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August 2, 1982
File: B-1132-3

Electro-Coatings, Inc.
1605 School Street
Moraga, California 94556

Attn: Mr. William Moore

Subject: Preliminary Report for Investigation at Electro-Coatings, Inc. Facility, Emeryville, California

Dear Mr. Moore:

We are pleased to submit six copies of this preliminary report presenting the results of J. H. Kleinfelder & Associates' investigations at your Emeryville, California facility.

Very truly yours,

J. H. KLEINFELDER & ASSOCIATES

Richard J. Zipp
Project Geologist

David C. Mathy /ps
David C. Mathy
Engineering Manager

RJZ:DCM:ct

Attachment

Prepared for: Electro-Coatings, Inc.

rec'd 9/8/82 SA

PRELIMINARY REPORT FOR INVESTIGATION

ELECTRO-COATINGS FACILITY

EMERYVILLE, CALIFORNIA

July 1982

J.H. KLEINFELDER & ASSOCIATES
Geotechnical Consultants • Materials Testing

TABLE OF CONTENTS

PLATES

APPENDICES

PRELIMINARY REPORT FOR INVESTIGATION

AT ELECTRO-COATINGS, INC. FACILITY
EMERYVILLE, CALIFORNIA

I. INTRODUCTION

A. Purpose

This preliminary report presents Kleinfelder & Associates' investigation at Electro-Coatings, Inc. facility in Emeryville, California. The report describes the scope of work performed in accordance with our November 1981 proposal. Data generated by the study, conclusions and recommendations for further work are contained herein. This study expands and further defines the work performed by Woodward-Clyde Consultants in their March, 1981 Phase I study. The earlier work was used as a reference base for this study. Monitoring wells constructed during earlier efforts, were sampled as part of our scope of work.

B. Scope of Work

J. H. Kleintelder & Associates was retained to perform an investigation of subsurface soil and shallow groundwater conditions at the Electro-Coatings Facility. The scope of work performed to date consists of the following:

- Drilling and sampling two on-site borings for geotechnical analysis. One boring was completed as a monitoring well.

- Drilling and completing four off-site monitoring wells.
- Logging soils during the exploration program.
- Sampling groundwater from monitoring wells.
- Analysis of groundwater for standard mineral, total, hexavalent and trivalent chromium.
- Analysis of selected soils for total chromium.
- Analysis of selected soils for engineering properties.
- Development of a preliminary report which includes site location map, site plan, local and regional hydrogeology, logs of test borings, well construction details, results of laboratory testing, procedures used for sampling and chemical analysis, and preliminary conclusions and recommendations.

C. Authorization

This work has been performed in accordance with the provisions of Purchase Order Number FP-2000-1 dated December 28, 1981, and Kleinfelder's proposal dated November 1981.

D. Physical Setting

The Electro-Coating, Inc. plant is located on the south side of Park Avenue between Holden and Horton Streets, on approximately 1.4 acres in Emeryville, California.

II. HYDROGEOLOGY

A. Subsurface Geology

Earlier consultants have described the regional hydrogeology in reports prepared for Electro-Coatings*. The project site lies

* Refer to 1977 and 1981 Woodward-Clyde Consultants reports for additional information.

within the San Francisco Bay area. The shallow valley sediments have been laid down as alluvium and near-shore bay deposits. The result is a series of interfingering and layered clays, silts, and sands of Pleistocene to Recent age. Borings made during this study were in fill and native material.

B. Groundwater

Locally confined groundwater conditions were encountered during this exploration program. All monitoring wells were designed so perforations would be placed above and opposite the water bearing zones.

Piezometric water levels measured during this study suggest a westerly direction of flow, which is consistent with the findings in earlier reports. Repeat water level measurements in some wells suggest that tidal action affects the water levels in the plant area. No additional data were generated which would contradict the net downgradient velocity of 0.2-2.0 ft/day estimated in our November 1981 proposal. Water quality data tends to confirm the continuity of the permeable zones in the shallow deposits.

III. EXPLORATION PROGRAM

A. General

Six borings were drilled in the vicinity of the Electro-Coatings plant to investigate subsurface soil and groundwater conditions. Five of the borings were completed as monitoring wells. The field exploration portion of this project was performed on April 12 and 13, 1982. The boring locations are shown on the Site Plan, Plate 2. These locations were selected to either provide

geotechnical information about the potential for subsidence due to groundwater withdrawal, or to monitor for the presence of contaminants in a downgradient direction from the plant. One of the wells was located to specifically monitor the area between the Electro-Coatings sump and the Engineering Waste machine pit.

The borings were drilled to depths ranging from 25 to 30 feet below the existing ground surface. All borings were drilled by truck-mounted continuous flight hollow-stem auger equipment. All borings were continuously logged by a Kleinfelder geologist. A detailed description of the soil and groundwater conditions is presented on the Boring Logs in Appendix A.

B. Soil Sampling

Soil samples were collected for logging purposes only, with the exception of four samples from well 14 which were analyzed for total chromium. Seven Woodward-Clyde samples were also analyzed for total chromium.

C. Monitoring Wells

Monitoring wells 14 through 18 were constructed during this study. A diagram of the typical monitoring well installation is shown on Plate 3. Each well was completed with four inch inside diameter PVC pipe, perforated for ten feet in the uppermost permeable zones. The perforations are 0.010-inch slots and the sand pack is a #20 Monterey sand. A bentonite plug was set on top of the sand pack and the remainder of the boring was backfilled with concrete. The wells were then pumped to clean the holes and develop them for sampling. A typical well installation is noted on Plate 3.

D. Water Sampling

Sample collection and handling was in accordance with accepted sampling procedures. Water samples were collected from the wells using a teflon bailer, vacuum pump, or air lift sampler, provided by Electro-Coatings. The sampling devices were rinsed with tap water prior to each respective sampling to avoid the possibility of cross contamination. Prior to taking the actual sample to be analyzed, where possible, monitoring wells were purged a minimum of one to two equivalent well volumes in an attempt to obtain a sample that reflected the water quality in the aquifer opposite the perforated zone.

The water samples were collected in specially prepared containers provided by the contract laboratory. The containers were rinsed with well water prior to sampling to remove any residue in the bottle left by the laboratory during bottle preparations. After sampling, the sample bottle was labeled with the project number and sample number. The samples were then refrigerated awaiting transportation to the laboratory.

Additional sample information such as sampling location, date, time, method, sampler, type of container used, and type of analysis to be run on each sample container was indicated on a Sample Control Sheet to be used as a permanent record.

E. Water Sampling Retests

The presence of oily chromium laden material around and in several of the older monitoring wells caused Kleinfelder staff to question some of the initial chemical test results. At our recommendation and Electro-Coatings' concurrence, wells 3A, 3B and 3C were purged and re-sampled two additional times. The

results are presented on Table 1. Copies of the laboratory reports are presented in the appendices. Interpretation of the test results is discussed in Section V.

TABLE 1

	Total Chromium mg/l		
	Well 3A	Well 3B	Well 3C
Initial Test (5/3/82-5/11/82)	24.6	47.0	6.45
6/21/82	8.6	10.6	9.6
7/13/82	0.28	24.0	13.4

IV. LABORATORY CHEMICAL ANALYSIS

A. Analytical Laboratory Techniques

Water and soil samples were sent to Anlab in Sacramento for analyis. Soil samples were tested for total chromium and water samples were tested for total and hexavalent chromium. Trivalent chromium values were obtained by difference. Water samples were also tested for standard mineral content.

The total chromium analysis sample preparation utilized an aqua regia acid digestion. Samples were analyzed by Atomic Absorption Spectroscopy (AAS). Hexavalent chromium was analyzed using a diphenylcarbazide colorimetric method.

The quality assurance program consisted of providing the laboratory with a tap water sample as a blank and analyzing one

duplicate sample. Tabulations of the chemical results are presented on Table 2 for water and Table 3 for soil. Copies of the laboratory reports are presented in the appendices.

B. Soil Laboratory Analysis

Consolidation tests were performed on saturated clay samples from below the water table.

V. DATA INTERPRETATION

- Significant quantities of chromium were encountered during this study. Plates 4 and 5 show the distribution of total and hexavalent chromium, respectively.

- Eleven soil samples were analyzed for total chromium. Ten of the eleven contained levels between 29 and 51 mg/kg chromium. The eleventh contained 305 mg/kg chromium. The first ten analyses appear to represent background levels of chromium. The eleventh sample may have come from a contaminated permeable stringer. The boring log describes the interval as a silty clay with increasing gravel and sand.

- Consolidation tests performed on soil samples indicate the clays are overconsolidated (overconsolidation ration = 1.6 - 4.3). Settlements in this area will be primarily due to recompression and therefore should be relatively small. Long term groundwater withdrawal, at rates up to 10 gallons per minute, should not produce differential settlement which would damage structures or utilities.

- A low permeability blue clay layer appears to underlie the plant area. It was encountered in 9 out of 10 deeper borings at depths of 20 to 26 feet.

- The presence of significant quantities of hexavalent chromium off-site appears to confirm the continuity of the permeable zones found underneath the plant property.

- Monitoring wells constructed during earlier studies are susceptible to contamination by surface water seeping into the well bore.

VI. CONCLUSIONS

- Groundwater above the level of the blue clay is contaminated underneath plant locations, and downgradient from plant property at wells 16, 17 and 18. Negligible chromium was found in wells 6 and 7 indicating the plume has not spread as far as Hubbard Street.

- Soils underneath and adjacent to the plant should not be subject to subsidence should a pumping/treatment program be initiated to mitigate the chromium contamination.

- The blue clay at depths of 20 to 26 feet appears to be acting as a vertical barrier to downward movement of chromium contaminated groundwater. Only boring number 18 did not intersect the clay. Boring number 18 may penetrate the blue clay if drilled deeper.

- Monitoring wells constructed during earlier studies are susceptible to surface contamination, and well 3A appears to have been contaminated.

- All monitoring wells which are being tested need to be sealed properly at the surface to exclude potential surface contamination.

- The distribution of chromium in the soils analyzed suggest that the chromium found in the groundwater was not leached from surface disposal of waste. The source appears to be the old sump located at the back of the plant.

VII. RECOMMENDATIONS

- Construct a deeper monitoring well near well 18 to ascertain whether the blue clay is present and to determine if deeper aquifers are contaminated.

- Purge and sample well 3A bi-weekly for a three month period to clean possible surface contamination out of the well. A minimum of five gallons of water should be extracted prior to each bi-weekly sampling.

- After three months of sampling well 3A the results should be analyzed to determine if another deep well below the blue clay is necessary near the back of the plant property.

- Electro-Coatings should evaluate their various extraction/treatment options with regard to practicality and cost effectiveness to mitigate the identified chromium contamination.

- Provide a proper surface seal for previously installed monitoring wells which are to be used in the future to test groundwater quality.

