

**Phase II Environmental
Site Assessment
Fleischmann's Yeast
Eastern Property
Sumner, Washington**

**Prepared for
Burns Philp**

**June 11, 1998
J-4901**



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Earth and Environmental Technologies

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**PHASE II ENVIRONMENTAL SITE ASSESSMENT
FLEISCHMANN'S YEAST EASTERN PROPERTY
SUMNER, WASHINGTON**

EXECUTIVE SUMMARY

A focused Phase II environmental Site Assessment was conducted on the Fleischmann's Yeast Eastern Parcel to evaluate environmental conditions in areas where potential releases of contaminants may have occurred. Following conversations with Burns Philp, the sampling program focused on areas where past activities may have caused releases of hazardous materials to the ground. This approach was preferred and more cost-effective than dividing the entire site into specific grids. The areas of focus included the existing closed in-place fuel oil underground storage tanks (USTs) and associated former boiler building; former garage; former paint shop; former machine shop, former maintenance building; former storage building, former utility shed; and existing catch basins (see Figure 2 for site features). No previous assessments or interviews revealed any known releases. Therefore, the focus of our Phase II assessment was to assess areas where historic releases may have occurred.

Nineteen soil samples from fifteen subsurface soil borings were selected for chemical analyses. An additional three sediment samples were collected and analyzed from on-site catch basins. A sample of the existing pond's sediments could not be collected because of accessibility and safety reasons. Nine groundwater samples were collected and analyzed from three on-site monitoring wells and six of the borings. The soil and groundwater samples were analyzed for total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and total xylenes (BTEX); volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); dissolved metals, total suspended soils (TSS), and PCBs.

Based on the chemical data collected from the selected sampling locations, the Fleischmann's Yeast eastern property media exhibit relatively good environmental quality when compared to typical industrial sites. The contamination identified appears to be limited to shallow subsurface soils in a small number of relatively limited areas of the property. In addition, the identified contamination above screening levels is found in primarily property soils. The groundwater quality of the property based on the samples collected from the on-site groundwater monitoring wells, appears to be fairly good. The only exception is in the area where there is identified petroleum-contaminated soil (PCS) by the closed in-place USTs. Since the groundwater samples collected from the on-site monitoring wells had non-detectable concentrations

of TPH, the TPH concentrations detected in the soil and groundwater samples collected from the borings near the closed in-place USTs appear to have limited mobility. In addition the sampling method for groundwater samples collected from the borings tends to produce more turbid samples than the actual monitoring wells. This can influence the chemical analyses results for these samples because of the suspected particles in the water and may not be a true measure of actual groundwater quality.

Based on the data collected to date, the specific areas identified in need of cleanup are the USTs and associated PCS and the on-site catch basins. In addition, construction contingency plans should be developed to prepare for the possibility of encountering residual petroleum hydrocarbons or other hazardous materials that may remain in the soil, prior to excavating on site and specifically in the historical areas mentioned above.

INTRODUCTION

This report summarizes the results of a Phase II environmental site assessment conducted at the Fleischmann's Yeast eastern property, located in Sumner, Washington. The site is zoned for industrial use according to the City of Sumner. This work was conducted in accordance with our proposal (98-11-1131R), dated November 14, 1997. There have been previous limited assessments conducted at the site as discussed below.

The primary goal of our Phase II assessment is to provide information for Burns Philp on the current conditions at the subject property to assess the potential for adverse environmental conditions and to assist with you with your assessment of the environmental status of the subject property.

In addition, we have provided recommendations for cleanup of certain areas identified during this Phase II assessment.

This report is divided into the following sections:

- ▶ **SITE BACKGROUND AND HISTORY** describes the property location, history, previous assessments, and surrounding area history;
- ▶ **GEOLOGY AND HYDROGEOLOGY** describes the general property and surrounding properties geology and hydrogeology;
- ▶ **SCOPE OF WORK** summarizes the work completed;

- ▶ **SOIL AND GROUNDWATER RESULTS** describes the results of soil and groundwater testing completed; and
- ▶ **CONCEPTUAL CLEANUP APPROACH** presents our approach to cleanup of specific areas on the property based on the results of our Phase II assessment.

Tables and figures are presented at the end of the text and include the location, facility layout, exploration locations, and analytical data.

Two appendices are included at the end of the report. These appendices present the boring logs for the field explorations and the analytical laboratory reports for the chemical analyses.

SITE BACKGROUND AND HISTORY

General Property Description

The Fleischmann's Eastern Parcel is located in the northwest portion of Sumner, Washington. The eastern parcel is approximately 14 acres in area and the plant facilities occupy about 8 acres. The remaining 6 acres are undeveloped and formerly used for land application of second beer effluent. The surrounding land use consists primarily of industrial and commercial businesses. Residential properties are located to the south, along Zehnder Street and further east of the subject property.

The subject property is zoned industrial in the City of Sumner. Most of the buildings on the property are currently out of service except for the Main Office Building and Vinegar Processing Building (Figure 2).

Other out-of-service buildings include the former Yeast Production Facility, Storage Building, Yeast Cutting and Packaging Building, Condensed Molasses Solids (CMS) Plant, Power Station, and Coolers. Several above-ground vinegar storage tanks exist on the north end of the property near the Vinegar Processing Building.

Historical Summary

The property was developed as a yeast and vinegar production facility in approximately 1913. Many of the original structures built on the property still exist today. The main structures include the main office, main yeast production plant, grain warehouse and mill, a smaller building with air compressor, boiler plant, and two fuel underground storage tanks (USTs). Based on a 1927

Sanborn fire insurance map, a cutting and packaging building, a garage, machine shop, and general storage shed were added to the existing structure. These features are shown on Figure 2. Figure 2 also depicts the locations of former boiler, engine, maintenance, and utility buildings.

A portion of Building 1 (western side) is of newer construction and is comprised of metal. Floor drains were installed in about 1971 which directed wastestreams to holding tanks for pretreatment. The aerated lagoon (see Figure 2) was constructed in the mid-1970s for additional pretreatment of all wastestreams prior to discharge to the Sumner wastewater treatment plant. Prior to 1971, the process wastes were directly discharged to the White River.

Burns Philp purchased the Fleischmann's Yeast and Vinegar facilities and property in May 1986. Fleischmann's was originally purchased by Standard Brands. Standard Brands merged with Nabisco in the 1980s, and then Nabisco merged with RJR and became RJR Nabisco. The property remained RJR Nabisco until its purchase by Burns Philp in 1986.

Hart Crowser prepared a Preliminary Environmental Assessment on the subject property in September 1995. This assessment included conducting a historical and regulatory agency database and file review; performing a site reconnaissance; and preparing a summary report. The assessment identified several primary environmental concerns with respect to the subject property. These concerns included underground storage tanks (USTs); asbestos-containing materials (ACM); potential contamination from past operations; lead-based paint; hazardous materials; and underground creek.

Hart Crowser also conducted an asbestos and lead-based paint survey at the subject property in May 1996. This work also included a fluorescent light ballasts and tubes survey and groundwater sampling effort. Asbestos and lead-based paint were discovered during the survey. It is our understanding that the ACM has been removed from the property by a separate contractor. The lead-based paint and fluorescent light ballasts and tubes are also being handled by a separate contractor. The chemical results from samples collected in 1996 from the three on-site monitoring wells indicated that TPH, lead, and chromium were not detected in these wells.

Surrounding Area

The surrounding area to the north and east of the subject property were historically agricultural lands in the early 1900s. Industrial facilities began to emerge in the area such as lumber and paper mills, as well as the vinegar and yeast production facility. The vinegar and yeast production facility was one of the first industrial facilities established in the area.

A lumber mill and wood preserving facility were located directly east of the subject property. The lumber mill was evident in a 1919 Sanborn fire insurance map. A 1960 aerial photograph indicated that this area was an open field. However, in 1974, a wood preserving with creosote operation was listed for this location and currently exists under the name of Western Wood Preserving. The area further east has historically been primarily residential except for a oil storage, refining, and recycling operation that has operated intermittently since approximately 1964.

Industrial operations have occupied the area directly to the north of the subject property since at least 1919. A paper and cardboard box manufacturing operations has been the primary occupant of this northern adjacent property since 1919. The current name of this business is Sonoco Products, though previous names include Fiberboard Corporation, and Paraffine Companies Inc., Board and Paper Division.

Immediately to the north of Sonoco Products, is a lead battery wholesaler and battery restorer and distributor named Exide Corporation. This site was formerly a Sonoco building. However, General Battery located at the site around 1983 and Exide Corporation took over the lease in 1984.

A trucking business has operated since approximately 1959 on the property directly to the west of the subject property and Fryar Avenue. Uses to the south of the subject property have been and currently are primarily residential since the 1960s.

GEOLOGY AND HYDROGEOLOGY

This section is based on current soil data and a previous Detailed Engineering Report prepared for Fleischmann's Yeast and Vinegar by Hart Crowser in 1994. The subject property is located within the Stuck/White River valley and is underlain by alluvial soils, containing variable amounts of sand, silt, and clay. Site-specific information indicates the subject property is mantled and underlain by well-draining Sultan silt loam. The Sultan loam is relatively finer-grained than other silty loams.

Groundwater occurs at shallow depths within the White River valley alluvium, typically occurring at 4 to 18 feet below ground surface. The current data indicate groundwater was encountered at depths of between 3 and 8 feet, and typically around 4 feet. Inferred regional groundwater flow direction is westerly to southwesterly, toward the White River. The subject property has two in-use industrial supply wells completed at depths ranging from 456 to 572 feet.

SCOPE OF WORK

The objective of our work was to assess previously identified potential environmental concerns to assist you with your assessment of the environmental status of the property. The purpose of our work was to enable focused sampling efforts on key constituents and areas that may pose a potential risk to human health and the environment.

The sampling locations were selected in areas of current or historical uses that had the highest potential for impacting the subsurface conditions of the property. Therefore, most of the sample locations were in the areas of the existing and former buildings and main operations (Figure 2). In addition, the existing on-site groundwater monitoring wells were sampled to assess on-site groundwater quality and impacts from current and past operations. Several catch basin sediments were also randomly sampled and analyzed to assess quality.

Our scope of work included:

- ▶ Advanced Geoprobe borings (subcontracted to Geo-Tech Explorations, Inc.) at fifteen on-site locations (P-1 through P-15). At each location, soil samples were collected at 4- to 5-foot-depth intervals below the ground surface down to the water table (approximately 3 to 8 feet) and a groundwater sample was collected in select borings. A site plan and sample locations are shown on Figure 2. Boring logs are presented in Appendix A.
- ▶ During boring activities, an on-site geologist logged the boreholes, collected soil and groundwater samples, and monitored the borehole headspace with a PID to qualitatively assess the presence of volatiles. Soil samples were submitted for laboratory analysis based on elevated PID readings. Field observations are shown on the boring logs presented in Appendix A.
- ▶ Collected groundwater samples from the three existing groundwater monitoring wells on the subject property.
- ▶ Collected soil/sediment samples from three randomly selected catch basins on site.
- ▶ Chemically analyzed soil and groundwater samples. Selected samples were analyzed for:
 - Total and Dissolved Metals by EPA Method 6000/7000 Series;

- Total Petroleum Hydrocarbons by WTPH-HCID;
 - Volatile Organic Compounds (VOCs) by EPA Method 8240/8260;
 - Semivolatile Organic Compounds (SVOCs) by EPA Method 8270;
 - Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) by EPA Method 8020;
 - Pesticide/PCBs by EPA Method 8081;
 - Total Suspended Solids (TSS); and
 - Conventional pH by EPA Method 150.1.
- ▶ Evaluated the current data, field observations, and chemical results; and
 - ▶ Prepared a final report and preliminary cleanup action approach for identified areas.

