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November 21, 1994

Mr. Scott O. Seery, CHMM
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SUBJECT: FORMER BEACON STATION NO. 574, 22315 REDWOOD ROAD, CASTRO VALLEY, CALIFORNIA

Dear Mr. Seery:

Enclosed is a copy of the Problem Assessment Report/Remedial Action Plan for the above-referenced Ultramar facility prepared by Acton, Mickelson van Dam, Inc. Please do not hesitate to call if you have any questions about this project at (209) 583-5571.

Sincerely,

ULTRAMAR INC.

Kenneth R. Earnest
Environmental Specialist II
Marketing Environmental Department

Enclosure: Problem Assessment Report/Remedial Action Plan

cc w/encl: Mr. Rich Hiett, San Francisco Bay Region, RWQCB
Mr. Peter J. Pugnale, Shell Oil Company
Mr. Paul A. Wilson, Property Owner

A Member of the Ultramar Group of Companies

BEACON
#1 Quality and Service

PROBLEM ASSESSMENT REPORT/REMEDIAL ACTION PLAN
FORMER BEACON STATION NO. 574

22315 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA
AMV PROJECT NO. 19021.03

November 10, 1994

Prepared By

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Date 11/10/94

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rpt097.mj

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PROBLEM ASSESSMENT REPORT/REMEDIAL ACTION PLAN
FORMER BEACON STATION NO. 574

22315 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA
AMV PROJECT NO. 19021.03

1.0 INTRODUCTION

Acton • Mickelson • van Dam, Inc. (AMV), has been authorized by Ultramar Inc. (Ultramar), to continue an ongoing hydrogeologic investigation at former Beacon Station No. 574 located at 22315 Redwood Road, Castro Valley, Alameda County, California (Figures 1 and 2). This report summarizes the results of previous hydrogeologic investigations conducted by other consultants as well as work recently completed by AMV. AMV's recommendations for future work are included in this report.

1.1 Site Background

The site is located at the intersection of Redwood Road and Grove Way in Castro Valley, 700 feet north of the southwestward-flowing San Lorenzo Creek. An unnamed creek (tributary to San Lorenzo Creek) is located approximately 500 feet north of the site. The elevation of the site is approximately 150 feet above mean sea level. Castro Valley is situated in the east San Francisco Bay Area, south of the San Leandro Hills and northwest of Walpert Ridge. Ground surface in the area of the site generally slopes toward the southwest. The site is bounded on the north by Grove Way and on the east by Redwood Road. The surrounding area is predominantly commercial properties.

A total of eight monitoring wells have been installed on or near the site by Delta Environmental Consultants, Inc. (Delta), and AMV since 1991. Ultramar leased the site and petroleum product storage and distribution facilities and operated a retail gasoline service station at this site from 1981 to 1987. Prior to 1981, the site had been leased and operated by Shell Oil Company (Shell). Information provided by Ultramar indicates that in 1987, when Ultramar ceased leasing the property, all underground storage tanks then in existence were removed. Available data indicate that at least one previous generation of tanks had been installed and used at the site by Shell. The first generation of tanks was removed prior to Ultramar's lease of the property in 1981. It is AMV's understanding that Ultramar is not aware of any specific incidents in which gasoline leaked from the former underground storage tanks or was spilled during filling of any of the tanks. The site is currently occupied by commercial businesses in separate suites within a single building (illustrated on Figure 2).

1.2 Regional Geologic and Hydrogeologic Setting

The site is located in Castro Valley, California, in the eastern San Francisco Bay Area. Ground water has been reported at depths of 15 to 25 feet below grade at the site. The surface of Castro

Valley is covered with Quaternary, nonmarine alluvium (referred to as "older alluvium" and described as dissected terrace deposits), probably deposited by San Lorenzo Creek and its tributaries (Wagner, et al., 1991). Cretaceous marine sedimentary rocks, assigned to the Panoche Formation, underlie the alluvium in Castro Valley, and form the surrounding hills and ridges. The northwest-trending Hayward fault zone is present west of the site.

2.0 RESULTS OF PREVIOUS PHASES OF HYDROGEOLOGIC INVESTIGATION

2.1 Underground Storage Tank Removal

According to a work plan prepared by Ultramar dated January 12, 1993, all underground tanks were removed from the site on May 5, 1987. Underground storage had previously consisted of one 500-gallon waste oil tank, two 5,000-gallon diesel tanks, a 7,000-gallon gasoline tank, and an 8,000-gallon gasoline tank. Records made available by Ultramar indicate that these tanks were originally installed and owned by Shell. These tanks replaced a set of three underground storage tanks that were removed by Shell sometime prior to 1981, when Ultramar assumed the lease on the property. The results of soil samples collected at the time of tank removal indicated the presence of petroleum hydrocarbon constituents in soil underlying the tanks. Overexcavation of the tank basin to a depth of approximately 20 feet was performed on May 18, 1987. After overexcavation, three of the seven soil samples collected at the limit of the excavation contained total volatile hydrocarbons at concentrations of 125.5, 208.7, and 1,989 parts per million (ppm).

2.2 Soil Borings and Monitoring Well Installation

On March 26, 1991, three soil borings were advanced at the site to depths of approximately 30 feet below grade and completed as 4-inch-diameter ground water monitoring wells MW-1, MW-2, and MW-3 (Figure 2). Ground water was encountered in the borings for these wells at approximately 22 feet below grade. Soil borings containing descriptions of soil encountered as the borings were advanced are contained in Appendix A. Soil samples collected as the borings for monitoring wells MW-1 and MW-2 were advanced consisted of gravelly sand to a depth of 6.5 feet below grade, underlain by sandy clay or clayey sand to approximately 22 feet, and sand and silty sand to the total boring depth of 30 feet below grade (Appendix A).

Soil samples collected from the soil borings were submitted for laboratory analysis of benzene, toluene, ethylbenzene, xylenes (BTEX), total petroleum hydrocarbons as gasoline (TPHg), and total petroleum hydrocarbons as diesel (TPHd). The results are compiled in Table 1. None of the soil samples contained detectable concentrations of TPHd. The soil samples collected from above the water table in the boring for monitoring well MW-2 (near the northwest corner of the first generation underground storage tanks operated by Shell) contained detectable concentrations of TPHg. The samples collected from 10 and 15 feet below grade in this boring contained 8.1 and 3,200 ppm TPHg, respectively.

The monitoring wells were installed as described in well construction diagrams contained in Appendix B. Water level measurements made in monitoring wells MW-1, MW-2, and MW-3 on March 26 and April 1, 1991 (Table 2), indicated a direction of ground water flow toward the southwest. The gradient of ground water flow was approximately 0.015 foot per foot. Ground water samples collected from monitoring wells MW-1, MW-2, and MW-3 on April 1, 1991, did not contain detectable concentrations of TPHd. BTEX and TPHg were detected in water samples collected from these wells. Benzene concentrations ranged from 41 micrograms per liter (μg/l) in a sample from monitoring well MW-3 to 650 μg/l in the sample collected from monitoring well MW-2 (Table 3).

Based on the results of installation of monitoring wells MW-1, MW-2, and MW-3, Ultramar prepared a work plan for installation of additional monitoring wells (Work Plan, Subsurface Environmental Investigation at Former Beacon Station No. 574, 22315 Redwood Road, Castro Valley, California, January 11, 1993). The work plan proposed installation of five additional ground water monitoring wells. The proposed work was executed by AMV after approval of Ultramar's work plan on May 13 and 18, 1993. AMV advanced and sampled five soil borings which were then converted to 2-inch-diameter monitoring wells MW-4, MW-5, MW-6, MW-7, and MW-8 (Figure 2).

Soil encountered by AMV in the boring for monitoring well MW-6 included silty clay from the surface to 8.5 feet below grade, silty sand between 8.5 and 14 feet below grade, silty clay beneath the silty sand to a depth of 19.5 feet, sandy silt between 19.5 and 27 feet below grade, and gravelly sand between 27 and 30 feet (the total depth of the boring). Ground water was encountered at about 20 feet below grade in the borings for monitoring wells MW-4 through MW-8. Soil boring logs for soil borings for monitoring wells MW-4 through MW-8 are contained in Appendix A.

AMV submitted a total of 23 soil samples for laboratory analysis of BTEX and TPHg. None of the samples collected from the borings for monitoring wells MW-4 through MW-8 contained detectable concentrations of petroleum constituents (Table 1).

AMV completed monitoring wells MW-4 through MW-8 as described on well construction diagrams contained in Appendix B. AMV measured depth to ground water in each existing monitoring well (MW-1 through MW-8) on May 18, 1993. Depth to ground water ranged from 15.72 to 22.66 feet below the top of the well casings (Table 2). AMV's water level measurements indicated a direction of ground water flow toward the southwest at a gradient of 0.01 foot per foot.

AMV collected ground water samples for analysis from monitoring wells MW-4 through MW-8 only on May 18, 1993 (monitoring wells MW-1 through MW-3 had been sampled on May 7, 1993) for laboratory analysis of BTEX and TPHg. BTEX constituents were not present at detectable concentrations in ground water samples collected from monitoring wells MW-4 through MW-8 (Table 3). The sample collected from monitoring well MW-6 did contain 170 μg/l TPHg.

The most recent quarterly monitoring event at the site was conducted on September 9, 1994, by Doulos Environmental and reported by Fugro, Inc. Depth to ground water on this date ranged from 16.87 feet below grade (MW-5) to 23.93 feet below grade (MW-1). The direction of ground water flow was generally toward the southwest (Figure 3) at a gradient of 0.01 foot per foot.

Analytical results of ground water samples collected in September 1994 indicate that BTEX constituents were detected only in samples collected from monitoring wells MW-1, MW-2, and MW-3 (the sample collected from monitoring well MW-6 contained 140 μg/l TPHg). The inferred distribution of benzene in ground water on September 9, 1994, beneath the site is illustrated on Figure 4.

2.3 Hydrogeologic Testing Results

On January 31 and February 1 and 2, 1994, AMV conducted an aquifer test, an air sparging test, and a vapor extraction test using wells at the site. Starting on January 31, 1994, a 24-hour, continuous pumping test was conducted, using monitoring well MW-1 as the pumping well. The pumping rate throughout the test was maintained at approximately 0.25 gallon per minute (gpm). Water levels were recorded in the pumping well and monitoring well MW-2 using an automated data logger. Monitoring well MW-2 is located approximately 55 feet from MW-1. After 24 hours of pumping, a drawdown of approximately 4.2 feet was measured in the pumping well, and approximately 0.11 foot of drawdown was measured in monitoring well MW-2. Aquifer test analytical methods indicated a calculated hydraulic conductivity (K) of approximately 0.005 [illegible]. The observed drawdown at monitoring well MW-2 (located northwest and crossgradient of the pumping well), indicates a downgradient capture zone extent of approximately 17 feet, and a crossgradient capture zone width of approximately 110 feet.

The soil vapor extraction test was performed over a 4 hour period using monitoring well MW-1 as the extraction well. Pumping of ground water from monitoring well MW-1 was continued during the soil vapor extraction test to maximize the open screened area in this well during the test. The airflow rate during the test was approximately 43.6 standard cubic feet per minute (scfm). Throughout the vapor extraction test, AMV measured a vacuum influence of about 0.35 inch of water column at monitoring well MW-2, indicating a zone of vacuum influence around monitoring well MW-1 with a radius of at least 55 feet. Air samples collected during the vapor extraction test contained 66 ppm benzene and 7,800 ppm TPHg at the start of the test and 42 ppm benzene and 4,500 ppm TPHg at the end of the test. The analytical and flow rate data indicate an initial extraction rate for TPHg of 67.7 pounds per day (lbs/day). The estimated initial extraction rate for benzene was 0.57 lbs/day.

Direction?

An 8-hour sparge test was conducted by injecting air through a temporary sparge point installed approximately 15 feet from monitoring well MW-1. Air was injected at a rate ranging from 7.0 to 7.7 scfm. Dissolved oxygen, carbon dioxide (CO_2), and TPHg concentrations in water and air from monitoring well MW-2 were monitored in the field and with samples collected for laboratory analysis during the test. Dissolved oxygen content in water samples collected from monitoring well MW-1 increased from 2.6 percent (sample collected before sparging began) to 6.5 percent (sample collected at the end of the sparge test). These measurements indicated that a sparge rate averaging approximately 7.4 scfm had an influence at least 15 feet away at monitoring well MW-1.

3.0 SUMMARY OF HYDROGEOLOGIC ASSESSMENT

3.1 Distribution of Petroleum Constituents in Soil

Soil samples collected from the borings for monitoring wells MW-4, MW-5, MW-6, MW-7, and MW-8 did not contain detectable concentrations of petroleum constituents. Soil samples collected from the borings for monitoring wells MW-1 and MW-3 at 20 feet below grade contained detectable concentrations of petroleum constituents; however, these samples were collected within the zone of water table fluctuation and probably reflect the presence of these constituents in ground water rather than the presence of these constituents in the vadose zone above ground water. Only the samples collected from above the water table in the boring for monitoring well MW-2, located near or possibly adjacent to the tank basin of the first generation tanks operated by Shell, contained detectable concentrations of TPHg. Soil sample analytical results and the results of a vapor extraction test performed on monitoring well MW-1 indicate that only soil in the vicinity of the former underground storage tanks contains petroleum constituents.

AMV has constructed two soil cross-sections to illustrate the inferred distribution of petroleum constituents in soil underlying the site. The cross-section locations are illustrated in Figure 5 and the cross-sections appear on Figure 6 (A-A') and Figure 7 (B-B').

3.2 Distribution of Petroleum Constituents in Ground Water

The direction of ground water flow beneath the site has been consistently toward the southwest. The ground water gradient has typically been 0.01 foot per foot.

The distribution of petroleum constituents in ground water is defined upgradient, downgradient, and crossgradient of the site. Ground water samples collected from monitoring wells MW-8 (upgradient), MW-5 (downgradient), and MW-4 (crossgradient) have historically not contained detectable concentrations of petroleum constituents. The only detection in samples from monitoring well MW-7 was TPHg at 60 μg/l in March 1994 (Table 3). Ground water samples collected from monitoring well MW-6 have consistently contained TPHg at concentrations ranging from 78 to 210 μg/l. BTEX constituents have generally not been detected in samples from monitoring well MW-6.

Ground water samples collected from monitoring wells MW-1, MW-2, and MW-3 have consistently contained detectable concentrations of petroleum constituents. Benzene concentrations have been highest in samples collected from monitoring well MW-2, ranging from 650 to 3,100 μg/l. The most recent benzene distribution map (Figure 4) indicates ground water containing dissolved petroleum constituents is limited to the area of the former underground storage tanks, with some dispersion towards the north (MW-3). The nearest monitoring wells at off-site locations do not contain dissolved benzene.

