITORING WELL LOCATIONS

49/100 Benzene, ppb/TPH(g), ppb

SCALE
ONE INCH = 50 FEET

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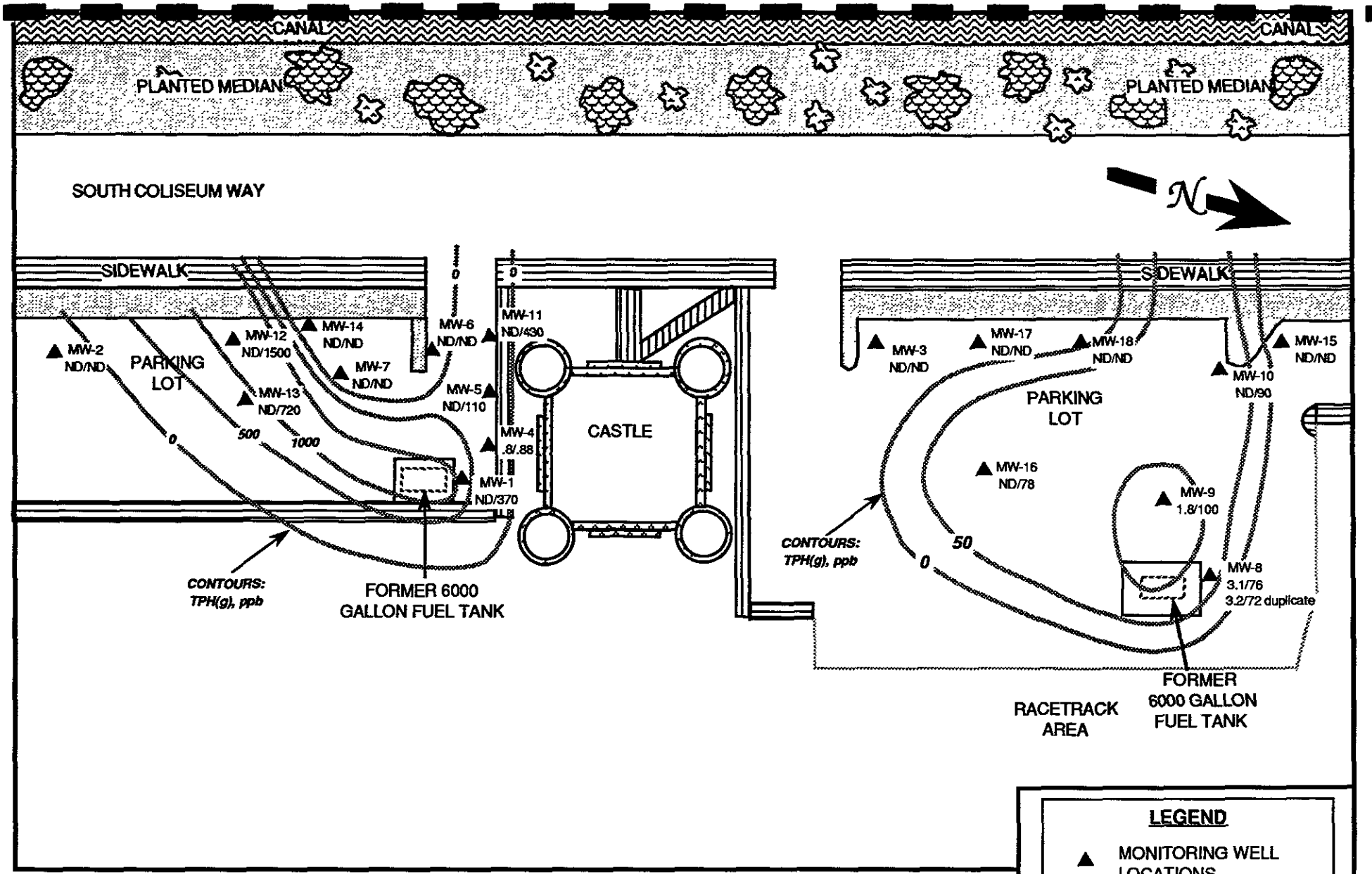
MALIBU GRAND PRIX
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA

GROUNDWATER PLUME CONCENTRATIONS FROM SAMPLES COLLECTED 07/17/91

PLATE
4



LEGEND

▲ MONITORING WELL LOCATIONS

49/100 Benzene, ppb/TPH(g), ppb

SCALE
ONE INCH = 50 FEET

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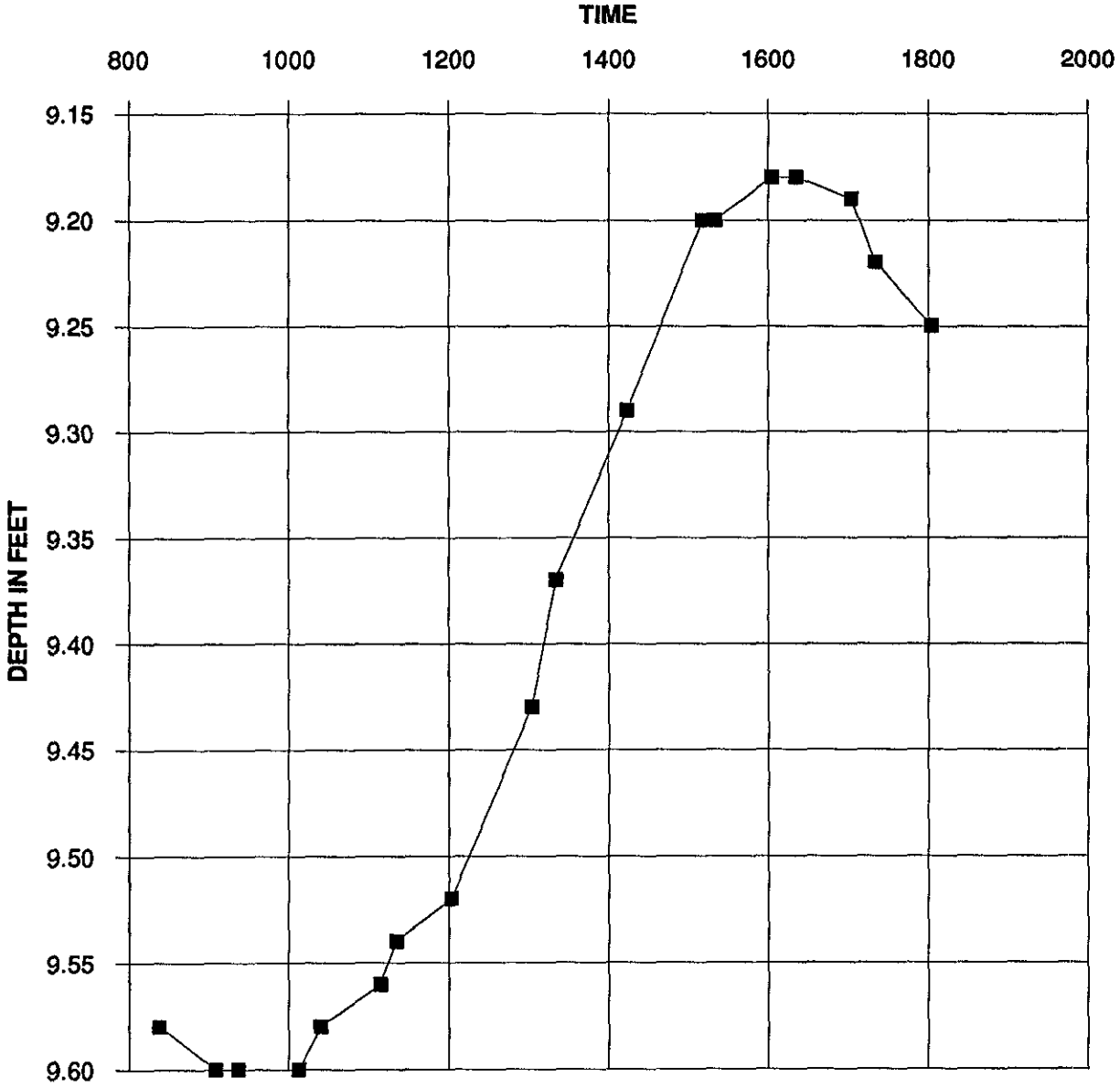
MALIBU GRAND PRIX
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA

GROUNDWATER PLUME CONCENTRATIONS FROM SAMPLES COLLECTED 10/09/91

PLATE
5

MGP - OAKLAND
DEPTH TO GROUNDWATER IN MW-2
OCTOBER 9, 1991



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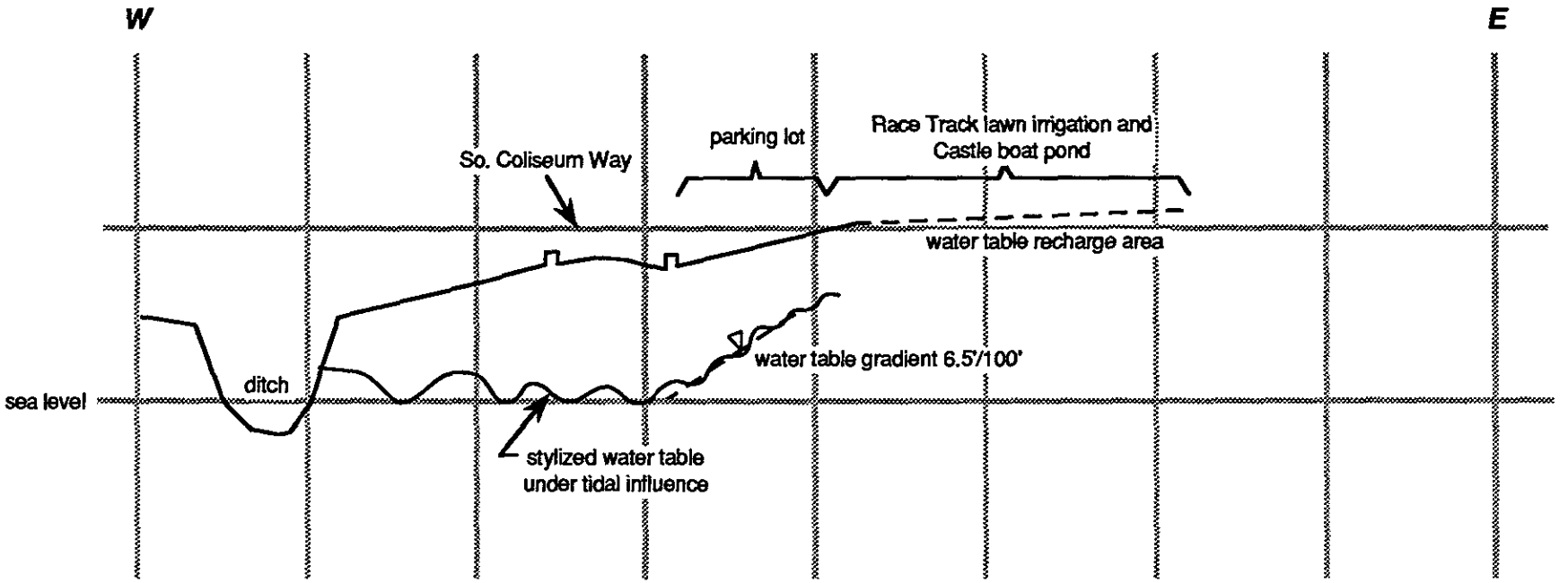
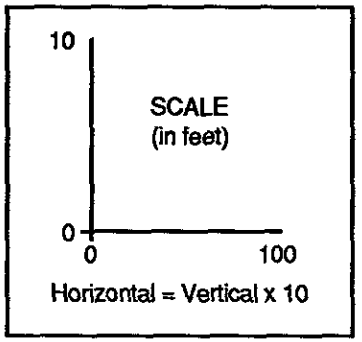
MALIBU GRAND PRIX
800 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA

DEPTH TO GROUNDWATER IN MW-2

PLATE
6





PLATE

7

MALIBU GRAND PRIX
800 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA

GENERALIZED E-W CROSS SECTION

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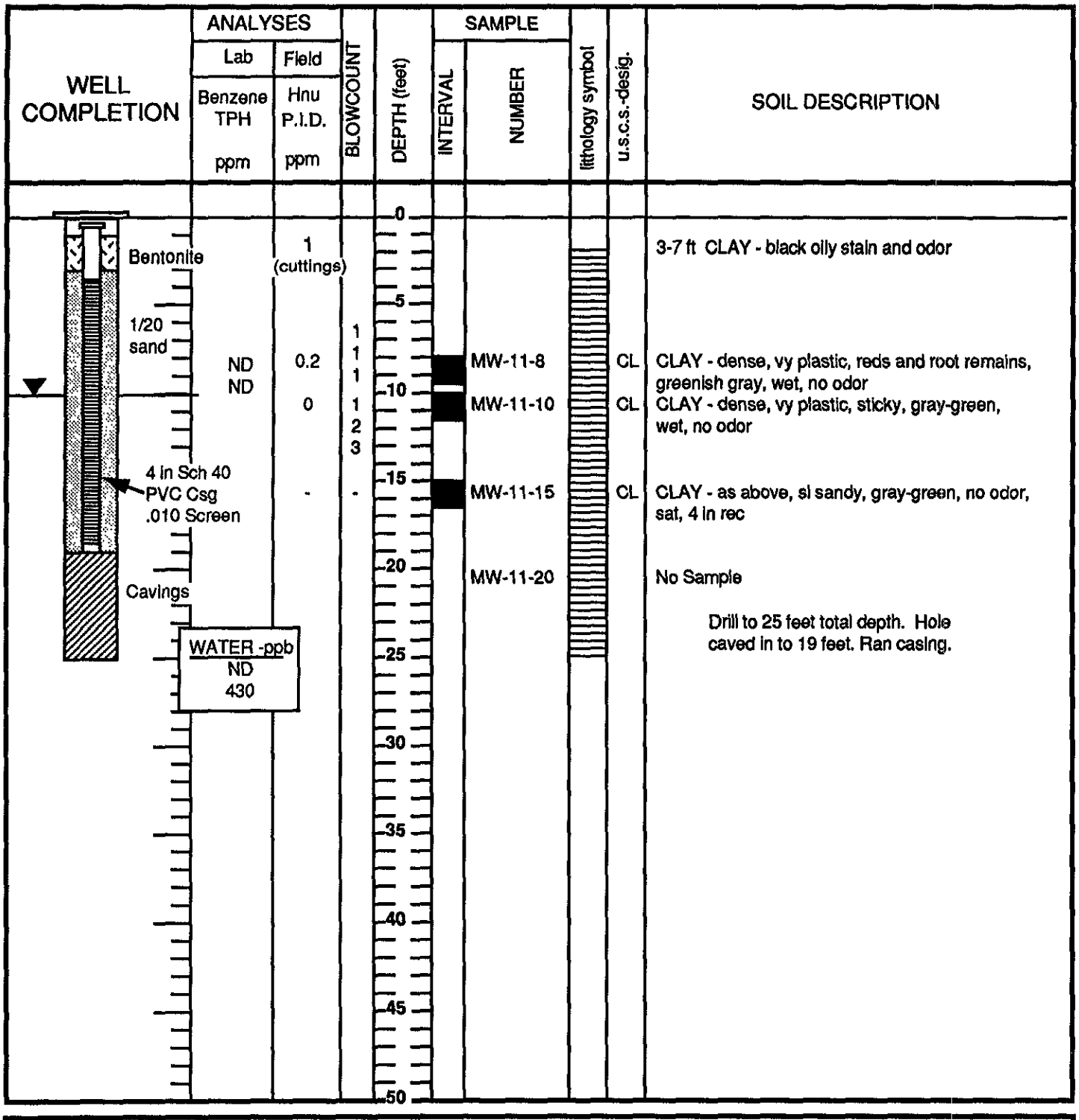
DATE: 12/18/91
PROJECT NUMBER: 4221-3



LOGGED BY: CLE
DATE DRILLED: 8-28-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

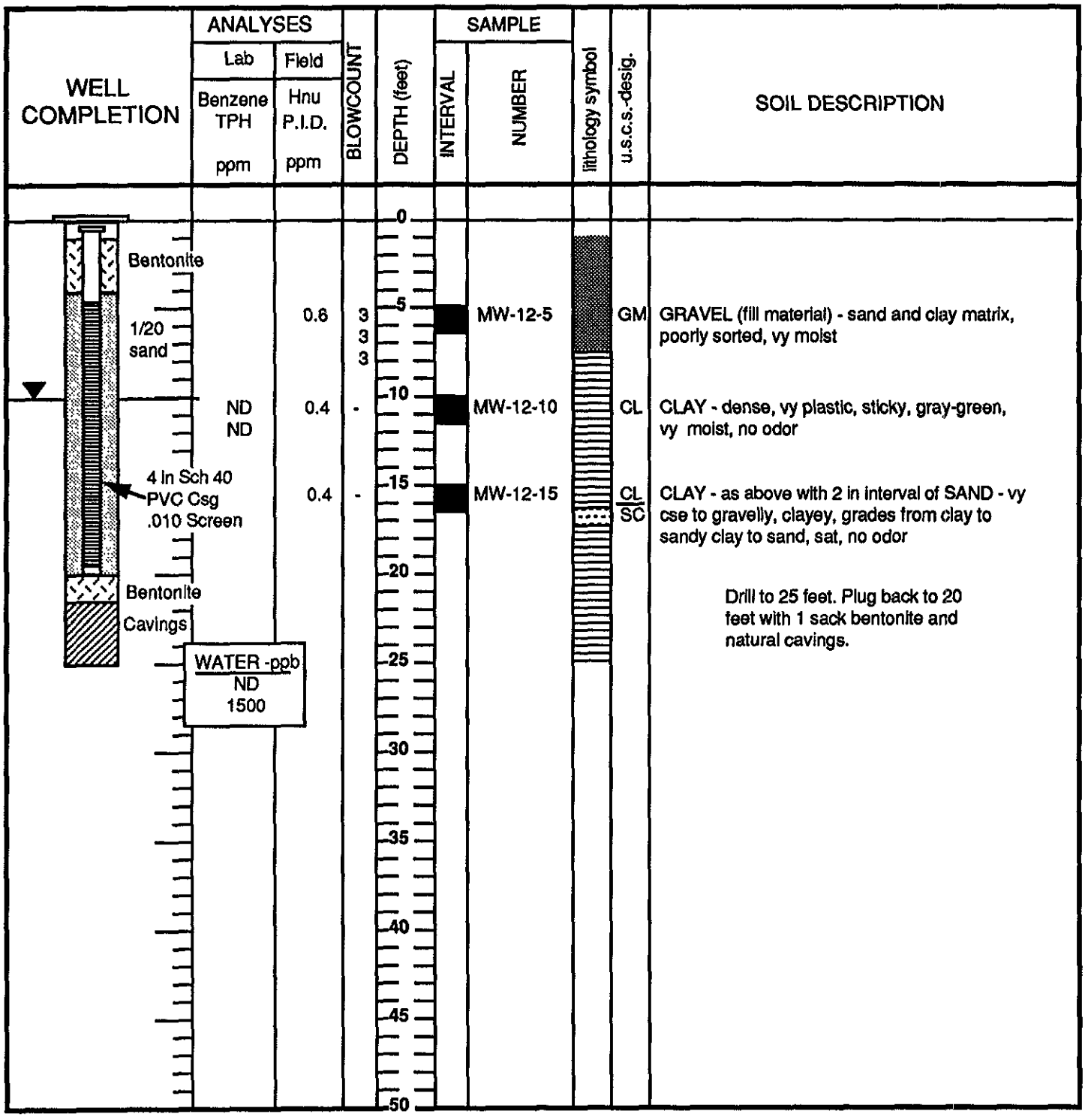
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
SW Corner of Castle, West of MW-5