TABLE 2

ELECTRO-COATINGS

GROUNDWATER ANALYSES*

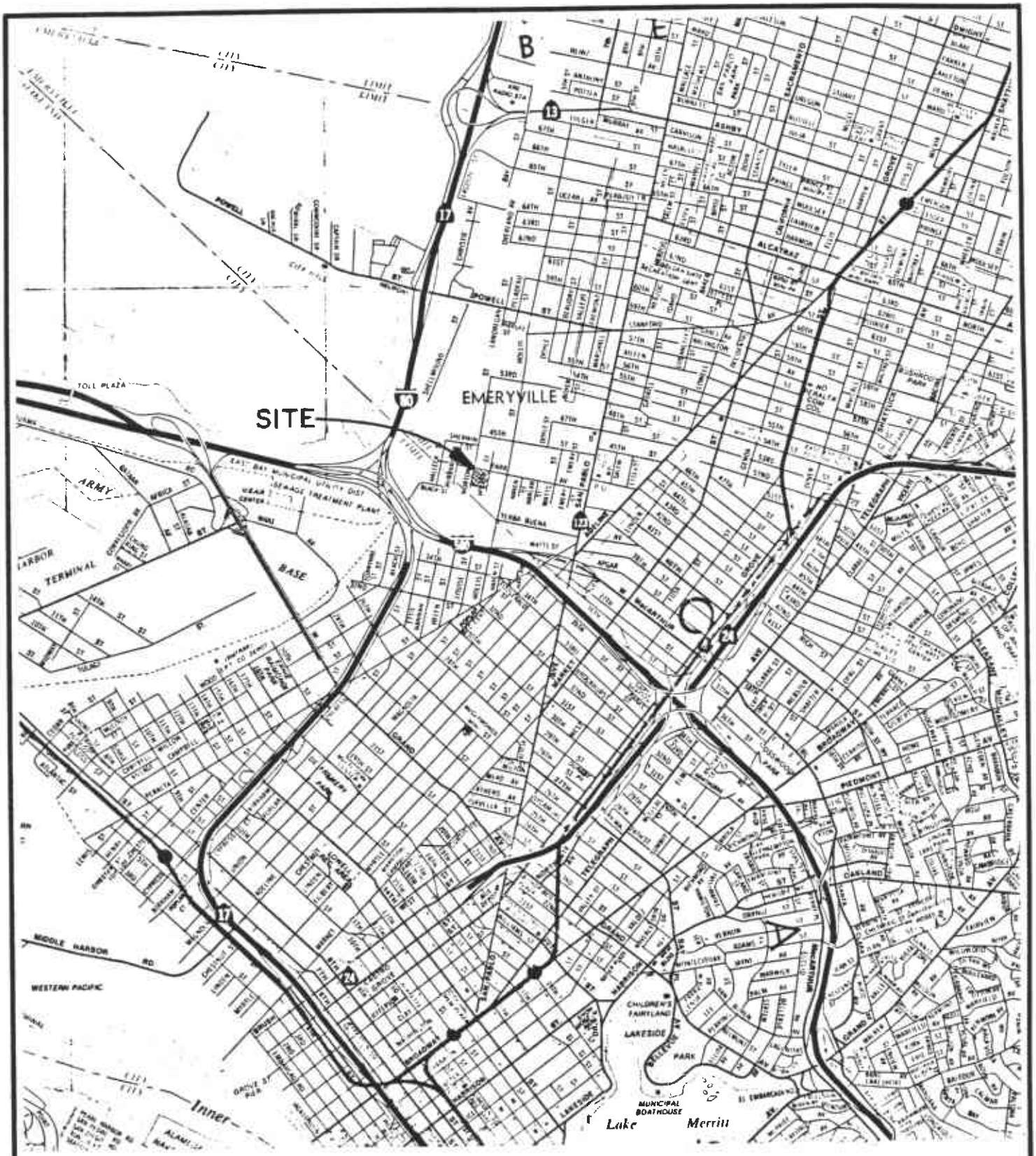
B-1132-3

Analysis	Well Number 1	2**	3A	3B	3C	4	5	6**	7**	8**	9	10	11	12	13	14	15**	16**	17**	18**
	Concentration (mg/l)																			
Calcium	60.5	49	37.8	53	64.0	78	233	283	163	57.5	285	117	185	98	145	184	101	127	200	347
Magnesium	32	82.5	23.8	4.65	20	42	131	13.6	93	21.4	103	36	92.5	121	76	103	60	62	106	138
Potassium	5.55	6.0	4.5	9.5	5.85	1.44	1.1	0.76	0.66	3.06	2.43	4.63	1.18	1.47	1.39	5.5	1.42	3.53	2.75	5.55
Sodium	52	59	41	30	80	74	110	91	100	44	110	45	68	67	74	190	130	109	98	88
Chromium	<0.02	<0.02	24.6	47.0	6.45	51	374	0.33	0.02	0.04	540	192	0.29	70	123	618	<0.02	209	101	11.7
Trivalent Cr.	<0.02	<0.02	0.3	12	<0.02	<0.02	7	<0.02	0.02	<0.02	25	<0.02	0.29	<0.02	<0.02	94	<0.01	4	<0.02	1.4
Hexavalent Cr.	<0.02	<0.02	24.3	35	6.45	50.9	367	0.33	<0.02	0.04	515	192	0.02	70	123	524	<0.02	205	101	10.3
Chloride	85	50	45	45	110	110	110	160	50	28	46	150	45	40	90	64	120	90	70	110
Bicarbonate Alkalinity	220	410	160	98	180	190	420	330	350	190	480	92	0.0	0.0	340	410	292	350	380	0.0
Sulfate	73	80	47	25	81	120	420	940	530	80	270	86	770	990	230	250	320	300	530	1300
Nitrate as N	0.02	1.4	0.02	0.07	0.36	9	4.8	5.81	2.87	2.2	6.09	4	6	5.6	1.2	8.05	3.4	11.2	5.65	3.98
pH	7.2	7.9	7.3	7.4	7.3	7.0	6.7	7.7	7.5	7.6	6.5	6.2	4.2	4.2	7.3	6.5	6.8	6.9	7.2	3.8
EC	860	1130	633	550	915	1200	1920	2900	1810	700	2040	1290	1630	1860	1580	2500	1670	2000	2000	2300
TDS	490	610	390	370	520	700	2000	2030	1300	410	2200	900	1200	1700	1100	2390	1040	1490	1540	2150

*Samples Collected 5/3/82-5/11/82.
**Offsite Wells

TABLE 3

Well Number	Sample Depth (ft)	Total Chromium (mg/kg)
9 (WH6)	6 - 7	31
10 (WH7)	3.5 - 4.5	29
10 (WH7)	5 - 7.5	52
11 (WH-8)	3	39
11 (WH-8)	5.5	35
13 (WH-10)	3	48
13 (WH-10)	8	305
14	5	33.0
14	10	48.8
14	15	40.2
14	20	46.0



J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

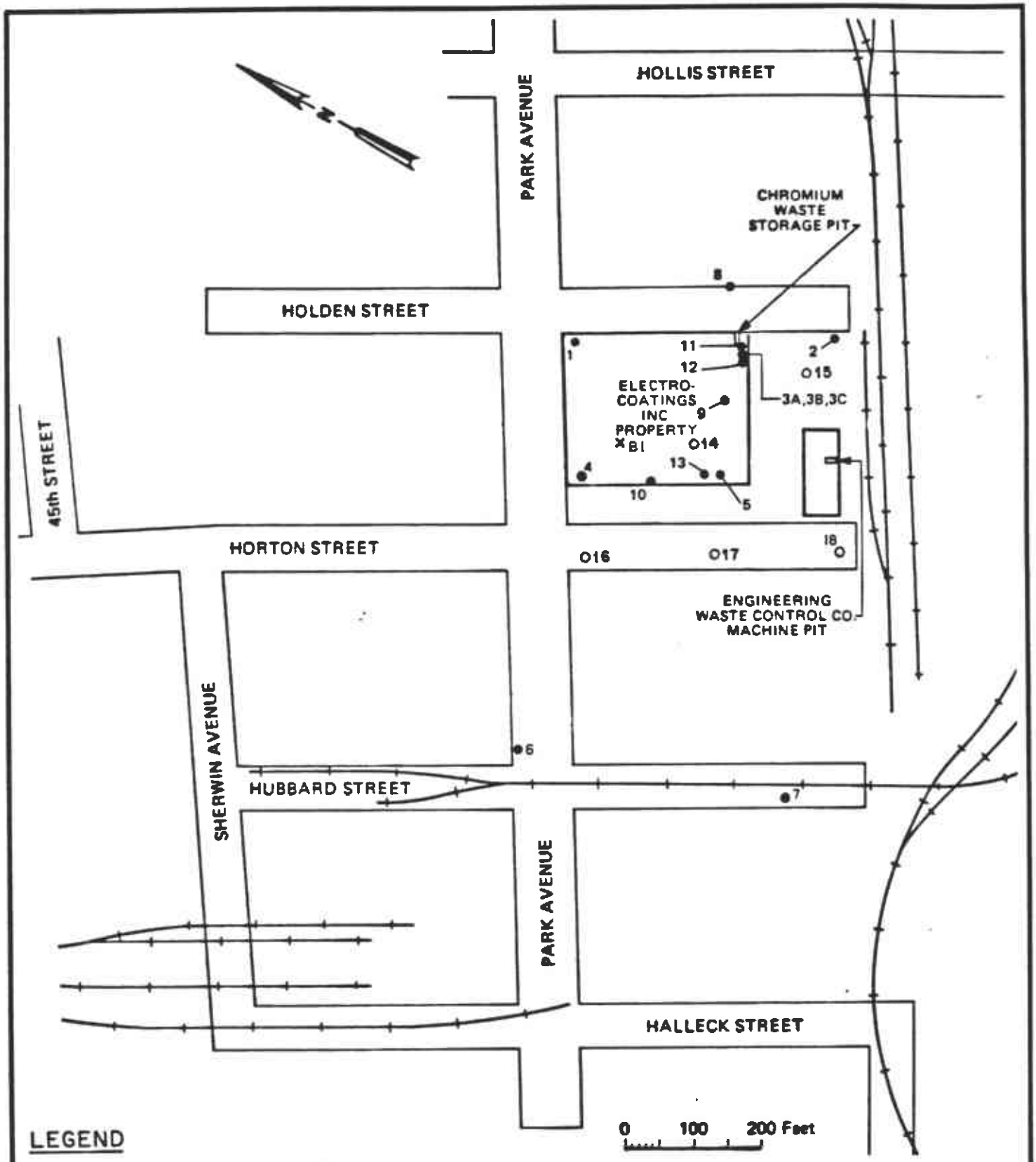
PREPARED BY: BK DATE: 7/19/82

CHECKED BY: RJZ DATE: 7/19/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOCATION MAP

PROJECT NO. B-1132-3

PLATE 1



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GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