4.0 DISCUSSION OF REMEDIATION ALTERNATIVES

As discussed in Section 3, the delineation of petroleum constituents in soil and ground water beneath the site appears to be complete. The extent of migration of ground water containing these constituents is defined. This section outlines an interim course of action for the remediation of soil and ground water underlying the site which contain petroleum constituents. The remediation activities discussed in this section have three goals:

1. Continued verification that ground water containing dissolved petroleum constituents has not migrated toward potential ground water users or surface water bodies.

2. Removal of petroleum constituents from ground water underlying the site.

3. Removal of petroleum constituents from soil underlying the site.

4.1 Removal of Petroleum Constituents from Ground Water

Strategies considered for interim remediation of ground water containing dissolved petroleum constituents include:

- Passive Remediation
- Ground Water Pumping and Aboveground Treatment

Vacuum enhanced P&T ?

- Vapor Extraction
- Vapor Extraction with Air Sparging

4.1.1 Passive Remediation

Passive remediation relies on existing natural processes to restrict migration of ground water containing dissolved petroleum constituents and remove these constituents from ground water. any oxygen? **Continued volatilization** and biodegradation of petroleum constituents in ground water and soil within the zone of water table fluctuation would be expected to reduce concentrations of these constituents with time. The available data indicate that natural mechanisms (including the relatively flat ground water gradient) are operating to restrict movement of ground water and/or the petroleum constituents in ground water. The pumping test results indicated a calculated **hydraulic conductivity (K) value of 0.005 foot/min.** The ground water gradient beneath the site is approximately 0.01 foot per foot. Using these values, an average linear ground water velocity of between 0.21 and 0.29 foot per day can be calculated (the lower velocity assumes a value for effective porosity of 0.35; the higher value assumes a value for effective porosity of 0.25). Using the lower velocity, petroleum constituents (including BTEX) would travel the distance from the former underground storage tanks to monitoring well MW-6 (approximately 80 feet) in approximately 380 days, or just over 1 year. With the higher velocity, petroleum constituents would reach MW-6 in just over 9 months. BTEX constituents have not yet reached MW-6, and the station ceased operation in early 1987, more than 7 years ago. It is likely that the release of petroleum constituents at the site took place sometime prior to 1987. **This indicates that natural mechanisms are now acting and have previously acted to retard the movement of these constituents downgradient.** DO conc. ?

8.3×10^{-5} ft s^{-1}
2.54×10^{-5} m s^{-}
silt/silty sand

If this option is selected, it would be necessary to continue the existing ground water monitoring program (although the sampling interval or number of wells monitored could be modified) to verify that the historically slow rates of migration of petroleum constituents will continue. A change in existing conditions (drastic water level changes or local pumping of ground water) may warrant reevaluation of this alternative.

4.1.2 Ground Water Pumping and Aboveground Treatment

This remediation alternative involves recovery of ground water by pumping from one or more extraction wells. After aboveground treatment, possibilities for disposal of the ground water include discharge to the sanitary or storm sewer.

Implementation of ground water pumping constitutes a method for both controlling the migration of and removing petroleum constituents from ground water beneath the site. The pumping test on monitoring well MW-1 described in Section 2.3 indicates that this well will yield approximately 0.25 gpm (or less) on a long-term, continuous basis. The short-term empirical extent of the capture zone resulting from this pumping rate was about 110 feet crossgradient and 17 feet downgradient of the pumping well. Sustained, continuous pumping may be expected to result in a larger capture zone.

In general, implementation of ground water pumping by itself is not a time-effective remedial technique. At many sites, multi-year operation of ground water pumping alone has still not resulted in satisfactory remediation of ground water containing petroleum constituents. At sites where ground water flow velocities are high and off-site migration of ground water containing petroleum constituents represents a risk to potential receptors, ground water pumping can provide a positive means of controlling migration. At this site, ground water monitoring over the last 2 years does not indicate a rapid rate of migration, and the current monitoring well network indicates the distribution of petroleum constituents does not threaten potential receptors.

Drawbacks to implementing ground water pumping at this site include the cost to design, permit, construct, operate, monitor, and maintain a system. The treatment of the ground water results in removal of petroleum constituents either by adsorption onto carbon or air stripping and discharge to the atmosphere. In either case, the constituents removed from ground water must be disposed of in some manner, creating another potential source of contamination. The treated ground water must then be discharged to the sanitary sewer (if allowed) or to the storm sewer (surface waters). Either situation creates the possibility of accidental discharge of ground water containing residual petroleum constituents. Ground water pumping (even at low rates) disrupts the ambient flow conditions and can potentially result in migration of ground water impacted by off-site sources onto the former Beacon/Shell site.

4.1.3 Vapor Extraction

Though typically considered a soil remediation technology, utilization of vapor extraction for removing dissolved hydrocarbons from ground water can be viable under certain conditions. A vapor extraction system operates on the concepts of vapor-liquid equilibrium and vapor flow through soil. Upon applying vacuum to the soil overlying the water table, the reduced pressure in the overlying soil vapor causes the volatile hydrocarbons dissolved in ground water to move from the liquid to the vapor phase. The induced vacuum extraction flow above the water table surface removes the hydrocarbon-enriched vapors. Because the vapor extraction flow continually removes the hydrocarbons that migrate from the ground water into the soil vapor, a state of disequilibrium exists. The volatilization of dissolved hydrocarbons from the ground water into the overlying soil vapor will continue as the system moves toward equilibrium.

In addition, vapor extraction can promote natural biodegradation of dissolved hydrocarbons by providing a continual source of fresh oxygen to stimulate indigenous microorganisms, which convert the hydrocarbons to carbon dioxide and water. At the same time, vapor extraction would be removing the hydrocarbons in the soil above the water table that presumably impacted ground water in the past, and could potentially impact ground water again. A possible limitation of vapor extraction is inability to control migration of dissolved hydrocarbons in ground water.

Disadvantages of this method are principally the costs associated with design, permitting, installation, maintenance, monitoring, and operation of the vapor extraction system. In addition, as with ground water extraction, petroleum constituents extracted with soil vapors would need to be discharged to the atmosphere or collected in carbon canisters through adsorption, with the attendant disposal difficulties.

4.1.4 Vapor Extraction With Air Sparging

The use of air sparging can enhance the effectiveness of vapor extraction for removing dissolved hydrocarbons from ground water. Sparging air into the water table within the zone of influence of vapor extraction wells can speed remediation by means of air stripping dissolved hydrocarbons from the ground water as the air passes through the ground water enroute to the vapor extraction wells. Furthermore, introduction of air via sparging would provide additional oxygen for enhancing the biologic breakdown of hydrocarbon compounds in the subsurface. With strategically located sparge points, air sparging has the additional possible benefit of controlling the migration of ground water containing dissolved hydrocarbons.

The disadvantages of this method are: the costs associated with design, permitting, installation, maintenance, monitoring, and operation of the vapor extraction system. In addition, petroleum constituents extracted with soil vapors would need to be discharged to the atmosphere or collected in carbon canisters through adsorption, with the attendant disposal difficulties and the potential for contact during waste handling and transport. It is also possible for the physical process of air sparging to result in creation of localized ground water mounds, which could potentially result in undesirable movement of the dissolved petroleum constituent plume in ground water.

4.2 Removal of Petroleum Constituents From Soil

Strategies considered for removing petroleum hydrocarbons from soil underlying the site include:

- Passive Remediation
- Soil Vapor Extraction

4.2.1 Passive Remediation

This alternative involves leaving the petroleum constituents in the soil and leaving the soil unaltered. Continuing natural volatilization and biodegradation of petroleum constituents in soil would be expected to reduce concentrations of petroleum constituents with time. The available data indicate that these natural agents have already attenuated the hydrocarbon impact to a certain degree.

While this method will take substantially longer than more active remedial strategies, low cost and low impacts to property use make it attractive at sites where [illegible] that the potential for receptor contact with impacted soil and ground water is low. As discussed in Section 3, this site falls in this category. If this option is selected, it would be necessary to continue the existing ground water monitoring program (although the sampling interval or number of wells monitored could be modified) to verify that the historically minor impacts to ground water due to migration of petroleum constituents from soil do not increase. A change in existing conditions (drastic water level changes or disturbance of the subsurface due to construction) may warrant reevaluation of this alternative.

50-200 years

4.2.2 Soil Vapor Extraction

Soil vapor extraction utilizes a vapor extraction well (or wells) to remove volatile hydrocarbons from the soil matrix. A vacuum applied to the extraction well results in the removal of soil vapors from the subsurface, accompanied by volatilization of petroleum constituents out of the soil matrix. Depending on the concentration levels of hydrocarbons entrained in the extracted vapor, the extracted soil vapors are either discharged directly to the atmosphere or treated before discharge to the atmosphere. The treatment would destroy or remove hydrocarbons from the discharged air in accordance with the local regulatory agency air discharge requirements. Extraction rates vary with the consistency, moisture content, and grain size of the soil horizon. In addition to the extraction benefit, soil venting can also be effective at promoting biologic breakdown of petroleum hydrocarbon compounds contained in soil and ground water by the introduction of additional oxygen into the subsurface.

The vacuum radius of influence and initial recovered petroleum constituent concentrations noted during the soil vapor extraction test (Section 2.3) indicated that application of this technology would remove petroleum constituents from soil at this site. [illegible] of this method are principally economic: the costs associated with design, permitting, installation, maintenance, monitoring, and operation of the vapor extraction system. In addition, as with ground water extraction, petroleum constituents extracted with soil vapors would need to be discharged to the atmosphere or collected in carbon canisters through adsorption, with the attendant disposal difficulties.

5.0 RECOMMENDATIONS FOR INTERIM REMEDIATION

Based on data compiled for this site and the discussion of remedial alternatives in Section 4, AMV recommends that passive remediation of both soil and ground water be allowed to continue at the site. The existing assessment, testing, and monitoring data do not indicate an imminent threat to potential receptors nor that the distribution of dissolved petroleum constituents in ground water extends beyond the existing monitoring well network. AMV proposes that the existing monitoring program (in a modified version - see below) be continued to verify that migration of ground water containing petroleum constituents beyond the existing downgradient monitoring wells is not occurring. If the monitoring indicates that migration is occurring, or ground water or site use conditions change, reevaluation of the proposed interim remedial method may be warranted.

Quarterly monitoring of existing monitoring wells MW-1, MW-2, MW-3, MW-[illegible] will be sufficient to detect changes [illegible] of migration of [illegible] plume in ground water. Monitoring of the remaining monitoring wells [illegible] MW-7, and MW-8) on an annual basis will be adequate to discern changes in the cross- and upgradient directions.

length of time?

6.0 REFERENCES

Wagner, D. L., E. J. Bortogno, and R. D. McJunkin. 1991. "Geologic Map of the San Francisco-San Jose Quadrangle, California, 1:250,000," California Department of Conservation, Division of Mines and Geology, Map No. 5A.

7.0 REMARKS

The opinions and conclusions contained in this report represent our professional opinions. These opinions are based in part, on information provided by the client and were developed in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied nor intended.

TABLE 1

[redacted]SAMPLE ANALYTICAL RESULTS

Former Beacon Station #574
22315 Redwood Road, Castro Valley, California
(concentrations in[redacted]

Monitoring Well	Date Sampled	Depth Sampled (feet)	[redacted]	Toluene	Ethylbenzene	Xylenes	[redacted]	TPHd[b]
MW-1	03-26-91	15	0.16	0.10	0.010	0.050	<1.0	<10
	03-26-91	20	13	110	33	300	3,200	<10
MW-2	03-26-91	10	0.013	0.26	0.11	0.68	8.1	<10
	03-26-91	15	19	120	42	240	3,200	<10
	03-26-91	20	0.39	0.22	0.11	0.41	14,[illegible]	<10
MW-3	03-26-91	15	<0.005	<0.005	<0.005	<0.005	<1.0	<10
	03-26-91	20	<0.005	0.18	0.44	5.9	230	<10
MW-4	05/14/93	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	20	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
MW-5	05/14/93	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	20	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
MW-6	05/14/93	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	20	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
MW-7	05/14/93	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	20	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
MW-8	05/14/93	5	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA
	05/14/93	20	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	NA

[a] TPHg = Total petroleum hydrocarbons as gasoline.
[b] TPHd = Total petroleum hydrocarbons as diesel.

TABLE 2

WATER LEVEL DATA
Former Beacon Station #574
22315 Redwood Road, Castro Valley, California

Monitoring Well	Date	Reference Elevation (feet)	Depth to Ground Water (feet)	Ground Water Elevation (feet)	Depth to Top of Screen (feet)	Well Depth (feet)
MW-1	03-26-91	156.55	22.43	134.12	10	NM
	04-01-91		22.37	134.18		NM
	03-27-92		22.43	134.12		NM
	06-04-92		23.4	133.15		NM
	09-23-92		24.07	132.48		NM
	11-12-92		24.16	132.39		29.33
	02-02-93		21.87	134.68		29.80
	05-07-93		22.58	133.97		29.84
	05-18-93		22.66	133.89		NM
	08-11-93		23.41	133.14		29.81
	11-05-93		24.09	132.46		29.81
	03-01-94		22.76	133.79		29.85
	06-02-94		23.22	133.31		29.85
	09-09-94		23.93	132.62		29.86
MW-2	03-26-91	155.17	20.91	134.26	10	NM
	04-01-91		20.82	134.35		NM
	03-27-92		20.82	134.35		NM
	06-04-92		21.81	133.36		NM
	09-23-92		22.45	132.72		NM
	11-12-92		22.6	132.57		29.71
	02-02-93		20.28	134.89		29.73
	05-07-93		20.97	134.20		29.73
	05-18-93		21.06	134.11		NM
	08-11-93		21.85	133.32		29.70
	11-05-93		22.32	132.85		29.70
	03-01-94		21.19	133.98		29.68
	06-02-94		21.59	133.58		29.69
	09-09-94		22.33	132.84		29.66
MW-3	03-26-91	157.13	21.62	135.51	10	NM
	04-01-91		21.55	135.58		NM
	03-27-92		21.46	135.67		NM
	06-04-92		22.34	134.79		NM
	09-23-92		22.84	134.29		NM
	11-12-92		23.04	134.09		29.55
	02-02-93		21.03	136.10		29.45
	05-07-93		21.59	135.54		29.53
	05-18-93		21.73	135.40		NM
	08-11-93		22.31	134.82		29.41
	11-05-93		22.85	134.28		29.41
	03-01-94		21.97	135.16		29.55
	06-02-94		22.29	134.84		29.56
	09-09-94		22.91	134.22		29.56

TABLE 2 (continued)

WATER LEVEL DATA
Former Beacon Station #574
22315 Redwood Road, Castro Valley, California

Monitoring Well	Date	Reference Elevation (feet)	Depth to Ground Water (feet)	Ground Water Elevation (feet)	Depth to Top of Screen (feet)	Well Depth (feet)
MW-4	05-18-93	151.96	17.55	134.41	13	NM
	08-11-93		17.50	134.46		28.43
	11-05-93		15.84	136.12		28.43
	03-01-94		17.35	134.61		28.11
	06-02-94		17.68	134.28		28.12
	09-09-94		18.19	133.77		28.13
MW-5	05-18-93	148.68	15.72	132.96	10	NM
	08-11-93		16.42	132.26		25.43
	11-05-93		16.92	131.76		25.43
	03-01-94		15.54	133.14		25.00
	06-02-94		16.19	132.49		25.00
	09-09-94		16.87	131.81		25.00
MW-6	05-18-93	153.96	20.80	133.16	15	NM
	08-11-93		21.64	132.32		31.15
	11-05-93		22.11	131.85		31.15
	03-01-94		20.80	133.16		29.96
	06-02-94		21.37	132.59		29.98
	09-09-94		22.05	131.91		29.96
MW-7	05-18-93	156.09	22.64	133.45	15	NM
	08-11-93		23.25	132.84		30.75
	11-05-93		23.93	132.16		30.75
	03-01-94		22.72	133.37		30.11
	06-02-94		23.22	132.87		30.12
	09-09-94		23.90	132.19		30.12
MW-8	05-18-93	158.04	21.55	136.49	18	NM
	08-11-93		22.43	135.61		34.82
	11-05-93		23.00	135.04		34.82
	03-01-94		22.05	135.09		34.04
	06-02-94		22.29	135.75		34.04
	09-09-94		22.99	135.05		34.04

[a] TPHg = Total petroleum hydrocarbons as gasoline.
[b] TPHd = Total petroleum hydrocarbons as diesel.

