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SOIL AND GROUNDWATER INVESTIGATION ARROYO SCHOOL

SAN LORENZO, CALIFORNIA

L&W Project 5186
February 16, 1991

Prepared for
San Lorenzo Unified School District

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General Engineering Contractors License No 507442
Certified for Hazardous Substances Removal and Remedial Actions

INTRODUCTION

Purpose

This report summarizes and presents the results of a preliminary soil and groundwater investigation of a fuel oil tank removal site at the Arroyo High School in San Lorenzo, California. This report when forwarded to the Alameda County Department of Health Services, will serve as a progress report.

Background

The school facility operated a 6000 gallon underground fuel oil tank as part of its heating system. A decision was made to remove the tank and on January 3, 1991 the tank was excavated and removed in accordance with the then current local and state requirements. Soil samples were collected from the excavation under direction of Alameda County personnel. Analysis of these samples and visual evidence indicated a high concentration of diesel contamination in the soil.

During removal of the tank backfill it was discovered that the diesel fuel had spread beyond the backfill limits and a course of soil and groundwater exploration was recommended. The exploration was recommended to provide: 1) essential information regarding the horizontal and vertical extent of any fuel oil contamination; and 2) the basis for remedial action recommendations.

Site Description

The area investigated is at the Arroyo School located at 1507 Lorenzo Avenue in San Lorenzo California. Figure 1 in Appendix A is a site plan showing the location of Arroyo School in relation to the nearby streets. The tank which was removed was located between the maintenance boiler-room portion of the building and temporary class rooms. This general location is in the approximate middle of the school complex.

The site investigated is an essentially level paved area with only minimal slope to provide surface drainage. The area is used as pedestrian and vehicular access between the various school facilities. The areas of the tank excavation and the maintenance boiler-room area of the school are shown on the Exploration Plan, Figure 2 of Appendix A.

EXPLORATION

Soil and Groundwater Exploration

To date, the site soil and groundwater conditions have been explored with 16 soil borings. Three of the borings MW1, MW2, and MW3 were finished as groundwater monitoring wells. Additionally there were several soil samples taken from the tank removal excavation as part of the removal protocol.

Locations of all of the borings as well as the limits of the tank excavation as of January 16, 1991 are shown on Figure 2, Exploration Plan in Appendix A. The precise conditions encountered in each of the borings are shown on the boring logs, Figures 3 through 18 of Appendix A.

Borings 1 through 6, drilled on January 16, borings 7 through 12 drilled on January 25, 1991, and Borings MW1, MW2, and MW3 drilled January 31, 1991 were advanced with a truck mounted CME 75 drill rig using 8 inch hollow stem augers. Borings 12 and 13 were drilled with a portable Minute Man drill rig on January 28, 1991.

Boring 1 was drilled 20.5 feet deep and encountered groundwater at about 17 feet below ground surface. Borings 2 through 13 were drilled to 15.5 feet below ground surface in order not to puncture the aquifer which was encountered at about 17 feet in Boring 1. Borings MW1, MW2, and MW3 were drilled to 25 feet below ground surface and were finished as Monitoring Wells MW1, MW2, and MW3.

Samples were obtained at 5 foot intervals in the CME 75 drill holes by driving a California (2.5 inch diameter split-barrel) sampler containing brass tubes into the "undisturbed" soil beyond the augers. For the CME 75 drill rig, driving energy was provided by a 140 pound hammer falling 30 inches in accordance with ASTM procedures. Samples were obtained at 5 foot intervals in the Minute Man drill holes by driving a Standard Penetration Test (2.0 inch diameter split-barrel) sampler containing brass tubes into the "undisturbed" soil beyond the augers. Driving energy for the Minute Man drill rig was provided by a 20 pound hammer falling 18 inches.

The samplers and brass tubes were cleaned between samples using soap, TSP, and two clear water rinses to prevent cross or down-hole contamination. All down-hole equipment was steamed cleaned prior to drilling. Samples obtained were logged, sealed with teflon, taped, labeled, entered on a chain of custody form and stored in an ice chest containing ice. Logs of all the borings were continually maintained by a registered Civil Engineer. The samples were then delivered under Chain-of-Custody procedures to the laboratory for analytical testing.

Each sample was analyzed for Total Petroleum Hydrocarbons as Diesel (TPH-D); Benezene, Toluene, Ethylbenzene and Xylene (BTEX); and Total Oil and Grease (TOG).

Results of the analyses are discussed in a later section.

FINDINGS

Soil Conditions

The generalized soil profile at the site could be summarized as several feet of FILL overlying silty CLAY which extended to the depths explored. The fill was typically a brown gravelly sand SILT to a sandy silty GRAVEL, field identified in the Unified Soil Classification System as ML or GM. This material is typical a coarse grained soil with gravels varying up to several inches in dimension. Sand and silt contents varied. The underlying clays were classified as CL and are cohesive, fine grained soils which generally exhibit lower porosities and permeabilities than ML soils. Detailed soil and groundwater conditions along with sampling data are presented on the boring logs in Appendix A.

Soil Analyses

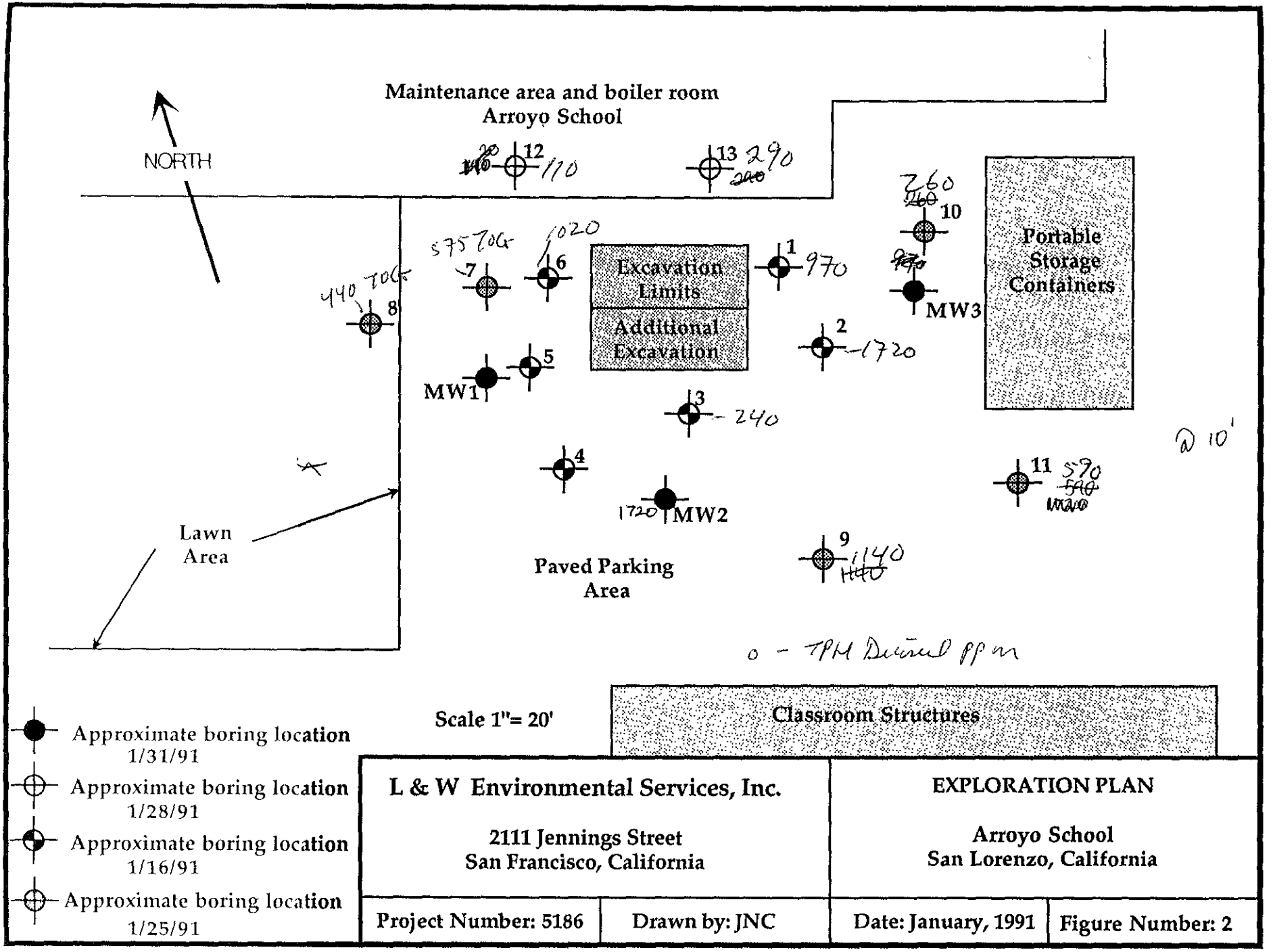
A total of 49 samples were obtained in order to be analyzed for Total Petroleum Hydrocarbons as Diesel (TPH-d) and Aromatic Volatile Hydrocarbons (Benzene, Toluene, Ethylbenzene and Xylene--BTEX) and Total Oil and Grease (TOG). Laboratory certificates for the analyses and copies of the Chains-of-Custody for the available results are attached in Appendix B. The following table summarizes the results available:

Results of Soil Analysis

Boring Number	Sample Depth	TPH Diesel	BTEX	TOG
	(all results are presented in parts per million - ppm)			
1	5.0'	ND	ND/ND/ND/ND	25
1	10.0'	970	ND/0.09/ND/1.9	5685
1	15.0'	80	ND/ND/ND/ND	270
1	20.0'	ND	ND/ND/ND/ND	25

Results of Soil Analysis
(continued)

Boring Number	Sample Depth	TPH Diesel	BTEX	TOG
	(all results are presented in parts per million - ppm)			
2	5.0'	ND	ND/ND/ND/ND	110
2	10.0'	1720	ND/ND/ND/**1.3**	3110
2	15.0'	40	ND/ND/ND/ND	140
3	5.0'	ND	ND/ND/ND/ND	135
3	10.0'	240	ND/ND/ND/ND	1015
3	15.0'	80	ND/ND/ND/ND	ND
4	5.0'	ND	ND/ND/ND/ND	480
4	10.0'	ND	ND/ND/ND/ND	ND
4	15.0'	ND	ND/ND/ND/ND	ND
5	5.0'	ND	ND/ND/ND/ND	ND
5	10.0'	ND	ND/ND/ND/ND	ND
5	15.0'	12	ND/ND/ND/ND	ND
6	5.0'	ND	ND/ND/ND/ND	ND
6	10.0'	1020	ND/ND/ND/ND	1035
6	15.0'	ND	ND/ND/ND/ND	230
7	5.0'	ND	ND/**0.1**/ND/ND	360
7	10.0'	70	ND/**0.05**/ND/ND	470
7	15.0'	ND	ND/**0.05**/ND/ND	575
8	5.0'	ND	ND/**0.3**/ND/**0.07**	ND
8	10.0'	ND	ND/**0.08**/ND/ND	440
8	15.0'	ND	ND/**0.03**/ND/ND	ND
9	5.0'	ND	ND/**0.2**/ND/ND	ND
9	10.0'	1140	ND/**0.4**/ND/ND	4260
9	15.0'	ND	ND/0.05/ND/ND	ND
10	5.0'	ND	ND/0.04/ND/ND	105
10	10.0'	260	ND/0.18/ND/0.5	1185
10	15.0'	13	ND/0.05/ND/ND	ND



L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California		EXPLORATION PLAN Arroyo School San Lorenzo, California	
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Results of Soil Analysis
(continued)

Boring Number	Sample Depth	TPH Diesel	BTEX	TOG
(all results are presented in parts per million - ppm)				
11	5.0'	ND	ND/**0.25**/ND/ND	25
11	10.0'	590	ND/**0.1**/ND/ND	805
11	15.0'	20	ND/**0.05**/ND/ND	ND
12	5.0'	ND	ND/ND/ND/ND	50
12	10.0'	20	ND/ND/ND/ND	20
12	15.0'	110	ND/ND/ND/ND	415
13	5.0'	ND	ND/ND/ND/ND	ND
13	10.0'	17	ND/ND/ND/ND	ND
13	15.0'	290	ND/**0.02**/ND/ND	265
MW1	5.0'	ND	ND/ND/ND/ND	275
MW1	10.0'	ND	ND/ND/ND/ND	250
MW1	15.0'	25	ND/ND/ND/ND	70
MW2	5.0'	ND	ND/ND/ND/ND	925
MW2	10.0'	ND	ND/ND/ND/ND	295
MW2	15.0'	ND	ND/ND/ND/ND	255
MW3	5.0'	ND	ND/ND/ND/ND	195
MW3	10.0'	20	ND/**0.05**/ND/ND	550
MW3	15.0'	20	ND/**0.04**/ND/**0.09**	570

The results of TPH-d and TOG at the 5.0, 10.0 and 15.0 foot elevations have been plotted and used as the basis of equal compound concentration contours. These contours are presented on Figures 19 through 24 of Appendix A.

Groundwater Conditions

Groundwater was encountered in Boring 1 at a depth of about 17 feet below ground surface at the time of drilling. The depth of the other exploratory borings was limited to avoid puncturing the aquifer. No distinct or discrete change in drilling or soil conditions was noted in Boring 1 at 17 feet but there may have been a thin layer of granular material between the samples at 15 and 20 feet. Groundwater conditions were further explored by installing monitoring wells MW1, MW2, and MW3. The borings were drilled to 25 feet below ground surface and slotted pvc well casing installed from 15 to 25 feet below ground surface. Details of the monitoring well installations are shown on Figures 25 through 27. State of California Water well reports, DWR 188 are attached as Appendix C.