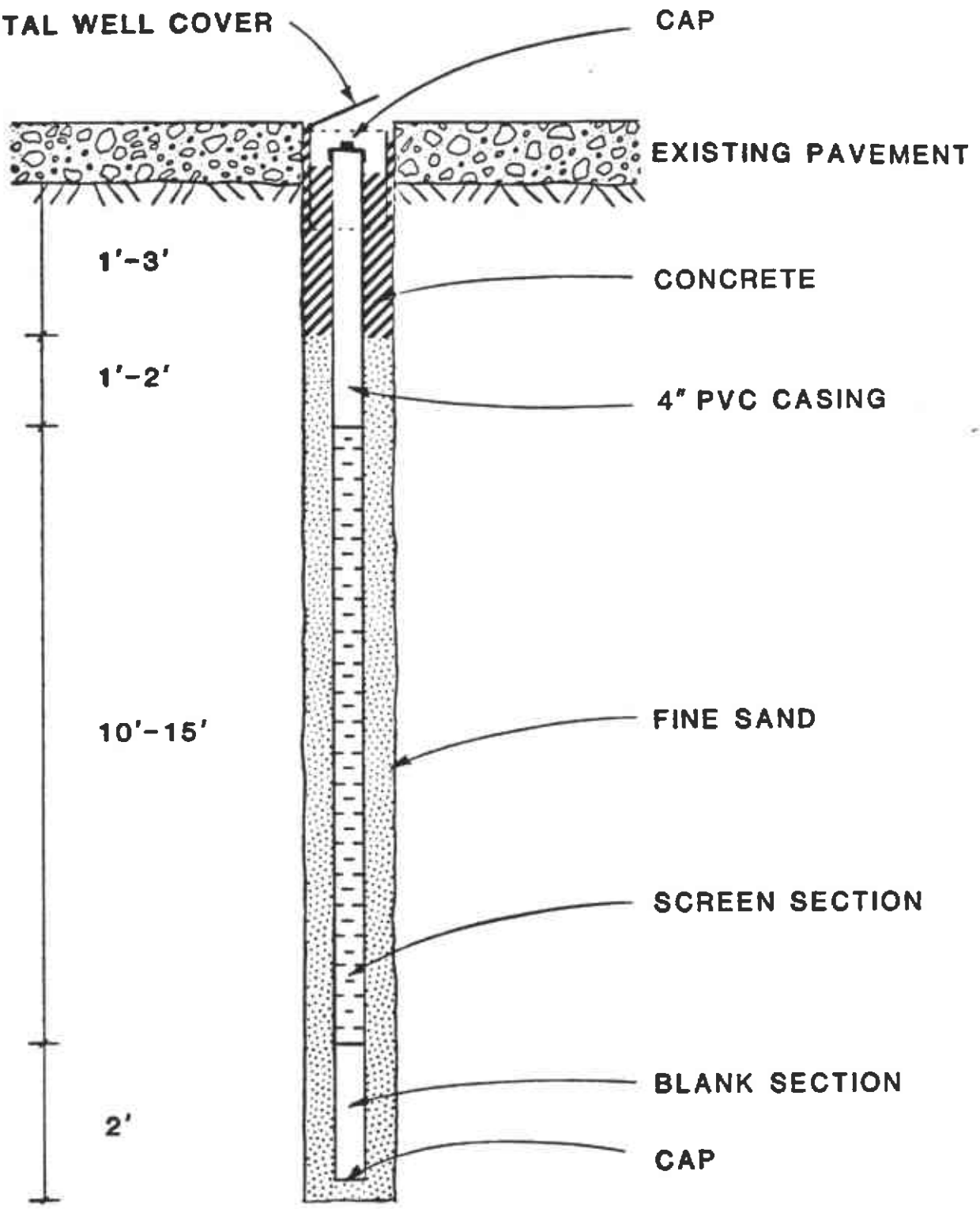
PREPARED BY: BK DATE: 7/19/82

CHECKED BY: RJZ DATE: 7/19/82

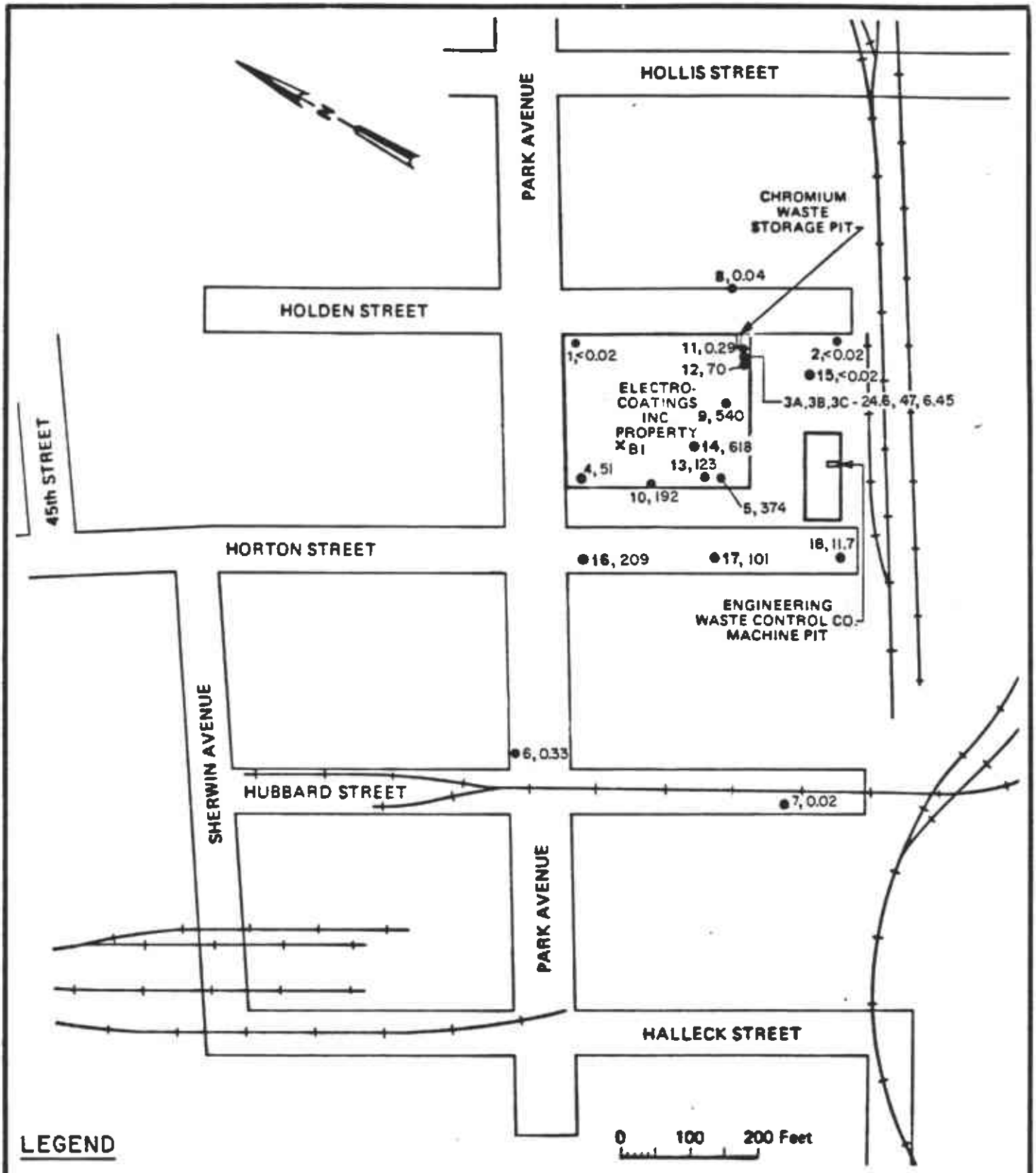
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
SITE PLAN

PROJECT NO. B-1132-3

PLATE 2



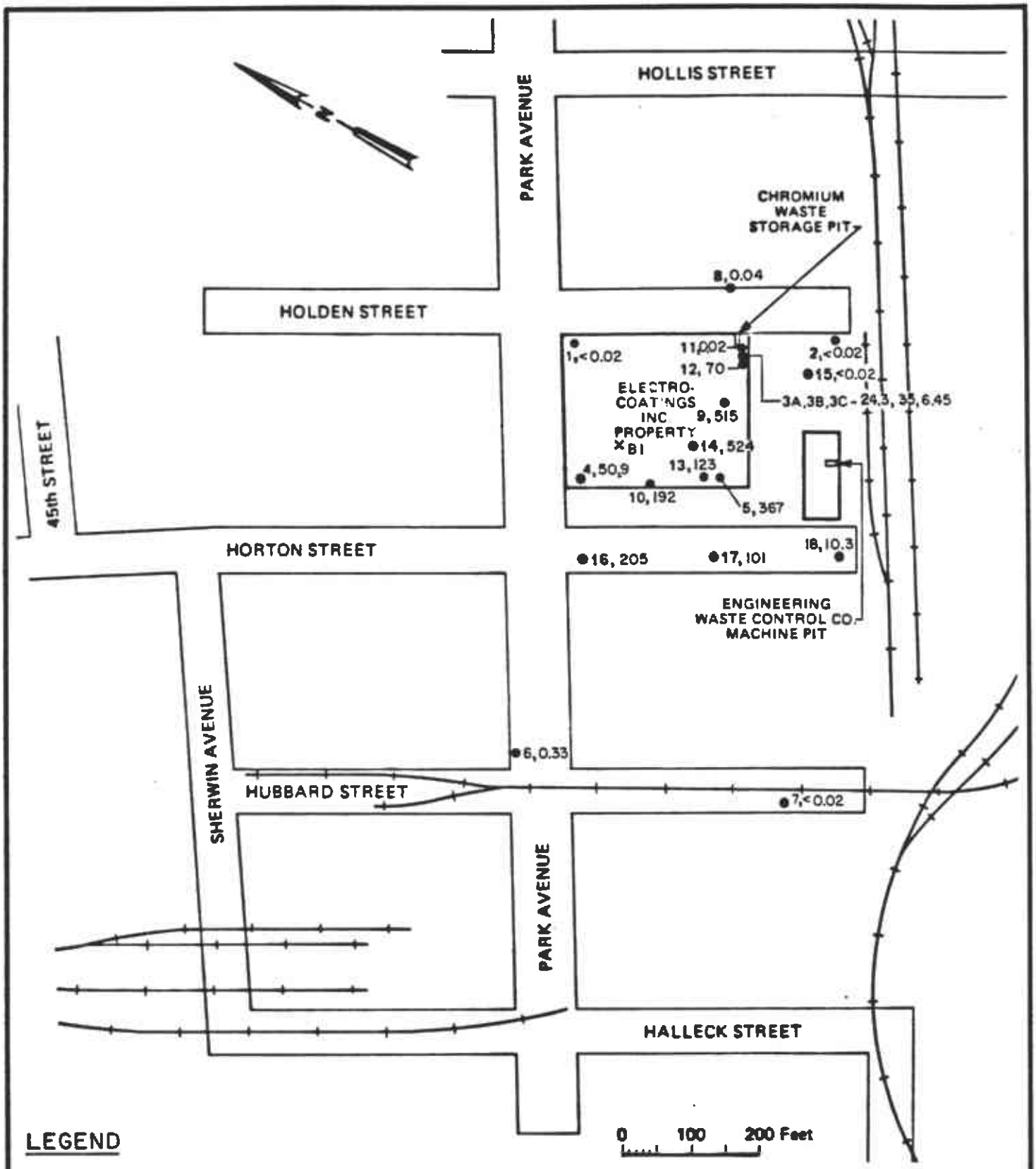
J.H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	ELECTRO-COATINGS INC. EMERYVILLE, CALIFORNIA	PLATE
	TYPICAL WELL PROFILE	3
PREPARED BY: BK DATE: 7/28/82		
CHECKED BY: RJZ DATE: 7/28/82	PROJECT NO. B-1132-3	



LEGEND

- ●6 MONITORING WELL LOCATION
- X BORING LOCATION
- ,51 CHROMIUM CONCENTRATION - mg/l

J.H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	ELECTRO-COATINGS INC. EMERYVILLE, CALIFORNIA TOTAL CHROMIUM IN GROUNDWATER	PLATE 4
PREPARED BY: BK DATE: 7/19/82		
CHECKED BY: RJZ DATE: 7/19/82	PROJECT NO. B-1132-3	



LEGEND

- ●6 MONITORING WELL LOCATION
- × BORING LOCATION
- ,35 HEXAVALENT Cr CONCENTRATION – mg/l

J.H. KLEINFELDER & ASSOCIATES GEOTECHNICAL CONSULTANTS • MATERIALS TESTING	ELECTRO-COATINGS INC. EMERYVILLE, CALIFORNIA HEXAVALENT CHROMIUM IN GROUNDWATER	PLATE 5
PREPARED BY: BK DATE: 7/19/82 CHECKED BY: RJZ DATE: 7/19/82	PROJECT NO. B-1132-3	

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel sand mixture, little or no fines.
		GM	Silty gravels, gravel-sand-clay mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silt-clays of low plasticity
	SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.

