

PANAMA CANAL AUTHORITY

DEPARTMENT OF ENGINEERING AND PROGRAMS MANAGEMENT

GEOLOGICAL FIELD LOG

BORING CCMT-9

PROJECT: CONTROL CENTER - MARINE TRAFFIC

PAGE 1 OF 5

LOCATION: BALBOA REACH - EAST BANK - WEST COROZAL

NORTHING: 993171.711 m

STATION: 69K + 569.52 m

CORE RECOVERY: 68%

START DATE: 14/June/2011

GEOLOGIST: M. J. Lacerda

CHECKED BY: Pastora Franceschi S.

EASTING: 656362.475 m

OFFSET: 435.77 m E

COMPLET. DATE: 15/June/2011

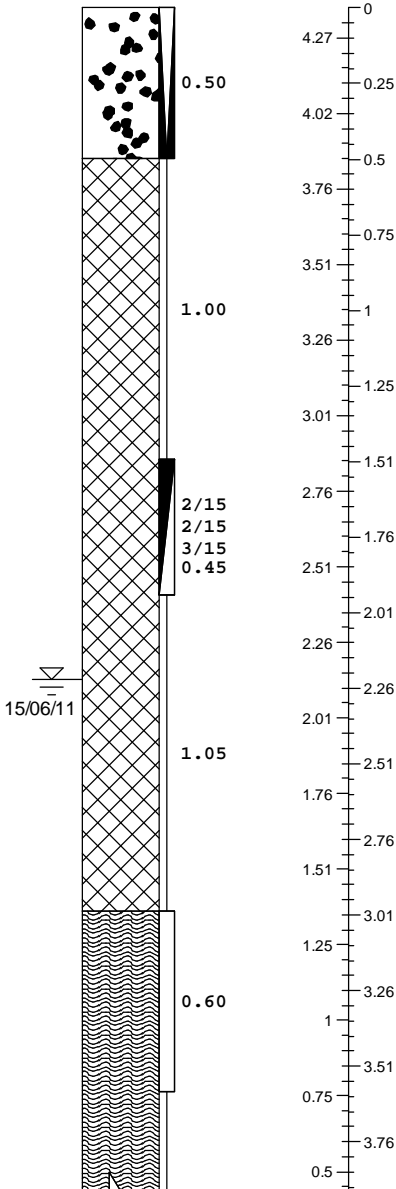
GROUND ELEVATION: 4.366 m

TOTAL DEPTH: 17.30 m

INCLINATION: Vertical

LOGGER: M. J. Lacerda

DRILLER: Jorge English

SOIL SYMBOLS, SAMPLERS, FIELD TEST DATA AND CORE RUN	ELEVATION	DEPTH	DESCRIPTION OF MATERIAL	DISCONTINUITY	DRILLING CHARACTERISTICS	qu MPa	CORE RECOV (%)	RQD (%)	
	(meters)								
		0	0.00 m ASPHALT AND CONCRETE.		Drilled with 3 5/8" tricone rotary bit and water, no attempt to recover core was made.				
		4.27	0.25						
		4.02	0.5	0.50 m FILL, OC-1 to RH-4, low consistency to hard rock, low to high plasticity, low to high dry strength, moderate water content, consists of clay, silt, sand, angular rock fragments up to 60 mm thick, vegetation roots, organic material. Color: brownish mottle with dark gray and greenish.		Pushed dry with HQ single tube. H. P. 0 PSI.		0%	-
		3.76	0.75						
		3.51	1			NOTE: H.P. is the hydraulic pressure on drill head necessary to cause core barrel to penetrate the soil, measured in PSI (Pounds per square inch).		20%	-
		3.26	1.25	C.R.=36%					
		3.01	1.51	1.50 m FILL, OC-1 to RH-4, low consistency to hard rock, low to high plasticity, low to high dry strength, moderate water content, consists of clay, silt, sand, angular rock fragments up to 30 mm thick, organic material. Color: brown, gray and black.		From 1.50 m to 1.95 m. SPT #1 - N=5		78%	-
		2.76	1.76						
		2.51	2.01			NOTE: SPT's were taken with a standard 2 in. split spoon & a 140-lbs. safety hammer dropped 30 inches for each blow			
		2.26	2.26	C.R.=78%					
	2.01	2.51			1.95 m - 3.00 m Pushed dry with HQ single tube. H. P. 0 PSI.		34%	-	
	1.76	2.76			Undisturbed thin wall Shelby tube. Shelby #1 H. P. 0 PSI.				
	1.51	3.01	3.00 m PACIFIC MUCK, OC-1 to OC-3, low to medium high consistency, high plasticity, high dry strength, moderate water content, consists of clay, silt, sand, abundant organic material, vegetation roots, decomposed wood, fossiliferous debris. Color: Black, brown and greenish.						
	1.25	3.26			Pushed dry with HQ single tube. H. P. 300 PSI.		100%	-	
	1	3.51							
	0.75	3.76							
	0.5		C.R.=100%						