On February 7 1991 the three wells were observed and monitored for depth to groundwater, and presence of free product. The observations are presented below:

SUMMARY OF GROUNDWATER MEASUREMENT

Location	Date Measured	Top of Casing Elevation (feet)	Thickness of Free Product (feet)	Depth to Groundwater	Piezometric Surface Elevation
MW1	2/07/91	100.00	NONE	11.42	88.58
MW2	2/07/91	100.03	NONE	11.27	88.76
MW3	2/07/91	100.17	NONE	11.44	88.73

Groundwater Hydrology

Based on the results of the exploration program to date, the groundwater encountered and presently being monitored at the site is located in the brown silty CLAY and clayey SILT layer found at about 17 feet below ground surface. The groundwater is confined as evidence by its subsequent rise in surface elevation after well installation. Using the February 7, 1991 groundwater data, the groundwater gradient has been calculated to be toward the south-east at about 1 foot per 200 feet. The groundwater gradient is shown on Figure 28 of Appendix A.

Groundwater Analyses

The following is a summary of the results of the analyses carried out on the various groundwater samples obtained at the site.

GROUNDWATER ANALYTICAL RESULTS

Well Sample	Date	TPH-D (ppm)	BTEX (ppb)	TOG (ppm)
MW1	2/07/91	0.3	ND/ND/ND/ND	ND
MW2	2/07/91	ND	ND/ND/ND/ND	ND
MW3	2/07/91	0.3	ND/ND/ND/ND	ND

Analytical Certificates

Certificates from a California certified laboratory for the soil and groundwater analyses are attached in Appendix B Copies of the Chain-of-Custody are also included in Appendix B. Original certificates are presented for previously unreported results, and certificate copies are presented for those analyses previously reported.

CONCLUSIONS

- Fuel Oil which had been stored in the tank has apparently leaked and has spread through the soil to well beyond the limits of the tank backfill.

- Levels of TPH-D attenuate in proportion to distance from the tank excavation. The horizontal limits of the spread of TPH-D have been explored and show a migration exceeding 50 feet from the tank..

- The maximum concentrations of TPH-D occur in the samples obtained 10 feet below ground surface. No TPH-D was detected in the samples taken at 5 feet below ground surface. These was considerable attenuation of the TPH-D concentrations between the samples obtained at 10 feet and those at 15.

- There is some impact of the groundwater below the site by the leakage of fuel oil. The analytical results of the first groundwater samples taken

at the site show a maximum concentration of TPH-D of 0.3 parts per million.

- There is some significant Total Oil and Grease contamination at the site. The levels and locations of TOG contamination at the 10 and 15 foot depths correspond somewhat to the levels of TPH-D contamination and are probably associated with the leaked fuel oil. The levels of TOG encountered in the 5 foot deep samples do not appear to be associated with the fuel oil leaks. The positive results of TOG in the 5 foot deep samples may be associated with natural background levels in artificial fill or perhaps with a surface spill of non-petroleum grease or oil in the past.

- The source of the soil contamination is considered to be the underground 6000 gallon fuel oil tank. Therefore the primary source of the soil TPH-D contamination has been removed.

- The contaminants which remain in the soil and under the building may be as such levels that the groundwater will not be affected by its presence. Continuing monitoring of the groundwater should provide further evidence as to any negative impact by the remaining contaminants.

RECOMMENDATIONS

- The groundwater at the site should be monitored on a quarterly basis for at least one year.

- The three monitoring wells should be measured, checked for floating product and sampled again during the second calendar quarter of 1991 (April 1 -June 30, 1991). More frequent initial monitoring

- Each water sample should be analyzed for Total Petroleum Hydrocarbons as Diesel (TPH-D); Aromatic Volatile Hydrocarbons (Benzene, Toluene, Ethylbenzene and Xylene--BTEX); and Total Oil and Grease (TOG).

- The results should be reviewed and reported to the Alameda County Department of Health Services along with the direction of the groundwater gradient.

- Conclusions and recommendations regarding any further remediation or investigation should be determined based on the groundwater quality.

APPENDIX A

Figures 1 through 28

SOIL AND GROUNDWATER
INVESTIGATION

ARROYO SCHOOL
SAN LORENZO, CALIFORNIA

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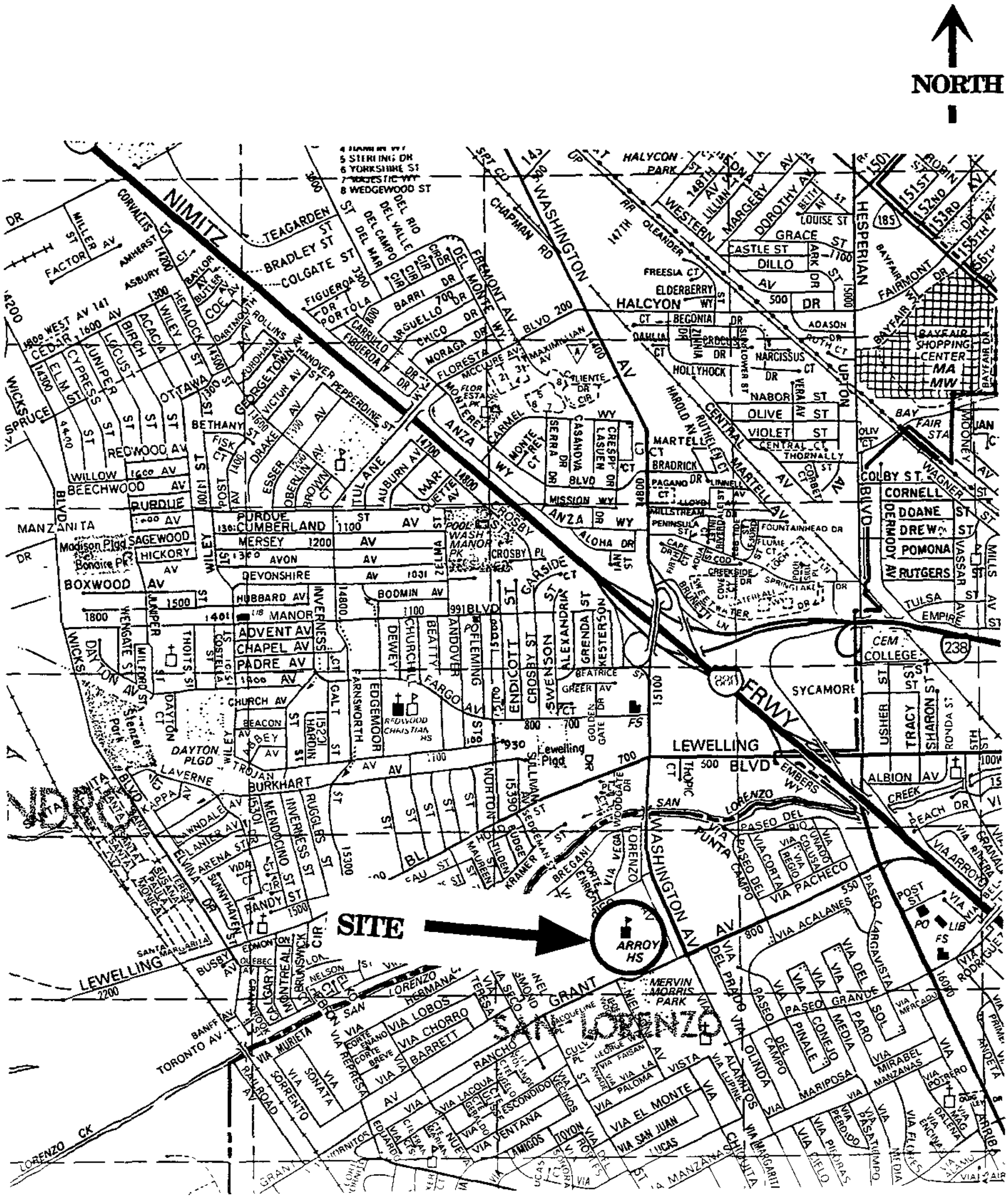
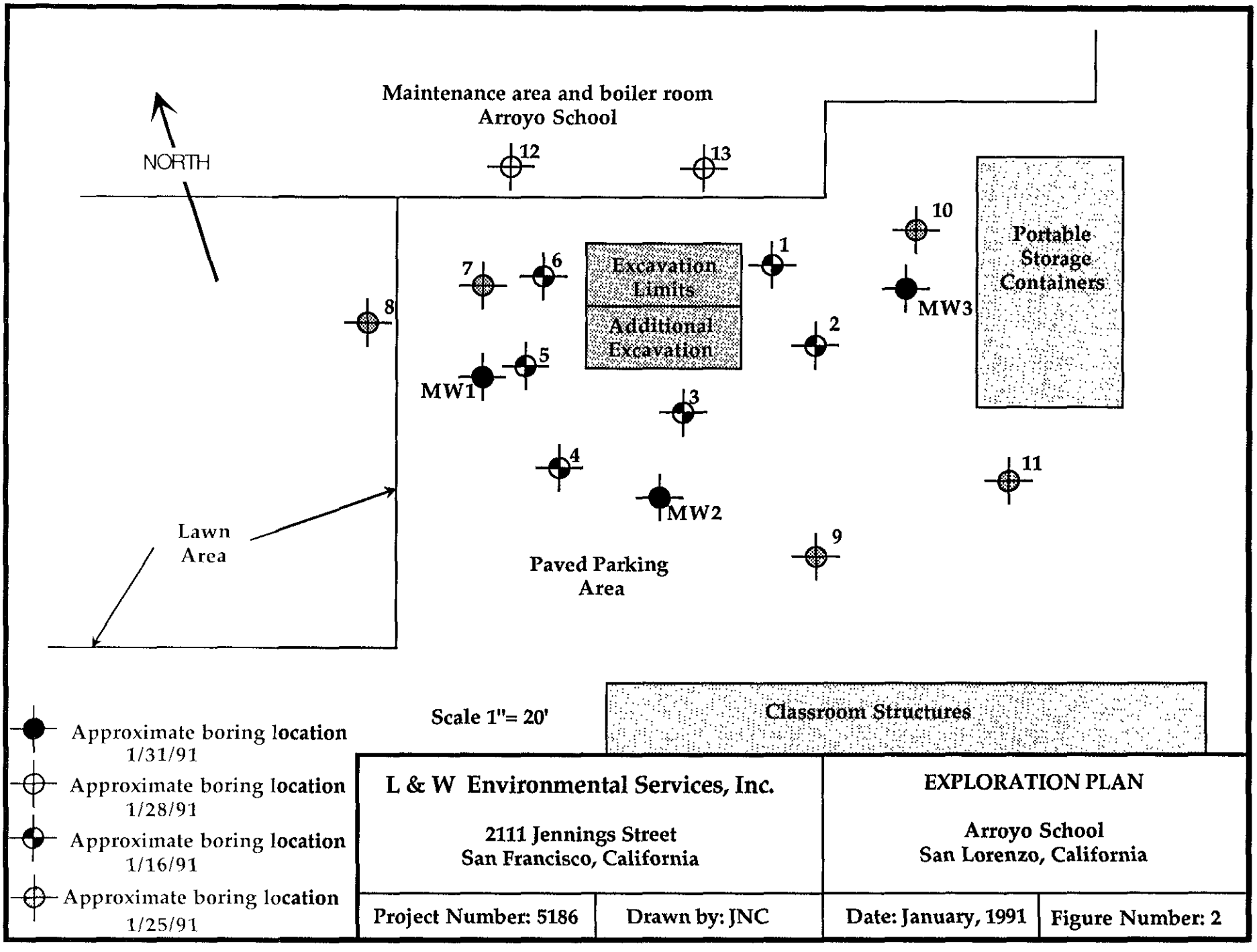


L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California		Site Plan Arroyo High School San Lorenzo, California	
Project Number: 5186	Drawn by: JNC	Date: January 1990	Figure Number: 1



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Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, medium stiff, damp (FILL).
5187-1-5.0	27	ML	0835		5	
						Dark brown to dark grey very silty CLAY, medium stiff, moist.
5187-1-10.0	7	CL	0845		10	
						Grey silty CLAY, stiff moist.
5187-1-15.0	20	CL	0855		15	Boring drilled 1/16/91 using 8 inch hollow stem auger and CME 75 drill rig.
5187-1-20.0	23	CL	0910		20	

Boring terminated at 20.5 feet. Groundwater encountered at approximately 17 feet.

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Figure Number 3

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		ML				Brown gravelly sandy SILT, stiff, damp (FILL).
5187-2-5.0	12		0945		5	
		CL/ ML				Dark grey to black very silty CLAY to clayey SILT, medium stiff, moist.
5187-2-10.0	10	CL	0955		10	Blue-grey silty CLAY, medium stiff moist.
5187-2-15.0	21	CL	1005		15	Color changing to grey-brown.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/16/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Figure Number 4

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, dense, moist (FILL).
5187-3-5.0	20	ML	1035		5	
						Dark brown very silty CLAY, medium stiff, moist.
5187-3-10.0	9	CL	1045		10	
						Blue-grey silty CLAY, medium stiff moist.
5187-3-15.0	20	CL	1055		15	Color changing to grey-brown.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/16/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Figure Number: 5

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, dense, moist (FILL).
5187-4-5.0	13	ML	1120		5	
		CL				Black very silty CLAY,medium stiff, moist.
		CL				Brown silty CLAY, medium stiff, moist.
5187-4-10.0	6	CL	1130		10	
						Grey-brown silty CLAY, medium stiff moist.
5187-4-15.0	18	CL	1140		15	Brown silty CLAY, stiff, moist, with caliche deposits.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/16/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Figure Number: 6

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		ML				Brown gravelly sandy SILT, dense, moist (FILL).
5187-5-5.0	13		1230		5	
		CL				Dark brown very silty CLAY, medium stiff, moist.
5187-5-10.0	7	CL	1235		10	Grey-brown silty CLAY,soft to medium stiff moist.
5187-5-15.0	10	CL	1250		15	

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/16/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, dense, moist (FILL).
5187-6-5.0	17	ML	1310		5	
					10	
5187-6-10.0	7	CL	1320			Dark brown to grey-brown silty CLAY, medium dense, moist.
5187-6-15.0	16	CL	1330		15	

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/16/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Figure Number: 8

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		GM				Brown sandy silty GRAVEL, dense, moist (FILL).
5187-7-5.0	5	ML	0915		5	Dark brown sandy clayey SILT, soft, moist,
5187-7-10.0	7	CL	0925		10	Dark grey silty CLAY, medium stiff, moist.
						Brown silty Clay, stiff, moist.
5187-7-15.0	12	CL	0940		15	

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/25/91 using 8 inch hollow stem auger and CME 75 drill rig.