Standard penetration split spoon sample

Modified Porter sampler

Shelby tube sample

Water level observed in boring

* No recovery

NFWE No free water encountered

NOTE: The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

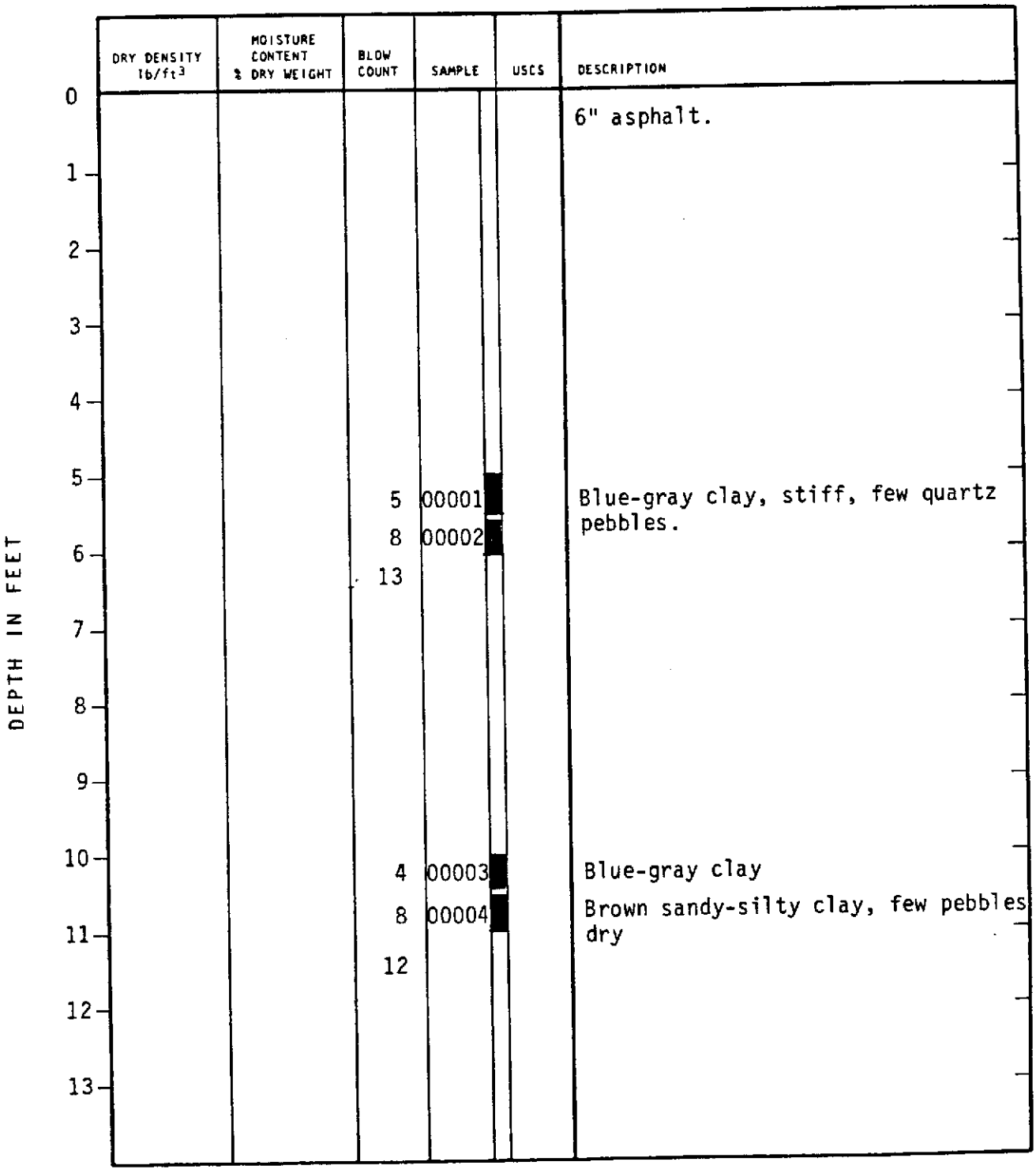
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

BORING LOG LEGEND

PROJECT NO. B-1132-3

PLATE

A-1



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GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

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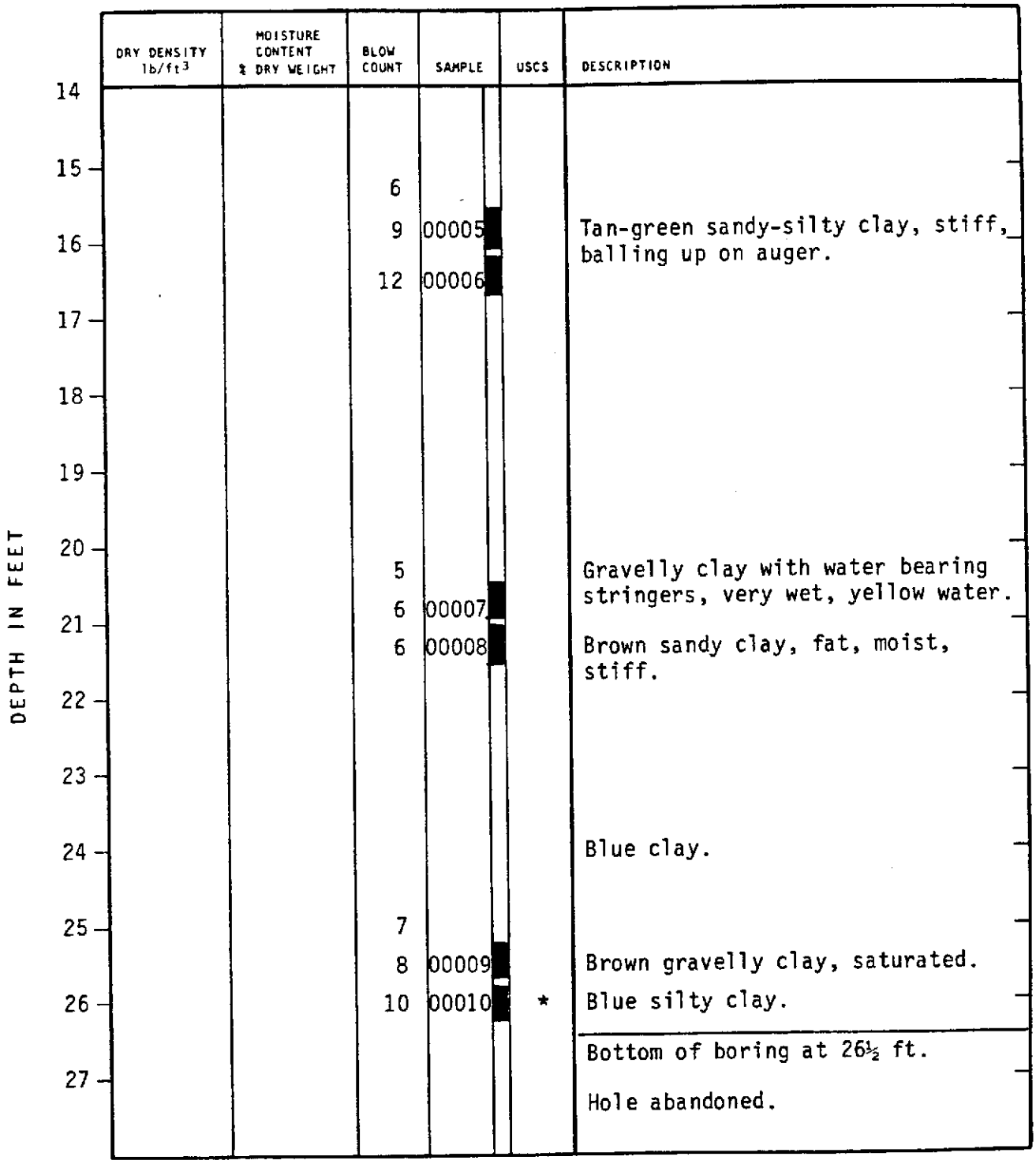
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. B-1

PROJECT NO. B-1132-3

PLATE

A-2



* Assumed base of shallow groundwater.

J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

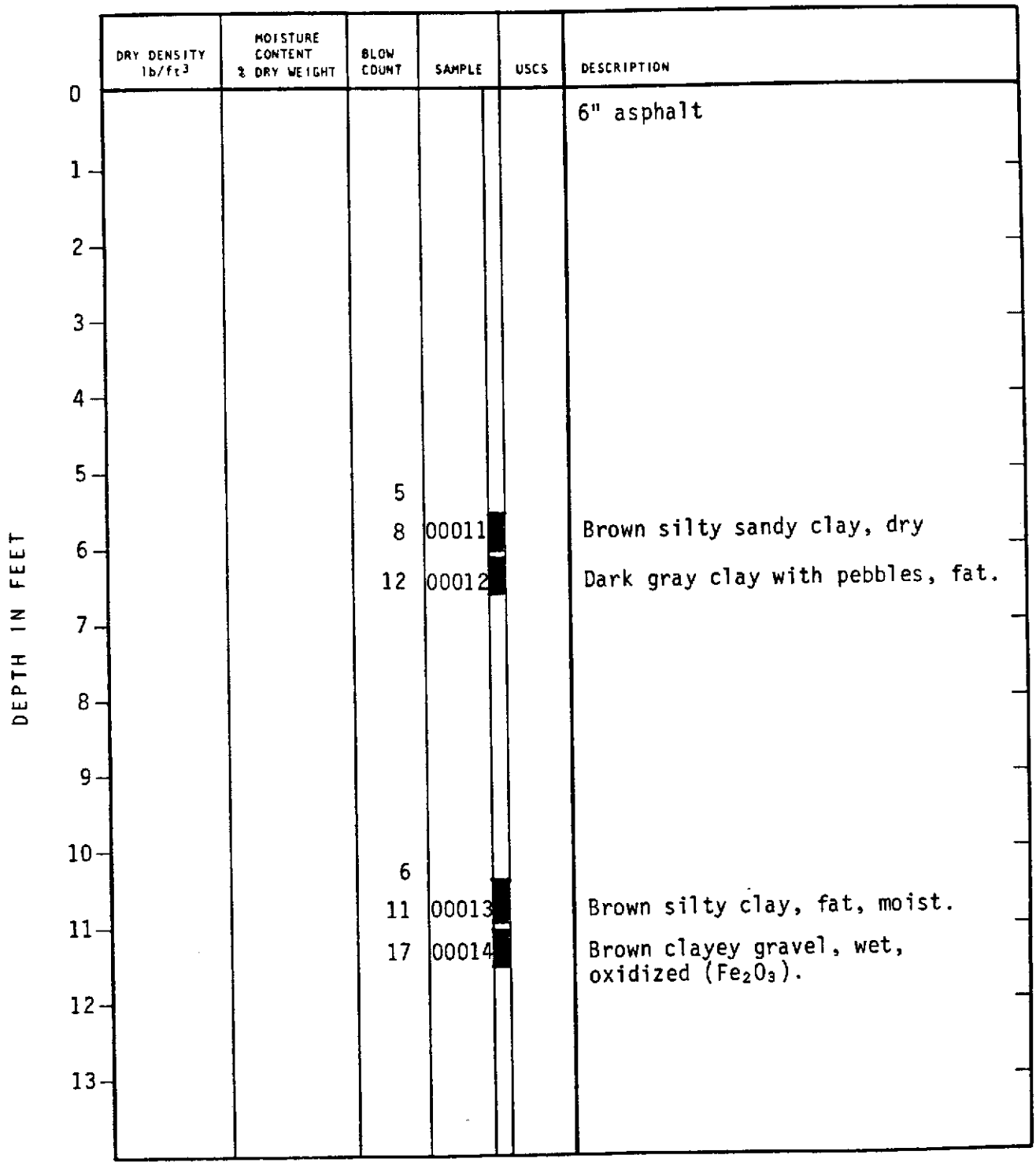
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. B-1 (CONT)

