The Sizewell C Project

6.3 Volume 2 Main Development Site

Chapter 18 Geology and Land Quality

Appendix 18A Phase 2 Geo-environmental Interpretative Report

Part 7 of 11

Revision:	1.0
Applicable Regulation:	Regulation 5(2)(a)
PINS Reference Number:	EN010012

May 2020

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Appendix F – Ground Investigation Factual Reports

On-shore Investigations Phase 1 for Sizewell Site 2011

CONTINUED

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

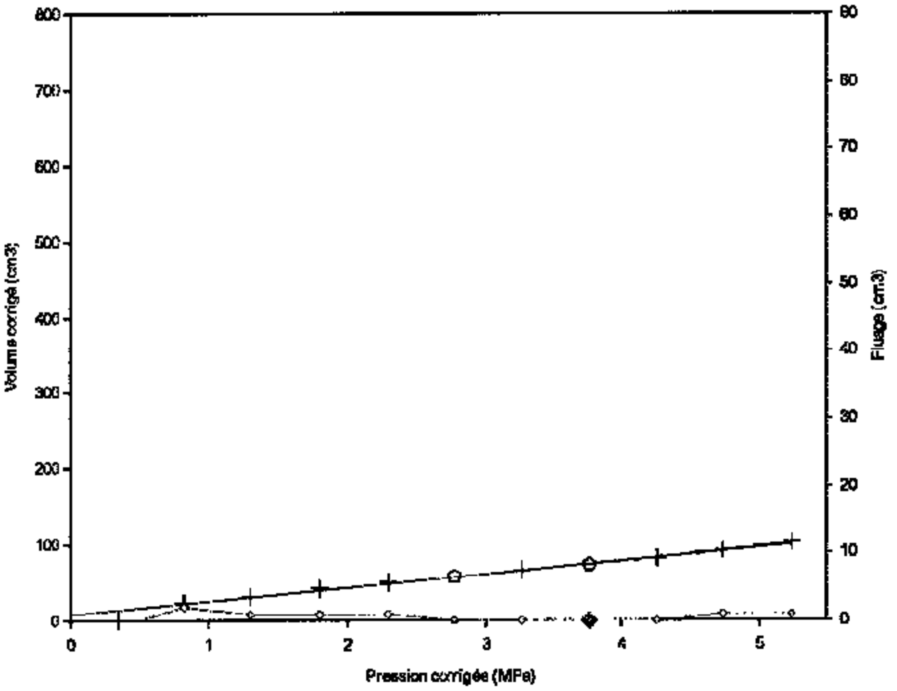
Affaire: SOIL MECHANICS SIZEWELL B, LEISTON IP16

Programme: W-PRessio
Version : 1.1

FONDASOL
290 rue des Galoubets
BP 765
84140 MONTFAVET

Fichier : P4
Dernière mise à jour:
21/09/2010 14:06:47

Sondage: MPM 2009-12



Profondeur : 34.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 5
Sonde: STANDARD
Gaine: Toilée renforcée
a = 1.86 cm3/MPa

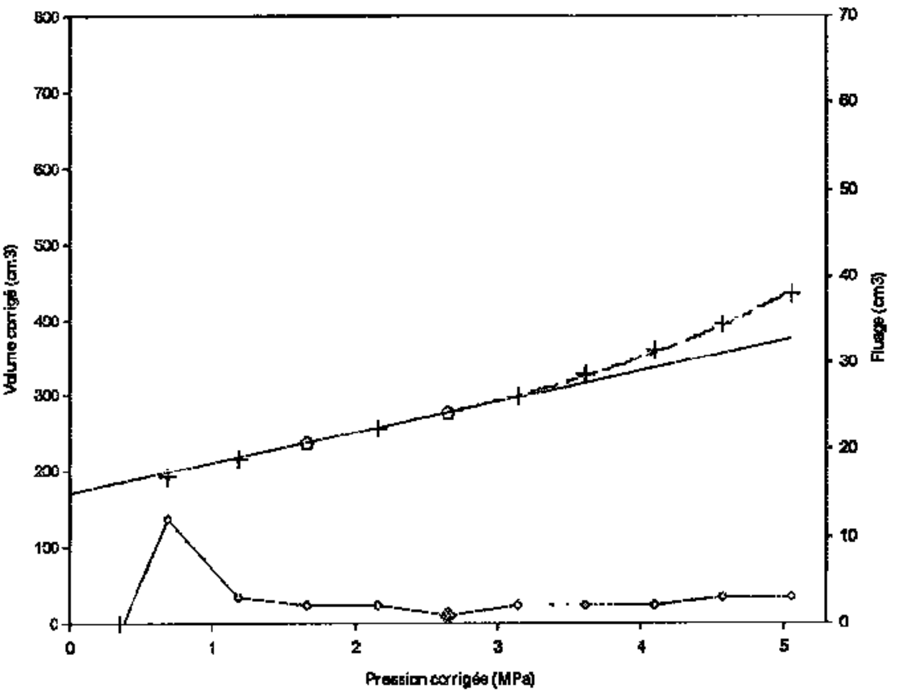
(valeurs en MPa)

E_M = 91.5

Pl = 8.55	Pmax = 5,23
Pl(i) = 8.55	Pf = 3.76
Pl(h) = 9.64	Po = 0.30
$Pl_{(pf)}$ = 5.64	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM 2009-12



Profondeur : 35.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 52.6

Pl = 7.52	Pmax = 5.06
Pl(i) = 7.52	Pf = 2.64
Pl(h) = 6.97	Po = 0.31
$Pl_{(pf)}$ = 3.96	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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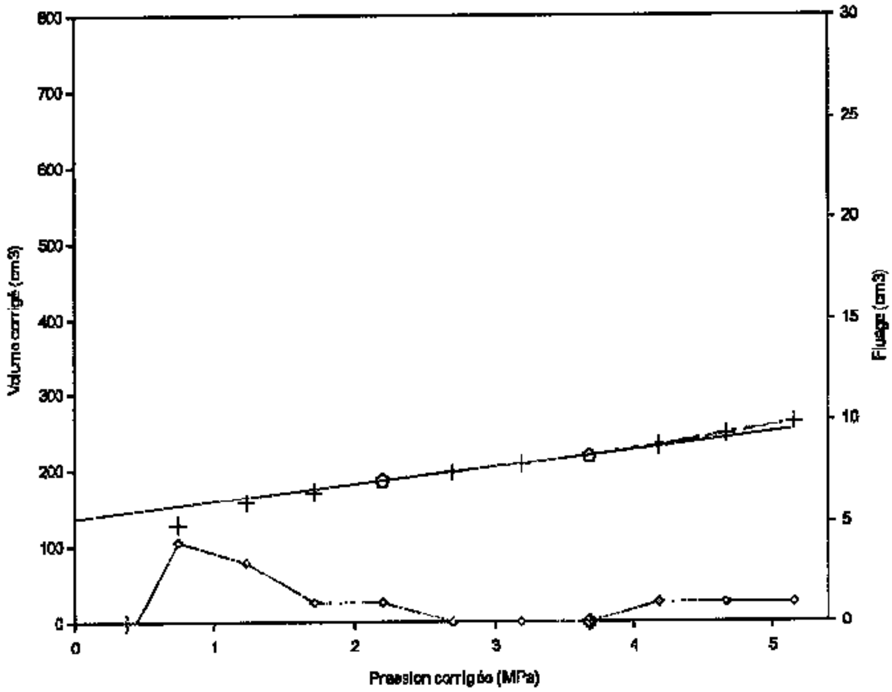
Sondage: MPM 2009-12

Profondeur : 36.00 m



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

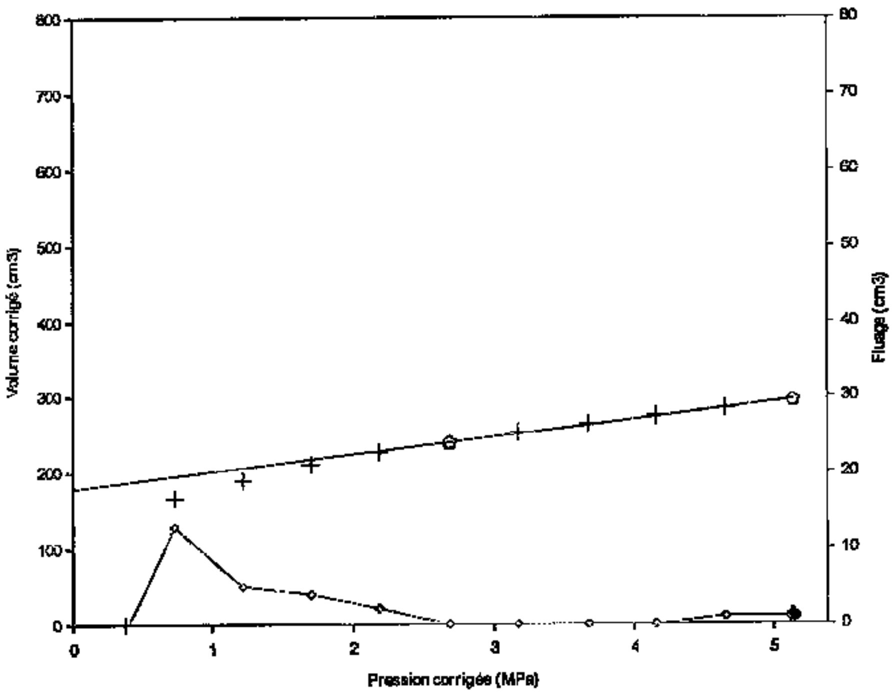
E_M = 86.1

Pl = 10.30	Pmax = 5.16
Pl(i) = 10.30	Pf = 3.68
Pl(h) = 9.95	Po = 0.32
$Pl_{(Pf)}$ = 5.53	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬡ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

Sondage: MPM 2009-12

Profondeur : 37.00 m



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 94.3

Pl > 5.15	Pmax = 5.15
	Pf > 5.15
	Po = 0.33
$Pl_{(Pf)}$ > 7.73	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬡ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

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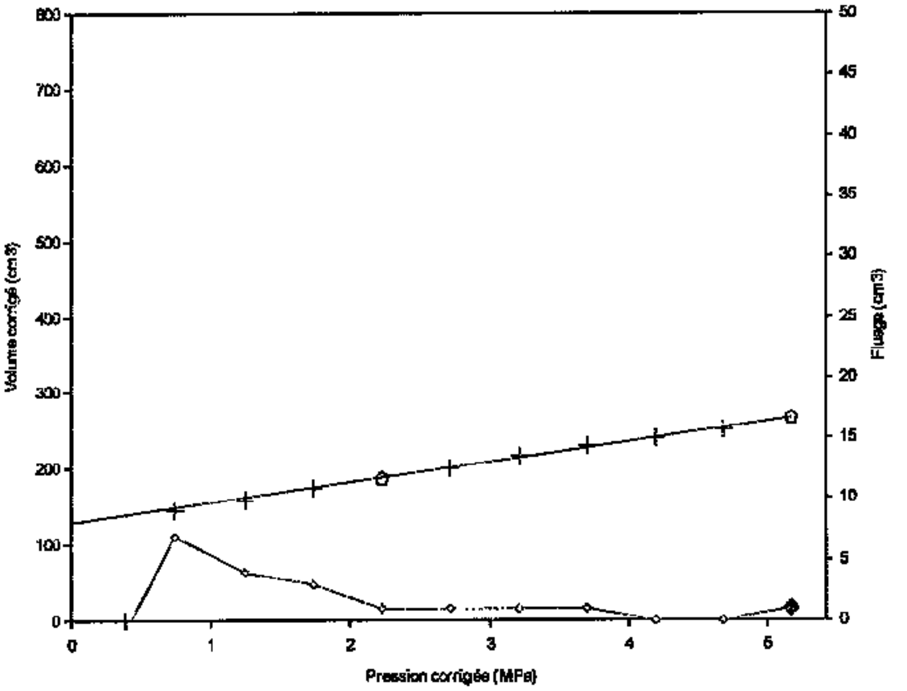
21/09/2010 14:06:47

Sondage: MPM 2009-12



Profondeur : 38.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

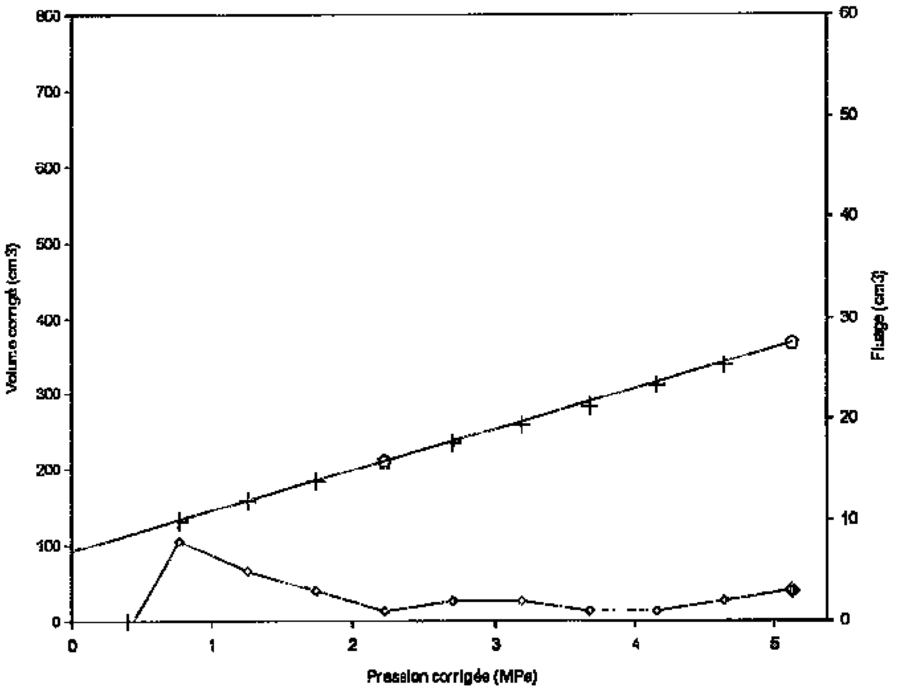
(valeurs en MPa)

E_M = 77.3

Pl	> 5.18	Pmax	= 5.18
		Pf	> 5.18
		Po	= 0.34
$Pl_{(Pf)}$	> 7.77		

Légende:
---- : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

Sondage: MPM 2009-12



Profondeur : 39.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 41.4

Pl	> 5.13	Pmax	= 5.13
		Pf	> 5.13
		Po	= 0.34
$Pl_{(Pf)}$	> 7.70		

Légende:
---- : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SOIL MECHANICS SIZEWELL B, LEISTON IP16

Programme: W-PRessio
Version : 1.1

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Fichier : P4
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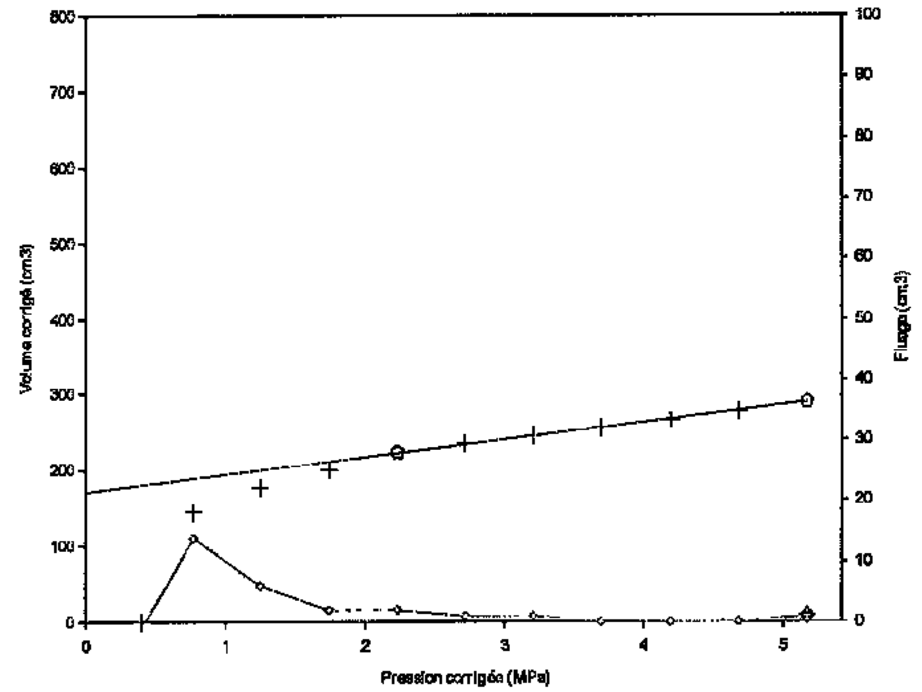
21/09/2010 14:06:47

Sondage: MPM 2009-12 — **Profondeur : 40.00 m**



Ko (estimé) :
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

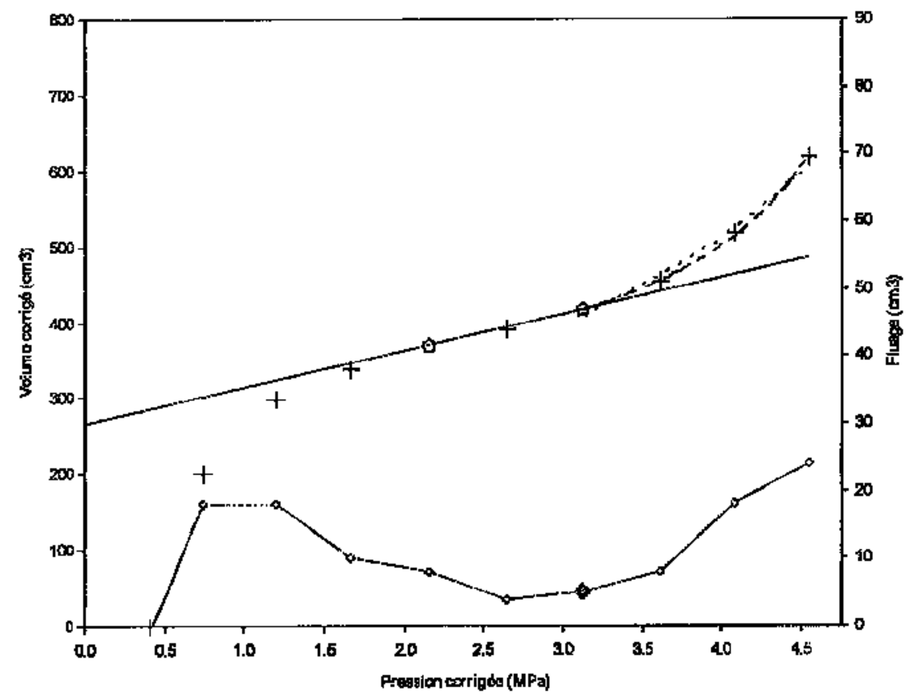
E_M = 92.5

Pl > 5.18	Pmax = 5.18
	Pf > 5.18
	Po = 0.35
$Pl_{(Pf)}$ > 7.77	

Suivant la norme
NFP 94-110-1

Légende:
---- : Pl(i) — — - : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM 2009-12 — **Profondeur : 41.00 m**



Ko (estimé) :
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 51.2

Pl = 6.12	Pmax = 4.54
Pl(i) = 6.12	Pf = 3.13
Pl(h) = 5.18	Po = 0.36
$Pl_{(Pf)}$ = 4.70	

Légende:
---- : Pl(i) — — - : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SOIL MECHANICS SIZEWELL B, LEISTON IP16

Programme: N-PRessio
Version : 1.1

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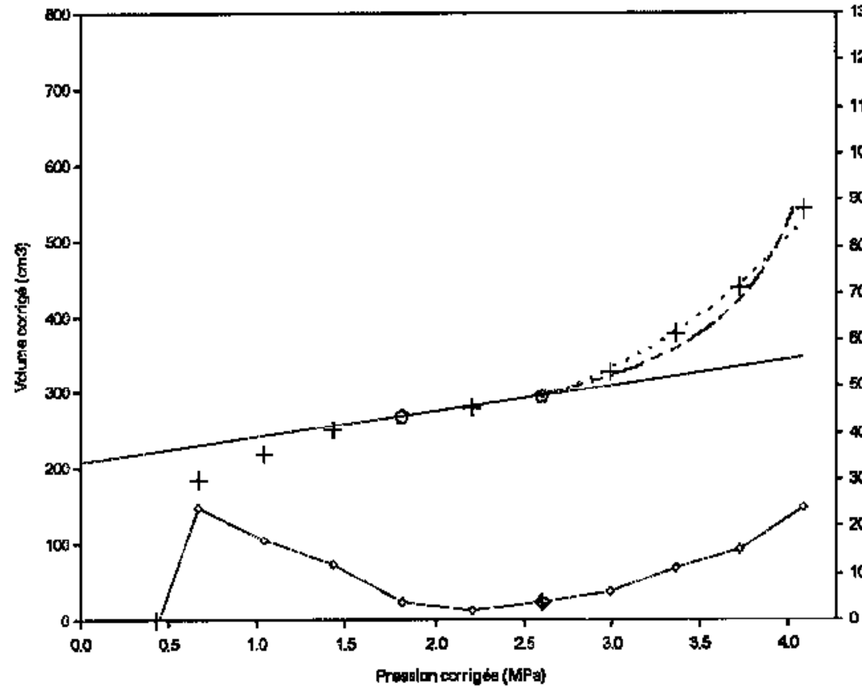
Sondage: MPM 2009-12 — **Profondeur : 42.00 m**



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

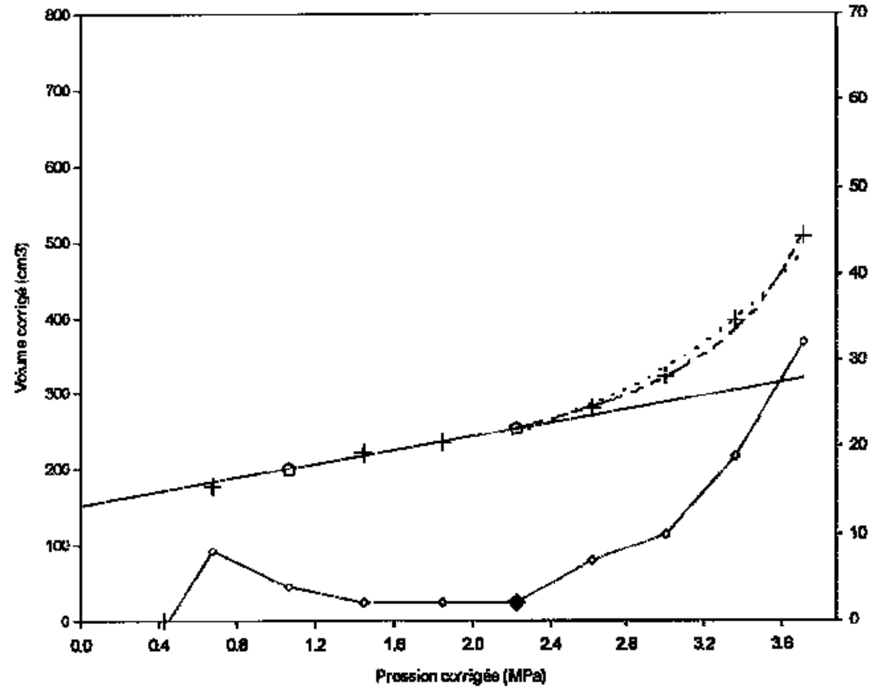
(valeurs en MPa)

E_M = 64.9

Pl = 5.01	Pmax = 4.09
Pl(i) = 5.01	Pf = 2.60
Pl(h) = 4.31	Po = 0.37
$Pl_{(pf)}$ = 3.90	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

Sondage: MPM 2009-12 — **Profondeur : 43.00 m**



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 45.6

Pl = 4.47	Pmax = 3.71
Pl(i) = 4.47	Pf = 2.23
Pl(h) = 3.99	Po = 0.38
$Pl_{(pf)}$ = 3.35	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

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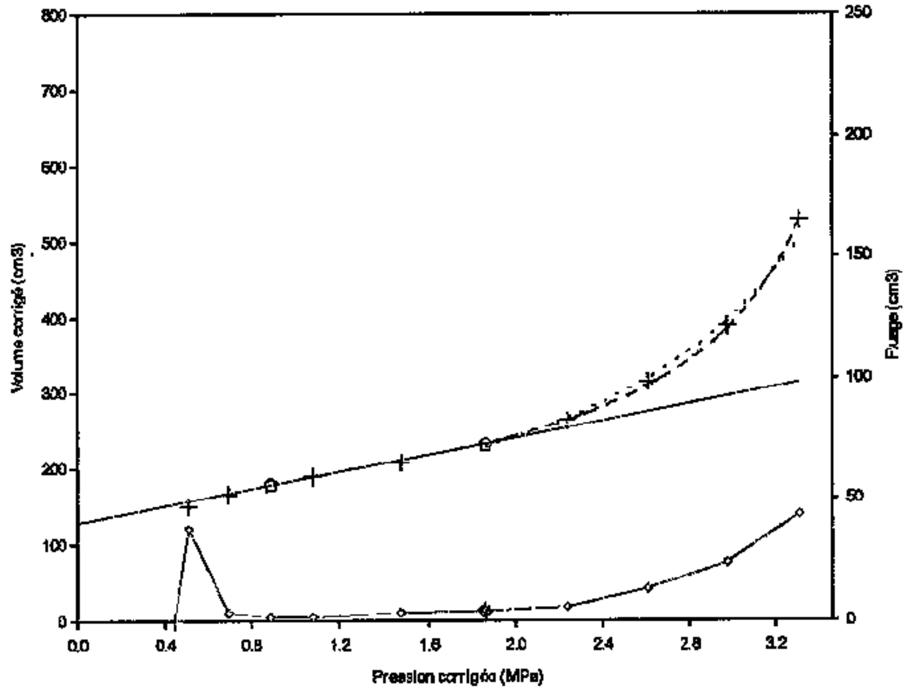


Profondeur : 44.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

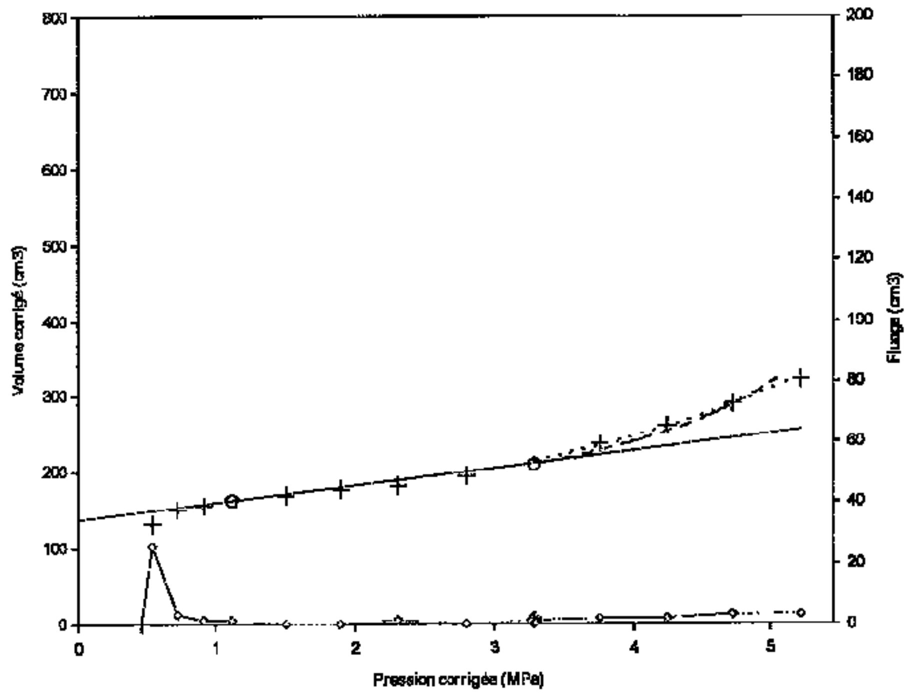
(valeurs en MPa)

EM = 35.2

Pl = 3.85	Pmax = 3.31
Pl(i) = 3.85	Pf = 1.86
Pl(h) = 3.55	Po = 0.39
Pl(Pf) = 2.78	

Légende:
---- : Pl(i) ——— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

Sondage: MPM 2009-12



Profondeur : 45.00 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 84.9

Pl = 7.51	Pmax = 5.22
Pl(i) = 7.51	Pf = 3.28
Pl(h) = 6.11	Po = 0.40
Pl(Pf) = 4.92	

Légende:
---- : Pl(i) ——— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

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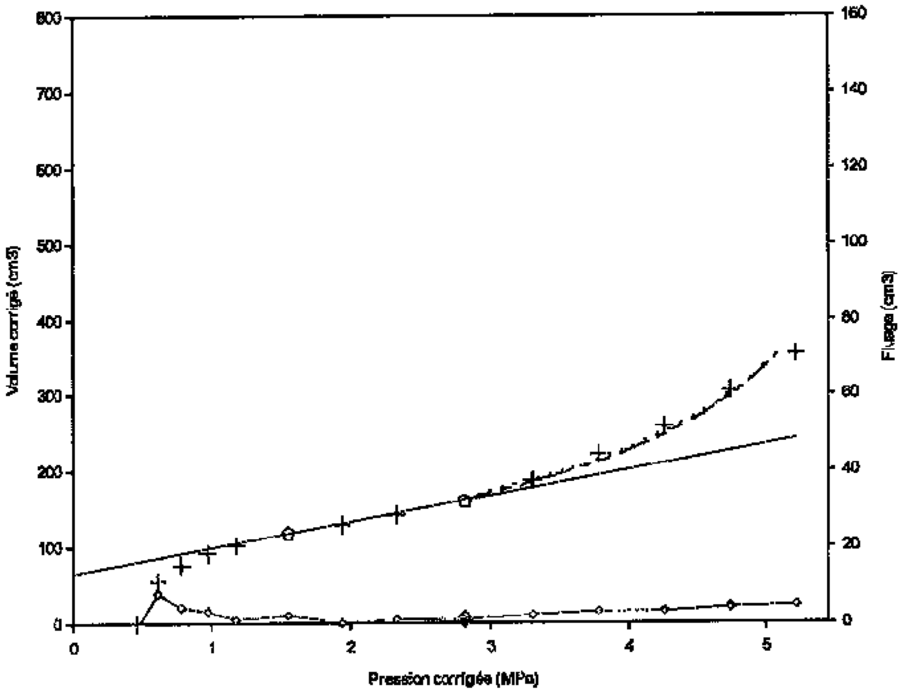
Sondage: MPM 2009-12

Profondeur : 46.00 m



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

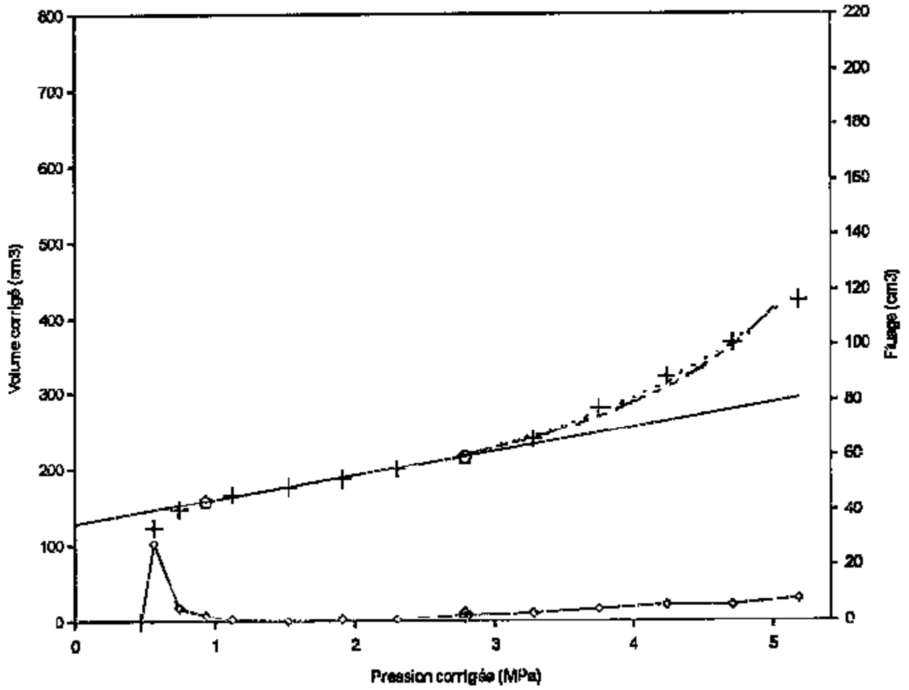
E_M = 53.2

Pl = 6.18	Pmax = 5.21
Pl(i) = 6.18	Pf = 2.82
Pl(h) = 5.86	Po = 0.41
$Pl_{(Pf)}$ = 4.23	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
x : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

Sondage: MPM 2009-12

Profondeur : 47.00 m



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 61.3

Pl = 6.40	Pmax = 5.19
Pl(i) = 6.40	Pf = 2.79
Pl(h) = 5.83	Po = 0.41
$Pl_{(Pf)}$ = 4.19	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
x : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SOIL MECHANICS SIZEWELL B, LEISTON IP16

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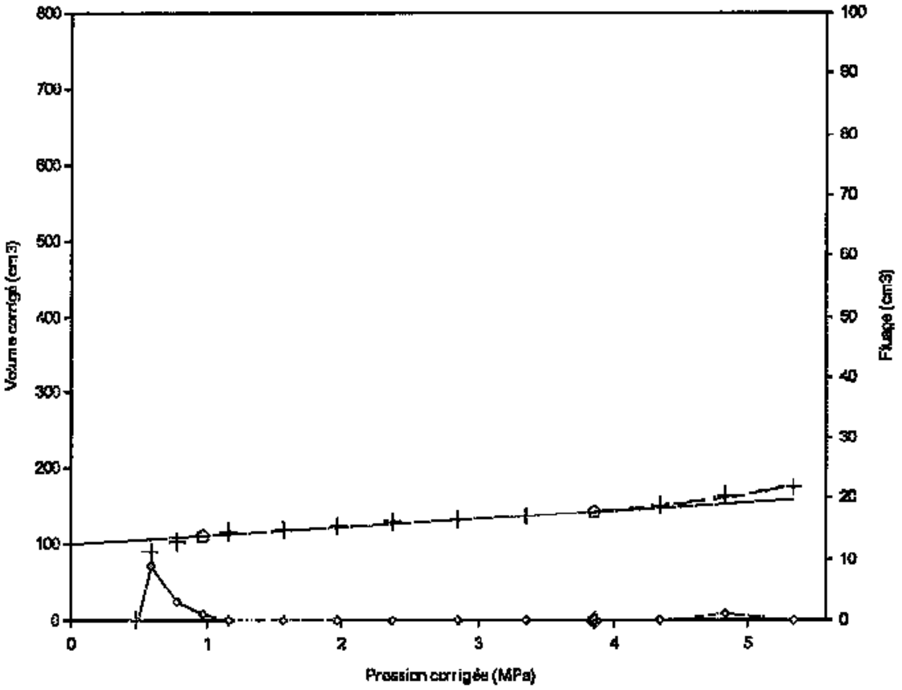
Programme: W-PRessio
Version : 1.1

Fichier : P4

Dernière mise à jour:
21/09/2010 14:06:47

Sondage: MPM 2009-12

Profondeur : 48.00 m



Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 6
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 155.6

Pl	= 10.39	Pmax	= 5.33
Pl(i)	= 10.39	Pf	= 3.85
Pl(h)	= 6.84	Po	= 0.42
$Pl_{(Pf)}$	= 5.78		

Légende:
---- : Pl(i) —-—- : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

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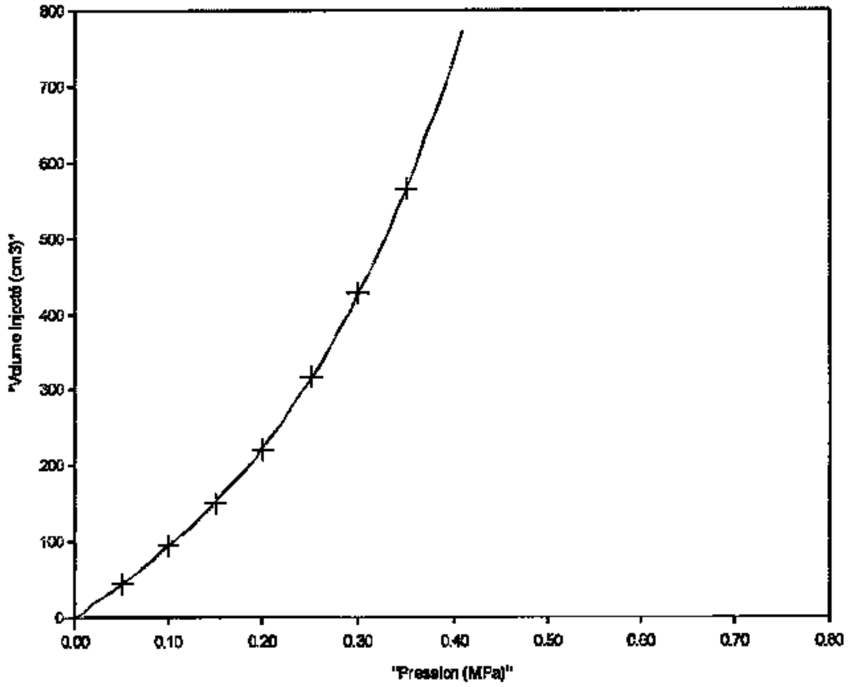
ETALONNAGE N° 5



Type sonde :
STANDARD

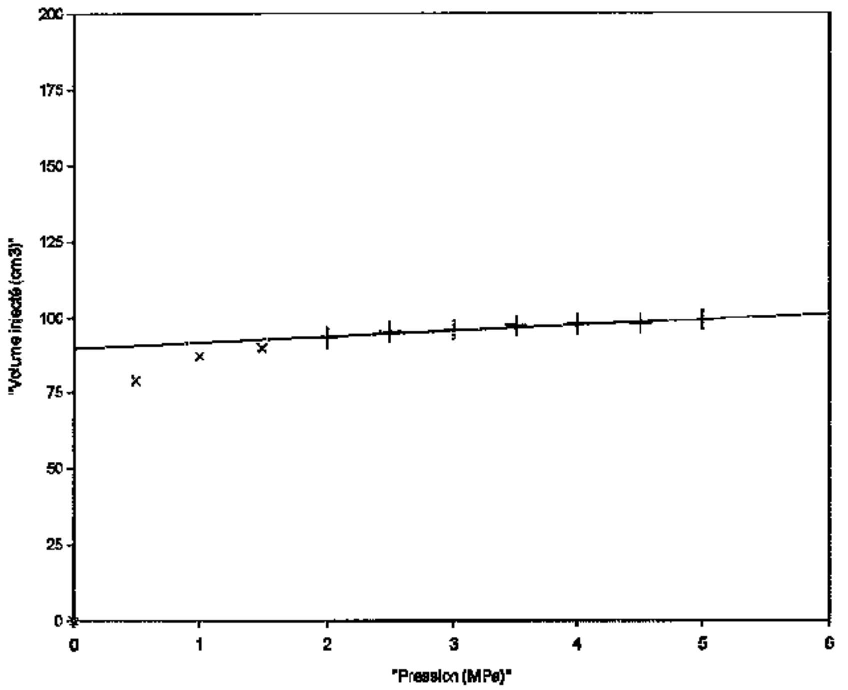
Gaine:
Toilée renforcée

Vs = 535 cm3

Conforme à la norme
NFP 94-110-1

Légende:
... : point de mesure
× : point non pris en compte

CALIBRAGE N° 5



Type sonde :
STANDARD

Gaine:
Toilée renforcée

Vs = 535 cm3

Coef. de compressibilité:
a = 1.86 cm3/MPa

Conforme à la norme
NFP 94-110-1

Légende:
: : point de mesure
× : point non pris en compte

AFFAIRE N°: ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SOIL MECHANICS SIZEWELL B, LEISTON IP16

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Version : 1.1

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Fichier : P4
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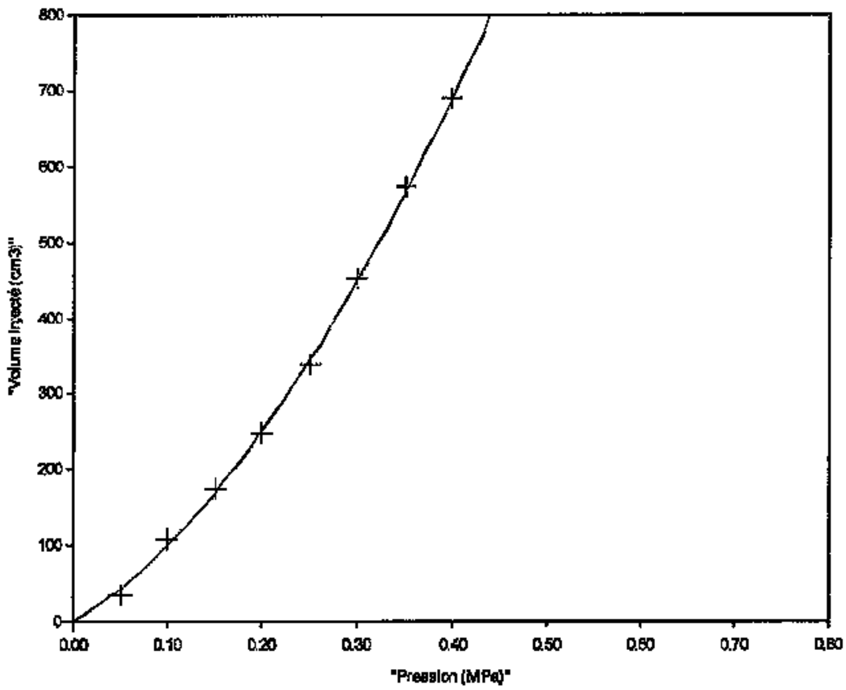
ETALONNAGE N° 6



Type sonde :
STANDARD

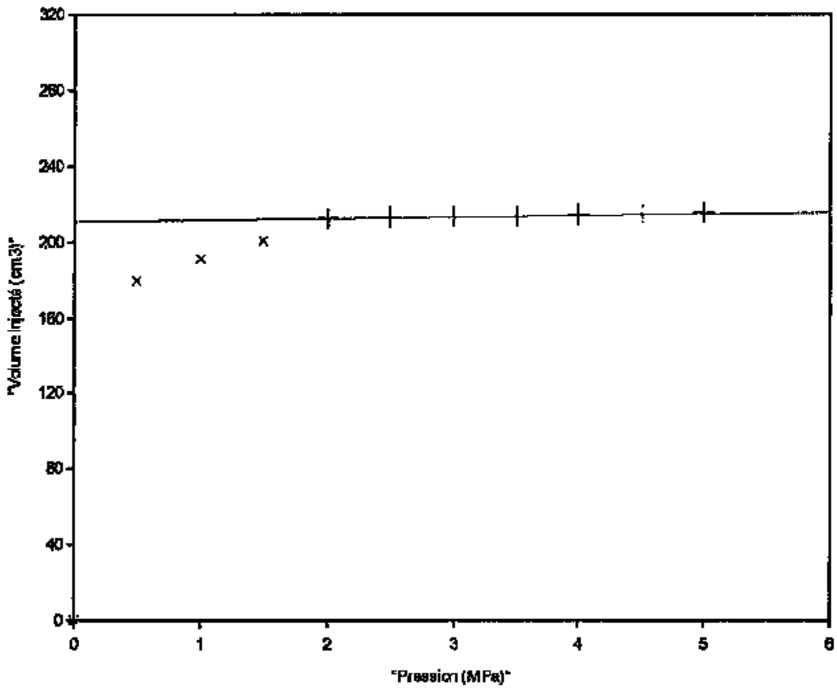
Gaine:
Toilée renforcée

Vs = 535 cm3

Conforme à la norme
NFP 94-110-1

Légende:
+ : point de mesure
x : point non pris en compte

CALIBRAGE N° 6



Type sonde :
STANDARD

Gaine:
Toilée renforcée

Vs = 535 cm3

Coef. de compressibilité:
a = 0.86 cm3/MPa

Conforme à la norme
NFP 94-110-1

Légende:
+ : point de mesure
x : point non pris en compte

AFFAIRE N° : ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SIZEWELL

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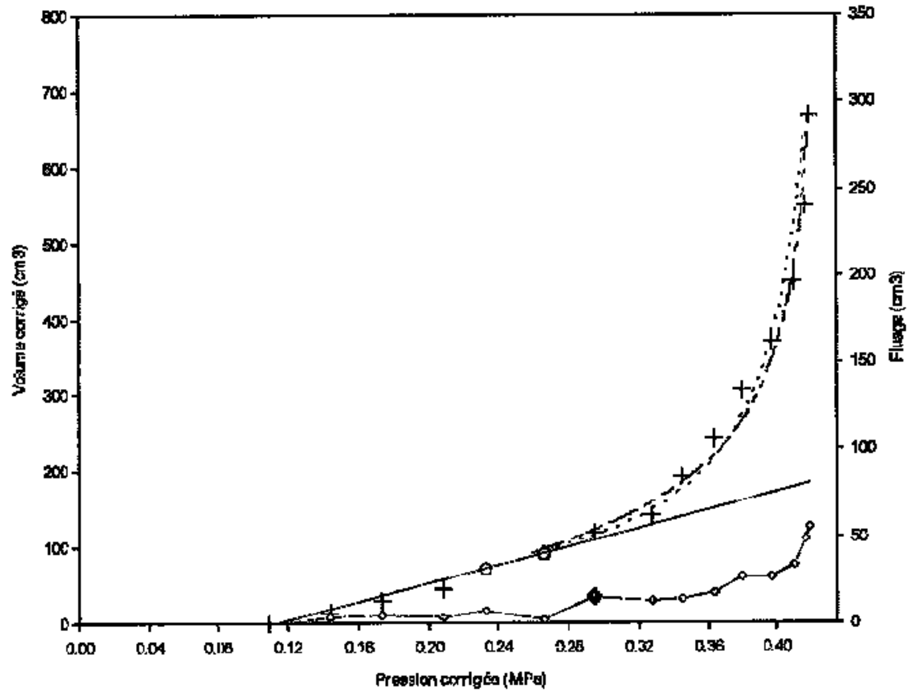
Programme: W-PRessio
Version : 1.1

Fichier : P11
Dernière mise à jour:
10/01/2011 16:29:44

Sondage: MPM13



Profondeur : 10.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

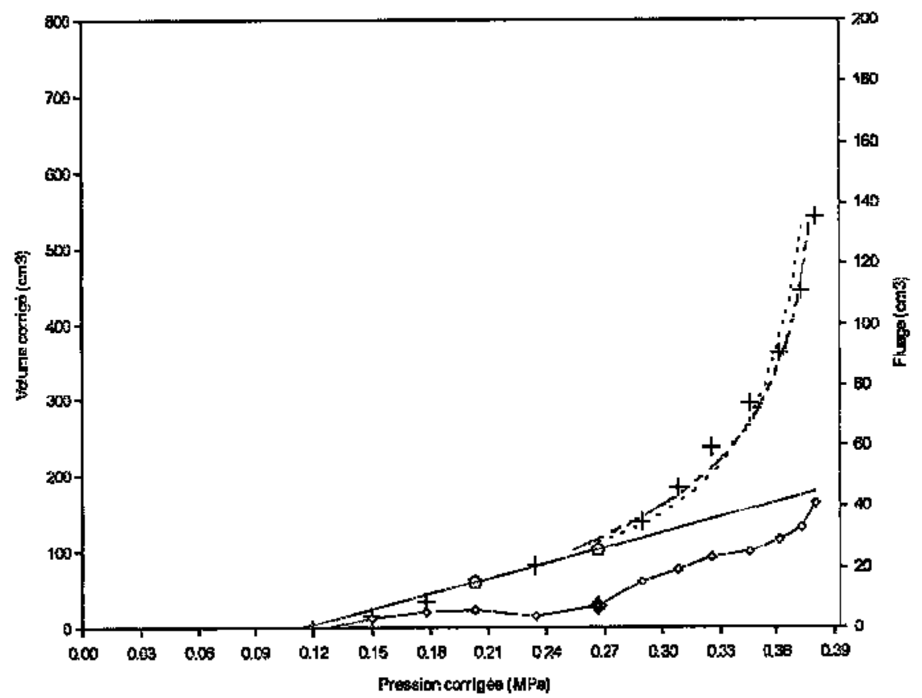
(valeurs en MPa)

E_M = 2.7

Pl = 0.42	Pmax = 0.42
Pl(i) = 0.42	Pf = 0.29
Pl(h) = 0.42	Po = 0.12
$Pl_{(Pf)}$ = 0.44	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 11.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

E_M = 2.4

Pl = 0.38	Pmax = 0.38
Pl(i) = 0.38	Pf = 0.27
Pl(h) = 0.38	Po = 0.14
$Pl_{(Pf)}$ = 0.40	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

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Fichier : P11
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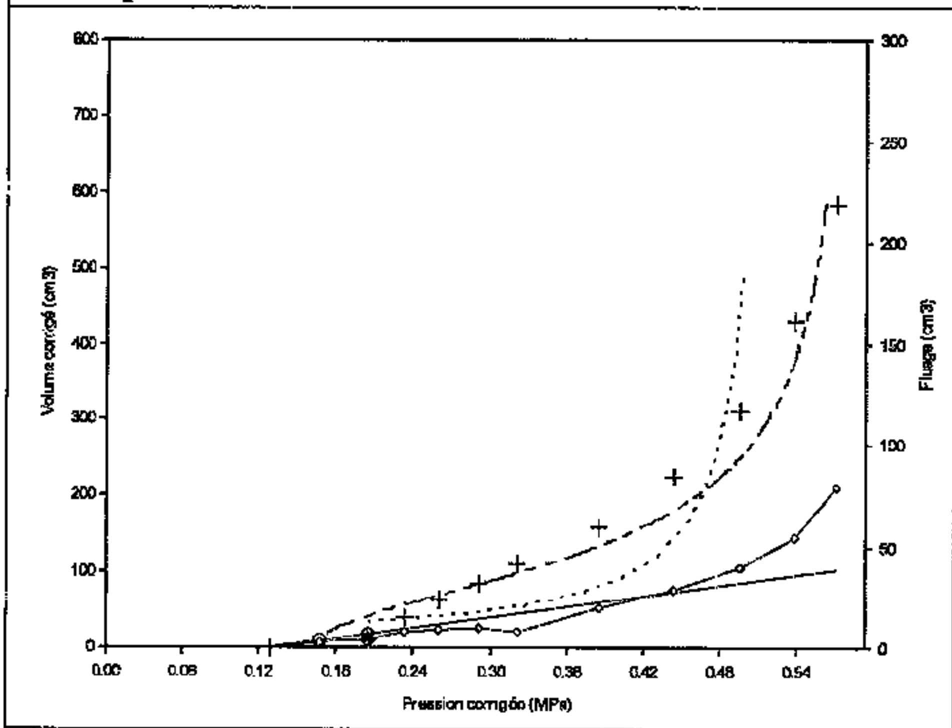
Sondage: MPM13



Profondeur : 12.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

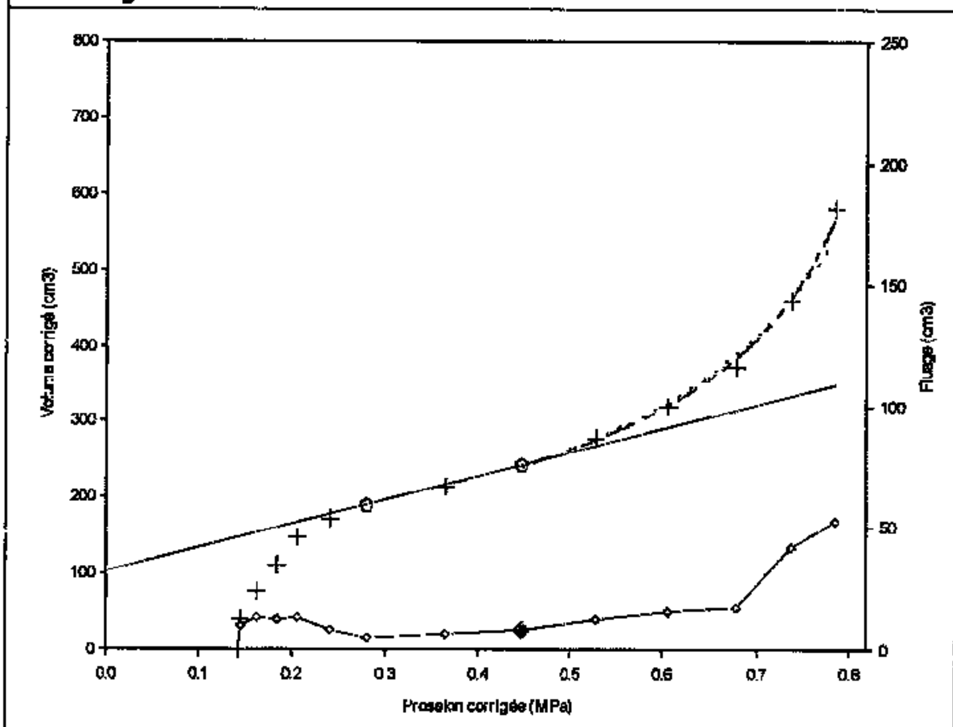
(valeurs en MPa)

EM = 6.4

Pl = 0.50	Pmax = 0.57
Pl(i) = 0.50	Pf = 0.21
Pl(h) = 0.56	Po = 0.15
$Pl_{(Pf)}$ = 0.31	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 13.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 6.4

Pl = 0.89	Pmax = 0.79
Pl(i) = 0.89	Pf = 0.45
Pl(h) = 0.85	Po = 0.16
$Pl_{(Pf)}$ = 0.67	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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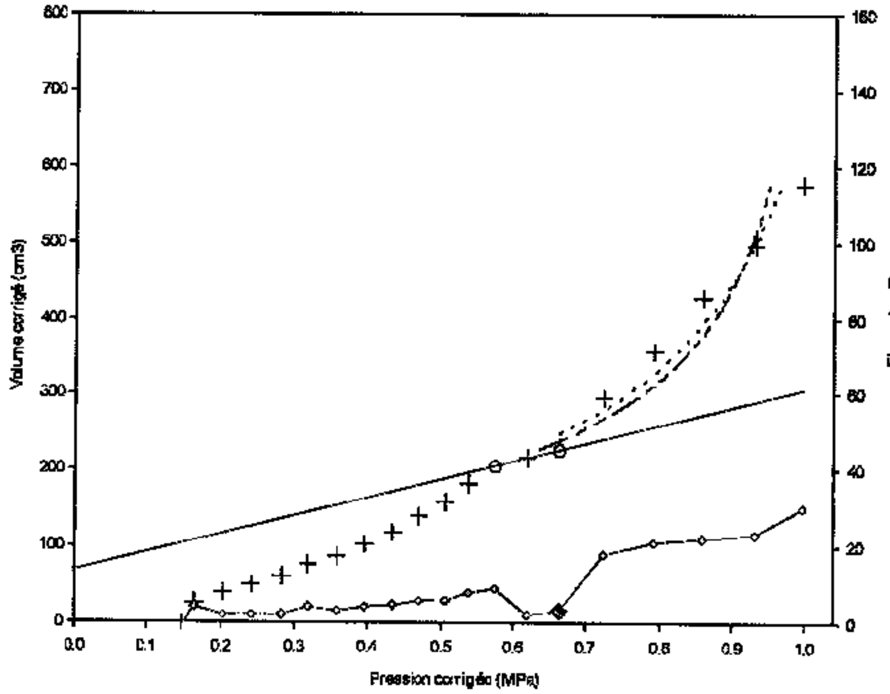


Profondeur : 14.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

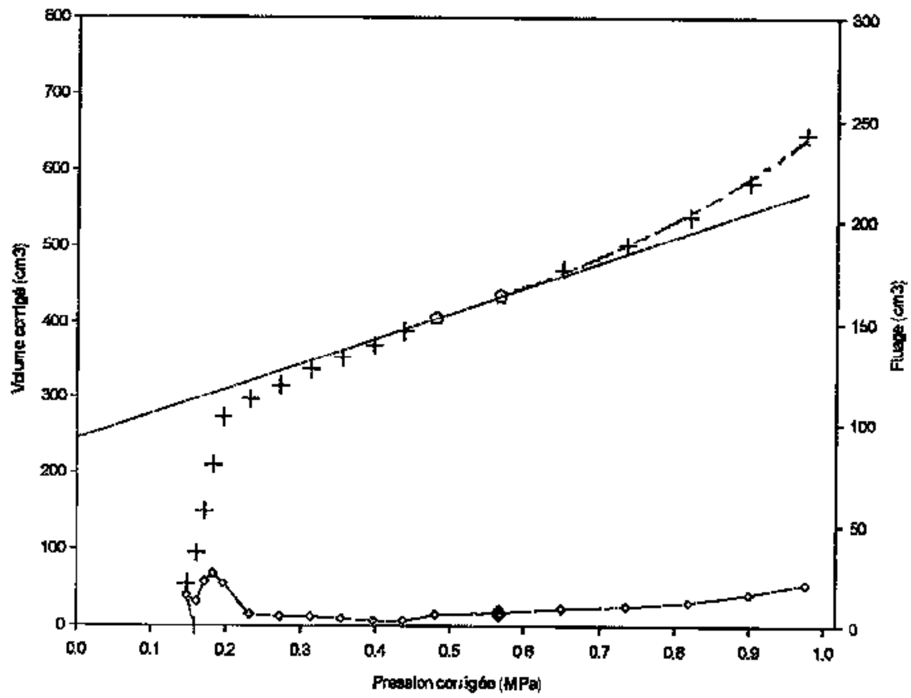
(valeurs en MPa)

EM = 8.4

Pl = 1.05	Pmax = 0.99
Pl(i) = 1.05	Pf = 0.66
Pl(h) = 1.00	Po = 0.18
Pl(Pf) = 0.99	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 15.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 7.6

Pl = 1.43	Pmax = 0.98
Pl(i) = 1.43	Pf = 0.57
Pl(h) = 1.36	Po = 0.19
Pl(Pf) = 0.85	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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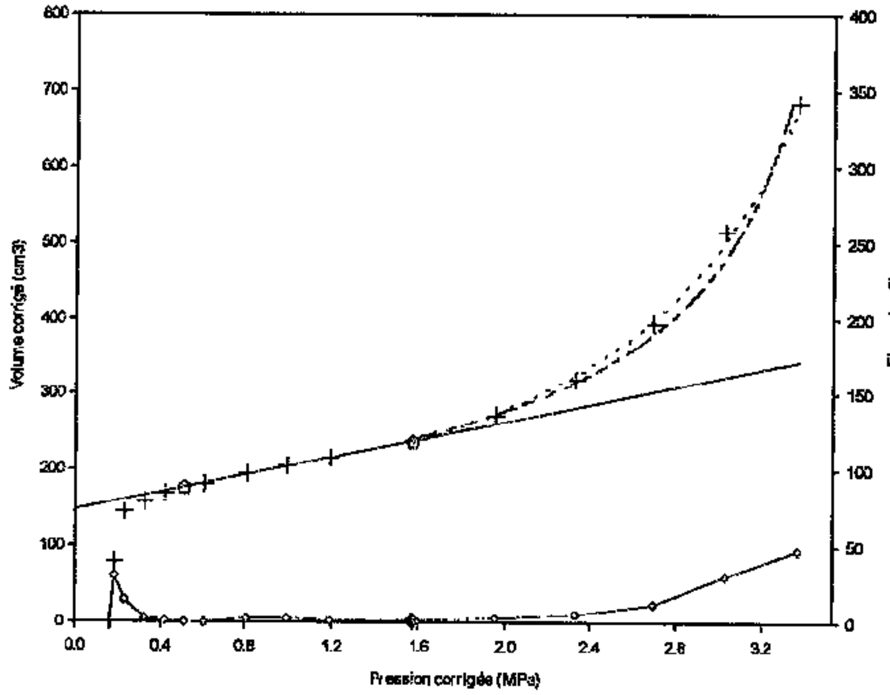


Profondeur : 16.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

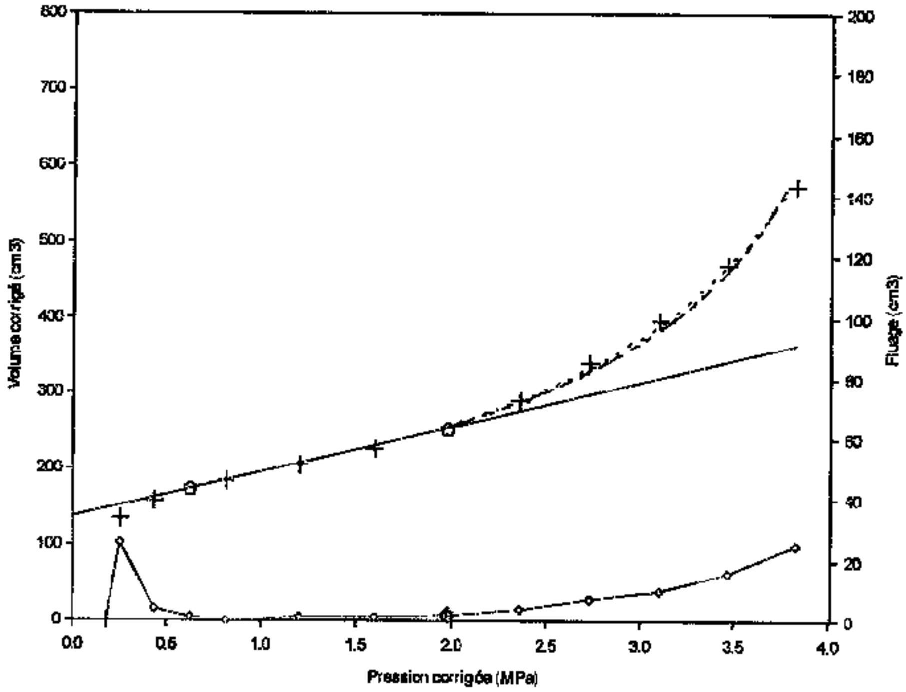
(valeurs en MPa)

E_M = 33.8

Pl = 3.64	Pmax = 3.37
Pl(i) = 3.64	Pf = 1.58
Pl(h) = 3.46	Po = 0.20
$Pl_{(Pf)}$ = 2.36	

Légende:
---- : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 17.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 33.7

Pl = 4.33	Pmax = 3.82
Pl(i) = 4.33	Pf = 1.98
Pl(h) = 4.15	Po = 0.22
$Pl_{(Pf)}$ = 2.96	

Légende:
---- : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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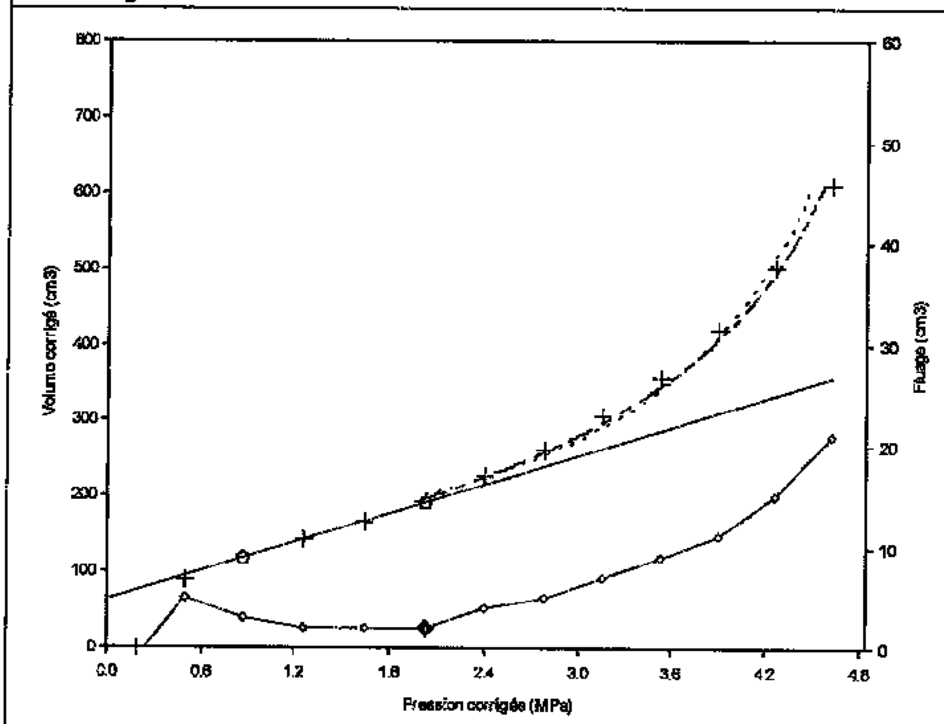


Profondeur : 18.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

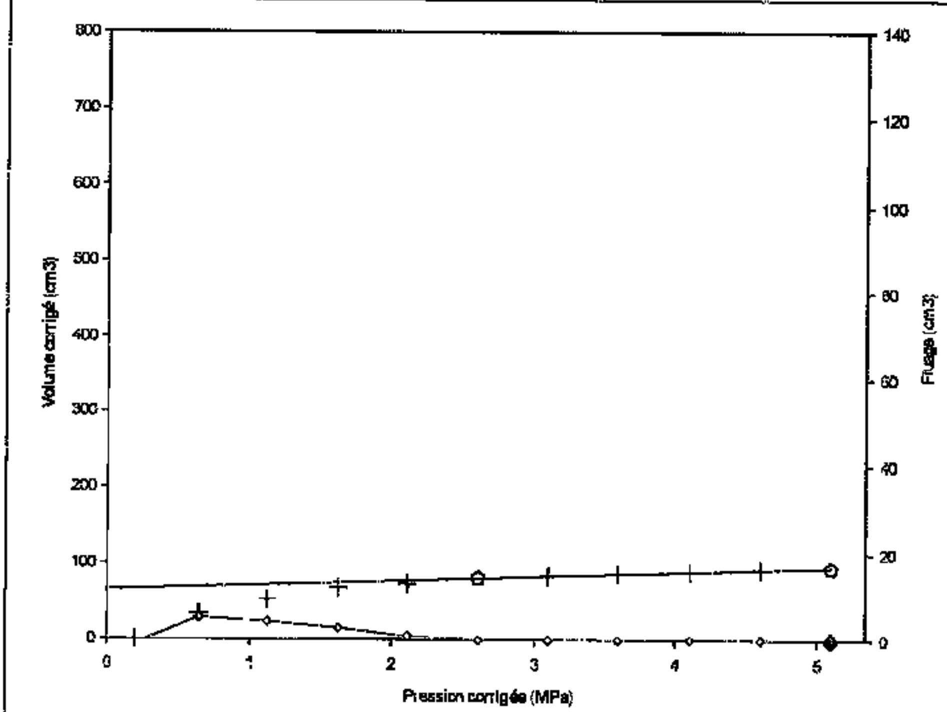
(valeurs en MPa)

EM = 29.0

Pl = 4.75	Pmax = 4.62
Pl(i) = 4.75	Pf = 2.02
Pl(h) = 4.81	Po = 0.23
$Pl_{(Pf)}$ = 3.03	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 19.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 297.3

Pl > 5.10	Pmax = 5.10
	Pf > 5.10
	Po = 0.25
$Pl_{(Pf)}$ > 7.65	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

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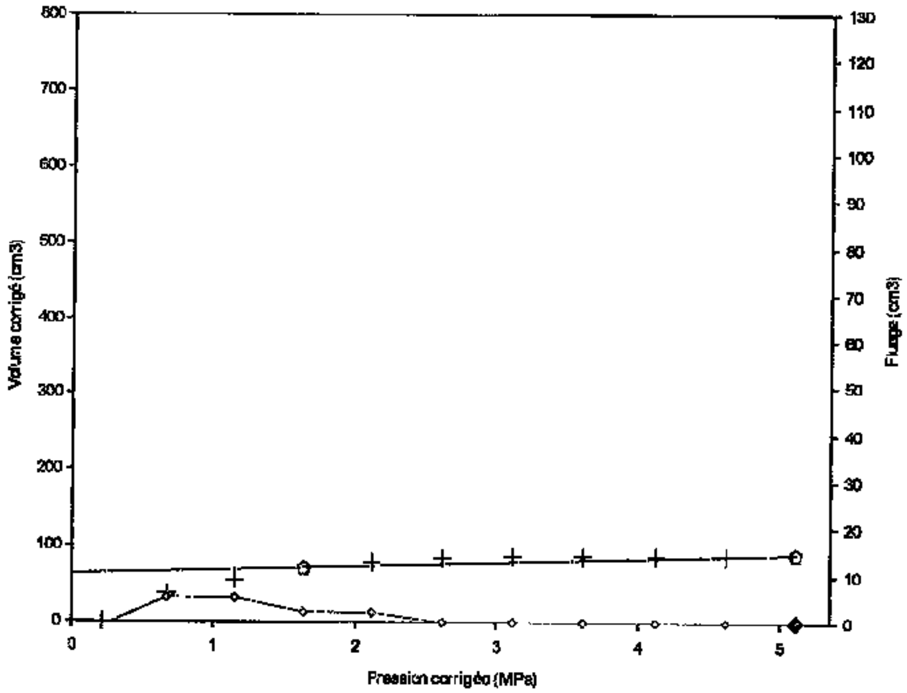


Profondeur : 20.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

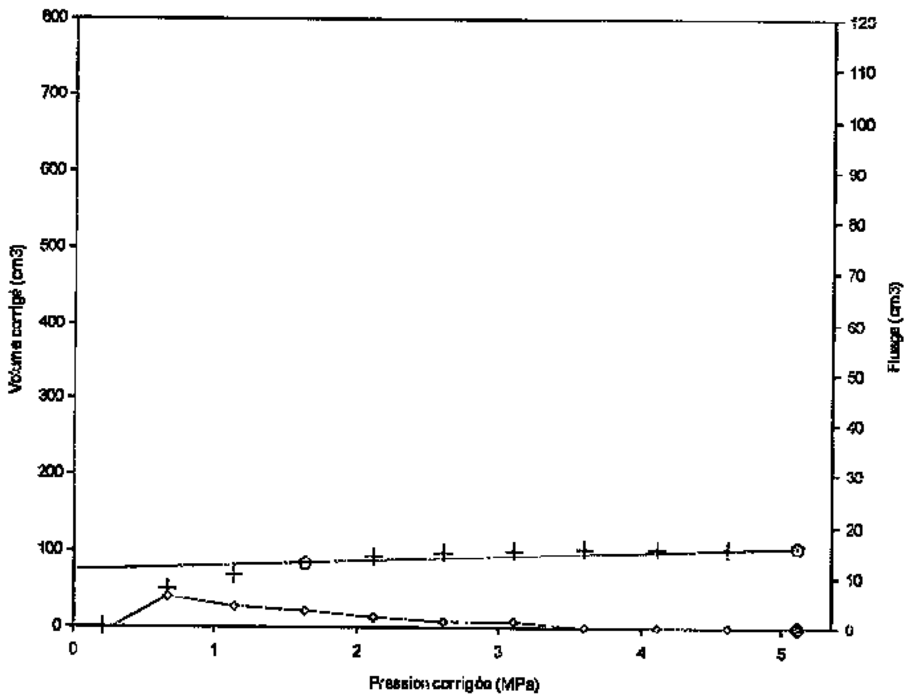
(valeurs en MPa)

E_M = 316.3

Pl > 5.11	Pmax = 5.11
	Pf > 5.11
	Po = 0.26
$Pl_{(Pf)}$ > 7.67	

Légende:
---- : Pl(t) ---- : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 21.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

E_M = 265.0

Pl > 5.11	Pmax = 5.11
	Pf > 5.11
	Po = 0.27
$Pl_{(Pf)}$ > 7.66	

Légende:
---- : Pl(t) ---- : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

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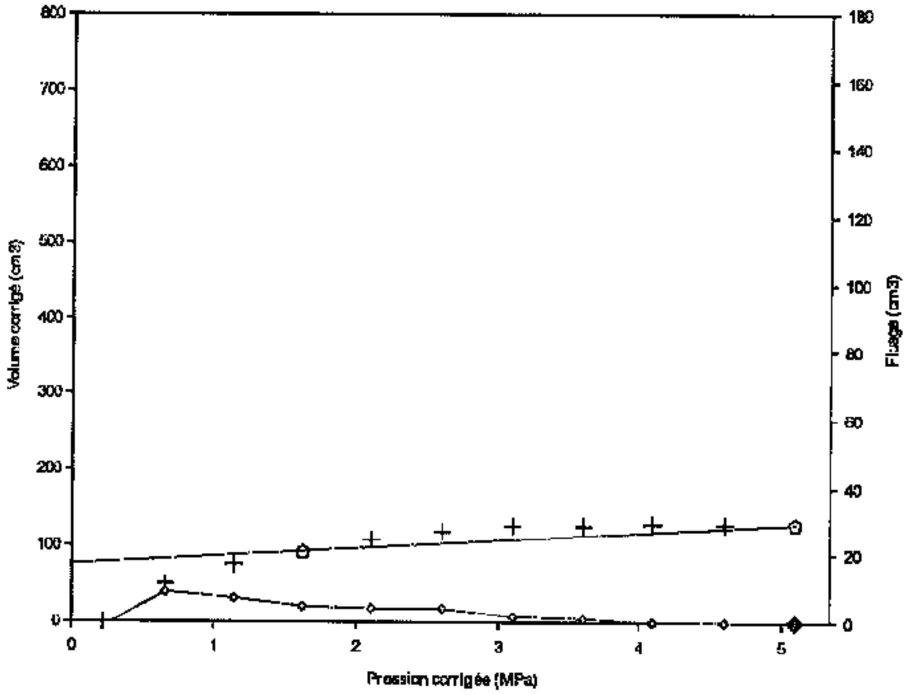


Profondeur : 22.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

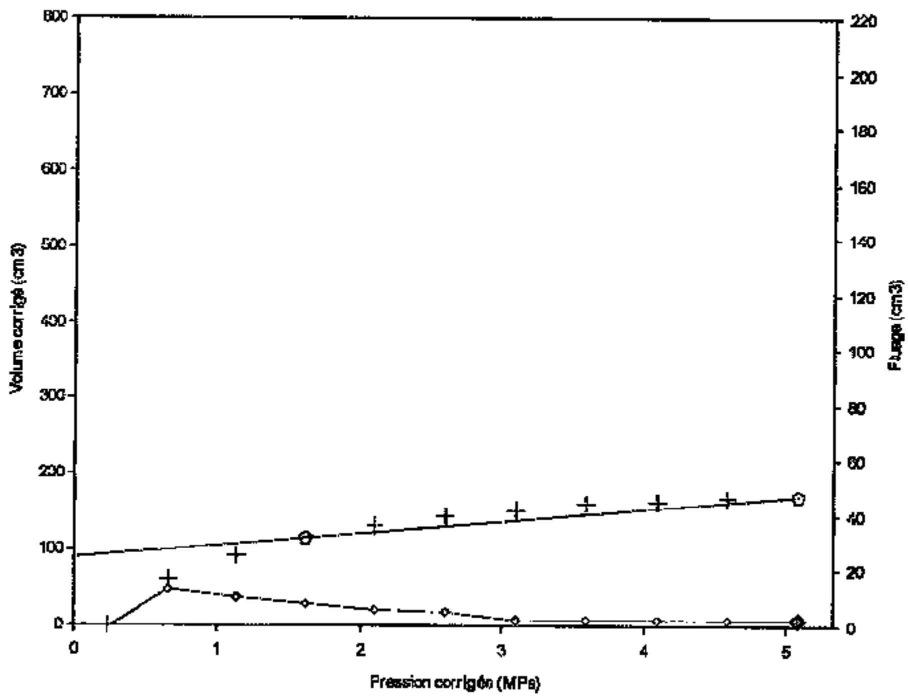
(valeurs en MPa)

EM = 165.8

Pl	**> 5.10**	Pmax	= 5.10
		Pf	> 5.10
		Po	= 0.29
Pl(Pf)	> 7.65		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 23.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.22 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 109.6

Pl	**> 5.08**	Pmax	= 5.08
		Pf	> 5.08
		Po	= 0.30
Pl(Pf)	> 7.62		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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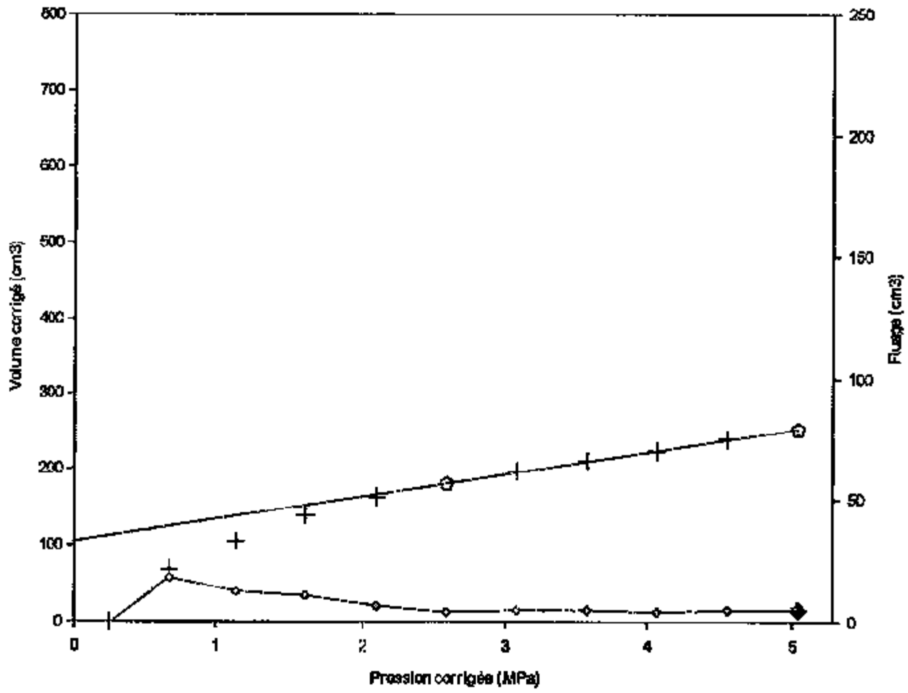


Profondeur : 24.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

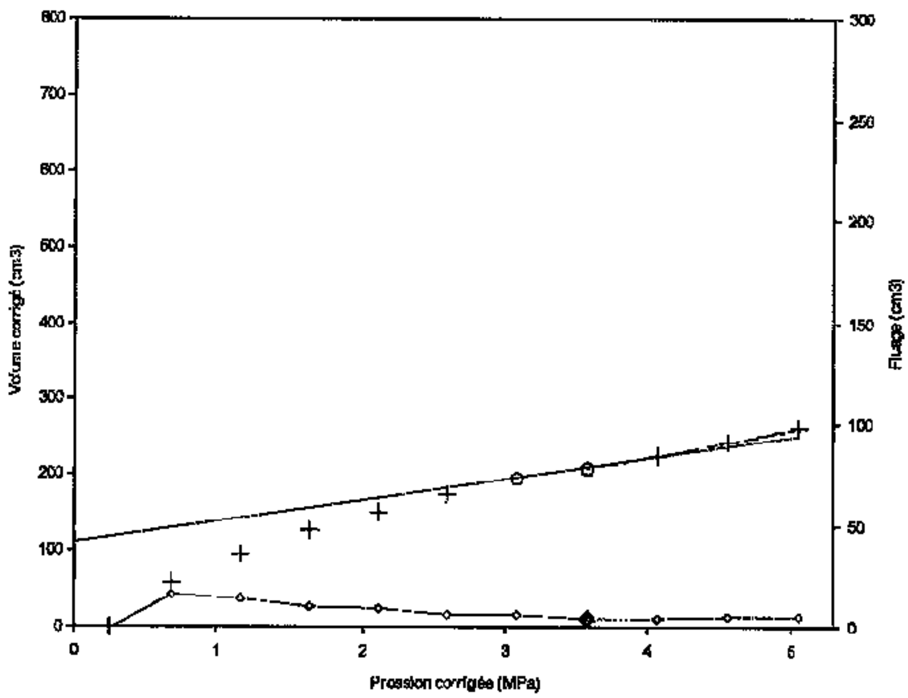
(valeurs en MPa)

E_M = 67.5

Pl > 5.04	Pmax = 5.04	
	Pf > 5.04	
	Po = 0.31	
$Pl_{(Pf)}$ > 7.56		

Légende:
---- : Pl(j) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 25.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 71.0

Pl = 9.21	Pmax = 5.05
Pl(j) = 9.21	Pf = 3.58
Pl(h) = 8.49	Po = 0.33
$Pl_{(Pf)}$ = 5.37	

Légende:
---- : Pl(j) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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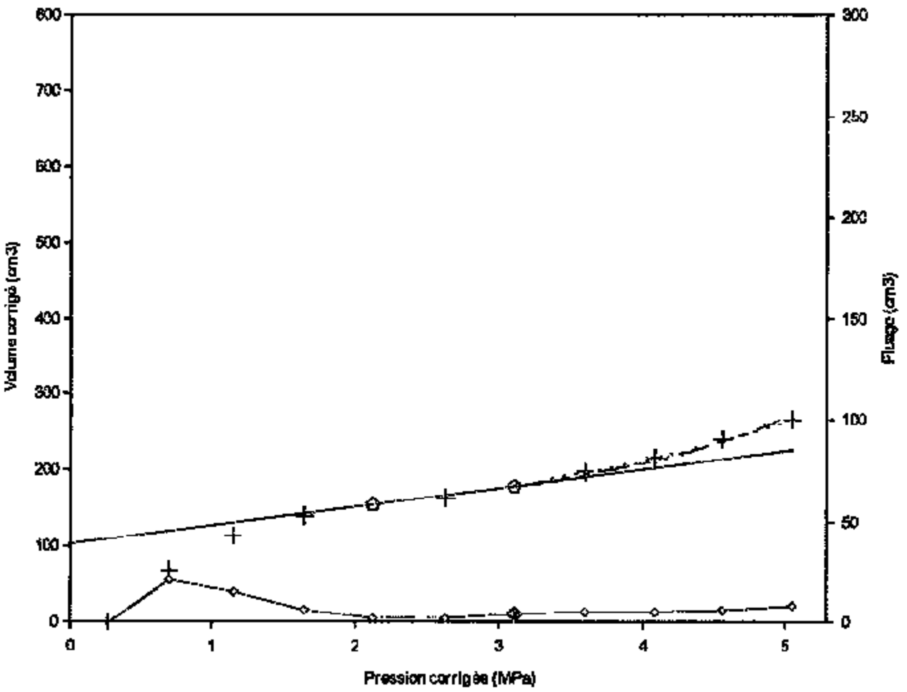


Profondeur : 26.00 m

Type de forage:
Désagrégateur rotation

Nappe: 3.10 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

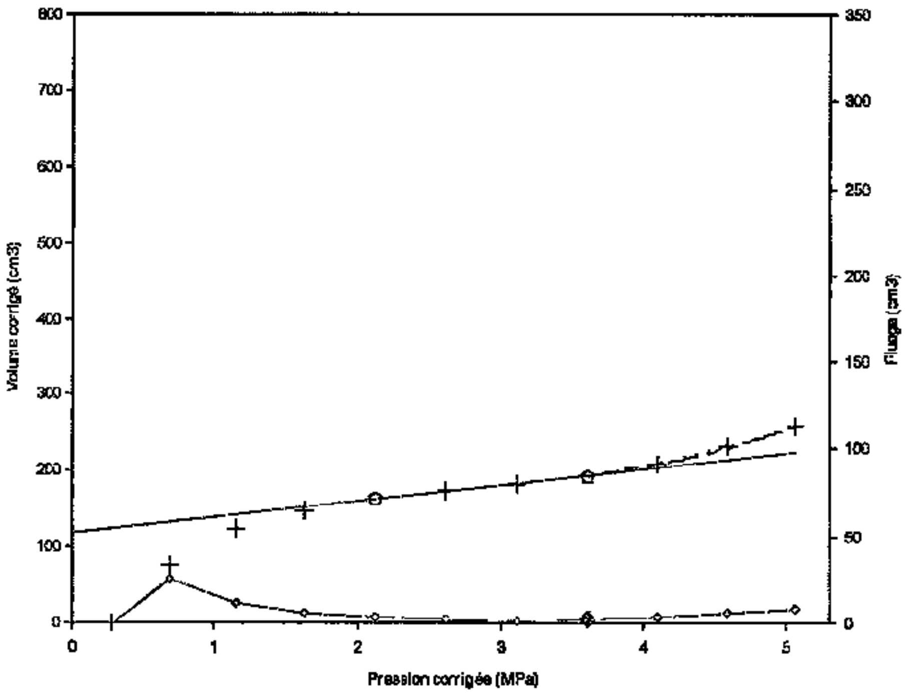
(valeurs en MPa)

EM = 76.1

Pl	= 7.82	Pmax	= 5.06
Pl(i)	= 7.82	Pf	= 3.11
Pl(h)	= 6.52	Po	= 0.34
Pl(Pf)	= 4.67		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 27.00 m

Type de forage:
Désagrégateur rotation

Nappe: 3.10 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.70 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 91.4

Pl	= 8.22	Pmax	= 5.07
Pl(i)	= 8.22	Pf	= 3.61
Pl(h)	= 6.36	Po	= 0.36
Pl(Pf)	= 5.41		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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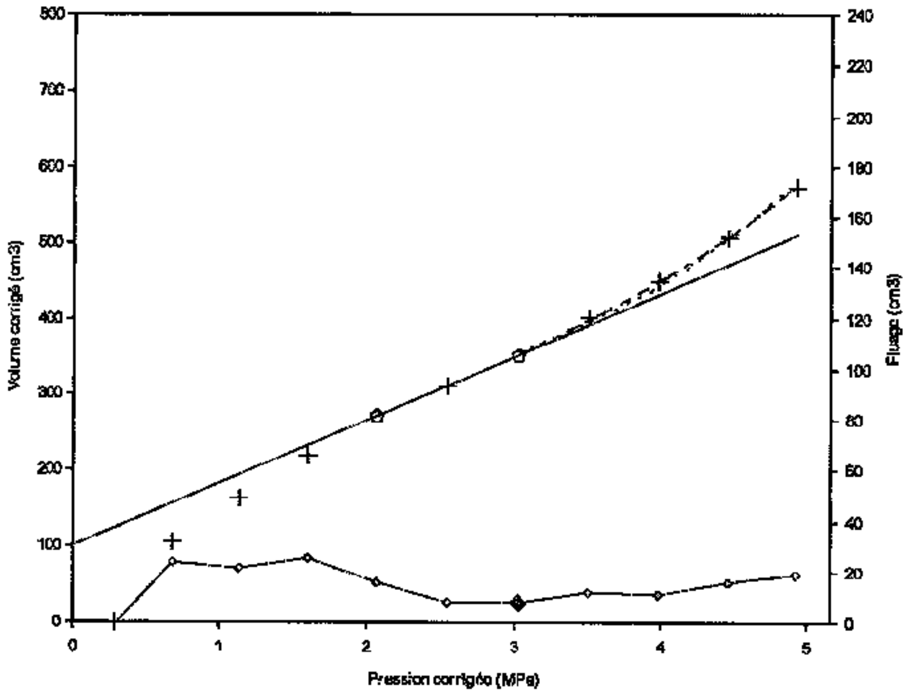


Profondeur : 28.00 m

Type de forage:
Désagrégateur rotation

Nappe: 3.10 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

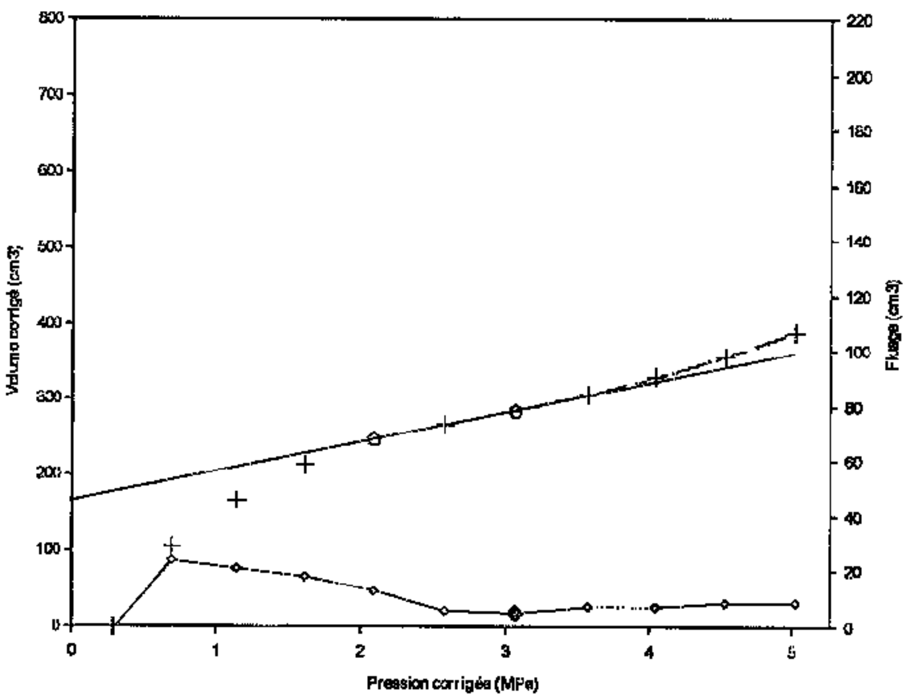
EM = 27.3

Pl	**= 6.42**	Pmax	= 4.93
Pl(i)	= 6.42	Pf	= 3.03
Pl(h)	= 6.56	Po	= 0.37
Pl (Pf)	= 4.55		

Légende:

---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 29.00 m

Type de forage:
Désagrégateur rotation

Nappe: 3.10 m

Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

EM = 54.7

Pl	**= 8.45**	Pmax	= 5.02
Pl(i)	= 8.45	Pf	= 3.08
Pl(h)	= 7.63	Po	= 0.38
Pl (Pf)	= 4.61		

Légende:

---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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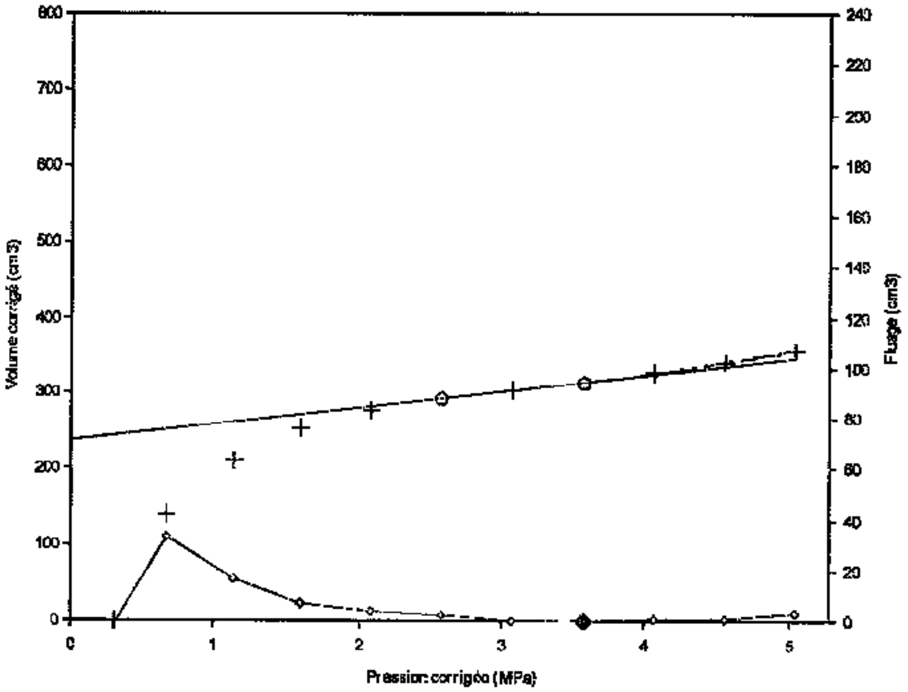
Sondage: MPM13



Profondeur : 30.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

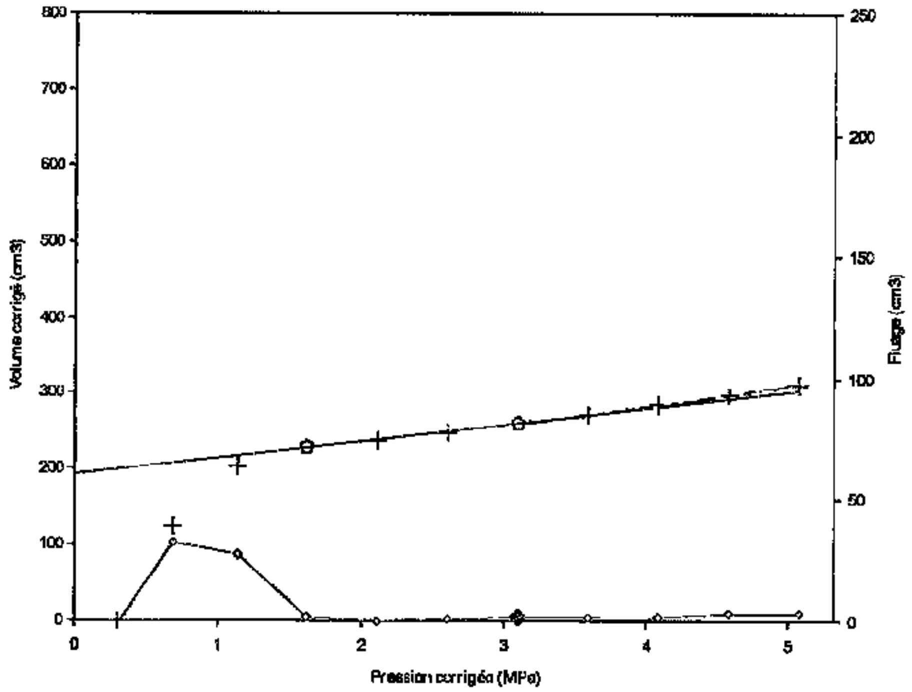
(valeurs en MPa)

E_M = 104.3

Pl = 12.41	Pmax = 5.05
Pl(i) = 12.41	Pf = 3.57
Pl(h) = 7.89	Po = 0.40
$Pl_{(PF)}$ = 5.36	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 31.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 96.8

Pl = 12.02	Pmax = 5.08
Pl(i) = 12.02	Pf = 3.11
Pl(h) = 11.10	Po = 0.41
$Pl_{(PF)}$ = 4.66	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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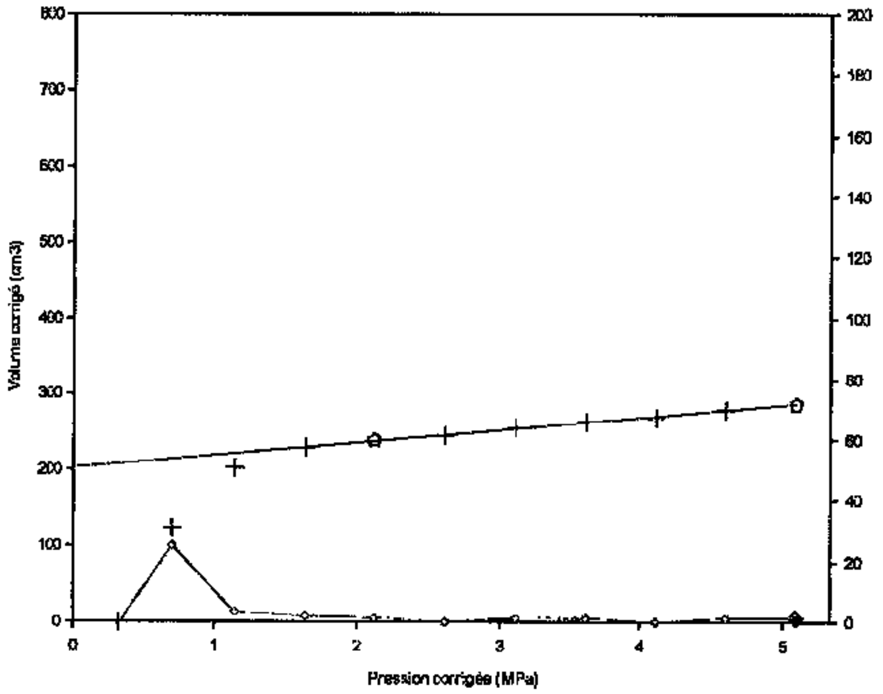
Sondage: MPM13



Profondeur : 32.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

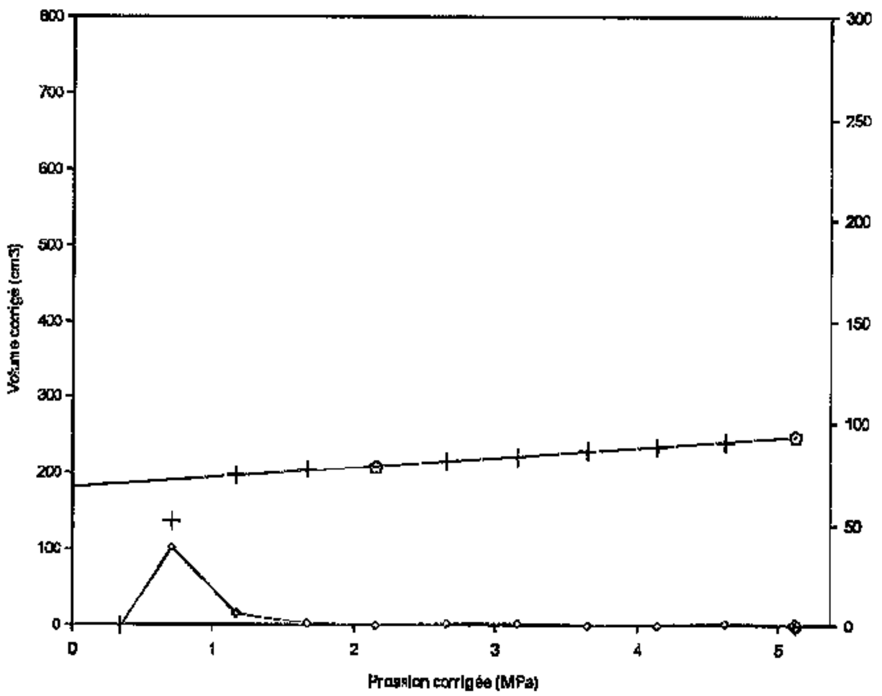
(valeurs en MPa)

EM = 130.3

Pl	> 5.10	Pmax	= 5.10
		Pf	> 5.10
		Po	= 0.42
Pl (Pf)	> 7.65		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 33.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

EM = 157.3

Pl	> 5.14	Pmax	= 5.14
		Pf	> 5.14
		Po	= 0.44
Pl (Pf)	> 7.70		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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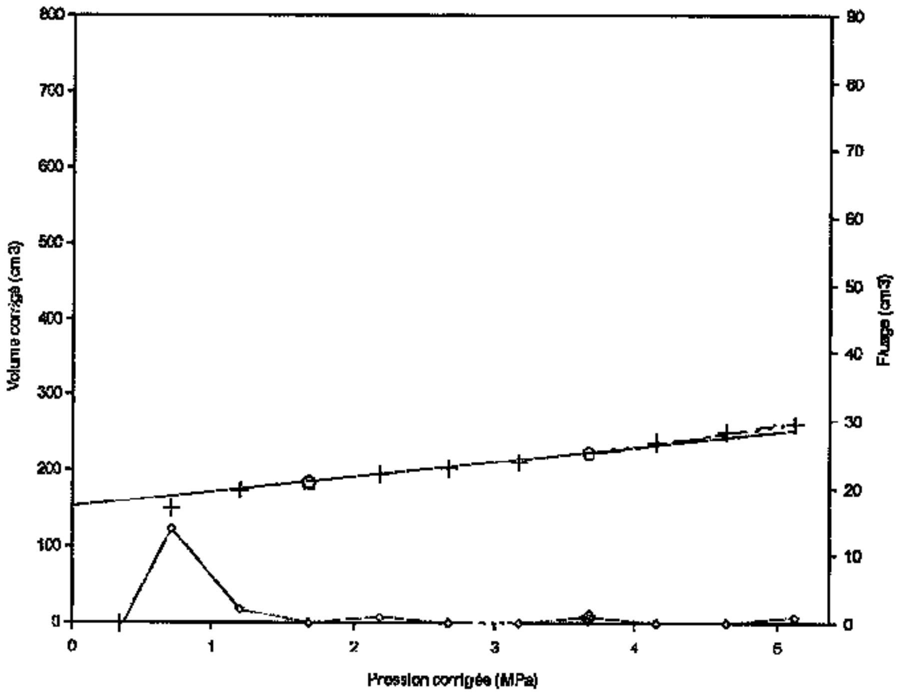


Profondeur : 34.00 m

Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

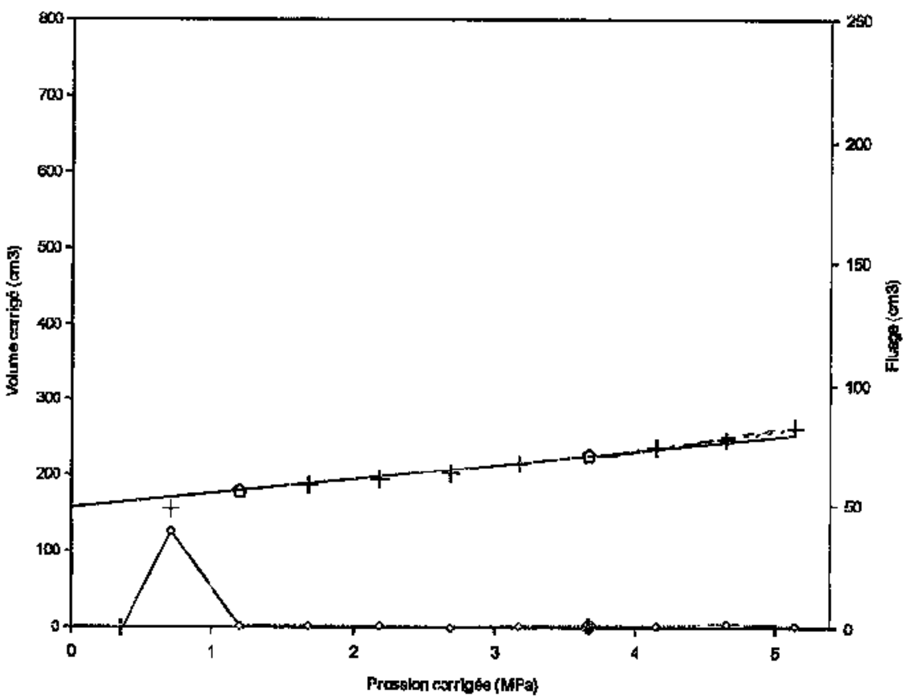
(valeurs en MPa)

EM = 101.5

Pl = 11.35	Pmax = 5.14
Pl(i) = 11.35	Pf = 3.66
Pl(h) = 8.18	Po = 0.45
Pl(Pf) = 5.49	

Légende:
- ---- : Pl(i) — — — : Pl(h)
- + : point de mesure
- × : point non pris en compte
- ⌂ : extrémité de la phase linéaire
- ◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 35.00 m

Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 3.86 cm3/MPa

(valeurs en MPa)

EM = 105.8

Pl = 11.61	Pmax = 5.15
Pl(i) = 11.61	Pf = 3.67
Pl(h) = 8.14	Po = 0.47
Pl(Pf) = 5.50	

Légende:
- ---- : Pl(i) — — — : Pl(h)
- + : point de mesure
- × : point non pris en compte
- ⌂ : extrémité de la phase linéaire
- ◦ : fluage ◈ : Pf

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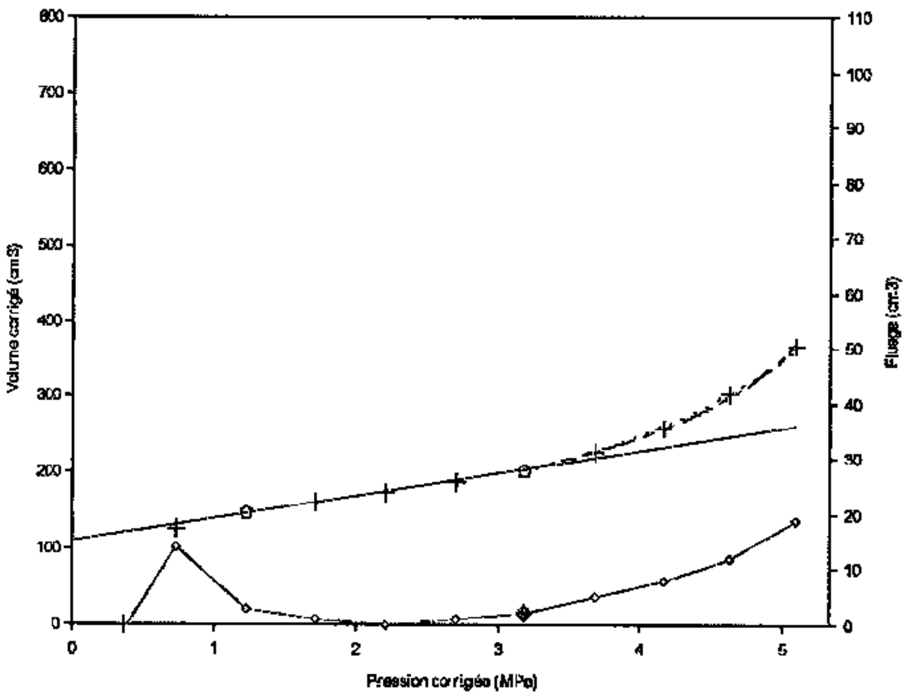


Profondeur : 36.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

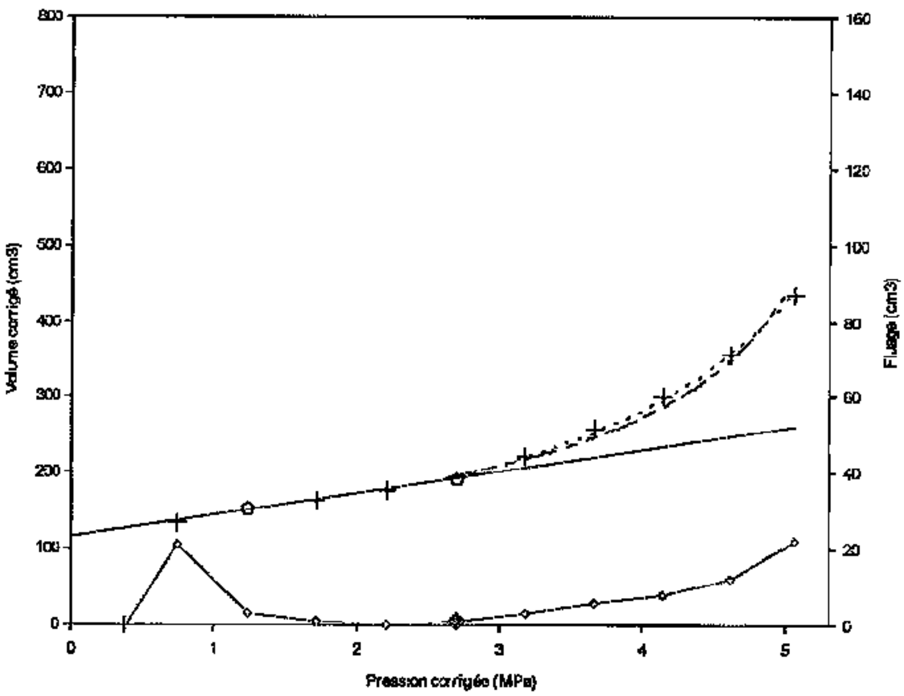
(valeurs en MPa)

E_M = 64.7

Pl = 6.50	Pmax = 5.10
Pl(i) = 6.50	Pf = 3.19
Pl(h) = 5.88	Po = 0.48
$Pl_{(Pf)}$ = 4.79	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
∘ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 37.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 66.5

Pl = 6.00	Pmax = 5.08
Pl(i) = 6.00	Pf = 2.71
Pl(h) = 5.52	Po = 0.49
$Pl_{(Pf)}$ = 4.06	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
∘ : fluage ◈ : Pf

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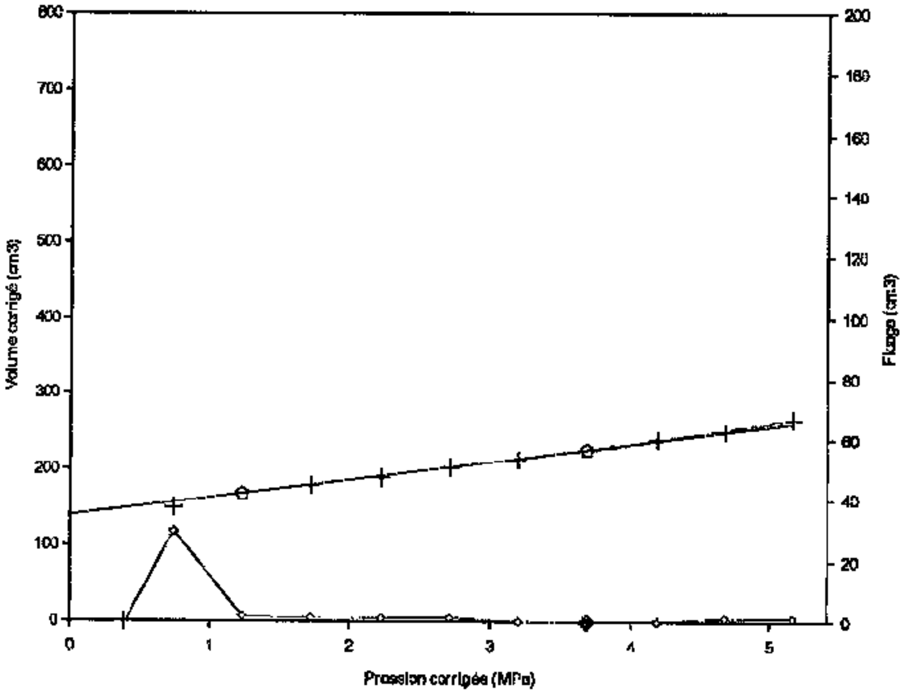


Profondeur : 38.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): [illegible] (estimé)
Hauteur du pressiomètre: [illegible] m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

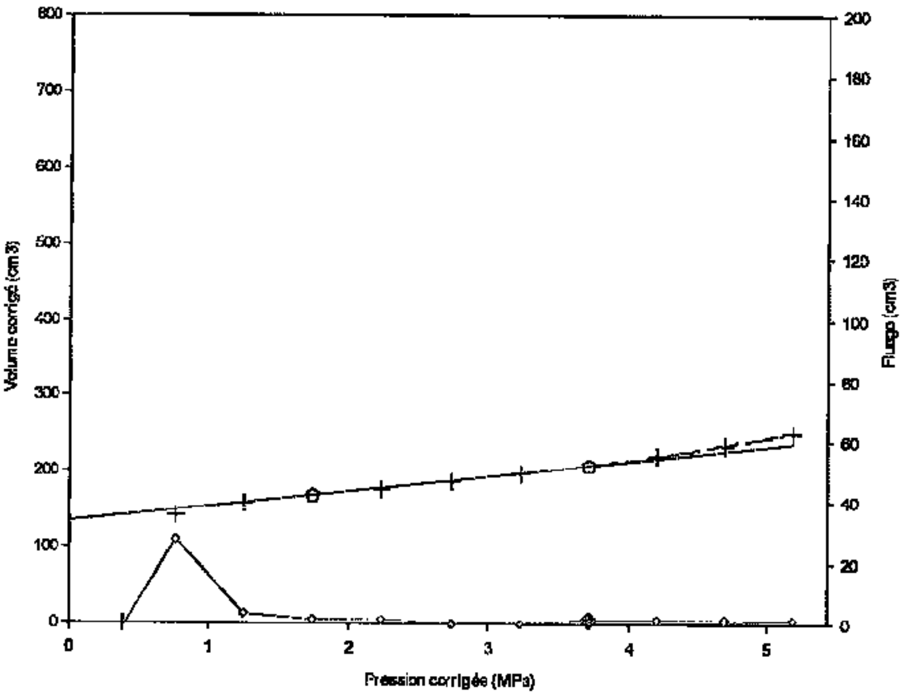
(valeurs en MPa)

EM = 81.5

Pl = 11.25	Pmax = 5.17
Pl(i) = 11.25	Pf = 3.70
Pl(h) = 10.40	Po = 0.51
$Pl_{(Pf)}$ = 5.55	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 39.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

EM = 96.7

Pl = 10.17	Pmax = 5.19
Pl(i) = 10.17	Pf = 3.72
Pl(h) = 9.06	Po = 0.52
$Pl_{(Pf)}$ = 5.58	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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Programme: W-PRessio
Version : 1.1

Fichier : PI1
Dernière mise à jour:
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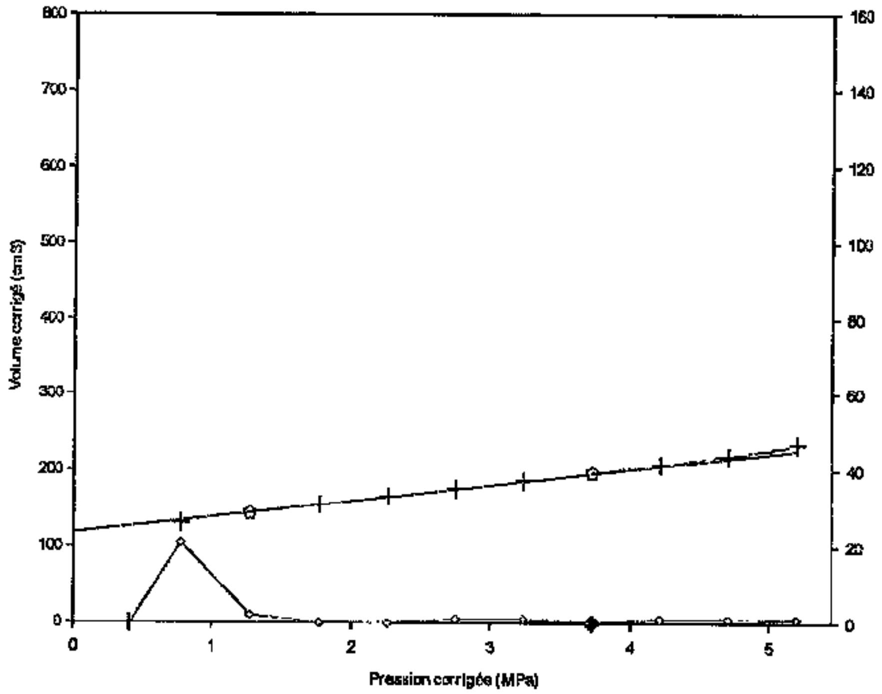
Sondage: MPM13



Profondeur : 40.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

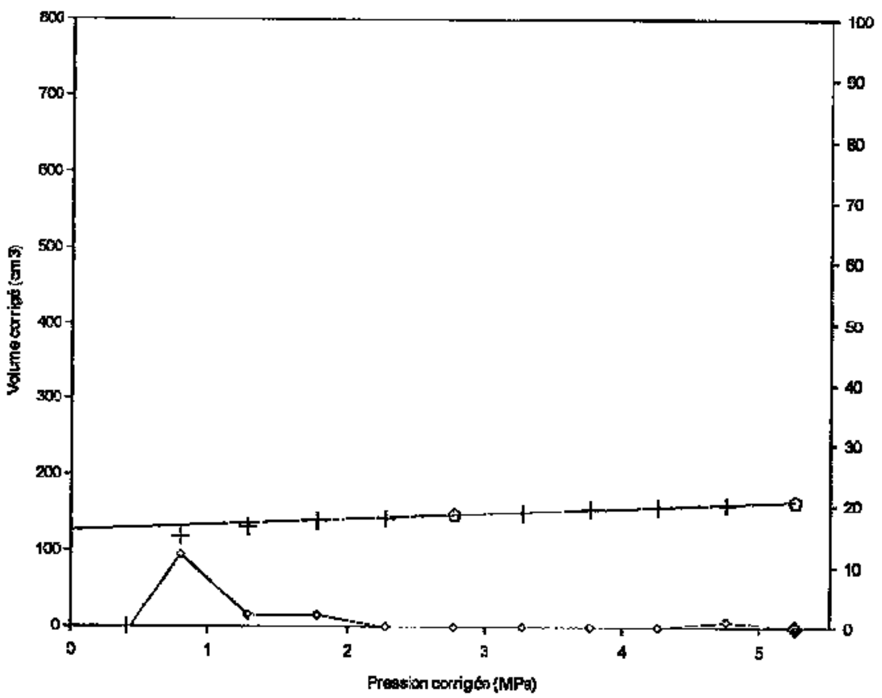
(valeurs en MPa)

E_M = 91.1

Pl = 10.93	Pmax = 5.21
Pl (i) = 10.93	Pf = 3.73
Pl (h) = 11.89	Po = 0.53
$Pl_{(Pf)}$ = 5.60	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 41.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 256.2

Pl > 5.26	Pmax = 5.26
	Pf > 5.26
	Po = 0.55
$Pl_{(Pf)}$ > 7.90	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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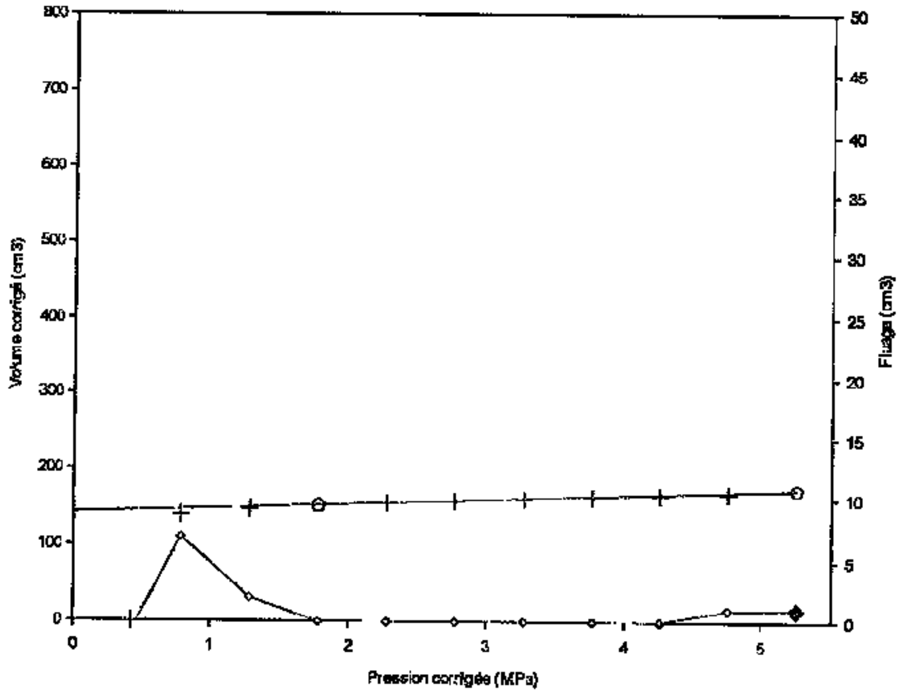
Sondage: MPM13



Profondeur : 42.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

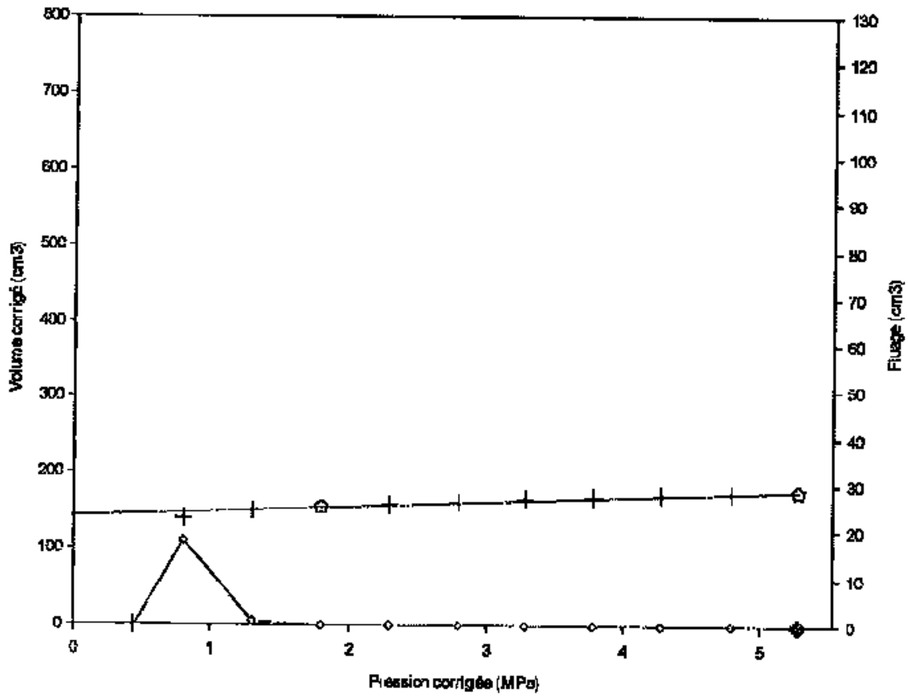
(valeurs en MPa)

E_M = 308.1

Pl > 5.27	Pmax = 5.27	
	Pf > 5.27	
	Po = 0.56	
Pl (Pf) > 7.90		

Légende:
---- : Pl(1) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 43.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

E_M = 295.1

Pl > 5.28	Pmax = 5.28	
	Pf > 5.28	
	Po = 0.58	
Pl (Pf) > 7.92		

Légende:
---- : Pl(1) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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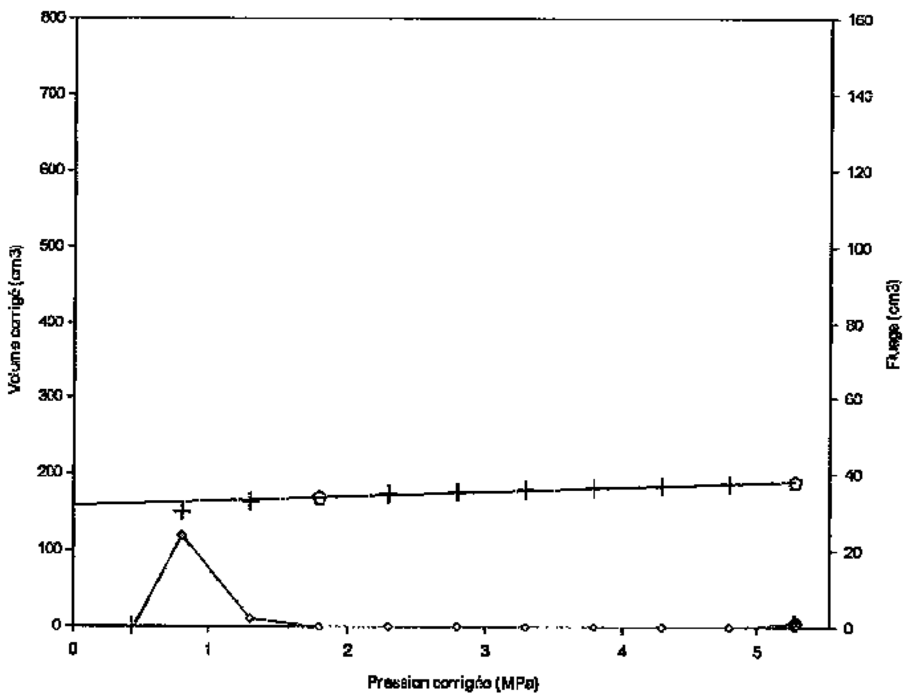


Profondeur : 44.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a : 0.86 cm3/MPa

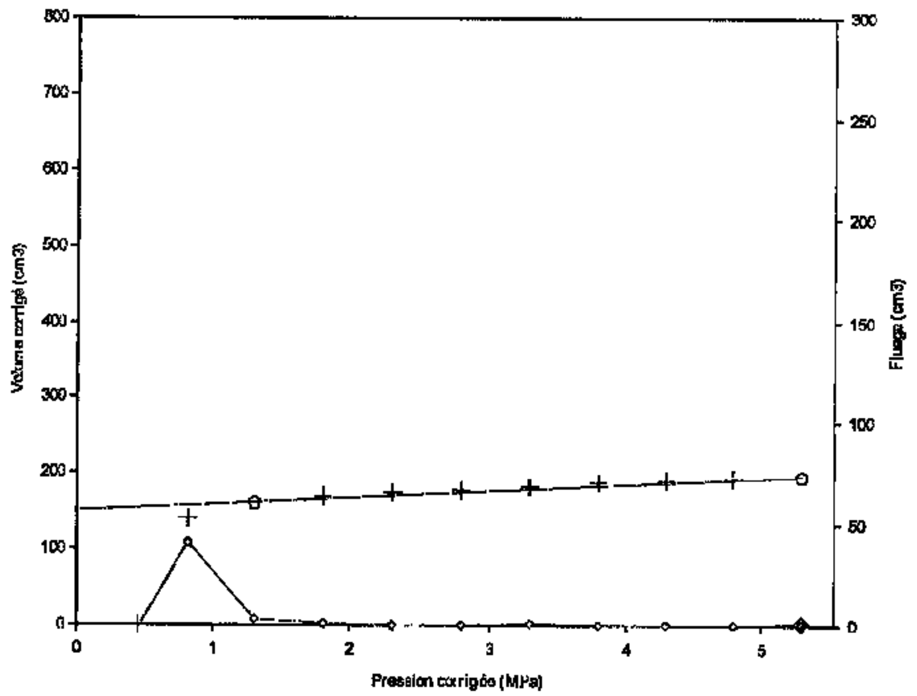
(valeurs en MPa)

EM = 301.1

Pl > 5.28	Pmax = 5.28
	Pf > 5.28
	Po = 0.59
Pl(Pf) > 7.92	

Légende:
- - - - : Pl(l) — — — : Pl(h)
\+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 45.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

(valeurs en MPa)

EM = 224.9

Pl > 5.29	Pmax = 5.29
	Pf > 5.29
	Po = 0.60
Pl(Pf) > 7.93	

Suivant la norme
NFP 94-110-1

Légende:
- - - - : Pl(l) — — — : Pl(h)
\+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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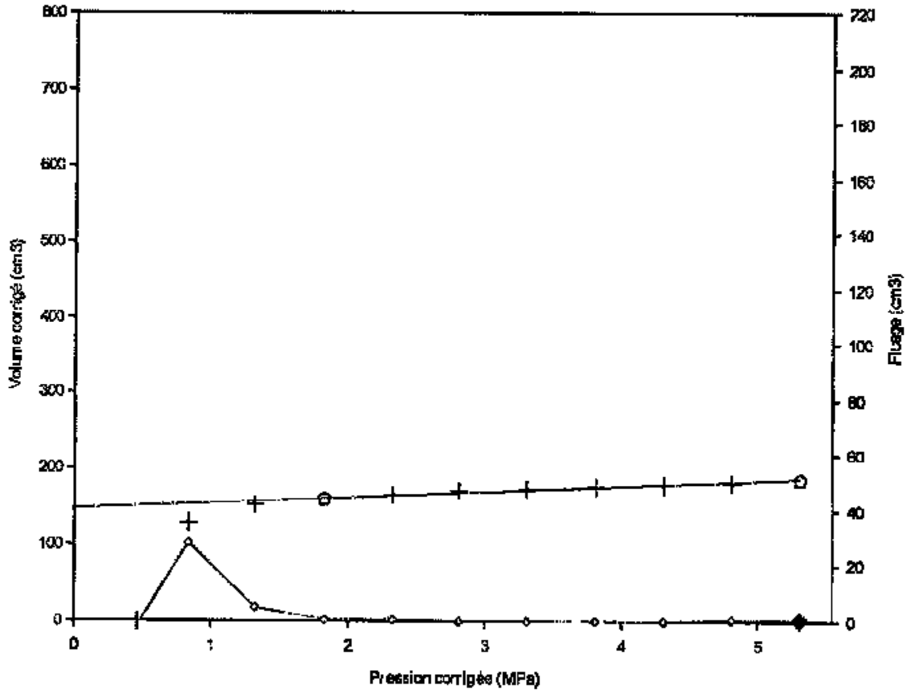


Profondeur : 46.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

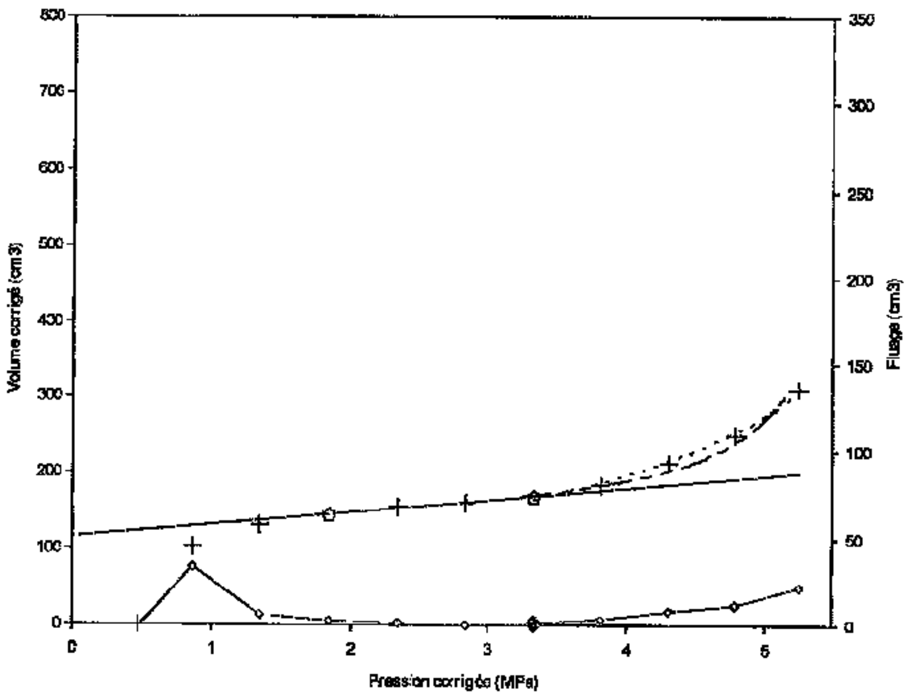
(valeurs en MPa)

E_M = 243.2

Pl > 5.30 | Pmax = 5.30
Pf > 5.30
Po = 0.62
$Pl_{(pr)}$ > 7.95

Légende:
- - - : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pl

Sondage: MPM13



Profondeur : 47.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 115.2

Pl = 6.72 | Pmax = 5.24
Pl(i) = 6.72 | Pf = 3.32
Pl(h) = 5.57 | Po = 0.63
$Pl_{(pr)}$ = 4.99

Légende:
- - - : Pl(i) — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pl

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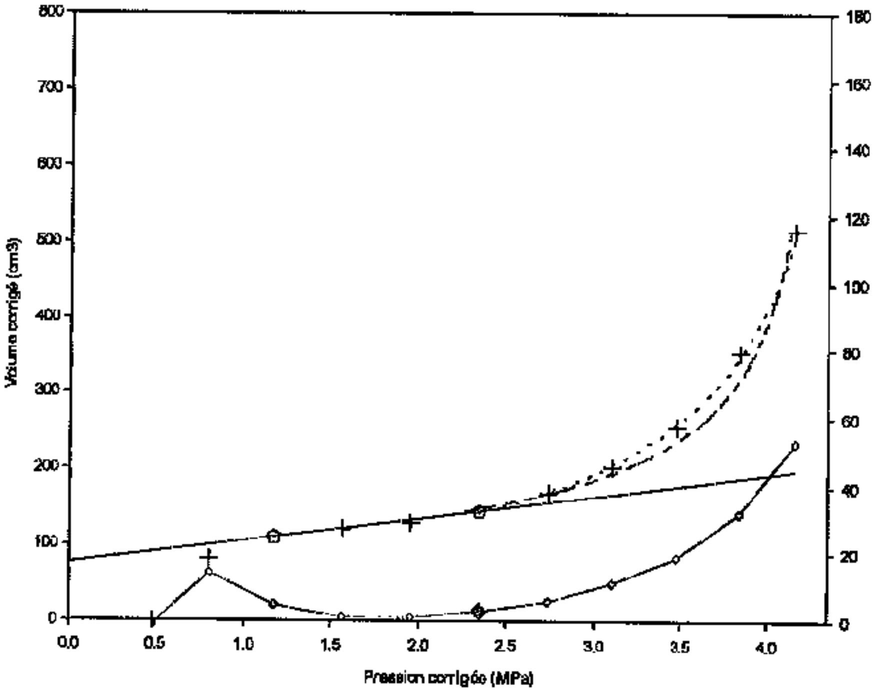
Sondage : MPM13



Profondeur : 48.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Km (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a 0.86 cm3/MPa

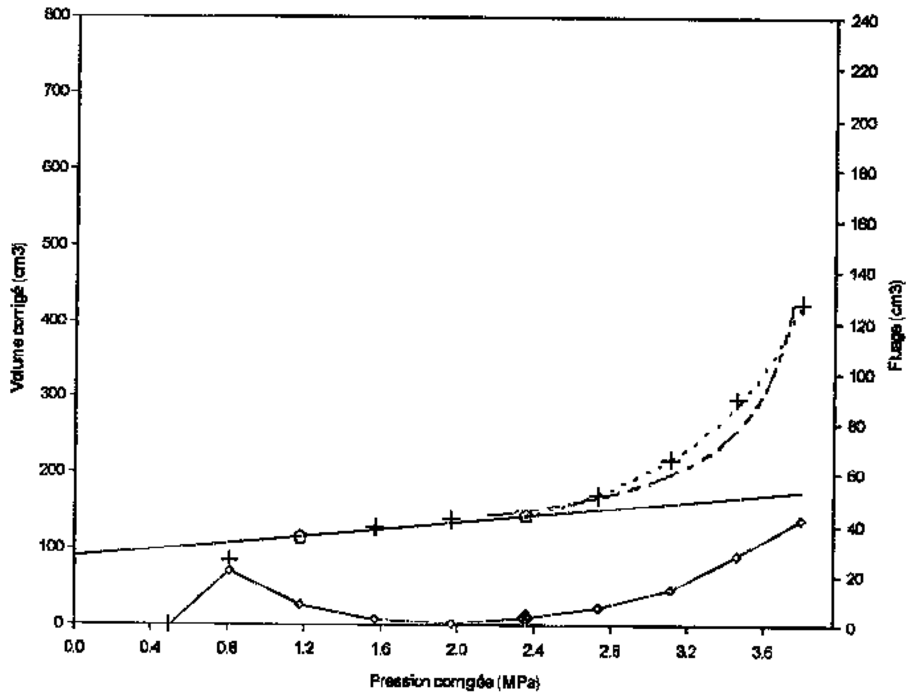
(valeurs en MPa)

E_M = 59.2

Pl = 4.41	Pmax = 4.16
Pl(i) = 4.41	Pf = 2.35
Pl(h) = 4.22	Po = 0.64
$Pl_{(Pf)}$ = 3.53	

Légende:
---- : Pl(i) ——— : Pl(h)
+ : point de mesure
x : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage : MPM13



Profondeur : 49.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Km (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.50 m

N° de l'inertie: 1
Sonde: STANDARD
Gaine: Toilée renforcée
a = 0.86 cm3/MPa

(valeurs en MPa)

E_M = 77.5

Pl = 4.15	Pmax = 3.81
Pl(i) = 4.15	Pf = 2.36
Pl(h) = 3.87	Po = 0.66
$Pl_{(Pf)}$ = 3.54	

Légende:
---- : Pl(i) ——— : Pl(h)
+ : point de mesure
x : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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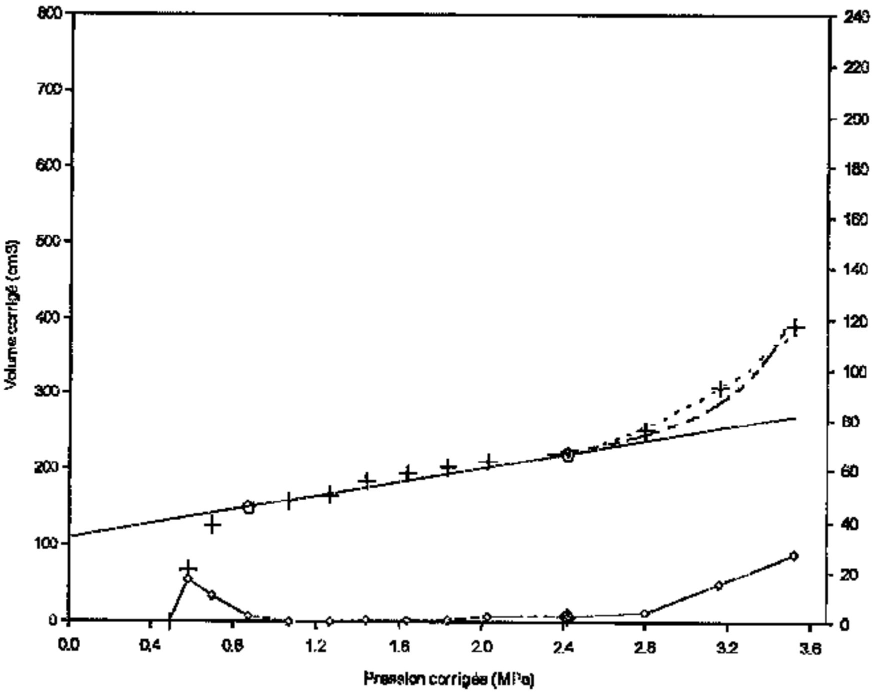
Sondage: MPM13



Profondeur : 50.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.30 cm3/MPa

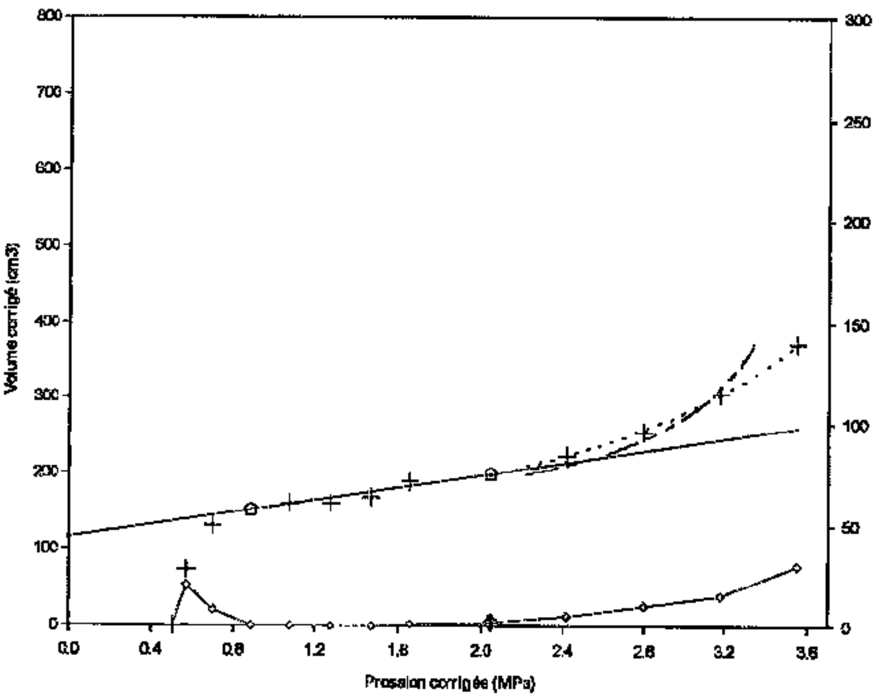
(valeurs en MPa)

EM = 43.6

Pl = 4.41	Pmax = 3.53
Pl(i) = 4.41	Pf = 2.42
Pl(h) = 3.70	Po = 0.67
Pl(Pf) = 3.63	

Légende:
---- : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage   ◈ : Pf

Sondage: MPM13



Profondeur : 51.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.30 cm3/MPa

(valeurs en MPa)

EM = 47.2

Pl = 4.56	Pmax = 3.55
Pl(i) = 4.56	Pf = 2.04
Pl(h) = 3.64	Po = 0.69
Pl(Pf) = 3.07	

Légende:
---- : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage   ◈ : Pf

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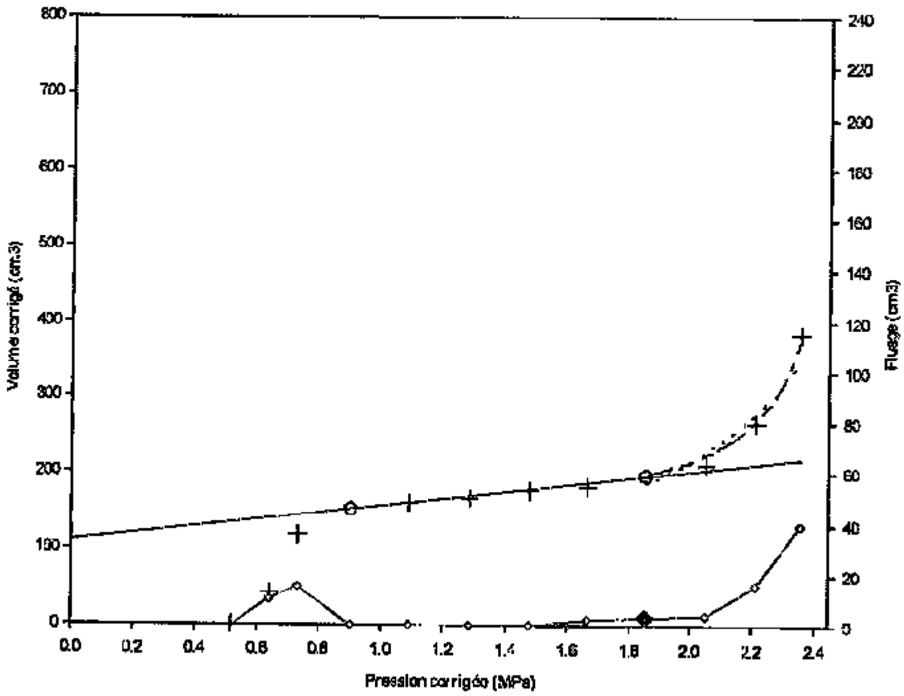
Sondage: MPM13



Profondeur : 52.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

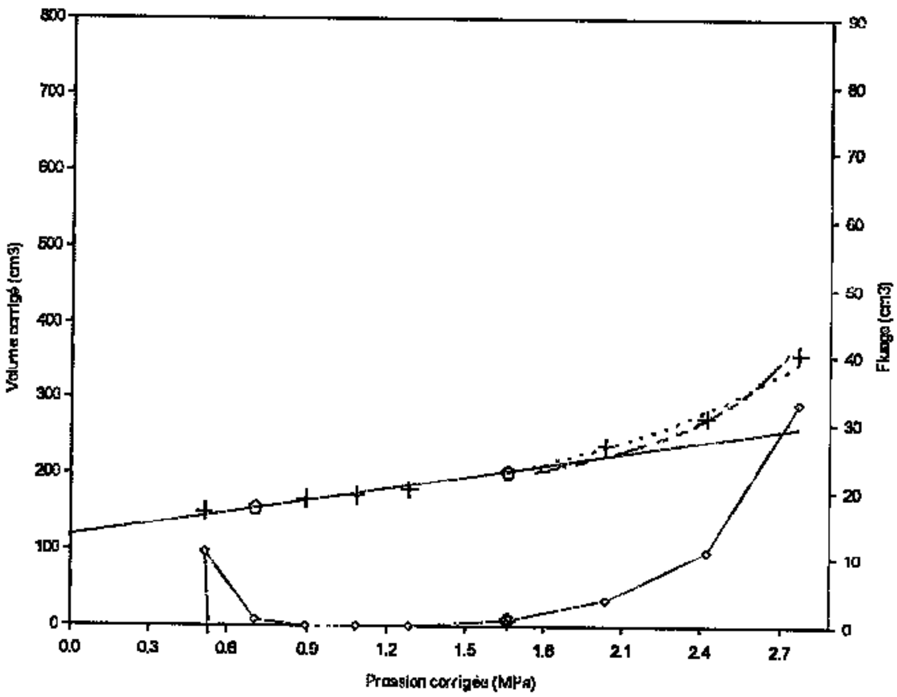
(valeurs en MPa)

EM = 41.6

Pl	= 2.70	Pmax	= 2.35
Pl(i)	= 2.70	Pf	= 1.86
Pl(h)	= 2.45	Po	= 0.70
Pl(pf)	= 2.79		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 53.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 38.4

Pl	= 3.72	Pmax	= 2.77
Pl(i)	= 3.72	Pf	= 1.66
Pl(h)	= 3.04	Po	= 0.71
Pl(pf)	= 2.49		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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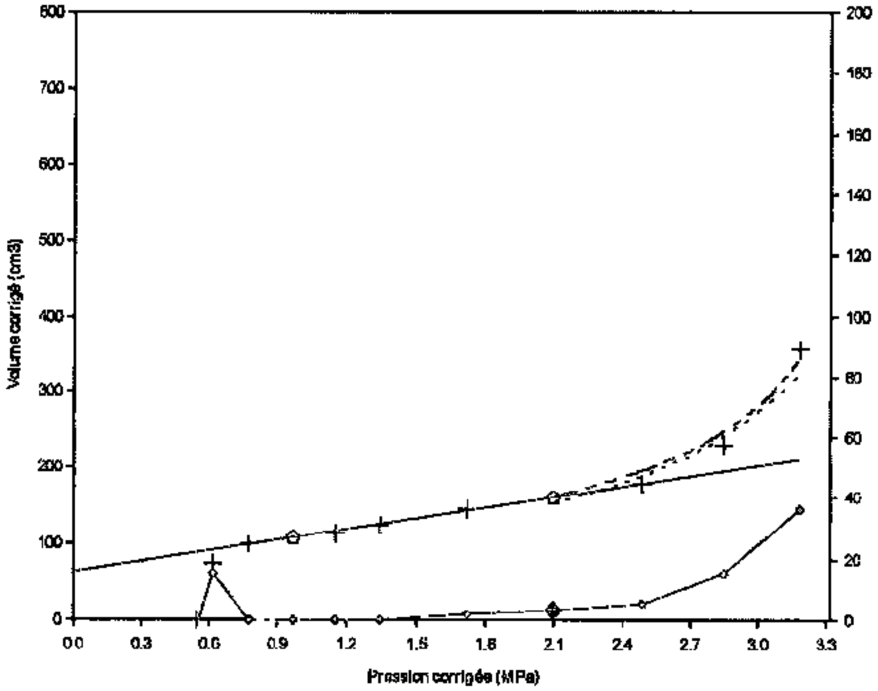


Profondeur : 54.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

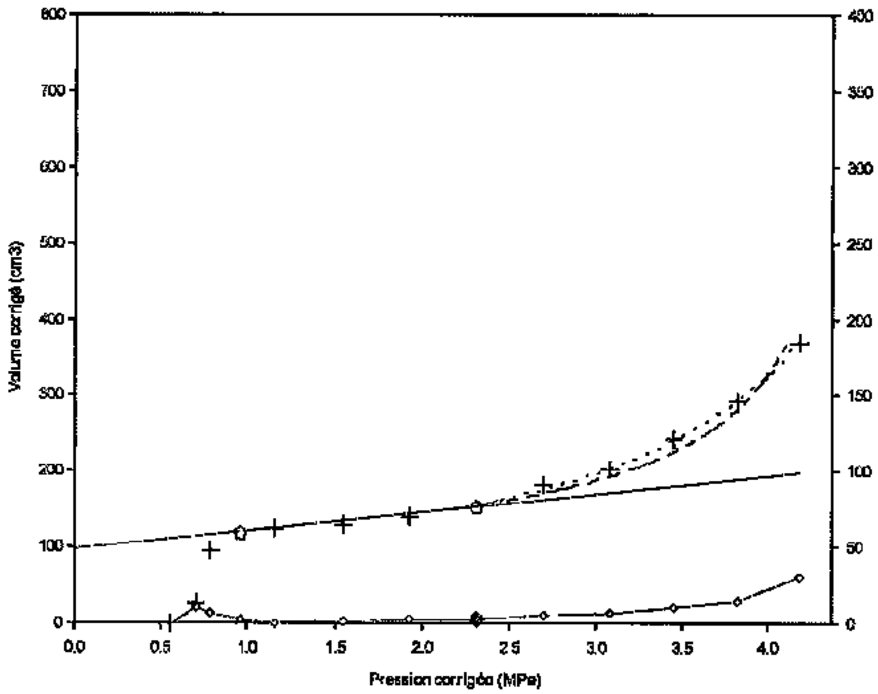
(valeurs en MPa)

EM = 39.7

Pl	**= 3.74**	Pmax	= 3.18
Pl(i)	= 3.74	Pf	= 2.11
Pl(h)	= 3.50	Po	= 0.73
Pl(pf)	= 3.16		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 55.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 76.4

Pl	**= 4.90**	Pmax	= 4.18
Pl(i)	= 4.90	Pf	= 2.32
Pl(h)	= 4.42	Po	= 0.74
Pl(pf)	= 3.48		

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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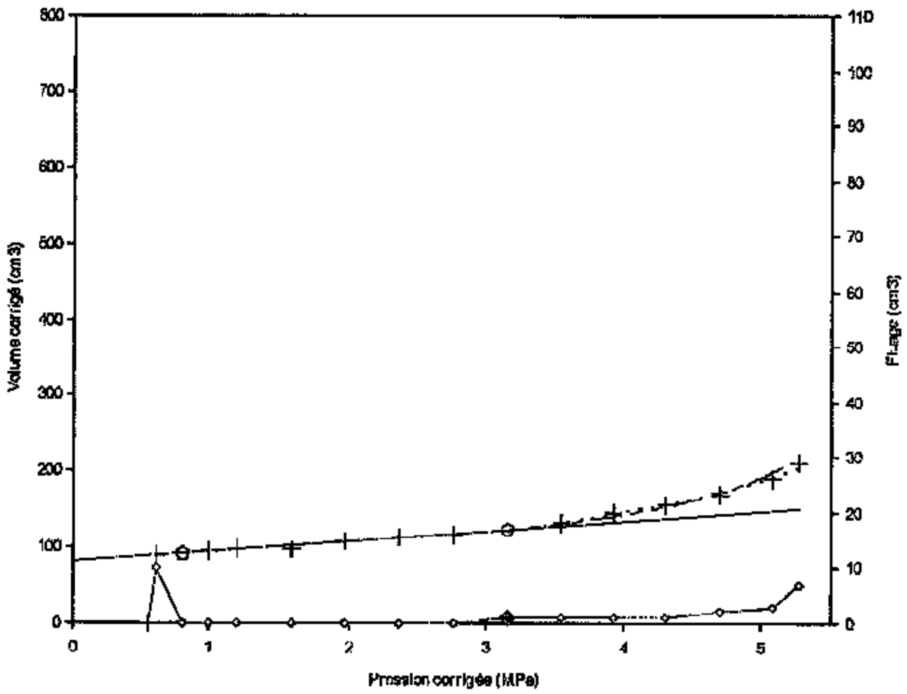


Profondeur : 56.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

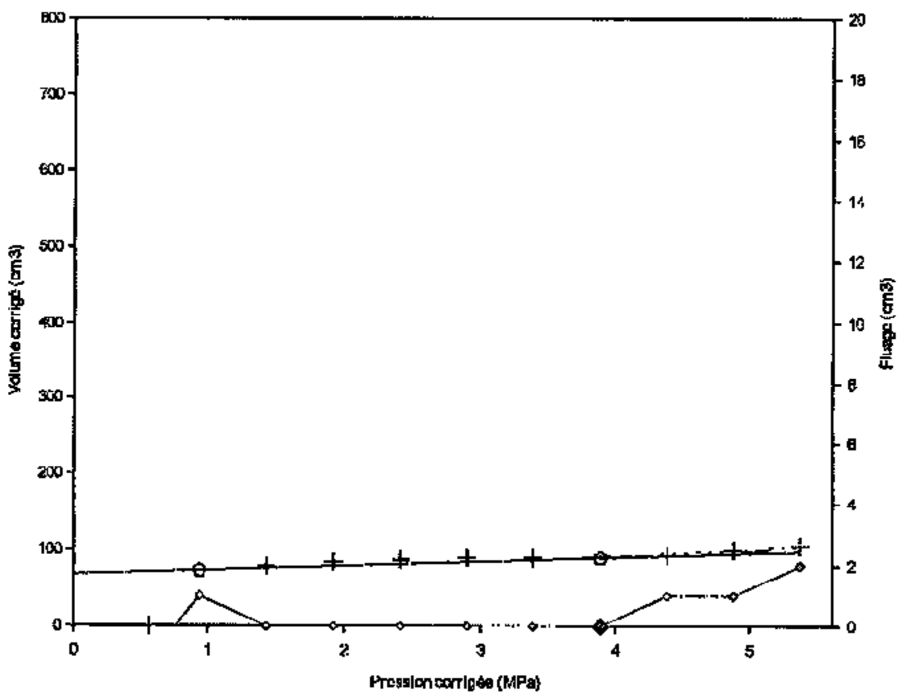
(valeurs en MPa)

EM = 139.3

Pl = 7.60	Pmax = 5.28
Pl(i) = 7.60	Pf = 3.16
Pl(h) = 6.14	Po = 0.75
Pl(pf) = 4.73	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 57.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 297.0

Pl = 13.01	Pmax = 5.37
Pl(i) = 13.01	Pf = 3.90
Pl(h) = 5.50	Po = 0.77
Pl(pf) = 5.85	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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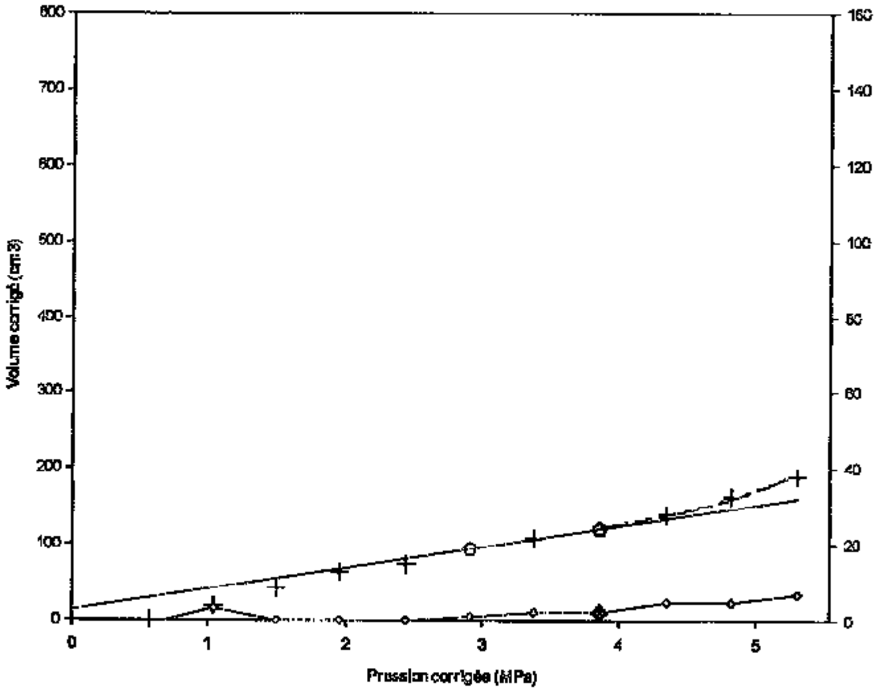
Sondage : MPM13



Profondeur : 58.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

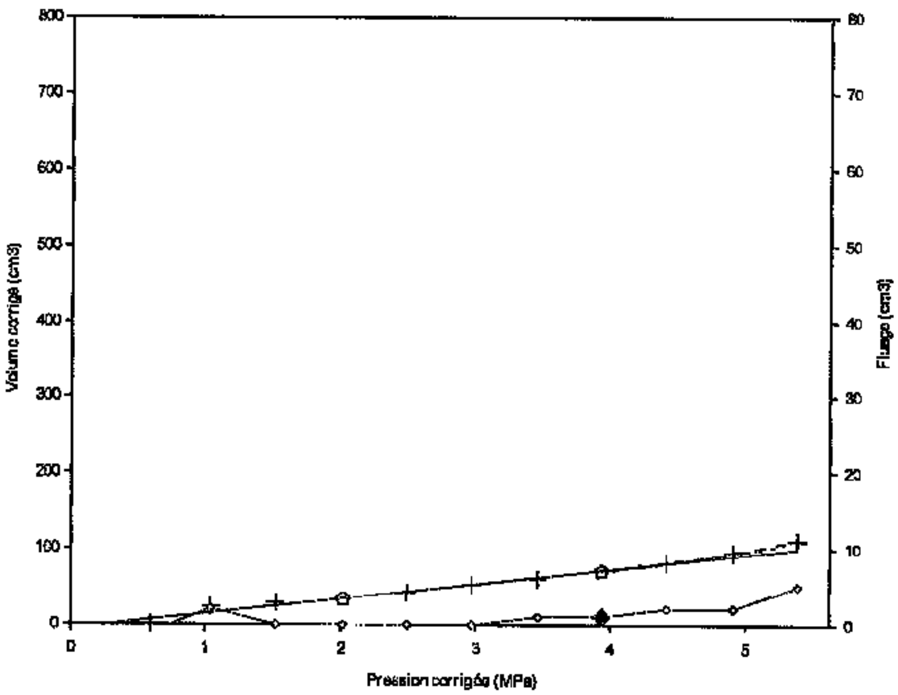
(valeurs en MPa)

E_M = 63.5

Pl = 7.18	Pmax = 5.31
Pl(i) = 7.18	Pf = 3.87
Pl(h) = 6.47	Po = 0.78
$Pl_{(Pf)}$ = 5.81	

Légende:
---- : Pl(i) — — : Pl(h)
\+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage : MPM13



Profondeur : 59.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 82.6

Pl = 7.68	Pmax = 5.39
Pl(i) = 7.68	Pf = 3.94
Pl(h) = 7.24	Po = 0.80
$Pl_{(Pf)}$ = 5.91	

Légende:
---- : Pl(i) — — : Pl(h)
\+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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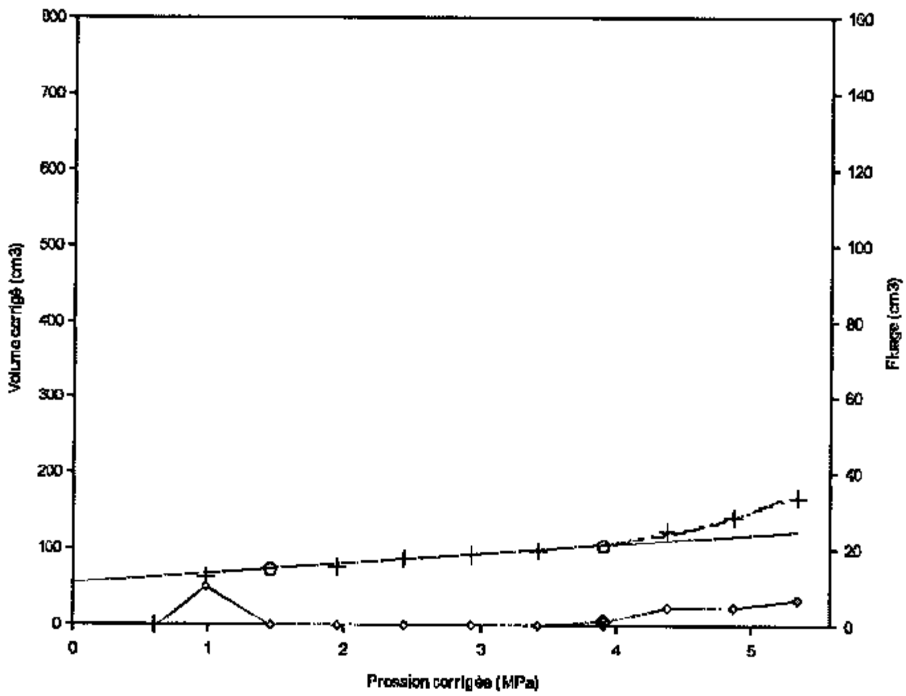


Profondeur : 60.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

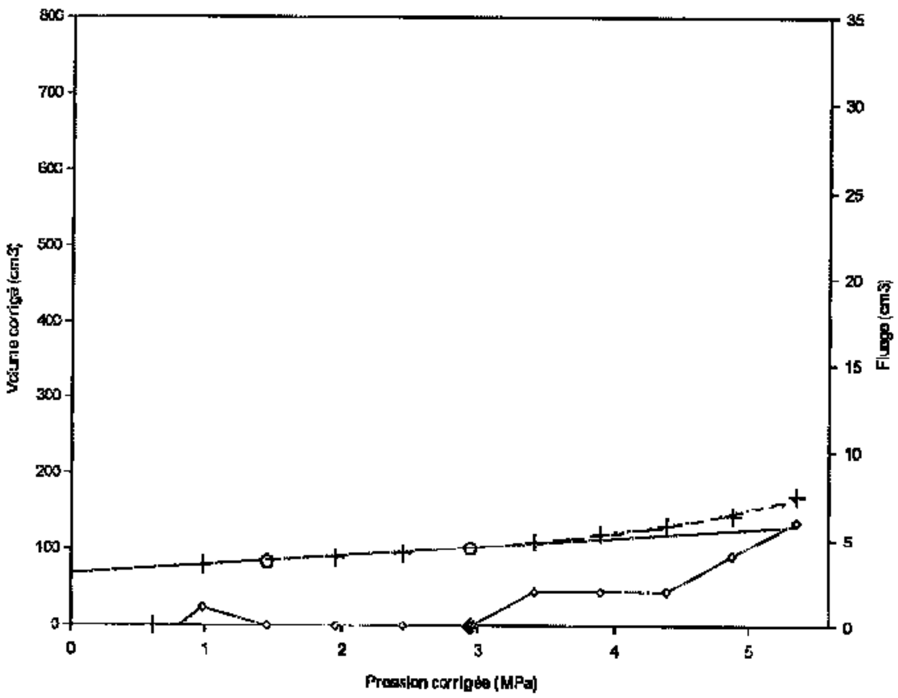
(valeurs en MPa)

EM = 138.7

Pl = 7.20	Pmax = 5.35
Pl(i) = 7.20	Pf = 3.91
Pl(h) = 6.05	Po = 0.81
Pl(Pf) = 5.86	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬡ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 61.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.30 cm3/MPa

(valeurs en MPa)

EM = 145.9

Pl = 8.32	Pmax = 5.35
Pl(i) = 8.32	Pf = 2.93
Pl(h) = 6.81	Po = 0.82
Pl(Pf) = 4.39	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬡ : extrémité de la phase linéaire
◦ : fluage ◆ : Pf

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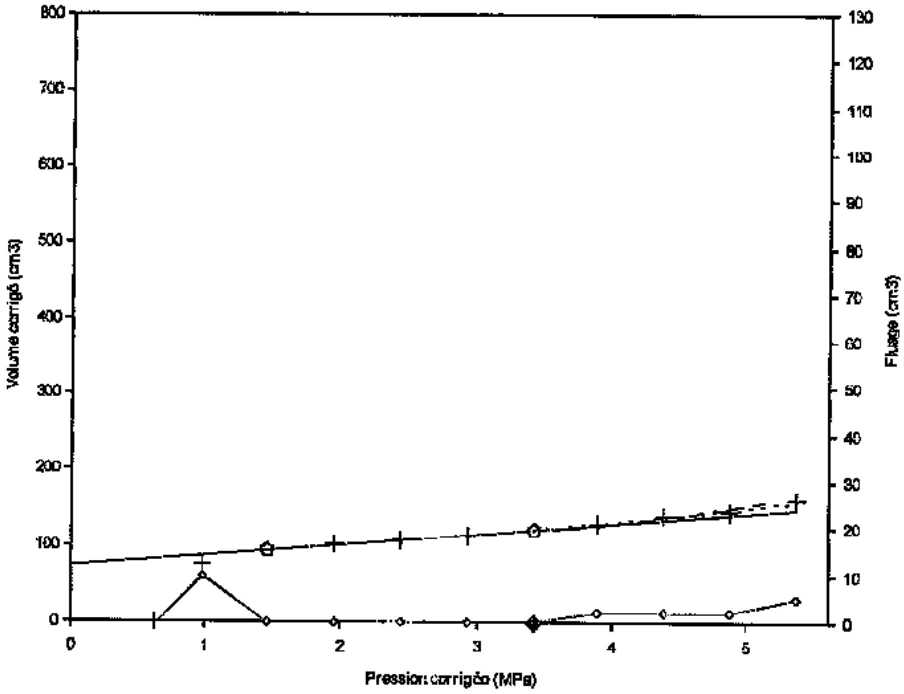


Profondeur : 62.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.30 cm3/MPa

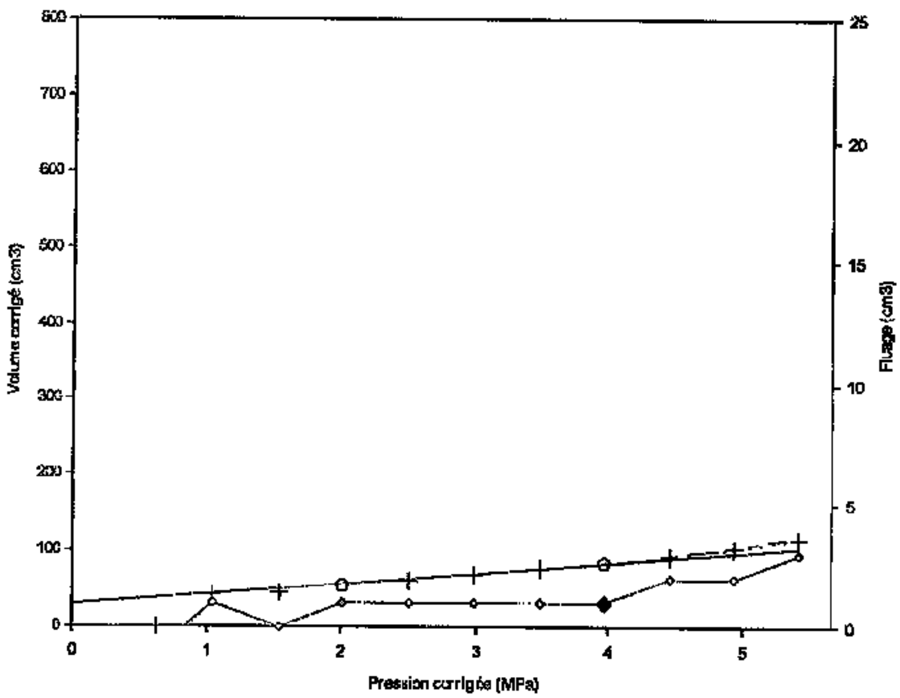
(valeurs en MPa)

E_M = 128.9

Pl = 10.69	Pmax = 5.37
Pl(i) = 10.69	Pf = 3.41
Pl(h) = 7.07	Po = 0.84
Pl(pf) = 5.12	

Légende:
: Pl(i) : Pl(h)
+ : point de mesure
× : point non pris en compte
: extrémité de la phase linéaire
: fluage : Pf

Sondage: MPM13



Profondeur : 63.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.20 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.30 cm3/MPa

(valeurs en MPa)

E_M = 120.8

Pl = 8.46	Pmax = 5.42
Pl(i) = 8.46	Pf = 3.97
Pl(h) = 7.27	Po = 0.85
Pl(pf) = 5.95	

Légende:
: Pl(i) : Pl(h)
+ : point de mesure
× : point non pris en compte
: extrémité de la phase linéaire
: fluage : Pf

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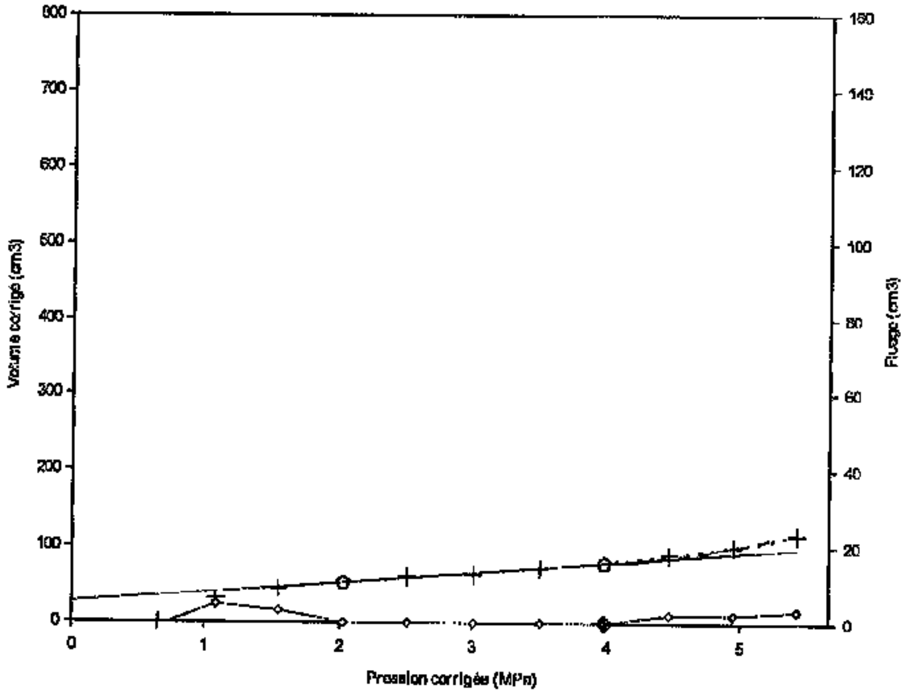


Profondeur : 64.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

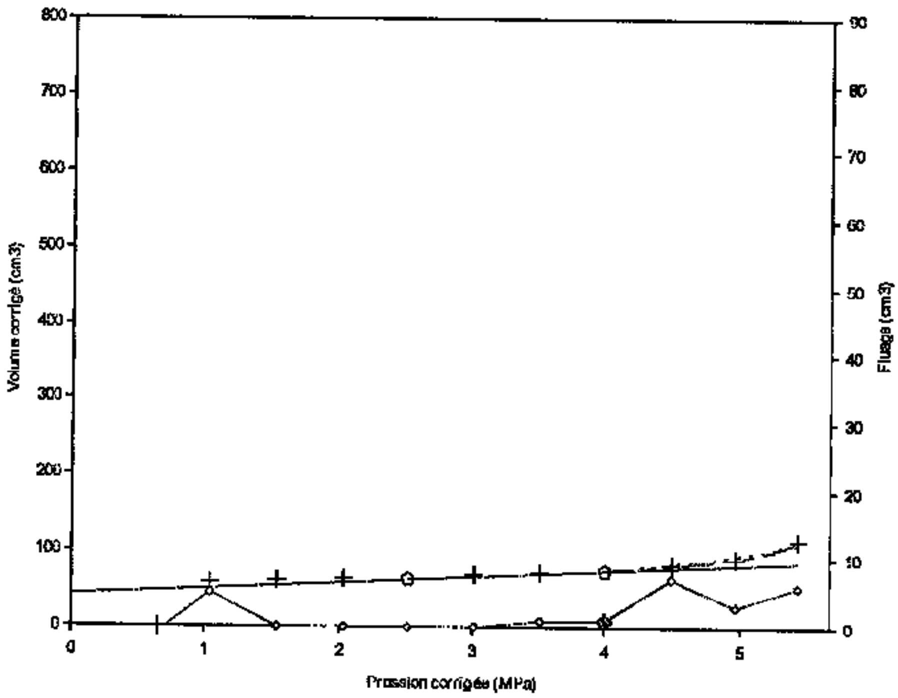
(valeurs en MPa)

EM = 124.6

Pl = 7.92	Pmax = 5.43
Pl(i) = 7.92	Pf = 3.98
Pl(h) = 6.29	Po = 0.86
Pl(pf) = 5.97	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 65.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 214.2

Pl = 7.94	Pmax = 5.44
Pl(i) = 7.94	Pf = 4.00
Pl(h) = 5.97	Po = 0.88
Pl(pf) = 5.99	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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Affaire: SIZEWELL	

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Programme: W-PRessio
Version : 1.3

Fichier : P11
Dernière mise à jour:
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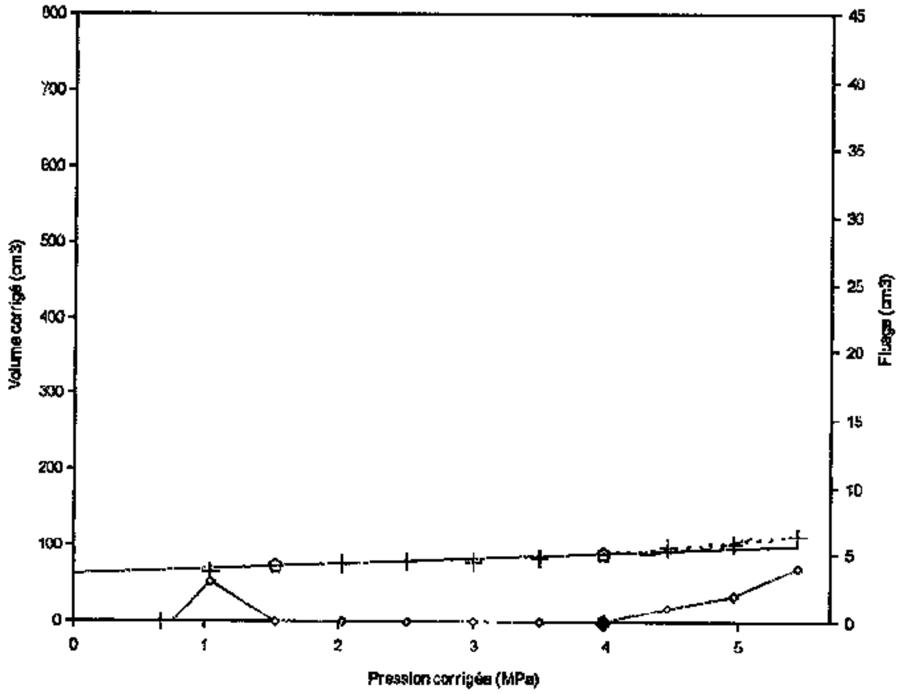
Sondage: MPM13



Profondeur : 66.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.70 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

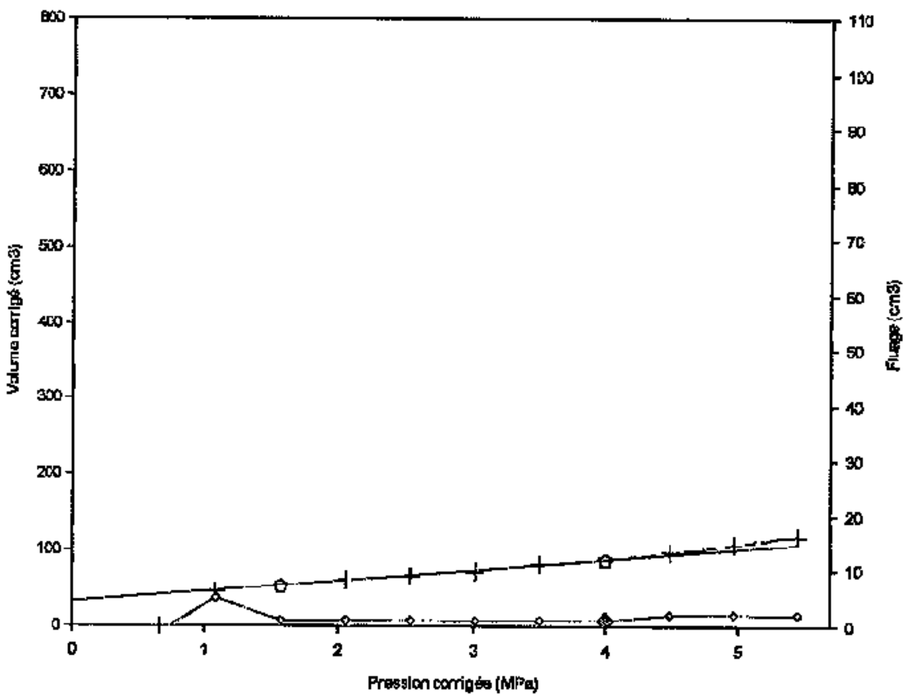
(valeurs en MPa)

E_M = 254.4

Pl = 10.12	Pmax = 5.45
Pl(i) = 10.12	Pf = 3.99
Pl(h) = 5.64	Po = 0.89
$Pl_{(Pf)}$ = 5.98	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 67.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.22 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

E_M = 118.2

Pl = 8.69	Pmax = 5.46
Pl(i) = 8.69	Pf = 4.00
Pl(h) = 7.65	Po = 0.90
$Pl_{(Pf)}$ = 6.00	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

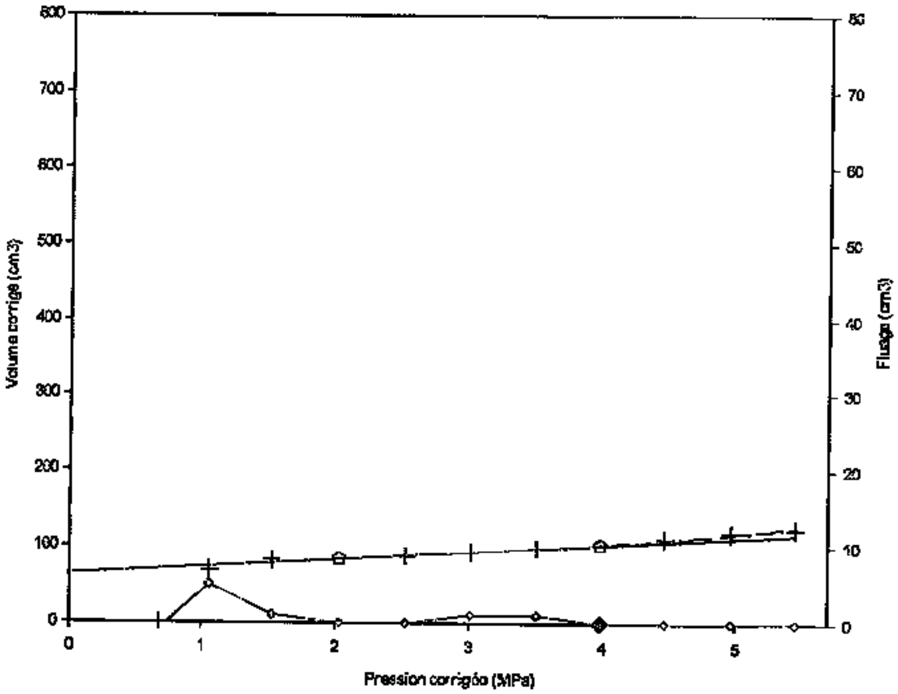
AFFAIRE N° : ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)
Affaire: SIZEWELL	

Programme: W-PRessio
Version : 1.1

FONDASOL
290 rue des Galoubets
BP 765
84140 MONTFAVET

Fichier : P11
Dernière mise à jour:
10/01/2011 16:29:44

Sondage: MPM13



Profondeur : 68.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

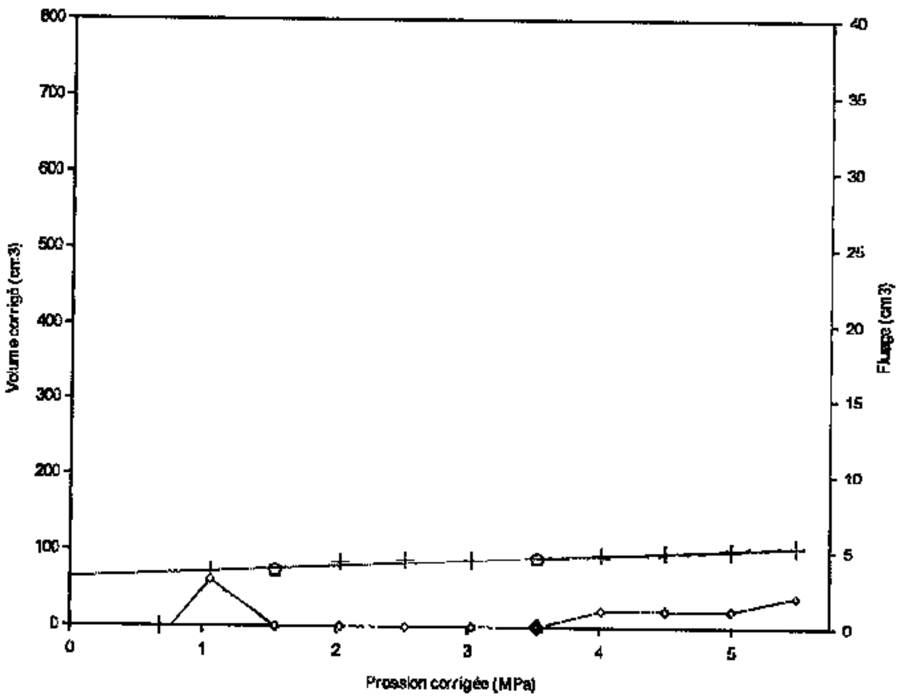
(valeurs en MPa)

EM = 179.6

Pl = 11.00	Pmax = 5.46
Pl(i) = 11.00	Pf = 3.99
Pl(h) = 8.10	Po = 0.92
Pl(Pf) = 5.99	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 69.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 224.0

Pl = 15.73	Pmax = 5.49
Pl(i) = 15.73	Pf = 3.52
Pl(h) = 6.79	Po = 0.93
Pl(Pf) = 5.28	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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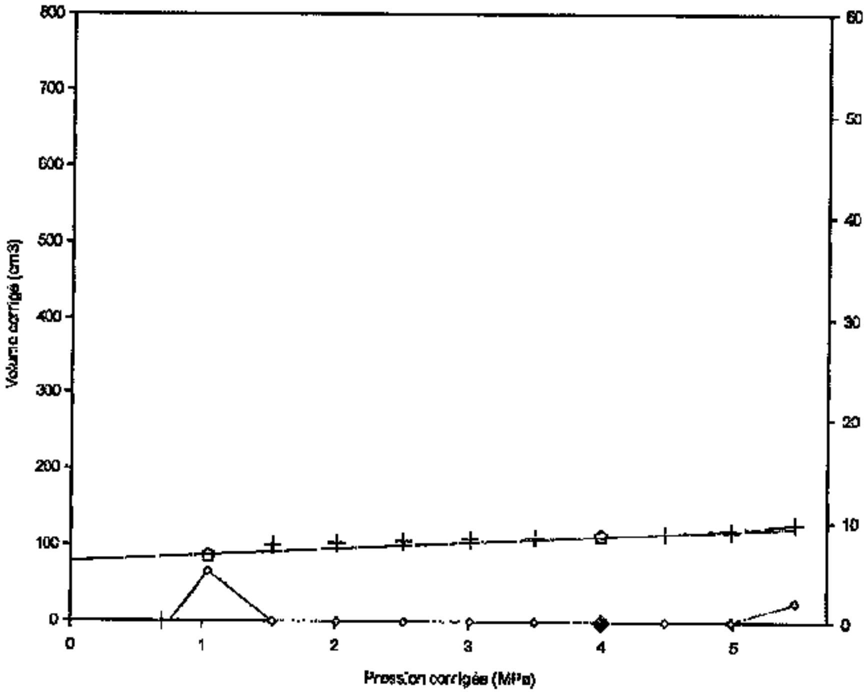


Profondeur : 70.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

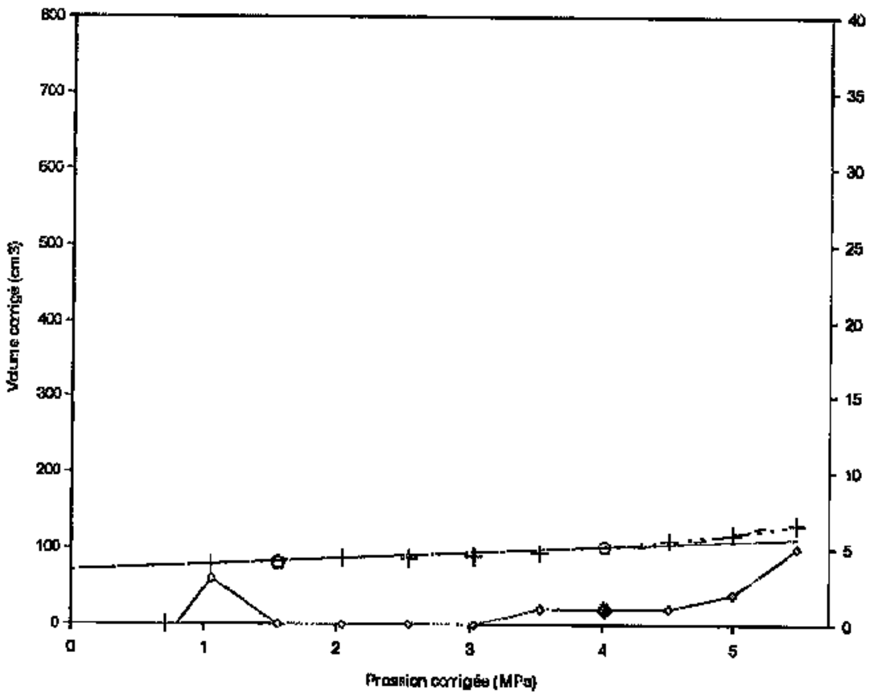
(valeurs en MPa)

EM = 207.3

Pl = 14.49	Pmax = 5.48
Pl(i) = 14.49	Pf = 4.00
Pl(h) = 6.49	Po = 0.95
Pl(pf) = 6.00	

Légende:
- - - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 71.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 219.0

Pl = 9.72	Pmax = 5.48
Pl(i) = 9.72	Pf = 4.02
Pl(h) = 6.08	Po = 0.96
Pl(pf) = 6.03	

Légende:
- - - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◆ : Pf

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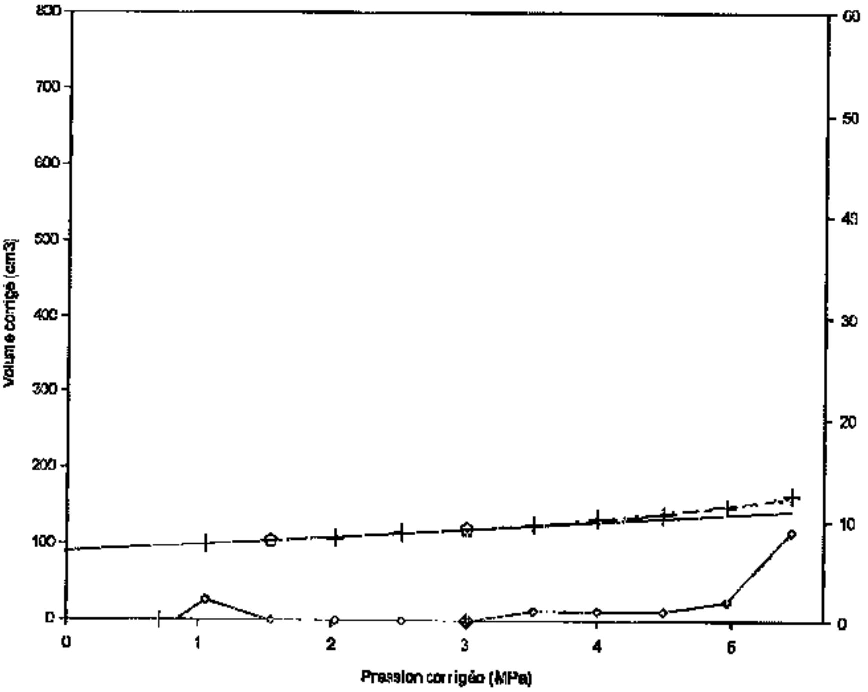


Profondeur : 72.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

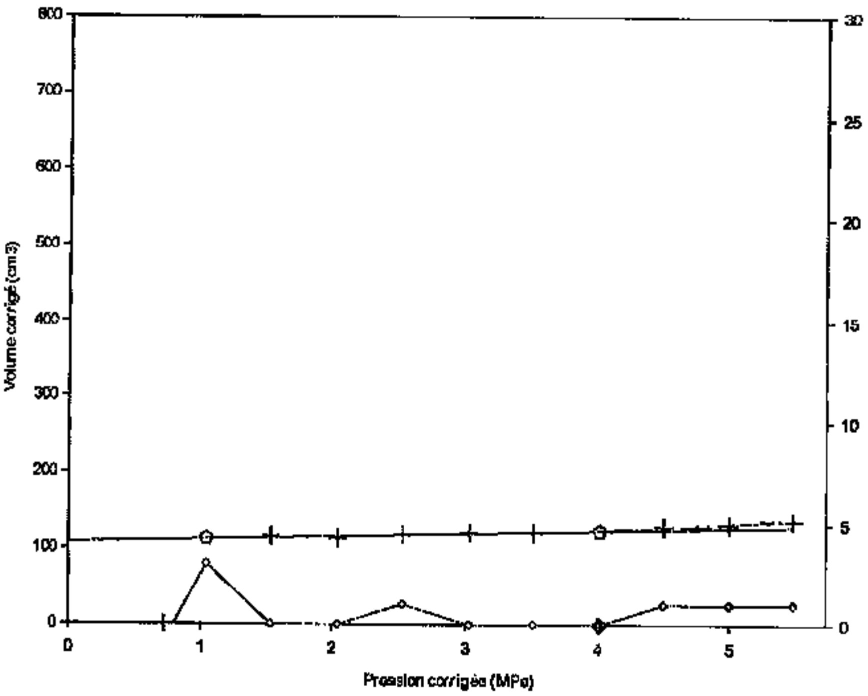
(valeurs en MPa)

E_M = 170.2

Pl = 11.01	Pmax = 5.46
Pl(i) = 11.01	Pf = 3.02
Pl(h) = 7.57	Po = 0.97
$Pl_{(Pf)}$ = 4.52	

Légende:
---- : Pl(i) ---- : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◊ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 73.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

E_M = 446.8

Pl = 17.08	Pmax = 5.50
Pl(i) = 17.08	Pf = 4.02
Pl(h) = 6.69	Po = 0.99
$Pl_{(Pf)}$ = 6.03	

Légende:
---- : Pl(i) ---- : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◊ : fluage ◈ : Pf

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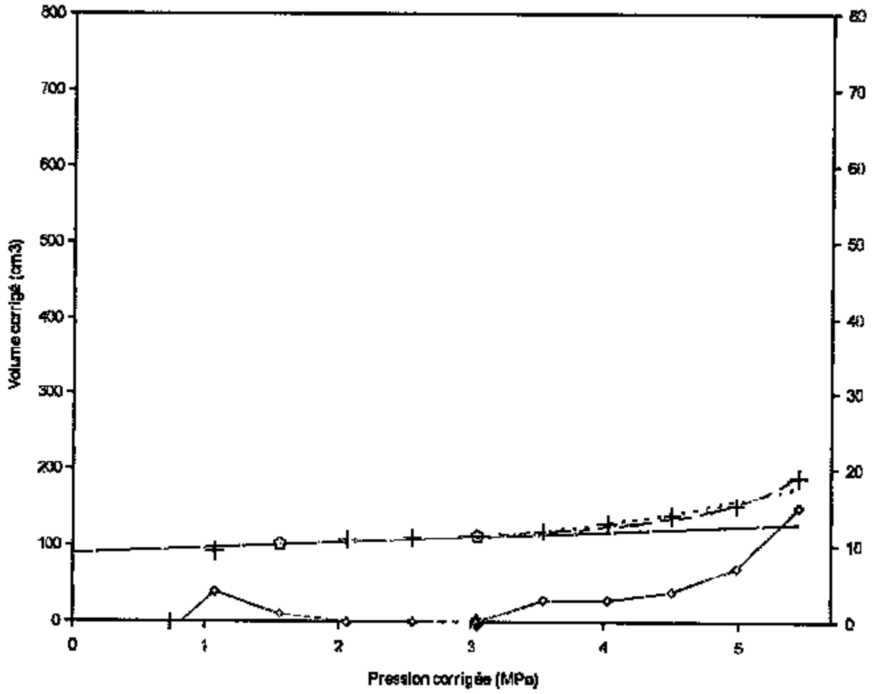


Profondeur : 74.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a : 5.00 cm3/MPa

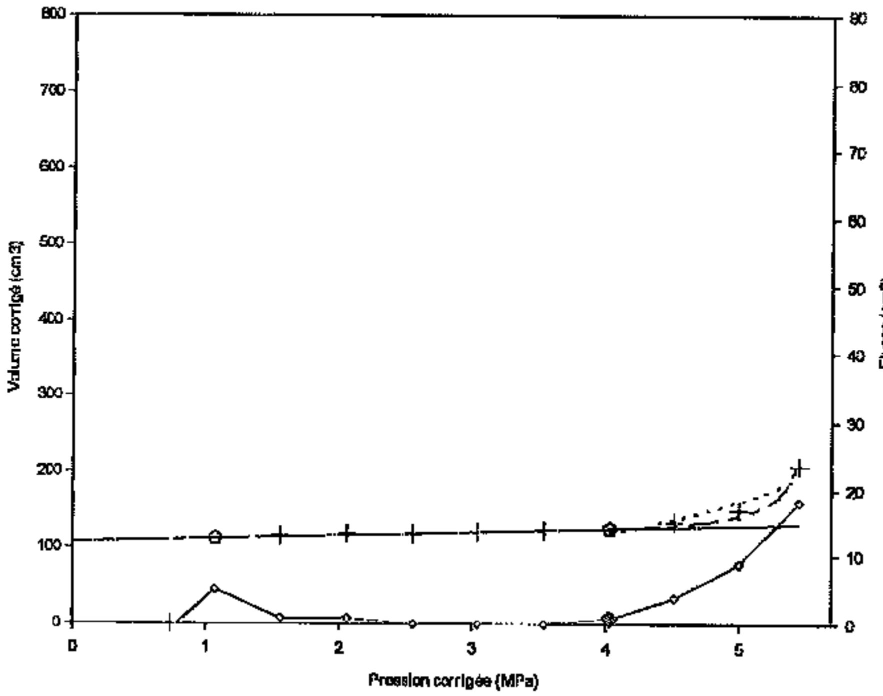
(valeurs en MPa)

E_M = 250.0

Pl = 8.52	Pmax = 5.47
Pl(i) = 8.52	Pf = 3.04
Pl(h) = 5.98	Po = 1.00
$Pl_{(Pf)}$ = 4.57	

Légende:
- - - - : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage   ◈ : Pf

Sondage: MPM13



Profondeur : 75.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

E_M = 412.6

Pl = 7.27	Pmax = 5.46
Pl(i) = 7.27	Pf = 4.04
Pl(h) = 5.57	Po = 1.01
$Pl_{(Pf)}$ = 6.05	

Légende:
- - - - : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage   ◈ : Pf

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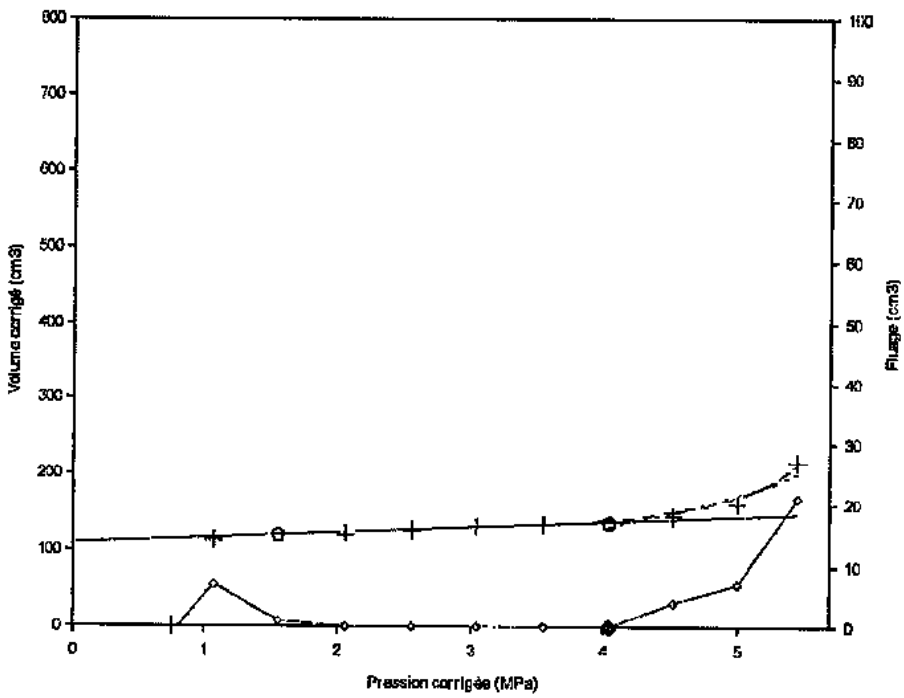


Profondeur : 76.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

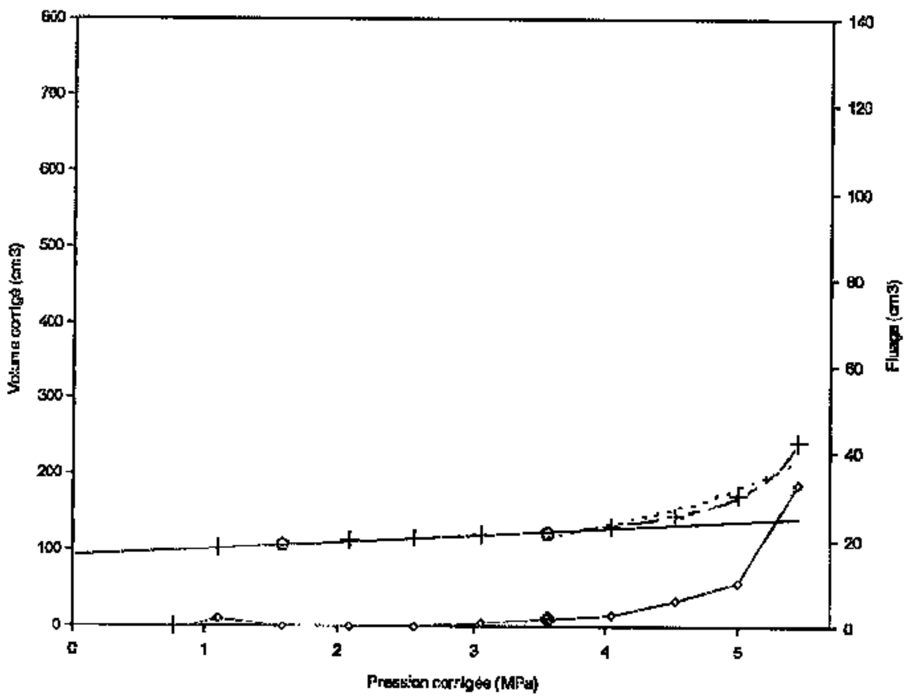
(valeurs en MPa)

E_M = 274.6

Pl = 7.55	Pmax = 5.47
Pl(i) = 7.55	Pf = 4.03
Pl(h) = 5.93	Po = 1.03
$Pl_{(Pf)}$ = 6.05	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 77.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 196.7

Pl = 7.09	Pmax = 5.46
Pl(i) = 7.09	Pf = 3.56
Pl(h) = 5.74	Po = 1.04
$Pl_{(Pf)}$ = 5.34	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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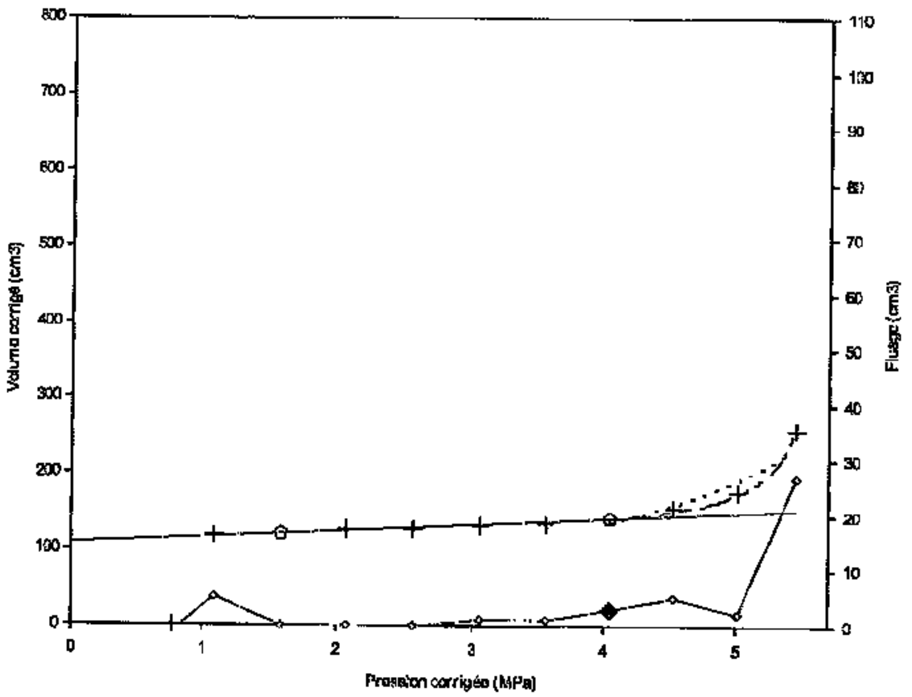


Profondeur : 78.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

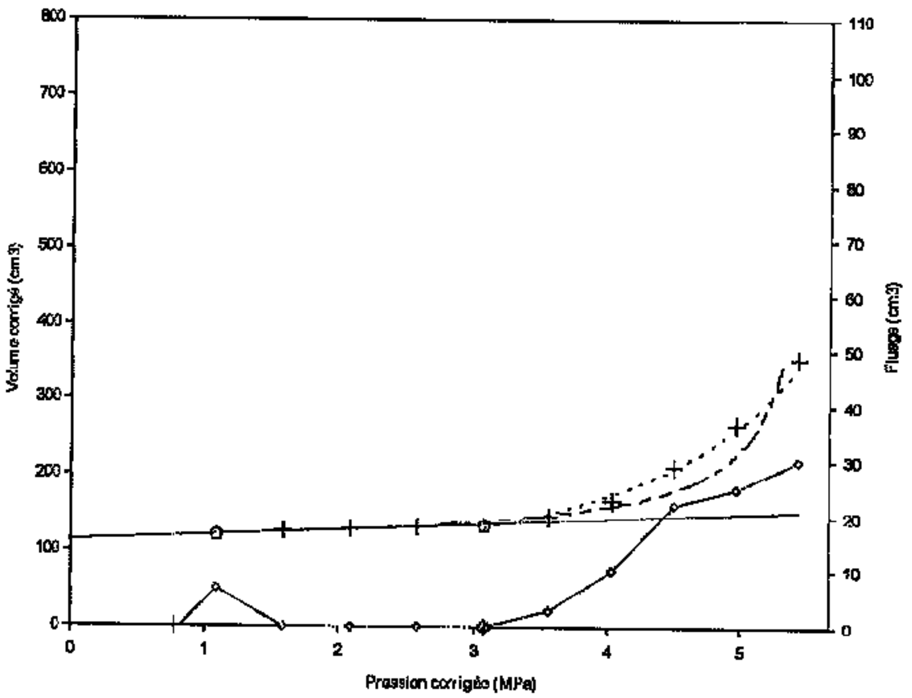
(valeurs en MPa)

EM = 221.6

Pl = 6.85	Pmax = 5.46
Pl(i) = 6.85	Pf = 4.05
Pl(h) = 5.64	Po = 1.06
Pl(Pf) = 6.07	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 79.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 258.4

Pl = 6.26	Pmax = 5.43
Pl(i) = 6.26	Pf = 3.07
Pl(h) = 5.48	Po = 1.07
Pl(Pf) = 4.61	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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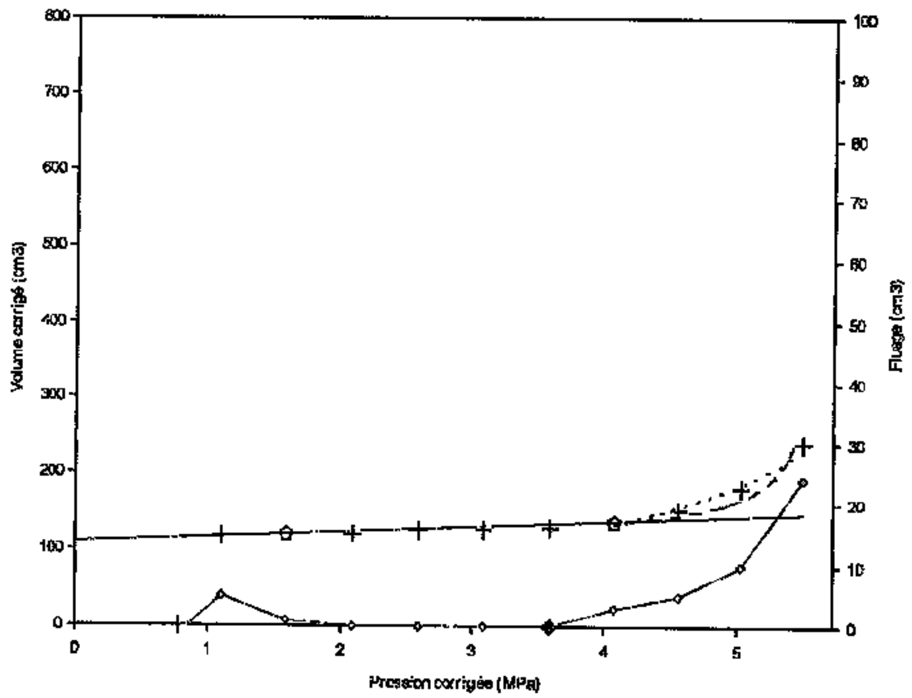


Profondeur : 80.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a : 5.00 cm3/MPa

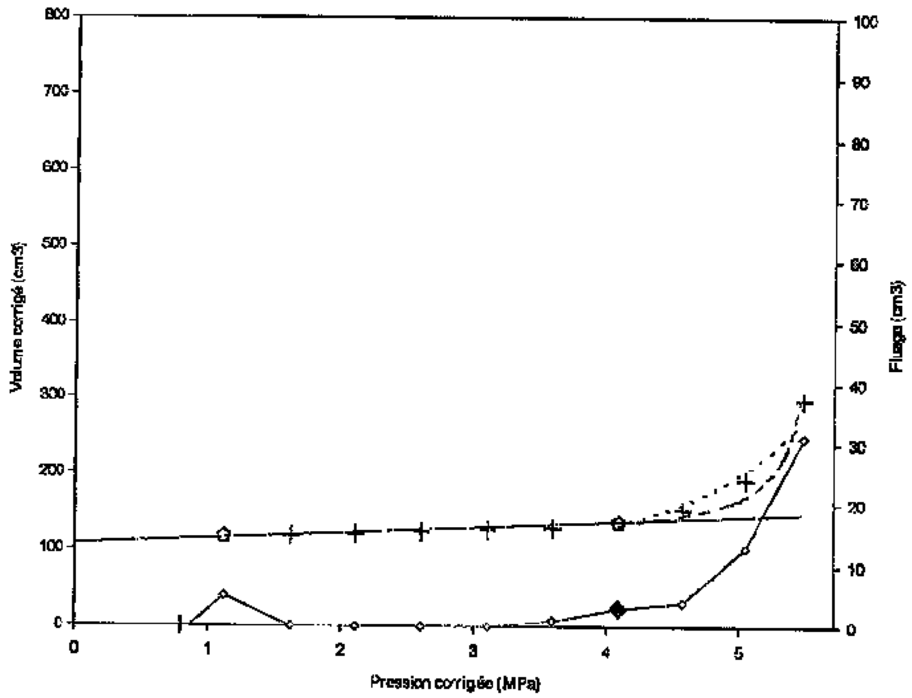
(valeurs en MPa)

EM = 275.0

Pl = 6.94	Pmax = 5.49
Pl(i) = 6.94	Pf = 3.58
Pl(h) = 5.64	Po = 1.08
Pl(Pf) = 5.37	

Légende:
- - - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 81.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

EM = 258.2

Pl = 6.34	Pmax = 5.47
Pl(i) = 6.34	Pf = 4.08
Pl(h) = 5.55	Po = 1.10
Pl(Pf) = 6.12	

Légende:
- - - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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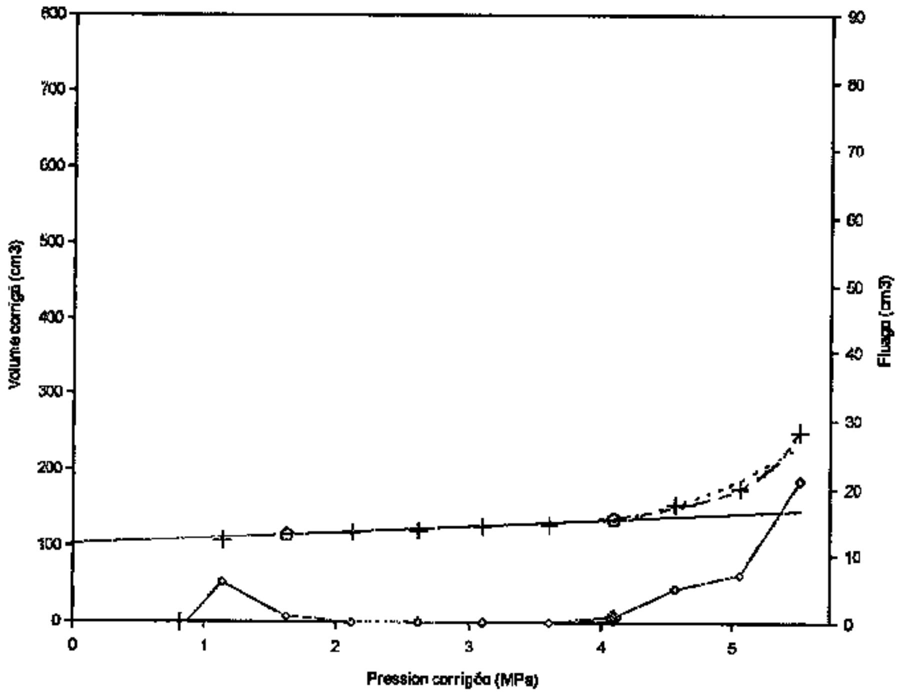


Profondeur : 82.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

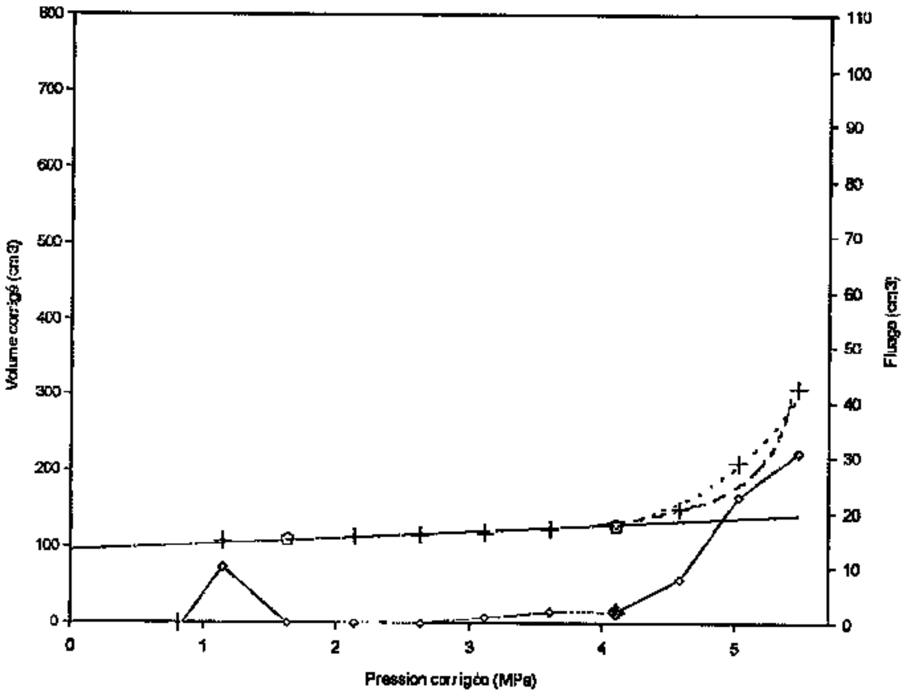
(valeurs en MPa)

E_M = 219.6

Pl = 6.82	Pmax = 5.51
Pl(i) = 6.82	Pf = 4.09
Pl(h) = 5.78	Po = 1.11
$Pl_{(Pf)}$ = 6.14	

Légende:
---- : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage   ◈ : Pl

Sondage: MPM13



Profondeur : 83.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 217.6

Pl = 6.11	Pmax = 5.49
Pl(i) = 6.11	Pf = 4.11
Pl(h) = 5.59	Po = 1.12
$Pl_{(Pf)}$ = 6.16	

Légende:
---- : Pl(i)   — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage   ◈ : Pl

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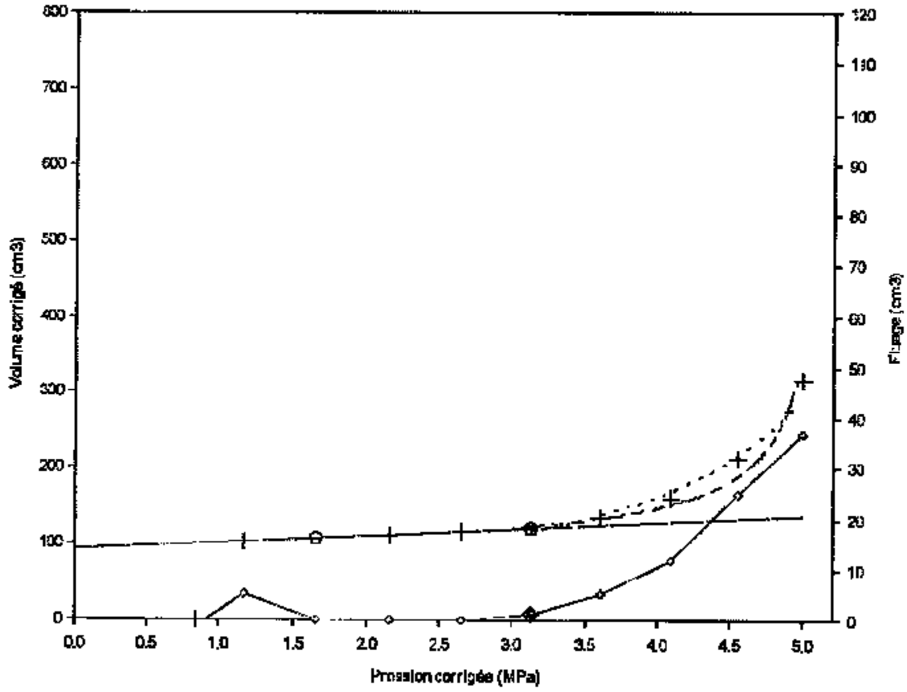


Profondeur : 84.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Kc (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

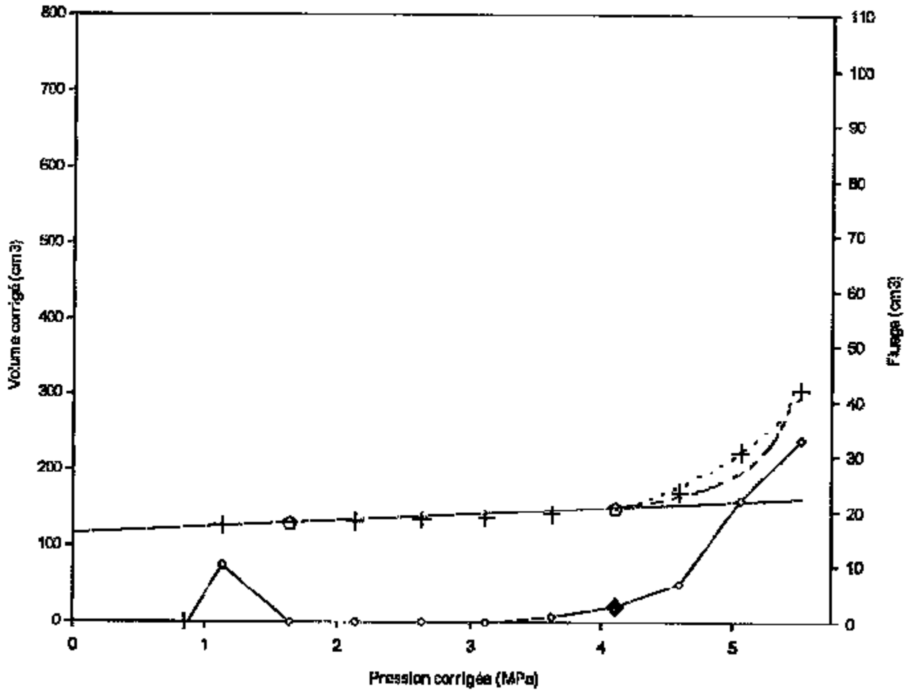
(valeurs en MPa)

E_M = 196.3

Pl = 5.75	Pmax = 4.99
Pl(i) = 5.75	Pf = 3.13
Pl(h) = 5.11	Po = 1.14
$Pl_{(Pf)}$ = 4.70	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 85.00 m
Type de forage: Désagrégateur rotation
Nappe: 3.10 m
Kc (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 214.0

Pl = 6.39	Pmax = 5.51
Pl(i) = 6.39	Pf = 4.11
Pl(h) = 5.62	Po = 1.15
$Pl_{(Pf)}$ = 6.17	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

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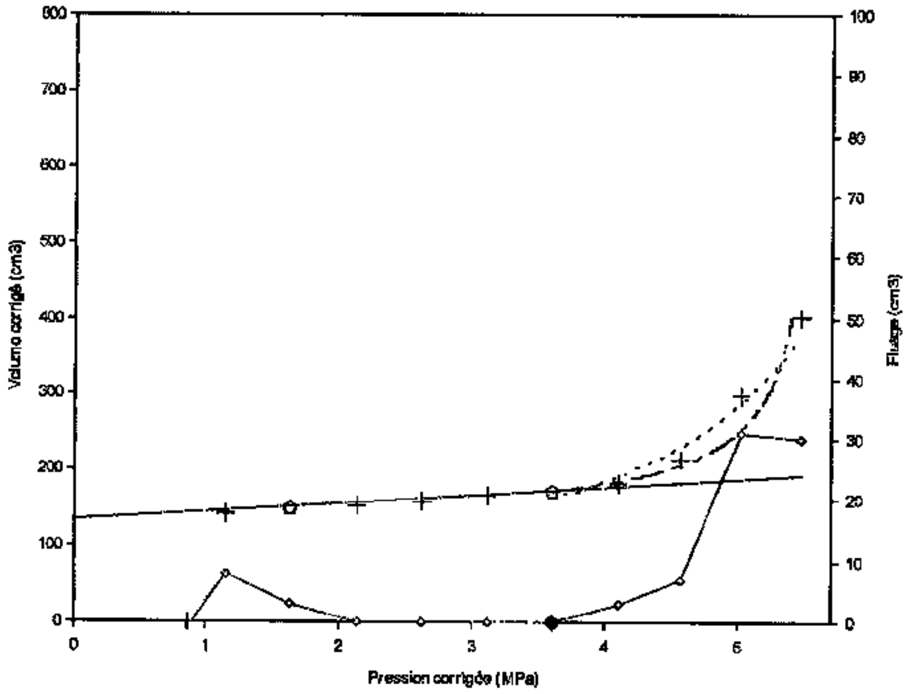


Profondeur : 86.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

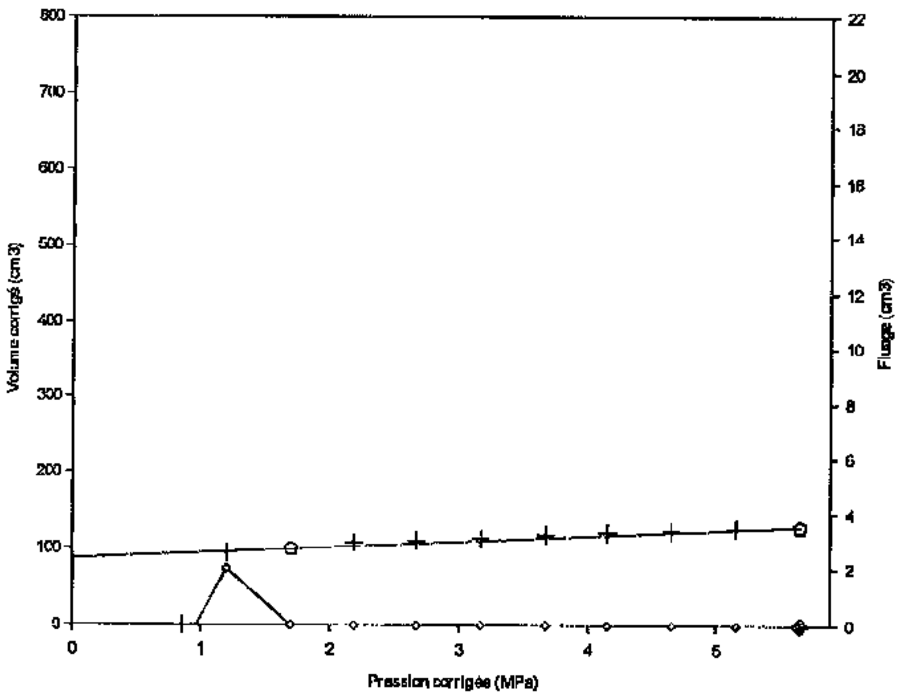
(valeurs en MPa)

EM = 180.4

Pl = 6.26	Pmax = 5.47
Pl(i) = 6.26	Pf = 3.60
Pl(h) = 5.56	Po = 1.17
Pl (Pf) = 5.41	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 87.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

EM = 244.2

Pl > 5.64	Pmax = 5.64
	Pf > 5.64
	Po = 1.18
Pl (Pf) > 8.46	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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Programme: W-PRessio
Version : 1.1

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Dernière mise à jour:
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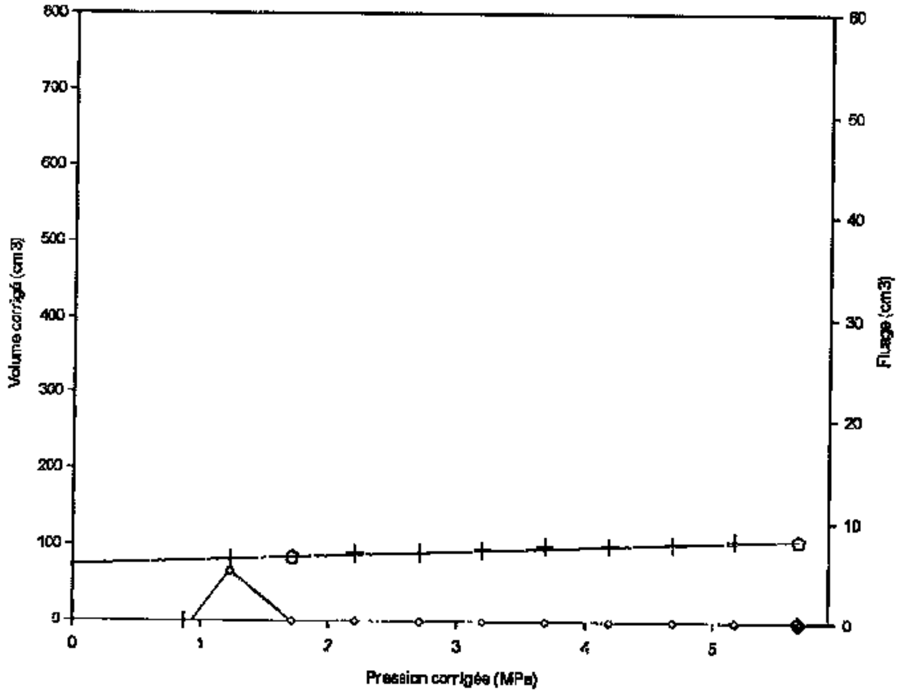
Sondage: MPM13



Profondeur : 88.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

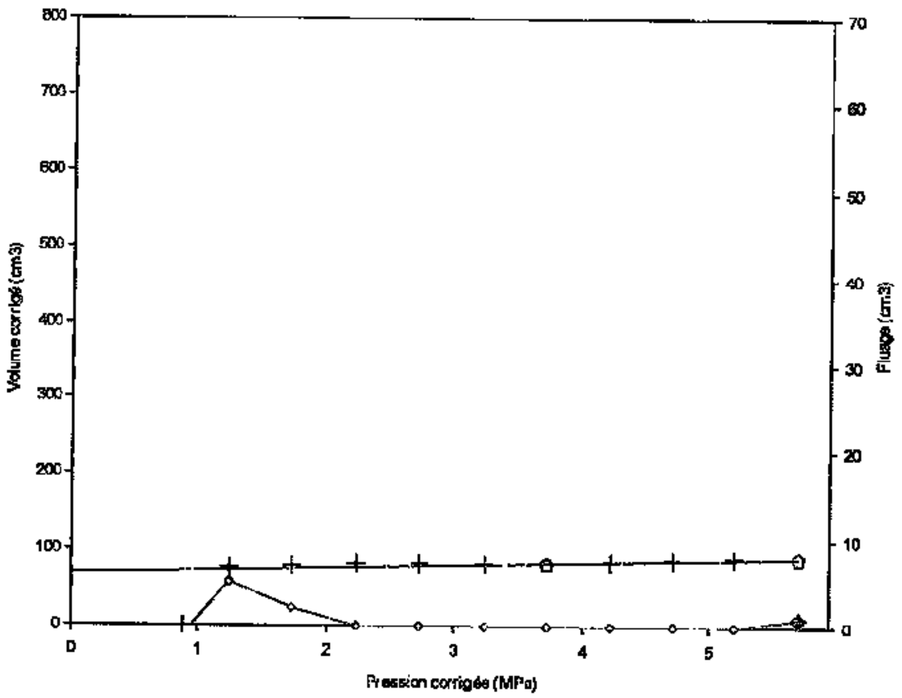
(valeurs en MPa)

E_M = 299.8

Pl	> 5.67	Pmax	= 5.67
		Pf	> 5.67
$Pl_{(Pf)}$	> 8.51	Po	= 1.19

Légende:
---- : Pl(l) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

Sondage: MPM13



Profondeur : 89.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 486.2

Pl	> 5.70	Pmax	= 5.70
		Pf	> 5.70
$Pl_{(Pf)}$	> 8.55	Po	= 1.21

Légende:
---- : Pl(l) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◆ : Pf

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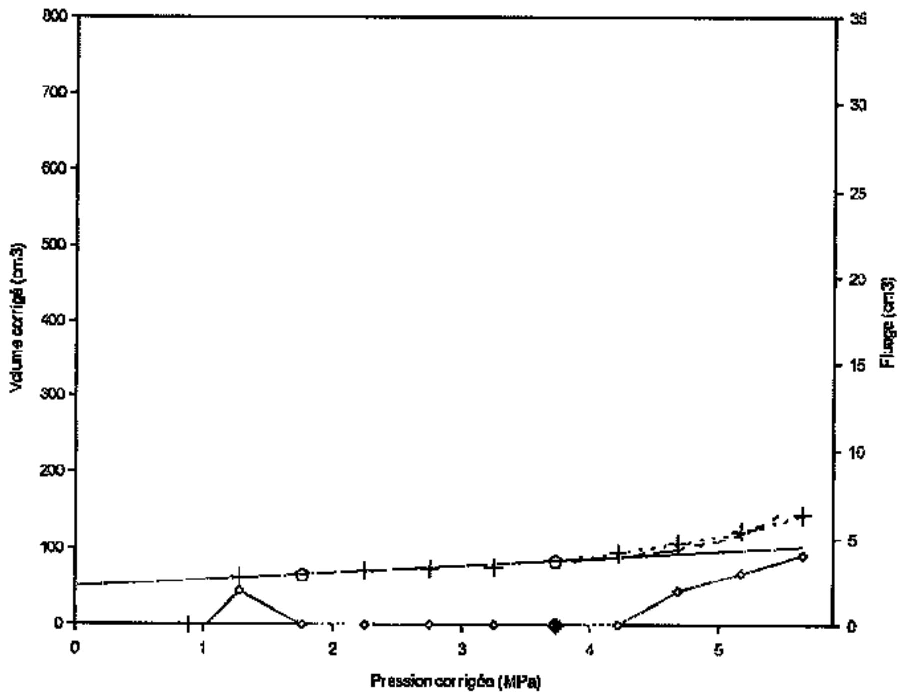


Profondeur : 90.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

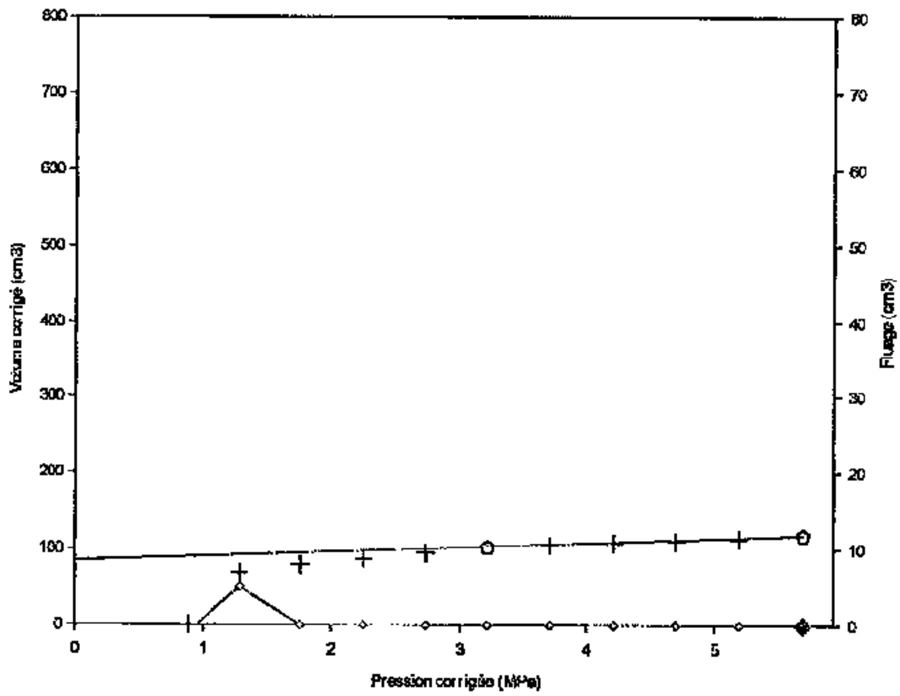
(valeurs en MPa)

E_M = 184.3

Pl = 7.82	Pmax = 5.66
Pl(i) = 7.82	Pf = 3.73
Pl(h) = 5.96	Po = 1.22
$Pl_{(Pf)}$ = 5.60	

Légende:
- - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 91.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 304.1

Pl > 5.69	Pmax = 5.69
	Pf > 5.69
	Po = 1.23
$Pl_{(Pf)}$ > 8.54	

Légende:
- - - : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⬠ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

AFFAIRE N° : ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

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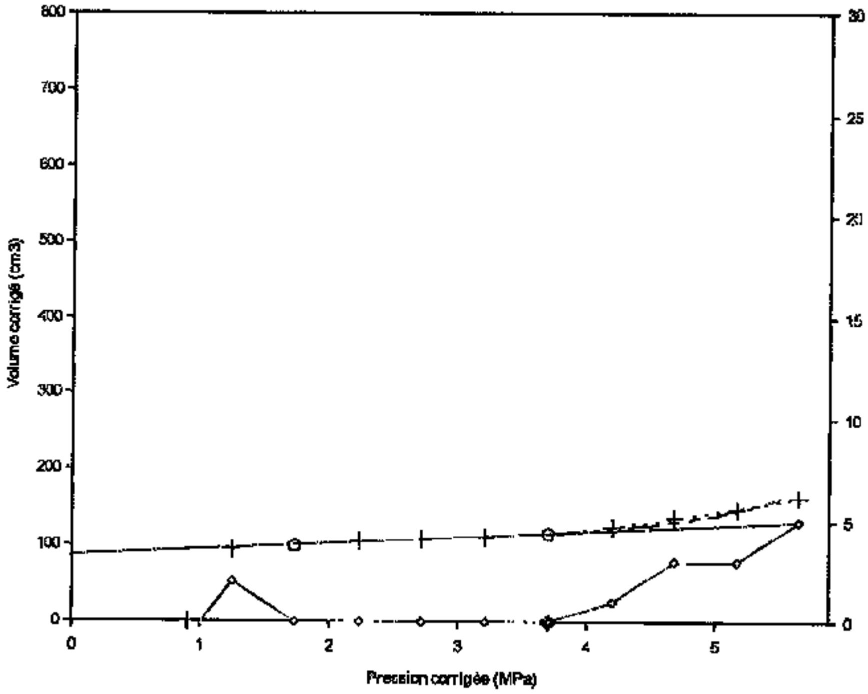


Profondeur : 92.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.9 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

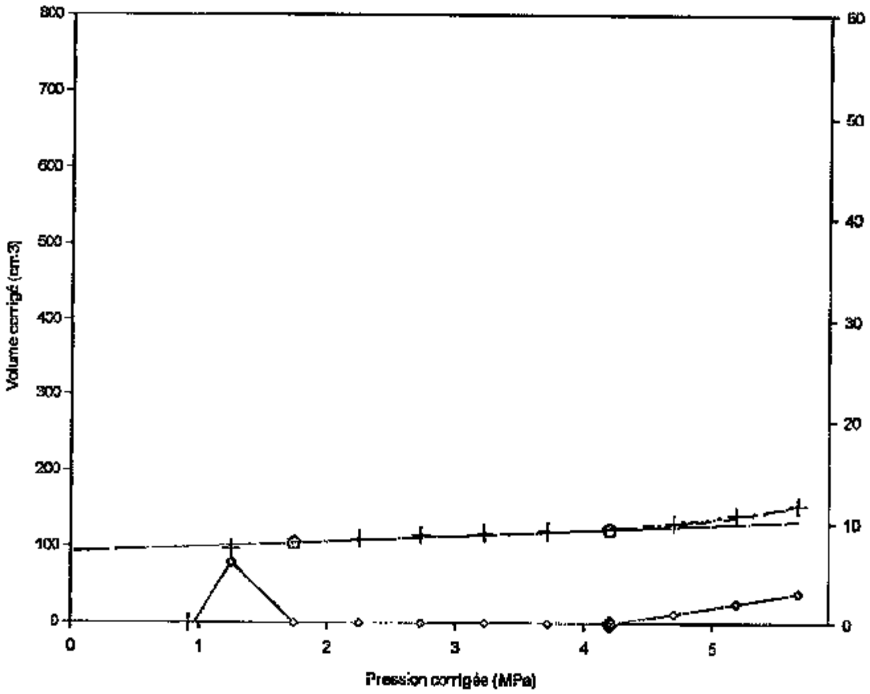
(valeurs en MPa)

EM = 218.8

Pl = 9.25	Pmax = 5.66
Pl(i) = 9.25	Pf = 3.71
Pl(h) = 6.49	Po = 1.25
Pl(Pf) = 5.57	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 93.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.6 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

EM = 239.5

Pl = 10.50	Pmax = 5.68
Pl(i) = 10.50	Pf = 4.21
Pl(h) = 6.77	Po = 1.26
Pl(Pf) = 6.32	

Légende:
---- : Pl(i) —— : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◇ : fluage ◈ : Pf

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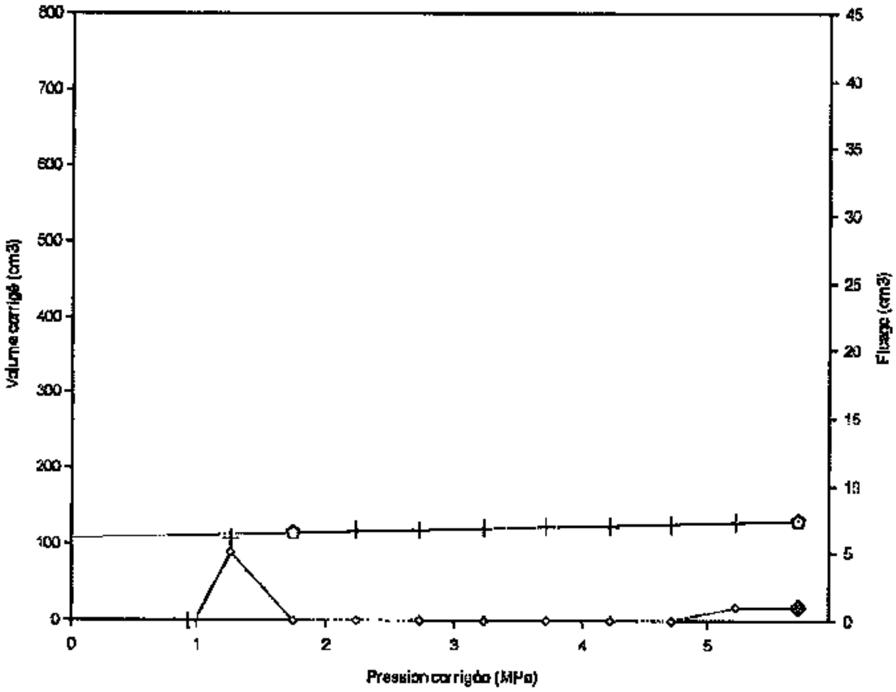


Profondeur : 94.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

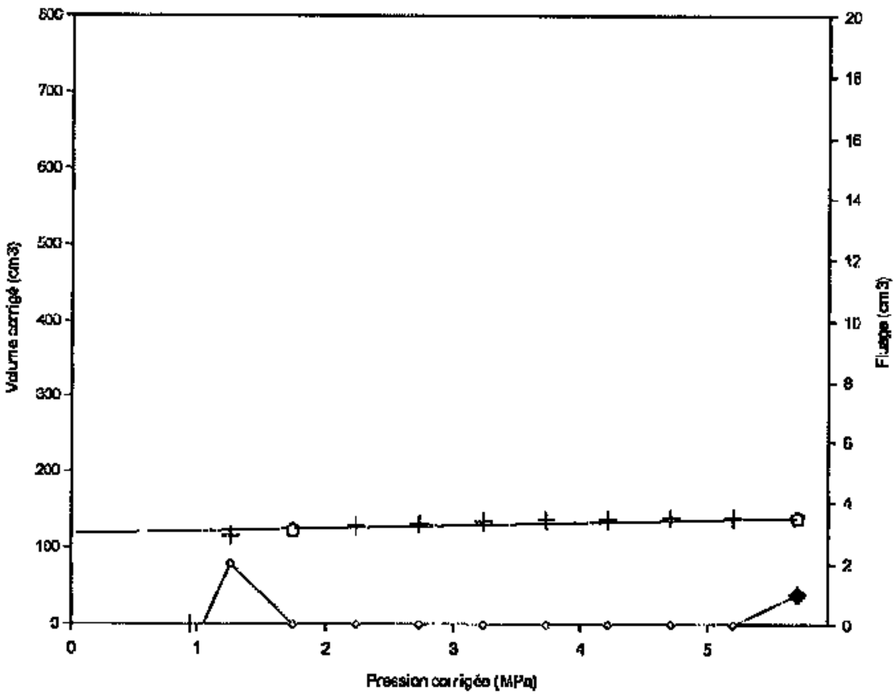
(valeurs en MPa)

EM = 423.8

Pl > 5.71
Pl(Pf) > 8.56
Pmax = 5.71
Pf > 5.71
Po = 1.28

Légende:
---- : Pl(?) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 95.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

EM = 456.9

Pl > 5.71
Pl(Pf) > 8.57
Pmax = 5.71
Pf > 5.71
Po = 1.29

Suivant la norme
NFP 94-110-1

Légende:
---- : Pl(?) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

AFFAIRE N° : ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

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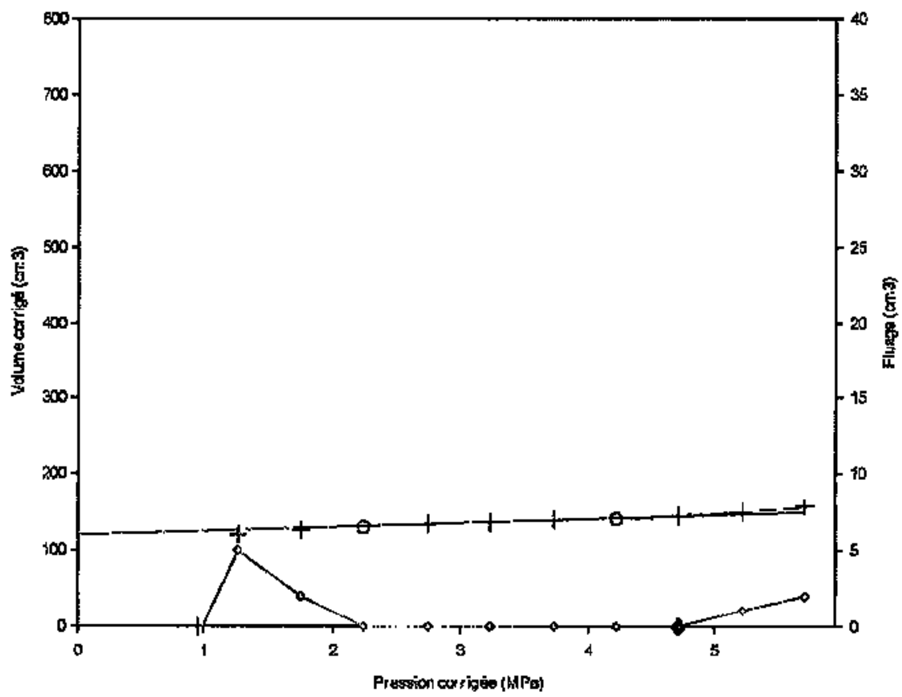


Profondeur : 96.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

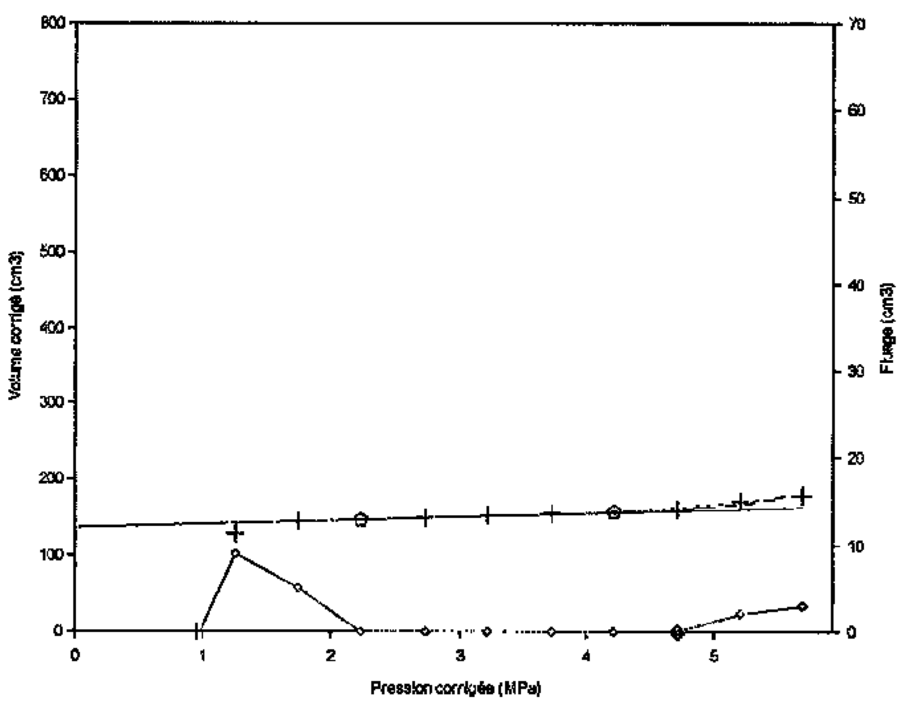
(valeurs en MPa)

E_M = 367.5

Pl = 17.01	Pmax = 5.71
Pl(i) = 17.01	Pf = 4.72
Pl(h) = 7.06	Po = 1.30
$Pl_{(Pt)}$ = 7.08	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pt

Sondage: MPM13



Profondeur : 97.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.00 cm3/MPa

(valeurs en MPa)

E_M = 375.7

Pl = 13.69	Pmax = 5.70
Pl(i) = 13.69	Pf = 4.72
Pl(h) = 6.05	Po = 1.32
$Pl_{(Pf)}$ = 7.08	

Légende:
---- : Pl(i) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
◦ : fluage ◈ : Pf

AFFAIRE N° : ML.100119	ESSAI PRESSIOMETRIQUE (NFP 94-110)

Affaire: SIZEWELL

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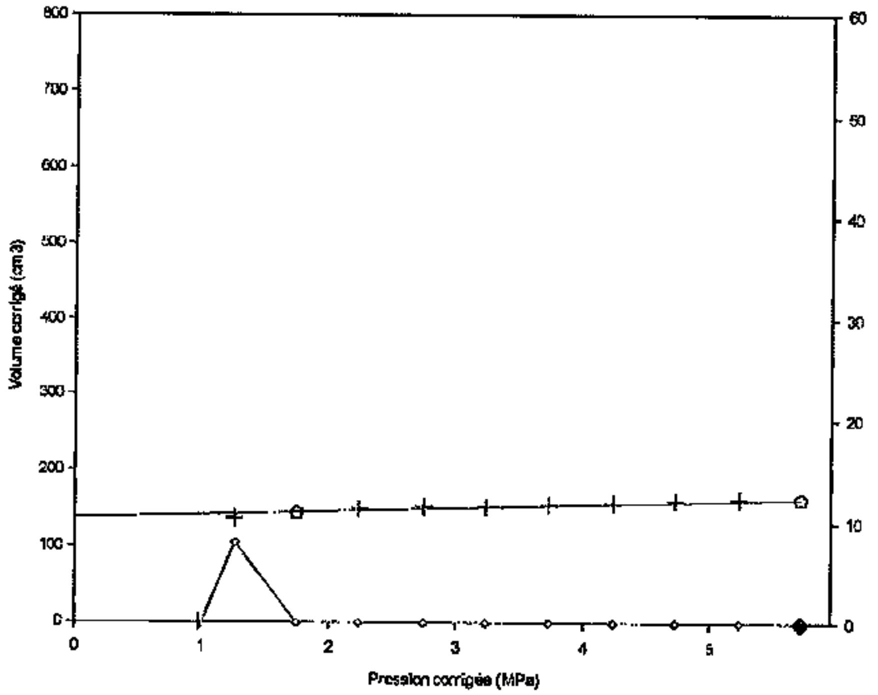
Sondage: MPM13



Profondeur : 98.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a 5.00 cm3/MPa

(valeurs en MPa)

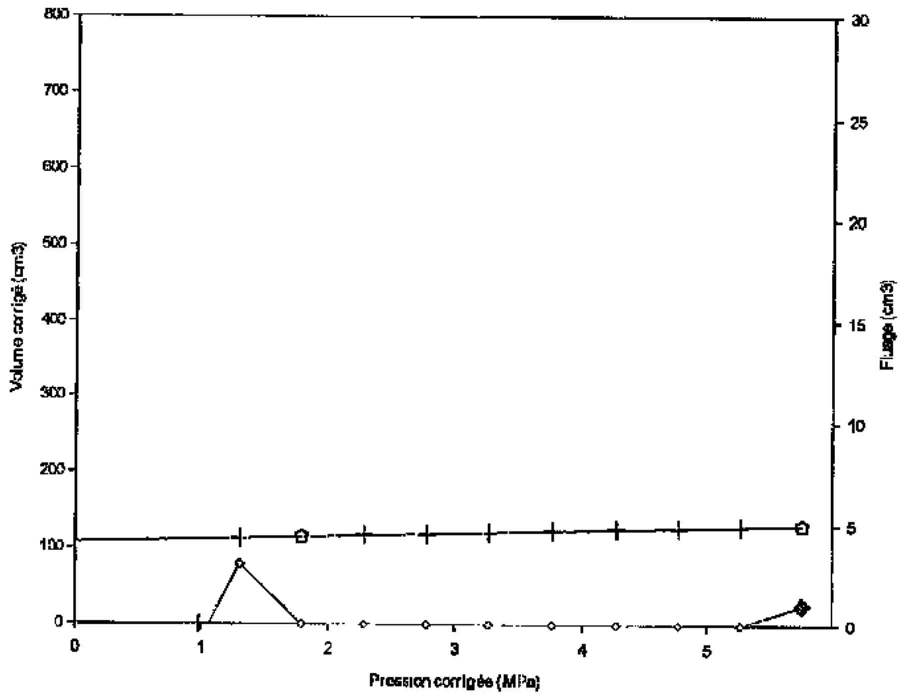
E_M = 377.1

Pl > 5.72	Pmax = 5.72
	Pf > 5.72
	Po = 1.33
$Pl_{(Pf)}$ > 8.58	

Suivant la norme
NFP 94-110-1

Légende:
---- : Pl(1) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

Sondage: MPM13



Profondeur : 99.00 m
Type de forage:
Désagrégateur rotation
Nappe: 3.10 m
Ko (estimé):
Masse vol. Sol (t/m3): 1.8 (estimé)
Hauteur du pressiomètre: 1.20 m

N° de l'inertie: 3
Sonde: TUBE FENDU

a = 5.30 cm3/MPa

(valeurs en MPa)

E_M = 424.4

Pl > 5.76	Pmax = 5.76
	Pf > 5.76
	Po = 1.34
$Pl_{(Pf)}$ > 8.64	

Légende:
---- : Pl(1) — — — : Pl(h)
+ : point de mesure
× : point non pris en compte
⌂ : extrémité de la phase linéaire
° : fluage ◈ : Pf

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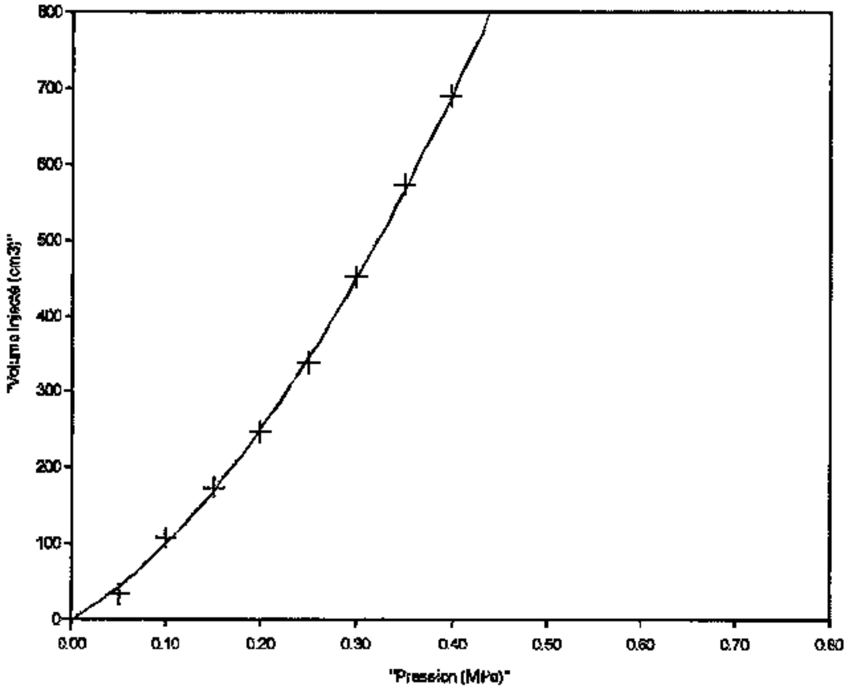
ETALONNAGE N° 1



Type sonde :
STANDARD

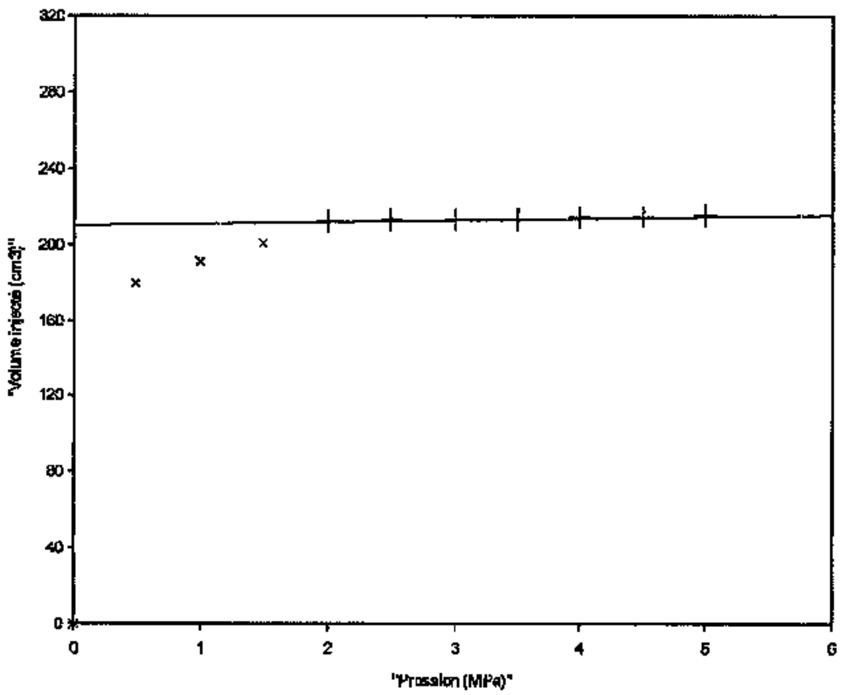
Gaine:
Toilée renforcée

Vs = 535 cm3

Conforme à la norme
NFP 94-110-1

Légende:
· : point de mesure
× : point non pris en compte

CALIBRAGE N° 1



Type sonde :
STANDARD

Gaine:
Toilée renforcée

Vs = 535 cm3

Coef. de compressibilité:
a = 0.86 cm3/MPa

Conforme à la norme
NFP 94-110-1

Légende:
| : point de mesure
× : point non pris en compte

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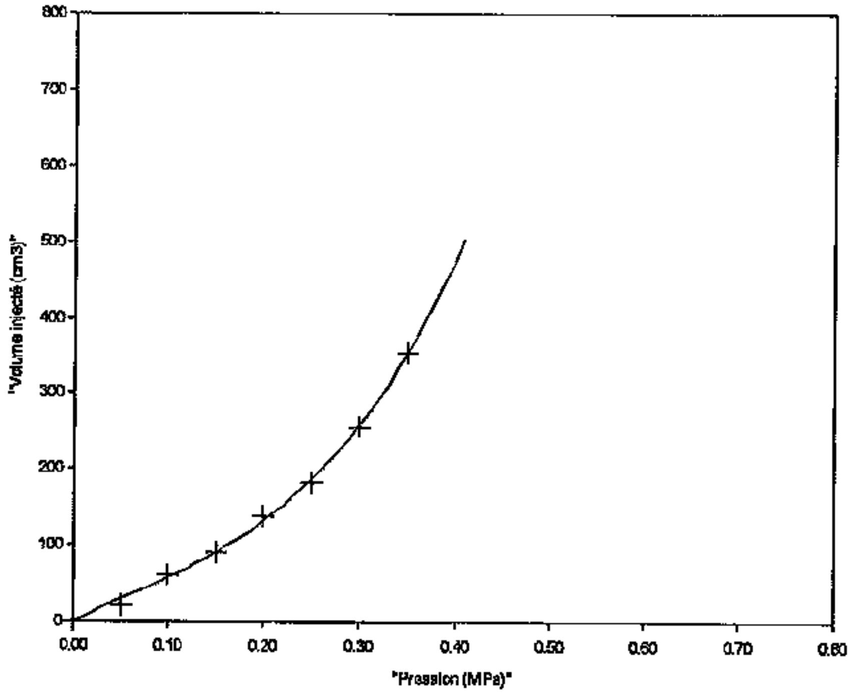
FONDASOL 290 rue des Caloubets BP 765 84140 MONTFAVET	Programme: W-PRessio Version : 1.1 Fichier : P11 Dernière mise à jour: 10/01/2011 16:29:44

ETALONNAGE N° 2



Type sonde :
TUBE FENDU

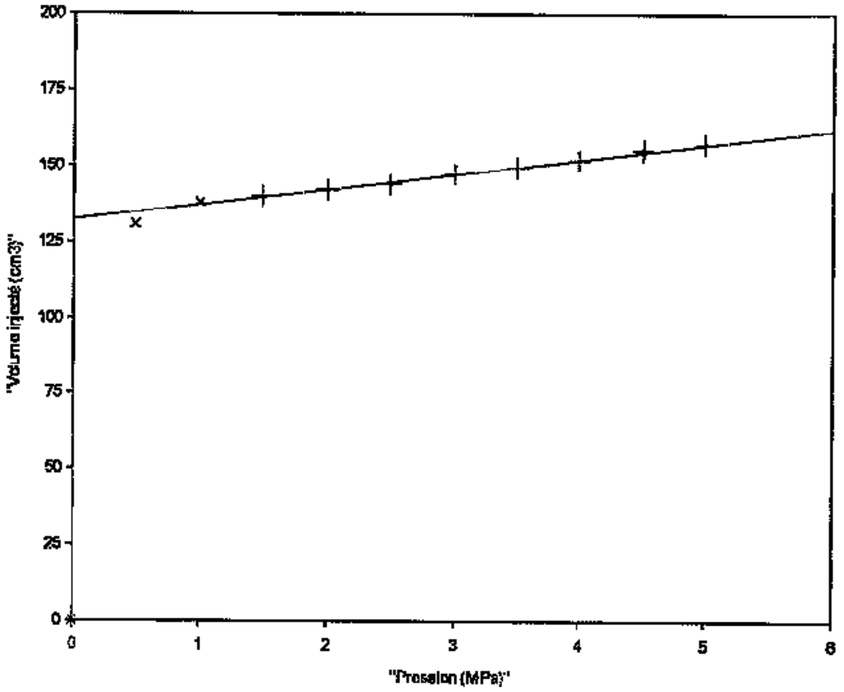
Gaine:
Toilée métallique

Vs = 560 cm3

Conforme à la norme
NFP 94-110-1

Légende:
+ : point de mesure
× : point non pris en compte

CALIBRAGE N° 2



Type sonde :
TUBE FENDU

Gaine:
Toilée métallique

Vs = 560 cm3

Coef. de compressibilité:
a = 5.00 cm3/MPa

Conforme à la norme
NFP 94-110-1

Légende:
| : point de mesure
× : point non pris en compte

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Affaire: SIZEWELL

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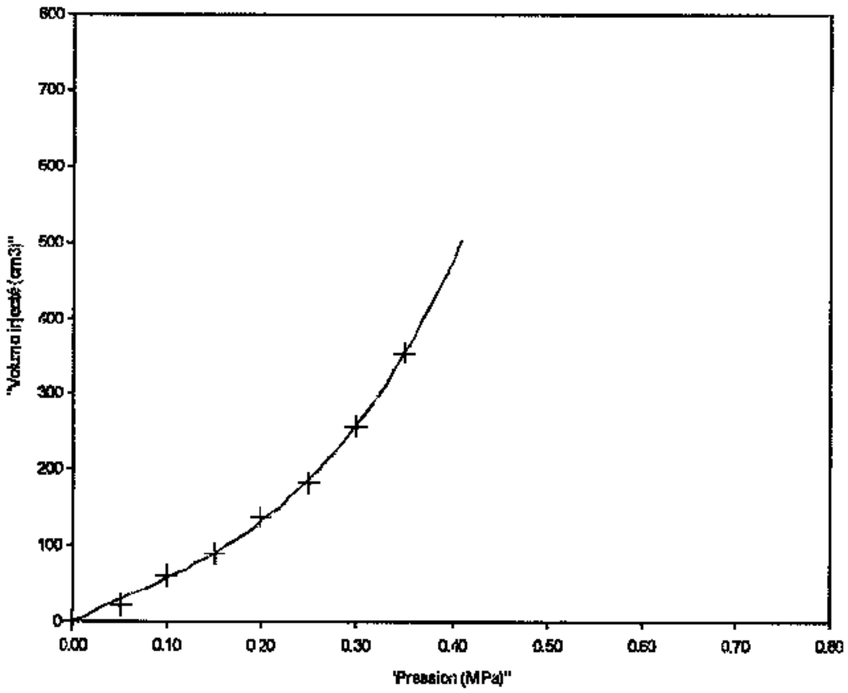


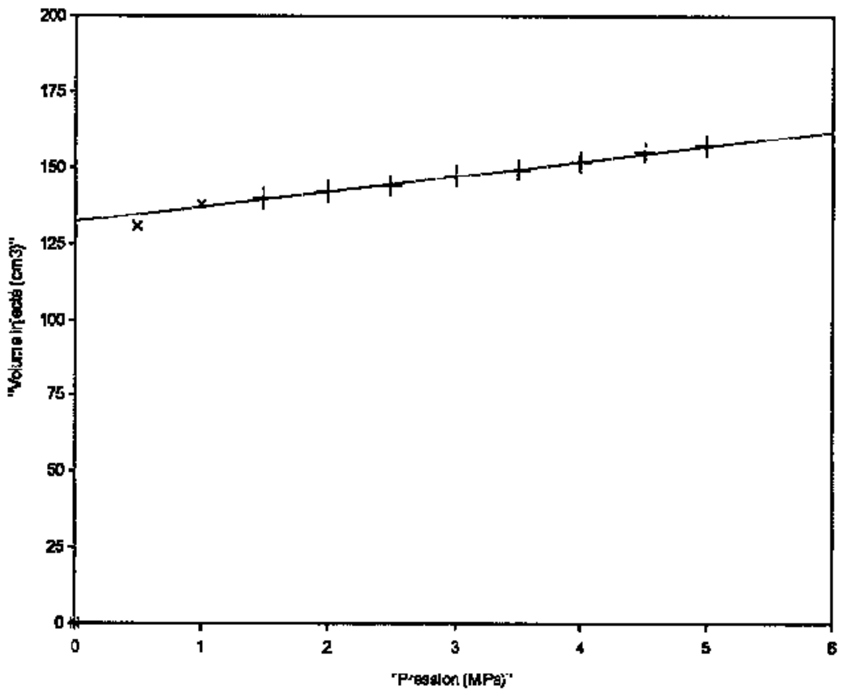
Type sonde :
TUBE FENDU

Vs = 560 cm3

Conforme à la norme
NFP 94-110-1

Légende:
: : point de mesure
x : point non pris en compte

CALIBRAGE N° 3



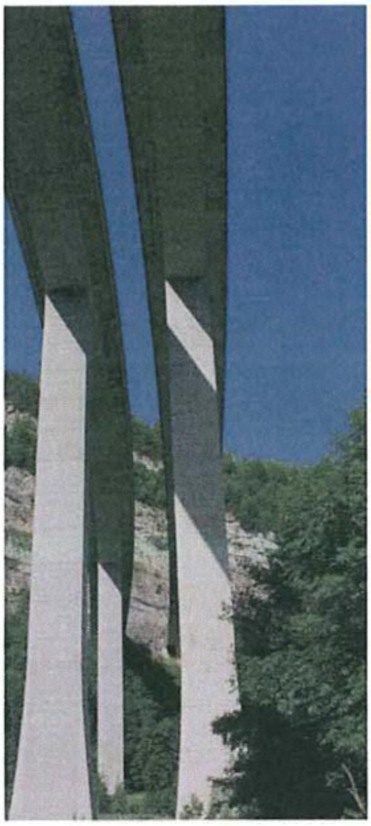
Type sonde :
TUBE FENDU

Vs = 560 cm3

Coef. de compressibilité:
a = 5.00 cm3/MPa

Conforme à la norme
NFP 94-110-1

Légende:
i : point de mesure
x : point non pris en compte



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Report No A0012-10/3B

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FACTUAL REPORT ON GROUND INVESTIGATION

VOLUME 3B: IN SITU TESTING

CONE PENETRATION TESTING
GEOPHYSICAL TESTING
PUMPING TEST

Carried out for: NNB Generation Company Limited

August 2011

Soil Mechanics
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Doncaster, South Yorkshire, DN6 8DG, UK
Tel: +44 (0) 1302 723456 Fax: +44 (0) 1302 725240
email: sm.doncaster@esgl.co.uk

Soil Mechanics part of Environmental Scientifics Group

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FACTUAL REPORT ON GROUND INVESTIGATION

VOLUME 3B : IN SITU TESTING

CONE PENETRATION TESTING
GEOPHYSICAL TESTING
PUMPING TEST

Report No: A0012-10/3B

Date: August 2011

Employer:

NNB Generation Company Limited
40 Grosvenor Place
Victoria
London
SW1X 7EN

Issue No	Date	Details
1	August 2011	Report as submitted

REPORT STRUCTURE

VOLUME NO	TITLE	REPORT NO
1	TEXT, MONITORING AND DRAWINGS	A0012-10/1
2A	EXPLORATORY HOLE RECORDS: 1:25 SCALE BOREHOLE LOGS	A0012-10/2A
2B	EXPLORATORY HOLE RECORDS: 1:25 SCALE BOREHOLE AND TRIAL PIT LOGS 1:100 SCALE BOREHOLE LOGS SPLIT TUBE SAMPLE DESCRIPTIONS DISCONTINUITY LOGS	A0012-10/2B
3A	IN SITU TESTING: DRILLING PARAMETER RESULTS MENARD PRESSUREMETER TESTING	A0012-10/3A
3B	**IN SITU TESTING:** **CONE PENETRATION TESTING** **GEOPHYSICAL TESTING** **PUMPING TEST**	**A0012-10/3B**
3C	IN SITU TESTING: SELF BORING PRESSUREMETER TESTING	A0012-10/3C
4	GEOTECHNICAL LABORATORY TESTING	A0012-10/4
5	PHOTOGRAPHS	A0012-10/5
6	COMPREHENSIVE AND DATA INTEGRATION REPORT	A0012-10/6

C O N T E N T S

ENCLOSURES

ENCLOSURE A

CONE PENETRATION TESTING – SM GEOCONE

SM Geocone Report Report No. M0102-10

Report No M0102-10

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FACTUAL REPORT ON GROUND INVESTIGATION

SM GEOCONE - CONE PENETRATION TESTING

Carried out for: NNB Generation Company Limited

Date: August 2011

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ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
FACTUAL REPORT ON GROUND INVESTIGATION

SM GEOCONE - CONE PENETRATION TESTING

Report No: **M0102-10**

Date: **August 2011**

Employer:

NNB Generation Company Limited
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Issue No	Date	Details
1	August 2011	Report as submitted

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NB REFERS ONLY TO CPT'S CARRIED OUT BY SM GEOCONE AND NOT LANKELMA

1 INTRODUCTION

During February 2010 Soil Mechanics (SM) were commissioned by EDF – DIN CEIDRE TEGG (EDF), on behalf of NNB Generation Company Limited (NNB), to carry out a ground investigation as part of the Onshore Investigations Phase 1 for Sizewell Site, Suffolk. The site is situated 3km east of the village of Leiston, Suffolk. The centre of the site is at National Grid reference TM 473 643.

