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TRANSMITTAL LETTER AND TEST BORING LOGS, TEST BORING LAYOUT SKETCH AND SITE VICINITY DRAWING FOR COMPLETION OF SOIL TEST BORINGS FOR MCON P-184 ATTACK WEAPONS SCHOOL FOR FISCAL YEAR 1990 NAS OCEANA VA
3/14/1989
ATEC ASSOCIATES OF VIRGINIA

ATEC Associates of Virginia, Inc.
2551 Eltham Avenue, Suite Z
Norfolk, Virginia 23513-2511
(804) 857-6765, FAX # (804) 857-6283

March 14, 1989

Department of the Navy
Commander
Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511-6287

Re: Soil Test Borings
FY90 MCON P-184
Attack Weapons School
NAS, Oceana, Virginia Beach, Virginia
ATEC Job No. 26-91012

Gentlemen:

Pursuant to your authorization, we have completed this project. The test boring logs, along with a test boring layout sketch and site vicinity drawing are submitted herewith. The samples will be stored for 30 days and then discarded unless we receive other instructions.

We appreciate the opportunity to serve you in this regard and trust that you will consult with us if there are any questions concerning this investigation. Please feel free to contact us at any time if we can provide you with any additional technical and/or professional assistance in connection with this project.

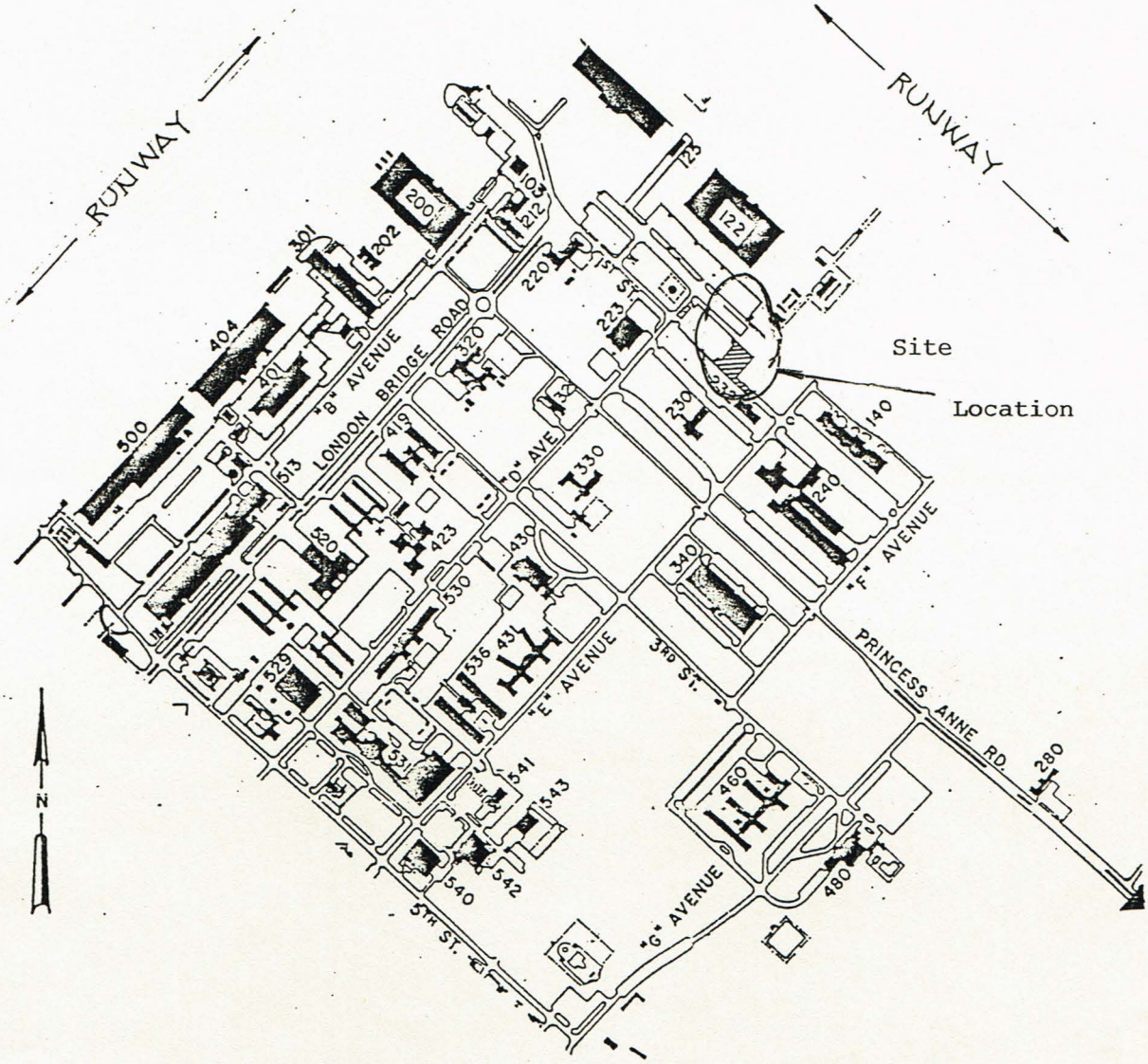
Very truly yours,

ATEC ASSOCIATES OF VIRGINIA, INC.

