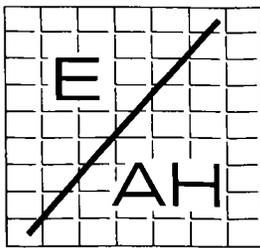


N61165.AR.002890
CNC CHARLESTON
5090.3a

LETTER TRANSMITTING FOURTH ROUND MONITORING WELL LOGS AND WELL
DEVELOPMENT LOGS AT SOLID WASTE MANAGEMENT UNITS 39 AND 43 CNC
CHARLESTON SC
3/11/1997
ENSAFE/ ALLEN AND HOSHALL



EnSafe / Allen & Hoshall

a joint venture for professional services

2901-08420

**Program
Management
Office**

Shelby Oaks Plaza
5909 Shelby Oaks Dr.
Suite 201
Memphis, TN 38134
Phone (901) 383-9115
Fax (901) 383-1743

**EnSafe/Allen & Hoshall
Branch Offices:**

Charleston
935 Houston Northcutt Blvd.
Suite 113
Mt. Pleasant, SC 29464
Phone (803) 884-0029
Fax (803) 856-0107

Cincinnati
400 TechneCenter Dr.
Suite 301
Milford, OH 45150
Phone (513) 248-8449
Fax (513) 248-8447

Pensacola
2114 Airport Blvd.
Suite 1150
Pensacola, FL 32504
Phone (904) 479-4595
Fax (904) 479-9120

Norfolk
303 Butler Farm Road
Suite 113
Hampton, VA 23666
Phone (804) 766-9556
Fax (804) 766-9558

Raleigh
5540 Centerview Drive
Suite 205
Raleigh, NC 27606
Phone (919) 851-1886
Fax (919) 851-4043

Nashville
311 Plus Park Blvd.
Suite 130
Nashville, TN 37217
Phone (615) 399-8800
Fax (615) 399-7467

Dallas
4545 Fuller Drive
Suite 326
Irving, TX 75038
Phone (214) 791-3222
Fax (214) 791-0405

March 11, 1997

Paul Bergstrand
Department of Health and Environmental Control
Bureau of Solid and Hazardous Waste
8901 Farrow Road
Columbia, South Carolina 29203

**RE: Submittal of Fourth Round Monitoring Well Logs and Well Development
Logs at SWMUs 39 and 43.**

Dear Mr. Bergstrand:

On behalf of the Caretakers Site Office, EnSafe/Allen & Hoshall is submitting copies of the well construction logs and well development logs for six wells installed in Zone A at Naval Base Charleston between January 6-14, 1997 under permit approval number HW-96-0090 (November 4, 1996). Five (5) monitoring wells (2 deep, 3 shallow) were installed in the vicinity of SWMU 39 (Former POL Drum Storage Area, Building 1604), the locations of which may be seen in Figure 1 attached to the *Request for Monitoring Well Installation* by EnSafe/Allen & Hoshall (October 29, 1996). Additionally, one (1) shallow well was installed at SWMU 43 (Publications and Printing Shop, Building 1628); its location may be seen in Figure 2 of the aforementioned monitoring well request.

If you have any questions or if we can be of further assistance, please do not hesitate to contact us at (803)-884-0029.

Sincerely,
EnSafe/Allen & Hoshall
A Joint Venture in Professional Service

By: Todd K. Kafka
Hydrogeologist

Enclosures

cc: Commander Phil Dalby, Officer In Charge, Caretakers Site Office
Tony Hunt, SOUTH DIV
Lawson Anderson, E/A&H
Project file 2901-08420

EnSafe/Allen & Hoshall

Monitoring Well NBCA039013

Project: ZONE A - Naval Base Charleston

Coordinates: 231550186 E, 38119199 N

Location: Charleston, SC

Surface Elevation: 8.4 feet msl

Started at 1550 on 1-06-97

TOC Elevation: 10.65 feet msl

Completed at 0905 on 1-07-97

Depth to Groundwater: 6.98 feet TOC Measured: 1/22/97

Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon

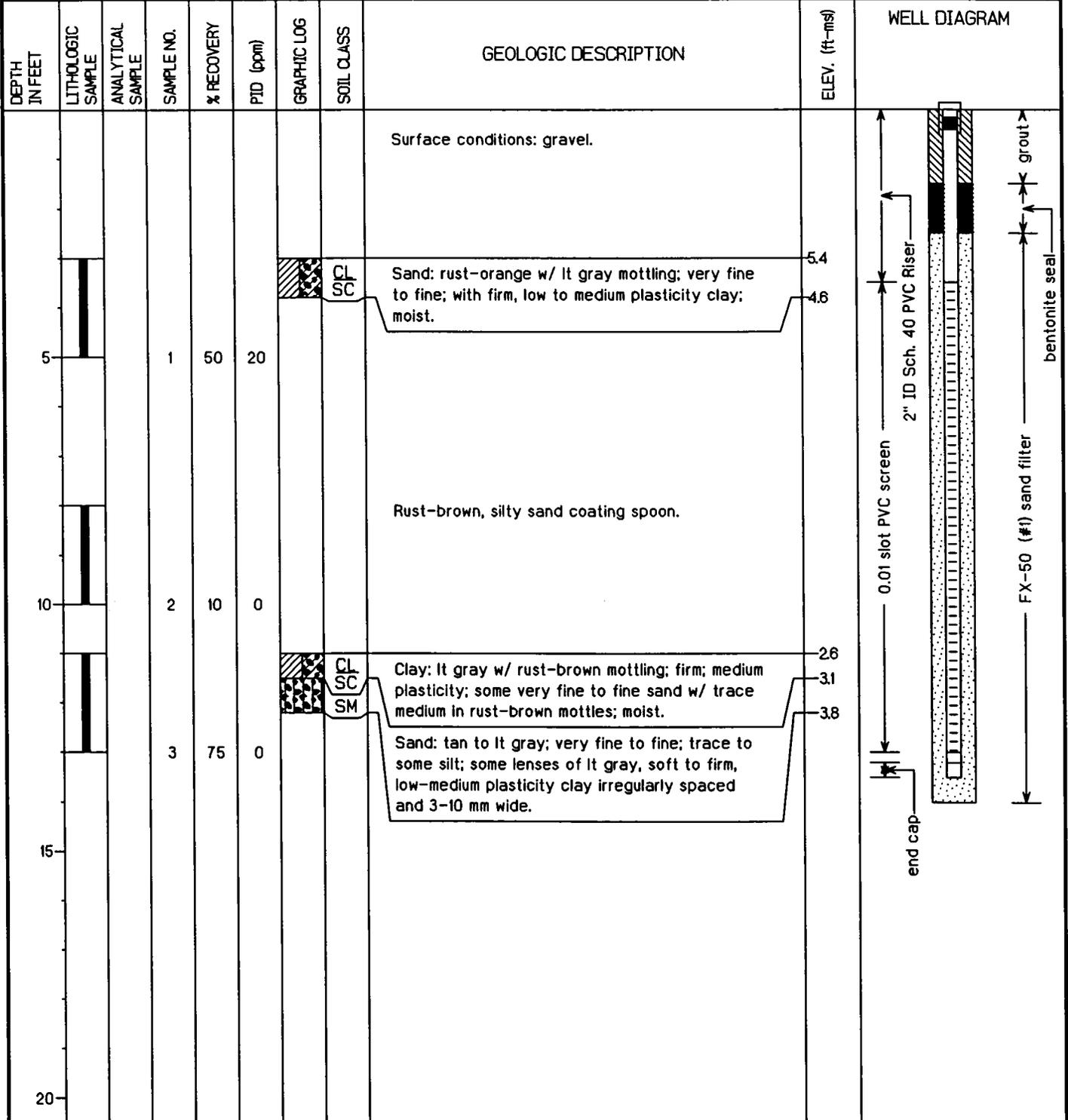
Groundwater Elevation: 3.67 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 13.5 feet bgs

Geologist: T. Kafka

Well Screen: 3.5 to 13.0 feet bgs



EnSafe/Allen & Hoshall

Monitoring Well NBCA039014

Project: ZONE A - Naval Base Charleston

Coordinates: 2315137.68 E, 381643.28 N

Location: Charleston, SC

Surface Elevation: 13.9 feet msl

Started at 1500 on 1-07-97

TOC Elevation: 13.64 feet msl

Completed at 1550 on 1-07-97

Depth to Groundwater: 6.86 feet TOC Measured: 1/22/97

Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon

Groundwater Elevation: 6.78 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 12.5 feet bgs

Geologist: T. Kafka

Well Screen: 2.5 to 12.0 feet bgs

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PTD (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
								Surface conditions: Asphalt.		
5			1	75	280		SP SM	Sand: It green-gray with dark green pits; very fine to fine; trace to some silt; well-sorted; damp; <i>Petro odor and suspicious gray-black stains in last 0.5'</i> .	0.4 0	
10			2	65	380		SP SM SM	Sand: as above; gray-black staining; some medium grain sand in thin 3-4 mm stringers; moist to wet.	5.9 5.2 4.6	
15			3	65	8		CL OL	Sand: gray to olive-brown with dark, glossy, black pits and stringers; very fine to fine with medium-coarse lens at 8.8'; some silt; <i>Heavy Petro odor..</i>	2.9 1.7	
20								Clay: green-gray to gray-green; silty; soft; low plasticity; trace to some very fine to fine sand increasing in content in last 0.5'; wet.		

EnSafe/Allen & Hoshall

Monitoring Well NBCA039015

Project: ZONE A - Naval Base Charleston

Coordinates: 2314512.80 E, 380981.55 N

Location: Charleston, SC

Surface Elevation: 7.0 feet msl

Started at 1300 on 1-07-97

TOC Elevation: 6.37 feet msl

Completed at 1430 on 1-07-97

Depth to Groundwater: 3.98 feet TOC Measured: 1/22/97

Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon

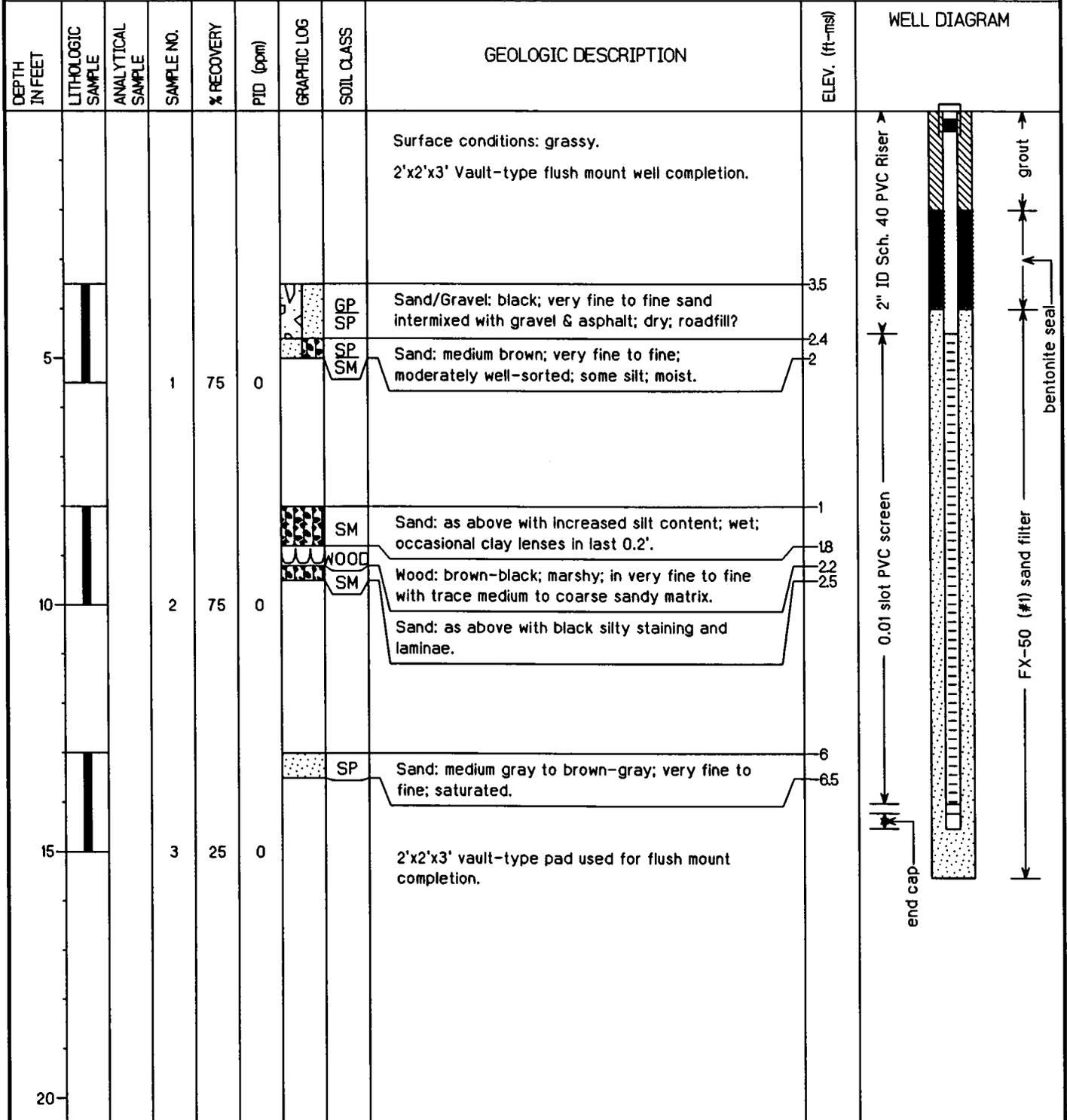
Groundwater Elevation: 2.39 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 14.5 feet bgs

Geologist: T. Kafka

Well Screen: 4.5 to 14.0 feet bgs



EnSafe/Allen & Hoshall

Monitoring Well NBCA043001

Project: ZONE A - Naval Base Charleston

Coordinates: 2315605.49 E, 380170.38 N

Location: Charleston, SC

Surface Elevation: 6.4 feet msl

Started at 0930 on 1-10-97

TOC Elevation: 6.19 feet msl

Completed at 1055 on 1-10-97

Depth to Groundwater: 5.22 feet TOC Measured: 1/22/97

Drilling Method: 4.25" ID (7.5" OD) HSA with split spoon

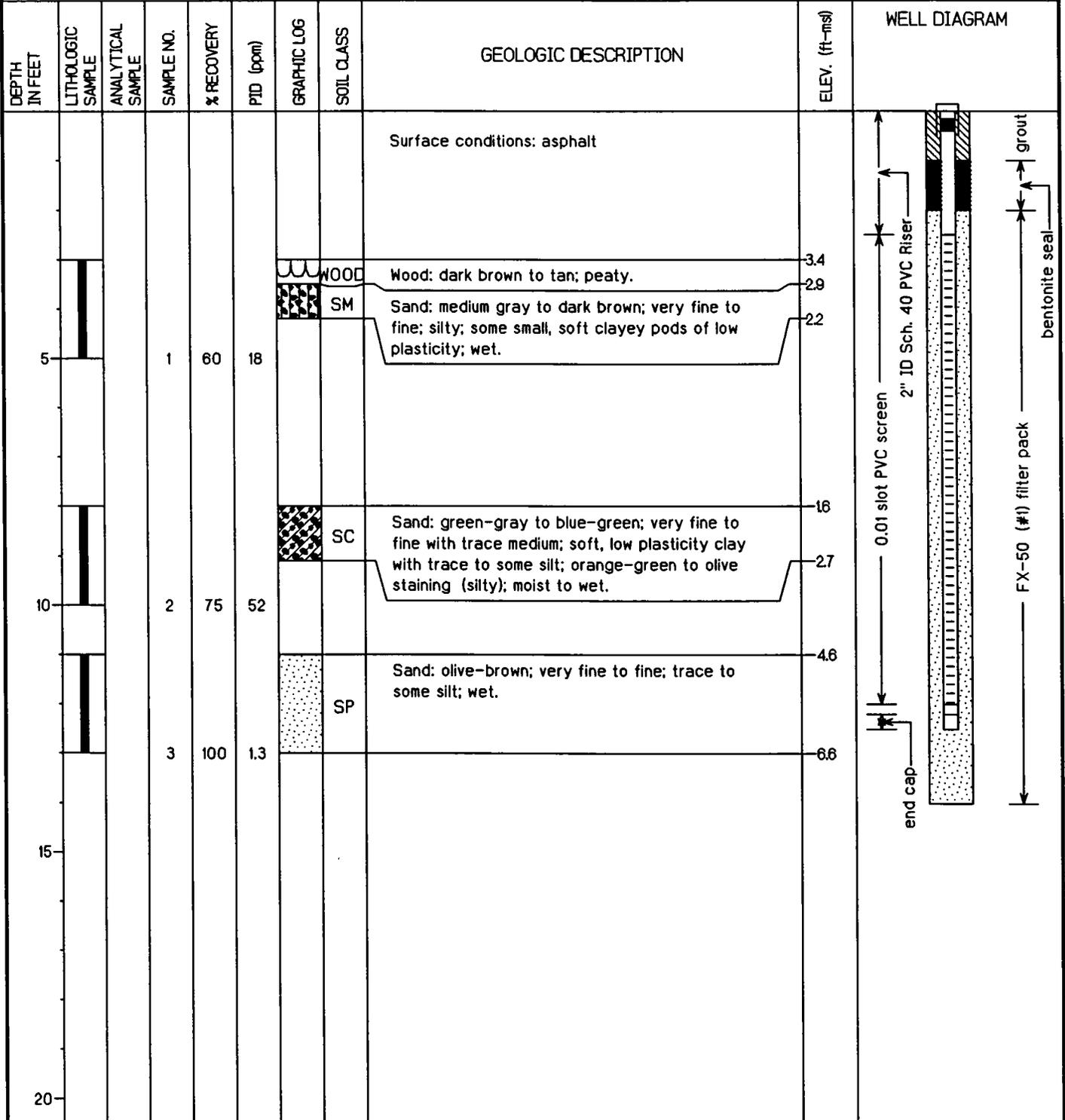
Groundwater Elevation: 0.97 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 12.5 feet bgs

Geologist: T. Kafka

Well Screen: 2.5 to 12.0 feet bgs



EnSafe/Allen & Hoshall

Monitoring Well NBCA03914D

Project: ZONE A - Naval Base Charleston

Coordinates: 2315147.98 E, 381638.85 N

Location: Charleston, SC

Surface Elevation: 13.7 feet msl

Started at 1030 on 1-09-97

TOC Elevation: 13.44 feet msl

Completed at 1230 on 1-14-97

Depth to Groundwater: 5.93 feet TOC Measured: 1/22/97

Drilling Method: Mud Rotary (6" OD cutting bit)

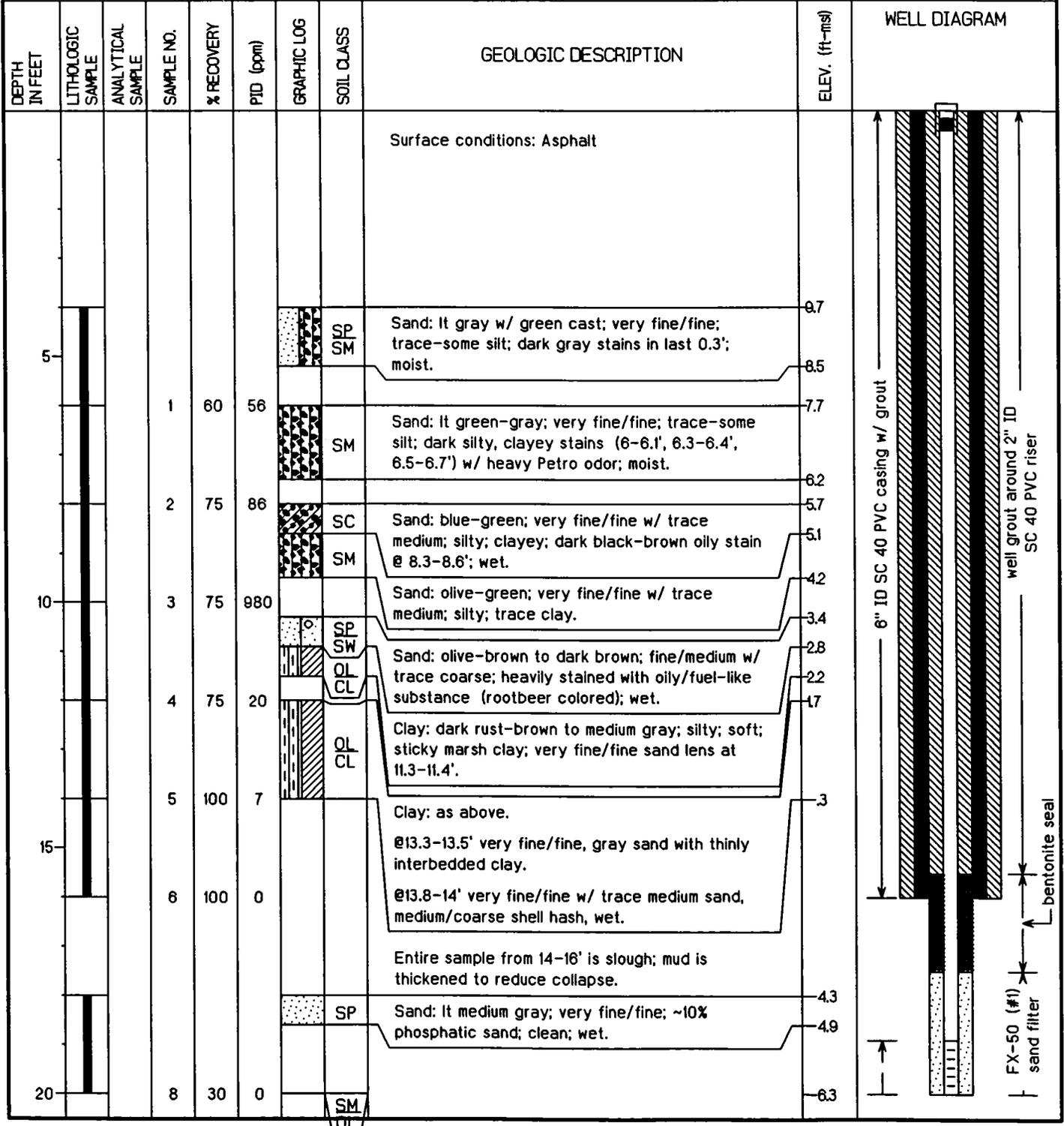
Groundwater Elevation: 7.51 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 24.2 feet bgs

Geologist: T. Kafka

Well Screen: 18.9 to 23.7 feet bgs



EnSafe/Allen & Hoshall

Monitoring Well NBCA03914D

Project: ZONE A - Naval Base Charleston

Coordinates: 2315147.98 E, 381638.85 N

Location: Charleston, SC

Surface Elevation: 13.7 feet msl

Started at 1030 on 1-09-97

TOC Elevation: 13.44 feet msl

Completed at 1230 on 1-14-97

Depth to Groundwater: 5.93 feet TOC Measured: 1/22/97

Drilling Method: Mud Rotary (6" OD cutting bit)

Groundwater Elevation: 7.51 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 24.2 feet bgs

Geologist: T. Kafka

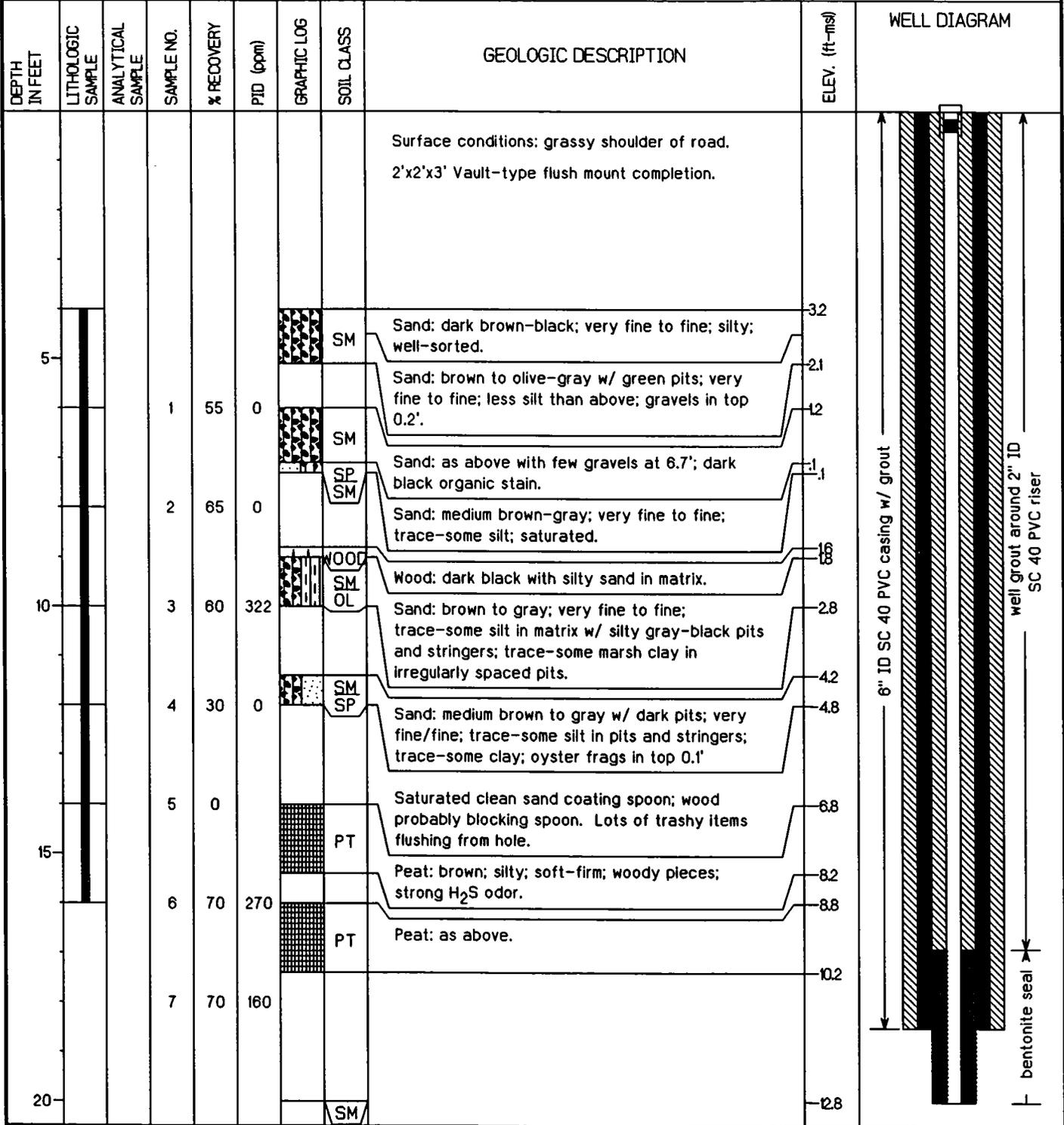
Well Screen: 18.9 to 23.7 feet bgs

DEPTH IN FEET	LITHOLOGIC SAMPLE	ANALYTICAL SAMPLE	SAMPLE NO.	% RECOVERY	PTD (ppm)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	ELEV. (ft-msl)	WELL DIAGRAM
25			9	75	0		SM CL	Sand: dark gray; very fine to fine w/ trace-some medium to coarse; silty; frequent clay stringers (<0.1' wide) of silty, soft, low-medium plasticity marsh clay; fine to coarse shell hash (~15% matrix) in last 0.3'.	8.3	
							SM		7.2 7.8 8.3	
			10	75	0		ML CL	Sand: lt tan; very fine to fine; ~75% phosphatic sand in matrix; dense; moist.	9.8	
30								Silt: olive brown; firm to stiff; clayey; some very fine/fine sand in matrix; @22-22.1' lag deposit of coarse shell hash and PO ₄ gravel; phosphatic sand in pockets/pits in silt at 22.2-22.4' and 22.5-22.7'; moist; Ashley Formation.		
35										
40										

EnSafe/Allen & Hoshall

Monitoring Well NBCA03915D

Project: ZONE A - Naval Base Charleston	Coordinates: 2314512.71 E, 380990.32 N
Location: Charleston, SC	Surface Elevation: 7.2 feet msl
Started at 1030 on 1-08-97	TOC Elevation: 6.55 feet msl
Completed at 0930 on 1-14-97	Depth to Groundwater: 6.31 feet TOC Measured: 1/22/97
Drilling Method: Mud Rotary (6" OD cutting bit)	Groundwater Elevation: 0.24 feet msl
Drilling Company: Alliance Environmental	Total Well Depth: 34.1 feet bgs
Geologist: T. Kafka	Well Screen: 24.1 to 33.6 feet bgs



EnSafe/Allen & Hoshall

Monitoring Well NBCA03915D

Project: ZONE A - Naval Base Charleston

Coordinates: 2314512.71 E, 380990.32 N

Location: Charleston, SC

Surface Elevation: 7.2 feet msl

Started at 1030 on 1-08-97

TOC Elevation: 6.55 feet msl

Completed at 0930 on 1-14-97

Depth to Groundwater: 6.31 feet TOC Measured: 1/22/97

Drilling Method: Mud Rotary (6" OD cutting bit)

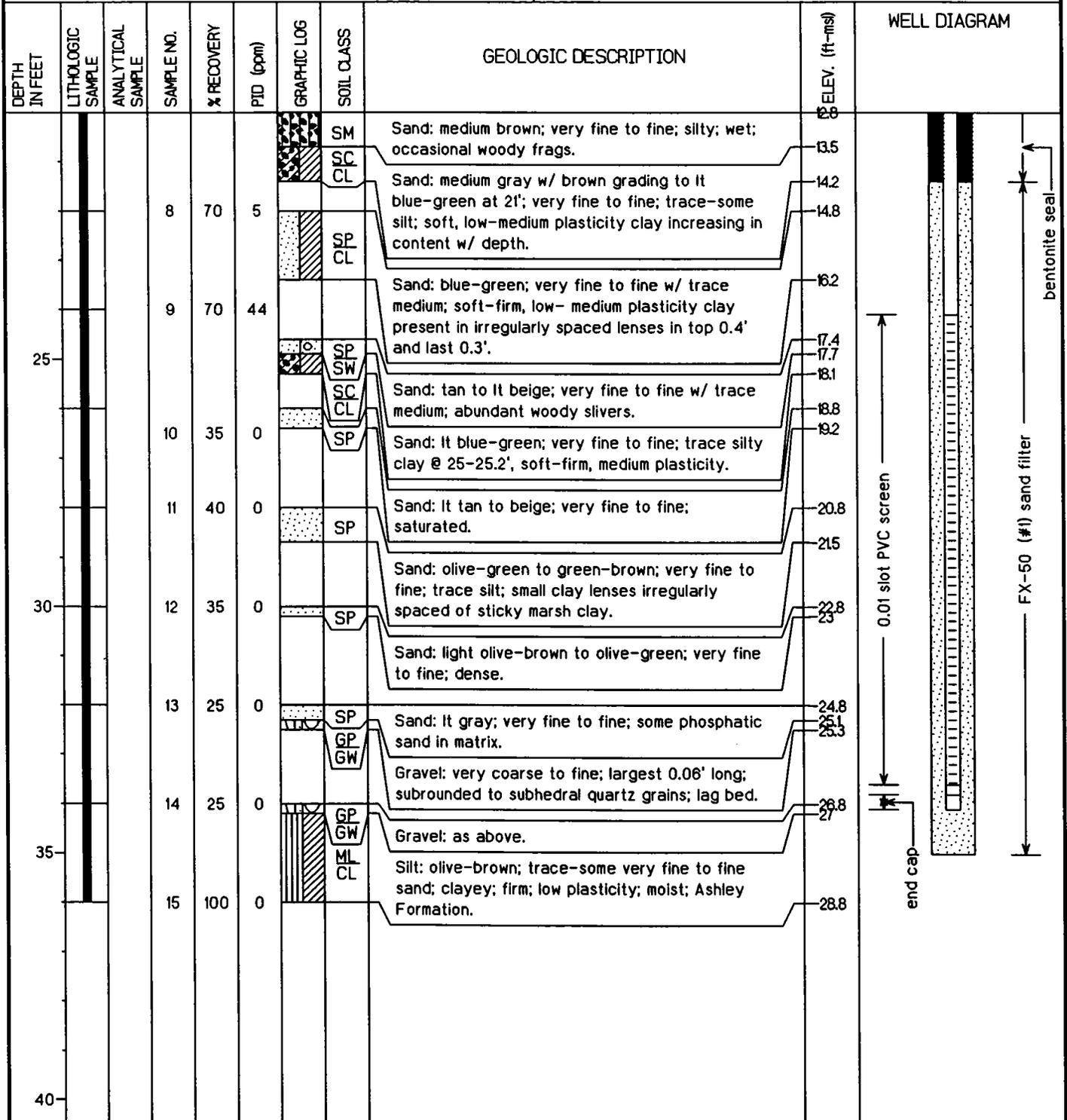
Groundwater Elevation: 0.24 feet msl

Drilling Company: Alliance Environmental

Total Well Depth: 34.1 feet bgs

Geologist: T. Kafka

Well Screen: 24.1 to 33.6 feet bgs



**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well:NBCA\039-15D

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal %	Log VOL. PG#
1/16/97	7	7.04	999	0.831	20	0.03	99
	30	7.91	590	0.958	20.5	0.04	99
	45	7.83	227	1.05	20.5	0.04	99
	50	7.91	112	1.05	20.6	0.04	99
	51	7.81	144	1.03	21	0.04	99
	52	7.8	152	1.05	20.9	0.04	99

Well Development Completed on: 1/16/97

COMMENTS: No visible turbidity: water has milky texture.

**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well:NBCA\039-015

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal %	Log VOL. PG#
1/16/97	10	7.54	999	35.1	19.4	2.23	100
	30	7.56	444	34.3	20.7	2.17	100
	55	7.61	79	34.9	21.2	2.22	100
	65	7.67	24	35	20.4	2.25	100
	75	7.67	30	35	21.3	2.22	100

Well Development Completed on: 1/16/97

COMMENTS: No visible turbidity.

**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well: NBCA\039-14D

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal %	Log VOL. PG
1/16/97	10	9.1	999	0.314	21.2	0.02	101
	30	7.99	205	0.339	21.7	0.01	101
	50	7.98	123	0.337	21.7	0.01	101
	65	7.98	140	0.339	21.6	0.01	101
	75	8.07	99	0.345	20.7	0.01	101
	85	7.81	74	0.343	21.6	0.01	101
	110	7.87	57	0.344	21.4	0.01	101

Well Development Completed on: 1/16/97

COMMENTS: No visible turbidity.

**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well: NBCA\039-013

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal %	Log VOL. PG
1/15/97	5	6.61	999	0.211	18.3	0	102
	15	5.56	999	0.177	19.1	0	102
	30	5.57	968	0.167	18.8	0	102
	40	5.46	94	0.176	18.7	0	102
	45	5.45	43	0.166	18.8	0	102
	47	5.45	29	0.165	18.6	0	102

Well Development Completed on: 1/15/97

COMMENTS: No visible turbidity.

**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well:NBCA\043-001

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal %	Log VOL. PG
1/15/97	5	5.64	999	1.1	20	0.05	103
	20	6.18	444	1.14	21.1	0.05	103
	30	6.16	297	1.16	21.5	0.05	103
	45	6.25	22	1.28	21.2	0.05	103
	50	6.43	10	1.32	21.6	0.06	103
	52	6.32	14	1.33	21.6	0.06	103

Well Development Completed on: 1/15/97

COMMENTS: No visible turbidity.

**ENSAFE / ALLEN & HOSHALL
 NAVAL BASE CHARLESTON
 WELL DEVELOPMENT STATUS REPORT
 ZONE A**

WELL DEVELOPMENT SUMMARY

Well: NBCA\039-014

Summary Log of well development progress.
 Readings are final readings for each visit.
 Volume data are cumulative from start of development.

DATE	VOLUME Gallons	pH	Turb NTU	Cond mS/cm	Temp Celsius	Sal ‰	Log VOL. PG
1/15/97	10	5.19	45	0.366	19.4	0.01	104
	15	6.1	10	0.369	19.7	0.01	104
	17	6.23	14	0.366	20	0.01	104

Well Development Completed on: 1/15/97

COMMENTS: No visible turbidity. Petro odor