This hole was drilled by ACP with drill rig CS-1000-P4 from ATLAS COPCO.

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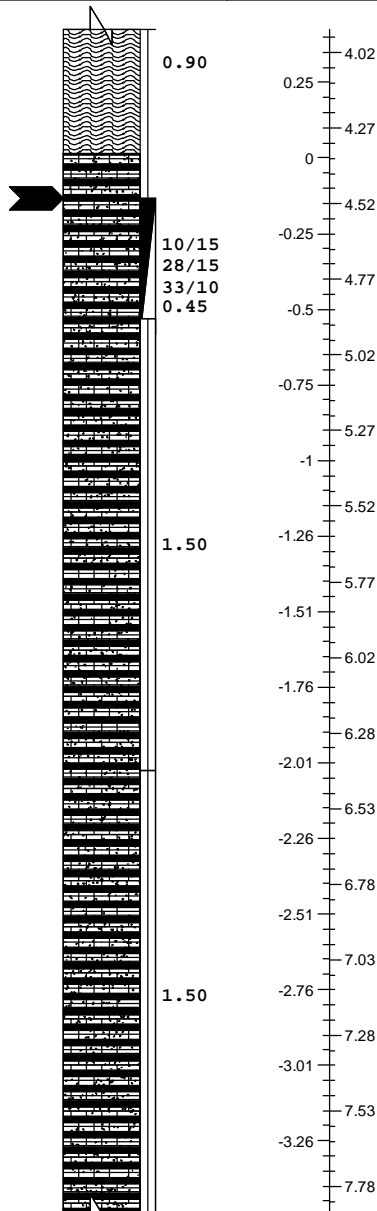
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	(meters)							
	0.90	4.02	<p>4.35 m - TOP OF LA BOCA FORMATION AND TOP OF WEATHERED ROCK</p> <p>SANDSTONE, Calcareous, OC-5 to RH-3, high consistency to medium hard rock, weak to moderate strength, weathered, very close jointing, joints are planar, rough, through 30° dipping beds, parts through bedding, medium grained, water-laid, contains carbonaceous and fossiliferous debris, quartz crystals, scattered sub angular to sub rounded rock fragments up to 2 mm in diameter, weathering decreases and hardness increases with depth. Color: greenish gray.</p> <p>C.R.=54%</p> <p>6.40 m - 7.90 m</p> <p>Very close jointing, joints are planar, rough, dipping 30°, some are filled with oxides and others are unfilled.</p>		<p>From 4.50 m to 4.90 m: SPT #2 - N=61.</p> <p>4.90 m to 11.90 m: Drilled with HQ double tube, diamond bit and water. Core recovered in poor condition and in poor, fragmentary condition, is highly weathered, iron stained and oxidized.</p> <p>Drilled as above.</p>		100%	-
	10/15 28/15 33/10 0.45	-0.25					78%	-
	1.50	-1.26					23%	0%
		-1.51						
		-1.76						
		-2.01						
	1.50	-2.76						
		-3.01						
		-3.26						
		-3.51						

