

Cascade Pole Site
Olympia, Washington

Project No. 4905039

**SUPPLEMENTAL SITE
INVESTIGATION REPORT**

Volume II

Appendices

Prepared on behalf of:

Cascade Pole Company
Port of Olympia

Prepared by:

Environmental Science &
Engineering, Inc. (ESE)

Amherst, New Hampshire

July 10, 1992



A CILCORP Company

APPENDIX A

**BORING LOGS AND
WELL CONSTRUCTION DETAILS**



Environmental
Science &
Engineering, Inc.

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LEGEND TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	DESCRIPTION	GRAPHIC LOC
COARSE GRAINED SOILS 50% or more retained on the No. 200 sieve.	GRAVELS More than half of coarse fraction retained on the No. 4 sieve	Clean sands	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.	
		Gravels with fines	GM	Silty gravels, gravel-sand mixtures.	
			GC	Clayey gravels, gravel-sand-clay mixtures.	
	SANDS More than half of coarse fraction passing the No. 4 sieve.	Clean sands	SW	Well-graded sands, gravelly sands, little or no fines.	
			SP	Poorly-graded sands, gravelly sands, little or no fines.	
		Sands with fines	SM	Silty sands, sand-silt mixtures.	
			SC	Clayey sands, sand clay mixtures.	
FINE GRAINED SANDS More than 50% passing the No. 200 sieve.	SILTS AND CLAYS	Liquid Limit below 50%	ML	Inorganic silts and very fine sands.	
			CL	Inorganic clays, gravelly clays, sandy clays, lean clays.	
			OL	Organic silts and organic clays	
			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	
		Liquid Limit 50% and above	CH	Inorganic fat clays.	
			OH	Organic clays or organic silts.	
Highly organic soils			Pt	Peat, organic content greater than 60%.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-1

Date: 1-14-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia

Drilling Method: HSA

Hole Diameter: 6 3/4"

Field location of boring:

NOTE: TIP II malfunctions due to rainy conditions.

Logged By: G. Burgess/Generous

Page No: 1 of 1

Installation Data: Backfill with Bentonite chips

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A		0.0-1.5	ML				0.0'-1.0' Clayey silt, brown, wet, cohesive, soft, no sheen.
1 -		B		1.5-3.0	SP				@1.0' Same as above, 25% shell fragments. @1.5' Sand, fine to medium, brown, loose, wet, 25% shell fragments, no sheen.
2 -					ML				@2.5' Silt, dark gray, soft, moist, some clay, fine sand, some shell fragments, no sheen.
3 -		C		3.0-4.5	ML				@3.5' Sandy silt, fine to medium, gray, moist, soft, some shell fragments, no sheen.
4 -		D		4.5-6.0					
5 -									
6 -		E		6.0-7.5					
7 -		F		7.5-9.0	GW				@7.0' Sandy gravel, fine to coarse gravel, fine to coarse sand black, saturated, loose, heavy oil stain.
8 -									
9 -		G		9.0-10.5	SW				@9.0' Sand, fine to coarse, dark gray, loose, moist, no sheen, 5% shell fragments.
10 -									
11 -		H		10.5-12.0					
12 -		I		12.0-13.5					
13 -									
14 -		J		13.5-15.0					
15 -					ML				@14.5' Silt, brown, cohesive, moderate density, moist, sheen.
16 -		K		15.0-16.5	SP				@15' Sand, fine to medium, dark gray, loose, moist, some coarse sand, 5% shell fragments.
17 -		L		16.5-18.0					
18 -		M		18.0-19.5					
19 -									
20 -		N		19.5-21.0					
21 -									
22 -		O		21.0-22.5	CL				@22.0' Sandy clay, fine grained, gray-green, soft, cohesive very moist, sheen.
						TOTAL DEPTH = 22.5 ft.			

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-1A

Date: 1-22-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

Hole Diameter: 6 3/4"

Logged By: G. Burgess

Page No: 1 of 1

Installation Data: Backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A		0.0-1.5	SP				Sand, fine to medium, 10% shell fragments, grey, dry.	
1 -									@1.0' Silty clay, cohesive, dry, grey.	
2 -		B			1.5-3.0	ML				
3 -						SP				@2.0' Gravelly sand, fine to medium sand, fine to medium gravel, 15% shell fragments, grey, no sheen, saturated.
4 -		C			3.0-4.5					
5 -										
6 -		D			4.5-6.0					
7 -										
8 -		E			6.0-7.5					
9 -										
10 -		F			7.5-9.0					
11 -										
12 -		G			9.0-10.5	ML				@8.5' Silty clay, cohesive, moist, medium density, dark grey to black, no sheen.
13 -										
14 -		H			11.0-12.5					
15 -										
16 -		I			12.5-14.0	SP				@12.5' Sand, fine to medium, 15% shell fragments, dark grey to black, no sheen.
17 -										
18 -	J			14.5-16.0						
19 -										
20 -	K			17.0-18.5						
21 -										
22 -					CL				@18.0' Silty sand, moist, cohesive, medium dense, wood fragments, grey-green, no sheen.	
						TOTAL DEPTH = 18.5 ft.				

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-2

Date: 1-9-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

Hole Diameter: 6 3/4"

Logged By: G. Burgess, J. Bryson

Page No: 1 of 1

Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A	ND	0.0-1.5	SP				Sand, fine to coarse, some fine to coarse gravel, loose moist, 10% shell fragments, grey.	
-		B	ND	1.5-3.0						
1 -										
-										
2 -										
-										
3 -			C	ND	3.0-4.5					
-										
4 -										@4.0' Sand, same as above, dark grey, saturated.
-			D	ND	4.5-6.0					
5 -						ML				@5.0' Silt, moist, tan.
-						SP				@5.1' Sand, fine to coarse, some fine to coarse gravel, loose, 40% shell fragments, gray, saturated.
6 -			E	ND	6.0-7.5					
-										
7 -										
-			F	8	7.5-9.0					
8 -										
-										
9 -			G	2	9.0-10.5					
-										
10 -										
-		H	11	10.5-12.0						
11 -										
-										
12 -		I	8	12.0-13.5						
-										
13 -										
-		J	16	13.5-15.0						
14 -										
-										
15 -		K	5	15.0-16.5	ML				@14.5' Clayey silt, soft, moist, trace very fine sand, grey-green.	
-					SW				@15.0' Sand, fine to coarse, loose, saturated, 40% shell fragments.	
16 -										
-		L	3	16.5-18.0						
17 -										
-										
18 -		M	4	18.0-19.5						
-										
19 -										
-										
20 -		N	2	19.5-21.0						
-										
21 -					CL				@20.5' Silty clay, soft, moist, cohesive, grey-green.	
-										
22 -										

TOTAL DEPTH = 21 ft.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-3

Date: 1-9-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Olympia, Washington

Drilling Method: HSA

Hole Diameter: 8"

Logged By: G. Burgess

Page No: 1 of 1

Installation Data: Backfill with Bentonite Chips

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -					GW				Gravel, fine to coarse, grey, dry, wood fragments	
1 -									@2' Wood fragments, reddish brown, moist	
2 -									@5' Wood fragments, reddish brown, saturated	
3 -			A	18	2.5-4.0					
4 -										
5 -										
6 -										
7 -			B	57	6.5-8.0					@7' Wood fragments, no soil evident, reddish brown, saturated no sheen
8 -										
9 -										@9' Sand, fine-grained, intermixed with wood fragments (~20% sand, 80% wood), saturated, no sheen
10 -			C	32	9.5-11.0	SP				
11 -										
12 -			D	NA	11.5-13.0					@12.5' Silty clay, gray-green, some fine-grained sand lenses moist, soft, no sheen
13 -										
14 -			E	18	13.0-14.5	CL				@15' Silty clay, gray-green, moist, soft, trace of fine sand no sheen
15 -			F	12	14.5-16.0					@16' Sand, gray, fine to medium grained, loose, saturated medium dense, ~40% shell fragments, no sheen
16 -			G	50	16.5-18.0	SP				
17 -										
18 -										
19 -		H	15	18.0-19.5	CL				@19' Silty clay, gray-green, saturated, soft, cohesive, no sheen	
20 -										
21 -										
22 -										

Total Depth = 19.5'

NOTE: Sample "I" submitted as a duplicate for sample "H".

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-4

Date: 1-14-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA


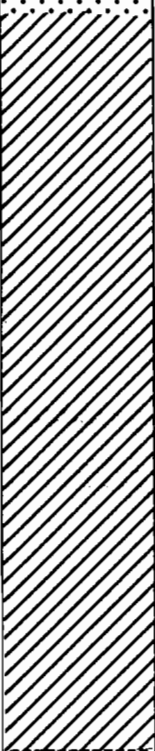
Hole Diameter: 6 3/4"

Logged By: G. Burgess/C. Generous

Page No: 1 of 1

Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A	ND	0.0-1.5	SP				@0-5' Sand, fine to medium, loose, some S H and small to large gravel, grey, moist, 10% shell fragments.	
1 -		B	ND	1.5-3.0						
2 -		C	2	3.0-4.5						
3 -		D	3	4.5-6.0						
4 -		E	75	6.0-7.5						@5.0' Same as above, saturated, no sheen.
5 -		F	6	7.5-9.0						@6.0' Same as above with sheen.
6 -		G	25	9.0-10.5						@7.5' Same as above, no sheen.
7 -		H	35	10.5-12.0		CL				@9.5' Clay, cohesive, moist, soft, 5% shell fragments, occasional wood fragments, no sheen.
8 -		I	19	12.0-13.5						
9 -		J	7	13.5-15.0						
10 -		K	3	15.0-16.5						
11 -		L	76	16.5-18.0						
12 -		M	89	18.0-19.5						
13 -		N	60	19.5-21.0		CL			@20.0' Clay, moist, cohesive, 1-5% shell fragments, gray-green, sheen.	
14 -										
15 -										
16 -										
17 -										
18 -										
19 -										
20 -										
21 -										
22 -									TOTAL DEPTH = 21 ft.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-5

Client: McFarland Cascade

Date: 1-8-91

Location: Olympia, WA

Driller: West Hazmat

Logged By: G. Burgess/J. Bryson

Drilling Method: ESA

Installation Data: Backfilled
w/Bentonite chips to surface.

Hole Diameter: 8"

Page No: 1 of 1

Field location of boring:

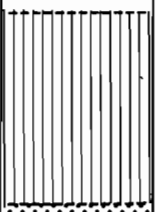

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:						
0 -		A		0.0-2.0	GW				@0-5' Sand gravel, grey brown, fine to coarse gravel, some cobbles, fine to medium gravel, sand, moist, medium dense.						
1 -															
2 -															
3 -															
4 -															
5 -			8		SW				@5' Sand, grey, fine to coarse grained, some gravel & cobbles, trace of silt, saturated, medium dense.						
6 -															
7 -															
8 -															
9 -															
10 -															
11 -															
12 -															
13 -															
14 -															
15 -		B	--	6.5-8.0	SW				As above, some shell fragments.						
16 -															
17 -															
18 -															
19 -															
20 -															
21 -															
22 -															
23 -															
24 -															
10 -		C	1	9.5-11.0	SW				As above, no gravel or cobbles.						
11 -															
12 -															
13 -															
14 -															
15 -															
16 -															
17 -															
18 -															
19 -															
12 -		D	11	11.5-13.0	ML				@ 12.5' Silt, saturated, shell fragments, brown sheen. As above, no sheen, no silt layer.						
13 -															
14 -															
15 -															
16 -															
17 -															
18 -															
19 -															
20 -															
21 -															
13 -			--		SW				@ 13' Sand, grey, fine to coarse, same gravel & cobbles, trace silt, saturated, no sheen.						
14 -															
15 -															
16 -															
17 -															
18 -															
19 -															
20 -															
21 -															
22 -															
14 -			1		SW				@ 15' Sand, as above, sheen.						
15 -															
16 -															
17 -															
18 -															
19 -															
20 -															
21 -															
22 -															
23 -															
15 -			17		SW				As above, sheen.						
16 -															
17 -															
18 -															
19 -															
20 -															
21 -															
22 -															
23 -															
24 -															
17 -			35		SW				As above, sheen.						
18 -															
19 -															
20 -															
21 -															
22 -															
23 -															
24 -															
18 -							E	3		20-21.5	SW				As above, sheen.
19 -															
20 -															
21 -															
22 -															
23 -															
24 -															
19 -			ND		CL									@23.0 Silty clay, grey, some shell fragments, moist, soft, cohesive. TOTAL DEPTH = 24 ft.	
20 -															
21 -															
22 -															
23 -															
24 -															

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039
Client: McFarland Cascade
Location: Olympia, WA
Logged By: G. Burgess/J. Bryson
Installation Data: Completed,
Backfilled w/Bentonite chips
to surface.

Boring No: EB-6
Date: 1-8-91
Driller: West Hazmat
Drilling Method: HSA
Hole Diameter: 8"
Page No: 1 of 1

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A		0 to 9"	ML				Gravelly silt: fine to coarse gravel, moist, dark brown to black, Peat (organic). Appearance--fill.
1 -									
2 -									
3 -		B	8	3.0-4.5	SP				Sand: fine to medium sand, slightly moist, 10% shell fragments, grey, medium dense.
4 -									
5 -									
6 -									
7 -									
8 -									
9 -									
10 -									
11 -									
12 -									
13 -									
14 -									
15 -									
16 -									
17 -									
18 -	D	18	18	Ring-Jar	SP				Sand: as above, sheen.
19 -									
20 -									
21 -	E	20	6		SP				Sand: as above, no sheen.
22 -									
23 -	F	23	ND		SP				Sand: as above, approximately 30% shell fragments.
24 -									
25 -	G	20	5		SP				Sand: as above.
26 -									
27 -	H	23	3		SP				Sand: as above, approximately 5% shell fragments.
28 -									
29 -	I	20	20	18.5-20.0	ML				@ 21.5' Clay silt: moist, cohesive, soft, greenish-grey, brown oily sheen.
30 -									
31 -	J	23	5	20.0-21.5	ML				TOTAL DEPTH = 22.5 ft.
32 -									

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-7

Date: 1-17-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

Hole Diameter: 6 3/4"

Logged By: G. Burgess/J. Martin

Page No: 1 of 1

Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A	ND	0.0-1.5	GW				Sandy gravel, fine to coarse gravel, fine to medium sand, brown, moist, no sheen.
1 -		B	ND	1.5-3.0					
2 -		C	16	3.0-4.5	SW				@3.0' Gravelly sand, fine to coarse sand, fine to coarse gravel, wood chips, brown, dry, no sheen.
3 -		D	17	4.5-6.0					
4 -		E	11	6.0-7.5	SP				@6.0' Gravelly sand, fine to medium sand, fine to medium gravel, wood fragments, moist, brown, saturated, no sheen.
5 -		F	110	7.5-9.0					
6 -		G	220	9.0-10.5	SP				@9.0' Gravelly sand, fine sand, fine to medium gravel, black, sheen (9.0-9.5 Bentonite).
7 -		H	240	10.5-12.0					
8 -		I	350	12.0-13.5					@12.0' Wood, some sand and gravel, black, sheen.
9 -		J	300	13.5-15.0					
10 -		K	240	15.0-16.5	SP				@14.5' Sand, fine to medium, 5% shell fragments, gray, wet, no sheen.
11 -		L	200	16.5-18.0					
12 -		M	185	18.0-19.5					
13 -		N	NA	19.5-21.0					TOTAL DEPTH = 25 ft.
14 -		O	510	21.0-22.5					
15 -		P	670	22.5-24.0	CL				@22.0' Silty clay, moist, cohesive, soft, gray-green.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-8

Date: 1-19-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

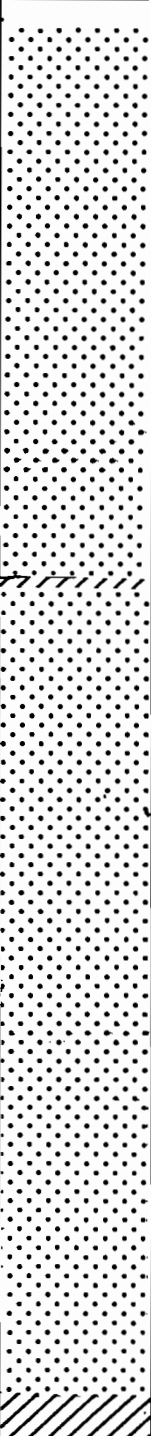
Hole Diameter: 6 3/4"

Logged By: G. Burgess/J. Martin

Page No: 1 of 1

Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A	6	0.0-1.5	SP				Sand, gravel, wood, fill, moist, gray-brown, no sheen.	
1 -		B		1.5-3.0					@1.5' Gravelly sand, fine to medium, fine to coarse gravel, dry, brown, no sheen.	
2 -			C	115	3.0-4.5					
3 -			D	220	4.5-6.0					@4.5' Gravelly sand, fine to medium, fine to medium gravel, 5% shell fragments, very moist, grey, no sheen, saturated at 6.0 feet.
4 -			E	1300	6.0-7.5					
5 -			F	90	7.5-9.0					
6 -						CL				@8.8' Silty clay, moist, cohesive, medium density, grey.
7 -			G	950	9.0-10.5	SP				@9.0' Gravelly sand, fine to medium sand, fine to medium gravel, grey, sheen, 5% shell fragments.
8 -										
9 -			H	1500	10.5-12.0					
10 -										
11 -			I	1020	12.5-14.0					
12 -										
13 -			J	980	14.0-15.5					
14 -										
15 -			K	1003	15.5-17.0					
16 -										
17 -										
18 -			L	1400	18.0-19.5					
19 -										
20 -			M	960	20.0-21.5					
21 -										
22 -		N	350	21.5-23.0	CL				@21.4' Sandy clay, cohesive, medium density, soft, gray-green.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EB-9

Date: 1-22-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA


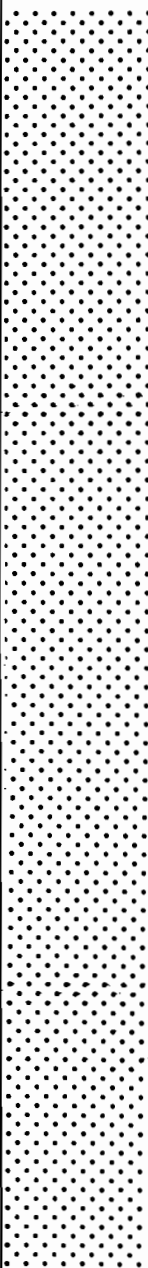
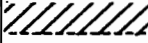
Hole Diameter: 6 3/4"

Logged By: G. Burgess

Page No: 1 of 1

Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A		0.0-1.5					ASPHALT.
1 -		B		1.5-3.0	SP				@0.25' Gravelly sand, fine to medium sand, fine to coarse gravel, 5% shell fragments, brown, dry, no sheen, saturated @4.0'.
2 -		C		3.0-4.5					
3 -		D		4.5-6.0	SP				@4.0' Gravelly sand, same as above, saturated.
4 -		E		6.0-7.5	SP				@4.5'to 20.5' Same as above, with sheen.
5 -		F		7.5-9.0					
6 -		G		9.0-10.5					
7 -		H		11.0-12.5					
8 -		I		13.0-14.5					
9 -		J		14.5-16.0					
10 -		K		16.0-17.5					
11 -		L		17.5-19.0					
12 -		M		19.5-21.0					
13 -						CL			
14 -									
15 -									
16 -									
17 -									
18 -									
19 -									
20 -									
21 -									
22 -									TOTAL DEPTH = 21 ft.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EB-10
 Date: 1-22-91
 Client: McFarland Cascade Driller: West Hazmat
 Location: Port of Olympia, WA Drilling Method: HSA
 Hole Diameter: 6 3/4"
 Logged By: G. Burgess Page No: 1 of 1
 Installation Data: Boring backfilled with Bentonite chips.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A		0.0-1.5	GW				Sandy gravel, fine to medium gravel, fine to medium sand, brown, moist, no sheen.	
1 -		B		1.5-3.0						
2 -			C		3.0-4.5	SP				@3.0' Gravelly sand, fine to medium sand, fine to medium gravel, 1% shell fragments, grey, wet, no sheen, saturated @3.5'.
3 -			D		4.5-6.0					
4 -			E		6.0-7.5					6.0' to 17.5' Same as above with sheen.
5 -			F		7.5-9.0					
6 -			G		9.0-10.5					
7 -			H		10.5-12.0					
8 -			I		12.5-14.0					
9 -			J		14.0-15.5					
10 -			K		15.5-17.0					
11 -			L		17.5-19.0	SP				@17.5' Sand, fine to medium, 1 - 5% shell fragments, grey, sheen.
12 -			M		19.5-21.0					@20.0' Sandy clay, cohesive, soft, moist, medium density, grey-green.
13 -						CL				
14 -										
15 -										
16 -										
17 -										
18 -										
19 -										
20 -										
21 -										
22 -									TOTAL DEPTH = 21.0 ft.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EB-11
 Client: McFarland Cascade Date: 1-18-91
 Location: Port of Olympia, WA Driller: West Hazmat
 Logged By: G. Burgess/J. Martin Drilling Method: HSA
 Installation Data: Backfilled Hole Diameter: 6 3/4"
 with Bentonite chips. Page No: 1 of 1