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Figure Number: 9

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Dark brown TOPSOIL
		ML				Brown gravelly clayey SILT, dense, stiff, damp to moist (FILL?).
5187-8-5.0	4	CL	1030		5	Dark brown sandy silty CLAY, soft, moist to wet.
5187-8-10.0	4	CL	1040		10	Grey-brown silty CLAY, soft, wet.
5187-8-15.0	7	CL	1050		15	becoming medium stiff, and less wet.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/25/91 using 8 inch hollow stem auger and CME 75 drill rig.

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Figure Number: 10

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		GW				Brown silty sandy GRAVEL, medium dense, moist (FILL).
		SP				Brown SAND, medium dense, moist (trench backfill).
5187-9-5.0	9	ML	1115		5	Dark brown clayey SILT, medium stiff, moist.
5187-9-10.0	6	CL	1125		10	Black silty CLAY, medium stiff, moist.
5187-9-15.0	15	CL	1135		15	Grey silty Clay, stiff, moist.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/25/91 using 8 inch hollow stem auger and CME 75 drill rig.

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Figure Number: 11

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		CL				Brown gravelly sandy CLAY, medium stiff,moist.
5187-10-5.0	15	CL	1235		5	
						Black silty CLAY, medium stiff, moist.
5187-10-10.0	5	CL	1240		10	
						Grey silty Clay, stiff, moist.
5187-10-15.0	14	CL	1250		15	

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/25/91 using 8 inch hollow stem auger and CME 75 drill rig.

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Figure Number: 12

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 4 inches of asphalt over 6 inches of base rock.
		ML				Brown gravelly sandy SILT, medium stiff,moist.
5187-11-5.0	5	CL	1320		5	
						Black silty CLAY stiff, moist.
5187-11-10.0	10	CL	1330		10	
5187-11-15.0	13	CL	1340		15	Grey silty Clay, stiff, moist.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/25/91 using
8 inch hollow stem auger
and CME 75 drill rig.

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Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 1 inch of concrete over 3 inches of pea gravel.
						Brown gravelly sandy CLAY, medium stiff,moist.
5187-12-5.0	68	CL	1245		5	
						Black silty CLAY, medium stiff, moist.
5187-12-10.0	9	CL	1315		10	
5187-12-15.0	27	CL	1340		15	Grey silty CLAY, stiff, moist.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/28/91 using 4 inch hollow stem auger and Minute Mandrill rig.

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Figure Number: 14

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 1 inch of concrete over 3 inches of pea gravel.
						Brown clayey GRAVEL, dense, moist.
5187-13-5.0	60	GC	1410		5	
						Grey to black very silty CLAY, medium stiff, moist.
5187-13-10.0	12	CL	1430		10	
5187-13-15.0	20	CL	1500		15	Grey silty CLAY, stiff, moist.

Boring terminated at 15.5 feet.
No groundwater encountered.

Boring drilled 1/28/91 using
4 inch hollow stem auger
and Minute Mandrill rig.

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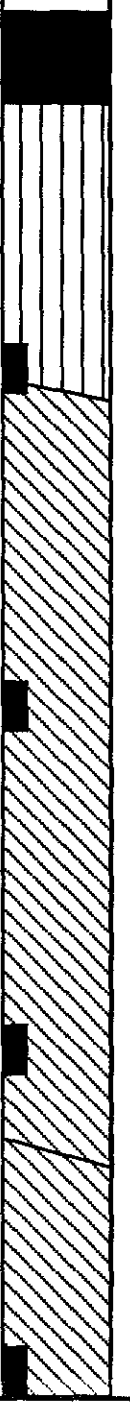
Date: January, 1991

Figure Number: 15

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 3 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, medium dense, damp (FILL).
5186-MW1-5.0	10	ML	0925		5	
						Dark grey very silty CLAY, to clayey SILT, soft, moist.
5186-MW1-10.0	5	CL/ ML	0935		10	
						Becoming stiff
5186-MW1-15.0	14	CL/ ML	0945		15	
						Brown silty CLAY, stiff, wet
5186-MW1-20.0	13	CL	0950		20	

L & W Environmental Services, Inc.

2111 Jennings Street
San Francisco, California

Log of Boring Number: MW1
Sheet 1 of 2
Arroyo High School
San Lorenzo, California

Project Number: 5186

Date: January, 1991

Figure Number 16

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					20	Brown silty CLAY as before.
					25	

Boring drilled 1/31/91 using 8 inch hollow stem auger and CME 75 drill rig.

Boring terminated at 25.0 feet. Groundwater encountered at approximately 17 feet.

Boring finished as monitoring well MW1 on 1/31/91.

L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Log of Boring Number: MW1 Sheet 2 of 2 Arroyo High School San Lorenzo, California	
Project Number: 5186	Date: January, 1991	Figure Number 16

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 3 inches of asphalt over 6 inches of base rock.
						Brown gravelly sandy SILT, dense, damp (FILL?).
		ML				
5186-MW2-5.0	3		1110		5	
						Dark grey-brown silty CLAY, soft, moist to wet.
5186-MW2-10.0	5	CL	1120		10	
						Dark brown sandy silty CLAY, stiff, moist.
5186-MW2-15.0	15	CL	1130		15	
		CL/ ML			20	Brown very silty CLAY to clayey SILT, stiff, moist.

L & W Environmental Services, Inc.

2111 Jennings Street
San Francisco, California

Log of Boring Number: MW2
Sheet 1 of 2
Arroyo High School
San Lorenzo, California

Project Number: 5186

Date: January, 1991

Figure Number 17

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					20	Brown very silty CLAY to clayey SILT as before.
					25	

Boring drilled 1/31/91 using 8 inch hollow stem auger and CME 75 drill rig.

Boring terminated at 25.0 feet. Groundwater encountered at approximately 17 feet.

Boring finished as monitoring well MW2 on 1/31/91.

L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Log of Boring Number: MW2 Sheet 2 of 2 Arroyo High School San Lorenzo. California	
Project Number: 5186	Date: January, 1991	Figure Number 17

Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					0	Pavement section of 3 inches of asphalt over 6 inches of base rock.
		GW/ GM				Brown silty sandy GRAVEL, medium dense, damp (FILL?).
5186-MW3-5.0	8	ML	1305		5	Grey very silty CLAY medium stuff, moist.
5186-MW3-10.0	9	CL	1320		10	
5186-MW3-15.0	18	ML/ CL	1330		15	Grey brown clayey SILT to very silty CLAY, medium stiff, moist.
		CL			20	Brown silty CLAY, stiff, moist.

L & W Environmental Services, Inc.

2111 Jennings Street
San Francisco, California

Log of Boring Number: MW3
Sheet 1 of 2
Arroyo High School
San Lorenzo, California

Project Number: 5186

Date: January, 1991

Figure Number 18

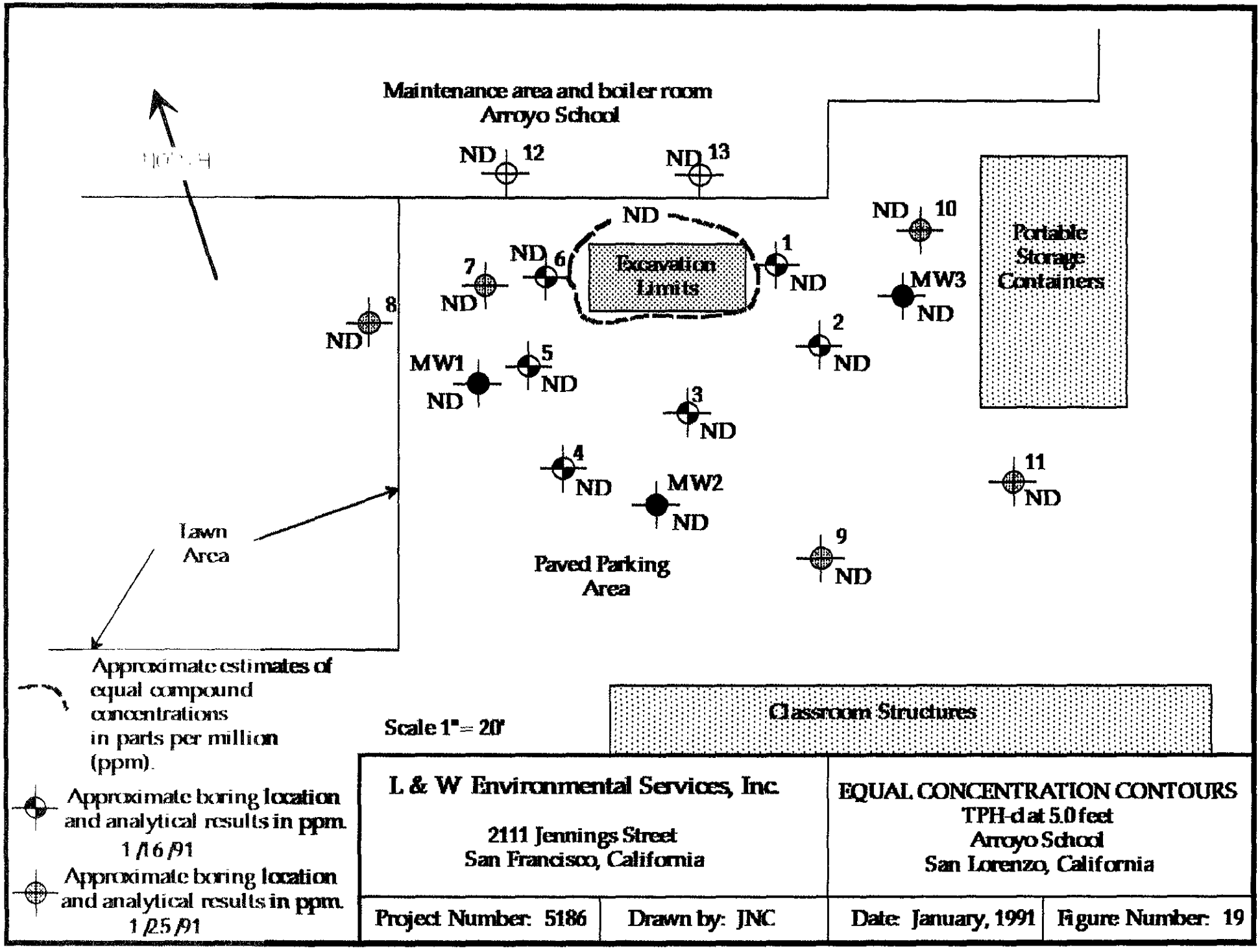
Sample Number	Blows per Foot	Soil Type	Time	Log	Depth in Feet	DESCRIPTION
					20	Brown silty CLAY as before.
					25	

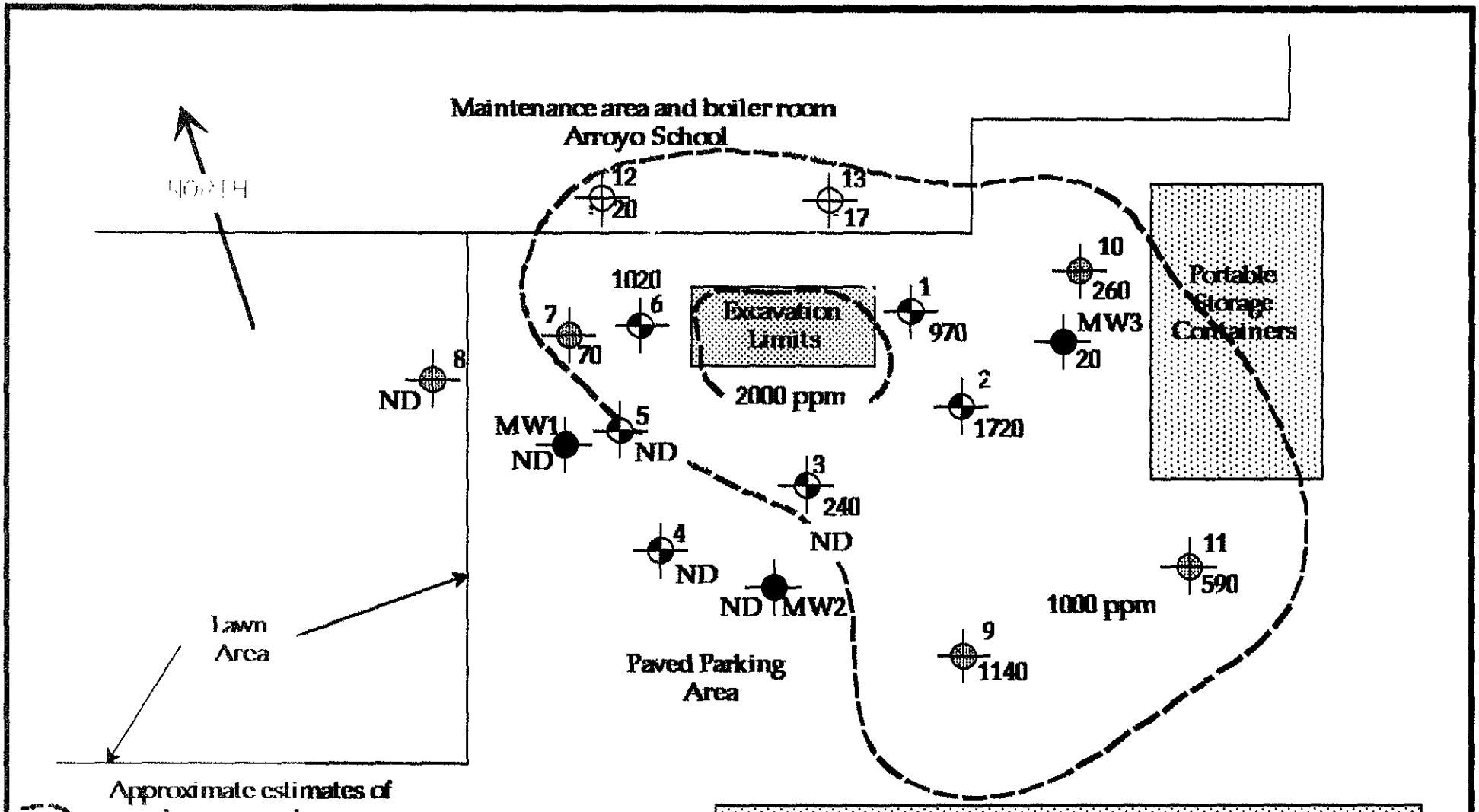
Boring drilled 1/31/91 using 8 inch hollow stem auger and CME 75 drill rig.