SOIL AND GROUNDWATER RESULTS

Soil Samples Analytical Results

Nineteen soil samples were selected for analysis. The analytical results for the soil samples are presented in Table 1. The analytical results for the soil samples collected above the water table (approximate depth of 3 to 8 feet) were compared with the MTCA Method A cleanup levels. The data are described below:

TPH-HCID. There were exceedences above the MTCA Method A cleanup levels in the soil samples analyzed from four of the fifteen borings and the three catch basins.

- ▶ The TPH exceedences occurred in two of three borings [P-1 (S1) and P-2 (S1)] near the closed in-place former Bunker C oil USTs. The TPH concentrations were 7,800 and 1,800 mg/kg, respectively, above the MTCA Method A cleanup level of 200 mg/kg. Oil product was noted in these samples during sampling.

- ▶ The TPH exceedences occurred in two other borings [(P-6(S1) and P-10(S1))] that were located near an above-ground storage tank and the wastewater treatment holding tank, respectively. These oil-range TPH concentrations, 230 and 210 mg/kg respectively, were only slightly higher than the 200 mg/kg MTCA Method A cleanup level. It is unlikely that these concentrations would exceed MTCA Method C Industrial TPH cleanup levels established using Ecology's Interim TPH Policy. The non-carcinogenic fraction of the TPH does not exceed industrial direct contact cleanup levels and the oil-range hydrocarbons present in the samples are relatively immobile and would not pose a significant risk via the soil to groundwater or soil to air pathways. Given that benzene and cPAHs have not been of concern at other portions of the property, it does not appear that the hydrocarbon occurrences observed in borings P-6 and P-10 pose a significant threat to human health or the environment.
- ▶ The TPH concentrations in the three catch basin samples ranged from 270 to 1,200 mg/kg. These oil-range hydrocarbon concentrations were higher than the Method A cleanup level. Although these TPH occurrences would not likely exceed risk-based cleanup levels established under the Interim TPH Policy, discharge of petroleum hydrocarbons and cPAHs associated with the catch basin sediments may result in unacceptable impacts to the aquatic environment.

Total Metals, Volatile Organic Compounds, PCBs, and Semivolatile Organic Compounds. There were no exceedences of MTCA industrial cleanup levels in any of the soil samples analyzed.

Groundwater Samples Analytical Results

Nine water samples were collected and analyzed from the subject property. Three of the water samples were collected from three existing groundwater monitoring wells. The other six water samples were collected from select borings.

TPH-HCID. TPH exceedences occurred in groundwater samples collected from borings P-1 and P-2 at concentrations of 1,600 and 4,300 µg/L located in borings P-1 and P-2, respectively. These concentrations were above the cleanup level of 1,000 µg/L for TPH. These borings were near the closed in-place USTs and in the borings where oil product was noted. These results coincided with the elevated concentrations of TPH in the soil samples collected from the same borings.

The groundwater samples collected from the on-site monitoring wells had non-detectable concentrations of TPH; therefore, providing a good indication that the TPH concentrations detected in the soil and groundwater samples near the closed in-place USTs likely have limited mobility and leachability.

VOCs, SVOCs, BTEX, Metals, and PCBs. There were no exceedences of dissolved metals, VOCs, SVOCs, PCBs, nor BTEX compounds in any of the water samples analyzed.

CONCEPTUAL CLEANUP APPROACH

Chemicals of Concern

To evaluate soil and groundwater analytical results, Washington State Model Toxics Control Act (MTCA) Method A cleanup levels for soil (WAC 173-340-740) and groundwater (WAC 173-340-720) were used to screen the data and identify chemicals of concern and assess whether remedial actions may be required at the site. Method A cleanup levels represent conservative screening criteria and do not necessarily trigger requirements for cleanup under MTCA. Based on the current data, TPH was identified as the only chemical of concern:

Total petroleum hydrocarbons were primarily detected in the borings near the closed in-place USTs and catch basins.

Metals, VOCs, SVOCs, and PCBs were not detected in the selected soil and groundwater samples at concentrations that were of concern. Therefore, TPH is the target chemical of concern for the proposed preliminary cleanup action plan.

Source Areas

The area of most concern at this time is the on-site closed in-place USTs located near the former boiler building (Figure 2). The USTs are reported to be approximately 15,000 gallons each, of steel construction, and located side by side of each other within a concrete vault and a concrete pad covering the top. The two geoprobe borings (P-1 and P-2) that indicated free product in the soil were located on the north and south side of this pad. A third geoprobe (P-14) boring was advanced toward the east and it contained non-detectable concentrations of TPH. A building is located directly west of the concrete pad and therefore we were unable to advance an additional boring directly west. The past operations of the two large USTs are the likely sources for the discovered soil contamination. The USTs operated from approximately 1913 through the 1970s. It was reported that originally the USTs were closed in-

place by filling them with water. However, the USTs floated slightly to the top and cracked the concrete pad. The water was then removed and the USTs were filled with sand.

Although no other elevated concentrations of TPH, PAHs, or other chemical constituents were detected in the samples collected and analyzed from the Phase II environmental assessment, other possible sources of TPH on the property include the former paint shop, garage, gas pump, waste oil AST, utility shed, maintenance shop, and on-site machinery. However, based on the recent soil and groundwater data, if TPH contamination exists in these other areas, it will likely be spotty and localized.

Extent of Contamination

The area of elevated concentrations of TPH seems to be localized in the area of the closed in-place USTs and the on-site catch basins. However, the full extent of the discovered contamination around the USTs has not been fully defined. Based on the three borings in the vicinity of the USTs and for planning purposes, the extent of contamination is assumed to not extend beyond 25 feet in any direction or below the groundwater table at 8 feet. Based on this assumption and the boring logs and chemical data to date, approximately 2,000 cubic yards petroleum hydrocarbon-affected soil are estimated from the UST area for disposal. Additional sampling and analysis would be necessary to further delineate this area.

Conceptual Cleanup Approach

A conceptual approach for removal of the USTs, identified petroleum contaminated soil (PCS), and cPAHs in the catch basins was developed to provide additional planning information and to allow development of a budgetary cost estimate.

Cleanup Action Plan. Prior to implementing cleanup at the property, a Final Cleanup Action Plan (CAP) would be prepared. The CAP would include a basis of design for the program, identification of permitting requirements, and a detailed implementation schedule, including cleanup duration. This CAP would address the need for additional sampling and analysis. The CAP would also estimate approximate soil volumes and identify preliminary screening of probable cleanup remedies. Based on the data collected to date, the following remedial actions have been identified:

- ▶ **Removal of Underground Storage Tanks and Petroleum-Contaminated Soil.** The existing closed in-place USTs and associated petroleum-contaminated soil should be removed and disposed of appropriately. In

addition, we recommend a development of construction contingency plans that include protection of site workers during any excavation on the property as well as a plan for handling contaminated soil when encountered. Any additional removal of contaminated soil will likely be limited to hot spot containment or removal action for primarily TPH-related soils in the upper 8 feet of soil.

- ▶ **Cleaning and Removal of the On-Site Catch Basins.** The on-site catch basins should be cleaned out and their contents removed and disposed of appropriately. The contents of each catch basin could be pumped out, contained in 55-gallon drums, and then removed and disposed of off site appropriately.

Prior to implementation of these remedial actions and any other remedial action at the site, the following permitting requirements would probably include:

- ▶ City of Sumner Fire Department Permit for UST Removal;
- ▶ City of Sumner Permit for grading and filling operations; and
- ▶ SEPA checklist to be filed with the City of Sumner.

Permitting for remediation activities could be conducted in conjunction with other permitting required for development of the site, such as a master use permit (MUP). The schedule for permitting depends to a large extent on whether and how the cleanup is integrated into the development process, if it is.

Following approval of all permits, a contractor should be selected for implementation of the remedial actions. Compliance monitoring should be conducted during the remedial action to ensure the design criteria and cleanup levels are attained. Following completion of the remedial action, construction as-built drawings and a final report would be prepared and submitted to the appropriate agencies.

In addition to planned remedial activities, a Construction Contingency Plan should also be developed prior to excavation activities associated with development. A Construction Contingency Plan should be developed to specify worker health and safety precautions, handling protocols, and off-site disposal/treatment options to address areas where localized contamination may be encountered, specifically in the areas of known or suspect USTs. The contingency plan would lay out common sense criteria for recognizing suspect materials based on appearance, odor, etc., and would identify chain of command links for notification during construction. As a key element, the plan

would also outline procedures for sampling and chemical characterization needed prior to implementing disposal/treatment options for suspect materials.

LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Burns Philp, for specific application to the subject property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

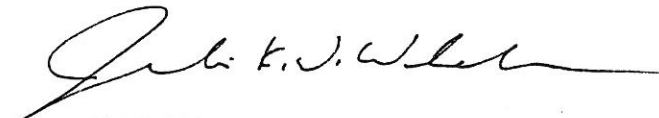
The MTCA cleanup levels included in this report are provided for comparison purposes only and are based on our understanding of cleanup levels required by Ecology for similar projects. They do not represent MTCA interpretations. By using them for comparison purposes, we are not implying that remedial actions at this site are required under MTCA. Specific MTCA interpretations may involve separate calculations and determinations upon which a range of cleanup standards may be established by Ecology.

These preliminary estimates are prepared for guidance in project evaluation only.

Our work did not include sampling or testing of drinking water for lead content, sampling for indoor air quality, assessment of sewer systems, sampling for radon vapor, a good faith survey for lead, and asbestos, and other items which are not the present standard of practice, unless otherwise noted herein.

Sincerely,

HART CROWSER, INC.



JULIE K.W. WUKELIC
Senior Environmental Engineer

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Table 1 - Summary of Analytical Results for Soil and Sediment Samples

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H4901

Sample Location	Screening Level	P1-S1	P2-S1	P3-S1	P3-S2	P4-S1	P5-S1	P6-S1	P7-S1	P9-S1	P10-S1	P11-S1
Depth in Feet		0-4	0-4	0-5	5-8	0-4	0-5	0-5	2-5	0-5	0-4	3-5
Total Petroleum Hydrocarbons in mg/kg		7800	1800	na	na	na	95	230	na	na	210	na
As Gasoline	100 (2)	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
As Diesel/Fuel Oil #2	200 (2)	2800	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
As Oil	200 (2)	5000	1800	< 50	< 50	< 50	95	230	< 50	< 50	210	< 50
Volatile Organic Compounds ^umg/kg												
Acetone	175 (4)	ns	ns	ns	ns	< 13	ns	ns	< 13	ns	ns	ns
Semivolatile Organics in ^Mmg/kg												
Naphthalene	70 (4)	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
2-Methylnaphthalene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Acenaphthene	210 (4)	270	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Fluorene	140 (4)	480	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Phenanthrene	na	910	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Fluoranthene	140 (4)	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Pyrene	105 (4)	1500	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(a)anthracene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Chrysene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(b)fluoranthene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(a)pyrene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Indeno(1,2,3-cd)pyrene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Benzo(g,h,i)perylene	na	< 230	ns	< 27	ns	ns	ns	ns	ns	ns	ns	ns
Total cPAHs (1)	20 (2)											
bis(2-Ethylhexyl)phthalate	70 (4)	< 1100	ns	< 140	ns	ns	ns	ns	ns	ns	ns	ns
Total Metals in mg/kg												
Barium	245 (4)	ns	ns	47	ns	ns	ns	61	89	ns	120	ns
Chromium	500 (2)	ns	ns	17	ns	ns	ns	22	7.3	ns	19	ns
Lead	1,000 (2)	ns	ns	< 21	ns	ns	ns	30	60	ns	34	ns
Mercury	1 (2)	ns	ns	< 0.11	ns	ns	ns	< 0.081	0.14	ns	0.49	ns
pH	na	ns	ns	ns	ns	ns	ns	ns	7.58	ns	ns	ns

na = not applicable
ns = not sampled

< = not detected at detection limit indicated

(1) Total cPAHs calculated using 1/2 detection limit for not detected values.