Donald R. Stites, P. E.
Geotechnical Engineer

DRS/cd

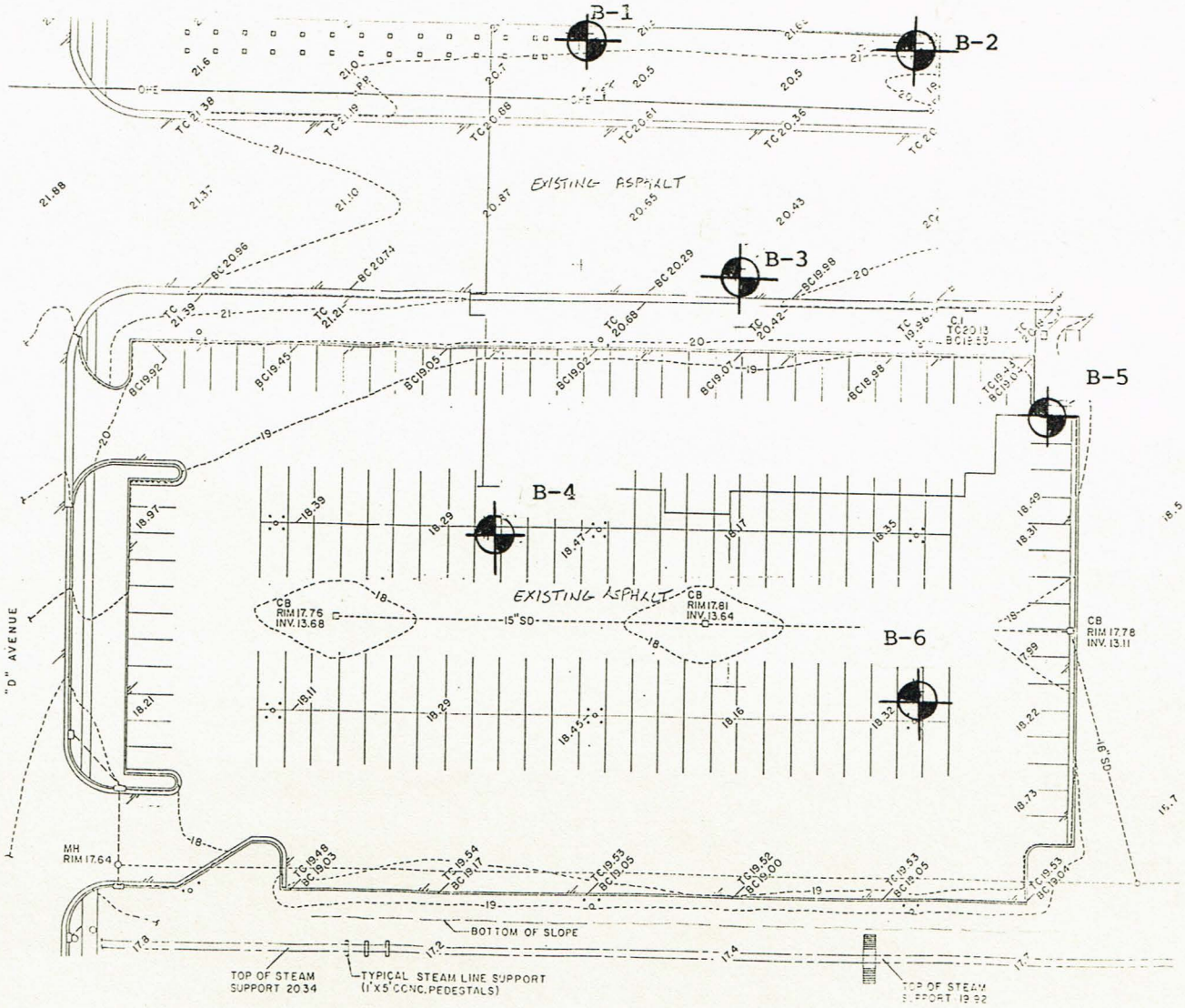
Copies: (3) Client



ATEC Associates
OF VIRGINIA, INC.

SITE VICINITY DRAWING

Job Name: FY90 MCON P-184 Attack Weapon School
Job No: 26-91012
Client: Department of the Navy
Date: February 1989



— Soil Boring Locations

ATEC Associates
OF VIRGINIA, INC.

TEST BORING LOCATION SKETCH

Job Name: FY90 MCON P-184 Attack Weapons School
Job No: 26-91012
Client: Department of the Navy
Date: February 1989

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 1

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/16/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
TOPSOIL 1.5"							
Tan, very moist, loose to medium dense Silty fine SAND (SM)			1	3/4 9/11	18		
	3.0		2	10/4 6/6	18		
*	4.0						*Dark gray, very moist, medium stiff Clayey SILT with decayed wood fragments (ML)
Gray and tan, saturated, medium stiff Silty CLAY (CL)		5	3	4/4 3/3	18		
			4	4/4 3/4	18		
	8.0						
Gray, saturated, medium dense fine to medium SAND with little Silt (SP-SM)			5	7/8 10/12	18		
		10	6	8/8 10/12	18		
	13.0						
Dark gray, saturated, Silty fine SAND (SM)			7	1 1/1	18		
		15					
		20	8	14 19/22	18		
		25	9	5 3/3	12		
		30	10	7 4/4	12		
		35	11	20 21/20	12		

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 1

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/16/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Dark gray, saturated, Silty fine SAND (SM)							
		40	12	22 30/22	12		
		45	13	3 3/3	18		
		50	14	4 4/4	18		
		55	15	2 3/3	18		
	57.0						
Dark gray, saturated, Clayey SILT with thin fine Sand seams and trace of of decayed wood (MH)		60	16	4 4/4	18		
		65	17	4 4/4	18		
		70	18	3 4/5	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 1