Boring terminated at 25.0 feet. Groundwater encountered at approximately 17 feet.

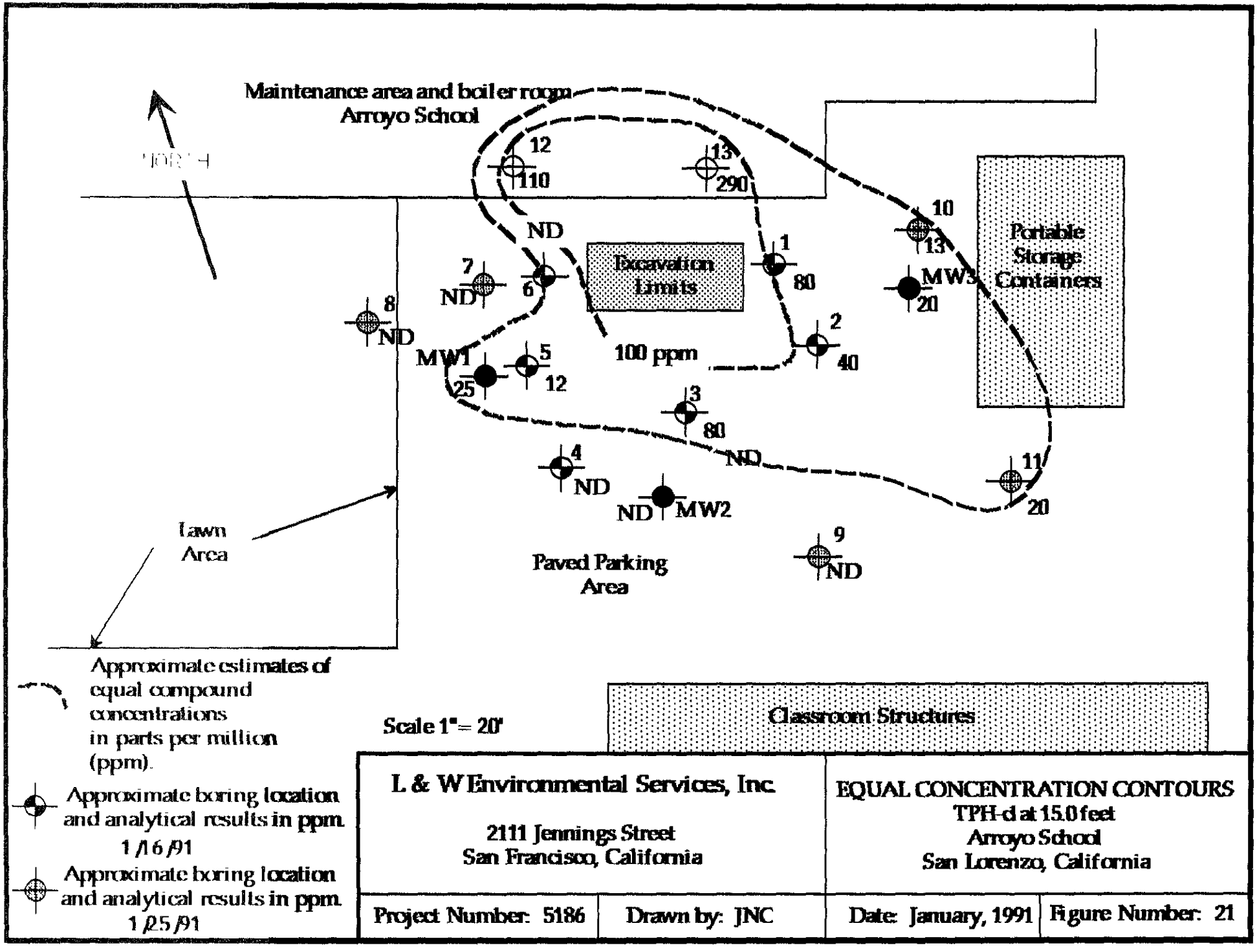
Boring finished as monitoring well MW3 on 1/31/91.

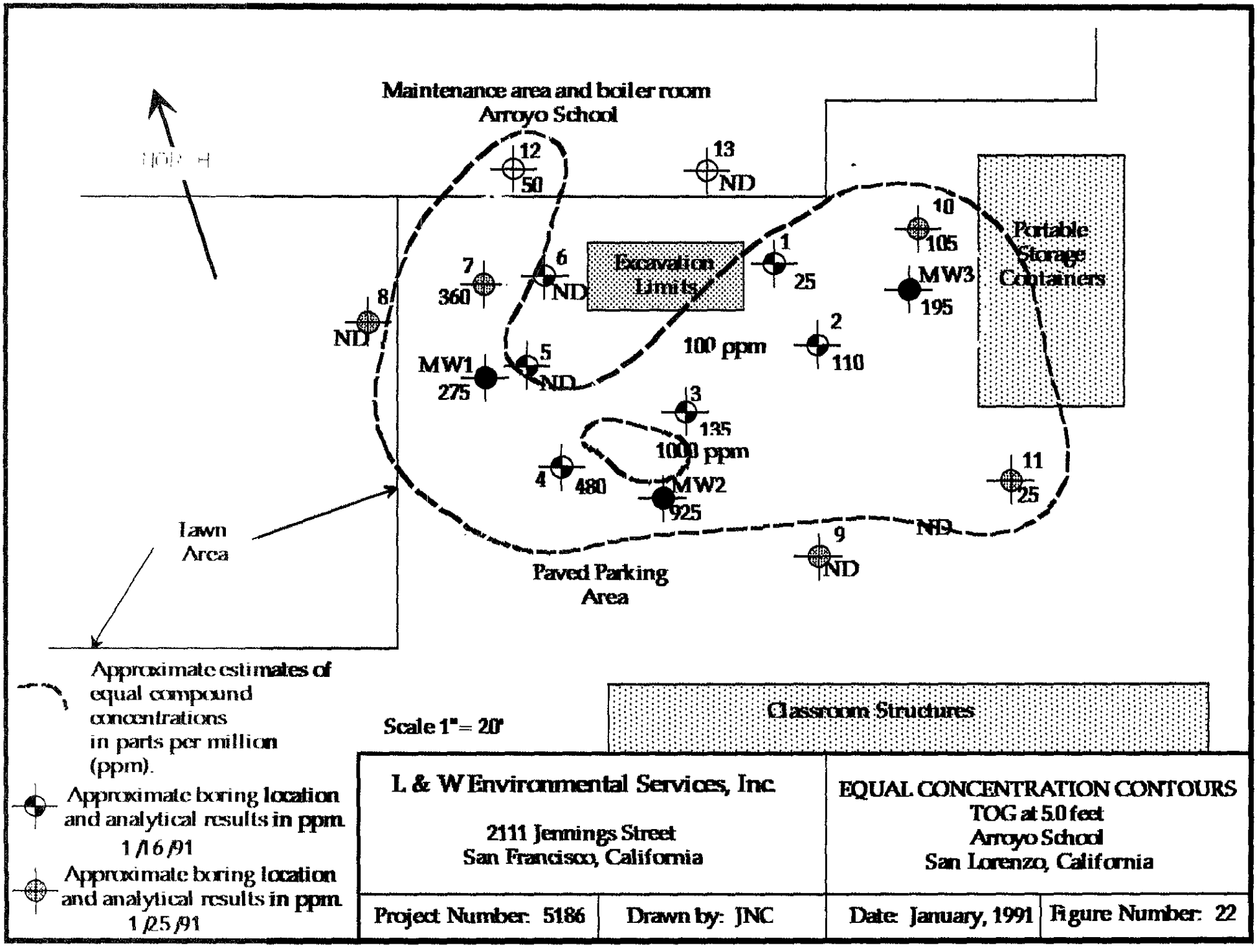
L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Log of Boring Number: MW3 Sheet 2 of 2 Arroyo High School San Lorenzo, California	
Project Number: 5186	Date: January, 1991	Figure Number 18

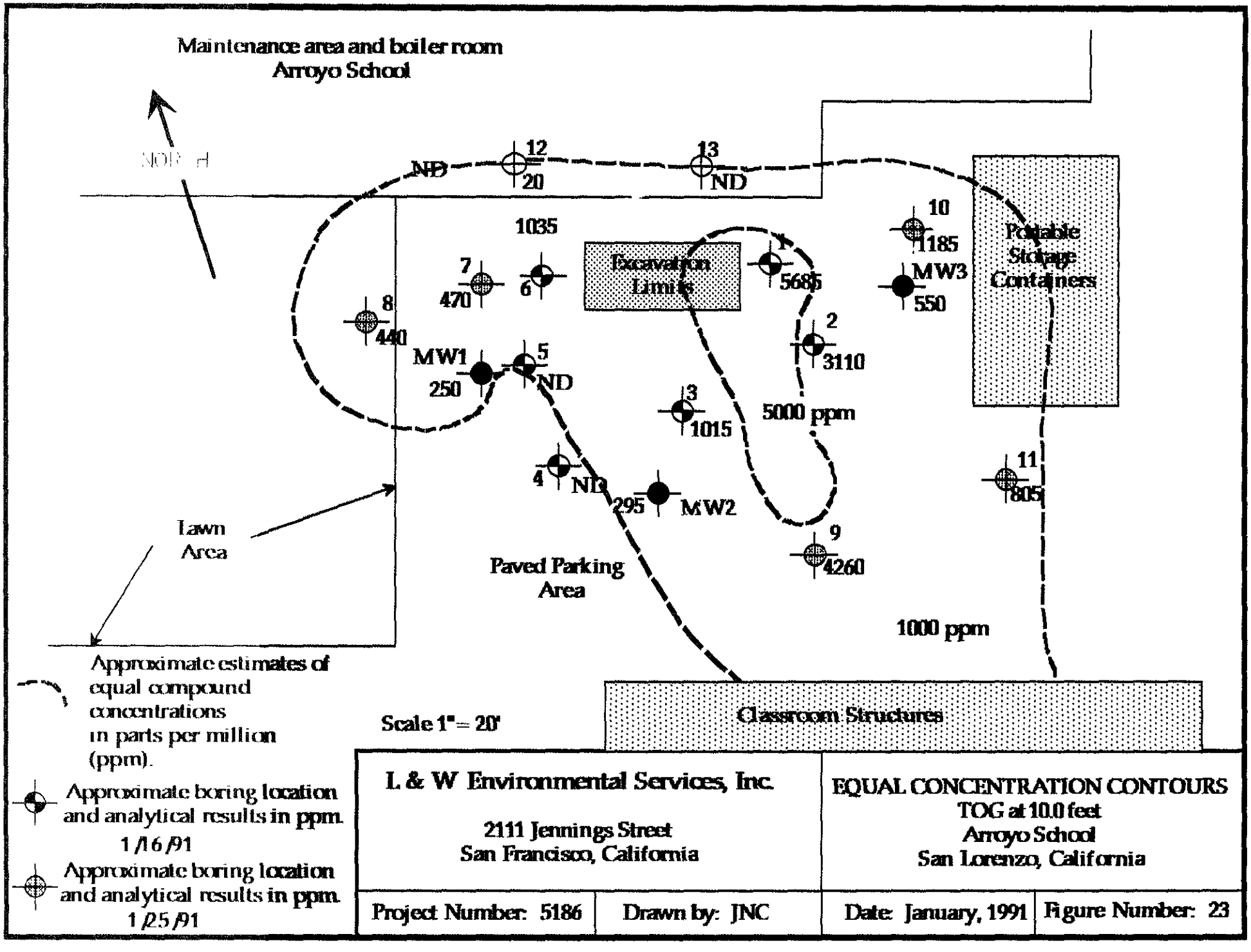

Maintenance area and boiler room
Arroyo School
ND 12
ND 13
ND
ND 10
Portable Storage Containers
ND 6
Excavation Limits
1
ND
7
ND
MW3
ND
8
ND
2
ND
MW1
ND
5
ND
3
ND
4
ND
MW2
ND
11
ND
9
ND
Lawn Area
Paved Parking Area
Approximate estimates of equal compound concentrations in parts per million (ppm).
Scale 1"= 20'
Classroom Structures
Approximate boring location and analytical results in ppm. 1/16/91
Approximate boring location and analytical results in ppm. 1/25/91
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
EQUAL CONCENTRATION CONTOURS
TPH-d at 5.0 feet
Arroyo School
San Lorenzo, California
Project Number: 5186
Drawn by: JNC
Date: January, 1991
Figure Number: 19