TABLE 3

GROUND WATER SAMPLE ANALYTICAL RESULTS

Former Beacon Station #574
22315 Redwood Road, Castro Valley, California

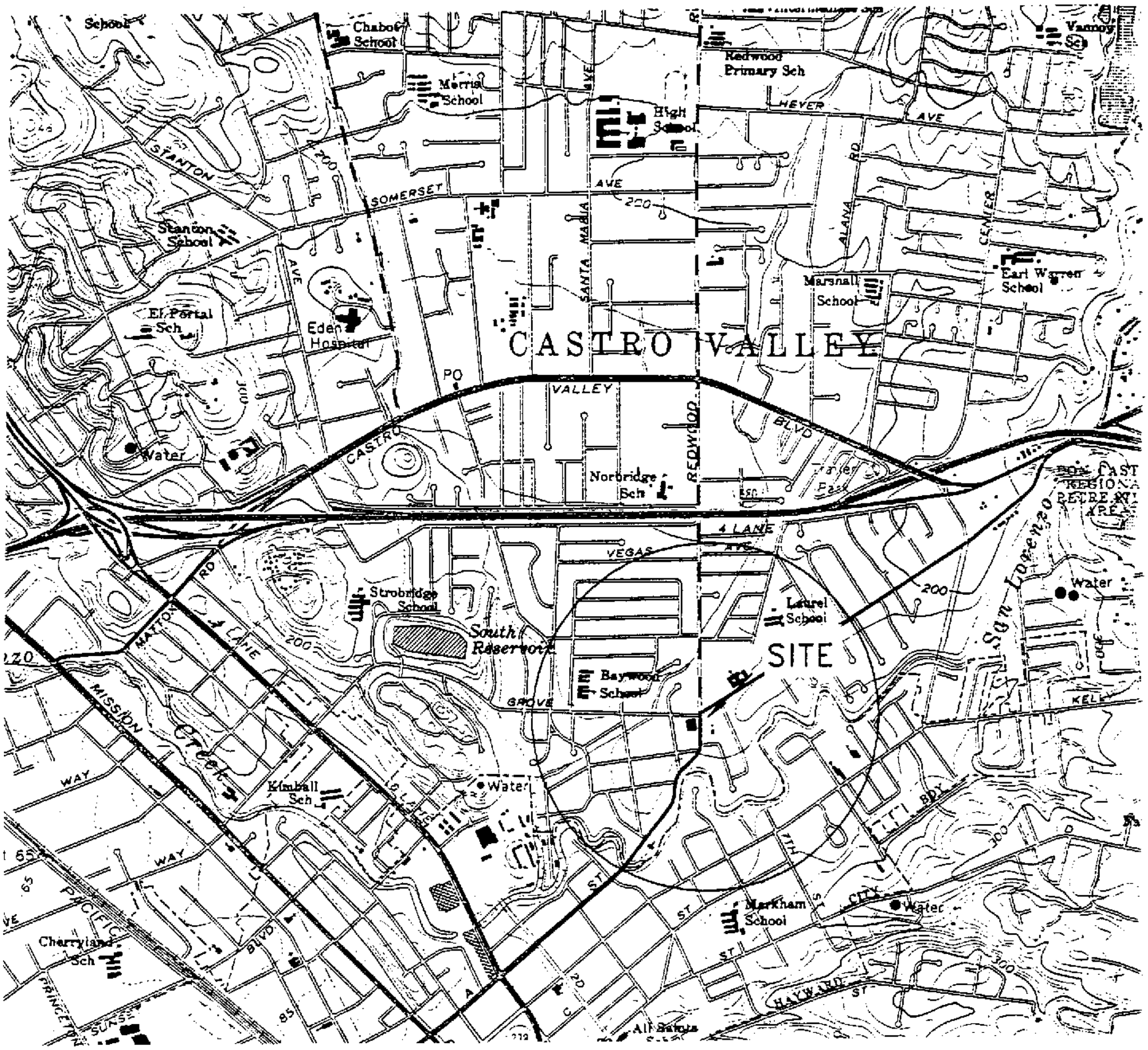
Monitoring Well	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPHg[a]	TPHd[b]	Motor Oil
MW-1	04-01-91	340	570	76	460	4,100	<100	NA
	03-27-92	700	900	230	1,100	5,000	<50	<50
	06-04-92	230	57	230	440	2,600	<800	NA
	09-23-92	400	430	110	550	3,400	NA	NA
	11-12-92	5.8	<5.0	140	340	2,700	NA	NA
	02-02-93	760	770	250	1,200	8,500	NA	NA
	05-07-93	970	630	280	1,500	7,700	NA	NA
	08-11-93	1,400	1,000	260	1,600	11,000	NA	NA
	11-05-93	6,200	4,700	1,400	7,100	36,000	NA	NA
	03-01-94	580	490	110	620	3,800	NA	NA
	06-02-94	1,900	1,200	420	2,100	8,900	NA	NA
	09-09-94	740	290	200	630	4,300	NA	NA
MW-2	04-01-91	650	640	150	960	10,000	<100	NA
	03-27-92	2,400	2,300	870	3,300	14,000	<50	<50
	06-04-92	1,900	1,700	580	2,300	14,000	<5,000	NA
	09-23-92	2,100	1,500	760	2,900	20,000	NA	NA
	11-12-92	2,400	860	540	3,500	25,000	NA	NA
	02-02-93	2,700	1,900	590	2,600	24,000	NA	NA
	05-07-93	1,800	1,300	460	2,600	18,000	NA	NA
	08-11-93	2,300	1,500	550	2,300	23,000	NA	NA
	11-05-93	3,100	2,900	860	3,700	30,000	NA	NA
	03-01-94	1,500	490	350	1,000	12,000	NA	NA
	06-02-94	2,000	790	460	13,000	12,000	NA	NA
	09-09-94	1,800	660	440	1,000	13,000	NA	NA
MW-3	04-01-91	41	91	37	420	3,100	<100	NA
	03-27-92	9.2	4.8	10	23	100	<50	<50
	06-04-92	7.5	2.7	0.5	15	180	<50	NA
	09-23-92	8.3	4.3	6.2	19	220	NA	NA
	11-12-92	12	5.5	7.7	19	230	NA	NA
	02-02-93	2.4	0.71	2.7	6.2	86	NA	NA
	05-07-93	2.6	1.2	3.9	8.4	140	NA	NA
	08-11-93	15	8.1	14	37	490	NA	NA
	11-05-93	45	24	34	93	820	NA	NA
	03-01-94	7.4	2.7	5.6	10	410	NA	NA
	06-02-94	13	4.9	14	31	440	NA	NA
	09-09-94	12	4.8	9.7	20	620	NA	NA

TABLE 3 (continued)

GROUND WATER SAMPLE ANALYTICAL RESULTS
Former Beacon Station #574
22315 Redwood Road, Castro Valley, California

Monitoring Well	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPHg[a]	TPHd[b]	Motor Oil
MW-4	05-18-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08-11-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	11-05-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	03-01-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	06-02-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	09-09-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
MW-5	05-18-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08-11-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	11-05-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	03-01-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	06-02-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	09-09-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
MW-6	05-18-93	<0.5	<0.5	<0.5	<0.5	120	NA	NA
	08-11-93	<0.5	<0.5	<0.5	<0.5	[illegible]	NA	NA
	11-05-93	<0.5	<0.5	<0.5	0.65	170	NA	NA
	03-01-94	<0.5	<0.5	<0.5	<0.5	210	NA	NA
	06-02-94	<0.5	<0.5	<0.5	<0.5	190	NA	NA
	09-09-94	<0.5	<0.5	<0.5	<0.5	140	NA	NA
MW-7	05-18-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08-11-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	11-05-93	<0.5	<0.5	<0.5	<0.5	[illegible]	NA	NA
	03-01-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	06-02-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	09-09-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
MW-8	05-18-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	08-11-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	11-05-93	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	03-01-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	06-02-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA
	09-09-94	<0.5	<0.5	<0.5	<0.5	<50	NA	NA

[a]TPHg = Total petroleum hydrocarbons as gasoline.
[b]TPHd = Total petroleum hydrocarbons as diesel.



General Notes

Base Map from U.S.G.S.
Hayward, California
7.5 Minute Topographic
Photorevised 1980

NORTH

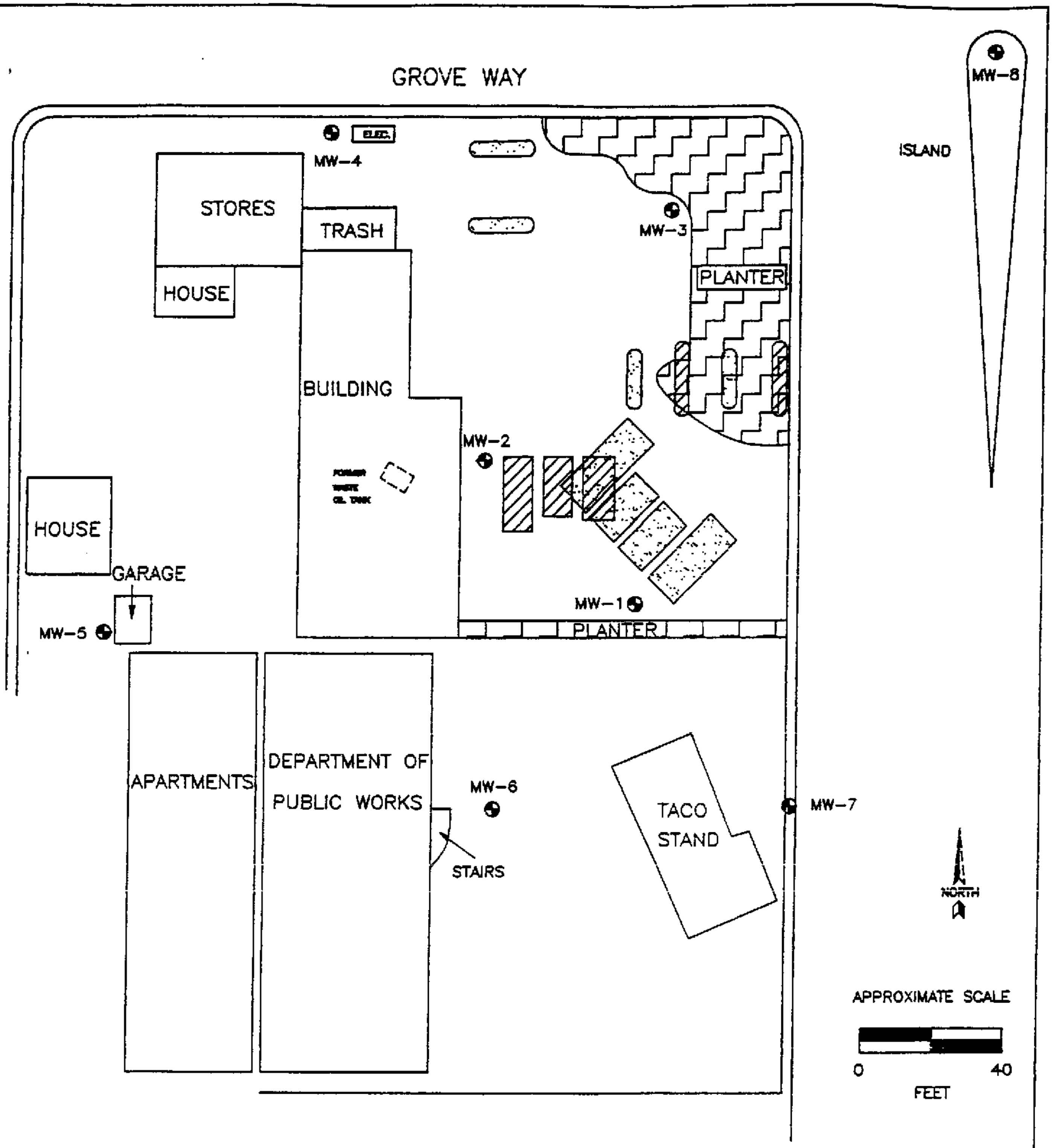
0 2,000
Approximate Scale
(in feet)

FIGURE 1

SITE LOCATION MAP
FORMER BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

Project No. 19021.02	Drawn DA
File No. FIG1	Prepared SAL
Revision	Reviewed

Acton • Mickelson • van Dam, Inc.
Consulting Scientists, Engineers, and Geologists
4511 Golden Foothill Parkway, #1
El Dorado Hills, California 95762
(916) 939-7550



LEGEND

MW-6 ◐ GROUND WATER MONITORING WELL AND NUMBER

▨ FIRST LOCATION OF TANKS AND PUMP ISLANDS

░ SECOND LOCATION OF TANKS AND PUMP ISLANDS

FIGURE 2
SITE MAP
FORMER BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CA

Project No. 19021.02	Drawn SAL	Acton • Mickelson • van Dam, Inc. Consulting Scientists, Engineers, and Geologists
File No. UL021SM	Prepared HEH	4511 Golden Foothill Parkway, #1 El Dorado Hills, California 95762 (916) 939-7550
Revision	Reviewed	