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/16/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Dark gray, saturated, Clayey SILT with thin fine Sand seams and trace of decayed wood (MH)			19	4 4/5	18		
		75					
			20	6 6/7	18		
		80					
	82.0						
Gray, saturated, very dense fine to medium SAND with trace of Silt (SP)			21	100/ 5"	10		
	85.0	85					
Bottom of borign 85.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER HRS. ____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 2

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS: Oceana: Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/17/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
TOPSOIL 1"							
Reddish yellow, very moist, loose to medium dense slightly Clayey Silty fine to medium SAND (SM)	4.0		1	4/5 7/16	24		
			2	3/4 2/4	20		
Light gray, saturated, medium stiff Silty CLAY (CL)	6.0	5	3	3/3 4/6	18		
Gray, saturated, losoe to dense fine to medium SAND with little Silt (SP-SM)	13.0		4	4/4 6/7	18		
			5	10/11 14/16	18		
		10	6	11/13 18/20	18		
Dark gray, saturated, very loose Silty fine SAND (SM)	17.0	15	7	2 1/1	18		
Gray, saturated, loose to dense Silty fine SAND with trace of marine shell fragments (SM)		20	8	12 12/15	18		
		25	9	3 4/6	12		
		30	10	4 4/7	18		
		35	11	28 24/16	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 2

CLIENT U S Navy
PROJECT NAME FY90 MCON-P -184- Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/17/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, loose to dense Silty fine SAND with trace of marine shell fragments (SM)				44			
		40	12	20/20	18		
	42.0						
Gray, saturated, medium stiff Clayey SILT with fine Sand seams and trace of decayed wood (MH)				3			
		45	13	3/4	18		
				5			
		50	14	7/5	12		
				4			
		55	15	4/5	16		
				4			
		60	16	5/6	16		
				4			
		65	17	3/4	18		
				4			
		70	18	4/5	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 2

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/17/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, medium stiff Clayey SILT with fine Sand seams and trace of decayed wood (MH)							
			19	6 7/9	18		
		75					
			20	7 6/11	18		
		80					
	82.0						
Gray, saturated, very dense fine to medium SAND with trace of Silt (SP)							
	85.0		21	100/ 2"	10		
		85					
Bottom of boring 85.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 3

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/21/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
ASPHALT 3"							
Brown, moist, medium dense Clayey Silty fine to coarse SAND (Possible Fill)	2.0		1	20/6 6/6	18		
Dark brown, moist, medium stiff fine (ML) Sandy Clayey SILT with some fine roots	4.0		*2	5/3 3/2	16/		
Light gray, saturated, soft, fine Sandy Silty CLAY (CL)	6.0	5	*3	2/2 2/1	10		
Tan, saturated, loose to medium dense fine SAND with little SILT (SP-SM)			4	3/5 6/7	20		
			*5	6/6 7/8	16		
		10	6	7/10 10/11	16		
	12.0						
Gray, saturated, loose to dense fine to medium SAND with trace of Silt (SP)			7	5 5/5	16		
		15					
			8	5 7/10	16		*Laboratory tests
		20					
			9	9 20/24	20		
		25					
	27.0						
Gray, saturated, medium dense to dense Silty fine SAND (SM) with some Clayey SILT (ML) pockets			10	4 7/7	16		
		30					
			11	5 6/8	18		
		35					

WATER LEVEL OBSERVATIONS
NOTED ON RODS ____ FT.
AT COMPLETION ____ FT.
AFTER ____ HRS. ____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 3

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184 Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/21/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	STD. PENETRATION BLOWS/6 IN; THREE 6 IN. INCREMENTS	STD. PENETRATION in. RECOVERY	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, medium dense to dense Silty fine SAND (SM)				14			
		40	12	24/20	14		
	42.0						
Gray, saturated, loose, Clayey fine Sandy SILT (ML)				3			
		45	13	4/4	18		
				3			
	50.0	50	*14	3/2	18		
Bottom of boring 50.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER _____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 4

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184 Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/21/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
ASPHALT 7"							
1" Asphalt overlying 6" crushed stone	0.6		1	48/12			
**	2.0			16/8	16		*Laboratory tests
Gray, moist, stiff Clayey SILT (ML)	4.0		* 2	8/7 / 7/7	24		
Tan, saturated, medium dense fine to medium SAND with trace of Silt (SP)	6.0	5	3	5/9 / 9/11	24		
Gray, saturated, loose to medium dense fine to medium SAND with trace of Silt (SP)			4	4/2 / 4/4	24		
		10	5	3/5 / 2/2	24		
			6	1/2 / 6/10	18		
		15	7	3 / 4/6	18		**Tan, moist, medium dense, fine to medium SAND with trace of Silt (SP)
	17.0						
Gray, saturated, very stiff Clayey SILT with some fine Sand seams (MH)		20	8	8 / 4/13	18		
		25	9	5 / 6/10	18		
	27.0						
Gray, saturated, medium dense fine to medium SAND with trace of Silt (SP)		30	10	6 / 7/14	18		
	32.0						Cave in @ 9.0'
Gray, saturated, dense to loose Silty fine SAND with trace of marine shell fragments (SM)		35	11	26 / 12/37	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS 6.5 FT.
AT COMPLETION 7.0 FT.
AFTER ____ HRS. ____ FT.