The scope of the investigation, which was specified by EDF, included cone penetration tests (CPT). The testing was carried out by SM Geocone, a specialist department of Soil Mechanics, during several visits to site between 10 July 2010 and 11 January 2011. This report presents the factual CPT fieldwork records together with an interpretation of the soils penetrated. The data are also presented separately in digital format following AGS (2005). The records of the other parts of the investigation are contained in SM Report No A0012-10.

2 CONE PENETRATION TESTING

2.1 General

Forty three CPTs were carried out at 37 separate locations to a maximum depth of 16.82 m by electric piezocone using a 20 tonne CPT truck. The programme of testing is summarised in Table 1.

The test locations were selected by NNB. The co-ordinates and reduced levels were surveyed by SM to National Grid and Ordnance Datum. The test locations are shown on the Site Plan in Enclosure G of Report A0012-10 Volume 1.

Testing was carried out in accordance with Part 9 of BS 1377 (1990). The cone calibration certificates are contained in Enclosure A and include details of the manufacturer, cone dimensions, capacity and geometry.

Any opinions and interpretations presented are outside the scope of Geocone's UKAS accreditation for cone penetration testing.

2.2 Data Processing

Data acquisition was carried out using CPTest, proprietary software supplied by Geomil Equipment BV of Holland. The measured cone end resistance, sleeve friction, dynamic porewater pressure and inclination were recorded at 1 cm intervals of penetration.

Interpretation of the data was carried out using Geomil's CPTask software and SM in-house data reduction spreadsheets to derive the friction ratio and soil classification. The interpretation of the data follows the recommendations of Lunne et al (1997). The automated soil classification uses the soil behaviour type chart of Robertson (1990), see Figure 1. A nominal groundwater level of 1 m has been used in the interpretation.

The CPT records are presented in Enclosure A and provide plots relative to depth below ground level of the measured and derived cone parameters. Explanation of the terms used and derivations of the cone and soil parameters are given in the Key in Enclosure A. The strata descriptions provided on the logs are based on the automated estimation of soil type and correlation with soil descriptions from relevant boreholes put down as part of the investigation.

Prepared By	Name **Peter Hepton BSc PhD**	Sig [redacted]	Position **Technical Manager**
Reviewed By	**Rob Cooke BSc PhD**		
Approved for Issue By	[redacted]		

REFERENCES

AGS : 2005 : Electronic transfer of geotechnical and geoenvironmental data (Edition 3.1 including addendum May 2005). Association of Geotechnical and Geoenvironmental Specialists.

BS 1377 : 1990 : Methods of test for soils for civil engineering purposes. British Standards Institution.

BS 5930 : 1999 : Code of practice for site investigations. British Standards Institution.

Lunne T, Robertson PK and Powell JJM : 1997 : Cone Penetration Testing in Geotechnical Practice. Blackie Academic & Professional.

Robertson P K : 1990 : Soil classification using the cone penetration test. Canadian Geotechnical Journal, 27(1), 151-8.

ENCLOSURE A

CONE PENETRATION TEST RESULTS

Key to Cone Penetration Test Records

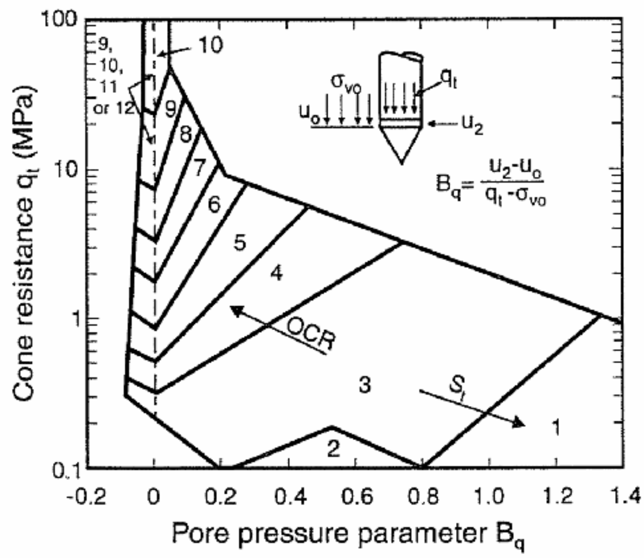
Soil Mechanics

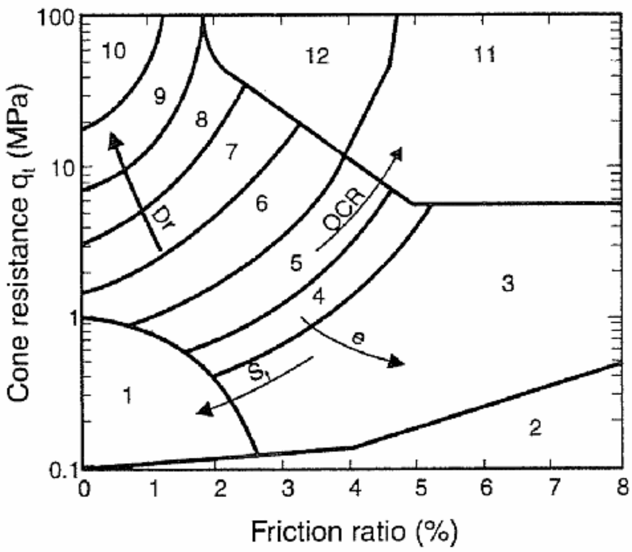
Parameter	Unit	Description	Equation
Measured parameters			
q_c	MPa	Cone resistance	Measured parameter
f_s	MPa	Sleeve friction	Measured parameter
I	degrees	Inclination	Measured parameter
u	MPa	Dynamic pore pressure (Piezocone only)	Measured parameter. Denoted as u_1 and u_2 for pore pressure filter locations on cone face and cone shoulder respectively.
-	m, s	Penetration depth and corresponding time	Measured parameters
Derived cone parameters			
R_f	%	Friction ratio	f_s / q_c . 100 %

Soil Description			
Soil Type	Classification after Robertson (1990) using normalised cone resistance, normalised friction ratio and pore pressure ratio (piezocone only), see Figure 1.		
Undrained shear strength description	Interpretation for fine soils only – soil types 3 and 4. Based on net cone resistance (corrected where pore pressure data available) and empirical cone factor = $(q_c - \sigma_{vo}) / N_k$ Cone factor used N_k = 16	Descriptive term	Strength, kPa
		Very soft Soft Firm Stiff Very stiff	<20 20 to 40 40 to 75 75 to 150 >150
Relative density description	Interpretation for coarse soils only – soil types 5, 6 and 7. Based on uncorrected cone resistance	Descriptive term	Cone resistance (q_c), MPa
		Very loose Loose Medium dense Dense Very dense	<2 2 to 4 4 to 12 12 to 20 >20

Soil Behaviour Type Interpretation

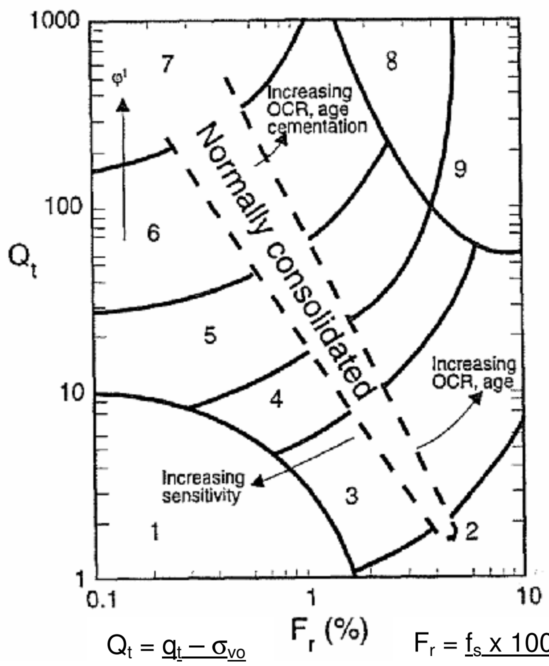
Soil Mechanics

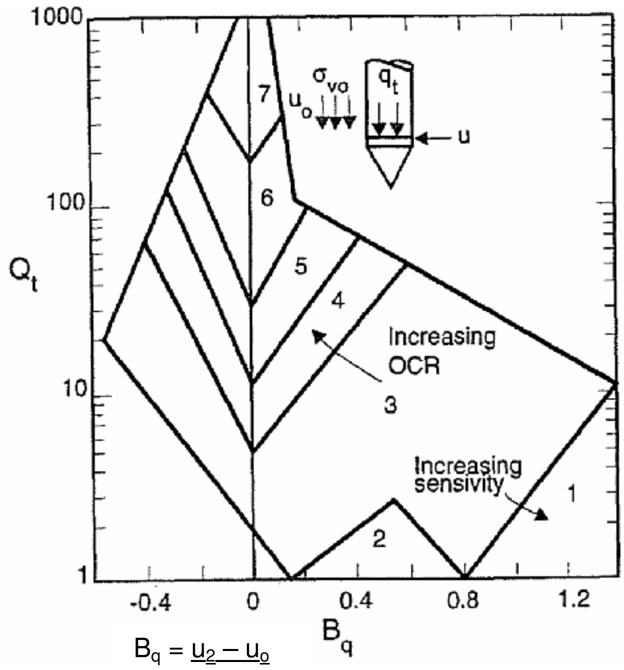




KEY TO SOIL BEHAVIOUR TYPES - after Robertson et al (1986)

ZONE	SOIL BEHAVIOUR TYPE	ZONE	SOIL BEHAVIOUR TYPE	ZONE	SOIL BEHAVIOUR TYPE
1	Sensitive fine grained	5	Clayey silt to silty clay	9	Sand
2	Organic material	6	Sandy silt to clayey silt	10	Gravelly sand to sand
3	Clay	7	Silty sand to sandy silt	11	Very stiff fine grained*
4	Silty clay to clay	8	Sand to silty sand	12	Sand to clayey sand*





$Q_t = \frac{q_t - \sigma_{vo}}{\sigma'_{vo}}$ $F_r = \frac{f_s}{q_t - \sigma_{vo}} \times 100\%$ $B_q = \frac{u_2 - u_o}{q_t - \sigma_{vo}}$

KEY TO SOIL BEHAVIOUR TYPES – after Robertson (1990)

ZONE	SOIL BEHAVIOUR TYPE	ZONE	SOIL BEHAVIOUR TYPE	ZONE	SOIL BEHAVIOUR TYPE
1	Sensitive fine grained	4	Silt mixtures: clayey silt to silty clay	7	Gravelly sand to sand
2	Organic soils – peats	5	Sand mixtures: silty sand to sandy silt	8	Very stiff sand to clayey sand
3	Clays: clay to silty clay	6	Sands: clean sand to silty sand	9	Very stiff fine grained

Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE	Figure
Project No.	M0104-10	1
Carried out for	NNB Generation Company Limited	

Summary of Cone Penetration Tests

Soil Mechanics

CPT No	Depth (m)	Date	Remarks	No of Sheets
CPT 2009_1	11.01	06-Sep-10		1
CPT 2009_2	2.64	11-Jul-10		1
CPT 2009_2A	15.19	11-Jul-10		2
CPT 2009_3	16.82	02-Aug-10		2
CPT 2009_4	15.35	24-Aug-10		2
CPT 2009_8	12.13	17-Sep-10		2
CPT 2009_9	15.37	06-Sep-10		2
CPT 2009_10	11.29	17-Sep-10		2
CPT 2009_11	8.86	06-Sep-10		1
CPT 2009_12	8.25	20-Sep-10		1
CPT 2009_13	4.58	17-Sep-10		1
CPT 2009_13A	4.27	17-Sep-10		1
CPT 2009_14	1.53	25-Aug-10		1
CPT 2009_14A	7.73	25-Aug-10		1
CPT 2009_15	7.55	25-Aug-10		1
CPT 2009_16	15.92	22-Sep-10		2
CPT 2009_17	14.09	21-Sep-10		2
CPT 2009_18	14.21	20-Sep-10		2
CPT 2009_19	1.52	18-Oct-10		1
CPT 2009_20	13.15	25-Aug-10		2
CPT 2009_22	12.60	02-Aug-10		2
CPT 2009_23	15.30	11-Jul-10		2
CPT 2009_24	15.13	11-Jul-10		2
CPT 2009_25	16.16	21-Sep-10		2
CPT 2009_26A	5.72	21-Sep-10		1

Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE	Table
Project No.	M0104-10	1
Carried out for	NNB Generation Company Limited	

Summary of Cone Penetration Tests

Soil Mechanics

CPT No	Depth (m)	Date	Remarks	No of Sheets
CPT 2009_26B	16.39	21-Sep-10		2
CPT 2009_28	6.01	10-Jan-11		1
CPT 2009_29	12.91	11-Jan-11		2
CPT 2009_31	8.85	02-Aug-10		1
CPT 2009_32	8.22	02-Aug-10		1
CPT 2009_33	0.44	02-Aug-10		1
CPT 2009_33A	0.71	02-Aug-10		1
CPT 2009_33B	9.67	02-Aug-10		1
CPT 2009_34	13.19	24-Aug-10		2
CPT 2009_35	14.65	18-Oct-10		2
CPT 2009_36	13.94	10-Jul-10		2
CPT 2009_37	16.81	11-Jul-10		2
CPT 2009_38	1.72	18-Oct-10		1
CPT 2009_39	15.36	10-Jan-11		2
CPT 2009_40	15.62	10-Jan-11		2
CPT 2009_41	16.04	10-Jan-11		2
CPT 2009_42	14.35	10-Jan-11		2
GEO1_CPT1C	13.30	10-Jan-11		2

Notes (unless indicated otherwise above)

- Piezocones fitted with polypropylene pore pressure filter located in the shoulder (u_2) position
- Tests with 10cm^2 cones carried out using friction reducer
- Tests terminated at refusal depth
- No backfilling to CPT holes
- Groundwater/collapse depths noted on individual report sheets where recorded

Soil Mechanics

CPT CONE

Cone No.	C10-CFIP.124	Date of Calibration	18/06/2010
Manufacturer	Geopoint	Reference Standards	BS1377: Part 9: 1990
Compression/ Subtraction	Compression	Reference Equipment	Pressure meter 1972-A Vernier callipers EV 18 Load cell 22541/2 Voltmeter 06402486
Pore Pressure Channel (Y/N)	Y		
Cone end area ratio (by dimension measurement), a	0.5	Sleeve end area ratio (by dimension measurement), b	1.0

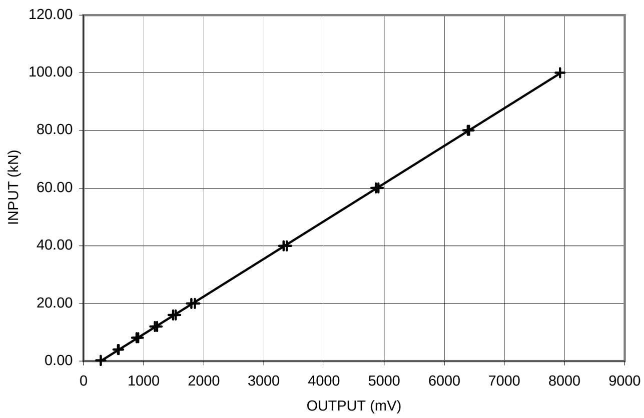
Note: Calibration Zero taken as no load in free air, Output taken as slope of linear regression line x maximum load.

Cone Type (S/ C/ M/ D/ T) C   Ch 3 (P/ C/ T/ N/ F) P

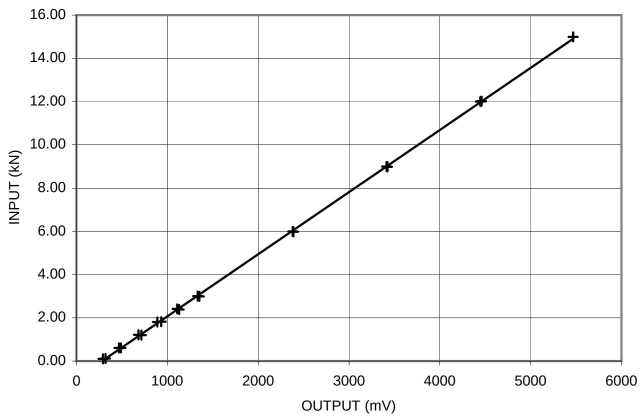
	Output		Input		Zero		Area		Alarm	
Channel 1	7653	mV	100	kN	262	mV	10	cm^2	0	kN
Channel 2	5216	mV	15	kN	255	mV	150	cm^2	0	kN
Channel 3	6861	mV	20	Bar	152	mV			0	Bar

Inclination	0^o	5^o	10^o		Alarm
	93	206	841		0
	15^o	20^o	25^o		
	1871	2957	4039	Extra Channels	N

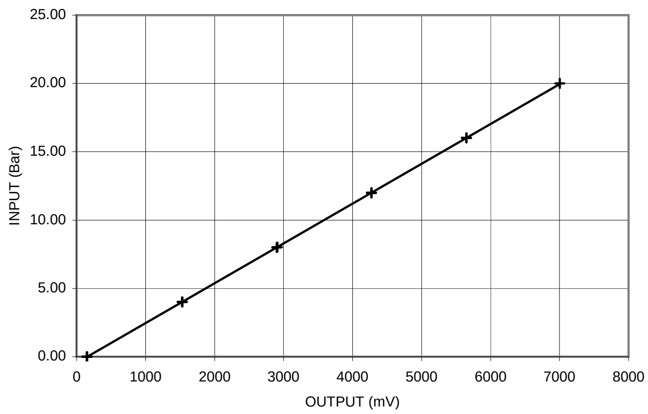
CHANNEL 1 - TIP



CHANNEL 2 - FRICTION SLEEVE



CHANNEL 3 - PORE PRESSURE



SM	Cone calibrated by: Peter Hepton Senior Technician (Calibration)	[redacted]uthorised for use by: Manager

Soil Mechanics

CPT CONE

Cone No.	C10-CFIP.584	Date of Calibration	18/06/2010
Manufacturer	Geopoint	Reference Standards	BS1377: Part 9: 1990
Compression/ Subtraction	Compression	Reference Kit	Pressure meter 1972-A Vernier callipers EV 8 Load cell 22541/2 Voltmeter 06402486
Pore Pressure Channel (Y/N	Y		
Cone end area ratio (by dimension measurement), a	0.5	Sleeve end area ratio (by dimension measurement	1.0

Notes: Calibration Zero taken as no load in free air, Output taken as slope of linear regression line x maximum load.

Cone Type (S/ C/ M/ D/ T) C

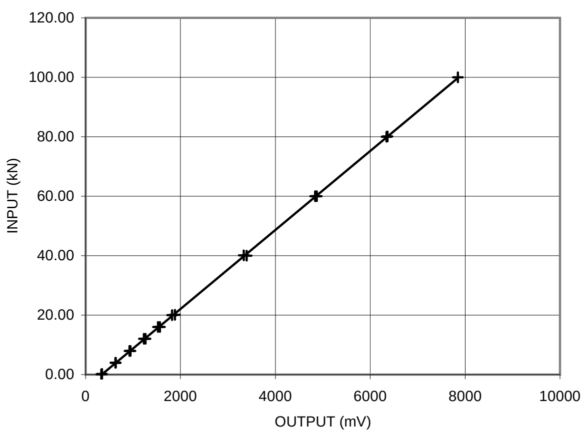
Ch 3 (P/ C/ T/ N/ F) P

	Output		Input		Zero		Area		Alarm	
Channel 1	7524	mV	100	kN	315	mV	10	cm^2	0	kN
Channel 2	5313	mV	15	kN	295	mV	150	cm^2	0	kN
Channel 3	9272	mV	20	Bar	158	mV			0	Bar

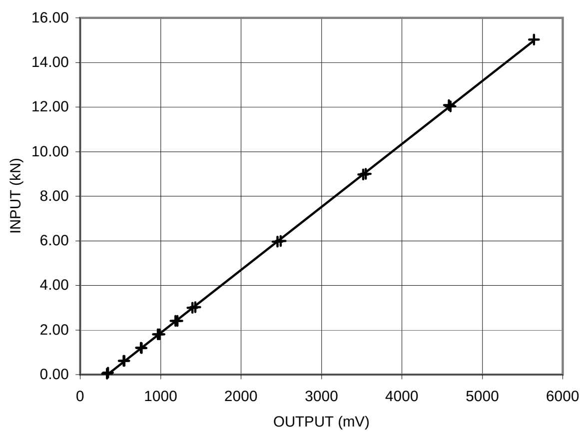
Inclination	0^o	5^o	10^o	Alarm
	23	94	512	0
	15^o	20^o	25^o	
	1085	1822	2439	

Extra Channels N

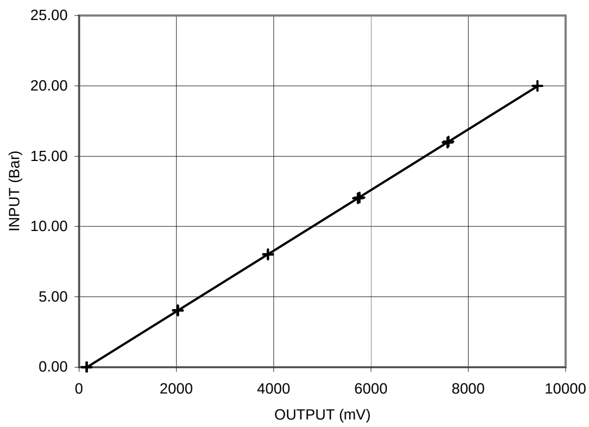
CHANNEL 1 - TIP



CHANNEL 2 - FRICTION SLEEVE



CHANNEL 3 - PORE PRESSURE

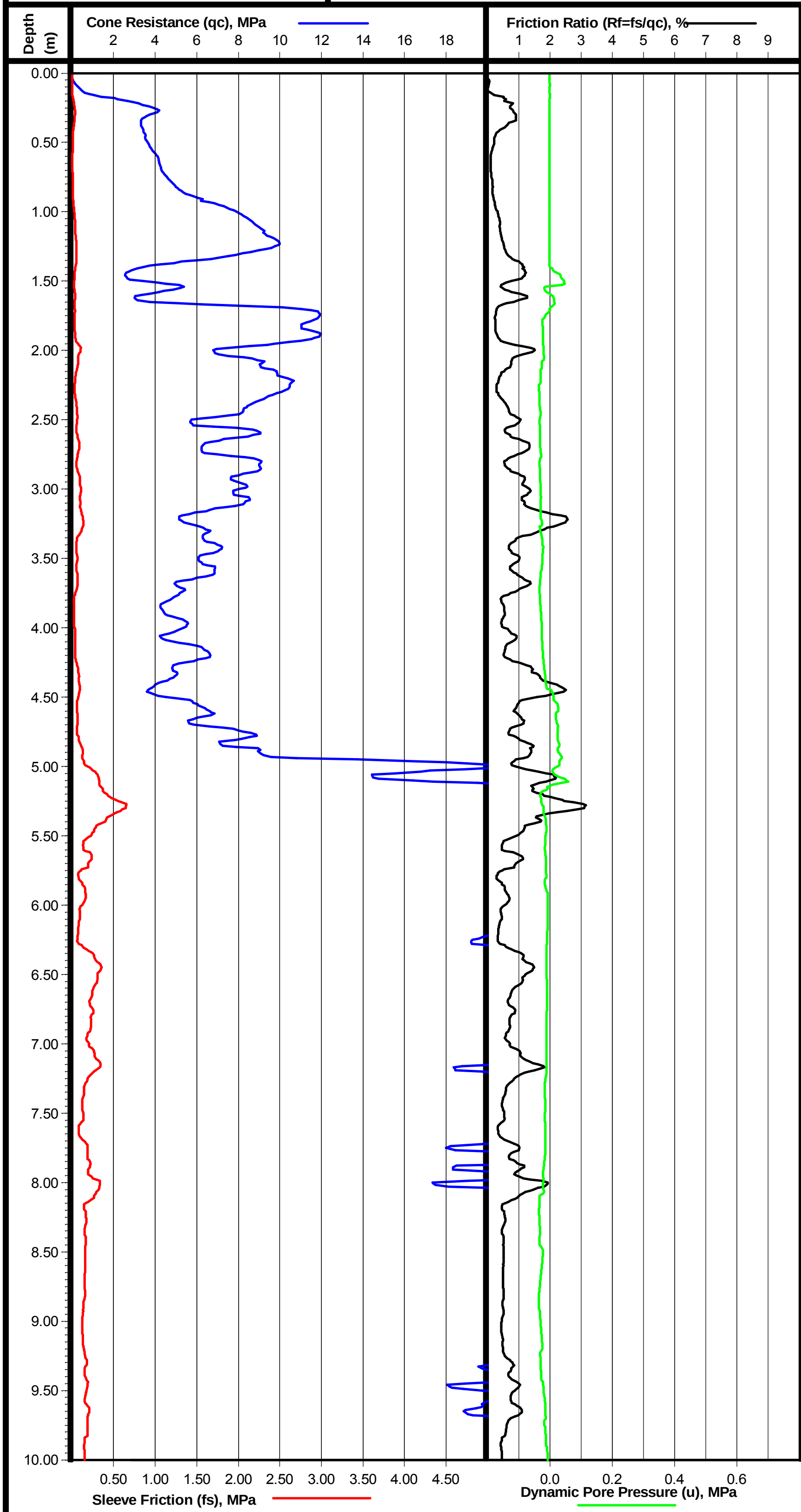


SM	Cone calibrated by: Peter Hepton Technical Manager	[redacted]rised for use by: Manager

Cone Penetration Test Log

Soil Mechanics

Date	06/09/2010	**Equipment and Methods**	**Ground Level** +1.92 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647122.84 N 264470.94
Operator	DB		



Strata Description	Depth	Level	(Thickness)
Medium dense, locally loose, gravelly SAND. (MADE GROUND)			(2.35)
Medium dense SAND. (Probable RECENT DEPOSITS)	2.35	-0.43	(2.05)
Loose to medium dense SAND. (Probable RECENT DEPOSITS)	4.40	-2.48	(0.60)
Very dense SAND varying to gravelly SAND. (CRAG DEPOSITS)	5.00	-3.08	(6.01)

Stratum continues to 11.01 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_1.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:40:55

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_1

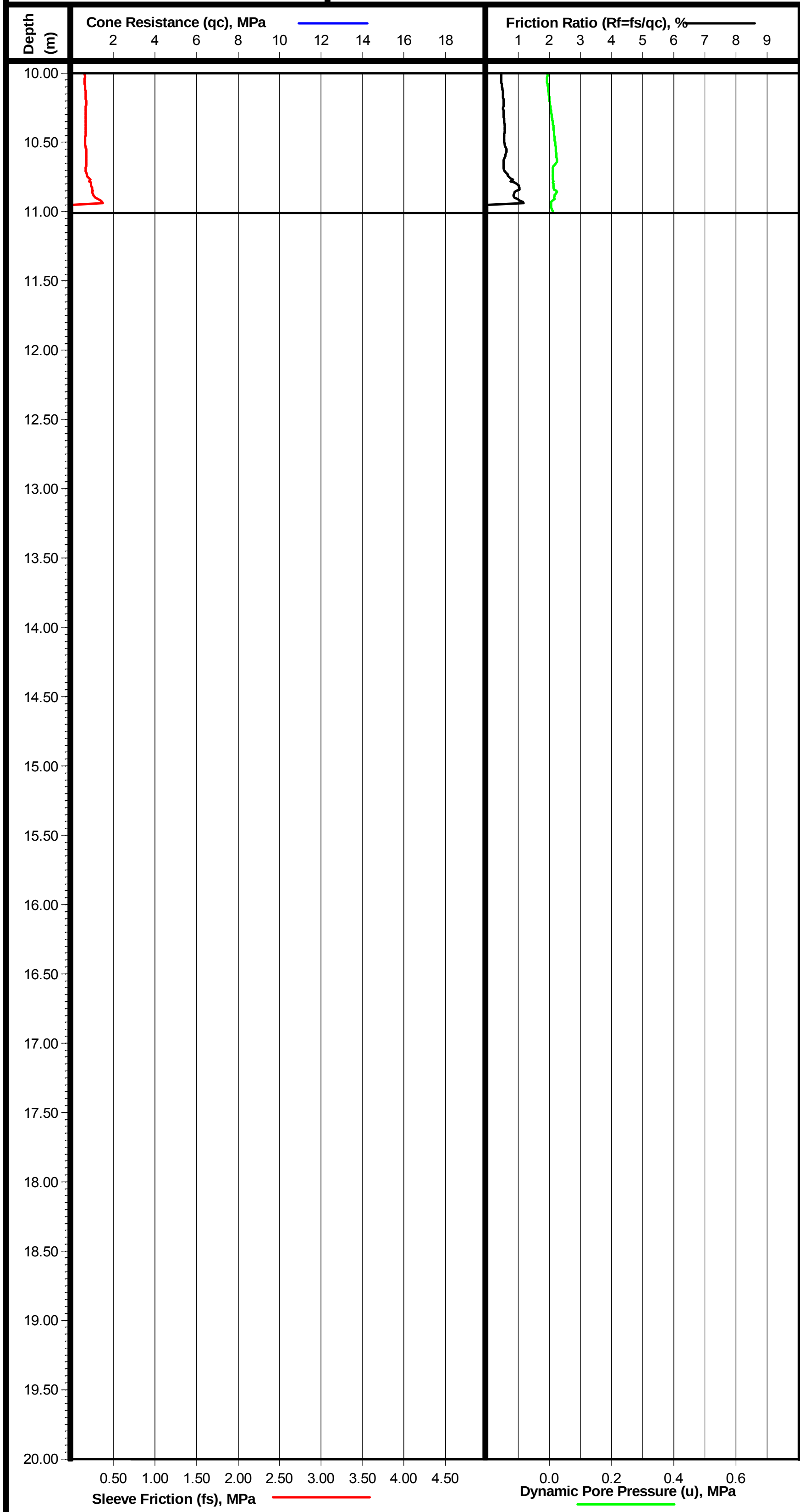
Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	06/09/2010	**Equipment and Methods**	
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	
Operator	DB		

Ground Level	+1.92 mOD
Co-ordinates National Grid	E 647122.84
	N 264470.94



Strata Description	Depth, Level (Thickness)		Legend
Very dense SAND varying to gravelly SAND. (CRAG DEPOSITS)	11.01	-9.09	
Base of CPT at 11.01 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_1.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

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Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

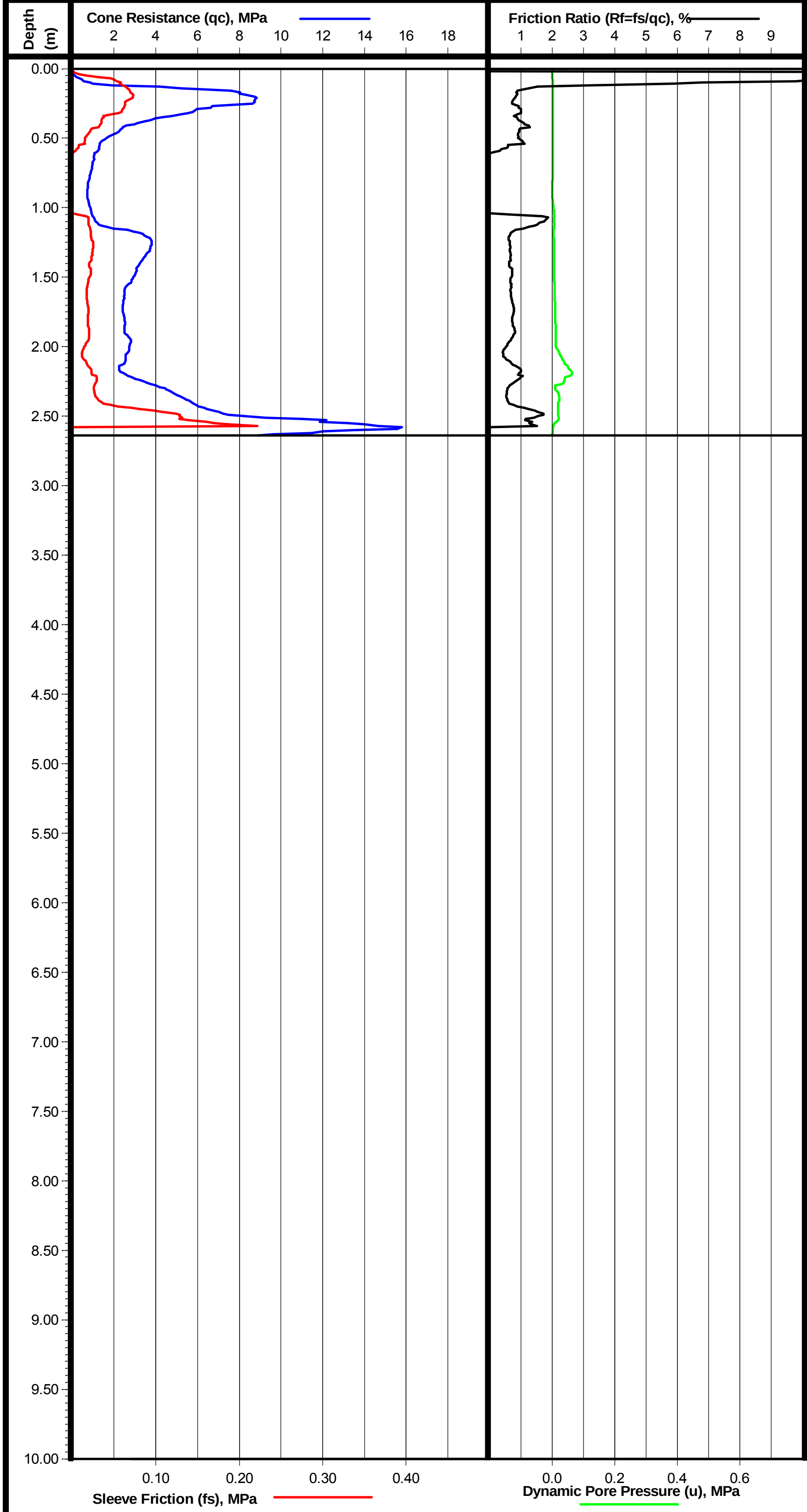
CPT 2009_1

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	11/07/2010	Equipment and Methods		Ground Level	+1.64 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		Co-ordinates National Grid	E 647218.77
Operator	DB				N 264231.87



Strata Description	Depth	Level	(Thickness)	Legend
Medium dense gravelly SAND. (Probable MADE GROUND)			(0.60)	
Very loose/soft material.	0.60	+1.04	(0.45)	
Loose SAND. (Probable MADE GROUND)	1.05	+0.59	(1.59)	
Base of CPT at 2.64 mBGL	2.64	-1.00		

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_2.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

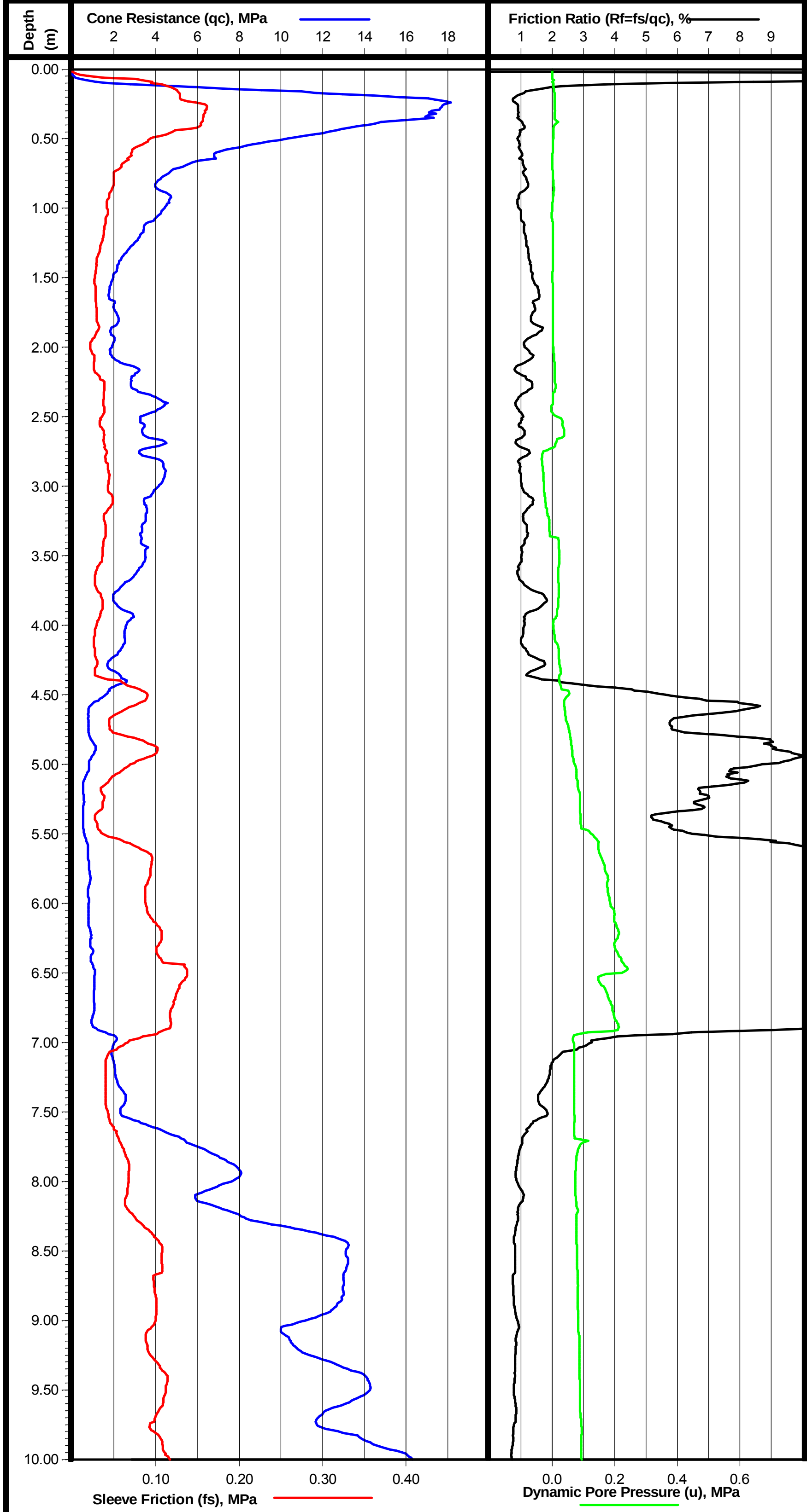
CPT No

CPT 2009_2

Sheet 1 of 1

Cone Penetration Test Log

Date	11/07/2010	**Equipment and Methods**		**Ground Level**	+1.61 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647217.06 N 264233.12
Operator	DB				



Strata Description	Depth	Level	(Thickness)
Dense gravelly SAND. (Probable MADE GROUND)			(0.50)
Loose SAND. (Probable MADE GROUND)	0.50	+1.11	(4.00)
Soft CLAY. (RECENT DEPOSITS)	4.50	-2.89	(1.05)
Firm organic CLAY. (RECENT DEPOSITS)	5.55	-3.94	(1.35)
Very loose silty SAND. (RECENT DEPOSITS)	6.90	-5.29	(0.80)
Medium dense SAND. (Probable CRAG DEPOSITS)	7.70	-6.09	(0.60)
Medium dense to dense SAND. (CRAG DEPOSITS)	8.30	-6.69	(1.70)

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_2a.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

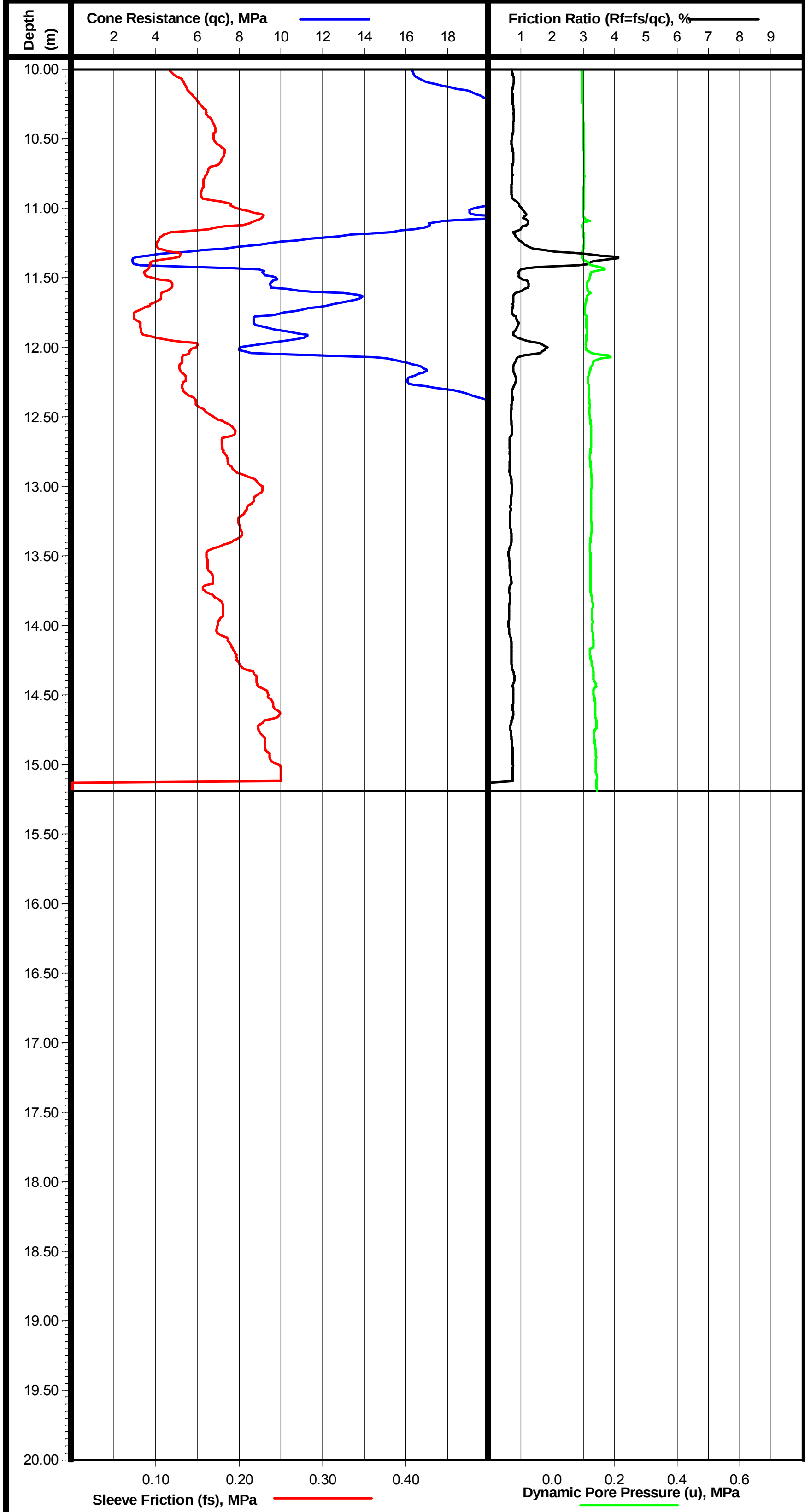
CPT No

CPT 2009_2A

Cone Penetration Test Log

Soil Mechanics

Date	11/07/2010	**Equipment and Methods**	**Ground Level** +1.61 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647217.06 N 264233.12
Operator	DB		



Strata Description	Depth	Level (Thickness)	Legend
Dense, locally very dense, SAND. (CRAG DEPOSITS)	10.00	-8.39 (1.15)	
Medium dense SAND. (CRAG DEPOSITS) 11.40 m band of stiff silty clay	11.15	-9.54 (0.95)	
Very dense SAND. (CRAG DEPOSITS)	12.10	-10.49 (3.09)	
Base of CPT at 15.19 mBGL	15.19	-13.58	

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_2a.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

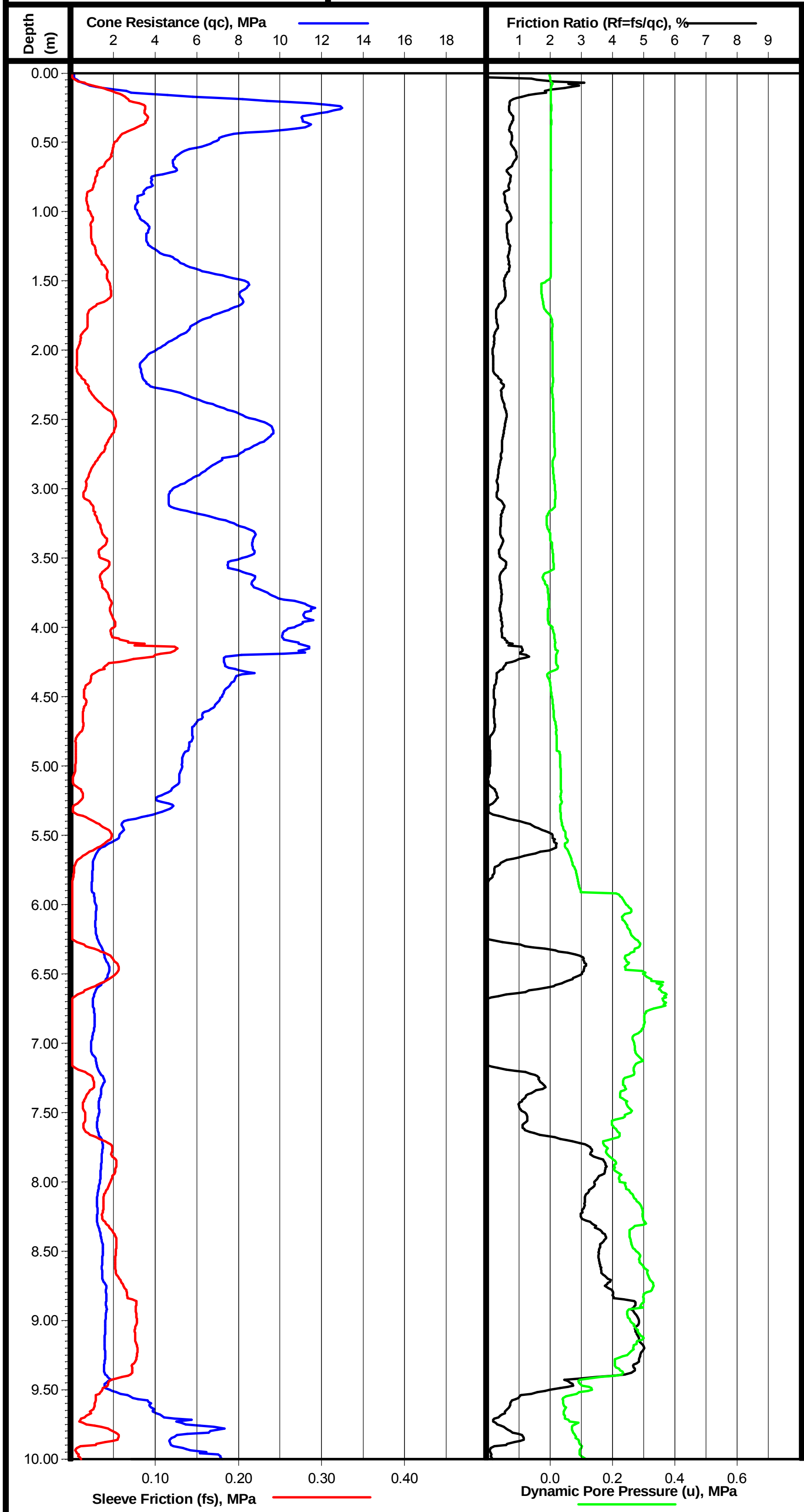
CPT No

CPT 2009_2A

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**		**Ground Level**	+1.71 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647043.63 N 264087.00
Operator	DB				



Strata Description		Depth, Level (Thickness)		Legend
Medium dense SAND. (Probable MADE GROUND)	0.20-0.40 m dense gravelly SAND 0.80-1.30 m loose 2.00-2.38 m loose	(5.85)		
Soft to firm sandy CLAY. (RECENT DEPOSITS)		5.85 (1.80)	-4.15	
Stiff silty CLAY. (RECENT DEPOSITS)		7.65 (1.90)	-5.95	
Dense becoming very dense SAND.	9.55-10.0 m medium dense	9.55	-7.85	

Stratum continues to 13.30 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_3.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:41:19 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

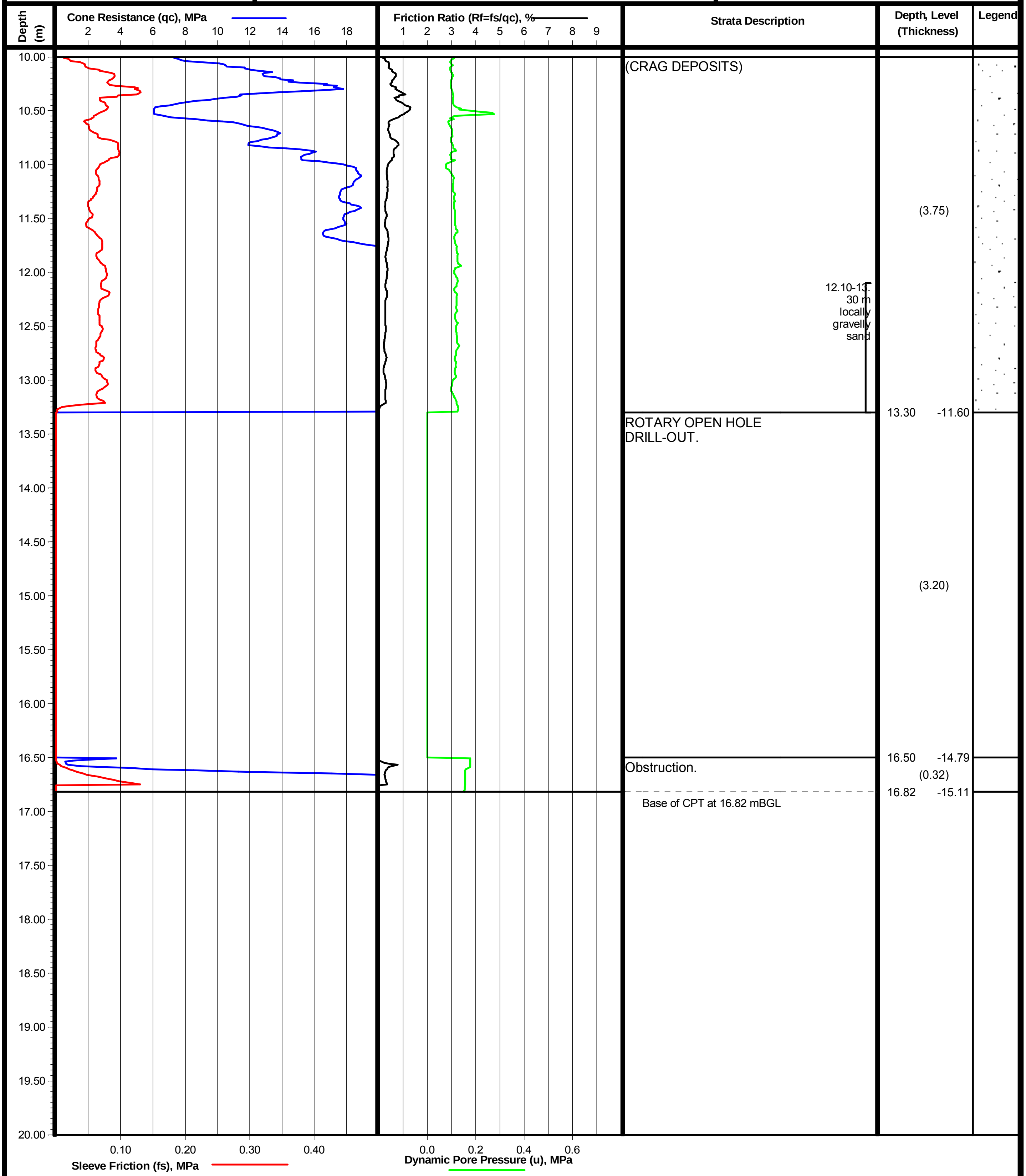
CPT No

CPT 2009_3

Sheet 1 of 2

Cone Penetration Test Log

Date	02/08/2010	**Equipment and Methods**	**Ground Level** +1.71 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647043.63 N 264087.00
Operator	DB		



Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_3.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:41:26

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

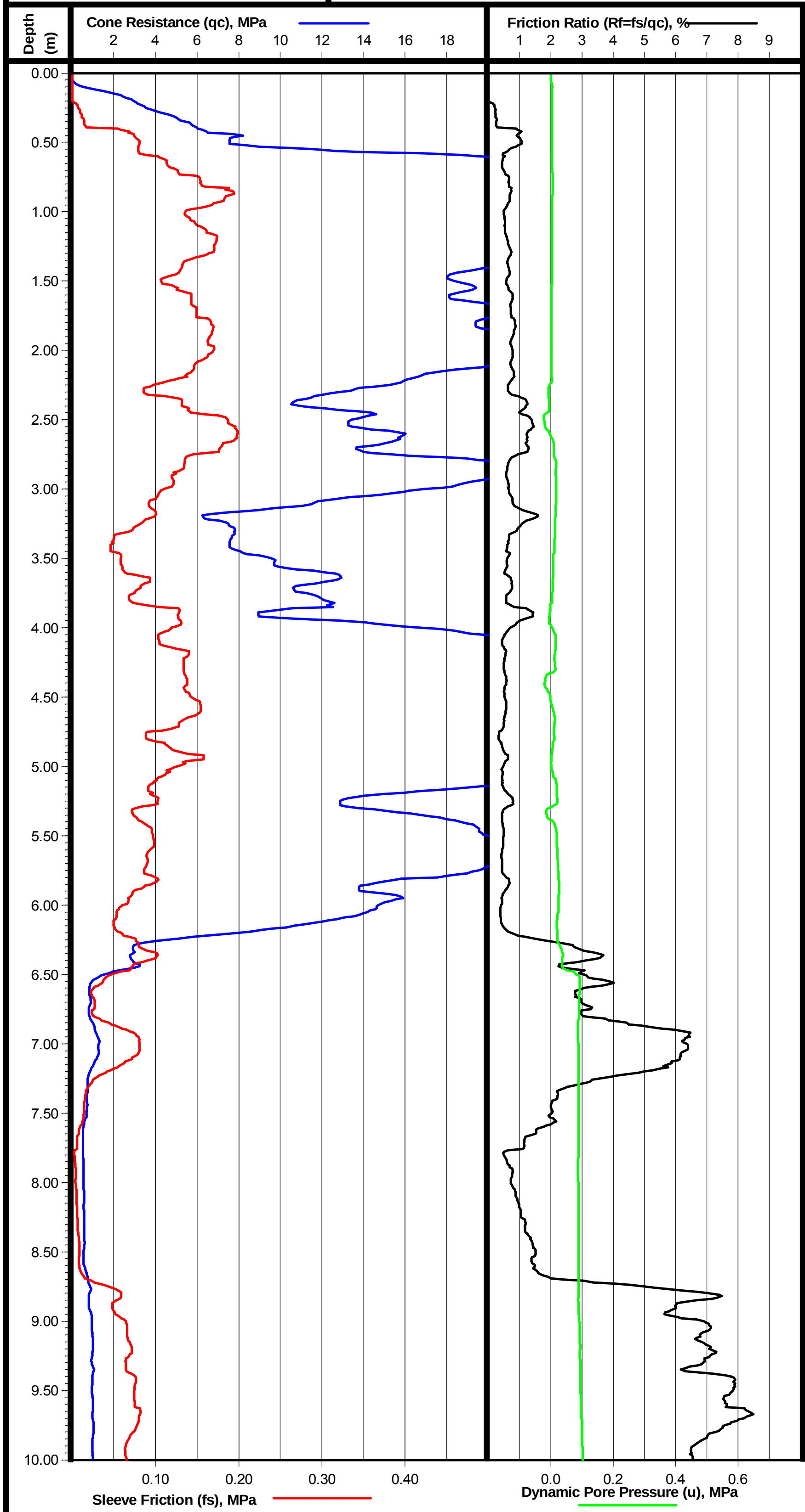
CPT 2009_3

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date 24/08/2010	**Equipment and Methods**	**Ground Level**	+2.95 mOD
Cone No C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647044.27
Operator DB			N 263930.39



Strata Description	Depth, Level (Thickness)		Legend
Very dense gravelly SAND. (MADE GROUND)	2.35 (2.35)	+0.60	
Medium dense to dense SAND. (MADE GROUND)	4.00 (1.65)	-1.05	
Very dense gravelly SAND. (MADE GROUND)	6.25 (2.25)	-3.30	
Firm CLAY. (RECENT DEPOSITS)	7.30 (1.05)	-4.35	
Soft CLAY. (RECENT DEPOSITS)	8.75 (1.45)	-5.80	
Firm organic CLAY. (RECENT DEPOSITS)	(2.00)		

Stratum continues to 10.75 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_4.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:41:31 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

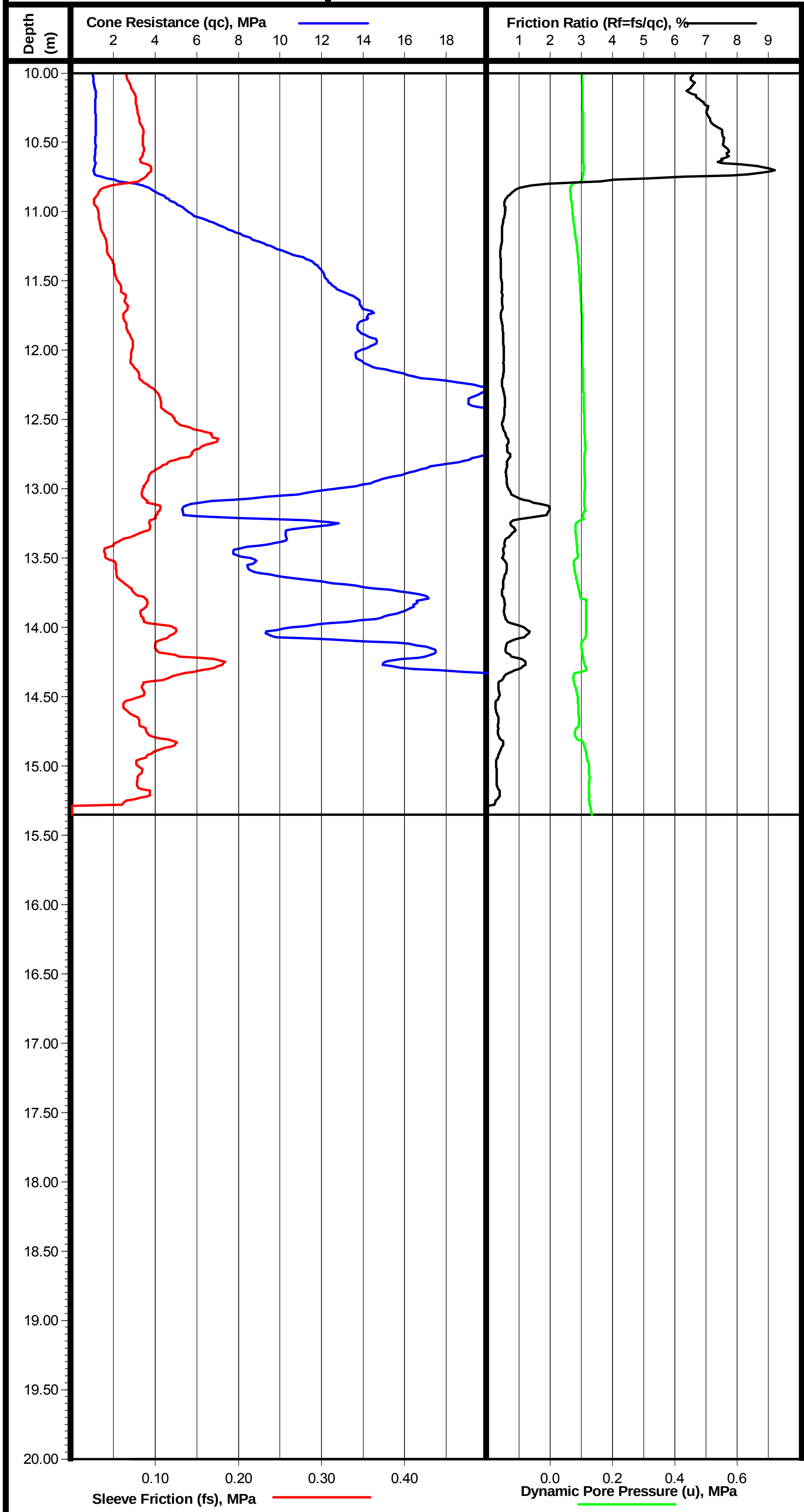
CPT 2009_4

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	24/08/2010	**Equipment and Methods**		**Ground Level**	+2.95 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647044.27
Operator	DB				N 263930.39



Strata Description	Depth, Level (Thickness)		Legend
Firm organic CLAY. (RECENT DEPOSITS)	10.75	-7.80	
Dense becoming very dense SAND. (CRAG DEPOSITS)	(2.25)		
	13.00	-10.05	
Medium dense to dense SAND with bands of silty sand. (CRAG DEPOSITS)	(1.30)		
	14.30	-11.35	
Very dense SAND. (CRAG DEPOSITS)	(1.05)		
	15.35	-12.40	
Base of CPT at 15.35 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_4.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:41:38 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

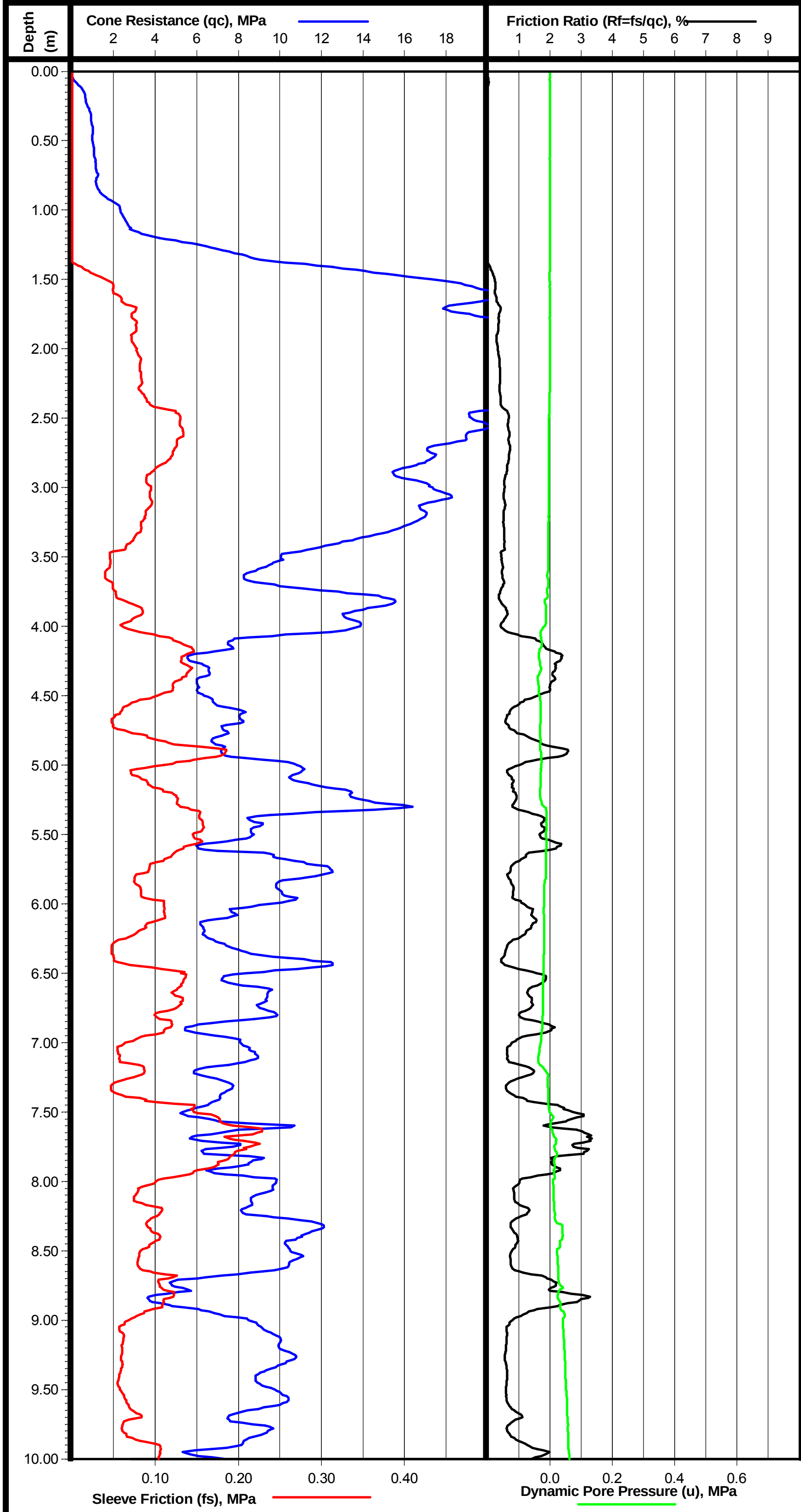
CPT 2009_4

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date 17/09/2010 **Cone No** C10CFIP.124_2010 **Operator** DB	**Equipment and Methods** Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Ground Level** +3.26 mOD **Co-ordinates National Grid** E 646922.85 N 264542.46	



Strata Description	Depth, Level (Thickness)	Legend
Loose becoming dense coarse SAND and GRAVEL. (MADE GROUND)	(1.39) 1.39 +1.87	
Dense to very dense gravelly SAND. (MADE GROUND)	(2.01) 3.40 -0.14	
Medium dense SAND with bands of silty sand. (Probable RECENT DEPOSITS)	(7.75)	

Stratum continues to 11.15 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_8.GEF

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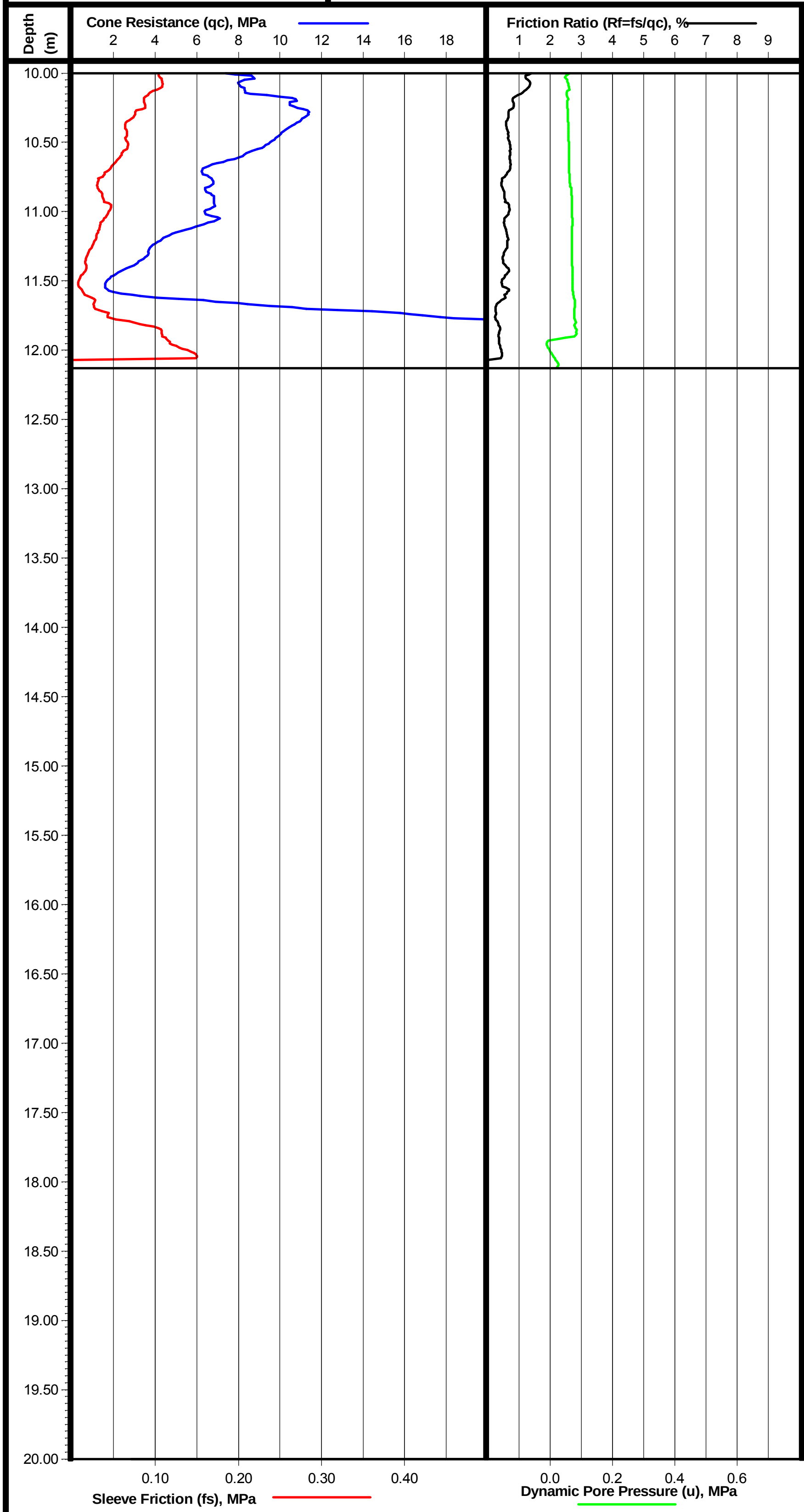
UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:41:44 AGS	**Project** ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE **Project No.** A0012-10 **Carried out for** NNB Generation Company Limited	**CPT No** **CPT 2009_8** Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	17/09/2010	**Equipment and Methods**		**Ground Level**	+3.26 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 646922.85
Operator	DB				N 264542.46



Strata Description	Depth	Level	(Thickness)	Legend
Medium dense SAND with bands of silty sand. (Probable RECENT DEPOSITS)	11.15	-7.89		
Very loose silty SAND. (Probable RECENT DEPOSITS)	11.85	-8.59	(0.70)	
Medium dense SAND. (Probable CRAG DEPOSITS)	12.13	-8.87	(0.28)	

Base of CPT at 12.13 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_8.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:41:51

AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

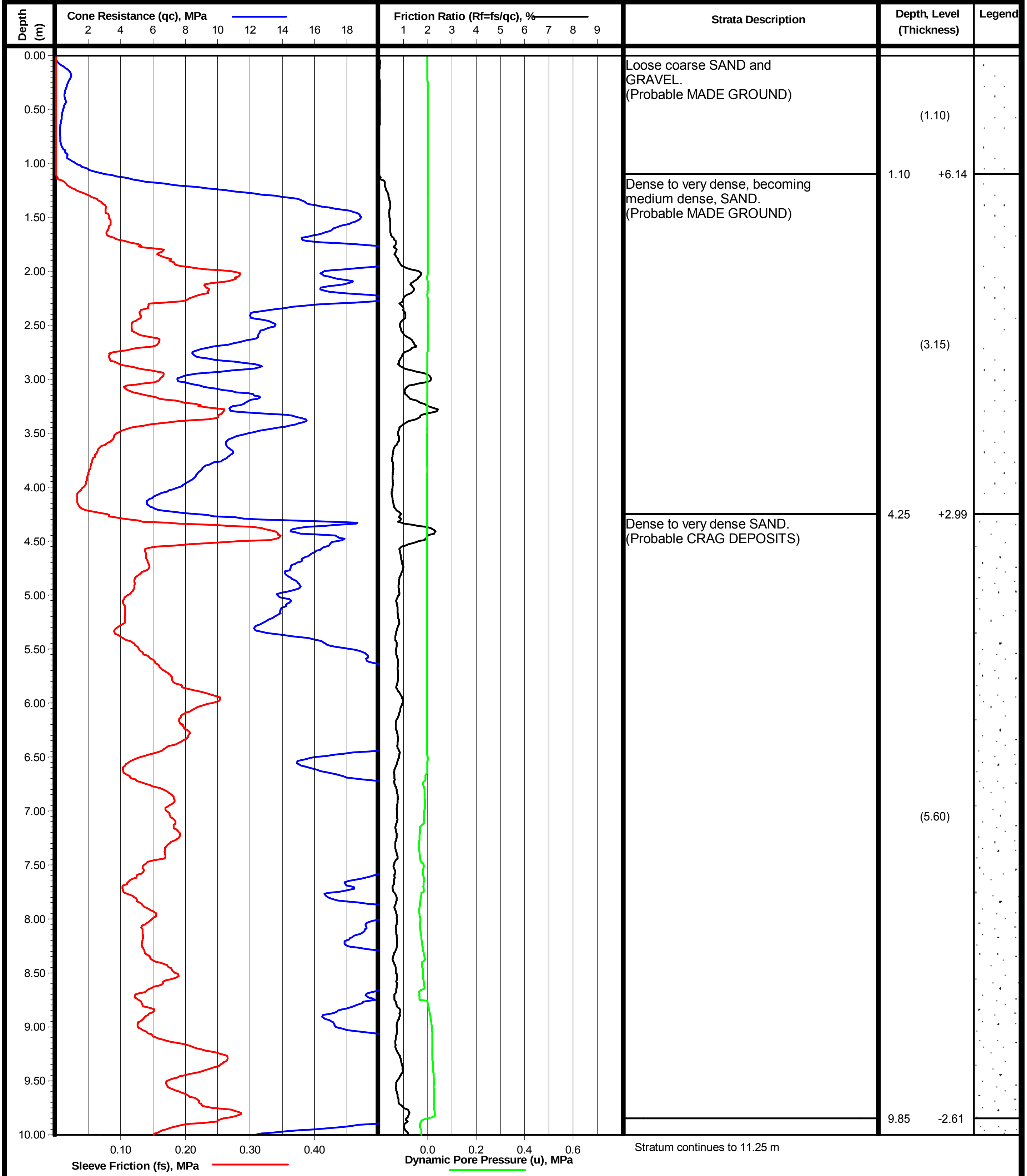
CPT 2009_8

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	06/09/2010	**Equipment and Methods**		**Ground Level**	+7.24 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 646803.40 N 264605.71
Operator	DB				



Stratum continues to 11.25 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_9.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

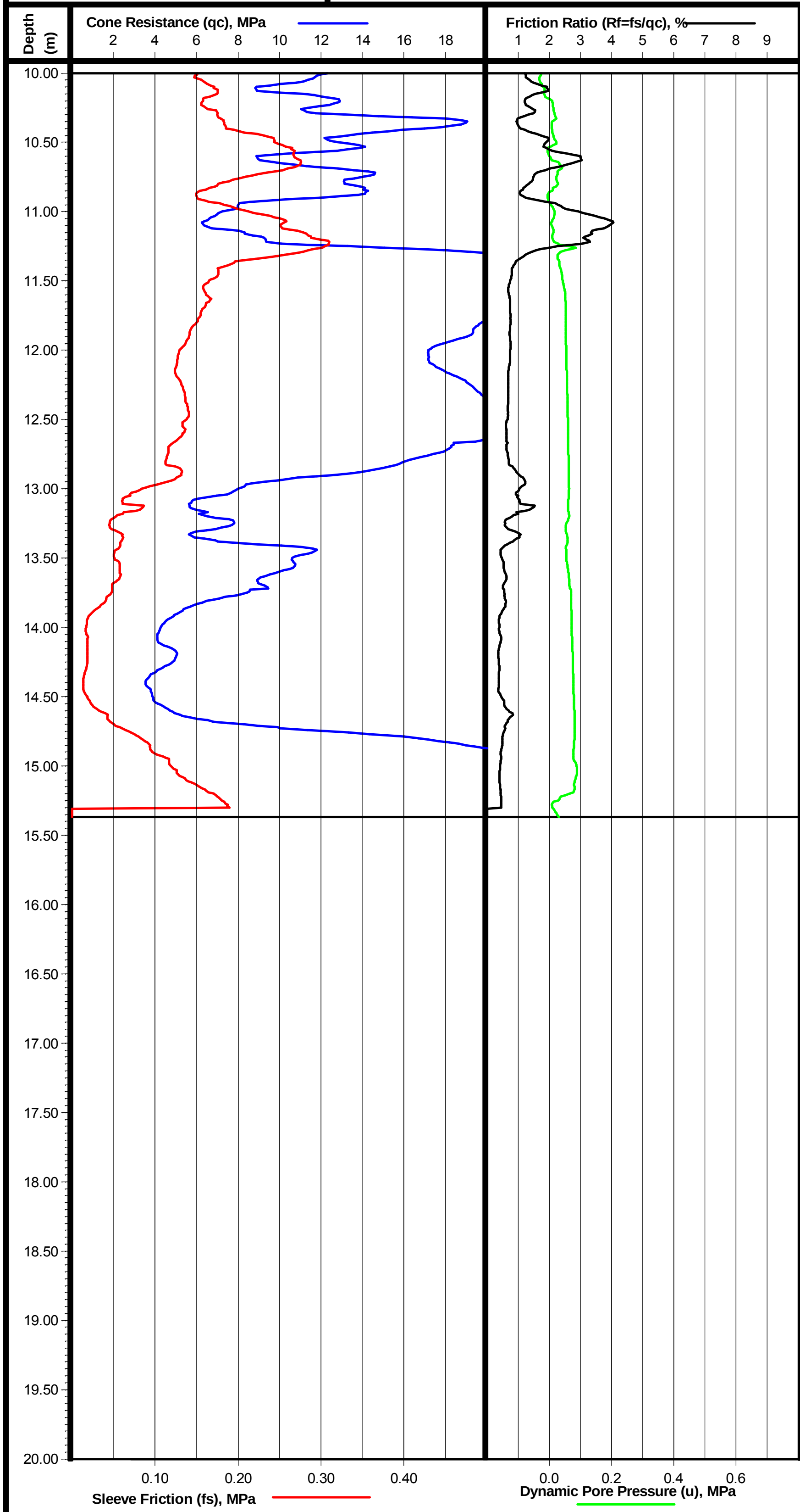
CPT No

CPT 2009_9

Soil Mechanics

Cone Penetration Test Log

Date	06/09/2010	**Equipment and Methods**	**Ground Level** +7.24 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 646803.40 N 264605.71
Operator	DB		



Strata Description	Depth	Level	(Thickness)
Medium dense to dense SAND and silty SAND. (Probable CRAG DEPOSITS)	11.25	-4.01	(1.40)
Dense to very dense SAND. (CRAG DEPOSITS)	12.90	-5.66	(1.65)
Medium dense SAND and silty SAND. (CRAG DEPOSITS)	13.80	-6.56	(0.90)
Loose to medium dense silty SAND. (Probable CRAG DEPOSITS)	14.70	-7.46	(0.90)
Dense becoming very dense SAND. (CRAG DEPOSITS)	15.37	-8.13	(0.67)

Base of CPT at 15.37 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_9.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:42:01

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_9

Sheet 2 of 2

Cone Penetration Test Log

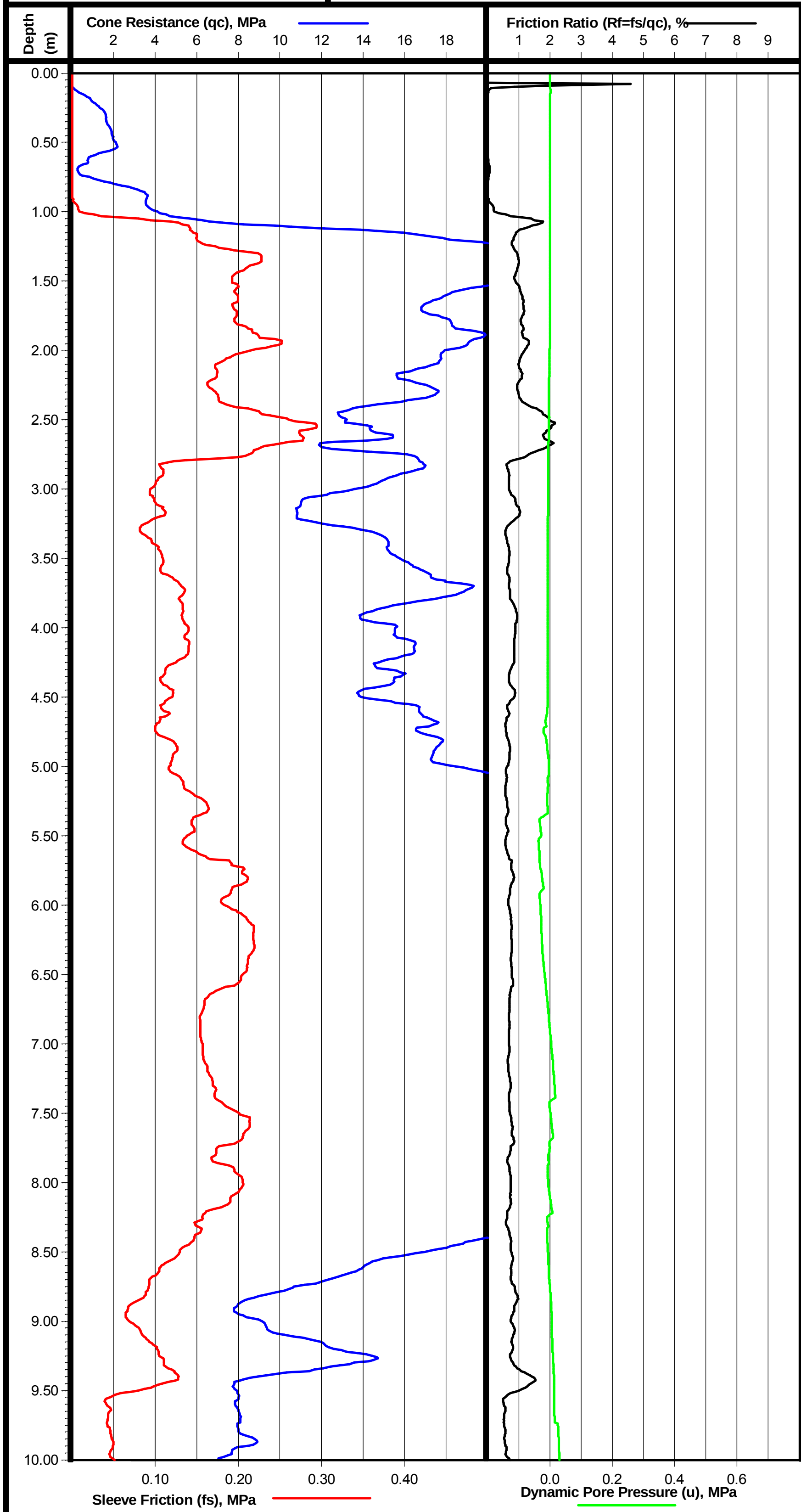
Soil Mechanics

Date	17/09/2010
Cone No	C10CFIP.124_2010
Operator	DB

Equipment and Methods

Test according to BS 1377 : Part 9 : Method 3.1 : 1990

Ground Level	+5.60 mOD
Co-ordinates National Grid	E 646678.84 N 264750.58



Strata Description	Depth	Level	(Thickness)	Legend
Very loose SAND. (Probable MADE GROUND)	0.90	+4.70	(0.90)	
Dense SAND. (Probable CRAG DEPOSITS)	5.10	+0.50	(4.20)	
Very dense SAND. (CRAG DEPOSITS)	8.45	-2.85	(3.35)	
Medium dense to dense SAND. (CRAG DEPOSITS) 9.45 m band of silty sand			(1.75)	

Stratum continues to 10.20 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_10.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

CPT No

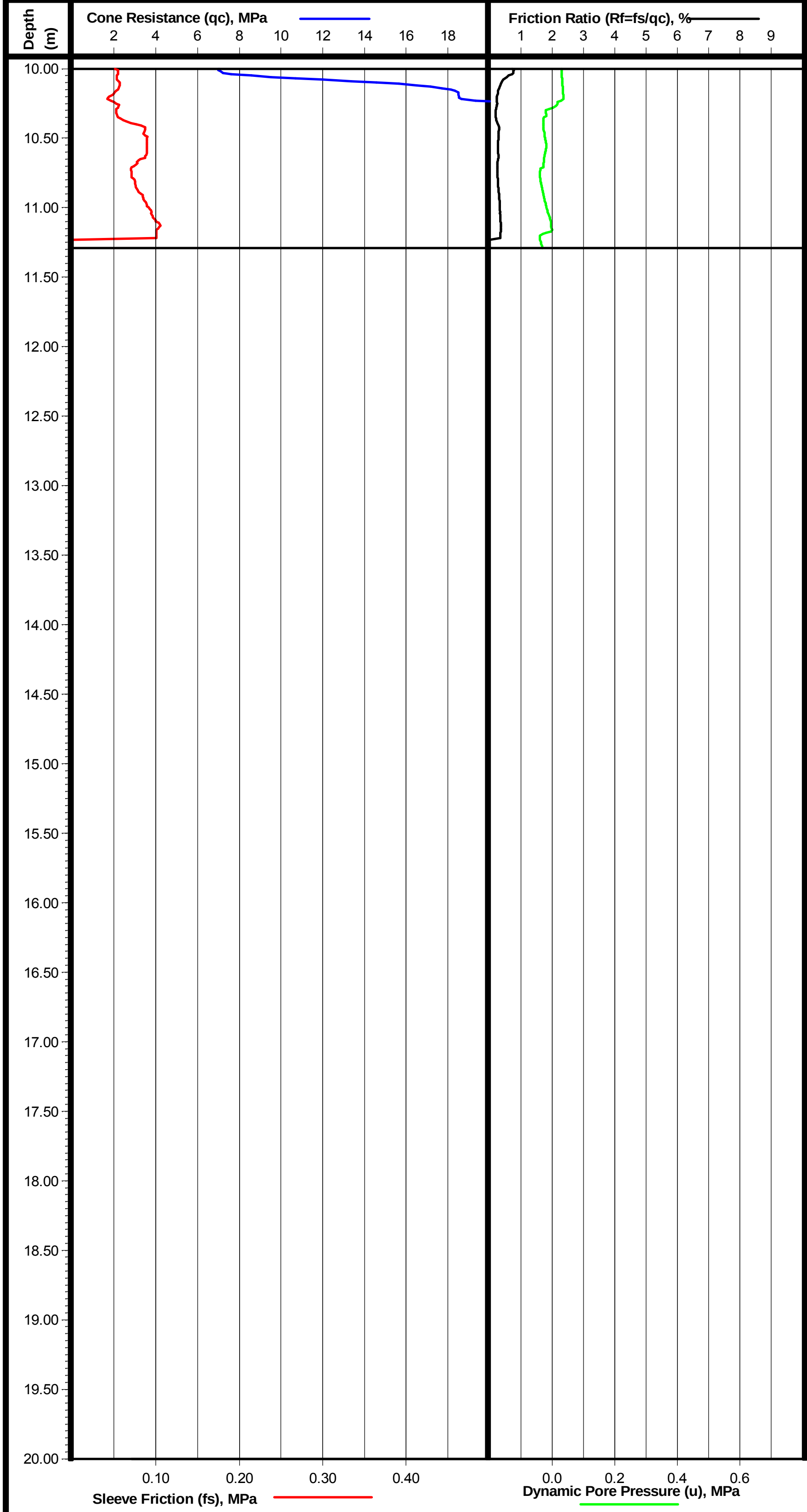
CPT 2009_10

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date 17/09/2010 **Cone No** C10CFIP.124_2010 **Operator** DB	**Equipment and Methods** Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Ground Level** **Co-ordinates** **National Grid**	+5.60 mOD E 646678.84 N 264750.58



Strata Description	Depth, Level (Thickness)		Legend
Medium dense to dense SAND. (CRAG DEPOSITS)	10.20	-4.60	
Very dense gravelly SAND. (CRAG DEPOSITS)	(1.09)		
	11.29	-5.69	
Base of CPT at 11.29 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_10.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:42:14 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

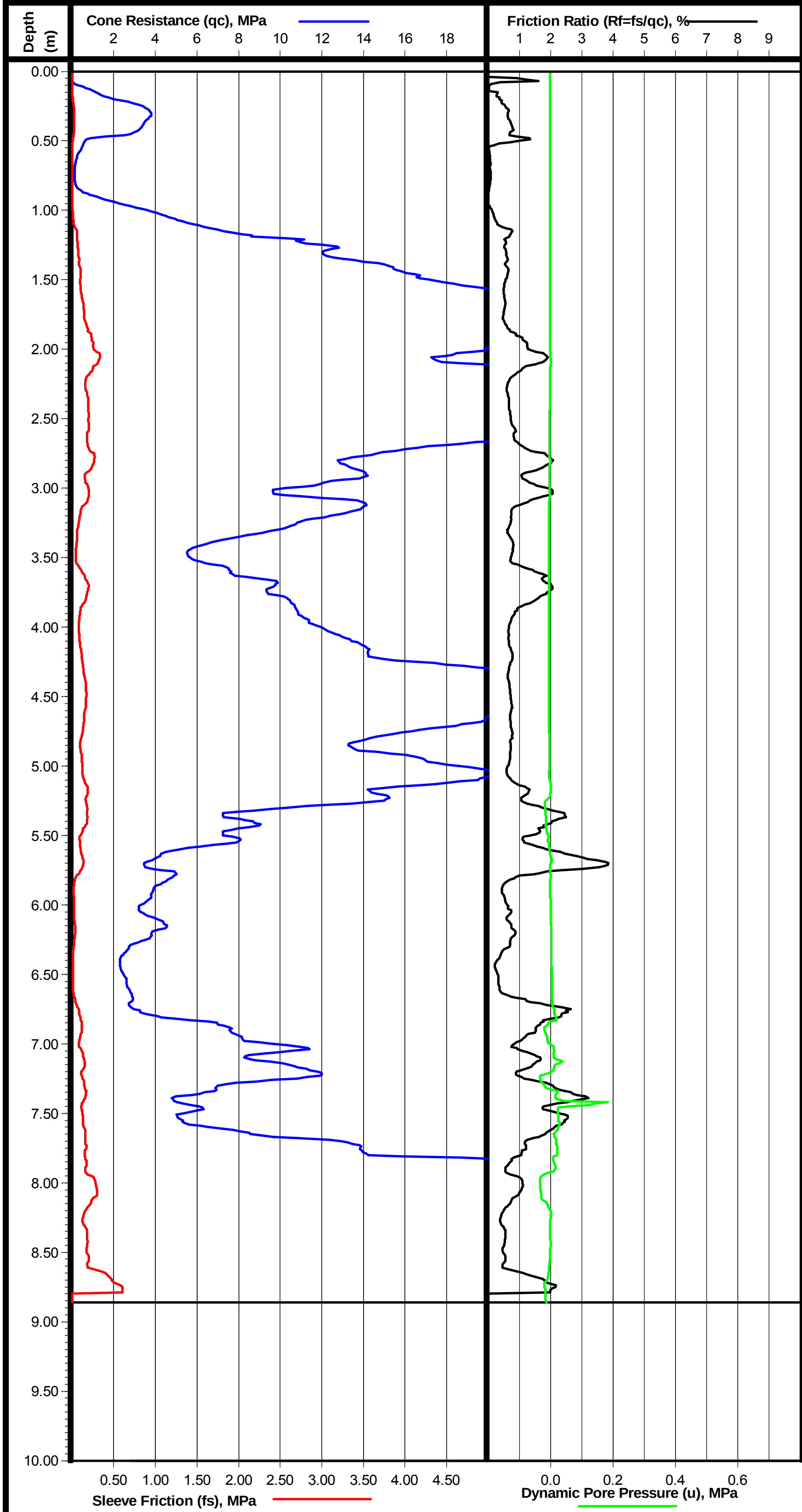
CPT 2009_10

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	06/09/2010	**Equipment and Methods**	**Ground Level**	+5.69 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647128.07 N 264528.96
Operator	DB			



Strata Description	Depth	Level	(Thickness)	Legend
Very loose, locally loose gravelly SAND. (Probable MADE GROUND)	1.00	+4.69	(1.00)	
Dense to very dense gravelly SAND. (Probable MADE GROUND)	2.65	+3.04	(1.65)	
Medium dense becoming dense, locally very dense, SAND with bands of silty sand. (Probable MADE GROUND)	5.20	+0.49	(2.55)	
Loose to medium dense SAND and silty sand. (Probable RECENT DEPOSITS)	7.60	-1.91	(2.40)	
Very dense gravelly SAND. (CRAG DEPOSITS)	8.86	-3.17	(1.26)	
Base of CPT at 8.86 mBGL				

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_11.GEF

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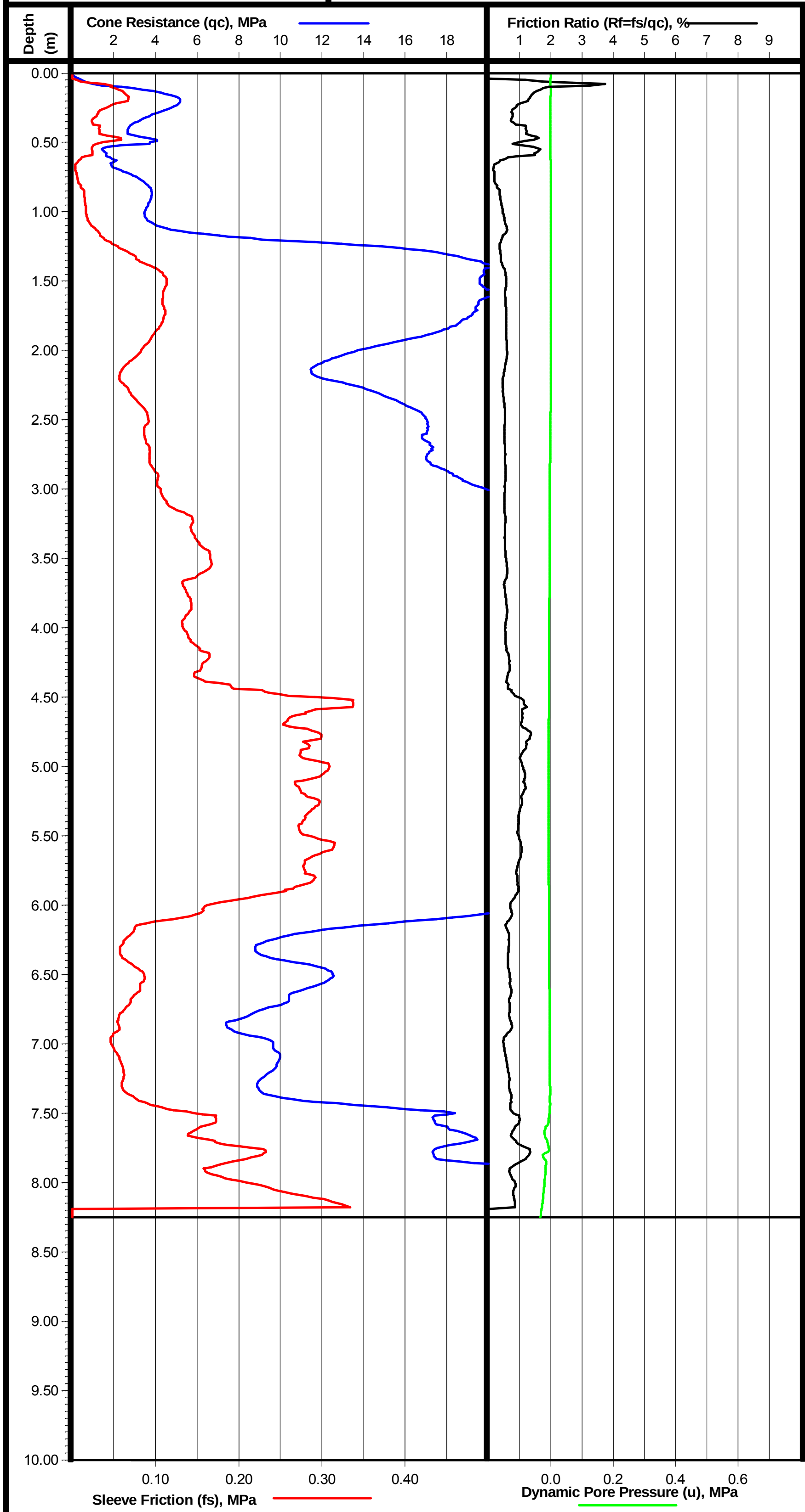
1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.	**Project**	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**	**CPT No**
	Project No.	**A0012-10**	**CPT 2009_11**
Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:42:16	**Carried out for**	**NNB Generation Company Limited**	Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	20/09/2010	**Equipment and Methods**	**Ground Level** +8.49 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 646952.17 N 264782.42
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Loose, locally medium dense SAND. (Probable MADE GROUND)	(1.20)		
	1.20	+7.29	
Dense gravelly SAND. (Probable MADE GROUND)	(1.80)		
	3.00	+5.49	
Very dense gravelly SAND. (Probable MADE GROUND)	(1.50)		
	4.50	+3.99	
Very dense SAND. (Probable MADE GROUND)	(1.70)		
	6.20	+2.29	
Medium dense SAND. (Probable RECENT DEPOSITS)	(1.15)		
	7.35	+1.14	
Dense becoming very dense, SAND. (CRAG DEPOSITS)	(0.90)		
	8.25	+0.24	
Base of CPT at 8.25 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_12.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:42:23 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

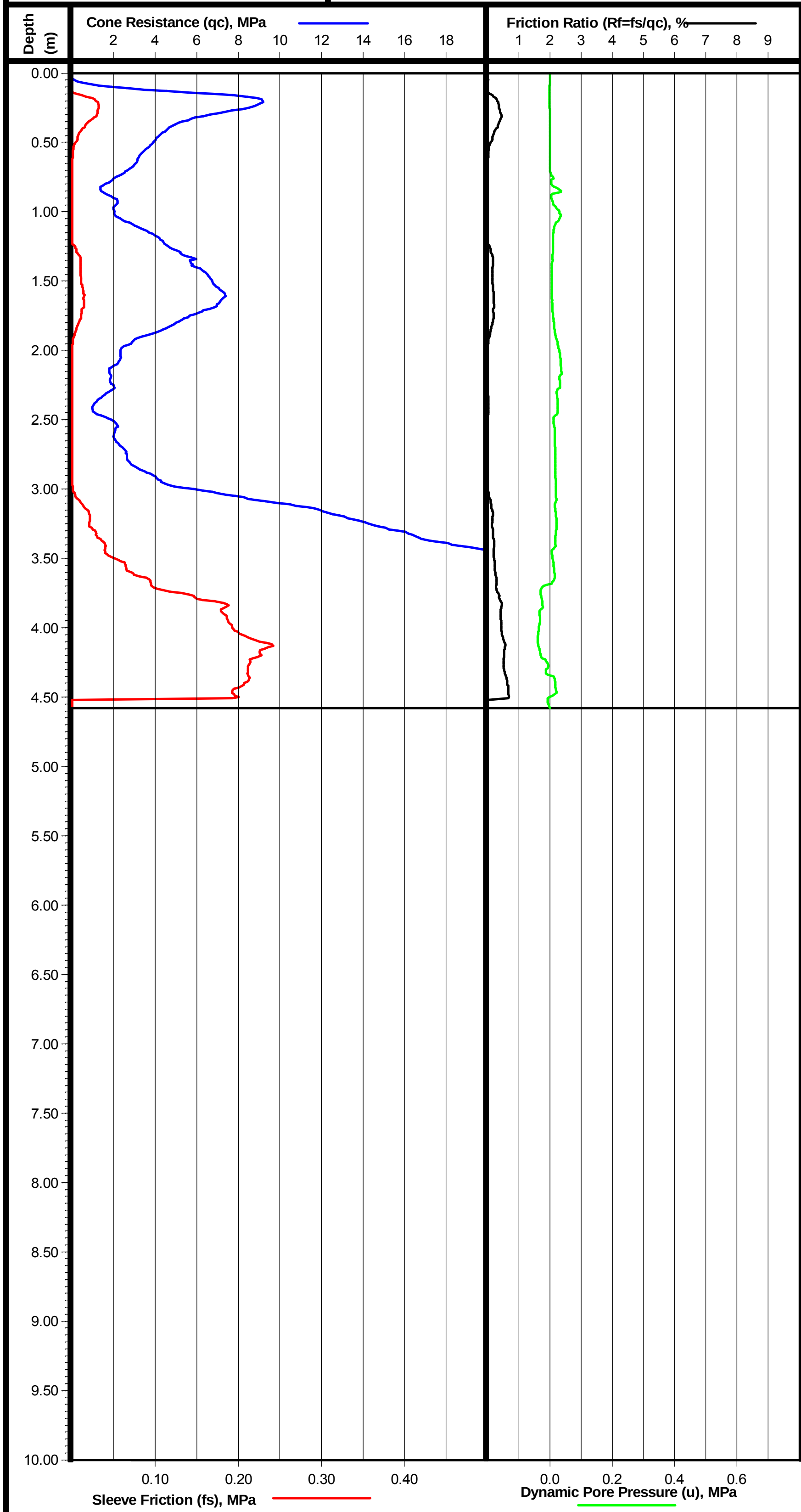
CPT 2009_12

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	17/09/2010	Equipment and Methods	Ground Level	+1.95 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	Co-ordinates National Grid	E 646435.98
Operator	DB			N 264585.34



Strata Description	Depth, Level (Thickness)		Legend
Loose, locally medium dense coarse SAND and GRAVEL. (Probable MADE GROUND)	(3.15)		
Dense coarse SAND and GRAVEL. (Probable CRAG DEPOSITS)	3.15 (0.35)	-1.20	
Very dense gravelly SAND. (CRAG DEPOSITS)	3.50 (1.08)	-1.55	
Base of CPT at 4.58 mBGL	4.58	-2.63	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_13.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:49:22

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

CPT No

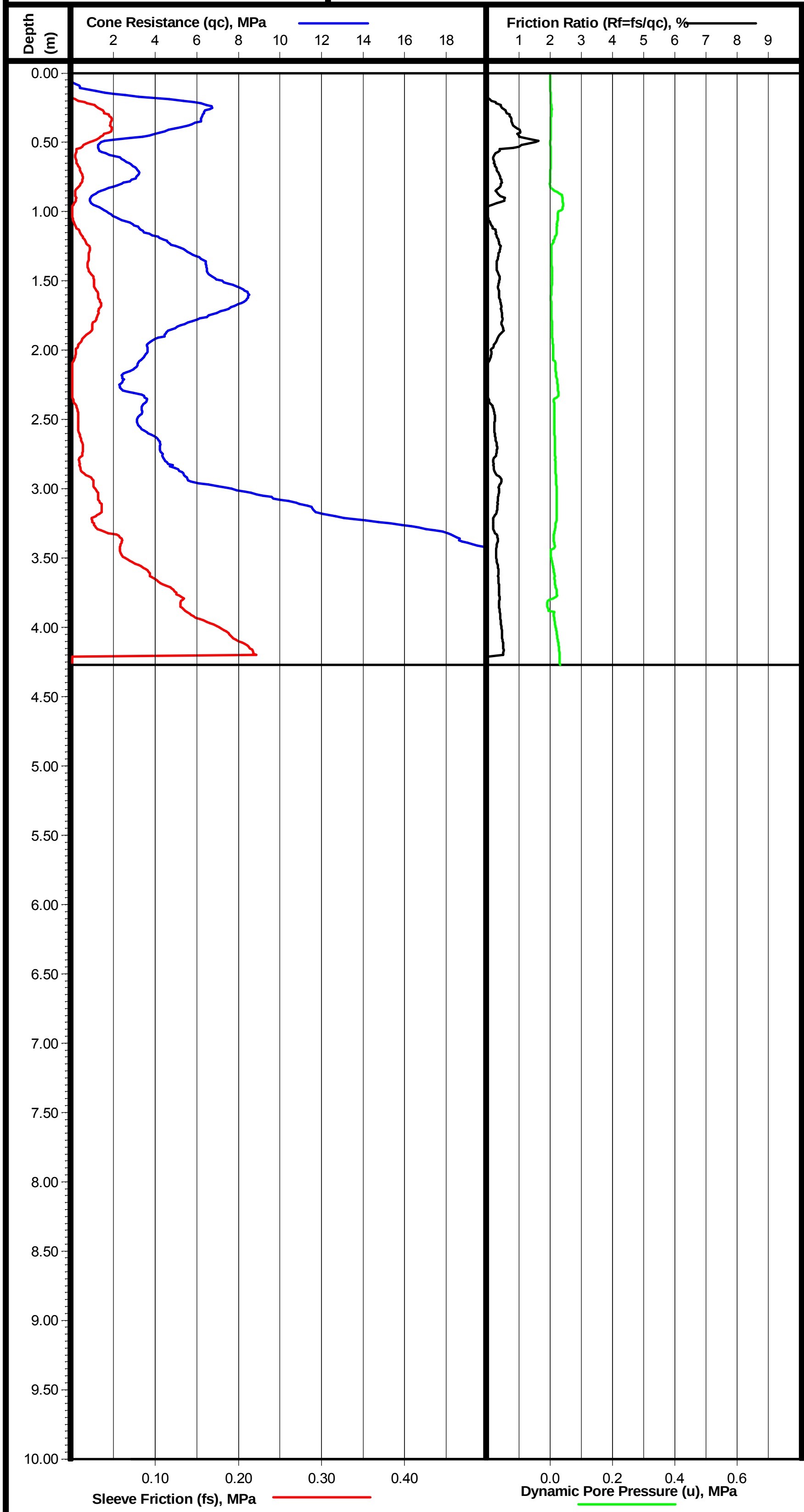
CPT 2009_13

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	17/09/2010	**Equipment and Methods**		**Ground Level**	+1.88 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 646434.41
Operator	DB				N 264586.10



Strata Description	Depth	Level	(Thickness)	Legend
Loose, locally medium dense, gravelly SAND. (Probable MADE GROUND)	3.20	-1.32	(3.20)	
Very dense gravelly SAND. (CRAG DEPOSITS)	4.27	-2.39	(1.07)	
Base of CPT at 4.27 mBGL				

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_13a.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:49:27 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_13A

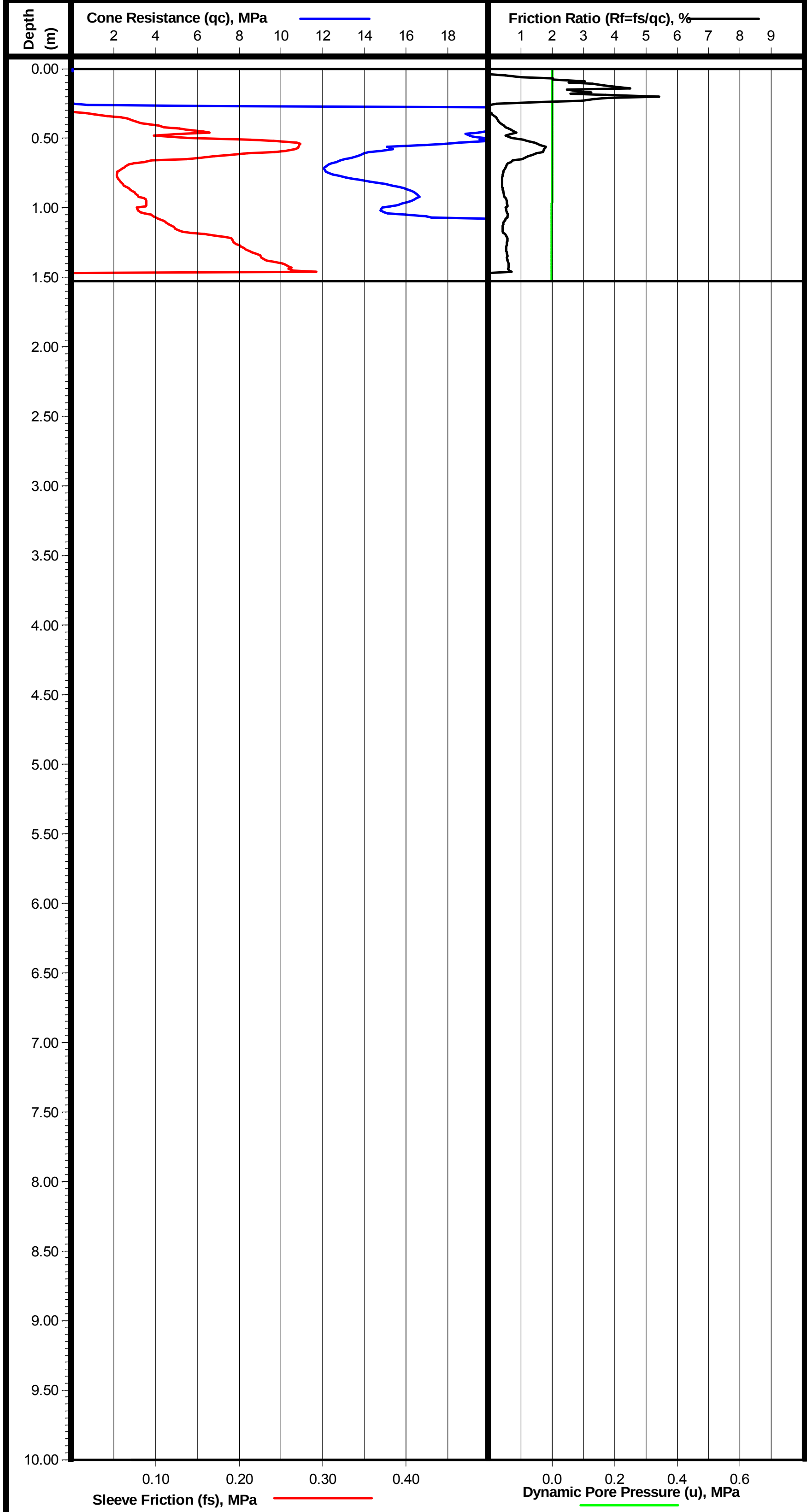
Sheet 1 of 1

Cone Penetration Test Log

Date	25/08/2010	**Ground Level**	+1.88 mOD
Cone No	C10CFIP.124_2010	**Co-ordinates National Grid**	E 646433.51 N 264585.11
Operator	DB		

Equipment and Methods

Test according to BS 1377 : Part 9 : Method 3.1 : 1990



Strata Description	Depth	Level	(Thickness)
Organic CLAY. (Probable MADE GROUND)	0.20	+1.68	
Medium dense to very dense gravelly SAND. (Probable MADE GROUND)	1.53	+0.35	(1.33)

Base of CPT at 1.53 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_14.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:49:31

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

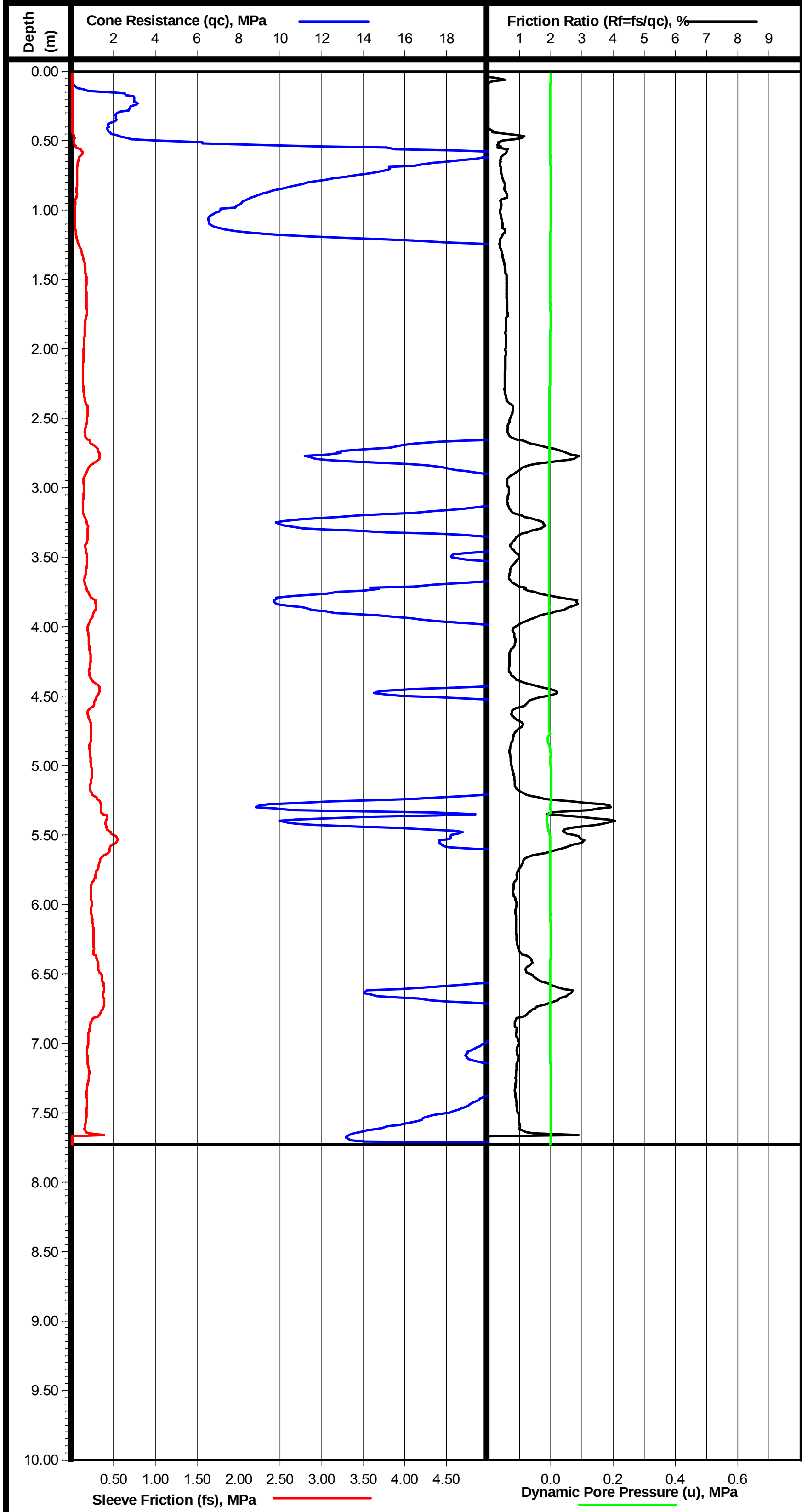
CPT 2009_14

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	25/08/2010	**Equipment and Methods**	**Ground Level** +11.04 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 646010.52 N 264337.76
Operator	DB		



Strata Description	Depth	Level	(Thickness)	Legend
CLAY. (Probable MADE GROUND)			(0.50)	
Medium dense to dense gravelly SAND. (Probable MADE GROUND)	0.50	+10.54	(0.75)	
Very dense gravelly SAND. (Probable CRAG DEPOSITS)	1.25	+9.79	(1.40)	
Dense to very dense SAND varying to silty and gravelly SAND. (CRAG DEPOSITS)	2.65	+8.39	(5.08)	
Base of CPT at 7.73 mBGL	7.73	+3.31		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_14a.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:49:33

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

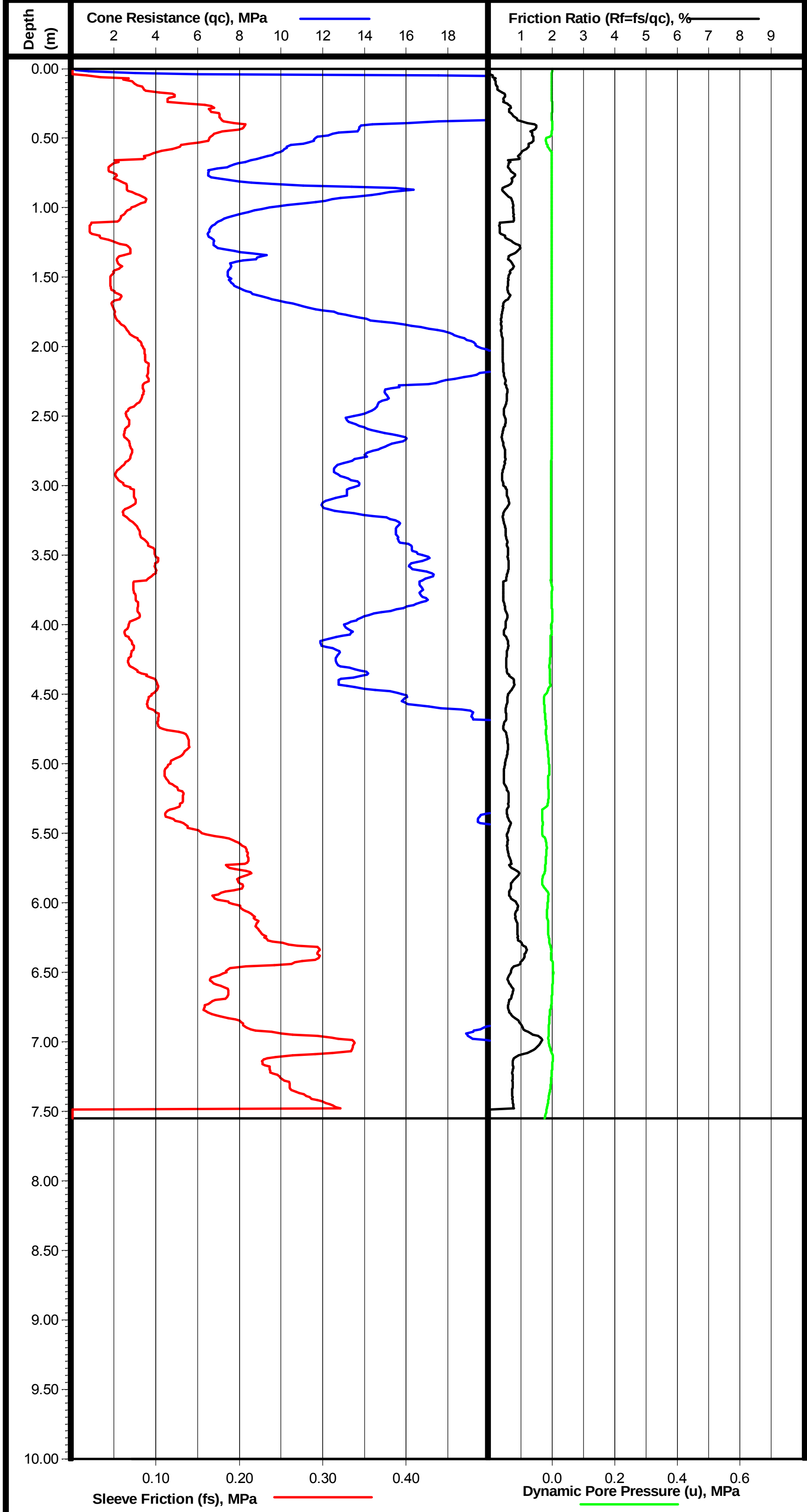
CPT No

CPT 2009_14A

Sheet 1 of 1

Cone Penetration Test Log

Date	25/08/2010	**Equipment and Methods**		**Ground Level**	+6.70 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 645590.91 N 264084.80
Operator	DB				



Strata Description	Depth	Level	(Thickness)
Very dense gravelly SAND. (Probable MADE GROUND)	0.40	+6.30	(0.40)
Medium dense SAND, locally gravelly. (Probable MADE GROUND)	1.75	+4.95	(1.35)
Dense gravelly SAND. (Probable CRAG DEPOSITS)	3.90	+2.80	(2.15)
Dense SAND. (CRAG DEPOSITS)	4.60	+2.10	(0.70)
Very dense gravelly SAND. (CRAG DEPOSITS)	5.75	+0.95	(1.15)
Very dense SAND. (CRAG DEPOSITS)	7.55	-0.85	(1.80)

Base of CPT at 7.55 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_15.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

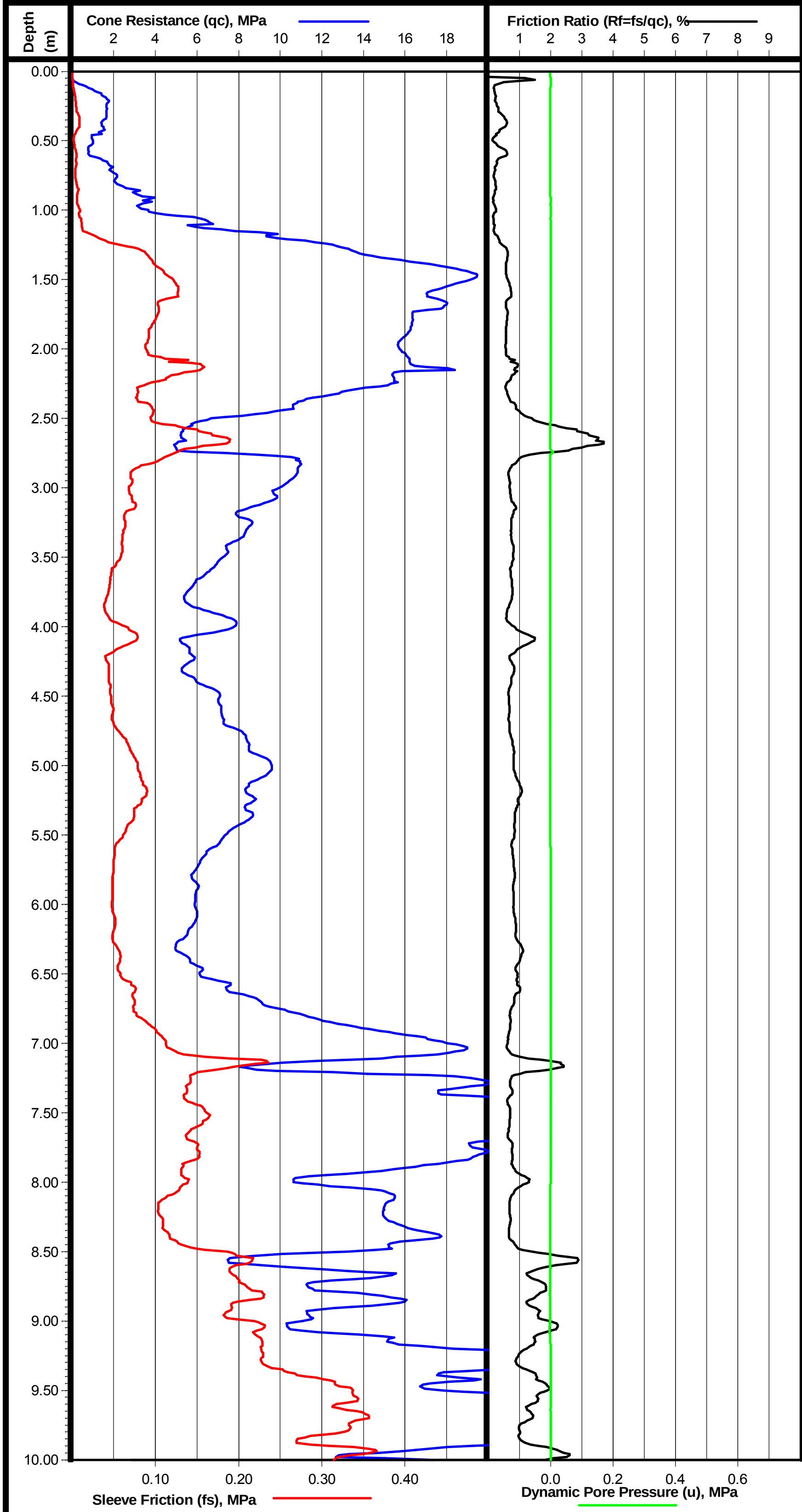
CPT 2009_15

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	22/09/2010	**Equipment and Methods**	**Ground Level** +12.56 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 645309.29 N 263829.96
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Loose SAND. (Probable MADE GROUND)	(1.10)		
	1.10	+11.46	
Dense gravelly SAND. (Probable CRAG DEPOSITS)	(1.40)		
	2.50	+10.06	
Medium dense SAND. (Probable CRAG DEPOSITS) 2.70 m band of silty sand	(4.30)		
	6.80	+5.76	
Dense SAND with bands of silty sand. (Probable CRAG DEPOSITS)	(2.40)		
	9.20	+3.36	
Very dense, locally dense SAND. (CRAG DEPOSITS)			

Stratum continues to 15.92 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_16.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:49:45 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

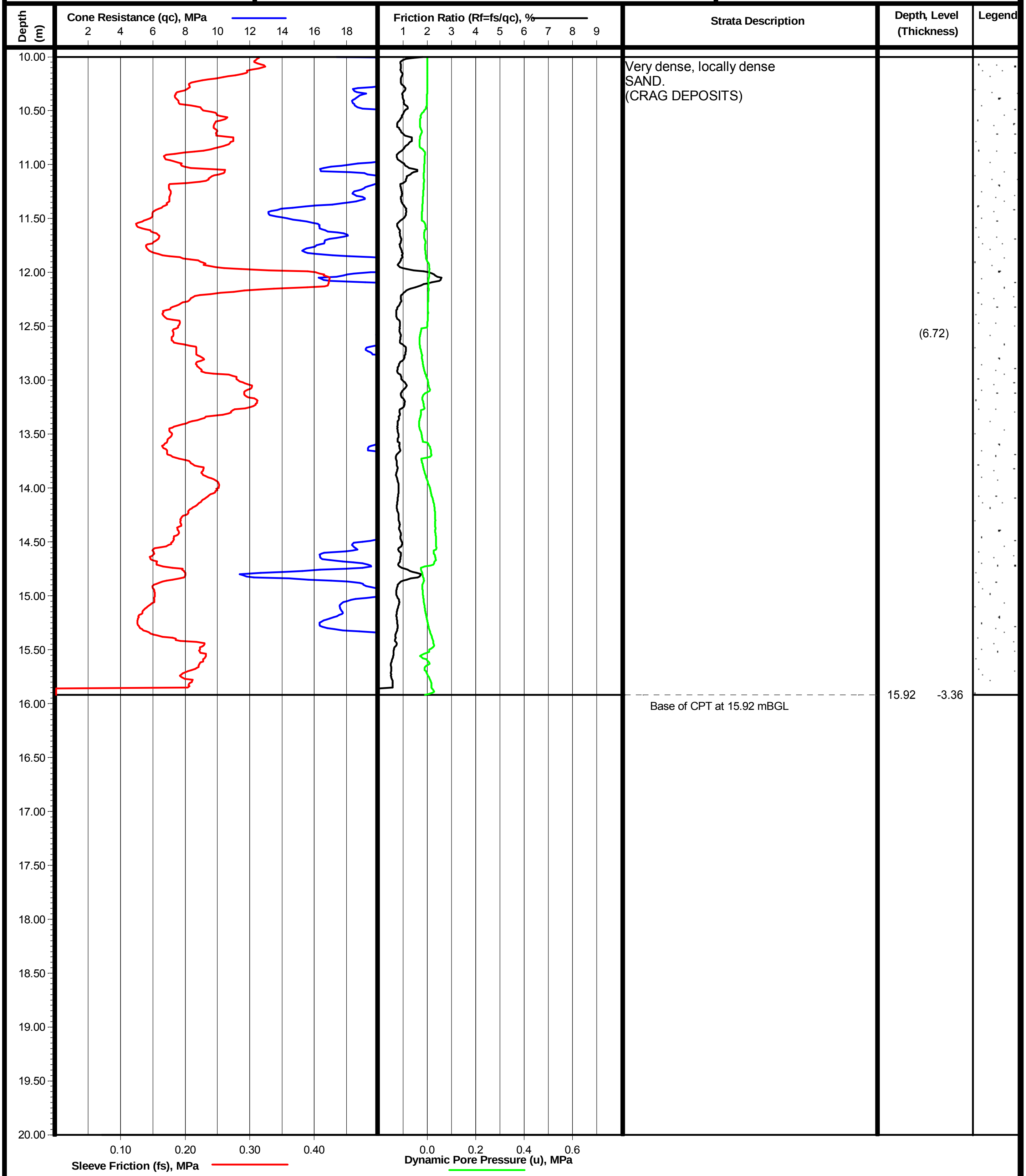
CPT 2009_16

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date 22/09/2010	**Equipment and Methods**	**Ground Level**	+12.56 mOD
Cone No C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 645309.29 N 263829.96
Operator DB			



Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_16.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

CPT No

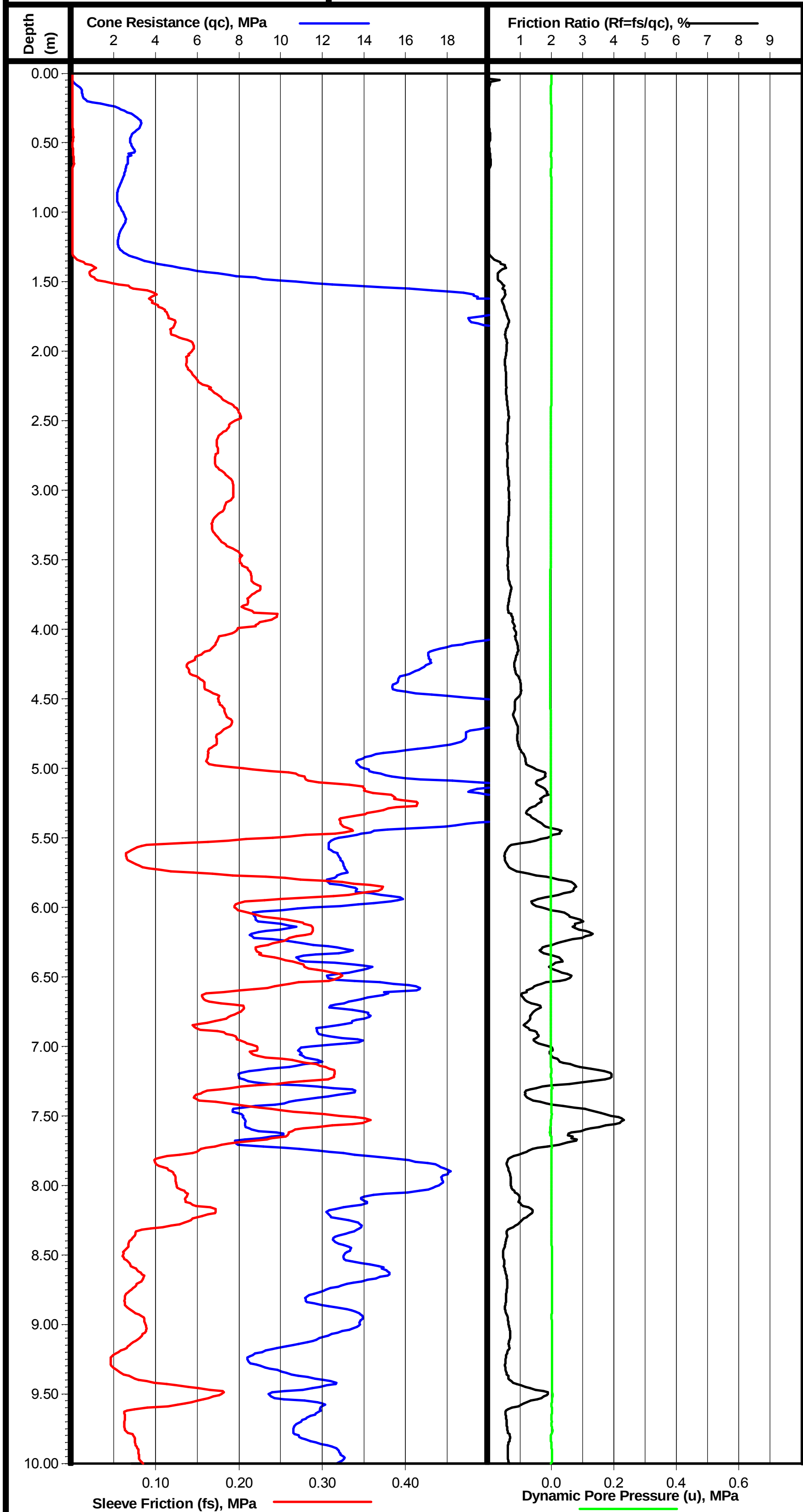
CPT 2009_16

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	21/09/2010	**Equipment and Methods**	**Ground Level**	+10.52 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647041.11
Operator	DB			N 264623.27



Strata Description	Depth, Level (Thickness)		Legend
Loose coarse SAND and GRAVEL. (Probable MADE GROUND)	(1.50)		
Very dense gravelly SAND. (Probable CRAG DEPOSITS)	1.50	+9.02	
	(2.50)		
Dense SAND. (Probable CRAG DEPOSITS)	4.00	+6.52	
	(2.05)		
Medium dense to dense SAND with bands of silty SAND. (CRAG DEPOSITS)	6.05	+4.47	
	(1.65)		
Dense becoming medium dense SAND. (CRAG DEPOSITS)	7.70	+2.82	
	(2.50)		

Stratum continues to 10.20 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_17.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:49:58 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

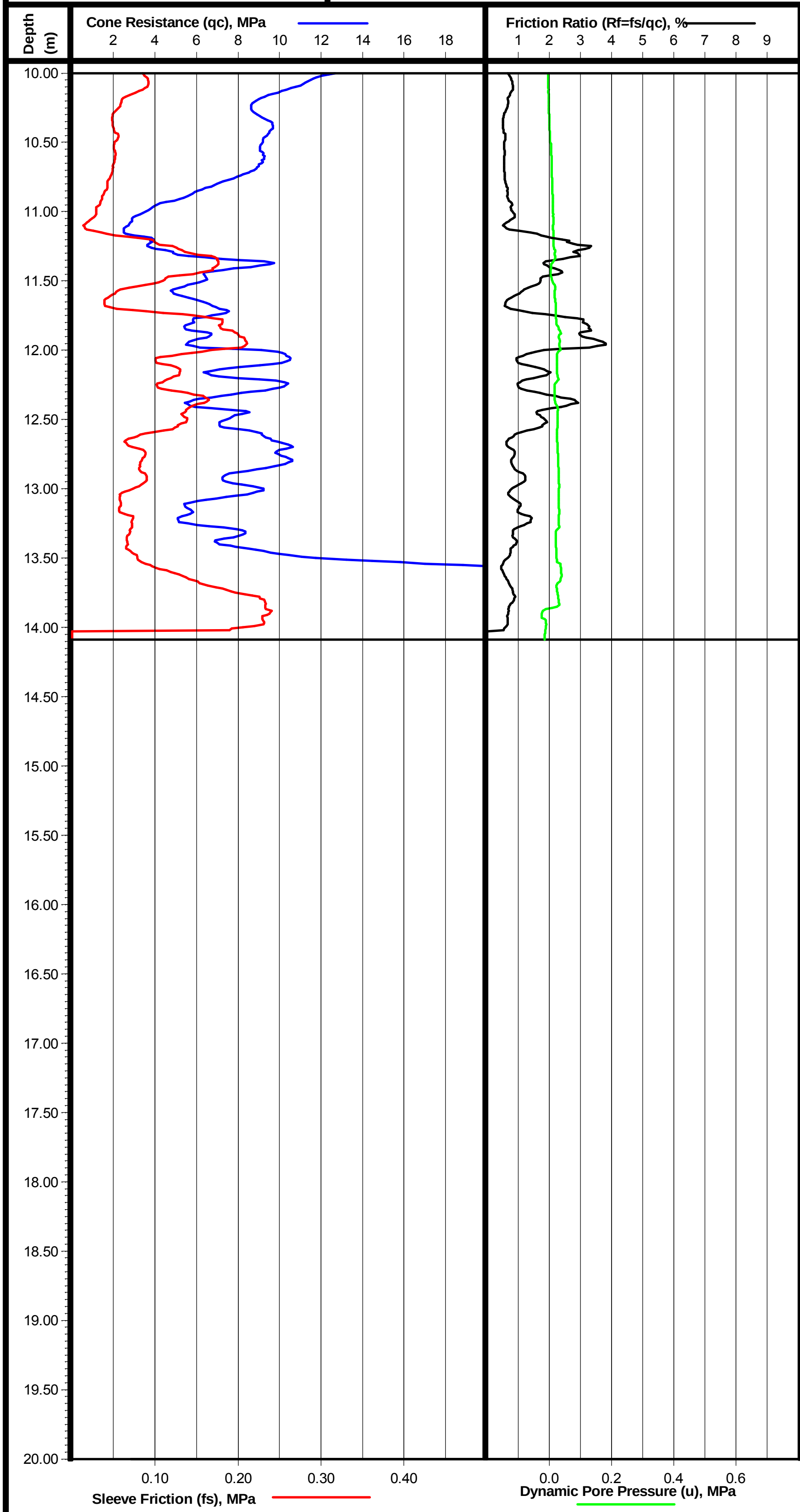
CPT 2009_17

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date 21/09/2010	**Equipment and Methods**	**Ground Level**	+10.52 mOD
Cone No C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647041.11
Operator DB			N 264623.27



Strata Description	Depth, Level (Thickness)	Legend
Dense becoming medium dense SAND. (CRAG DEPOSITS)	10.20 +0.32	
Medium dense SAND and silty sand. (CRAG DEPOSITS) 11.00-11.25 m band of silty sand/silty clay	(3.20)	
	13.40 -2.89	
Very dense SAND. (CRAG DEPOSITS)	(0.60)	
	14.00 -3.49	
Base of CPT at 14.09 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_17.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:50:05 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

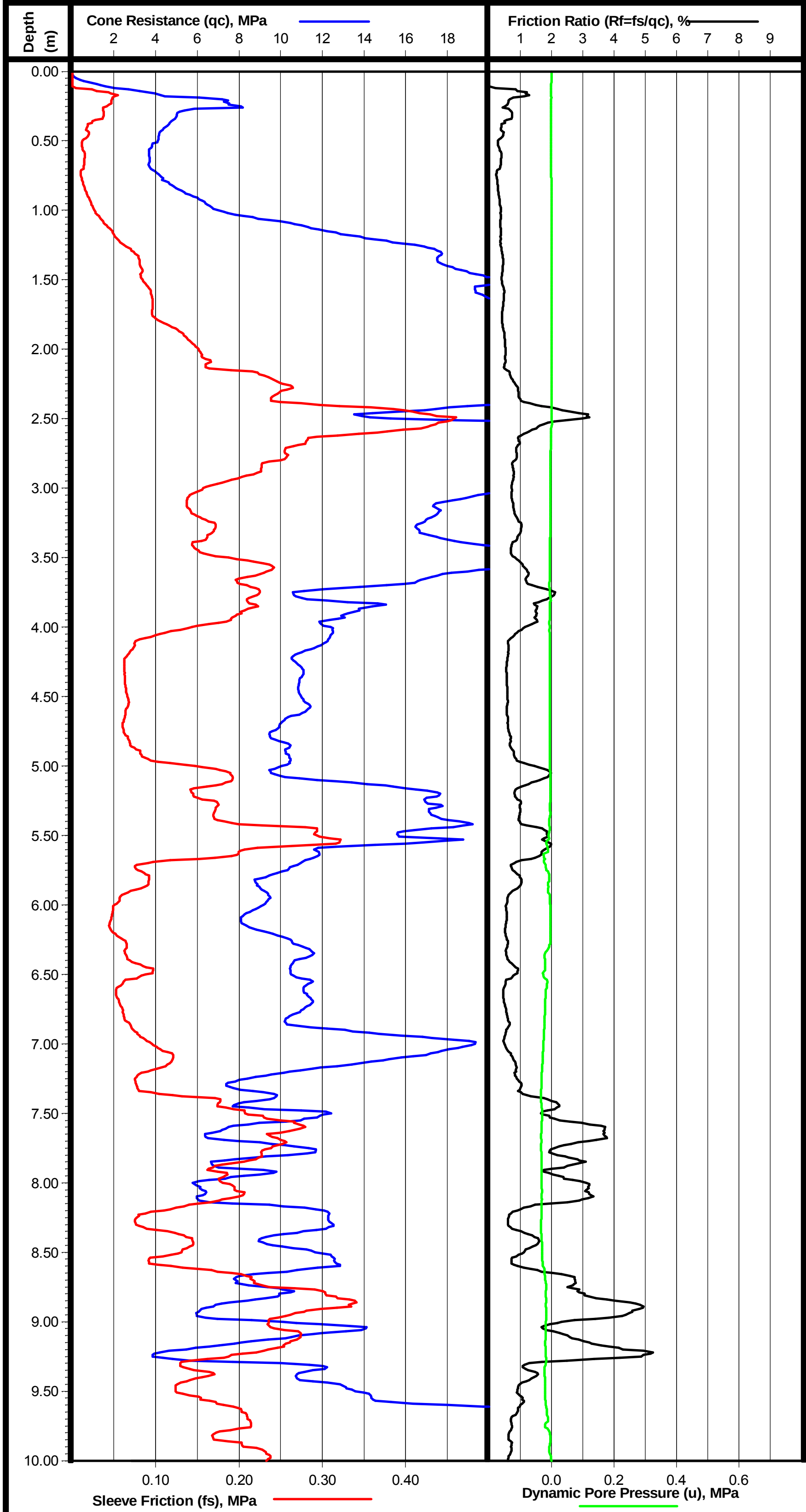
CPT No

CPT 2009_17

Cone Penetration Test Log

Soil Mechanics

Date	20/09/2010	**Equipment and Methods**	**Ground Level**	+6.47 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647100.84 N 264734.06
Operator	DB			



Strata Description	Depth	Level	(Thickness)	Legend
Medium dense gravelly SAND. (Probable MADE GROUND)	1.10	+5.37	(1.10)	
Very dense, locally dense, SAND varying to gravelly sand. (Probable RECENT DEPOSITS)	3.60	+2.87	(2.50)	
Medium dense, locally dense, SAND. (Probable RECENT DEPOSITS)	7.35	-0.89	(3.75)	
Medium dense SAND and silty sand. (CRAG DEPOSITS)	9.60	-3.14	(2.25)	
Very dense SAND.				

Stratum continues to 11.00 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_18.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:50:10 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

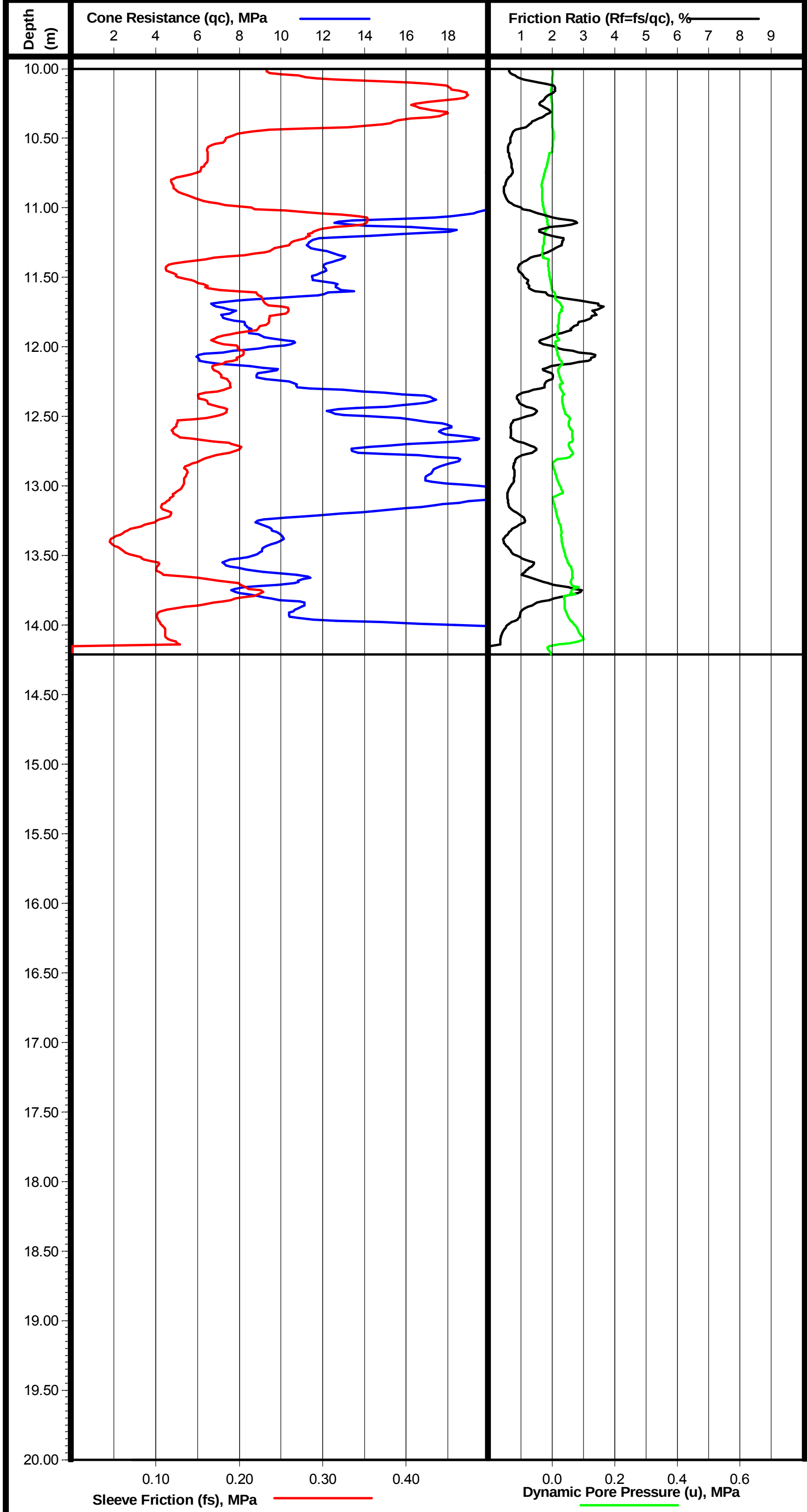
CPT 2009_18

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	20/09/2010	**Equipment and Methods**	**Ground Level** +6.47 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647100.84 N 264734.06
Operator	DB		



Strata Description	Depth, Level (Thickness)	Legend
(CRAG DEPOSITS)	(1.40)	
Dense becoming medium dense, silty SAND. (CRAG DEPOSITS)	11.00 -4.54 (1.30)	
Dense SAND. (CRAG DEPOSITS)	12.30 -5.84 (0.90)	
Medium dense silty SAND. (CRAG DEPOSITS)	13.20 -6.74 (0.90)	
Obstruction.	14.10 -7.64	
Base of CPT at 14.21 mBGL	14.21 -7.75	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_18.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:50:18 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

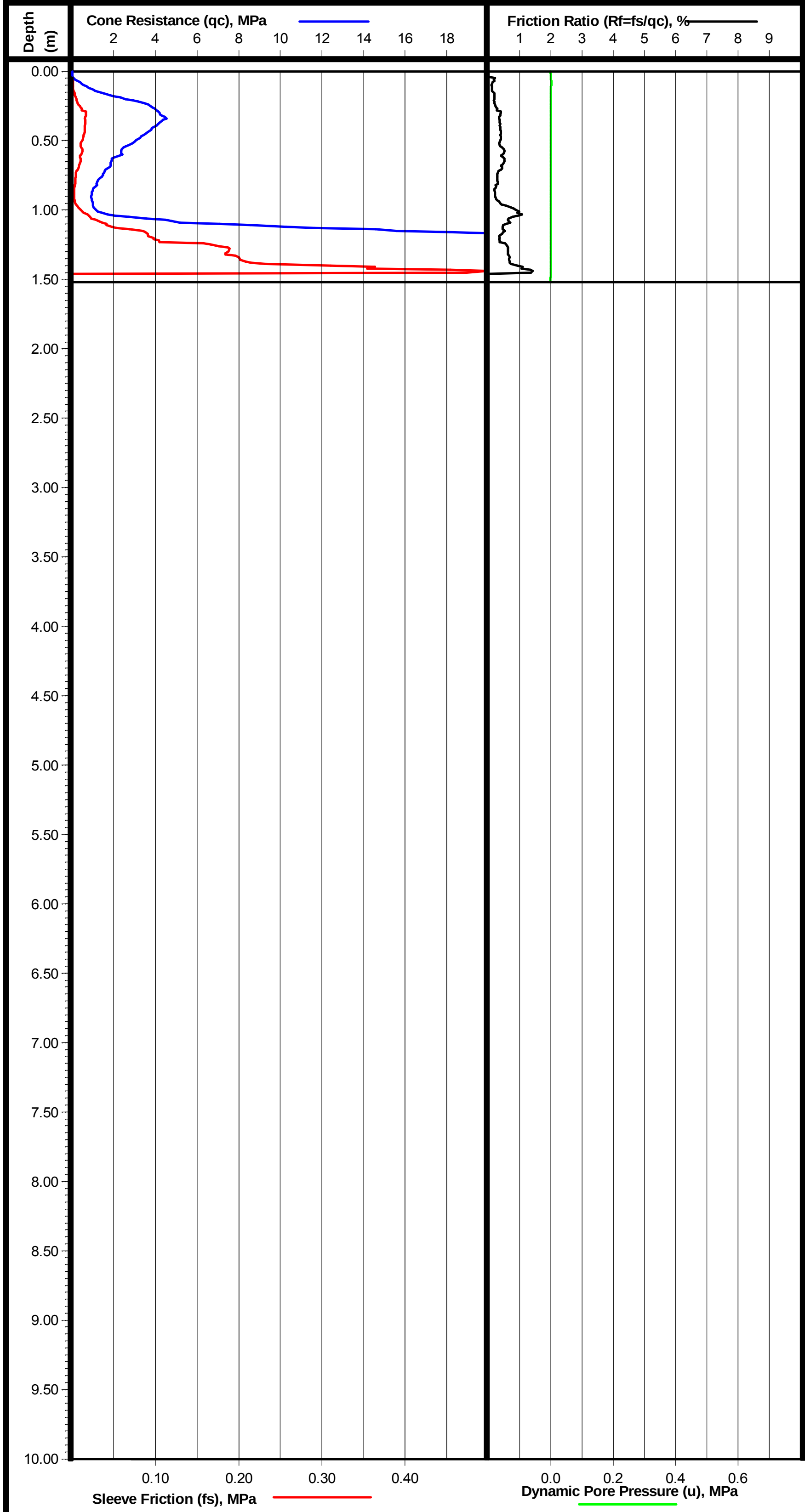
CPT 2009_18

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	18/10/2010	**Equipment and Methods**	**Ground Level** +7.44 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647359.22 N 264330.76
Operator	DB		



Strata Description	Depth	Level	(Thickness)	Legend
Loose gravelly SAND. (Probable MADE GROUND)	1.00	+6.44	(1.00)	
Very dense SAND. (Probable MADE GROUND)	1.52	+5.92	(0.52)	
Base of CPT at 1.52 mBGL				

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_19.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

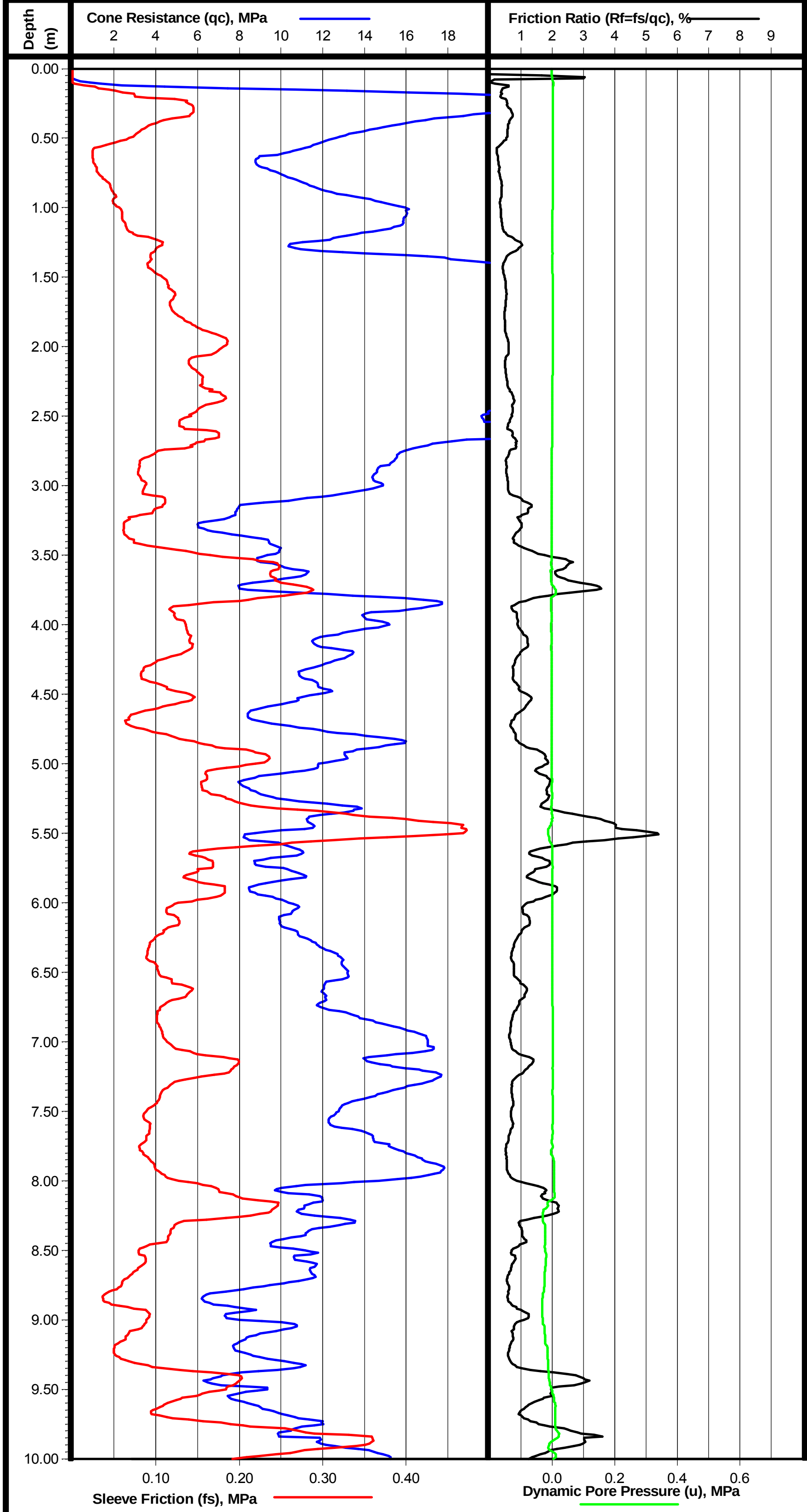
CPT 2009_19

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	25/08/2010	**Equipment and Methods**	**Ground Level** +8.62 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647125.48 N 264625.88
Operator	DB		



Strata Description	Depth, Level (Thickness)	Legend
Dense, locally very dense gravelly SAND. (Probable MADE GROUND)	(1.35) 1.35 +7.27	
Very dense gravelly SAND. (Probable MADE GROUND)	(1.70) 3.05 +5.57	
Medium dense SAND. (Probable RECENT DEPOSITS)	(0.75) 3.80 +4.82	
Medium dense, locally dense, SAND. (Probable RECENT DEPOSITS) 5.50 m band of silty sand	(2.60) 6.40 +2.22	
Dense SAND. (Probable CRAG DEPOSITS)	(1.75) 8.15 +0.47	
Medium dense, locally dense, SAND with bands of silty sand. (CRAG DEPOSITS)	(3.65)	

Stratum continues to 11.80 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_20.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:50:24 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

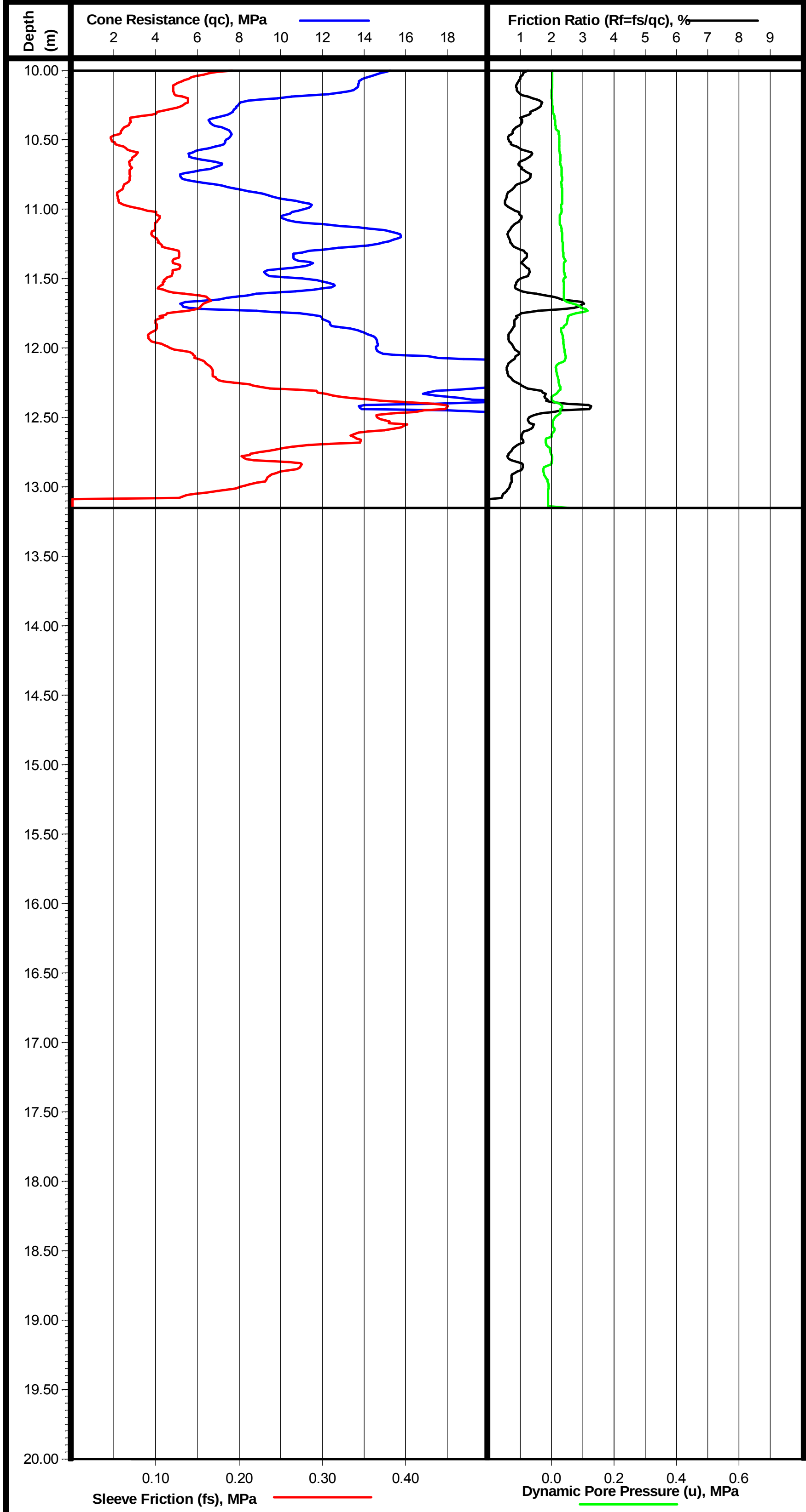
CPT 2009_20

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	25/08/2010	**Equipment and Methods**		**Ground Level**	+8.62 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647125.48
Operator	DB				N 264625.88



Strata Description	Depth, Level (Thickness)		Legend
Medium dense, locally dense, SAND with bands of silty sand. (CRAG DEPOSITS)	11.80	-3.18	
Very dense, locally dense, SAND. (CRAG DEPOSITS)	(1.35)		
	13.15	-4.53	

Base of CPT at 13.15 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_20.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:50:32 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

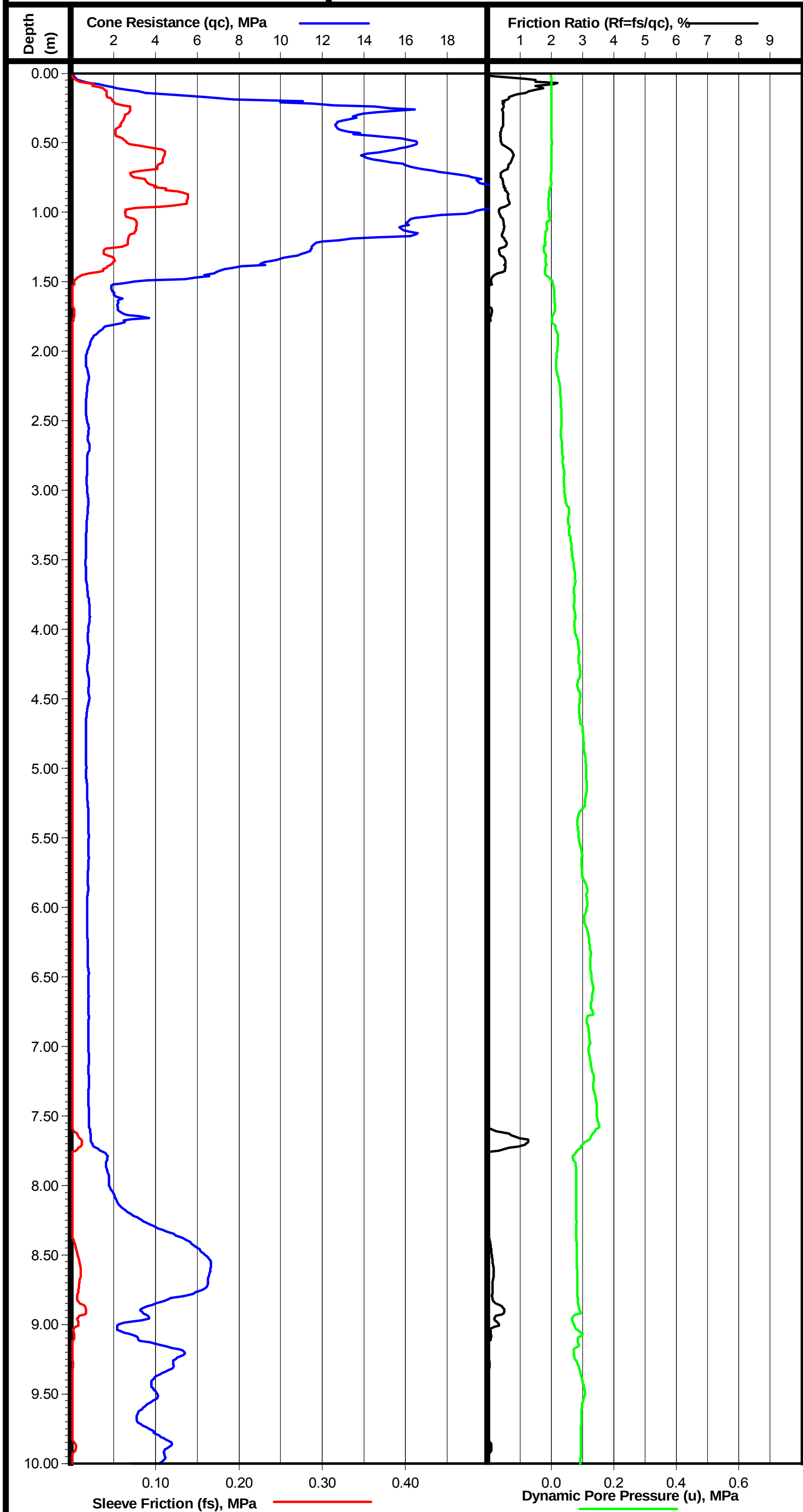
CPT No

CPT 2009_20

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**		**Ground Level**	+1.46 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647284.06
Operator	DB				N 264372.48



Strata Description	Depth	Level	(Thickness)	Legend
Dense, locally very dense, gravelly SAND. (Probable MADE GROUND)	1.50	-0.04	(1.50)	
Very loose/soft material. (Probable RECENT DEPOSITS)	8.00	-6.54	(6.50)	
Loose to medium dense SAND. (Probable RECENT DEPOSITS)			(2.15)	

Stratum continues to 10.15 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_22.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:50:36 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

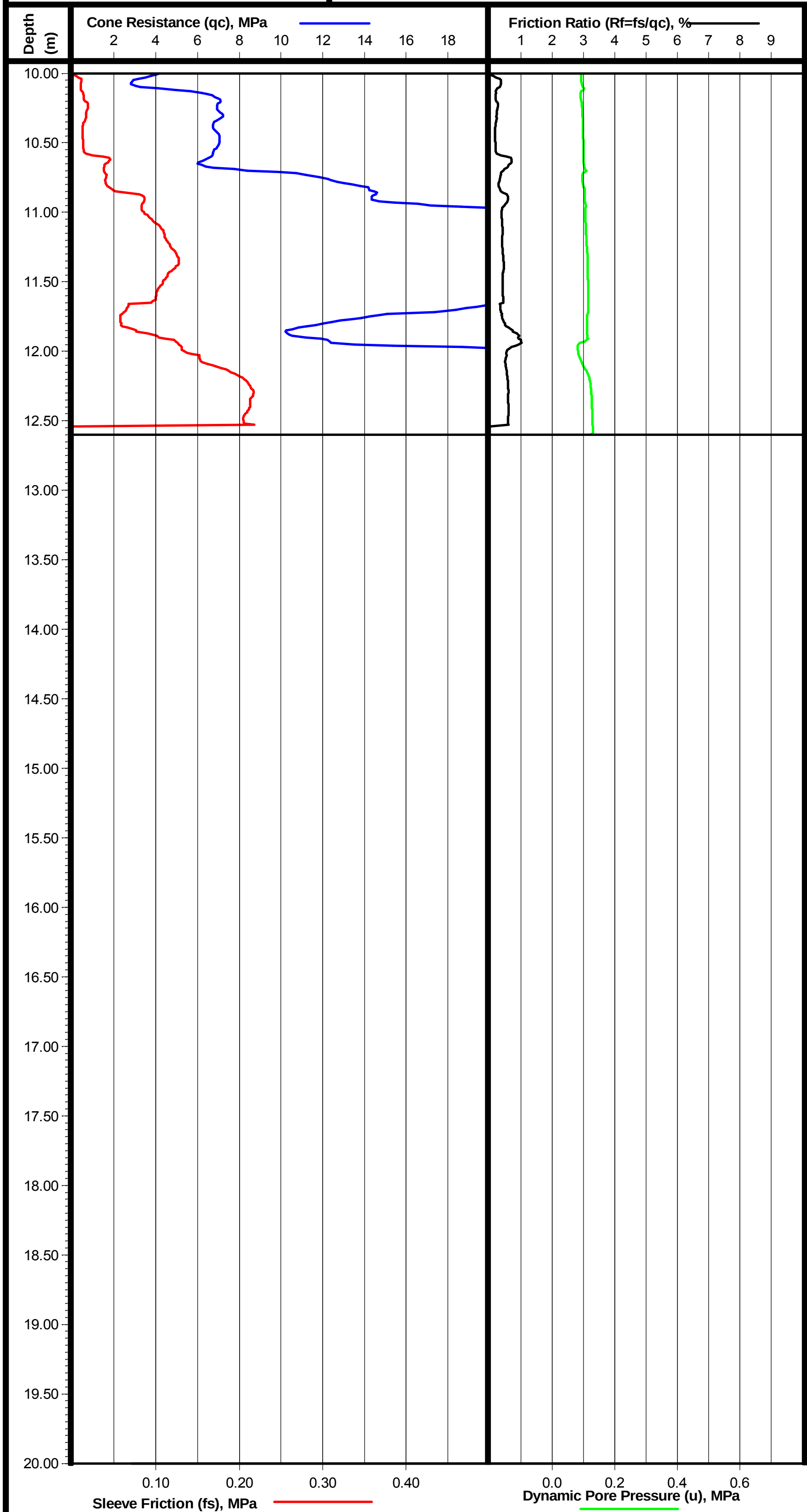
CPT 2009_22

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**	**Ground Level** +1.46 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647284.06 N 264372.48
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Loose to medium dense SAND. (Probable RECENT DEPOSITS)	10.15	-8.69	
Medium dense SAND. (Probable CRAG DEPOSITS)	(0.60)		
	10.75	-9.29	
Very dense, locally dense, SAND. (CRAG DEPOSITS)	(1.85)		
	12.60	-11.14	
Base of CPT at 12.60 mBGL			

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_22.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

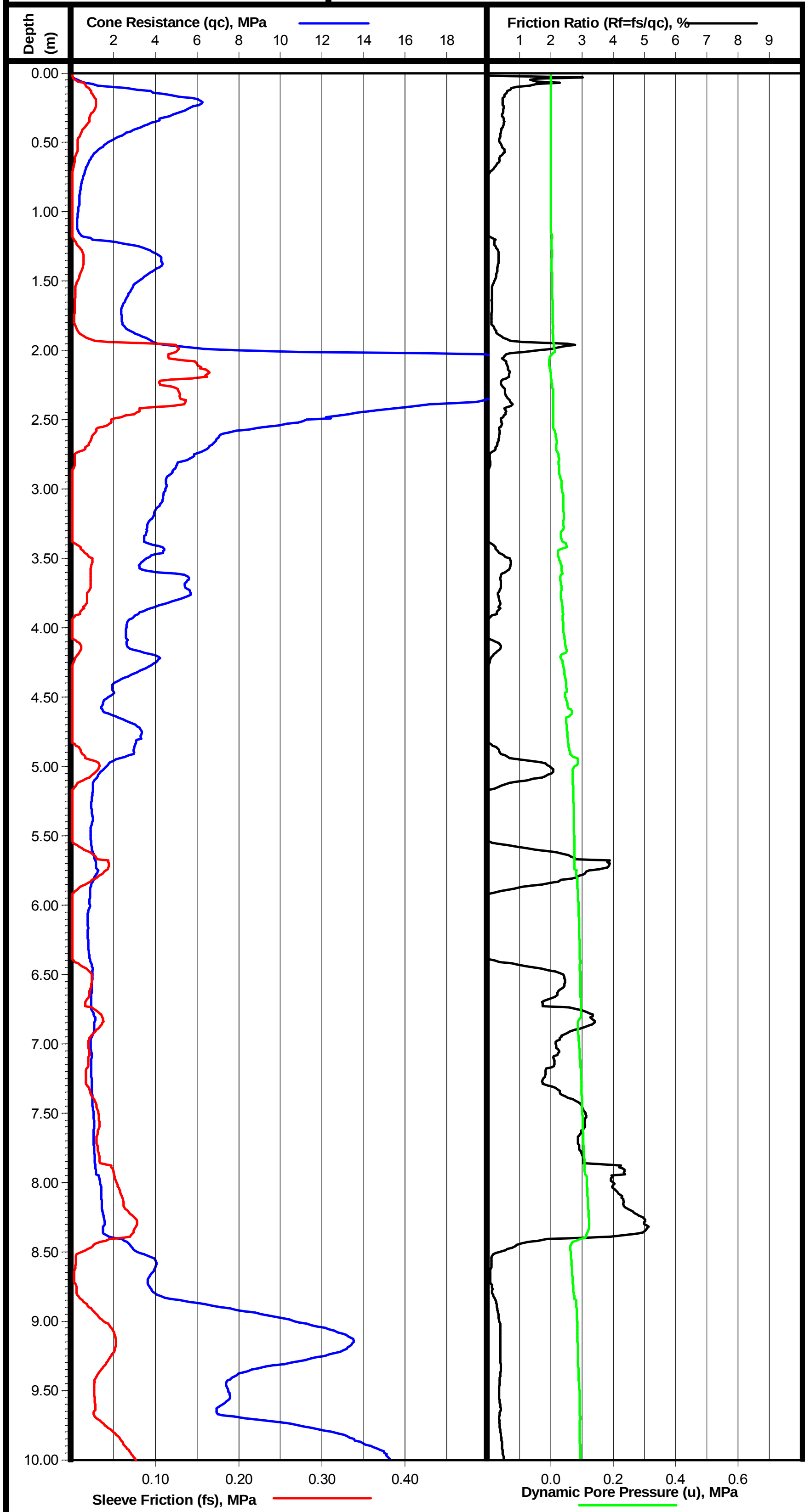
CPT No

CPT 2009_22

Cone Penetration Test Log

Soil Mechanics

Date 11/07/2010	**Equipment and Methods**		**Ground Level**	+1.64 mOD
Cone No C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647218.11
Operator DB				N 264181.27



Strata Description	Depth	Level	(Thickness)
Medium dense gravelly SAND. (Probable MADE GROUND)	0.70	+0.94	(0.70)
Very loose/soft material. (Probable MADE GROUND)	1.20	+0.44	(0.50)
Loose SAND. (Probable MADE GROUND)	2.00	-0.36	(0.80)
Very dense gravelly SAND. (Probable MADE GROUND)	2.70	-1.06	(0.70)
Medium dense becoming loose SAND and SILT. (RECENT DEPOSITS)	5.00	-3.36	(2.30)
Very loose SAND and SILT. (RECENT DEPOSITS)	6.45	-4.81	(1.45)
Firm silty CLAY. (RECENT DEPOSITS)	8.45	-6.81	(2.00)
Medium dense SAND. (CRAG DEPOSITS)	9.70	-8.06	(1.25)

Stratum continues to 11.25 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_23.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:50:47 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

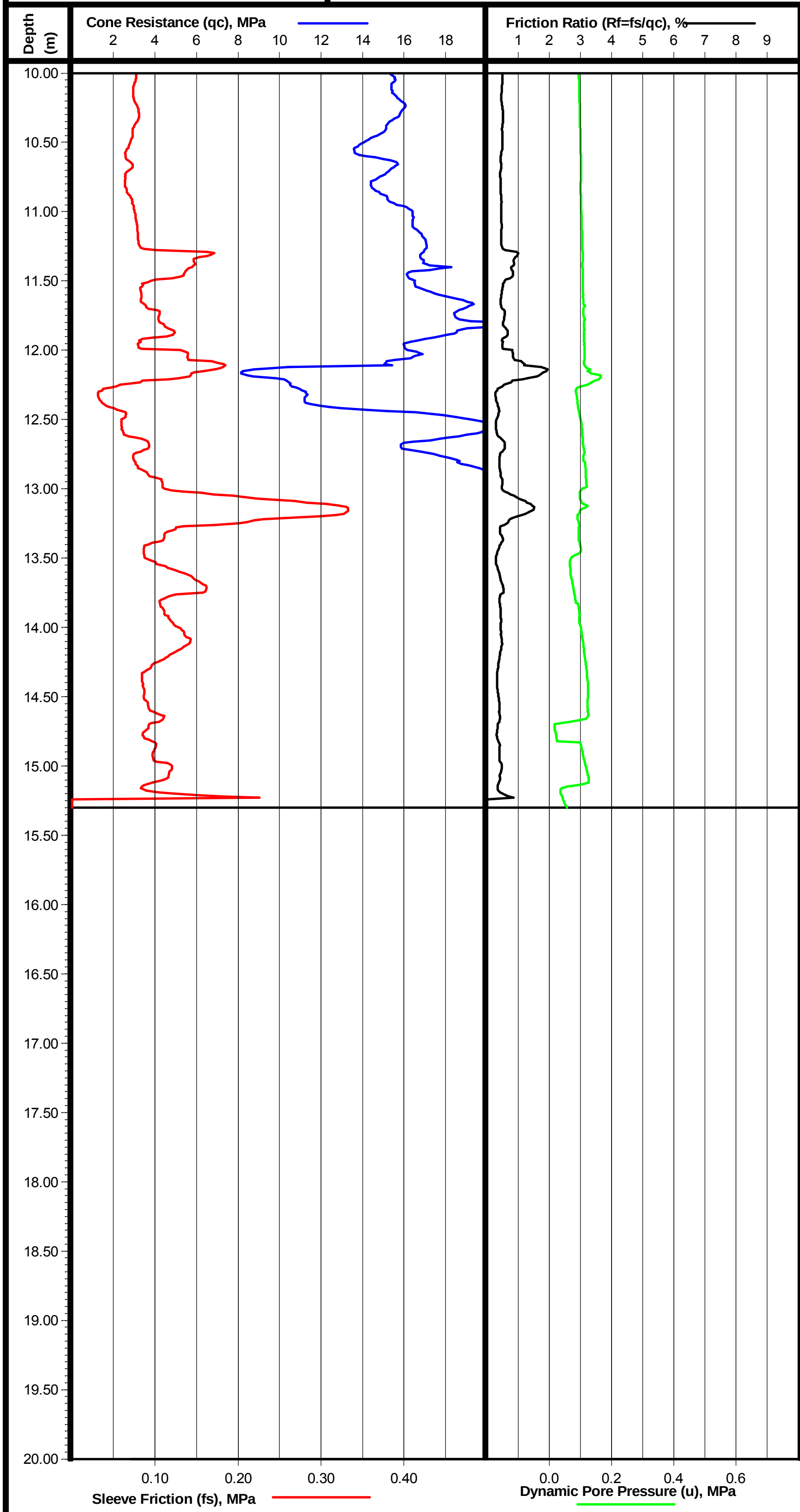
CPT No

CPT 2009_23

Sheet 1 of 2

Cone Penetration Test Log

Date	11/07/2010	**Equipment and Methods**		**Ground Level**	+1.64 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647218.11
Operator	DB				N 264181.27



Strata Description	Depth, Level (Thickness)		Legend
Dense SAND. (CRAG DEPOSITS)	(1.55)		
	11.25	-9.61	
Dense silty SAND. (CRAG DEPOSITS)	(0.85)		
	12.10	-10.46	
Medium dense to dense SAND. (CRAG DEPOSITS)	(0.75)		
	12.85	-11.21	
Very dense SAND. (CRAG DEPOSITS)	(2.45)		
	15.30	-13.66	
Base of CPT at 15.30 mBGL			

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_23.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

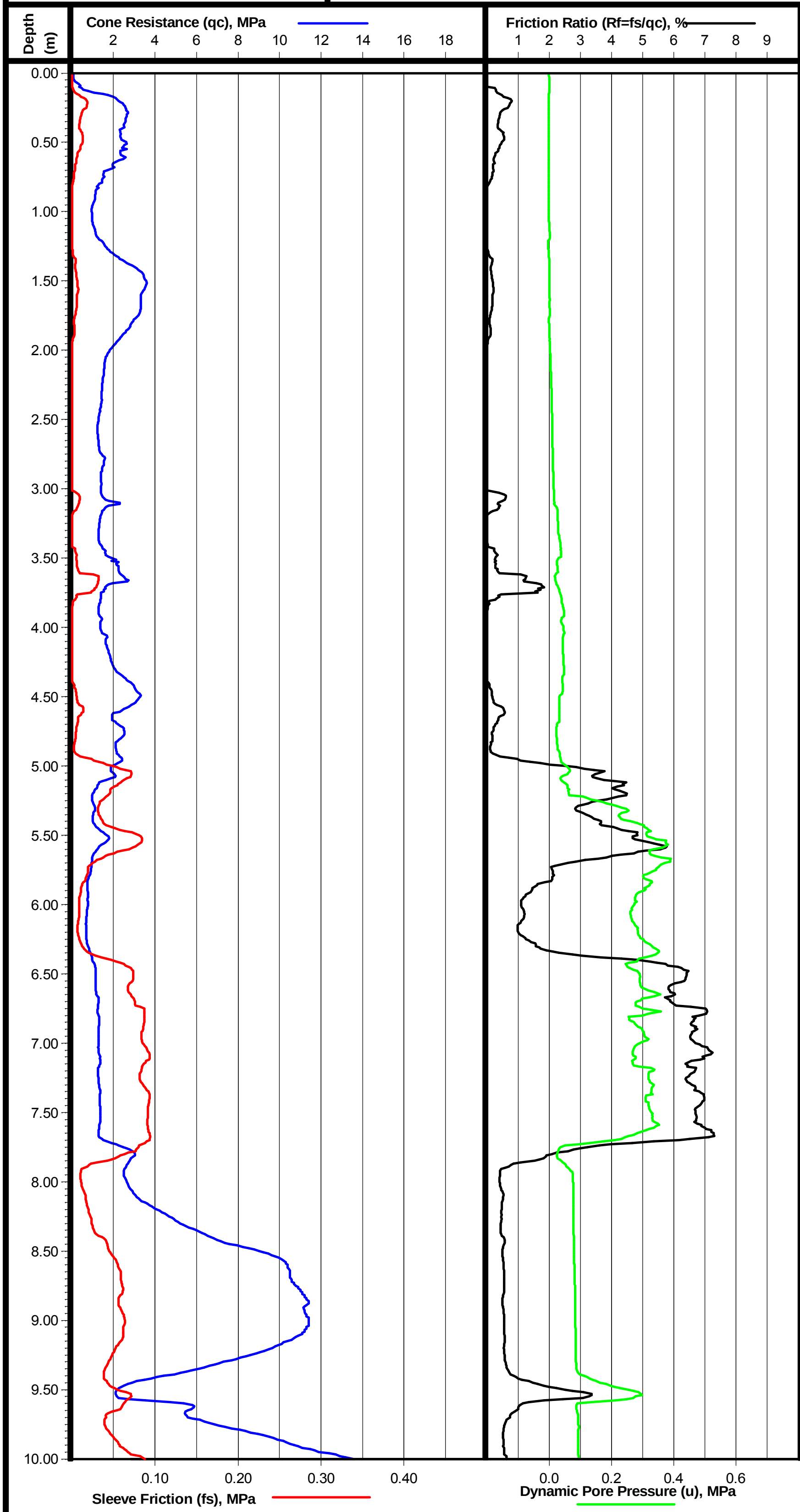
CPT No

CPT 2009_23

Cone Penetration Test Log

Soil Mechanics

Date	11/07/2010	**Equipment and Methods**	**Ground Level** +1.56 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647100.61
Operator	DB		N 264164.66



Strata Description	Depth, Level (Thickness)		Legend
Very loose to loose material. (Probable RECENT DEPOSITS)	(5.25)		
Firm silty CLAY. (RECENT DEPOSITS)	5.25	-3.69	
	(1.15)		
Firm to stiff CLAY. (RECENT DEPOSITS)	6.40	-4.84	
	(1.30)		
Medium dense becoming very dense SAND. (CRAG DEPOSITS)	7.70	-6.14	
9.55 m silty clay band	(3.22)		

Stratum continues to 10.92 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_24.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:00 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

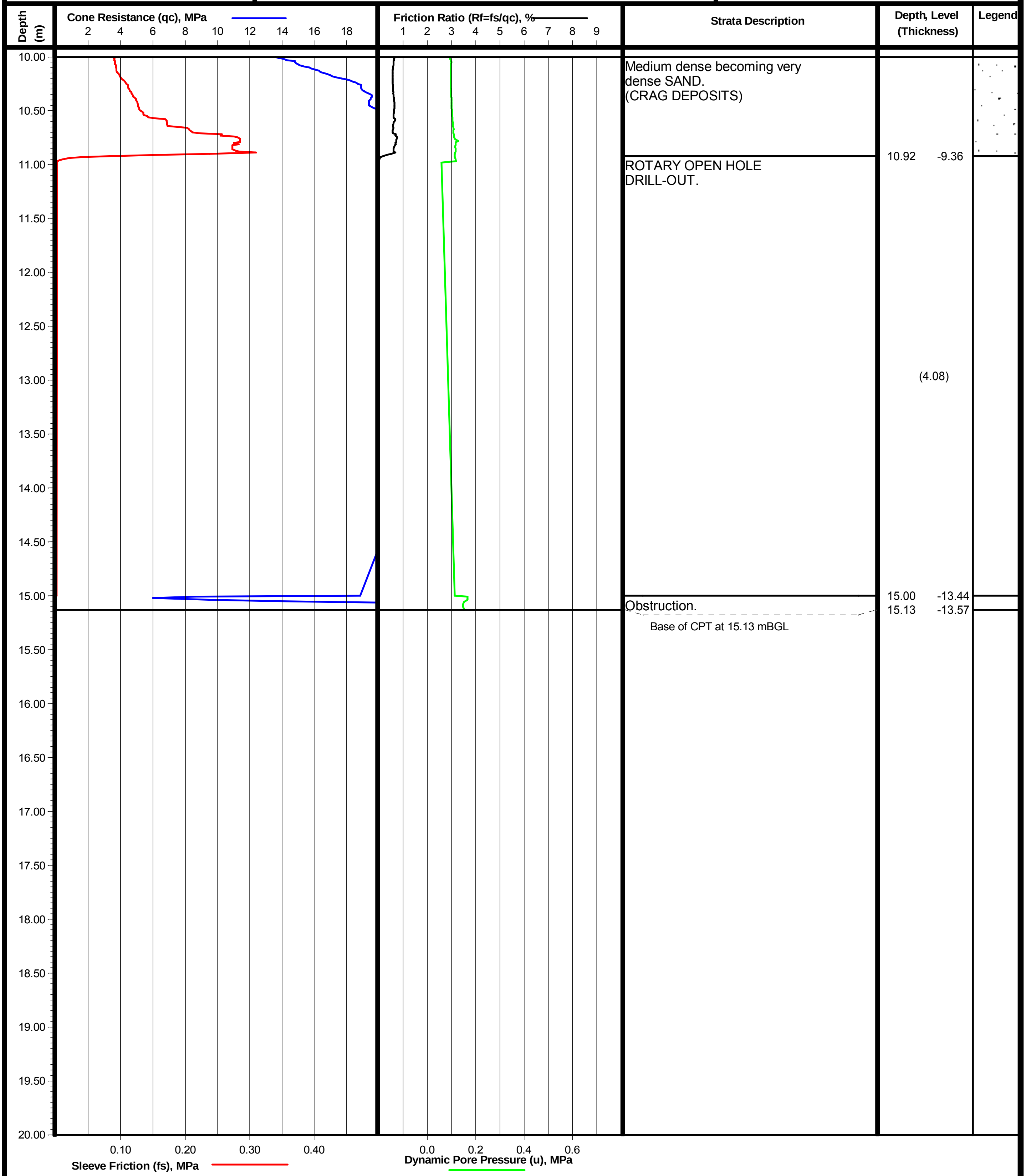
CPT 2009_24

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	11/07/2010	**Equipment and Methods**		**Ground Level**	+1.56 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647100.61
Operator	DB				N 264164.66



Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_24.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.	**Project**	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:07	**Project No.**	**A0012-10**
	Carried out for	**NNB Generation Company Limited**

CPT No

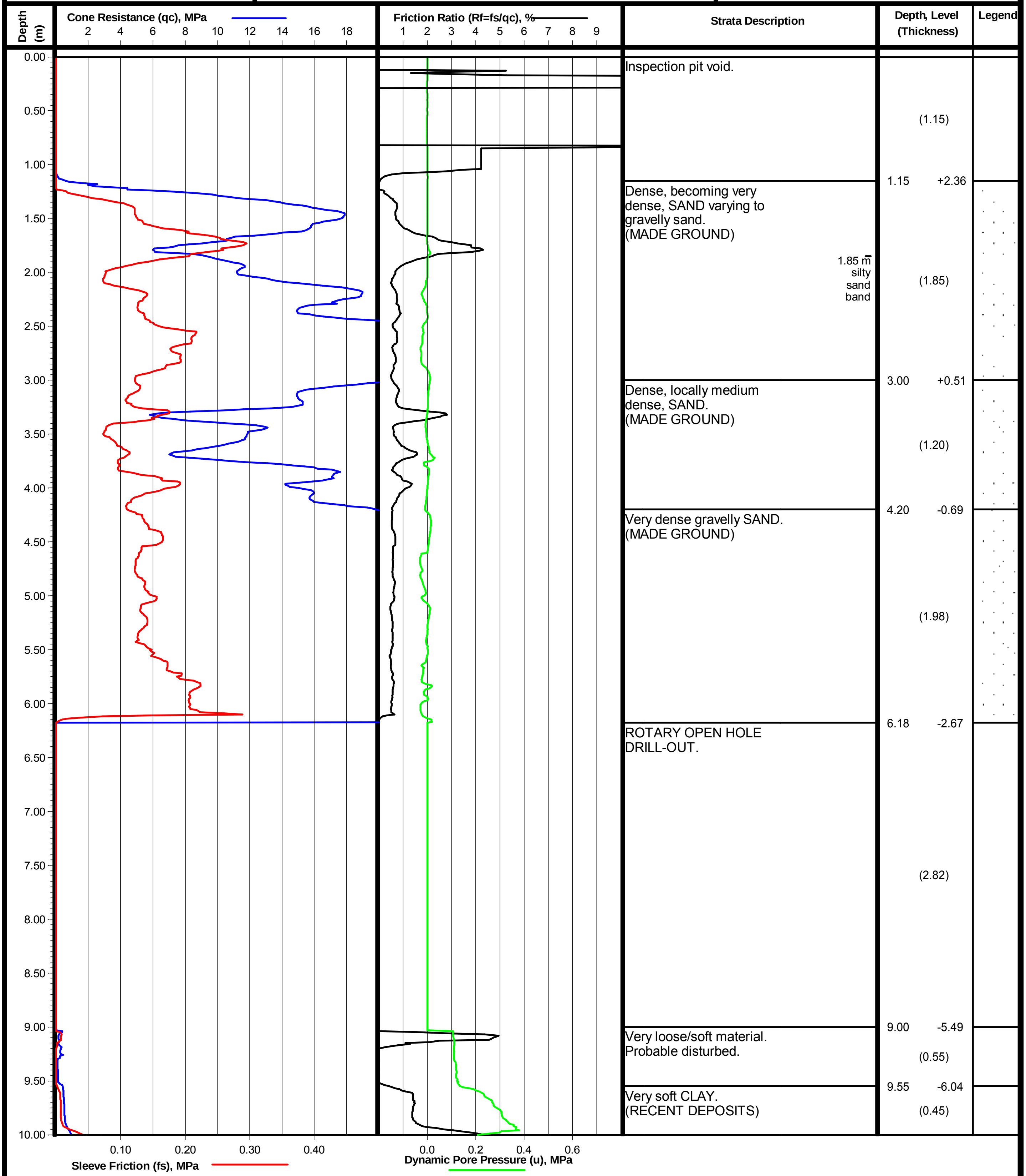
CPT 2009_24

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	21/09/2010	**Equipment and Methods**	**Ground Level** +3.51 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647106.99 N 263989.83
Operator	DB		



Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_25.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_25

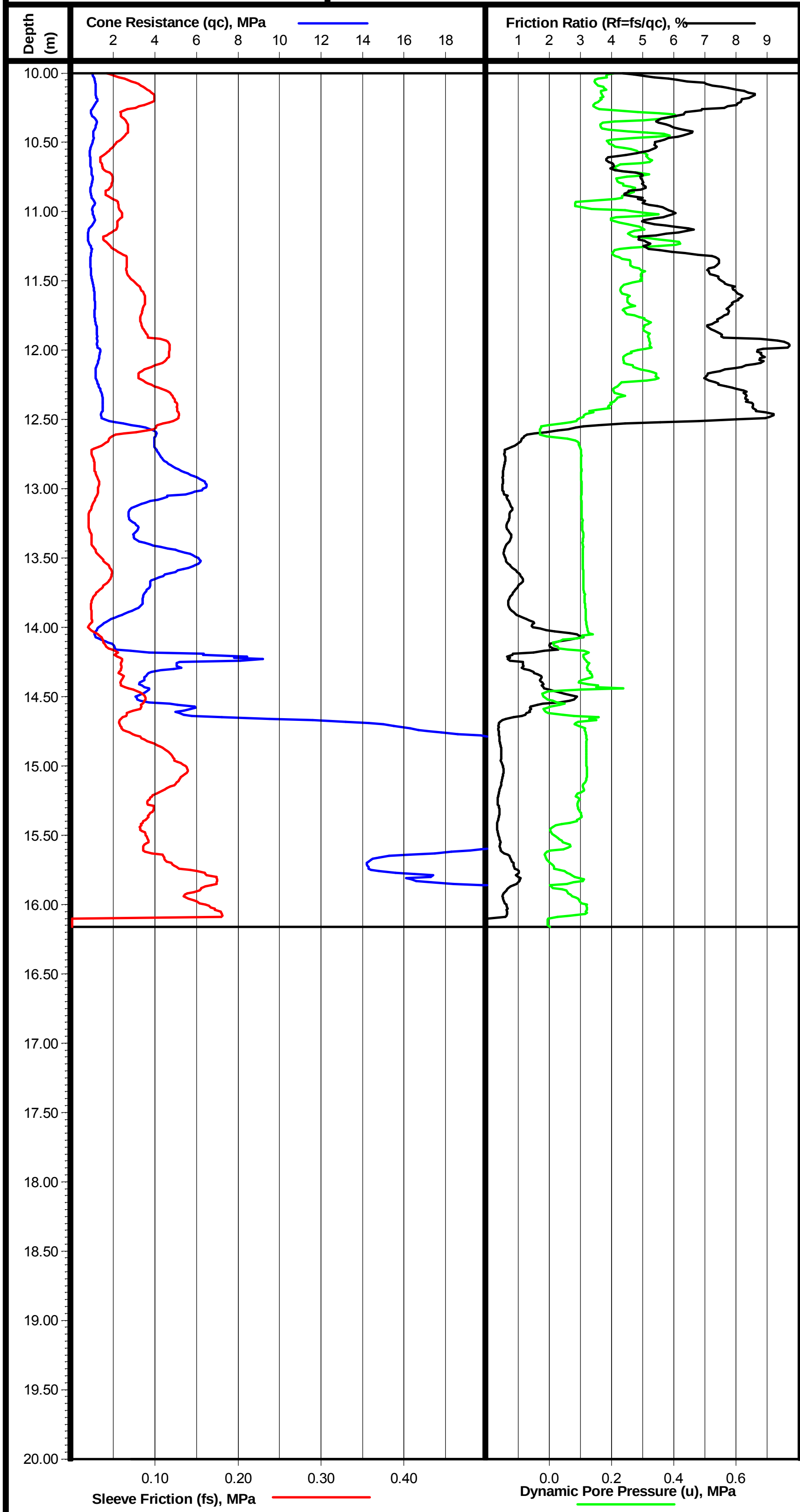
Sheet 1 of 2

Cone Penetration Test Log

Date	21/09/2010
Cone No	C10CFIP.124_2010
Operator	DB

Equipment and Methods
Test according to BS 1377 : Part 9 : Method 3.1 : 1990

Ground Level	+3.51 mOD
Co-ordinates National Grid	E 647106.99 N 263989.83



Strata Description	Depth, Level (Thickness)		Legend
Firm organic CLAY. (RECENT DEPOSITS)	10.00	-6.49	
	(2.50)		
Loose to medium dense silty SAND. (RECENT DEPOSITS)	12.50	-8.99	
	(2.20)		
Very dense, locally dense, SAND. (CRAG DEPOSITS)	14.70	-11.19	
	(1.46)		
Base of CPT at 16.16 mBGL	16.16	-12.65	

Remarks
Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_25.GEF
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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

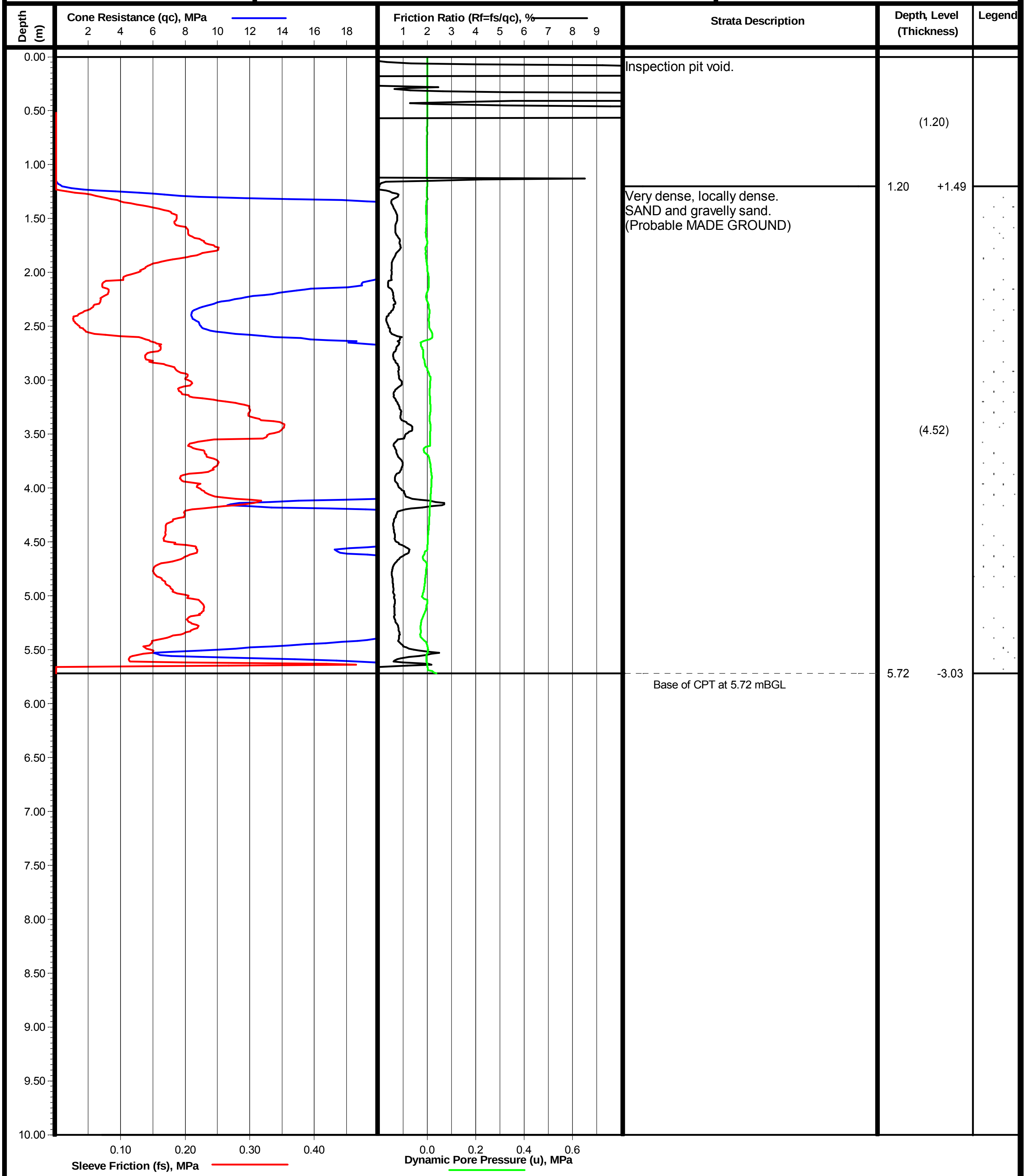
Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No
CPT 2009_25
Sheet 2 of 2

Cone Penetration Test Log

Date	21/09/2010	**Equipment and Methods**	**Ground Level** +2.69 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647100.61 N 263896.37
Operator	DB		



Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_26a.GEF

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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:21

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

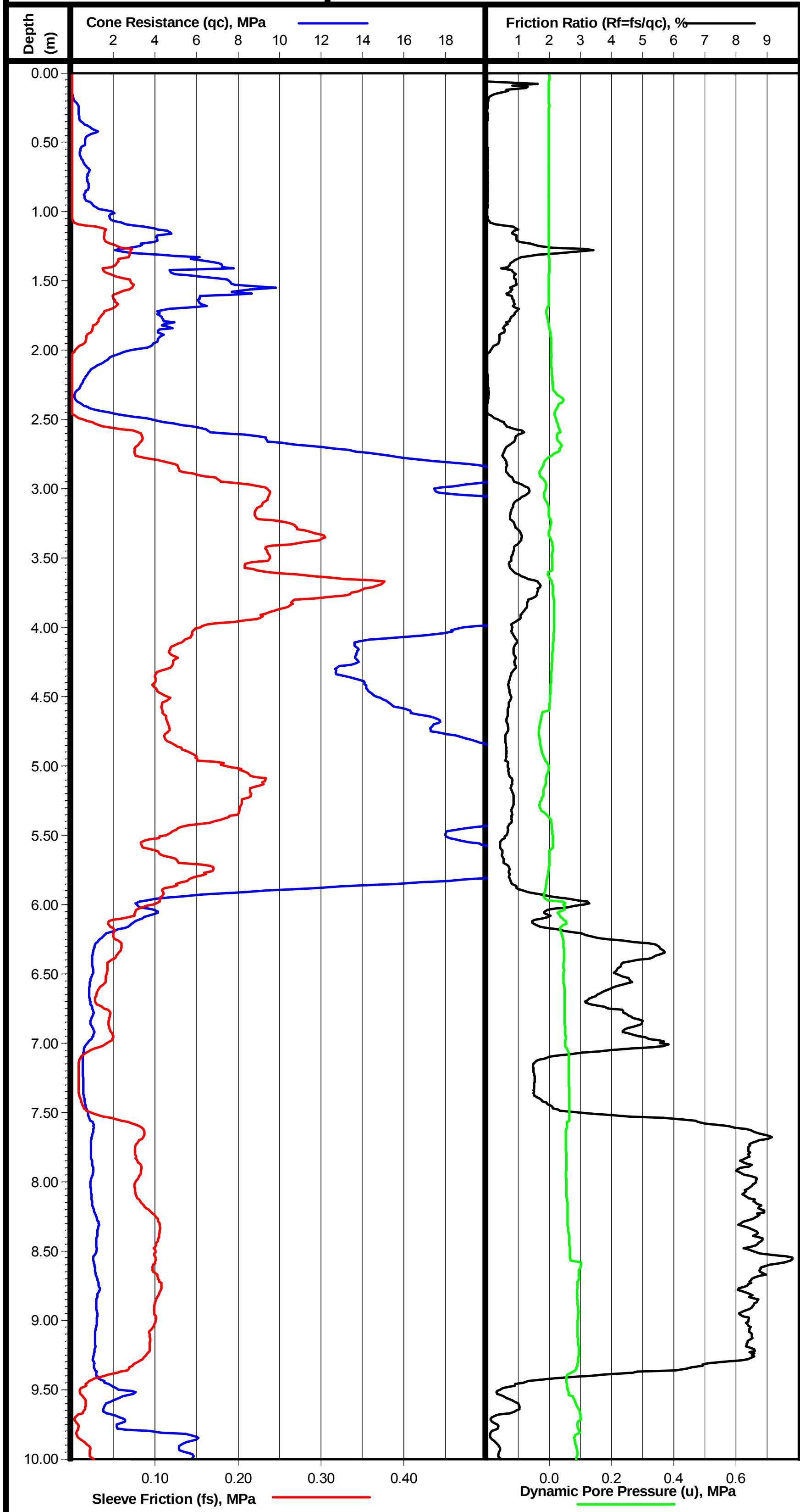
CPT 2009_26A

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	21/09/2010	**Equipment and Methods**	**Ground Level** +2.70 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647100.67 N 263896.72
Operator	DB		



Strata Description	Depth	Level	(Thickness)
Very loose SAND. (MADE GROUND)	1.00	+1.70	(1.00)
Medium dense SAND. (MADE GROUND)	2.00	+0.70	(1.00)
Very soft CLAY. (MADE GROUND)	2.60	+0.10	(0.60)
Dense to very dense SAND, locally gravelly sand. (MADE GROUND)	6.00	-3.31	(3.40)
Firm CLAY. (RECENT DEPOSITS)	7.05	-4.36	(1.05)
Soft sandy CLAY. (RECENT DEPOSITS)	7.25	-4.56	
Firm organic CLAY. (Probable RECENT DEPOSITS)	9.50	-6.81	(2.25)
Loose silty SAND becoming medium dense sand.			

Legend

Stratum continues to 10.50 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_26b.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:26 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

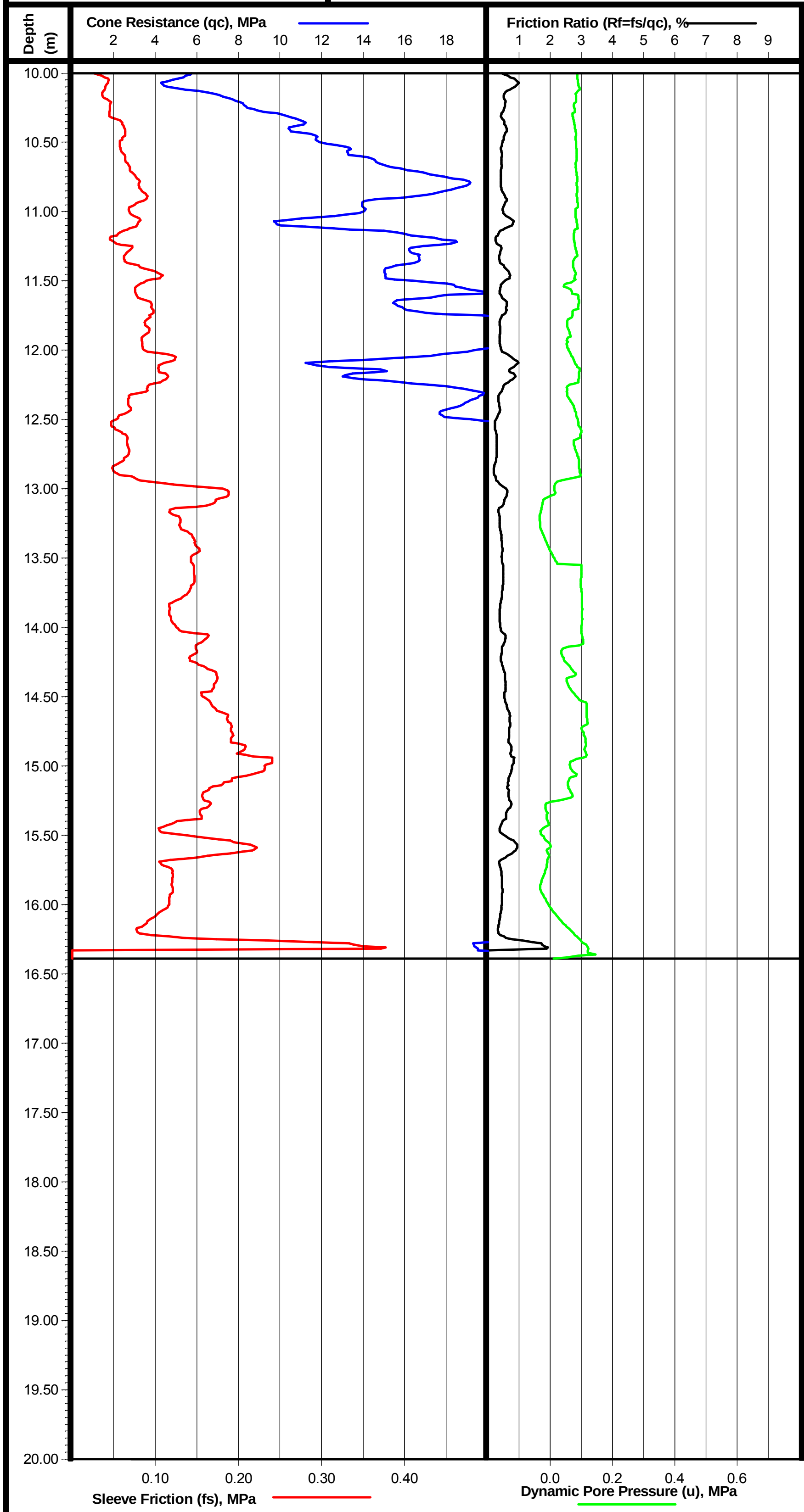
CPT 2009_26B

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	21/09/2010	**Equipment and Methods**		**Ground Level**	+2.70 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647100.67 N 263896.72
Operator	DB				



Strata Description	Depth, Level (Thickness)	Legend
(RECENT DEPOSITS)	(1.00)	
	10.50 -7.81	
Dense SAND. (CRAG DEPOSITS)	(2.00)	
	12.50 -9.81	
Very dense SAND. (CRAG DEPOSITS) 12.90-13.30 m bands of gravelly sand	(3.89)	
	16.39 -13.69	
Base of CPT at 16.39 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_26b.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:51:33 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

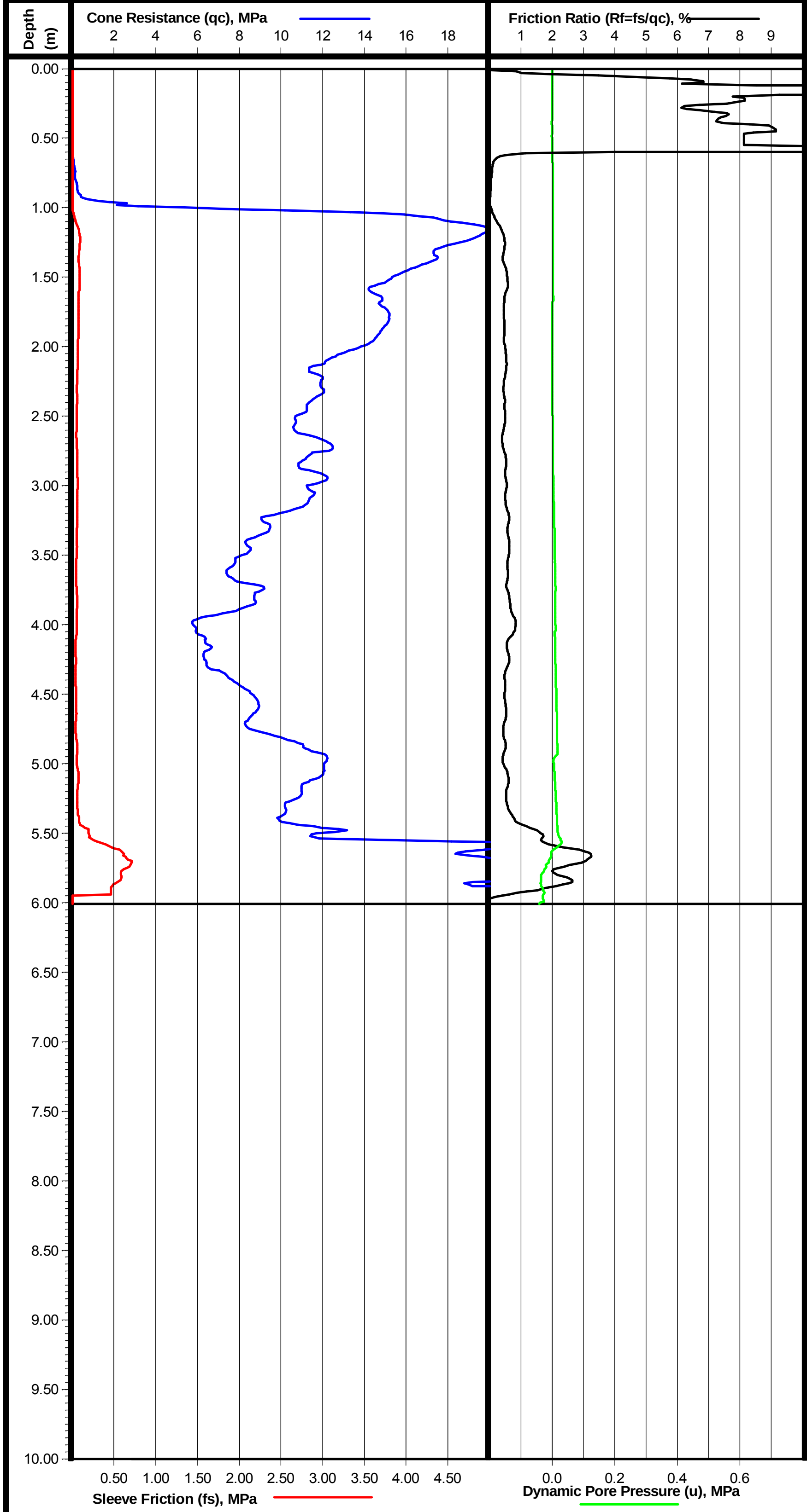
CPT 2009_26B

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**	**Ground Level** +3.15 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647172.81 N 263810.92
Operator	DB		



Strata Description	Depth	Level	(Thickness)	Legend
Very soft PEAT. (Probable MADE GROUND)	1.00	+2.15	(1.00)	
Dense gravelly SAND. (Probable MADE GROUND)	2.15	+1.00	(1.15)	
Medium dense to dense gravelly SAND. (Probable RECENT DEPOSITS)	2.90	+0.25	(0.75)	
Dense SAND. (Probable RECENT DEPOSITS)	3.20	-0.05	(0.30)	
Medium dense SAND. (Probable RECENT DEPOSITS)	4.80	-1.65	(1.60)	
Dense SAND. (Probable RECENT DEPOSITS)	5.55	-2.40	(0.75)	
Very dense SAND. (CRAG DEPOSITS)	6.01	-2.86	(0.46)	

Base of CPT at 6.01 mBGL

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_28.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

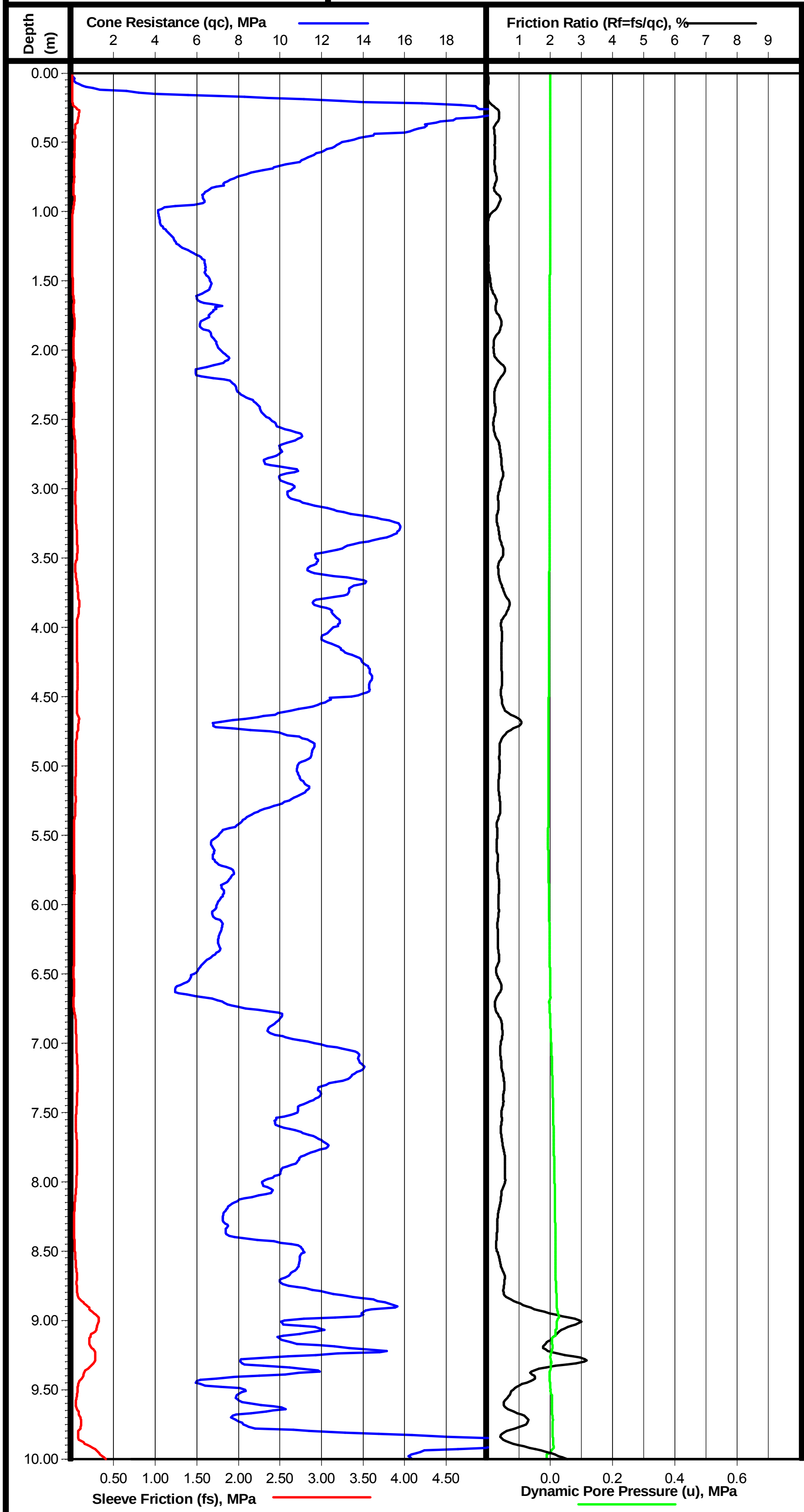
CPT 2009_28

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	11/01/2011	**Equipment and Methods**	**Ground Level**	+6.42 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647249.46
Operator	DB			N 263818.29



Strata Description	Depth, Level (Thickness)		Legend
Dense, locally very dense, gravelly SAND. (Probable MADE GROUND)	(0.70)		
	0.70	+5.72	
Medium dense gravelly SAND locally sand. (Probable RECENT DEPOSITS)	(1.80)		
	2.50	+3.92	
Dense gravelly SAND locally sand. (Probable RECENT DEPOSITS)	(2.00)		
	4.50	+1.92	
Medium dense, locally dense, SAND. (Probable RECENT DEPOSITS) 7.00-7.80 m locally dense	(4.45)		
	8.95	-2.53	
Medium dense silty SAND with bands of sand. (Probable RECENT DEPOSITS)	(0.55)		
	9.50	-3.08	
Medium dense SAND.	(0.30)		
	9.80	-3.38	

Stratum continues to 10.50 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_29.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:44 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_29

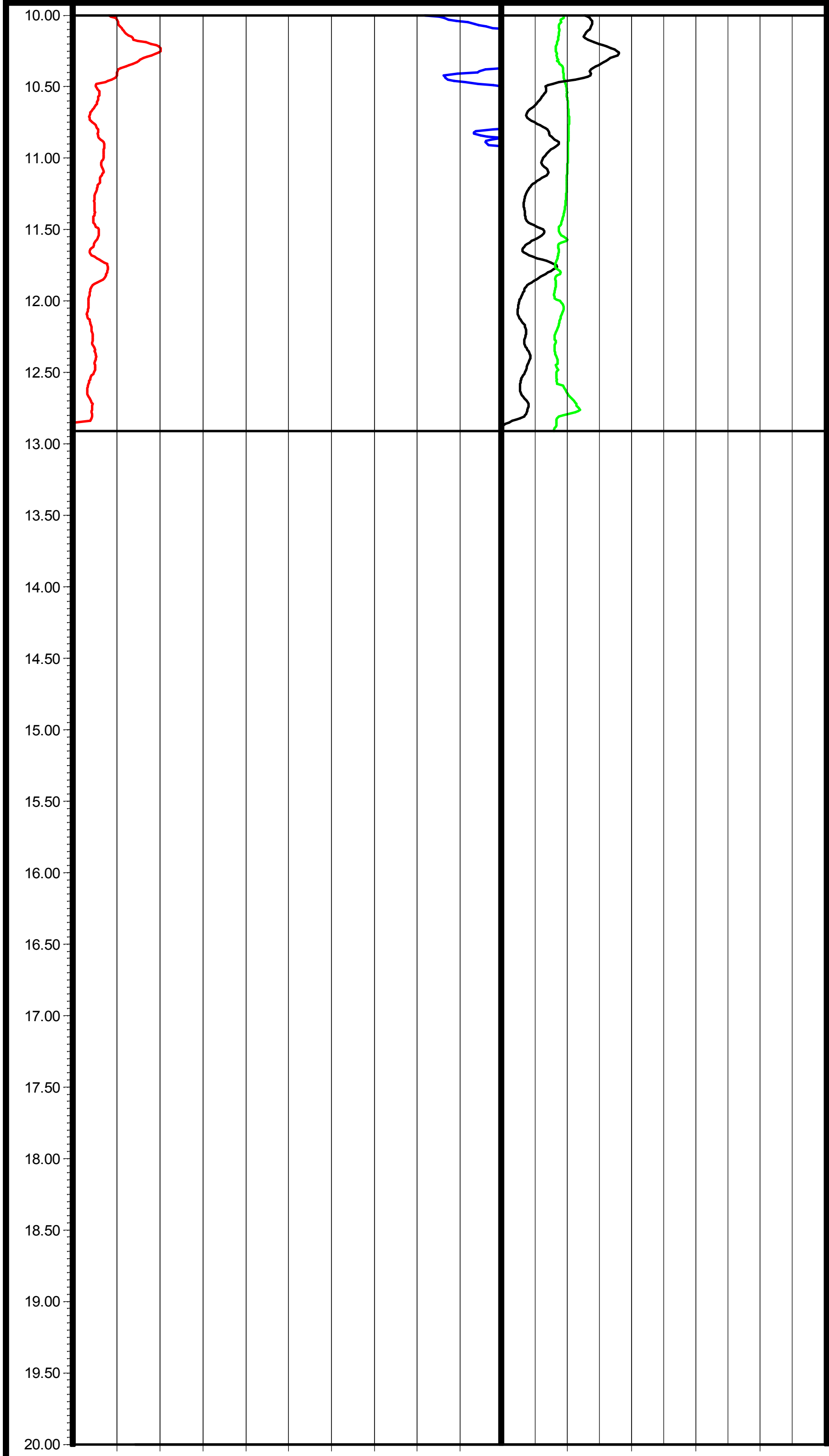
Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	11/01/2011	**Equipment and Methods**		**Ground Level**	+6.42 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647249.46
Operator	DB				N 263818.29

Depth (m) | **Cone Resistance (qc), MPa** 2 4 6 8 10 12 14 16 18 | **Friction Ratio (Rf=fs/qc), %** 1 2 3 4 5 6 7 8 9 | **Strata Description** | **Depth, Level (Thickness)** | **Legend**



Strata Description	Depth	Level	(Thickness)
9.50m - 9.80m : (RECENT DEPOSITS)			(0.70)
9.80m - 10.50m : Dense to very dense SAND, locally silty SAND. (RECENT DEPOSITS)	10.50	-4.08	
Very dense SAND. (CRAG DEPOSITS)			(2.41)
Base of CPT at 12.91 mBGL	12.91	-6.49	

0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50
Sleeve Friction (fs), MPa

0.0 0.2 0.4 0.6
Dynamic Pore Pressure (u), MPa

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_29.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:51:51 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

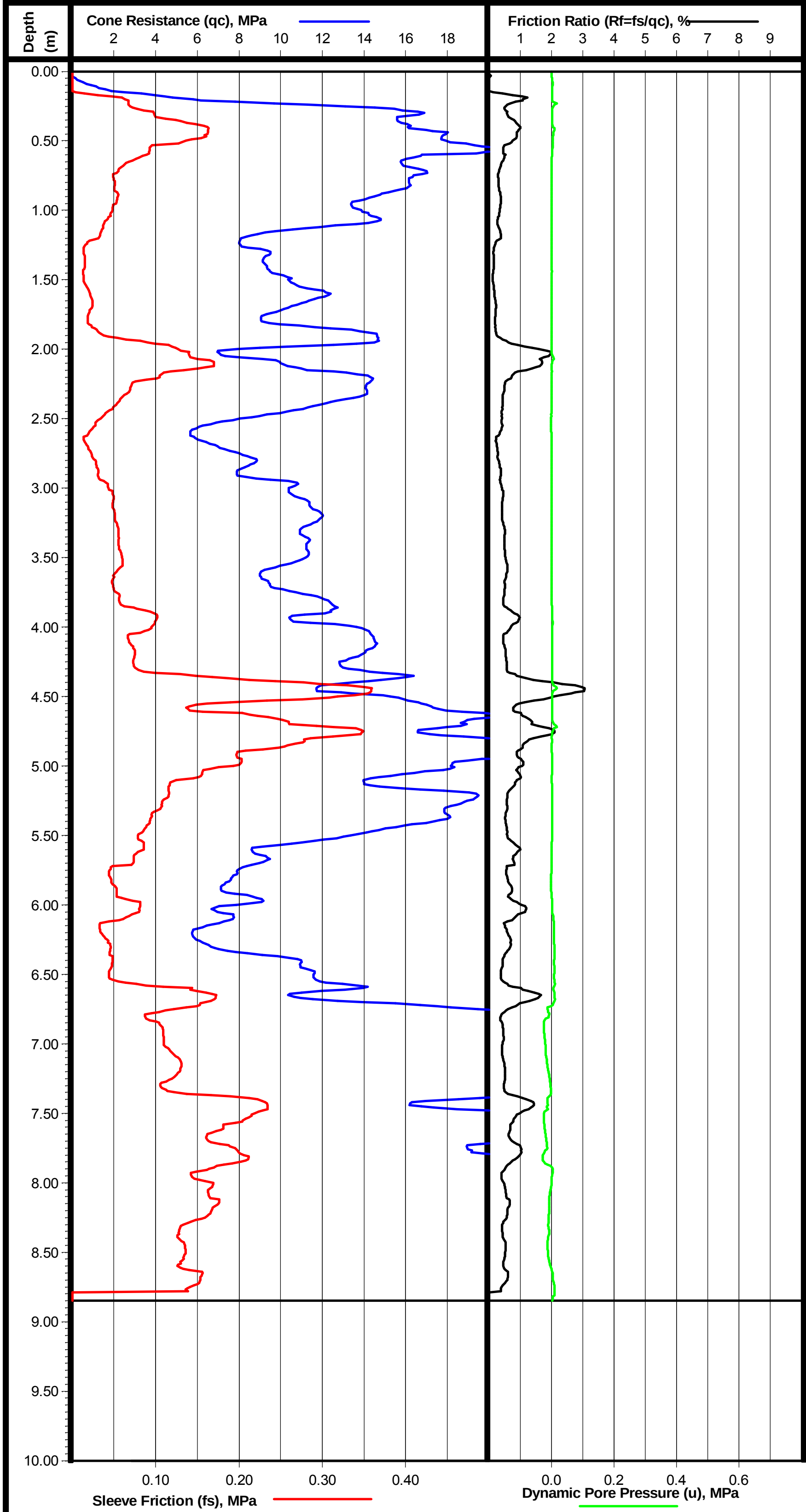
CPT No

CPT 2009_29

Sheet 2 of 2

Cone Penetration Test Log

Date	02/08/2010	**Equipment and Methods**	**Ground Level** +6.40 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647408.17 N 263804.99
Operator	DB		



Strata Description	Depth	Level	(Thickness)
Dense becoming medium dense gravelly SAND. (MADE GROUND)	1.95	+4.45	(1.95)
Medium dense SAND and gravelly sand. (MADE GROUND) 2.35 m dense	3.25	+3.15	(1.30)
Medium dense becoming dense SAND. (MADE GROUND)	4.40	+2.00	(1.15)
Dense SAND. (MADE GROUND)	5.55	+0.85	(1.15)
Medium dense SAND. (MADE GROUND)	6.80	-0.40	(1.25)
Very dense, locally dense SAND and gravelly sand. (CRAG DEPOSITS)	8.85	-2.45	(2.05)
Base of CPT at 8.85 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_31.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

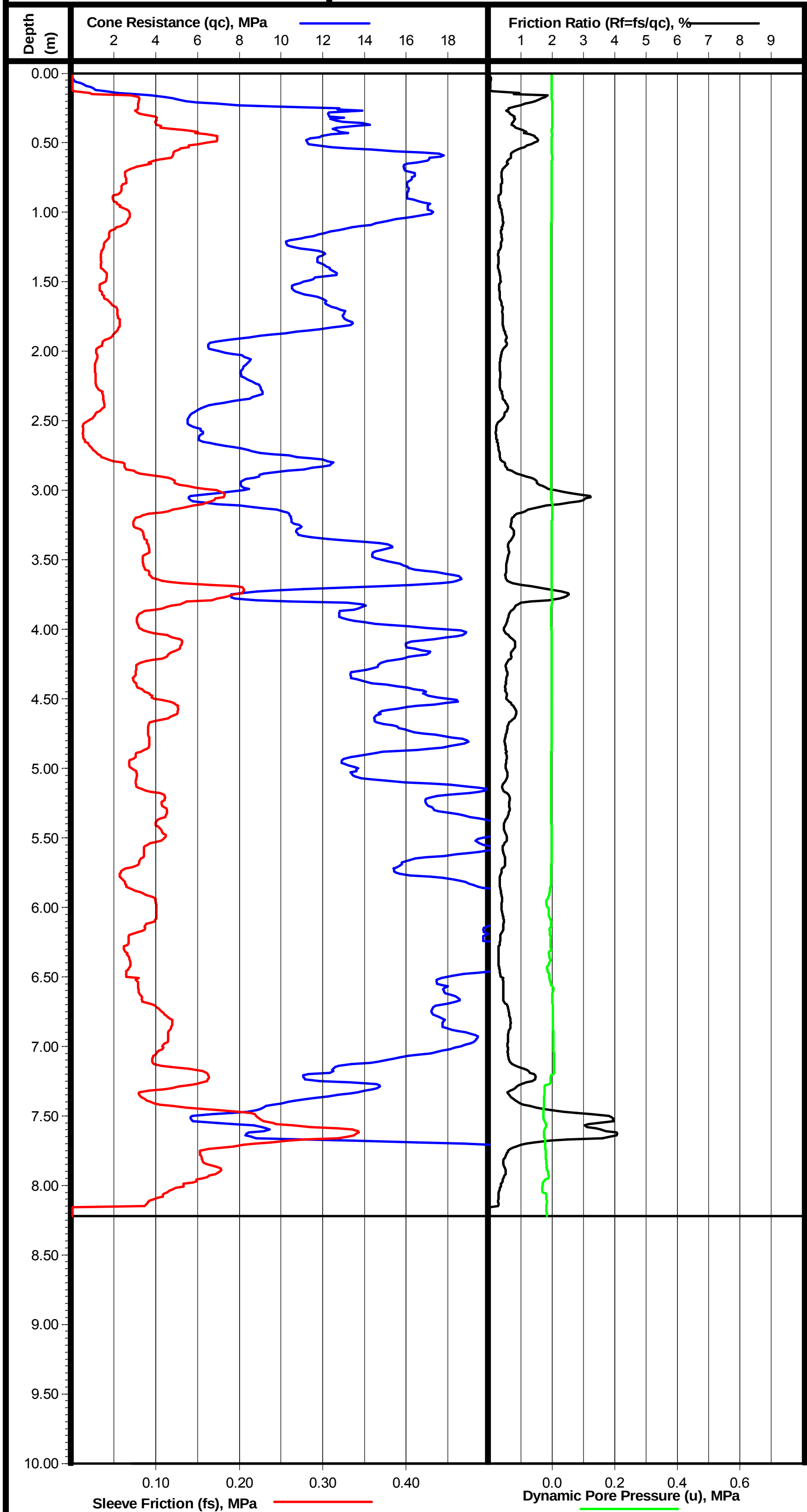
CPT 2009_31

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Ground Level**	+6.40 mOD
Cone No	C10CFIP.124_2010			**Co-ordinates National Grid**	E 647472.78 N 263807.75
Operator	DB				



Strata Description	Depth	Level	(Thickness)
Dense gravelly SAND. (Probable MADE GROUND)			(1.25)
Medium dense gravelly SAND. (Probable RECENT DEPOSITS) 1.25-1.90 m dense to medium dense	1.25	+5.15	(2.05)
Dense SAND and gravelly sand. (CRAG DEPOSITS)	3.30	+3.10	(2.50)
Dense to very dense gravelly SAND. (CRAG DEPOSITS)	5.80	+0.60	(0.70)
Dense SAND. (CRAG DEPOSITS)	6.50	-0.10	(0.95)
Medium dense silty SAND. (CRAG DEPOSITS)	7.45	-1.05	
Very dense gravelly SAND. (CRAG DEPOSITS)	7.65	-1.25	(0.57)
Base of CPT at 8.22 mBGL	8.22	-1.82	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_32.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:52:02 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

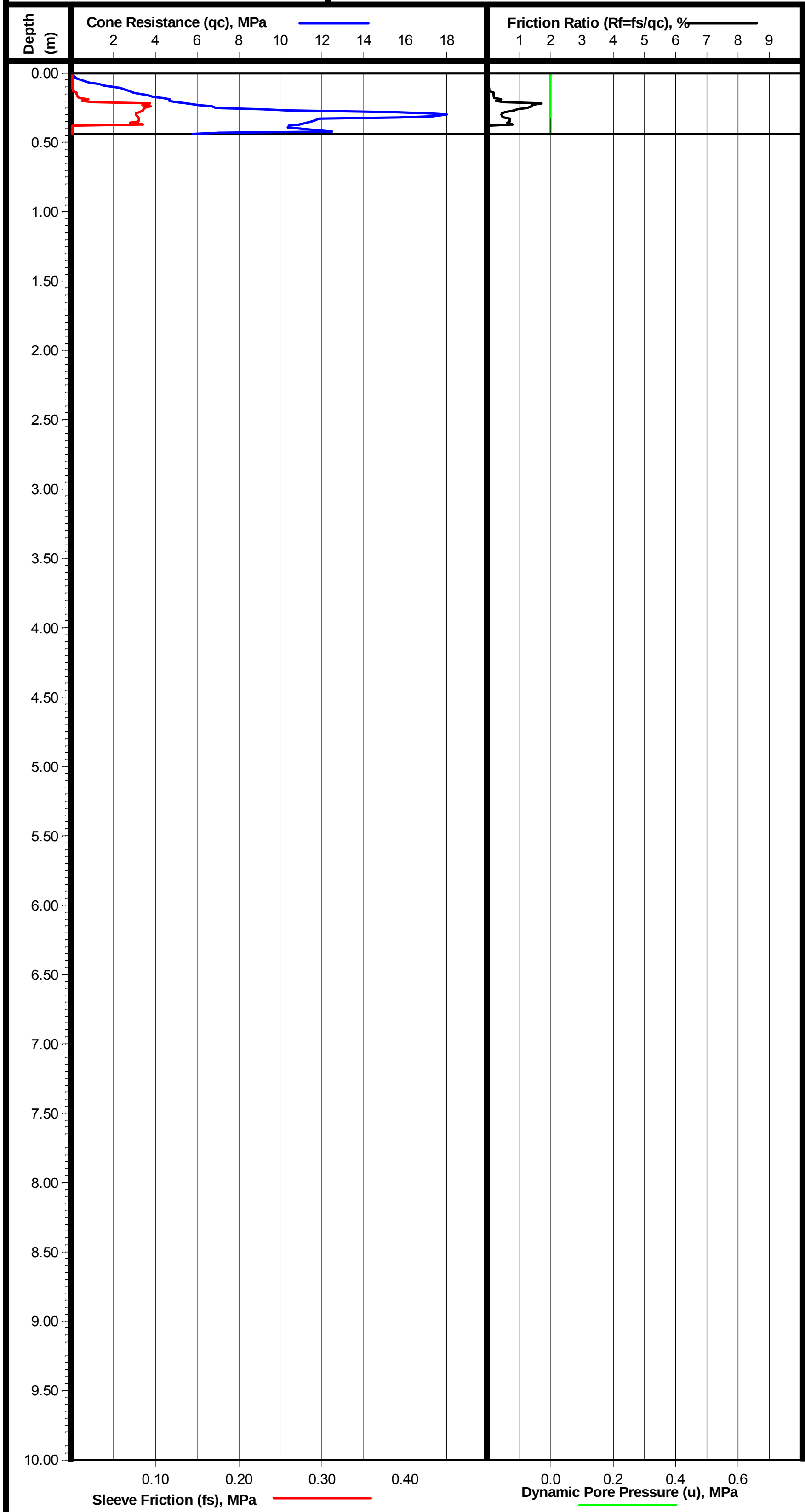
CPT No

CPT 2009_32

Sheet 1 of 1

Cone Penetration Test Log

Date	02/08/2010	**Equipment and Methods**		**Ground Level**	+6.51 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647472.82
Operator	DB				N 263899.57



Strata Description	Depth, Level (Thickness)	Legend
Dense SAND.	(0.44) 0.44 +6.07	
Base of CPT at 0.44 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_33.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:52:09

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

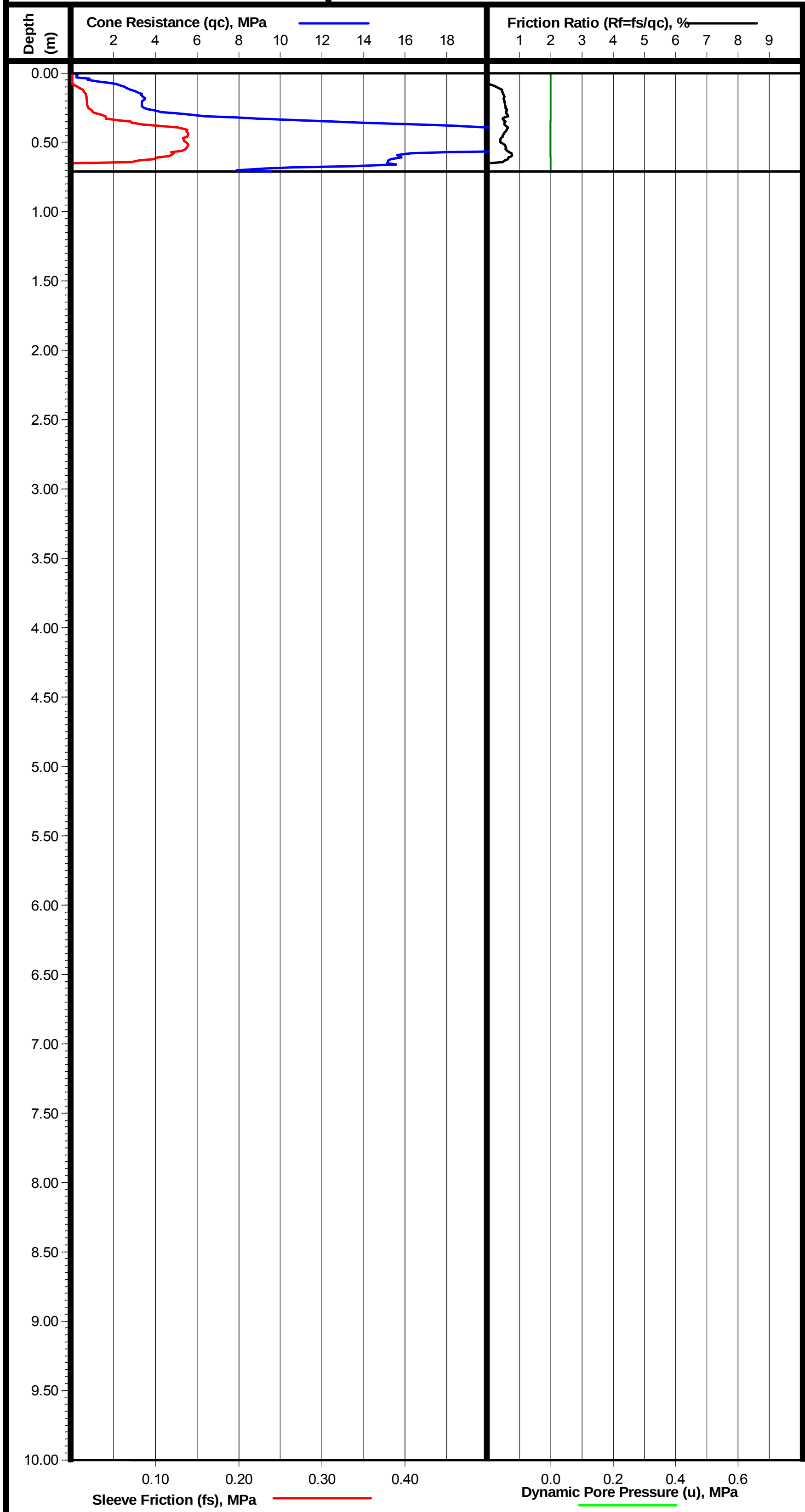
CPT 2009_33

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**	**Ground Level**	+6.51 mOD	
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid**	E 647473.84	
Operator	DB			N 263899.63	



Strata Description	Depth, Level (Thickness)	Legend
Very dense gravelly SAND.	(0.71)	
	0.71 +5.80	
Base of CPT at 0.71 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_33a.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:52:10 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

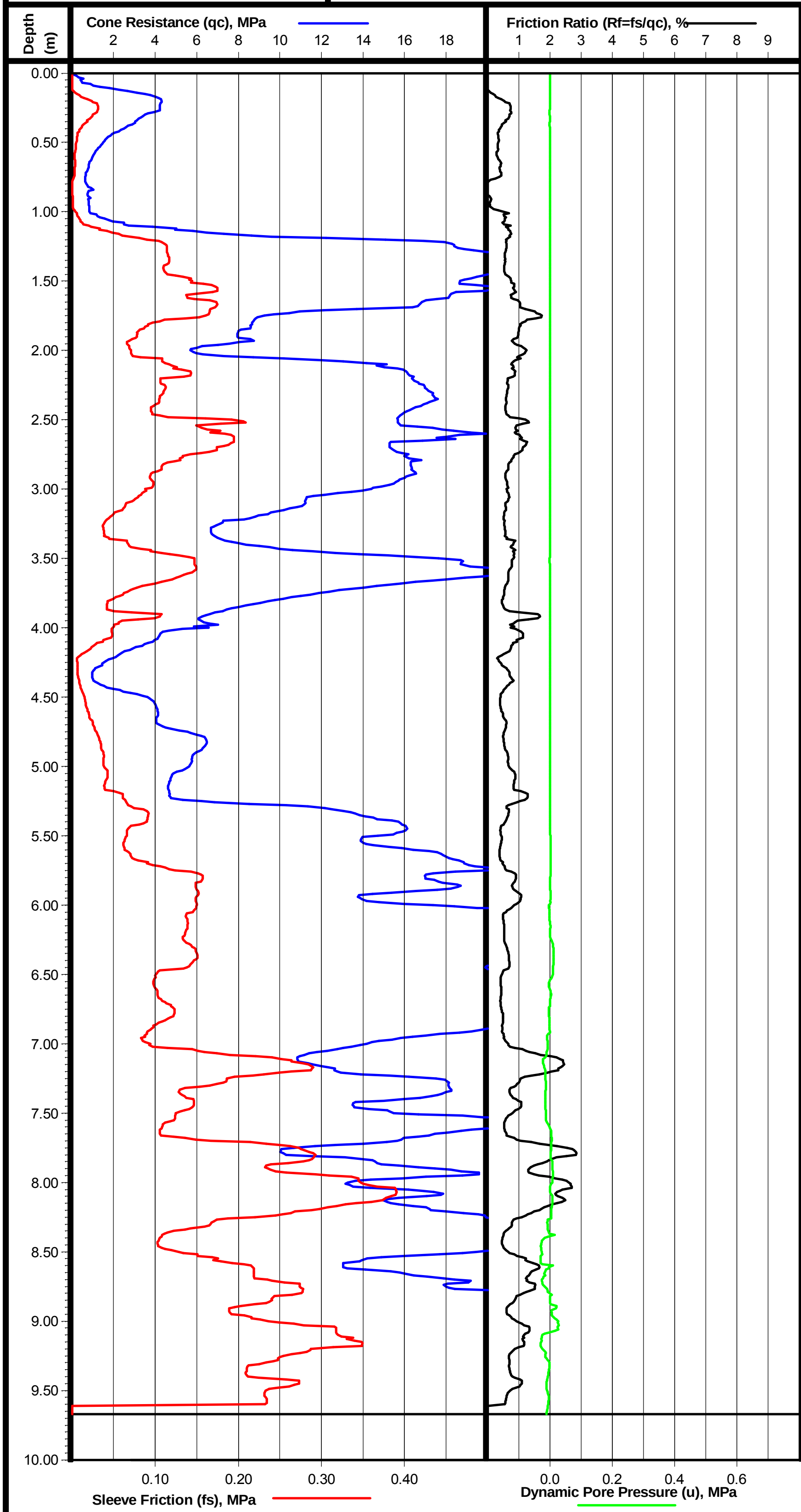
CPT 2009_33A

Sheet 1 of 1

Cone Penetration Test Log

Soil Mechanics

Date	02/08/2010	**Equipment and Methods**	**Ground Level** +6.54 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647475.33 N 263899.45
Operator	DB		



Strata Description	Depth	Level	(Thickness)	Legend
Loose gravelly SAND and very loose sand. (Probable MADE GROUND)	1.20	+5.34	(1.20)	
Dense gravelly sand and medium dense SAND. (Probable MADE GROUND)	2.10	+4.44	(0.90)	
Dense SAND and gravelly SAND. (Probable MADE GROUND)	3.10	+3.44	(1.00)	
Medium dense and dense SAND. (Probable MADE GROUND)	3.80	+2.74	(0.70)	
Medium dense SAND. (Probable RECENT DEPOSITS) 4.30-4.45 m very loose silty sand	5.30	+1.24	(1.50)	
Dense becoming very dense, SAND and gravelly sand. (CRAG DEPOSITS)	7.05	-0.51	(1.75)	
Dense SAND. (CRAG DEPOSITS)	8.80	-2.26	(1.75)	
Very dense SAND. (CRAG DEPOSITS)	9.67	-3.13	(0.87)	
Base of CPT at 9.67 mBGL				

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_33b.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_33B

Sheet 1 of 1

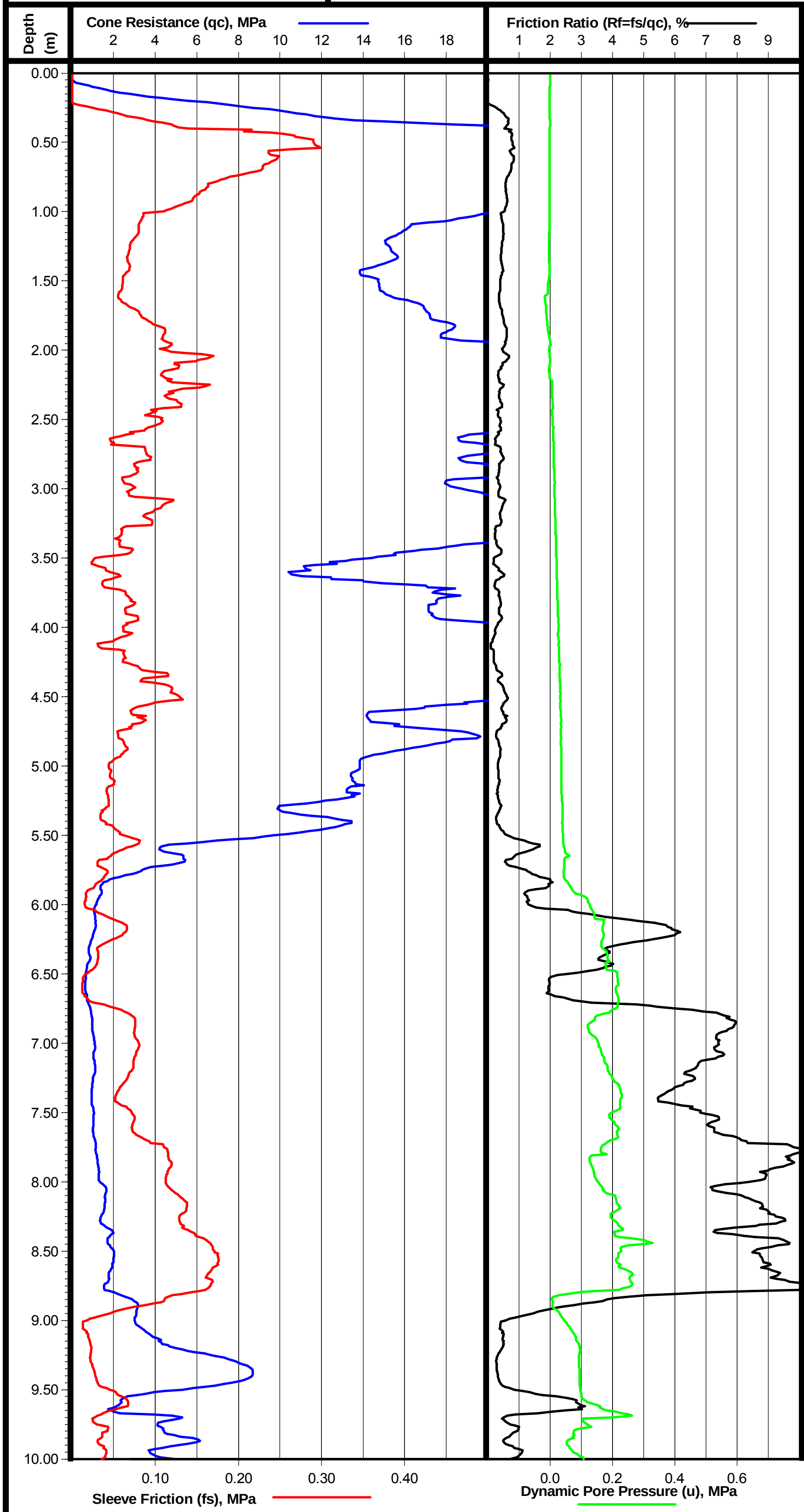
Cone Penetration Test Log

Soil Mechanics

Date	24/08/2010	**Ground Level**	+2.00 mOD
Cone No	C10CFIP.124_2010	**Co-ordinates National Grid**	E 647465.56 N 263996.11
Operator	DB		

Equipment and Methods

Test according to BS 1377 : Part 9 : Method 3.1 : 1990



Strata Description	Depth	Level	(Thickness)
Very dense and dense gravelly SAND. (Probable MADE GROUND)	5.90	-3.90	(5.90)
Firm CLAY. (RECENT DEPOSITS)	7.60	-5.60	(1.70)
Stiff organic CLAY. (RECENT DEPOSITS)	8.85	-6.85	(1.25)
Loose to medium dense SAND and silty SAND. (RECENT DEPOSITS)			(1.35)

Stratum continues to 10.20 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_34.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

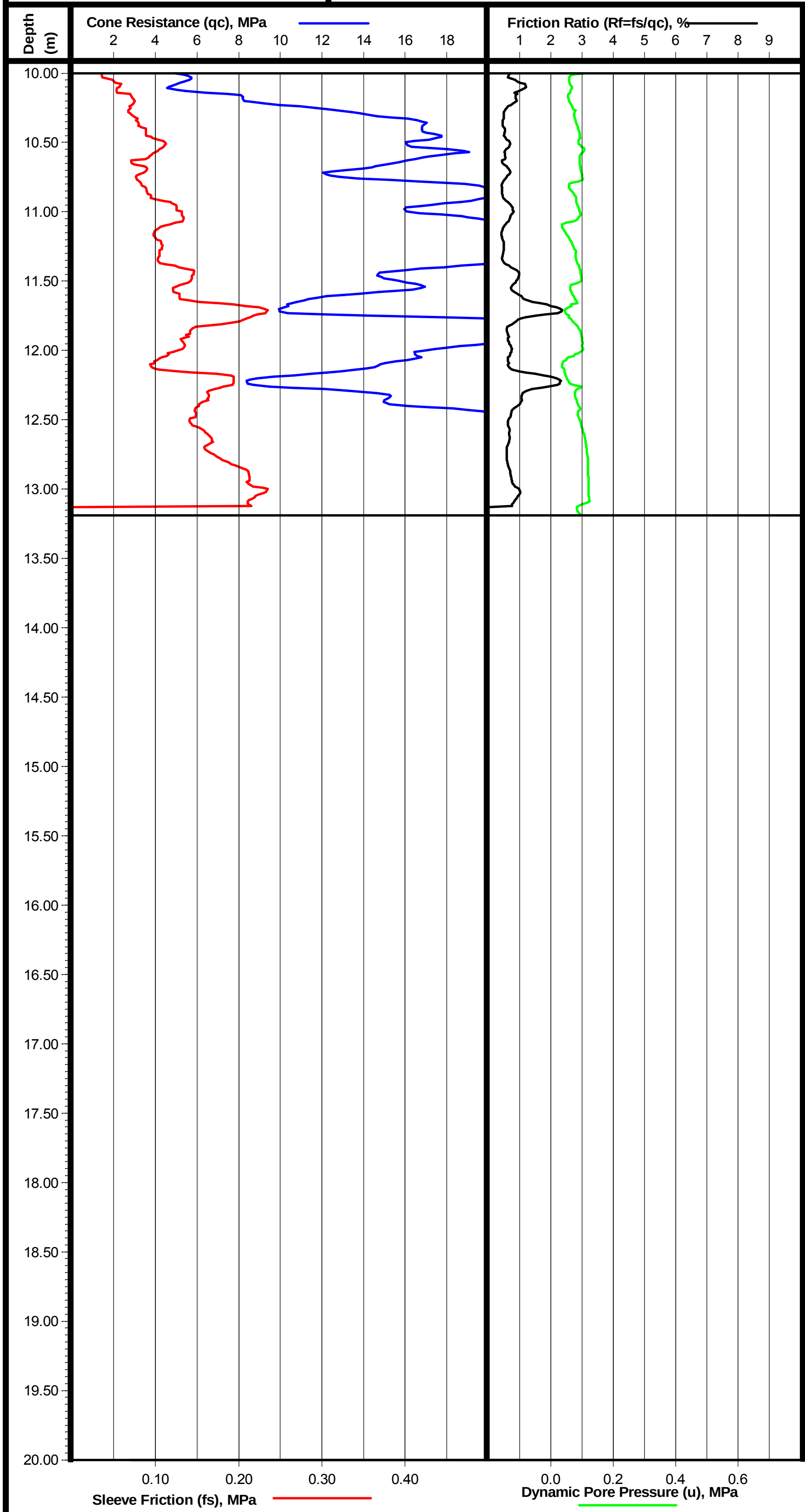
CPT No

CPT 2009_34

Cone Penetration Test Log

Soil Mechanics

Date	24/08/2010	**Equipment and Methods**	**Ground Level** +2.00 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647465.56 N 263996.11
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Loose to medium dense SAND and silty SAND. (RECENT DEPOSITS)	10.20	-8.20	
Dense, locally very dense, SAND. (CRAG DEPOSITS)	(2.99)		
Base of CPT at 13.19 mBGL	13.19	-11.19	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_34.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:52:26

AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_34

Sheet 2 of 2

Cone Penetration Test Log

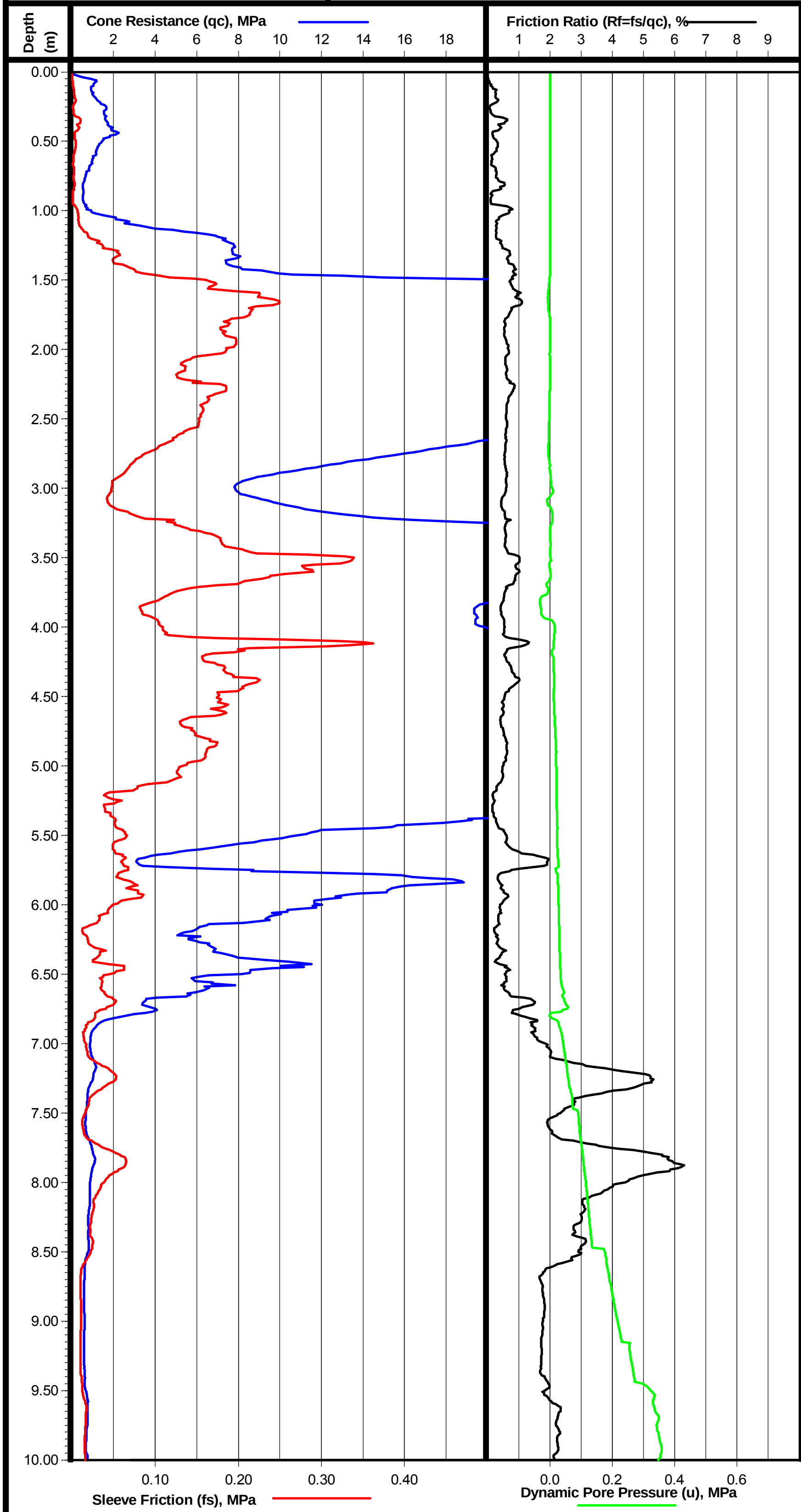
Soil Mechanics

Date	18/10/2010	
Cone No	C10CFIP.124_2010	
Operator	DB	

Equipment and Methods

Test according to BS 1377 : Part 9 : Method 3.1 : 1990

Ground Level	+3.86 mOD
Co-ordinates National Grid	E 647475.32
	N 264118.17



Strata Description	Depth, Level (Thickness)		Legend
Very loose gravelly SAND. (Probable MADE GROUND)	(1.20)		
Very dense, locally dense, gravelly SAND. (Probable MADE GROUND) 2.95-3.25 m medium dense sand	1.20 (4.30)	+2.66	
Medium dense SAND. (Probable RECENT DEPOSITS)	5.50 (1.30)	-1.64	
Firm CLAY. (RECENT DEPOSITS)	6.80 (1.75)	-2.94	
Soft CLAY. (RECENT DEPOSITS)	8.55 (0.95)	-4.69	
Firm CLAY. (RECENT DEPOSITS)	9.50	-5.64	

Stratum continues to 11.65 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_35.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2205/08/2011 09:36:32 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

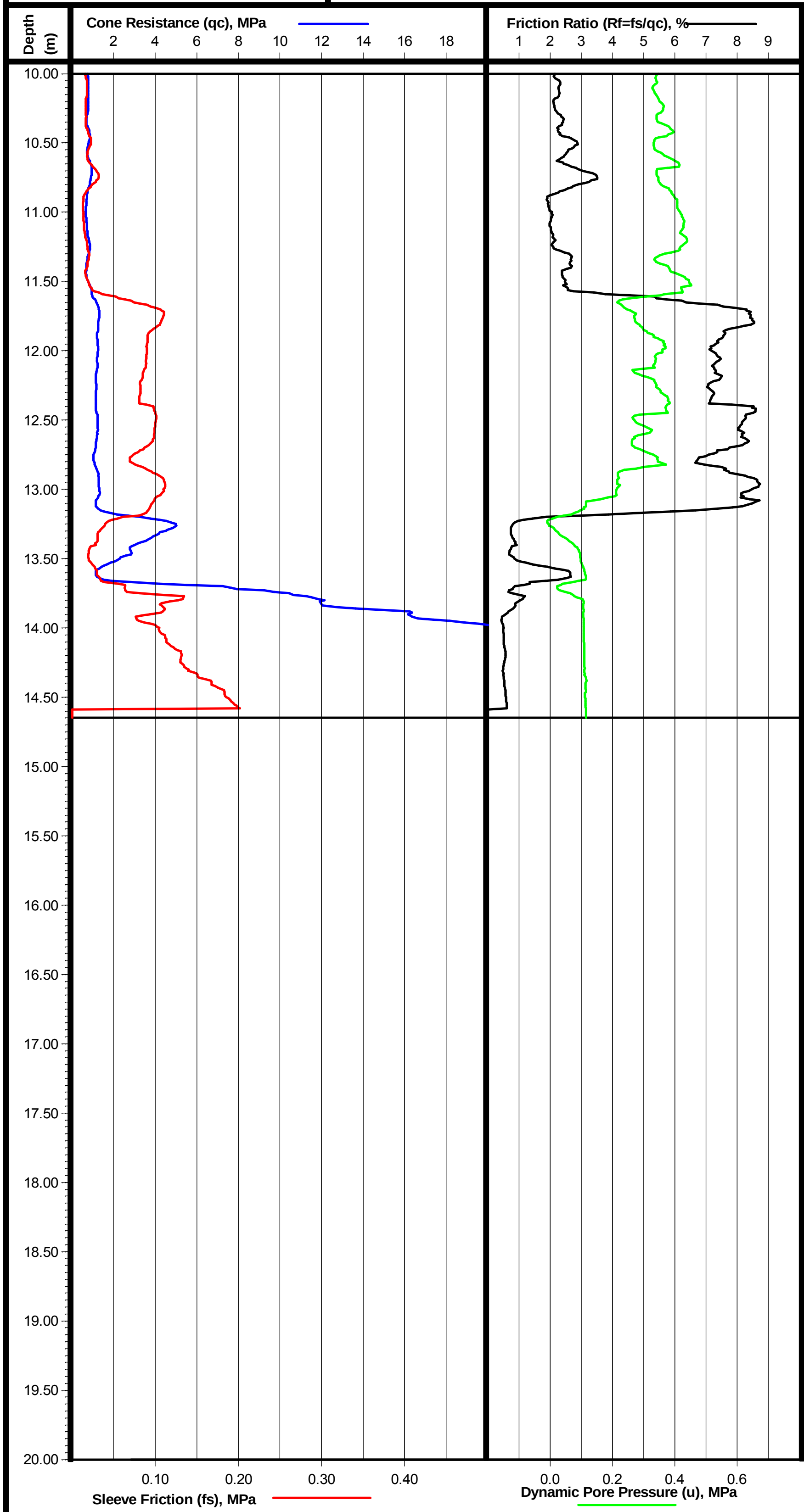
CPT 2009_35

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	18/10/2010	**Equipment and Methods**	**Ground Level** +3.86 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647475.32 N 264118.17
Operator	DB		



Strata Description	Depth, Level (Thickness)	Legend
Firm CLAY. (RECENT DEPOSITS)	(2.15)	
	11.65 -7.79	
Firm to stiff organic CLAY. (RECENT DEPOSITS)	(1.50)	
	13.15 -9.29	
Very loose to loose silty SAND. (RECENT DEPOSITS)	(0.55)	
	13.70 -9.84	
Very dense SAND. (CRAG DEPOSITS)	(0.95)	
	14.65 -10.79	
Base of CPT at 14.65 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_35.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

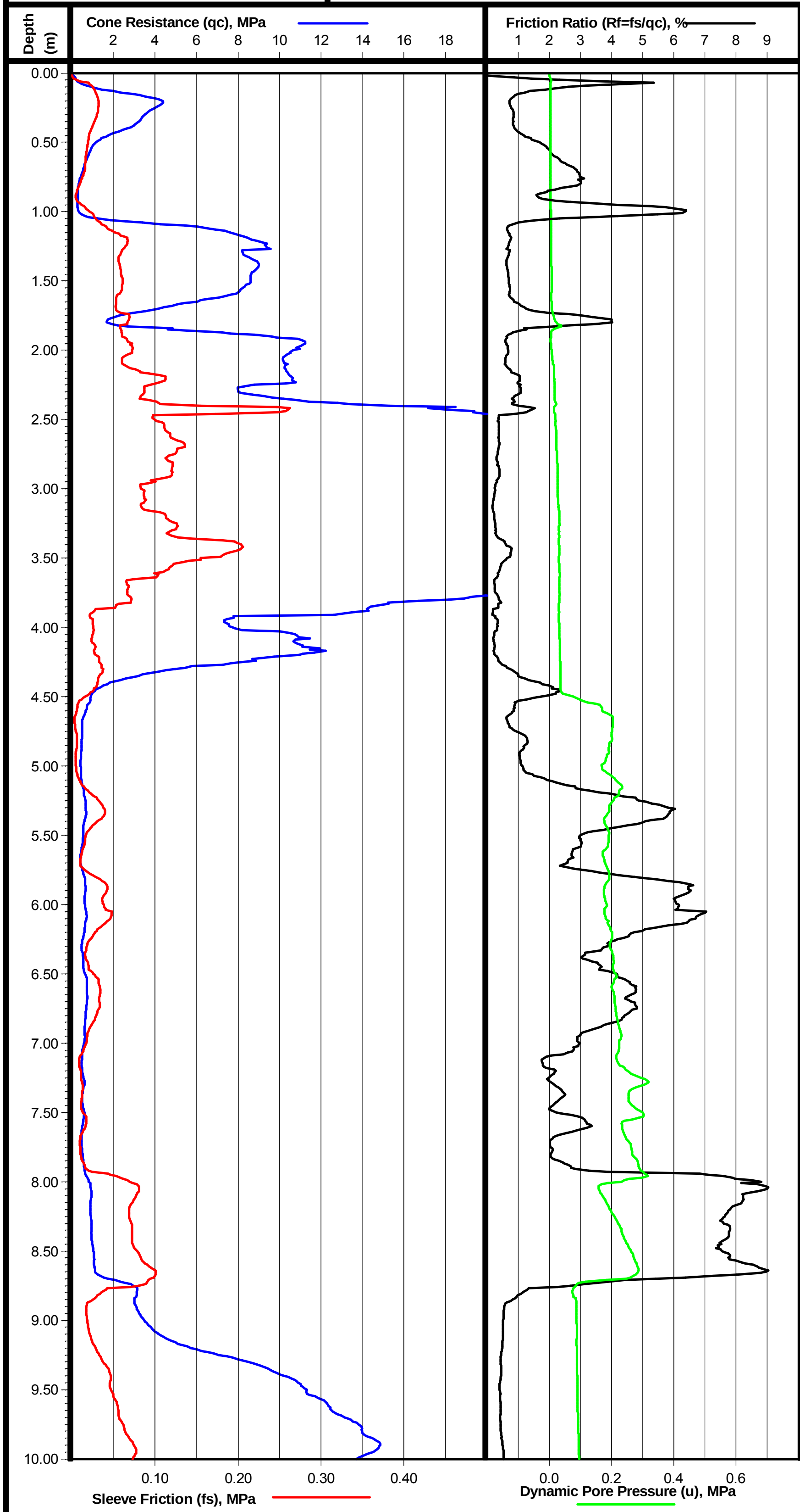
CPT No

CPT 2009_35

Cone Penetration Test Log

Soil Mechanics

Date	10/07/2010	**Equipment and Methods**	**Ground Level** +2.04 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647474.25 N 264231.42
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Loose to medium dense SAND. (Probable MADE GROUND) 0.50-1.05 m very soft clay	(2.50)		
Very dense gravelly SAND. (Probable MADE GROUND)	2.50 (2.00)	-0.46	
Soft CLAY. (RECENT DEPOSITS)	4.50 (3.45)	-2.46	
Firm organic CLAY. (RECENT DEPOSITS)	7.95 (0.75)	-5.91	
Dense to very dense SAND. (CRAG DEPOSITS)	8.70	-6.66	

Stratum continues to 12.85 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_36.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:52:43 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

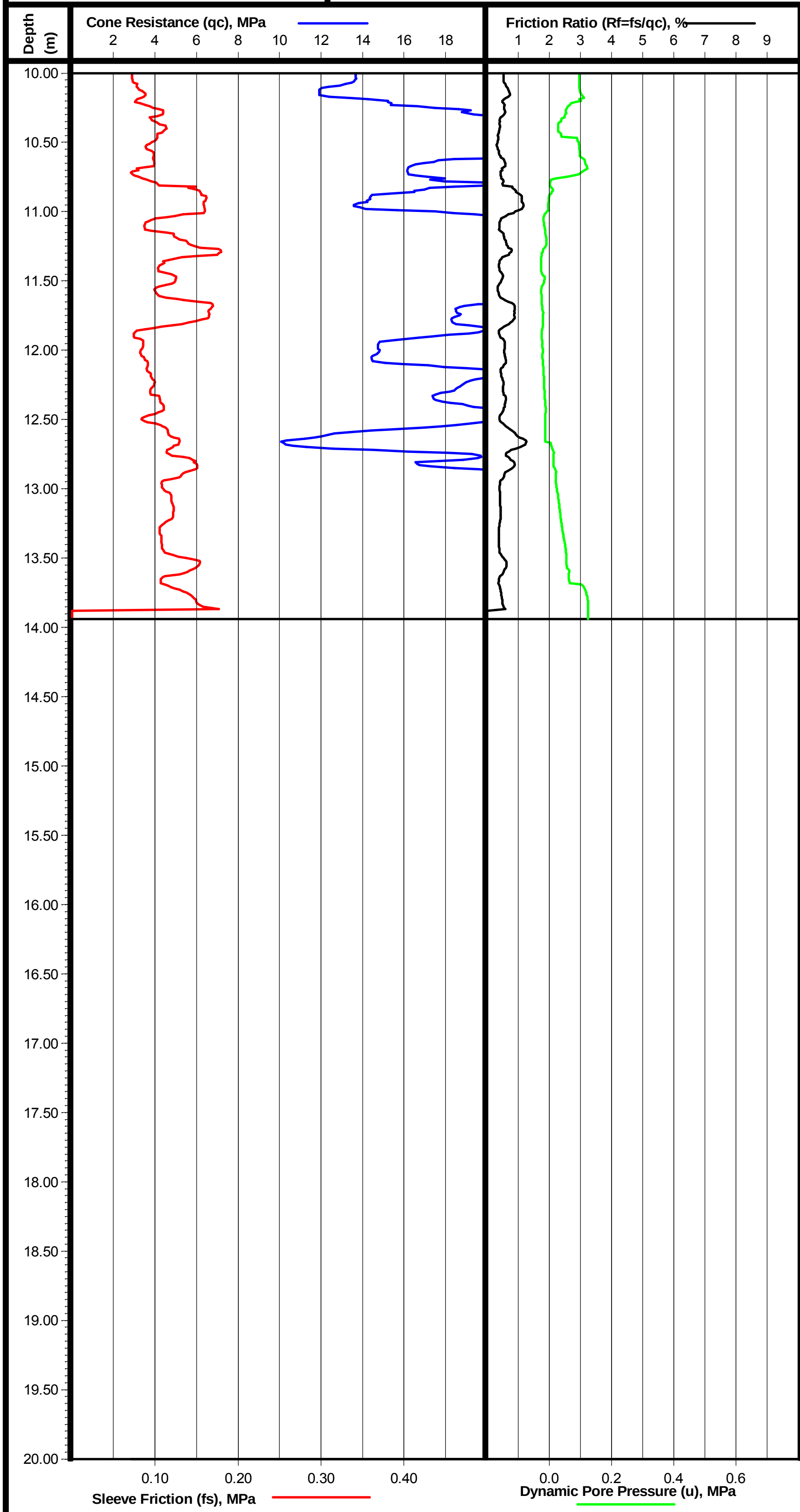
CPT 2009_36

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/07/2010	**Equipment and Methods**		**Ground Level**	+2.04 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647474.25
Operator	DB				N 264231.42



Strata Description	Depth	Level	(Thickness)	Legend
Dense to very dense SAND. (CRAG DEPOSITS)			(4.15)	
	12.85	-10.81		
Very dense SAND. (CRAG DEPOSITS)			(1.09)	
	13.94	-11.90		
Base of CPT at 13.94 mBGL				

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_36.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_36

Cone Penetration Test Log

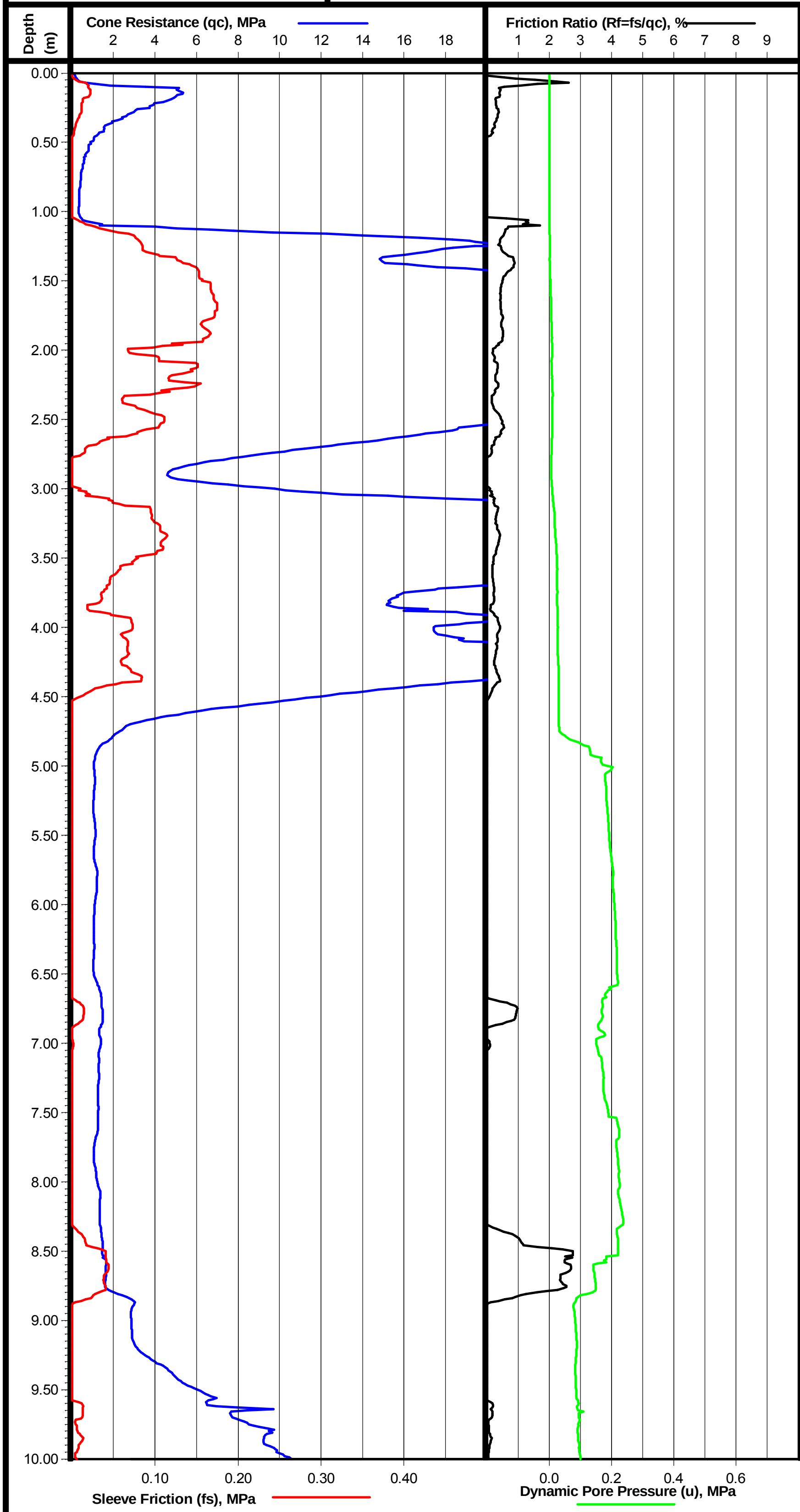
Soil Mechanics

Date	11/07/2010
Cone No	C10CFIP.584
Operator	DB

Equipment and Methods

Test according to BS 1377 : Part 9 : Method 3.1 : 1990

Ground Level	+2.42 mOD
Co-ordinates National Grid	E 647468.79 N 264291.33



Strata Description	Depth	Level	(Thickness)	Legend
Medium dense gravelly SAND. (Probable MADE GROUND)			(0.50)	
Very loose/soft material.	0.50	+1.92	(0.50)	
Very dense, locally dense, gravelly SAND. (MADE GROUND)	1.00	+1.42	(3.70)	
Firm SILT. (Probable RECENT DEPOSITS)	4.70	-2.28	(4.10)	
Loose to medium dense very silty SAND. (RECENT DEPOSITS)	8.80	-6.38	(0.80)	
Medium dense to dense	9.60	-7.18		

Stratum continues to 10.60 m

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_37.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:52:54 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

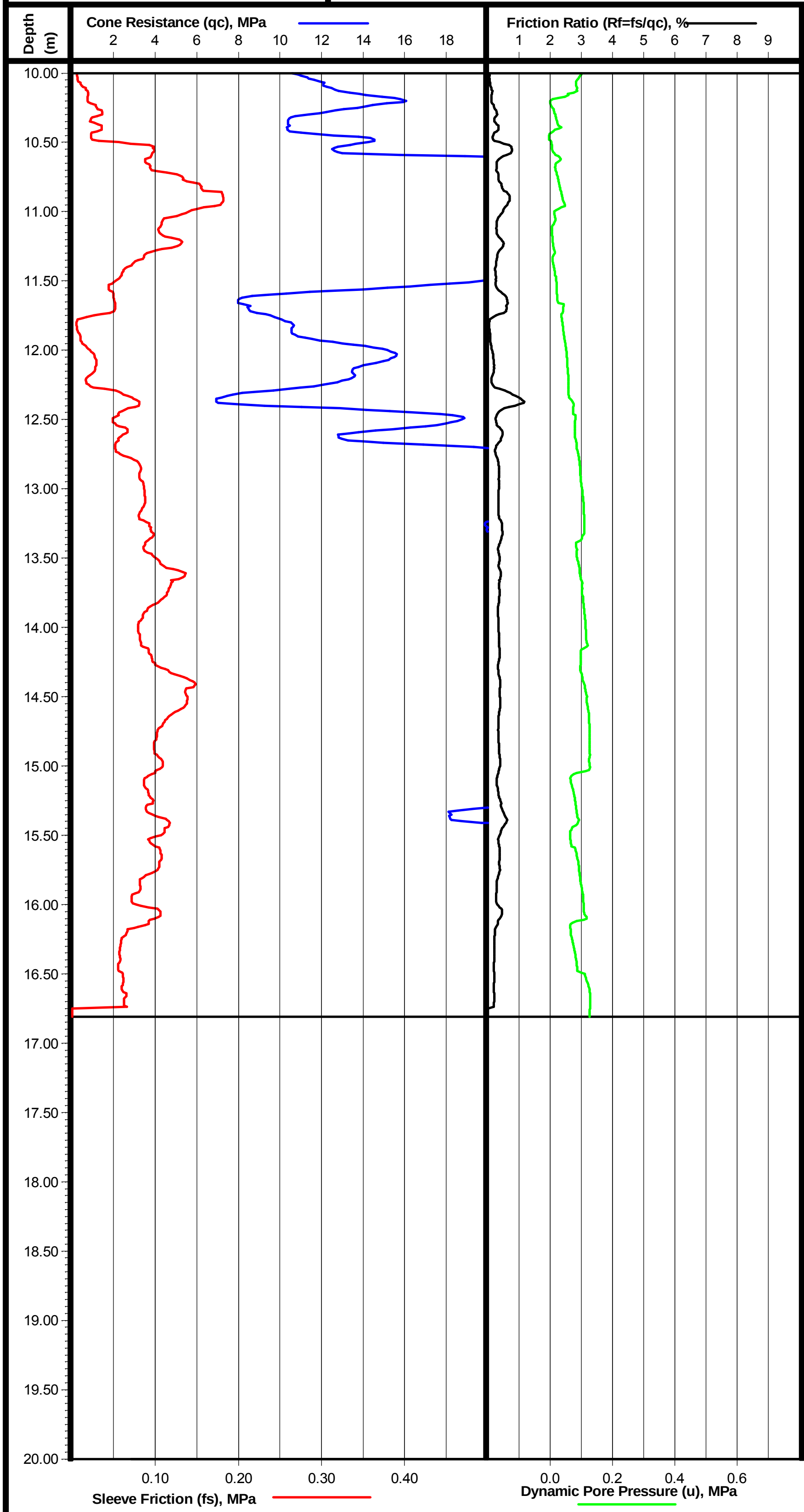
CPT No

CPT 2009_37

Sheet 1 of 2

Cone Penetration Test Log

Date	11/07/2010	**Equipment and Methods**	**Ground Level** +2.42 mOD
Cone No	C10CFIP.584	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647468.79 N 264291.33
Operator	DB		



Strata Description	Depth	Level	(Thickness)
SAND. (Probable CRAG DEPOSITS)			(1.00)
Very dense SAND and gravelly SAND. (CRAG DEPOSITS)	10.60	-8.18	(0.95)
Medium dense to dense SAND. (CRAG DEPOSITS)	11.55	-9.13	(1.20)
Very dense SAND. (CRAG DEPOSITS)	12.75	-10.33	(3.45)
Very dense gravelly SAND. (CRAG DEPOSITS)	16.20	-13.78	(0.61)
Base of CPT at 16.81 mBGL	16.81	-14.39	

Remarks

Piezo Cone: C10CFIP.584, Data File: A0012-10_cpt_2009_37.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:53:02

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

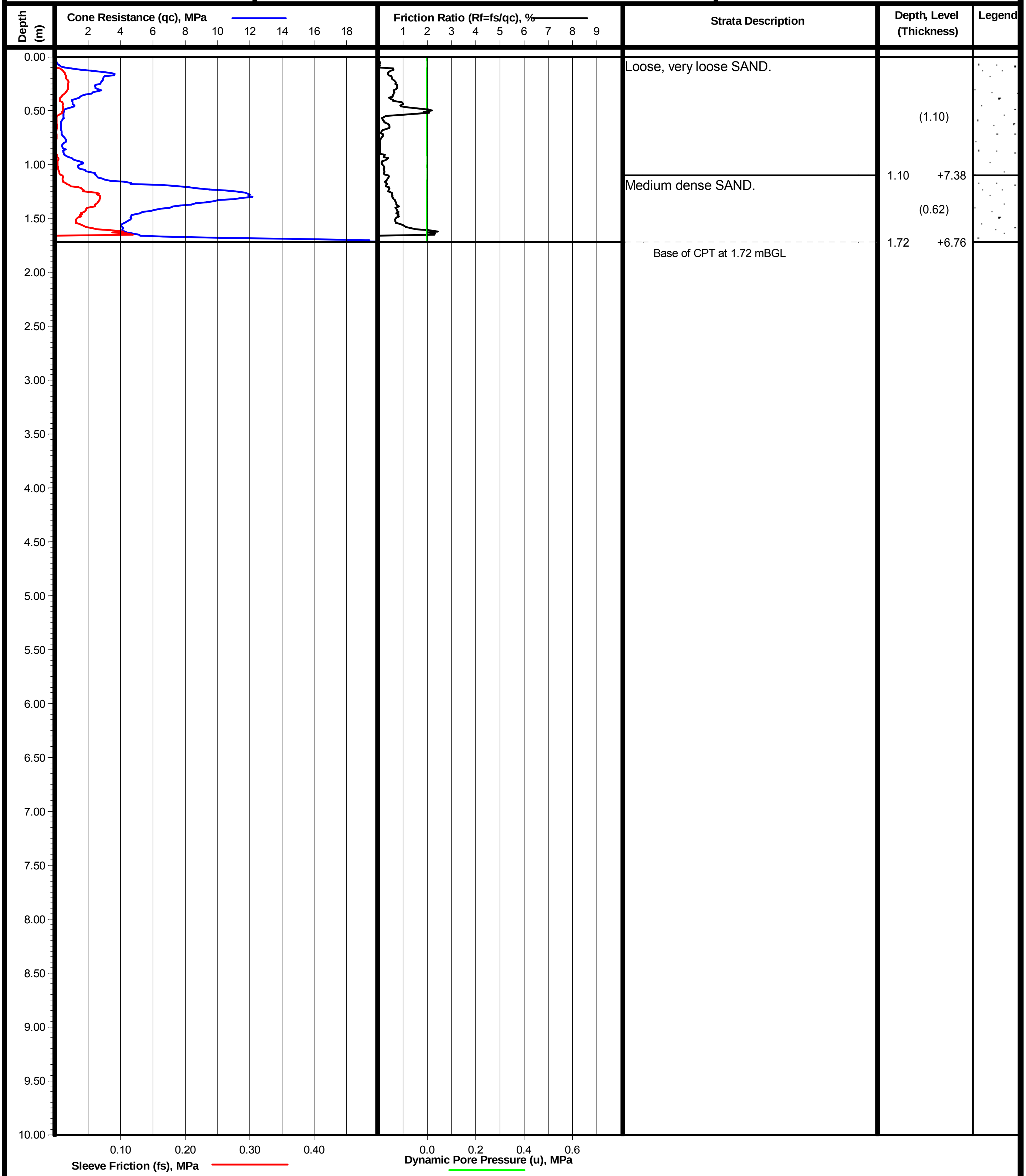
CPT 2009_37

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	18/10/2010	Equipment and Methods	Ground Level	+8.48 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	Co-ordinates National Grid	E 647473.58
Operator	DB			N 264377.99



Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_38.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

AGS

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

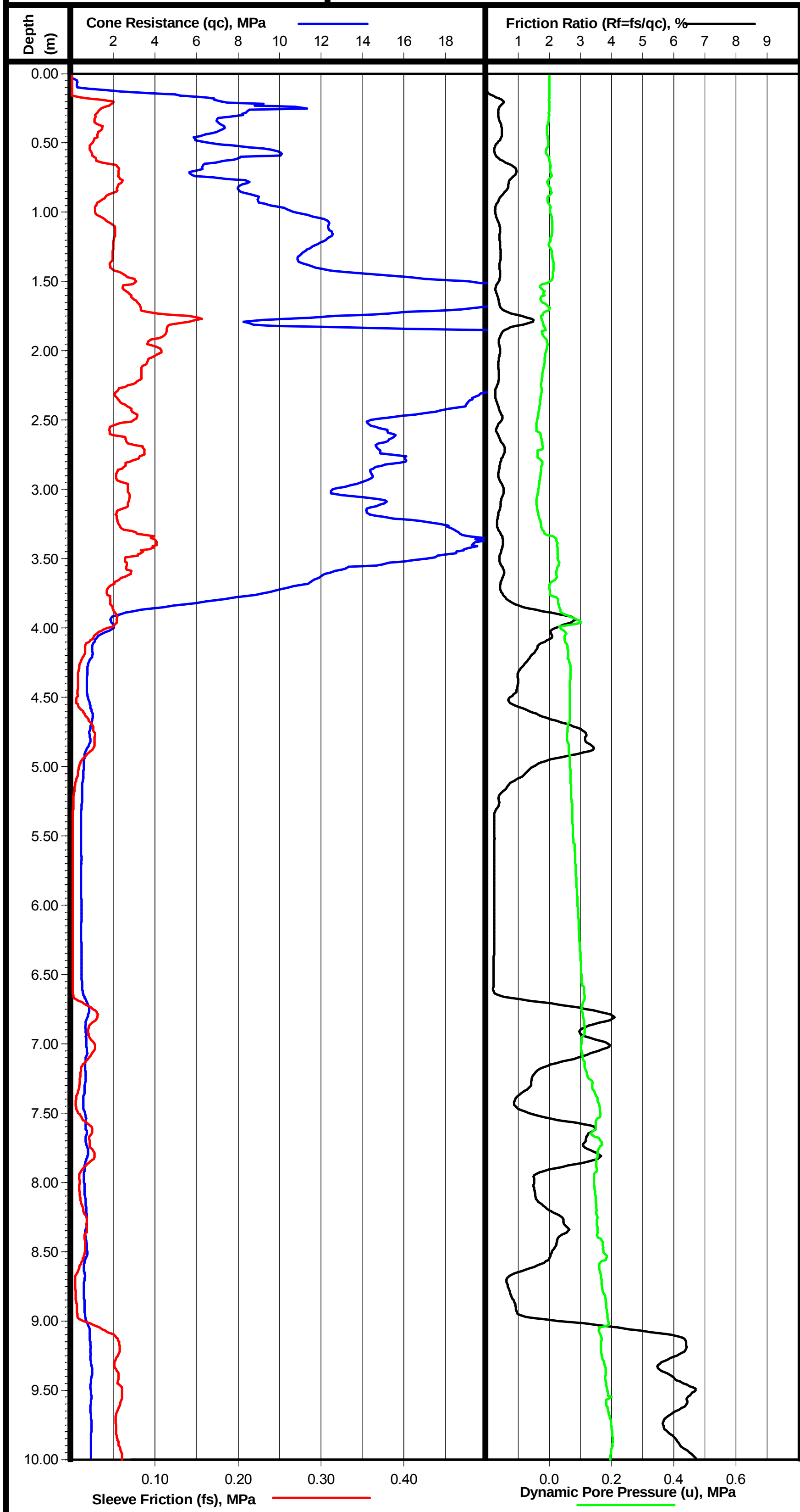
CPT No

CPT 2009_38

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**		**Ground Level**	+1.67 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647331.64
Operator	DB				N 264109.63



Strata Description	Depth	Level (Thickness)
Medium dense gravelly SAND. (Probable MADE GROUND)		(1.05)
Dense, locally very dense, gravelly SAND. (Probable MADE GROUND) 1.80 m band of medium dense sand	1.05	+0.62 (2.85)
Very loose silty SAND varying to firm silty clay. (RECENT DEPOSITS)	3.90	-2.23 (1.05)
Soft silty CLAY. (RECENT DEPOSITS)	4.95	-3.28 (1.80)
Soft CLAY, locally silty CLAY. (RECENT DEPOSITS)	6.75	-5.08 (2.25)
Firm organic CLAY. (RECENT DEPOSITS)	9.00	-7.33 (1.00)

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_39.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2205/08/2011 09:37:51

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

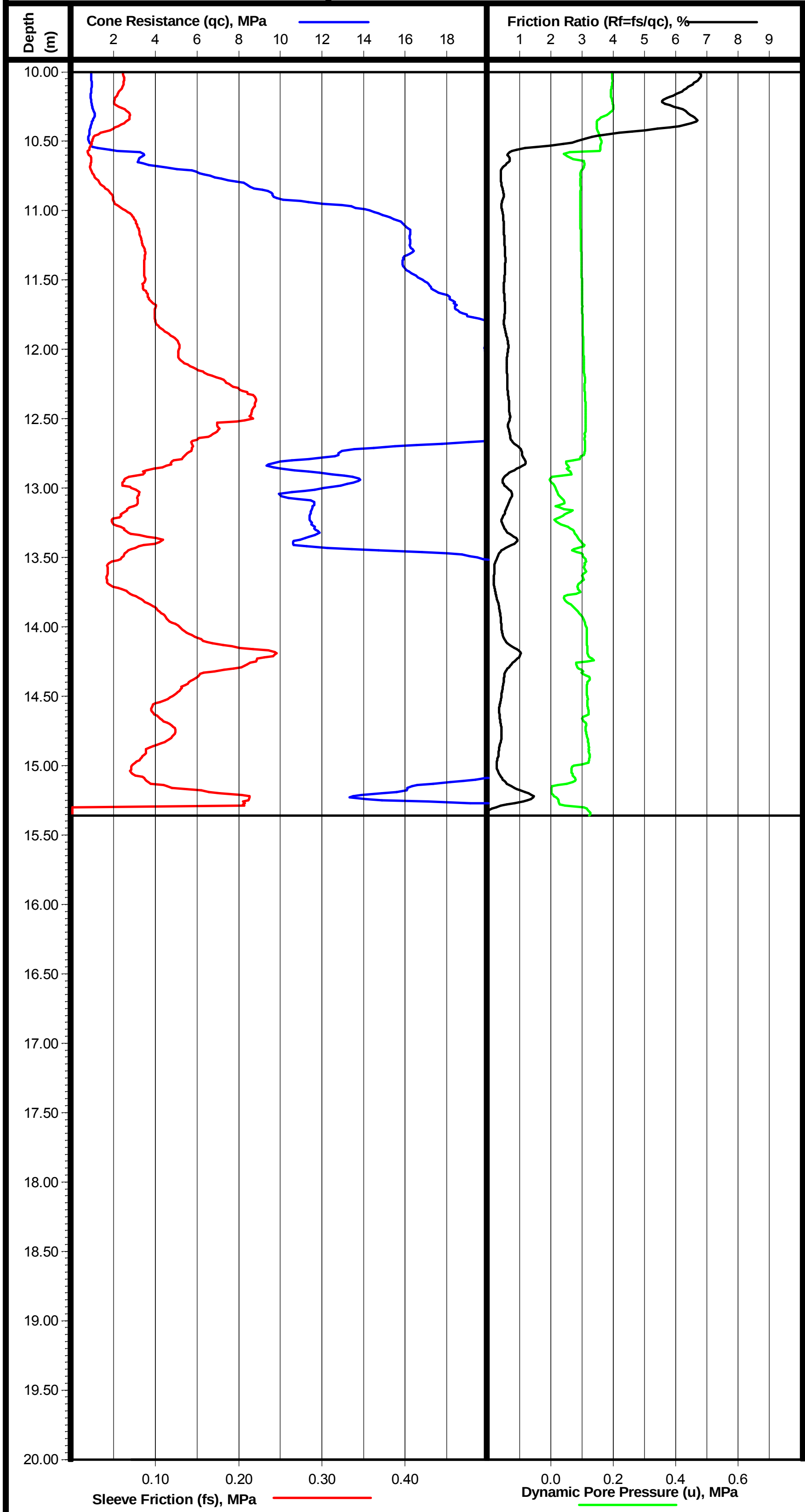
CPT No

CPT 2009_39

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**		**Ground Level**	+1.67 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647331.64 N 264109.63
Operator	DB				



Strata Description	Depth	Level	(Thickness)	Legend
Soft CLAY, locally silty CLAY. (Probable RECENT DEPOSITS)	10.00	-8.33	(0.50)	
Medium dense becoming dense SAND. (Probable CRAG DEPOSITS)	10.50	-8.83	(1.50)	
Very dense SAND. (CRAG DEPOSITS)	12.00	-10.33	(0.75)	
Medium dense SAND. (CRAG DEPOSITS)	12.75	-11.08	(0.70)	
Very dense SAND. (CRAG DEPOSITS) 13.80 m band of gravelly sand	13.45	-11.78	(1.91)	
Base of CPT at 15.36 mBGL	15.36	-13.69		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_39.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2205/08/2011 09:37:56 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

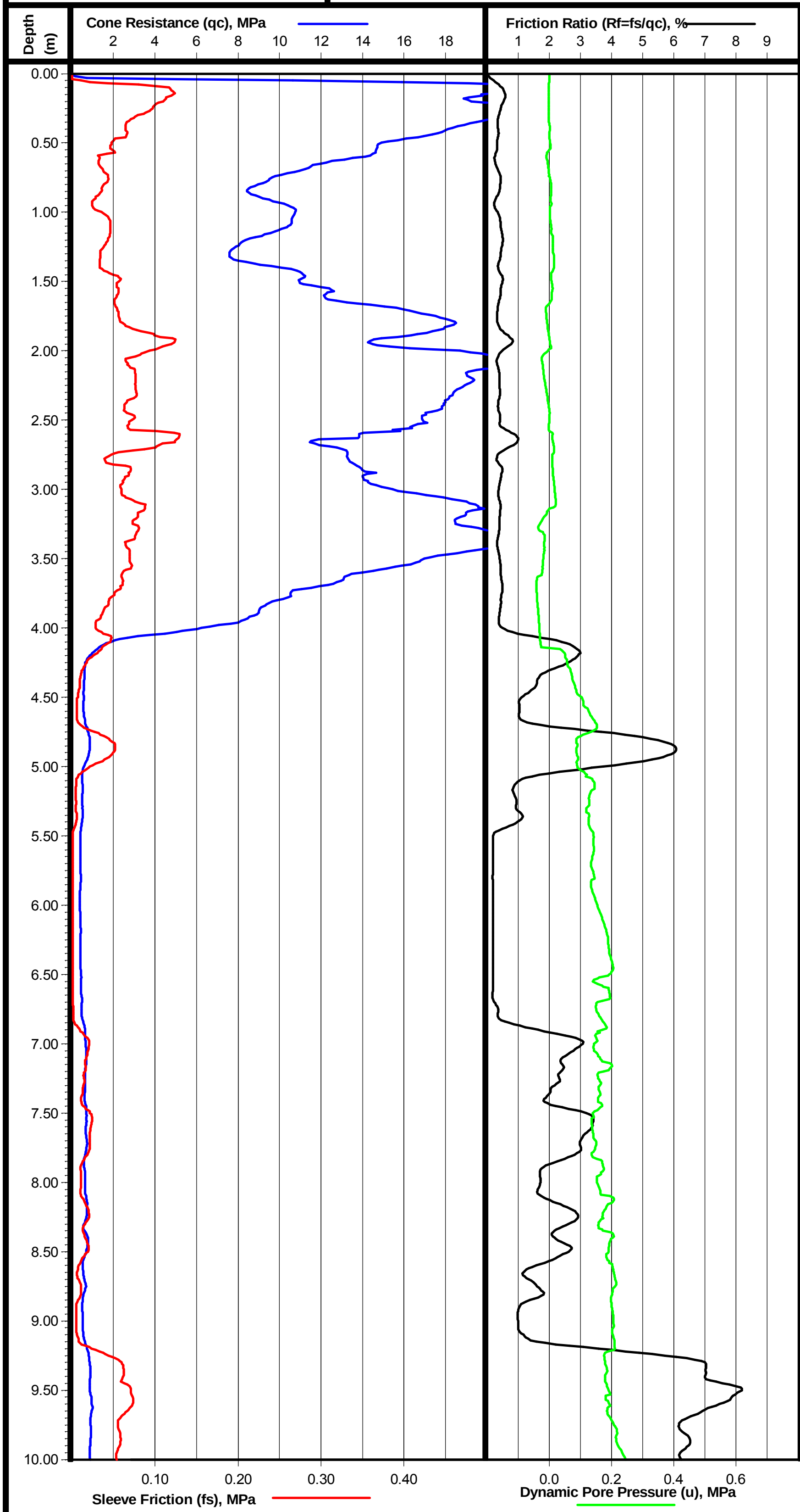
CPT 2009_39

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**		**Ground Level**	+1.71 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647365.29 N 264105.91
Operator	DB				



Strata Description	Depth, Level (Thickness)		Legend
Dense, locally medium dense gravelly SAND. (Probable MADE GROUND)		(1.65)	
Dense, locally very dense, gravelly SAND. (Probable MADE GROUND) 2.70 m band of medium dense sand; 3.65-4.10 m band of medium dense sand	1.65	+0.06 (2.45)	
Soft silty CLAY, locally CLAY. (RECENT DEPOSITS)	4.10	-2.40 (1.40)	
Very soft to soft silty CLAY. (RECENT DEPOSITS)	5.50	-3.80 (1.40)	
Soft CLAY. (RECENT DEPOSITS)	6.90	-5.20 (2.30)	
Firm organic CLAY. (RECENT DEPOSITS)	9.20	-7.50 (0.80)	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_40.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

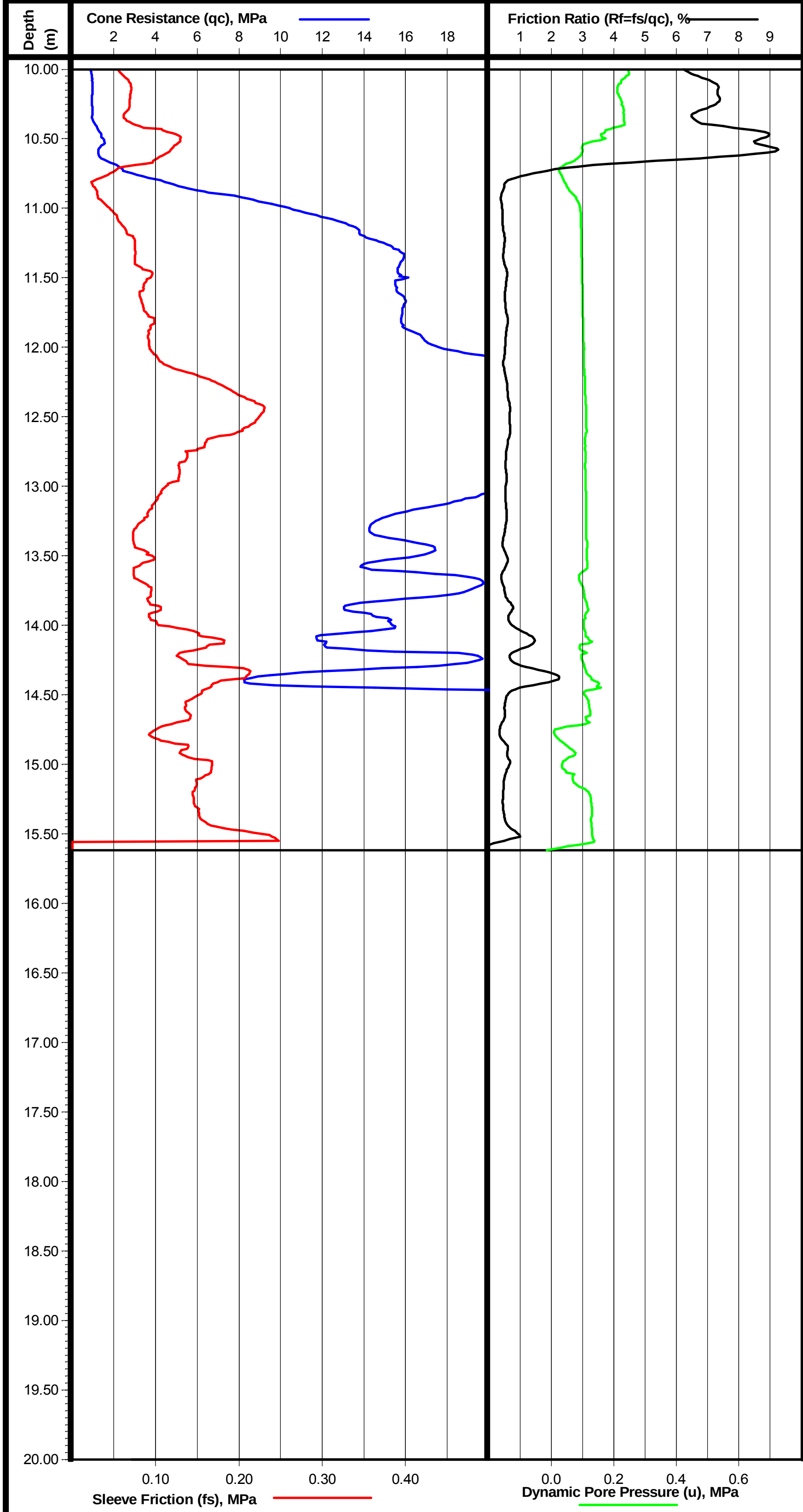
CPT No

CPT 2009_40

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**	**Ground Level** +1.71 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647365.29 N 264105.91
Operator	DB		



Strata Description		Depth, Level (Thickness)		Legend
Soft CLAY. (RECENT DEPOSITS)		10.00	-8.30	
		(0.80)		
Dense, locally very dense SAND. (CRAG DEPOSITS)	10.80-11.10 m medium dense	10.80	-9.10	
	12.10-13.10 m very dense	(3.65)		
	14.10-14.45 m bands of silty sand			
Very dense SAND. (CRAG DEPOSITS)		14.45	-12.75	
		(1.17)		
Base of CPT at 15.62 mBGL		15.62	-13.92	

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_40.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2205/08/2011 09:39:15 AGS

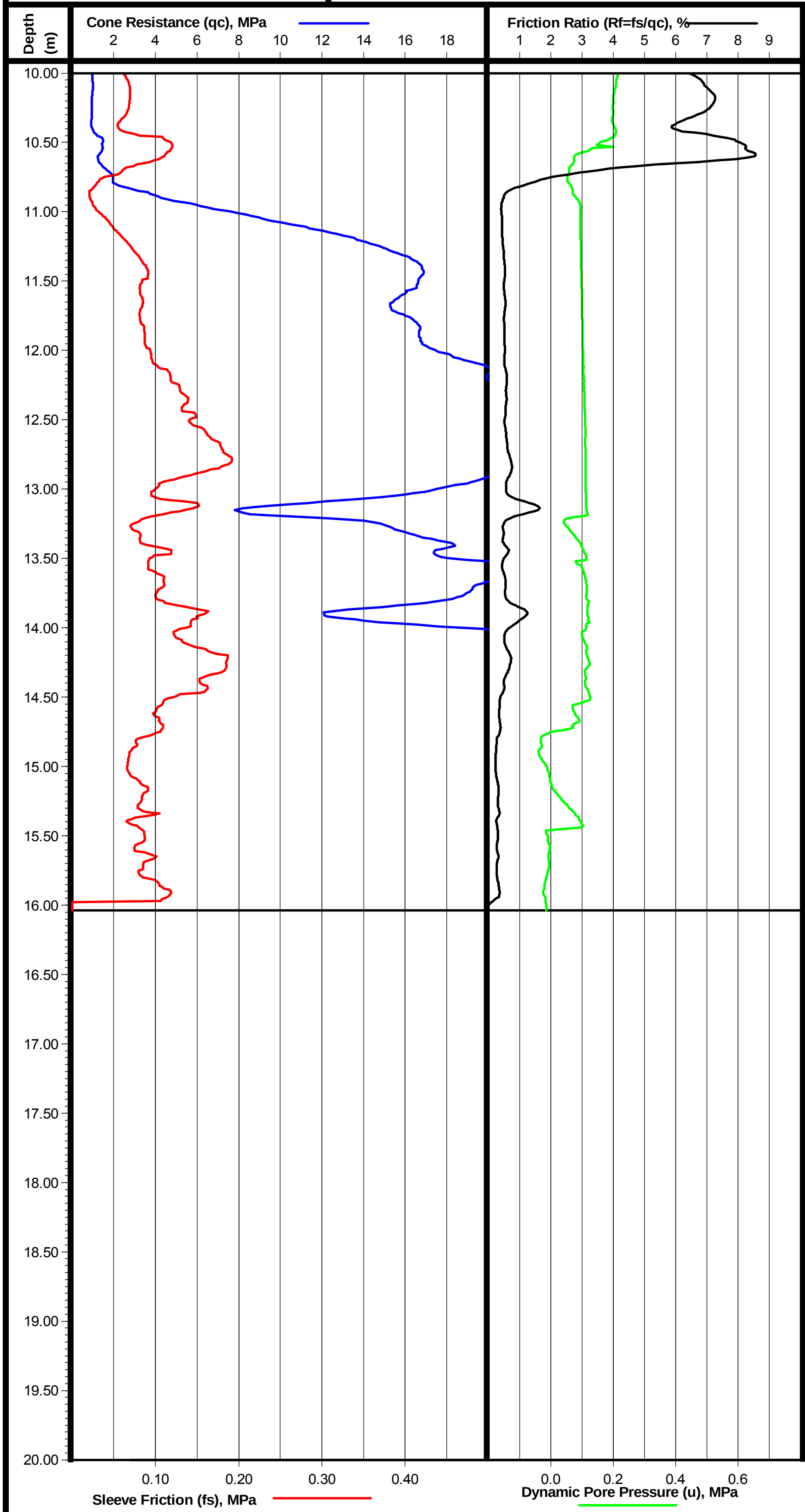
Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

CPT 2009_40

Cone Penetration Test Log

Date	10/01/2011	**Equipment and Methods**		**Ground Level**	+1.77 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		**Co-ordinates National Grid**	E 647348.54
Operator	DB				N 264095.05



Strata Description	Depth	Level	(Thickness)
Firm organic CLAY. (RECENT DEPOSITS)	10.70	-8.93	
Dense becoming very dense SAND. (CRAG DEPOSITS) 10.70-11.20 m medium dense	13.10	-11.33	(2.40)
Dense SAND with bands of silty sand. (CRAG DEPOSITS)	14.75	-12.98	(1.65)
Very dense SAND, locally gravelly SAND. (CRAG DEPOSITS)	16.04	-14.27	(1.29)
Base of CPT at 16.04 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_41.GEF

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1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:53:45

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

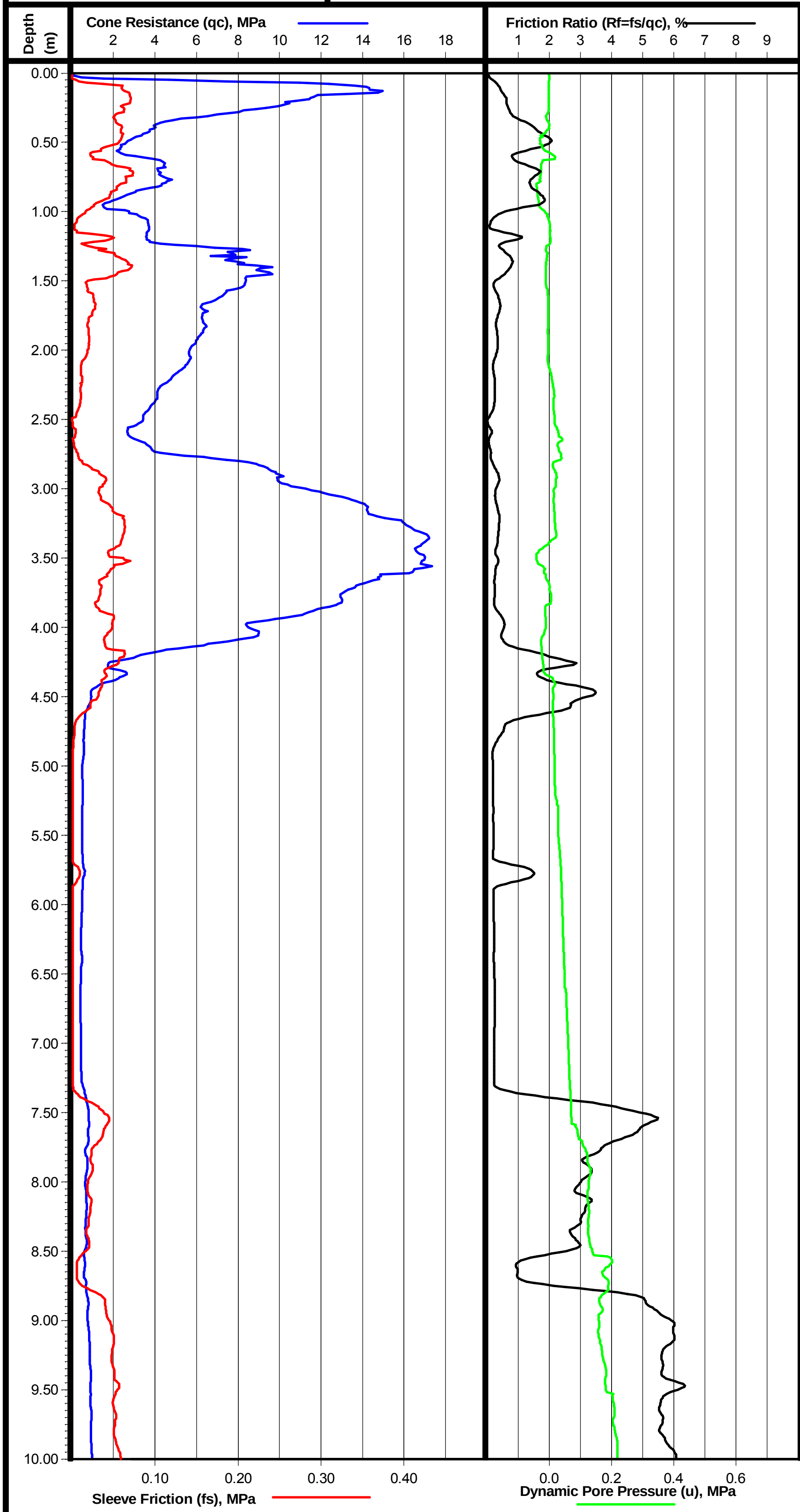
CPT 2009_41

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**	**Ground Level** +1.61 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647334.45 N 264082.72
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Medium dense, locally loose SAND, locally gravelly SAND. (MADE GROUND)	(2.75)		
	2.75	-1.14	
Dense gravelly SAND. (Probable MADE GROUND)	(1.45)		
	4.20	-2.59	
Very soft to soft silty CLAY. (RECENT DEPOSITS) 4.85-5.20 m bands of silty sand	(3.20)		
	7.40	-5.79	
Soft CLAY. (RECENT DEPOSITS) 8.55-8.75 m silty clay	(1.35)		
	8.75	-7.14	
Soft becoming firm organic CLAY. (RECENT DEPOSITS)	(1.95)		

Stratum continues to 10.70 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_42.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:53:51 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

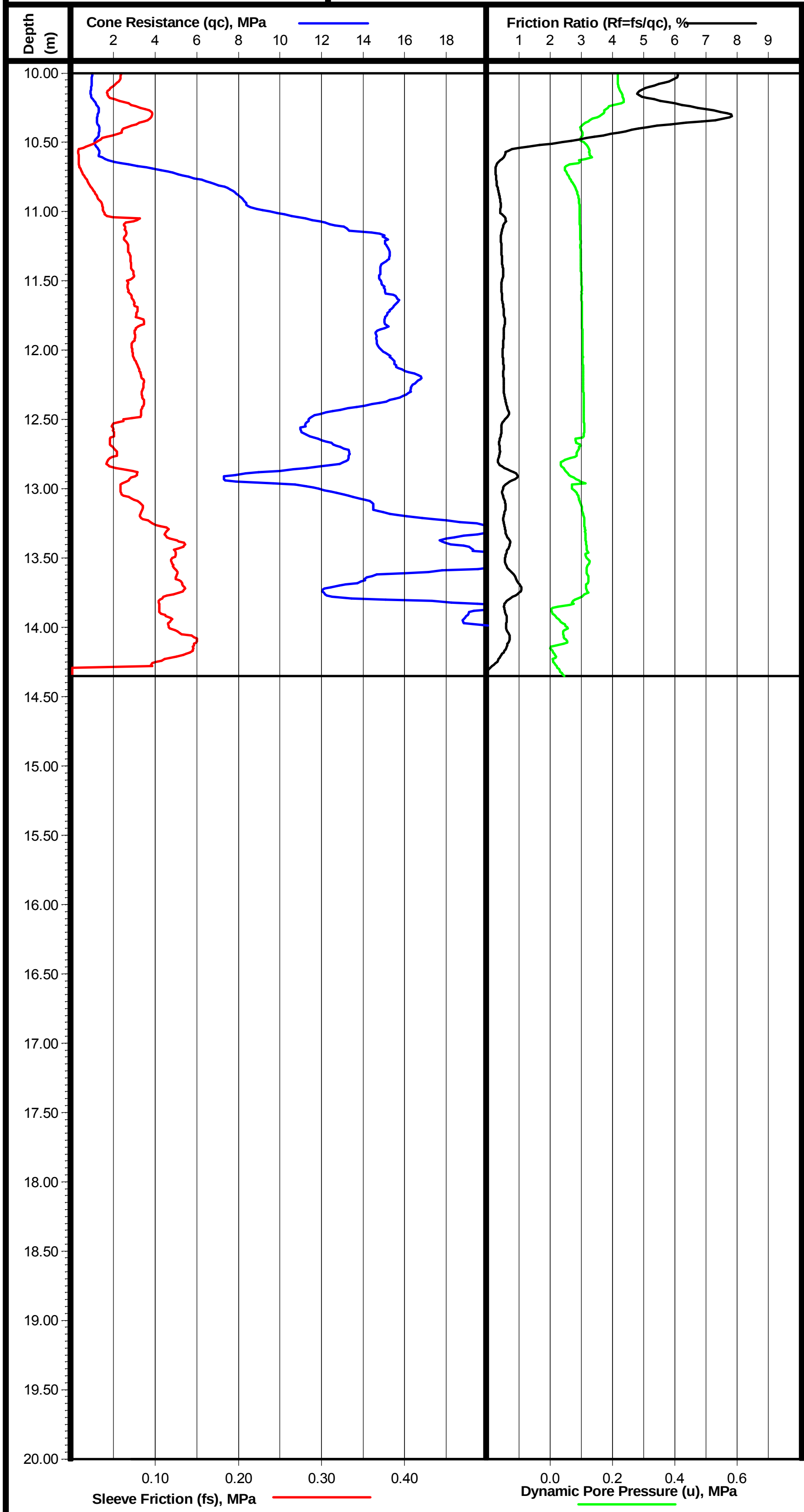
CPT 2009_42

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**	**Ground Level** +1.61 mOD
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates National Grid** E 647334.45 N 264082.72
Operator	DB		



Strata Description	Depth, Level (Thickness)		Legend
Soft becoming firm organic CLAY. (RECENT DEPOSITS)	10.70	-9.09	
Dense SAND. (CRAG DEPOSITS) 12.65-12.95 m medium dense silty sand	(3.30) 14.00	-12.39	
Very dense SAND. (CRAG DEPOSITS)	(0.35) 14.35	-12.74	
Base of CPT at 14.35 mBGL			

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_cpt_2009_42.GEF

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UKAS TESTING 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50 (c) ESGL 408 v1.2221/02/2011 15:53:59 AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

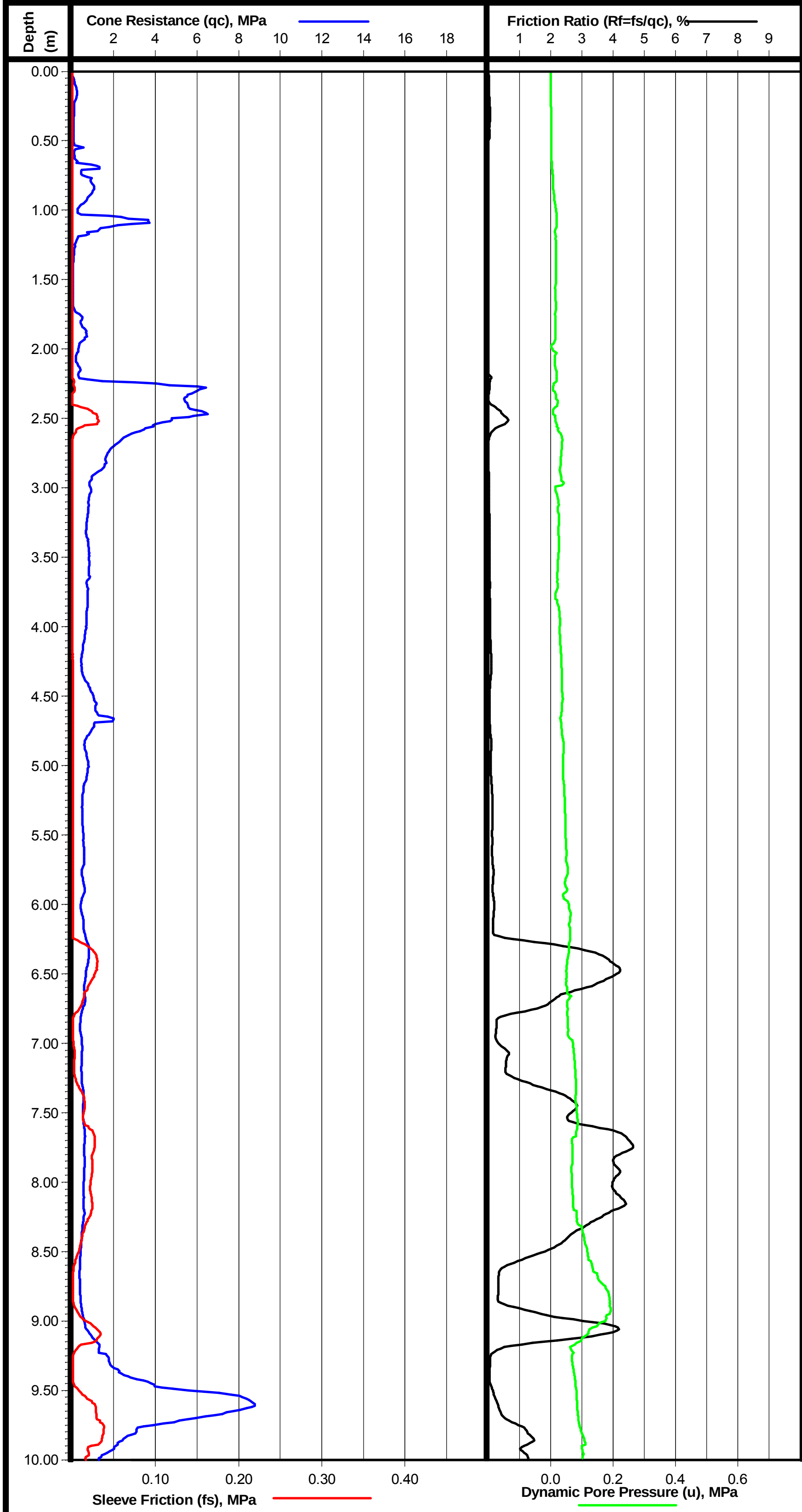
CPT 2009_42

Sheet 2 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	**Equipment and Methods**	**Ground Level** -
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990	**Co-ordinates** -
Operator	DB		**National Grid** -



Strata Description	Depth, Level (Thickness)	Legend
ROTARY OPEN HOLE DRILL-OUT. Backfill.	(9.15)	
Medium dense, locally loose silty SAND, locally SAND. (Probable RECENT DEPOSITS)	9.15 (1.50)	

Stratum continues to 10.65 m

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_Geo1_cpt1.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:56:30

AGS

Project	**ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE**
Project No.	**A0012-10**
Carried out for	**NNB Generation Company Limited**

CPT No

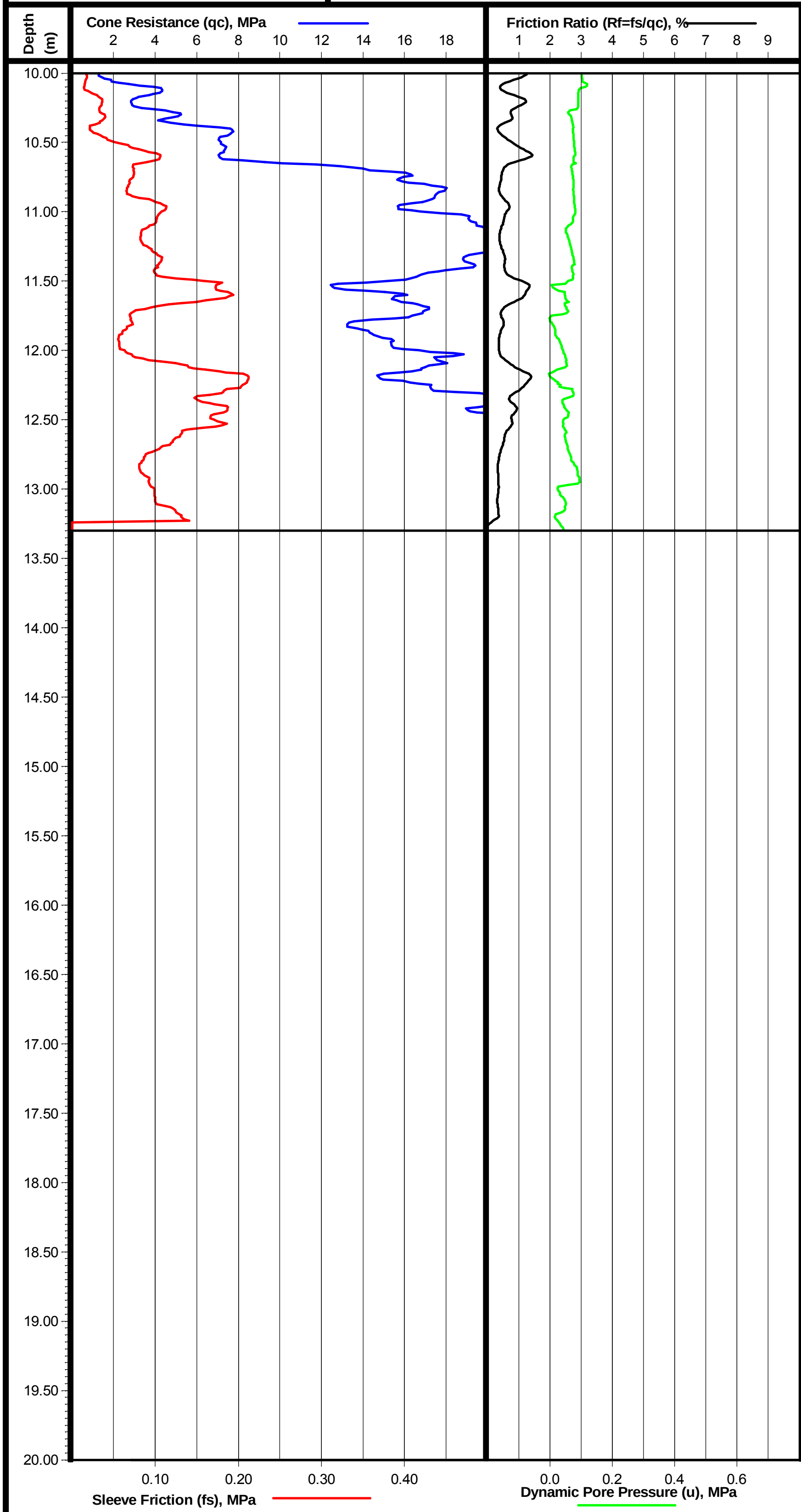
GEO1_CPT1C

Sheet 1 of 2

Cone Penetration Test Log

Soil Mechanics

Date	10/01/2011	Equipment and Methods		Ground Level	-
Cone No	C10CFIP.124_2010	Test according to BS 1377 : Part 9 : Method 3.1 : 1990		Co-ordinates National Grid	- -
Operator	DB				



Strata Description	Depth, Level (Thickness)	Legend
Medium dense, locally loose silty SAND, locally SAND. (Probable RECENT DEPOSITS)	10.65	
Dense SAND. (Probable RECENT DEPOSITS)	(1.65) 12.30	
Very dense SAND. (CRAG DEPOSITS)	(1.00) 13.30	
Base of CPT at 13.30 mBGL		

Remarks

Piezo Cone: C10CFIP.124_2010, Data File: A0012-10_Geo1_cpt1.GEF

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UKAS 1157

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres.

Scale 1:50

(c) ESGL 408 v1.2221/02/2011 15:56:37

AGS

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE
Project No.	A0012-10
Carried out for	NNB Generation Company Limited

CPT No

GEO1_CPT1C

ENCLOSURE B

CONE PENETRATION TESTING - LANKELMA

Lankelma Report   Report No.105087R001ED

SIZEWELL

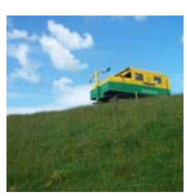
Static CPT (cone penetration tests) factual report

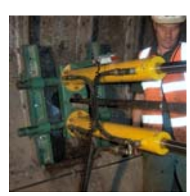
Cone Resistance

Local Friction

Pore water pressure

Contract No: 105087	**Date: 15th December 2010**





PROJECT:	Sizewell

CLIENT:	ESG Soil Mechanics

CONSULTANT:	

FIELDWORK

CPT Rig	20 tonne capacity track-truck mounted CPT unit (UK3)
Operator(s)	Ben Ranson and Scott Kennedy
Date started	29th November 2010
Date completed	1st December 2010
Lankelma's Project Manager	Emma Davis
Client's Site Manager	Ben Swallow

REPORT

	Date	Name	Signature
Prepared	15.12.10	Emma Davis	
Checked	15.12.10	Tom Abson	
Approved	15.12.10	Edwin Lee	

Date: 15th December 2010
Our Ref: 105087R001ED

4 Hexthorpe Road
Doncaster
South Yorkshire
DN4 0AE

Attention: Mr. Mathew Taylor

Dear Mathew,

CONE PENETRATION TESTS AT SIZEWELL

We have pleasure in providing a copy of our report and a digital copy of the text and the data in AGS format for the above project.

We trust that you are satisfied with the performance of our staff, equipment and reporting on this project, and would be happy to discuss any further requirements you have and look forward to being of service in the future.

Yours faithfully,
Lankelma Limited

Edwin Lee
Senior Projects Engineer

CONTENTS

1.0 INTRODUCTION

At the request of ESG Soil Mechanics (the Client), a soils investigation was carried out at Sizewell.

The investigation consisted of performing Cone Penetration Testing at the site. All tests were performed at locations set out by the Client's representative on site. The Scope of works comprised:

- 26 No. electric Piezo Cone Penetration Tests (CPTU's) to a maximum depth of 18.78m or refusal.
- Provision of a factual report with estimated soil type.

All tests were performed and measured the cone resistance, local side friction and pore water pressure with depth.

2.0 FIELDWORK

The Cone Penetration Tests were performed with a 20 tonne track-truck mounted CPT unit (UK15) equipped with a 20 Tonne Capacity Hydraulic ram set.

A single electric piezocone (S10-CFIP.644) of a type conforming to the requirements of clause 3.1 of BS1377: 1990: Part 9 was used on this project.

The cone was manufactured by Geopoint Systems B.V of the Netherlands and measured the cone end resistance (qc), the local side friction (fs) and porewater pressure (u).

A copy of the calibration certificate for the cone used is presented in Appendix A.

The final depth of the test was determined by either completion of the specified test depth or when the maximum safe capacity of the equipment was reached.

The cone resistance and local side friction are measured by load cells housed in the cone whilst pore water pressures are measured by a pressure transducer that is also housed in the cone.

The recorded data is transmitted through the hollow push rods by an umbilical cable that is attached to a computerised data acquisition system. The rate of penetration is kept constant at 20mm $\pm$ 5mm per second except where penetrating very dense or hard strata. The system gives instantaneous and continuous graphical records of cone resistance, local side friction and porewater pressure with depth on a colour VDU screen.

Simultaneously, the results are recorded on the computer hard disc at 10mm depth intervals and this facility enables automatic controlled processing and plotting of the data. The raw data files are then backed up and emailed through to the office at the end of each shift.

3.0 POSITIONING

All positions were set out by the Client's representative on site.

4.0 ESTIMATED SOIL TYPE

The test results are presented in Appendix B. The cone resistance, local side friction, porewater pressure and calculated friction ratio are all presented against depth. Based on this information and experience in similar soils the estimated soil type is obtained and presented on the log along with the corresponding British Standard soil legend.

The estimation of soil type using measurements of just cone and friction are based upon the variation of the friction ratio in respect to the cone end resistance. The friction ratio varies depending upon whether the soil is cohesive or granular.

Many studies have been performed on the interpretation of the estimated soil type from the CPT tests (Robertson *et. al.*, 1986 and Meigh, 1987). Details of the references used are presented in Section 6.0.

For reference purposes, a chart for the estimated soil type together with a series of tables for soil description are presented in Appendix A.

5.0 REFERENCES

Baldi, G., Bellotti, R., Ghionna, V.N., Jamiolkowski, M. and Pusqualini, E., (1986). "Interpretation of CPT's and CPTU's, 2nd Part: Drained Penetration of Sands". Proc. 4th International Geotechnical Seminar, Singapore, pp143-156.

Erwig, H. (1988). Discussion on soil Type Interpretation. Proceedings of Conference on Penetration Testing in the U.K., I.C.E. Birmingham University, 1998, p.p 261-263

Lunne, T., Robertson, P. K. and Powell, J. J. M. (1997) "Cone Penetration testing in Geotechnical Practice" Blackie.

Meigh, A.C. (1987). "Cone Penetration testing. Methods and Interpretation." CIRIA Ground Engineering Report. In situ testing.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J (1986) "Use of piezometer cone data". Proceedings of the ASCE Specialty Conference In

Situ '86:Use of In Situ Tests in Geotechnical Engineering, Blacksburg, 1263-80, American Society of Engineers (ASCE).

Houlsby, G.T. and Teh, C.I. (1988) "Analysis of the piezocone in clay". Proceedings of the International Symposium on Penetration Testing, ISOPT-1, Orlando, 2, 777-83, Balkema Pub., Rotterdam

Wakeling, T.R.M. – A Comparison of the Results of Standard Site Investigation methods against the results of a detailed geotechnical Investigation in the middle Chalk at Mundford, Norfolk: BGS conference on in-situ investigations in Soil and Rocks, Paper 2, London, May 1969.

APPENDIX A

GENERAL INFORMATION

LIST OF FIGURES

GeoPoint Systems bv

Rijksstraatweg 22F
2171 AL Sassenheim
Tel. : +31 71 301 92 51
Fax : +31 71 301 92 52
E-mail : info@geopoint.nl
ING bank : 68.23.01.396
Postbank : 5226758
BTW nr. : NL806331677B01

Cone Calibration Certificate

Number	**S10-CFIIP.644**
Type	Subtraction 100 kN, 1000 mm2
Date	11-10-2010
Client	Lankelma Ltd
Engineer	W.A.C. Volgering
Certificate number	GP-644-01
Calibration equipment	HBM
HBM certificate number	**FL 1194**

Load qc in [kN]	Output qc [mV]	Load fs [kN]	Output fs [mV]	Load pp [MPa]	Output pp [mV]	Zeroshifts [mV]
10	773	10	774	0,4	1617	qc : **284**
20	1545	20	1545	0,8	3204	fs : **264**
30	2312	30	2316	1,2	4784	pp : **256**
40	3081	40	3086	1,6	6361	XY :
50	**3845**	50	**3853**	2,0	**7916**	

Inclination [°]	X = -20°	X = 0°	X = +20°	Y = -20°	Y = 0°	Y = +20°
	599	2525	4395	606	2525	4406

Range (nominal) :
Tip resistance **50 kN**
Tip + Local friction **50 kN**
Pore pressure **2,0 MPa (20 Bar)**

Range (maximum) :
100 kN
100 kN
3,0 MPa

Max. Inaccuracy :
Tip Resistance **1,0%**
Sleeve Friction **2,0%**
Pore Pressure **1,0%**

Total inaccuracy consist of hysteresis, non-linearity, crosstalk and calibration error.

Remarks : [redacted]

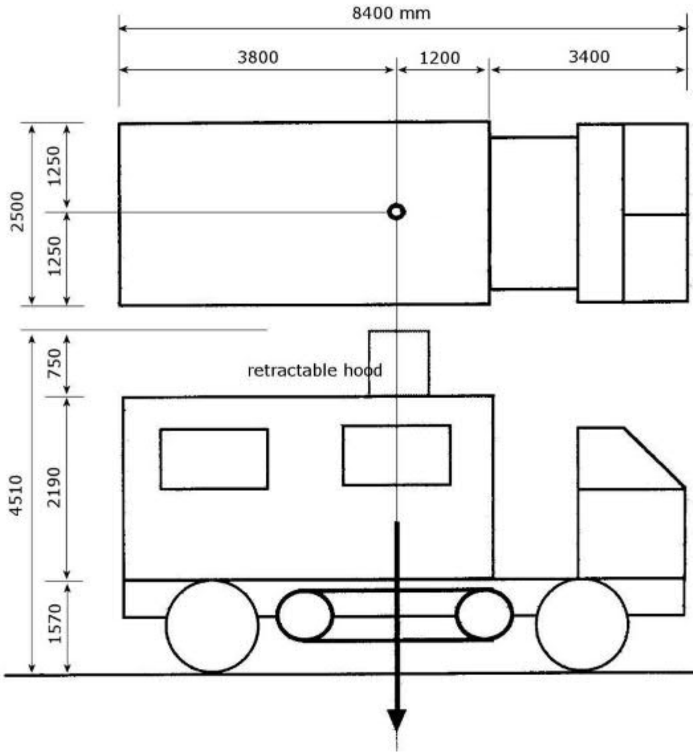
Approved **Date:** 11-10-2010
Technician: M. van Es.

UK15

Track truck mounted CPT unit

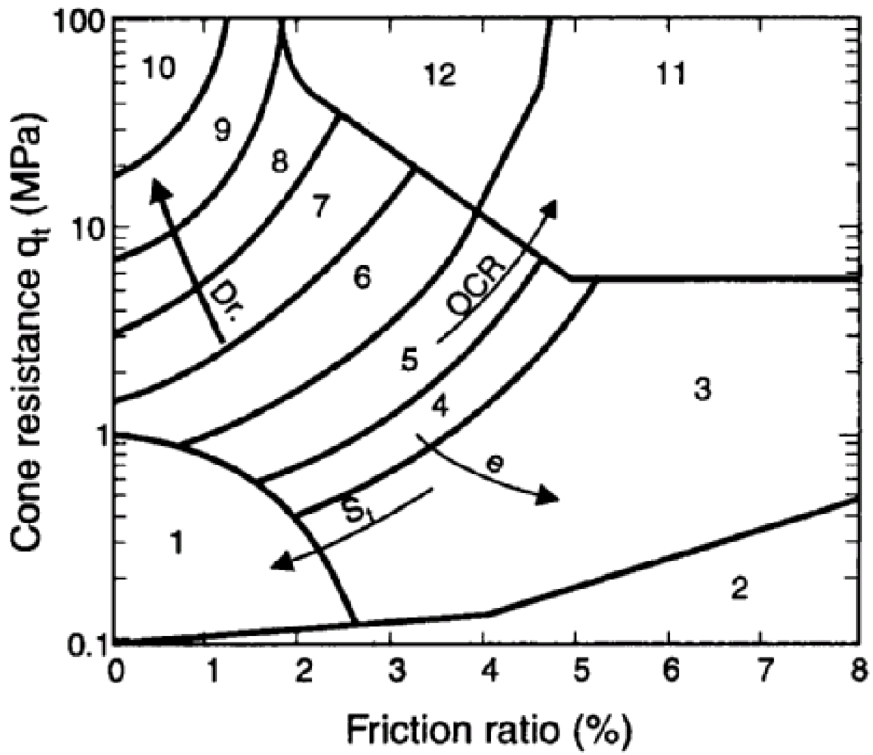
20.5 tonnes

Soft and uneven ground



Tel: +44 (0)1797 280050 Fax: +44 (0)1797 280195 Email: info@lankelma.com
Lankelma Ltd, Cold Harbour Barn, Cold Harbour Lane, Iden, E. Sussex, TN31 7UT, U.K

CPT Soil Classification by Robertson et al., 1986



Zone	Soil Behaviour Type				
1	Sensitive fine grained	**5**	Clayey silt to silty clay	**9**	Sand
2	Organic material	**6**	Sandy silt to clayey silt	**10**	Gravelly sand to sand
3	Clay	**7**	Silty sand to sandy silt	**11**	Very stiff fine grained *
4	Silty clay to clay	**8**	Sand to silty sand	**12**	Sand to clayey sand *

*Over consolidated or cemented

SOIL DESCRIPTION TABLES

GRANULAR SOILS (Sands and Gravels)

Description	Cone Resistance (qc) (MPa)
Very Loose	0 – 2
Loose	2 – 4
Medium Dense	4 – 12
Dense	12 – 20
Very Dense	>20

COHESIVE SOILS (Clays)

Description	Cone Resistance (q_c) (MPa)	Equivalent S_u value from q_c (kPa)
Very Soft	0 – 0.4	0 –20
Soft	0.4 – 0.8	20 – 40
Firm	0.8 – 1.5	40 – 75
Stiff	1.5 – 3	75 – 150
Very stiff	>3	>150

CHALK

Grade	Typical Brief Description (after Wakeling, 1969)	Friction Ratio (%)	Cone Resistance (MPa) (After Power, 1982)
6	Highly/completely weathered CHALK	-	Below 5
5	Highly weathered CHALK	0.75 – 1.00	5 – 15
4	Partly weathered CHALK	1.00 – 1.25	10 – 15
3	Slightly/unweathered CHALK	1.25 – 1.50	15 – 20
2	Slightly/unweathered CHALK	1.50 – 2.00	More than 20
1	Unweathered CHALK	-	No penetration

GLOSSARY OF CPT TERMS

Cone resistance q_c :- The total force acting on the cone Q_c, divided by the projected area of the cone, A_c; ($q_c = Q_c / A_c$).

Corrected Cone resistance, q_t :- The cone resistance q_c corrected for pore water pressure effects.

Corrected sleeve friction, f_t :- The sleeve friction corrected for pore water pressure effects on the end of the friction sleeve.

Friction ratio, R_f :- The ratio, expressed as a percentage, of the sleeve friction, f_s, to the cone resistance, q_c, both measured at the same depth; [$R_f = (f_s / q_c) \cdot 100$].

Friction sleeve :- The section of the cone penetrometer upon which the sleeve friction is measured.

Net cone resistance q_n :- The corrected cone resistance minus the vertical total stress. $q_n = q_t - \sigma_{vo}$.

Pore pressure, u :- The pore pressure generated during penetration and measured by a pore pressure sensor. u_1 when measured on the cone, u_2 when measured just behind the cone and u_3 when measured just behind the friction sleeve.

Pore pressure ratio, B_q :- The net pore pressure normalized with respect to the net cone resistance.

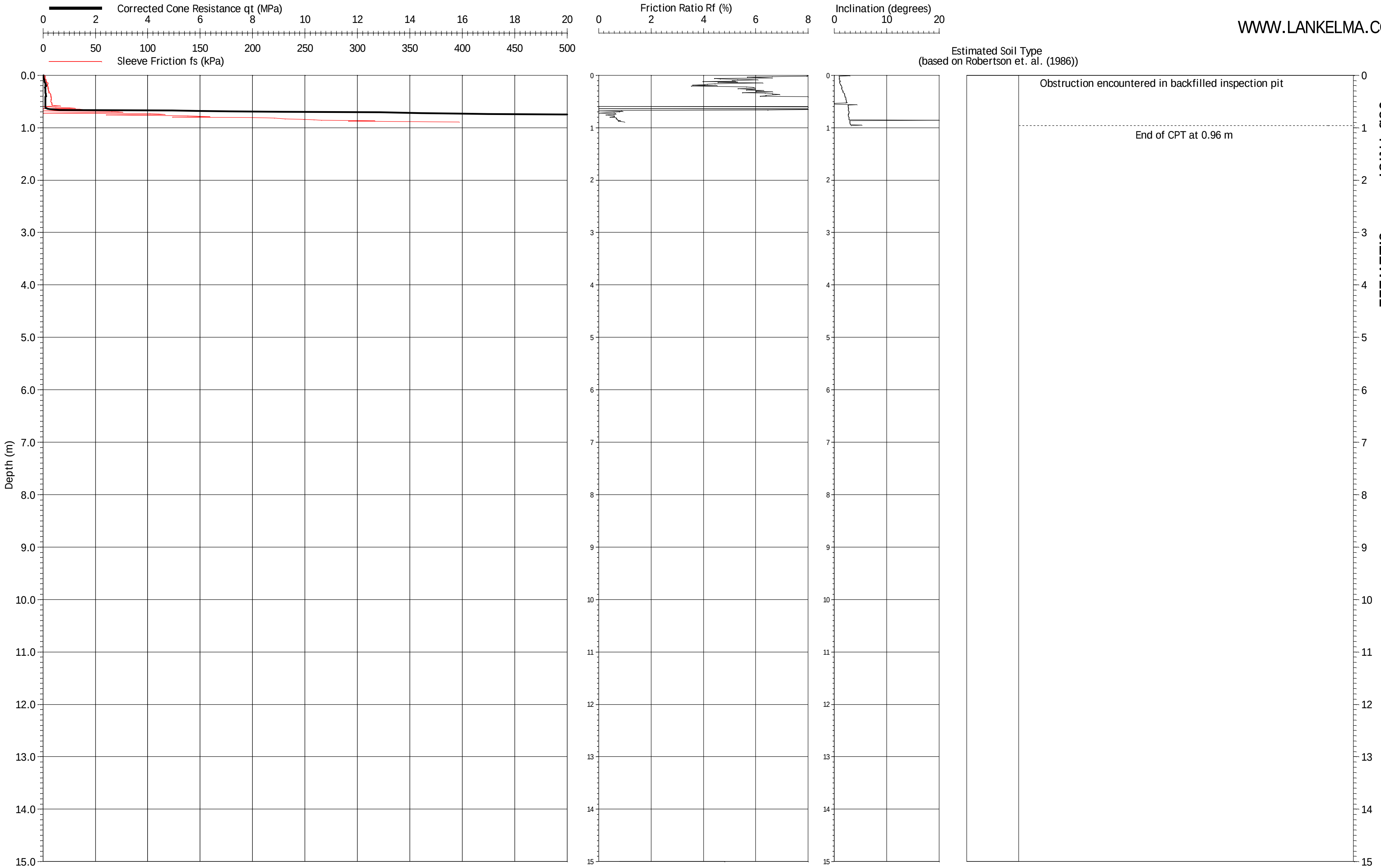
Sleeve friction, f_s :- The total frictional force acting on the friction sleeve, F_s, divided by its surface area, A_s. $f_s = F_s / A_s$.

APPENDIX B

PIEZOCONE PENETRATION TEST RESULTS

LIST OF FIGURES

WWW.LANKELMA.COM



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Job Title: SIZEWELL

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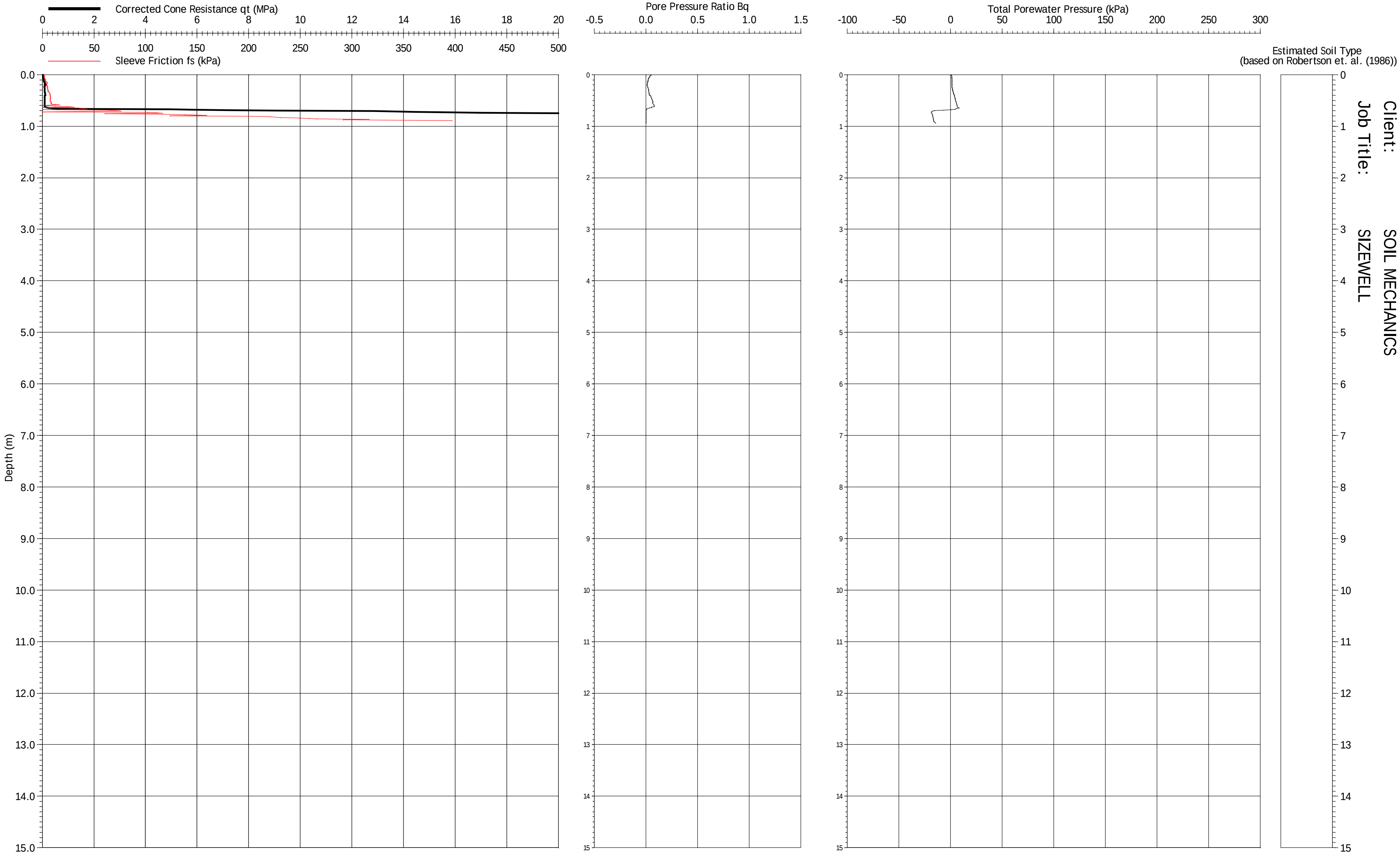
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted] - GEO1CPT1
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked [redacted]	
Remarks:			

CONE PENETRATION TEST GEO1CPT1

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



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Coordinates: -

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Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]7 - GEO1CPT1

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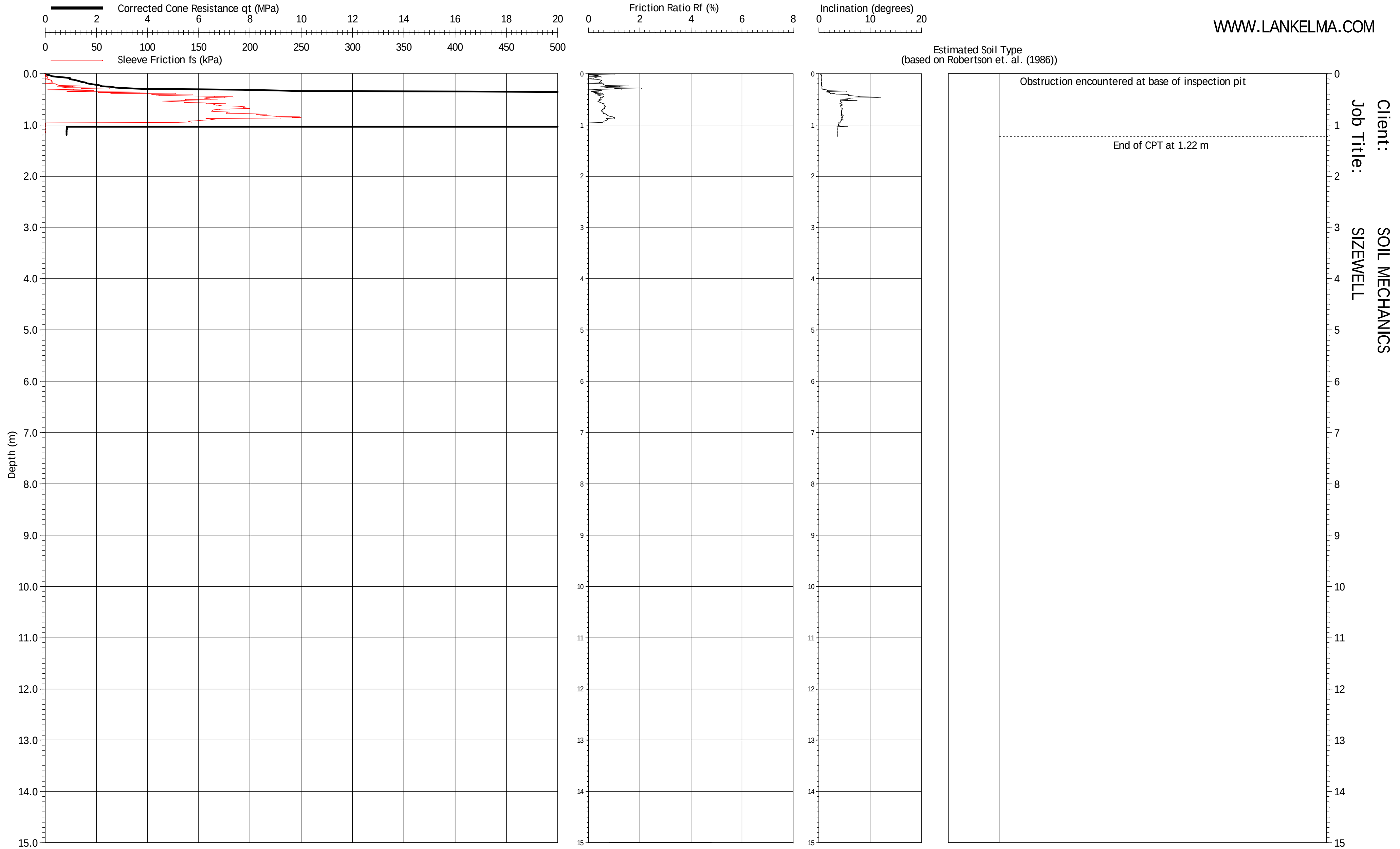
CONE PENETRATION TEST GEO1CPT1

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: [redacted]7 - GEO1CPT1A

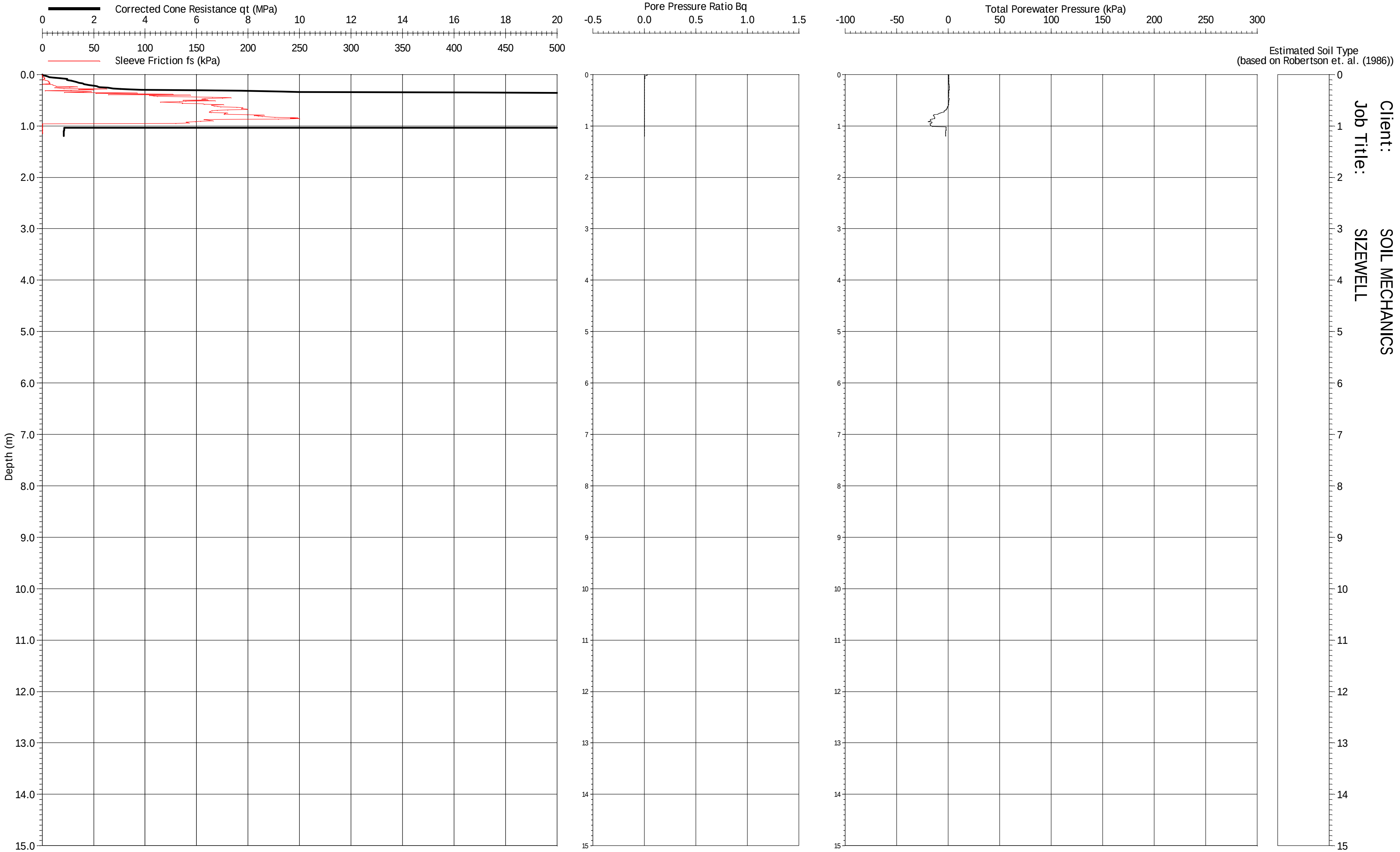
Checked [redacted]

CONE PENETRATION TEST GEO1CPT1A

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



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Ground Level: -
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Remarks:

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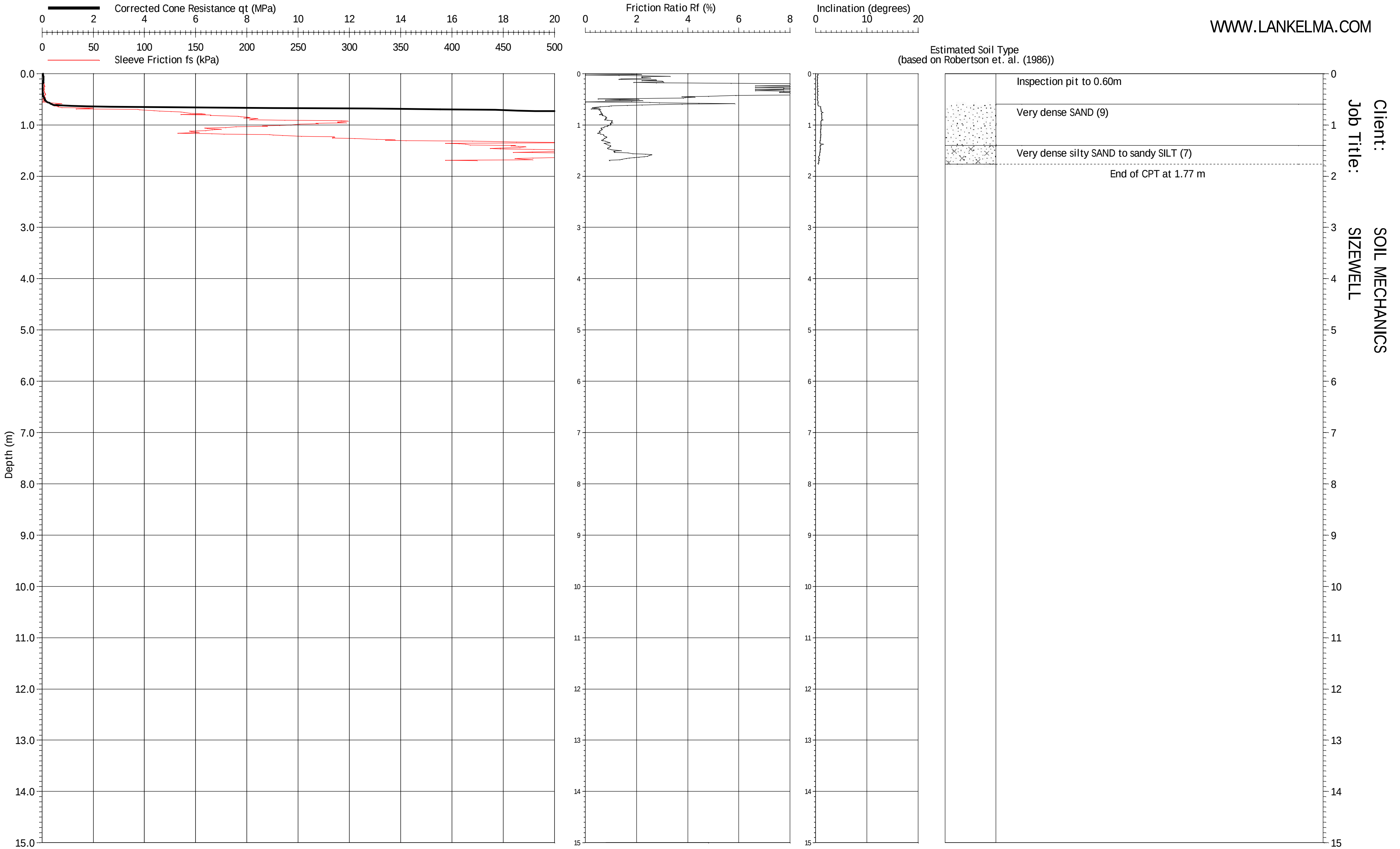
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



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Ground Level: -

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Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

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Checked B[redacted]

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LANKELMA

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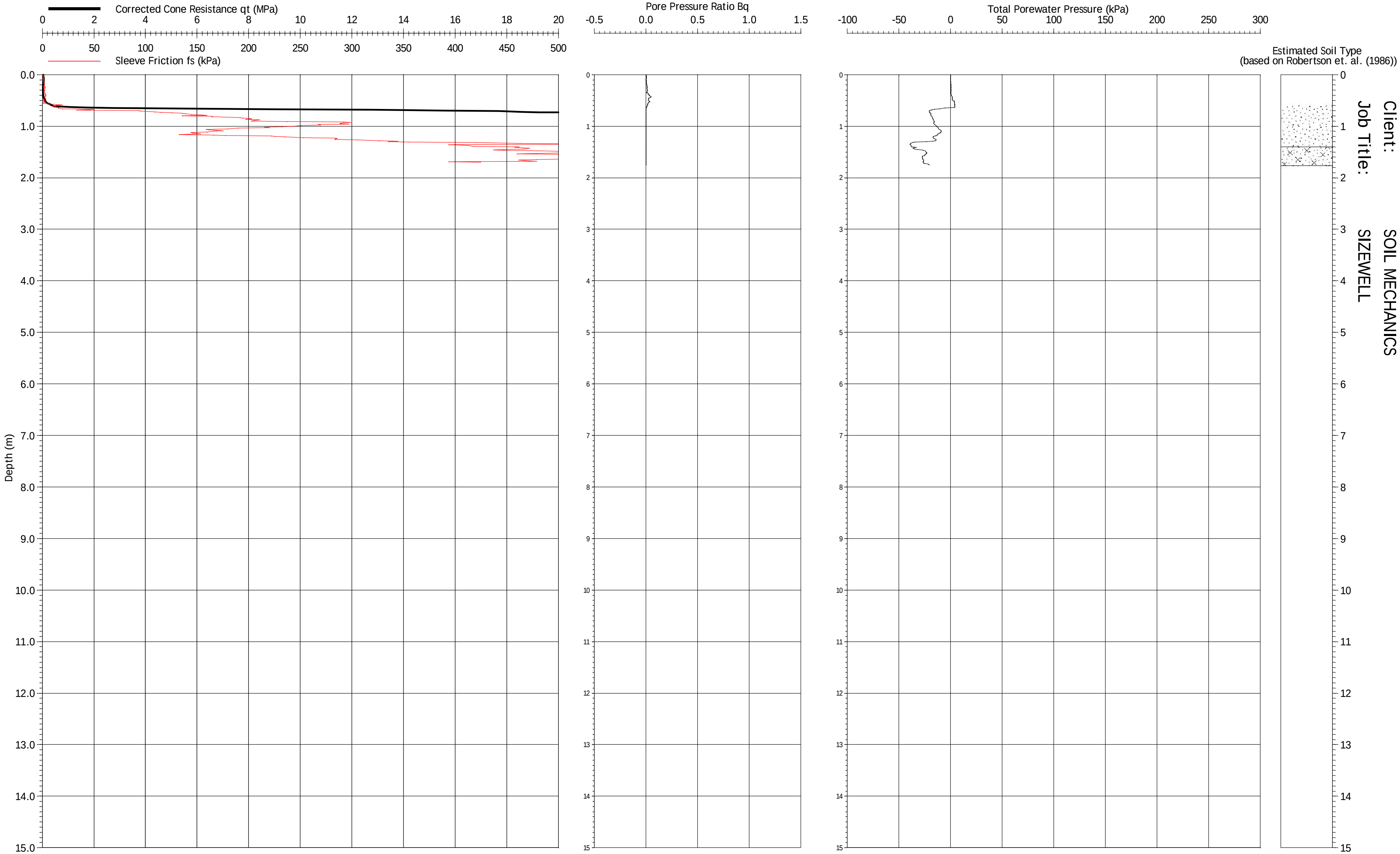

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Remarks:

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Date of Plot: 15/12/2010

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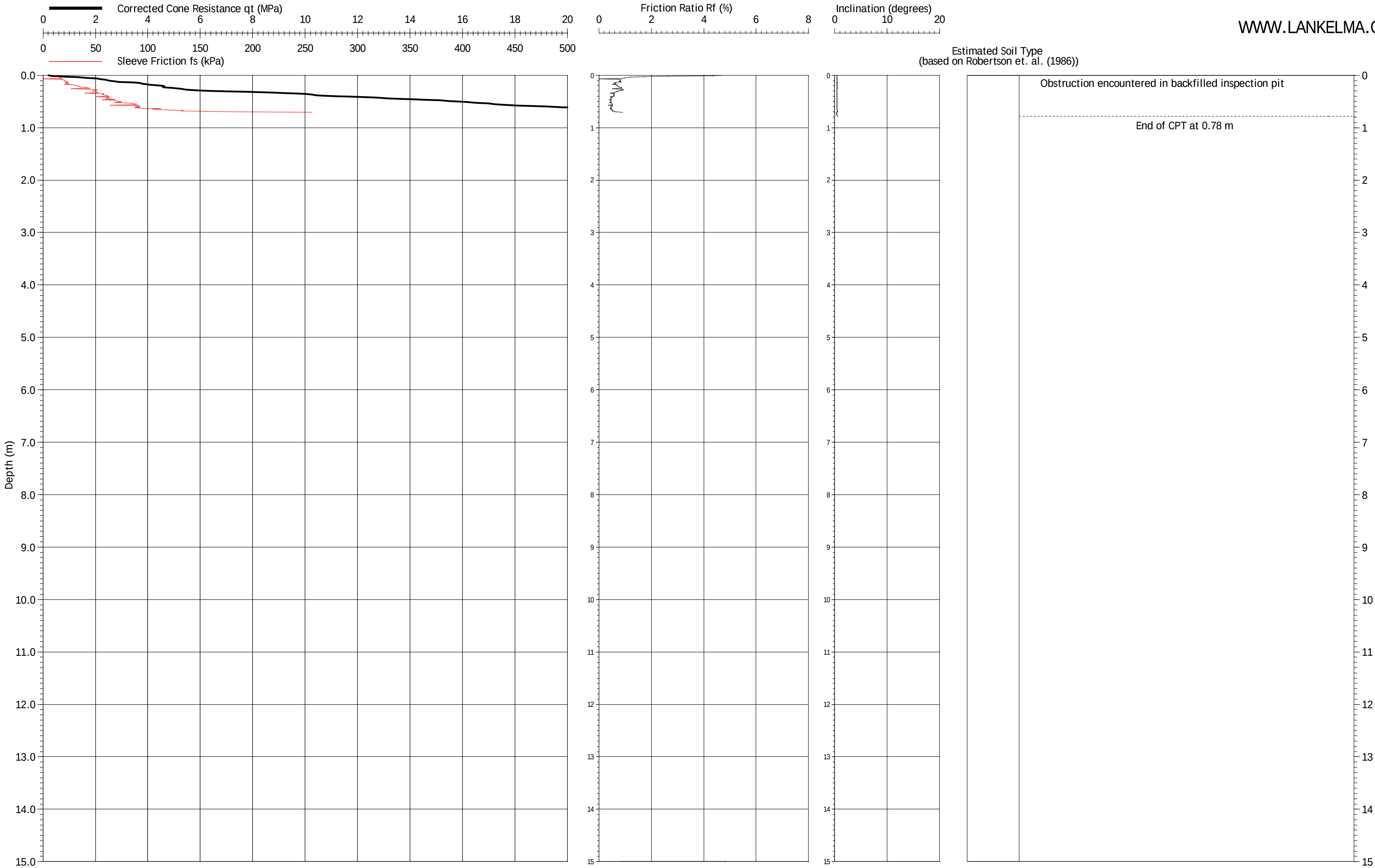

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Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name [redacted] - GEO1CPT2

Checked [redacted]

CONE PENETRATION TEST GEO1CPT2

LANKELMA CPT LTD

LANKELMA

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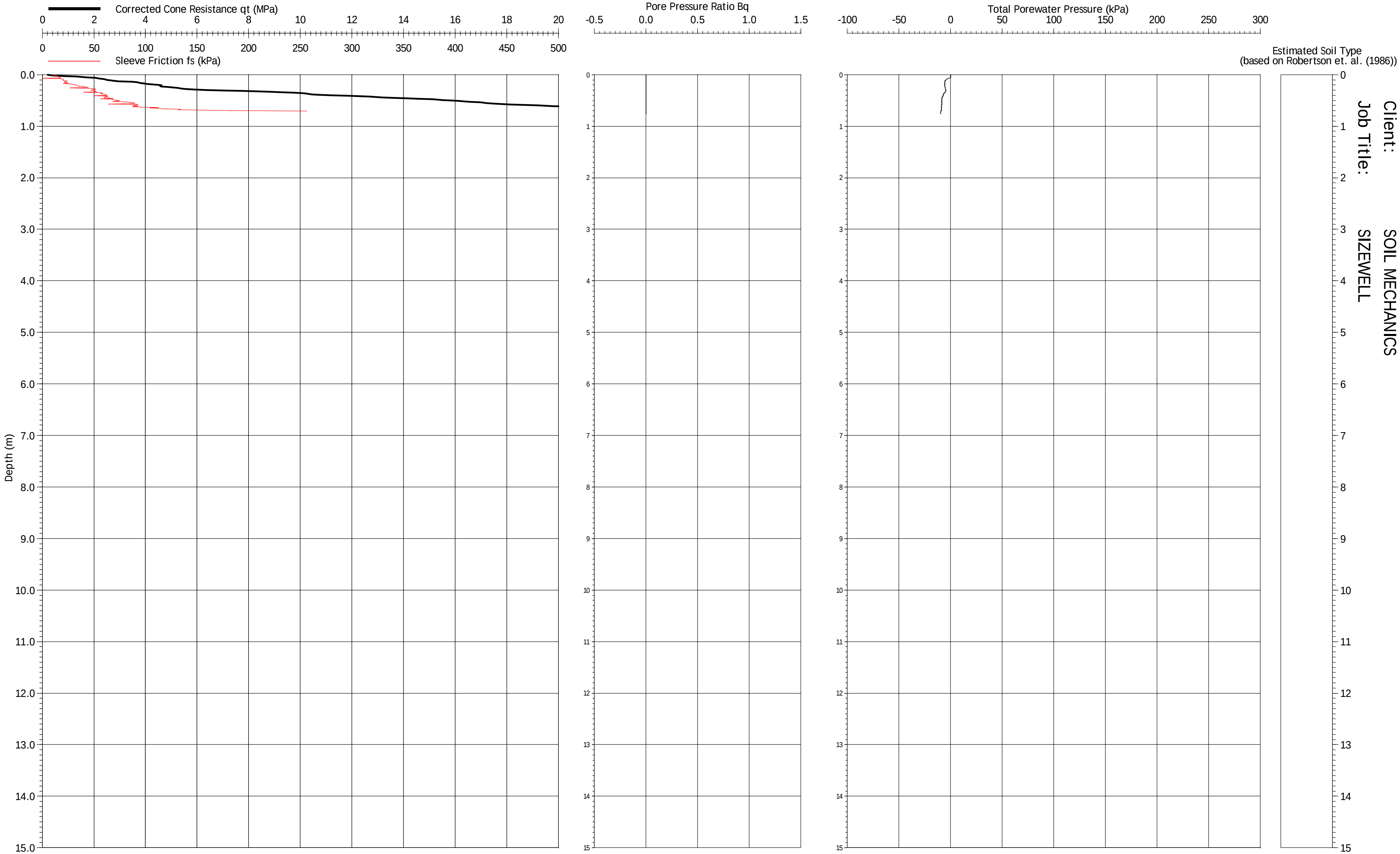
Job Title: SIZEWELL



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Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

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Date of Plot: 15/12/2010
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Checked [redacted]

CONE PENETRATION TEST GEO1CPT2
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Form: CPT_303_Bq2

WWW.LANKELMA.COM

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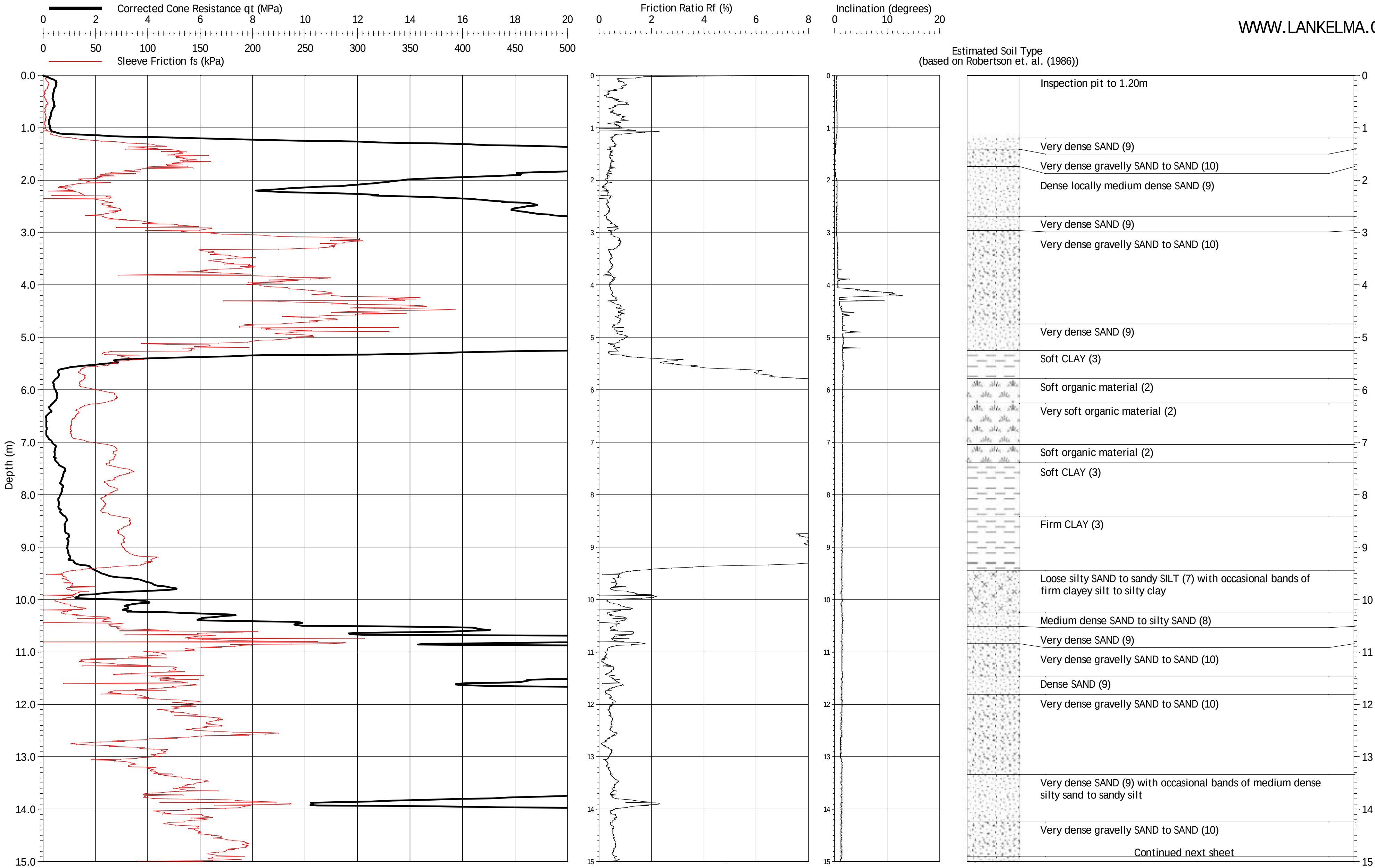
Job Title: SIZEWELL



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Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT2A
LANKELMA CPT LTD

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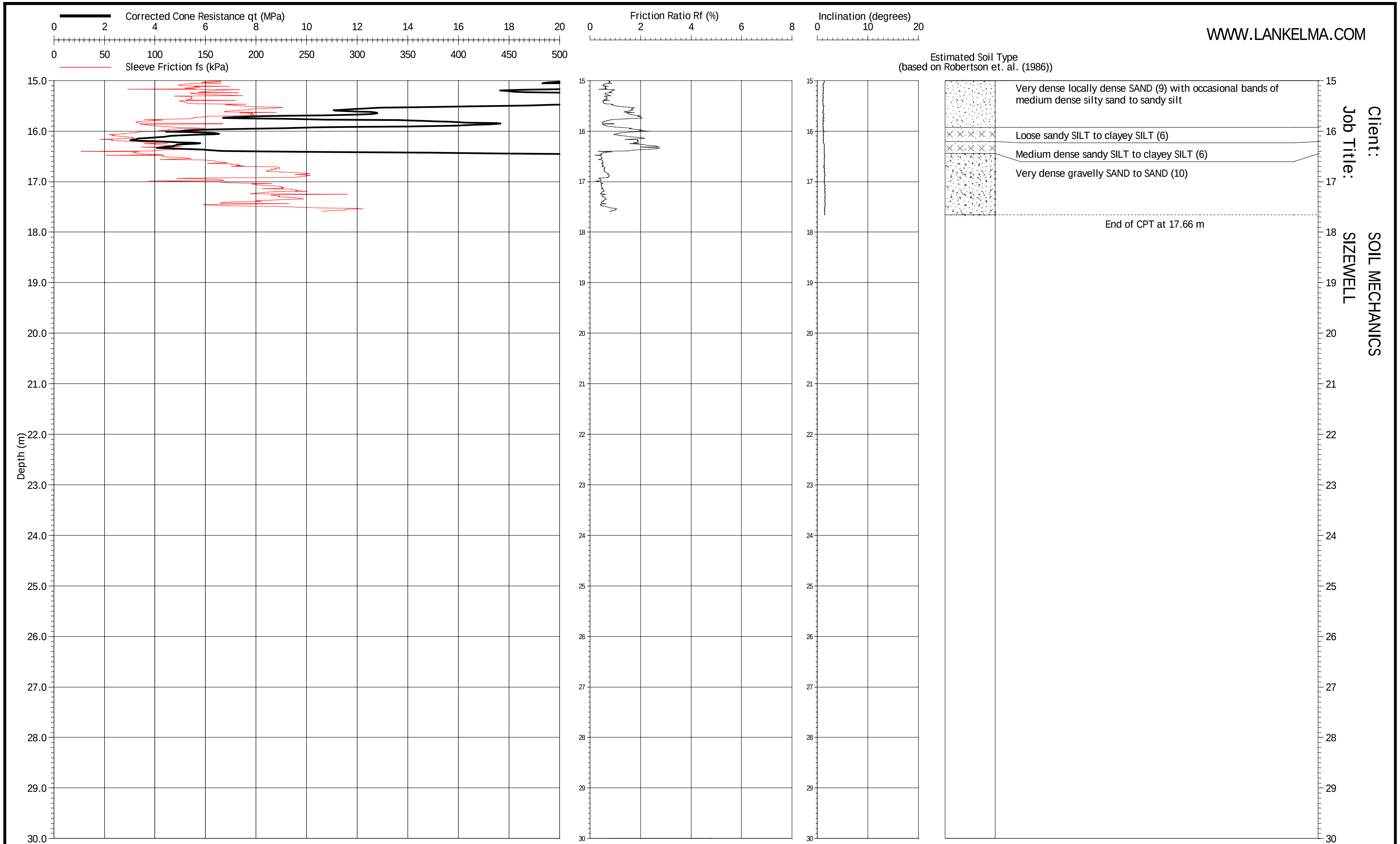
Form: CPT_201_20MPa



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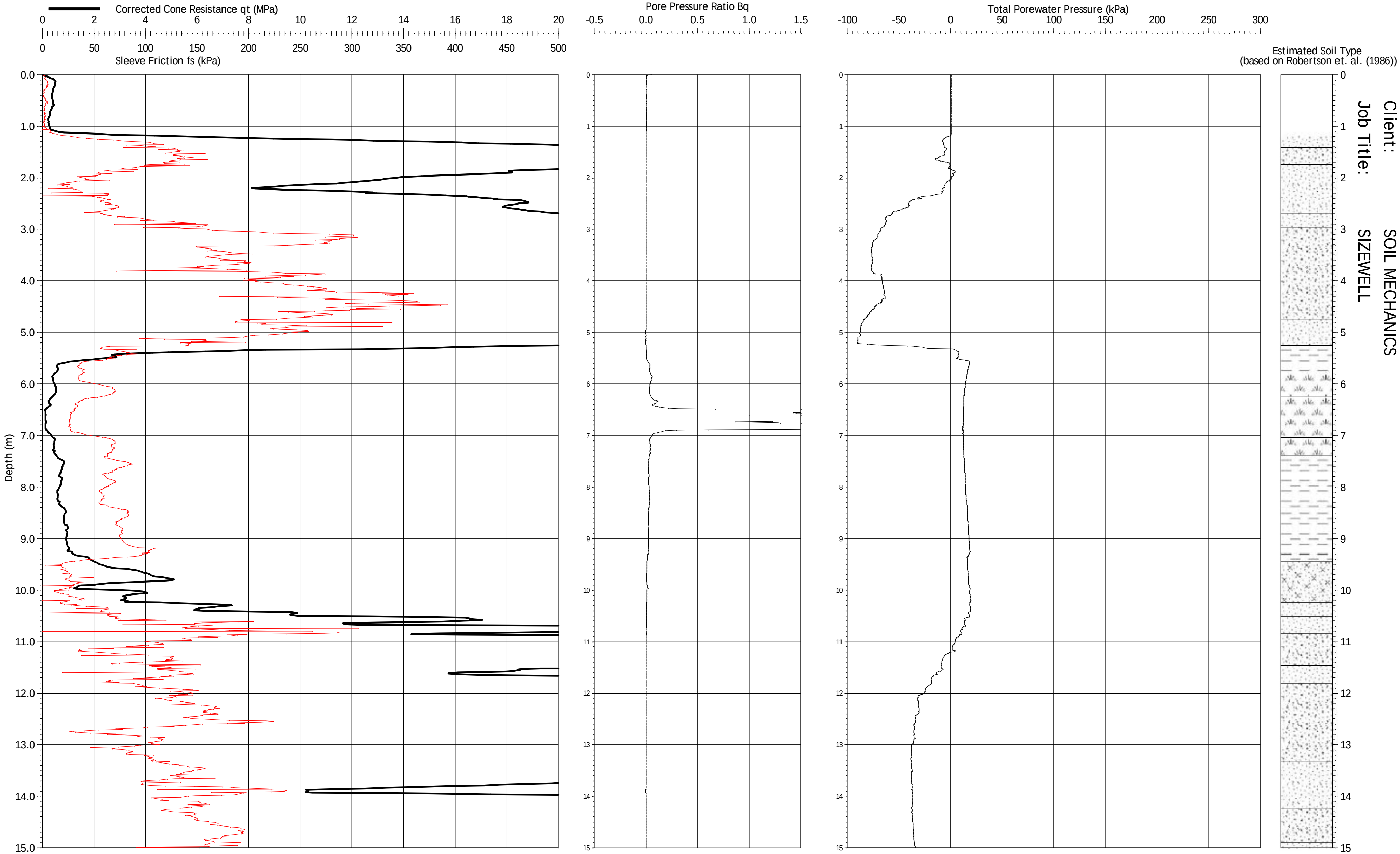
Ground Level:	-	File Name:	[redacted]087 - GEO1CPT2A
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT2A

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: [redacted]87 - GEO1CPT2A

Checked By [redacted]

CONE PENETRATION TEST GEO1CPT2A

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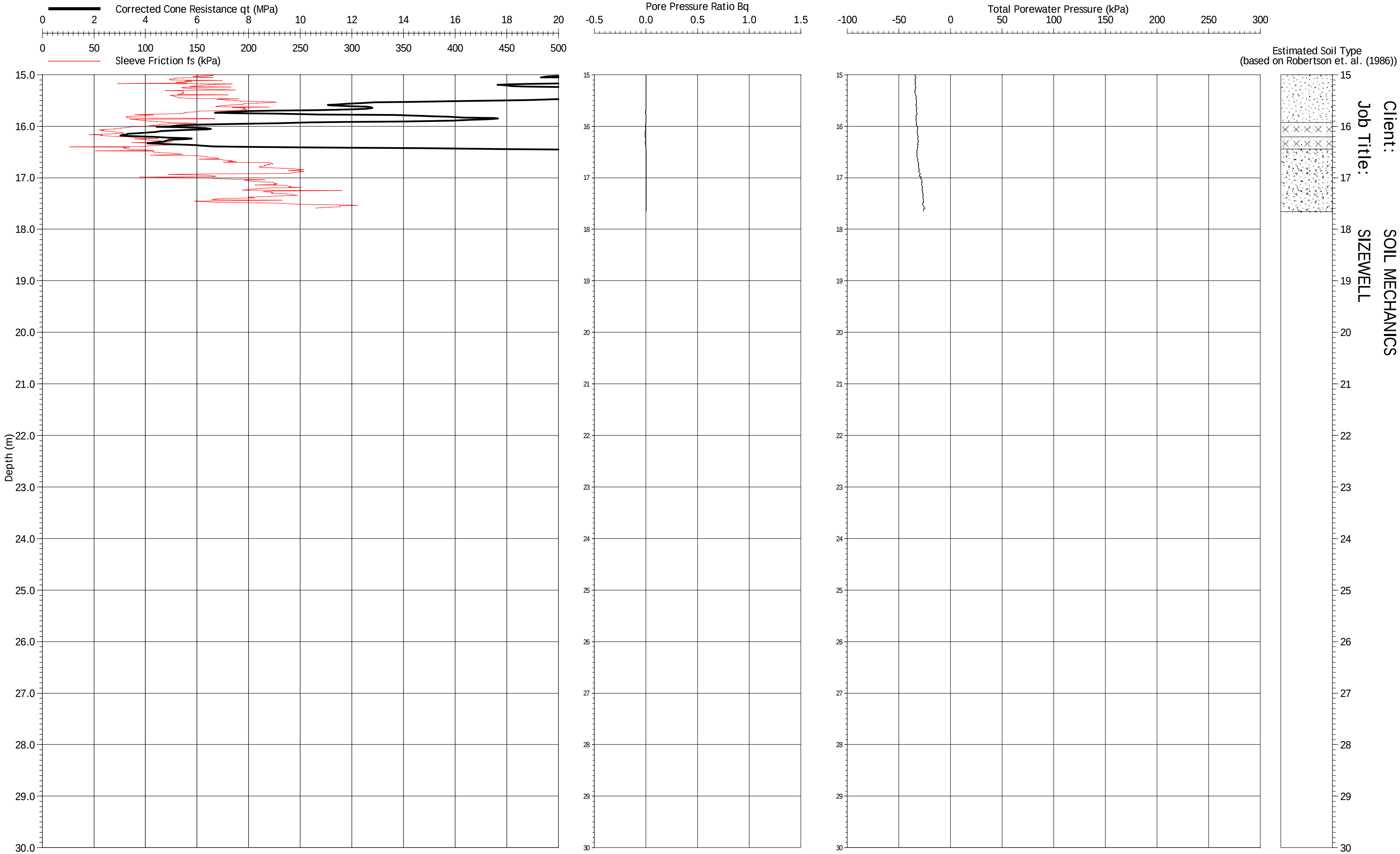

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CONE PENETRATION TEST GEO1CPT2A

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

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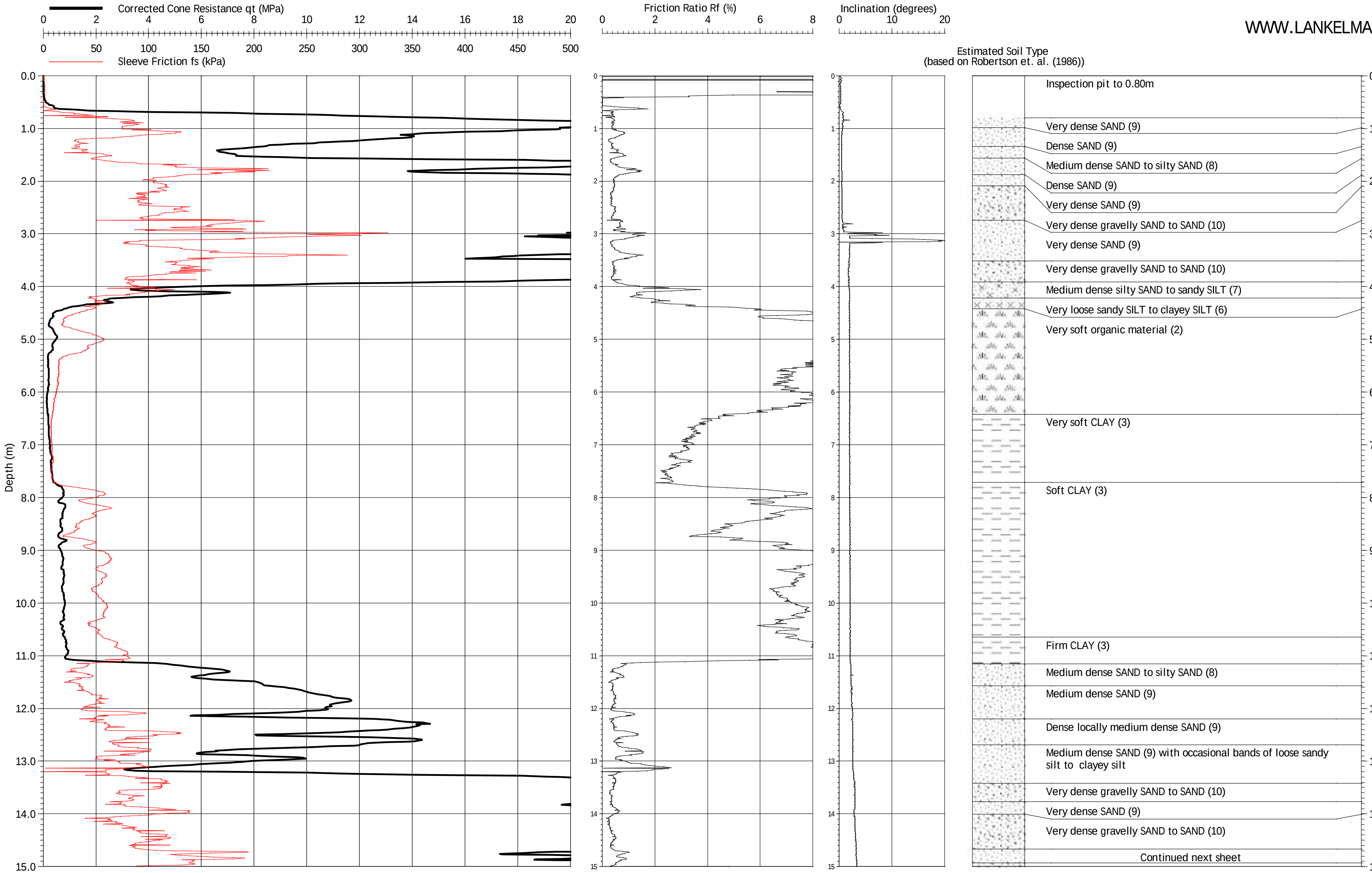
Client: SOIL MECHANICS

Job Title: SIZEWELL



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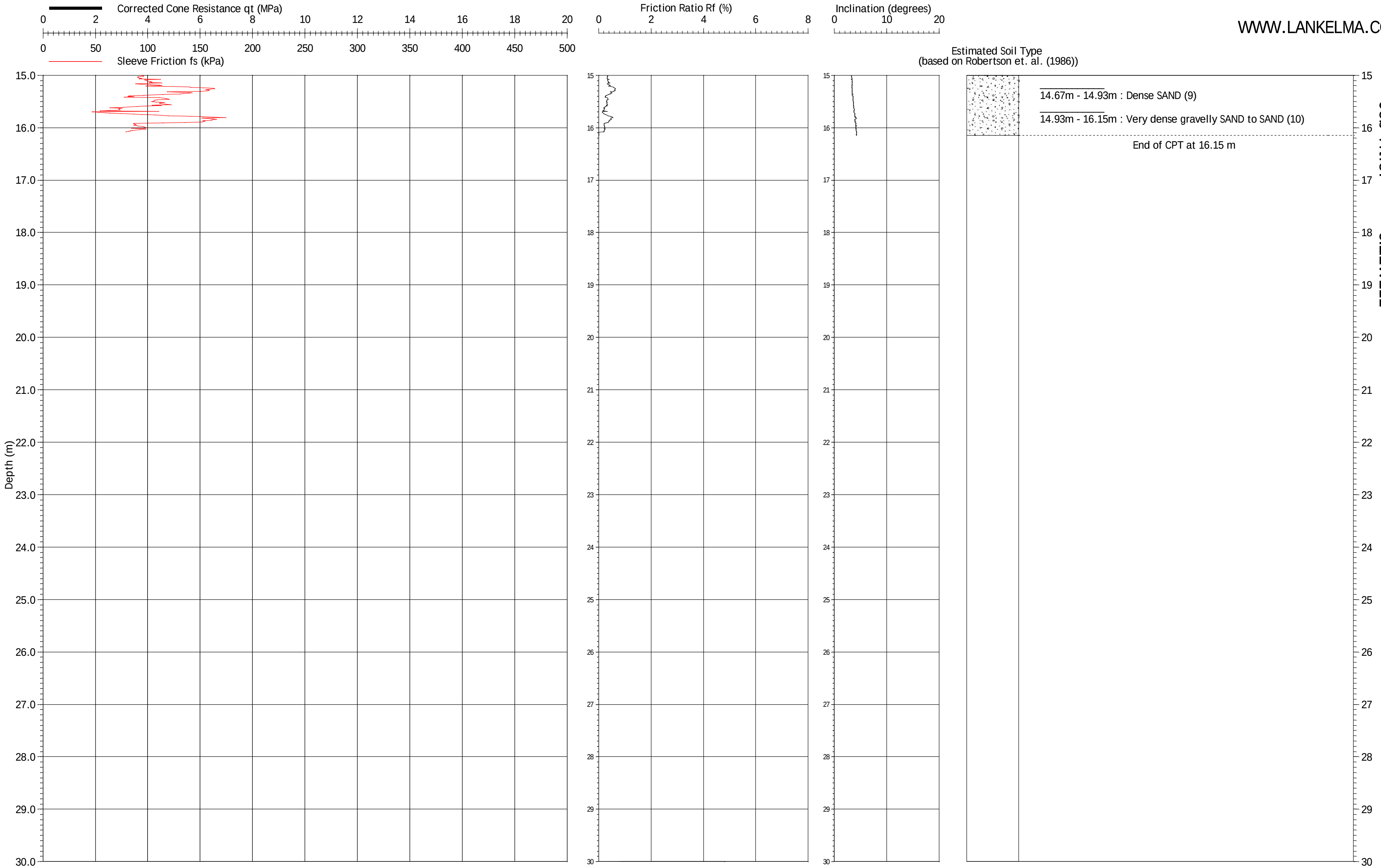
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked B[redacted]	
Remarks:			

CONE PENETRATION TEST GEO1CPT3

LANKELMA CPT LTD

Form: CPT_201_20MPa



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Client: SOIL MECHANICS

Job Title: SIZEWELL

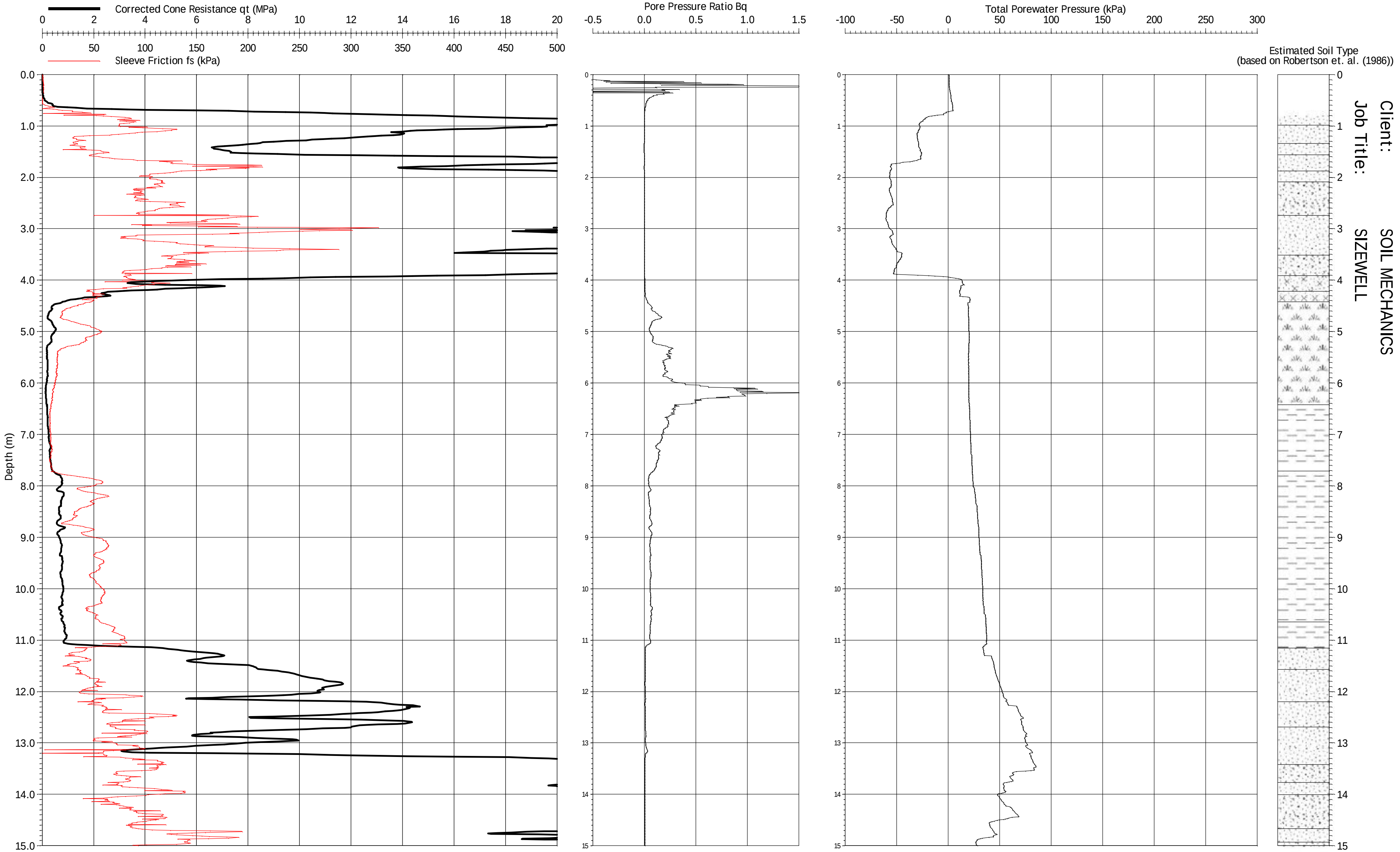
Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - GEO1CPT3
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT3

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS

Job Title: SIZEWELL

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Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO1CPT3
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT3

LANKELMA CPT LTD

LANKELMA

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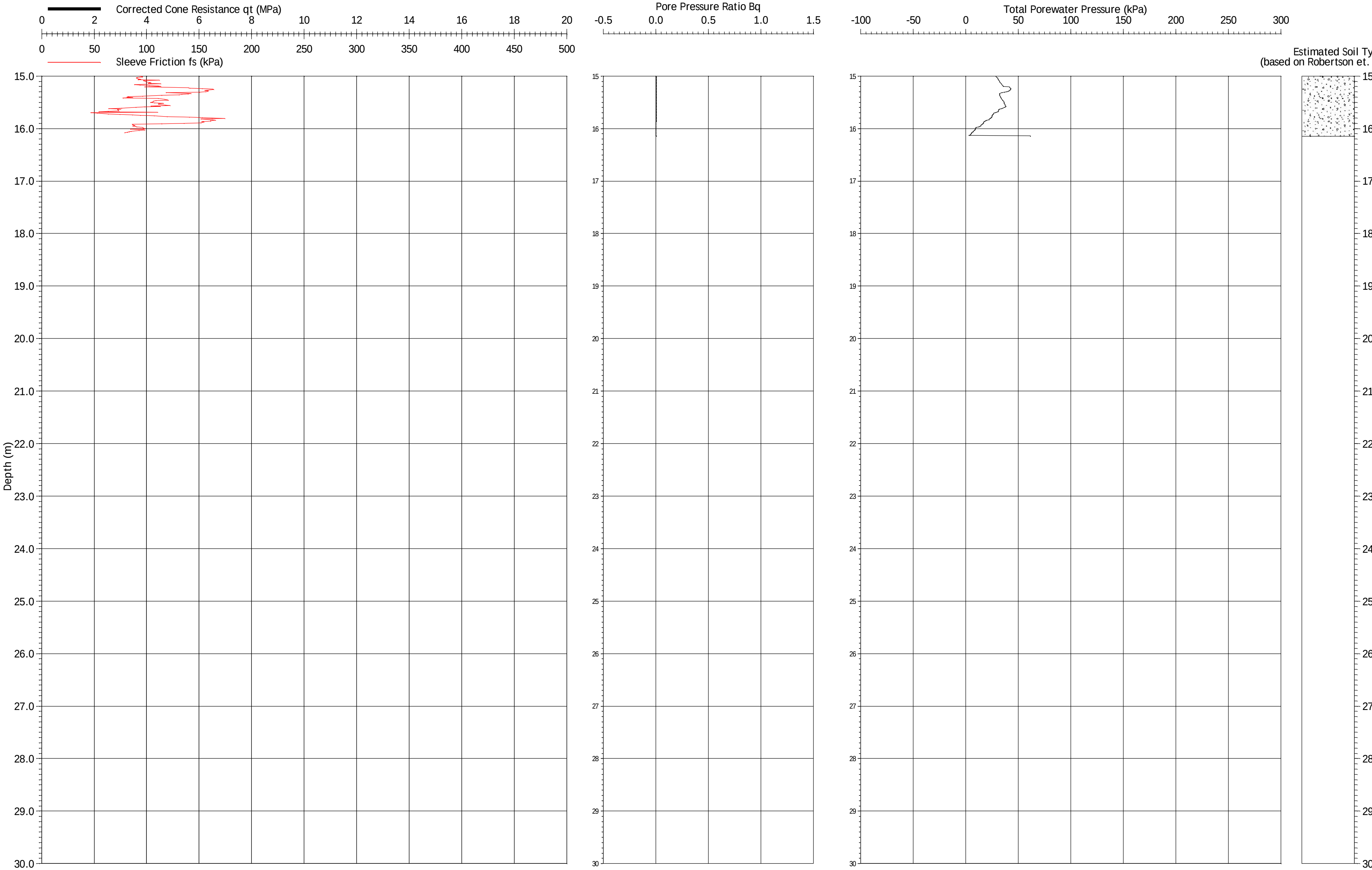

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Job Title: SIZEWELL

Location: Sizewell

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Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: 105087 - GEO1CPT3

Checked By [redacted]

CONE PENETRATION TEST GEO1CPT3

LANKELMA CPT LTD

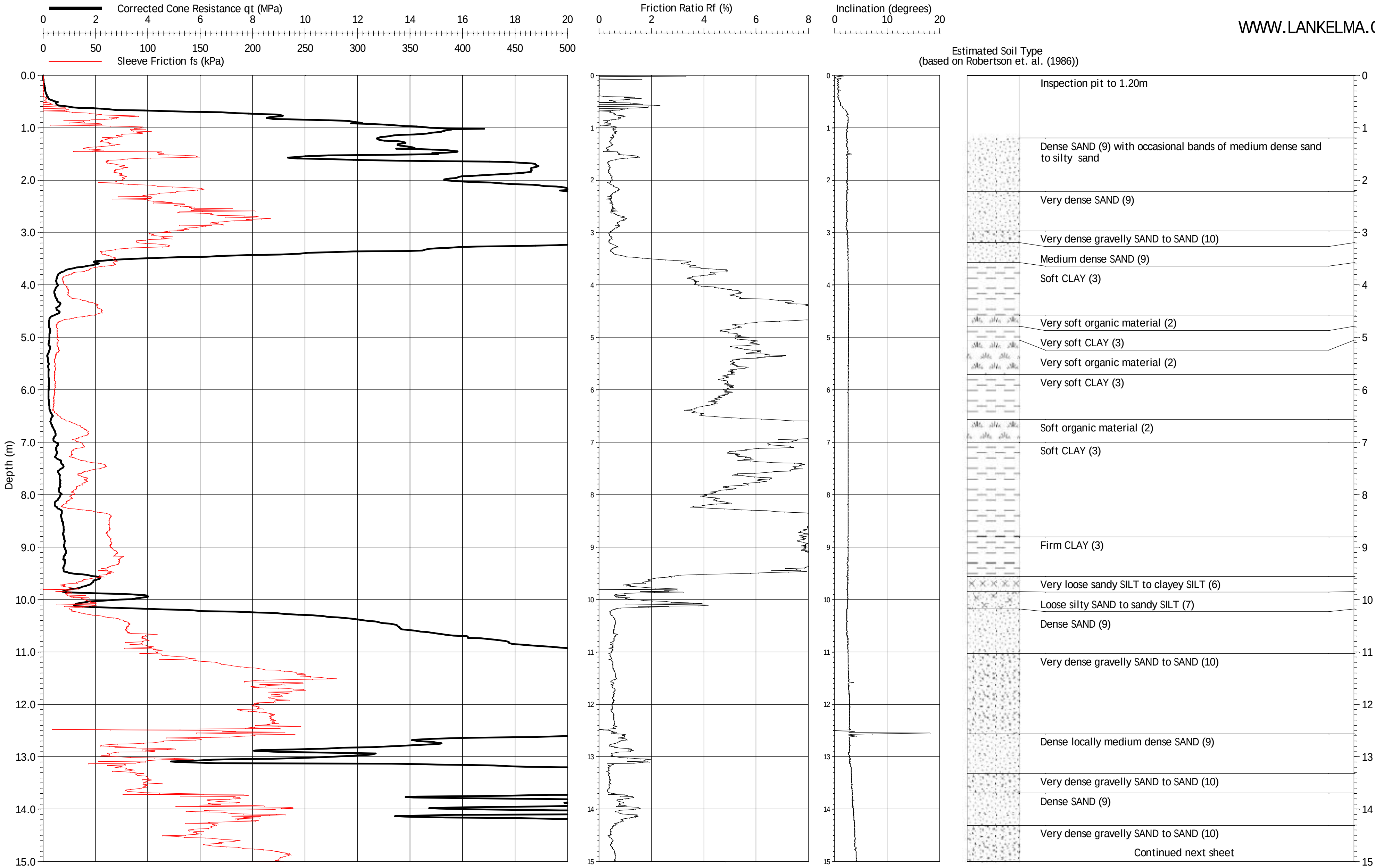
LANKELMA

Form: CPT_303_Bq2

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



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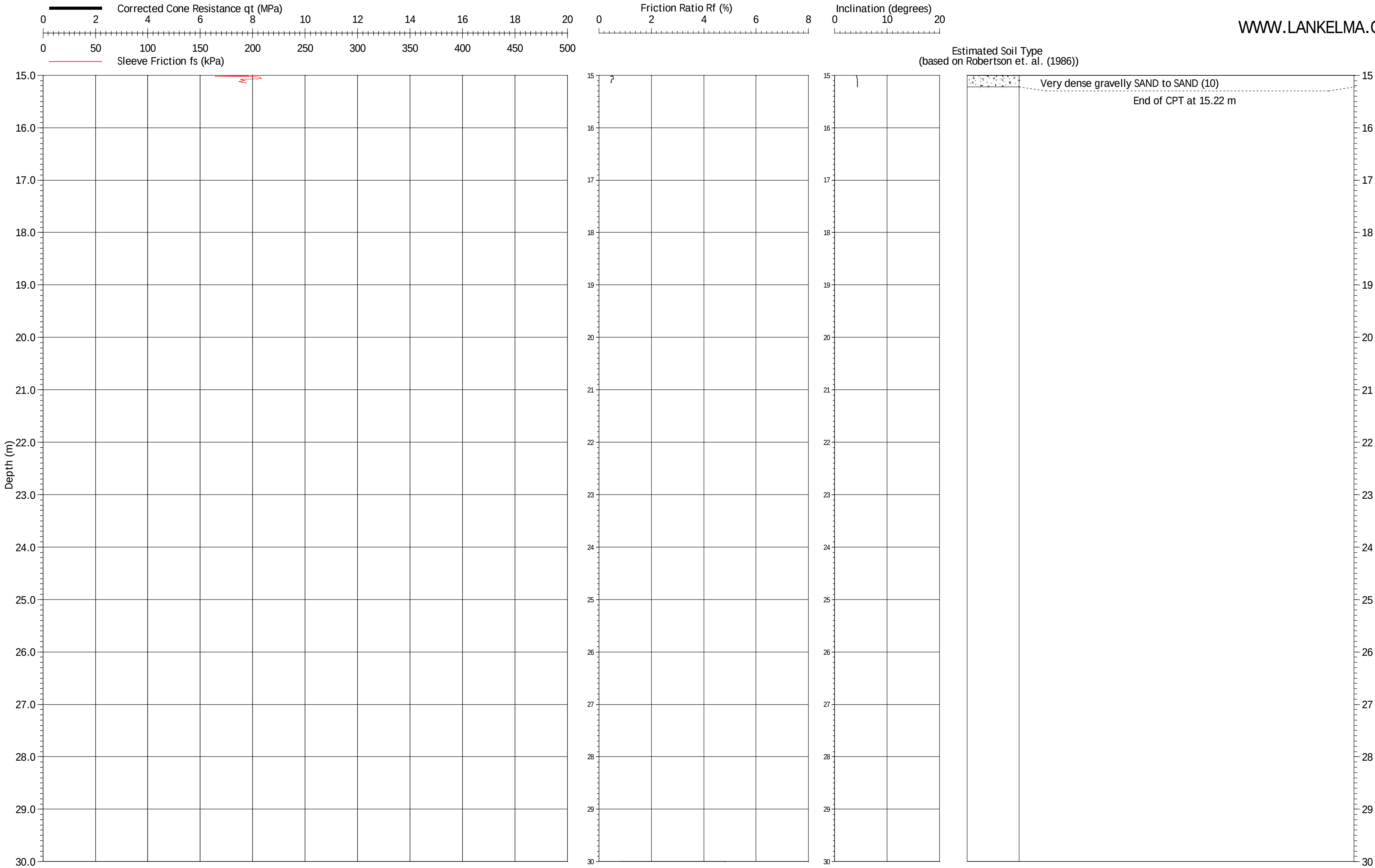
Ground Level:	-	File Name:	[redacted] 87 - GEO1CPT4
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	
Remarks:			

CONE PENETRATION TEST GEO1CPT4

LANKELMA CPT LTD

Form: CPT_201_20MPa



WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: [redacted]87 - GEO1CPT4

Checked By: [redacted]

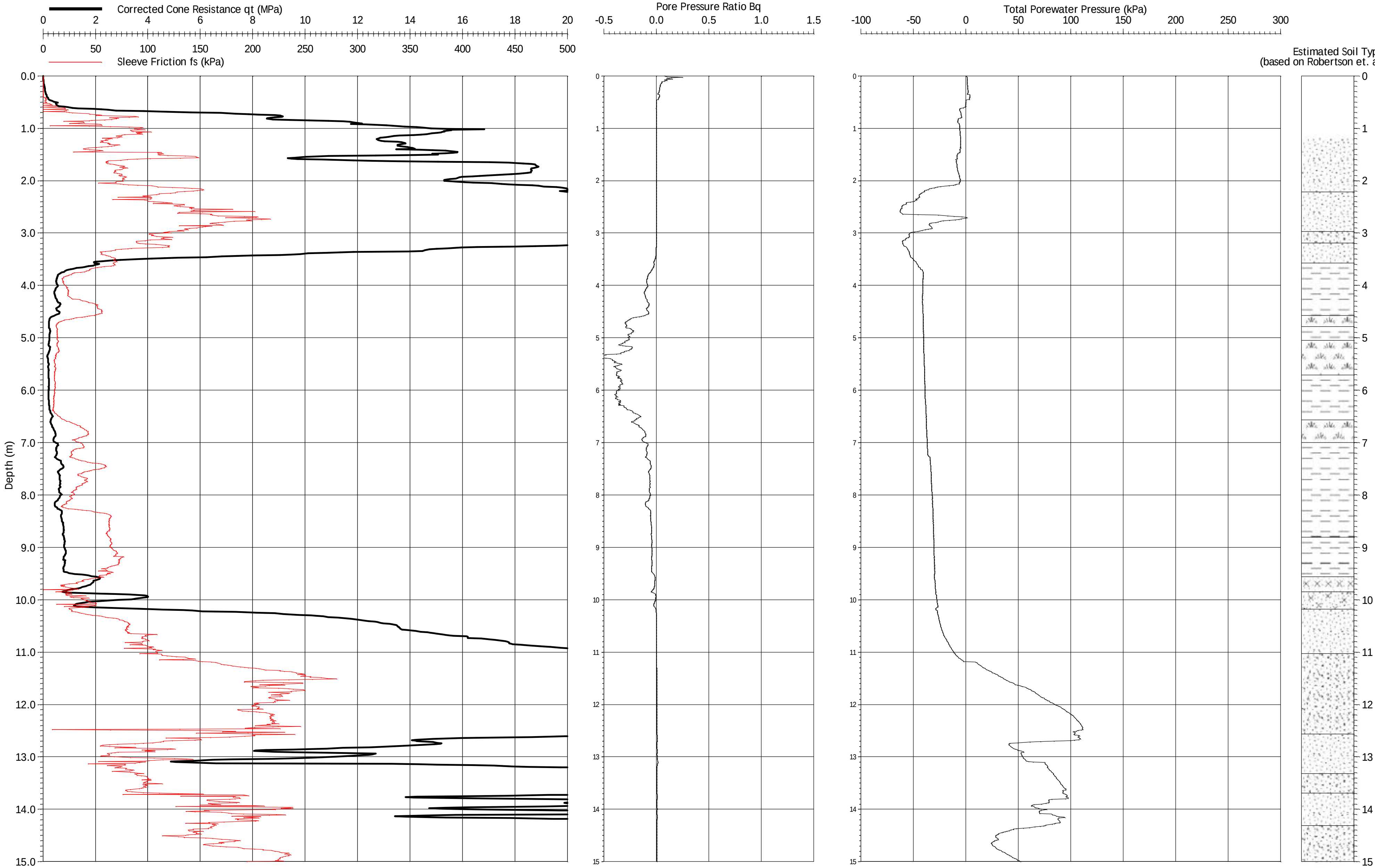
CONE PENETRATION TEST GEO1CPT4

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa

Client: SOIL MECHANICS
Job Title: SIZEWELL



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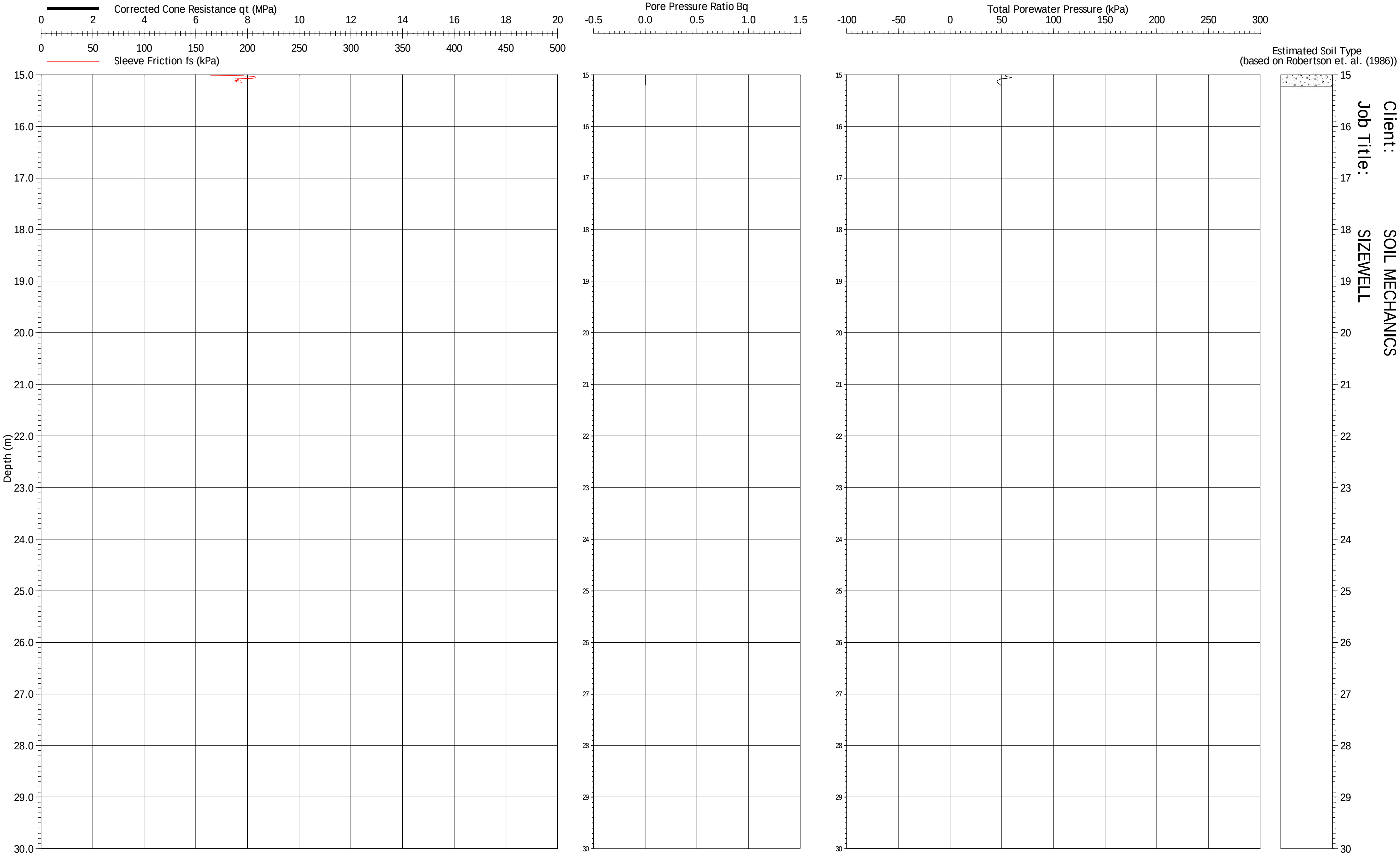
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked B[redacted]	
Remarks:			

CONE PENETRATION TEST GEO1CPT4
LANKELMA CPT LTD

Form: CPT_303_Bq2



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: 5087 - GEO1CPT4

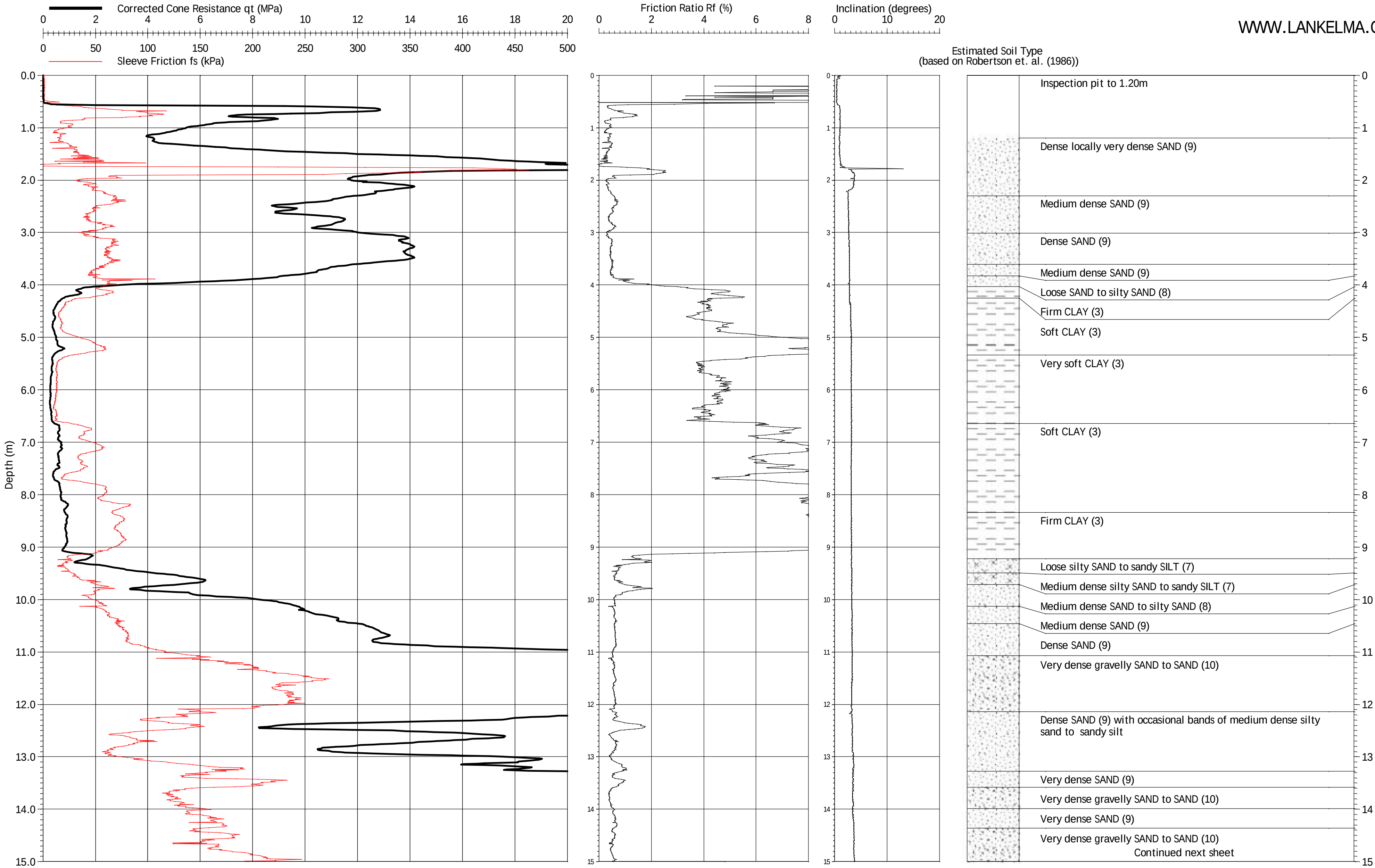
Checked By: [redacted]

CONE PENETRATION TEST GEO1CPT4

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: [redacted]5087 - GEO1CPT5

Checked By: [redacted]

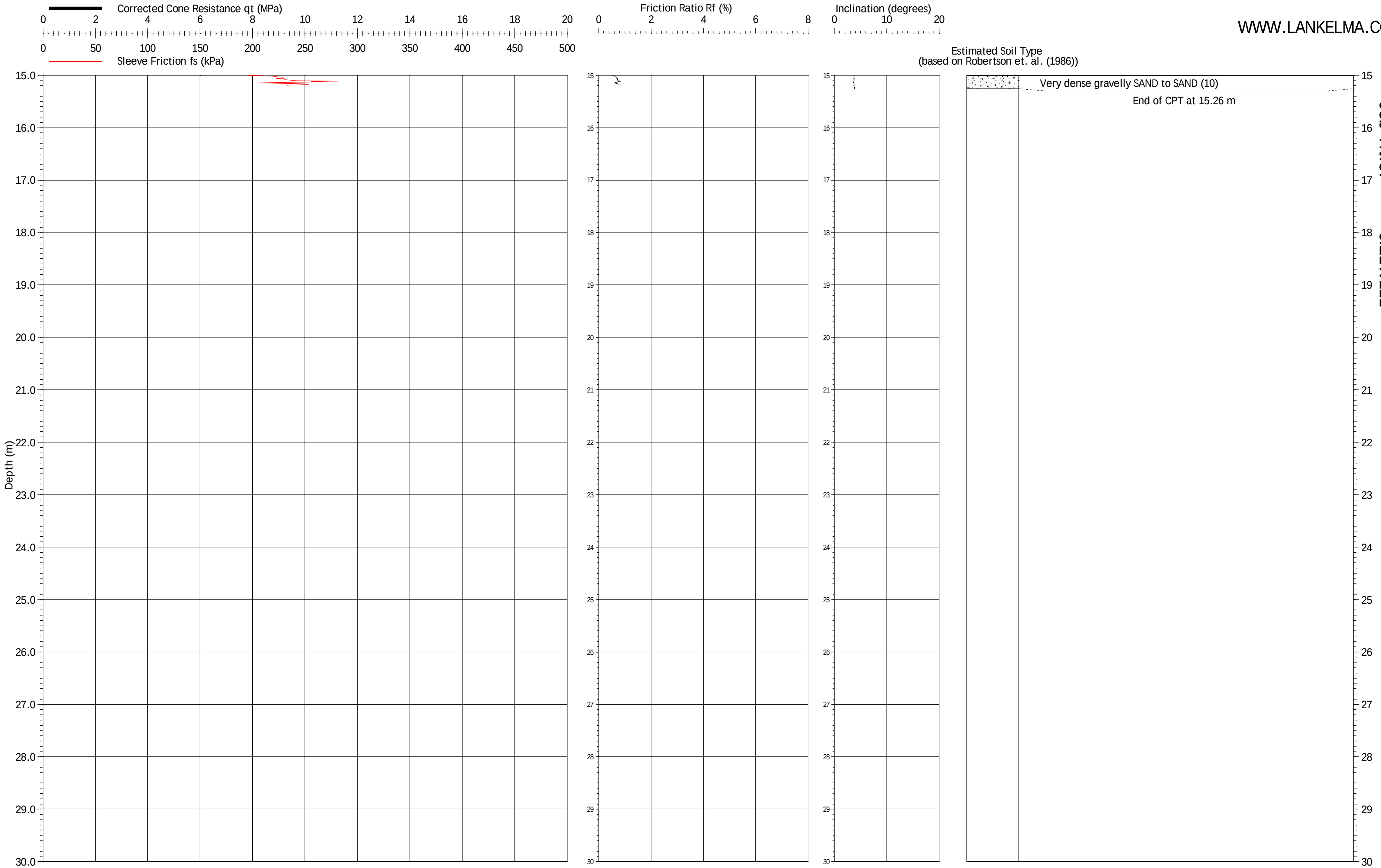
CONE PENETRATION TEST GEO1CPT5

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa

WWW.LANKELMA.COM



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Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name [redacted] 087 - GEO1CPT5

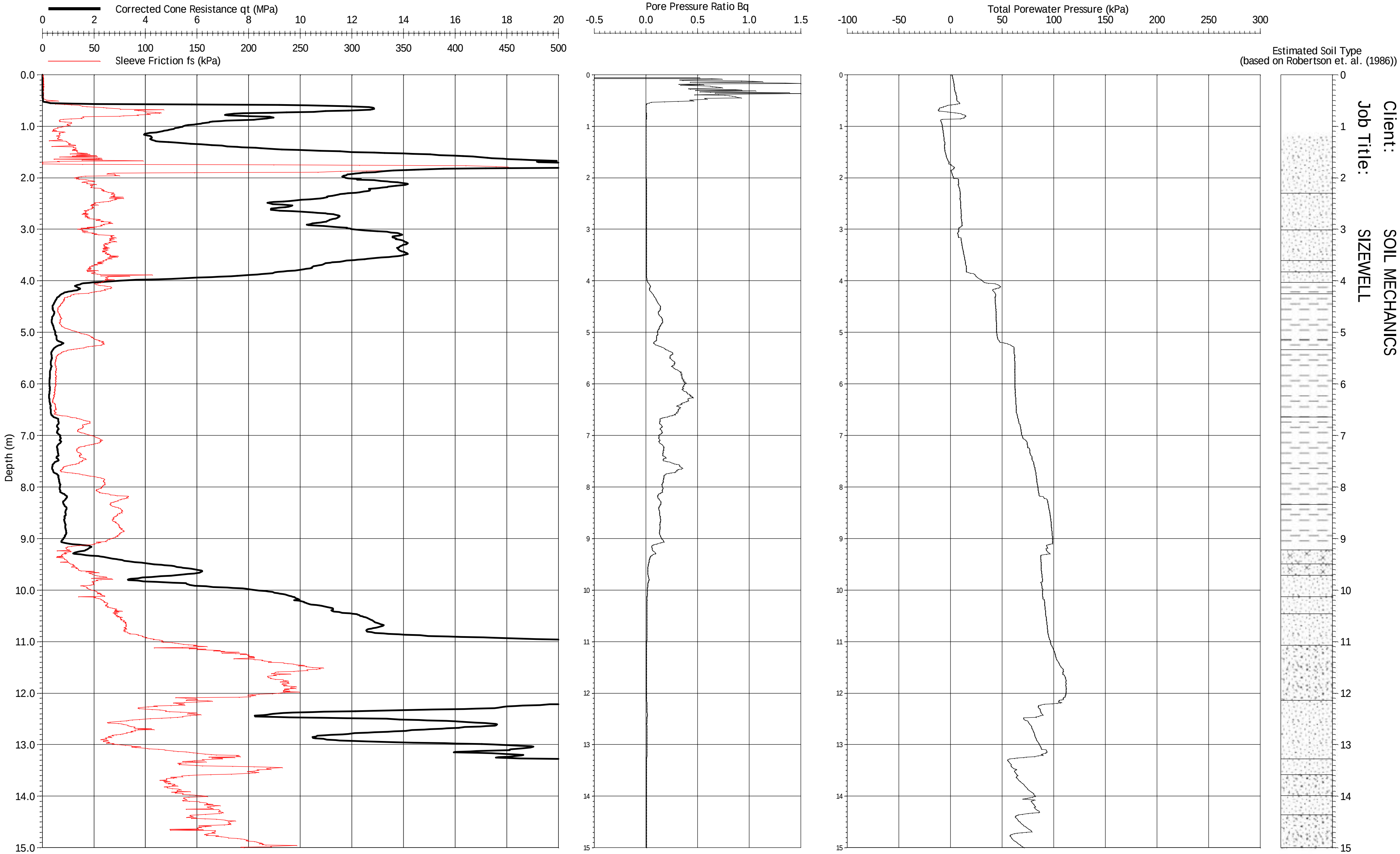
Checked B[redacted]

CONE PENETRATION TEST GEO1CPT5

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GEO1CPT5

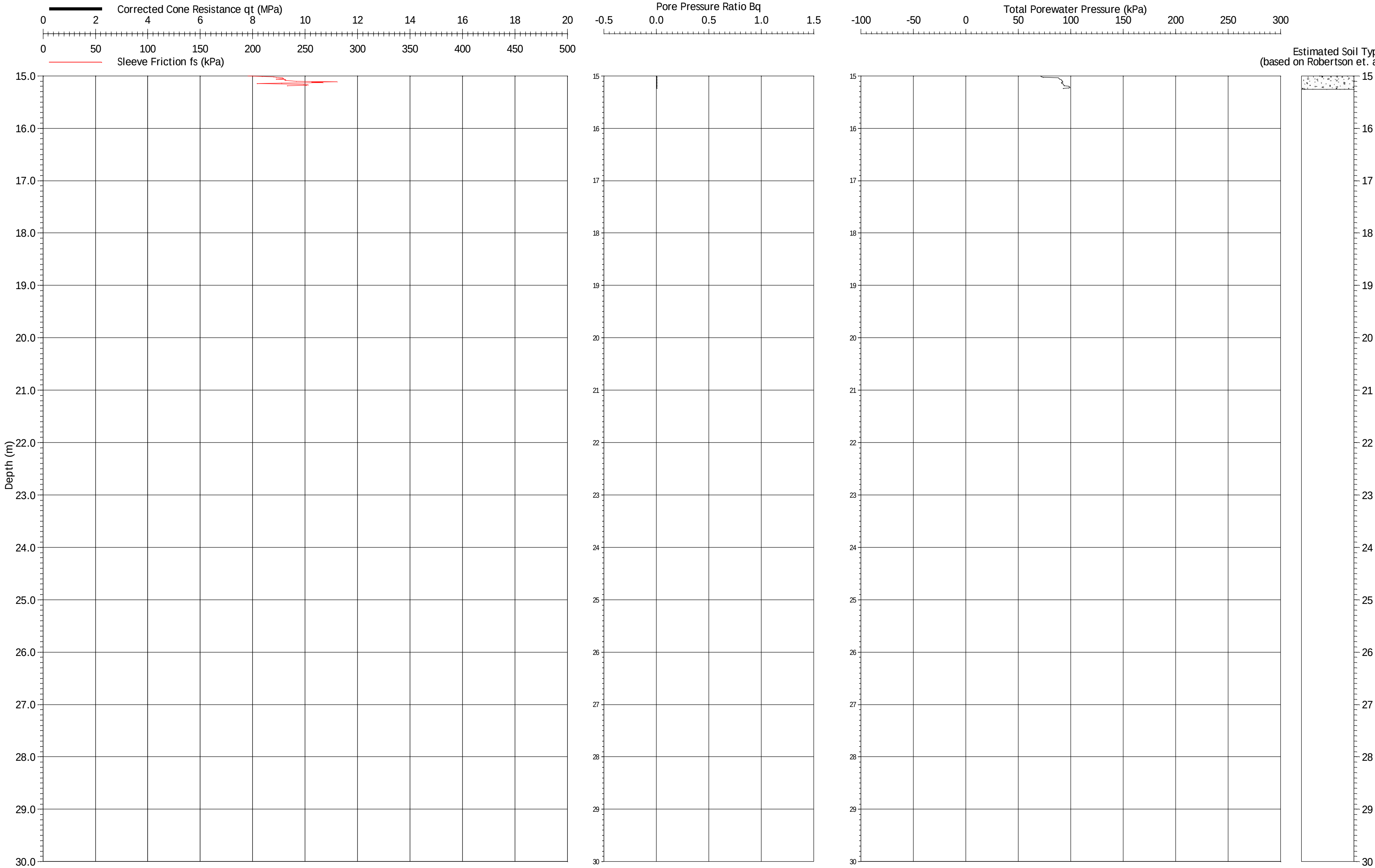
Checked By: [redacted]

CONE PENETRATION TEST GEO1CPT5

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - GEO1CPT5
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT5

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

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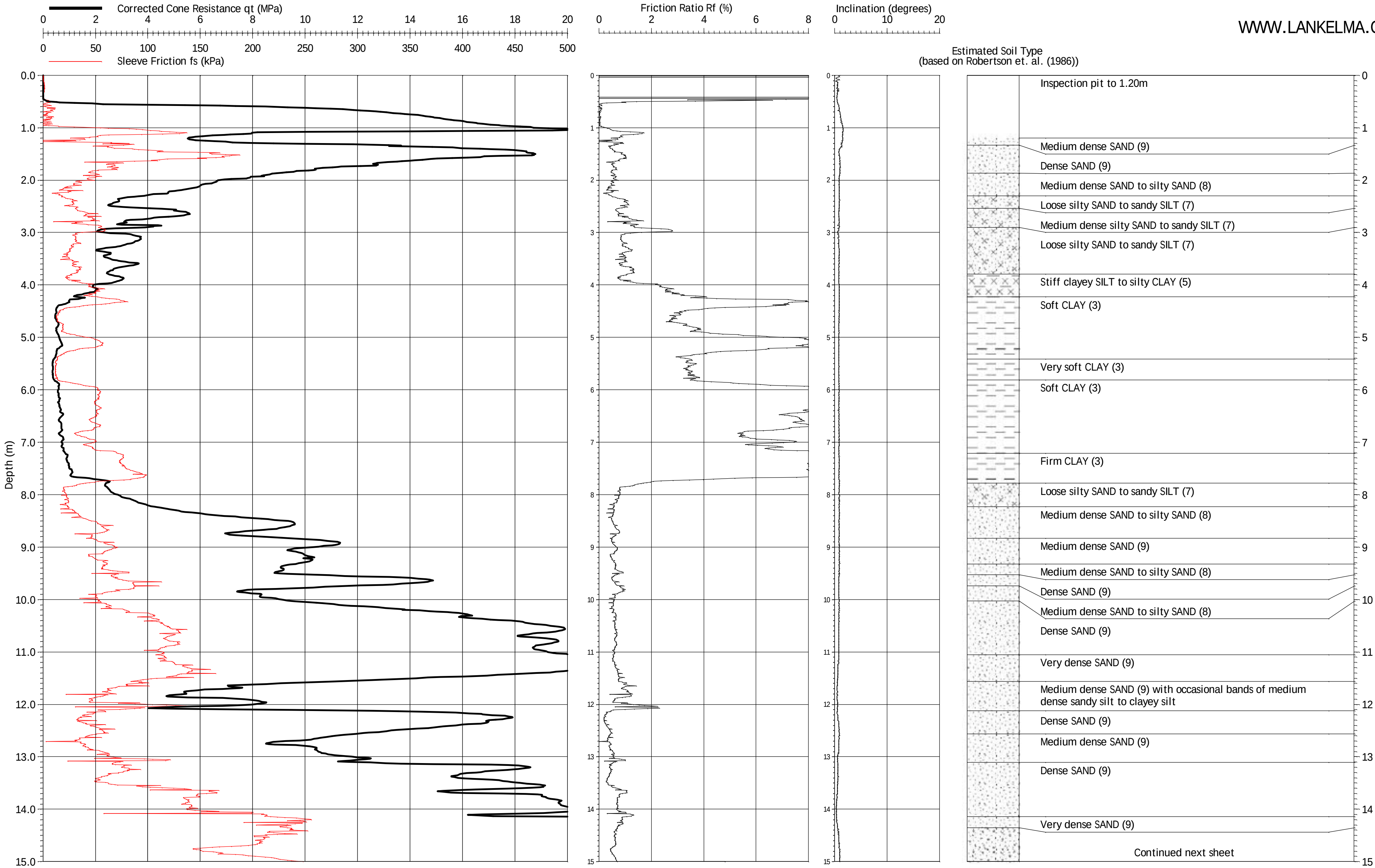
Client: SOIL MECHANICS
Job Title: SIZEWELL



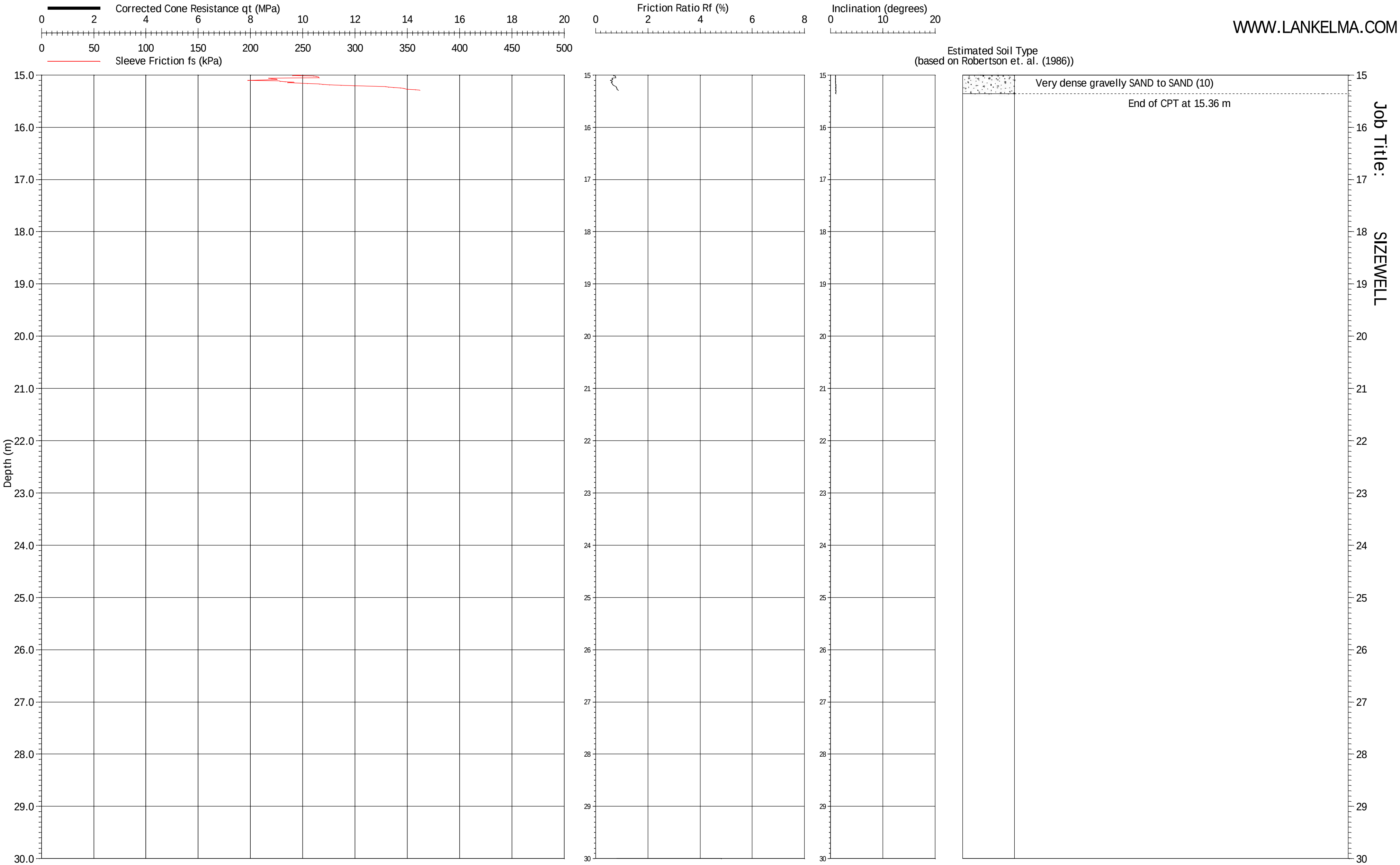
Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 01/12/2010
Date of Plot: 15/12/2010
File Name: 105087 - GEO1CPT6
Checked By: [redacted]

CONE PENETRATION TEST GEO1CPT6
LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS
Job Title: SIZEWELL

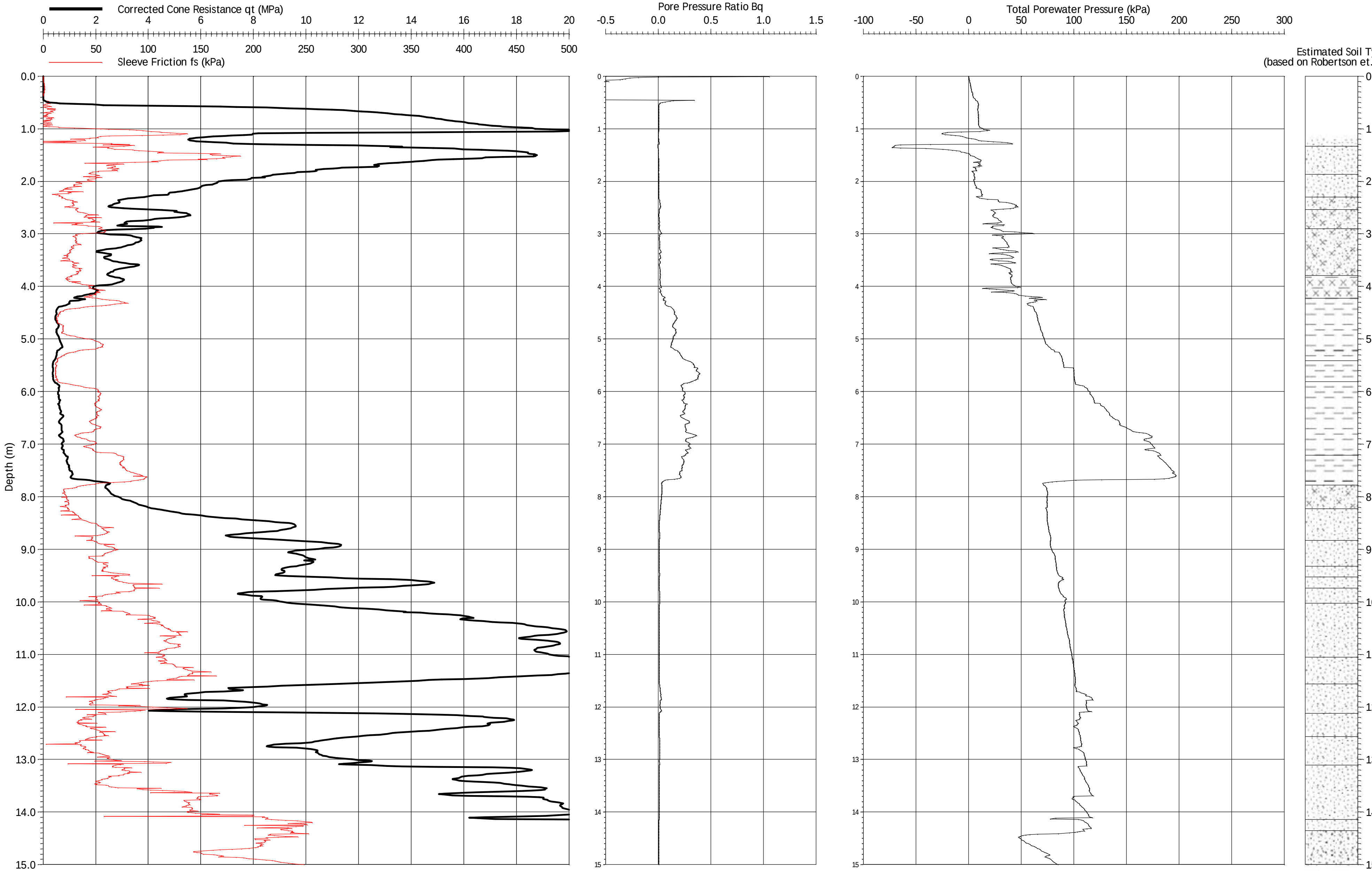
Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - GEO1CPT6
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT6
LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa

Client: SOIL MECHANICS
Job Title: SIZEWELL



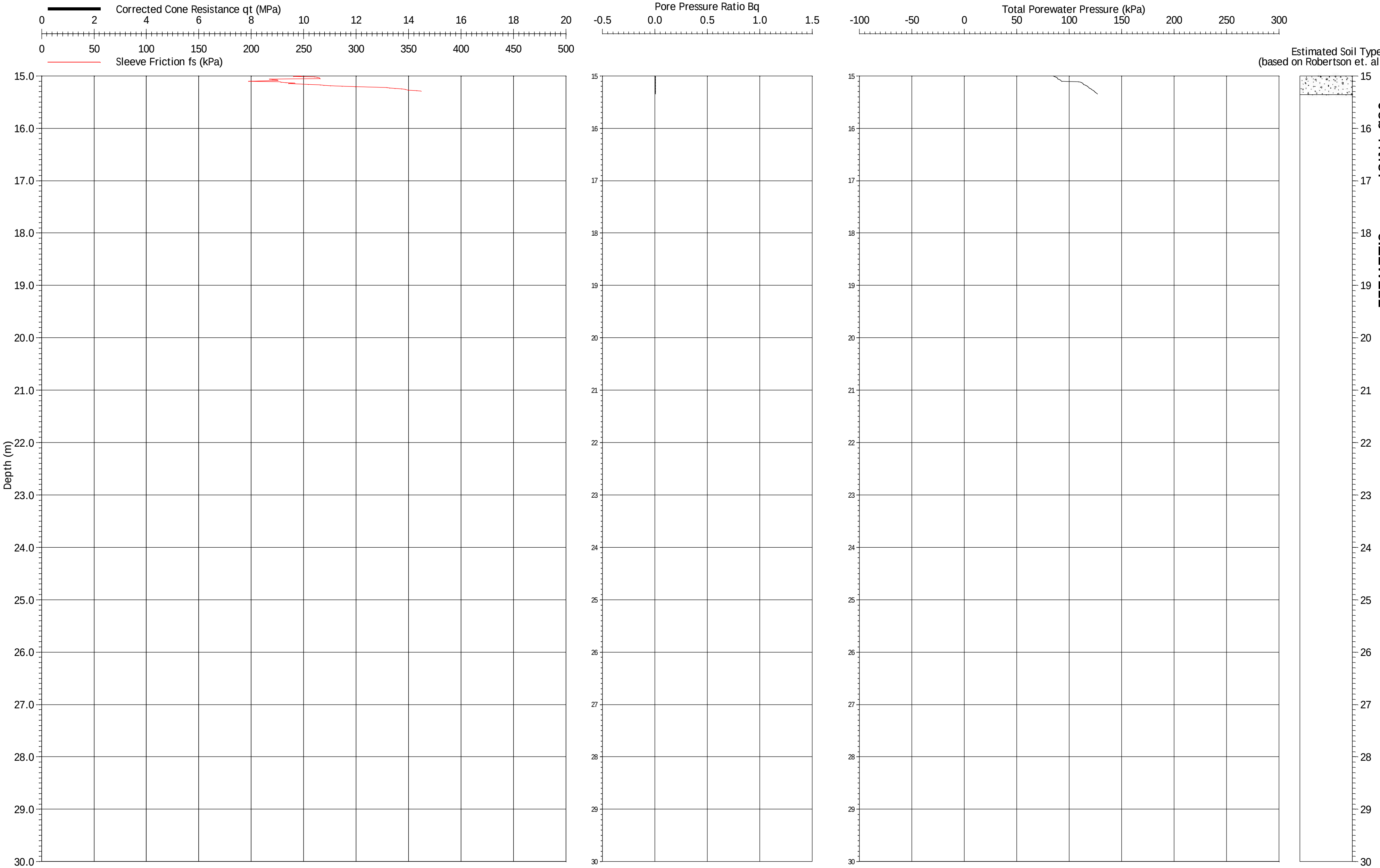
Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]87 - GEO1CPT6
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO1CPT6
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

Client: SOIL MECHANICS
Job Title: SIZEWELL



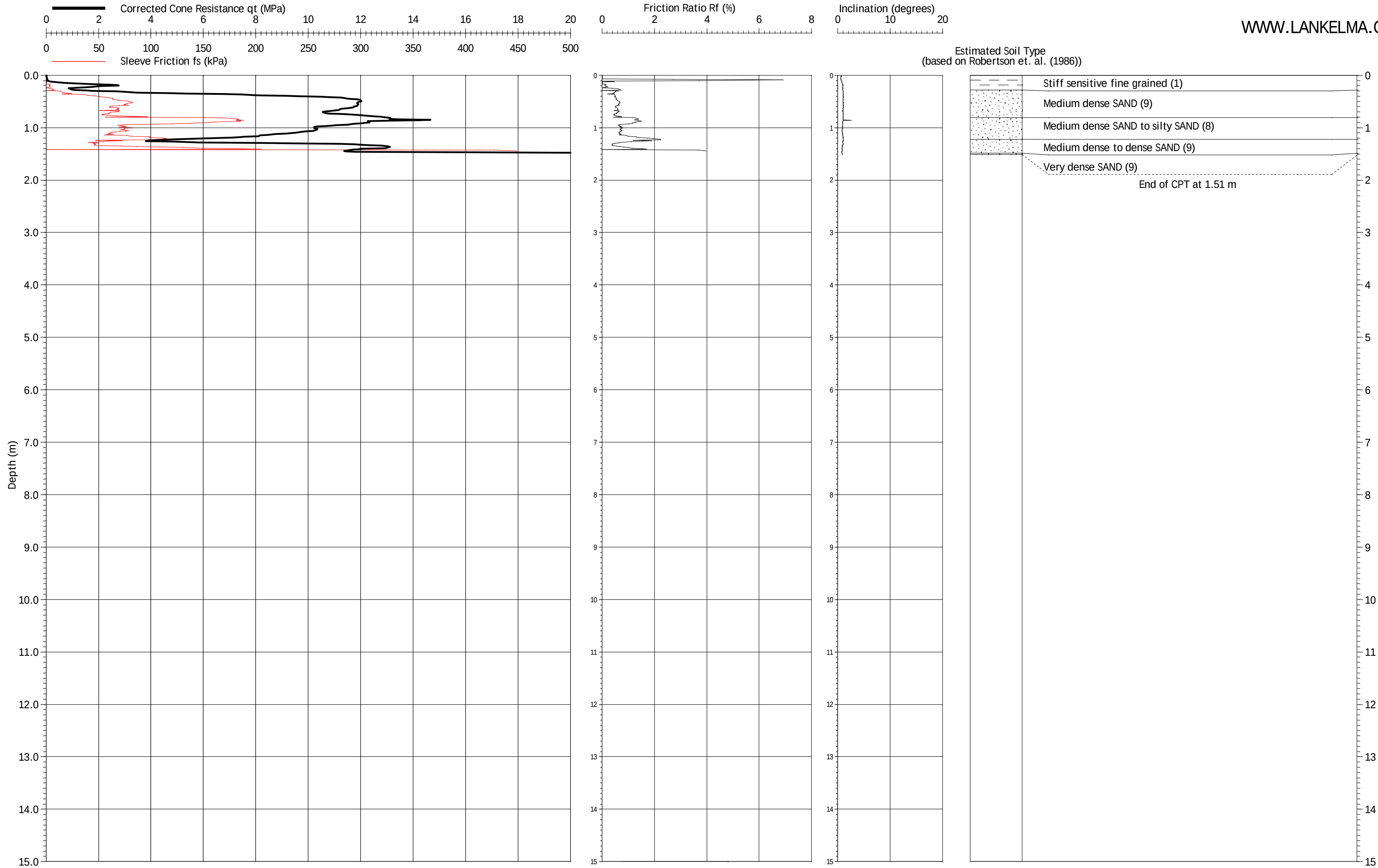
Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 01/12/2010
Date of Plot: 15/12/2010
File Name: [redacted] - GEO1CPT6
Checked By: [redacted]

CONE PENETRATION TEST GEO1CPT6
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



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Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO2CPT1
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO2CPT1

LANKELMA CPT LTD

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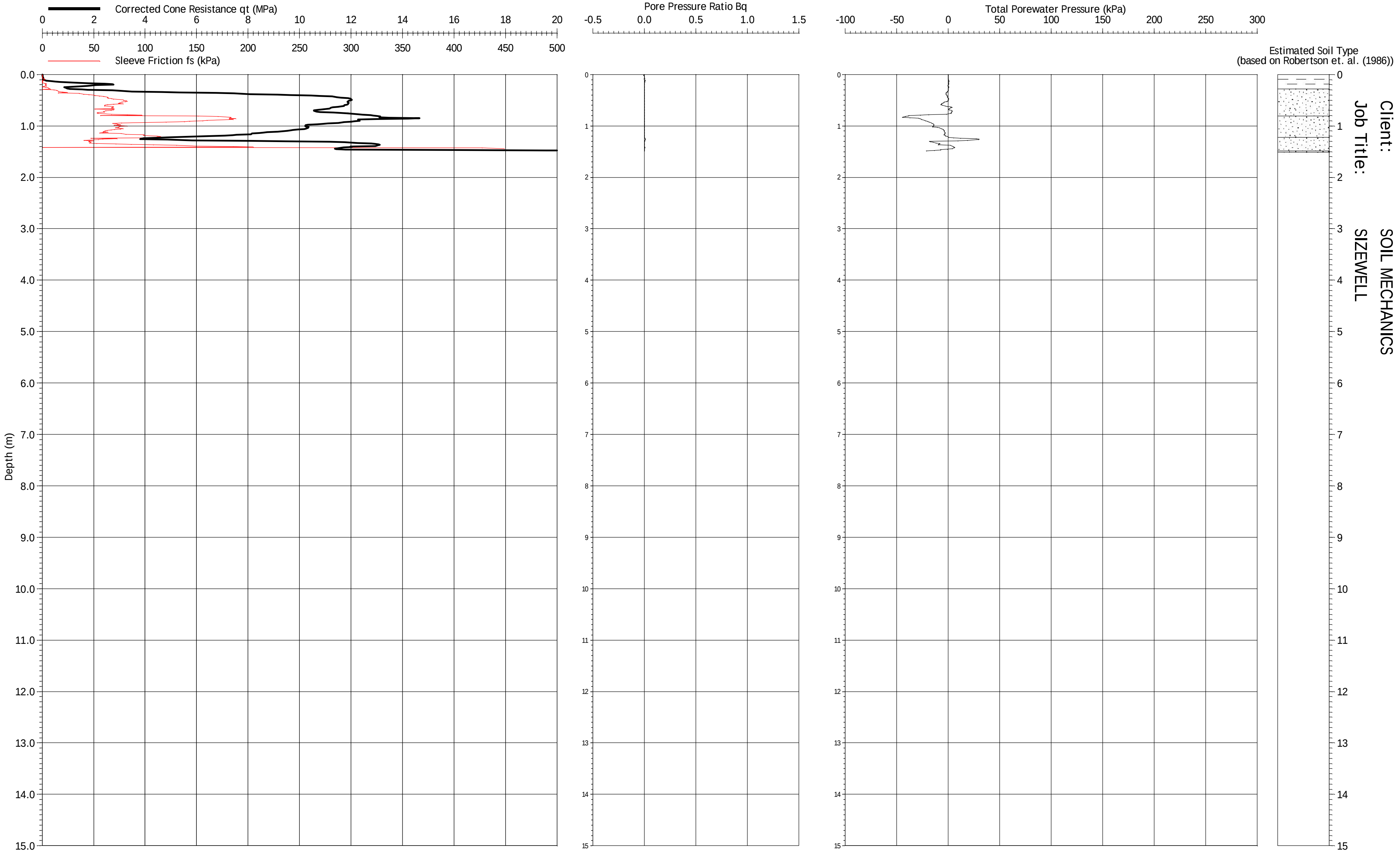
Form: CPT_201_20MPa



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]87 - GEO2CPT1

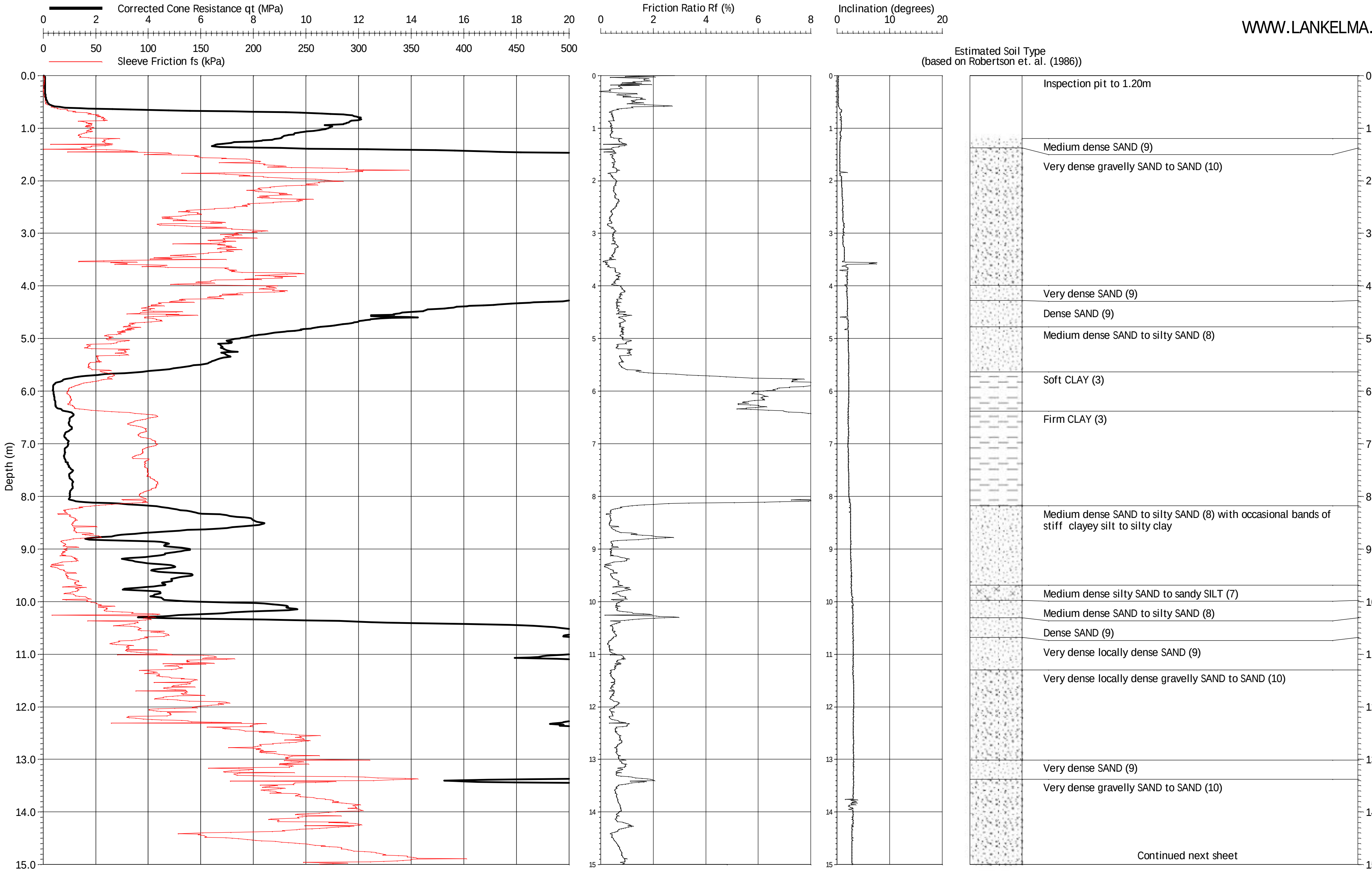
Checked B[redacted]

CONE PENETRATION TEST GEO2CPT1

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO2CPT1A
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

CONE PENETRATION TEST GEO2CPT1A

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Form: CPT_201_20MPa

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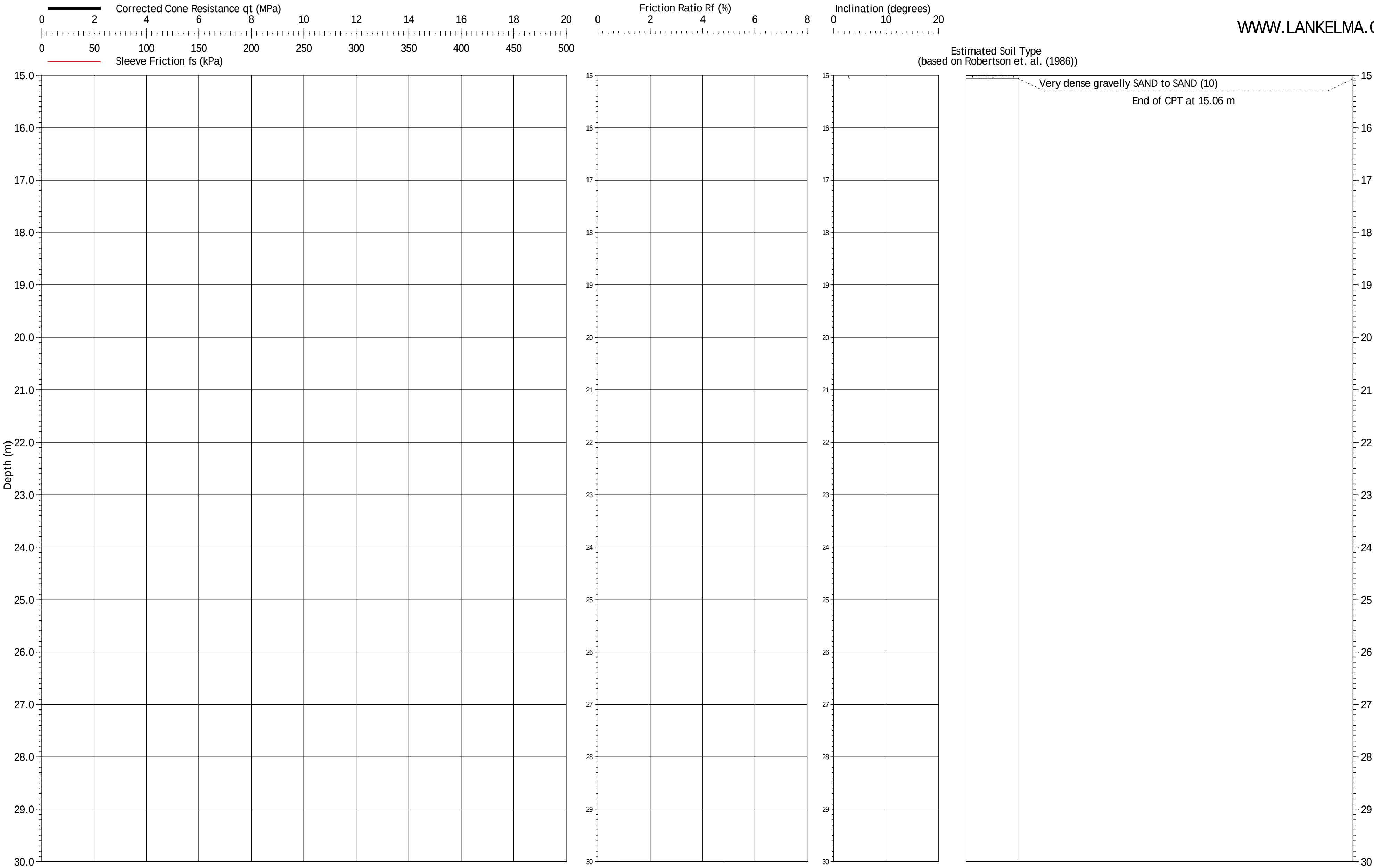

Client: SOIL MECHANICS
Job Title: SIZEWELL

Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 01/12/2010
Date of Plot: 15/12/2010
File Name: [redacted]37 - GEO2CPT1A
Checked By [redacted]

CONE PENETRATION TEST GEO2CPT1A
LANKELMA CPT LTD

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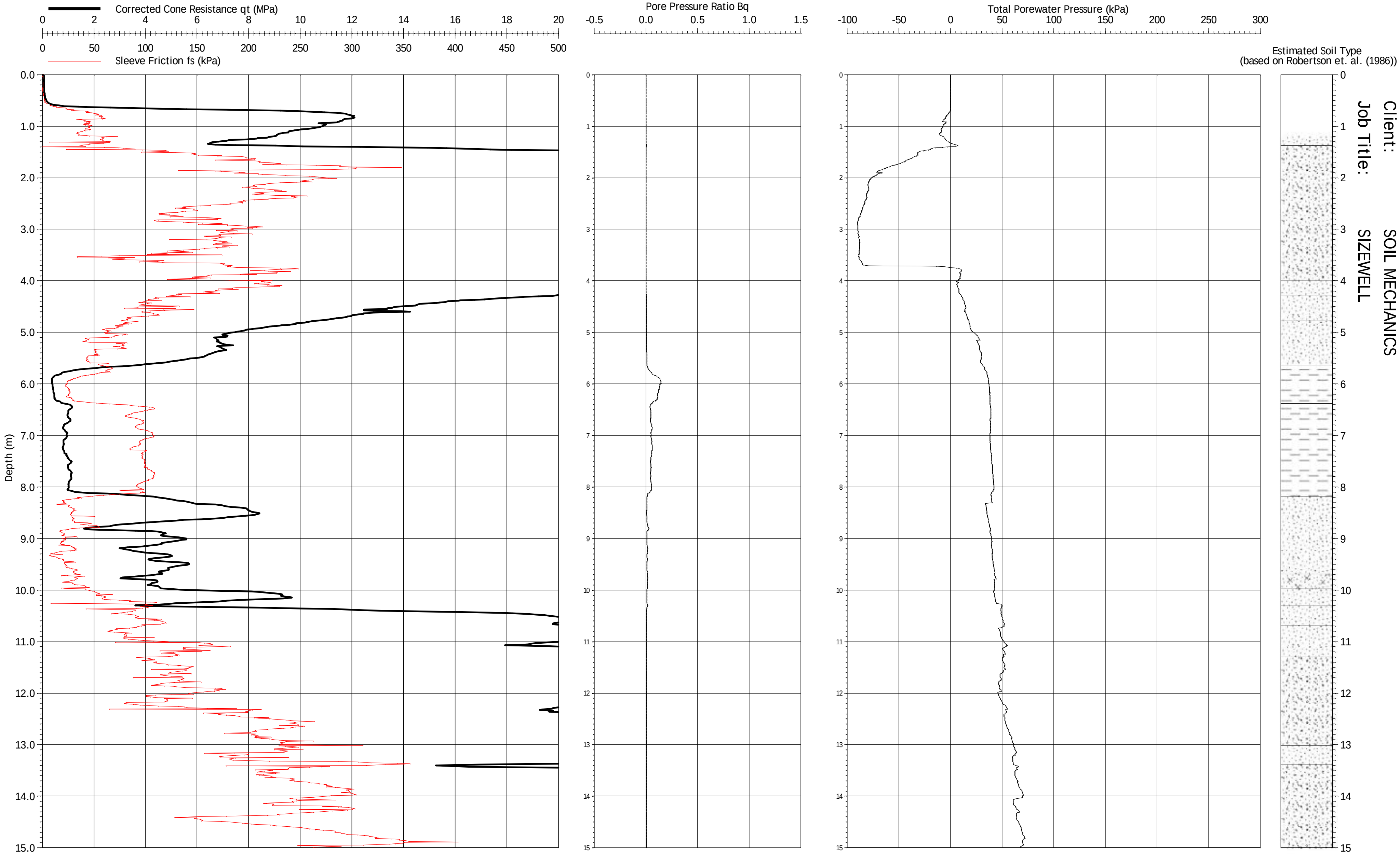
Form: CPT_201_20MPa

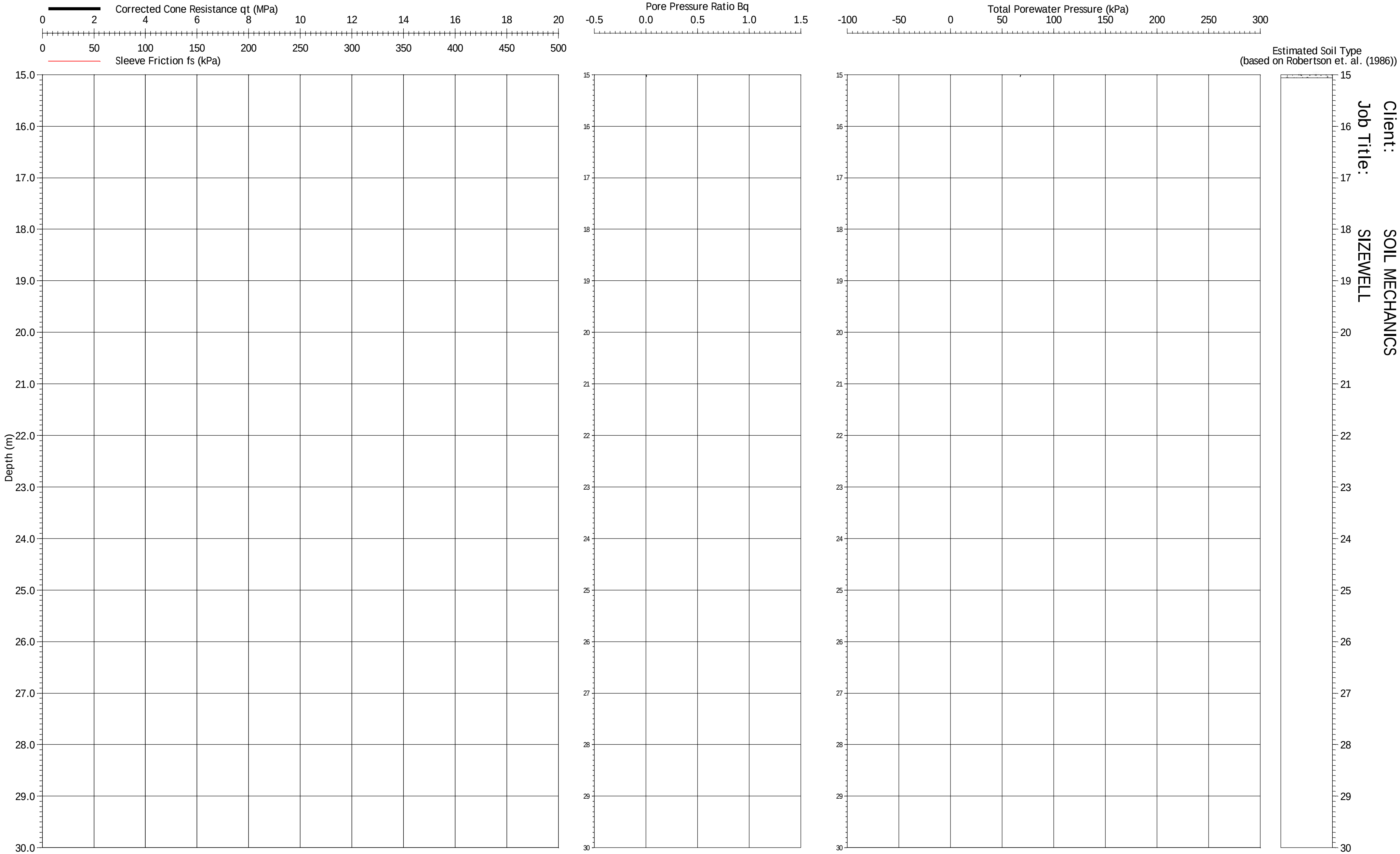


Location:	Sizewell	Date of Test:	01/12/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO2CPT1A
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

CONE PENETRATION TEST GEO2CPT1A

LANKELMA CPT LTD

Form: CPT_303_Bq2



Client: SOIL MECHANICS
Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 01/12/2010

Date of Plot: 15/12/2010

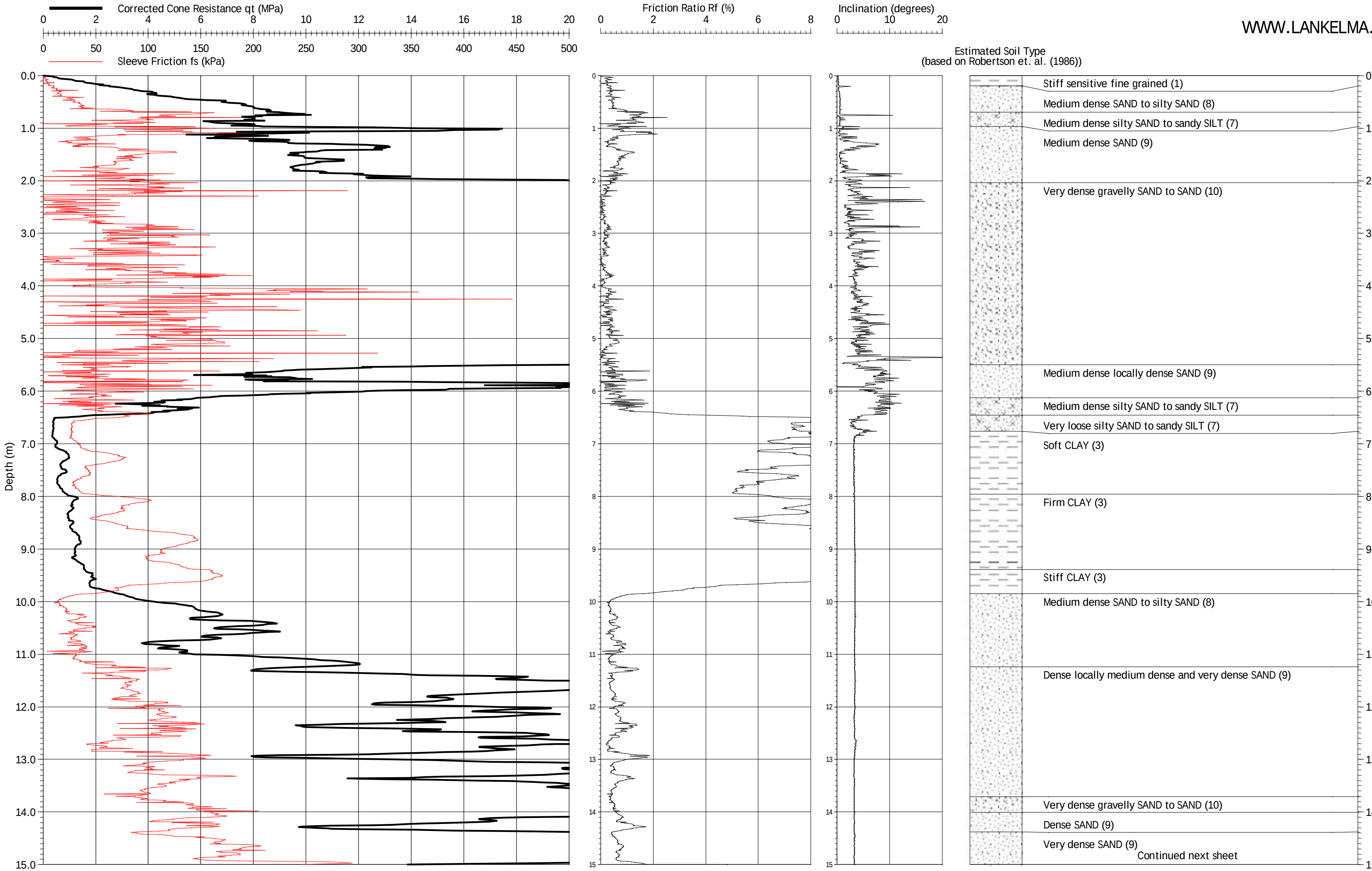
File Name: [redacted]087 - GEO2CPT1A

Checked By [redacted]

CONE PENETRATION TEST GEO2CPT1A LANKELMA

LANKELMA CPT LTD

Form: CPT_303_Bq2



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Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - GEO4CPT1
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked B[redacted]	
Remarks:			

CONE PENETRATION TEST GEO4CPT1

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Form: CPT_201_20MPa

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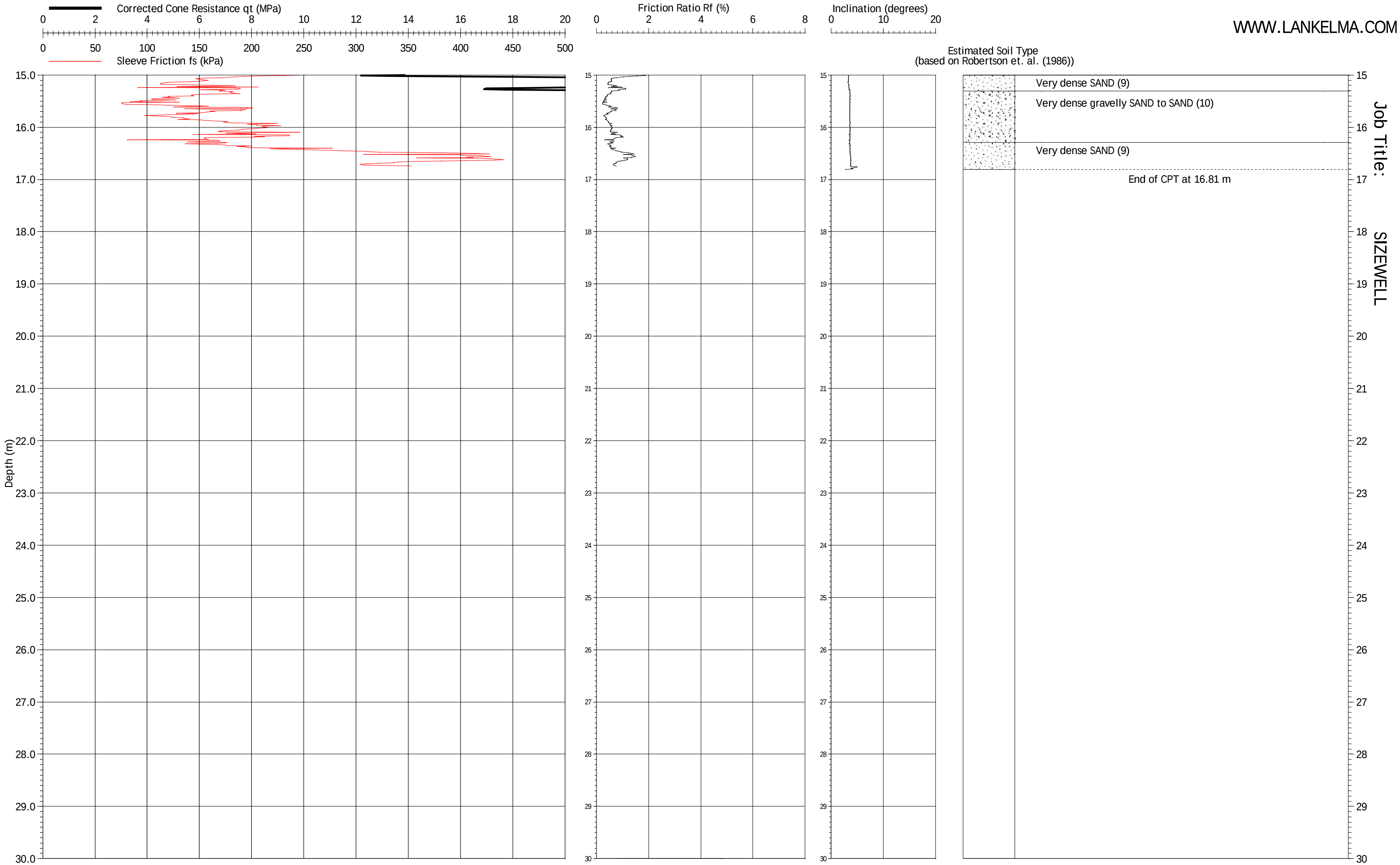
Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: 105087 - GEO4CPT1

Checked By: [redacted]

CONE PENETRATION TEST GEO4CPT1

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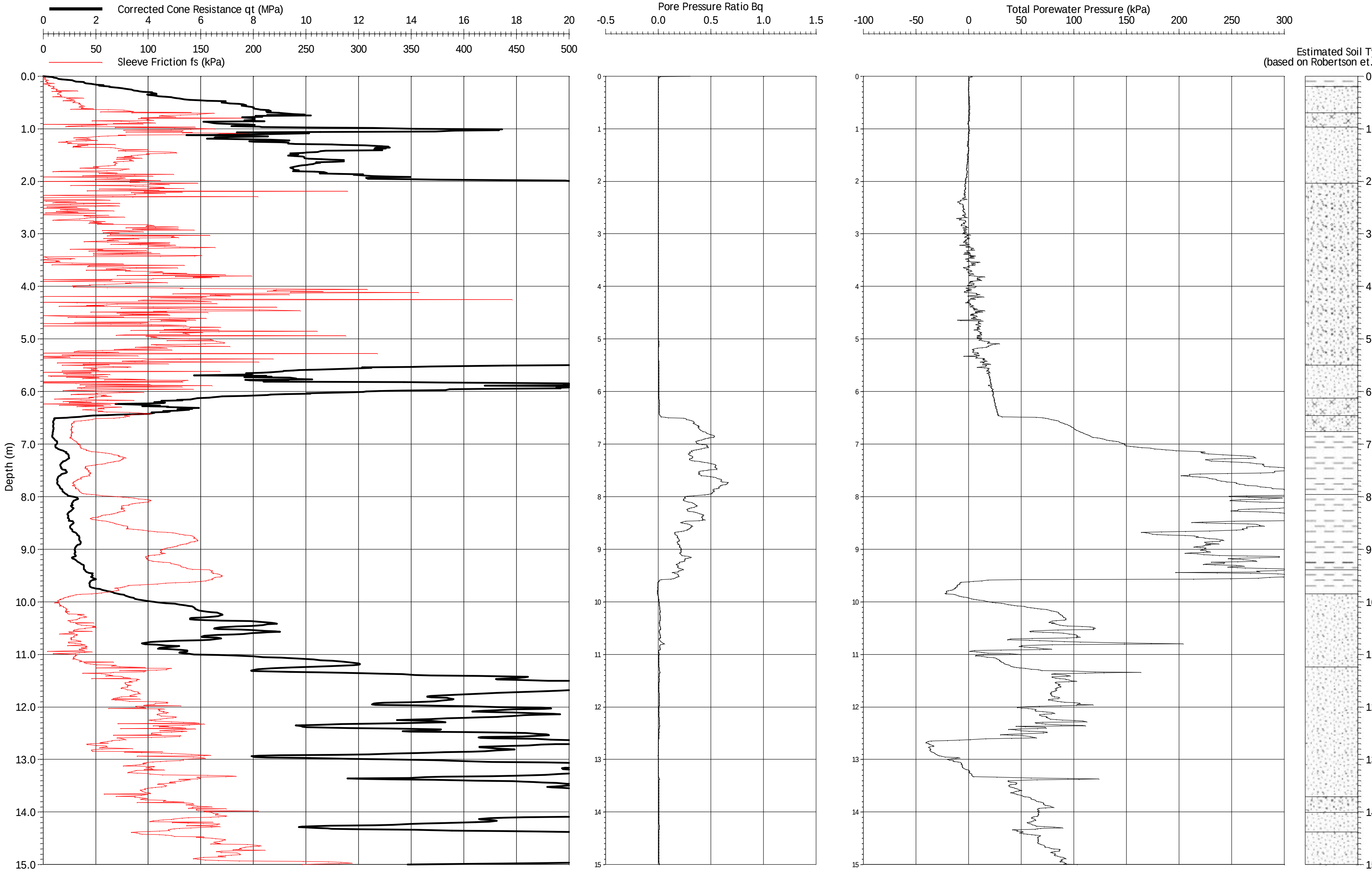
Form: CPT_201_20MPa

Client: SOIL MECHANICS
Job Title: SIZEWELL



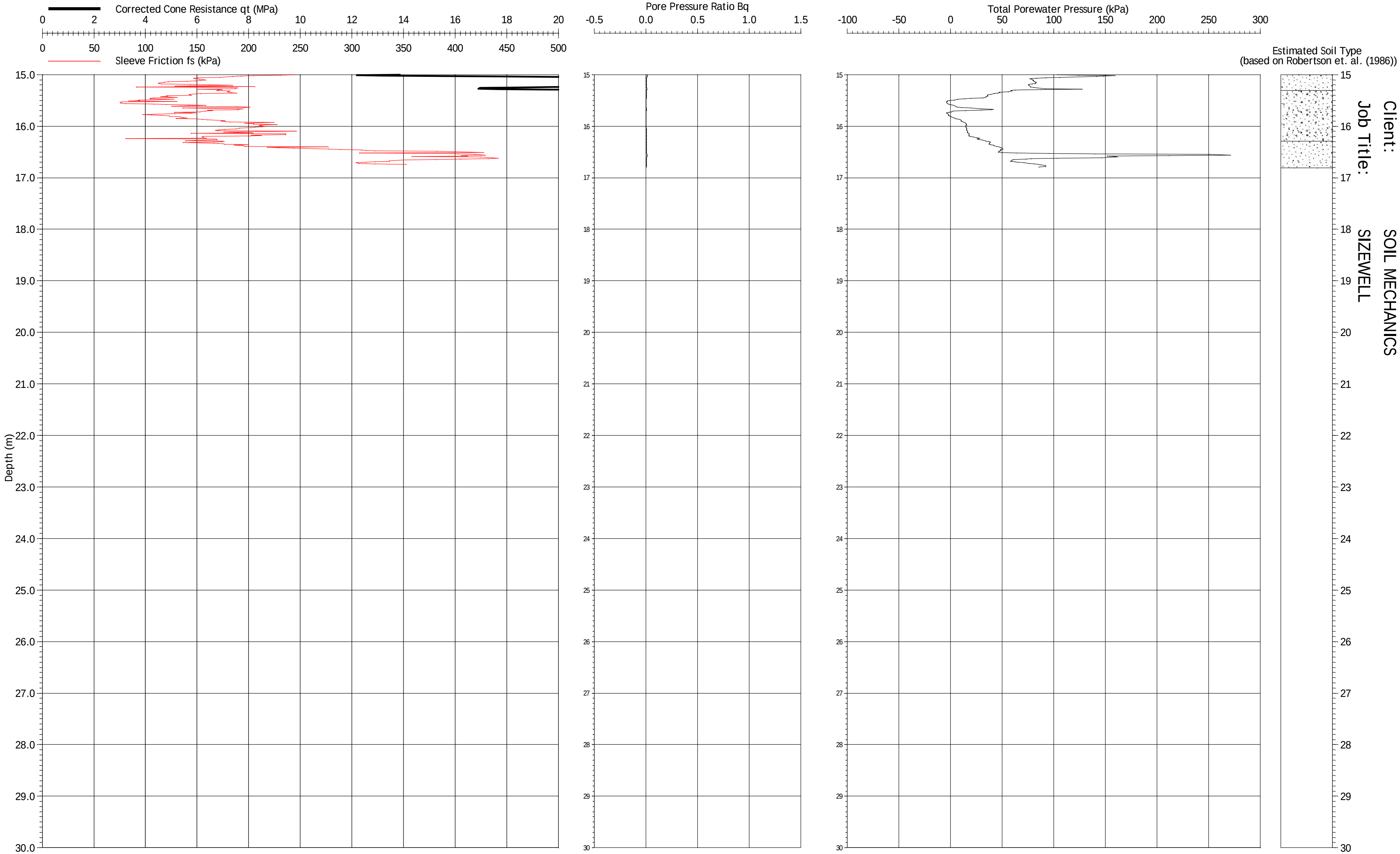
Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 30/11/2010
Date of Plot: 15/12/2010
File Name: 105087 - GEO4CPT1
Checked By [redacted]

CONE PENETRATION TEST GEO4CPT1
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - GEO4CPT1
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

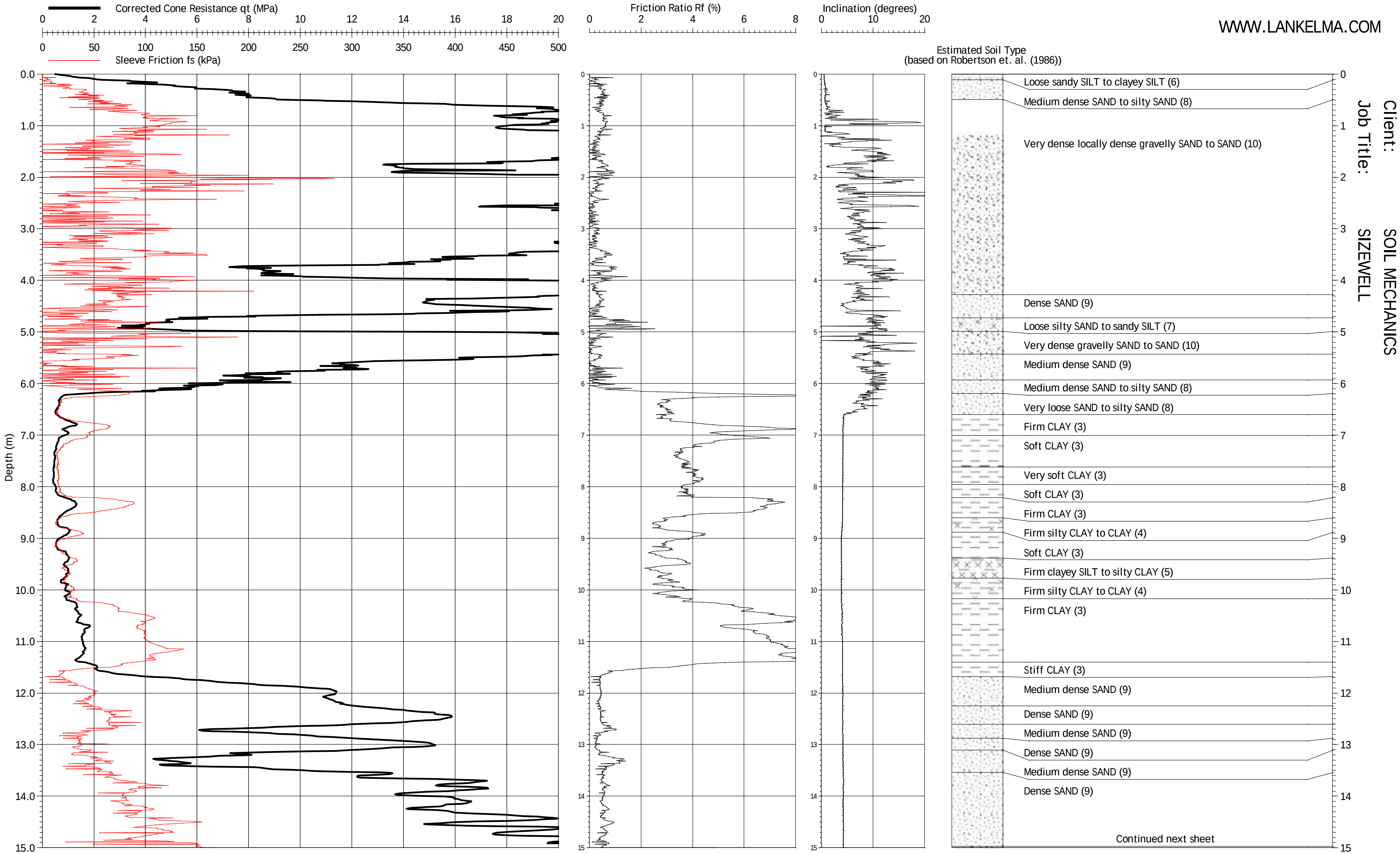
CONE PENETRATION TEST GEO4CPT1
LANKELMA CPT LTD

Form: CPT_303_Bq2

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]87 - GEO4CPT2
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

CONE PENETRATION TEST GEO4CPT2

LANKELMA CPT LTD

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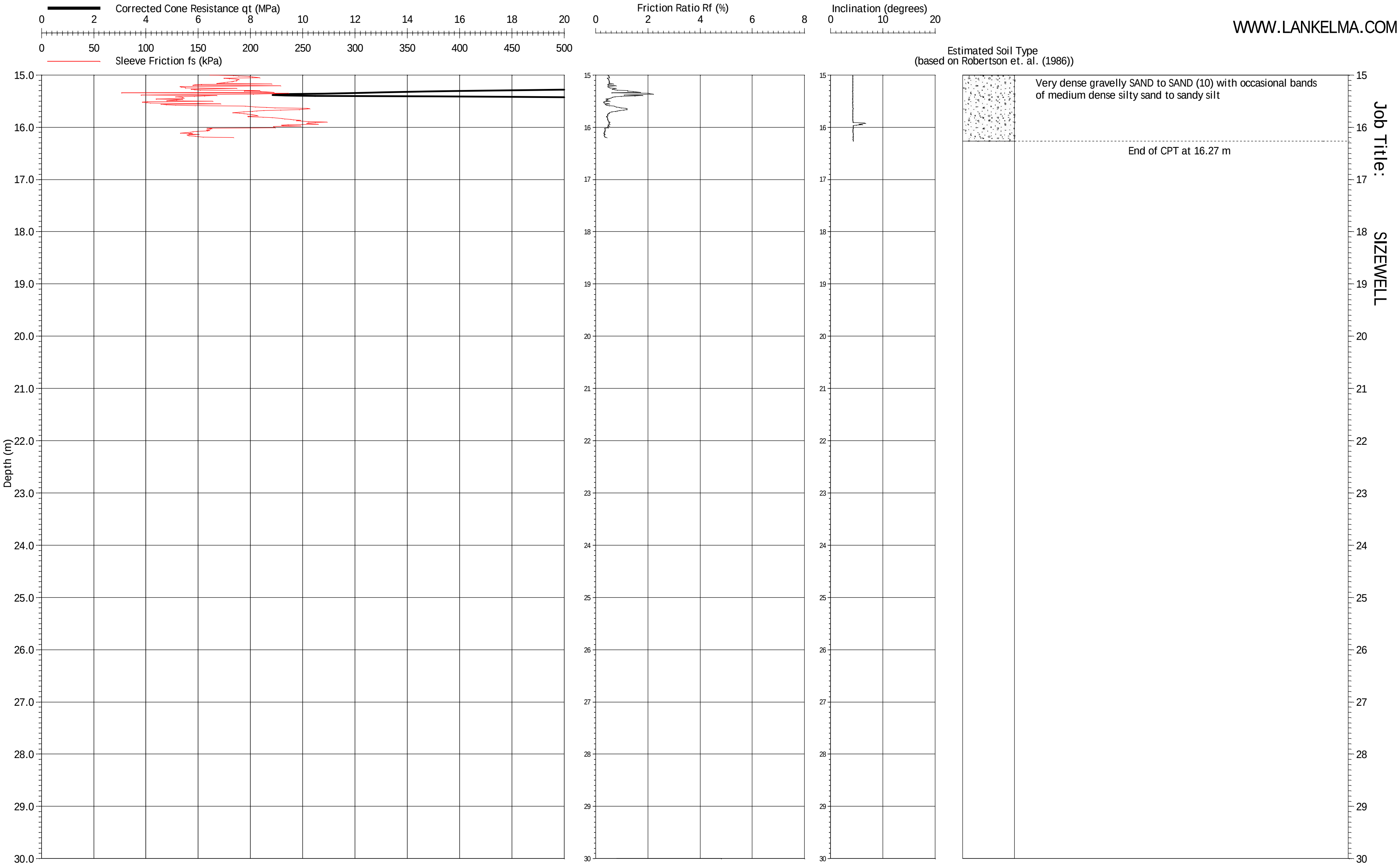
Form: CPT_201_20MPa



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Client: SOIL MECHANICS
Job Title: SIZEWELL

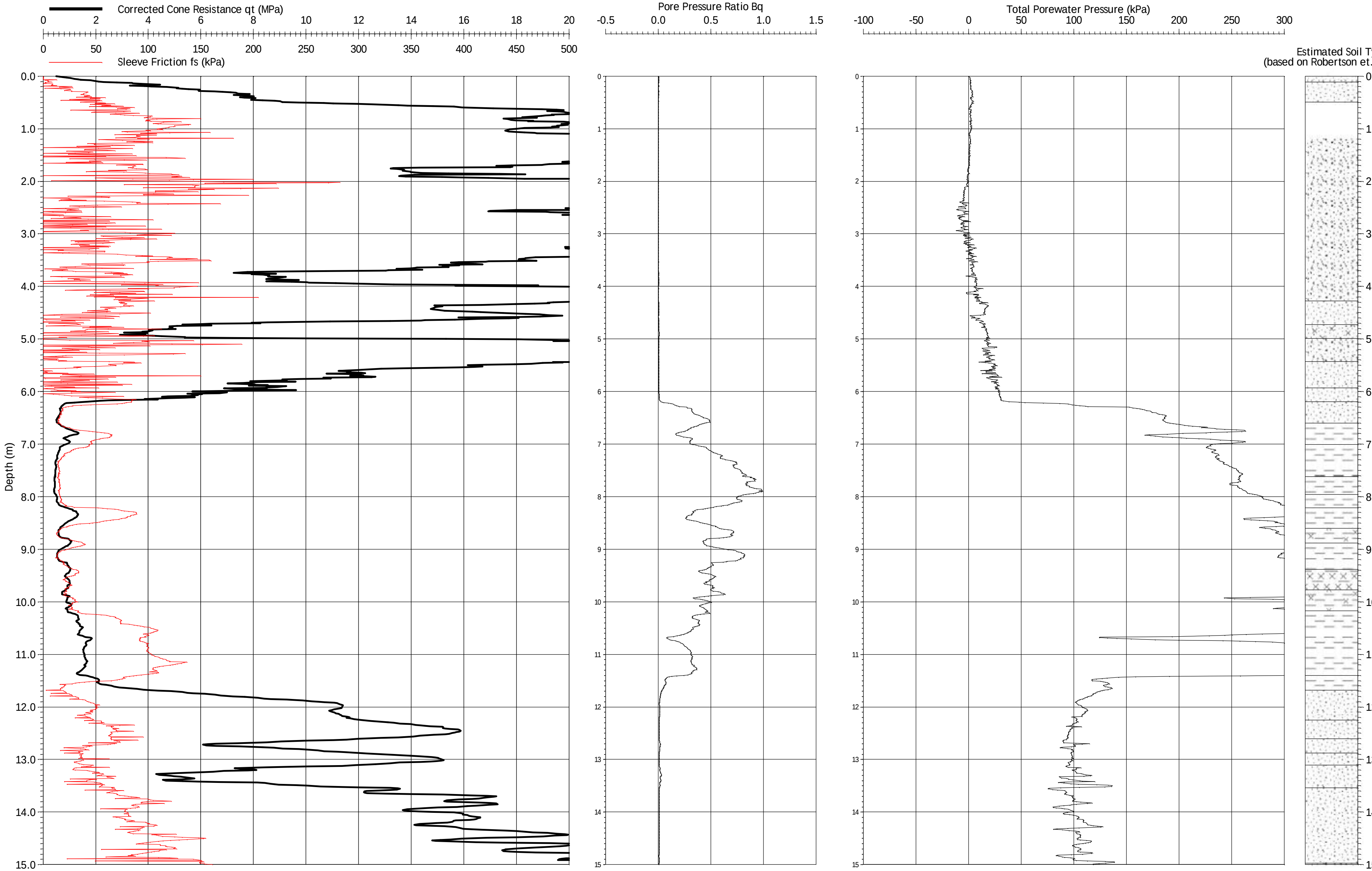
Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 30/11/2010
Date of Plot: 15/12/2010
File Name: [redacted]087 - GEO4CPT2
Checked By [redacted]

CONE PENETRATION TEST GEO4CPT2
LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS
Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO4CPT2
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

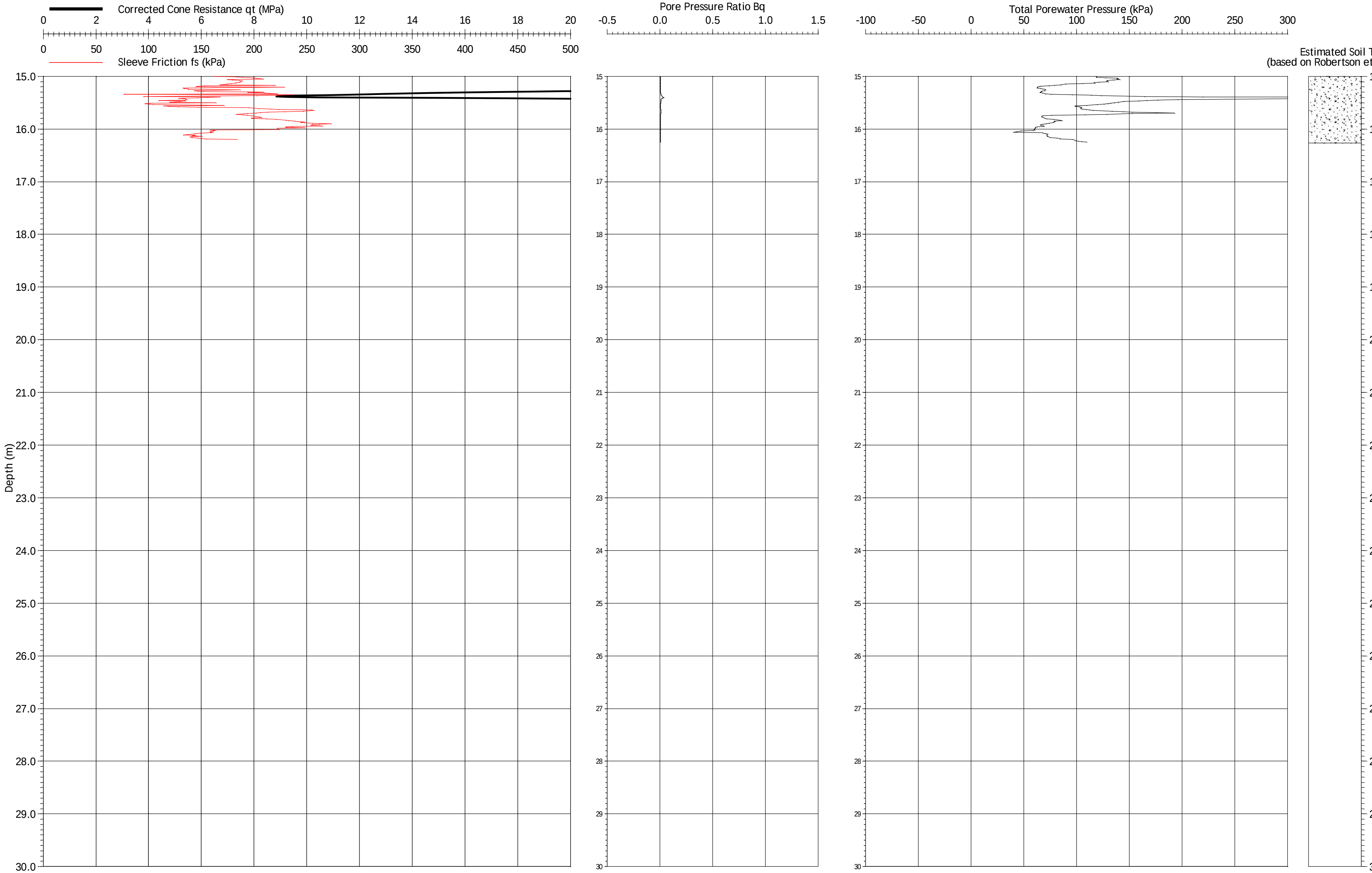
CONE PENETRATION TEST GEO4CPT2
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GEO4CPT2

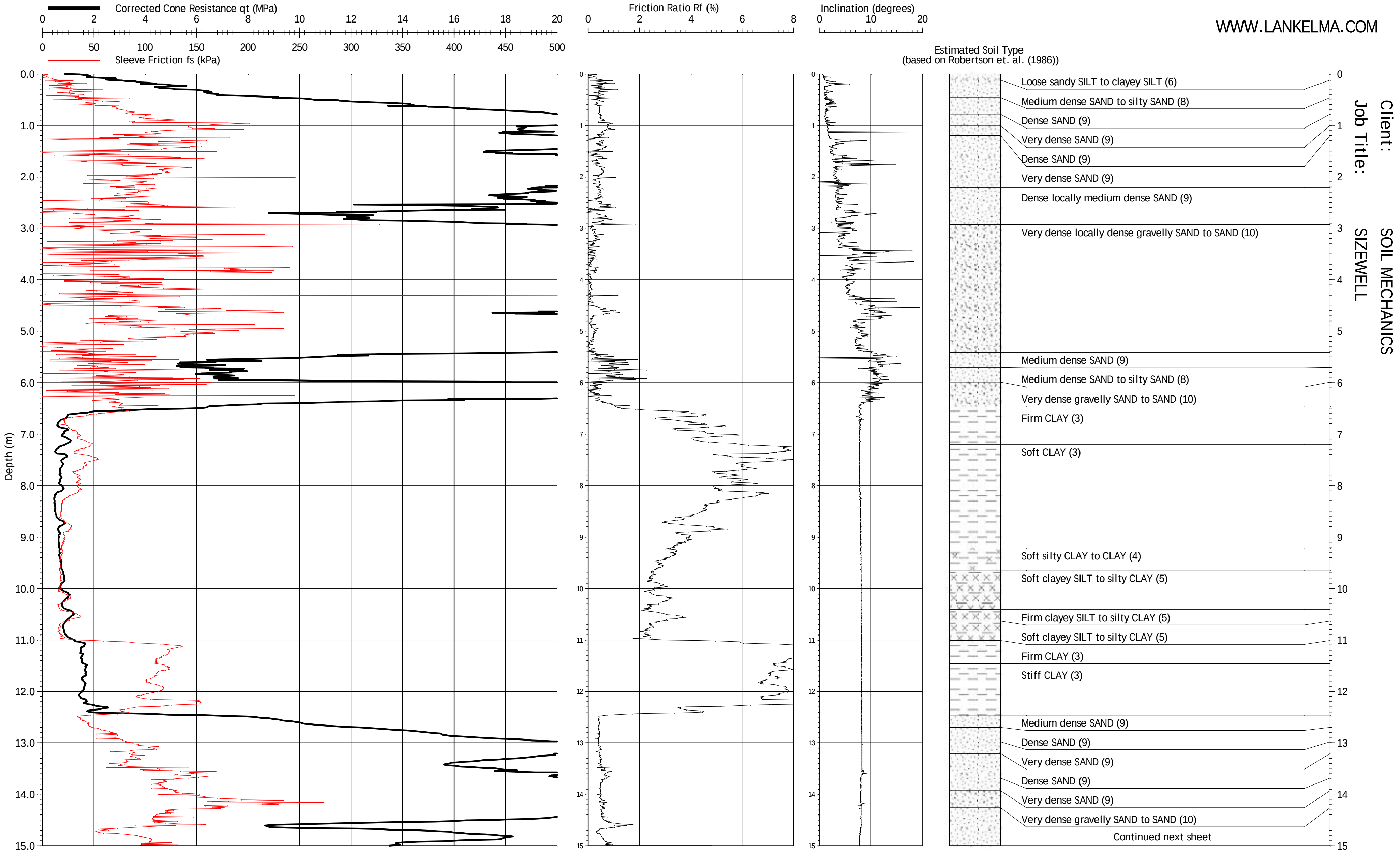
Checked By: [redacted]

CONE PENETRATION TEST GEO4CPT2

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GEO4CPT3

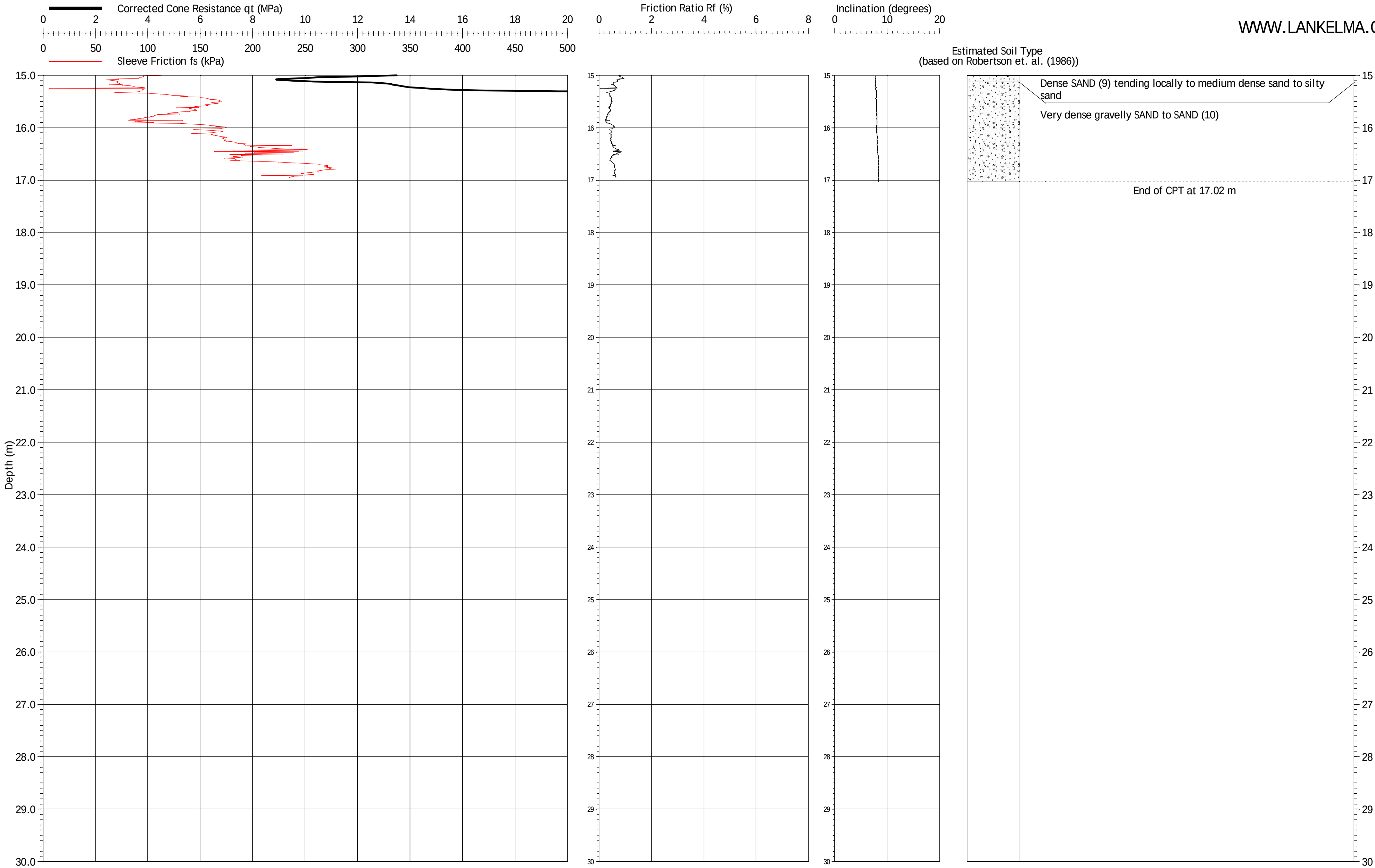
Checked By [redacted]

CONE PENETRATION TEST GEO4CPT3

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



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Client: SOIL MECHANICS

Job Title: SIZEWELL

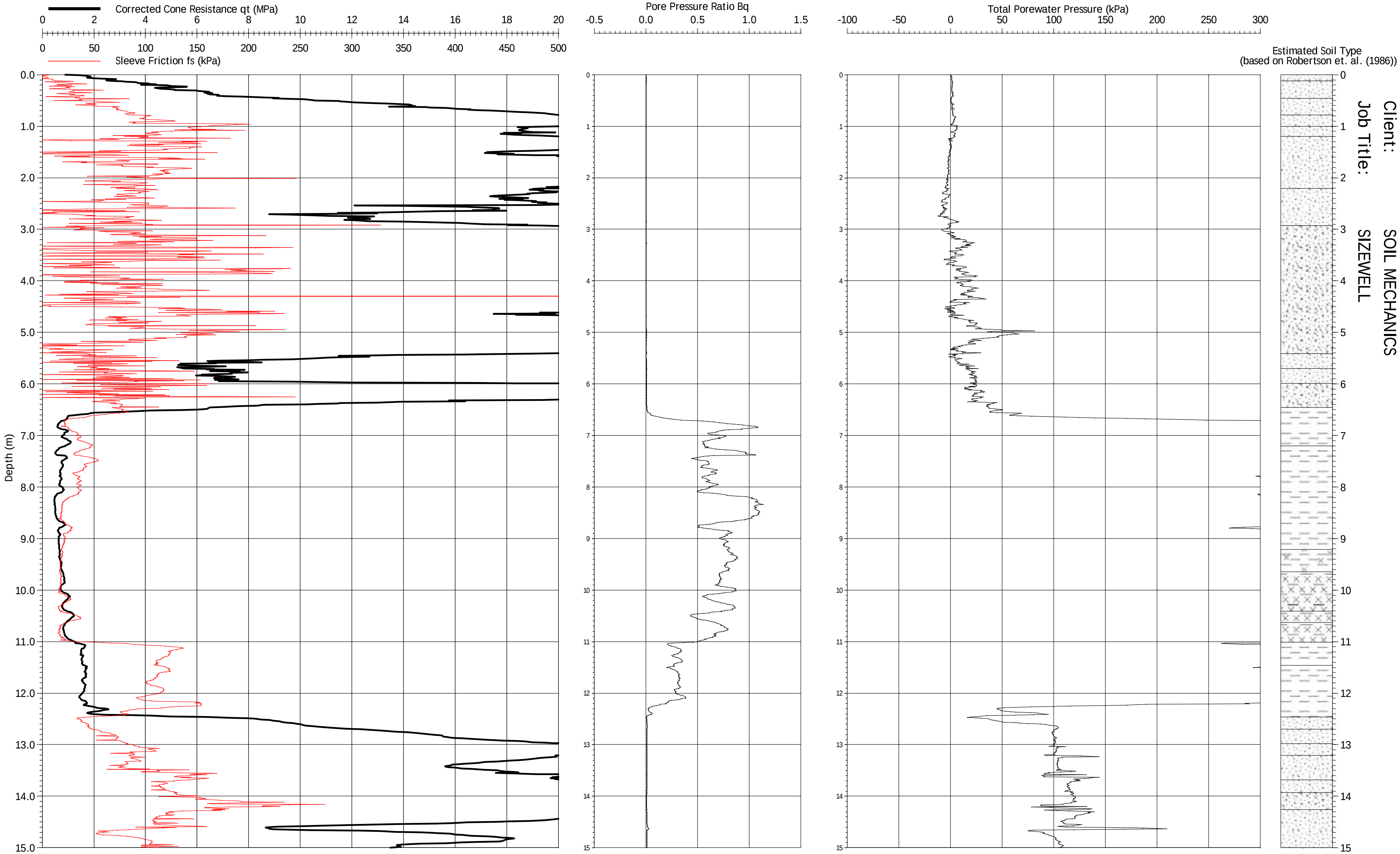
Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]87 - GEO4CPT3
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

CONE PENETRATION TEST GEO4CPT3

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



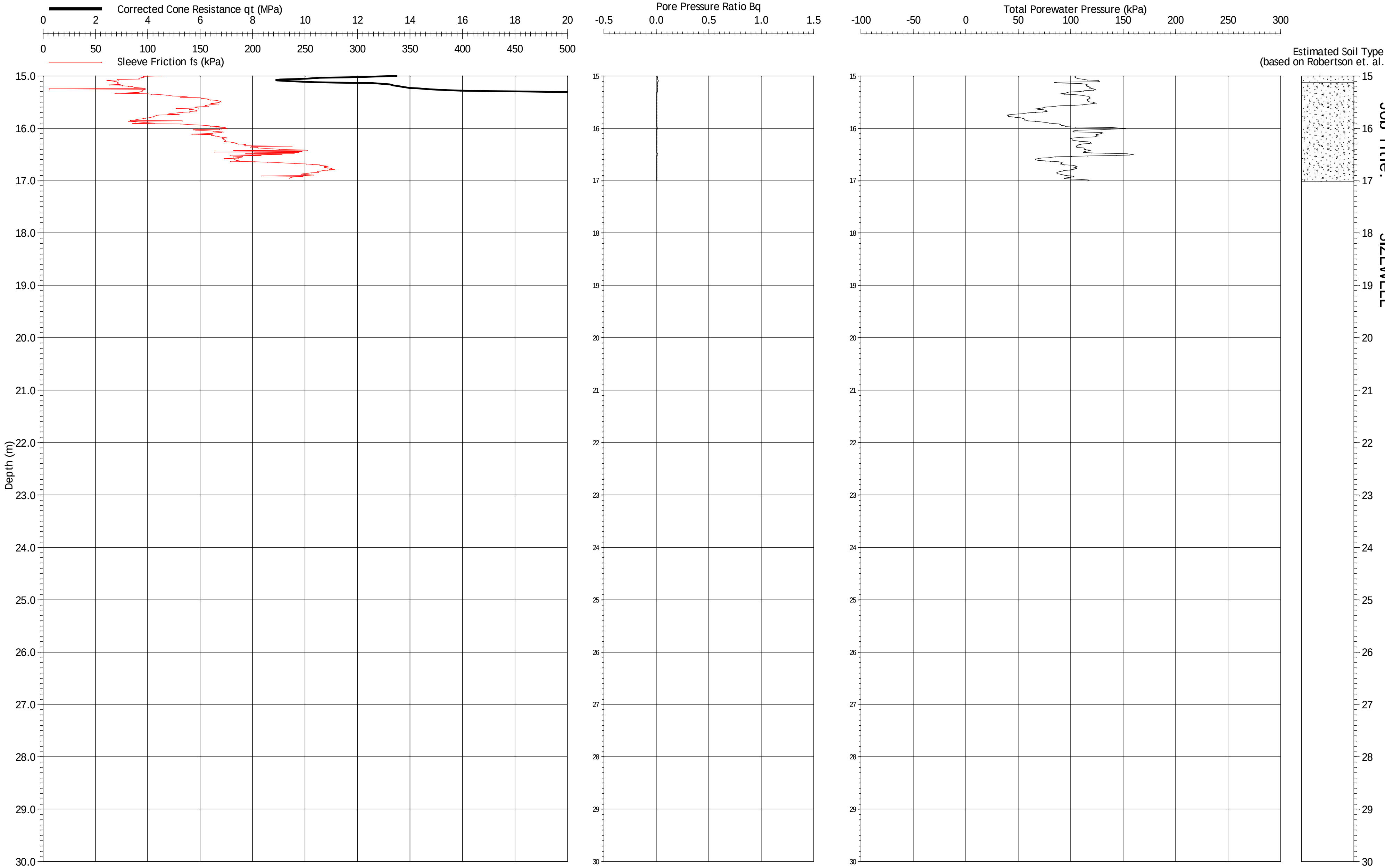
Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	105087 - GEO4CPT3
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GEO4CPT3

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GEO4CPT3

Checked By[redacted]

CONE PENETRATION TEST GEO4CPT3

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

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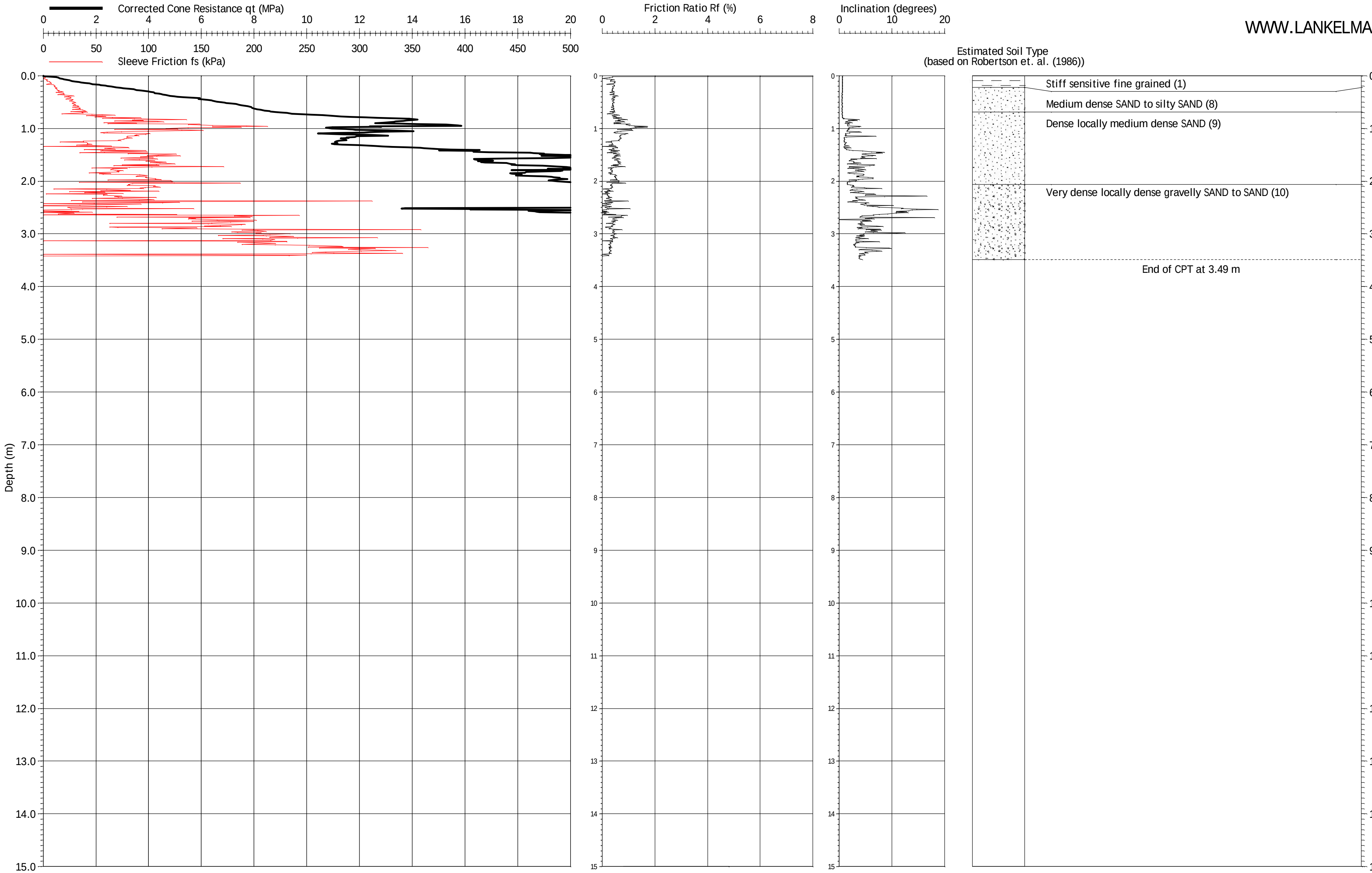
Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GEO4CPT4

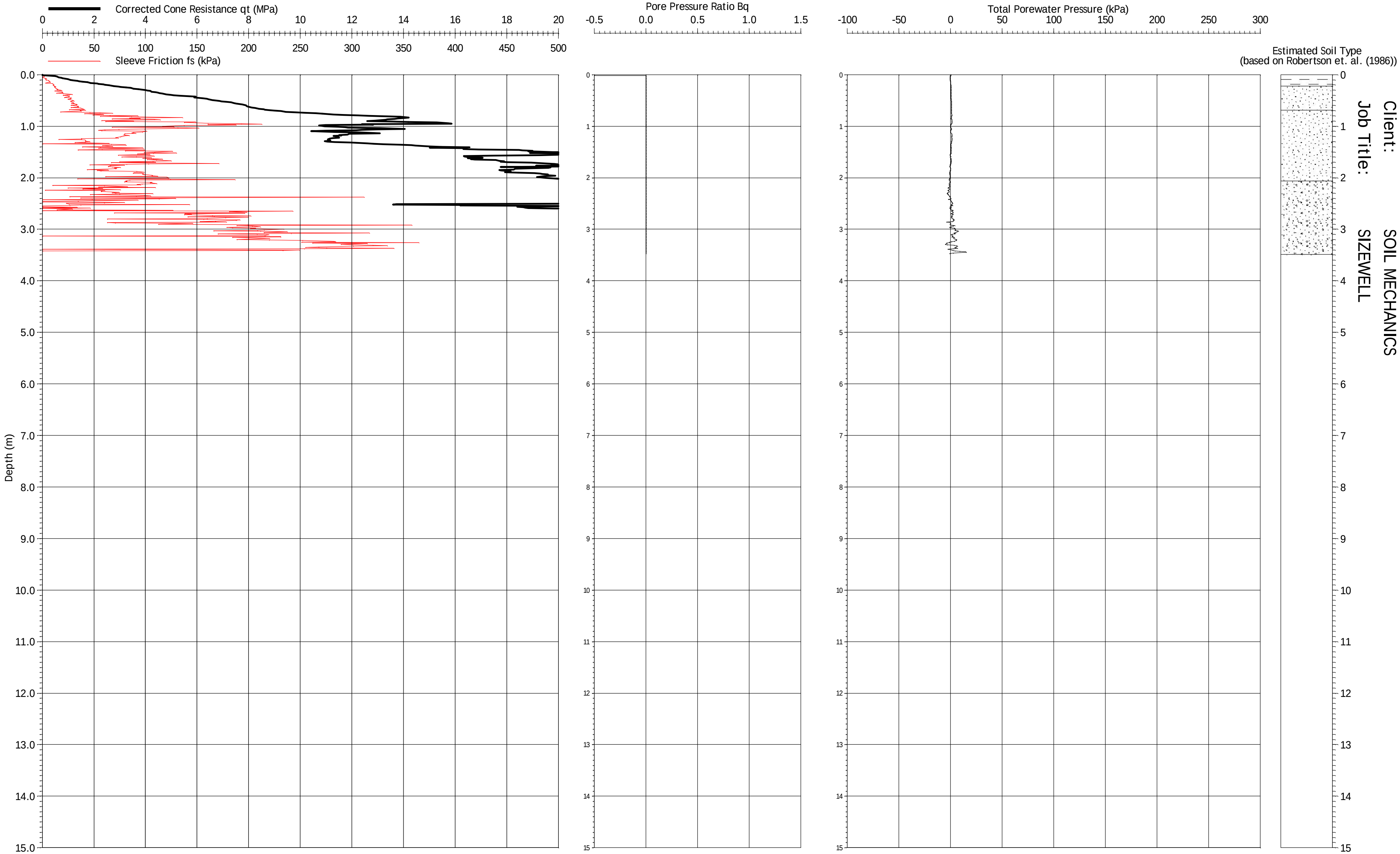
Checked By: [redacted]

CONE PENETRATION TEST GEO4CPT4

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: 105087 - GEO4CPT4

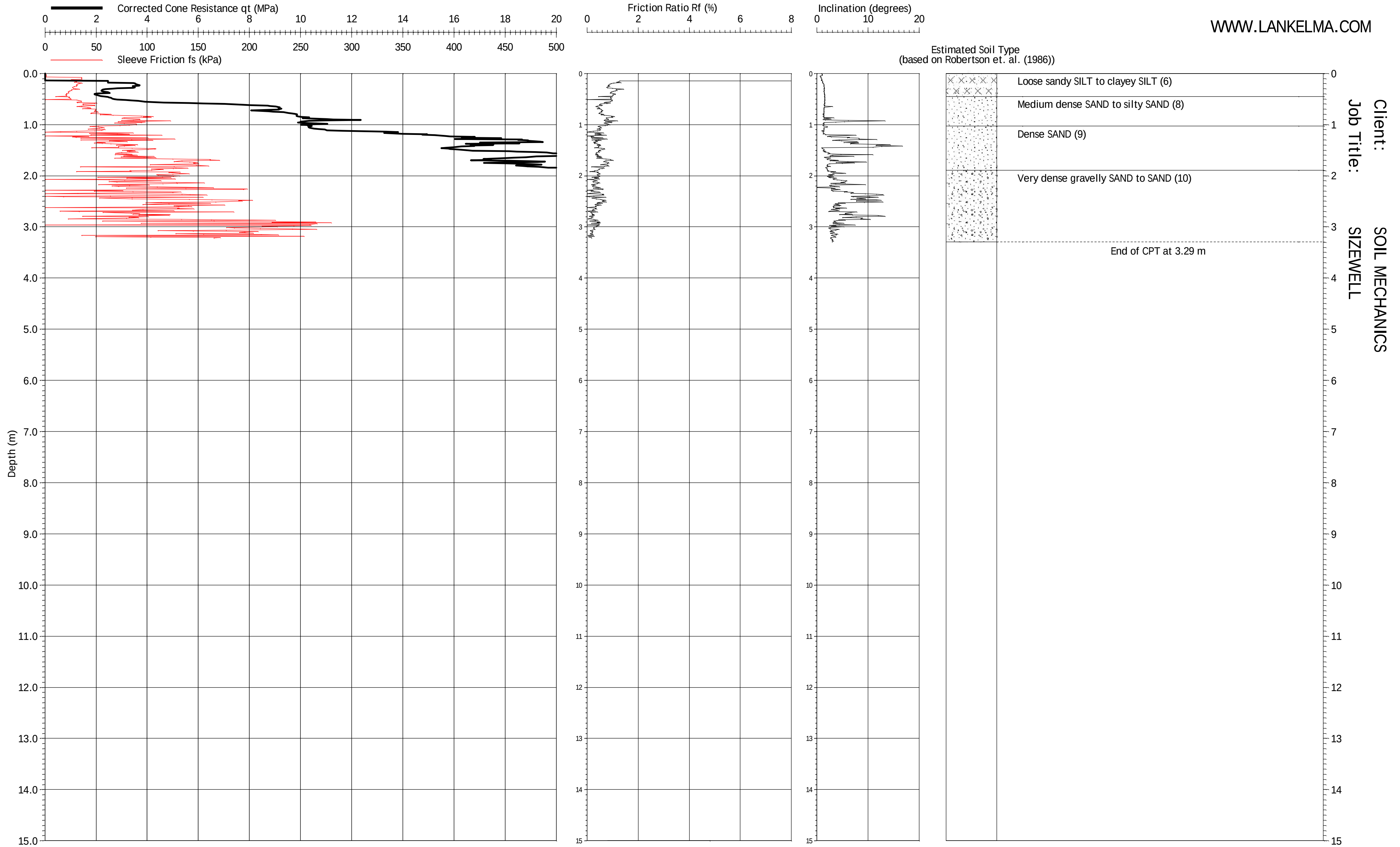
Checked By: [redacted]

CONE PENETRATION TEST GEO4CPT4

LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 30/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]5087 - GEO4CPT4A

Checked By: [redacted]

CONE PENETRATION TEST GEO4CPT4A

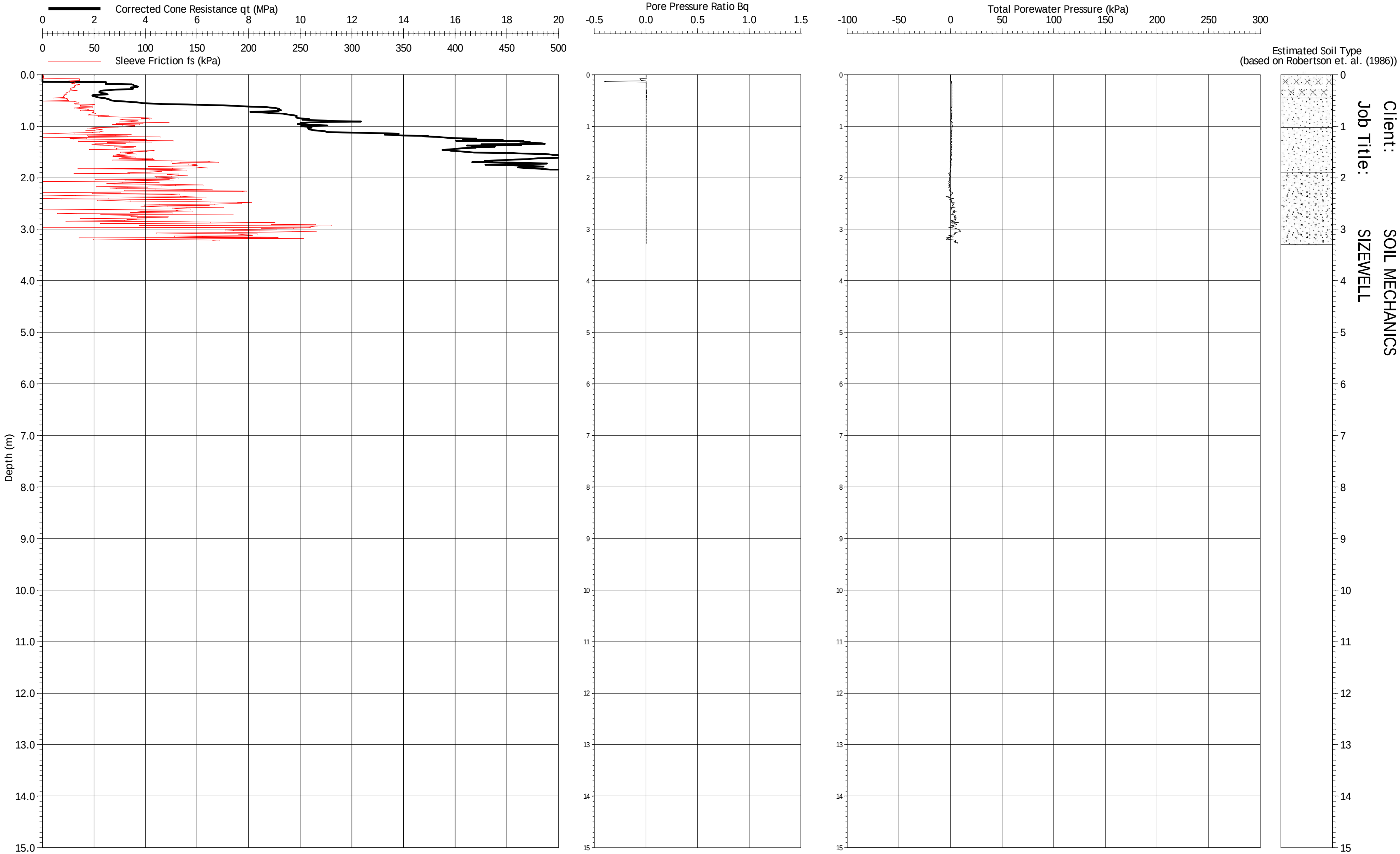
LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location:	Sizewell	Date of Test:	30/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]87 - GEO4CPT4A
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked B[redacted]	
Remarks:			

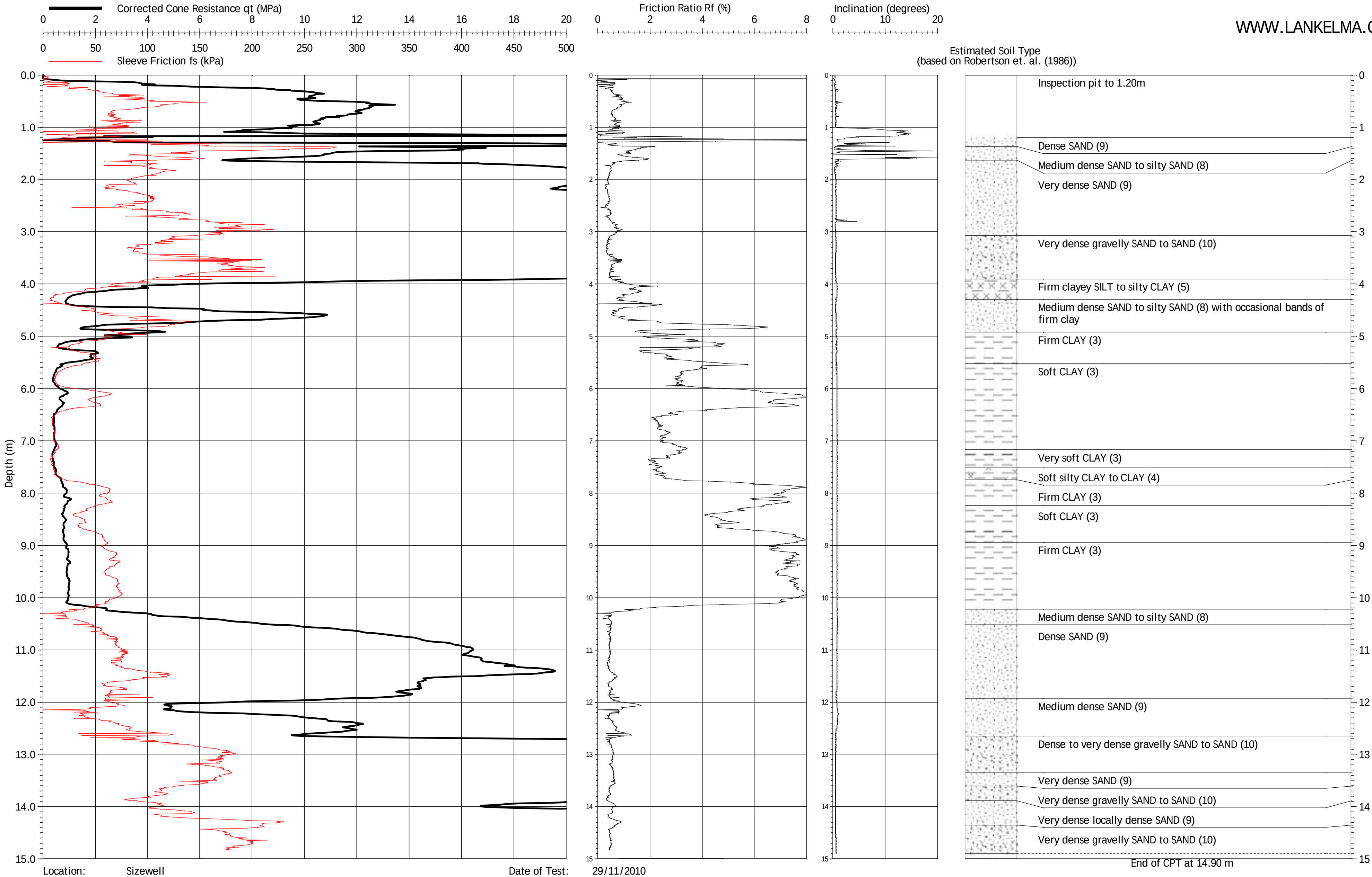
CONE PENETRATION TEST GEO4CPT4A LANKELMA

LANKELMA CPT LTD

Form: CPT_303_Bq2

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name[redacted]087 - GO2CPT2

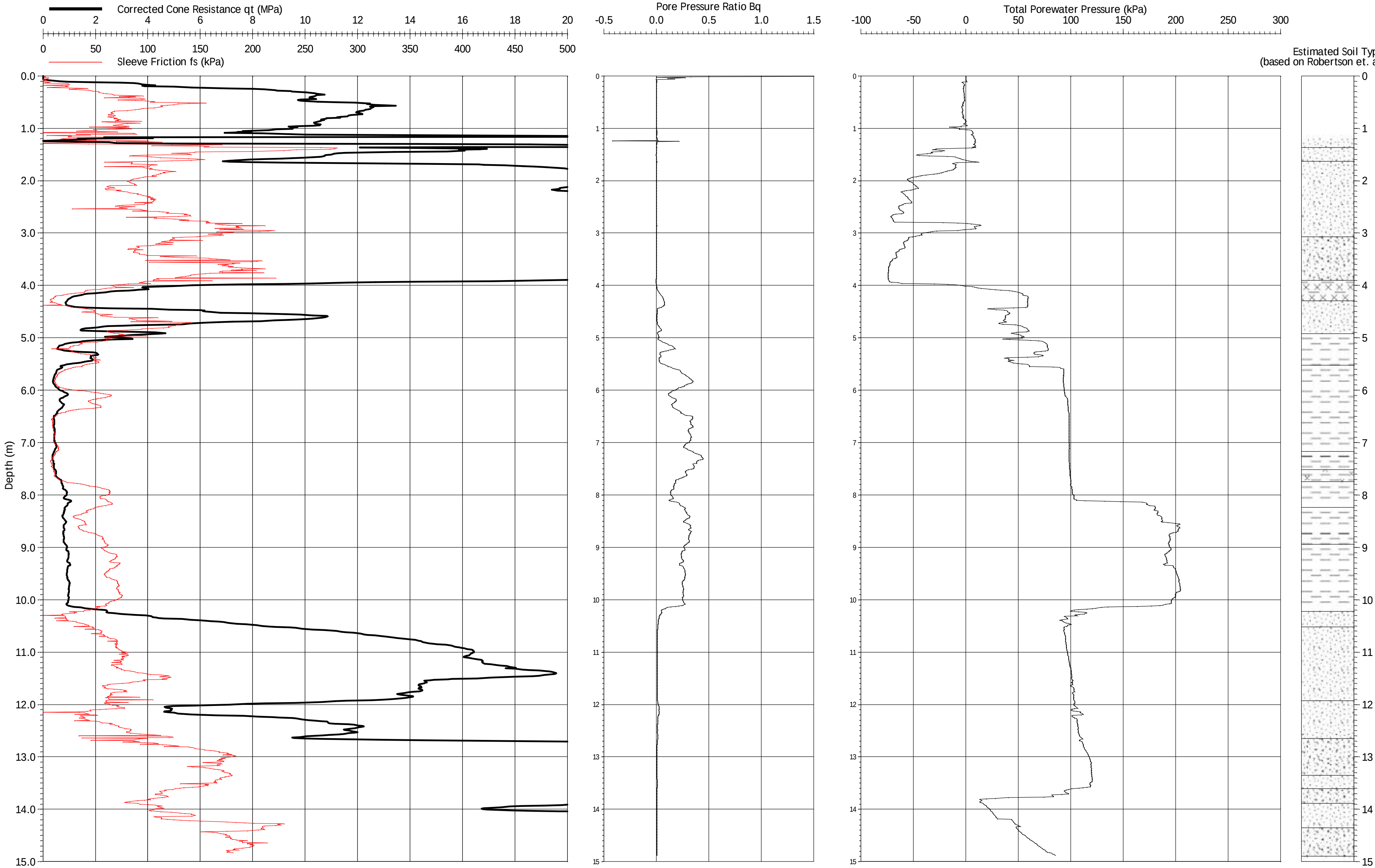
Checked [redacted]

CONE PENETRATION TEST GO2CPT2

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]87 - GO2CPT2

Checked By [redacted]

CONE PENETRATION TEST GO2CPT2

LANKELMA CPT LTD

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Form: CPT_303_Bq2

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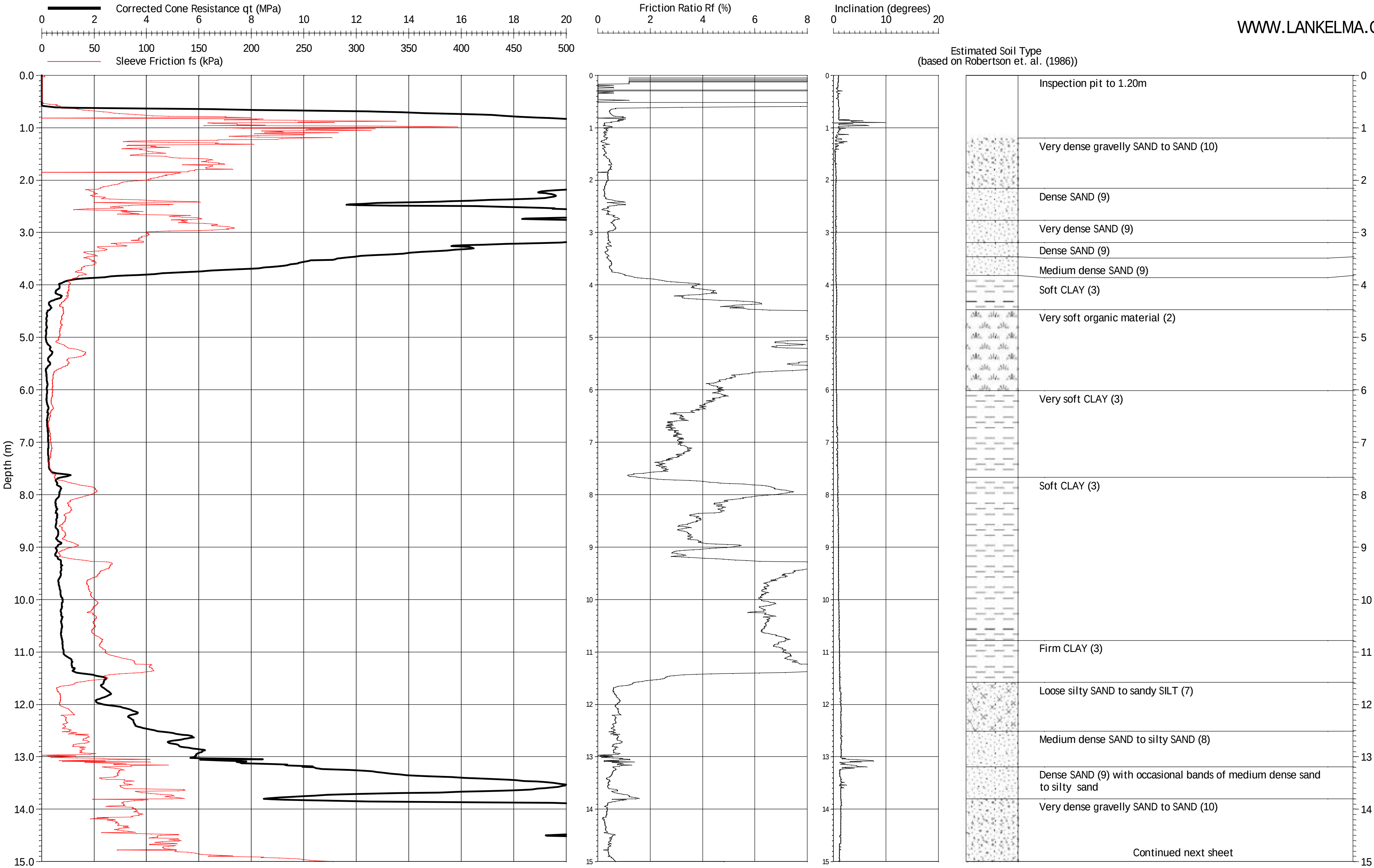
Client: SOIL MECHANICS
Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: 105087 - GO2CPT3

Checked By: [redacted]

CONE PENETRATION TEST GO2CPT3

LANKELMA CPT LTD

Form: CPT_201_20MPa

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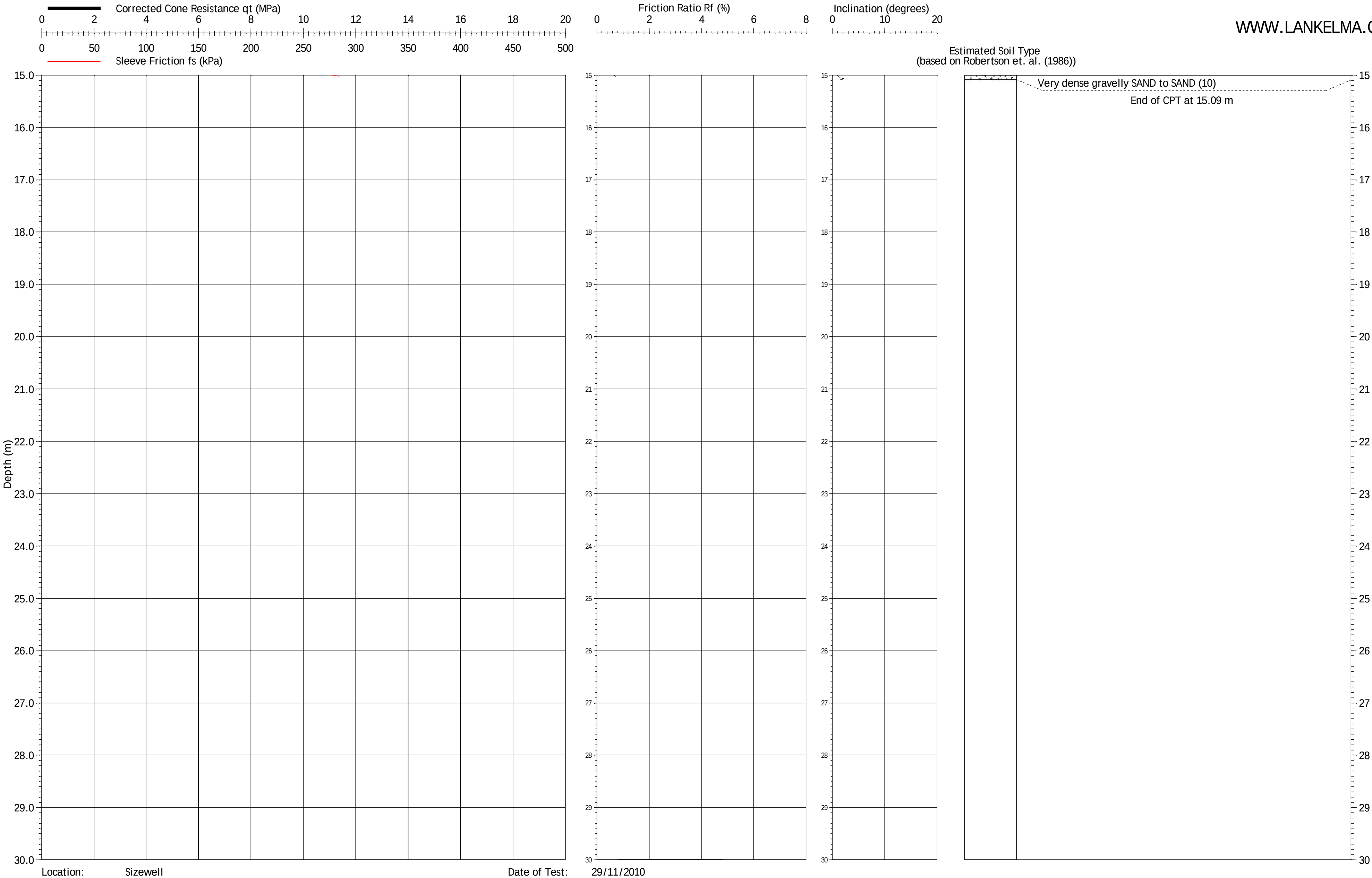

Client: SOIL MECHANICS
Job Title: SIZEWELL

Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

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LANKELMA

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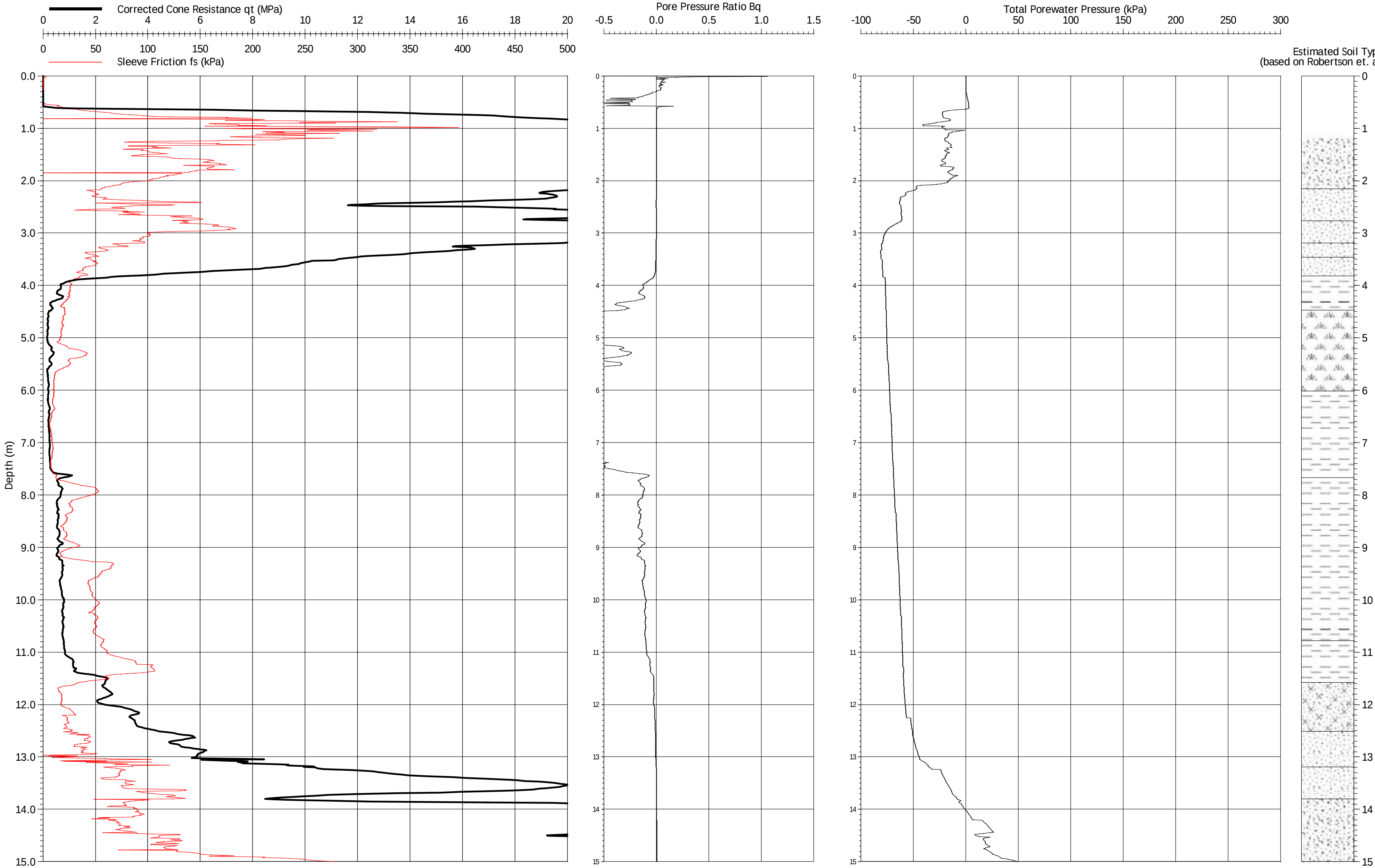

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Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

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Date of Plot: 15/12/2010

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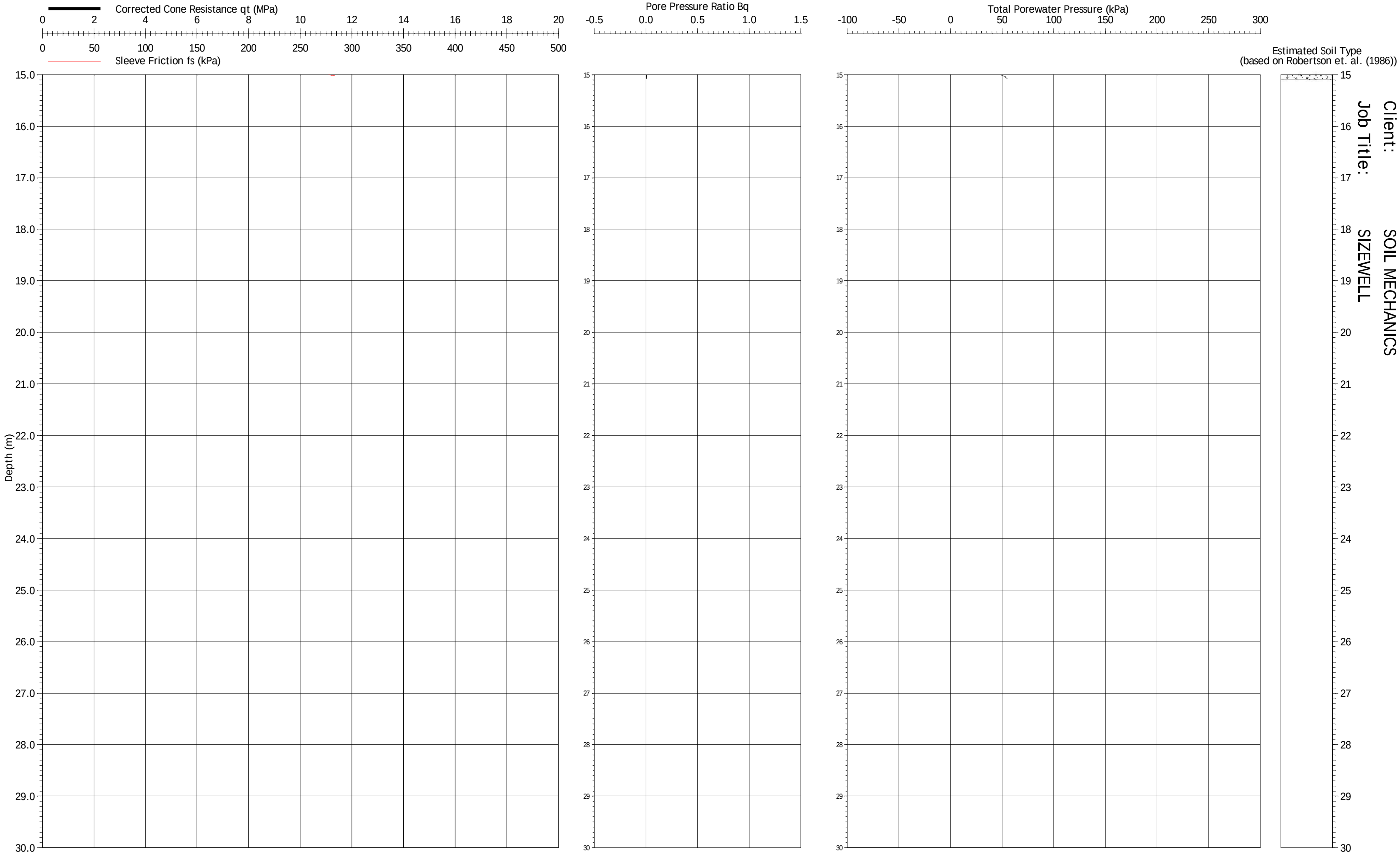

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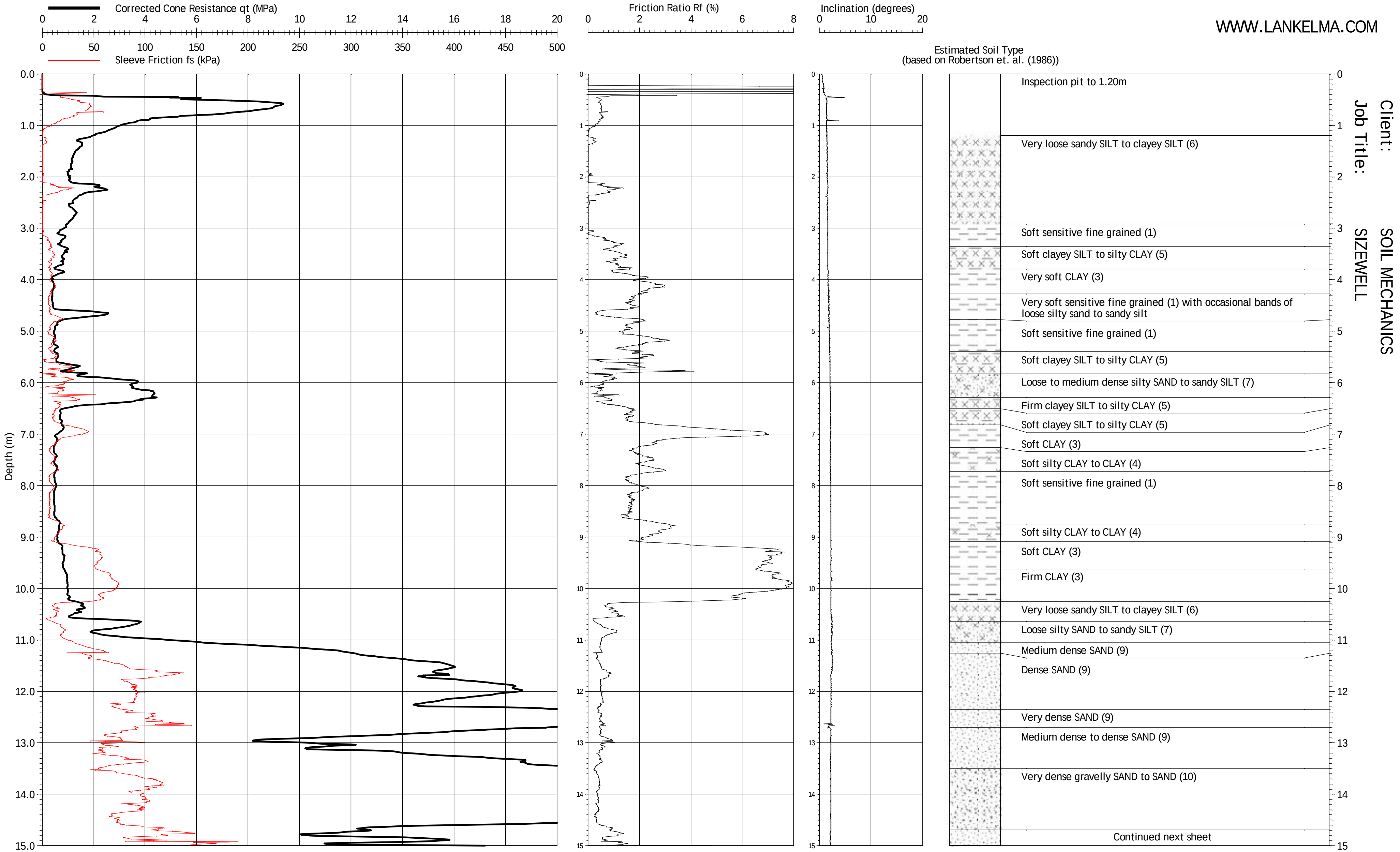

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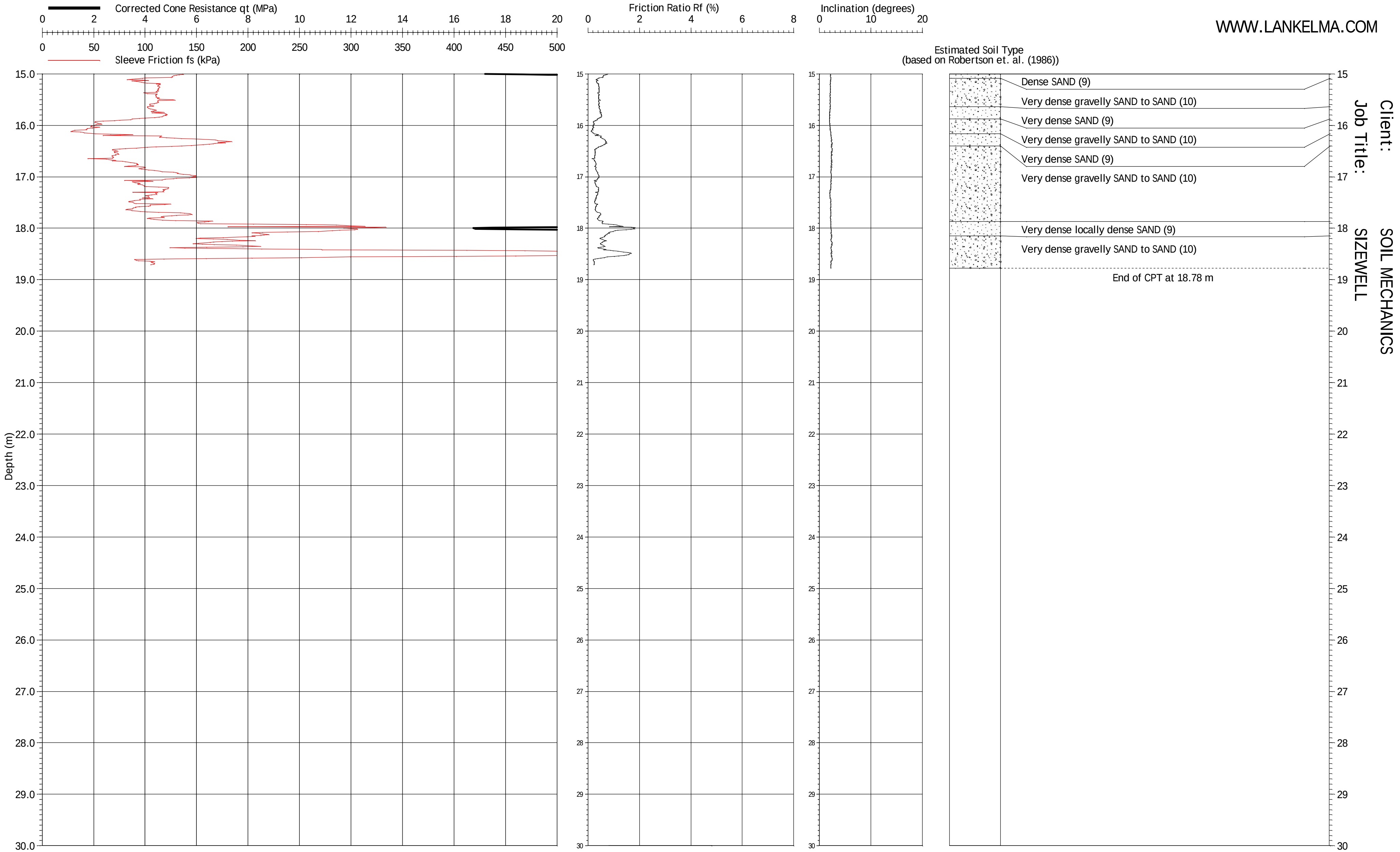
LANKELMA

Form: CPT_201_20MPa



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Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

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Checked By[redacted]

CONE PENETRATION TEST GO2CPT4

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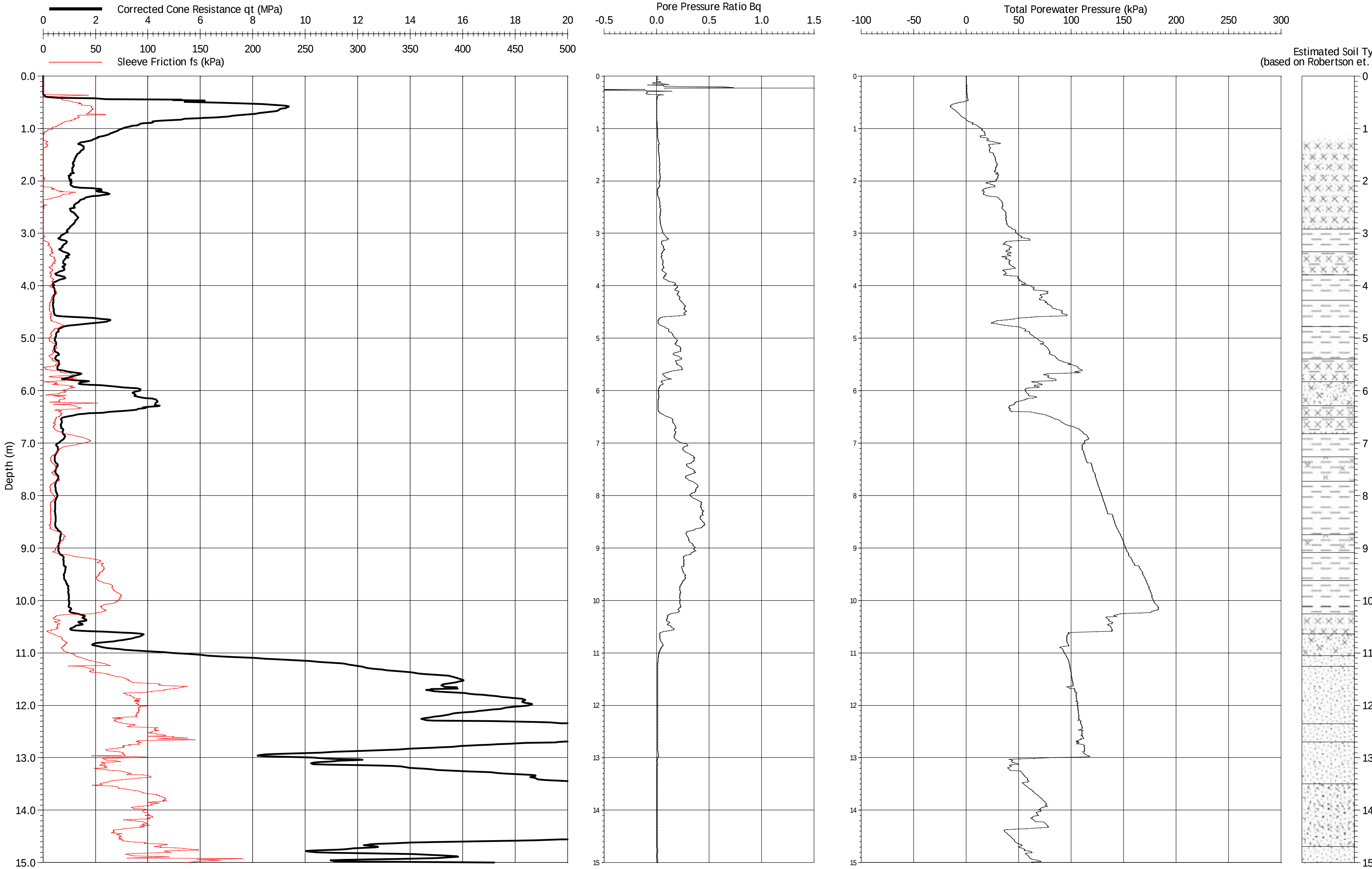
LANKELMA

Form: CPT_201_20MPa



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Job Title: SIZEWELL

Location: Sizewell

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Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

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Date of Plot: 15/12/2010

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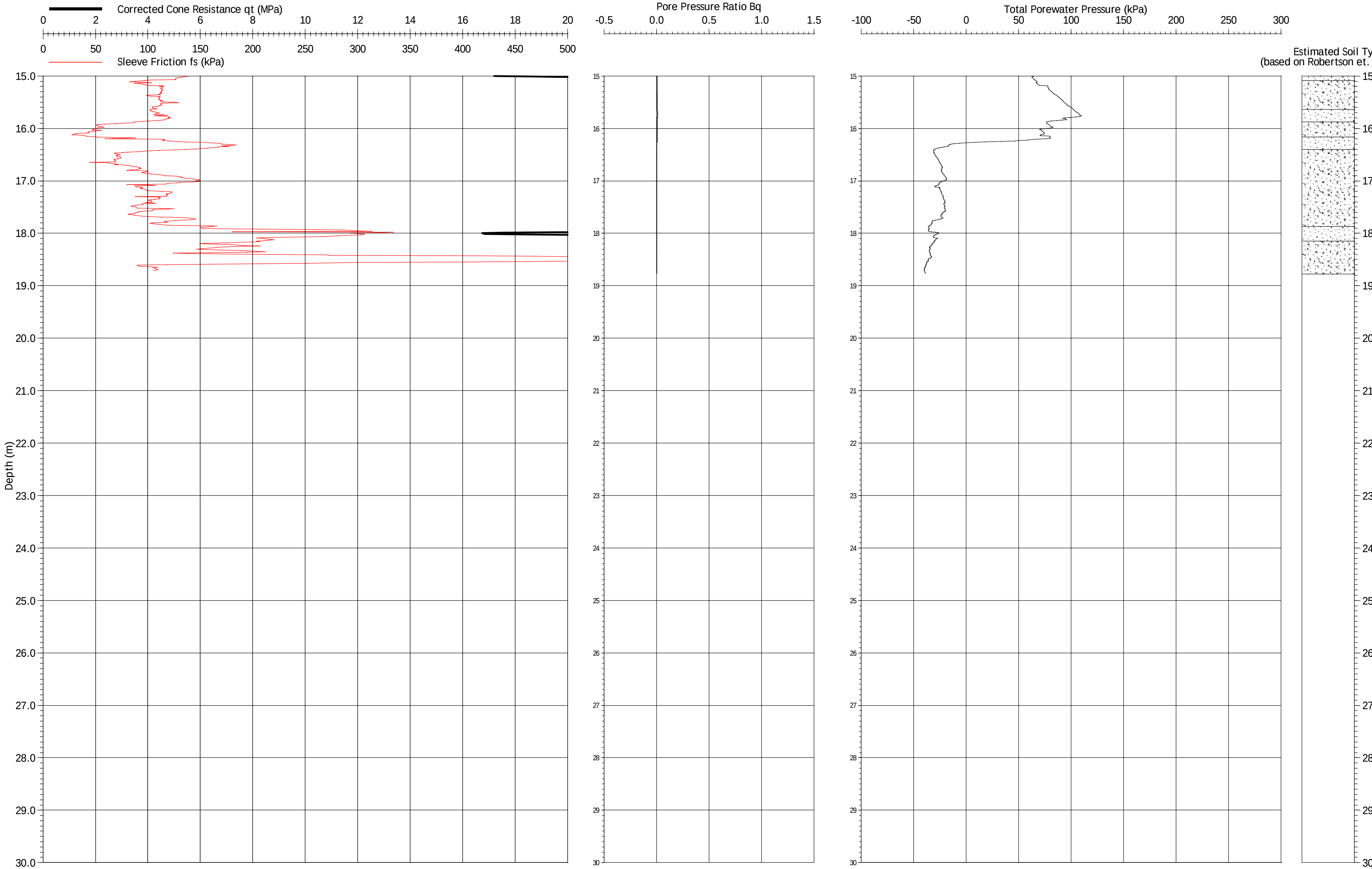

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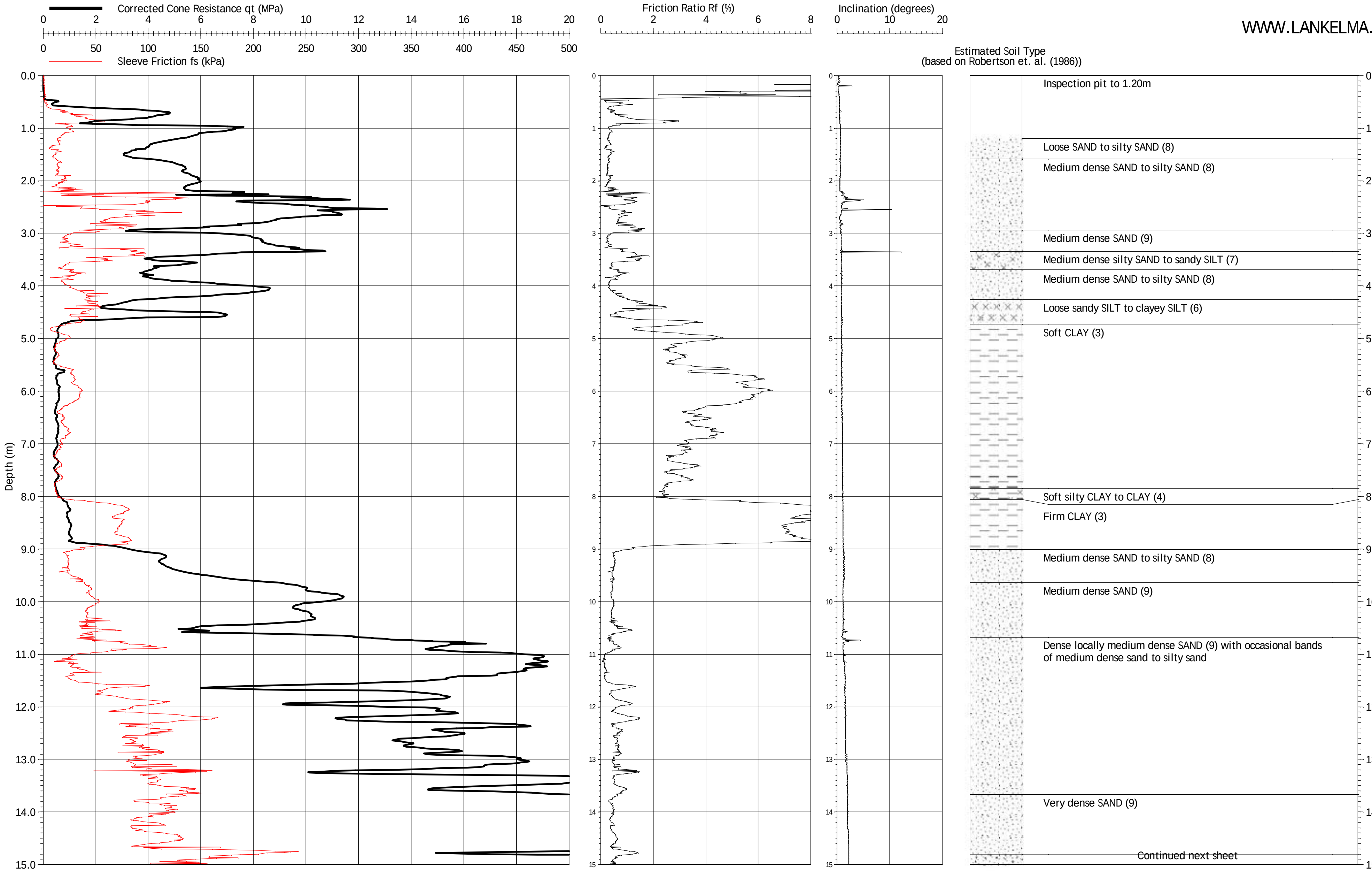

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

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LANKELMA

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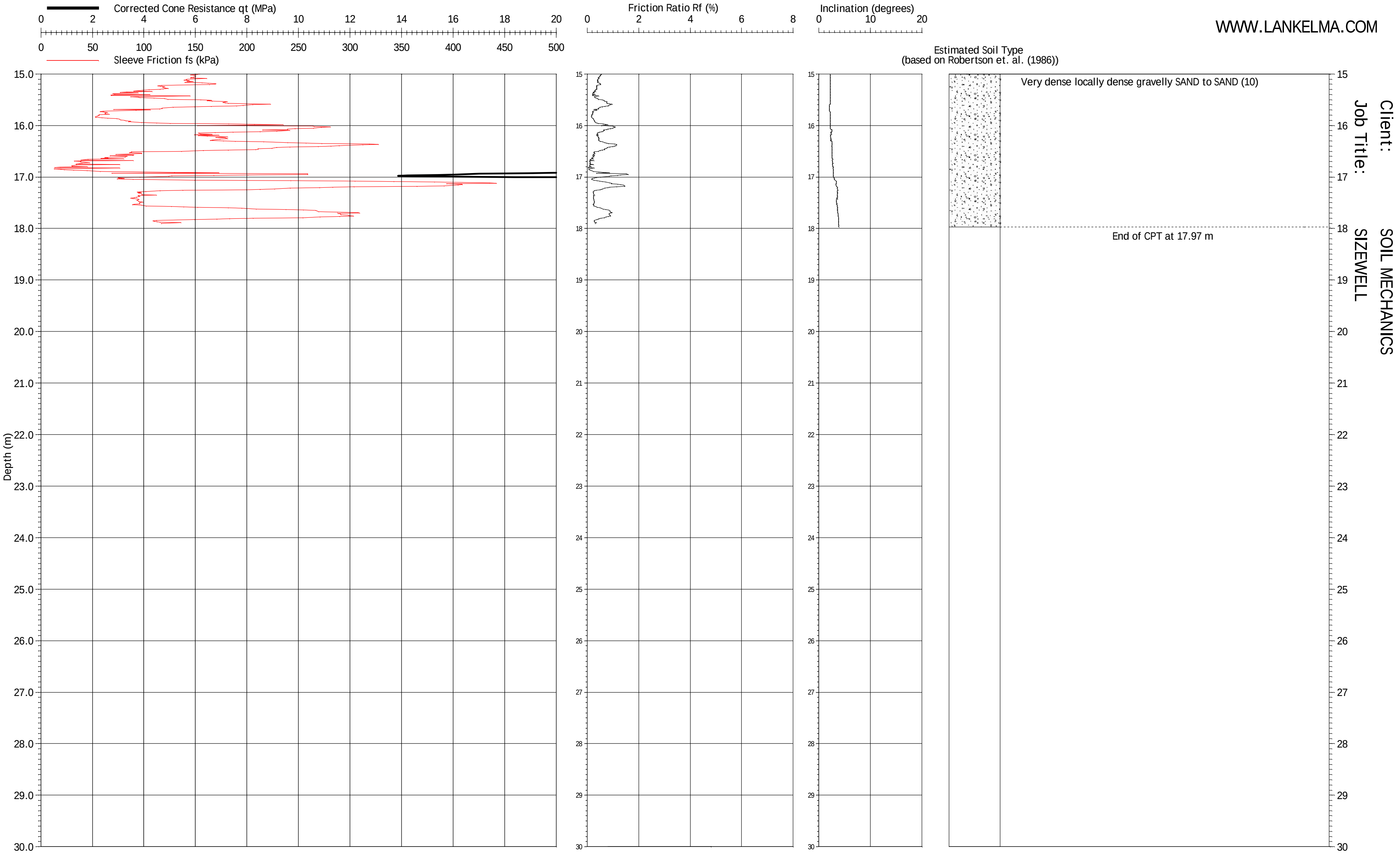

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	29/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	087 - GO2CPT5
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
Remarks:			

CONE PENETRATION TEST GO2CPT5

LANKELMA CPT LTD

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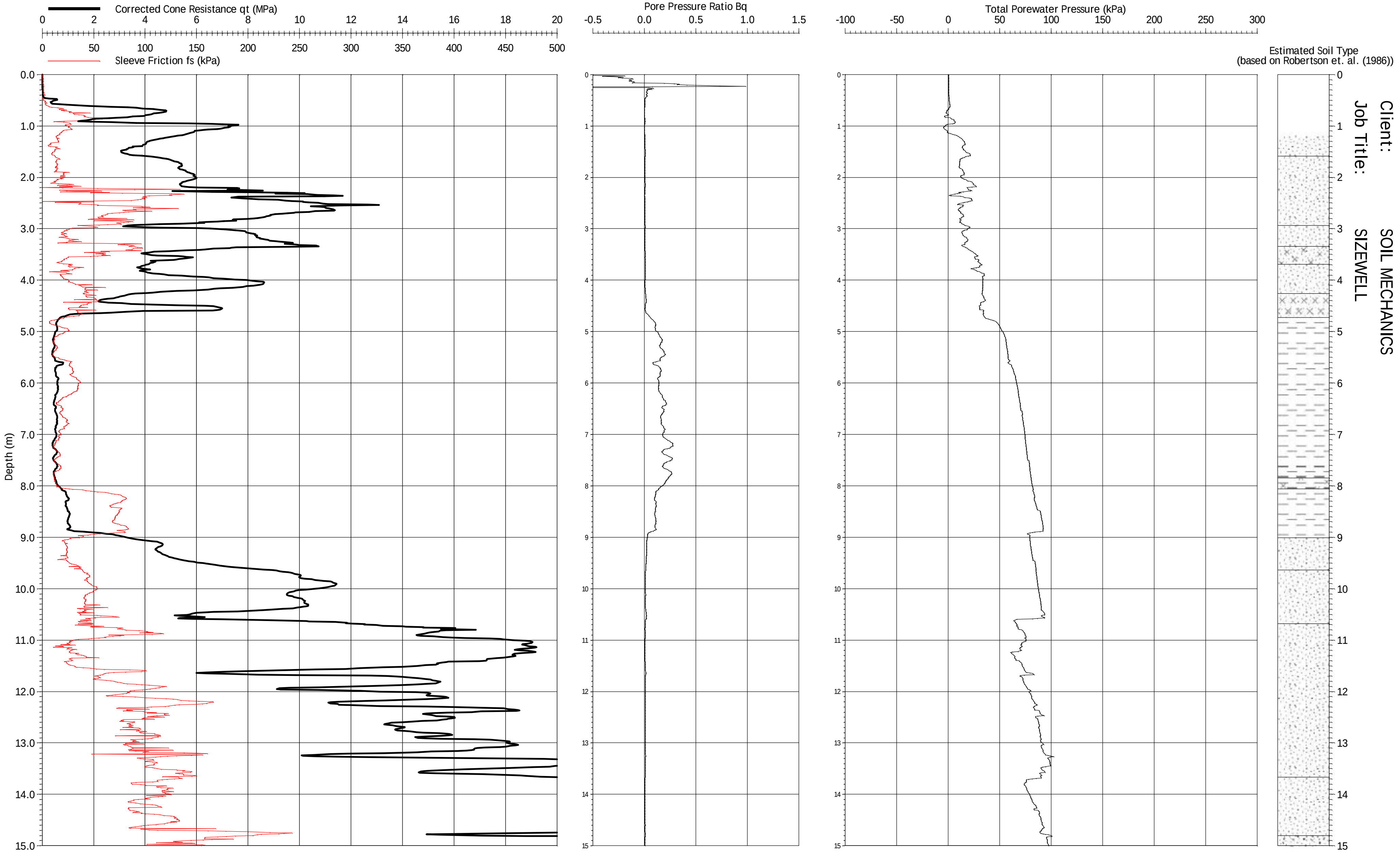

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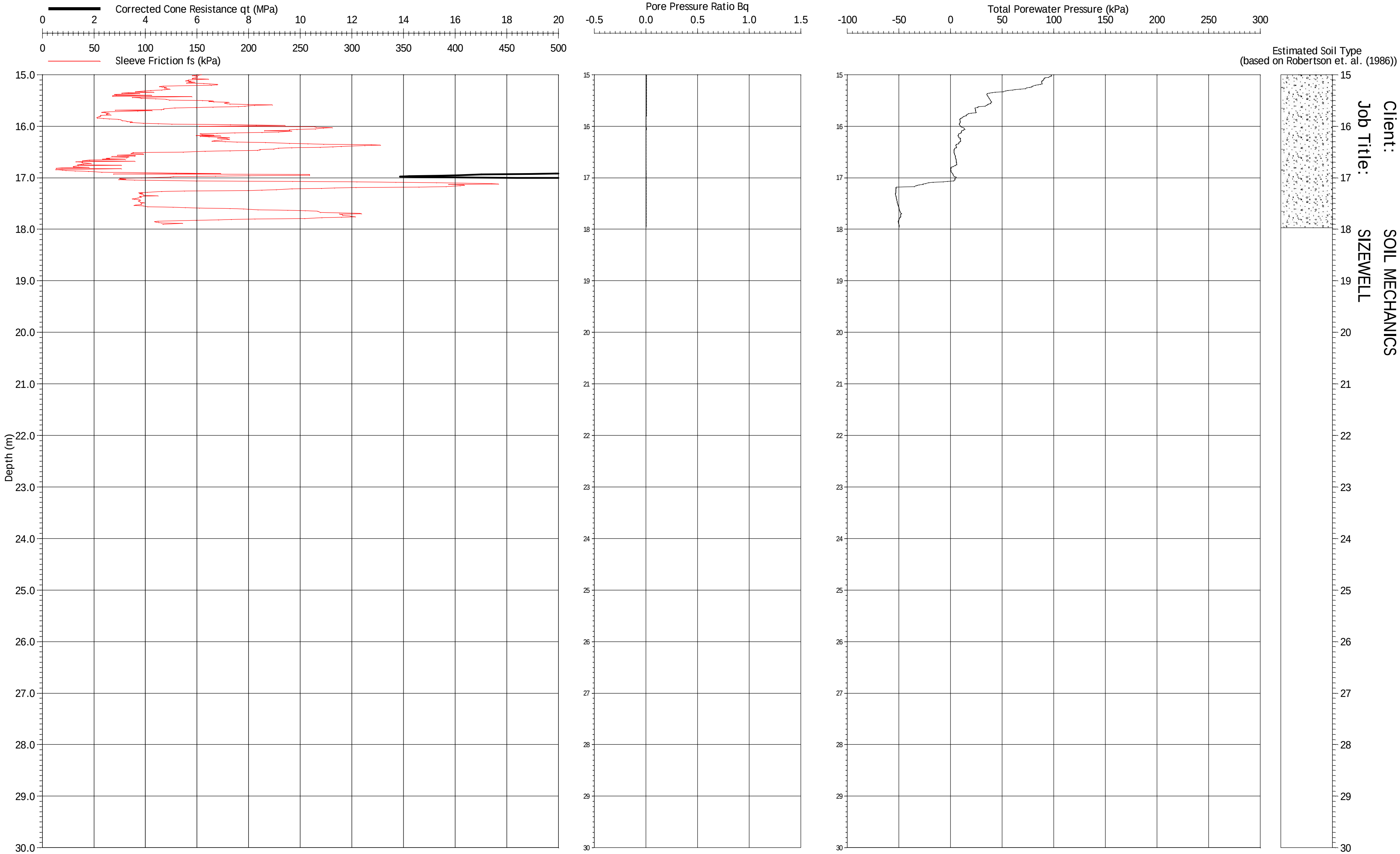
CONE PENETRATION TEST GO2CPT5
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Nam[redacted]7 - GO2CPT5

Checked [redacted]

CONE PENETRATION TEST GO2CPT5

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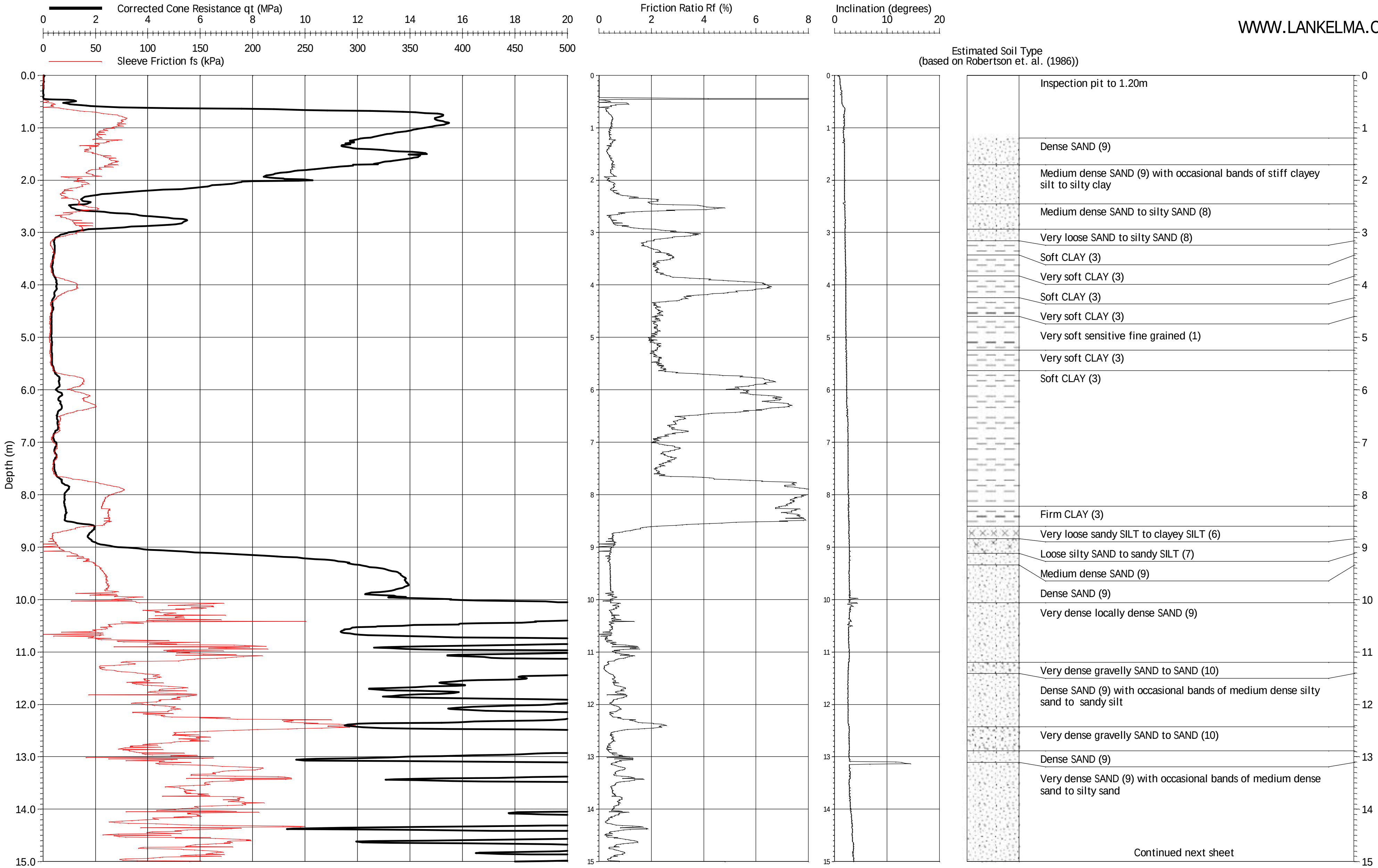
LANKELMA

Form: CPT_303_Bq2



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	29/11/2010
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Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GO2CPT6

LANKELMA CPT LTD

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Form: CPT_201_20MPa

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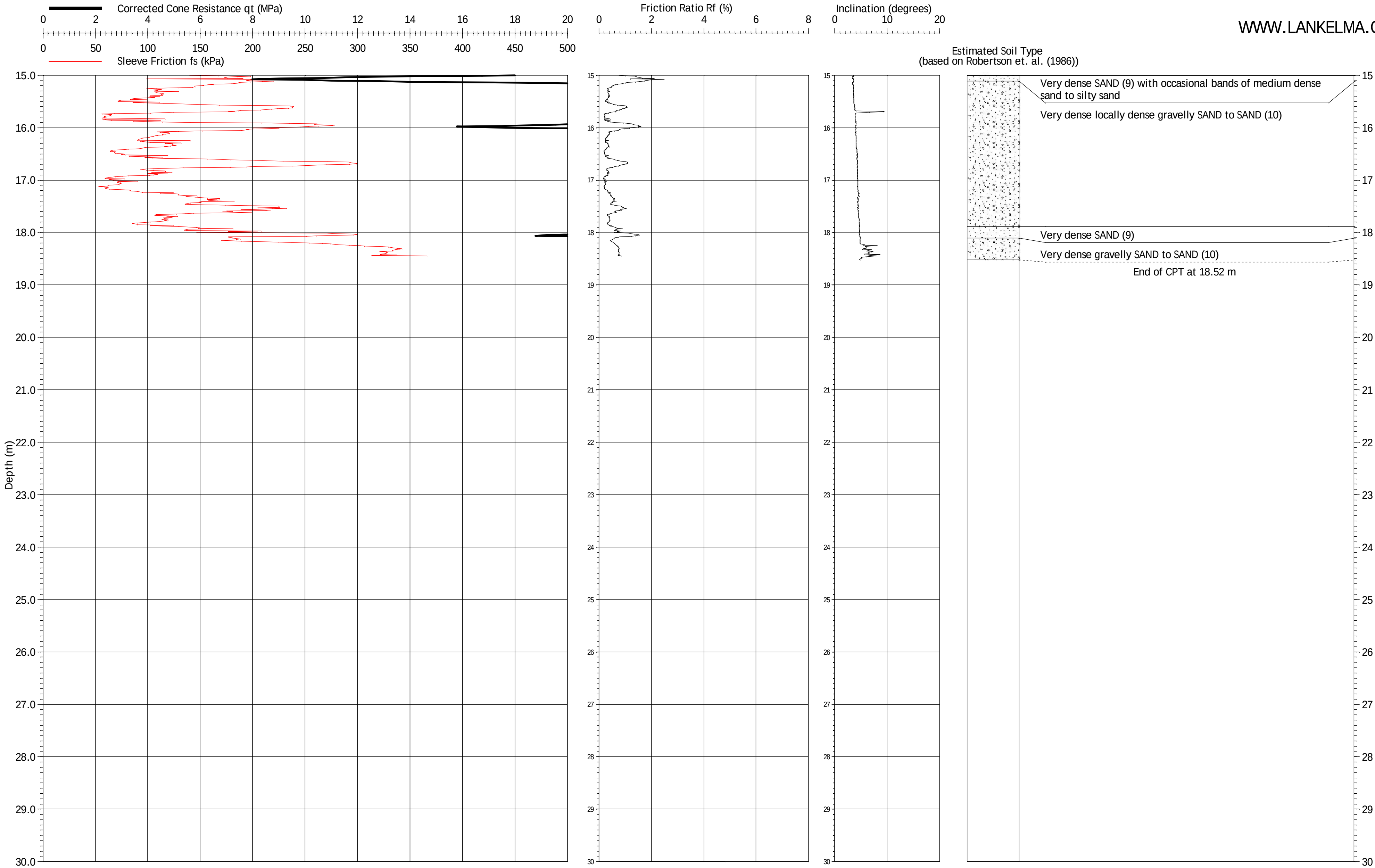
Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]087 - GO2CPT6

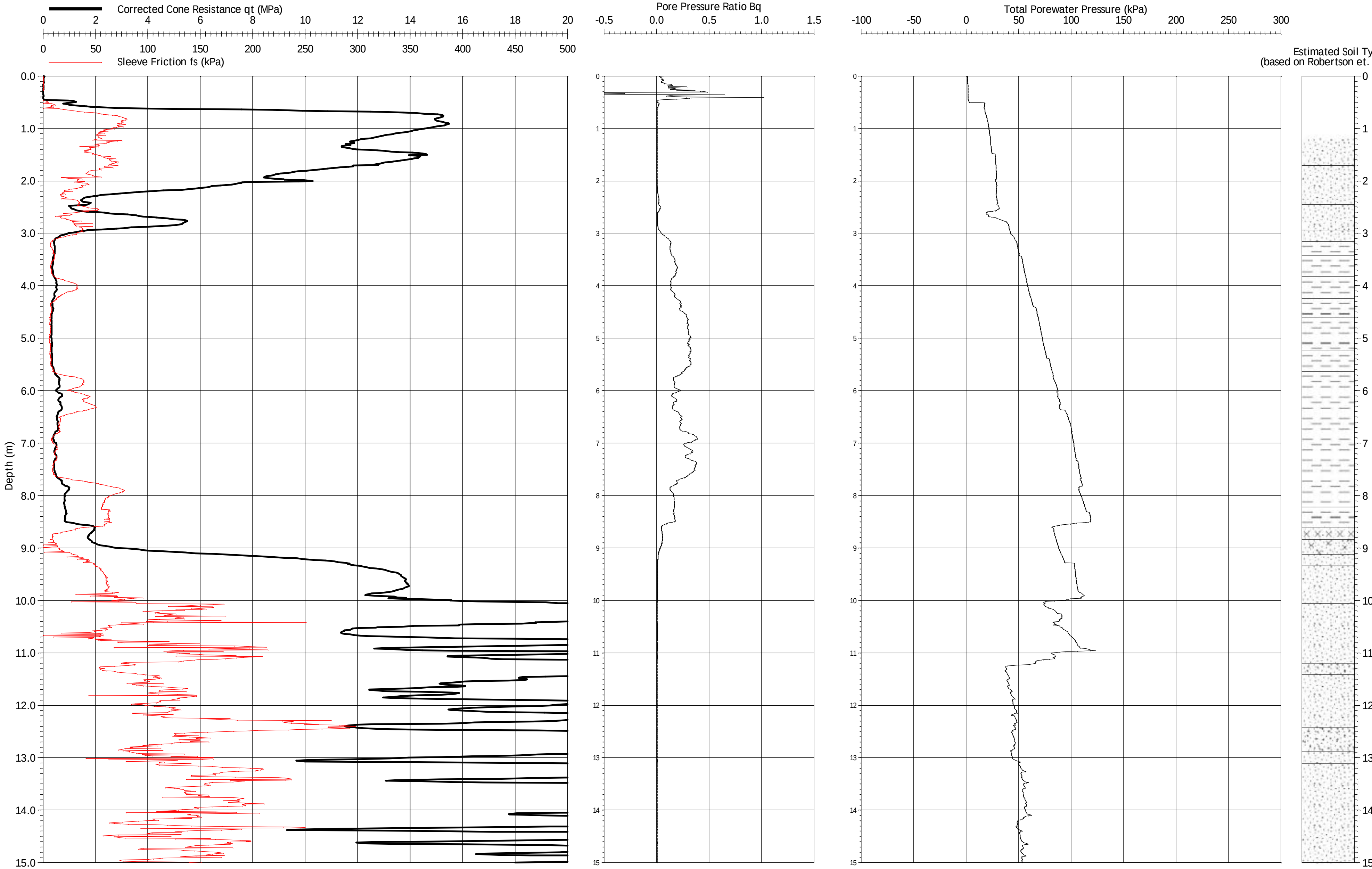
Checked By:

CONE PENETRATION TEST GO2CPT6

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS
Job Title: SIZEWELL

Location: Sizewell
Coordinates: -
Ground Level: -
Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 29/11/2010
Date of Plot: 15/12/2010
File Name: [redacted]087 - GO2CPT6
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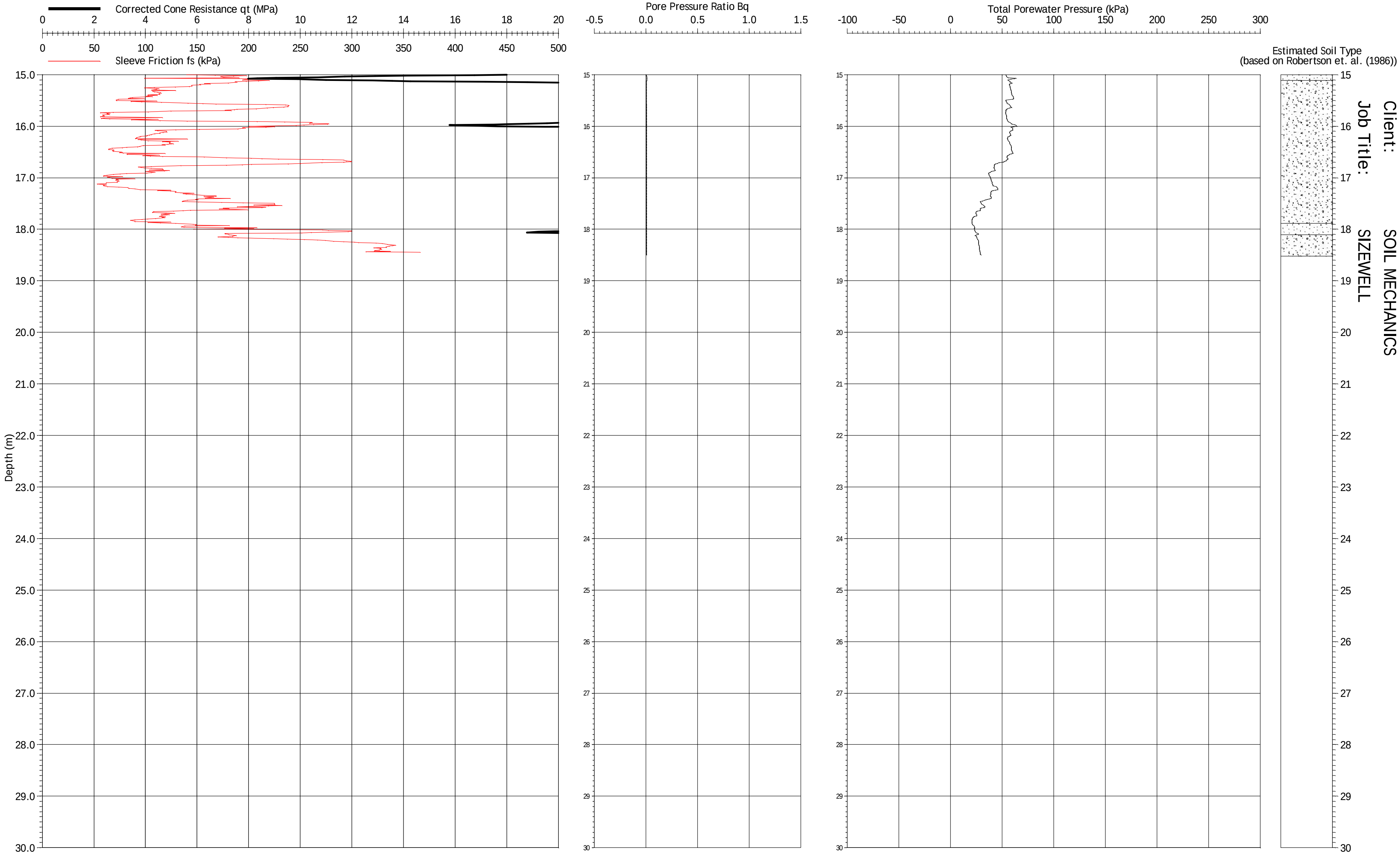
CONE PENETRATION TEST GO2CPT6
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2



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Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST GO2CPT6

LANKELMA CPT LTD

LANKELMA

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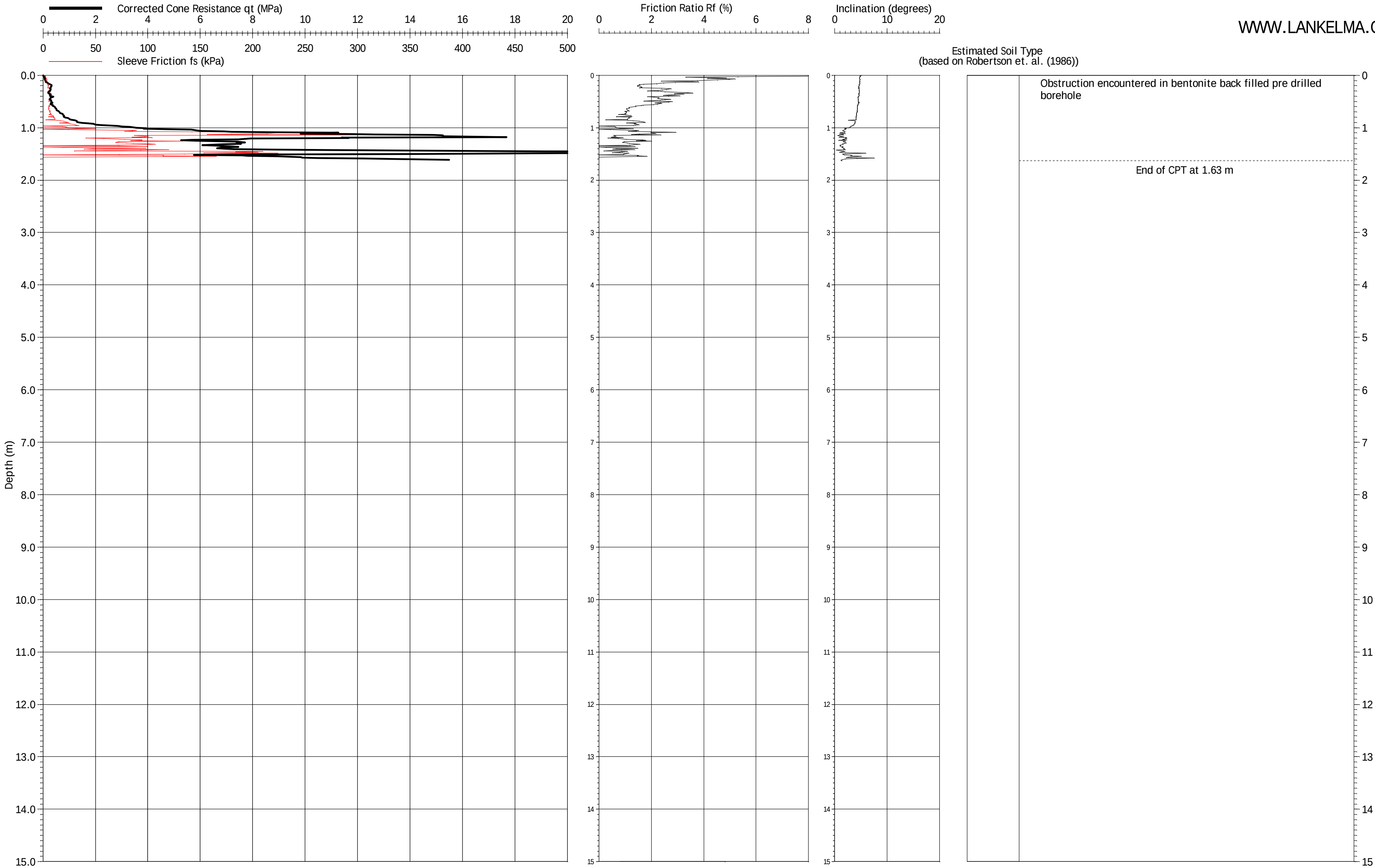

Client: SOIL MECHANICS

Job Title: SIZEWELL

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Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]7 - CPT19
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked	[redacted]
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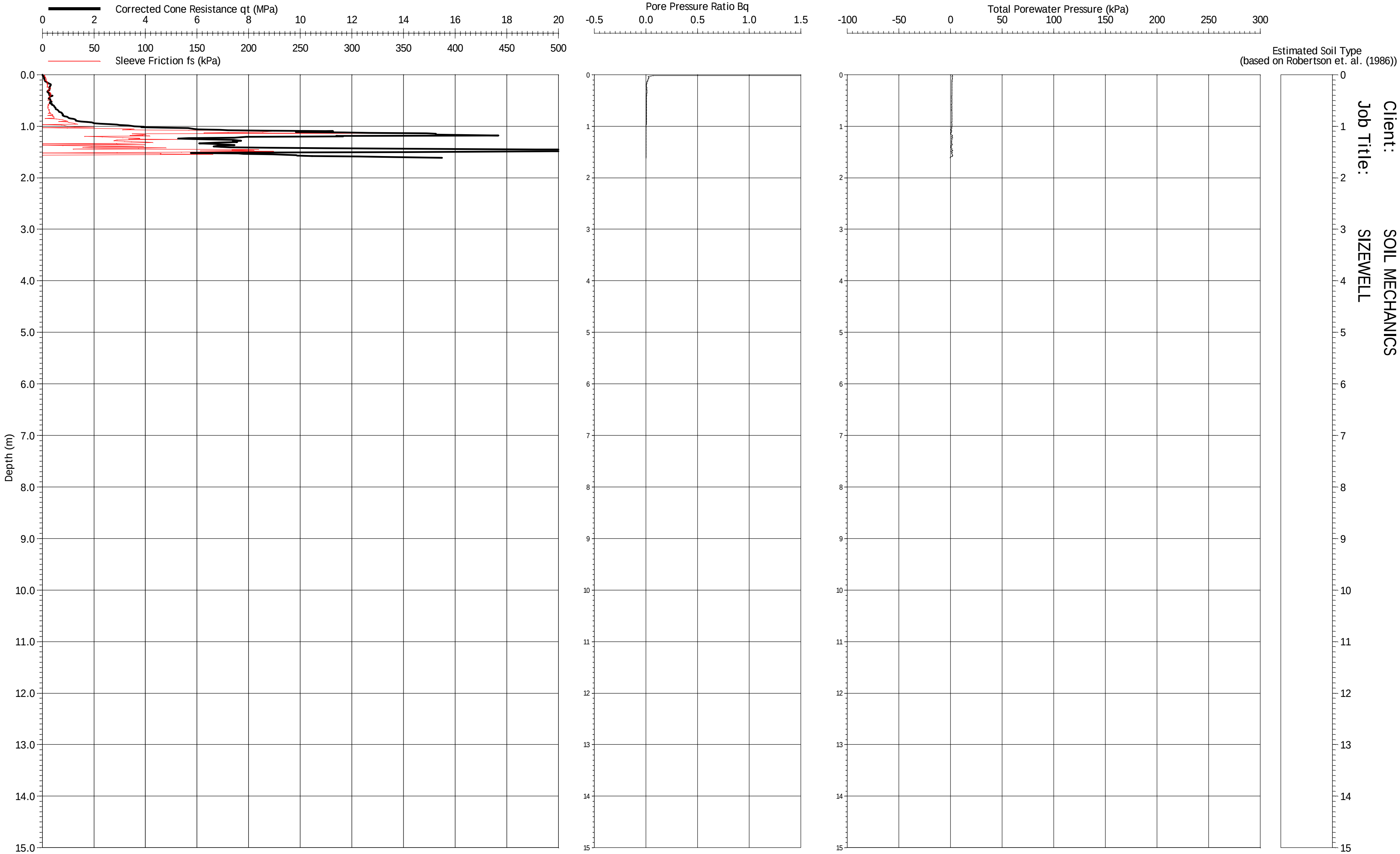
CONE PENETRATION TEST CPT19

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



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Coordinates:	-	Date of Plot:	15/12/2010
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CONE PENETRATION TEST CPT19

LANKELMA CPT LTD

LANKELMA

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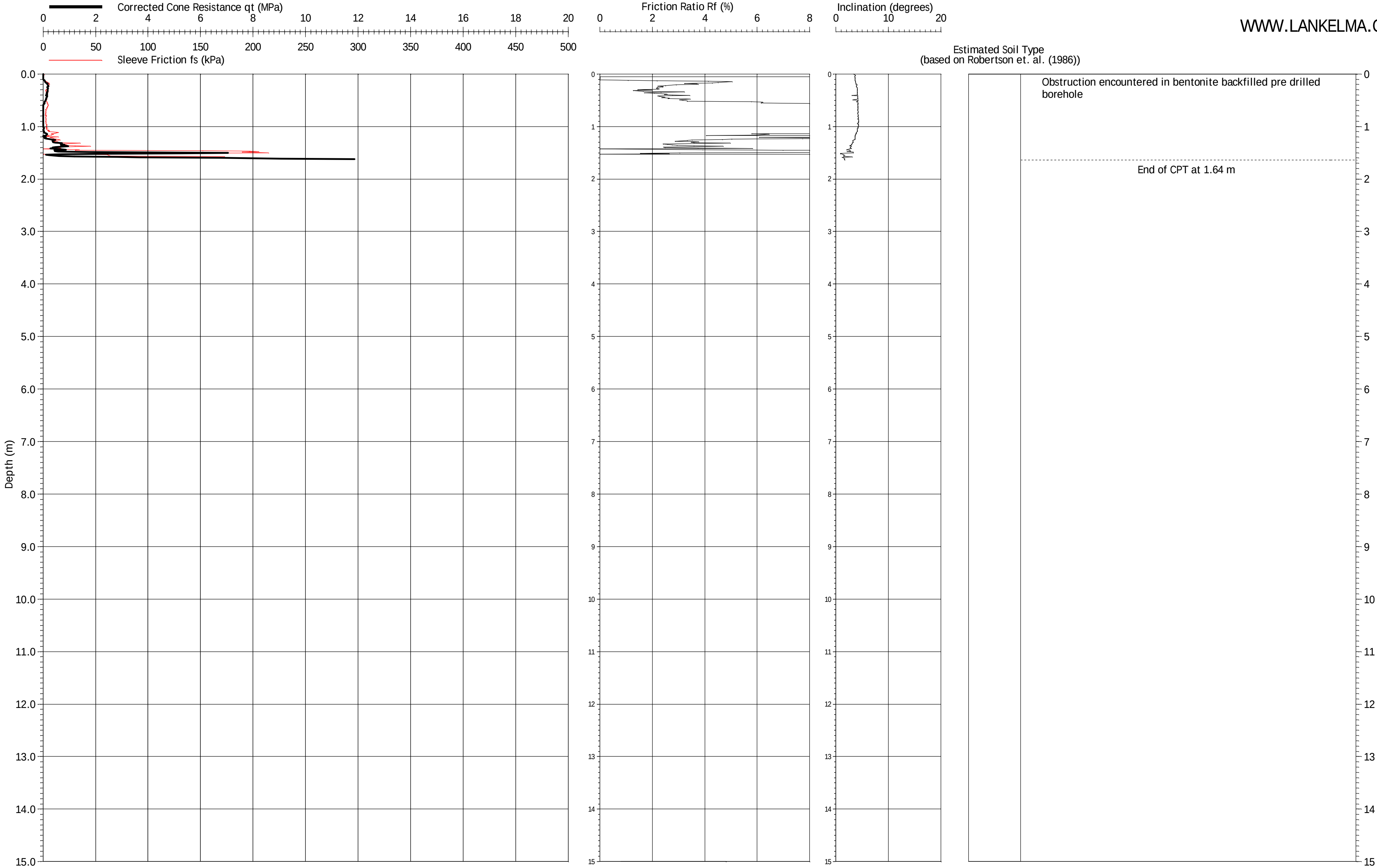


WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL

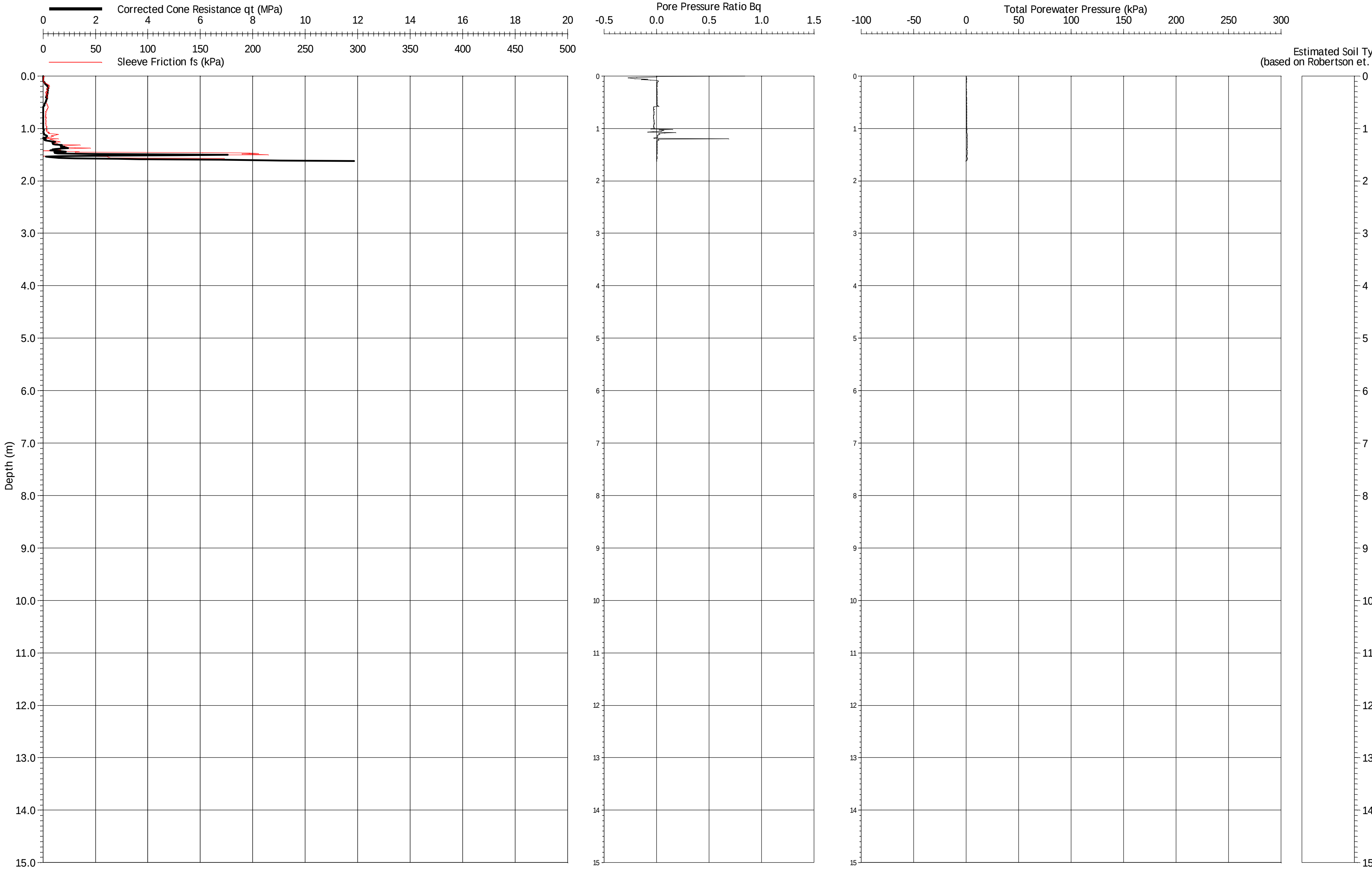
Location:	Sizewell	Date of Test:	29/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]7 - CPT19A
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked [redacted]	
Remarks:			

CONE PENETRATION TEST CPT19A

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS

Job Title: SIZEWELL

Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: [redacted]7 - CPT19A

Checked [redacted]

CONE PENETRATION TEST CPT19A

LANKELMA CPT LTD

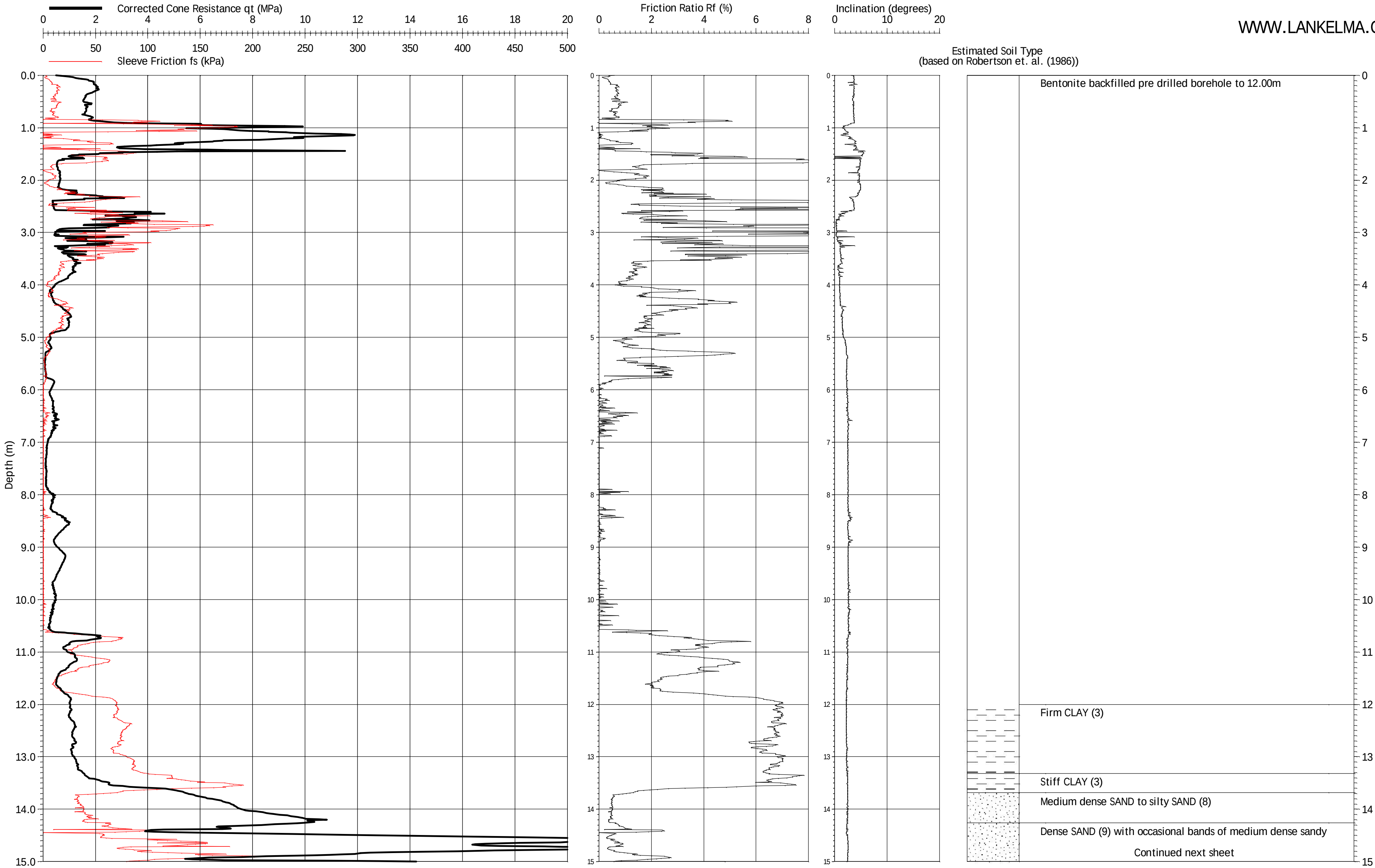
LANKELMA

Form: CPT_303_Bq2

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: [redacted] 5087 - CPT19B

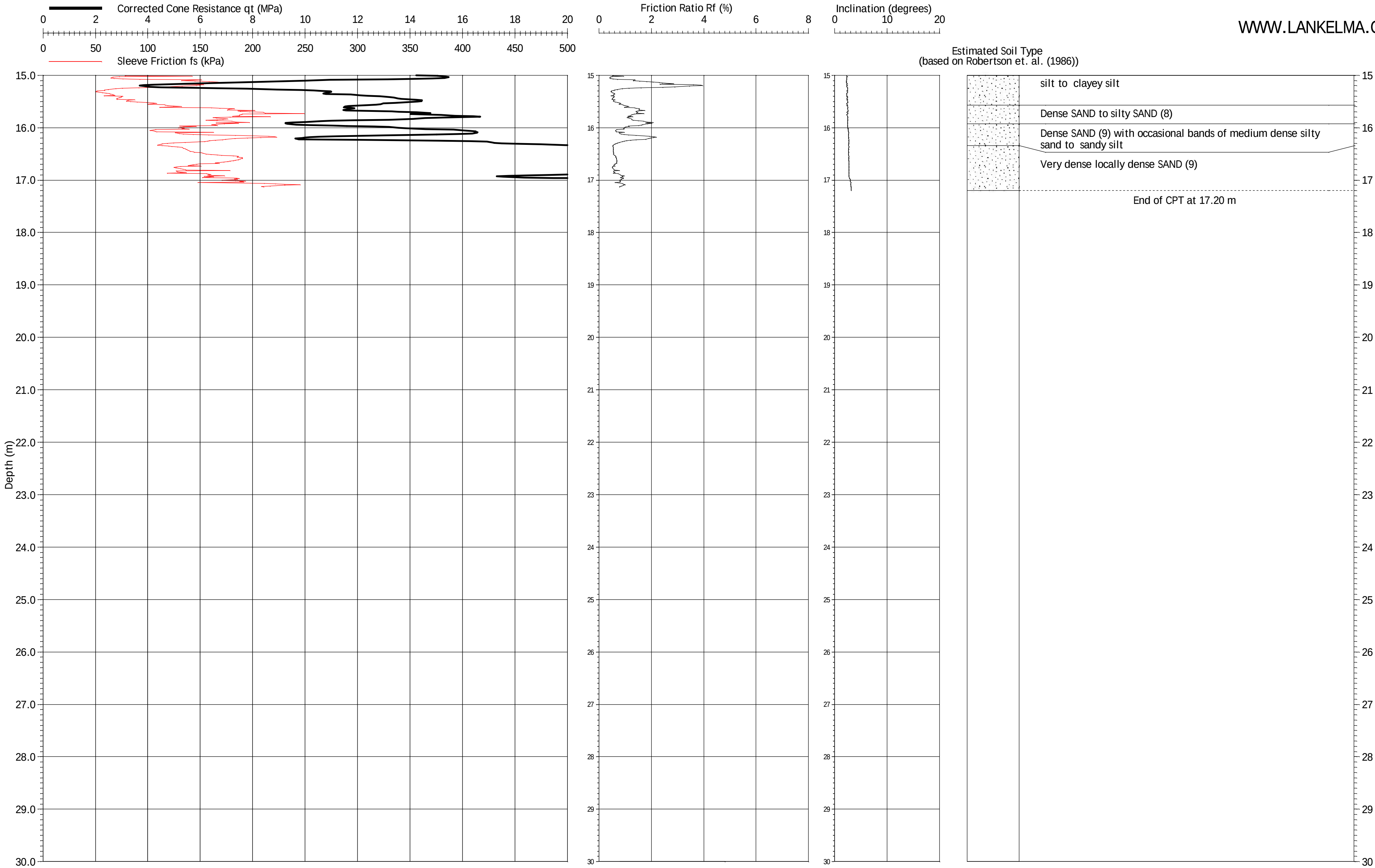
Checked By [redacted]

CONE PENETRATION TEST CPT19B

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



WWW.LANKELMA.COM

Client: SOIL MECHANICS
Job Title: SIZEWELL

Location: Sizewell
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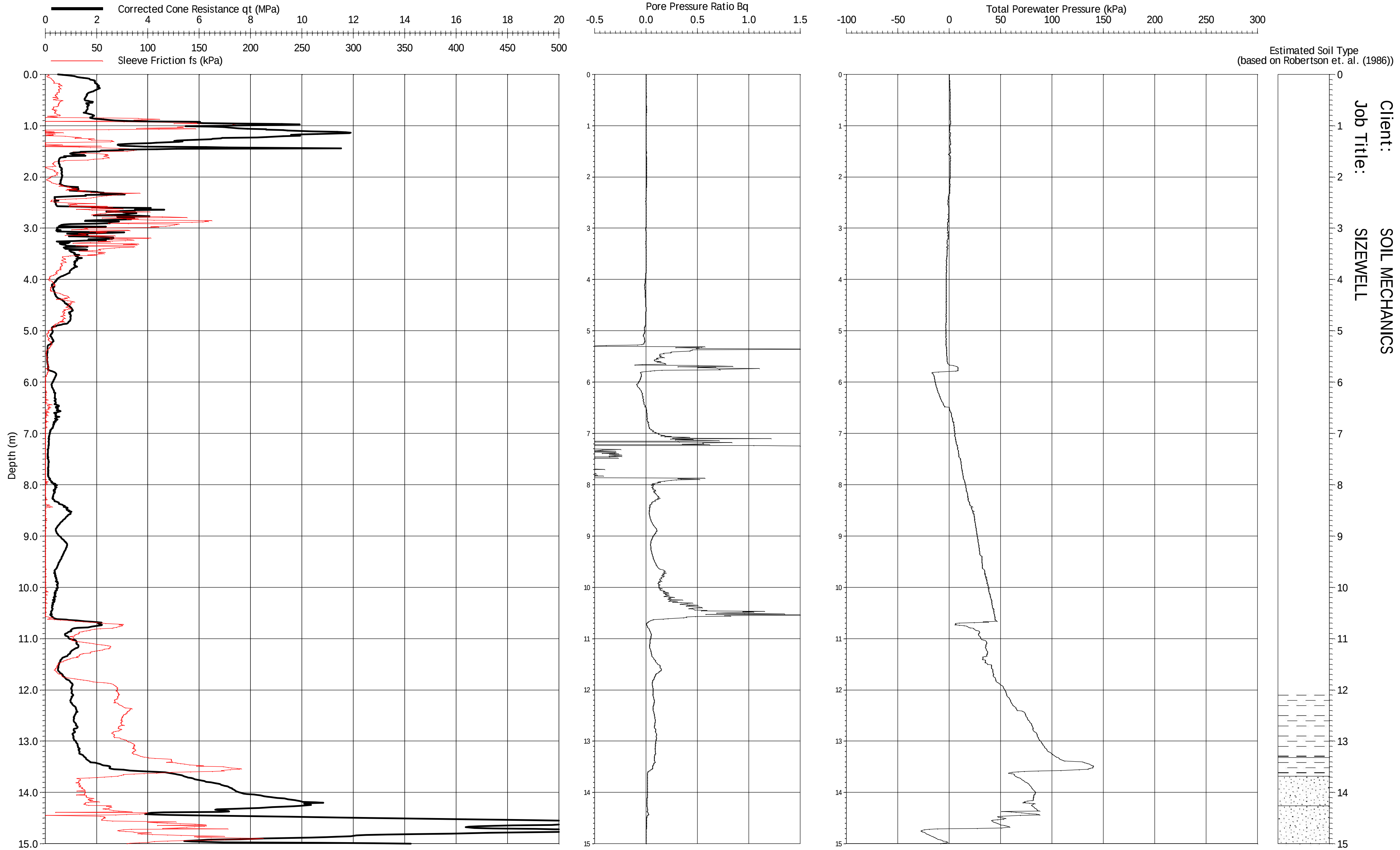

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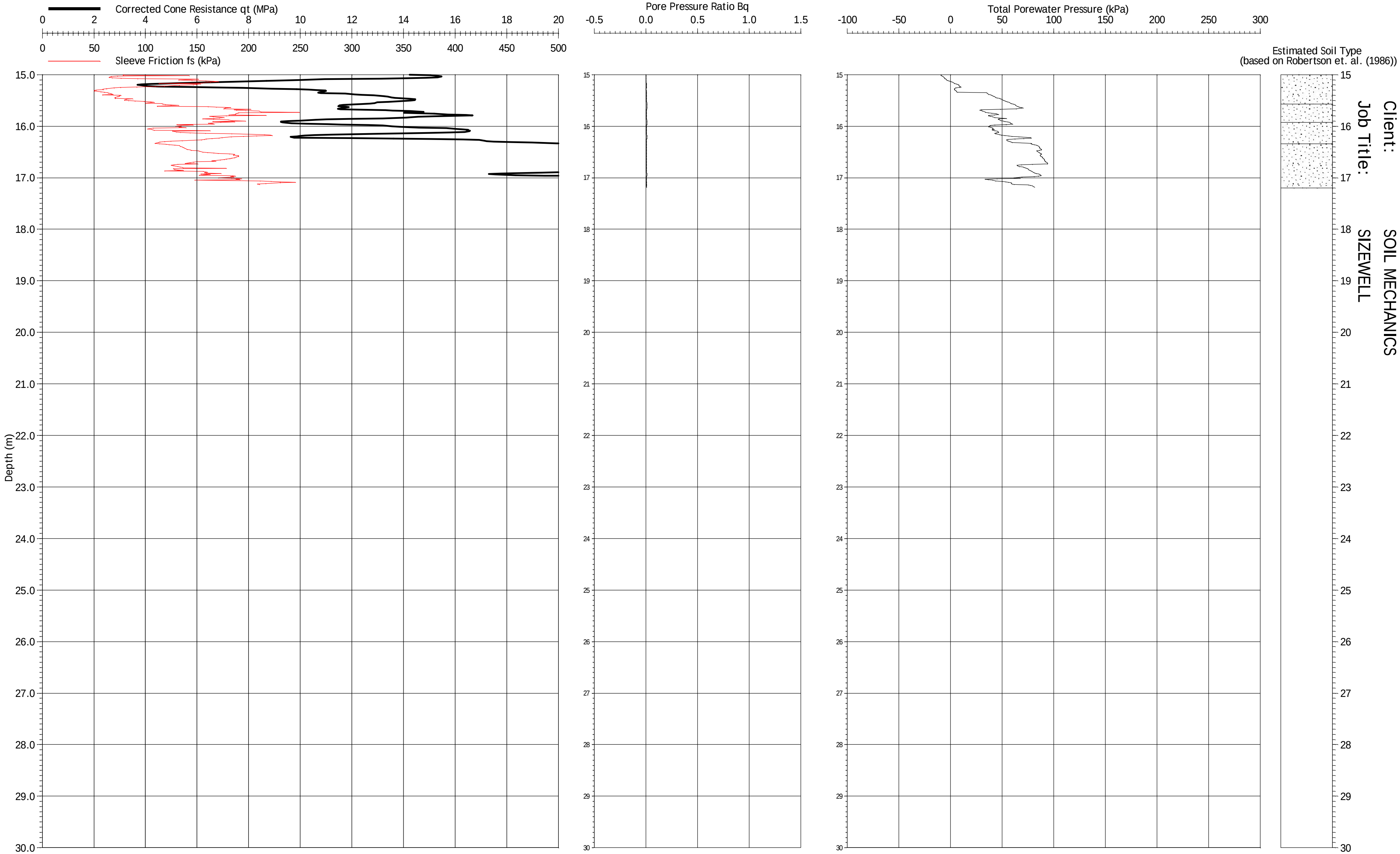

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CONE PENETRATION TEST CPT19B

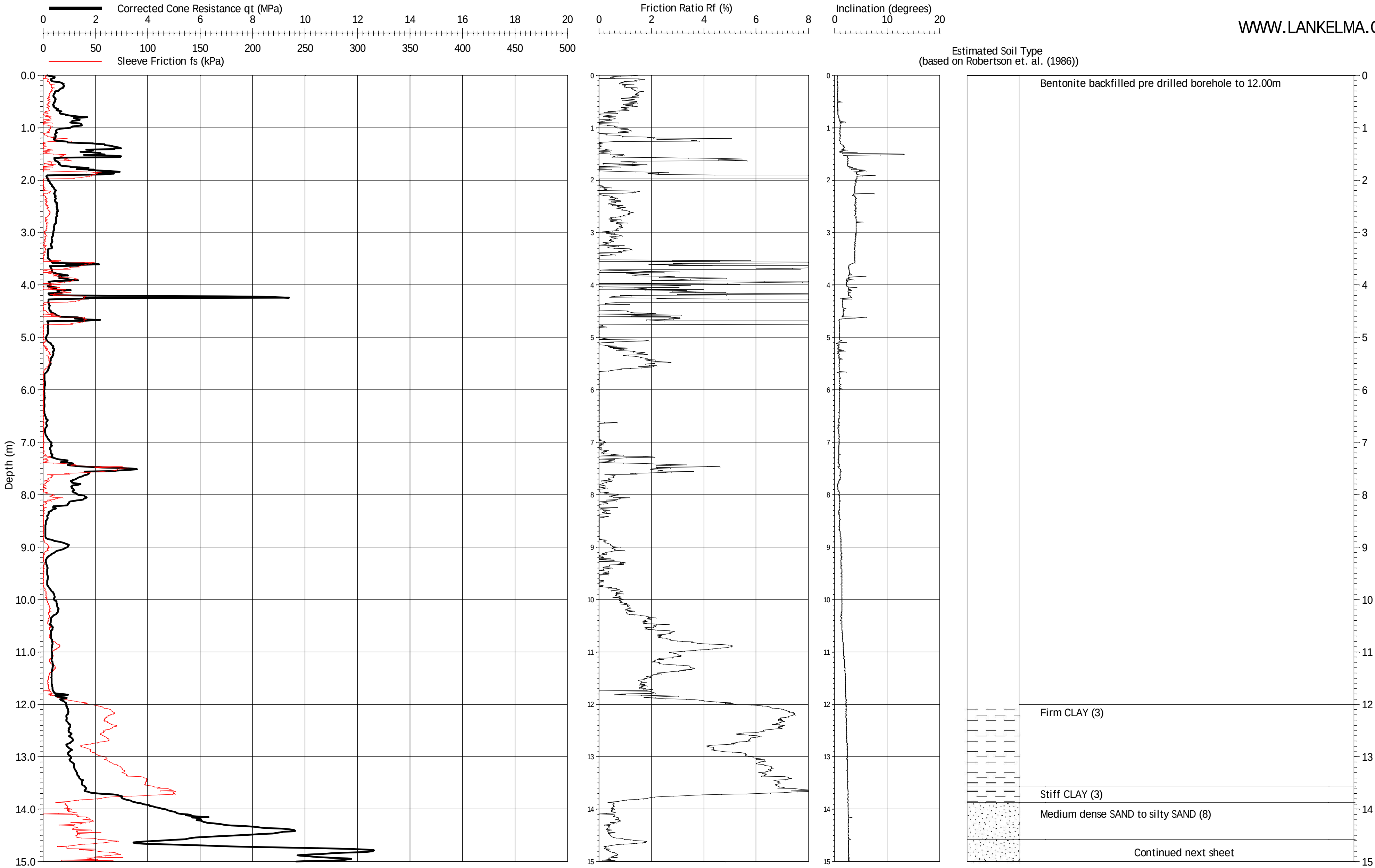
LANKELMA CPT LTD

Form: CPT_303_Bq2

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: 105087 - CPT21

Checked B[redacted]

CONE PENETRATION TEST CPT21

LANKELMA CPT LTD

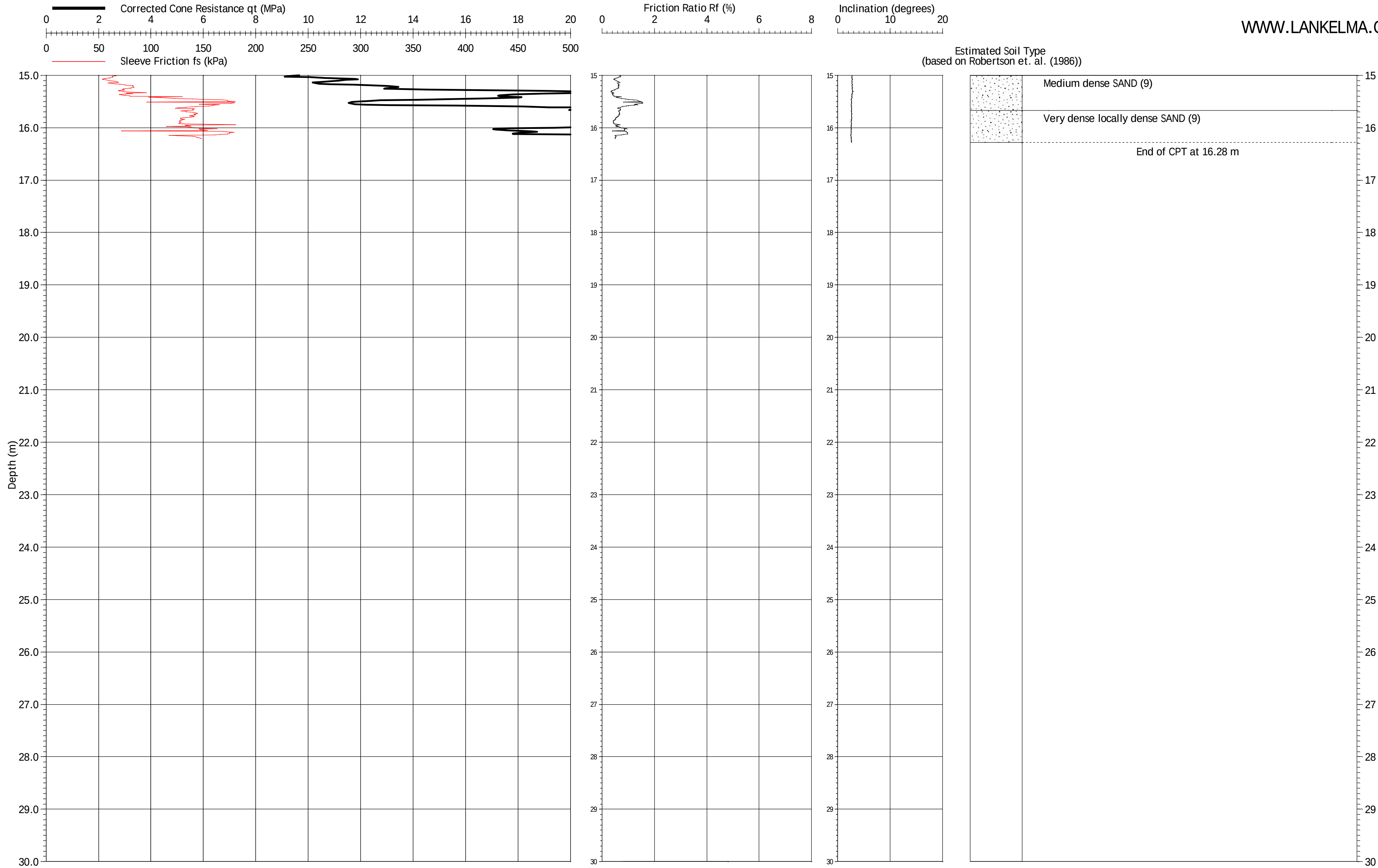
LANKELMA

Form: CPT_201_20MPa

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



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Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]87 - CPT21
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
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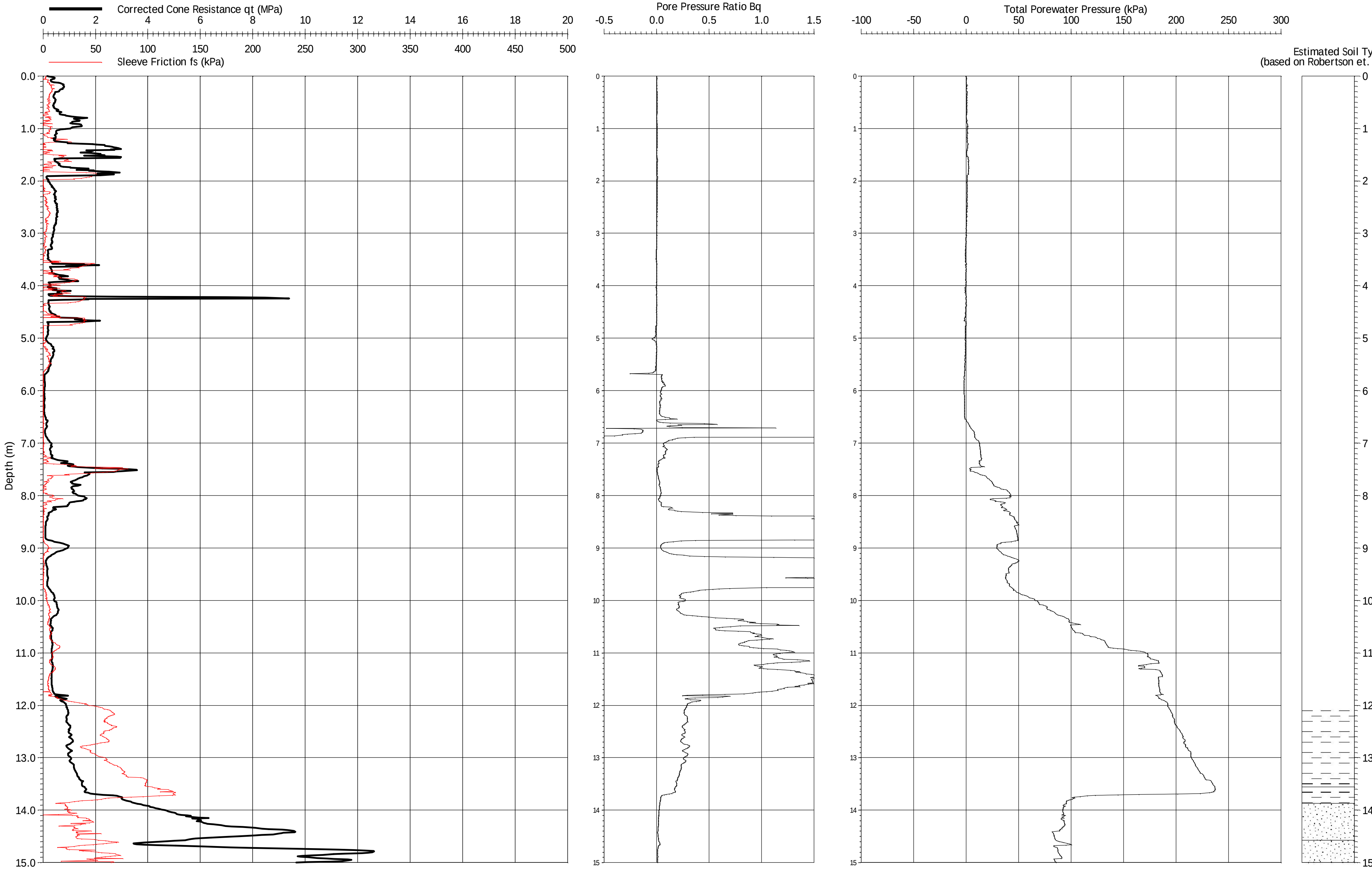
CONE PENETRATION TEST CPT21

LANKELMA CPT LTD

LANKELMA

Form: CPT_201_20MPa



Client: SOIL MECHANICS
Job Title: SIZEWELL

Location:	Sizewell	Date of Test:	29/11/2010
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name:	[redacted]087 - CPT21
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By:	[redacted]
Remarks:			

CONE PENETRATION TEST CPT21
LANKELMA CPT LTD

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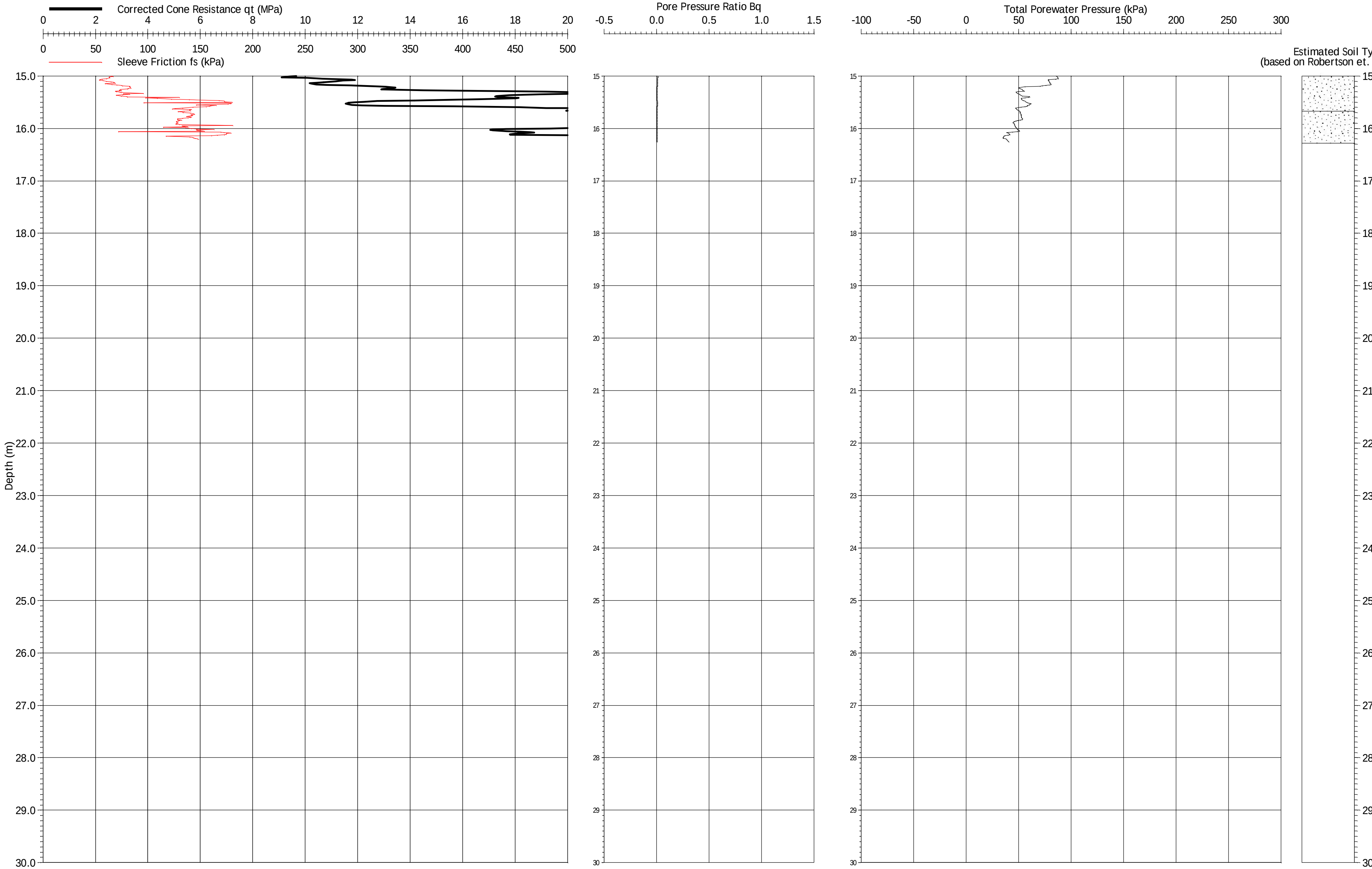
Form: CPT_303_Bq2

Client: SOIL MECHANICS

Job Title: SIZEWELL



Location: Sizewell

Coordinates: -

Ground Level: -

Cone & Rig Used: S10-CFIIP.644 - uk15

Remarks:

Date of Test: 29/11/2010

Date of Plot: 15/12/2010

File Name: 105087 - CPT21

Checked By: [redacted]

CONE PENETRATION TEST CPT21

LANKELMA CPT LTD

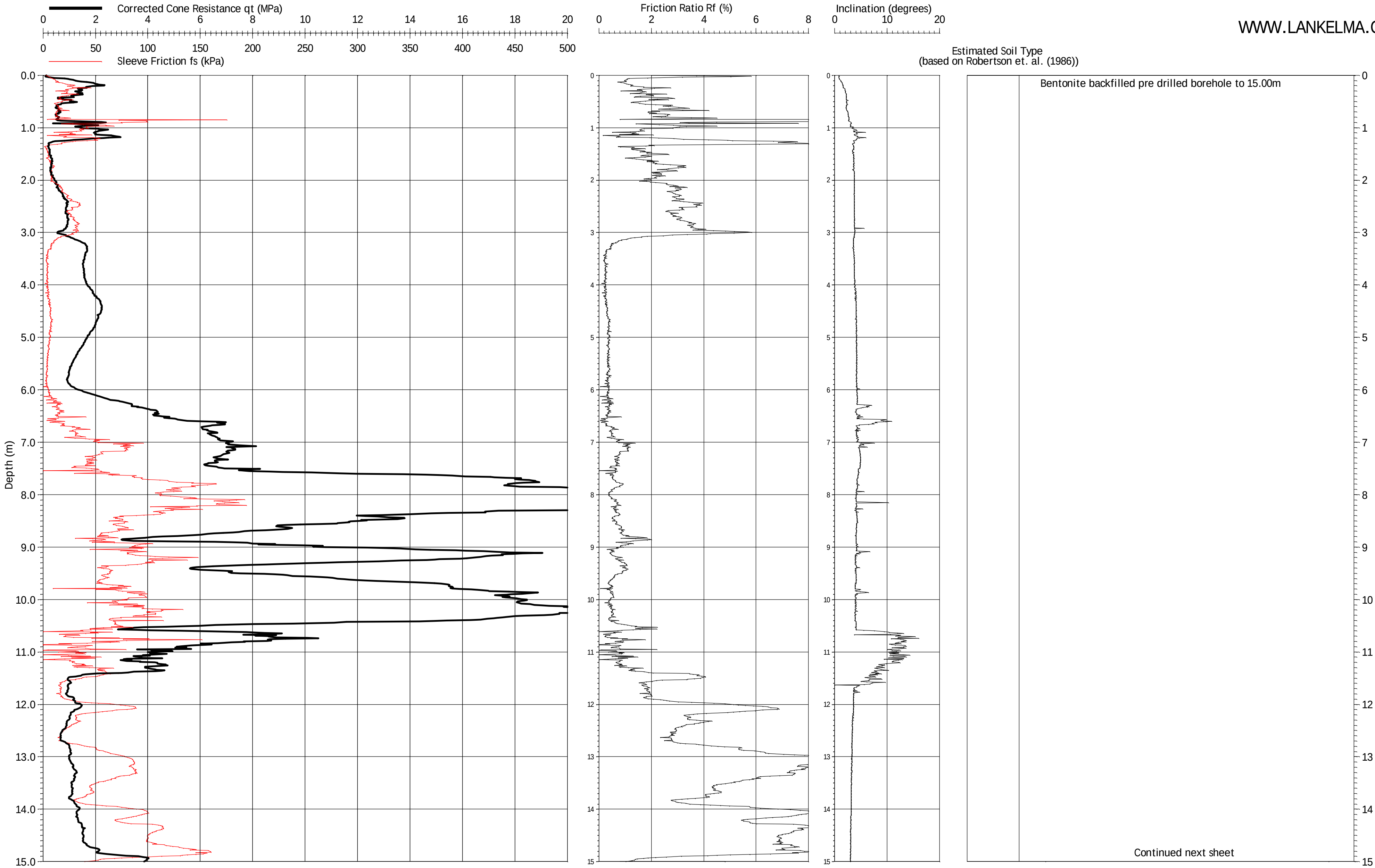
LANKELMA

Form: CPT_303_Bq2

WWW.LANKELMA.COM

Client: SOIL MECHANICS

Job Title: SIZEWELL



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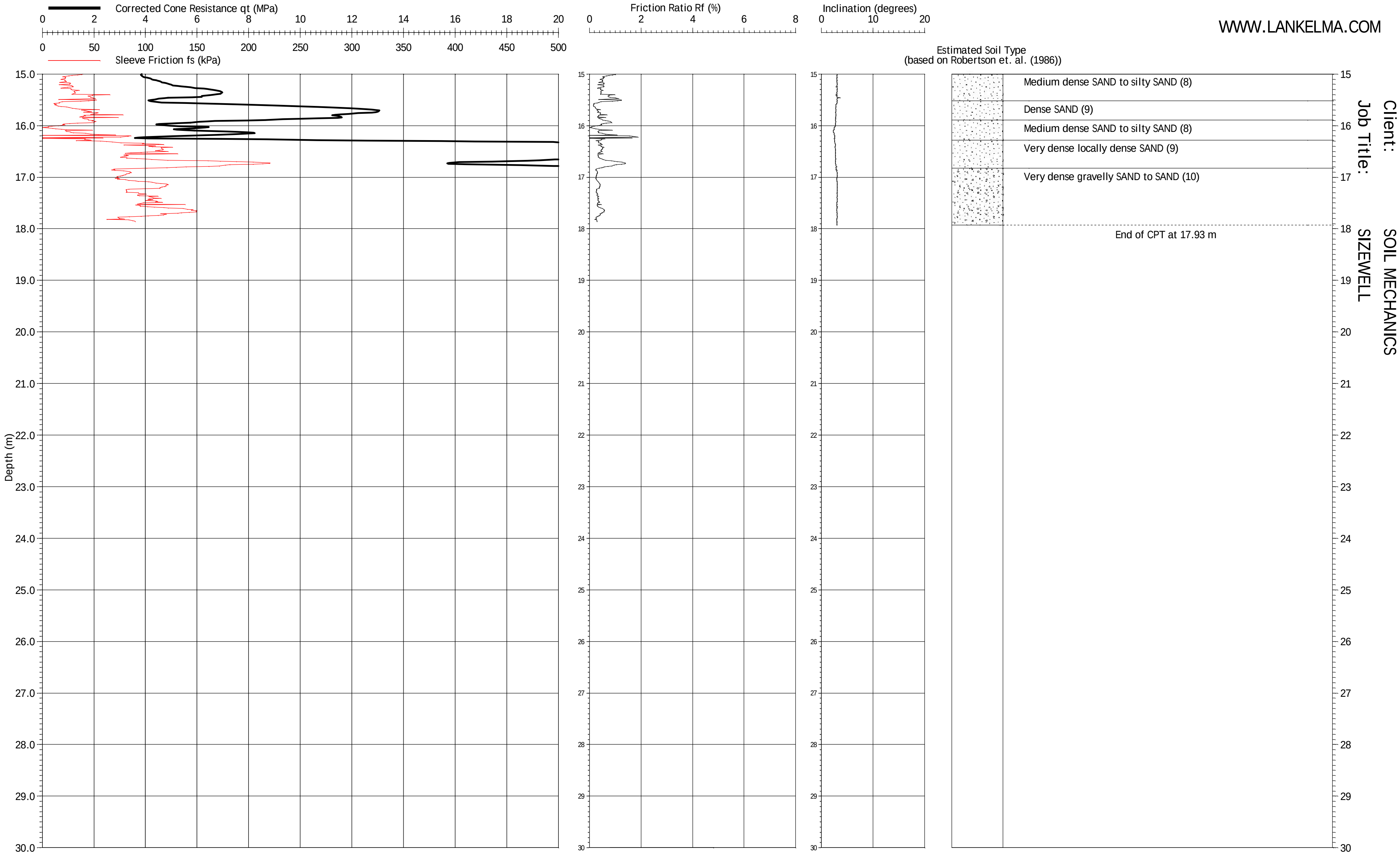
Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name [redacted] - CPT38	
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked [redacted]	
Remarks:			

CONE PENETRATION TEST CPT38

LANKELMA CPT LTD

Form: CPT_201_20MPa



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Ground Level:	-	File Name:	[redacted]087 - CPT38
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked By	[redacted]
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LANKELMA

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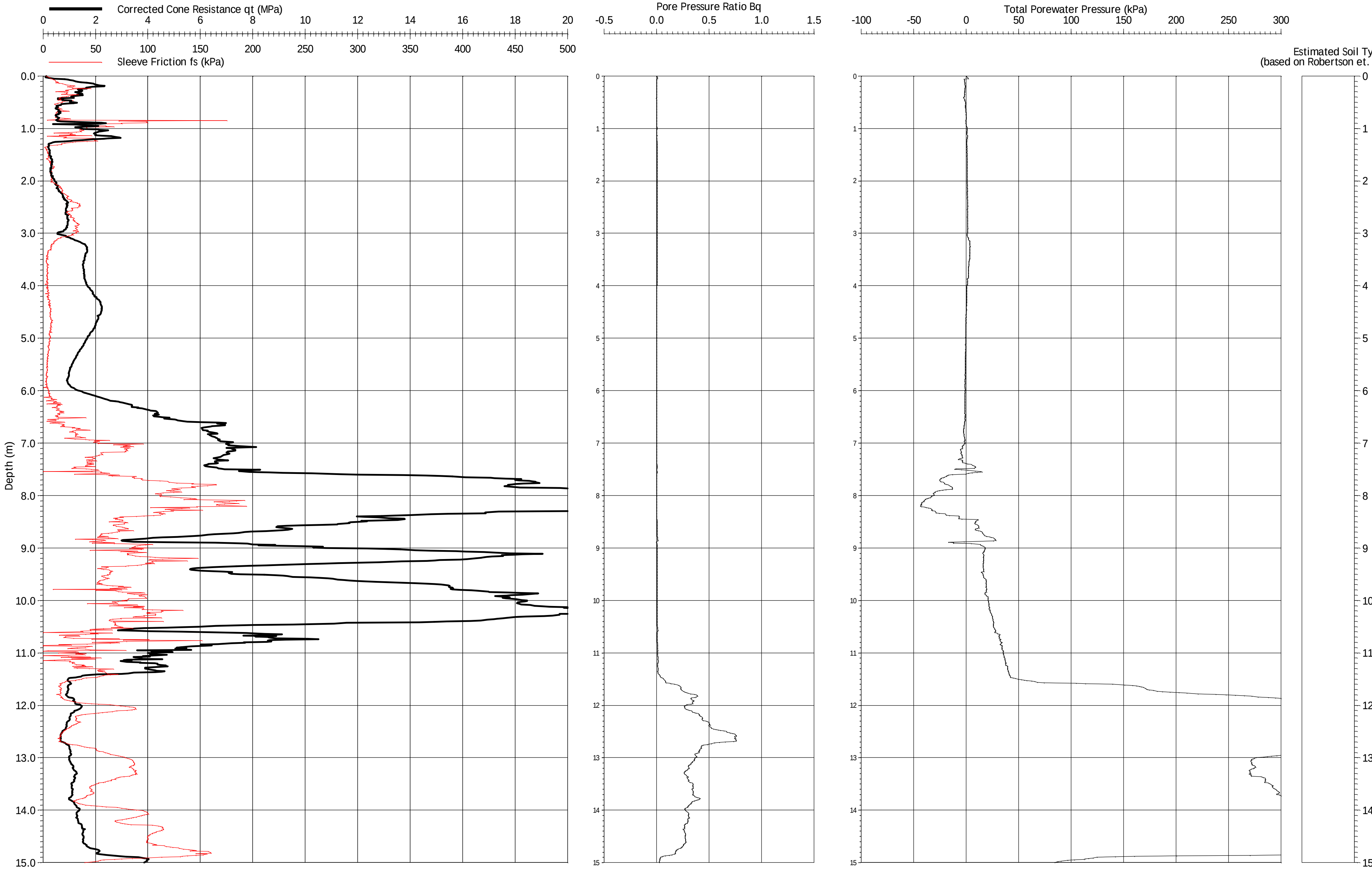

Client: SOIL MECHANICS
Job Title: SIZEWELL

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Coordinates:	-	Date of Plot:	15/12/2010
Ground Level:	-	File Name [redacted]	7 - CPT38
Cone & Rig Used:	S10-CFIIP.644 - uk15	Checked [redacted]	
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CONE PENETRATION TEST CPT38

LANKELMA CPT LTD

LANKELMA

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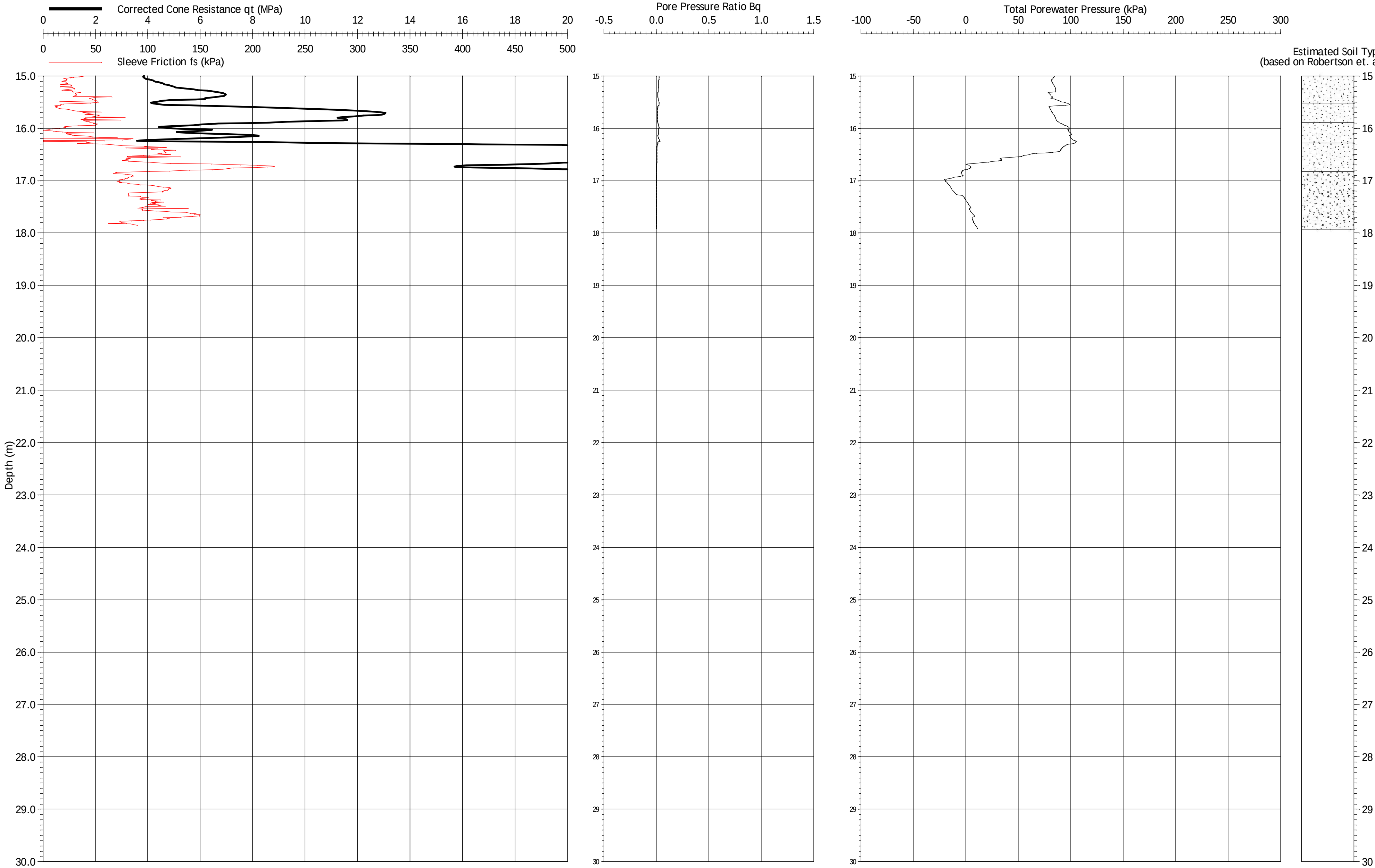

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Job Title: SIZEWELL

Location: Sizewell
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Cone & Rig Used: S10-CFIIP.644 - uk15
Remarks:

Date of Test: 29/11/2010
Date of Plot: 15/12/2010
File Name: [redacted]87 - CPT38
Checked By [redacted]

CONE PENETRATION TEST CPT38
LANKELMA CPT LTD

LANKELMA

Form: CPT_303_Bq2

ENCLOSURE C

BOREHOLE GEOPHYSICAL LOGGING

European Geophysical Surveys Report Report No. SM0922_rpt/TM46

EUROPEAN GEOPHYSICAL SERVICES

REPORT ON THE

GEOPHYSICAL LOGGING

OF

BOREHOLES

AT THE

ONSHORE INVESTIGATION PHASE 1

FOR SIZEWELL SITE

PROJECT NO. A0012-10

Prepared For:

Soil Mechanics
Askern Road
Carcroft
Doncaster
DN6 8DG

APRIL 2011/SM0922_rpt FINAL/TM46

European Geophysical Services Ltd
22 The Stables, Sansaw Business Park, Hadnall, Shrewsbury. SY4 4AS
Tel: 01939 210710 Fax: 01939 210532 E-mail: eurogeophys@europeangeophysical.com **www.europeangeophysical.com**
Registered in England and Wales No. 2962962 VAT No. GB 648 4148 18

1. INTRODUCTION

At the request of Soil Mechanics, geophysical logging was carried out in boreholes at the Onshore Investigation Phase 1 for Sizewell Site.

The work was carried out by European Geophysical Services between July 2010 and April 2011. This report covers work carried out up to 04th April 2011.

2. THE GEOPHYSICAL LOGGING METHODS

The Equipment and Field Procedure

A logging system with a 600m capacity motorised winch mounted in a 4x4 van was used.

The following logs were run:-

Fluid Temperature and Conductivity	GVTCME
Caliper	GV4AC
Natural Gamma	GVGAM
Focused Resistivity	GVLL3
Density	GVFDS
Full Wave Sonic	GVFWS
Optical Borehole Imager	AOBI
Acoustic Borehole Imager	AABI

Tool description sheets are included in the Appendix.

All logging data was recorded digitally for reprocessing and archiving purposes.

With the exception of the fluid logs and the optical imager, all logs were run from the bottom of the boreholes upward.

Presentation of Results

A3 Composite logs have been produced where a full suite of logs have been run.

The imager logs of the existing plastic lined narrow boreholes have been produced in A4 size.

2. THE GEOPHYSICAL LOGGING METHODS cont.

Fluid Temperature (T)

There is a natural geothermal gradient of increasing temperature with depth. This gradient varies with the thermal conductivity of the geological formation and is modified by water flowing in, out or vertically though the borehole.

This log is used to determine any flow pattern within the borehole and to identify flow zones.

Differential logs are produced over a one metre spacing, these are an interpretative aid to detect gradient changes.

Fluid Conductivity (EC or EC25)

The electrical conductivity (EC) of the water is related to its salinity and dissolved solids and is therefore a measure of the quality of the borehole water. The shape of the log trace can indicate zones of inflow.

Using data from the temperature log the electrical conductivity is corrected to 25℃ (EC25).

This log is used to identify different zones of water quality.

Differential logs are produced over a one metre spacing, these are an interpretative aid to detect gradient changes.

Caliper (Cal)

This tool measures the mean diameter of the borehole. It is used to check the integrity of the borehole lining, and where the borehole is unlined to identify zones of washout, breakout or fissures.

Natural Gamma (Gam)

The tool measures the naturally occurring gamma radiation found in rocks and sediments. It is mainly used to detect the clays that contain potassium K^{40}, though the U^{238} series of elements and the Th^{232} series of elements also emit gamma radiation.

The higher the concentration of these clay minerals the greater the responses on the natural gamma log.

2. THE GEOPHYSICAL LOGGING METHODS cont...

Focused Resistivity Log (Deep and Shallow)

The Focused Resistivity tool uses Guard Electrodes to focus the current into the formation. This gives excellent vertical resolution and good penetration, especially in highly conductive borehole fluids where a Normal Resistivity Sonde would not be as effective.

The tool has two electrode spacing's to allow a deep and shallow depth of investigation.

The response of this log is a function of porosity, type of formation / mineralogy and its pore water quality. These logs aid in the identification of strata and quality of the pore water.

Full Wave Sonic (FWS) - unlined boreholes

This tool has been specially designed to provide a full wave form recording of sonic signals and uses a fixed spaced transmitter – receiver of 1m.
The received signals are digitised at a fast sampling rate with high resolution.

The data is processed for P wave velocity (or transit time). This tool can only be used in fluid filled unlined boreholes.

Where there is soft / unconsolidated formation of low sonic velocity at or below the velocity of the borehole's fluid no formation arrivals are detectable due to the arrival of the direct wave up the borehole's fluid column. Borehole fluid velocities are around 1500m/s for water and higher for mud – dependent on type.

Full Wave Sonic (FWS) - plastic lined boreholes

Full-wave sonic logging may be used to evaluate the effectiveness of the cement grouting of plastic lined boreholes. Where formation arrivals are detected sonic coupling between the tool and the formation exists and therefore it is assumed that the plastic lining is bonded by the cement to the formation. Sections of the sonic log which show no formation arrivals may be areas where there is either poorly bonded plastic casing or soft / unconsolidated formation of low sonic velocity below the velocity of the borehole column's fluid.

2. THE GEOPHYSICAL LOGGING METHODS cont...

Density

The Formation Density tool has three detectors at different spacing's from a source of gamma radiation. The logs from each detector indicate the apparent bulk density of the material surrounding the tool at a radius of investigation related to the spacing. The Long Spaced Density has a spacing of 48cm, the High Resolution Density has a spacing of 24cm and the Bed Resolution Density has a spacing of 14cm. The tool is run side-walled up the borehole wall.

The Bed Resolution Density (BRD) log has high resolution but very shallow penetration (2 – 3cm) and is very responsive to borehole diameter changes and fractures.

The High Resolution Density (HRD) has a larger radius of penetration than the BRD, up to around 10cm under average/medium range of densities.

The Long Spaced Density (LSD) has the greatest penetration of up to 15 - 20cm, but least resolution.

Optical Borehole Imager (OBI) - plastic lined boreholes

A precision-machined prism and CCD camera assembly permits a high definition video image of the borehole wall to be captured in a variety of horizontal and vertical resolutions. The resulting image is digitised in the sonde for transmission to the surface acquisition system.

The image is then orientated to Magnetic North and displayed as an unwrapped image log. This enables detailed images of the borehole wall to be obtained. For the best results the optical imager should be run above the water level or in clean, clear fluid. The image is recorded on the way down the borehole to limit disturbance to the clarity of the water in the borehole by the logging tool. Where conditions are not suitable an acoustic imager may be run.

Acoustic Borehole Imager (ABI)-plastic lined boreholes

This tool scans the borehole wall through 360 degrees and records the acoustic reflection of the resulting signal in terms of amplitude and transit time (the travel time from the tool to the borehole wall). This technique requires a fluid filled borehole with a minimum of suspended solids, polymers or muds within the fluid column.

This sensitive technique responds to small diameter changes, rugosity and the acoustic nature of the borehole wall. The resultant images are orientated (to magnetic North) 0° through 90°, 180° and 270° back to 0°.
In plastic lined narrow boreholes the technique may be used to detect sections of slotted casing.

3.0 SUMMARY OF THE BOREHOLES LOGGED

3.1 Full suite of geophysical logs comprising Natural Gamma, Caliper, Fluid Temperature/Electric Conductivity, Resistivity, Density and Full Wave Sonic.

Borehole	Dates		
CBH 2009			
01	24.8.10	25.8.10	22/23.9.10
02	27.7.10	28.7.10	9/11/12/18.8.10
03	23.11.10		
04	16.7.10	20.7.10	21.7.10
05	15.7.10	16.7.10	19.7.10
06	13.7.10	14.7.10	15.7.10
07	18.8.10	19.8.10	20.8.10
08U	13.10.10	14.10.10	15.10.10
09U	11.10.10	12.10.10	13.10.10
10	7.9.10	8.9.10	
11U	26.10.10	27.10.10	
MPM 2009			
04	13.10.10		
07	5.10.10		
SD2010			
01	16.11.10	Plus verticality	
03	14.12.10	Plus verticality	

3.2 Verticality, Density and Sonic – plastic lined

Borehole	Dates		
DBH 2009			
01	24.1.11	04.04.11	
02	10.2.11	04.04.11	
SBP2009_02	03.2.11	04.04.11	

3.3 Imaging (Acoustic and Optical)

Borehole	Dates		
SM02	10.8.10		
BH05	10.8.10		
BH07	5.10.10		
BH12	10.8.10		
YH02	10.2.11		
YH03	19.9.10	6.10.10	
YG205	19.9.10	5.10.10	

4.0 NOTES ON THE GEOPHYSICAL LOGGING

The majority of boreholes had to be logged in short unlined sections due to the poor stability of the boreholes. This resulted in several visits to some boreholes as the lengths of casing were removed. The logs from each run were merged, in some cases due to the changing borehole conditions (diameter, mud) a few discontinuities were produced.

CBH2009-03

This borehole was deemed too unstable to run unlined logs as it was collapsing during first pull of casing. Open-hole logs were only achieved between 18 – 19.4m and 54 – 40.1m.

CBH2009-11U

Only cased-hole logs were possible over the majority of the borehole at any one time due to poor stability. Short sections of open-hole were initially logged with the caliper tool.

SD2010-01 and SD2010-03

The short spaced density logs of BRD and HRD were affected by the casing joints resulting in regular peaks on the logs.

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Figure: CBH2009-01 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	24 & 25/08/10 & 22 & 23/09/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-01	Logging Datum: Ground Level	ref:	SWC_CBH2009_01_A3.wcl

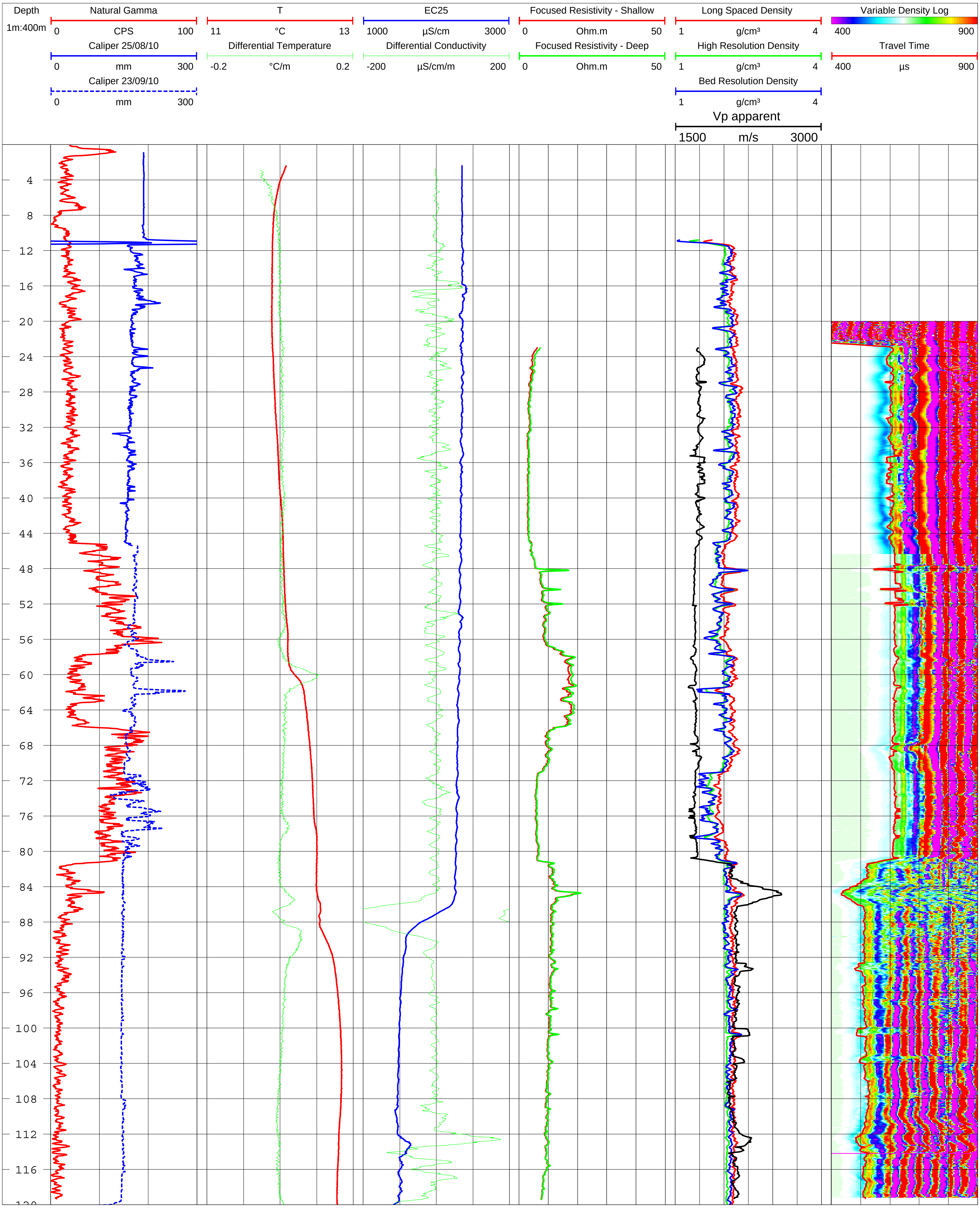

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Figure: CBH2009-02 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	27 & 28/07/10 & 09,11,12,18/10/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-02	Logging Datum: Ground Level	ref:	SWC_CBH2009_02_A3.wcl

Depth	Natural Gamma	T	EC25	Focused Resistivity - Shallow	Long Spaced Density	Variable Density Log
1m:400m	0 cps 100	12 °C 17	1000 µS/cm 2000	0 Ohm.m 50	1 g/cm³ 4	400 900
	Caliper	Differential Temperature	Differential Conductivity	Focused Resistivity - Deep	High Resolution Density	Travel Time
	0 mm 400	-0.2 °C/m 0.2	-200 µS/cm/m 200	0 Ohm.m 50	1 g/cm³ 4	400 µs 900
					Bed Resolution Density	
					1 g/cm³ 4	
					Vp apparent	
					1500 m/s 3000	

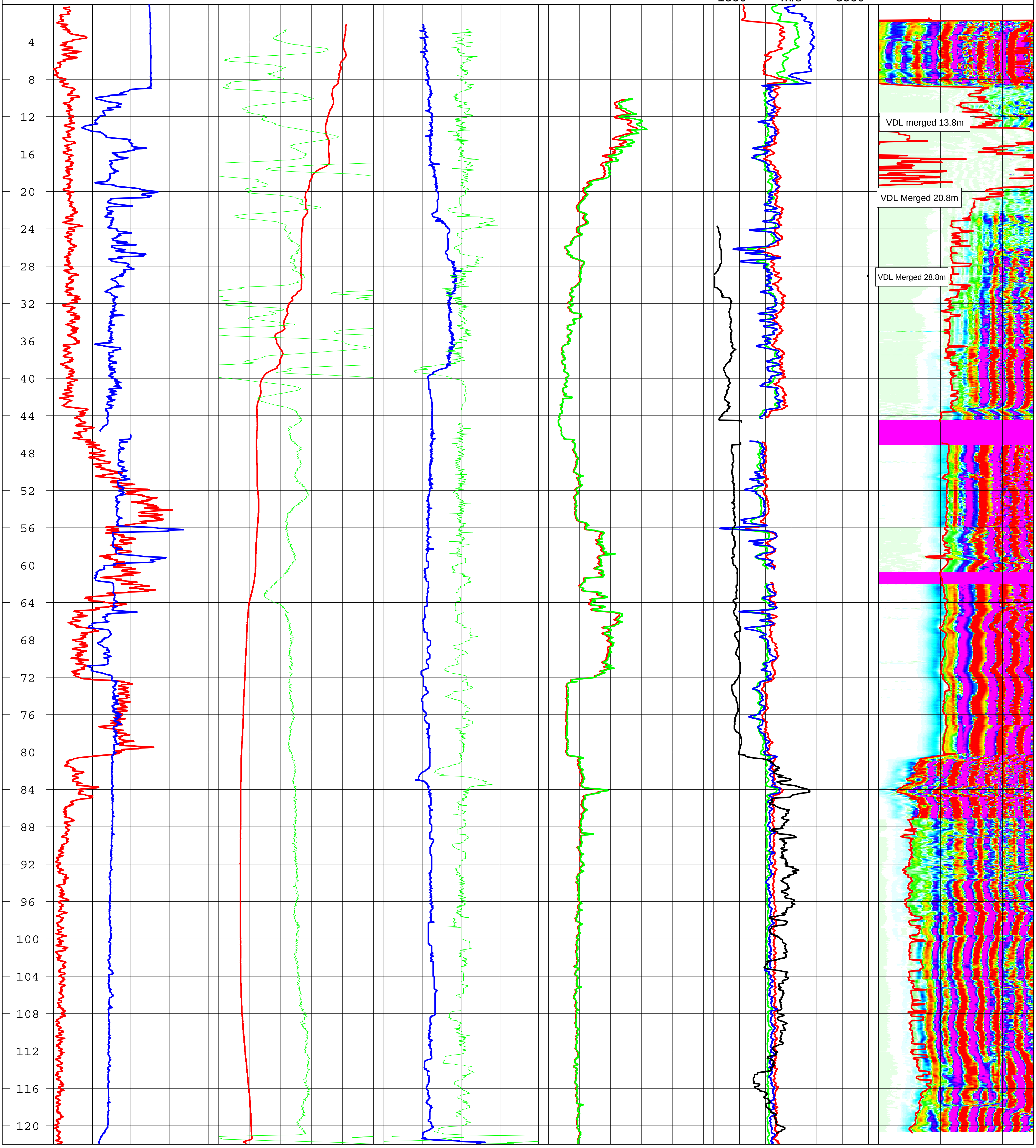

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Figure: CBH2009-03 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	23/11/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-03	Logging Datum: Ground Level	ref:	SWC_CBH2009_03_A3.wcl

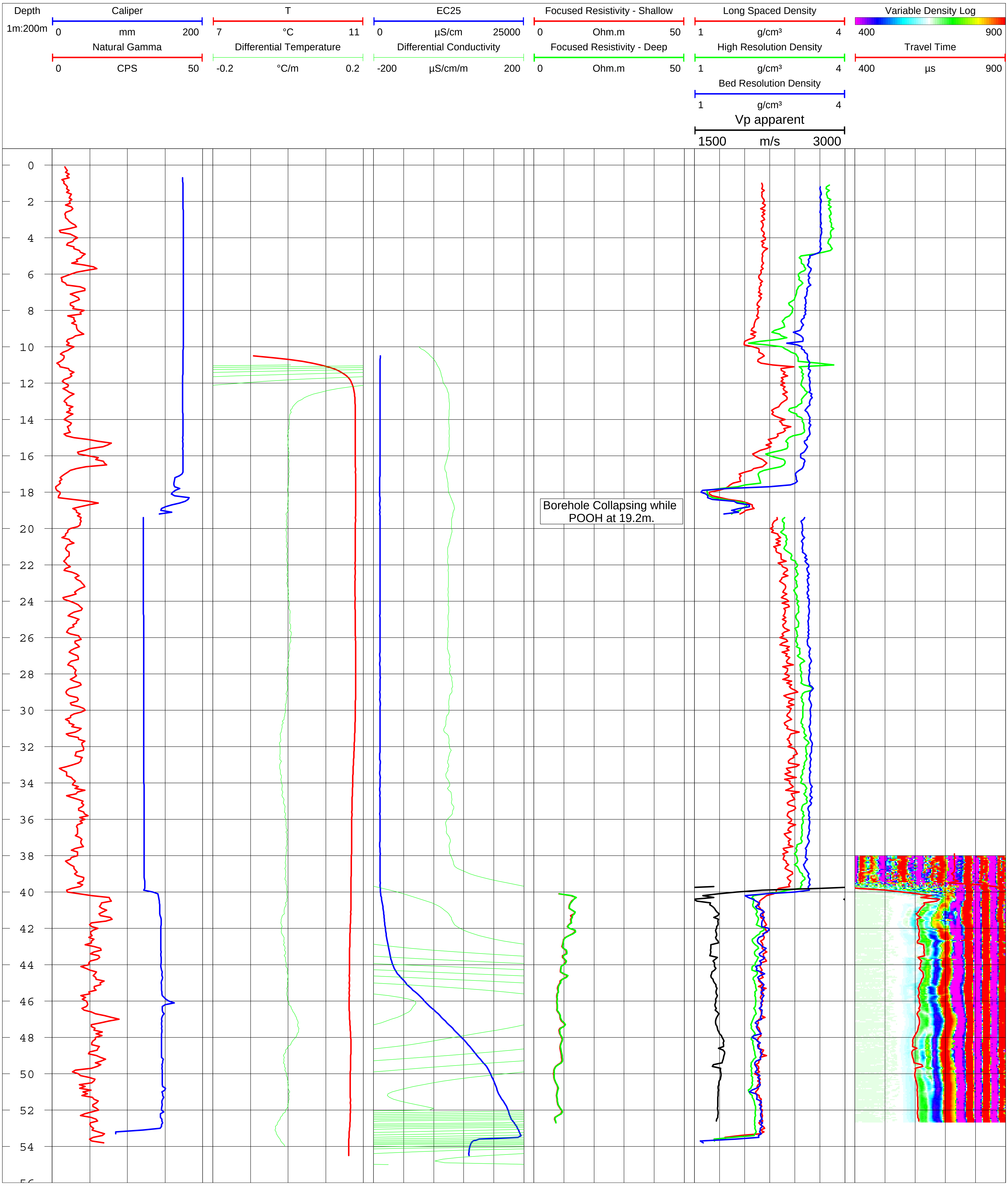

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Figure: CBH2009-04 Composite Geophysical Log			
CLIENT: NNB Generation Company Ltd		DATE:	16/20/21./07.10
SITE: Onshore Investigation Phase 1 For Sizewell Site		PROJECT:	A0012-10
WELL id: CBH2009-04	Logging Datum: Ground Level	ref:	CBH2009_04_A3.wcl

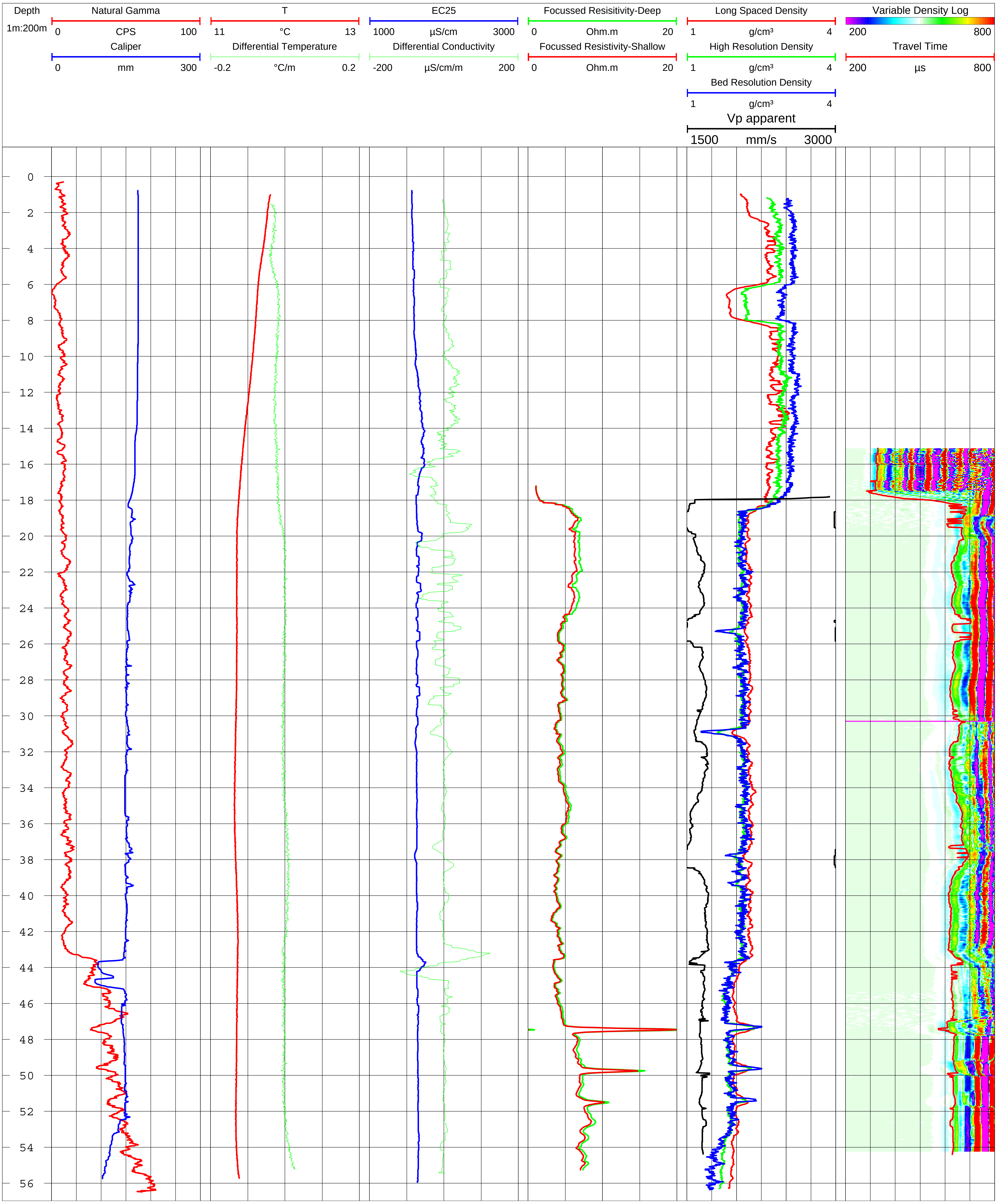

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Figure: CBH2009-05 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	15,16 & 19/07/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-05	Logging Datum: Ground Level	ref:	SWC_CBH2009_05_A3.wcl

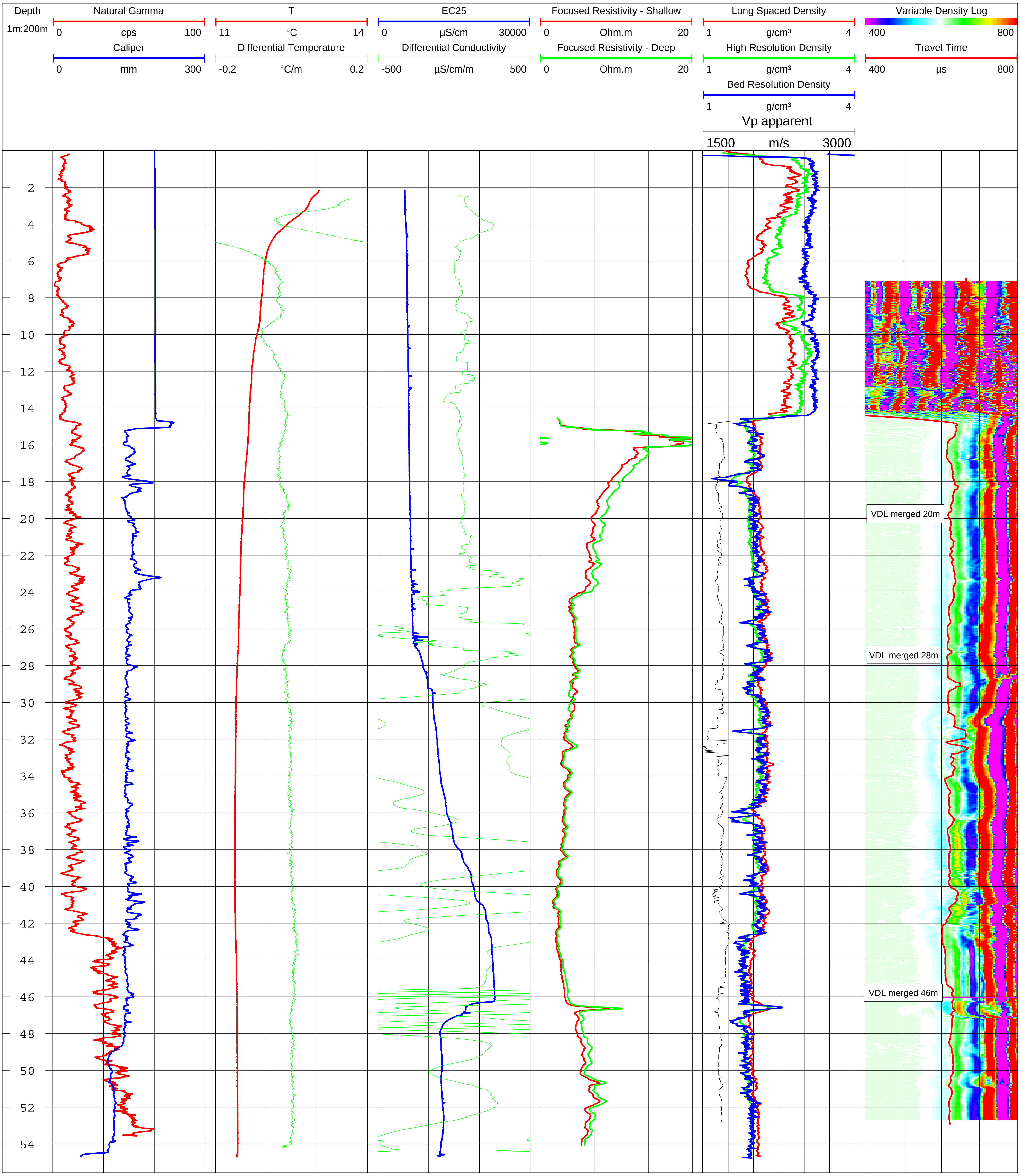

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Figure: CBH2009-06 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	13 &14/07/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id:	CBH2009-06	Logging Datum: Ground Level	ref: SWC_CBH2009_06_A3.wcl

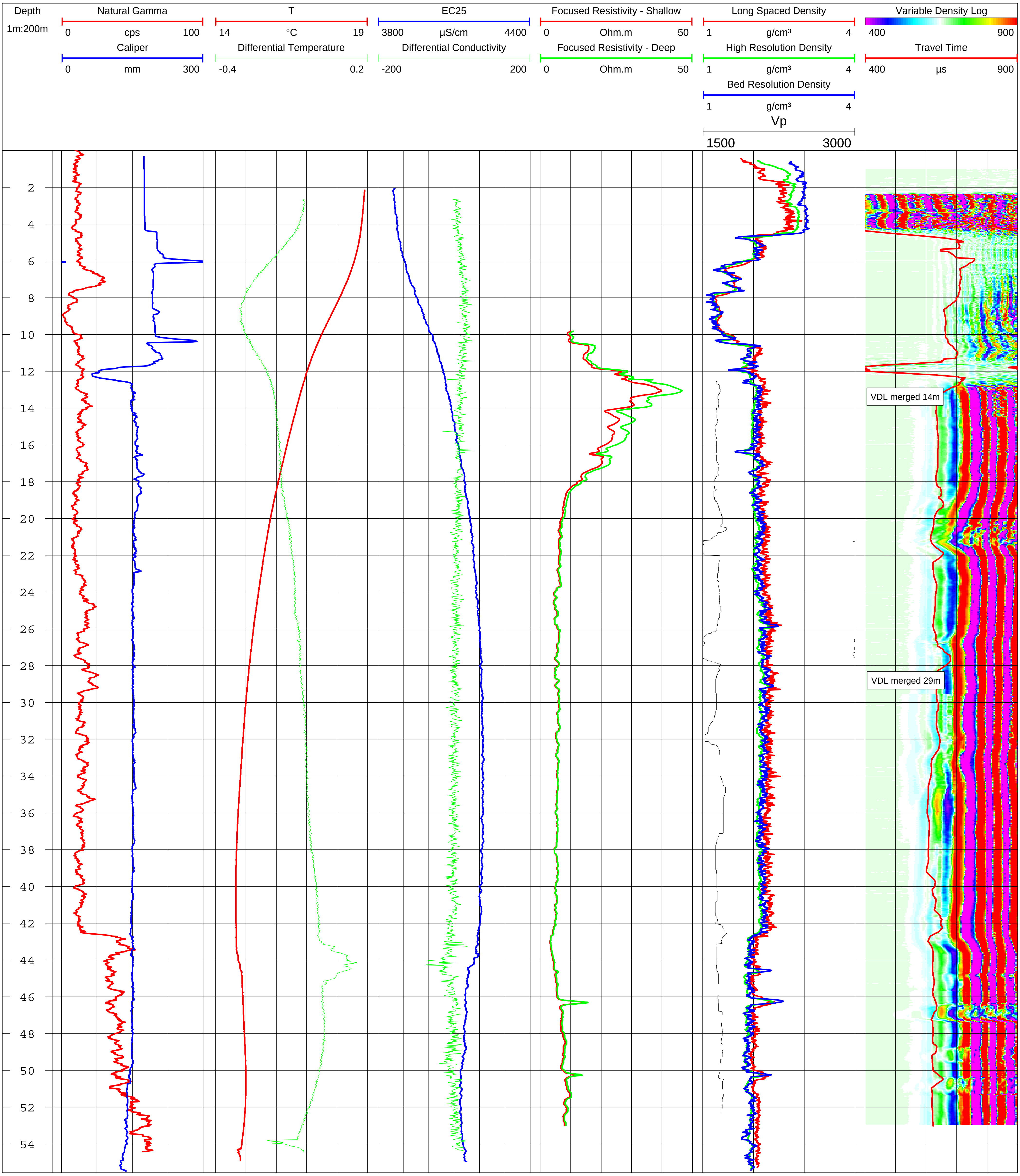

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Figure: CBH2009-07 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	18/19/20.8.10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id:	CBH2009-07	Logging Datum: Ground Level	ref: SWC_CBH2009_07_A3.wcl

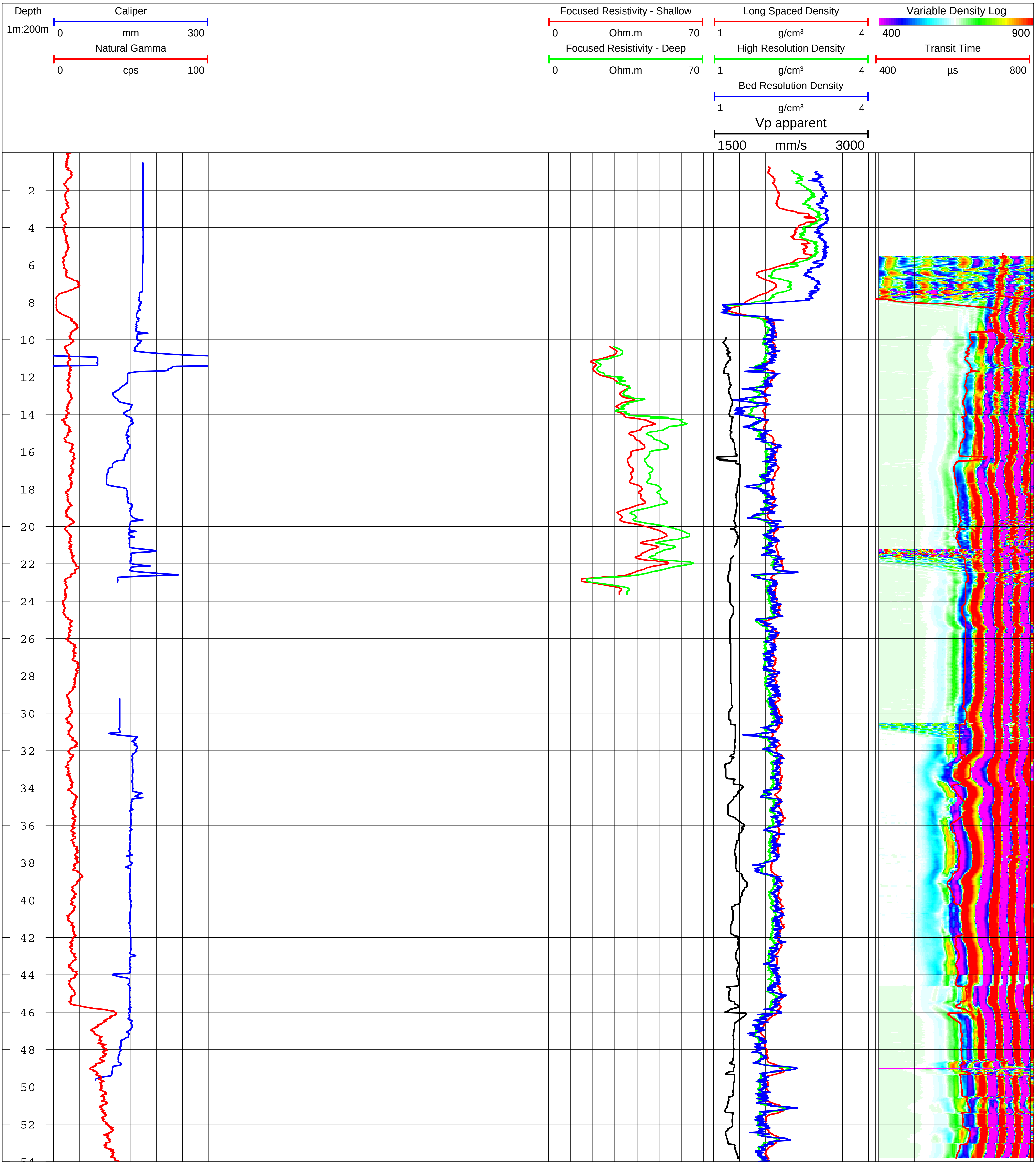

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Figure: CBH2009-08U Composite Geophysical Log

CLIENT:	NNB Generation Company Limited	DATE:	13,14 &15/10/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-08U	Logging Datum: Ground Level	ref:	SWC_CBH2009_08U_A3.wcl

Depth	Natural Gamma	T	EC25	Focused Resistivity - Shallow	Long Spaced Density	Variable Density Log
1m:400m	0 CPS 80	11 °C 13	4000 µS/cm 6000	0 Ohm.m 20	1 g/cm³ 4	400 900
	Caliper	Differential Temperature	Differential Conductivity	Focused Resistivity - Deep	High Resolution Density	Travel Time
	0 mm 400	-0.2 °C/m 0.2	-200 µS/cm/m 200	0 Ohm.m 20	1 g/cm³ 4	400 µs 900
					Bed Resolution Density	
					1 g/cm³ 4	
					Vp apparent	
					1500 m/s 3000	

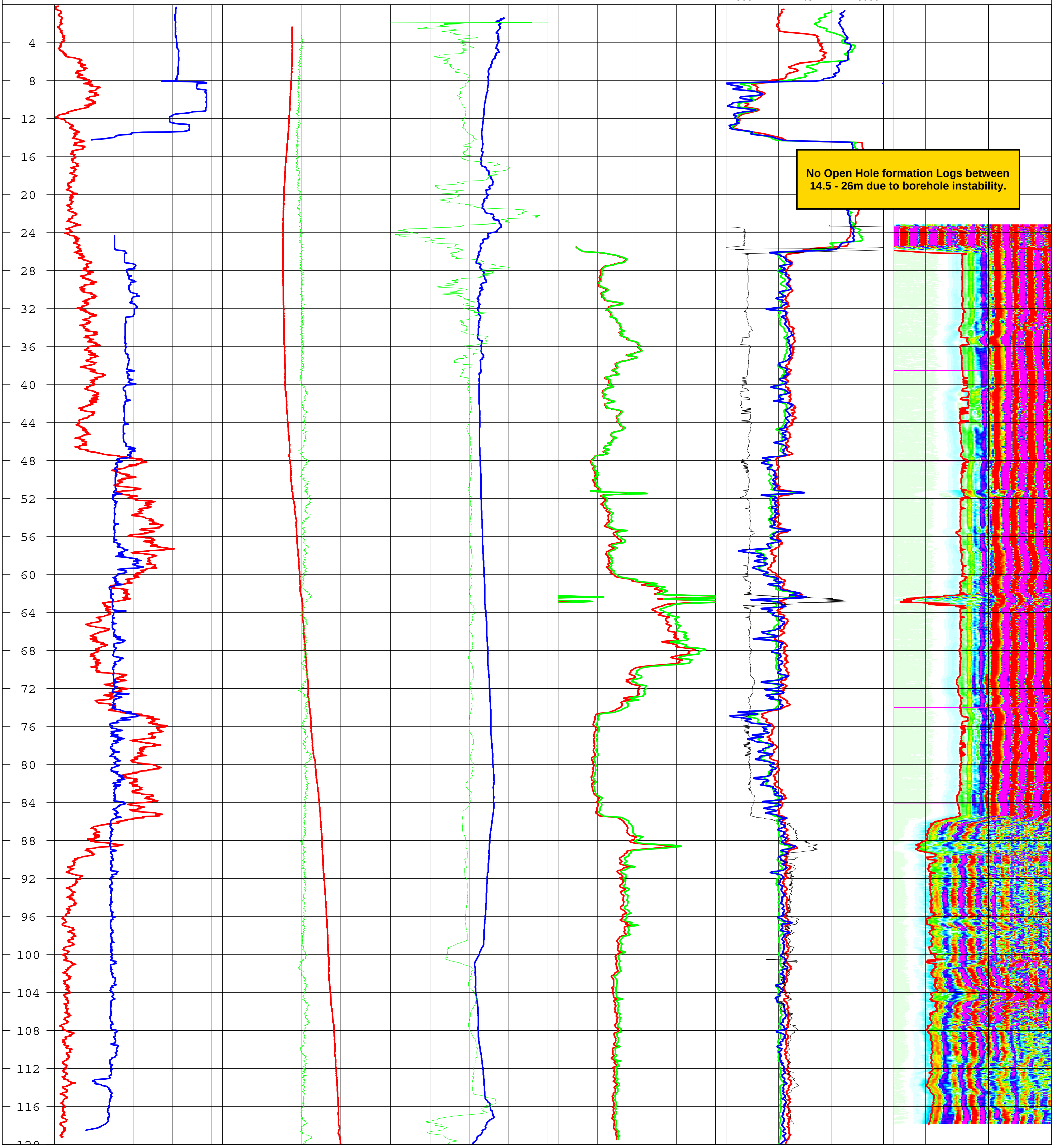

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Figure: CBH2009-9U Composite Geophysical Log

CLIENT:	NNB Generation Company Limited	DATE:	11 & 12 & 13/10/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-9U	Logging Datum: Ground Level	ref:	SWC_CBH2009_9U_A3.wcl

Depth 1m:200m	Caliper 10" Casing In-situ	T 10"	EC25 10"	Focused Resistivity - Shallow	Long Spaced Density 10"	Variable Density Log
	100 mm 400	13 °C 15	5000 µS/cm 10000	0 Ohm.m 4	1 g/cm³ 4	200 800
	Caliper 8" Casing In-situ	Differential Temperature 10"	Differential Conductivity 10"	Focused Resistivity - Deep	Long Spaced Density 8"	Travel Time
	100 mm 400	-0.2 0.2	-200 200	0 Ohm.m 4	1 g/cm³ 4	200 µs 800
	Natural Gamma 10" Casing	T 8"	EC25 8"		High Resolution Density 10"	
	0 CPS 60	13 °C 15	5000 µS/cm 10000		1 g/cm³ 4	
	Natural Gamma 8" Casing	Differential Temperature 8"	Differential Conductivity 8"		High Resolution Density 8"	
	0 CPS 60	-0.2 0.2	-200 200		1 g/cm³ 4	
					Bed Resolution Density 10"	
					1 g/cm³ 4	
					Bed Resolution Density 8"	
					1 g/cm³ 4	
					Vp apparent	
					1500 m/s 3000	

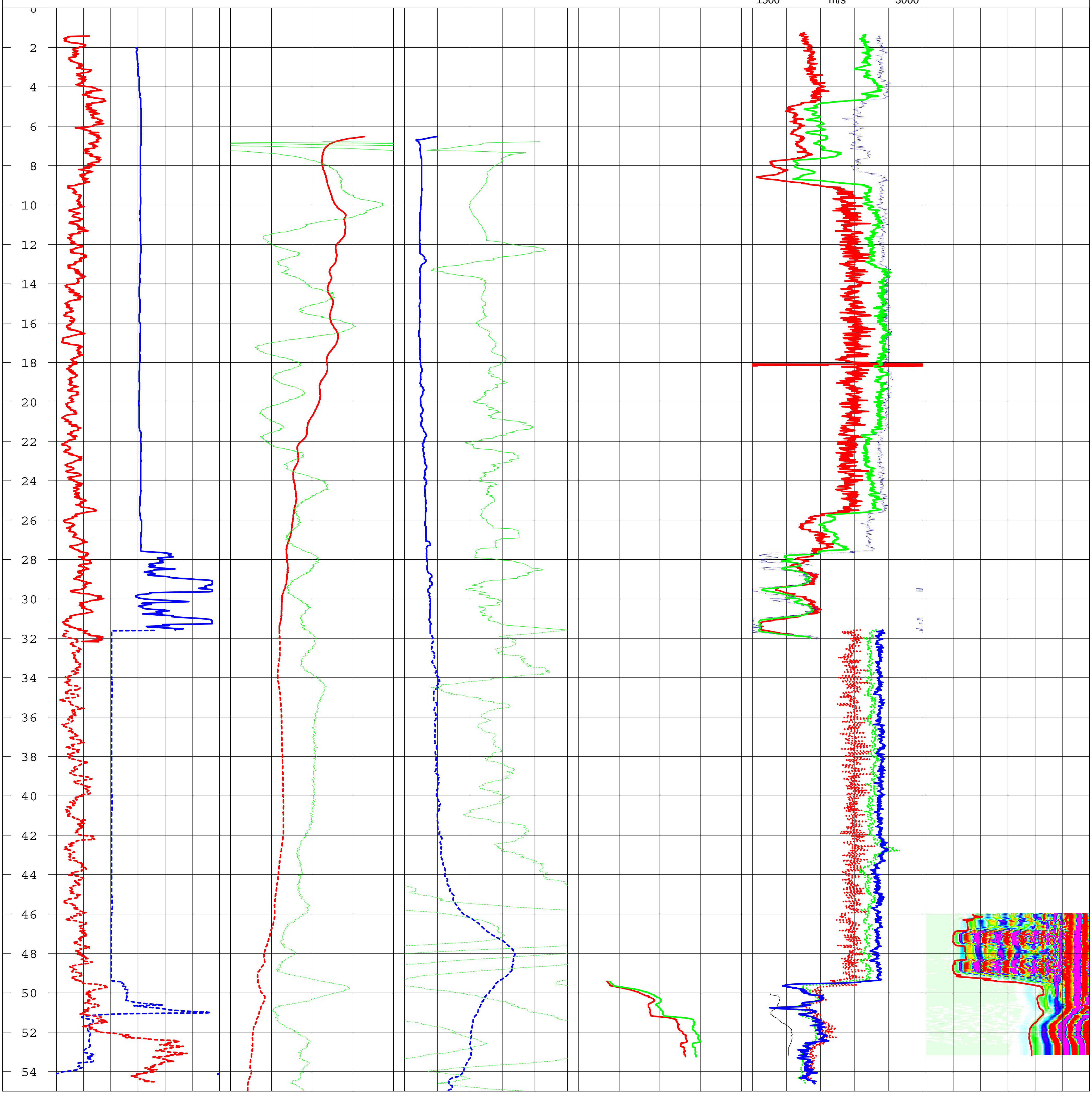

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Figure: CBH2009-10 Composite Geophysical Log

CLIENT:	NNB Generation Company Limited	DATE:	07 & 08/09/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: CBH2009-10	Logging Datum: Ground Level	ref:	SWC_CBH2009_10_A3.wcl

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Figure: CBH2009_11U Cased Hole Geophysical Logs

CLIENT:	NNB Generation Company Ltd	DATE:	26&27.10.10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id:	CBH2009_11U	Logging Datum: Ground Level	ref: SWC_CBH2009-11U_A3.wcl

Depth	Caliper 6" BH	Long Spaced Density 6"	High Resolution Density 6"	Bed Resolution Density 6"
1m:200m	100 mm 400	1 g/cm³ 4	1 g/cm³ 5	1 g/cm³ 5
	Caliper 8" BH	Long Space Density 8"	High Resolution Density 8"	Bed Resolution Density 8"
	100 mm 400	1 g/cm³ 4	1 g/cm³ 5	1 g/cm³ 6
	Caliper 10" BH			
	100 mm 400			
	Natural Gamma			
	0 cps 100			

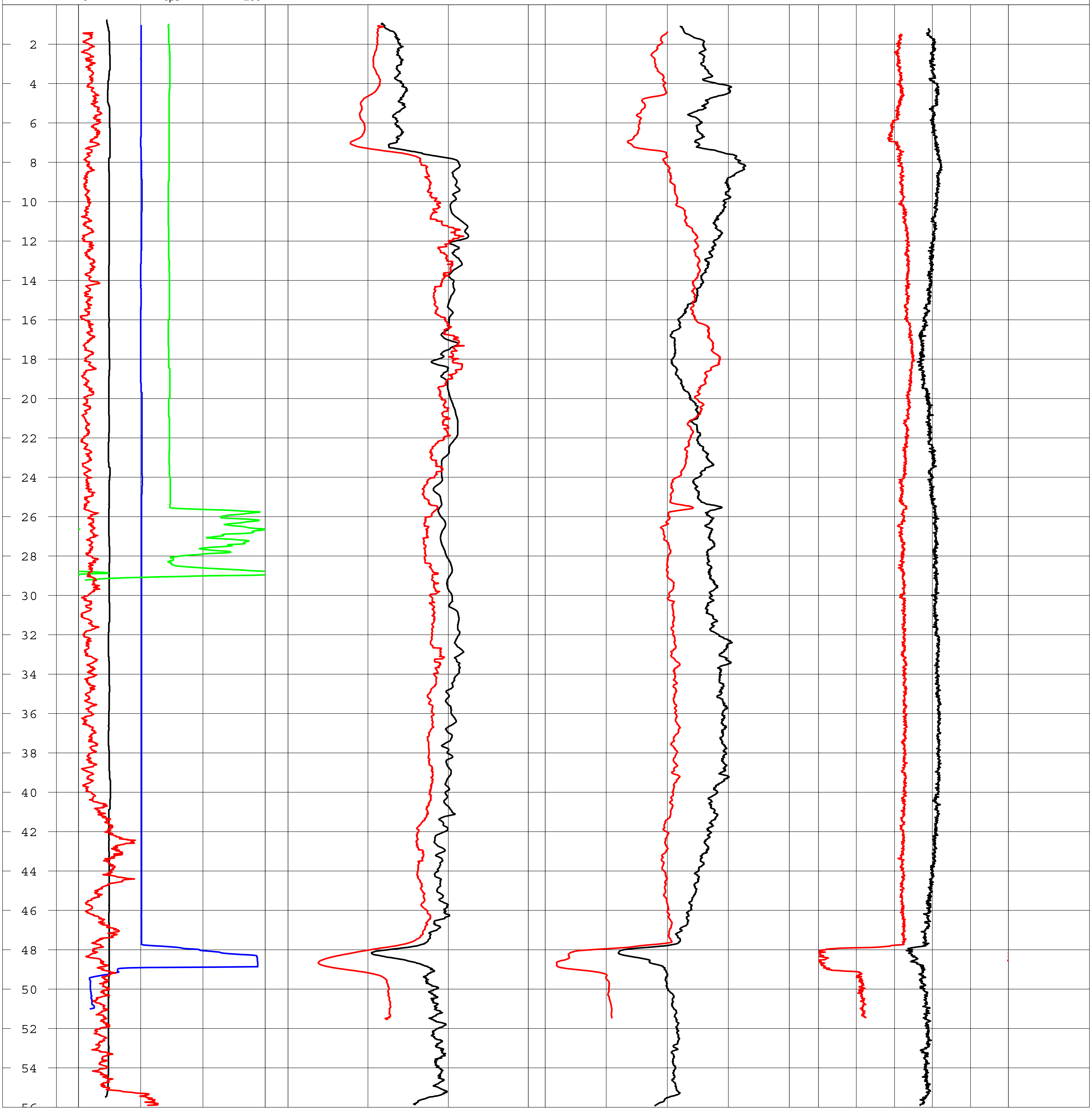

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Figure: MPM2009-04 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	13/12/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: MPM2009_04	Logging Datum: Ground Level	ref:	SWC_MPM2009_04_A3.wcl

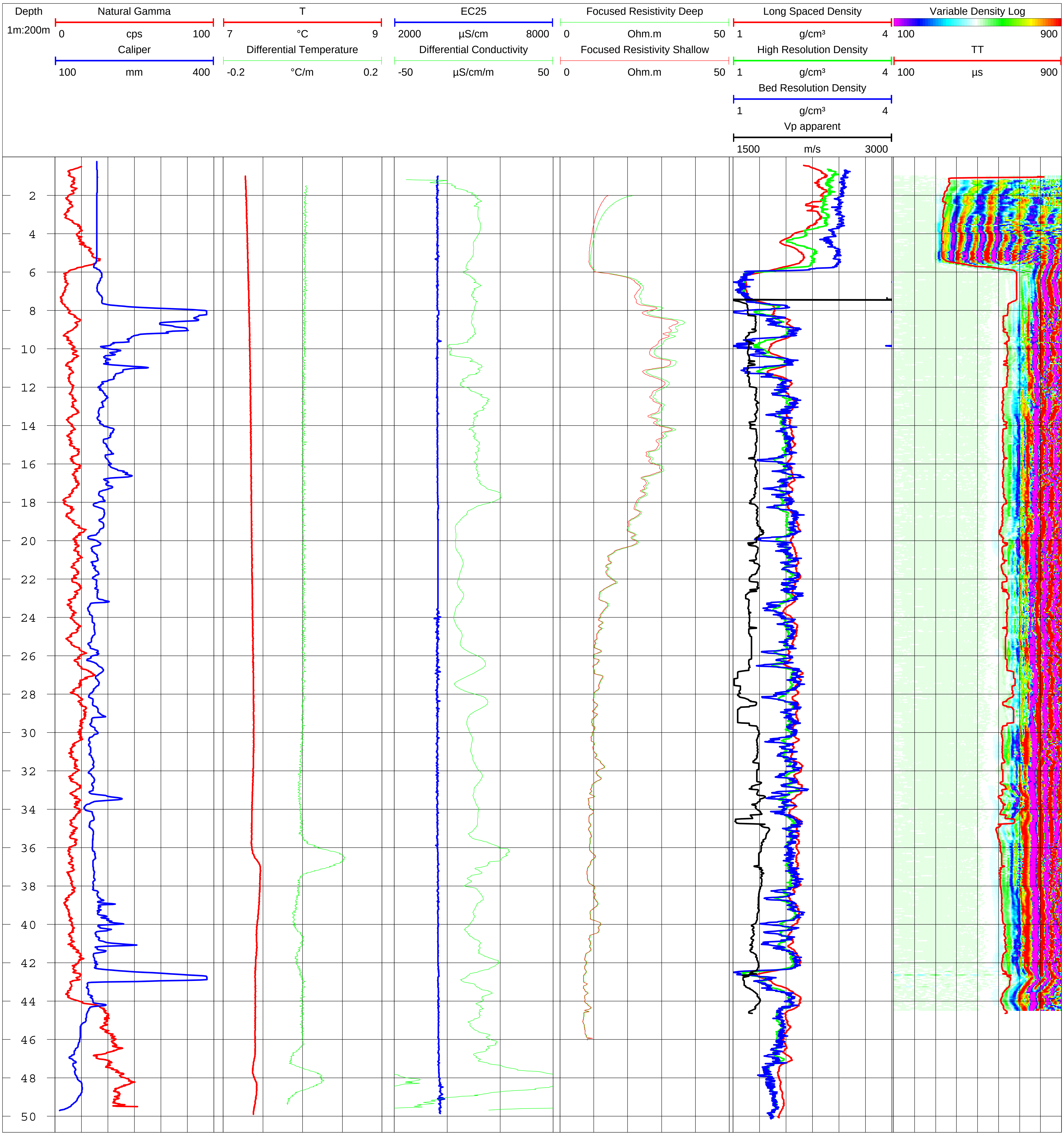

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Figure: MPM2009-07 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	04/10/10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: MPM2009_07	Logging Datum: Ground Level	ref:	SWC_MPM2009_07_DRAFT_A3.wcl

Depth	Caliper	T	EC25	Focused Rsistivity Deep	Long Spaced Density	Variable Density Log
1m:200m	0 mm 200	14 °C 17	2000 µS/cm 3000	0 Ohm.m 30	1 g/cm³ 4	400 900
	Gam	Differential Temperature	Differential Conductivity	Focused Rsistivity Shallow	High Resolution Density	Travel Time
	0 CPS 100	-0.2 0.2	-200 200	0 Ohm.m 30	1 g/cm³ 4	400 µs 900
					Bed Resolution Density	
					1 g/cm³ 4	
					Vp apparent	
					1000 m/s 3000	

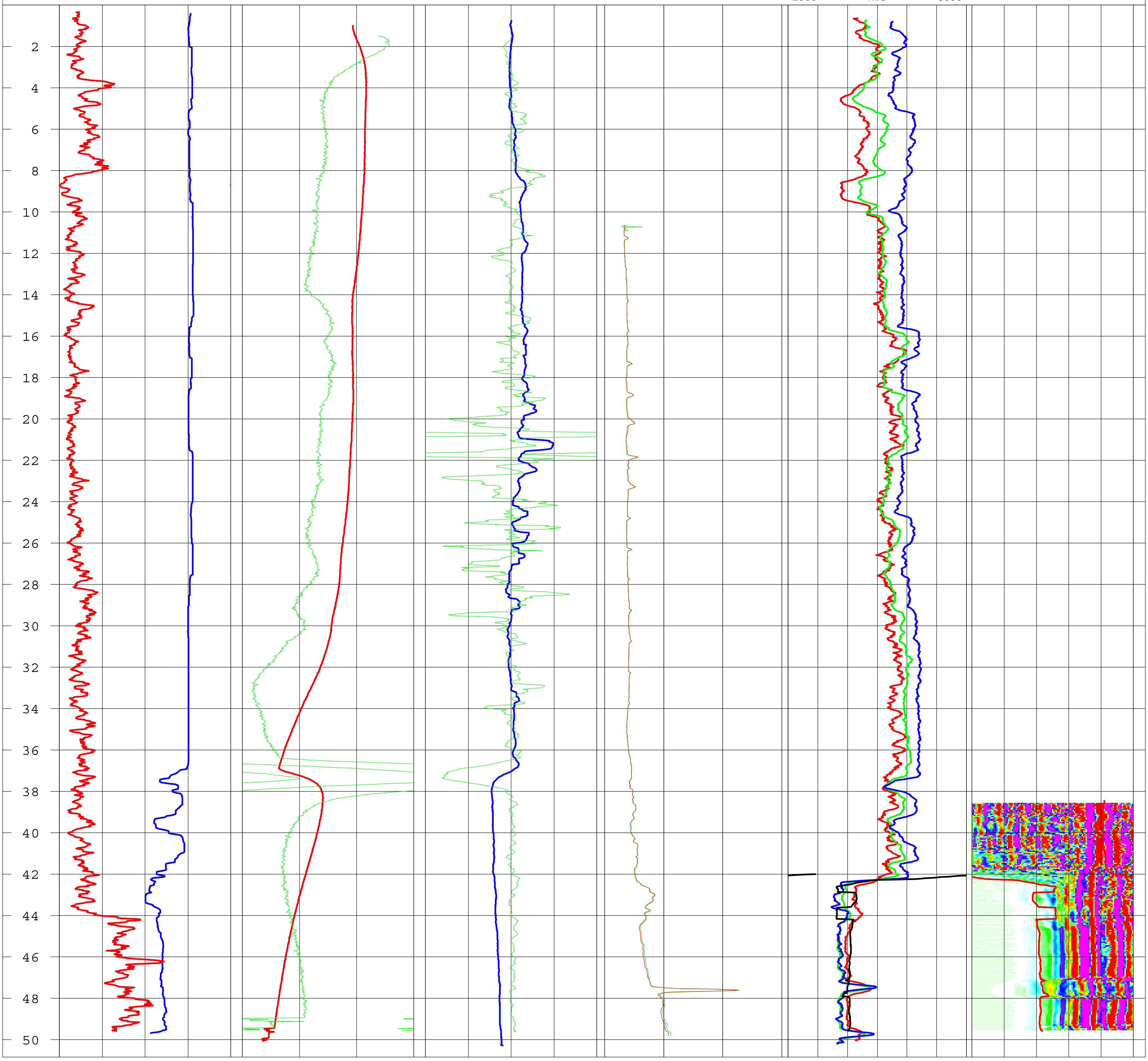

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Figure: SD2010-01 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	16.11.10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id:	SD2010-01	Logging Datum: Ground Level	ref: SWC_SD2010_01_A3.wcl

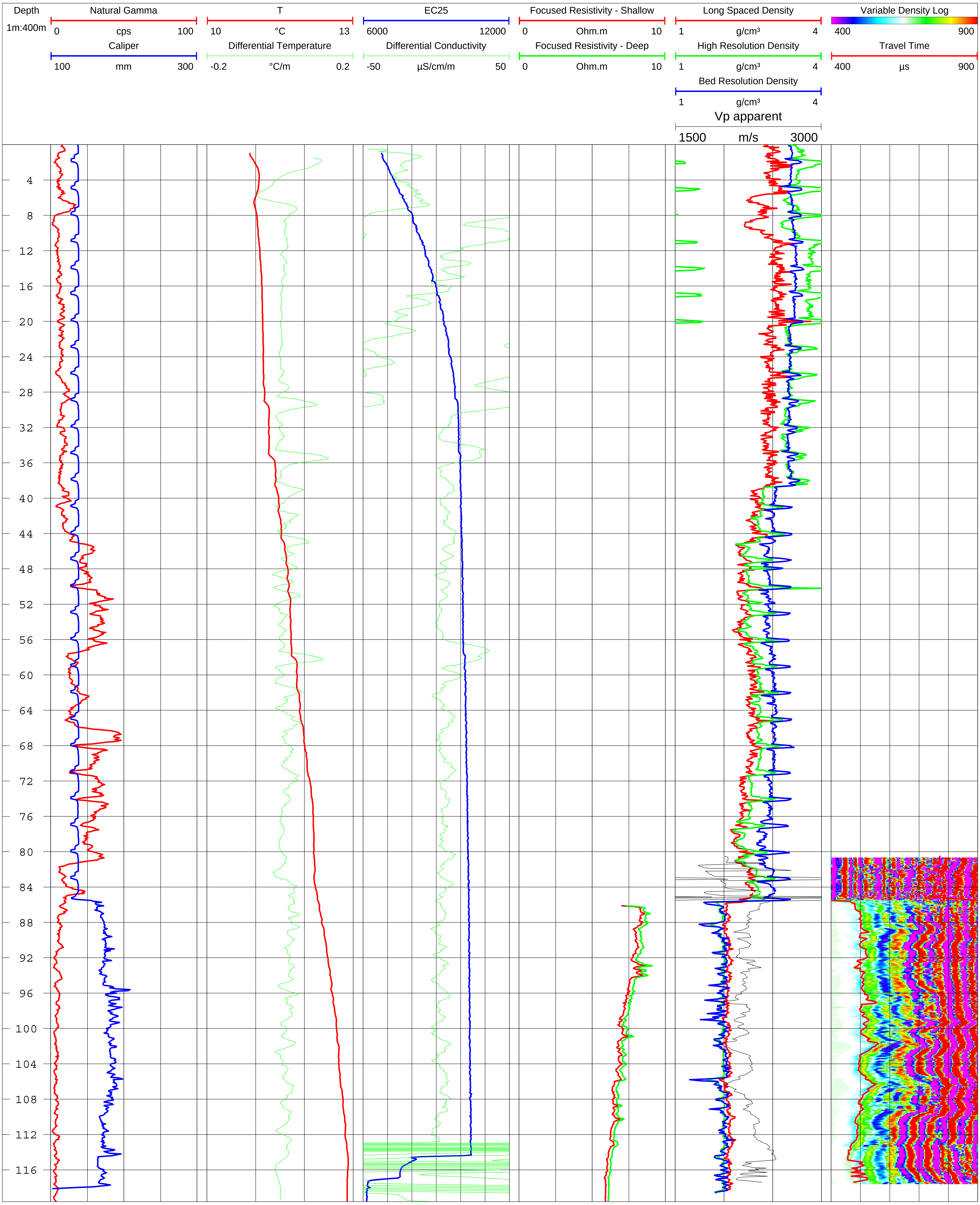

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Figure: SD2010-01 Verticality wrt base of casing 86m

CLIENT:	NNB Generation Company Ltd	DATE:	18.11.10
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: SD2010-01	Logging Datum: Ground Level	ref:	SWC SD2010_01 _vert_A3.wcl

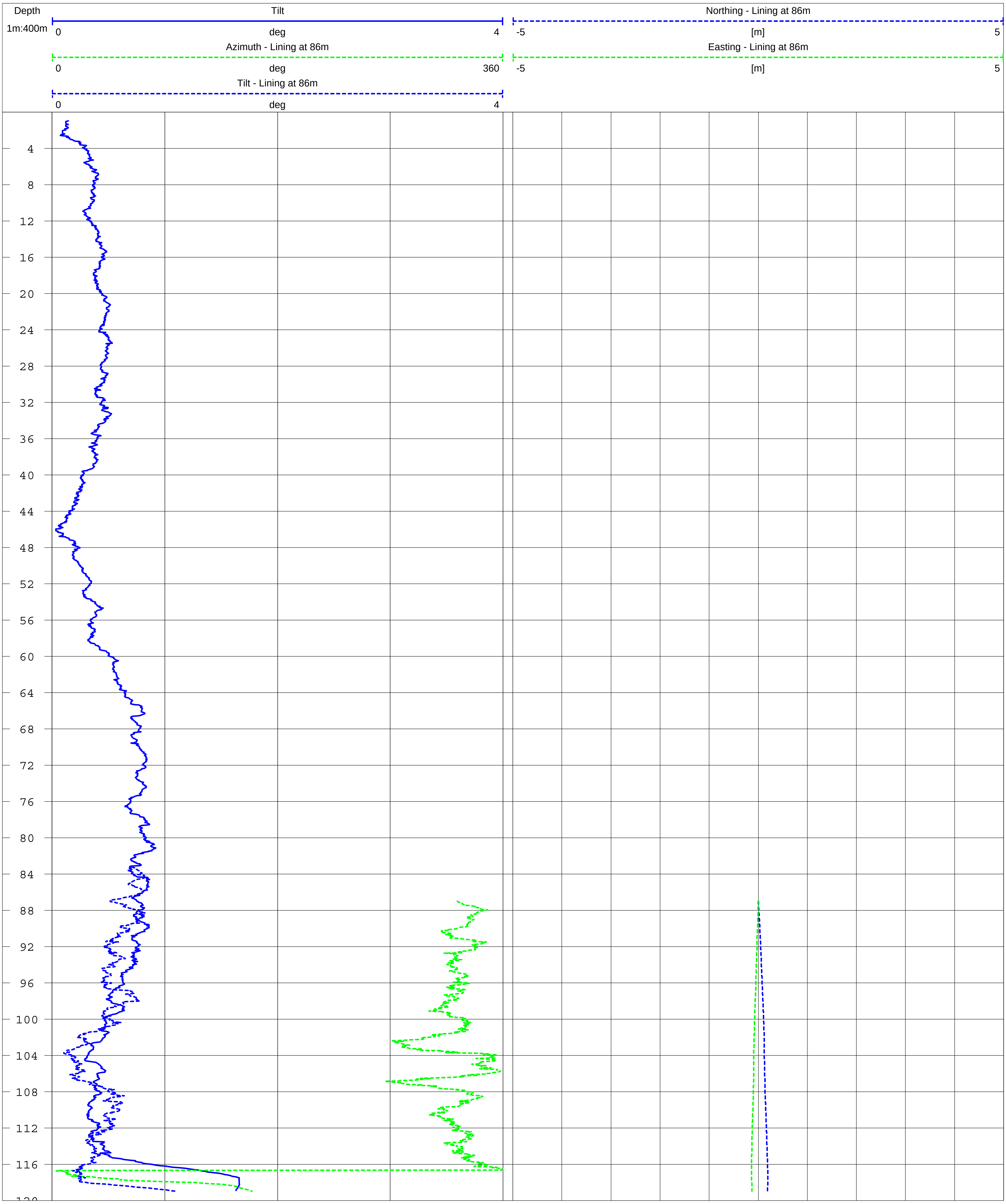

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Figure: SD2010-03 Composite Geophysical Log

CLIENT:	NNB Generation Company Ltd	DATE:	14.12.11
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: SD2010-03	Logging Datum: Ground Level	ref:	SWC_SD20010_03_A3.wcl

Depth 1m:400m	Natural Gamma 0 cps 100 / Caliper 0 mm 200	T 6 °C 13 / Differential Temperature -0.2 °C/m 0.2	EC25 2000 µS/cm 6000 / Differential Conductivity -50 µS/cm/m 50	Focused Resistivity - Shallow 0 Ohm.m 20 / Focused Resistivity - Deep 0 Ohm.m 20	Long Spaced Density 1 g/cm³ 4 / High Resolution Density 1 g/cm³ 4 / Bed Resolution Density 1 g/cm³ 4 / Vp apparent 1500 m/s 3000	Variable Density Log 400 900 / Travel Time 400 µs 900

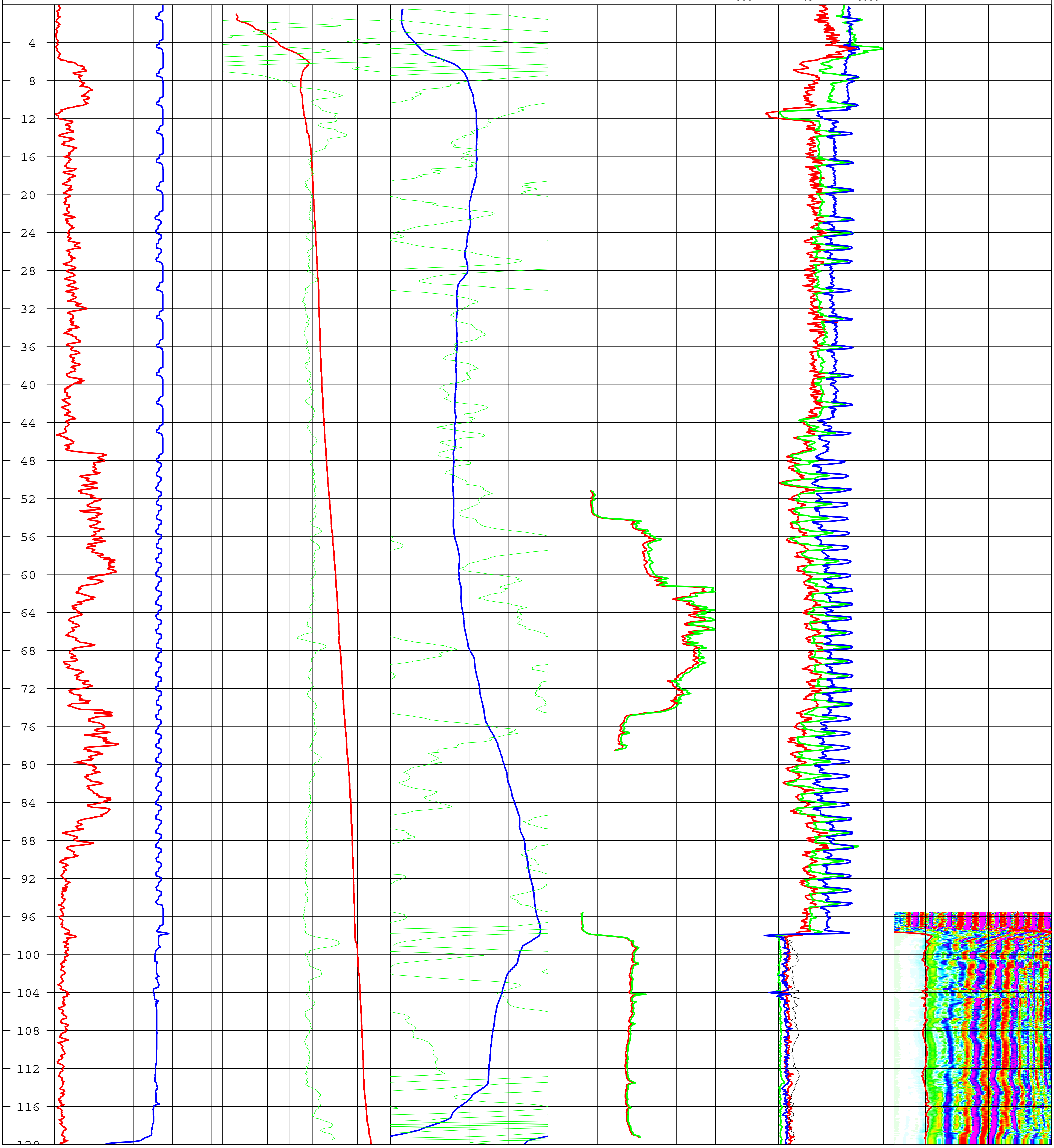

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Figure: Verticality and Deviation Logs

CLIENT:	Soil Mechanics	DATE:	14.12.10
SITE:	Onshore Investigation Phase 1 For sizewell Site	PROJECT:	A0012-10
WELL id:	SD2010_03	Logging Datum: Ground Level	ref: SWC_SD2010_03_vert.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

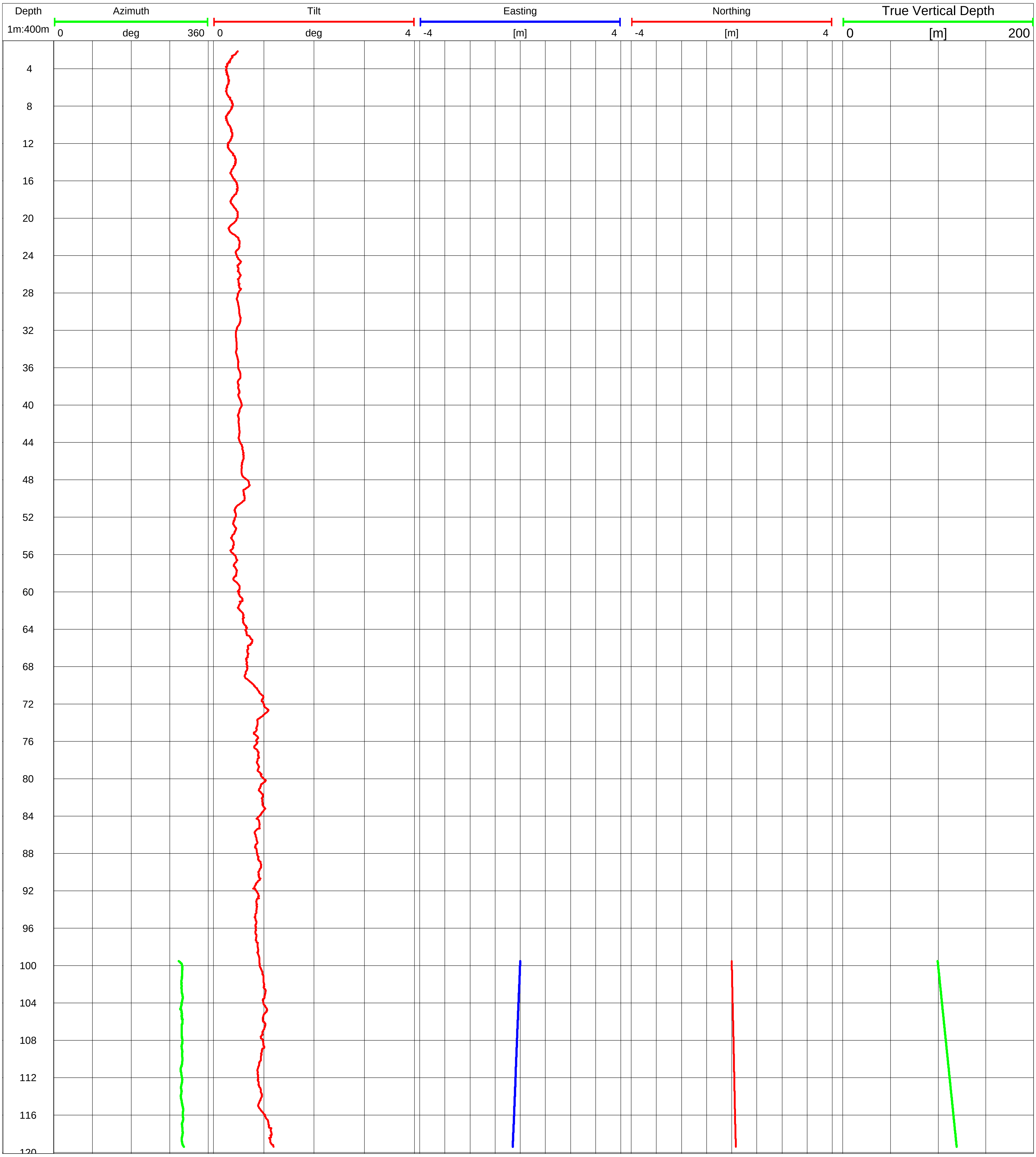

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Figure: DBH2009_01 Plastic Lined Density and Full Wave Sonic Logs

CLIENT:	NNB Generation Company Ltd	DATE:	24.1.11
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: DBH2009_01	Logging Datum: Ground Level	ref:	DBH2009_01_PL_Dn_FWS.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

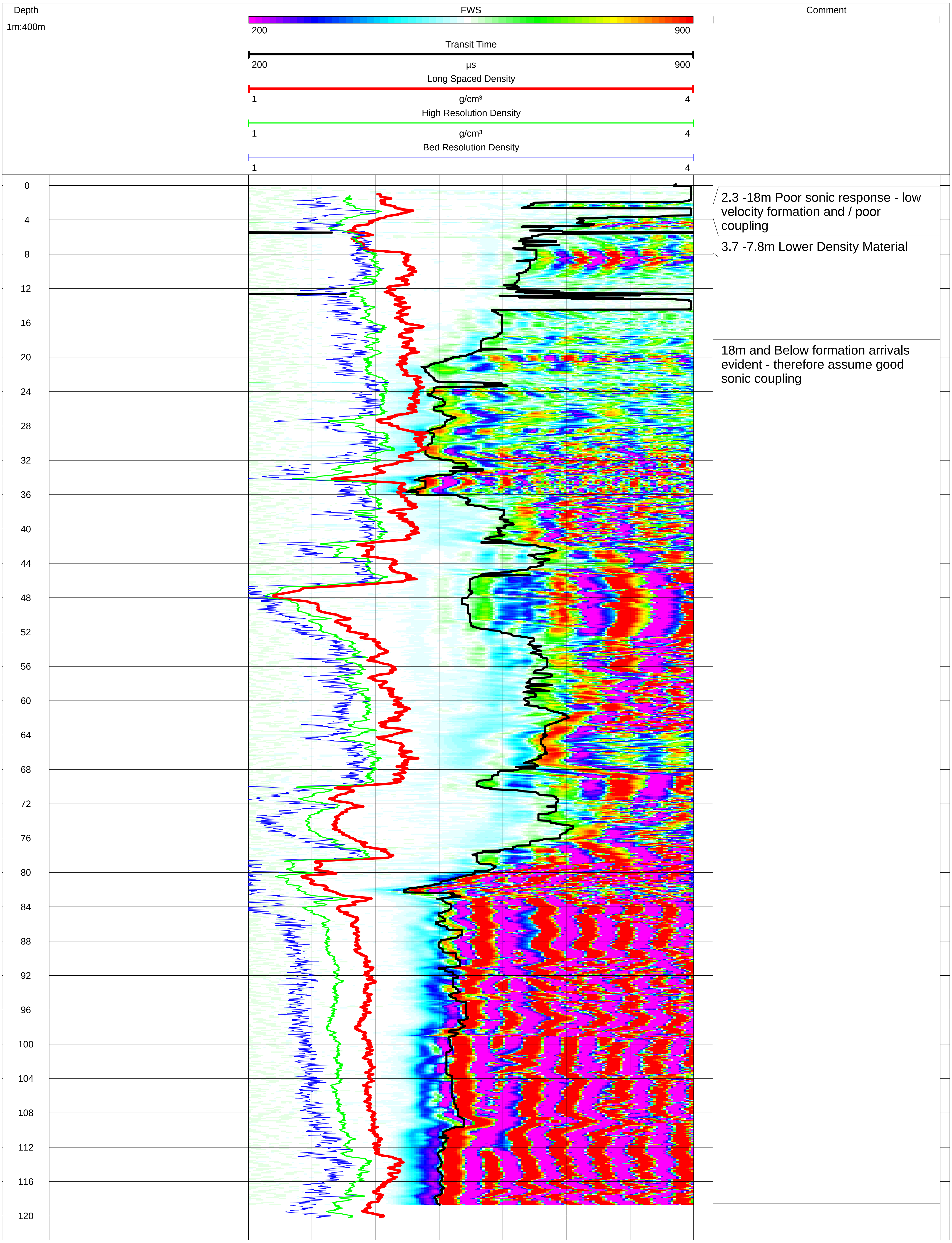

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Figure: Verticality and Deviation Logs -3 runs

CLIENT:	Soil Mechanics	DATE:	4.4.11
SITE:	Onshore Investigation Phase 1 For sizewell Site	PROJECT:	A0012-10
WELL id:	DBH2009_01	Logging Datum: Ground Level	ref: DBH2009_01 PL_vert-3 runs.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

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Figure: DBH2009_02 Plastic Lined Density and Full Wave Sonic Logs

CLIENT:	NNB Generation Company Ltd	DATE:	10.2.11
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: DBH2009_02	Logging Datum: Ground Level	ref:	DBH2009-02_PL FWS Dn.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

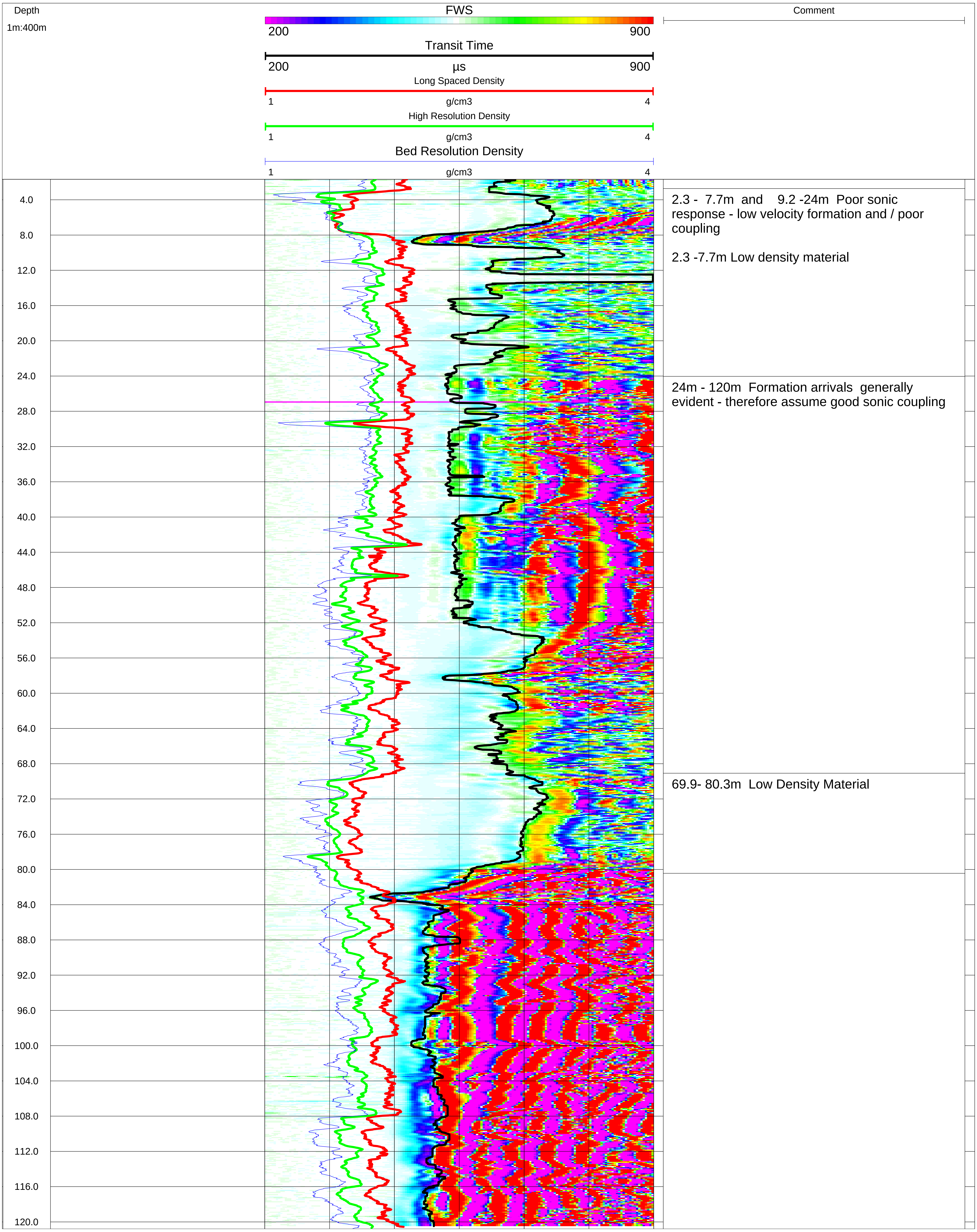

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Figure: Verticality and Deviation Logs - 3 runs

CLIENT:	NNB Generation Company Ltd	DATE:	4.4.11
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id:	DBH2009-02	Logging Datum: Ground Level	ref: DBH2009-02_PL_Vert 3 runs.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

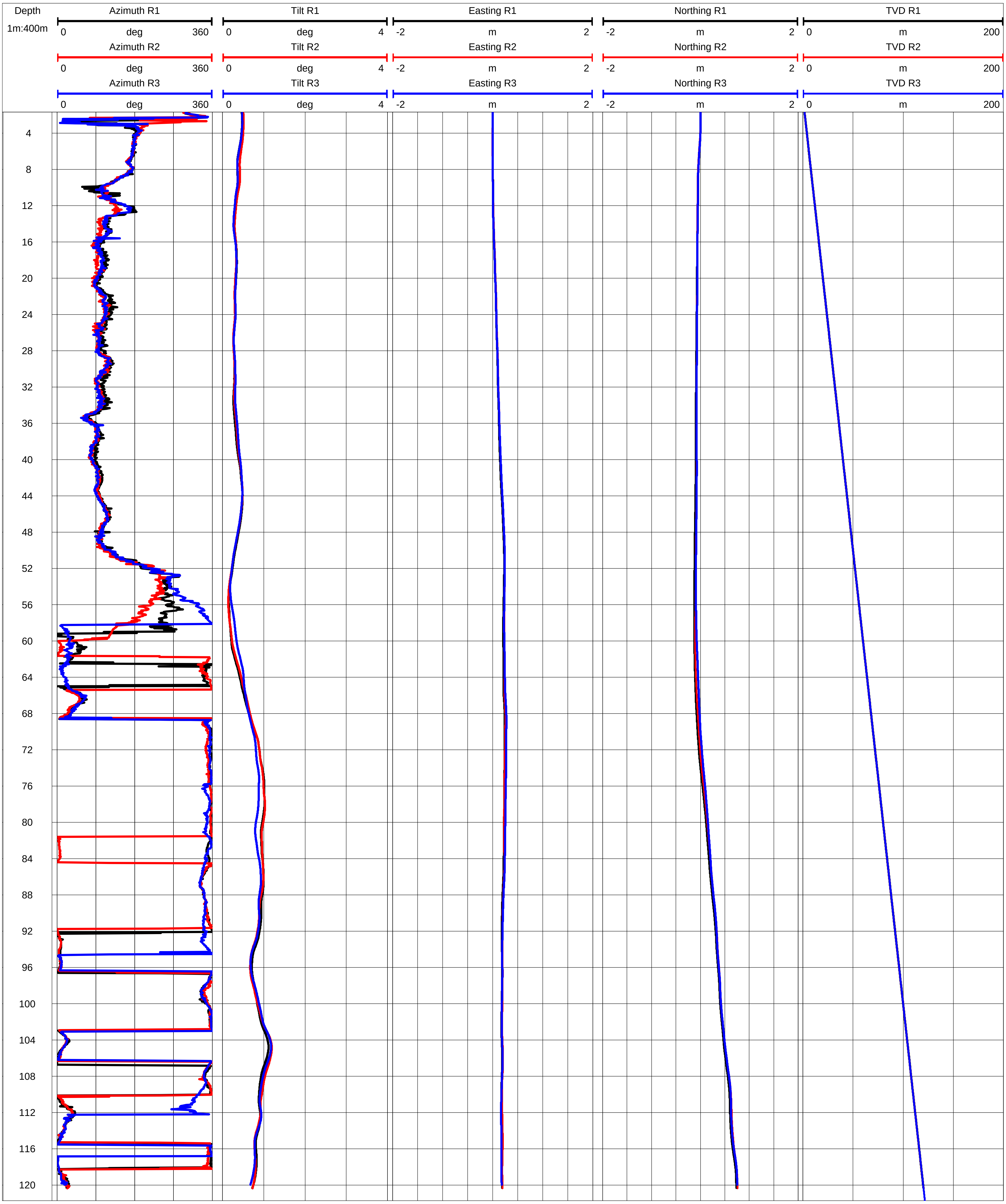

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Figure: SBP2009_02 Plastic Lined Density and Full Wave Sonic Logs

CLIENT:	NNB Generation Company Ltd	DATE:	3.2.11
SITE:	Onshore Investigation Phase 1 For Sizewell Site	PROJECT:	A0012-10
WELL id: SBP2009_02	Logging Datum: Ground Level	ref:	SBP2009-02_PL_Dn_FWS.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.

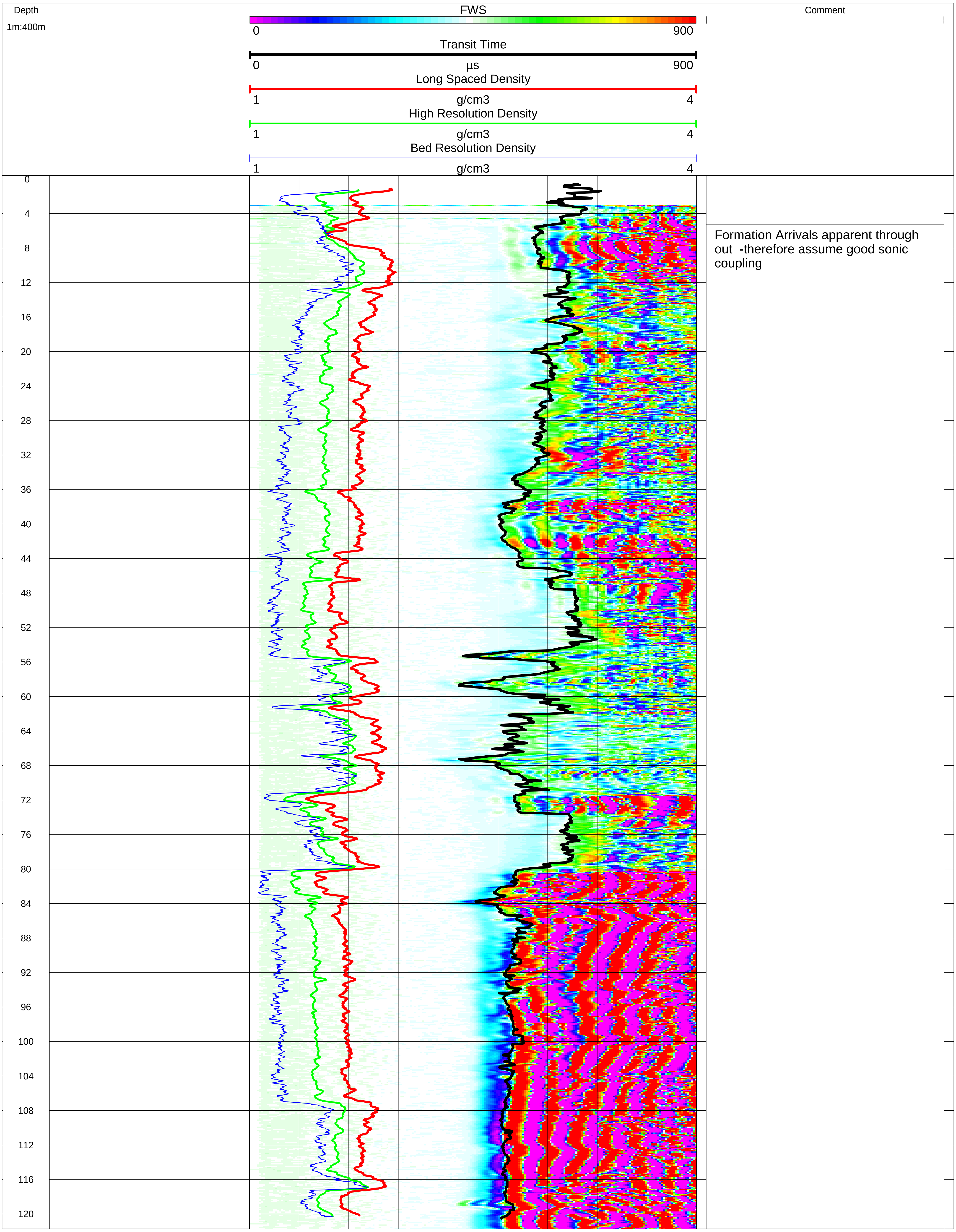

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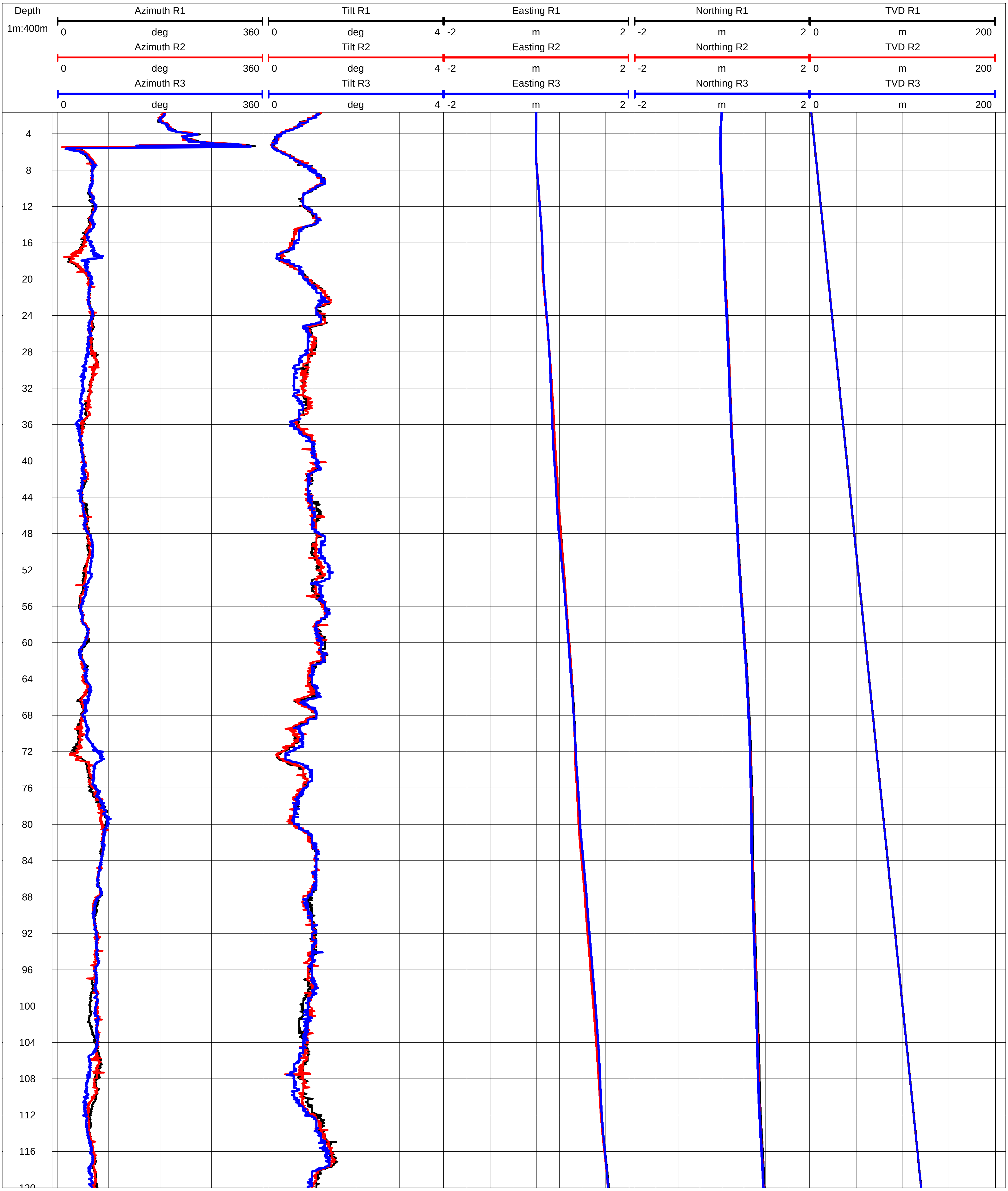
Figure: Verticality and Deviation Logs - 3 runs

CLIENT:	NNB Generation Company Ltd		DATE:	4.4.11	
SITE:	Onshore Investigation Phase 1 For Sizewell Site		PROJECT:	A0012-10	
WELL id:	SBP2009-02	Logging Datum: Ground Level		ref:	SBP2009-02_PL_vert 3 runs.wcl

KEY Cal: Caliper mm, Gam: Natural Gamma api, T: Temperature °C, EC25: Electrical Conductivity µS/cm @25°C, DT&DC: Differential Logs, 0.4m NR: 0.4m Normal Resistivity Ohm.m, 1.6m NR: 1.6m Normal Resistivity Ohm.m, PR: Point Resistance Ohms, SP: Spontaneous Potential mV, LSD: Long Spaced Density g/cm³, HRD: High Resolution Density g/cm³, BRD: Bed Resolution Density g/cm³, Dn: Density - compensated and borehole corrected g/cm³. Vp: P Wave Velocity m/s, Amp: P Wave Aplitude %, TT: Transit Time (sonic) µs, FV: Fluid Velocity mm/s, CCL: Casing Collar Locator mV, pH: Acidity, ORP: Redox Potential mV, DO: Dissolved Oxygen % saturation, N, Nitrate as mg/l -N, r: repeat run, u: up run, d: down run, p: pumped, s: static. AB/WL: Above Water Level. BL/WL: Below Water Level.



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Client:	**NNB Generation Company Ltd**	Log Type: *Optical*
Borehole:	**SM02**	

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

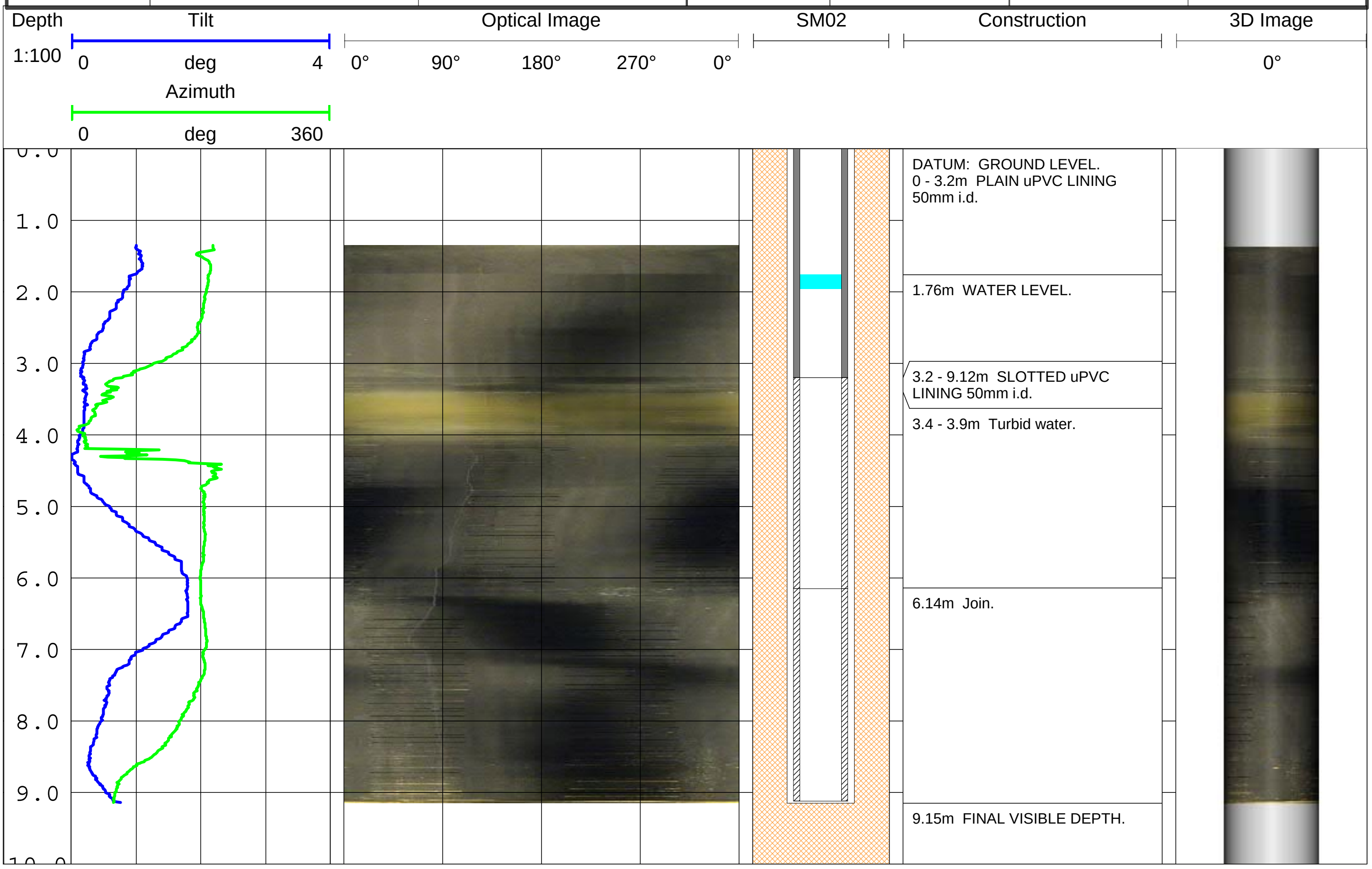
Drilled Depth:	**Unknown**	Date:	**10th August 2010**
Logged Depth:	**9.15m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.35 - 9.15m**		
Fluid Level:	**1.76m**	Ref:	**SWC_SM02_IMAGE_A4.wcl**

BOREHOLE RECORD

Bit	From	To
Unknown		

CASING RECORD

Type	Size	From.	To.
Plain uPVC	**50mm**	**0m**	**3.2m**
Slotted uPVC	**50mm**	**3.2m**	**9.12m**



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Client:	**NNB Generation Company Ltd**	Log Type: *Optical*
Borehole:	**BH5**	

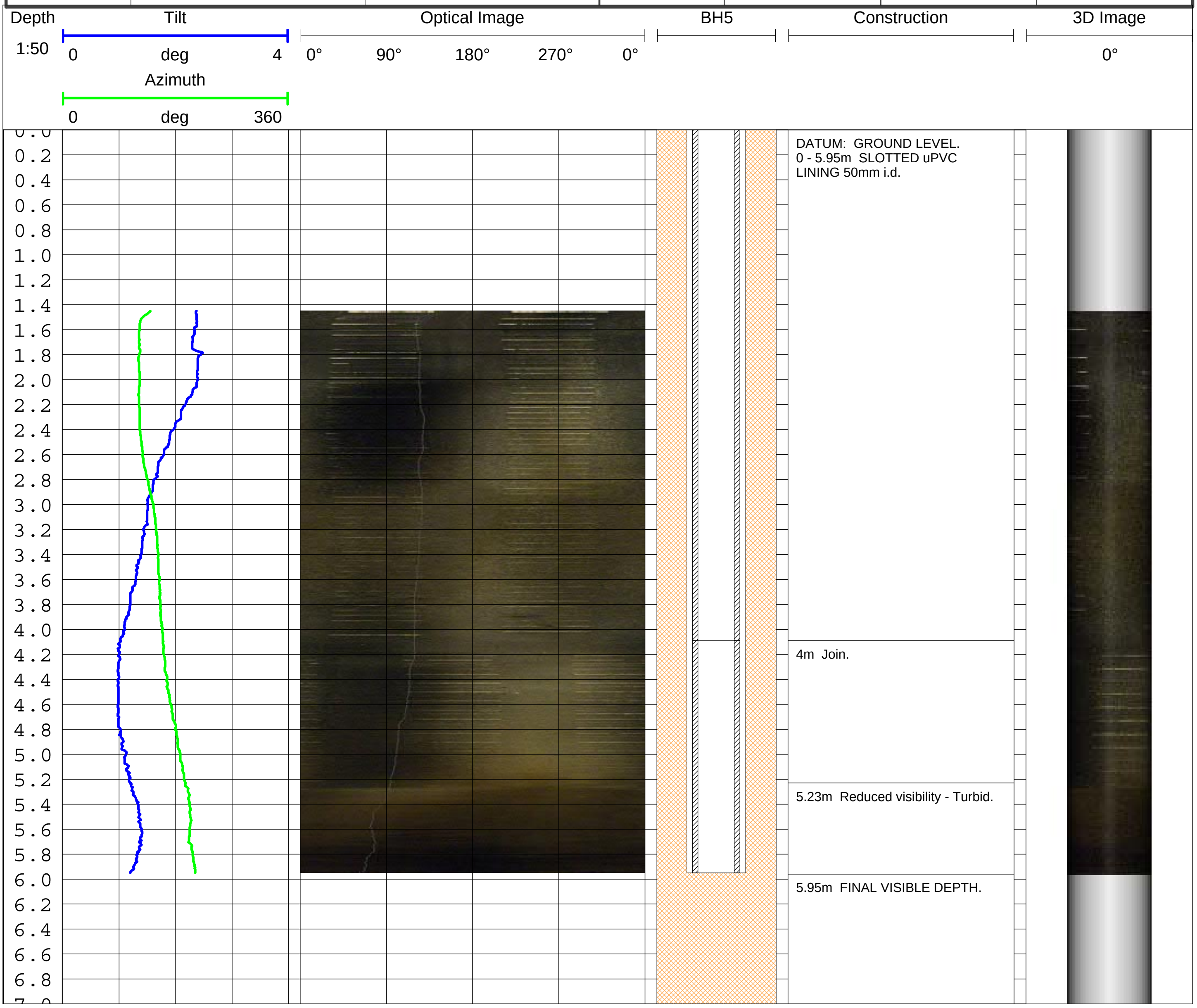
ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

Drilled Depth:	**Unknown**	Date:	**10th August 2010**
Logged Depth:	**5.95m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.45 - 5.95m**		
Fluid Level:	**<1.45m**	Ref:	**SWC_BH5_IMAGE_A4.wcl**

BOREHOLE RECORD		
Bit	From	To
Unknown		

CASING RECORD			
Type	Size	From.	To.
Slotted uPVC	**50mm**	**0m**	**5.95m+**



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Client:	**NNB Generation Company Ltd**	Log Type: ***Optical***
Borehole:	**BH7**	

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

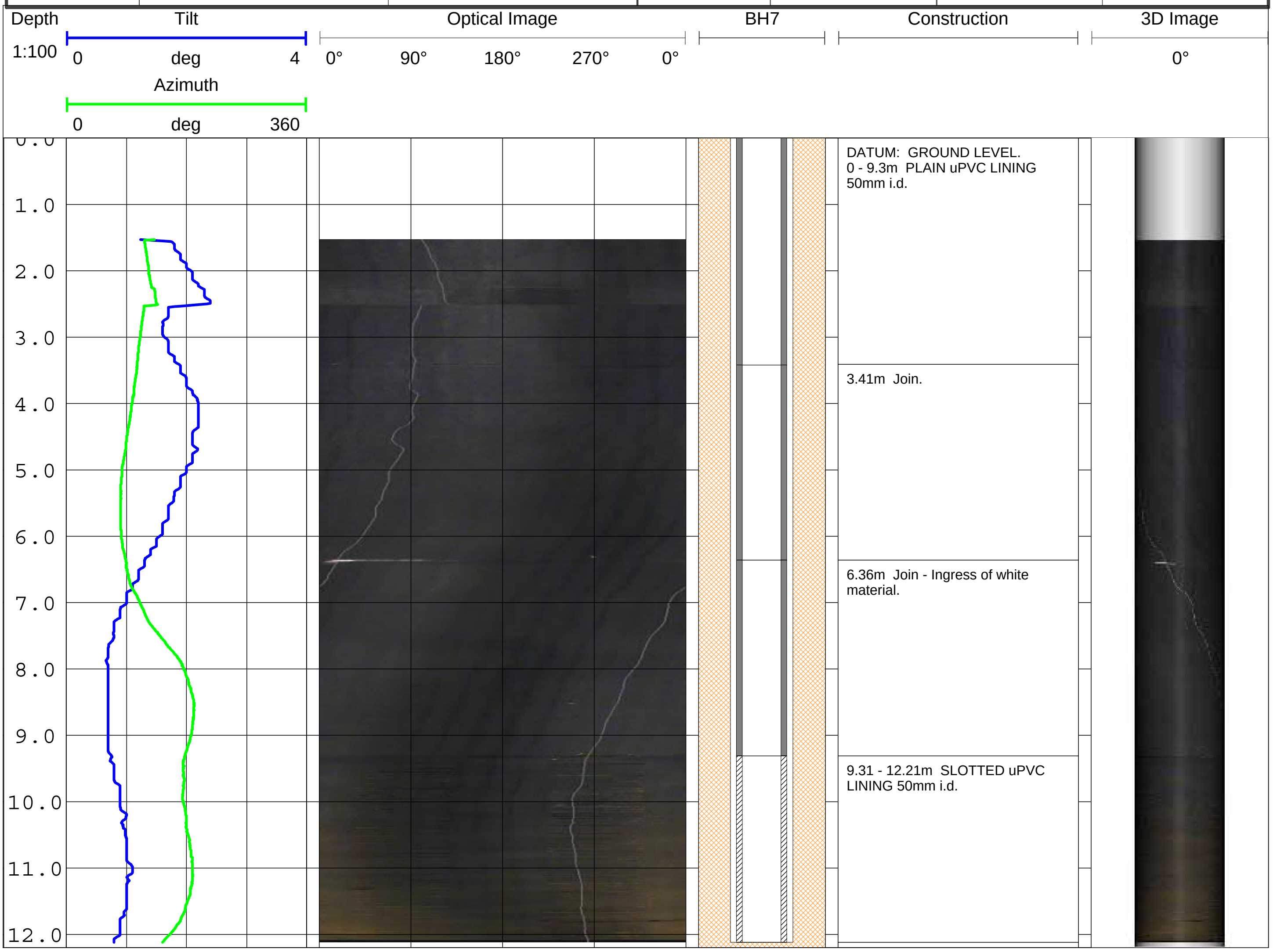
Drilled Depth:	**Unknown**	Date:	**10th August & 5th October 2010**
Logged Depth:	**12.12m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.53 - 12.12m**		
Fluid Level:	**<1.53m**	Ref:	**SWC_BH7_IMAGE_A4.wcl**

BOREHOLE RECORD

Bit	From	To
Unknown		

CASING RECORD

Type	Size	From.	To.
uPVC	**50mm**	**0m**	**9.3m**
Slotted uPVC	**50mm**	**9.3m**	**12.12m+**



EUROPEAN GEOPHYSICAL SERVICES LTD

Client:	**NNB Generation Company Ltd**	Log Type: ***Optical***
Borehole:	**BH12**	

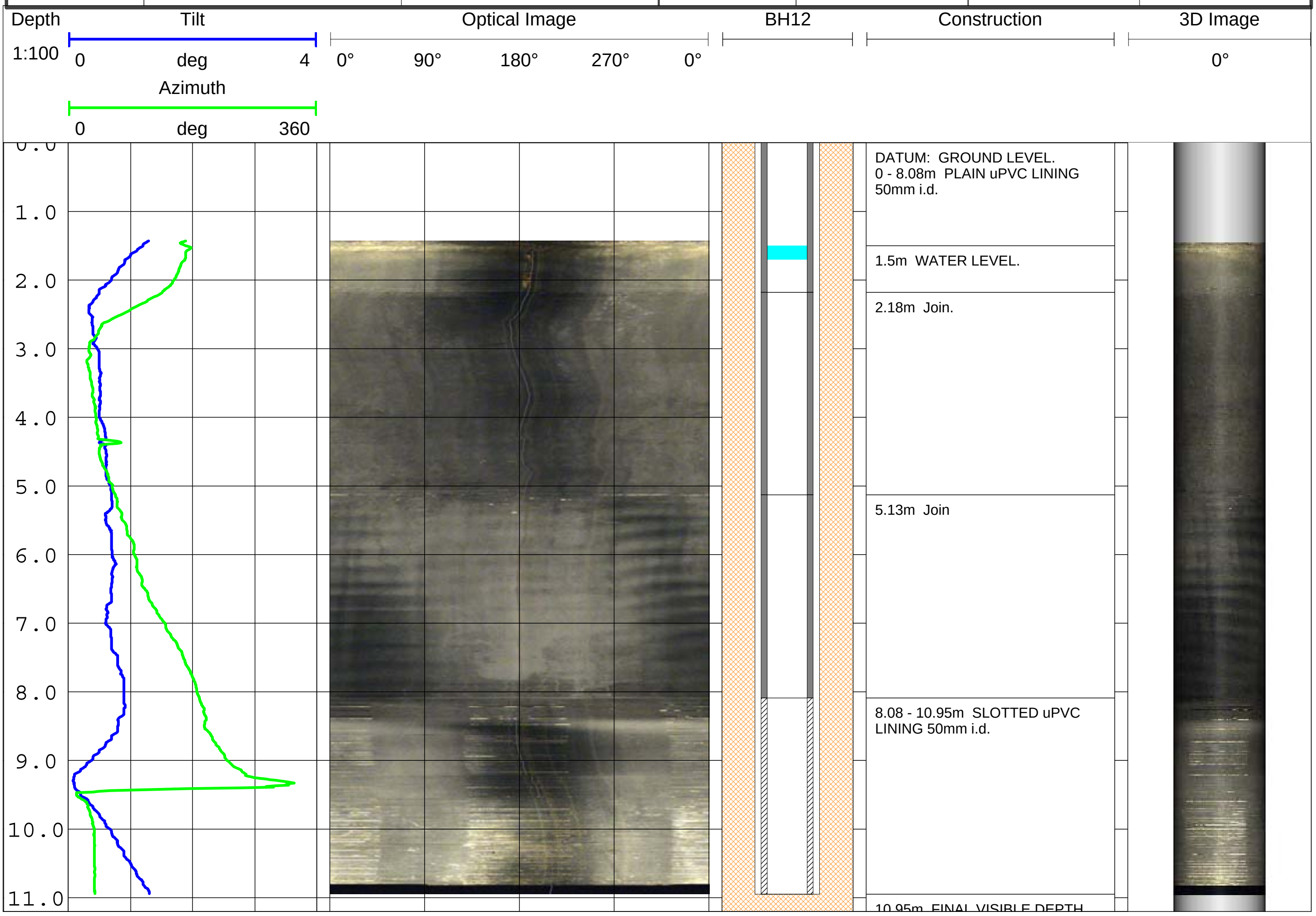
ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

Drilled Depth:	**Unknown**	Date:	**10th August 2010**
Logged Depth:	**10.95m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.43 - 10.95m**		
Fluid Level:	**1.5m**	Ref:	**SWC_BH12_IMAGE_A4.wcl**

BOREHOLE RECORD		
Bit	From	To
Unknown		

CASING RECORD			
Type	Size	From.	To.
Plain uPVC	**50mm**	**0m**	**8.08m**
Slotted uPVC	**50mm**	**8.08m**	**10.95m**



EUROPEAN GEOPHYSICAL SERVICES LTD	
Client: **NNB Generation Company Ltd**	Log Type: ***Optical***
Borehole: **YH02**	

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

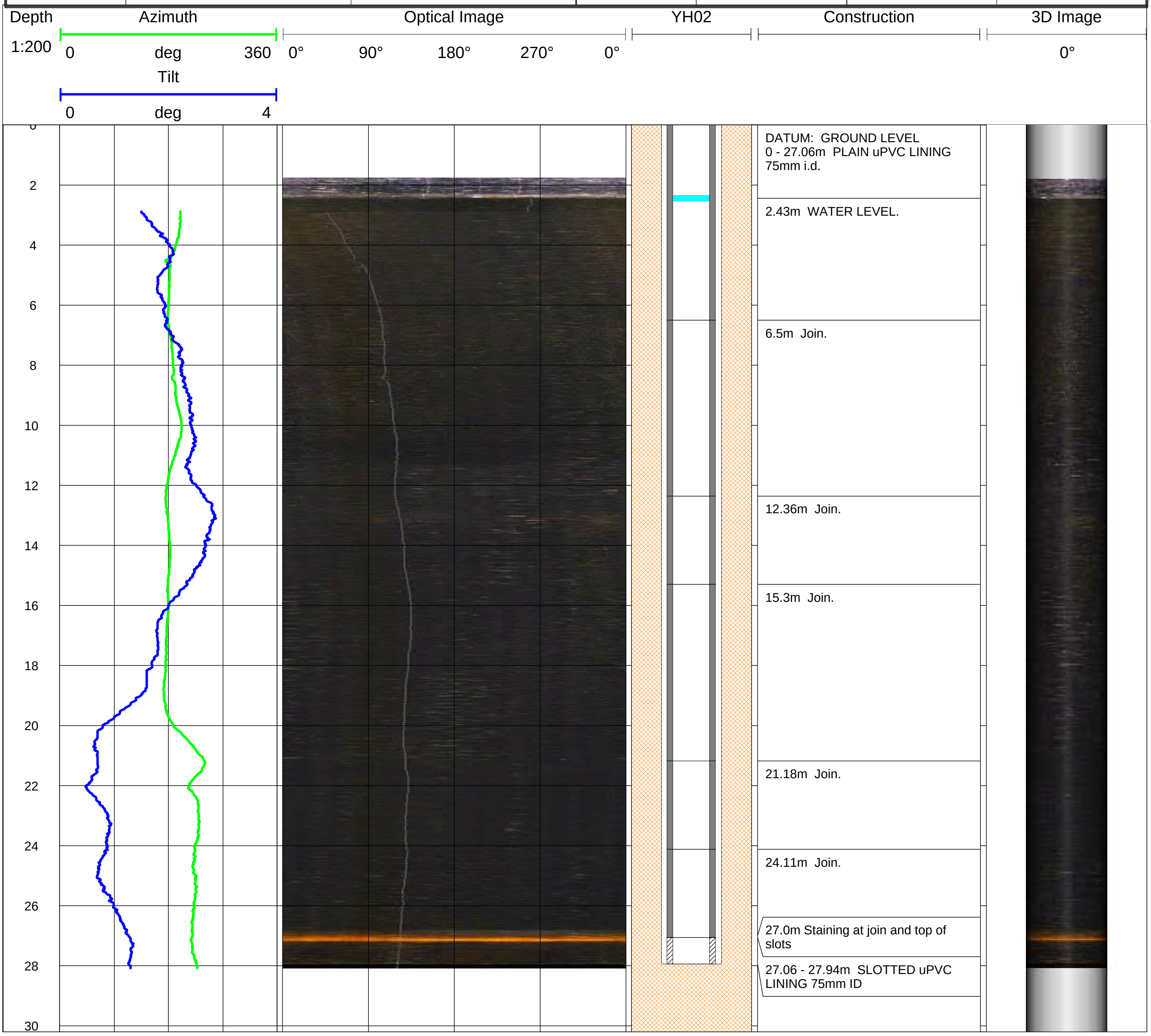
Drilled Depth:	**Unknown**	Date:	**10th Feb 2011**
Logged Depth:		Recorded By:	**Mat Magill**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:			
Fluid Level:		Ref:	**SWC_YH02_IMAGE_A4.wcl**

BOREHOLE RECORD

Bit	From	To
Unknown		

CASING RECORD

Type	Size	From.	To.
Plain uPVC	**75mm**	**0m**	**27.06m**
Slotted uPVC	**75mm**	**27.06m**	**27.94m**



EUROPEAN GEOPHYSICAL SERVICES LTD

Client:	**NNB Generation Company Ltd**	Log Type: ***Optical***
Borehole:	**YG03**	

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

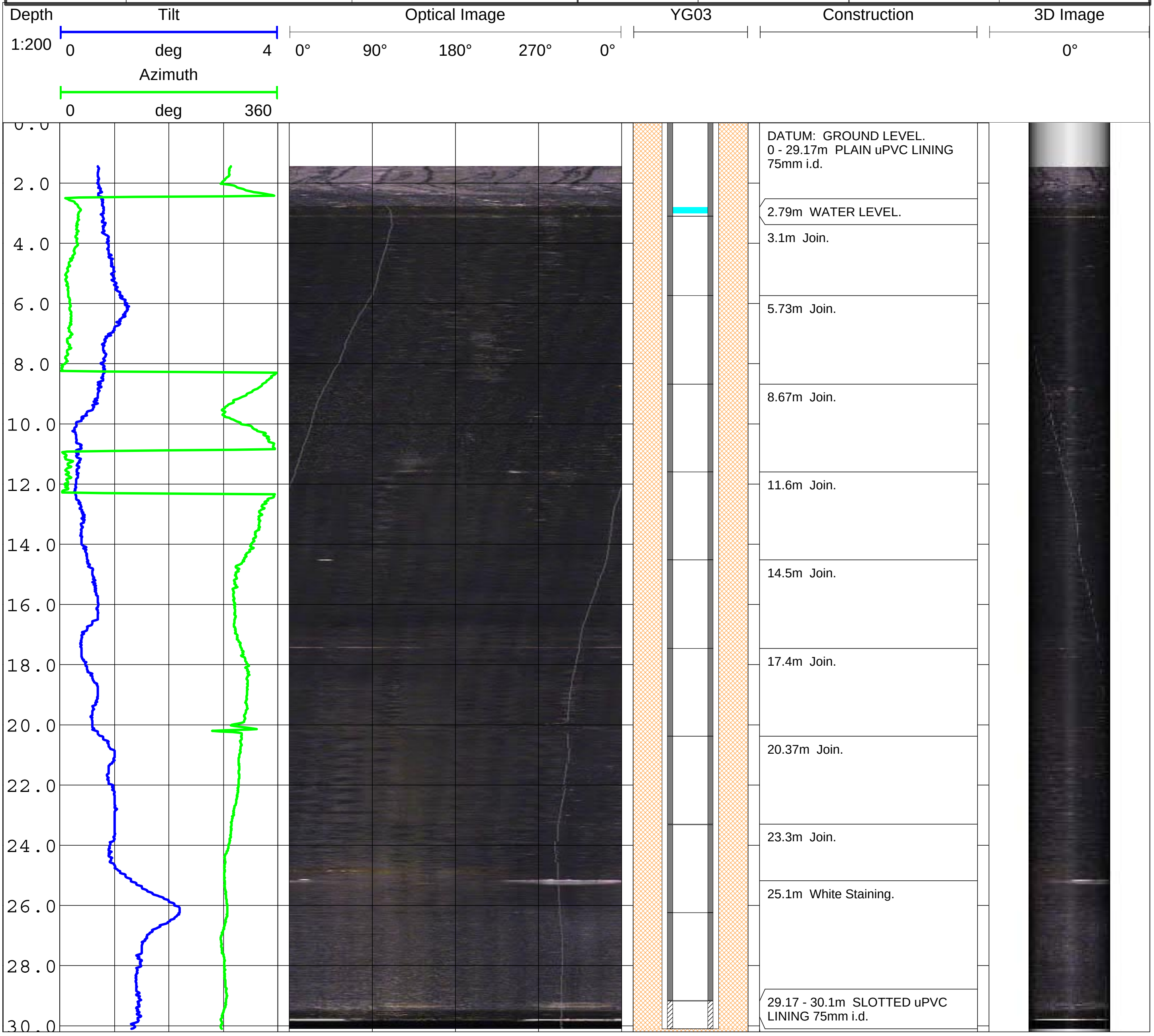
Drilled Depth:	**Unknown**	Date:	**19th Sept & 6th Oct 2010**
Logged Depth:	**30.1m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.43 - 30.1m**		
Fluid Level:	**2.79m**	Ref:	**SWC_YG03_IMAGE_A4.wcl**

BOREHOLE RECORD

Bit	From	To
Unknown		

CASING RECORD

Type	Size	From.	To.
Plain uPVC	**75mm**	**0m**	**29.17m**
Slotted uPVC	**75mm**	**29.17m**	**30.1m**



EUROPEAN GEOPHYSICAL SERVICES LTD	
Client: **NNB Generation Company Ltd**	Log Type:
Borehole: **YG205**	***Optical***

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Location: **Sizewell** Area: **Suffolk** Grid Ref: **TM46** Elevation:

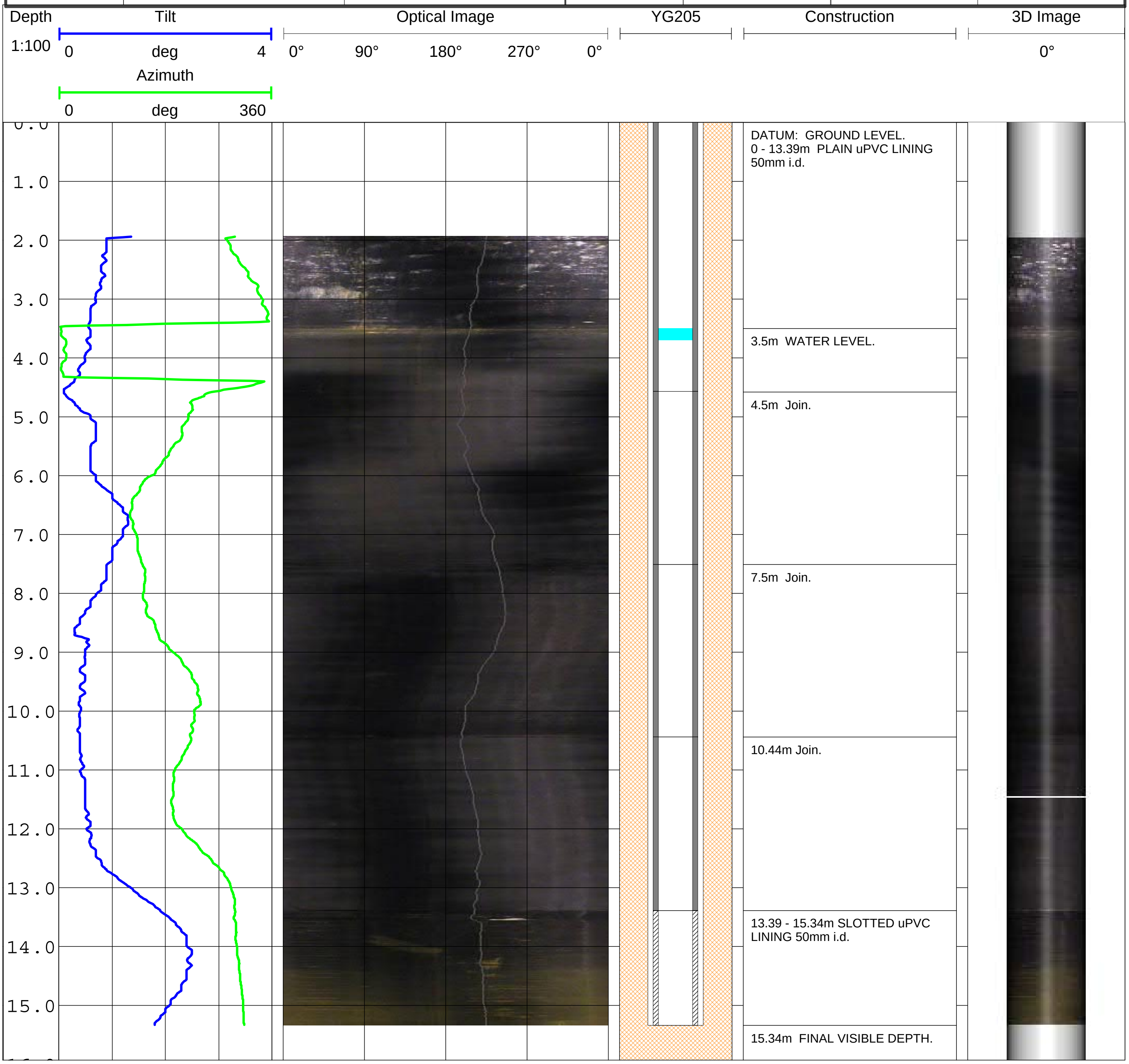
Drilled Depth:	**Unknown**	Date:	**19th Sept & 5th Oct 2010**
Logged Depth:	**15.34m**	Recorded By:	**Rob Jennins**
Logging Datum:	**Ground Level**	Remarks:	
Logged Interval:	**1.9 - 15.34m**		
Fluid Level:	**3.5m**	Ref:	**SWC_YG205_IMAGE_A4.wcl**

BOREHOLE RECORD

Bit	From	To
Unknown		

CASING RECORD

Type	Size	From.	To.
uPVC	**50mm**	**0m**	**13.39m**
Slotted uPVC	**50mm**	**13.39m**	**15.34m+**



APPENDIX

TOOL DESCRIPTION SHEETS

EUROPEAN GEOPHYSICAL SERVICES

Temperature and Electrical Conductivity Tool

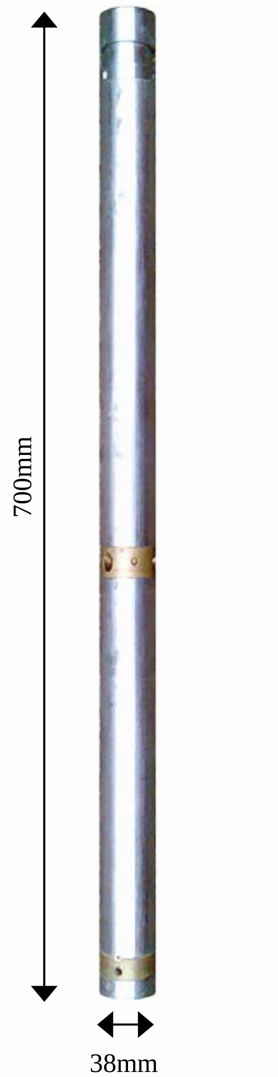
There is a natural geothermal gradient of increasing temperature (T) with depth. This gradient varies with the thermal conductivity of the geological formation and is modified by water flowing in, out or vertically though the borehole.

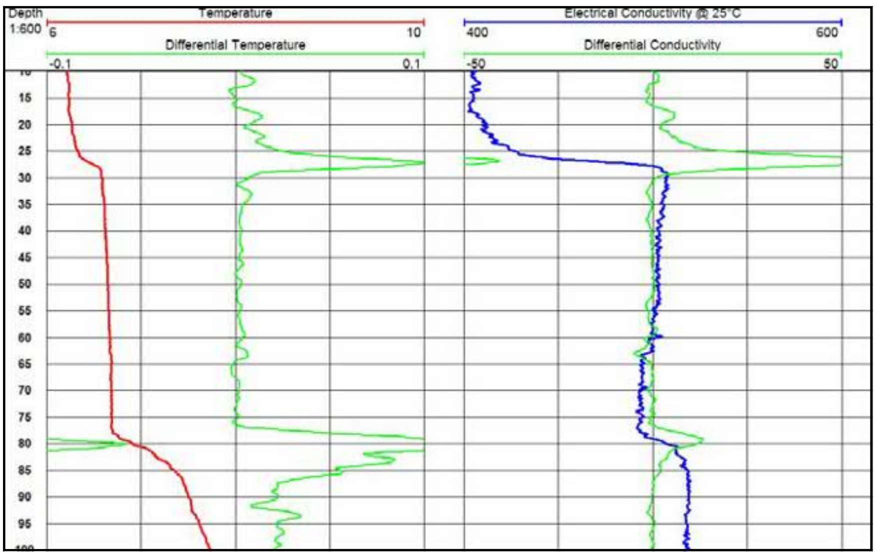
The electrical conductivity (EC) of the water is related to its salinity and dissolved solids and is therefore a measure of the quality of the borehole water. Changes in the log profile indicate inflows or outflows of differing quality waters.

Using data from the temperature log, the electrical conductivity is corrected to 25 °C (EC25).

Differential logs are produced and may be used as an interpretative aid to detect gradient changes.

The boreholes should have been developed and the fluid allowed to approach equilibrium with the groundwater system before logging is carried out





Example Temperature and Electrical Conductivity Log showing points of fissure flow

Specifications

Size:	700m x 38mm
Weight:	3.5kg
Temperature range:	2°-80°C
Conductivity range:	5-50000µS/cm
Max. temperature:	80°C
Max. pressure:	20MPa

Borehole Conditions

Minimum diameter 50mm
Fluid filled
Unlined, or lined

Logging Conditions

2—9 m/min

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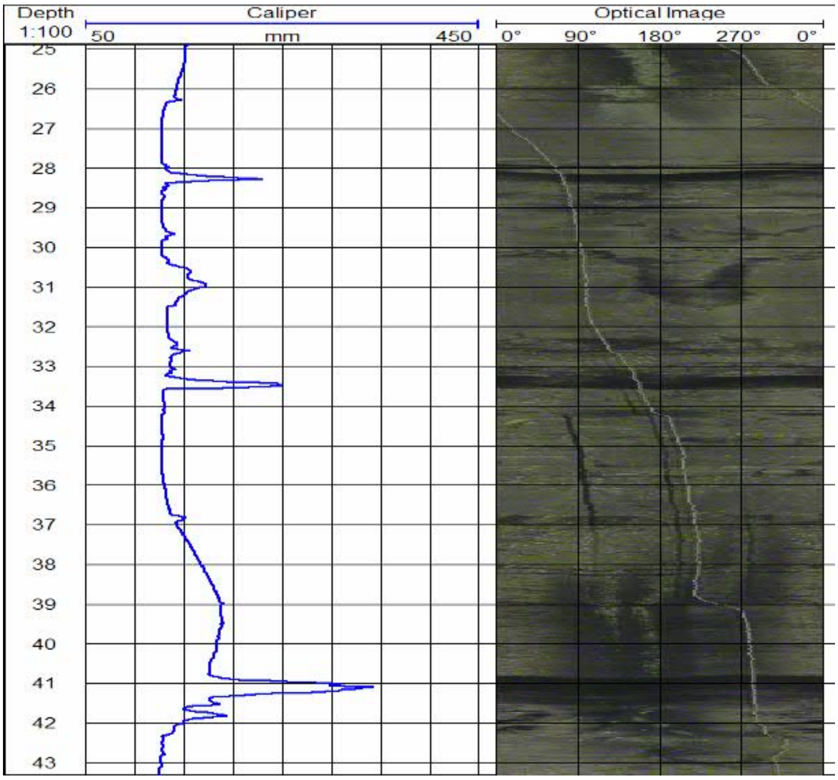
EUROPEAN GEOPHYSICAL SERVICES

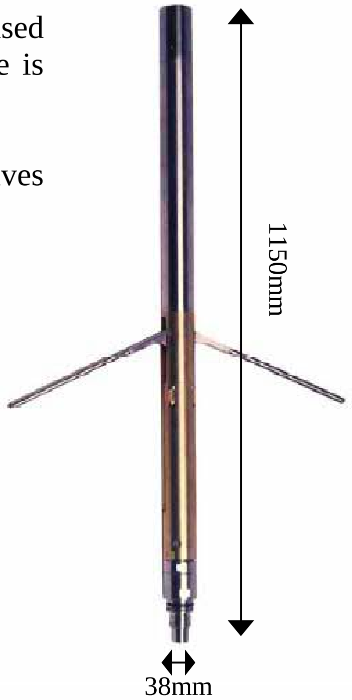
Caliper Tools

These tools measure the mean diameter of boreholes. They are used to check the integrity of borehole linings, and where a borehole is unlined to identify zones of washout, breakout or fissures.

For narrower boreholes (<400mm) the 2 or 3 arm caliper gives greater resolution than the 4 arm caliper.



Example caliper log showing fractures in sandstone seen in the optical image to the right



Specifications	**2 or 3 Arm Caliper**	**4 Arm Caliper**
Size:	1150 x 38mm	1180 x 80mm
Weight:	6kg	18kg
Range:	50 - 600mm	100 - 1500mm
Max.temperature:	80°C	80°C
Max. pressure:	20MPa	20MPa

Logging Conditions
2 - 9 m/min
Free running

Borehole Conditions
Dry or fluid filled
Unlined or lined

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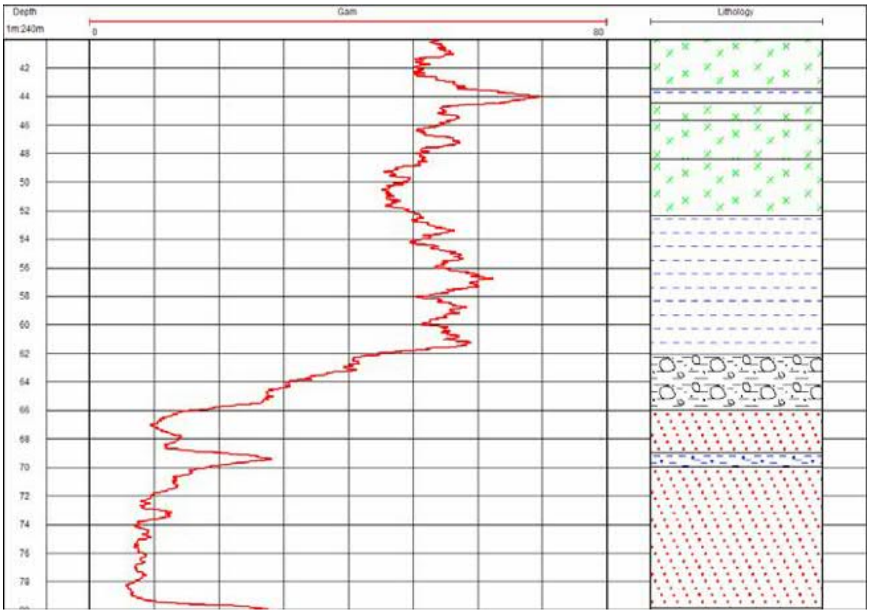
Natural Gamma Tool

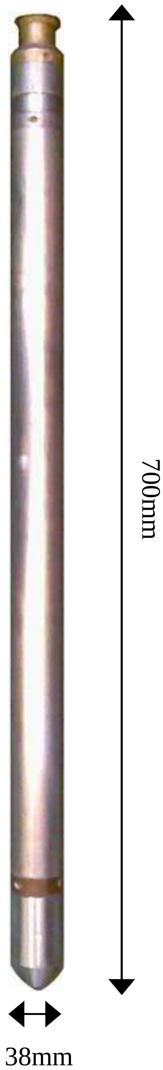
This tool measures the naturally occurring gamma radiation found in rocks and sediments from Potassium^{40}, Urainiuim^{238} and Thorium^{232}.

Clay formations tend to have a high concentration of minerals that contain potassium.

The higher the concentration of these clay minerals the greater the responses on the natural gamma log.



Lithological identification based on a natural gamma log



Specifications

Size:	700 x 38mm
Weight:	3.5kg
Detector (NaI):	25 x 50mm
Max. temperature:	80°C
Max. pressure:	20MPa

Borehole Conditions

Minimum diameter 50mm
Dry or fluid filled
Unlined, steel or plastic lined

Logging Conditions

2 - 9 m/min
Free running

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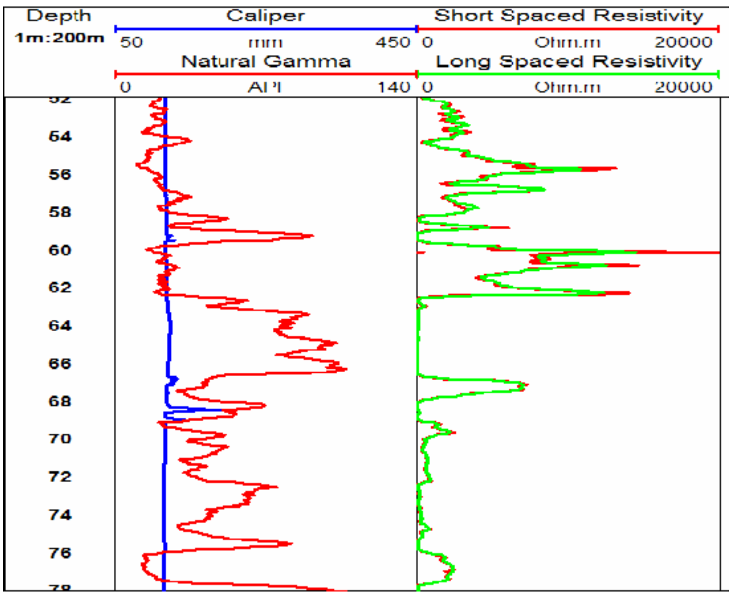
Dual Spaced Focused Resistivity Tool

38mm

This tool measures the resistivity of the material surrounding the borehole.
The Focused Resistivity tool provides resistivity logs with finer vertical resolution and a deeper depth of investigation than a Normal Resistivity tool.
Performance is also improved in higher conductivity mud, saline water and higher resistivity formations.

The response of this log is a function of porosity, mineralogy and pore water quality.

In metal lined boreholes the resistivity can give qualitative information on the condition of the casing and may be used to identify areas of increased corrosion or encrustation.



Example focused resistivity log showing increased resolution over a normal resistivity tool

Specifications

Size:	2370 x 38mm
Weight	7.0 kg
Range:	1 to 10,000 Ohm.m
Max. temperature:	80ºC
Max. pressure:	20MPa

Logging Conditions
4 - 9 m/min
Free running

Borehole Conditions
Minimum diameter 50mm
Fluid filled
Unlined

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www.europeangeophysical.com
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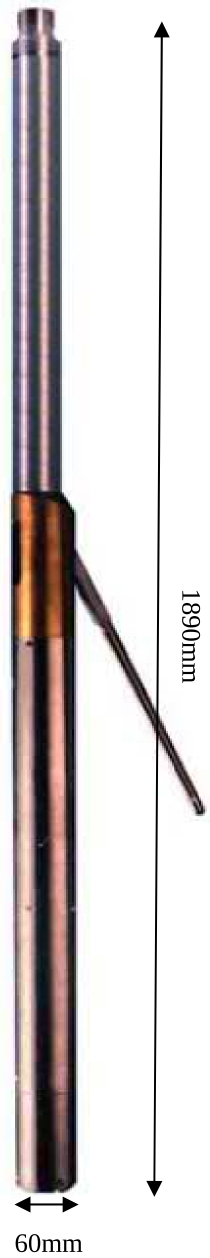
Formation Density Tool

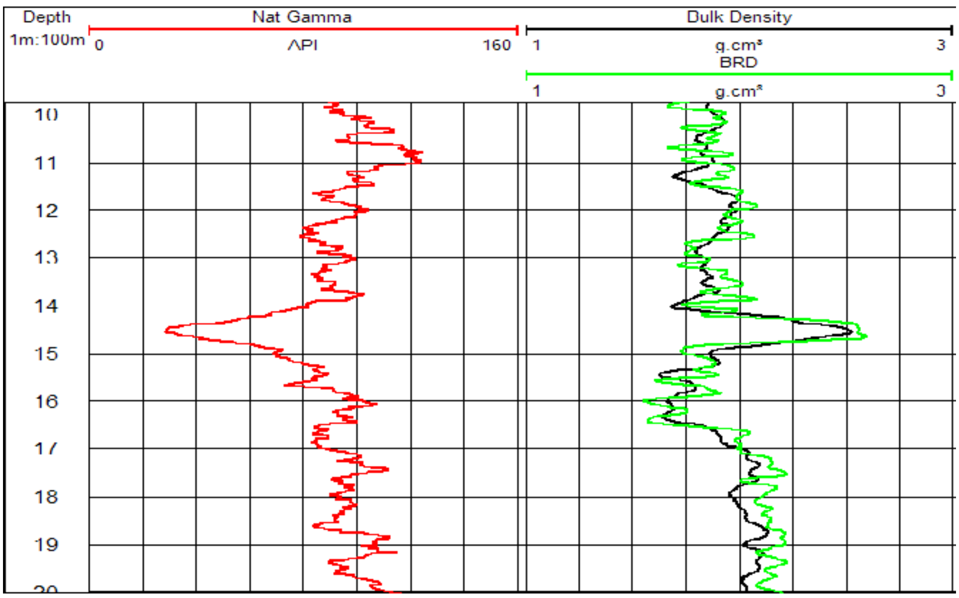
The Formation Density Tool has three collimated detectors at different spacings from a source of gamma radiation. The collimated tool and side-walled running minimise the effects of diameter variations and fluid type. The logs from each detector indicate the apparent density of the formation within a radius of investigation related to the spacings.
The Long Spaced Density has a spacing of 48cm, the High Resolution Density has a spacing of 24cm and the Bed Resolution Density has a spacing of 14cm.

The Bed Resolution Density (BRD) log has high resolution but very shallow penetration (2 - 3cms) and is very responsive to formation changes, diameter variations and borehole construction.

The High Resolution Density (HRD) has a greater penetration than the BRD, up to around 10cms in medium density formations.

The Long Spaced Density (LSD) has the greatest depth of investigation of up to 20cms, but least resolution.





Formation density log correlating with a natural gamma log. Note higher resolution in BRD log detecting thin beds.

Specifications		**Borehole Conditions**	**Logging Conditions**
Size:	1890 x 66mm	up to 300mm	2 - 5 m/min
Weight:	28kg	Fluid filled or **dry***	Side-walled
Max. temperature:	80°C	Unlined or **lined***	
Max. pressure:	20MPa		

***In dry or lined sections of boreholes, these logs give qualitative information on the density of the material surrounding the tool, the logs are expressed in terms of apparent density in g.cm³.**

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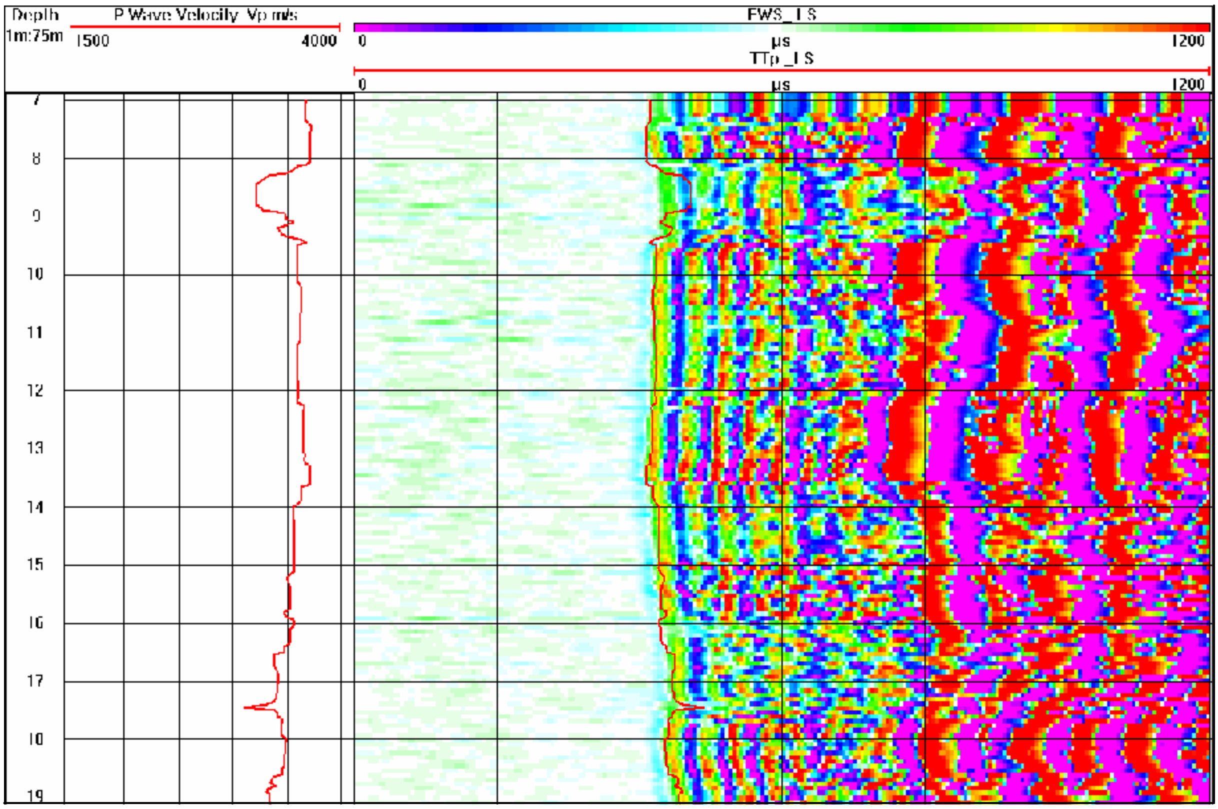
Sonic Tool - Full Wave Log

This tool has been specially designed to provide a full wave-form recording of sonic signals and uses fixed spaced transmitter – receivers. The received signals are digitised at a fast sampling rate resulting in high resolution data. The data may be processed for P wave velocity (or transit time) and amplitude. Estimates of S wave velocity may be obtained under suitable formation and borehole conditions. The P wave velocity log may be used for identifying variations in hardness and porosity. **This log can only be achieved in fluid filled unlined boreholes.**



Example Full Wave Sonic Log showing P Wave first arrivals and P Wave Velocity in meters per second

Specifications
Size: 1.9m x 60mm
Weight: 22kg
Sampling rate: Variable (500samples at 4ms or slower)
Resolution: 16 bit; Record length: min 2 ms
Gain settings: 16 levels
Max. temperature: 80°C
Max. pressure: 20MPa

Borehole Conditions
Diameter up to 300mm
Water filled
Unlined

Logging Conditions
2 - 5 m/min
centralised

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Optical Imager Tool

A precision-machined prism and CCD camera assembly permits a high definition optical image of the borehole wall to be captured in a variety of horizontal and vertical resolutions.
The resulting image is digitised in the tool for transmission to the surface acquisition system.

The image is then orientated to North and displayed as an unwrapped image log. This enables a detailed structural interpretation to be made if required.

For the best results the optical imager should be run above the water level or in clean, clear fluid.

The logging tool is centralised during data acquisition by two sets of bow-springs, which are adjusted for a variety of borehole diameters.

The image is viewed and recorded on the way down the borehole so as to limit disturbance to the clarity of any water that is present.

The orientation system employs a flux gate magnetometer and therefore data within approximately one metre of magnetic steel casing is un-orientated.

Specifications

Size:	1780 x 60mm
Weight:	7kg
Tilt:	0° - 90°
Azimuth:	0° - 360°
Vertical resolution:	User defined up to 0.5mm
Horizontal resolution:	User defined up to 720 pixels/360°
Colour resolution:	24 bit RGB
Max. temperature:	70°C
Max. pressure:	20MPa

Borehole Conditions
Minimum diameter 75mm
Maximum diameter 250mm
Dry or **clear** water filled
Unlined

Logging Conditions
0.5 - 2 m/min
Centralised

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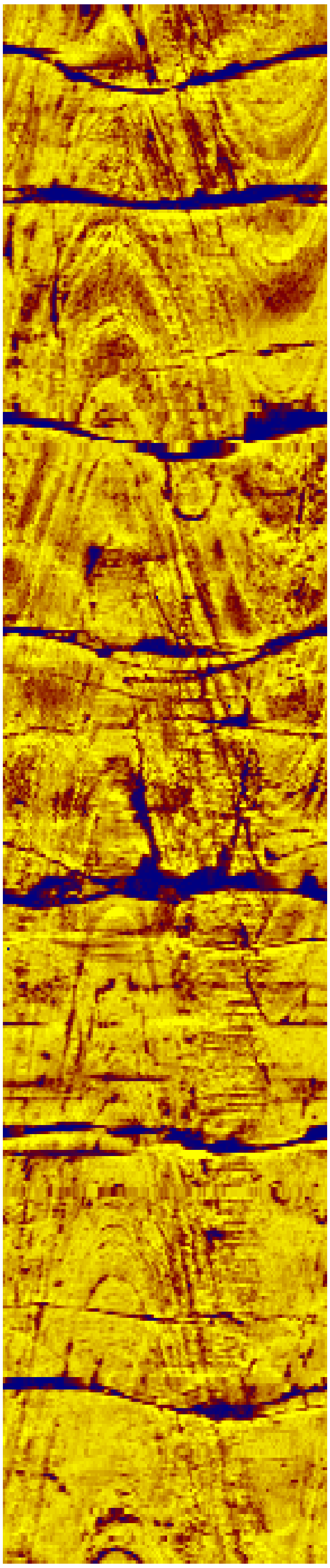
Acoustic Imager (Televiewer) Tool



The Acoustic Imager produces an image of the borehole wall using the travel time and amplitude of an acoustic signal transmitted and received by a rotating ultrasonic sensor in the tool.

The variance of the acoustic properties of the formation and associated features enable the nature of fractures, fissures, veins, bedding planes and lithology changes to be determined.

The acoustic image on the right shows both fractures and steeply dipping bedding.

.

The image is then orientated to Magnetic North and displayed as an unwrapped image log. This enables a detailed structural interpretation to be made, if required.

The logging tool is centralised during data acquisition by two sets of bow-springs, which are adjusted for a variety of borehole diameters.

The image is viewed on the way down the borehole to allow fine tuning of the acquisition parameters. The settings are then adjusted and the image is recorded on the way up the borehole.

Specifications

Size:	2100 x 60mm
Weight:	8kg
Tilt:	0°- 90°
Azimuth:	0° - 360°
Vertical resolution:	User defined up to 0.5mm
Horizontal resolution:	User defined up to 288 measurements/revolution
Rotation speed:	up to 10 revolutions per second
Caliper resolution:	Better than 0.1mm
Max. temperature:	50°C
Max. pressure:	20MPa

Borehole Conditions
Minimum diameter 76mm
Maximum diameter 250mm
Cored or rotary drilled boreholes
Fluid filled, unlined

Logging Conditions
0.5 - 2 m/min
Centralised

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ENCLOSURE D

SURFACE GEOPHYSICAL SURVEY TRIALS

SM Pelorus Surveys Report Report No. L0224-10/1

Pelorus Surveys

Report No L0224-10/1

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

REPORT ON SURFACE GEOPHYSICAL SURVEY TRIALS

Carried out for:
NNB Generation Company Limited

October 2010

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Soil Mechanics Pelorus Surveys part of Environmental Scientifics Group

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

REPORT ON SURFACE GEOPHYSICAL SURVEY TRIALS

Report No: **L0224-10/1**

Date: **October 2010**

Client:

NNB Generation Company Limited
40 Grosvenor Place
Victoria
London
SW1X 7EN

Rev No	Date	Details
0	September 2010	Report as submitted
1	October 2010	Revised following additional borehole data

C O N T E N T S

1 INTRODUCTION

In February 2010 Soil Mechanics (SM) were commissioned by NNB Generation Company Limited (NNB), to carry out a geotechnical investigation at the site of the proposed Sizewell C power station near Leiston, Suffolk. The scope of the investigation, defined by NNB and summarised in SM Report A0012, included seismic profiles, with the suggestion that a surface wave seismic method be considered. In SM's Tender, continuous surface wave profiling was offered with the suggestion that a trial should be carried out to assess the method. It was further suggested that electrical resistivity tomography be considered as an alternative method. Following a meeting on site on 22 June 2010, SM were instructed to carry out a comparative trial of these two methods along a designated profile line.

The investigation was carried out in accordance with Method Statements submitted by SM and approved by NNB and the fieldwork was carried out by Soil Mechanics Pelorus Surveys, a specialist department of SM, on 11 and 23 to 25 August 2010

This report presents the factual records of the fieldwork together with an interpretation of the findings with respect to the proposed objectives.

2 THE SITE AND GEOLOGY

2.1 The Site

The site of the proposed Sizewell C power station is situated 3 km east of Leiston, Suffolk at National Grid reference TM 470 640, see Site Location Plan, Fig 1, Enclosure A.

Drawing No L0224-10/1/01, Enclosure A, shows a plan of the site including the traverse lines proposed for surface geophysical profiling. The majority of the site to the west of a 7 m high bund constructed of Made Ground is essentially flat at a ground level of approximate 1.5 m OD. Traverse GEO1 crosses an extensive area of hard standing before crossing variously grassed, densely vegetated areas, the bund and the beach. Traverses GEO2 and GEO3 are similar in character, see below and Traverse GEO4 crosses a flat grassed area before climbing the bund. Traverses GEO5 and 6 are located on the foreshore.

Traverse GEO3 was chosen for the comparative trial. At the time of the surface geophysical trial the ground was essentially level and mainly grass covered. However the line of the Traverse GEO3 passed through a 40 m section of dense woodland and across two site roads. It is understood that the area was used for depositing spoil arising from the construction of the adjacent Sizewell B station

2.2 Geology

Previous investigations, including that carried out in 1994, (Soil Mechanics, 1994) indicated that the expected succession comprises locally Made Ground or beach deposits, soft organic clay (alluvium) and peat, medium dense to dense sand (Crag Deposits), London Clay, Lower London Tertiary deposits of sands and clays and Chalk. Information given in the Tender Document indicated that the thickness of Made Ground is 5 to 6 m and that the surface of the Crag deposit is 10 to 11 m below ground level. The Crag deposit was described as predominantly fine to coarse sand, increasing rapidly with depth from medium dense to very dense; also containing weakly cemented sand horizons, bands of shell fragments and occasional thin lenses of silty clay.

Two boreholes put down to assist the interpretation of the surface geophysical survey trials, and a number of others, also part of the current investigation within about 100 m of Traverse GEO3, showed the thickness of Made Ground varying from 4.2 to 11.0 m and the depth to the Crag as being about 7.4 to 12.5 m. This information is summarised in Table 1, Enclosure A.

3 FIELDWORK

3.1 Electrical Resistivity Tomography

A resistivity tomography section was surveyed along the length of Traverse GEO3 using an Iris Instruments Syscal Junior Switch 72 resistivity meter and a seventy two electrode array. The electrode spacing was 2.5 m and the instrument was programmed to acquire data to a depth of about 18 m using the Wenner Schlumberger electrode configuration. Brief details of the equipment and the electrical resistivity tomography method are given in Enclosure C. Prior to commencement the line of the traverse had been set out (and cut through the wooded section as necessary) using a Trimble DMS212 beacon service GPS system. During the geophysical fieldwork this setting out was verified using a Leica 1200 SmartRover survey grade RTK dGPS system with correction data obtained from Leica SmartNet service.

The data were acquired as an initial spread of 936 resistivity readings at twenty four levels using a current base (distance between the current electrodes) ranging from 7.5 to 92.5 m. Two additional spreads comprising 342 readings were then added by 'rolling along' one cable length at a time to achieve continuous coverage to an approximate depth of investigation of 18 m.

3.2 Continuous Surface Wave Survey

The continuous surface wave (CSW) survey along GEO3 comprised the acquisition of thirteen sets of Rayleigh wave dispersion data from geophone arrays at 20 m centres. The positions are shown as CSW1 – 13 on Site Plan, Drawing No L0224-10/1/01. An additional array, CSW14 was also recorded near the SW corner of the site as shown on the Site Plan.

The equipment comprised a GDS Instruments continuous surface wave system which was operated by Surface Wave Surveys Limited (SWS). Each array comprised six 2 Hz geophones at 1 m intervals, and an electromagnetic vibrator provided the seismic excitation. Control of the frequency 'template' and data acquisition and storage are performed by the PC controller. A brief description of the method, showing the various system components is presented in Enclosure C.

The source was positioned either 2 m or 5 m from the nearest geophone depending on the part of the frequency template being recorded. The overall frequency range was from 6 Hz (lowest manufacturer's recommended value) to 200 Hz. In order to maximise the potential detail obtainable at maximum attainable depth, the frequency sequence proposed in the Method Statement was extended to incorporate 0.25 Hz increments between 6 Hz and 10 Hz. Further details of the general procedures and the specific methodology adopted at the present site are given in SWS' Report, Enclosure B.

Initial processing is carried out in real time in the PC controller so that the operator could view phase and frequency data as well as an approximate dispersion curve built up as the system progressed through its programmed frequency template. Data were stored as sets of relative phase shifts across the array as a function of frequency.

4 RESULTS

4.1 Electrical resistivity Tomography

The resistivity field data were downloaded from the resistivity meter using Iris Instruments' *Prosys* software and output in Geotomo Software's *RES2DINV* format. This package was then used to invert the field data to produce a model of the ground resistivity section beneath the traverse. The inversion method involves deriving a set of synthetic resistivity data from an initial model of the resistivity distribution. The synthetic data are compared with the field data and the model is iteratively adjusted until the synthetic and field data closely match. The closeness of the match is expressed as a percentage RMS error. The RMS error for the present data set was 2.1% after seven iterations, using a 1.25 m cell width, equivalent to half the electrode spacing. This error value is regarded as a close match for this type of survey. The results of the processing are shown in Fig 2.

Two distinct zones will be noticed with a transition at about 60 m along the profile. To the SE the model shows a relatively low resistivity layer about 3 to 4 m thick whose upper surface is at about 5 m below ground level. To the NW this feature is not present and the resistivity values are consistently higher.

4.2 Continuous Surface Wave Survey

The process of determining a shear wave velocity profile from a set of Rayleigh wave dispersion data can be carried out in two ways. The simpler method uses the factored wavelength concept which makes the assumption that the phase velocity associated with a particular frequency corresponds to material at a depth equal to some fraction of the corresponding wavelength. The fraction normally adopted is 0.33. The method is considered to be appropriate for sequences where the velocity increases reasonably uniformly with depth but may be less reliable in the case of abrupt velocity changes or velocity reversals. Iterative modelling methods have been developed in which the dispersion curve generated by a velocity model is compared with field data and the model adjusted to achieve an acceptable fit. For the present data set this procedure was adopted where possible using *WINSASW2* (Chung-Ang University, 2002, Rosenblad, 2009). A detailed description of the operation of this software, and the pre conditioning of the raw data using *PRECSW*, is given in Enclosure B.

The results of the seismic processing are presented in Enclosure B. These show the interpreted velocity profiles derived from the factored wavelength and iterative modelling methods. Three profiles CSW 5, 8 and 9 did not yield satisfactory results using *WINSASW2* and are presented as factored wavelength results only. The estimated inversion quality is monitored by the software and plots showing field data, processed output and estimate of velocity resolution are shown together with the results in Enclosure B.

Some very low S wave velocities emerge from the modelling process which are likely to be unrealistically low and a product of the limitations of the technique, though the presence of peat may be a contributory factor. The deepest layers used in the modelling should also be regarded as synthetic values introduced to optimise the fit to the field data and in general the interpretation at depth will be less reliable than that nearer to the surface.

The shear wave velocity profiles obtained using a modelling technique are shown as a composite set of velocity-depth profiles distributed along the traverse in Fig 2. From this it can be seen that they exhibit quite similar characteristics in that there is a relatively high velocity surface layer overlying a velocity reversal and then, in some instances, an increase in velocity with increasing depth. The thickness of the high velocity layer appears to be between 2 and 5 m, and is thinnest at about 100 m along the profile

5 DISCUSSION

Contours of the depth to the top of the Crag derived from the data given in Table 1 are shown on the Site Plan, Drawing No L0224-10/1/01. Based on these contours a section along GEO3 has been derived and plotted on the interpreted resistivity section and summary seismic section in Fig 2. The reliability of the estimate to the depth of this surface has been significantly improved by the data from the boreholes GEO3_BH1 and GEO3_BH2 which were put down to assist interpretation of these data following an initial appraisal. Summary logs are shown in Fig 2, superimposed on the geophysical profiles. It will be noted that a more suitable position for GEO3_BH1 would have been some 20 to 30 m SE of its actual position but this was not possible due to restrictions on rig access. Preliminary engineering logs are included in Enclosure D and N value depth profiles are shown in Fig D1. These show that the top of Crag closely corresponds to an abrupt increase in N value.

A similar section has also been derived for the top of peat and this has also been plotted in Fig 2. This was chosen as it may have electrical properties which are distinctly different from overlying granular alluvium or fill and underlying Crag. In addition the boundary between Made Ground and alluvium is understood to be difficult to determine.

An evaluation of either of the surface geophysical methods as a tool to map the surface of the Crag depends on the degree of correlation between aspects of the geophysical models and ground truth.

Referring to Fig 2 it is apparent that the top of the low resistivity layer at a depth of about 5 m in the south eastern 180 m of traverse corresponds to the top of the peat deposit. This contains silty clay layers which, possibly, together with a high saline water content in the peat probably contribute to its low resistivity. There is very good correlation at GEO3_BH2 and although this correlation appears to weaken with increasing distance away from this borehole that may be a result of the section having been cut from a surface based on relatively poor control data. Between the start of the traverse and approximately chainage 60, the low resistivity layer is not present even though there is a 3.5 m thick layer of peat shown in GEO3_BH1, so the resistivity method has not consistently mapped this layer.

The thickness of the (blue) low resistivity layer, interpreted as peat, correlates well with GEO3_BH2 where there appears to be a local depression in the Crag surface. The strength of resistivity contrast here is less than at the top surface of the peat and to use the blue/green transition in the resistivity image to determine the depth to the top of the Crag would probably underestimate it by up to 3 m. Towards the NW end of the traverse there is no clear feature in the image which can be correlated with the top of the Crag.

Given the high and, presumably, saline water table it is possible that the resistivity results simply reflect the hydrological conditions and the sudden change of subsurface conditions along the north western 60 m of the profile may be controlled more by groundwater regime than lithology.

The initial impression of the surface wave results was that, although the confidence diminishes with increasing depth, a suggestion could be seen of a correlation between the inferred Crag surface and an increase in S wave velocity along the NW 40 m of the profile. This has been strengthened by the control provided by GEO3_BH1. In general, the expected velocity inversion at the top of the peat has been detected by the seismic survey. .However an anomalously high velocity thin layer has been modelled in CSW10 at GEO3_BH2 which does not correlate either with the description or the SPT N value profile.

In summary, the Crag surface has either been poorly mapped or not mapped at all by the CSW method. This is partly due to the limitations of source and receivers at low frequencies but also, it appears, to attenuation in the peat as the method has been marginally more successful where the peat is thinnest

Neither the resistivity nor the seismic method has been clearly successful in achieving the objective of mapping the surface of the Crag along Traverse GEO3 because this horizon is probably too deep for continuous surface wave seismics and not sufficiently distinctive in electrical resistivity terms to present a consistently detectable target.

Based on these results it is considered that a similar degree of success would be achieved on parts of Traverses GEO1, 2 and, to a very limited extent on GEO4. The bund and hard standing which intersect parts of GEO1 and GEO4 are considered to be unsuited to these techniques. It would be inappropriate to draw conclusions regarding the foreshore but groundwater salinity, seismic noise and ground coupling issues would need to be considered.

Given the limited evidence from surface wave seismics, and the SPT data, that the Crag surface correlates with an increase in stiffness it is suggested that cone penetration testing along the geophysical profiles may provide a more reliable method to map this surface.

Prepared By	**G A Ricketts MSc BEng DIC**
Reviewed By	**R Venning MSc BSc**
Approved for Issue By	**R Venning MSc BSc**

REFERENCES

Publications and Reports

Anon : 2002 : Data Interpretation and Analysis for SASW Measurements. Dept of Civil Engineering, Chung-Ang University, An Seong, Korea.

Rosenblad, B.L. (2009), "Deep Shear Wave Velocity Profiles of Mississippi Embayment Sediments Determined from Surface Wave Measurements," Final Report to USGS, Grant No. 06HQGR0131.

Soil Mechanics Limited : 1994 : Sizewell C Power Station Site Investigation. Carried out for Nuclear Electric plc.

ENCLOSURE A

TABLE, FIGURES, DRAWING

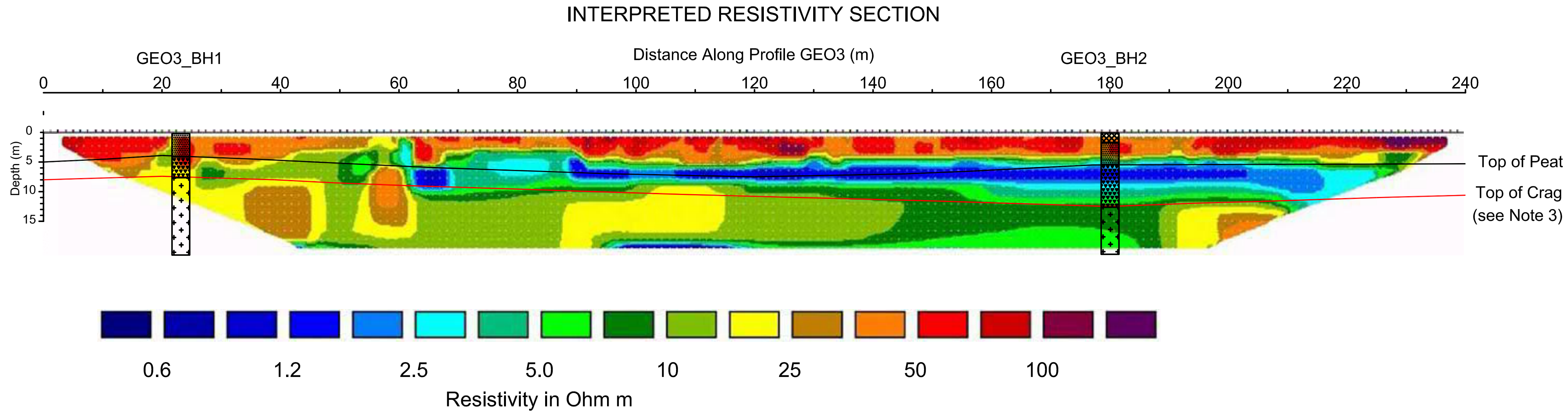
Summary Borehole Information

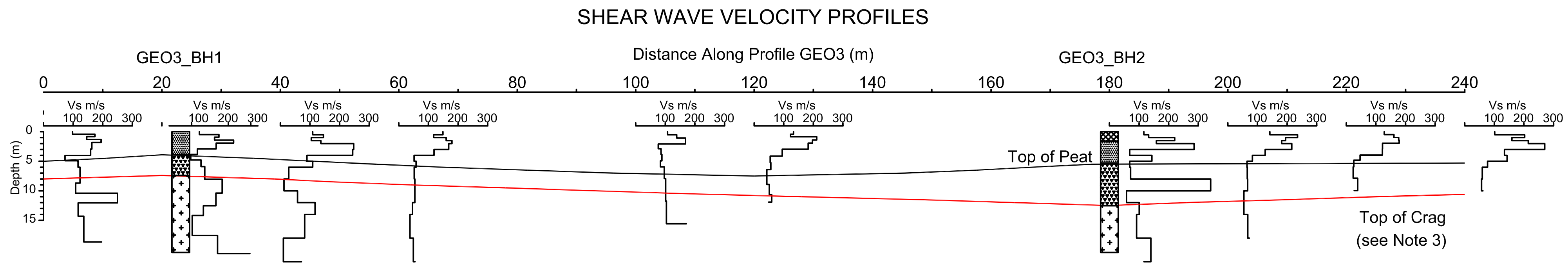
Soil Mechanics

BH	Easting	Northing	Depth		Stratum
			From	To	
GW07	647244.9	264293.2	GL	7.00	Sand & Gravel (Possible Made Ground)
			7.00	7.80	Peat & Alluvium
			7.80		Crag
CBH2009_4U	647220.1	264306.1	GL	5.50	Sand and Gravel (Possible Made Ground)
			5.40	7.40	Peat & Alluvium
			7.40		Orange / Green Sand (Crag)
SPT2009_2	647243.4	264230.3	GL	8.50	Sand and Gravel (Made Ground)
			8.50	11.60	Peat & Alluvium
			11.60		Crag
DBH2009_20	647330.1	264094.9	GL	11.00	Sand and Gravel (possible Made Ground)
			11.00	12.00	Peat & Alluvium
			12.00		Sand and Shells (Crag)
G4	647416.1	263986.8	GL	5.40	Sand and Gravel (Possible Made Ground)
			5.40	9.50	Peat & Alluvium
			9.50		Crag
SPT2009_10	647394.9	264120.4	GL	10.00	No data
			10.00	10.80	Peat & Alluvium
			10.80		Crag
GW15	647317.1	264003.9	GL	4.20	Made Ground
			4.20	9.00	Peat & Alluvium
			9.00		Crag
GEO3_BH1	647315	264213	GL	3.90	Sand
			3.90	7.40	Peat & Alluvium
			7.40	20.45 pen	Crag
GEO3_BH2	647396	264078	GL	1.60	Made Ground
			1.60	5.30	Sand
			5.30	12.50	Peat & Alluvium
			12.50	20.45 pen	Crag

Notes: Rev 1 GEO3_BH1 and _BH2 added

Soil Mechanics	Project: SIZEWELL PHASE 1 ONSHORE SURFACE GEOPHYSICAL TRIALS	SITE LOCATION PLAN	Fig 1
			Project No: L0224-10 / Rev: 0





Legend:

- Made Ground
- Sand
- Peat
- Crag

Notes:

1) Resistivity data obtained using Iris Syscal Switch 72 system, 2.5 m electrode interval, Wenner Schlumberger array. Inverted using RES2DINV.
2) Shear wave velocity profiles obtained using GDS Instruments continuous surface wave system. Frequency range 6 - 200 Hz. Data inverted using WINSASW2. Seismic array interval 20 m. Not all dispersion curves suitable for inversion.
3) Stratum boundaries inferred from borehole information provided by Soil Mechanics.

Scale: 1:1000

0 10 20 40 60 80 m

Rev.	Drawn	Date	Checked	Approved	Details
1	GAR	Oct 2010			BHs added,sections rev'd
0	GAR	Sep 2010			For comment

Survey Date: August 2010 | Surveyor: GAR | Drawn By: GAR

Client:
NNB GENERATION COMPANY LIMITED

Engineer:

Contractor:
Soil Mechanics

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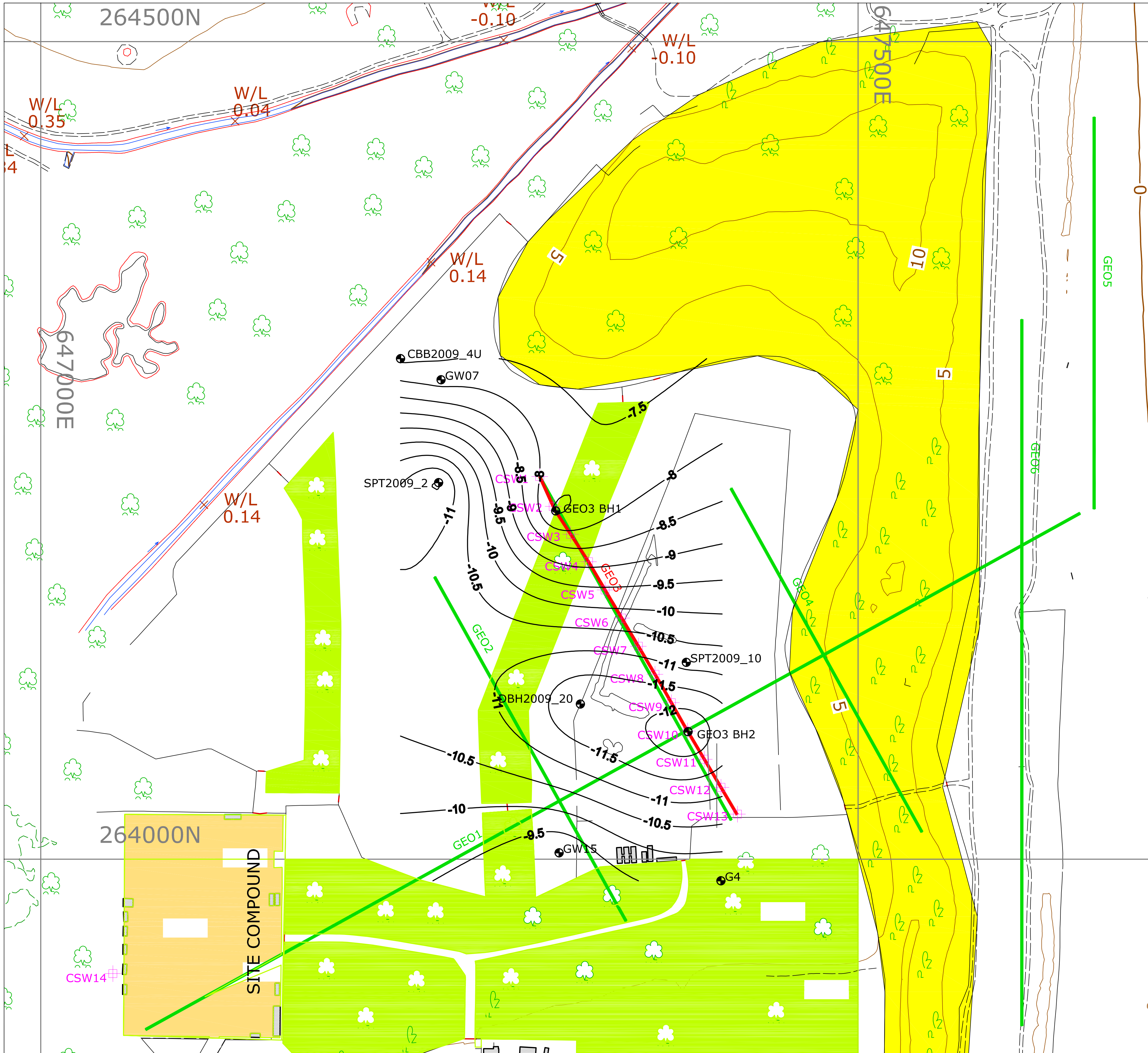
Contract:
ONSHORE INVESTIGATIONS PHASE 1
FOR SIZEWELL SITE

SURFACE GEOPHYSICS TRIALS RESULTS
L0224-10/1 Fig 2

Original Sheet Size: A3
Scales: Horiz.: 1:1000,1cm=200m/s Vert.: 1:1000
Rev.: 1



Legend:

GEO2	Proposed geophysical profile
GEO3	Trial profile GEO3
CSW2	Continuous surface wave array
-10	Estimated depth of Crag contour, see text

Notes:

1) Co-ordinate System: OS National Grid (OSGB36)
2) Positioning obtained by a Leica Type 1200 SmartRover using SmartNet correction service.
3) Borehole information supplied by Soil Mechanics.
4) Background mapping provided in digital format by NNB

Scale: 1:2500

0 25 50 100 150 200 m

Rev.	Drawn	Date	Checked	Approved	Details
1	GAR	Oct 10			Additional BHs
0	GAR	Sep 10			For comment

Survey Date: August 2010

Surveyor:

Drawn By: GAR

Client:

NNB GENERATION COMPANY LIMITED

Engineer:

Contractor:

Soil Mechanics

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Contract:

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

SURFACE GEOPHYSICS TRIAL SITE PLAN

L0224-10/1/01

Original Sheet Size: A3

Scales: Horiz.: 1:2500 Vert.:

Rev.: 1

ENCLOSURE B

REPORT BY SURFACE WAVE SURVEYS LIMTED

SURFACE WAVE SURVEYS LIMITED

Non-intrusive Measurement of Ground Stiffness

SUMMARY REPORT ON A CONTINUOUS SURFACE WAVE SURVEY AT THE SITE OF THE SIZEWELL C NUCLEAR POWER STATION, SUFFOLK FOR SOIL MECHANICS

Introduction

A new nuclear power station is to be constructed to the north of the existing A and B installations at Sizewell in Suffolk. Soil Mechanics have been contracted to carry out an investigation of the site, an important part of which involves establishing the depth of the top of a cemented sandstone formation known as the Norwich Crag. Geophysical techniques were proposed for this including Continuous Surface Wave (CSW) surveying sub-contracted to Surface Wave Surveys Limited. As the objective, thought to be at approximately 10m depth, was thought to be close to the limit of resolution for the CSW technique it was decided to carry out a trial along a 240m long traverse known as GE03 close to the centre of the site. SWSL mobilised on 23rd August 2010 and carried out tests to establish optimum data acquisition parameters that same afternoon. The remaining work was carried out on the following two days, 24th and 25th August.

Data Acquisition

Site Conditions

The GE03 traverse runs from north-west to south-east over essentially flat, sandy grassland. It passes through a wooded area between 20m and 60m of the north-western end where work commenced. Ground conditions were good and the weather during the survey period was generally cool and breezy with occasional showers.

Field Layout

The data were acquired with a Continuous Surface Wave System manufactured by GDS Instruments Limited of Hook, Hampshire. A 489N/600Hz electromagnetic vibrator was used as energy source with six single 2Hz geophones as detectors. Full details of the data acquisition process are given in the statement of method attached. The tests to establish optimum parameters were carried out at the extreme north-western end of the traverse (location 301). As the target was expected to be close to the limit of resolution of the technique the emphasis was on optimizing the lowest frequency data between 6Hz and 10Hz. As a result of the tests was decided to do this by using a 0.25Hz increment in this range and a first geophone offset of 5m with the remaining geophones at 1m intervals. From 10Hz up to 200Hz the offset was reduced from 5m to 2m. Increments were 0.5Hz to 12Hz, then 1Hz to 20Hz, 2Hz to 40Hz, 5Hz to 100Hz and 10Hz to 200Hz.

Using this frequency template profiles were acquired at 20m intervals along the traverse and numbered 301 through to 313. With time available on the afternoon of

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the 25th an additional profile was acquired on the edge of the car park in the south-west corner of the site where the Crag was thought to be shallower.

Data Processing

Full details of the data processing sequence are included in the attached statement of method. Each set of data was initially processed using GDS Instruments' Postpro software to give the phase angle for a theoretical 1m geophone spacing at each frequency. The frequency/phase angle pairs were then input to a spreadsheet which calculates the shear wave velocity and stiffness at each frequency and allocates them to a depth of one third of the wavelength (a wavelength/3 inversion). In these calculations a value for Poisson's Ratio of 0.35 and a bulk density of $1.8Mgm^{-3}$ were assumed. Different values can easily be used instead if required, but the maximum change it could cause in the results would be less than 10%. The final output from each spreadsheet is in the form of a table of results followed by a page of graphs, the most important of which shows shear wave velocity against depth.

Advanced processing was then carried out using WinSASW2 software with PreCSW. This software enables an optimum earth model to fit the field data to be found using matrix inversion techniques. It has been developed by Professor Sung-Ho Joh of the University of Chung-Ang, Korea, based on theory described in his Ph.D. work ('Advances in data interpretation technique for Spectral Analysis of Surface Waves (SASW) measurements.' Ph.D. Dissertation, the University of Texas at Austin, 1996).

If a CSW dataset is to be inverted by WinSASW2 it must have a high bandwidth, no major discontinuities and no large gaps due to unreliability. The criteria for a successful inversion are that the dispersion curve for the model should be a good match to the representative dispersion curve (a smoothed version of the field data) the shear wave velocity profile should be a reasonable shape and the resolution of the velocity should not fall below a figure of 0.1. For each profile successfully inverted a .mdi (Microsoft Document Imager) file is also produced for quality control purposes. It shows three dispersion curves superimposed on one another. Grey circles are used for the field data, blue ones for the smooth polynomial which best fits the field data and red ones for the output results from WinSASW2. Also shown on the right of these is a graph of velocity resolution against depth.

Assessment of Results

In assessing the results it is important to study both wavelength/3 and WinSASW2 inversions. On the final page of the spreadsheet for each profile, graphs for both are therefore presented on the same axes using dark blue diamonds for the former and straight red lines for the latter. Several factors need to be taken into account when interpreting wavelength/3 inversions and these are described in a separate section at the end of this report.

A study of the profiles along the traverse as a whole provides a general picture consisting of several metres of soil of velocity between $100ms^{-1}$ and $200ms^{-1}$ (likely to be made ground) overlying material of lower velocity (likely to be alluvium and peat). The maximum depth of penetration is in the region of 7m, which means the top of the Crag cannot be identified. The velocity in the made ground is erratic suggesting its structure is of a complex nature.

Particular comments about individual velocity profiles are as follows:

301 suggests high velocity bands at 0.5m, 1.5m and 3.5m depth but has inverted well down to perhaps 6m. There is a suggestion of a major velocity increase in the region of 10m, although this is beyond the limit of reliability.

302 is broadly similar to 301 except the velocity increase at depth occurs at around 8m. Whilst this is again beyond the limit of reliable data an increase at that depth occurred with all other models tried, strengthening the possibility that it might actually exist.

303 (located in the centre of the woodland) shows a sharp drop in velocity at about 2.5m on the wavelength/3 plot. WinSASW2 cannot produce a model that will follow this and the inversion is therefore only deemed satisfactory to 2.5m.

304 again has a big velocity drop, this time in the region of 2m. On this occasion WinSASW2 has just managed to handle it and the result is thought to be good down to perhaps 4m.

305 has a wavelength/3 result which shows a lot of stiffness structure between 1m and 4m depth. If the structure is left in the dispersion curve, the shape is far too complex to follow. If a broad brush approach is tried, so much data has to be taken out that the dispersion curve has significant gaps and there is insufficient data for the WinSASW2 software to work with. The result is that this profile will not invert.

306, in sharp contrast, has a fairly smooth wavelength/3 plot which has produced a very good inversion down to around 5m.

307 is a reasonable result down to about 3m. The wavelength/3 results show a thin, stiff feature between 3m and 3.5m and what appears to be a quite abrupt change in trend from a decrease in stiffness with depth to an increase at 4m depth. Neither of these can be modelled.

308 has a massive discontinuity which appears to be the result of a layer of unusually high velocity between 1m and 1.5m depth. This cannot be modelled round and so the profile will not invert with WinSASW2.

309 is almost identical to 308 and must therefore be declared another no result.

310 appears better at first glance of the wavelength/3, but a more careful look shows velocity peaks around 1.5m and 3m depth. This makes it fairly similar to 305 which did not invert. As before, the peaks have to be smoothed to produce a dispersion curve that the software has a chance of following and this leads to the data becoming too thin in places for the inversion process to work. The consequence is a rather poor inversion which cannot be relied upon below perhaps 2m depth.

311 is another profile with limited depth penetration. The wavelength/3 inversion is thought to be reasonable to 4m and the WinSASW2 inversion to perhaps 3m.

312 is somewhat better and both inversions are deemed reliable to about 4m.

313, the last profile on the traverse, is better still and the inversions are thought to be good down to 5m.

Finally 014, the test profile on the edge of the car park, is another very difficult dataset. Wavelength/3 shows high stiffness zones around 0.5m, 2m and 3.5m and with discontinuities like these there is no prospect of a WinSASW2 inversion working.

Conclusions

This trial has produced useful shear wave velocity information about the made ground along the traverse and some of the alluvial material below it. It has shown the structure of the made ground to be quite complex with thin bands of quite widely differing velocity. Unfortunately it has failed to locate the top of the Norwich Crag due to insufficient depth penetration. This is entirely due to the generally low-velocity nature of the near-surface soils, the average velocity of which is significantly lower than was expected.

Comments on the Interpretation of CSW Data

1. The factored wavelength method of inverting the surface wave data involves averaging the stiffness information over a depth of one wavelength of the surface wave and assigning this value to a depth which is a fraction of the wavelength. The fraction normally used is 1/3, because it has been found by research to be the best approximation when stiffness increases steadily with depth. In cases where sharp stiffness changes occur between layers, this

method of inversion has a smoothing effect around the layer interfaces and for this reason the stiffness values assigned at various depths should be regarded as guideline rather than absolute values.

2. Where a thin layer of high stiffness is sandwiched by material of much lower stiffness, the inversion method produces pointed features in the stiffness/depth curve. An example of this can be seen in profile 308 (between 1.25m and 2.25m). The result is a ‘pointed nose’ feature which points downwards to the right. In such cases it is important to note from which region on the curve the ‘nose’ emanates. In profile 5 this is between 1.25m and 1.5m. Stiffness values above and below the region of emanation can be regarded as reliable. Those within the features themselves most certainly are not and should be disregarded on the understanding that a layer of higher stiffness exists in this zone.

3. Sometimes the geometry of the earth layering can result in the generation of ‘higher-mode’ surface waves. These are waves which are bounded by an interface below ground rather than the surface and therefore result in spurious points on the stiffness/depth curve. These points tend to occur in segments and can be identified by their unnatural appearance – they are usually in very straight lines with an even spacing between points and are often removed as part of the data processing.

[redacted]

R D Tinsley BSc MSc ARCS 22nd September 2010

Managing Director

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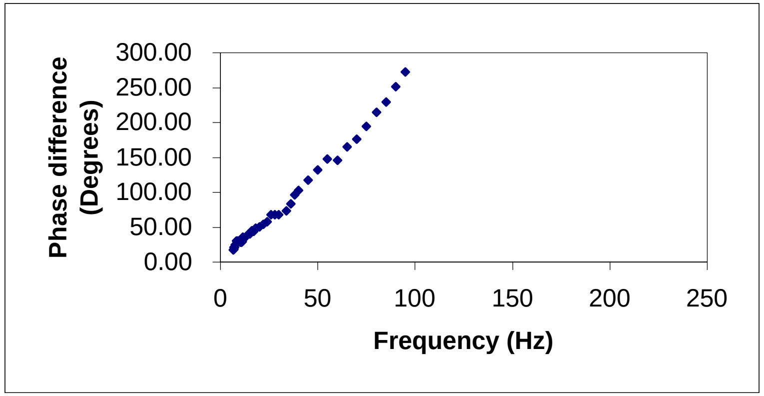
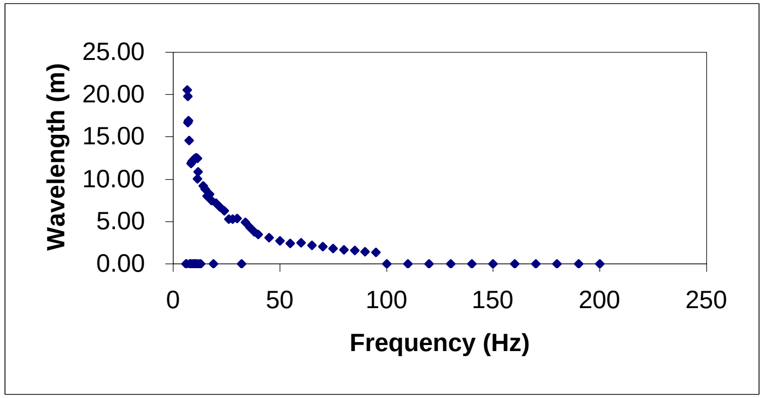
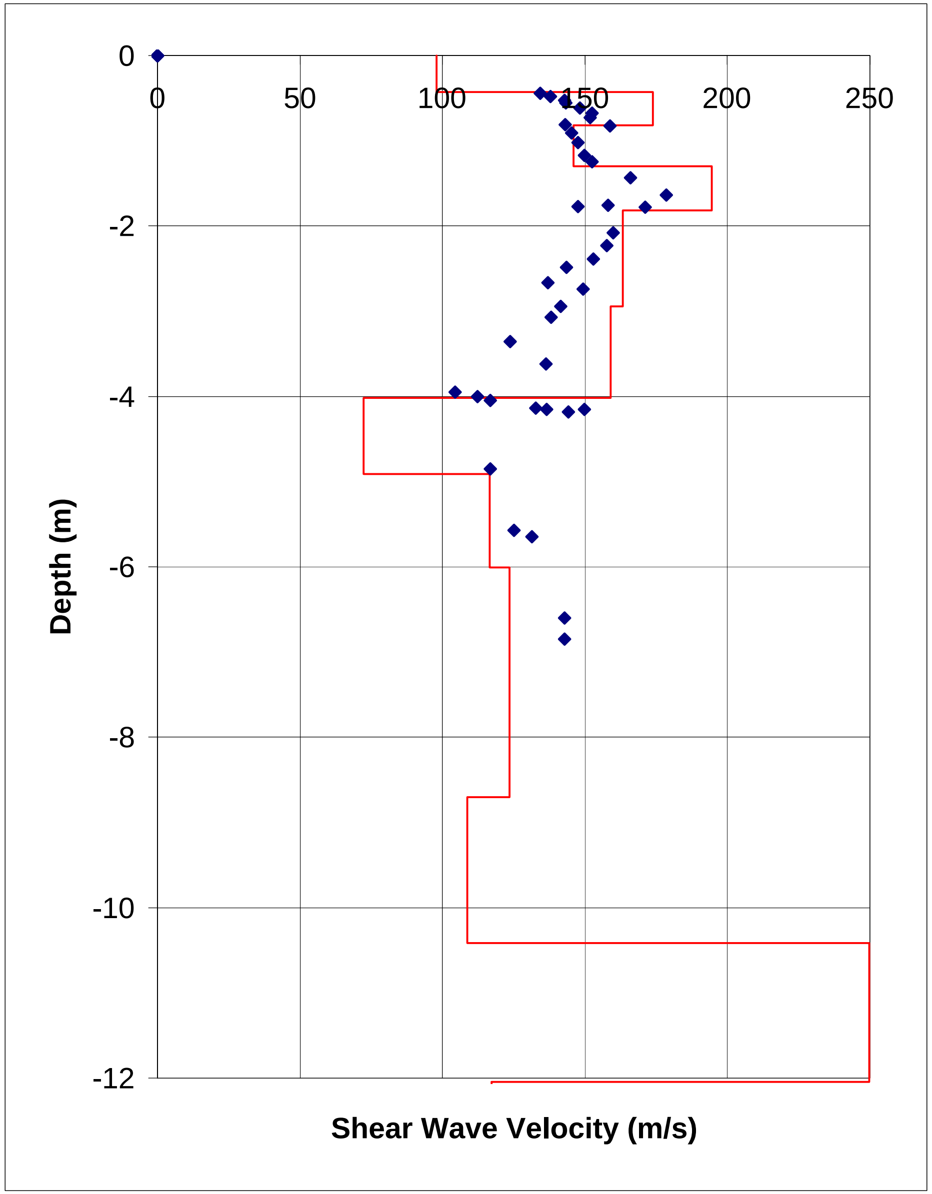
Continuous Surface Wave Profile

Date: 23/08/10
Site: Sizewell C, Location 301







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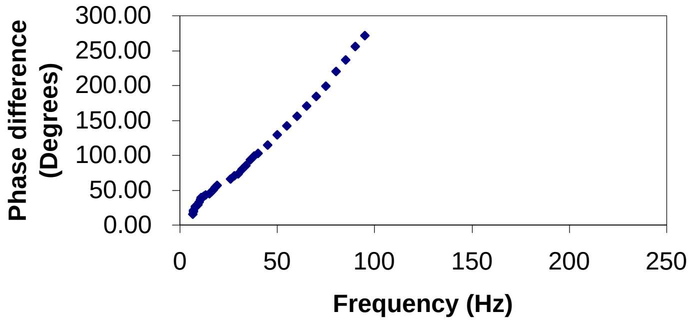
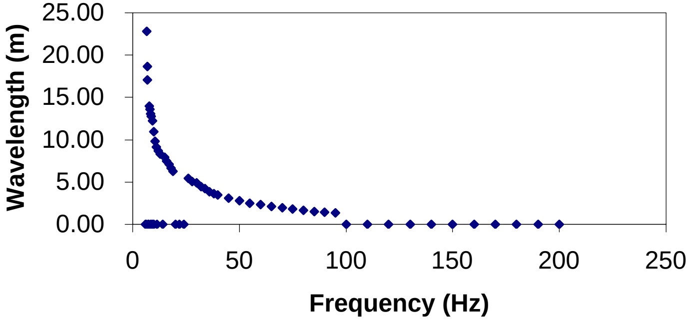
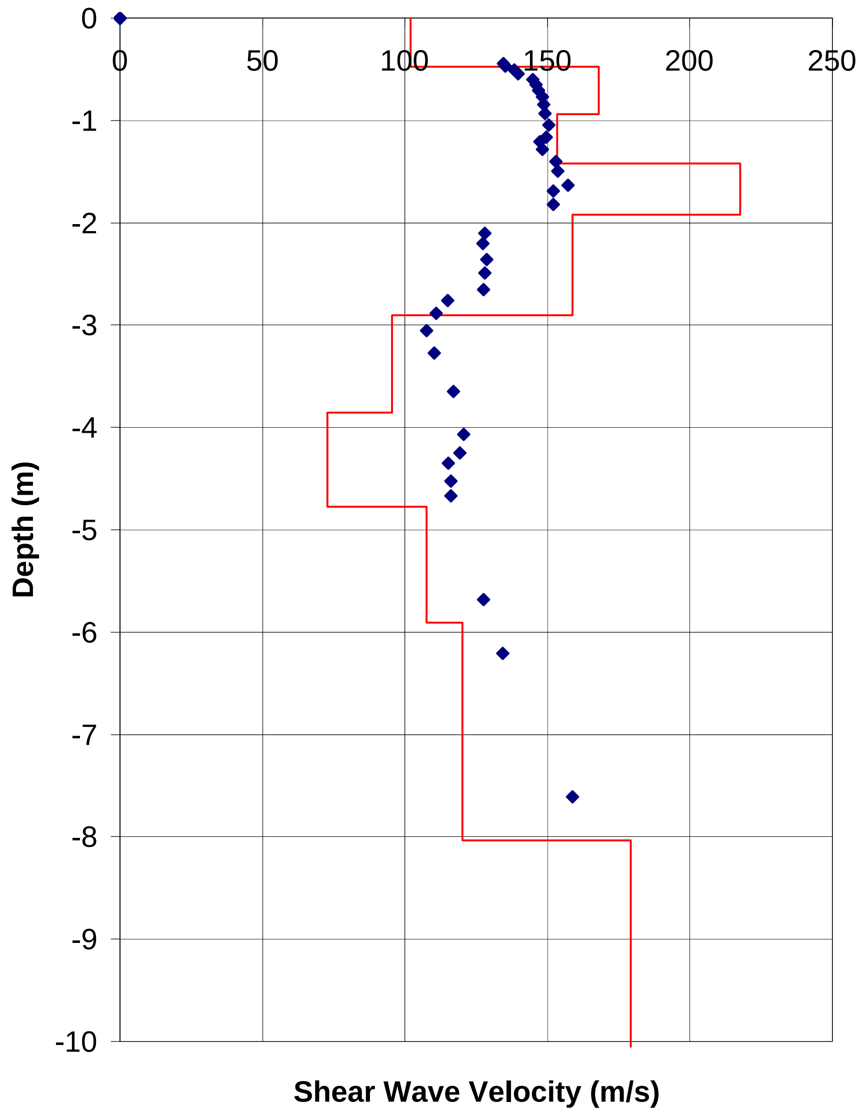
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 302







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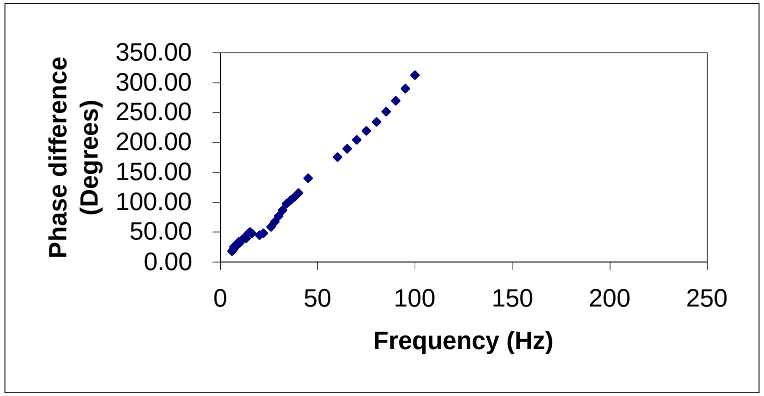
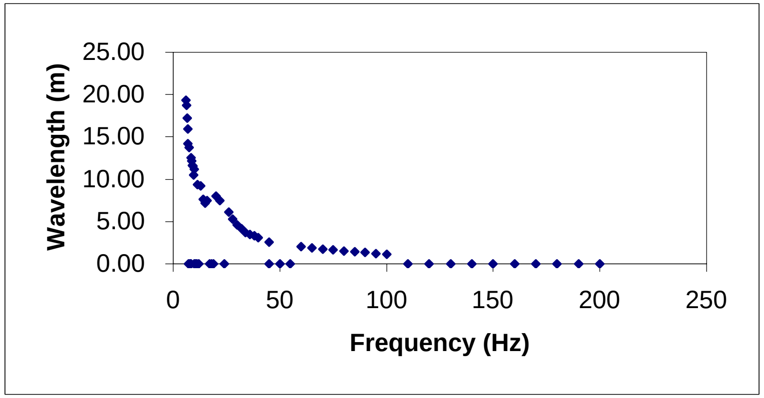
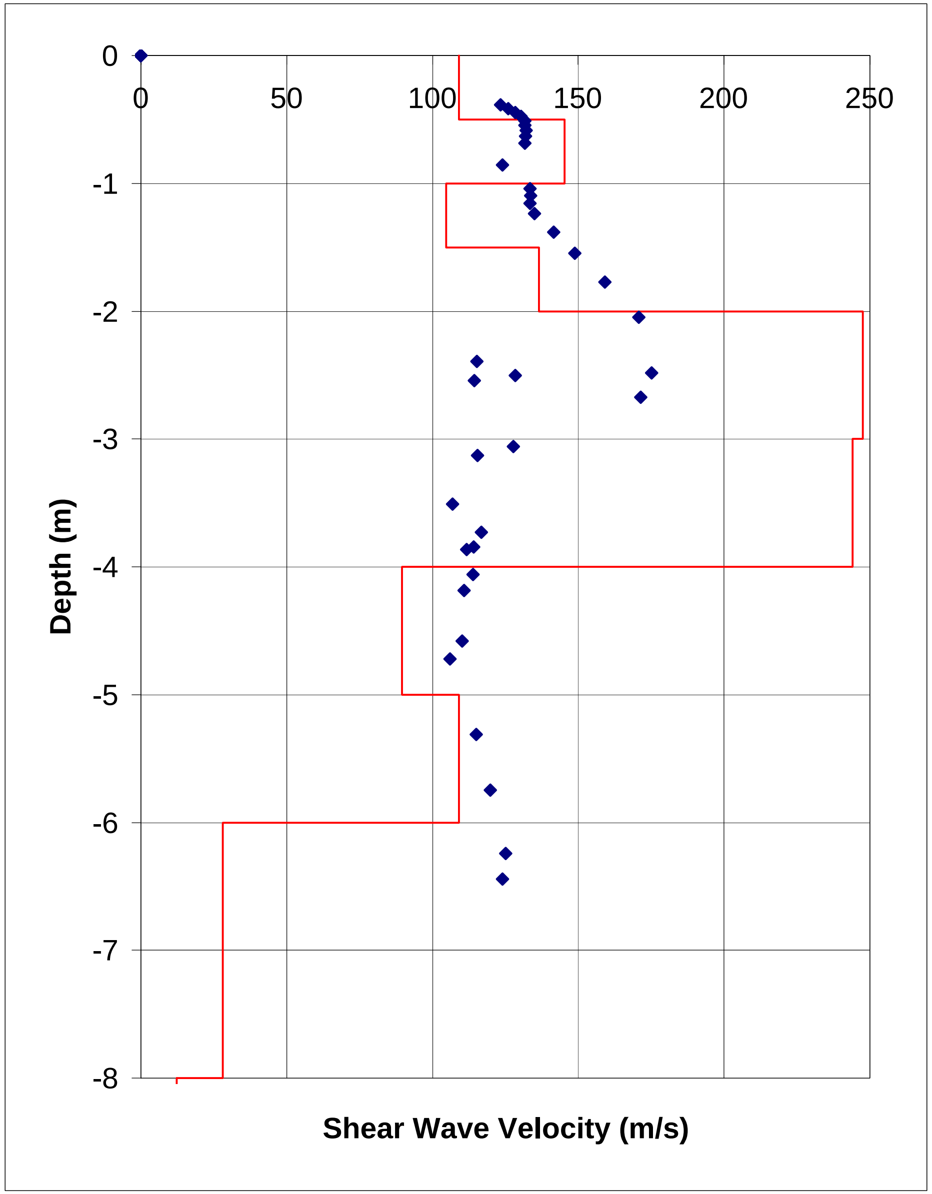
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 303







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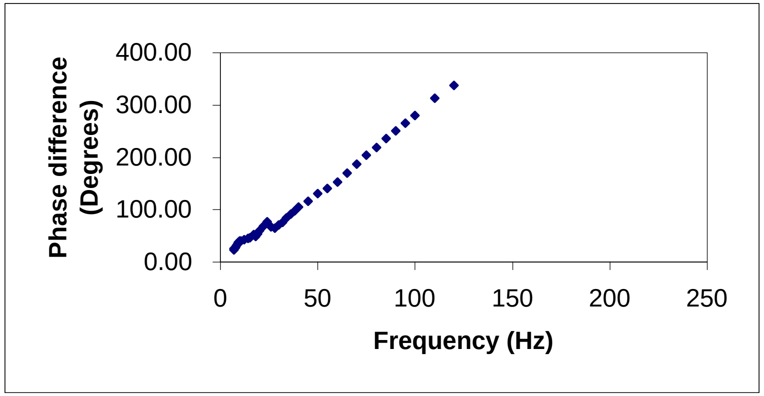
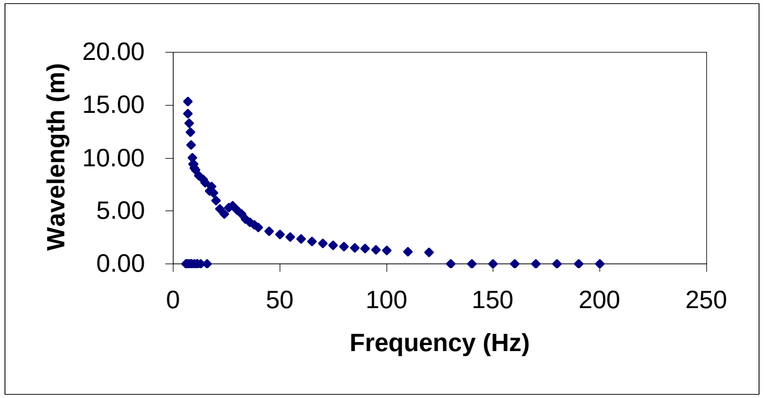
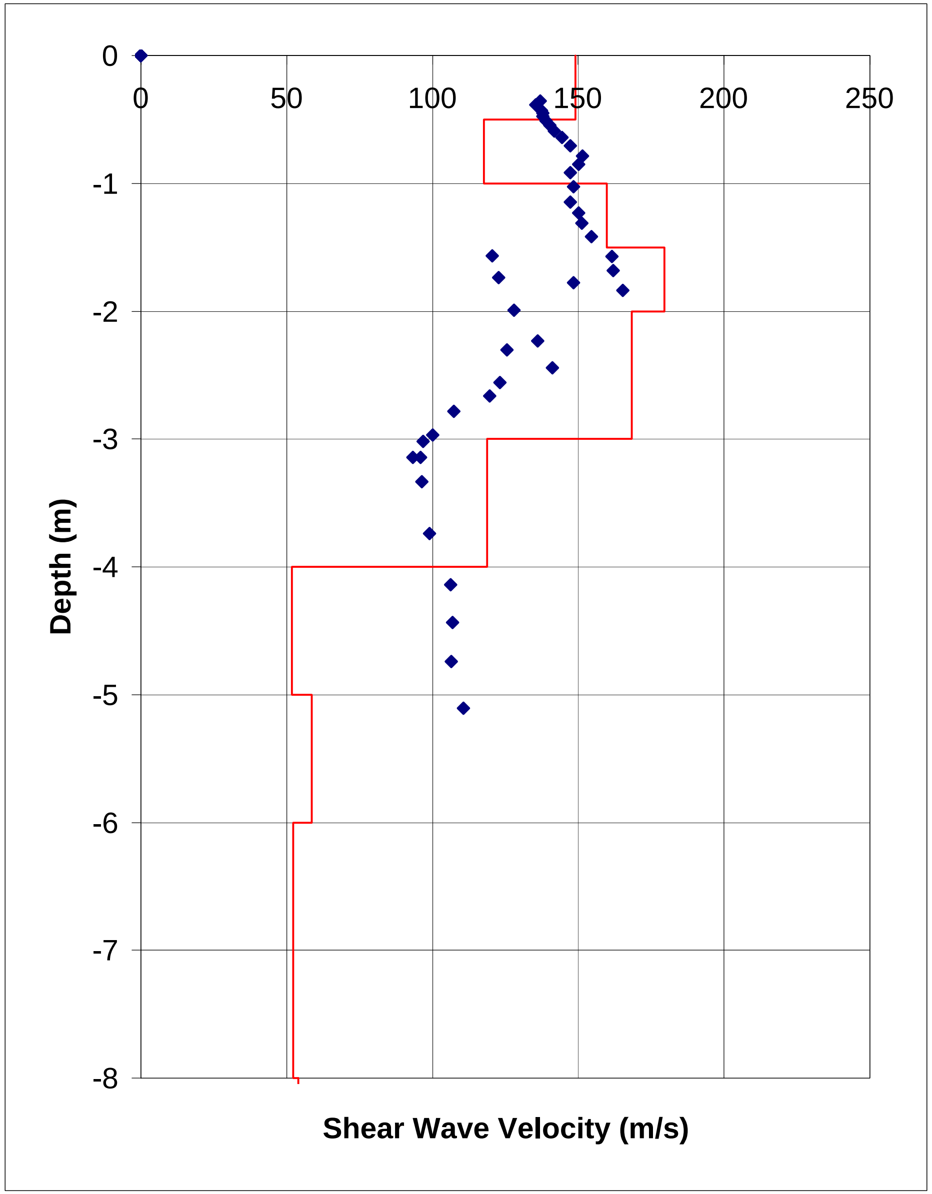
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 304







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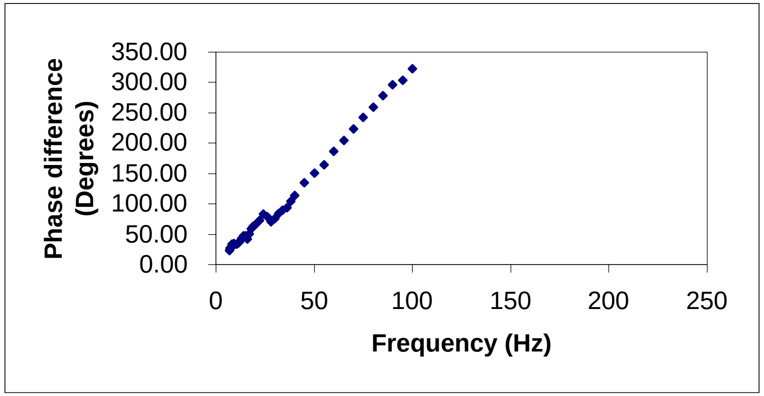
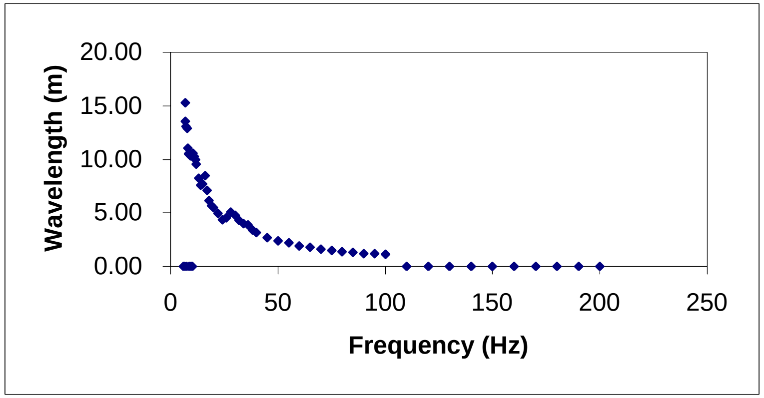
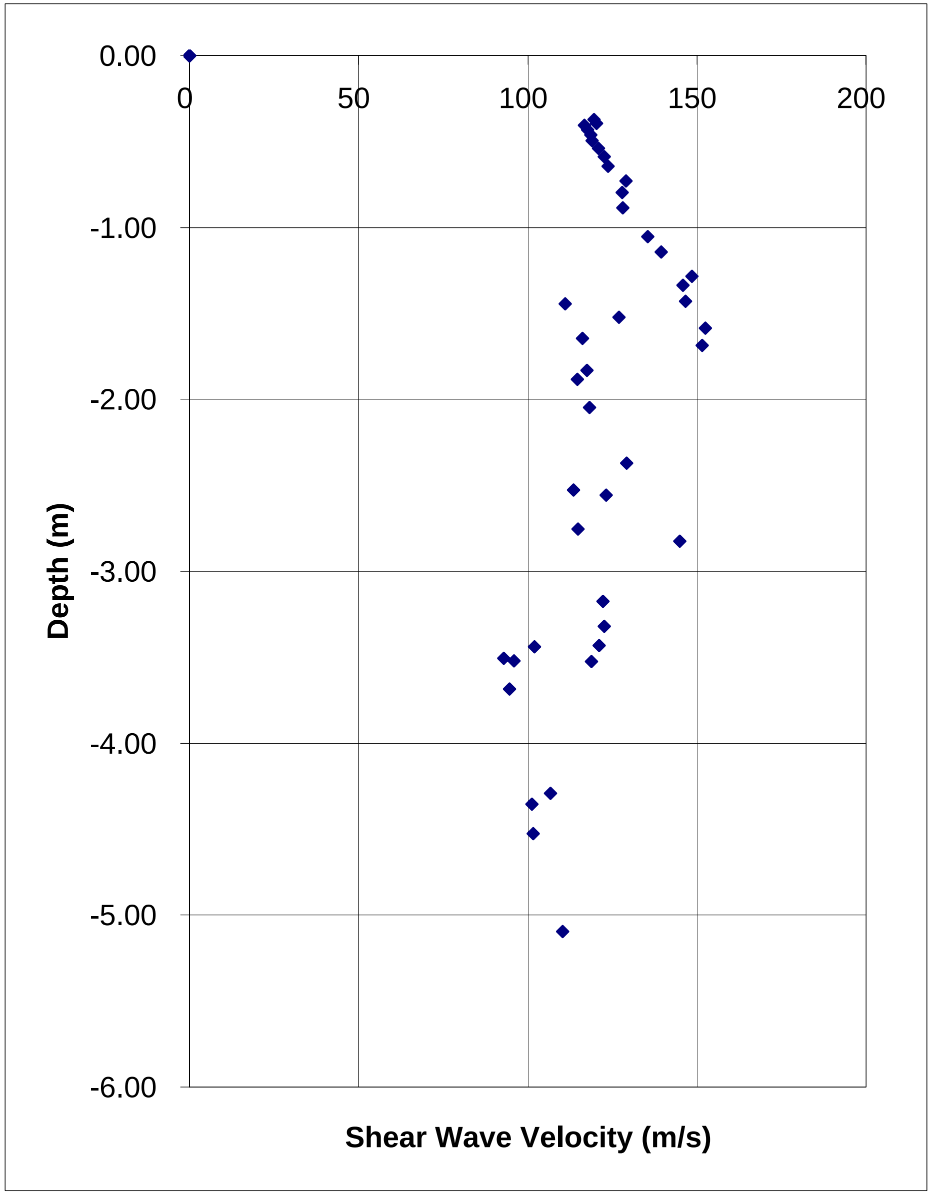
Continuous Surface Wave Profile

Date: 24/08/10
Location: Sizewell C, Location 305







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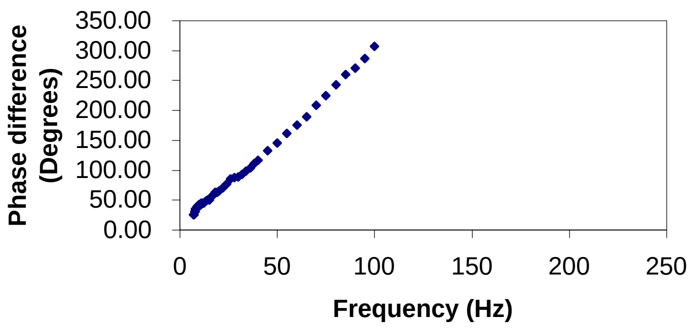
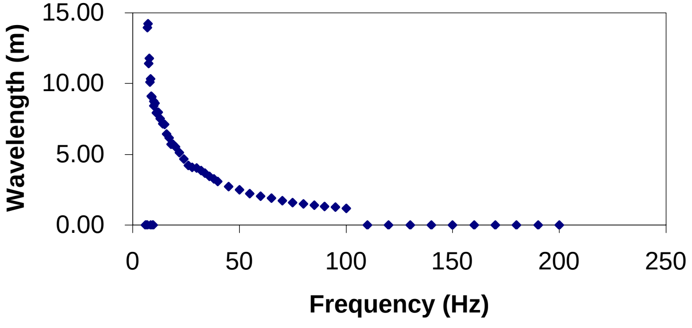
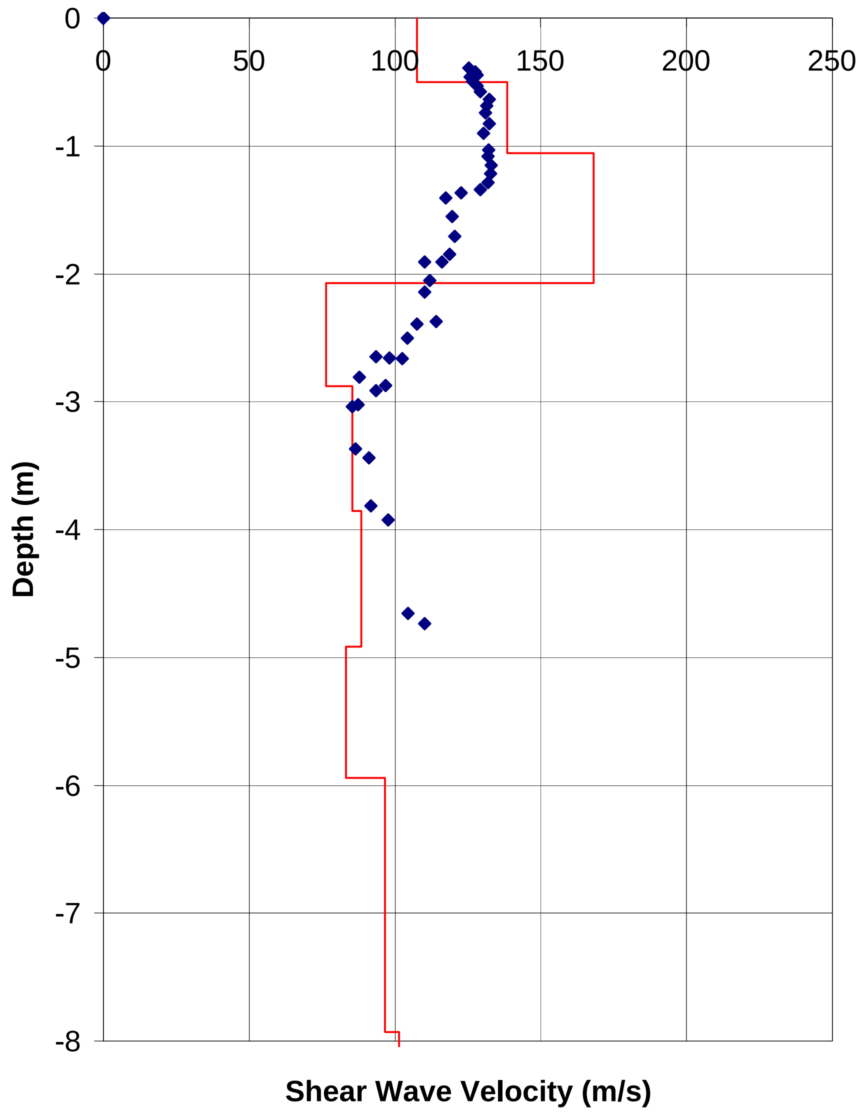
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 306







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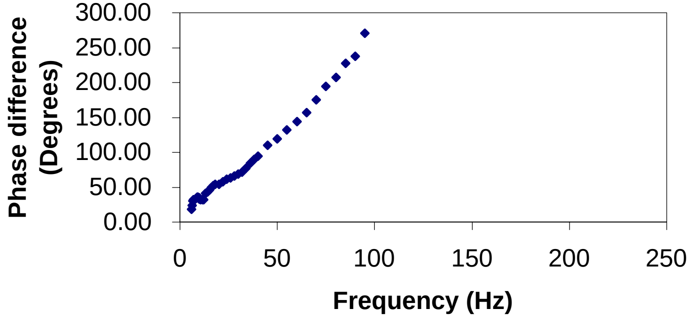
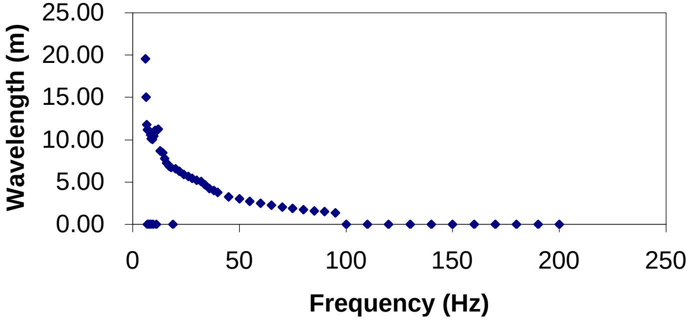
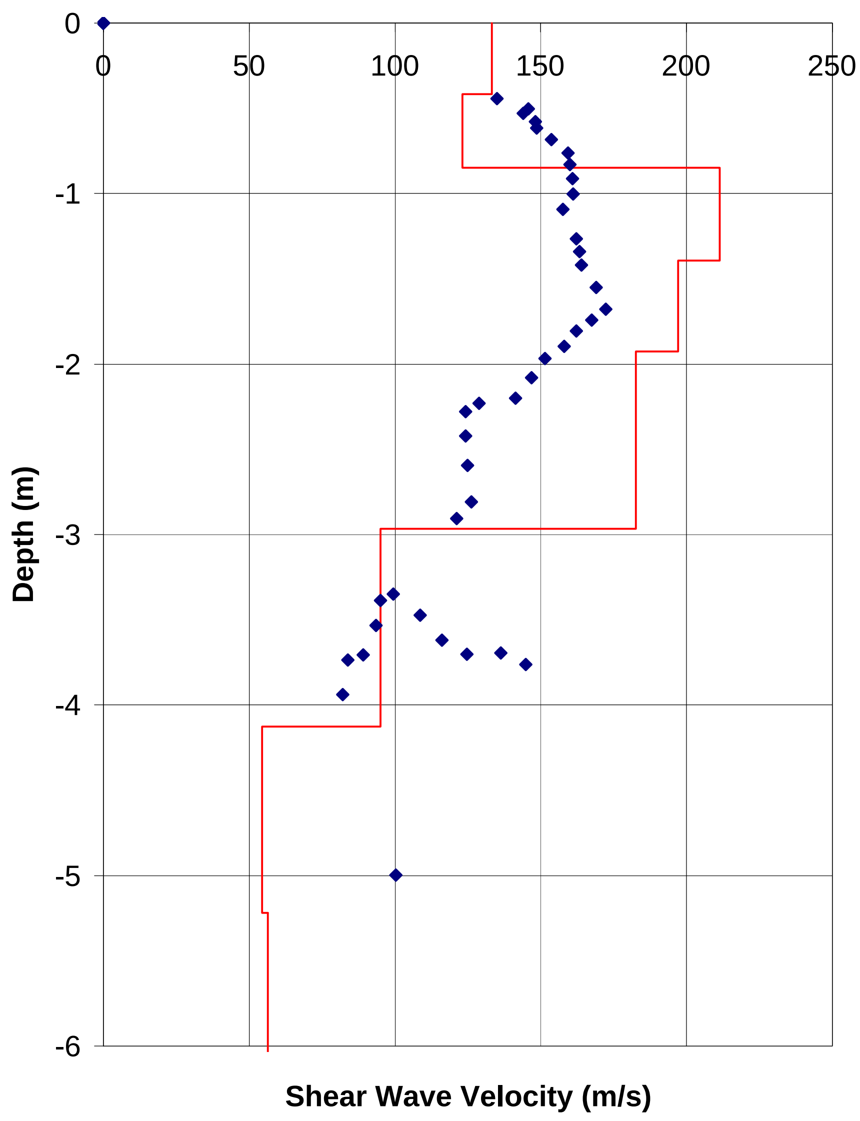
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 307







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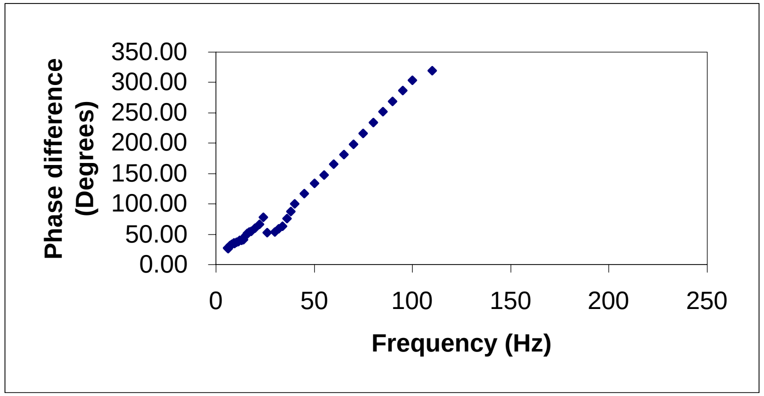
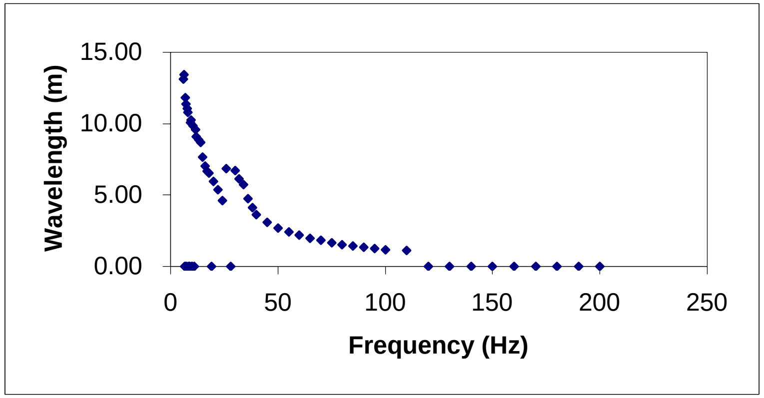
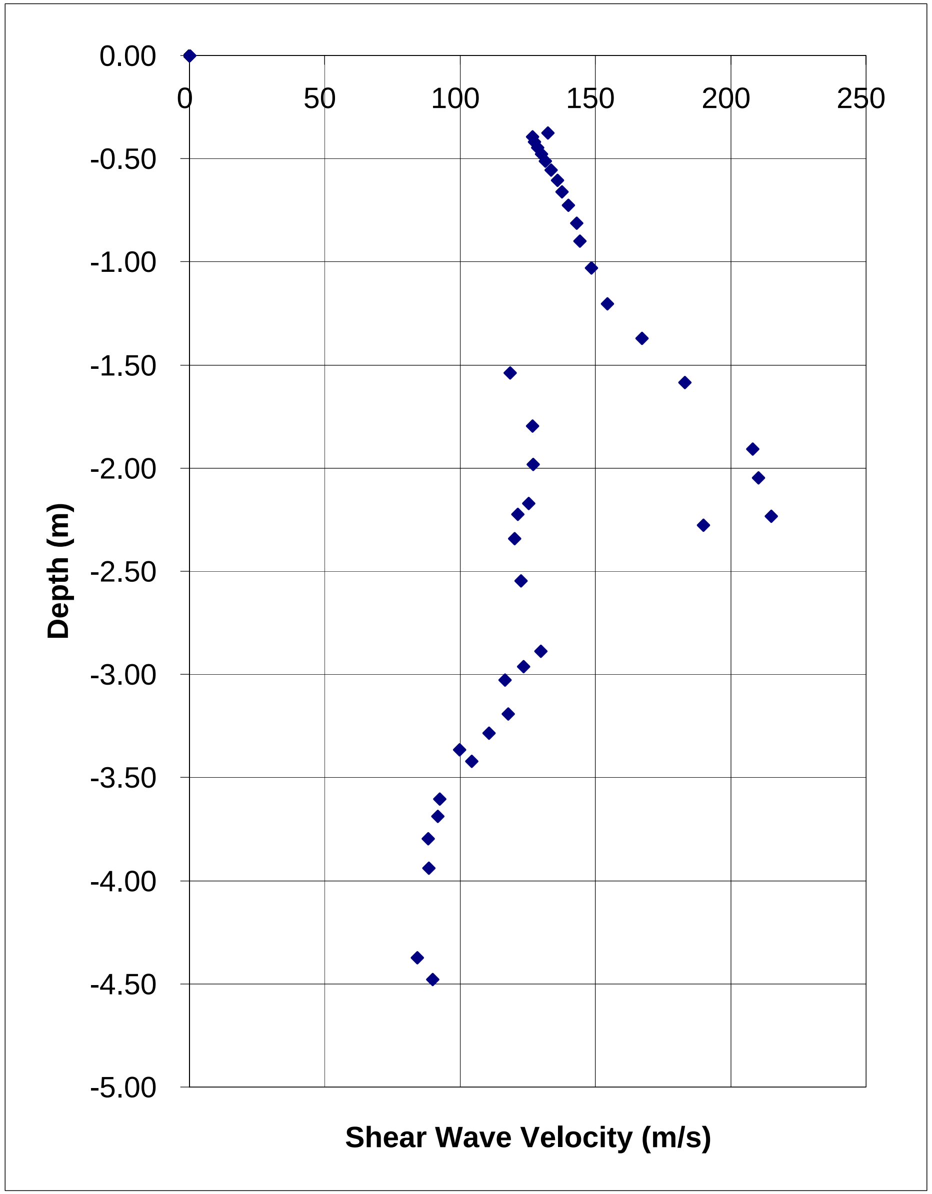
Continuous Surface Wave Profile

Date: 24/08/10
Location: Sizewell C, Location 308







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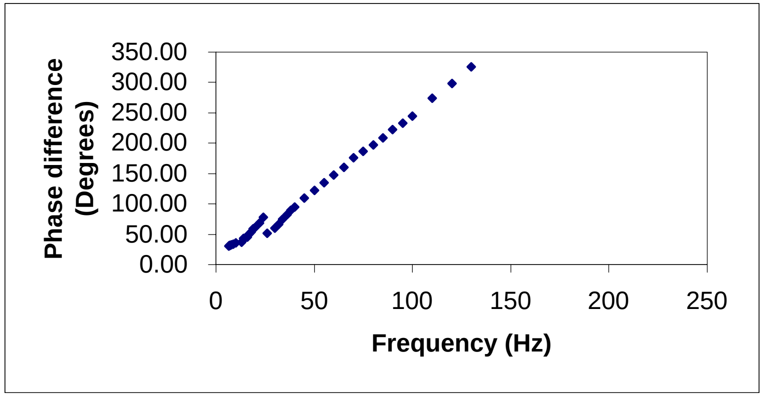
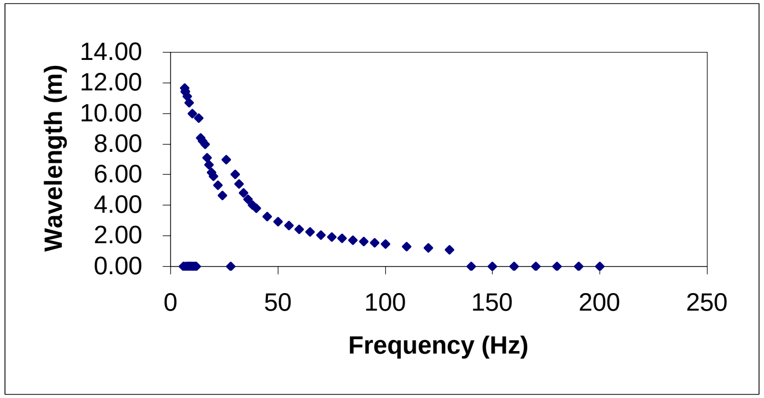
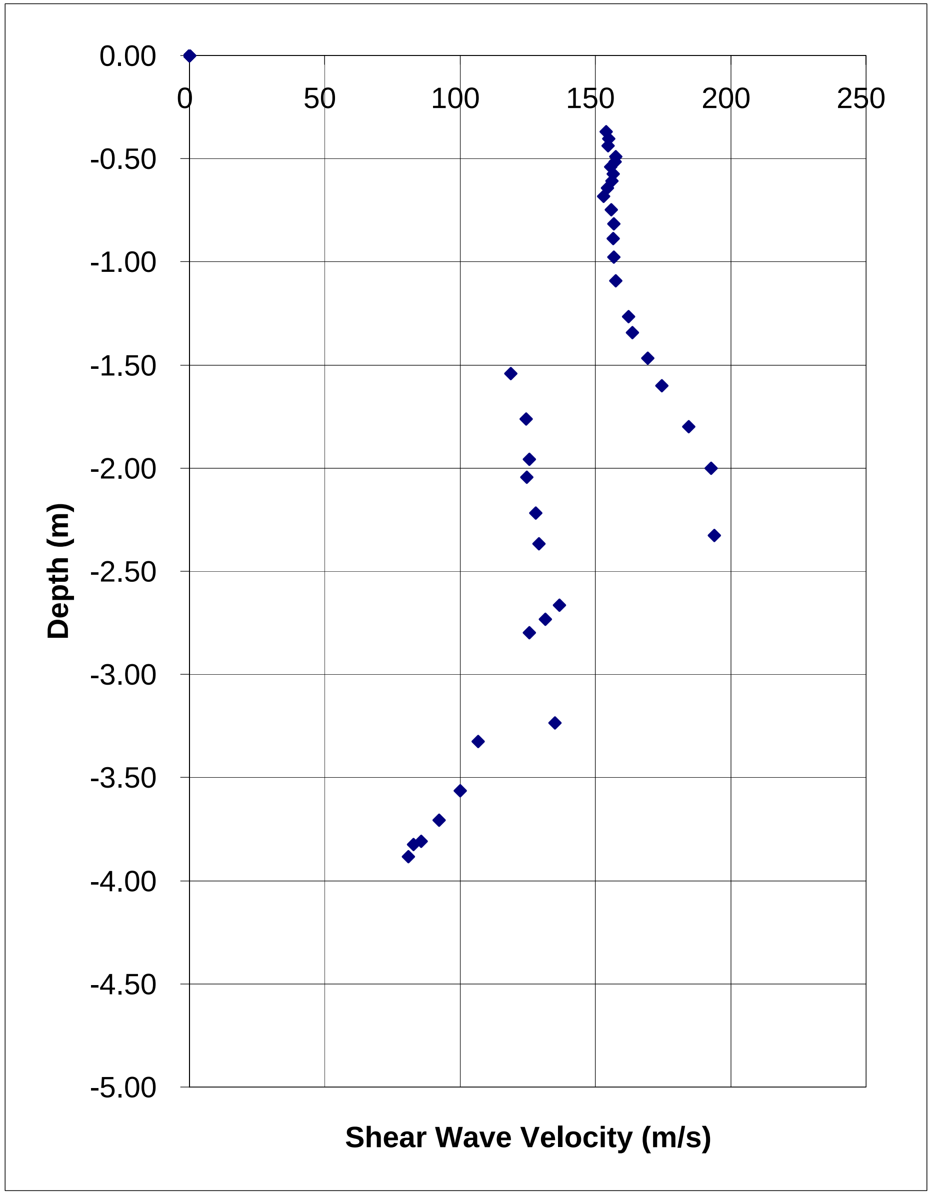
Continuous Surface Wave Profile

Date: 24/08/10
Location: Sizewell C, Location 309







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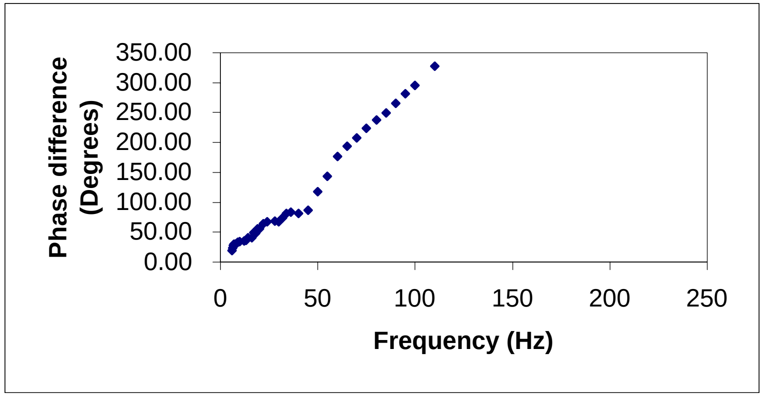
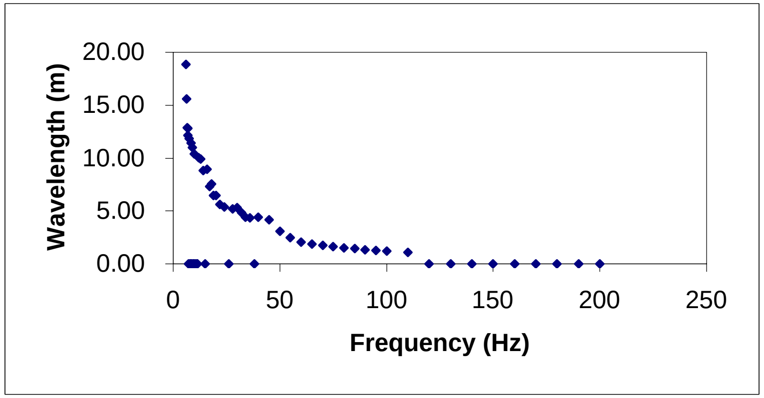
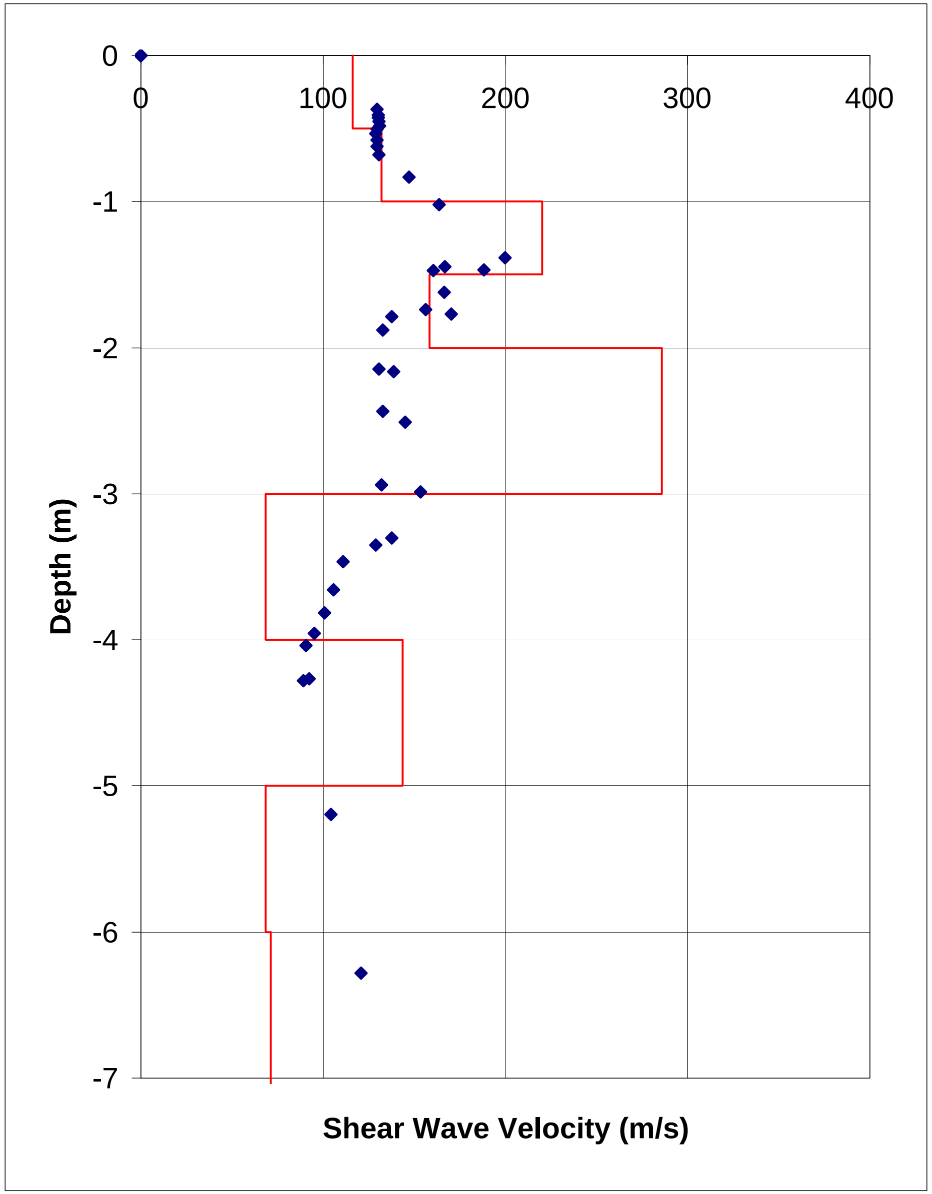
Continuous Surface Wave Profile

Date: 24/08/10
Site: Sizewell C, Location 310







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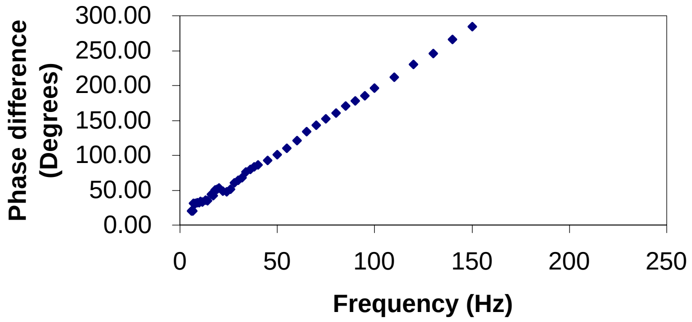
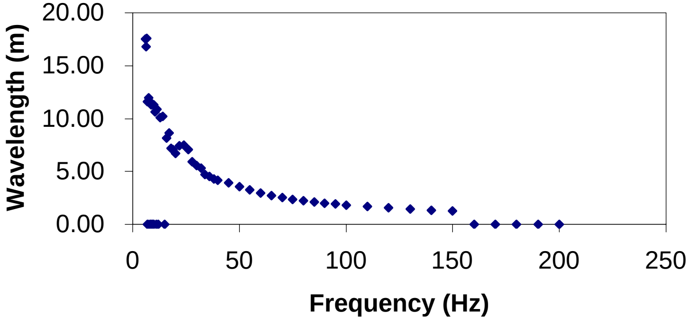
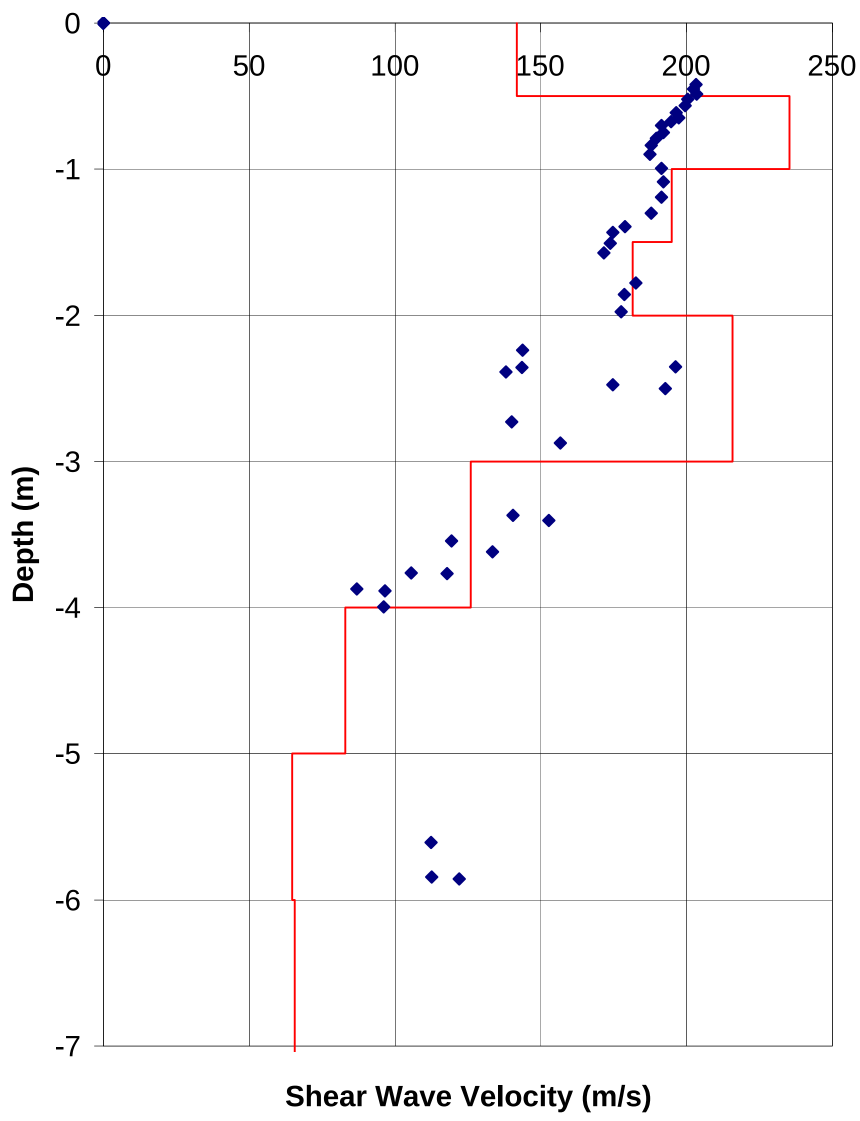
Continuous Surface Wave Profile

Date: 25/08/10
Site: Sizewell C, Location 311







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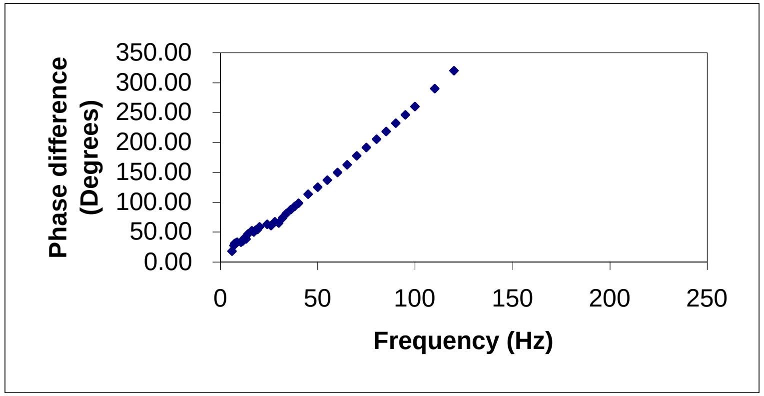
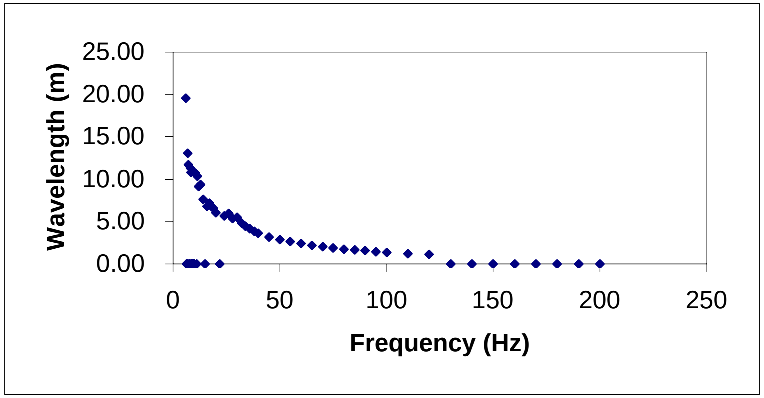
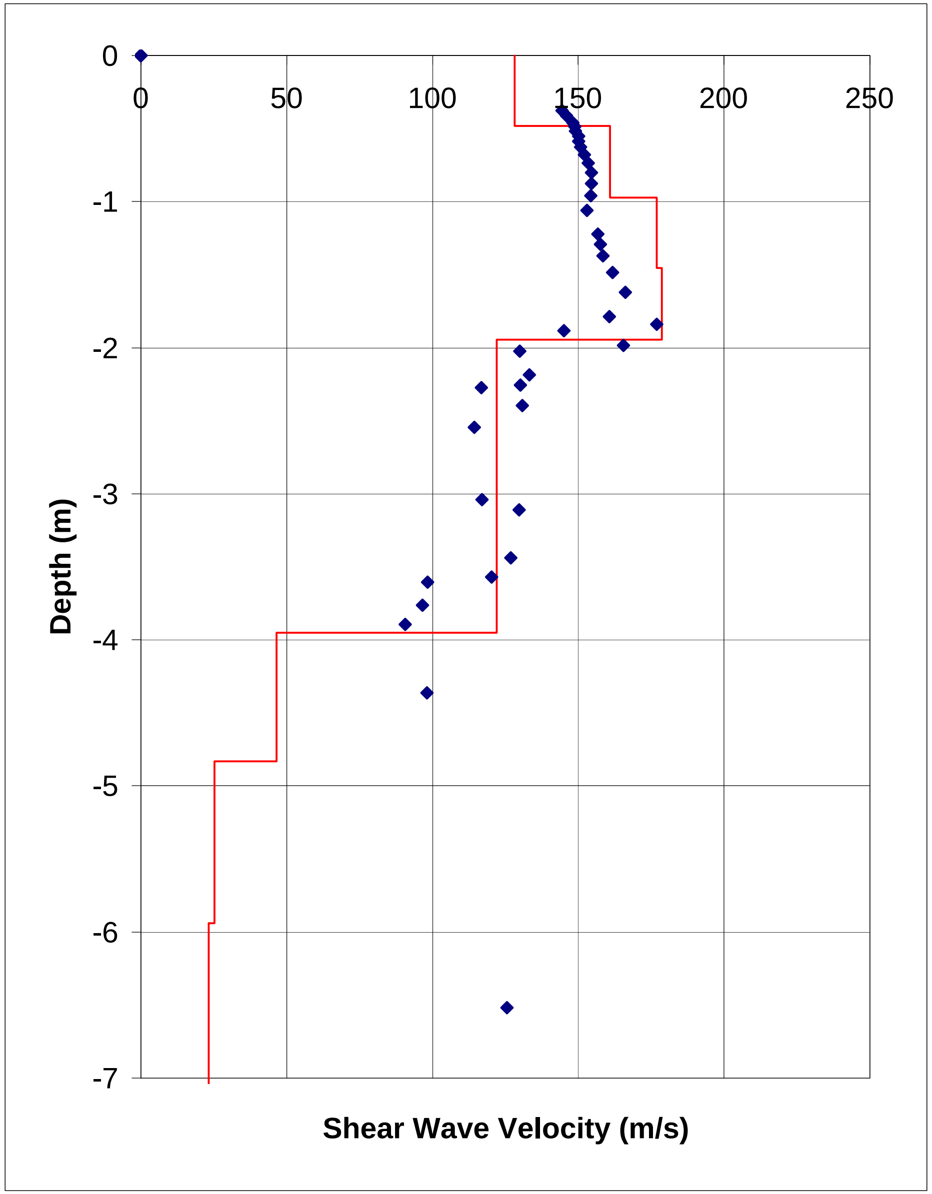
Continuous Surface Wave Profile

Date: 25/08/10
Site: Sizewell C, Location 312







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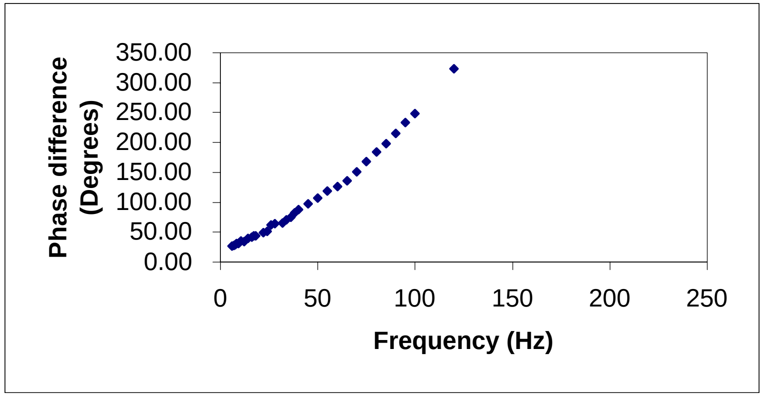
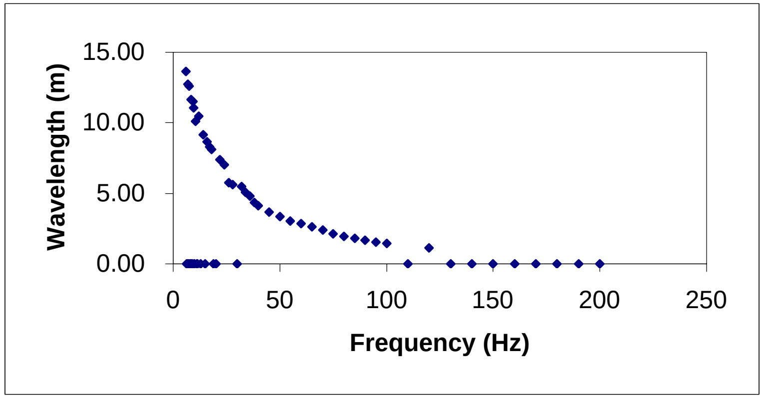
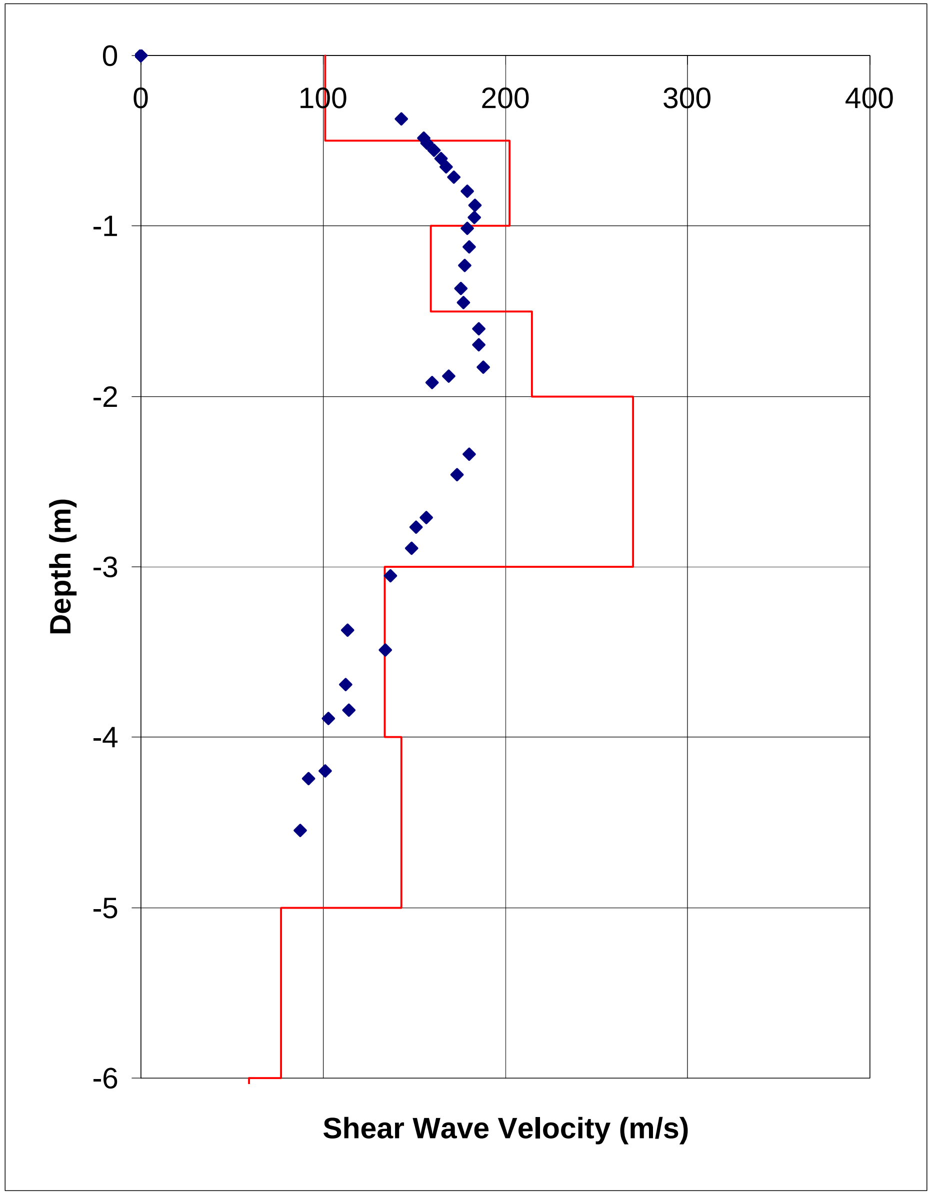
Continuous Surface Wave Profile

Date: 25/08/10
Site: Sizewell C, Location 313







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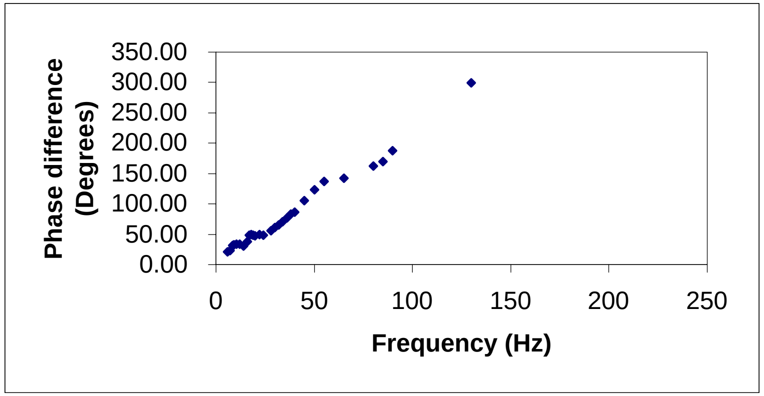
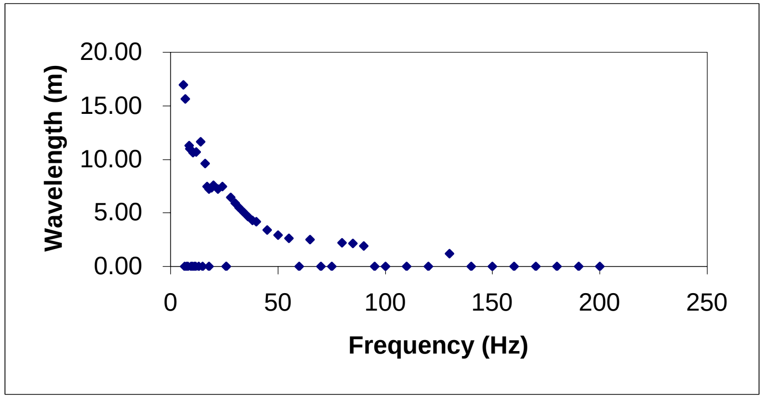
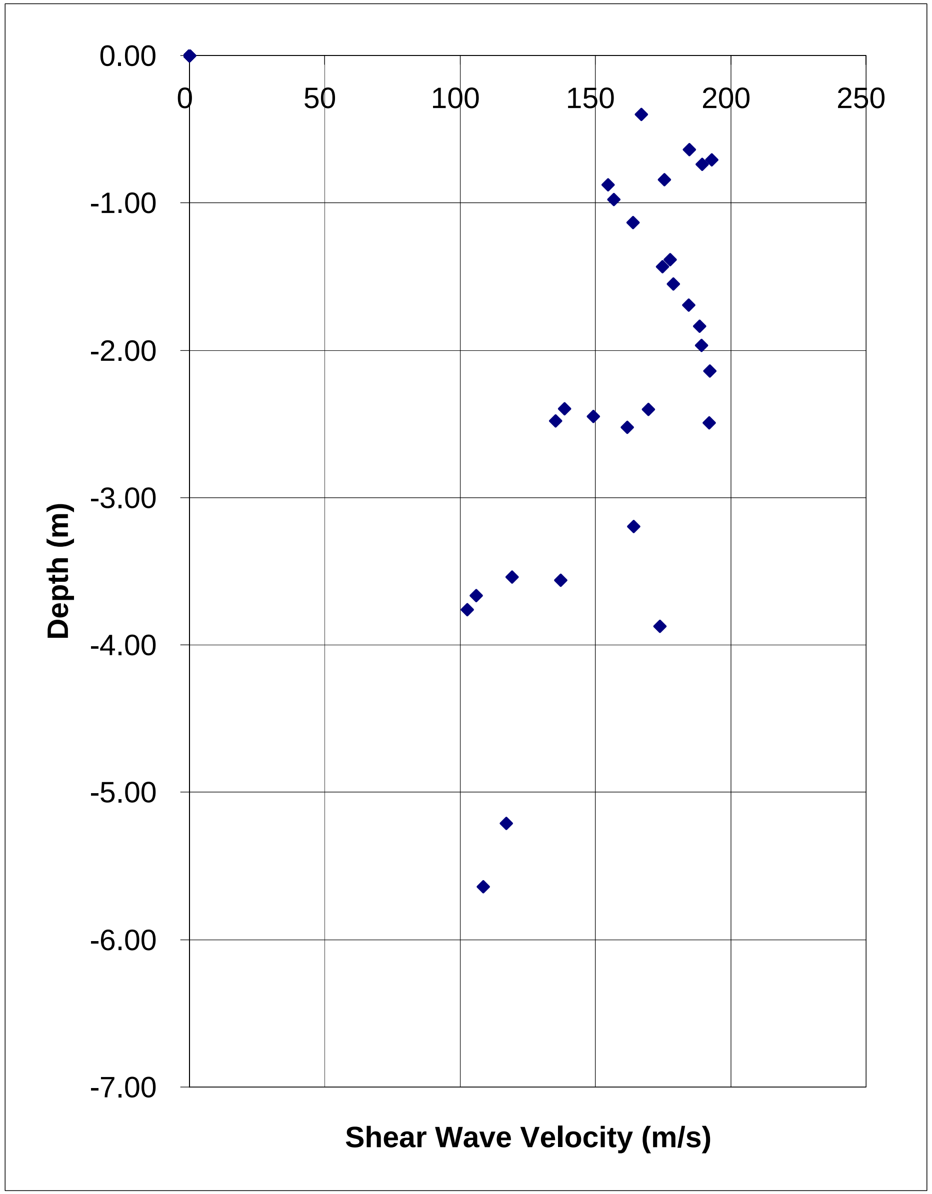
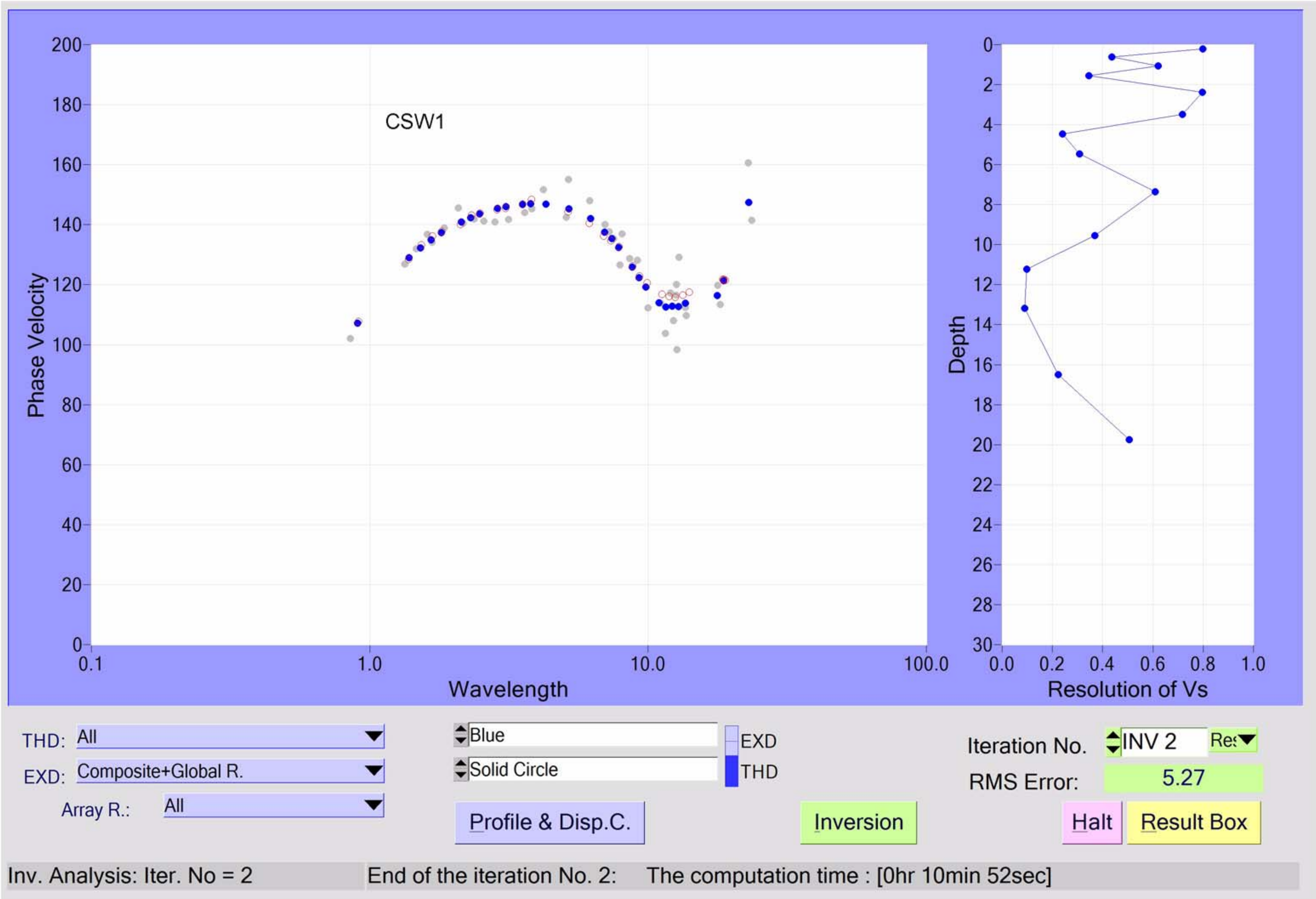
Continuous Surface Wave Profile

Date: 25/08/10
Location: Sizewell C, Location 14

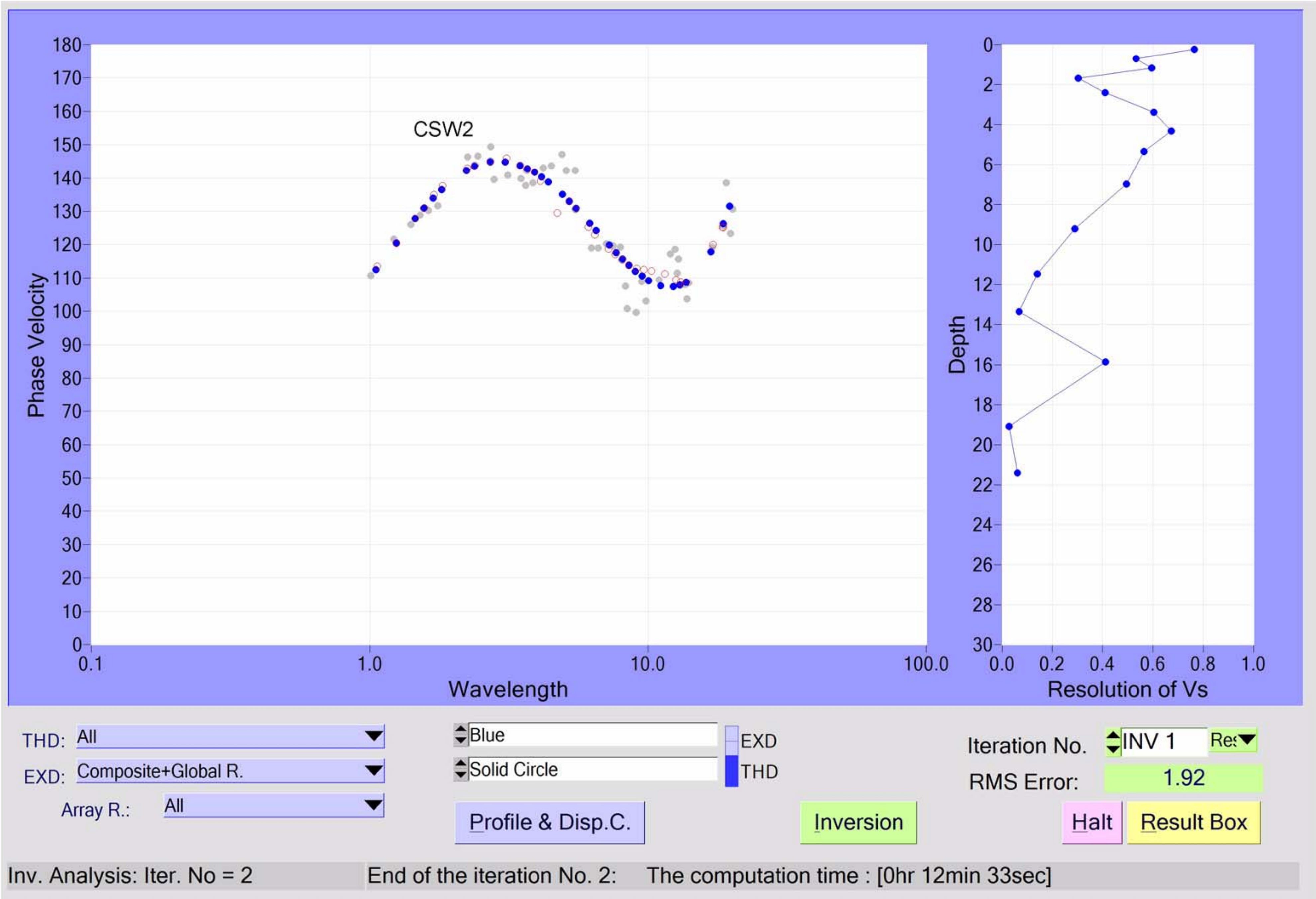


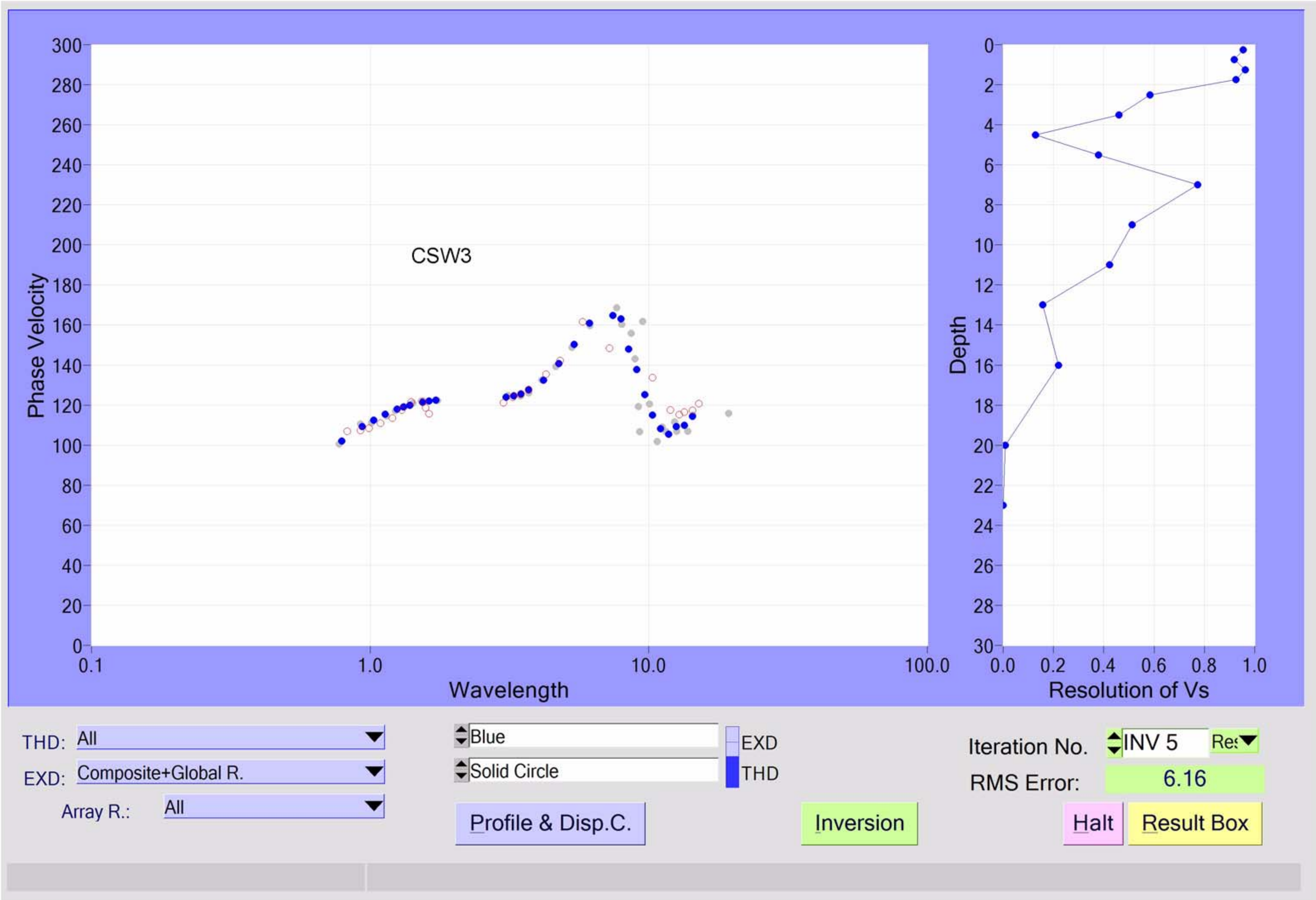




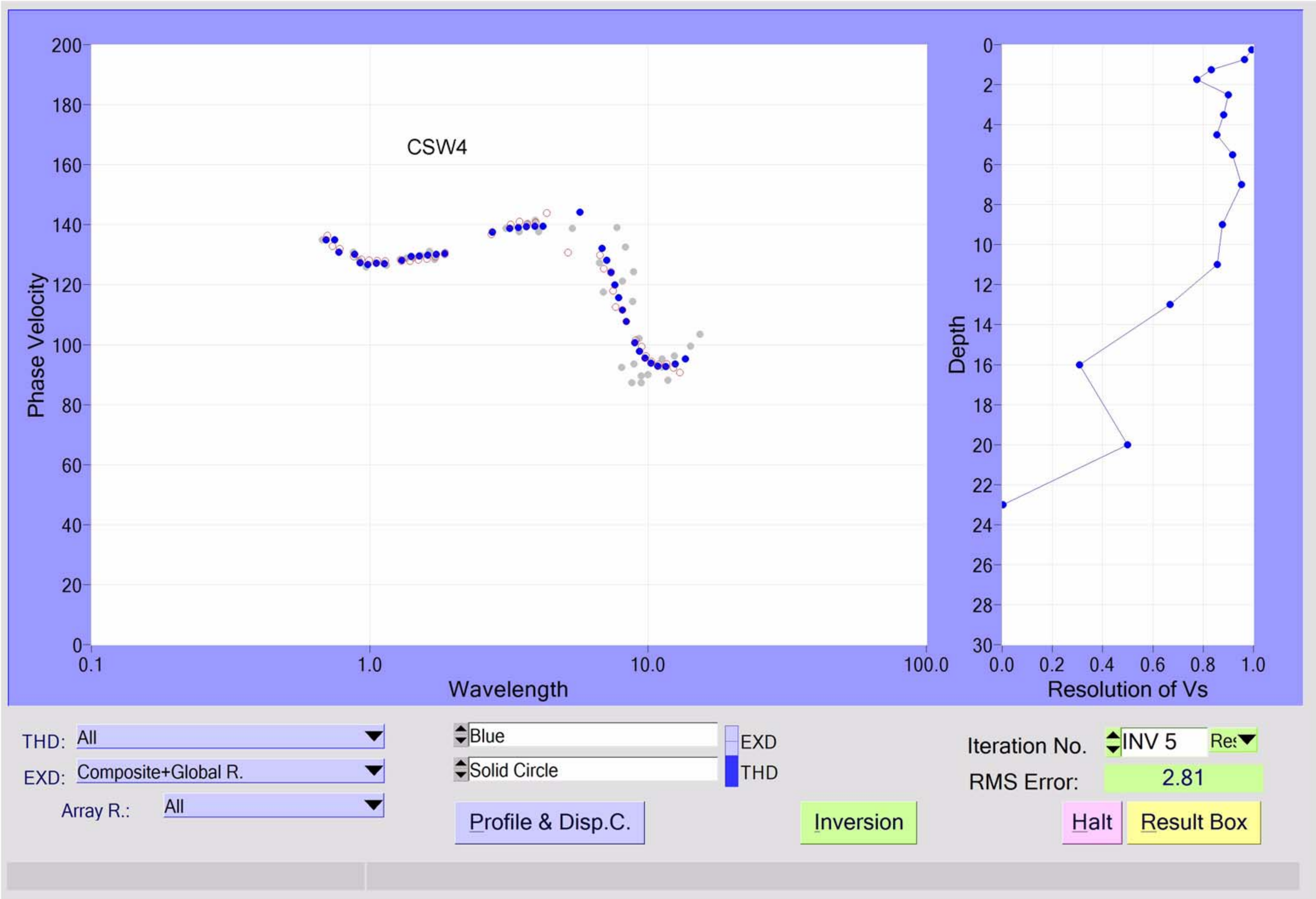


CSW1
Phase Velocity
Wavelength
0.1
1.0
10.0
100.0
200
180
160
140
120
100
80
60
40
20
0
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 2
RMS Error:
5.27
Halt
Result Box
Inv. Analysis: Iter. No = 2
End of the iteration No. 2: The computation time : [0hr 10min 52sec]

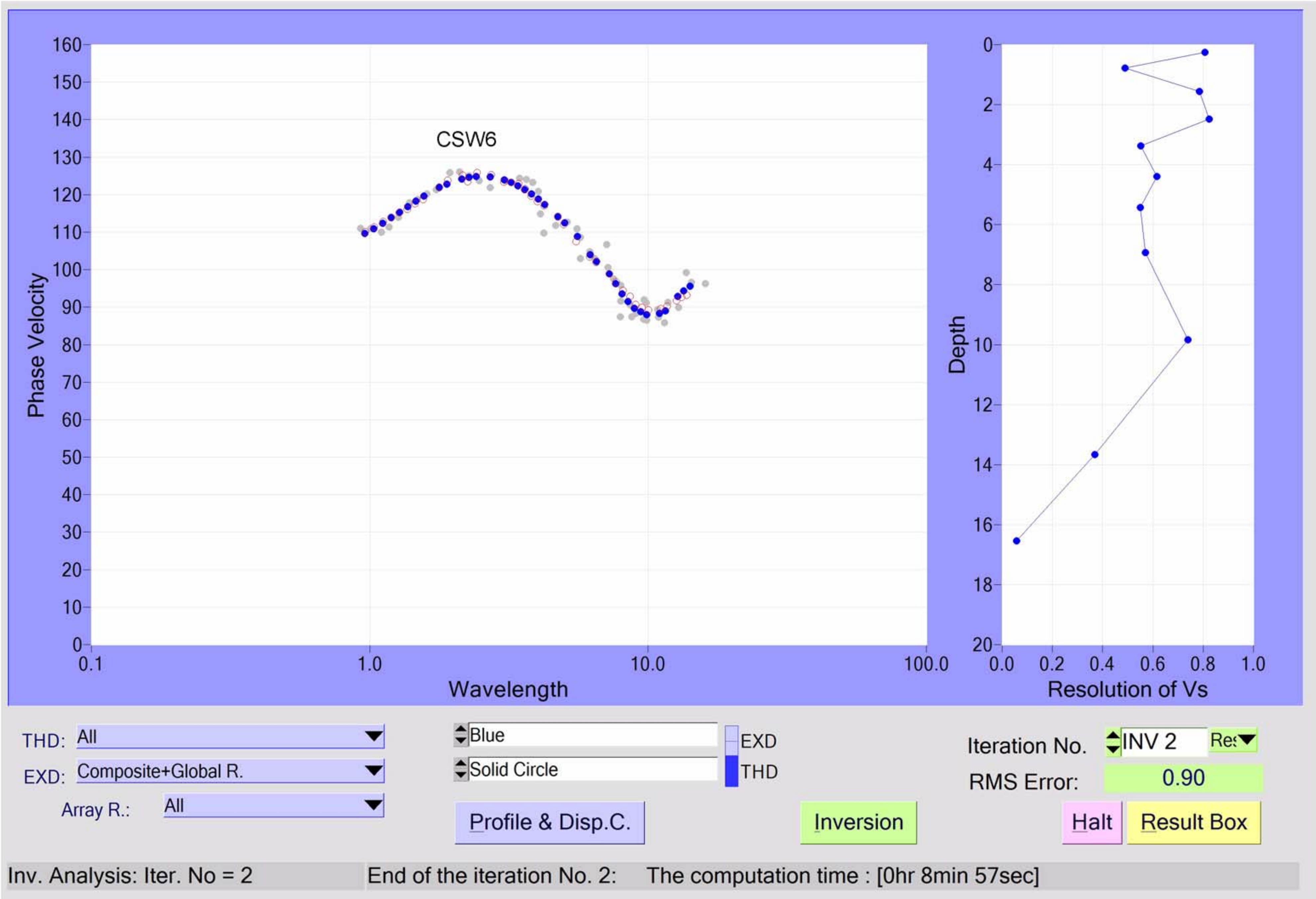

CSW2
Phase Velocity
Wavelength
0.1
1.0
10.0
100.0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
Depth
Resolution of Vs
0.0
0.2
0.4
0.6
0.8
1.0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
THD:
All
EXD:
Composite+Global R.
Array R.:
All
Blue
Solid Circle
EXD
THD
Iteration No.
INV 1
RMS Error:
1.92
Profile & Disp.C.
Inversion
Halt
Result Box
Inv. Analysis: Iter. No = 2
End of the iteration No. 2:
The computation time : [0hr 12min 33sec]

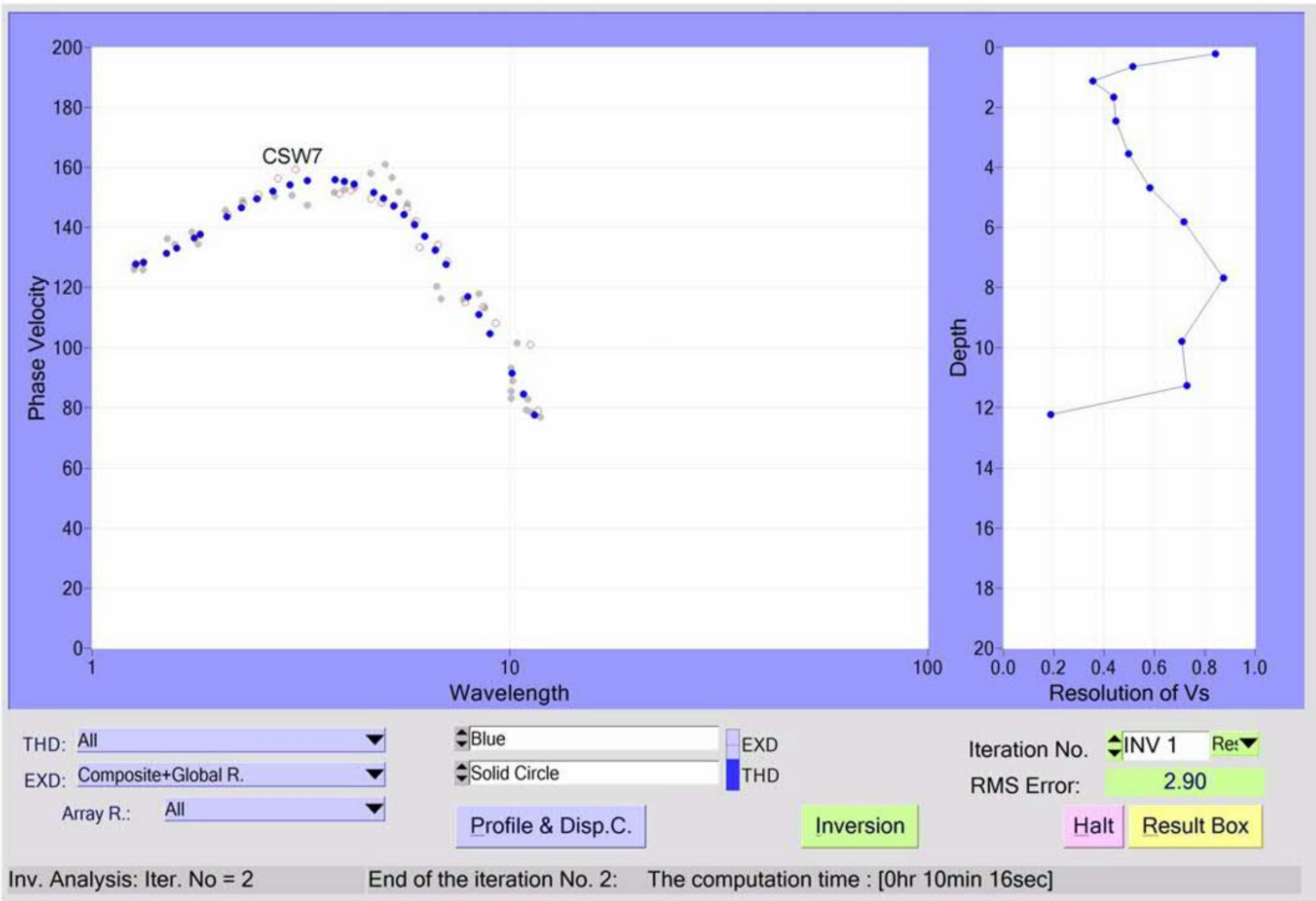


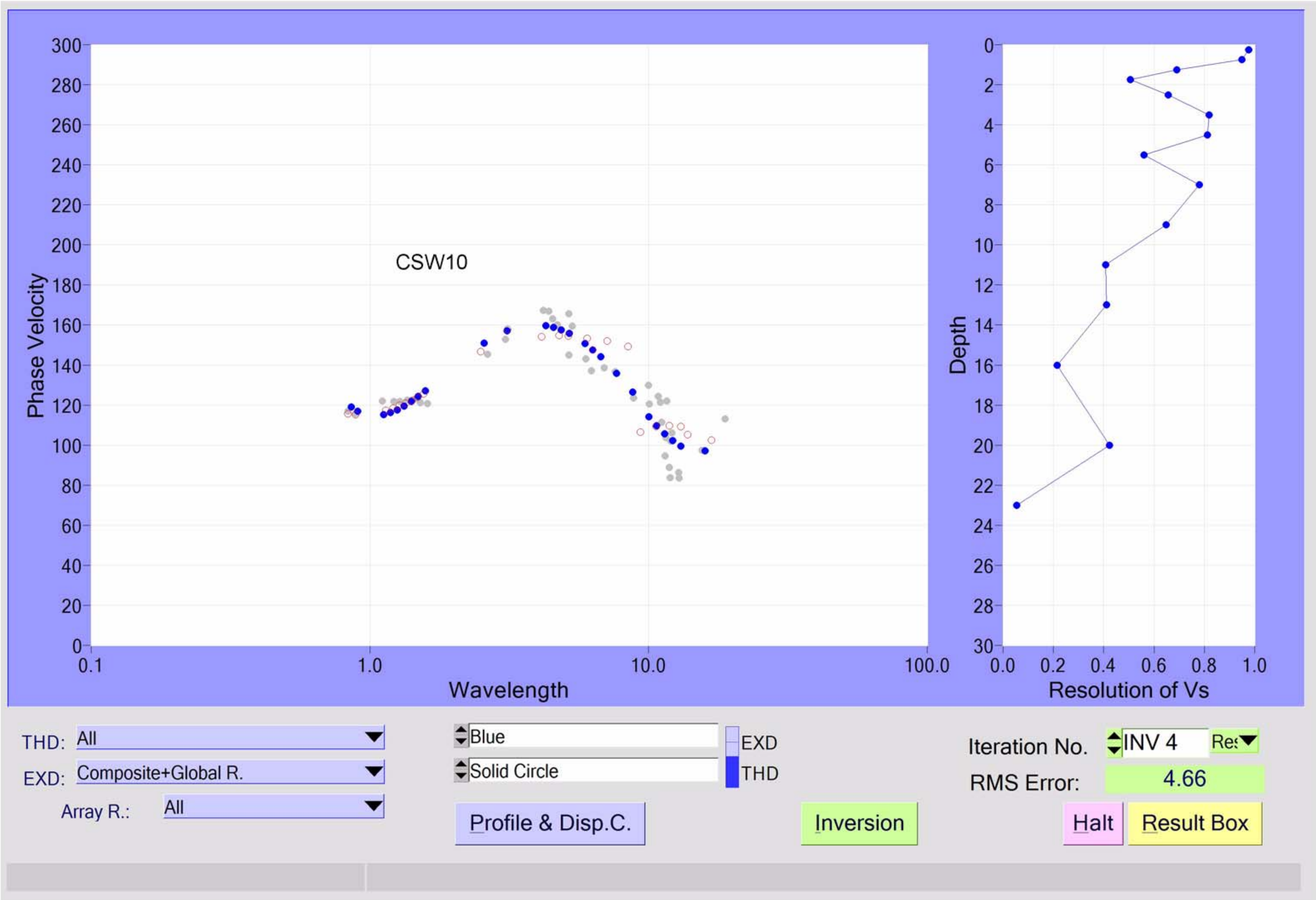
CSW3
Phase Velocity
Wavelength
0.1
1.0
10.0
100.0
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Depth
Resolution of Vs
0.0
0.2
0.4
0.6
0.8
1.0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No. INV 5
RMS Error: 6.16
Halt
Result Box

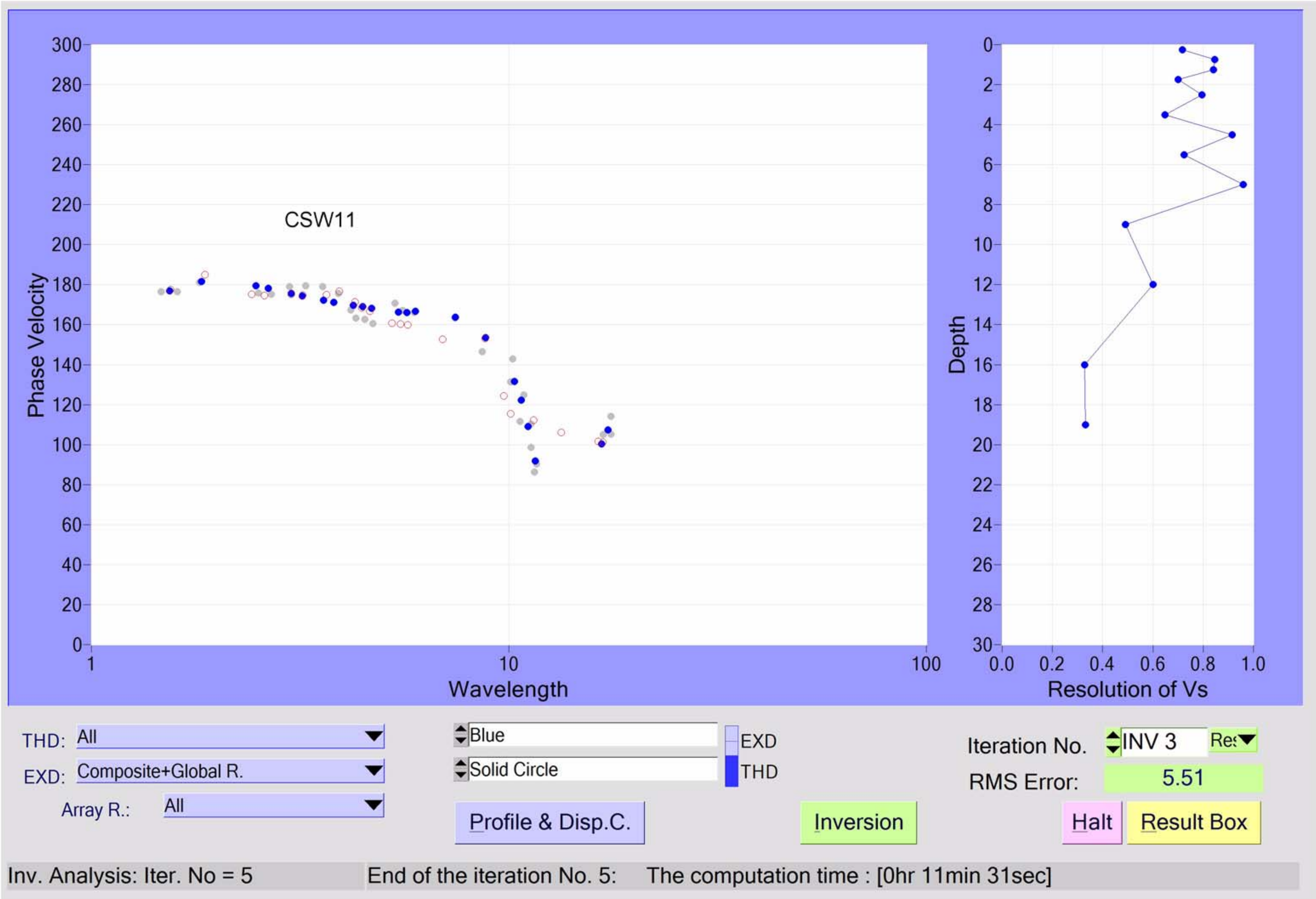


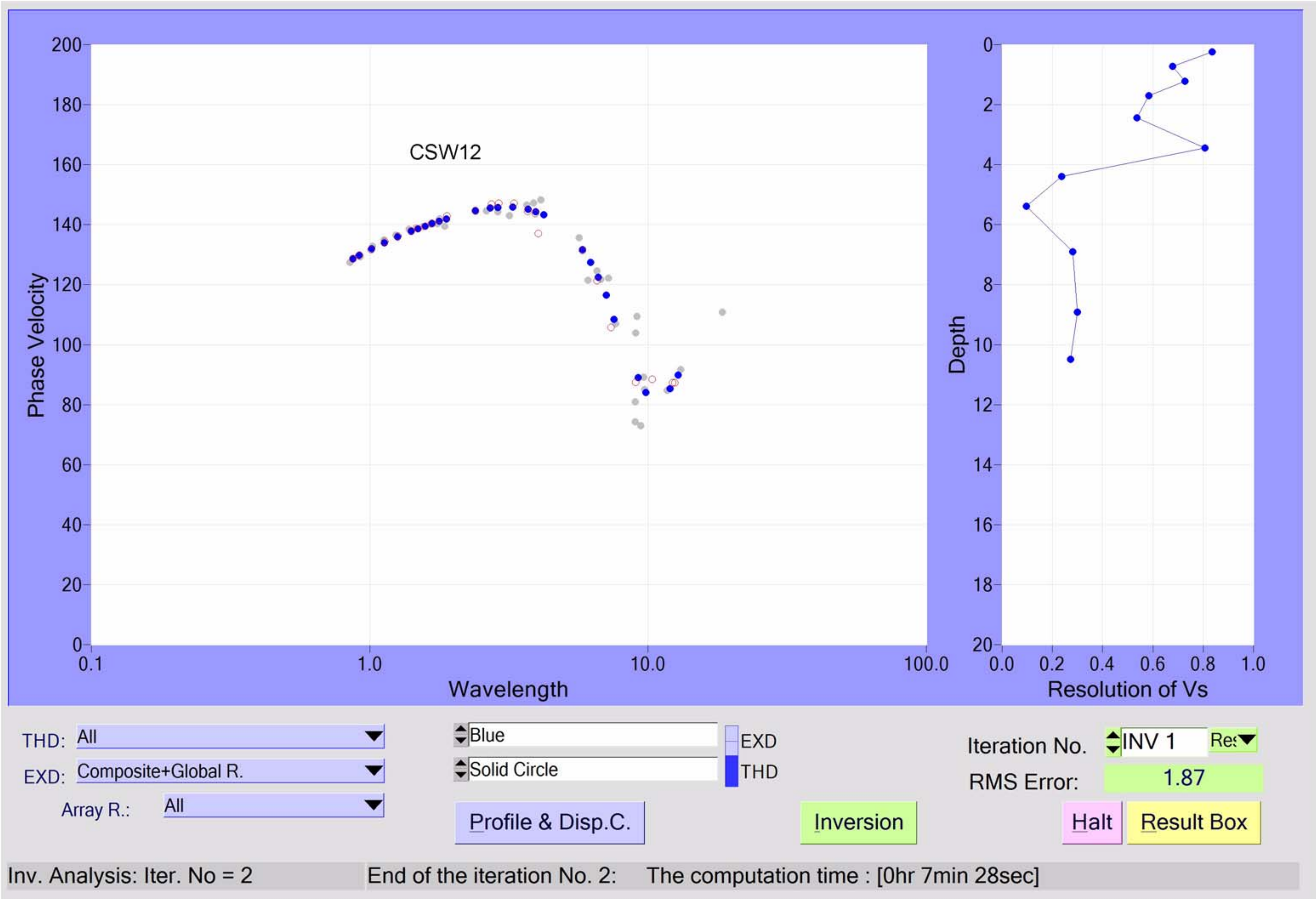
CSW4
Phase Velocity
Wavelength
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 5
RMS Error:
2.81
Halt
Result Box

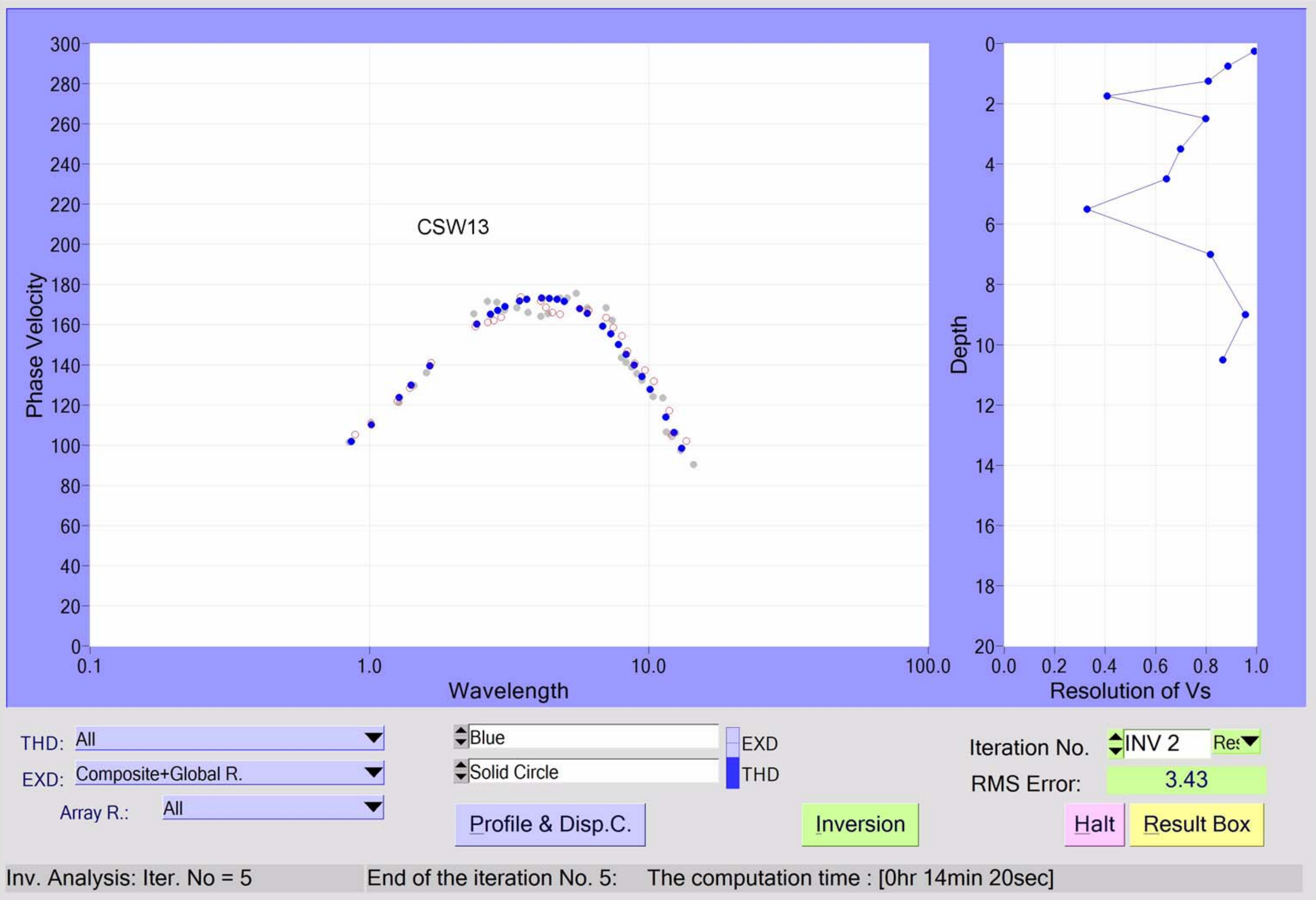

CSW6
Phase Velocity
Wavelength
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No. INV 2
RMS Error: 0.90
Halt
Result Box
Inv. Analysis: Iter. No = 2
End of the iteration No. 2: The computation time : [0hr 8min 57sec]


CSW7
Phase Velocity
Wavelength
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 1
RMS Error:
2.90
Halt
Result Box
Inv. Analysis: Iter. No = 2
End of the iteration No. 2: The computation time : [0hr 10min 16sec]


CSW10
Phase Velocity
Wavelength
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 4
RMS Error:
4.66
Halt
Result Box


CSW11
Phase Velocity
Wavelength
Depth
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 3
RMS Error:
5.51
Halt
Result Box
Inv. Analysis: Iter. No = 5
End of the iteration No. 5: The computation time : [0hr 11min 31sec]


CSW12
Phase Velocity
200
180
160
140
120
100
80
60
40
20
0
0.1
1.0
10.0
100.0
Wavelength
Depth
0
2
4
6
8
10
12
14
16
18
20
0.0
0.2
0.4
0.6
0.8
1.0
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 1
RMS Error:
1.87
Halt
Result Box
Inv. Analysis: Iter. No = 2
End of the iteration No. 2:
The computation time : [0hr 7min 28sec]


CSW13
Phase Velocity
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
0.1
1.0
10.0
100.0
Wavelength
Depth
0
2
4
6
8
10
12
14
16
18
20
0.0
0.2
0.4
0.6
0.8
1.0
Resolution of Vs
THD: All
EXD: Composite+Global R.
Array R.: All
Blue
Solid Circle
EXD
THD
Profile & Disp.C.
Inversion
Iteration No.
INV 2
RMS Error:
3.43
Halt
Result Box
Inv. Analysis: Iter. No = 5
End of the iteration No. 5: The computation time : [0hr 14min 20sec]

ENCLOSURE C

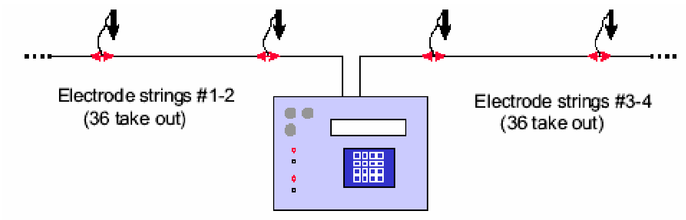
TECHNICAL INFORMATION

Soil Mechanics

Technical Information

IRIS Instruments

SYSCAL Jr Switch 72 Resistivity System



The SYSCAL Jr Switch-72 multi-node resistivity imaging system features an internal switching board for up to 72 electrodes and an internal 100W power supply. The output current is automatically adjusted to optimise the input voltages and ensure best measurement quality. The system is designed to perform pre-defined sets of resistivity measurements with a roll-along capability. Four strings of cable with 18 electrode take-outs are connected together on the back of the resistivity meter. Standard cables are available with 5m and 10m electrode spacings. Custom cables for special arrays and non-standard applications can also be assembled.

Preset arrays (Wenner, Dipole, Schlumberger etc) or customized arrays are uploaded from a PC using ELECTRE software. Data recovered from the instrument using PROSYS software can be processed using standard inversion software such as RES2DINV, RESIX-2DI or RES3DINV.

OUTPUT CURRENT SPECIFICATIONS

Type	Auto ranging – micro processor controlled.
Current output	up to 1200mA
Voltage output	up to 400V (800V peak to peak)
Power	up to 100W
Cycle Times	Selectable 0.25, 0.5, 1 or 2 seconds Programmable from 0.25 to 10 seconds
Current measurement precision	0.5% typical

INPUT VOLTAGE SPECIFICATIONS

Type	Automatic ranging and calibration
Input impedance	20 MOhm minimum
Input voltage protection	up to 1000V, range from –5V to +5V
Frequency rejection	Power line rejection
Voltage measurement precision	0.5% typical
Noise reduction	Continuous stacking selectable from 1 to 255 stacks
SP compensation	Automatic linear drift correction
Resistivity accuracy	0.5% typical
Induced polarization (chargeability)	measured over four predefined windows
Chargeability accuracy	1% of measured value for input voltages greater than 10 mV.

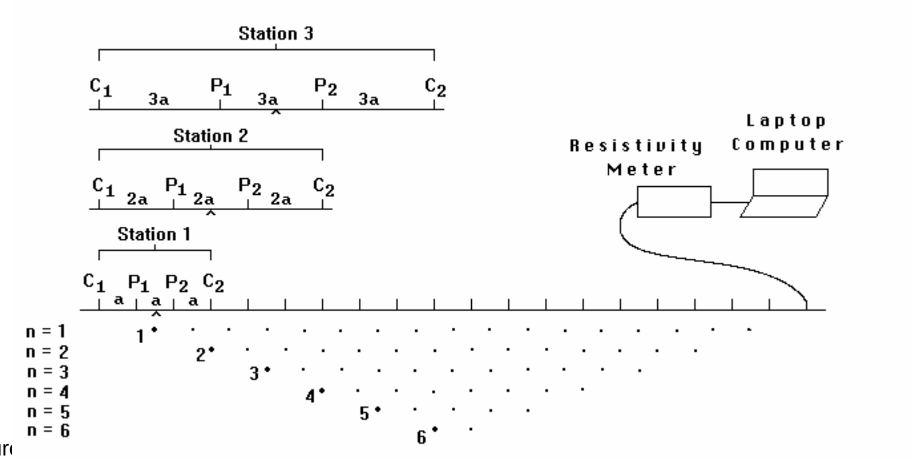
GENERAL SPECIFICATIONS

Case	Weatherproof and shock resistant
Operating temperature	-20 to +70 ^{o}C
Dimensions	21 x 23 x 40 cm
Weight	11.5 kg
Internal memory	2700 readings
Power supply	2 internal rechargeable 12V 7 Ah batteries optional 12V car battery.
Cable weight	15 kg for an 18 electrode 5m spacing reel

RES2DINV RESISTIVITY INVERSION SOFTWARE

RES2DINV is a computer program which will automatically determine a two-dimensional (2-D) resistivity model for the subsurface for the data obtained from electrical imaging surveys (Griffiths and Barker 1993). Since it is a Windows based program, any Windows compatible graphics card or printer is automatically supported. It has been tested with video screen modes of up to 1600 by 1200 pixels and 256 colours.

Figure 1 shows an example of the electrodes arrangement and measurement sequence which can be used for a 2-D electrical imaging survey. This program is designed to invert large data sets (with about 100 to 5000 datum points) collected with a system with a large number of electrodes (about 25 to 650 electrodes).



Figur lectrode survey setup.

The 2-D model used by the inversion program, which consists of a number of rectangular blocks, is shown in Figure 2. The arrangement of the blocks is loosely tied to the distribution of the datum points in the pseudosection. The distribution and size of the blocks is automatically generated by the program so that the number of blocks do not exceed the number of datum points. However, the program has an option which allows the user to use a model where the number of blocks can exceed the number of datum points. The depth of the bottom row of blocks is set to be approximately equal to the equivalent depth of investigation (Edwards 1977) of the datum points with the largest electrode spacing. The data must be collected with a system where the electrodes are arranged along a line with a constant spacing between adjacent electrodes.

A forward modelling subroutine is used to calculate the apparent resistivity values, and a non-linear least-squares optimisation technique is used for the inversion routine (deGroot-Hedlin and Constable 1990, Loke and Barker 1996a). This program can be used for surveys using the Wenner, pole-pole, dipole-dipole, pole-dipole, Wenner-Schlumberger and rectangular arrays. You can process pseudosections with up to 650 electrodes and 6500 datum points at a single time. The largest electrode spacing can be up to 36 times the smallest spacing used in a single data set. The program data limits will be extended in the future as larger field data sets are encountered.

Besides normal surveys carried out with the electrodes on the ground surface, the program also supports underwater and cross-borehole surveys.

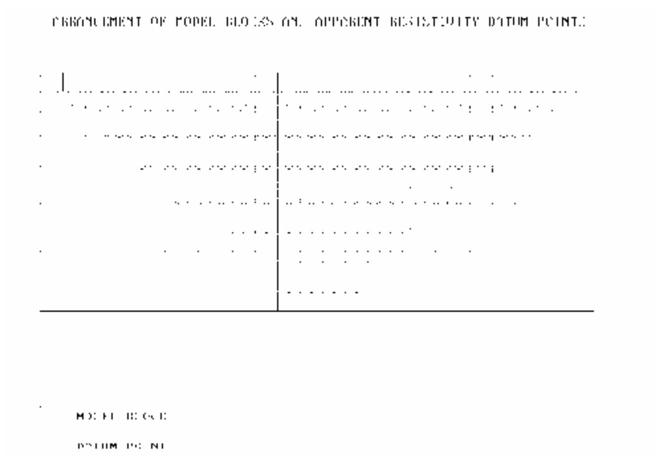


Figure 2. Arrangement of the blocks used in a model together with the datum points in the pseudosection.

The CSWS provides:

- ***Automated, computer-controlled test procedures*** ✓
- ***Easy-to-use, MS Windows®-based user interface*** ✓
- **Cost-effective compared with alternative methods** ✓
- ***Easy to use:*** ✓
  - ***set up in 5 minutes***
  - ***portable equipment***
  - ***non-invasive testing***
  - ***USB port for data downloads***
- ***Stiffness v depth available immediately in field*** ✓
- ***Time domain output*** ✓
- ***On-line Fast Fourier Transform (FFT)*** ✓

Continuous Surface Wave System (CSWS)

What is it?

The Continuous Surface Wave System (CSWS) enables a shear stiffness-depth profile to be determined to depths between 10m (in clays) and 30m (in some granular soils and weak rocks) without the need to provide a borehole. It provides on-line data processing such that the stiffness-depth profile may be viewed as the test is in progress. This allows the operator to assess the quality of the data before moving to another location. These profiles enable geotechnical engineering predictions of surface settlement.

Recent developments in laboratory small strain stiffness measurements and the use of non-linear finite element analysis have closed the (perceived) gap between static and dynamic measurements of stiffness. Thus, stiffness parameters, determined from seismic velocity measurements, can be used in geotechnical design. Traditionally, geophysics has been used only as an indirect means of targeting and dimensioning sub-surface features. This application has its origins in oil and mineral exploration.

The CSWS is set up on the ground surface and propagates Rayleigh waves which are constrained within a zone which is, approximately, one wavelength in depth. In ground where the stiffness changes with depth, these elastic waves are dispersive in nature, which means that they travel at a velocity which is dependent upon frequency and wavelength.

The CSWS uses a frequency controlled vibrator to regulate the frequency of these surface waves, thus permitting a dispersion curve (velocity against frequency or wavelength) to be readily determined (see Fig. 1). By using the theory of elasticity, shear wave velocity and shear modulus G can be determined from these velocity measurements.

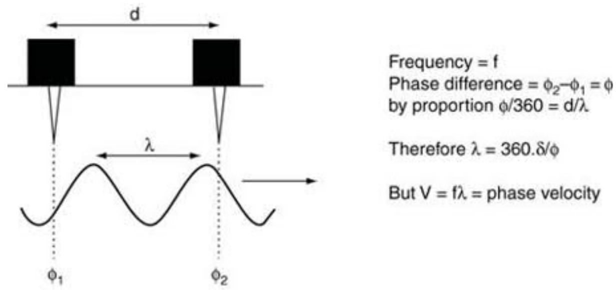


Fig. 1 By knowing the frequency, f, and the change in phase with distance from the vibrator, the phase velocity of the ground Rayleigh waves can be determined

Technical specification

- **Display**: 12.1” colour TFT touch screen
- **Resolution of measurement**: 16 bit data capture
- **Frequency of measurement**: up to 200,000 samples per second
- **Sensor number:** standard system for 2-6 geophones, upgradeable to a maximum of 12
- **Size of control unit**: 450mm x 350mm x 180mm
- **Weight of control unit**: 12kg
- **Power**: 92-265V AC, 48-440Hz, 65w maximum, single phase three wire earthed supply, 2A fuse x 2
- **Size of ground vibrator**: 450mm x 350mm x 180mm
- **Weight of ground vibrator**: 70kg (489N force)
- **Can be used as a Spectral Analysis of Surface Waves (SASW) test system using an impact source**

System set-up

The set-up is shown in Figs 2 and 3. A computer-controlled inertial vibrator applies a precisely regulated and measured continuous vertically polarized disturbance to the ground surface. This generates surface waves which are detected by a line of sensors (geophones) which are co-linear with the vibrator. The signals from the sensors are fed back to the computer which analyses the phase relationships between them and so computes the velocity of the surface wave. By changing the frequency of the continuous wave generated by the vibrator, velocity measurements can be made over a range of depths. The measured dispersion curve is inverted to produce a profile of surface wave velocity with depth. By entering the bulk density and its Poisson's ratio of the soil/rock, this profile is converted to that of shear modulus with depth. These parameters may be estimated on site with minimal errors in stiffness.

The plot of shear stiffness against depth may be viewed after each stiffness measurement is made. Typically a shear stiffness-depth profile will contain between 50 and 100 separate stiffness measurements at different depths. By using smaller frequency increments, even more stiffness measurements may be made. A typical profile will take about 45 minutes to produce. If the cost of each individual stiffness measurement is considered, the surface wave system works out cheaper than other direct methods of measurement such as the pressuremeter and the plate loading test.

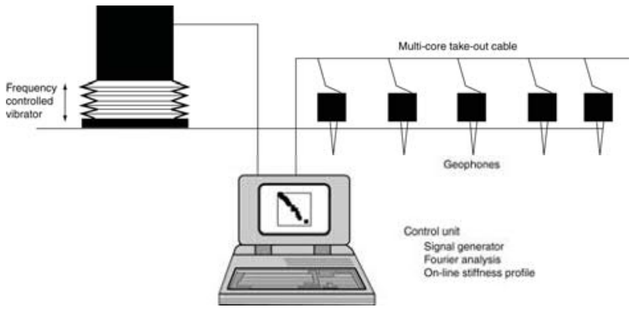
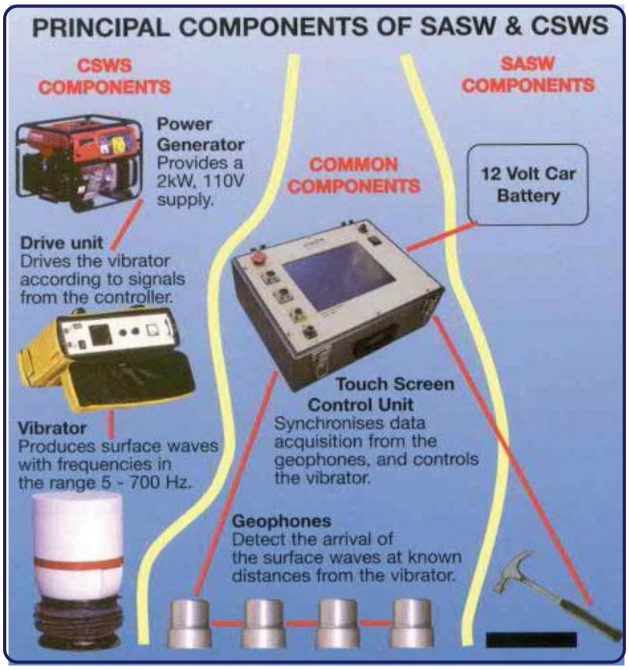


Fig 2. Diagrammatic layout of the CSWS

Fig 3. Photograph showing a six-geophone layout on one of our test sites



System features

- Provides on-line shear modulus with depth profile to depths of up to 30m depending on the type of soil or weak rock
- Enables rapid assessment of ground variability across a site in terms of stiffness
- Provides stiffness parameters for ground that is difficult or impossible to sample in a representative manner, eg granular soils and highly fractured rock
- Provides between 50 and 100 (or more) stiffness measurements per location
- Can be operated by two people in the field
- Enables predictions of settlement
- Verifies soil improvement, eg from dynamic compaction, vibrofloatation and classic consolidation
- Enables the measurement of Gmax which can provide a valuable benchmark for stiffness investigations in soils

Why buy CSWS?

- Automated test software - the user enters the required test frequencies and the software runs the complete test automatically.
- User friendly, easy-to-use software interface.
- Flexible data output which can be imported directly into Microsoft® Excel.
- Data output includes time domain, frequency domain (magnitude and phase), coherence and stiffness v depth using the Lambda/3 method.
- Future upgrade possibilities to CSWS system (with ground vibrator).

Due to continued development, specifications may change without notice.

ENCLOSURE D

BOREHOLE INFORMATION

PRELIMINARY

Borehole Log

Soil Mechanics

Drilled / Logged / Checked	Start / End	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level / Coordinates / National Grid / Chainage
[redacted]	Start 7/10/10 End 11/10/10	Cable Percussion Boring, Dando 3000	0.0	20.45	200	19.00	

Samples and Tests

Depth	Type & No	Records	Date / Casing	Time / Water
0.10	D1	Hand dug inspection pit 300 x 1200.		
0.40-0.80	B2			
1.00	W3			
1.50-2.00	B4			
2.50-3.00	SPT5	N=0 1,0/0,0,0,0	2.50	0.50
2.50-3.00	B6			
3.50-4.00	B7			
3.90	D8			
4.50-5.00	B9		4.50	2.90
5.00-5.45	SPT10	N=3 1,0/1,0,1,1		
5.00-5.45	B11		5.80	3.10
6.00-6.45	SPT12	N=7 1,1/2,2,2,2		
6.00-6.45	B13			
7.00-7.45	SPT14	N=12 1,2/2,4,3,3	6.10	3.40
7.00-7.45	B15			
7.40	D16			
8.00-8.45	SPT17	N=16 1,2/4,3,4,5	8.00	0.00
8.00-8.45	B18			
9.00-9.45	SPT19	N=4 1,0/1,1,1,1	9.00	0.00
9.00-9.45	B20			
10.00-10.45	SPT21	N=20 3,3/4,4,6,6	10.00	0.00
10.00-10.45	B22			
11.00-11.45	SPT23	N=22 2,3/4,4,6,8	11.00	0.0
11.00-11.45	B24			
12.00-12.45	SPT25	N=18 1,2/3,4,5,6	12.00	0.0

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/Instruments
0.0-0.10m Orangish brown clayey fine to medium SAND. Rare shell fragments (TOPSOIL).	0.10m		Bentonite
0.10-3.90m Orangish brown slightly clayey, slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies including claystone + flint. 0.10-3.00m occasional shell fragments.	3.90m		
3.90-7.40m Spongy brown pseudo-fibrous PEAT. With layers of soft grey silty clay. 6.00m becoming black 7.00m becoming amorphous	7.40m		Cement Grout
7.40-20.45m Grey slightly silty, slightly clayey fine to coarse SAND. Occasional shell fragments. 7.40- silty, v.clayey (Crag deposits)			
END OF BOREHOLE 20.45m.			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1,	1.00	rose to 0.80m after 20mins.	
2,	7.40	rose to 2.50m after 20mins.	

Depth Related Remarks

From / to (m): Water added 1.2 to 3.9m.

Chiselling — Depths (m) / Time / Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project: Sizewell
Project No. A0012-10
Carried out for: EDF

Borehole: GE03 BH1

PRELIMINARY

Borehole Log

Soil Mechanics

Drilled Logged Checked	Start - End -	Equipment, Methods and Remarks	Depth from to Diameter Casing Depth	Ground Level Coordinates National Grid Chainage

Samples and Tests / Strata

Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
12.00-12.45	B26							
13.00-13.45	SD27	N=18 1,2/4,4,5,5	13.00	0.00				
13.00-13.45	B28							
14.00-14.45	SD29	N=18 1,2/4,4,5,5	14.00	0.00				
14.00-14.45	B30							
15.00-15.45	SD31	N=16 2,2/3,4,4,5	15.00	0.00				
15.00-15.45	B32							
16.00-16.50	B33							
17.00-17.45	SD34	N=16 2,3/4,4,4,4	17.00	0.00				
17.00-17.45	B35							
18.00-18.50	B36							
19.00-19.45	SD37	N=19 1,2/4,5,4,6	19.00	0.00				
19.00-19.45	B38							
20.00-20.45	SD39							

Depth	Type & No	Records	Date Casing	Time Water

Groundwater Entries No. Struck (m) Post strike behaviour Depth sealed (m)	Depth Related Remarks * From to (m)	Chiselling Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Sizewell
Project No. A0012-10
Carried out for

Borehole GEO3 BH1

PRELIMINARY

Borehole Log

Soil Mechanics

Drilled / Logged / Checked	Start / End	Equipment, Methods and Remarks	Depth from	to	Diameter	Casing Depth	Ground Level / Coordinates / National Grid / Chainage
[redacted]	12/10/10 / 13/10/10	Cable Percussion Boring, Dando 3000	0.0	20.45	200	20.00	- / - / -

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
0.10	D1	Hand dug inspection pit 300 x 1200.		
0.50-1.00	B2			
1.20-1.70	B3			
1.60	D4			
2.50-2.95	SD5	N=16 2,2/3,3,4,6	2.50	1.00
2.50-2.95	B6			
3.50-4.00	B7			
4.50-5.00	B8			
5.00-5.60	SD9	SW PEN 300 N=4 1,1,1,1	4.60	4.00
5.00-5.60	B10			
5.30	D11			
6.00-6.70	SD12	SW PEN 400 N=1 1,0,0,0	5.80	3.50
6.00-6.70	B13			
7.00-7.65	SD14	SW PEN 350 N=3 1,1,0,1	6.90	4.00
7.00-7.65	B15			
8.00-8.45	SD16	N=1 1,0/0,0,0,1	7.60	5.30
8.00-8.45	B17			
9.00-9.75	SD18	SW PEN 450 N=4 1,1,1,1	8.90	6.20
9.00-9.75	B19			
10.00-10.50	SD20	SW PEN 200 N=4 1,1,1,1	10.00	7.50
10.00-10.50	B21			
11.00-11.45	SD22	N=6 1,1/2,1,2,1	9.10	8.20
11.00-11.45	B23			

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
0.0-0.10m D1 MISSING	0.10m		BENTONITE
0.10-1.00m Brown slightly silty, gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of various lithologies including flint. (MADE GROUND).	1.00m		
1.00-1.60m Foreman reports CONCRETE. Recovered as sub angular to subrounded fine to coarse GRAVEL of various lithologies including flint + concrete (MADE GROUND).	1.60m		
1.60-5.30m Brown slightly clayey, very ~~sandy~~ gravelly fine to coarse sand. Gravel is subangular to subrounded fine to coarse of various lithologies including flint.	5.30m		
5.30-12.50m Plastic brown silty, clayey pseudo-fibrous PEAT. 6.00-7.65m V. soft grey silty clay with decaying plant remains 10.00m becoming black 11.00-11.45 black amorphous peat.			

Groundwater Entries

No.	Struck (m)	Post strike behaviour	Depth sealed (m)
1,	1.00	rose to 0.80m after 20mins	

Depth Related Remarks * From to (m)

Chiselling

Depths (m)	Time	Tools used
1.2-1.6	1½ hrs	

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project Sizewell
Project No. A0012-10
Carried out for EDF

Borehole GE03 BH2

PRELIMINARY

Borehole Log

Soil Mechanics

Drilled / Logged / Checked	Start / End	Equipment, Methods and Remarks	Depth from / to / Diameter / Casing Depth	Ground Level / Coordinates / National Grid / Chainage

Samples and Tests

Depth	Type & No	Records	Date Casing	Time Water
12.00-12.55	SD24	SW PEN 2.50	10.80	10.20
12.00-12.55	B25	N=5 1,1/2,1		
12.50	W26			
12.50	D27			
13.00-13.45	SD28	N=15	13.00	0.00
13.00-13.45	B29	1,2/3,4,4,4		
14.00-14.45	SD30	N=20	14.00	0.00
14.00-14.45	B31	2,3/3,4,5,8		
15.00-15.45	SD32	N=33 3,6/8,8,8,9	15.00	0.00
15.00-15.45	B33			
16.00-16.50	B34			
17.00-17.45	SD35	N=32 2,4/4,8,10,10	17.00	0.00
17.00-17.45	B36			
18.00-18.45	B37			
19.00-19.45	SD38	N=31 2,4/6,6,8,11	19.00	G.L
19.00-19.45	B39			
20.00-20.45	SD40	N=22 2,4/4,5,6,7	20.00	G.L

Strata

Description	Depth, Level (Thickness)	Legend	Backfill/ Instruments
12.50 – 20.45m Grey slightly silty fine to ~~medium~~ coarse SAND. Rare gravel sized shell fragments. 15.00m becoming occasional shell fragments. (Crag deposits).			
20.45m END OF BOREHOLE			

Groundwater Entries
No. Struck (m) Post strike behaviour Depth sealed (m)

Depth Related Remarks *
From to (m)

Chiselling
Depths (m) Time Tools used

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project
Project No.
Carried out for

Borehole GE03 BH2

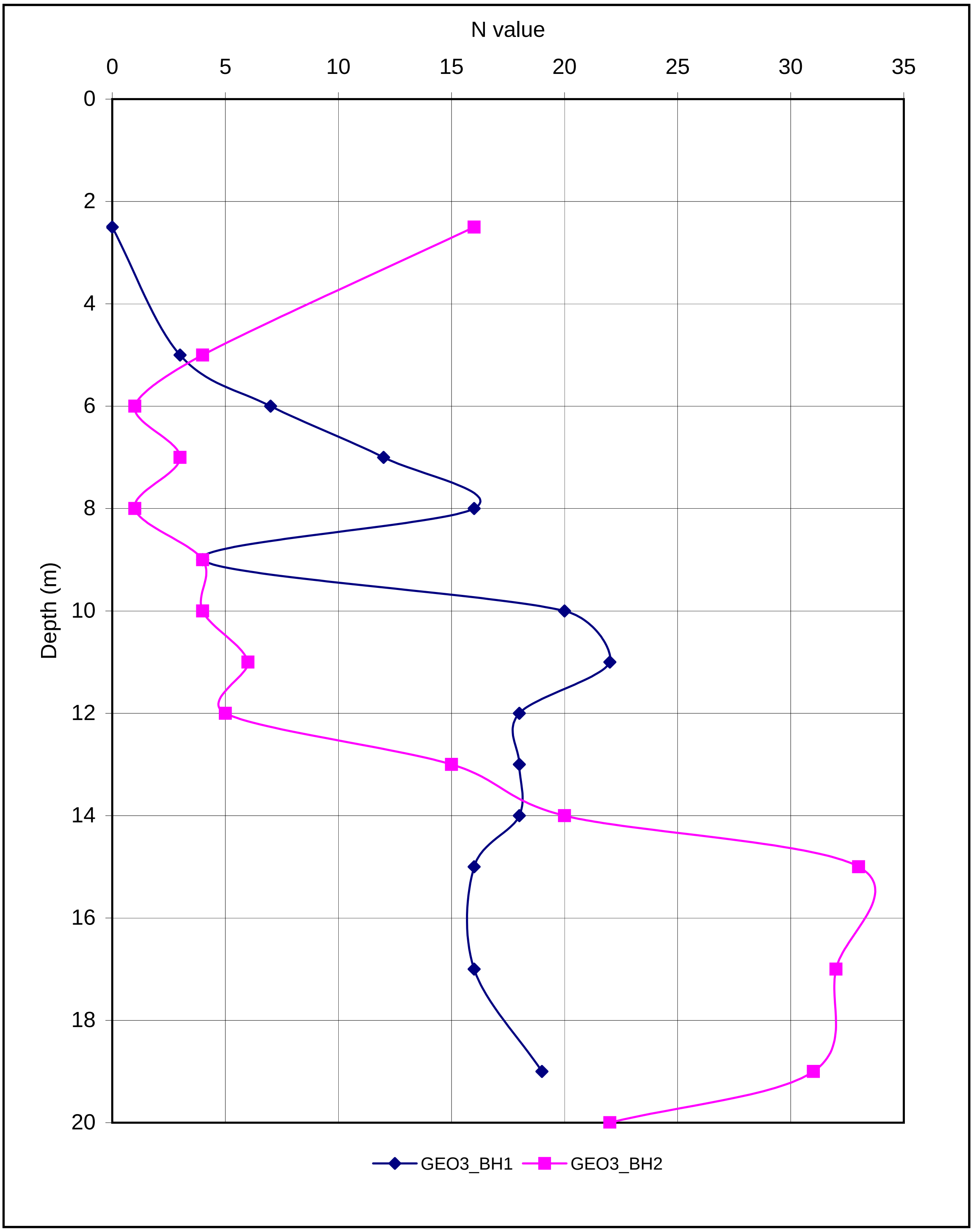


Figure D1
N ValuePlots
Sizewell
Report No L0224-10/1

ENCLOSURE E

CROSS HOLE SEISMIC SURVEY

SM Pelorus Surveys Report Report No. L0224-10/2

ESG Environmental Scientifics Group

Soil Mechanics

Pelorus Surveys

Report No L0224-10/2

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

REPORT ON CROSSHOLE SEISMIC SURVEY

Carried out for:
NNB Generation Company Limited

August 2011

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Soil Mechanics Pelorus Surveys part of Environmental Scientifics Group

ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

REPORT ON CROSSHOLE SEISMIC SURVEY

Report No: **L0224-10/2**

Date: **August 2011**

Client:

NNB Generation Company Limited
40 Grosvenor Place
Victoria
London
SW1X 7EN

Rev No	Date	Details
0	April 2011	Report as submitted
1	August 2011	Revised

ESG Environmental Scientifics Group

Soil Mechanics

C O N T E N T S

1 INTRODUCTION

In February 2010 Soil Mechanics (SM) were commissioned by NNB Generation Company Limited (NNB), a subsidiary of EDF Energy (EDF), to carry out a geotechnical investigation at the site of the proposed Sizewell C power station near Leiston, Suffolk. The scope of the investigation, defined by NNB and summarised in SM Report A0012, included crosshole testing to derive depth profiles of shear wave and P-wave velocity from ground level to 120 m depth.

The investigation was carried out in accordance with Method Statements submitted by SM and approved by NNB. The fieldwork was carried out by Soil Mechanics Pelorus Surveys, a specialist department of SM, on 10 and 11 February, 1 to 4 March and 19 July 2011. This report presents the factual records of the fieldwork and the survey results.

2 THE SITE AND GEOLOGY

2.1 The Site

The site of the proposed Sizewell C power station is situated 3 km east of Leiston, Suffolk at National Grid reference TM 470 640, see Site Location Plan, Fig 1, Enclosure A. The three boreholes put down for use in seismic testing, SBP 2009_2, DBH 2009_1 and DBH 2009_2, were in a grassed area near the western edge of that part of the site known as Field 2. Ground level was approximately 1.5 m OD. Further details of the site and of the borehole construction and wireline logging carried out by European Geophysical Services Limited (EGS) are given in SM Report No A0012.

2.2 Geology

Previous investigations, including that carried out in 1994, (Soil Mechanics, 1994) indicated that the expected succession comprises locally Made Ground or beach deposits, soft organic clay (alluvium) and peat, medium dense to dense sand (Crag Deposits), London Clay, Lower London Tertiary deposits of sands and clays and Chalk. Information given in the Tender Document indicated that the thickness of Made Ground is 5 to 6 m and that the surface of the Crag deposit is 10 to 11 m below ground level. The Crag deposit was described as predominantly fine to coarse sand, increasing rapidly with depth from medium dense to very dense; also containing weakly cemented sand horizons, bands of shell fragments and occasional thin lenses of silty clay.

The logs of the boreholes used for the crosshole testing showed approximately 5 m of Made Ground overlying 2.5 m of peat and 5 m of Recent Deposits overlying the Crag Deposits. The interface between the Crag Deposits and London Clay was at 43 m depth and the top of the White Chalk was encountered at a depth of 80.75 m.

3 FIELDWORK

3.1 Crosshole Shear Wave Testing

The cross hole shear wave survey fieldwork was carried out in three stages; an initial visit was made on 10 and 11 February 2011 and testing carried out from ground level to a depth of 58 m through the Made Ground/Recent Deposits, Crag Deposits and London Clay sequence. The second phase was carried out on 3 and 4 March 2011 and testing performed over the lower part of the sequence in the Lambeth Group and Chalk materials.

The test depth during the first visit was limited by the capability of the equipment available at that time. The equipment was subsequently reconfigured to allow testing between 58 m and the base of the holes for the second visit. The phased approach to the testing permitted the opportunity for early identification and rectification of any problems with the borehole installations while drilling plant and equipment was still on site, which would not have been possible by the time of the second visit. Records of both upward and downward impacts of the source were made at 1 m intervals between 2.5 m and 119.5 m below ground level, -1.0 to -118.0 m OD.

The results obtained during the February 2011 visit were rejected by EDF and that part of the survey was repeated from approximately ground level to 60 m depth, -0.3 to -58.3 m OD, in a third stage on 19 July 2011.

Borehole SBP 2009_2 was used as the source hole and the other two boreholes were used as receiver holes. The shear wave source was a Bison Type 1465-1 shear wave hammer which comprises a clamped anvil and a sliding weight. It was lowered to each required test depth and clamped hydraulically. Both upward and downward impacts of the sliding weight were used.

The receivers were OYO Type 3315 borehole picks (geophones) pneumatically clamped in the receive boreholes at the same level as the hammer. These were connected to an ABEM Terraloc

Mk 6 seismograph which displayed and recorded the seismograms. A hydrophone fixed to the shear wave hammer was used to trigger the seismograph.

The tops of the casings were used as datums for the seismic measurements and their levels were measured using RTK GPS so that they could subsequently be related to Ordnance Datum.

Technical details of the equipment are given in Enclosure B.

3.2 Crosshole P-wave Testing

For the crosshole P-wave testing, which was carried out on 1 March 2011, the source was a borehole sparker powered by an Allied Acoustics CSP1000 high voltage power supply, and the receivers were Neptune D/90 hydrophones. Technical details are given in Enclosure B. Seismograms were recorded on the ABEM Terraloc seismograph which was triggered by a hydrophone fixed to the source.

Signal transmission was very weak in the Made Ground and Recent Deposits, but below the latter very strong and sharp arrivals were generally observed. Seismograms were recorded at 1 m intervals between 4.5 m and 119.5 m below ground level.

4 RESULTS

4.1 Crosshole Shear Wave Testing

The crosshole shear wave seismograms were downloaded from the seismograph and plotted as shown in Fig 2. This shows that in the great majority of records, clear shear wave arrivals exhibiting phase reversals have been obtained. Interval times, ie the transit time of the seismic event between the first and second receiver hole, were timed using ABEM Terraloc picking software and listed in a spreadsheet.

In order to derive velocity information from these data it is necessary to know the raypath length between the two receiver holes at each test depth. This information was obtained from verticality surveys carried out by EGS on 4 April 2011. The three runs made in each borehole were averaged and the easting and northing of each source and receiver location were calculated in conjunction with the surveyed positions of the boreholes at ground surface. These data were entered into the spreadsheet containing transit times and velocities calculated as given in Table 1 and shown in Fig 3.

4.2 Crosshole P-wave Testing

P-wave seismograms were downloaded and plotted as shown in Fig 4. First arrivals were picked using ABEM Terraloc software, listed and combined with the coordinates derived from the verticality surveys to derive the velocity profiles given in Table 1 and shown in Fig 5.

5 COMMENTS

Very shallow shear wave velocities are generally consistent with those measured by the continuous surface wave survey (SM Pelorus Report No L0224-10/1). From about -15 m OD there is a rapid increase in shear wave velocity from about 250 m/s to almost 600 m/s. The velocities in the Crag Deposits below about -20 m OD exhibit quite a large range between 300 and 600 m/s with two marked low velocity zones which are echoed in the P-wave velocity profile.

The strongly contrasting interface at the Crag/London Clay contact caused refraction in both the shear wave and P-wave data. There is a gap in the P-wave profile related to this. The missing data point at -40.3 m OD in the shear wave profile coincides with an assessed zone of core loss in Borehole SBP 2009-1. The apparently anomalous high value at -45.3 m OD coincides with a hard siltstone band in the London Clay noted in the borehole log. The Lambeth Group/Chalk contact has resulted in the velocity profile being distorted so that chalk velocities may have been interpreted at the base of the Lambeth.

Prepared By	**G A Ricketts MSc BEng DIC**
Reviewed By	**R Venning MSc BSc**
Approved for Issue By	**R Venning MSc BSc**

ENCLOSURE A

TABLE AND FIGURES

Crosshole Seismic Velocities

SM Pelorus

Reduced Level (m bOD)	Path Length DBH1 - DBH2 (m)	S wave Velocity (km/s)	Reduced Level (m bOD)	P wave Velocity (km/s)
0.3	4.32	0.34		
1.3	4.31	0.18		
2.3	4.29	0.20		
3.3	4.27	0.17		
4.3	4.25	0.18		
5.3	4.24	0.17		
6.3	4.23	0.18		
7.3	4.23	0.17		
8.3	4.22	0.19		
9.3	4.21	0.20		
10.3	4.19	0.24	10	1.50
11.3	4.18	0.25	11	1.71
12.3	4.16	0.28	12	1.67
13.3	4.15	0.26	13	1.70
14.3	4.14	0.27	14	1.80
15.3	4.13	0.31	15	1.74
16.3	4.12	0.35	16	1.71
17.3	4.10	0.37	17	1.88
18.3	4.08	0.42	18	1.94
19.3	4.07	0.53	19	1.77
20.3	4.06	0.59	20	1.98
21.3	4.05	0.54	21	2.10
22.3	4.04	0.41	22	1.90
23.3	4.03	0.44	23	1.85
24.3	4.02	0.39	24	1.98
25.3	4.00	0.38	25	1.91
26.3	3.99	0.37	26	1.81
27.3	3.98	0.52	27	1.79
28.3	3.97	0.47	28	1.89
29.3	3.96	0.59	29	2.11
30.3	3.94	0.56	30	2.10
31.3	3.93	0.57	31	2.09
32.3	3.91	0.43	32	1.93
33.3	3.90	0.36	33	1.93
34.3	3.89	0.32	34	1.83
35.3	3.87	0.43	35	1.89
36.3	3.86	0.51	36	1.98
37.3	3.85	0.59	37	2.03
38.3	3.83	0.55	38	1.99
39.3	3.82	0.61	39	1.96
40.3	3.80		40	1.97
41.3	3.78	0.54	41	1.96
42.3	3.76	0.58	42	
43.3	3.74	0.54	43	1.70
44.3	3.73	0.38	44	1.68
45.3	3.71	0.81	45	1.65
46.3	3.70	0.43	46	1.61
47.3	3.69	0.35	47	1.80
48.3	3.68	0.35	48	1.84

Notes:		
Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE	**Table** 1
Project No.	L0224-10	
Carried out for	NNB GENERATION COMPANY LIMITED	Sheet 1 of 3

Crosshole Seismic Velocities

SM Pelorus

Reduced Level (m bOD)	Path Length DBH1 - DBH2 (m)	S wave Velocity (km/s)	Reduced Level (m bOD)	P wave Velocity (km/s)
49.3	3.66	0.31	49	1.98
50.3	3.65	0.34	50	1.66
51.3	3.63	0.37	51	1.71
52.3	3.62	0.45	52	1.70
53.3	3.60	0.61	53	1.70
54.3	3.59	0.66	54	1.79
55.3	3.58	0.56	55	1.88
56.3	3.57	0.66	56	1.85
57.3	3.56	0.76	57	2.16
58.3	3.55	0.57	58	1.71
59	3.53	0.52	59	1.81
60	3.51	0.24	60	1.87
61	3.48	0.51	61	1.76
62	3.46	0.44	62	1.87
63	3.43	0.34	63	1.86
64	3.40	0.38	64	1.89
65	3.36	0.48	65	1.89
66	3.33	0.49	66	1.82
67	3.30	0.49	67	1.88
68	3.27	0.45	68	1.98
69	3.25	0.35	69	1.71
70	3.23	0.26	70	1.66
71	3.21	0.29	71	1.60
72	3.18	0.31	72	1.70
73	3.16	0.46	73	1.68
74	3.13	0.51	74	1.74
75	3.11	1.02	75	1.73
76	3.09	1.03	76	1.74
77	3.08	0.95	77	1.84
78	3.06	1.09	78	2.40
79	3.03	0.98	79	2.17
80	3.01	1.10	80	2.36
81	2.99	1.27	81	2.85
82	2.97	1.25	82	
83	2.95	1.20	83	
84	2.94	1.07	84	2.86
85	2.92	0.85	85	2.21
86	2.92	1.01	86	2.20
87	2.91	1.05	87	2.28
88	2.89	1.01	88	2.41
89	2.88	1.01	89	2.40
90	2.87	1.08	90	2.29
91	2.85	1.13	91	2.37
92	2.83	1.02	92	2.26
93	2.81	1.11	93	2.45
94	2.80	1.06	94	2.28
95	2.79	1.01	95	2.42
96	2.77	1.03	96	2.47
97	2.76	0.94	97	2.30

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

Project No. L0224-10

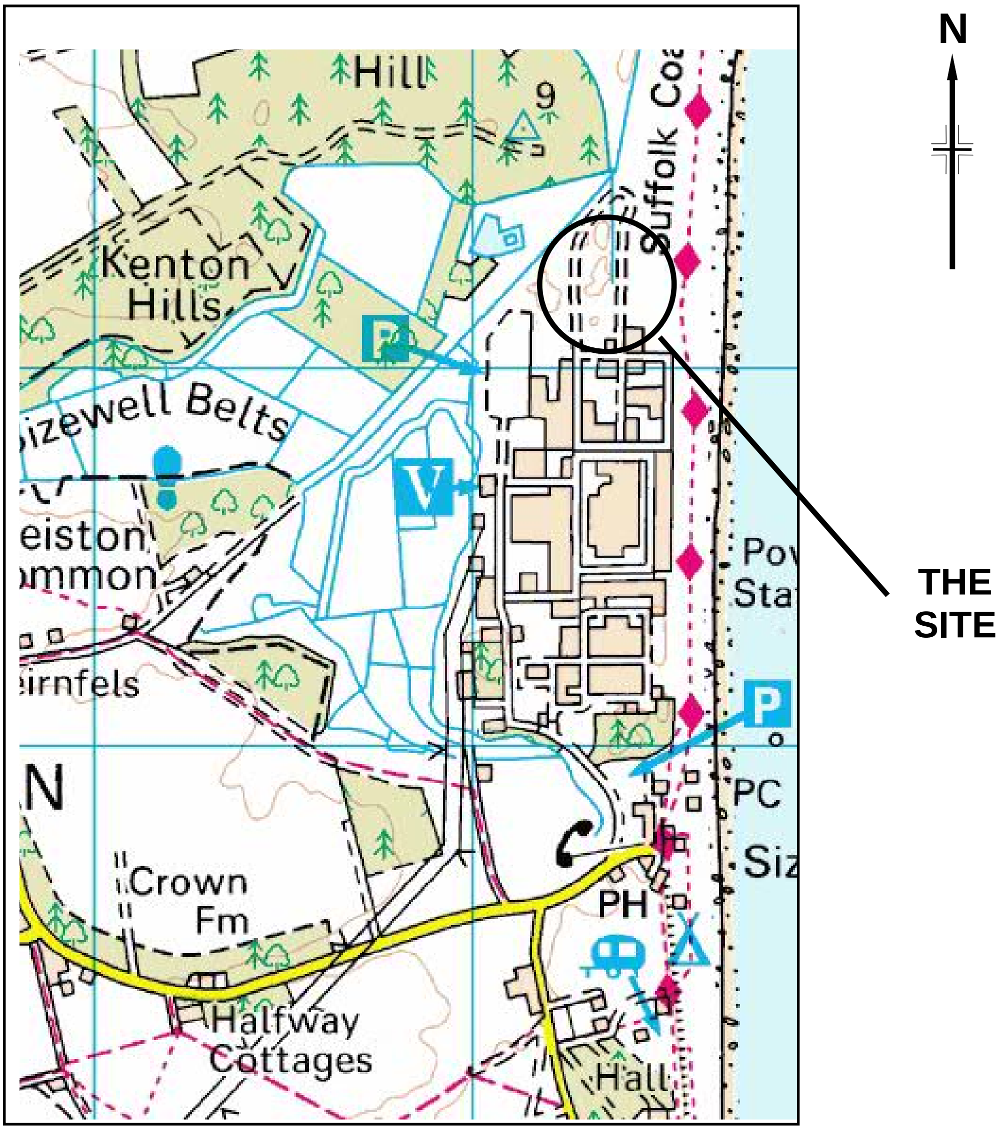
Carried out for NNB GENERATION COMPANY LIMITED

Table 1

Crosshole Seismic Velocities

Reduced Level (m bOD)	Path Length DBH1 - DBH2 (m)	S wave Velocity (km/s)	P wave Velocity (km/s)
98	2.75	1.03	2.56
99	2.75	1.02	2.39
100	2.74	1.01	2.33
101	2.73	1.11	2.66
102	2.72	1.07	2.22
103	2.70	0.98	2.30
104	2.68	1.03	2.33
105	2.67	0.99	2.28
106	2.67	0.96	2.48
107	2.67	1.01	2.37
108	2.67	1.06	2.32
109	2.66	1.00	2.22
110	2.66	1.03	2.31
111	2.66	1.03	2.31
112	2.65	1.03	2.21
113	2.64	1.00	2.46
114	2.64	0.95	2.15
115	2.63	1.11	2.34
116	2.63	1.04	2.39
117	2.63	1.06	2.39
118	2.62	1.08	2.28

Site Location Plan



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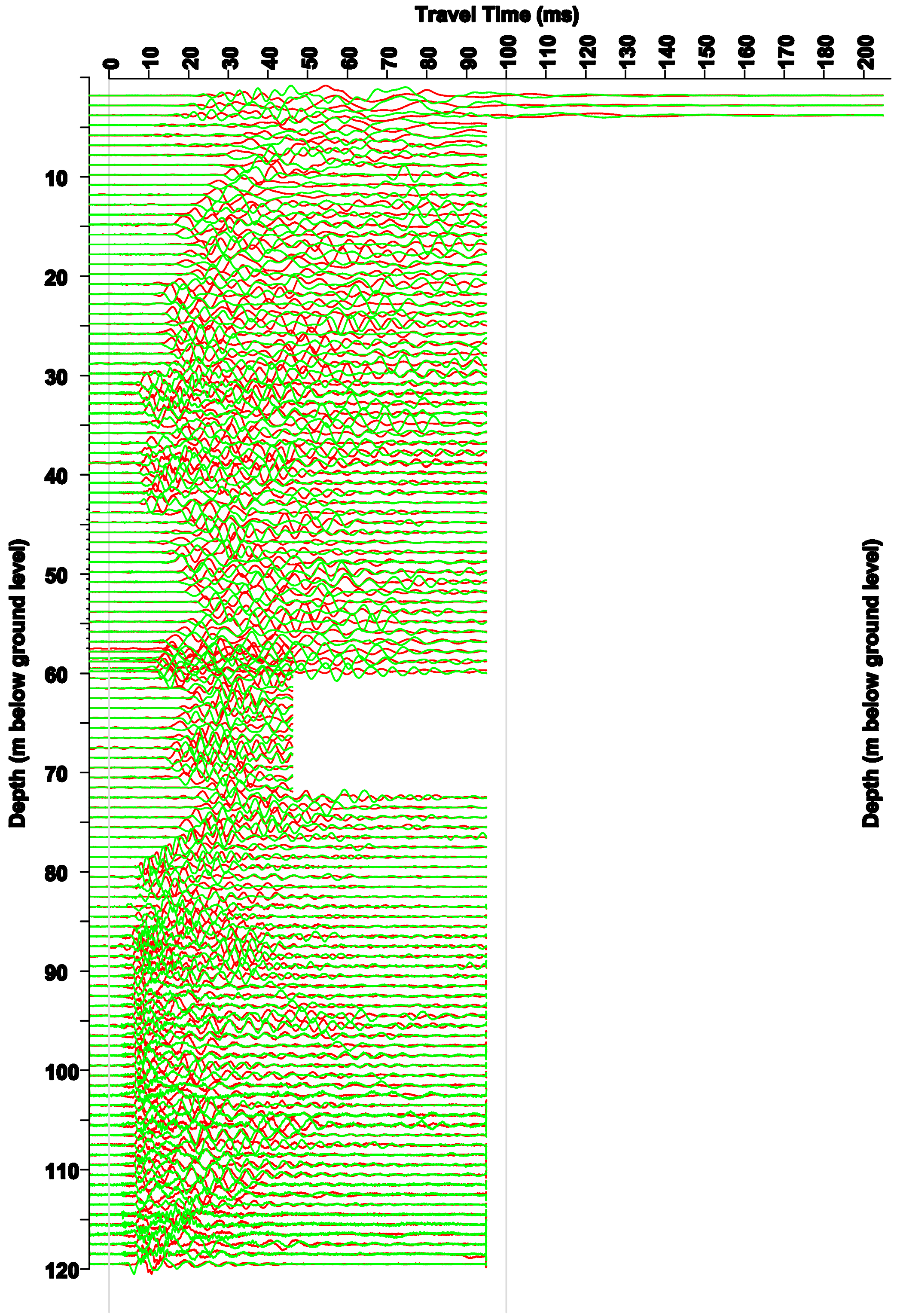
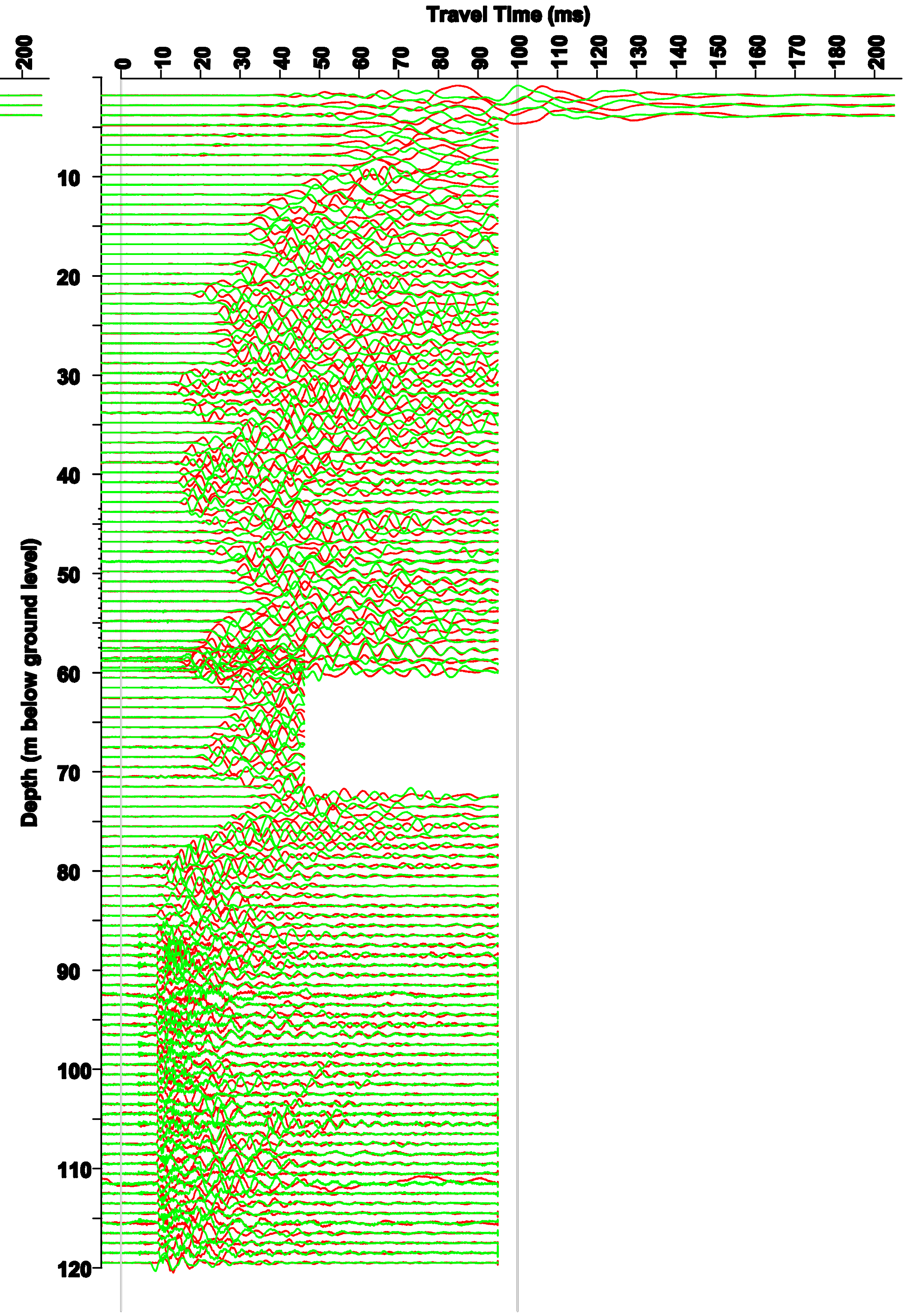
	Project No.	L0224-10	1
	Carried out for	NNB GENERATION COMPANY LIMITED	





Legend:

Up impact

Down Impact

Notes:

Rev.	Drawn	Date	Checked	Approved	Details
1	GAR	Aug 11	GAR	RV	Feb 11 data replaced by July 11 data
0	GAR	April 2011		RV	For comment

Survey Date: March, July 2011 | **Surveyor:** | **Drawn By:** GAR

Client: NNB GENERATION COMPANY LIMITED

Engineer:

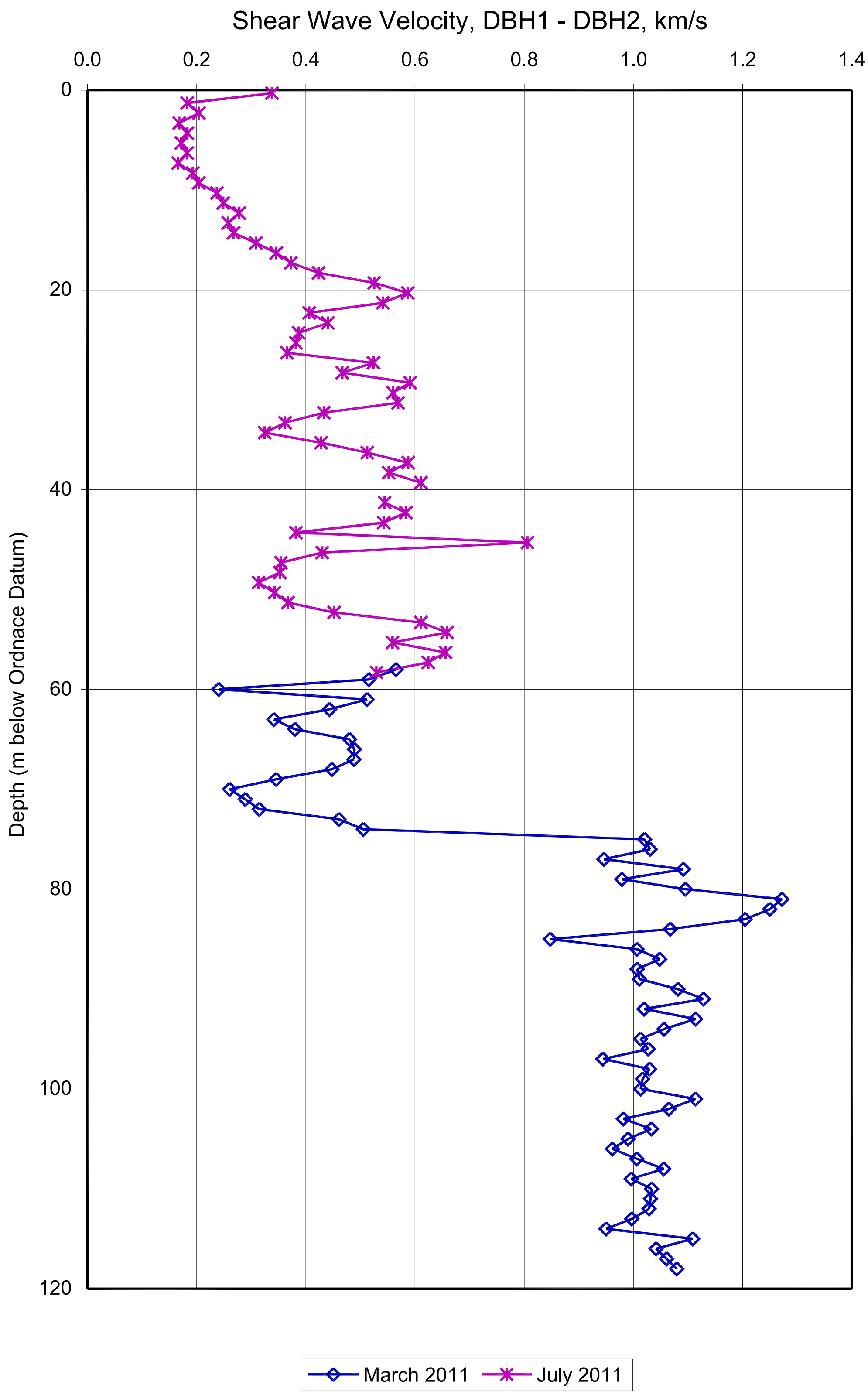
Contractor: Soil Mechanics

Pelorus Surveys
Glossop House
Hogwood Lane
Finchampstead
Wokingham RG40 4QW
pelorus-surveys@esg.co.uk
Tel: 0118 932 8888
Fax: 0118 932 8383

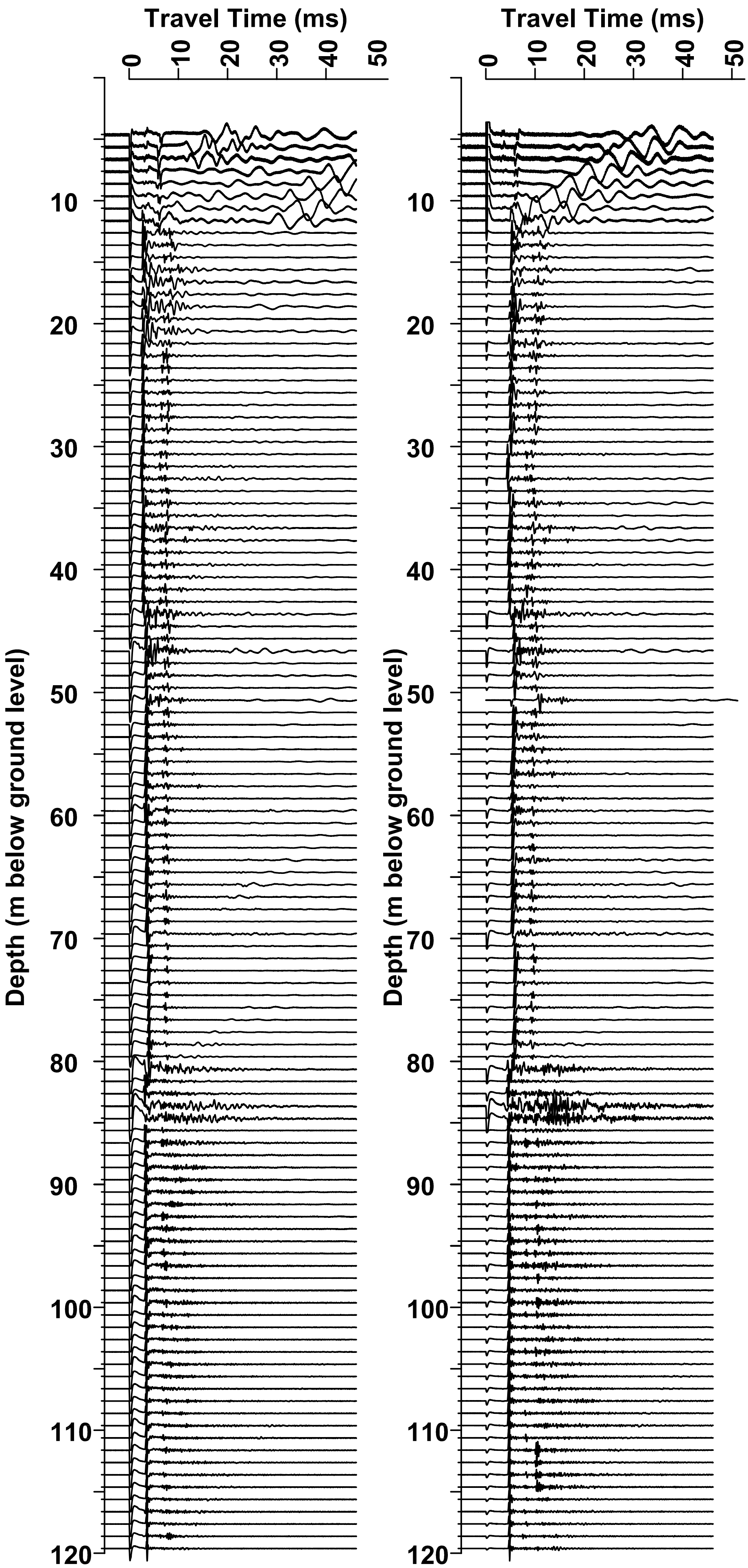
Contract: ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FIG 2 SHEAR WAVE SEISMOGRAMS
L0224-10/2

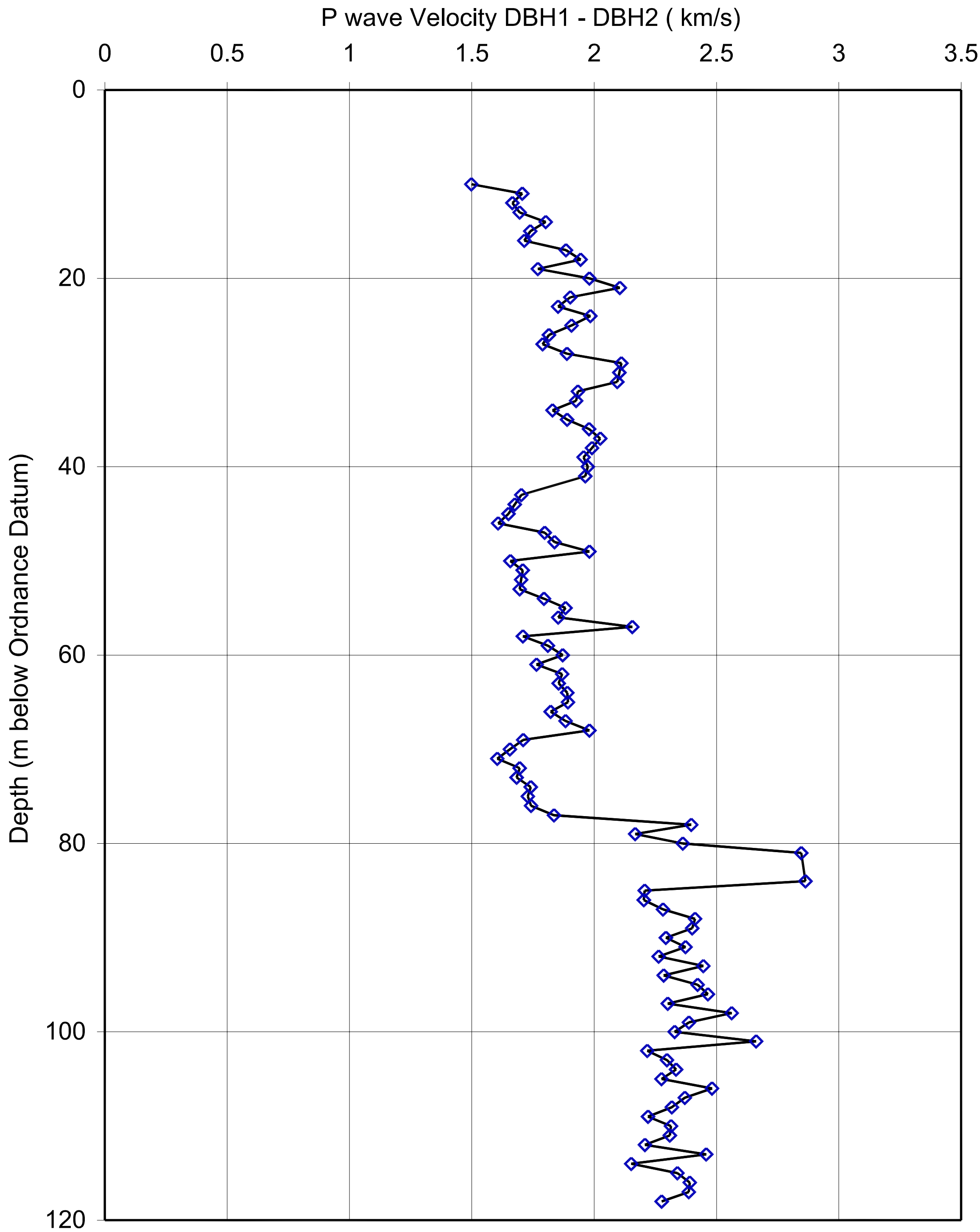
Original Sheet Size: A3 | **Scales:** Horiz.: Vert.: | **Rev.:** 1



SM Pelorus	Project: ONSHORE PHASE 1 SIZEWELL SITE	SEISMIC TESTING S WAVE VELOCITY PROFILE	Fig 3	
			Project No: L0224-10/02	Rev: 1



SM Pelorus	Project: ONSHORE PHASE 1 SIZEWELL SITE	SEISMIC TESTING P WAVE SEISMOGRAMS	Fig 4	
			Project No: L0224-10/02	Rev: 0



SM Pelorus

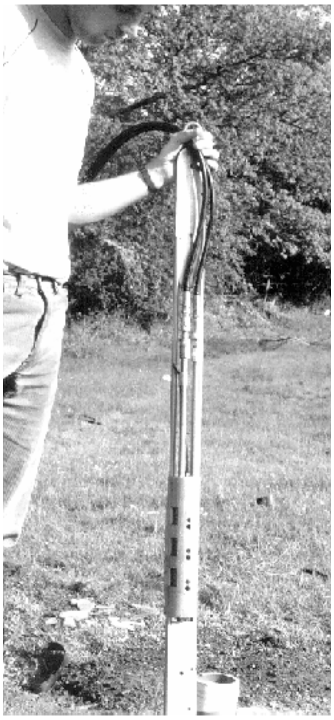
Project: ONSHORE PHASE 1 SIZEWELL SITE	SEISMIC TESTING P WAVE VELOCITY PROFILE	Fig 5	Project No: L0224-10/02	Rev: 0

ENCLOSURE B

TECHNICAL INFORMATION

Technical Information

BISON INSTRUMENTS INC. BOREHOLE SHEAR WAVE HAMMERS



Bison Crosshole Shear Wave Hammers consist of a stationary body and a sliding striker. Hydraulically activated plates, extended by a hand pump at the surface, lock the stationary body in the bore hole. Using the hoist cable: the operator manually lifts and drops the striker to produce the hammer blows. The Bison Crosshole Shear Wave Hammer designs permit either downward or upward hammer blows, producing vertically polarised shear waves of opposing polarities. This helps to identify the direct shear wave arrival in the presence of other, possibly earlier; seismic arrivals.

Two sizes of Bison Crosshole Hammer are available:

The Model 1465 Hammer has a larger diameter, greater locking plate surface area, and a heavier striker. Its pair of locking plates allow greater expansion for positive locking in the borehole.

The Mode1465-1 Hammer has a smaller diameter for slimmer drill holes.

Specifications for Bison Crosshole Shear Wave Hammers

	Model 1465	**Model 1465-1**
Diameter	3.25 inches (83mm)	2.75 inches (70mm)
Diameter with locking . plates fully extended	5.85 inches (148mm)*	3.85 inches (98mm)*
Striker length	55 inches (1400mm)	54.5 inches (1385mm)
Stationary body length, between impact points	16.75 inches (426mm)	12:5 inches (317mm)
Striker travel distance	12 inches (300mm)	15 inches (380mm)
Active striker weight (minimum)	25 lbs. (11.3kg)**	12 lbs. (5.4kg)**
Total Weight	51 lbs. (23.1 kg)	29 lbs. {13.2kg)
Maximum Hydraulic Pressure	1000 psi (6850kPa)	1000 psi (6850kPa)
Locking Plate Surface Area	34.8 sq. in, (0.0224m^2)	17.0 sq. in. (0.0110m^2) (single plate)

*Special spacers are available to enable either hammer to work in larger diameter holes
**Extra weight may be added to the striker of either hammer for greater Impact

Technical Information

Applied Acoustics CSP1000 Capacitor Discharge Power Supply

The Applied Acoustic Engineering CSP1000 is an extensively field proven seismic power supply. This new generation power supply is lighter, easier and safer to use than the old transformer and capacitor bank systems. Energy settings are adjusted simply by a front panel rotary switch. A unique socket located on the front panel allows safe connection and disconnection of the boomer or sparker

Safety features

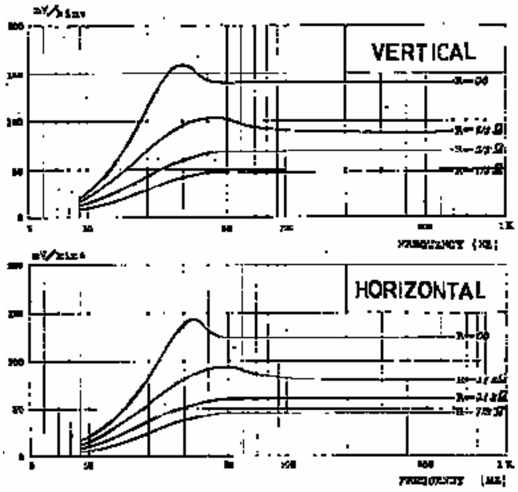
Safety features include: interlocks on HV connector and top cover, mechanical/electrical discharge of all capacitors, bleed resistors on all HV components, double layer safety cut-outs shuts down system on fault condition, high voltage and thermal cut-outs, etc.

Specifications

Dimensions	19”rack mount 7U high, 550mm deep
Weight	55.0kg
Power Input	207 - 260V AC, 45 - 65Hz, 2.5kVA 3 pin connector
Voltage Output	3550 or 3800V DC, 4 pin connector
Output Energy	100 to 1000J in 100J increments
Charging Rate	1100J/second
Capacitance	144micro F
Repetition Rate	Up to 6pps

Technical Information

OYO CORPORATION BOREHOLE PICK MODEL 3315



The Borehole Pick contains 3 geophones, 1 vertically placed and 2 horizontally placed at right angles to one another so that they pick up P and S waves respectively. A rubber membrane that expands under hydraulic or pneumatic pressure forces the probe against the borehole wall at the desired depth for sure measurements of S waves. Electrical wiring and hydraulic tubing are incorporated together in the Borehole Pick cable, which is marked with a depth scale. The Borehole Pick is easily connected to any ordinary seismograph.

Standard specifications

vertical geophones	natural freq.	28Hz	
	sensitivity	150mV/kine	
	impedance	215 Ohms	
horizontal geophones	natural freq.	28Hz	
	sensitivity	150mV/kine	
	impedance	215 Ohms	
packer rubber tube	outer dia. x inner dia. x length	40 x 36x140mm	though rubber thickness becomes
	maximum outer dia.	86mm	thin it can be expanded up to 120mm
	maximum pressure	2kg/cm^2	when the atmospheric pressure is 1.
cable	cores	4	pairs 0.32mm
	tube	6mmx 4mm	transparent pressure 10 kg/cm^2
	measure	1 cm mark	red mark at 1m interval. total 100m.
	shield	polyethylene	film
	sheath material	polyurethane	transparent
	tensile strength	390kg	strength of tension wire
	outer dia.	10.5mm	
material quality	pickup proper	SUS 304	
	weight	SUS 304	
dimensions	total length	303mm	
	outer dia.	43mm	
weight	pickup unit	2.2kg	
	cable	10.5kg	l00m
	total approx.	13kg	cable + body proper

Technical Information

ABEM TERRALOC® MARK VIb SEISMOGRAPH

The ABEM Terraloc® Mk VIb is a high resolution, multi-channel seismograph with an 18 bit A/D converter and a 3 bit IFP (instantaneous floating point) amplifier giving an overall resolution of 21 bits. Its has a high dynamic range of 126 dB and a wide range of recording and delay times that permits the recording of refractors at depths of less than 1 m to over 1000 m. Due to the high sampling rates the Terraloc Mk VIb can be used for tomography, measurement of surface waves and for shallow marine seismic refraction (bottom drag and Sonobuoy) surveys. The seismograph can be used for shallow reflection seismics using a built-in roll along function and a broad range of analogue and digital filters. Geophone and cable testing together with noise monitoring can be carried out on site using a wide choice of multi- or single trace view modes and frequency spectrum analysis. The seismograph has built-in processing and interpreting software enabling rapid on site data interpretation. Seismic traces are stored in the international SEG-2 format.

Specifications

Number of Channels	24 expandable to 48
Sampling rate (selectable)	25, 50, 100, 200, 500, 1000, and 2000 µs
Record length (selectable)	128, 256, 512, 1024, 2048, 4096, 8192 or 16384 samples per trace
Pre-trigger record	0 - 100% of recorded length
Pre Stack correlation	Yes
Delay time	Related to sampling rate. May be set (for example from: 0 - 0.8 s at 25 µs sampling rate 0 - 131 s at 2 ms sampling rate
Stacking	32 bits, up to 999 impacts
Unstack	Remove last shot from stack
First-arrivals picking	Automatic or manual. Times can be saved with record
Trigger inputs	Trigger coil, make/brake, geophone, TTL
A/D converter resolution	21 bits
Dynamic range	126 dB
Max input signal	500 m V p-p
Frequency range	1-4000 Hz (at 25 µs sampling rate)
Input impedance	3 kW
Noise Monitor	Amplitude or full waveform display available on-line

Processor, RAM memory and hard disk size

Processor	Pentium 133
Internal memory	32 MB
Hard disk space	at least 540 MB
Upgrade option	Internal memory 128 MB Hard disk 810 MB
Post recording features	FFT analysis, auto correlation first-arrival picking refractor velocity analysis
Floppy Drive	1.44 MB 3.5"
Power	10-30 V DC external battery
Power consumption	36 W (24-ch)
Ambient temperature (operating)	0 to +50°C (24-ch)
Ambient temperature (storage)	-40 to +80°C
Weight, 24 channel unit	16 kg
Dimensions, 24 channel unit	480 x 260 x 330 mm

Analog filters

- Low cut (selectable)	12 or 24 dB/octave 16 steps from 12 to 240 Hz
- Notch	50 or 60 Hz specified on order
- Anti-aliasing	set automatically based on sampling rate

Digital filters	Bandpass, low-cut, high-cut bandreject, alpha-beta and remove DC offset
Spectrum analysis	Any single trace

ENCLOSURE F

PUMPING TEST

WJ Groundwater Limited – Pumping Test Factual Report Report No. 423/1638

Onshore Investigations Phase 1
for Sizewell Site

PUMPING TEST
FACTUAL REPORT

Client: Soil Mechanics

WJ GROUNDWATER LIMITED

Onshore Investigations Phase 1
for Sizewell Site

PUMPING TEST
FACTUAL REPORT

Client: Soil Mechanics

Report No.	Revision No.	Date of Issue:	Issued to:	Prepared by:	Checked by:
423/1638	1	18 Mar 2011	Soil Mechanics	GH	TR

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Contents

1 Introduction

In March 2010 WJ Groundwater Limited (WJ) were appointed by Soil Mechanics to carry out a pumping test at the site of the proposed new power station at Sizewell, Suffolk, adjacent to the existing power station. The pumping test objectives were to;

- Contribute to the general understanding of the hydro-geological conditions within the Crag deposits.
- Acquire hydraulic properties of the aquifer at a large scale.
- Asses radius of influence and determine the effects of pumping on nearby piezometers.
- Asses the impact on neighbouring sites of environmental and scientific importance.

The site works included the drilling and installation of a single abstraction well within the Crag deposits. An array of standpipe piezometers, installed by Soil Mechanics, were monitored to measure the response to pumping.

This factual report is limited to detailing the site work carried out and the presentation of the data obtained. Interpretation of the data is covered in a separate report.

2 The Site and Ground Conditions

The site comprised a generally rough grassed area immediately adjacent to the North Sea coast, though separated from the shore line by coastal sand dunes. Adjacent to the site are the existing Sizewell A (currently being decommissioned) and Sizewell B power stations. The location plan is shown in Figure 1. Generally existing ground level was approximately between +1 to +2 mOD.

The ground conditions encountered during drilling of the abstraction well were as follows:

Stratum	Top of Stratum (mAOD)
SAND	1.5
Peaty CLAY	-9.4
Crag Deposits	-10.4
London CLAY	-40.4

3 Field Work

A rotary drilling rig was mobilised to site on 19 July 2010, with drilling commencing the following day using rotary water flush reverse circulation techniques. The abstraction well, DBH2009_20 was completed by 23 July 2010. The location of the abstraction well and other installations are shown in Figure 2, and borehole are provided in Appendix A. Installation details of the well and piezometers used are given in Table 1. It should be noted that there was a six month period between the well installation and the subsequent development and pumping test works, during which time other drilling and ground investigation works were undertaken.

Development of the well was carried out using airlift techniques. The well was developed using an eductor pipe, with water discharged through settlement tanks to the sea. The well was developed for approximately 4 hours, the discharge water became visually clear of fines within 1 hour of commencing development.

The pumping tests were carried out using a 30 kW electric submersible pump (Grundfos SP95-7), powered by a diesel generator. The pump was installed at close to the base of the pumped well and connected to the surface with a 150 mm nominal diameter riser. The headworks included a valve which was used to control the pumping rate. Discharge from the well was piped away using a 150 mm pipeline to a settlement tank on top of the coastal dunes; from the tank the water discharged via two 150 mm pipes terminating on the shore at low tide level. The total discharge length was approximately 350 m.

Water level monitoring in the pumped well and local piezometers was carried out using vibrating wire transducers, connected to a multi-channel datalogger. All piezometers were monitored using ‘Diver’ type downhole data loggers monitoring water level, temperature and electrical conductivity. A 100 mm electromagnetic flowmeter was connected to the datalogger in order to monitor the abstraction flow rate. Manual dipping was carried out to allow calibration of transducers and the confirmation of water levels. The monitoring and instrumentation equipment used was as follows:

Instrument	Quantity	Location	Purpose
VW pressure transducers	8	Installed at the base of pumped wells and near piezometers.	Monitor water levels inside site compounds
Standalone downhole loggers	18	All piezometers	Monitor water level, temperature and electrical conductivity
Electromagnetic flowmeter	1	Installed in discharge line close to well head	Monitor abstraction flow from pumped well
Electronic datalogger	1	Close to well head	Log data from VW pressure transducers, barometer and flowmeters
Datalogger barometer	1	Within datalogger enclosure	To allow barometric compensation of pressure readings

The programme for the site works was as follows:

	From	To
Mobilise drilling rig	19 July 2010	19 July 2010
Drill and install abstraction well DBH2009_20	20 July 2010	23 July 2010
Mobilise development and pumping test equipment	17 January 2011	17 January 2011
Develop well DBH2009_20	19 January 2011	20 January 2011
Install monitoring equipment	20 January 2011	20 January 2011
Equipment test	15:00 26 January 2011	15:34 26 January 2011
Intermittent step test	09:00 27 January 2011	10:00 28 January 2011
Constant rate test (aborted)	11:00 31 January 2011	02:43 1 February 2011
Replace pump	2 February 2011	2 February 2011
Constant rate test (10 days)	10:00 3 February 2010	10:00 13 February 2010
Recovery monitoring (4 days)	10:00 13 February 2010	10:00 17 February 2011
Post test observations (14 days)	10:00 17 February 2011	10:00 3 March 2011

4 Pumping Test Results

The datalogged water level and flow data for the whole testing period are given in Appendices B and C. Manual dip records are given in Appendix D. All the water level and flow data for the testing period are shown in Figure 3. Standing water levels in the Crag Deposits show a tidal response with water levels varying between +0.9 mOD and +0.2 mOD during the monitored period.

Intermittent Step Test

An intermittent step test was carried out on the abstraction well DBH2009_20, over the period of 27th and 28th January 2011. The well was pumped in four discrete steps with increasing flows of approximately 7.5, 15, 22.5 and 30 l/s, each step lasted for 2 hours. Between each step the water level in the pumped and observation wells was allowed to recover to, or close to, standing groundwater level. The results of the step test are shown in Figure 4 and summarised below.

Flow rate (l/s)	Water level in well (mOD)	Drawdown in well (m)
No pumping	0.38	-
7.5	-1.11	1.49
15	-2.46	2.84
22.5	-3.86	4.24
30	-5.55	5.93

Constant Rate Test

A constant rate test commenced on the abstraction well, DBH2009_20, on 31 January 2011, however due to a fault with the pump the test was aborted the following day. The pump was replaced and the test restarted on 3 February 2011 at a flow rate of approximately 30 l/s. The results from the constant rate test are shown in Figure 5. The drawdown after approximately ten days of pumping has been calculated using the tidal peak water levels before the start of pumping and before the pump was switched-off. The calculated drawdowns are as follows:

Well/Piezometer	Distance from DBH2009_20 (m)	Water level 00:02 03/02/11 (mOD)	Water level 05:45 13/02/11 (mOD)	Drawdown (m)
DBH2009_20	-	0.56	-5.56	6.13
DBH2009_3	5.24	0.71	-2.13	2.84
DBH2009_4	9.04	0.69	-1.29	1.98
DBH2009_5	25.48	0.68	-1.01	1.69
DBH2009_6	81.37	0.71	-0.29	1.00
DBH2009_7	242.10	0.65	0.26	0.39
DBH2009_8	9.23	0.69	-1.82	2.51
DBH2009_9	27.04	0.57	-1.22	1.80
DBH2009_10	81.15	0.75	-0.10	0.85
DBH2009_11	229.61	0.73	0.29	0.44
DBH2009_12	25.02	0.72	-1.03	1.75
DBH2009_13	125.39	0.70	-0.10	0.80
DBH2009_14	248.33	0.69	0.28	0.41
MPM2009_4A	122.73	0.69	0.04	0.65
MPM2009_7A	23.49	0.72	-0.95	1.67
GW6 DA	305.43	0.64	0.34	0.30
GW24D	235.32	0.58	0.17	0.41

The distance-drawdown data are presented in a semi-log plot in Figure 6. Following the pumping test the water levels were monitored during the recovery period for four days, this was followed by a period of 14 days of post test observations. The water levels before, during and after pumping are shown in cross sections along a North-South axis and a West-East axis in Figures 7 and 8 respectively.

The water level in the shallow piezometers, GW6 S and GW24 S, show a downward trend over the monitored period, albeit with some rises at various points probably due to precipitation events. The shallow aquifer does not appear to be affected by the abstraction from the Crag Deposits.

Electrical Conductivity

All the observation wells were monitored for electrical conductivity during the testing period, the results are shown in Figure 9. There is a large variation in electrical conductivity measured within the boreholes, from 0.3 mS/cm in DBH2009_14 to 37 mS/cm in MPM2009_4A. Some show tidal response, particularly DBH2009_11 which is located on the foreshore.

In some boreholes there are obvious changes to the measured conductivity related to the pumping, most notably DBH2009_5 and DBH2009_11. In other boreholes it is apparent that there is a step in the conductivity readings in some boreholes when the datalogger is removed for downloading purposes. This is probably due to vertical disturbance of the column of water within the piezometer when the datalogger is pulled out and reinstalled. However, over the duration of the recovery period the measured conductivities generally return to their pre-test levels.

Temperature

All the observation wells were monitored for temperature during the testing period, the results are shown in Figure 10. It is apparent that the temperatures in all the installations within the Crag Deposits were stable throughout the monitored period. Temperatures varied from 10.9 °C in borehole GW6 DA, to 11.4 °C in borehole DBH2009_7. Within the shallow piezometers GW6 S and GW24 S, the measured temperatures are lower than those in the Crag Deposits and exhibit a downward trend throughout the monitored period. This is likely to be due to seasonal affects on the shallow groundwater, no discernable changes to the downward trend occurred during the pumping period.

Dr Gary Holmes
For and on behalf of
WJ GROUNDWATER LIMITED

Dr Toby Roberts
For and on behalf of
WJ GROUNDWATER LIMITED

Table 1: Well and Piezometer Schedule

Well/ Piezometer	Easting	Northing	Ground level (mOD)	Depth (m)	Response Zone Top (mOD)	Response Zone Bottom (mOD)	Response stratum	Liner Type	Installed by	Comments
DBH2009_20	647329.976	264094.779	1.59	40.0	-12.4	-38.4	Crag Deposits	300 mm uPVC	WJ	1 mm slots
DBH2009_3	647330.260	264100.008	1.68	35.0	-11.3	-33.3	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_4	647320.940	264094.595	1.47	20.5	-8.9	-19.0	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_5	647304.502	264094.429	1.41	20.5	-9.6	-19.1	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_6	647248.606	264095.262	1.51	20.0	-9.7	-18.5	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_7	647087.879	264094.451	1.69	20.0	-11.8	-18.3	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_8	647339.203	264094.842	1.67	35.0	-15.8	-33.3	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_9	647357.017	264095.023	1.84	35.0	-16.2	-33.2	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_10	647411.130	264094.980	1.78	35.0	-14.2	-33.2	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_11	647559.581	264095.188	3.25	20.0	-12.2	-16.8	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_12	647329.983	264069.761	1.57	35.0	-11.9	-33.4	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_13	647329.628	263969.385	2.05	20.0	-7.4	-18.0	Crag Deposits	74 mm uPVC	Soil Mechanics	
DBH2009_14	647330.173	263846.450	6.27	20.0	-3.2	-13.7	Crag Deposits	74 mm uPVC	Soil Mechanics	
MPM2009_4A	647351.538	264215.601	1.57	45.7	-9.0	-44.1	Crag Deposits	74 mm uPVC	Soil Mechanics	
MPM2009_7A	647345.888	264112.079	1.76	44.0	-10.7	-42.2	Crag Deposits	74 mm uPVC	Soil Mechanics	
GW6 DA	647288.932	264397.440	0.71	13.7	-6.6	-13.0	Crag Deposits	74 mm uPVC	Soil Mechanics	
GW24D	647157.133	264254.467	1.44	16.2	-8.6	-14.8	Crag Deposits	74 mm uPVC	Soil Mechanics	
GW6 S	647287.824	264395.338	0.70	5.0	0.1	-4.3	Gravel/Made Ground	74 mm uPVC	Soil Mechanics	
GW24 S	647158.403	264256.128	1.52	4.7	0.9	-3.0	Sands/Made Ground	74 mm uPVC	Soil Mechanics	

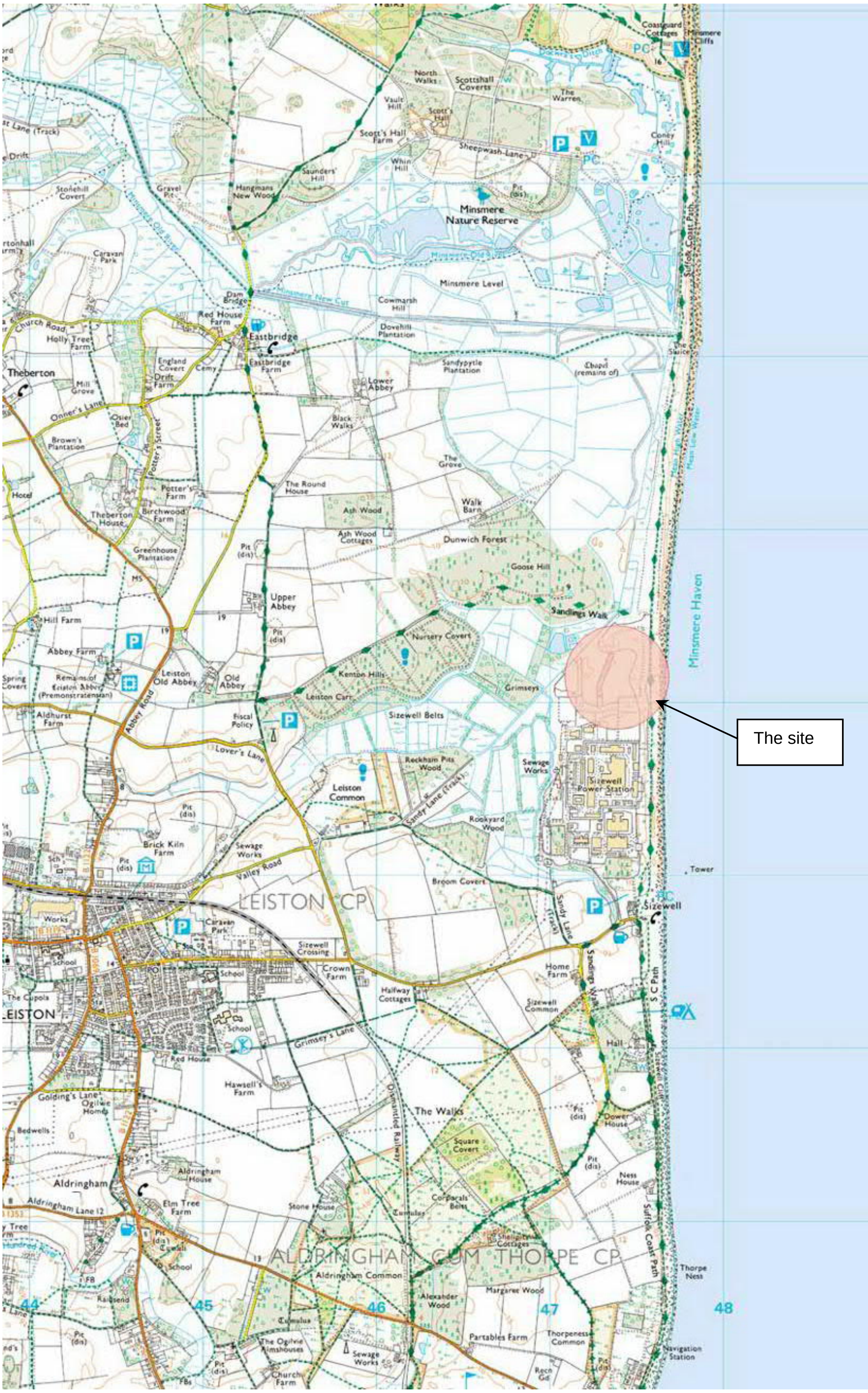
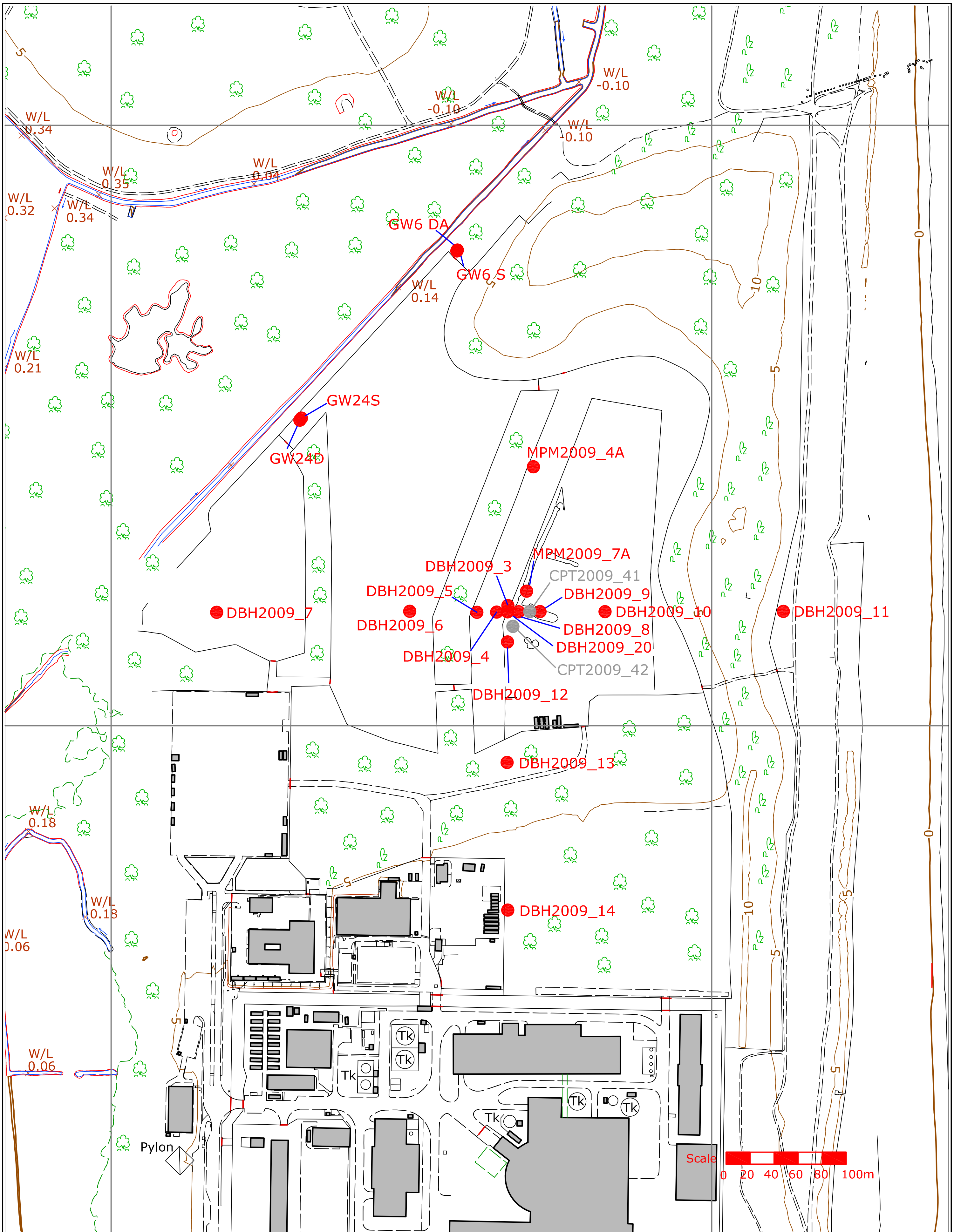


Figure 1: Pumping Test :Location



Notes:

Project: Sizewell Pumping Test		
Title: As Built Well Layout		
Drawing No:Figure 2	Rev: 1	By: QR
Scale: 1:4000@A4	Date: 16/03/11	Chk: GH

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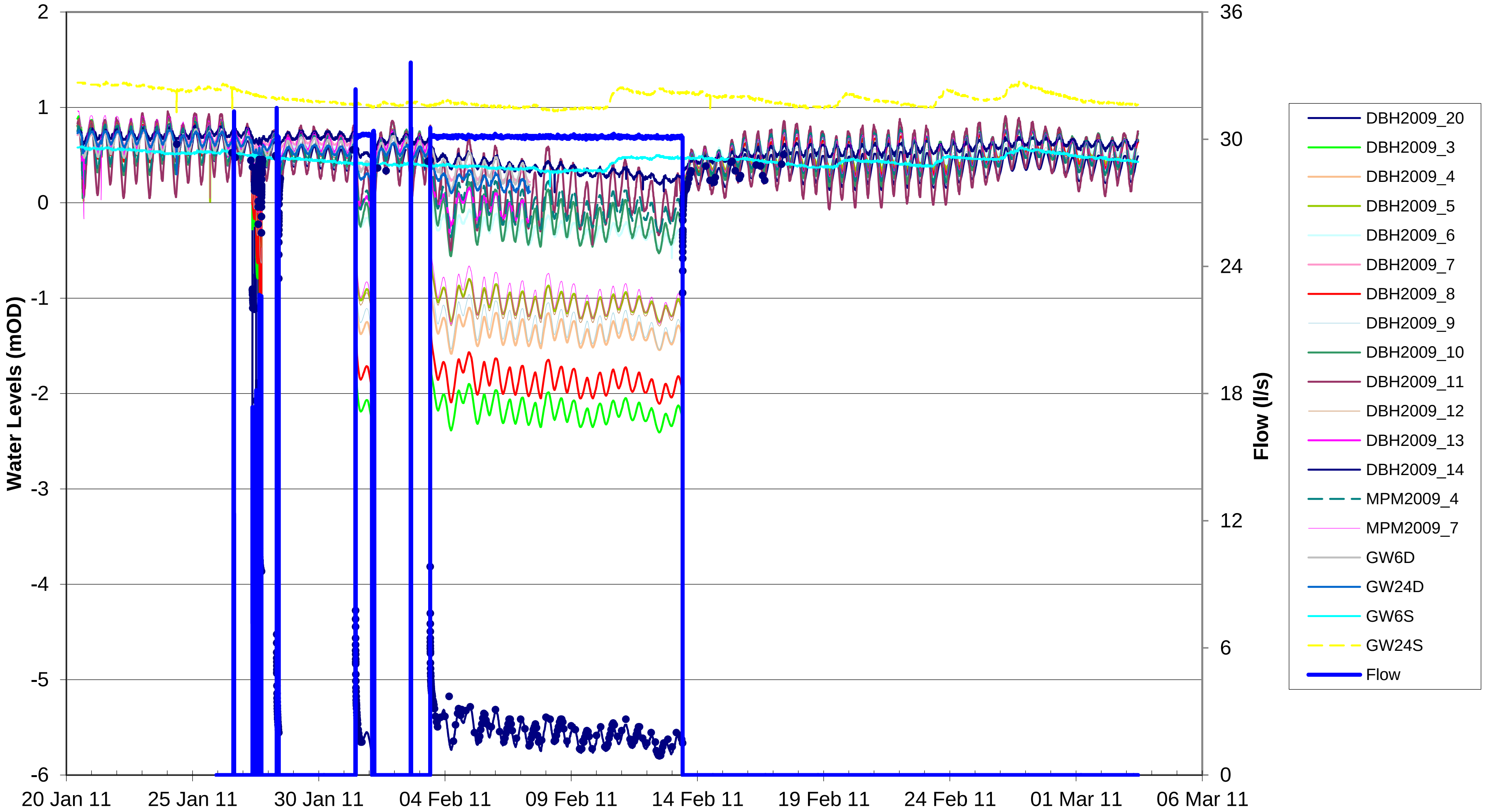
Figure 3: All Water Level and Flow Data



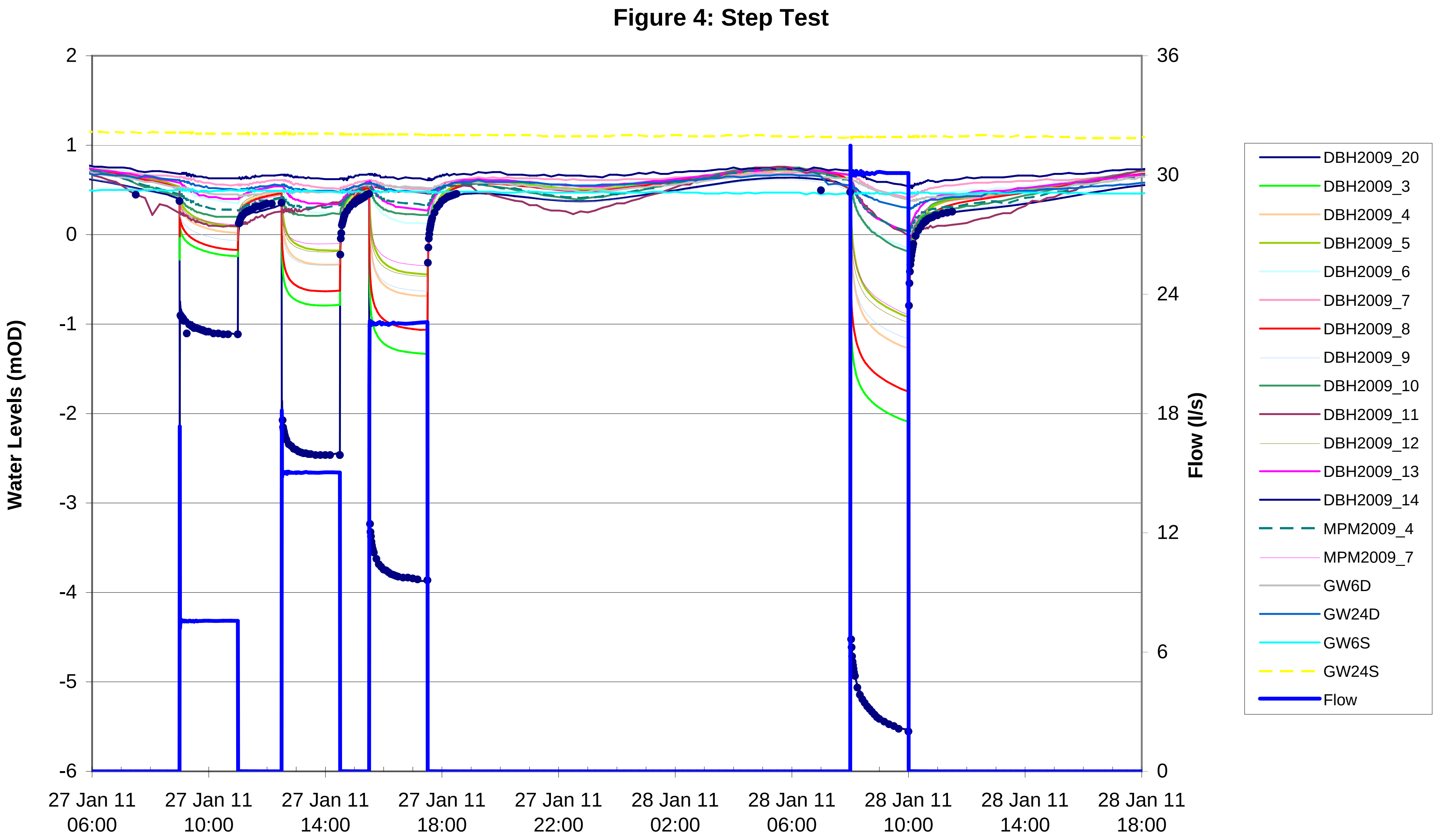


Figure 4: Step Test
Water Levels (mOD)
Flow (l/s)
2
1
0
-1
-2
-3
-4
-5
-6
36
30
24
18
12
6
0
27 Jan 11 06:00
27 Jan 11 10:00
27 Jan 11 14:00
27 Jan 11 18:00
27 Jan 11 22:00
28 Jan 11 02:00
28 Jan 11 06:00
28 Jan 11 10:00
28 Jan 11 14:00
28 Jan 11 18:00
DBH2009_20
DBH2009_3
DBH2009_4
DBH2009_5
DBH2009_6
DBH2009_7
DBH2009_8
DBH2009_9
DBH2009_10
DBH2009_11
DBH2009_12
DBH2009_13
DBH2009_14
MPM2009_4
MPM2009_7
GW6D
GW24D
GW6S
GW24S
Flow

Figure 5: Constant Rate Test

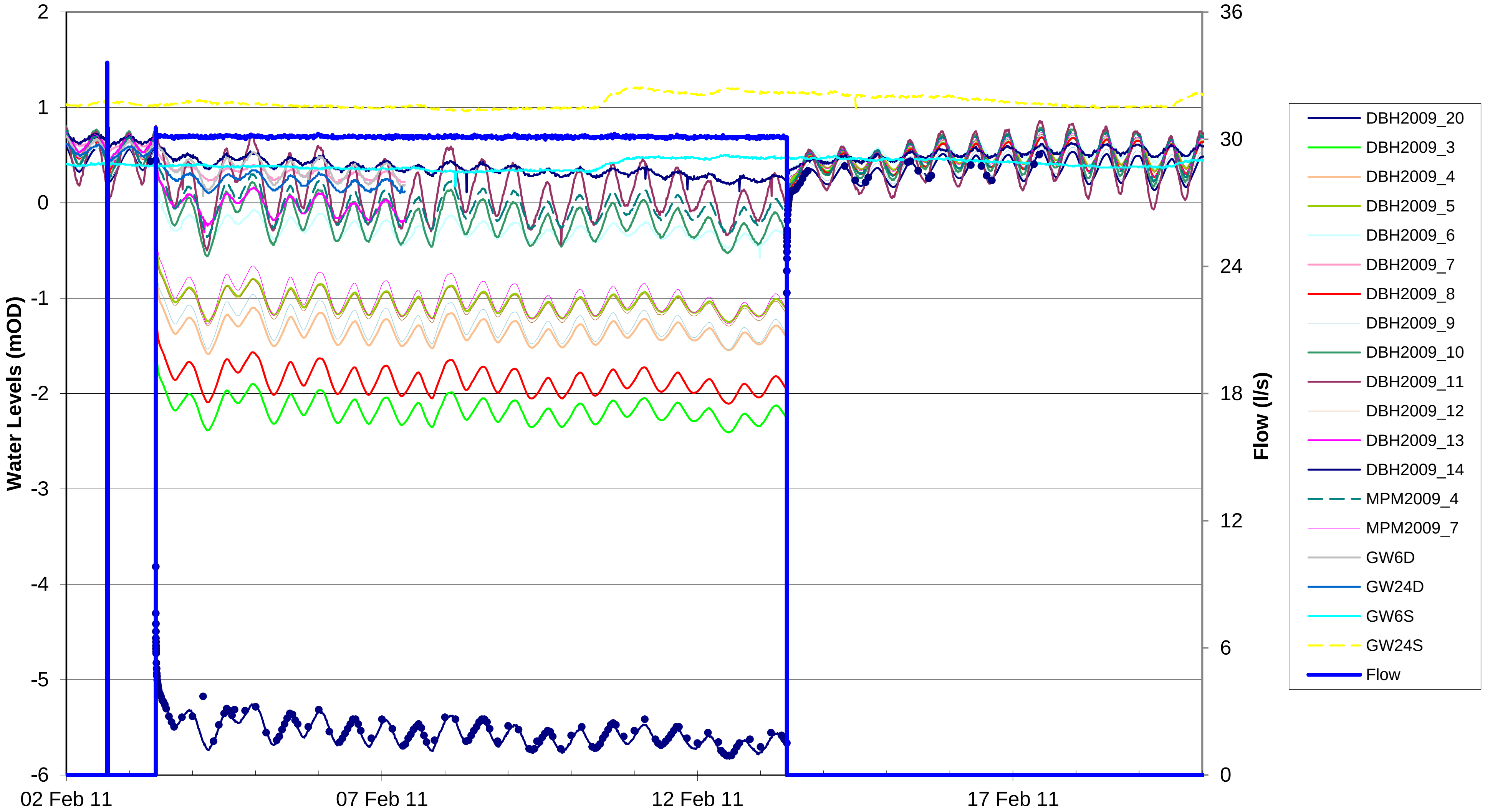
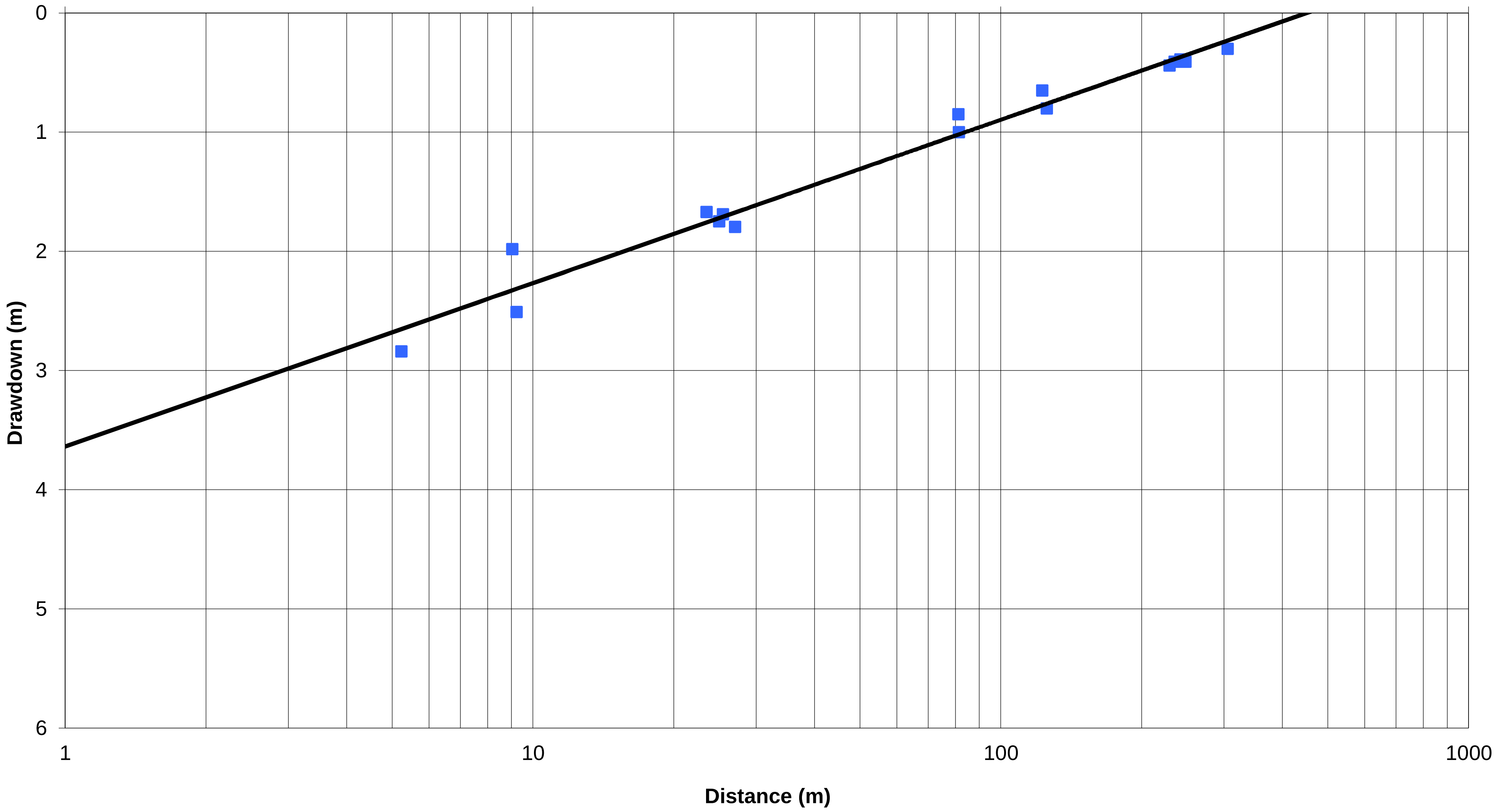
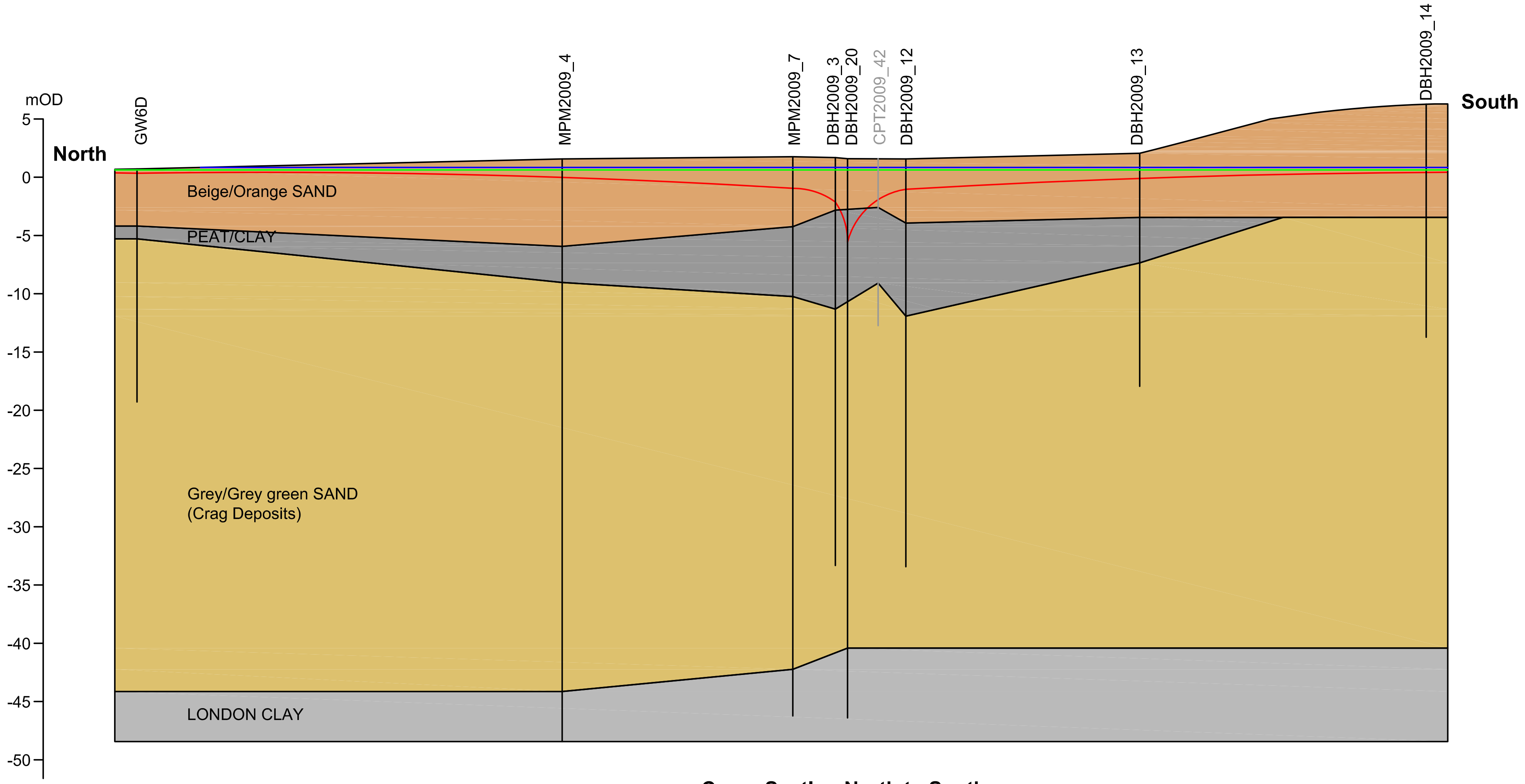


Figure 6: Distance Drawdown Plot





Cross Section North to South

Horizontal Scale: 1:2500

Vertical Scale: 1:500

Notes:

1. Water levels prior to pumping taken at high tide on 12:53 21/01/11.
2. Pumped water levels taken at high tide on 05:45 13/02/11.
3. Recovered water levels taken at high tide on 21:30 01/03/11.
4. Where borehole does not reach the London Clay, strata interface level taken from nearest borehole.
5. Strata interface levels linearly interpolated between borehole locations.
6. Strata levels in DBH2009_20 unreliable due to drilling techique not used in above section, CPT2009_42 used instead.

Key:

- Water level prior to test
- Water level during test
- Water level after test

Project: Sizewell Pumping Test		
Title: Cross Section - North to South		
Drawing No: Figure 7	Rev: 1	By: QR
Scale: See drawing	Date: 16/03/2011	Chk: GH

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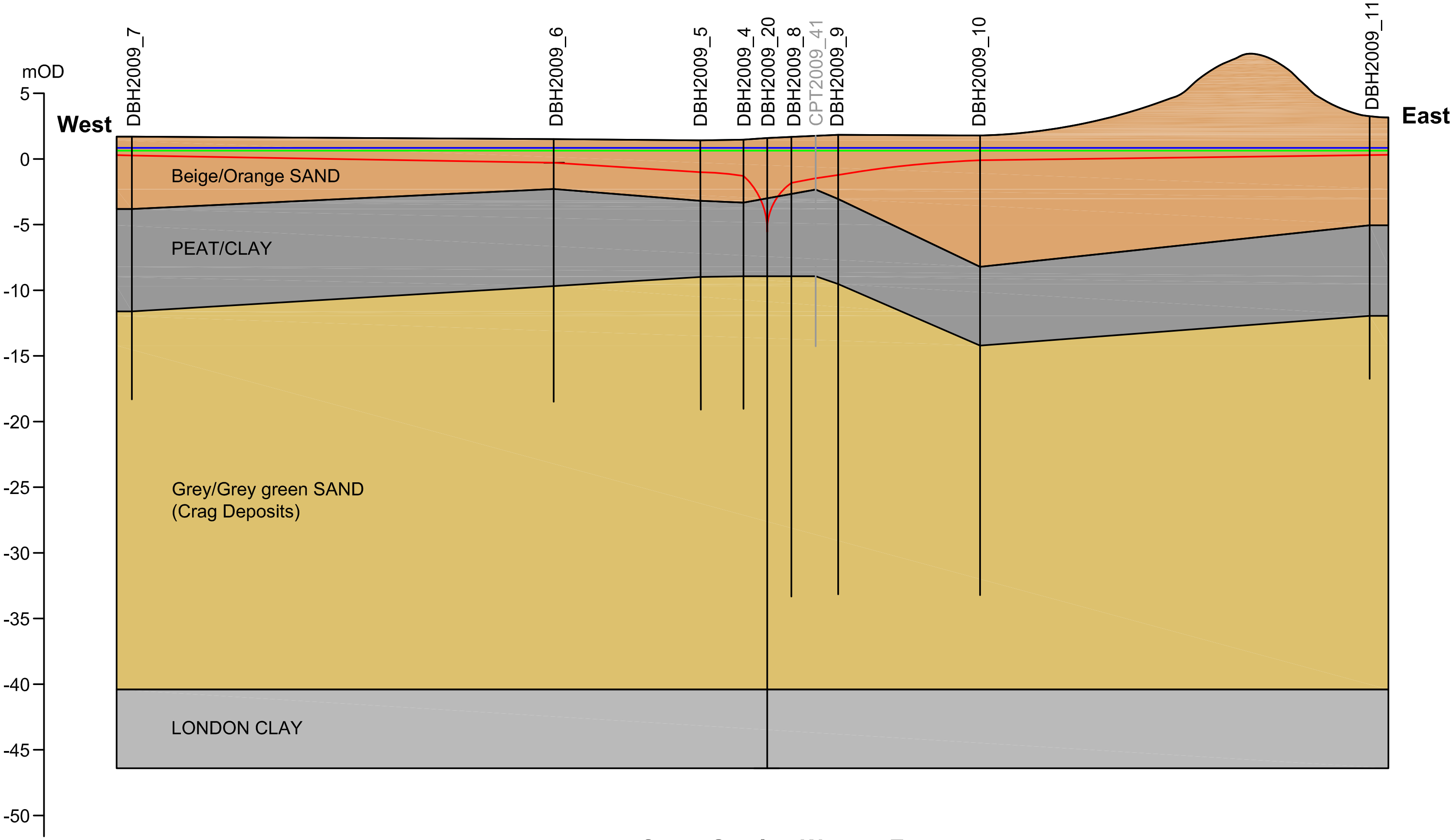

Cross Section West to East
Horizontal Scale: 1:2500
Vertical Scale: 1:500

Notes:
1. Water levels prior to pumping taken at high tide on 12:53 21/01/11.
2. Pumped water levels taken at high tide on 05:45 13/02/11.
3. Recovered water levels taken at high tide on 21:30 01/03/11.
4. Where borehole does not reach the London Clay, strata interface level taken from nearest borehole.
5. Strata interface levels linearly interpolated between borehole locations.
6. Strata above Crag Deposits in SBH2009_5 described as Grey black silty SAND rather than PEAT/CLAY
7. Strata levels in DBH2009_8, DBH2009_9 and DBH2009_20 unreliable due to drilling techique not used in above section, CPT2009_41 used instead.

Key:
Water level prior to test
Water level during test
Water level after test

Project: Sizewell Pumping Test		
Title: Cross Section - West to East		
Drawing No: Figure 8	Rev: 1	By: QR
Scale: See drawing	Date: 16/03/2011	Chk: GH

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Figure 9: Electrical Conductivity

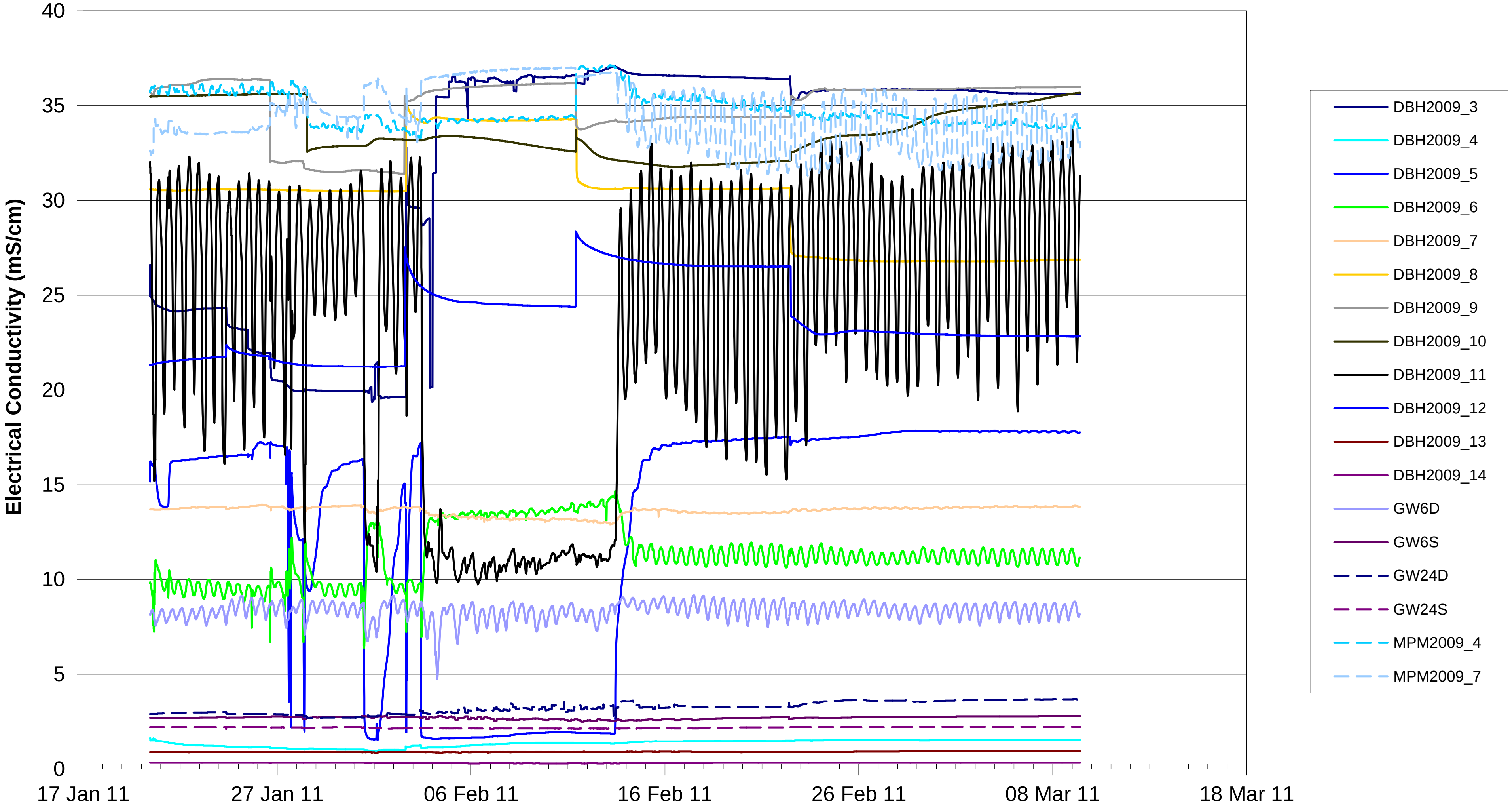
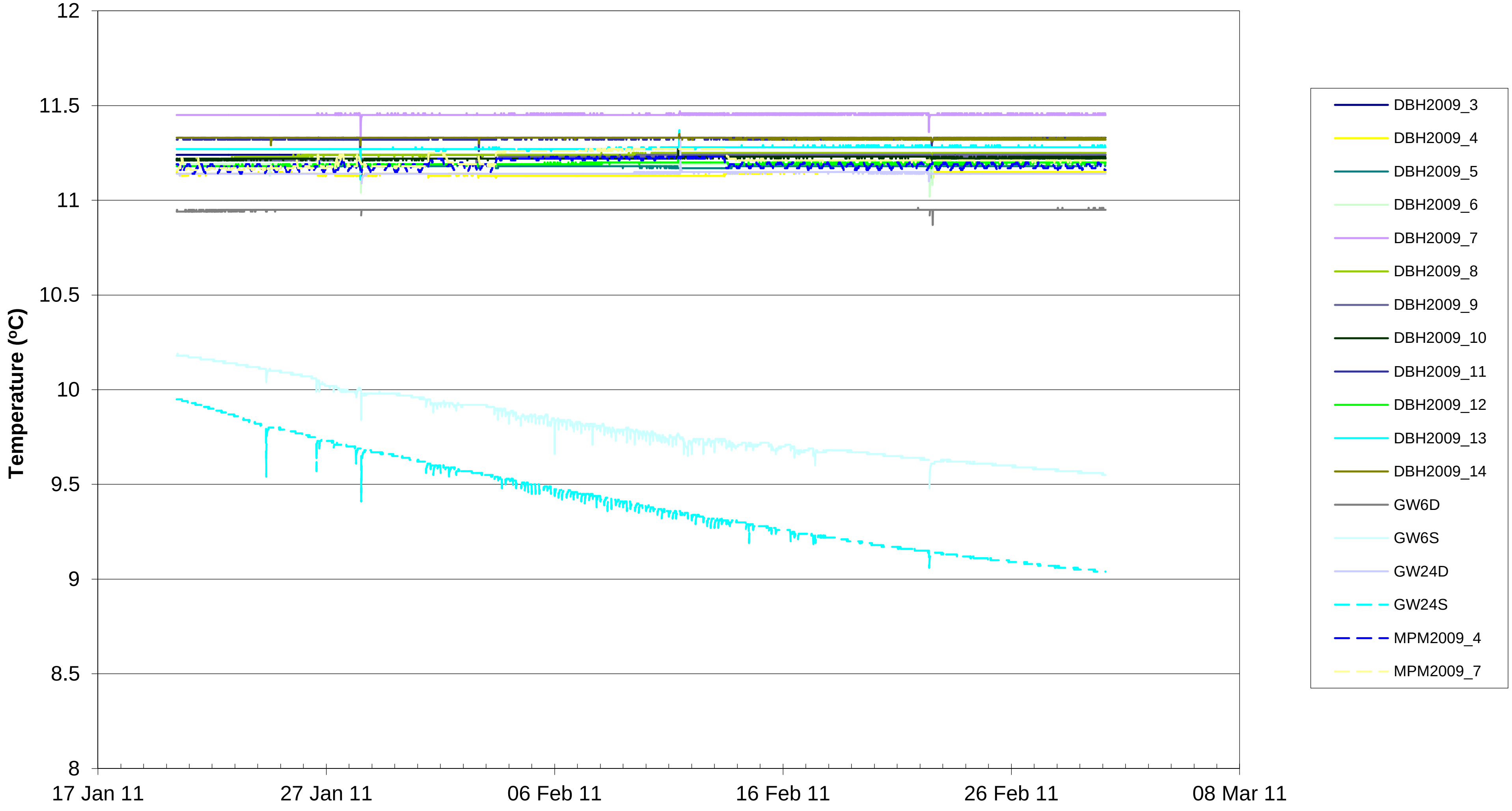
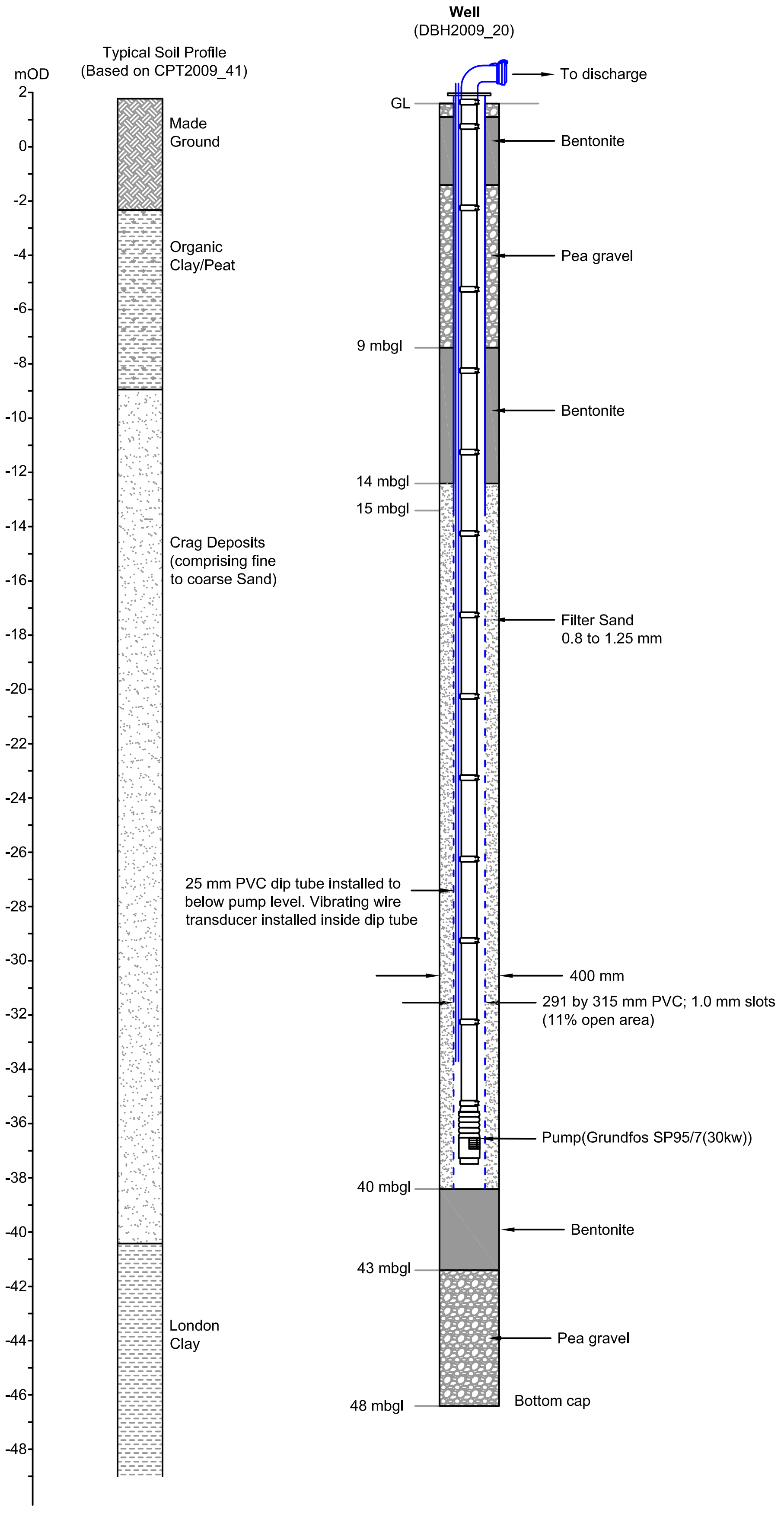


Figure 10: Temperature



Appendix A: Well and Pump Installation Details



Notes:
1. Soil strata information taken from CPT2009_41 and interface level of London Clay taken from DBH2009_20.

Project: Sizewell Pumping Test		
Title: Well Installation Details - DBH2009_20		
Drawing No: J1638/002	Rev: 4	By: QR
Scale: NTS	Date: 18/03/11	Chk: GH

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Appendix B: Datalogged Water Level and Flow Data

(On CD only)

Appendix C: Standalone Downhole Logger Water Level Data

(On CD only)

Appendix D: Manual Dip Data

(On CD only)

ESG Environmental Scientifics Group

Soil Mechanics

Report No A0012-10/3C

OFFSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FACTUAL REPORT ON GROUND INVESTIGATION

VOLUME 3C : IN SITU TESTING

SELF BORING PRESSUREMETER TESTING

Carried out for: NNB Generation Company Limited

August 2011

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Soil Mechanics part of Environmental Scientifics Group

OFFSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL SITE

FACTUAL REPORT ON GROUND INVESTIGATION

VOLUME 3C : IN SITU TESTING

SELF BORING PRESSUREMETER TESTING

Report No: **A0012-10**

Date: **August 2011**

Employer:

NNB Generation Company Limited
40 Grosvenor Place
Victoria
London
SW1X 7EN

Issue No	Date	Details
1	August 2011	Report as submitted

REPORT STRUCTURE

VOLUME NO	TITLE	REPORT NO
1	TEXT, MONITORING AND DRAWINGS	A0012-10/1
2A	EXPLORATORY HOLE RECORDS: 1:25 SCALE BOREHOLE LOGS	A0012-10/2A
2B	EXPLORATORY HOLE RECORDS: 1:25 SCALE BOREHOLE AND TRIAL PIT LOGS 1:100 SCALE BOREHOLE LOGS SPLIT TUBE SAMPLE DESCRIPTIONS DISCONTINUITY LOGS	A0012-10/2B
3A	IN SITU TESTING: DRILLING PARAMETER RESULTS MENARD PRESSUREMETER TESTING	A0012-10/3A
3B	IN SITU TESTING: CONE PENETRATION TESTING GEOPHYSICAL TESTING PUMPING TEST	A0012-10/3B
3C	**IN SITU TESTING: SELF BORING PRESSUREMETER TESTING**	**A0012-10/3C**
4	GEOTECHNICAL LABORATORY TESTING	A0012-10/4
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ESG Environmental Scientifics Group

Soil Mechanics

CONTENTS

1 INTRODUCTION

During February 2010 Soil Mechanics (SM) were commissioned by EDF – DIN CEIDRE TEGG (EDF), on behalf of NNB Generation Company Limited (NNB), to carry out a ground investigation as part of the Onshore Investigations Phase 1 for Sizewell Site, Suffolk.

The scope of the investigation, which was specified by EDF, included self boring pressuremeter (SBP) testing. The work was carried out by the specialist in situ testing department of SM, between 09 July and 09 November 2010. This report presents the factual fieldwork records together with an interpretation of the soils penetrated. The data is also presented separately in digital format following AGS (2005). The records of the other parts of the investigation are contained in SM Report No A0012-10.

2 FIELDWORK

2.1 General

The fieldwork was carried out in general accordance with BS 5930 (1999). Pressuremeter tests were undertaken at locations and depths scheduled by NNB, in conjunction with drilling of boreholes put down by SM. The testing was undertaken using self boring pressuremeters (SBP) manufactured by Cambridge Insitu. Details of the instruments are as follows:

SUMMARY OF PRESSUREMETER EQUIPMENT

Instrument Type	Nominal Diameter (mm)	Strain Capacity (mm)	Pressure Capacity (MPa)	Instrument Details	Remarks
SBP-6	88	6 (per arm)	7	6 arm multiplex (SBP-MPX Type X D, 1996)	Serial No 960521.
SBP-3	88	6 (per arm)	7	3 arm multiplex (SBP-MPX Type X D, 1996)	Serial No 930111
SBP-3	88	6 (per arm)	7	3 arm multiplex (SBP-MPX Type X D, 1996)	Serial No Dylan

The displacement and pressure measuring transducers for the pressuremeter were calibrated prior to the commencement of testing and on completion of the fieldwork. Assessments of the membrane stiffness (ie resistance to inflation in air) were made at the same time and also during the fieldwork where appropriate. The calibration registers are contained in Enclosure A.

The testing carried out is summarised below:

SUMMARY OF PRESSUREMETER TESTS

Borehole Reference	Number of Tests	Test References	Test Depths, mbgl	Dates	Remarks
SBP 2009_1	16	B1T1 to B1T16	11.00m to 77.50m	03/10/10 to 29/10/10	Casagrande 6 drilling rig
SBP 2009_2	16	B2T1 to B2T16	13.30m to 79.00m	02/10/10 to 09/11/10	Beretta T51 drilling rig
SBP 2009_3	48	B3T1 to B3T48	11.00m to 84.00m	13/07/10 to 17/09/10	Beretta T51 drilling rig
SBP 2009_4	44	B4T1 to B4T44	12.10m to 82.85m	09/07/10 to 19/09/10	Geotech 6 drilling rig. Unable to self bore test pocket for Tests 28, 29, 30, 34 and 35. No test carried out.

2.2 Pressuremeter Self Boring and Testing

The SBP comprises a cylindrical instrument with integral cutter that is drilled into the ground using a rotary drilling rig. The rig provides rotation to the SBP cutter through inner rods, and thrust to advance the pressuremeter via the non-rotating outer rods. Water or drilling mud is flushed by the drilling rig pump down the inner rods and up through the inner/outer annulus to remove the cuttings, and provide lubrication and cooling. The outside of the pressuremeter remains in contact with the ground during insertion and the test pocket is therefore much less disturbed than for a prebored type pressuremeter.

Between test locations the boreholes were drilled by rotary wireline coring (Geobor S) to depths approximately 1 m above the scheduled test depth. The SBP was then lowered to the base of the hole and self bored to the required test depth. The cutter position and rate of progress were optimised to achieve minimum disturbance during installation.

The testing procedure comprised a cycle of loading and unloading with typically two unload/reload loops. The loading/unloading was controlled using an electronic strain control unit to pressurise the SBP with compressed gas. Loading of the ground was initially stress controlled at an appropriate loading rate for the ground conditions until cavity expansion commenced, then continued under strain control at a preset rate of 1% per minute.

Loading was continued until either the strain or pressure capacity of the instrument was achieved or if in the operator's opinion continuation would result in a risk of damage to the equipment. The pressuremeter was then unloaded under stress control.

On completion of each test, depending on test spacing and the stability of the borehole, the pressuremeter was either self bored to the next test depth or removed and the borehole advanced by rotary drilling to the next test location, as described above.

3 ANALYSIS OF RESULTS

Analysis of the collected pressuremeter data was carried out by SM using proprietary software developed by Cambridge Insitu. Interpretation of the pressuremeter test data was performed using the average values of strain obtained from the radial displacement measuring positions except where the data from one or more of the 'arms' was judged as unrepresentative. In these cases analysis has been carried out using the most reliable arm average combinations. For a 6 arm instrument these include: three even arms (Arms 2, 4 and 6), three odd arms (Arms 1, 3 and 5) and two opposing arms (Axis 1 – Arms 1 and 4, Axis 2 – Arms 2 and 5, Axis 3 – Arms 3 and 6). For a 3 arm instrument analysis of single arm can be carried out.

The pressuremeter tests have been interpreted to provide, where appropriate, estimates of the following parameters:

- in situ cavity pressure by the 'lift-off' method
- in situ cavity pressure after Marsland and Randolph (1977) modified by Hawkins et al (1990)
- in situ cavity pressure using drained Mohr-Coulomb yield by Cambridge Insitu in-house method
- undrained shear strength and limit pressure during loading after Gibson and Anderson (1961) modified by Windle and Wroth (1977)

- undrained shear strength during unloading after Jefferies (1988)
- drained shear strength during loading (angle of friction and dilation) after Hughes et al (1977)
- shear modulus from linear fit to unload-reload loops after Windle and Wroth (1977)
- undrained shear modulus – shear strain relationship (non-linear stiffness response) after Bolton and Whittle (1999)
- drained shear modulus – shear strain relationship (non-linear stiffness response) after Manassero (1989)
- consistency of undrained parameters using curve fitting method after Whittle (1999)

The results for the four boreholes are summarised in Tables 1 to 4. Test plots showing the pressure against displacement for each pressuremeter test, together with the results of the interpretation of the data, are presented as Figures in accordance with the Contents page. An example of the software analysis output is included as Enclosure B.

The ambient pore water pressures used in the drained analysis are also shown in Table 1; these are based on the observed pressures following unloading of the pressuremeter tests. Calculations of overburden pressure are based on an assumed soil density of 2 Mg/m^3.

A nominal value of 30^o has been used for the constant volume angle of friction, ϕ'_{cv}, used in the drained shear strength interpretation.

It should be noted that tests in the Crag Deposits and more granular Lambeth Group soils are likely to occur under drained conditions and consequently there will be an increase in effective stress during the expansion phase. The shear modulus results for individual loops should therefore be normalised to the average mean effective stress for each loop.

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Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, ϕcv (deg)	Drained strength: Peak angle of friction, ϕ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
B1T1	11.00	10.00-11.50	SBP-6	960521	89.1	03-Oct-10	Sand - RD	1.00	130	Arm ave		258	370	255					30.0	44.8	18.5	
B1T2	15.10	14.50-15.60	SBP-6	960521	89.1	04-Oct-10	Sand - CD	1.00	170	Arm ave		452	659	455					30.0	45.2	19.0	
B1T3	19.20	18.50-19.70	SBP-6	960521	89.1	07-Oct-10	Sand - CD	1.00	200	Arm ave		742	1273	740					30.0	44.9	18.5	
B1T4	23.00	22.50-23.50	SBP-3	930910	89.1	14-Oct-10	Sand - CD	1.00	230	Arm ave		898	1528	890					30.0	51.1	27.1	
B1T5	27.00	27.00-27.50	SBP-3	930910	89.5	15-Oct-10	Sand - CD	1.00	300	Arm ave		801	820	800					30.0	45.3	19.0	
B1T6	31.00	30.50-31.50	SBP-3	930910	89.5	15-Oct-10	Sand - CD	1.00	300	Arm ave		916	1757	915					30.0	44.5	18.0	
B1T7	35.10	34.50-35.60	SBP-3	930910	89.5	17-Oct-10	Sand - CD	1.00	400	Arm ave		1176	2450	1175					30.0	50.6	26.4	
B1T8	39.10	38.50-39.60	SBP-3	930910	89.1	18-Oct-10	Sand - CD	1.00	410	Arm ave		1671	2458	1670					30.0	43.1	16.2	
B1T9	43.15	42.50-43.65	SBP-3	930910	89.1	18-Oct-10	Sand - CD	1.00	490	Arm ave		1111	2393	1110					30.0	59.1	38.8	
B1T10	48.00	47.00-48.50	SBP-3	930910	89.5	19-Oct-10	Clay - LC	1.00	450	Arm ave	1113	1103		1110	947	3167	356	391				
B1T11	52.00	51.50-52.50	SBP-3	930910	89.1	20-Oct-10	Clay - LC	1.00		Axis 1	568	641		570	1020	3299	614	207				
B1T12	57.00	56.50-57.50	SBP-3	930910	89.1	21-Oct-10	Clay - LC	1.00		Arm ave	897	900		900	1369	4237	689	381				
B1T13	64.80	64.20-65.30	SBP-3	930910	89.1	26-Oct-10	nd + grav -	1.00		Arm ave		2010	2810	2010					30.0	49.6	24.9	
B1T14	68.40	68.00-68.90	SBP-3	930910	89.1	27-Oct-10	Clay - LG	1.00		Arm ave	2349	2454		2400	1966	4001	258	355				
B1T15	72.50	72.00-73.00	SBP-3	930910	89.1	28-Oct-10	Clay - LG	1.00		Arm ave	1598	1915		1915	1621	3971	311	434				
B1T16	77.50	77.00-78.00	SBP-3	930910	89.1	29-Oct-10	Clay - LG	1.00		Arm ave	1003	1407		1410	1833	5703	793	655				

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 1.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained: Stiffness exponent, β	Non linear stiffness – Undrained: Shear stress constant, α (MPa)	Non linear stiffness – Drained: Gradient	Non linear stiffness – Drained: Intercept (MPa)	Remarks
B1T1	11.00	10.00-11.50	SBP-6	960521	89.1	03-Oct-10	Sand - RD	1.00	130	Arm ave	7	1	81	0.131			0.742	8.8	
B1T2	15.10	14.50-15.60	SBP-6	960521	89.1	04-Oct-10	Sand - CD	1.00	170	Arm ave	25	1	121	0.195			0.780	21.1	
												2	128	0.318			0.717	15.8	
												3	134	0.330			0.727	18.3	
B1T3	19.20	18.50-19.70	SBP-6	960521	89.1	07-Oct-10	Sand - CD	1.00	200	Arm ave	38	1	258	0.103			0.773	38.2	
												2	308	0.150			0.716	30.6	
												3	310	0.183			0.757	47.6	
B1T4	23.00	22.50-23.50	SBP-3	930910	89.1	14-Oct-10	Sand - CD	1.00	230	Arm ave	59	1	482	0.112			0.706	40.9	
												2	558	0.140			0.633	26.9	
B1T5	27.00	27.00-27.50	SBP-3	930910	89.5	15-Oct-10	Sand - CD	1.00	300	Arm ave	22	1	105	0.223			0.675	8.0	
B1T6	31.00	30.50-31.50	SBP-3	930910	89.5	15-Oct-10	Sand - CD	1.00	300	Arm ave	58	1	420	0.087			0.857	127.7	
												2	533	0.088			0.872	189.7	
												3	549	0.113			0.908	316.1	
B1T7	35.10	34.50-35.60	SBP-3	930910	89.5	17-Oct-10	Sand - CD	1.00	400	Arm ave	86	1	565	0.076			0.720	46.1	
												2	689	0.100			0.609	24.3	
B1T8	39.10	38.50-39.60	SBP-3	930910	89.1	18-Oct-10	Sand - CD	1.00	410	Arm ave	71	1	290	0.090			0.653	13.7	
												2	516	0.094			0.646	24.8	
												3	562	0.146			0.578	16.9	
B1T9	43.15	42.50-43.65	SBP-3	930910	89.1	18-Oct-10	Sand - CD	1.00	490	Arm ave	51	1	140	0.227			0.847	39.2	
												2	471	0.099			0.816	98.2	
												3	495	0.147			0.759	70.5	
B1T10	48.00	47.00-48.50	SBP-3	930910	89.5	19-Oct-10	Clay - LC	1.00	450	Arm ave	37	1	66	0.616	0.462	1.8			
												2	51	0.869	0.579	4.1			
												3	46	0.947	0.649	6.2			
B1T11	52.00	51.50-52.50	SBP-3	930910	89.1	20-Oct-10	Clay - LC	1.00		Axis 1	30	1	52	0.455	0.645	4.9			
												2	54	0.494	0.745	10.6			
												3	49	0.705	0.742	10.1			
B1T12	57.00	56.50-57.50	SBP-3	930910	89.1	21-Oct-10	Clay - LC	1.00		Arm ave	138	1	96	0.439	0.568	5.0			
												2	95	0.380	0.623	7.5			
												3	91	0.431	0.625	7.6			
B1T13	64.80	64.20-65.30	SBP-3	930910	89.1	26-Oct-10	nd + grav -	1.00		Arm ave	98	1	281	0.130	0.709	24.0			
												2	417	0.115	0.722	39.3			
												3	514	0.065	0.563	9.6			
B1T14	68.40	68.00-68.90	SBP-3	930910	89.1	27-Oct-10	Clay - LG	1.00		Arm ave	40	1	71	0.829	0.452	2.3			
												2	61	0.957	0.536	3.9			
												3	59	0.971	0.597	5.7			
B1T15	72.50	72.00-73.00	SBP-3	930910	89.1	28-Oct-10	Clay - LG	1.00		Arm ave	94	1	52	0.942	0.621	5.5			
												2	48	1.098	0.665	7.3			
												3	48	1.073	0.620	5.4			
B1T16	77.50	77.00-78.00	SBP-3	930910	89.1	29-Oct-10	Clay - LG	1.00		Arm ave	134	1	65	0.843	0.685	9.8			
												2	58	1.102	0.664	8.2			
												3	51	1.343	0.680	8.6			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 1.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, ϕcv (deg)	Drained strength: Peak angle of friction, ϕ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
B2T1	13.30	12.75-13.80	SBP-6	960521	89.1	02-Oct-10	Silty SAND	1.00	110	Arm ave		448	510	445					30.0	40.4	12.6	
B2T2	15.50	14.75-16.00	SBP-6	960521	89.1	04-Oct-10	Silty SAND	1.00	140	Arm ave		373	405	375					30.0	47.8	23	
B2T3	19.30	16.75-19.80	SBP-6	960521	89.1	05-Oct-10	Silty SAND	1.00		Arm ave												No soil resistance to test expansion. No suitable data for analysis
B2T4	20.30	19.80-20.80	SBP-6	960521	89.1	05-Oct-10	Silty SAND	1.00	195	Arm ave		NA	410	551					30.0	51.0	27.0	Insufficient yield for in situ stress analysis
B2T5	24.10	23.40-24.60	SBP-6	960521	89.1	13-Oct-10	Silty SAND	1.00	230	Arm ave		NA	NA	650					30.0	56.3	34.6	Insufficient yield for in situ stress analysis
B2T6	29.80	29.30-30.30	SBP-6	960521	89.1	14-Oct-10	velly silty S	1.00	300	Arm ave		1095	1532	1530					30.0	40.2	12.4	
B2T7	34.50	33.80-35.00	SBP-6	960521	89.1	16-Oct-10	Silty SAND	1.00	360	Even arms		1412	1457	1430					30.0	45.1	18.8	Arm 1 sticking intermittently
B2T8	38.50	37.80-39.00	SBP-6	960521	89.1	17-Oct-10	Silty SAND	1.00	410	Arm ave		2097	2441	1050					30.0	58.9	38.5	Membrane burst during final loading
B2T9	43.00	42.30-43.50	SBP-6	960521	89.1	20-Oct-10	Silty SAND	1.00	430	Odd arms		1955	1771	1850					30.0	31.1	1.3	Fault on Arm 3 and unexpected behaviour on Arms 2 and 4
B2T10	48.00	47.30-48.50	SBP-6	960521	89.1	26-Oct-10	Sandy CLA	1.00	170	Arm ave	607	918		915		3700	442	427				
B2T11	52.50	51.80-53.00	SBP-6	960521	89.1	27-Oct-10	Sandy CLA	1.00	540	Arm ave												No soil resistance to test expansion. No suitable data for analysis
B2T12	62.00	60.80-62.50	SBP-6	960521	89.1	31-Oct-10	Silty CLAY	1.00	780	Arm ave	774	492		740		5633	606	539				
B2T13	64.50	63.80-65.00	SBP-6	960521	89.1	01-Nov-10	velly silty S	1.00	650	Arm ave	947	1207		1205	1455	4382	631	314				Arm 4 some disturbance. Behaviour appears more undrained
B2T14	70.00	69.30-70.50	SBP-6	960521	89.1	01-Nov-10	CLAY	1.00	750	Arm ave				1100								Membrane burst after first unload-reload loop. Insufficient yield for in situ pressure analysis.
B2T15	74.50	73.30-75.00	SBP-3	930111	89.1	08-Nov-10	Silty CLAY	1.00	735	Arm ave	1421	1571		1425		4576	689	869				
B2T16	79.00	78.30-79.50	SBP-3	930111	89.1	09-Nov-10	Silty CLAY	1.00	1475	Axis 1	2730			2750		6332	654	514				Fault on Arm 2

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table

2.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained: Stiffness exponent, β	Non linear stiffness – Undrained: Shear stress constant, α (MPa)	Non linear stiffness – Drained: Gradient	Non linear stiffness – Drained: Intercept (MPa)	Remarks
B2T1	13.30	12.75-13.80	SBP-6	960521	89.1	02-Oct-10	Silty SAND	1.00	110	Arm ave	11	1	86	0.291			0.760	14.6	
												2	112	0.180			0.680	8.3	
												3	92	0.319			0.770	19.3	
B2T2	15.50	14.75-16.00	SBP-6	960521	89.1	04-Oct-10	Silty SAND	1.00	140	Arm ave	24	1	93	0.221			0.740	12.9	
												2	100	0.247			0.730	13.7	
												3	111	0.256			0.750	17.1	
B2T3	19.30	16.75-19.80	SBP-6	960521	89.1	05-Oct-10	Silty SAND	1.00		Arm ave									No soil resistance to test expansion. No suitable data for analysis
B2T4	20.30	19.80-20.80	SBP-6	960521	89.1	05-Oct-10	Silty SAND	1.00	195	Arm ave	13	1	64	0.216			0.750	9.6	Insufficient yield for in situ stress analysis
												2	106	0.213			0.670	8.4	
												3	140	0.199			0.670	10.4	
B2T5	24.10	23.40-24.60	SBP-6	960521	89.1	13-Oct-10	Silty SAND	1.00	230	Arm ave	12	1	62	0.221			0.900	29.0	Insufficient yield for in situ stress analysis
												2	120	0.134			0.720	10.9	
												3	175	0.125			0.700	14.2	
B2T6	29.80	29.30-30.30	SBP-6	960521	89.1	14-Oct-10	velly silty S	1.00	300	Arm ave	64	1	124	0.202			0.830	33.0	
												2	291	0.127			0.740	35.0	
												3	409	0.122			0.820	93.0	
B2T7	34.50	33.80-35.00	SBP-6	960521	89.1	16-Oct-10	Silty SAND	1.00	360	Even arms	50	1	111	0.297			0.820	29.0	Arm 1 sticking intermittently
												2	169	0.243			0.870	62.0	
												3	263	0.125			0.790	43.0	
B2T8	38.50	37.80-39.00	SBP-6	960521	89.1	17-Oct-10	Silty SAND	1.00	410	Arm ave	87	1	533	0.043			0.700	33.0	Membrane burst during final loading
												2	603	0.064			0.700	41.0	
												3	751	0.061			0.780	101.0	
B2T9	43.00	42.30-43.50	SBP-6	960521	89.1	20-Oct-10	Silty SAND	1.00	430	Odd arms	98	1	599	0.068			0.490	6.0	Fault on Arm 3 and unexpected behaviour on Arms 2 and 4
												2	681	0.068			0.550	11.8	
												3	763	0.065			0.550	13.8	
B2T10	48.00	47.30-48.50	SBP-6	960521	89.1	26-Oct-10	Sandy CLA	1.00	170	Arm ave	73	1	65	0.412	0.688	8.1			
												2	65	0.489	0.689	8.8			
												3	66	0.422	0.625	5.5			
B2T11	52.50	51.80-53.00	SBP-6	960521	89.1	27-Oct-10	Sandy CLA	1.00	540	Arm ave									No soil resistance to test expansion. No suitable data for analysis
B2T12	62.00	60.80-62.50	SBP-6	960521	89.1	31-Oct-10	Silty CLAY	1.00	780	Arm ave	158	1	166	0.183	0.613	8.9			
												2	132	0.322	0.698	15.8			
												3	137	0.281	0.712	17.9			
B2T13	64.50	63.80-65.00	SBP-6	960521	89.1	01-Nov-10	velly silty S	1.00	650	Arm ave	101	1	205	0.131	0.651	13.1			Arm 4 some disturbance. Behaviour appears more undrained
												2	88	0.459	0.635	7.9			
												3	96	0.414	0.719	15.2			
												4	104	0.423	0.658	10.8			
B2T14	70.00	69.30-70.50	SBP-6	960521	89.1	01-Nov-10	CLAY	1.00	750	Arm ave		1	283	0.081	0.655	13.5			Membrane burst after first unload-reload loop. Insufficient yield for in situ pressure analysis.
B2T15	74.50	73.30-75.00	SBP-3	930111	89.1	08-Nov-10	Silty CLAY	1.00	735	Arm ave	166	1	117	0.220	0.660	9.6			
												2	113	0.249	0.650	9.3			
												3	107	0.284	0.629	7.9			
B2T16	79.00	78.30-79.50	SBP-3	930111	89.1	09-Nov-10	Silty CLAY	1.00	1475	Axis 1	72	1	80	0.323	0.750	14.1			Fault on Arm 2
												2	80	0.357	0.758	15.4			
												3	84	0.357	0.735	13.5			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 2.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, ϕcv (deg)	Drained strength: Peak angle of friction, ϕ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
B3T1	11.00	10.50-11.50	SBP-6	960521	89.1	13-Jul-10	Peat	-1.15	150	Axis 3	165			175	233	545	92	58				
B3T1	11.00				89.1	13-Jul-10				Axis 3												
B3T2	13.00	12.50-13.50	SBP-6	960521	89.1	13-Jul-10	Peat/sand	-1.15	140	Axis 3	161			160	232	511	86	23				
B3T2	13.00				89.1	13-Jul-10				Axis 3												
B3T3	15.10	14.60-15.60	SBP-6	960521	89.1	14-Jul-10	Sand - CD	-1.10	160	Axis 2	204	NA	NA	400					30.0	46.8	21.2	
B3T4	17.00	16.50-17.00	SBP-3	Dylan	89.5	19-Jul-10	Sand - CD	-1.15	115	Arm ave		500	603	500					30.0	52.5	29.1	
B3T4	17.00				89.5	19-Jul-10				Arm ave												
B3T5	19.00	18.50-19.50	SBP-3	Dylan	89.5	20-Jul-10	Sand - CD	-1.10	170	Arm ave		583	878	580					30.0	50.3	26.0	
B3T5	19.00				89.5	20-Jul-10				Arm ave												
B3T6	21.00	20.50-21.50	SBP-3	Dylan	89.5	20-Jul-10	Sand - CD	-1.10	200	Arm ave		598	1006	600					30.0	46.0	20.1	
B3T6	21.00				89.5	20-Jul-10				Arm ave												
B3T7	23.00	22.50-23.50	SBP-3	Dylan	89.5	21-Jul-10	Sand - CD	-1.10	180	Arm ave		631	1605	630					30.0	54.7	32.3	
B3T7	23.00				89.5	21-Jul-10				Arm ave												
B3T8	25.00	24.50-25.50	SBP-3	Dylan	89.5	21-Jul-10	Sand - CD	-1.10	220	Arm ave		676	1397	675					30.0	52.6	29.3	
B3T8	25.00				89.5	21-Jul-10				Arm ave												
B3T9	27.00	26.50-27.50	SBP-3	Dylan	89.5	22-Jul-10	nd - Crag D	-1.10		Arm ave												Membrane burst during intial loading. Gi analysis only.
B3T10	30.00	29.50-30.50	SBP-3	Dylan	89.5	27-Jul-10	nd - Crag D	-1.10		Arm ave												Disturbed test pocket. No suitable data for analysis.
B3T11	32.00	31.50-32.50	SBP-3	Dylan	89.5	29-Jul-10	Sand - CD	-1.10	300	Arm ave		1606	2419	1606					30.0	37.8	9.4	
B3T11	32.00				89.5	29-Jul-10				Arm ave												
B3T12	34.00	33.50-34.50	SBP-3	Dylan	89.5	30-Jul-10	Sand - CD	-1.10	300	Arm ave		1392	2287	1400					30.0	37.7	9.2	
B3T12	34.00				89.5	30-Jul-10				Arm ave												
B3T12	34.00				89.5	30-Jul-10				Arm ave												
B3T13	36.00	36.50-37.50	SBP-3	Dylan	89.5	02-Aug-10	Sand - CD	-1.10	335	Arm ave		1394	2862	1500					30.0	54.1	31.3	
B3T13	36.00				89.5	02-Aug-10				Arm ave												
B3T13	36.00				89.5	02-Aug-10				Arm ave												
B3T14	38.00	37.50-38.50	SBP-3	Dylan	89.5	03-Aug-10	Sand - CD	-1.10	355	Arm ave		2245	2499	2244					30.0	34.0	4.8	
B3T14	38.00				89.5	03-Aug-10				Arm ave												
B3T15	40.00	39.50-40.50	SBP-3	Dylan	89.5	03-Aug-10	Sand - CD	-0.70	410	Arm ave		1088	1487	1085					30.0	44.2	17.7	
B3T15	40.00				89.5	03-Aug-10				Arm ave												
B3T16	42.00	41.50-42.50	SBP-3	Dylan	89.1	04-Aug-10	Sand - CD	-0.50	450	Arm ave		1198	2020	1195					30.0	43.1	16.1	
B3T16	42.00				89.1	04-Aug-10				Arm ave												
B3T17	44.00	43.50-44.50	SBP-3	Dylan	89.1	05-Aug-10	Sand - CD	-0.80	470	Arm ave		1241	2141	1240					30.0	47.6	22.2	
B3T17	44.00				89.1	05-Aug-10				Arm ave												
B3T17	44.00				89.1	05-Aug-10				Arm ave												
B3T18	46.00	45.50-46.50	SBP-3	Dylan	89.1	06-Aug-10	Clay - LC	-0.80	485	Arm ave	475	646		646	NA	3457	511	NA				No unloading data collected.
B3T18	46.00				89.1	06-Aug-10				Arm ave												
B3T19	47.00	46.50-47.50	SBP-3	Dylan	89.1	11-Aug-10	Clay - LC	-1.00		Arm ave	470	841		840	790	3381	472	457				
B3T19	47.00				89.1	11-Aug-10				Arm ave												
B3T19	47.00				89.1	11-Aug-10				Arm ave												
B3T20	49.00	48.50-49.50	SBP-3	Dylan	89.1	09-Aug-10	Clay - LC	-1.00		Arm ave	545	919		920	1121	3990	554	452				
B3T20	49.00				89.1	09-Aug-10				Arm ave												
B3T21	51.00	50.50-51.50	SBP-3	Dylan	89.1	10-Aug-10	Clay - LC	-1.10		Arm ave	995	924		925	963	3888	633	445				
B3T21	51.00				89.1	10-Aug-10				Arm ave												
B3T21	51.00				89.1	10-Aug-10				Arm ave												
B3T22	52.00	51.50-52.50	SBP-3	Dylan	89.1	11-Aug-10	Clay - LC	-1.10		Arm ave	724	869		870	771	3975	565	525				
B3T22	52.00				89.1	11-Aug-10				Arm ave												
B3T22	52.00				89.1	11-Aug-10				Arm ave												
B3T23	53.00	53.50-53.50	SBP-3	Dylan	89.1	12-Aug-10	Clay - LC	-1.10		Arm ave	900	1274		1275	1260	3796	385	426				
B3T23	53.00				89.1	12-Aug-10				Arm ave												
B3T23	53.00				89.1	12-Aug-10				Arm ave												

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table **3.1**

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, ϕcv (deg)	Drained strength: Peak angle of friction, ϕ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
B3T24	54.00	53.50-54.50	SBP-3	Dylan	89.1	12-Aug-10	Clay - LC	-1.10		Arm ave	1323	1435		1420	1036	3942	532	409				
B3T24	54.00				89.1	12-Aug-10				Arm ave												
B3T25	54.70	54.50-55.20	SBP-6	960521	89.1	20-Aug-10	Clay - LC	-1.10		Arm ave												Pressure leak during test. No suitable data for analysis
B3T26	55.70	55.20-56.20	SBP-6	960521	89.1	23-Aug-10	Clay - LC	0.00		Arm ave	1528	1224		1255	1254	3942	495	435				
B3T26	55.70				89.3	23-Aug-10				Arm ave												
B3T26	55.70				89.3	23-Aug-10				Arm ave												
B3T27	57.50	57.00-58.00	SBP-6	960521	89.1	24-Aug-10	Clay	-0.60		Arm ave	1052	1215		1215	812	3153	375	414				
B3T27	57.50				89.1	24-Aug-10				Arm ave												
B3T28	58.50	58.00-59.00	SBP-6	960521	89.1	24-Aug-10	Clay	-1.00		Arm ave	951	1085		1085	910	4147	720	381				
B3T28	58.50				89.1	24-Aug-10				Arm ave												
B3T29	60.00	59.00-60.50	SBP-6	960521	89.1	25-Aug-10	Clay	-0.60		Arm ave	589			600								Disturbed test pocket. No suitable data for analysis.
B3T30	61.30	60.50-61.80	SBP-6	960521	89.1	25-Aug-10	Sandy Clay	-0.60		Arm ave	947	972		970	1104	4785	711	618				
B3T30	61.30				89.1	25-Aug-10				Arm ave												
B3T31	63.70	63.00-64.20	SBP-6	960521	89.1	26-Aug-10	nd and Grav	-0.65		Arm ave	625			625								Disturbed test pocket. No suitable data for analysis.
B3T32	64.70	64.2065.20	SBP-6	960521	89.1	26-Aug-10	Clay	-0.65		Odd arms				635								Arm4 full displacement at low test pressure. Gi analysis only.
B3T33	65.85	65.25-66.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90		Arm ave	368			690					30.0	75.7	65.5	Disturbed test pocket. No suitable data for analysis.
B3T34	66.85	66.35-67.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90		Arm ave	1346	1407	2886	1405					30.0	68.0	52.8	
B3T34	66.85				89.1	01-Sep-10				Arm ave												
B3T34	66.85				89.1	01-Sep-10				Arm ave												
B3T35	67.85	67.35-68.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90	710	Arm ave	1230	1586	2164	1585					30.0	39.7	11.7	
B3T35	67.85				89.1	01-Sep-10				Arm ave												
B3T35	67.85				89.1	01-Sep-10				Arm ave												
B3T36	68.75	67.85-68.75	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90	730	Even arms	751	1134		1135	1185	4241	585	556				
B3T36	68.75				89.1	01-Sep-10				Even arms												
B3T36	68.75				89.1	01-Sep-10				Even arms												
B3T37	69.75	69.25-70.25	SBP-6	960521	89.1	02-Sep-10	Clay	-0.88		Arm ave	1602	1960		1650	1394	3735	342	424				
B3T37	69.75				89.1	02-Sep-10				Arm ave												
B3T37	69.75				89.1	02-Sep-10				Arm ave												
B3T38	71.15	70.50-71.65	SBP-6	960521	89.1	03-Sep-10	Clay	-0.90		Arm ave	1067	1346		1345	NA	4559	549	NA				Membrane burst after Loop 2. No unloading data for analysis.
B3T38	71.15				89.1	03-Sep-10				Arm ave												
B3T39	72.15	71.65-72.65	SBP-6	960521	89.1	06-Sep-10	Clay	-0.95		Arm ave												
B3T40	73.20	72.70-73.70	SBP-6	960521	89.1	08-Sep-10	Clay	-1.05		Arm ave	1006	1441		1440	1687	5136	549	579				
B3T40	73.20				89.1	08-Sep-10				Arm ave												
B3T41	74.20	73.70-74.70	SBP-6	960521	89.1	08-Sep-10	Clay	-1.05		Arm ave	754	1147		1145	1543	4591	566	566				
B3T41	74.20				89.1	08-Sep-10				Arm ave												
B3T41	74.20				89.1	08-Sep-10				Arm ave												
B3T42	77.00	76.50-77.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.95		Arm ave	1508	1296		1510	1616	5146	641	679				
B3T42	77.00				89.1	15-Sep-10				Arm ave												
B3T43	78.00	77.50-78.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.93		Arm ave	1592	2597		1590	1896	5912	825	674				
B3T43	78.00				89.1	15-Sep-10				Arm ave												
B3T44	79.00	78.50-79.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.93		Arm ave	1581	1598		1590	1254	5602	432	922				
B3T44	79.00				89.1	15-Sep-10				Arm ave												
B3T45	80.00	79.50-80.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.96		Arm ave	1412	1457		1450	2169	7053	941	807				
B3T45	80.00				89.1	16-Sep-10				Arm ave												
B3T45	80.00				89.1	16-Sep-10				Arm ave												
B3T46	81.00	80.50-81.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.91		Arm ave	1199	1347		1340	1953	6909	987	730				

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Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 3.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength			Drained strength			Remarks
																Limit pressure, pL (kPa)	Shear strength (loading), cu (kPa)	Shear strength (unloading), cu (kPa)	Const vol angle of friction for analysis, ϕcv (deg)	Peak angle of friction, $\phi' pk$ (deg)	Angle of dilation, v'	
B3T46	81.00				89.1	16-Sep-10				Arm ave												
B3T47	82.00	81.50-82.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.93		Arm ave	1363	1336		1350	2032	6687	962	697				
B3T47	82.00				89.1	16-Sep-10				Arm ave												
B3T48	84.00	83.50-84.50	SBP-6	960521	89.1	17-Sep-10	Clay	-0.93		Arm ave	1302	1245		1280	2051	7059	968	689				
B3T48	84.00				89.1	17-Sep-10				Arm ave												

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 3.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained – Stiffness exponent, β	Non linear stiffness – Undrained – Shear stress constant, α (MPa)	Non linear stiffness – Drained – Gradient	Non linear stiffness – Drained – Intercept (MPa)	Remarks
B3T1	11.00	10.50-11.50	SBP-6	960521	89.1	13-Jul-10	Peat	-1.15	150	Axis 3	2	1	3	2.730	0.709	0.6			
B3T1	11.00				89.1	13-Jul-10				Axis 3		2	2	3.519	0.730	0.7			
B3T2	13.00	12.50-13.50	SBP-6	960521	89.1	13-Jul-10	Peat/sand	-1.15	140	Axis 3	3	1	7	0.993	0.726	1.4			
B3T2	13.00				89.1	13-Jul-10				Axis 3		2	12	0.402	0.600	0.8			
B3T3	15.10	14.60-15.60	SBP-6	960521	89.1	14-Jul-10	Sand - CD	-1.10	160	Axis 2	18	1	84	0.187			0.648	4.9	
B3T4	17.00	16.50-17.00	SBP-3	Dylan	89.5	19-Jul-10	Sand - CD	-1.15	115	Arm ave	7	1	84	0.156			0.709	4.6	
B3T4	17.00				89.5	19-Jul-10				Arm ave		2	118	0.208			0.815	28.0	
B3T5	19.00	18.50-19.50	SBP-3	Dylan	89.5	20-Jul-10	Sand - CD	-1.10	170	Arm ave	25	1	132	0.173			0.861	43.3	
B3T5	19.00				89.5	20-Jul-10				Arm ave		2	177	0.205			0.854	57.9	
B3T6	21.00	20.50-21.50	SBP-3	Dylan	89.5	20-Jul-10	Sand - CD	-1.10	200	Arm ave	33	1	129	0.220			0.813	28.5	
B3T6	21.00				89.5	20-Jul-10				Arm ave		2	185	0.254			0.853	61.9	
B3T7	23.00	22.50-23.50	SBP-3	Dylan	89.5	21-Jul-10	Sand - CD	-1.10	180	Arm ave	36	1	141	0.161			0.873	51.2	
B3T7	23.00				89.5	21-Jul-10				Arm ave		2	269	0.155			0.858	86.8	
B3T8	25.00	24.50-25.50	SBP-3	Dylan	89.5	21-Jul-10	Sand - CD	-1.10	220	Arm ave	68	1	331	0.093			0.891	130.2	
B3T8	25.00				89.5	21-Jul-10				Arm ave		2	383	0.117			0.881	143.6	
B3T9	27.00	26.50-27.50	SBP-3	Dylan	89.5	22-Jul-10	nd - Crag D	-1.10		Arm ave	39								Membrane burst during intial loading. Gi analysis only.
B3T10	30.00	29.50-30.50	SBP-3	Dylan	89.5	27-Jul-10	nd - Crag D	-1.10		Arm ave									Disturbed test pocket. No suitable data for analysis.
B3T11	32.00	31.50-32.50	SBP-3	Dylan	89.5	29-Jul-10	Sand - CD	-1.10	300	Arm ave	118	1	187	0.146			0.800	36.1	
B3T11	32.00				89.5	29-Jul-10				Arm ave		2	430	0.195			0.820	105.6	
B3T12	34.00	33.50-34.50	SBP-3	Dylan	89.5	30-Jul-10	Sand - CD	-1.10	300	Arm ave	81	1	676	0.077			0.781	97.8	
B3T12	34.00				89.5	30-Jul-10				Arm ave		2	748	0.078			0.829	166.6	
B3T12	34.00				89.5	30-Jul-10				Arm ave		3	946	0.032			0.800	131.5	
B3T13	36.00	36.50-37.50	SBP-3	Dylan	89.5	02-Aug-10	Sand - CD	-1.10	335	Arm ave	93	1	216	0.189			0.912	102.8	
B3T13	36.00				89.5	02-Aug-10				Arm ave		2	569	0.081			0.838	137.5	
B3T13	36.00				89.5	02-Aug-10				Arm ave		3	749	0.102			0.968	596.5	
B3T14	38.00	37.50-38.50	SBP-3	Dylan	89.5	03-Aug-10	Sand - CD	-1.10	355	Arm ave	85	1	325	0.152			0.863	103.1	
B3T14	38.00				89.5	03-Aug-10				Arm ave		2	576	0.160			0.877	214.9	
B3T15	40.00	39.50-40.50	SBP-3	Dylan	89.5	03-Aug-10	Sand - CD	-0.70	410	Arm ave	86	1	379	0.158			0.859	124.9	
B3T15	40.00				89.5	03-Aug-10				Arm ave		2	404	0.216			0.873	158.8	
B3T16	42.00	41.50-42.50	SBP-3	Dylan	89.1	04-Aug-10	Sand - CD	-0.50	450	Arm ave	63	1	295	0.233			0.845	90.9	
B3T16	42.00				89.1	04-Aug-10				Arm ave		2	323	0.287			0.850	107.3	
B3T17	44.00	43.50-44.50	SBP-3	Dylan	89.1	05-Aug-10	Sand - CD	-0.80	470	Arm ave	64	1	288	0.165			0.922	151.4	
B3T17	44.00				89.1	05-Aug-10				Arm ave		2	450	0.159			0.858	140.0	
B3T17	44.00				89.1	05-Aug-10				Arm ave		3	466	0.162			0.854	144.4	
B3T18	46.00	45.50-46.50	SBP-3	Dylan	89.1	06-Aug-10	Clay - LC	-0.80	485	Arm ave	37	1	62	0.335	0.765	12.2			No unloading data collected.
B3T18	46.00				89.1	06-Aug-10				Arm ave		2	59	0.431	0.728	10.0			
B3T19	47.00	46.50-47.50	SBP-3	Dylan	89.1	11-Aug-10	Clay - LC	-1.00		Arm ave	36	1	56	0.344	0.780	12.5			
B3T19	47.00				89.1	11-Aug-10				Arm ave		2	47	0.867	0.731	9.7			
B3T19	47.00				89.1	11-Aug-10				Arm ave		3	47	1.000	0.699	8.3			
B3T20	49.00	48.50-49.50	SBP-3	Dylan	89.1	09-Aug-10	Clay - LC	-1.00		Arm ave	31	1	70	0.430	NA	NA			
B3T20	49.00				89.1	09-Aug-10				Arm ave		2	69	0.434	0.901	35.2			
B3T21	51.00	50.50-51.50	SBP-3	Dylan	89.1	10-Aug-10	Clay - LC	-1.10		Arm ave	40	1	85	0.218	0.852	27.2			
B3T21	51.00				89.1	10-Aug-10				Arm ave		2	40	2.574	0.738	12.5			
B3T21	51.00				89.1	10-Aug-10				Arm ave		3	57	0.723	NA	NA			
B3T22	52.00	51.50-52.50	SBP-3	Dylan	89.1	11-Aug-10	Clay - LC	-1.10		Arm ave	36	1	97	0.247	0.767	18.1			
B3T22	52.00				89.1	11-Aug-10				Arm ave		2	71	0.861	0.726	14.0			
B3T22	52.00				89.1	11-Aug-10				Arm ave		3	65	1.019	0.759	18.3			
B3T23	53.00	53.50-53.50	SBP-3	Dylan	89.1	12-Aug-10	Clay - LC	-1.10		Arm ave	49	1	101	0.127	0.804	20.5			
B3T23	53.00				89.1	12-Aug-10				Arm ave		2	61	1.050	0.792	19.9			
B3T23	53.00				89.1	12-Aug-10				Arm ave		3	55	1.233	0.751	15.6			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 3.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness: Undrained: Stiffness exponent, β	Non linear stiffness: Undrained: Shear stress constant, α (MPa)	Non linear stiffness: Drained: Gradient	Non linear stiffness: Drained: Intercept (MPa)	Remarks
B3T24	54.00	53.50-54.50	SBP-3	Dylan	89.1	12-Aug-10	Clay - LC	-1.10		Arm ave	28	1	83	0.265	0.749	13.9			
B3T24	54.00				89.1	12-Aug-10				Arm ave		2	83	0.411	0.753	16.5			
B3T25	54.70	54.50-55.20	SBP-6	960521	89.1	20-Aug-10	Clay - LC	-1.10		Arm ave									Pressure leak during test. No suitable data for analysis
B3T26	55.70	55.20-56.20	SBP-6	960521	89.1	23-Aug-10	Clay - LC	0.00		Arm ave	107	1	56	0.729	0.619	4.9			
B3T26	55.70				89.3	23-Aug-10				Arm ave		2	57	0.673	0.640	6.2			
B3T26	55.70				89.3	23-Aug-10				Arm ave		3	47	1.003	0.631	5.9			
B3T27	57.50	57.00-58.00	SBP-6	960521	89.1	24-Aug-10	Clay	-0.60		Arm ave	36	1	63	0.441	0.673	6.7			
B3T27	57.50				89.1	24-Aug-10				Arm ave		2	46	1.115	0.632	5.3			
B3T28	58.50	58.00-59.00	SBP-6	960521	89.1	24-Aug-10	Clay	-1.00		Arm ave	27	1	66	0.454	0.674	7.3			
B3T28	58.50				89.1	24-Aug-10				Arm ave		2	53	0.858	0.655	6.8			
B3T29	60.00	59.00-60.50	SBP-6	960521	89.1	25-Aug-10	Clay	-0.60		Arm ave									Disturbed test pocket. No suitable data for analysis.
B3T30	61.30	60.50-61.80	SBP-6	960521	89.1	25-Aug-10	Sandy Clay	-0.60		Arm ave	71	1	95	0.313	0.700	11.7			
B3T30	61.30				89.1	25-Aug-10				Arm ave		2	70	1.014	0.641	8.6			
B3T31	63.70	63.00-64.20	SBP-6	960521	89.1	26-Aug-10	nd and Grav	-0.65		Arm ave									Disturbed test pocket. No suitable data for analysis.
B3T32	64.70	64.2065.20	SBP-6	960521	89.1	26-Aug-10	Clay	-0.65		Odd arms	84								Arm4 full displacement at low test pressure. Gi analysis only.
B3T33	65.85	65.25-66.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90		Arm ave									Disturbed test pocket. No suitable data for analysis.
B3T34	66.85	66.35-67.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90		Arm ave	157	1	303	0.182			0.841	83.8	
B3T34	66.85				89.1	01-Sep-10				Arm ave		2	418	0.253			0.774	74.1	
B3T34	66.85				89.1	01-Sep-10				Arm ave		3	481	0.217			0.783	91.3	
B3T35	67.85	67.35-68.35	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90	710	Arm ave	80	1	259	0.257			0.657	17.6	
B3T35	67.85				89.1	01-Sep-10				Arm ave		2	278	0.314			0.718	33.7	
B3T35	67.85				89.1	01-Sep-10				Arm ave		3	266	0.386			0.731	40.3	
B3T36	68.75	67.85-68.75	SBP-6	960521	89.1	01-Sep-10	Sand	-0.90	730	Even arms	43	1	57	0.961	0.653	7.5			
B3T36	68.75				89.1	01-Sep-10				Even arms		2	47	1.540	0.641	6.9			
B3T36	68.75				89.1	01-Sep-10				Even arms		3	48	1.695	0.583	5.1			
B3T37	69.75	69.25-70.25	SBP-6	960521	89.1	02-Sep-10	Clay	-0.88		Arm ave	33	1	66	0.595	0.636	6.3			
B3T37	69.75				89.1	02-Sep-10				Arm ave		2	48	1.402	0.625	6.2			
B3T37	69.75				89.1	02-Sep-10				Arm ave		3	41	1.765	0.595	5.0			
B3T38	71.15	70.50-71.65	SBP-6	960521	89.1	03-Sep-10	Clay	-0.90		Arm ave	77	1	86	0.834	0.741	19.0			Membrane burst after Loop 2. No unloading data for analysis.
B3T38	71.15				89.1	03-Sep-10				Arm ave		2	68	1.113	0.659	9.9			
B3T39	72.15	71.65-72.65	SBP-6	960521	89.1	06-Sep-10	Clay	-0.95		Arm ave		1	63	0.896	0.767	16.0			
B3T40	73.20	72.70-73.70	SBP-6	960521	89.1	08-Sep-10	Clay	-1.05		Arm ave	62	1	109	0.607	0.677	14.0			
B3T40	73.20				89.1	08-Sep-10				Arm ave		2	92	1.020	0.780	26.8			
B3T41	74.20	73.70-74.70	SBP-6	960521	89.1	08-Sep-10	Clay	-1.05		Arm ave	52	1	71	0.776	0.730	14.0			
B3T41	74.20				89.1	08-Sep-10				Arm ave		2	57	1.168	0.785	17.6			
B3T41	74.20				89.1	08-Sep-10				Arm ave		3	49	1.598	0.739	12.5			
B3T42	77.00	76.50-77.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.95		Arm ave	83	1	60	0.911	0.761	15.9			
B3T42	77.00				89.1	15-Sep-10				Arm ave		2	50	1.498	0.743	12.8			
B3T43	78.00	77.50-78.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.93		Arm ave	45	1	71	1.032	0.758	17.9			
B3T43	78.00				89.1	15-Sep-10				Arm ave		2	56	1.290	0.770	16.9			
B3T44	79.00	78.50-79.50	SBP-6	960521	89.1	15-Sep-10	Clay	-0.93		Arm ave	153	1	100	0.831	0.753	22.6			
B3T44	79.00				89.1	15-Sep-10				Arm ave		2	85	1.162	0.727	18.6			
B3T45	80.00	79.50-80.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.96		Arm ave	166	1	111	0.756	0.836	41.0			
B3T45	80.00				89.1	16-Sep-10				Arm ave		2	94	0.909	0.753	22.4			
B3T45	80.00				89.1	16-Sep-10				Arm ave		3	85	1.147	0.755	22.5			
B3T46	81.00	80.50-81.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.91		Arm ave	140	1	113	0.558	0.785	29.3			

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Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

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Carried out for NNB Generation Company Limited

Table **3.2**

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained – Stiffness exponent, β	Non linear stiffness – Undrained – Shear stress constant, α (MPa)	Non linear stiffness – Drained – Gradient	Non linear stiffness – Drained – Intercept (MPa)	Remarks
B3T46	81.00				89.1	16-Sep-10				Arm ave		2	93	0.993	0.759	23.8			
B3T47	82.00	81.50-82.50	SBP-6	960521	89.1	16-Sep-10	Clay	-0.93		Arm ave	173	1	106	0.685	0.777	27.2			
B3T47	82.00				89.1	16-Sep-10				Arm ave		2	92	1.028	0.779	26.8			
B3T48	84.00	83.50-84.50	SBP-6	960521	89.1	17-Sep-10	Clay	-0.93		Arm ave	146	1	113	0.728	0.811	35.9			
B3T48	84.00				89.1	17-Sep-10				Arm ave		2	97	0.950	0.762	25.5			

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Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

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Carried out for NNB Generation Company Limited

Table 3.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, φcv (deg)	Drained strength: Peak angle of friction, φ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
B4T1	12.10	11.60-12.60	SBP-3	930911	89.1	09-Jul-10	Peat/sand	-1.10	95	Arm ave	149	155	436	435					30.0	38.3	9.9	
B4T1	12.10																					
B4T1	12.10																					
B4T2	14.10	13.60-14.60	SBP-3	930911	89.1	10-Jul-10	nd and gra	-1.10	184	Arm ave		403	677	400					30.0	49.1	24.2	
B4T2	14.10																					
B4T3	16.10	15.60-16.60	SBP-3	930911	89.1	10-Jul-10	nd and gra	-1.10	161	Arm ave		418	565	415					30.0	42.6	15.5	
B4T3	16.10																					
B4T4	18.43	17.90-18.93	SBP-3	930911	89.1	11-Jul-10	nd and gra	-1.10	230	Arm ave		875	1062	950					30.0	42.7	15.6	Burst at 1850 kPa.
B4T5	20.10	19.60-20.60	SBP-3	930911	89.1	12-Jul-10	Sand grave	0.00	180	Arm ave		794	1190	795					30.0	43.7	17.0	Arm 2 sticking temporarily
B4T5	20.10																					
B4T5	20.10																					
B4T6	22.10	21.60-22.60	SBP-3	930911	89.1	13-Jul-10	Sand grave	0.00	260	Arm ave		796	1164	795					30.0	55.4	33.3	
B4T6	22.10																					
B4T6	22.10																					
B4T7	24.10	23.60-24.60	SBP-3	930911	89.1	14-Jul-10	Sands	0.00	221	Arm ave		737	864	800					30.0	43.1	16.2	
B4T7	24.10																					
B4T7	24.10																					
B4T8	26.10	25.60-26.60	SBP-3	930911	89.1	14-Jul-10	h hard banc	0.00	240	Arm ave	307	373	546	545					30.0	43.5	16.7	Pressure loss at 1900 kPa
B4T8	26.10																					
B4T9	28.10	27.60-28.60	SBP-3	930911		15-Jul-10	h hard banc	0.00		Arm ave		440	572	440					30.0	47.8	22.5	
B4T9	28.10																					
B4T9	28.10																					
B4T10	31.10	30.60-31.60	SBP-3	930911	89.1	20-Jul-10	avel and sa	0.00	311	Arm ave		1102	1420	1105					30.0	47.1	21.5	
B4T10	31.10																					
B4T10	31.10																					
B4T11	33.10	32.60-33.60	SBP-3	930911	89.1	21-Jul-10	avel and sa	0.00	380	Arm ave		1377	2085	1375					30.0	53.3	30.2	
B4T11	33.10																					
B4T11	33.10																					
B4T12	35.10	34.60-35.60	SBP-3	930911	89.1	22-Jul-10	avel and sa	0.00	400	Axis 1		1619	2515	1620					30.0	47.9	22.6	Arm 2 sticking temporarily. Arm 3 jump.
B4T12	35.10																					
B4T12	35.10																					
B4T13	37.10	36.60-37.60	SBP-3	930911	89.1	23-Jul-10	avel and sa	0.00	371	Arm ave		1807	2289	1805					30.0	44.6	18.2	Arm 2 response stiffer
B4T13	37.10																					
B4T13	37.10																					
B4T14	39.10	38.60-39.60	SBP-3	930911	89.1	24-Jul-10	avel and sa	0.00	391	Arm ave		1675	2491	1675					30.0	43.8	17.0	Arm 2 response stiffer
B4T14	39.10																					
B4T14	39.10																					
B4T15	41.10	40.60-41.60	SBP-3	930911	89.1	25-Jul-10	avel and sa	0.00	411	Arm ave		1109	2016	1110					30.0	52.4	28.9	
B4T15	41.10																					
B4T15	41.10																					
B4T16	43.10	42.60-43.60	SBP-3	930911	89.1	26-Jul-10	and and cla	0.00	485	Arm ave		1292	1851	1290					30.0	50.8	26.6	
B4T16	43.10																					
B4T16	43.10																					
B4T17	44.10	43.60-44.60	SBP-3	930911	89.1	26-Jul-10	and and cla	0.00	500	Arm ave		1496	2368	1495					30.0	44.2	17.6	Arm 2 sticking.
B4T17	44.10																					
B4T17	44.10																					
B4T18	45.60	45.10-46.10	SBP-3	930911	89.1	28-Jul-10	and and cla	0.00		Axis 1	995	1128		995	966	3198	382	372				Arm 2 offline during early part of test
B4T19	47.10	46.60-47.60	SBP-3	930911	89.1	29-Jul-10	Clays	0.00		Axis 3	1070	1139		1100	356	5311	862	635				Arm 1 liftoff after Loop 2
B4T19	47.10																					
B4T19	47.10																					
B4T20	48.60	48.10-49.10	SBP-3	930911	89.1	30-Jul-10	Clays	0.00		Arm ave	780	936		780	1115	3674	385	354				Arm responses somewhat erratic
B4T20	48.60																					

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Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 4.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, φcv (deg)	Drained strength: Peak angle of friction, φ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
#REF!	#REF!																					
B4T21	49.60	49.10-50.10	SBP-3	930911	89.1	03-Aug-10	Clays	0.00		Arm ave	1601	1527		1600	948	3170	177	386				
B4T21	49.60																					
B4T21	49.60																					
B4T22	50.60	50.10-51.10	SBP-3	930911	89.1	04-Aug-10	Clays	0.00		Arm ave	1059	1224		1060	800	3677	417	300				
B4T22	50.60																					
B4T22	50.60																					
B4T23	51.30	51.10-51.80	SBP-3	930911	89.1	04-Aug-10	Clays	0.00		Arm ave	520	543		520	875	4635	776	537				
B4T23	51.30																					
B4T23	51.30																					
B4T24	52.60	52.10-53.10	SBP-3	930911	89.1	07-Aug-10	Clays	0.00		Axis 2	1119	1228		1120	1142	4748	745	532				Arm 1 lift off during Loop 1. Arm 3 sticking during Loop 3.
B4T24	52.60																					
B4T24	52.60																					
B4T25	57.10	56.60-57.60	SBP-3	930911	89.5	18-Aug-10	Stiff silty cla	0.00		Axis 1	1219	1169		1195	1194	3801	535	411				Arm 2 sticking. Arm 3 late lift off
B4T25	57.10																					
B4T26	57.60	57.10-58.10	SBP-3	930911	89.5	19-Aug-10	Stiff silty cla	0.00		Axis 1	940	929		930	1278	4404	787	427				Arm 2 and 3 sticking
B4T26	57.60																					
B4T26	57.60																					
B4T27	59.10	58.60-59.60	SBP-3	930911	89.1	20-Aug-10	Stiff silty cla	0.00		Arm ave												Test pocket disturbed. No suitable data for analysis.
B4T28	NA	NA	SBP-3	930911		25-Aug-10	Siltstone	0.00														Unable to self bore sufficient test pocket. No test carried out
B4T29	NA	NA	SBP-3	930911		26-Aug-10	Siltstone	0.00														Unable to self bore sufficient test pocket. No test carried out
B4T30	NA	61.60-62.30	SBP-3	930911		31-Aug-11	Stiff silty cla	0.00														Unable to self bore sufficient test pocket. No test carried out
B4T31	63.40	62.30-63.40	SBP-3	930911	89.1	31-Aug-11	Stiff silty cla	0.00		Axis 1	690	812		1690	1277	5333	923	444	30.0	32.8	3.3	Arm 3 sticking during Loop 3. Drained
B4T31	63.40																					
B4T31	63.40																					
B4T32	64.10	63.60-64.60	SBP-3	930911	89.1	01-Sep-11	Sandy clay	0.00	620	Axis 1		1869	2454	1870					30.0	43.5	16.7	Arm 3 sticking
B4T32	64.10																					
B4T32	64.10																					
B4T33	66.60	66.10-67.10	SBP-3	930911	89.1	02-Sep-11	Sands	0.00	650	Axis 1		1152	1501	1150					30.0	50.9	26.9	Arm 3 sticking
B4T33	66.60																					
B4T34	NA	68.10-68.15	SBP-3	930911		03-Sep-11	Sands	0.00												48.1	22.9	Unable to self bore sufficient test pocket. No test carried out
B4T35	NA	69.10-69.25	SBP-3	930911		03-Sep-11	ravelly san	0.00														Unable to self bore sufficient test pocket. No test carried out
B4T36	71.10	70.60-71.60	SBP-3	930911	89.1	03-Sep-11	ay with clay	0.00	750	Axis 1		1678	2440	1675					30.0	48.1	22.9	Arm 2 some erratic behaviour. Arm 3 sticking intermittently
B4T36	71.10																					
B4T36	71.10																					
B4T37	72.70	72.20-73.20	SBP-3	930911	89.1	04-Sep-11	ay with clay	0.00	800	Axis 2		3096	NA	1857					30.0	NA	NA	Arm 3 sticking
B4T37	72.70																					
B4T37	72.70																					
B4T38	73.70	73.20-74.20	SBP-3	930911	89.1	04-Sep-11	ay with clay	0.00		Arm ave												Burst at 1300 kPa. No suitable data for analysis
B4T39	75.20	74.70-75.70	SBP-3	930911	89.1	05-Sep-11	f grey silty c	0.00		Axis 1	1598	1591		1600	1730	5818	907	668				Arm 2 offline during part of test. Arm 3 stuck.
B4T39	75.20																					
B4T40	77.10	76.60-77.60	SBP-3	930911	89.1	14-Sep-11	Stiff clay	0.00		Axis 1	2017	1900		1950	2174	3823	221	335				Arm 2 offline at start of test
B4T40	77.10																					
B4T41	78.10	77.60-78.60	SBP-3	930911	89.1	15-Sep-11	Stiff clay	0.00		Axis 1	1661	1879		1665	1626	5233	685	184				Arm 2 offline at start of test. Test terminated early during unloading
B4T41	78.10																					

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL
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Carried out for NNB Generation Company Limited

Table
4.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Lift-off pressure (kPa)	M+R horizontal pressure (kPa)	Drained horizontal pressure analysis (kPa)	In situ horizontal stress, Po (kPa)	In situ horizontal stress, Po curve modelling (kPa)	Undrained strength: Limit pressure, pL (kPa)	Undrained strength: Shear strength (loading), cu (kPa)	Undrained strength: Shear strength (unloading), cu (kPa)	Drained strength: Const vol angle of friction for analysis, φcv (deg)	Drained strength: Peak angle of friction, φ'pk (deg)	Drained strength: Angle of dilation, ν'	Remarks
#REF!	#REF!																					
B4T42	80.10	79.60-80.60	SBP-3	930911	89.1	16-Sep-11	Stiff clay	0.00		Axis 3	1588	1598		1590	2100	6761	1392	586				Arm 2 ofline at start of test and intermittently during test
B4T42	80.10																					
B4T43	81.87	81.10-82.27	SBP-6	960521	89.1	19-Sep-11	Clay	-1.05		Arm ave	1304	1408		1410	1554	6386	791	925				
B4T43	81.87																					
B4T44	82.85	82.27-83.25	SBP-6	960521	89.1	19-Sep-11	Clay	-1.05		Even arms	1595	1138		1135	1645	7250	1293	967				Arm 3 lift off during Loop 1
B4T44	82.85																					
B4T44	82.85																					

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 4.1

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained – Stiffness exponent, β	Non linear stiffness – Undrained – Shear stress constant, α (MPa)	Non linear stiffness – Drained – Gradient	Non linear stiffness – Drained – Intercept (MPa)	Remarks
B4T1	12.10	11.60-12.60	SBP-3	930911	89.1	09-Jul-10	Peat/sand	-1.10	95	Arm ave	13	1	103	0.130			0.757	14.2	
B4T1	12.10											2	113	0.150			0.754	16.0	
B4T1	12.10											3	117	0.180			0.780	22.1	
B4T2	14.10	13.60-14.60	SBP-3	930911	89.1	10-Jul-10	nd and gra	-1.10	184	Arm ave	13	1	109	0.107			0.803	5.3	
B4T2	14.10											2	110	0.210			0.646	25.5	
B4T3	16.10	15.60-16.60	SBP-3	930911	89.1	10-Jul-10	nd and gra	-1.10	161	Arm ave	13	1	117	0.105			0.747	14.0	
B4T3	16.10											2	111	0.279			0.759	18.5	
B4T4	18.43	17.90-18.93	SBP-3	930911	89.1	11-Jul-10	nd and gra	-1.10	230	Arm ave	74	1	409	0.056			0.715	30.3	Burst at 1850 kPa.
B4T5	20.10	19.60-20.60	SBP-3	930911	89.1	12-Jul-10	Sand grave	0.00	180	Arm ave	52	1	136	0.077			0.466	1.2	Arm 2 sticking temporarily
B4T5	20.10											2	216	0.084			0.668	11.8	
B4T5	20.10											3	351	0.094			0.845	92.2	
B4T6	22.10	21.60-22.60	SBP-3	930911	89.1	13-Jul-10	Sand grave	0.00	260	Arm ave	45	1	182	0.096			0.682	11.5	
B4T6	22.10											2	297	0.061			0.770	36.8	
B4T6	22.10											3	465	0.073			0.803	82.8	
B4T7	24.10	23.60-24.60	SBP-3	930911	89.1	14-Jul-10	Sands	0.00	221	Arm ave	33	1	128	0.185			0.804	28.0	
B4T7	24.10											2	222	0.126			0.774	35.3	
B4T7	24.10											3	234	0.146			0.892	109.8	
B4T8	26.10	25.60-26.60	SBP-3	930911	89.1	14-Jul-10	h hard banc	0.00	240	Arm ave	69	1	209	0.160			0.844	63.7	Pressure loss at 1900 kPa
B4T8	26.10											2	246	0.112			0.832	66.6	
B4T9	28.10	27.60-28.60	SBP-3	930911		15-Jul-10	h hard banc	0.00		Arm ave	36	1	161	0.139			0.723	17.5	
B4T9	28.10											2	150	0.203			0.830	48.7	
B4T9	28.10											3	167	0.219			0.922	115.9	
B4T10	31.10	30.60-31.60	SBP-3	930911	89.1	20-Jul-10	avel and sa	0.00	311	Arm ave	42	1	129	0.180			0.598	5.0	
B4T10	31.10											2	260	0.093			0.698	18.7	
B4T10	31.10											3	402	0.108			0.812	85.4	
B4T11	33.10	32.60-33.60	SBP-3	930911	89.1	21-Jul-10	avel and sa	0.00	380	Arm ave	144	1	268	0.113			0.587	6.1	
B4T11	33.10											2	539	0.063			0.640	19.9	
B4T11	33.10											3	842	0.048			0.771	102.4	
B4T12	35.10	34.60-35.60	SBP-3	930911	89.1	22-Jul-10	avel and sa	0.00	400	Axis 1	98	1	373	0.054			1.006	427.5	Arm 2 sticking temporarily. Arm 3 jump.
B4T12	35.10											2	582	0.084			0.973	503.1	
B4T12	35.10											3	735	0.029			0.929	336.5	
B4T13	37.10	36.60-37.60	SBP-3	930911	89.1	23-Jul-10	avel and sa	0.00	371	Arm ave	132	1	139	0.147			0.750	17.5	Arm 2 response stiffer
B4T13	37.10											2	418	0.065			0.681	22.9	
B4T13	37.10											3	1111	0.032			0.775	125.7	
B4T14	39.10	38.60-39.60	SBP-3	930911	89.1	24-Jul-10	avel and sa	0.00	391	Arm ave	177	1	250	0.102			0.792	35.8	Arm 2 response stiffer
B4T14	39.10											2	662	0.065			0.741	60.4	
B4T14	39.10											3	1037	0.056			0.730	85.0	
B4T15	41.10	40.60-41.60	SBP-3	930911	89.1	25-Jul-10	avel and sa	0.00	411	Arm ave	72	1	162	0.135			0.514	2.7	
B4T15	41.10											2	347	0.081			0.743	36.5	
B4T15	41.10											3	486	0.087			0.719	39.6	
B4T16	43.10	42.60-43.60	SBP-3	930911	89.1	26-Jul-10	and and cla	0.00	485	Arm ave	61	1	356	0.056			0.666	16.9	
B4T16	43.10											2	402	0.107			0.696	30.1	
B4T16	43.10											3	413	0.224			0.680	33.5	
B4T17	44.10	43.60-44.60	SBP-3	930911	89.1	26-Jul-10	and and cla	0.00	500	Arm ave	101	1	257	0.096			0.675	14.8	Arm 2 sticking.
B4T17	44.10											2	585	0.035			0.874	170.6	
B4T17	44.10											3	761	0.023			0.877	211.4	
B4T18	45.60	45.10-46.10	SBP-3	930911	89.1	28-Jul-10	and and cla	0.00		Axis 1	39	1	45	0.903	0.709	11.700			Arm 2 offline during early part of test
B4T19	47.10	46.60-47.60	SBP-3	930911	89.1	29-Jul-10	Clays	0.00		Axis 3	59	1	95	0.332	0.697	11.660			Arm 1 liftoff after Loop 2
B4T19	47.10											2	87	0.588	0.729	16.011			
B4T19	47.10											3	136	0.252	0.657	11.399			
B4T20	48.60	48.10-49.10	SBP-3	930911	89.1	30-Jul-10	Clays	0.00		Arm ave	139	1	88	0.384	0.669	9.145			Arm responses somewhat erratic
B4T20	48.60											2	67	0.541	0.492	2.191			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

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Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 4.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness – Undrained – Stiffness exponent, β	Non linear stiffness – Undrained – Shear stress constant, α (MPa)	Non linear stiffness – Drained – Gradient	Non linear stiffness – Drained – Intercept (MPa)	Remarks
#REF!	#REF!											3	60	0.734	0.565	4.037			
B4T21	49.60	49.10-50.10	SBP-3	930911	89.1	03-Aug-10	Clays	0.00		Arm ave	46	1	72	0.462	0.619	5.899			
B4T21	49.60											2	55	1.022	0.804	23.933			
B4T21	49.60											3	60	0.801	0.614	6.176			
B4T22	50.60	50.10-51.10	SBP-3	930911	89.1	04-Aug-10	Clays	0.00		Arm ave	38	1	79	0.371	0.641	6.719			
B4T22	50.60											2	64	0.761	0.606	5.847			
B4T22	50.60											3	68	0.615	0.626	6.655			
B4T23	51.30	51.10-51.80	SBP-3	930911	89.1	04-Aug-10	Clays	0.00		Arm ave	51	1	89	0.342	0.582	4.697			
B4T23	51.30											2	81	0.617	0.571	5.082			
B4T23	51.30											3	72	1.021	0.614	7.733			
B4T24	52.60	52.10-53.10	SBP-3	930911	89.1	07-Aug-10	Clays	0.00		Axis 2	34	1	56	1.064	0.624	6.050			Arm 1 lift off during Loop 1. Arm 3 sticking during Loop 3.
B4T24	52.60											2	56	1.364	0.484	2.775			
B4T24	52.60											3	53	1.503	0.548	4.516			
B4T25	57.10	56.60-57.60	SBP-3	930911	89.5	18-Aug-10	Stiff silty cla	0.00		Axis 1	29	1	46	0.981	0.677	7.120			Arm 2 sticking. Arm 3 late lift off
B4T25	57.10											2	41	1.232	0.570	3.630			
B4T26	57.60	57.10-58.10	SBP-3	930911	89.5	19-Aug-10	Stiff silty cla	0.00		Axis 1	42	1	48	0.697	0.802	14.995			Arm 2 and 3 sticking
B4T26	57.60											2	54	0.771	0.718	9.981			
B4T26	57.60											3	50	1.021	0.727	11.817			
B4T27	59.10	58.60-59.60	SBP-3	930911	89.1	20-Aug-10	Stiff silty cla	0.00		Arm ave									Test pocket disturbed. No suitable data for analysis.
B4T28	NA	NA	SBP-3	930911		25-Aug-10	Siltstone	0.00											Unable to self bore sufficient test pocket. No test carried out
B4T29	NA	NA	SBP-3	930911		26-Aug-10	Siltstone	0.00											Unable to self bore sufficient test pocket. No test carried out
B4T30	NA	61.60-62.30	SBP-3	930911		31-Aug-11	Stiff silty cla	0.00											Unable to self bore sufficient test pocket. No test carried out
B4T31	63.40	62.30-63.40	SBP-3	930911	89.1	31-Aug-11	Stiff silty cla	0.00		Axis 1	21	1	86	0.367	0.833	30.208	0.852	31.5	Arm 3 sticking during Loop 3. Drained
B4T31	63.40											2	116	0.573	0.871	62.924	0.848	45.7	
B4T31	63.40											3	143	0.456	0.754	31.312	0.841	52.7	
B4T32	64.10	63.60-64.60	SBP-3	930911	89.1	01-Sep-11	Sandy clay	0.00	620	Axis 1	66	1	90	0.275			0.683	8.3	Arm 3 sticking
B4T32	64.10											2	243	0.128			0.673	16.3	
B4T32	64.10											3	478	0.127			0.530	9.3	
B4T33	66.60	66.10-67.10	SBP-3	930911	89.1	02-Sep-11	Sands	0.00	650	Axis 1	46	1	149	0.220			0.914	86.8	Arm 3 sticking
B4T33	66.60											2	185	0.234			0.850	64.8	
B4T34	NA	68.10-68.15	SBP-3	930911		03-Sep-11	Sands	0.00											Unable to self bore sufficient test pocket. No test carried out
B4T35	NA	69.10-69.25	SBP-3	930911		03-Sep-11	ravelly san	0.00											Unable to self bore sufficient test pocket. No test carried out
B4T36	71.10	70.60-71.60	SBP-3	930911	89.1	03-Sep-11	ay with clay	0.00	750	Axis 1	65	1	162	0.186			0.750	21.6	Arm 2 some erratic behaviour. Arm 3 sticking intermittently
B4T36	71.10											2	202	0.250			0.848	63.1	
B4T36	71.10											3	277	0.279			0.914	146.5	
B4T37	72.70	72.20-73.20	SBP-3	930911	89.1	04-Sep-11	ay with clay	0.00	800	Axis 2	130	1	1008	0.037			NA	NA	Arm 3 sticking
B4T37	72.70											2	3240	0.018			NA	NA	
B4T37	72.70											3	10486	0.007			NA	NA	
B4T38	73.70	73.20-74.20	SBP-3	930911	89.1	04-Sep-11	ay with clay	0.00		Arm ave									Burst at 1300 kPa. No suitable data for analysis
B4T39	75.20	74.70-75.70	SBP-3	930911	89.1	05-Sep-11	f grey silty	0.00		Axis 1	52	1	49	1.233	0.757	12.846			Arm 2 offline during part of test. Arm 3 stuck.
B4T39	75.20											2	41	1.129	0.716	8.147			
B4T40	77.10	76.60-77.60	SBP-3	930911	89.1	14-Sep-11	Stiff clay	0.00		Axis 1	22	1	40	1.158	0.780	13.238			Arm 2 offline at start of test
B4T40	77.10											2	35	1.115	0.711	7.526			
B4T41	78.10	77.60-78.60	SBP-3	930911	89.1	15-Sep-11	Stiff clay	0.00		Axis 1	59	1	58	0.946	0.739	13.110			Arm 2 offline at start of test. Test terminated early during unloading
B4T41	78.10											2	54	0.917	0.762	14.255			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table 4.2

Summary of Pressuremeter Test Results

Soil Mechanics

Test reference	Depth (m)	Test pocket (m)	Test type	Instrument refence	Diameter (mm)	Date	Material type	Groundwater level for analysis (mbgl)	Ambient groundwater pressure (kPa)	Arms analysed	Initial modulus, Gi (MPa)	Loop ref	Shear modulus, Gur (MPa)	Strain amplitude, ec (%)	Non linear stiffness: Undrained: Stiffness exponent, β	Non linear stiffness: Undrained: Shear stress constant, α (MPa)	Non linear stiffness: Drained: Gradient	Non linear stiffness: Drained: Intercept (MPa)	Remarks
#REF!	#REF!											3	50	1.044	0.769	14.535			
B4T42	80.10	79.60-80.60	SBP-3	930911	89.1	16-Sep-11	Stiff clay	0.00		Axis 3	37	1	63	0.994	0.752	15.907			Arm 2 ofline at start of test and intermittently during test
B4T42	80.10											2	50	1.202	0.704	10.473			
B4T43	81.87	81.10-82.27	SBP-6	960521	89.1	19-Sep-11	Clay	-1.05		Arm ave	98	1	96	0.612	0.730	17.700			
B4T43	81.87											2	91	0.793	0.770	22.900			
B4T44	82.85	82.27-83.25	SBP-6	960521	89.1	19-Sep-11	Clay	-1.05		Even arms	90	1	87	0.853	0.790	26.169			Arm 3 lift off during Loop 1
B4T44	82.85											2	85	0.991	0.747	19.543			
B4T44	82.85											3	83	1.220	0.748	21.343			

Notes: Reference should be made to Section 3 of the report for explanation of the methods of test interpretation and assessment of material parameters.

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. A0012-10

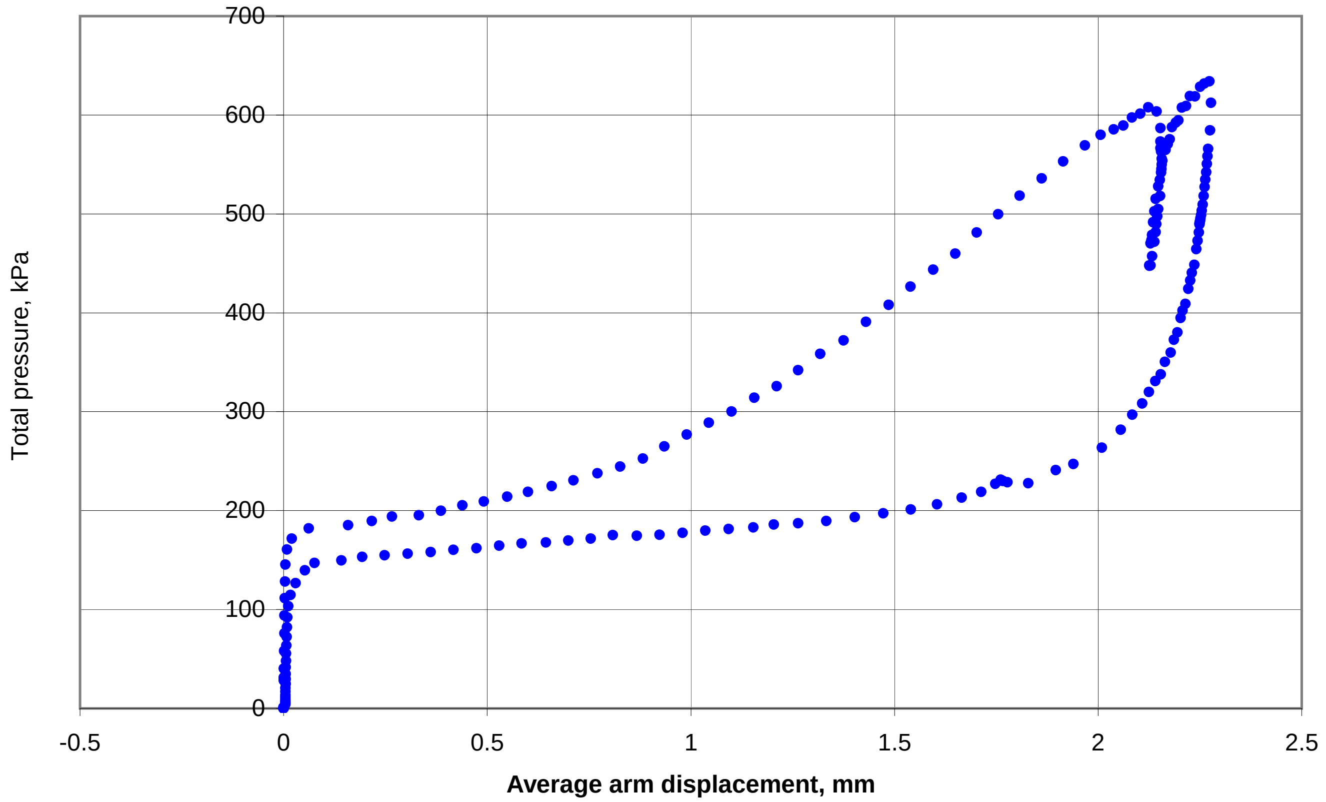
Carried out for NNB Generation Company Limited

Table 4.2

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Oct-10	Test reference	B1T1	BH	SBP2009_1
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	1
Material	Sand - RD	Test pocket (mbgl)	10.00-11.50	Depth, m	11.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	255	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	258
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	370

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.8	ν (deg)	18.5

Initial shear modulus (Average arm)

G_i (MPa)	7

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	81	0.131			0.742	8.8	

Remarks

Max test pressure = 634 kPa. Max av displ = 2.28 mm. Max arm displ = 4.53 mm (Arm2). No of loops = 1 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

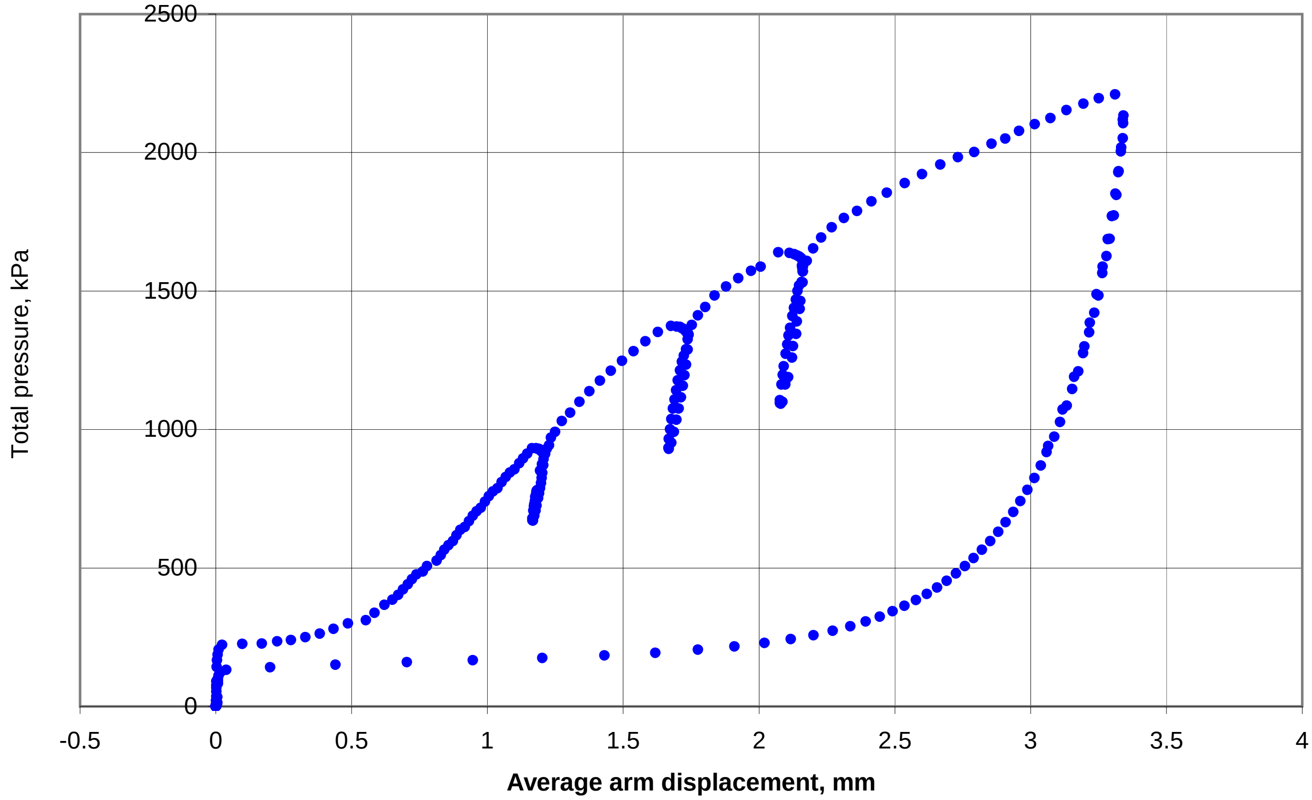
Figure

SBP2009_1 T1

Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Oct-10	Test reference	B1T2	BH	SBP2009_1
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	2
Material	Sand - CD	Test pocket (mbgl)	14.50-15.60	Depth, m	15.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	455	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	452
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	659

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	45.2	ν (deg)	19.0

Initial shear modulus (Average arm)

G_i (MPa)	25

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	121	0.195			0.780	21.1	
2	128	0.318			0.717	15.8	
3	134	0.330			0.727	18.3	

Remarks

Max test pressure = 2210 kPa. Max av displ = 3.34 mm. Max arm displ = 4.66 mm (Arm4). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

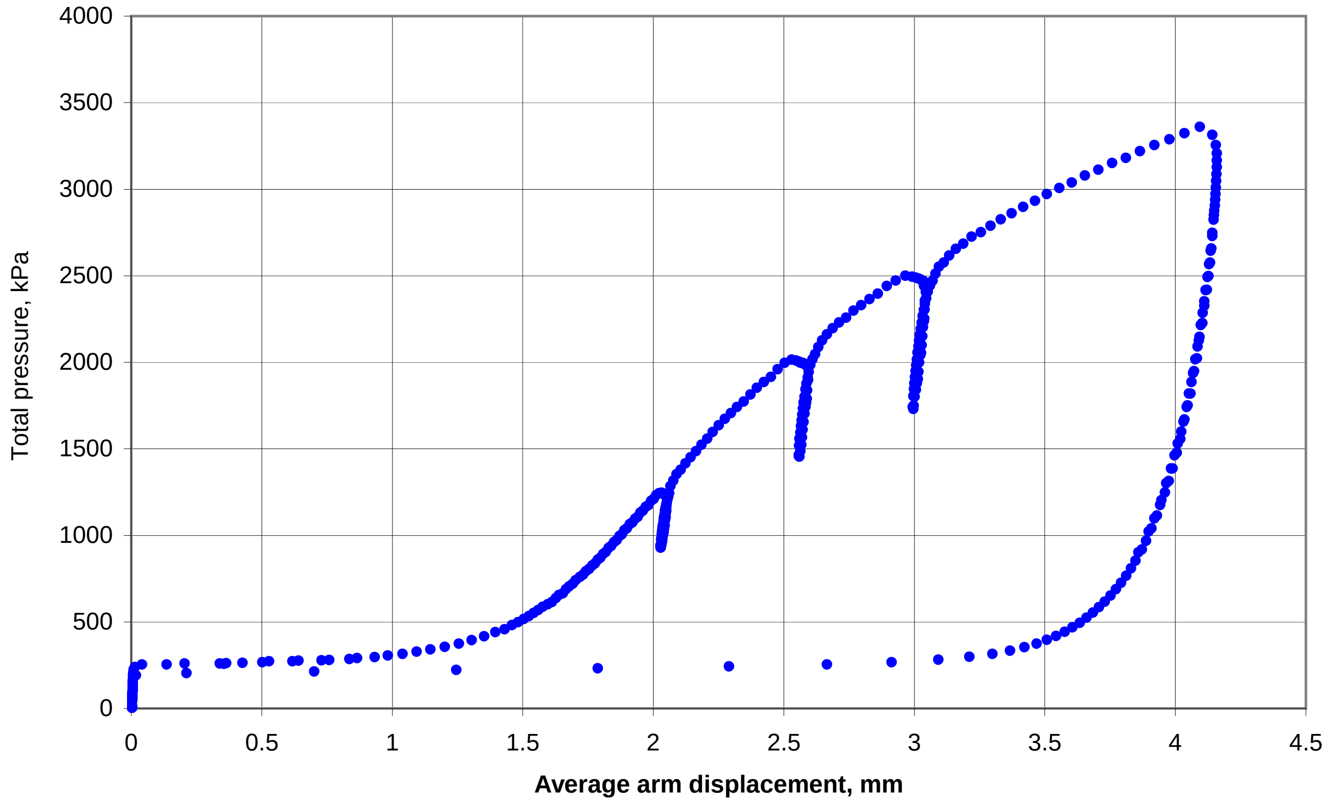
Figure

SBP2009_1 T2

Self Boring Pressuremeter Test

Soil Mechanics

Date	07-Oct-10	Test reference	B1T3	BH	SBP2009_1
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	3
Material	Sand - CD	Test pocket (mbgl)	18.50-19.70	Depth, m	19.20



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	740	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	742
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1273

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.9	ν (deg)	18.5

Initial shear modulus (Average arm)

G_i (MPa)	38

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	258	0.103			0.773	38.2	
2	308	0.150			0.716	30.6	
3	310	0.183			0.757	47.6	

Remarks

Max test pressure = 3360 kPa. Max av displ = 4.16 mm. Max arm displ = 4.68 mm (Arm4). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_1 T3

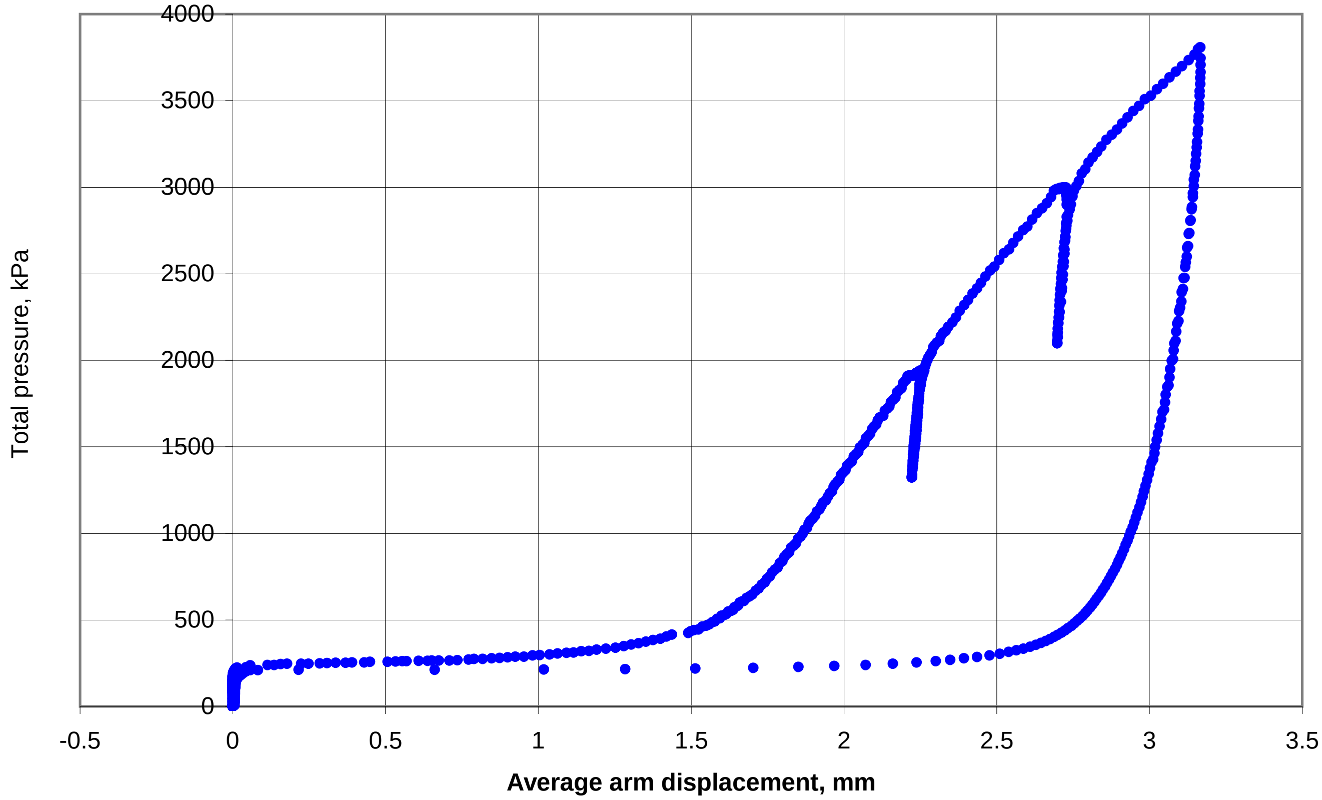
Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Oct-10
Probe	SBP-3 930910
Material	Sand - CD

Test reference	B1T4
GWL (mbgl)	1.00
Test pocket (mbgl)	22.50-23.50

BH	SBP2009_1
Test	4
Depth, m	23.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	890	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	898
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1528

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	51.1	ν (deg)	27.1

Initial shear modulus (Average arm)

G_i (MPa)	59

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	482	0.112			0.706	40.9	
2	558	0.140			0.633	26.9	

Remarks

Max test pressure = 3808 kPa. Max av displ = 3.17 mm. Max arm displ = 4.21 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

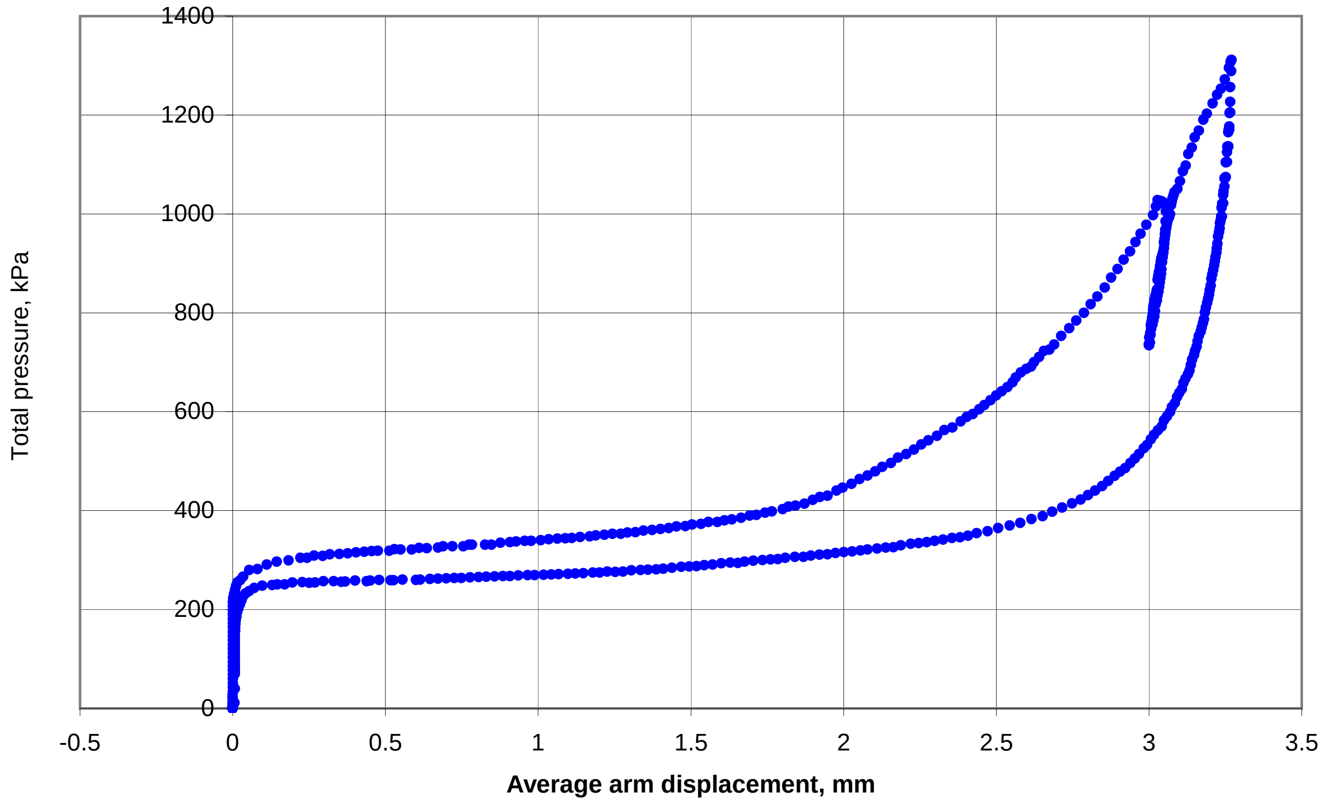
Figure

SBP2009_1 T4

Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Oct-10		Test reference	B1T5		BH	SBP2009_1
Probe	SBP-3 930910		GWL (mbgl)	1.00		Test	5
Material	Sand - CD		Test pocket (mbgl)	27.00-27.50		Depth, m	27.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	800	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	801
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	820

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	45.3	ν (deg)	19.0

Initial shear modulus (Average arm)

G_i (MPa)	22

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	105	0.223			0.675	8.0	

Remarks

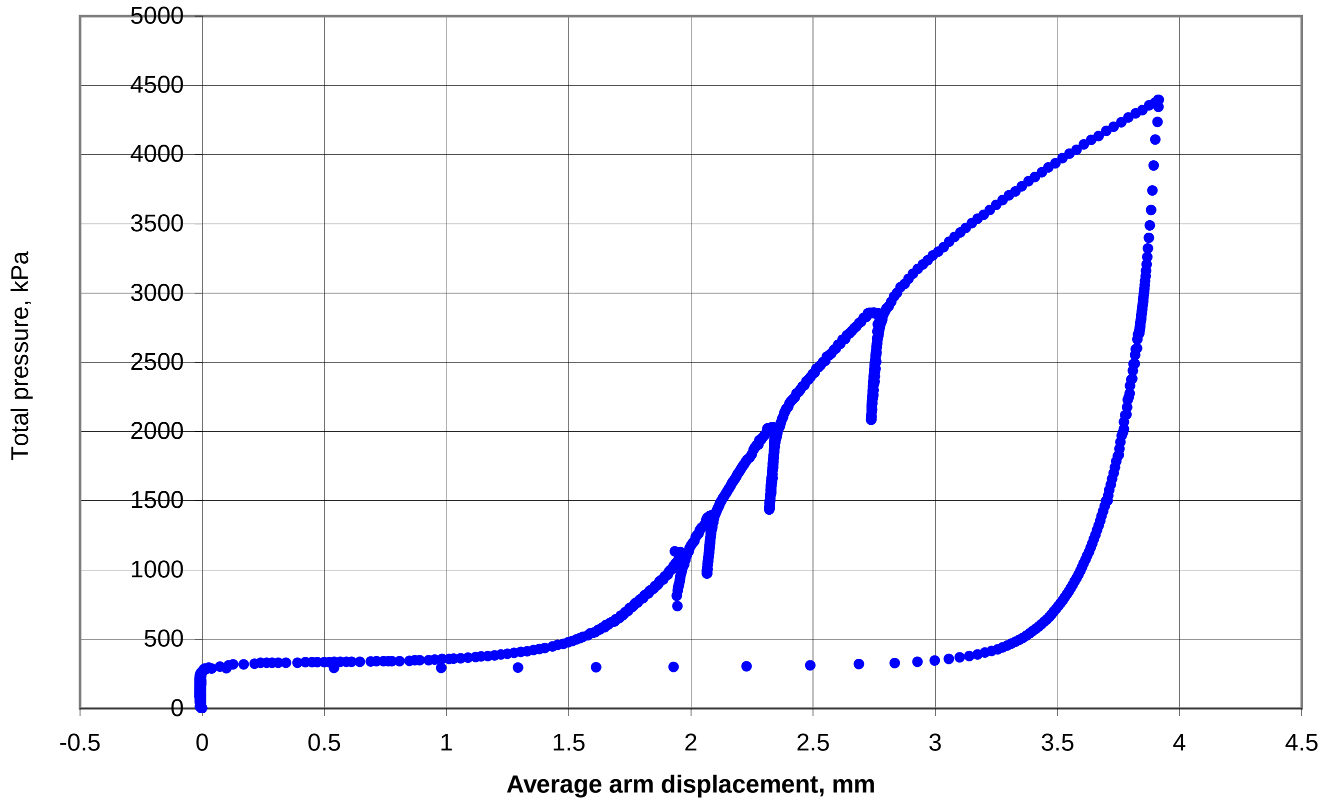
Max test pressure = 1311 kPa. Max av displ = 3.27 mm. Max arm displ = 4.93 mm (Arm2). No of loops = 1 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_1 T5**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Oct-10	Test reference	B1T6	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	6
Material	Sand - CD	Test pocket (mbgl)	30.50-31.50	Depth, m	31.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	915	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	916
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1757

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.5	ν (deg)	18.0

Initial shear modulus (Average arm)

G_i (MPa)	58

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	420	0.087			0.857	127.7	
2	533	0.088			0.872	189.7	
3	549	0.113			0.908	316.1	

Remarks

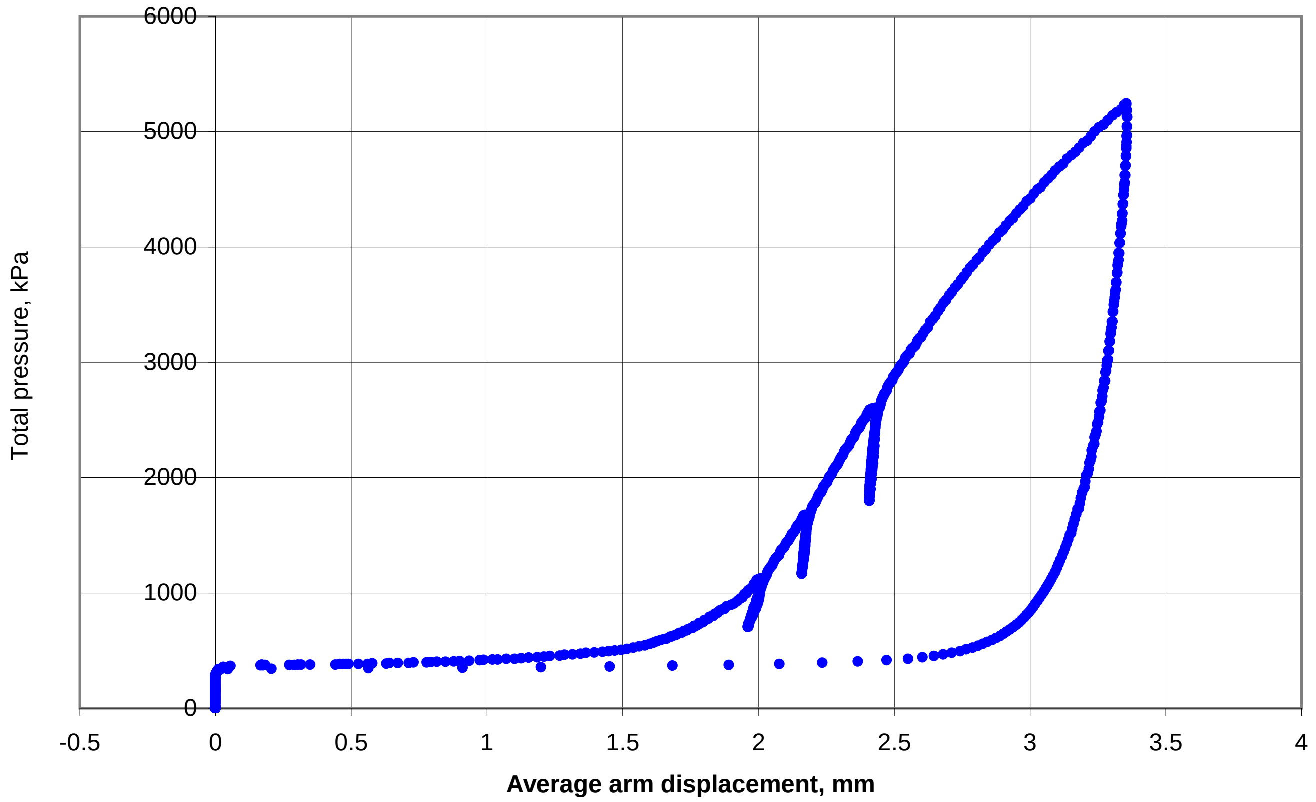
Max test pressure = 4394 kPa. Max av displ = 3.92 mm. Max arm displ = 4.53 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_1 T6**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	17-Oct-10	Test reference	B1T7	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	7
Material	Sand - CD	Test pocket (mbgl)	34.50-35.60	Depth, m	35.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1175	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1176
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2450

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	50.6	ν (deg)	26.4

Initial shear modulus (Average arm)

G_i (MPa)	86

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	565	0.076			0.720	46.1	
2	689	0.100			0.609	24.3	

Remarks

Max test pressure = 5245 kPa. Max av displ = 3.36 mm. Max arm displ = 4.41 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

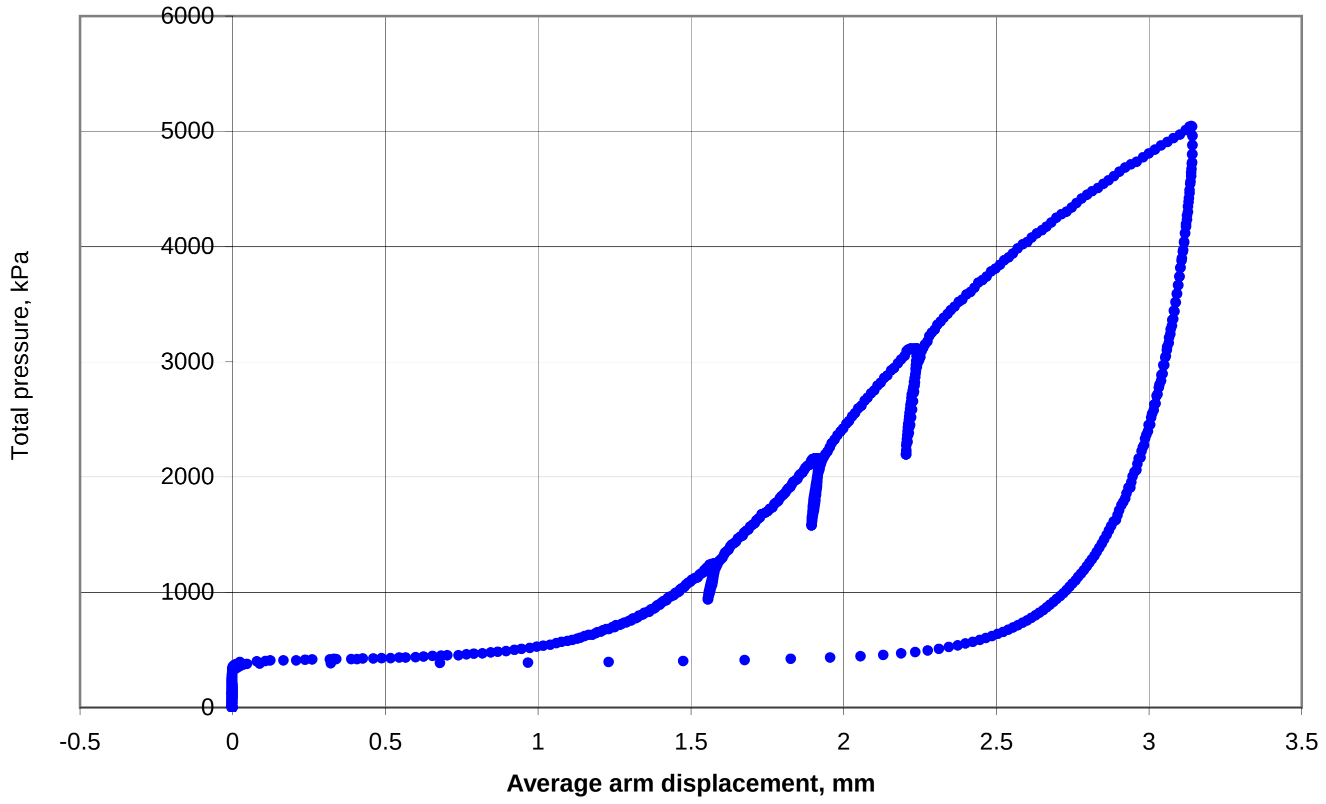
Figure

SBP2009_1 T7

Self Boring Pressuremeter Test

Soil Mechanics

Date	18-Oct-10	Test reference	B1T8	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	8
Material	Sand - CD	Test pocket (mbgl)	38.50-39.60	Depth, m	39.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1670	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1671
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2458

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.1	ν (deg)	16.2

Initial shear modulus (Average arm)

G_i (MPa)	71

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	290	0.090			0.653	13.7	
2	516	0.094			0.646	24.8	
3	562	0.146			0.578	16.9	

Remarks

Max test pressure = 5045 kPa. Max av displ = 3.14 mm. Max arm displ = 4.11 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

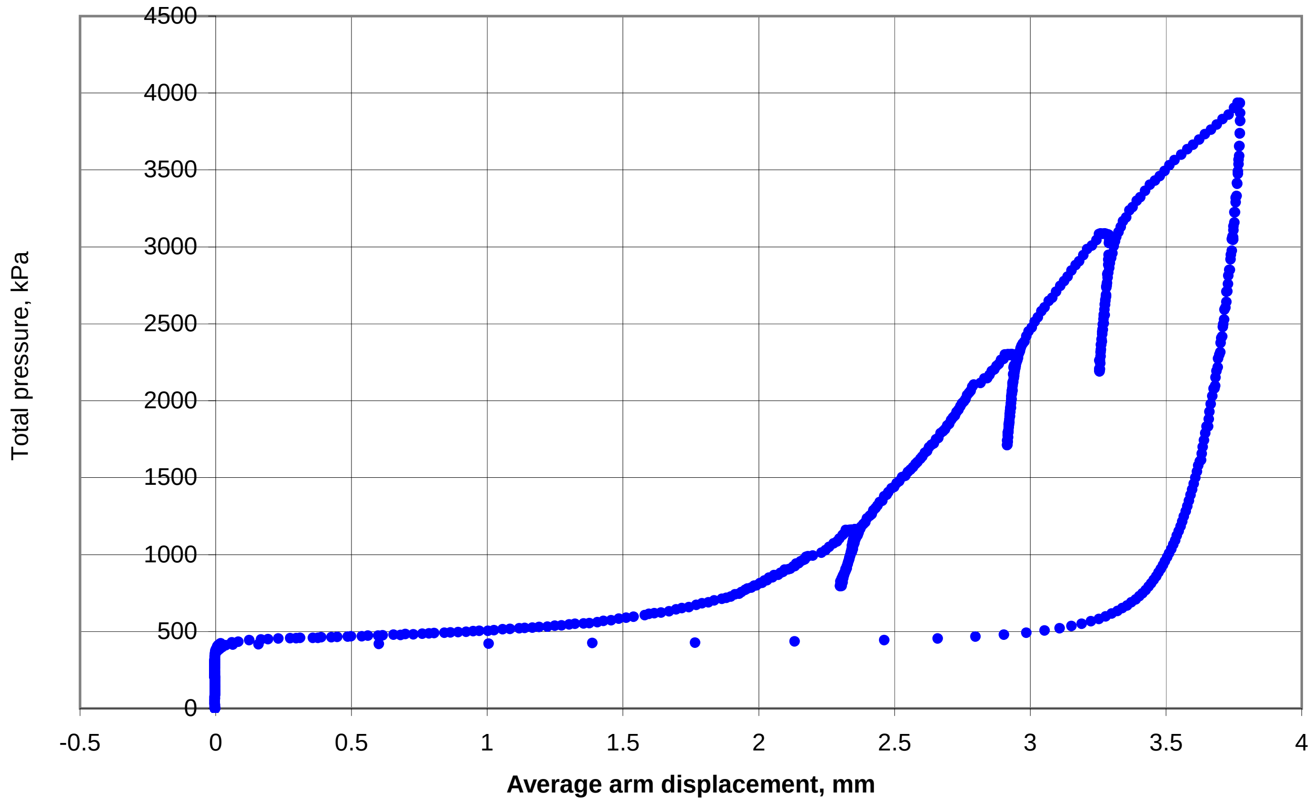
Figure

SBP2009_1 T8

Self Boring Pressuremeter Test

Soil Mechanics

Date	18-Oct-10	Test reference	B1T9	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	9
Material	Sand - CD	Test pocket (mbgl)	42.50-43.65	Depth, m	43.15



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1110	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1111
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2393

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	59.1	ν (deg)	38.8

Initial shear modulus (Average arm)

G_i (MPa)	51

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	140	0.227			0.847	39.2	
2	471	0.099			0.816	98.2	
3	495	0.147			0.759	70.5	

Remarks

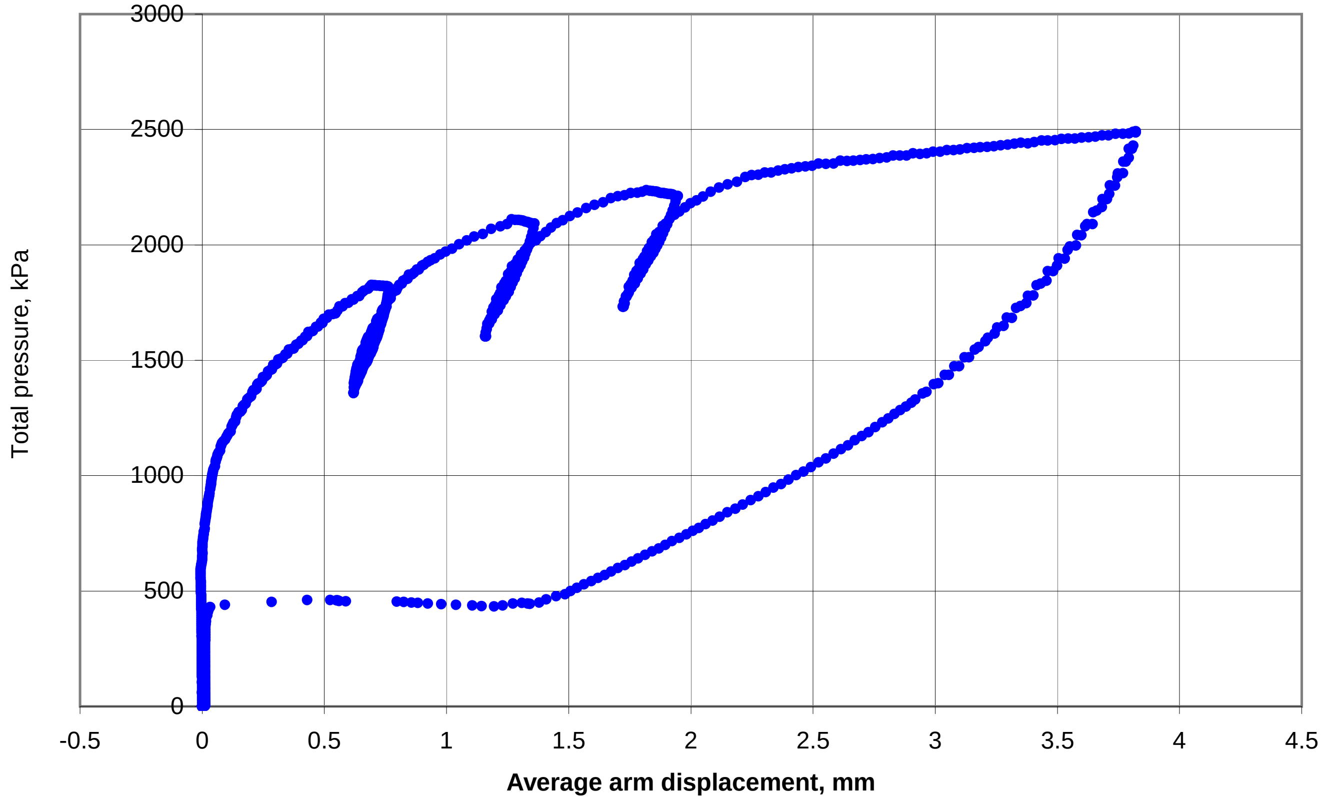
Max test pressure = 3937 kPa. Max av displ = 3.77 mm. Max arm displ = 5.08 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_1 T9**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	19-Oct-10	Test reference	B1T10	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	10
Material	Clay - LC	Test pocket (mbgl)	47.00-48.50	Depth, m	48.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1110	$P_{o\ LO}$ (kPa)	1113	$P_{o\ MR}$ (kPa)	1103
$P_{o\ curve\ modelling}$ (kPa)	947			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	356	$c_{u\ unloading}$ (kPa)	391	p_L (kPa)	3167
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	37

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	66	0.616	0.462	1.8			
2	51	0.869	0.579	4.1			
3	46	0.947	0.649	6.2			

Remarks

Max test pressure = 2492 kPa. Max av displ = 3.82 mm. Max arm displ = 5.1 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

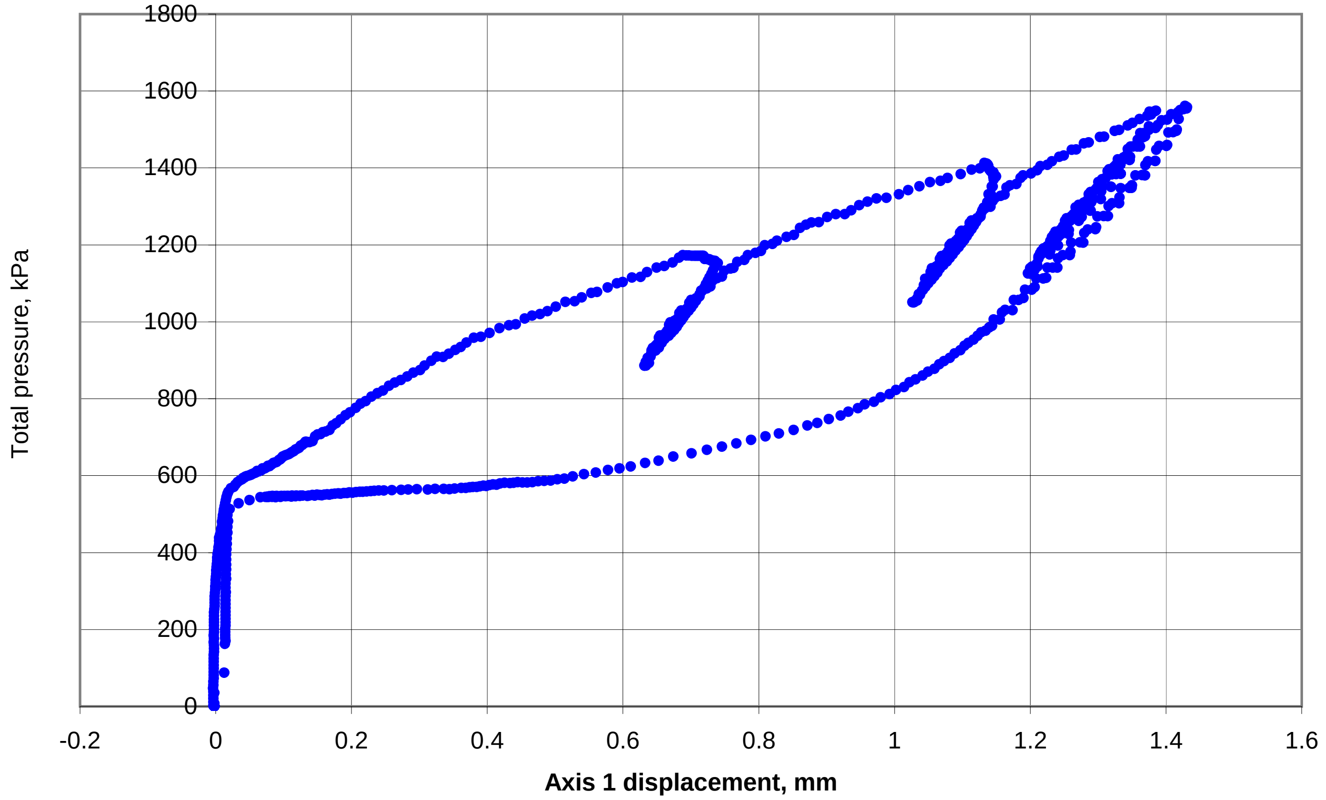
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_1 T10**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Oct-10	Test reference	B1T11	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	11
Material	Clay - LC	Test pocket (mbgl)	51.50-52.50	Depth, m	52.00



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	570	$P_{o\ LO}$ (kPa)	568	$P_{o\ MR}$ (kPa)	641
$P_{o\ curve\ modelling}$ (kPa)	1020			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	614	$c_{u\ unloading}$ (kPa)	207	p_L (kPa)	3299
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	30

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	52	0.455	0.645	4.9			
2	54	0.494	0.745	10.6			
3	49	0.705	0.742	10.1			

Remarks

Max test pressure = 1561 kPa. Max av displ = 3.99 mm. Max arm displ = 5.56 mm (Arm3). No of loops = 3 . Analysis type: Axis 1.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

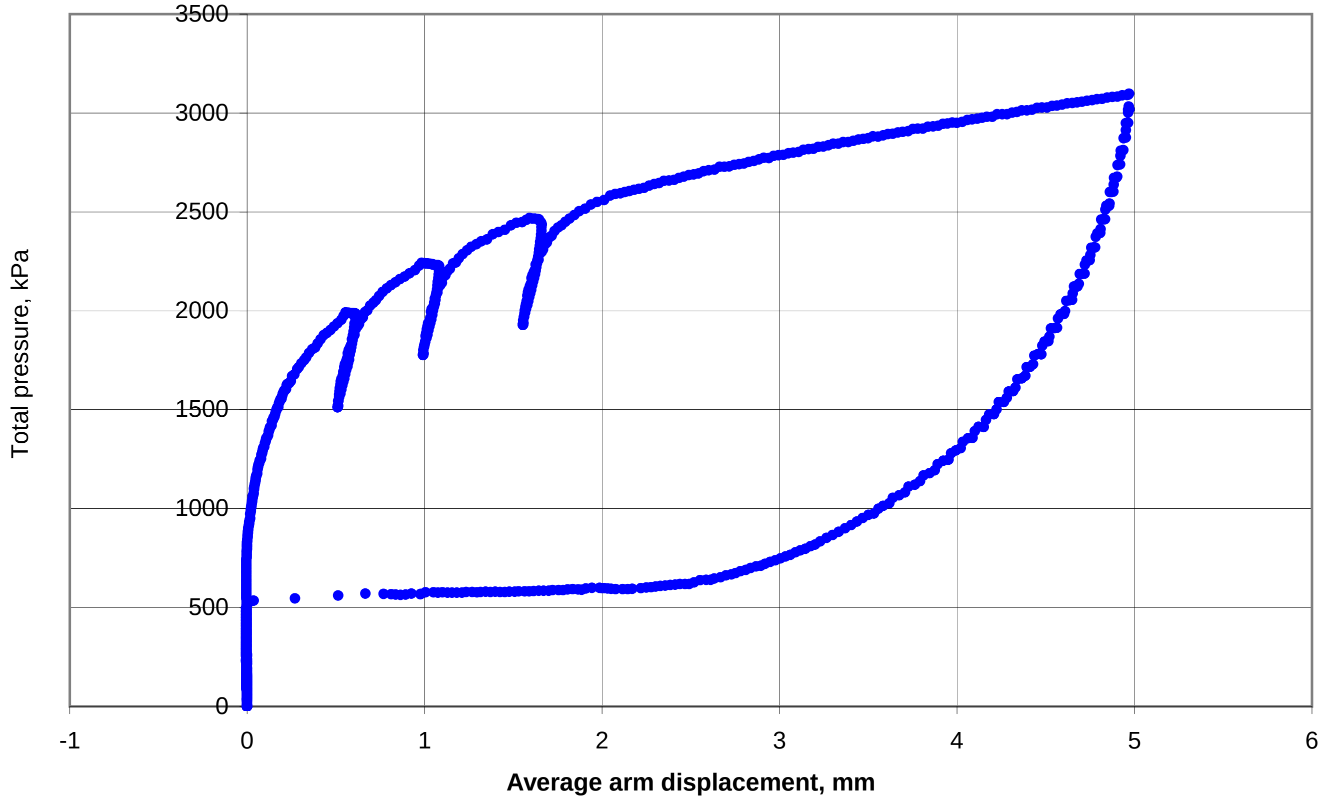
Figure

SBP2009_1 T11

Self Boring Pressuremeter Test

Soil Mechanics

Date	21-Oct-10	Test reference	B1T12	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	12
Material	Clay - LC	Test pocket (mbgl)	56.50-57.50	Depth, m	57.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	900	$P_{o\ LO}$ (kPa)	897	$P_{o\ MR}$ (kPa)	900
$P_{o\ curve\ modelling}$ (kPa)	1369			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	689	$c_{u\ unloading}$ (kPa)	381	p_L (kPa)	4237
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	138

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	96	0.439	0.568	5.0			
2	95	0.380	0.623	7.5			
3	91	0.431	0.625	7.6			

Remarks

Max test pressure = 3097 kPa. Max av displ = 4.97 mm. Max arm displ = 5.2 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

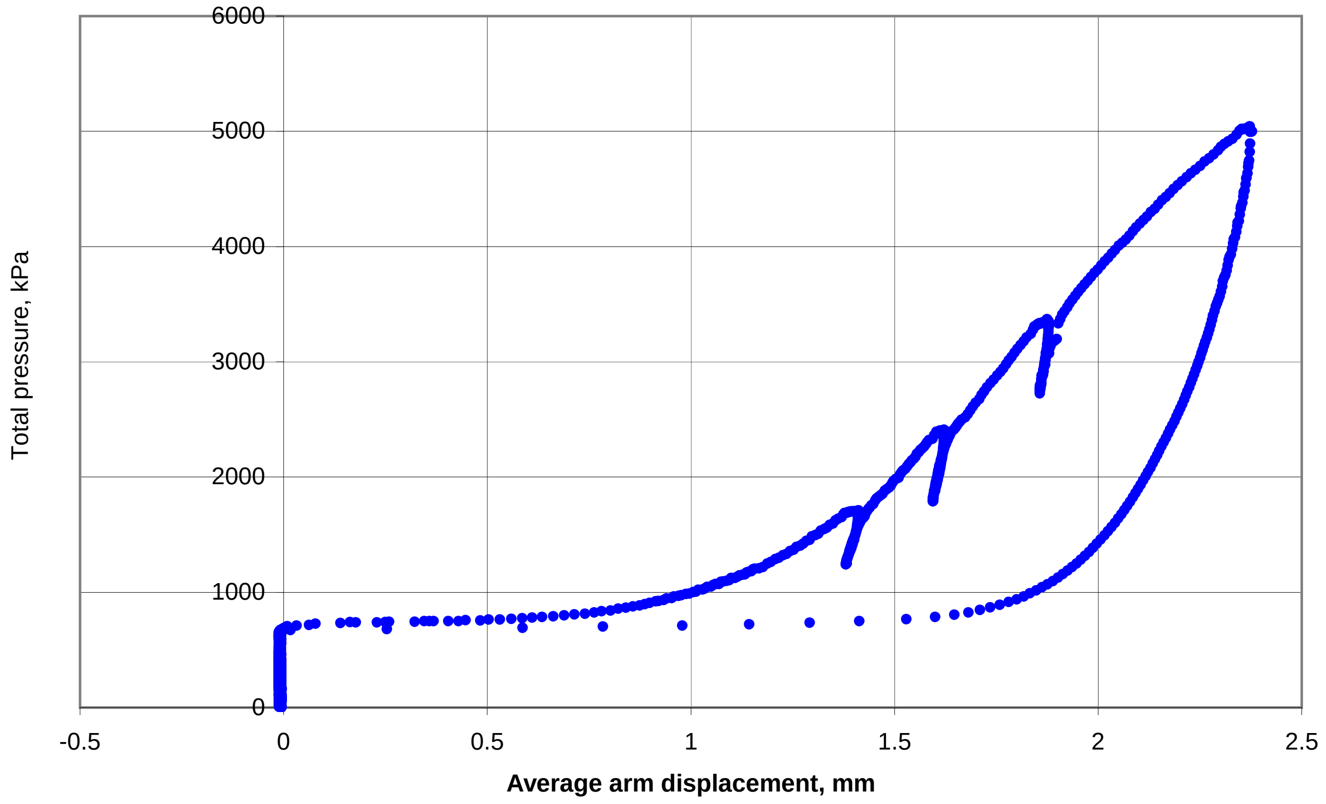
Figure

SBP2009_1 T12

Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Oct-10	Test reference	B1T13	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	13
Material	Sand + grav - LG	Test pocket (mbgl)	64.20-65.30	Depth, m	64.80



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	2010	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	2010
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2810

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	49.6	ν (deg)	24.9

Initial shear modulus (Average arm)

G_i (MPa)	98

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	281	0.130	0.709	24.0			
2	417	0.115	0.722	39.3			
3	514	0.065	0.563	9.6			

Remarks

Max test pressure = 5042 kPa. Max av displ = 2.38 mm. Max arm displ = 2.85 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

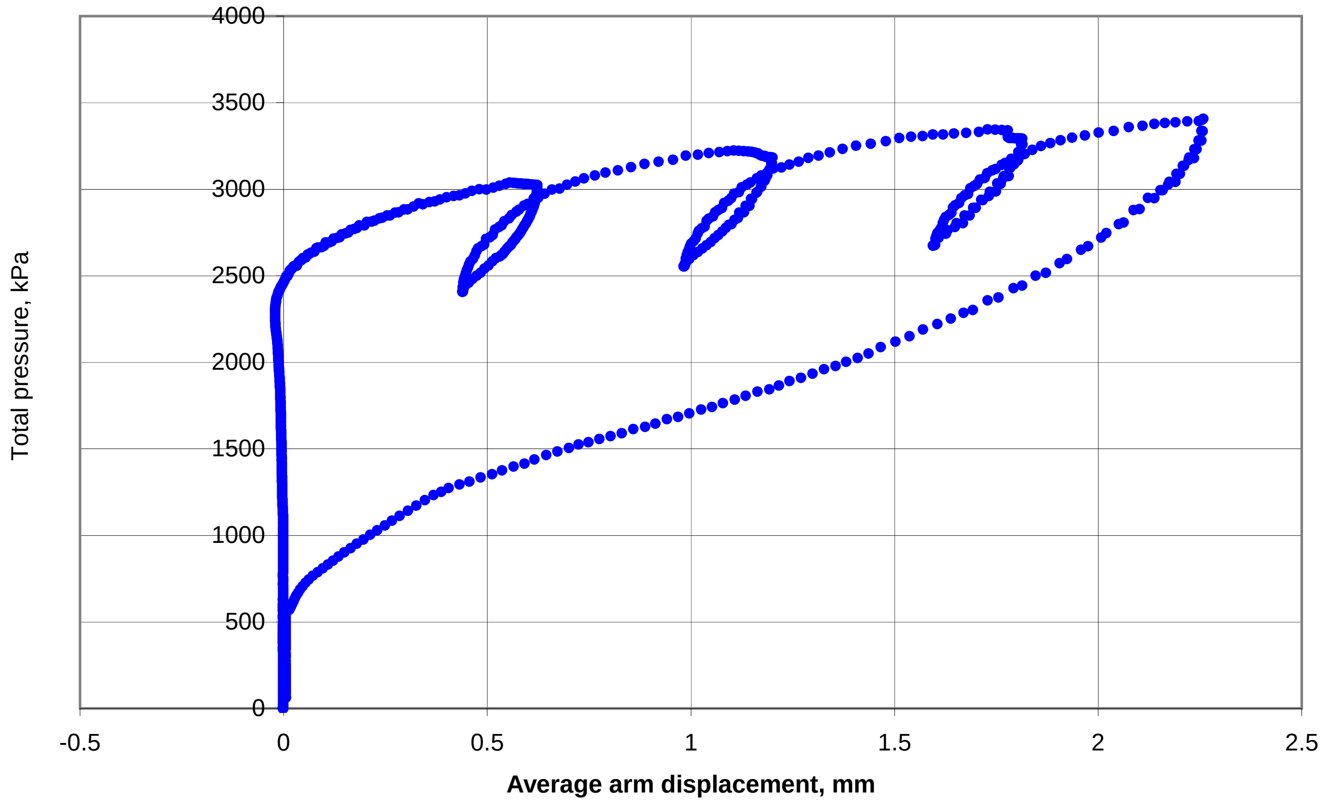
Figure

SBP2009_1 T13

Self Boring Pressuremeter Test

Soil Mechanics

Date	27-Oct-10	Test reference	B1T14	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	14
Material	Clay - LG	Test pocket (mbgl)	68.00-68.90	Depth, m	68.40



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	2400	$P_{o\ LO}$ (kPa)	2349	$P_{o\ MR}$ (kPa)	2454
$P_{o\ curve\ modelling}$ (kPa)	1966			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	258	$c_{u\ unloading}$ (kPa)	355	p_L (kPa)	4001
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	40

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	71	0.829	0.452	2.3			
2	61	0.957	0.536	3.9			
3	59	0.971	0.597	5.7			

Remarks

Max test pressure = 3406 kPa. Max av displ = 2.26 mm. Max arm displ = 3.21 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

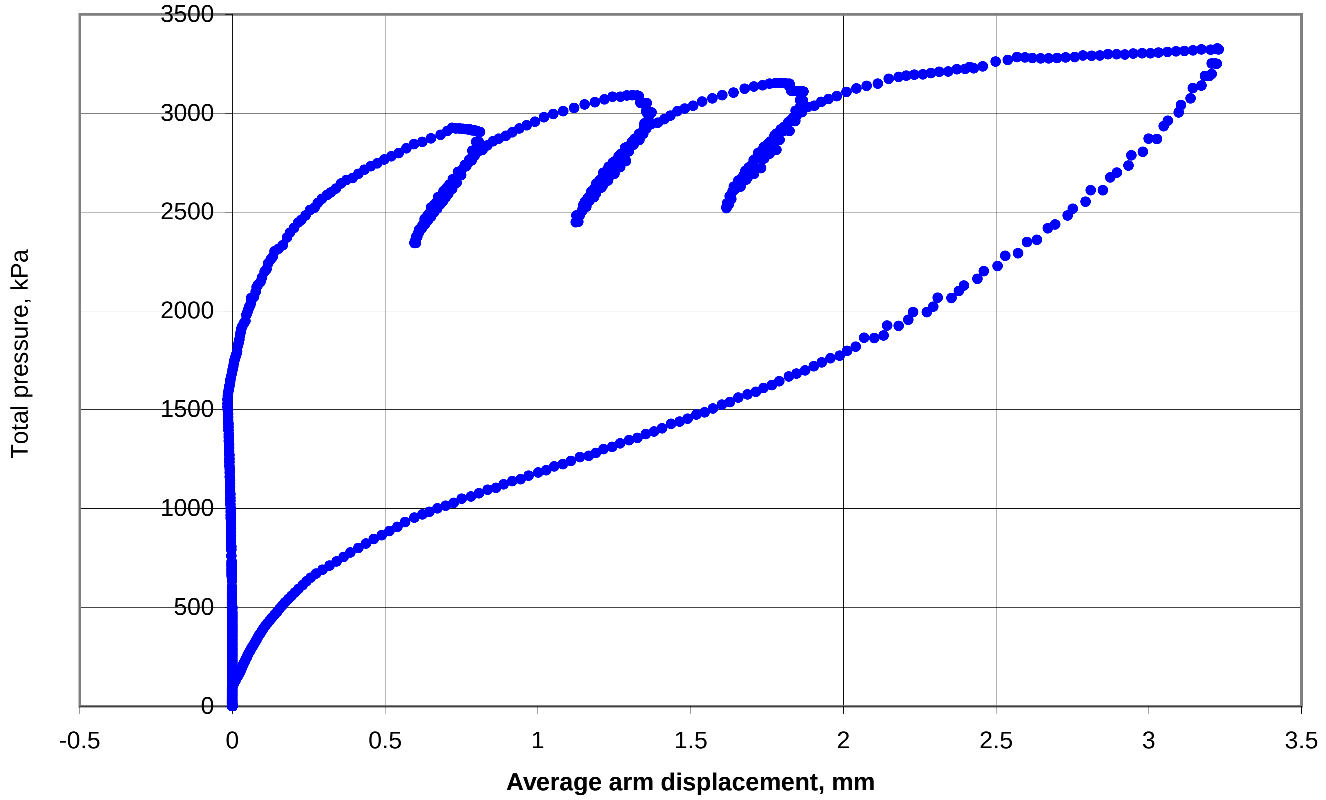
Figure

SBP2009_1 T14

Self Boring Pressuremeter Test

Soil Mechanics

Date	28-Oct-10	Test reference	B1T15	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	15
Material	Clay - LG	Test pocket (mbgl)	72.00-73.00	Depth, m	72.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1915	$P_{o\ LO}$ (kPa)	1598	$P_{o\ MR}$ (kPa)	1915
$P_{o\ curve\ modelling}$ (kPa)	1621			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	311	$c_{u\ unloading}$ (kPa)	434	p_L (kPa)	3971
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	94

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	52	0.942	0.621	5.5			
2	48	1.098	0.665	7.3			
3	48	1.073	0.620	5.4			

Remarks

Max test pressure = 3327 kPa. Max av displ = 3.23 mm. Max arm displ = 4.33 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

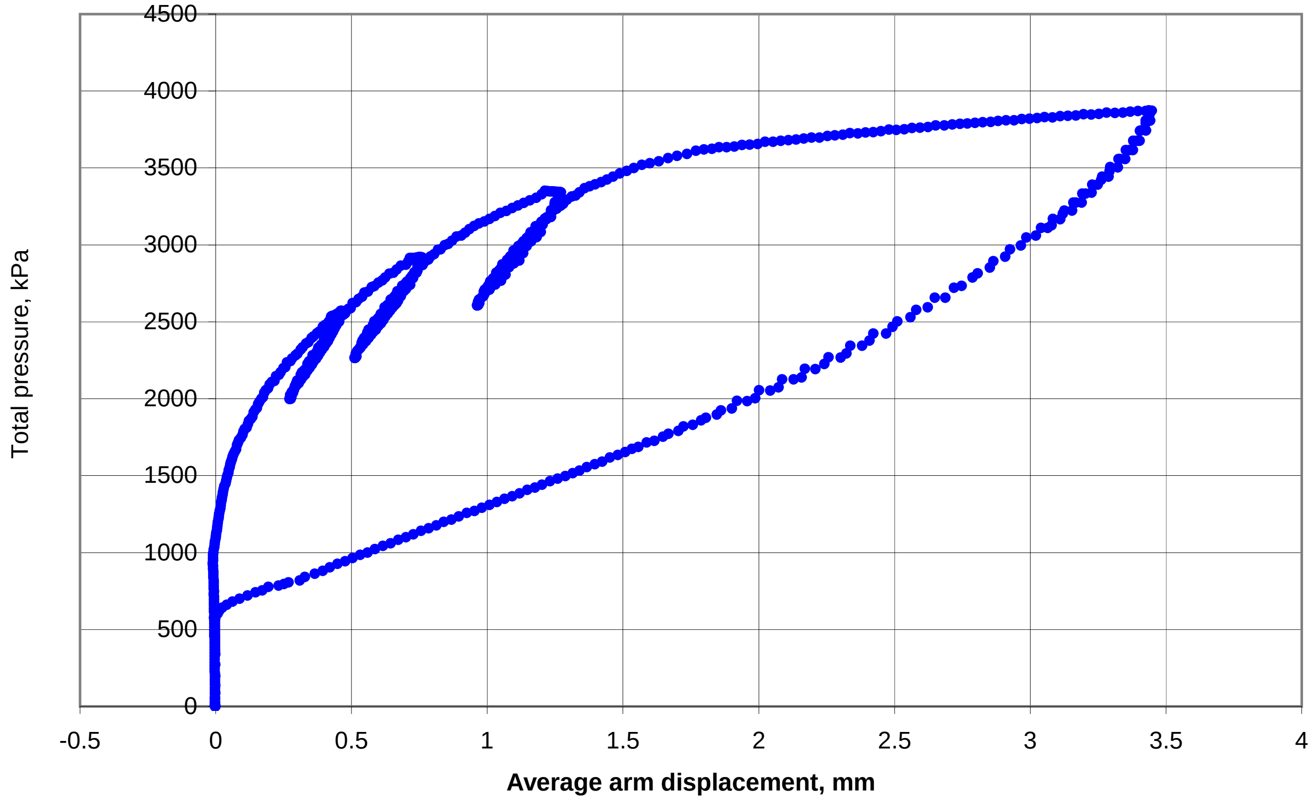
Figure

SBP2009_1 T15

Self Boring Pressuremeter Test

Soil Mechanics

Date	29-Oct-10	Test reference	B1T16	BH	SBP2009_1
Probe	SBP-3 930910	GWL (mbgl)	1.00	Test	16
Material	Clay - LG	Test pocket (mbgl)	77.00-78.00	Depth, m	77.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1410	$P_{o\ LO}$ (kPa)	1003	$P_{o\ MR}$ (kPa)	1407
$P_{o\ curve\ modelling}$ (kPa)	1833			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	793	$c_{u\ unloading}$ (kPa)	655	p_L (kPa)	5703
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	134

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	65	0.843	0.685	9.8			
2	58	1.102	0.664	8.2			
3	51	1.343	0.680	8.6			

Remarks

Max test pressure = 3874 kPa. Max av displ = 3.45 mm. Max arm displ = 4.21 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

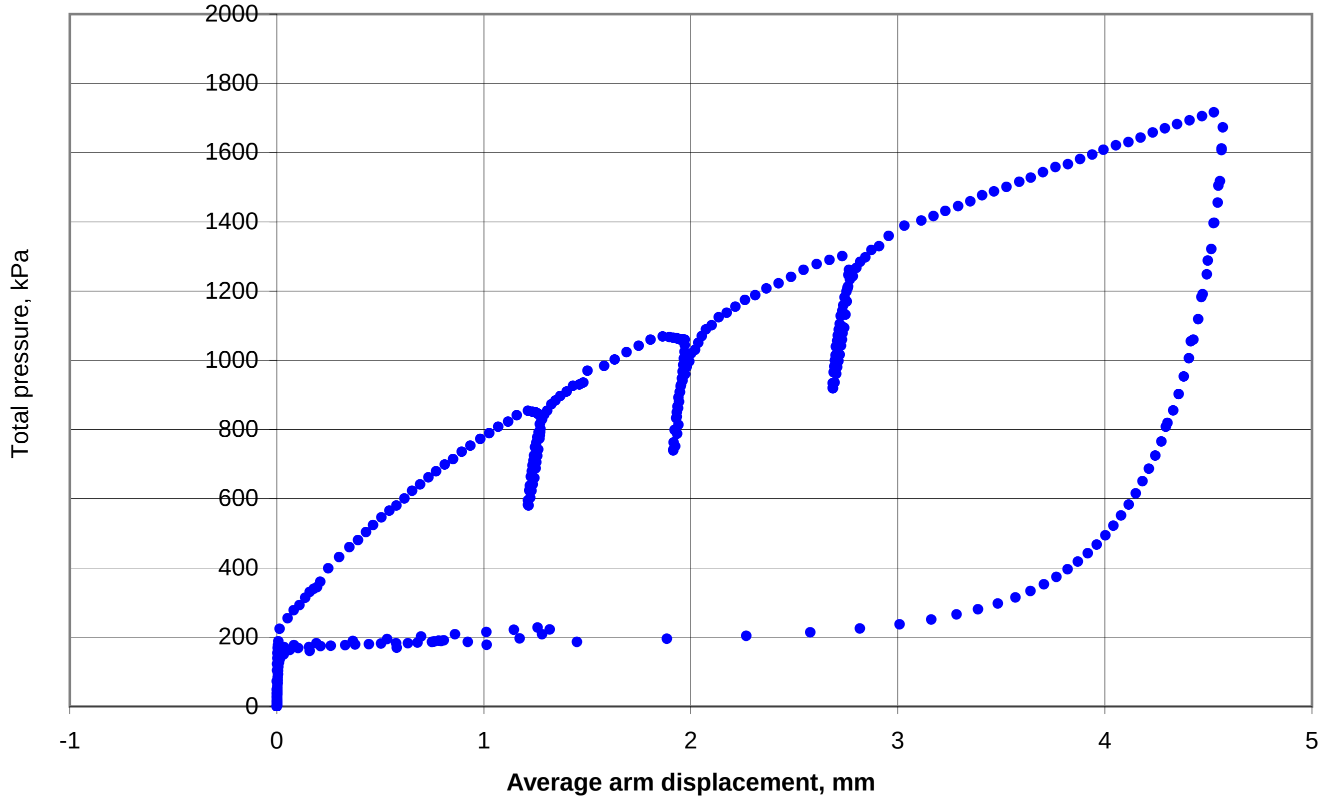
Figure

SBP2009_1 T16

Self Boring Pressuremeter Test

Soil Mechanics

Date	02-Oct-10	Test reference	B2T1	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	1
Material	Silty SAND	Test pocket (mbgl)	12.75-13.80	Depth, m	13.30



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	445	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	448
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	510

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	40.4	ν (deg)	12.6

Initial shear modulus (Average arm)

G_i (MPa)	11

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	86	0.291			0.760	14.6	
2	112	0.180			0.680	8.3	
3	92	0.319			0.770	19.3	

Remarks

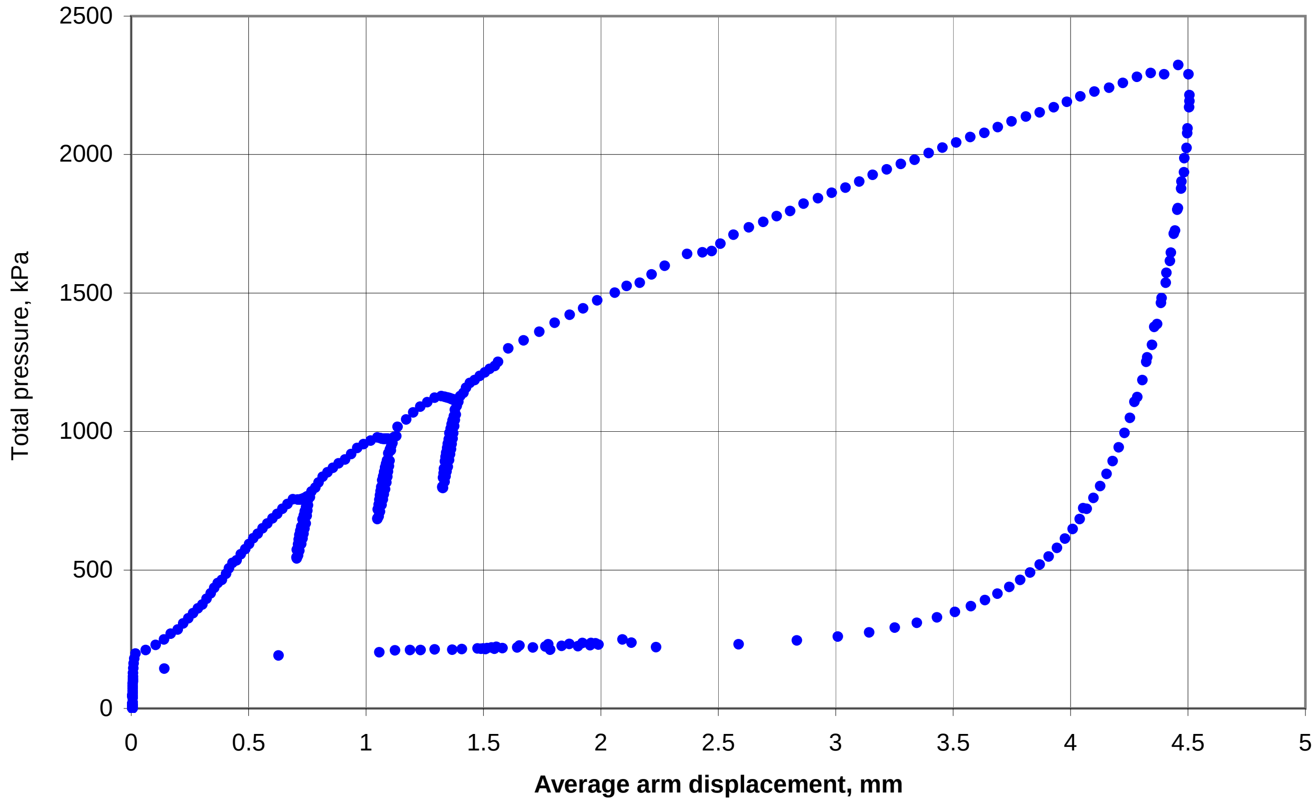
Max test pressure = 1716 kPa. Max av displ = 4.57 mm. Max arm displ = 5.11 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:	Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	Figure
	Project No.	M0102-10	**SBP2009_2 T1**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Oct-10	Test reference	B2T2	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	2
Material	Silty SAND	Test pocket (mbgl)	14.75-16.00	Depth, m	15.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	375	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	373
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	405

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	47.8	ν (deg)	22.5

Initial shear modulus (Average arm)

G_i (MPa)	24

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	93	0.221			0.740	12.9	
2	100	0.247			0.730	13.7	
3	111	0.256			0.750	17.1	

Remarks

Max test pressure = 2323 kPa. Max av displ = 4.51 mm. Max arm displ = 5.1 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

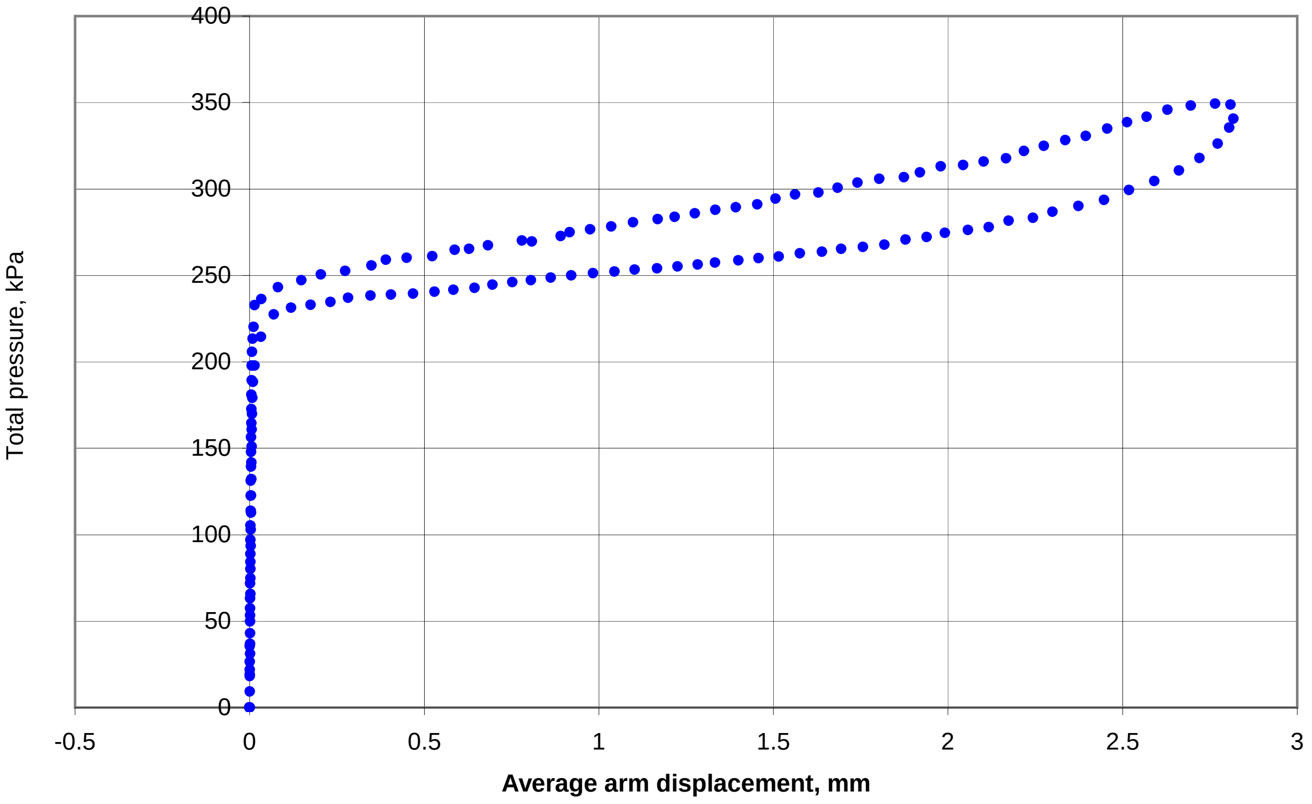
Figure

SBP2009_2 T2

Self Boring Pressuremeter Test

Soil Mechanics

Date	05-Oct-10	Test reference	B2T3	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	3
Material	Silty SAND	Test pocket (mbgl)	16.75-19.80	Depth, m	19.30



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

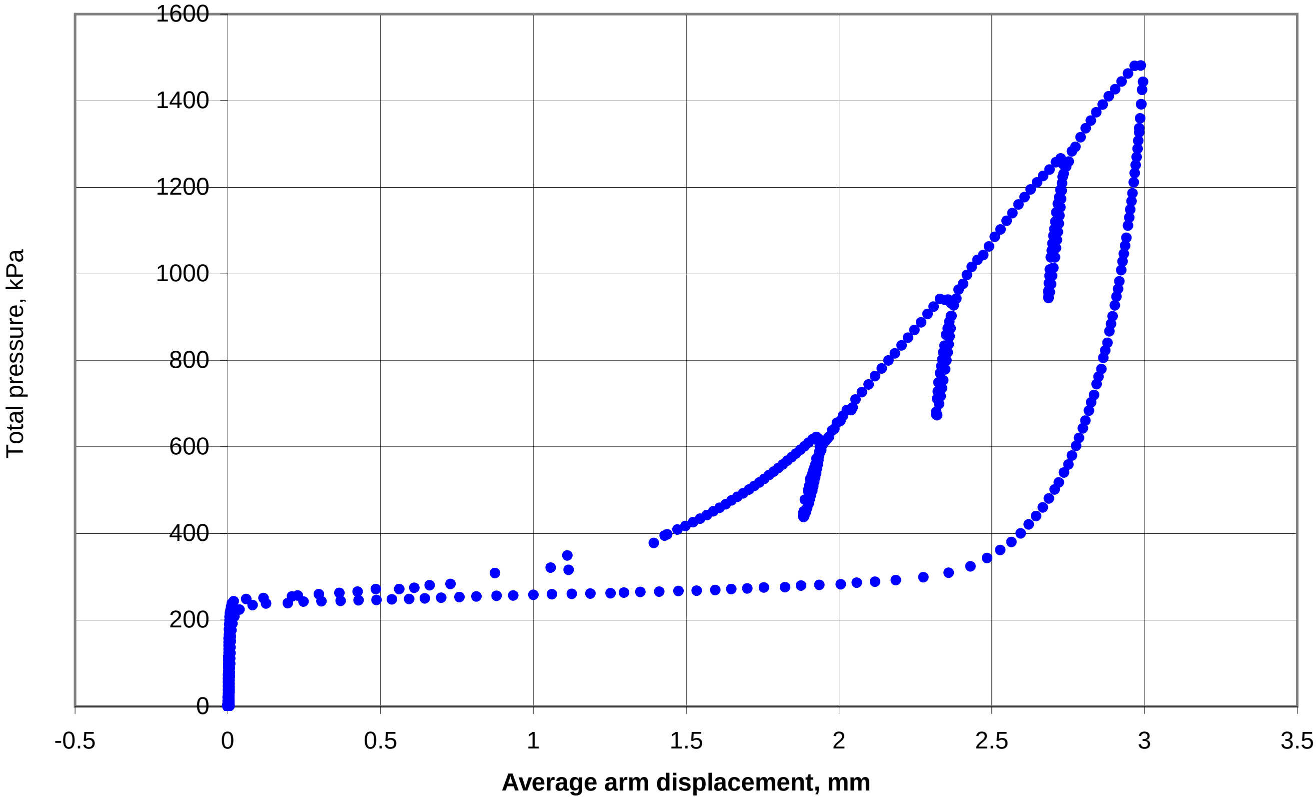
Max test pressure = 349 kPa. Max av displ = 2.82 mm. Max arm displ = 5.21 mm (Arm1). No of loops = 0 . Analysis type: Average arm. No soil resistance to test expansion. No suitable data for analysis

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T3**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	05-Oct-10	Test reference	B2T4	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	4
Material	Silty SAND	Test pocket (mbgl)	19.80-20.80	Depth, m	20.30



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	551	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	NA
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	410

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	51.0	ν (deg)	27.0

Initial shear modulus (Average arm)

G_i (MPa)	13

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	64	0.216			0.750	9.6	
2	106	0.213			0.670	8.4	
3	140	0.199			0.670	10.4	

Remarks

Max test pressure = 1481 kPa. Max av displ = 3 mm. Max arm displ = 4.78 mm (Arm5). No of loops = 3 . Analysis type: Average arm. Insufficient yield for in situ stress analysis

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T4**
	Carried out for	NNB Generation Company Limited	

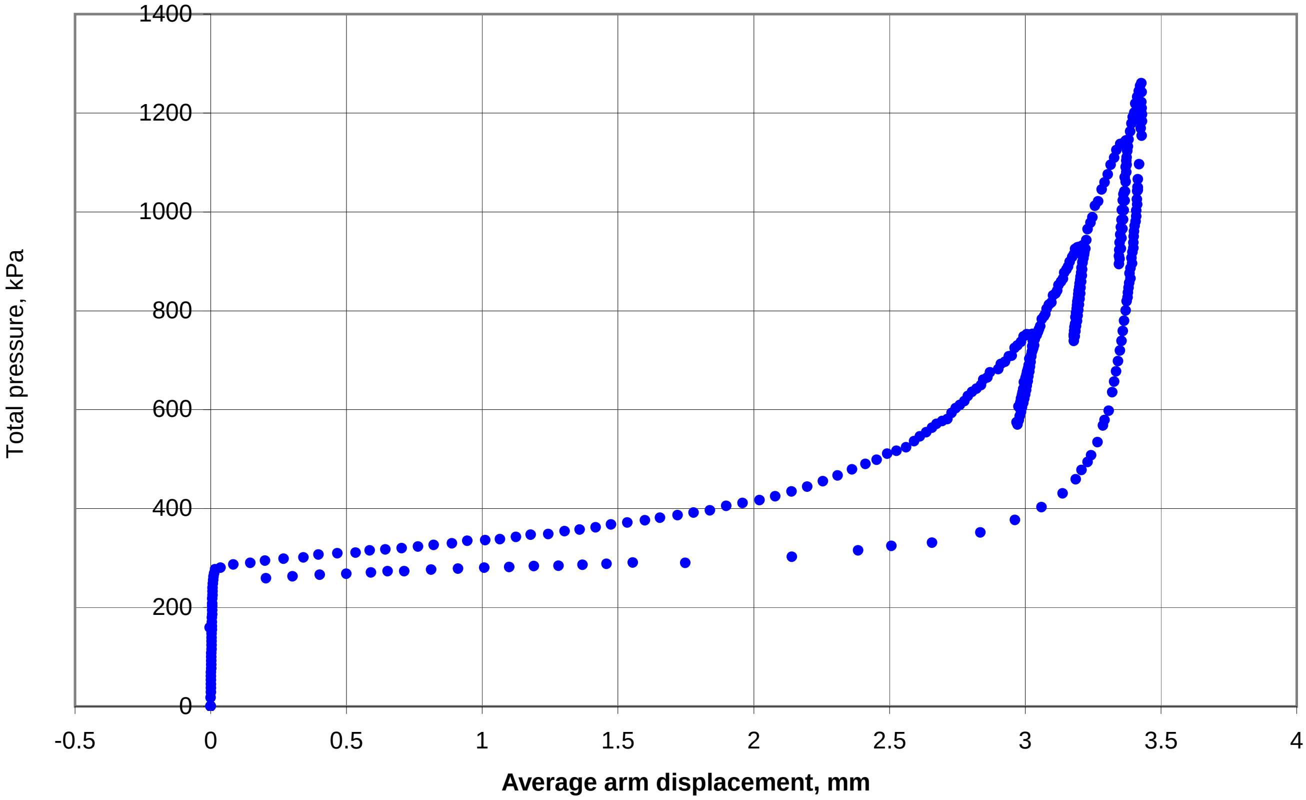
Self Boring Pressuremeter Test

Soil Mechanics

Date	13-Oct-10
Probe	SBP-6 960521
Material	Silty SAND

Test reference	B2T5
GWL (mbgl)	1.00
Test pocket (mbgl)	23.40-24.60

BH	SBP2009_2
Test	5
Depth, m	24.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	650	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	NA
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	NA

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	56.3	ν (deg)	34.6

Initial shear modulus (Average arm)

G_i (MPa)	12

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	62	0.221			0.900	29.0	
2	120	0.134			0.720	10.9	
3	175	0.125			0.700	14.2	

Remarks

Max test pressure = 1260 kPa. Max av displ = 3.43 mm. Max arm displ = 5.23 mm (Arm1). No of loops = 3 . Analysis type: Average arm. Insufficient yield for in situ stress analysis

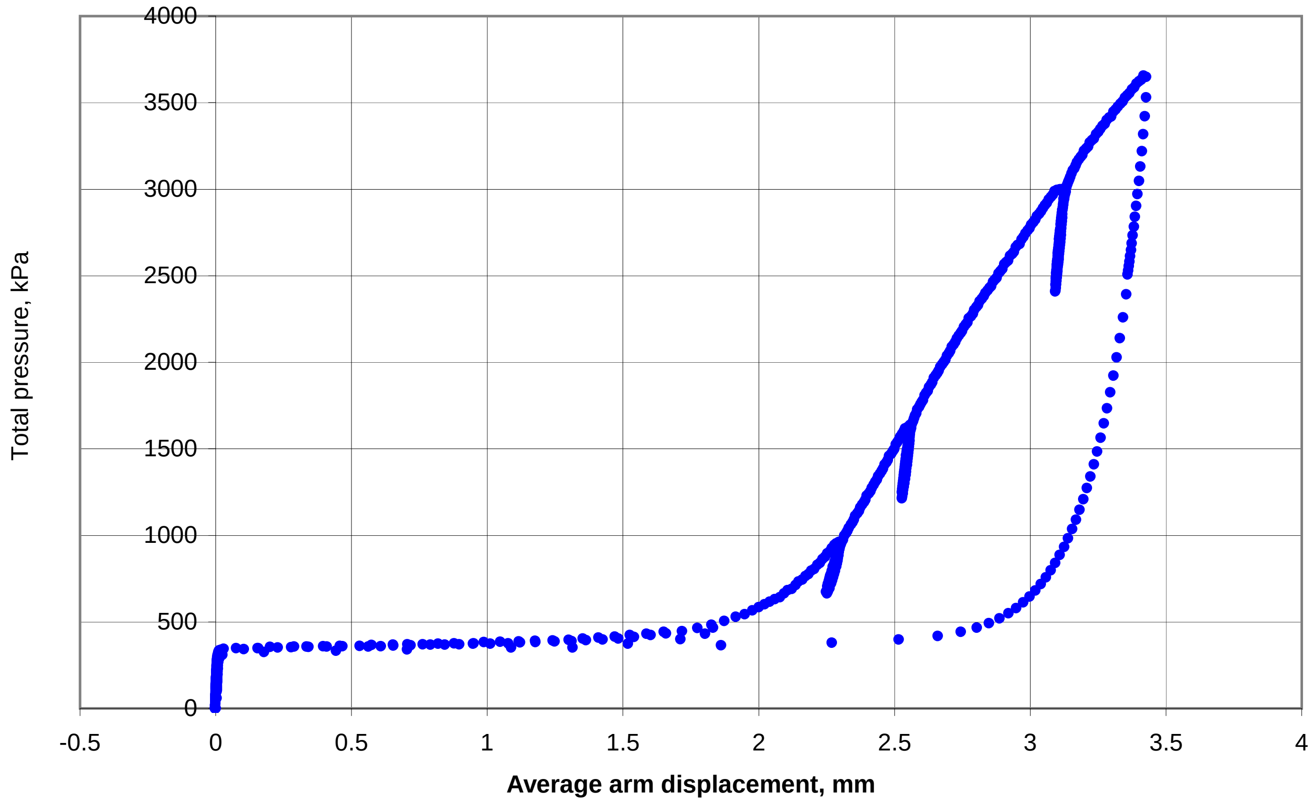
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_2 T5**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Oct-10	Test reference	B2T6	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	6
Material	Gravelly silty SAND	Test pocket (mbgl)	29.30-30.30	Depth, m	29.80



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1530	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1095
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1532

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	40.2	ν (deg)	12.4

Initial shear modulus (Average arm)

G_i (MPa)	64

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	124	0.202			0.830	33.0	
2	291	0.127			0.740	35.0	
3	409	0.122			0.820	93.0	

Remarks

Max test pressure = 3657 kPa. Max av displ = 3.43 mm. Max arm displ = 4.56 mm (Arm6). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

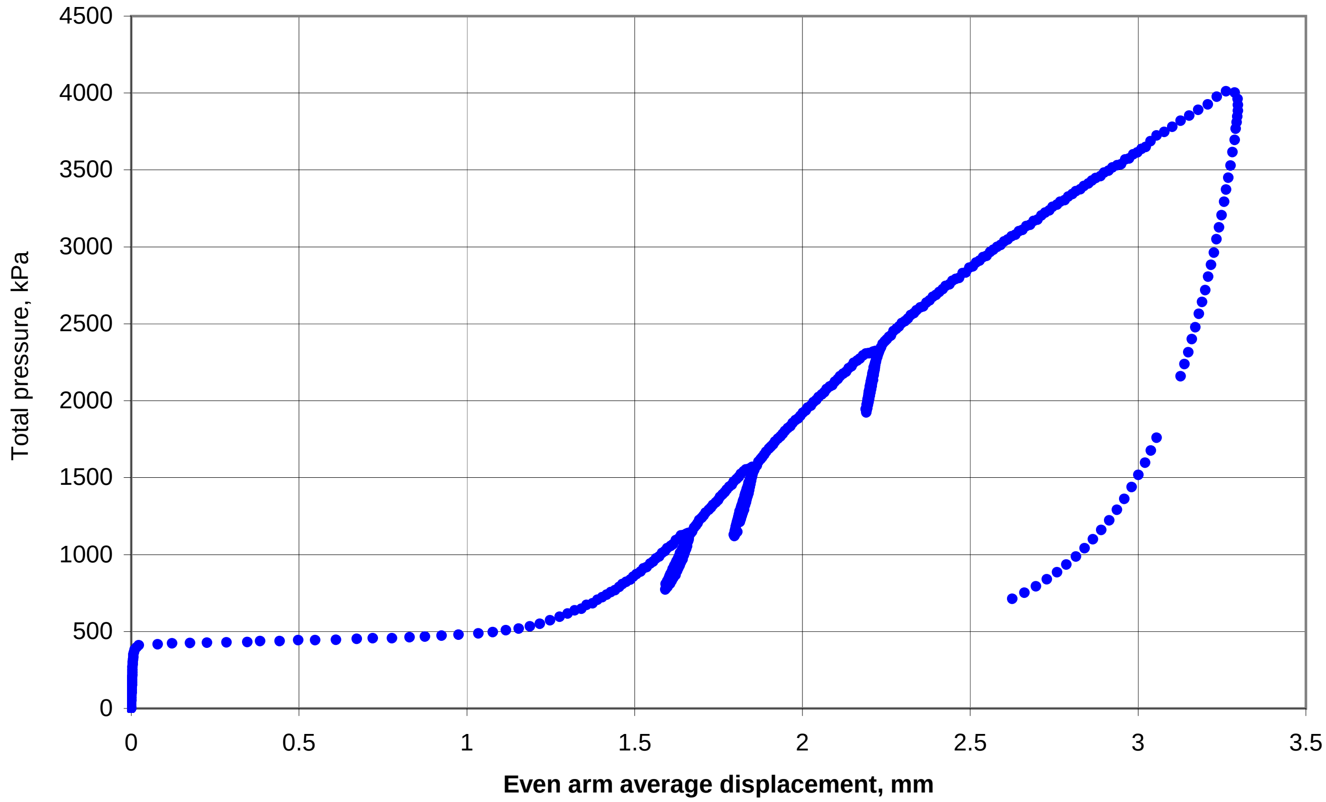
Figure

SBP2009_2 T6

Self Boring Pressuremeter Test

Soil Mechanics

Date	16-Oct-10	Test reference	B2T7	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	7
Material	Silty SAND	Test pocket (mbgl)	33.80-35.00	Depth, m	34.50



In situ horizontal stress (Even arm average)

$P_{o\ BE}$ (kPa)	1430	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1412
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1457

Shear strength (Even arm average)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	45.1	ν (deg)	18.8

Initial shear modulus (Even arm average)

G_i (MPa)	50

Unload-reload loop shear modulus (Even arm average)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	111	0.297			0.820	29.0	
2	169	0.243			0.870	62.0	
3	263	0.125			0.790	43.0	

Remarks

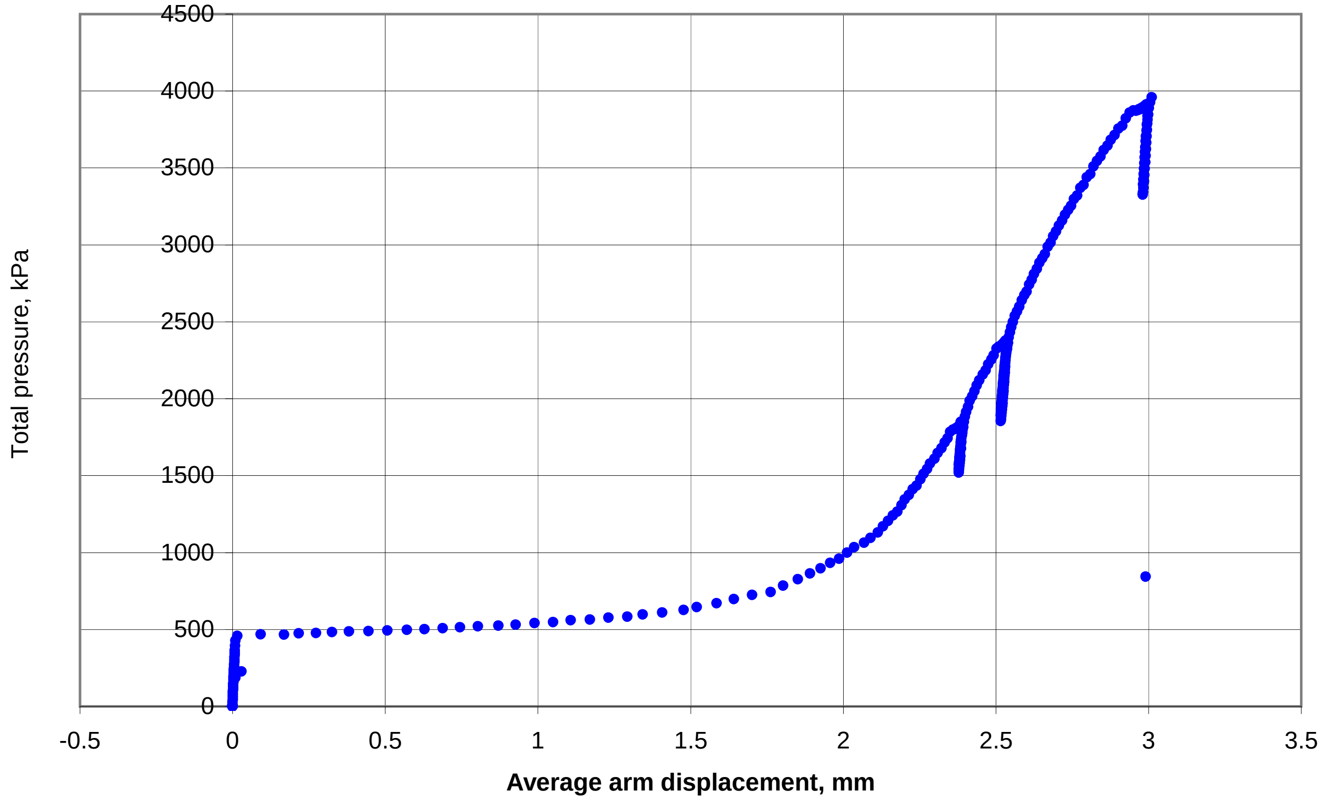
Max test pressure = 4011 kPa. Max av displ = 3.65 mm. Max arm displ = 4.92 mm (Arm1). No of loops = 3 . Analysis type: Even arm average. Arm 1 sticking intermittently

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T7**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	17-Oct-10	Test reference	B2T8	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	8
Material	Silty SAND	Test pocket (mbgl)	37.80-39.00	Depth, m	38.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1050	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	2097
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2441

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	58.9	ν (deg)	38.5

Initial shear modulus (Average arm)

G_i (MPa)	87

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	533	0.043			0.700	33.0	
2	603	0.064			0.700	41.0	
3	751	0.061			0.780	101.0	

Remarks

Max test pressure = 3959 kPa. Max av displ = 3.01 mm. Max arm displ = 3.75 mm (Arm2). No of loops = 3 . Analysis type: Average arm. Membrane burst during final loading

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

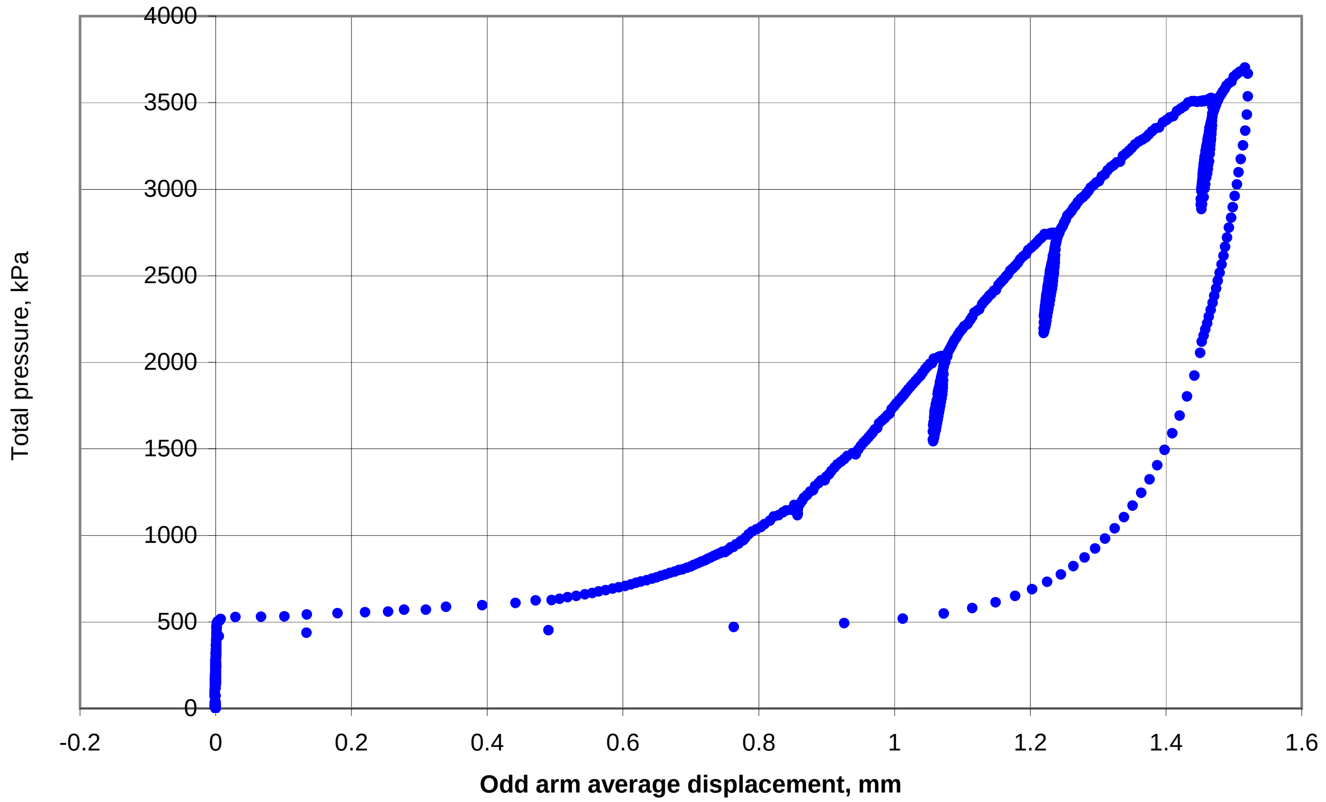
Figure

SBP2009_2 T8

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Oct-10	Test reference	B2T9	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	9
Material	Silty SAND	Test pocket (mbgl)	42.30-43.50	Depth, m	43.00



In situ horizontal stress (Odd arm average)

$P_{o\ BE}$ (kPa)	1850	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1955
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1771

Shear strength (Odd arm average)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	31.1	ν (deg)	1.3

Initial shear modulus (Odd arm average)

G_i (MPa)	98

Unload-reload loop shear modulus (Odd arm average)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	599	0.068			0.490	6.0	
2	681	0.068			0.550	11.8	
3	763	0.065			0.550	13.8	

Remarks

Max test pressure = 3703 kPa. Max av displ = 2.84 mm. Max arm displ = 8.08 mm (Arm2). No of loops = 3 . Analysis type: Odd arm average. Fault on Arm 3 and unexpected behaviour on Arms 2 and 4

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

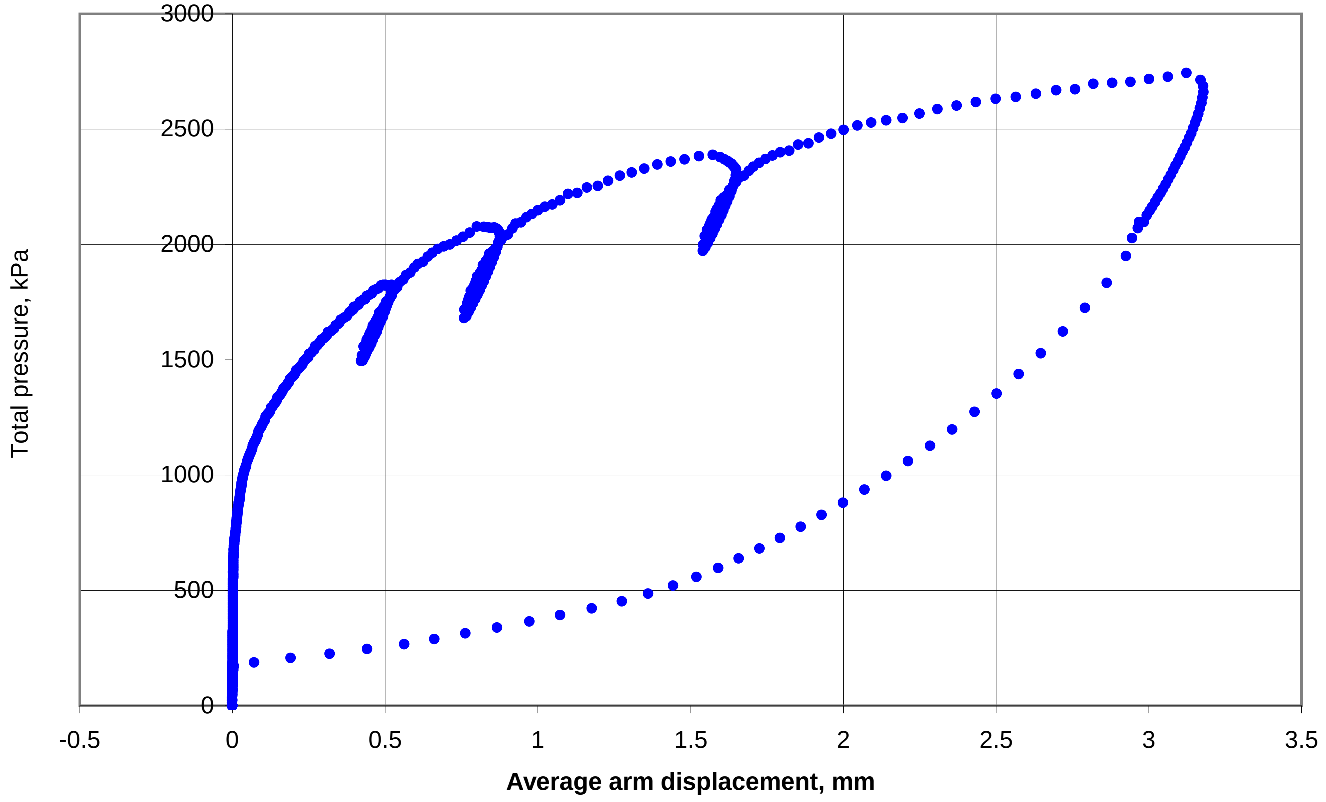
Figure

SBP2009_2 T9

Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Oct-10	Test reference	B2T10	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	10
Material	Sandy CLAY	Test pocket (mbgl)	47.30-48.50	Depth, m	48.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	915	$P_{o\ LO}$ (kPa)	607	$P_{o\ MR}$ (kPa)	918
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	442	$c_{u\ unloading}$ (kPa)	427	p_L (kPa)	3700
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	73

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	65	0.412	0.688	8.1			
2	65	0.489	0.689	8.8			
3	66	0.422	0.625	5.5			

Remarks

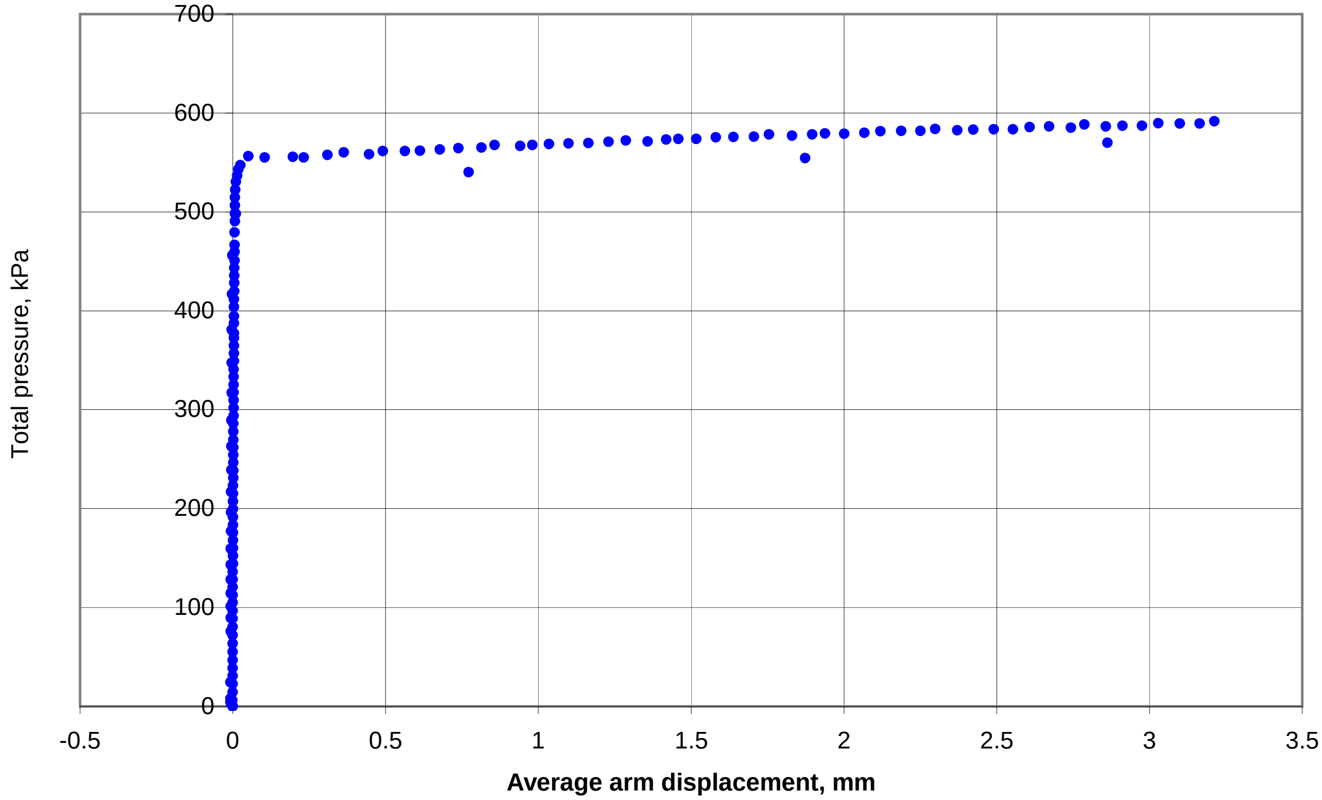
Max test pressure = 2744 kPa. Max av displ = 3.18 mm. Max arm displ = 4.18 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T10**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	27-Oct-10	Test reference	B2T11	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	11
Material	Sandy CLAY	Test pocket (mbgl)	51.80-53.00	Depth, m	52.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 591 kPa. Max av displ = 3.21 mm. Max arm displ = 3.42 mm (Arm2). No of loops = 0 . Analysis type: Average arm. No soil resistance to test expansion. No suitable data for analysis

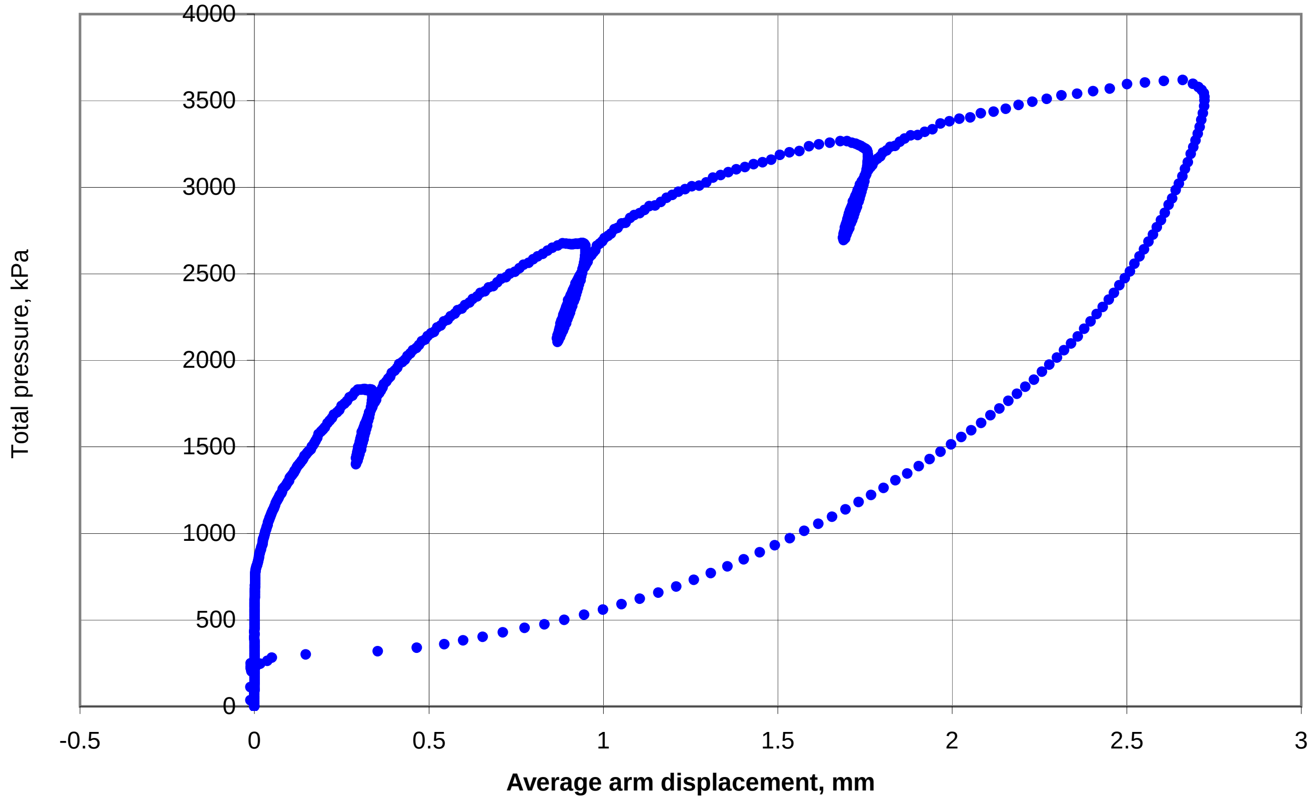
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_2 T11**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	31-Oct-10		Test reference	B2T12		BH	SBP2009_2
Probe	SBP-6 960521		GWL (mbgl)	1.00		Test	12
Material	Silty CLAY		Test pocket (mbgl)	60.80-62.50		Depth, m	62.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	740	$P_{o\ LO}$ (kPa)	774	$P_{o\ MR}$ (kPa)	492
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	606	$c_{u\ unloading}$ (kPa)	539	p_L (kPa)	5633
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	158

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	166	0.183	0.613	8.9			
2	132	0.322	0.698	15.8			
3	137	0.281	0.712	17.9			

Remarks

Max test pressure = 3619 kPa. Max av displ = 2.72 mm. Max arm displ = 4.14 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

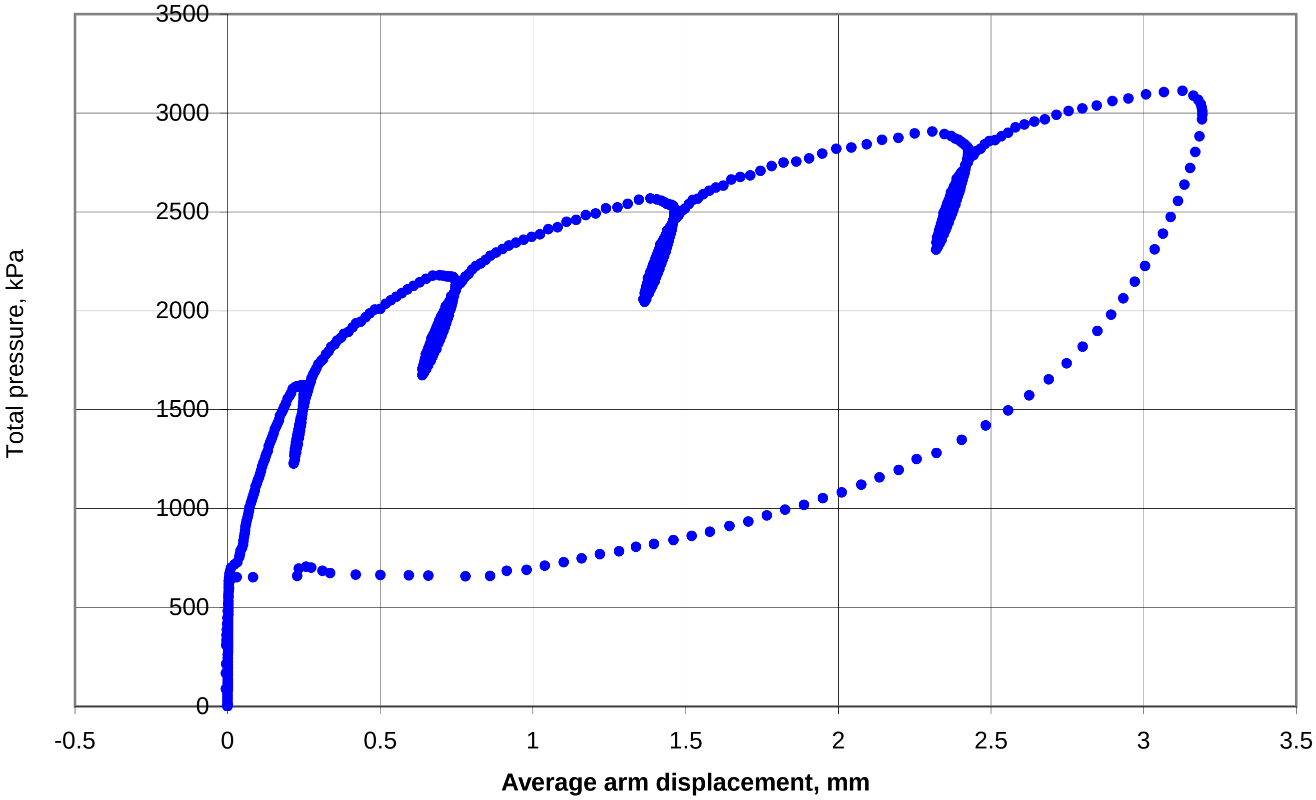
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_2 T12**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Nov-10	Test reference	B2T13	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	13
Material	Gravelly silty SAND	Test pocket (mbgl)	63.80-65.00	Depth, m	64.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1205	$P_{o\ LO}$ (kPa)	947	$P_{o\ MR}$ (kPa)	1207
$P_{o\ curve\ modelling}$ (kPa)	1455			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	631	$c_{u\ unloading}$ (kPa)	314	p_L (kPa)	4382
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	101

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	205	0.131	0.651	13.1			
2	88	0.459	0.635	7.9			
3	96	0.414	0.719	15.2			
4	104	0.423	0.658	10.8			

Remarks

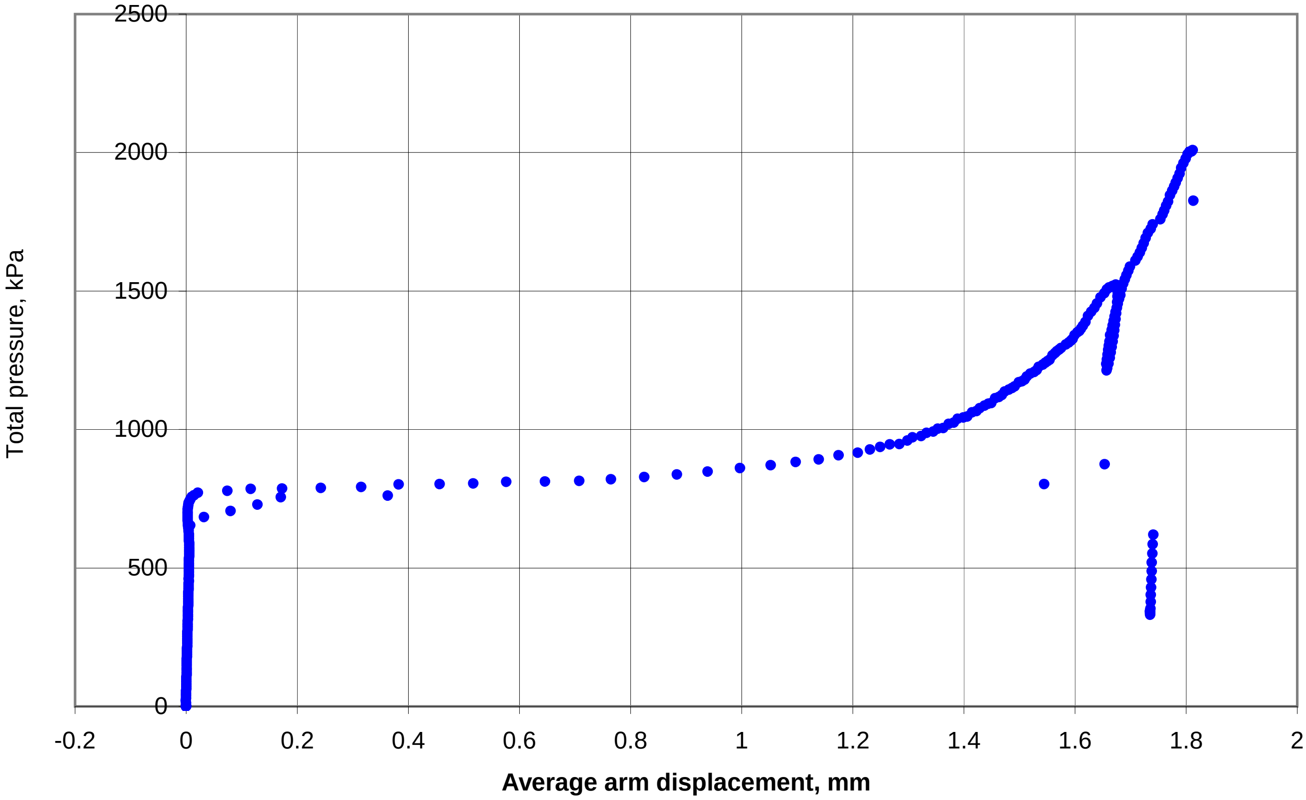
Max test pressure = 3111 kPa. Max av displ = 3.19 mm. Max arm displ = 4.54 mm (Arm4). No of loops = 4 . Analysis type: Average arm. Arm 4 some disturbance. Behaviour appears more undrained

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T13**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Nov-10	Test reference	B2T14	BH	SBP2009_2
Probe	SBP-6 960521	GWL (mbgl)	1.00	Test	14
Material	CLAY	Test pocket (mbgl)	69.30-70.50	Depth, m	70.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1100	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	283	0.081	0.655	13.5			

Remarks

Max test pressure = 2008 kPa. Max av displ = 1.81 mm. Max arm displ = 10.42 mm (Arm3). No of loops = 1 . Analysis type: Average arm. Membrane burst after first unload-reload loop. Insufficient yield for in situ pressure analysis.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure **SBP2009_2 T14**

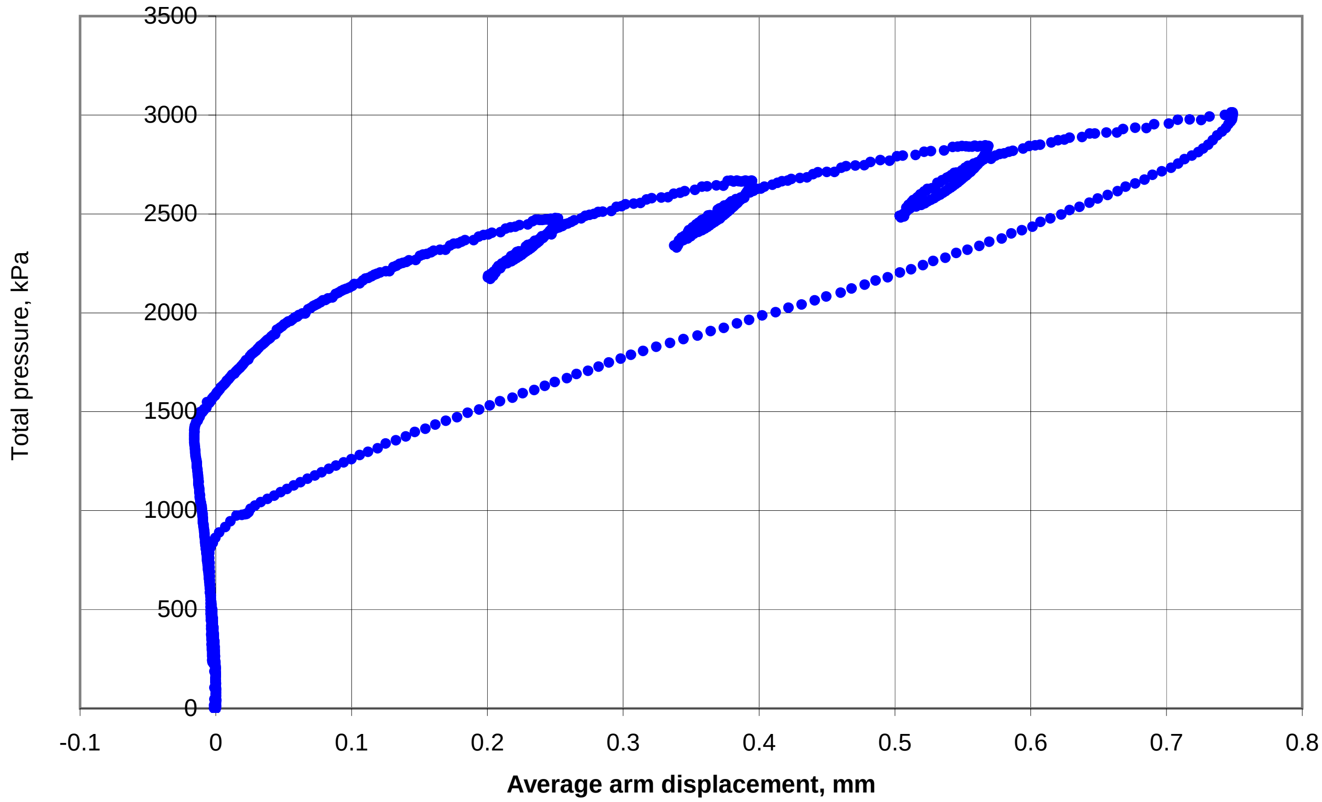
Self Boring Pressuremeter Test

Soil Mechanics

Date	08-Nov-10
Probe	SBP-3 930111
Material	Silty CLAY

Test reference	B2T15
GWL (mbgl)	1.00
Test pocket (mbgl)	73.30-75.00

BH	SBP2009_2
Test	15
Depth, m	74.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1425	$P_{o\ LO}$ (kPa)	1421	$P_{o\ MR}$ (kPa)	1571
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	689	$c_{u\ unloading}$ (kPa)	869	p_L (kPa)	4576
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	166

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	117	0.220	0.660	9.6			
2	113	0.249	0.650	9.3			
3	107	0.284	0.629	7.9			

Remarks

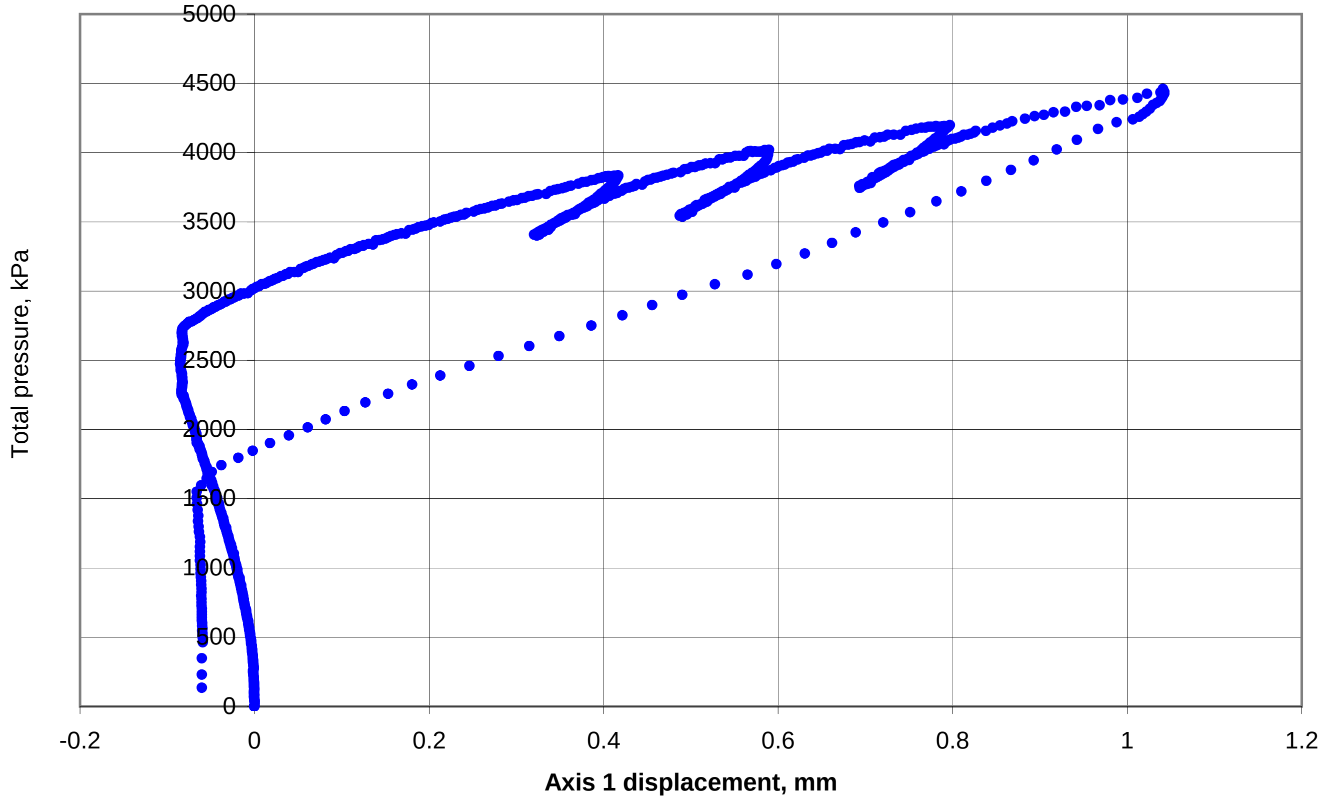
Max test pressure = 3013 kPa. Max av displ = 0.75 mm. Max arm displ = 1.09 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T15**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	09-Nov-10	Test reference	B2T16	BH	SBP2009_2
Probe	SBP-3 930111	GWL (mbgl)	1.00	Test	16
Material	Silty CLAY	Test pocket (mbgl)	78.30-79.50	Depth, m	79.00



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	2750	$P_{o\ LO}$ (kPa)	2730	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	654	$c_{u\ unloading}$ (kPa)	514	p_L (kPa)	6332
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	72

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	80	0.323	0.750	14.1			
2	80	0.357	0.758	15.4			
3	84	0.357	0.735	13.5			

Remarks

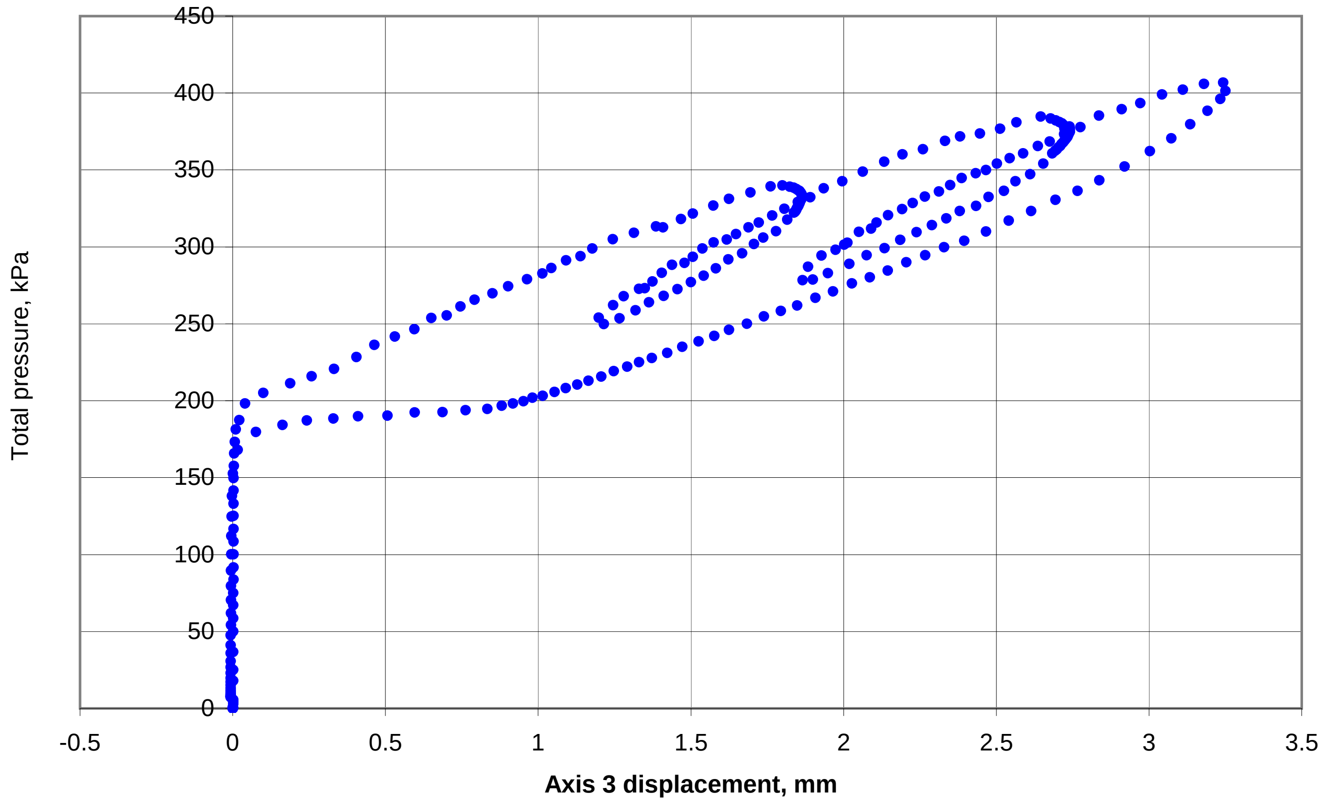
Max test pressure = 4197 kPa. Max av displ = 0.4 mm. Max arm displ = 0.8 mm (Arm1). No of loops = 3 . Analysis type: Axis 1. Fault on Arm 2

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_2 T16**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	13-Jul-10	Test reference	B3T1	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	1
Material	Peat	Test pocket (mbgl)	10.50-11.50	Depth, m	11.00



In situ horizontal stress (Axis 3)

$P_{o\ BE}$ (kPa)	175	$P_{o\ LO}$ (kPa)	165	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)	233			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 3)

$c_{u\ loading}$ (kPa)	92	$c_{u\ unloading}$ (kPa)	58	p_L (kPa)	545
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 3)

G_i (MPa)	2

Unload-reload loop shear modulus (Axis 3)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	3	2.730	0.709	0.6			
2	2	3.519	0.730	0.7			

Remarks

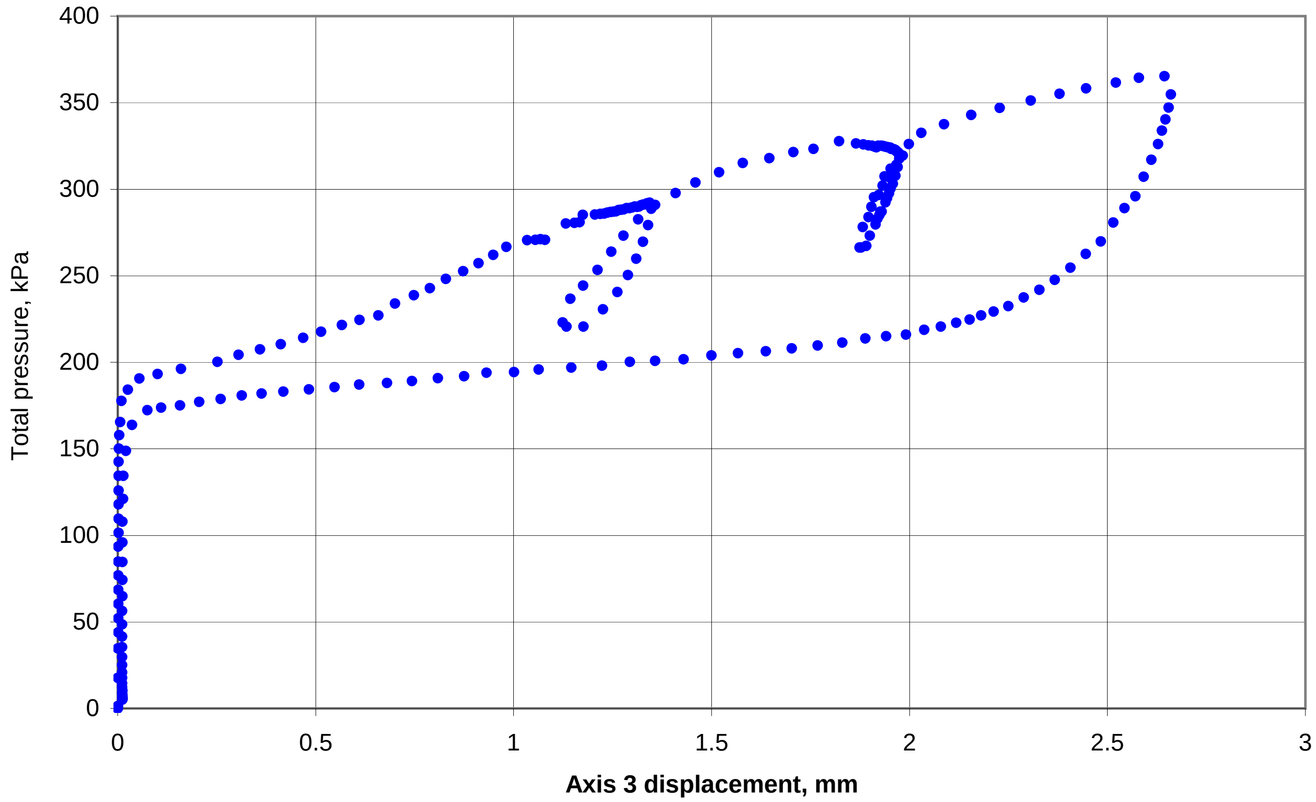
Max test pressure = 407 kPa. Max av displ = 3.03 mm. Max arm displ = 4.6 mm (Arm2). No of loops = 2 . Analysis type: Axis 3.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T1**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	13-Jul-10	Test reference	B3T2	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	2
Material	Peat/sand	Test pocket (mbgl)	12.50-13.50	Depth, m	13.00



In situ horizontal stress (Axis 3)

$P_{o\ BE}$ (kPa)	160	$P_{o\ LO}$ (kPa)	161	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)	232			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 3)

$c_{u\ loading}$ (kPa)	86	$c_{u\ unloading}$ (kPa)	23	p_L (kPa)	511
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 3)

G_i (MPa)	3

Unload-reload loop shear modulus (Axis 3)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	7	0.993	0.726	1.4			
2	12	0.402	0.600	0.8			

Remarks

Max test pressure = 365 kPa. Max av displ = 2.86 mm. Max arm displ = 4.53 mm (Arm5). No of loops = 2 . Analysis type: Axis 3.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

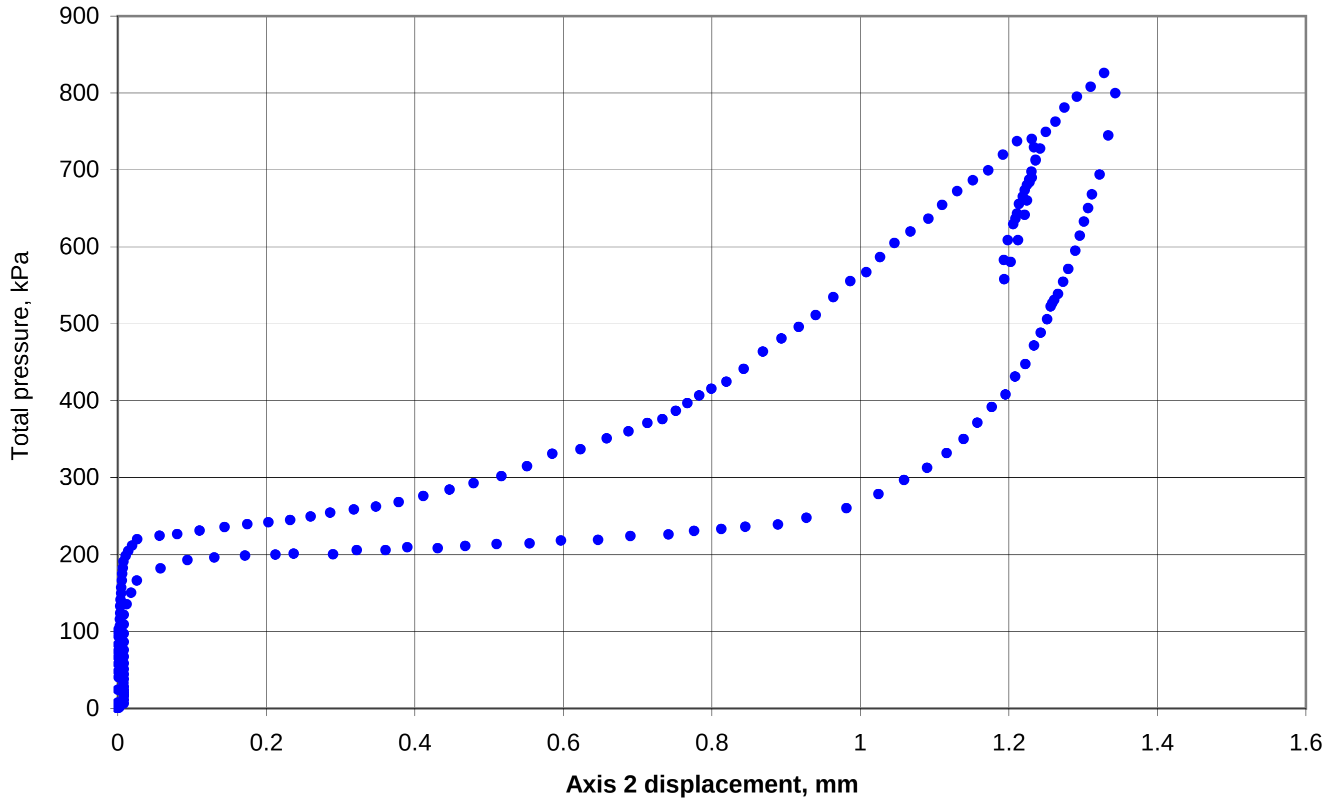
Figure

SBP2009_3 T2

Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Jul-10	Test reference	B3T3	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	3
Material	Sand - CD	Test pocket (mbgl)	14.60-15.60	Depth, m	15.10



In situ horizontal stress (Axis 2)

$P_{o\ BE}$ (kPa)	400	$P_{o\ LO}$ (kPa)	204	$P_{o\ MR}$ (kPa)	NA
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	NA

Shear strength (Axis 2)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	46.8	ν (deg)	21.2

Initial shear modulus (Axis 2)

G_i (MPa)	18

Unload-reload loop shear modulus (Axis 2)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	84	0.187			0.648	4.9	

Remarks

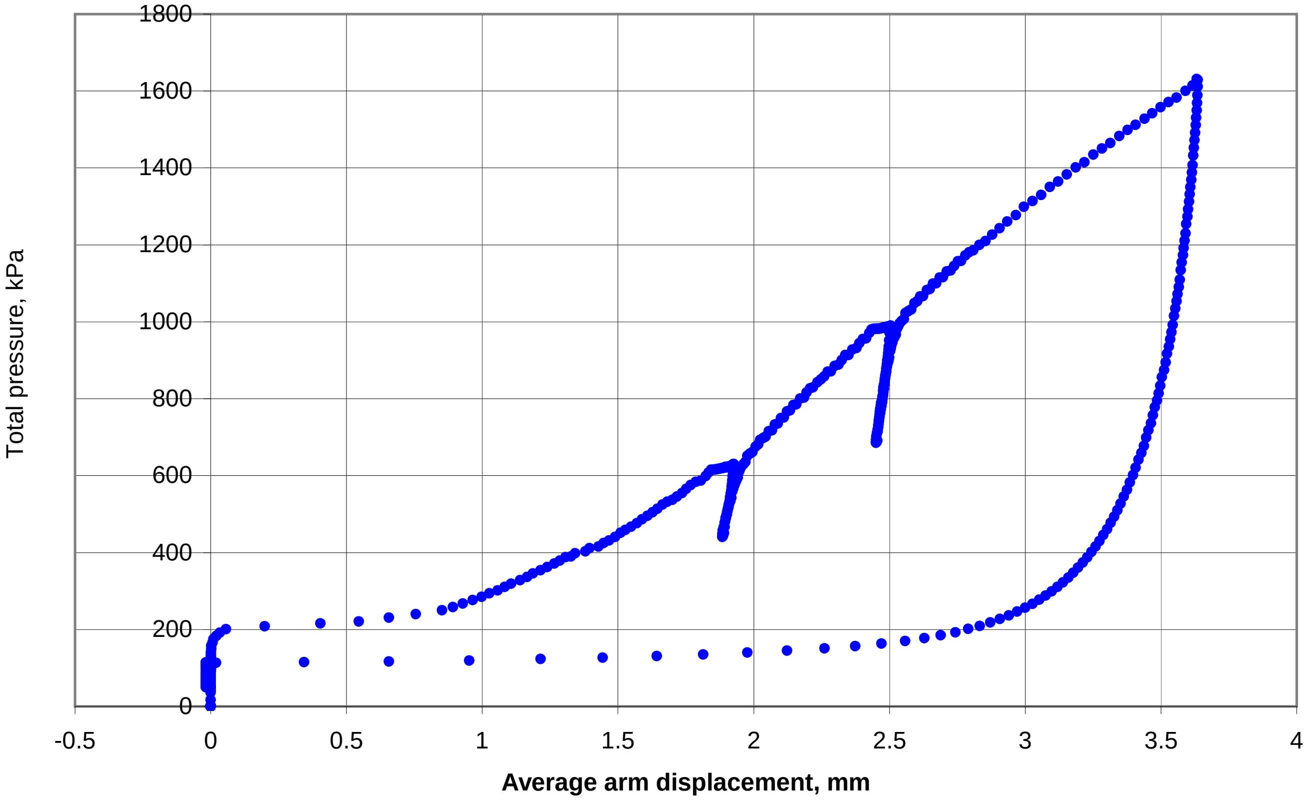
Max test pressure = 826 kPa. Max av displ = 1.74 mm. Max arm displ = 5.86 mm (Arm3). No of loops = 1 . Analysis type: Axis 2.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T3**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	19-Jul-10	Test reference	B3T4	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	4
Material	Sand - CD	Test pocket (mbgl)	16.50-17.00	Depth, m	17.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	500	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	500
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	603

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	52.5	ν (deg)	29.1

Initial shear modulus (Average arm)

G_i (MPa)	7

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	84	0.156			0.709	4.6	
2	118	0.208			0.815	28.0	

Remarks

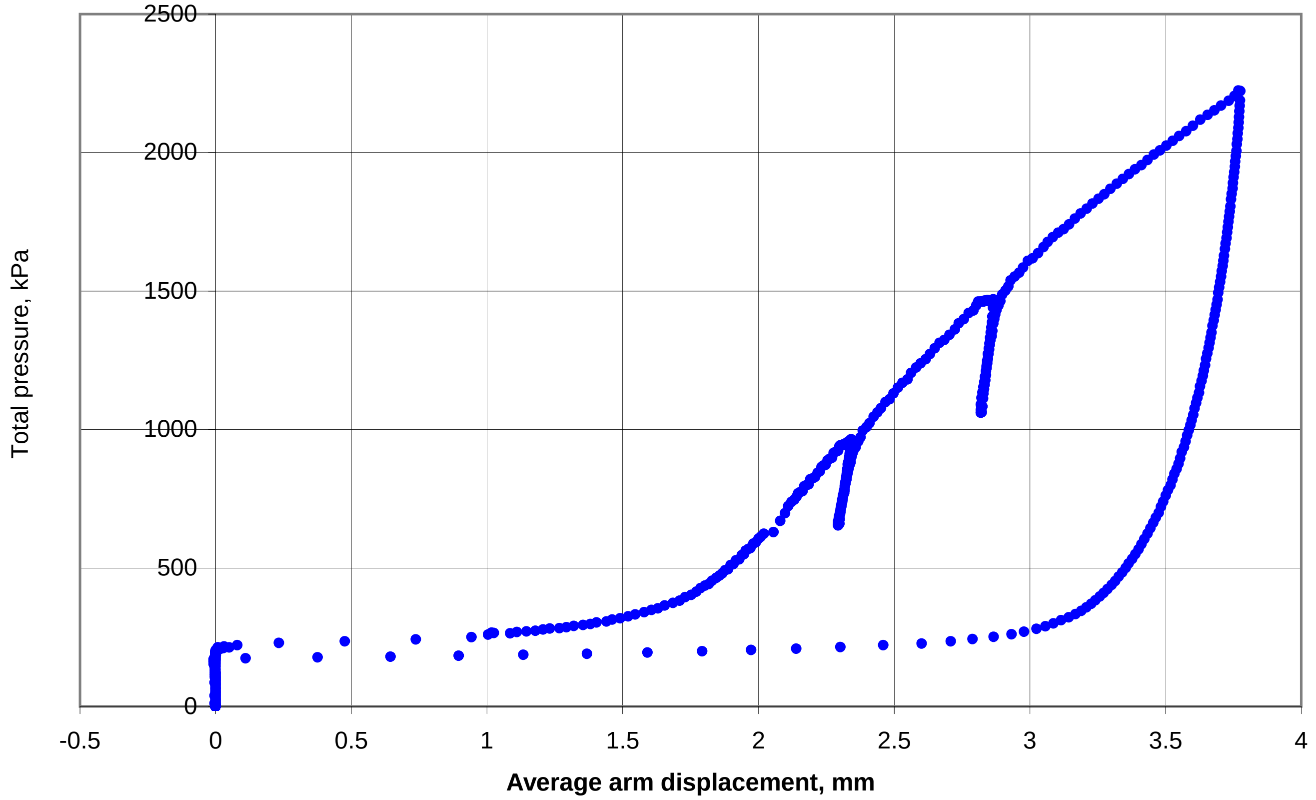
Max test pressure = 1631 kPa. Max av displ = 3.64 mm. Max arm displ = 3.97 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T4**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Jul-10	Test reference	B3T5	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	5
Material	Sand - CD	Test pocket (mbgl)	18.50-19.50	Depth, m	19.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	580	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	583
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	878

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	50.3	ν (deg)	26.0

Initial shear modulus (Average arm)

G_i (MPa)	25

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	132	0.173			0.861	43.3	
2	177	0.205			0.854	57.9	

Remarks

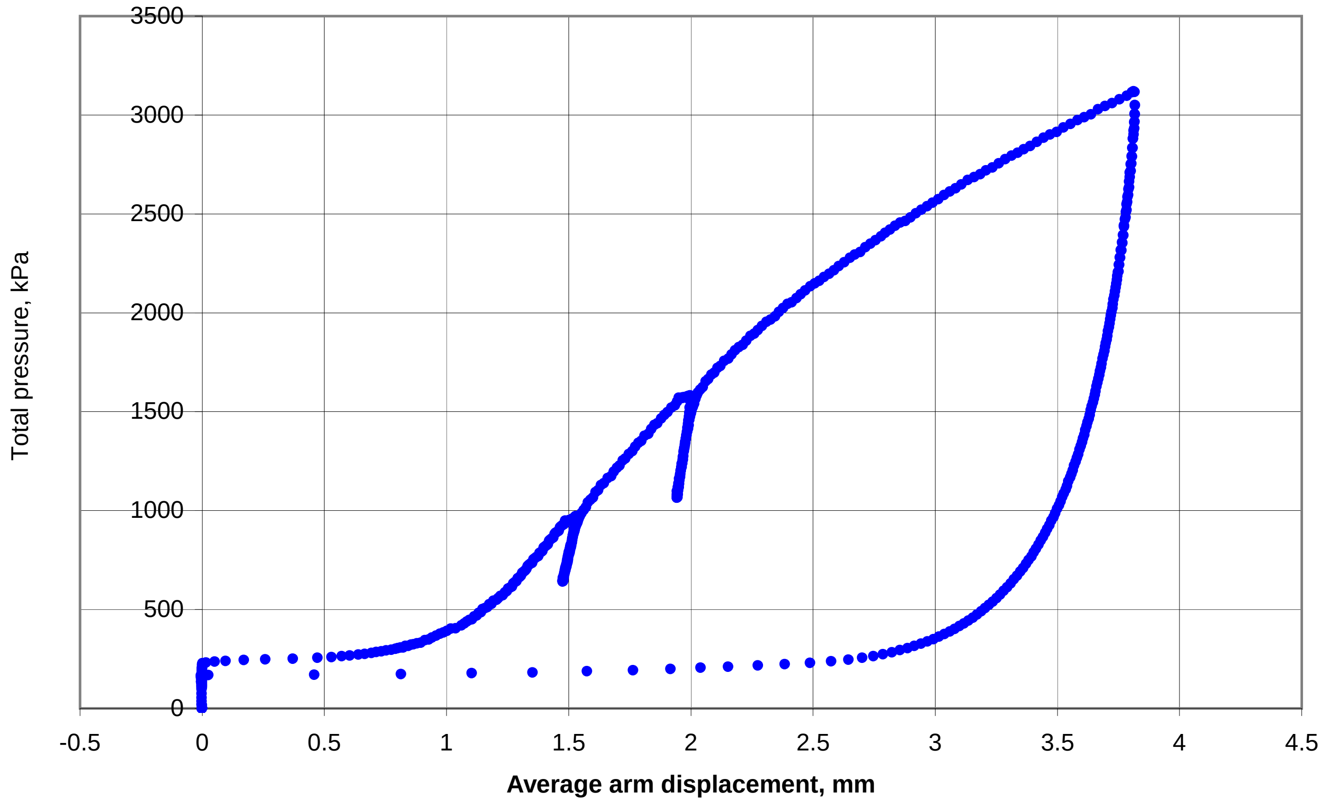
Max test pressure = 2224 kPa. Max av displ = 3.78 mm. Max arm displ = 4.09 mm (Arm2). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T5**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Jul-10	Test reference	B3T6	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	6
Material	Sand - CD	Test pocket (mbgl)	20.50-21.50	Depth, m	21.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	600	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	598
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1006

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	46.0	ν (deg)	20.1

Initial shear modulus (Average arm)

G_i (MPa)	33

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	129	0.220			0.813	28.5	
2	185	0.254			0.853	61.9	

Remarks

Max test pressure = 3120 kPa. Max av displ = 3.82 mm. Max arm displ = 4.35 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

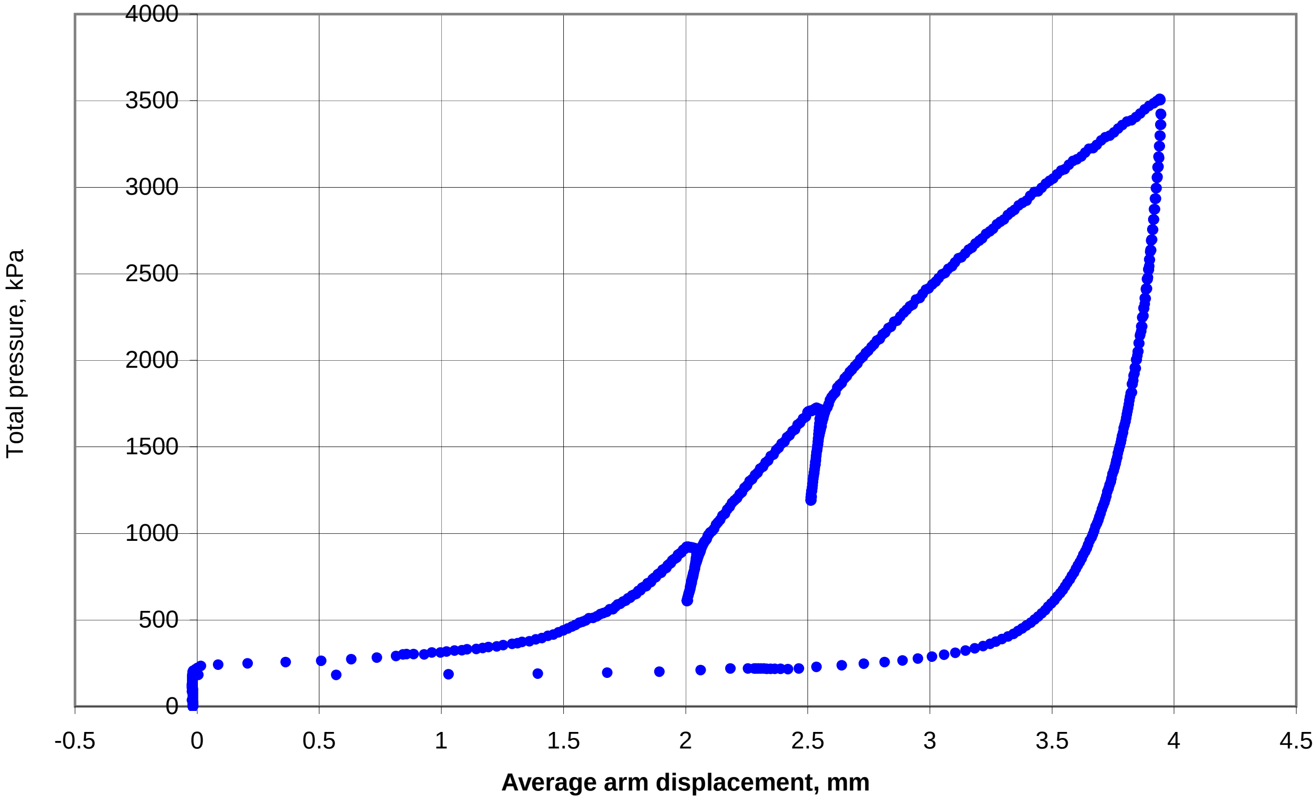
Figure

SBP2009_3 T6

Self Boring Pressuremeter Test

Soil Mechanics

Date	21-Jul-10	Test reference	B3T7	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	7
Material	Sand - CD	Test pocket (mbgl)	22.50-23.50	Depth, m	23.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	630	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	631
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1605

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	54.7	ν (deg)	32.3

Initial shear modulus (Average arm)

G_i (MPa)	36

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	141	0.161			0.873	51.2	
2	269	0.155			0.858	86.8	

Remarks

Max test pressure = 3509 kPa. Max av displ = 3.95 mm. Max arm displ = 4.03 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

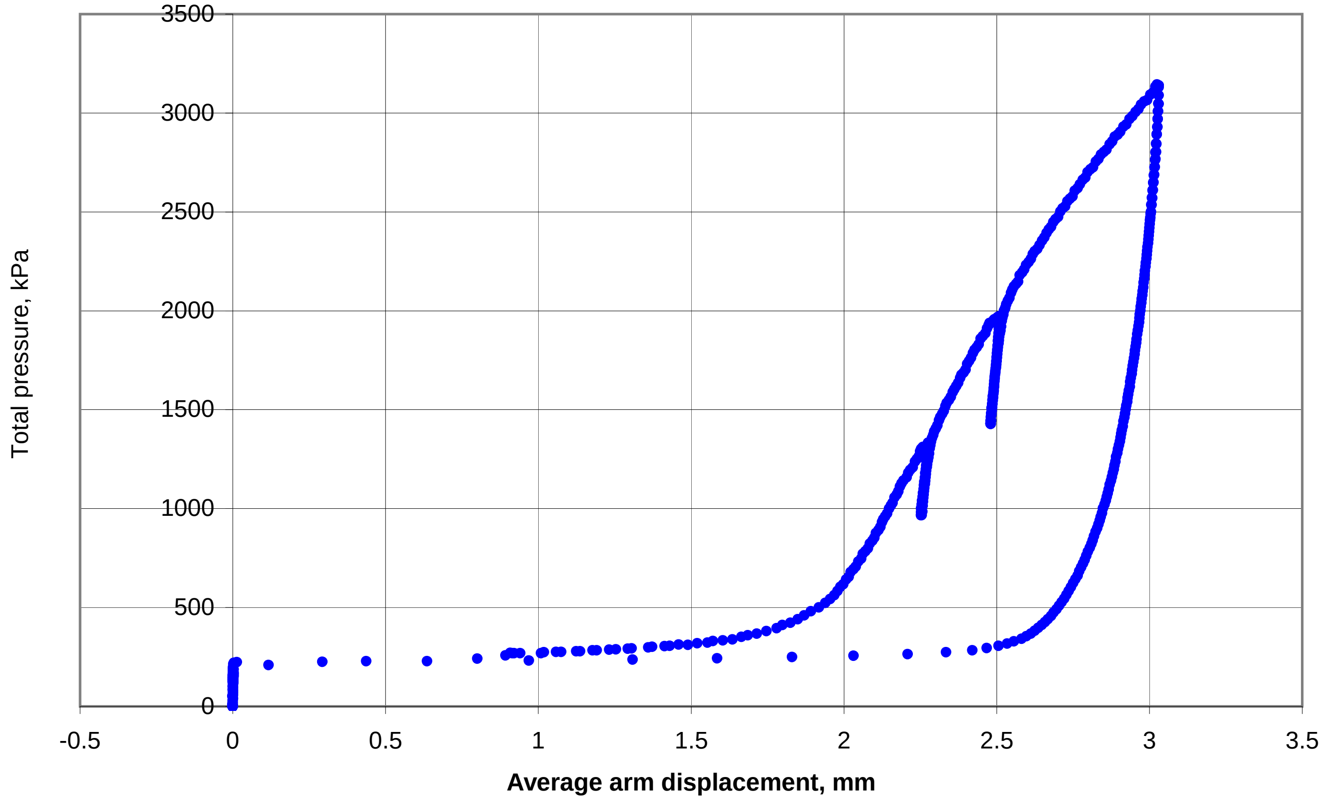
Figure

SBP2009_3 T7

Self Boring Pressuremeter Test

Soil Mechanics

Date	21-Jul-10	Test reference	B3T8	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	8
Material	Sand - CD	Test pocket (mbgl)	24.50-25.50	Depth, m	25.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	675	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	676
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1397

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	52.6	ν (deg)	29.3

Initial shear modulus (Average arm)

G_i (MPa)	68

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	331	0.093			0.891	130.2	
2	383	0.117			0.881	143.6	

Remarks

Max test pressure = 3144 kPa. Max av displ = 3.03 mm. Max arm displ = 4.5 mm (Arm2). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T8**
	Carried out for	NNB Generation Company Limited	

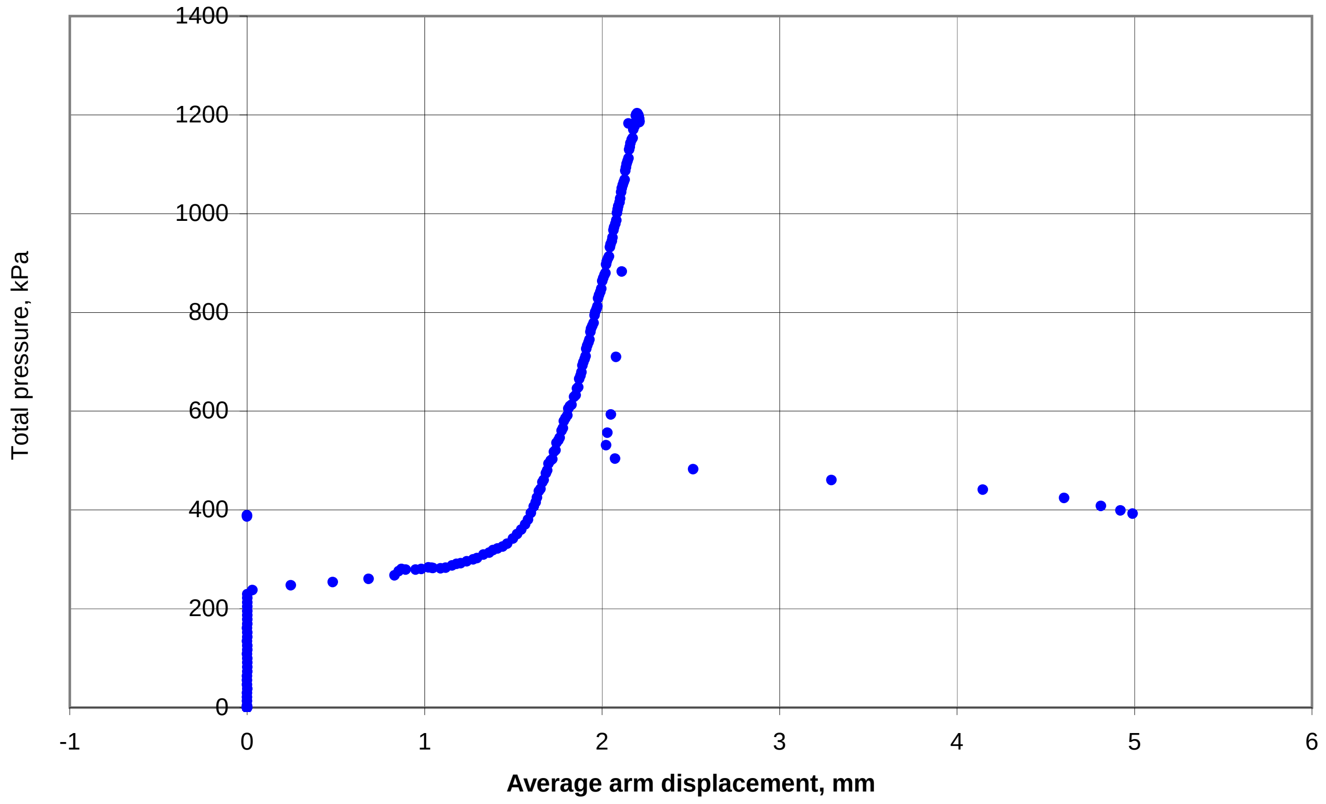
Self Boring Pressuremeter Test

Soil Mechanics

Date	22-Jul-10
Probe	SBP-3 Dylan
Material	Sand - Crag Dep

Test reference	B3T9
GWL (mbgl)	
Test pocket (mbgl)	26.50-27.50

BH	SBP2009_3
Test	9
Depth, m	27.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	39

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 1203 kPa. Max av displ = 4.99 mm. Max arm displ = 5.93 mm (Arm2). No of loops = 0 . Analysis type: Average arm. Membrane burst during intial loading. Gi analysis only.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T9**
	Carried out for	NNB Generation Company Limited	

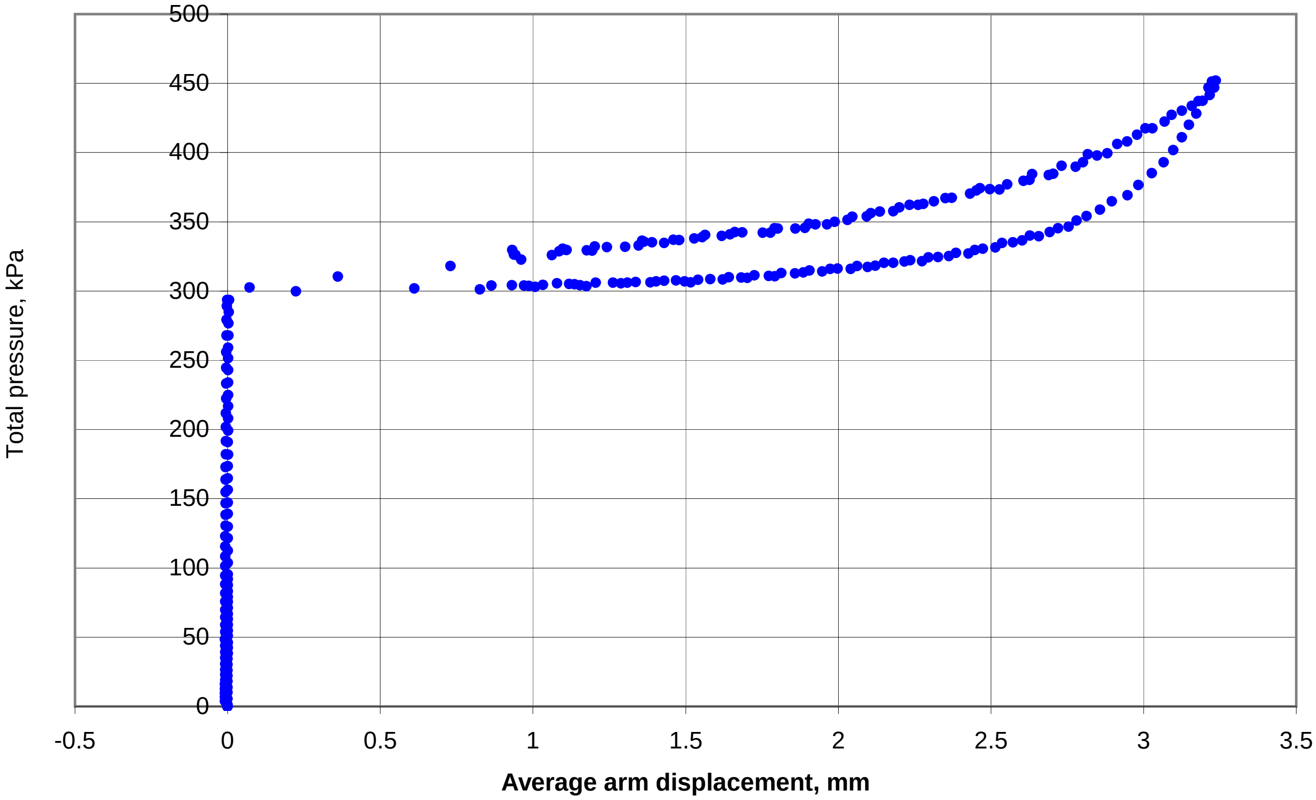
Self Boring Pressuremeter Test

Soil Mechanics

Date	27-Jul-10
Probe	SBP-3 Dylan
Material	Sand - Crag Dep

Test reference	B3T10
GWL (mbgl)	
Test pocket (mbgl)	29.50-30.50

BH	SBP2009_3
Test	10
Depth, m	30.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 452 kPa. Max av displ = 3.24 mm. Max arm displ = 5.04 mm (Arm3). No of loops = 0 . Analysis type: Average arm. Disturbed test pocket. No suitable data for analysis.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T10

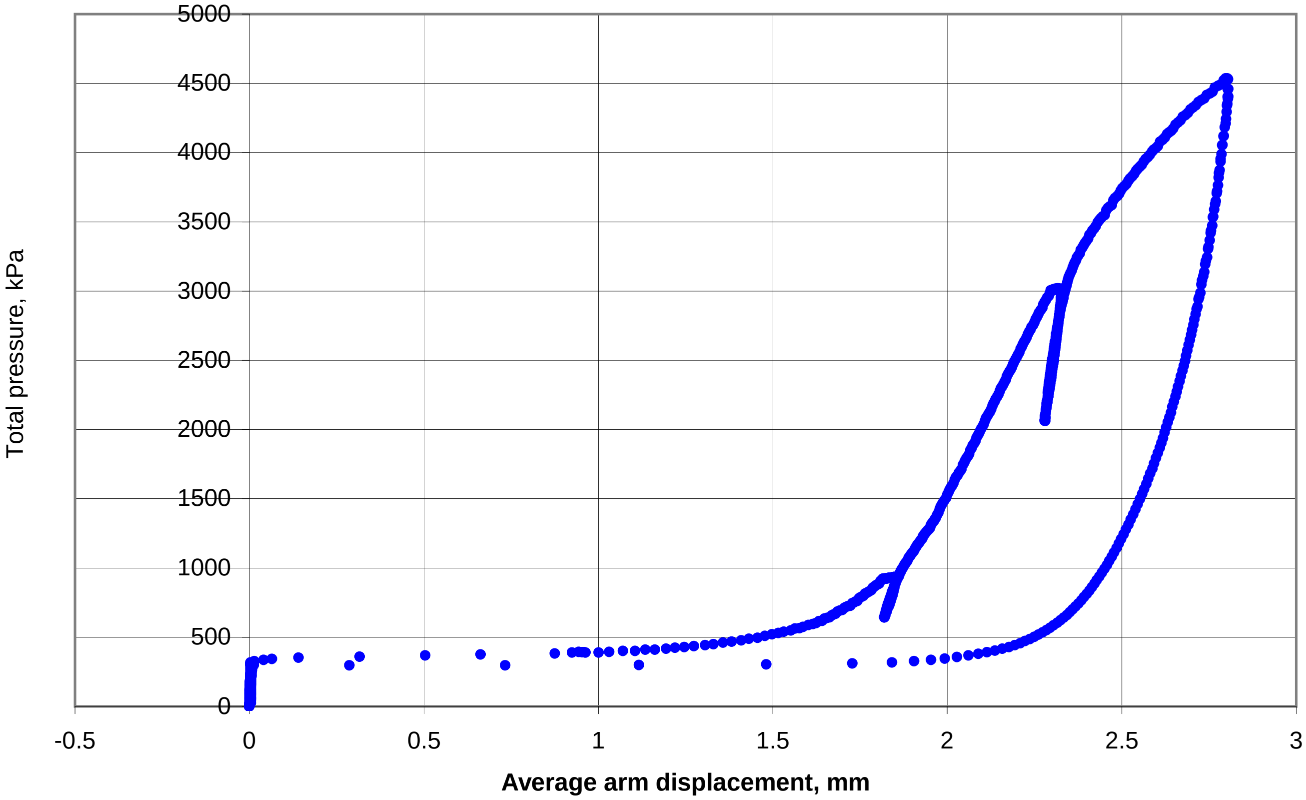
Self Boring Pressuremeter Test

Soil Mechanics

Date	29-Jul-10
Probe	SBP-3 Dylan
Material	Sand - CD

Test reference	B3T11
GWL (mbgl)	
Test pocket (mbgl)	31.50-32.50

BH	SBP2009_3
Test	11
Depth, m	32.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1606	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1606
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2419

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	37.8	ν (deg)	9.4

Initial shear modulus (Average arm)

G_i (MPa)	118

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	187	0.146			0.800	36.1	
2	430	0.195			0.820	105.6	

Remarks

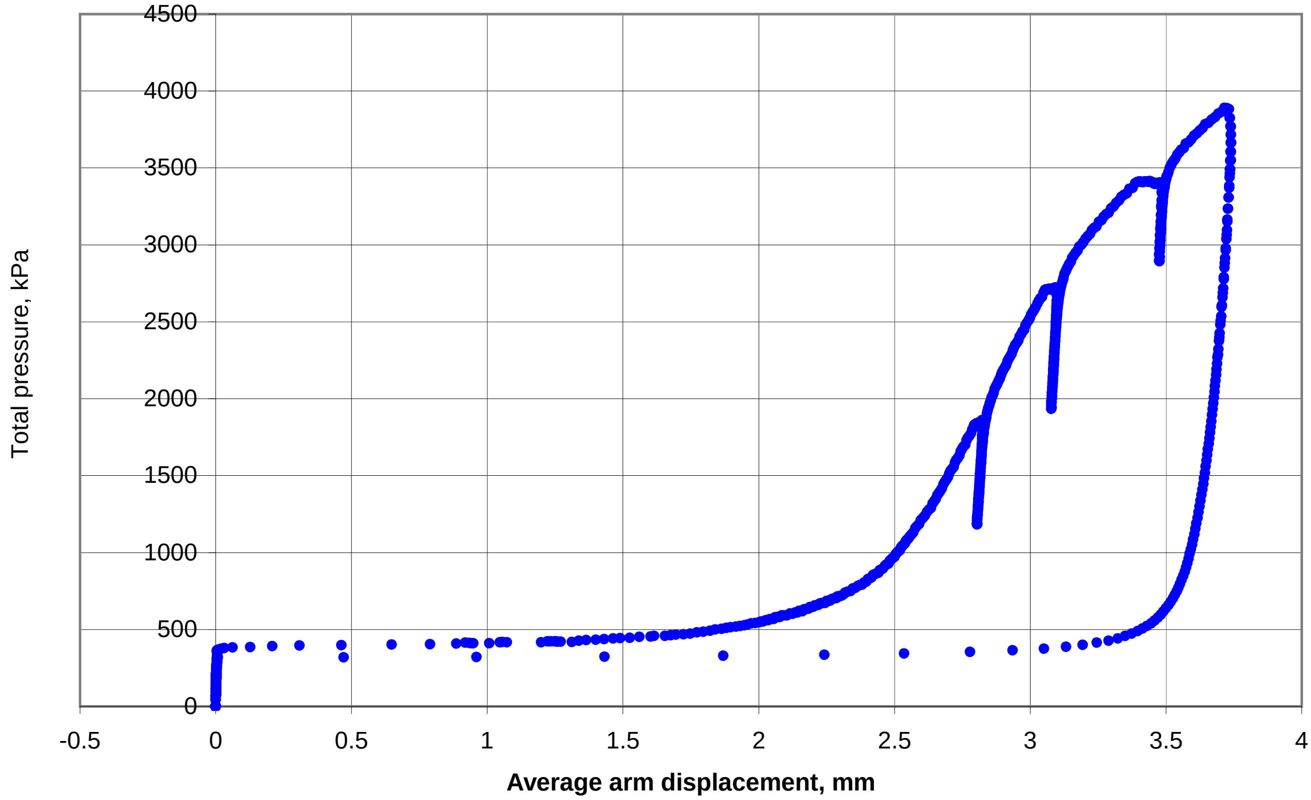
Max test pressure = 4536 kPa. Max av displ = 2.81 mm. Max arm displ = 4.11 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T11**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	30-Jul-10	Test reference	B3T12	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	12
Material	Sand - CD	Test pocket (mbgl)	33.50-34.50	Depth, m	34.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1400	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1392
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2287

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	37.7	ν (deg)	9.2

Initial shear modulus (Average arm)

G_i (MPa)	81

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	676	0.077			0.781	97.8	
2	748	0.078			0.829	166.6	
3	946	0.032			0.800	131.5	

Remarks

Max test pressure = 3889 kPa. Max av displ = 3.74 mm. Max arm displ = 4.22 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

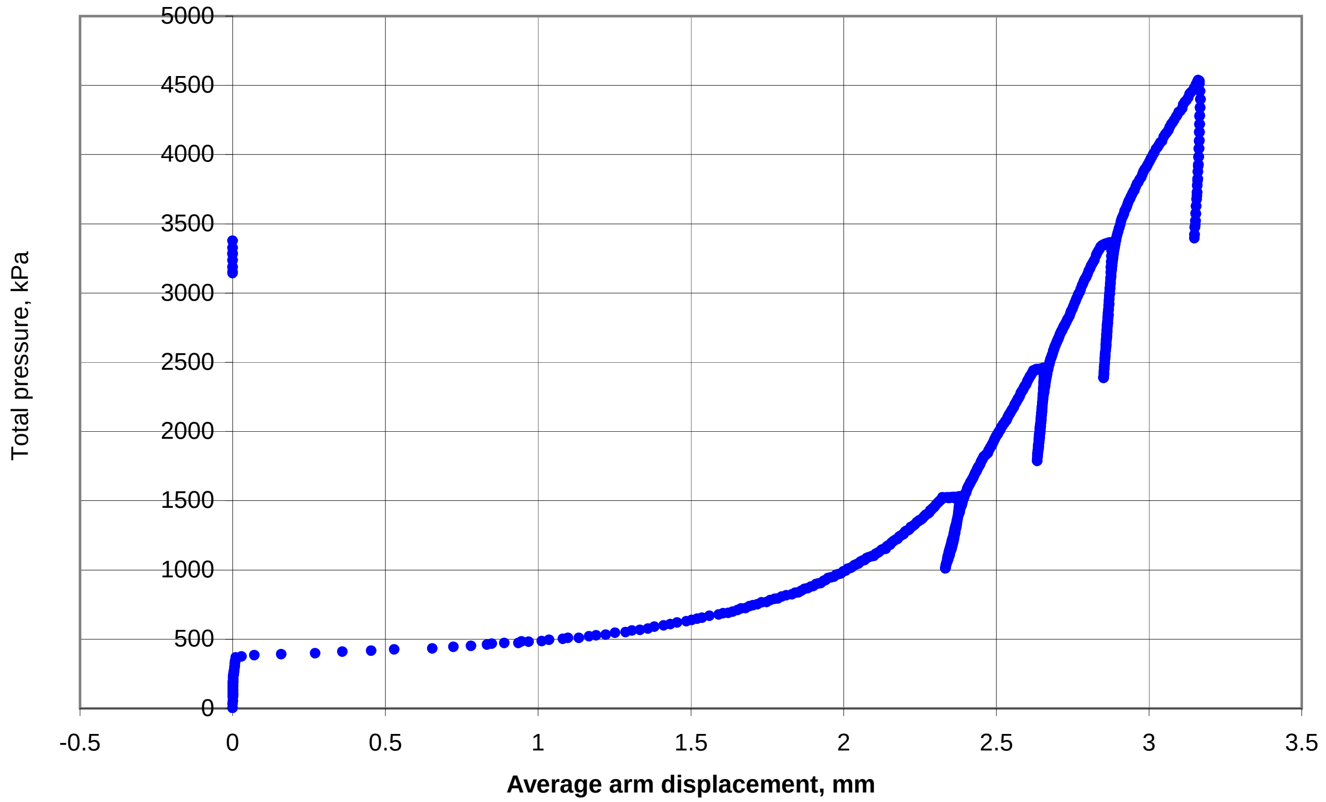
Carried out for NNB Generation Company Limited

Figure **SBP2009_3 T12**

Self Boring Pressuremeter Test

Soil Mechanics

Date	02-Aug-10		Test reference	B3T13		BH	SBP2009_3
Probe	SBP-3 Dylan		GWL (mbgl)			Test	13
Material	Sand - CD		Test pocket (mbgl)	36.50-37.50		Depth, m	36.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1500	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1394
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2862

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	54.1	ν (deg)	31.3

Initial shear modulus (Average arm)

G_i (MPa)	93

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	216	0.189			0.912	102.8	
2	569	0.081			0.838	137.5	
3	749	0.102			0.968	596.5	

Remarks

Max test pressure = 3366 kPa. Max av displ = 2.88 mm. Max arm displ = 4 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

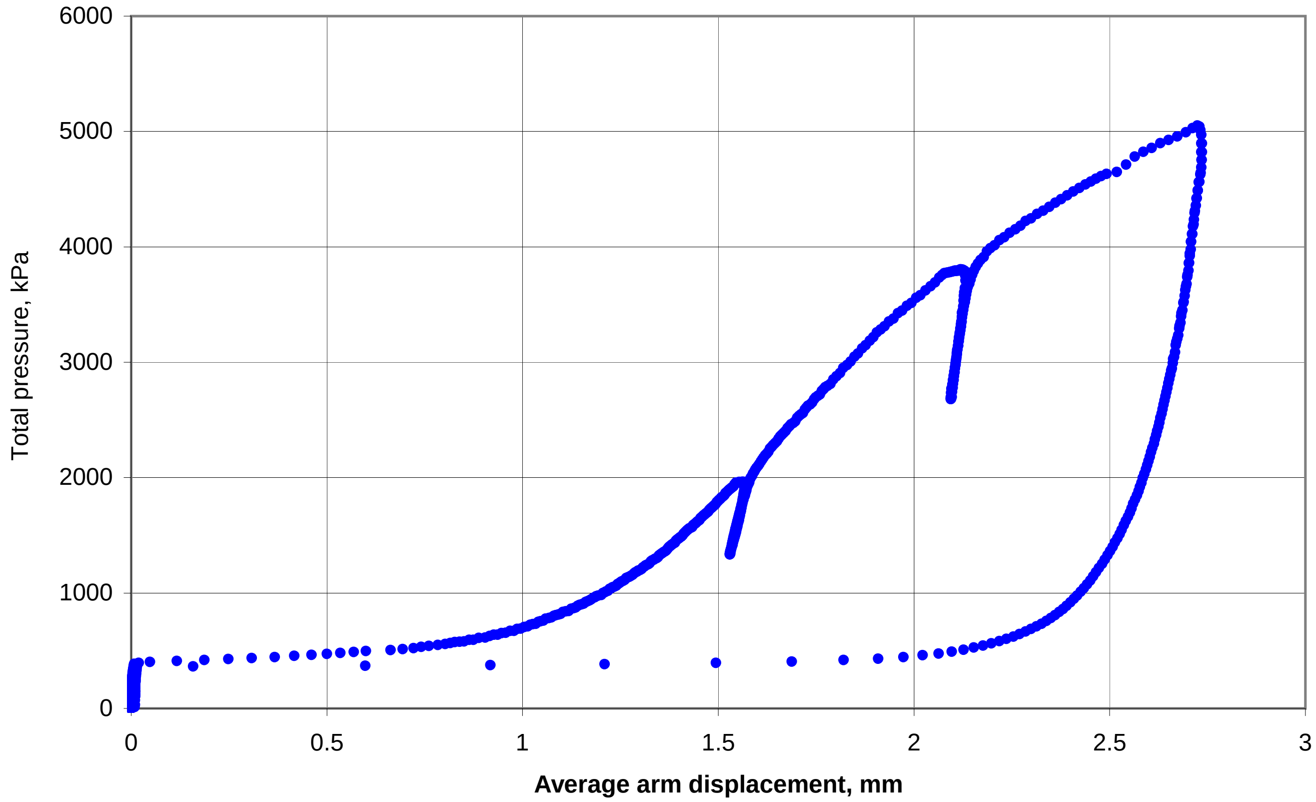
Figure

SBP2009_3 T13

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Aug-10	Test reference	B3T14	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	14
Material	Sand - CD	Test pocket (mbgl)	37.50-38.50	Depth, m	38.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	2244	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	2245
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2499

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	34.0	ν (deg)	4.8

Initial shear modulus (Average arm)

G_i (MPa)	85

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	325	0.152			0.863	103.1	
2	576	0.160			0.877	214.9	

Remarks

Max test pressure = 5051 kPa. Max av displ = 2.74 mm. Max arm displ = 4.02 mm (Arm2). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

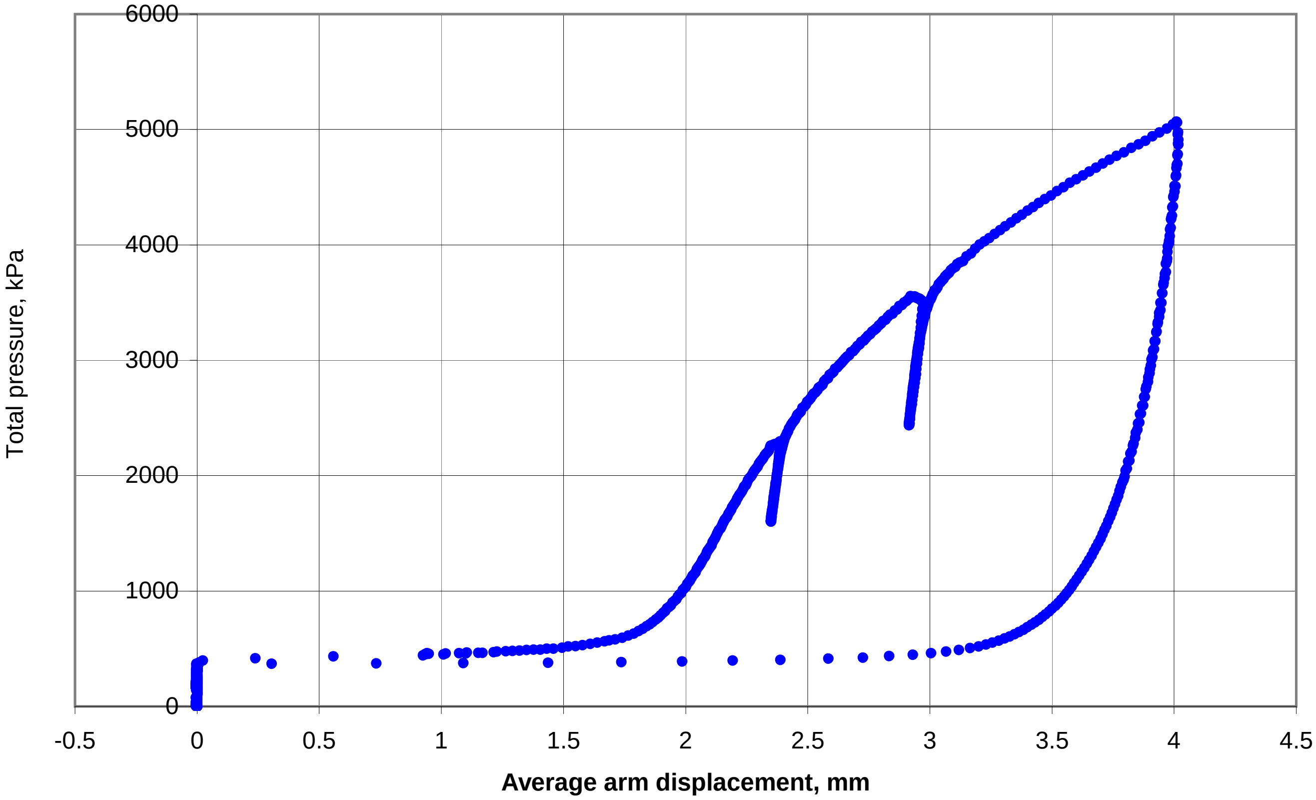
Figure

SBP2009_3 T14

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Aug-10	Test reference	B3T15	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	15
Material	Sand - CD	Test pocket (mbgl)	39.50-40.50	Depth, m	40.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1085	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1088
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1487

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.2	ν (deg)	17.7

Initial shear modulus (Average arm)

G_i (MPa)	86

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	379	0.158			0.859	124.9	
2	404	0.216			0.873	158.8	

Remarks

Max test pressure = 5068 kPa. Max av displ = 4.02 mm. Max arm displ = 4.91 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T15

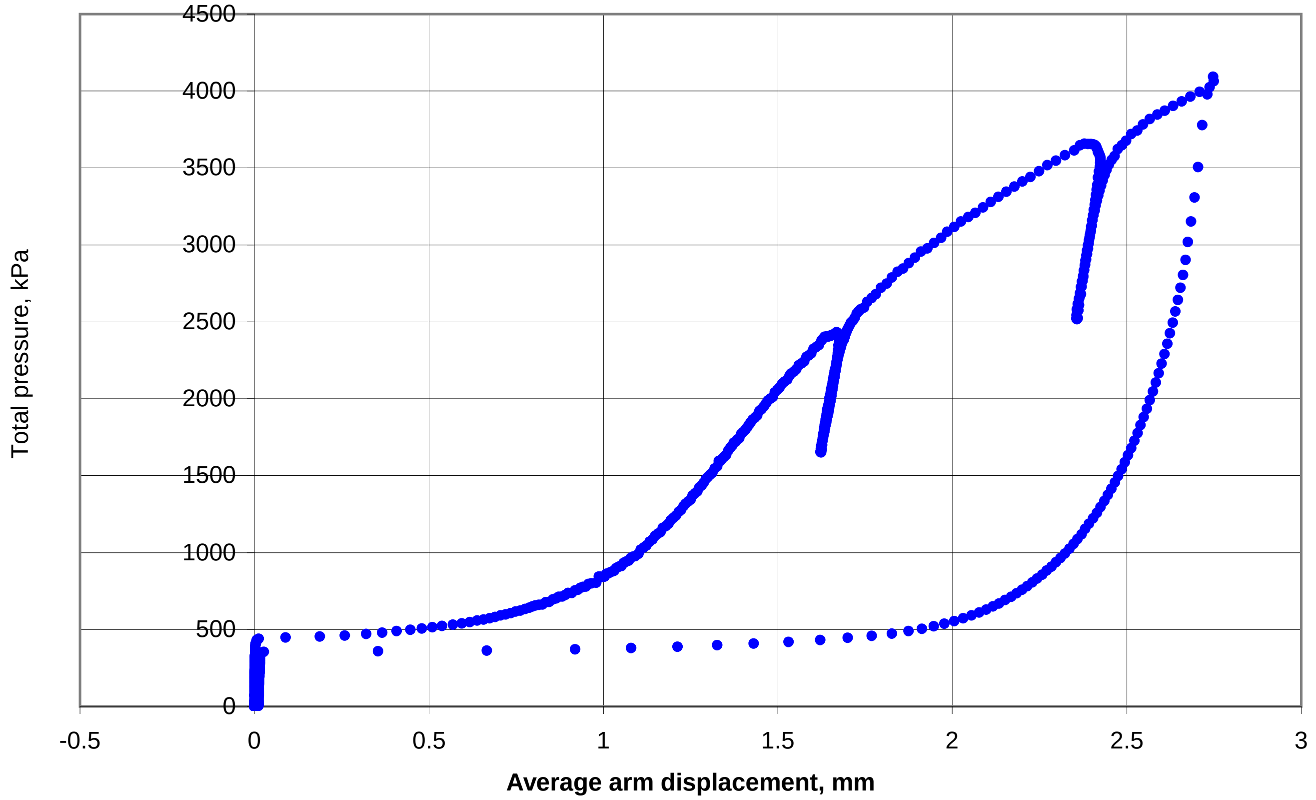
Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Aug-10
Probe	SBP-3 Dylan
Material	Sand - CD

Test reference	B3T16
GWL (mbgl)	
Test pocket (mbgl)	41.50-42.50

BH	SBP2009_3
Test	16
Depth, m	42.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1195	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1198
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2020

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.1	ν (deg)	16.1

Initial shear modulus (Average arm)

G_i (MPa)	63

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	295	0.233			0.845	90.9	
2	323	0.287			0.850	107.3	

Remarks

Max test pressure = 4093 kPa. Max av displ = 2.75 mm. Max arm displ = 3.38 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T16

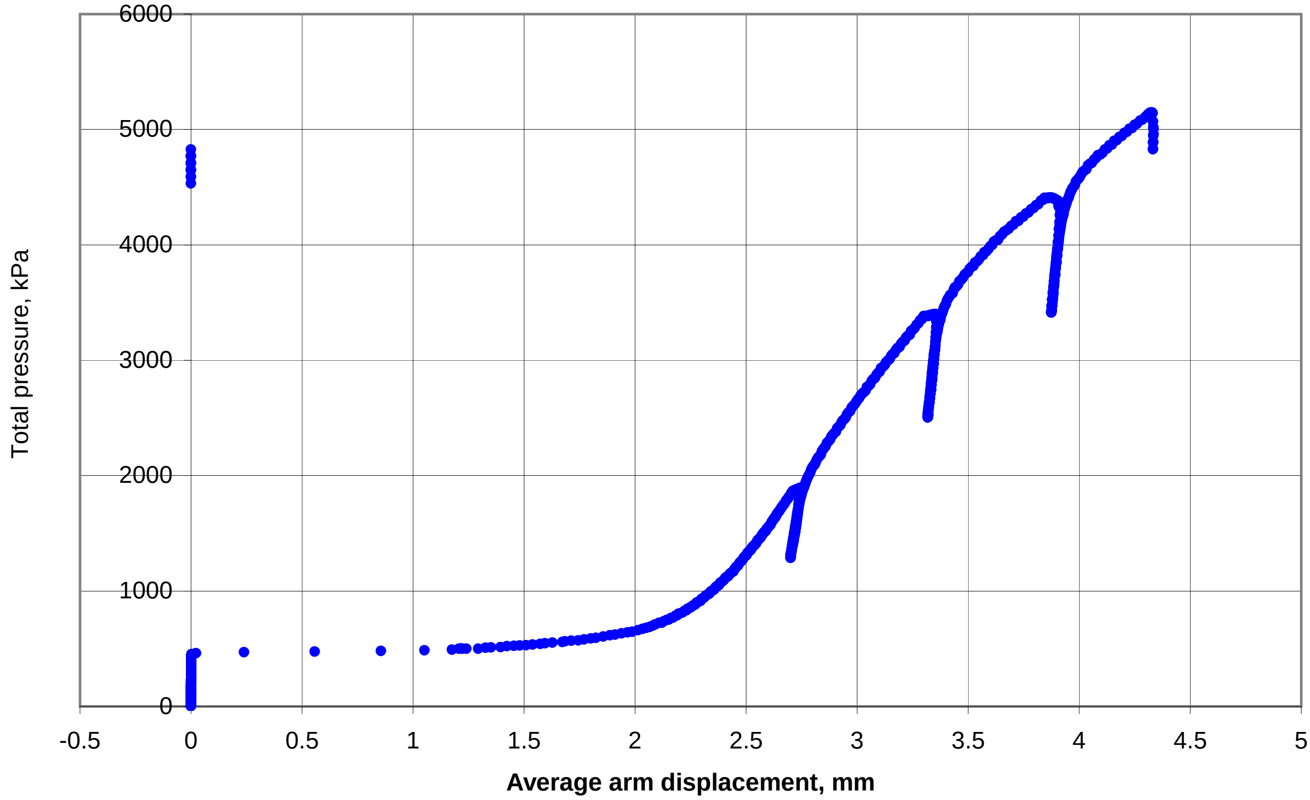
Self Boring Pressuremeter Test

Soil Mechanics

Date	05-Aug-10
Probe	SBP-3 Dylan
Material	Sand - CD

Test reference	B3T17
GWL (mbgl)	
Test pocket (mbgl)	43.50-44.50

BH	SBP2009_3
Test	17
Depth, m	44.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1240	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1241
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2141

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	47.6	ν (deg)	22.2

Initial shear modulus (Average arm)

G_i (MPa)	64

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	288	0.165			0.922	151.4	
2	450	0.159			0.858	140.0	
3	466	0.162			0.854	144.4	

Remarks

Max test pressure = 4410 kPa. Max av displ = 3.9 mm. Max arm displ = 4.25 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T17**
Carried out for	NNB Generation Company Limited	

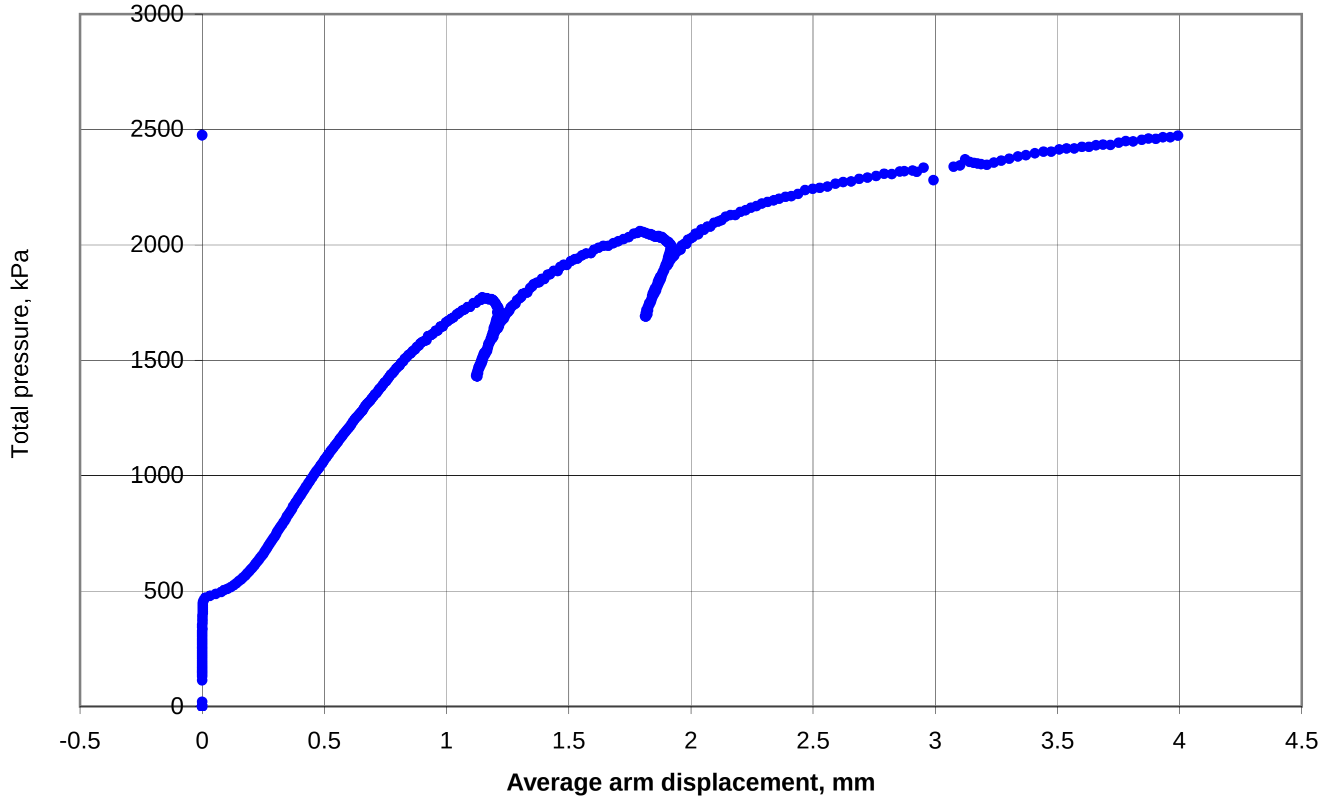
Self Boring Pressuremeter Test

Soil Mechanics

Date	06-Aug-10
Probe	SBP-3 Dylan
Material	Clay - LC

Test reference	B3T18
GWL (mbgl)	
Test pocket (mbgl)	45.50-46.50

BH	SBP2009_3
Test	18
Depth, m	46.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	646	$P_{o\ LO}$ (kPa)	475	$P_{o\ MR}$ (kPa)	646
$P_{o\ curve\ modelling}$ (kPa)	NA			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	511	$c_{u\ unloading}$ (kPa)	NA	p_L (kPa)	3457
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	37

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	62	0.335	0.765	12.2			
2	59	0.431	0.728	10.0			

Remarks

Max test pressure = 2476 kPa. Max av displ = 3.99 mm. Max arm displ = 5.19 mm (Arm1). No of loops = 2 . Analysis type: Average arm. No unloading data collected.

Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T18**
Carried out for	NNB Generation Company Limited	

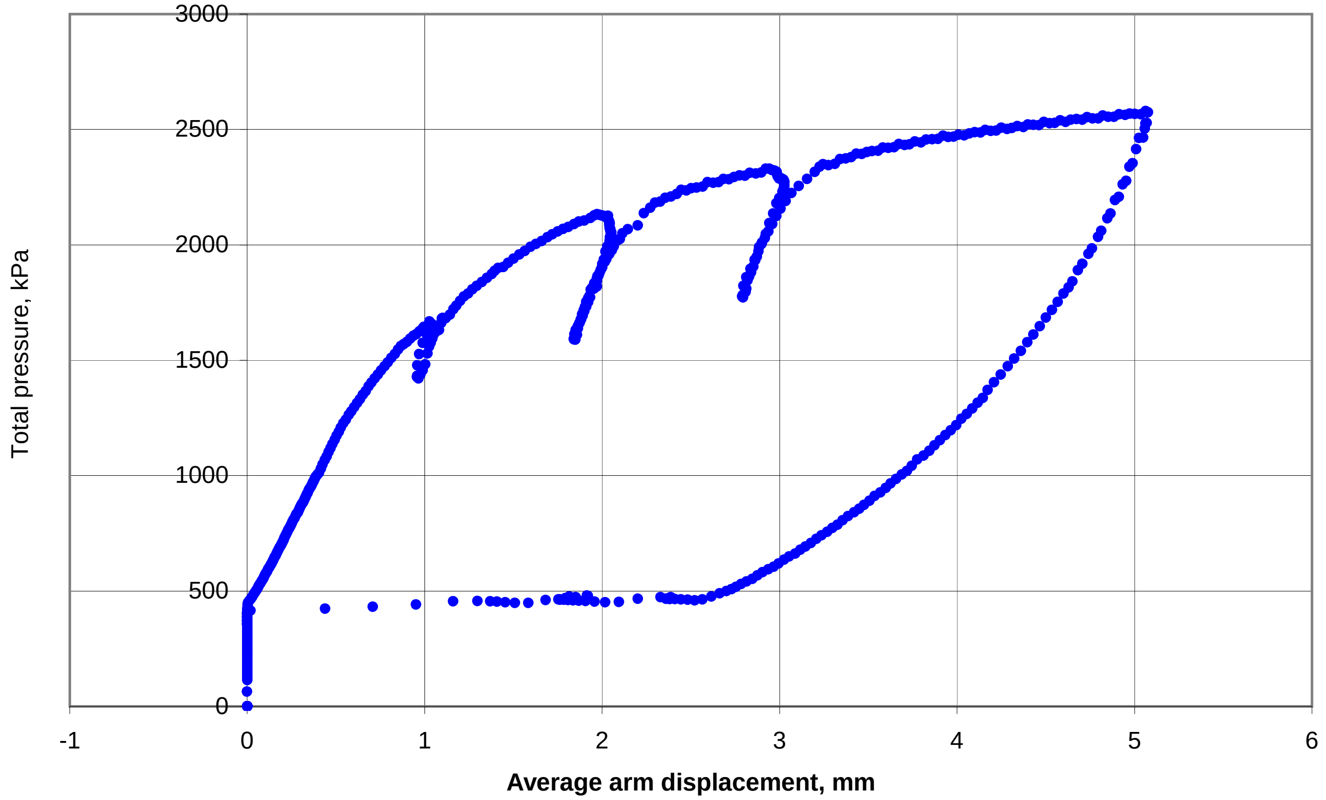
Self Boring Pressuremeter Test

Soil Mechanics

Date	11-Aug-10
Probe	SBP-3 Dylan
Material	Clay - LC

Test reference	B3T19
GWL (mbgl)	
Test pocket (mbgl)	46.50-47.50

BH	SBP2009_3
Test	19
Depth, m	47.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	840	$P_{o\ LO}$ (kPa)	470	$P_{o\ MR}$ (kPa)	841
$P_{o\ curve\ modelling}$ (kPa)	790			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	472	$c_{u\ unloading}$ (kPa)	457	p_L (kPa)	3381
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	36

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	56	0.344	0.780	12.5			
2	47	0.867	0.731	9.7			
3	47	1.000	0.699	8.3			

Remarks

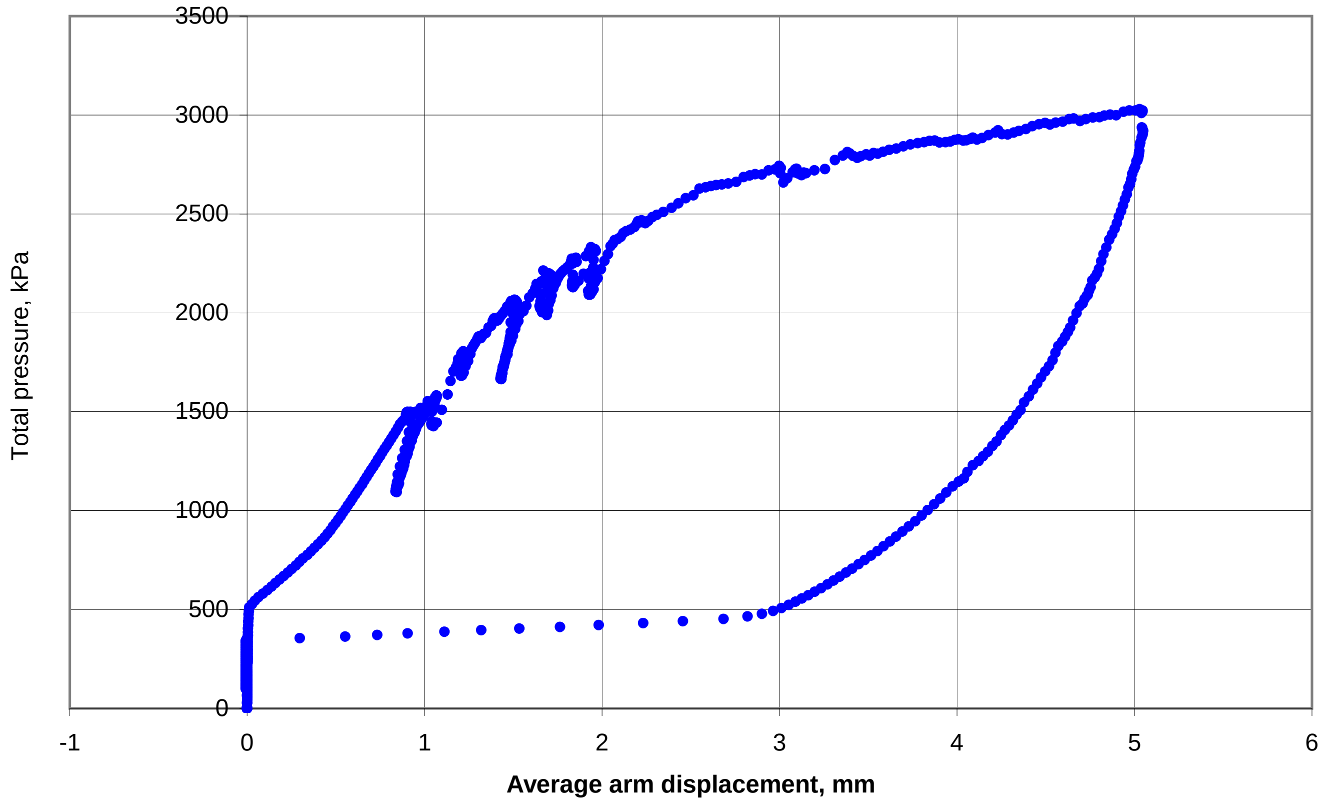
Max test pressure = 2579 kPa. Max av displ = 5.08 mm. Max arm displ = 6.38 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T19**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	09-Aug-10	Test reference	B3T20	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	20
Material	Clay - LC	Test pocket (mbgl)	48.50-49.50	Depth, m	49.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	920	$P_{o\ LO}$ (kPa)	545	$P_{o\ MR}$ (kPa)	919
$P_{o\ curve\ modelling}$ (kPa)	1121			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	554	$c_{u\ unloading}$ (kPa)	452	p_L (kPa)	3990
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	31

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	70	0.430	NA	NA			
2	69	0.434	0.901	35.2			

Remarks

Max test pressure = 3030 kPa. Max av displ = 5.05 mm. Max arm displ = 5.96 mm (Arm2). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T20

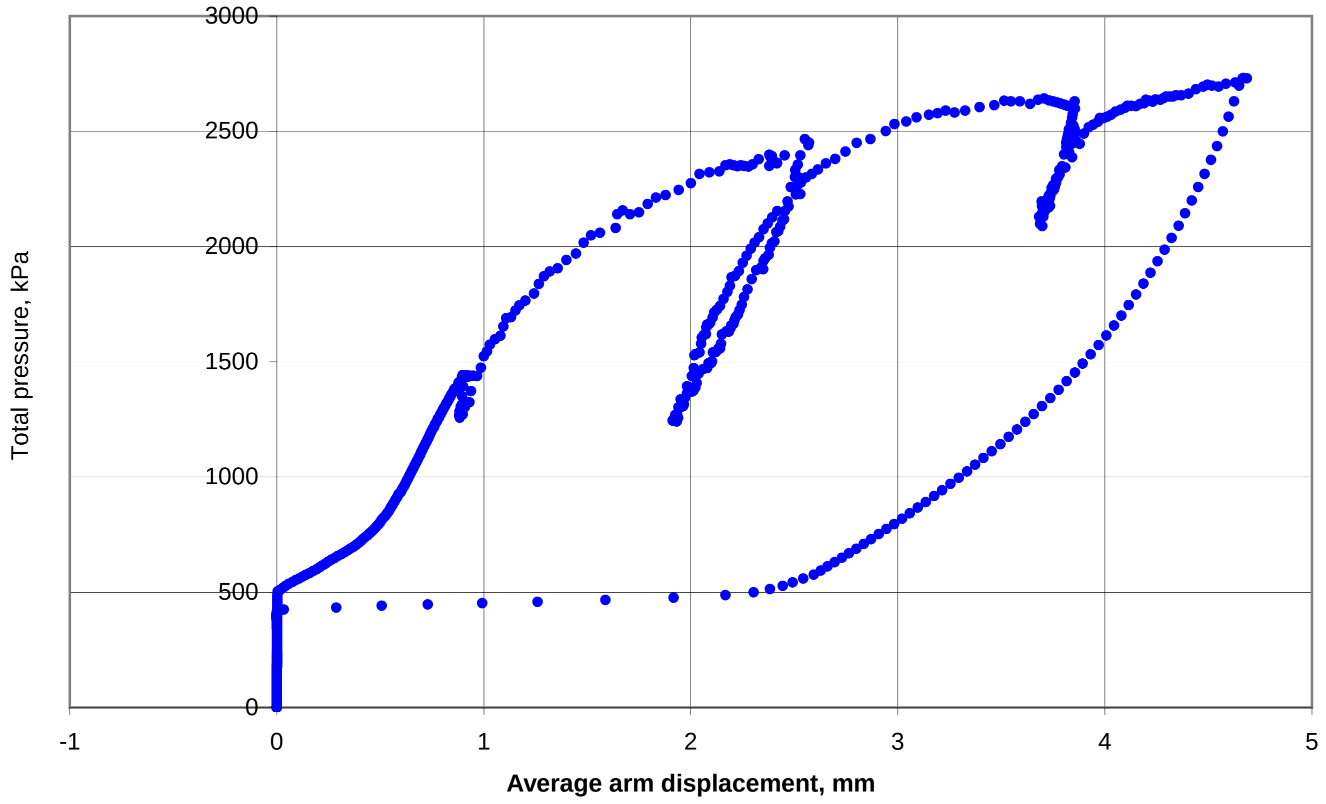
Self Boring Pressuremeter Test

Soil Mechanics

Date	10-Aug-10
Probe	SBP-3 Dylan
Material	Clay - LC

Test reference	B3T21
GWL (mbgl)	
Test pocket (mbgl)	50.50-51.50

BH	SBP2009_3
Test	21
Depth, m	51.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	925	$P_{o\ LO}$ (kPa)	995	$P_{o\ MR}$ (kPa)	924
$P_{o\ curve\ modelling}$ (kPa)	963			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	633	$c_{u\ unloading}$ (kPa)	445	p_L (kPa)	3888
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	40

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	85	0.218	0.852	27.2			
2	40	2.574	0.738	12.5			
3	57	0.723	NA	NA			

Remarks

Max test pressure = 2731 kPa. Max av displ = 4.69 mm. Max arm displ = 5.31 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

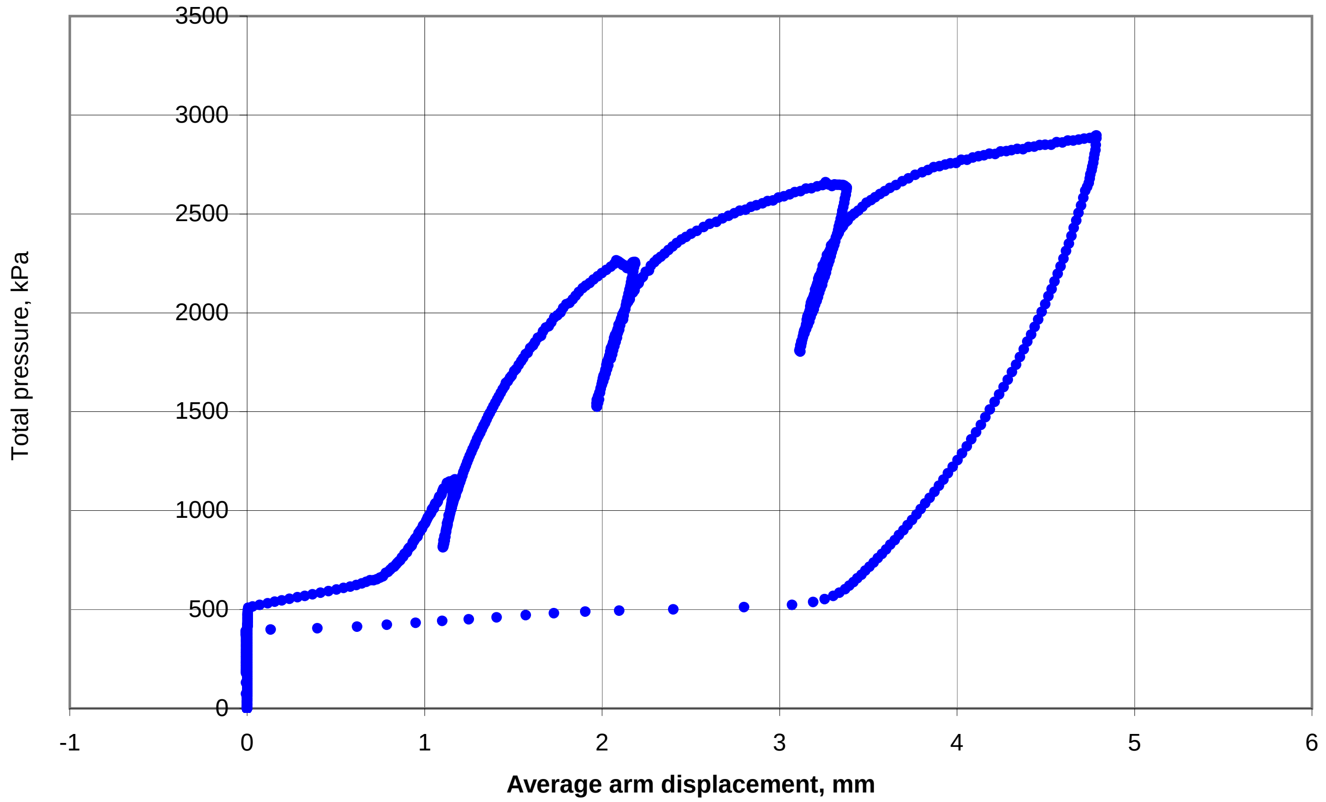
Figure

SBP2009_3 T21

Self Boring Pressuremeter Test

Soil Mechanics

Date	11-Aug-10	Test reference	B3T22	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	22
Material	Clay - LC	Test pocket (mbgl)	51.50-52.50	Depth, m	52.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	870	$P_{o\ LO}$ (kPa)	724	$P_{o\ MR}$ (kPa)	869
$P_{o\ curve\ modelling}$ (kPa)	771			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	565	$c_{u\ unloading}$ (kPa)	525	p_L (kPa)	3975
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	36

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	97	0.247	0.767	18.1			
2	71	0.861	0.726	14.0			
3	65	1.019	0.759	18.3			

Remarks

Max test pressure = 2896 kPa. Max av displ = 4.79 mm. Max arm displ = 5.3 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

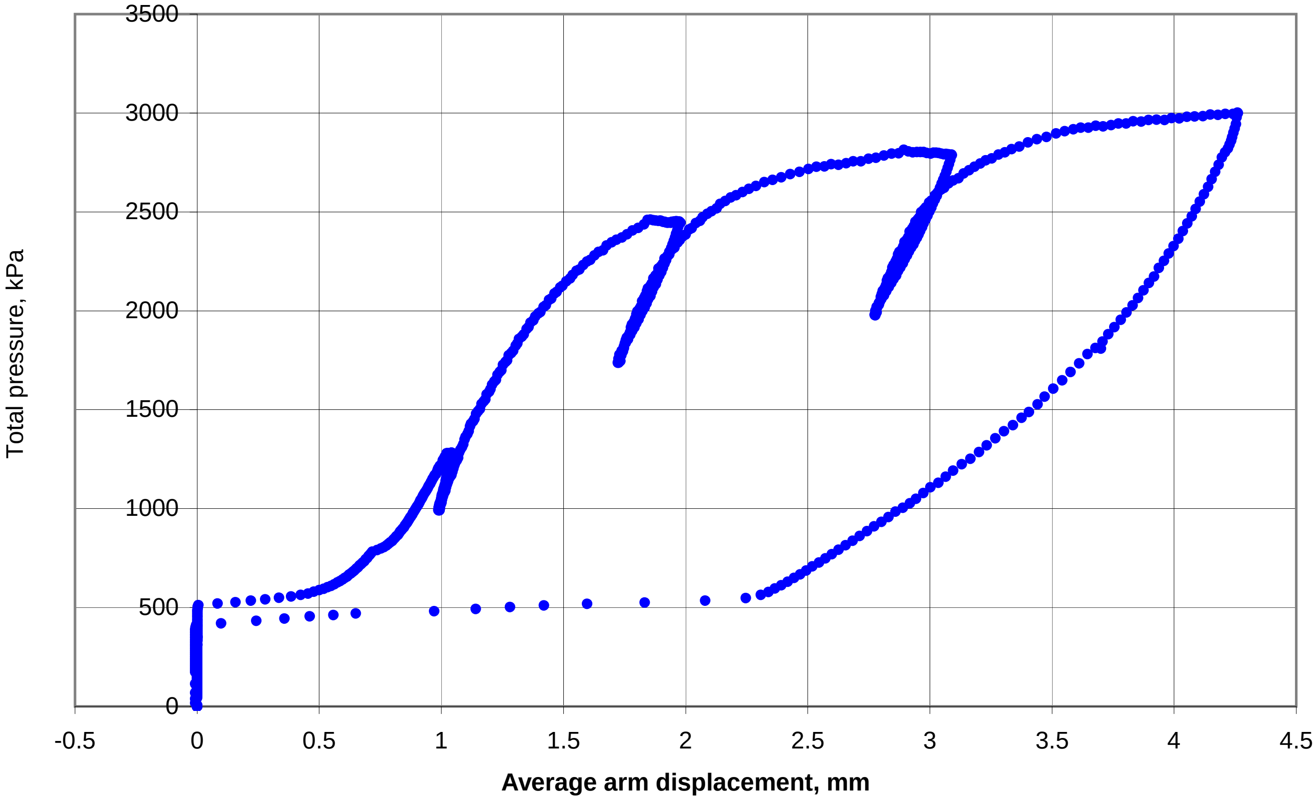
Figure

SBP2009_3 T22

Self Boring Pressuremeter Test

Soil Mechanics

Date	12-Aug-10	Test reference	B3T23	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	23
Material	Clay - LC	Test pocket (mbgl)	53.50-53.50	Depth, m	53.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1275	$P_{o\ LO}$ (kPa)	900	$P_{o\ MR}$ (kPa)	1274
$P_{o\ curve\ modelling}$ (kPa)	1260			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	385	$c_{u\ unloading}$ (kPa)	426	p_L (kPa)	3796
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	49

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	101	0.127	0.804	20.5			
2	61	1.050	0.792	19.9			
3	55	1.233	0.751	15.6			

Remarks

Max test pressure = 3002 kPa. Max av displ = 4.26 mm. Max arm displ = 5.29 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

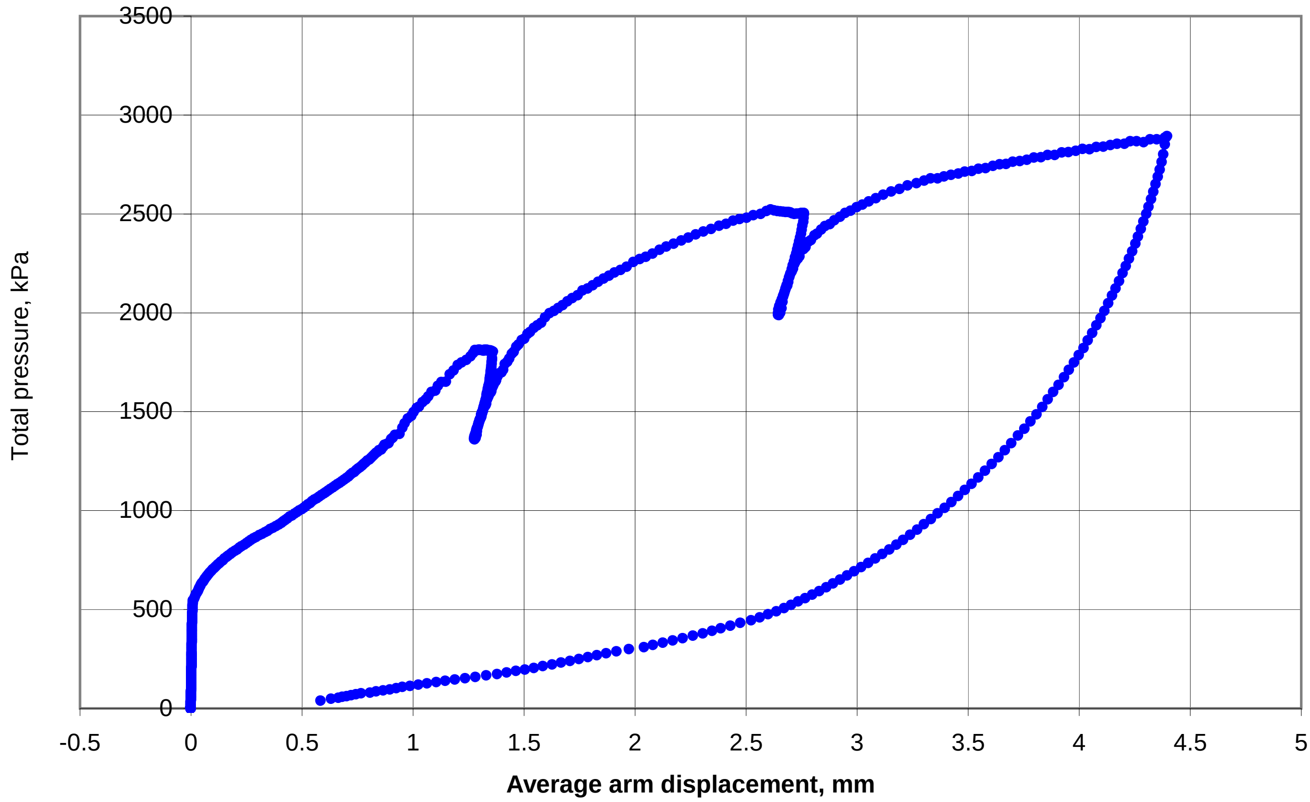
Figure

SBP2009_3 T23

Self Boring Pressuremeter Test

Soil Mechanics

Date	12-Aug-10	Test reference	B3T24	BH	SBP2009_3
Probe	SBP-3 Dylan	GWL (mbgl)		Test	24
Material	Clay - LC	Test pocket (mbgl)	53.50-54.50	Depth, m	54.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1420	$P_{o\ LO}$ (kPa)	1323	$P_{o\ MR}$ (kPa)	1435
$P_{o\ curve\ modelling}$ (kPa)	1036			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	532	$c_{u\ unloading}$ (kPa)	409	p_L (kPa)	3942
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	28

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	83	0.265	0.749	13.9			
2	83	0.411	0.753	16.5			

Remarks

Max test pressure = 2893 kPa. Max av displ = 4.4 mm. Max arm displ = 5.32 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T24

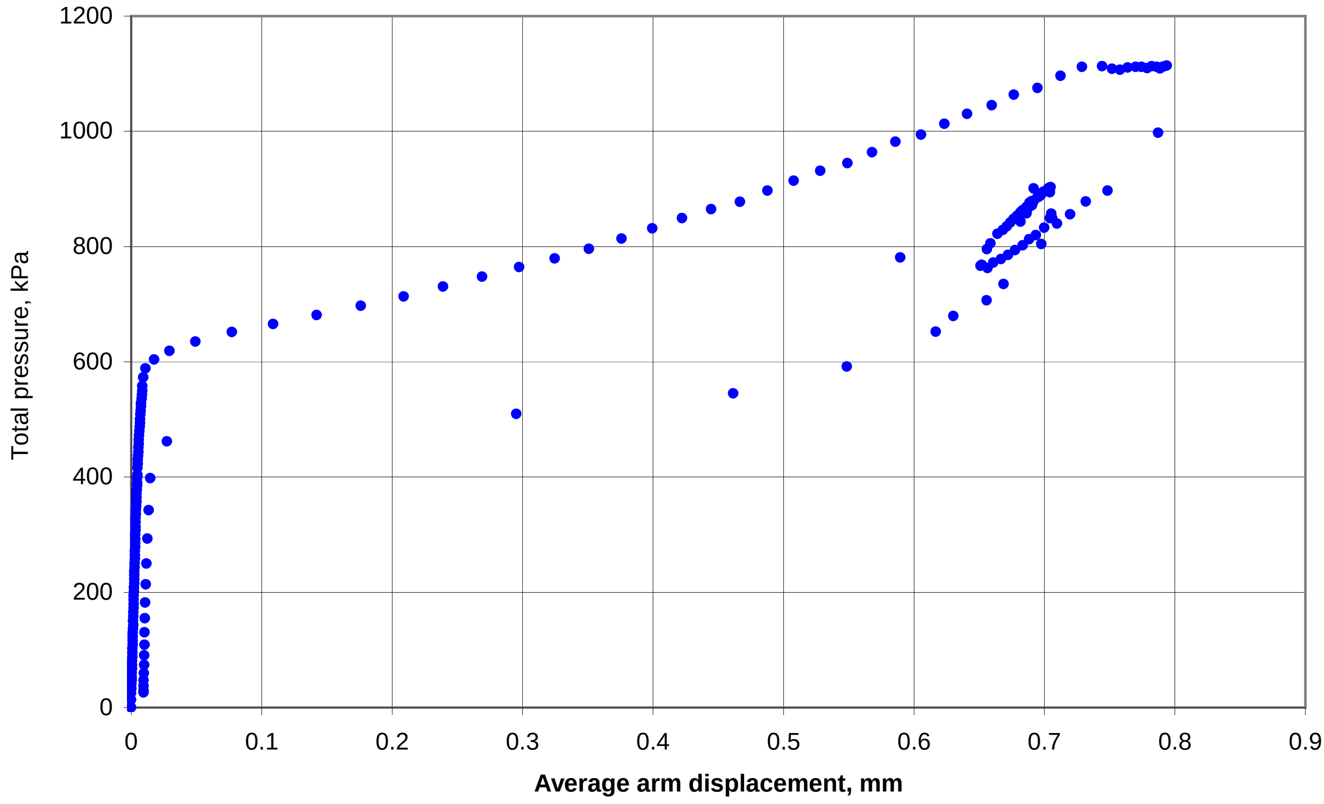
Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Aug-10
Probe	SBP-6 960521
Material	Clay - LC

Test reference	B3T25
GWL (mbgl)	
Test pocket (mbgl)	54.50-55.20

BH	SBP2009_3
Test	25
Depth, m	54.70



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 1114 kPa. Max av displ = 0.79 mm. Max arm displ = 1.31 mm (Arm6). No of loops = 0 . Analysis type: Average arm. Pressure leak during test. No suitable data for analysis

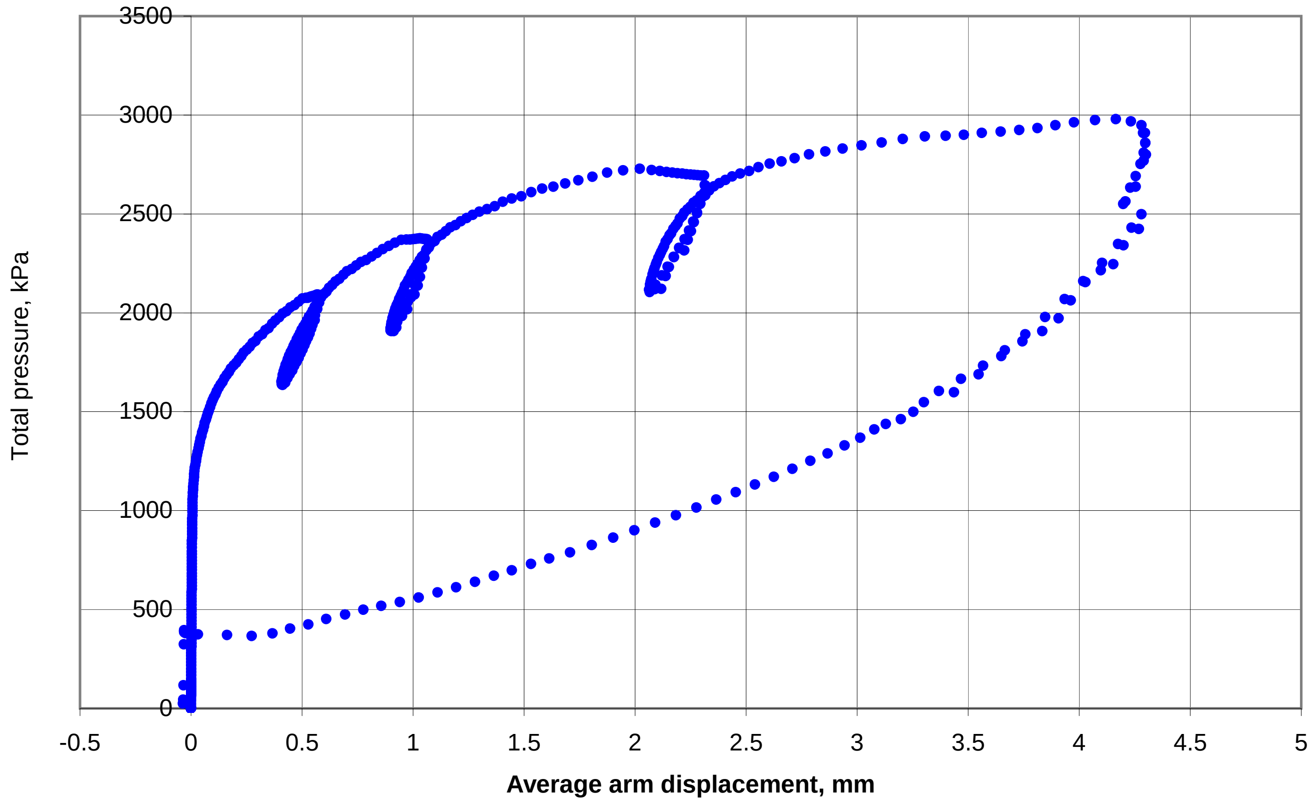
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T25**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	23-Aug-10	Test reference	B3T26	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	26
Material	Clay - LC	Test pocket (mbgl)	55.20-56.20	Depth, m	55.70



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1255	$P_{o\ LO}$ (kPa)	1528	$P_{o\ MR}$ (kPa)	1224
$P_{o\ curve\ modelling}$ (kPa)	1254			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	495	$c_{u\ unloading}$ (kPa)	435	p_L (kPa)	3942
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	107

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	56	0.729	0.619	4.9			
2	57	0.673	0.640	6.2			
3	47	1.003	0.631	5.9			

Remarks

Max test pressure = 2978 kPa. Max av displ = 4.3 mm. Max arm displ = 5.26 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

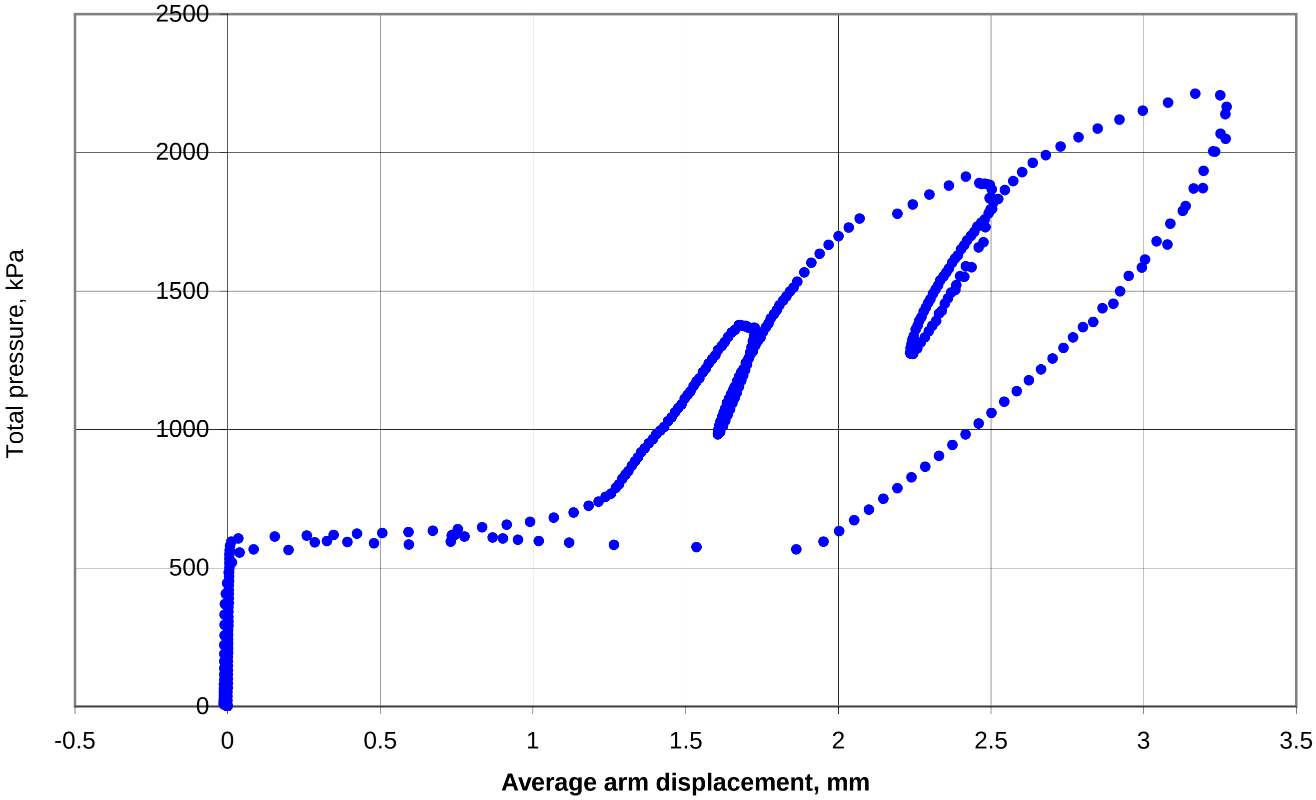
Figure

SBP2009_3 T26

Self Boring Pressuremeter Test

Soil Mechanics

Date	24-Aug-10	Test reference	B3T27	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	27
Material	Clay	Test pocket (mbgl)	57.00-58.00	Depth, m	57.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1215	$P_{o\ LO}$ (kPa)	1052	$P_{o\ MR}$ (kPa)	1215
$P_{o\ curve\ modelling}$ (kPa)	812			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	375	$c_{u\ unloading}$ (kPa)	414	p_L (kPa)	3153
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	36

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	63	0.441	0.673	6.7			
2	46	1.115	0.632	5.3			

Remarks

Max test pressure = 2213 kPa. Max av displ = 3.27 mm. Max arm displ = 4.72 mm (Arm5). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

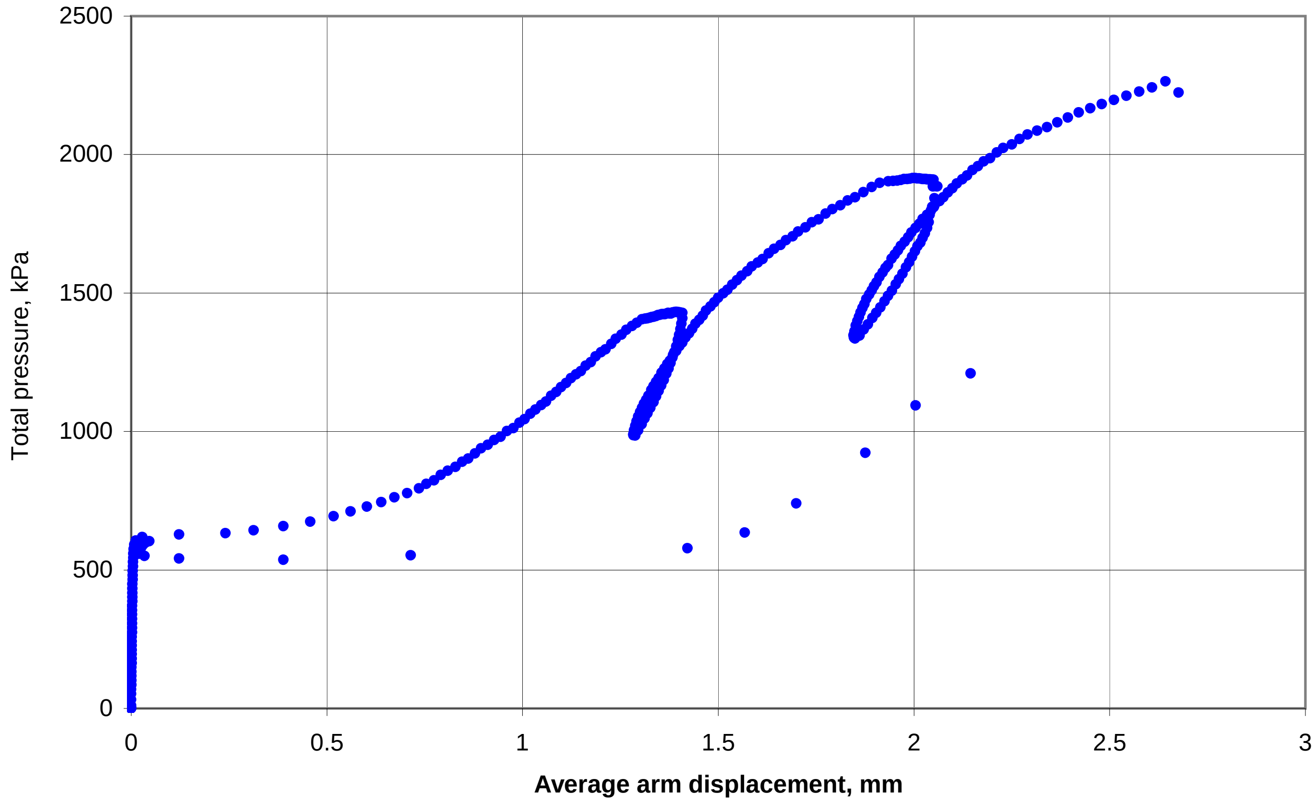
Figure

SBP2009_3 T27

Self Boring Pressuremeter Test

Soil Mechanics

Date	24-Aug-10	Test reference	B3T28	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	28
Material	Clay	Test pocket (mbgl)	58.00-59.00	Depth, m	58.50



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1085	$P_{o\ LO}$ (kPa)	951	$P_{o\ MR}$ (kPa)	1085
$P_{o\ curve\ modelling}$ (kPa)	910			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	720	$c_{u\ unloading}$ (kPa)	381	p_L (kPa)	4147
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	27

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	66	0.454	0.674	7.3			
2	53	0.858	0.655	6.8			

Remarks

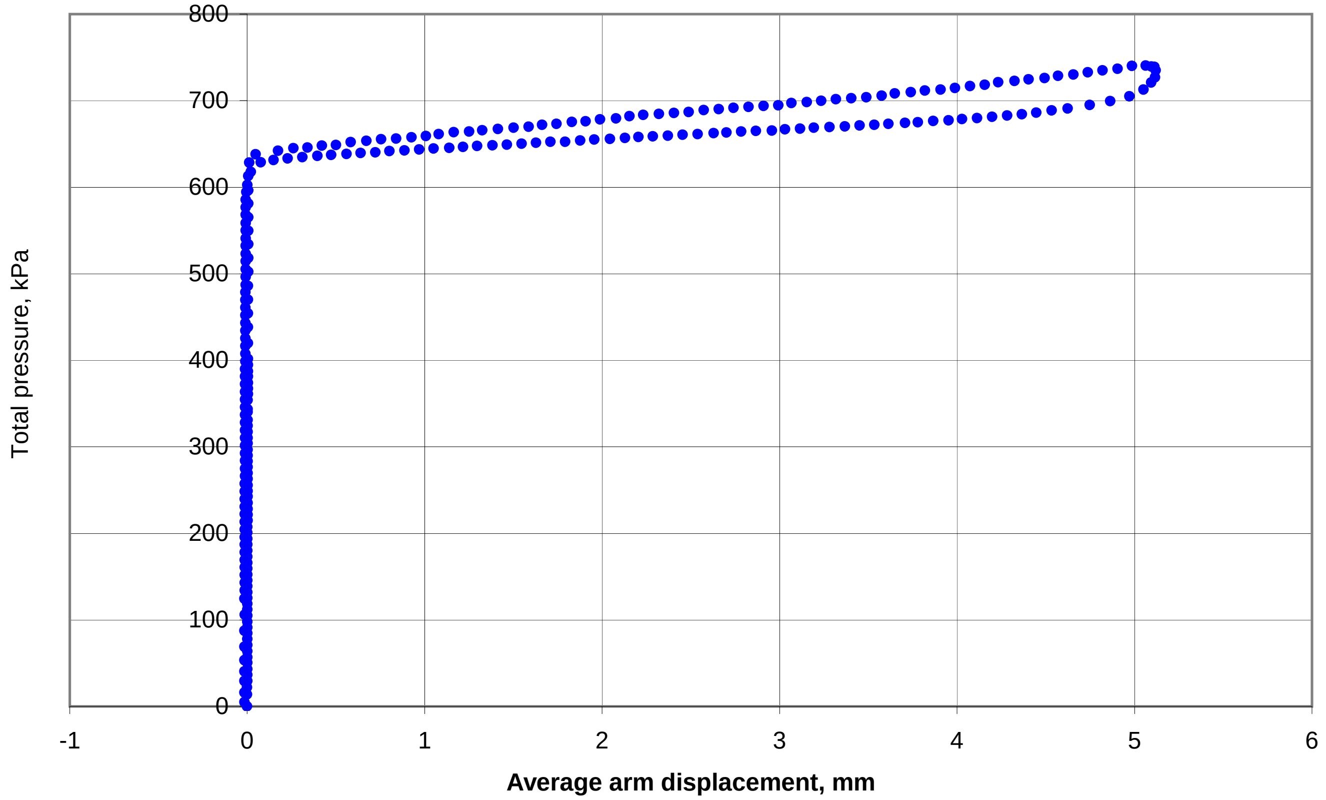
Max test pressure = 2264 kPa. Max av displ = 2.68 mm. Max arm displ = 3.88 mm (Arm2). No of loops = 2 . Analysis type: Average arm.

Notes:	Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	Figure
	Project No.	M0102-10	**SBP2009_3 T28**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	25-Aug-10		Test reference	B3T29		BH	SBP2009_3
Probe	SBP-6 960521		GWL (mbgl)			Test	29
Material	Clay		Test pocket (mbgl)	59.00-60.50		Depth, m	60.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	600	$P_{o\ LO}$ (kPa)	589	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 740 kPa. Max av displ = 5.12 mm. Max arm displ = 6.33 mm (Arm3). No of loops = 0 . Analysis type: Average arm. Disturbed test pocket. No suitable data for analysis.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T29**
	Carried out for	NNB Generation Company Limited	

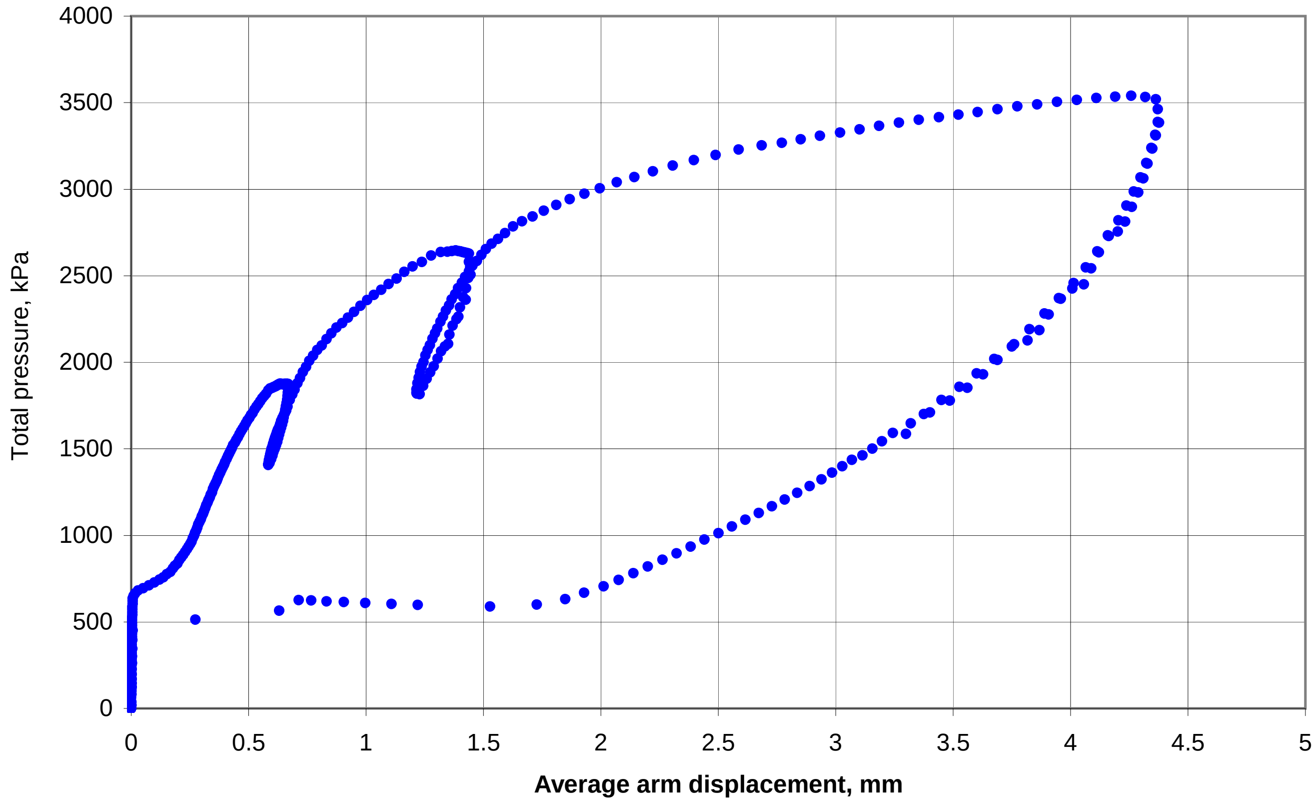
Self Boring Pressuremeter Test

Soil Mechanics

Date	25-Aug-10
Probe	SBP-6 960521
Material	Sandy Clay

Test reference	B3T30
GWL (mbgl)	
Test pocket (mbgl)	60.50-61.80

BH	SBP2009_3
Test	30
Depth, m	61.30



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	970	$P_{o\ LO}$ (kPa)	947	$P_{o\ MR}$ (kPa)	972
$P_{o\ curve\ modelling}$ (kPa)	1104			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	711	$c_{u\ unloading}$ (kPa)	618	p_L (kPa)	4785
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	71

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	95	0.313	0.700	11.7			
2	70	1.014	0.641	8.6			

Remarks

Max test pressure = 3539 kPa. Max av displ = 4.38 mm. Max arm displ = 5.2 mm (Arm4). No of loops = 2 . Analysis type: Average arm.

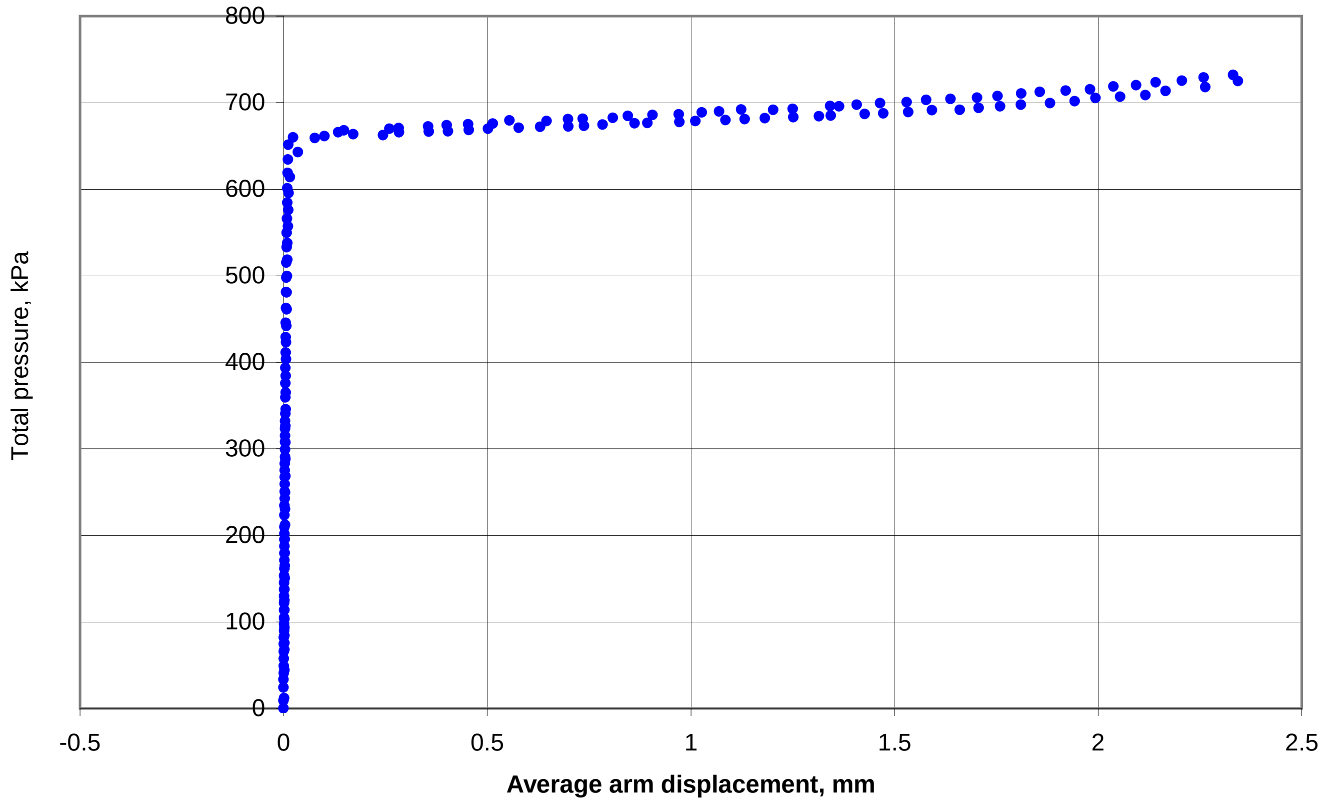
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T30**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Aug-10	Test reference	B3T31	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	31
Material	Sand and Gravel?	Test pocket (mbgl)	63.00-64.20	Depth, m	63.70



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	625	$P_{o\ LO}$ (kPa)	625	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 732 kPa. Max av displ = 2.34 mm. Max arm displ = 5.77 mm (Arm5). No of loops = 0 . Analysis type: Average arm. Disturbed test pocket. No suitable data for analysis.

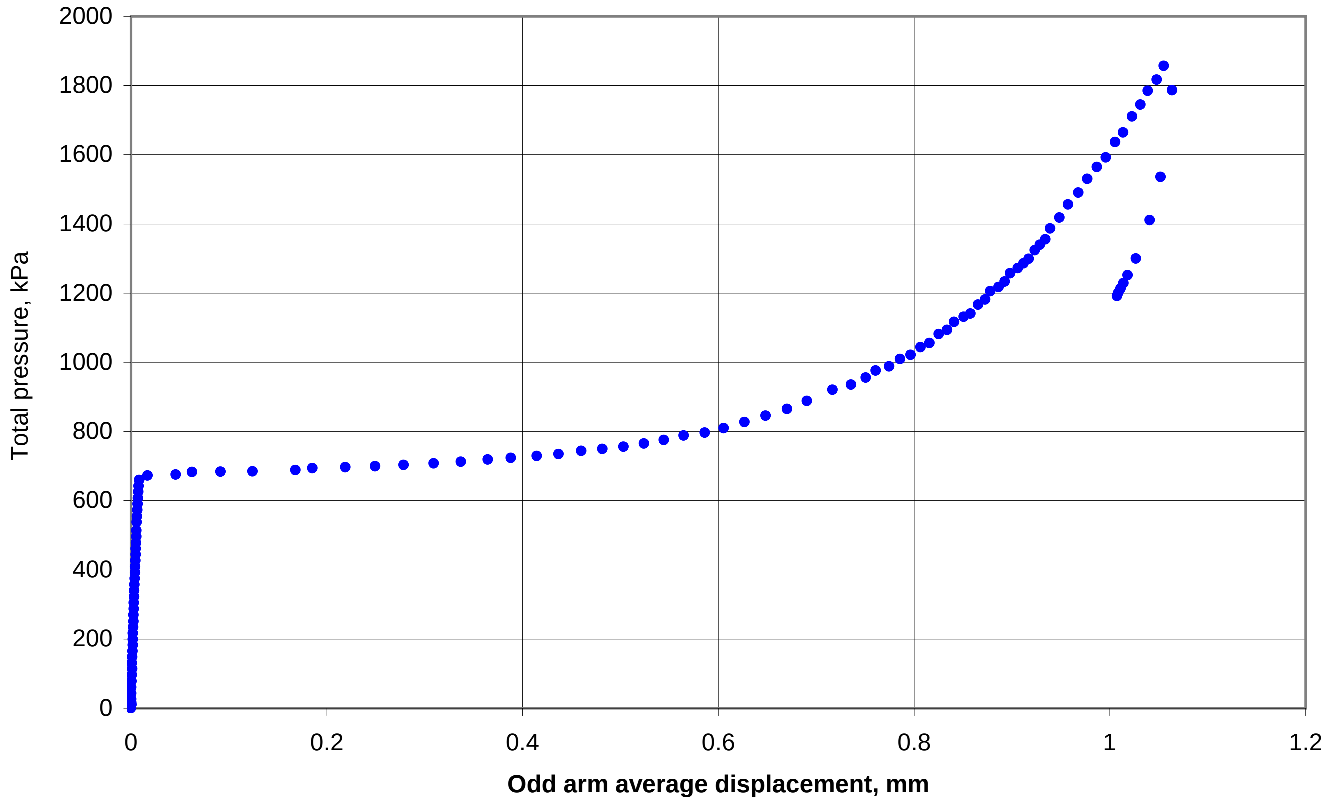
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T31**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Aug-10	Test reference	B3T32	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	32
Material	Clay	Test pocket (mbgl)	64.2065.20	Depth, m	64.70



In situ horizontal stress (Odd arm average)

$P_{o\ BE}$ (kPa)	635	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Odd arm average)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Odd arm average)

G_i (MPa)	84

Unload-reload loop shear modulus (Odd arm average)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

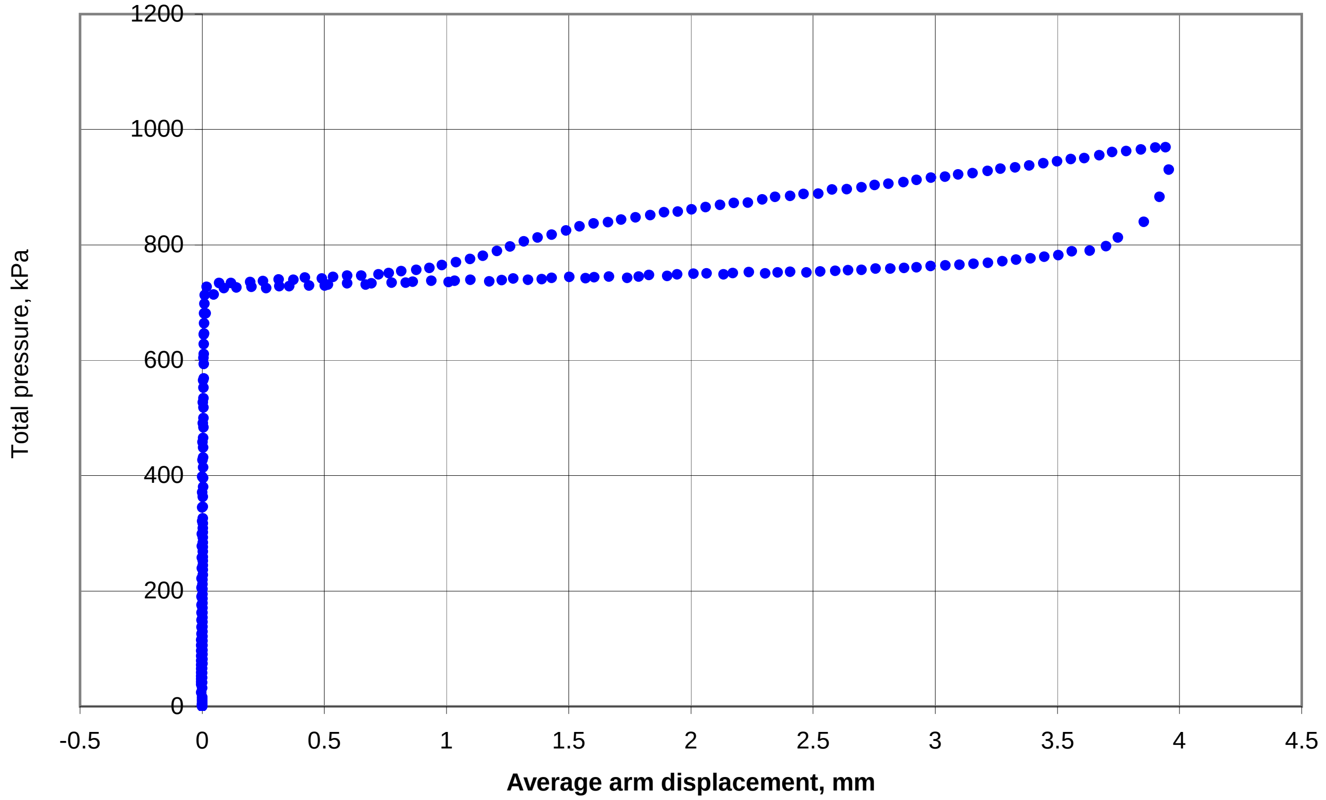
Max test pressure = 1857 kPa. Max av displ = 1.91 mm. Max arm displ = 6.28 mm (Arm4). No of loops = 0 . Analysis type: Odd arm average. Arm4 full displacement at low test pressure. Gi analysis only.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T32**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Sep-10	Test reference	B3T33	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	33
Material	Sand	Test pocket (mbgl)	65.25-66.35	Depth, m	65.85



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	690	$P_{o\ LO}$ (kPa)	368	$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	75.7	ν (deg)	65.5

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 969 kPa. Max av displ = 3.96 mm. Max arm displ = 4.99 mm (Arm5). No of loops = 0 . Analysis type: Average arm. Disturbed test pocket. No suitable data for analysis.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T33

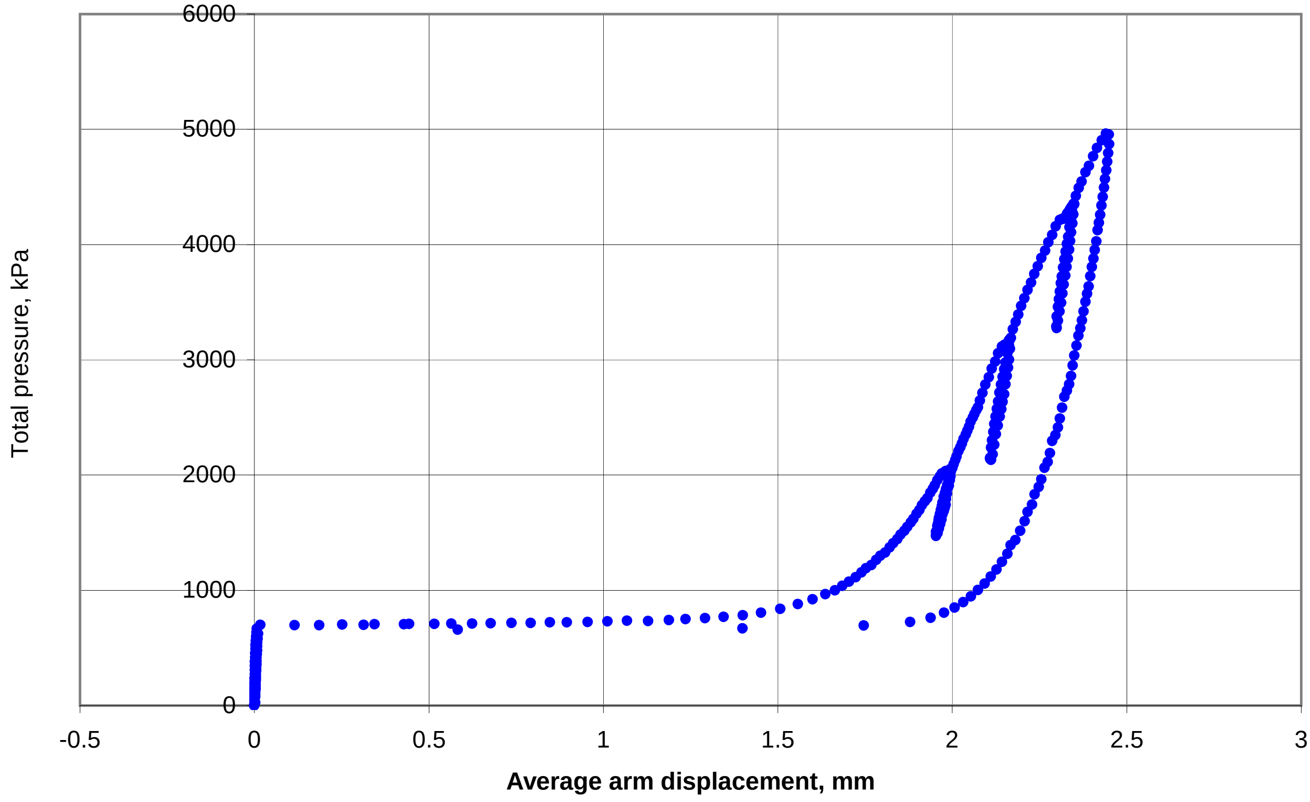
Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Sep-10
Probe	SBP-6 960521
Material	Sand

Test reference	B3T34
GWL (mbgl)	
Test pocket (mbgl)	66.35-67.35

BH	SBP2009_3
Test	34
Depth, m	66.85



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1405	$P_{o\ LO}$ (kPa)	1346	$P_{o\ MR}$ (kPa)	1407
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2886

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	68.0	ν (deg)	52.8

Initial shear modulus (Average arm)

G_i (MPa)	157

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	303	0.182			0.841	83.8	
2	418	0.253			0.774	74.1	
3	481	0.217			0.783	91.3	

Remarks

Max test pressure = 4963 kPa. Max av displ = 2.45 mm. Max arm displ = 3.5 mm (Arm4). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T34

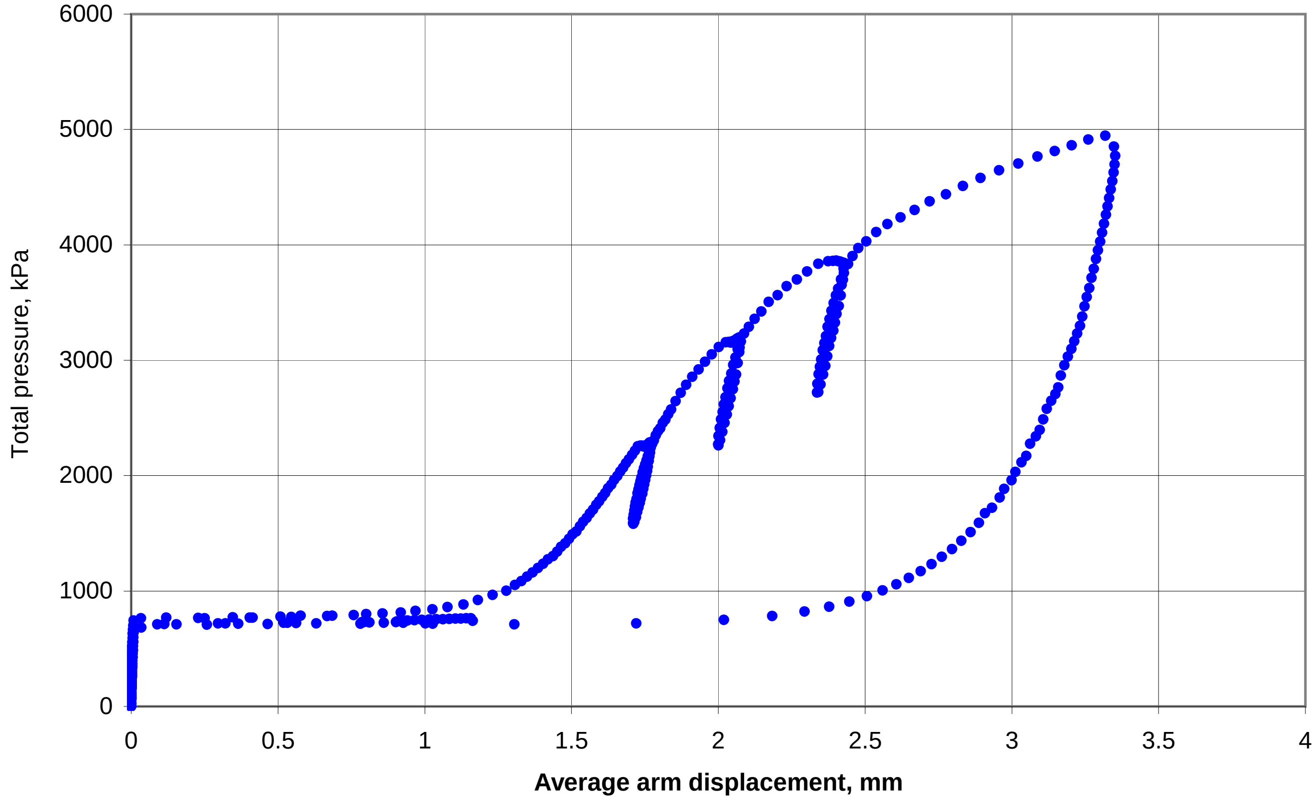
Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Sep-10
Probe	SBP-6 960521
Material	Sand

Test reference	B3T35
GWL (mbgl)	
Test pocket (mbgl)	67.35-68.35

BH	SBP2009_3
Test	35
Depth, m	67.85



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1585	$P_{o\ LO}$ (kPa)	1230	$P_{o\ MR}$ (kPa)	1586
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2164

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	39.7	ν (deg)	11.7

Initial shear modulus (Average arm)

G_i (MPa)	80

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	259	0.257			0.657	17.6	
2	278	0.314			0.718	33.7	
3	266	0.386			0.731	40.3	

Remarks

Max test pressure = 4946 kPa. Max av displ = 3.35 mm. Max arm displ = 4.03 mm (Arm6). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

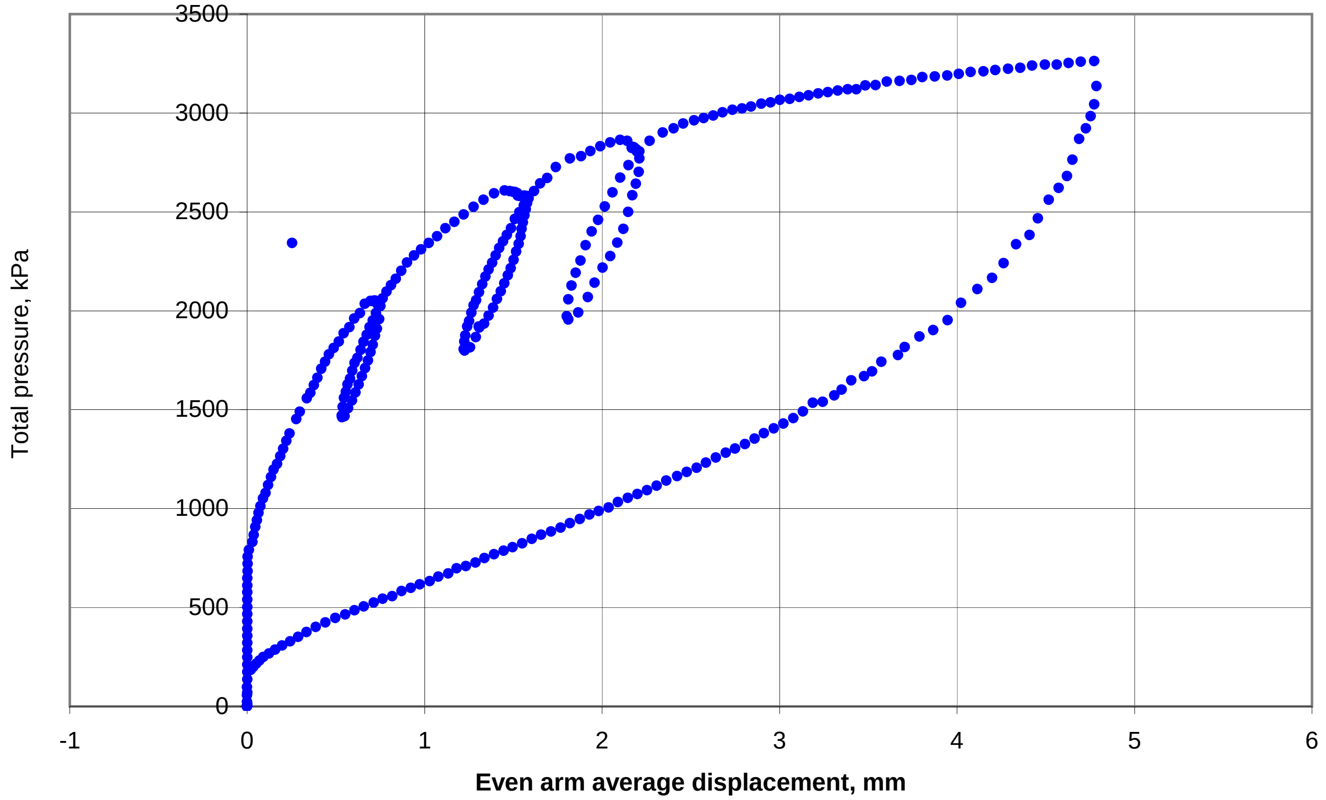
Figure

SBP2009_3 T35

Self Boring Pressuremeter Test

Soil Mechanics

Date	01-Sep-10	Test reference	B3T36	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	36
Material	Sand	Test pocket (mbgl)	67.85-68.75	Depth, m	68.75



In situ horizontal stress (Even arm average)

$P_{o\ BE}$ (kPa)	1135	$P_{o\ LO}$ (kPa)	751	$P_{o\ MR}$ (kPa)	1134
$P_{o\ curve\ modelling}$ (kPa)	1185			$P_{o\ drained}$ (kPa)	

Shear strength (Even arm average)

$c_{u\ loading}$ (kPa)	585	$c_{u\ unloading}$ (kPa)	556	p_L (kPa)	4241
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Even arm average)

G_i (MPa)	43

Unload-reload loop shear modulus (Even arm average)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	57	0.961	0.653	7.5			
2	47	1.540	0.641	6.9			
3	48	1.695	0.583	5.1			

Remarks

Max test pressure = 3263 kPa. Max av displ = 4.68 mm. Max arm displ = 5.18 mm (Arm2). No of loops = 3 . Analysis type: Even arm average.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

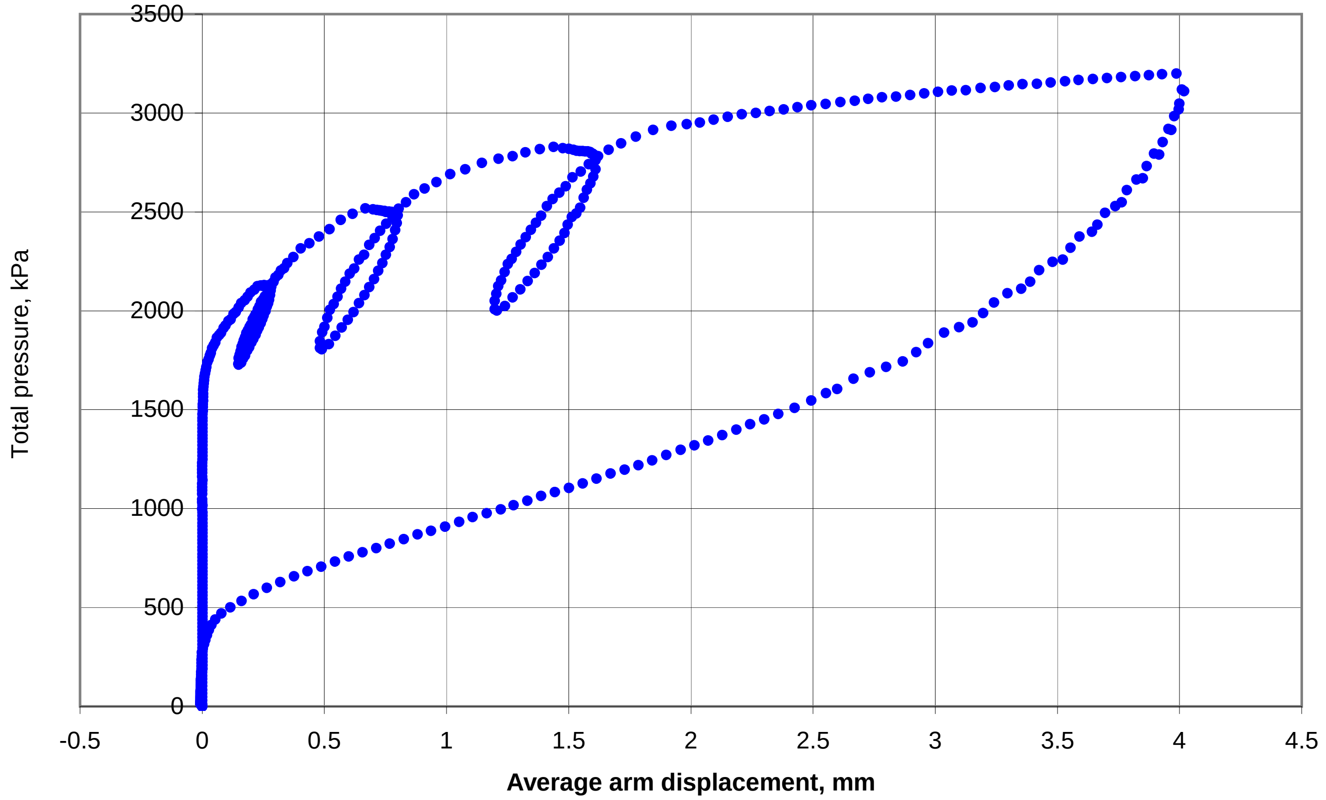
Figure

SBP2009_3 T36

Self Boring Pressuremeter Test

Soil Mechanics

Date	02-Sep-10	Test reference	B3T37	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	37
Material	Clay	Test pocket (mbgl)	69.25-70.25	Depth, m	69.75



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1650	$P_{o\ LO}$ (kPa)	1602	$P_{o\ MR}$ (kPa)	1960
$P_{o\ curve\ modelling}$ (kPa)	1394			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	342	$c_{u\ unloading}$ (kPa)	424	p_L (kPa)	3735
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	33

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	66	0.595	0.636	6.3			
2	48	1.402	0.625	6.2			
3	41	1.765	0.595	5.0			

Remarks

Max test pressure = 3200 kPa. Max av displ = 4.02 mm. Max arm displ = 4.61 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

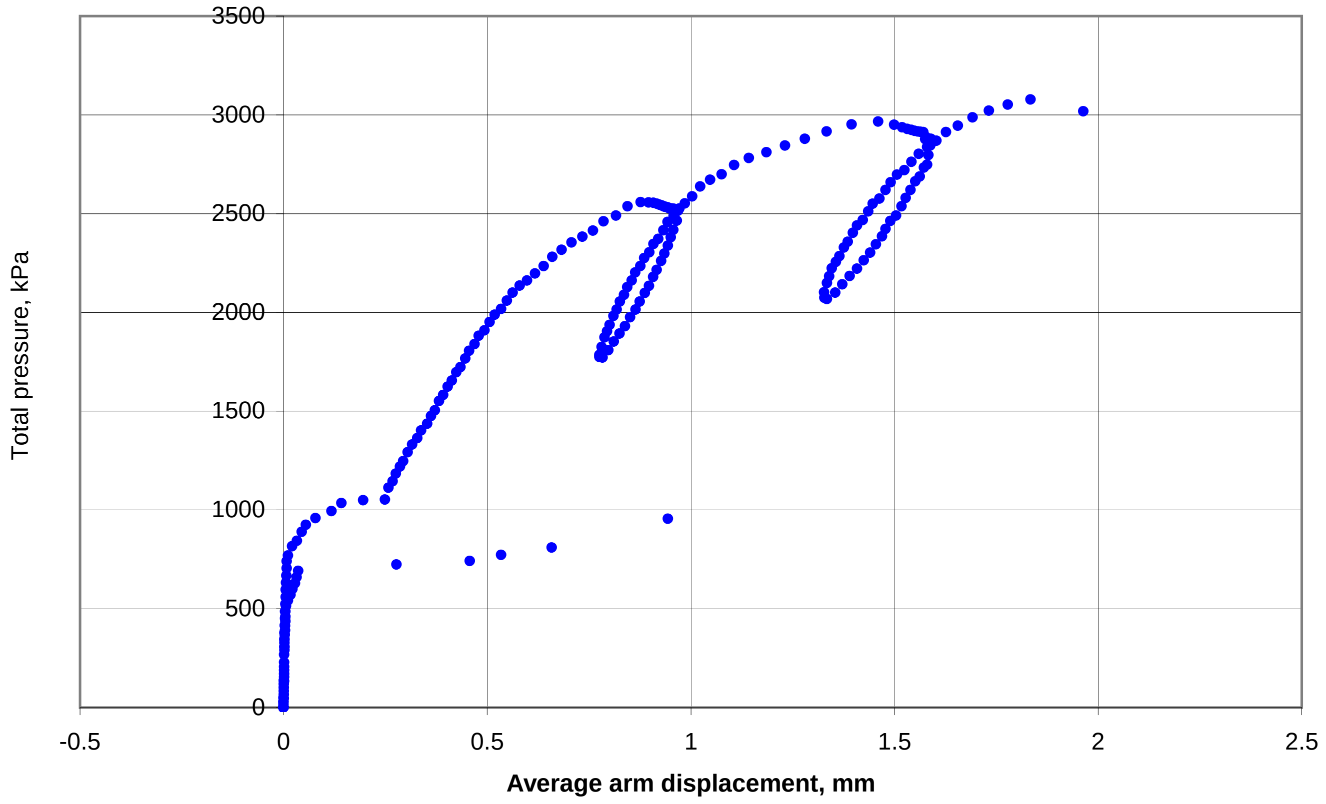
Figure

SBP2009_3 T37

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Sep-10	Test reference	B3T38	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	38
Material	Clay	Test pocket (mbgl)	70.50-71.65	Depth, m	71.15



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1345	$P_{o\ LO}$ (kPa)	1067	$P_{o\ MR}$ (kPa)	1346
$P_{o\ curve\ modelling}$ (kPa)	NA			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	549	$c_{u\ unloading}$ (kPa)	NA	p_L (kPa)	4559
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	77

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	86	0.834	0.741	19.0			
2	68	1.113	0.659	9.9			

Remarks

Max test pressure = 3078 kPa. Max av displ = 1.96 mm. Max arm displ = 3.24 mm (Arm4). No of loops = 2 . Analysis type: Average arm. Membrane burst after Loop 2. No unloading data for analysis.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

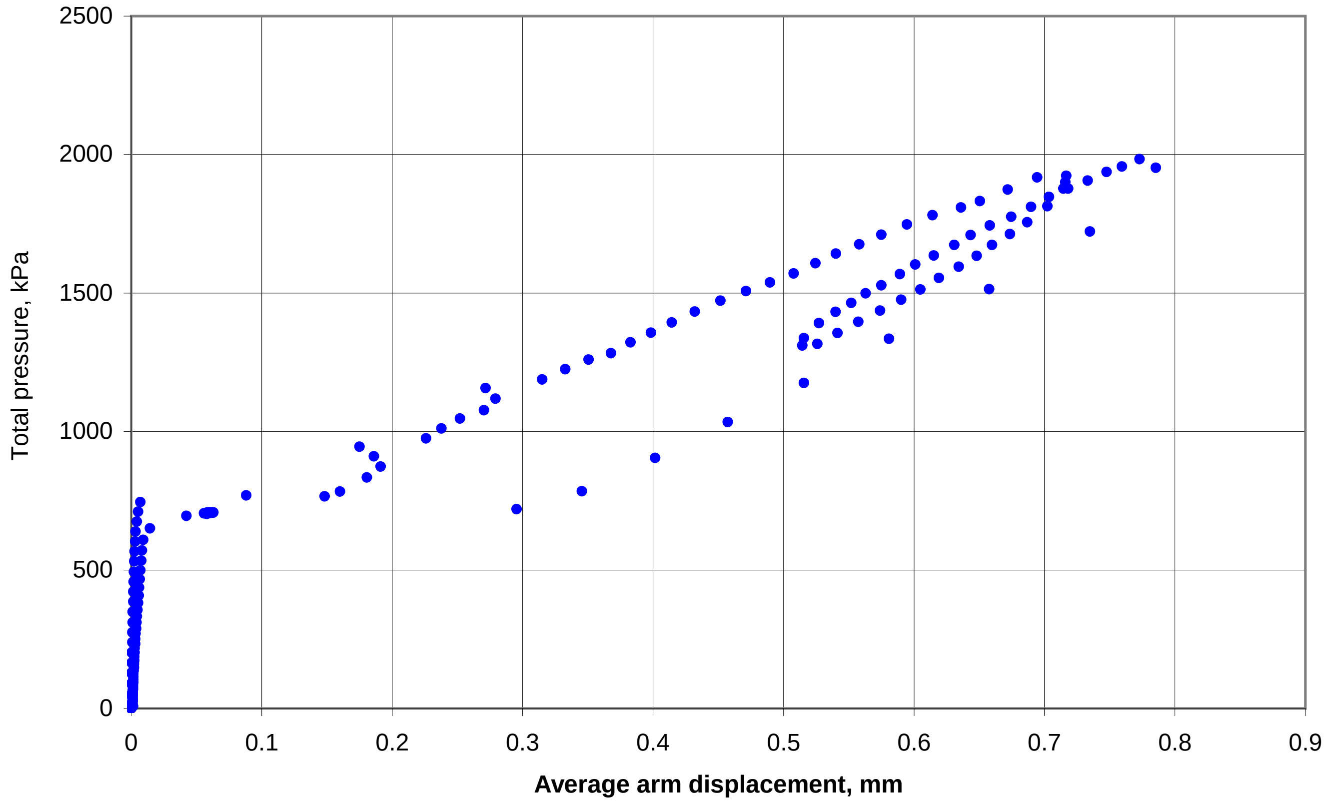
Figure

SBP2009_3 T38

Self Boring Pressuremeter Test

Soil Mechanics

Date	06-Sep-10	Test reference	B3T39	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	39
Material	Clay	Test pocket (mbgl)	71.65-72.65	Depth, m	72.15



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	63	0.896	0.767	16.0			

Remarks

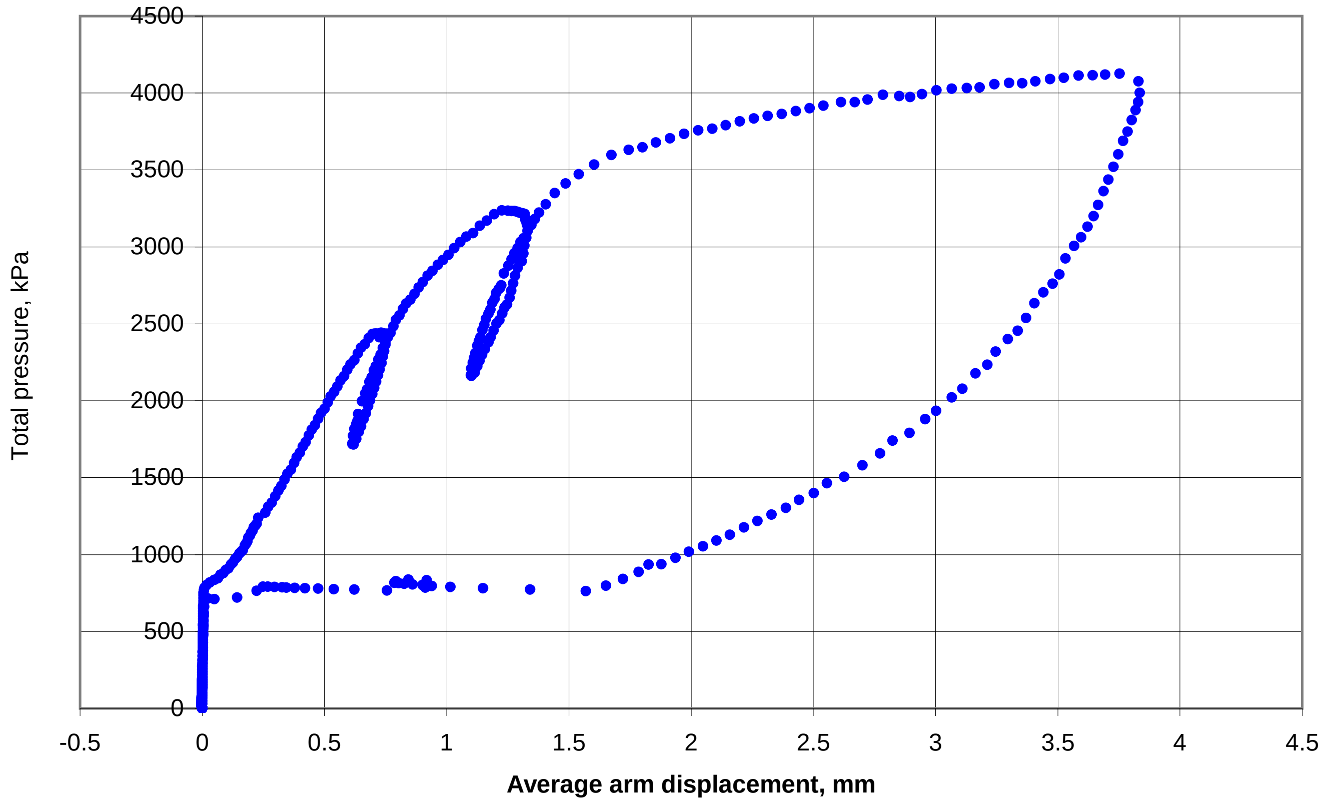
Max test pressure = 1983 kPa. Max av displ = 0.79 mm. Max arm displ = 1.75 mm (Arm6). No of loops = 1 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T39**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	08-Sep-10	Test reference	B3T40	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	40
Material	Clay	Test pocket (mbgl)	72.70-73.70	Depth, m	73.20



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1440	$P_{o\ LO}$ (kPa)	1006	$P_{o\ MR}$ (kPa)	1441
$P_{o\ curve\ modelling}$ (kPa)	1687			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	549	$c_{u\ unloading}$ (kPa)	579	p_L (kPa)	5136
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	62

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	109	0.607	0.677	14.0			
2	92	1.020	0.780	26.8			

Remarks

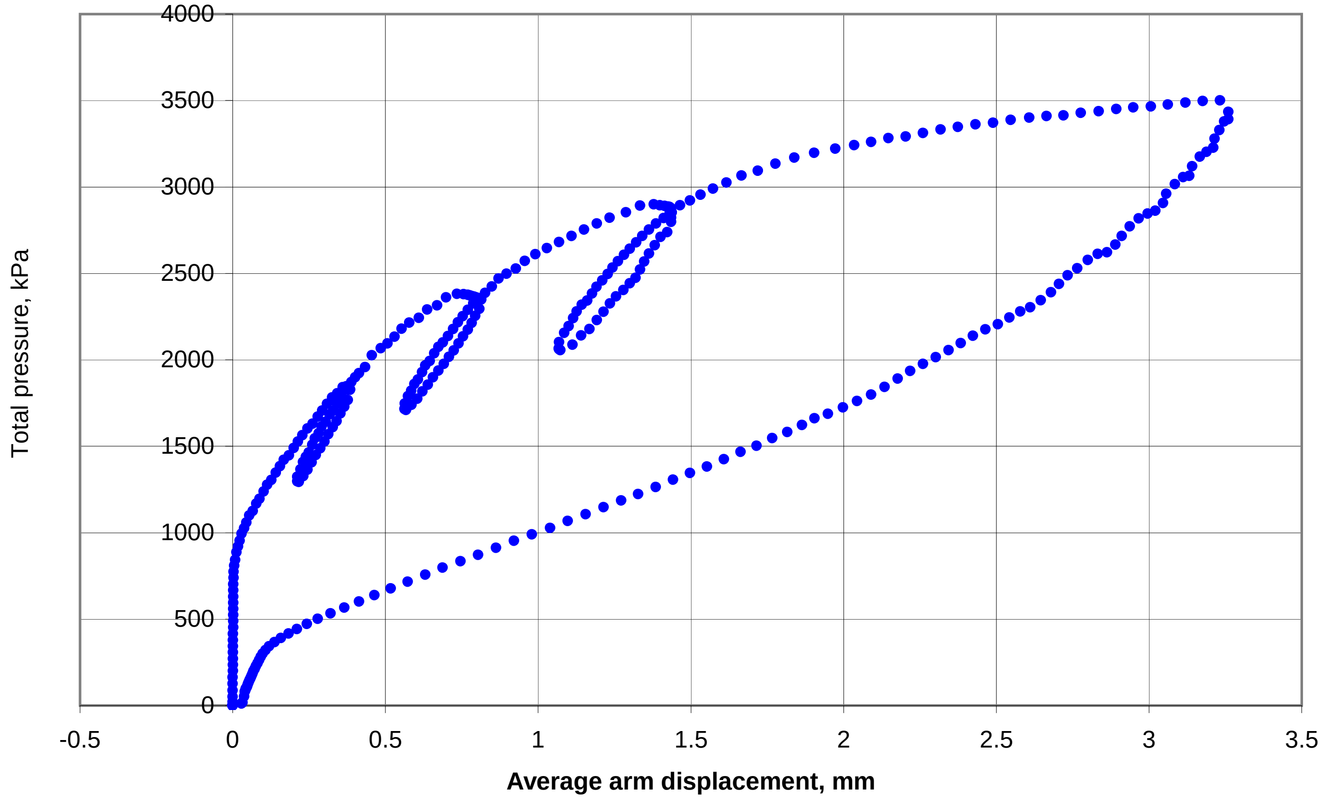
Max test pressure = 4125 kPa. Max av displ = 3.84 mm. Max arm displ = 4.28 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_3 T40**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	08-Sep-10	Test reference	B3T41	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	41
Material	Clay	Test pocket (mbgl)	73.70-74.70	Depth, m	74.20



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1145	$P_{o\ LO}$ (kPa)	754	$P_{o\ MR}$ (kPa)	1147
$P_{o\ curve\ modelling}$ (kPa)	1543			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	566	$c_{u\ unloading}$ (kPa)	566	p_L (kPa)	4591
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	52

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	71	0.776	0.730	14.0			
2	57	1.168	0.785	17.6			
3	49	1.598	0.739	12.5			

Remarks

Max test pressure = 3500 kPa. Max av displ = 3.26 mm. Max arm displ = 4.82 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

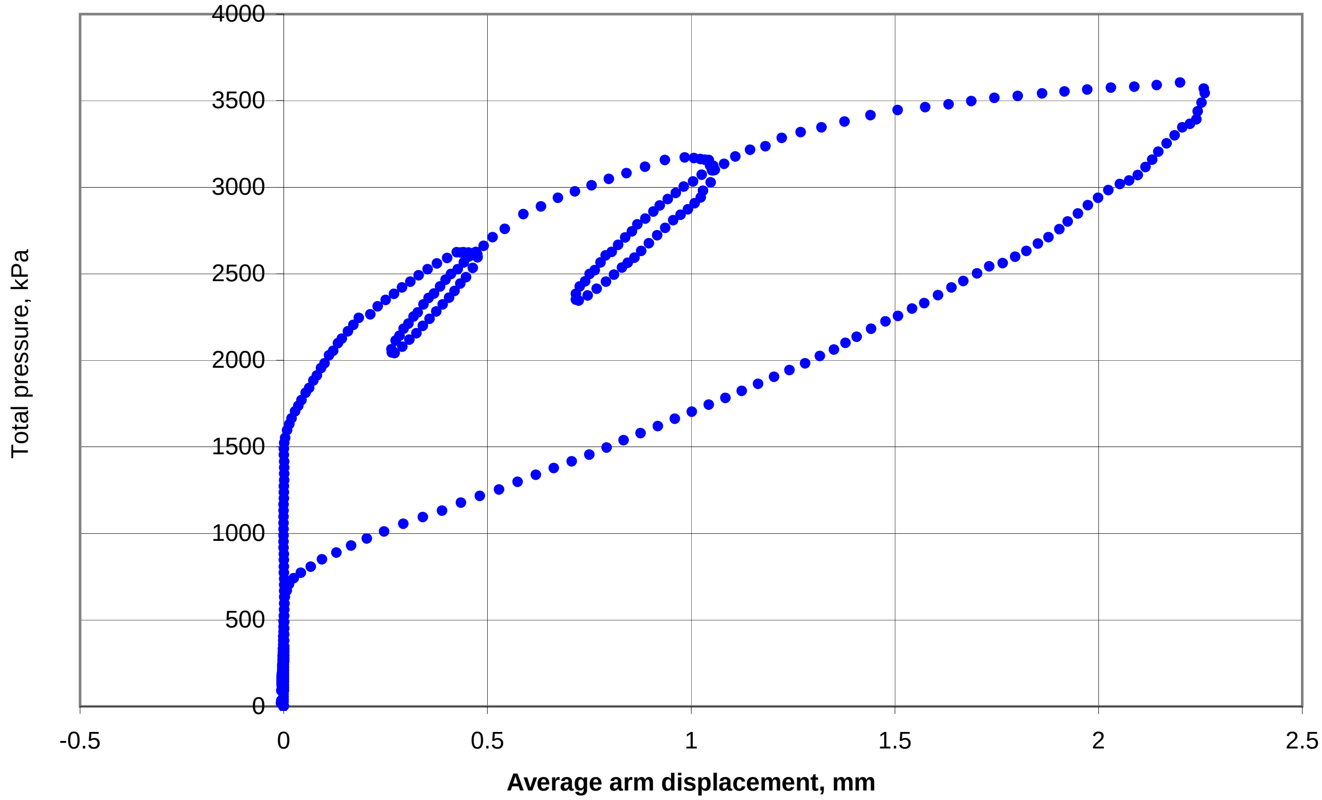
Figure

SBP2009_3 T41

Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Sep-10	Test reference	B3T42	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	42
Material	Clay	Test pocket (mbgl)	76.50-77.50	Depth, m	77.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1510	$P_{o\ LO}$ (kPa)	1508	$P_{o\ MR}$ (kPa)	1296
$P_{o\ curve\ modelling}$ (kPa)	1616			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	641	$c_{u\ unloading}$ (kPa)	679	p_L (kPa)	5146
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	83

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	60	0.911	0.761	15.9			
2	50	1.498	0.743	12.8			

Remarks

Max test pressure = 3603 kPa. Max av displ = 2.26 mm. Max arm displ = 3.48 mm (Arm1). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

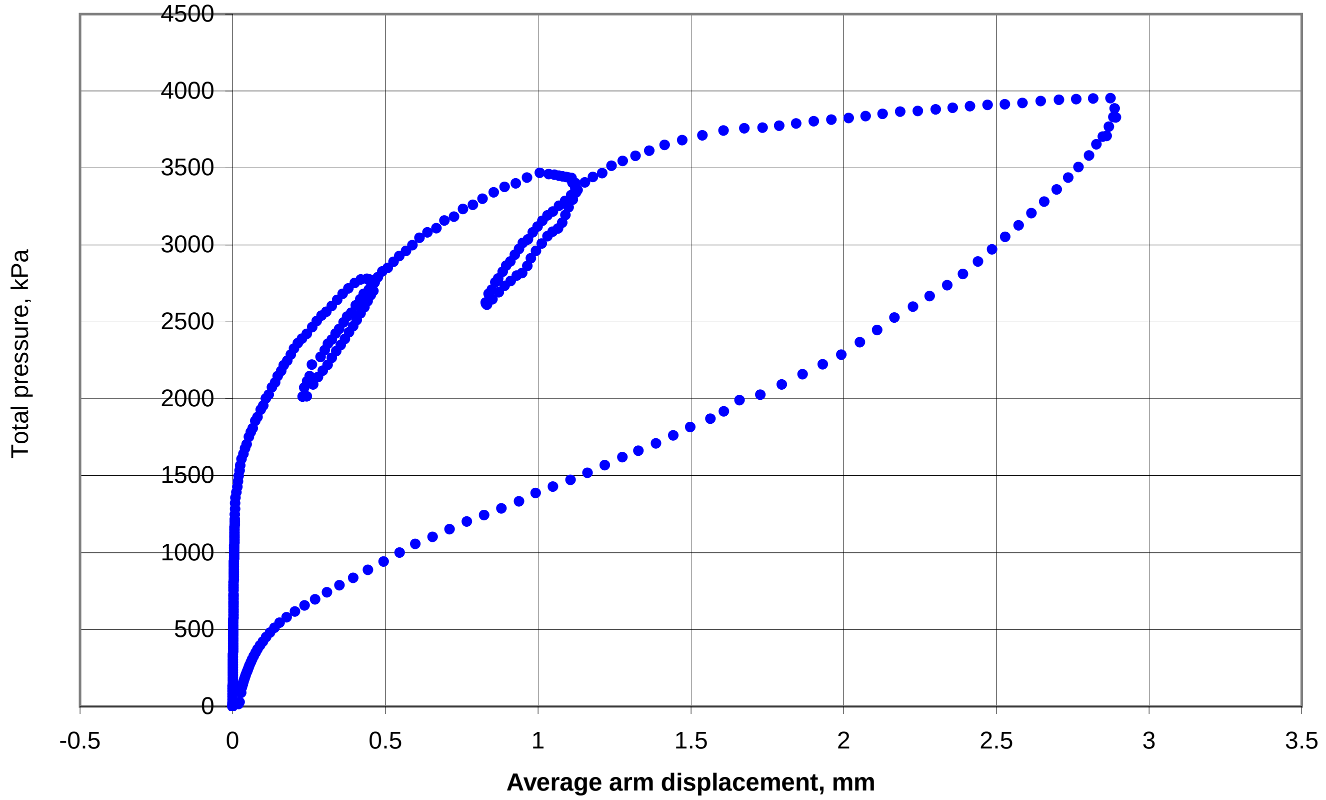
Figure

SBP2009_3 T42

Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Sep-10	Test reference	B3T43	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	43
Material	Clay	Test pocket (mbgl)	77.50-78.50	Depth, m	78.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1590	$P_{o\ LO}$ (kPa)	1592	$P_{o\ MR}$ (kPa)	2597
$P_{o\ curve\ modelling}$ (kPa)	1896			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	825	$c_{u\ unloading}$ (kPa)	674	p_L (kPa)	5912
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	45

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	71	1.032	0.758	17.9			
2	56	1.290	0.770	16.9			

Remarks

Max test pressure = 3952 kPa. Max av displ = 2.89 mm. Max arm displ = 4.16 mm (Arm4). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

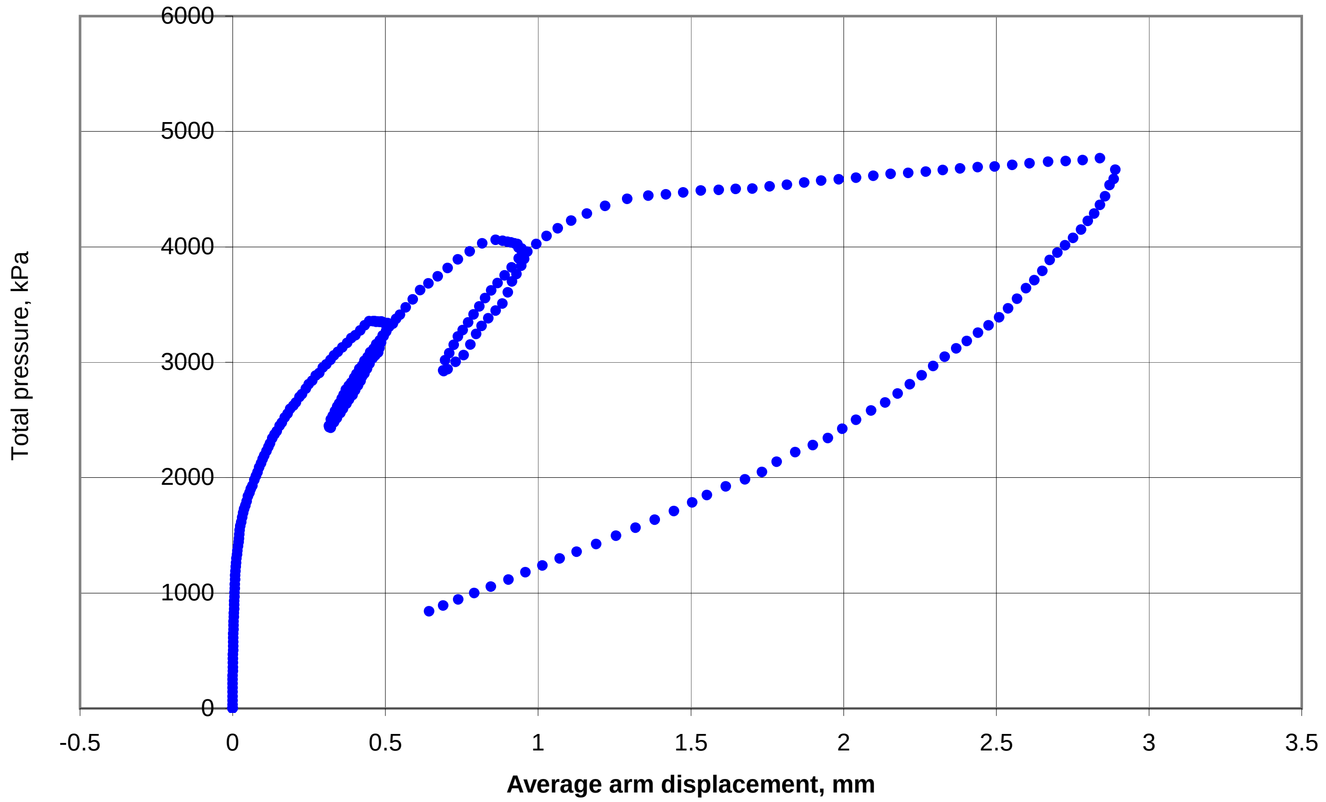
Figure

SBP2009_3 T43

Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Sep-10		Test reference	B3T44		BH	SBP2009_3
Probe	SBP-6 960521		GWL (mbgl)			Test	44
Material	Clay		Test pocket (mbgl)	78.50-79.50		Depth, m	79.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1590	$P_{o\ LO}$ (kPa)	1581	$P_{o\ MR}$ (kPa)	1598
$P_{o\ curve\ modelling}$ (kPa)	1254			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	432	$c_{u\ unloading}$ (kPa)	922	p_L (kPa)	5602
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	153

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	100	0.831	0.753	22.6			
2	85	1.162	0.727	18.6			

Remarks

Max test pressure = 4768 kPa. Max av displ = 2.89 mm. Max arm displ = 4.12 mm (Arm5). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

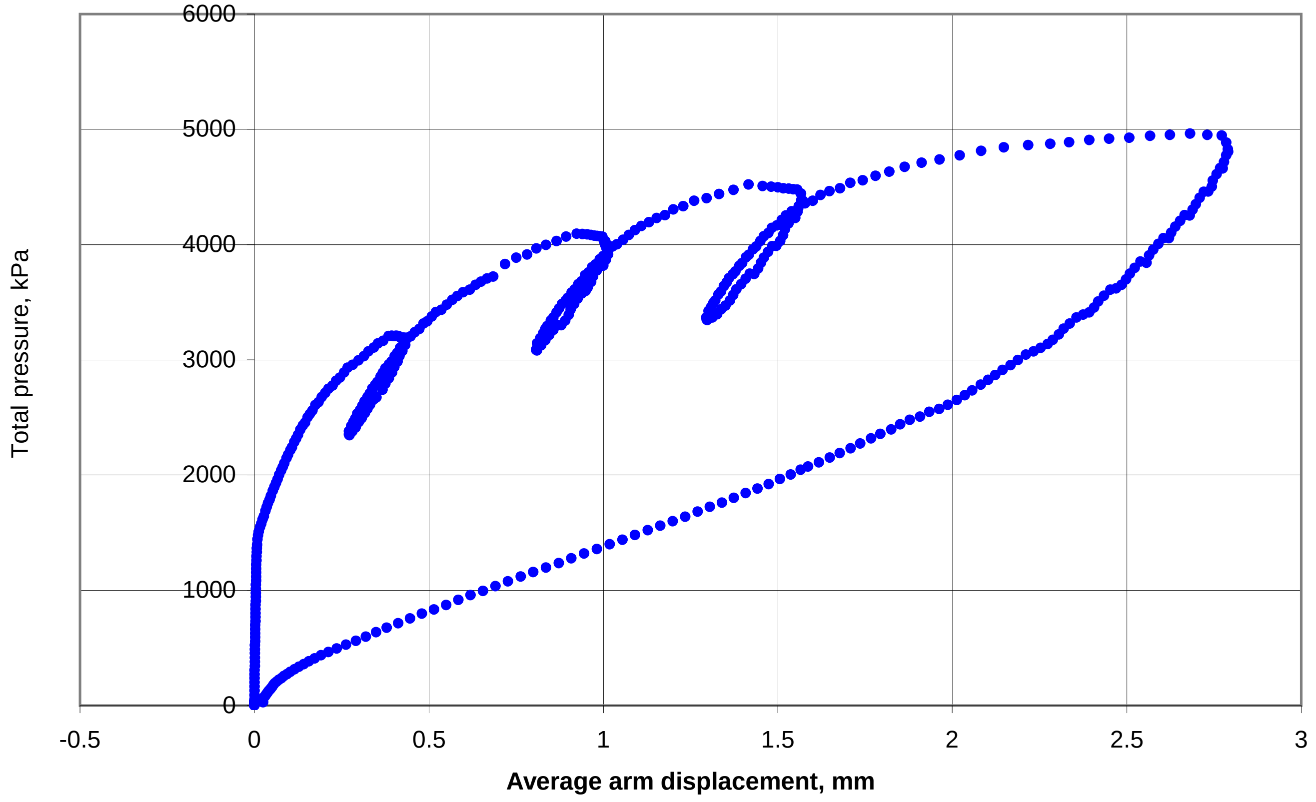
Figure

SBP2009_3 T44

Self Boring Pressuremeter Test

Soil Mechanics

Date	16-Sep-10	Test reference	B3T45	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	45
Material	Clay	Test pocket (mbgl)	79.50-80.50	Depth, m	80.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1450	$P_{o\ LO}$ (kPa)	1412	$P_{o\ MR}$ (kPa)	1457
$P_{o\ curve\ modelling}$ (kPa)	2169			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	941	$c_{u\ unloading}$ (kPa)	807	p_L (kPa)	7053
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	166

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	111	0.756	0.836	41.0			
2	94	0.909	0.753	22.4			
3	85	1.147	0.755	22.5			

Remarks

Max test pressure = 4962 kPa. Max av displ = 2.79 mm. Max arm displ = 3.42 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T45

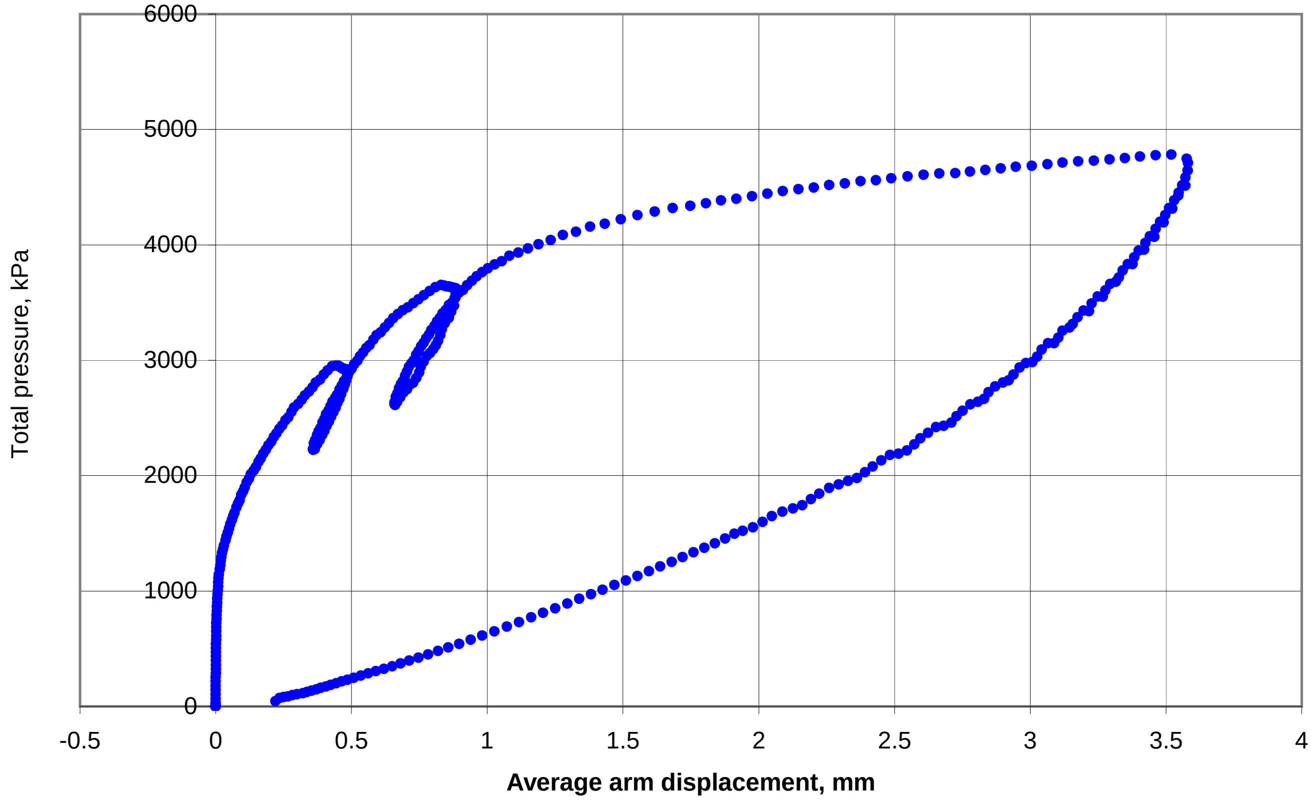
Self Boring Pressuremeter Test

Soil Mechanics

Date	16-Sep-10
Probe	SBP-6 960521
Material	Clay

Test reference	B3T46
GWL (mbgl)	
Test pocket (mbgl)	80.50-81.50

BH	SBP2009_3
Test	46
Depth, m	81.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1340	$P_{o\ LO}$ (kPa)	1199	$P_{o\ MR}$ (kPa)	1347
$P_{o\ curve\ modelling}$ (kPa)	1953			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	987	$c_{u\ unloading}$ (kPa)	730	p_L (kPa)	6909
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	140

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	113	0.558	0.785	29.3			
2	93	0.993	0.759	23.8			

Remarks

Max test pressure = 4782 kPa. Max av displ = 3.58 mm. Max arm displ = 4.43 mm (Arm4). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_3 T46

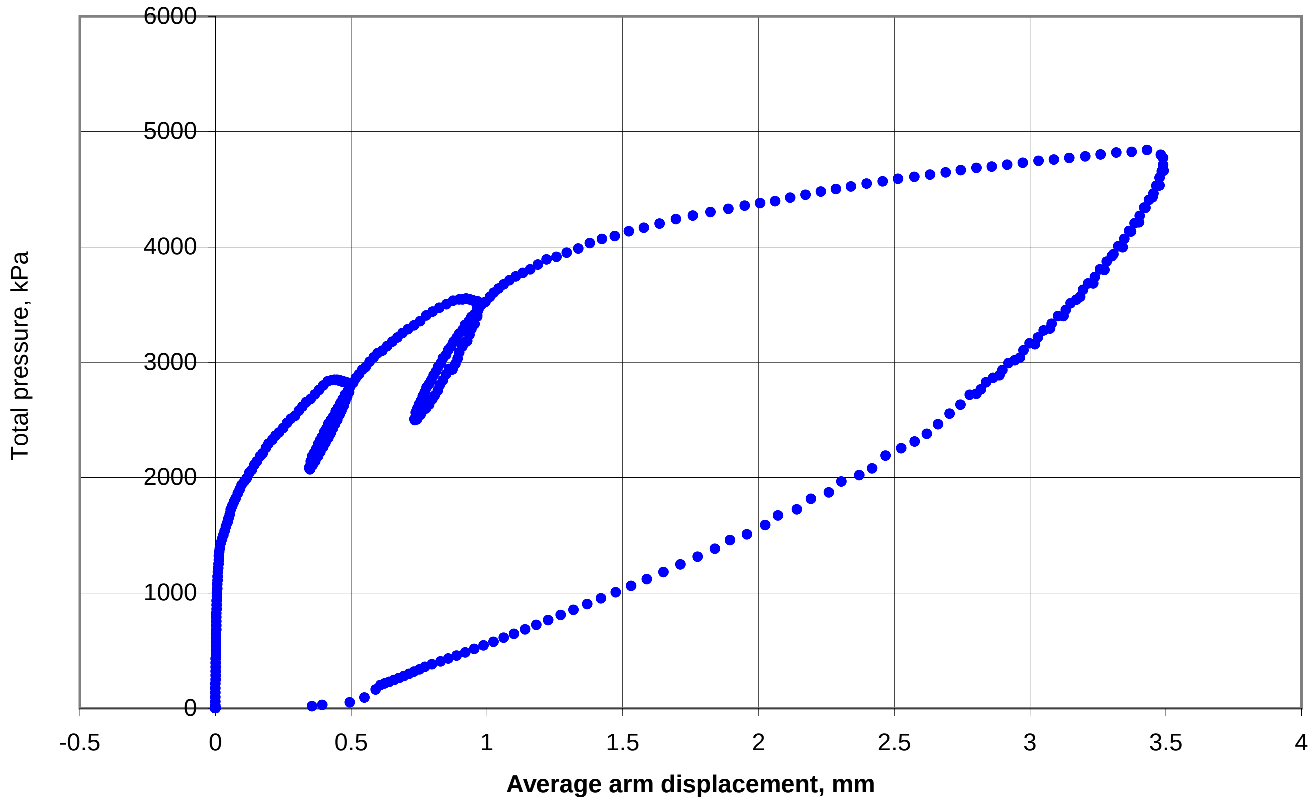
Self Boring Pressuremeter Test

Soil Mechanics

Date	16-Sep-10
Probe	SBP-6 960521
Material	Clay

Test reference	B3T47
GWL (mbgl)	
Test pocket (mbgl)	81.50-82.50

BH	SBP2009_3
Test	47
Depth, m	82.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1350	$P_{o\ LO}$ (kPa)	1363	$P_{o\ MR}$ (kPa)	1336
$P_{o\ curve\ modelling}$ (kPa)	2032			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	962	$c_{u\ unloading}$ (kPa)	697	p_L (kPa)	6687
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	173

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	106	0.685	0.777	27.2			
2	92	1.028	0.779	26.8			

Remarks

Max test pressure = 4840 kPa. Max av displ = 3.49 mm. Max arm displ = 4.89 mm (Arm5). No of loops = 2 . Analysis type: Average arm.

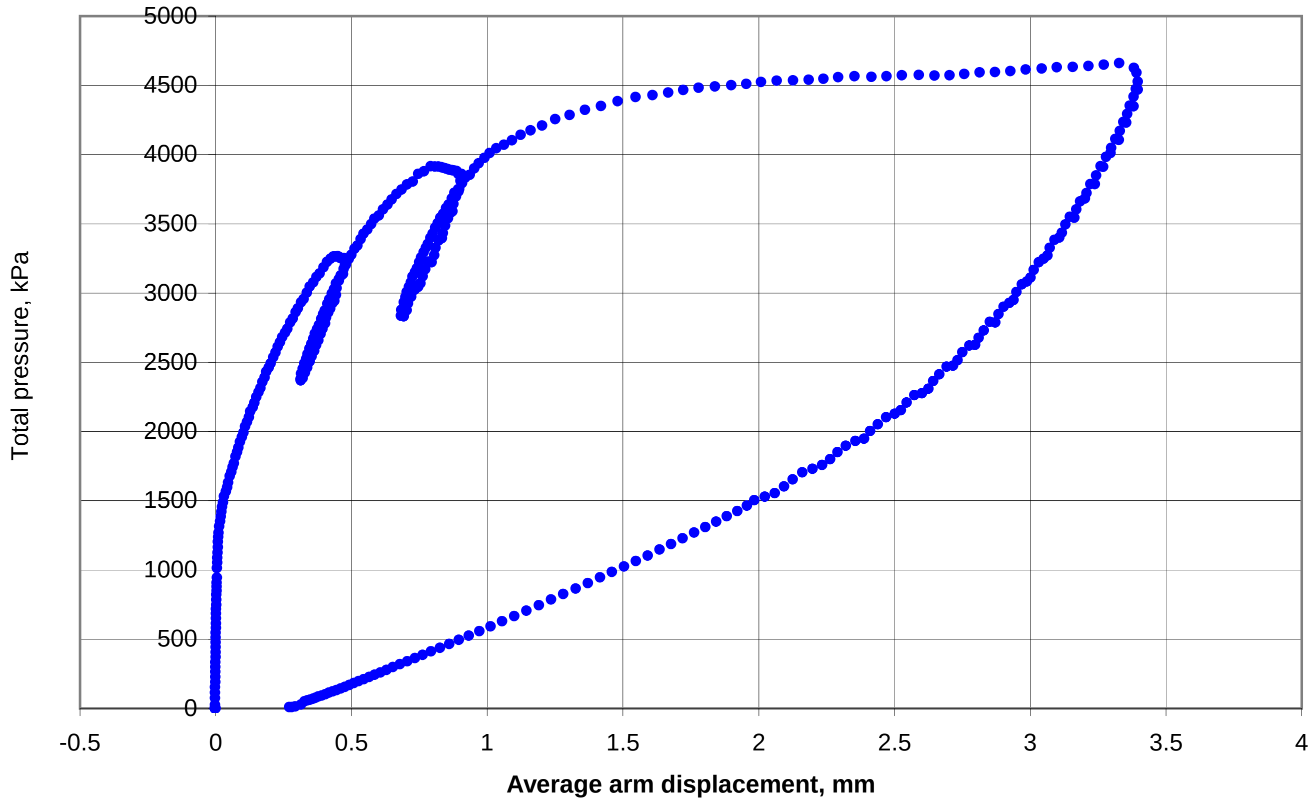
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_3 T47**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	17-Sep-10	Test reference	B3T48	BH	SBP2009_3
Probe	SBP-6 960521	GWL (mbgl)		Test	48
Material	Clay	Test pocket (mbgl)	83.50-84.50	Depth, m	84.00



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1280	$P_{o\ LO}$ (kPa)	1302	$P_{o\ MR}$ (kPa)	1245
$P_{o\ curve\ modelling}$ (kPa)	2051			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	968	$c_{u\ unloading}$ (kPa)	689	p_L (kPa)	7059
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	146

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	113	0.728	0.811	35.9			
2	97	0.950	0.762	25.5			

Remarks

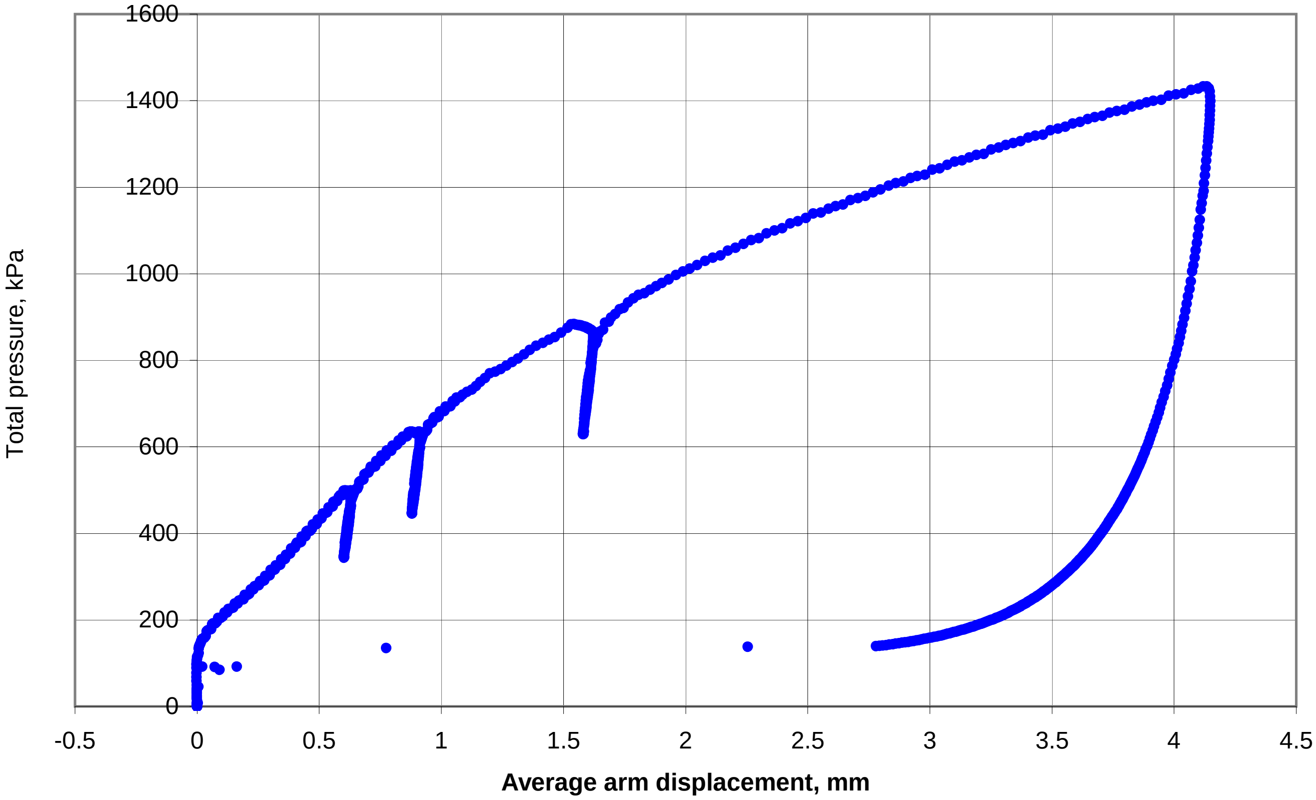
Max test pressure = 4661 kPa. Max av displ = 3.4 mm. Max arm displ = 4.77 mm (Arm6). No of loops = 2 . Analysis type: Average arm.

Notes:	Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	Figure
	Project No.	M0102-10	**SBP2009_3 T48**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	09-Jul-10	Test reference	B4T1	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	1
Material	Peat/sand	Test pocket (mbgl)	11.60-12.60	Depth, m	12.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	435	$P_{o\ LO}$ (kPa)	149	$P_{o\ MR}$ (kPa)	155
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	436

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	38.3	ν (deg)	9.9

Initial shear modulus (Average arm)

G_i (MPa)	13

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	103	0.130			0.757	14.2	
2	113	0.150			0.754	16.0	
3	117	0.180			0.780	22.1	

Remarks

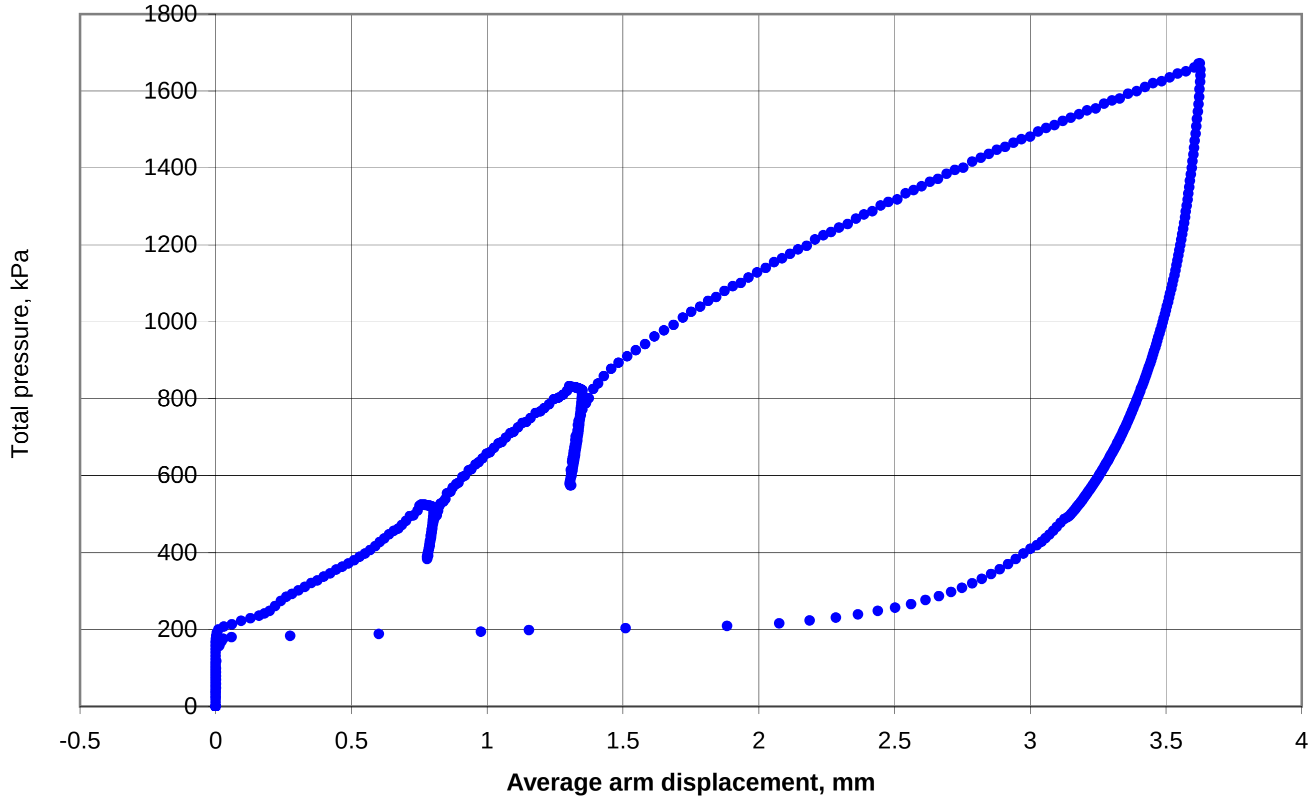
Max test pressure = 1433 kPa. Max av displ = 4.15 mm. Max arm displ = 4.25 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T1**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	10-Jul-10	Test reference	B4T2	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	2
Material	Sand and gravel	Test pocket (mbgl)	13.60-14.60	Depth, m	14.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	400	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	403
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	677

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	49.1	ν (deg)	24.2

Initial shear modulus (Average arm)

G_i (MPa)	13

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	109	0.107			0.803	5.3	
2	110	0.210			0.646	25.5	

Remarks

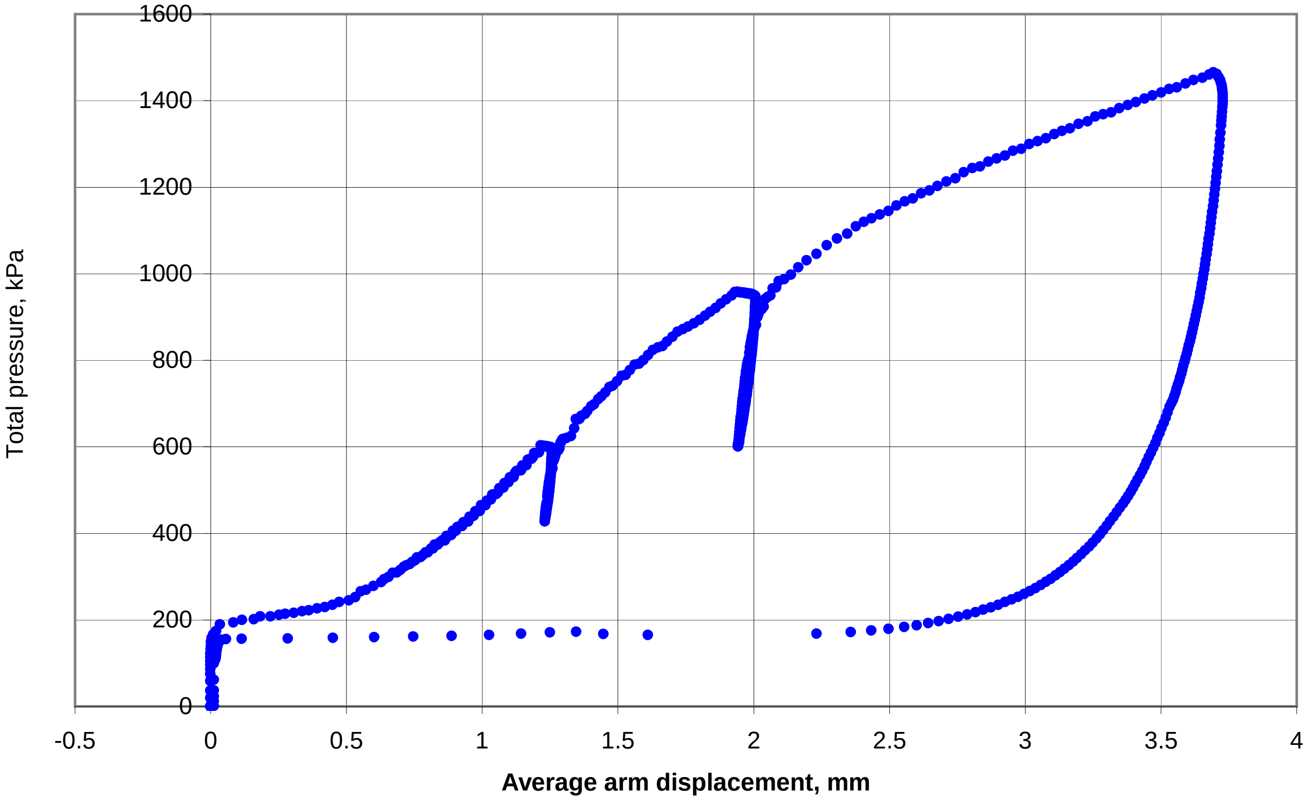
Max test pressure = 1672 kPa. Max av displ = 3.63 mm. Max arm displ = 4.07 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T2**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	10-Jul-10	Test reference	B4T3	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	3
Material	Sand and gravel	Test pocket (mbgl)	15.60-16.60	Depth, m	16.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	415	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	418
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	565

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	42.6	ν (deg)	15.5

Initial shear modulus (Average arm)

G_i (MPa)	13

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	117	0.105			0.747	14.0	
2	111	0.279			0.759	18.5	

Remarks

Max test pressure = 1465 kPa. Max av displ = 3.73 mm. Max arm displ = 4.29 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

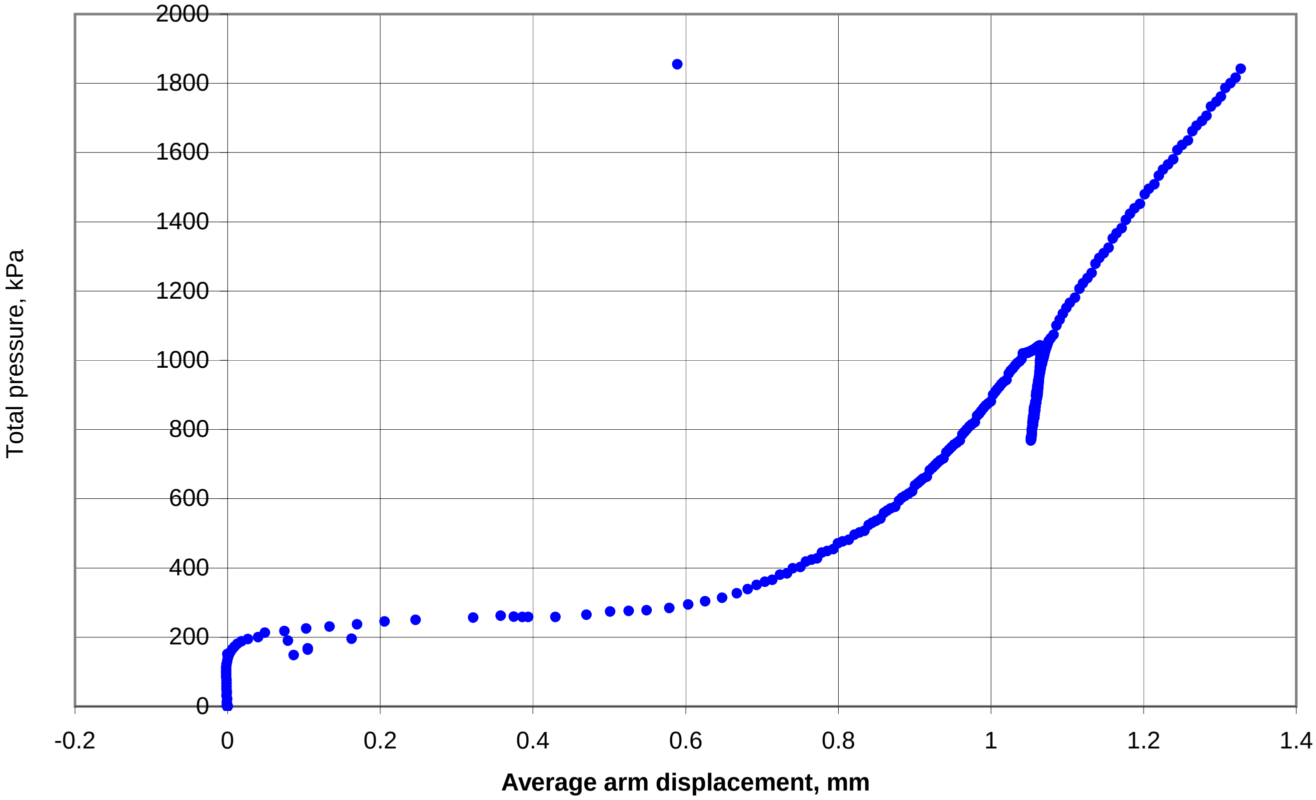
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_4 T3**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	11-Jul-10	Test reference	B4T4	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	4
Material	Sand and gravel	Test pocket (mbgl)	17.90-18.93	Depth, m	18.43



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	950	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	875
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1062

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	42.7	ν (deg)	15.6

Initial shear modulus (Average arm)

G_i (MPa)	74

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	409	0.056			0.715	30.3	

Remarks

Max test pressure = 1855 kPa. Max av displ = 1.33 mm. Max arm displ = 1.78 mm (Arm2). No of loops = 1 . Analysis type: Average arm. Burst at 1850 kPa.

Notes:

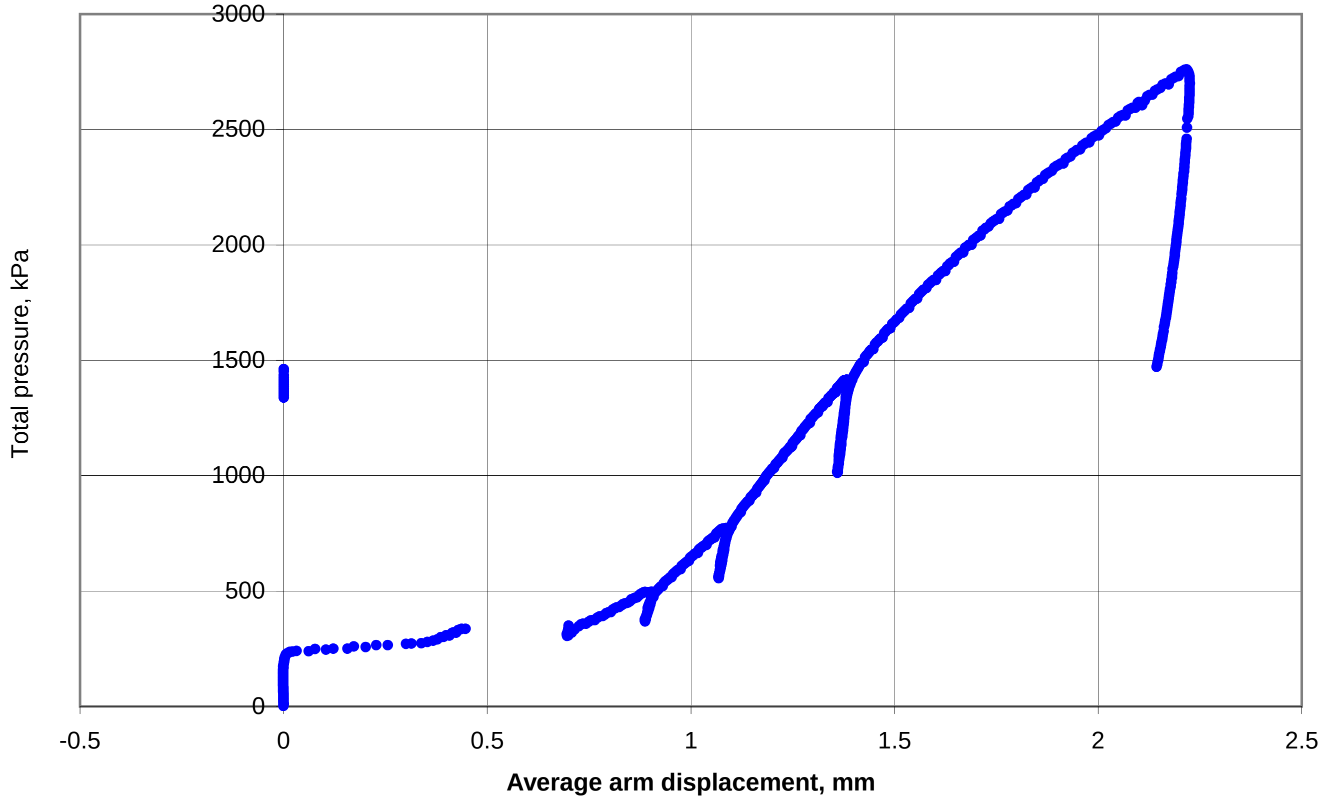
Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL
Project No. M0102-10
Carried out for NNB Generation Company Limited

Figure
SBP2009_4 T4

Self Boring Pressuremeter Test

Soil Mechanics

Date	12-Jul-10	Test reference	B4T5	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	5
Material	Sand gravel	Test pocket (mbgl)	19.60-20.60	Depth, m	20.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	795	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	794
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1190

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.7	ν (deg)	17.0

Initial shear modulus (Average arm)

G_i (MPa)	52

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	136	0.077			0.466	1.2	
2	216	0.084			0.668	11.8	
3	351	0.094			0.845	92.2	

Remarks

Max test pressure = 2144 kPa. Max av displ = 1.77 mm. Max arm displ = 2.45 mm (Arm2). No of loops = 3 . Analysis type: Average arm. Arm 2 sticking temporarily

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

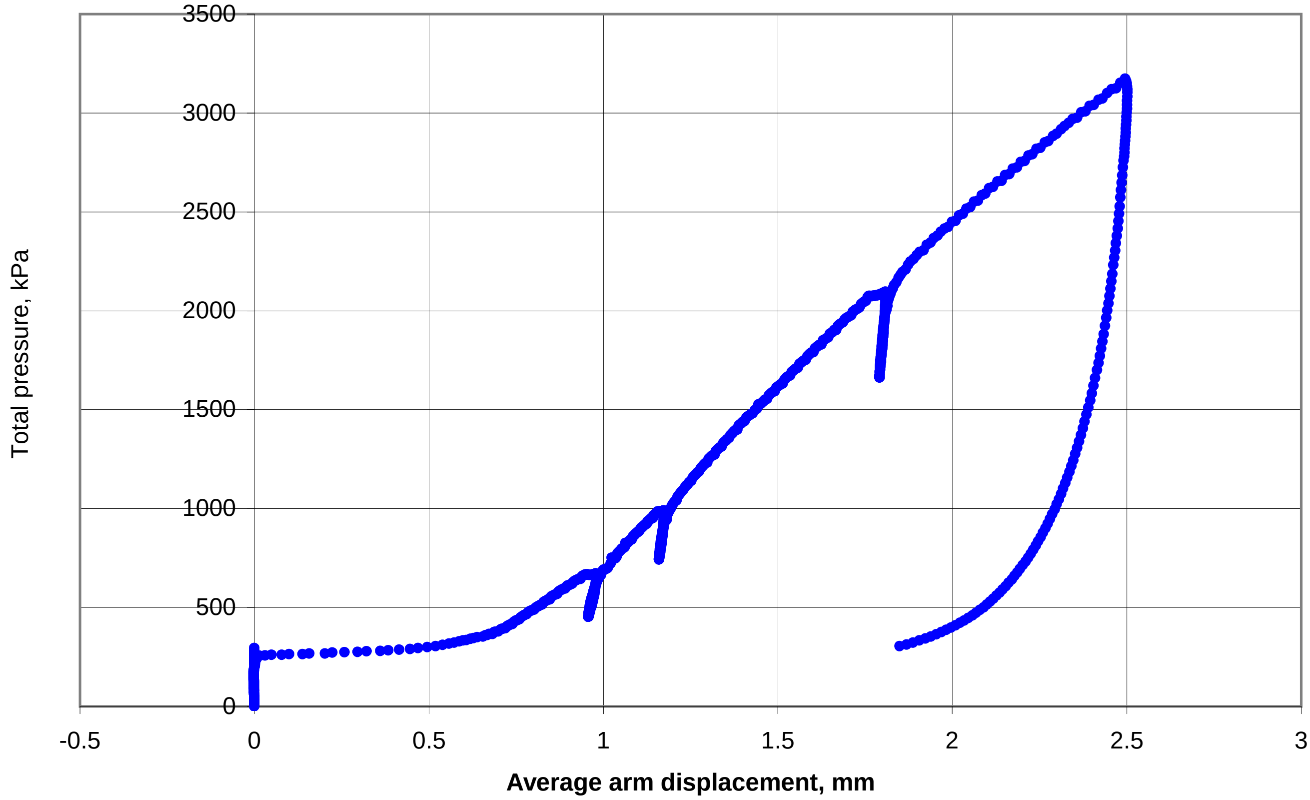
Figure

SBP2009_4 T5

Self Boring Pressuremeter Test

Soil Mechanics

Date	13-Jul-10		Test reference	B4T6		BH	SBP2009_4
Probe	SBP-3 930911		GWL (mbgl)			Test	6
Material	Sand gravel		Test pocket (mbgl)	21.60-22.60		Depth, m	22.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	795	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	796
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1164

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	55.4	ν (deg)	33.3

Initial shear modulus (Average arm)

G_i (MPa)	45

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	182	0.096			0.682	11.5	
2	297	0.061			0.770	36.8	
3	465	0.073			0.803	82.8	

Remarks

Max test pressure = 2096 kPa. Max av displ = 1.81 mm. Max arm displ = 2.12 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

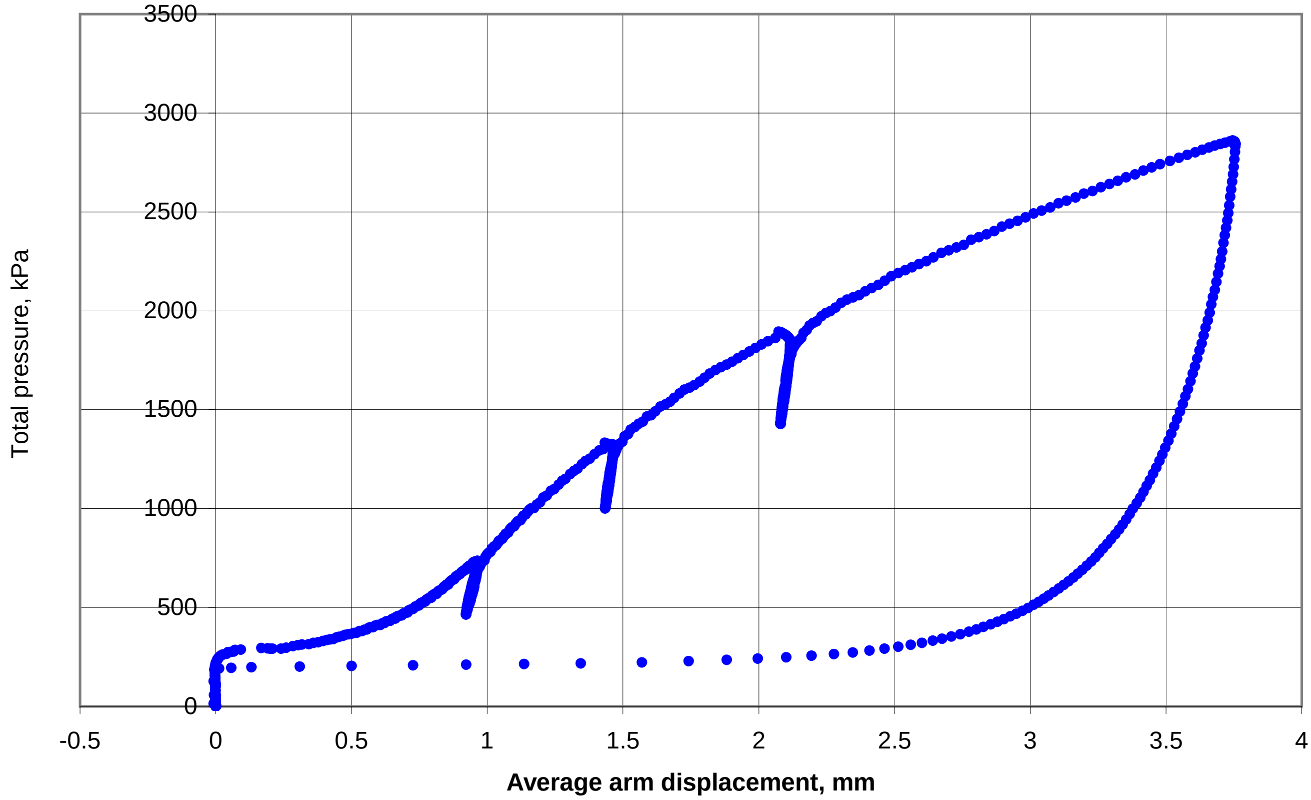
Figure

SBP2009_4 T6

Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Jul-10	Test reference	B4T7	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	7
Material	Sands	Test pocket (mbgl)	23.60-24.60	Depth, m	24.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	800	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	737
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	864

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.1	ν (deg)	16.2

Initial shear modulus (Average arm)

G_i (MPa)	33

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	128	0.185			0.804	28.0	
2	222	0.126			0.774	35.3	
3	234	0.146			0.892	109.8	

Remarks

Max test pressure = 2114 kPa. Max av displ = 2.42 mm. Max arm displ = 3.46 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

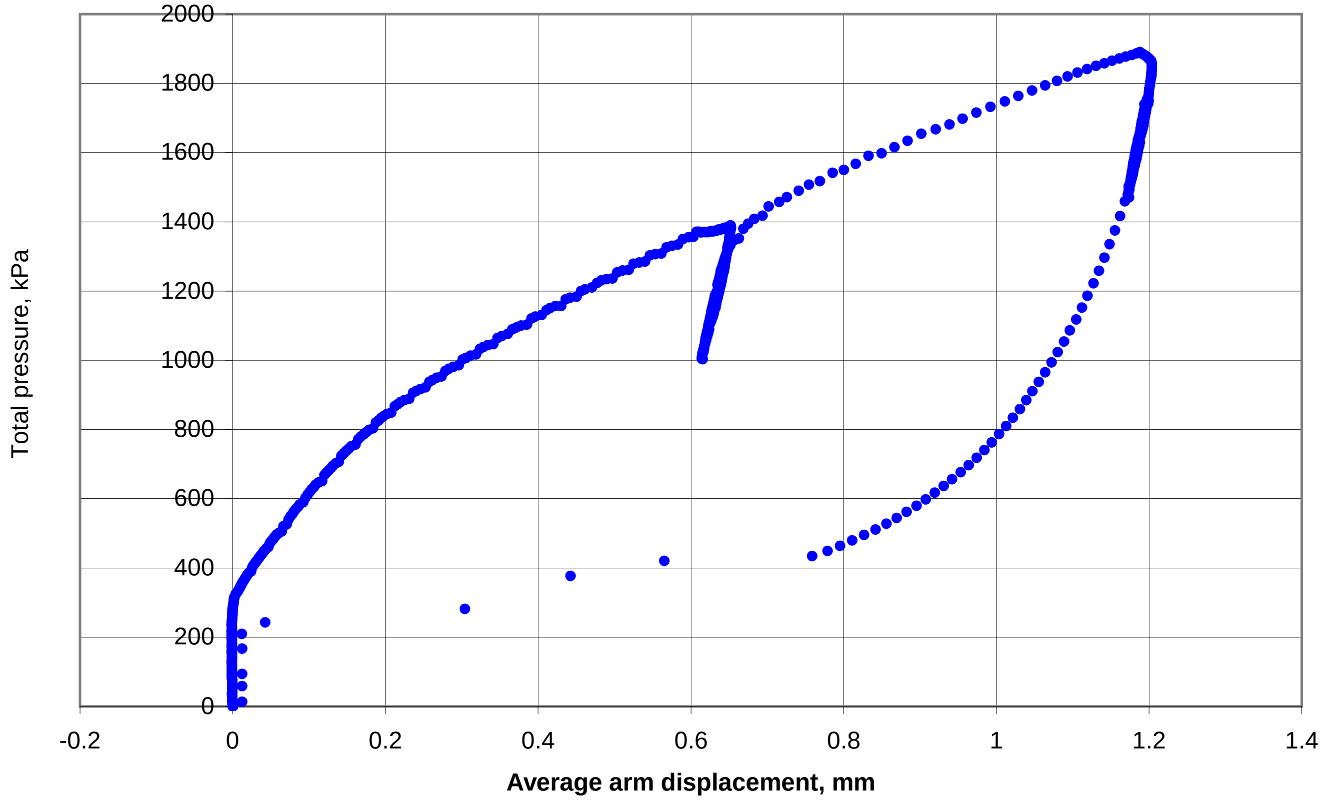
Figure

SBP2009_4 T7

Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Jul-10	Test reference	B4T8	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	8
Material	ands with hard bands of 'ro	Test pocket (mbgl)	25.60-26.60	Depth, m	26.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	545	$P_{o\ LO}$ (kPa)	307	$P_{o\ MR}$ (kPa)	373
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	546

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.5	ν (deg)	16.7

Initial shear modulus (Average arm)

G_i (MPa)	69

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	209	0.160			0.844	63.7	
2	246	0.112			0.832	66.6	

Remarks

Max test pressure = 1890 kPa. Max av displ = 1.2 mm. Max arm displ = 1.57 mm (Arm3). No of loops = 2 . Analysis type: Average arm. Pressure loss at 1900 kPa

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T8**
	Carried out for	NNB Generation Company Limited	

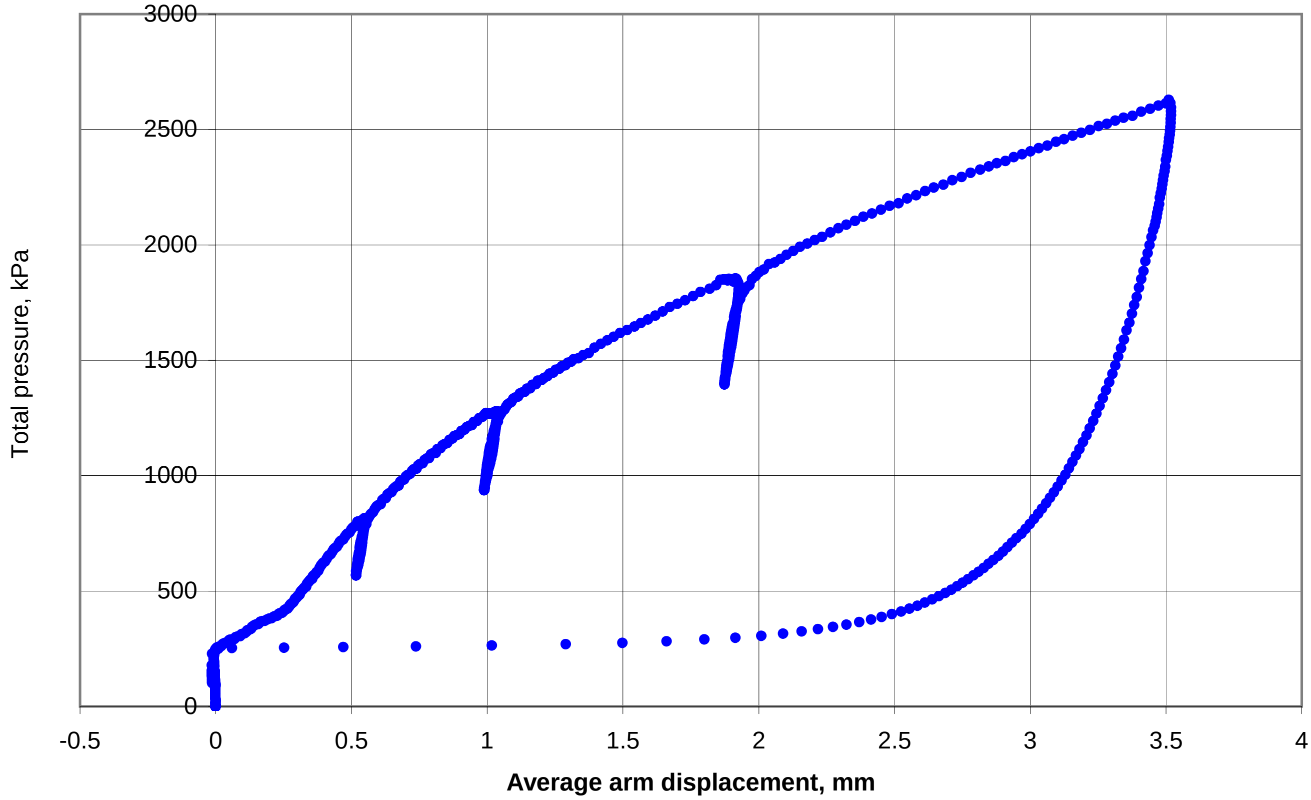
Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Jul-10
Probe	SBP-3 930911
Material	ands with hard bands of 'ro

Test reference	B4T9
GWL (mbgl)	
Test pocket (mbgl)	27.60-28.60

BH	SBP2009_4
Test	9
Depth, m	28.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	440	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	440
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	572

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	47.8	ν (deg)	22.5

Initial shear modulus (Average arm)

G_i (MPa)	36

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	161	0.139			0.723	17.5	
2	150	0.203			0.830	48.7	
3	167	0.219			0.922	115.9	

Remarks

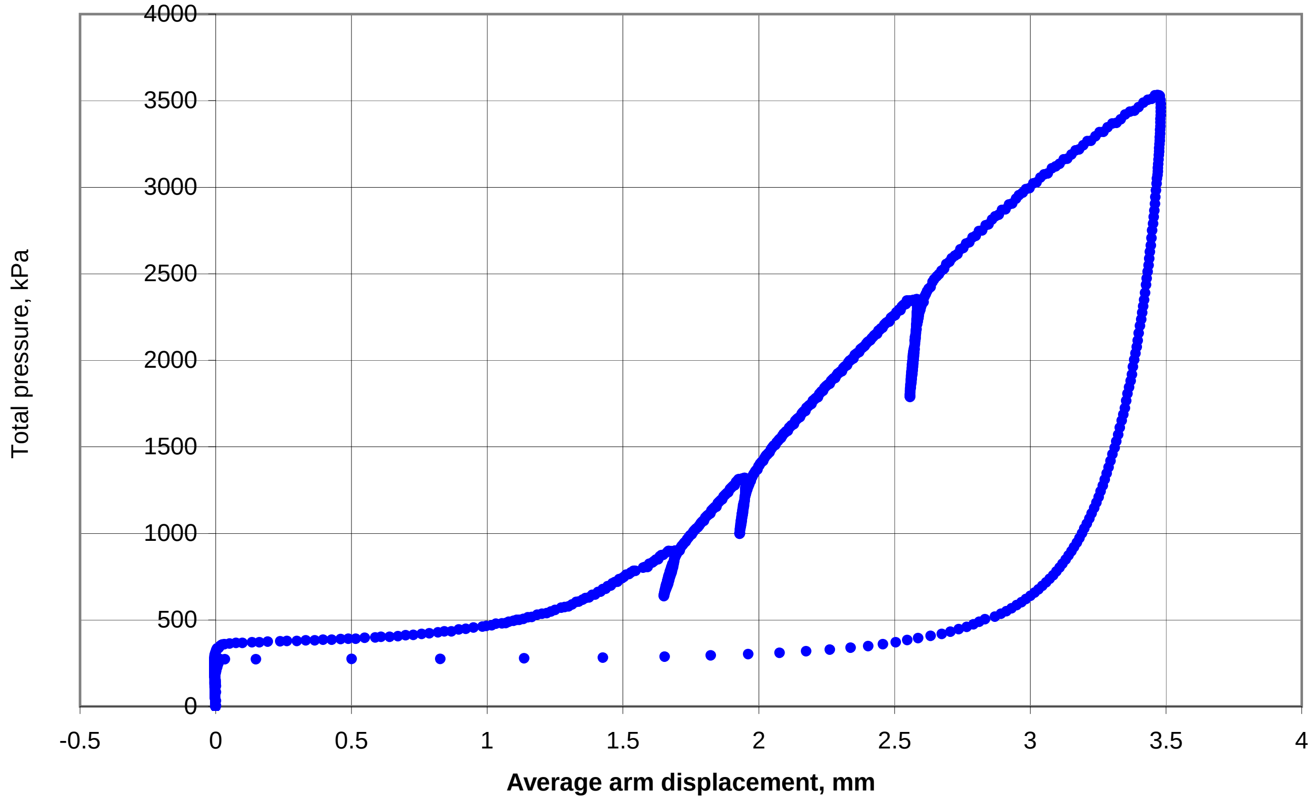
Max test pressure = 2629 kPa. Max av displ = 3.52 mm. Max arm displ = 4.66 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T9**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Jul-10	Test reference	B4T10		BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)			Test	10
Material	Gravel and sands	Test pocket (mbgl)	30.60-31.60		Depth, m	31.10



In situ horizontal stress (Average arm)

$P_{o\,BE}$ (kPa)	1105	$P_{o\,LO}$ (kPa)		$P_{o\,MR}$ (kPa)	1102
$P_{o\,curve\ modelling}$ (kPa)				$P_{o\,drained}$ (kPa)	1420

Shear strength (Average arm)

$c_{u\,loading}$ (kPa)		$c_{u\,unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	47.1	ν (deg)	21.5

Initial shear modulus (Average arm)

G_i (MPa)	42

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	129	0.180			0.598	5.0	
2	260	0.093			0.698	18.7	
3	402	0.108			0.812	85.4	

Remarks

Max test pressure = 3532 kPa. Max av displ = 3.48 mm. Max arm displ = 3.85 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_4 T10

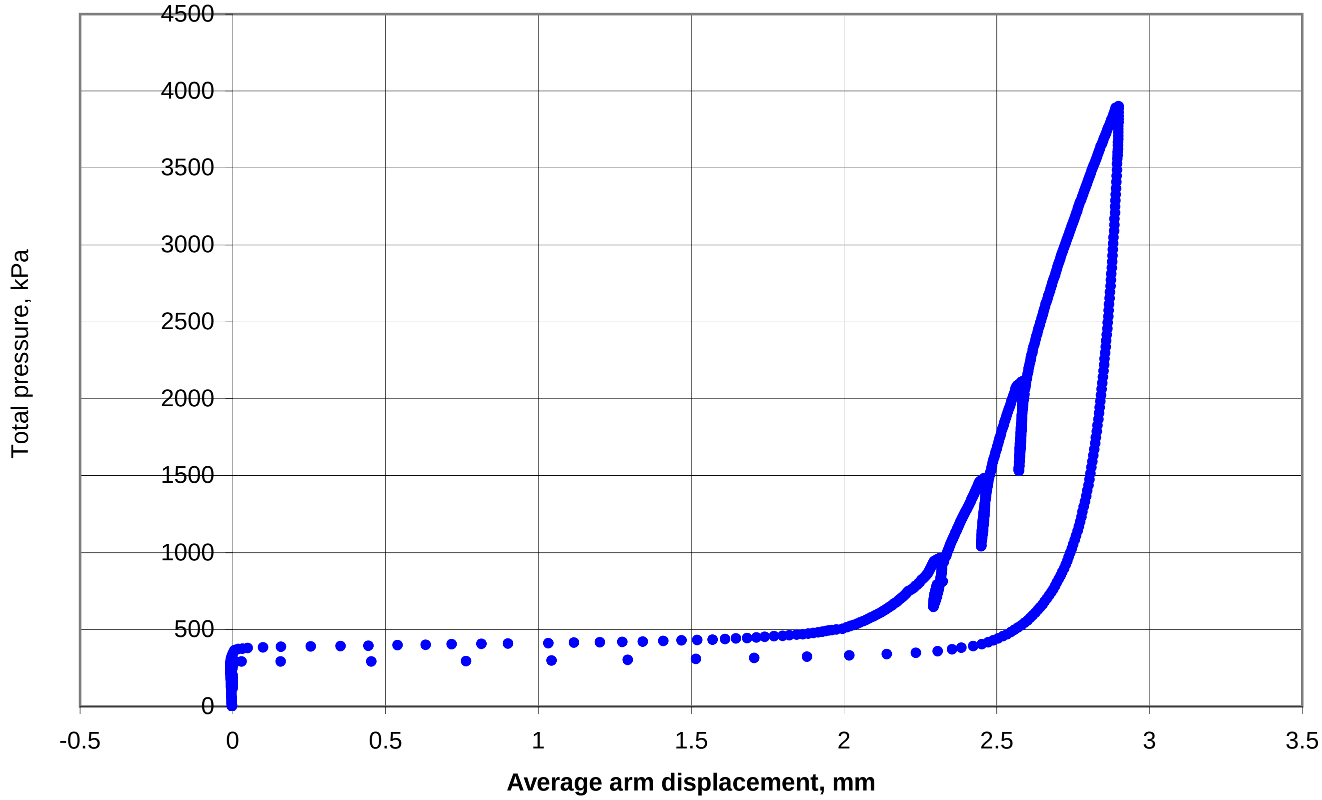
Self Boring Pressuremeter Test

Soil Mechanics

Date	21-Jul-10
Probe	SBP-3 930911
Material	Gravel and sands

Test reference	B4T11
GWL (mbgl)	
Test pocket (mbgl)	32.60-33.60

BH	SBP2009_4
Test	11
Depth, m	33.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1375	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1377
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2085

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	53.3	ν (deg)	30.2

Initial shear modulus (Average arm)

G_i (MPa)	144

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	268	0.113			0.587	6.1	
2	539	0.063			0.640	19.9	
3	842	0.048			0.771	102.4	

Remarks

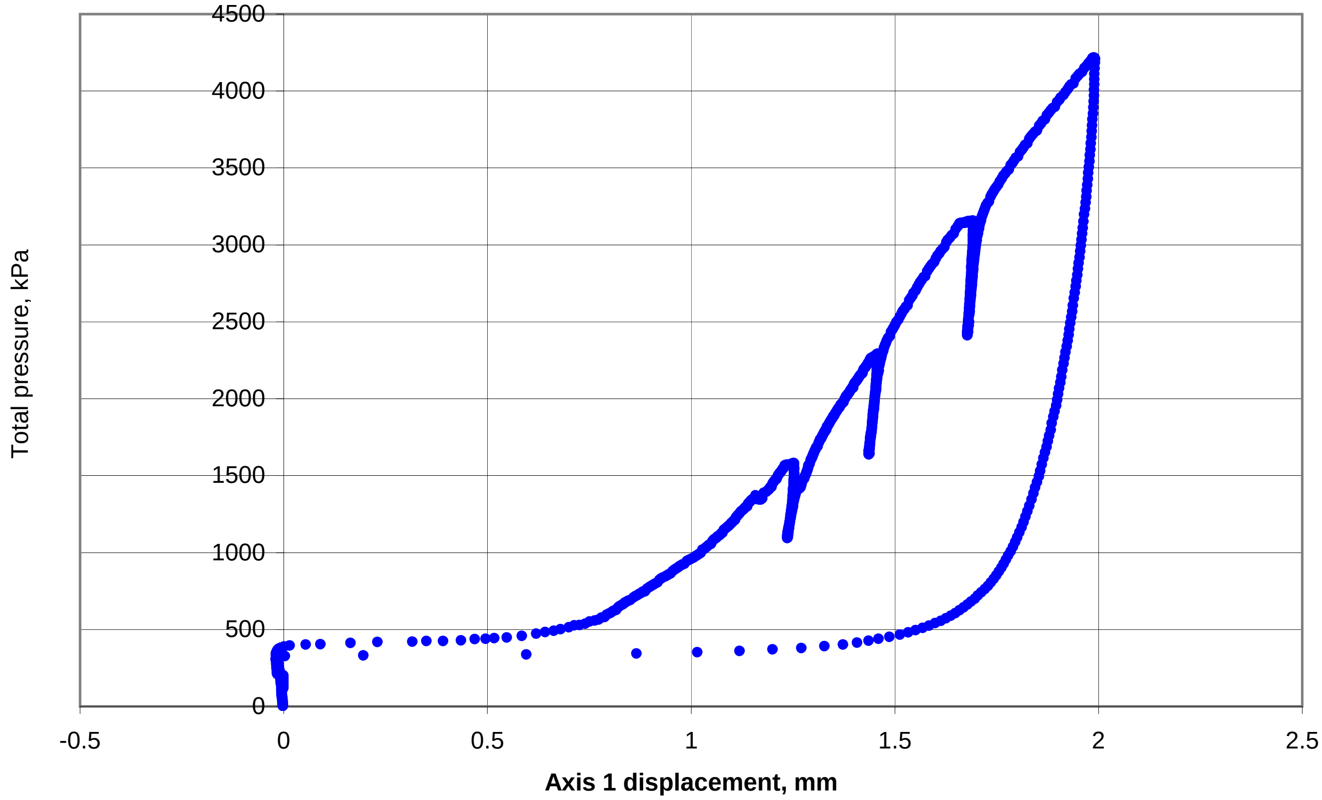
Max test pressure = 2996 kPa. Max av displ = 2.72 mm. Max arm displ = 3.9 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:	Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	Figure
	Project No.	M0102-10	**SBP2009_4 T11**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	22-Jul-10	Test reference	B4T12	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	12
Material	Gravel and sands	Test pocket (mbgl)	34.60-35.60	Depth, m	35.10



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1620	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1619
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2515

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	47.9	ν (deg)	22.6

Initial shear modulus (Axis 1)

G_i (MPa)	98

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	373	0.054			1.006	427.5	
2	582	0.084			0.973	503.1	
3	735	0.029			0.929	336.5	

Remarks

Max test pressure = 3223 kPa. Max av displ = 1.65 mm. Max arm displ = 1.81 mm (Arm2). No of loops = 3 . Analysis type: Axis 1. Arm 2 sticking temporarily. Arm 3 jump.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

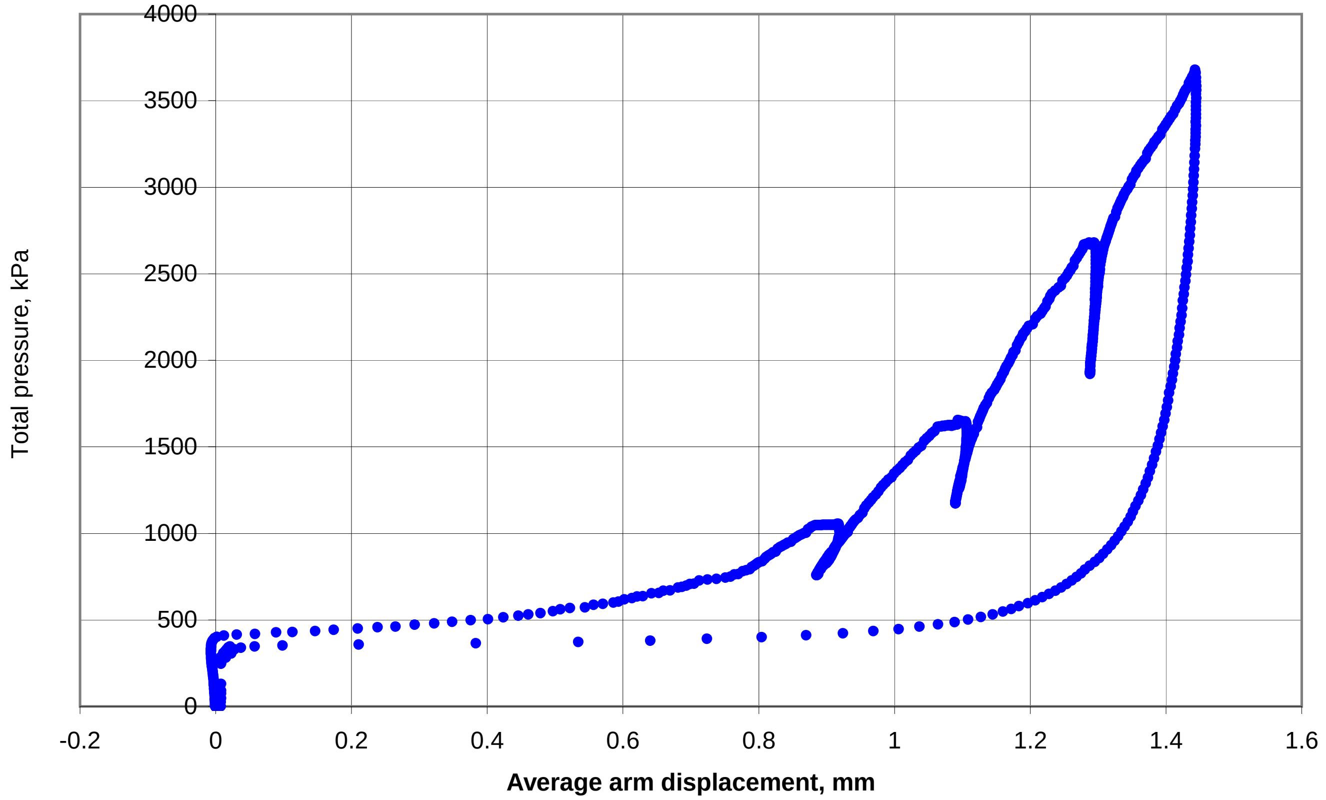
Figure

SBP2009_4 T12

Self Boring Pressuremeter Test

Soil Mechanics

Date	23-Jul-10	Test reference	B4T13	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	13
Material	Gravel and sands	Test pocket (mbgl)	36.60-37.60	Depth, m	37.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1805	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1807
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2289

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.6	ν (deg)	18.2

Initial shear modulus (Average arm)

G_i (MPa)	132

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	139	0.147			0.750	17.5	
2	418	0.065			0.681	22.9	
3	1111	0.032			0.775	125.7	

Remarks

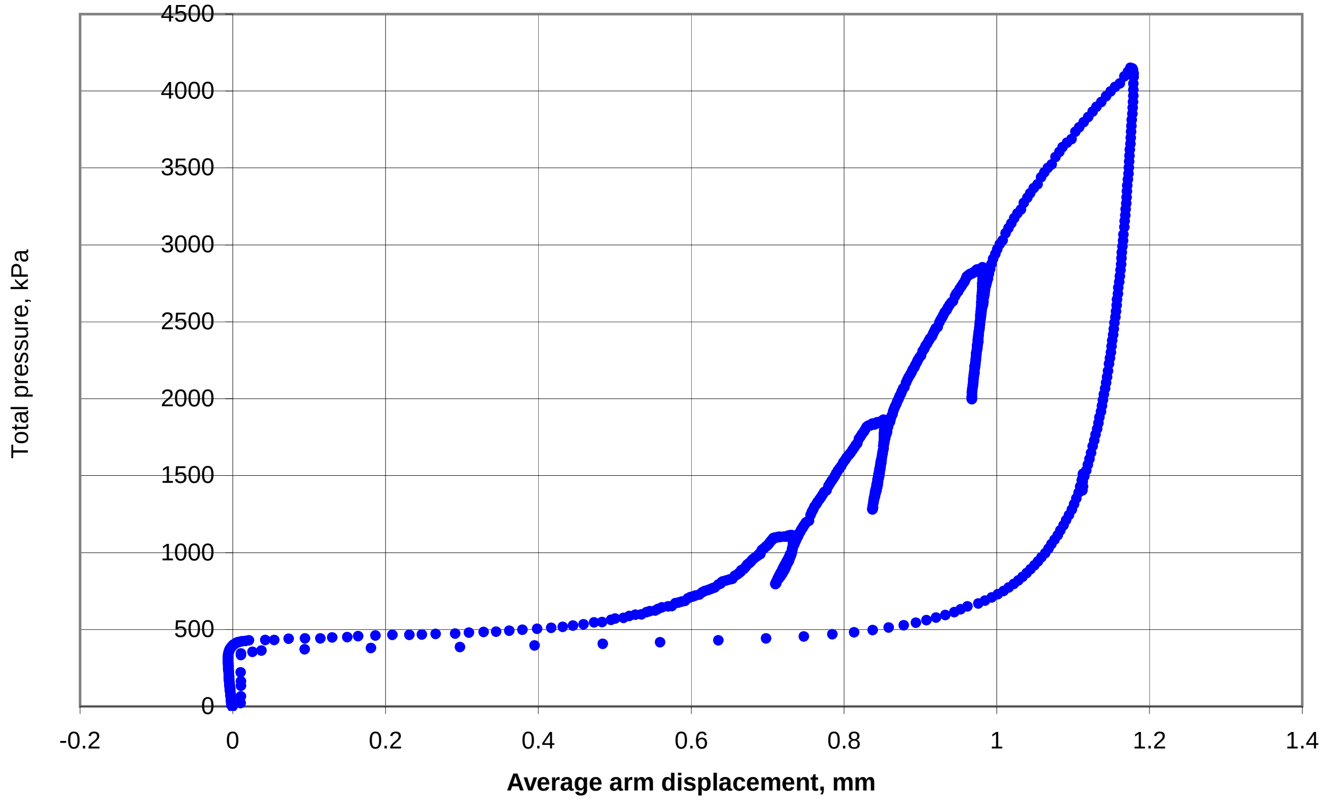
Max test pressure = 3677 kPa. Max av displ = 1.44 mm. Max arm displ = 2.64 mm (Arm3). No of loops = 3 . Analysis type: Average arm. Arm 2 response stiffer

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T13**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	24-Jul-10	Test reference	B4T14	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	14
Material	Gravel and sands	Test pocket (mbgl)	38.60-39.60	Depth, m	39.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1675	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1675
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2491

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	43.8	ν (deg)	17.0

Initial shear modulus (Average arm)

G_i (MPa)	177

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	250	0.102			0.792	35.8	
2	662	0.065			0.741	60.4	
3	1037	0.056			0.730	85.0	

Remarks

Max test pressure = 4150 kPa. Max av displ = 1.18 mm. Max arm displ = 2.64 mm (Arm3). No of loops = 3 . Analysis type: Average arm. Arm 2 response stiffer

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

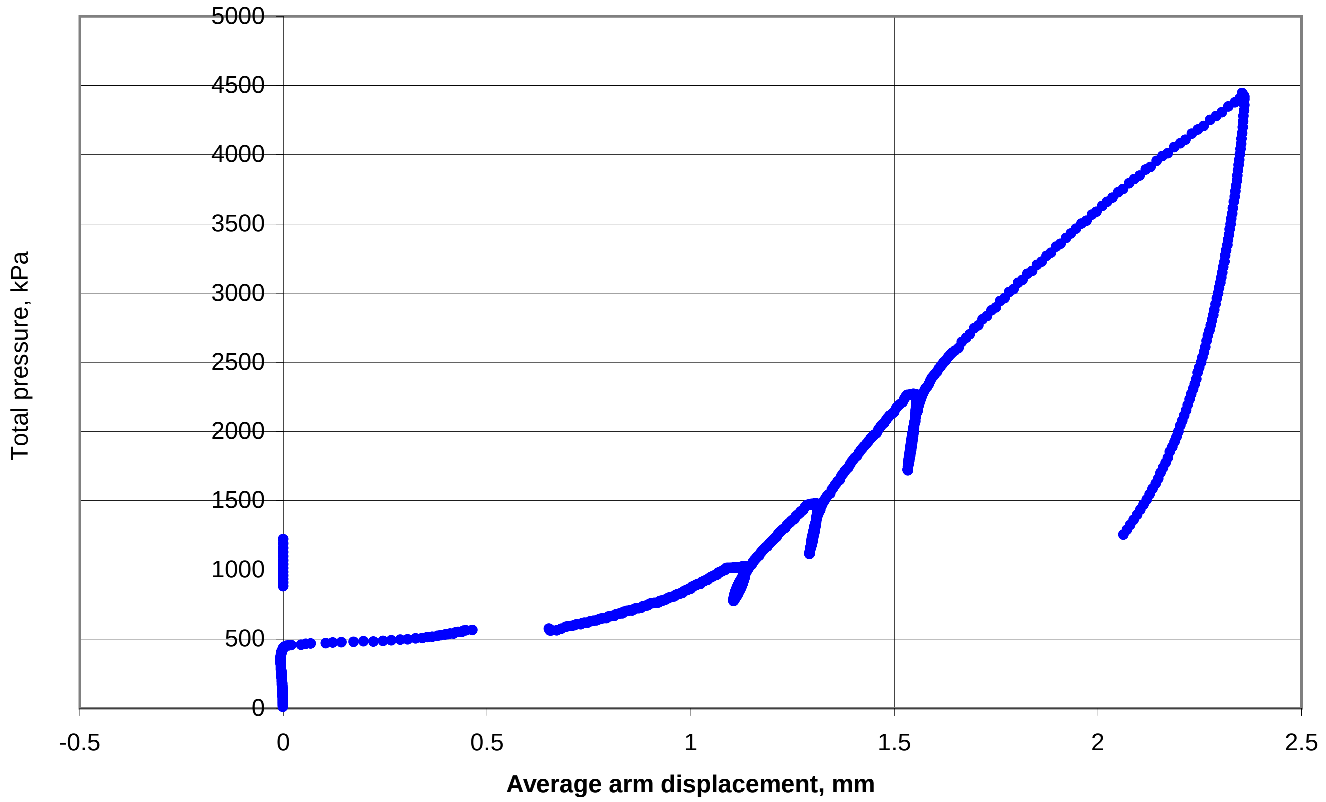
Figure

SBP2009_4 T14

Self Boring Pressuremeter Test

Soil Mechanics

Date	25-Jul-10	Test reference	B4T15	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	15
Material	Gravel and sands	Test pocket (mbgl)	40.60-41.60	Depth, m	41.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1110	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1109
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2016

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	52.4	ν (deg)	28.9

Initial shear modulus (Average arm)

G_i (MPa)	72

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	162	0.135			0.514	2.7	
2	347	0.081			0.743	36.5	
3	486	0.087			0.719	39.6	

Remarks

Max test pressure = 2271 kPa. Max av displ = 1.56 mm. Max arm displ = 1.98 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

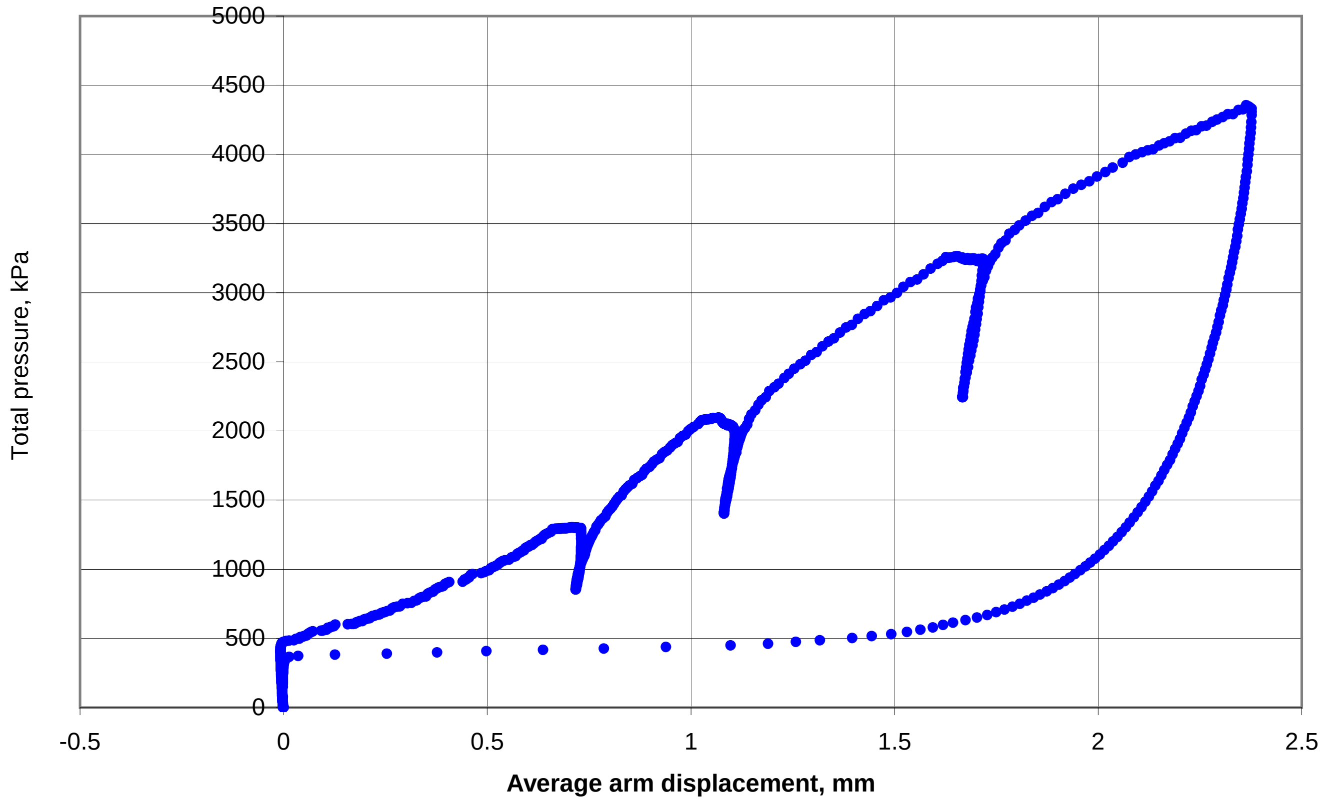
Figure

SBP2009_4 T15

Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Jul-10	Test reference	B4T16	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	16
Material	Sand and clays	Test pocket (mbgl)	42.60-43.60	Depth, m	43.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1290	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1292
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1851

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	50.8	ν (deg)	26.6

Initial shear modulus (Average arm)

G_i (MPa)	61

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	356	0.056			0.666	16.9	
2	402	0.107			0.696	30.1	
3	413	0.224			0.680	33.5	

Remarks

Max test pressure = 4356 kPa. Max av displ = 2.38 mm. Max arm displ = 2.8 mm (Arm2). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_4 T16

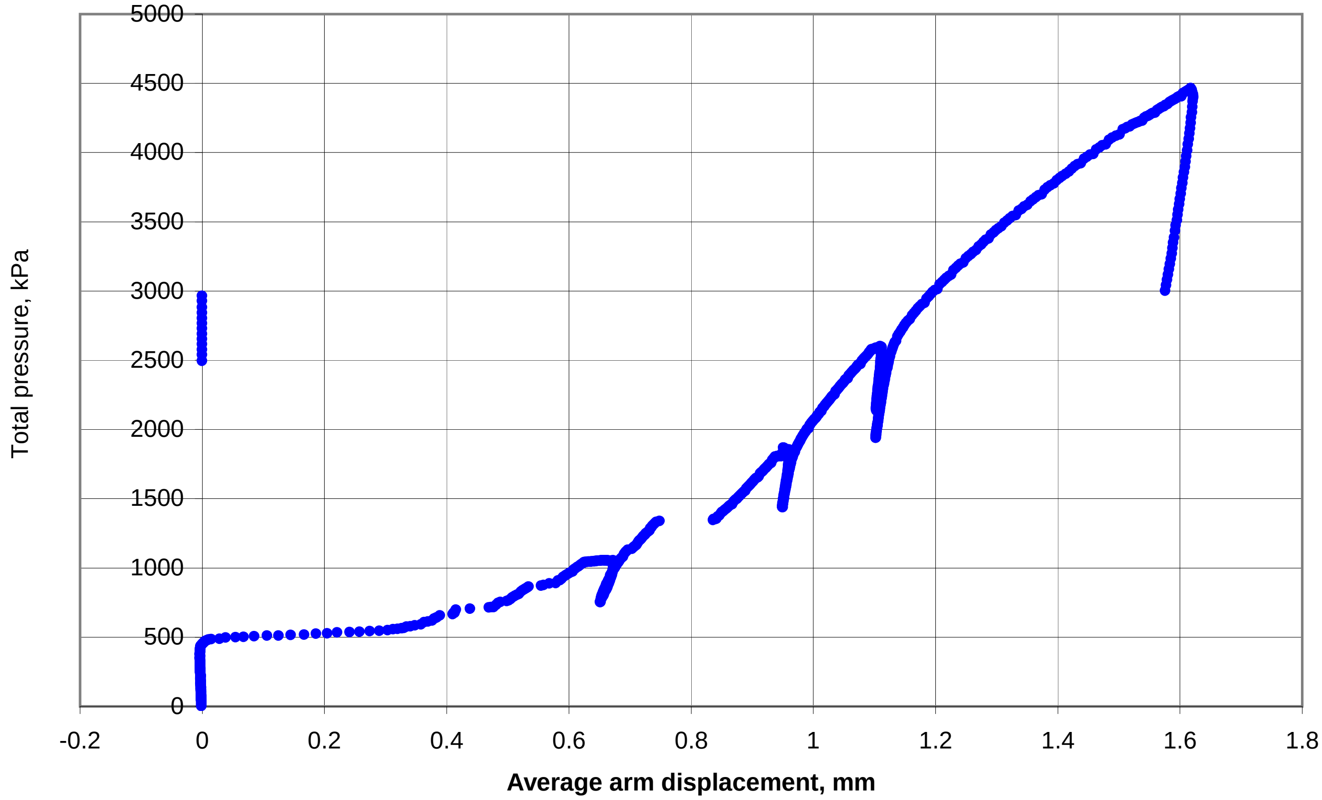
Self Boring Pressuremeter Test

Soil Mechanics

Date	26-Jul-10
Probe	SBP-3 930911
Material	Sand and clays

Test reference	B4T17
GWL (mbgl)	
Test pocket (mbgl)	43.60-44.60

BH	SBP2009_4
Test	17
Depth, m	44.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1495	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1496
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2368

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	44.2	ν (deg)	17.6

Initial shear modulus (Average arm)

G_i (MPa)	101

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	257	0.096			0.675	14.8	
2	585	0.035			0.874	170.6	
3	761	0.023			0.877	211.4	

Remarks

Max test pressure = 2601 kPa. Max av displ = 1.11 mm. Max arm displ = 1.66 mm (Arm3). No of loops = 3 . Analysis type: Average arm. Arm 2 sticking.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

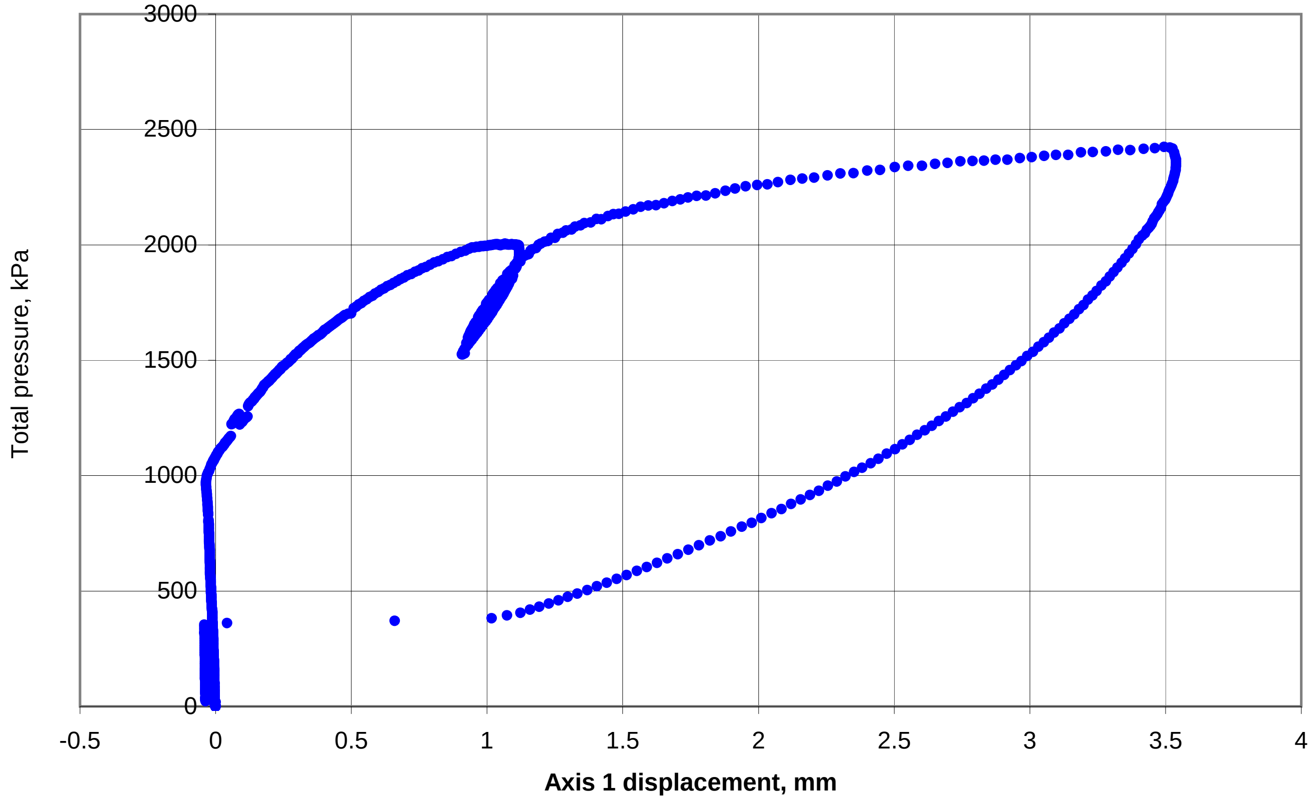
Figure

SBP2009_4 T17

Self Boring Pressuremeter Test

Soil Mechanics

Date	28-Jul-10	Test reference	B4T18	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	18
Material	Sand and clays	Test pocket (mbgl)	45.10-46.10	Depth, m	45.60



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	995	$P_{o\ LO}$ (kPa)	995	$P_{o\ MR}$ (kPa)	1128
$P_{o\ curve\ modelling}$ (kPa)	966			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	382	$c_{u\ unloading}$ (kPa)	372	p_L (kPa)	3198
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	39

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	45	0.903	0.709	11.7			

Remarks

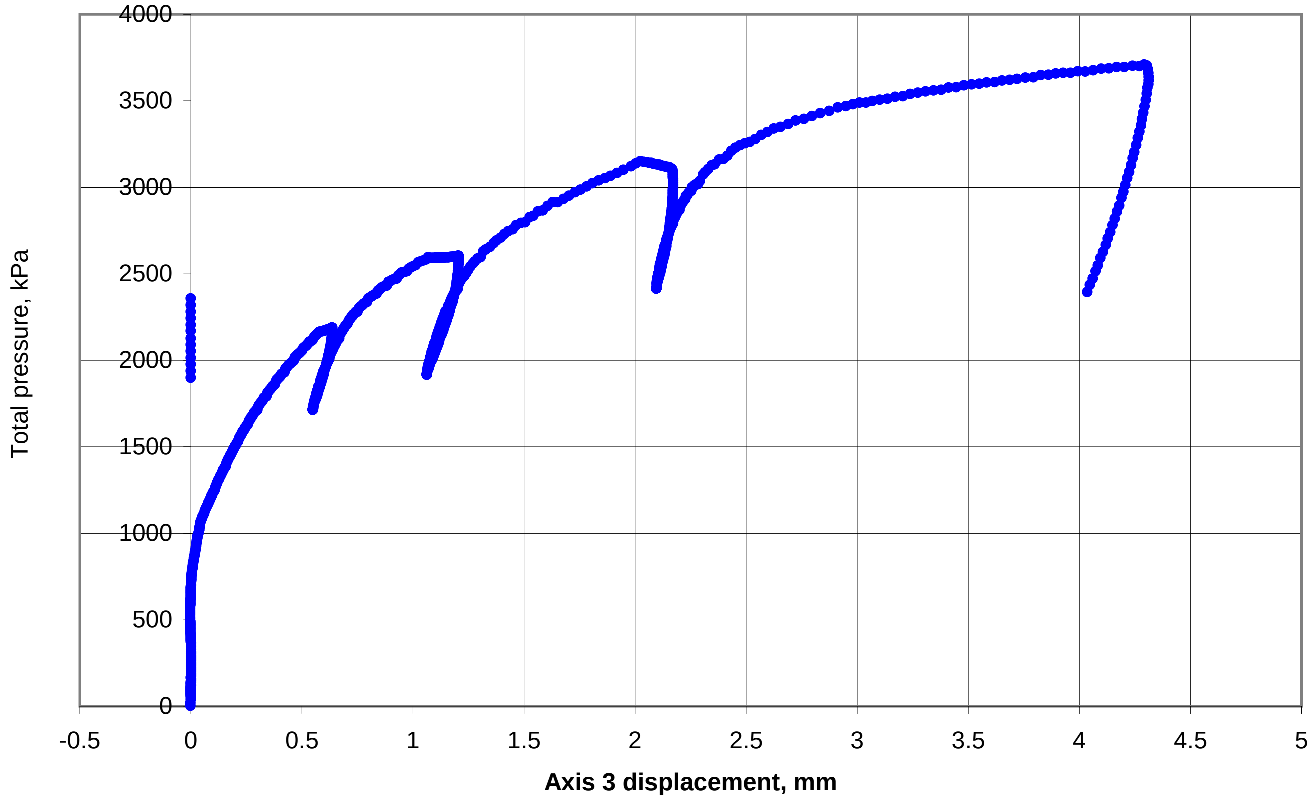
Max test pressure = 2424 kPa. Max av displ = 3.55 mm. Max arm displ = 10.52 mm (Arm2). No of loops = 1 . Analysis type: Axis 1. Arm 2 offline during early part of test

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T18**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	29-Jul-10	Test reference	B4T19	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	19
Material	Clays	Test pocket (mbgl)	46.60-47.60	Depth, m	47.10



In situ horizontal stress (Axis 3)

$P_{o\ BE}$ (kPa)	1100	$P_{o\ LO}$ (kPa)	1070	$P_{o\ MR}$ (kPa)	1139
$P_{o\ curve\ modelling}$ (kPa)	356			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 3)

$c_{u\ loading}$ (kPa)	862	$c_{u\ unloading}$ (kPa)	635	p_L (kPa)	5311
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 3)

G_i (MPa)	59

Unload-reload loop shear modulus (Axis 3)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	95	0.332	0.697	11.7			
2	87	0.588	0.729	16.0			
3	136	0.252	0.657	11.4			

Remarks

Max test pressure = 3151 kPa. Max av displ = 1.29 mm. Max arm displ = 2.17 mm (Arm3). No of loops = 3 . Analysis type: Axis 3. Arm 1 liftoff after Loop 2

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

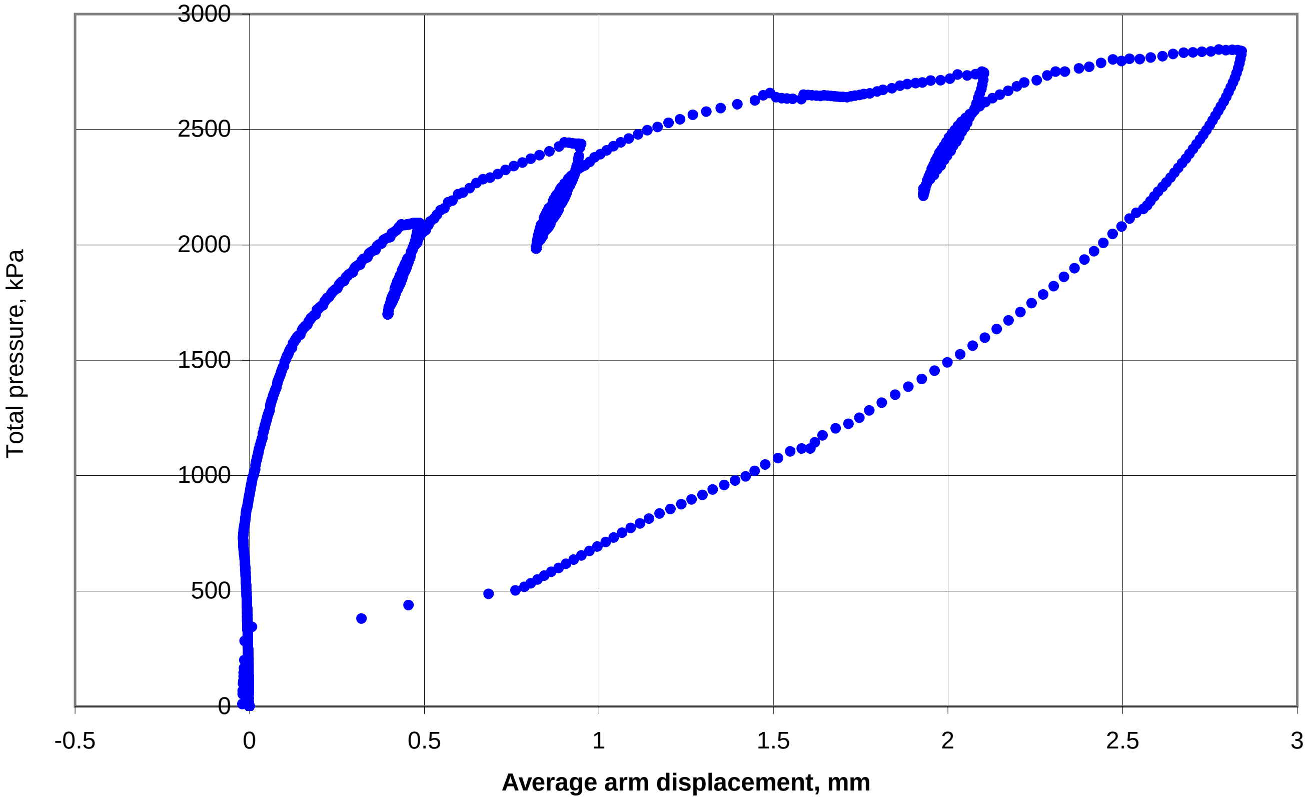
Figure

SBP2009_4 T19

Self Boring Pressuremeter Test

Soil Mechanics

Date	30-Jul-10	Test reference	B4T20	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	20
Material	Clays	Test pocket (mbgl)	48.10-49.10	Depth, m	48.60



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	780	$P_{o\ LO}$ (kPa)	780	$P_{o\ MR}$ (kPa)	936
$P_{o\ curve\ modelling}$ (kPa)	1115			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	385	$c_{u\ unloading}$ (kPa)	354	p_L (kPa)	3674
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	139

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	88	0.384	0.669	9.1			
2	67	0.541	0.492	2.2			
3	60	0.734	0.565	4.0			

Remarks

Max test pressure = 2846 kPa. Max av displ = 2.84 mm. Max arm displ = 4.73 mm (Arm1). No of loops = 3 . Analysis type: Average arm. Arm responses somewhat erratic

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

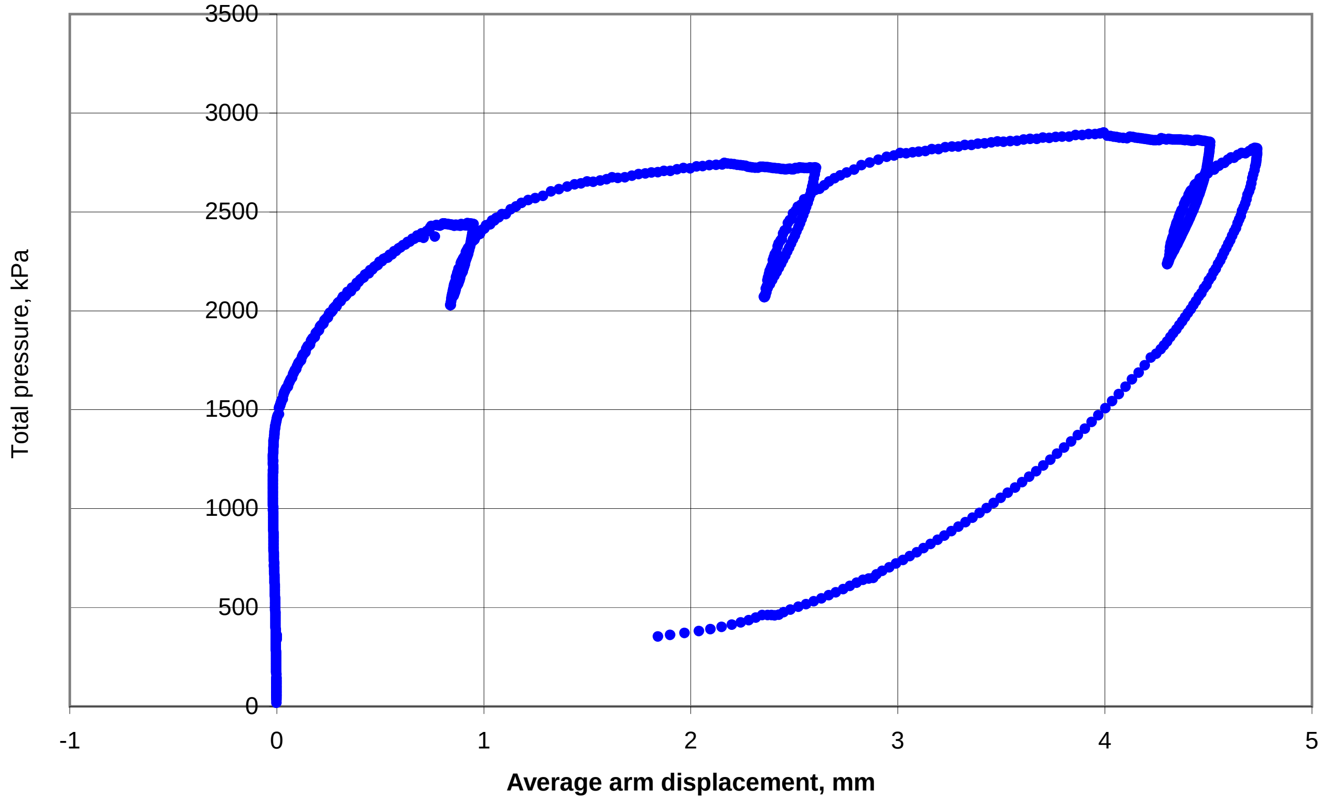
Figure

SBP2009_4 T20

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Aug-10	Test reference	B4T21	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	21
Material	Clays	Test pocket (mbgl)	49.10-50.10	Depth, m	49.60



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1600	$P_{o\ LO}$ (kPa)	1601	$P_{o\ MR}$ (kPa)	1527
$P_{o\ curve\ modelling}$ (kPa)	948			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	177	$c_{u\ unloading}$ (kPa)	386	p_L (kPa)	3170
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	46

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	72	0.462	0.619	5.9			
2	55	1.022	0.804	23.9			
3	60	0.801	0.614	6.2			

Remarks

Max test pressure = 2900 kPa. Max av displ = 4.51 mm. Max arm displ = 5.02 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

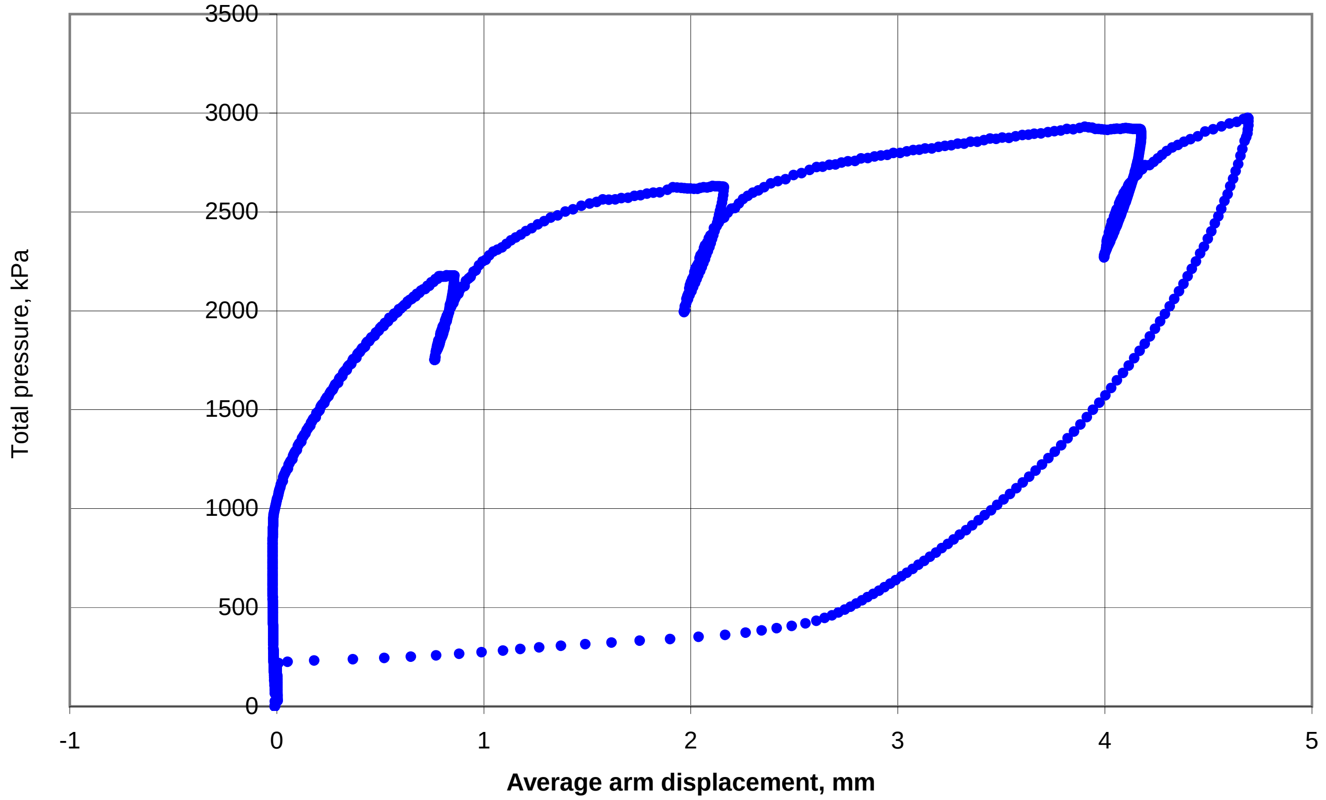
Figure

SBP2009_4 T21

Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Aug-10	Test reference	B4T22	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	22
Material	Clays	Test pocket (mbgl)	50.10-51.10	Depth, m	50.60



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1060	$P_{o\ LO}$ (kPa)	1059	$P_{o\ MR}$ (kPa)	1224
$P_{o\ curve\ modelling}$ (kPa)	800			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	417	$c_{u\ unloading}$ (kPa)	300	p_L (kPa)	3677
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	38

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	79	0.371	0.641	6.7			
2	64	0.761	0.606	5.8			
3	68	0.615	0.626	6.7			

Remarks

Max test pressure = 2975 kPa. Max av displ = 4.69 mm. Max arm displ = 5.33 mm (Arm3). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

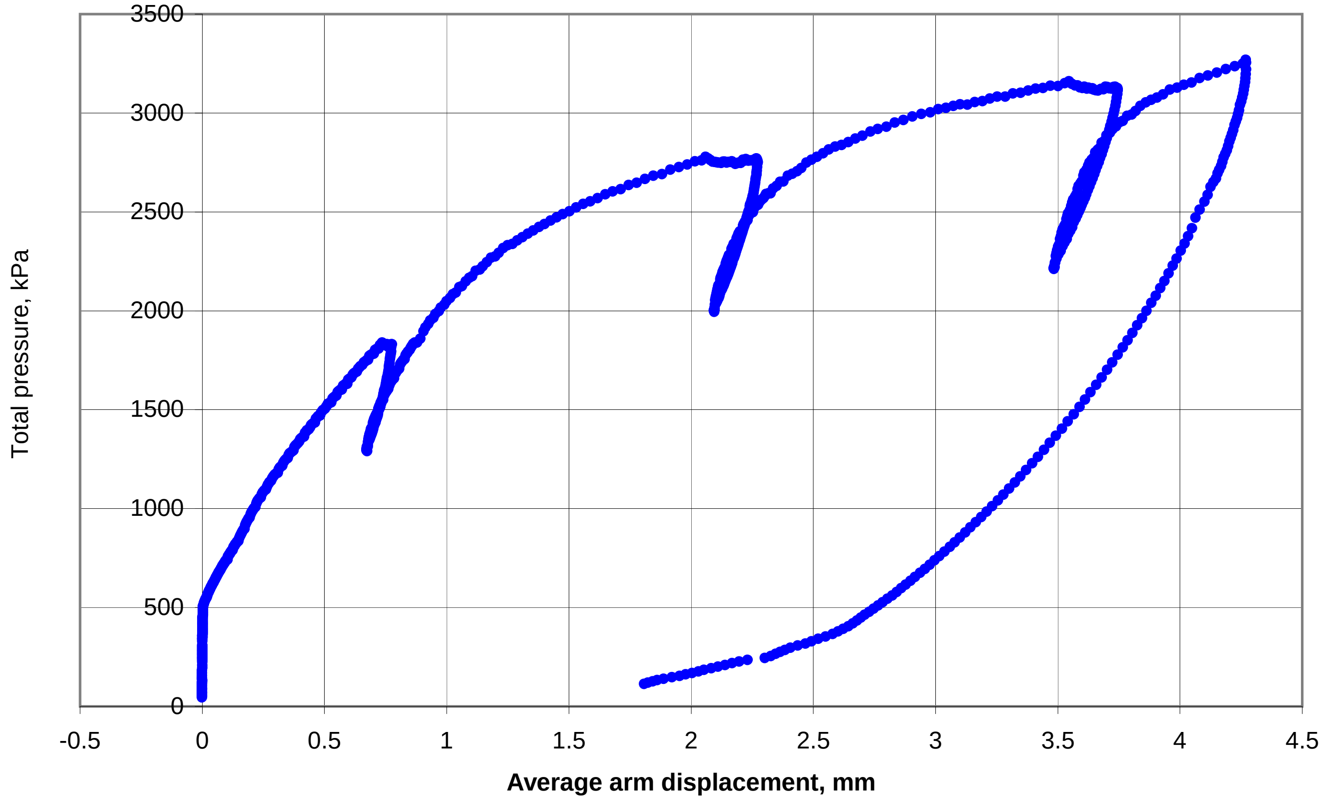
Figure

SBP2009_4 T22

Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Aug-10	Test reference	B4T23	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	23
Material	Clays	Test pocket (mbgl)	51.10-51.80	Depth, m	51.30



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	520	$P_{o\ LO}$ (kPa)	520	$P_{o\ MR}$ (kPa)	543
$P_{o\ curve\ modelling}$ (kPa)	875			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	776	$c_{u\ unloading}$ (kPa)	537	p_L (kPa)	4635
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	51

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	89	0.342	0.582	4.7			
2	81	0.617	0.571	5.1			
3	72	1.021	0.614	7.7			

Remarks

Max test pressure = 3160 kPa. Max av displ = 3.75 mm. Max arm displ = 4.6 mm (Arm1). No of loops = 3 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

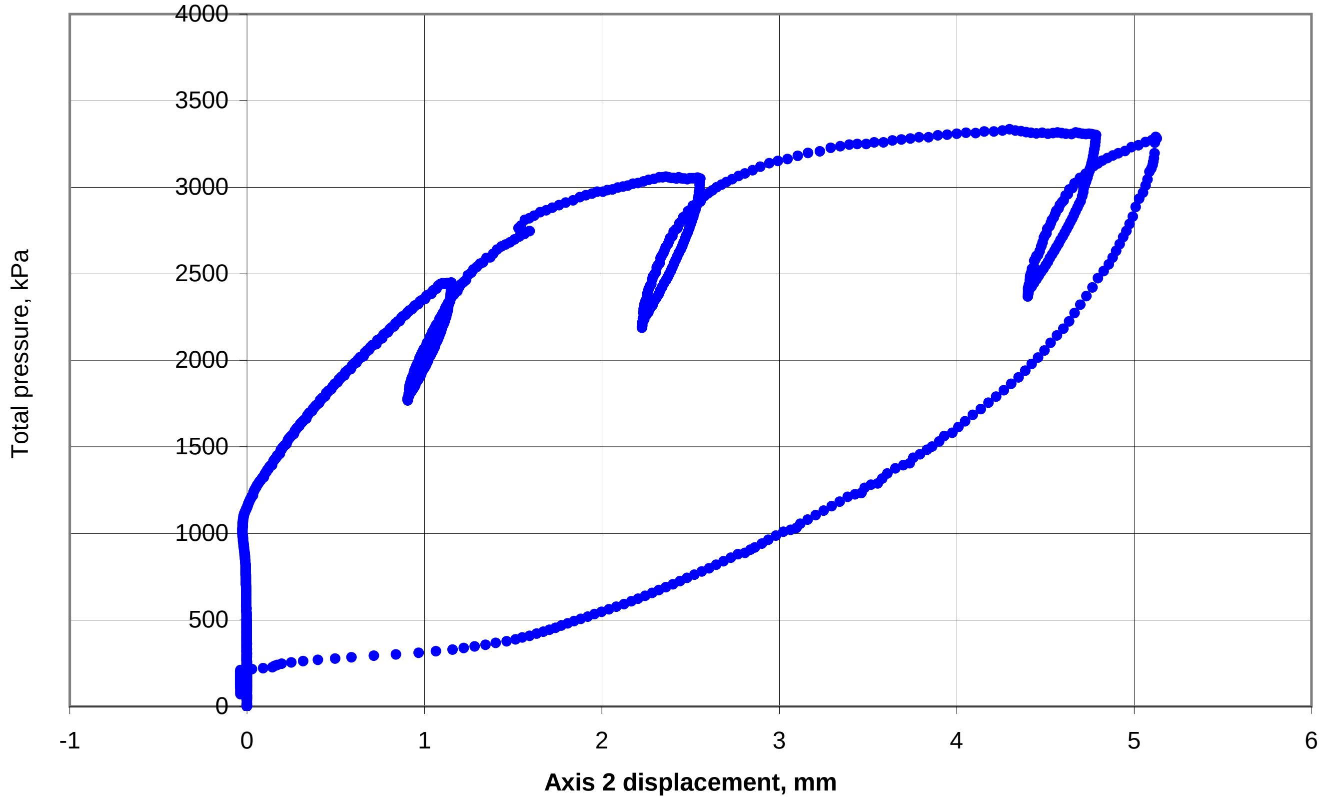
Figure

SBP2009_4 T23

Self Boring Pressuremeter Test

Soil Mechanics

Date	07-Aug-10	Test reference	B4T24	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	24
Material	Clays	Test pocket (mbgl)	52.10-53.10	Depth, m	52.60



In situ horizontal stress (Axis 2)

$P_{o\ BE}$ (kPa)	1120	$P_{o\ LO}$ (kPa)	1119	$P_{o\ MR}$ (kPa)	1228
$P_{o\ curve\ modelling}$ (kPa)	1142			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 2)

$c_{u\ loading}$ (kPa)	745	$c_{u\ unloading}$ (kPa)	532	p_L (kPa)	4748
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 2)

G_i (MPa)	34

Unload-reload loop shear modulus (Axis 2)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	56	1.064	0.624	6.1			
2	56	1.364	0.484	2.8			
3	53	1.503	0.548	4.5			

Remarks

Max test pressure = 3334 kPa. Max av displ = 4.21 mm. Max arm displ = 4.79 mm (Arm2). No of loops = 3 . Analysis type: Axis 2. Arm 1 lift off during Loop 1. Arm 3 sticking during Loop 3.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

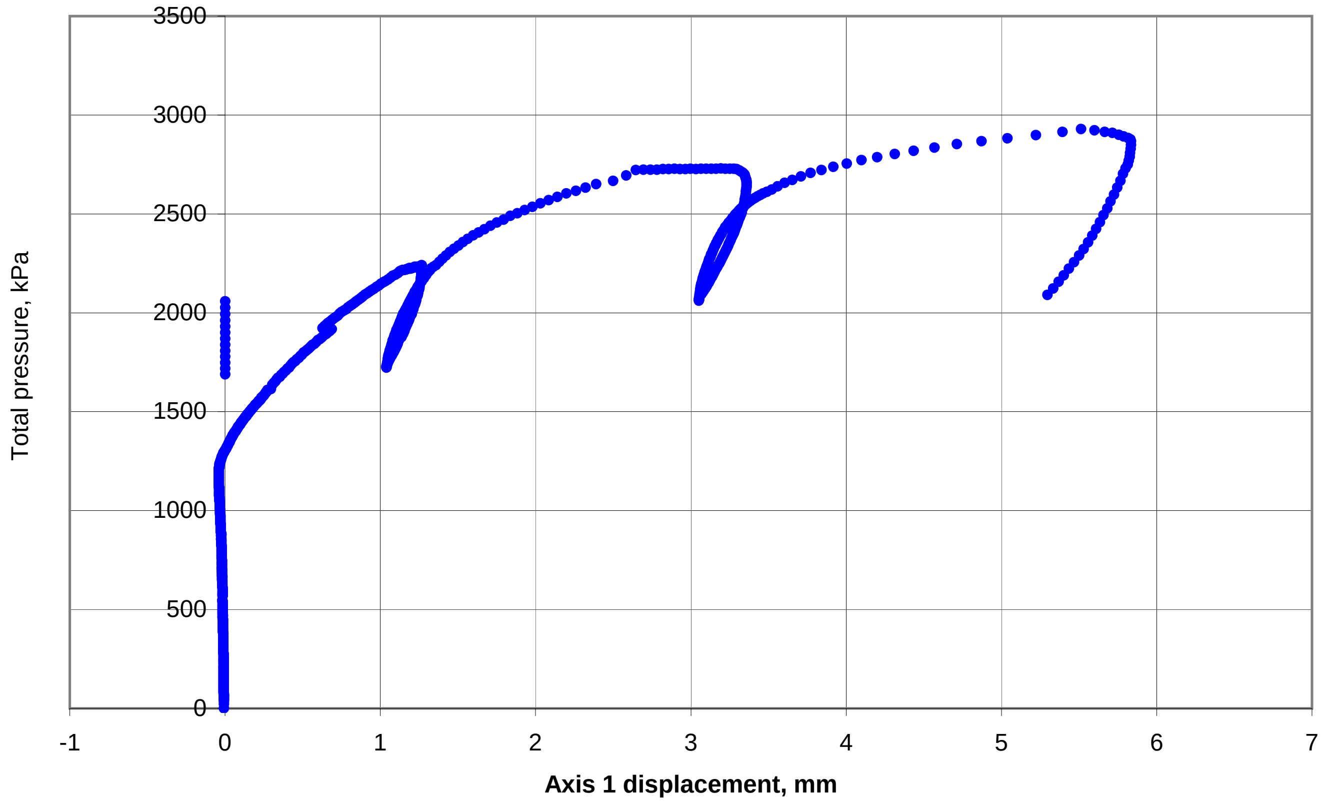
Figure

SBP2009_4 T24

Self Boring Pressuremeter Test

Soil Mechanics

Date	18-Aug-10	Test reference	B4T25	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	25
Material	Stiff silty clay	Test pocket (mbgl)	56.60-57.60	Depth, m	57.10



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1195	$P_{o\ LO}$ (kPa)	1219	$P_{o\ MR}$ (kPa)	1169
$P_{o\ curve\ modelling}$ (kPa)	1194			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	535	$c_{u\ unloading}$ (kPa)	411	p_L (kPa)	3801
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	29

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	46	0.981	0.677	7.1			
2	41	1.232	0.570	3.6			

Remarks

Max test pressure = 2729 kPa. Max av displ = 3.03 mm. Max arm displ = 9.08 mm (Arm2). No of loops = 2 . Analysis type: Axis 1. Arm 2 sticking. Arm 3 late lift off

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

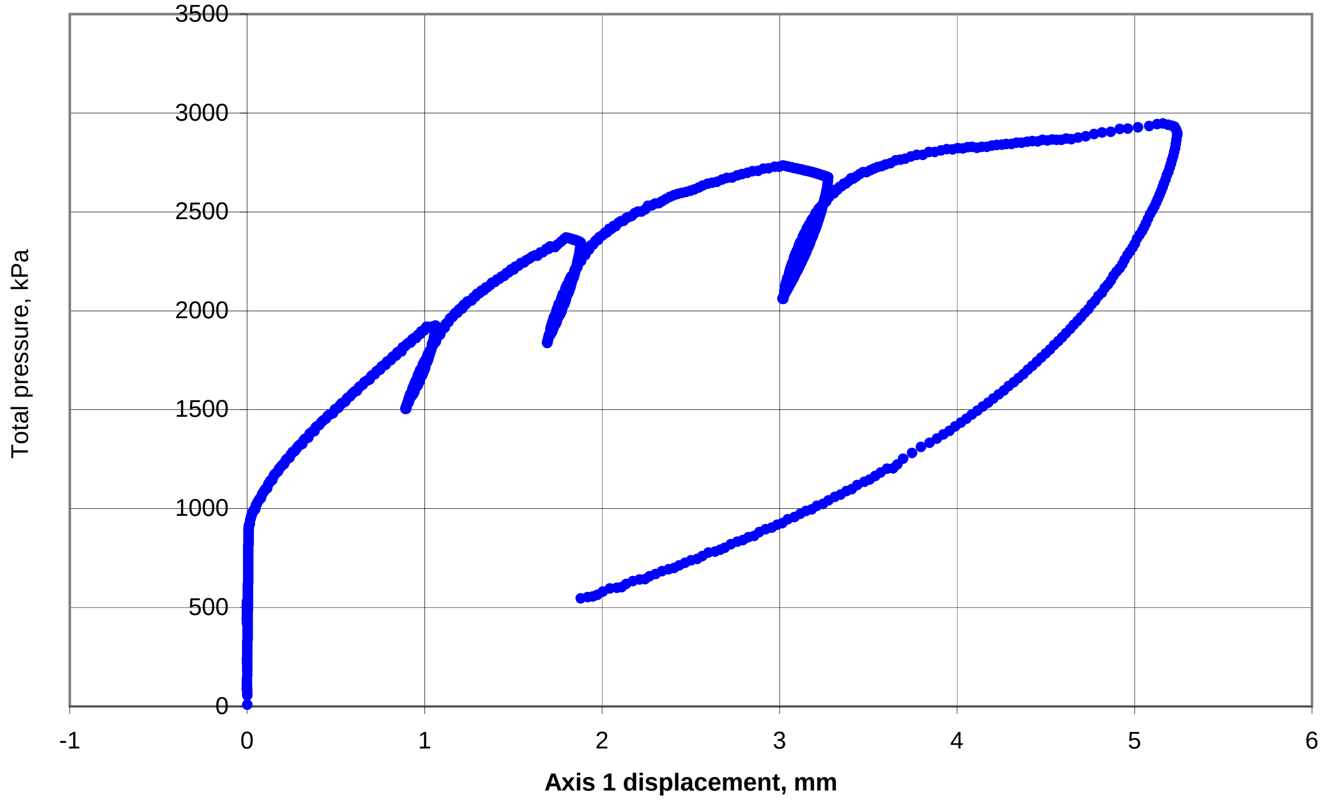
SBP2009_4 T25

Sheet 1 of 1

Self Boring Pressuremeter Test

Soil Mechanics

Date	19-Aug-10	Test reference	B4T26	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	26
Material	Stiff silty clay	Test pocket (mbgl)	57.10-58.10	Depth, m	57.60



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	930	$P_{o\ LO}$ (kPa)	940	$P_{o\ MR}$ (kPa)	929
$P_{o\ curve\ modelling}$ (kPa)	1278			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	787	$c_{u\ unloading}$ (kPa)	427	p_L (kPa)	4404
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	42

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	48	0.697	0.802	15.0			
2	54	0.771	0.718	10.0			
3	50	1.021	0.727	11.8			

Remarks

Max test pressure = 2734 kPa. Max av displ = 3.15 mm. Max arm displ = 3.91 mm (Arm2). No of loops = 3 . Analysis type: Axis 1. Arm 2 and 3 sticking

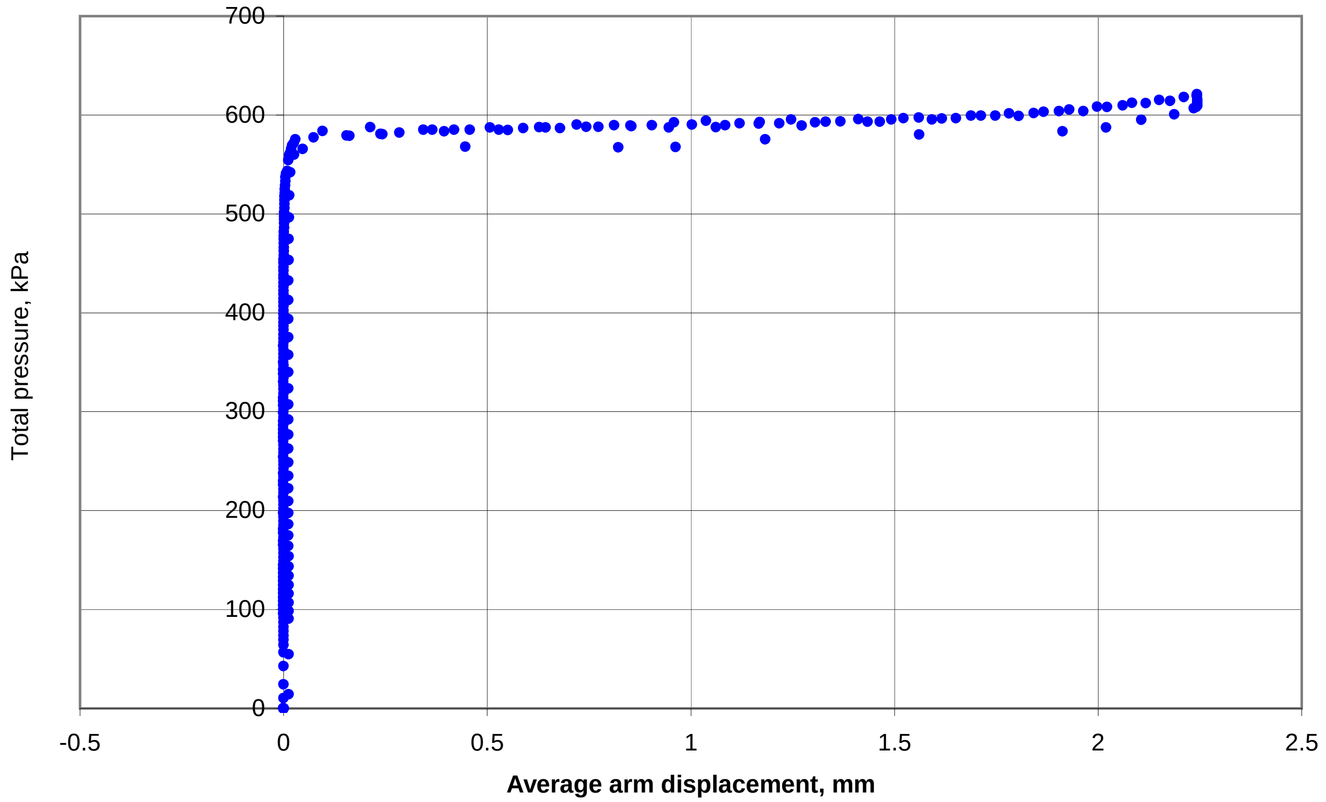
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_4 T26**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	20-Aug-10	Test reference	B4T27	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	27
Material	Stiff silty clay	Test pocket (mbgl)	58.60-59.60	Depth, m	59.10



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 621 kPa. Max av displ = 2.24 mm. Max arm displ = 3.88 mm (Arm2). No of loops = 0 . Analysis type: Average arm. Test pocket disturbed. No suitable data for analysis.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T27**
	Carried out for	NNB Generation Company Limited	

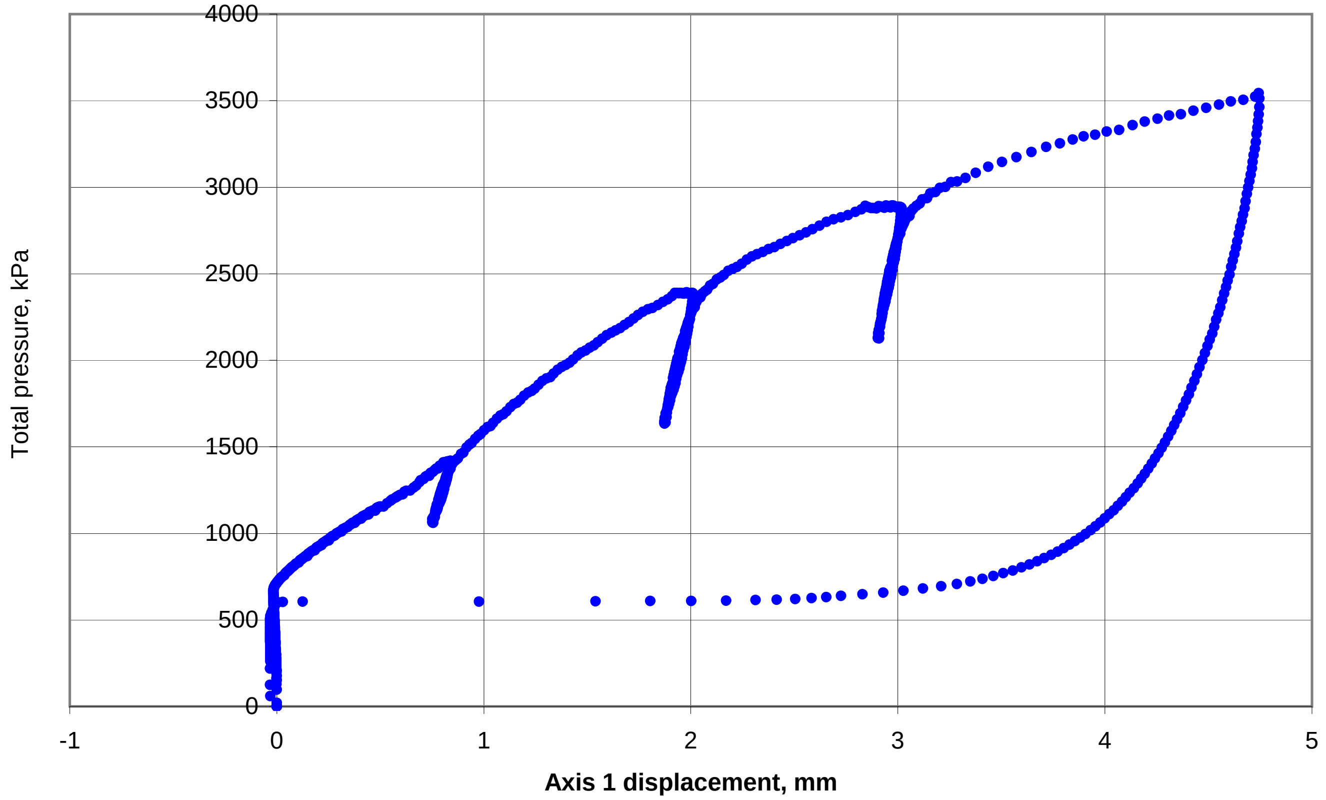
Self Boring Pressuremeter Test

Soil Mechanics

Date	31-Aug-11
Probe	SBP-3 930911
Material	Stiff silty clay

Test reference	B4T31
GWL (mbgl)	
Test pocket (mbgl)	62.30-63.40

BH	SBP2009_4
Test	31
Depth, m	63.40



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1690	$P_{o\ LO}$ (kPa)	690	$P_{o\ MR}$ (kPa)	812
$P_{o\ curve\ modelling}$ (kPa)	1277			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	923	$c_{u\ unloading}$ (kPa)	444	p_L (kPa)	5333
ϕ_{cv} (deg)	30.0	ϕ (deg)	32.8	ν (deg)	3.3

Initial shear modulus (Axis 1)

G_i (MPa)	21

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	86	0.367	0.833	30.2	0.852	31.5	
2	116	0.573	0.871	62.9	0.848	45.7	
3	143	0.456	0.754	31.3	0.841	52.7	

Remarks

Max test pressure = 3293 kPa. Max av displ = 2.83 mm. Max arm displ = 3.9 mm (Arm1). No of loops = 3 . Analysis type: Axis 1. Arm 3 sticking during Loop 3. Drained and undrained analysis carried out.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

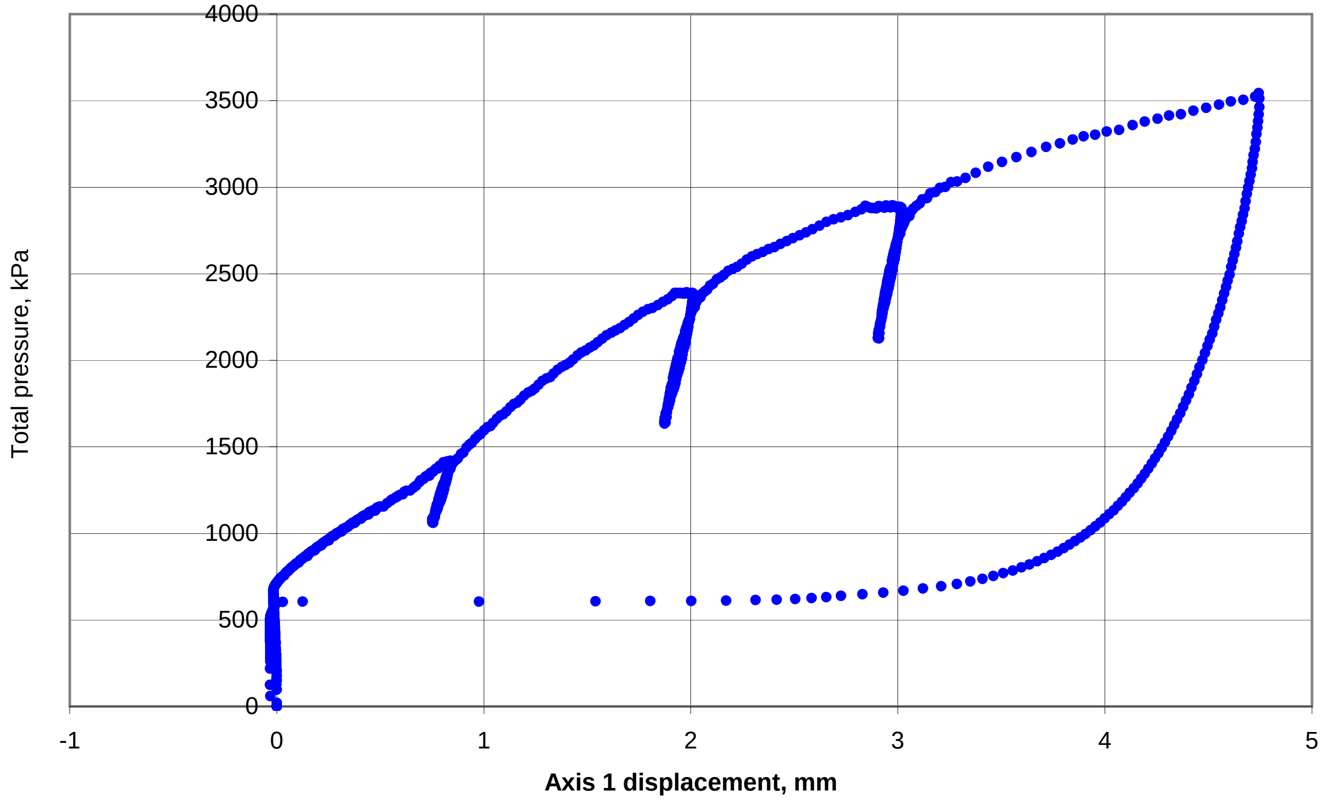
Figure

SBP2009_4 T31

Self Boring Pressuremeter Test

Soil Mechanics

Date	31-Aug-11	Test reference	B4T31	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	31
Material	Stiff silty clay	Test pocket (mbgl)	62.30-63.40	Depth, m	63.40



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1690	$P_{o\ LO}$ (kPa)	690	$P_{o\ MR}$ (kPa)	812
$P_{o\ curve\ modelling}$ (kPa)	1277			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	923	$c_{u\ unloading}$ (kPa)	444	p_L (kPa)	5333
ϕ_{cv} (deg)	30.0	ϕ (deg)	32.8	ν (deg)	3.3

Initial shear modulus (Axis 1)

G_i (MPa)	21

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	86	0.367	0.833	30.2	0.852	31.5	
2	116	0.573	0.871	62.9	0.848	45.7	
3	143	0.456	0.754	31.3	0.841	52.7	

Remarks

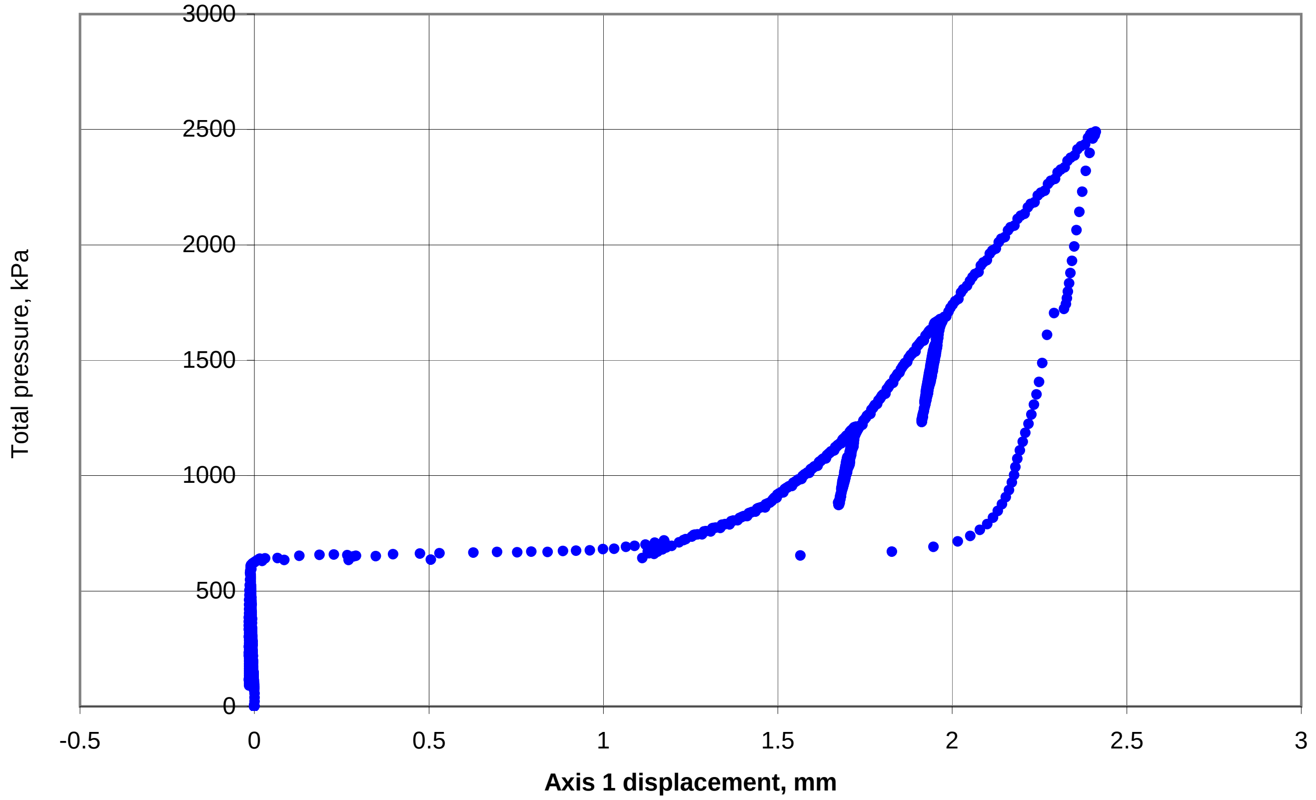
Max test pressure = 3293 kPa. Max av displ = 2.83 mm. Max arm displ = 3.9 mm (Arm1). No of loops = 3 . Analysis type: Axis 1. Arm 3 sticking during Loop 3. Drained and undrained analysis carried out.

Notes:	**Project** ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL **Project No.** M0102-10 **Carried out for** NNB Generation Company Limited	**Figure** **SBP2009_4 T31**

Self Boring Pressuremeter Test

Soil Mechanics

Date	02-Sep-11	Test reference	B4T33	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	33
Material	Sands	Test pocket (mbgl)	66.10-67.10	Depth, m	66.60



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1150	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1152
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	1501

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	50.9	ν (deg)	26.9

Initial shear modulus (Axis 1)

G_i (MPa)	46

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	149	0.220			0.914	86.8	
2	185	0.234			0.850	64.8	

Remarks

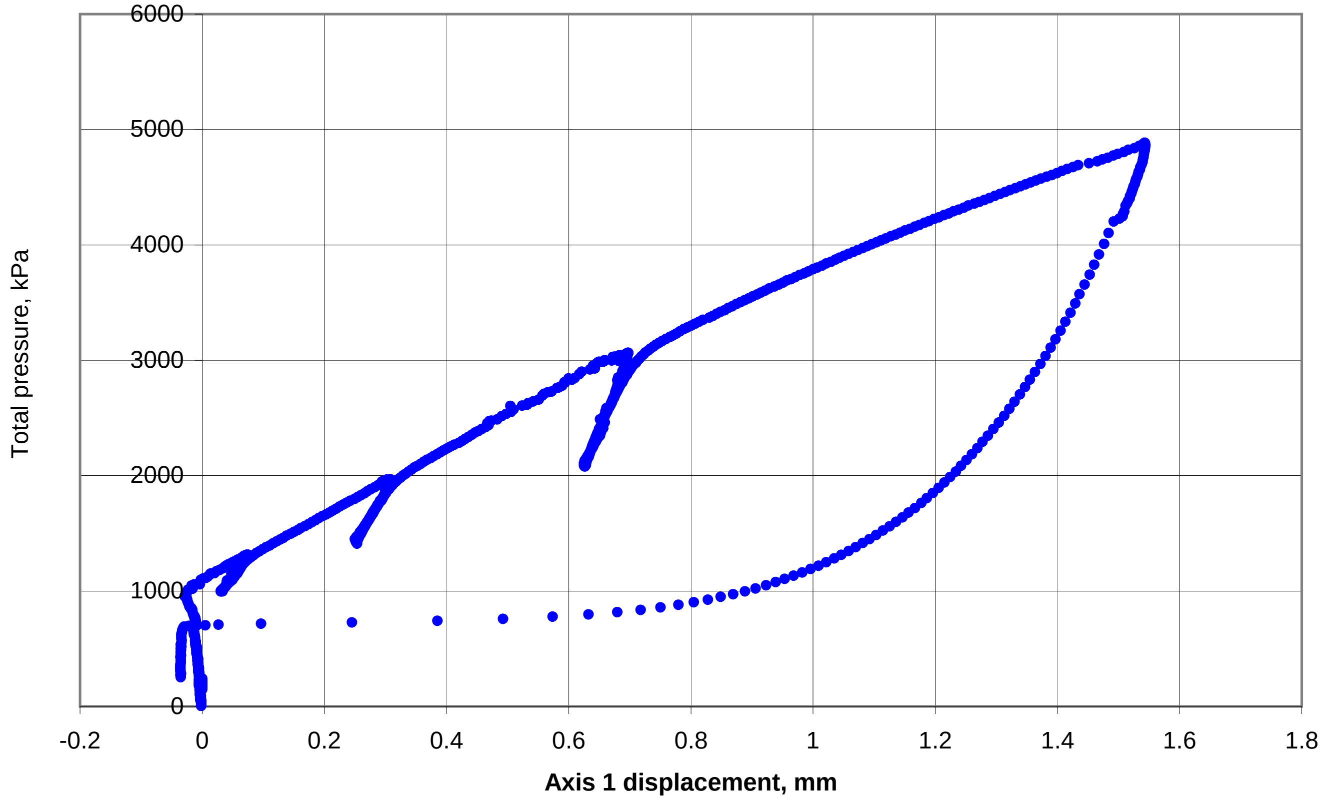
Max test pressure = 2491 kPa. Max av displ = 2.2 mm. Max arm displ = 2.93 mm (Arm2). No of loops = 2 . Analysis type: Axis 1. Arm 3 sticking

Notes:	Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	Figure
	Project No.	M0102-10	**SBP2009_4 T33**
	Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	03-Sep-11	Test reference	B4T36	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	36
Material	grey clay with claystone b	Test pocket (mbgl)	70.60-71.60	Depth, m	71.10



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1675	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	1678
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	2440

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	48.1	ν (deg)	22.9

Initial shear modulus (Axis 1)

G_i (MPa)	65

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	162	0.186			0.750	21.6	
2	202	0.250			0.848	63.1	
3	277	0.279			0.914	146.5	

Remarks

Max test pressure = 3905 kPa. Max av displ = 1.97 mm. Max arm displ = 3.12 mm (Arm3). No of loops = 3 . Analysis type: Axis 1. Arm 2 some erratic behaviour. Arm 3 sticking intermittently

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_4 T36

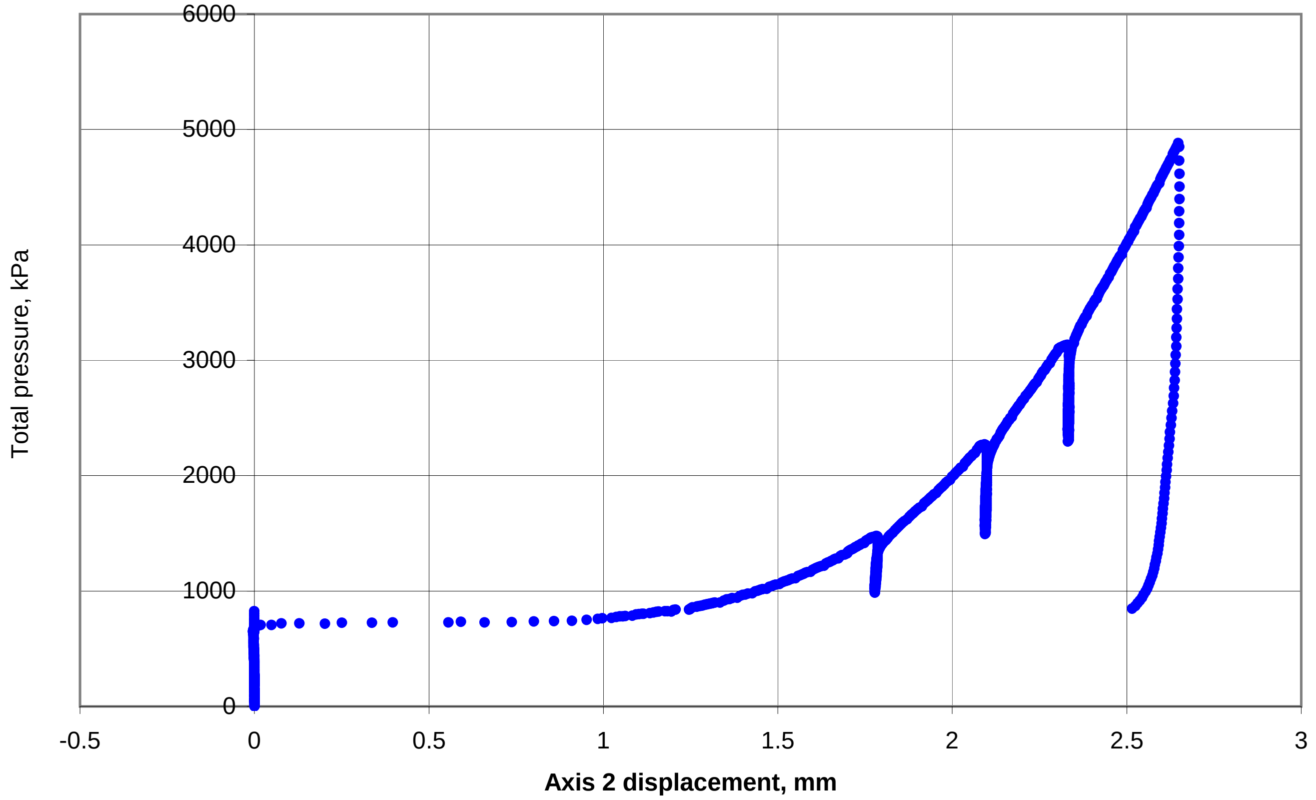
Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Sep-11
Probe	SBP-3 930911
Material	grey clay with claystone ba

Test reference	B4T37
GWL (mbgl)	
Test pocket (mbgl)	72.20-73.20

BH	SBP2009_4
Test	37
Depth, m	72.70



In situ horizontal stress (Axis 2)

$P_{o\ BE}$ (kPa)	1857	$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	3096
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	NA

Shear strength (Axis 2)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)	30.0	ϕ (deg)	NA	ν (deg)	NA

Initial shear modulus (Axis 2)

G_i (MPa)	130

Unload-reload loop shear modulus (Axis 2)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	1008	0.037			NA	NA	
2	3240	0.018			NA	NA	
3	10486	0.007			NA	NA	

Remarks

Max test pressure = 3134 kPa. Max av displ = 1.06 mm. Max arm displ = 2.34 mm (Arm2). No of loops = 3 . Analysis type: Axis 2. Amr 3 sticking

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

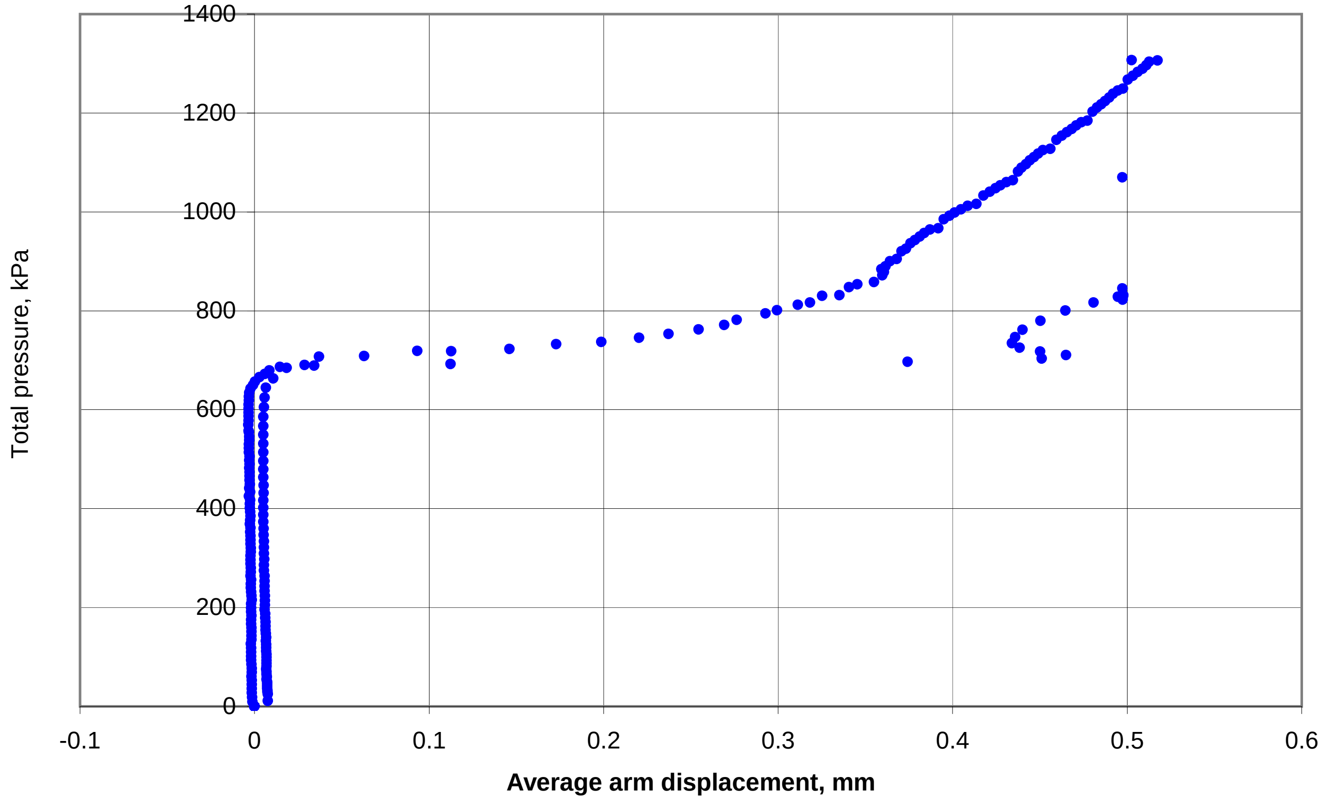
Figure

SBP2009_4 T37

Self Boring Pressuremeter Test

Soil Mechanics

Date	04-Sep-11	Test reference	B4T38	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	38
Material	grey clay with claystone ba	Test pocket (mbgl)	73.20-74.20	Depth, m	73.70



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)		$P_{o\ LO}$ (kPa)		$P_{o\ MR}$ (kPa)	
$P_{o\ curve\ modelling}$ (kPa)				$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)		$c_{u\ unloading}$ (kPa)		p_L (kPa)	
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	0

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	

Remarks

Max test pressure = 1307 kPa. Max av displ = 0.52 mm. Max arm displ = 0.88 mm (Arm2). No of loops = 0 . Analysis type: Average arm. Burst at 1300 kPa. No suitable data for analysis

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

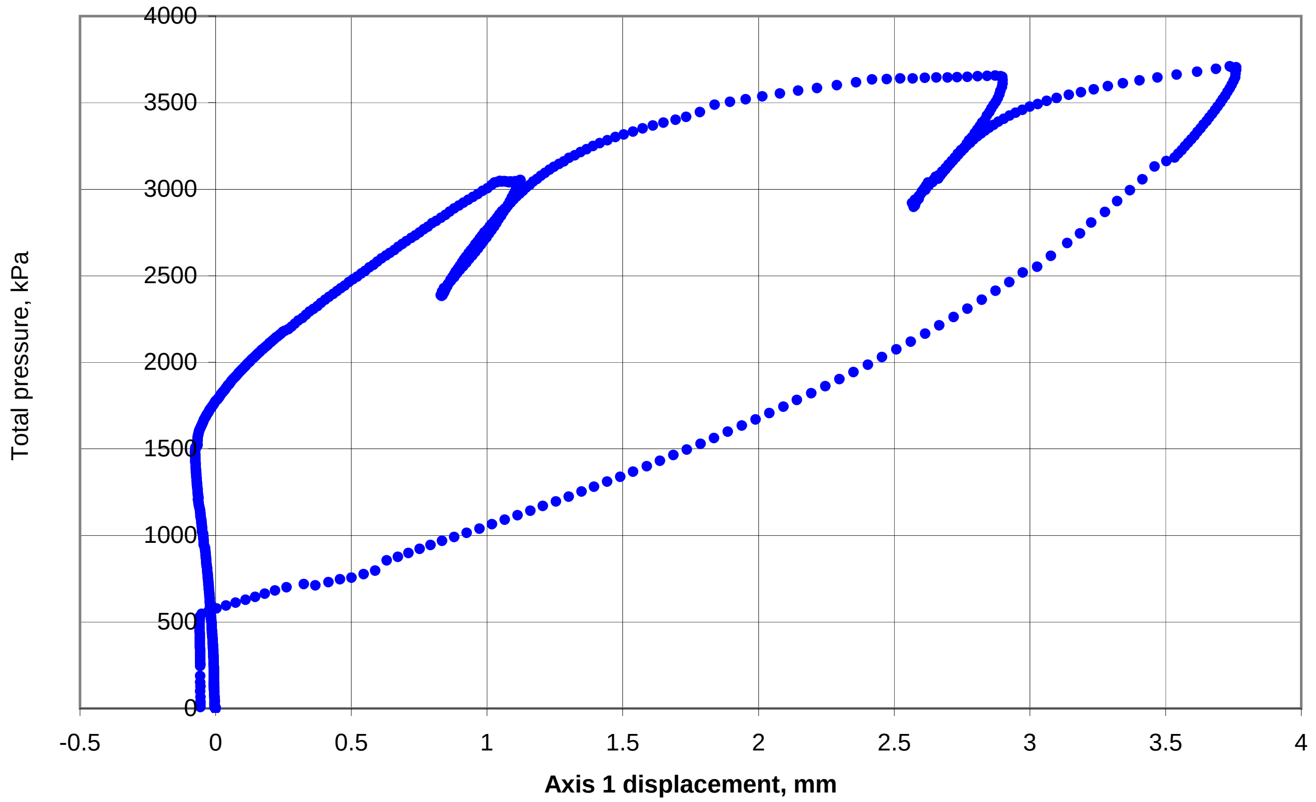
Figure

SBP2009_4 T38

Self Boring Pressuremeter Test

Soil Mechanics

Date	05-Sep-11	Test reference	B4T39	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	39
Material	Stiff grey silty clay	Test pocket (mbgl)	74.70-75.70	Depth, m	75.20



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1600	$P_{o\ LO}$ (kPa)	1598	$P_{o\ MR}$ (kPa)	1591
$P_{o\ curve\ modelling}$ (kPa)	1730			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	907	$c_{u\ unloading}$ (kPa)	668	p_L (kPa)	5818
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	52

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	49	1.233	0.757	12.8			
2	41	1.129	0.716	8.1			

Remarks

Max test pressure = 3710 kPa. Max av displ = 4.82 mm. Max arm displ = 10.58 mm (Arm2). No of loops = 2 . Analysis type: Axis 1. Arm 2 offline during part of test. Arm 3 stuck.

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T39**
	Carried out for	NNB Generation Company Limited	

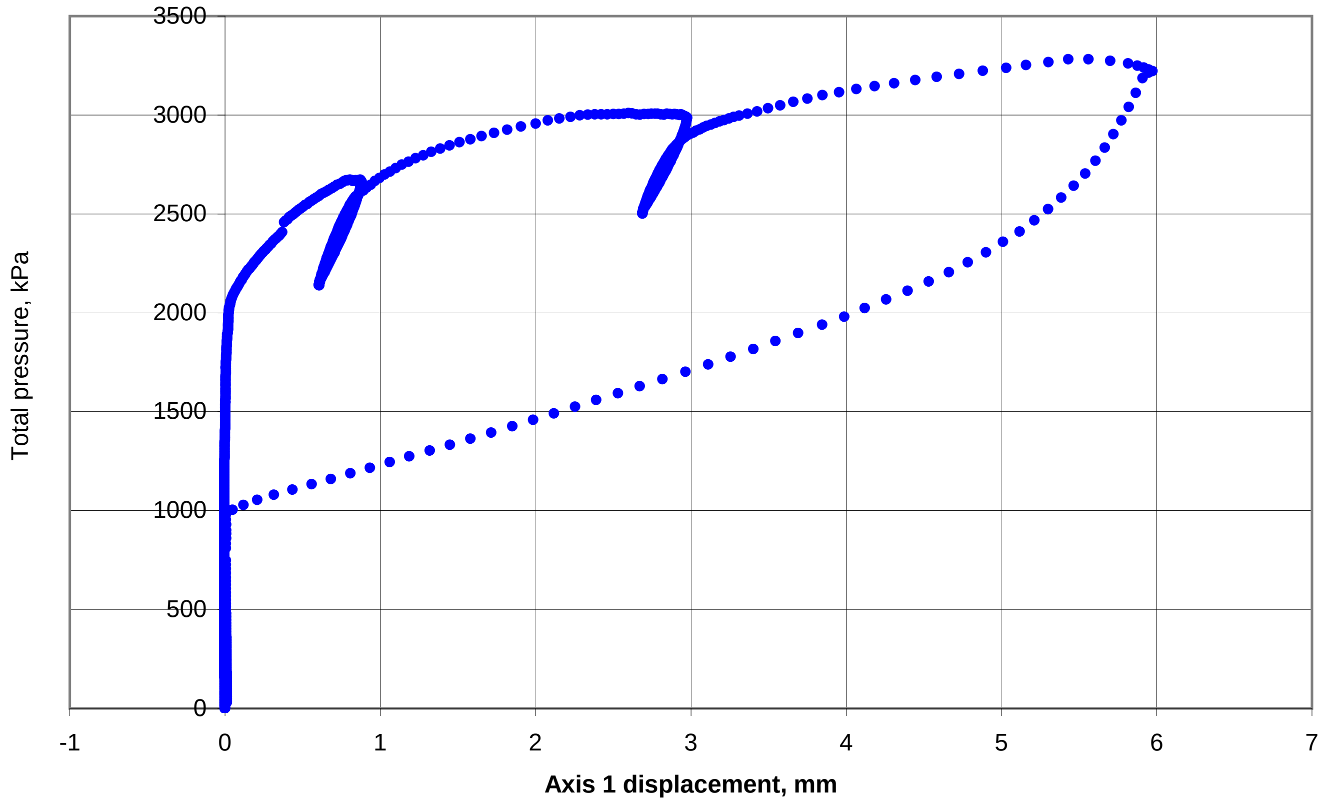
Self Boring Pressuremeter Test

Soil Mechanics

Date	14-Sep-11
Probe	SBP-3 930911
Material	Stiff clay

Test reference	B4T40
GWL (mbgl)	
Test pocket (mbgl)	76.60-77.60

BH	SBP2009_4
Test	40
Depth, m	77.10



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1950	$P_{o\ LO}$ (kPa)	2017	$P_{o\ MR}$ (kPa)	1900
$P_{o\ curve\ modelling}$ (kPa)	2174			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	221	$c_{u\ unloading}$ (kPa)	335	p_L (kPa)	3823
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	22

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	40	1.158	0.780	13.2			
2	35	1.115	0.711	7.5			

Remarks

Max test pressure = 3282 kPa. Max av displ = 4.97 mm. Max arm displ = 10.49 mm (Arm2). No of loops = 2 . Analysis type: Axis 1. Arm 2 offline at start of test

Notes:	**Project**	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
	Project No.	M0102-10	**SBP2009_4 T40**
	Carried out for	NNB Generation Company Limited	

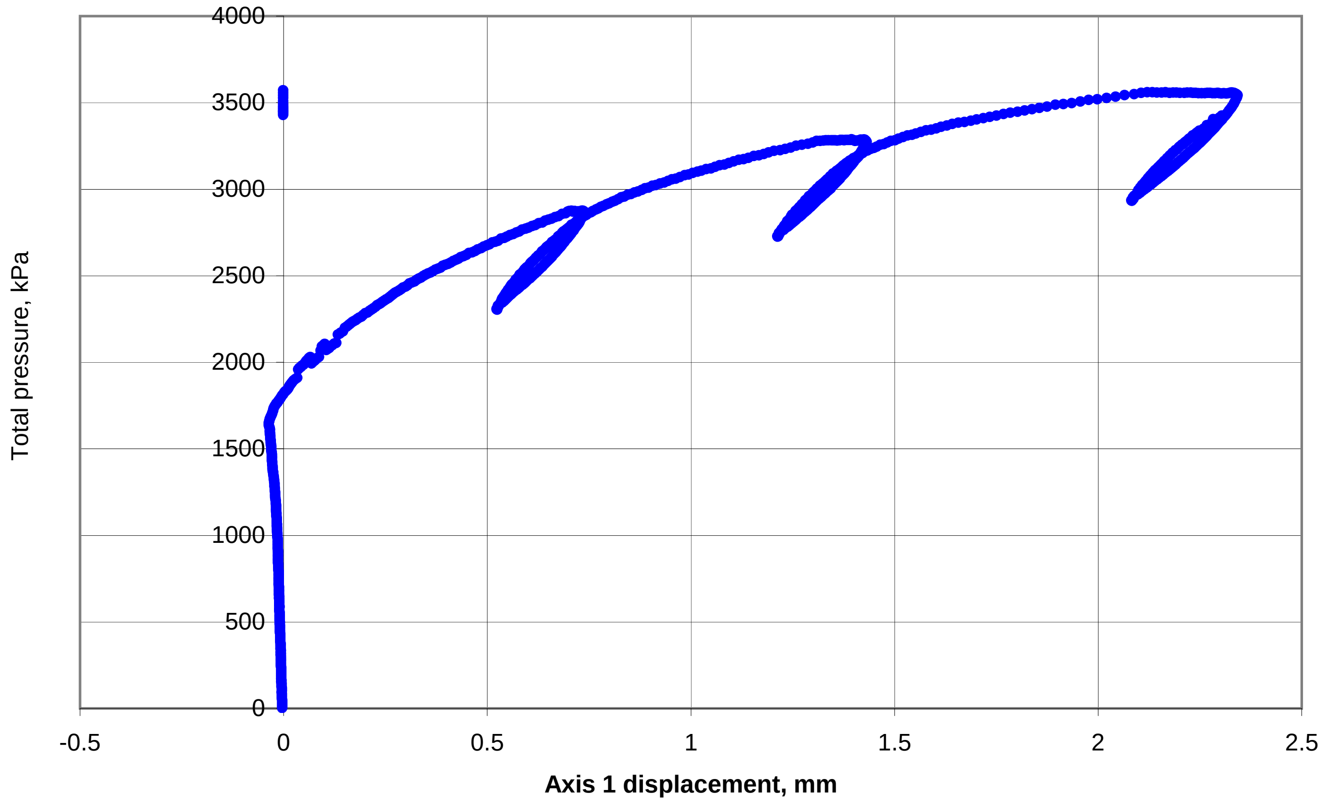
Self Boring Pressuremeter Test

Soil Mechanics

Date	15-Sep-11
Probe	SBP-3 930911
Material	Stiff clay

Test reference	B4T41
GWL (mbgl)	
Test pocket (mbgl)	77.60-78.60

BH	SBP2009_4
Test	41
Depth, m	78.10



In situ horizontal stress (Axis 1)

$P_{o\ BE}$ (kPa)	1665	$P_{o\ LO}$ (kPa)	1661	$P_{o\ MR}$ (kPa)	1879
$P_{o\ curve\ modelling}$ (kPa)	1626			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 1)

$c_{u\ loading}$ (kPa)	685	$c_{u\ unloading}$ (kPa)	184	p_L (kPa)	5233
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 1)

G_i (MPa)	59

Unload-reload loop shear modulus (Axis 1)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	58	0.946	0.739	13.1			
2	54	0.917	0.762	14.3			
3	50	1.044	0.769	14.5			

Remarks

Max test pressure = 3288 kPa. Max av displ = 3.55 mm. Max arm displ = 10.5 mm (Arm2). No of loops = 3 . Analysis type: Axis 1. Arm 2 offline at start of test. Test terminated early during unloading

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

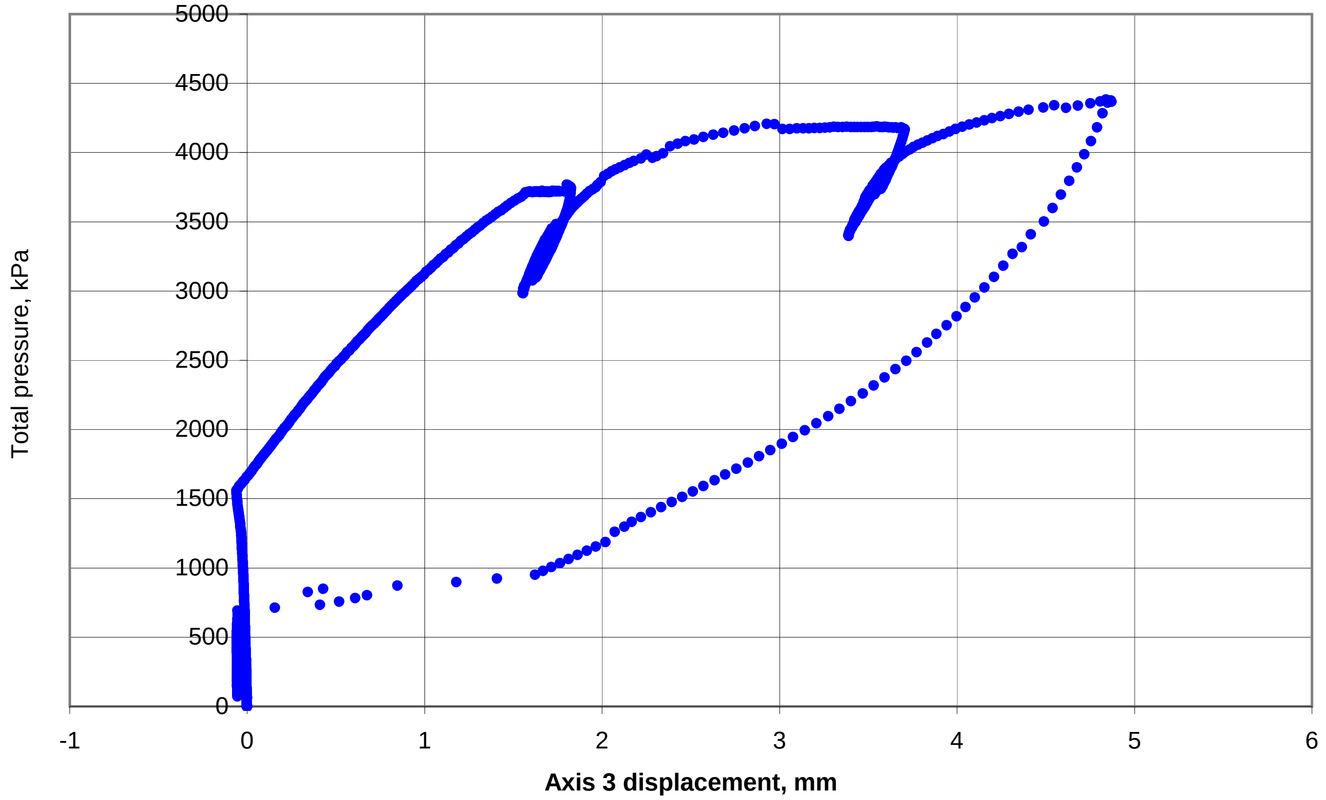
Figure

SBP2009_4 T41

Self Boring Pressuremeter Test

Soil Mechanics

Date	16-Sep-11	Test reference	B4T42	BH	SBP2009_4
Probe	SBP-3 930911	GWL (mbgl)		Test	42
Material	Stiff clay	Test pocket (mbgl)	79.60-80.60	Depth, m	80.10



In situ horizontal stress (Axis 3)

$P_{o\ BE}$ (kPa)	1590	$P_{o\ LO}$ (kPa)	1588	$P_{o\ MR}$ (kPa)	1598
$P_{o\ curve\ modelling}$ (kPa)	2100			$P_{o\ drained}$ (kPa)	

Shear strength (Axis 3)

$c_{u\ loading}$ (kPa)	1392	$c_{u\ unloading}$ (kPa)	586	p_L (kPa)	6761
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Axis 3)

G_i (MPa)	37

Unload-reload loop shear modulus (Axis 3)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	63	0.994	0.752	15.9			
2	50	1.202	0.704	10.5			

Remarks

Max test pressure = 4383 kPa. Max av displ = 6.16 mm. Max arm displ = 10.55 mm (Arm2). No of loops = 2 . Analysis type: Axis 3. Arm 2 ofline at start of test and intermittently during test

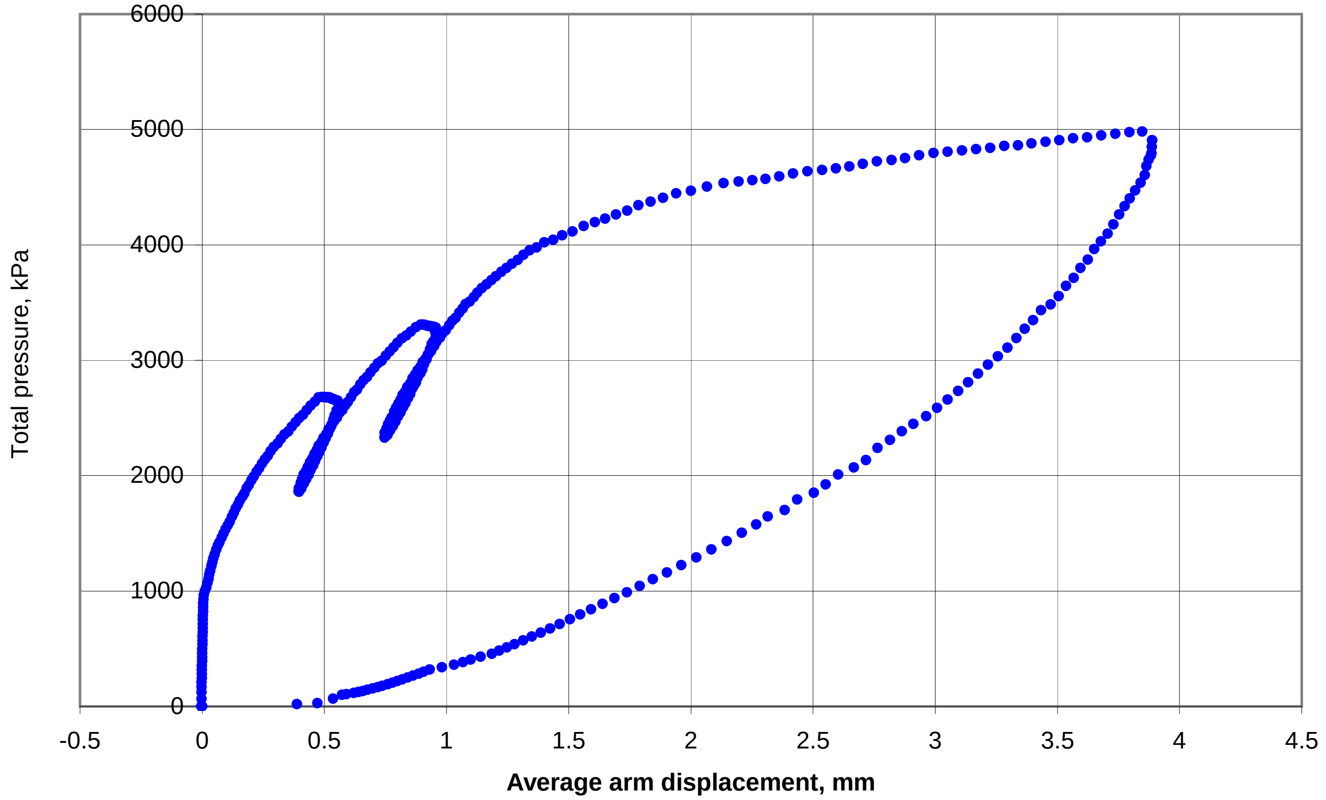
Notes:

Project	ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL	**Figure**
Project No.	M0102-10	**SBP2009_4 T42**
Carried out for	NNB Generation Company Limited	

Self Boring Pressuremeter Test

Soil Mechanics

Date	19-Sep-11	Test reference	B4T43	BH	SBP2009_4
Probe	SBP-6 960521	GWL (mbgl)		Test	43
Material	Clay	Test pocket (mbgl)	81.10-82.27	Depth, m	81.87



In situ horizontal stress (Average arm)

$P_{o\ BE}$ (kPa)	1410	$P_{o\ LO}$ (kPa)	1304	$P_{o\ MR}$ (kPa)	1408
$P_{o\ curve\ modelling}$ (kPa)	1554			$P_{o\ drained}$ (kPa)	

Shear strength (Average arm)

$c_{u\ loading}$ (kPa)	791	$c_{u\ unloading}$ (kPa)	925	p_L (kPa)	6386
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Average arm)

G_i (MPa)	98

Unload-reload loop shear modulus (Average arm)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	96	0.612	0.730	17.7			
2	91	0.793	0.770	22.9			

Remarks

Max test pressure = 4983 kPa. Max av displ = 3.89 mm. Max arm displ = 4.6 mm (Arm3). No of loops = 2 . Analysis type: Average arm.

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

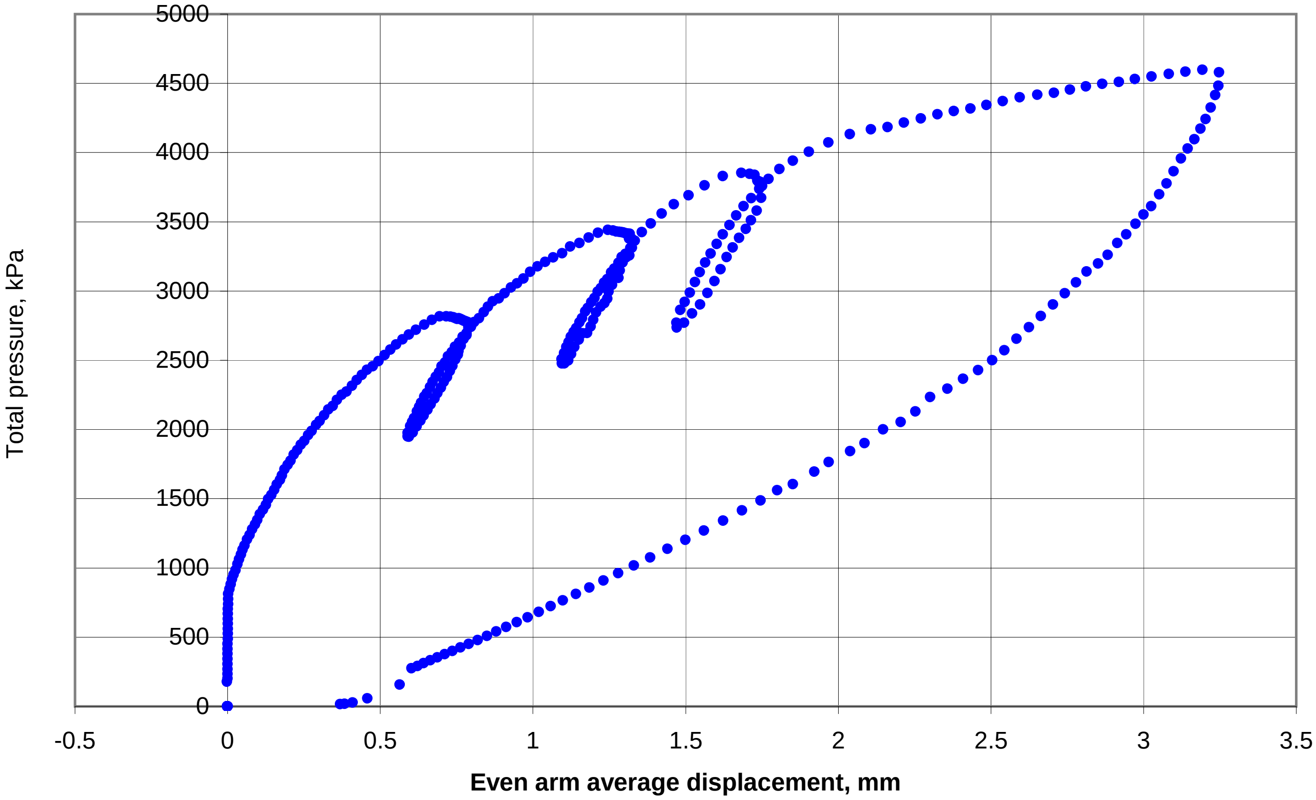
Figure

SBP2009_4 T43

Self Boring Pressuremeter Test

Soil Mechanics

Date	19-Sep-11	Test reference	B4T44	BH	SBP2009_4
Probe	SBP-6 960521	GWL (mbgl)		Test	44
Material	Clay	Test pocket (mbgl)	82.27-83.25	Depth, m	82.85



In situ horizontal stress (Even arm average)

$P_{o\ BE}$ (kPa)	1135	$P_{o\ LO}$ (kPa)	1595	$P_{o\ MR}$ (kPa)	1138
$P_{o\ curve\ modelling}$ (kPa)	1645			$P_{o\ drained}$ (kPa)	

Shear strength (Even arm average)

$c_{u\ loading}$ (kPa)	1293	$c_{u\ unloading}$ (kPa)	967	p_L (kPa)	7250
ϕ_{cv} (deg)		ϕ (deg)		ν (deg)	

Initial shear modulus (Even arm average)

G_i (MPa)	90

Unload-reload loop shear modulus (Even arm average)

Loop ref	G_{ur} (MPa)	ε_c (%)	Non linear stiffness interpretation				Remarks
			Undrained		Drained		
			β	α (MPa)	Gradient	Intercept, MPa	
1	87	0.853	0.790	26.2			
2	85	0.991	0.747	19.5			
3	83	1.220	0.748	21.3			

Remarks

Max test pressure = 4598 kPa. Max av displ = 3.17 mm. Max arm displ = 4.43 mm (Arm1). No of loops = 3 . Analysis type: Even arm average. Arm 3 lift off during Loop 1

Notes:

Project ONSHORE INVESTIGATIONS PHASE 1 FOR SIZEWELL

Project No. M0102-10

Carried out for NNB Generation Company Limited

Figure

SBP2009_4 T44

ENCLOSURE A

CALIBRATION REGISTERS

SBP-6 No. 960521

SBP-3 No. 930111

SBP-3 No Dylan

Pressuremeter Calibration Register

Soil Mechanics

Instrument : **SBP - MPX Type D 6 arm** **Serial No.** **960521**

	Arm calibrations (mV / mm)						Pressure cell calibrations (mV / MPa)			
Date	Arm 1	Arm 2	Arm 3	Arm 4	Arm 5	Arm 6	TPC	PPA	PPB	Cable (m)
22-Apr-10	294.7	325.2	297.2	308.7	302.3	316.8				
18-Aug-10	310.3	315.4	301.2	306.8	294.8	298.5	558.8	221.0	233.8	
Average	**303**	**320**	**299**	**308**	**299**	**308**	**559**	**221**	**234**	
01-Oct-10	278.7	298.6	305.6	308.1	287.5	293.1	535.2	257.5		Repaired
17-Nov-10	293.7	303.9	295.7	308.1	291.7	297.5	558.9	253.8	235.1	
Average	**286**	**301**	**301**	**308**	**290**	**295**	**547**	**256**	**235**	

	Calculated arm zeroes (mV)						Calculated pressure cell zeroes (mV)			
22-Apr-10	112.7	160.7	-92.5	-183.4	200.0	425.9				
18-Aug-10	77.2	184.2	-238.8	-98.5	-30.7	374.3	-1339.9	35.9	-1081.7	
Average	**95.0**	**172.4**	**-165.6**	**-140.9**	**84.7**	**400.1**	**-1339.9**	**35.9**	**-1081.7**	
01-Oct-10	49.4	192.3	-84.4	-98.4	-48.4	384.9	-1550.7	-199.1		
17-Nov-10	118.9	272.7	-99.0	-56.1	42.4	466.1	-1304.1	-67.1	-1162.1	
Average	**84.2**	**232.5**	**-91.7**	**-77.2**	**-3.0**	**425.5**	**-1427.4**	**-133.1**	**-1162.1**	

Date	Membrane calibrations					Tests
	File ref.	Intercept (kPa)	Slope (kPa/mm)	Comprssn (mm/GPa)	Remarks	
22-Apr-10		25.1	12.8			
13-Jul-10	C3T1	38.6	23			
19-Aug-10	C3T4	-3.6	12			
07-Sep-10	C3T5	59.2	21			
18-Sep-10	C3T6	45.0	20			
Average		**33**	**18**			

Notes:

Slope 10 kPa/mm

Offset 10 kPa

Project SIZEWELL C POWER STATION ONSHORE INVESTIGATION

Project No. A0012-10

Carried out for NNB Generation Company Limited

Table

SBP-6 960521

Pressuremeter Calibration Register

Soil Mechanics

Instrument : **SBP-MPX 3 arm** **Serial No.** **930111**

Date	Arm calibrations (mV / mm)						Pressure cell calibrations (mV / MPa)			
	Arm 1	Arm 2	Arm 3				TPC	PPA	PPB	Cable (m)
27-Jul-10	308.4	273.1	292.7				650.6	(213)	(233)	
18-Sep-10	313.1	273.1	292.3				650.1	214.4	233.8	
13-Oct-10	329.9	318.5	285.7				633.2	211.8	229.1	
19-Nov-10	333.9	300.8	285.8				654.1	215.0	233.6	
Average	**332**	**310**	**286**				**647**	**213**	**232**	

Date	Calculated arm zeroes (mV)						Calculated pressure cell zeroes (mV)			
27-Jul-10	-7.7	133.7	128.5				-745.8			
18-Sep-10	43.0	149.4	253.9				608.3	-467.4	-758.5	
13-Oct-10	19.5	-43.5	84.8				-662.6	550.6	-429.9	
19-Nov-10	99.2	7.4	92.2				-754.3	496.3	-442.4	
Average 2010	**59**	**-18**	**88**				**-708**	**523**	**-436**	

Date	Membrane stiffness calibration			
	File ref.	Intercept (kPa)	Slope (kPa/mm)	Remarks
08-Jul-10	C2009T1	56	18	
08-Jul-10	C2009T2	50	17	
08-Jul-10	C2009T3	44	17	
08-Jul-10	C2009T4	46	15	
08-Jul-10		44	17	
27-Jul-10	C2009T5	20	11	
27-Jul-10	C2009T6	20	9	
27-Jul-10		14	10	
10-Aug-10	C2009T7	42	8	
01-Sep-10	C2009T8	14	8	
19-Sep-10	C2009T9	54	29	
30-Sep-10	C2T10	46	28	
13-Oct-10		22	12	
Average 2010		**36**	**15**	

Notes:

Project SIZEWELL C POWER STATION ONSHORE INVESTIGATION
Project No. A0012-10
Carried out for NNB Generation Company Limited

Table
PMT CAL

Pressuremeter Calibration Register

Soil Mechanics

Instrument : SBP-MPX 3 arm **Serial No.** Dylan

	Arm calibrations (mV / mm)						Pressure cell calibrations (mV / MPa)			
Date	Arm 1	Arm 2	Arm 3				TPC	PPA	PPB	Cable (m)
16-Jul-10	303.5	288.2	288.0				402.9	234.3	244.3	
Average	**304**	**288**	**288**				**403**	**234**	**244**	

Date	Calculated arm zeroes (mV)						Calculated pressure cell zeroes (mV)			
16-Jul-10	-126.1	-361.1	-363.9				-1279.4	-7.4	-1880.1	
Average 2010	**-126**	**-361**	**-364**				**-1279**	**-7**	**-1880**	

Date	Membrane stiffness calibration			
	File ref.	Intercept (kPa)	Slope (kPa/mm)	Remarks
16-Jul-10		29	8	
05-Aug-10		12	14	
07-Aug-10		21	10	
Average 2010		**21**	**11**	

Notes:

Project SIZEWELL C POWER STATION ONSHORE INVESTIGATION
Project No. A0012-10
Carried out for NNB Generation Company Limited

Table
SBP-3 Dylan

ENCLOSURE B

EXAMPLE ANALYSES

Notes on Pressuremeter Test Results	Key
Example Undrained Analysis Output	14 sheets
Example Drained Analysis Output	12 sheets

Notes on Pressuremeter Test Results

Soil Mechanics

KEY TO RESULTS

P_o	Pressure corresponding to regeneration of in situ strain.
c_u	Undrained shear strength.
p_L	Limit pressure.
G_i	Initial shear modulus.
G_{ur}	Shear modulus derived from unload-reload loop.
ε_c	Cavity strain range over which loop has been performed.
G_s	Shear modulus = $\alpha \gamma^{\beta-1}$ for non-linear stiffness model
γ	Shear strain
α	Shear stress constant = $\eta \beta$
η	Radial stress constant
β	Elastic exponent

NOTES ON RESULTS

1. Summary results are presented for the pressuremeter tests carried out at this site. Full details of the tests and analysis are presented in Enclosure A. Where appropriate, the summary results presented here are based on a graphical average of all three strain axes of the pressuremeter. Use of average readings for strain arms reduces the influence of movement of the pressuremeter relative to the test pocket and may therefore be considered to be a more reliable result. Reference should be made to graphical data and test notes to assess the reliability of individual results.

2. The material type quoted is the presumed geological horizon. Reference should be made to borehole records for a full description.

3. The depth quoted for the test is the depth of the centre of the expanding section of the pressuremeter, corresponding to the location of the strain arms.

4. The test references used are the references assigned by the logging and analysis software. These take the form of BxxTyy, where xx is a two digit abbreviation of the borehole number and yy is a two digit test number, sequential for each borehole.

5. In cohesive soils the in situ total horizontal stress ($ó_{ho}$) is usually assessed using either the 'lift-off' method or the modified Marsland and Randolph method. The former assumes an idealised insertion of the pressuremeter into the ground without disturbance; the latter can only be applied where the material strength allows some yielding of the material within the pressure capacity of the instrument. As a result an accurate assessment of in situ horizontal stress may not always be reliably made. It is also possible to determine the in situ horizontal stress from the curve fitting procedure described in Section 9 below and this has been used where appropriate. The best estimate of in situ stress is a subjective assessment of the various results obtained from the different methods. This is used in the calculation of shear strength from the loading part of the test curve.

6. A pressuremeter test fails the ground in shear and all moduli quoted are shear moduli. Unload-reload loops are performed in tests to provide an estimate of unload-reload shear modulus (G_{ur}). The actual value of G_{ur} is dependant on stress level and cavity strain range and the value given should be normalised as appropriate.

7. It is normal practice to carry out two or more unload-reload loops during a test. Results from these individual loops are presented consecutively (ie G_{ur} for loop 1 is presented above G_{ur} for loop 2). The cavity strain range (ε_c) over which the loop has been performed is presented alongside the relevant G_{ur} value.

8. Shear modulus (G) and Young's Modulus (E) are theoretically related by:

    $$E = 2G(1+ \nu)$$

    where ν is Poisson's Ratio

    Due to the finite stiffness of the equipment and the potential in accuracies associated with the methods used to assess the compression of the instrument membrane it is not possible to accurately measure shear moduli in excess of about 3000 MPa and in such circumstances values are reported simply as greater than 3000 MPa.

9. Non-linear stiffness/strain response

    The Windle and Wroth (1977) interpretation is used to derive a value of shear modulus from the whole of an unload-reload loop; this values is quoted along with the corresponding change in strain during the loop. However, the elastic response of a soil is known to be non-linear and measurements of stiffness are therefore dependent on the magnitude of the corresponding strain. The Bolton and Whittle (1999) analysis extends the interpretation to give a comprehensive description of this non-linear relationship by looking at smaller increments of pressure and strain other than the points at the extreme ends of the loop. The shear modulus can be determined for the individual data points on the reloading part of the unload-reload loop from the increments of pressure and strain relative to an origin which is taken as the minimum values of stress and strain for the loop.

    According to Bolton & Whittle (1999) the variation of stiffness (shear modulus, G_s) with strain (cavity strain, γ_c) seen during reloading in an unload-reload loop can be expressed as a power law, $G_s = \alpha\ \gamma_c^{\beta-1}$. The theory indicates a linear relationship between the log of radial stress and the log of shear strain, defined by a line with gradient β (the elastic exponent) and intercept η (radial stress constant). The shear stress constant α is equal to $\eta\beta$. These values are reported on the test summary sheets.

    A curve fitting method of test interpretation has been developed from this approach.

10. Tests terminated by membrane rupture before the full testing cycle could be completed have been identified as such on the individual test summary.

B2T12 - SUMMARY OF RESULTS
[File made with WinSitu Version 1.4.1.1]

[DETAILS OF TEST]

Project	:	M0102-10
Site	:	Sizewell C
Borehole	:	SBP2009_2
Test name	:	B2T12
Test date	:	31 Oct 10
Test depth	:	62.00 Metres
Water table	:	Metres
Ambient PWP	:	780.0 kPa
Material	:	Sandy clay
Probe	:	Digital 6 arm weak rock self boring pressuremeter
Diameter	:	89.1 mm

Data analysed using average arm displacement curve
A non-linear analysis of the rebound cycles has been carried out
The file includes results from a curve fitting analysis

Analysed by on 23 Nov 10

Remarks: Instrument tip at 62.5m. 90% seal during boring.

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm)	:	"Arm ave=0.003"
Po from Marsland & Randolph (kPa)	:	"Arm ave=491.9"
Po from Lift off (kPa)	:	"Arm ave=774.3"
PWP versus Total Stress (kPa)	:	"PPC Ave=696.3"
Best estimate of Po (kPa)	:	"Arm ave=740.0"

[UNDRAINED STRENGTH PARAMETERS]

Gibson & Anderson 1961 - Cu (kPa)	:	"Arm ave=915.7"
Limit pressure (kPa)	:	"Arm ave=5633"
Jefferies 1988 - Cu (kPa)	:	"Arm ave=539.3"
Undrained yield stress (kPa)	:	"Arm ave=1122.6"

[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=158.3"

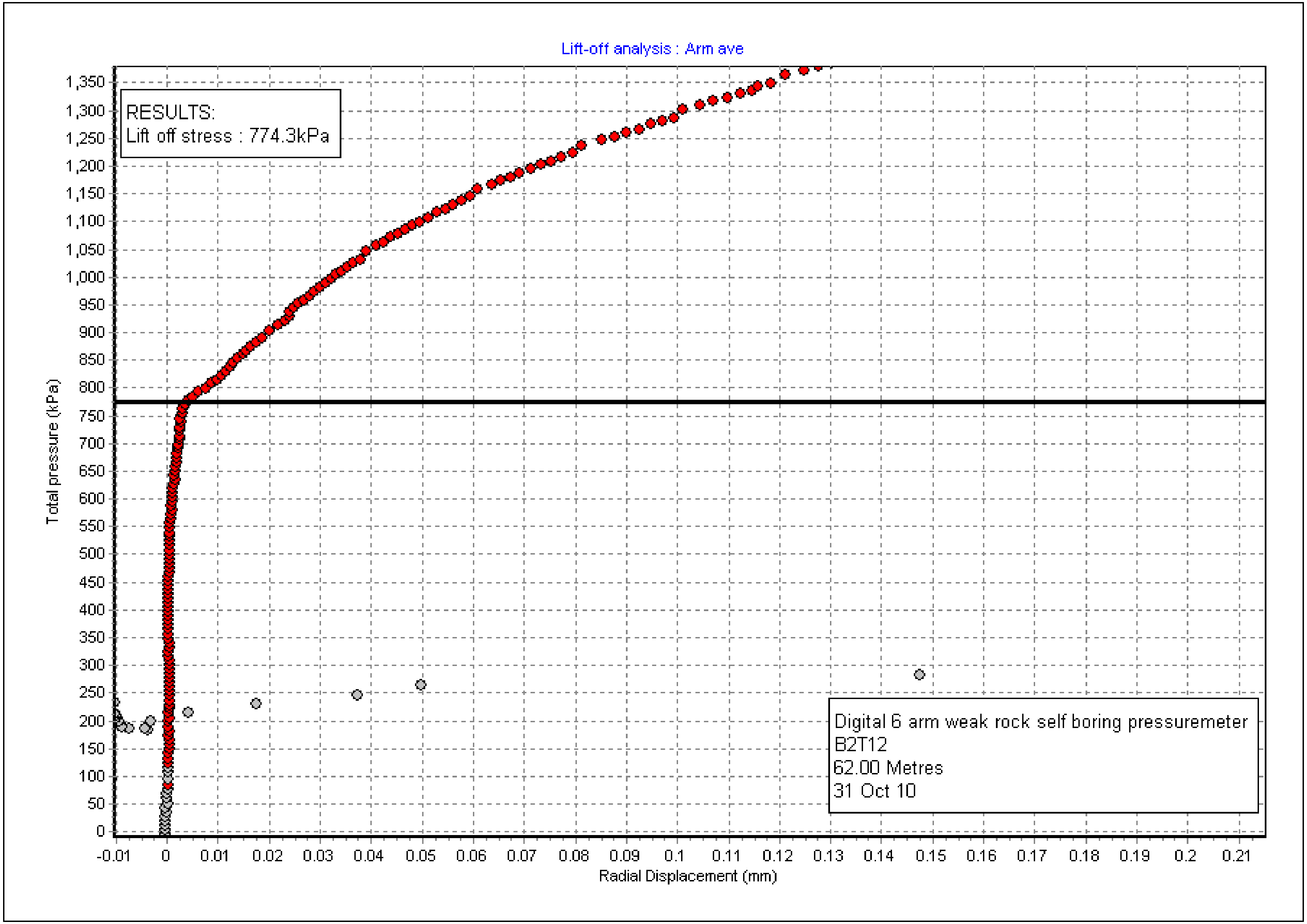
Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	166.2	0.695	1536	0.183	305
Arm ave	2	131.5	2.026	2289	0.322	424
Arm ave	3	136.8	3.857	2854	0.281	385

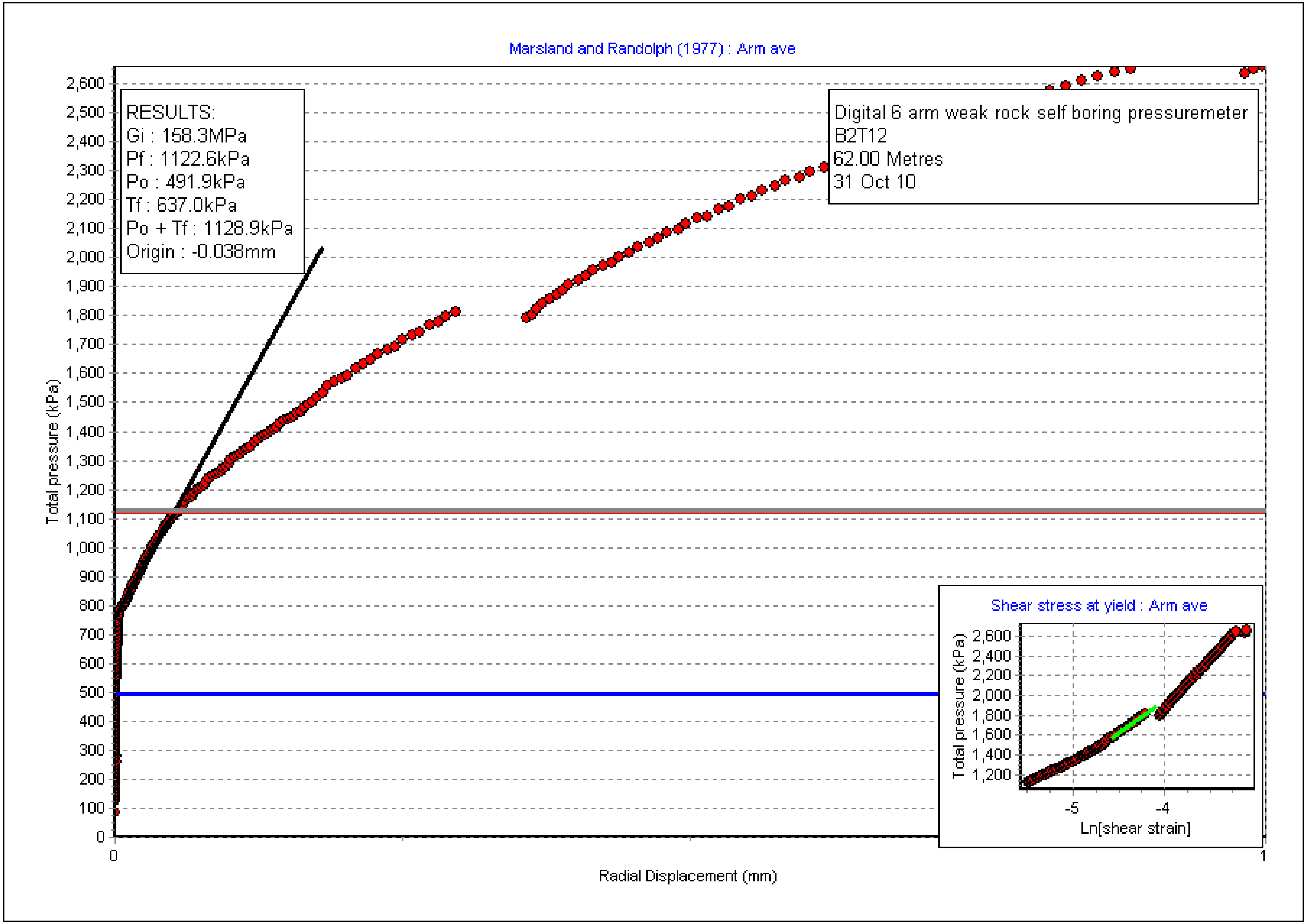
[UNDRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

Axis	Loop No	Intercept (MPa)	Alpha (MPa)	Gradient
Arm ave	1	14.545	8.912	0.613
Arm ave	2	22.658	15.825	0.698
Arm ave	3	25.160	17.910	0.712

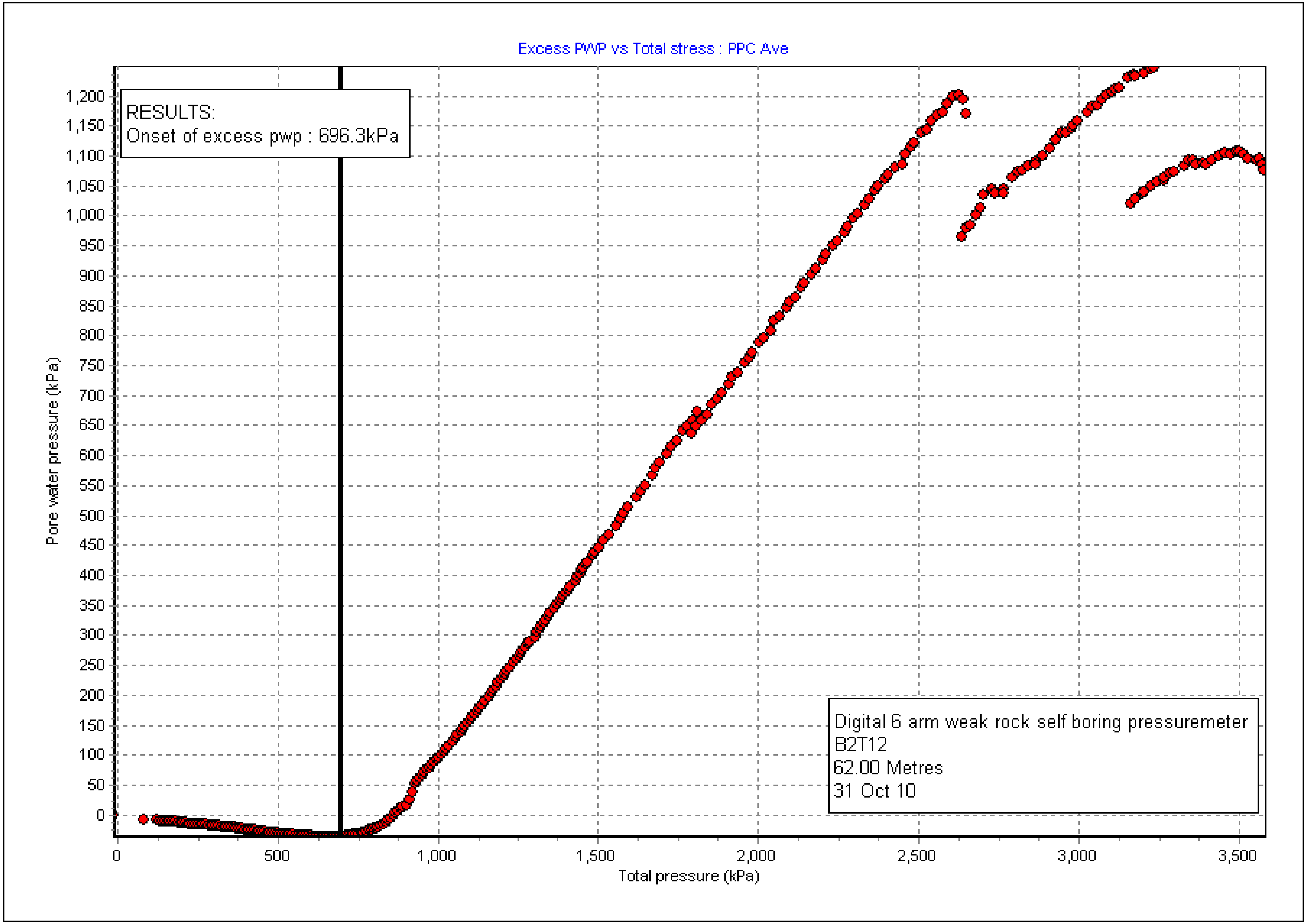
[PARAMETERS USED FOR UNDRAINED CURVE MODELLING]
Axis is Arm ave

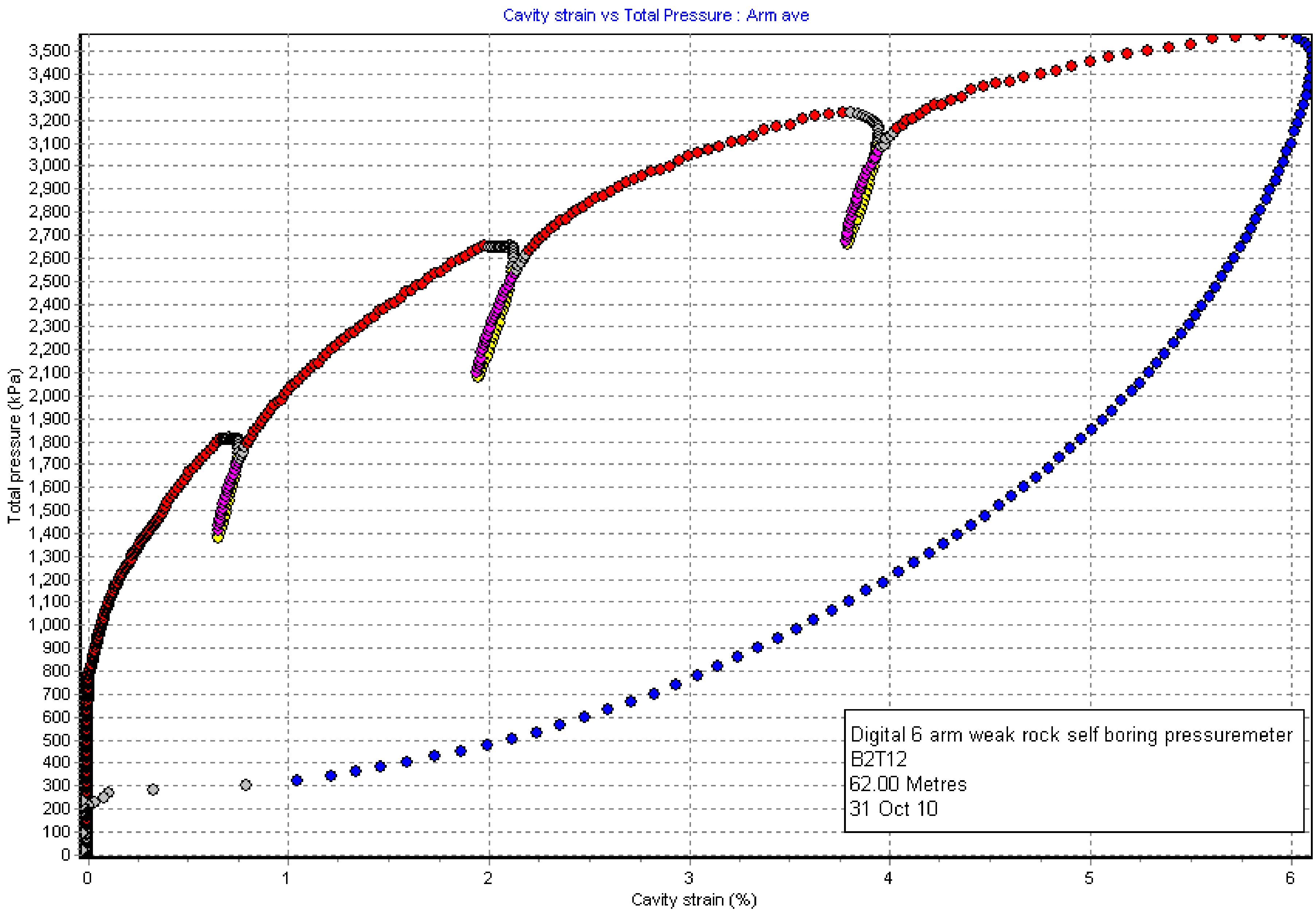
Strain Origin (mm)	:	0.41
Po (kPa)	:	1300
Cu (kPa)	:	605.5
Limit pressure (kPa)	:	5011
Non-linear exponent	:	0.712
Calculated alpha (MPa)	:	17.489
G at yield (MPa)	:	68.2


Lift-off analysis : Arm ave
RESULTS:
Lift off stress : 774.3kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
1,350
1,300
1,250
1,200
1,150
1,100
1,050
1,000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
-0.01
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.11
0.12
0.13
0.14
0.15
0.16
0.17
0.18
0.19
0.2
0.21

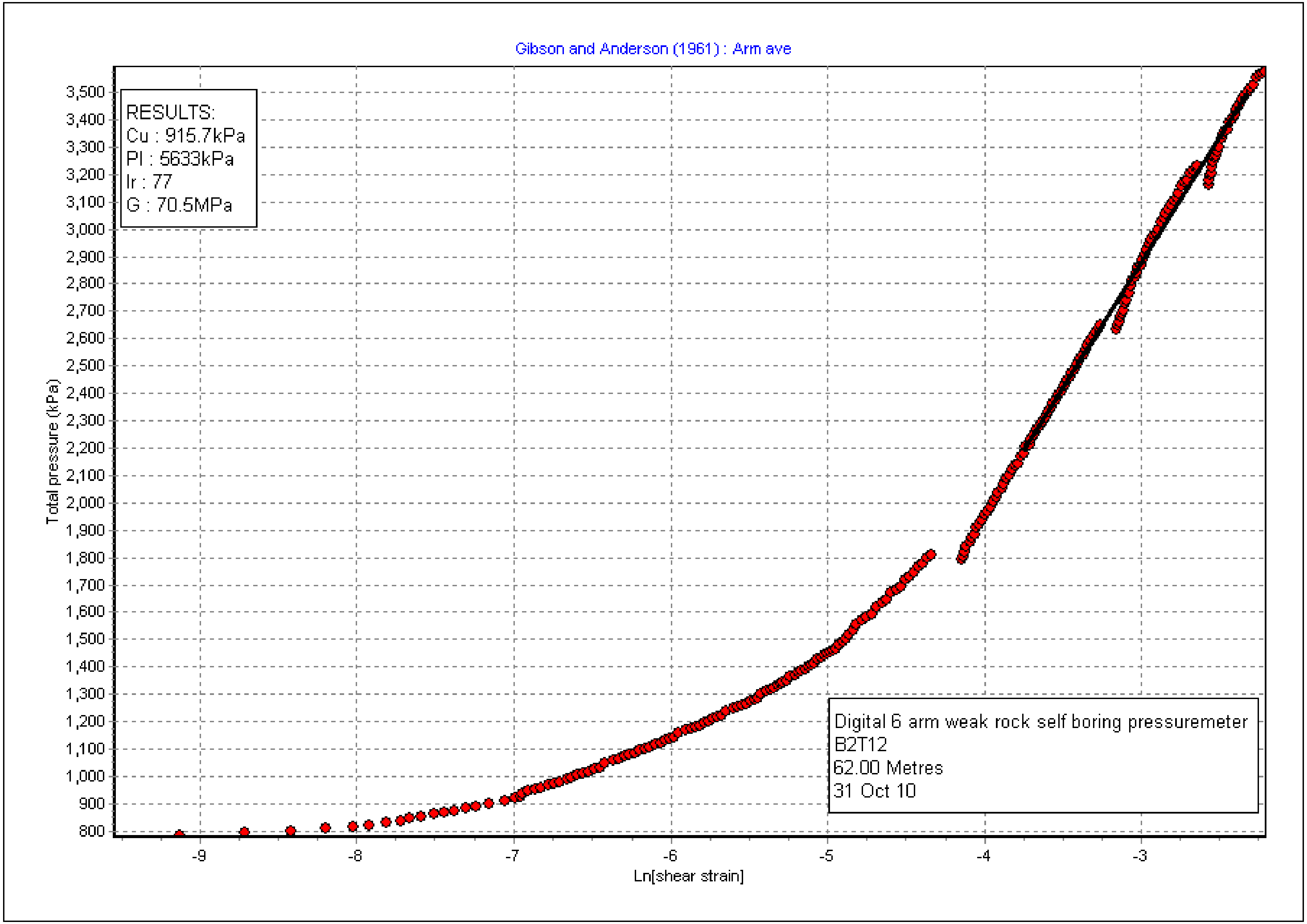


Marsland and Randolph (1977) : Arm ave
RESULTS:
Gi : 158.3MPa
Pf : 1122.6kPa
Po : 491.9kPa
Tf : 637.0kPa
Po + Tf : 1128.9kPa
Origin : -0.038mm
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Ln[shear strain]

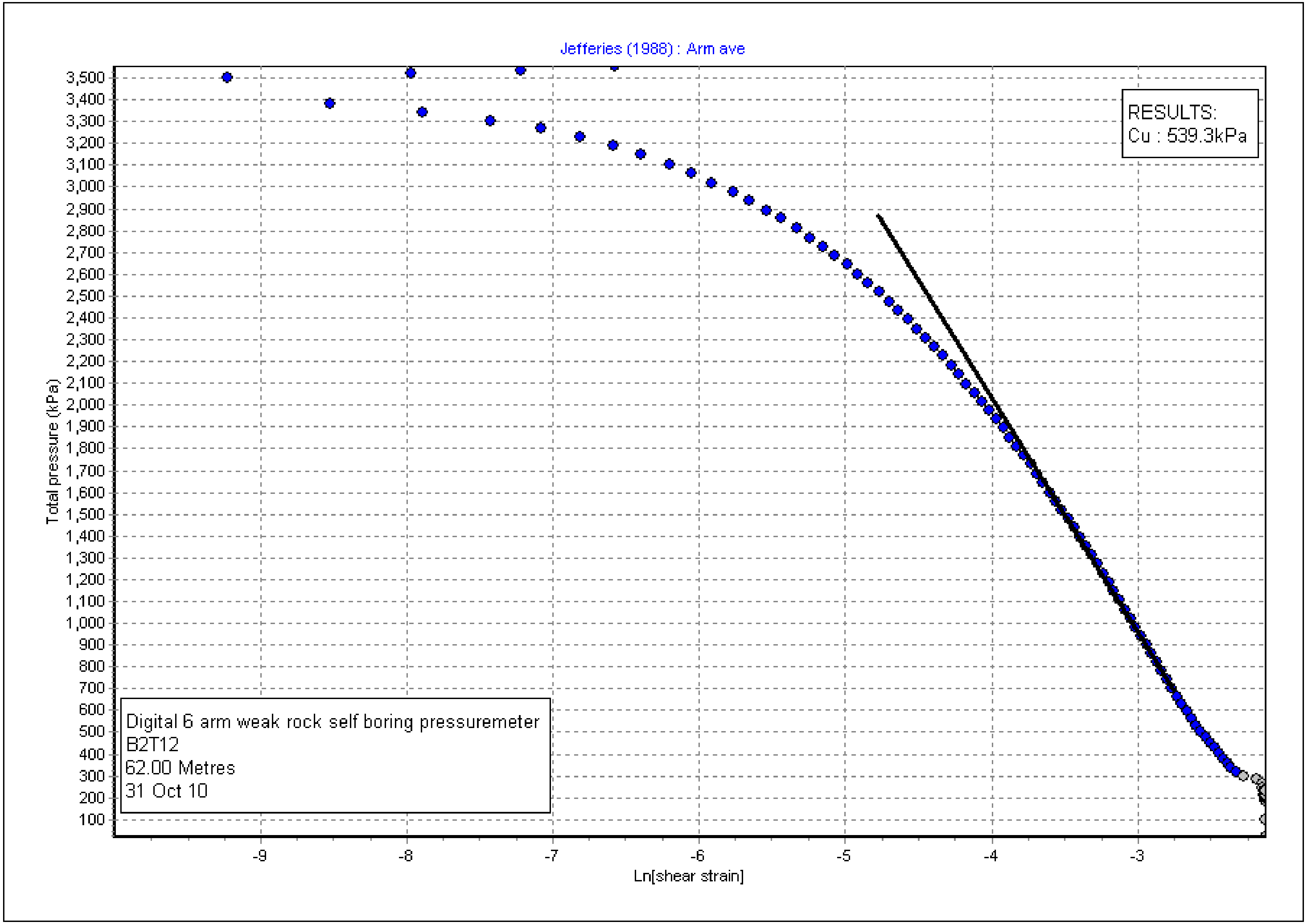

Excess PWP vs Total stress : PPC Ave
RESULTS:
Onset of excess pwp : 696.3kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Pore water pressure (kPa)
Total pressure (kPa)
0
500
1,000
1,500
2,000
2,500
3,000
3,500
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1,000
1,050
1,100
1,150
1,200

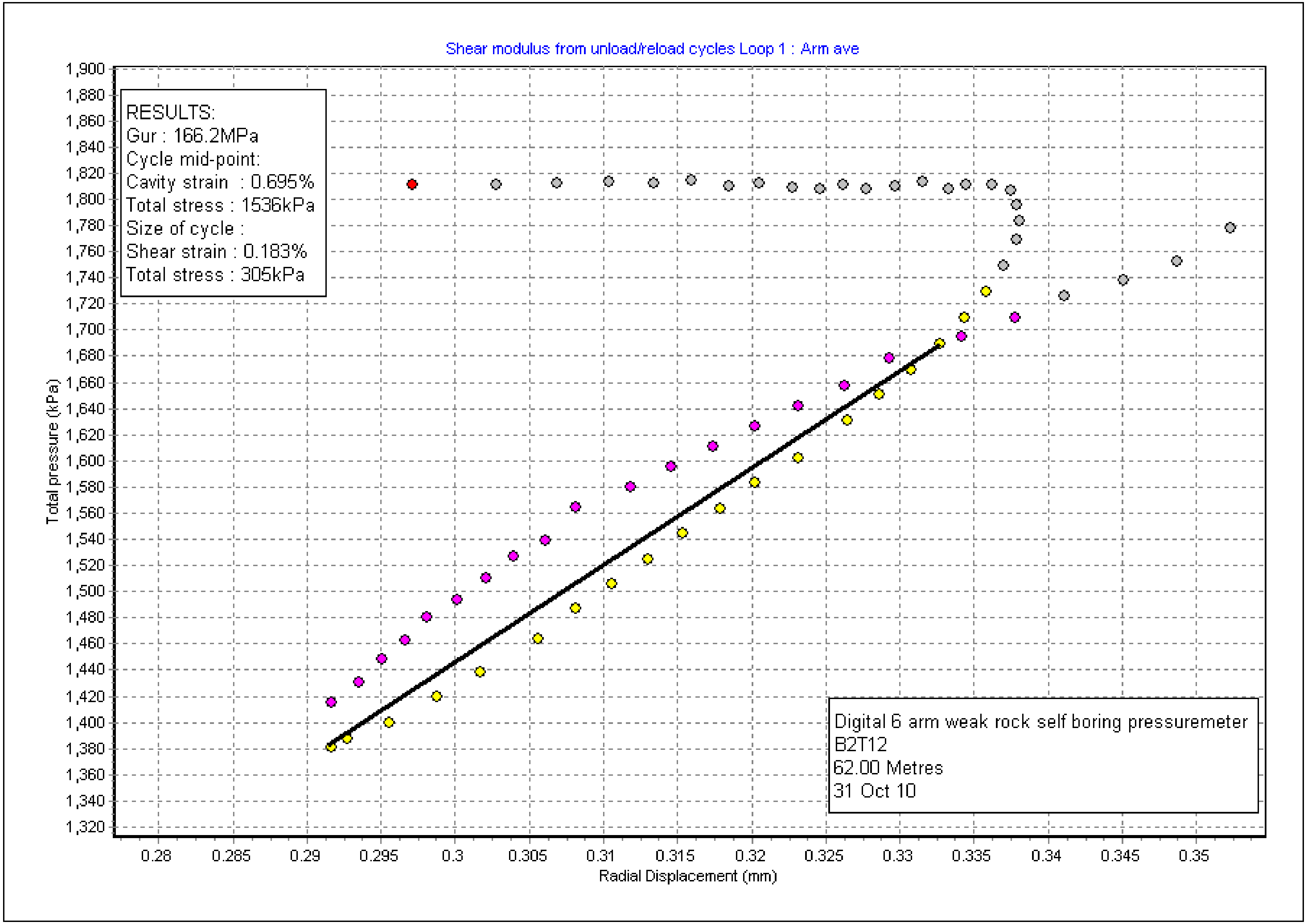


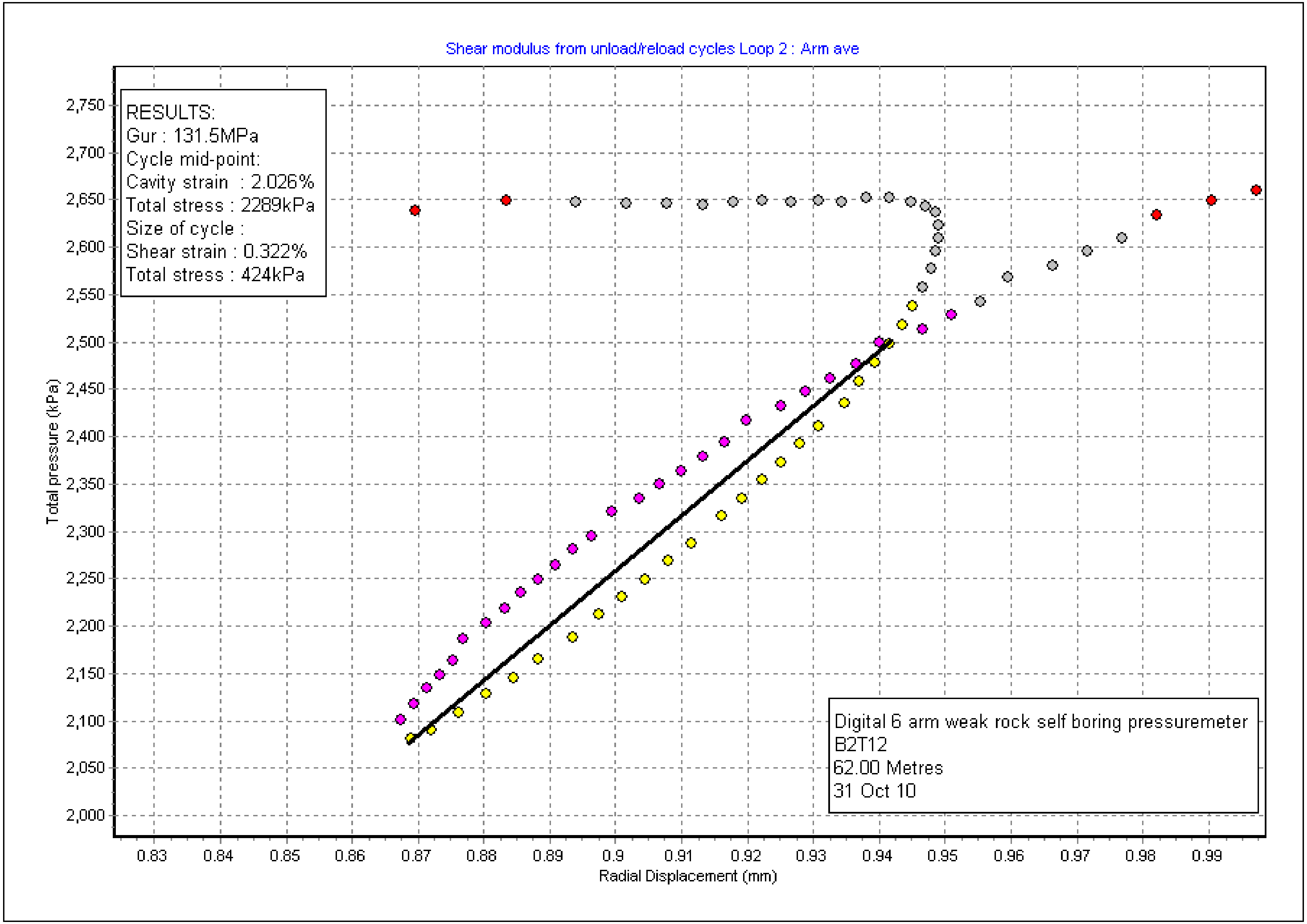
Cavity strain vs Total Pressure : Arm ave
Total pressure (kPa)
3,500
3,400
3,300
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
0
1
2
3
4
5
6
Cavity strain (%)
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10

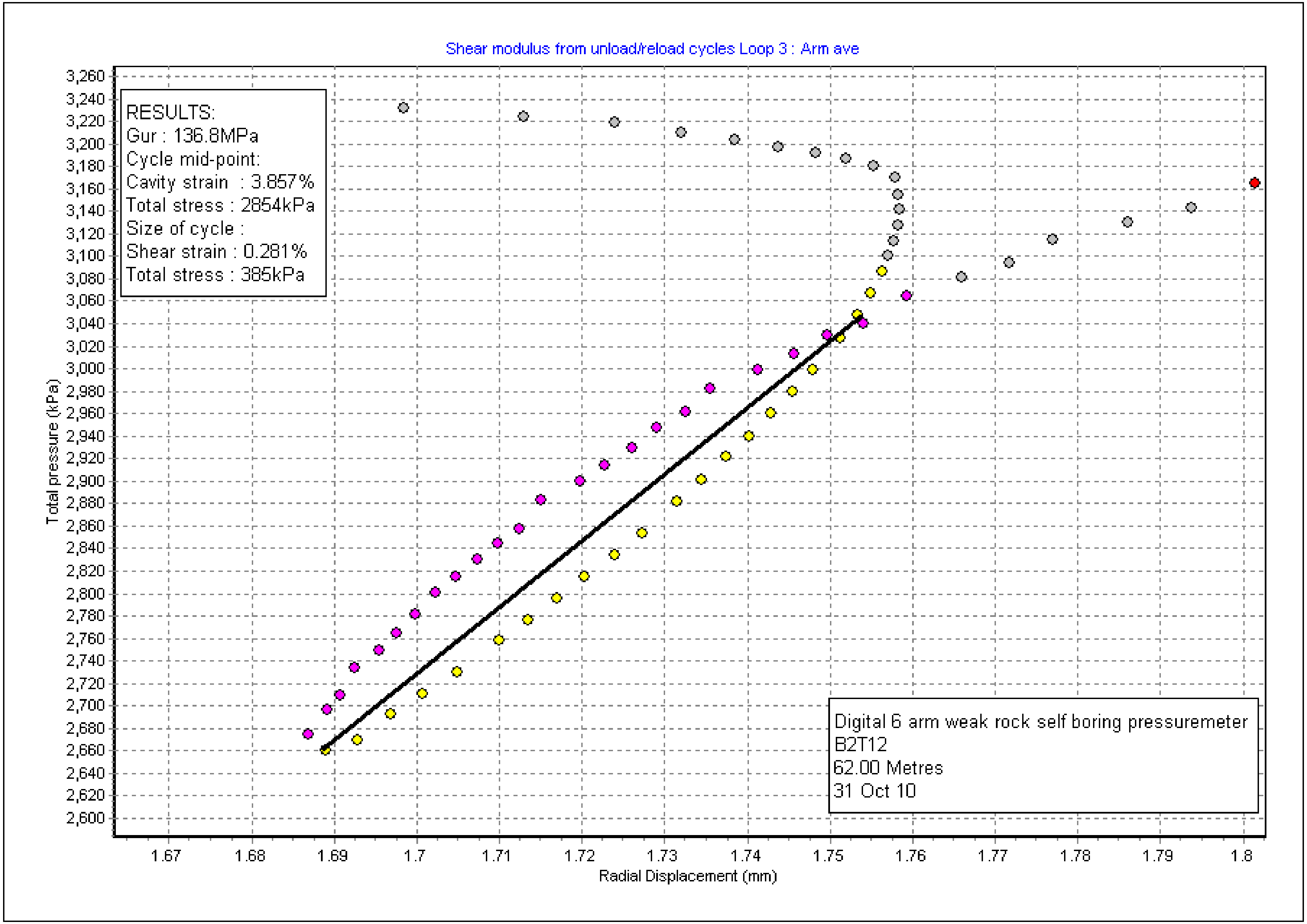


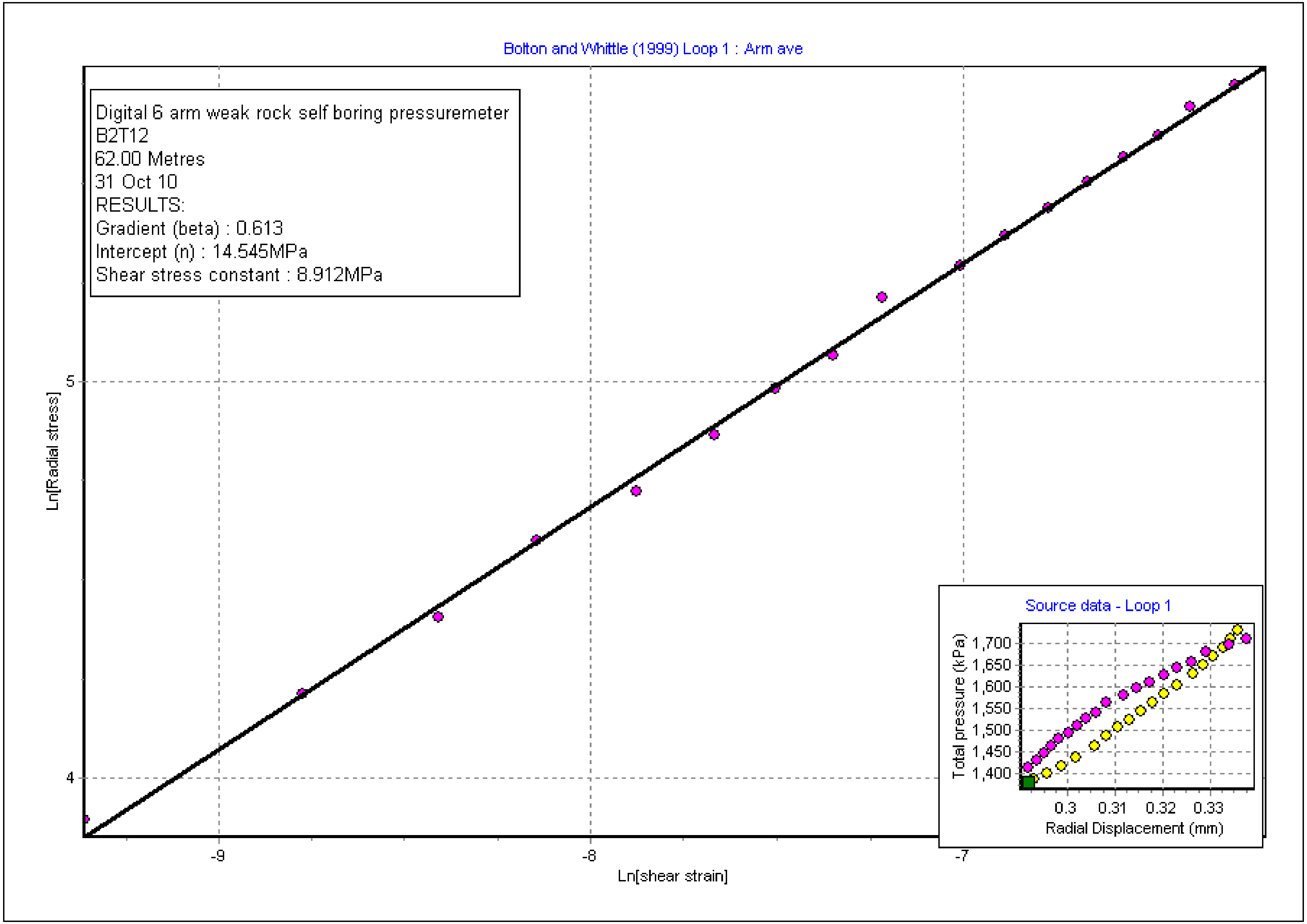
Gibson and Anderson (1961) : Arm ave
RESULTS:
Cu : 915.7kPa
Pl : 5633kPa
Ir : 77
G : 70.5MPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
3,500
3,400
3,300
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
-9
-8
-7
-6
-5
-4
-3
Ln[shear strain]


Jefferies (1988) : Arm ave
RESULTS:
Cu : 539.3kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
3,500
3,400
3,300
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
-9
-8
-7
-6
-5
-4
-3
Ln[shear strain]

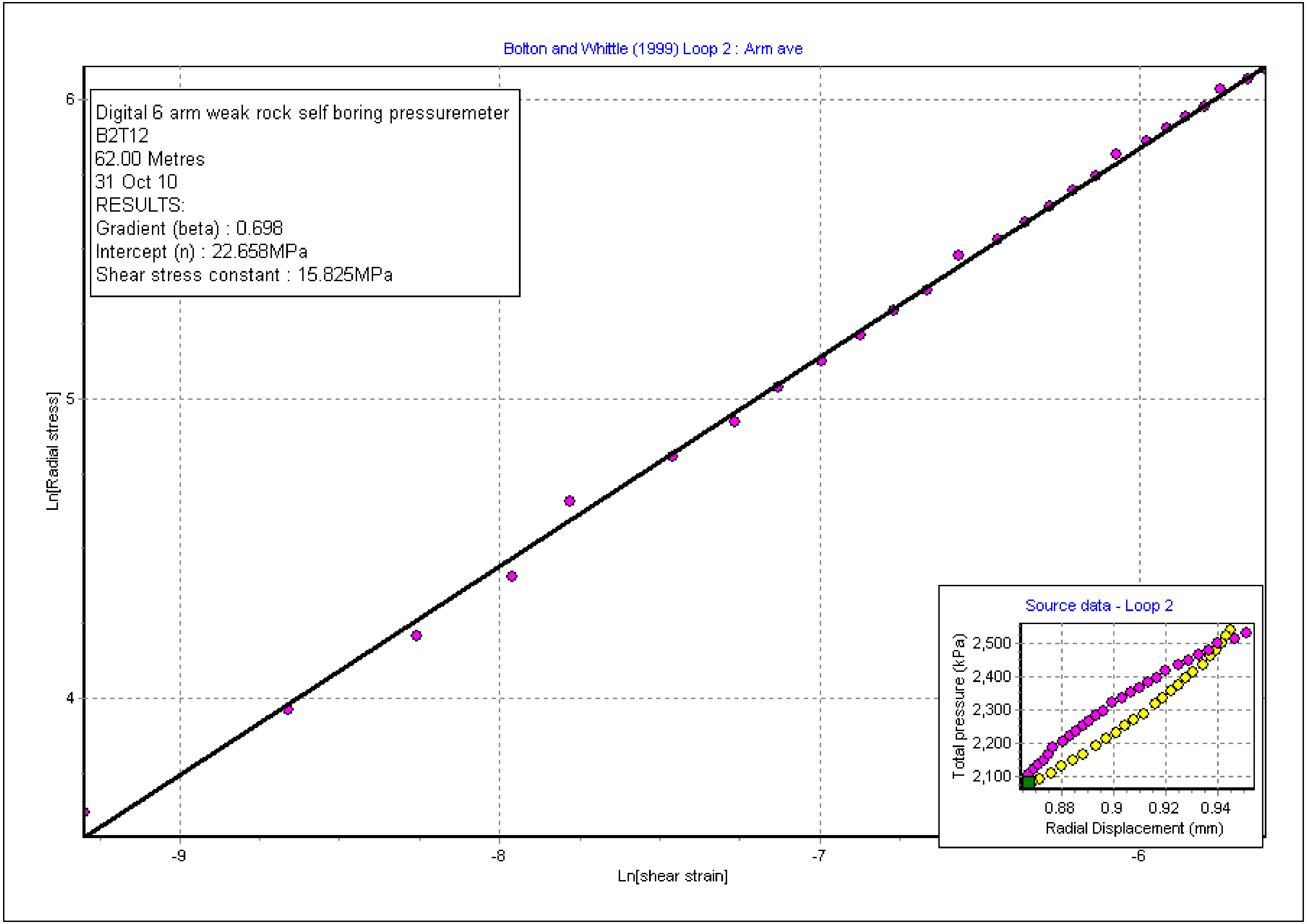

Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 166.2MPa
Cycle mid-point:
Cavity strain : 0.695%
Total stress : 1536kPa
Size of cycle :
Shear strain : 0.183%
Total stress : 305kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
1,900
1,880
1,860
1,840
1,820
1,800
1,780
1,760
1,740
1,720
1,700
1,680
1,660
1,640
1,620
1,600
1,580
1,560
1,540
1,520
1,500
1,480
1,460
1,440
1,420
1,400
1,380
1,360
1,340
1,320
0.28
0.285
0.29
0.295
0.3
0.305
0.31
0.315
0.32
0.325
0.33
0.335
0.34
0.345
0.35


Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 131.5MPa
Cycle mid-point:
Cavity strain : 2.026%
Total stress : 2289kPa
Size of cycle :
Shear strain : 0.322%
Total stress : 424kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
2,750
2,700
2,650
2,600
2,550
2,500
2,450
2,400
2,350
2,300
2,250
2,200
2,150
2,100
2,050
2,000
Radial Displacement (mm)
0.83
0.84
0.85
0.86
0.87
0.88
0.89
0.9
0.91
0.92
0.93
0.94
0.95
0.96
0.97
0.98
0.99

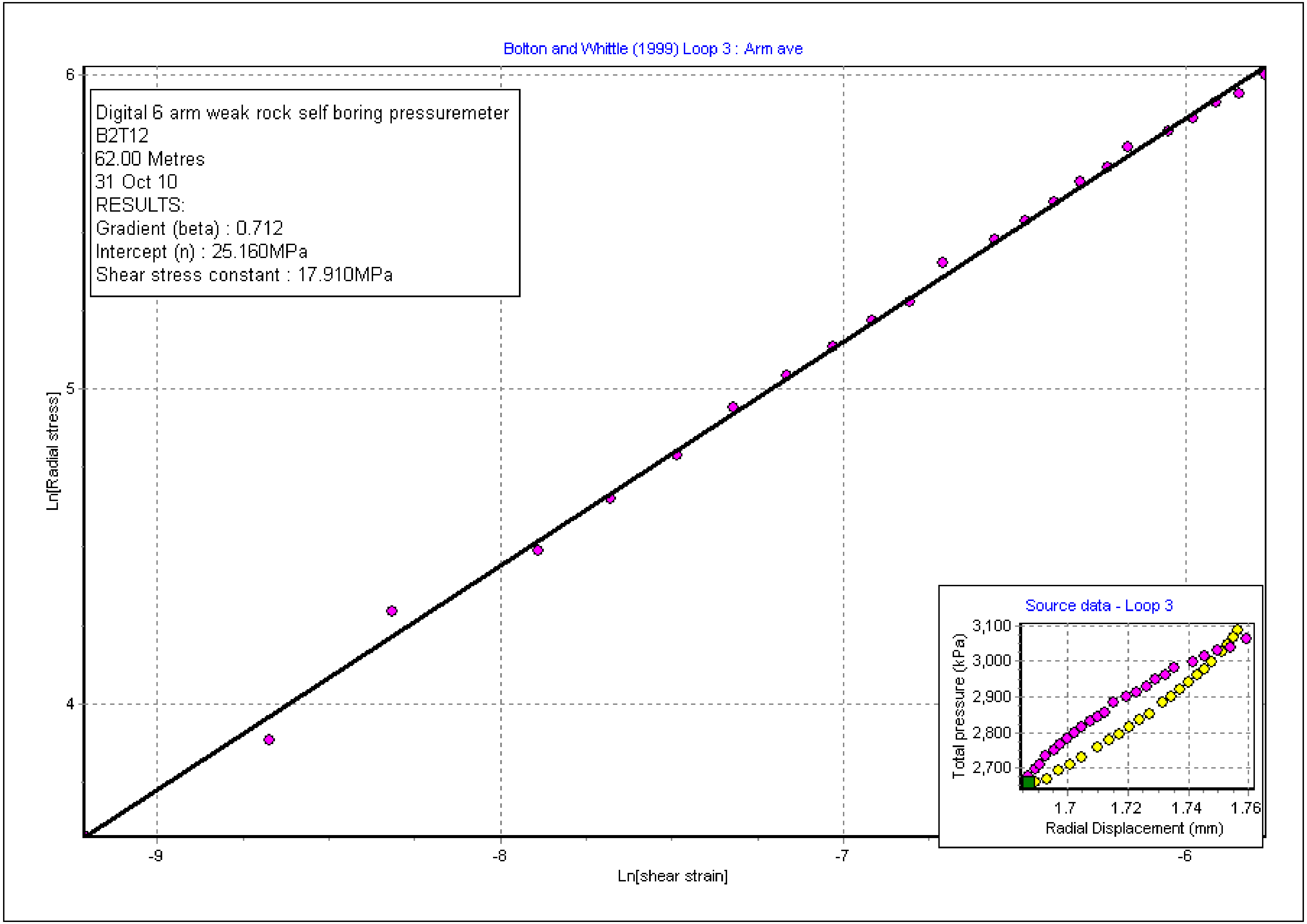

Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 136.8MPa
Cycle mid-point:
Cavity strain : 3.857%
Total stress : 2854kPa
Size of cycle :
Shear strain : 0.281%
Total stress : 385kPa
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
3,260
3,240
3,220
3,200
3,180
3,160
3,140
3,120
3,100
3,080
3,060
3,040
3,020
3,000
2,980
2,960
2,940
2,920
2,900
2,880
2,860
2,840
2,820
2,800
2,780
2,760
2,740
2,720
2,700
2,680
2,660
2,640
2,620
2,600
1.67
1.68
1.69
1.7
1.71
1.72
1.73
1.74
1.75
1.76
1.77
1.78
1.79
1.8

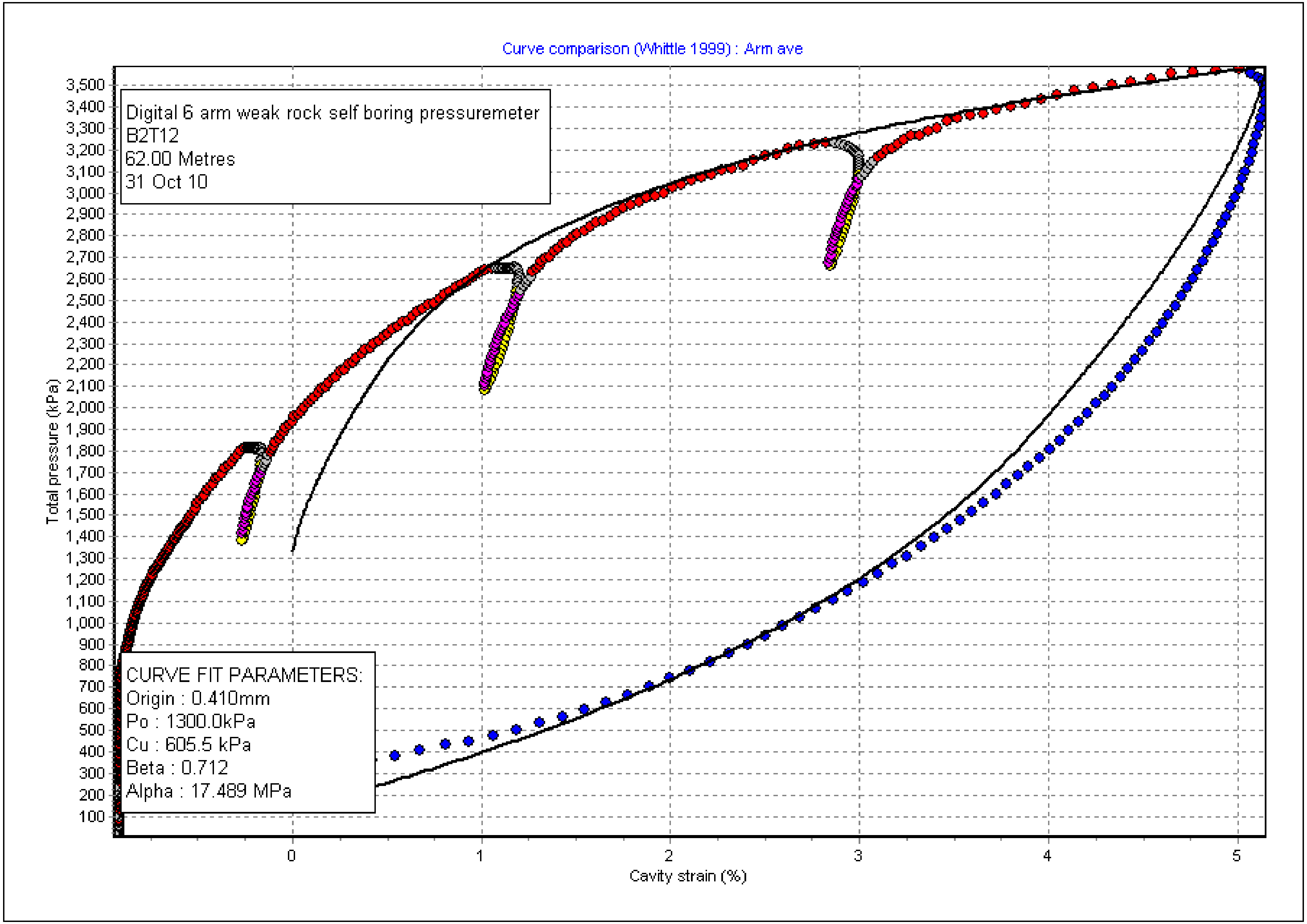


Bolton and Whittle (1999) Loop 1 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
RESULTS:
Gradient (beta) : 0.613
Intercept (n) : 14.545MPa
Shear stress constant : 8.912MPa
Ln[Radial stress]
5
4
-9
-8
-7
Ln[shear strain]
Source data - Loop 1
Total pressure (kPa)
1,700
1,650
1,600
1,550
1,500
1,450
1,400
0.3
0.31
0.32
0.33
Radial Displacement (mm)



Bolton and Whittle (1999) Loop 2 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
RESULTS:
Gradient (beta) : 0.698
Intercept (n) : 22.658MPa
Shear stress constant : 15.825MPa
Ln[Radial stress]
6
5
4
-9
-8
-7
-6
Ln[shear strain]
Source data - Loop 2
Total pressure (kPa)
2,500
2,400
2,300
2,200
2,100
0.88
0.9
0.92
0.94
Radial Displacement (mm)


Bolton and Whittle (1999) Loop 3 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
RESULTS:
Gradient (beta) : 0.712
Intercept (n) : 25.160MPa
Shear stress constant : 17.910MPa
Ln[Radial stress]
6
5
4
-9
-8
-7
-6
Ln[shear strain]
Source data - Loop 3
Total pressure (kPa)
3,100
3,000
2,900
2,800
2,700
1.7
1.72
1.74
1.76
Radial Displacement (mm)


Curve comparison (Whittle 1999) : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B2T12
62.00 Metres
31 Oct 10
CURVE FIT PARAMETERS:
Origin : 0.410mm
Po : 1300.0kPa
Cu : 605.5 kPa
Beta : 0.712
Alpha : 17.489 MPa
Total pressure (kPa)
Cavity strain (%)

B1T3 - SUMMARY OF RESULTS
[File made with WinSitu Version 1.4.1.1]

[DETAILS OF TEST]

Project	:	M1002-11
Site	:	Sizewell
Borehole	:	SBP2009_1
Test name	:	B1T3
Test date	:	7 Oct 10
Test depth	:	19.20 Metres
Water table	:	Metres
Ambient PWP	:	200.0 kPa
Material	:	Sand
Probe	:	Digital 6 arm weak rock self boring pressuremeter
Diameter	:	89.0 mm

Data analysed using average arm displacement curve

Analysed by on 1 Apr 11

Remarks:

[RESULTS FOR CAVITY REFERENCE PRESSURE]

Strain Origin (mm)	:	"Arm ave=1.765"
Po from Marsland & Randolph (kPa)	:	"Arm ave=742.1"
Po from Mohr-Coulomb yield (kPa)	:	"Arm ave=1272.8"
Best estimate of Po (kPa)	:	"Arm ave=740.0"

[UNDRAINED STRENGTH PARAMETERS]

Undrained yield stress (kPa)	:	"Arm ave=1766.2"
Mohr-Coulomb yield stress (kPa)	:	"Arm ave=1765.3"

[DRAINED ANALYSIS OF SANDS - HUGHES et al 1977]

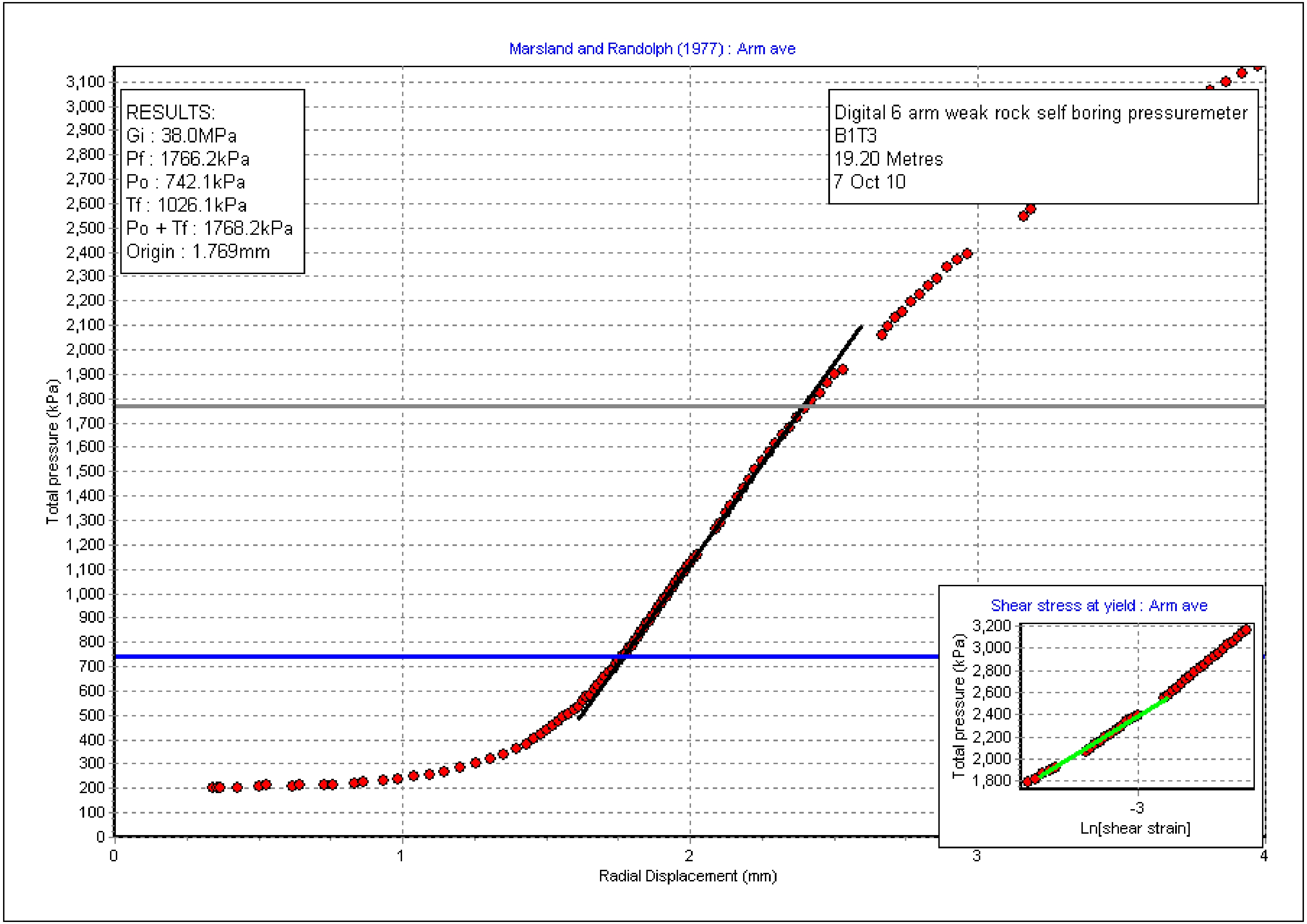
Constant volume friction angle (°)	:	30.0
Angle of internal friction (°)	:	"Arm ave=44.9"
Dilation angle (°)	:	"Arm ave=18.5"
Gradient of log-log plot	:	"Arm ave=0.545"

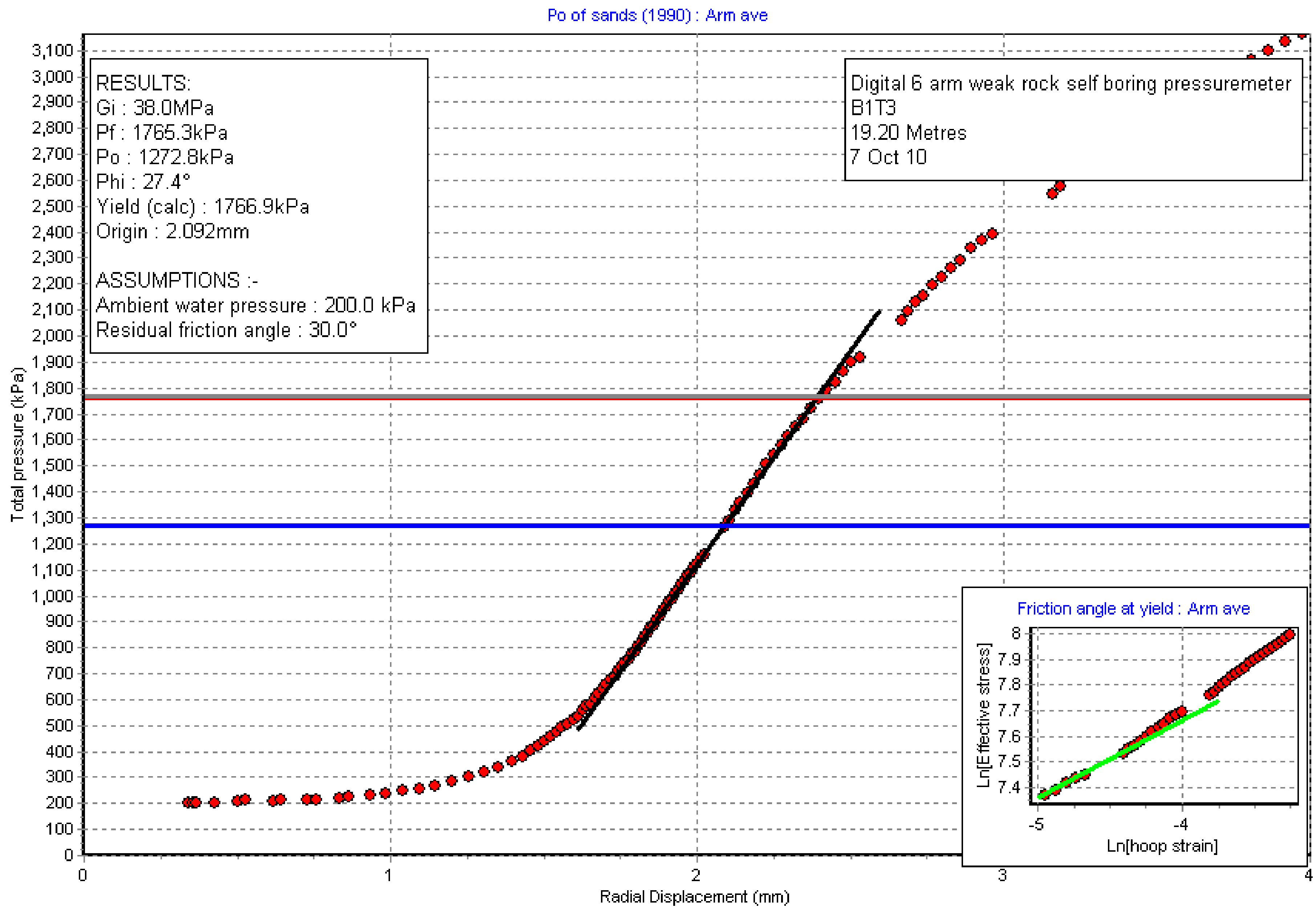
[LINEAR INTERPRETATION OF SHEAR MODULUS G]
Initial slope shear modulus (MPa) :"Arm ave=38.0"

Axis	Loop No	Value (MPa)	Mean Strain (%)	Mean Pc (kPa)	dE (%)	dPc (kPa)
Arm ave	1	257.8	0.596	973	0.103	266
Arm ave	2	308.1	1.753	1586	0.150	462
Arm ave	3	310.0	2.707	1913	0.183	567

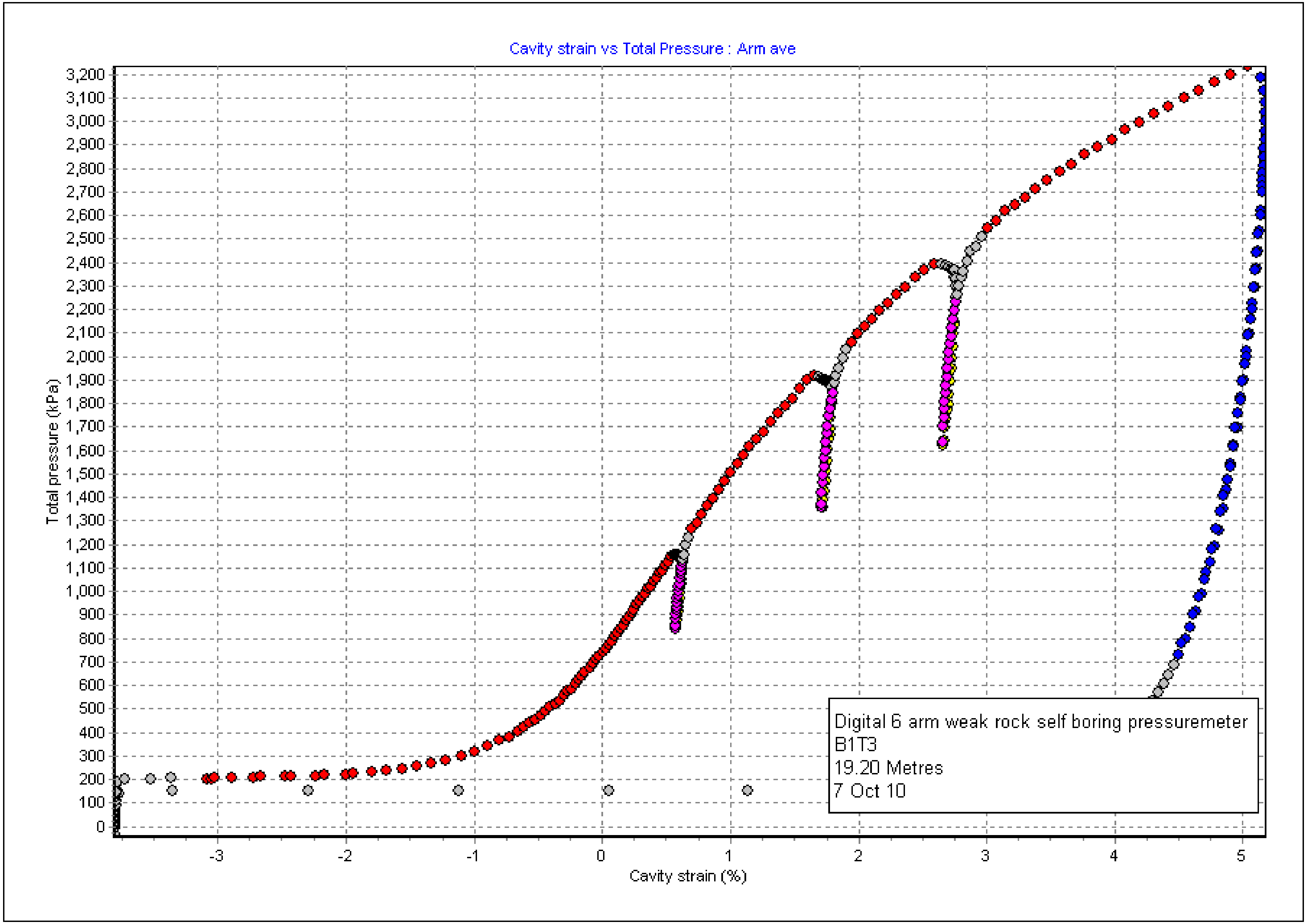
[DRAINED NON LINEAR INTERPRETATION OF SECANT SHEAR MODULUS]

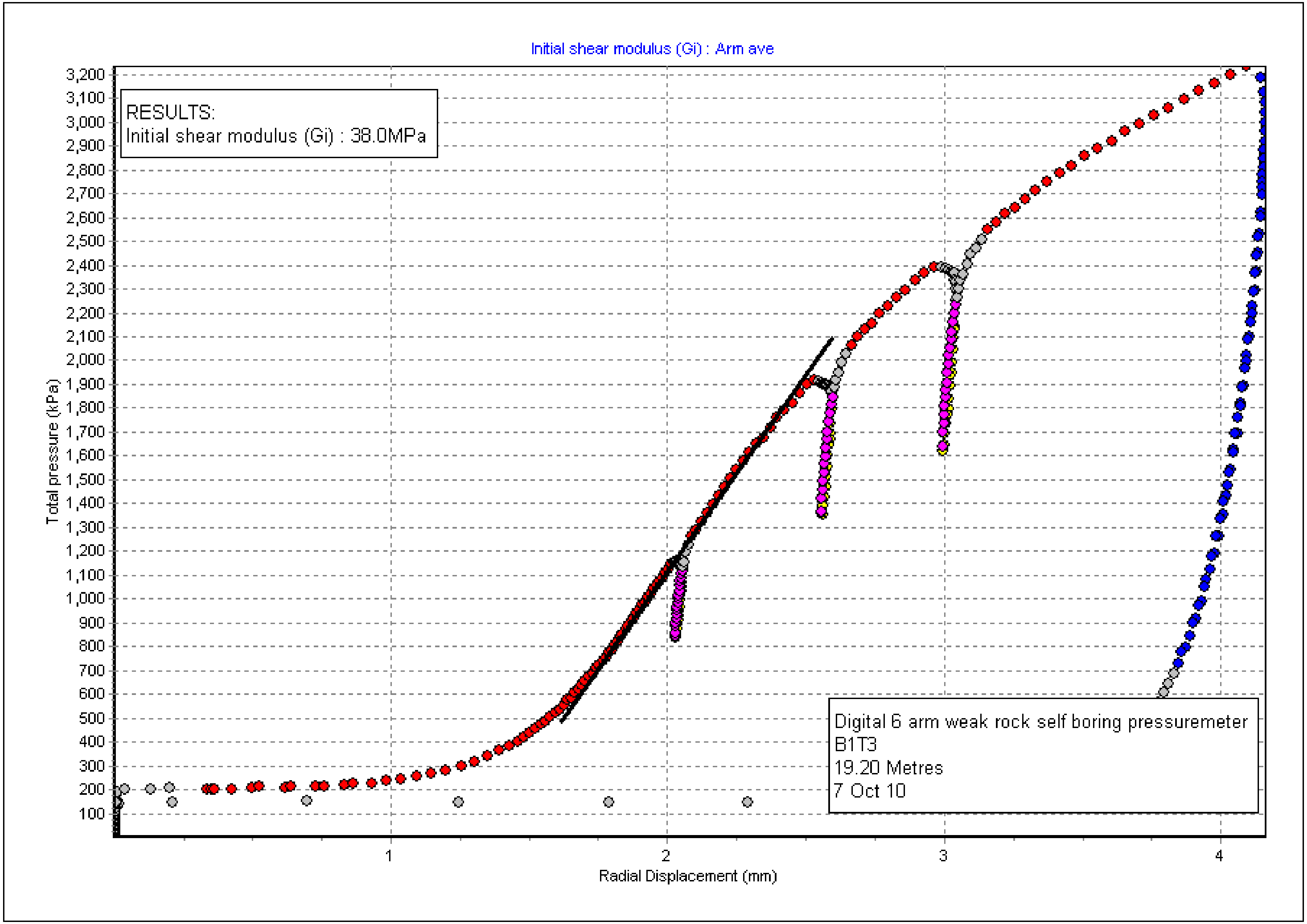
Axis	Loop No	Constant (MPa)	Gradient
Arm ave	1	38.175	0.773
Arm ave	2	30.634	0.716
Arm ave	3	47.638	0.757


Marsland and Randolph (1977) : Arm ave
RESULTS:
Gi : 38.0MPa
Pf : 1766.2kPa
Po : 742.1kPa
Tf : 1026.1kPa
Po + Tf : 1768.2kPa
Origin : 1.769mm
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
Shear stress at yield : Arm ave
Total pressure (kPa)
Ln[shear strain]

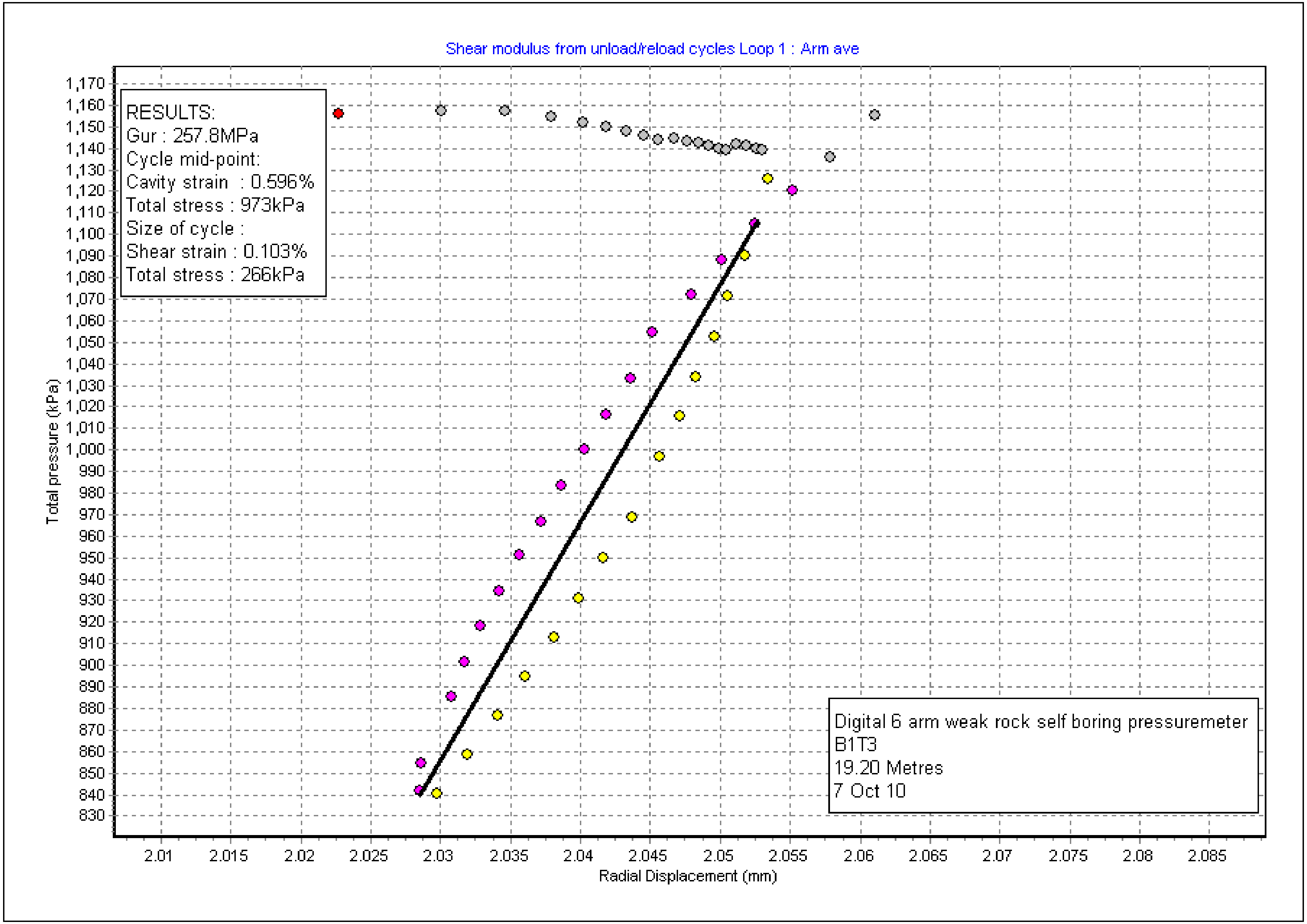


Po of sands (1990) : Arm ave
RESULTS:
Gi : 38.0MPa
Pf : 1765.3kPa
Po : 1272.8kPa
Phi : 27.4°
Yield (calc) : 1766.9kPa
Origin : 2.092mm
ASSUMPTIONS :-
Ambient water pressure : 200.0 kPa
Residual friction angle : 30.0°
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
Friction angle at yield : Arm ave
Ln[Effective stress]
Ln[hoop strain]

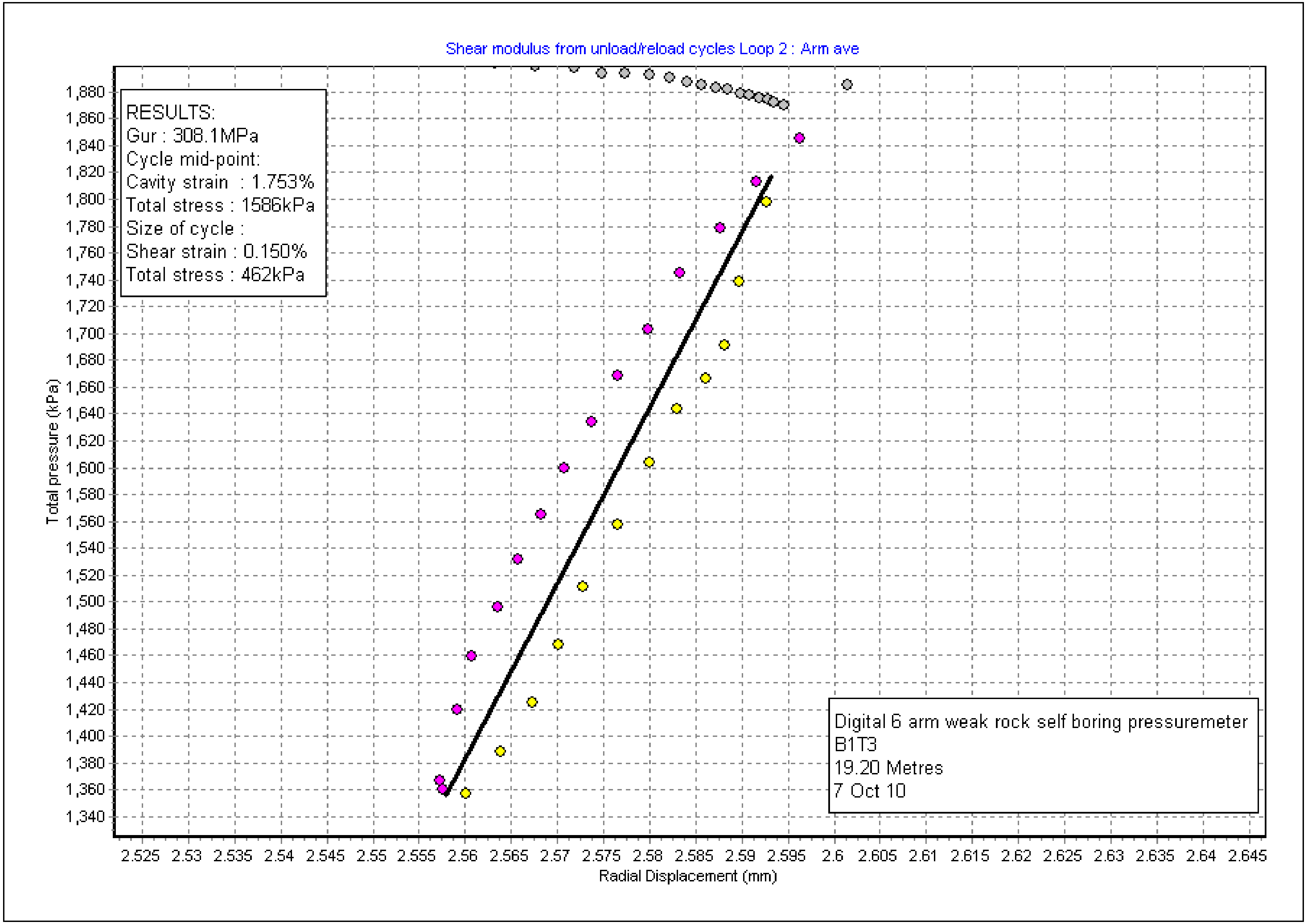

Cavity strain vs Total Pressure : Arm ave
Total pressure (kPa)
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
-3
-2
-1
0
1
2
3
4
5
Cavity strain (%)
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10

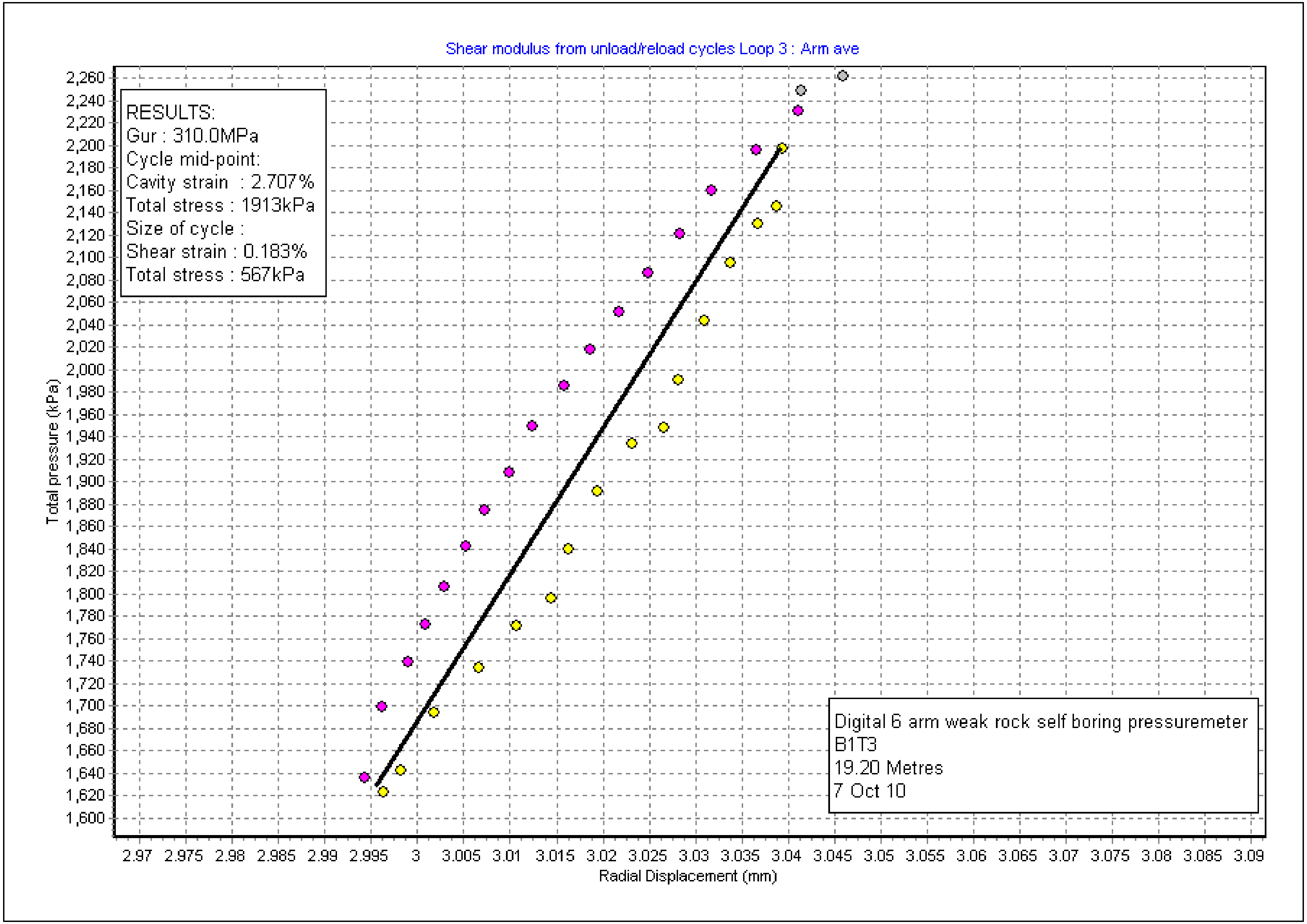


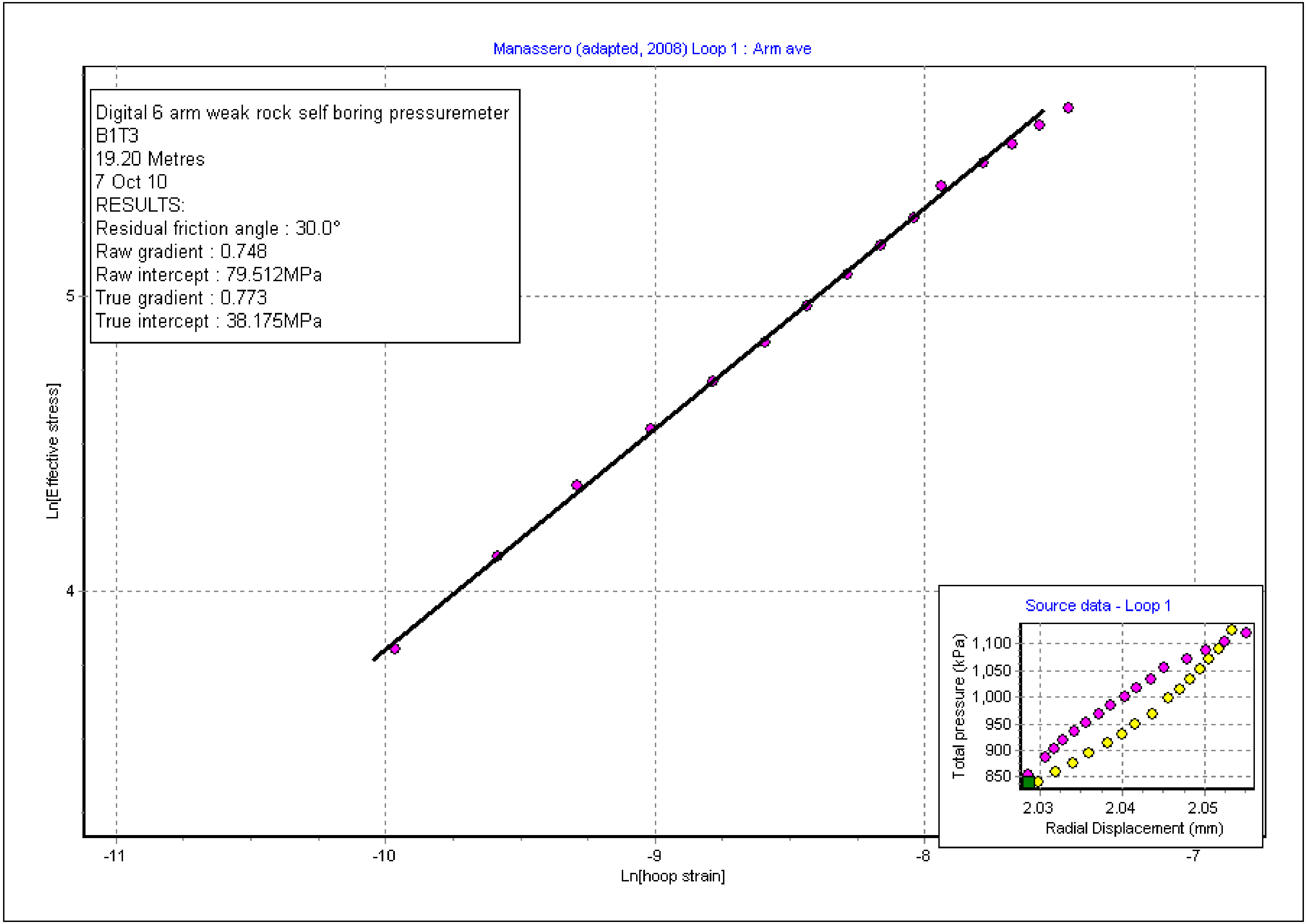
Initial shear modulus (Gi) : Arm ave
RESULTS:
Initial shear modulus (Gi) : 38.0MPa
Total pressure (kPa)
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
1
2
3
4
Radial Displacement (mm)
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10

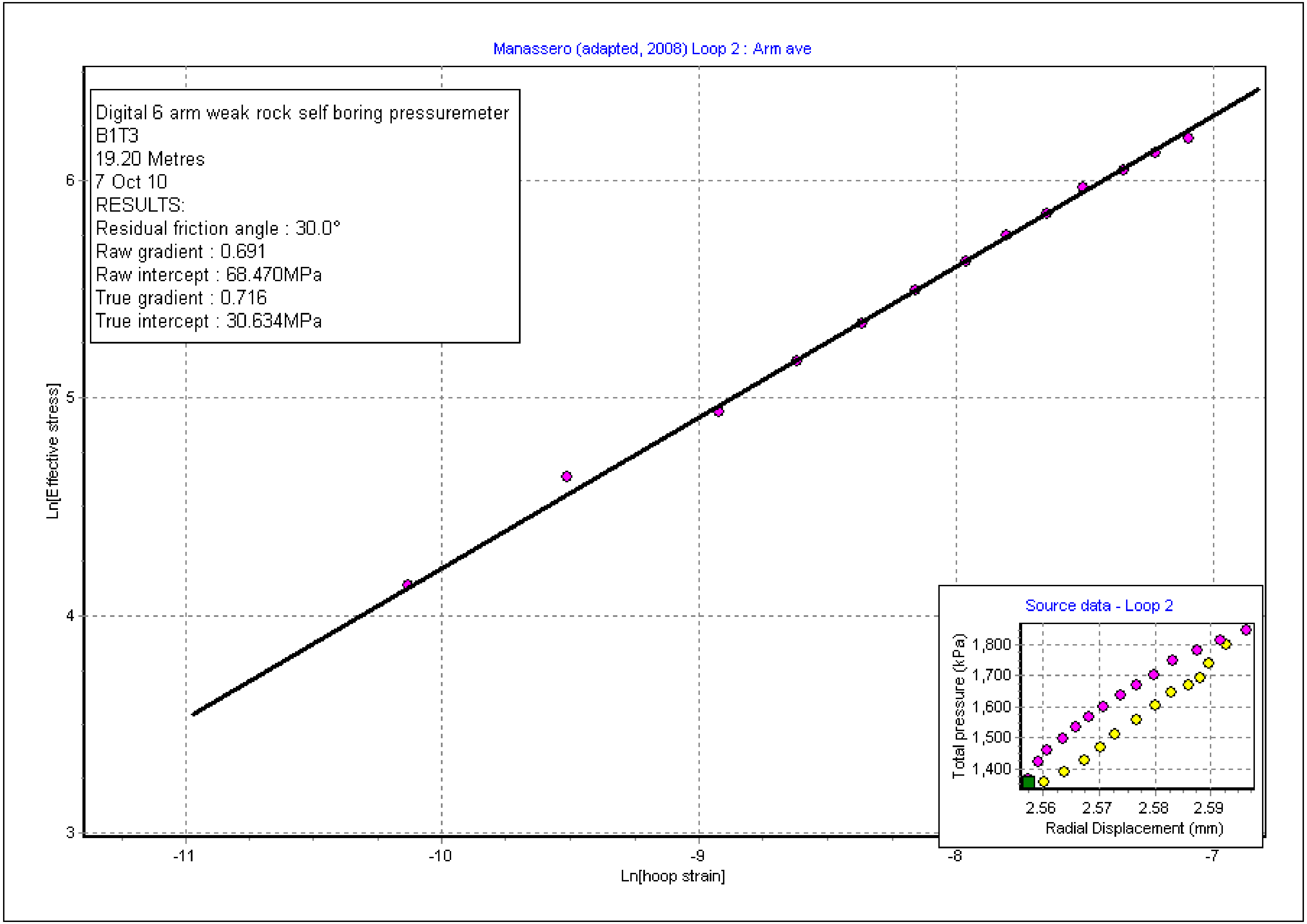


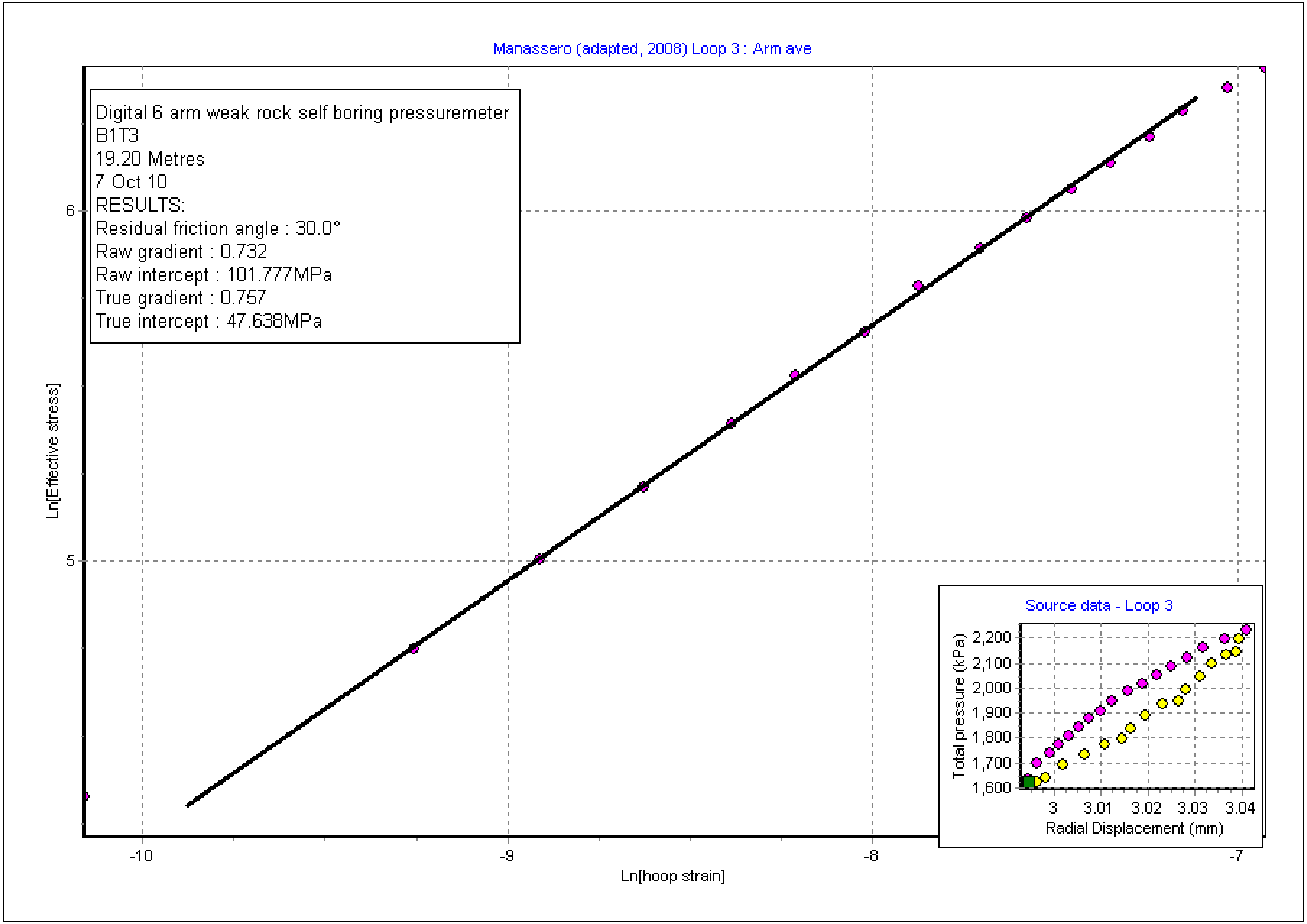
Shear modulus from unload/reload cycles Loop 1 : Arm ave
RESULTS:
Gur : 257.8MPa
Cycle mid-point:
Cavity strain : 0.596%
Total stress : 973kPa
Size of cycle :
Shear strain : 0.103%
Total stress : 266kPa
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Total pressure (kPa)
Radial Displacement (mm)
1,170
1,160
1,150
1,140
1,130
1,120
1,110
1,100
1,090
1,080
1,070
1,060
1,050
1,040
1,030
1,020
1,010
1,000
990
980
970
960
950
940
930
920
910
900
890
880
870
860
850
840
830
2.01
2.015
2.02
2.025
2.03
2.035
2.04
2.045
2.05
2.055
2.06
2.065
2.07
2.075
2.08
2.085

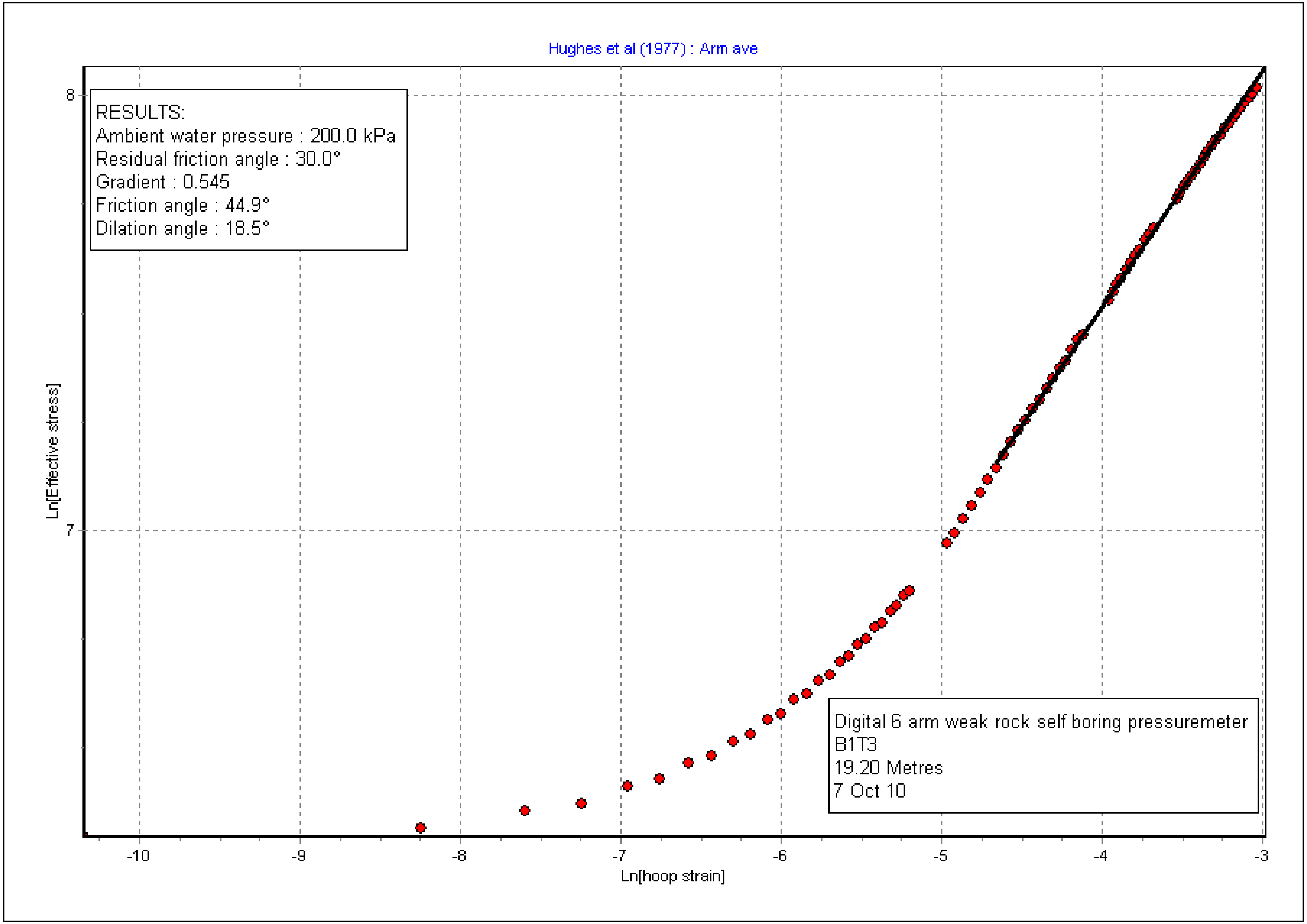

Shear modulus from unload/reload cycles Loop 2 : Arm ave
RESULTS:
Gur : 308.1MPa
Cycle mid-point:
Cavity strain : 1.753%
Total stress : 1586kPa
Size of cycle :
Shear strain : 0.150%
Total stress : 462kPa
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Total pressure (kPa)
1,880
1,860
1,840
1,820
1,800
1,780
1,760
1,740
1,720
1,700
1,680
1,660
1,640
1,620
1,600
1,580
1,560
1,540
1,520
1,500
1,480
1,460
1,440
1,420
1,400
1,380
1,360
1,340
2.525
2.53
2.535
2.54
2.545
2.55
2.555
2.56
2.565
2.57
2.575
2.58
2.585
2.59
2.595
2.6
2.605
2.61
2.615
2.62
2.625
2.63
2.635
2.64
2.645
Radial Displacement (mm)


Shear modulus from unload/reload cycles Loop 3 : Arm ave
RESULTS:
Gur : 310.0MPa
Cycle mid-point:
Cavity strain : 2.707%
Total stress : 1913kPa
Size of cycle :
Shear strain : 0.183%
Total stress : 567kPa
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Total pressure (kPa)
2,260
2,240
2,220
2,200
2,180
2,160
2,140
2,120
2,100
2,080
2,060
2,040
2,020
2,000
1,980
1,960
1,940
1,920
1,900
1,880
1,860
1,840
1,820
1,800
1,780
1,760
1,740
1,720
1,700
1,680
1,660
1,640
1,620
1,600
Radial Displacement (mm)
2.97
2.975
2.98
2.985
2.99
2.995
3
3.005
3.01
3.015
3.02
3.025
3.03
3.035
3.04
3.045
3.05
3.055
3.06
3.065
3.07
3.075
3.08
3.085
3.09


Manassero (adapted, 2008) Loop 1 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
RESULTS:
Residual friction angle : 30.0°
Raw gradient : 0.748
Raw intercept : 79.512MPa
True gradient : 0.773
True intercept : 38.175MPa
Ln[Effective stress]
5
4
-11
-10
-9
-8
-7
Ln[hoop strain]
Source data - Loop 1
Total pressure (kPa)
1,100
1,050
1,000
950
900
850
2.03
2.04
2.05
Radial Displacement (mm)


Manassero (adapted, 2008) Loop 2 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
RESULTS:
Residual friction angle : 30.0°
Raw gradient : 0.691
Raw intercept : 68.470MPa
True gradient : 0.716
True intercept : 30.634MPa
Ln[Effective stress]
6
5
4
3
-11
-10
-9
-8
-7
Ln[hoop strain]
Source data - Loop 2
Total pressure (kPa)
1,800
1,700
1,600
1,500
1,400
2.56
2.57
2.58
2.59
Radial Displacement (mm)


Manassero (adapted, 2008) Loop 3 : Arm ave
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
RESULTS:
Residual friction angle : 30.0°
Raw gradient : 0.732
Raw intercept : 101.777MPa
True gradient : 0.757
True intercept : 47.638MPa
Ln[Effective stress]
6
5
-10
-9
-8
-7
Ln[hoop strain]
Source data - Loop 3
Total pressure (kPa)
2,200
2,100
2,000
1,900
1,800
1,700
1,600
3
3.01
3.02
3.03
3.04
Radial Displacement (mm)


Hughes et al (1977) : Arm ave
RESULTS:
Ambient water pressure : 200.0 kPa
Residual friction angle : 30.0°
Gradient : 0.545
Friction angle : 44.9°
Dilation angle : 18.5°
Digital 6 arm weak rock self boring pressuremeter
B1T3
19.20 Metres
7 Oct 10
Ln[Effective stress]
Ln[hoop strain]
8
7
-10
-9
-8
-7
-6
-5
-4
-3