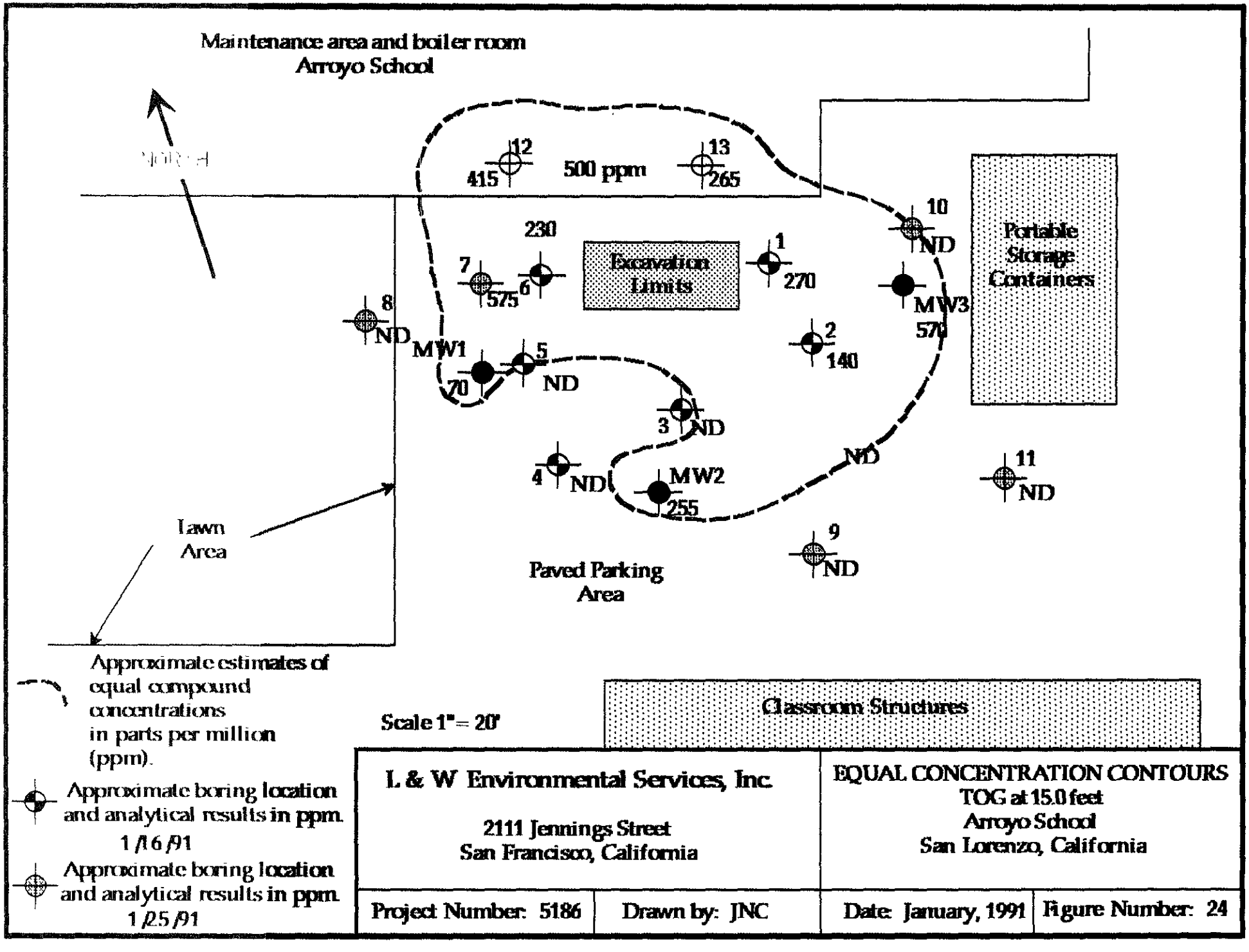


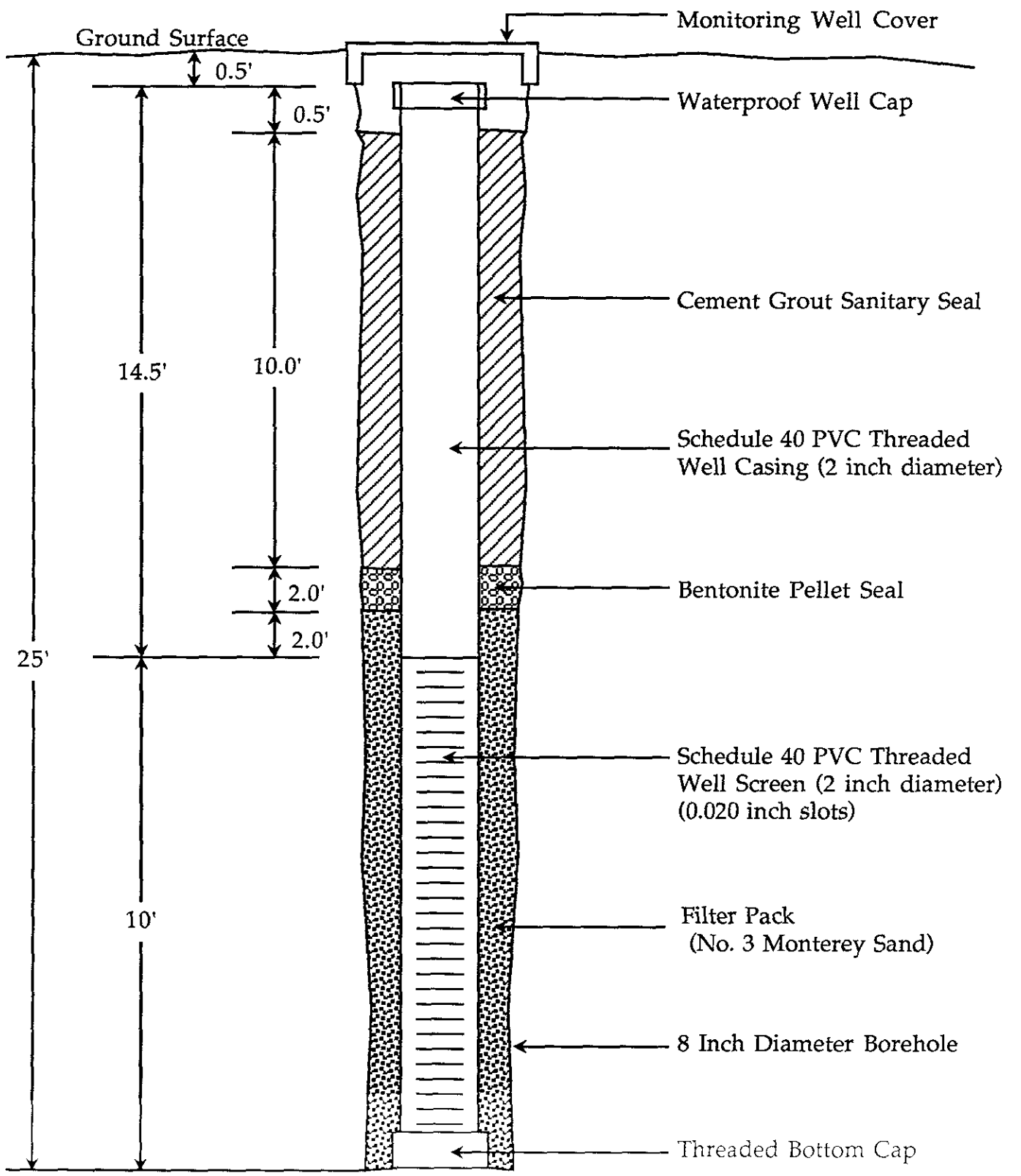
L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California		EQUAL CONCENTRATION CONTOURS TPH-d at 10.0 feet Arroyo School San Lorenzo, California	
Project Number: 5186	Drawn by: JNC	Date: January, 1991	Figure Number: 20


Maintenance area and boiler room
Arroyo School
NORTH
12
110
13
290
10
13
ND
Excavation Limits
1
80
Portable Storage Containers
7
ND
6
MW3
20
8
ND
2
40
MW1
25
5
12
100 ppm
3
80
ND
4
ND
11
20
ND
MW2
Lawn Area
Paved Parking Area
9
ND
Approximate estimates of equal compound concentrations in parts per million (ppm).
Approximate boring location and analytical results in ppm. 1/16/91
Approximate boring location and analytical results in ppm. 1/25/91
Scale 1"= 20'
Classroom Structures
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
EQUAL CONCENTRATION CONTOURS
TPH-d at 15.0 feet
Arroyo School
San Lorenzo, California
Project Number: 5186
Drawn by: JNC
Date: January, 1991
Figure Number: 21

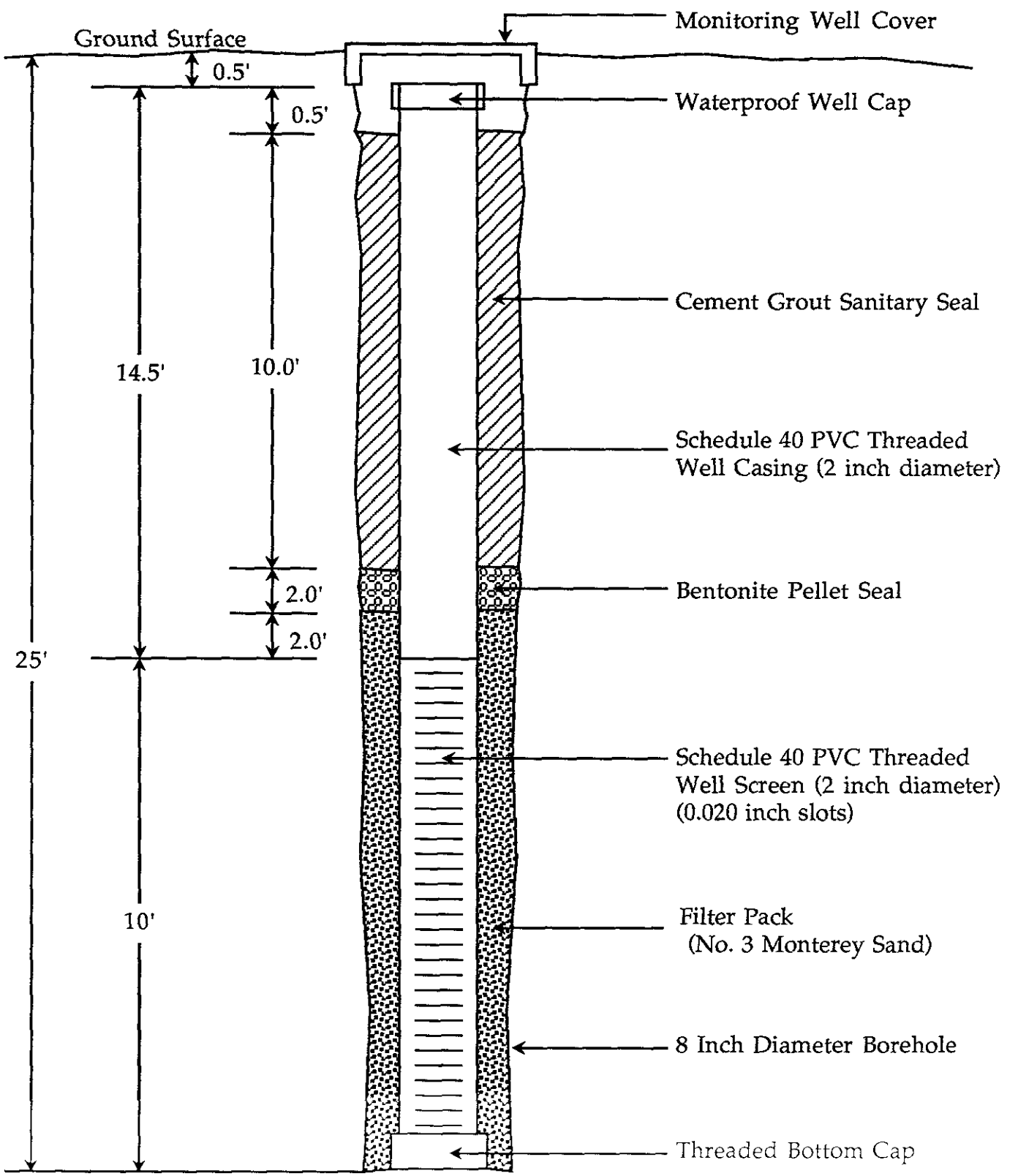

Maintenance area and boiler room
Arroyo School
NORTH
12
50
13
ND
10
105
Portable
Storage
Containers
Excavation
Limits
1
25
7
360
6
ND
MW3
195
8
ND
2
110
100 ppm
MW1
275
5
ND
3
135
1000 ppm
4
480
MW2
925
11
25
ND
9
ND
Lawn
Area
Paved Parking
Area
Approximate estimates of
equal compound
concentrations
in parts per million
(ppm).
Approximate boring location
and analytical results in ppm
1/16/91
Approximate boring location
and analytical results in ppm
1/25/91
Scale 1"= 20'
Classroom Structures
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
EQUAL CONCENTRATION CONTOURS
TOG at 5.0 feet
Arroyo School
San Lorenzo, California
Project Number: 5186
Drawn by: JNC
Date: January, 1991
Figure Number: 22