Yd

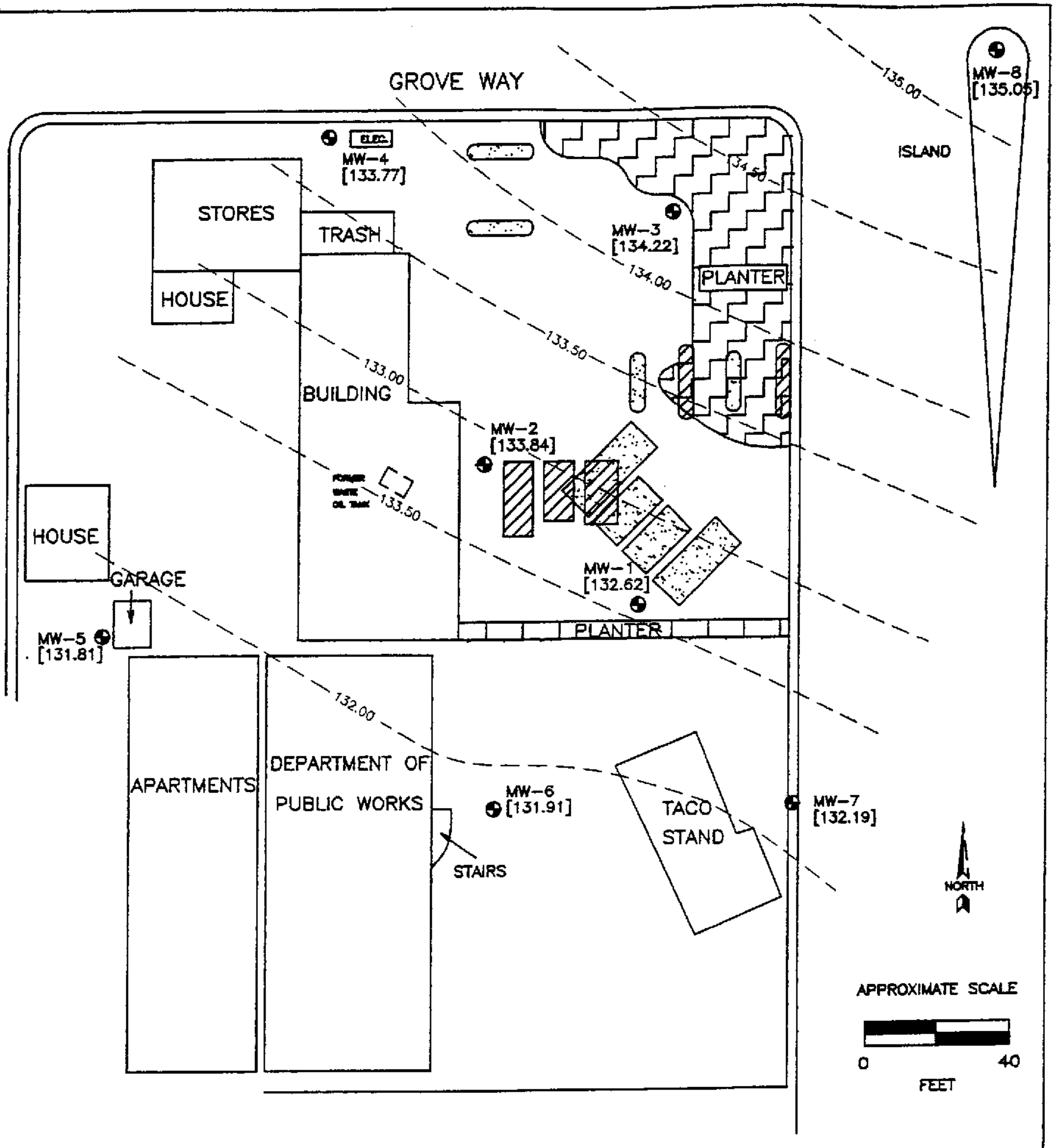
5, 6, 7

semi

1, 2, 3

stop

4, 6



LEGEND

MW-6 ● [132.59]	GROUND WATER MONITORING WELL AND NUMBER
132.50	INFERRED GROUND WATER CONTOUR AND ELEVATION
▨	FIRST LOCATION OF TANKS AND PUMP ISLANDS
░	SECOND LOCATION OF TANKS AND PUMP ISLANDS

FIGURE 3
WATER TABLE CONTOUR MAP (9/9/94)
FORMER BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CA

Project No. 19021.02	Drawn CCB
File No. PA84WTC3	Prepared DVD
Revision	Reviewed

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El Dorado Hills, California 95762
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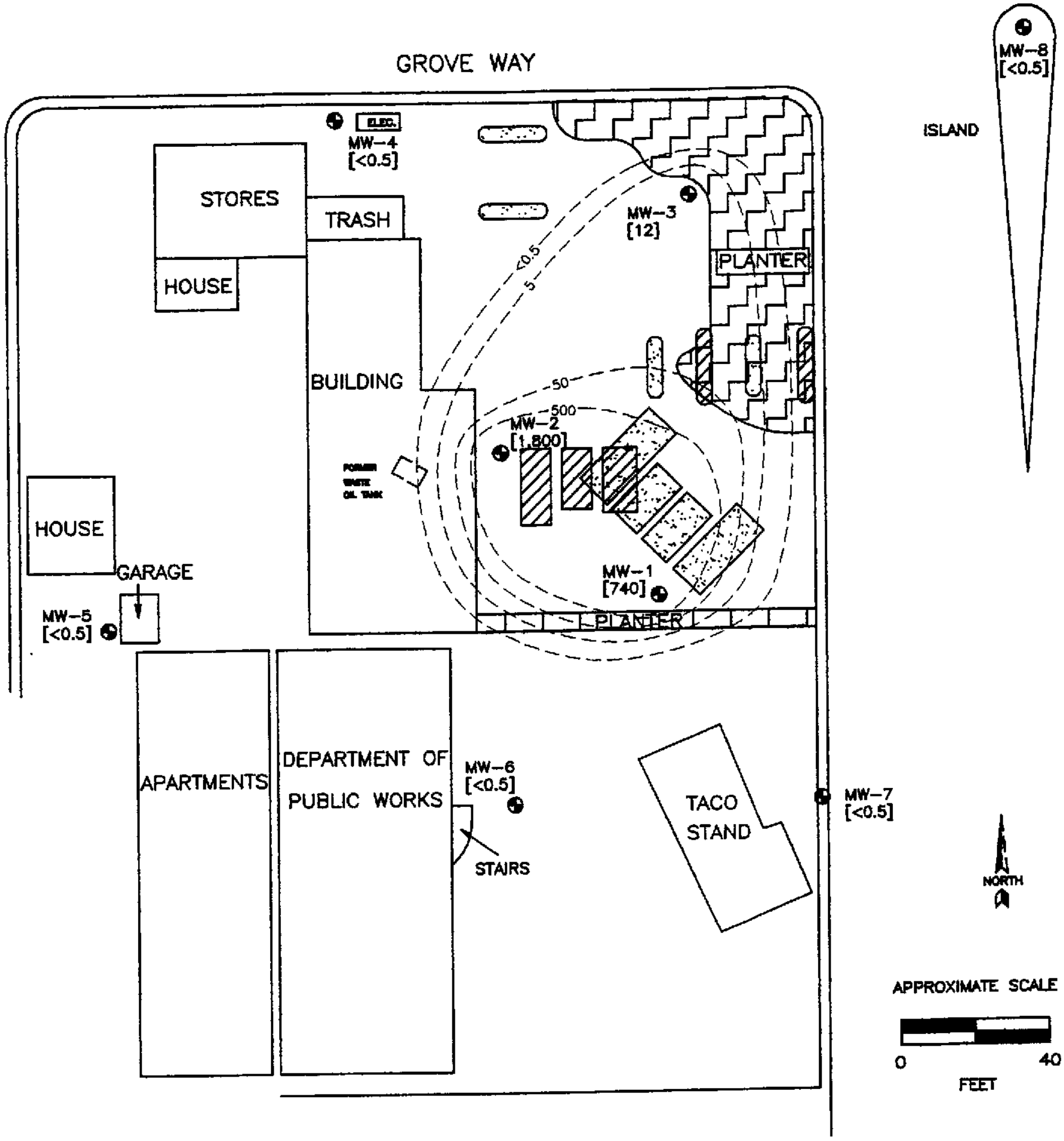

LEGEND

MW-6 [<0.5] ● GROUND WATER MONITORING WELL LOCATION AND NUMBER SHOWING BENZENE CONCENTRATION IN MICROGRAMS PER/LITER

— —500— — BENZENE ISOCONCENTRATION CONTOUR IN MICROGRAMS PER/LITER

▨ FIRST LOCATION OF TANKS AND PUMP ISLANDS

⬚ SECOND LOCATION OF TANKS AND PUMP ISLANDS

FIGURE 4

BENZENE ISOCONCENTRATION MAP (9/9/94)
FORMER BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CA

Project No. 19021.02	Drawn CCB
File No. PA94ICD4	Prepared DVD
Revision	Reviewed

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El Dorado Hills, California 95762
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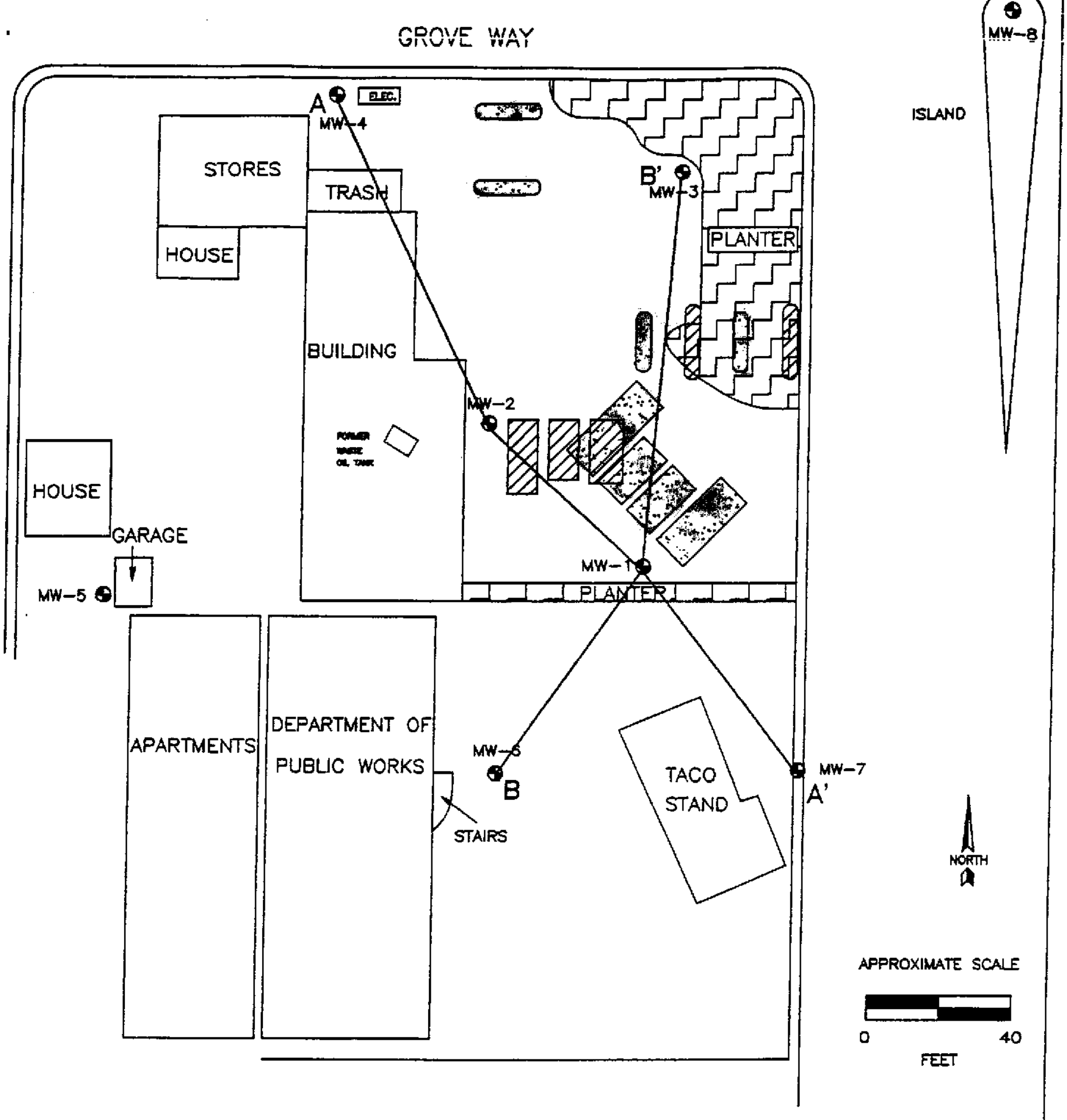

LEGEND

MW-6 ●	GROUND WATER MONITORING WELL AND NUMBER
▨	FIRST LOCATION OF TANKS AND PUMP ISLANDS
░	SECOND LOCATION OF TANKS AND PUMP ISLANDS