(2) MTCA Method A Industrial cleanup level.

(3) MTCA Method C Industrial Direct Contact cleanup level.

(4) MTCA Method B Soil to Groundwater cleanup level based on drinking water scenario.

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Table 1 - Summary of Analytical Results for Soil and Sediment Samples

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L1901

Sample Location	Screening Level	P12-S2	P13-S1	P13-S2	P14-S1	P15-S1	P15-S1 Dup	CB-1	CB-2	CB-3	CB-3 Dup
Depth in Feet		5-8.5	1-4	4-8	0-4	0-4	0-4	surface	surface	surface	surface
Total Petroleum Hydrocarbons in mg/kg		na	166	119	180	na	na	960	1200	270	210
As Gasoline	100 (2)	< 10	56	37	< 10	< 10	< 10	< 10	< 10	< 10	< 10
As Diesel/Fuel Oil #2	200 (2)	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
As Oil	200 (2)	< 50	110	82	180	< 50	< 50	960	1200	270	210
Volatile Organic Compounds ^Mmg/kg											
Acetone	175 (4)	ns	ns	45	ns	ns	ns	ns	ns	ns	ns
Semivolatile Organics ^{Mg}in mg/kg											
Naphthalene	70 (4)	200	ns	ns	ns	ns	ns	ns	1000	ns	ns
2-Methylnaphthalene	na	< 27	ns	ns	ns	ns	ns	ns	960	ns	ns
Acenaphthene	210 (4)	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Fluorene	140 (4)	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Phenanthrene	na	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Fluoranthene	140 (4)	< 27	ns	ns	ns	ns	ns	ns	370	ns	ns
Pyrene	105 (4)	< 27	ns	ns	ns	ns	ns	ns	670	ns	ns
Benzo(a)anthracene	na	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Chrysene	na	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Benzo(b)fluoranthene	na	< 27	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Benzo(a)pyrene	na	< 27	ns	ns	ns	ns	ns	ns	1100	ns	ns
Indeno(1,2,3-cd)pyrene	na	< 27	ns	ns	ns	ns	ns	ns	700	ns	ns
Benzo(g,h,i)perylene	na	< 27	ns	ns	ns	ns	ns	ns	1100	ns	ns
Total cPAHs (1)	20 (2)										
bis(2-Ethylhexyl)phthalate	70 (4)	51	ns	ns	ns	ns	ns	ns	< 280	ns	ns
Total Metals in mg/kg											
Barium	245 (4)	ns	ns	64	45	ns	ns	ns	ns	ns	ns
Chromium	500 (2)	ns	ns	19	18	ns	ns	ns	ns	ns	ns
Lead	1,000 (2)	ns	ns	< 19	< 18	ns	ns	ns	ns	ns	ns
Mercury	1 (2)	ns	ns	< 0.12	< 0.11	ns	ns	ns	ns	ns	ns
pH	na	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns

na = not applicable
ns = not sampled

< = not detected at detection limit indicated

(1) Total cPAHs calculated using 1/2 detection limit for not detected values.

(2) MTCA Method A Industrial cleanup level.

(3) MTCA Method C Industrial Direct Contact cleanup level.

(4) MTCA Method B Soil to Groundwater cleanup level based on drinking water scenario.

Table 2 - Summary of Analytical Results for Water Samples

Hart Crosser
H4901

Sample Locations	Screening Level	Detection Limit	P1	P2	P3	P7	P9	P13	MW-3	MW-4	MW-4 Dup	POND
Total Petroleum Hydrocarbons in ug/L		na	1600	4300	nd	540	nd	nd	nd	nd	nd	ns
As Gasoline	1,000 (1)	200	nd	nd	nd	540	nd	nd	nd	nd	nd	ns
As Diesel/Fuel Oil #2	1,000 (1)	800	1600	1500	nd	nd	nd	nd	nd	nd	nd	ns
As Oil	1,000 (1)	2000	nd	2800	nd	nd	nd	nd	nd	nd	nd	ns
Volatile Organic Compounds in ug/L												
Bromomethane	11 (2)	0.4	0.54	ns	ns	nd	ns	0.83	nd	ns	ns	ns
Acetone	800 (2)	8	4.3	ns	ns	31	ns	7 J	2 J	ns	ns	ns
2-Butanone	4,800 (2)	8	1.4	ns	ns	9.9 J	ns	2.6 J	1.2 J	ns	ns	ns
Toluene	1,000 (2)	0.4	0.48	ns	ns	nd	ns	< 0.8	nd	ns	ns	ns
2-Hexanone	na	8	nd	ns	ns	nd	ns	13 J	nd	ns	ns	ns
m,p-Xylene	10,000 (2)	0.8	nd	ns	ns	2.7	ns	< 1.6	nd	ns	ns	ns
o-Xylene	10,000 (2)	0.4	nd	ns	ns	1.1	ns	< 0.8	nd	ns	ns	ns
Semivolatile Organics in ug/L												
2-Methylnaphthalene	na	0.093	ns	ns	ns	ns	ns	ns	1.4	0.15	ns	ns
Dibenzofuran	na	0.47	ns	ns	ns	ns	ns	ns	0.14 J	nd	ns	ns
Fluorene	640 (2)	0.093	ns	ns	ns	ns	ns	ns	0.21 J	nd	ns	ns
Phenanthrene	na	0.093	ns	ns	ns	ns	ns	ns	0.11	nd	ns	ns
Di-n-butylphthalate	1,600 (2)	0.47	ns	ns	ns	ns	ns	ns	0.27 J	0.17 J	ns	ns
Butylbenzylphthalate	3,200 (2)	0.47	ns	ns	ns	ns	ns	ns	0.12 J	0.1 J	ns	ns
bis(2-Ethylhexyl)phthalate	6 (2)	0.47	ns	ns	ns	ns	ns	ns	1.4	0.66	ns	ns
Di-n-octylphthalate	320 (2)	0.47	ns	ns	ns	ns	ns	ns	0.1 J	nd	ns	ns
Diethylphthalate	12,800 (2)	0.47	ns	ns	ns	ns	ns	ns	0.3 J	0.14 J	ns	ns
Dissolved Metals in ug/L												
Arsenic	5 (1)	0.001	0.0045	ns	nd	0.0033	ns	0.0014	0.0016	0.003	ns	nd
Barium	1,120 (2)	0.0005	0.045	ns	0.041	0.013	ns	0.027	0.11	0.059	ns	0.0043
Chromium	50 (1)	0.0005	nd	ns	nd	0.015	ns	nd	0.0017	nd	ns	0.001
Lead	5 (1)	0.0005	nd	ns	nd	nd	ns	0.0011	nd	nd	ns	nd
Selenium	50 (2)	0.002	nd	ns	nd	nd	ns	0.0027	nd	nd	ns	nd
pH	na	na	6.47	9.32	8.47	6.46	6.85	7.00	6.37	6.50	ns	8.05
Total Suspended Solids in mg/L	na	10	600	560	26,000	3,000	2,600	19,000	500	72	ns	55

na - not applicable

nd - not detected

ns - not sampled

J = estimated concentration

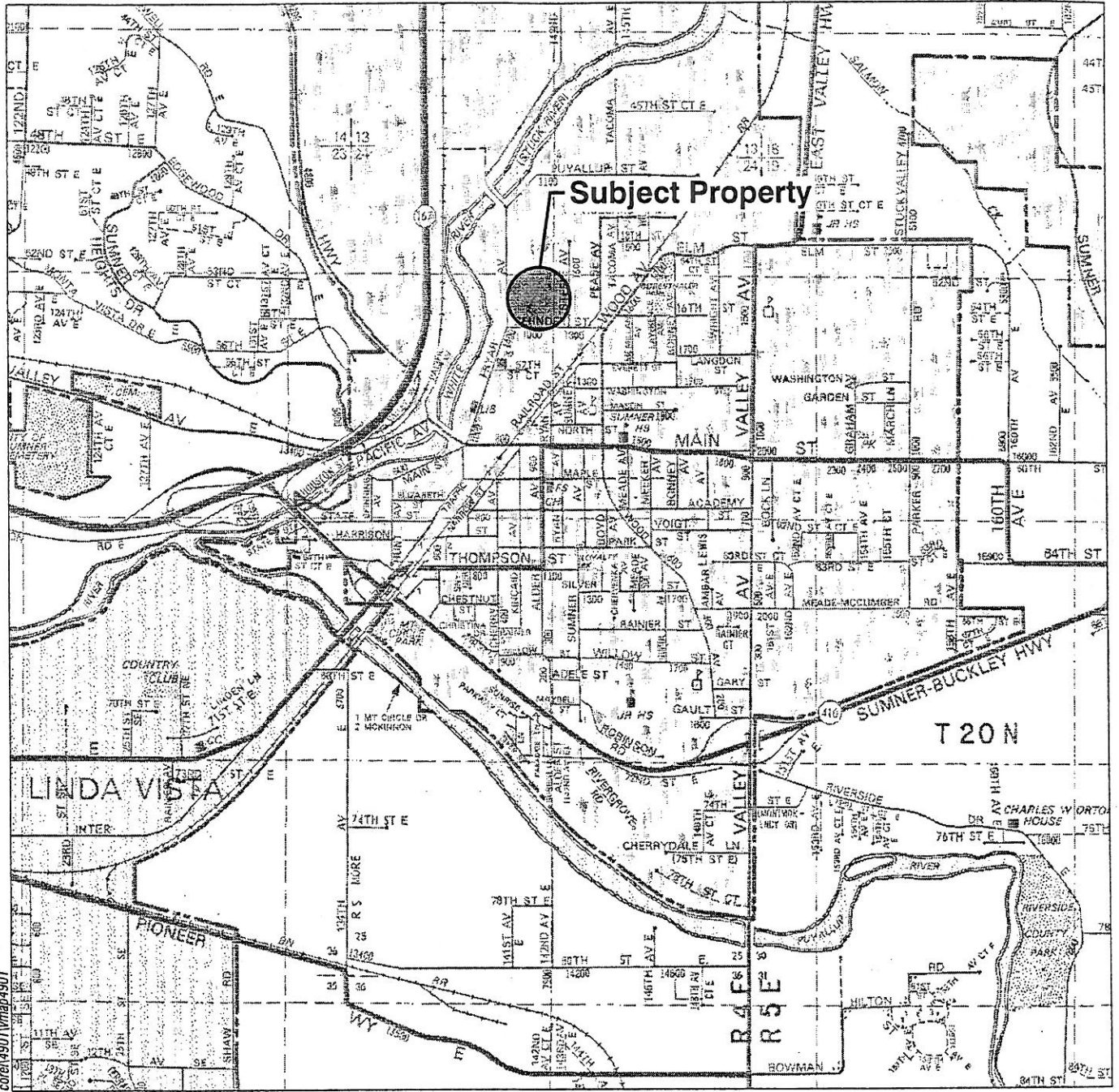
< = not detected at detection limit indicated.