BORING METHOD
HSA -- HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 4

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/21/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, dense to loose Silty fine SAND with trace of marine shell fragments (SM)							
		40	12	3 2/2	18		
		45	13	3 3/4	18		
		50	14	4 2/3	18		
		55	15	4 5/3	18		
		60	16	3 4/3	18		
	62.0						
Gray, saturated, medium stiff to very stiff Clayey SILT with trace of decayed wood (MH)		65	17	3 4/6	18		
		70	18	5 4/5	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 4

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/21/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	STD. PENETRATION BLOWS/6 IN; THREE 6 IN. INCREMENTS	STD. PENETRATION in. RECOVERY	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, medium stiff to very stiff Clayey SILT with trace of decayed wood (MH)			19	8 10/15	18		
		75					
	77.0						
Black, saturated, decayed wood			20	12 12/17	18		
		80					
	82.0						
Light gray, saturated, medium dense fine to medium SAND with trace of Silt (SP)			21	4 6/12	18		
		85					
			22	15 12/18	18		
	90.0	90					
Bottom of boring 90.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 5

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/23/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
TOPSOIL 4"							
Brown, moist, loose to medium dense Silty Sandy Clayey mixture (Possible Fill)	2.0		1	3/4 7/4	20		
Gray and tan, moist, fine Sandy Silty CLAY (CL)			* 2	3/4 5/5	22		*Laboratory tests
	6.0	5	* 3	3/3 5/5	22		
Gray, saturated, loose fine to medium SAND With trace to little Silt (SP-SM)			4	3/3 4/7 7	24		
			5	3/3 4/4 7	24		
		10	6	4/1 1/1 2	24		
		15	* 7	3 3/3 6	18		
		20	8	10 14/8 22	20		
		25	9	3 3/5 8	20		Cave in @ 21.0'
	27.0						
Gray, saturated, medium dense to very dense Silty fine SAND with trace of mica (SM)		30	10	4 4/7 11	18		
		35	11 *	6 8/10 18	18		

WATER LEVEL OBSERVATIONS
NOTED ON RODS ____ FT.
AT COMPLETION 4.0 FT.
AFTER ____ HRS. ____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 5

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/23/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, satuated, medium dense to very dense Silty fine SAND with trace of Mica (SM)			12	12 21/52	18		*Laboratory tests
	40.0	40					
Gray, saturated, medium dense fine to medium SAND with little Silt (SP-SM)			13	20 15/11	18		
		45					
			14	4 6/5	18		
		50					
	52.0						
Gray, saturated, loose very Silty fine SAND (SM) with some Clayey SILT (ML) pockets			15	6 4/5	18		
		55					
			16 *	5 4/5	18		
		60					
			17	No sample	Ø		
		65					
	67.0						
Gray, saturated, medium stiff Clayey SILT with trace of decayed wood (MH)			18	4 4/5	18		
		70					

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 5

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/23/89
BORING METHOD HSA
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	in. RECOVERY	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, medium stiff Clayey SILT with trace of decayed wood (MH)							
			19	5			*Laboratory tests
		75		4/4	18		
				5			
			20*	6/6	18		
		80					
				5			
	84.0		21				
Gray, saturated, medium dense to very dense fine to medium SAND with trace of Silt (SP)		85		7/8	18		
			22	9			
		90		9/12	18		
				8			
	95.0	95	23	17/68	18		
Bottom of boring 95.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 6

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-184-Attack Weapons School
PROJECT LOCATION NAS: Oceana: Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/20/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	BLOWS/6 IN; THREE 6 IN. INCREMENTS	RECOVERY, in.	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
ASPHALT 3"							
Tan, moist, medium dense fine to medium SAND with trace of Silt and little Clay lumps (SP)	2.0		1	30/12 9/8	20		
Brown, moist, stiff, fine Sandy Clayey SILT with trace of fine roots (ML)	4.0		2	9/7 6/6	20		
Brown & gray, very moist, loose to medium dense Silty Clayey SAND (SC)	6.0	5	3 *	3/6 6/8	20		
Gray, saturated, loose to dense fine SAND with little Silt (SP-SM)			4	3/5 5/6	20		
			5	3/4 7/7	20		*Laboratory tests
		10	6	3/3 4/5	20		
			7	3 5/5	12		
		15					
			8	9 20/20	12		
		20					
	22.0						
Gray, saturated, loose to dense Silty fine SAND with trace of marine shell fragments (SM)			9	4 3/2	10		
		25					
			10	6 4/2	14		
		30					
			11	7 12/12	18		
		35					

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING
CA — CASING ADVANCER

*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

ATEC Associates, Inc.

Consulting Geotechnical / Materials Engineers, and Environmental Scientists

LOG OF BORING NO. 6

CLIENT U S Navy
PROJECT NAME FY90 MCON-P-Attack Weapons School
PROJECT LOCATION NAS; Oceana; Virginia Beach, Virginia
BORING LOCATION
FOREMAN Forrester
INSPECTOR Stites

JOB NO. 26-91012
DATE 2/20/89
BORING METHOD MD
ROCK CORE DIA. ____ IN.
SHELBY TUBE DIA. ____ IN.

MATERIAL DESCRIPTION	STRATUM DEPTH, FT.	DEPTH, FT.	STD. PENETRATION SAMPLE NO.	STD. PENETRATION BLOWS/6 IN; THREE 6 IN. INCREMENTS	STD. PENETRATION in. RECOVERY,	SHELBY TUBE NO.	BORING AND SAMPLING NOTES
Gray, saturated, loose to dense Silty fine SAND with trace of marine shell fragments (SM)				20			
		40	12	22/25	14		
	42.0						
Gray, saturated, stiff Clayey SILT with little fine Sand (MH)				3			*Laboratory Tests
		45	*13	6/6	18		
	47.0						
Gray, saturated, medium dense Silty fine SAND (SM)				9			
	50.0	50	14	9/7	14		
Bottom of boring 50.0'							

WATER LEVEL OBSERVATIONS
NOTED ON RODS _____ FT.
AT COMPLETION _____ FT.
AFTER ____ HRS. _____ FT.