FIGURE 5

GEOLOGIC CROSS-SECTION LOCATION MAP
FORMER BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CA

Project No. 19021.02	Drawn CCB
File No. PA05FD	Prepared DVD
Revision	Reviewed

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Consulting Scientists, Engineers, and Geologists
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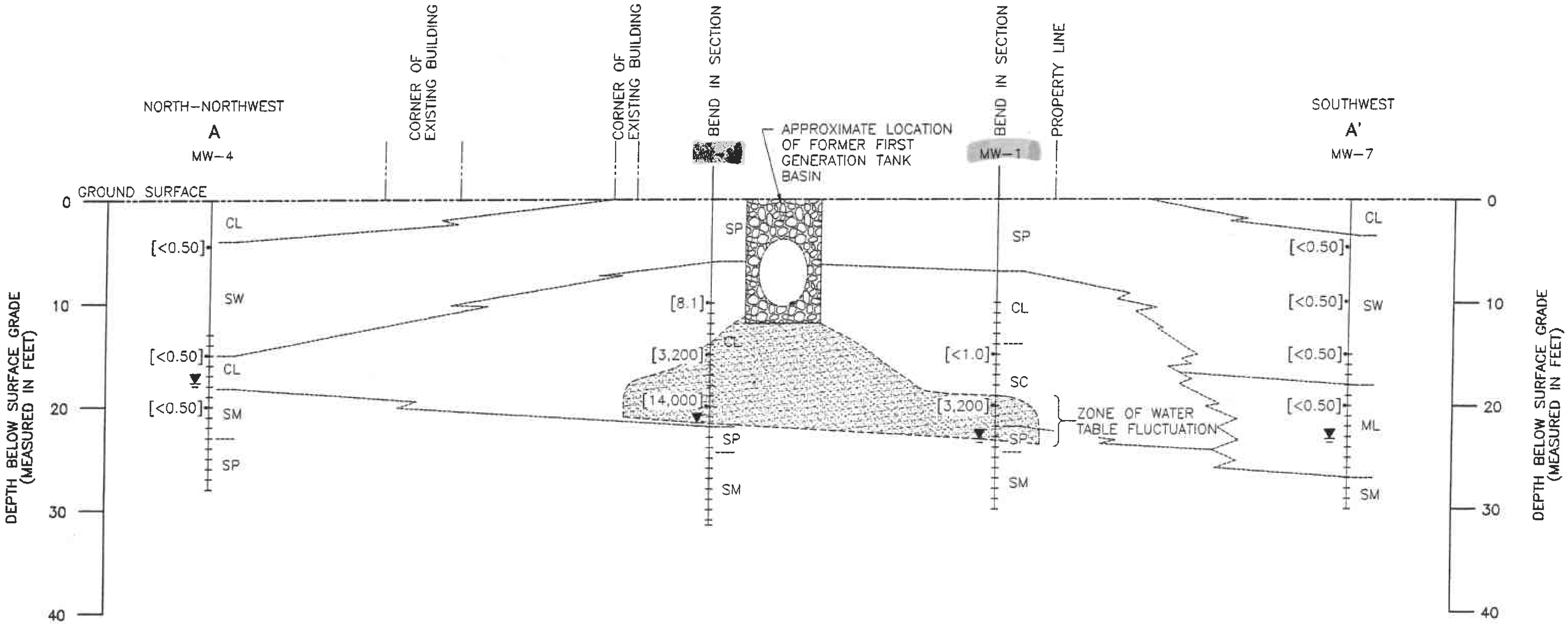
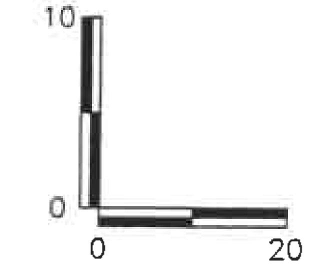
El Dorado Hills, California 95762
(916) 939-7550





Approximate Scale
Measured In Feet
(Vertical Exaggeration: 2X)

EXPLANATION:

[3,200]	Soil Sample Analytical Results (TPHg In Parts Per Million)
▼	Ground Water Elevation on June 2, 1994
SP	USCS Soil Classification Symbol
╲	Inferred Contact
╪	Slotted Casing Interval
▨	Inferred Area of Soil Containing Petroleum Hydrocarbons >10 PPM

FIGURE 6
GEOLOGIC CROSS–SECTION A–A'

BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

Project No. 19021.03	Drawn CCB
File No. PA06XSEC	Prepared DVD
Revision	Reviewed

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Consulting Scientists, Engineers, and Geologists
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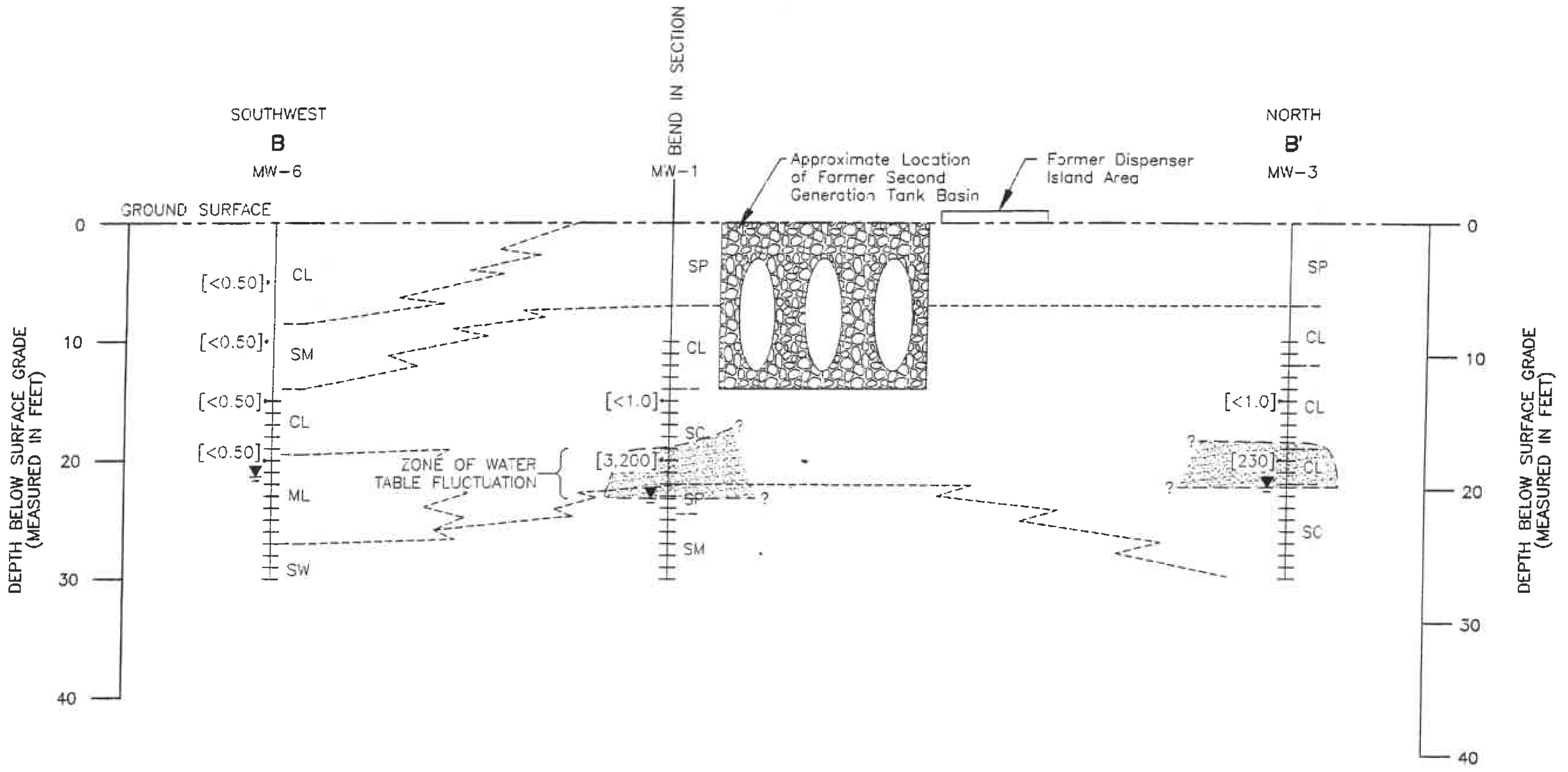
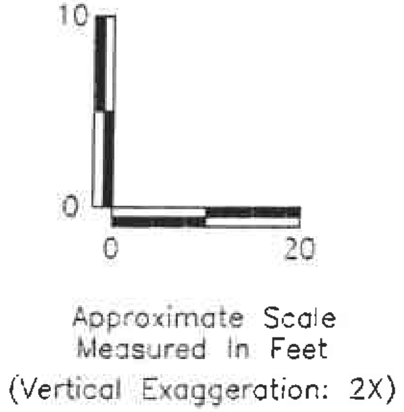
El Dorado Hills, California 95762
(916) 939-7550





Approximate Scale Measured In Feet
(Vertical Exaggeration: 2X)

EXPLANATION:

[3,200]	Soil Sample Analytical Results (TPHg In Parts Per Million)
▼	Ground Water Elevation on June 2, 1994
SP	USCS Soil Classification Symbol
- - -	Inferred Contact
I	Slotted Casing Interval
○	Inferred Area of Soil Containing Petroleum Hydrocarbons >10 PPM

FIGURE 7
GEOLOGIC CROSS SECTION B-B'
BEACON STATION #574
22315 REDWOOD ROAD
CASTRO VALLEY, CALIFORNIA

Project No. 19021.03	Drawn CCB	Acton • Mickelson • van Dam, Inc. Consulting Scientists, Engineers, and Geologists
File No. PA07XSEC	Prepared DVD	4511 Golden Foothill Parkway, #1 El Dorado Hills, California 95762 (916) 939-7550
Revision	Reviewed	

APPENDIX A

SOIL BORING LOGS

PROJECT NAME / LOCATION Former Beacon Station #574 22315 Redwood Road Castro Valley, CA	PROJECT NUMBER: 40-90-818	BORING NUMBER: MW-1	SHEET 1 OF 2
	CONTRACTOR: West Hazmat Drilling		DRILLING METHOD: H.S.A.
	DRILLER: Gene Reinhart		DRILLING RIG: Acker
	START: 8:15/03-26-91		COMPLETED: 9:30/03-26-91
LAND OWNER: Paul Wilson	SURFACE ELEVATION: 156.55		LOGGED BY: Hal Hansen

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INTERVAL (ft)	SAMPLE RECOVERY (in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: HNU UNITS: ppm	GENERAL OBSERVATION NOTES [redacted]
						ASPHALT AND ROADBASE		
					1			
					2	GRAVELLY SAND; olive, fine to coarse-grained, common plastic fines, moist (SP)		
					3			
					4			
CA	MW-1-1	15/30/50 for 5"	5.0-6.5	18"	5		0	
					6			
					7			
					8	SANDY CLAY; olive, moderately plastic, fine to coarse sand, some gravel, moist (CL)		
					9			
CA	MW-1-2	24/37/20	10.0-11.5	18"	10		0	
					11			
					12			
					13			
					14			
CA	MW-1-3	50 for 6"	15.0-16.5	7"	15	CLAYEY SAND; olive-brown, fine to coarse sand, moist (SC)	60	
					16			
					17			
					18			
					19			
CA	MW-1-4	30/50 for 5"	20.0-21.5	8"	20		[redacted]	[redacted]
					21			
					22			
					23	SAND; olive-brown, fine-grained, [redacted] (SP)		

WATER LEVEL DATA			
DATE	03-26		
TIME	6:29		
GWL	22.43		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen

SIGNATURE

Hal Hansen

TYPED NAME

PROJECT NAME / LOCATION Former Beacon Station #574 22315 Redwood Road Castro Valley, CA	PROJECT NUMBER: 40-90-818	BORING NUMBER: MW-1	SHEET 2 OF 2
	CONTRACTOR: West Hazmat Drilling		DRILLING METHOD: H.S.A.
	DRILLER: Gene Reinhart		DRILLING RIG: Acker
	START: 8:15/03-26-91		COMPLETED: 9:30/03-26-91
LAND OWNER: Paul Wilson	SURFACE ELEVATION: 156.55		LOGGED BY: Hal Hansen

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INT E(ft)	SAMPLE RECOV E(in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: hNu UNITS: ppm	GENERAL OBSERVATION NOTES
CA	MW-1-5	8/23/25	25.0-26.5	8"	25	SILTY [redacted] olive-brown, fine-grained sand, [redacted] (SM)	8	
					26			
					27			
					28			
					29			
CA	MW-1-6	12/14/50 for 5"	30.0-31.5	7"	30		3	
					31			
					32	Total Depth 31.5 feet		
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			
					41			
					42			
					43			
					44			
					45			
					46			
					47			

WATER LEVEL DATA

DATE	03-26		
TIME	6:29		
GWL	22.43		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen

SIGNATURE

Hal Hansen

TYPED NAME

PROJECT NAME / LOCATION

Former Beacon Station #574
22315 Redwood Road
Castro Valley, CA

PROJECT NUMBER: 40-90-818

BORING NUMBER: MW-2

SHEET 1 OF 2

CONTRACTOR: West Hazmat Drilling

DRILLING METHOD: H.S.A.

DRILLER: Gene Reinhart

DRILLING RIG: Acker

START: 10:30/03-26-91

COMPLETED: 11:45/03-26-91

LAND OWNER: Paul Wilson

SURFACE ELEVATION: 155.17

LOGGED BY: Hal Hansen

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INT E(ft)	SAMPLE RECOV E(in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: hNu UNITS: ppm	GENERAL OBSERVATION NOTES sample results
					1	ASPHALT AND ROADBASE		
					2	GRAVELLY SAND; olive, fine to coarse-grained, common plastic fines, moist (SP)		
					3			
					4			
CA	MW-2-1	20/30/50 for 5"	5.0-6.5	7"	5		15	
					6	SANDY CLAY; olive, moderately plastic, fine to coarse sand some gravel, moist (CL)		
					7			
					8			
					9			
CA	MW-2-2	10/50 for 6"	10.0-11.5	12"	10		30	
					11			
					12			
					13			
					14			[redacted]
CA	MW-2-3	30/50 for 5"	15.0-16.5	7"	15		90	
					16			
					17			
					18			
					19			
CA	MW-2-4	7/14/15	20.0-21.5	15"	20		90	[redacted]
					21			
					22	SAND; olive-brown, fine-grained, [redacted] (SP)		
					23			

WATER LEVEL DATA

DATE	03-26		
TIME	6:22		
GWL	20.91		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen

SIGNATURE

Hal Hansen

TYPED NAME

PROJECT NAME / LOCATION Former Beacon Station #574 22315 Redwood Road Castro Valley, CA	PROJECT NUMBER: 40-90-818	BORING NUMBER: MW-2	SHEET 2 OF 2
	CONTRACTOR: West Hazmat Drilling	DRILLING METHOD: H.S.A.	
	DRILLER: Gene Reinhart	DRILLING RIG: Acker	
	START: 10:30/03-26-91	COMPLETED: 11:45/03-26-91	
LAND OWNER: Paul Wilson	SURFACE ELEVATION: 155.17	LOGGED BY: Hal Hansen	

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INT (ft)	SAMPLE RECOV E(in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: hNu UNITS: ppm	GENERAL OBSERVATION NOTES
CA	MW-2-5	15/16/18	25.0-26.5	16"	25	**SILTY SAND:** olive-brown, fine-grained sand, [redacted] (SM)	3	
					26			
					27			
					28			
					29			
CA	MW-2-6	14/22/43	30.0-31.5	14"	30		0	
					31			
					32	Total Depth 31.5 feet		
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			
					41			
					42			
					43			
					44			
					45			
					46			
					47			

WATER LEVEL DATA

DATE	03-26		
TIME	6:22		
GWL	20.91		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen

SIGNATURE

Hal Hansen

TYPED NAME

PROJECT NAME / LOCATION
Former Beacon Station #574
22315 Redwood Road
Castro Valley, CA

PROJECT NUMBER: 40-90-818
BORING NUMBER: MW-3
SHEET 1 OF 2

CONTRACTOR: West Hazmat Drilling
DRILLING METHOD: H.S.A.
DRILLER: Gene Reinhart
DRILLING RIG: Acker
START: 1:40/03-26-91
COMPLETED: 3:00/03-26-91

LAND OWNER: Paul Wilson
SURFACE ELEVATION: 157.13
LOGGED BY: Hal Hansen

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INTERVAL (ft)	SAMPLE RECOVERY (in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: hNu UNITS: ppm	GENERAL OBSERVATION NOTES Sample results
						ASPHALT AND ROADBASE		
					1	SAND; brown, fine-grained, well sorted moist (SP)		
					2			
					3			
					4			
CA	MW-3-1	15/26/37	5.0-6.5	18"	5		0	
					6			
					7	CLAY; dark gray, lightly plastic, moist (CL)		
					8			
					9			
CA	MW-3-2	16/18/32	10.0-11.5	7"	10		0	
					11			
					12	SANDY CLAY; olive-brown, moderately plastic, moist (CL)		
					13			
					14			
CA	MW-3-3	23/50 for 5"	15.0-16.5	8"	15		1	
					16			
					17			
					18			
					19	SILTY CLAY; olive, moderately plastic, very moist (CL)		
CA	MW-3-4	50 for 6"	20.0-21.5	7"	20		8	[redacted]
					21			
					22			
					23			

WATER LEVEL DATA			
DATE	03-26		
TIME	6:14		
GWL	21.62		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen
SIGNATURE

Hal Hansen
TYPED NAME

PROJECT NAME / LOCATION

Former Beacon Station #574
22315 Redwood Road
Castro Valley, CA

PROJECT NUMBER: 40-90-818

BORING NUMBER: MW-3

SHEET 2 OF 2

CONTRACTOR: West Hazmat Drilling

DRILLING METHOD: H.S.A.