PROJECT NO. B-1132-3

PLATE

A-2.1



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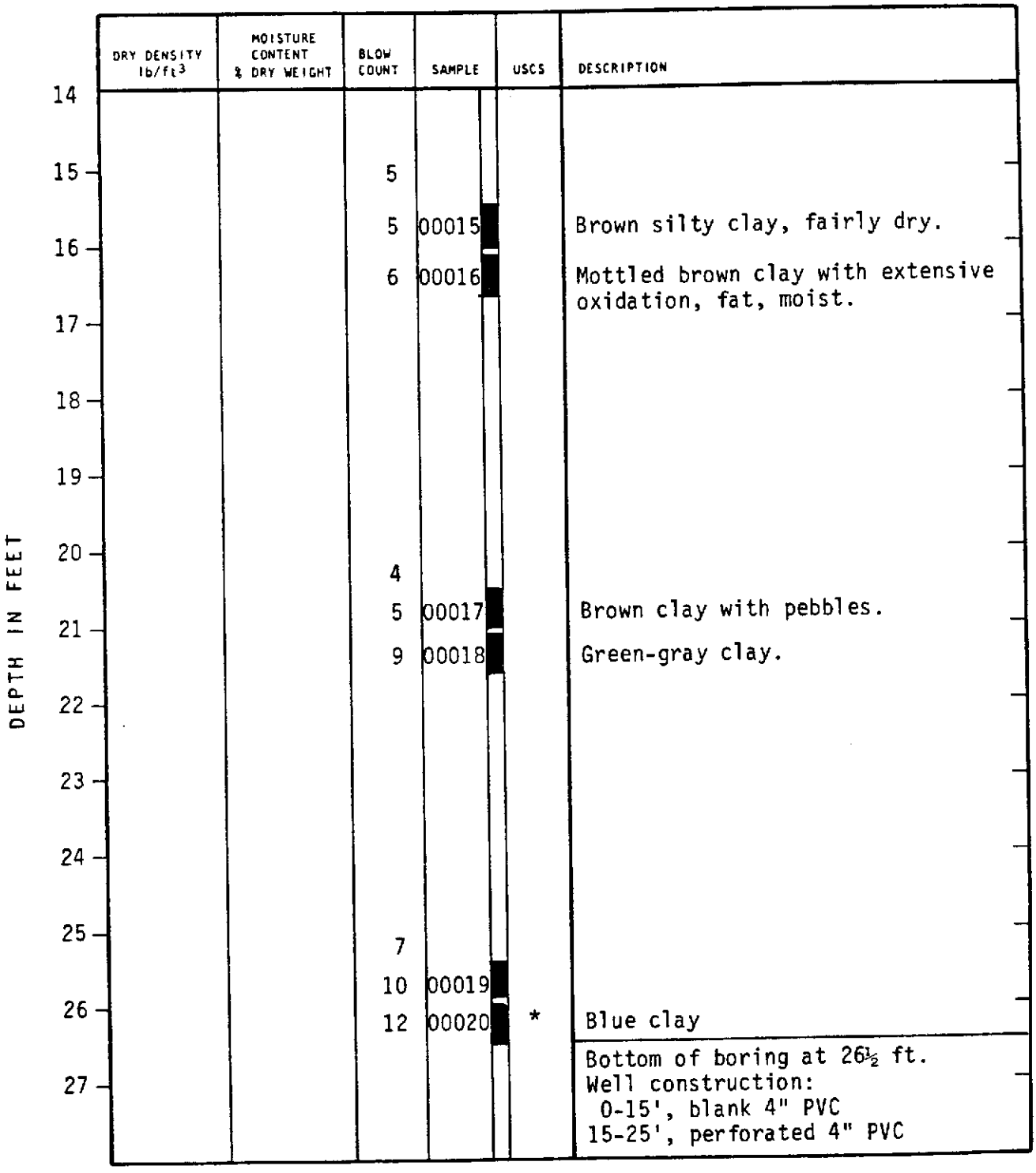
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOG OF BORING NO. 14

PROJECT NO. B-1132-3

PLATE
A-3



* Assumed base of shallow groundwater.

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GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

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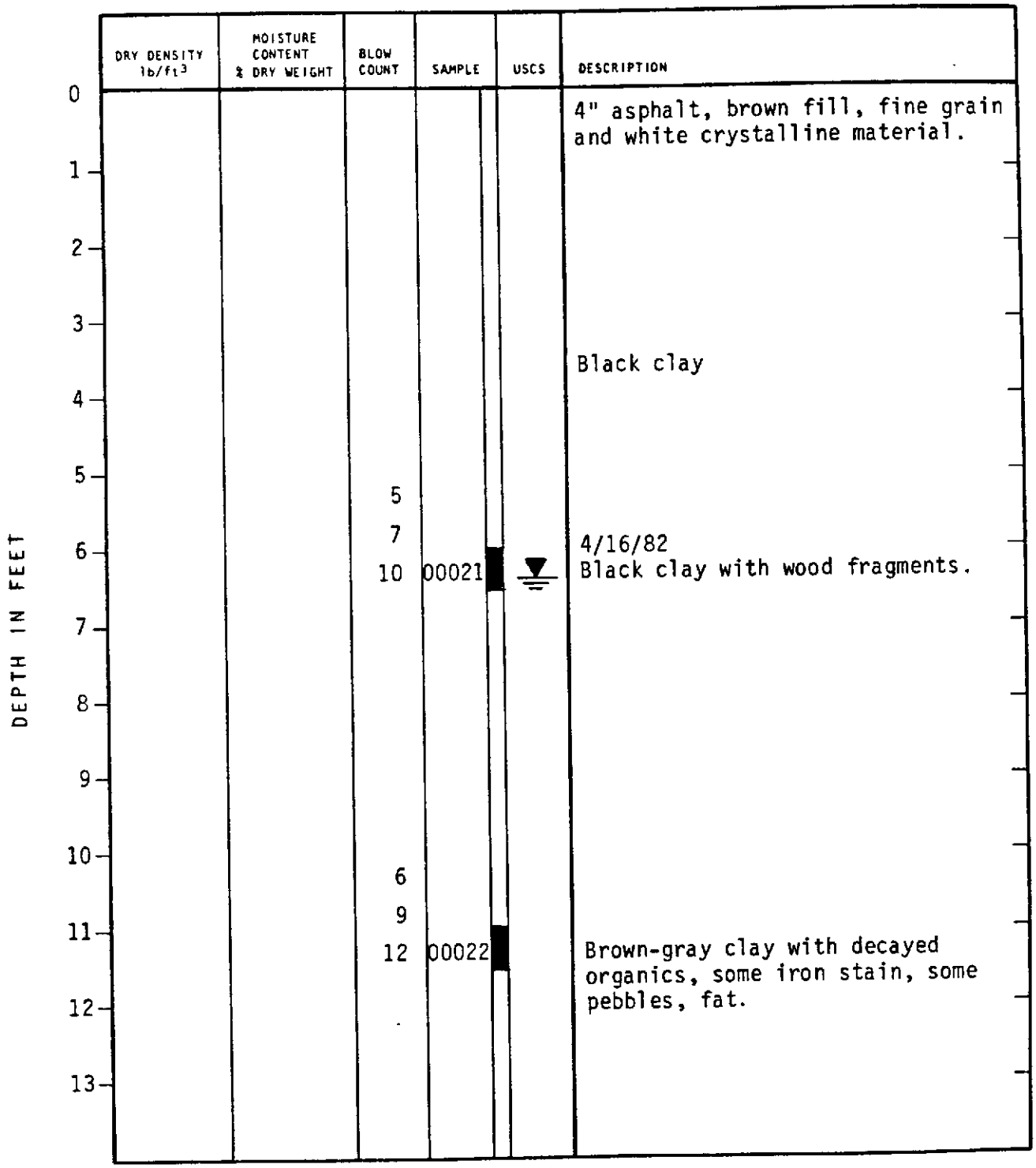
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 14 (CONT)

PROJECT NO. B-1132-3

PLATE
A-3.1



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GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 15

PROJECT NO. B-1132-3

PLATE

A-4

DEPTH IN FEET	DRY DENSITY lb/ft³	MOISTURE CONTENT % DRY WEIGHT	BLOW COUNT	SAMPLE	USCS	DESCRIPTION
14						
15			5			
			6			
16			11	00023		Brown sandy-gravelly clay, fat.
17						
18						Light brown sandy clay, saturated.
19						
20			11			
			14			
21			27	00024		Brown sandy gravel, saturated.
22						
23						
24						
25			9			
			10			
26			14	00025	*	Brown clayey gravel, blue clay.
27						Bottom of boring at 26½ ft. Well construction: 0-15', blank 4" PVC 15-25', perforated 4" PVC

* Assumed base of shallow groundwater.

J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

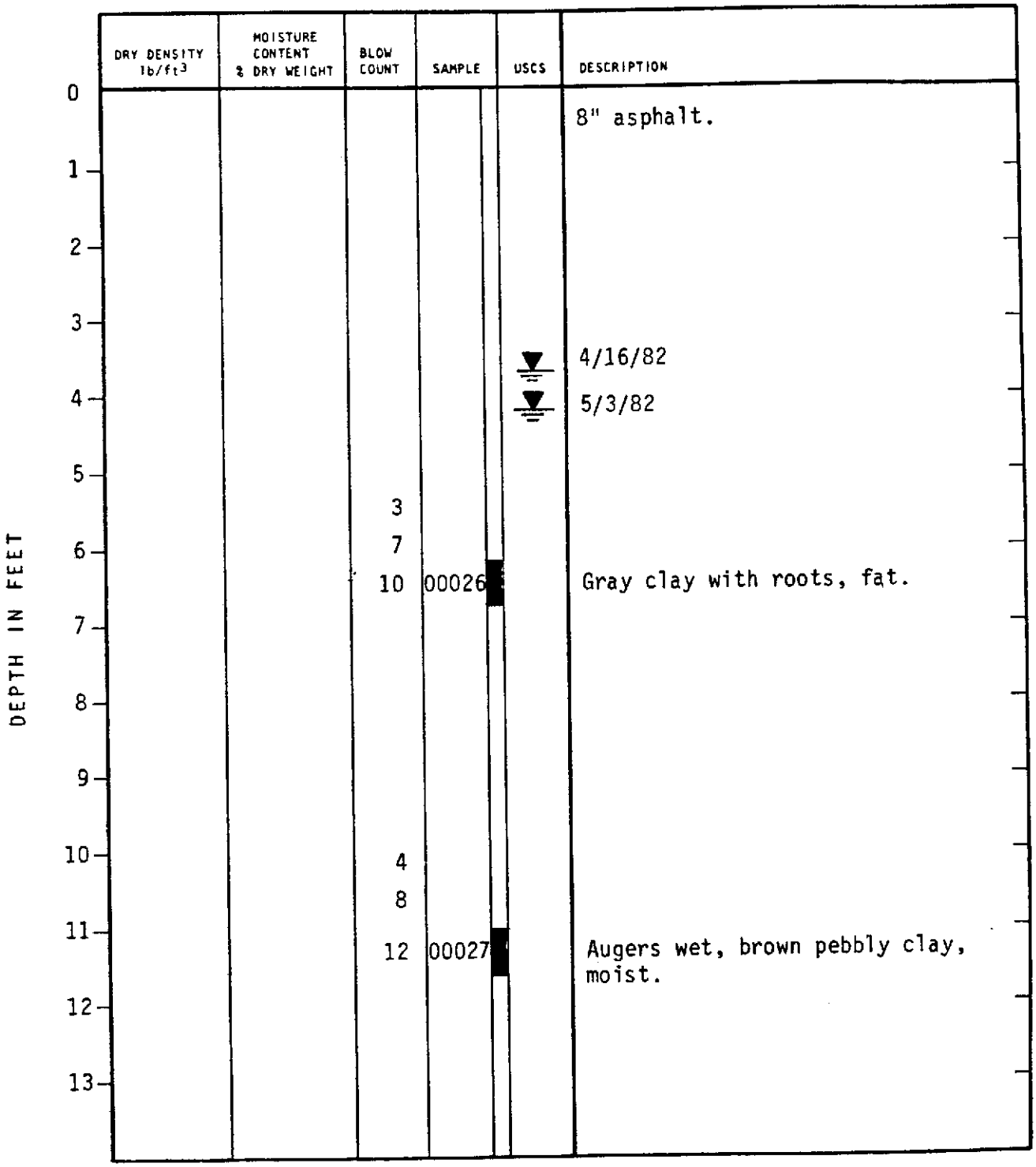
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 15 (CONT)