BORING METHOD
HSA — HOLLOW STEM AUGER
CFA — CONTINUOUS FLIGHT AUGER
DC — DRIVEN CASING
MD — MUD DRILLING
RC — ROCK CORING

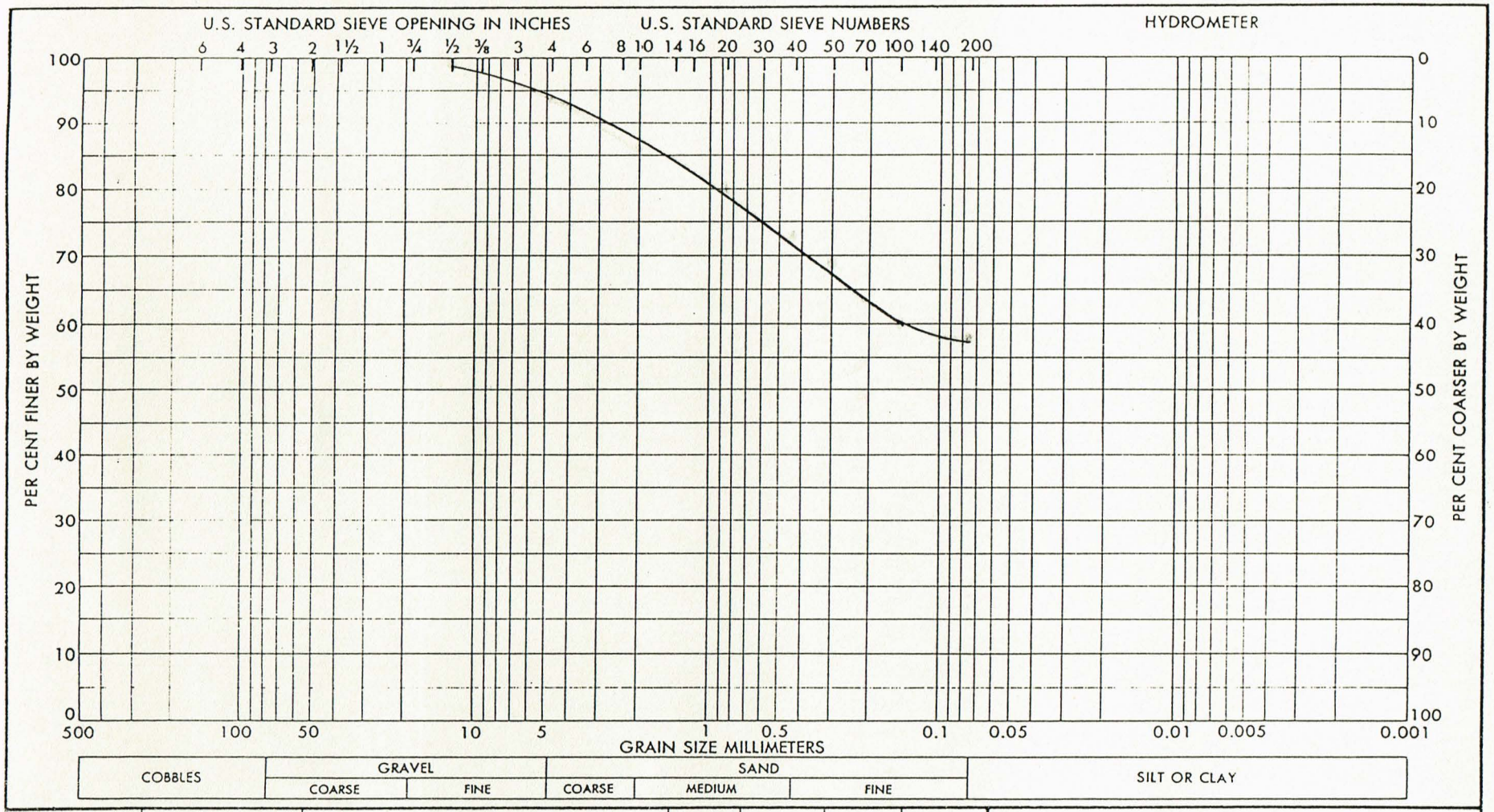
*THESE SHELBY TUBE SAMPLES OBTAINED IN AN AUXILIARY BORING DRILLED A FEW FEET FROM THIS BORING

Project: FY90 MCON-P-184
Client: Dept. of the Navy
Job # : 26-91012

SUMMARY OF LABORATORY TEST DATA

ATEC ASSOCIATES OF VIRGINIA, Inc.
2551 Eltham Ave., Suite Z
Norfolk, Virginia 23513