PLATE 8

LOG OF BORING MW-11



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DATE DRILLED: 8-28-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

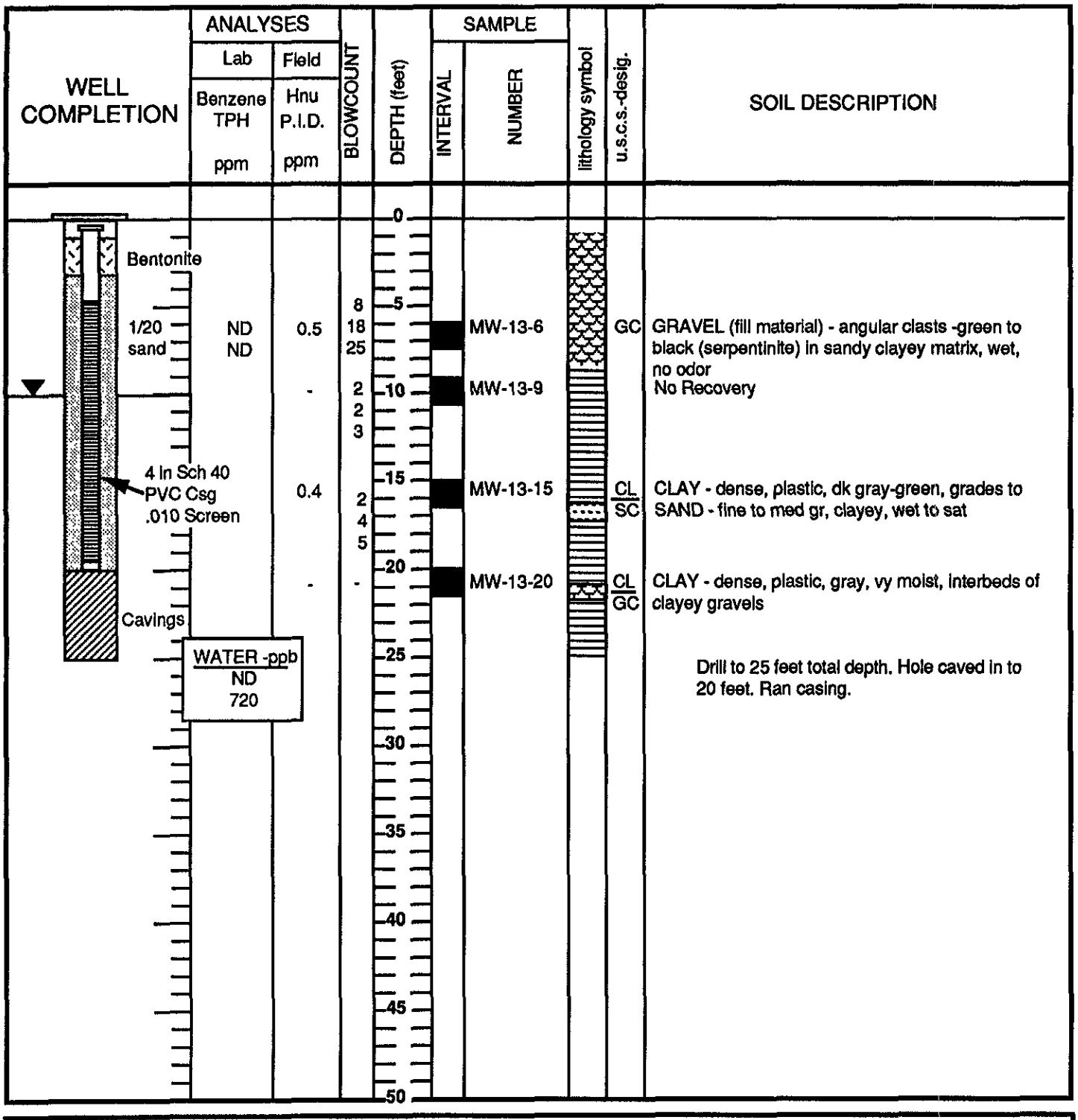
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Castle Parking Lot, South of MW-14

PLATE 9

LOG OF BORING MW-12



LOGGED BY: CLE
DATE DRILLED: 8-28-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

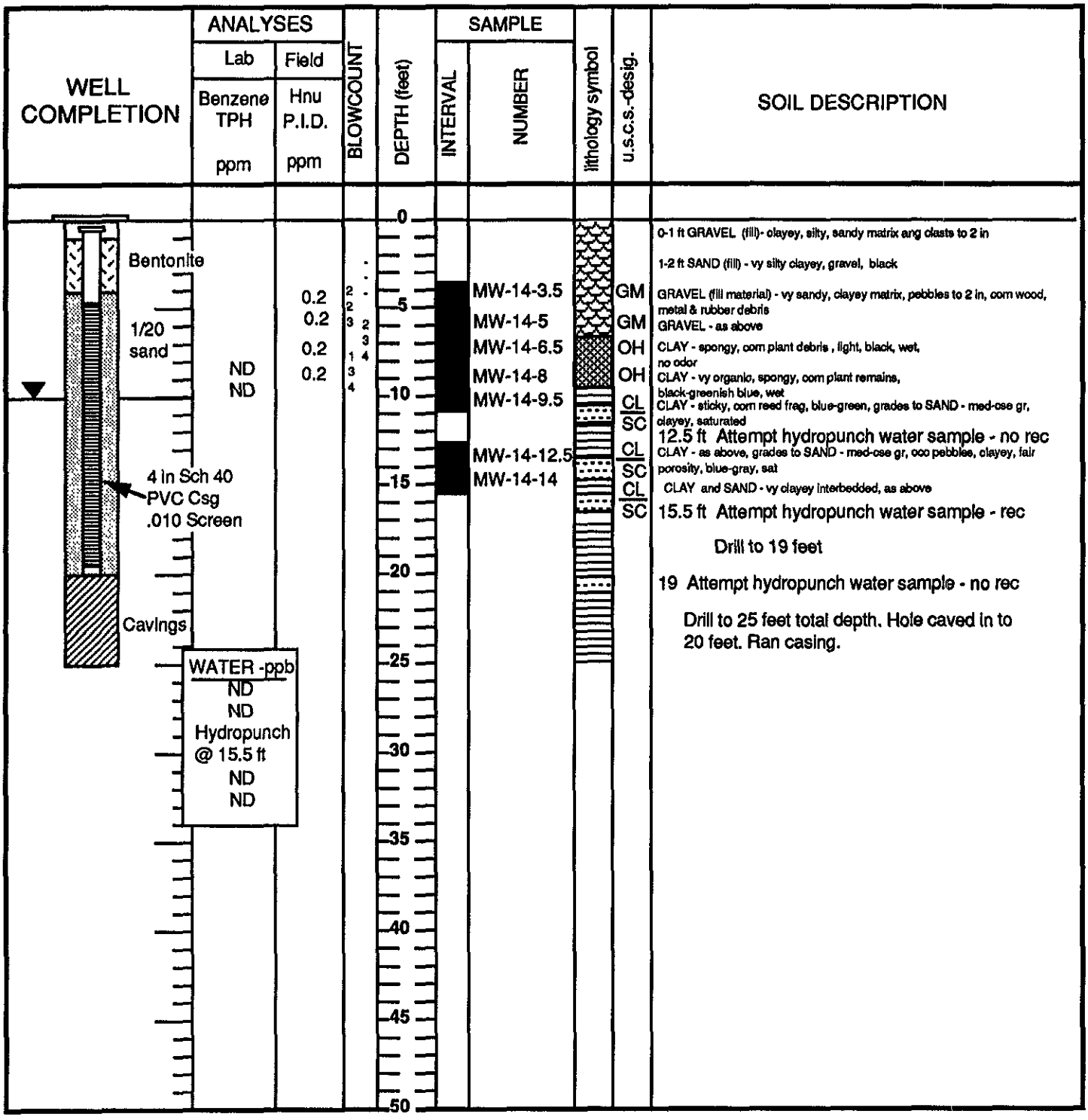
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Castle Parking Lot, East of MW-12

PLATE 10

LOG OF BORING MW-13



LOGGED BY: CLE
DATE DRILLED: 8-27-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