DRILLER: Gene Reinhart

DRILLING RIG: Acker

START: 1:40/03-26-91

COMPLETED: 3:00/03-26-91

LAND OWNER: Paul Wilson

SURFACE ELEVATION: 157.13

LOGGED BY: Hal Hansen

SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	SAMPLE INT (ft)	SAMPLE RECOV (in)	DEPTH SCALE 1"= 4'	DESCRIPTIONS OF MATERIALS AND CONDITIONS	CONTAMINANT OBSERVATION INSTRUMENT: hNu UNITS: ppm	GENERAL OBSERVATION NOTES
CA	MW-3-5	13/50 for 6"	25.0-26.5	8"	25	**CLAYEY SAND**; olive-brown, medium-grained sand, [redacted] (SC)	60	
					26			
					27			
					28			
					29			
CA	MW-3-6	14/50 for 6"	30.0-31.5	8"	30		0	
					31			
					32	Total Depth 31.5 feet		
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			
					41			
					42			
					43			
					44			
					45			
					46			
					47			

WATER LEVEL DATA

DATE	03-26		
TIME	6:14		
GWL	21.62		
CASING DEPTH	30'		

GEOLOGIST

Hal Hansen

SIGNATURE

Hal Hansen

TYPED NAME

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Consulting Scientists, Engineers, and Geologists

Log of Soil Boring MW-4

Casing Elevation: 151.96 ft

Completion Depth: 28 feet

Project No.
19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

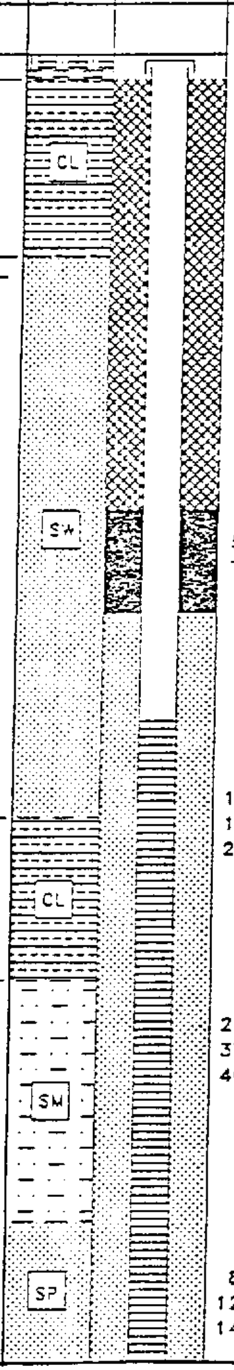
Drilling	Date	Time
Start	05-13-93	11:40
Finish	05-13-93	12:00

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 17.55 ft



Depth (feet)	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0	lawn						
0.5	**SILTY CLAY**, olive brown, moderately plastic, moist (CL)						
4	**GRAVELLY SAND**, brown, fine- to coarse-grained, moist (SW)						
5		8 9 10	18	18		MW4-1	0
10		50/6	6	3		MW4-2	0
15	**SILTY CLAY**, brown, moderately plastic, very moist (CL)	10 15 20	18	18		MW4-3	0
18	**SILTY SAND**, brown, fine-grained, [redacted] (SM)						
20		27 37 40	18	18		MW4-4	0
23	**SAND**, greenish gray, fine-grained saturated (SP)						
25		8 12 14	18	6		MW4-5	0

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Log of Soil Boring MW-4

Casing Elevation: 151.96 ft

Completion Depth: 28 feet

Project No.
19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

Drilling	Date	Time
Start	05-13-93	11:40
Finish	05-13-93	12:00

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 17.55 ft

Depth (feet)	Sample Int.	DESCRIPTION	Graphic Log	Boring/Well Detail	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
25	▨	continued from above [redacted], greenish gray, fine-grained, [redacted](SP)	SP		8 12 14	18	6		MW4-5	0
26										
27										
28		Terminated drilling at 28 feet.								
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										

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Log of Soil Boring MW-5

Casing Elevation: 148.68 ft

Completion Depth: 25 feet

Project No. 19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

Drilling	Date	Time
Start	05-13-93	1:30
Finish	05-13-93	2:10

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 15.72 ft

DESCRIPTION

asphalt

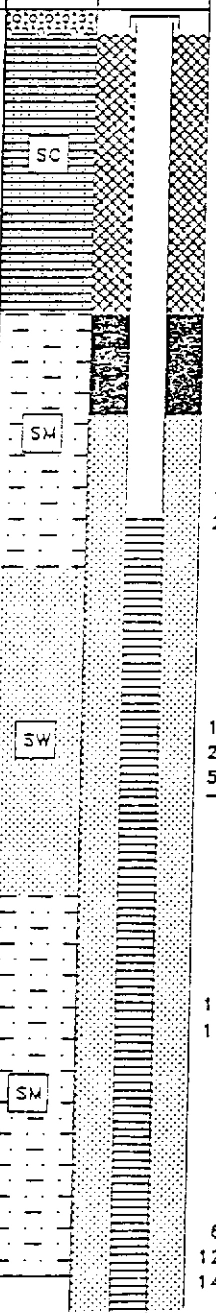
CLAYEY SAND, brown, fine- to coarse-grained, moist (SC)

SILTY SAND, brown, fine-grained, moist (SM)

GRAVELLY SAND, brown, fine- to coarse-grained, common plastic fines, ~~saturated~~ (SW)

SILTY SAND, greenish gray, fine-grained, ~~saturated~~ (SM)

Terminated drilling at 25 feet.



Depth (feet)	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
5	11 13 18	18	15		MW5-1	0
10	11 12 20	18	16		MW5-2	0
15	14 22 50/3	15	15		MW5-3	0
20	6 10 14	18	18		MW5-4	0
25	6 12 14	18	5		MW5-5	0

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Log of Soil Boring MW-6

Casing Elevation: 153.96 ft

Completion Depth: 30 feet

Project No. 19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

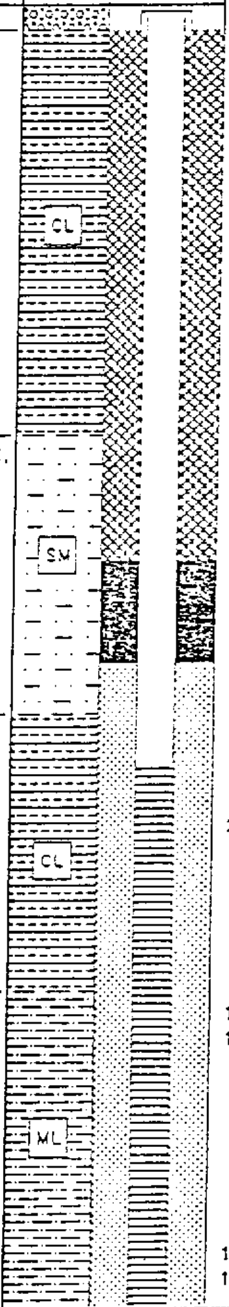
Drilling	Date	Time
Start	05-13-93	8:40
Finish	05-13-93	9:05

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 20.80 ft



Depth (feet)	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0	asphalt / roadbase						
1	**SILTY CLAY**, dark gray, moderately plastic, slightly moist (CL)						
5	color change to olive	5 8 16	18	18		MW6-1	0
9	**SILTY SAND**, yellowish brown, fine-grained, moist (SM)						
10		9 12 17	18	18		MW6-2	0
14	**SILTY CLAY**, olive, moderately plastic, very moist (CL)						
15		5 10 21	18	18		MW6-3	0
20	**SANDY SILT**, brown, non-plastic, fine-grained sand, [redacted](ML)	7 14 15	18	18		MW6-4	0
25		5 12 19	18	15		MW6-5	1

File #19021004

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Log of Soil Boring MW-6

Casing Elevation: 153.96 ft

Completion Depth: 30 feet

Project No. 19021.01

Location: Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

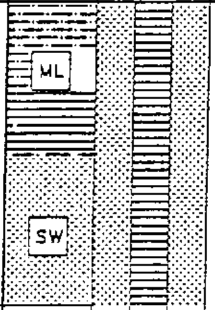
Drilling	Date	Time
Start	05-13-93	8:40
Finish	05-13-93	9:05

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 20.80 ft



Depth (feet)	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
	continued from above						
25	**SANDY SILT**, brown, non-plastic, fine-grained sand, [redacted] (ML)	5 12 19	18	15		MW6-5	1
26							
27							
28	**GRAVELLY SAND**, olive, fine- to coarse-grained, [redacted] (SW)						
29		5 14 23	18	17		MW6-6	1
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							

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Log of Soil Boring MW-7

Project No. 19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

Casing Elevation: 156.09 ft

Completion Depth: 30 feet

Drilling	Date	Time
Start	05-13-93	9:50
Finish	05-13-93	10:40

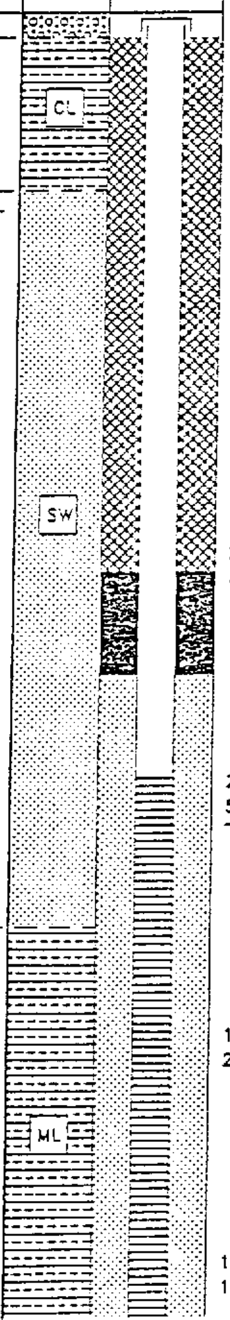
Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 22.64 ft

Depth (feet)	Sample Int.	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0		asphalt						
1		SILTY CLAY, dark gray, moderately plastic, slightly moist (CL)						
2								
3								
4		GRAVELLY SAND, brown, fine- to coarse-grained, moist (SM)	19 21 23					
5	■			18	18		MW7-1	0
6								
7								
8								
9								
10	■		17 25 40	18	18		MW7-2	0
11								
12								
13								
14								
15	■		25 50 6	12	12		MW7-3	0
16								
17								
18		CLAYEY SILT, brown, non-plastic, [redacted] (ML)						
19								
20	■		7 11 23	18	18		MW7-4	0
21								
22								
23								
24								
25	■		8 15 16	18	18		MW7-5	2



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Log of Soil Boring MW-7

Casing Elevation: 156.09 ft

Completion Depth: 30 feet

Project No. 19021.01

Location: Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

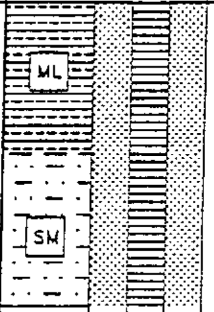
Drilling	Date	Time
Start	05-13-93	9:50
Finish	05-13-93	10:40

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 22.64 ft



Depth (feet)	Sample Int.	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		continued from above	8					
25	■	CLAYEY SILT, brown, non-plastic saturated (ML)	15					
			16	18	18		MW7-5	2
26								
27		SILTY SAND, greenish blue, fine- to coarse-grained, saturated, common plastic fines (SM)						
28								
29			9					
			22					
30	■		23	18	12		MW7-6	0
		Terminated drilling at 30 feet.						
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								

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Log of Soil Boring MW-8

Project No. 19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Farestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

Casing Elevation: 158.04 ft

Completion Depth: 35 feet

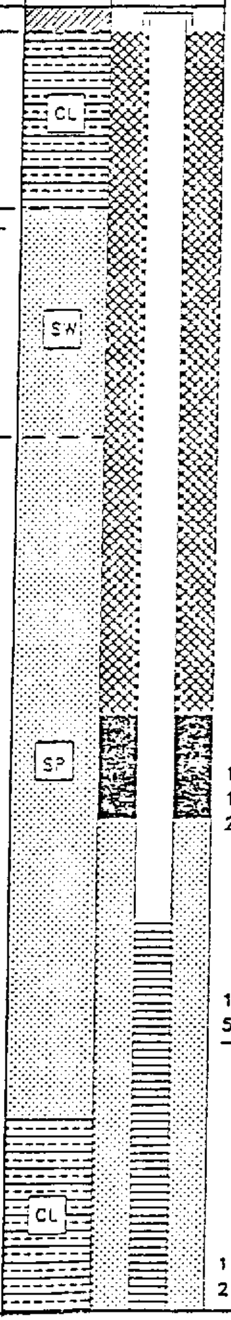
Drilling	Date	Time
Start	05-13-93	3:00
Finish	05-13-93	3:40

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 21.55 ft



Depth (feet)	DESCRIPTION	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
0	concrete						
1	SILTY CLAY, brown, moderately plastic, moist (CL)						
4	GRAVELLY SAND, brown, fine- to coarse-grained, moist (SW)	5 8 13	18	18		MW8-1	0
9	SAND, yellowish brown, fine-grained, moist (SP)	7 15 19	18	18		MW8-2	0
15		11 17 20	18	18		MW8-3	0
20		12 50/6	12	12		MW8-4	0
22	SILTY CLAY, brown, moderately plastic, saturated (CL)						
25		9 17 22	18	18		MW8-5	0

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Log of Soil Boring MW-8

Casing Elevation: 158.04 ft

Completion Depth: 35 feet

Project No.
19021.01

Location:
Former Beacon #574
22315 Redwood Rd, Castro Valley, CA

Drilling Company: Woodward Drilling
Driller: Eric Forestrom
Drilling and Sampling Methods:
B-57 Mobile Drill Rig with Hollow Stem Auger
California modified split-spoon sampler
fitted with 6" brass sample sleeves

Drilling	Date	Time
Start	05-13-93	3:00
Finish	05-13-93	3:40

Logged by: Hal E. Hansen

Checked by:

OVM/OVA hNu PID with 10.2 eV Probe

Water Depth 21.55 ft

Depth (feet)	Sample Int.	DESCRIPTION	Graphic Log	Boring/Well Detail	Blows/6 In	Inches Driven	Inches Recov'd	Comments	Sample #	Field OVM/OVA Reading (ppm)
		continued from above								
25	■	SILTY CLAY, brown, moderately plastic, [redacted] (CL)	CL		9 17 22	18	15		MW8-5	0
26										
27		SILTY SAND, greenish gray, fine-grained, [redacted] (SM)								
28										
29			SM		8 13 14	18	18		MW8-6	0
30	■									
31										
32		SAND, greenish gray, medium-grained, [redacted] (SP)								
33			SP							
34					50 5	5	5		MW8-7	0
35	■	Terminated drilling at 35 feet.								
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										

APPENDIX B

WELL CONSTRUCTION DIAGRAMS

INSTALLATION OF FLUSH GRADE MONITORING WELL

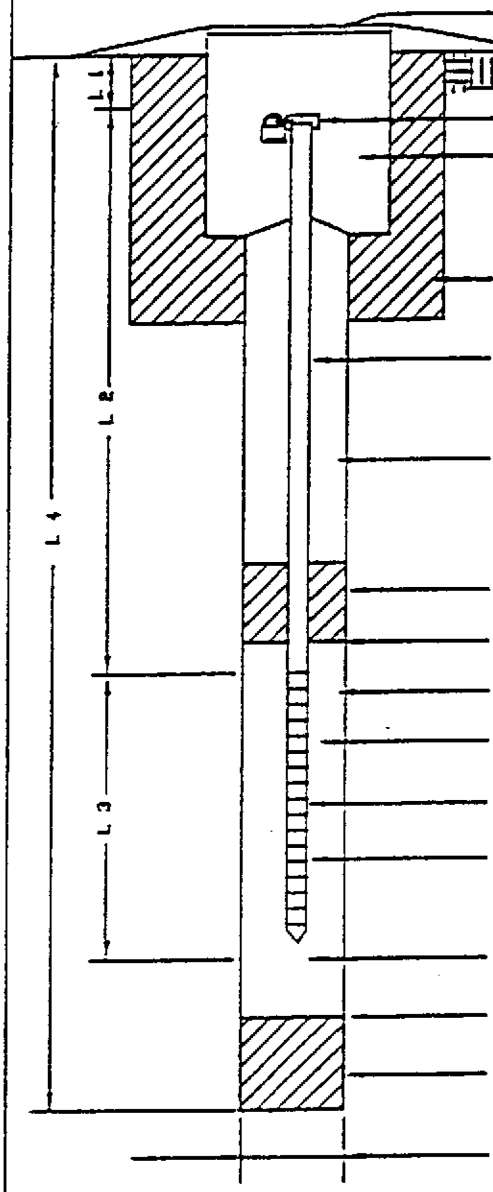
PROJECT Former Beacon Station #574
22315 Redwood Road, Castro Valley, CA

DELTA NO. 40-90-818

MONITORING WELL NO. MW-1

ELEVATIONS: TOP OF RISER 156.55

GROUND LEVEL



PROTECTIVE CASING

LOCKING WATER TIGHT CAP

FLUSH GRADE WELL CONSTRUCTION

DIAMETER AND MATERIAL 12-inch steel

TOTAL LENGTH 12 inches

LENGTH ABOVE GROUND ½ inch

THICKNESS AND TYPE OF SEAL 2-feet concrete

DIAMETER, MATERIAL AND JOINT TYPE OF RISER PIPE 4-inch Sch 40 PVC Flush Thread

TYPE OF BACKFILL AROUND RISER Neat cement containing 5% bentonite

THICKNESS AND TYPE OF SEAL 2-feet bentonite pellets

DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 2 feet

TYPE OF FILTER AROUND SCREEN #3 lonestar

MONITORING WELL MATERIAL Sch 40 PVC

SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE) 0.01 inch

DIAMETER AND LENGTH OF SCREEN 4 inch x 20 feet

DEPTH TO THE BOTTOM OF MONITORING WELL 30 feet

DEPTH TO THE BOTTOM OF FILTER SAND 30 feet

THICKNESS AND TYPE OF SEAL N/A

DIAMETER OF BOREHOLE 10 inches

L 1 = 0.25 FT.
L 2 = 9.75 FT.
L 3 = 20 FT.
L 4 = 30 FT.

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL *
3-26-91	6:29	22.43

INSTALLATION COMPLETED:
DATE: 3/26/91
TIME: 10:30

* MEASURE POINT: Top of casing

Delta Environmental Consultants, Inc.

1022 B/3-89

INSTALLATION OF FLUSH GRADE MONITORING WELL

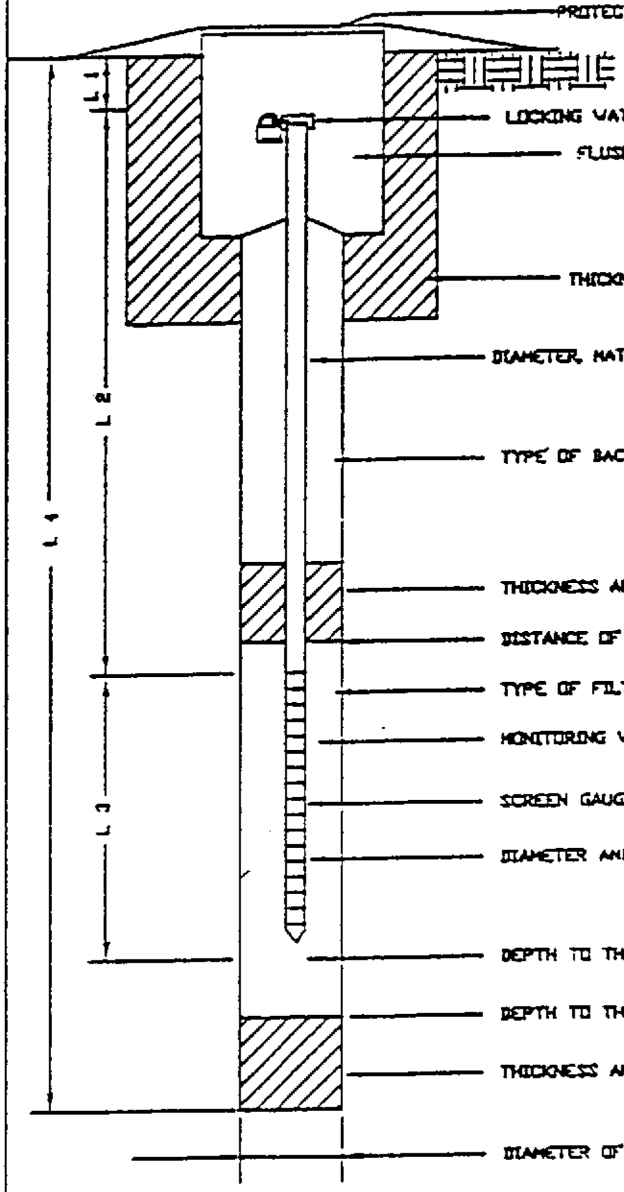
PROJECT Former Beacon Station #574
22315 Redwood Road, Castro Valley, CA

DELTA NO. 40-90-818

MONITORING WELL NO. MW-2

ELEVATIONS: TOP OF RISER 155.17

GROUND LEVEL



PROTECTIVE CASING

LOCKING WATER TIGHT CAP

FLUSH GRADE WELL CONSTRUCTION

DIAMETER AND MATERIAL 12-inch steel

TOTAL LENGTH 12 inches

LENGTH ABOVE GROUND ½ inch

THICKNESS AND TYPE OF SEAL 2-feet concrete

DIAMETER, MATERIAL AND JOINT TYPE OF RISER PIPE 4-inch Sch 40 PVC Flush Thread

TYPE OF BACKFILL AROUND RISER Neat cement containing 5% bentonite

THICKNESS AND TYPE OF SEAL 2-feet bentonite pellets

DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 2 feet

TYPE OF FILTER AROUND SCREEN #3 lonestar

MONITORING WELL MATERIAL Sch 40 PVC

SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE) 0.01 inch

DIAMETER AND LENGTH OF SCREEN 4 inch x 20 feet

DEPTH TO THE BOTTOM OF MONITORING WELL 30 feet

DEPTH TO THE BOTTOM OF FILTER SAND 30 feet

THICKNESS AND TYPE OF SEAL N/A

DIAMETER OF BOREHOLE 10 inches

L 1 = 0.25 FT.

L 2 = 9.75 FT.

L 3 = 20 FT.

L 4 = 30 FT.

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL *
3-26-91	6:22	20.91

INSTALLATION COMPLETED:

DATE: 3/26/91

TIME: 12:45

* MEASURE POINT: Top of casing

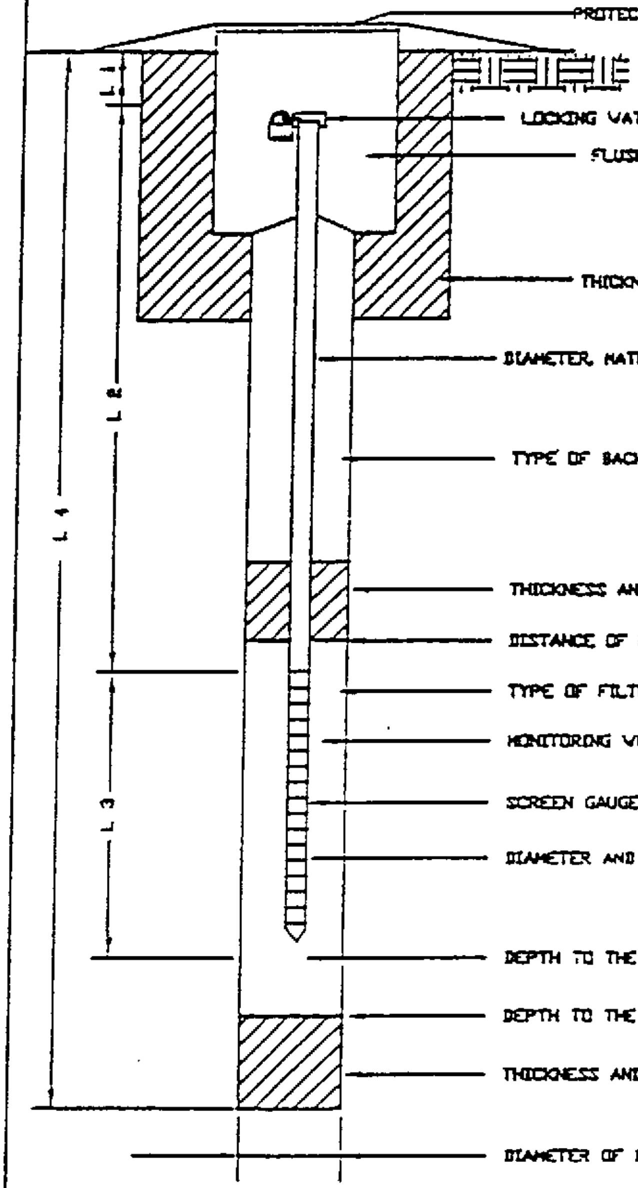
Delta
Environmental
Consultants, Inc.

1022 B/3-89

INSTALLATION OF FLUSH GRADE MONITORING WELL

PROJECT Former Beacon Station #574
22315 Redwood Road, Castro Valley, CA
DELTA NO. 40-90-818

MONITORING WELL NO. MW-3
ELEVATIONS: TOP OF RISER 157.13
GROUND LEVEL



PROTECTIVE CASING
LOCKING WATER TIGHT CAP
FLUSH GRADE WELL CONSTRUCTION
DIAMETER AND MATERIAL 12-inch steel
TOTAL LENGTH 12 inches
LENGTH ABOVE GROUND ¼ inch
THICKNESS AND TYPE OF SEAL 2-feet concrete
DIAMETER, MATERIAL, AND JOINT TYPE OF RISER PIPE 4-inch Sch 40 PVC Flush Thread
TYPE OF BACKFILL AROUND RISER Neat cement containing 5% bentonite
THICKNESS AND TYPE OF SEAL 2 feet bentonite pellets
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN 2 feet
TYPE OF FILTER AROUND SCREEN #3 lonestar
MONITORING WELL MATERIAL Sch 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE) 0.01 inch
DIAMETER AND LENGTH OF SCREEN 4 inch x 20 feet
DEPTH TO THE BOTTOM OF MONITORING WELL 30 feet
DEPTH TO THE BOTTOM OF FILTER SAND 30 feet
THICKNESS AND TYPE OF SEAL N/A
DIAMETER OF BOREHOLE 10 inches

L 1 = 0.25 FT.
L 2 = 9.75 FT.
L 3 = 20 FT.
L 4 = 30 FT.

INSTALLATION COMPLETED:
DATE: 3/26/91
TIME: 4:30

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL *
3-26-91	6:14	21.62

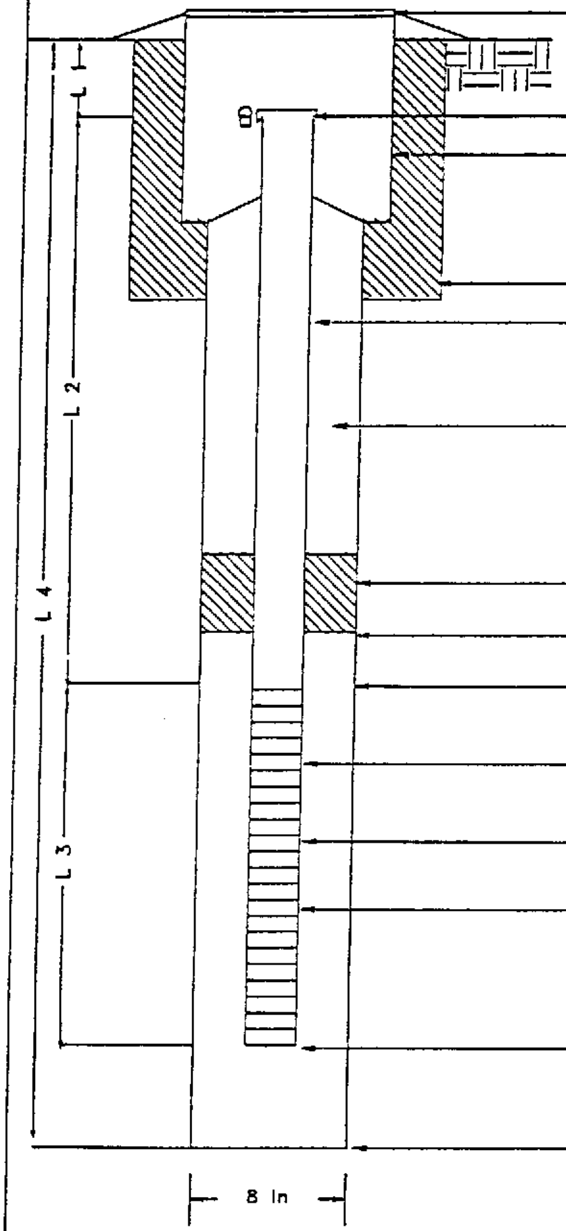
* MEASURE POINT: Top of casing

Delta Environmental Consultants, Inc.

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Former Beacon #574
22315 Redwood Rd
Castro Valley, CA

MONITORING WELL NO.: MW-4
ELEVATION: 151.96 ft



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	28 feet
Depth to the Bottom of Filter Sand	28 feet

L1 = 0.25 ft
L2 = 12.75 ft
L3 = 15 ft
L4 = 28 ft

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
05-18-93	8:22	17.55 ft

*Measuring Point Top of casing

Completion Date and Time

05-13-93 12:25

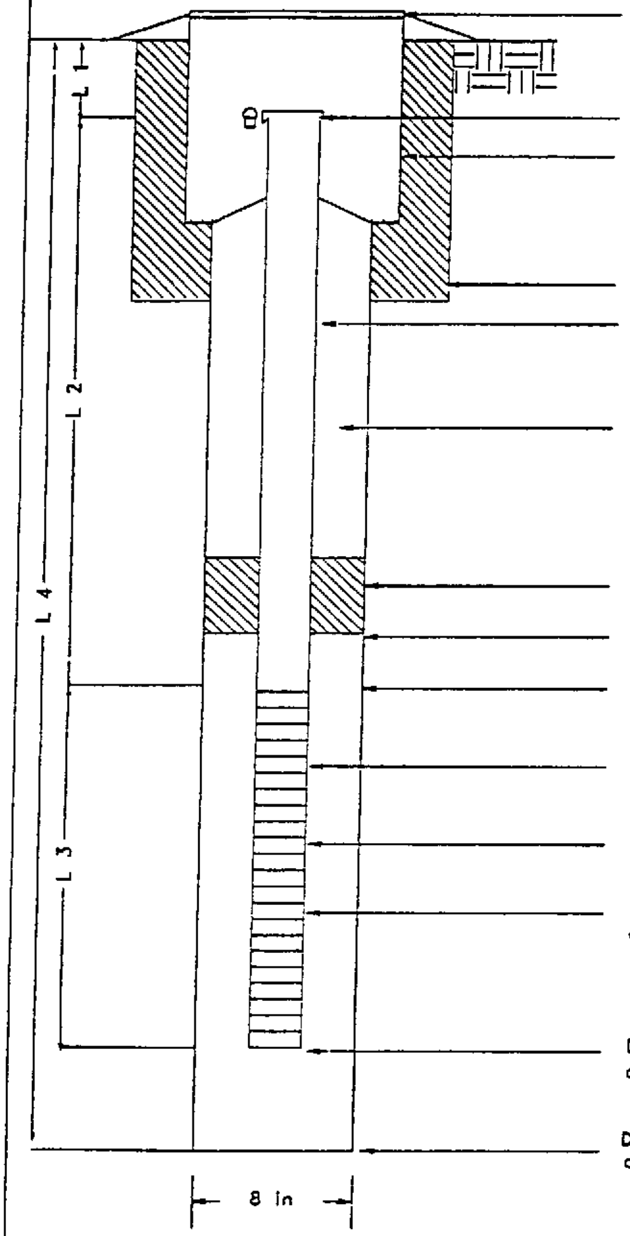
ACTON • MICKELSON • VAN DAM, INC.

File #19021010

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Former Beacon #574
22315 Redwood Rd
Castro Valley, CA

MONITORING WELL NO.: MW-5
ELEVATION: 148.68 ft



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	25 feet
Depth to the Bottom of Filter Sand	25 feet

L1 = 0.25 ft
L2 = 9.75 ft
L3 = 15 ft
L4 = 25 ft

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
05-18-93	8:27	15.72 ft

*Measuring Point Top of casing

Completion Date and Time

05-13-93 2:30

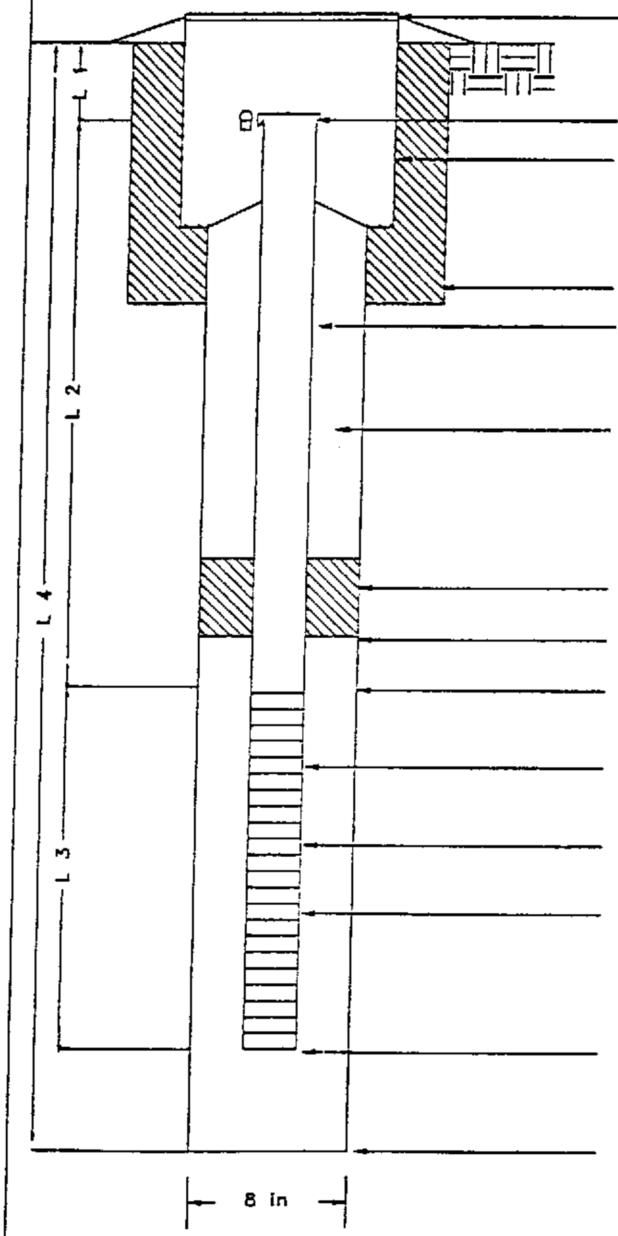
ACTON • MICKELSON • VAN DAM, INC.

File #19021011

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Former Beacon #574
22315 Redwood Rd
Castro Valley, CA

MONITORING WELL NO.: MW-6
ELEVATION: 153.96 ft



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	30 feet
Depth to the Bottom of Filter Sand	30 feet

L1 = 0.25 ft
L2 = 14.75 ft
L3 = 15 ft
L4 = 30 ft

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
05-18-93	8:07	20.80 ft

Completion Date and Time
05-13-93 9:30

*Measuring Point Top of casing

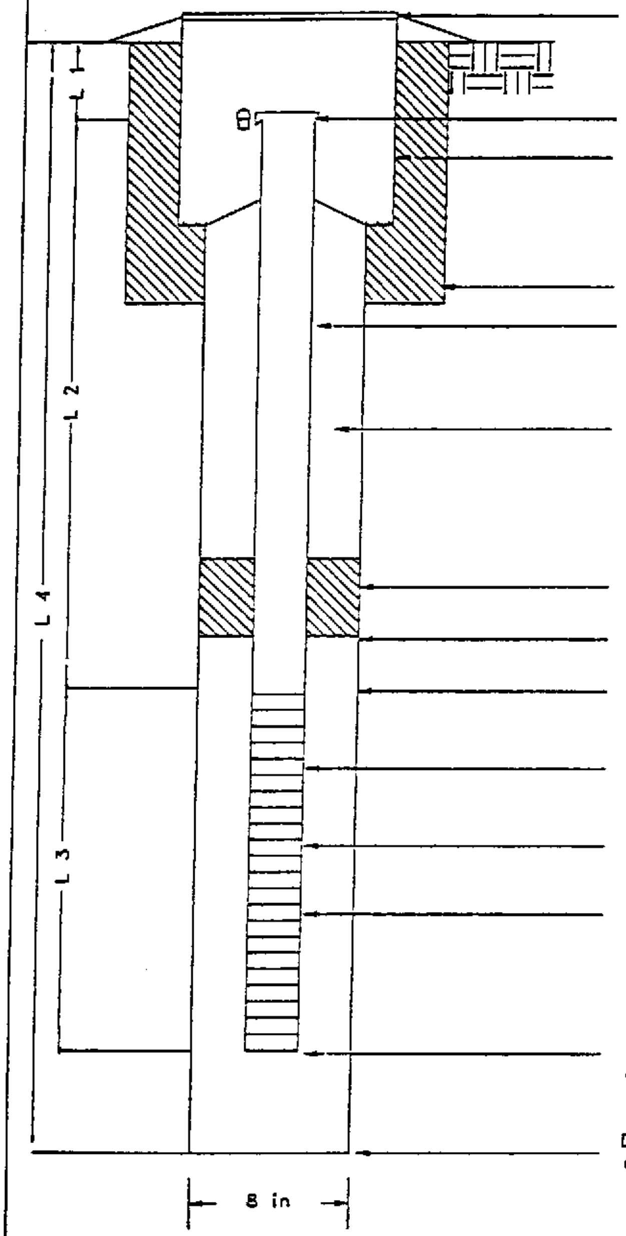
ACTON • MICKELSON • VAN DAM, INC.

File #19021012

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Former Beacon #574
22315 Redwood Rd
Castro Valley, CA

MONITORING WELL NO.: MW-7
ELEVATION: 136.09 ft



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	30 feet
Depth to the Bottom of Filter Sand	30 feet

L1 = 0.25 ft
L2 = 14.75 ft
L3 = 15 ft
L4 = 30 ft

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
05-18-93	8:13	22.64 ft

Completion Date and Time

05-13-93 10:55

*Measuring Point Top of casing

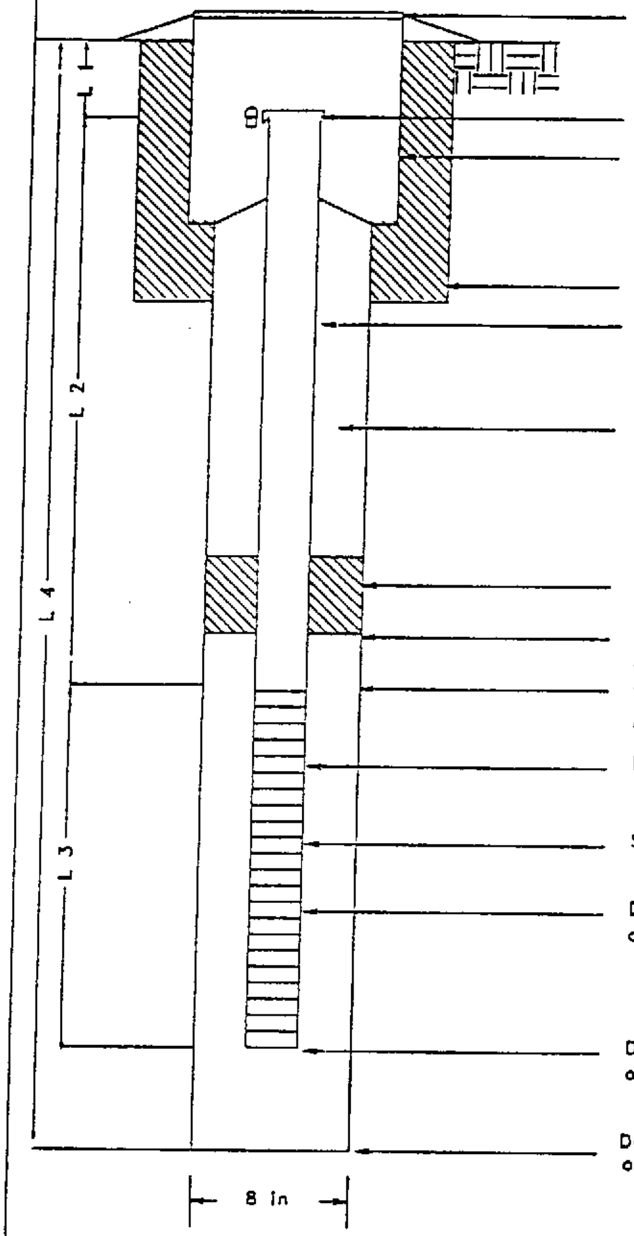
ACTON • MICKELSON • VAN DAM, INC.

File #19021013

MONITORING WELL CONSTRUCTION DETAILS

PROJECT: Former Beacon #574
22315 Redwood Rd
Castro Valley, CA

MONITORING WELL NO.: MW-8
ELEVATION: 158.04 ft



Protective Casing	
Locking Water Tight Cap	
Flush Grade Well Construction	
Diameter and Mat'l	8-inch steel
Total length	12 inches
Length Above Ground	1/4 inch
Thickness and Type of Seal	2 feet, concrete
Diameter, Mat'l and Joint Type of Riser Pipe	2 inch, SCH 40 PVC flush thread
Type of Backfill Around Riser	cement/ 5% bentonite grout
Thickness and Type of Seal	2 feet bentonite chips
Distance of Filter Sand Above Top of Screen	2 feet
Type of Filter Around Screen	#3 lonestar
Monitoring Well Mat'l	SCH 40 PVC
Screen Gauge/Slot Size	0.020 inch
Diameter and Length of Screen	2 inch, 15 feet
Depth to Bottom of Monitoring Well	33 feet
Depth to the Bottom of Filter Sand	33 feet

L1 = 0.25 ft
L2 = 17.75 ft
L3 = 15 ft
L4 = 33 ft

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	WATER LEVEL*
05-18-93	8:16	21.55 ft

*Measuring Point Top of casing

Completion Date and Time

05-13-93 5:00

ACTON • MICKELSON • VAN DAM, INC.

File #19021014