PROJECT NO. B-1132-3

PLATE

A-4.1



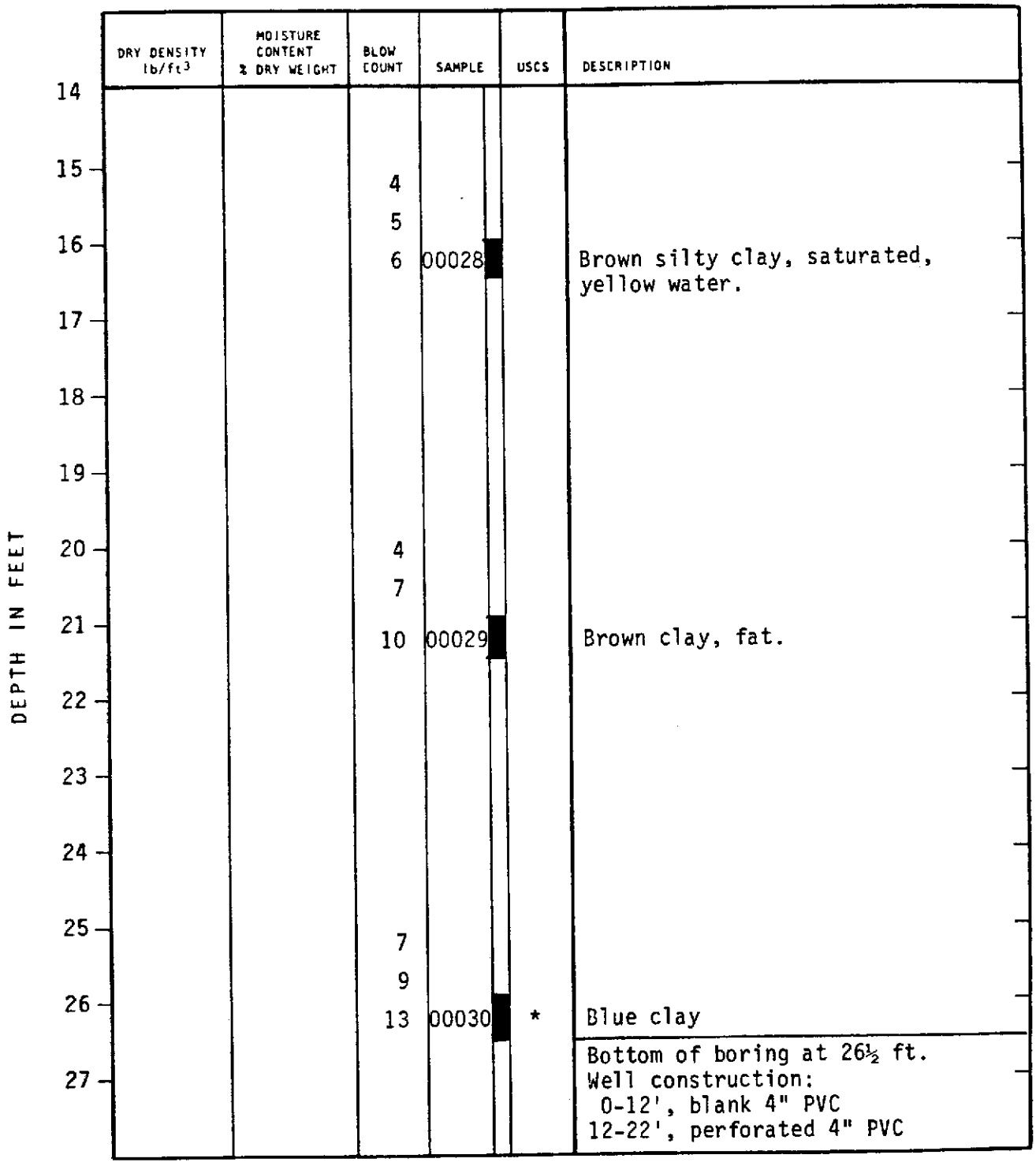
J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82
CHECKED BY: DCM DATE: 5/10/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOG OF BORING NO. 16

PROJECT NO. B-1132-3

PLATE
A-5



* Assumed base of shallow groundwater.

J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

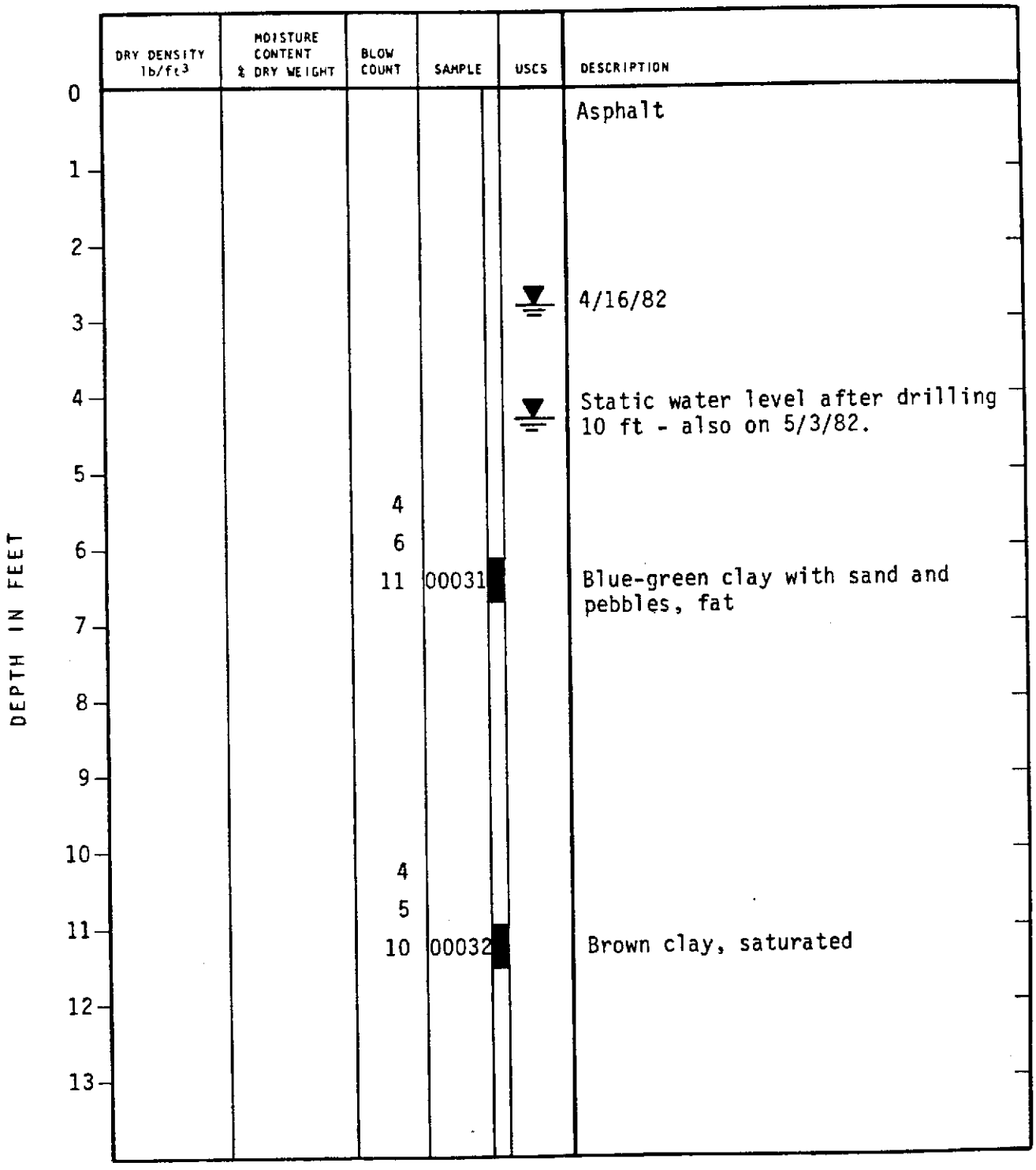
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 16 (CONT)

PROJECT NO. B-1132-3

PLATE

A-5.1



J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

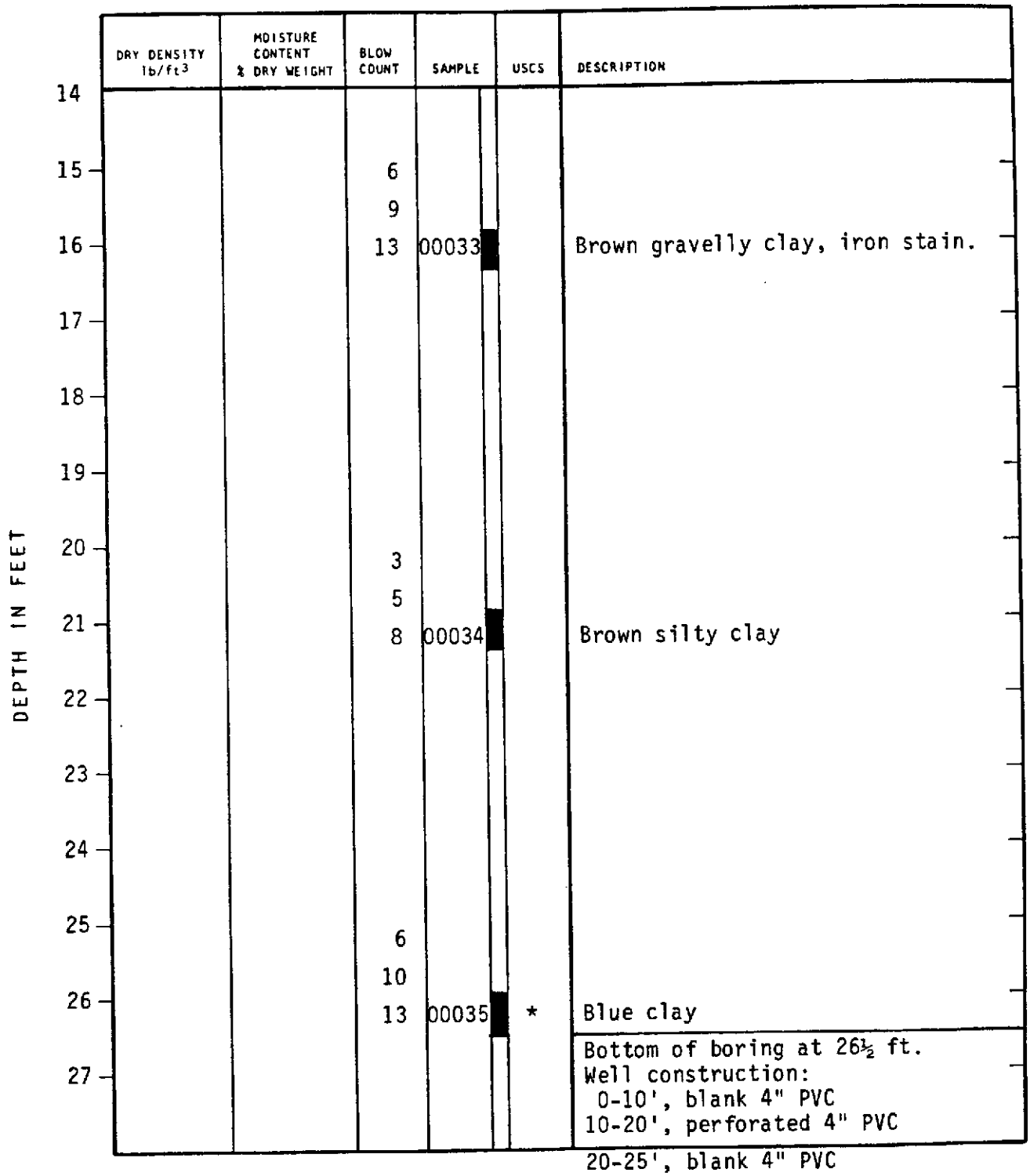
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 17

PROJECT NO. B-1132-3

PLATE

A-6



* Assumed base of shallow groundwater.