(1) MTCA Method A groundwater cleanup level.

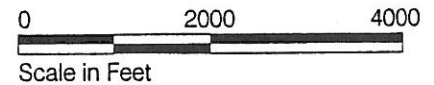
(2) MTCA Method B groundwater cleanup level.

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Vicinity Map



core\4901\map\4901



HARTCROWSER

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Figure 1

**APPENDIX A
EXPLORATION LOGS**

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance.

Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SAND or GRAVEL	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Density		Consistency		
Very loose	0 - 4	Very soft	0 - 2	<0.125
Loose	4 - 10	Soft	2 - 4	0.125 - 0.25
Medium dense	10 - 30	Medium stiff	4 - 8	0.25 - 0.5
Dense	30 - 50	Stiff	8 - 15	0.5 - 1.0
Very dense	>50	Very stiff	15 - 30	1.0 - 2.0
		Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

Minor Constituents

Estimated Percentage


Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Legends


Sampling Test Symbols

BORING SAMPLES

 Split Spoon

 Shelby Tube

 Cuttings

 Core Run


* No Sample Recovery

P Tube Pushed, Not Driven


TEST PIT SAMPLES

 Grab (Jar)

 Bag

 Shelby Tube

Groundwater Observations

 Groundwater Level on Date (ATD) At Time of Drilling

Test Symbols

GS Grain Size Classification

CN Consolidation

TUU Triaxial Unconsolidated, Undrained

TCU Triaxial Consolidated Undrained

TCD Triaxial Consolidated Drained

QU Unconfined Compression

DS Direct Shear

K Permeability

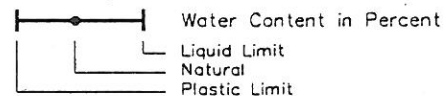
PP Pocket Penetrometer
Approximate Compressive Strength in TSF