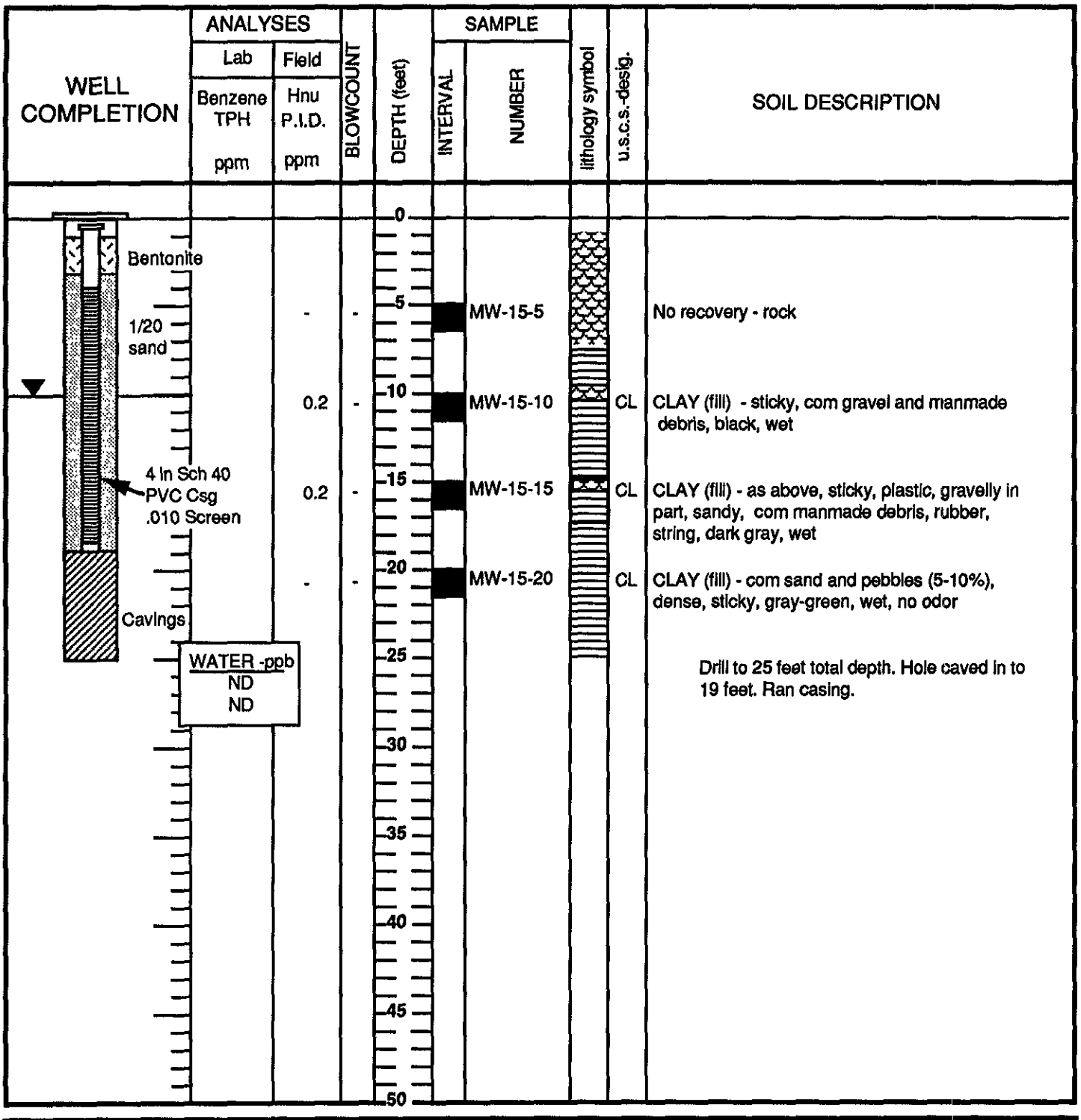
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Castle Parking Lot, West of MW-7

LOG OF BORING MW-14

PLATE
11



LOGGED BY: CLE
DATE DRILLED: 8-29-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

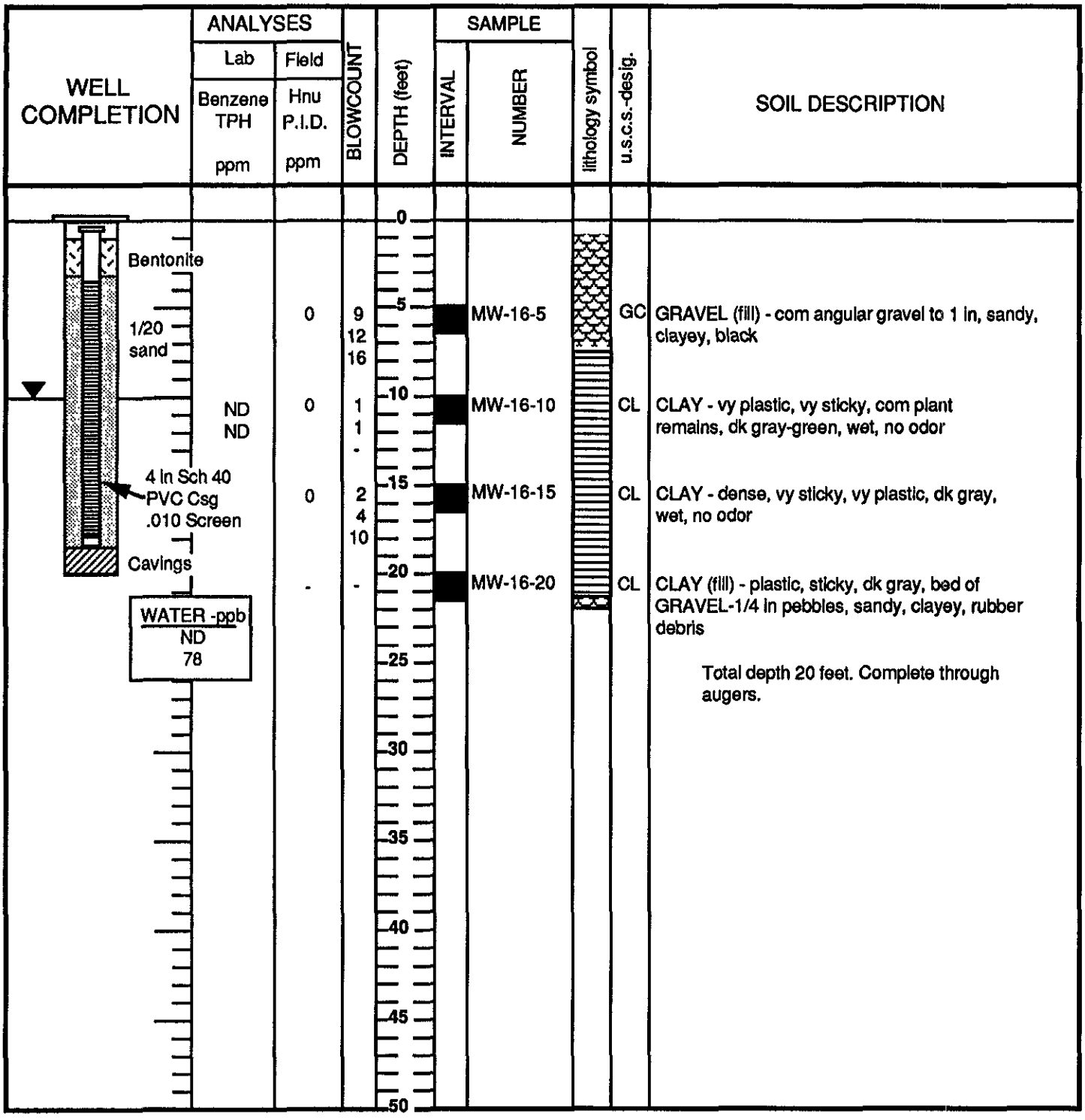
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Racetrack Parking Lot, North of MW-10

PLATE 12

LOG OF BORING MW-15



LOGGED BY: CLE
DATE DRILLED: 8-29-91
TOTAL DEPTH: 20 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

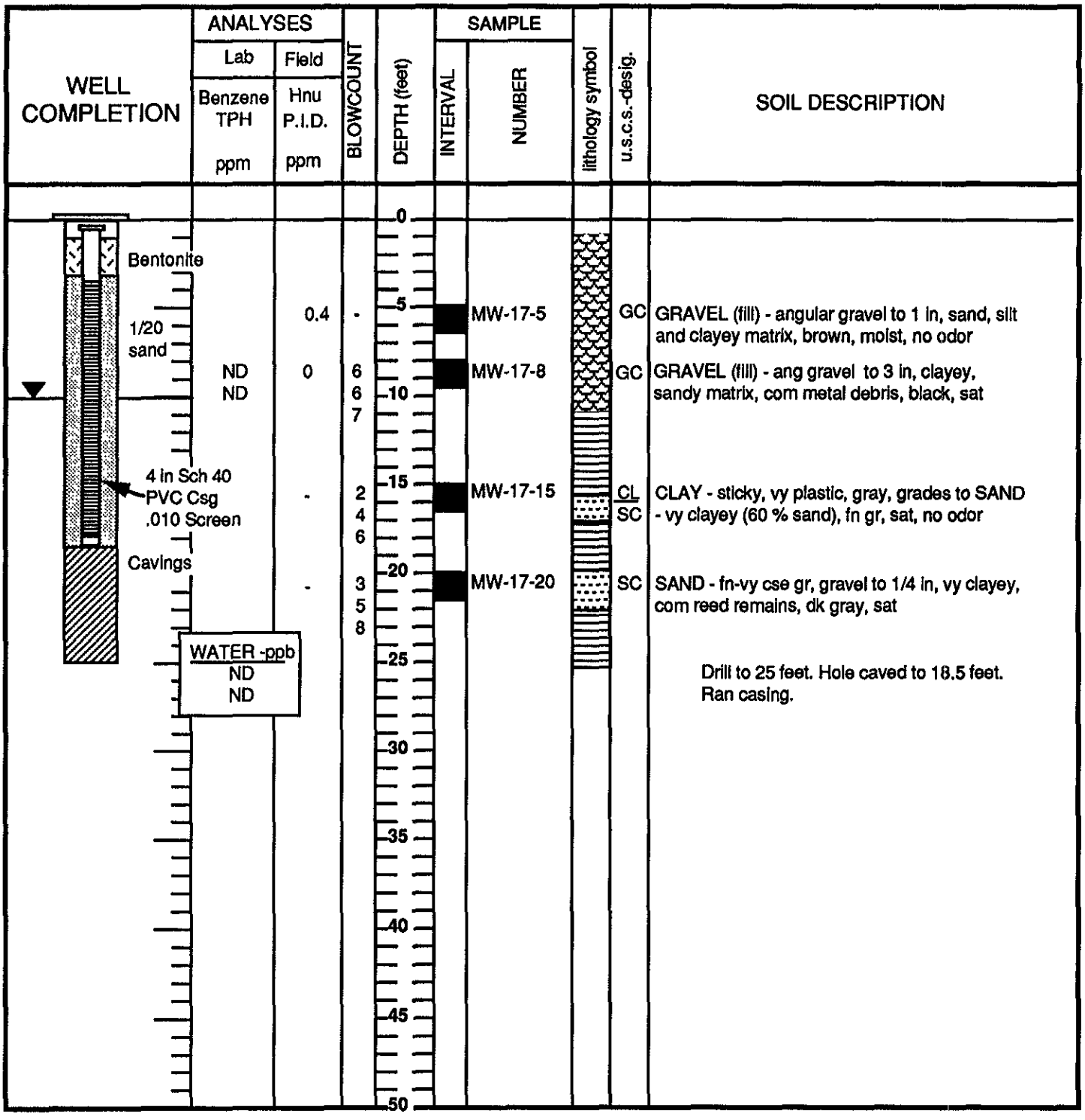
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Racetrack Parking Lot, 58 FT NE OF MW-3