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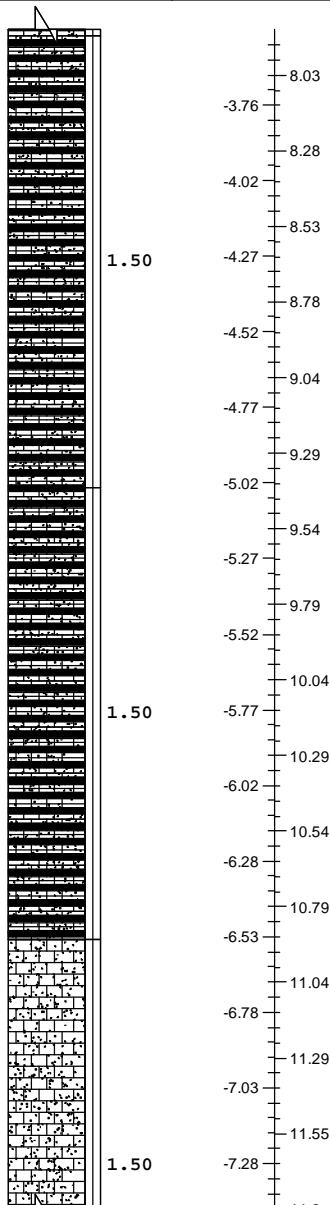
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	(meters)							
		8.03			Drilled as above, core recovered in poor, fragmentary condition.		37%	0%
		-3.76						
		8.28						
		-4.02						
	1.50	8.53						
		-4.27						
		8.78						
		-4.52						
		9.04						
		-4.77						
			9.29	9.20 m to 9.70 m: Very close jointing, joints are planar, rough, dipping 30°, unfilled.			57%	0%
			-5.02					
			9.54					
			-5.27					
			9.79	9.70 m to 10.20 m: Possible fault gouge zone.				
			-5.52					
	1.50	10.04			10.20-10.55m Vertical joint, planar, rough, unfilled.			
			-5.77					
			10.29					
			-6.02					
		10.54						
		-6.28						
		10.79						
		-6.53	10.90 m -TOP OF SOUND ROCK		Drilled as above.		87%	0%
		11.04	SANDSTONE, Calcareous, RH-3, medium hard rock, moderate strength, wide jointing, joints are planar, rough, some are unfilled and some are filled with oxides, massive, with abundant thin sub horizontal dark grey beds and seams which seem carbonaceous, fine to medium grained, contains quartz and calcite crystals, carbonaceous and fossiliferous debris, scattered sub angular to sub					
		-6.78						
		11.29						
		-7.03						
		11.55						
1.50		-7.28						
		11.8						

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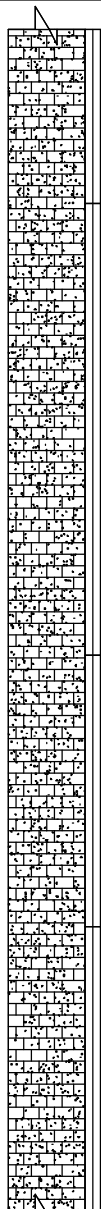
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	(meters)								
	-7.53	12.05	rounded rock fragments up to 2 mm in diameter. Color: light gray.						
	-7.78	12.3	C.R.=92% RQD=89%						
	-8.03	12.55			Drilled as above.		100%	87%	
	-8.28	12.8			From depth 12.40 m to 12.60 m core is in poor, fragmentary condition.				
	-8.53	13.05							
	-8.78	13.3							
	-9.04	13.55							
	-9.29	13.81							
	-9.54	14.06			Drilled as above.		100%	100%	
	-9.79	14.31							
	-10.04	14.56							
	-10.29	14.81							
	-10.54	15.06							
	-10.79	15.31							
	-11.04	15.56							
	-11.29								