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A	0	0-1.5	SP				Gravelly sand: fine to medium sand, fine to medium gravel, dry, brown, no sheen.
1 -		B	1	1.5-3.0					@1' Gravelly sand: fine to medium sand, fine to medium gravel, 1% shell fragments, grey, dry, no sheen.
2 -									
3 -		C	3	3.0-4.5					
4 -		D	2	4.5-6.0					
5 -									
6 -		E	2	6.0-7.5		SP			@6' Gravelly sand: fine to medium sand, fine to medium gravel, 1% shell fragments, grey, saturated, no sheen.
7 -		F	10	7.5-9.0					
8 -									
9 -		G	4	9.0-10.5					
10 -		H	110	10.5-12.0					
11 -									
12 -		I			12.0-13.5				
13 -									
14 -		J	6.5	14.0-15.5		SP			@14' Gravelly sand: fine to medium sand, fine to medium gravel, 1% shell fragments, grey, dry, no sheen.
15 -		K	45	15.5-17.0					
16 -									
17 -		L	31	17.5-19.0					
18 -									@18.5' Sandy clay: very fine sand, moist, soft, cohesive, medium density, grey-green.
19 -		M		19.0-20.5	CL				
20 -									
21 -									
22 -									TOTAL DEPTH = 20.5 ft.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039	Boring No: EW-2
Client: McFarland Cascade	Date: 1-16-91
Location: Port of Olympia, WA	Driller: West Hazmat
Logged By: G. Burgess/J. Martin	Drilling Method: HSA
Installation Data: Screen:	Hole Diameter: 10 3/4"
20.5 to 1.65; Blank: 1.65-0;	Page No: 1 of 1
Sand: 20' to 1.0'; Bentonite: 1'-0; Concrete: 0-+0.5'	

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -									Fill sand pad for Rrg.	
1 -									@0-5' Concrete debris removed and backfilled with fill sand for rig access.	
2 -										
3 -										
4 -										
5 -			A	NA	5.0-6.5	SP				@ 5' Sand: fine to medium, trace fine gravel, 5% shell fragments, dark grey to black, saturated, sheen.
6 -			B	NA	6.5-8.0					
7 -										
8 -			C	31	8.0-9.0	SP				@ 8' Gravelly sand: fine to medium sand, fine to coarse gravel, wood fragments, black, oily, loose.
9 -			D	141	9.0-10.0					
10 -			E	38	10.0-11.5	SP				@ 10' Gravelly sand: fine to medium sand, fine gravel, loose, 5% shell fragments, black, saturated, sheen.
11 -			F	26	11.5-13.0					
12 -										
13 -			G	30	13.0-14.5					
14 -			H	120	14.5-16.0					
15 -						ML				@ 14.5' Silty clay: moist, cohesive, soft, medium density, grey.
16 -			I	75	16.0-17.5	SP				@ 15' Gravelly sand: fine to medium sand, fine gravel, loose, 5% shell fragments, black, sheen, saturated.
17 -			J	142	17.5-19.0	SP				@ 16' Sand: fine to medium, 5% shell fragments, black, loose, sheen.
18 -										
19 -			K	50	19.0-20.5	CL				@ 18.5' Silty clay: Grey, moist, cohesive.
20 -						SP				@ 18.6' Sand: fine to medium, 5% shell fragments, black, loose, sheen.
21 -					CL				@ 20' Clay: moist, soft, cohesive, medium density, grey-green.	
22 -									TOTAL DEPTH 21.5 ft.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039
Client: McFarland Cascade
Location: Olympia, WA
Logged By: G. Burgess/C. Generous
Installation Data: Screen: 22.5'-2.5'
Blank: 2.5'-0'; Sand: 22.5'-2';
Bentonite: 2'-1'; Concrete: 1'-0'

Boring No: EW-3
Date: 1-15-91
Driller: West Hazmat
Drilling Method: HSA
Hole Diameter: 8'
Page No: 1 of 1

Field location of boring:




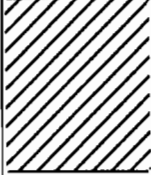
Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments: On 1-24-91 a 4" well was installed to replaced the 2" well installed on 1-15-91.	
0 -		A	3 ppm	0.0-1.5	SW				Gravelly sand, fine to coarse grained, small to large gravel, brown, loose, moist, no sheen. @ .5' Gravel, small to large gravel, fine to coarse sand. As above. As above. As above.	
1 -										
2 -										
3 -										
4 -										
5 -										
6 -		B	10 ppm	6.0-7.5	SW				@ 6' Gravelly sand, fine to coarse grained sand, small to large gravel, brown, loose, moist, shell fragments, no sheen. @ 7' Gravel, fine to coarse with fine to coarse sand, loose, moist GW Saturated @ 9', heavy sheen. @ 10.5' Sandy gravel, fine grained sand, fine to coarse gravel, silt, saturated, loose, grey, heavy sheen. SP @ 13.5' Sand, fine grained, grey to dark grey, wet, loose, medium to coarse sand, shell fragments, sheen. SP @ 15' Sand, fine to medium grained, grey to dark grey, some coarse sand, wet, loose, shall fragments, heavy sheen, G 130 ppm 16.5-18.0 SP @ 17' Silty sand, fine grained, brown, medium dense, wet, heavy sheen. @ 17.5' Sand as at 15' with sheen. ML @ 18' Silt, brown, soft, cohesive, some clay, medium dense, no sheen. @ 18.5' Sand with shell fragments, no sheen. SP @ 18.5' Sand with shell fragments, no sheen. I 70 ppm 19.5-21.0 ML @ 21.5' Sand fine to medium grained, grey to dark grey, wet, loose, approximately 10% shell fragments, sheen. SP @ 22' Silty, clay, brown, soft, moist, cohesive, no sheen.	
7 -										
8 -										
9 -										
10 -										
11 -										
12 -										
13 -										
14 -										
15 -										
16 -										
17 -										
18 -										
19 -										
20 -										
21 -										
22 -										

TD = 22.5'

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EW-4
 Client: McFarland Cascade Date: 1-11-91
 Location: Port of Olympia, WA Driller: West Hazmat
 Logged By: G. Burgess/J. Martin Drilling Method: HSA
 Installation Data: Screen: 20'-2.5' Hole Diameter: 10 3/4"
 Blank: 2.5-0; Sand: 19.0'-1.5'; Page No: 1 of 1
 Bentonite: 1.5'-0'; Concrete: 0-+0.5'

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A	2.5	0-1.5	SP				Gravelly sand: fine to medium sand, fine to medium gravel moist, brown.	
1 -		B	0.7	1.5-3.0						
2 -										
3 -		C	421	3.0-4.5	SP				@ 3.0' Sand as above, with wood chips.	
4 -		D	280	4.5-6.0	SP				@ 4.5' Gravelly sand: fine to medium sand, fine to medium gravel, wet, brown, no sheen, saturated at 5 ft.	
5 -										
6 -		E	330	6.0-7.5	SP				@ 6' Same as above with sheen.	
7 -										
8 -			F	238	8.0-9.5					@ 8' Fill: clay with sand & gravel, wood chips, yellow, wet.
9 -			G	330	9.5-11.0					@ 9.5' Fill: wood, some sand & gravel, wet, brown.
10 -										
11 -	H	570	11-12.5	SP				@ 11' Sand: fine to medium, wet, 5% shell fragments, grey-black sheen.		
12 -										
13 -	I	351	13-14.5							
14 -		J	683	14.5-16.0	CL				@ 14' Silty clay: moist, cohesive, grey-green.	
15 -					SP				@ 14.2' Sand: fine to medium, wet, 5% shell fragments, grey-black, sheen.	
16 -		K	293	16.0-17.5					@ 14.5' Gravelly sand: fine to medium sand, fine to medium gravel, wet, 5% shell fragments, grey.	
17 -										
18 -	L	281	18-19.5							
19 -									@ 19.0' Sand clay: moist, cohesive, medium density, grey-green.	
20 -					CL					
21 -										
22 -									TOTAL DEPTH = 21.5 FT.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EW-5
 Client: McFarland Cascade Date: 1-16-91
 Location: Port of Olympia, WA Driller: West Hazmat
 Logged By: G. Burgess/C. Generous Drilling Method: HSA
 Installation Data: 4" Hole Diameter: 10 3/4"
 Screen: 25.5'-3'; Blank: 3'-0'; Page No: 1 of 2
 Sand: 24.5'-2'; Bentonite: 2'-0'; Concrete: 0'+0.5'

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:	
0 -		A	3	0-1.5	SP				Gravelly sand: fine to medium sand, fine to coarse gravel, moist, dark brown, no sheen.	
1 -		B	3	1.5-3						
2 -										
3 -		C	3	3-4.5						
4 -		D	20	20	4.5-6.0	SP				@4' Gravelly sand: medium to coarse sand, fine to coarse gravel, grey, loose, very moist, wood fragments, no sheen, saturated @4.5'
5 -						SP				@5.5' Sand: fine to medium sand, some small gravel, 5-10% shell fragments, dark grey.
6 -		E	20	20	6.0-7.5	SP				@6' Same as above, with wood fragments and sheen.
7 -		F	54	54	7.5-8.0	CL				@7.5' Sand: fine to medium sand, fine to coarse gravel, 1" silty clay layers @7.6', dark grey, saturated, no sheen.
8 -		G	128	128	8.0-9.5					
9 -		H			9.5-11	SP				@9.5' Sand: fine to medium, 5-15 cm shell fragments, grey, saturated, no sheen.
10 -										
11 -		I	4	4	11-12.5	SP				@11.5' Sand: same as above, some fine to medium gravel.
12 -		J	12	12	12.5-14	SP				@12.5' Sand: same as above, no gravel.
13 -										
14 -		K	7	7	14-15.5					@14.5' Sand: same as above, sheen.
15 -		L	12	12	15.5-17	ML SP				@15' Sandy silt: fine grained, grey/green, cohesive, very moist, soft, no sheen. @15.5 Sand: fine to medium, 5-15cm shell fragments, no sheen.
16 -										@16.5' Clayey silt: grey/green, cohesive, soft, no sheen, very moist.
17 -		M			17-18.5	ML SP				@17' Sand: fine to medium, shell fragments, loose, wet, no sheen. @17.5 Sand: same as above, less shell fragments.
18 -		N	1	1	18.5-20					
19 -										@19.5' Silty clay, stiff, cohesive, moist, grey/green, no sheen.
20 -		O			20-21.5	SP				@19.7' Sand: fine to medium, shell fragments, loose, wet, no sheen.
21 -		P			21.5-23					@21' Sand: fine to medium, loose, very moist, grey/green, no sheen trace of silt.
22 -									@22.5' Sand: same as above with sheen.	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EW-6

Date: 1-21-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

Hole Diameter: 6 3/4"

Logged By: G. Burgess

Page No: 1 of 1

Installation Data: See comments.
























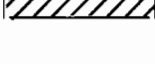
Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments: 2" screen: 21.5'-1.5'; blank : 1.5'-0'; sand: 20.5'-1.0'; bentonite: 1.0'-0'; concrete: 0'-+0.5'.	
0 -		A		0.0'-1.5'	SP				Gravelly sand: fine to medium sand, fine gravel, moist, organics, topsoil, black, no sheen.	
1 -		B		1.5'-3.0'	SP				@1.5' Gravelly sand: fine to medium sand, fine to medium gravel, 5% shell fragments, wet, gray, no sheen.	
2 -		C		3.0'-4.5'	SP				@3.0' Gravelly sand: same as above, saturated, no sheen.	
3 -										
4 -										
5 -		D			5.0'-6.5'	SW				@5.0' Sand: fine to coarse, 5% shell fragments, saturated, grey, no sheen.
6 -		E			6.5'-8.0'					
7 -										
8 -										
9 -		F			8.5'-10.0'					
9 -						CL				@9.0' Clayey silt: moist, cohesive, grey, no sheen.
10 -		G			10.0'-11.5'	SP				@9.1' Gravelly sand: fine to medium sand, fine to medium gravel, wood fragments, brown-black, no sheen.
11 -										
12 -	H			11.5'-13.0'	SP				@11.5' Gravelly sand: fine to medium sand, fine gravel, 5% shell fragments, saturated, grey, no sheen.	
13 -										
14 -										
15 -	I			13.0'-14.5'						
16 -	J			14.5'-16.0'	SP				@14.5' Gravelly sand: same as above with sheen.	
17 -										
18 -	K			16.0'-17.5'	SP				@16.0' Gravelly sand: same as above, no sheen.	
19 -										
20 -	L			17.5'-19.0'						
21 -										
21 -					CL				@20.5' Clay: trace silt, moist, cohesive, medium density, grey-green.	
22 -									TOTAL DEPTH = 21.5'	

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EW-7
 Client: McFarland Cascade Date: 1-21-91
 Location: Olympia, WA Driller: West Hazmat
 Logged By: G. Burgess Drilling Method: HSA
 Installation Data: Screen: 20.5-3' Hole Diameter: 6 3/4"
 Blank: 3-0', Sand: 20.5-2' Page No: 1 of 1
 Bentonite: 2-1.5', Concrete: 1.5-0'

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -									0-3" FILL: Fine to coarse gravel.
1 -		A	1	3"-1.5'	SP				@3", Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, dry, no sheen.
2 -		B	8	1.5'-3.0'	SP				@1.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, dry, no sheen.
3 -									
4 -		C	1	3.0'-4.5'	SP				@ 3.0', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, dry, 2% shell fragments, no sheen.
5 -		D	1	4.5'-6.0'	SP				@4.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated at 5'bgs, 2% shell fragments, no sheen.
6 -									
7 -		E	16	6.5'-8.0'	SP				@6.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 2% shell fragments, light sheen.
8 -									
9 -		F	88	8.0'-9.5'	SP				@8.0', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 2% shell fragments, sheen.
10 -									
11 -		G	182	9.5'-11.0'	SP				@9.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, sheen.
12 -									
13 -		H	99	11.0'-12.5'	SP				@11', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, no sheen.
14 -									
15 -		I	95	13.0'-14.5'	SP				@13.0', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, light sheen.
16 -									
17 -		J	120	14.5'-16.0'	SP				@14.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, sheen.
18 -									
19 -		K	120	16.0'-17.5'	SP				@16.0', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, sheen.
20 -									
21 -		L	48	17.5'-19.0'	SP				@17.5', Gravelly sand: fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, no sheen.
22 -									
		M		19.0'-20.0'	SP				@19.0', Gravelly sand, fine to medium sand, fine to coarse gravel, light grey, saturated, 5% shell fragments, sheen.
				20.0'-20.5'	CL				@20.0', silty clay: grey-green, moist, cohesive, med. density.
									TOTAL DEPTH 22.5 ft.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EW-9

Client: McFarland Cascade

Date: 1-21-91

Location: Olympia, WA

Driller: West Hazmat

Logged By: G. Burgess

Drilling Method: HSA

Installation Data: 20.8'-3.3'

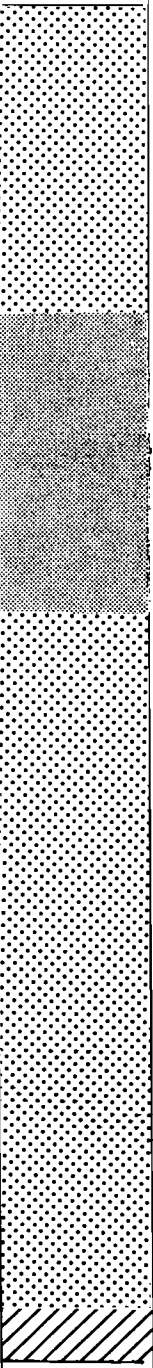
Hole Diameter: 6 3/4"

Blank: 3.3'-0', Sand: 20'-2'

Page No: 1 of 1

Bentonite: 2.0'-0.5', Concrete: 0.5'+0.5'

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A	0	0.0'-1.5'	SP				@0.0'-1.5' Gravelly sand: fine to medium sand, fine to coarse grav brown, dry: fill.
1 -		B		1.5'-3.0'					
2 -									
3 -		C	60	3.0'-4.5'	SP				@3.0' Sand: fine to medium, 10% shell fragments, brown, dry, no sheen.
4 -		D	70	4.5'-6.0'	SW				@4.5 Sand: fine to coarse, 5% shell fragments, wet, brown, no sheen.
5 -		E	90	6.0'-7.5'					
6 -									
7 -		F		7.5'-9.0'					
8 -									
9 -		G		9.0'-10.5'	SP				@9.0' Sand: fine to medium, 5% shell fragments, grey, wet, sheen.
10 -									
11 -	H	80	11.0'-12.5'						
12 -									
13 -	I		12.5'-14.0'						
14 -									
15 -	J		14.0'-15.5'						
16 -									
17 -	K		15.5'-16.0'						
18 -									
19 -	L		16.0'-17.5'						
20 -									
21 -									
22 -									
									TOTAL DEPTH 20.8 ft.

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039

Boring No: EW-10

Date: 1-22-91

Client: McFarland Cascade

Driller: West Hazmat

Location: Port of Olympia, WA

Drilling Method: HSA

Hole Diameter: 6 3/4"

Logged By: G. Burgess

Page No: 1 of 1

Installation Data: See comments.

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concentration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments: 2"screen: 21.5'-1.5'; blank: 1.5'-0.0'; sand: 20.5'-1.0'; bentonite: 1.0'-0.0'; concrete: 0.0'+0.5'.	
0 -		A		0.0'-1.5'	GW				Sandy gravel: fine to medium sand, fine to coarse gravel, moist, brown, no sheen.	
1 -				several attempts with no recovery						
2 -										
3 -		B		3.0'-4.5'						
4 -					several attempts with no recovery	GW				@4.5' Sandy gravel: same as above, saturated.
5 -										
6 -		C		6.0'-7.5'		SP				@6.0' Gravelly sand: fine to medium sand, fine to medium coarse gravel, wet, gray, 1-3% shell fragments, no sheen.
7 -										
8 -		D		7.5'-9.0'		SP				@7.5' Gravelly sand: fine to medium sand, fine gravel, grey, wet, 3% shell fragments, no sheen.
9 -			E	9.0'-10.5'						
10 -			F	10.5'-12.0'						
11 -										
12 -			G	12.5'-14.0'		SP				@12.5' Sand: fine sand, 5% shell fragments, wet, grey, no sheen.
13 -										
14 -			H	14.5'-16.0'						
15 -										
16 -			I	16.0'-17.5'						
17 -										
18 -			J	17.5'-19.0'						
19 -										
20 -			K	19.5'-21.0'						
21 -					CL			@20.25' Sandy clay: moist, cohesive, medium density, grey.		
22 -								TOTAL DEPTH = 21.5'		

LOG OF
EXPLORATORY BORING

Project No: 4-90-5039 Boring No: EW-11
 Client: McFarland Cascade Date: 1-23-91
 Location: Olympia, WA Driller: West Hazmat
 Logged By: G. Burgess Drilling Method: HSA
 Installation Data: 20.5'-0.5' Hole Diameter: 10 3/4"
 Blank: 0.5'--+3.75', Sand: 19.5'-0.25' Page No: 1 of 1
 Bentonite: 0.25'--+0.5', Concrete: +0.5'--+1.5'

Field location of boring:

Depth (ft)	Graphic Log	Sample I.D.	Vapor Concen- tration (ppm)	Sample Interval (feet)	Soil Group Symbol (U.S.C.S.)	Water Level	Time	Date	Comments:
0 -		A	60	0.0'-1.5'	SW				@0.0'-2.5' Sand: fine to coarse, black, wet from surface water, no sheen.
1 -									
2 -		B	50	2.5'-3.0'	SP				@2.5' Sand: fine to medium, 5% shell fragments, grey, wet, no sheen.
3 -		C	60	3.0'-4.5'	SP				@3.0' Sand: fine to medium, 5% shell fragments, grey, saturated, sheen.
4 -		D	80	4.5'-6.0'	SP				@4.5' Sand: fine to medium, trace gravel, 5% shell fragments, grey saturated, sheen.
5 -									
6 -		E	80	6.0'-7.5'					
7 -									
8 -		F	80	7.5'-9.0'					
9 -									
10 -		G	80	9.5'-11.0'					
11 -									
12 -		H	80	11.0'-12.5'	SP				@11.0' Sand: fine to medium, trace gravel, 5% shell fragments, brown, saturated, heavy sheen.
13 -									
14 -		I	80	12.5'-14.0'	SP				@12.5' Sand: fine to medium, 5% shell fragments, trace gravel, brown, sheen.
15 -									
16 -		J	80	14.5'-16.0'					
17 -									
18 -		K	70	16.0'-17.5'					
19 -									
20 -	L	70	17.5'-19.0'						
21 -									
22 -	M	80	19.0'-19.5'	CL				@19.5 Silty clay: grey-green, moist, cohesive, medium density.	
									TOTAL DEPTH 20.5 ft.