Maintenance area and boiler room
Arroyo School
NORTH
ND
12
20
13
ND
1035
7
470
6
Excavation Limits
1
5685
10
1185
MW3
550
Portable Storage Containers
8
440
MW1
250
5
ND
2
3110
3
1015
5000 ppm
4
ND
295
MW2
11
805
9
4260
Lawn Area
Paved Parking Area
1000 ppm
Classroom Structures
Scale 1" = 20'
Approximate estimates of equal compound concentrations in parts per million (ppm).
Approximate boring location and analytical results in ppm. 1/16/91
Approximate boring location and analytical results in ppm. 1/25/91
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
EQUAL CONCENTRATION CONTOURS
TOG at 10.0 feet
Arroyo School
San Lorenzo, California
Project Number: 5186
Drawn by: JNC
Date: January, 1991
Figure Number: 23

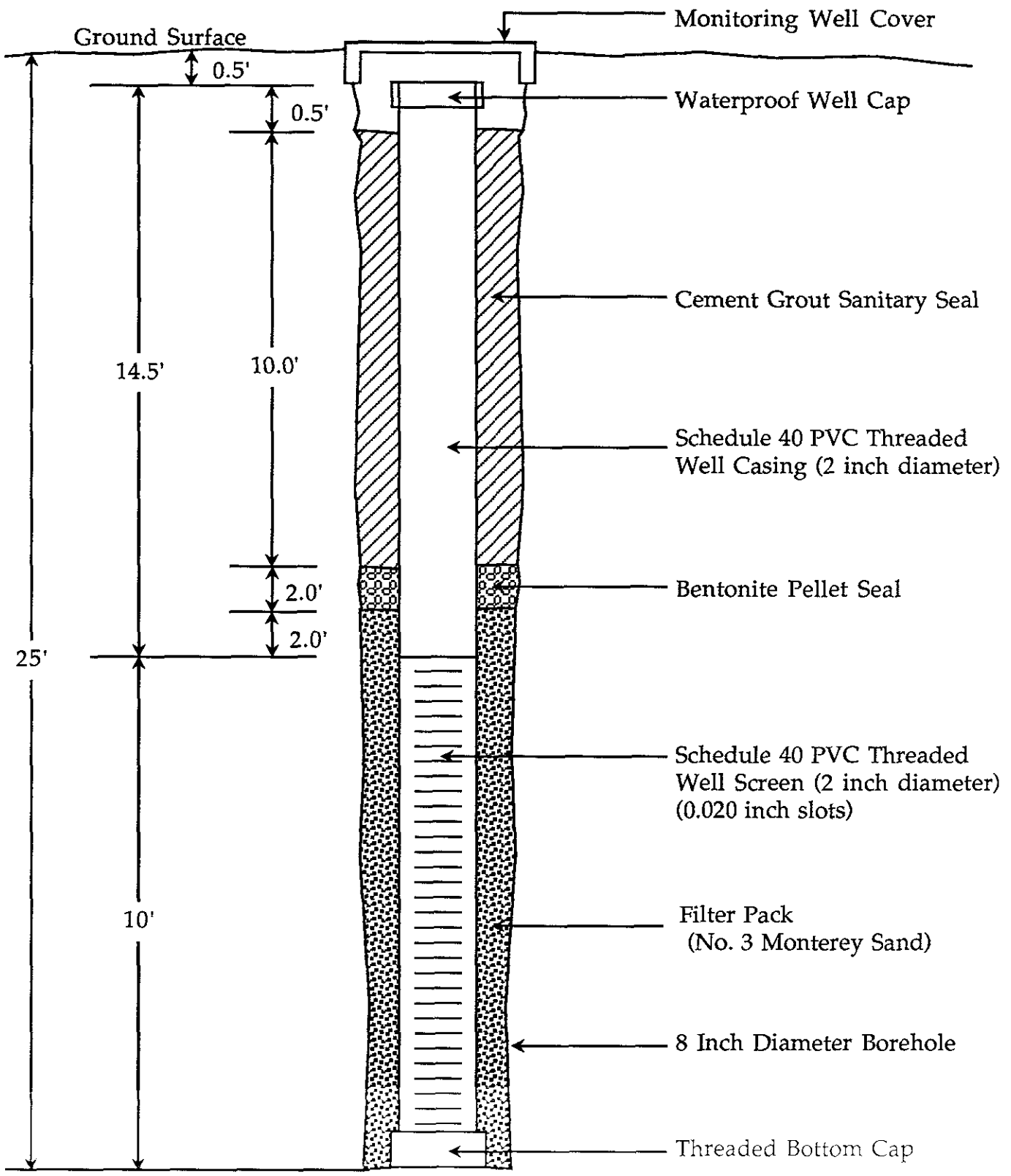

Maintenance area and boiler room
Arroyo School
NORTH
12
415
500 ppm
13
265
10
ND
Portable
Storage
Containers
230
7
575
6
Excavation
Limits
1
270
MW3
570
8
ND
MW1
70
5
ND
2
140
3
ND
4
ND
MW2
255
ND
11
ND
9
ND
Lawn
Area
Paved Parking
Area
Approximate estimates of
equal compound
concentrations
in parts per million
(ppm).
Approximate boring location
and analytical results in ppm.
1/16/91
Approximate boring location
and analytical results in ppm.
1/25/91
Scale 1"= 20'
Classroom Structures
L & W Environmental Services, Inc.
2111 Jennings Street
San Francisco, California
EQUAL CONCENTRATION CONTOURS
TOG at 15.0 feet
Arroyo School
San Lorenzo, California
Project Number: 5186
Drawn by: JNC
Date: January, 1991
Figure Number: 24



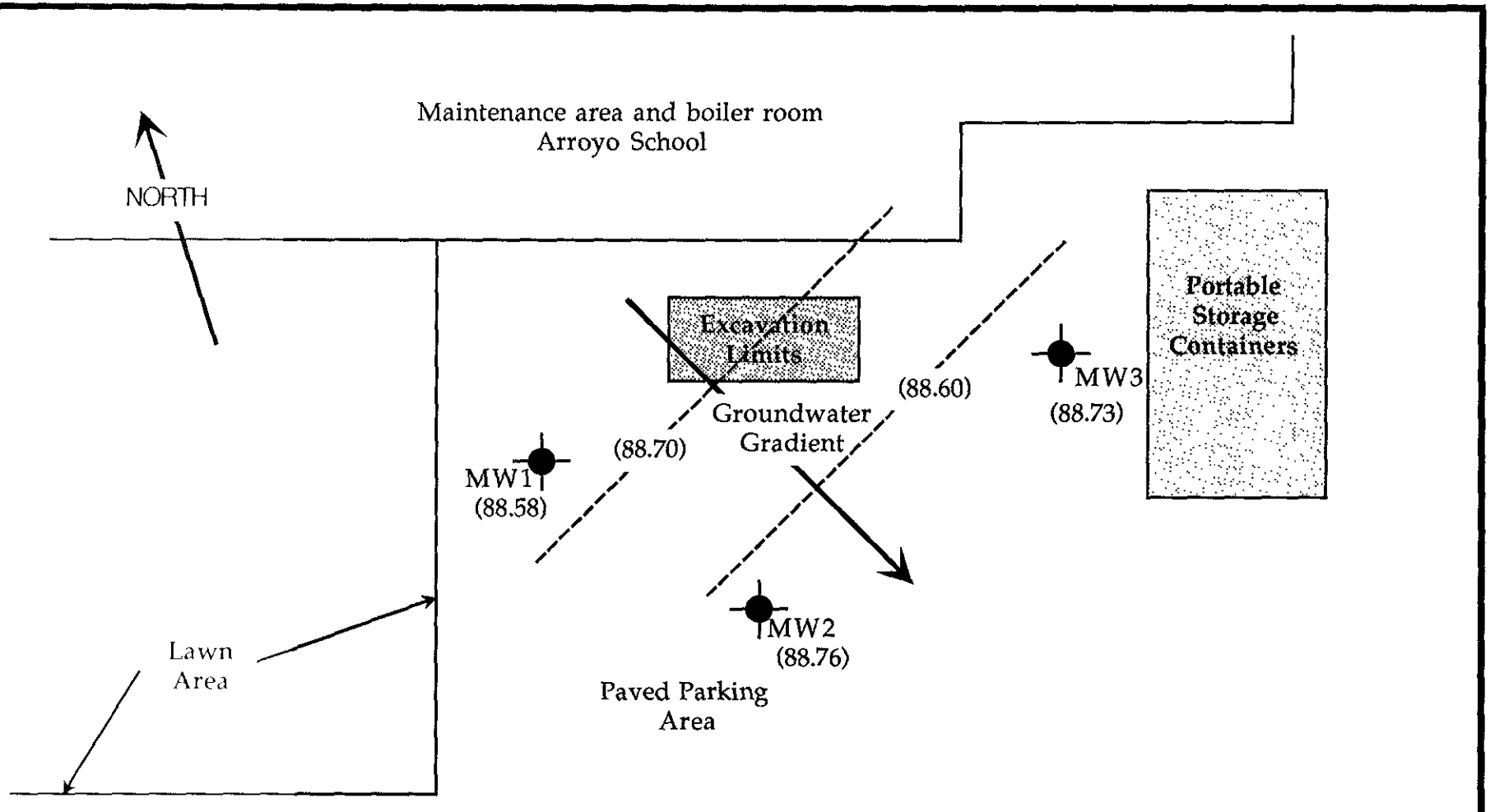
L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Arroyo School Lorenzo Avenue San Lorenzo, California	Monitoring Well MW-1 Installation Detail
Project Number: 5186	Date: January, 1991	Figure Number: 25



L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Arroyo School Lorenzo Avenue San Lorenzo, California	Monitoring Well MW-2 Installation Detail
Project Number: 5186	Date: January, 1991	Figure Number: 26



L & W Environmental Services, Inc. 2111 Jennings Street San Francisco, California	Arroyo School Lorenzo Avenue San Lorenzo, California	Monitoring Well MW-3 Installation Detail
Project Number: 5186	Date: January, 1991	Figure Number:27



Scale 1"= 20'

Lines of equal groundwater elevation

Approximate monitoring well location and groundwater elevation.

L & W Environmental Services, Inc. **2111 Jennings Street** **San Francisco, California**		**GROUNDWATER GRADIENT** **Arroyo School** **San Lorenzo, California**	
Project Number: 5186	Drawn by: JNC	Date: January, 1991	Figure Number: 28

APPENDIX B

Laboratory Certificates and Chain of Custody Forms

SOIL AND GROUNDWATER
INVESTIGATION

ARROYO SCHOOL
SAN LORENZO, CALIFORNIA

L&W Project 5186
February 16, 1991

CHAIN OF CUSTODY

24 HRS

1 of 2 pgs

SAMPLERS: (Signature)

PROJECT NAME: Arroyo High School JOB NUMBER: 5187

DESCRIPTION: Heating Oil Tank

ADDRESS: San Lorenzo

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER		STATION LOCATION	TOTAL PETROLEUM HYDROCARBONS	BTX & E	VOC - EPA 8240	TOTAL OIL & GREASE	TETRAETHYL LEAD					REMARKS
5187 1-5.0	1/16/91	0855	✓			Boring 1 @ 5.0'	X	X		X						
5187-1-10.0	1/16/91	0915	✓			Boring 1 @ 10.0'	X	X		X						
5187-1-15.0	1/16/91	0935	✓			Boring 1 @ 15.0'	X	X		X						
5187-1-20.0	1/16/91	0945	✓			Boring 1 @ 20.0'	X	X		X						
5187-2-5.0	1/16/91	0945	✓			Boring 2 @ 5.0'	X	X		X						
5187-2-10.0	1/16/91	0955	✓			Boring 2 @ 10.0'	X	X		X						
5187-2-15.5	1/16/91	1005	✓			Boring 2 @ 15.5	X	X		X						
5187-3-5.0	1/16/91	1035	✓			Boring 3 @ 5.0'	X	X		X						
5187-3-10.0	1/16/91	1045	✓			Boring 3 @ 10.0'	X	X		X						
5187-4-5.0	1/16/91	1120	✓			Boring 4 @ 5.0'	X	X		X						
5187-4-10.0	1/16/91	1130	✓			Boring 4 @ 10.0'	X	X		X						
5187-4-15.0	1/16/91	1140	✓			Boring 4 @ 15.0	X	X		X						
5187-5-5.0	1/16/91	1230	✓			Boring 5 @ 5.0	X	X		X						
5187-5-10.0	1/16/91	1235	✓			Boring 5 @ 10.0	X	X		X						
5187-3-15.0	1/16/91	1055	✓			Boring 3 @ 15.0	X	X		X						*Out of Sequence
5187-5-15.0	1/16/91	1250	✓			Boring 5 @ 15.0	X	X		X						

RELINQUISHED BY: (Signature)	DATE 1/16/91	RECEIVED BY: (Signature)	DATE 1/16/91
	TIME 3:36		TIME 3:36
RELINQUISHED BY: (Signature)	DATE 1/16/91	RECEIVED BY: (Signature)	DATE 1/16/91
	TIME 5:44		TIME 5:44 PM
RELINQUISHED BY: (Signature)	DATE 1/17/91	RECEIVED BY: (Signature)	DATE 1/17/91
	TIME 7:55 AM		TIME 7:55 AM
RELINQUISHED BY: (Signature)	DATE	RECEIVED FOR LABORATORY BY: (Signature)	DATE
	TIME		TIME