J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82
CHECKED BY: DCM DATE: 5/10/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOG OF BORING NO. 17 (CONT)

PROJECT NO. B-1132-3

PLATE
A-6.1

DEPTH IN FEET	DRY DENSITY lb/ft³	MOISTURE CONTENT % DRY WEIGHT	BLOW COUNT	SAMPLE	USCS	DESCRIPTION
0						Asphalt
1						
2						Gray silty clay.
3					▼	4/16/82
4					▼	5/3/82
5			3			
			7			
6			10	*		Black clay.
7						Brown clay.
8						
9						
10			10			Water on outside of Porter sampler.
			14			Brown sandy clay, some iron stain,
11			19	*		saturated.
12						
13						

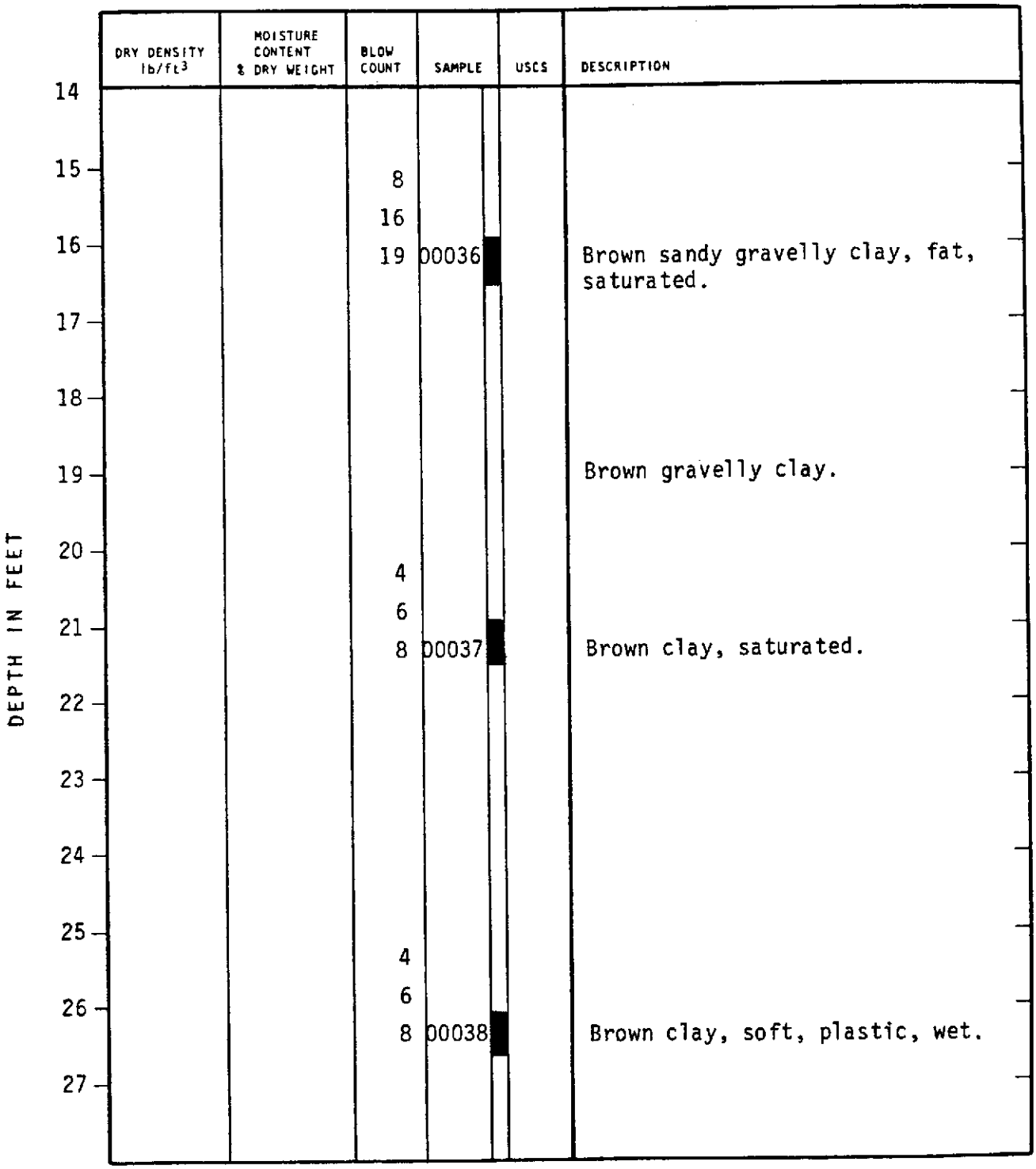
J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82
CHECKED BY: DCM DATE: 5/10/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOG OF BORING NO. 18

PROJECT NO. B-1132-3

PLATE
A-7



J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82

CHECKED BY: DCM DATE: 5/10/82

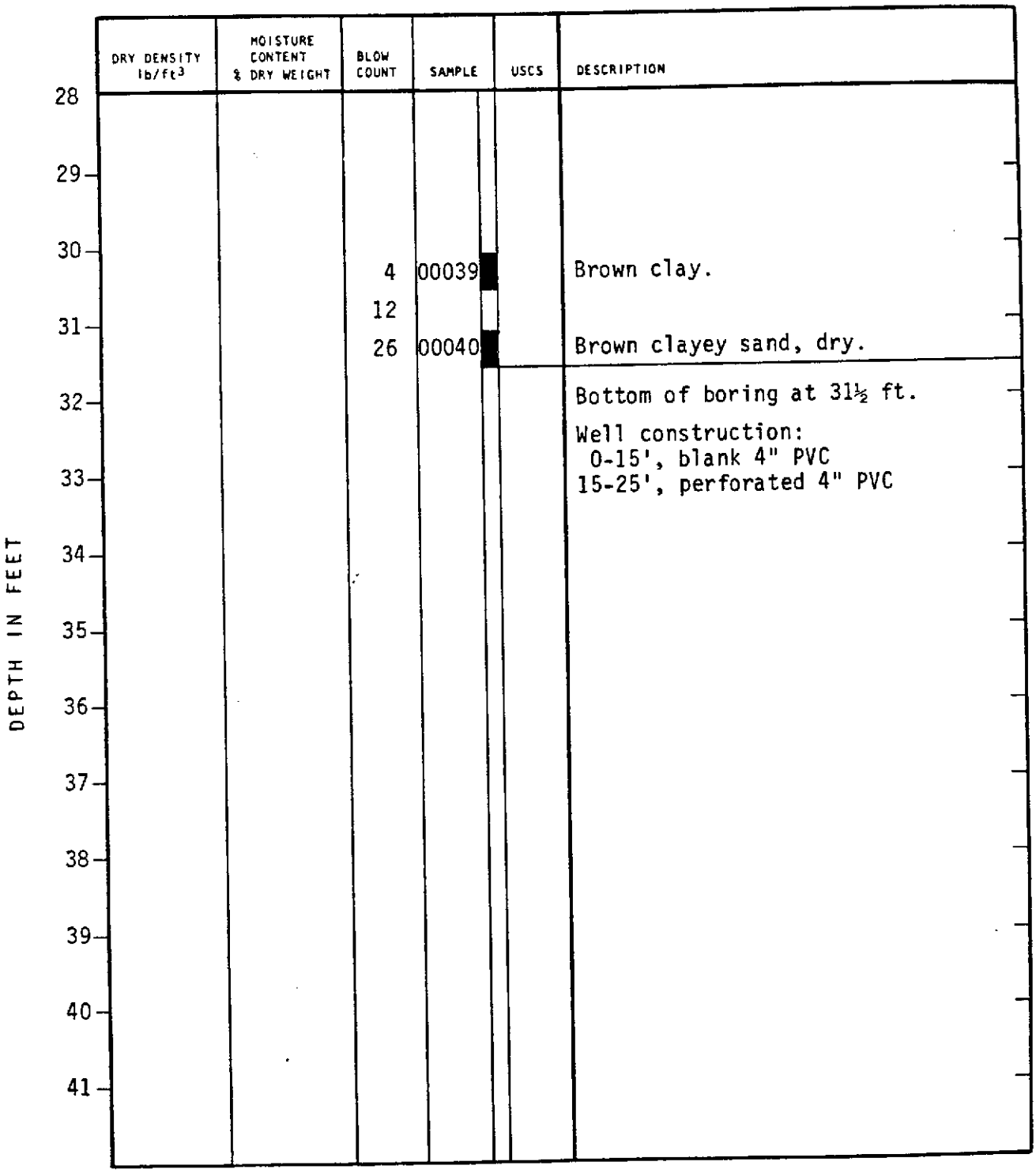
ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA

LOG OF BORING NO. 18 (CONT)

PROJECT NO. B-1132-3

PLATE

A-7.1



J.H. KLEINFELDER & ASSOCIATES
GEOTECHNICAL CONSULTANTS • MATERIALS TESTING

PREPARED BY: RJZ DATE: 5/10/82
CHECKED BY: DCM DATE: 5/10/82

ELECTRO-COATINGS INC.
EMERYVILLE, CALIFORNIA
LOG OF BORING NO. 18 (CONT)

PROJECT NO. B-1132-3

PLATE
A-7.2

APPENDIX B

Electro-Coatings

Cross-Reference Index

Well Number	Kleinfelder Sample No.
1	00077/78
2	00075/76
3A	00071/72
	00082
	00085
3B	00065/66
	00083
	00086
3C	00069/70
	00084
	00087
4	00055/56
5	00059/60
6	00050/51
7	00052/53
8	00073/74
9	00079/80/81
10	00058/59
11	00067/68
12	00063/64
13	00061/62
14	00045/54
15	00041/42
16	00048/49
17	00046/47
18	00043/44

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ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 14, 1982
DATE SAMPLE REC'D: 5-4-82
REPORT #: 059282

KLEINFELDER & ASSOCIATES
1975 E STREET
FRESNO, CA 93706

ANALYSIS	00041, 42 82-0592-1	00043,44 82-0592-2	00046,47 82-0592-3
CALCIUM, MG/L	101	347	200
POTASSIUM, MG/L	1.42	5.55	2.75
MAGNESIUM, MG/L	60	138	106
SODIUM, MG/L	130	88	98
TOTAL CHROMIUM, MG/L	< 0.02	11.7	101
HEXAVALENT CHROMIUM, MG/L	< 0.02	10.3	101
TRIVALENT CHROMIUM, MG/L	< 0.01	1.4	< 0.02
SPEC.CONDUCTANCE, UMHO	1670	2300	2000
TOT.DISS.SOLIDS, MG/L	1040	2150	1540
CHLORIDE, MG/L	120	110	70
SULFATE, MG/L	320	1300	530
NITRATES, MG/L	3.40	3.98	5.65
BICARB.ALKALINITY, MG/L AS CACO3	292	0.0	380
CARB.ALKALINITY, MG/L AS CACO3	0.0	0.0	0.0
PH	6.8	3.8	7.2

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JUNE 14, 1982
DATE SAMPLE REC'D: 5-4-82
REPORT #: 059282

KLEINFELDER & ASSOCIATES
1975 E STREET
FRESNO, CA 93706

ANALYSIS	00048, 49 82-0592-4	00050,51 82-0592-5	00052,53 82-0592-6
CALCIUM, MG/L	127	283	163
POTASSIUM, MG/L	3.53	0.76	0.66
MAGNESIUM, MG/L	62	13.6	93
SODIUM, MG/L	109	91	100
TOTAL CHORMIUM, MG/L	209	0.33	0.02
HEXAVALENT CHROMIUM, MG/L	205	0.33	< 0.02
TRIVALENT CHROMIUM, MG/L	4	< 0.02	0.02
SPEC.CONDUCTANCE, UMHO	2000	2900	1810
TOT.DISS.SOLIDS, MG/L	1490	2030	1300
CHLORIDE, MG/L	90	160	50
SULFATE, MG/L	300	940	530
NITRATES, MG/L	11.2	5.81	2.87
BICARB.ALKALINITY, MG/L AS CACO3	350	330	350
CARB. ALKALINITY, MG/L AS CACO3	0.0	0.0	0.0
PH	6.9	7.7	7.5

NOTE: ALL CONSTITUENTS OF THE ION BALANCE FOR SAMPLE 0592-7 WERE CHECKED AND FOUND TO BE CORRECT.