LOG OF EXPLORATORY
BORING WITH WELL
INSTALLATION DATA

PROJECT NO. 4-90-5039
CLIENT: McFarland Cascade
LOCATION: Port of Olympia, WA
LOGGED BY: GLS

WELL NO. EW-12
DATE: 10/23/91
DRILLER: Tacoma Pump/Drill
PAGE: 1 of 1

FIELD LOCATION: 5' So. of AG-16S
BENCHMARK ELEVATION: N/A
WELL CASING ELEVATION: ~~21.57~~ 21.57 Above MLLW
WELL CASING TYPE: 304 Stainless Steel
SCREEN PERFORATION: 0.010

WELL COMPLETION DEPTH: 24.9
TOTAL DEPTH: 25'
BORING DIAMETER: 9.875
WELL DIAMETER: 2"
FILTER PACK TYPE: 12/20 Sand

SEAL TYPE: Bentonite chips
WATER DEPTH FIRST: 6.5 BGS
WATER DEPTH COMPLETED: N/A
WATER DEPTH 24HRS: 8.80 BTOC

DEPTH	VAPOR CONC. (PPM)	BLOW/FT	SAMPLE TYPE	USCS SOIL TYPE	GRAPHICS LOG	DESCRIPTION	WELL DIAGRAM
0							
0-4.5'		47		sp	[Dotted pattern]	0-4.5' Gravelly SAND: Medium sand, brown, moist, slight-moderate odor, no sheen.	
4.5'		26			[Dotted pattern]	@4.5' SAND: Fine to medium, brown, slightly moist, no sheen.	
5'		26			[Dotted pattern]	@5.5' Wood shavings, brown, no sheen.	
5.5'		36			[Dotted pattern]	@6.5' SAND, Fine to medium, dark gray, 10-20% shell fragments, wet, moderate odor, sheen.	
6.5'		18		sp	[Dotted pattern]		
15'		15			[Dotted pattern]	@15.5' SAND, fine grey, wet, loose, 10% shell fragments, no sheen.	
18'		18		sp	[Dotted pattern]		
14'		14			[Dotted pattern]	@18.5' SAND, fine to medium, gray, wet, loose, some gravel, slight sheen.	
20'		16		ml	[Horizontal lines]	@20' Clayey SILT, gray, wet, loose.	
20.2'		22			[Dotted pattern]	@20.2' Silty SAND, fine, olive gray, wet, dense, very slight sheen.	
25'		39		sp	[Dotted pattern]		
25'		36		cl	[Diagonal lines]	@24' Silty CLAY, olive gray, wet, firm, no sheen.	
						Total Depth: 25'	



LOG OF EXPLORATORY
BORING WITH WELL
INSTALLATION DATA

PROJECT NO. 4-90-5039
CLIENT: McFarland Cascade
LOCATION: Port of Olympia, WA
LOGGED BY: GTB

WELL NO. RW-4
DATE: 10/3/91
DRILLER: Slead
PAGE: 1 of 1

FIELD LOCATION: SE of AG-1s

BENCHMARK ELEVATION: N/A

WELL CASING ELEVATION: ~~18.75~~ 18.55 ft MLLW

WELL CASING TYPE: Corrugated Galvanized Steel

SCREEN PERFORATION: 0.20" torch cut

WELL COMPLETION DEPTH: 15'

TOTAL DEPTH: 15'

BORING DIAMETER: 42"

WELL DIAMETER: 30"

FILTER PACK TYPE: Pea Gravel

SEAL TYPE: Bentonite Chips

WATER DEPTH FIRST: 7'

WATER DEPTH COMPLETED: N/A

WATER DEPTH 24HRS: 6.3'

DEPTH	VAPOR CONC. (PPM)	BLOW/FT	SAMPLE TYPE	USCS SOIL TYPE	GRAPHICS LOG	DESCRIPTION	WELL DIAGRAM
0				sp		0-3' Silty SAND, fine to medium, brown, dry, organics.	
				sp		@3' Gravelly SAND, fine to medium sand, fine gravel, moist, trace silt, 10% shell fragments, no sheen.	
5				sp		@7' Gravelly SAND, fine to medium sand, fine grave, wet, trace silt, 10% shell fragments, sheen.	
10				cl		@14' Sandy CLAY, gray, medium density, wet, trace silt, sheen.	
15						Total Depth: 15'	
20							
25							
30							
35							
40							



LOG OF EXPLORATORY
BORING WITH WELL
INSTALLATION DATA

PROJECT NO. 4-90-5039
CLIENT: McFarland Cascade
LOCATION: Port of Olympia, WA
LOGGED BY: GTB

WELL NO. RW-5
DATE: 10/2/91
DRILLER: Stead
PAGE: 1 of 1

WELL LOCATION: SW of EW-1

WELL COMPLETION DEPTH: 15'

SEAL TYPE: Bentonite Pellets

BENCHMARK ELEVATION: N/A

TOTAL DEPTH: 15'

WATER DEPTH FIRST: 8'

WELL CASING ELEVATION: ~~18.87~~ 18.87 ft MLLW

BORING DIAMETER: 36"

WATER DEPTH COMPLETED: N/A

WELL CASING TYPE: Corrugated Galvanized Steel

WELL DIAMETER: 30

WATER DEPTH 24HRS: 6.5

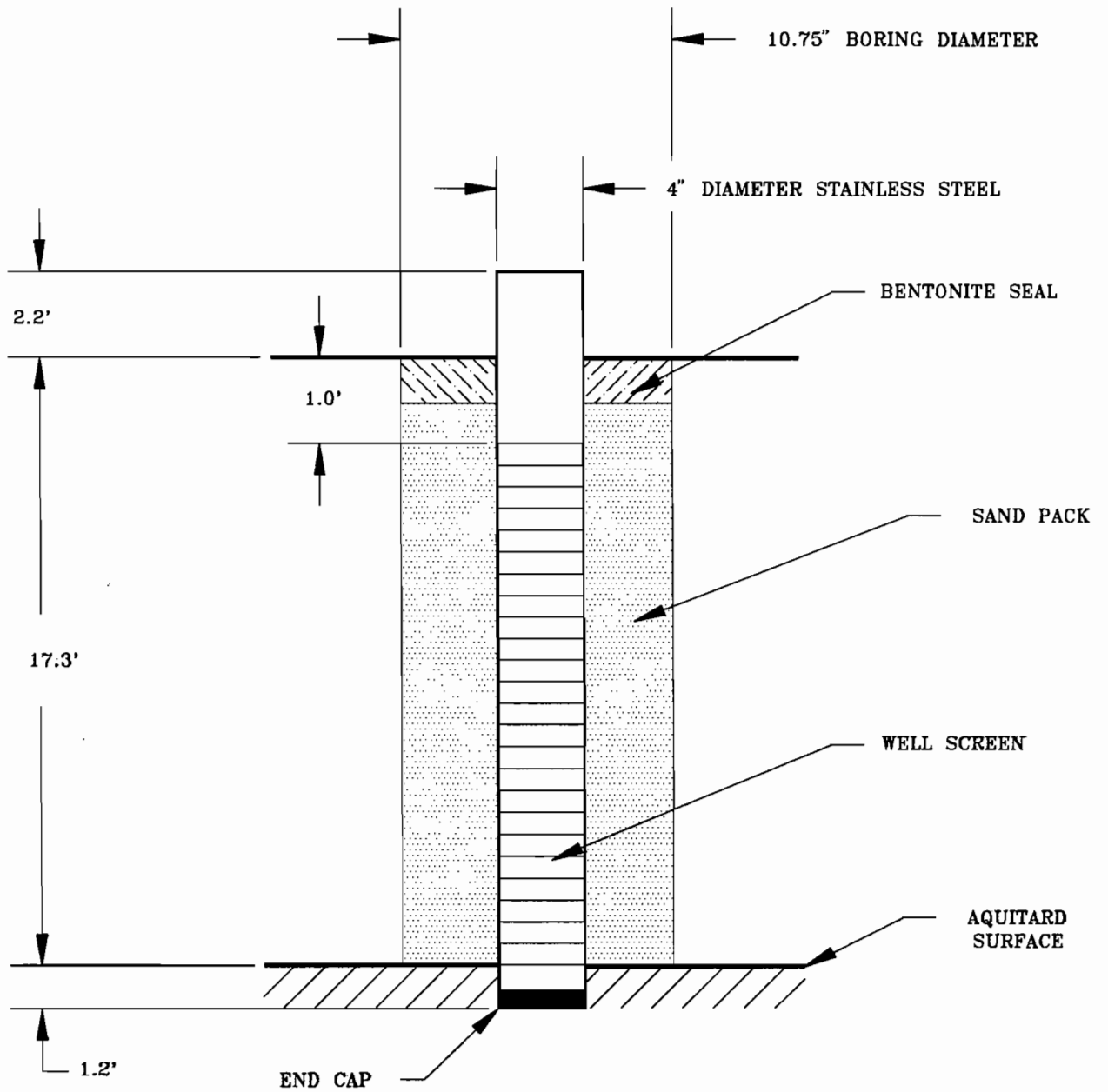
SCREEN PERFORATION: 0.20" Torch Cut

FILTER PACK TYPE: Gravel

DEPTH	VAPOR CONC. (PPM)	BLOW/FT	SAMPLE TYPE	USCS SOIL TYPE	GRAPHICS LOG	DESCRIPTION	WELL DIAGRAM
0							
5				sp		0-15'bgl - Gravelly SAND: Fine to medium sand, fine gravel, 10% shell fragments, trace silt, grey to dark grey, moist. Note: Wet at 8'bgl.	
10							
15						Total Depth: 15'bgl	
20							
25							
30							
35							
40							

Sediment Soil borings

On August 27, 1991 six borings were completed near the base of the riprap in the intertidal sediments. The purpose of these borings was to obtain additional data regarding the depth to the aquitard surface beneath the near-shore sediments in the East Bay of Budd Inlet. The six soil borings, S-1 through S-6, were located approximately at 100-foot intervals between Seep Locations ES-8 and ES-14 (Figure 2-6). The soil borings were drilled to a total depth of 5.5 to 11.3 feet below the ground surface using hand-auger equipment which consisted of a 4-inch diameter barrel, approximately 1.5 feet in length, which is connected to 5-foot long extension rods. A tee handle was then attached to manually turn the auger and collect the sediments within the barrel. Soil removed from the auger barrel was examined in the field for visual indication of contamination and for lithologic description. Soil samples, representative of each lithology change, were collected from each boring for future reference. Each soil boring location was surveyed on August 27, 1991 by Howard Godat & Associates to obtain x- and y-coordinates and an elevation relative to MLLW.



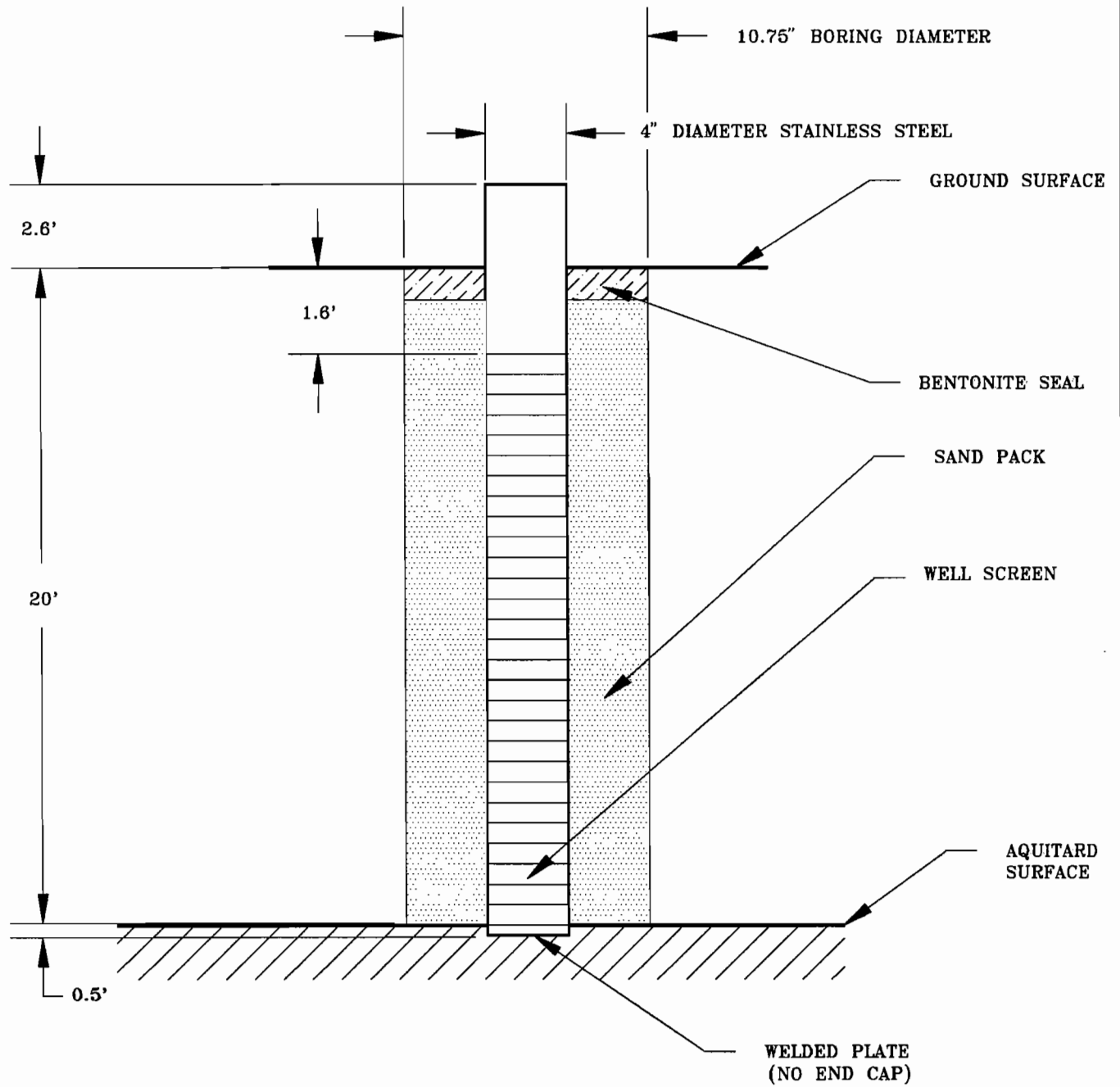
Environmental
Science &
Engineering, Inc.


A CILCORP Company

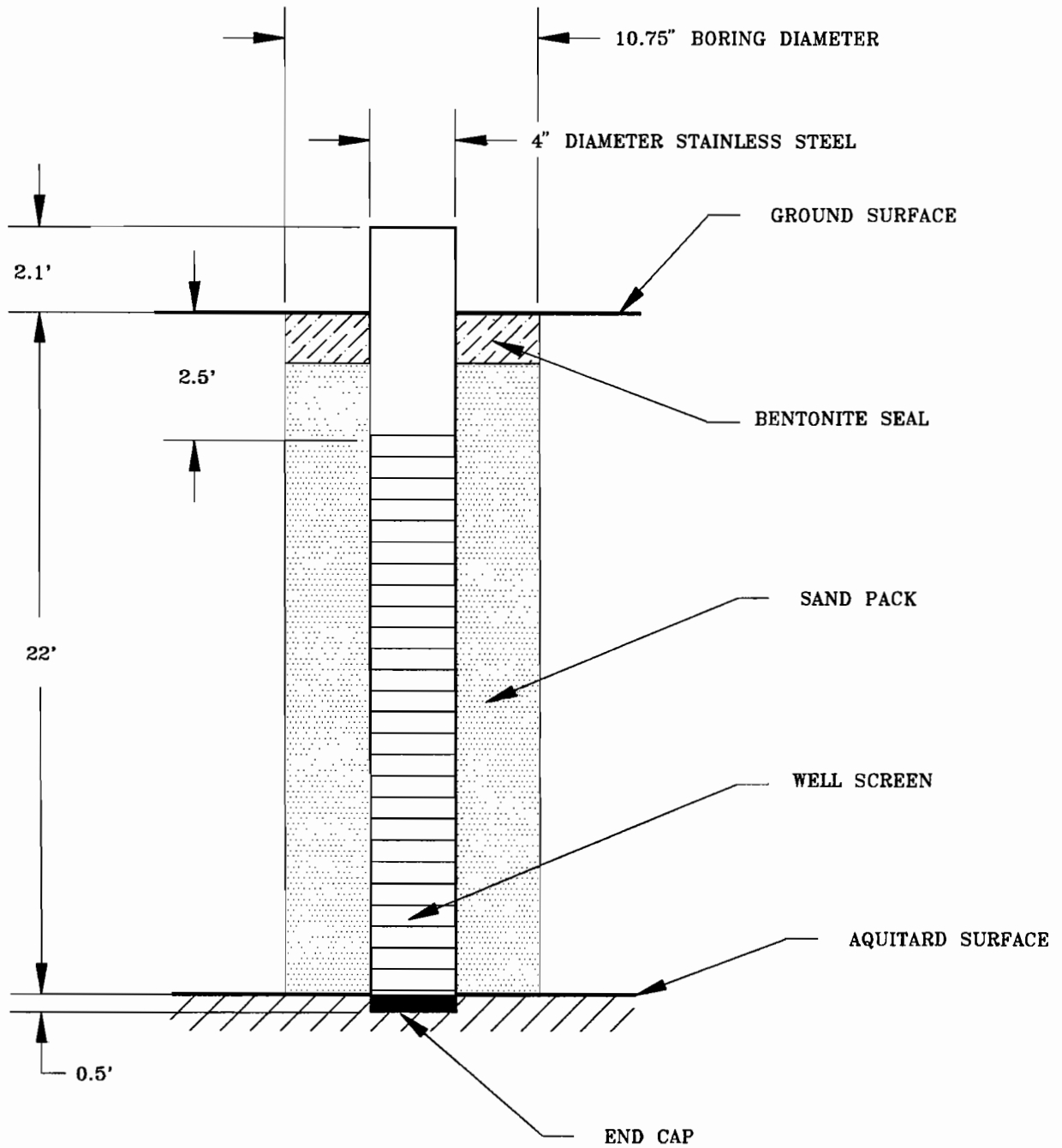
SUPPLEMENTAL SITE INVESTIGATION
CASCADE POLE SITE
OLYMPIA, WASHINGTON


WELL INSTALLATION DETAILS
WELL EW-1

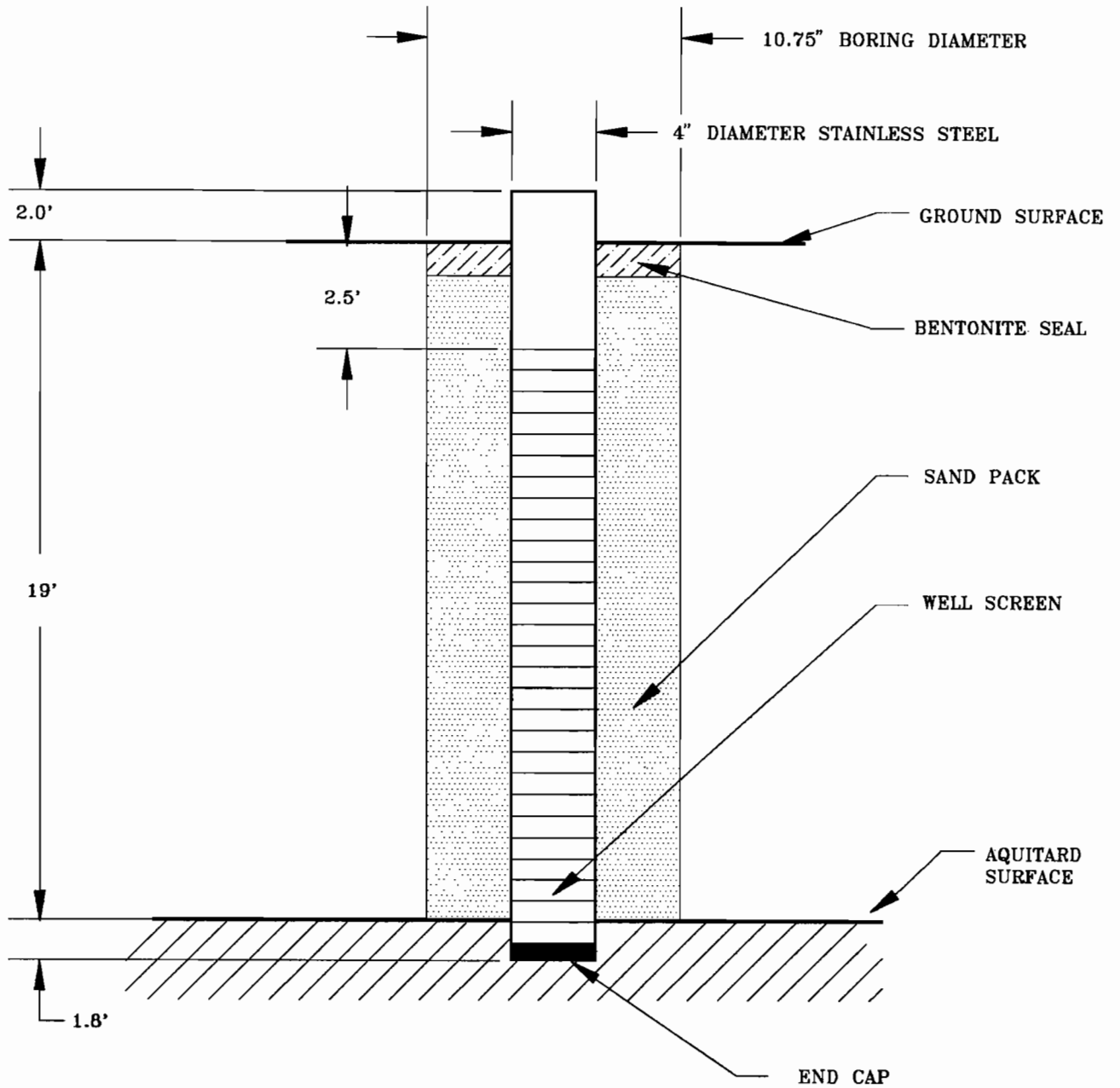
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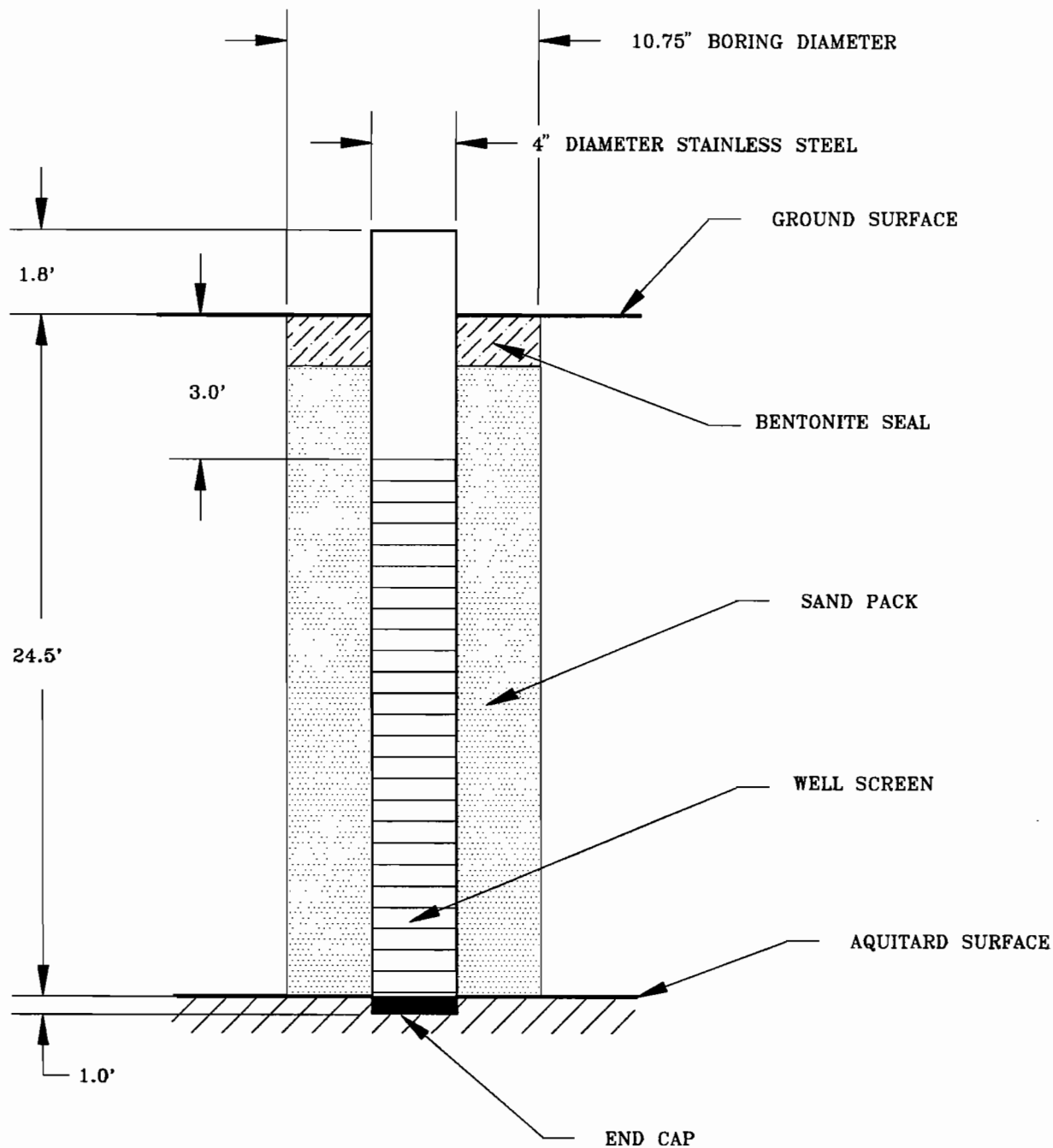
	Environmental Science & Engineering, Inc.
	<small>A CILCORP Company.</small>
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON	
WELL INSTALLATION DETAILS WELL EW-2	
SCALE: AS SHOWN	REVISION: DRAWN BY: DATE: 9/17/97




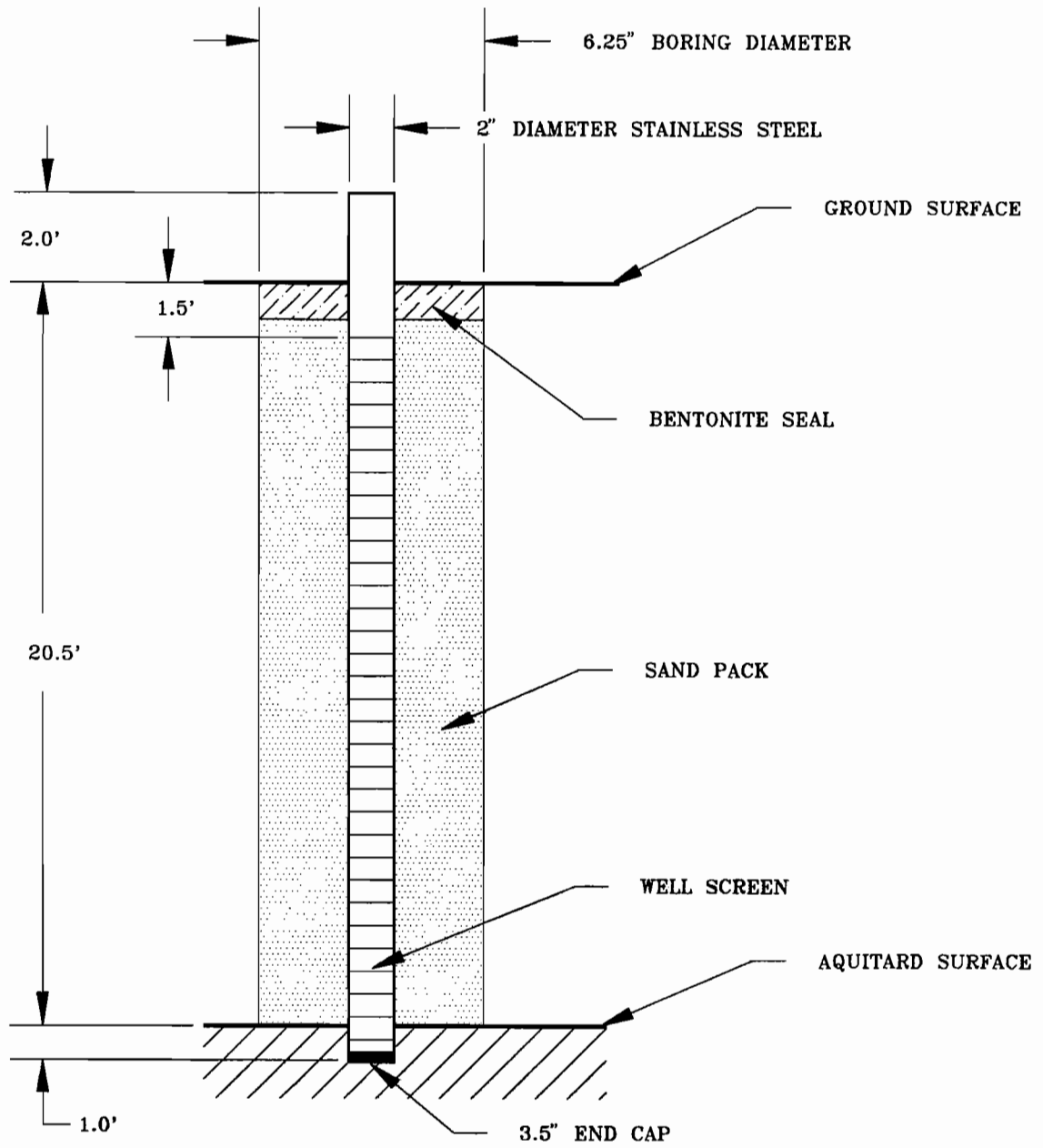
	Environmental Science & Engineering, Inc.		
	<small>A CILCORP Company</small>		
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON			
WELL INSTALLATION DETAILS WELL EW-3			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91




	Environmental Science & Engineering, Inc.
	<small>A GILCORP Company</small>
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON	
WELL INSTALLATION DETAILS WELL EW-4	
SCALE: AS SHOWN	REVISION: _____
DRAWN BY: _____	DATE: 9/17/91

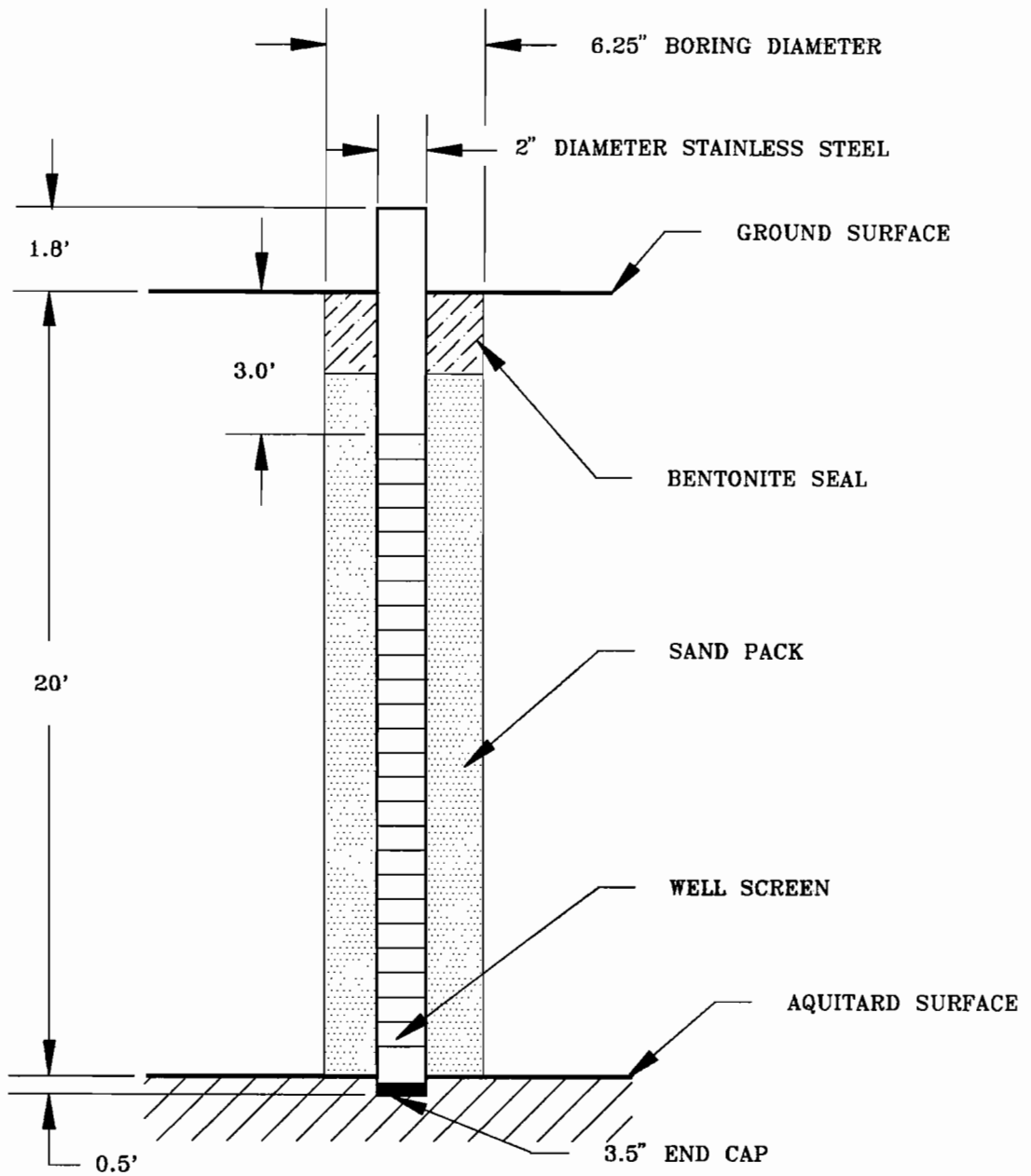



	Environmental Science & Engineering, Inc.		
	<small>A CILCORP Company</small>		
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON			
WELL INSTALLATION DETAILS WELL EW-5			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91

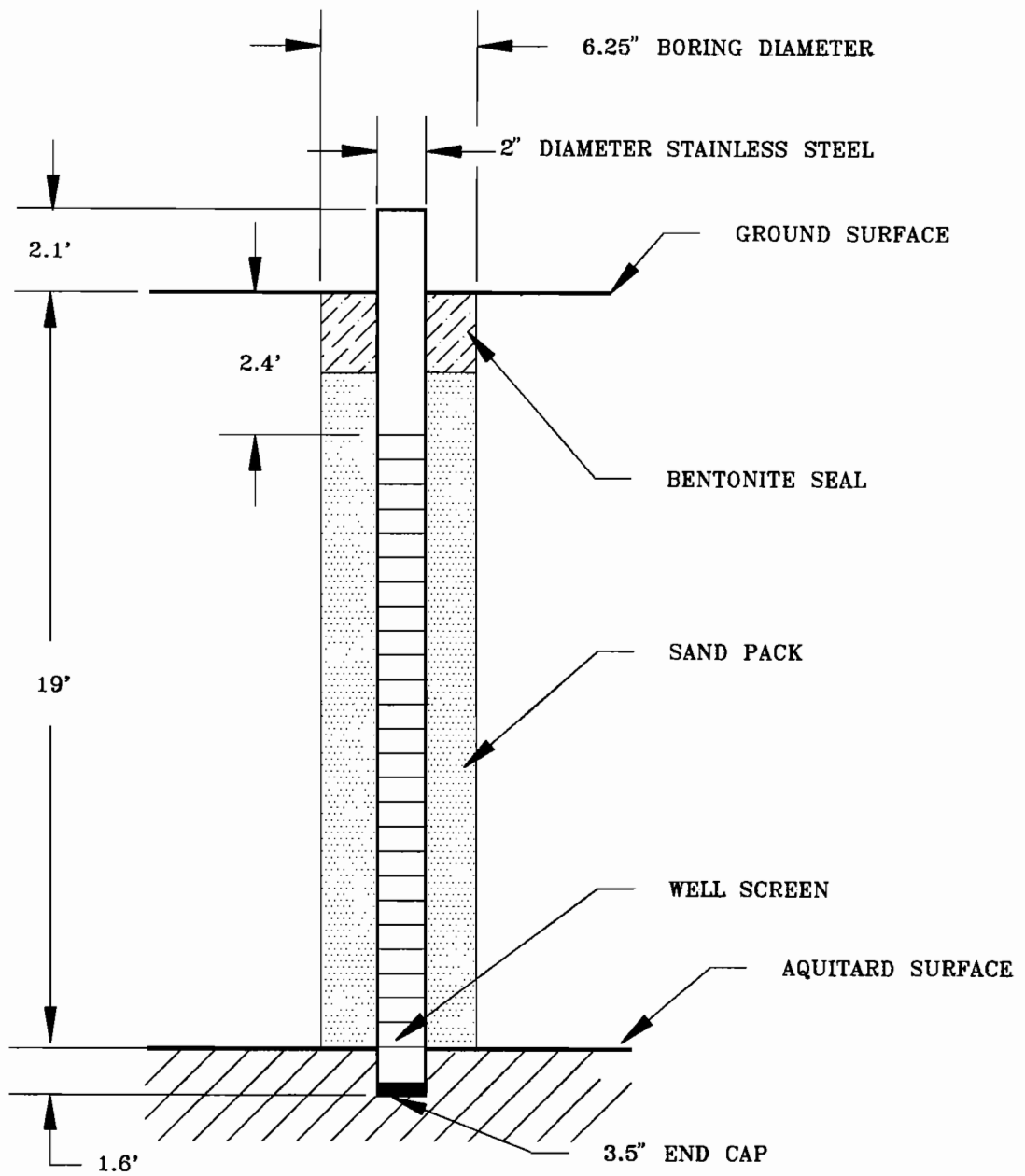


	Environmental Science & Engineering, Inc.		
	<small>A CILCORP Company.</small>		
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON			
WELL INSTALLATION DETAILS WELL EW 6			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91

FILE: MCFEW6.DWG



	Environmental Science & Engineering, Inc.		
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SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON			
WELL INSTALLATION DETAILS WELL EW-7			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91



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Science &
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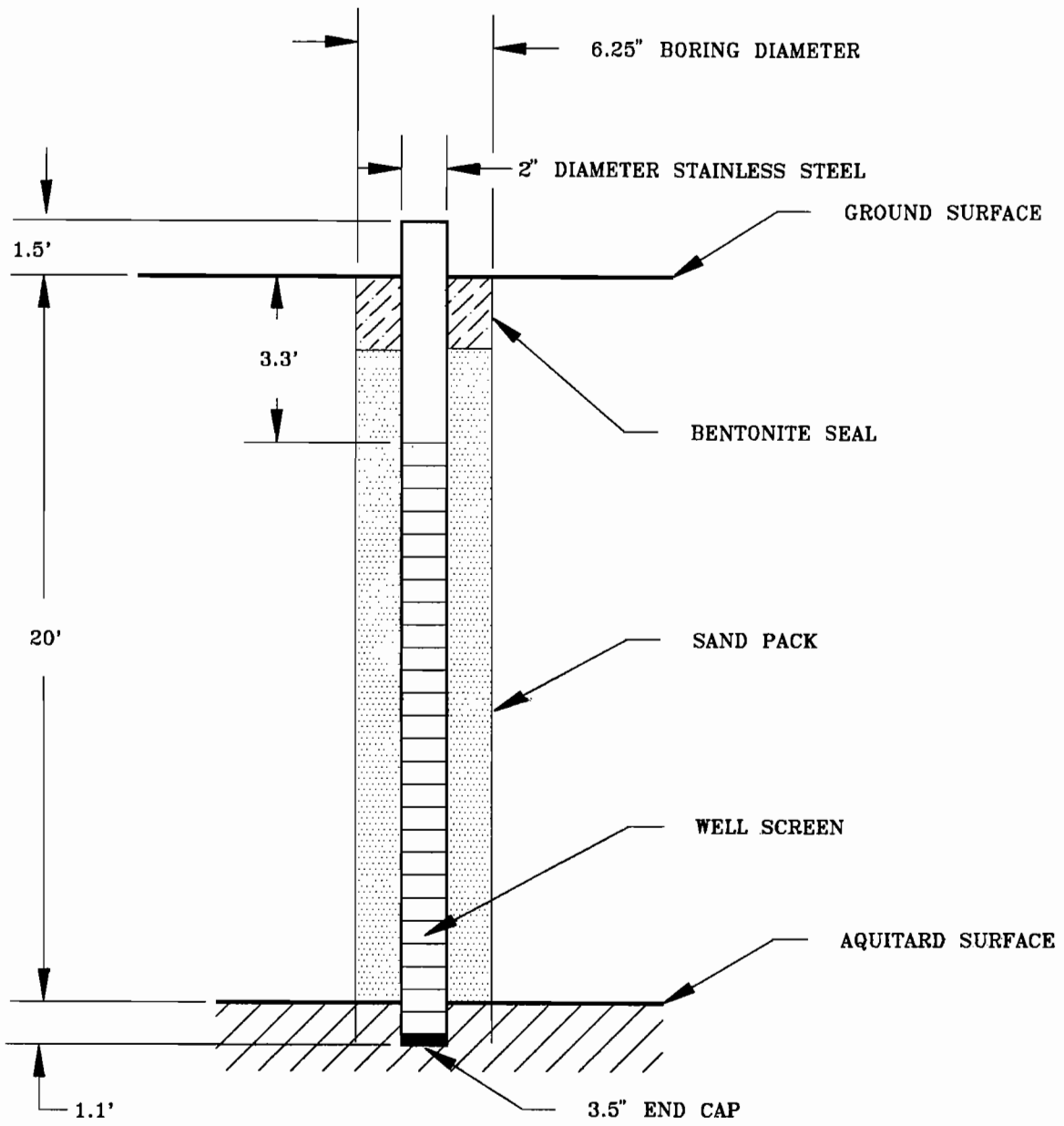
A GILCORP Company


SUPPLEMENTAL SITE INVESTIGATION
CASCADE POLE SITE
OLYMPIA, WASHINGTON

WELL INSTALLATION DETAILS
WELL EW-8

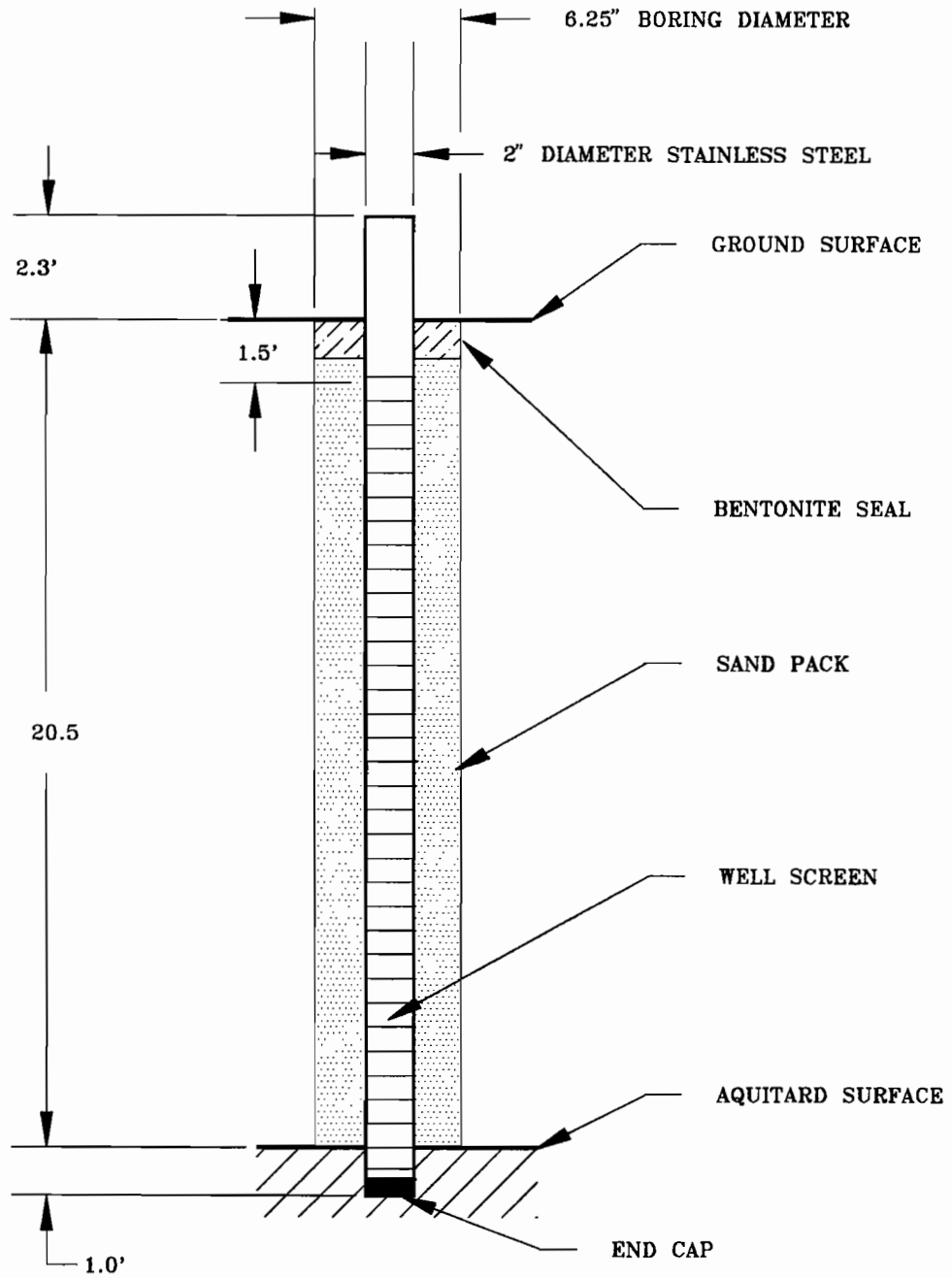
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SCALE: AS SHOWN REVISION: DRAWN BY: DATE: 9/17/91

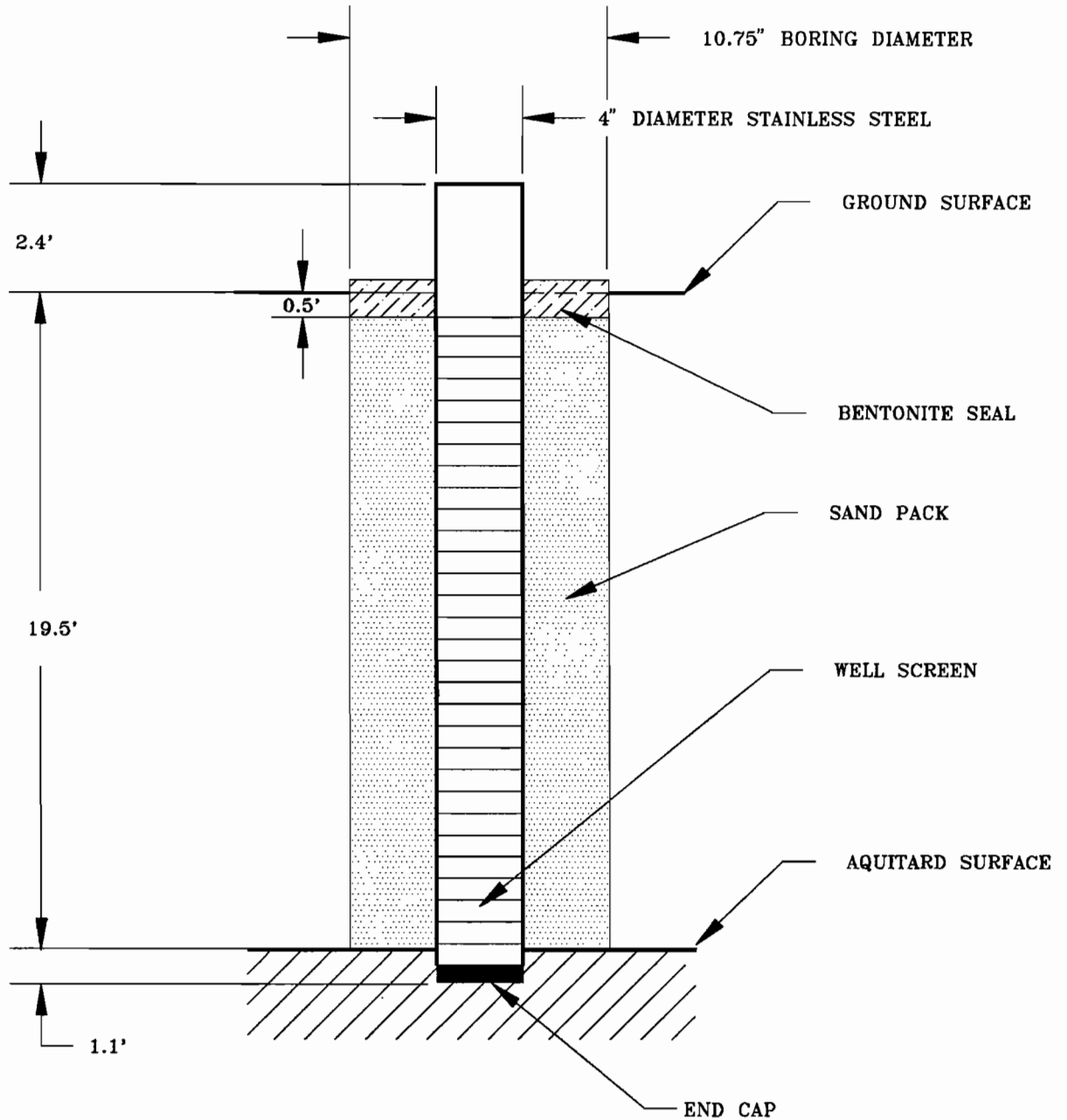


	Environmental Science & Engineering, Inc. <small>A CILCORP Company</small>		
	SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON		
WELL INSTALLATION DETAILS WELL EW-9			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91

FILE: MCFEW9.DWG



	Environmental Science & Engineering, Inc.		
	<small>A CILCORP Company</small>		
SUPPLEMENTAL SITE INVESTIGATION CASCADE POLE SITE OLYMPIA, WASHINGTON			
WELL INSTALLATION DETAILS WELL EW-10			
SCALE: AS SHOWN	REVISION:	DRAWN BY:	DATE: 9/17/91



Environmental
Science &
Engineering, Inc.

A CECO/CRP Company

SUPPLEMENTAL SITE INVESTIGATION
CASCADE POLE SITE
OLYMPIA, WASHINGTON

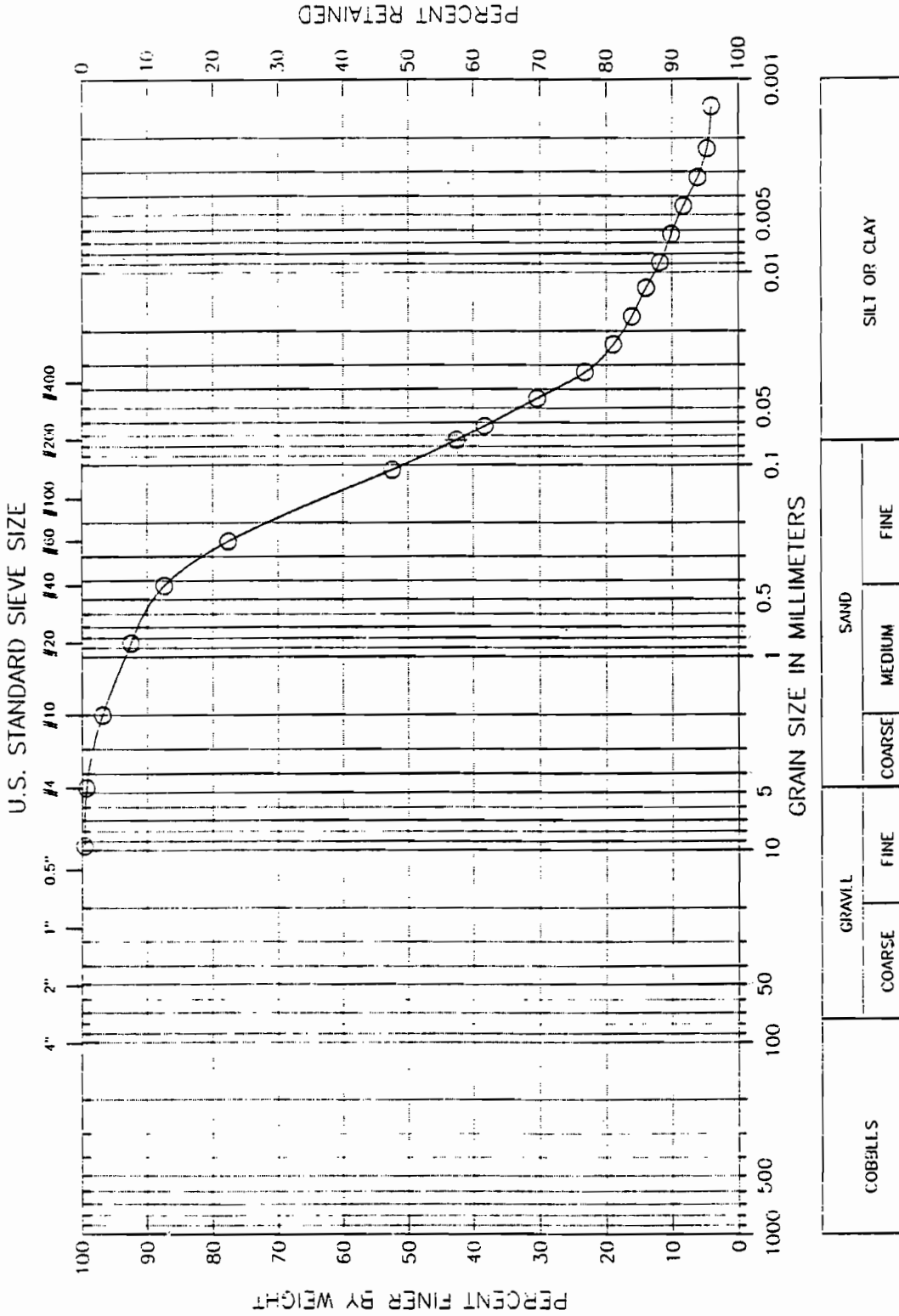
WELL INSTALLATION DETAILS
WELL EW-11

SCALE: AS SHOWN | REVISION: | DRAWN BY: | DATE: 9/17/94

Soil Technology, Inc.

Boring No.: EB-3-D
 Sample No.: 9102001-01
 Tested by : RGS
 Filename : 128EB3D

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EB-3-D
 Date : Wed Feb 20 1991



Classification :
 (SM) Silty sand
 Visual Description :

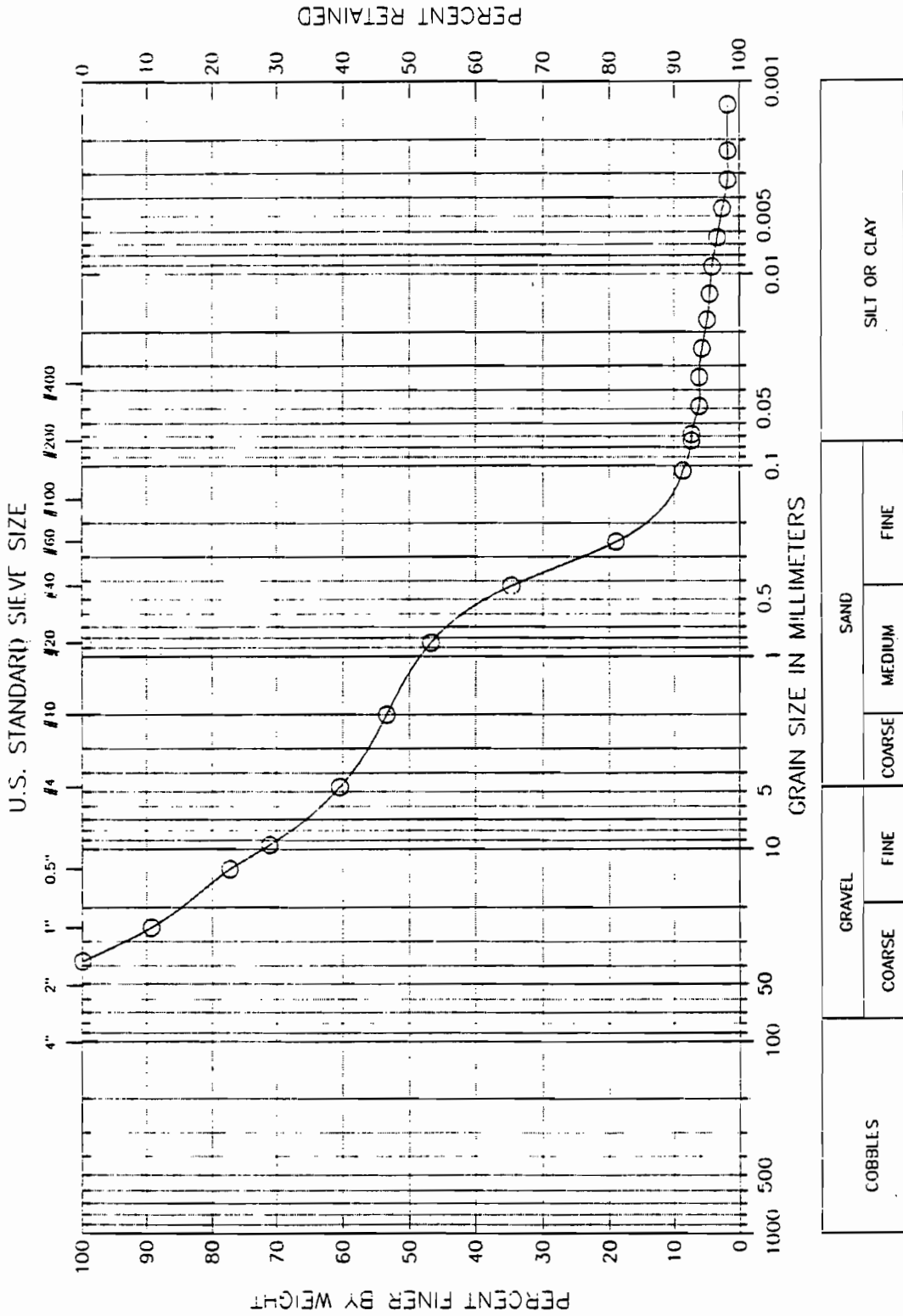
Remarks :
 WET DENSITY = 113 PCF; DRY DENSITY = 78 PCF WC=44%

Figure 1

Soil Technology, Inc.

Boring No.: EW-5-D
 Sample No.: 9102001-02
 Tested by: RGS
 Filename: 128EW5D

Project: ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP--S--EW-5-D
 Date: Wed Feb 20 1991



Classification :
 (SP-SM) Poorly graded sand with silt and gravel
 Visual Description :

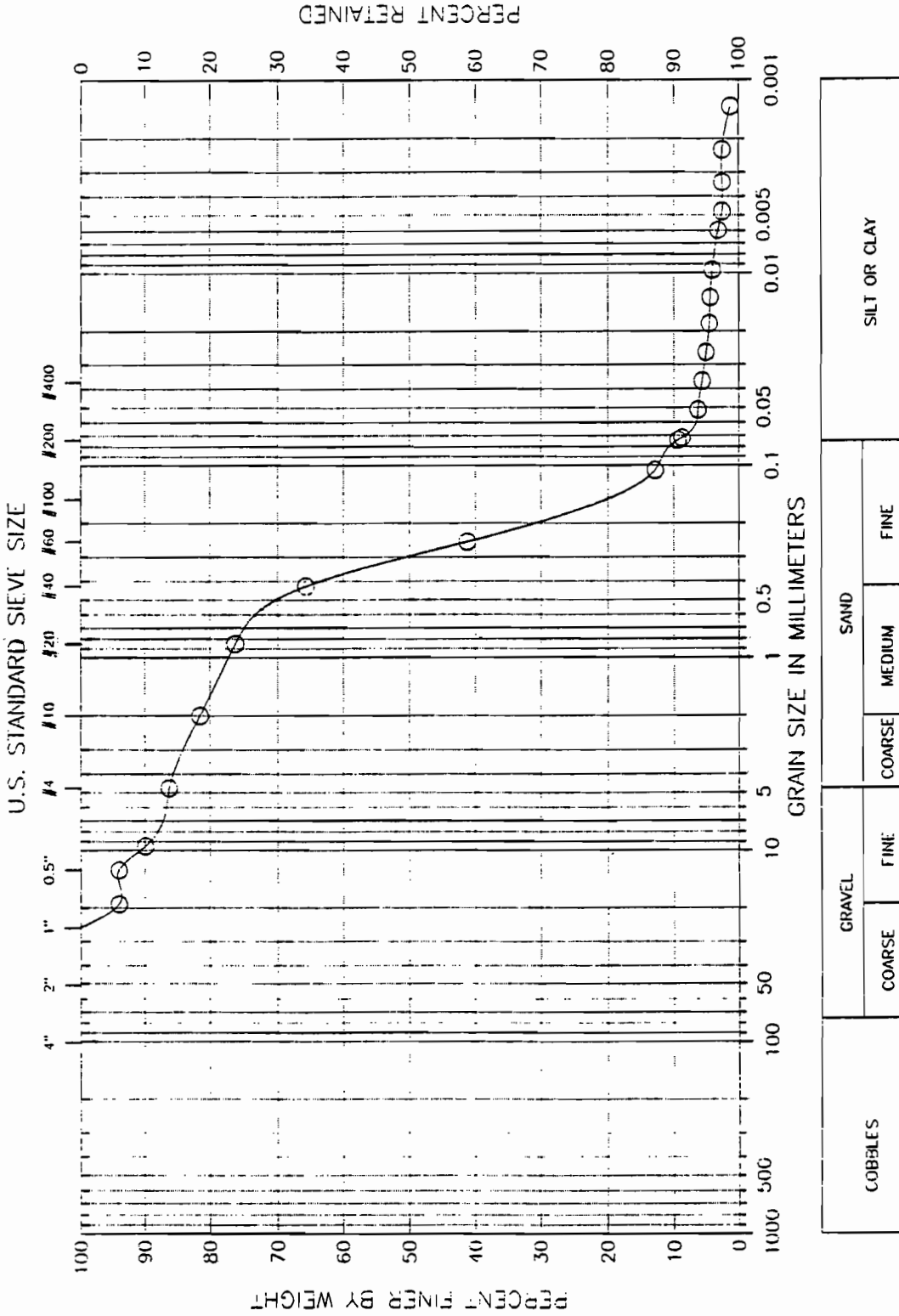
Remarks :
 WET DENSITY = 136 PCF; DRY DENSITY = 123 PCF WC=10%

Figure 2

Soil Technology, Inc.

Boring No.: EB-6-C
 Sample No.: 9102001-03
 Tested by : RGS
 Filename : 128EB6C

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EB-6-C
 Date : Wed Feb 20 1991



Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :

Remarks :
 WEY DENSITY = 124 PCF; DRY DENSITY = 103 PCF WC=20%

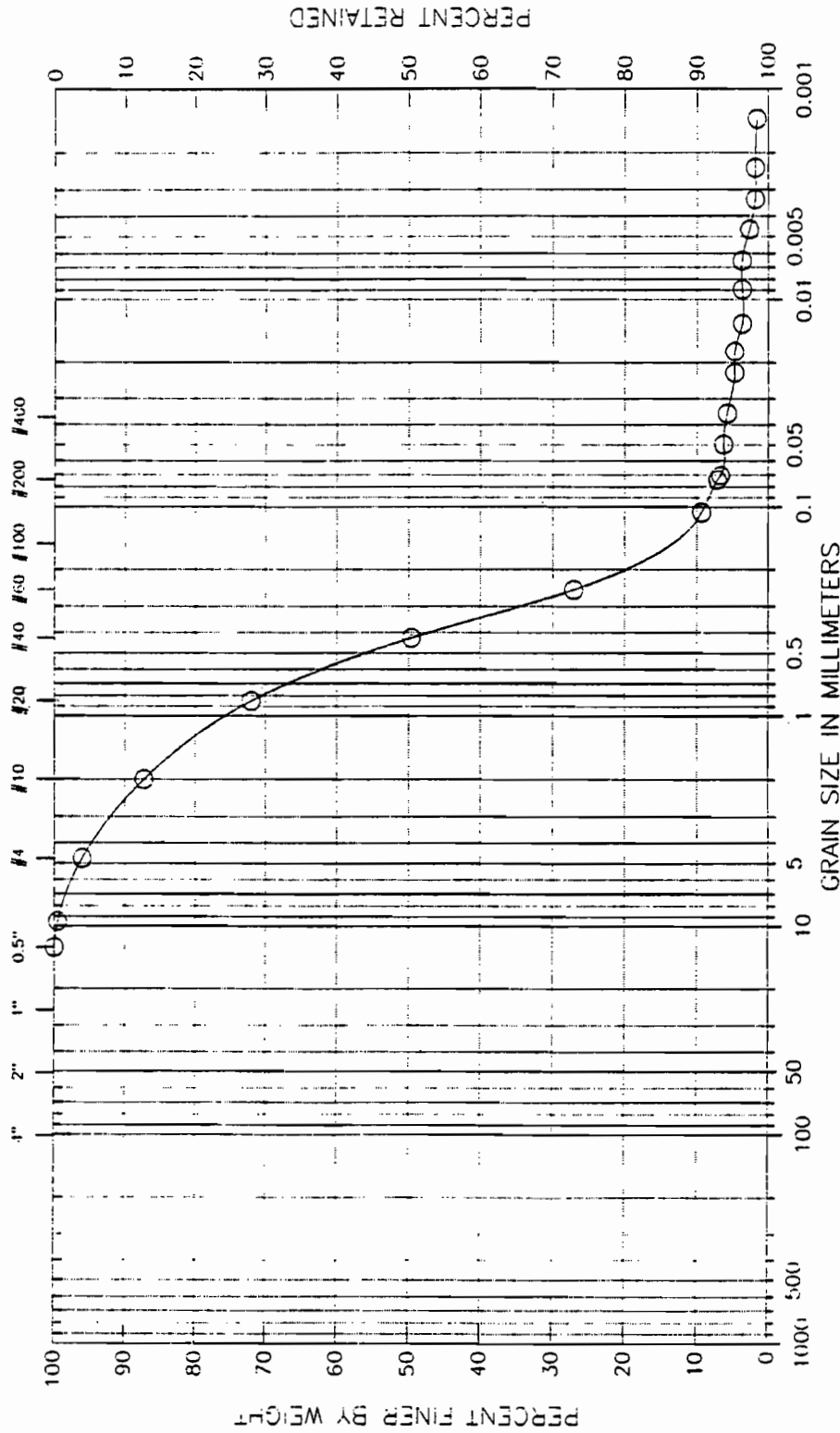
Figure 3

Soil Technology, Inc.

Boring No.: EW-1-A
 Sample No.: 9102001-04
 Tested by : RGS
 Filename : 128EW1

Project : ESE, PORT OF CLYMBIA
 Project No.: J-128
 Location: CP-S-EW-1-A
 Date : Thu Feb 21 1991

U.S. STANDARD SIEVE SIZE



Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :

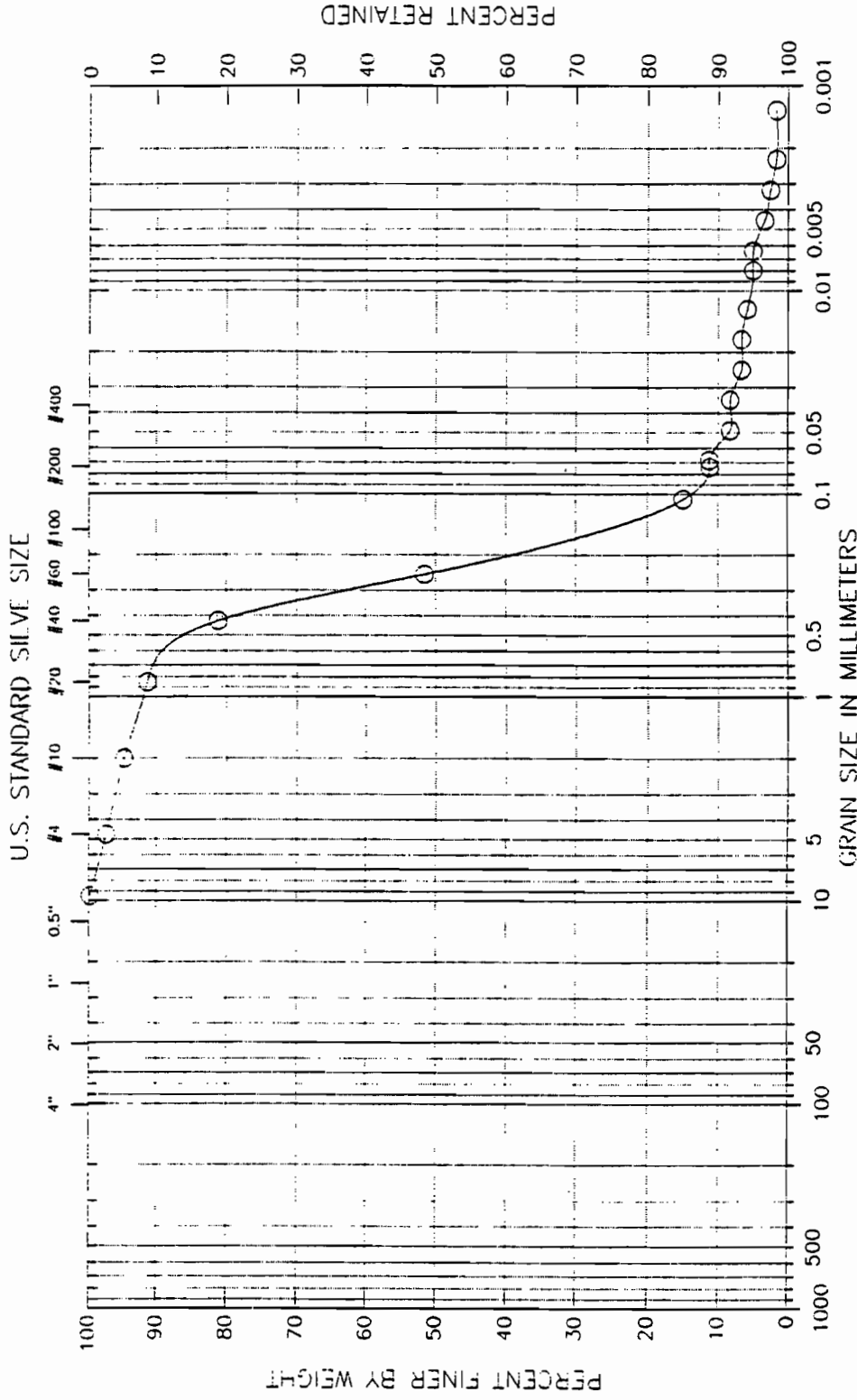
Remarks :
 WET DENSITY = 123 PCF; DRY DENSITY = 106 PCF WC=16%

Figure 4

Soil Technology, Inc.

Boring No.: EW-1-G
 Sample No.: 9102001-05
 Tested by: RGS
 Filename: 128EWIG

Project: ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EW-1-G
 Date: Thu Feb 21 1991



Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :

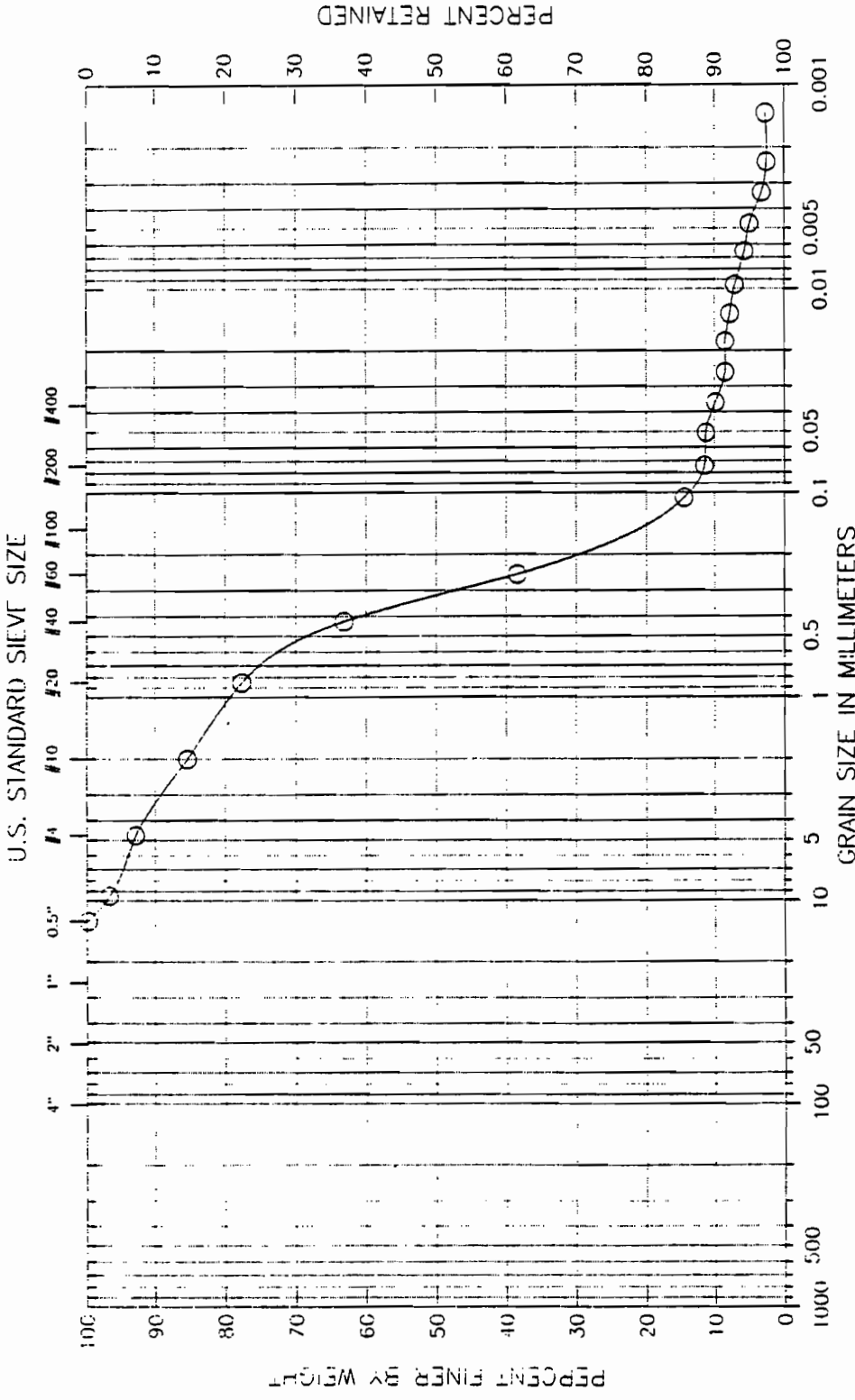
Remarks :
 WET DENSITY = 132 PCF; DRY DENSITY = 109 PCF WC=21%

Figure 5

Soil Technology, Inc.

Boring No.: EB-5-D
 Sample No.: 9102001-06
 Tested by : RGS
 Filename : 128EB5

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EB-5-D
 Date : Thu Feb 21 1991



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Classification :
 (SW-SM) Well-graded sand with silt
 Visual Description :

Remarks :
 WET DENSITY = 130 PCF; DRY DENSITY = 108 PCF WC=20%

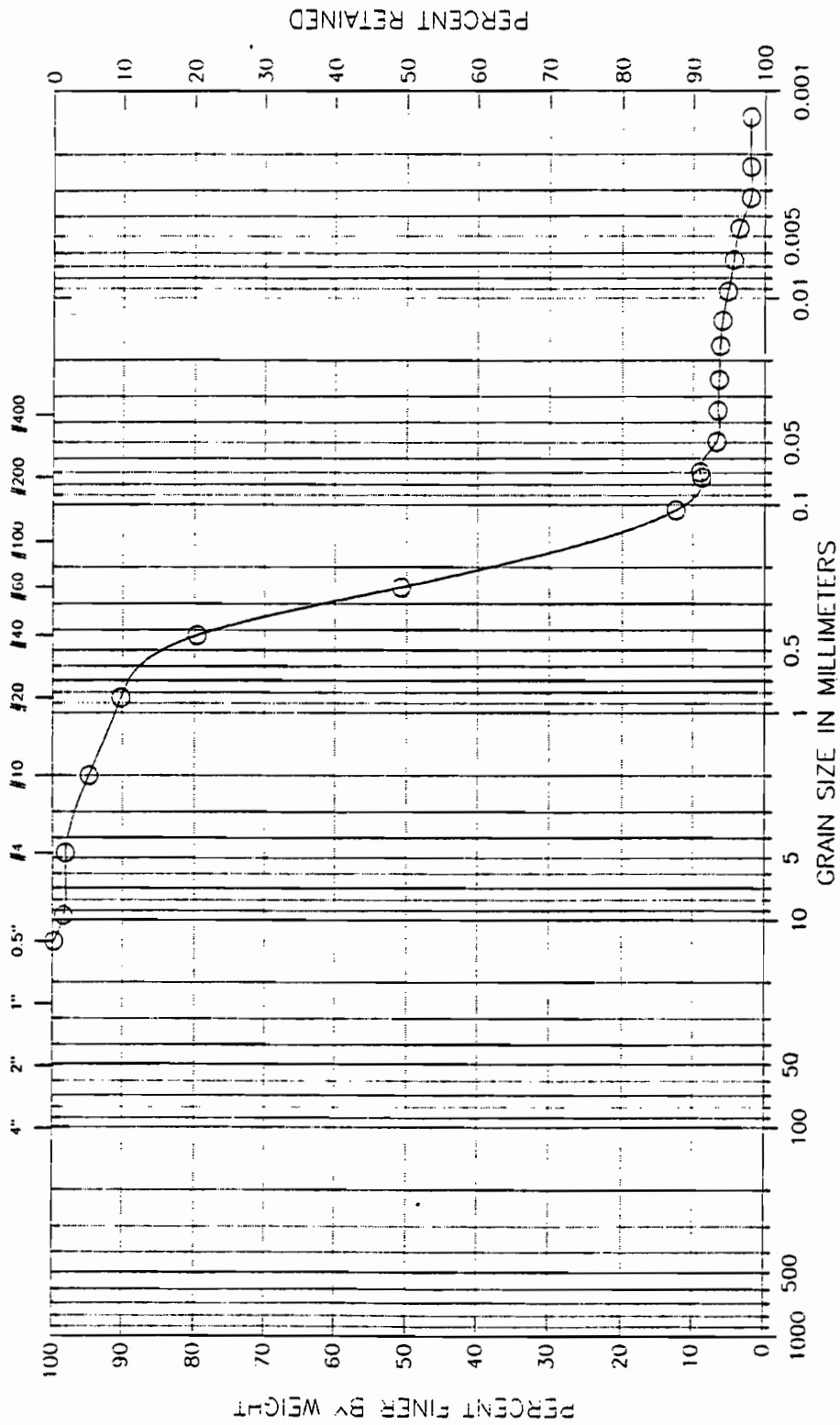
Figure 6

Soil Technology, Inc.

Boring No.: EB-1-0
 Sample No.: 9102001-07
 Tested by : RGS
 Filename : 128EB10

Project : ESL, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EP-1-0
 Date : Wed Feb 20 1991

U.S. STANDARD SIEVE SIZE



COBBLES	GRAVEL		SAND			SILT OR CLAY		
	COARSE	FINE	COARSE	MEDIUM	FINE			

Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :

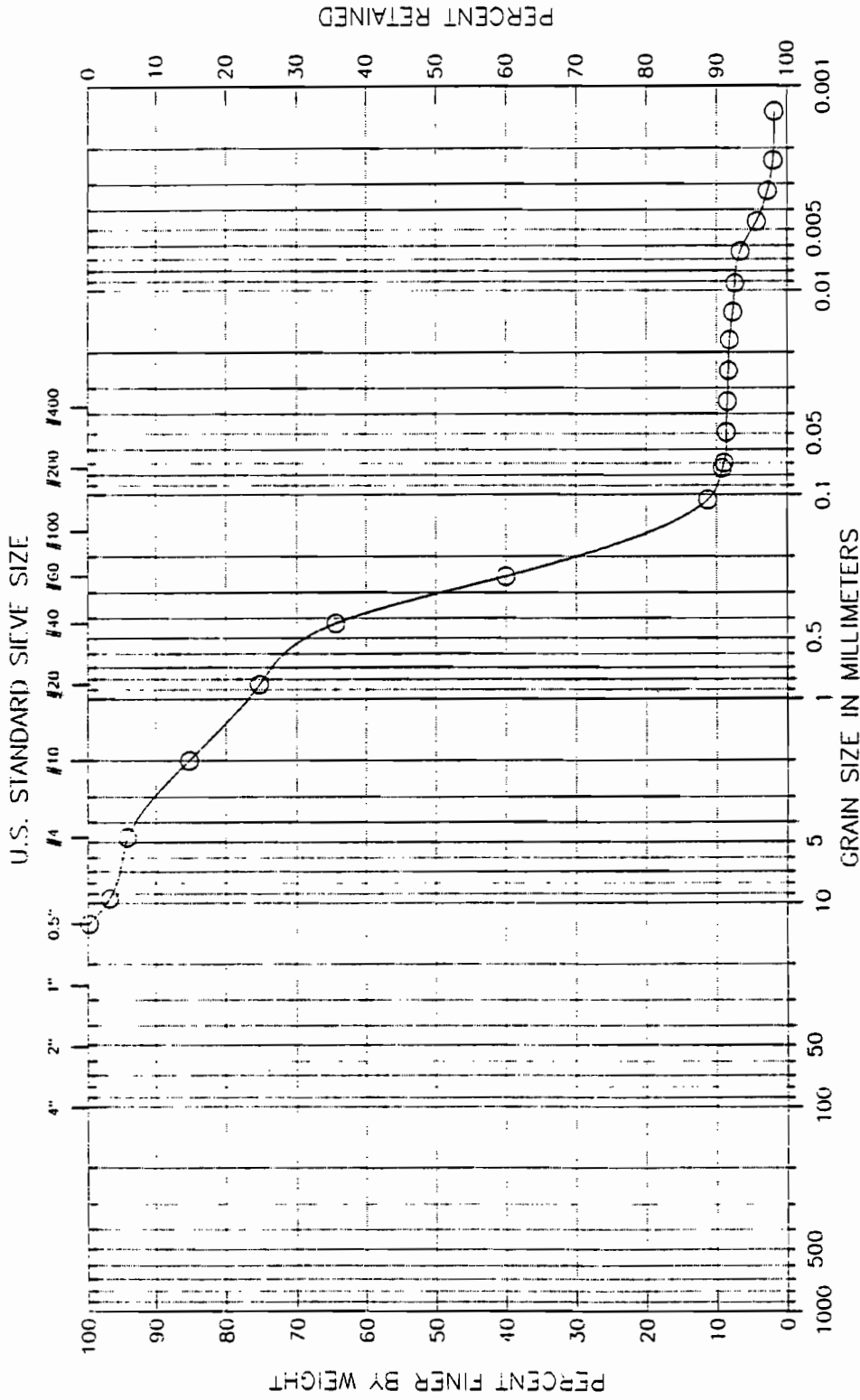
Remarks :
 WET DENSITY = 132 PCF; DRY DENSITY = 106 PCF WC=24%

Figure 7

Soil Technology, Inc.

Boring No.: EB-2-N
 Sample No.: 9102001-08
 Tested by : RGS
 File name : 128EB2N

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EB-2-N
 Date : Thu Feb 21 1991



COBBLE'S	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :

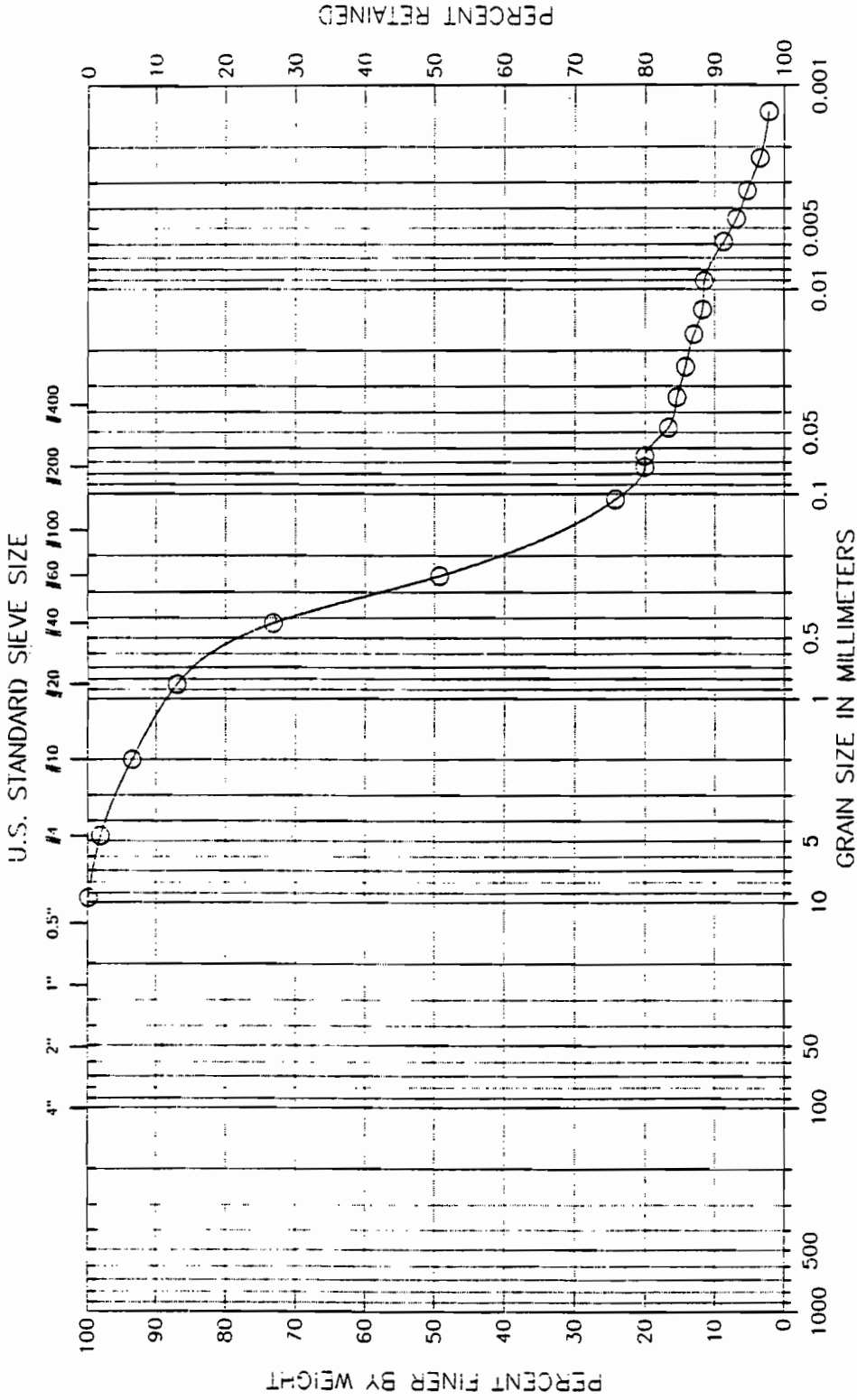
Remarks :
 WET DENSITY = 131 PCF; DRY DENSITY = 107 PCF WC=23%

Figure 8

Soil Technology, Inc.

Boiling No.: EB-11-G
 Sample No.: 9101001-09
 Tested by: RGS
 Filename: 128EB11G

Project: ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EB-11-G
 Date: Thu Feb 21 1991



COBBLES	GRAVEL		SAND			SILT OR CLAY		
	COARSE	FINE	COARSE	MEDIUM	FINE			

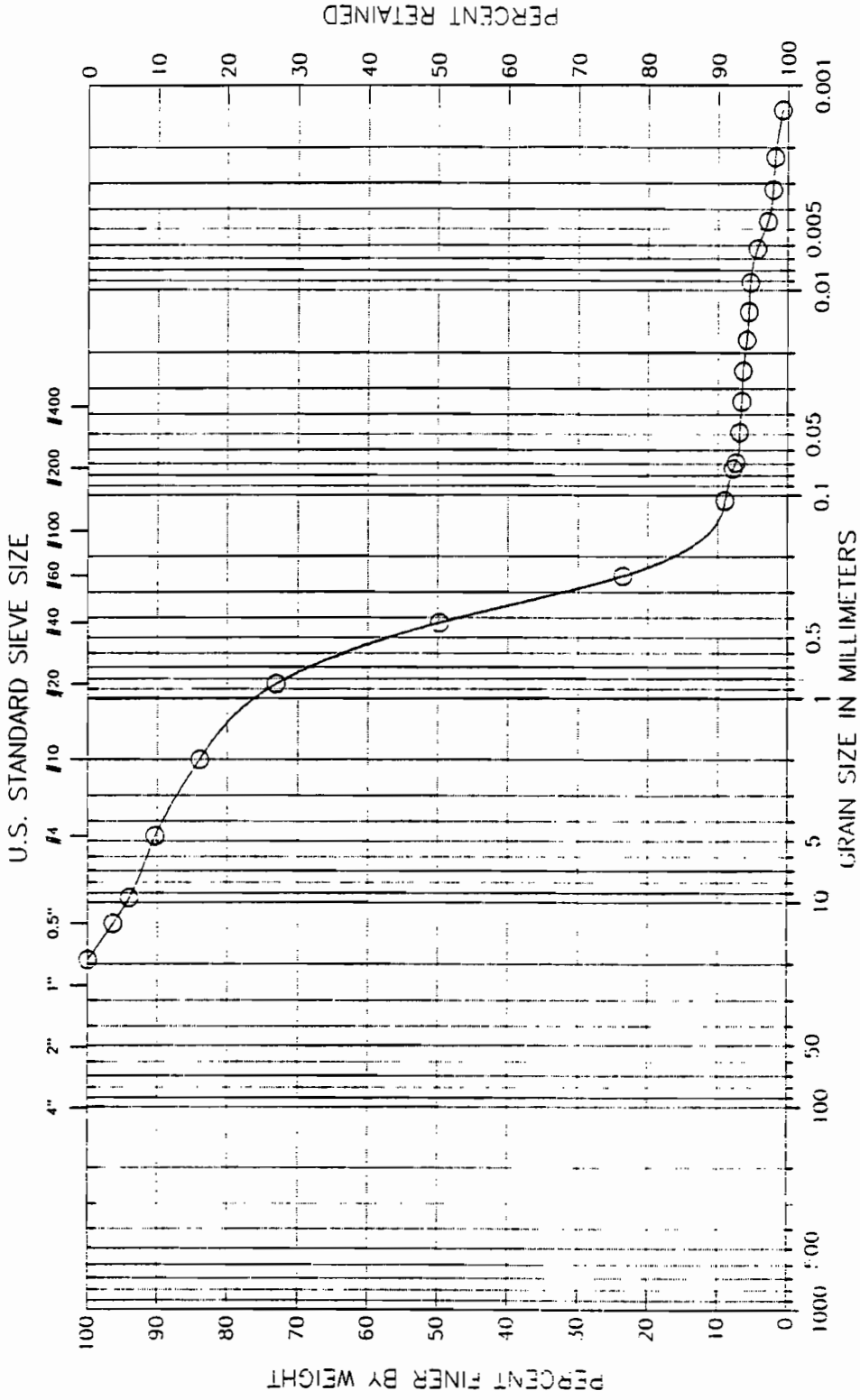
Classification: (SM) Silty sand
 Visual Description:
 Remarks: WET DENSITY = 126 PCF; DRY DENSITY = 104 PCF, WC=21%

Figure 9

Soil Technology, Inc.

Boring No.: EW-8-E
 Sample No.: 9102001-10
 Tested by : RGS
 Filename : 128EW8E

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EW-8-E
 Date : Thu Feb 21 1991



Classification :

(SP-SM) Poorly graded sand with silt

Visual Description :

Remarks :

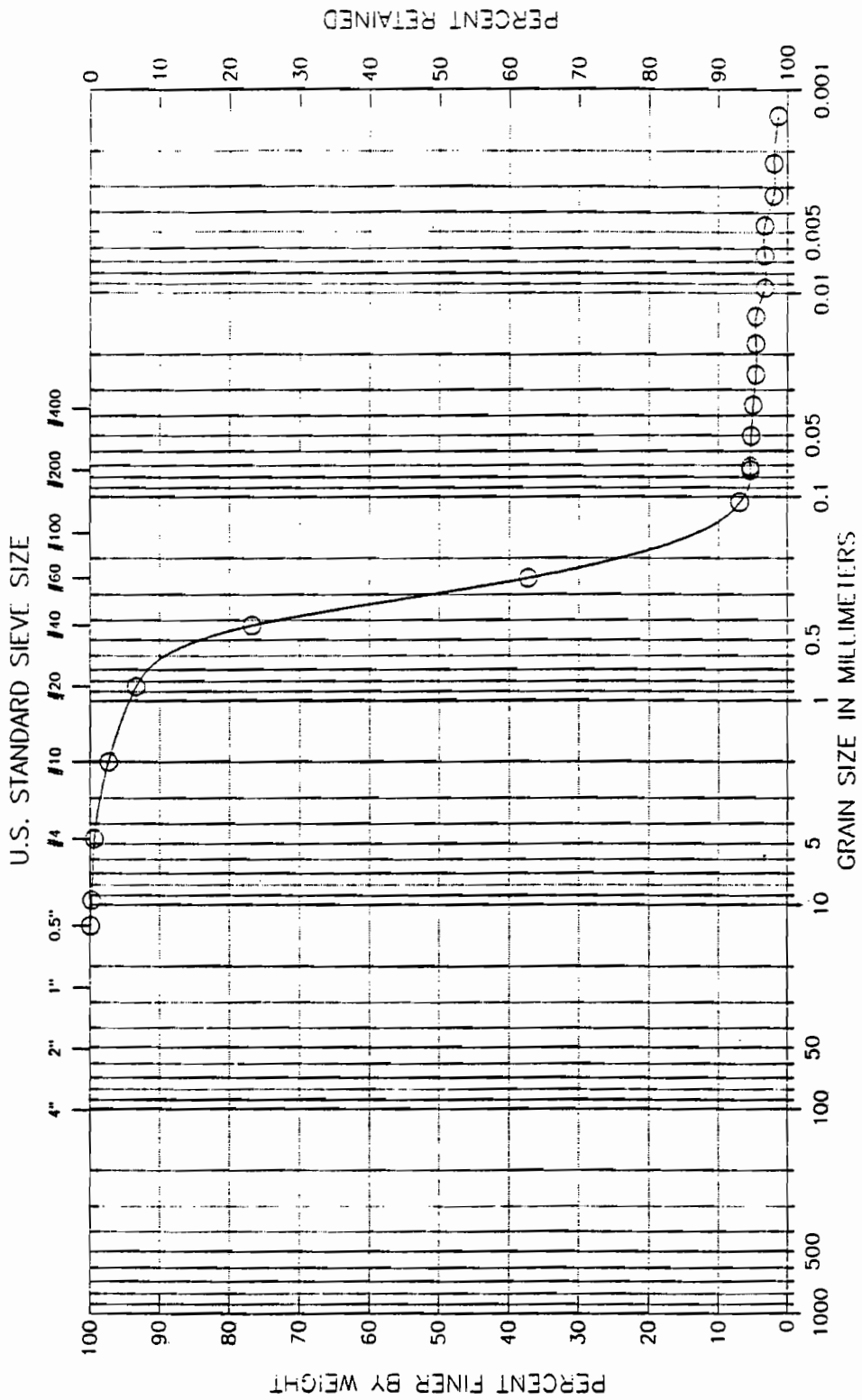
WET DENSITY = 122 PCF; DRY DENSITY = 103 PCF WC=18%

Figure 10

Soil Technology, Inc.

Boring No.: EW-6-N
 Sample No.: 9101245-12
 Tested by: RGS
 Filename: 128EW6N

Project: FSE, PORT OF OLYMPIA
 Project No.: J-128
 Location: CP-S-EW-6-N
 Date: 1hu Feb 21 1991



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

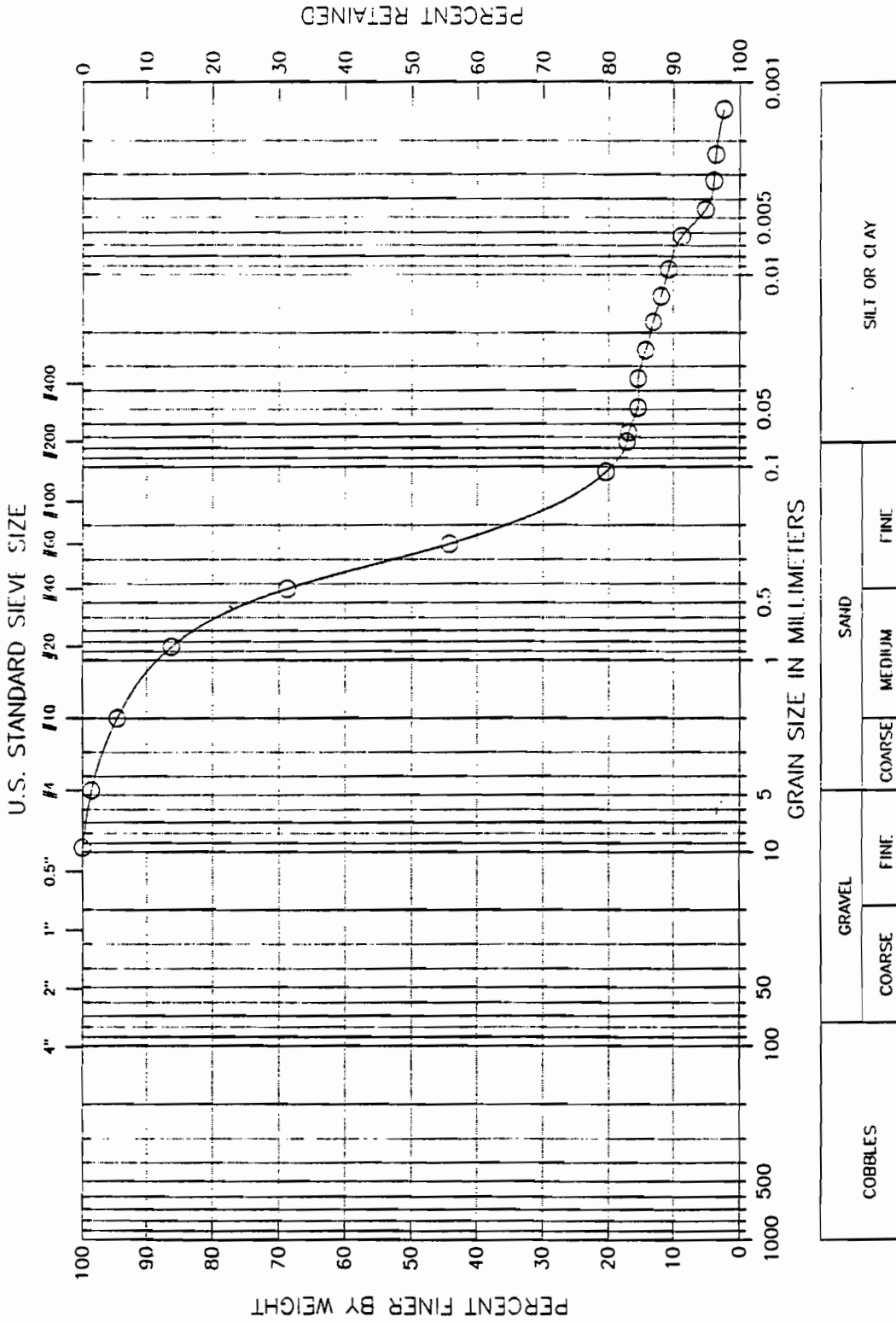
Classification: (SP-SM) Poorly graded sand with silt
 Visual Description: WET DENSITY = 121 PCF; DRY DENSITY = 98 PCF; WC=24%

Figure 1

Soil Technology, Inc.

Boring No.: EW-9-G
 Sample No.: 9101245-13
 Tested by: RGS
 Filename: 128EW9G

Project: ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EW-9-G
 Date: Thu Feb 21 1991



Classification: (SM) Silty sand
 Visual Description:

Remarks: WET DENSITY = 128 PCF; DRY DENSITY = 107 PCF; WC=19%

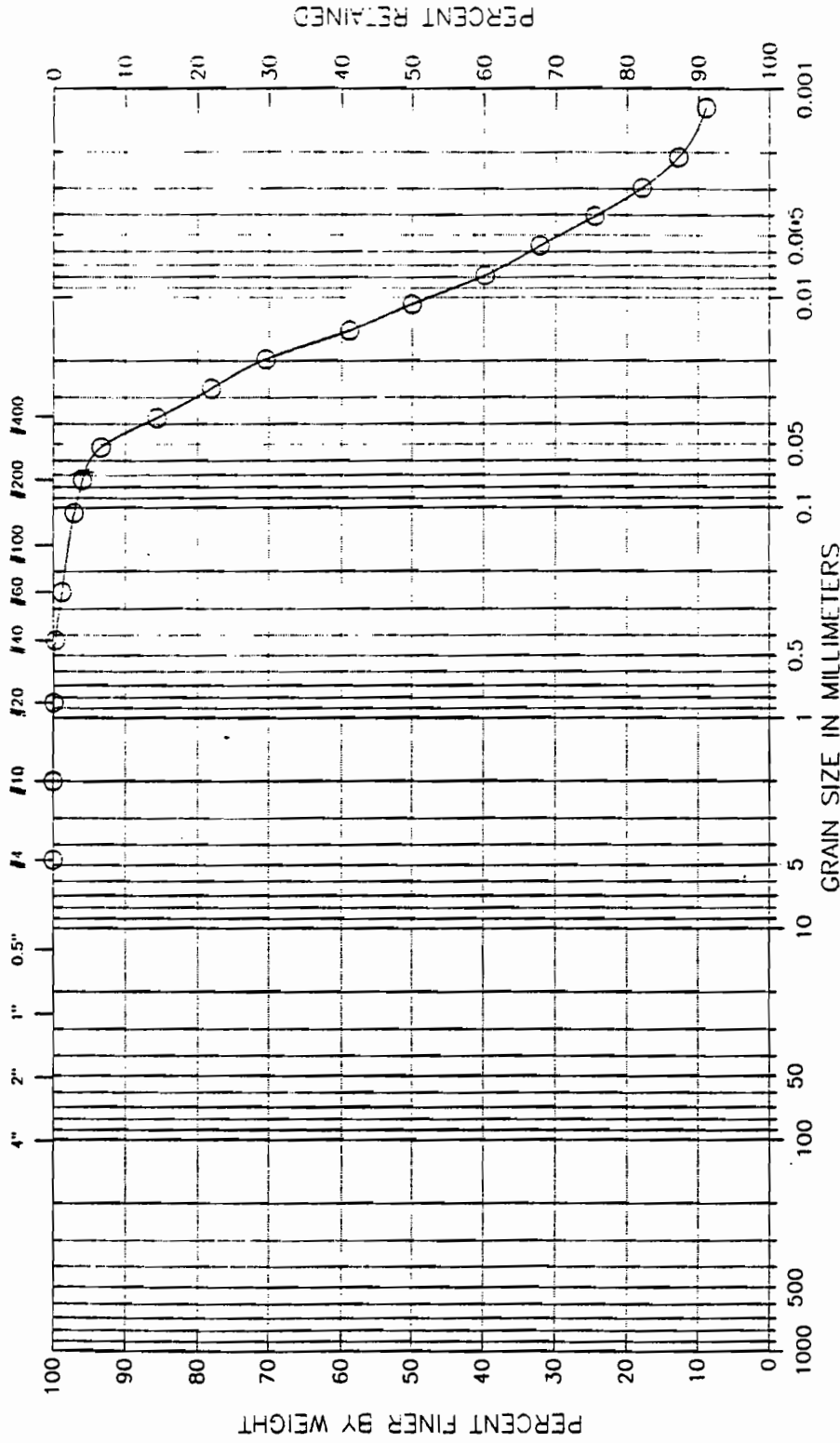
Figure 2

Soil Technology, Inc.

Boring No.: EW-9-N
 Sample No.: 9101245-14
 Tested by : RGS
 Filename : 128EW9N

Project : ESE, PORT OF OLYMPIA
 Project No.: J-128
 Location: CP-S-EW-9-N
 Date : Fri Feb 22 1991

U.S. STANDARD SIEVE SIZE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

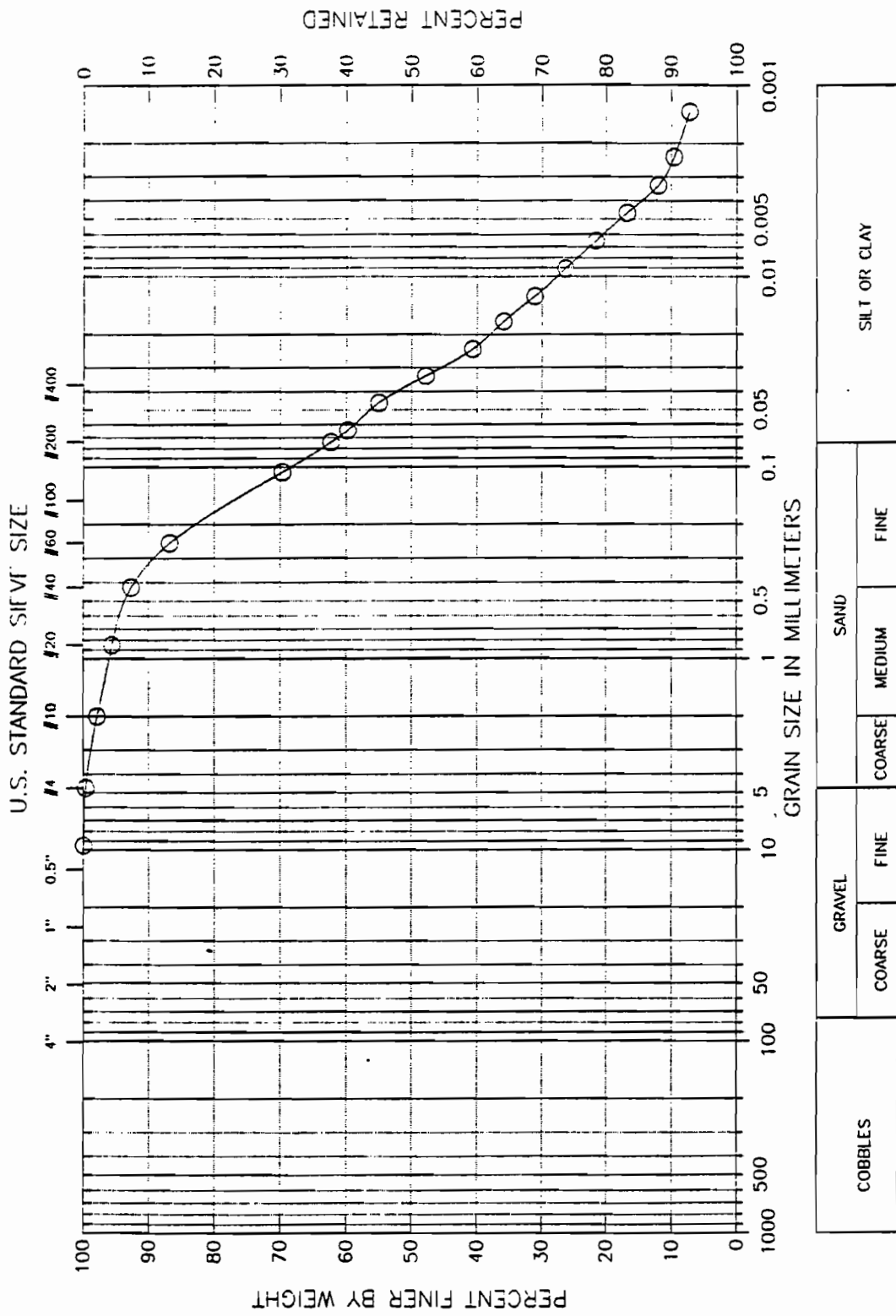
Classification :
 (ML) silt
 Visual Description :

Remarks :
 WET DENSITY = 97 PCF; DRY DENSITY = 55 PCF, WC=77%

Figure 3

Soil Technology, Inc.

Boring No.: EW-10-L
 Project : ESE, PORT OF OLYMBIA
 Sample No.: 9101245-15
 Project No.: J-128
 Tested by : RGS
 Location: CP-S-EW-10-L
 Filename : 128EW10L
 Date : Fri Feb 22 1991



Classification :
 (ML) Sandy silt
 Visual Description :

Remarks :
 WET DENSITY = 102 PCF; DRY DENSITY = 66 PCF; WC=56%

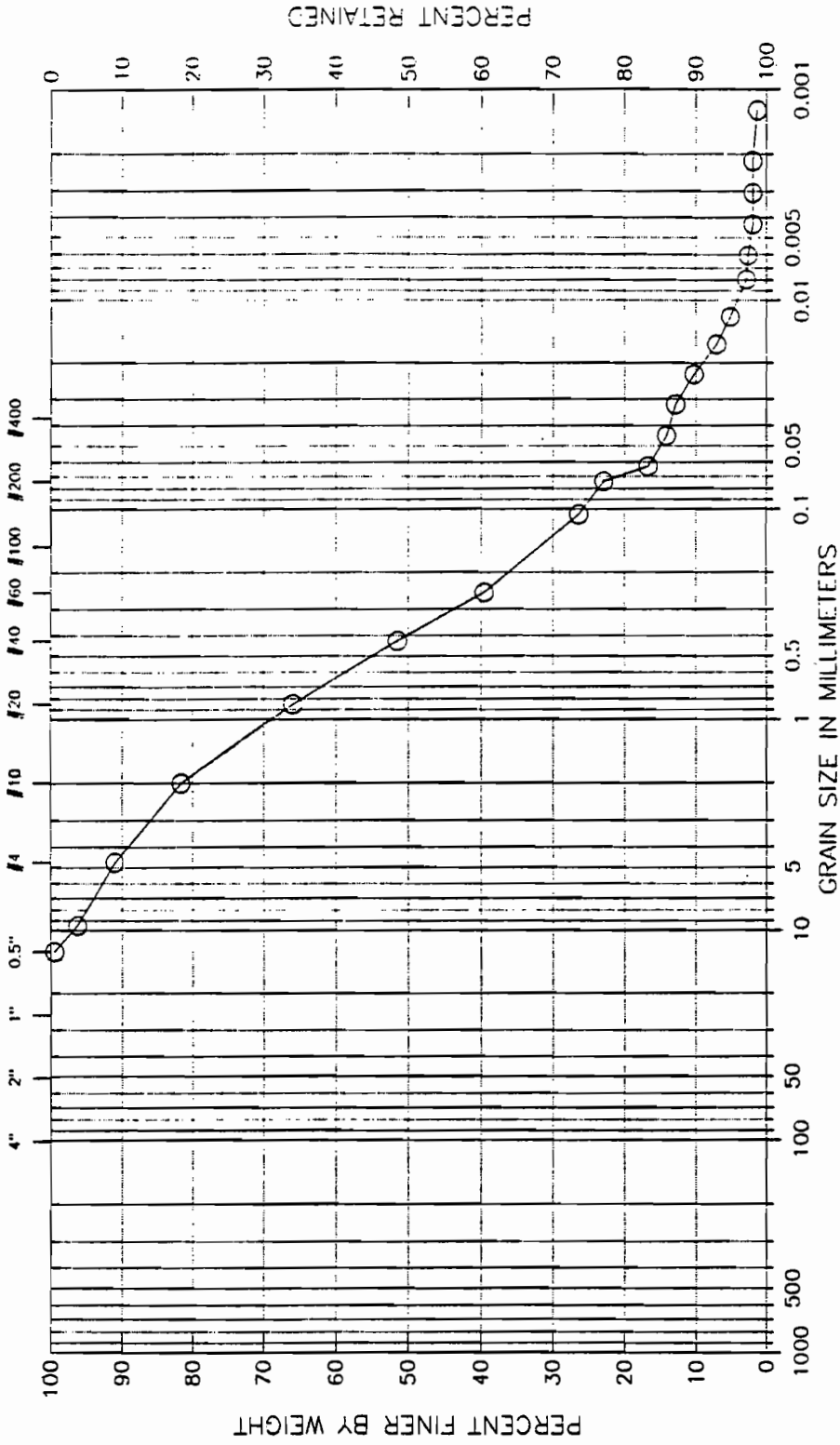
Figure 4

Soil Technology, Inc.

Boring No.: EW-11-A
 Sample No.: 9101245-16
 Tested by: RGS
 Filename: 128EW11A

Project: ESL, PORT OF OLYMPIA
 Project No.: J-128
 Location: CP-S-EW-11-A
 Date: Thu Feb 21 1991

U.S. STANDARD SIEVE SIZE



PERCENT FINER BY WEIGHT

PERCENT RETAINED

GRAIN SIZE IN MILLIMETERS

Classification:
 (SM) Silty sand
 Visual Description:

Remarks:

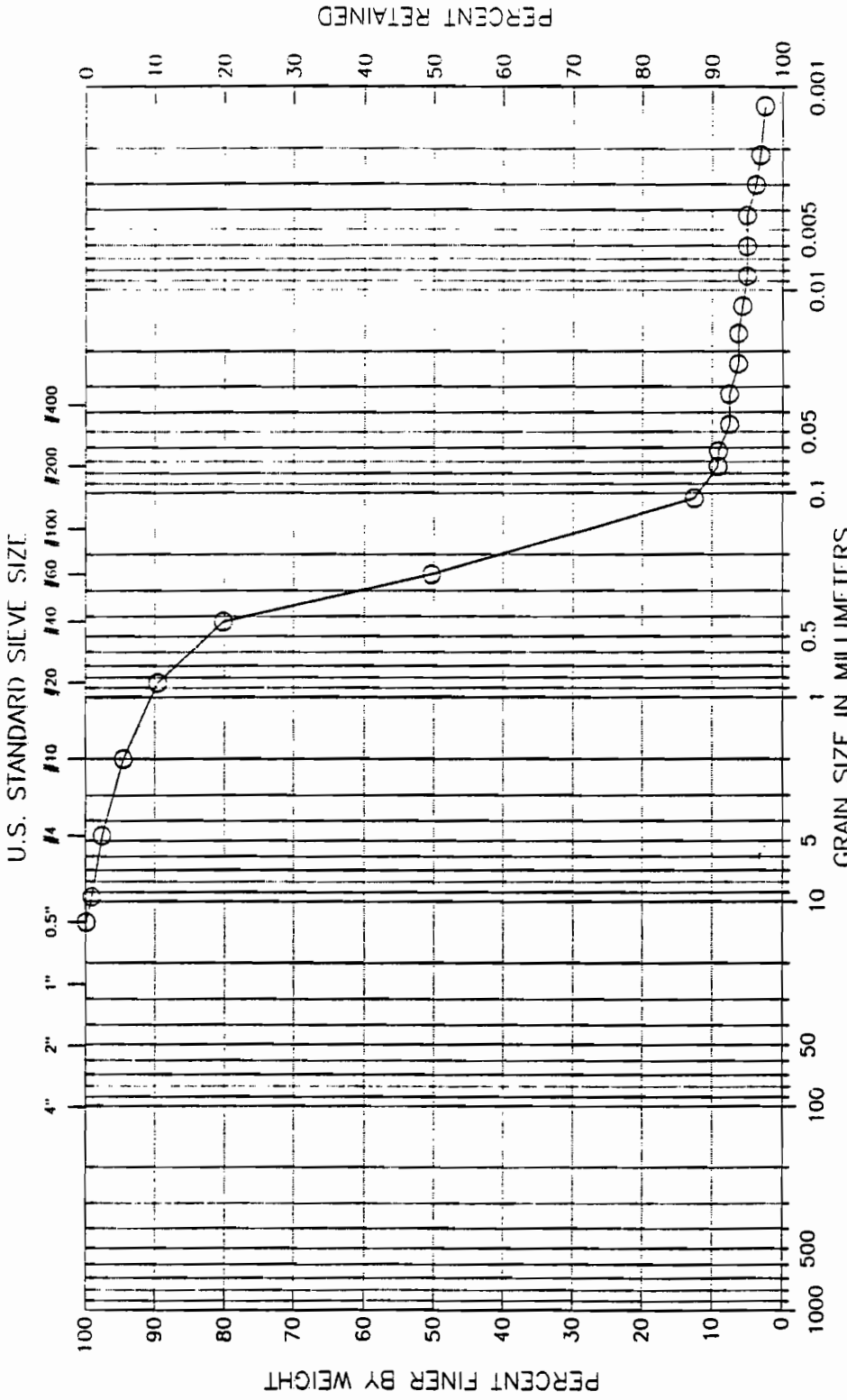
WET DENSITY = 98 PCF; DRY DENSITY = 69 PCF; WC=42 %

Figure 5

Soil Technology, Inc.

Boring No.: EW-11-I
 Sample No.: 9101245-17
 Tested by : RGS
 Filename : 128EW11I

Project : ESE, PORT OF OLYMPIA
 Project No.: J-128
 Location: CP-S-EW-11-I
 Date : Thu Feb 21 1991



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

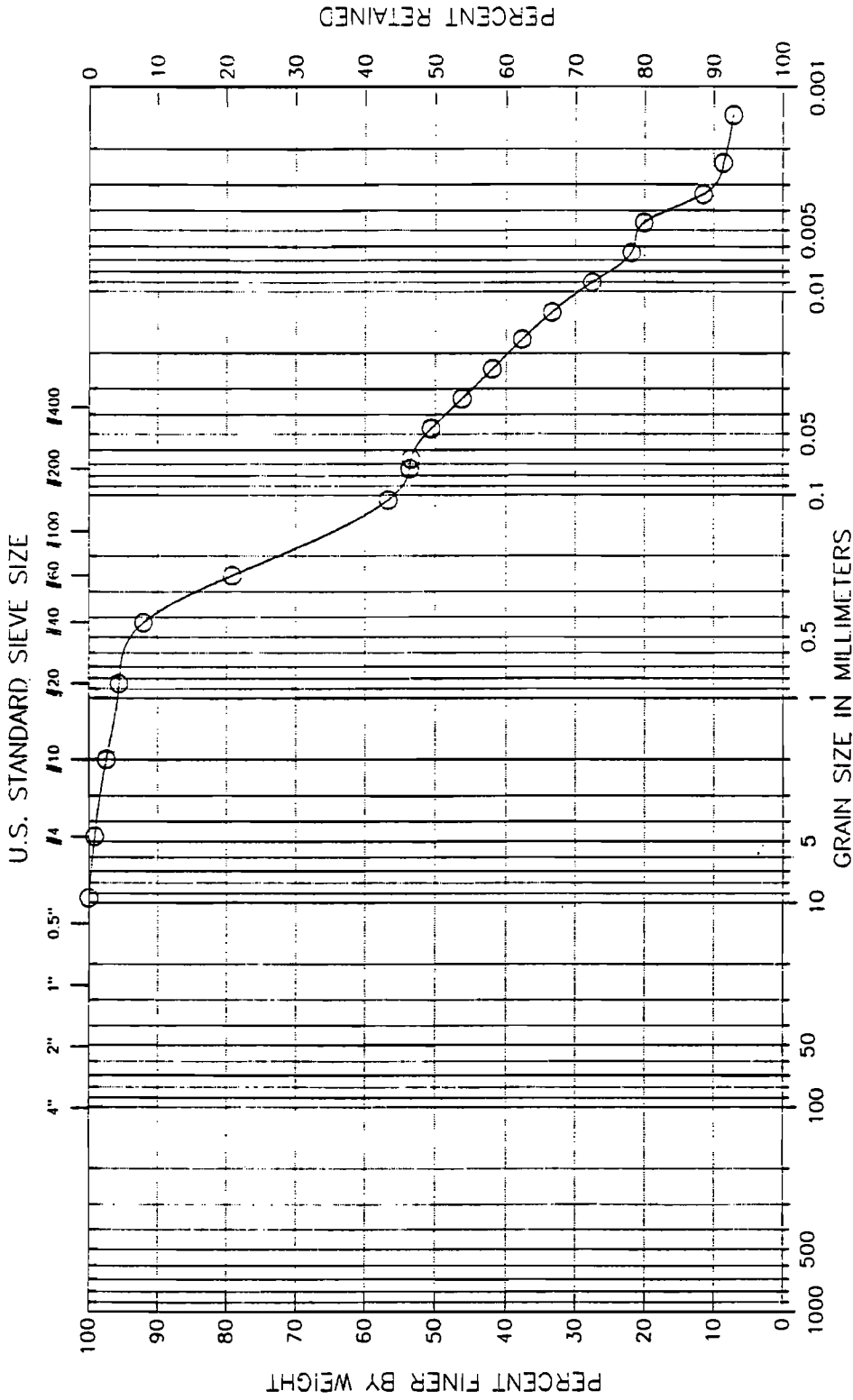
Classification :
 (SP-SM) Poorly graded sand with silt
 Visual Description :
 Remarks :
 WET DENSITY = 131 PCF; DRY DENSITY = 101 PCF; WC=29%

Figure 6

Soil Technology, Inc.

Boring No.: EW-11-M
 Sample No.: 9101245-18
 Tested by : RGS
 Filename : 128EW11M

Project : ESE, PORT OF OLYMBIA
 Project No.: J-128
 Location: CP-S-EW-11-M
 Date : Fri Feb 22 1991



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE		

Classification :
 (ML) Sandy silt
 Visual Description :

Remarks :
 WET DENSITY = 108 PCF; DRY DENSITY = 72 PCF; WC=19%

Figure 7