TV Torvane
Approximate Shear Strength in TSF

CBR California Bearing Ratio

MD Moisture Density Relationship

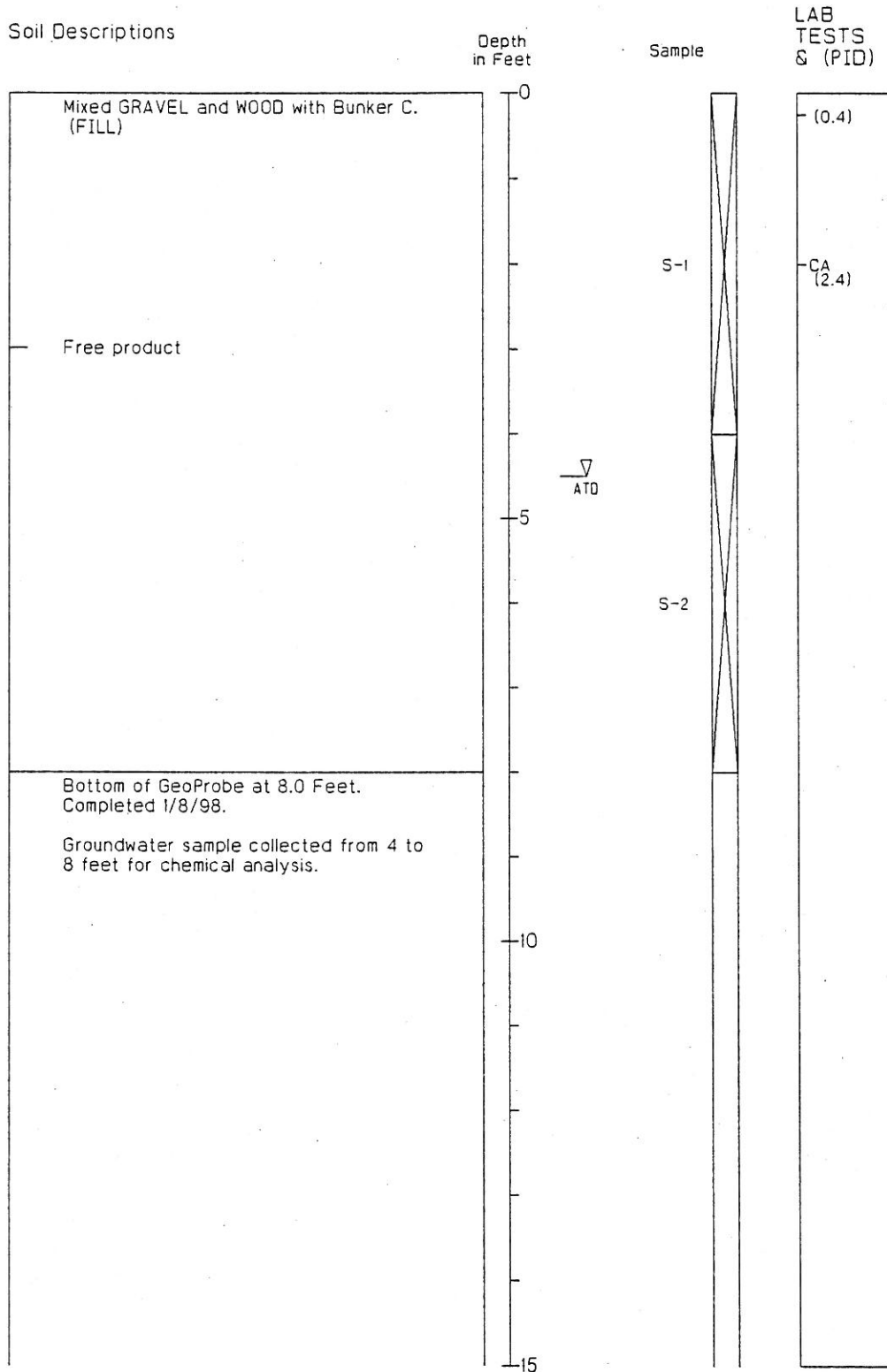
AL Atterberg Limits



PID Photoionization Detector Reading

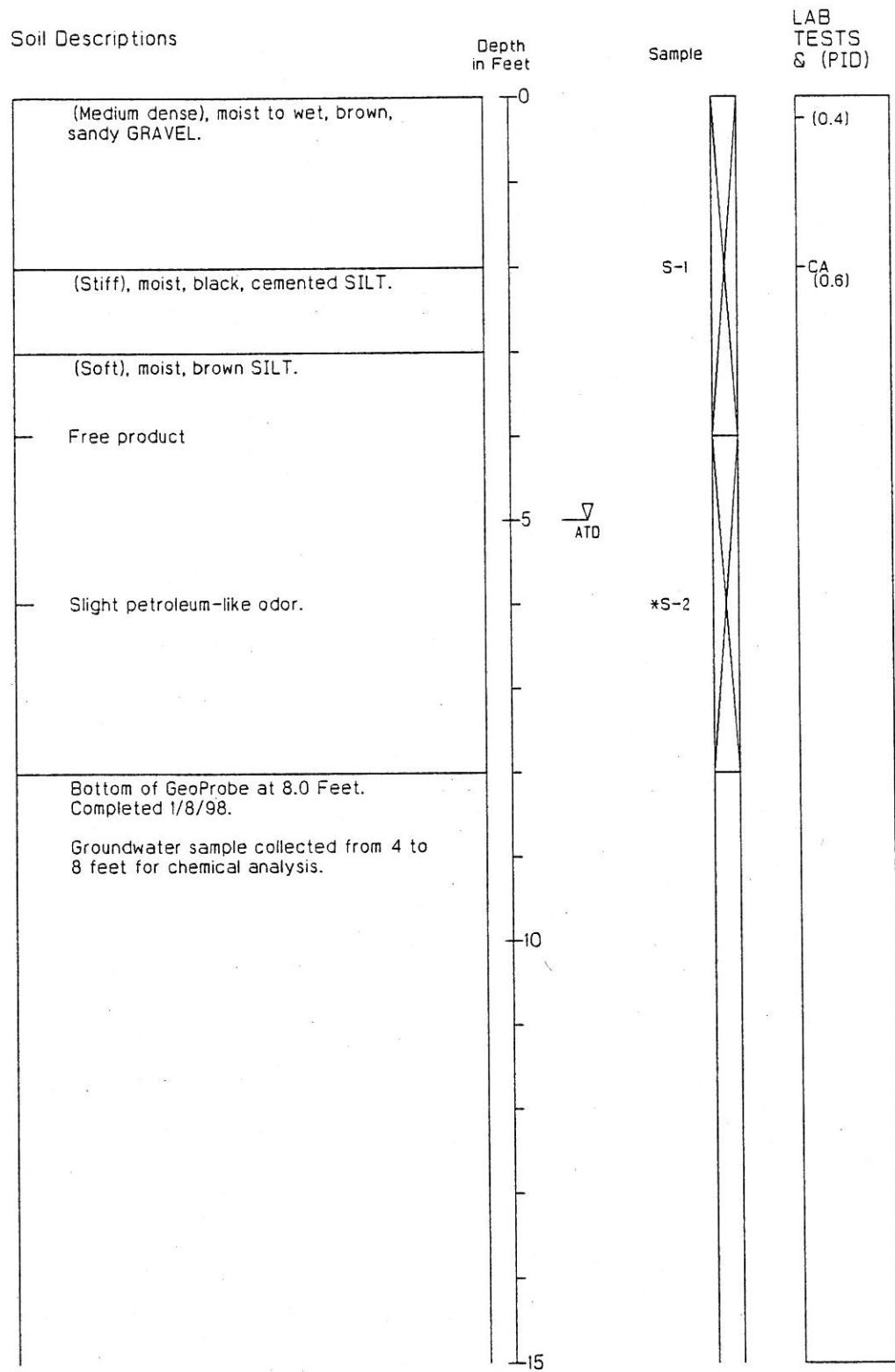
CA Chemical Analysis

GeoProbe P-1



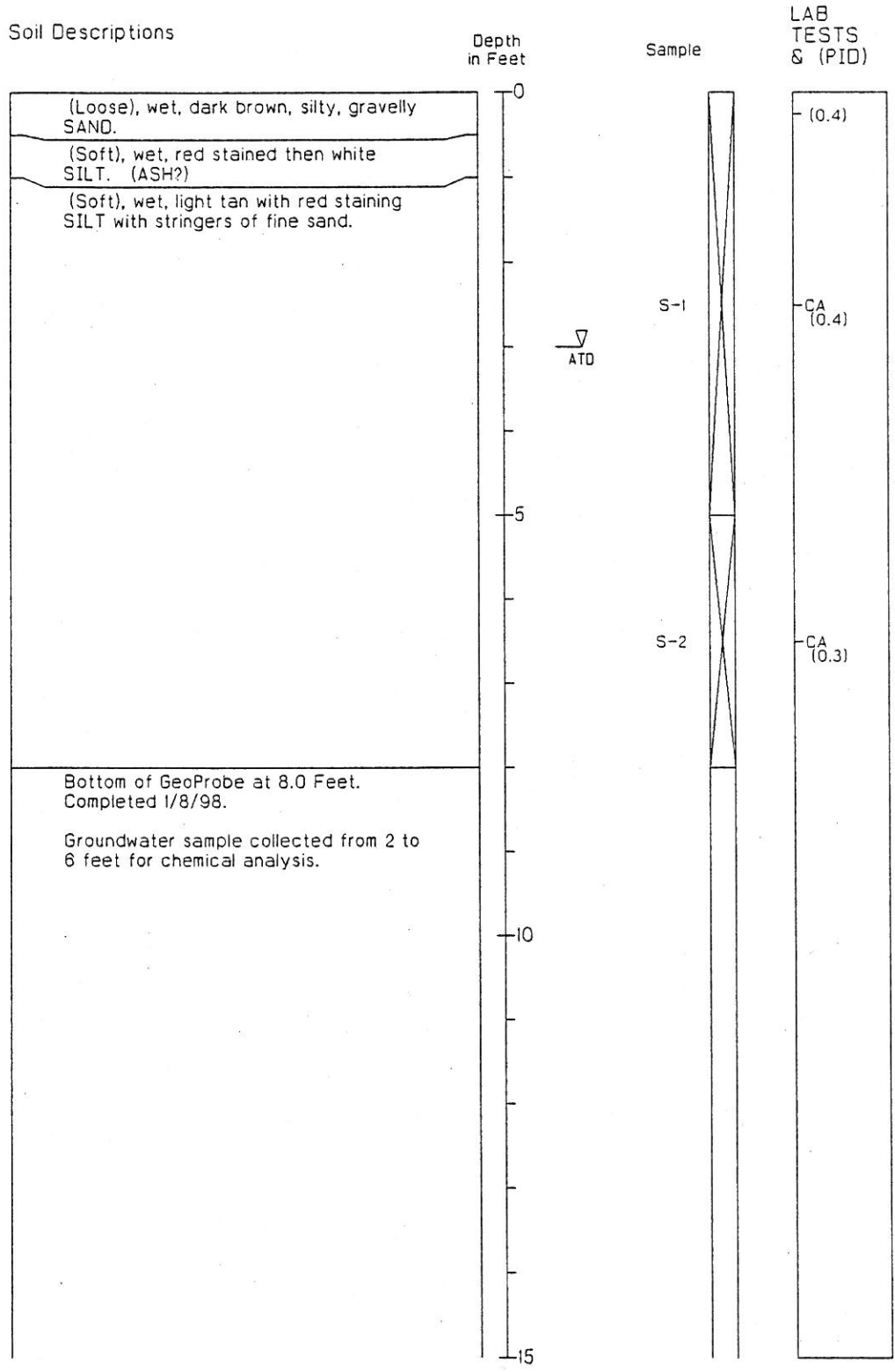
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-2



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-3



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

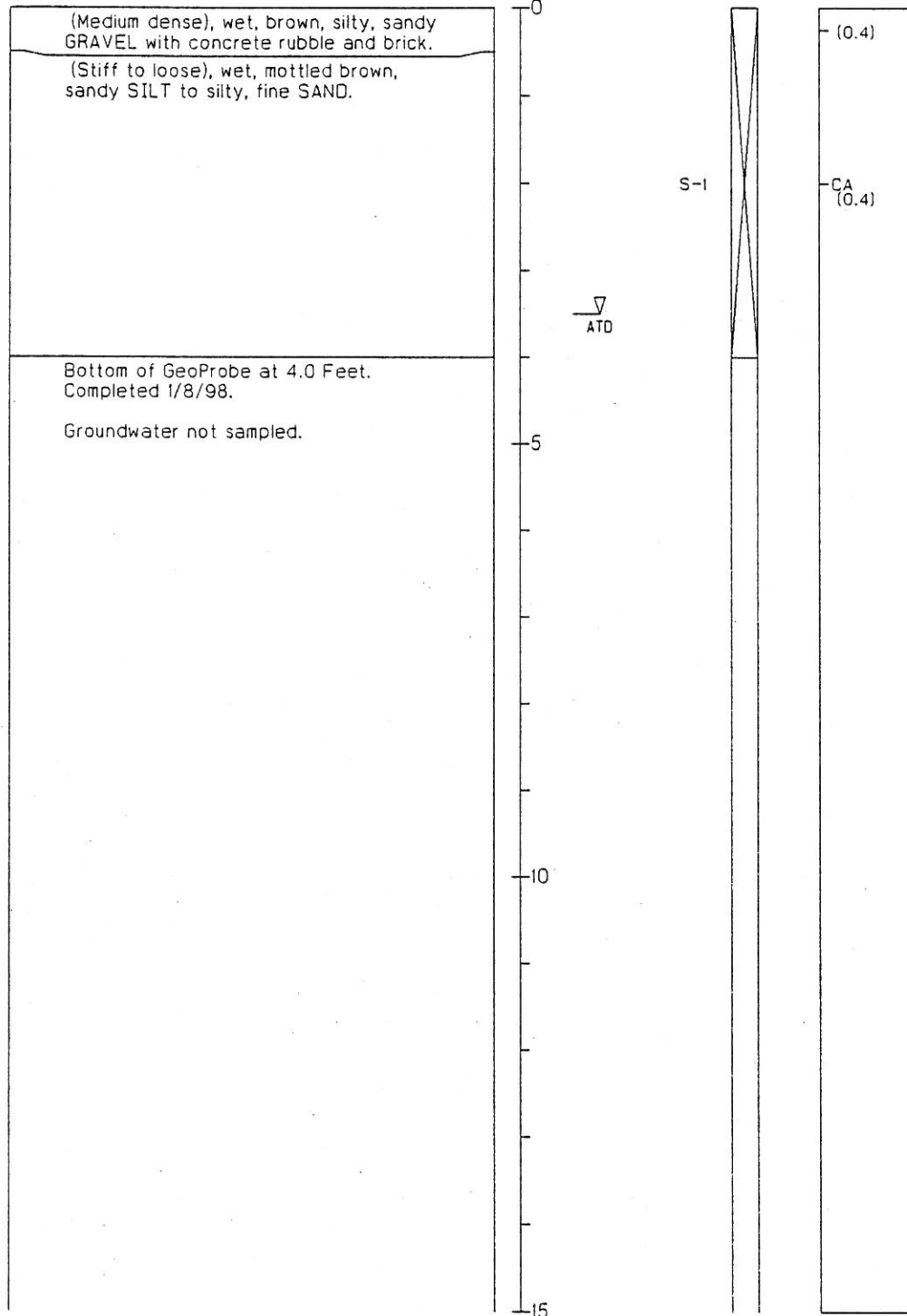
GeoProbe P-4

Soil Descriptions

Depth
in Feet

Sample

LAB
TESTS
& (PID)



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-5

Soil Descriptions

<p>1 inch of Asphalt Concrete over 7 inches of Concrete over (medium dense), wet, brown, gravelly SILT with chunks of concrete.</p>
<p>(Medium dense to loose), wet, Brown mottled, silty, fine SAND with interbedded sandy silt.</p>
<p>Bottom of GeoProbe at 8.0 Feet. Completed 1/8/98.</p> <p>Groundwater not sampled.</p>

Depth
in Feet



Sample

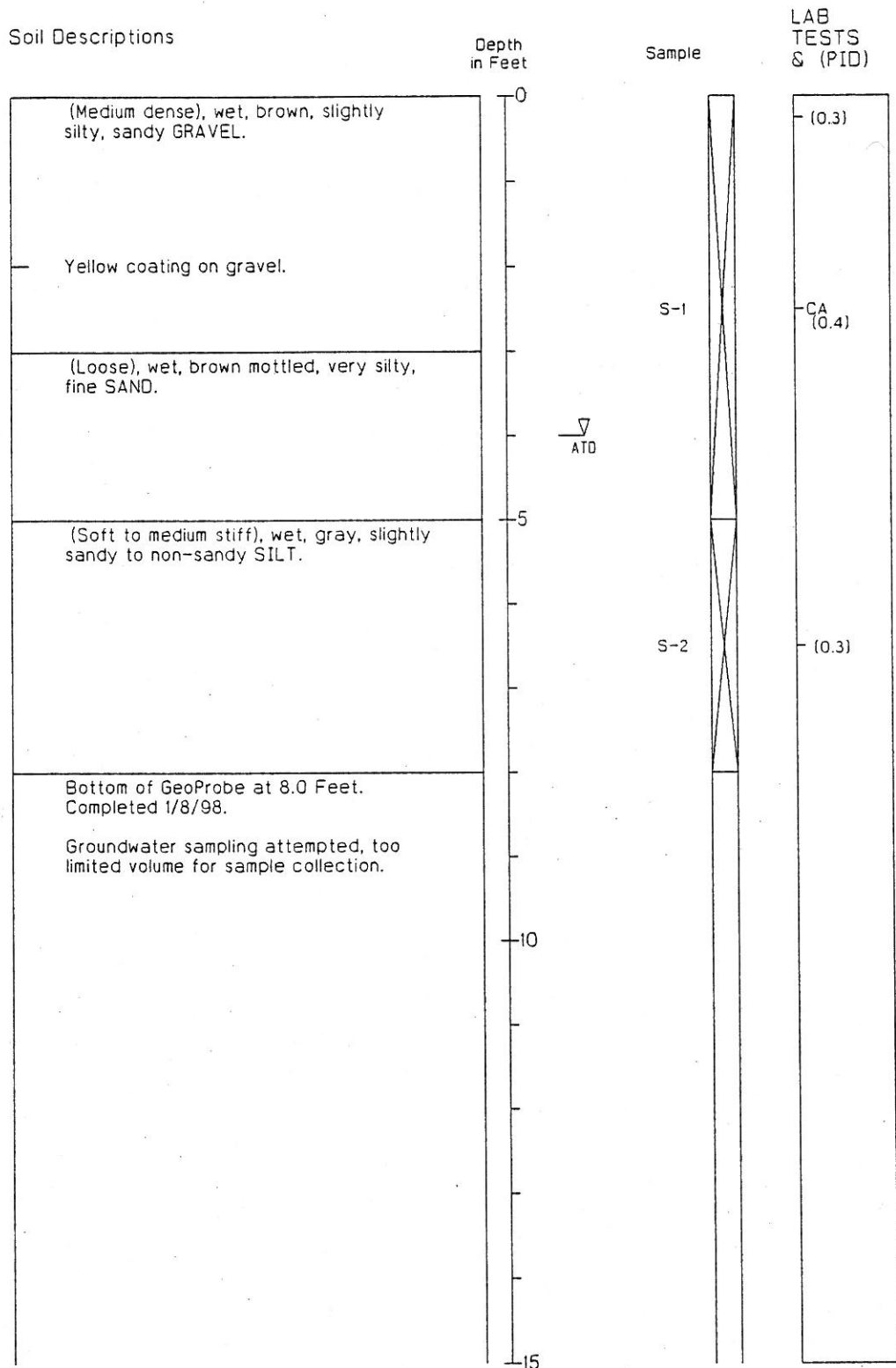


LAB
TESTS
& (PID)