LOG OF BORING MW-16

PLATE 13



LOGGED BY: CLE
DATE DRILLED: 8-30-91
TOTAL DEPTH: 25 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

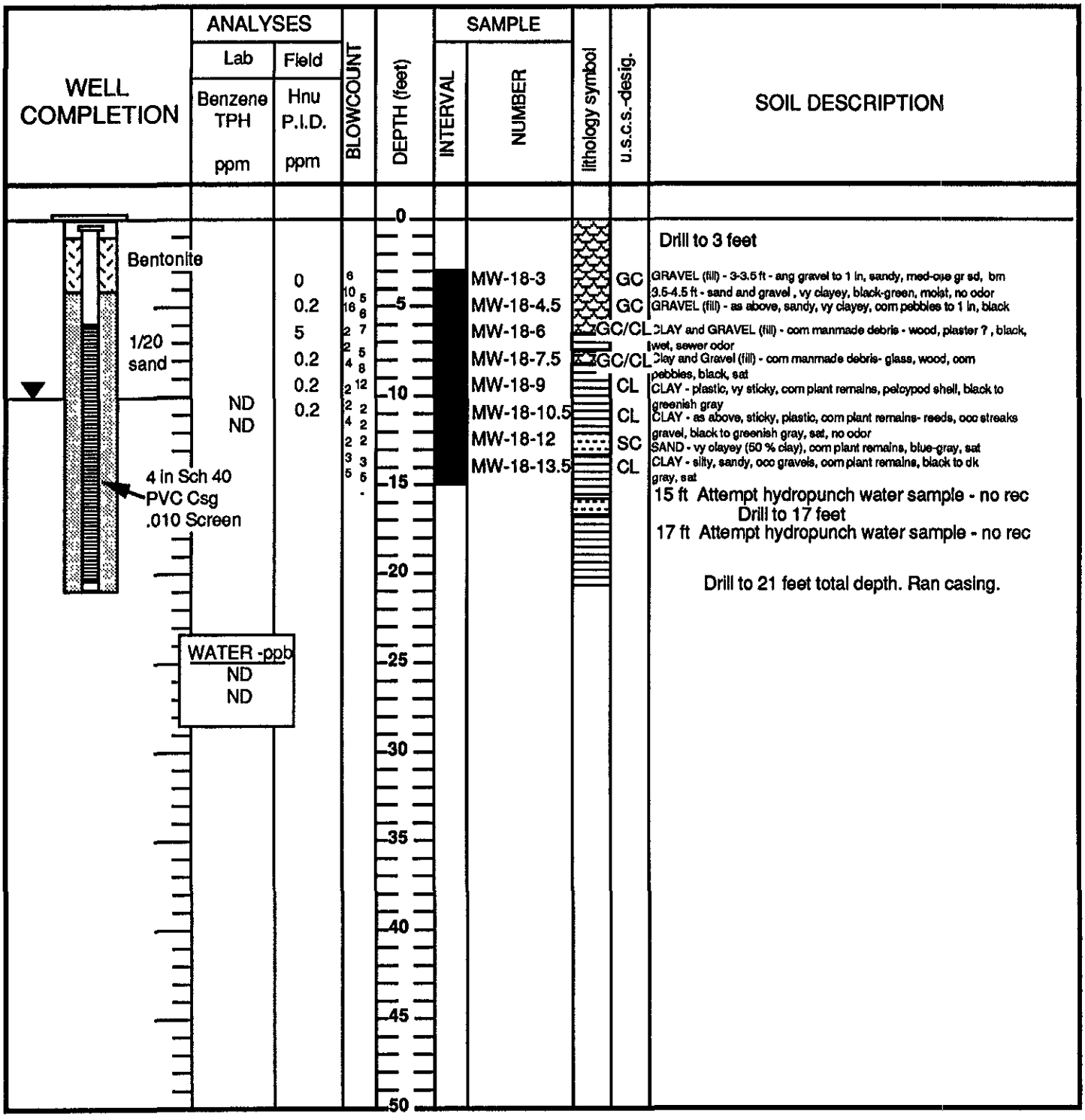
RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Racetrack Parking Lot, North of MW-3

PLATE 14

LOG OF BORING MW-17



LOGGED BY: CLE
DATE DRILLED: 8-29-91
TOTAL DEPTH: 21 FEET
DRILLING COMPANY: RESNA

DIAMETER OF BORING: 10-INCH
WATER ENCOUNTERED AT: 10 FT
SAMPLING METHOD: MODIFIED SPLIT-SPOON
ELEVATION: 10 FT

RESNA/GROUNDWATER RESOURCES, INC.
(805)835-7700
environmental/geotechnical services

PROJECT NUMBER: 4221-3

LOCATION: **MALIBU GRAND PRIX**
8000 SOUTH COLISEUM WAY
OAKLAND, CALIFORNIA
Racetrack Parking Lot, South of MW-10

PLATE 15

LOG OF BORING MW-18

APPENDIX A

Chain of Custody and Laboratory Results

GROUNDWATER RESOURCES INC.

A RESNA Company

P.O. Box 9383
Bakersfield, California
Telephone: (805) 835-7700
Tele-Fax: (805) 835-7717

CHAIN OF CUSTODY RECORD

LAB DESTINATION: Applied Analytical Industries

PROJECT NUMBER: ~~351~~ 2481-4

P.O. NUMBER: 6453-G

SAMPLER(S): (Signature) Claus L Engelhardt

PROJECT CONTACT: Claus Engelhardt

COUNTY: Alameda

LAB NUMBER	SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	CONDITION ON RECEIPT	ANALYSIS REQUESTED	SAMPLE TYPE	CONTAINER TYPE
	O-mw-5	7-17-91	11:15	mw-5		BTXE TPH(gasoline)	water	VOA
	O-mw-6	7-17-91	11:25	mw-6		" " "	"	"
	O-mw-7	7-17-91	11:35	mw-7		" " "	"	"
	O-mw-4	7-17-91	11:40	mw-4		" " "	"	"
	O-mw-1	7-17-91	11:55	mw-1		" " "	"	"
	O-mw-2	7-17-91	12:01	mw-2		" " "	"	"
	O-mw-8	7-17-91	2:35	mw-8		" " "	"	"
	O-mw-10	7-17-91	2:40	mw-10		" " "	"	"
	O-mw-9	7-17-91	2:50	mw-9		" " "	"	"
	O-mw-3	7-17-91	3:15	mw-3		" " "	"	"
	Duplicate	7-17-91	—	—		" " "	"	"
	Travel Blank	—	—	—		" " "	"	"

SPECIAL INSTRUCTIONS: _____

POSSIBLE SAMPLE HAZARDS: _____

1. Relinquished by: Claus L Engelhardt Date/Time: 3:40 7/17/91 Received by: [illegible] Date/Time: 4:30 7/17/91
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

CCR (Rev 7/90)

WHITE: LABORATORY PINK: JOB FILE YELLOW: SAMPLE TRIP

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Claus Engelhardt
GRI
1500 South Main Ave.
Bakersfield, CA 93307

Project: AGS 19514-L, Project ~~#390-3~~ 2481-4
Alameda

Date Sampled: 07-17-91
Date Received: 07-17-91
BTEX Analyzed: 07-29/30-91
TPHg Analyzed: 07-29/30-91
TPHd Analyzed: NR
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
O-MW-5 W1107234	ND	ND	ND	ND	ND	NR
O-MW-6 W1107235	7.4	ND	ND	5.6	1200	NR
O-MW-7 W1107236	12	1.7	4.7	3.8	120	NR
O-MW-4 W1107237	49	4.3	1.5	38	1100	NR
O-MW-1 W1107238	ND	0.6	ND	ND	270	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

August 2, 1991
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 1211)

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Claus Engelhardt	Date Sampled:	07-17-91
	GRI	Date Received:	07-17-91
	1500 South Main Ave.	BTEX Analyzed:	07-29/30-91
	Bakersfield, CA 93307	TPHg Analyzed:	07-29/30-91
Project:	AGS 19514-L, Project #390-3	TPHd Analyzed:	NR
	Alameda	Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
O-MW-2 W1107239	ND	ND	ND	ND	ND	NR
O-MW-8 W1107240	330	1.8	1.7	3.6	1300	NR
O-MW-10 W1107241	4.2	ND	ND	ND	290	NR
O-MW-9 W1107242	3.4	ND	ND	ND	87	NR
O-MW-3 W1107243	3.8	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

August 2, 1991
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Claus Engelhardt	Date Sampled:	07-17-91
	GRI	Date Received:	07-17-91
	1500 South Main Ave.	BTEX Analyzed:	07-29/30-91
	Bakersfield, CA 93307	TPHg Analyzed:	07-29/30-91
Project:	AGS 19514-L, Project #390-3	TPHd Analyzed:	NR
	Alameda	Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
DUPLICATE MW-4 W1107244	45	2.7	1.0	33	1000	NR
TRAVEL BLANK W1107245	ND	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

L Kurk
Laboratory Representative

August 2, 1991
Date Reported

groundwater resources, inc.