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/16/91
Reported: 01/22/91
Job #: 72170

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/kg

Lab ID	Client ID	Diesel	MDL
72170-1	5187-1- 5.0'	ND<10	10
72170-2	5187-1-10.0'	970	200
72170-3	5187-1-15.0'	80	10
72170-4	5187-1-20.0'	ND<10	10
72170-5	5187-2- 5.0'	ND<10	10
72170-6	5187-2-10.0'	1720	100
72170-7	5187-2-15.0'	40	10
72170-8	5187-3- 5.0'	ND<10	10
72170-9	5187-3-10.0'	240	10
72170-10	5187-4- 5.0'	ND<10	10
72170-11	5187-4-10.0'	ND<10	10
72170-12	5187-4-15.0'	ND<10	10
72170-13	5187-5- 5.0'	ND<10	10
72170-14	5187-5-10.0'	ND<10	10
72170-15	5187-3-15.0'	80	10
72170-16	5187-5-15.0'	12	10

QA/QC: Spike Recovery for Diesel: 97%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director
JC/dc

Precision Analytical Laboratory, Inc.
4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222 3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/17/91
Reported: 01/22/91
Job #: 72171

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/kg

Lab ID	Client ID	Diesel	MDL
72171-1	5187-6- 5.0'	ND<10	10
72171-2	5187-6-10.0'	1020	10
72171-3	5187-6-15.0'	ND<10	10

QA/QC: Spike Recovery for Diesel: 89%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/16/91
Reported: 01/22/91
Job #: 72170

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72170-1	5187-1- 5.0'	ND<0.015	0.015	ND<0.015	0.015
72170-2	5187-1-10.0'	ND<0.015	0.015	0.09	0.015
72170-3	5187-1-15.0'	ND<0.015	0.015	ND<0.015	0.015
72170-4	5187-1-20.0'	ND<0.015	0.015	ND<0.015	0.015
72170-5	5187-2- 5.0'	ND<0.015	0.015	ND<0.015	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72170-1	5187-1- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72170-2	5187-1-10.0'	ND<0.015	0.015	1.9	0.045
72170-3	5187-1-15.0'	ND<0.015	0.015	ND<0.045	0.045
72170-4	5187-1-20.0'	ND<0.015	0.015	ND<0.045	0.045
72170-5	5187-2- 5.0'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 83%
Spike Recovery for Toluene: 88%
Spike Recovery for O-Xylene: 90%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

L & W Environmental Services
Job No.: 72170

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72170-6	5187-2-10.0'	ND<0.015	0.015	ND<0.015	0.015
72170-7	5187-2-15.0'	ND<0.015	0.015	ND<0.015	0.015
72170-8	5187-3- 5.0'	ND<0.015	0.015	ND<0.015	0.015
72170-9	5187-3-10.0'	ND<0.015	0.015	ND<0.015	0.015
72170-10	5187-4- 5.0'	ND<0.015	0.015	ND<0.015	0.015
72170-11	5187-4-10.0'	ND<0.015	0.015	ND<0.015	0.015
72170-12	5187-4-15.0'	ND<0.015	0.015	ND<0.015	0.015
72170-13	5187-5- 5.0'	ND<0.015	0.015	ND<0.015	0.015
72170-14	5187-5-10.0'	ND<0.015	0.015	ND<0.015	0.015
72170-15	5187-3-15.0'	ND<0.015	0.015	ND<0.015	0.015
72170-16	5187-5-15.0'	ND<0.015	0.015	ND<0.015	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72170-6	5187-2-10.0'	ND<0.015	0.015	1.3	0.045
72170-7	5187-2-15.0'	ND<0.015	0.015	ND<0.045	0.045
72170-8	5187-3- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72170-9	5187-3-10.0'	ND<0.015	0.015	ND<0.045	0.045
72170-10	5187-4- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72170-11	5187-4-10.0'	ND<0.015	0.015	ND<0.045	0.045
72170-12	5187-4-15.0'	ND<0.015	0.015	ND<0.045	0.045
72170-13	5187-5- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72170-14	5187-5-10.0'	ND<0.015	0.015	ND<0.045	0.045
72170-15	5187-3-15.0'	ND<0.015	0.015	ND<0.045	0.045
72170-16	5187-5-15.0'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 83%
Spike Recovery for Toluene: 88%
Spike Recovery for O-Xylene: 90%

MDL: Method detection limit; Compound below this level would not be detected.

Precision Analytical Laboratory, Inc.
4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222 3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

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Job #: 72171

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72171-1	5187-6- 5.0'	ND<0.015	0.015	ND<0.015	0.015
72171-2	5187-6-10.0'	ND,0.015	0.015	ND<0.015	0.015
72171-3	5187-6-15.0'	ND<0.015	0.015	ND<0.015	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72171-1	5187-6- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72171-2	5187-6-10.0'	ND,0.015	0.015	ND<0.045	0.045
72171-3	5187-6-15.0'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 88%
Spike Recovery for Toluene: 90%
Spike Recovery for O-Xylene: 94%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/16/91
Reported: 01/22/91
Job #: 72170

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Oil & Grease Analysis
EPA Method 9071
mg/kg

Lab ID	Client ID	Oil & Grease	MDL
72170-1	5187-1- 5.0'	25	20
72170-2	5187-1-10.0'	5685	20
72170-3	5187-1-15.0'	270	20
72170-4	5187-1-20.0'	25	20
72170-5	5187-2- 5.0'	110	20
72170-6	5187-2-10.0'	3110	20
72170-7	5187-2-15.0'	140	20
72170-8	5187-3- 5.0'	135	20
72170-9	5187-3-10.0'	1015	20
72170-10	5187-4- 5.0'	480	20
72170-11	5187-4-10.0'	ND<20	20
72170-12	5187-4-15.0'	ND<20	20
72170-13	5187-5- 5.0'	ND<20	20
72170-14	5187-5-10.0'	ND<20	20
72170-15	5187-3-15.0'	ND<20	20
72170-16	5187-5-15.0'	ND<20	20

QA/QC: Spike Recovery for Sample #1 - 8: 90%
Spike Recovery for Sample #9 - 16: 87%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/17/91
Reported: 01/22/91
Job #: 72171

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Oil & Grease Analysis
EPA Method 9071
mg/kg

Lab ID	Client ID	Oil & Grease	MDL
72171-1	5187-6- 5.0'	ND<20	20
72171-2	5187-6-10.0'	1035	20
72171-3	5187-6-15.0'	230	20

QA/QC: Spike Recovery for Oil & Grease: 97%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

CHAIN OF CUSTODY

72201

SAMPLERS: (Signature) [signature]

PROJECT NAME: Arroyo School

JOB NUMBER: 5186

DESCRIPTION: Fuel Oil Tank

ADDRESS: San Lorenzo, CA

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER		STATION LOCATION	TOTAL PETROLEUM HYDROCARBONS	BTX & E	VOC - EPA 8240	TOTAL OIL & GREASE	TETRAETHYL LEAD			REMARKS
5186-7-5.0	1/25/91	0915	✓			Boring 7 @ 5.0'	✓	✓		✓				
5186-7-10.0	1/25/91	0925	✓			Boring 7 @ 10.0'	✓	✓		✓				
5186-7-15.0	1/25/91	0940	✓			Boring 7 @ 15.0'	✓	✓		✓				
5186-8-5.0	1/25/91	1030	✓			Boring 8 @ 5.0'	✓	✓		✓				
5186-8-10.0	1/25/91	1040	✓			Boring 8 @ 10.0'	✓	✓		✓				
5186-8-15.0	1/25/91	1050	✓			Boring 8 @ 15.0'	✓	✓		✓				
5186-9-5.0	1/25/91	1115	✓			Boring 9 @ 5.0'	✓	✓		✓				
5186-9-10.0	1/25/91	1125	✓			Boring 9 @ 10.0'	✓	✓		✓				
5186-9-15.0	1/25/91	1135	✓			Boring 9 @ 15.0'	✓	✓		✓				
5186-10-5.0	1/25/91	1235	✓			Boring 10 @ 5.0'	✓	✓		✓				
5186-10-10.0	1/25/91	1240	✓			Boring 10 @ 10.0'	✓	✓		✓				
5186-10-15.0	1/25/91	1250	✓			Boring 10 @ 15.0'	✓	✓		✓				
5186-11-5.0	1/25/91	1330	✓			Boring 11 @ 5.0	✓	✓		✓				
5186-11-10.0	1/25/91	1330	✓			Boring 11 @ 10.0	✓	✓		✓				
5186-11-15.0	1/25/91	1340				Boring 11 @ 15.0	✓	✓		✓				

RELINQUISHED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
[signature]	DATE 1/25/91 TIME 1510	[signature]	DATE 1/25/91 TIME 1510
[signature]	DATE 1/29/91 TIME 9:05	[signature]	DATE 1/29/91 TIME 9:10P
[signature]	DATE 1/29/91 TIME 10:00 AM	[signature]	DATE 1/29/91 TIME 10:00 am
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE TIME

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/08/91
Job #: 72201

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/kg

Lab ID	Client ID	Diesel	MDL
72201-1	5186-7- 5.0'	ND<10	10
72201-2	5186-7-10.0'	70	10
72201-3	5186-7-15.0'	ND<10	10
72201-4	5186-8- 5.0'	ND<10	10
72201-5	5186-8- 0.0'	ND<10	10
72201-6	5186-8-15.0'	ND<10	10
72201-7	5186-9- 5.0'	ND<10	10
72201-8	5186-9-10.0'	1140	100
72201-9	5186-9-15.0'	ND<10	10
72201-10	5186-10- 5.0'	ND<10	10
72201-11	5186-10-10.0'	260	50
72201-12	5186-10-15.0'	13	10
72201-13	5186-11- 5.0'	ND<10	10
72201-14	5186-11-10.0'	590	50
72201-15	5186-11-15.0'	20	10

QA/QC: Spike Recovery for Diesel: 97%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/08/91
Job #: 72201

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72201-1	5186-7- 5.0'	ND<0.015	0.015	0.1	0.015
72201-2	5186-7-10.0'	ND<0.015	0.015	0.05	0.015
72201-3	5186-7-15.0'	ND<0.015	0.015	0.05	0.015
72201-4	5186-8- 5.0'	ND<0.015	0.015	0.3	0.015
72201-5	5186-8-10.0'	ND<0.015	0.015	0.08	0.015
72201-6	5186-8-15.0'	ND<0.015	0.015	0.03	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72201-1	5186-7- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72201-2	5186-7-10.0'	ND<0.015	0.015	ND<0.045	0.045
72201-3	5186-7-15.0'	ND<0.015	0.015	ND<0.045	0.045
72201-4	5186-8- 5.0'	ND<0.015	0.015	0.07	0.045
72201-5	5186-8-10.0'	ND<0.015	0.015	ND<0.045	0.045
72201-6	5186-8-15.0'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 87%
Spike Recovery for Toluene: 86%
Spike Recovery for O-Xylene: 87%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72201-7	5186-9- 5.0'	ND<0.015	0.015	0.2	0.015
72201-8	5186-9-10.0'	ND<0.15	0.15	0.4	0.15
72201-9	5186-9-15.0'	ND<0.015	0.015	0.05	0.015
72201-10	5186-10- 5.0'	ND<0.015	0.015	0.04	0.015
72201-11	5186-10-10.0'	ND<0.03	0.03	0.18	0.03
72201-12	5186-10-15.0'	ND<0.015	0.015	0.05	0.015
72201-13	5186-11- 5.0'	ND<0.015	0.015	0.25	0.015
72201-14	5186-11-10.0'	ND<0.03	0.03	0.1	0.03
72201-15	5186-11-15.0'	ND<0.015	0.015	0.05	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72201-7	5186-9- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72201-8	5186-9-10.0'	ND<0.15	0.15	ND<0.3	0.3
72201-9	5186-9-15.0'	ND<0.015	0.015	ND<0.045	0.045
72201-10	5186-10- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72201-11	5186-10-10.0'	ND<0.03	0.03	0.5	0.06
72201-12	5186-10-15.0'	ND<0.015	0.015	ND<0.045	0.045
72201-13	5186-11- 5.0'	ND<0.015	0.015	ND<0.045	0.045
72201-14	5186-11-10.0'	ND<0.03	0.03	ND<0.06	0.06
72201-15	5186-11-15.0'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 87%
Spike Recovery for Toluene: 86%
Spike Recovery for O-Xylene: 87%

MDL: Method detection limit; Compound below this level would not be detected.

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/08/91
Job #: 72201

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Oil & Grease Analysis
EPA Method 9071
mg/kg

Lab ID	Client ID	Oil & Grease	MDL
72201-1	5186-7- 5.0'	360	20
72201-2	5186-7-10.0'	470	20
72201-3	5186-7-15.0'	575	20
72201-4	5186-8- 5.0'	ND<20	20
72201-5	5186-8-10.0'	440	20
72201-6	5186-8-15.0'	ND<20	20
72201-7	5186-9- 5.0'	ND<20	20
72201-8	5186-9-10.0'	4260	20
72201-9	5186-9-15.0'	ND<20	20
72201-10	5186-10- 5.0'	105	20
72201-11	5186-10-10.0'	1185	20
72201-12	5186-10-15.0'	ND<20	20
72201-13	5186-11- 5.0'	25	20
72201-14	5186-11-10.0'	805	20
72201-15	5186-11-15.0'	ND<20	20

QA/QC: Spike Recovery for Samples #1 thru 9: 93%
Spike Recovery for Samples #10 thru 15: 80%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

CHAIN OF CUSTODY

SAMPLERS: (Signature) Surjeet Sidhu

PROJECT NAME: ARROYO HIGH SCHOOL JOB NUMBER: 5186

DESCRIPTION: SOIL SAMPLES

ADDRESS: SAN LORENZO, CA.