<p>(0.3)</p>
<p>CA (0.3)</p>
<p>(0.3)</p>

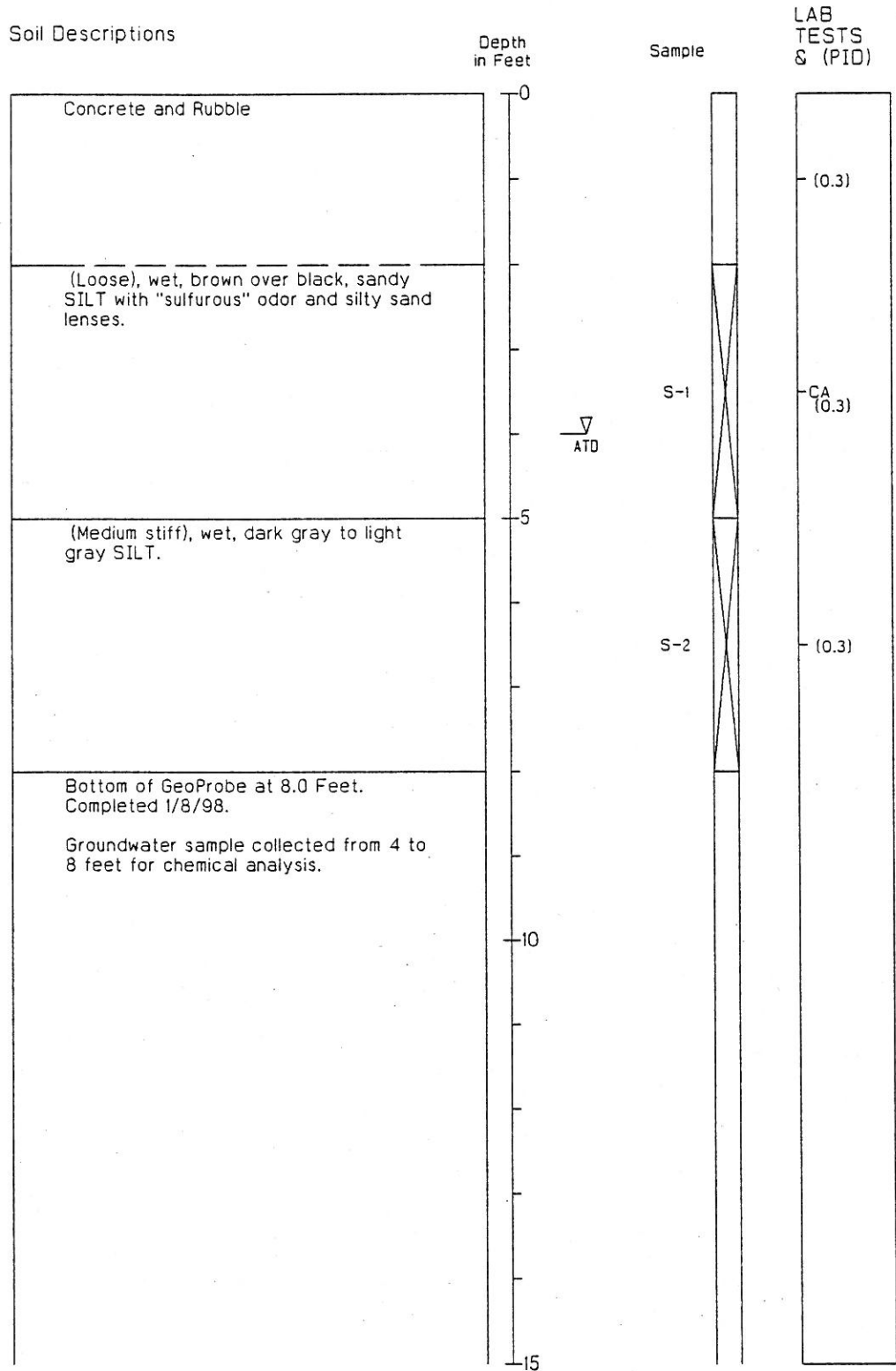
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-6



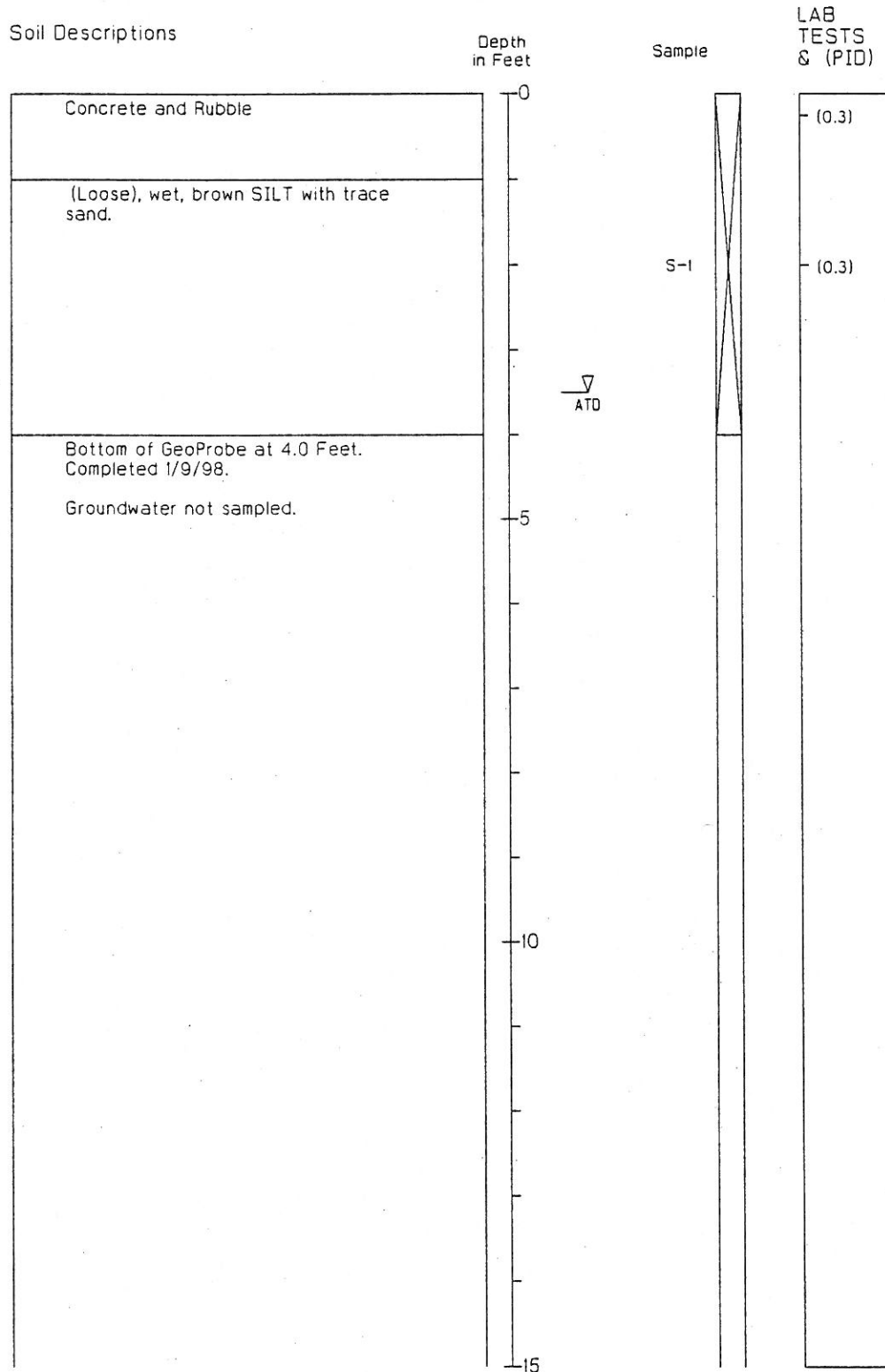
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-7



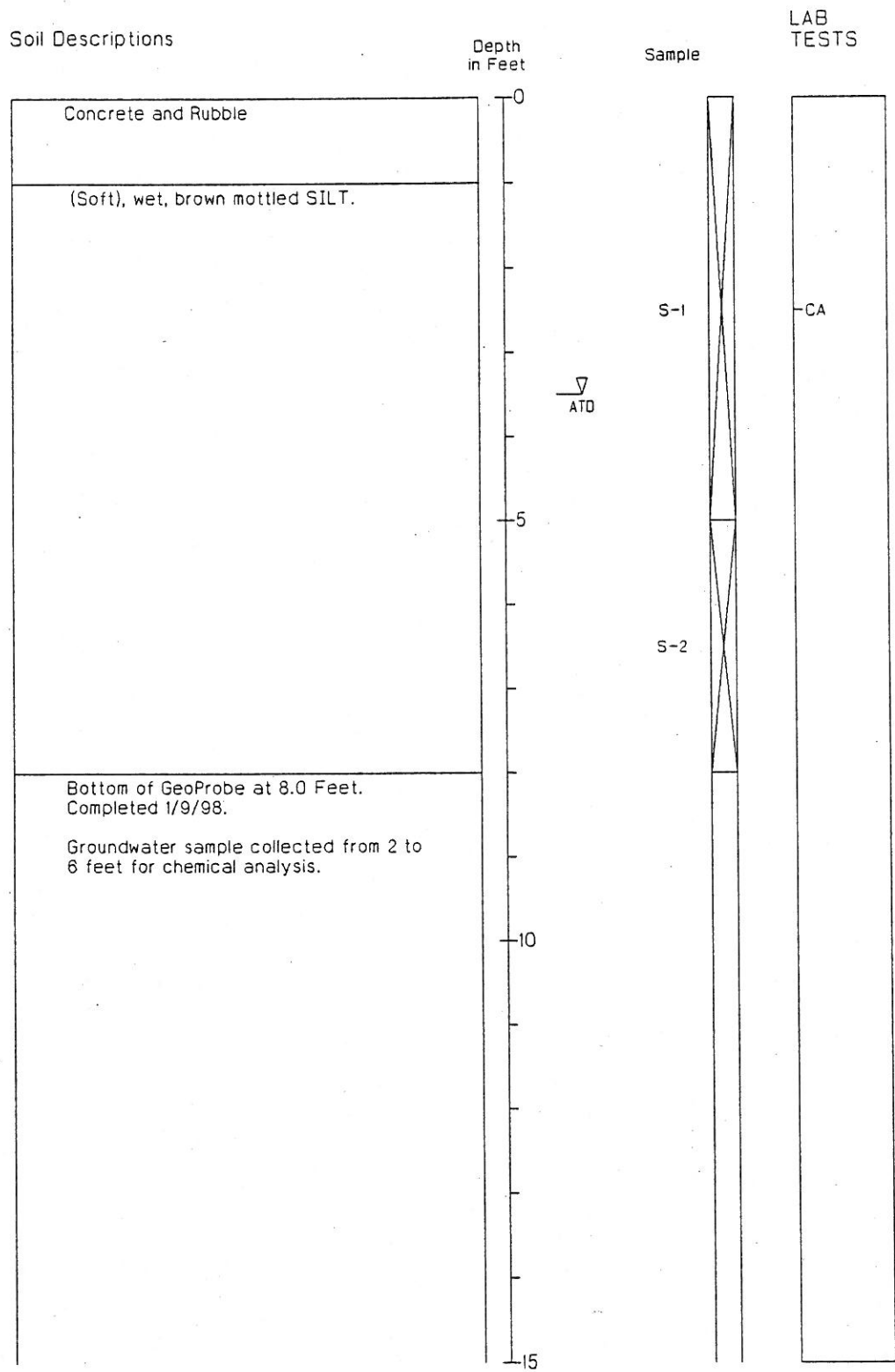
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-8



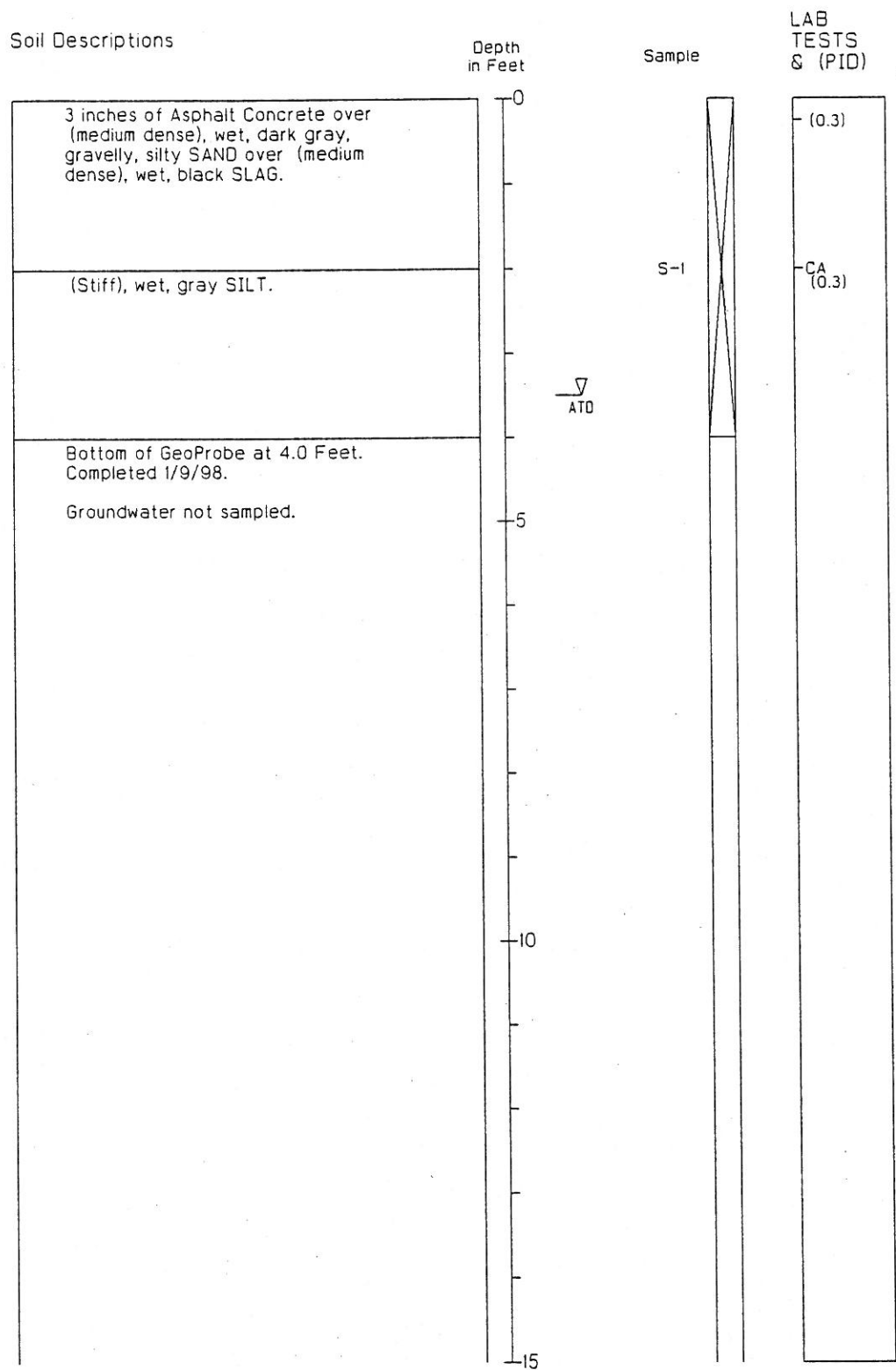
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-9



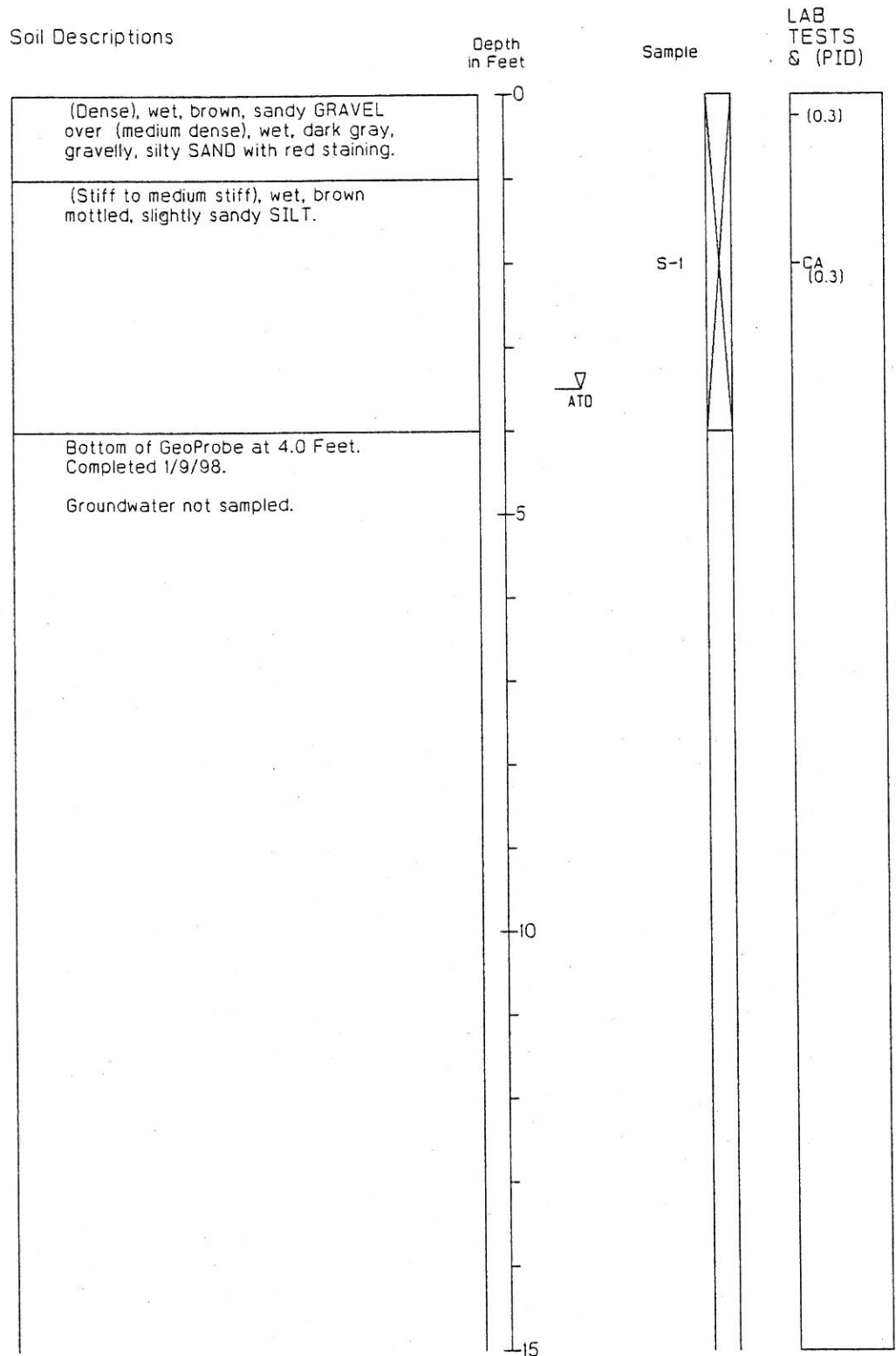
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-10



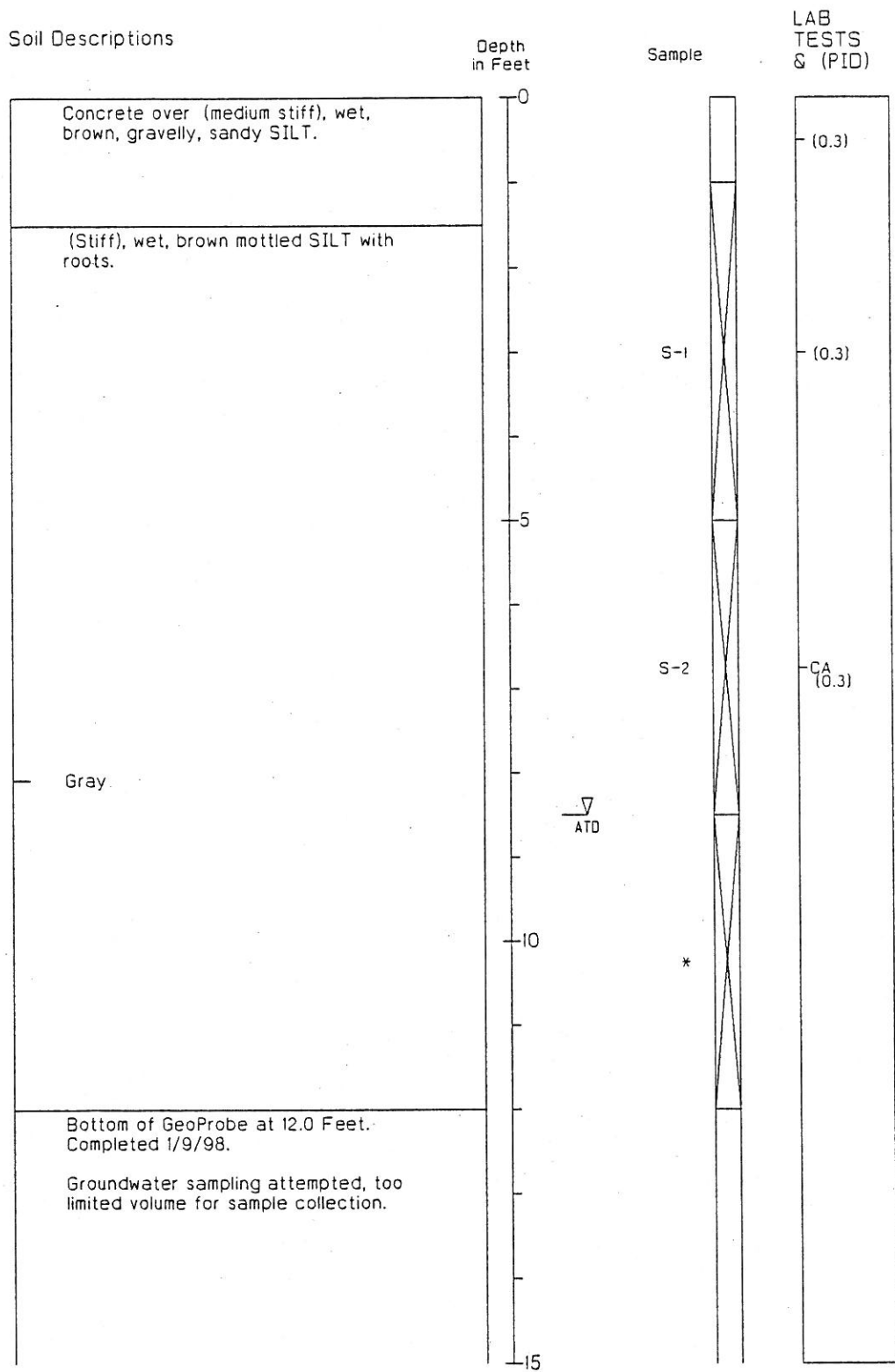
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-11



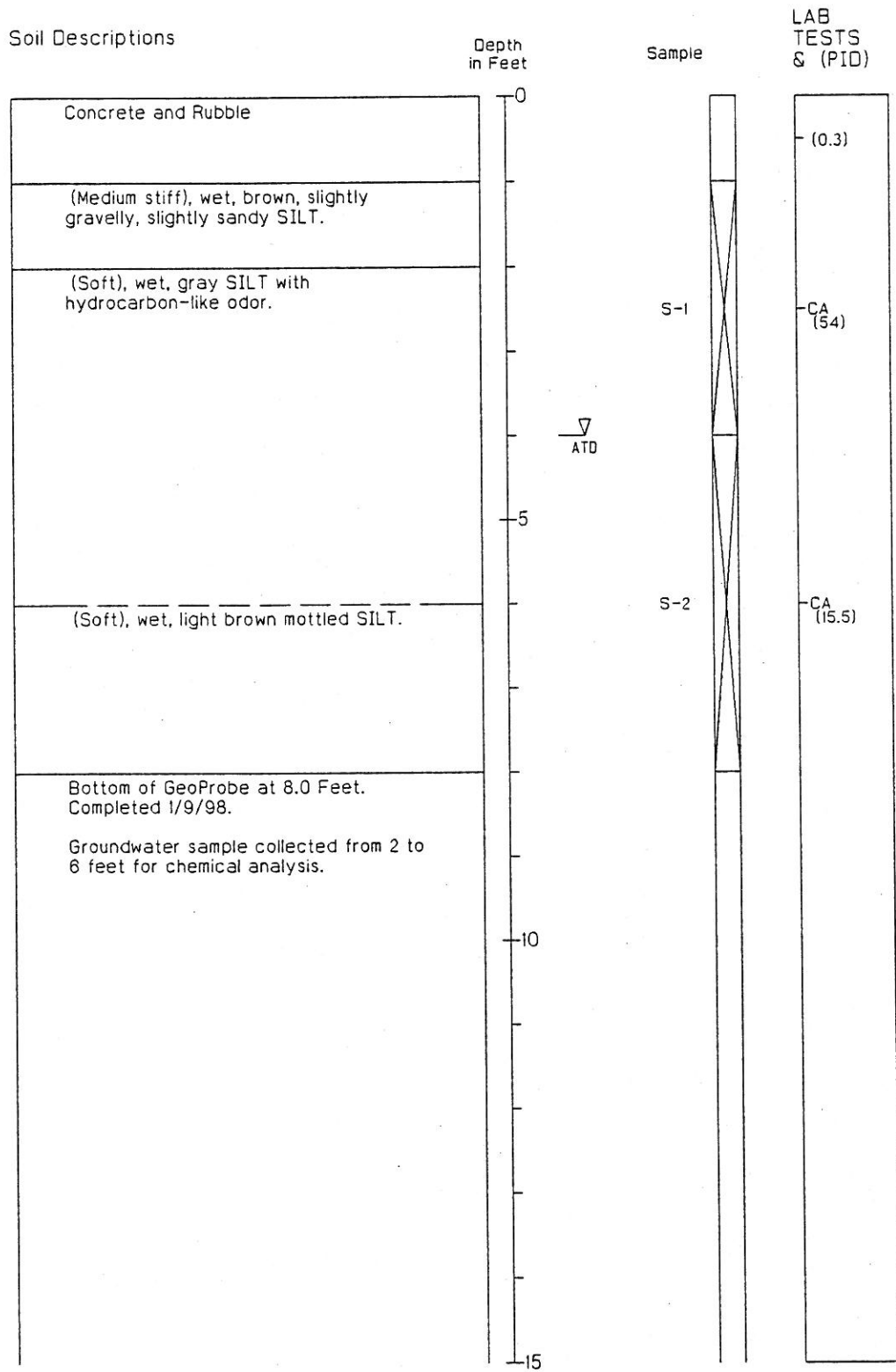
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-12



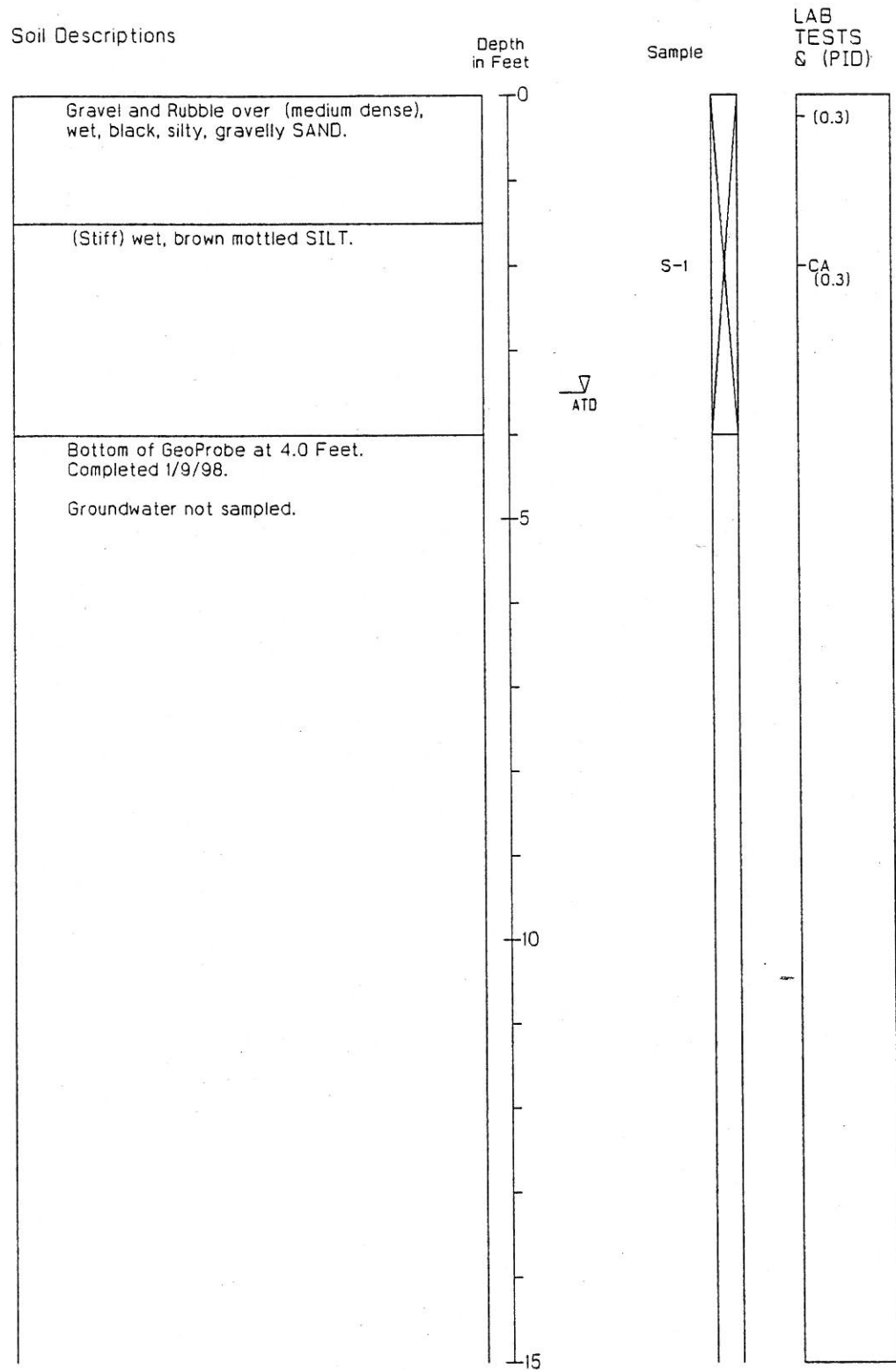
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-13



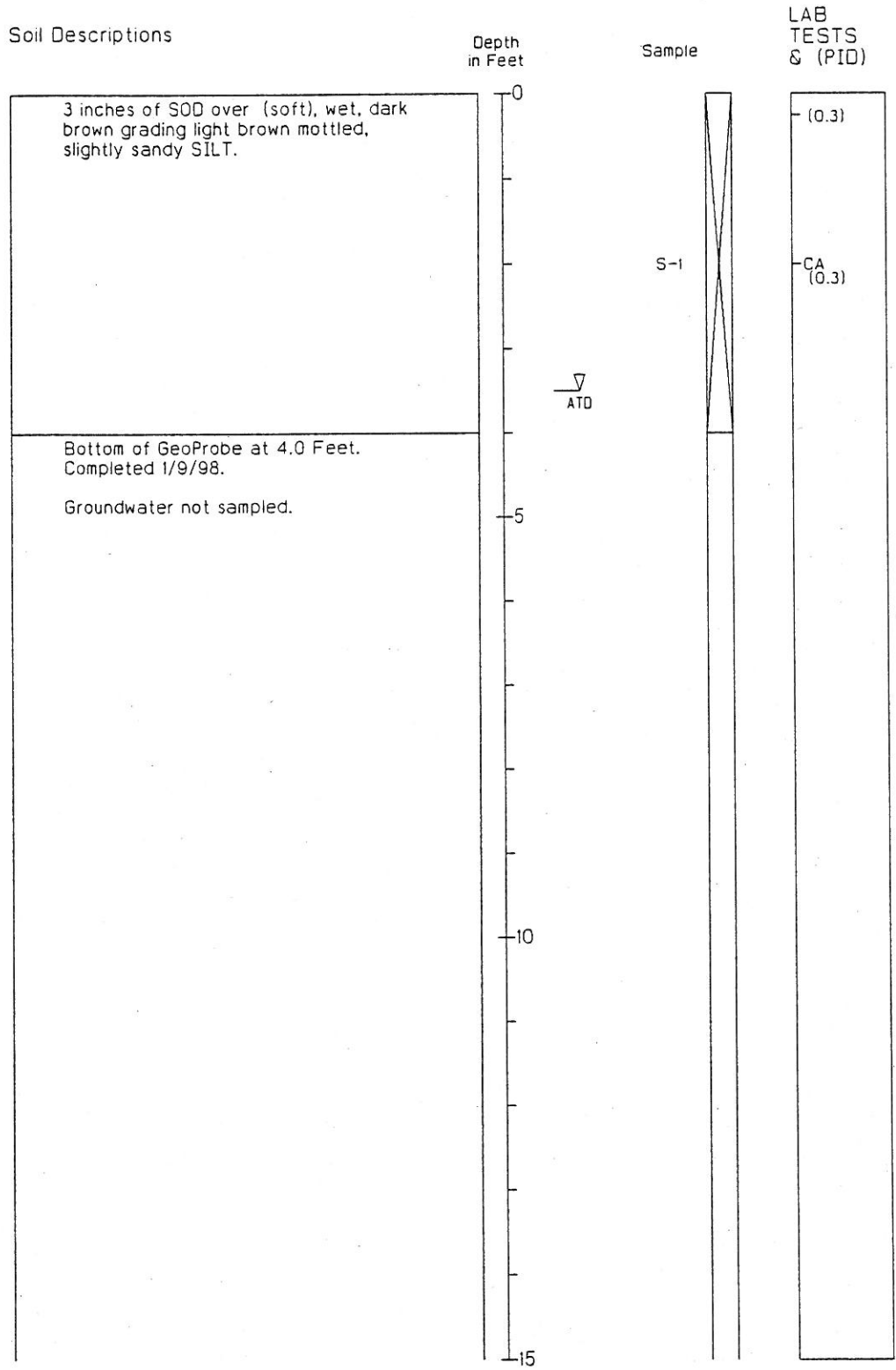
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-14



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

GeoProbe P-15



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.