Boring Number or Sampling Location	Sample Number	Sample Depth, Ft.	Unified Soil Classification Symbol	CLASSIFICATION PROPERTIES							PHYSICAL PROPERTIES					
											Compressive Strength, Qu		COMPACTION			
				Average Natural Moisture Content, %	Dry Unit Weight, pcf	Liquid Limit, %	Plastic Limit, %	Plasticity Index, %	% Passing #200 Sieve	Grain Size Data, Figure #	Compressive Strength, tsf	Strain at Failure, %	Maximum dry Density, pcf (Proctor type)	Optimum Moisture, %	CBR Value Soaked, at 0.1" Penetration	Swell, %
3	2	2.0-4.0	ML	26.1		27.2	22.5	4.7								
3	3	4.0-6.0	CL	30.6					58.8	1						
3	5	8.0-10.0		20.9												
3	8	18.5-20.0		18.6												
3	11	33.5-35.0	ML	29.3					65.5	2						
3	14	48.5-50.0	ML	42.1		42.4	27.3	15.1	90.9							
4	2	2.0-4.0		22.7												
4	8	18.5-20.0		63.4												
4	9	23.5-25.0		38.8												
4	11	33.5-35.0		23.8												
4	13	43.5-45.0		18.2												
4	17	63.5-65.0		49.8												
4	19	73.5-75.0		55.2												
5	2	2.0-4.0		21.6												
5	3	4.0-6.0	CL	21.4		32.6	8.9	23.7								
5	7	13.5-15.0	SP	21.5					4.1	3						
5	11	33.5-35.0	SM	21.2					48.4	4						
5	15	53.5-55.0		29.3												
5	16	58.5-60.0	ML	39.8					87.6							
5	18	68.5-70.0		36.2												
5	20	78.5-80.0	MH	57.1		88.8	34.4	54.4								
6	3	2.0-4.0		12.7												
6	2	2.0-4.0		21.6												
6	13	43.5-45.0		41.4												



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
3	4.0-6.0	Light gray, fine Sandy Silty CLAY (CL)	30.6			

Figure 1

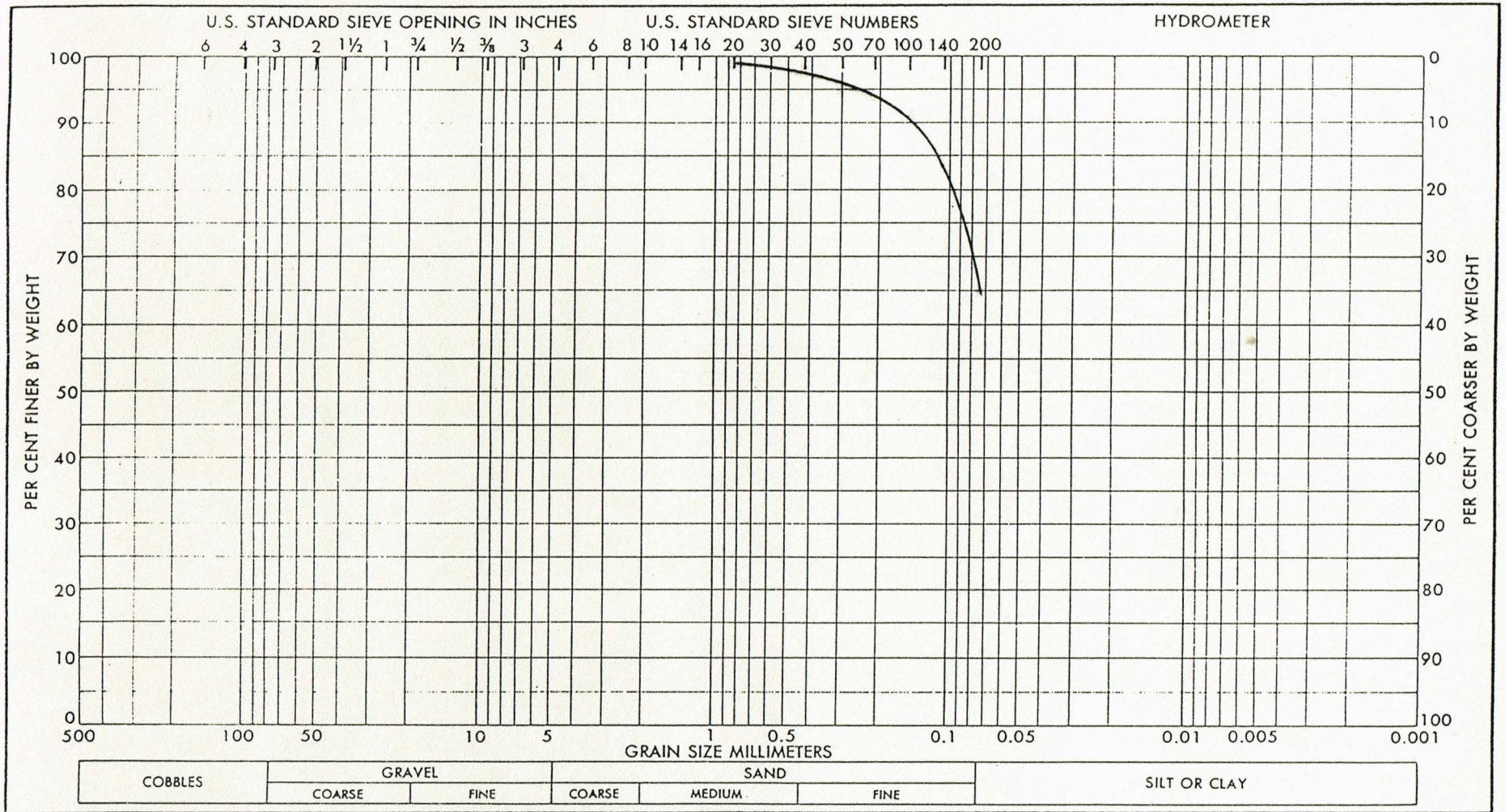
GRADATION CURVES

PROJECT FY90 MCON-P-184

AREA

BORING NO. 3

DATE 3/9/89



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
11	33.5-35.0	Gray, Silty fine SAND (SM)	29.3			
		with some Clayey SILT (ML)				
		pockets				
		Figure 2				