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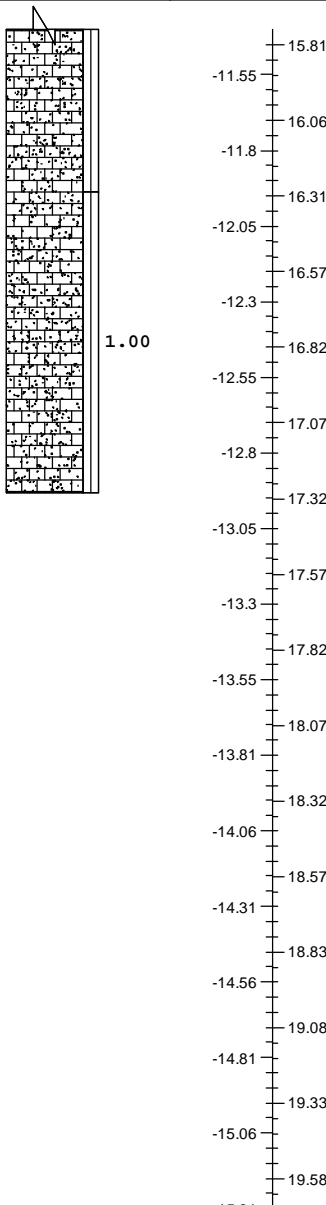
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	(meters)							
		15.81			15.90 m Lost water return.			
		-11.55					80%	80%
		16.06						
		-11.8			Drilled as above.			
		16.31						
		-12.05						
		16.57						
		-12.3						
		16.82						
		-12.55						
		17.07						
		-12.8						
		17.32					80%	80%
		-13.05						
		17.57						
		-13.3						
		17.82						
		-13.55						
		18.07						
		-13.81						
		18.32						
		-14.06						
		18.57						
		-14.31						
		18.83						
		-14.56						
		19.08						
		-14.81						
		19.33						
		-15.06						
		19.58						
		-15.31						
			<div>Bottom of Hole</div> <div>CORE BOXES:</div> <div>BOX #FROMTO</div> <div>1)0.00 - 8.20 m</div> <div>2)8.20 - 11.90 m</div> <div>3)11.90 - 14.80 m</div> <div>4)14.80 - 17.30 m</div> <div>SAMPLE FOR LABORATORY TESTING PURPOSES:</div> <div>SAMPLE #FROMTO</div> <div>1)14.80 - 15.30 m</div> <div>TYPE OF MATERIAL</div> <div>Elevation:Depth:Description:</div> <div>4.37 to 3.870.00 to 0.50Asphalt and Concrete</div> <div>3.87 to 1.370.50 to 3.00Fill</div> <div>1.37 to 0.023.00 to 4.35Pacific Muck</div> <div>0.02 to -6.534.35 to 10.90Top of La Boca Fm & of Weathered Rock, Sandstone, Calc.</div> <div>-6.53 to -12.9310.90 to 17.30Top of Sound rock - Sandstone, Calcareous</div>					


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KEY TO SYMBOLS

Symbol Description

Symbol Description

Strata symbols

 Standard penetration test



Concrete Slab



Fill



Pacific Muck



Sandstone, Calcareous,
Weathered



Sandstone, Calcareous



Undisturbed thin wall
Shelby tube



Rock core

Misc. Symbols



Water table during
drilling



Boring continues



Core Recovered



Length of Casing

Soil Samplers



Drilled with tricone rotary
bit and water.



Pushed dry with casing.

Notes:

1. The Top of Sound Rock in all the borings of the Panama Canal Authority, ACP, means the depth where fresh rock starts. Fresh rock is defined as the rock surface that has not been subjected to or altered by surface weathering. Unweathered rock is synonymous with sound or fresh rock.

2. The C.R.% and the RQD% at the end of each material unit means the total core recovery and the quality of the rock recovered per material unit, given as a percentage.

3. qu values in this log were obtained from the standard Unconfined Compressive Strength tests performed in the Soil Laboratory of the ACP and from Point Load Tests where indicated.