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JUNE 14, 1982
DATE SAMPLE REC'D: 5-4-82
REPORT #: 059282

KLEINFELDER & ASSOCIATES
1975 E STREET
FRESNO, CA 93706

ANALYSIS	00045, 54 82-0592-7	00055 82-0592-8
CALCIUM, MG/L	184	18.3
POTASSIUM, MG/L	5.50	1.28
MAGNESIUM, MG/L	103	3.5
SODIUM, MG/L	190	6.0
TOTAL CHROMIUM, MG/L	618	< 0.02
HEXAVALENT CHROMIUM, MG/L	524	< 0.02
TRIVALENT CHROMIUM, MG/L	94	< 0.02
SPEC.CONDUCTANCE, UMHO	2500	
TOT.DISS.SOLIDS, MG/L	2390	
CHLORIDE, MG/L	65	
SULFATE, MG/L	250	
NITRATES, MG/L	8.05	
BICARB.ALKALINITY, MG/L AS CaCO3	410	
CARB. ALKALINITY, MG/L AS CaCO3	0.0	
PH	6.5	

DATA CERTIFIED BY Kay Nauls

REPORT APPROVED BY Roger Elliott

ANLAB/T. IKESAKI

LK

NOTE: ALL SAMPLES FILTERED THROUGH 0.45 MILIPORE FILTER BEFORE ANALYSIS.

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1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 15, 1982
DATE SAMPLE REC'D: 5-5-82
REPORT #: 059982

KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

ALL SAMPLES B-1132-3

ANALYSIS	00055/56 82-0599-1	00057/58 82-0599-2	00059/60 82-0599-3
CALCIUM, MG/L	78	117	233
POTASSIUM, MG/L	1.44	4.63	1.10
MAGNESIUM, MG/L	42	36	131
SODIUM, MG/L	74	45	110
CHROMIUM, MG/L	51.0	192	374
TRIVALENT CHROMIUM, MG/L	< 0.02	< 0.02	7
HEXAVALENT CHROMIUM, MG/L	50.9	192	367
SPEC.CONDUCTANCE, UMHO	1200	1290	1920
TOT.DISS.SOLIDS, MG/L	700	900	2000
CHLORIDE, MG/L	110	150	110
SULFATE, MG/L	120	86	420
NITRATES, MG/L	9.00	4.00	4.80
BICARB.ALKALINITY, MG/L AS CaCO3	190	92	420
CARB.ALKALINITY, MG/L AS CaCO3	0.0	0.0	0.0
PH	7.0	6.2	6.7

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1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 15, 1982
DATE SAMPLE REC'D: 5-5-82
REPORT #: 059982

KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

ANALYSIS	00061/62 82-0599-4	00063/64 82-0599-5	00065/66 82-0599-6
CALCIUM, MG/L	145	98	53
POTASSIUM, MG/L	1.39	1.47	9.50
MAGNESIUM, MG/L	76	121	4.65
SODIUM, MG/L	74	67	30
CHROMIUM, MG/L	123	70	47.0
TRIVALENT CHROMIUM, MG/L	< 0.02	< 0.02	12
HEXAVALENT CHROMIUM, MG/L	123	70	35.0
SPEC.CONDUCTANCE, UMHO	1580	1860	550
TOT.DISS.SOLIDS, MG/L	1100	1700	370
CHLORIDE, MG/L	90	40	45
SULFATE, MG/L	230	990	25
NITRATES, MG/L	1.20	5.60	0.07
BICARB.ALKALINITY, MG/L AS CaCO3	340	0.0	98
CARB.ALKALINITY, MG/L AS CaCO3	0.0	0.0	0.0
PH	7.3	4.2	7.4

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JUNE 15, 1982
DATE SAMPLE REC'D: 5-5-82
REPORT #: 059982

KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

ANALYSIS	00067/68 82-0599-7	00069/70 82-0599-8	00071/72 82-0599-9
CALCIUM, MG/L	185	64.0	37.8
POTASSIUM, MG/L	1.18	5.85	4.50
MAGNESIUM, MG/L	92.5	20	23.8
SODIUM, MG/L	68	80	41
CHROMIUM, MG/L	0.29	6.45	24.6
TRIVALENT CHROMIUM, MG/L	0.29	< 0.02	0.3
HEXAVALENT CHROMIUM, MG/L	< 0.02	6.45	24.3
SPEC.CONDUCTANCE, UMHO	1630	915	633
TOT.DISS.SOLIDS, MG/L	1200	520	390
CHLORIDE, MG/L	45	110	45
SULFATE, MG/L	770	81	47
NITRATES, MG/L	6.00	0.36	0.02
BICARB.ALKALINITY, MG/L AS CACO3	0.0	180	160
CARB.ALKALINITY, MG/L AS CACO3	0.0	0.0	0.0
PH	4.2	7.3	7.3

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1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 15, 1982
DATE SAMPLE REC'D: 5-5-82
REPORT #: 059982

KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

ANALYSIS	00073/74 82-0599-10	00075/76 82-0599-11	00077/78 82-0599-1
CALCIUM, MG/L	57.5	49	60.5
POTASSIUM, MG/L	3.06	6.0	5.55
MAGNESIUM, MG/L	21.4	82.5	32
SODIUM, MG/L	44	59	52
CHROMIUM, MG/L	0.04	< 0.02	< 0.02
TRIVALENT CHROMIUM, MG/L	< 0.02	< 0.02	< 0.02
HEXAVALENT CHROMIUM, MG/L	0.04	< 0.02	< 0.02
SPEC.CONDUCTANCE, UMHO	700	1130	860
TOT.DISS.SOLIDS, MG/L	410	610	490
CHLORIDE, MG/L	28	50	85
SULFATE, MG/L	80	80	73
NITRATES, MG/L	2.20	1.40	0.02
BICARB.ALKALINITY, MG/L AS CaCO3	190	410	220
CARB.ALKALINITY, MG/L AS CaCO3	0.0	0.0	0.0
PH	7.6	7.9	7.2

NOTE: ION BALANCE CONSTITUENTS FOR SAMPLES 0599-2 THROUGH -7 WERE CHECKED AND FOUND TO BE CORRECT.

NOTE: ALL SAMPLES FILTERED THROUGH 0.45 MILIPORE FILTER BEFORE ANALYSIS.

DATA CERTIFIED BY Kay Namba

REPORT APPROVED BY Roger Elliott

ANLAB/T. IKESAKI

LK

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1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 15, 1982
DATE SAMPLE REC'D: 5-12-82
REPORT #: 063182

KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ANALYSIS	B1132-3 79 82-0631-1	B1132-3 80 82-0631-2	B1132-3 81 82-0631-3
SPEC.CONDUCTANCE, UMHO			2040
TOT.DISS.SOLIDS, MG/L			2200
CHLORIDE, MG/L			46
SULFATE, MG/L			270
NITRATES, MG/L			6.09
BICARB.ALKALINITY, MG/L AS CACO3			480
CARB.ALKALINITY, MG/L AS CACO3			0.0
PH			6.5
CALCIUM, MG/L			285
POTASSIUM, MG/L			2.43
MAGNESIUM, MG/L			103
SODIUM, MG/L			110
CHROMIUM, MG/L	668	540	
HEXAVALENT CHROMIUM, MG/L		515	
TRIVALENT CHROMIUM, MG/L		25	

DATA CERTIFIED BY Ken Nawls
REPORT APPROVED BY Roger Elliott
ANLAB/T. IKESAKI

LK

NOTE: SAMPLES 2 & 3 FILTERED WITH MILIPORE FILTER BEFORE ANALYSIS.

APPENDIX C

CROSS REFERENCE SHEET

SOIL SAMPLES

Boring Number	Depth Interval (ft)
9 (WH6)	6 - 7
10 (WH7)	3.5 - 4.5
10 (WH7)	5 - 7.5
11 (WH8)	3
11 (WH8)	5.5
13 (WH10)	3
13 (WH10)	8
14 (B-1132-3-11)	5
14 (B-1132-3-13)	10
14 (B-1132-3-15)	15
14 (B-1132-3-17)	20

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1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

FEBRUARY 18, 1982
DATE SAMPLE REC'D: 1-27-82
REPORT #: 011882

KLEINFELDER & ASSOCIATES
1901 OLYMPIC BOULEVARD
WALNUT CREEK, CA 94596

ATTN: RICHARD ZIPP

SAMPLE DESCRIPTION	ANLAB ID #	TOTAL CHROMIUM MG/KG (WET WT)*
B-1132-3		
WH6 (6' - 7')	82-0118-1	31
WH7 (3.5 - 4.5)	82-0118-2	29
WH7 (5 - 7.5)	82-0118-3	52
WH8 (3)	82-0118-4	39
WH8 (5.5)	82-0118-5	35
WH10 (3)	82-0118-6	48
WH10 (8)	82-0118-7	305

*SAMPLES DIGESTED WITH AQUA REGIA AND ANALYZED BY AIR-ACETYLENE FLAME WITH BACKGROUND CORRECTION. RESULTS OF DUPLICATE DIGESTIONS WERE WITHIN 10% OF EACH OTHER.

DATA CERTIFIED BY Ken Namla

REPORT APPROVED BY Noel D Ibrum

ANLAB/T. IKESAKI

LK

KLEINFELDER
WALNUT CREEK
JHK
CMM
RMW
RAW
DCM
BRH
FEB 22 1982
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ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JULY 23, 1982
DATE SAMPLE REC'D: 6-30-82
REPORT #: 084082

KLEINFELDER & ASSOC.
1901 OLYMPIC BOULEVARD
WALNUT CREEK, CA 94596

ATTN: DICK ZIPP

SAMPLE DESCRIPTION	ANLAB ID #	TOTAL CHROMIUM * MG/L
B1132-3-11	82-0840-1	33.0
B1132-3-13	82-0480-2	48.8
B1132-3-15	82-0480-3	40.2
B1143-3-17	82-0480-4	46.0

*SAMPLES DIGESTED WITH AQUA-REGIA AND ANALYZED BY FLAME AAS.

DATA CERTIFIED BY Ken Namba

REPORT APPROVED BY Roger Elliott

ANLAB/T. IKESAKI

LK

APPENDIX D

CROSS REFERENCE SHEET

GROUNDWATER RETEST

Well Number	Sample Number
3A	00082
3B	00083
3C	00084
3A	00085
3B	00086
3C	00087

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A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JUNE 23, 1982
DATE SAMPLE REC'D: 6-22-82
REPORT #: 081082

KLEINFELDER & ASSOCIATES
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

SAMPLE DESCRIPTION	ANLAB ID #	TOTAL CHORMIUM MG/L
B-1132-3, 00082 3A	82-0810-1	8.6
B-1132-3, 00083 3B	82-0810-2	10.6
B-1132-3, 00084 3C	82-0810-3	9.6

DATA CERTIFIED BY Sue Littlefield
REPORT APPROVED BY Roger Elliott
ANLAB/T. IKESAKI

LK

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

JULY 19, 1982
DATE SAMPLE REC'D: 7-14-82
REPORT #: 092382

J.H. KLEINFELDER & ASSOC.
9795 BUSINESS PARK DRIVE
SACRAMENTO, CA 95827

ATTN: DICK ZIPP

ALL SAMPLES B1132-3

ANALYSIS	00085 82-0923-1	00086 82-0923-2	00087 82-0923-3
PH	8.4	7.1	7.4
CHROMIUM, MG/L	0.28	24.0	13.4
HEXAVALENT CHROMIUM, MG/L	0.28	23.8	13.4

DATA CERTIFIED BY Ken Nanks
REPORT APPROVED BY Kaye Elliott
ANLAB/T. IKESAKI

LK