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER			STATION LOCATION	TOTAL PETROLEUM HYDROCARBONS	BTX & E	VOC - EPA 8240	TOTAL OIL & GREASE	TETRAETHYL LEAD				REMARKS
5186-12-5'	1/24/91	12:45 PM	X					X	X		X					
5186-12-10'	1/28/91	1:15 PM	X					X	X		X					
5186-12-15'	1/28/91	1:40 PM	X					X	X		X					
5186-13-5'	1/28/91	2:10 PM	X					X	X		X					
5186-13-10'	1/28/91	2:30 PM	X					X	X		X					
5186-13-15'	1/28/91	3:00 PM	X					X	X		X					

RELINQUISHED BY: (Signature) Surjeet Sidhu	DATE 1/28/91 TIME 4:00 pm	RECEIVED BY: (Signature) Lorraine Mantovani	DATE 1/28/91 TIME 4:00pm
RELINQUISHED BY: (Signature) Lorraine Mantovani	DATE 1/29/91 TIME 9:05am	RECEIVED BY: (Signature) Lakhwant Sidhu	DATE 1/29/91 TIME 9:16 AM
RELINQUISHED BY: (Signature) Lakhwant Sidhu	DATE 1/29/91 TIME 10:AM	RECEIVED BY: (Signature) Harbinder Sidhu	DATE 1/29/91 TIME 10:AM
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE TIME

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/04/91
Job #: 72200

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/kg

Lab ID	Client ID	Diesel	MDL	Gasoline	MDL
72200-1	5186-12- 5'	ND<10	10	ND<10	10
72200-2	5186-12-10'	20	10	ND<10	10
72200-3	5186-12-15'	110	10	ND<10	10
72200-4	5186-13- 5'	ND<10	10	ND<10	10
72200-5	5186-13-10'	17	10	ND<10	10
72200-6	5186-13-15'	290	50	ND<10	10

QA/QC: Spike Recovery for Diesel: 94%
Spike Recovery for Gasoline: 107%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/04/91
Job #: 72200

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72200-1	5186-12- 5'	ND<0.015	0.015	ND<0.015	0.015
72200-2	5186-12-10'	ND<0.015	0.015	ND<0.015	0.015
72200-3	5186-12-15'	ND<0.015	0.015	ND<0.015	0.015
72200-4	5186-13- 5'	ND<0.015	0.015	ND<0.015	0.015
72200-5	5186-13-10'	ND<0.015	0.015	ND<0.015	0.015
72200-6	5186-13-15'	ND<0.015	0.015	0.02	0.015

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72200-1	5186-12- 5'	ND<0.015	0.015	ND<0.045	0.045
72200-2	5186-12-10'	ND<0.015	0.015	ND<0.045	0.045
72200-3	5186-12-15'	ND<0.015	0.015	ND<0.045	0.045
72200-4	5186-13- 5'	ND<0.015	0.015	ND<0.045	0.045
72200-5	5186-13-10'	ND<0.015	0.015	ND<0.045	0.045
72200-6	5186-13-15'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 82%
Spike Recovery for Toluene: 92%
Spike Recovery for O-Xylene: 90%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 01/29/91
Reported: 02/04/91
Job #: 72200

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Oil & Grease Analysis
EPA Method 9071
mg/kg

Lab ID	Client ID	Oil & Grease	MDL
72200-1	5186-12- 5'	50	20
72200-2	5186-12-10'	20	20
72200-3	5186-12-15'	415	20
72200-4	5186-13- 5'	ND<20	20
72200-5	5186-13-10'	ND<20	20
72200-6	5186-13-15'	265	20

QA/QC: Spike Recovery for Oil & Grease: 88%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

CHAIN OF CUSTODY

SAMPLERS: (Signature) [signature]

PROJECT NAME: Arroyo School JOB NUMBER: 5186

DESCRIPTION: Fuel Oil Tank

ADDRESS: San Lorenzo, CA

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER		STATION LOCATION	TOTAL PETROLEUM HYDROCARBONS as diesel	BTX & E	VOC - EPA 8240	TOTAL OIL & GREASE	TETRAETHYL LEAD				REMARKS
5186-MW1-5.0	1/31/91	0925	✓			Boring MW1 @ 5.0'	✓	✓		✓					
5186-MW1-10.0	1/31/91	0935	✓			Boring MW1 @ 10.0'	✓	✓		✓					
5186-MW1-15.0	1/31/91	0950	✓			Boring MW1 @ 15.0'	✓	✓		✓					
5186-MW2-5.0	1/31/91	1110	✓			Boring MW2 @ 5.0'	✓	✓		✓					
5186-MW2-10.0	1/31/91	1120	✓			Boring MW2 @ 10.0'	✓	✓		✓					
5186-MW2-15.0	1/31/91	1130	✓			Boring MW2 @ 15.0'	✓	✓		✓					
5186-MW3-5.0	1/31/91	1305	✓			Boring MW3 @ 5.0	✓	✓		✓					
5186-MW3-10.0	1/31/91	1320	✓			Boring MW3 @ 10.0	✓	✓		✓					
5186-MW3-15.0	1/31/91	1330	✓			Boring MW3 @ 15.0	✓	✓		✓					

RELINQUISHED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
[signature]	1/31/91 1:43pm	[signature]	1/31/91 1:43 PM
[signature]	1/31/91 430	Lorraine Manfredini	1/31/91 430pm
Lorraine Manfredini	2/1/91 3:45pm	Lakhwant Sidhu	2/1/91 3:50P
Lakhwant Sidhu	2/4/91 6:30P	Kulwinder Sidhu	2/4/91 6:30pm

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/04/91
Reported: 02/12/91
Job #: 72218

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/kg

Lab ID	Client ID	Diesel	MDL
72218-1	5186-MW1- 5'	ND<10	10
72218-2	5186-MW1-10'	ND<10	10
72218-3	5186-MW1-15'	25	10
72218-4	5186-MW2- 5'	ND<10	10
72218-5	5186-MW2-10'	ND<10	10
72218-6	5186-MW2-15'	ND<10	10
72218-7	5186-MW3- 5'	ND<10	10
72218-8	5186-MW3-10'	20	10
72218-9	5186-MW3-15'	20	10

QA/QC: Spike Recovery for Diesel: 98%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/04/91
Reported: 02/12/91
Job #: 72218

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72218-1	5186-MW1- 5'	ND<0.015	0.015	ND<0.02	0.02
72218-2	5186-MW1-10'	ND<0.015	0.015	ND<0.02	0.02
72218-3	5186-MW1-15'	ND<0.015	0.015	ND<0.02	0.02
72218-4	5186-MW2- 5'	ND<0.015	0.015	ND<0.02	0.02
72218-5	5186-MW2-10'	ND<0.015	0.015	ND<0.02	0.02

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72218-1	5186-MW1- 5'	ND<0.015	0.015	ND<0.045	0.045
72218-2	5186-MW1-10'	ND<0.015	0.015	ND<0.045	0.045
72218-3	5186-MW1-15'	ND<0.015	0.015	ND<0.045	0.045
72218-4	5186-MW2- 5'	ND<0.015	0.015	ND<0.045	0.045
72218-5	5186-MW2-10'	ND<0.015	0.015	ND<0.045	0.045

QA/QC: Spike Recovery for Benzene: 71%
Spike Recovery for Toluene: 93%
Spike Recovery for O-Xylene: 93%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

L & W Environmental Services
Job No.: 72218

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Aromatic Volatile Hydrocarbon Analysis
EPA Method 8020
mg/kg

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72218-6	5186-MW2-15'	ND<0.015	0.015	ND<0.02	0.02
72218-7	5186-MW3- 5'	ND<0.015	0.015	ND<0.02	0.02
72218-8	5186-MW3-10'	ND<0.015	0.015	0.05	0.02
72218-9	5186-MW3-15'	ND<0.015	0.015	0.04	0.02

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72218-6	5186-MW2-15'	ND<0.015	0.015	ND<0.045	0.045
72218-7	5186-MW3- 5'	ND<0.015	0.015	ND<0.045	0.045
72218-8	5186-MW3-10'	ND<0.015	0.015	ND<0.045	0.045
72218-9	5186-MW3-15'	ND<0.015	0.015	0.09	0.045

QA/QC: Spike Recovery for Benzene: 71%
Spike Recovery for Toluene: 93%
Spike Recovery for O-Xylene: 93%

MDL: Method detection limit; Compound below this level would not be detected.

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/04/91
Reported: 02/12/91
Job #: 72218

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo High School - San Lorenzo, CA.
Matrix: Soil

Total Oil & Grease Analysis
EPA Method 9071
mg/kg

Lab ID	Client ID	Oil & Grease	MDL
72218-1	5186-MW1- 5'	275	20
72218-2	5186-MW1-10'	250	20
72218-3	5186-MW1-15'	70	20
72218-4	5186-MW2- 5'	925	20
72218-5	5186-MW2-10'	295	20
72218-6	5186-MW2-15'	255	20
72218-7	5186-MW3- 5'	195	20
72218-8	5186-MW3-10'	550	20
72218-9	5186-MW3-15'	570	20

QA/QC: Spike Recovery for Oil & Grease: 94%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

CHAIN OF CUSTODY

24 HOUR RUSH

72232

SAMPLERS: (Signature) [illegible signature]

PROJECT NAME: [illegible] School | JOB NUMBER: 5186

DESCRIPTION: [illegible] Tank

ADDRESS: San ~~[illegible]~~ Lorenzo

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER		STATION LOCATION	TOTAL PETROLEUM HYDROCARBONS	BTX & E	VOC - EPA 8240	TOTAL OIL & GREASE	TETRAETHYL LEAD				REMARKS
5186-MW1-W	2/7/91	1310		✓		Monitoring Well MW1	✓	✓		✓					2 Liters 3 VOAS
5186-MW2-W	2/7/91	1345		✓		Monitoring Well MW2	✓	✓		✓					2 Liters 3 VOAS
518-MW3-W	2/7/91	14[illegible]		✓		Monitoring Well MW 3	✓	✓		✓					2 Liters 3 VOAS

RELINQUISHED BY: (Signature)	DATE / TIME	RECEIVED BY: (Signature)	DATE / TIME
[illegible signature]	DATE 2/7/91 TIME 2:30 pm	Lakhwant Sidhu	DATE 2/7/91 TIME 3:30 P
Lakhwant Sidhu	DATE 2/7/91 TIME 4:30 P	Kalwinder Sidhu	DATE 2/7/91 TIME 4:30 pm
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED BY: (Signature)	DATE TIME
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE TIME

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/08/91
Reported: 02/11/91
Job #: 72232

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo School - San Lorenzo, CA.
Matrix: Water

Total Petroleum Hydrocarbon Analysis
DHS Extraction Method (LUFT)
mg/L

Lab ID	Client ID	Diesel	MDL
72232-1	5186-MW1-W	0.3	0.05
72232-2	5186-MW2-W	ND<0.05	0.05
72232-3	5186-MW3-W	0.3	0.05

QA/QC: Spike Recovery for Diesel: 113%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/08/91
Reported: 02/11/91
Job #: 72232

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo School - San Lorenzo, CA.
Matrix: Water

Aromatic Volatile Hydrocarbon Analysis
EPA Method 602
ug/L

Lab ID	Client ID	Benzene	MDL	Toluene	MDL
72232-1	5186-MW1-W	ND<0.3	0.3	ND<0.3	0.3
72232-2	5186-MW2-W	ND<0.3	0.3	ND<0.3	0.3
72232-3	5186-MW3-W	ND<0.3	0.3	ND<0.3	0.3

Lab ID	Client ID	Ethyl-benzene	MDL	Xylene	MDL
72232-1	5186-MW1-W	ND<0.3	0.3	ND<0.6	0.6
72232-2	5186-MW2-W	ND<0.3	0.3	ND<0.6	0.6
72232-3	5186-MW3-W	ND<0.3	0.3	ND<0.6	0.6

QA/QC: Spike Recovery for Benzene: 79%
Spike Recovery for Toluene: 104%
Spike Recovery for O-Xylene: 102%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

Precision Analytical Laboratory, Inc.

4136 LAKESIDE DRIVE, RICHMOND, CA 94806 PHONE (415) 222-3002 FAX (415) 222-1251

CERTIFICATE OF ANALYSIS

STATE LICENSE NO. 211

Received: 02/08/91
Reported: 02/11/91
Job #: 72232

Attn: George Wilson
L & W Environmental Services
2111 Jennings Street
San Francisco, CA. 94124

Project: Arroyo School - San Lorenzo, CA.
Matrix: Water

Oil & Grease Analysis
Standard Methods 16th Edition 503A
mg/L

Lab ID	Client ID	Oil & Grease	MDL
72232-1	5186-MW1-W	ND<5.0	5.0
72232-2	5186-MW2-W	ND<5.0	5.0
72232-3	5186-MW3-W	ND<5.0	5.0

QA/QC: Spike Recovery for Benzene: 96%

MDL: Method detection limit; Compound below this level would not be detected.

Jaime Chow
Laboratory Director

JC/dc

APPENDIX C

Water Well Drillers Reports

SOIL AND GROUNDWATER
INVESTIGATION

ARROYO SCHOOL
SAN LORENZO, CALIFORNIA

L&W Project 5186
February 16, 1991

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED