Chart Description Report for
NEC

Project:
SACS Cable System
KP0.000 to KP0.726

Description:
Chart Description

Survey Date:
20-Aug-2016 to 24-Sep-2016

Project Number:
10817

Report Number:
Office 001

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	N Jones
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… E Self

Revision	Date	Title	Report Ref
0	06-Jun-2017	Rev0	002/06-Jun-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Inshore Fortaleza	
Survey Vessel	M.V. Penedo II	
Survey Dates	20-Aug-2016 to 24-Sep-2016	
Survey Extents	KP0.000 to KP0.726	
Equipment Used	Positioning System	Applanix POSMV Wavemaster, Veripos LD5
	Echo Sounder (MBES System)	Reson Seabat T-20
	Echo Sounder (SBES System)	Reson Seabat T-20
	Side Scan Sonar	EdgeTech 4200 MP
	Sub-Bottom Profiler	Teledyne CHIRP III
	Magnetometer	Marine Magnetics SeaSPY
	Grab Sampler	Van Veen

SACS.S1.NU001 **North-Up Chart Description** **Scale 1:1,000**

Chart Range	03° 43.6331' S, 038° 27.5809' W to 03° 44.0586' S, 038° 27.0597' E
Range of Depths	-9m to 11m LAT
General Seabed Topography	As the route enters the water, the seabed deepens at a gradient of 4° before reducing to a gradient of 0.5°.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise fine sand close to the beach, with fine sand to fine gravel in the northeast of the chart.
Shallow Soils	Sand present to greater than the depth of interest.
Potential Hazards	No hazardous seabed gradients are observed.
Cable Crossings	The survey route crosses one in service cable.

Chart Description Report for
NEC

Project:
SACS Cable System
KP0.000 to KP31.670

Description:
Offshore Chart Description

Survey Date:
08-Oct-2016 to 25-Nov-2016

Project Number:
10817

Report Number:
Offshore 001

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	27-Nov-2016	Rev0	0/27-Nov-2016/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Fortaleza
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	08-Oct-2016 to 25-Nov-2016
Survey Extents	BMH Fortaleza and Block 1, KP0.000 to KP31.670

Equipment Used	
Positioning System	Fugro Starfix HP
Echo Sounder (MBES System)	Simrad EM1002 / EM120
Echo Sounder (SBES System)	Simrad EA400 Combi
Side Scan Sonar	EdgeTech 4200-FS
Sub-Bottom Profiler	Hull-mounted Pinger
Combined Side Scan Sonar & Pinger	Edgetech 2000 TVD
Magnetometer	Geometrix G-882
Cone Penetrometer	Neptune 3000
Vibrocorer	Kullenburg 3m Piston Corer

SACS.S1.NU002 **Offshore North-Up Chart Description** **Scale 1:5,000**

Chart Range 03° 43.9210’ S, 038° 27.4250’ W to 03° 42.8497' S, 038° 25.2167' W

Range of Depths 1m to 19m LAT

General Seabed Topography The seabed generally deepens from the BMH Fortaleza before levelling out in the centre.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise fine sand very close to the beach in the southwest, with bands of fine to coarse sand and fine sand to fine gravel in the centre and northeast.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one in service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
ATLANTIS 2 seg 4	IS	03°	43.298'	S	038°	25.995'	W	16	2.939	DA

SACS.S1.NU003	Offshore North-Up Chart Description	Scale 1:5,000

Chart Range	03°43.1134' S, 038°25.7603' W to 03°41.8491' S, 038°23.1538' W
Range of Depths	14m to 17m LAT
General Seabed Topography	The seabed gently undulates but remains a fairly consistent depth.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise fine to medium sand with numerous bands of fine gravel.
Potential Hazards	No hazardous seabed gradients are observed.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU004 **Offshore North-Up Chart Description** **Scale 1:5,000**

Chart Range 03° 42.0672' S, 038° 23.6035' W to 03° 40.8027' S, 038° 20.9970' W

Range of Depths 14m to 23m LAT

General Seabed Topography The seabed gently undulates as it deepens to the northeast. A small channel is seen cutting across the route in the northeast cutting approximately 2.5m below the surrounding seabed.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise bands of fine to coarse sand and fine sand to fine gravel.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses two out of service cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
AMERICAS 1 seg S4	OOS	03°	41.822'	S	038°	23.098'	W	16	9.009	DA
Telegraph (Natal-Fortaleza)	OOS	03°	40.880'	S	038°	21.157'	W	20	13.001	DA

SACS.S1.NU005 **Offshore North-Up Chart Description** **Scale 1:5,000**

Chart Range 03°41.0287' S, 038°21.4635' W to 03°39.3625' S, 038°19.7369' W

Range of Depths 16m to 24m LAT

General Seabed Topography The seabed undulates whilst gently deepening towards the northeast. A mound is found in the northeast, approximately 5m above the surrounding seabed.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise bands of fine to coarse sand and fine sand to fine gravel. In the northeast areas of fine to coarse sand with fine to coarse gravel are found.

Shallow Soils Shallow soils are shown by geotechnical sampling to be medium dense, very fine to coarse sand, with occasional fine to coarse gravel.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one out of service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Natal-Fortaleza)	OOS	03°	40.880'	S	038°	21.157'	W	20	13.001	DA

SACS.S1.NU006 **Offshore North-Up Chart Description** **Scale 1:5,000**

Chart Range 03° 39.4989' S, 038° 19.8251' W to 03° 37.3712' S, 038° 18.4541' W

Range of Depths 21m to 29m LAT

General Seabed Topography The seabed undulates whilst gently deepening towards the northeast.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise loose to dense slightly silty fine to medium sand with abundant shell fragments, with small areas of gravelly sand in the centre and north.

Shallow Soils Shallow soils are shown by geotechnical sampling to comprise loose to dense slightly silty fine to coarse sand, with abundant shell fragments and occasional fine gravel.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one out of service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph Fortaleza (Ceara)-Natal	OOS	03°	37.582'	S	038°	18.588'	W	28	20.844	DA

SACS.S1.NU007 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

03° 38.0024' S, 038° 18.8574' W to 03° 35.1834' S, 038° 14.5146' W

Range of Depths

23m to 33m LAT

General Seabed Topography

The seabed gently undulates, while however remaining a fairly consistent depth as it heads northeast. In the southwest the route crosses an area of erosion centred on two peaks. In the centre a mound is seen rising approximately 4.5m from the surrounding seabed. The route then turns southeast and continues to gently undulate, before crossing a sandwave in the northeast with gradients of up to 14° on its flanks.

Seabed Features and Obstructions

Seabed sediments are shown by geotechnical sampling to comprise loose to dense silty fine to coarse sand with abundant shell fragments, with areas of gravelly sand and silty sand. Organic sandy fine to coarse gravel was identified on the mound in the centre.

Shallow Soils

Shallow soils are shown by geotechnical sampling to comprise loose to dense slightly fine to coarse sand with abundant shell fragments and occasional fine gravel.

Potential Hazards

Seabed gradients reach up to 14° on a sandwave crossing the route in the northeast.

Cable Crossings

The survey route crosses one out-of-service cable, one planned cable and three in-service cables.

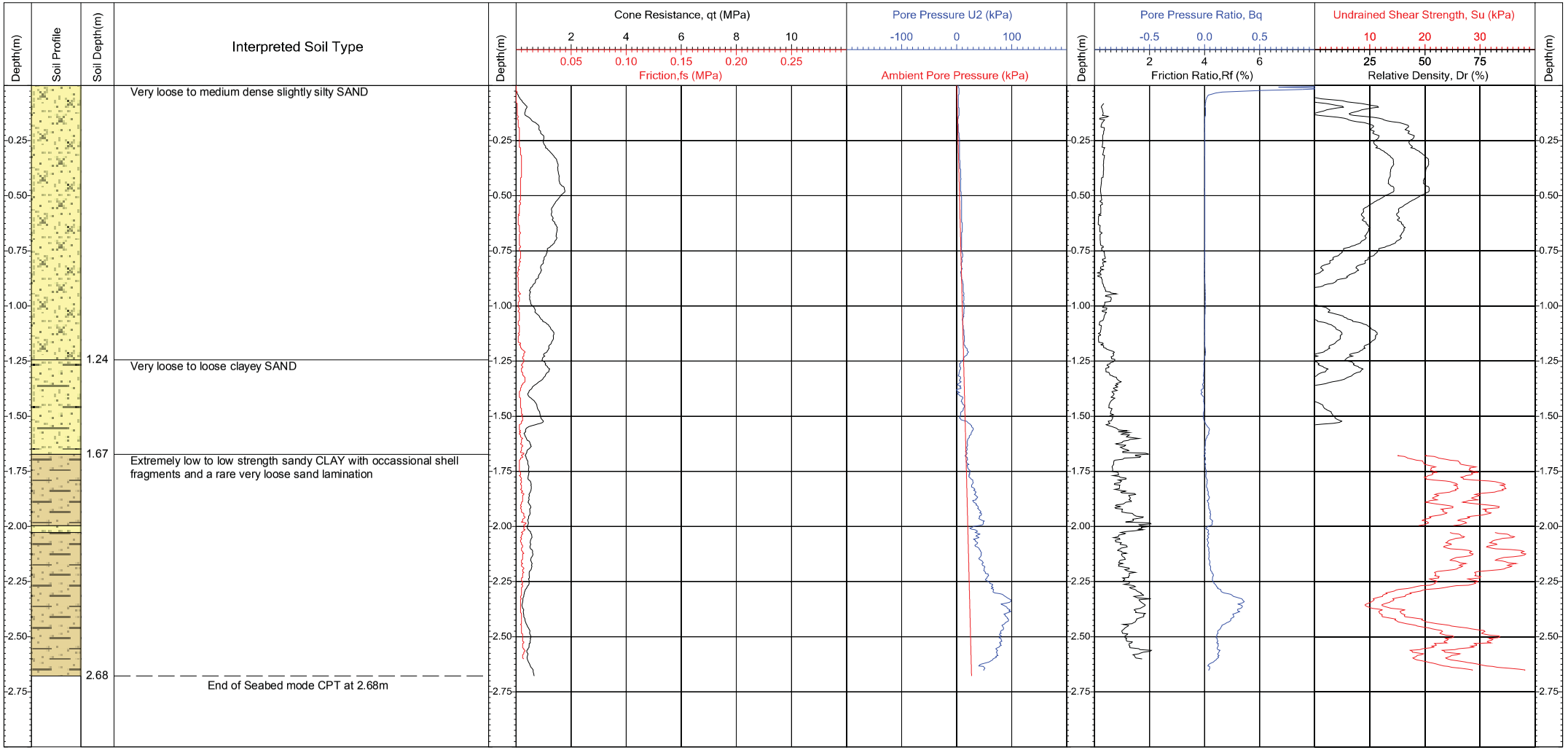
Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph Fortaleza (Ceara)-Natal	OOS	03°	37.582'	S	038°	18.588'	W	28	20.844	DA
ATLANTIS 2 seg 4	IS	03°	34.524'	S	038°	16.367'	W	30	28.031	DA
BRUSA Seg 6	P	03°	34.707'	S	038°	15.864'	W	29	29.020	DA
GlobeNet seg 3	IS	03°	34.967'	S	038°	15.140'	W	28	30.445	DA
SAM seg G	IS	03°	35.129'	S	038°	14.672'	W	30	31.361	DA

APPENDICES

APPENDIX A CPT LOGS

SACS Cable Route Survey

INSITU CPTU TESTING

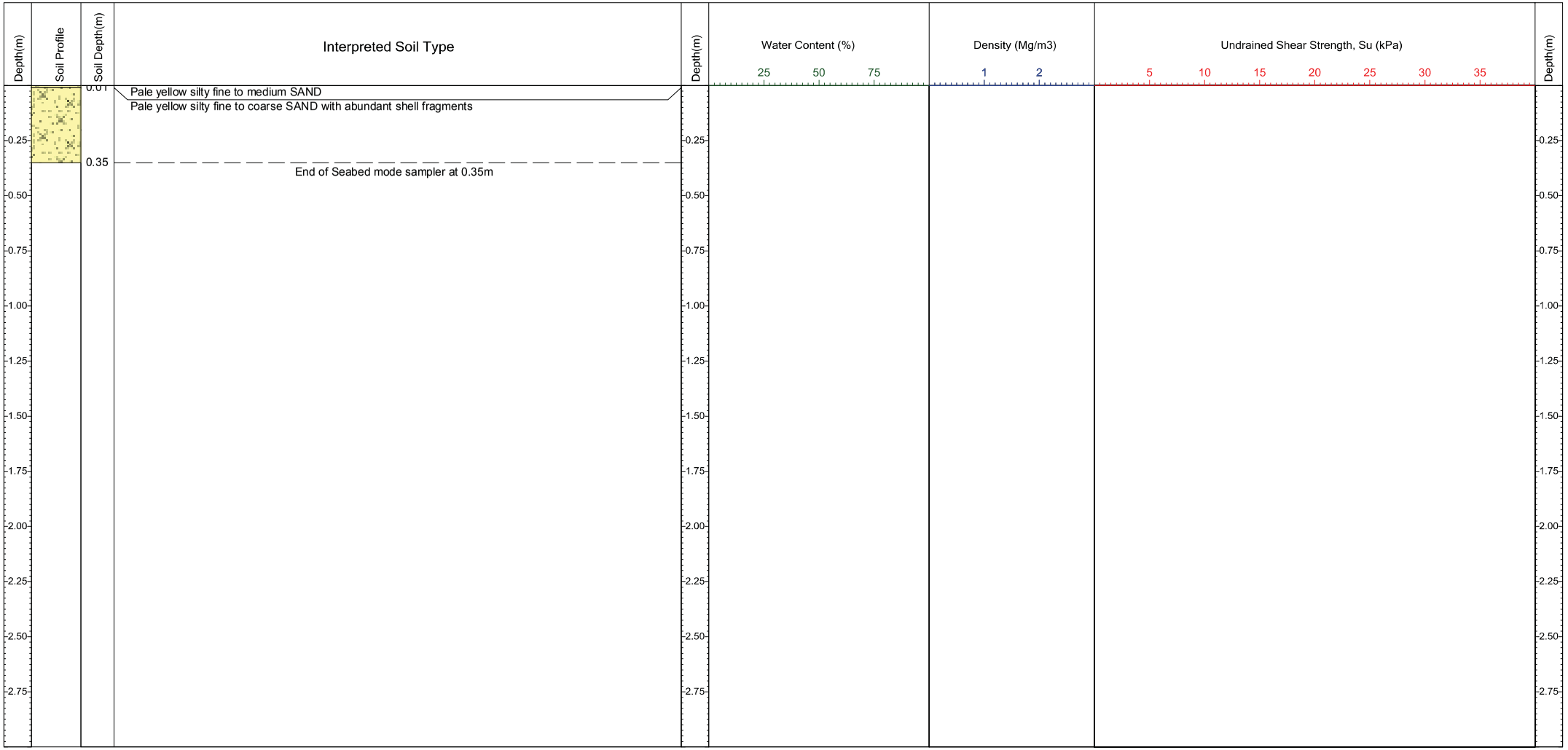


Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2422291.5	798504.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			CPT Number
	Contract	10817	Water Depth	23.3	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
Test stopped due to rod bend. Minimum penetration achieved	Client Name	NEC	Date of Test	19/11/2016		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				SACS_FTL_OE_CPT001B
	Vessel	Ocean Endeavour	Cone No. / α Factor	3086	0.83	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	JT 20/11/2016			
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	7.0°						

APPENDIX B PISTON CORE LOGS

SACS Cable Route Survey

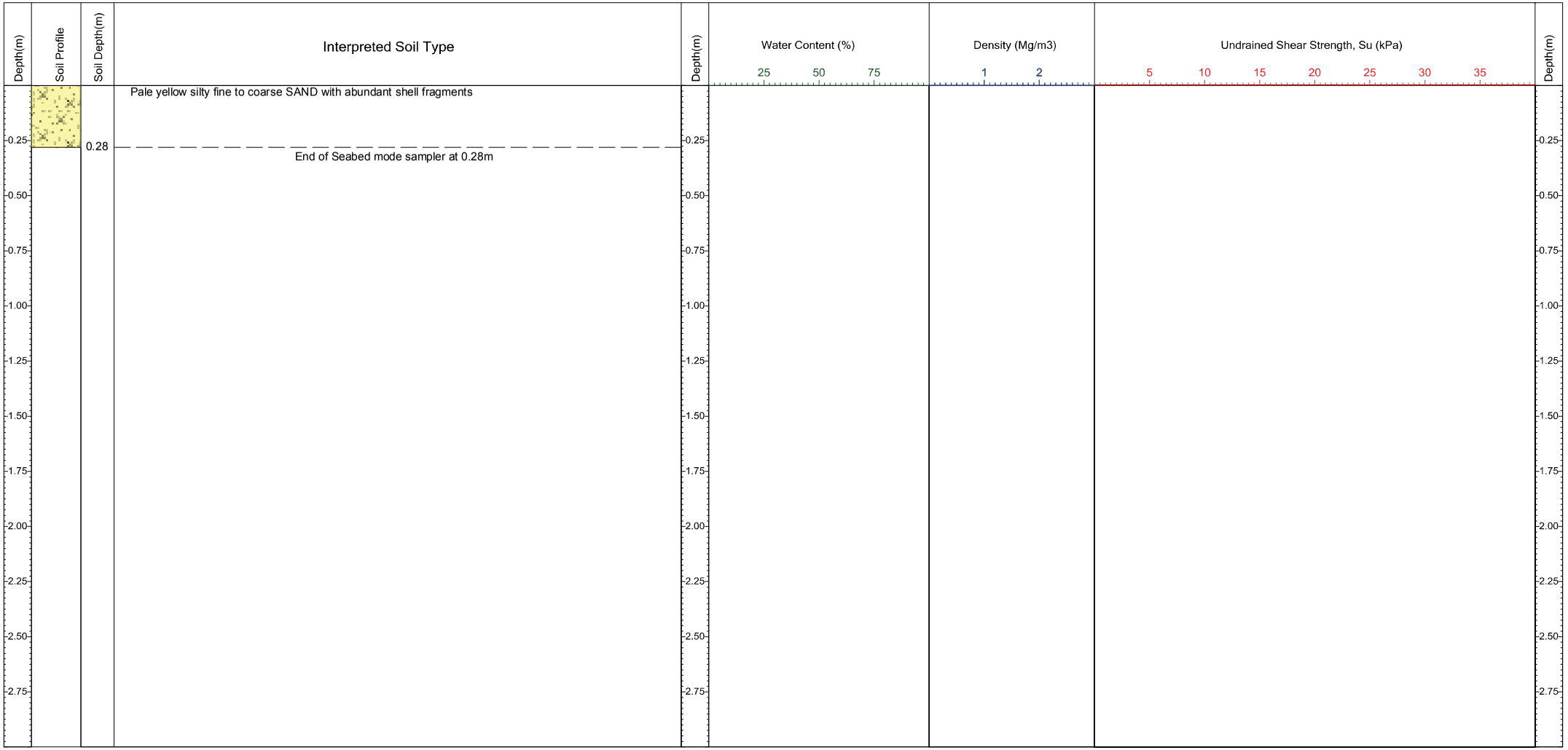
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2422291.5 798497.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	23.3 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required. Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC027
	Vessel	Ocean Endeavour	Penetration (m)	0.35		PB 25/11/2016			
	Method	Piston corer	Recovery (m)	0.35					

SACS Cable Route Survey

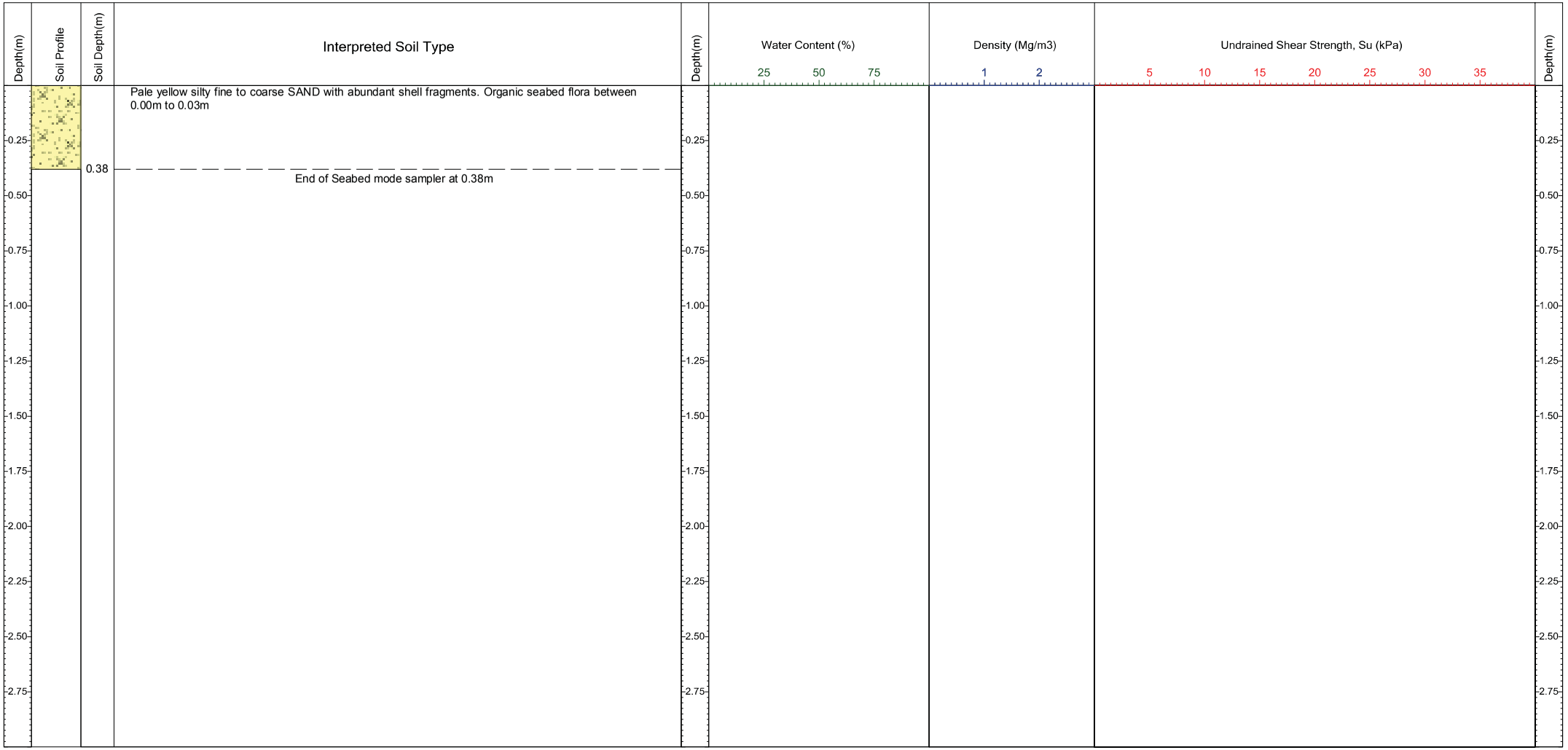
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2422295.5 798505.1	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	23.1 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC027A
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.28		PB 25/11/2016			
	Method	Piston corer	Recovery (m)	0.28					

SACS Cable Route Survey

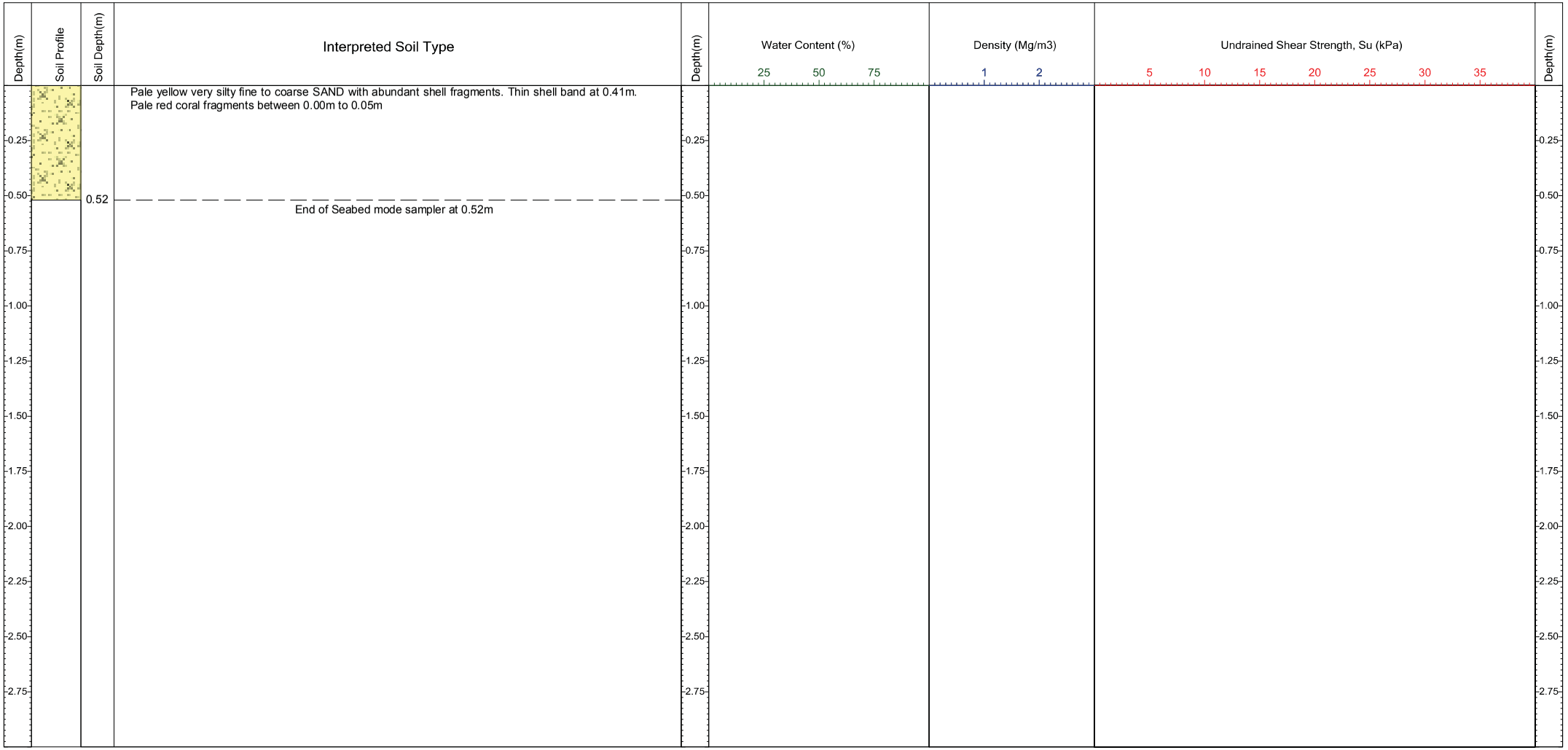
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2425009.0 802698.9	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery not achieved. Retest required	Contract	10817	Water Depth	27.1 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC001
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.38		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.38					

SACS Cable Route Survey

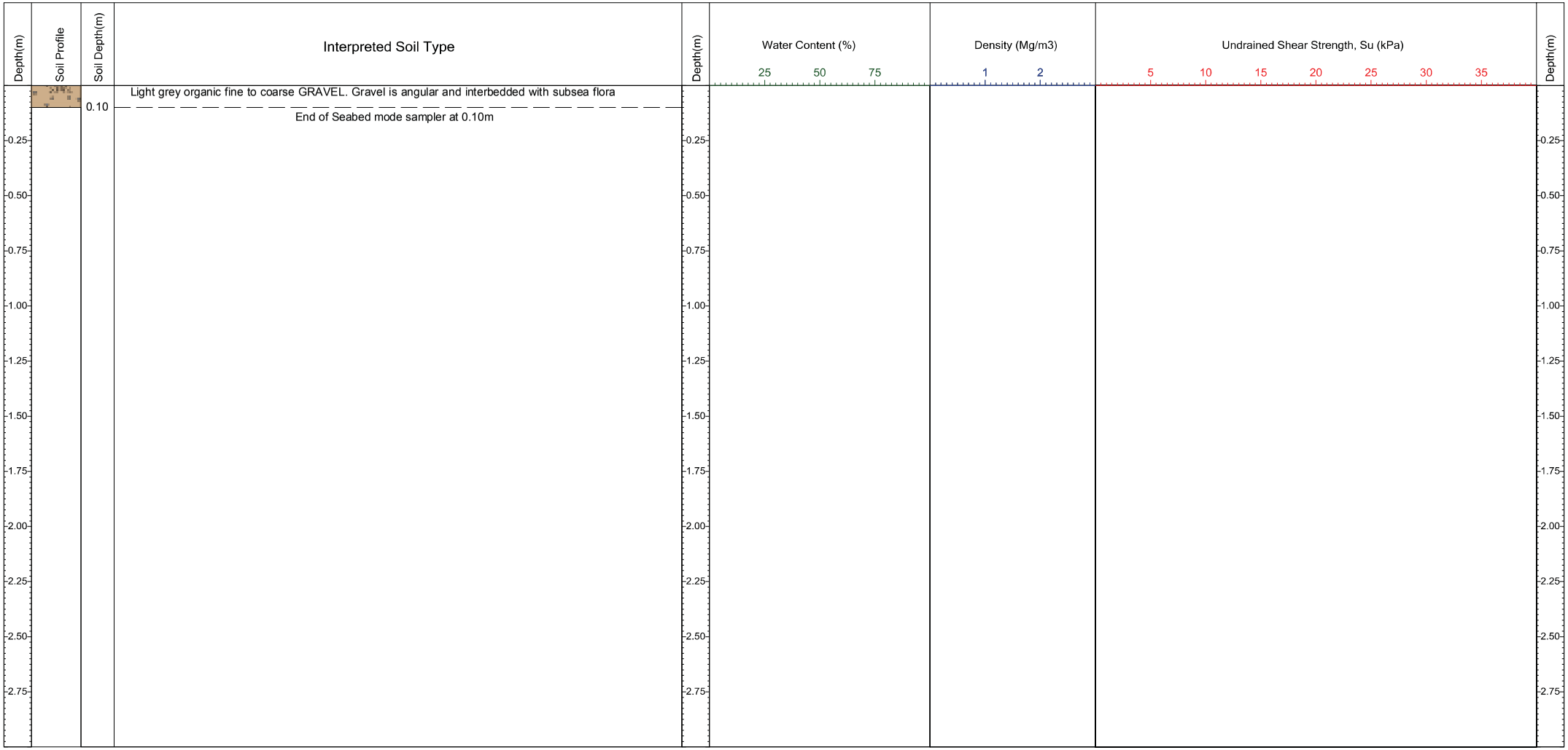
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2425006.8 802700.9	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Retested location. Minimum recovery not achieved.	Contract	10817	Water Depth	26.9 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC001A
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.52		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.52					

SACS Cable Route Survey

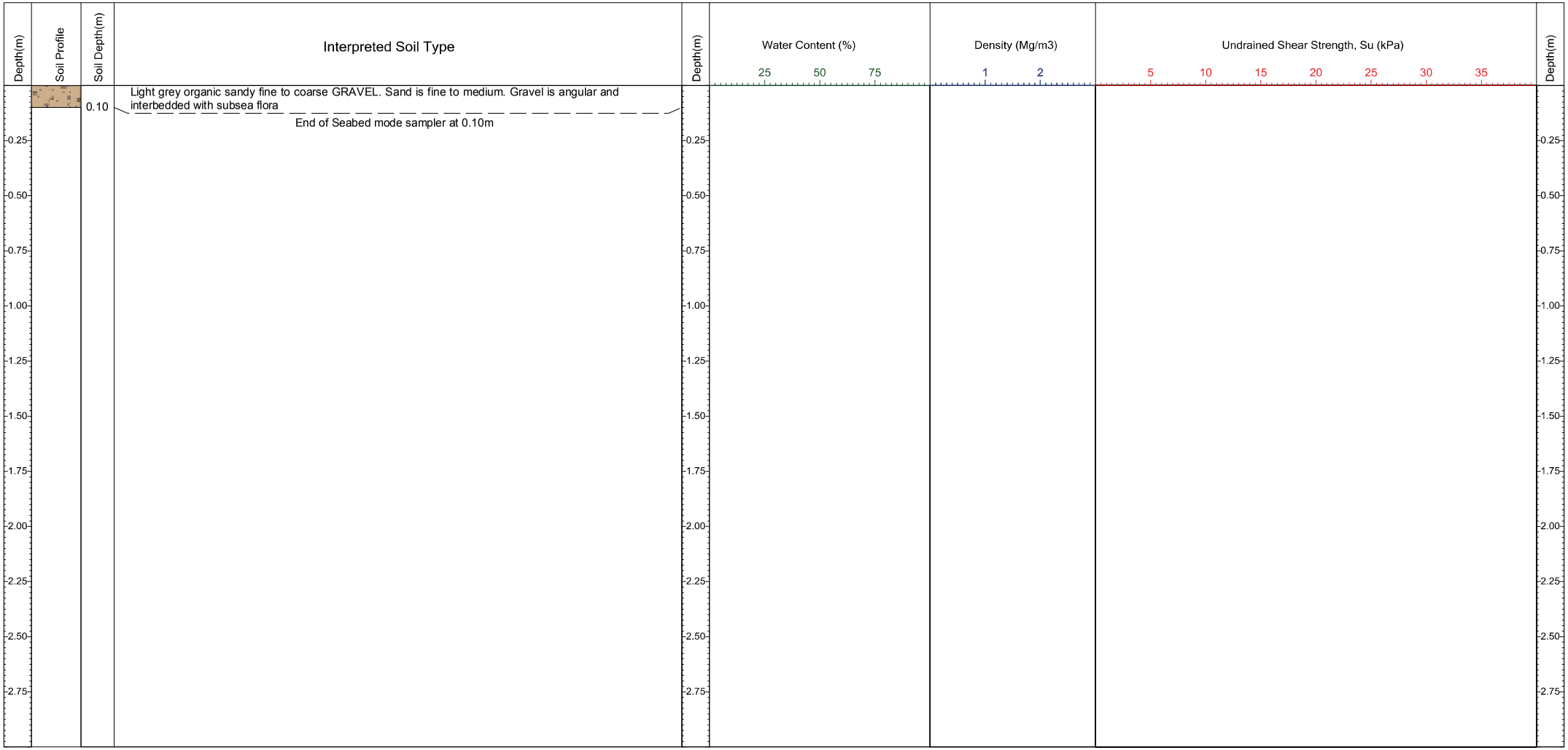
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2426952.9 805771.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	23.9 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC026
	Vessel	Ocean Endeavour	Penetration (m)	0.10		PB 25/11/2016			
	Method	Piston corer	Recovery (m)	0.10					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2426950.5 805787.5	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	23.9 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC026A
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.10		PB 25/11/2016			
	Method	Piston corer	Recovery (m)	0.10					

Chart Description Report for
NEC

Project:
SACS Cable System
KP31.138 to KP70.688

Description:
Offshore Chart Description

Survey Date:
08-Oct-2016 to 25-Nov-2016

Project Number:
10817

Report Number:
Offshore 002

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	27-Nov-2016	Rev0	0/27-Nov-2016/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Fortaleza
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	08-Oct-2016 to 25-Nov-2016
Survey Extents	Block 1, 2 and 3, KP31.138 to KP70.688

Equipment Used	
Positioning System	Fugro Starfix HP
Echo Sounder (MBES System)	Simrad EM1002 / EM120
Echo Sounder (SBES System)	Simrad EA400 Combi
Side Scan Sonar	EdgeTech 4200-FS
Sub-Bottom Profiler	Hull-mounted Pinger
Combined Side Scan Sonar & Pinger	Edgetech 2000 TVD
Magnetometer	Geometrix G-882
Cone Penetrometer	Neptune 3000
Vibrocorer	Kullenburg 3m Piston Corer

SACS.S1.NU008 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range 03° 35.0895' S, 038° 14.7861' W to 03° 36.3064' S, 038° 9.5732' W

Range of Depths 22m to 36m LAT

General Seabed Topography The seabed undulates as it gently deepens towards the east. The route crosses sandwaves running perpendicular to the route. In the east these sandwaves are found to be very steep on one side reaching gradients up to 26°.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to predominately comprise medium to coarse sand, with varying levels of shell fragments and gravel.

Shallow Soils Shallow soils are shown by geotechnical sampling to comprise medium to coarse sand, with varying levels of shell fragments and gravel.

Potential Hazards Seabed gradients above 5° are found on the flanks of numerous sandwaves identified running perpendicular to the route. The largest gradients are found on sandwaves between 03° 36.2079' S, 038° 11.5504' W and 03° 36.3679' S, 038° 10.3015' W, with gradients up to 26°.

Cable Crossings The survey route crosses three in-service cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SAM seg G	IS	03°	35.129'	S	038°	14.672'	W	30	31.361	DA
GlobeNet seg 4	IS	03°	35.933'	S	038°	12.345'	W	33	35.918	DA
SAM seg F	IS	03°	36.322'	S	038°	11.222'	W	33	38.117	DA

SACS.S1.BU001 **Offshore North-Up Chart Description** **Scale 1:5,000**

Chart Range	03° 36.0481' S, 038° 06.8142' W to 03° 36.2676' S, 038° 04.2078' W
Range of Depths	26m to 40m LAT
General Seabed Topography	The seabed undulates while remaining a fairly constant depth. The route crosses four sandwaves running perpendicular to the route, three of which are present within the branching unit confines. These sandwaves are found to be steepest on their western sides, reaching gradients up to 25°.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to predominately comprise fine to coarse sand with varying levels of shell fragments and occasional gravel.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and occasional gravel.
Potential Hazards	Seabed gradients above 5° are found on the flanks of numerous sandwaves found running perpendicular to the route. The largest gradients are found on sandwaves between 03° 35.9942' S, 038° 06.2283' W and 03° 36.1565' S, 038° 4.6318' W, with gradients up to 25°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU009 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range
03° 36.3318' S, 038° 09.8447' W to 03° 36.1565' S, 038° 4.6318' W

Range of Depths
26m to 40m LAT

General Seabed Topography
The seabed undulates as it gently deepens towards the east. The route crosses sandwaves running perpendicular to the route. In the east these sandwaves are found to be steepest on their western sides, reaching gradients up to 25°.

Seabed Features and Obstructions
Seabed sediments in the west are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and occasional gravel. The centre of the route comprises fine to coarse sand with frequent gravel and shell fragments. In the east the sediments continually vary again, comprising fine to coarse sand with varying levels of shell fragments and occasional gravel

Shallow Soils
Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and occasional gravel.

Potential Hazards
Seabed gradients above 5° are found on the flanks of numerous sandwaves found running perpendicular to the route. The largest gradients are found on sandwaves between 03° 35.9942' S, 038° 06.2283' W and 03° 36.1565' S, 038° 4.6318' W, with gradients up to 25°.

Cable Crossings
The survey route crosses one in-service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SAC seg A	IS	03°	36.066'	S	038°	07.005'	W	37	45.991	DA

SACS.S1.NU010 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

03° 36.0853' S, 038° 04.9033' W to 03° 38.4548' S, 037° 59.6904' W

Range of Depths

27m to 45m LAT

General Seabed Topography

The seabed undulates as it gently deepens towards the southeast. The route crosses sandwaves running perpendicular to the route. In the west these sandwaves are found to be very steep on their western sides, reaching gradients up to 29°. Further steep sandwaves are found in the east with gradients of up to 22° found on their flanks.

Seabed Features and Obstructions

Seabed sediments are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Shallow Soils

Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Potential Hazards

Seabed gradients above 5° are found on the flanks of numerous sandwaves found running perpendicular to the route. The largest gradients are found on sandwaves between 03° 36.0853' S, 038° 04.9033' W and 03° 36.3586' S, 038° 0.38630' W, with gradients up to 29°.

Cable Crossings

The survey route crosses one out-of-service cable and two in-service cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
AMX-1 seg 3.1	IS	03°	36.670'	S	038°	03.403'	W	38	52.958	DA
Telegraph (Fortaleza (Ceara)-Natal)	OOS	03°	37.361'	S	038°	01.951'	W	38	55.964	DA
SAC seg B	IS	03°	38.351'	S	037°	59.816'	W	36	60.373	DA

SACS.S1.NU011 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range 03° 38.2300' S, 037° 59.9619' W to 03° 15.0685' S, 038° 01.5585' W

Range of Depths 31m to 43m LAT

General Seabed Topography The seabed undulates as it remains a fairly constant depth. The route continually crosses numerous sandwaves running perpendicular to the route. These sandwaves are found to have gradients up to 10° on their flanks.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Shallow Soils Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Potential Hazards Gradients of over 5° and up to 10° are present on the flanks of sandwaves crossing the route.

Cable Crossings The survey route crosses one in-service cable.

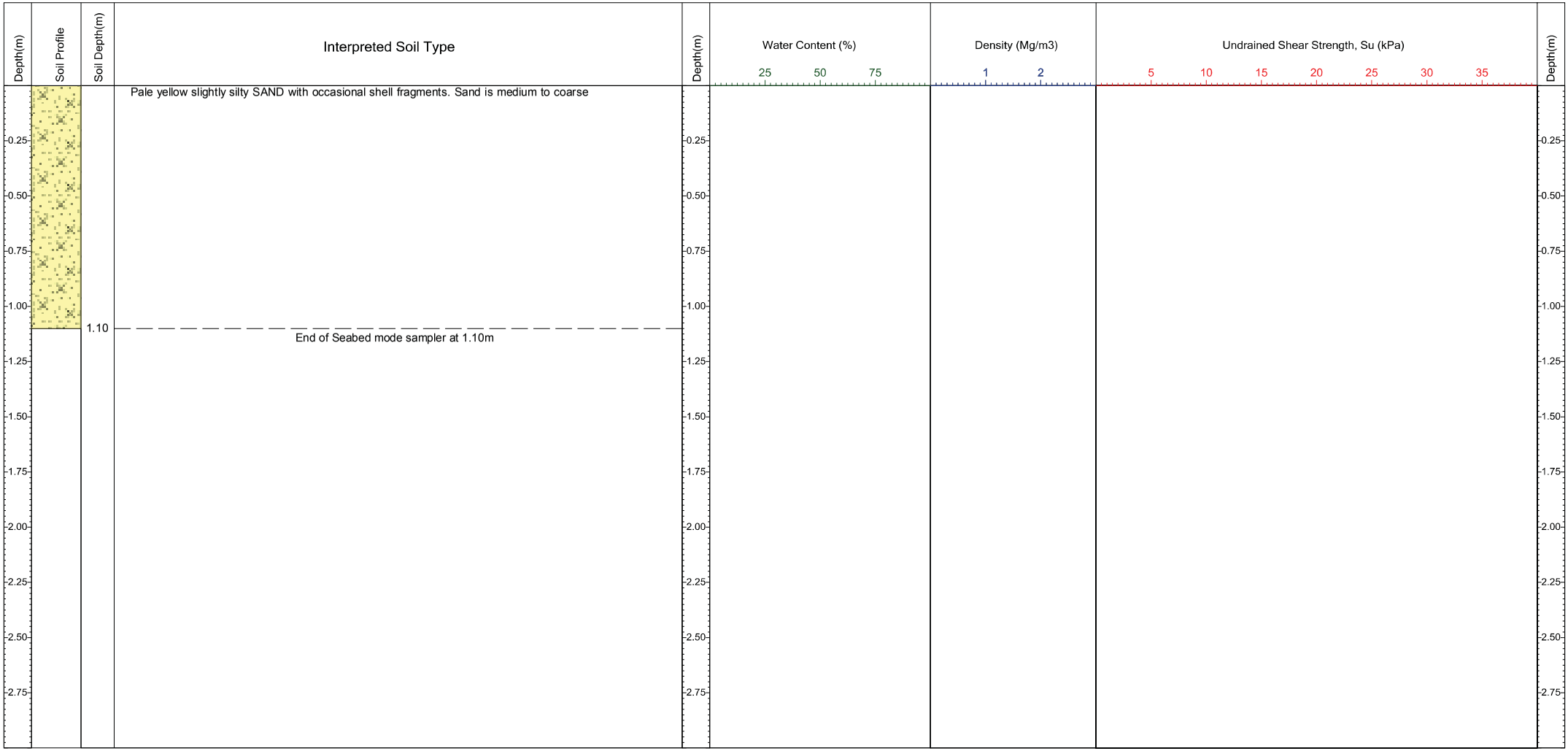
Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SAC seg B	IS	03°	38.351'	S	037°	59.816'	W	36	60.373	DA

APPENDICES

APPENDIX A PISTON CORE LOGS

SACS Cable Route Survey

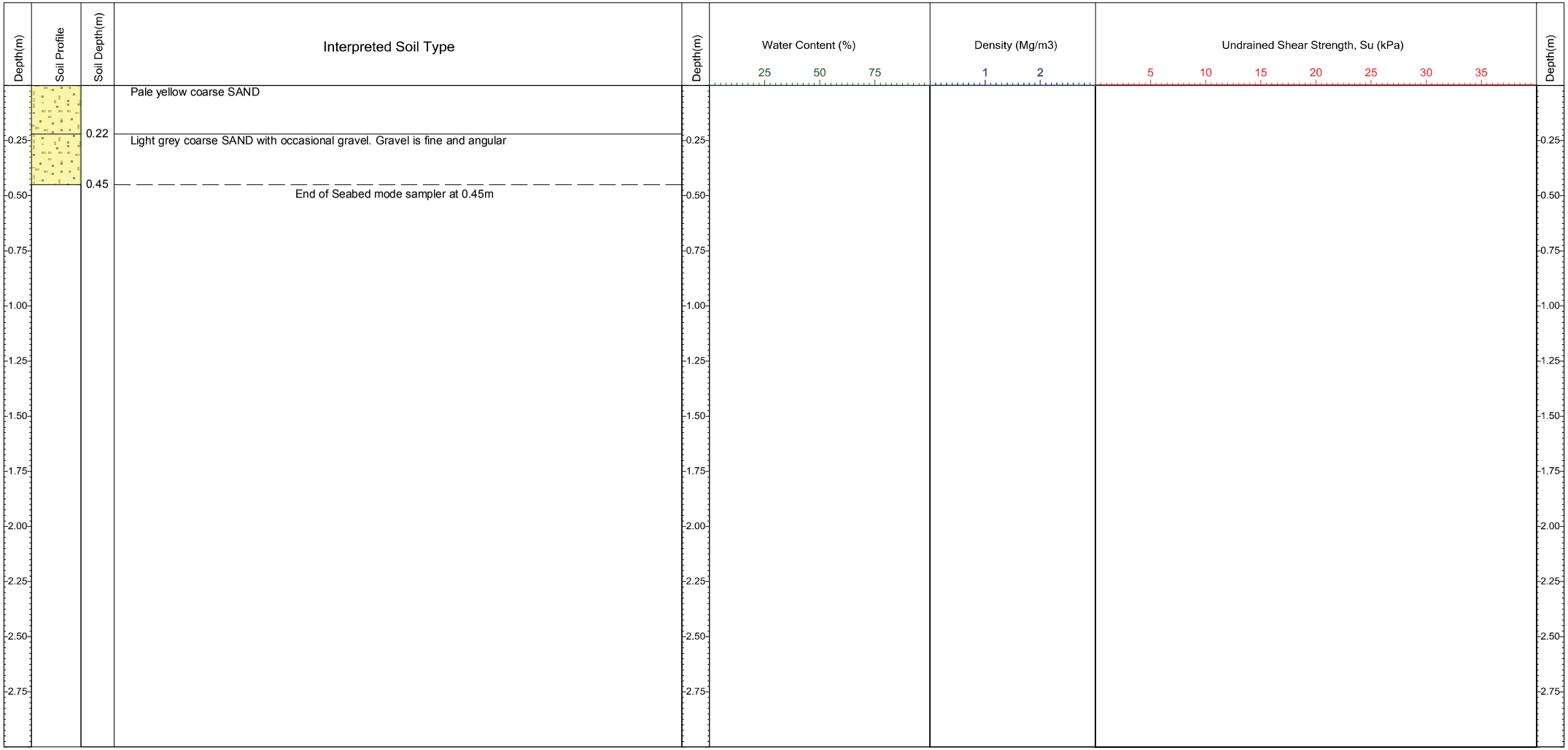
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2432077.5 806043.4	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery achieved	Contract	10817	Water Depth	26.4 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC002
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.10		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	1.10					

SACS Cable Route Survey

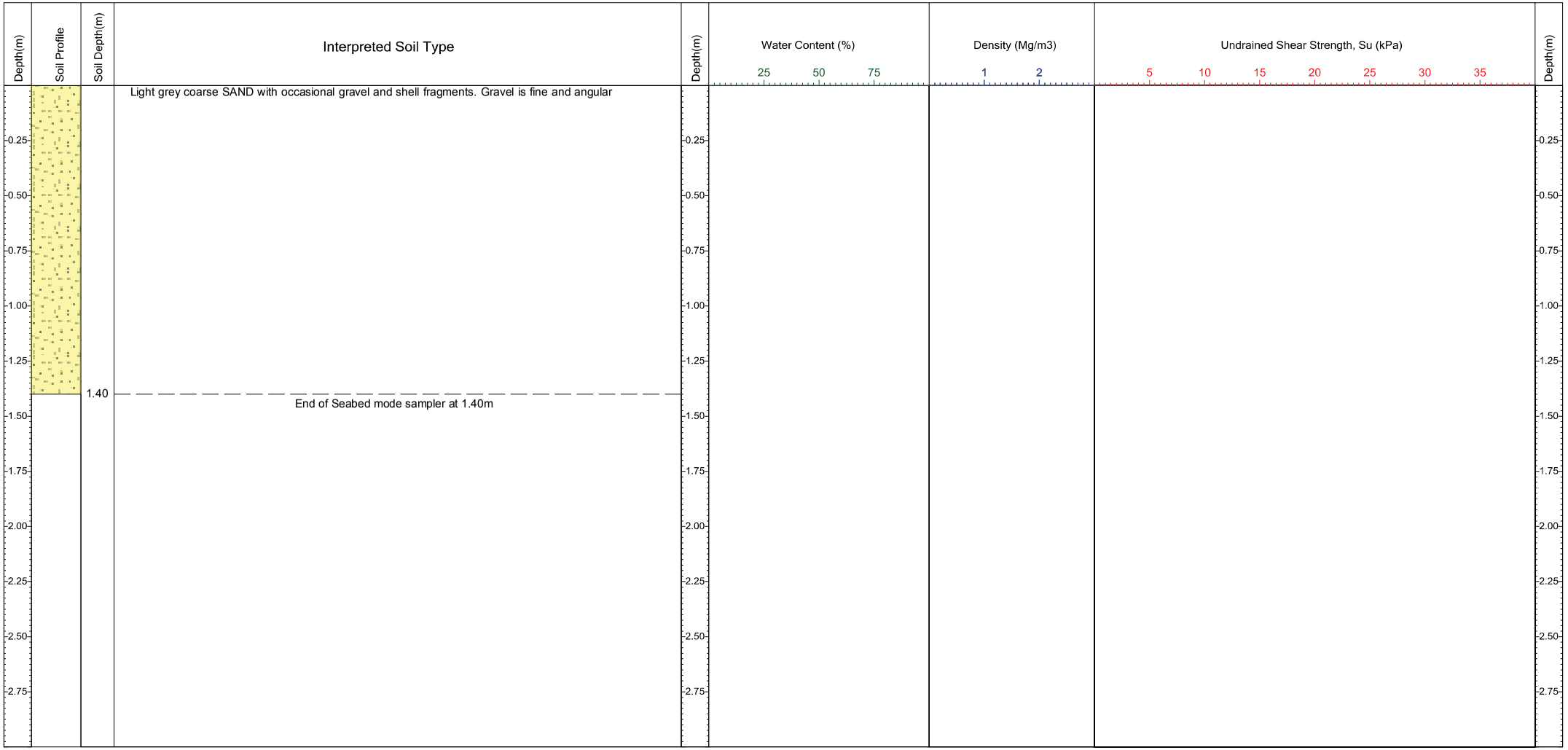
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2433704.9 805485.6	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery not achieved. Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	32.6 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC025
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.45		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.45					

SACS Cable Route Survey

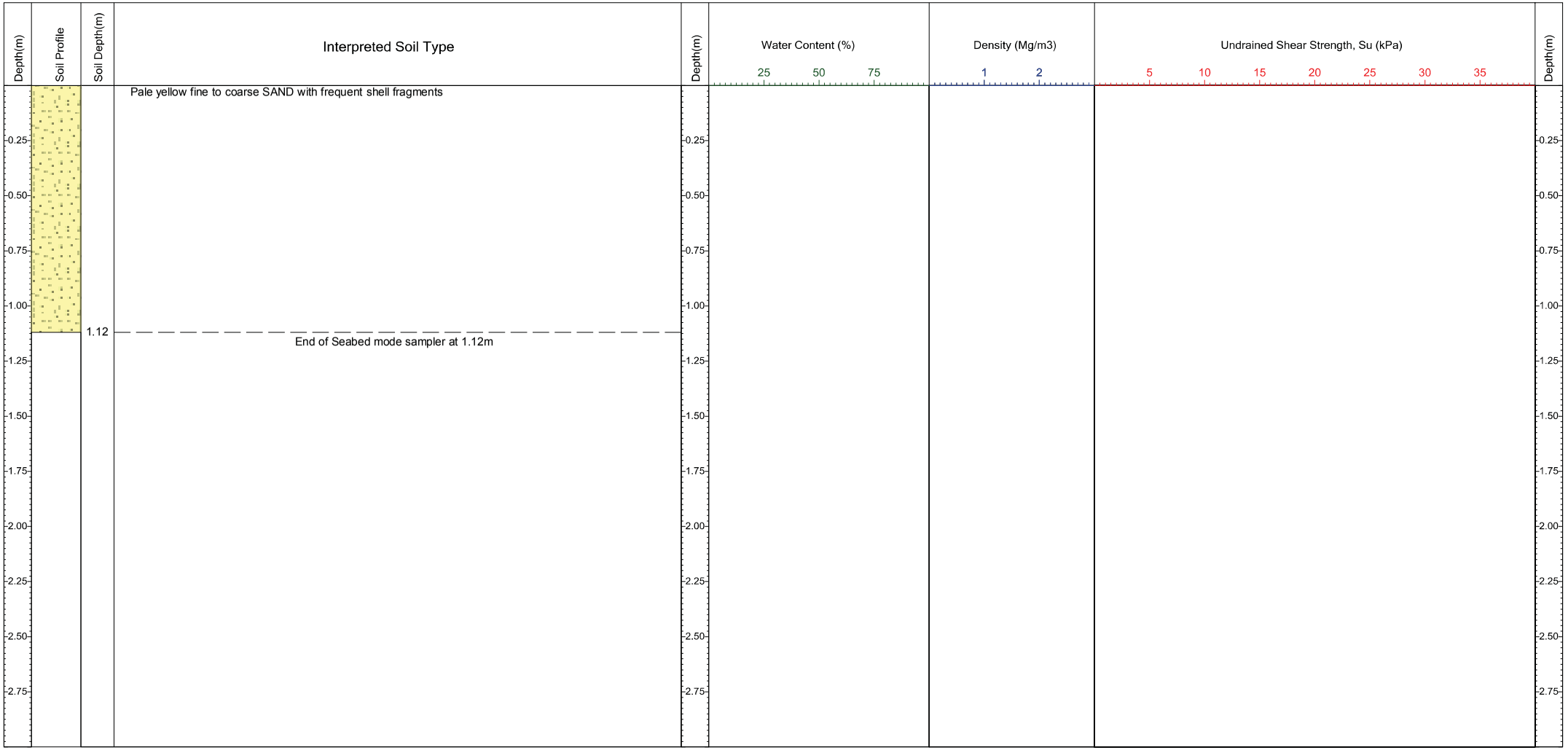
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2433706.0 805487.0	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	32.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC025A
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.40		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	1.40					

SACS Cable Route Survey

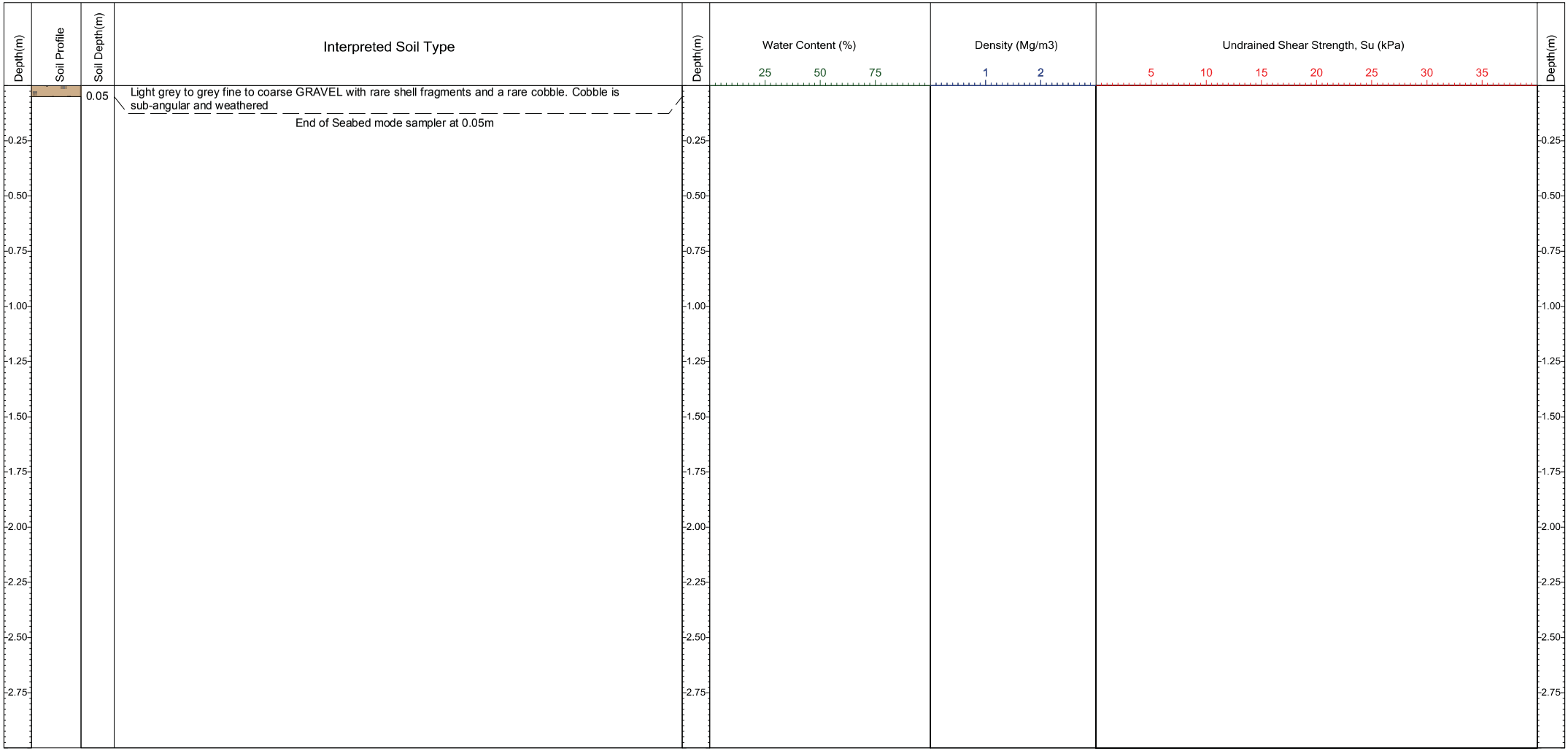
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2438731.7 803846.0	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	23.8 (mLAT)		Preliminary	Draft	Final	
Minimum recovery achieved	Client Name	NEC	Date of Test	19/11/2016					SACS_FTL_OE_PC003
	Vessel	Ocean Endeavour	Penetration (m)	1.12		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	1.12					

SACS Cable Route Survey

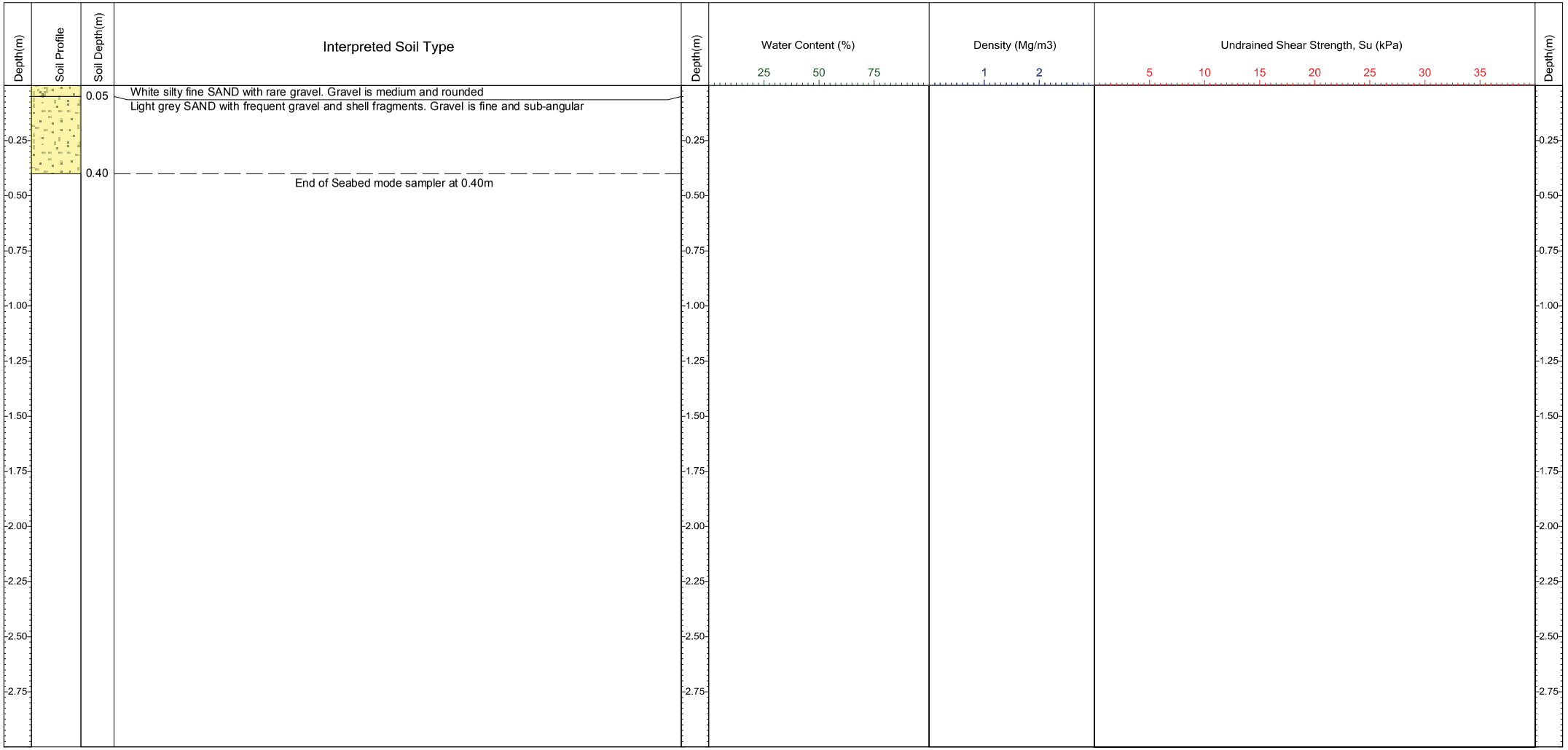
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2445911.3 804513.1	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery not achieved. Retest required	Contract	10817	Water Depth	35.3 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC024
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.05		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.05					

SACS Cable Route Survey

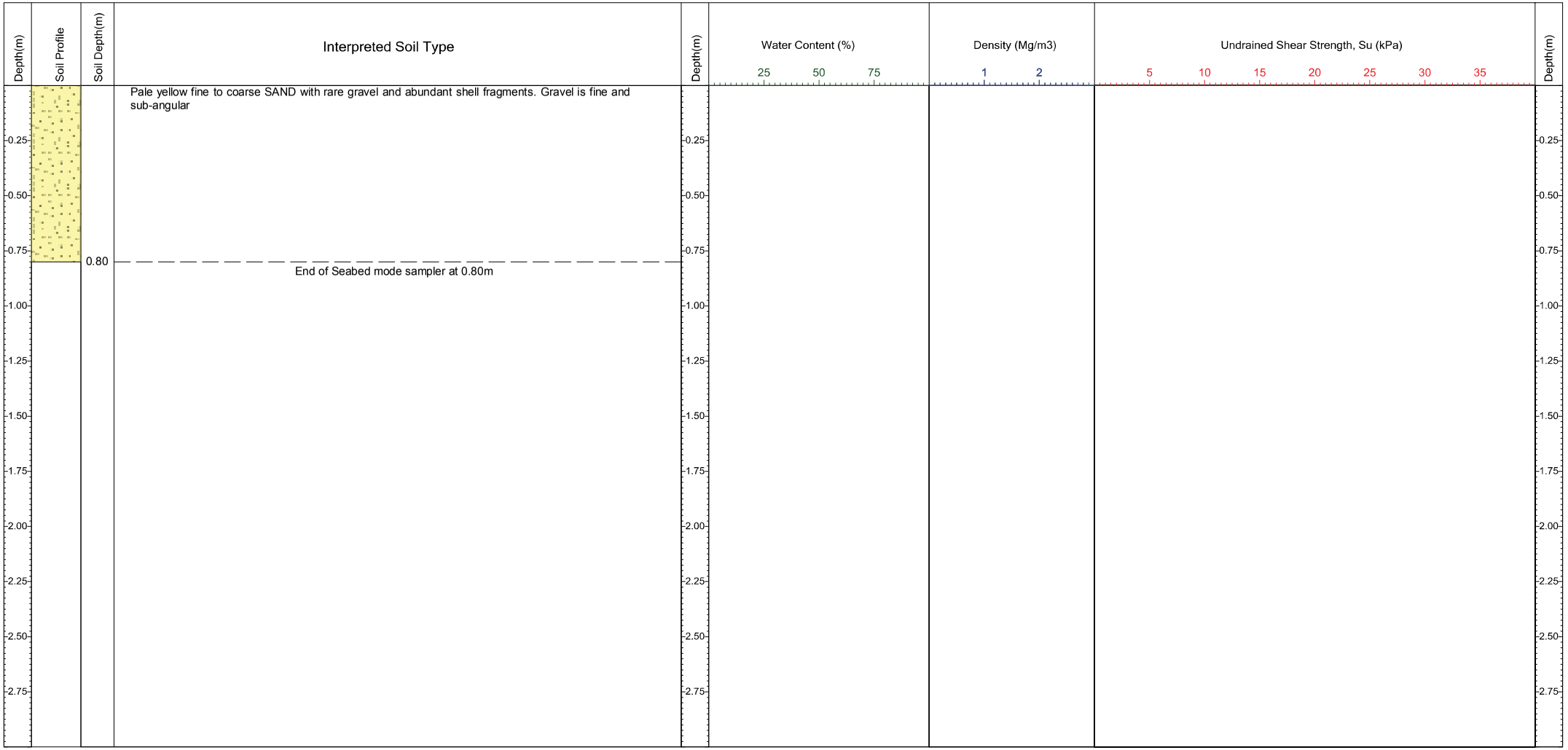
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2445908.3 804512.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	35.2 (mLAT)		Preliminary	Draft	Final	
Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC024A
	Vessel	Ocean Endeavour	Penetration (m)	0.40		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.40					

SACS Cable Route Survey

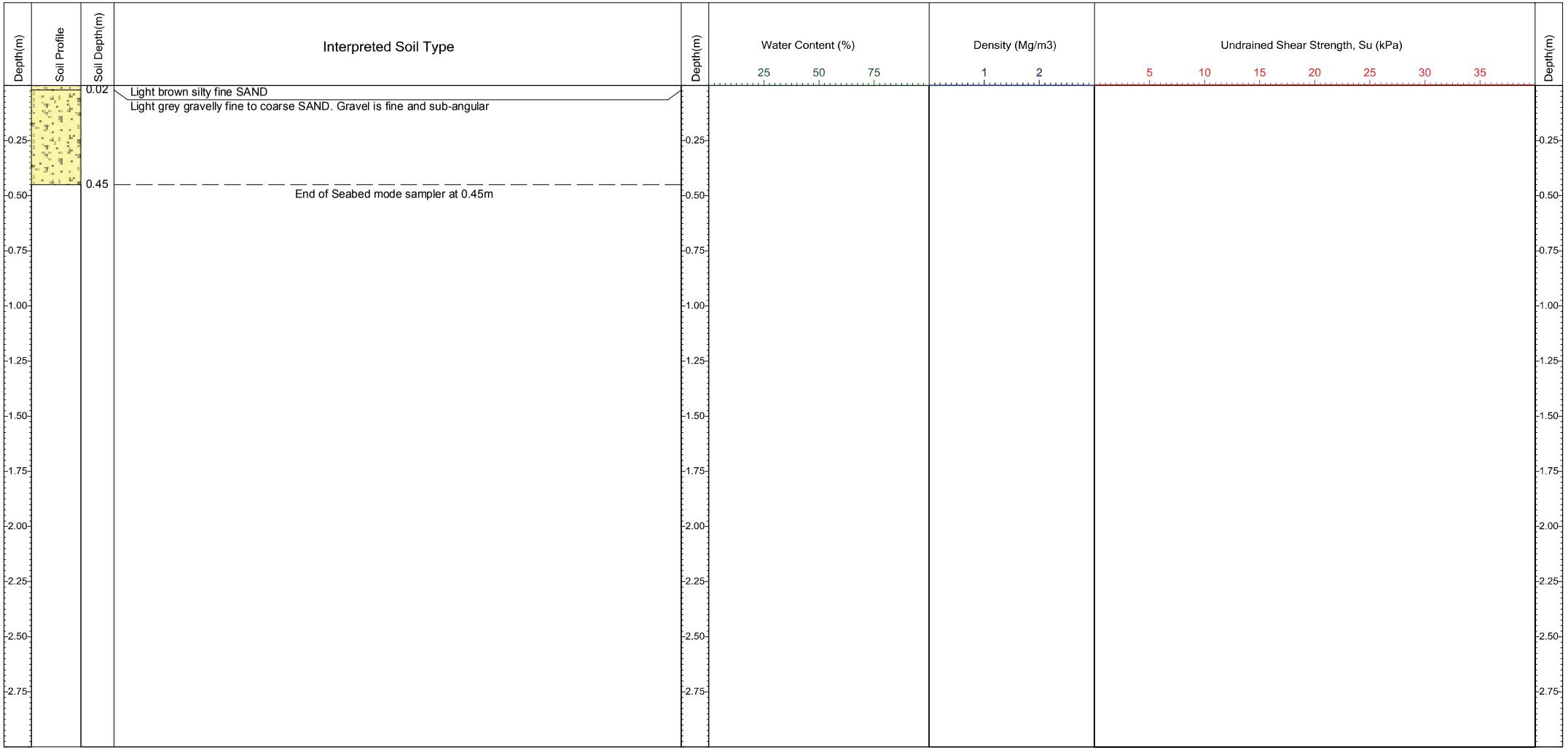
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2451372.2 803987.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	31.7 (mLAT)		Preliminary	Draft	Final	
Minimum recovery achieved	Client Name	NEC	Date of Test	19/11/2016					SACS_FTL_OE_PC004
	Vessel	Ocean Endeavour	Penetration (m)	0.80		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.80					

SACS Cable Route Survey

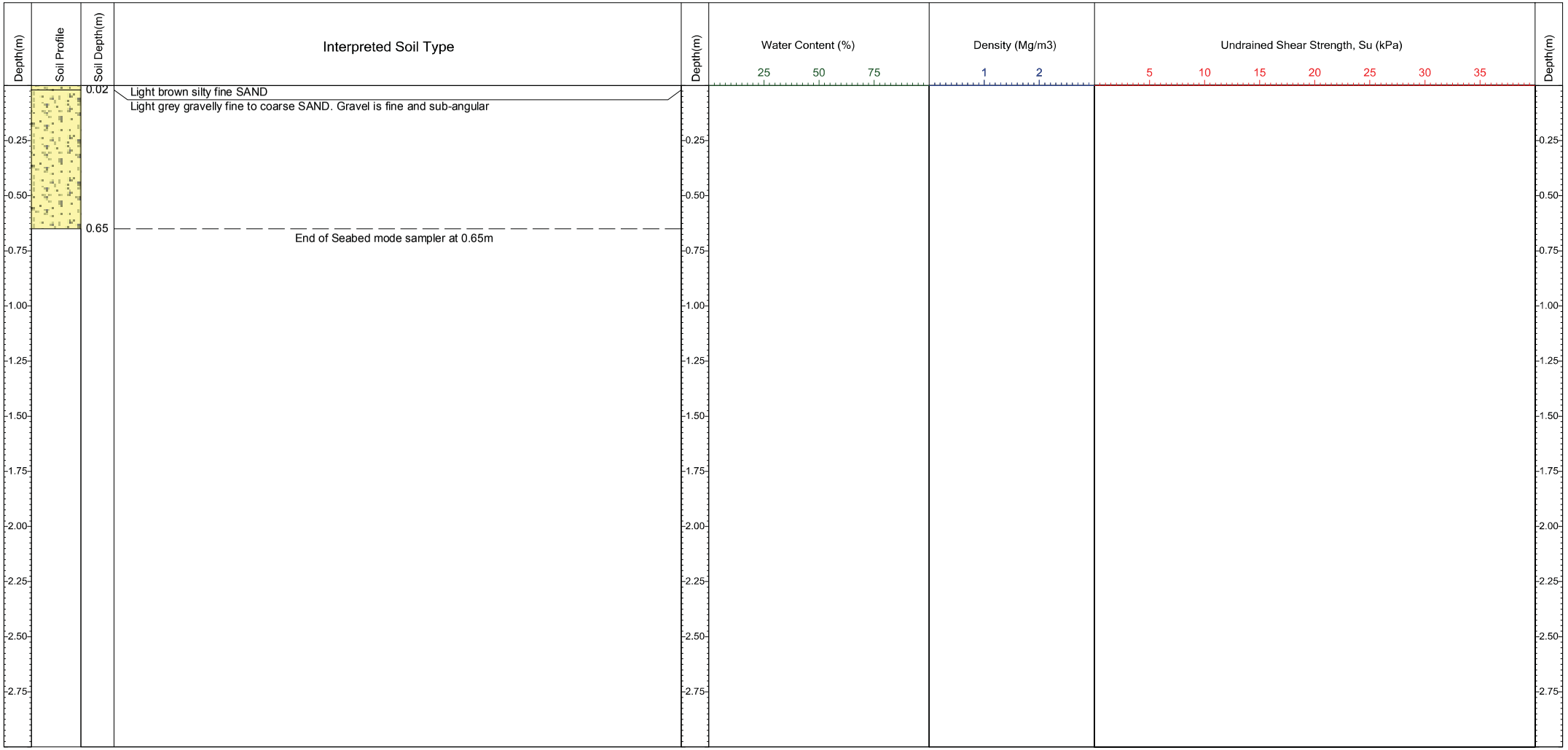
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2456801.7 801502.3	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum sample recovery not achieved. Retest required. Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	39.6 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC023
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.45		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.45					

SACS Cable Route Survey

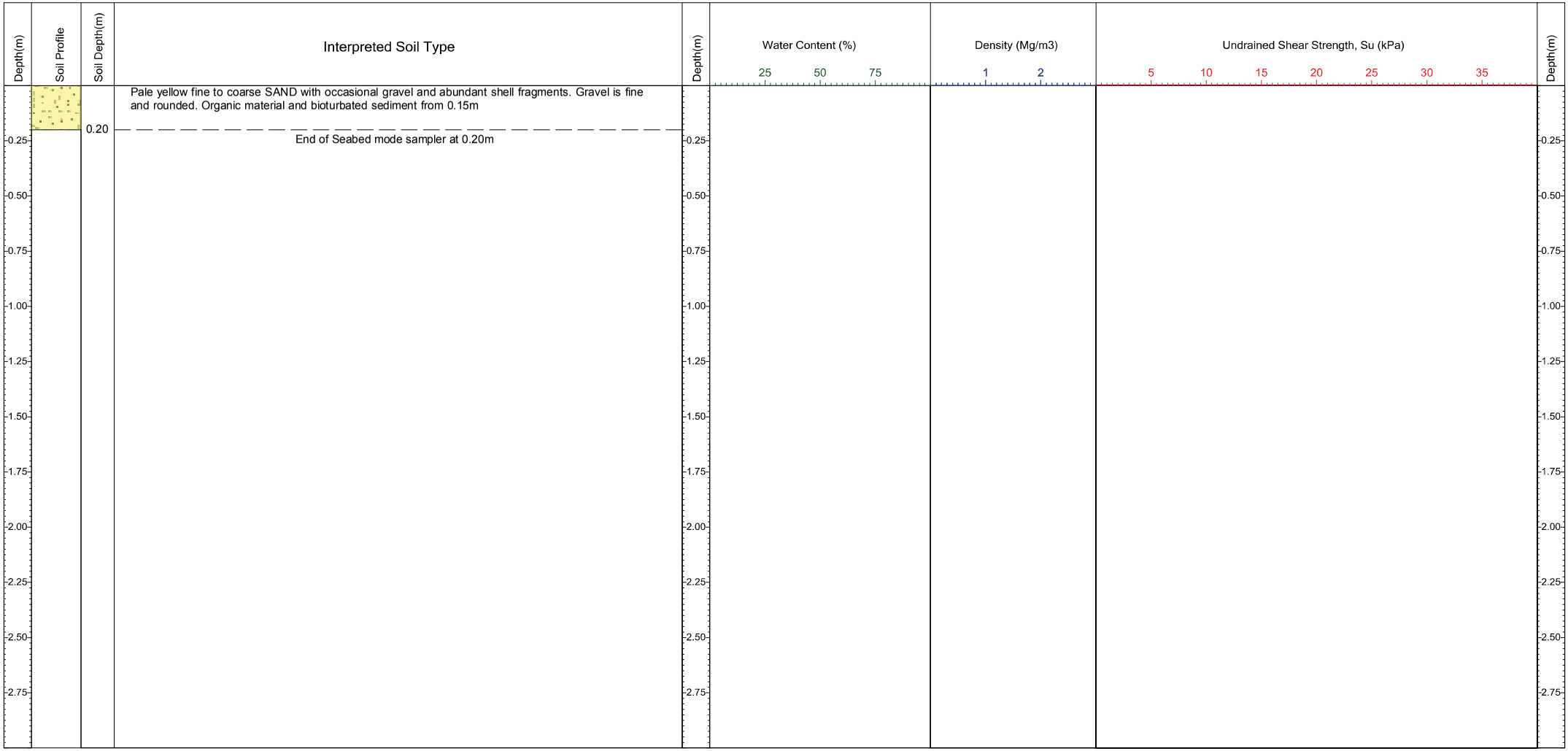
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2456804.5 801495.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	39.5 (mLAT)		Preliminary	Draft	Final	
Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC023A
	Vessel	Ocean Endeavour	Penetration (m)	0.65		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.65					

SACS Cable Route Survey

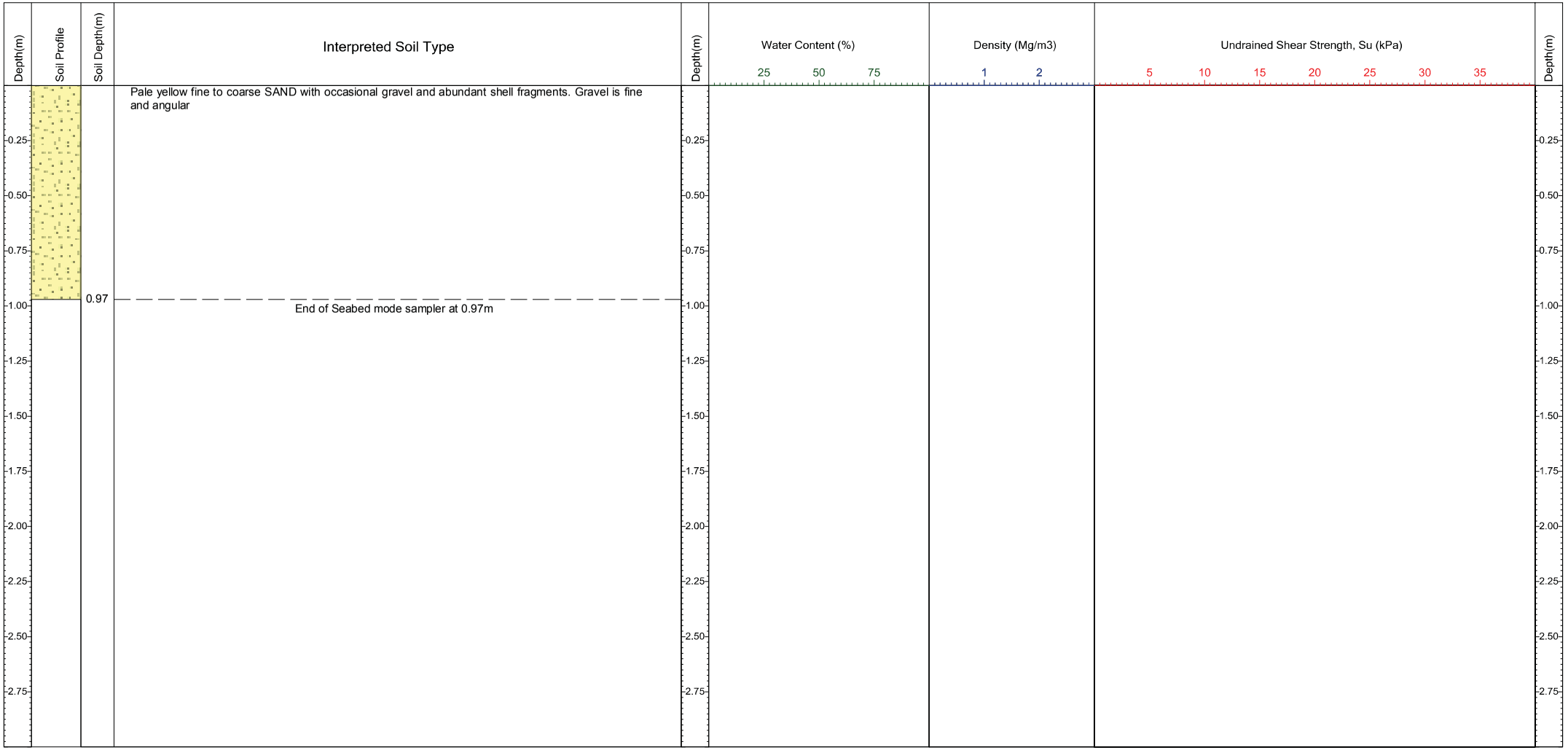
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2460402.0 799411.0	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	35.4 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required	Client Name	NEC	Date of Test	19/11/2016					SACS_FTL_OE_PC005
	Vessel	Ocean Endeavour	Penetration (m)	0.20		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.20					

SACS Cable Route Survey

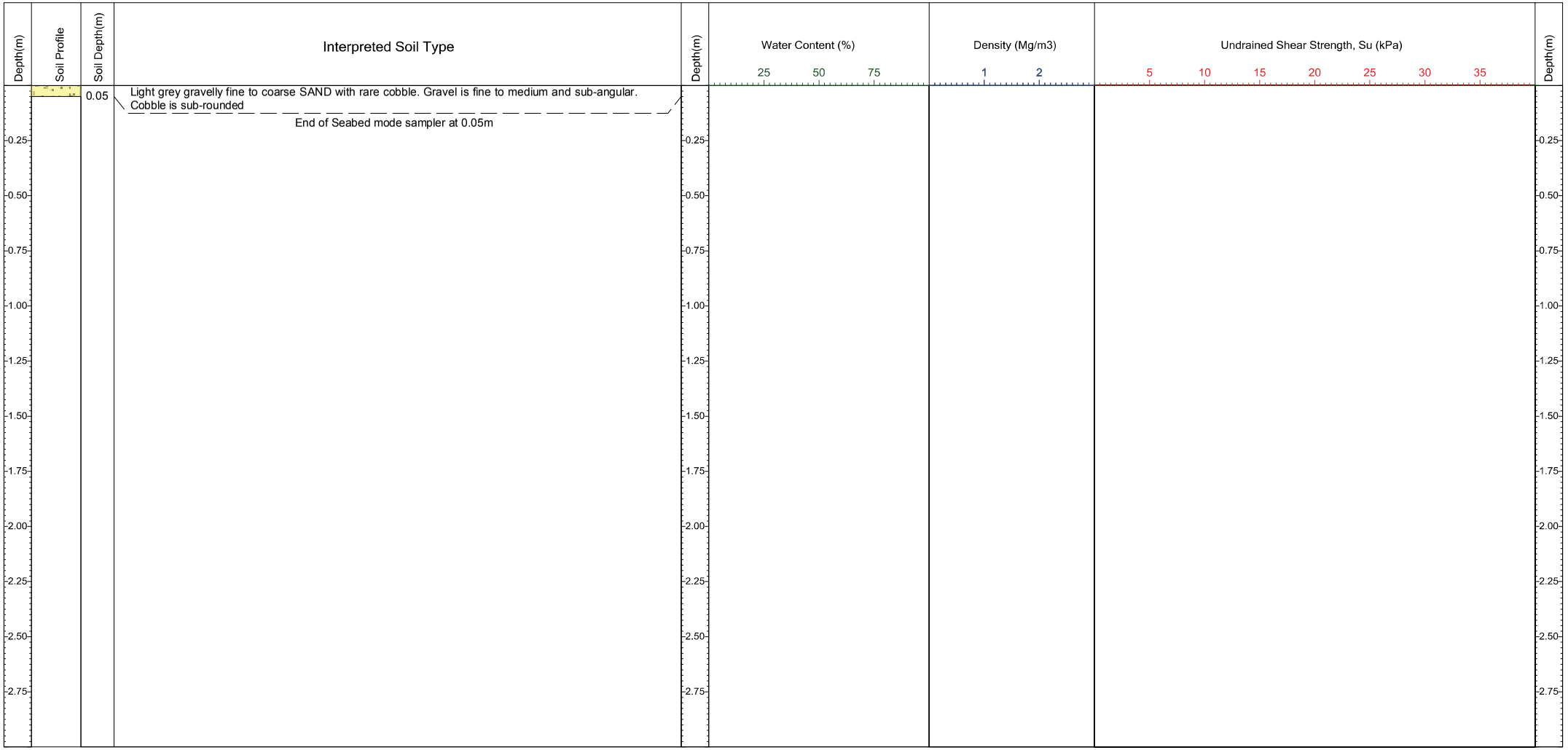
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2460399.4 799417.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Target recovery achieved	Contract	10817	Water Depth	35.3 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC005A
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.97		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.97					

SACS Cable Route Survey

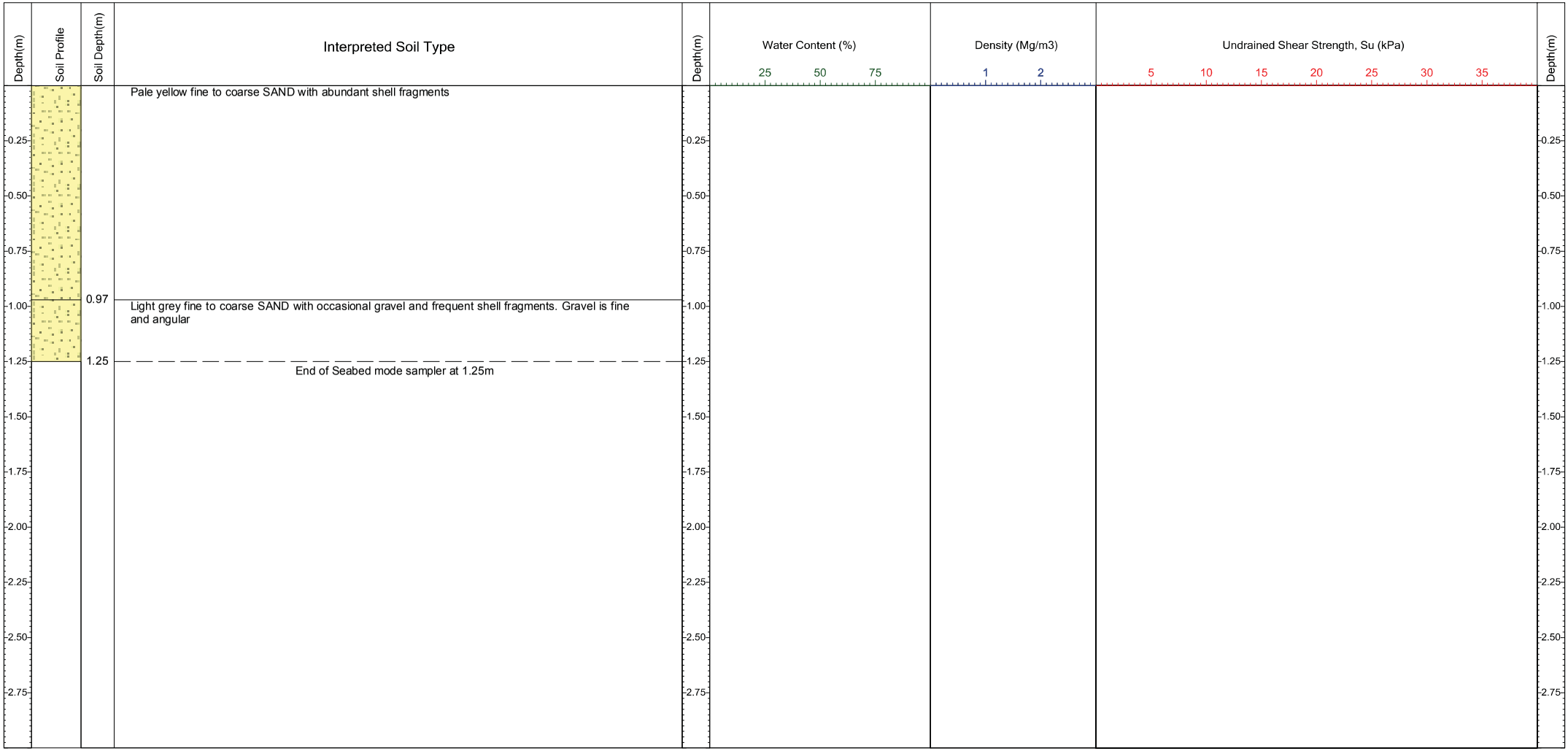
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2466180.9 797387.4	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	36.8 (mLAT)		Preliminary	Draft	Final	
Insufficient sample recovery. Retest required. Cobble stuck in tulip	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC022
	Vessel	Ocean Endeavour	Penetration (m)	0.05		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.05					

SACS Cable Route Survey

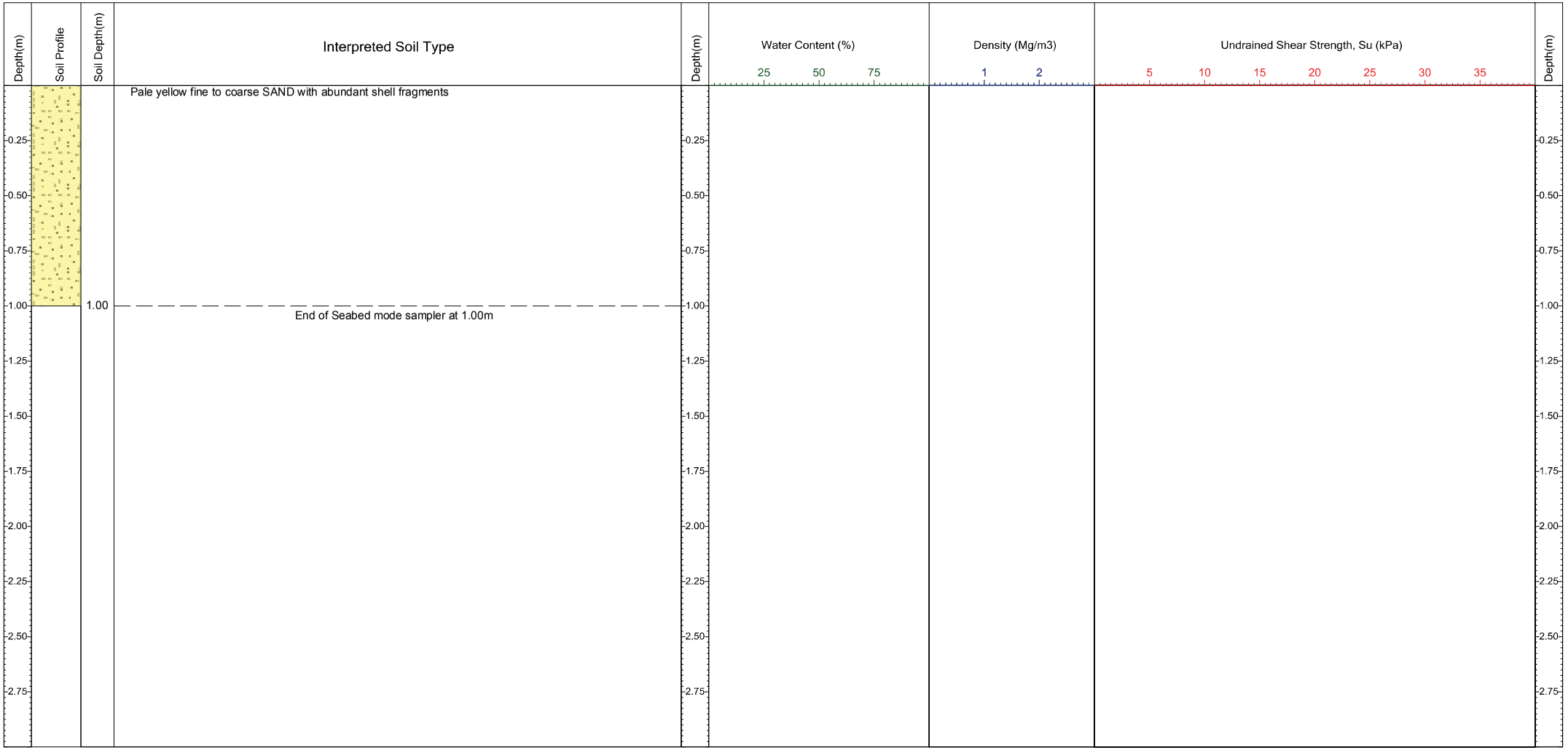
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2466173.7 797388.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	36.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC022A
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.25		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	1.25					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2466329.9 797333.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	32.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC021
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.00		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	1.00					

Chart Description Report for
NEC

Project:
SACS Cable System
KP68.376 to KP98.566

Description:
Offshore Chart Description

Survey Date:
08-Oct-2016 to 25-Nov-2016

Project Number:
10817

Report Number:
Offshore 003

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	27-Nov-2016	Rev0	0/27-Nov-2016/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Fortaleza
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	08-Oct-2016 to 25-Nov-2016
Survey Extents	Block 2,3 and 4, KP68.376 to KP98.566

Equipment Used		
	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi
	Side Scan Sonar	EdgeTech 4200-FS
	Sub-Bottom Profiler	Hull-mounted Pinger
	Combined Side Scan Sonar & Pinger	Edgetech 2000 TVD
	Magnetometer	Geometrix G-882
	Cone Penetrometer	Neptune 3000
	Vibrocorer	Kullenburg 3m Piston Corer

SACS.S1.NU012 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range 03° 39.9625' S, 037° 55.8350' W to 03° 43.6372' S, 037° 50.9364' W

Range of Depths 28m to 44m LAT

General Seabed Topography The seabed undulates as it remains a fairly constant depth. The route continually crosses numerous sandwaves running perpendicular to the route. These sandwaves are found to have gradients up to 28° on their flanks.

Seabed Features and Obstructions Seabed sediments are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Shallow Soils Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Potential Hazards Gradients of over 5° and up to 28° are present on the flanks of sandwaves crossing the route.

Cable Crossings The survey route crosses one in-service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
GlobeNet seg 6	IS	03°	41.180'	S	037°	54.432'	W	42	72.015	DA

SACS.S1.NU013 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

03° 42.9018' S, 037° 52.5770' W to 03° 47.0737' S, 037° 47.6509' W

Range of Depths

30m to 46m LAT

General Seabed Topography

The seabed undulates as it remains a fairly constant depth. The route continually crosses numerous sandwaves running perpendicular to the route. These sandwaves are found to have gradients up to 19° on their flanks.

Seabed Features and Obstructions

Seabed sediments are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel. A veneer of silty fine sand is identified by geotechnical sampling in a small area in the southeast.

The planned MONET Seg2 Fortaleza BU1-2 cable, detailed in the table below, exhibited no magnetometer anomalies but was visible on sonar data, suggesting it has progressed from planned to being in development.

Shallow Soils

Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.

Potential Hazards

Gradients of over 5° and up to 19° are present on the flanks of sandwaves crossing the route.

Cable Crossings

The survey route crosses one planned cable

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
MONET Seg2 Fortaleza BU1-2	P	03°	44.910'	S	037°	49.435'	W	40	84.028	DA

SACS.S1.NU014 **Offshore North-Up Chart Description** **Scale 1:10,000**

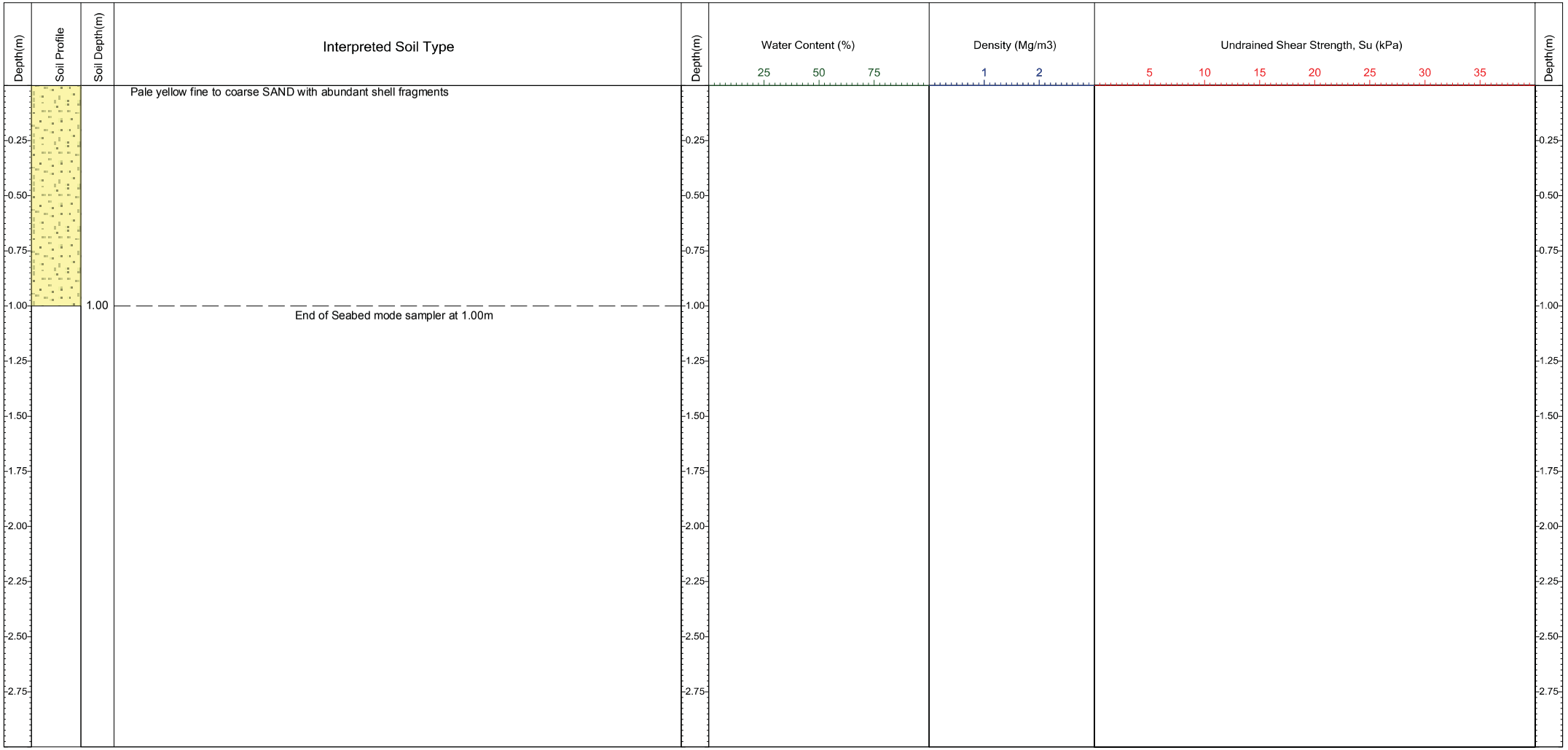
Chart Range	03° 46.4903' S, 037° 48.1786' W to 03° 48.5811' S, 037° 42.9657' W
Range of Depths	30m to 57m LAT
General Seabed Topography	The seabed undulates while it deepens gently to the southeast. The route crosses numerous sandwaves running perpendicular to the route in the west. These sandwaves are found to have gradients up to 23° on their flanks.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel. A veneer of silty fine sand is identified by geotechnical sampling in a small area in the southeast.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise fine to coarse sand with varying levels of shell fragments and gravel.
Potential Hazards	Gradients of over 5° and up to 23° are present on the flanks of sandwaves crossing the route in the west.
Cable Crossings	The survey route crosses no cables.

APPENDICES

APPENDIX A PISTON CORE LOGS

SACS Cable Route Survey

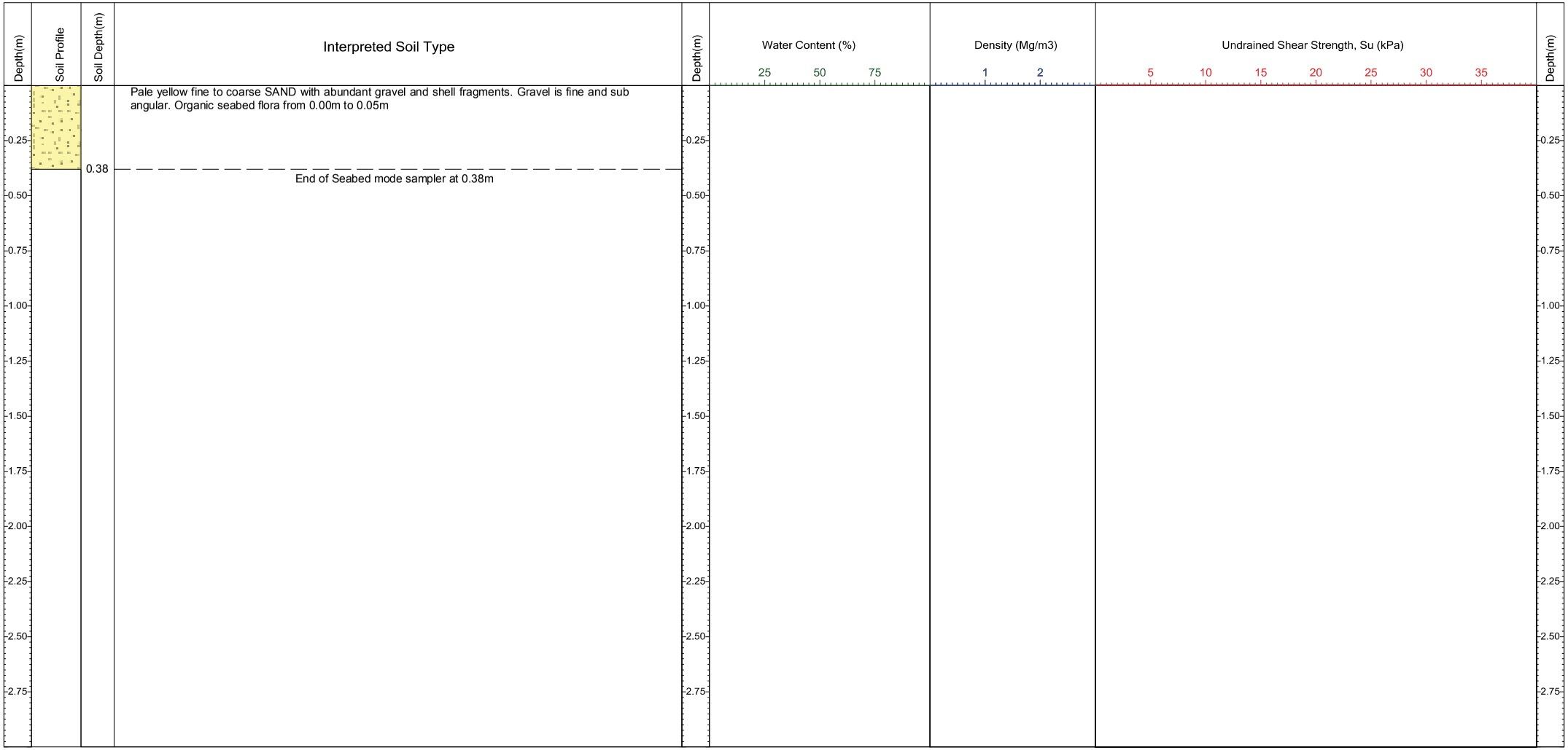
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2466329.9 797333.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	32.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC021
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.00		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	1.00					

SACS Cable Route Survey

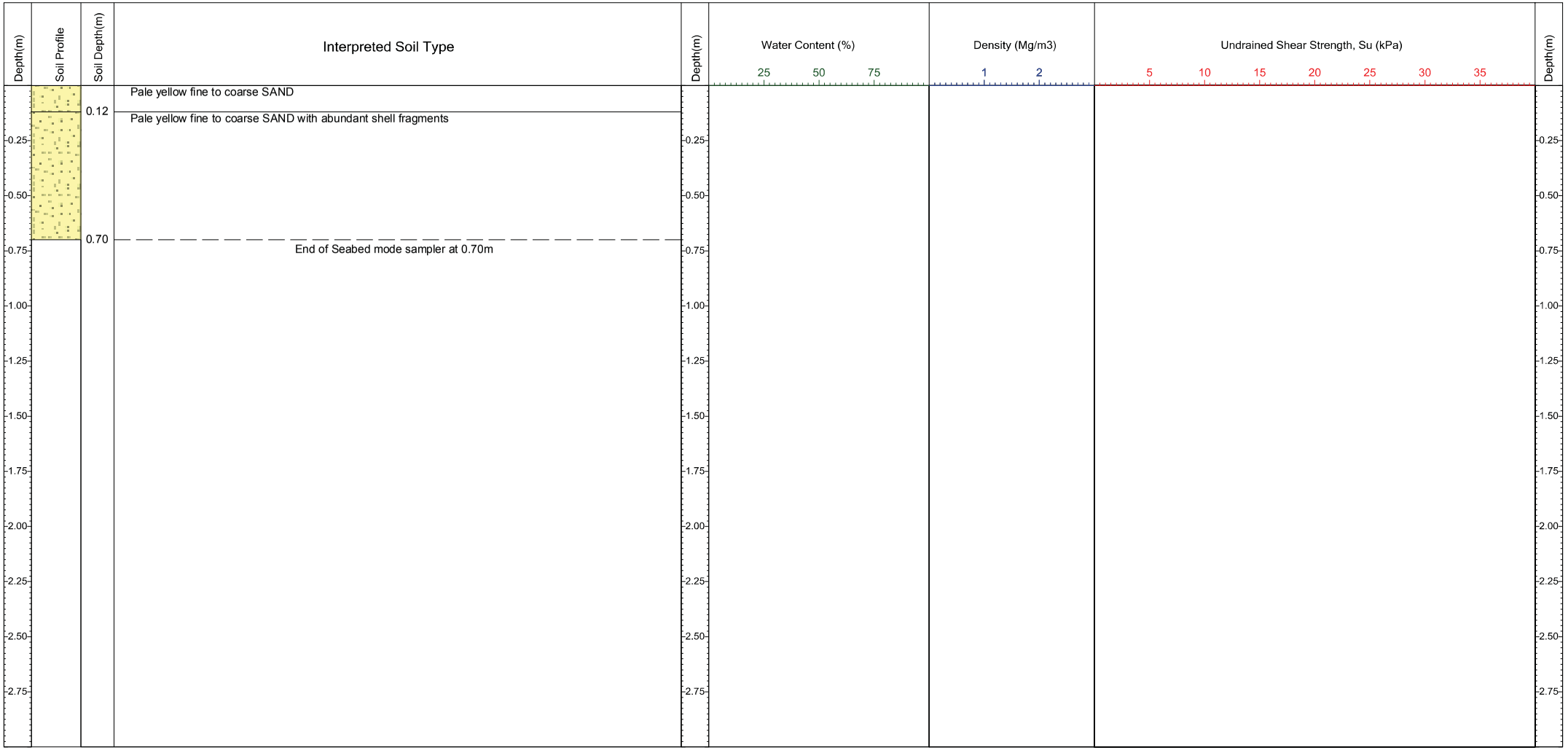
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2468968.0 794867.0	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery not achieved. Retest required	Contract	10817	Water Depth	38.0 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC006
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.38		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.38					

SACS Cable Route Survey

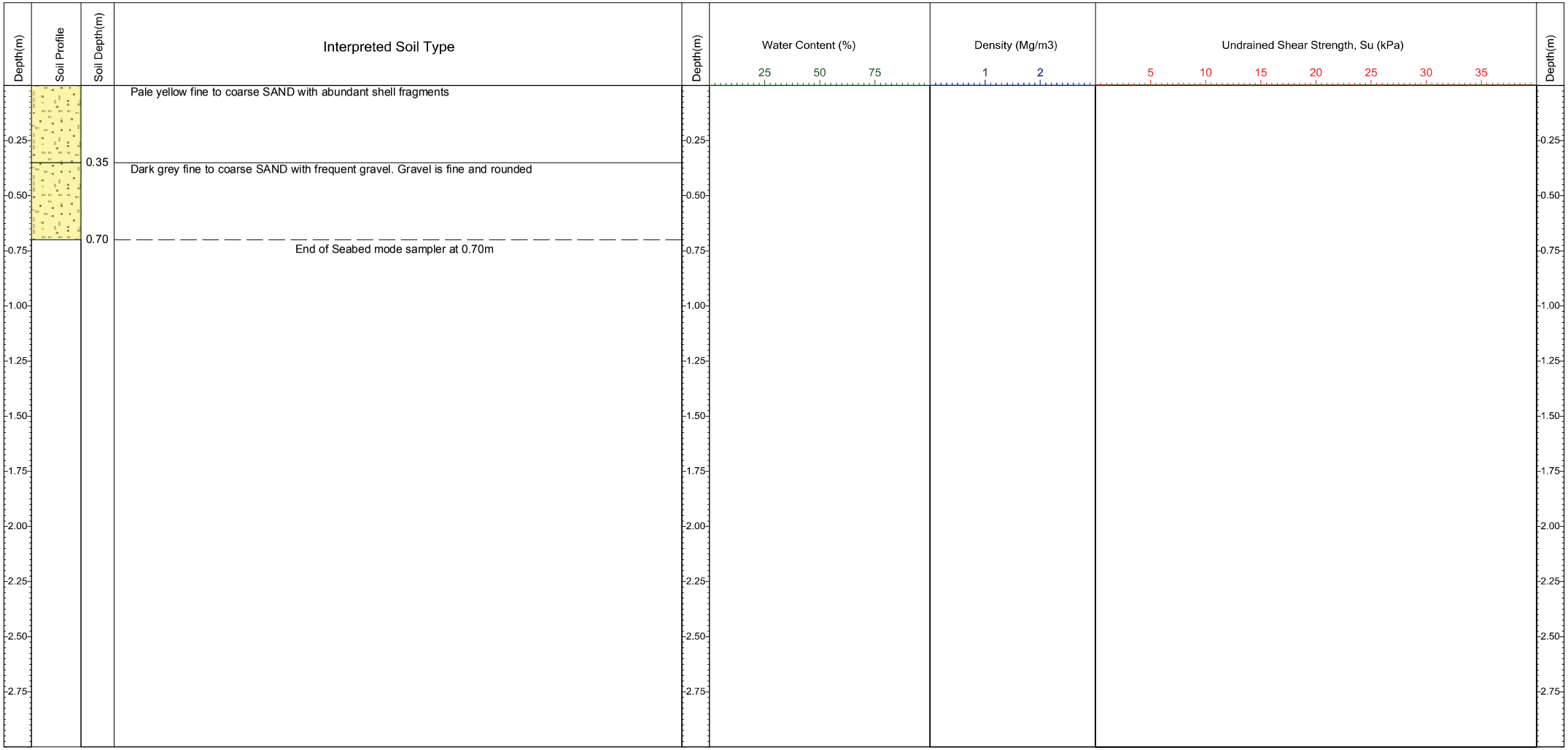
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2468969.2 794864.6	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	37.7 (mLAT)		Preliminary	Draft	Final	
Target recovery achieved	Client Name	NEC	Date of Test	19/11/2016					SACS_FTL_OE_PC006A
	Vessel	Ocean Endeavour	Penetration (m)	0.70		JT 19/11/2016			
	Method	Piston corer	Recovery (m)	0.70					

SACS Cable Route Survey

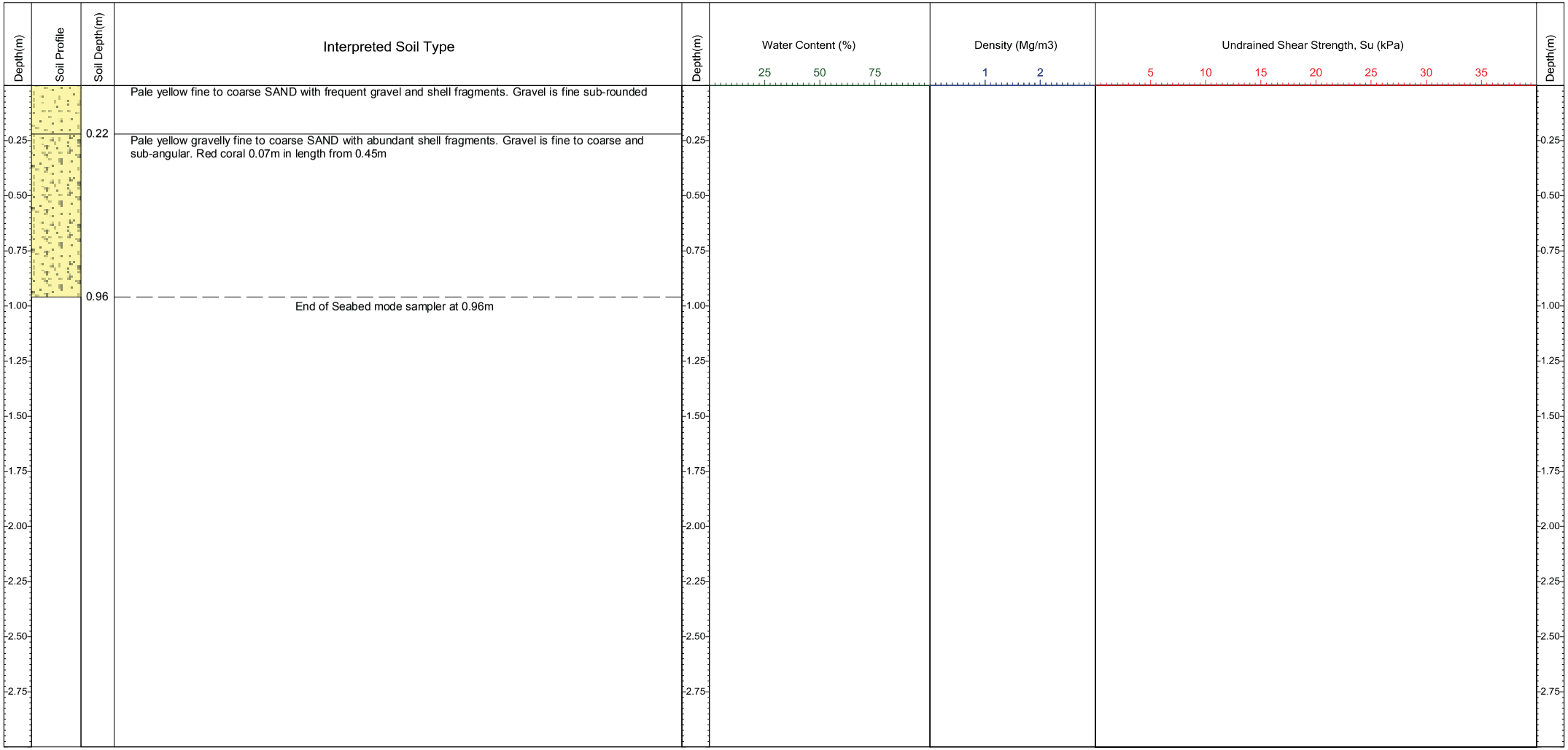
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2472604.0 791821.9	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery achieved. Core sample not split open. Description obtained from end logging only	Contract	10817	Water Depth	40.9 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC020
	Client Name	NEC	Date of Test	25/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.70		JT 25/11/2016			
	Method	Piston corer	Recovery (m)	0.70					

SACS Cable Route Survey

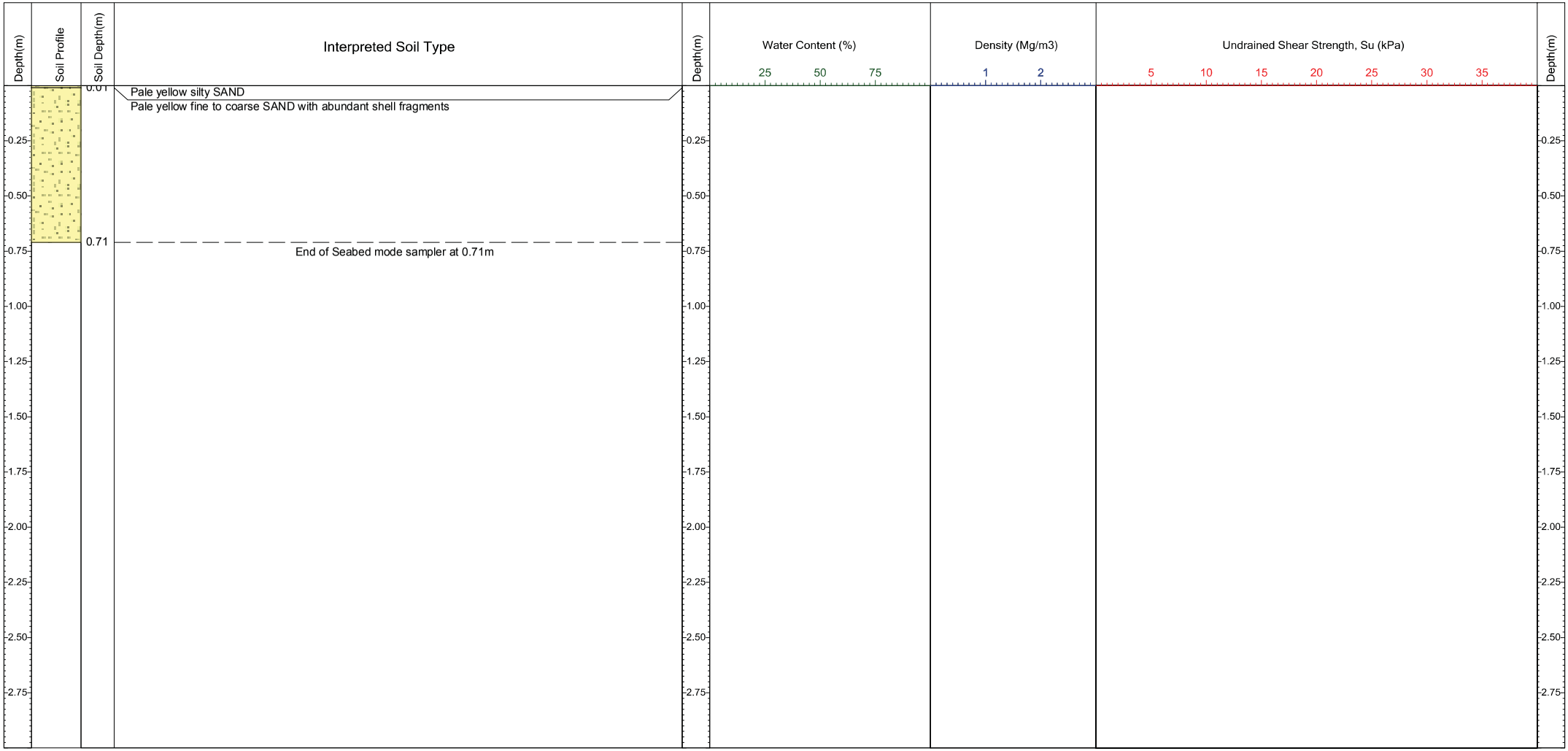
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2477020.3 789592.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	46.4 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC007
	Client Name	NEC	Date of Test	19/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.96		PB 19/11/2016			
	Method	Piston corer	Recovery (m)	0.96					

SACS Cable Route Survey

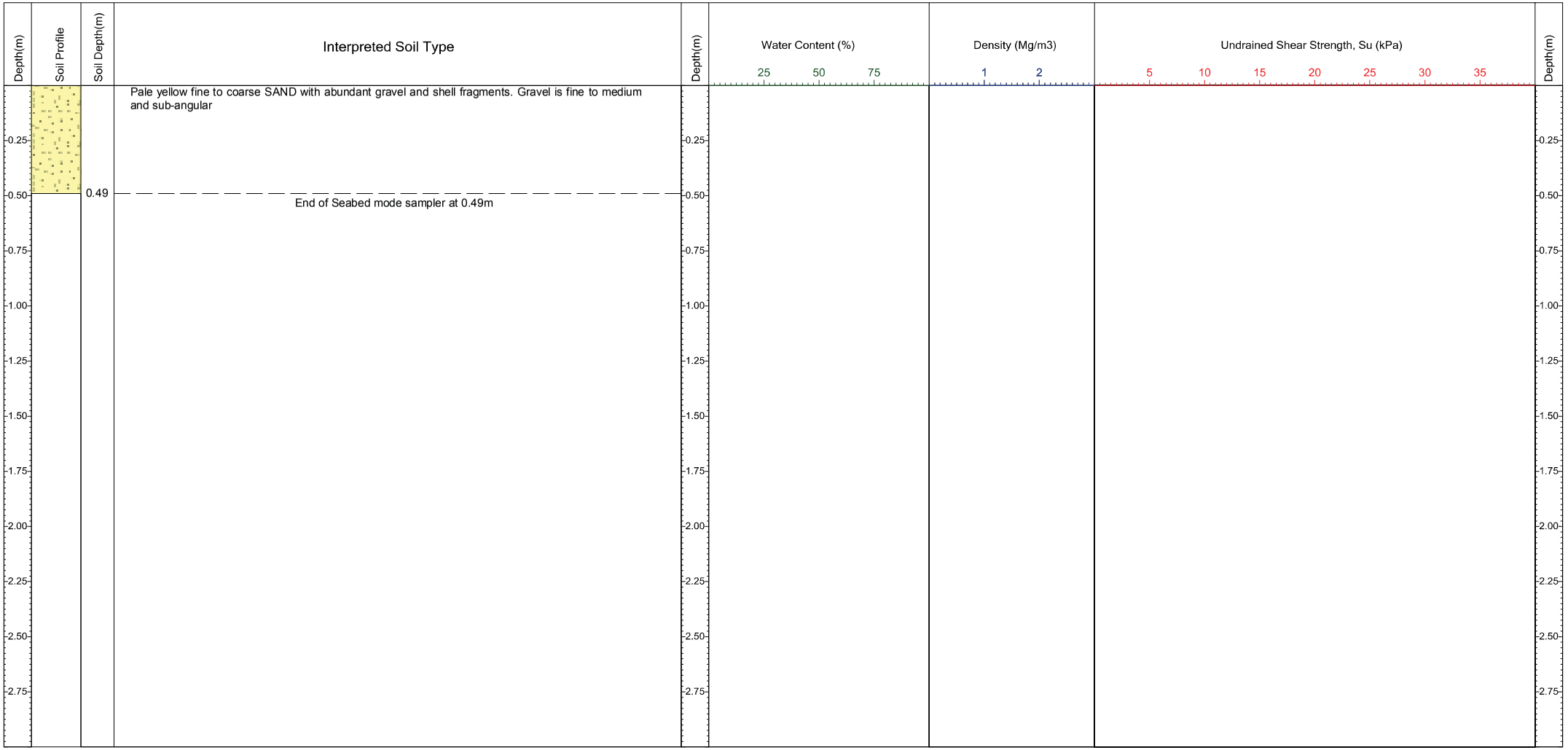
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2480139.0 785686.7	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	35.7 (mLAT)		Preliminary	Draft	Final	
Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	25/11/2016					SACS_FTL_OE_PC019
	Vessel	Ocean Endeavour	Penetration (m)	0.71		PB 25/11/2016			
	Method	Piston corer	Recovery (m)	0.71					

SACS Cable Route Survey

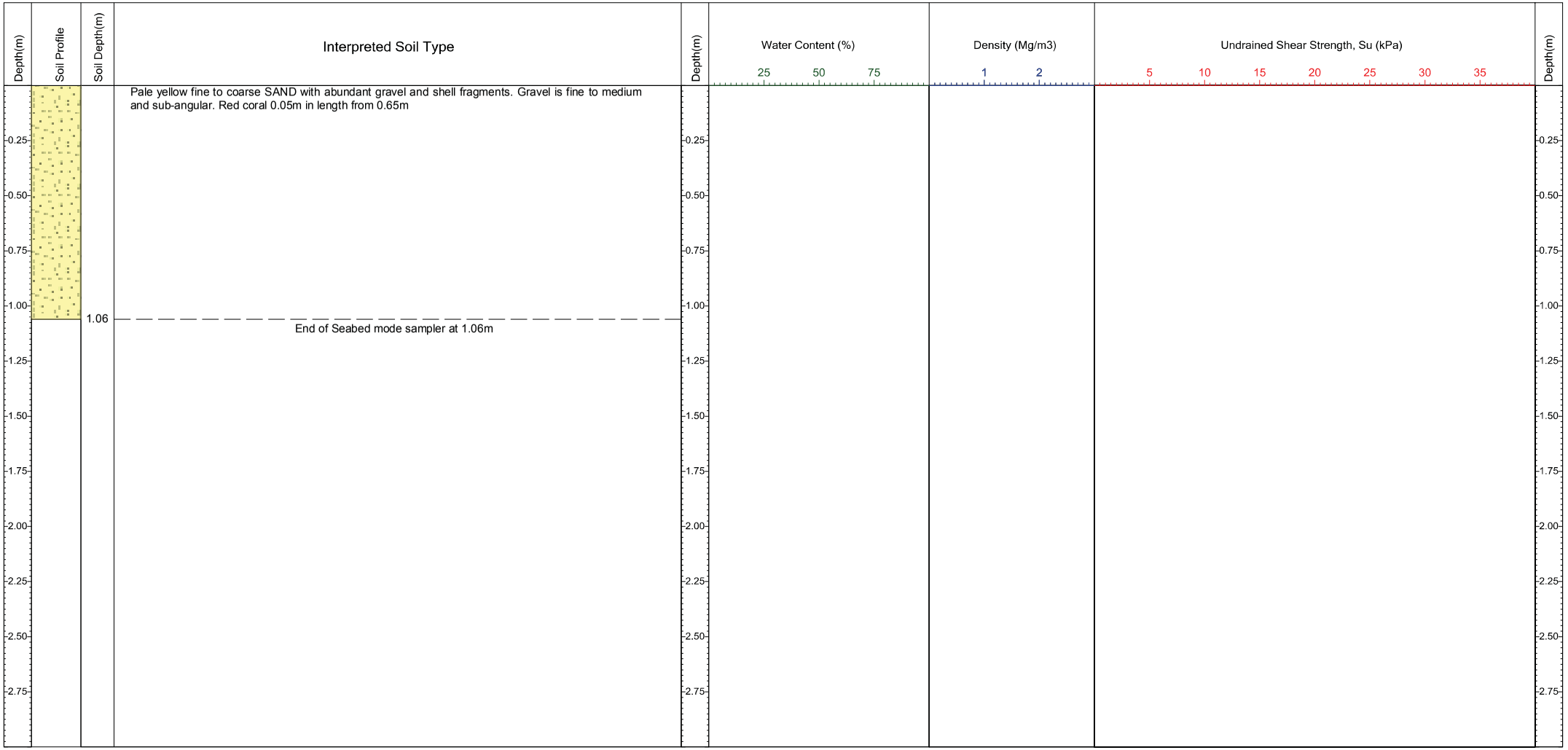
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2484133.9 782818.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum recovery not achieved. Retest required	Contract	10817	Water Depth	43.7 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC008
	Client Name	NEC	Date of Test	18/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.49		PB 18/11/2016			
	Method	Piston corer	Recovery (m)	0.49					

SACS Cable Route Survey

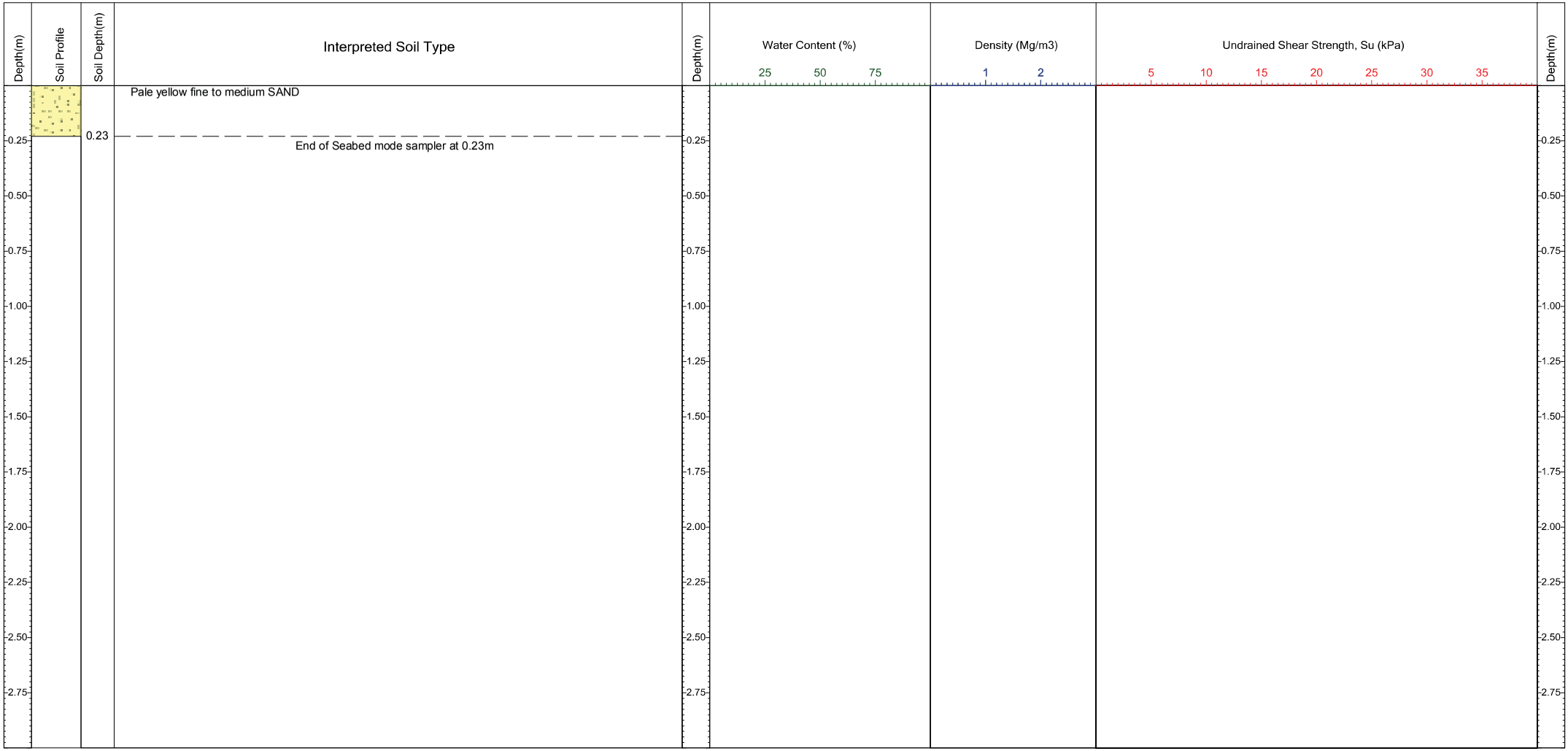
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2484126.5 782816.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	43.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC008A
	Client Name	NEC	Date of Test	18/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.06		PB 18/11/2016			
	Method	Piston corer	Recovery (m)	1.06					

SACS Cable Route Survey

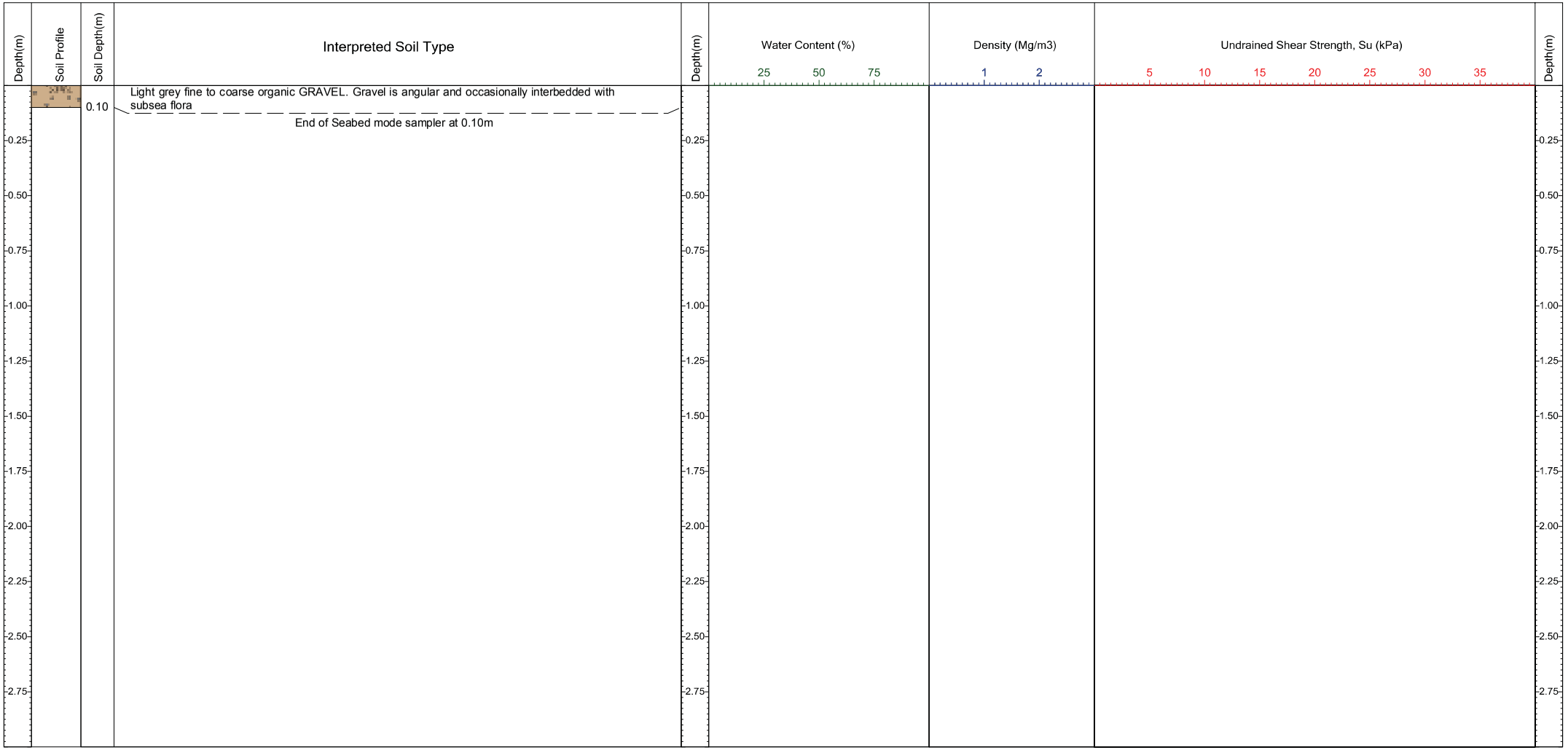
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2488281.6 781617.7	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	46.7 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required. Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	24/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.23		PB 24/11/2016			SACS_FTL_OE_PC028
	Method	Piston corer	Recovery (m)	0.23					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2488843.8 781593.6	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	49.0 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC018A
	Client Name	NEC	Date of Test	24/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.10		PB 24/11/2016			
	Method	Piston corer	Recovery (m)	0.10					

Chart Description Report for
NEC

Project:
SACS Cable System
KP98.063 to KP127.887

Description:
Offshore Chart Description

Survey Date:
08-Oct-2016 to 25-Nov-2016

Project Number:
10817

Report Number:
Offshore 004

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	27-Nov-2016	Rev0	0/27-Nov-2016/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Fortaleza
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	08-Oct-2016 to 25-Nov-2016
Survey Extents	Block 3, 4 and 5, KP98.063 to KP127.887

Equipment Used	
Positioning System	Fugro Starfix HP
Echo Sounder (MBES System)	Simrad EM1002 / EM120
Echo Sounder (SBES System)	Simrad EA400 Combi
Side Scan Sonar	EdgeTech 4200-FS
Sub-Bottom Profiler	Hull-mounted Pinger
Combined Side Scan Sonar & Pinger	Edgetech 2000 TVD
Magnetometer	Geometrix G-882
Cone Penetrometer	Neptune 3000
Vibrocorer	Kullenburg 3m Piston Corer

Due to features encountered during the survey, route development was conducted and survey data were acquired south of the proposed route. Details within these chart description reports are based on the new, proposed route and not on the currently available RPL.

SACS.S1.NU015 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	03° 48.5711' S, 037° 43.2372' W to 03° 46.8288' S, 037° 38.0243' W
Range of Depths	49m to 565m LAT
General Seabed Topography	In the west the seabed undulates as it deepens gently to the east. Once the route reaches the Brazilian Continental Slope the seabed deepens steeply, reaching gradients of up to 43°. The gradient of the slope lessens from 03° 48.2030' S, 037° 39.9326' W, after which the seabed gradually deepens to the northeast, with gradients still above 5°. In the east the route crosses two channels.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling change within this chart. In the west sediments comprise sandy fine to medium gravel with abundant shell fragments, with areas of fine to coarse sand with abundant gravel and shell fragments within this. At the beginning of the Brazilian Continental Slope sediments comprise slightly clayey fine to medium sand. As the slope gradient becomes less steep to the east sediments comprise clayey fine to coarse sand with rare shell fragments. Numerous large features are identified on side scan sonar data on the Brazilian Continental Slope, measuring up to 8.2m height.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise sandy fine to medium gravel with abundant shell fragments or fine to coarse sand with varying levels of shell fragments and gravel in the west. In the east sediments comprise clayey fine to coarse sand with rare shell fragments. Underlying the clayey sand is very soft extremely low strength sandy clay with rare shell fragments, itself underlain by soft extremely low strength clay.
Potential Hazards	Gradients of over 5° and up to 43° are present on the Brazilian Continental Slope.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU016 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	03° 46.9846' S, 037° 38.2958' W to 03° 45.1869' S, 037° 33.0829' W
Range of Depths	483m to 1548m LAT
General Seabed Topography	In the west the seabed deepens down the Brazilian Continental Slope with a fairly constant gradient, below 5°. A wide trench then cuts across the route running north to south, from 03° 47.0880' S, 037° 36.4605' W to 03° 46.8779' S, 037° 35.3189' W. Gradients on both flanks exceed 5°, reaching a maximum of 38° on the western flank. East of the trench the seabed deepens once more with gradients occasionally over 5°, momentarily shoaling over a 25m high mound in the east.
Seabed Features and Obstructions	West of the trench seabed sediments are shown by geotechnical sampling to comprise clayey fine to coarse sand with rare shell fragments. Sonar data were not acquired within the trench due to operational constraints; however a geotechnical sampling location at the bottom of the trench indicated sediments comprise a veneer of fine to medium sand. East of the trench sediments comprise very soft extremely low strength slightly sandy clay, becoming clayey fine to medium sand with rare gravel further down the slope.
Shallow Soils	Shallow soils are shown by geotechnical sampling in the west to comprise clayey fine to coarse sand with rare shell fragments. Underlying this is very soft extremely low strength sandy clay with rare shell fragments, itself underlain by soft extremely low strength sandy clay. At the base of the trench sediments comprise a veneer of fine to medium sand, underlain by fine to coarse sand with occasional gravel and frequent shell fragments. East of the trench sediments comprise very soft extremely low strength slightly sandy clay. Underlying this is very soft extremely low strength slightly sandy clay, underlain by soft extremely low to very low strength clay. Further down the slope sediments comprise clayey fine to medium sand with rare gravel, underlain again by very soft extremely low to very low strength clay.
Potential Hazards	A wide trench crossing the route exhibits seabed gradients of up to 38° on its flanks.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU017 **Offshore North-Up Chart Description** **Scale 1:10,000**

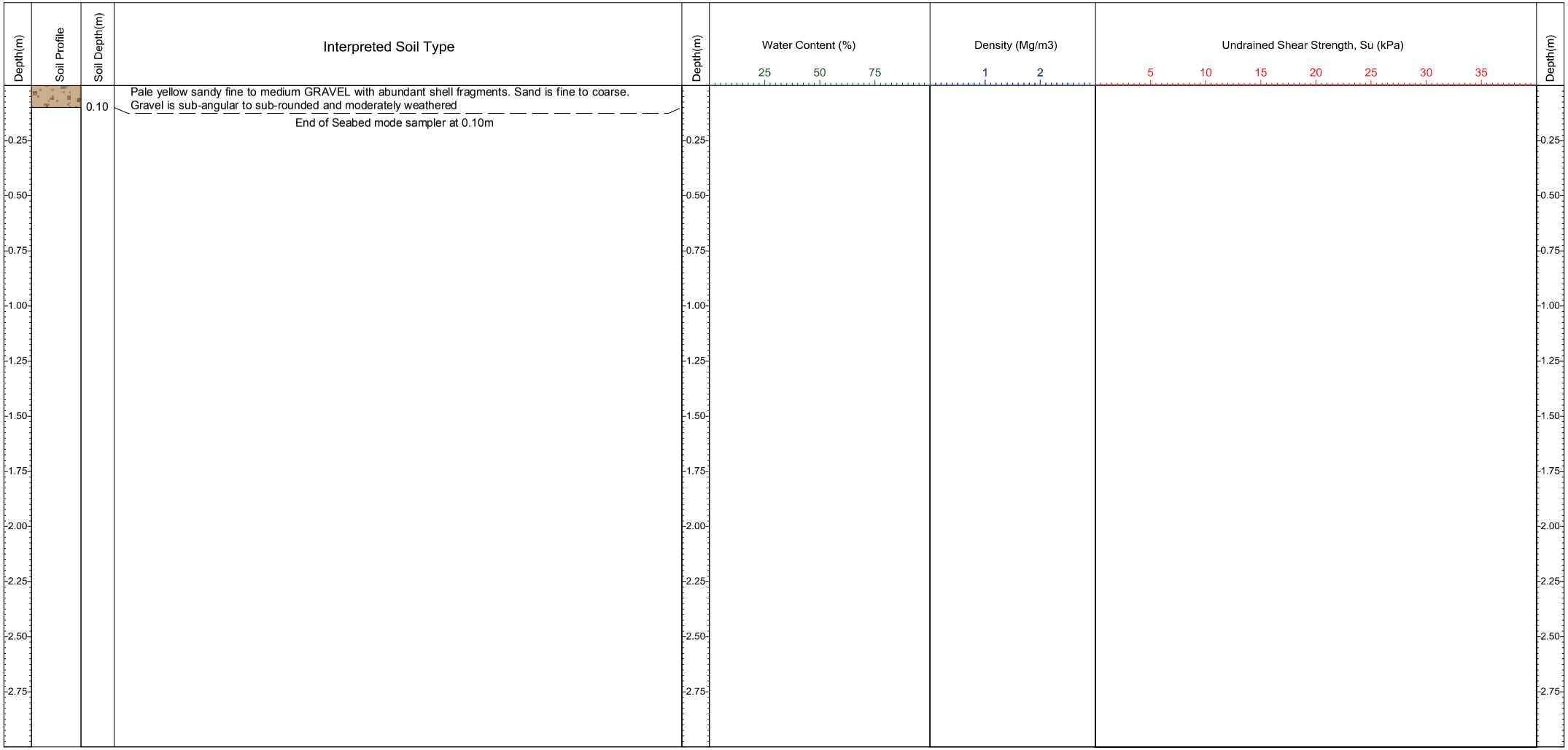
Chart Range	03° 45.1884' S, 037° 33.3544' W to 03° 45.5430' S, 037° 28.1415' W
Range of Depths	934m to 1831m LAT
General Seabed Topography	The seabed deepens to the east as the route progresses down the Brazilian Continental Slope, whilst dropping down three ridges that produce seabed gradients above 5°.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise clayey fine to medium sand with rare gravel.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise clayey fine to medium sand with rare gravel, underlain by very soft extremely low to very low strength clay with rare gravel and occasional shell fragments.
Potential Hazards	Gradients of over 5° are present on ridges down the Brazilian Continental Slope. The maximum seabed gradient identified on these ridges is 20°.
Cable Crossings	The survey route crosses no cables.

APPENDICES

APPENDIX A PISTON CORE LOGS

SACS Cable Route Survey

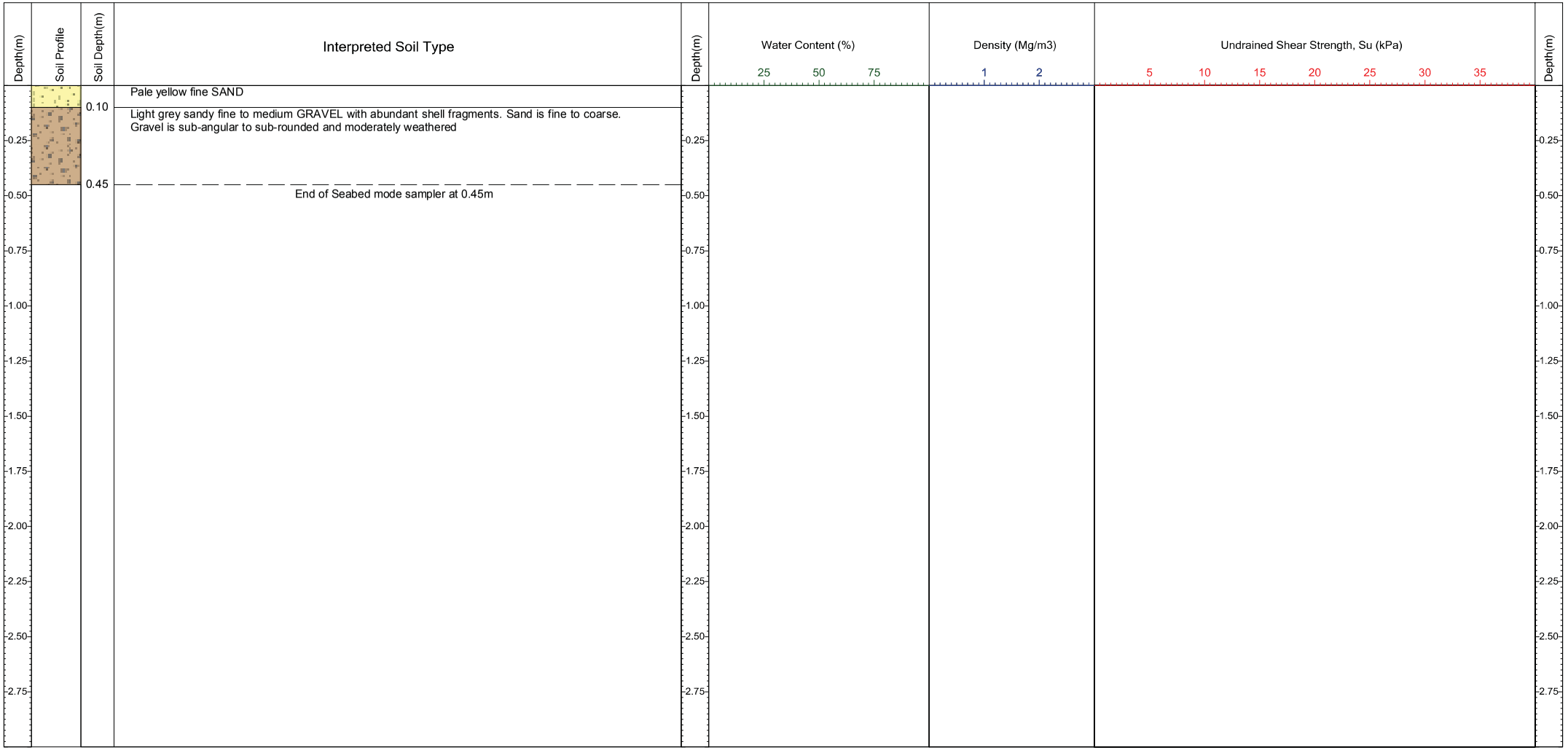
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2493649.9 781663.3	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	64.9 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required	Client Name	NEC	Date of Test	24/11/2016					SACS_FTL_OE_PC017
	Vessel	Ocean Endeavour	Penetration (m)	0.10		PB 24/11/2016			
	Method	Piston corer	Recovery (m)	0.10					

SACS Cable Route Survey

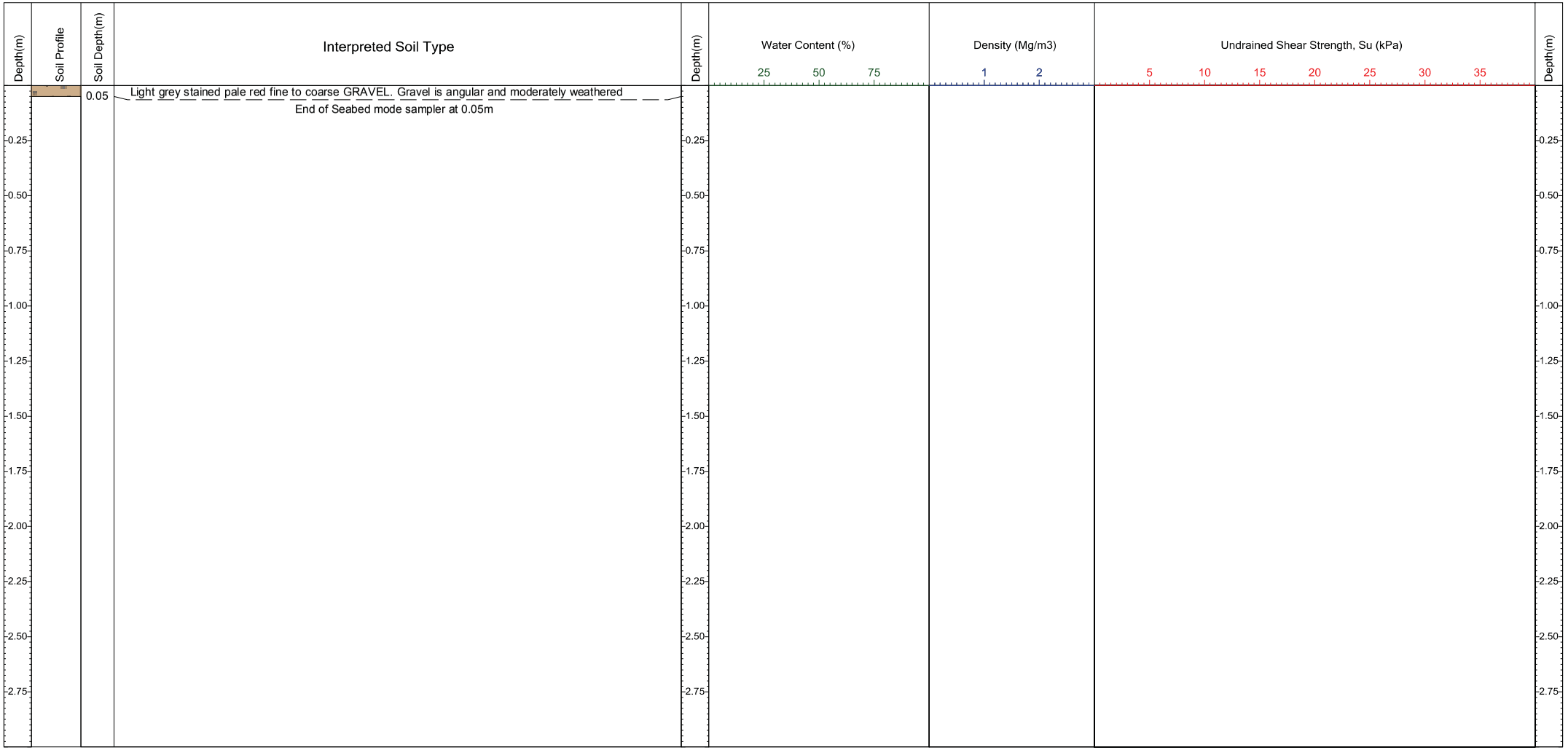
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2493648.0 781663.6	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	64.8 (mLAT)		Preliminary	Draft	Final	
Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	24/11/2016					SACS_FTL_OE_PC017A
	Vessel	Ocean Endeavour	Penetration (m)	0.45		PB 24/11/2016			
	Method	Piston corer	Recovery (m)	0.45					

SACS Cable Route Survey

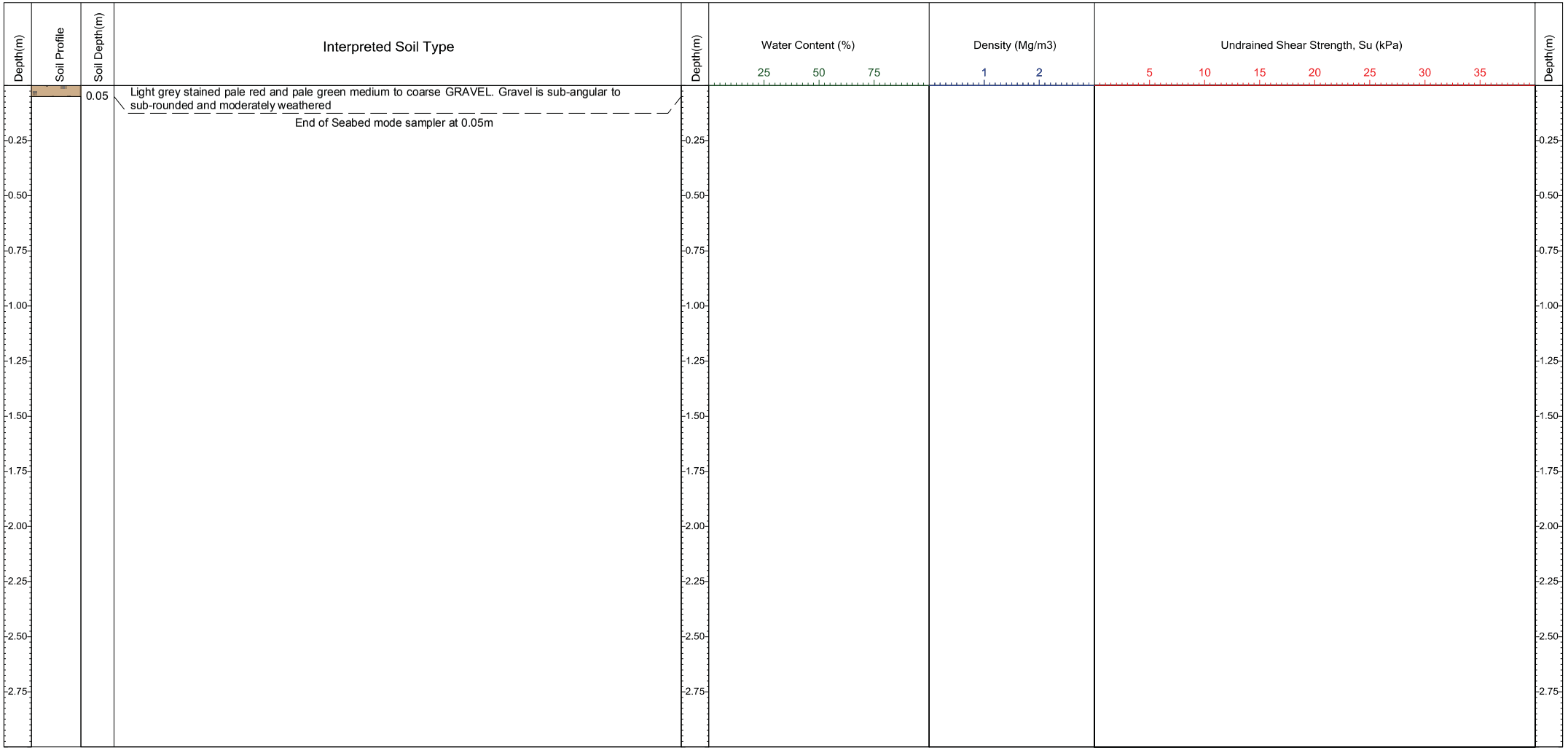
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2493781.9 781624.8	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	68.3 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required	Client Name	NEC	Date of Test	20/11/2016					SACS_FTL_OE_PC009
	Vessel	Ocean Endeavour	Penetration (m)	0.05		JT 20/11/2016			
	Method	Piston corer	Recovery (m)	0.05					

SACS Cable Route Survey

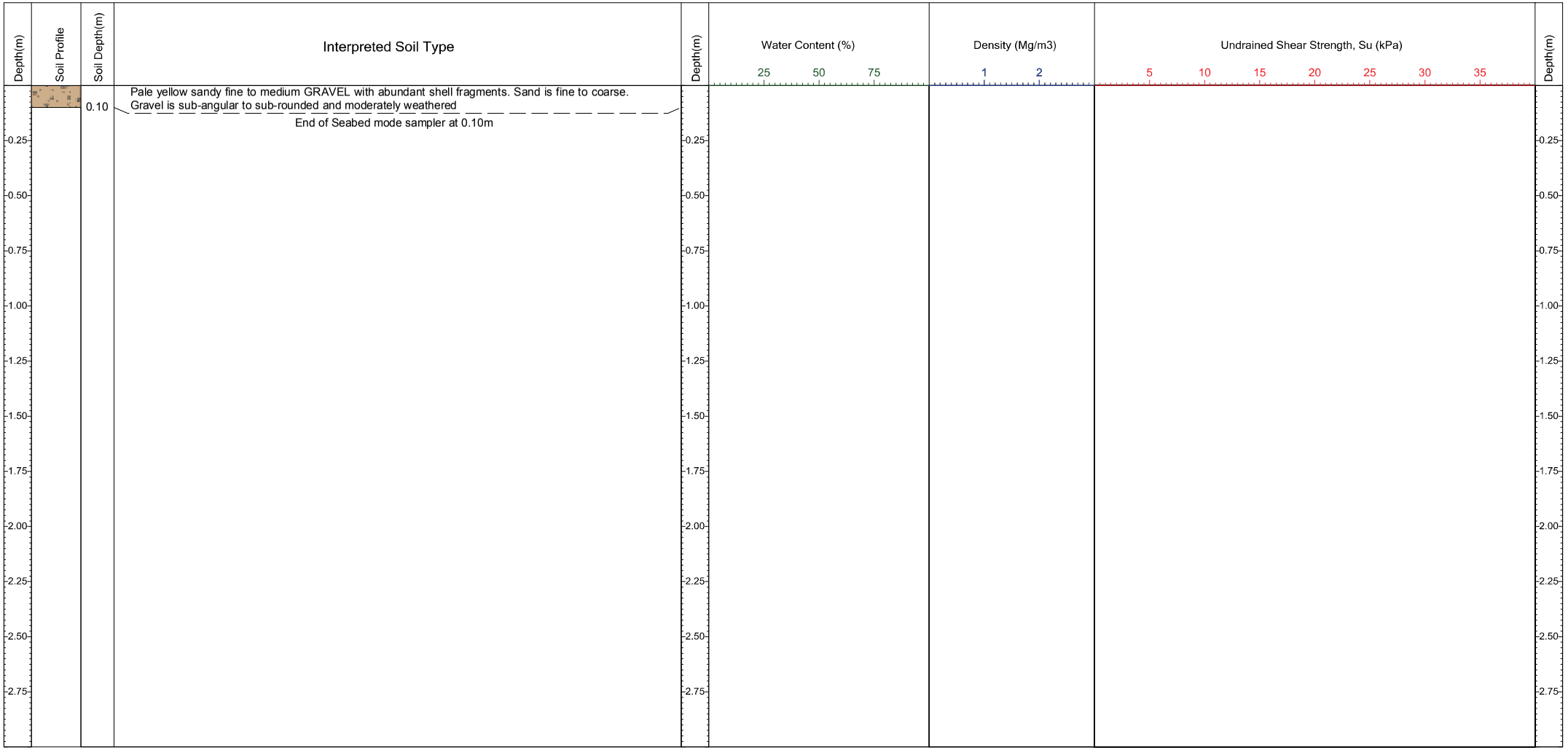
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2493791.9 781625.4	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	68.2 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC009A
	Client Name	NEC	Date of Test	20/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.05		JT 20/11/2016			
	Method	Piston corer	Recovery (m)	0.05					

SACS Cable Route Survey

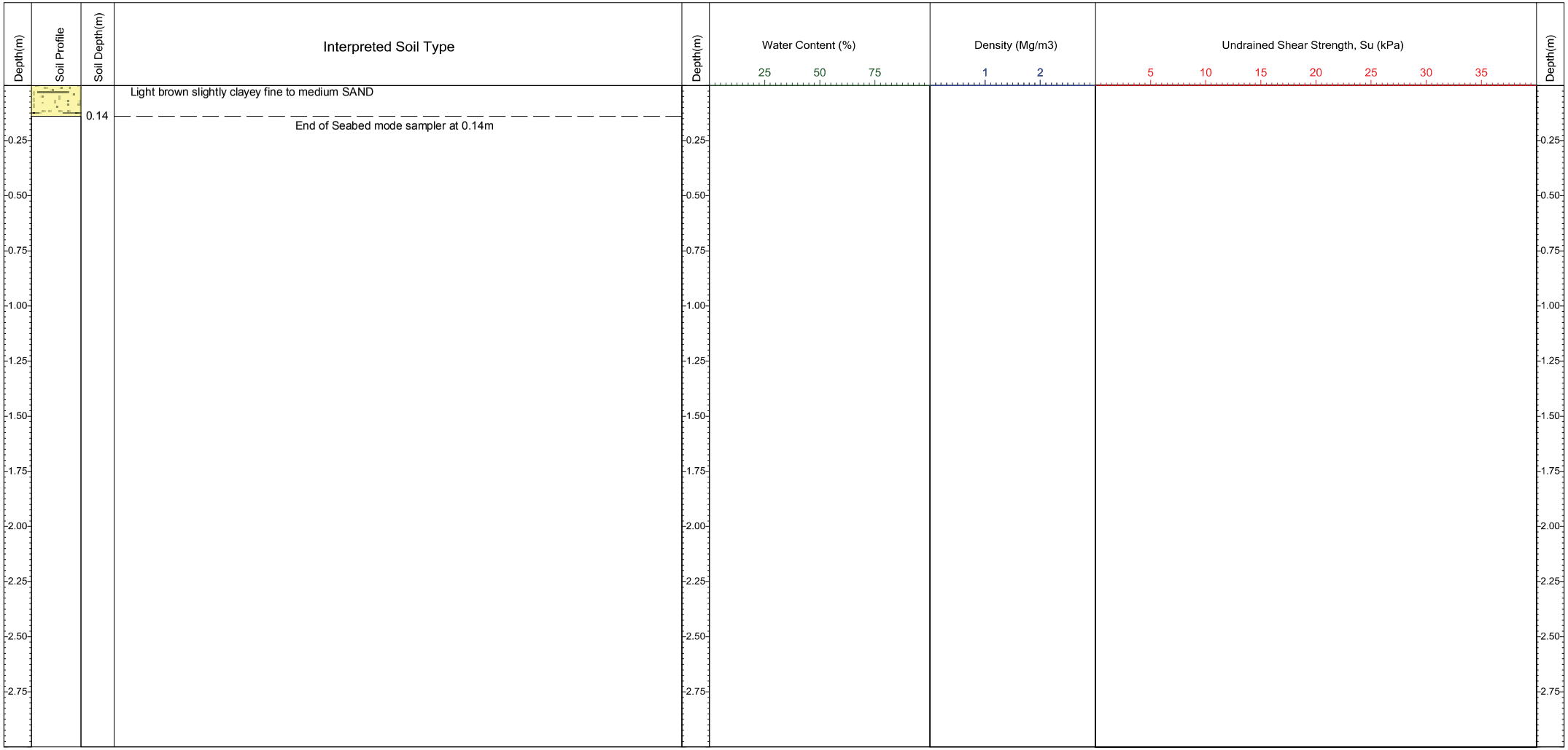
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2494919.3 782023.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	74.5 (mLAT)		Preliminary	Draft	Final	
Minimum recovery not achieved. Retest required	Client Name	NEC	Date of Test	24/11/2016					SACS_FTL_OE_PC016
	Vessel	Ocean Endeavour	Penetration (m)	0.10		PB 24/11/2016			
	Method	Piston corer	Recovery (m)	0.10					

SACS Cable Route Survey

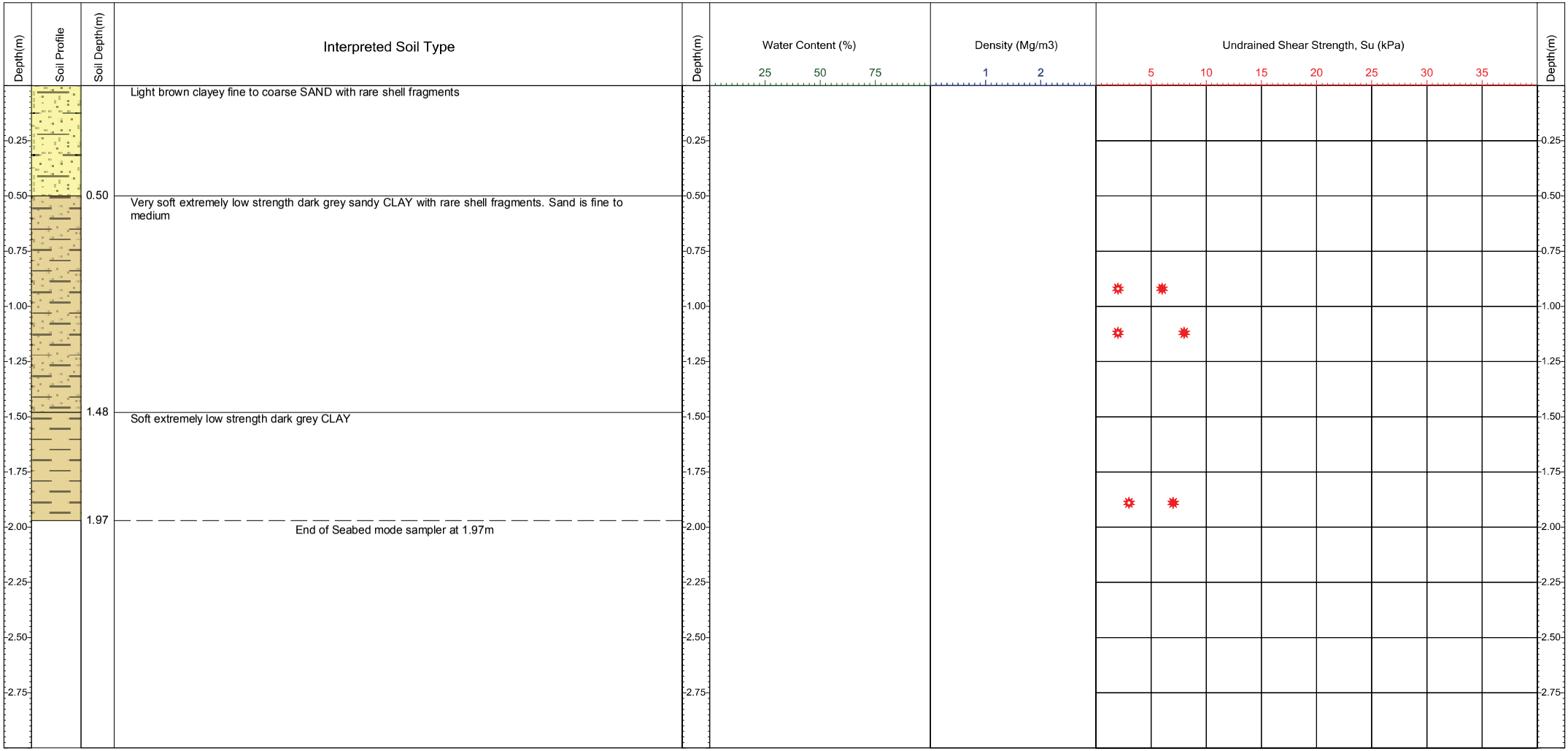
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2496890.5 782719.3	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	413.2 (mLAT)		Preliminary	Draft	Final	
Core sample not split open. Description obtained from end logging only	Client Name	NEC	Date of Test	24/11/2016					SACS_FTL_OE_PC015C
	Vessel	Ocean Endeavour	Penetration (m)	0.14		PB 24/11/2016			
	Method	Piston corer	Recovery (m)	0.14					

SACS Cable Route Survey

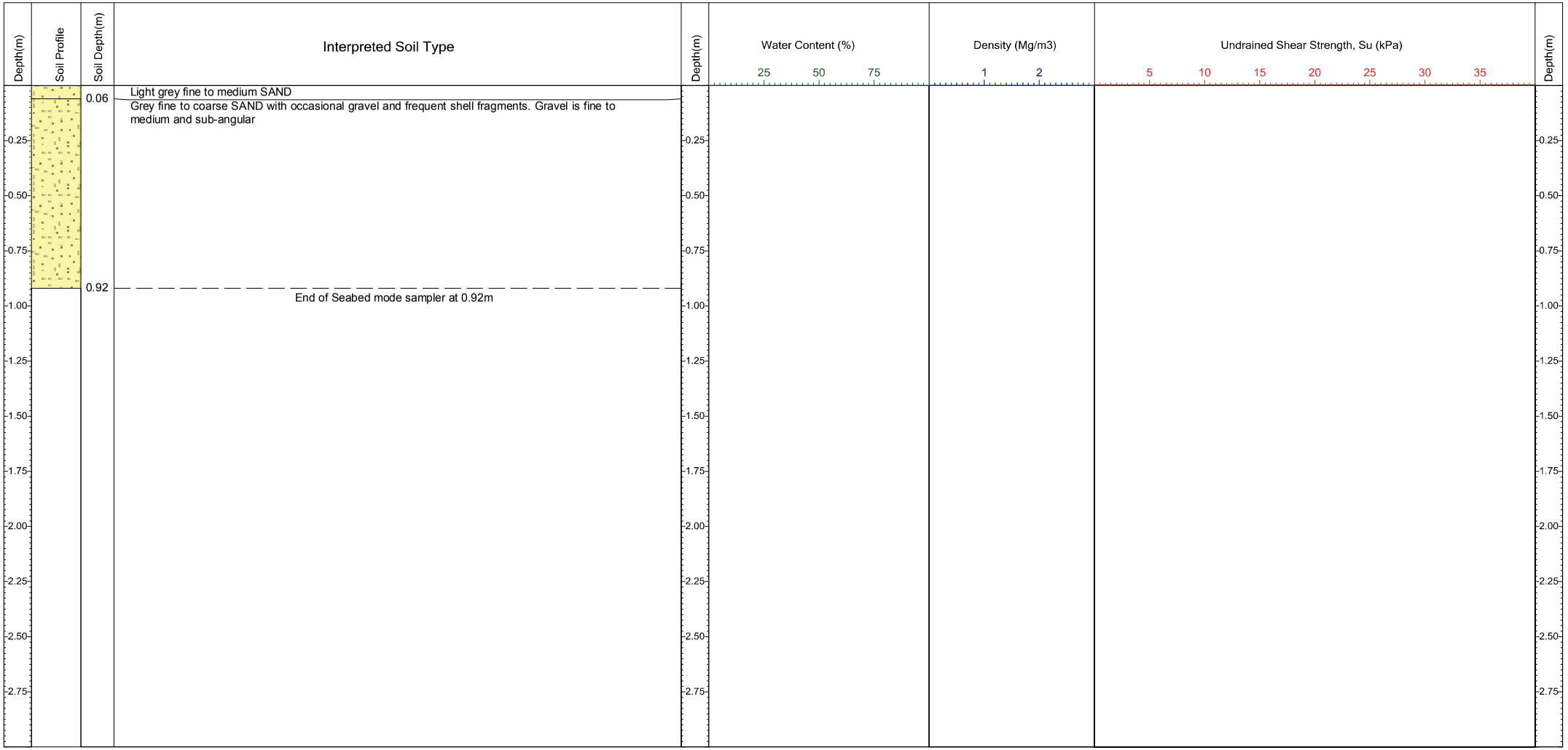
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2499941.4 783771.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split. Descriptions obtained from end logging only	Contract	10817	Water Depth	570.8 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC014
	Client Name	NEC	Date of Test	24/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.97		JT 24/11/2016			
	Method	Piston corer	Recovery (m)	1.97					

SACS Cable Route Survey

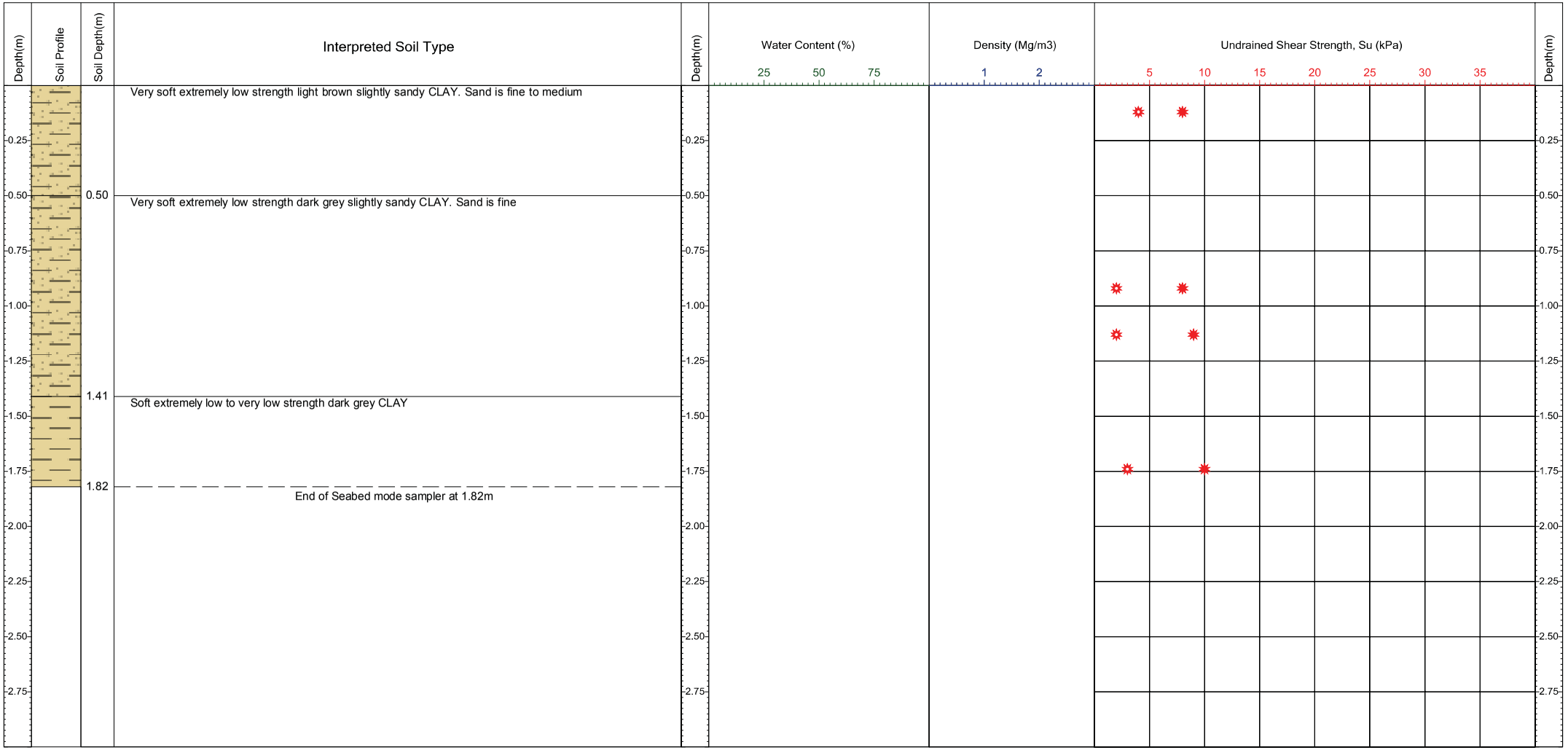
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2503404.5 784566.3	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	1130.0 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC010A
	Client Name	NEC	Date of Test	20/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	0.92		PB 20/11/2016			
	Method	Piston corer	Recovery (m)	0.92					

SACS Cable Route Survey

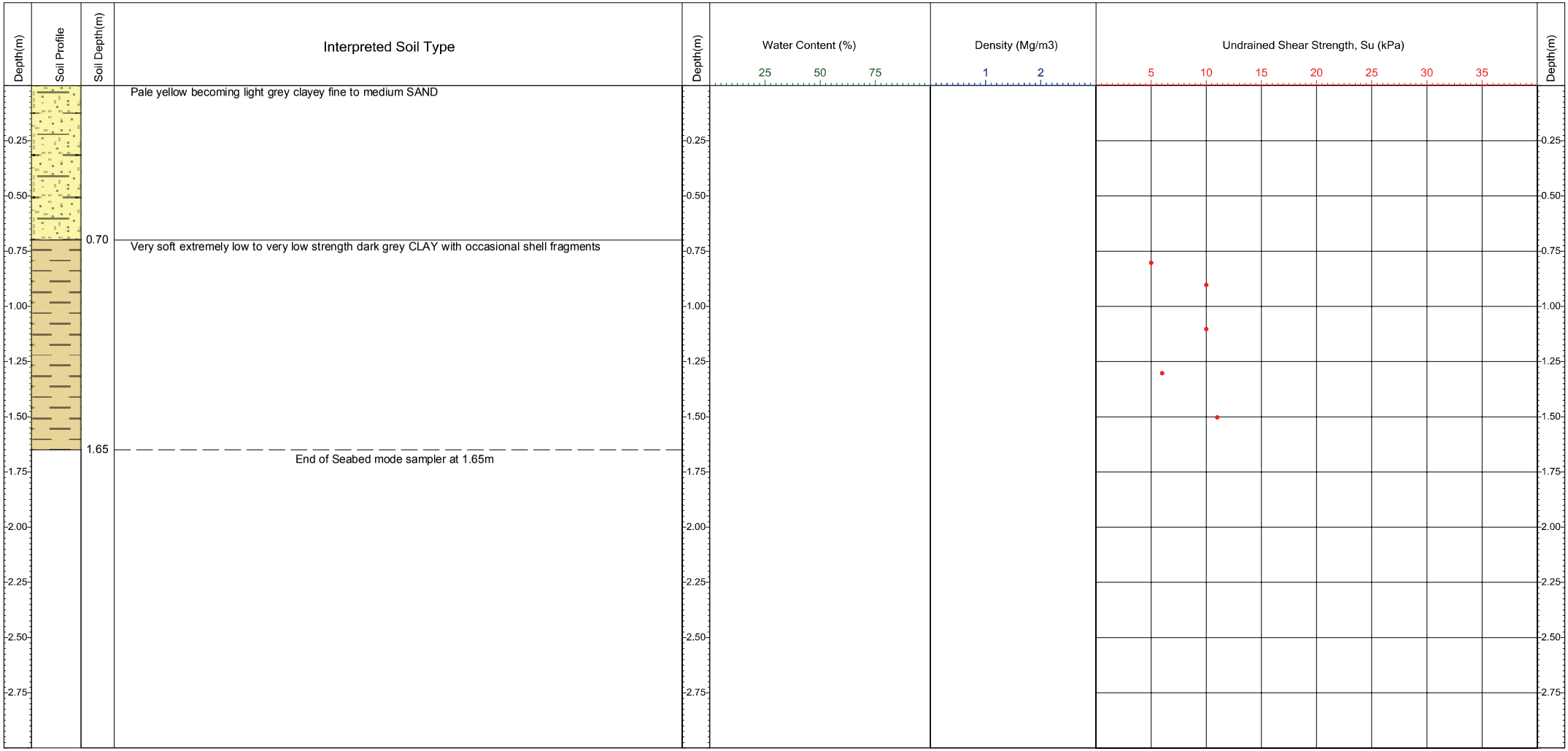
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2504385.2 784735.1	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Core sample not split, description obtained from end logging only	Contract	10817	Water Depth	828.3 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC013
	Client Name	NEC	Date of Test	24/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.82		JT 24/11/2016			
	Method	Piston corer	Recovery (m)	1.82					

SACS Cable Route Survey

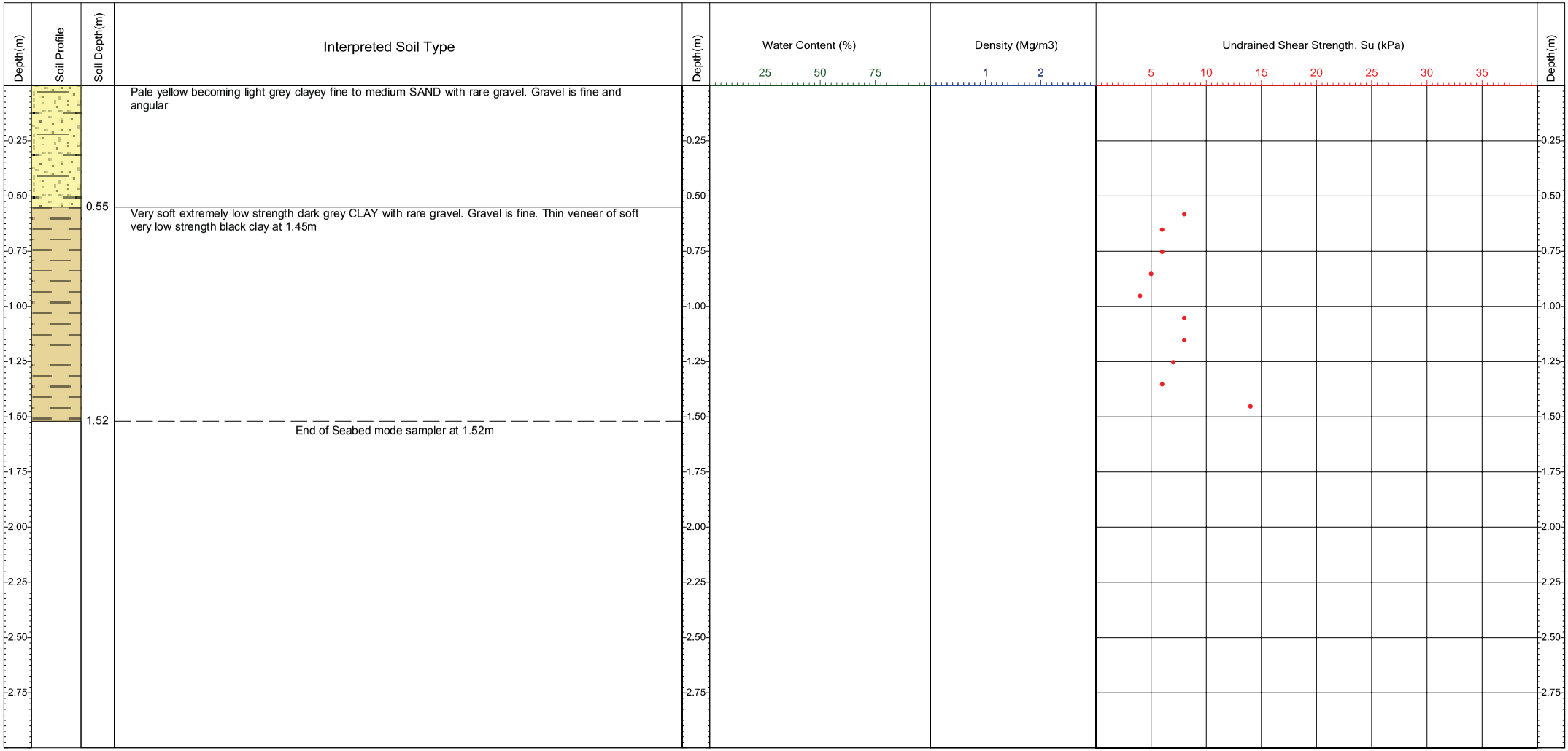
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2507719.4 785302.2	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
	Contract	10817	Water Depth	1031.7 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC012
	Client Name	NEC	Date of Test	20/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.65		PB 20/11/2016			
	Method	Piston corer	Recovery (m)	1.65					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	2512317.3 786092.4	CRS: WGS 84 Mercator (7N 53W)	QC Status			Core Location
Minimum sample recovery achieved	Contract	10817	Water Depth	1549.7 (mLAT)		Preliminary	Draft	Final	SACS_FTL_OE_PC011
	Client Name	NEC	Date of Test	21/11/2016					
	Vessel	Ocean Endeavour	Penetration (m)	1.52		JT 21/11/2016			
	Method	Piston corer	Recovery (m)	1.52					

Chart Description Report for
NEC

Project:
SACS Cable System
KP837.071 to KP1025.376

Description:
Offshore Chart Description

Survey Date:
30-Oct-2016 to 31-Oct-2016

Project Number:
10817

Report Number:
Offshore 001

Report Status:
Revision 2

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	S Kilburn
	Surveying	A Villena-Lincoln
Authorisation	Approved	..... C Buckmaster

Revision	Date	Title	Report Ref
2	03-Jan-2017	Rev2	2/03-Jan-2017/Rev2

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	30-Oct-2016 to 31-Oct-2016	
Survey Extents	KP837.071 to KP1025.376	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU026 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 47.4119' S, 031° 34.4227' W to 02° 48.6681' S, 030° 42.2938' W

Range of Depths 4363m to 4740m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one out of service telegraph cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Monrovia-Pernambuco (Recife))	OOS	02°	48.534'	S	030°	47.860'	W	4690	924.478	LW

SACS.S1.NU027 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 48.6027' S, 030° 45.0088' W to 02° 50.8269' S, 029° 52.8799' W

Range of Depths 4704m to 4914m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses no cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Coaxial BRACAN 1	OOS	02°	49.227'	S	030°	19.096'	W	4845	977.795	LW
ATLANTIS 2 seg 5	IS	02°	50.070'	S	030°	04.044'	W	4875	1005.737	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP467.175 to KP842.104

Description:
Offshore Chart Description

Survey Date:
31-Oct-2016 to 01-Nov-2016

Project Number:
10817

Report Number:
Offshore 002

Report Status:
Revision 2

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	S Kilburn
	Surveying	A Villena-Lincoln
Authorisation	Approved	..... C Buckmaster

Revision	Date	Title	Report Ref
2	03-Jan-2017	Rev2	2/03-Jan-2017/Rev2

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	31-Oct-2016 to 01-Nov-2016	
Survey Extents	KP467.175 to KP842.104	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU022 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 45.6316' S, 034° 52.0783' W to 02° 45.8451' S, 033° 59.9494' W

Range of Depths 3851m to 4109m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one planned cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SEABRAS-1	P	02°	44.311'	S	034°	49.464'	W	3887	473.692	LW

SACS.S1.NU023 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 45.4425' S, 034° 02.6644' W to 02° 45.1102' S, 033° 10.5355' W

Range of Depths 4061m to 4211m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses one planned cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
BRUSA Seg 7	P	02°	46.501'	S	033°	36.614'	W	4151	611.426	LW

SACS.S1.NU024 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 45.0482' S, 033° 13.2505' W to 02° 46.2862' S, 032° 21.1216' W

Range of Depths 4132m to 4338m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east. Small mounds are found along the route, no hazardous gradients are found.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses two out of service telegraph cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (St.Vincent - Pernambuco (Recife) No1)	OOS	02°	45.971'	S	032°	34.173'	W	4236	727.408	LW
Telegraph (St.Vincent - Pernambuco (Recife) No1)	OOS	02°	46.036'	S	032°	31.487'	W	4246	732.387	LW

SACS.S1.NU025 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 46.2207' S, 032° 23.8366' W to 02° 47.4773' S, 031° 31.7077' W

Range of Depths 4271m to 4418m LAT

General Seabed Topography The seabed gently undulates as it deepens towards the east. Small mounds are found along the route, no hazardous gradients are found.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses three out of service telegraph cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (St.Vincent - Pernambuco (Recife) No1)	OOS	02°	46.385'	S	032°	17.029'	W	4313	759.188	LW
Telegraph (St.Vincent - Fernando de Noronha)	OOS	02°	46.546'	S	032°	10.335'	W	4326	771.597	LW
Telegraph (Fernando de Noronha-Dakar)	OOS	02°	47.288'	S	031°	39.562'	W	4375	828.639	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP365.909 to KP472.807

Description:
Offshore Chart Description

Survey Date:
03-Nov-2016 to 04-Nov-2016

Project Number:
10817

Report Number:
Offshore 003

Report Status:
Revision 2

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	S Kilburn
	Surveying	A Villena-Lincoln
Authorisation	Approved	..... C Buckmaster

Revision	Date	Title	Report Ref
2	03-Jan-2017	Rev2	2/03-Jan-2017/Rev2

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	03-Nov-2016 to 04-Nov-2016
Survey Extents	KP365.909 to KP472.807

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU021 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 03° 09.1654' S, 035° 37.1039' W to 02° 44.2598' S, 034° 49.3627' W

Range of Depths 3567m to 3916m LAT

General Seabed Topography The seabed gently deepens towards the northeast before heading east. In the centre the route drops down a small ridge with gradients up to 3°.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses two in service cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
GlobeNet seg 10	IS	03°	03.282'	S	035°	30.899'	W	3659	382.565	LW
ATLANTIS 2 seg 4	IS	02°	56.258'	S	035°	25.868'	W	3709	398.516	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP280.617 to KP394.311

Description:
Offshore Chart Description

Survey Date:
03-Nov-2016 to 13-Nov-2016

Project Number:
10817

Report Number:
Offshore 004

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	03-Nov-2016 to 13-Nov-2016	
Survey Extents	KP280.617 to KP394.311	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU020 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 03° 40.4228' S, 036° 06.9508' W to 02° 57.8554' S, 035° 27.0121' W

Range of Depths 3146m to 3773m LAT

General Seabed Topography The seabed gently deepens towards the northeast, with a small channel and numerous small depressions in the centre. Seabed gradients reach 6° on the northern flank of the small channel. In the northeast the route drops down a small ridge with gradients up to 3°.

Potential Hazards No hazardous seabed gradients are observed.

Cable Crossings The survey route crosses three in service cables, two out of service telegraph cables and one planned cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Fortaleza (Ceara)-Recife (Pernambuco))	OOS	03°	34.094'	S	035°	53.357'	W	3373	308.934	LW
SAC seg B	IS	03°	28.426'	S	035°	47.436'	W	3469	324.640	LW
AMX-1 seg 3.1	IS	03°	18.535'	S	035°	44.342'	W	3508	343.883	LW
MONET Seg3 BU1 Santos-2	P	03°	18.535'	S	035°	44.342'	W	3508	343.883	LW
Telegraph (Sao Luiz -Recife)	OOS	03°	15.516'	S	035°	43.257'	W	3523	349.970	LW
GlobeNet seg 10	IS	03°	03.282'	S	035°	30.899'	W	3659	382.565	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP212.566 to KP312.481

Description:
Offshore Chart Description

Survey Date:
13-Nov-2016 to 14-Nov-2016

Project Number:
10817

Report Number:
Offshore 005

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	13-Nov-2016 to 14-Nov-2016	
Survey Extents	KP212.566 to KP312.481	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU019 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

03° 43.9088' S, 036° 43.4654' W to 03° 33.1537' S, 035° 51.3364' W

Range of Depths

2461m to 3464m LAT

General Seabed Topography

The seabed gently deepens towards the east then northeast. The edge of a mound is located north of the proposed route in the west, upon which seabed gradients reach more than 5°.

A channel, running southwest to northeast, is crossed in the west. Seabed gradients reach more than 5° on the flanks of this channel at 03° 43.9674' S, 036° 40.7212' W and 03° 44.0358' S, 036° 37.5716' W.

Another channel is crossed in the centre, also running southwest to northeast. Seabed gradients reach more than 5° on the flanks of this channel at 03° 42.3997' S, 036° 22.0530' W and 03° 41.8177' S, 036° 17.3818' W.

Potential Hazards

Seabed gradients reach up to 31° on the edge of a mound north of the proposed route. Two channels exhibit gradients above 5°, with seabed gradients reaching up to 10° on the flanks of the western channel and up to 6° on the flanks of the central channel.

Cable Crossings

The survey route crosses one out of service telegraph cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Fortaleza (Ceara)-Recife (Pernambuco))	OOS	03°	34.094'	S	035°	53.357'	W	3373	308.934	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP117.889 to KP217.593

Description:
Offshore Chart Description

Survey Date:
14-Nov-2016 to 24-Nov-2016

Project Number:
10817

Report Number:
Offshore 006

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	D Jones
Authorisation	Approved	…… P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	14-Nov-2016 to 24-Nov-2016
Survey Extents	KP117.889 to KP217.593

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU018 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

03° 45.1857' S, 037° 32.8793' W to 03° 43.9521' S, 036° 40.7503' W

Range of Depths

1007m to 2876m LAT

General Seabed Topography

The seabed deepens towards the east, steeply to begin with before becoming gentler. After dropping down a steep ridge in the west the route then crosses four ridge features that protrude into the cable corridor from the south. Each of these exhibit gradients above 5° on their flanks.

After the ridges, in the central portion of the chart the route crosses three channels, all traversing the corridor from southwest to northeast. Seabed gradients reach more than 5° on the flanks of these channels.

Two mounds in the northeast and a channel in the southeast, with gradients of more than 5° on their edges, also extend into the proposed corridor without actually reaching the proposed cable route.

Potential Hazards

Seabed gradients reach more than 5° at numerous times within this chart.

The seabed steeply deepens in the west, reaching a maximum of 30° at 03° 45.2034' S, 037° 30.7426' W. The route then drops down a ridge at 03° 45.6630' S, 037° 28.7236' W, where seabed gradients reach up to 30°.

Seabed gradients reach more than 5° on the edge of ridges at 03° 45.1429' S, 037° 27.1421' W, 03° 44.7795' S, 037° 23.5077' W, 03° 44.7776' S, 037° 22.2091' W and 03° 44.7723' S, 037° 18.7491' W. The maximum gradient encountered on these four features is 25°.

Seabed gradients reach more than 5° on the flanks of three channels that cross the route in the centre of the chart. In the first channel, between 03° 41.2548' S, 037° 10.2662' W and 03° 41.4514' S, 037° 09.1760' W, gradients reach up to 12°. In the second channel, between 03° 42.2542' S, 037° 04.7225' W and 03° 42.5304' S, 037° 03.1900' W, gradients reach up to 12°. In the third channel, between 03° 42.9381' S, 037° 00.9272' W and 03° 43.3105' S, 036° 58.8598' W, gradients reach up to 16°.

Seabed gradients on two mounds in the northeast reach up to 31°, while a channel in the southeast exhibits gradients of up to 12° on its flanks.

Cable Crossings

The survey route crosses three in service cables and one out of service telegraph cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
GlobeNet seg 10	IS	03°	45.267'	S	037°	27.436'	W	1813	129.289	SA

GlobeNet seg 6	IS	03°	45.266'	S	037°	27.434'	W	1813	129.294	SA
Telegraph (Fortaleza (Ceara)-Natal)	OOS	03°	44.605'	S	037°	18.175'	W	2209	146.644	LWS
SAM seg F	IS	03°	42.665'	S	037°	13.621'	W	2377	155.984	LWS

Chart Description Report for
NEC

Project:
SACS Cable System
KP1020.333 to KP1208.826

Description:
Offshore Chart Description

Survey Date:
31-Oct-2016 to 27-Dec-2016

Project Number:
10817

Report Number:
Offshore 007

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	31-Oct-2016 to 27-Dec-2016
Survey Extents	KP1020.333 to KP1208.826

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU028 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 02° 50.6424' S, 029° 55.5949' W to 02° 54.1759' S, 029° 03.4660' W

Range of Depths 4782m to 5003m LAT

General Seabed Topography The seabed gently undulates whilst remaining a fairly constant depth.

Potential Hazards There are no hazardous seabed gradients within this chart.

Cable Crossings The survey route crosses one out of service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
ATLANTIS_1	OOS	02°	52.530'	S	029°	27.757'	W	4888	1072.035	

SACS.S1.NU029 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 53.9918' S, 029° 06.1810' W to 02° 56.0875' S, 028° 14.0521' W
Range of Depths	4583m to 5096m LAT
General Seabed Topography	The seabed undulates whilst gently deepening to the east. A ridge crosses the route running WSW to ENE in the west, exhibiting gradients above 5°. The ridge rises approximately 400m from the surrounding seabed at its peak near the centre of the corridor, but becomes far less prominent with lower gradients in the north and south of the corridor.
Potential Hazards	Gradients above 5° and up to 32° are on the flanks of a ridge that crosses the proposed cable route between 02° 54.7577' S, 028° 54.8210' W and 02° 54.8670' S, 028° 53.2006' W.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP1203.796 to KP1391.964

Description:
Offshore Chart Description

Survey Date:
27-Dec-2016 to 28-Dec-2016

Project Number:
10817

Report Number:
Offshore 008

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	27-Dec-2016 to 28-Dec-2016
Survey Extents	KP1203.796 to KP1391.964

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU030 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 56.0875' S, 028° 16.7671' W to 02° 56.0875' S, 027° 24.6382' W
Range of Depths	4942m to 5211m LAT
General Seabed Topography	The seabed undulates whilst gently deepening to the east. The route crosses three mounds/ridges, two in the centre and one in the east. Seabed gradients above 5°are identified on the eastern flank of the central mound.
Potential Hazards	Seabed gradients reach up to 8° on the eastern flank of a mound in the centre of the route.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU031 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 56.0875' S, 027° 27.3532' W to 02° 55.2906' S, 026° 35.2243' W
Range of Depths	5013m to 5392m LAT
General Seabed Topography	The seabed undulates whilst very gradually deepening to the east. The route crosses three mounds/ridges. Seabed gradients are above 5° on the flanks of all three features, with the central ridge exhibiting the highest gradients.
Potential Hazards	Gradients above 5° and up to 21° are on the flanks of a ridge that crosses the proposed cable route between 02° 55.9100' S, 026° 57.6437' W and 02° 55.8026' S, 026° 52.7714' W.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP1386.932 to KP1575.146

Description:
Offshore Chart Description

Survey Date:
28-Dec-2016 to 29-Dec-2016

Project Number:
10817

Report Number:
Offshore 009

Report Status:
Revision 1

Gardline

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	28-Dec-2016 to 29-Dec-2016
Survey Extents	KP1386.932 to KP1575.146

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU032 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 55.3593' S, 026° 37.9393' W to 02° 54.0401' S, 025° 45.8104' W
Range of Depths	5073m to 5465m LAT
General Seabed Topography	The seabed undulates whilst remaining a fairly constant depth. Numerous ridges and mounds are in the cable corridor, all with gradients above 5°.
Potential Hazards	Seabed gradients reach up to 30° on a small but steep mound in the centre of the chart, while other mounds exhibit gradients above 5°. The west flank of a ridge in the east exhibits seabed gradients of up to 31°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU033 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 54.1088' S, 025° 48.5254' W to 02° 52.7896' S, 024° 56.3965' W
Range of Depths	5039m to 5604m LAT
General Seabed Topography	The seabed undulates whilst remaining a fairly constant depth. Numerous ridges and mounds are in the cable corridor, all with gradients above 5°.
Potential Hazards	Seabed gradients reach commonly exceed 5° on ridges crossing the proposed cable route, reaching up to 35° on a ridge in the centre.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP1570.114 to KP1758.540

Description:
Offshore Chart Description

Survey Date:
29-Dec-2016 to 30-Dec-2016

Project Number:
10817

Report Number:
Offshore 010

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	29-Dec-2016 to 30-Dec-2016	
Survey Extents	KP1570.114 to KP1758.540	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU034 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

02° 52.8583' S, 024° 59.1115' W to 02° 52.9465' S, 024° 06.9826' W

Range of Depths

4641m to 5673m LAT

General Seabed Topography

The seabed remains a fairly constant depth either side of numerous ridges that cross the route. The route crosses a ridge in the west, and then remains flat and featureless until it crosses the edge of a mound in the centre. Shortly after this feature the route crosses the edge of a seamount extending into the route corridor from the south, and then finally passes another ridge in the east. All of these features exhibit substantial seabed gradients.

Route development was conducted north of the seamount, potentially providing a clearer path for the cable that avoids the most substantial gradients.

Potential Hazards

Steep gradients are encountered numerous times. The route crosses a ridge between 02° 52.6392' S, 024° 54.5696' W and 02° 52.4336' S, 024° 46.8341' W, where gradients reach up to 34°. A mound in the centre of the route exhibits seabed gradients of up to 34° on its flanks.

A seamount south of the proposed cable route protrudes into the corridor, rising approximately 1005m from the surrounding seabed. The route crosses the northern edge of this feature between 02° 51.7595' S, 024° 21.5673' W and 02° 52.0925' S, 024° 17.4920' W. Seabed gradients reach up to 32° on the flanks of the seamount.

Another ridge is crossed in the east, between 02° 52.5298' S, 024° 12.1368' W and 02° 52.7221' S, 024° 09.7792' W, exhibiting gradients of up to 36° on its flanks.

Cable Crossings

The survey route crosses no cables.

SACS.S1.NU035 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 52.7536' S, 024° 09.6976' W to 02° 55.8655' S, 023° 17.5687' W
Range of Depths	4411m to 5737m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times over a series of ridges and mounds throughout this chart. Most notably, a quick succession of three substantial ridges is crossed in the east between 02° 54.8032' S, 023° 40.8970' W and 02° 55.8143' S, 023° 21.0047' W. Within this region a seamount is also identified, north of the proposed cable route. Seabed gradients reach up to 41° here and are commonly over 20°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP1753.509 to KP1941.685

Description:
Offshore Chart Description

Survey Date:
30-Dec-2016 to 31-Dec-2016

Project Number:
10817

Report Number:
Offshore 011

Report Status:
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REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	30-Dec-2016 to 31-Dec-2016	
Survey Extents	KP1753.509 to KP1941.685	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU036	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	02° 55.8180' S, 023° 20.2837' W to 02° 56.7297' S, 022° 28.1548' W
Range of Depths	4766m to 5717m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the west, at 35°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU037 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 56.6822' S, 022° 30.8698' W to 02° 57.5939' S, 021° 38.7409' W
Range of Depths	4771m to 5812m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients. The seabed deepens slightly in the east.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the centre, at 41°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP1936.654 to KP2124.825

Description:
Offshore Chart Description

Survey Date:
31-Dec-2016 to 01-Jan-2017

Project Number:
10817

Report Number:
Offshore 012

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	31-Dec-2016 to 01-Jan-2017	
Survey Extents	KP1936.654 to KP2124.825	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU038 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	02° 57.5464' S, 021° 41.4559' W to 02° 58.4581' S, 020° 49.3270' W
Range of Depths	4506m to 5816m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients. The seabed shoals slightly in the east. Route development was conducted north of a mound in the east, potentially providing a clearer path for the cable that avoids the most substantial gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the centre, shortly before the route development, at 40°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU039	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	02° 58.4106' S, 020° 52.0420' W to 02° 59.3223' S, 019° 59.9131' W
Range of Depths	4506m to 5402m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a mound in the west, at 31°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP2119.794 to KP2308.868

Description:
Offshore Chart Description

Survey Date:
01-Jan-2017 to 02-Jan-2017

Project Number:
10817

Report Number:
Offshore 013

Report Status:
Revision 1

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
1	03-Jan-2017	Rev1	1/03-Jan-2017/Rev1

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	01-Jan-2017 to 02-Jan-2017	
Survey Extents	KP2119.794 to KP2308.868	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU040	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	02° 59.2748' S, 020° 02.6281' W to 03° 01.6461' S, 019° 10.4992' W
Range of Depths	4519m to 5566m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a mound in the centre, at 37°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU041 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	03° 01.2996' S, 019° 13.2142' W to 03° 07.9515' S, 018° 21.0853' W
Range of Depths	3892m to 5497m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients. In the west a seamount rises approximately 1200m from the surrounding seabed. Another seamount, rising approximately 1300m from the surrounding seabed, is identified south of the proposed cable route in the centre of the chart.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges, mounds and seamounts throughout the chart. The proposed cable route crosses a seamount between 03° 02.7056' S, 019° 02.1782' W and 03° 03.4646' S, 018° 56.3314' W, on which seabed gradients of up to xx° are identified. The steepest seabed gradient is identified on a seamount in the centre, at 38°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP2303.798 to KP2493.404

Description:
Offshore Chart Description

Survey Date:
02-Jan-2017 to 03-Jan-2017

Project Number:
10817

Report Number:
Offshore 014

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	03-Jan-2017	Rev0	0/03-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	02-Jan-2017 to 03-Jan-2017
Survey Extents	KP2303.798 to KP2493.404

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU042 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 03° 07.6050' S, 018° 23.8003' W to 03° 14.2561' S, 017° 31.6714' W

Range of Depths 4174m to 5255m LAT

General Seabed Topography The route crosses numerous ridges and mounds, each exhibiting steep gradients.

Potential Hazards Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a mound in the east, at 36°.

Cable Crossings The survey route crosses one telegraph cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (St Vincent - Ascension No.2)	OOS	03°	14.226'	S	017°	31.910'	W	4689	2400.695	

SACS.S1.NU043 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 03° 13.9097' S, 017° 34.3864' W to 03° 20.5602' S, 016° 42.2575' W

Range of Depths 3837m to 4744m LAT

General Seabed Topography The route crosses numerous ridges and mounds, each exhibiting steep gradients. South of the proposed route in the centre a mound extends into the cable corridor, shortly before the route traverses a large mound/ridge between 03° 18.2959' S, 016° 59.8751' W and 03° 19.6386' S, 016° 49.1921' W. The mound rises approximately 6000m from the surrounding seabed, while the following ridge/mound rises approximately 640m from the surrounding seabed.

Potential Hazards Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the west, at 39°.

Cable Crossings The survey route crosses one telegraph cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (St Vincent - Ascension No.2)	OOS	03°	14.226'	S	017°	31.910'	W	4689	2400.695	

Chart Description Report for
NEC

Project:
SACS Cable System
KP2488.335 to KP2585.190

Description:
Offshore Chart Description

Survey Date:
03-Jan-2017 to 04-Jan-2017

Project Number:
10817

Report Number:
Offshore 015

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	04-Jan-2017	Rev0	0/04-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	03-Jan-2017 to 04-Jan-2017	
Survey Extents	KP2488.335 to KP2585.190	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU044 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 03° 20.2139' S, 016° 44.9725' W to 03° 24.2143' S, 015° 52.8436' W

Range of Depths 3148m to 4650m LAT

General Seabed Topography The route crosses numerous ridges and mounds, each exhibiting steep gradients.

Potential Hazards Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the east, at 39°.

Cable Crossings The survey route crosses two cables.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegragh (St Vincent - Ascension No.1)	OOS	03°	22.215'	S	016°	22.977'	W	4242	2529.259	LW
Coaxial SAT Seg C	OOS	03°	23.403'	S	016°	05.071'	W	4416	2562.495	LW

Chart Description Report for
NEC

Project:
SACS Cable System
KP2580.151 to KP2676.906

Description:
Offshore Chart Description

Survey Date:
04-Jan-2017 to 05-Jan-2017

Project Number:
10817

Report Number:
Offshore 016

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	05-Jan-2017	Rev0	0/05-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	04-Jan-2017 to 05-Jan-2017	
Survey Extents	KP2580.151 to KP2676.906	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU045 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	03° 24.0341' S, 015° 55.5586' W to 03° 27.4933' S, 015° 03.4297' W
Range of Depths	3523m to 4569m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients. Between ridges in the west the seabed remains at a fairly constant depth, whereas in the east it gently shoals between ridges. Route development to the north and south of the proposed corridor was conducted in the east to provide extra coverage in the run-in to the Ascension branch unit.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the east, at 34°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP2671.866 to KP2781.558

Description:
Offshore Chart Description

Survey Date:
04-Jan-2017 to 06-Jan-2017

Project Number:
10817

Report Number:
Offshore 017

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	06-Jan-2017	Rev0	0/06-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	04-Jan-2017 to 06-Jan-2017	
Survey Extents	KP2671.866 to KP2781.558	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU046 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

03° 27.3131' S, 015° 06.1447' W to 03° 30.7727' S, 014° 14.0158' W

Range of Depths

2982m to 4493m LAT

General Seabed Topography

The route crosses numerous ridges and mounds in the west, continuing as it enters Ascension branch unit, each exhibiting steep gradients. The ridges and mounds cover the north, west and northwest areas of the branch unit. In the centre of the branch unit, following a steep gradient down a ridge, the seabed flattens off. This flat region of seabed extends to the south of the branch unit.

Route development to the north and south of the proposed corridor was conducted west of the branch unit to provide extra coverage in the run-in to the Ascension branch unit. The branch unit itself was also extended, to the south, where the edge of a mound was identified, rising approximately 270m from the surrounding flat seabed.

East of the branch unit the route once again encounters isolated mounds with steep gradients.

Potential Hazards

Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the west of the branch unit, at 41°.

Cable Crossings

The survey route crosses one OOS cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegragh (Ascension - Sierra Leone)	OOS	03°	30.002'	S	014°	25.634'	W	4011	2747.053	LWS

SACS.S1.BU002 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

03° 27.7759' S, 014° 59.1715' W to 03° 31.2355' S, 014° 07.0425' W

Range of Depths

2982m to 4351m LAT

General Seabed Topography

The route crosses numerous ridges and mounds in the west, continuing as it enters Ascension branch unit, each exhibiting steep gradients. The ridges and mounds cover the north, west and northwest areas of the branch unit. In the centre of the branch unit, following a steep gradient down a ridge, the seabed flattens off. This flat region of seabed extends to the south of the branch unit.

Route development to the north and south of the proposed corridor was conducted west of the branch unit to provide extra coverage in the run-in to the Ascension branch unit. The branch unit itself was also extended, to the south, where the edge of a mound was identified, rising approximately 270m from the surrounding flat seabed.

East of the branch unit the route once again encounters isolated mounds with steep gradients.

Potential Hazards

Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a ridge in the west of the branch unit, at 41°.

Cable Crossings

The survey route crosses one OOS cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegragh (Ascension - Sierra Leone)	OOS	03°	30.002'	S	014°	25.634'	W	4011	2747.053	LWS

Chart Description Report for
NEC

Project:
SACS Cable System
KP2763.576 to KP3043.416

Description:
Offshore Chart Description

Survey Date:
06-Jan-2017 to 07-Jan-2017

Project Number:
10817

Report Number:
Offshore 018

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	07-Jan-2017	Rev0	0/07-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	06-Jan-2017 to 07-Jan-2017
Survey Extents	KP2763.576 to KP3043.416

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU047	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	03° 30.5929' S, 014° 16.7308' W to 03° 33.0831' S, 013° 24.6019' W
Range of Depths	3208m to 3911m LAT
General Seabed Topography	The route crosses numerous ridges and mounds, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a mound in the east, at 37°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU048	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	03° 33.1778' S, 013° 27.3169' W to 03° 31.3602' S, 012° 35.1880' W
Range of Depths	2626m to 3810m LAT
General Seabed Topography	The route crosses numerous ridges in the west and a continuous series of ridges in the east, each exhibiting steep gradients. The seabed shoals towards the east. The continuous series of ridges and shoaling to the east is attributed to approaching the Mid-Atlantic Ridge.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges throughout the chart. The steepest seabed gradient is identified on a mound in the west, at 37°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU049 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	03° 31.4549' S, 012° 37.9030' W to 03° 29.6373' S, 011° 45.7741' W
Range of Depths	2180m to 4024m LAT
General Seabed Topography	The route crosses the Mid-Atlantic Ridge in the centre of this chart. In the west the route crosses a continuous series of ridges as the seabed shoals towards the edge of the Mid-Atlantic Ridge. The seabed then deepens steeply down a trench at the centre of the Mid-Atlantic Ridge, undulates for approximately 12km over a chaotic sequence of ridges and mounds at the base of the trench, before steeply rising up the eastern flank of the trench. East of the edge of the Mid-Atlantic Ridge the route once again crosses a continuous series of ridges, remaining at a fairly constant depth. The Mid-Atlantic Ridge is crossed between 03° 30.7706' S, 012° 17.7008' W and 03° 30.2884' S, 012° 03.8948' W. Significant gradients are encountered on and around this feature, particularly as the route descends down the western flank of the ridge.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges throughout the chart. The steepest seabed gradient is identified on the western flank of the Mid-Atlantic Ridge, at 47°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP3038.385 to KP3238.716

Description:
Offshore Chart Description

Survey Date:
07-Jan-2017 to 08-Jan-2017

Project Number:
10817

Report Number:
Offshore 019

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	08-Jan-2017	Rev0	0/08-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	07-Jan-2017 to 08-Jan-2017	
Survey Extents	KP3038.385 to KP3238.716	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU050 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	03° 29.7319' S, 011° 48.4891' W to 03° 41.6797' S, 010° 56.3602' W
Range of Depths	2188m to 3940m LAT
General Seabed Topography	The route crosses numerous ridges in the west, each exhibiting steep gradients. The seabed deepens gradually towards the east. The continuous series of ridges and shoaling to the east is attributed to leaving the Mid-Atlantic Ridge. In the east the seabed flattens off and only smaller ridges are encountered.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges through in the west of the chart. The steepest seabed gradient is identified on a ridge in the west, at 30°.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU051 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	03° 39.9609' S, 010° 59.0752' W to 04° 12.8144' S, 010° 11.9310' W
Range of Depths	2970m to 4166m LAT
General Seabed Topography	The route crosses numerous ridge, each exhibiting steep gradients. In the west a seamount rises approximately 950m from the surrounding seabed, encroaching from the south to just beyond the centre of the cable corridor. North of the seamount the seabed is flatter.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and a seamount throughout the chart. The steepest seabed gradient is identified on the flank of a ridge in the centre, at 40°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP3230.477 to KP3424.285

Description:
Offshore Chart Description

Survey Date:
08-Jan-2017 to 09-Jan-2017

Project Number:
10817

Report Number:
Offshore 020

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	09-Jan-2017	Rev0	0/09-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	08-Jan-2017 to 09-Jan-2017
Survey Extents	KP3230.477 to KP3424.285

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU052	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	04° 10.0885' S, 010° 15.4597' W to 04° 43.3414' S, 009° 32.4000' W
Range of Depths	3330m to 3988m LAT
General Seabed Topography	The route crosses numerous ridges trending north to south, each exhibiting steep gradients. These ridges are smaller than the preceding ridges associated with the Mid-Atlantic Ridge. In the centre the route crosses a wide trench, between 04° 29.0619' S, 009° 50.9561' W and 04° 35.2603' S, 009° 42.8682' W. The trench descends approximately 380m from the surrounding seabed, with seabed gradients reaching 27° on the steeper western flank.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges throughout this chart. The route crosses a wide trench in the centre, where a maximum gradient of 27° is identified on its western flank.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU053 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	04° 41.2454' S, 009° 35.1150' W to 05° 14.2143' S, 008° 52.3909' W
Range of Depths	3436m to 3953m LAT
General Seabed Topography	The route crosses numerous ridges, each exhibiting steep gradients. Between ridge features the seabed gradually deepens to the southeast. A small but steep mound, rising approximately 230m from the surrounding seabed, is identified in the centre of the chart, south of the proposed cable route.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and a small but steep mound throughout the chart. The steepest seabed gradient is identified on a small but steep mound in the centre, at 20°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP3416.058 to KP3718.311

Description:
Offshore Chart Description

Survey Date:
09-Jan-2017 to 10-Jan-2017

Project Number:
10817

Report Number:
Offshore 021

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	10-Jan-2017	Rev0	0/10-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	09-Jan-2017 to 10-Jan-2017
Survey Extents	KP3416.058 to KP3718.311

Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU054 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	05° 11.4924' S, 008° 55.9196' W to 05° 44.1736' S, 008° 12.8604' W
Range of Depths	3209m to 3967m LAT
General Seabed Topography	The route crosses numerous ridges trending north to south, each exhibiting steep gradients. In the centre the route crosses the northern edge of a seamount between 05° 32.8159' S, 008° 28.2378' W and 05° 33.8697' S, 008° 26.8703' W. The seamount rises approximately 650m from the surrounding seabed.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and a seamount. A maximum gradient of 30° is encountered on the western flank of a seamount in the chart centre.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU055 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range 05° 42.6003' S, 008° 15.5755' W to 06° 09.4160' S, 007° 23.4465' W

Range of Depths 3620m to 4910m LAT

General Seabed Topography The route crosses numerous ridges in the west before dropping steeply down a ridge. The seabed is briefly flat and featureless before a chaotic sequence of mounds is encountered, after which the seabed deepens again. In the centre the seabed is extremely flat, until ridges are once again encountered in the east.

Potential Hazards Steep gradients are encountered numerous times on the flanks of ridges and mounds throughout the chart. The steepest seabed gradient is identified on a small but steep mound in the west, at 39°.

Cable Crossings The survey route crosses one out of service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SAT 2 seg D1	OOS	05°	59.038'	S	007°	43.766'	W	4735	3576.177	LW

SACS.S1.NU056	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	06° 08.1681' S, 007° 25.8901' W to 06° 31.1961' S, 006° 33.7611' W
Range of Depths	4017m to 4963m LAT
General Seabed Topography	The route crosses numerous ridges, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges throughout the chart. The steepest seabed gradient is identified on a ridge in the west, at 32°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP3713.408 to KP3913.175

Description:
Offshore Chart Description

Survey Date:
10-Jan-2017 to 11-Jan-2017

Project Number:
10817

Report Number:
Offshore 022

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	11-Jan-2017	Rev0	0/11-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	10-Jan-2017 to 11-Jan-2017	
Survey Extents	KP3713.408 to KP3913.175	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU057 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	06° 30.1459' S, 006° 36.2047' W to 06° 50.9832' S, 005° 44.0757' W
Range of Depths	3858m to 5149m LAT
General Seabed Topography	The route crosses numerous ridges before dropping steeply down a significant ridge. The ridge, which crosses the cable corridor from east to west, descends approximately 850m and exhibits very steep gradients throughout. The proposed cable route encounters this ridge between 06° 46.5820' S, 005° 57.6134' W and 06° 47.1482' S, 005° 55.8730' W.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges, and very steep seabed gradients, up to 57° and commonly above 40°, are identified on a large ridge in the west.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU058 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	06° 50.1886' S, 005° 46.5193' W to 07° 07.1349' S, 004° 54.3903' W
Range of Depths	4121m to 5156m LAT
General Seabed Topography	The route crosses numerous ridges and small but steep mounds throughout the chart. Between ridges the seabed generally shoals slightly to the southeast.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds, with a maximum seabed gradient of 41° identified on a ridge in the west.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP3908.444 to KP4154.373

Description:
Offshore Chart Description

Survey Date:
11-Jan-2017 to 12-Jan-2017

Project Number:
10817

Report Number:
Offshore 023

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	12-Jan-2017	Rev0	0/12-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	11-Jan-2017 to 12-Jan-2017	
Survey Extents	KP3908.444 to KP4154.373	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU059	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	07° 06.3408' S, 004° 56.8339' W to 07° 23.2770' S, 004° 04.7049' W
Range of Depths	3806m to 4867m LAT
General Seabed Topography	The route crosses numerous ridges and small but steep mounds throughout the chart. Between ridges the seabed generally shoals slightly to the southeast.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds, with a maximum seabed gradient of 38° identified on a mound in the east.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU060 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	07° 22.4833' S, 004° 07.1484' W to 07° 36.7344' S, 003° 15.0195' W
Range of Depths	3300m to 4878m LAT
General Seabed Topography	The route crosses numerous ridges and small but steep mounds throughout the chart. The route enters St. Helena Branch Unit in the east, where the edge of a seamount is identified in the northwest corner. The highest identified point of the seamount rises approximately 1300m from the surrounding seabed.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges, mounds and a seamount, with a maximum seabed gradient of 41° identified on a mound on the flank of the seamount in the northwest of the branch unit.
Cable Crossings	The survey route crosses no cables.

SACS.S1.BU003 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	07° 31.2620' S, 003° 40.1155' W to 07° 39.1611' S, 002° 47.9865' W
Range of Depths	3300m to 4878m LAT
General Seabed Topography	The route crosses numerous ridges and small but steep mounds throughout the chart and throughout St. Helena Branch Unit. In the northwest of the branch unit a seamount is identified, protruding approximately 1300m from the surrounding seabed. Steep seabed gradients are identified on features throughout the chart.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges, mounds and a seamount, with a maximum seabed gradient of 41° identified on a mound on the flank of the seamount in the northwest of the branch unit.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP4099.946 to KP4300.856

Description:
Offshore Chart Description

Survey Date:
12-Jan-2017 to 13-Jan-2017

Project Number:
10817

Report Number:
Offshore 024

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	13-Jan-2017	Rev0	0/13-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	12-Jan-2017 to 13-Jan-2017	
Survey Extents	KP4099.946 to KP4300.856	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU061	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	07° 36.5151' S, 003° 17.4630' W to 07° 46.3579' S, 002° 25.3341' W
Range of Depths	3708m to 4769m LAT
General Seabed Topography	The route leaves St. Helena Branch Unit in the west and crosses numerous ridges and small but steep mounds throughout the chart, each exhibiting steep gradients.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges and mounds, with a maximum seabed gradient of 39° identified on a ridge in the centre.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU062	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	07° 45.3846' S, 002° 27.7776' W to 08° 11.4446' S, 001° 35.6487' W
Range of Depths	3622m to 4775m LAT
General Seabed Topography	The route crosses numerous steep mounds throughout the west and centre of the chart, with the seabed flattening out somewhat in the east. Steep gradients are encountered regularly.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of mounds, with a maximum seabed gradient of 41° identified on a mound in the west.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP4295.776 to KP4583.346

Description:
Offshore Chart Description

Survey Date:
13-Jan-2017 to 14-Jan-2017

Project Number:
10817

Report Number:
Offshore 025

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	14-Jan-2017	Rev0	0/14-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	13-Jan-2017 to 14-Jan-2017	
Survey Extents	KP4295.776 to KP4583.346	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU063	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	08° 10.1527' S, 001° 38.0923' W to 08° 30.0949' S, 000° 45.0933' W
Range of Depths	3572m to 5114m LAT
General Seabed Topography	The route crosses numerous steep mounds throughout the chart. Steep gradients are encountered regularly.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of mounds, with a maximum seabed gradient of 45° identified on a mound in the centre.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU064	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	08° 29.4429' S, 000° 48.4068' W to 08° 38.3172' S, 000° 03.7221' E
Range of Depths	4396m to 5560m LAT
General Seabed Topography	The route crosses numerous ridges traversing the cable route trending from north to south. Steep gradients are encountered regularly.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of ridges, with a maximum seabed gradient of 35° identified on a ridge in the centre.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU065	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	08° 37.9708' S, 000° 01.2786' E to 08° 44.5236' S, 000° 53.4075' E
Range of Depths	4606m to 5845m LAT
General Seabed Topography	The route crosses numerous steep mounds and ridges throughout the chart. Steep gradients are encountered regularly.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of mounds and ridges, with a maximum seabed gradient of 30° identified on a mound in the centre.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP4578.855 to KP4857.823

Description:
Offshore Chart Description

Survey Date:
14-Jan-2017 to 15-Jan-2017

Project Number:
10817

Report Number:
Offshore 026

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	15-Jan-2017	Rev0	0/15-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	14-Jan-2017 to 15-Jan-2017	
Survey Extents	KP4578.855 to KP4857.823	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU066	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	08° 44.3650' S, 000° 50.9640' E to 08° 47.7472' S, 001° 43.0929' E
Range of Depths	4566m to 5816m LAT
General Seabed Topography	The route crosses mounds and then the saddle between two seamounts in the west. The seabed undulates while remaining a fairly constant depth after the seamounts, until the route crosses mounds in the east.
Potential Hazards	Steep gradients are encountered numerous times on the flanks of seamounts in the west and mounds in the east, with a maximum seabed gradient of 33° identified on a seamount.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU067 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	08° 47.5886' S, 001° 40.6494' E to 08° 52.7191' S, 002° 32.7783' E
Range of Depths	5022m to 5729m LAT
General Seabed Topography	The route crosses a mound in the west and mounds in the east, with the seabed undulating while remaining essentially flat in the centre of the chart.
Potential Hazards	Steep gradients of up to 29° are encountered on the flank of a mound in the west. Seabed gradients of up to 21° are occasionally identified on isolated mounds in the east.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU068 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	08° 52.4568' S, 002° 30.3348' E to 08° 58.0518' S, 003° 22.4638' E
Range of Depths	5256m to 5712m LAT
General Seabed Topography	The seabed undulates while remaining essentially flat in the west, with occasional mounds and ridges protruding into the route corridor from the north or south without traversing the proposed cable route itself. In the centre the route crosses a ridge traversing the route from northwest to southeast. East of the ridge the seabed is shallower, with the seabed once again remaining essentially flat but for occasional mounds and undulations to the east.
Potential Hazards	Seabed gradients of up to 29° are identified on the flanks of mounds within the route corridor. The maximum seabed gradient exhibited by the ridge traversing the route in the centre is 12°.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP4853.317 to KP5224.007

Description:
Offshore Chart Description

Survey Date:
15-Jan-2017 to 16-Jan-2017

Project Number:
10817

Report Number:
Offshore 027

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	16-Jan-2017	Rev0	0/16-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	15-Jan-2017 to 16-Jan-2017	
Survey Extents	KP4853.317 to KP5224.007	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU069	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	08° 57.7895' S, 003° 20.0197' E to 09° 03.3831' S, 004° 12.1486' E
Range of Depths	4177m to 5655m LAT
General Seabed Topography	For the majority of the chart the seabed is essentially flat. In the east a seamount, protruding approximately 1300m from the surrounding seabed, traverses the route corridor. Steep gradients are observed on the flanks of this feature, which crosses the proposed route from 09° 02.7171' S, 004° 05.7825' E to the end of the chart.
Potential Hazards	A seamount in the east exhibits steep gradients of up to 34° on its flanks.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU070	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	09° 03.1210' S, 004° 09.7051' E to 09° 08.7132' S, 005° 01.8340' E
Range of Depths	4260m to 5470m LAT
General Seabed Topography	In the west of the chart the proposed cable route descends steeply down the eastern flank of a seamount. From 09° 03.6713' S, 004° 14.4640' E the seabed shoals very gently to the east with only minor undulations.
Potential Hazards	A seamount in the west exhibits steep gradients of up to 39° on its flanks.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU071	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	09° 08.4510' S, 004° 59.3899' E to 09° 14.0416' S, 005° 51.5189' E
Range of Depths	5099m to 5357m LAT
General Seabed Topography	The seabed shoals very gently to the east with only minor undulations.
Potential Hazards	There are no hazardous seabed gradients.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU072 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	09° 13.7795' S, 005° 49.0748' E to 09° 19.3677' S, 006° 41.2037' E
Range of Depths	4951m to 5149m LAT
General Seabed Topography	The seabed shoals very gently to the east with only minor undulations.
Potential Hazards	There are no hazardous seabed gradients.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP5219.507 to KP5498.406

Description:
Offshore Chart Description

Survey Date:
16-Jan-2017 to 17-Jan-2017

Project Number:
10817

Report Number:
Offshore 028

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	J Taylor
	Surveying	T Stynes
Authorisation	Approved	..... P Bayfield

Revision	Date	Title	Report Ref
0	17-Jan-2017	Rev0	0/17-Jan-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	16-Jan-2017 to 17-Jan-2017	
Survey Extents	KP5219.507 to KP5498.406	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU073	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	09° 19.1057' S, 006° 38.7602' E to 09° 24.6944' S, 007° 30.8891' E
Range of Depths	4312m to 5048m LAT
General Seabed Topography	The seabed shoals very gently to the east with only minor undulations. In the centre a mound protrudes approximately 600m from the surrounding seabed, south of the proposed cable route.
Potential Hazards	There are no hazardous seabed gradients along the proposed cable route. Seabed gradients of up to 34° are identified on the flanks of a mound protruding into the route corridor from the south.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU074	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	09° 24.4325' S, 007° 28.4456' E to 09° 30.0194' S, 008° 20.5746' E
Range of Depths	4685m to 4895m LAT
General Seabed Topography	The proposed route crosses a small channel in the west then the seabed shoals very gently to the east with only minor undulations.
Potential Hazards	Seabed gradients reach up to 8° on the flanks of a small channel in the west.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU075	Offshore North-Up Chart Description	Scale 1:100,000

Chart Range	09° 29.7576' S, 008° 18.1310' E to 09° 35.3420' S, 009° 10.2600' E
Range of Depths	4495m to 4736m LAT
General Seabed Topography	The seabed shoals very gently to the east with only minor undulations.
Potential Hazards	There are no hazardous seabed gradients.
Cable Crossings	The survey route crosses no cables.

Chart Description Report for
NEC

Project:
SACS Cable System
KP 5493.910 to KP 5864.176

Description:
Offshore Chart Description

Survey Date:
17-Jan-2017 to 10-Feb-2017

Project Number:
10817

Report Number:
Offshore 029

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	M Irwing
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… R Bakewell

Revision	Date	Title	Report Ref
0	13-Feb-2017	Rev0	029/12-Feb-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS – Deep Water	
Survey Vessel	M.V. Ocean Endeavour	
Survey Dates	17-Jan-2017 to 10-Feb-2017	
Survey Extents	KP 5493.910 to KP 5864.176	
Equipment Used	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi

SACS.S1.NU076 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range	09°35.0803' S, 009° 07.8164' E to 09° 40.6639' S, 009° 59.9454' E
Range of Depths	4223m to 4540m LAT
General Seabed Topography	At the western extent the seabed is essentially flat. The route crosses two channels; The first channel, 2.3km wide, traverses the survey corridor from northeast to southwest with gradients of up to 15° on its flanks, while the second channel, 1.3km wide, traverses the route corridor from northeast to southwest with numerous meanders, has gradients of up to 7° on its flanks. Between the channels the seabed is essentially flat. In the eastern half of the chart area, two further deep water channel systems are visible along the northern edge of the survey corridor.
Potential Hazards	Two deep water channel systems are crossed though neither have gradients greater than 15° where intersecting the proposed route.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU077 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

09° 40.4021' S, 009° 57.5018' E to 09° 45.9848' S, 010° 49.6308' E

Range of Depths

3092m to 4356m

General Seabed Topography

In the western half of the chart area, a number of deep water channel systems are visible along the northern edge of the survey corridor though do not encroach on the RPL.

The proposed route encounters a meandering channel, 1.3km wide, which traverses the route corridor from northwest to southeast. Local gradients up to 15° occur on the eastern limb.

At the far eastern end of the chart, the route encounters a break in slope where seabed shoals relatively quickly with average gradients of 12° and local ones 19°.

Potential Hazards

Steep gradients are encountered on a break in slope where localised gradients reach 26°.

Cable Crossings

The survey route crosses one in service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
SAT 3 seg 1	IS	09°	43.568'	S	010°	27.056'	E	3937	5639.696	LW

SACS.S1.NU078 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

09° 45.7232' S, 010° 47.1872' E to 09° 45.6490' S, 011° 39.3162' E

Range of Depths

1924m to 3502m

General Seabed Topography

The proposed route shoals at the western end crossing some local ridges running oblique to the general slope direction where gradients typically reach 7-8°.

The route reaches a plateau for a short while before encountering a network of linked depressions crossing the route corridor.

Where these crater sized features coalesce seabed topography becomes more rugged and uneven. Around the edges of these features maximum gradients reach 36°. Where the route intersects these regional features, localised gradients reach 22°.

Once past the influence of these wide depressions, the proposed route follows a gentler course to the end of the chart area.

Potential Hazards

Steep gradients on hummocky coalesced terrain where gradients of 15-20° are typically reached on slope faces.

Cable Crossings

The survey route crosses one in service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
WACS_S1c(3.1)	IS	09°	46.108'	S	011°	22.377'	E	2371	5741.195	LWS

SACS.S1.NU079 **Offshore North-Up Chart Description** **Scale 1:100,000**

Chart Range

09° 45.7152' S, 011° 36.8726' E to 09° 41.3594' S, 012° 29.0016' E

Range of Depths

2207m to 1221m

General Seabed Topography

At the western end of the chart area, the proposed route follows a hummocky course where the RPL encounters a localised mound rising 125m from the surrounding seabed the average gradient is 13°.

Following this the route skirts a broader regional mound before shoaling over a further broad mound toward the centre of the chart.

The route then steadily descends along a gentle slope before meeting a steep ridge slope face at the eastern end of the chart where gradients reach 25°.

The route then undulates gently before turning and heading northeast, where the continental slope becomes smooth and even and the 1500m contour is encountered.

Seabed Features

From the 1500m contour, seabed features comprise very soft clay.

Further up the slope very soft clay with sedimentary troughs comprising silty clay cross the route oblique to the slope face.

Within the survey corridor, an area of hardground or debris occurs 130m southeast off the route.

Shallow soils

Geotechnical sampling found the soils to comprise extremely low strength becoming very low strength slightly silty clay

Potential Hazards

The RPL crosses a localised mound where localised gradients are 22°.
The RPL crosses a seabed ridge where maximum gradients reach 25°.

Cable Crossings

The survey route crosses one out of service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Luanda - Benguela)	OOS	09°	41.765'	S	012°	27.959'	E	1278	5862.125	SA

Chart Description Report for
NEC

Project:
SACS Cable System
KP5845.51 to KP5894.15

Description:
Offshore Chart Description

Survey Date:
27-Jan-2017 to 09-Feb-2017

Project Number:
10817

Report Number:
Offshore 001

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	M Irwing
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… R Bakewell

Revision	Date	Title	Report Ref
0	10-Feb-2017	Rev0	001/10-Feb-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Sangano
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	27-01-2017 to 09-02-2017
Survey Extents	KP5845.5 to KP5894.1

Equipment Used		
	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi
	Combined Side Scan Sonar & Chirp	Edgetech-DSS
	Magnetometer	Geometrics G-882
	Cone Penetrometer	Neptune 3000
	Piston Corer	Kullenburg 3m Piston Corer

SACS.S1.NU080 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 44.5620’ S, 012° 24.3984’ E to 09° 43.0681' S, 012° 24.6112' E
Range of Depths	1614m to 1420m LAT
General Seabed Topography	From the start of the chart area, where in deep water, the proposed route heads east across fairly hummocky and uneven topography. After approximately 2.7km, the route heads northeast crossing a sharp rise where gradients locally reach up to 40°. The RPL encounters the 1500m contour and the start of the shallow water survey on a fairly even slope, where the route then begins a fairly gentle and consistent climb to the end of the chart area. Seabed gradients are typically 1-2° throughout.
Seabed Features and Obstructions	Seabed sediments are fairly uniform throughout the chart area. Geotechnical sampling shows the sediments to comprise very soft clay. In the northeastern corner of the chart, the route encounters a series of elongate sedimentary troughs, running oblique to the route corridor, ~30m wide and less than 1m deep.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise extremely low strength to very low strength clay to 3m depth below seabed. Sub-bottom data indicates that these soils are not expected to vary within the chart area.
Potential Hazards	In the southwestern corner of the chart area seabed gradients locally reach up to 40° on a sharp rise that cuts across the majority of the route corridor. It is noted from the client supplied desktop study that the route crosses a zone marked by the presence of Aptian salt structures emplaced at depth. This area partly coincides with sedimentary troughs visible on the sonar and a general reduction of visible sub-bottom reflectors on sub-bottom data at >3m. CPT data in this area however does not indicate any anomalous geotechnical boundary.
Cable Crossings	No cables cross the route corridor.

SACS.S1.NU081 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

09° 43.2217’ S, 012° 24.2166’ E to 09° 41.1928' S, 012° 29.4295' E

Range of Depths

1478m to 1197m LAT

General Seabed Topography

The seabed gently shoals throughout the chart area at gradient 1-2°.

Seabed Features and Obstructions

Seabed sediments are fairly uniform throughout the chart area. Geotechnical sampling shows the sediments to comprise very soft clay.

In the south the route encounters a series of longitudinal troughs, ~30m wide and less than 1m deep. These features possibly represent sedimentary troughs.

An anomalous area, visible on sonar data, positions 130m to the south of the route. For ground truthing purposes, two attempts were made with the piston corer. Whilst no sample was recovered, evidence of damage sustained to the coring equipment on recovery re-inforces the hard nature of the area.

Shallow Soils

Shallow soils shown by geotechnical sampling to comprise extremely low strength to very low strength clay to 3m depth below seabed. Sub-bottom data indicates that these soils are not expected to vary considerably within the chart area.

Potential Hazards

It is noted from the client supplied desktop study that the route crosses a zone marked by the presence of Aptian salt structures emplaced at depth. This area partly coincides with sedimentary troughs visible on the sonar and a general reduction of visible sub-bottom reflectors on sub-bottom data at >3m. CPT data in this area however does not indicate any anomalous geotechnical boundary.

Cable Crossings

The survey route crosses one OOS cable - the *Luanda-Benguela* telegraph. This cable however was not identified with sonar or magnetometer. As this is an old out of service telegraph sitting in comparatively deep water, lack of identification is not unexpected.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
Telegraph (Luanda - Benguela)	OOS	09°	41.726'	S	012°	28.059'	E	Unknown (possibly buried as not visible on sonar records)	5862.13	unknown

SACS.S1.NU082	Offshore North-Up Chart Description	Scale 1:10,000

Chart Range	09° 41.2985’ S, 012° 29.1580’ E to 09° 39.2695' S, 012° 34.3709' E
Range of Depths	887m to 1213m LAT
General Seabed Topography	The seabed gently shoals evenly throughout the chart area at gradient 2°.
Seabed Features and Obstructions	Seabed sediments are fairly uniform throughout the chart area. Geotechnical sampling shows the sediments to comprise predominantly very soft clay. In some areas sonar data suggests seabed material grades locally in places, possibly more silty, though sediments are not expected to vary significantly.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise extremely low strength to very low strength clay to 3m depth below seabed. Sub-bottom data indicates that these soils are not expected to vary considerably within the chart area.
Potential Hazards	No interpreted hazards in chart area.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU083	Offshore North-Up Chart Description	Scale 1:10,000

Chart Range	09° 39.3752’ S, 012° 34.0994’ E to 09° 37.3462' S, 012° 39.3122' E
Range of Depths	538m to 905m LAT
General Seabed Topography	The seabed gently shoals fairly evenly throughout the chart area at 1.5-2°.
Seabed Features and Obstructions	Seabed sediments are fairly uniform throughout the chart area. Seabed sediments are shown by geotechnical sampling to comprise predominantly very soft slightly silty clay becoming less silty towards the northeast.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise extremely low strength to very low strength silty clay to 3m depth below seabed. Sub-bottom data indicates that these soils are not expected to vary within the chart area. A general reduction in visible reflectors occurs in seismic data towards the northeastern extents of the chart area. This may be related to widespread diapiric activity, where mapped regional boundaries taken from client supplied information in the desktop study cross the route corridor.
Potential Hazards	No interpreted hazards in chart area.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU084 **Offshore North-Up Chart Description** **Scale 1:10,000**

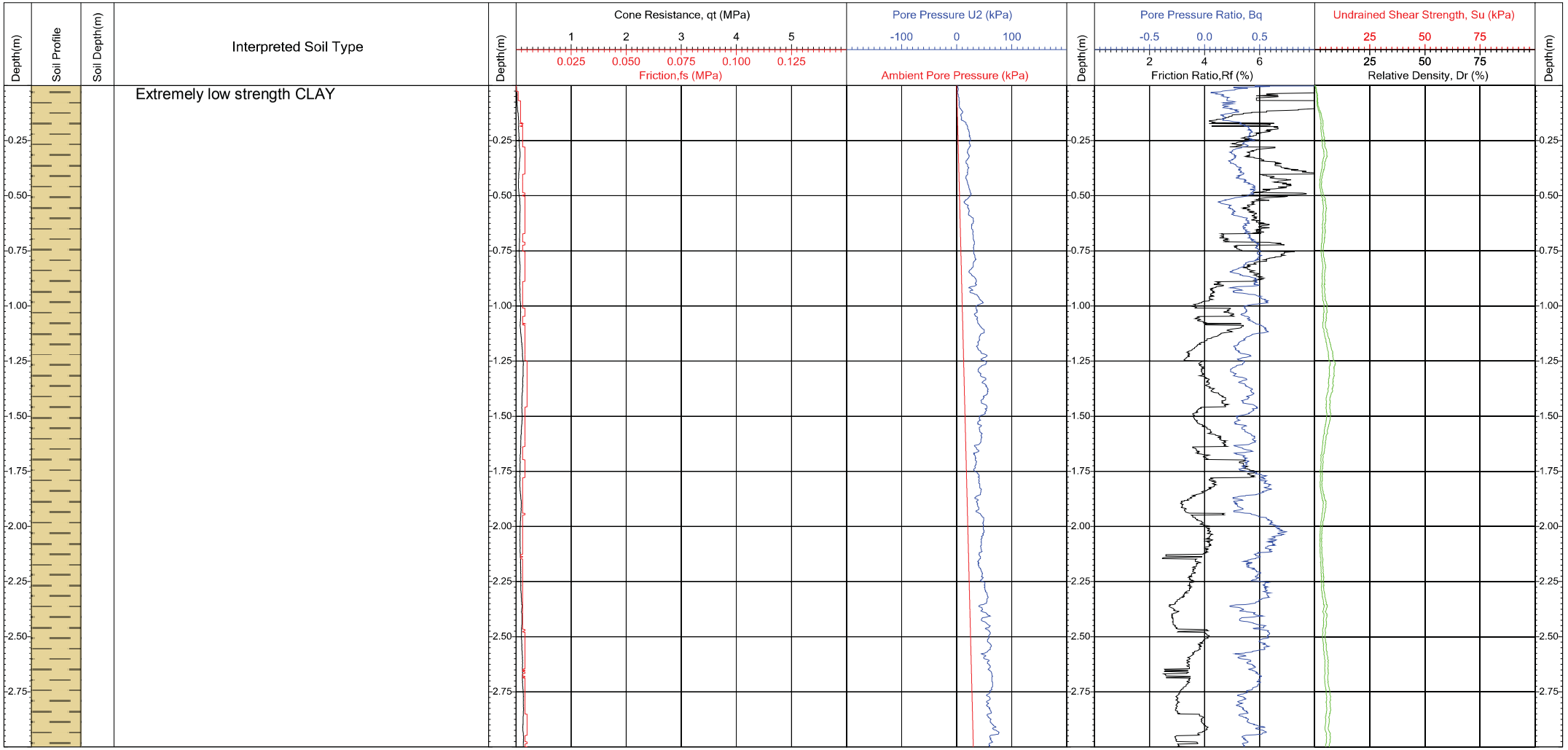
Chart Range	09° 37.4518’ S, 012° 39.0407’ E to 09° 35.4225' S, 012° 44.2536' E
Range of Depths	571m to 427m LAT
General Seabed Topography	In the southwest The seabed gently shoals throughout the chart area at 1.5-2°. Towards the northeastern end of the chart area where shoaling toward the top of the continental slope, the seabed forms undulatory slope terraces. These features are more pronounced, particularly along the northern edge of the route corridor where localised gradients reach 11-12°.
Seabed Features and Obstructions	Seabed sediments in the southwestern half of the route are shown by geotechnical sampling to comprise very soft silty clay. In the north eastern third of the route, where sediment boundaries are apparent on sonar data, seabed sediments were found to comprise predominantly slightly sandy silt/clay. Sonar mosaic suggests that elsewhere across the route corridor; sediments may coarsen further where patches of high reflectivity occur. Areas of rock/hardground occur either side of the proposed route towards the edges of the route corridor with measured heights from sonar data is 0.5-4.5m.
Shallow Soils	For the majority of the chart area, shallow soils are shown by geotechnical sampling to comprise extremely low strength to very low strength silty clay to 3m depth below seabed. In the northeastern half of the chart area, this uppermost soils unit grades to slightly sandy silt/clay in places across the route corridor. In the southwestern corner of the chart area, a sub-surface anomaly, ~140m wide is visible on sub-bottom data, crossing the route at ~3m-7.1m depth below seabed. This interpreted ‘gassy’ or potential hard layer in the sediment may be related to regional diapiric activity that is also evident on sub-bottom data at greater depth and is supported by the client supplied desktop study. Sampling at/near this feature however did not indicate that a significant geotechnical boundary was detected.
Potential Hazards	Seabed gradients reach up to 11-12° on hummocky terrain in the northeast of the chart area. Scattered rock/hardground exposures occur towards the edges of the route corridor.
Cable Crossings	The survey route crosses no cables.

APPENDICES

APPENDIX A CPT LOGS

SACS Cable Route Survey

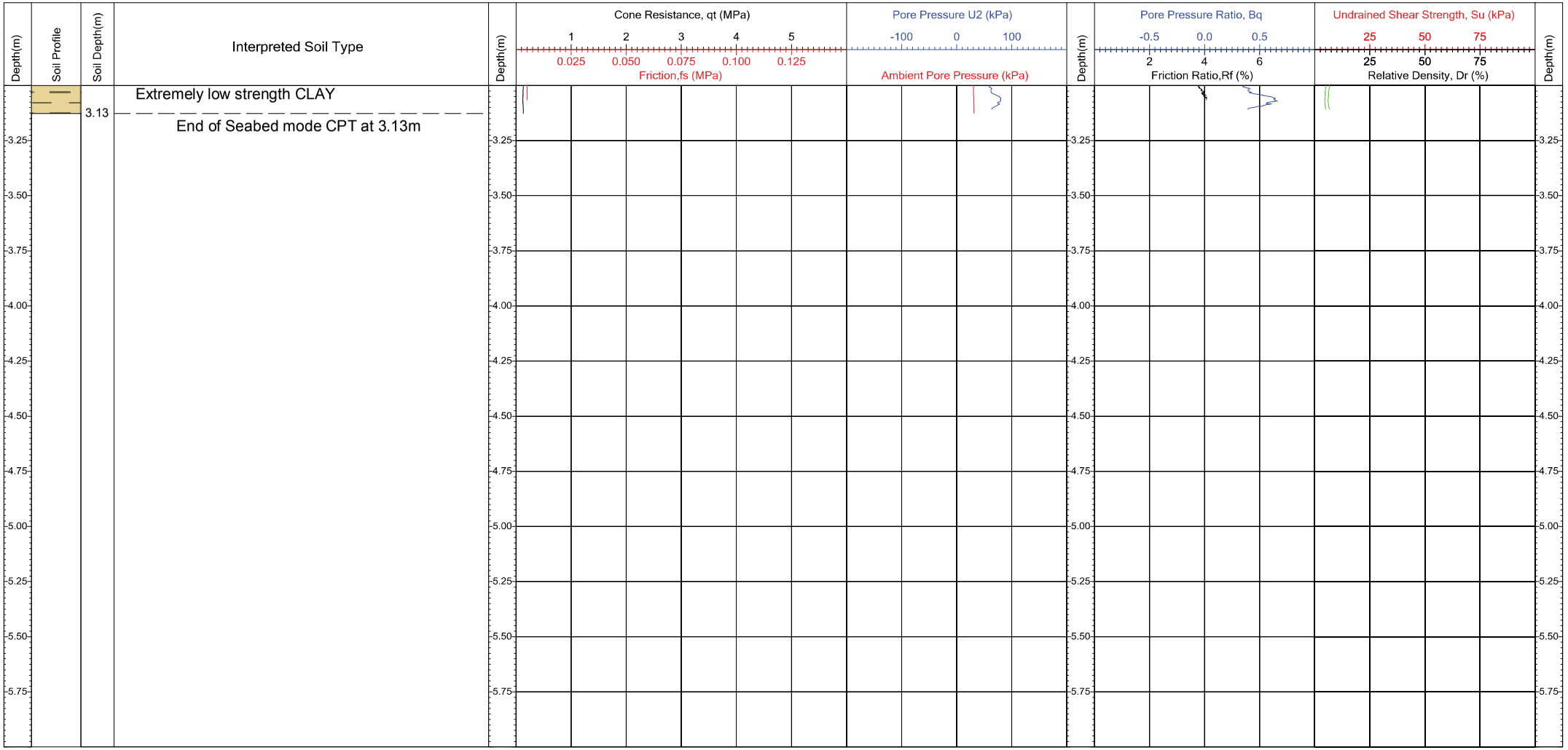
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8026197.5	127220.1	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	1491.9	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	03/02/2017		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achived	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81					SACS_SGO_OE_CPT001
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	1.0°		*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 03/02/2017	SK 03/02/2017	AP 03/02/2017	

SACS Cable Route Survey

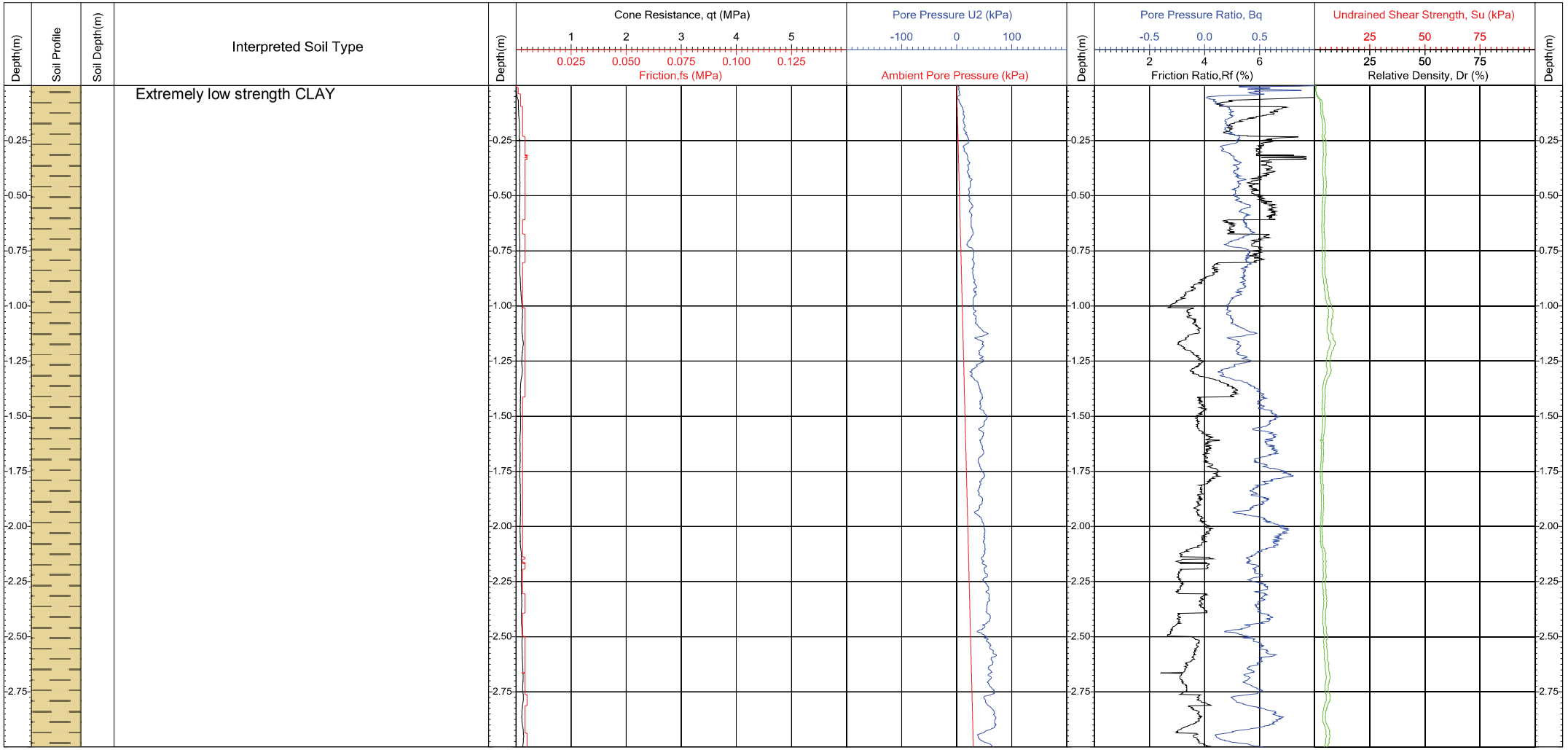
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8026197.5	127220.1	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
						Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Contract	10817	Water Depth	1491.9	(mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achived	Client Name	NEC	Date of Test	03/02/2017						SACS_SGO_OE_CPT001
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 03/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	1.0°						

SACS Cable Route Survey

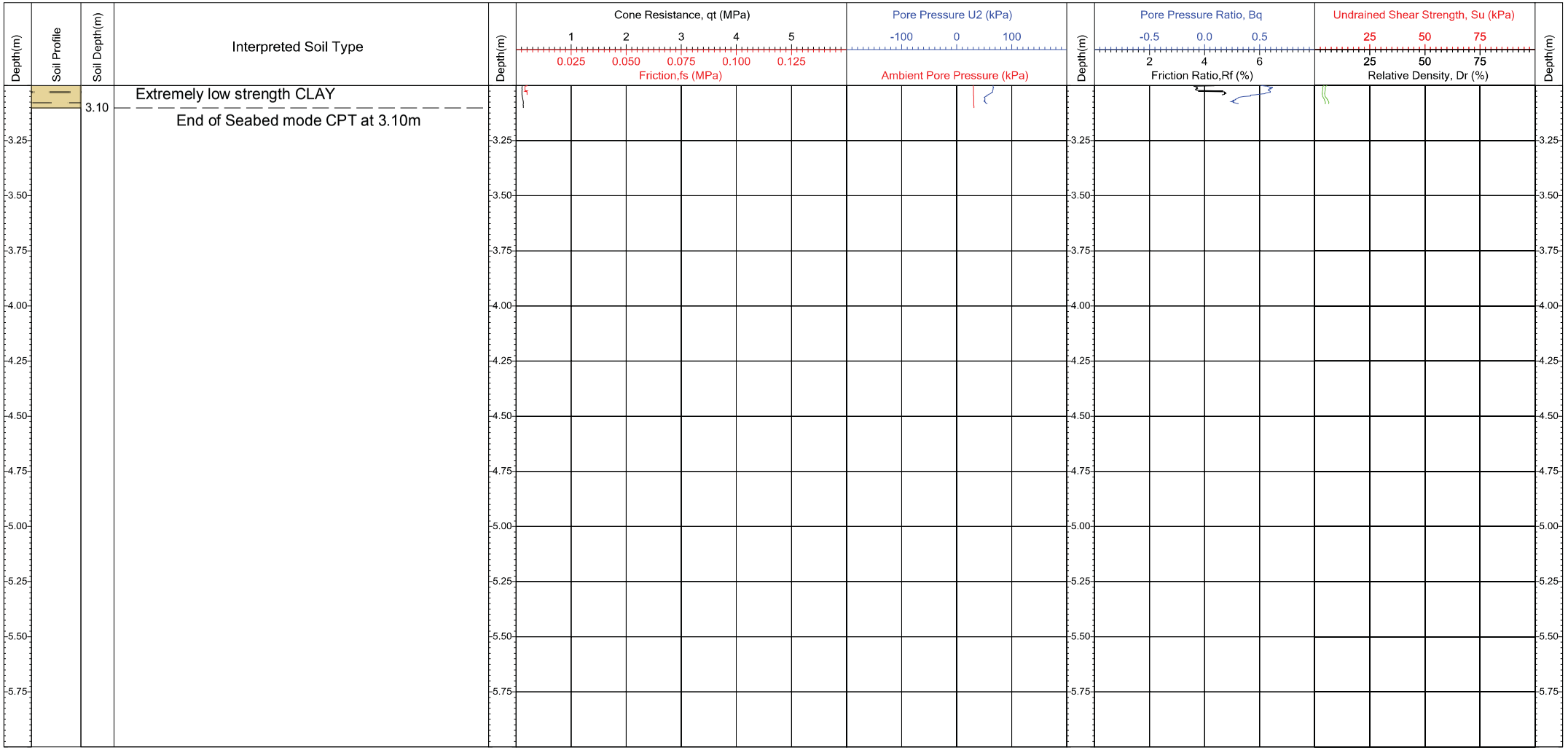
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8033077.6 129908.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
					Assumed Soil Density: 18KN/m3				
	Contract	10817	Water Depth	1322.7 (mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Target penetration achieved	Client Name	NEC	Date of Test	03/02/2017					SACS_SGO_OE_CPT002
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103 0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 03/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	2.0°					

SACS Cable Route Survey

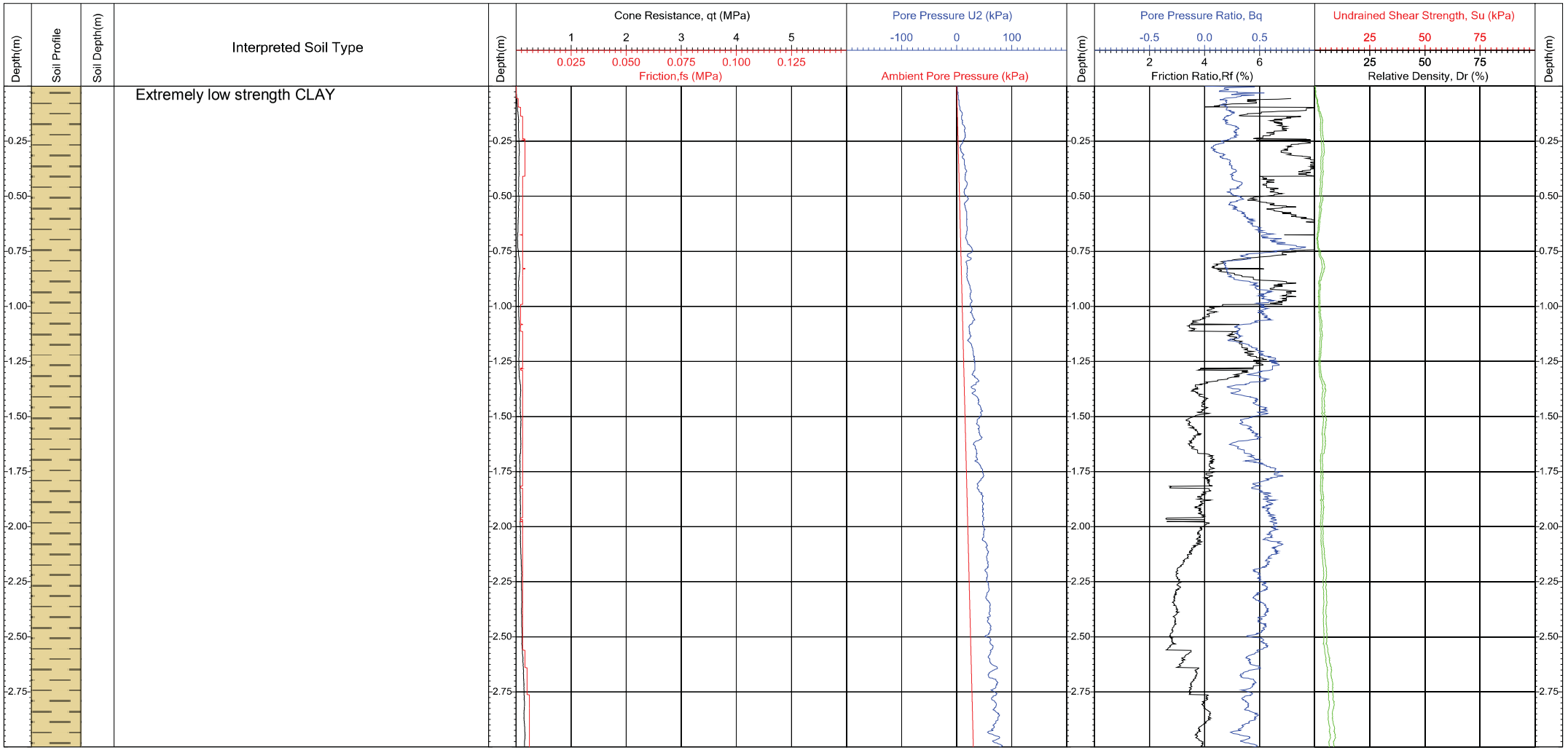
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8033077.6	129908.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
						Assumed Soil Density: 18KN/m3				
	Contract	10817	Water Depth	1322.7	(mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Target penetration achieved	Client Name	NEC	Date of Test	03/02/2017						SACS_SGO_OE_CPT002
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 03/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	2.0°						

SACS Cable Route Survey

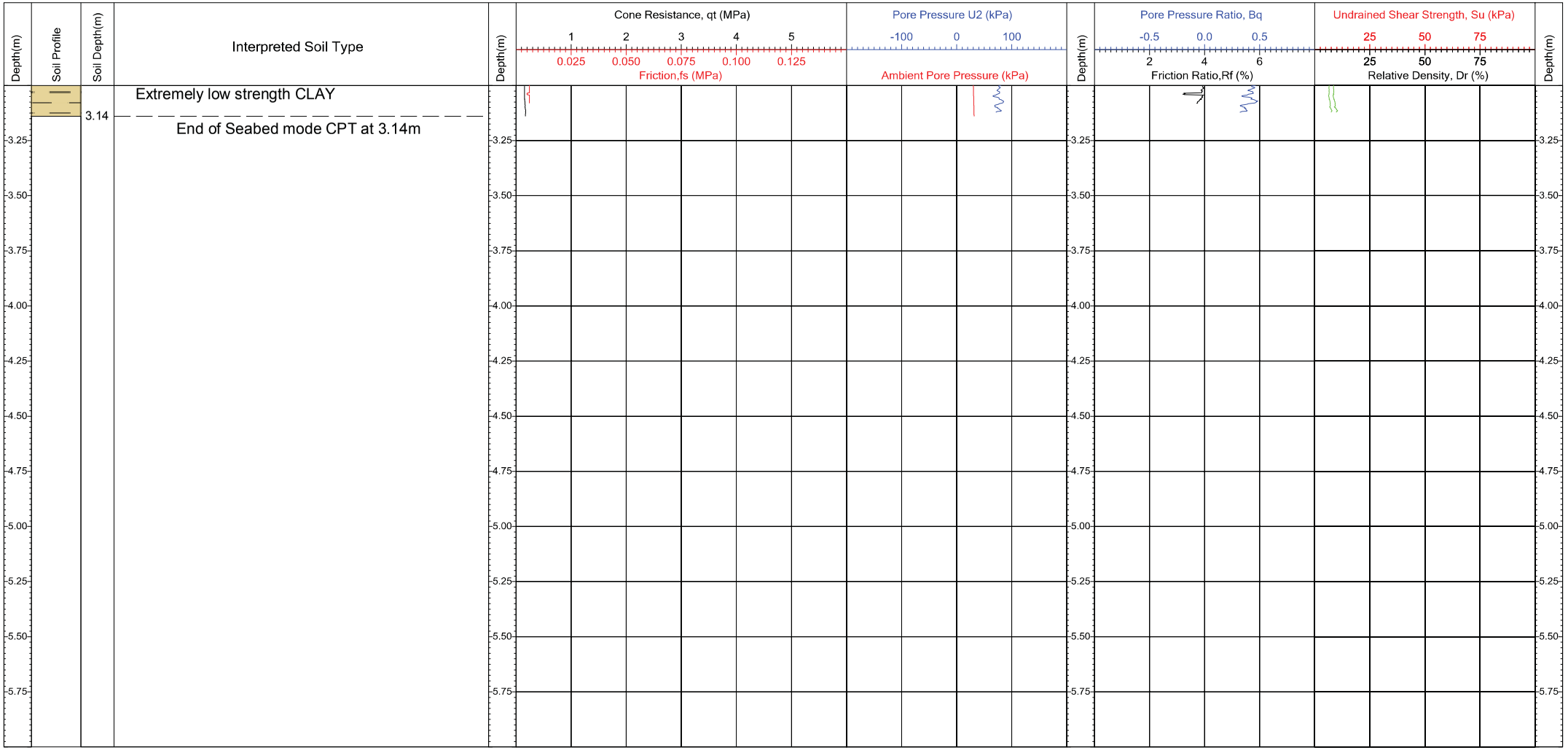
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8043266.6	133723.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	1006.4	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	02/02/2017		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achieved	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81					SACS_SGO_OE_CPT003
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	4.0°		*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 02/02/2017	SK 03/02/2017	AP 03/02/2017	

SACS Cable Route Survey

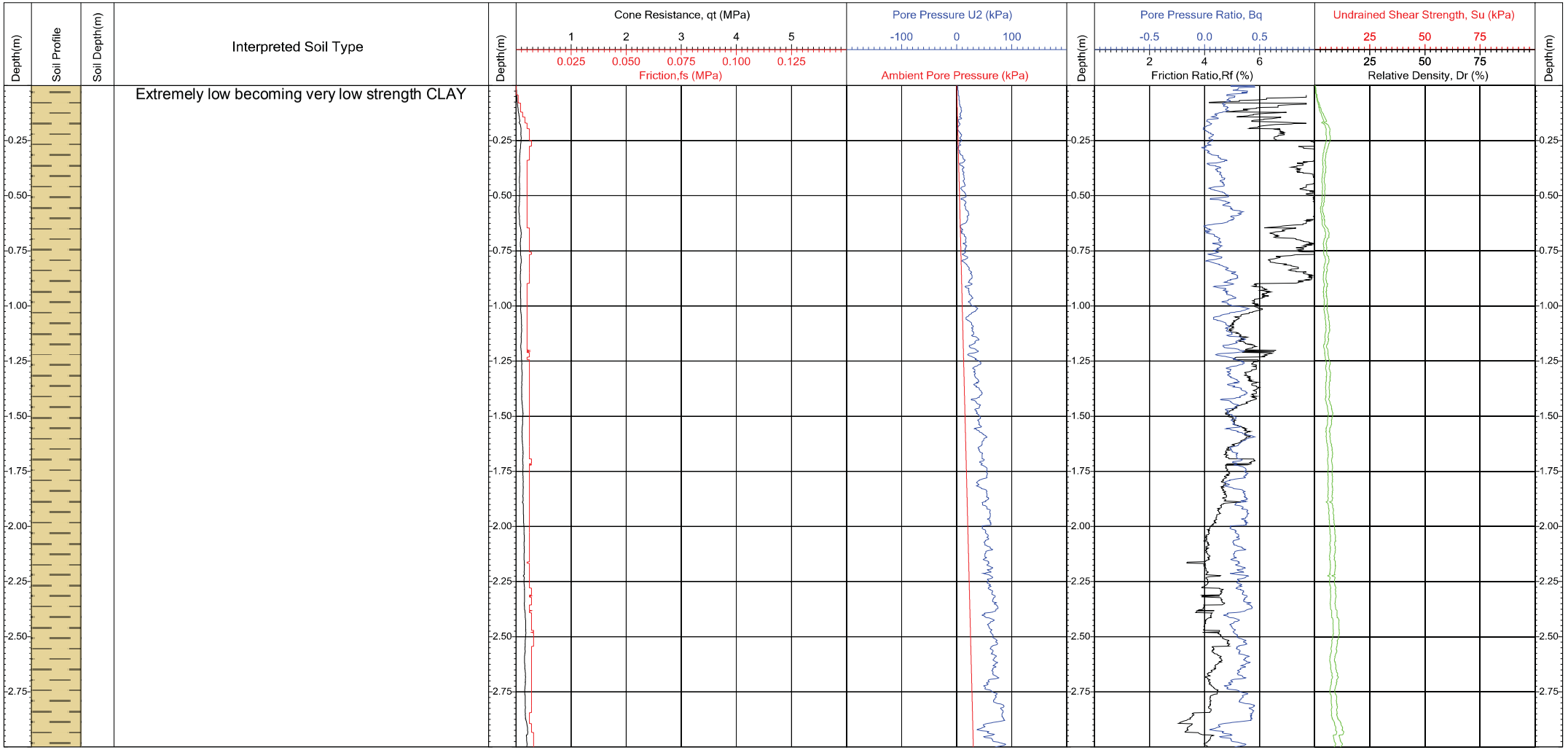
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8043266.6	133723.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	1006.4	(mLAT)	Assumed Soil Density: 18KN/m3 NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Target penetration achieved	Client Name	NEC	Date of Test	02/02/2017						SACS_SGO_OE_CPT003
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 02/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	4.0°						

SACS Cable Route Survey

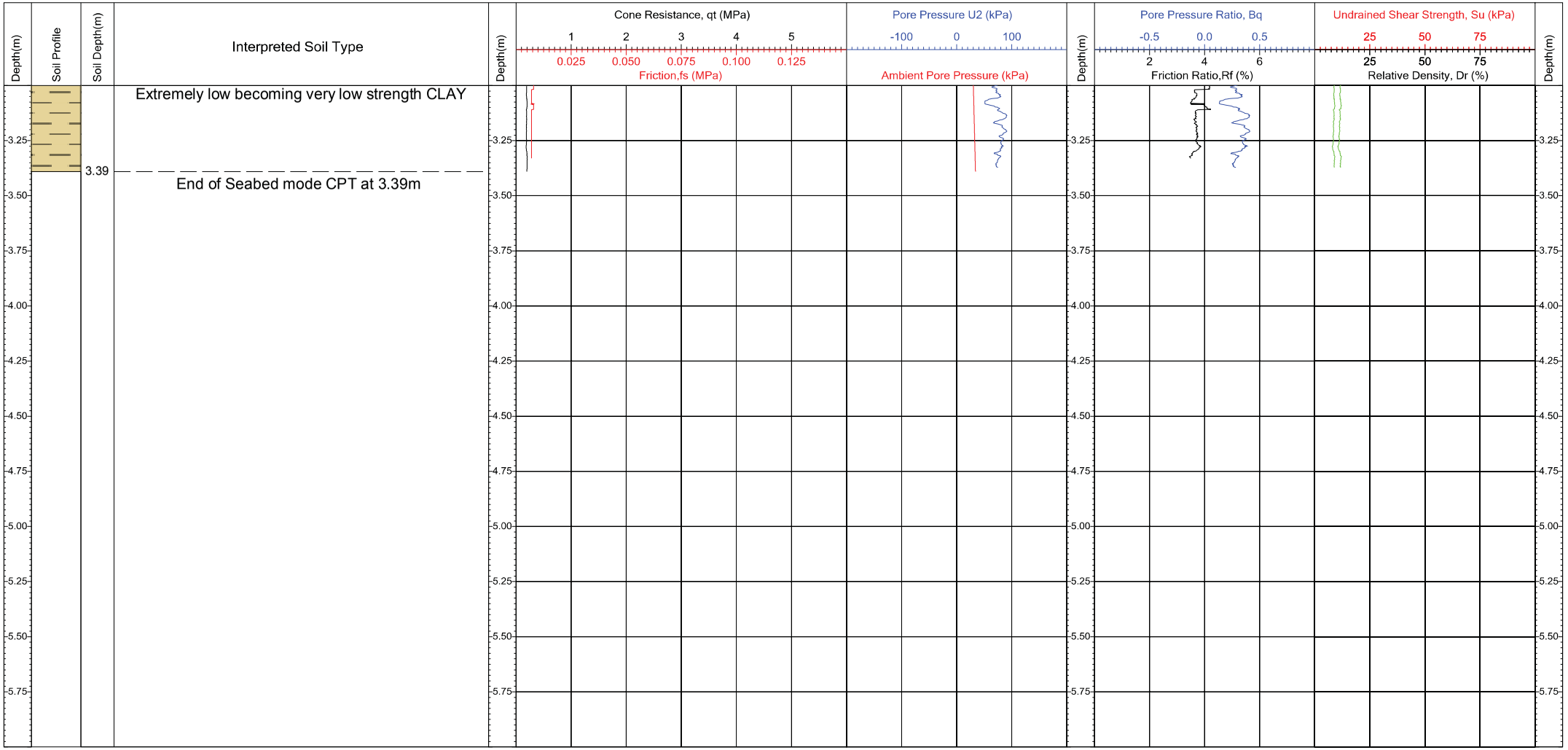
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8056466.4	139133.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
						Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
Target penetration achieved	Contract	10817	Water Depth	515.2	(mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				SACS_SGO_OE_CPT004
	Client Name	NEC	Date of Test	02/02/2017						
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 02/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	3.0°						

SACS Cable Route Survey

INSITU CPTU TESTING

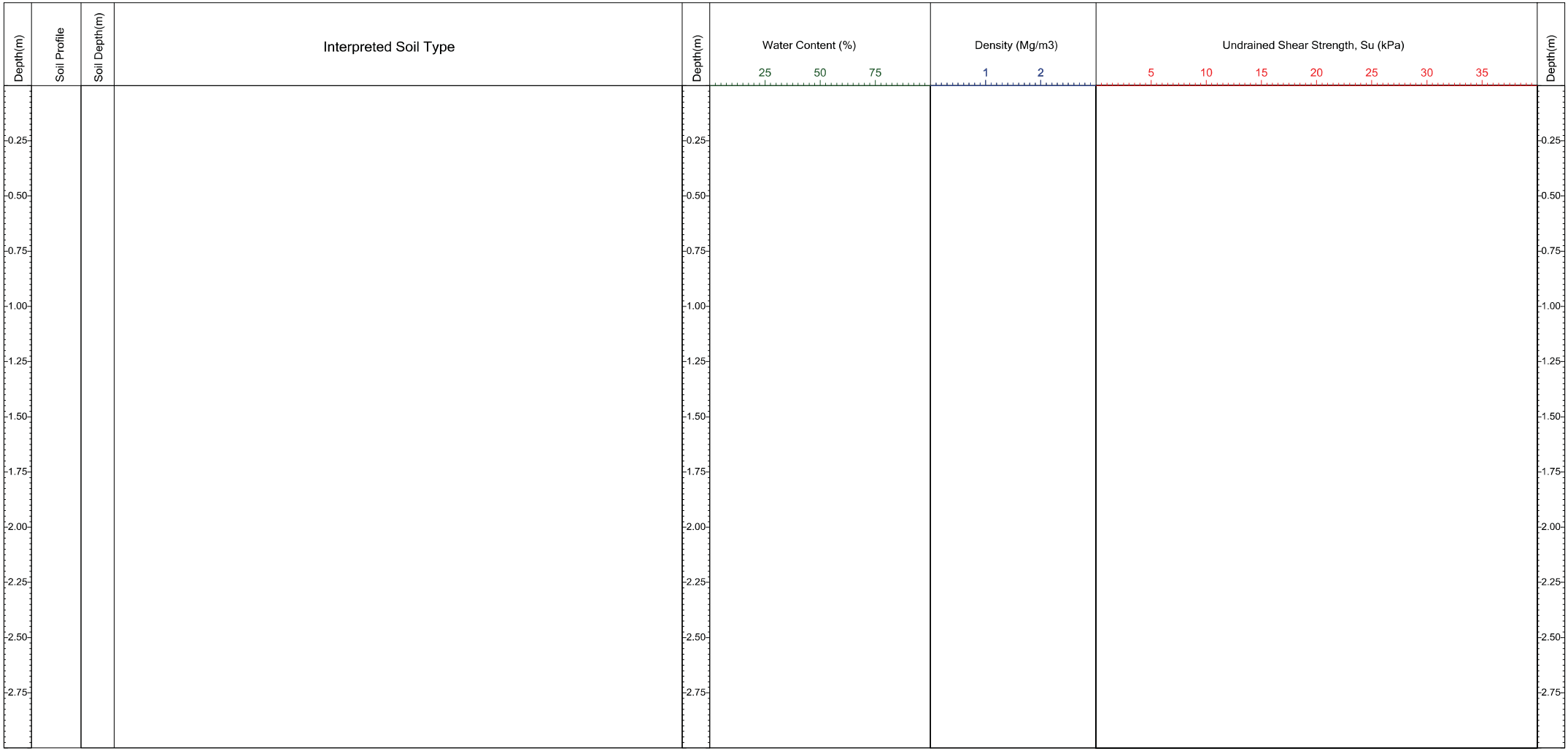


Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8056466.4	139133.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
						Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Contract	10817	Water Depth	515.2	(mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achieved	Client Name	NEC	Date of Test	02/02/2017						SACS_SGO_OE_CPT004
	Vessel	Ocean Endeavour	Cone No. / α Factor	3103	0.81	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 02/02/2017	SK 03/02/2017	AP 03/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	3.0°						

APPENDIX B PISTON CORE LOGS

SACS Cable Route Survey

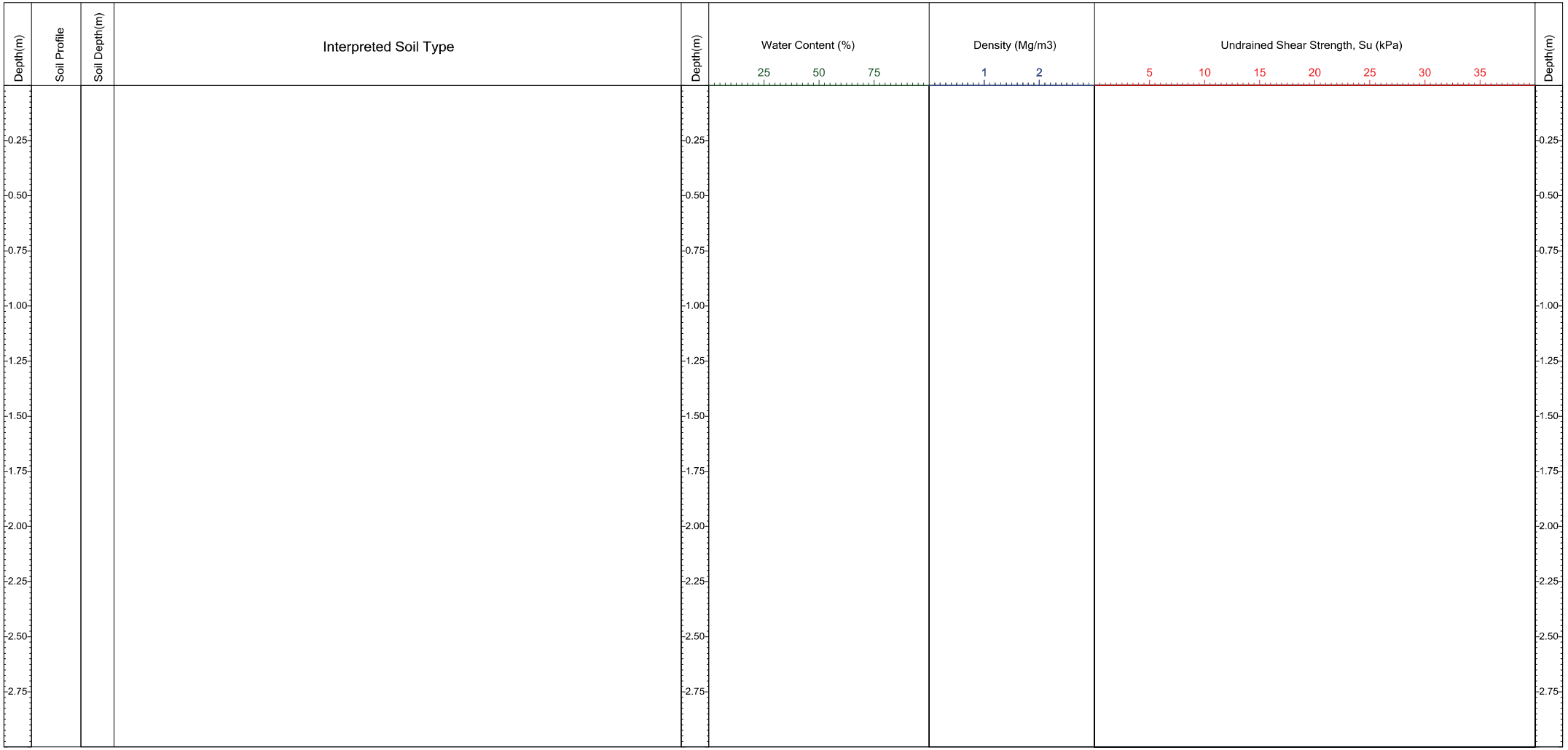
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8028868.3 128045.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
No penetration achieved, targeted a hard contact on the sonar. Barrel bent.	Contract	10817	Water Depth	1436.0 (mLAT)					SACS_SGO_OE_PC001
	Client Name	NEC	Date of Test	04/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.0		AP	DW	AP	
	Method	Piston corer	Recovery (m)	0.00		04/02/2017	06/02/2017	06/02/2017	

SACS Cable Route Survey

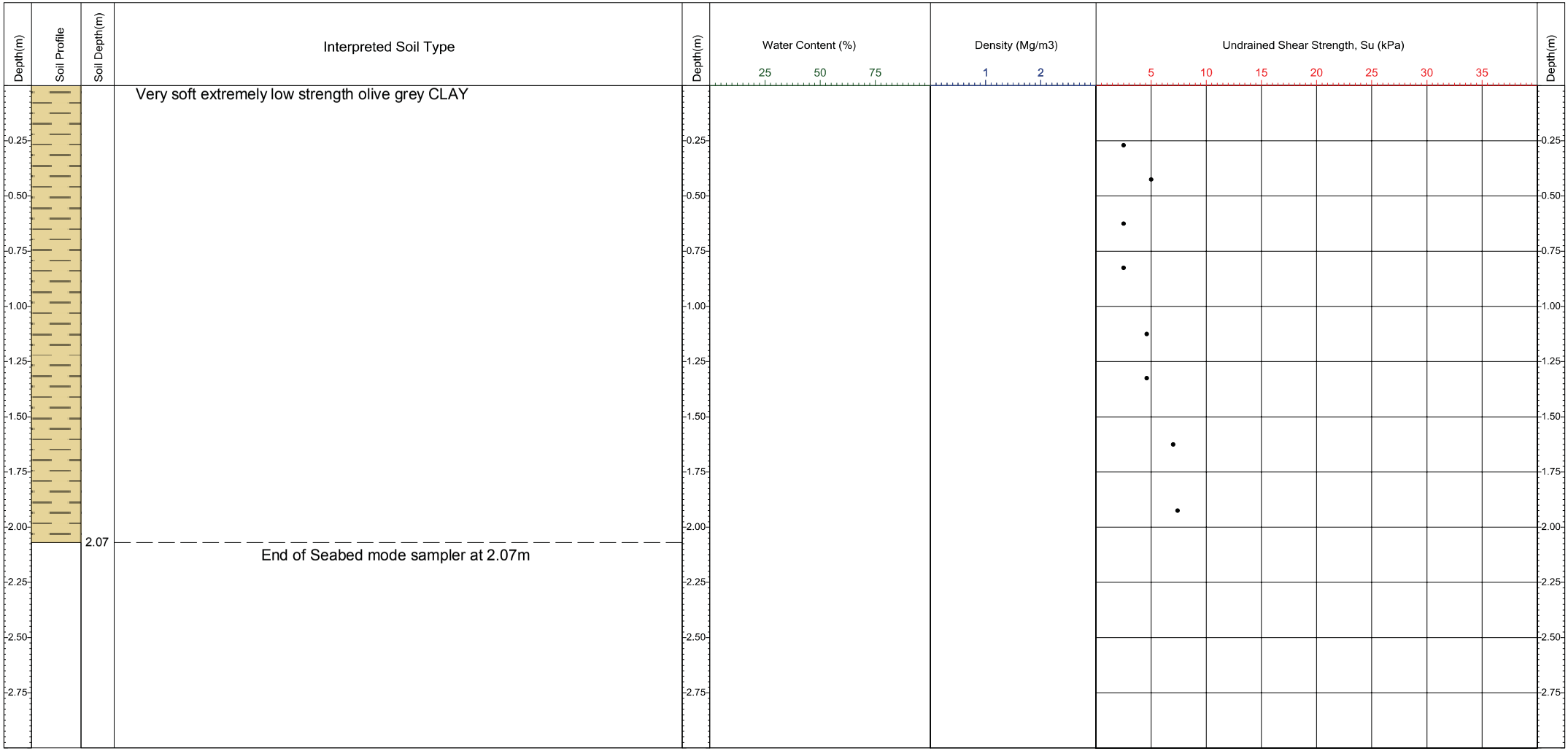
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8028878.4 128044.0	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	1435.1 (mLAT)		Preliminary	Draft	Final	
No penetration achieved due to hard layer	Client Name	NEC	Date of Test	04/02/2017					SACS_SGO_OE_PC001A
	Vessel	Ocean Endeavour	Penetration (m)	0.0		AP 04/02/2017	DW 06/02/2017	AP 06/02/2017	
	Method	Piston corer	Recovery (m)	0.00					

SACS Cable Route Survey

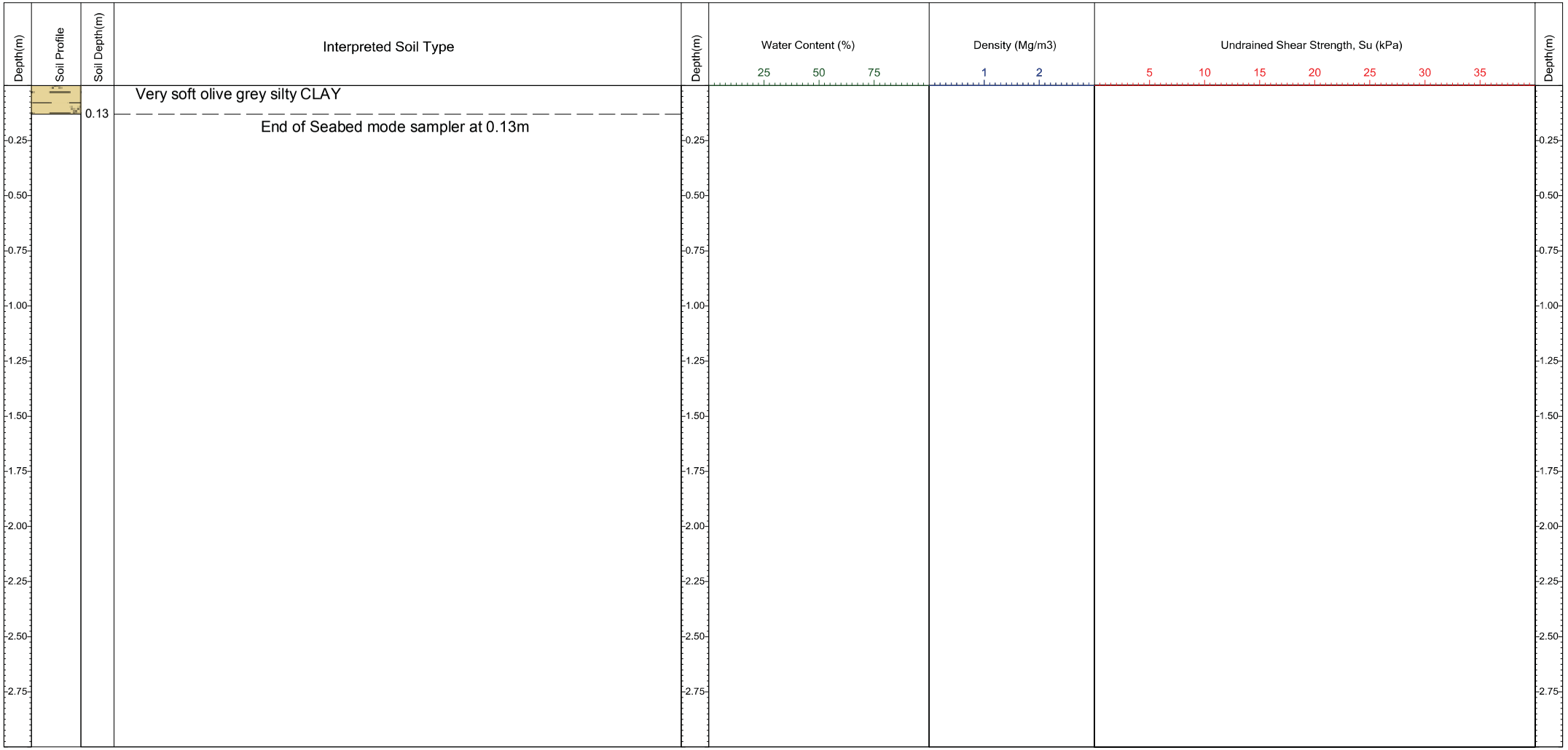
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8038675.1 132107.4	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	1163.2 (mLAT)		Preliminary	Draft	Final	
Target recovery achieved	Client Name	NEC	Date of Test	04/02/2017					SACS_SGO_OE_PC002
	Vessel	Ocean Endeavour	Penetration (m)	3.0		AP	DW	AP	
	Method	Piston corer	Recovery (m)	2.07		04/02/2017	06/02/2017	06/02/2017	

SACS Cable Route Survey

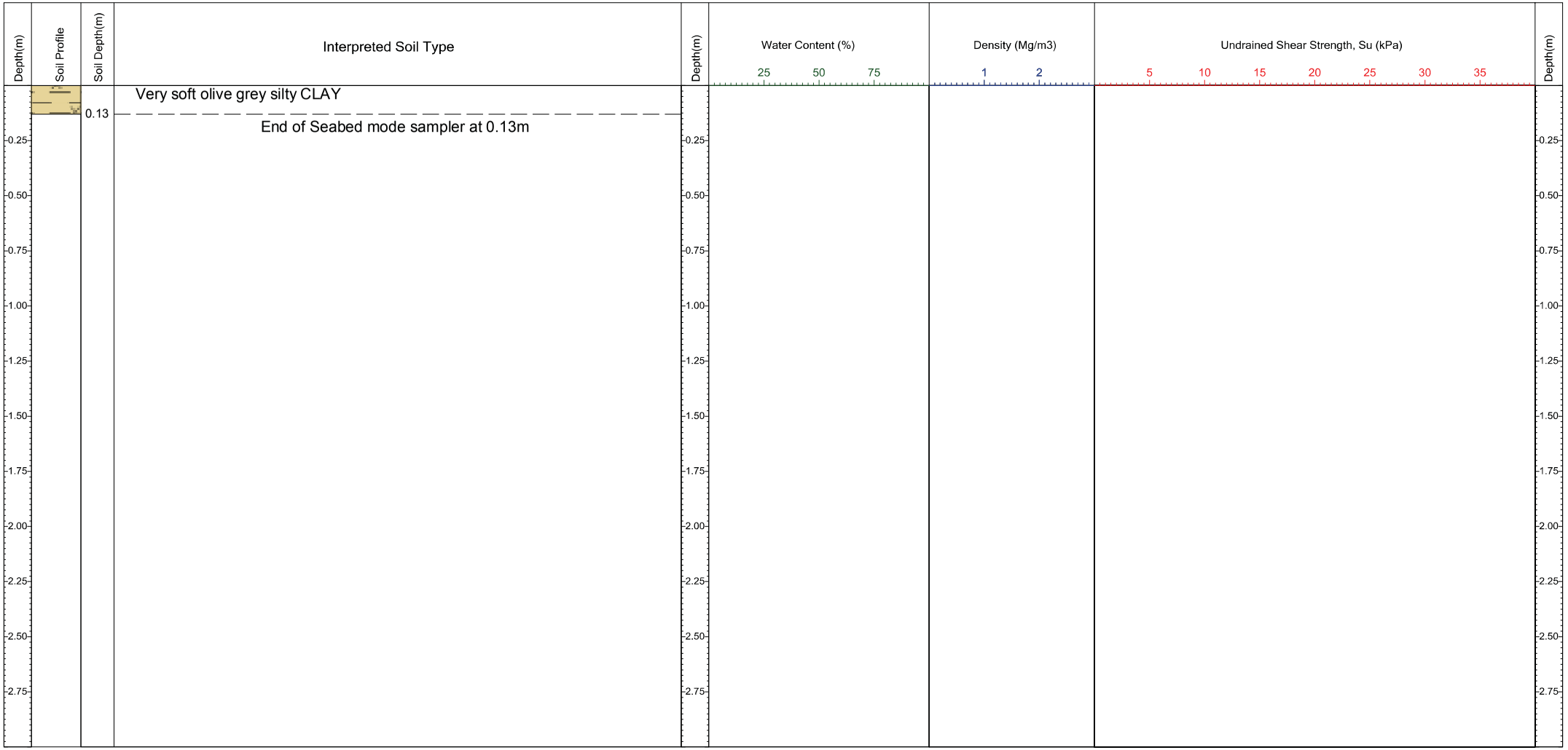
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8049826.9 136483.0	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Failed to achieved target recovery	Contract	10817	Water Depth	779.3 (mLAT)					SACS_SGO_OE_PC003
	Client Name	NEC	Date of Test	04/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	1.0		AP	DW	AP	
	Method	Piston corer	Recovery (m)	0.13		04/02/2017	06/02/2017	06/02/2017	

SACS Cable Route Survey

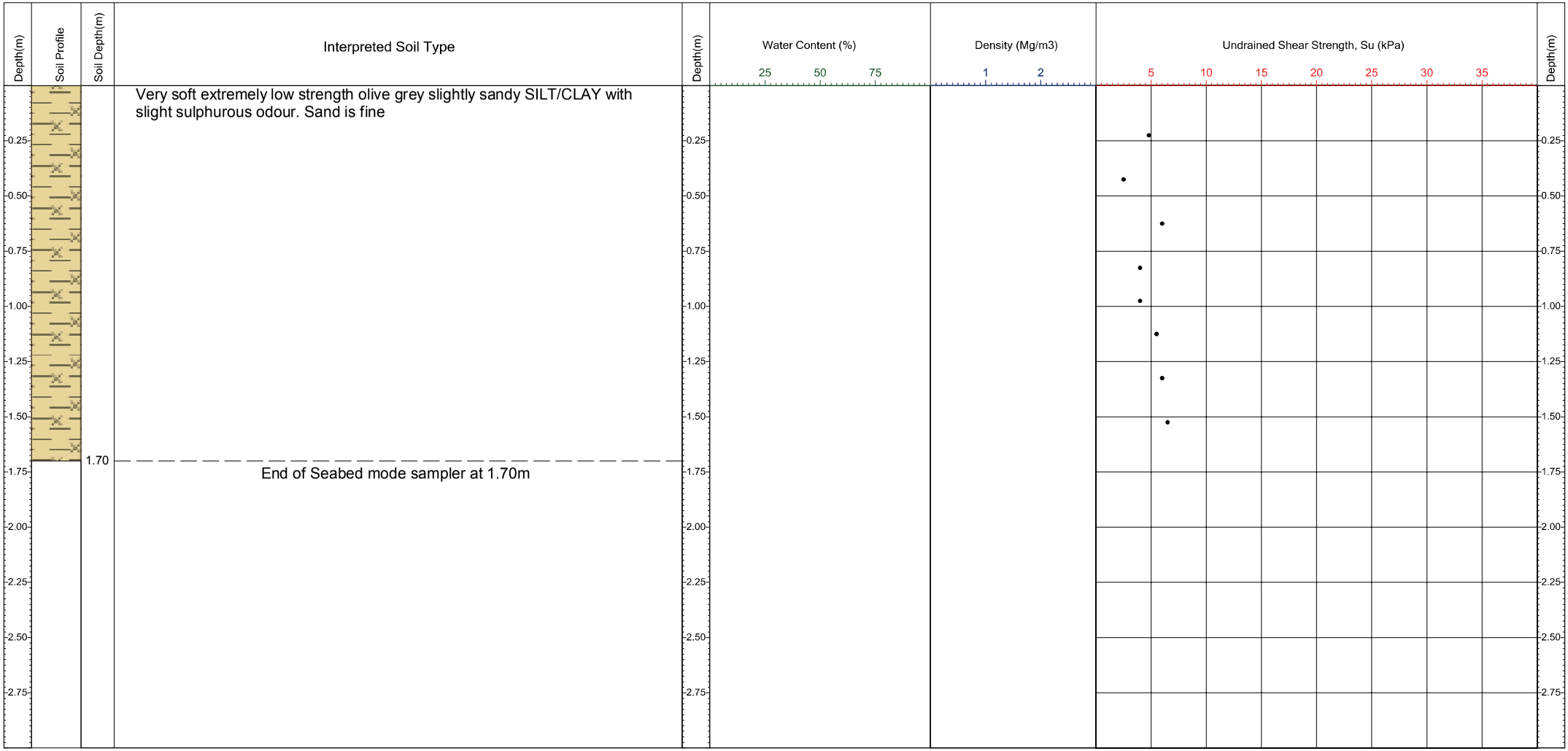
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8049832.8 136491.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Failed to achieved target recovery	Contract	10817	Water Depth	779.2 (mLAT)					SACS_SGO_OE_PC003A
	Client Name	NEC	Date of Test	04/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	1.0		AP	DW	AP	
	Method	Piston corer	Recovery (m)	0.13		04/02/2017	06/02/2017	06/02/2017	

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8061924.1 141228.5	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Target recovery achieved	Contract	10817	Water Depth	363.0 (mLAT)					SACS_SGO_OE_PC004
	Client Name	NEC	Date of Test	04/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	3.0		AP	DW	AP	
	Method	Piston corer	Recovery (m)	1.70		04/02/2017	06/02/2017	06/02/2017	

Chart Description Report for
NEC

Project:
SACS Cable System
KP5893.68 to KP5897.4

Description:
Offshore Chart Description

Survey Date:
01-Feb-2017 to 04-Feb-2017

Project Number:
10817

Report Number:
Offshore 002

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	M Irwing
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… R Bakewell

Revision	Date	Title	Report Ref
0	11-Feb-2017	Rev0	002/11-Feb-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Sangano
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	01-Feb-2017 to 04-Feb-2017
Survey Extents	KP5893.68 to KP5897.40

Equipment Used	
Positioning System	Fugro Starfix HP
Echo Sounder (MBES System)	Simrad EM1002 / EM120
Echo Sounder (SBES System)	Simrad EA400 Combi
Side Scan Sonar	EdgeTech 4200-FS
Sub-Bottom Profiler	Hull-mounted Pinger
Combined Side Scan Sonar & Chirp	Edgetech-DSS
Magnetometer	Geometrics G-882
Cone Penetrometer	Neptune 3000
Piston Corer	Kullenberg 3m Piston Corer

SACS.S1.NU085 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 35.5282’ S, 012° 38.9821’ E to 09° 34.6766' S, 012° 48.1950' E
Range of Depths	301m to 127m LAT
General Seabed Topography	In the southwest of the chart area, the seabed shoals along undulatory slope terraces at 1.5-2°. The proposed route encounters a break in slope in the southwestern part of the chart area; where crossing the feature obliquely, local gradients and maximum reach up to 5° and 20° respectively. Continuing northeast along slightly uneven terrain at <2°, the proposed route meets the top of the continental slope and the shelf break area at ~250m after crossing some localised mounds.
Seabed Features and Obstructions	Seabed sediments in the southwestern half of the route are shown by geotechnical sampling to comprise very soft silty clay. The proposed route encounters a fault trending northeast southwest across the area surveyed. Where intersecting, the route rises 17m though elsewhere along the feature relief reaches 20m. An area of disturbed ground flanking this feature suggests the slope here is possibly prone to mass movement. Further along the slope, the route clips some areas of interpreted hard mounds which appear to be distributed along the axis of the fault. As the proposed route turns and heads east, the seabed becomes fairly featureless, with seabed material found to consist of predominantly clayey silt. The RPL encounters a further fault system, where it crosses almost perpendicular climbing 18m up the slope face. Once negotiated the route passes over a series of fairly broad mounds which are typically 1-2m high. Distinct on sonar data, these mounds probably formed as a result of fluid escape relating to faulting episodes. MBES data recorded water column anomalies indicating these mounds act as a conduit for active gas seeps.
Shallow Soils	Around the top of the continental slope area, shallow soils are shown by geotechnical sampling to comprise extremely low becoming very low strength silty clay to 3m depth below seabed. Up onto the shelf break, soils are typically coarser, where the uppermost unit is extremely low becoming very low strength clayey silt. In the south of the chart area, where route development was undertaken, soils to 3m depth appear more structured with dense sand layers encountered as tested with CPT. However where underlying hard mounds, a lack of coherent reflectors and some masking indicates some form of disturbance in the shallow soils.

SACS.S1.NU085 **Offshore North-Up Chart Description** **Scale 1:10,000**

Potential Hazards

Two interpreted fault systems cross the RPL.

Areas of interpreted hard mounds with a possible association with active gas seepage are widespread where flanking, particularly across parts of the survey corridor where route development occurs to the south of the survey area.

Cable Crossings

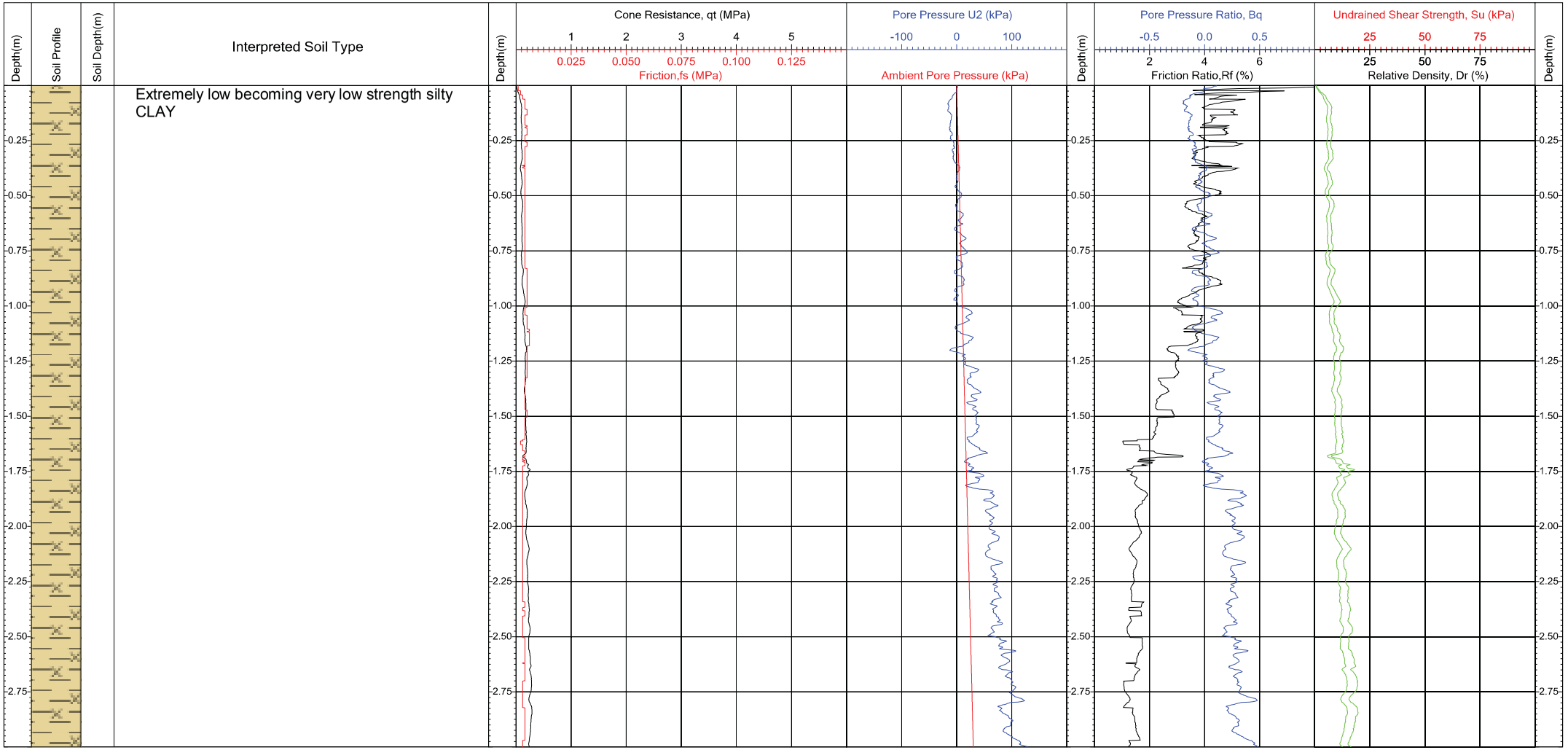
The survey route crosses no cables.

APPENDICES

APPENDIX A CPT LOGS

SACS Cable Route Survey

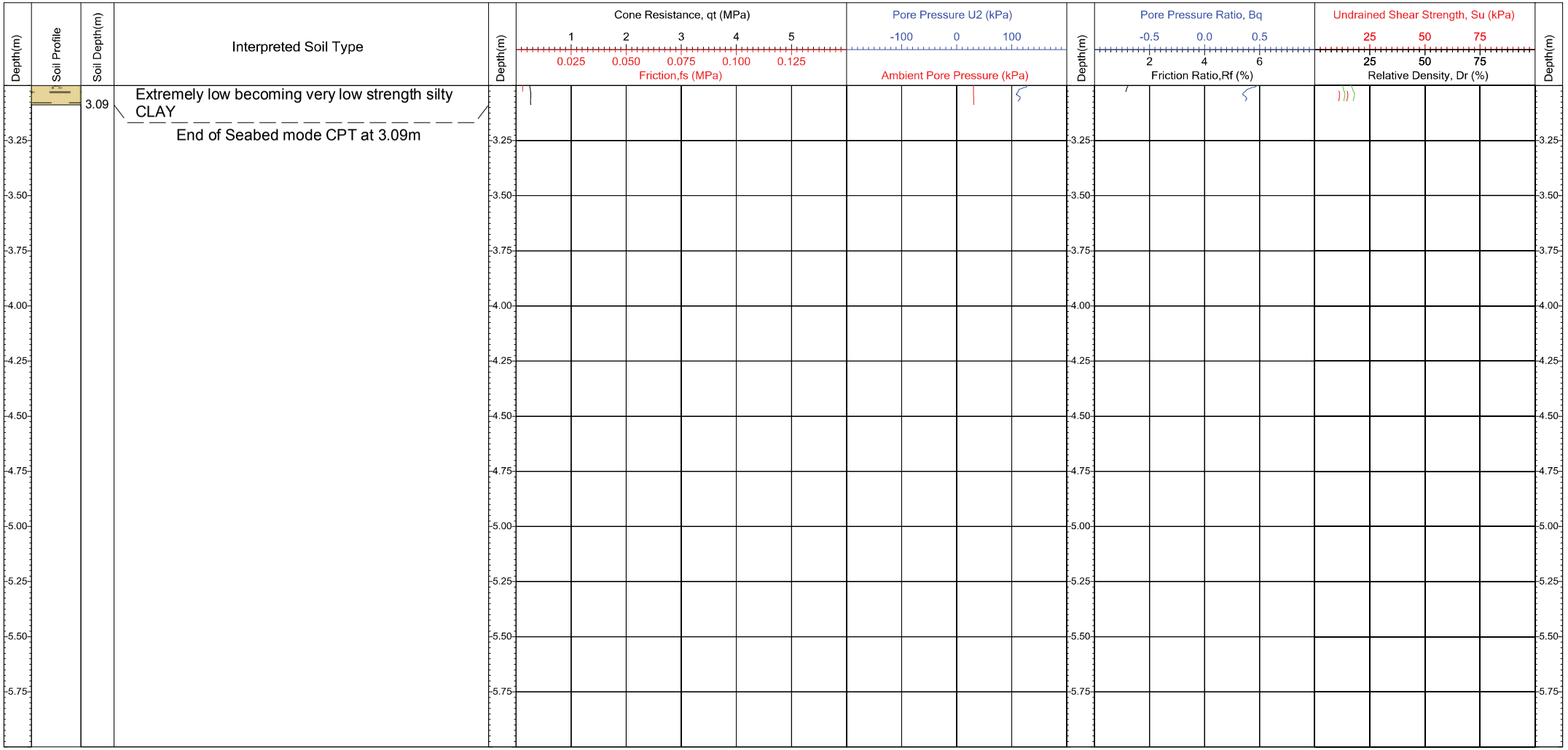
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8066340.2 143423.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	233.3 (mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	06/02/2017	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achieved	Vessel	Ocean Endeavour	Cone No. / α Factor	3069 0.84		AP	SK	AP	SACS_SGO_OE_CPT005
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	6.0°	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	06/02/2017	07/02/2017	07/02/2017	

SACS Cable Route Survey

INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8066340.2	143423.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
						Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Contract	10817	Water Depth	233.3	(mLAT)	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Target penetration achieved	Client Name	NEC	Date of Test	06/02/2017						SACS_SGO_OE_CPT005
	Vessel	Ocean Endeavour	Cone No. / α Factor	3069	0.84	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	6.0°						

Chart Description Report for
NEC

Project:
SACS Cable System
KP 5897.40 to KP 5915.18

Description:
Offshore Chart Description

Survey Date:
02-Feb-2017 to 09-Feb-2017

Project Number:
10817

Report Number:
Offshore 003

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	M Irwing
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… R Bakewell

Revision	Date	Title	Report Ref
0	11-Feb-2017	Rev0	003/11-Feb2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Sangano
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	02-Feb-2017 to 09-Feb-2017
Survey Extents	KP5897.4to KP5915.18

Equipment Used		
	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi
	Side Scan Sonar	EdgeTech 4200-FS
	Sub-Bottom Profiler	Hull-mounted Pinger
	Combined Side Scan Sonar & Chirp	Edgetech DSS
	Magnetometer	Geometrics G-882
	Cone Penetrometer	Neptune 3000
	Piston Corer	Kullenberg 3m Piston Corer

SACS.S1.NU085 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 35.5282’ S, 012° 38.9821’ E to 09° 34.6766' S, 012° 48.1950' E
Range of Depths	301m to 127m LAT
General Seabed Topography	In the southwest of the chart area, the seabed shoals along undulatory slope terraces at 1.5-2°. The proposed route encounters a break in slope in the southwestern part of the chart area; where crossing the feature obliquely, local gradients and maximum reach up to 5° and 20° respectively. Continuing northeast along slightly uneven terrain at <2°, the proposed route meets the top of the continental slope and the shelf break area at ~250m after crossing some localised mounds.
Seabed Features and Obstructions	Seabed sediments in the southwestern half of the route are shown by geotechnical sampling to comprise very soft silty clay. The proposed route encounters a fault trending northeast southwest across the area surveyed. Where intersecting, the route rises 17m though elsewhere along the feature relief reaches 20m. An area of disturbed ground flanking this feature suggests the slope here is possibly prone to mass movement. Further along the slope, the route clips some areas of interpreted hard mounds which appear to be distributed along the axis of the fault. As the proposed route turns and heads east, the seabed becomes fairly featureless, with seabed material found to consist of predominantly clayey silt. The RPL encounters a further fault system, where it crosses almost perpendicular climbing 18m up the slope face. Once negotiated the route passes over a series of fairly broad mounds which are typically 1-2m high. Distinct on sonar data, these mounds probably formed as a result of fluid escape relating to faulting episodes. MBES data recorded water column anomalies indicating these mounds act as a conduit for active gas seeps.
Shallow Soils	Around the top of the continental slope area, shallow soils are shown by geotechnical sampling to comprise extremely low becoming very low strength silty clay to 3m depth below seabed. Up onto the shelf break, soils are typically coarser, where the uppermost unit is extremely low becoming very low strength clayey silt. In the south of the chart area, where route development was undertaken, soils to 3m depth appear more structured with dense sand layers encountered as tested with CPT. However where underlying hard mounds, a lack of coherent reflectors and some masking indicates some form of disturbance in the shallow soils.

SACS.S1.NU085 **Offshore North-Up Chart Description** **Scale 1:10,000**

Potential Hazards

Two interpreted fault systems cross the RPL.

Areas of interpreted hard mounds with a possible association with active gas seepage are widespread where flanking, particularly across parts of the survey corridor where route development occurs to the south of the survey area.

Cable Crossings

The survey route crosses no cables.

SACS.S1.NU086 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 34.6852’ S, 012° 48.9235’ E to 09° 34.5209' S, 012° 54.1364' E
Range of Depths	135m to 104m LAT
General Seabed Topography	The seabed gently shoals throughout the chart area at a steady gradient, averaging <0.2°. Local small undulations occur in the centre of the chart.
Seabed Features and Obstructions	At the western extent of the chart, seabed sediments are interpreted to consist of clay/silt with frequent depressions containing patches of interpreted coarse material. The route then passes through the BU position where the seabed is largely featureless. Toward the centre of the chart, seabed sediments shown by geotechnical sampling to comprise sandy clayey silt. Increasing sonar reflectivity in this area suggests clayey sand with localised patches of hardground occur where the seabed appears notably dimpled. The proposed route crosses an area of distinctive hardground, approximately 60m wide. CPT data yielded no penetration at this surface. A number of magnetic anomalies occur towards the eastern edge of the chart positioning close to the route.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise very soft sandy clayey silt with shell overlying soft silty clay to 3m depth below seabed.
Potential Hazards	The RPL encounters interpreted hardground. Route development undertaken during the survey found that this strip of hardground continued across the widened route corridor to the south.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU087 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

09° 34.5295’ S, 012° 53.8649’ E to 09° 34.3653' S, 012° 59.0778' E

Range of Depths

107m to 79m LAT

General Seabed Topography

Seabed shoals slightly at <0.2°. From about halfway along the route corridor, ambient seabed gradient increases slightly.

Seabed topography for the most part is relatively even throughout the chart area.

Seabed Features and Obstructions

Seabed sediments are shown by geotechnical sampling to comprise sand clayey silt. Towards the western end of the chart, occasional small depressions occur, interpreted to mark areas of coarse material.

Local variations in sonar reflectivity indicate fluctuations in silt/sand content.

Shallow Soils

Shallow soils are shown by geotechnical sampling to comprise very soft sandy clayey silt with shell overlying soft silty clay.

In places along the route corridor, occasional lenses of dense sand occur within 3m depth below seabed as tested by CPT. Sub-bottom data indicates these are not laterally continuous.

Potential Hazards

None

Cable Crossings

The survey route crosses one in service cable.

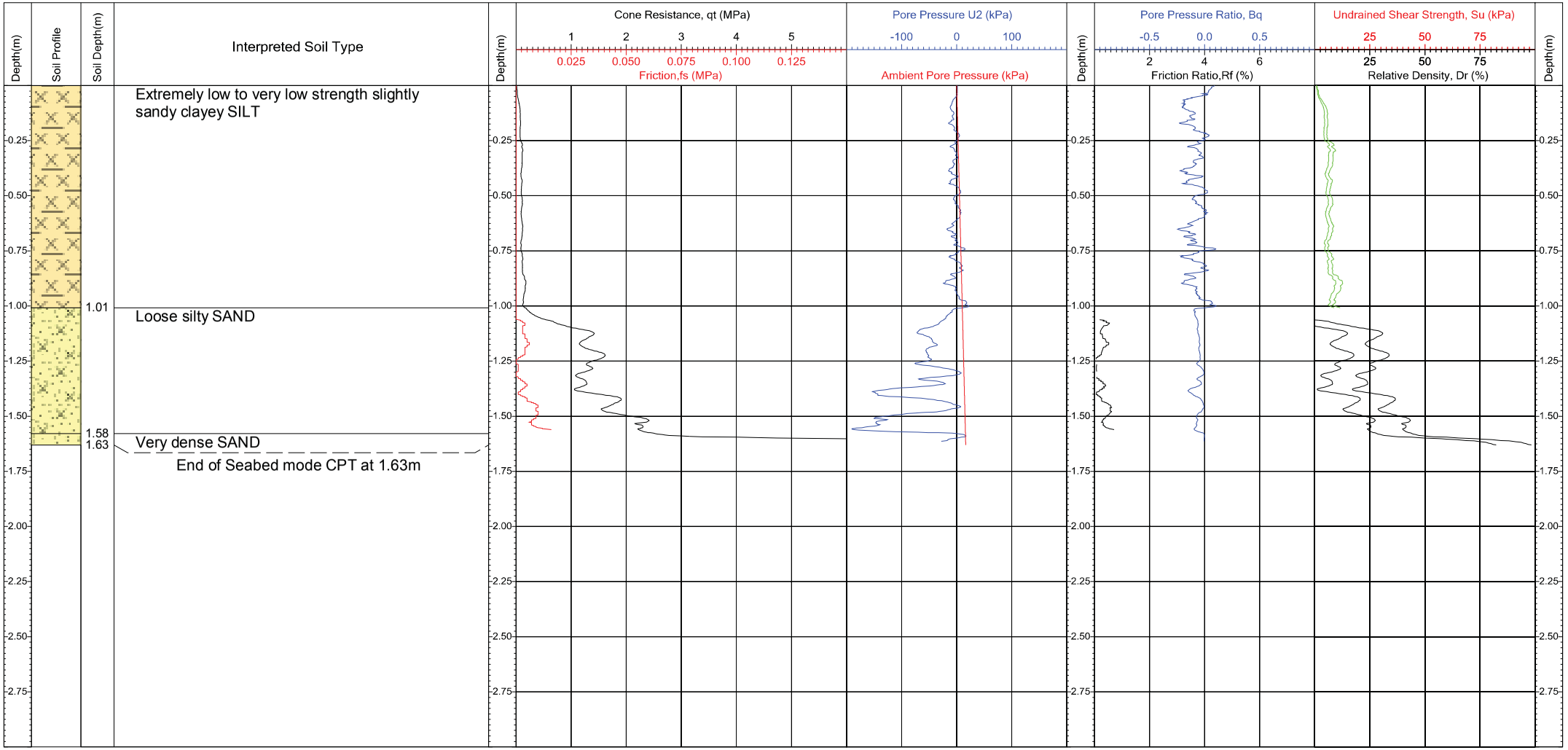
Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
ADONES seg 6	IS	09°	34.517'	S	012°	54.271'	E	104m	5912.7	DA

APPENDICES

APPENDIX A CPT LOGS

SACS Cable Route Survey

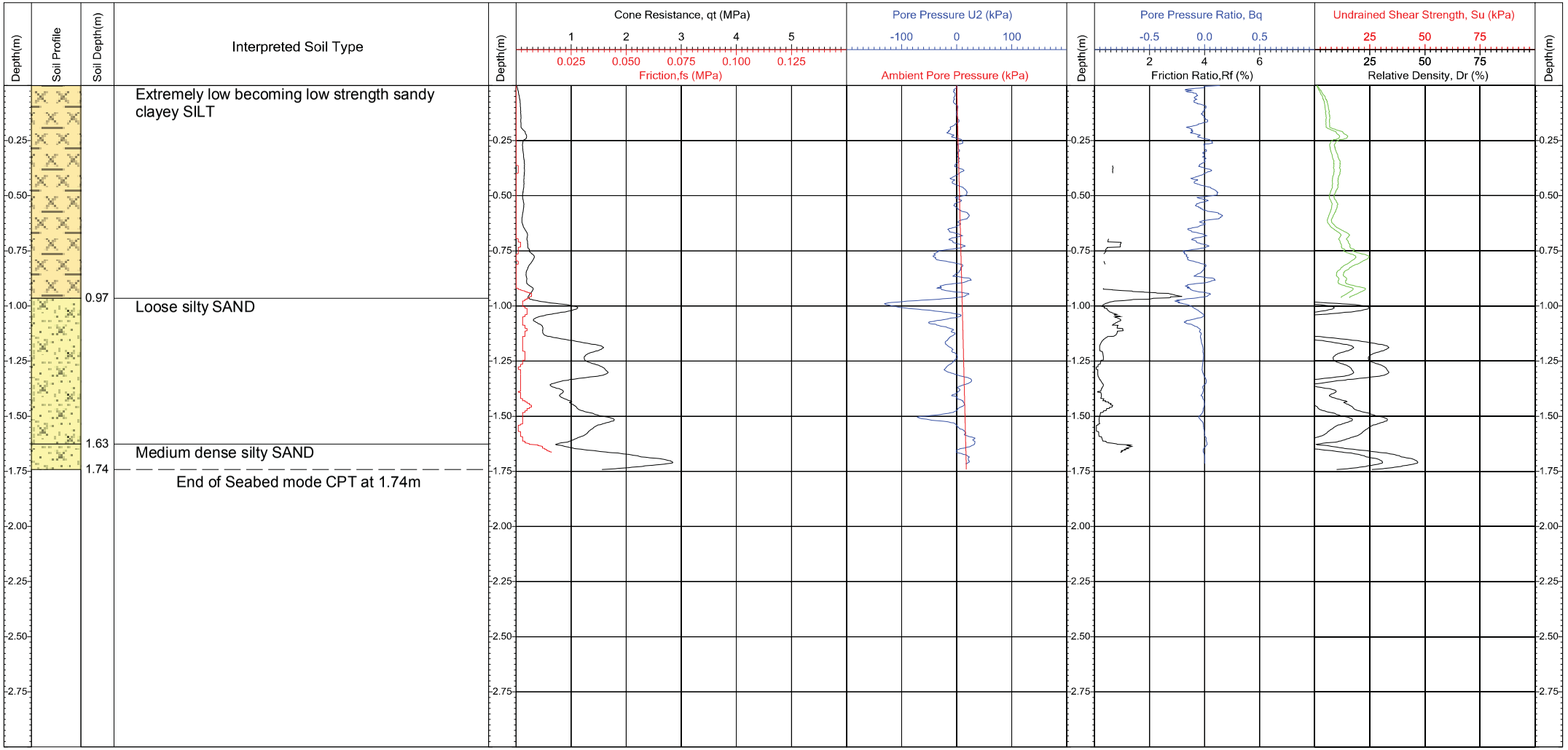
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8072176.3	142519.3	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	149.3	(mLAT)	Assumed Soil Density: 18KN/m3 NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Test stopped due to rod bend	Client Name	NEC	Date of Test	06/02/2017						SACS_SGO_OE_CPT006
	Vessel	Ocean Endeavour	Cone No. / α Factor	3069	0.84	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	7.0°						

SACS Cable Route Survey

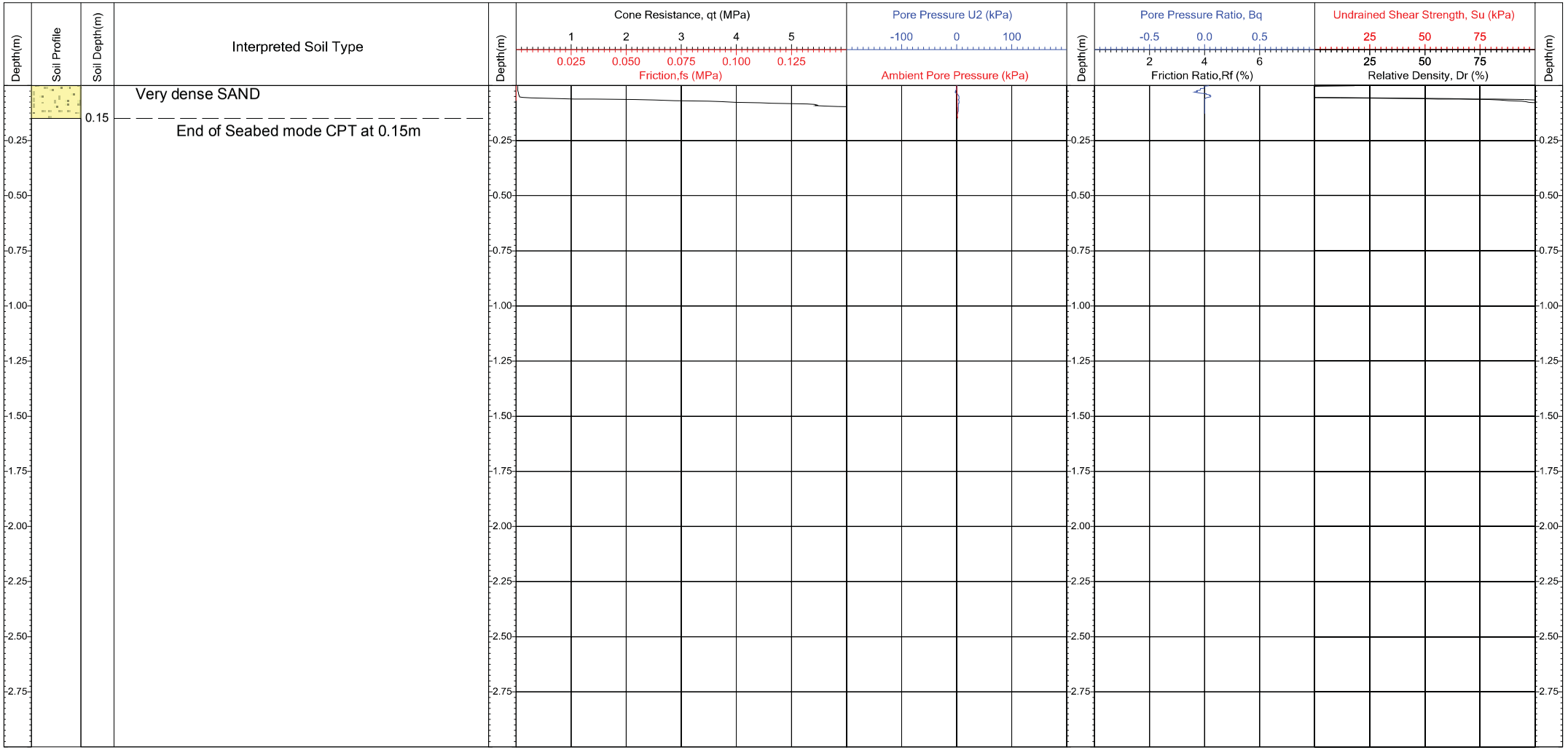
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8072171.3	142516.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	148.6	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	06/02/2017		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Test stopped due to rod bend	Vessel	Ocean Endeavour	Cone No. / α Factor	3069	0.84					SACS_SGO_OE_CPT006B
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	4.0°		*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	

SACS Cable Route Survey

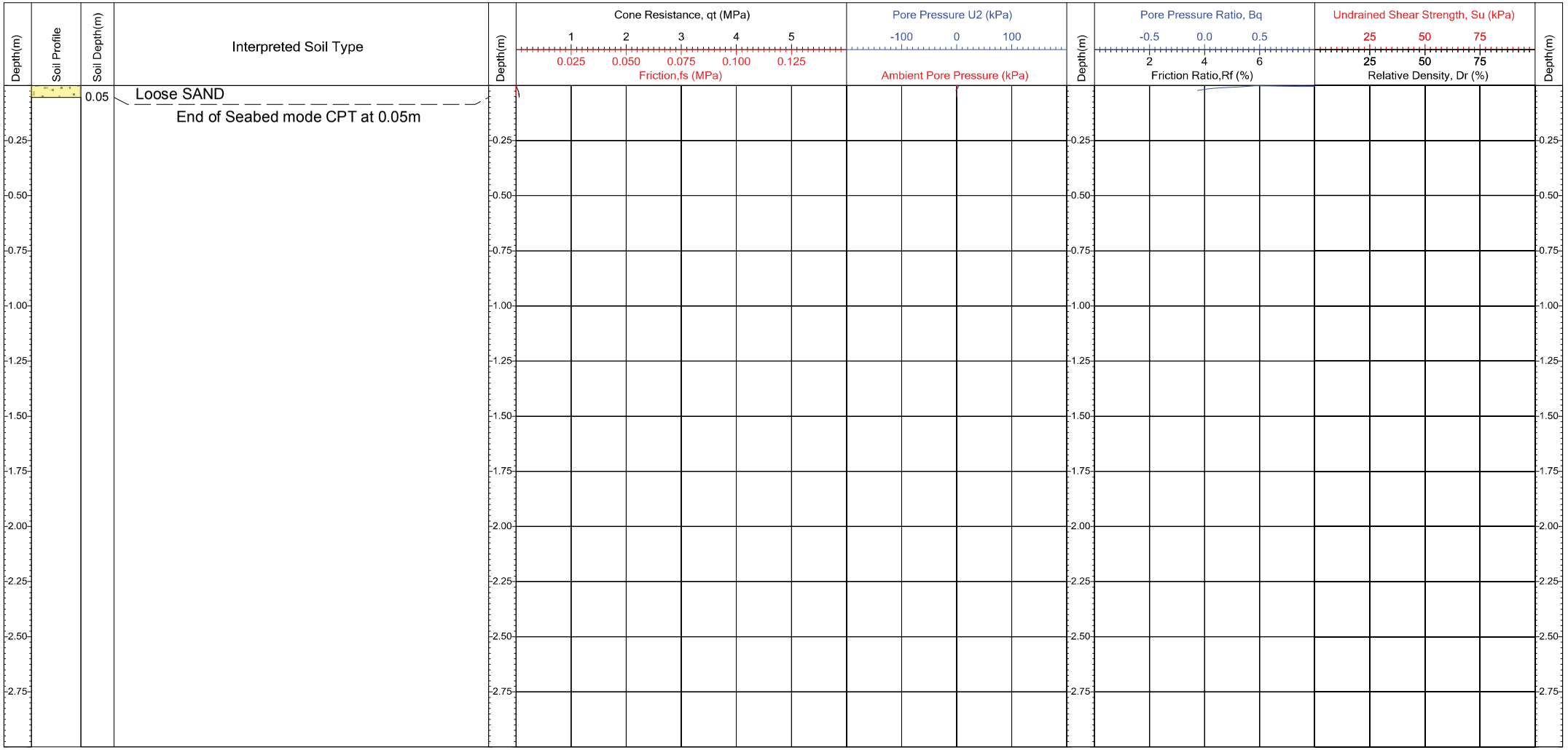
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8079252.5	143862.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	113.0	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	06/02/2017		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Test stopped due to rapid tip surge.	Vessel	Ocean Endeavour	Cone No. / α Factor	3069	0.84	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	SACS_SGO_OE_CPT007
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	3.0°						

SACS Cable Route Survey

INSITU CPTU TESTING

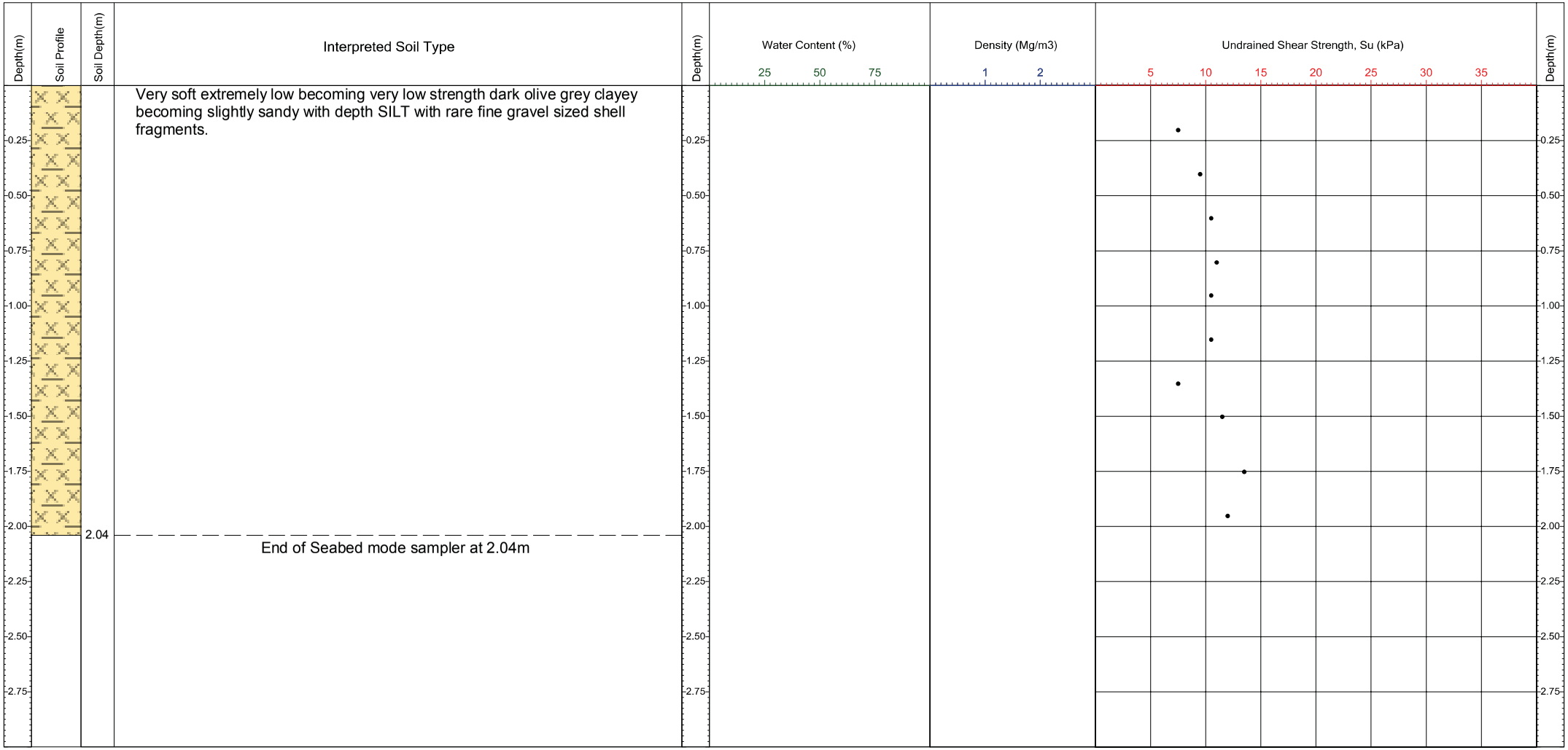


Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8079254.1	143854.4	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	113.3	(mLAT)	Assumed Soil Density: 18KN/m3 NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Test stopped on tip surge	Client Name	NEC	Date of Test	06/02/2017						SACS_SGO_OE_CPT007A
	Vessel	Ocean Endeavour	Cone No. / α Factor	3069	0.84	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	4.0°						

APPENDIX B PISTON CORE LOGS

SACS Cable Route Survey

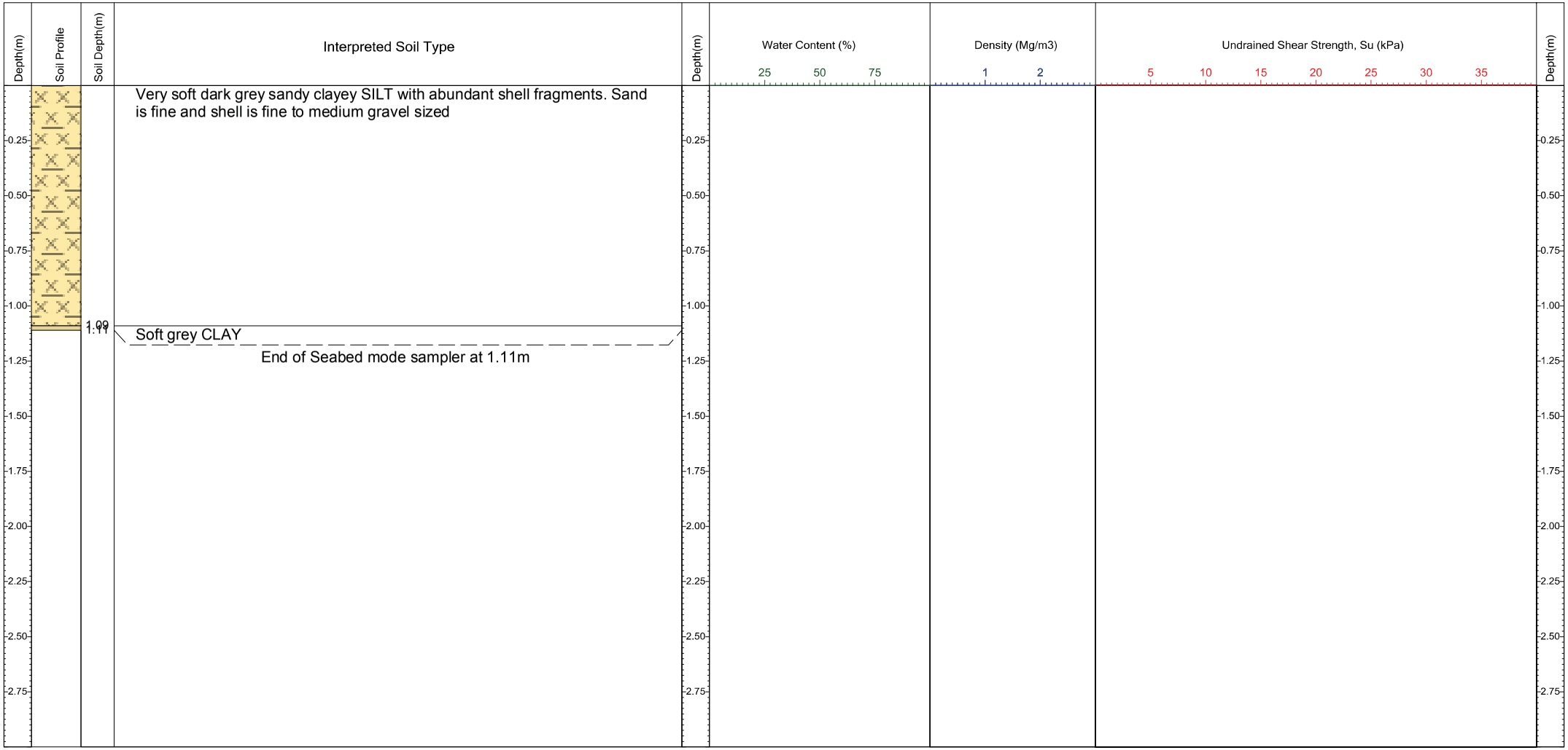
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8069036.1 143359.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Target recovery achieved	Contract	10817	Water Depth	183.0 (mLAT)					SACS_SGO_OE_PC005
	Client Name	NEC	Date of Test	06/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	2.5		AP	SK	AP	
	Method	Piston corer	Recovery (m)	2.04		06/02/2017	07/02/2017	07/02/2017	

SACS Cable Route Survey

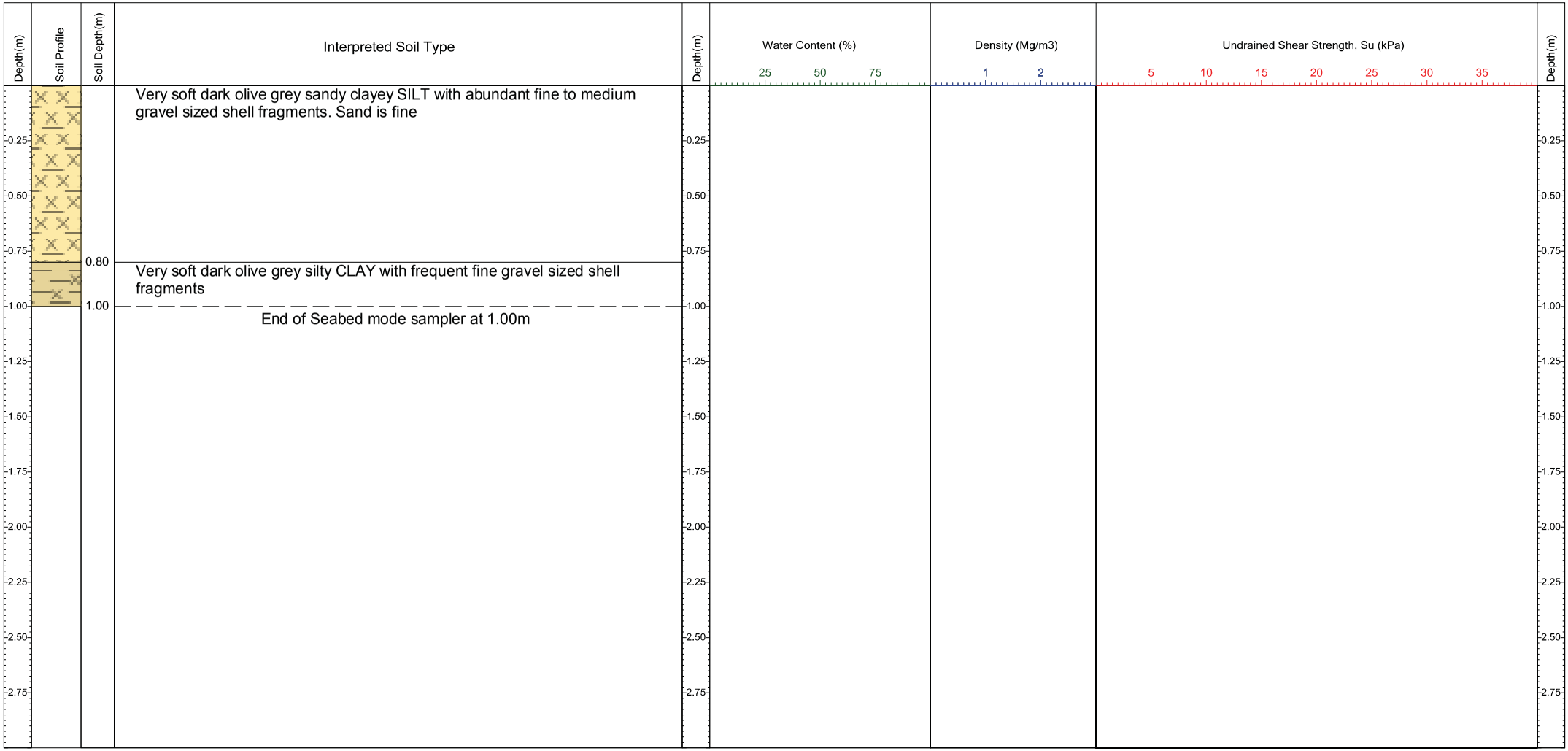
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8077575.5 143887.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Target recovery achieved	Contract	10817	Water Depth	119.4 (mLAT)					SACS_SGO_OE_PC006
	Client Name	NEC	Date of Test	06/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	3.0		AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	Piston corer	Recovery (m)	1.11					

SACS Cable Route Survey

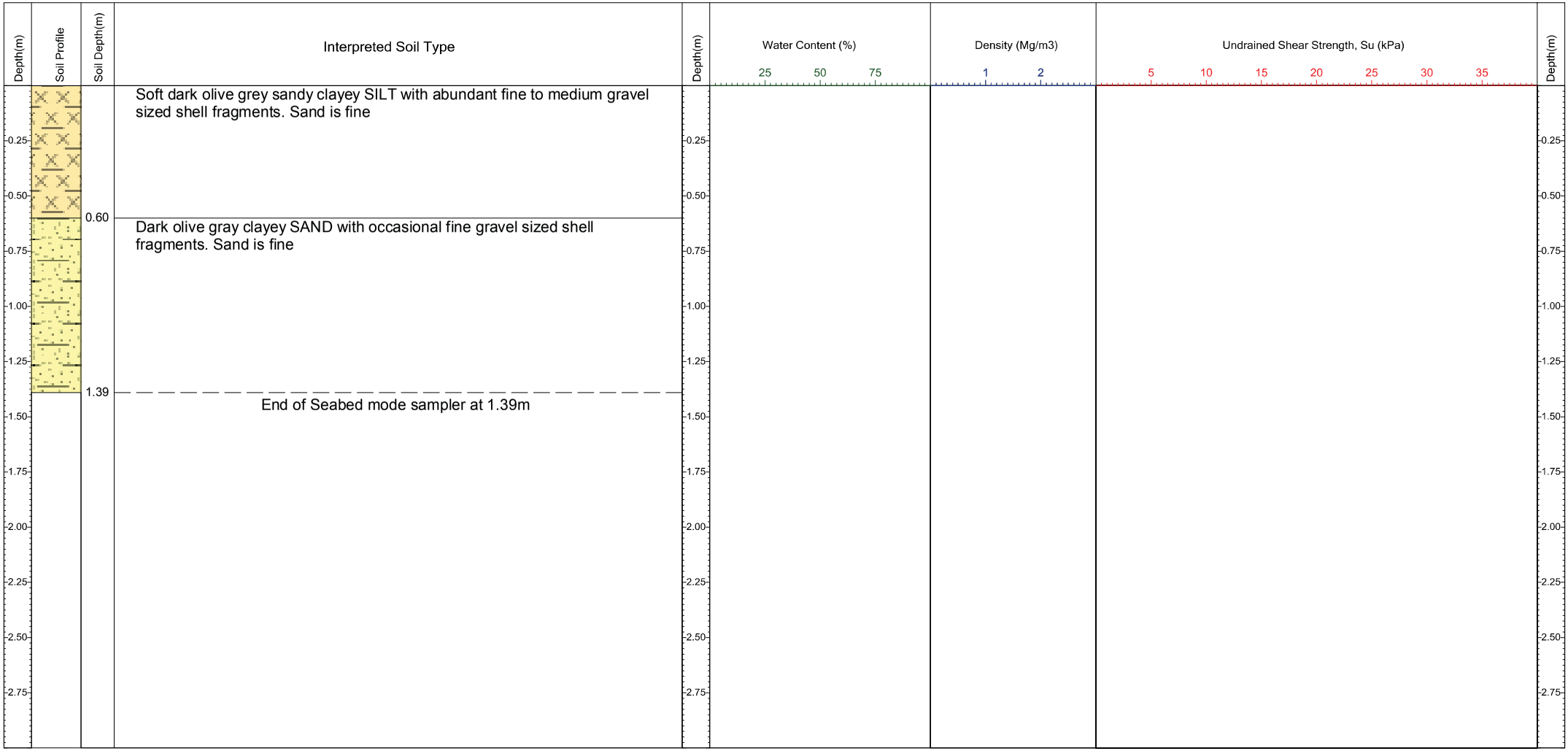
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8079357.8 143859.8	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	112.9 (mLAT)		Preliminary	Draft	Final	
Targget recovery achieved	Client Name	NEC	Date of Test	06/02/2017					SACS_SGO_OE_PC007
	Vessel	Ocean Endeavour	Penetration (m)	1.5		AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	Piston corer	Recovery (m)	1.00					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8084613.6 144110.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	101.1 (mLAT)		Preliminary	Draft	Final	
Target recovery achieved	Client Name	NEC	Date of Test	06/02/2017					SACS_SGO_OE_PC008
	Vessel	Ocean Endeavour	Penetration (m)	2.0		AP 06/02/2017	SK 07/02/2017	AP 07/02/2017	
	Method	Piston corer	Recovery (m)	1.39					

Chart Description Report for
NEC

Project:
SACS Cable System
KP5915.20 to KP5939.7

Description:
Offshore Chart Description

Survey Date:
06-Feb-2017 to 08-Feb-2017

Project Number:
10817

Report Number:
Offshore 004

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	M Irwing
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… R Bakewell

Revision	Date	Title	Report Ref
0	11-Feb-2017	Rev0	004/11-Feb-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Shallow Water Offshore Sangano
Survey Vessel	M.V. Ocean Endeavour
Survey Dates	06-Feb-2017 to 08-Feb-2017
Survey Extents	KP5915.20 to KP5939.70

Equipment Used		
	Positioning System	Fugro Starfix HP
	Echo Sounder (MBES System)	Simrad EM1002 / EM120
	Echo Sounder (SBES System)	Simrad EA400 Combi
	Side Scan Sonar	EdgeTech 4200-FS
	Sub-Bottom Profiler	Hull-mounted Pinger
	Magnetometer	Geometrics G-882
	Cone Penetrometer	Neptune 3000
	Piston Corer	Kullenberg 3m Piston Corer

SACS.S1.NU087 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range

09° 34.5295’ S, 012° 53.8649’ E to 09° 34.3653' S, 012° 59.0778' E

Range of Depths

107m to 79m LAT

General Seabed Topography

Seabed shoals slightly at <0.2°. From about halfway along the route corridor ambient gradient increases slightly.

Seabed topography for the most part is relatively even throughout the chart area.

Seabed Features and Obstructions

Seabed sediments are shown by geotechnical sampling to comprise sandy clayey silt. Towards the western end of the chart, occasional small depressions occur, interpreted to mark areas of coarse material.

Local variations in sonar reflectivity indicate fluctuations in silt/sand content.

Shallow Soils

Shallow soils are shown by geotechnical sampling to comprise very soft sandy clayey silt with shell overlying soft silty clay.

In places along the route corridor, occasional lenses of dense sand occur within 3m depth below seabed as tested by CPT. Sub-bottom data indicates these are not laterally continuous.

Potential Hazards

None

Cable Crossings

The survey route crosses one in service cable.

Comment	Cable Status	Latitude			Longitude			Depth (m)	Cum KP Dist(km)	System Cable Type
ADONES seg 6	IS	09°	34.517'	S	012°	54.271'	E	104m	5912.7	DA

SACS.S1.NU088 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 34.3738’ S, 012° 58.8063’ E to 09° 34.2123' S, 013° 04.0192' E
Range of Depths	82m to 39m LAT
General Seabed Topography	Seabed shoals fairly evenly at 0.2° across the chart area, interrupted occasionally by shallow narrow troughs and a small break in slope, across which gradients reach 1-1.5°. At the eastern end of the chart, local gradients reach 10 where the route shoals over rocky terrain.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise predominantly silty clay. Seabed features undergo a marked transition where areas of interpreted hardground/dense sand/gravel occur stretching across the route corridor in the western half of the chart. Corresponding with alternating relief, these bands of high sonar reflectivity were sampled with the piston corer, where gravel and cemented sand were recovered in the core. Elsewhere as the route progresses to the east, sediments appear to undergo a general transition to a more sandier clay with areas of dense sand and gravel /gravelly sand with numerous pitted depressions exposed by a current streaked veneer. Where the seabed topography starts to exhibit relief across the survey corridor, the route enters an area where clay gives way to sand influenced bedforms; generally consisting of silty clay and dense sand with accumulations of gravel. At the chart extents, the route encounters more variable seabed material, passing through scattered exposures of rock outcrops, subcropping rock, patches of silty megarippled sand and gravelly sand.
Shallow Soils	Shallow soils are shown by geotechnical sampling to mainly comprise silty clay which extends to 3m depth below seabed. For the majority of the chart, a reflector is visible on sub-bottom data marking a change to a unit of dense sand as sampled by the CPT. Where this unit subcrops closely beneath seabed pitted depressions are more evident, probably containing coarse sand and gravel.
Potential Hazards	Hardground is encountered in three instances along the route. The RPL passes over areas of rock outcropping.
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU089 **Offshore North-Up Chart Description** **Scale 1:10,000**

Chart Range	09° 34.2207’ S, 013° 03.7477’ E to 09° 34.0594' S, 013° 08.9606' E
Range of Depths	46m to 18m LAT
General Seabed Topography	After passing over some hummocky terrain at the western end of the chart area, the seabed shoals steadily at <0.2°. This steady climb is interrupted at regular intervals where the route crosses a number of shallow troughs, typically 100m wide and 0.5m deep. Gradients typically 2-3° are met on the flanks of these troughs. Seabed terrain generally becomes more uneven at the eastern end of the chart area, where approaching the nearshore section. Significant gradients are not encountered in this area.
Seabed Features and Obstructions	At the western limit of the chart, seabed material typically comprises predominantly sandy gravel with gravelly sand and cemented sands/hardgrounds. As the route navigates past this hummocky terrain, seabed sediments are shown by geotechnical sampling to comprise silty sand. As the route heads eastwards, seabed material grades to clayey sand. The proposed route crosses shallow sedimentary troughs, typically 0.5m-1.0m depth which comprise gravelly sand. These circular lobate bedforms appear to be discontinuous.
Shallow Soils	Shallow soils are shown by geotechnical sampling to mainly comprise silty sand overlying clayey sand. A distinct reflector visible on sub-bottom data is less than 3m in places and is interpreted to mark the uppermost sand and interpreted top of bedrock.
Potential Hazards	The RPL crosses areas of outcropping rock
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU090 **Offshore North-Up Chart Description** **Scale 1:10,000**

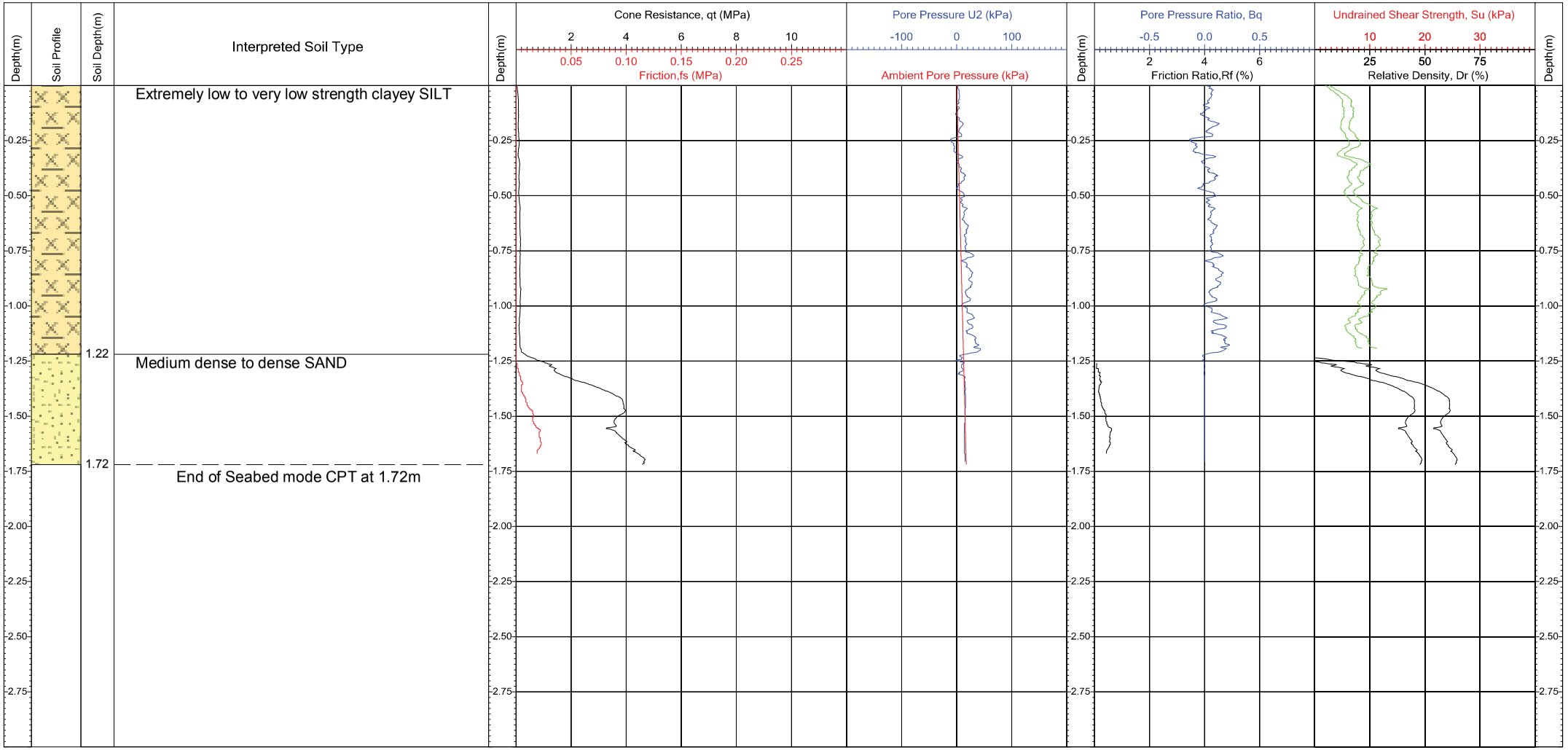
Chart Range	09° 34.2207’ S, 013° 03.7477’ E to 09° 34.0594' S, 013° 08.9606' E
Range of Depths	11m to 26m LAT
General Seabed Topography	The seabed shoals steadily at <0.2°. This steady climb is interrupted at regular intervals where the route crosses a number of shallow troughs, typically 100m wide and 0.5m deep. Gradients typically 2-3° are met on the flanks of these troughs. Seabed terrain generally becomes more uneven at the eastern end of the chart area, where rocky outcrops are more frequent; significant gradients are encountered on these outcrops.
Seabed Features and Obstructions	At the eastern limit of the chart, seabed material typically comprises predominantly sandy gravel with gravelly sand. As the route navigates past this hummocky terrain, seabed sediments are shown by geotechnical sampling to comprise loose to medium dense sand. The proposed route crosses shallow sedimentary troughs, typically 0.5m-1.0m depth which comprise gravelly sand. These circular lobate bedforms appear to be discontinuous. As the route heads eastwards, the seabed traverses areas of outcropping rock.
Shallow Soils	Shallow soils are shown by geotechnical sampling to mainly comprise silty sand overlying clayey sand. A distinct reflector visible on sub-bottom data is less than 3m in places and is interpreted to mark the uppermost sand and interpreted top of bedrock.
Potential Hazards	The RPL crosses areas of outcropping rock.
Cable Crossings	The survey route crosses no cables.

APPENDICES

APPENDIX A CPT LOGS

SACS Cable Route Survey

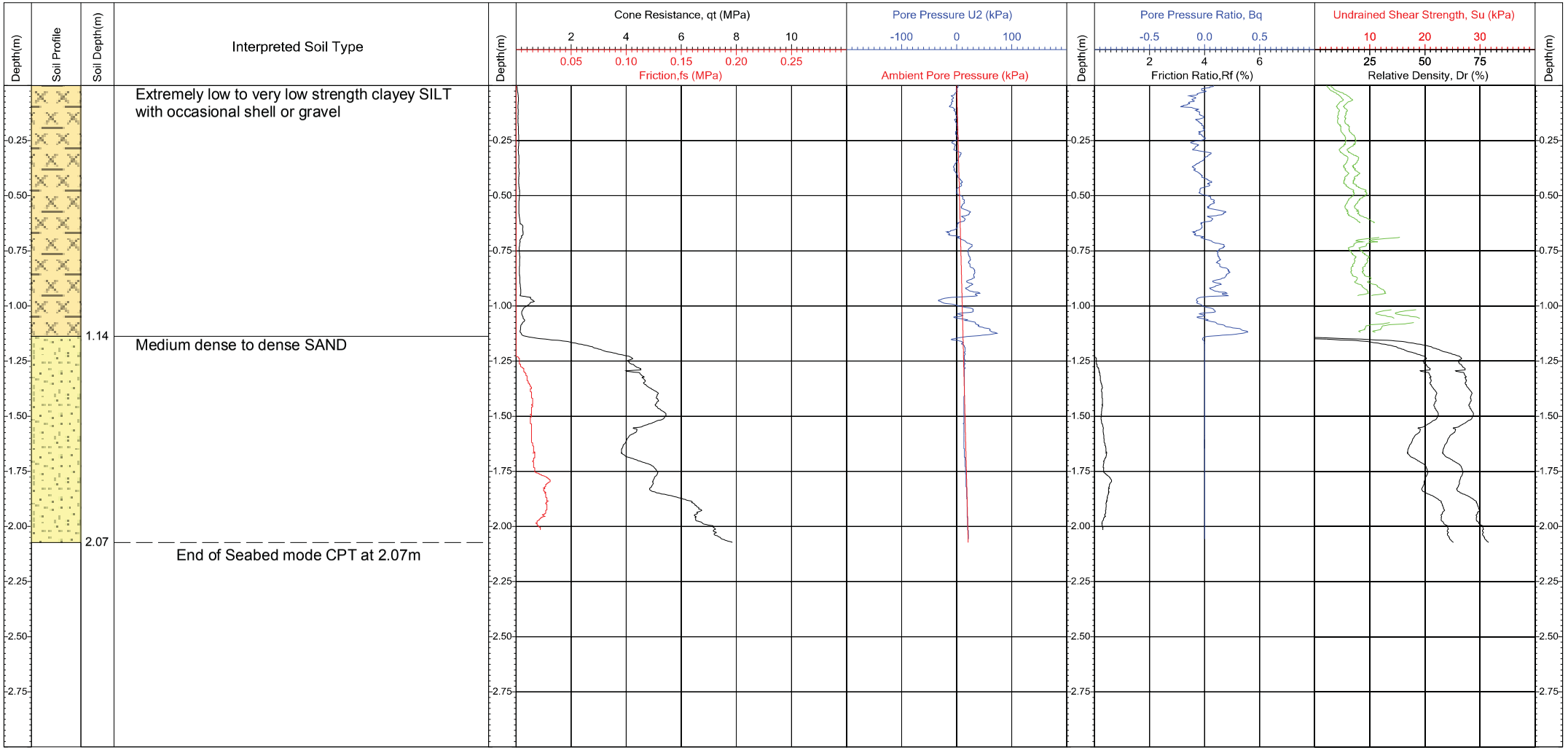
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8087822.2 144182.4	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	93.2 (mLAT)	Assumed Soil Density: 18KN/m3 NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00	Preliminary	Draft	Final	
Test stopped due to total load	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_CPT008
	Vessel	Ocean Endeavour	Cone No. / α Factor	3073 0.82	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	4.0°					

SACS Cable Route Survey

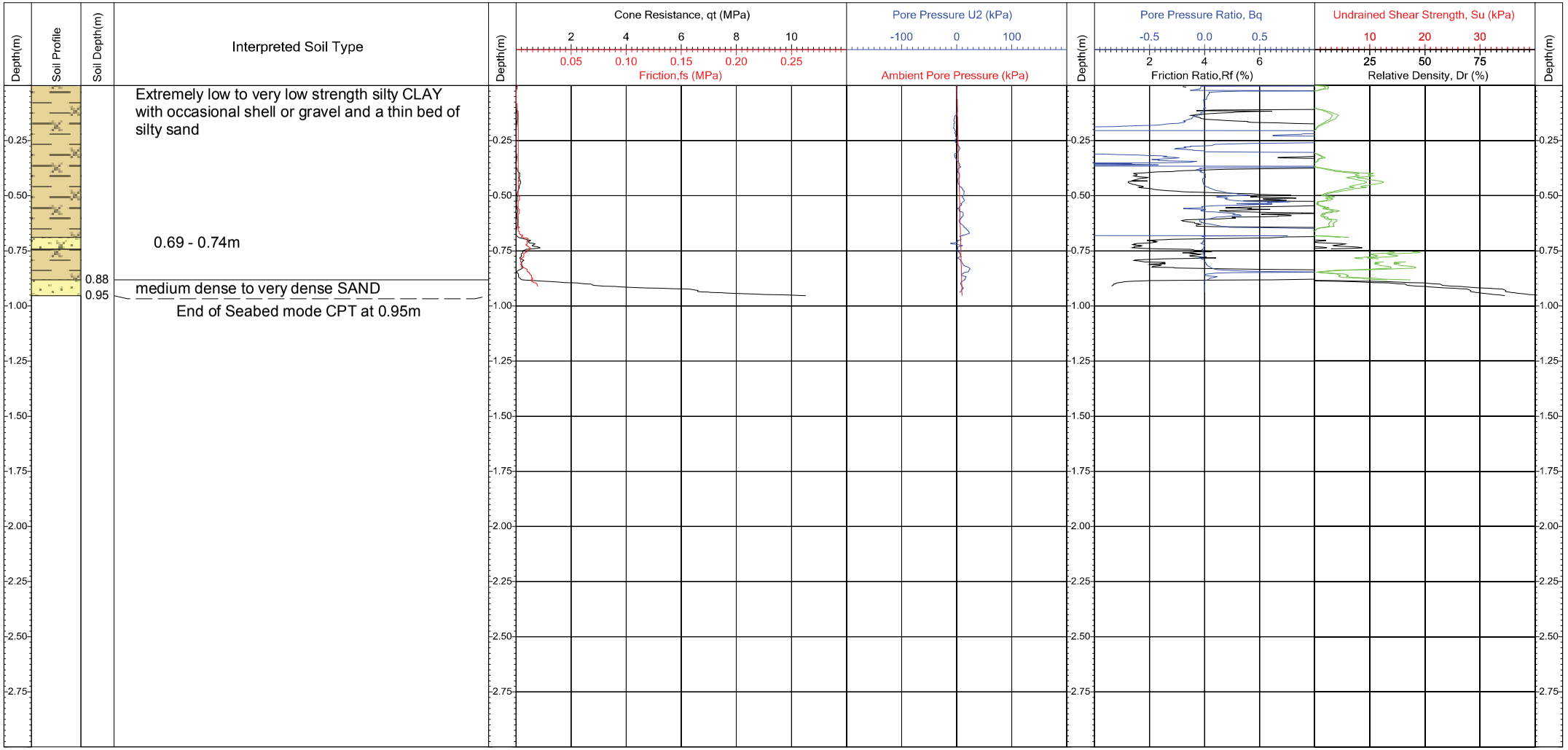
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8087815.3	144173.3	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	93.3	(mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	08/02/2017		NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Test stopped due to rod bend	Vessel	Ocean Endeavour	Cone No. / α Factor	3073	0.82	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	SACS_SGO_OE_CPT008A
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	3.0°						

SACS Cable Route Survey

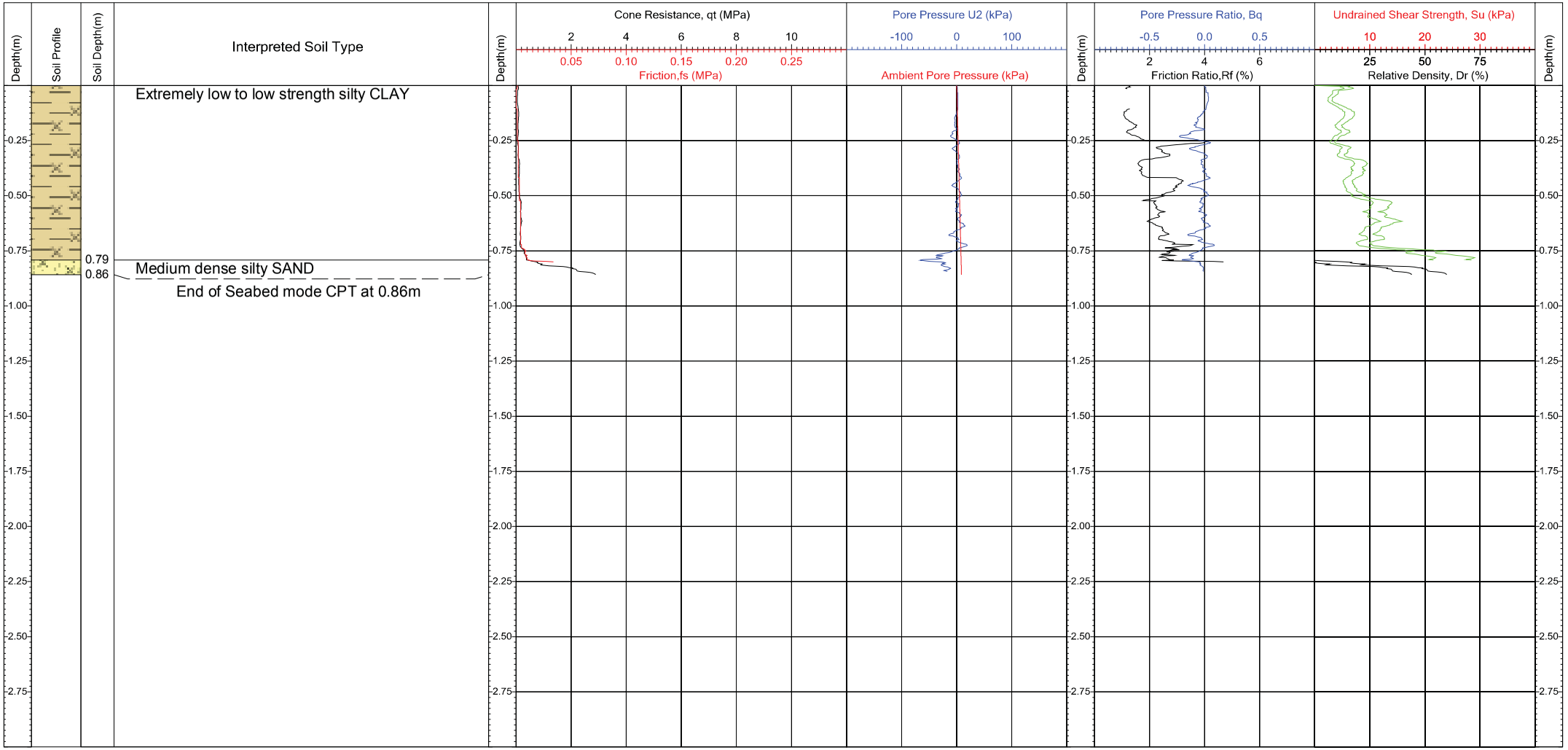
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8098374.8 144515.1	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	54.6 (mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
Test stopped due to rapid tip surge	Client Name	NEC	Date of Test	08/02/2017	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				SACS_SGO_OE_CPT009
	Vessel	Ocean Endeavour	Cone No. / α Factor	3073 0.82	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	2.0°					

SACS Cable Route Survey

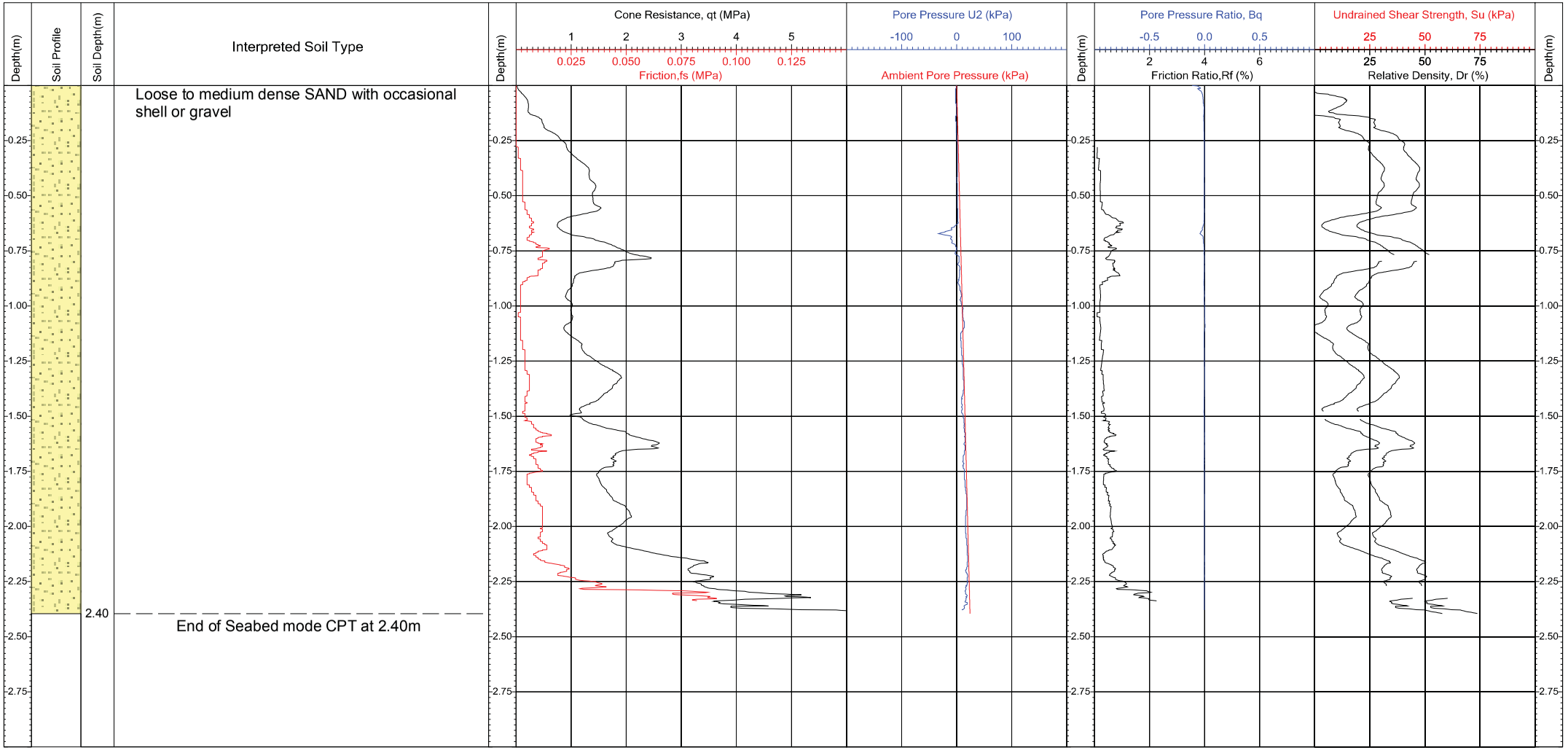
INSITU CPTU TESTING



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8098373.3 144510.7	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	54.6 (mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	08/02/2017	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Test stopped due to rod bend	Vessel	Ocean Endeavour	Cone No. / α Factor	3073 0.82					SACS_SGO_OE_CPT009A
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	2.0°	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	

SACS Cable Route Survey

INSITU CPTU TESTING

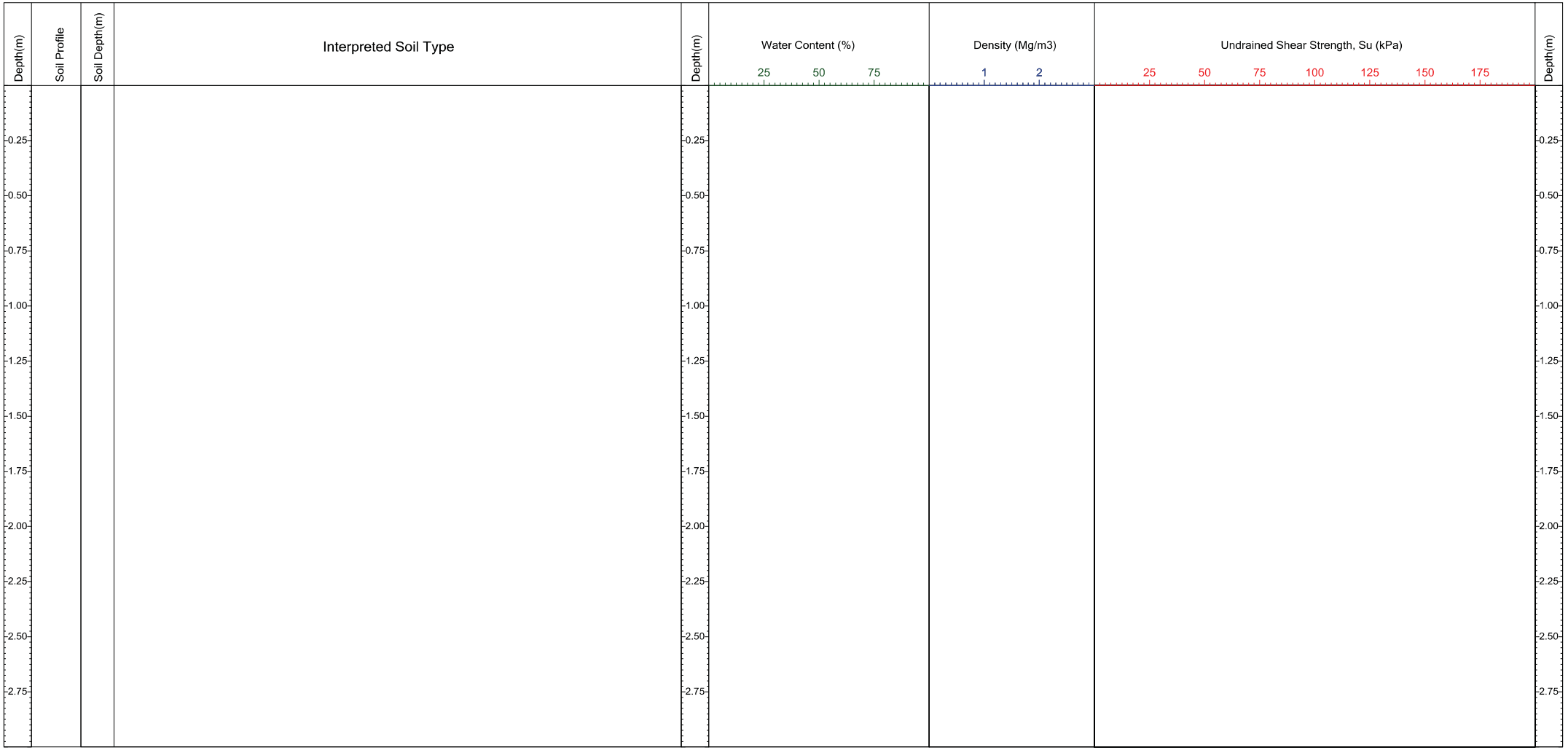


Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8109661.3 144898.1	CRS: WGS 84 Mercator (7S 15W)	QC Status			CPT Number
	Contract	10817	Water Depth	20.5 (mLAT)	Assumed Soil Density: 18KN/m3	Preliminary	Draft	Final	
	Client Name	NEC	Date of Test	09/02/2017	NKT1: 15.00 NKT2: 20.00 NKT3: 12.50 NKT4: 16.50 K01: 0.50 K01: 2.00				
Test stopped due to possible rod bend	Vessel	Ocean Endeavour	Cone No. / α Factor	3073 0.82	*The predicted relative density, Dr, results should be applied with caution and considered as equivalent values of Dr	AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	SACS_SGO_OE_CPT010
	Method	GDCP0001 and Seabed mode CPT	Base Inclination	1.0°					

APPENDIX B PISTON CORE LOGS

SACS Cable Route Survey

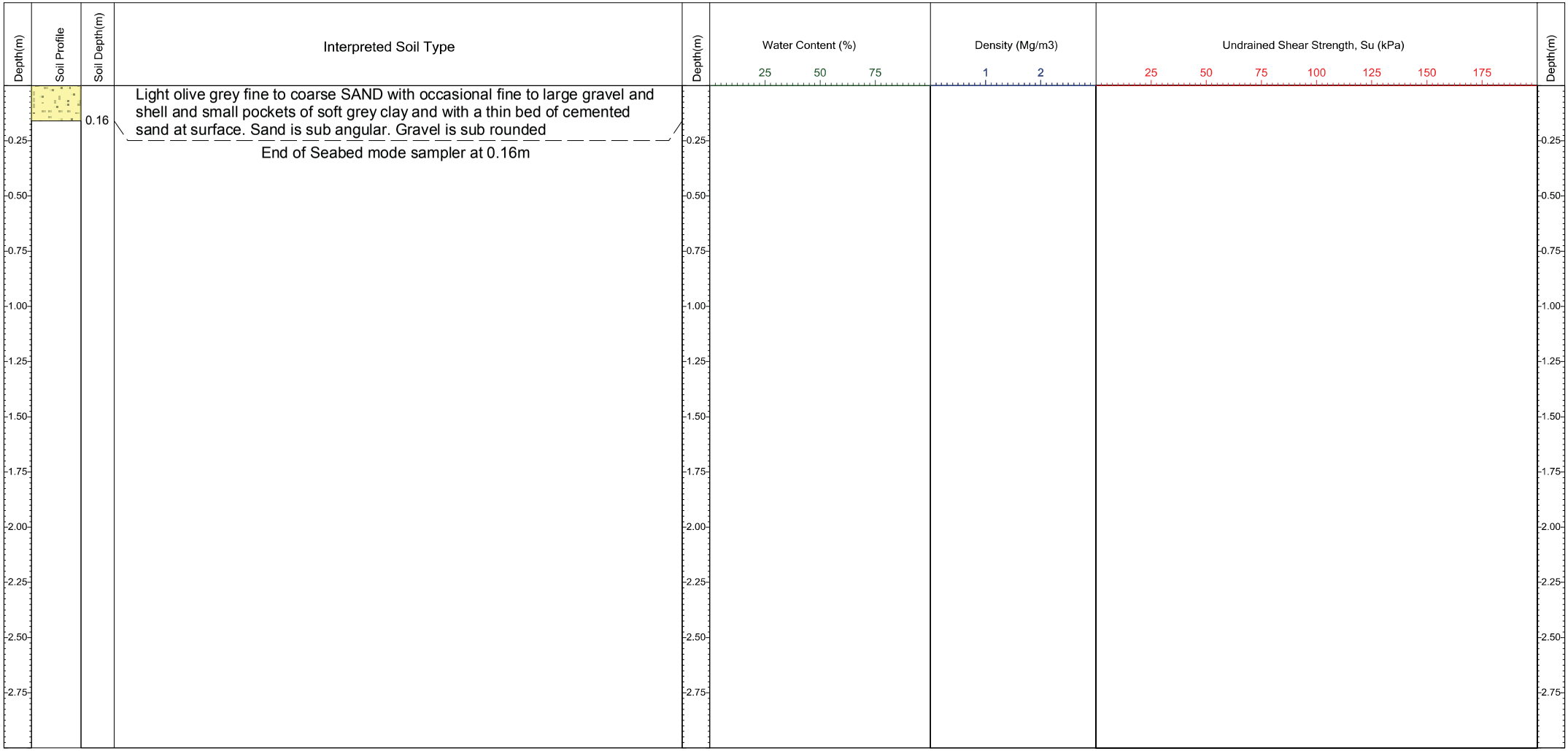
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8093754.6 144400.5	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Failed to achieve target recovery. No recovery, evidence of slight damage to cutting shoe	Contract	10817	Water Depth	73.6 (mLAT)					SACS_SGO_OE_PC009
	Client Name	NEC	Date of Test	08/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.1		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.00					

SACS Cable Route Survey

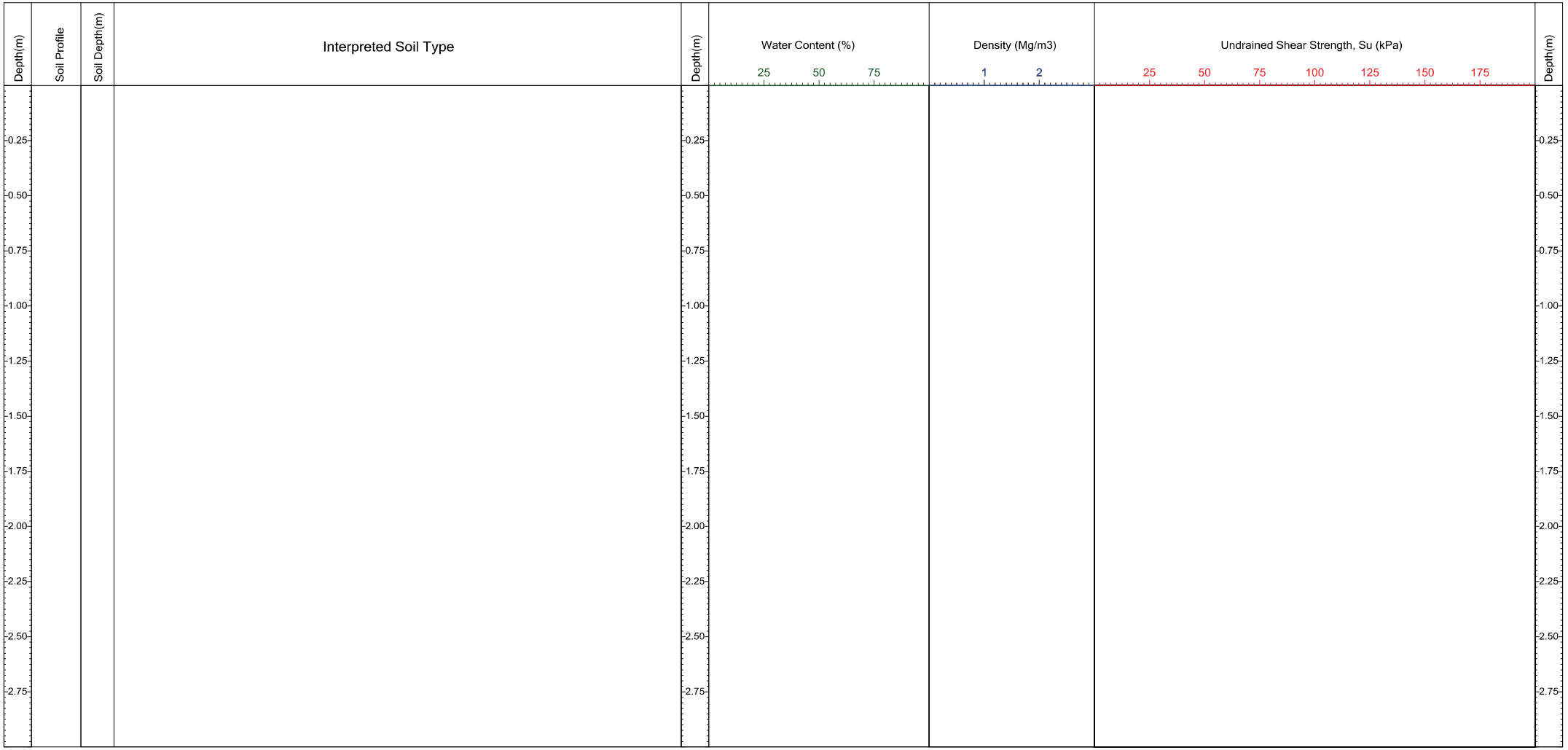
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8093755.8 144396.2	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	73.6 (mLAT)		Preliminary	Draft	Final	
Failed to achieve target recovery	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_PC009A
	Vessel	Ocean Endeavour	Penetration (m)	0.2		AP 08/02/2017			
	Method	Piston corer	Recovery (m)	0.16					

SACS Cable Route Survey

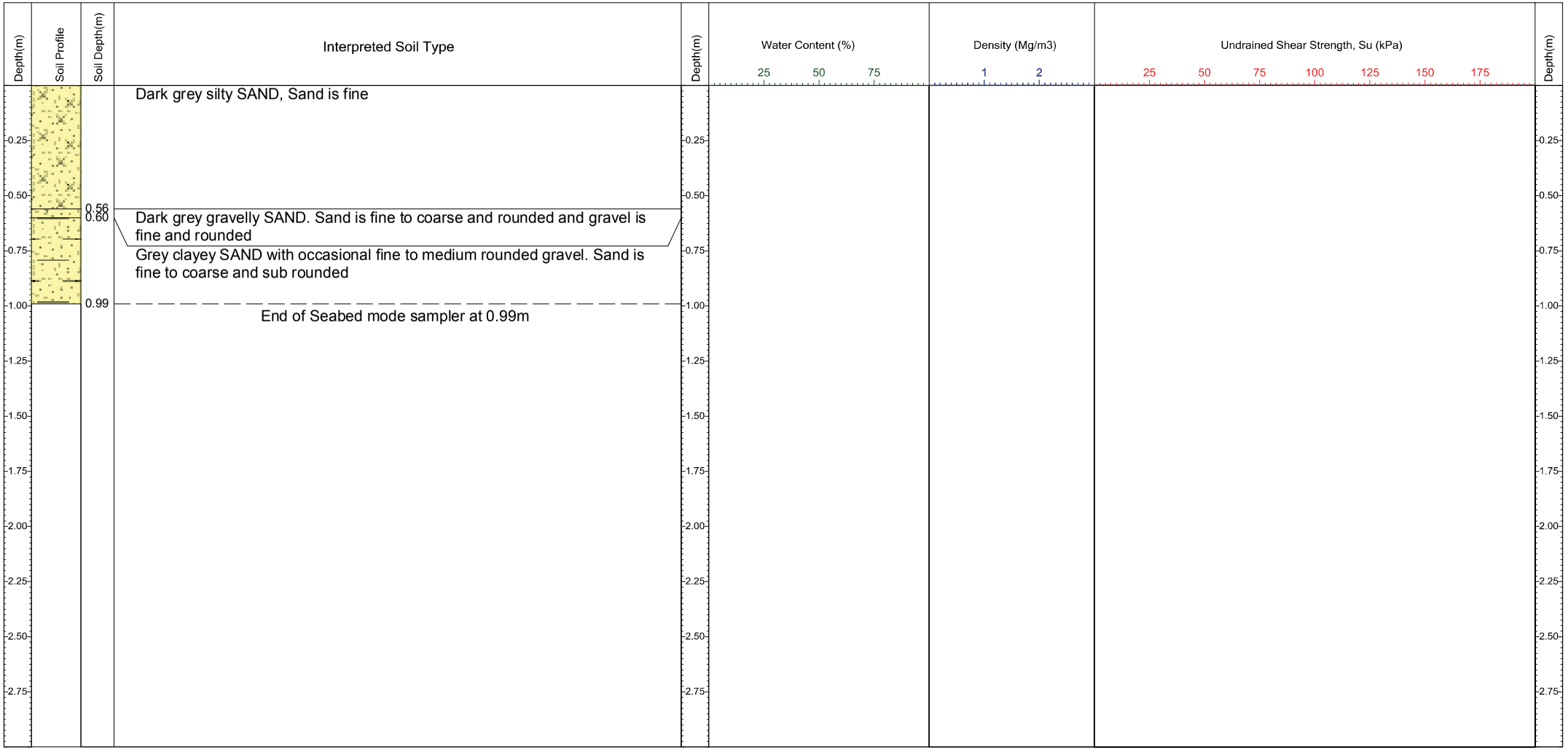
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8104726.7 144723.2	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	33.6 (mLAT)		Preliminary	Draft	Final	
No recovery	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_PC010
	Vessel	Ocean Endeavour	Penetration (m)	0.0		AP 08/02/2017			
	Method	Piston corer	Recovery (m)	0.00					

SACS Cable Route Survey

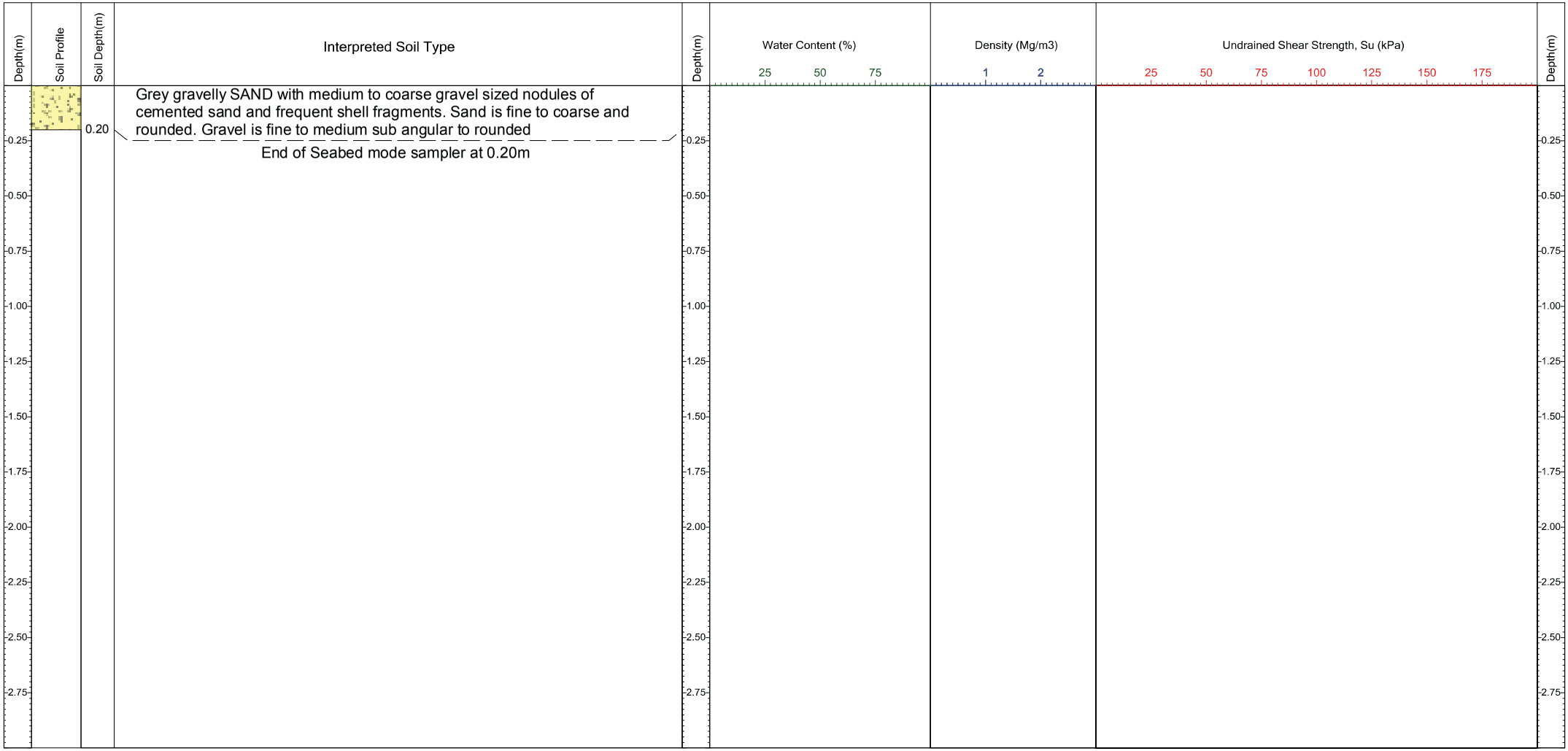
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8104731.6 144716.4	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	33.6 (mLAT)		Preliminary	Draft	Final	
Sample recovery ok	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_PC010A
	Vessel	Ocean Endeavour	Penetration (m)	1.3		AP 08/02/2017			
	Method	Piston corer	Recovery (m)	0.99					

SACS Cable Route Survey

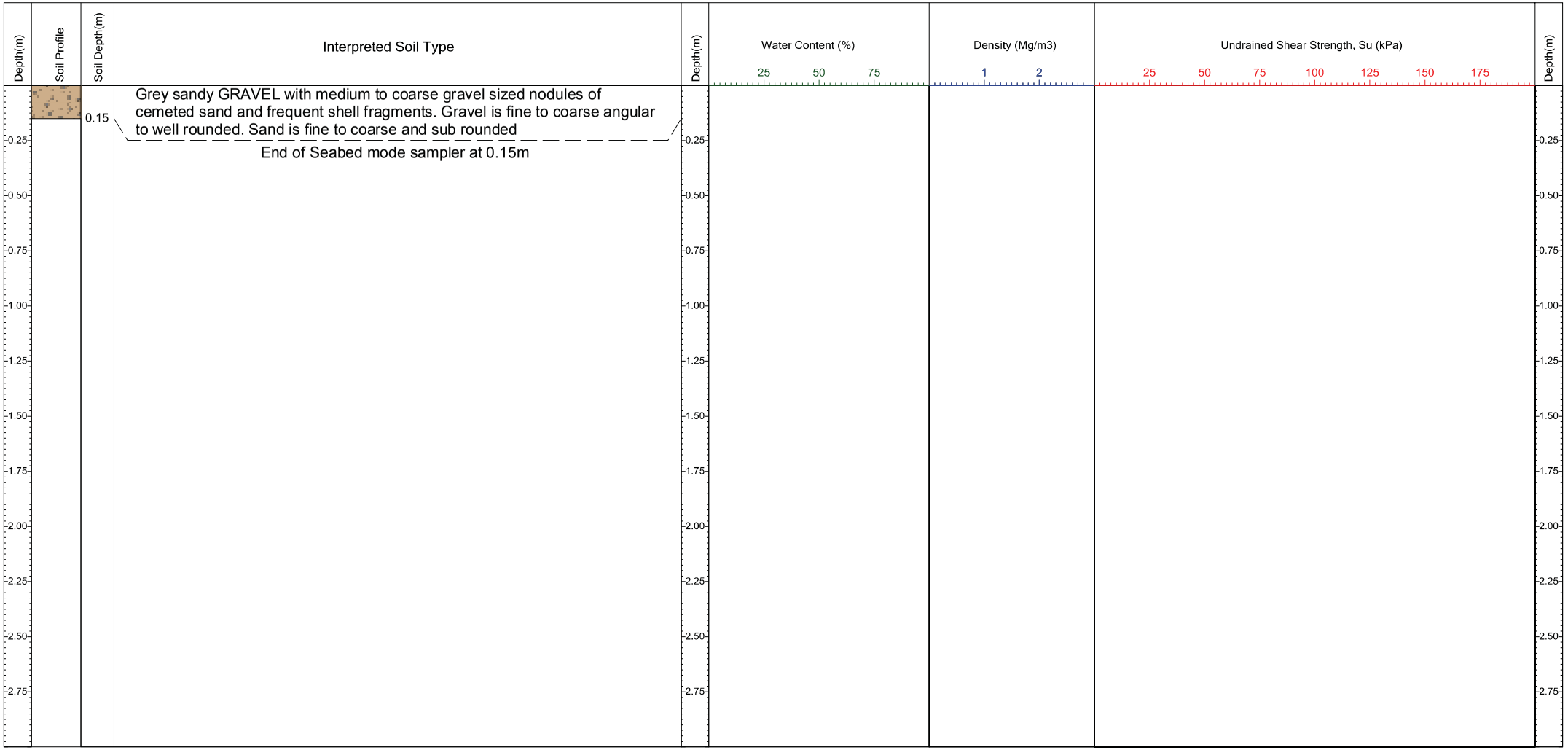
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8109306.5 144880.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Failed to achieve target recovery	Contract	10817	Water Depth	21.1 (mLAT)					SACS_SGO_OE_PC011
	Client Name	NEC	Date of Test	08/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.3		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.20					

SACS Cable Route Survey

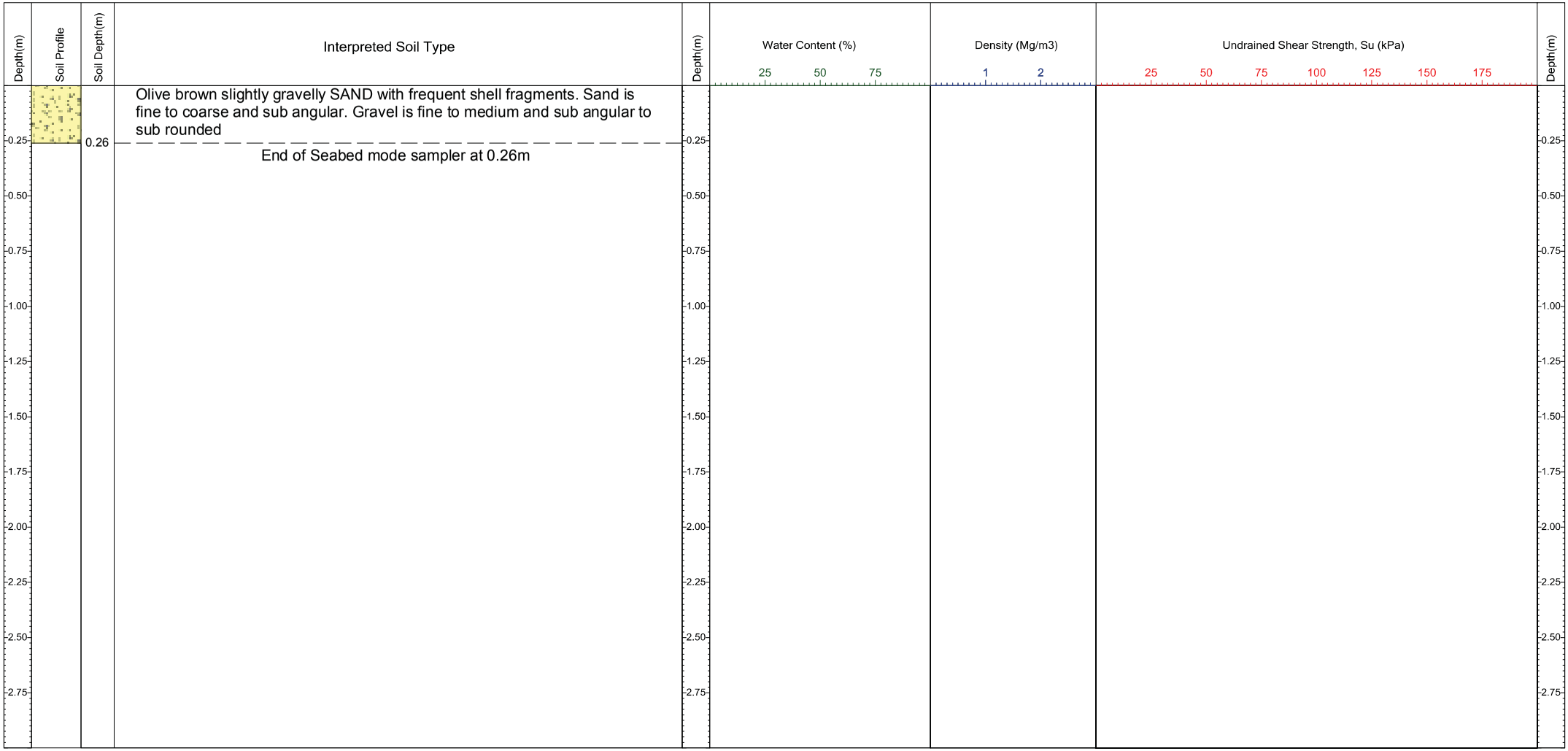
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8109307.3 144884.2	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Recovery ok	Contract	10817	Water Depth	21.1 (mLAT)					SACS_SGO_OE_PC011A
	Client Name	NEC	Date of Test	08/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.2		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.15					

SACS Cable Route Survey

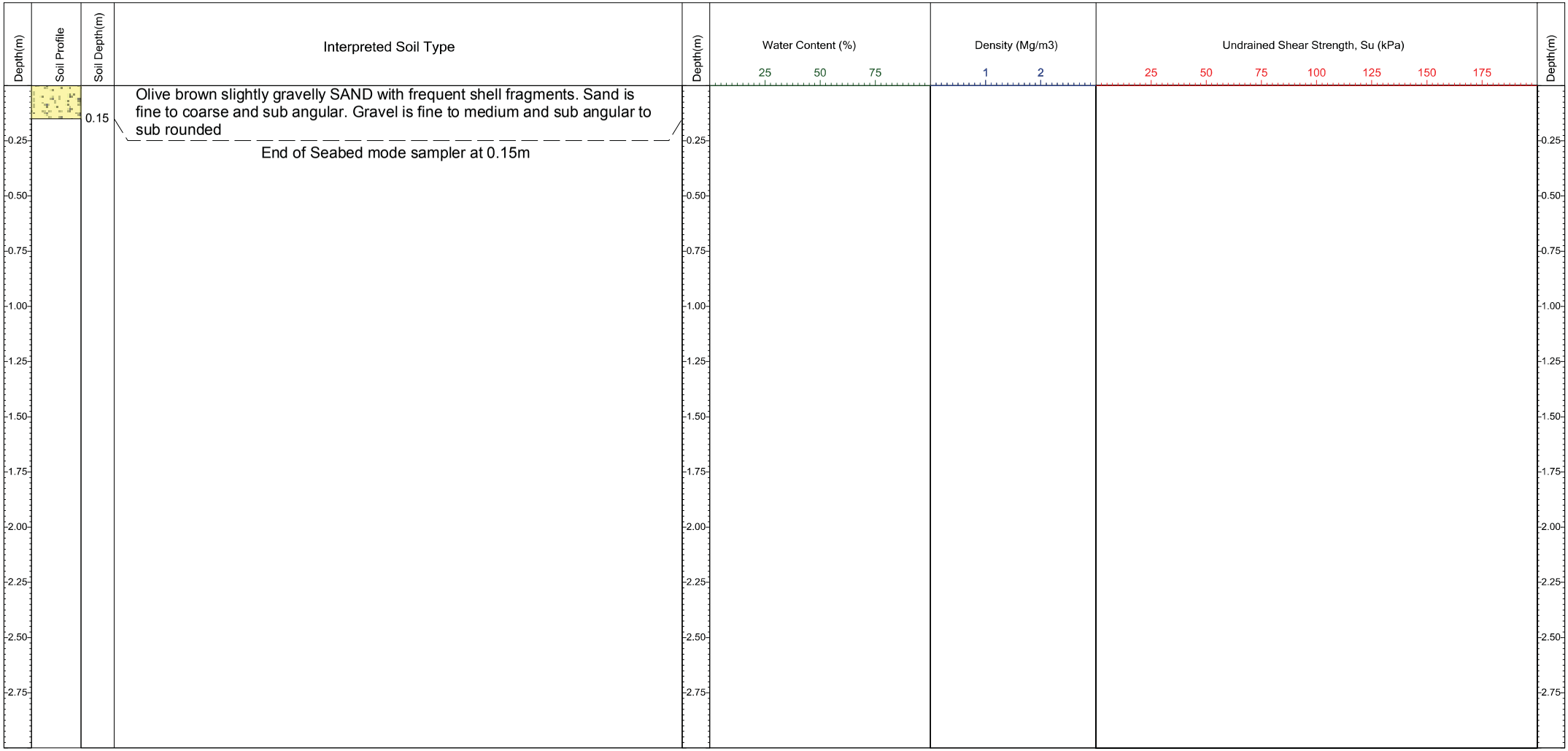
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8110300.4 144909.5	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Failed to achieve target recovery	Contract	10817	Water Depth	19.7 (mLAT)					SACS_SGO_OE_PC012
	Client Name	NEC	Date of Test	08/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.3		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.26					

SACS Cable Route Survey

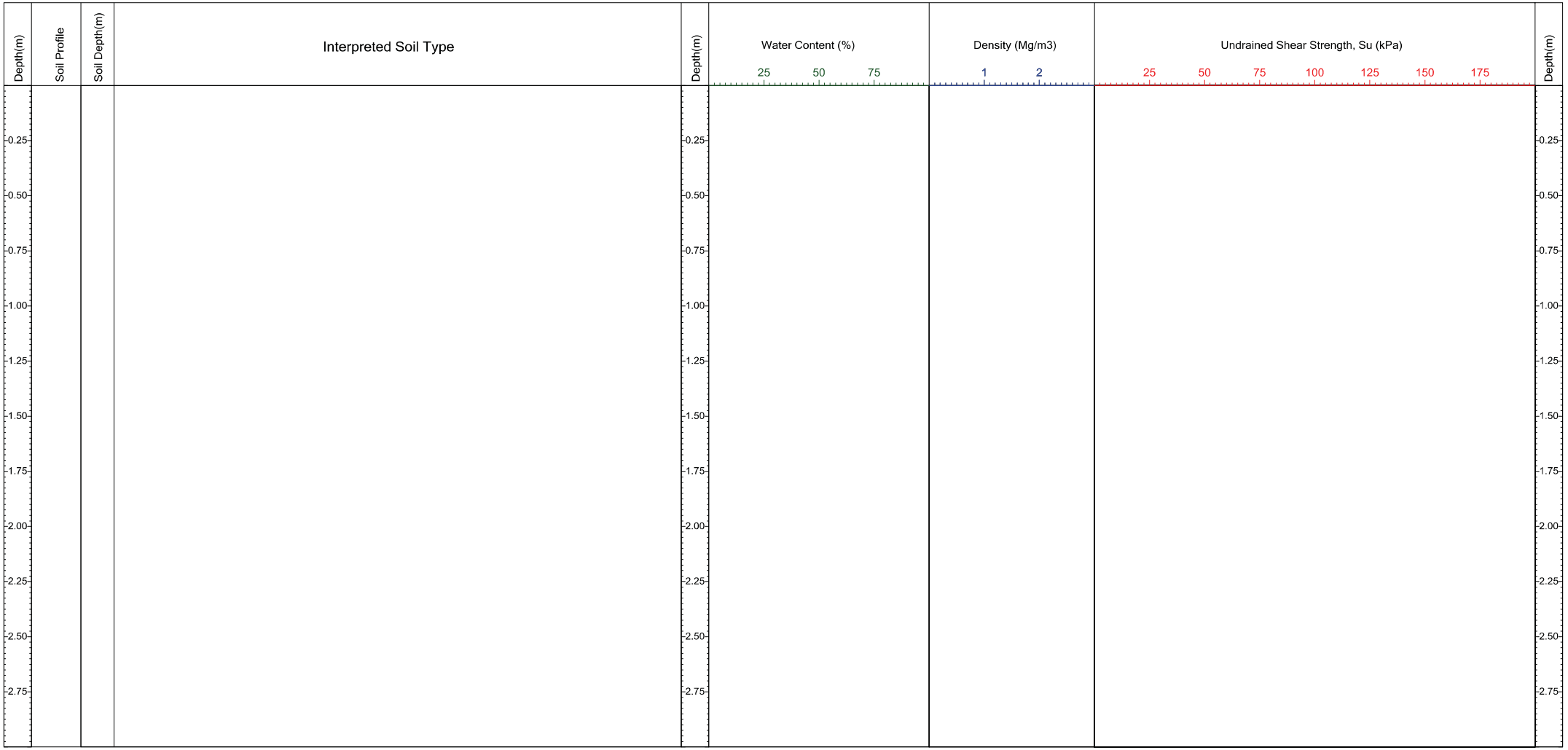
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8110285.5 144911.6	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
						Preliminary	Draft	Final	
Recovery ok	Contract	10817	Water Depth	19.7 (mLAT)					SACS_SGO_OE_PC012A
	Client Name	NEC	Date of Test	08/02/2017					
	Vessel	Ocean Endeavour	Penetration (m)	0.2		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.15					

SACS Cable Route Survey

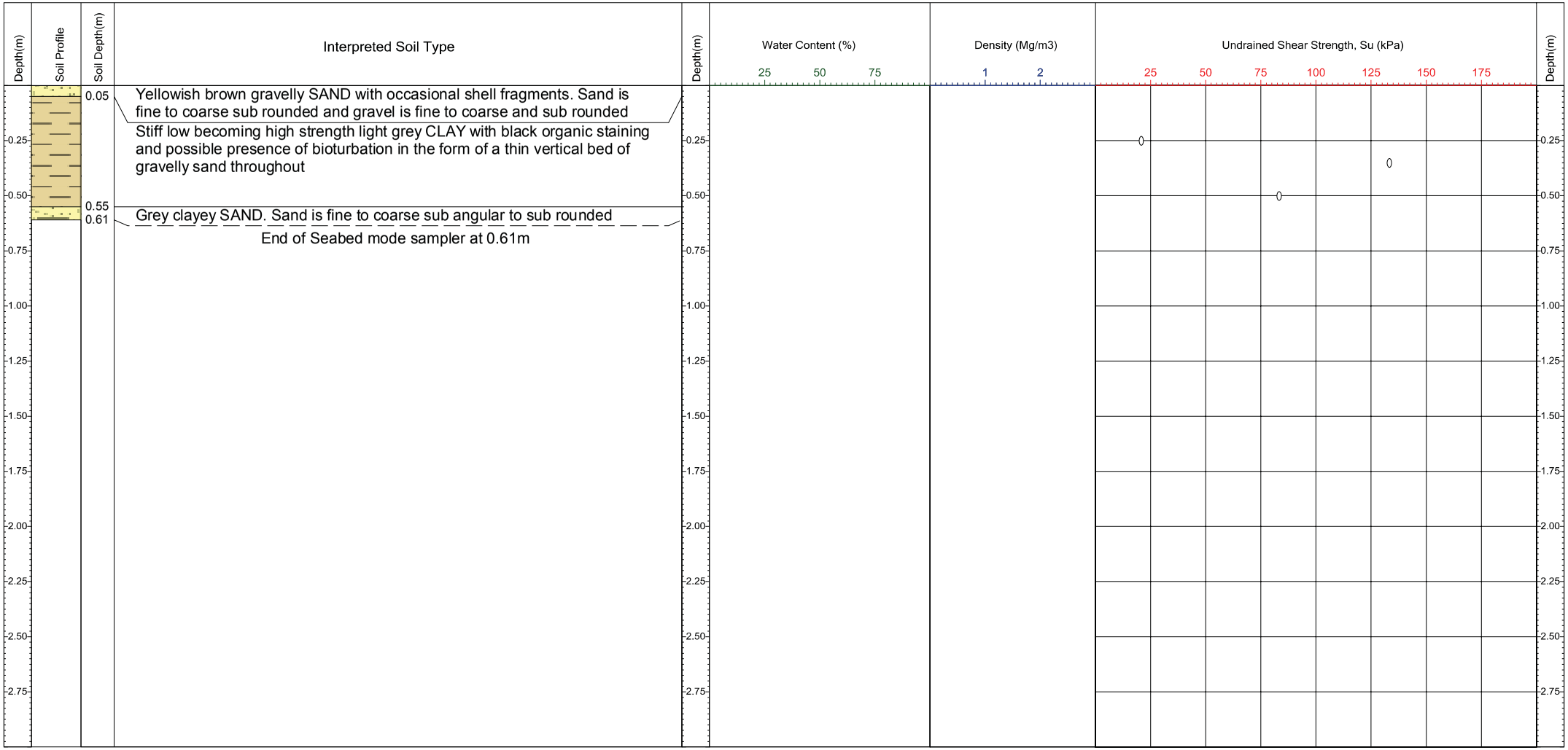
LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8107621.8 144823.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	27.0 (mLAT)		Preliminary	Draft	Final	
No recovery	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_PC013
	Vessel	Ocean Endeavour	Penetration (m)	0.0		AP 08/02/2017	DW 09/02/2017	AP 09/02/2017	
	Method	Piston corer	Recovery (m)	0.00					

SACS Cable Route Survey

LOG AND LABORATORY TEST RESULTS



Comments	Area	Atlantic: Brazil to Angola	Coordinates (E, N)	8107618.0 144823.9	CRS: WGS 84 Mercator (7S 15W)	QC Status			Core Location
	Contract	10817	Water Depth	26.9 (mLAT)		Preliminary	Draft	Final	
Recovery ok	Client Name	NEC	Date of Test	08/02/2017					SACS_SGO_OE_PC013A
	Vessel	Ocean Endeavour	Penetration (m)	0.7		AP	DW	AP	
	Method	Piston corer	Recovery (m)	0.61		08/02/2017	09/02/2017	09/02/2017	

Chart Description Report for
NEC

Project:
SACS Cable System
KP5977.138 to KP5980.721

Description:
Chart Description

Survey Date:
24-Jan-2017 to 06-Feb-2017

Project Number:
10817

Report Number:
Office 002

Report Status:
Revision 0

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	N Jones
	Surveying	A Villena-Lincoln
Authorisation	Approved	…… E Self

Revision	Date	Title	Report Ref
0	06-Jun-2017	Rev0	002/06-Jun-2017/Rev0

SURVEY SUMMARY

Nominal Survey Area	SACS Cable – Inshore Sangano
Survey Vessel	M.V. Mestre Bruno
Survey Dates	24-Jan-2017 to 06-Feb-2017
Survey Extents	KP5977.138 to KP5980.721

Equipment Used	Positioning System	Applanix POSMV Wavemaster, Veripos LD5
	Echo Sounder (MBES System)	Reson Seabat T-20
	Echo Sounder (SBES System)	Reson Seabat T-20
	Side Scan Sonar	EdgeTech 4200 MP
	Sub-Bottom Profiler	Teledyne CHIRP III
	Magnetometer	Marine Magnetics SeaSPY
	Grab Sampler	Van Veen

SACS.S1.NU091 | **North-Up Chart Description** | **Scale 1:5,000**

Chart Range	09° 32.9149' S, 013° 10.0344' E to 09° 35.0168' S, 013° 12.6409' E
Range of Depths	4m to 15m LAT
General Seabed Topography	Generally, the seabed shoals gently at <0.2°. At the end of the route corridor ambient gradient increases to 1°. Within rock outcrops at the eastern end of the chart, local gradients reach 15°.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise predominantly silty sand with areas of coarse sand/gravel. The western end of the chart is dominated by outcropping/subcropping rock. Local variations in sonar reflectivity indicate some patches of clay/silt/sand are present.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise silty sand. A reflector is visible on sub-bottom data marking the change from this sand unit to the underlying bedrock. Sub-bottom profiler data shows that the sediments range from 0m (where rock outcrops) to 5m thick. In the west of the chart rock outcrops/subcrops and as the RPL heads east towards the landing point the sand unit thickens.
Potential Hazards	Outcropping/Subcropping Rock
Cable Crossings	The survey route crosses no cables.

SACS.S1.NU092 **North-Up Chart Description** **Scale 1:1,000**

Chart Range	09° 33.6262' S, 013° 11.5473' E to 09° 34.0466' S, 013° 12.0686' E
Range of Depths	-28m to 9m LAT
General Seabed Topography	In western areas of the chart, the seabed shoals at a gradient of <0.2°. As the RPL approaches the landing point the seabed gradient increases, reaching a maximum gradient of 1.5°.
Seabed Features and Obstructions	Seabed sediments are shown by geotechnical sampling to comprise predominantly silty sand with areas of coarse sand/gravel. Local variations in sonar reflectivity indicate some patches of clay/silt/sand are present. Four rock outcrops are present within the centre of the route corridor.
Shallow Soils	Shallow soils are shown by geotechnical sampling to comprise silty sand. A reflector is visible on sub-bottom data marking the change from this sand unit to the underlying bedrock. Sub-bottom profiler data shows that the sediments range from 0m (where rock outcrops) to 5m thick.
Potential Hazards	None
Cable Crossings	The survey route crosses no cables.