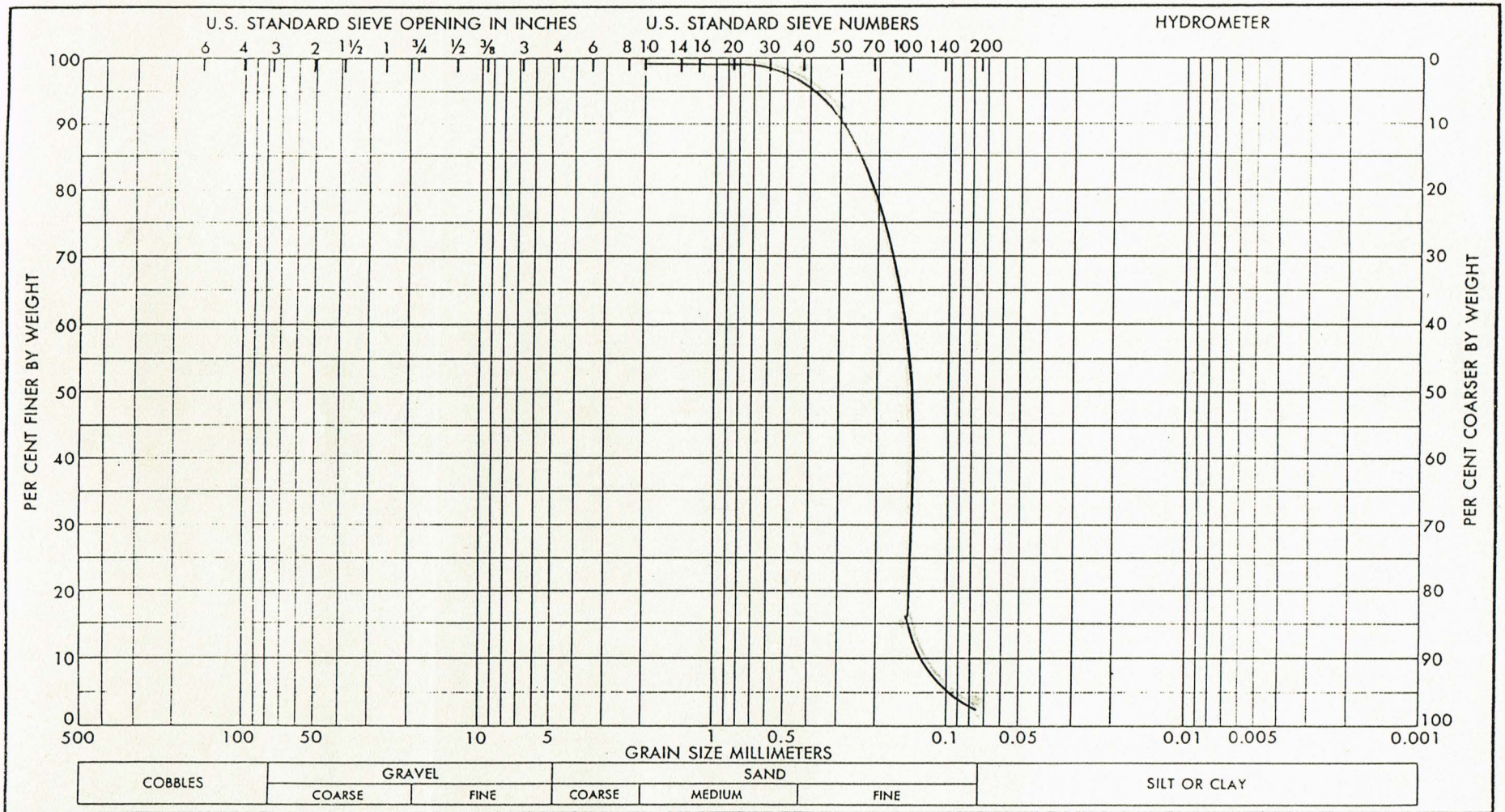
GRADATION CURVES

PROJECT FY90 MCON-P-184

AREA

BORING NO. 3

DATE 3/9/89



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
7	13.5-15.0	Gray, fine to medium SAND with trace to little Silt (SP-SM)	21.5			

Figure 3

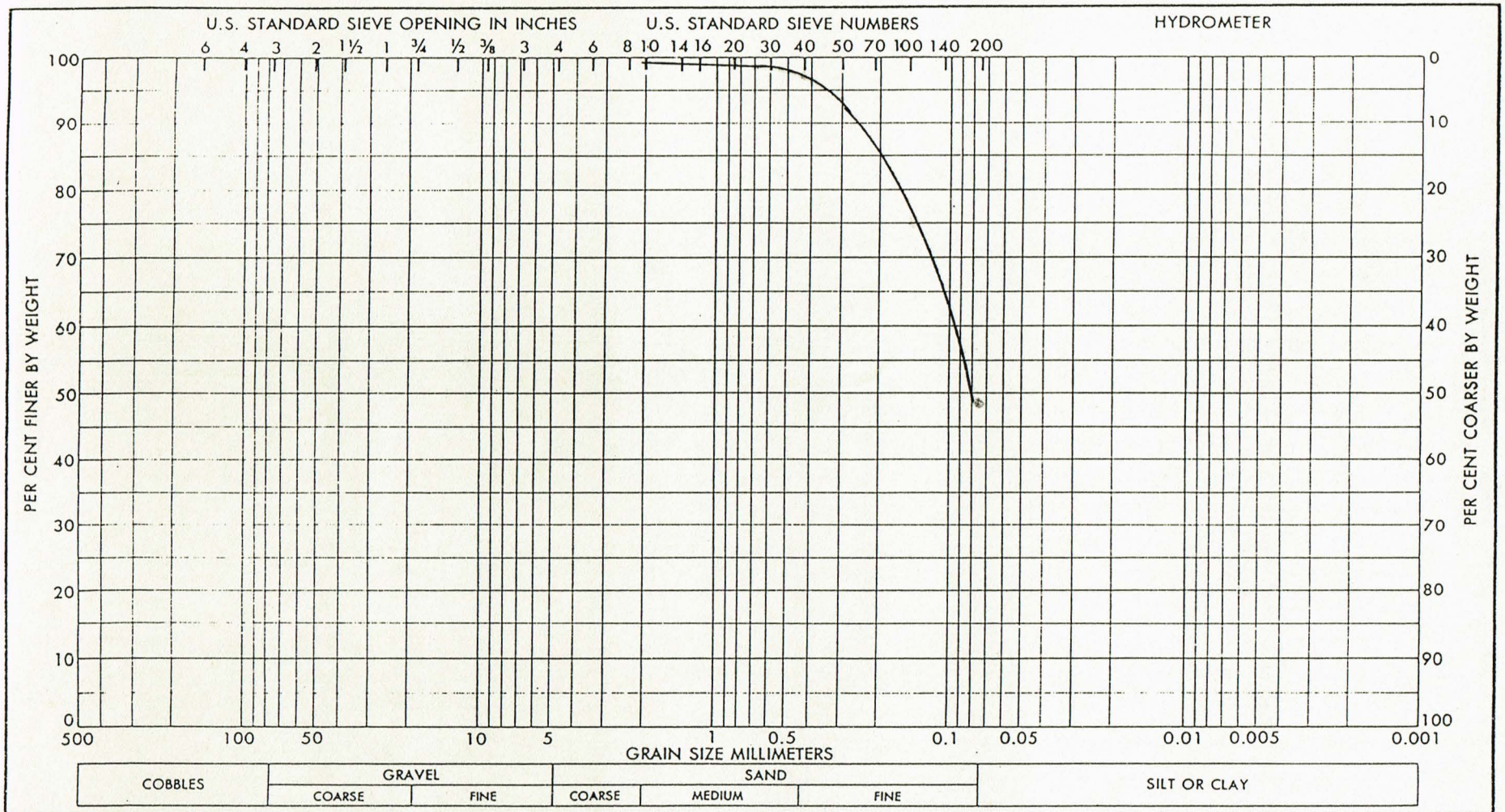
GRADATION CURVES

PROJECT FY90 MCON-P-184

AREA

BORING NO. 5

DATE 3/9/89



SAMPLE NO.	ELEV OR DEPTH	CLASSIFICATION	NAT W%	LL	PL	PI
11	33.5-35.0	Gray, Silty fine SAND with trace of mica (SM)	21.2			

Figure 4

GRADATION CURVES

PROJECT FY90 MCON-P-184

AREA

BORING NO. 5

DATE 3/9/89

FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

NON COHESIVE SOILS
(Silt, Sand, Gravel and Combinations)

Density

Very Loose	- 5 blows/ft. or less
Loose	- 6 to 10 blows/ft.
Medium Dense	-11 to 30 blows/ft.
Dense	-31 to 50 blows/ft.
Very Dense	-51 blows/ft. or more

Relative Proportions

Descriptive Term	Percent
Trace	1 -10
Little	11-20
Some	21-35
And	36-50

Particle Size Identification

Boulders	-8 inch diameter or more	
Cobbles	-3 to 8 inch diameter	
Gravel	-Coarse	-1 to 3 inch
	Medium	-½ to 1 inch
	Fine	-¼ to ½ inch
Sand	-Coarse	2.00mm to ¼ inch (dia. of pencil lead)
	Medium	0.42 to 2.00mm (dia. of broom straw)
	Fine	0.074 to 0.42mm (Dia. of human hair)
Silt		0.074 to 0.002mm (Cannot see particles)

COHESIVE SOILS
(Clay, Silt and Combinations)

Consistency

Very Soft	- 3 blows/ft. or less
Soft	- 4 to 5 blows/ft.
Medium Stiff	- 6 to 10 blows/ft.
Stiff	-11 to 15 blows/ft.
Very Stiff	-16 top 30 blows/ft.
Hard	-31 blows/ft. or more

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0- 4
Slight	5- 7
Medium	8-22
High to Very High	over 22

Classification on logs are made by visual inspection of samples.

Standard Penetration Test — Driving a 2.0" O.D., 1-3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary for ATEC to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The number of hammer blows for seating the spoon and making the test are recorded for each 6.0 inches of penetration on the drill log (Example — 6/8/9). The standard penetration test result can be obtained by adding the last two figures (i.e. 8+ 9 = 17 blows/ft.). (ASTM D-1586-67)

Strata Changes — In the column "Soil Descriptions" on the drill log the horizontal lines represent strata changes. A solid line (_____) represents an actually observed change, a dashed line (_ _ _ _ _) represents an estimated change.

Ground Water observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.