091938

1500 S. Union Avenue
Bakersfield, CA 93307
Telephone: (805) 835-7700
Tele-Fax: (805) 835-7717

CHAIN OF CUSTODY RECORD

LAB DESTINATION: Applied Analytical

PROJECT NUMBER: 4221-3

P.O. NUMBER

PROJECT CONTACT: Claus L. Engelhardt

SAMPLER(S): (Signature) Claus L. Engelhardt

COUNTY: Alameda

LAB NUMBER	SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	CONDITION ON RECEIPT	ANALYSIS REQUESTED	SAMPLE TYPE	CONTAINER TYPE
	mw-11-8	8-28-91	8:10	mw-11, 8' depth		BTXE, TPH gasoline	Soil	brass
	mw-12-10	8-28-91	11:10	mw-12 10' depth		" " "	"	"
	mw-13-6	8-28-91	2:05	mw-13 6' depth		" " "	"	"
	mw-14-8	8-27-91	12:45	mw-14 8' depth		" " "	"	"
	mw-16-10	8-29-91	10:55	mw-16 10' depth		" " "	"	"
	mw-18-10	8-29-91	3:30	mw-18 10' depth		" " "	"	"
	mw-17-8	8-30-91	8:05	mw-17 8' depth		" " "	"	"
	mw-14-15	8-27-91	2:30	mw-14 15' depth (Hydropunch)		BTXE, TPH(gasoline)	water	VOA(2)

SPECIAL INSTRUCTIONS:

POSSIBLE SAMPLE HAZARDS:

1. Relinquished by: Claus L Engelhardt Date/Time: 8-30-91 2:56 Received by: Don Johnston Cypress St Date/Time: 8/30/91 2:57
1. Relinquished by: Don Johnston Cypress St Date/Time: 8/30/91 1657 Received by: Cynthia Ennis Date/Time: 8/30/91 5
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

CCR (Rev. 10/89) WHITE: LABORATORY PINK: JOB FILE YELLOW: SAMPLE LOG

groundwater resources, inc.
1900 S. Union Avenue
Bakersfield, CA 93307
Telephone: (805) 835-7700
Tele-Fax: (805) 835-7717

CHAIN OF CUSTODY RECORD

LAB DESTINATION: Applied Analytical

PROJECT NUMBER: 4221-3

P.O. NUMBER 6695-G

PROJECT CONTACT: Claus L. Englehardt

SAMPLER(S): (Signature) Claus L. Englehardt

COUNTY: Alameda MGP Oakland

LAB NUMBER	SAMPLE NUMBER	DATE	TIME	SAMPLE LOCATION	CONDITION ON RECEIPT	ANALYSIS REQUESTED	SAMPLE TYPE	CONTAINER TYPE
	mw-11-8	8-28-91	8:10	mw-11, 8' depth		BTXE, TPH gasoline	Soil	brass
	mw-12-10	8-28-91	11:10	mw-12 10' depth		" " "	"	"
	mw-13-6	8-27-91	2:05	mw-13 6' depth		" " "	"	"
	mw-14-8	8-27-91	12:45	mw-14 8' depth		" " "	"	"
	mw-16-10	8-29-91	10:55	mw-16 10' depth		" " "	"	"
	mw-18-10	8-29-91	3:30	mw-18 10' depth		" " "	"	"
	mw-17-8	8-30-91	8:05	mw-17 8' depth		" " "	"	"
	mw-14-15	8-27-91	2:30	mw-14 15' depth (duplicate)		BTXE, TPH(gasoline)	water	VOA(2)

SPECIAL INSTRUCTIONS:

POSSIBLE SAMPLE HAZARDS:

1. Relinquished by: Claus L Englehardt Date/Time: 8-30-91 2:56 Received by: Lon Johnston Express 01 Date/Time: 8-30-91 2:57pm
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____
1. Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

CCR (Rev. 10/89) WHITE: LABORATORY PINK: JOB FILE YELLOW: SAMPLE LOG

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Claus Engelhardt	Date Sampled:	08-28/29/30-91
	GRI	Date Received:	08-30-91
	1500 South Main Ave.	BTEX Analyzed:	09-06-91
	Bakersfield, CA 93307	TPHg Analyzed:	09-06-91
Project:	19514-L, Project 4221-3	TPHd Analyzed:	NR
		Matrix:	Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.005	0.005	0.005	0.005	1.0	10
SAMPLE Laboratory Identification						
MW-11-8 S1108559	ND	ND	ND	ND	ND	NR
MW-12-10 S1108560	ND	ND	ND	ND	ND	NR
MW-13-6 S1108561	ND	ND	ND	ND	ND	NR
MW-14-8 S1108562	ND	ND	ND	ND	ND	NR
MW-16-10 S11108563	ND	ND	ND	ND	ND	NR

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

September 10, 1991
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Claus Engelhardt	Date Sampled:	08-28/29/30-91
	GRI	Date Received:	08-30-91
	1500 South Main Ave.	BTEX Analyzed:	09-06-91
	Bakersfield, CA 93307	TPHg Analyzed:	09-06-91
Project:	19514-L, Project 4221-3	TPHd Analyzed:	NR
		Matrix:	Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.005	0.005	0.005	0.005	1.0	10
SAMPLE Laboratory Identification						
MW-18-10 S1108564	ND	ND	ND	ND	ND	NR
MW-17-8 S1108565	ND	ND	ND	ND	ND	NR

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

September 10, 1991
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Claus Engelhardt	Date Sampled:	08-27-91
	GRI	Date Received:	08-30-91
	1500 South Main Ave.	BTEX Analyzed:	09-05-91
	Bakersfield, CA 93307	TPHg Analyzed:	09-05-91
Project:	AGS 19514-L, Project #4221-3	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-14 15' W1108566	ND	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

September 10, 1991
Date Reported

RESNA

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

094142

PROJECT NO.	PROJECT NAME/SITE
4221-3	

SAMPLERS (SIGN) Gary J. Cauthon / Gary Cauthon
(PRINT) R. Young / ~~Rex~~ Jo Young / Rex Jo Young

P.O. #: 6913-G

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION	DATE 1991	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTEX (602/8020)	TPHg (8015)	TPHd (8015)	TOG 418 1/5520	601/8010	624/8240	625/8270	REMARKS
MW-4	10-9	16:40				✓	2	VOA	✓	✓						
MW-14	9	15:50					2	VOA								
MW-12	9	4:10														
MW-13	9	3:27														
MW-7	9	11:00														
MW-1	9	15:30														
MW-6	9	17:32														
MW-11	9	17:50														
MW-5	9	16:50														
MW-2	9	1900														
MW-18	10/10	950														
MW-17	10	1030														
MW-16	10	1040														
MW-3	10	1255														
MW-9	10	1310														

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
Rex J. Young	10/10/91	1440	Anthony Ewers 10/10/91
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
RELINQUISHED BY:	DATE	TIME	RECEIVED BY LABORATORY:

LABORATORY: Applied Analytical

REQUESTED TURNAROUND TIME: 2 weeks.

RECEIPT CONDITION:

PLEASE SEND RESULTS TO:

PROJECT MANAGER: Rex Young

RESNA

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

PROJECT NO.	PROJECT NAME/SITE	P.O. #:
4221-3		6913-G

SAMPLERS (SIGN) Rex J. Young
(PRINT) R. Young / G. Cauthon

SAMPLE IDENTIFICATION	DATE 1991	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTEX (602/8020)	TPHg (8015)	TPHd (8015)	TOG 418.1/5520	601/8010	624/8240	625/8270	REMARKS
MW-8	10/10	13:20			HCl		2	W	✓	✓						
MW-10	10/10	1344			↓			W	✓	✓						
MW 15	10/10	1358						W	✓	✓						
(Duplicate)(MW-8)	10/10				↓	↓	↓	W	✓	✓						

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	LABORATORY:	PLEASE SEND RESULTS TO:
Rex J. Young	10/10/91	1440	Anthony Ennis 10/10/91	Applied Analytical	GRI
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:		
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	REQUESTED TURNAROUND TIME: Normal	
RELINQUISHED BY:	DATE	TIME	RECEIVED BY LABORATORY:	RECEIPT CONDITION: chilled	PROJECT MANAGER: REX YOUNG

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (510) 623-0775
Fax: (510) 651-2233

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Rex Young	Date Sampled:	10-09-91
	GRI	Date Received:	10-10-91
	1500 South Union Ave.	BTEX Analyzed:	10-23-91
	Bakersfield, CA 93307	TPHg Analyzed:	10-23-91
Project:	AGS 19514-L, Project #4221-3	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-4 W1110301	0.8	ND	ND	ND	88	NR
MW-14 W1110302	ND	ND	ND	0.9	ND	NR
MW-12 W1110303	ND	2.6	0.8	5.1	1500	NR
MW-13 W1110304	ND	0.9	0.6	3.0	720	NR
MW-7 W1110305	ND	ND	ND	ND	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

October 28, 1991
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 1211)

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	Bakersfield, CA 93307	TPHg Analyzed:	10-23-91
Project:	AGS 19514-L, Project #4221-3	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-1 W1110306	ND	ND	ND	ND	370	NR
MW-6 W1110307	ND	ND	ND	ND	ND	NR
MW-11 W1110308	ND	1.2	1.0	6.4	430	NR
MW-5 W1110309	ND	ND	ND	ND	110	NR
MW-2 W1110310	ND	ND	ND	ND	ND	NR

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ANALYSIS REPORT

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GRI
1500 South Union Ave.
Bakersfield, CA 93307
Project: AGS 19514-L, Project #4221-3

Date Sampled: 10-10-91
Date Received: 10-10-91
BTEX Analyzed: 10-23-91
TPHg Analyzed: 10-23-91
TPHd Analyzed: NR
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-18 W1110311	ND	ND	ND	ND	ND	NR
MW-17 W1110312	ND	ND	ND	ND	ND	NR
MW-16 W1110313	ND	ND	ND	ND	78	NR
MW-3 W1110314	ND	ND	ND	ND	ND	NR
MW-9 W1110315	1.8	ND	ND	ND	100	NR

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	Bakersfield, CA 93307	TPHg Analyzed:	10-23-91
Project:	AGS 19514-L, Project #4221-3	TPHd Analyzed:	NR
		Matrix:	Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	100
SAMPLE Laboratory Identification						
MW-8 W1110316	3.1	0.6	0.7	ND	76	NR
MW-10 W1110317	ND	ND	ND	ND	90	NR
MW-15 W1110318	ND	ND	ND	ND	ND	NR
Duplicate W1110319	3.2	0.6	0.7	ND	72	NR

ppb = parts per billion = µg/L = micrograms per liter.
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BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

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APPENDIX B

Test Data Sheets

DATA SET: MW-7

CLIENT: MALIBU GRAND PRIX
LOCATION: OAKLAND
COUNTY: ALAMEDA
PROJECT: Well Pumping Test Data
AQUIFER: UNCONFINED
WATER TABLE: 10.17 feet

DATE: [illegible]
WELL NO.: MW-7
FLOW RATE: [illegible] gal/min
WELL DEPTH: 15.50 feet
THICKNESS: [illegible] feet

RADIUS OF FLOWING WELL: 2.000 in
RADIUS OF WELL CASING: 2.000 in
The following depths are from top of Aquifer:
PUMPING WELL: SCREENED FROM 0.00 TO 9.33 feet

FITTING ERROR: 3.353 PERCENT

Neuman, 1975: Par. Per. Unconfined Aquifer

MODEL PARAMETERS:

STORAGE COEF:	1.600E+00	TRANSM:	165.000 sqft/day
	FREE		FREE
ANISOTROPY EQUAT(Kz/Kr)1:			0.15420
			FREE
SPECIFIC YIELD:			5.147E-01
			FREE

No.	TIME (sec)	DRAWDOWN (feet) DATA	SYNTHETIC	DIFFERENCE (percent)
1	10.00	0.0100	0.0523	-423.8
2	20.00	0.0900	0.103	-14.63
3	30.00	0.140	0.138	0.924
4	40.00	0.160	0.165	-3.54
5	50.00	0.180	0.187	-4.13
6	60.00	0.200	0.205	-2.81
7	70.00	0.220	0.221	-0.606
8	80.00	0.230	0.235	-2.31
9	90.00	0.240	0.247	-3.04
10	100.0	0.260	0.258	0.615
11	110.0	0.260	0.268	-3.14
12	120.0	0.280	0.277	0.884
13	130.0	0.280	0.286	-2.15
14	140.0	0.290	0.293	-1.10

NO.	TIME (SEC)	DRAWDOWN (FEET) DATA	SYNTHETIC	RESIDUAL (PERCENTAGE)
15	150.0	0.300	0.301	-0.33
16	160.0	0.300	0.308	-2.67
17	170.0	0.310	0.314	-1.29
18	180.0	0.310	0.320	-3.23
19	200.0	0.330	0.332	-0.61
20	220.0	0.350	0.342	2.29
21	250.0	0.350	0.356	-1.71
22	270.0	0.350	0.364	-4.00
23	300.0	0.360	0.376	-4.44
24	330.0	0.360	0.386	-7.22
25	360.0	0.380	0.396	-4.21
26	390.0	0.390	0.404	-3.59
27	420.0	0.390	0.412	-5.64
28	450.0	0.400	0.420	-5.00

CURRENT RESOLUTION MATRIX NOT AVAILABLE

DATA SET: MW-18

CLIENT: MALIBU GRAND PRIX
LOCATION: OAKLAND
COUNTY: ALAMEDA
PROJECT: Well Pumping Test Data
AQUIFER: UNCONFINED
WATER TABLE: 12.86 feet

DATE: 08 OCT 91
WELL NO.: MW-18
FLOW RATE: 1.20 gal/min
WELL DEPTH: 21.00 feet
THICKNESS: 7.64 feet

RADIUS OF FLOWING WELL: 2.000 in
RADIUS OF WELL CASING: 2.000 in
The following depths are from top of Aquifer:
PUMPING WELL: SCREENED FROM 0.00 TO 7.64 feet

FITTING ERROR: 4.379 PERCENT

Neuman, 1975: Par. Pen. Unconfined Aquifer

MODEL PARAMETERS:

STORAGE COEF:	7.859E-01	TRANSM:	91.037 sqft/day
	FREE		FREE
ANISOTROPY [SQRT(Kz/Kr)]:			0.13420
			FREE
SPECIFIC YIELD:	5.147E-01		
	FREE		

No.	TIME (sec)	DRAWDOWN (feet) DATA	SYNTHETIC	DIFFERENCE (percent)
1	1.00	0.0100	1.869E-04	98.13
2	10.00	0.100	0.108	-8.46
3	20.00	0.220	0.204	6.88
4	30.00	0.280	0.270	3.25
5	40.00	0.320	0.320	-0.217
6	50.00	0.370	0.360	2.48
7	60.00	0.400	0.394	1.46
8	70.00	0.440	0.422	3.90
9	80.00	0.460	0.447	2.61
10	90.00	0.490	0.470	4.03
11	100.0	0.500	0.490	1.94
12	130.0	0.540	0.540	-0.162
13	160.0	0.580	0.581	-0.189
14	190.0	0.600	0.614	-2.46

No.	TIME (sec)	DRAWDOWN (feet) DATA	SYNTHETIC	DIFFERENCE (percent)
15	220.0	0.620	0.643	-3.80
16	250.0	0.650	0.668	-2.87
17	280.0	0.630	0.691	-9.70

CURRENT RESOLUTION MATRIIX NOT AVAILABLE

DATA SET: MW-7

CLIENT:	MGPOAKLAND	DATE:	10/09/91
LOCATION:	OAKLAND	WELL NO.:	MW-7
COUNTY:	ALAMEDA	WELL DEPTH:	21.00 ft
PROJECT:	Well Slug Test Data	WATER TABLE:	10.170 ft
AQUIFER:	UNCONFINED	THICKNESS:	9.33 ft
INTAKE RADIUS:	0.167 ft	CASING RADIUS:	0.167 ft
SCREEN TOP:	5.500 ft	SCREEN BASE:	19.50 ft
INITIAL HEAD:	9.330 ft	TRANS. RATIO:	1.0000

MODEL PARAMETERS:

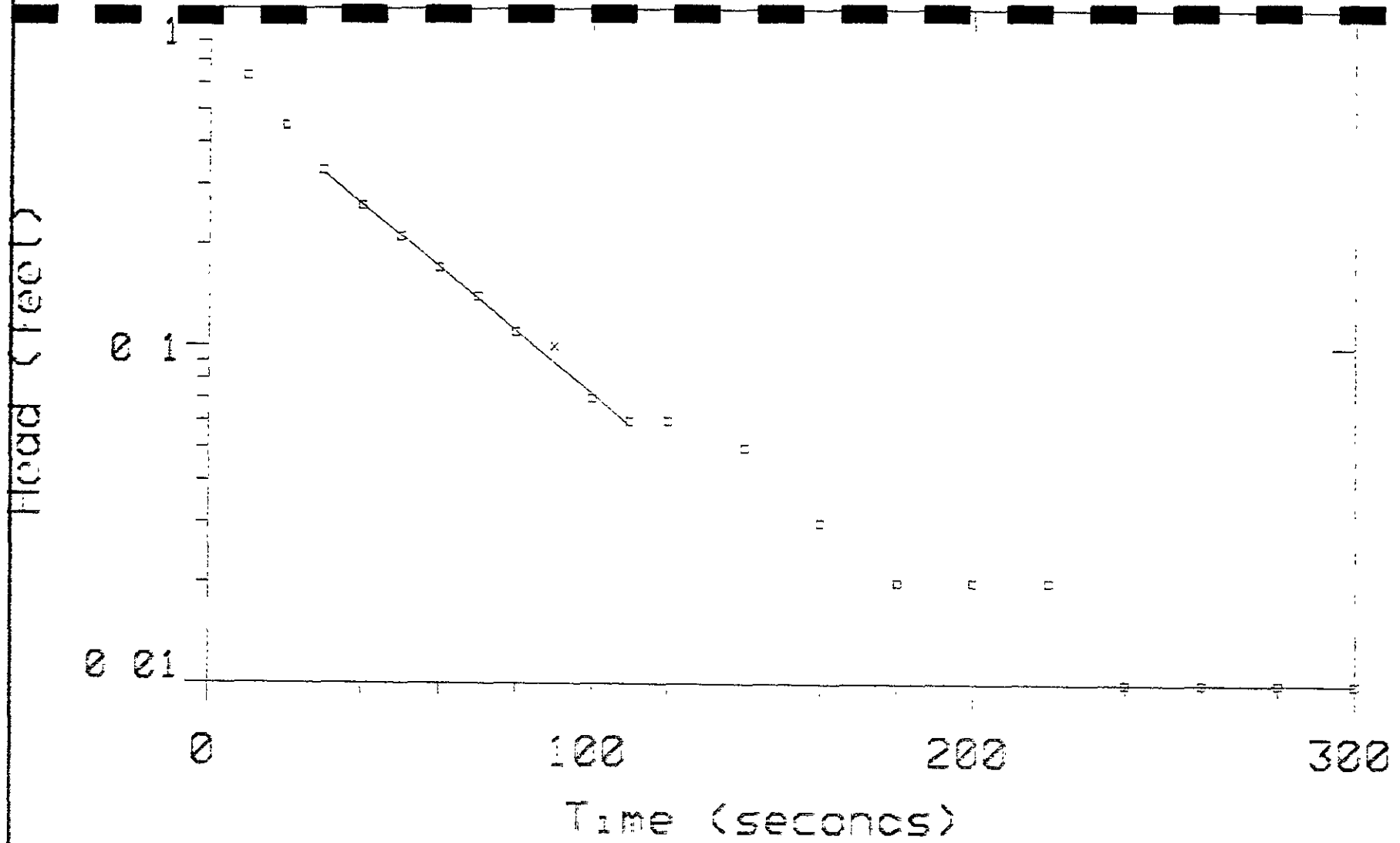
TRANSMISSIVITY: 116. square ft/day

CONDUCTIVITY: 12.5 ft/day

MODEL TYPE: UNCONFINED PARTIALLY PENETRATED AQUIFER (Bouwer & Rice)

No.	TIME (secs)	Head, H (ft) DATA	SYNTHETIC	DIFFERENCE (percent)
1	10.00	0.630		
2	20.00	0.450		
3	30.00	0.330	0.325	1.45
4	40.00	0.260	0.262	-0.884
5	50.00	0.210	0.211	-0.748
6	60.00	0.170	0.170	-0.385
7	70.00	0.140	0.137	1.67
8	80.00	0.110	0.111	-0.936
9	90.00	0.100	0.0722	27.76
10	100.0	0.0700	0.0582	16.76
11	110.0	0.0600		
12	120.0	0.0600		
13	140.0	0.0500		
14	160.0	0.0300		
15	180.0	0.0200		
16	200.0	0.0200		
17	220.0	0.0200		
18	240.0	0.0100		
19	260.0	0.0100		
20	280.0	0.0100		
21	300.0	0.0100		

CURRENT RESOLUTION MATRIIX NOT AVAILABLE



MODEL TYPE: BOUWER and RICE CONDUCTIVITY 12 49 ft/day TRANSMISSIVITY 116 6 sq ft/day INITIAL HEAD 9 330 ft Data Set MW-7 | Date 10/05/91	for MSPOAKLAND By GROUND WATER RESOURCES WELL DATA Units ft AQUIFER UNCONFINED THICKNESS 9 330 SCREEN top 5 500 base 19 52 DIAMETER casing 3340 intake 3340 DEPTH water Table 12 17 TI 21 00	Well Slug Test Data Well MW-7 OAKLAND ALAMEDA

DATA SET: MW-18

CLIENT:	MGPOAKLAND	DATE:	10/08/91
LOCATION:	OAKLAND	WELL NO.:	MW-18
COUNTY:	ALAMEDA	WELL DEPTH:	21.00 ft
PROJECT:	Well Slug Test Data	WATER TABLE:	12.860 ft
AQUIFER:	UNCONFINED	THICKNESS:	7.64 ft
INTAKE RADIUS:	0.167 ft	CASING RADIUS:	0.167 ft
SCREEN TOP:	5.500 ft	SCREEN BASE:	20.50 ft
INITIAL HEAD:	7.640 ft	TRANS. RATIO:	1.0000

MODEL PARAMETERS:

TRANSMISSIVITY: 56.5 square ft/day

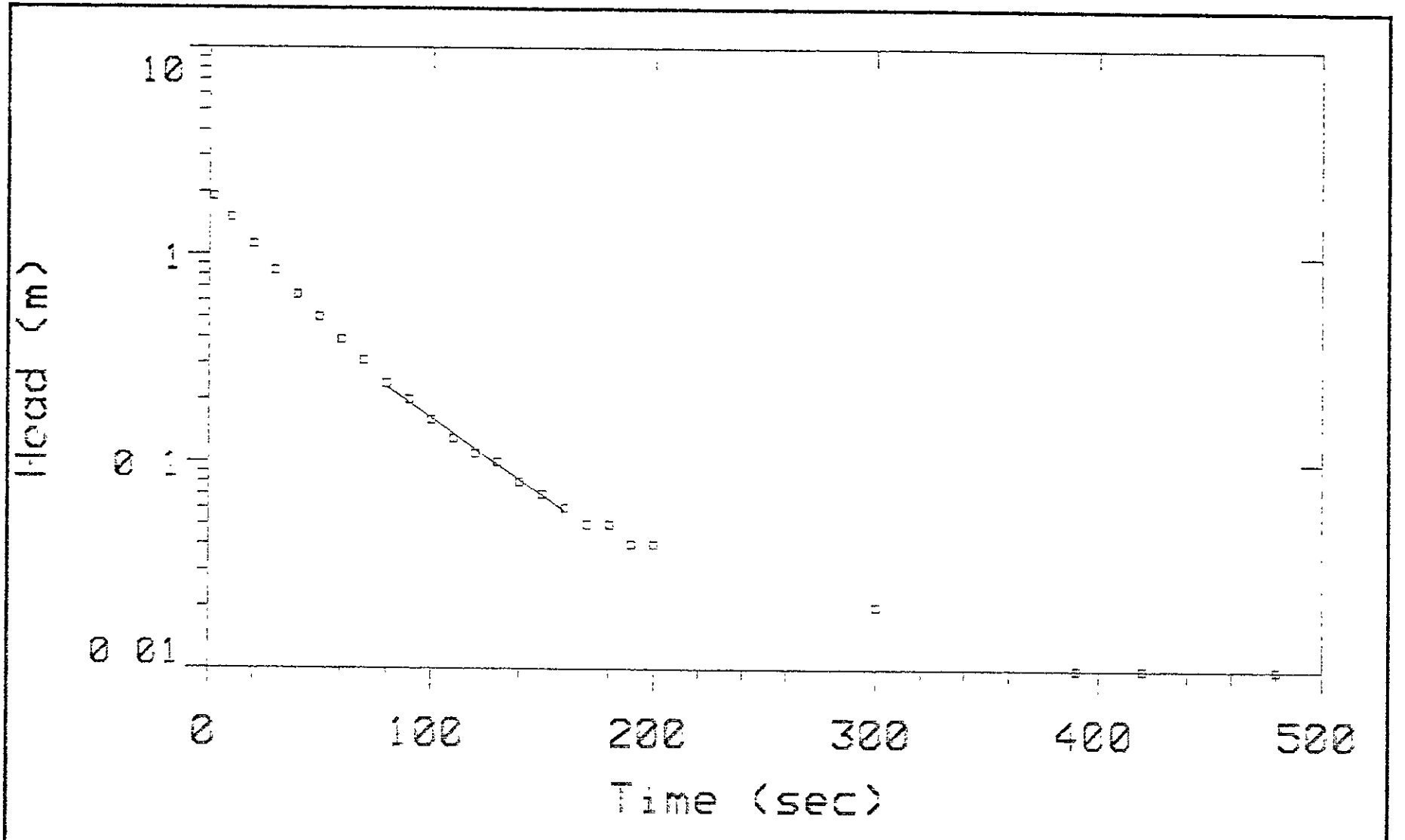
CONDUCTIVITY: 7.39 ft/day

MODEL TYPE: UNCONFINED PARTIALLY PENETRATED AQUIFER (Bouwer & Rice)

No.	TIME (secs)	Head, H (ft) DATA
1	2.00	1.91
2	10.00	1.51
3	20.00	1.12
4	30.00	0.840
5	40.00	0.640
6	50.00	0.500
7	60.00	0.390
8	70.00	0.310
9	80.00	0.240
10	90.00	0.200
11	100.0	0.160
12	110.0	0.130
13	120.0	0.110
14	130.0	0.1000
15	140.0	0.0800
16	150.0	0.0700
17	160.0	0.0600
18	170.0	0.0500
19	180.0	0.0500
20	190.0	0.0400
21	200.0	0.0400
22	300.0	0.0200
23	390.0	0.0100

No.	TIME (secs)	Head, H (ft) DATA
24	420.0	0.0100
25	480.0	0.0100

CURRENT RESOLUTION MATRIIX NOT AVAILABLE



MODEL TYPE: BOUWER and RICE

CONDUCTIVITY 7 394 ft/day

TRANSMISSIVITY 56 49 sq ft/day

INITIAL HEAD 7 640 ft

Data Set MW-18 | Date 10/08/91

for MGPOAKLAND

by GROUND WATER RESOURCES

WELL DATA Units ft

AQUIFER UNCONFINED

THICKNESS 7 640

SCREEN top 5 500 base 22 50

DIAMETER casing 3340 intake 3340

DEPTH Water Table 12 86 TD 21 00

Well Slug Test Data

Well: MW-18D

OAKLAND

ALAMEDA